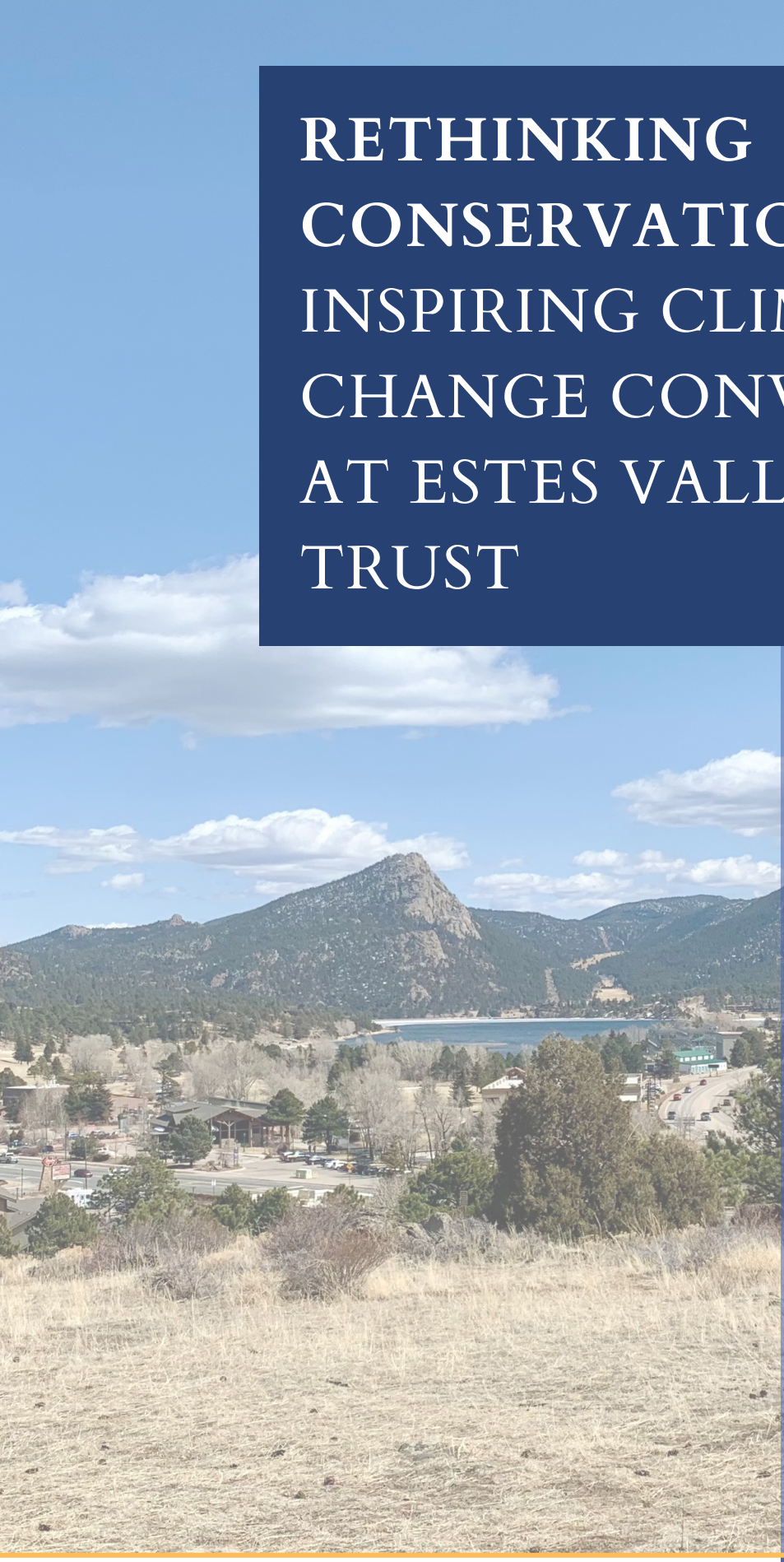

RETHINKING CONSERVATION: INSPIRING CLIMATE CHANGE CONVERSATIONS AT ESTES VALLEY LAND TRUST

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Submitted to:
Jeffrey Boring
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WORCESTER POLYTECHNIC INSTITUTE

May 4, 2022

Rethinking Conservation:

Inspiring Climate Change Conversations at Estes Valley Land Trust

An Interactive Qualifying Project
submitted to the Faculty of
WORCESTER POLYTECHNIC INSTITUTE
in partial fulfilment of the requirements for the
degree of Bachelor of Science

by
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Date:
May 4th, 2022

Report Submitted to:

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Abstract

The Estes Valley Land Trust (EVLT) conserves land across Estes Valley, Colorado. Questions about land management practices have surfaced due to drought and other climate change indicators. Our project facilitated conversations about land management between landowners and also produced media content to spread awareness about these practices. Through interviews and recordings, we created content that tells the stories of landowners and their views on land management, which can be used to broadcast EVLT's mission in a time of climate change.

Acknowledgments

We would like to thank everyone who supported and led us to success throughout this project. First, we would like to thank our advisors Professor Leslie Dodson and Ingrid Shockey for their continued guidance and mentorship throughout this semester. Next, we would like to thank Estes Valley Land Trust (EVLT), our sponsor, for allowing us to conduct this project on such short notice. We would like to especially express our gratitude towards Jeffrey Boring, the Executive Director of EVLT, and Joanna Maggetti, Business Manager of EVLT, for providing us with resources such as contacts, legal documents, insight, and feedback. Furthermore, we would like to thank all of our interviewees, including climate expert Jeff Lukas, EVLT landowners, and EVLT's Board of Directors. We highly enjoyed the connections formed and the valuable information we obtained about conservation easements and climate change. Finally, we would like to thank the town of Estes Park, the YMCA of the Rockies, and Worcester Polytechnic Institute for providing us with the opportunity to work with people across the nation.

Authorship

Section	Author	Editor
Abstract	Nupur Shukla	Sarah Hull
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Conclusion	Sarah Hull	Jade Veth

Meet the Team

MARK BIBIU

Hi! My name is Mark Bibiu and I'm originally from Mombasa, Kenya. I am a Mechanical Engineering major at Worcester Polytechnic Institute pursuing a minor in Economics and a Master's in Management Operations and Supply Chain Analytics. It has been an unreal experience being able to work with people toward a great cause here in Estes Park, Colorado. I'm grateful to have experienced such a different culture and truly be fully immersed. Colorado has been an amazing journey from the 80 mph wind gusts to the 10,000 ft elevation hikes. To be a part of a WPI team with such great dynamic and impressive collaborative skills made it all the better. Through all the core memories that have been created and the on-site experience, I just know this trip will shape everything I do going forward.

SARAH HULL

Hi, my name is Sarah Hull and I am from Long Island, New York. I am a Junior at Worcester Polytechnic Institute and I study Environmental Engineering with a minor in Sustainable Development. At college, I am in Greek life and on the sailing team. In Colorado, I have had a lot of fun skiing, painting, and seeing the beautiful mountains.

NUPUR SHUKLA

Hi, my name is Nupur Shukla, and I am originally from Bihar, India, but I now reside in Sharon, Massachusetts. I am a Computer Science major with a double minor in Robotics Engineering and Data Science at WPI. My IQP experience in Estes Park has been incredible! Through my fieldwork and interviews, I got the opportunity to meet dedicated landowners and passionate environmentalists. I was inspired by their drive to achieve their goals. I am grateful for this opportunity, and I cannot wait to use the soft skills I have developed in my future endeavors.

JADE VETH

Hi, my name is Jade Veth, and I am majoring in Mechanical Engineering for my undergraduate degree and Management for my graduate degree. I grew up in Sharon, Massachusetts, and now live in Boston. It has been quite the experience coming out here to Estes Park. I have been fortunate enough to explore the extraordinary landscape and get to know the amazing residents through interviews and site visits. Getting to see undeveloped land that others may not get the chance to ever see because of conservation easements, has been incredible. I know that this IQP experience has given me great opportunities to grow personally and professionally.

RYAN WEEKS

Hi! My name is Ryan Weeks, and I'm originally from Palm Beach Gardens, Florida, and now live in Catonsville, Maryland. Currently, I am a junior majoring in Aerospace Engineering and minoring in Astrophysics at WPI. I have loved the opportunity to be exposed to a change in scenery in Estes Park, Colorado. The mountains are beautiful and the friendliness of the people is definitely much more than I have experienced on the East Coast.

EXECUTIVE SUMMARY

Background

Land trusts are important organizations that work with landowners to preserve natural landscapes for generations to come. They accomplish this through the use of conservation easements, which are permanent but voluntary legal contracts that prohibit a parcel of land from being developed. The Land trust movement around the United States is trying to become more aware of climate change and is taking a stronger role in mitigation. This project focuses on Estes Valley Land Trust (EVLT), a land trust in Estes Park, Colorado, which has preserved nearly 10,000 acres of land since 1987. EVLT is joining these efforts through facilitated conversations with landowners about land management practices, learning more about climate change, and implementing their Estes Valley Open Space Plan.

Although climate change is a global concern, mitigation practices are still not commonly found in a conservation easement. However, in Estes Park, there has been an increase in the frequency and severity of wildfires, and temperatures in the region have risen by 3.4 °F over the last century (NPS, 2018). Although that temperature difference seems minuscule, it has led to short, mild winters and hotter summers, affecting the local landscapes and wildlife. In particular, threats of pine beetle outbreaks, invasive species, low moisture for wildlife, and habitat loss is intensified by this change. The goal of this project is to facilitate conversations with landowners about climate change that support the Estes Valley Land Trust's conservation strategies and mission. To accomplish this goal, we identified three objectives: 1. understand climate change in Estes Park, 2. identify current conservation management strategies, and 3. develop content about the viewpoints of current landowners.

Approach

Our approach considered site conditions, local perspectives, and content development. To understand general weather pattern change in Estes Park, we researched snowfall, precipitation, and daily temperature data in Estes Park since 2002. We spoke to a sample of local residents in formal and informal interviews and conducted a focus group of EVLT's Board of Directors. Our discussions focused on the impact on landowners of more frequent occurrences of natural disasters, such as wildfires and floods.

In a series of interviews with landowners whose land is in a conservation easement with EVLT, we asked questions regarding land management strategies. We captured these

interviews on camera and audio recording devices. For each landowner interview, our team worked together to curate interview questions based on our subject's occupation, role in EVLT, and age demographic. In our team of five, one person interviewed our subject, while others set up equipment, checked the recording devices, considered the aesthetic aspect of our location, and collected B-roll footage.

Figure A. Team member Nupur Shukla interviewed climate research expert, Jeff Lukas (left). Team member Ryan Weeks capturing B-roll footage (right) (Photos taken by Mark Bibiu and Jade Veth).

Results

Our research into climate change in the Estes Valley revealed that while precipitation levels are increasing in Estes Park, the pattern is changing. Rainfall events are frequently occurring as heavy downpours with floods rather than an evenly distributed rainfall pattern. The average temperature in Estes Park is increasing, along with the instances of extreme hot and cold temperatures.

Our interviews revealed land management practices that landowners use to reduce the risk of natural disasters to themselves and their land. Invasive plant species regulation is required by Larimer County, Colorado, but many landowners also practice wildfire mitigation techniques such as forest thinning, trimming of low tree branches, and controlled burns. The landowners practice these habits to protect themselves but do not always relate these actions to contributions to climate change mitigation in their community. Through our work here, we hope to assist EVLT and member landowners appreciate and expand their strategies — to help themselves and the planet.

EXECUTIVE SUMMARY

Figure B. Mark Bibiu interviewed Katy Withers, a retired geologist who bought land under a conservation easement with EVLT in 2020 (Photo by Jade Veth).

We edited footage from our interviews to compile three types of videos that range from three to five minutes in duration: “Landowner Walk and Talk”, “Climate Conversations”, and “Climate Sound Bites”. As seen in Figure B, Mark Bibiu interviews recent landowner Katy Withers during the sit-down portion of our video series.

To formalize the content development, we included the ELVT logo and gave instructions on how to publish them on the EVLT YouTube page. We determined that YouTube can be an effective distribution platform for the videos because EVLT had an existing page that is accessible to all members of the community. EVLT can create announcements via their website or send video links to their email alias.

Recommendations

Our findings generated several clear steps for EVLT to follow in order to continue these conversations. First, we recommend that they post our video series across a planned timeline. To maintain the format, we left the interview guide and directions for editing and posting videos so that EVLT can continue to produce and post new content.

Second, we suggest that EVLT play an active role in educating its landowners about land management practices that mitigate climate change. An effective strategy could be to host speakers and guest lectures from climate experts who could interact with landowners and

allow them to learn and ask questions. The landowners we interviewed have a good understanding of fire mitigation techniques, but we only saw one instance of runoff and flood mitigation practices being utilized. Flood mitigation clauses written into conservation easements could better prepare the landowners for severe weather events, which are increasing in both frequency and severity.

Our third recommendation concerns orientation for new landowners. Two landowners we interviewed purchased land that was already under a conservation easement, which is a fairly common occurrence. New owners may not know how to abide by their conservation easement, so a new landowner orientation would benefit them greatly. This orientation could consist of Board members, and long-time landowners answering questions and showing new owners how to protect themselves and their land.

Finally, our team had the opportunity to attend the very first film festival hosted by Estes Valley Land Trust, titled Student Nature Film Festival with the theme of nature, which sponsored three scholarships for Estes Park High School students. This was a brand-new program of EVLT with opportunities to expand and improve the outreach. For example, hosting at an earlier time, designing a longer promotion period, and offering a specific prompt are some suggestions. The idea would be to generate a lot of interest and widespread participation.

Conclusion

Sitting on the Front Range that is experiencing critical climate effects, Estes Valley Land Trust has the opportunity to unite the concepts of land management and climate change mitigation for its members and landowners. Engagement in these topics can be the catalyst for minimizing negative impacts in the long term. Through this project, we hoped to plant the seeds to continue conversations with landowners and potential conservation easement donors about climate futures that support the Estes Valley Land Trust's conservation strategies and mission.

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I. Transforming Landscapes Through Conservation Easements

As of 2020, 56 million acres of land in the United States have been conserved by Land Trust Alliance accredited land trusts (Land Trust Alliance, 2020). To put that into perspective, that area is slightly smaller than the United Kingdom, which is roughly 60 million acres (59,926,400). The Land Trust Alliance is a national land conservation organization that represents land trusts throughout the United States, all of which are committed to excellence and permanent conservation (Land Trust Alliance, 2020). Though land trusts may be unfamiliar to ordinary citizens, the Land Trust Accreditation Commission, an independent program of the Land Trust Alliance (2021) recently noted that "as of July 2021, there are 453 accredited land trusts in 46 U.S. states and territories."

What, then, is a land trust? When we asked residents and visitors of Estes Park, Colorado, most struggled to find an accurate definition and many were completely unfamiliar with the phrase. Many people mistakenly think land trusts are parcels of land. More accurately, however, land trusts are formal organizations that facilitate the development and maintenance of conservation easements, as a way to promote healthy ecosystems or enable other critical land-use strategies. Conservation easements, which are voluntary legal agreements, prevent parcels of land from being developed to preserve elements of the landscape for conservation purposes. In addition, easements provide financial benefits to landowners. Each conservation easement can be tailored to priorities that reflect the interests of property owners and each land trust. Furthermore, in recent years, land trusts are focusing on efforts to mitigate and adapt to the long-term impacts of climate change.

This project focuses on the work of Estes Valley Land Trust (EVLT), a conservation land trust primarily working to limit commercial development and preserve open space, such as natural areas, waterways, meadows, and forests. Estes Valley Land Trust is a non-profit organization on the Front Range of Colorado that has successfully worked with private landowners to preserve almost 10,000 acres of land since 1987. Given the protection and maintenance of land, EVLT wants to play a more active role in addressing climate change in the locality of Estes Park, Colorado. Landowners play a crucial part in the upkeep of land by using various land management strategies; however, these landowners may not realize the positive impact of their efforts concerning climate change.

The effects of climate change in Estes Park, Colorado have been immense. The West is in the midst of a megadrought, and in the last century, the average annual temperature in the area around Estes Valley and Rocky Mountain National Park has risen by 3.4 °F (NPS, 2018). The region now contends with shorter, milder winters, hotter summers, drought, and wildfire

risks, all of which are affecting the regional landscapes and wildlife. Estes Valley is vulnerable to ongoing threats from climate change, making it imperative to develop community climate resilience strategies.

Estes Valley Land Trust's goal is to "protect open space and wildlife habitat to preserve our quality of life" (Estes Valley Land Trust, n.d.). EVLT sees considerable potential for community engagement and action on climate as well as other issues through conservation easements. Creating a vision for community resilience involves rethinking conservation with landowner partners of Estes Valley Land Trust to inspire climate change conversations and its effects on property. Therefore, the goal of this project is to facilitate conversations with landowners and potential conservation easement donors about climate futures that support the Estes Valley Land Trust's conservation strategies and mission. To accomplish this goal, we identified three objectives: 1. understand climate change in Estes Park, 2. identify current conservation management strategies that involve climate change considerations, and 3. develop content about the viewpoints of current landowners to facilitate climate conversations. This work is aimed at helping Estes Valley Land Trust educate and support landowners in their efforts to mitigate climate change.

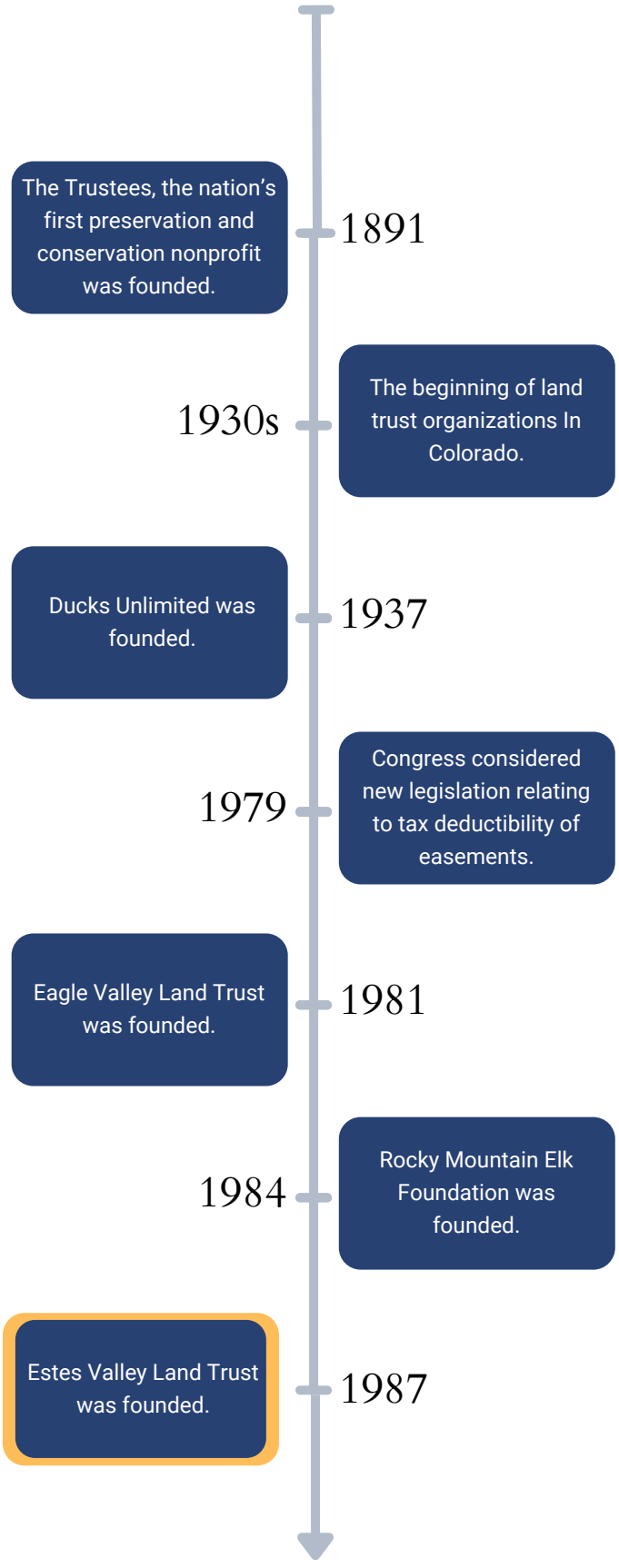
II. The Evolution and Importance of Land Trusts

Land trusts have the potential to better serve strategic climate planning. One way is by educating conservation easement property owners about conservation strategies. In this chapter, we present background on the mission of land trust organizations, including their economic and environmental frameworks, as well as their public engagement approaches. We explore the role of the Estes Valley Land Trust in local futures planning and present the work of other land trusts dedicated to conservation in a time of climate change.

The Evolution of Land Trusts in Colorado

The first land trust organizations in Colorado date back to the 1930s, at a time when land trusts were not perceived as an opportunity for land conservation nor as an economic and environmental benefit (Davis, 2018). Instead, these early land trusts were primarily motivated by financial interests. Typically, a donation to a trust was used as a means to maintain private ownership of land while ensuring that no one else could develop there, to support the preservation of open space for large landmarks, and to reduce property taxes. An additional purpose for a land trust was landowner anonymity. Since landowners are not typically allowed to vote in city-building projects, the land trust's anonymous ownership structure allowed individuals to use it as a way to participate in city-building project voting without being accused of land ownership bias (Boyte-White, 2021). Ownership anonymity also leads to landowner asset protection. Boyte-White states that "[land trusts] can also provide a number of other estate planning benefits and protect assets from judgments or liens" (Boyte-White, 2021). For landowners in the trust, this means that they are protected from having their properties seized by the government or bank. Instead, any property infractions committed by the landowner, such as lack of payments or violation of conservation rules, would be taken up with the trust and not the local government or bank. It was not until decades after the establishment of the first land trusts that the general public saw the potential of land trusts to benefit their local landscapes while protecting the environment (Brewer, 2019).

The Trustees of Reservations, the first national land trusts initiative, was established in 1891. Still, it was not until 1979 that Congress instituted tax benefits for trusts, which increased interest in these types of partnerships between donors and Trustees (The Trustees of Reservations, 2021). Over time, additional benefits such as the establishment of conservation easements in Colorado, tax credit for donors, and other incentives, gave rise to a model of land trusts with different goals (Boyte-White, 2021). Even though land trusts



provided many personal benefits for participants, the primary focus of land trusts has always been environmental. The preservation of wildlife habitats is a sought-after goal that has become the primary focus of many land trusts (The Land Trust Alliance, 2021). In Colorado, for example, habitat preservation has been implemented by the Ducks Unlimited land trust (founded in 1937) along with Rocky Mountain Elk Foundation (founded in 1984) (Ducks Unlimited, n.d., Rocky Mountain Elk Foundation, n.d.). Other organizations such as Eagle Valley Land Trust and Estes Valley Land Trust focus specifically on protecting bodies of water or land from development (Eagle Valley Land Trust, n.d.). Not only do land trusts boost land preservation efforts, but these organizations also allow individuals to advocate for, or address, certain local and state policies regarding personal land conservation efforts. Donating land to a trust can garner support from not only the land trust organization, but also from other landowners who have put their land in the trust.

Land trusts have therefore been a prominent tool in Colorado over the last 40 years to involve community members in a variety of activities about planning and preserving for the future. One way that EVLT does this is by holding tri-annual educational breakfasts to spread awareness about the land trust and topics that pertain to its members. Its latest educational breakfast featured presentations about how wildfire smoke affects the health of communities. In addition, EVLT held its first film festival contest at the local high school. Each participant in the festival was

to create a short film centered around the theme of 'nature.' EVLT did this with the aim of gaining exposure for the organization while allocating a scholarship to the winners of the festival. In doing so, the organization has effectively involved residents of Estes Park that would not otherwise have an affiliation with the trust. These efforts also make themselves known to a younger generation connected through the high school. The land trust increased exposure for the organization, and with 'nature' as the underlying theme throughout all films, they struck a chord within the audience about critical topics that this world faces on a daily basis. Each film highlighted different issues, such as animal extinction, habitat displacement, and the changes in climate, but all played a part in conserving the land of this earth, in sync with the goals of EVLT.

Landowners, Conservation Motives, and Climate Change

Climate experts and environmental scientists stress the critical importance of adapting to the effects of climate change through regional land use. However, the relationship between land management and climate change can be a difficult topic to grasp, and landowners who own large parcels of land may not connect their management efforts to climate adaptation. Therefore, it is important to understand landowner motivations behind donating conservation easements.

In a paper that explores the attitudinal characteristics of landowners in Colorado and Wyoming, author Jennifer Eileen Cross (2011) "found that attitudes toward land trusts and adoption of conservation easements were significantly higher in Colorado than in Wyoming" (p. 82). The attitudes that the author reflects on are not meant as positive or negative. Instead, Cross states that the landowners in Colorado were more likely to donate land into conservation easements than landowners in Wyoming. Among other factors, the author concludes that the tax credit law, which passed in Colorado in 2008 but not in Wyoming, greatly benefits landowners when they donate land into a conservation easement. Specifically, any conservation easements created in 2021 will transfer to a tax credit certificate with 90% of the donated value, capping the certificate at $5 million dollars (Colorado Department of Regulatory Agencies, n.d.). Researcher Adina Merenlender (2004), a professor in the Conservation Department at the University of California Berkeley, argues that this tax reduction benefit "fulfills two needs: showing that something good is being done for the environment and the need to reduce the tax burden" (p. 72). To further the work of land conservation, Merenlender notes it is important to understand landowners' points of view on land management and long-term conservation. Management and conservation goals of land include adaptation to climate change. In order to meet conservation goals

without excessive expense, the landowner must be amenable to conserving their land (Merenlender, 2004). These studies and research papers indicate the scattered motivations (caring about conservation goals, taking advantage of tax breaks, and feeling a sense of responsibility toward their land) of landowners. However, climate change mitigation has not been identified among them.

Climate Change and Land Ownership

Climate change has had a dramatic impact on the West, particularly in the past few decades. The state of Colorado has experienced deadly climate change events such as catastrophic wildfires and megadrought. Additionally, the area has been affected by destructive flash floods, and severe water shortages brought on by drought and unstable weather patterns.

Wildfires have now become one of the main concerns of landowners and land trusts in the West. In 2020, Estes Park experienced one of its worst wildfires. According to the National Park Service (2021), "Approximately, 30,000 acres or 10 percent of Rocky Mountain National Park were impacted by the East Troublesome and Cameron Peak Fires." The East Troublesome fire burned on the Western Slope for 18 miles before jumping to the east side of the Rocky Mountains on October 21 (National Park Service, 2021). Just a day later, "evacuations for the majority of the Estes Valley were implemented" when major winds (up to 50 mph) were forecast to push the fire further east on October 23 and 24 (National Park Service, 2021). This wildfire was noted for its highly irregular behavior that indicated new threats from fires in the region moving forward.

The ongoing megadrought in the west has become the root of many problems in Colorado. In a journal studying the rate of intensification of the southwestern megadrought in North America, author Williams states that "Both 2002 and 2021 were probably drier than any other year in nearly three centuries" (p. 233). After studying rings of old trees and testing soil moisture levels, Williams further concluded that "2000-2021 was the driest 22-yr period since at least 800" (p. 232). Climate scientists recognize that the megadrought in the West continues. Finally, according to the Western Regional Climate Center, the town of Estes Park has been experiencing higher temperatures (Figure 1). Higher temperatures are a major factor in this megadrought and are crucial indicators for landowners to understand the changing climate so that they can make educated decisions to better manage their land.

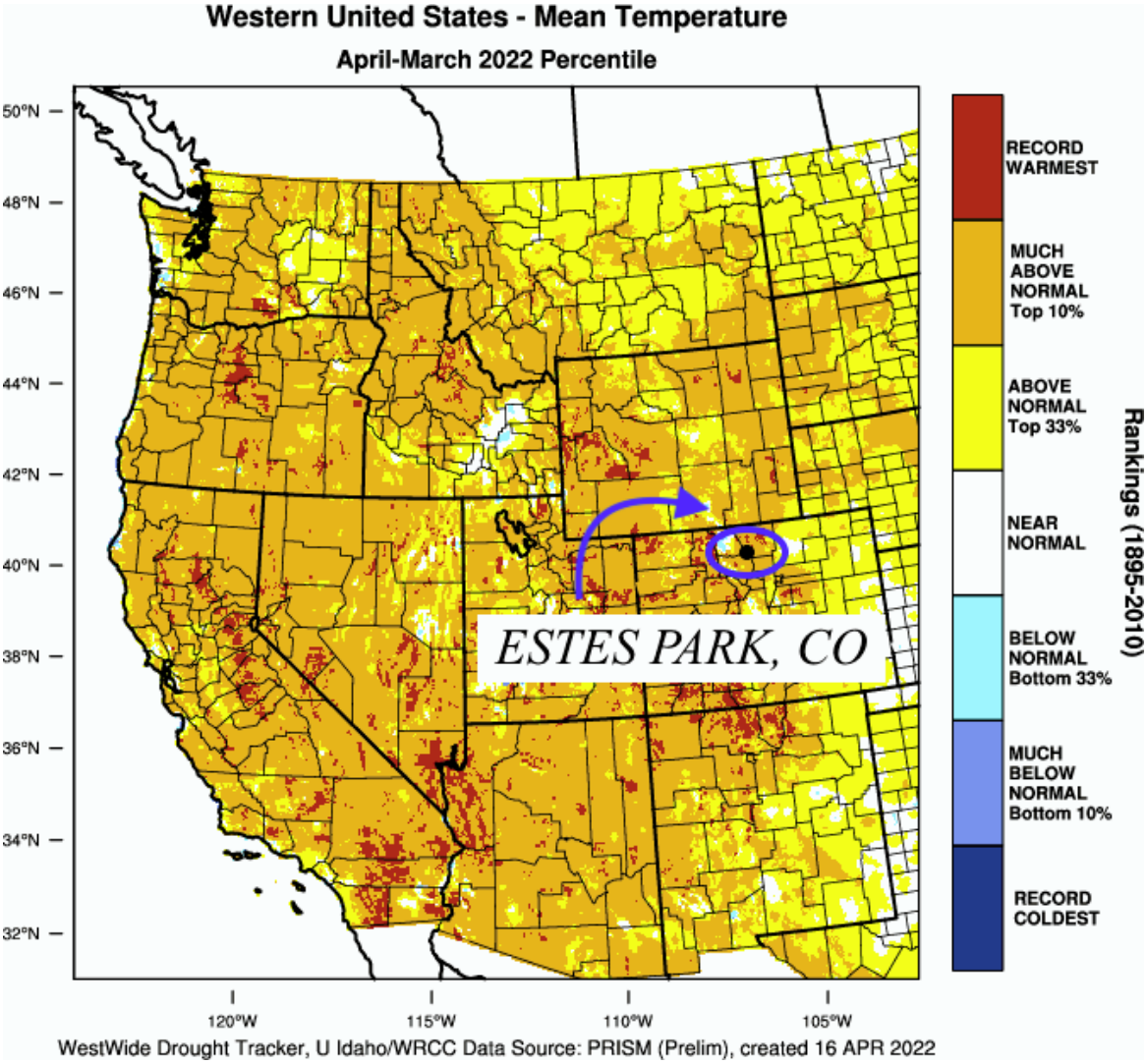


Figure 1. Map showing the average temperature, collected by the Western Regional Climate Center. Estes Park, Colorado is "Above Normal" to "Much Above Normal" (WRCC, April 5, 2022).

Partners and Collaborators for Conservation

In the state of Colorado, 23 active land trusts help to conserve and protect nearly 3-and-half million acres of land (3,456,478 acres) (Land Trust Alliance, n.d.). The areas in conservation are significant across the state (Figures 2, 3, and 4). For all land trusts, including the Estes Valley Land Trust (EVLT), their activities and efforts affect both human and nonhuman entities.

Figure 2. Map of Colorado (Nations Online Project, n.d.).

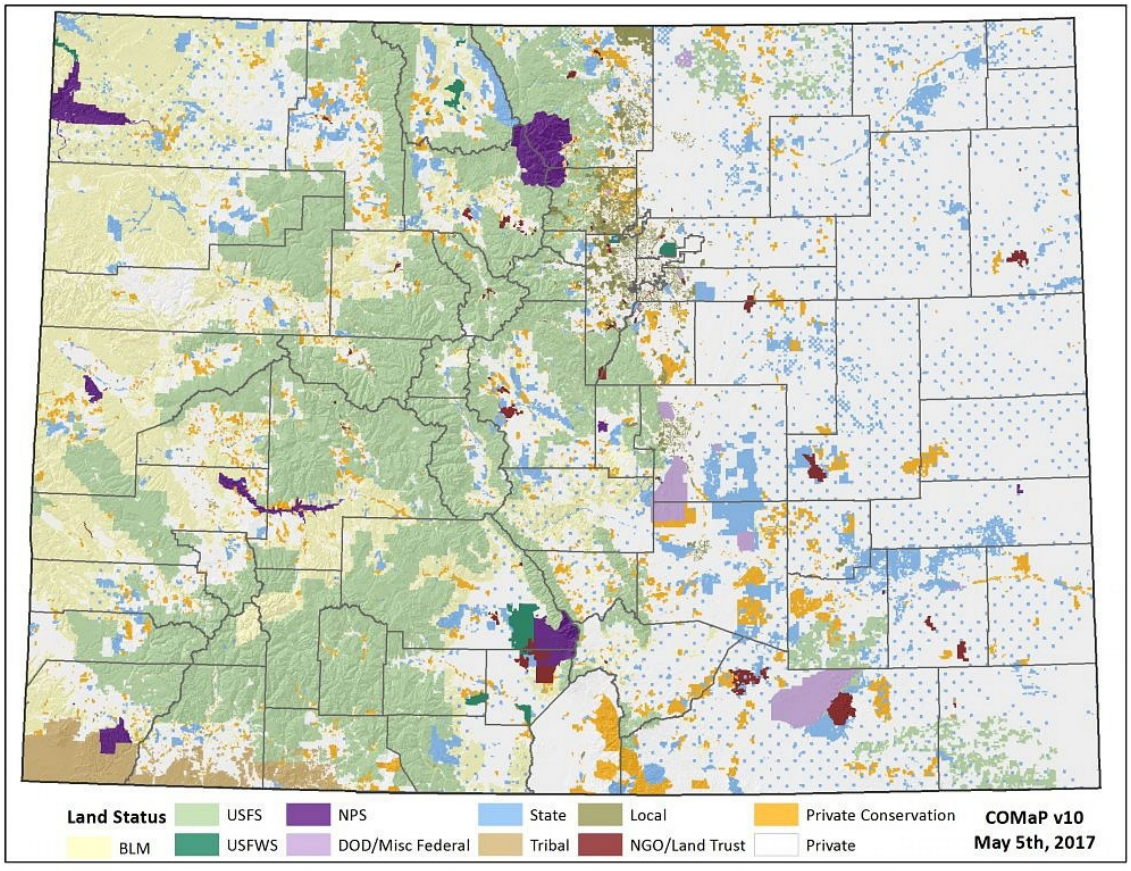


Figure 3. Conserved land in the state of Colorado (Colorado Natural Heritage Program, May 5, 2017).

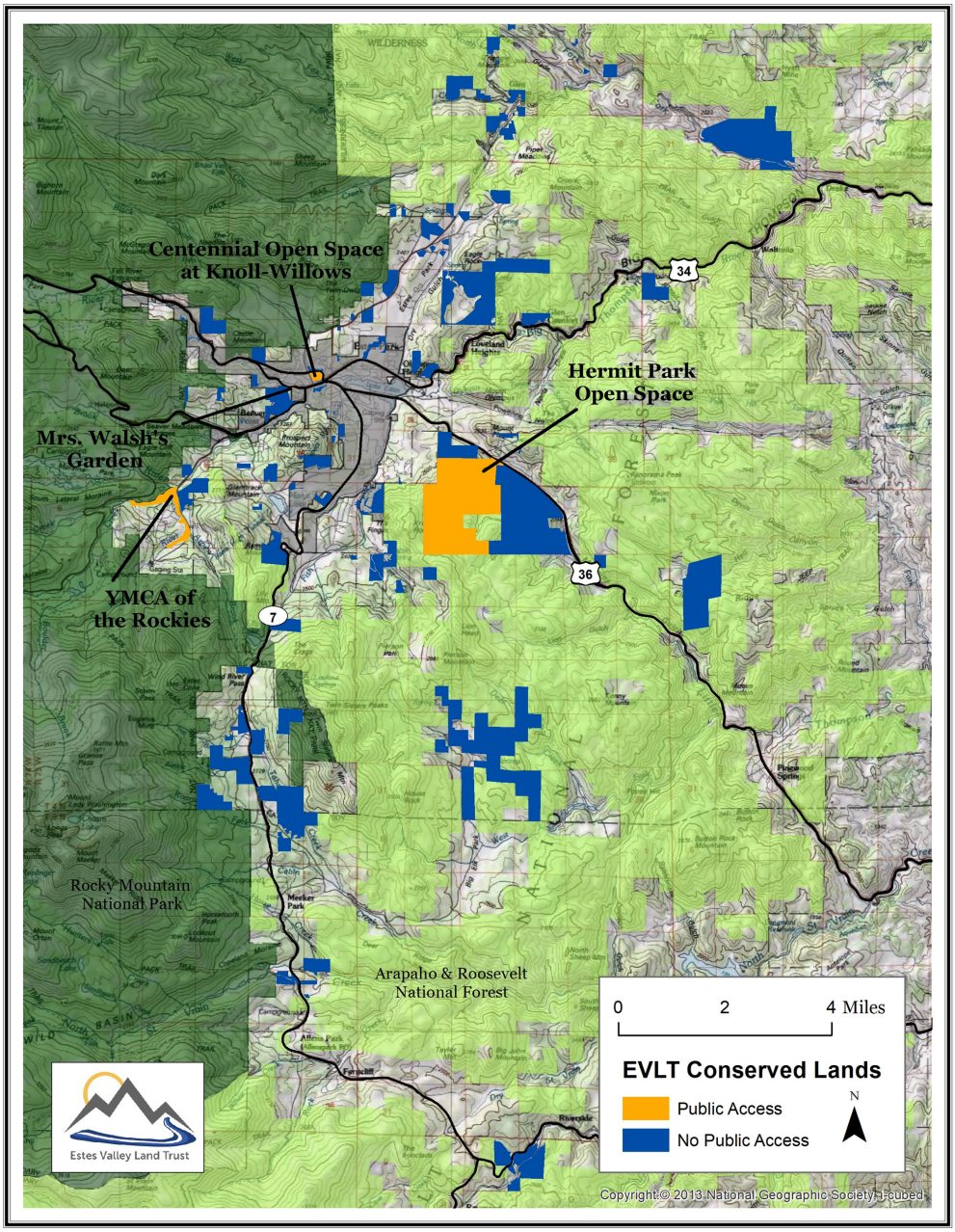


Figure 4. Conserved land by Estes Valley Land Trust (Estes Valley Land Trust, n.d.).

For all land trusts, including the Estes Valley Land Trust (EVLT), their activities and efforts affect both human and nonhuman entities.

The Estes Valley Land Trust

The mission of Estes Valley Land Trust (EVLT) is "to conserve land throughout the Estes Valley and surrounding areas for current and future generations" (Estes Valley Land Trust, n.d.). Founding members Jim Crain, Pieter Hondius, Robert Irvin, Lorna Knowlton, Ralph

Read, Roland Retrum, and Maurice Worley developed their strategic plan to protect the beautiful Estes Valley for future generations to see and enjoy (Estes Valley Land Trust, n.d.). EVLT with a landowner drafts a custom conservation easement that reflects the property owner's rights and beliefs combined with conservation values developed by EVLT that are intended to last forever. Conservation values generally include natural features of the land, such as meadows, forests, and rivers. Once a landowner donates a conservation easement, the land stays in this agreement even if the land is sold. Based on these decisions, conserved land may or may not be open to the public according to the conservation easements' clauses. Furthermore, there are unique regulations that some easements enforce, such as allowing owners to develop a limited number of structures, grow certain crops, maintain hiking trails, or prohibit access. The majority of the 170 of EVLT's conservation easements are on private property and only allow access with the permission of the landowner. In other locations, however, individuals can visit Centennial Open Space at Knoll-Willows, Hermit Park Open Space, Thumb Open Space, and Mrs. Walsh's Garden, all of which are freely accessible to the public because these properties are owned by the Town of Estes Park or other public entities (Figure 5).

Figure 5. EVLT easements on public lands (left to right): Centennial Open Space at Knoll-Willows and Mrs. Walsh's Garden (Photos by Mark Bibiu and Jade Veth).

Although most EVLT easements do not allow public access, the Trust offers limited access to private conservation easements through a volunteer program that is vital to their operation. With almost 10,000 acres of land in the Trust, a team of more than 100 volunteers is required to monitor all of the easements (Estes Valley Land Trust, n.d.). These volunteers are motivated by a desire to improve conservation in a local region and are a critical source of support for the organization. According to Colorado State law, land trusts must monitor their properties, which EVLT accomplishes with their volunteers who walk the

entirety of each expansive property annually. Volunteers document evidence of land management practices, and any changes made to the property, to ensure that landowners are following the clauses in their conservation easement.

To continue protecting Estes Park, EVLT has developed the Estes Valley Open Space Plan, a strategic land conservation plan to preserve an additional 5,000 acres in the next 10 years (Estes Valley Land Trust, n.d.). Landowners are critical stakeholders and participants in the goal to increase conservation in the Estes Valley region.

The town of Estes Park's future is in question due to the many visitors coupled with climate change. An essential part of the economy in Estes Park is the tourism industry driven by outdoor recreation in Rocky Mountain National Park. Due to Estes Park's proximity to Rocky Mountain National Park, tourism is an economic anchor in the community and EVLT recognizes the importance of tourism to the residents. EVLT's commitment to creating trails on their acquired lands and making other lands open to the public helps to augment tourism. An example is Thumb Open Space, which the town of Estes Park purchased and donated as a conservation easement, which ensures the property will remain undeveloped and open for wildlife and future public access. In addition to securing an additional 5,000 acres of land, EVLT aims to build 20 miles of trails on public lands and create new preservation tools and partnerships. They expect to do so with the help of residents, regional and state efforts, and fundraising. Consequently, EVLT has developed a vision statement as part of their goal for the Land Trust and the valley:

We envision a resilient and charming Estes Valley with snow-capped peaks, healthy forests and meadows, clean water, interconnected wildlife habitat, close-knit and inclusive mountain communities that celebrate and cooperate to preserve nature, and residents who live active lifestyles and support a strong and diverse economy (Estes Valley Land Trust, n.d.).

Estes Valley Land Trust is committed to evolving as a partner in both the human and nonhuman local ecosystem to address issues such as habitat loss, extinction, and climate change. Taking steps to unify these relationships can improve the relevance and sustainability of the land trust model.

Case Studies in Land Trust Operations

The two case studies below highlight how different land trusts operate and what their conservation easements include. The first case study addresses why the members of a land

trust organization in Northern Michigan chose to donate land to the conservation easement as well as their attitudes toward the land trust. The second case study focuses on studying conservation easements in a time of climate change. It features a research audit of 269 conservation easements from various land trusts to search for clauses that may pertain to changes in climate.

Case 1. Attitudinal Studies about Land Trust Conservation in Northern Michigan

Similar to Estes Valley Land Trust, the Little Traverse Conservancy (LTC) in Michigan is a land trust dating back to the 1970s that specializes in acquiring land for conservation purposes. LTC has made more than 200 nature preserves available to the public consisting of 107 miles of trails. The Conservancy accomplished this through "partnerships with local units of government" (Little Traverse Conservancy, n.d.). The organization primarily focuses on the perspective and motivations of "stakeholders of small-scale land trust conservation" (Braddock & Heinen, 2021). These stakeholders primarily consisted of landowners of "small-interspersed parcels" that were much smaller than the major ones that can be hundreds of acres large. Researchers interviewed 33 members and landowners involved with the organization to determine the main reasons landowners reported as motivating their decision to offer conservation easements or donate their properties (Braddock & Heinen, 2021). The study revealed that the primary reason that most landowners donated land or agreed to easements was for the "protection of nature and scenic beauty" (Braddock & Heinen, 2021) and that most landowners did not enter easements simply for tax benefits.

Additionally, the interviews provided a better understanding of landowners' perspectives on the role, goals, and progress of the Little Traverse Conservancy (Braddock & Heinen, 2021). Results of the study discredited the widely held belief that tax incentives and monetary gain continue to be the primary reasons donors give land, as opposed to conservation interests. Suggestions from interviewees focused on the need for LTC to increase publicity with potential donors, landowners, and volunteers for land management and trial monitoring. One interviewee suggested the Trust "increase their capacity to publicize and advertise to local communities, expand outreach programs, and expand educational programs for adults and youth" (Braddock & Heinen, 2021). Doing so would help increase the number of potential volunteers and donors. Respondents also mentioned the merits of involving youth in LTC summer educational programs and volunteer opportunities to address the issue of high volunteer turnover. Because most of the volunteers in LTC were retirees that usually cannot spend many years with an organization

due to increasing physical limitations, turnover is high and there is often a need for training and hiring of new volunteers (Braddock & Heinen, 2021). Educating young people might inspire them to be volunteers and it provides a younger generation with an early understanding of the importance of conservation and the environment.

Currently, the LTC hosts "quarterly field trips for an adult audience interested in learning more about valuable natural spaces" (Little Traverse Conservancy, n.d.), and on their website, they state that "each year we present programs to more than 4,500 children from nearly 300 school groups to help them appreciate nature and learn about the outdoors in the outdoors" (Little Traverse Conservancy, n.d.). Steps such as these that prioritize publicizing the organization and its potential benefits to the entire community, particularly young people, could help Estes Valley Land Trust increase its ability to gain and monitor more conservation easements and educate more people on how they can combat climate change and its effects in Estes Park.

Case 2. Adapting Conservation Easements to Climate Change

Conservation easements exist throughout the United States; however, due to their strict outline, they often fail to accommodate environmental changes (Owley, 2011). This rigid structure is comprised of the landowner's preferences in the agreement to the present conditions of the land during negotiation. As previously mentioned, conservation easements are used to conserve spaces by limiting development and open access. Many individuals are aware of climate change, but in the context of the terms in their conservation easements, there are minimal references to it. In a case study authored by Rissman et al. (2015), only six conservation easement documents out of 269, collected from multiple organizations across six states, alluded to climate change, and there was no uniform reference to it. Specifically, Rissman et al. found that:

Two included climate adaptation as a purpose, stating "the protection of the Property … will help to ensure that wildlife populations … remain healthy and viable in the face of future changes to the climate or ecology of the area." Two CEs recognized the potential for climate change to alter management plan requirements for species; one recognized carbon sequestration on the property as a climate change mitigation measure while also noting the CE should adapt with climate-induced landscape changes; and one exempted the landowner and CE holder from liability due to climate-induced changes (see Online Supporting Information for climate-related CE terms) (Rissman et al., 2015).

Researchers note that following their interviews, staff members from conservation organizations began to reassess their current conservation easement terms.

This study offers ways to address the absence of climate change references in existing conservation easement documents through the conservation easement amendment mechanism. This strategy would allow for modifications to an existing contract after initial signing; it would enable revisions to the management plan; it could support approved changes through discretionary consent from a land trust board to other members; or it could update laws or policies in the conservation easements (Rissman et al., 2015). This case study is similar to the Estes Valley Land Trust's interest in encouraging landowners to pursue climate change adaptations in their conservation easements instead of traditional static agreements.

Summary

Land trusts and conservation easements are tools used by many communities to preserve land by permanently preventing development, and by sharing land management practices such as killing weeds or preventing fires. Other communities show how conservation easements that contain public trails on private land, shift the landowners' motivation for entering a conservation easement. When the public has access (even limited access to trails) to a conservation easement, the landowner can better see the value that their land has to the community, as opposed to only themselves.

It is unusual for climate change to be considered during the initial writing of conservation easements. There are benefits to the land trust organization in educating their landowners about climate change, and how they can mitigate the effects of it on their land. The land trust benefits when the land under easement with them has a high conservation value. If the land under a conservation easement is damaged, either through natural or human events, its conservation value drops, and the land trust loses money (Estes Valley Land Trust, Oldham). Therefore, it can be in the best interest of the land trust to educate its landowners about how to maintain their land, and protect it from natural events, such as wildfires or floods, so that the land can maintain its conservation value. Through the combination of these techniques – having more public access to conservation easements, and a climate change education program – a land trust organization has more means to facilitate conversations with not only their landowners but also the public.

III. Designing a Multi-method Approach

This project aimed to facilitate conversations with landowners about climate futures in support of Estes Valley Land Trust's conservation strategies guided by the following objectives:

- Understand climate change trends in Estes Valley
- Identify best practices in conservation management strategies for climate change
- Develop content highlighting the viewpoints of current landowners

We pursued a multi-method approach to achieving the goal of facilitating climate conversations with landowners.

Understand Climate Change in Estes Park

To understand how climate change has affected Estes Park and the surrounding region in previous years, we studied environmental databases, interviewed climate experts, and produced site photography to document climate change indicators. We wanted to see how different parcels of land have changed since being in a conservation easement with EVLT. These observations informed our conversations with landowners.

We referenced databases from the National Weather Service, the National Park Service, the Western Regional Climate Center, and the High Plains Regional Climate Center. We studied maps and data detailing changes in precipitation and temperature in the western United States

These datasets enabled us to show how climate change has and is projected to affect the Estes Valley. Data on rising temperatures also indicated a risk for secondary climate change impacts from fires to droughts.

Rising temperatures are the most commonly known gauge of climate change. To see how this has affected Estes Park, we consulted climate data on how average annual temperature and days below -20 °F per year in the Rocky Mountain National Park have changed over time. Another indicator of climate change in and around Estes Valley is a change in precipitation. We studied climate maps to understand the temperature and amount of precipitation in Estes Park in comparison to years in the past. To better understand climate change in and around Estes Valley, we spoke with local climate expert, Jeff Lukas, Principal of Lukas Climate Research and Consulting. We conducted a structured interview to discuss climate change on a local scale, and the impact land trusts can have on the region. We videotaped this interview using mobile phones and lapel microphones. Interview guides for Objective 1 can be found in Appendix A.

In addition, we toured, videotaped, and photographed Knoll-Willows Open Space (Figure 6), Mrs. Walsh's Garden, and the lands owned by Art and Marsha French, Debby Hughes and Leo Weber, Jackie and Ken Oldham, and Katy Withers to compare against historical records compiled by EVLT volunteers to see how different parcels of land have looked since being in a conservation easement with EVLT. We used GoPro and photography equipment to help detail landowners' properties.

Figure 6. Site surveys of Centennial Open Space at Knoll-Willows, one of EVLT's public conservation easements taken by team members Sarah Hull (left) and Mark Bibiu (right) (Photos by Nupur Shukla).

The monitoring logbooks completed by EVLT volunteers provided baseline images, which can be seen in Figure 7. When filling out the monitoring report, volunteers evaluate the land based on its conservation easement, making sure that there is no development occurring or other prohibited items in the agreement. Given that we briefly toured Centennial Open Space at Knoll-Willows, we make no assumptions based on how much the land has changed. However, when looking through records, the monitoring report from Spring 2004 was the only one that overlapped with the time we resided in Estes Park. By taking photos similar to the historical monitoring report, we experienced a hint of what it is like to be a volunteer.

Figure 7. Comparison of Centennial Open Space at Knoll-Willows from Spring of 2004 (left) to Spring of 2022 (Photos by Howard Lipke and Sarah Hull).

Identify Best Practices in Conservation Management for Climate Change

Our second objective focused on identifying best practices in conservation management strategies that involve climate change considerations. We collected data from several sources, including different conservation easements and other land trust organizations that use novel approaches to climate action.

We conducted a semi-structured interview with the Executive Director of Estes Valley Land Trust, Jeffrey Boring, to get insights into current strategies that EVLT uses that consider climate change and to understand potential procedures the organization would like to implement. Our interview prompts can be found in Appendix A.

We identified climate change practices through archival research from EVLT and other land trusts. We audited conservation easements to search for climate references by studying clauses and regulations in place for each. This step indicated whether or when climate changes have been considered when creating these contracts.

We also conducted interviews and a focus group to gather local perspectives on climate change and if there are references to the topic in conservation easements. We held a focus group with EVLT's Board of Directors, by bringing together a small group of individuals to answer questions in a moderated setting. We also interviewed EVLT landowners. Using open-ended interviews, we engaged interviewees in conversations about climate change and conservation easements. Interview guides for these participants can also be found in Appendix A.

To compile climate resilience best practices in the context of land trusts, we explored case studies and reviewed assessments from land trusts that have implemented strategies to address climate change.

Develop Content Highlighting the Viewpoints of Current Landowners

We tested two different formats for video interviews and profiles: a sit-down interview and a walk-and-talk interview. As shown in Figure 8, team member Ryan Weeks is answering questions sitting down while Sarah Hull (off-camera) is asking sample questions. In Figure 9, Weeks is walking alongside Hull as they have a conversation. We developed video profiles that highlight viewpoints current landowners have on climate change. Using GoPros video cameras, cell phones, and audio recording devices, we recorded conversations and interviews with EVLT's Executive Director Jeffrey Boring, board members, and landowners to use in these profiles. Figure 10 shows Ryan Weeks interviewing landowner Art French. We gained an inside perspective of climate change in relation to conservation

easements by collecting media from the Executive Director and the board members since they have direct knowledge of how conservation easements are put into place and what they contain.

Figure 8. Sarah Hull (off-camera) interviewed Ryan Weeks during the sit-down portion of our "mock-interview" (Photo by Mark Bibiu).

Figure 9. Ryan Weeks (left) being interviewed by Sarah Hull (right) during the walk and talk portion of our "mock-interview" (Photo by Mark Bibiu).

Figure 10. Ryan Weeks interviewed Art French, a retired geologist who bought land under a conservation easement with EVLT (Photo by Mark Bibiu).

IV. Critical Findings in the Field

Although everyone may not agree on the verbiage to describe the changes in the climate in Estes Park, it is evident that landowners actively manage their properties in ways that address climate change. Our key findings from our fieldwork ranged from in-depth conservations about climate change to land-use policies as we move into an uncertain future of drought and fires.

Understand Climate Change in Estes Park

To gain a better understanding of how climate change is affecting Estes Park, we intended on using data from the national weather service to find climate trends in annual precipitation, snowfall, and the average temperature in Estes Park. However, we were hindered by a lack of data which only started between 2000 and 2002 for all three climate measurements. A 30-year time span is required for a trend to be considered a climate trend and this span only yielded approximately 20 years of data (National Oceanic and Atmospheric Administration, 2019).

Rising temperatures were evident in all sources we used to see how it has changed in Estes Park. Figure 11 displays the rapid decrease in annual days below -20 °F over the past century, while in Figure 12, the trendline for the average temperature in the Rocky Mountain National Park points to an increase of about 3.4 °F in the past century. The temperature map portrayed in Figure 1, shows evidence that Estes Park's temperature this past year has been in the top 10 percentile compared to previous years. Climate expert Jeff Lukas also sees evidence of a "2-2.5 degree" increase in the region (Interview 2, April 6, 2022).

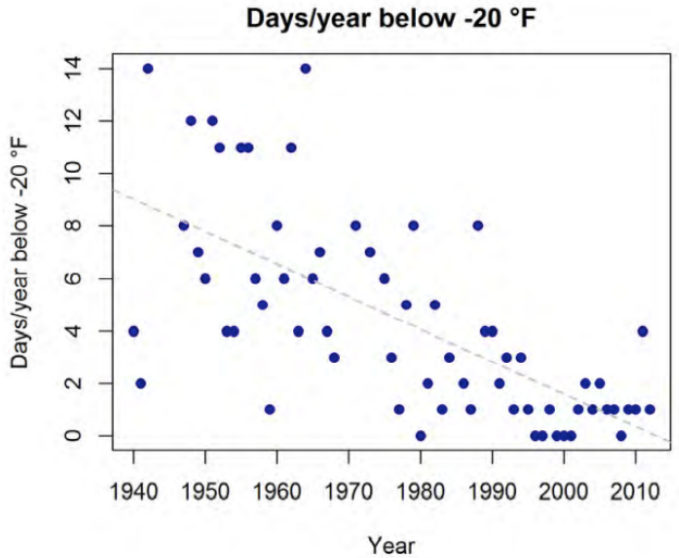


Figure 11. This plot displays the frequency of days below -20 °F in the Rocky Mountain National Park over the past 70 years (National Park Service, 2014).

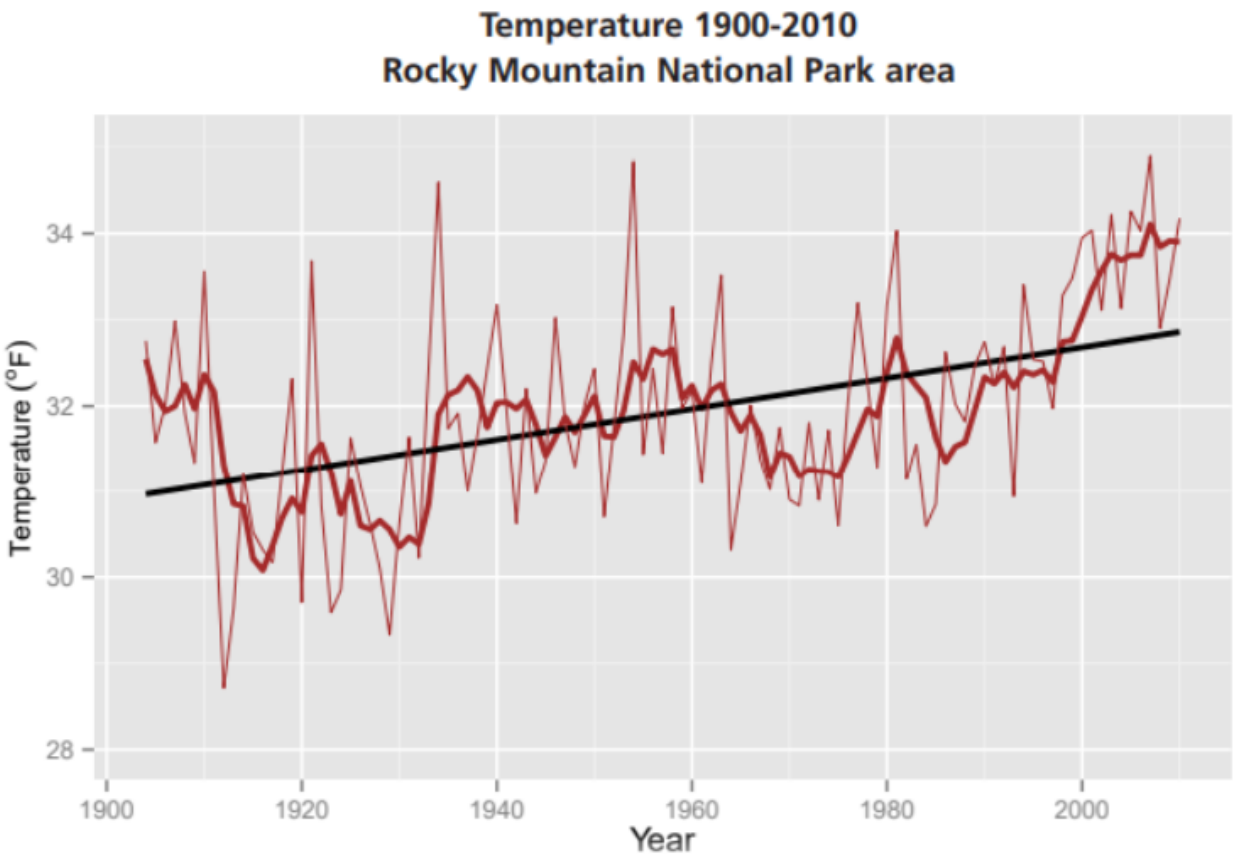


Figure 12. This plot displays the annual average temperature in the Rocky Mountain National Park over the past century (National Park Service, 2014).

In terms of precipitation change in the region, Figure 13 shows that winter 2021/22 had slightly less precipitation than in past years. The color codes indicate that this winter contains 90-100% of the usual precipitation. Changes in precipitation such as this decrease were mentioned by multiple landowners. Landowner Debby Hughes mentioned a "significant decrease in moisture" over the 70-plus years that she has been living in and visiting Estes Park (Interview 4, April 12, 2022). EVLT board member and 14 year resident of Estes Park, Jan Swaney, mentioned a change in snowfall over the years, stating "we still have our dump in the spring and then maybe that's even later than it used to be, because a lot of times it'll come in May" (Interview 3, April 8, 2022).

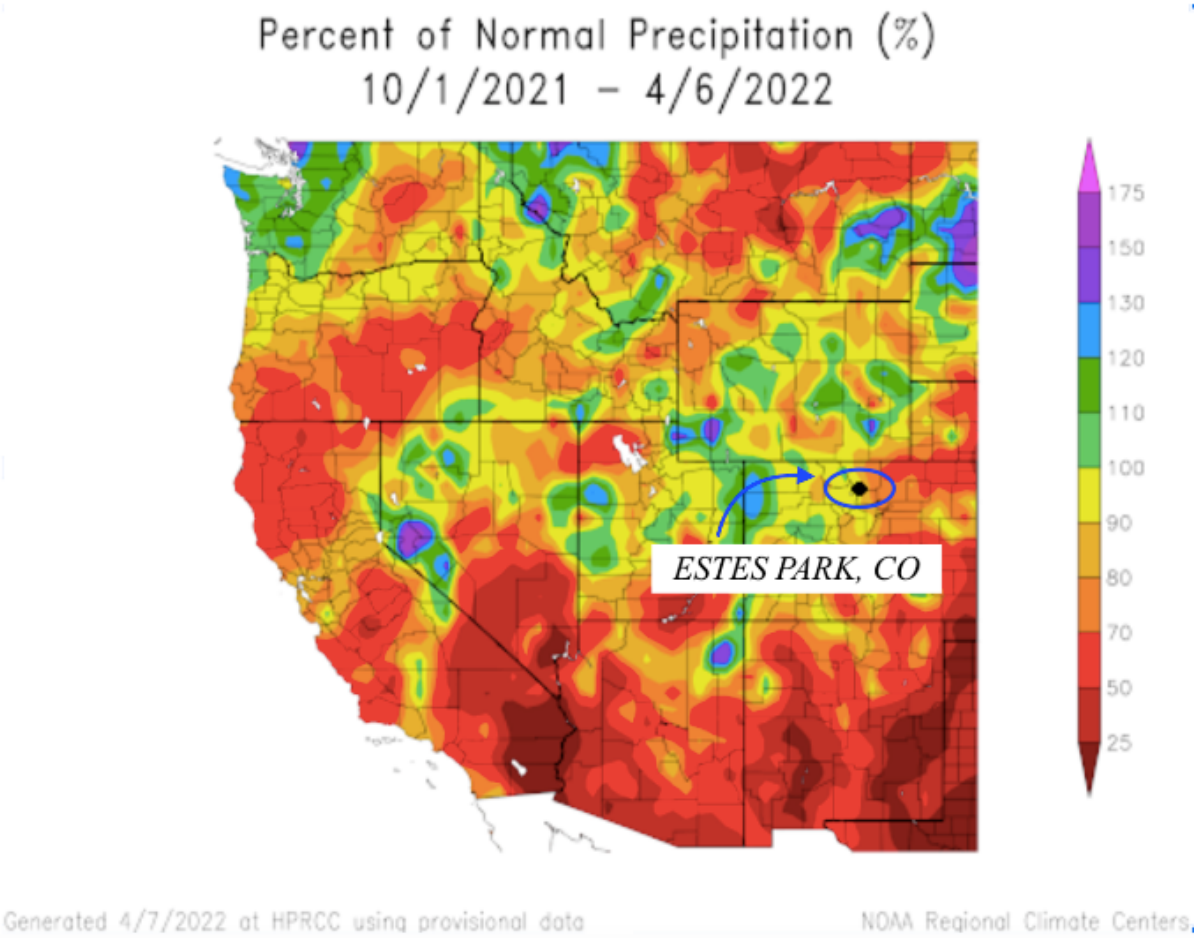


*Figure 13. P*ercent of normal precipitation in the western United States from October 1, 2021 to April 6, 2022 compared to the past (High Plains Regional Climate Center, 2022).

Overall, it is abundantly clear that climate change has increased the intensity of droughts, decreased precipitation, changed precipitation patterns, and increased annual temperatures in Estes Park and the surrounding region. Climate maps, data, and insight from a climate expert helped to validate some of the changes in climate pointed out by landowners and EVLT board members. Figure 14 summarizes some climate data from the National Park Service and United States Department of Agriculture Rocky Mountain Research Center.

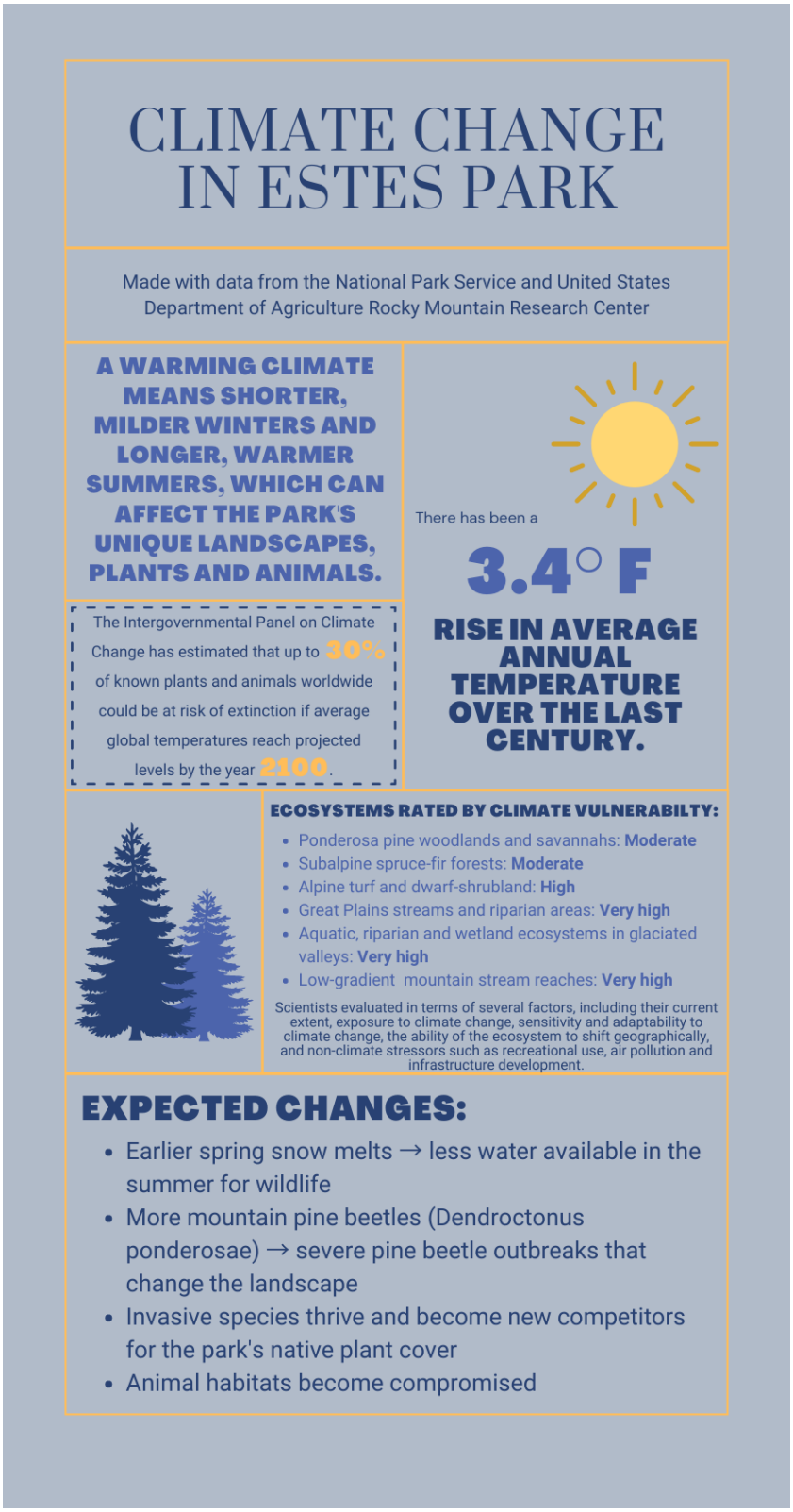


Figure 14. Summarized Estes Park climate data (National Park Service, 2018 and USDA, n.d.).

Identify Best Practices in Conservation Management for Climate Change

Carbon Sequestration

The montane ecosystem, containing flat meadows and mountains populated with trees, in and around the Estes Valley makes it difficult to implement the same climate mitigation efforts that can be seen elsewhere in the United States. Carbon sequestration was a recurring theme that became evident after combing through sources, specifically in Conservation in a Changing Climate (2019) and our conversations with a climate expert. Conservation in a Changing Climate is an online resource for land trusts distributed by the Land Trust Alliance that emphasizes natural climate solutions (NCS), which are proven ways of storing and reducing carbon emissions in the world's forests, grasslands, and wetlands (Conservation in a Changing Climate 2019). It identifies carbon sequestration as one, which is defined here by the United States Department of Agriculture as "the process by which atmospheric carbon dioxide is taken up by trees, grasses, and other plants through photosynthesis and stored as carbon in biomass (trunks, branches, foliage, and roots) and soils" (United States Department of Agriculture, 2016). Although carbon sequestration can be implemented in many different ways around the world, it is one of the only practices that is well matched to the unique landscape and climate of Estes Park. The practice balances out the carbon released into the atmosphere from humans and forest fires, which are becoming more frequent. The U.S. Geological Survey adds that "encouraging the growth of plants—particularly larger plants like trees—advocates of biologic sequestration hope to help remove CO2 from the

Art French, Land Owner

Art French Is a retired geoscientist with ExxonMobil and he and his wife, Marsha, live on a hundred acres of conserved property.

INTERVIEW

Do you mind telling us how you kind of got introduced with the EVLT?

When my wife and I retired in 2008 and moved up here, we bought the property. During the title search, we discovered the conservation easement, and the lady that sold the property to us was upfront with that.

Well, Marsha and I read through regulations of what's eased. We realized everything we could wish was in there [regulations]. We didn't feel restricted at all by the conservation easement. But we're very conservation minded and we have been that way for our whole lives, so this was nothing new. Nothing to change..

Have you guys ever been affected by fires at all in this area?

So the last fire that came through here in October or November, we evacuated for five days. You can hardly see it now, but it came up the other side from Fish Creek to the ridge. And then fortunately, it [the fire] stopped because if it had come down, it would've got our property.

Could you tell us about how you've seen climate change affect Estes Park in your time here?

In the time here, we've had a lot more and bigger forest fires and wildfires, which is the biggest way that it's impacted us and probably the biggest way it's impacted the whole state.

atmosphere" (U.S. Geological Survey, n.d.).

Much of the land that is placed in conservation easements with EVLT contains forests and meadows that enable carbon sequestration. We asked landowners whether they "see the land trust's work as part of the solution to combating climate change?" and if "your soil and trees sequester carbon; do you consider conserving your property as a small contribution towards reducing carbon emissions?" Answers ranged from "land trusts are primarily for other uses" To "absolutely!"

"Fire, I think is the biggest thing, fire mitigation, which is part of why we mow the Meadows"

- Art French

For example, Art French, a retired ExxonMobil geologist who bought land under a conservation easement, mentioned how land trust conservation easements can be used to "protect [land], to mitigate the fire danger, to mitigate the weeds, the diseases that parasites spread to attack the trees" (Interview 1, March 29, 2022). When asked about which parts of maintaining the land were the hardest, he mentioned that "fire, I think is the biggest thing, fire mitigation, which is part of why we mow the meadows" and also pointed out an area in the land where he thinned many trees to prevent the spread of a potential fire (Interview 1, March 29, 2022). In an informal conversation, French discussed how the land trust has values in other ways but emphasized the need to care for the different species that lived on his land.

Other landowners spoke more broadly about carbon sequestration. Debby Hughes and Leo Weber, long-time residents of Estes Park, commented that they believe that the land trust's work is to educate. Hughes' family has deep ties to the land trust and donated a conservation easement in 1998 to preserve 60 acres of land adjacent to Rocky

Leo Weber and Debby Hughes, Land Owners

Leo and Debby are long time residents of Estes Park and donated a 60 acre conservation easement in the 1990s. Leo was a former president of EVLT's Board of Directors.

INTERVIEW

Why did you enter your land into a conservation easement?

Bottom line, to protect it from development. We're on 60 acres that border a national park. I don't know if you've ever been to Zion National Park, but there's commercial development right up to the boundary of the park. It's sad to see. And it was my mother-in-law who owned the property at that time. Then Deb and I inherited it from her, and it was about protecting the property from development.

What qualifications for a conservation easement did your land meet?

Proximity to a national park, view corridors, and wetlands. We have two streams, one at each end of the property and open space. Actually, we have an unusual amount of Juniper forest on this property, which is a plus. The south end of our property is pretty much swampy, wildlife corridors.

How do you manage your land in the conservation easement?

We don't do a lot of it. We do fire mitigation and we do weed mitigation and just enjoy it. The basic thing we're doing is preventing this property from being over-developed. You know it's on 60 acres. You can imagine what it would be like bordering a national park. So, yeah, keeping it an open space.

Mountain National Park. Hughes commented positively on EVLT's efforts to connect the land trust with "Colorado State University and Colorado University and other organizations that have people that can help landowners" (Interview 3, April 12, 2022). Hughes and Weber agreed that the trees and soil on their property contribute to reducing carbon emissions. Hughes exclaimed, "absolutely, you know, any cutting we do is for fire mitigation" (Interview 4, April 12, 2022).

"The fewer houses and the fewer people you have, the less people you have contributing to increasing CO2"

- Jackie Oldham

Jackie Oldham, a landowner and Treasurer of Estes Valley Land Trust, and her husband Ken Oldham, a retired attorney who wrote many of the conservation easements, donated two conservation easements, one in 1996 and the other in 2001. Together, they believed the main way easements relate to mitigating climate change is through less development. She stated, "the fewer houses and the fewer people you have, the less people you have contributing to increasing CO2" (Interview 5, April 14, 2022). Jackie Oldham, when asked about her trees and soil helping to sequester carbon, expressed, "definitely, no question about it" (Interview 5, April 14, 2022).

Katy Withers is a new member of EVLT since she bought a parcel of land that was already under a conservation easement in 2020; however, she is not a new resident of Estes Park, having already owned a home. Since she is a recent landowner and member of EVLT, Withers commented that the project we are doing is the first direct time she is aware EVLT is doing with regard to climate change, but she is sure there have been past projects and programs that she is unaware of. Upon our second question, Withers reflected, "that's a good point. I haven't really thought of that

Leo Weber and Debby Hughes, Land Owners

Leo and Debby are long time residents of Estes Park and donated a 60 acre conservation easement in the 1990s. Leo was a former president of EVLT's Board of Directors.

INTERVIEW

How has your land been affected by climate change?

Well I think one way it has been affected is good because we are doing a lot more fire mitigation and forest management. So, I believe that we have a healthier forest than we had before.

I agree. The way it affected the land, we have more weed issues, a lot more weed issues than we've had in the past and with the flooding, we did have some erosion.

Do you see the land trust work as part of the solution to combat climate change, if that is within the scope?

I think the job of the land trust is to educate and be a resource. They're in contact with Colorado State University and Colorado University and other organizations that have people that can help landowners. We had a forester come out and help us figure out what we could mitigate for fires while still keeping the forest healthy. When the fires were burning, we had volunteer firefighters from all over the west. They were on the Cameron Peak fire, and one guy came to the house and he spent the morning walking around the property with us figuring out where they were going to stage equipment and where they were going to put sprinklers. Spending time with professionals really helps educate.

perspective, but I do think that taking good care of the native trees, native species of grass and plants is beneficial to sequestering carbon" (Interview 6, April 19, 2022).

A focus group conducted with four Board of Directors members took place in the Hondius Community Room of the Estes Park Public Library, aptly named after one of the founders of EVLT. Many of these Directors have been involved with the land trust for several years and have been present throughout the changes that have occurred in Estes Park, including the weather changes. During this focus group, we discovered that many of the conservation easements contain clauses that pertain to forest management and wildfire mitigation, yet there were no specific requirements for invasive plant species control, which itself can contribute to overgrowth, dry fuel load, and changed ecosystem health. Weed growth, not only in Estes Park but globally, has increased in the past few years. This is due to the warmer temperatures resulting from climate change which enlarges the viable habitat of certain plants (Peters, 2014). In turn, migrating species deprive the native plant species of resources like food, water, and space causing them to die. To protect the native species from the invasive population of weeds, the weeds must be identified and removed. Although among some landowners weed control seems minimal, based on comments from the Directors, we learned that weeds have become a pressing issue in recent years. Pat Begley, a Director, exclaimed, "as far as the weeds go, that's undeniable. There are all kinds of weeds here that were not here 15 years ago," while Jackie Oldham concurred, "when we built our house, there was no cheatgrass anywhere" (Interview 3, April 8, 2022). From this, it is evident that the land has changed, and new activities must be implemented to combat them. The Directors elaborated on how the importance of land stewardship is a direction that EVLT is heading towards, especially with their search for a

Jackie (pictured) and Ken Oldham, Land Owners

Jackie and Ken donated two easements to EVLT in the late 90s and early 2000s. Jackie is the Treasurer of the Board of Directors, and Ken was very active with the land trust for many years. He is a retired attorney who wrote many of the conservation easements.

INTERVIEW

How did you get Involved with EVLT?

When we first moved up here, we rented a room in one of the bank buildings downtown, we had an office. And it was a land trust that would have its monthly board meetings in the conference room of the bank. You had to go through the middle of our office to get to the conference room. So we'd be sitting there on Saturday morning working and people would come in for their meeting. So we got acquainted with them and it soon became obvious that I could be helpful to them because, in my business career, I had focused on land use and interacted with governmental agencies, and done all the things that you need to do to help out the land trust. So they finally just asked me to join the board, which I was happy to do. And the rest is history.

- Ken

Why did you decide to donate your conservation easements?

One thing, we knew a lot about the land trust when we decided to do a conservation easement. But we felt like, and I think we do have a wonderful property, if it ever was out of our family, we didn't want to see a bunch of houses going up the hill. We wanted to keep as much of it open as possible.

- Jackie

Stewardship Manager, whose primary responsibilities include coordinating conservation easement programs, developing stewardship projects on public and private lands, and creating partnerships among public land management agencies and private landowners (Estes Valley Land Trust, 2022).

Conservation Easements Clauses

As mentioned before, each conservation easement is uniquely drafted upon each landowner's wishes and the framework of the land trust. When auditing different conservation easements of Estes Valley Land Trust, we discovered that the private conservation easements are very similar to one another. They start by naming the landowners as the "Grantors" and EVLT as the "Grantee," as well as defining key terms and the most fundamental aspects of the agreement such as the statement: "The purpose of this Conservation Easement is to preserve and protect in perpetuity the Conservation Values of the Property" (Estes Valley Land Trust, Oldham). Next is the Rights of Trust, which outlines what EVLT is allowed to do to the land, such as "preserve and protect the Conservation Values of the Property," and enter the property to enforce the conservation easement (yearly monitoring). Following that is the Prohibited Uses, where the restrictions on the land are outlined. This is the most important section of the conservation easement, as this is the part that prevents the land from being developed. According to Ken Oldham, the most important clause in this section is the first one—which prohibits the parcel of land from being divided, meaning that when the property is sold or transferred, it must be done so in its entirety (Estes Valley Land Trust, Oldham and Interview 5, April 14, 2022). Out of four conservation easements we read, all four contained the following prohibitions: excavation, mining, fuel extraction, dumping, hoarding,

Katy Withers, Land Owner

Katy bought a parcel of land within Meadowdale Ranch in 2020 that was already in an existing conservation easement.

INTERVIEW

So your soil and trees, sequester carbon, do you consider conserving your land and the trees as a part of combating climate change?

That's a good point. I hadn't really thought about that perspective, but I do think that taking good care of the native trees, native species of grass and plants is beneficial to sequestering carbon. We have this wildfire mitigation program where we have harvested certain trees that were either diseased or too close together or whatever. So you think, well, is that bad for climate change that we've cut some trees, but it would be way worse… And, last year we had a wildfire that was sparked in town by high wind blowing an electrical wire onto some branches. And we evacuated the ranch. We actually could see the flames from here. And so it's a real issue too. Manage the wildfire issue and balance that with leaving as many trees as you can, that are healthy trees. **So yeah, I mean, everything is kind of a balance, the whole the whole system there. You just have to work the best you can as a good steward to try to find the right balance and the best balance**.

dumping industrial or commercial wastes, industrial or commercial activities, changing or moving bodies of water, selling water rights, topographical alterations, driving motorized vehicles except on designated roads (Estes Valley Land Trust, Oldham). The following section, Reserved Rights and Permitted Uses describes the freedoms that the landowner retains. In a standard conservation easement, the following clauses are frequently included: keep their land private, hike with guests, camp their property, and repair existing structures (Estes Valley Land Trust, Oldham). This means that the landowners have the right to exclude the public from their property, but also enjoy activities on their property that both celebrates and protects nature.

However, the agreements also have a personalized option to cater to the specific wants, needs, and goals of the landowner. Some easements allow hunting, while others prohibit it; some even specify how a landowner can acquire firewood (cutting down live trees versus dead ones). What activities are permitted or prohibited is impacted by the topography, size, and features of the land. For example, a half-acre property may not allow any structures, but a larger parcel of land may allow for several houses; similarly, a property that contains a body of water is going to have more water protection restrictions than a property that is mountainous and does not contain a body of water. Many agreements allow for the landowner to build a set number of structures within a specific area of the property, called the Building Envelope. The amount and size of the structures are dependent on the size of the entirety of the conserved parcel. These clauses are negotiated between the land trust organization and the landowners to conserve the land with the highest conservation value possible, but also to accommodate the landowner and their wishes.

The following sections in the conservation easement explain the responsibilities of the landowners and the land trust going forward. The landowners are responsible for keeping their land up to Larimer County Weed Control standards. No other maintenance is not explicitly mentioned, but it is made clear that EVLT is not responsible for the maintenance (Estes Valley Land Trust, Oldham). Finally, the specific conservation values that a property has is written out. For the Oldham's property, it is in proximity to Rocky Mountain National Park (they share a border), and the water, vegetation, and wildlife resources from five habitats, "ponderosa pine woodland, montane shrubland, mixed montane forest, riparian shrubland, rock outcrop" (Estes Valley Land Trust, Oldham). There are many differences in the details of each conservation easement, which are tailored to the conservation goals of EVLT and the landowner's specific needs.

Develop Content Highlighting the Viewpoints of Current Landowners

With EVLT's approval, we conducted sit-down and walk-and-talk style interview formats. The sit-down interviews were useful for substantive questions about climate change-related issues. The walk-and-talk format (Figure 15) created a more fluid and personable environment and was used for questions relating to the subject's background and involvement with EVLT. We conducted both types of interviews with the four landowners we interviewed.

Figure 15. Team member Ryan Weeks and interviewee Art French conducted the "walk-and-talk" portion of the interview as they walked through French's property. (Photo by Mark Bibiu).

The climate expert interview with Jeff Lukas provided climate data and perspective on climate change in the Estes region (Figure 16). Lukas's mentioned that data may show temperatures increasing by 2.5 degrees in the last 30 years, but this temperature difference is unnoticeable by residents. However, he continued to speak about the extremes of the weather changing. He stated, "What I do notice is we get fewer cold extremes. Winter lows below zeros don't happen as often" (Interview 2, April 6, 2022). Lukas also mentioned that temperatures above 100 degrees Fahrenheit, a temperature that defines extreme Colorado weather, "barely used to happen before 2000, and now it happens much more" (Interview 2, April 6, 2022).

Figure 16. Team member Nupur Shukla interviewed climate research expert, Jeff Lukas. (Photograph by Sarah Hull).

We edited footage from our interviews to compile three types of videos: “Landowner Walk and Talk,” “Climate Conversations,” and “Climate Sound Bites.” The “Landowner Walk and Talk” format delves into the interviewee’s background and involvement with EVLT. These mini-videos serve as short profiles of land trust participants where the viewer can relate more substantively to the landowner. For example, the “Climate Conversations” video features a montage of responses we received from landowners in response to our climate change questions. This video allows the viewer to learn about land conservation practices and the role these practices play in mitigating climate change. Finally, “Climate Sound Bites” are key informant interviews such as the Jeff Lukas interview or EVLT’s Executive Director interview. These key informant videos are three to five minutes long and focus on the response to a specialized topic. Our storyboard for a portion of the French interview, specifically the “walk and talk” portion, can be seen in Figure 17.

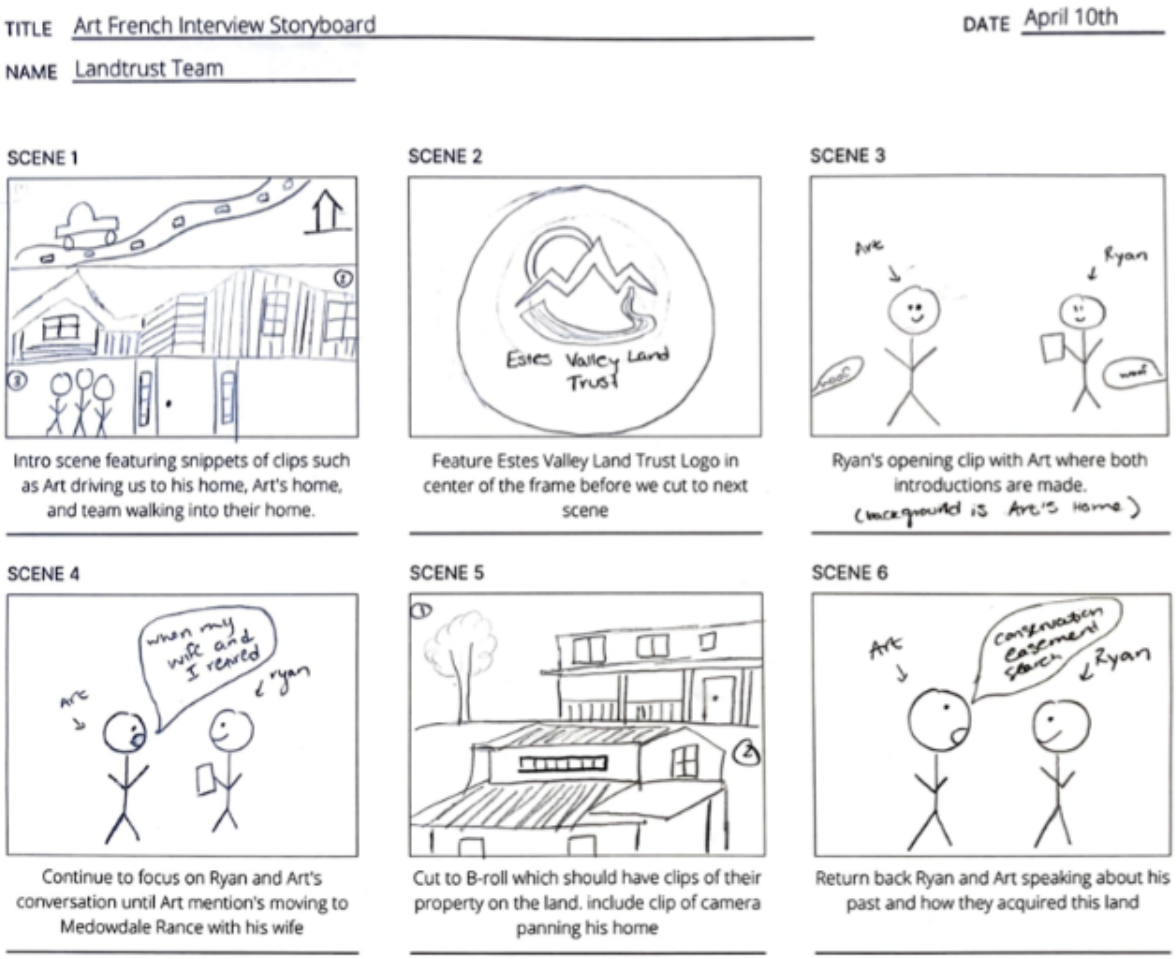


Figure 17. Storyboard for Art French Interview (Drawing by Nupur Shukla).

The interview with Art French portrays him as a relatable hands-on landowner who cuts down low tree branches, removes trees infested with the mistletoe weed, and walks his property every day to honor his commitment to the conservation easement. In this video, viewers see French as someone they can potentially learn from because he was once in a place where he held little to no knowledge on stewardship of the property. With the picturesque scenes and warm atmosphere in these videos, we hope to generate conversation between current and future landowners about land management and its effects on climate change.

We collaborated with EVLT to decide on consolidating the two YouTube channels that they have already created because more than one channel is confusing for viewers. For this consolidated channel, we curated short three to five-minute videos. These videos include the landowner interviews, the climate expert interview, the Executive Director's interview, and a meet-the-team video. This YouTube channel can be accessed easily through a link to the main page, as well as through each video.

Younger Generations: Climate Change and Land Trusts

We had an opportunity to conduct an informal interview with local high school seniors. We gathered that they believed climate change to be a pressing issue as “the recent fires and less snowfall are real indicators of climate change.” When asked whether they knew about land trusts, conservation easements, or EVLT, these students had little to no knowledge and gave no response.

We worked with Alex Harris, Estes Park’s high school biology teacher, to present to a sophomore biology class on both our project and EVLT. We sprinkled questions throughout our slideshow to foster student engagement. The questions we asked are outlined in Appendix A. When we asked students about the definitions of land trusts and conservation easements, we found that no one had the slightest idea. Next, we asked our audience to define climate change, to which the majority of students responded with words like “global warming,” “temperatures increasing,” and “ice melting” (Estes Park High School Students, April 2022). When we asked them to give us examples of local climate changes, we received many responses including “less snowfall,” “increase in number and severity of wildfires,” and “less rain.”

From the responses of both high school seniors and the sophomore biology class, many people in the younger generation in Estes Park are not aware of the land trust and its goals. It is important to educate and involve younger generations in climate conversations because they will be responsible for continuing to work towards conservation goals.

Discussion

Many of the climate opinions and experiences expressed to us in our interviews were supported by the gathered data and information from climate expert Jeff Lukas. Landowners and EVLT board members also gave us more insight into changes that we were not able to see in our site visits, varying from an increasing invasive weed problem to recent flash floods. Fire mitigation also seemed to be the focal point of many conservation easements and land stewardship.

Although many landowners were able to see the changes in the climate, not all were able to see how their land stewardship helped to mitigate climate change likely due to their localized contributions. Landowners, such as Art French and Katy Withers, are participating in carbon sequestration by protecting the health of their trees and other vegetation — one contribution that is often overlooked.

As stated earlier, not all interviewees have explicitly given their acknowledgment of

“climate change” in the region; however, they do appear to have an adequate grasp on how temperature, precipitation, wildfires, and floods have changed in the region and practices of land management to mitigate said changes. Recognizing climate change is difficult if residents have not lived in Estes Park for decades. Art French mentioned that he had noticed “bigger forest fires,” but he did not know if he could attribute that to climate change and not just “weather changes” because he and his wife have “only been here for ten years” (Interview 1, March 29, 2022). Based on the results of our interviews, having an understanding of the regional changes in climate and weather correlates with helping organizations such as the Estes Valley Land Trust in their efforts to mitigate climate change effects.

To evoke a sense of urgency and spread the importance of land conservation in the context of climate change, we compiled viewpoints for the EVLT to distribute. We plan to release this information through the form of multimedia on the Estes Valley Land Trust website and YouTube. After looking at the target audiences and the best form of media to inform different generations in Estes Park about the EVLT, we decided to create and promote a YouTube channel. We intend to highlight examples of public and privately-owned conservation easements and the practices to maintain them. The videos will also include climate-related experiences of long-time residents, landowners, and climate experts on the specific effects of climate change in Estes Valley. These videos will range from three to five minutes and will contain the highlights of each interview. We hope this content will educate viewers on climate change in Estes Park and reach a variety of audiences that could potentially contribute to the goals of the Estes Valley Land Trust in the future.

Recommendations and Conclusion

Several themes have emerged from our work with EVLT over the last two months. These themes present opportunities to advance the work already in place and to better prepare the community for climate change.

Recommendation 1.

Promote Extensive Stewardship Through Workshop Talks

What: EVLT can promote environmental stewardship through several means. The first step might be to gain more knowledge about climate changes and the land trust structure. The topics of these events could become a series with each workshop focusing on one issue. Some of these issues could be flood mitigation clauses in conservation easements or the maintenance and control of invasive endemic species. Figure 18 shows a mockup invite that EVLT can send out to landowners to promote the workshop talks.

Figure 18. Mockup of a future workshop focusing on flood mitigation tactics led by climate expert, Jeff Lukas (Invite created by Nupur Shukla).

Who: These events would be beneficial to current landowners as they would have an opportunity to learn more about the environment around them. This knowledge could help current landowners to personalize their land management practices.

When: Workshops can be strategically hosted based on the issue the workshop is covering. For example, if the topic is flood mitigation tactics, the workshop can be hosted before the summer and winter seasons start since that is when precipitation increases.

Where: These educational workshops can be hosted at the public library in Estes Park. The library allows for residents to book large meeting rooms for hours, so it would be a productive space to gather.

How: These educational workshops can be hosted at the public library in Estes Park. The library allows for residents to book large meeting rooms for hours, so it would be a productive space to gather.

Why: Landowners may see an opportunity to be more flexible with changes to their easement to accommodate the changing climate. This openness is already in place with many landowners, so these owners can take steps to model best stewardship practices to future landowners.

Recommendation 2.

Launch a New Landowner Orientation

We recommend that EVLT launch an orientation for all new landowners to address any reservations about managing their newly purchased property. This session/workshop would cover the basics of land management and could be conducted in many forms. Below are some options highlighting the advantages of each:

Option 1: Hold a Q&A session either online or in-person, depending on the landowners' preferences. EVLT could recruit a panel of experienced landowners who could answer questions new landowners may have about owning and managing their property.

Option 2: Have experienced landowners give talks or presentations on their personal experiences and how they learned to manage their land. They could give new landowners tips and tricks, and new landowners would have a chance to establish contacts with some key informants. Once again, these talks or presentations would either be online or in-person, depending on the audience's preferences.

Option 3: A mix or a series of these two events would also be beneficial as both parties can exchange knowledge: current landowners might present their experiences and new landowners could ask questions at the end of these presentations. These events would help new landowners grasp their stewardship duties fully as they gain knowledge from experienced landowners.

All three options above allow for new landowners to receive a formal introduction to land management practices. Not only will these new owners be able to gain knowledge from skillful landowners, but they will get an opportunity to connect with the land trust community while developing key information contacts. Figure 19 shows a possible invite that could be sent to new landowners to invite them to the orientation. As an incentive, new landowners who complete this orientation will receive a certificate stating their participation and dedication to the land trust. Figure 20 shows a mockup of a possible certificate that EVLT can distribute.

YOU'RE INVITED TO

NEW LANDOWNER ORIENTATION

WITH GUEST LANDOWNERS

20 MAR 2023

RUN BY JEFFREY BORING AND JOANNA MAGGETTI

8AM - 4PM

LIBRAY: HONDIUS COMMUNITY ROOM OR ZOOM

This session will cover the basics of land management for a conservation easement. We will also go over the typical clauses and what to expect for things you can do on your land.

We have invited Art French and Katy Withers to share their experiences and how they learned to manage their land. They will be providing some tips and tricks, and resources they use.

This event will then be followed up by a Q&A session.

Estes Valley Land Trust

Figure 19. A mockup of the invite that EVLT can distribute to new landowners for the orientation session (Design by Jade Veth).

Figure 20. A mockup of a future certificate that EVLT can distribute to new landowners who complete the New Landowner Orientation (Design by Nupur Shukla).

Recommendation 3.

Develop Additional YouTube Content

Future Content

We recommend that the two YouTube Channels that EVLT currently holds be consolidated into one singular channel. This change would help avoid any confusion for viewers and potential subscribers. This consolidated YouTube Channel could reach different audiences and create new opportunities for the land trust organization, keeping in mind that a channel requires upkeep. There are many options for future content.

Option 1: "Meet the Team" video that includes short introductions to the Estes Valley Land Trust staff and showcases each of their roles in the organization. Viewers would be able to learn more about and connect with each member at the Estes Valley Land Trust. This personal connection can draw in loyal subscribers or simply generate interest in the channel.

Option 2: "A Day in the Life of ___" video where the subject of the video takes the audience through their day. This type of video could be used to showcase a volunteer's day featuring the tasks they complete for EVLT. These videos could help give future volunteers an idea of what they could accomplish if they were to participate in the EVLT volunteering program. The "Day in the Life of ___" videos are also applicable to anyone who has a unique, exciting day ahead of them, so even Board Members or staff who, for example, are attending a climate-related convention could film and post these types of videos.

Option 3: Feature a tour of the Open Spaces in Estes Park. A simple video featuring the beautiful landscapes seen from Knoll-Willows or showcasing the intricate flora in Mrs. Walsh's Garden would draw in audiences, especially the residents of Estes Park. Moreover, whenever anyone would visit these spaces, they would be reminded of Estes Valley Land Trust, which could support engagement with the Trust.

Option 4: Feature the winner of the Film Festival. The winner could talk about the process of developing their content, which might generate interest among other high schoolers to watch their peer on this channel. Highlighting a volunteer that did excellent work would draw in other potential volunteers who hope to be featured on this channel.

Maintaining the YouTube Channel

A variety of videos can potentially draw more followers and spread information about the goal and mission of EVLT. Continuing to post different types of content keeps the current audience engaged and potential subscribers to become permanent followers. Still, the process of editing and posting is an entirely separate role that would need to be filled to ensure the liveliness of this channel.

A high school intern could be hired to fill this position. They would be responsible for the production of videos and posting to the channel. Hiring an intern would generate interest in the younger generations and ensure that later generations are aware of the importance of land trusts. To help the intern get situated, please refer to our guides in Appendix B for posting a video on YouTube and editing a video on Adobe Premiere Pro (Figures 21 and 22 respectively).

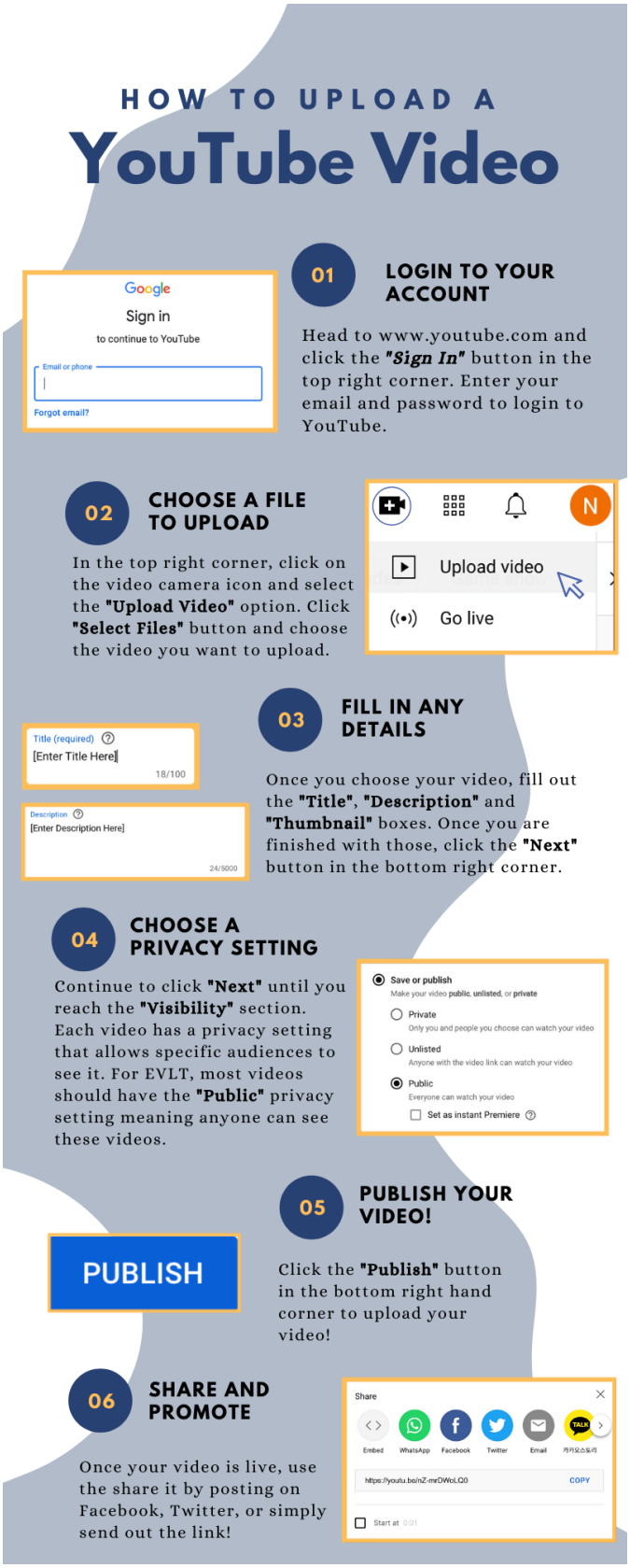


Figure 21. Guide for How to Upload a YouTube Video (Graphic by Nupur Shukla).

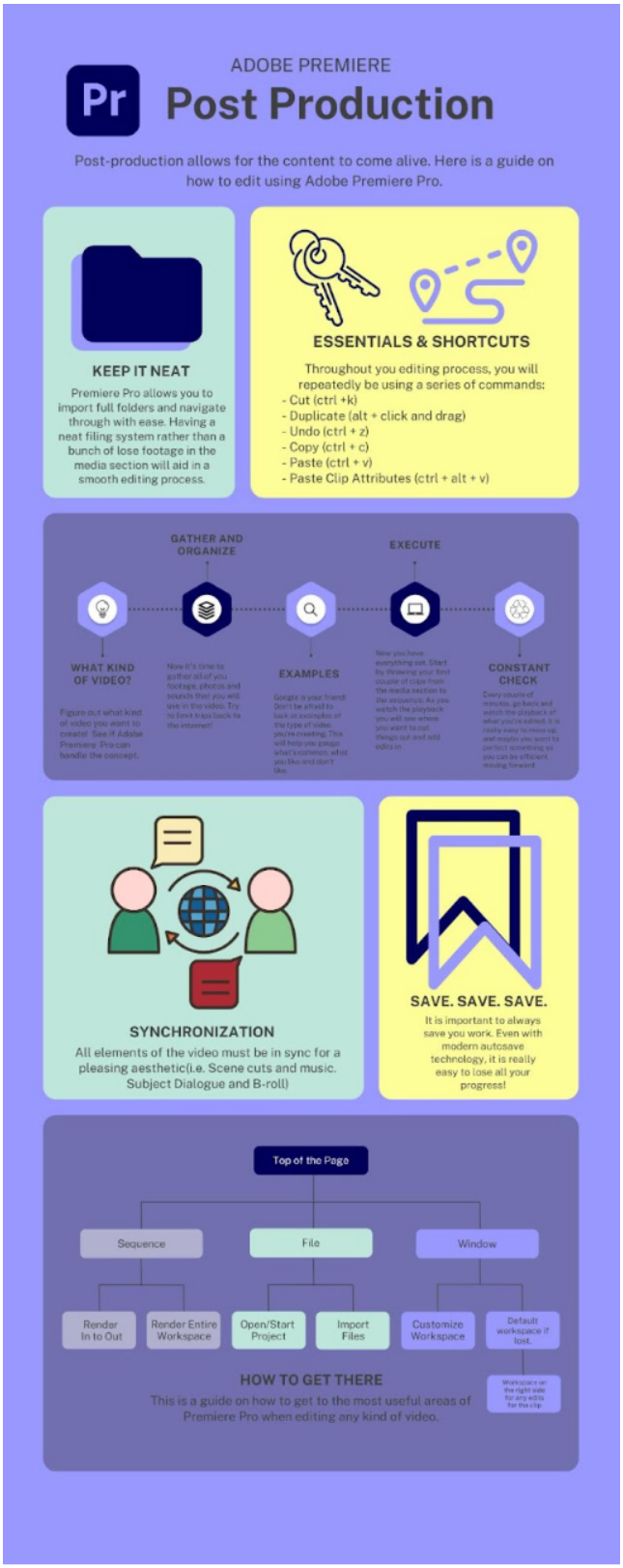


Figure 22. Guide for How to Edit Content on Adobe Premiere Pro (Graphic by Mark Bibiu).

Recommendation 4.

Support Events such as Film Festivals

We were fortunate enough to attend the very first film festival hosted by Estes Valley Land Trust. Public outreach is critical for sharing EVLT's goals.

Participation: To optimize events, improvements can be made to encourage strong participation. The first annual film festival was held at 6:30 PM allowing for only a few high schoolers (other than the ones participating in the festival) to attend. Holding the festival earlier in the day or right after school (between the hours of 3 PM and 5 PM), will enable more students to attend.

Promotion: We also suggest that the promotion for this event start many months before the event. The first festival was promoted for only a month or two, which is understandable since it had to be planned last minute due to unforeseen circumstances. Moving forward, promotions through emails, newspaper articles, and the YouTube channel could be marketed five to six months prior. This will keep the audience engaged for a longer period and attract excitement around the annual event. Figure 20 shows a possible flyer design that could be used to promote the film festival.

Theme Ideas: The prompt of the film festival could be tailored each year to generate specific conversations relevant to the land trust community. For future prompts, EVLT could ask students to create a film where they define a climate-related problem and think of creative solutions. Other prompts could include the importance of recycling, the need for the outdoors, or the consequences of carbon emissions. These specific prompts could allow for students to still express their creativity through their solutions while allowing for a more structured film to be produced.

Figure 23. Mockup of a future promotional poster (Poster created by Jade Veth).

Conclusion

Although it is apparent that conservation easements can protect land, many believe that the practices laid out within the agreements have been static due to their perpetuity and do not necessarily factor in the implications of climate change. Colorado is threatened by the increasing average temperatures caused by climate change. These higher temperatures heighten threats to snowpack, exacerbate water scarcity, create ongoing drought, encourage beetle infestation, and increase wildfire events (University of Colorado Boulder, n.d.).

Investigating how land trusts can implement conservation strategies that promote climate resilience can help to identify ways Estes Valley Land Trust can develop climate conscious contracts and programs. We hope that by facilitating conversations regarding climate futures, Estes Valley Land Trust continues to help others gain a better understanding of how they can play a more active role in climate change.

We hope that the work we have done is impactful and hope that the conversations about climate change and how conservation easements can consider climate futures can continue. We hope that the Estes Valley Land Trust will continue to be an educational platform for the community. We hope that land management practices that are climate resilient are shared with the Estes Valley region through the land trust. Broadly, Estes Park can be a leader in the community for climate change action.

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Appendices

Appendix A

Draft Interview Prompts

Climate Expert

1. Where in Colorado do you reside?
2. How long have you resided there?
3. What is your profession?
4. What have you done to study the climate, i.e., case studies, journals, etc.?
5. What changes have you noticed firsthand when you walk outside?
6. What do you know about land trusts?
7. Do you think land trusts and easements have helped to combat climate change?
8. Do you have suggestions on ways they can?

Jeffrey Boring (Executive Director at EVLT)

1. What is your role as Executive Director at EVLT?
2. What are current processes in place that take local climate changes into account?
3. What are future strategies you would like to implement to increase climate change awareness?

Focus Group

1. What is your name and how long have you lived in the Estes Park area?
2. What is your profession?
3. How long have you been involved with EVLT?
4. In what ways have the weather patterns changed in Estes Park since you have lived here?
    a. What physical changes have you seen to the land? The wildlife you see?
    b. Have you been personally affected by these changes?
    c. How would you explain the changes?
5. Do you know the process of entering a conservation easement?
    a. What are the typical land management requirements for each easement?
    b. What land management tactics have you seen/heard of landowners doing on their land?
        i. In what ways does this benefit the environment / their property (or their land in the easement)?
    c. Are landowners in the trust guided through / educated about the land management process at all? In which ways?

Appendix A (cont.)

6. Has EVLT taken the necessary steps to spread the importance of land management (in the context of climate change/weather pattern changes) to the residents of Estes Park (landowners, the youth, the retired community)?
    a. What are some ways you have seen EVLT bring attention to their cause?
        i. Do you think the tri-annual breakfasts are sufficient for spreading awareness of land trusts and conservation easements?
        ii. How do you feel about their new efforts (the film festival)?
        iii. Do you have any suggestions on what they should do?

Landowners in the EVLT

1. Do you own property under easement with the land trust?
2. Why did you donate a conservation easement or, why did you buy a property that is under easement with the land trust?
3. Are you concerned about climate change? Why or why not?
4. Do you see the land trust's work as part of the solution to combating climate change?
5. Your soil and trees sequester carbon, do you consider conserving your property as a small contribution towards reducing carbon emissions?
6. What changes in local climate have you seen if any?
7. How is your land affected by local climate changes?

Presentation to Sophomore Biology Class

1. What is a land trust?
2. What is a conservation easement?
3. What is the definition of climate change?
4. What are some indicators?
5. What are some climate changes you have noticed in Colorado?