Chapter 5

# Utah's Future

## Key issues facing Utah's Future




*RED PINE LAKE | KORI ANN KURTZEBORN*




## Chapter Introduction


*BRIAN STEED*


**In Utah, we are generational thinkers. When we look at our mountains, rivers, and valleys, we imagine the inheritance we will leave to our children, grandchildren, and great-grandchildren: landscapes that are healthy, prosperous, and vibrant. Yet planning outside of our own lifetimes can be difficult. Long-term visions must be grounded in nearer-term goals that keep us accountable and motivated. The 2034 Winter Olympics in Salt Lake City provides such a milestone. Just as the 2002 Olympics galvanized investment and innovation for a prior generation, the decade ahead gives us the opportunity to align our aspirations with tangible outcomes that will benefit Utah for the next century.**

**By setting environmental goals with 2034 in mind, Utah can prepare not only to welcome the world again but also to secure lasting gains for its people and places. Targets for cleaner air, reliable water supplies, a resilient Great Salt Lake, and healthy forests and rangelands are all within reach. Efforts to prevent and adapt to disasters—from wildfires to earthquakes—can similarly be accelerated with a clear timeframe. In this way, the Olympics become more than a sporting event; they can serve as a catalyst for generational stewardship, helping Utah take practical steps today that will echo into the future.**

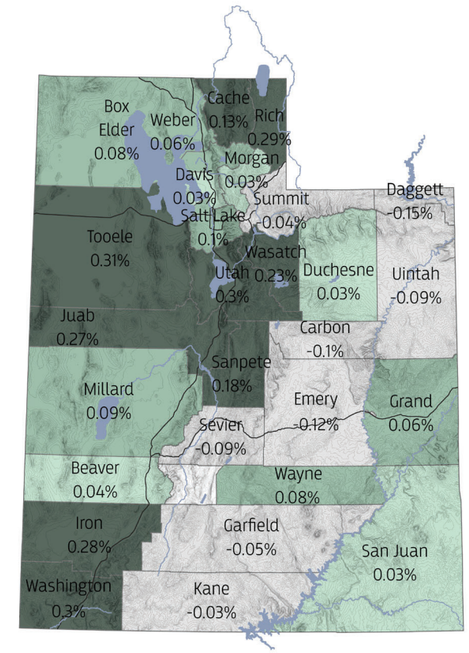



**Figure 5.I.1** 2024 Population Growth

***Map Created by Kori Ann Kurtzeborn, Data from the Kem C. Gardner Policy Institute***

*RED PINE LAKE | KORI ANN KURTZEBORN*

# Rethinking Seismic Engineering Along the Wasatch Front

*BRADY COX, PH.D. & MOHSEN ZAKER ESTEGHAMATI, PH.D, P.E.*

Current code-based seismic designs along the Wasatch Front may underestimate demands from a realistic magnitude 7.0 earthquake by more than 25%, warranting consideration of measures beyond minimum code requirements.

*Terms to Know:*

**Probabilistic: Approach using likelihoods and uncertainty to predict possible outcomes.**

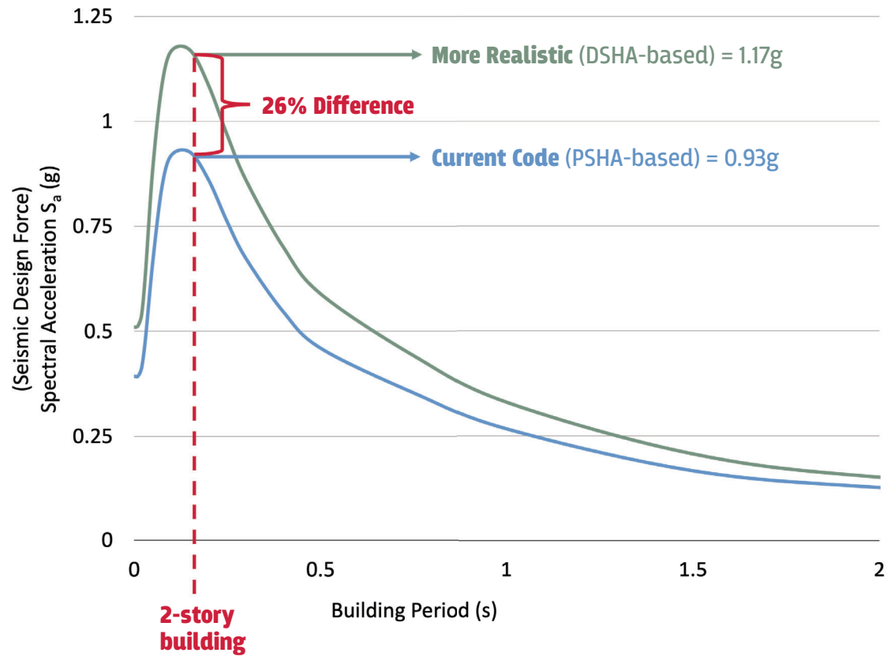
**Deterministic: Approach assuming fixed conditions to predict a single, definite outcome.**

**Current building codes require seismic design forces to be the lesser of two values: one from probabilistic seismic hazard analysis (PSHA) and one from deterministic seismic hazard analysis (DSHA). PSHA evaluates the likelihood of many possible earthquake scenarios over a specified time interval, providing calculations to balance safety objectives with economic considerations. DSHA, by contrast, identifies a single, large, but historically realistic earthquake that would be expected at a site. PSHA values are always lower than DSHA values along the Wasatch Front. Along the Wasatch Fault this single earthquake is approximately a magnitude 7.0 event. This magnitude is based on our best estimates from large earthquakes that have occurred about every 1,300 years along the Wasatch Fault. The last earthquake of this magnitude occurred approximately 1,400 years ago near Salt Lake City, and more than 2,500 years ago near Brigham City. So, data suggest the Wasatch Front is "overdue" for a magnitude 7.0 earthquake.**

**The difference between PSHA- and DSHA-based values is significant along the Wasatch Front (refer to Figure 5.A.1). For example, in Salt Lake City, DHSA design forces for a two-story building built on shallow, weathered rock (i.e., Site Class B subsurface conditions) near the Utah State Capitol are about 26% higher than those from PSHA. This means buildings designed only to PSHA-based codes could face much greater demands during a real magnitude 7.0 event, raising the risk of severe damage or collapse.**


*MAGNA MAIN STREET AFTER EARTHQUAKE, MARCH 18, 2020 | EARTHQUAKES.UTAH.GOV*

Figure 5.A.1 Seismic Design Forces from DSHA and PSHA




**The Utah Earthquake Engineering Center (UEEC) is studying whether extra safety measures—designing beyond code minimums—may be needed to ensure buildings can withstand a magnitude 7.0 earthquake shaking. Preliminary results show that costs associated with designing to higher DSHA seismic forces are likely quite low for many buildings. These efforts aim to ensure Utah is more resilient to a future major earthquake.**

**The last 7.0 earthquake occurred approximately 1,400 years ago near Salt Lake City, and more than 2,500 years ago near Brigham City. So, data suggest the Wasatch Front is "overdue" for a magnitude 7.0 earthquake.**

*CONSERVATION GARDEN PARK, WEST JORDAN, UT | AARON FORTIN*



*Partner Perspective*

# Next Steps in Municipal and Industrial Water Conservation

*LAURA VERNON*

Efforts are underway to balance water supply in the Great Salt Lake Basin through continued conservation and regional collaboration.

*Terms to Know:*

Municipal and industrial (M&I) water: **Water used by cities, businesses, and industries, not farming.**

Depletion: **a portion of water demand that doesn't return to the hydrologic System**

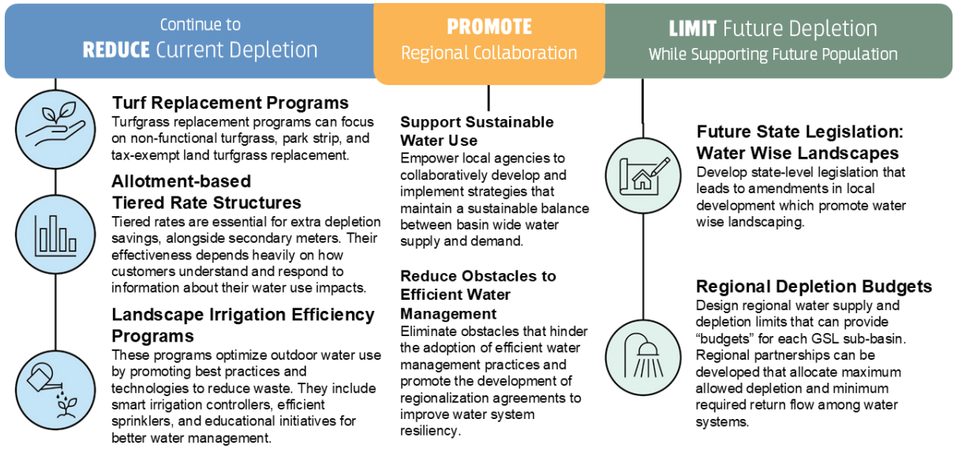
**The issues surrounding Great Salt Lake are going to require all water users to contribute to the solution of getting more water to the lake. As part of the development of the Great Salt Lake Basin Integrated Plan, the Utah Division of Water Resources has released a study titled "Municipal and Industrial (M&I) Water Conservation Opportunities." Investigation of M&I water use examines conservation measures and their associated costs. The report also and provides actionable recommendations to safeguard Great Salt Lake.**

**M&I is the second-largest human-related source of depletion in the Great Salt Lake Basin, after agriculture. Outdoor water use accounts for 96% of total M&I depletion, making it the top opportunity for conservation. Indoor water use has low depletion relative to outdoor use because most of it returns to the system after being treated through the sewer system.**

**Reducing outdoor water use will be most effective in increasing potential flows to Great Salt Lake.**

**The study emphasizes the need to approach water planning at a regional or state level, rather than solely a local level. Local conservation programs exist, but not at the scale needed to offset growth demand. Broad adoption of efforts—like turfgrass-replacement, allotment-based tiered rates and efficient irrigation—is key to reducing basin depletions. The study recommends the introduction of region-specific depletion budgets that would account for the unique constraints with water supply and demand. Region-wide efforts to reduce depletions and find a balance among water users at the local citizen, city council, water system and legislative levels is necessary to provide long-term water planning solutions for Great Salt Lake and all uses in the basin.**

Figure 5.B.1 Municipal and Industrial Water Conservation Opportunities



# Carefully Planned Growth Can Create Resilience for Both Farmers and the Lake

*BRYN **W**AT**K**INS & STACIA RYDER*

The pressures of global economics and real estate development can conflict with farmers' efforts to steward water resources.

*Terms to Know:*

**Codesign: Collaborative process where researchers and stakeholders design solutions together.**

**While farmers must necessarily play a key role in water conservation, they are not solely responsible for the conditions that have led to the Great Salt Lake's decline, nor can they be the only actors accountable to solve the problem. Indeed, interview-based research indicates that farmers feel deeply protective of Utah's land and water. They believe—often spiritually—in using the Great Salt Lake Basin's finite natural resources to strengthen their communities. As demand for housing in the Basin grows, and as profit margins in agriculture continue to fall, farmers feel increasing pressure to sell to real estate developers or maintain water-intensive land use—even though their hearts and heritage remain with the care of the land. An anonymous farmer who was part of the research said, "We're kind of in an agricultural death zone…I think sometimes we're putting growth ahead of the stability of everybody else who lives here." Utah needs both food and housing, along with a collective effort to stabilize water usage throughout the Basin. Policies enabling farmers to choose to steward water more conservatively while also earning a fair return on their labors will enable farmers to choose water conservation and remain in agriculture. And Great Salt Lake, too, can build greater resiliency if the region engages in more serious conversations about managing growth. Conservative economic expansion and growth that prioritizes and defends both ecology and heritage will create opportunities to better steward water. Solutions should be codesigned with farmers to take seriously their financial needs and place-based values. Those processes will better preserve the long-term stability of the region as a whole.**

*HAY BA**L**E NEAR BEAR **L**A**K**E BIRD RE**FU**GE | AAR**O**N **FO**RTIN*

*AGRIC**UL**TURA**L** **L**AND NEAR BEAR **L**A**K**E BIRD RE**FU**GE | AAR**O**N **FO**RTIN*

# Enhancing Wildfire Resilience in Utah

*LARISSA YOCOM*

Wildfire resilience can be increased using community preparedness strategies, pre-fire fuel reduction methods, and post-fire planting.

**Wildfire resilience in the human context is the ability for people, homes, communities, and infrastructure to withstand wildfire without significant disruption to health or livelihoods. This can be enhanced through wildfire-ready construction materials, vegetation management, and planning. Effective wildfire preparations include minor improvements such as installing screens on home vents to major interventions like planning development to minimize wildfire risk.**

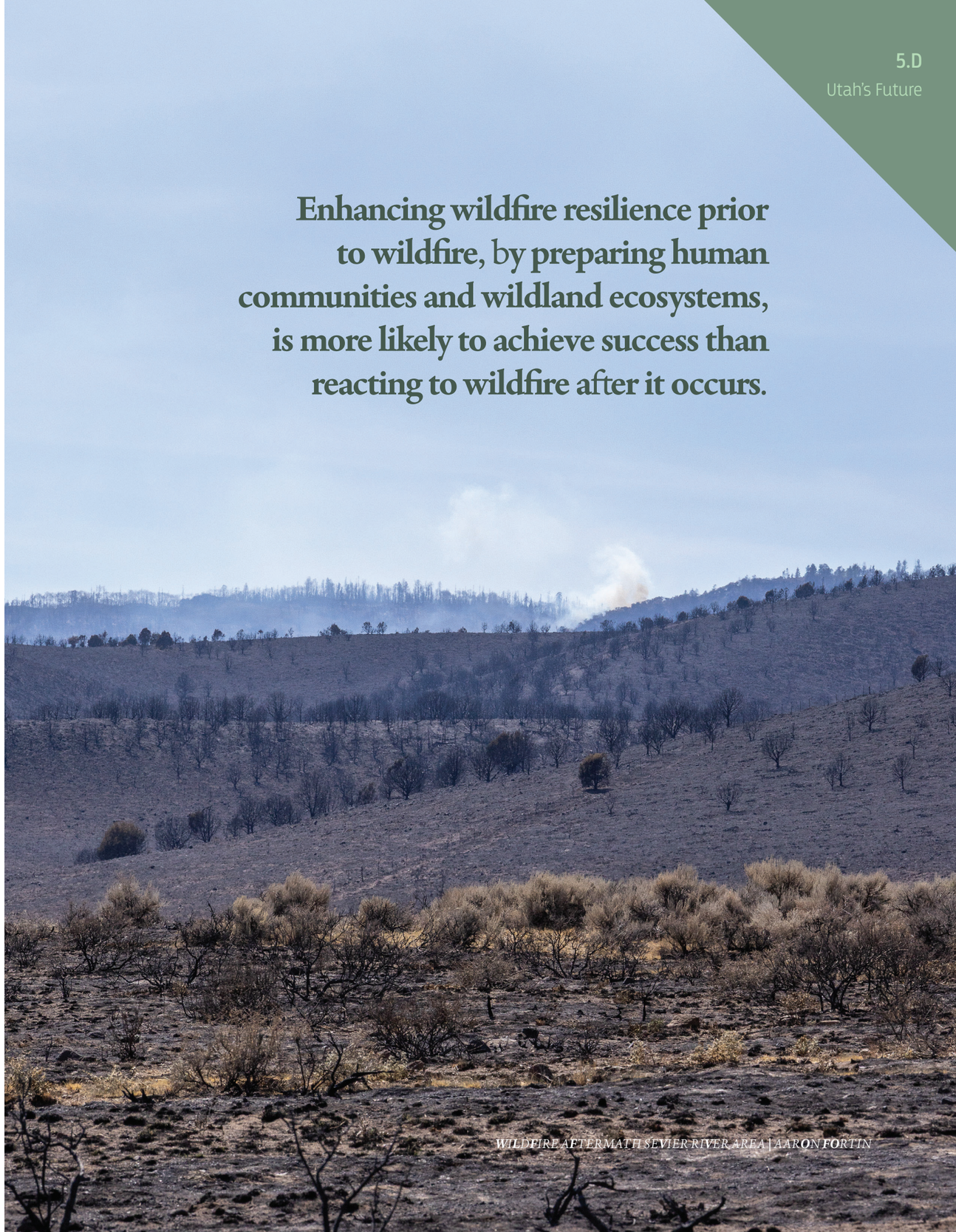
**In the context of wildland ecosystems, wildfire resilience refers to the ability of an ecosystem to return to a similar condition after a fire, through natural processes or through management activities such as hillslope stabilization or planting. In Utah, many ecosystems are naturally wildfire resilient. Some of our native species have a long history of recovering or even thriving after fire, though it may take time. In some ecosystems, resilience can be fostered prior to fire through active vegetation and fuel management. A loss of resilience occurs when a wildfire burns in an uncharacteristic way for an ecosystem, or when heat or drought overwhelm recovery processes. This means that in some burned areas, ecosystems may not return to pre-fire conditions.**

**Recent research shows that planting aspen in post-fire settings can be successful in Utah to create wildlife habitat, stabilize soil, and possibly serve as a fire break where it grows in pure groves. However, enhancing wildfire resilience prior to wildfire, by preparing human communities and wildland ecosystems, is more likely to achieve success than reacting to wildfire after it occurs.**

*LEFT: WILLARD PEAK FIRE | KORI ANN KURTZEBORN*

*BELOW: FIRE FIGHTERS, LOGAN, UT | STEVE SMITH*

Enhancing wildfire resilience prior to wildfire, by preparing human communities and wildland ecosystems, is more likely to achieve success than reacting to wildfire after it occurs.



*WILDFIRE AFTERMATH SEVIER RIVER AREA | AARON FORTIN*

*Partner Perspective*

# The Continuing Mission of the Utah Department of Environmental Quality

*TIM DAVIS*

> "Protecting and improving Utah's air, land, and water while supporting communities and growth statewide."
> –Mission Statement for the Department of Environmental Quality

**The Utah Department of Environmental Quality (DEQ) works with state and local partners to carry out its mission of protecting Utah's air, land, and water while supporting communities and growth statewide.**

**Recent examples include:**

- **Working with prospective data centers on the best locations to build in Utah without overburdening the Wasatch Front's airshed.**
- **Installing 19 dust monitors around the Great Salt Lake and in the West Desert to track dust origins and examine for possible toxic elements.**
- **Testing all Utah K-12 schools for lead in drinking water by taking 1,158 samples at no cost to schools. Utah was the first state in the nation to do so.**

**Utah is a diverse state with majestic mountains, stunning canyons, wonderful communities, and life-giving rivers and lakes. Utah's growth is inextricably linked to the health of its air, land, and water. Air pollution, energy production, affordable housing, and water conservation must all be addressed. These are significant challenges. Fortunately, Utahns are known for their grit and their ability to solve tricky challenges together.**

**In order to make progress on these challenges, Utah must begin by changing its relationship to water. Whether in the Sevier, Colorado, or the Great Salt Lake Basins, valuing water in everything we do is essential for agriculture, communities, and future generations. This year, DEQ's Division of Drinking Water helped bring clean drinking water to rural communities in Apple Valley and Westwater for the first time.**

**Similarly, sustained improvements in air quality depend on the individual and collective choices Utahns make everyday. Building on decades of focus and investment,annual statewide emissions have plummeted over the last 25 years, despite adding more than a million Utahns during that same time period.**

**DEQ is charged with implementing state and federal environmental regulations. Working collaboratively across Utah, DEQ is committed to accelerating win-win solutions that enable businesses and communities to achieve healthy growth alongside improved air, land, and water quality.**

*THE NARROWS, ZION NATIONAL PARK | AARON FORTIN*

*RIBBON CUTTING CEREMONY FOR WESTWATER DRINKING WATER PROJECT | NAVAJO NATION LEADERS & LIEUTENANT GOVERNOR*

*AMERICAN FORK CANYON, UT | AARON FORTIN*

## CHAPTER 5 REFERENCES


5.i.1. **Kem C. Gardner Policy Institute**. (2025). *State and County Estimates TABLEAU*. [**Dataset**]. **University of Utah David Eccles School of Business**. **https://gardner.utah.edu/utah-demographics/population-estimates/state-and-county/state-and-county-estimates-tableau/**

5.C.1. **Watkins**, B. **N**. (2025). *'**O**nce **O**ur **L**and is Gone, It's Gone': **F**armer **P**erspectives on Growth, Embeddedness, and the **F**uture of **F**ood in the Great Salt **L**ake Basin*. [**Thesis**, **Utah State University**]. **USU D**igital **Commons**. **https://digitalcommons.usu.edu/etd**2023/455

5.D.1. **Nesbit**, K. A., **Yocom**, **L. L.**, **Trudgeon**, A. **M.**, De**Rose**, **R.** J., & **Rogers**, **P. C.** (2023). **Tamm review: Quaking aspen's influence on fire occurrence, behavior, and severity**. *Forest Ecology and Management*, 531:120752. **https://doi.org/**10.1016/j.**foreco**.2022.120752

5.D.2. **Nesbit**, K. A., **Yocom**, **L. L.**, **Trudgeon**, A. **M.**, **Rogers**, **P. C.**, **McAvoy**, D. J., **Lane**, **E.**, & De**Rose**, **R.** J. (2024). **Stand composition and development stage affect fuel characteristics of quaking aspen forests in Utah, USA**. *Canadian Journal of Forest Research*, 55:1-13. **https://doi.org/**10.1139/cjfr-2024-0095

5.D.3. **Yocom**, **L. L.**, **Kreider**, **M. R.**, **Burney**, O. **T.**, **Parsons**. **T.**, **Choi**, **R. T.**, **Liese**, **E.** K., & **Mock**, K. **E.** (2025). **Experiments to enhance post-fire aspen seedling survival and growth**. *New Forests*, 56(4):41. **https://doi.org/**10.1007/s11056-025-10097-7


*TWILIGHT OVER UTAH LAKE | AARON FORTIN*