Remote Monitoring Technologies for Colorado Land Trusts

An analysis produced by Land Trust Alliance for Keep It Colorado

Executive Summary

Land trusts have long employed a diverse set of tools to monitor the conservation easements and fee-owned lands they steward each year. Whether by walking a property with a landowner to document changes in land use or flying over a property to get a view from above, a thorough and efficient approach to monitoring is invaluable to any stewardship team seeking to understand potential threats to the conservation values of a property and how to address them.

Increasingly, remote monitoring technologies — which can include satellite imagery, unmanned aerial vehicles (UAVs), aviation-based resources and other tools — have become more widespread and accessible to land trusts in recent years. These alternatives to traditional in-person monitoring provide land trusts with a suite of new approaches for conducting effective stewardship and offer new options to supplement existing efforts and bring new perspectives to their work.

In August 2020, the nonprofit coalition Keep It Colorado received $205,000 in grant funding from Great Outdoors Colorado and the Gates Family Foundation to launch a program that would help Colorado land trusts monitor conservation properties across the state. **Motivated by the challenges brought on by the COVID-19 pandemic, which prevented many stewardship teams from safely visiting landowners and traveling to properties around the state,** Keep It Colorado saw remote monitoring as an opportunity to ensure that land trusts' stewardship obligations could be met despite these obstacles. At the same time, this support would provide land trusts with a chance to evaluate these tools' broader value for stewardship as a long-term solution.

Exploring and Testing Different Approaches

These grants enabled 12 land trusts in Colorado to monitor over 1,608,000 acres across the state in 2020 using remote monitoring tools. Motivated by considerations including safety concerns related to the COVID-19 pandemic as well as increasing pressure on stewardship teams' capacity to monitor growing portfolios, these land trusts explored a range of approaches using several different technologies. Seven organizations contracted with Planet Labs, five organizations used Upstream Tech's Lens product, and two organizations purchased imagery from Airbus or Nearmap.

The learning curve associated with trying a new technology was more significant than anticipated for some organizations, particularly for those that worked directly with one larger vendor, whose products required extra technical expertise to use effectively and posed additional challenges for users. Despite this, many of these organizations' stewardship teams viewed most of the technologies they piloted as invaluable for fulfilling their obligations in an exceptional year, while benefiting from long-term solutions that they continue to incorporate into their work. **One land trust described remote monitoring as simply a "game changer" for stewardship.**

Along the way, land trusts learned many important lessons about how to effectively incorporate these tools for the unique needs of their organizations and the types of stewardship concerns often encountered in Colorado. They all idenitified **price, customer service, spatial resolution, geographic coverage and data accessibility as the most important considerations when selecting a remote monitoring technology and vendor.** Generally, these land trusts found that resolutions coarser than 1.5-meter were not typically suitable for detecting the kinds of small-scale changes that might constitute a violation, and many users found that a slider bar feature to view past and present imagery side-by-side helped to spot potential changes on the landscape. The timing of imagery delivery, particularly for tasked imagery was custom-ordered, was slow or unpredictable for many land trusts, which made scheduling monitoring and other stewardship activities more difficult and stressful.

Program Impacts

All land trusts in the cohort were able to maintain positive landowner relationships surrounding their use of these tools, citing responses to their remote monitoring approaches overall as neutral, positive, or very positive in all cases. **Some land trusts even reported benefits in using remote monitoring to engage with absentee landowners, seasonal residents and landowners with mobility limitations who may not otherwise participate in on-site monitoring visits in a typical year.**

Participants also provided data on their monitoring efforts where possible, and of the 10 land trusts that provided cost data, three estimated seeing higher costs by using remote monitoring methods than they had when monitoring in-person, while seven reported spending less. At each end of the spectrum, one Planet Labs user estimated spending 162% more while one Lens user reported a 55% decrease in spending in 2020 compared to 2019. For 164 properties monitored using Lens, on average, properties smaller than approximately 6,000 acres were more cost-effective to monitor remotely than in-person, while larger properties were less cost-effective.

Of the six land trusts that provided monitoring effort data, four Lens users reported declines in personnel hours needed to complete monitoring, ranging from a 46% reduction to an 80% reduction. Of two Planet Labs users, one reported an 83% reduction and one reported a 15% increase in personnel hours.

Besides the monitoring efficiencies and effectiveness seen by many of the participants, seven organizations avoided a total of more than 56,800 miles of travel by monitoring remotely. In terms of avoided emissions, **this represents a gross reduction of 46,676 pounds of carbon dioxide emissions, using figures for average car fuel economy.**

After their first-year experience, most of the 12 land trusts in the grantee cohort believe that remote monitoring will either play a major role (33%) in stewardship efforts or that they will likely use it to monitor a handful of properties each year (42%) moving forward. Funding and capacity are perennial concerns for land trusts, and any mechanism offering the potential to stretch conservation dollars further may be powerful in increasing an organization's ability to fulfill its mission.

To this end, continued support for land trusts through educational and capacity-building opportunities would enable Colorado land trusts to expand their use of remote monitoring tools and ability to learn more about effective implementation. Through this program, land trusts have shown that remote monitoring can be a powerful addition to their stewardship toolkits, and further support will be valuable in enabling land trusts to continue to ensure the long-term success of protecting land.

To learn more, read our full report: "Remote Monitoring Technologies for Colorado Land Trusts"