

Boise State University

**ScholarWorks**

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2021 Undergraduate Research Showcase

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## **Why are Boise's Trails So Muddy?**

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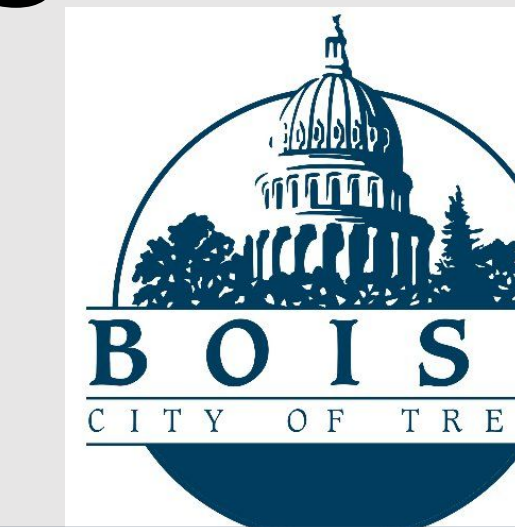
## Introduction:

A collaborative project with the City of Boise to understand and educate on the impacts of climate change and increased use in the Boise Foothills. Climate change is altering this ecosystem and causing increasingly muddy trails. Muddy trails are incongruent with recreational use.



# Why are Boise's Trails so Muddy?

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## The project:

### Objectives

- Create a trail sign to be placed in the Boise foothills to educate users about respectful trail use
- Conduct trailhead tabling to educate users
- Use social media as a platform to educate the Boise community on correct recreational practices
- Utilize climate data and create projections to understand how climate change has already affected Boise's temperature and snowmelt patterns
  - Use this data to inform about the future conditions of the Boise foothills
  - Understand how climate change will affect these recreational trails

## Data Summary and Conclusions:

- Data collected from Natural Resources Conservation Service: Idaho SNOTEL Site, Bogus Basin (6340ft).
- Temperature fluctuations - fluctuations are occurring
  - 2003 was a very cold year with many days at or below freezing
  - 2016 was a much warmer year with few days at or below freezing
    - Natural fluctuations will occur as temperature is caused by many factors
- Both April and November show a trend of decreasing freezing temperatures - these months were chosen because temperatures fluctuate above and below freezing affecting the trails
  - The Boise Foothills are experiencing less days below freezing
- Data Maps collected from USDA Forest Service, Climate Change Maps project
- By 2070, the Boise foothills are projected to experience 60 to >90 more frost-free days a year compared to historical (1975 - 2005) data
- Boise foothills is experiencing (and projected to continue experiencing ) a greater number of frost-free days - increasing muddy trails

## Future Research:

This project infuses the first stage of research. Discovering a true pattern of fewer days below freezing will require earlier climatic data. Analyzing a twenty year period does not allow for dramatic trends. This data shows that warming has occurred in the Boise Foothills throughout the last twenty years. Further research could prove this hypothesis and show how climate change is affecting the recreational conditions of the foothills.

## Are The Foothills Your New Gym?

The Boise Foothills provide a beautiful outdoor space to recreate! In 2020 over 3 million people used this recreation area. The foothill ecosystem houses critical wildlife and important plant species. Misusing our trails while recreating can lead to loss of biodiverse vegetation, increased erosion, and failed restoration efforts. Fragmentation and loss of sagebrush-steppe ecosystems makes it difficult for species that rely on the health of Hull's Gulch.

### What Can You Do To Help?

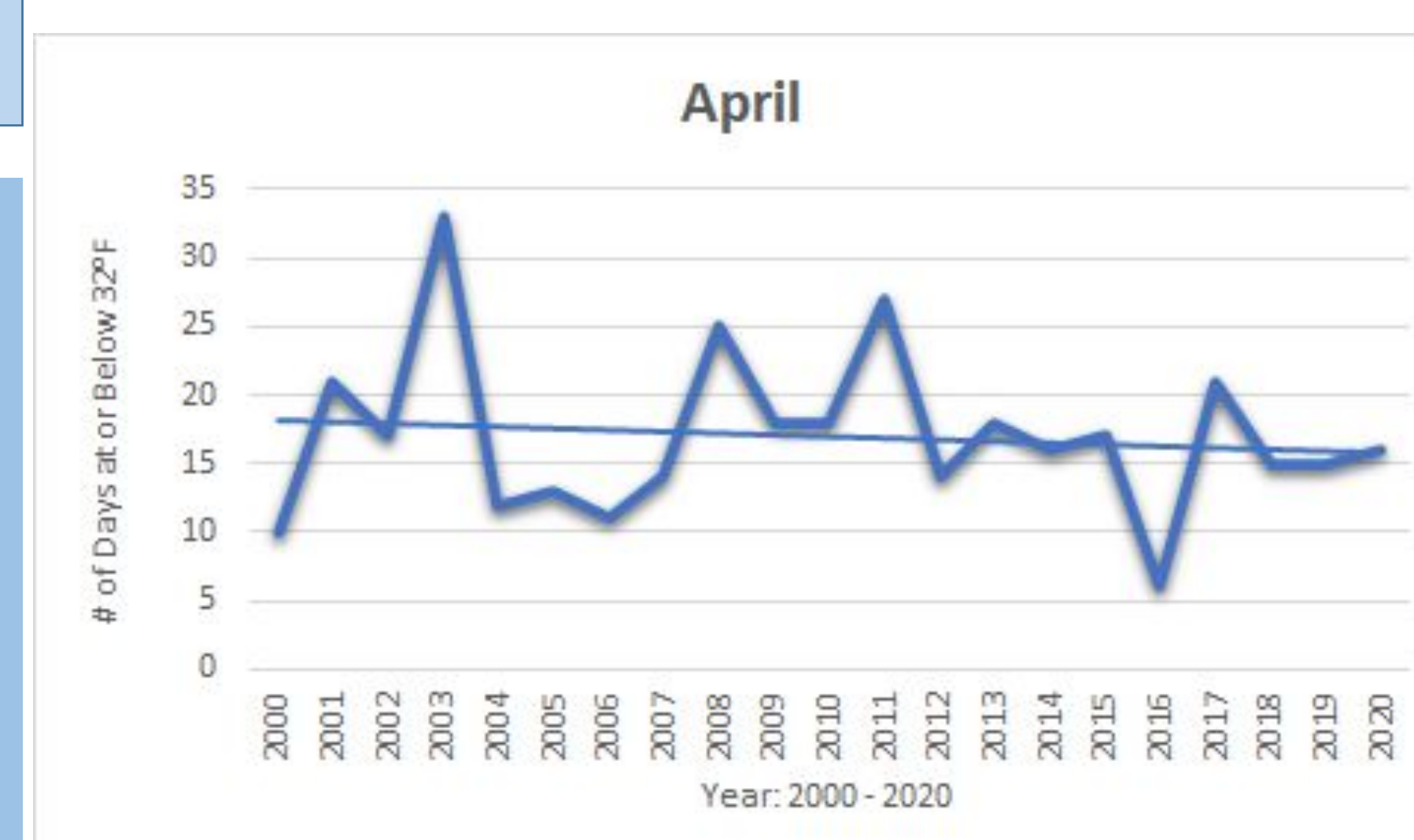
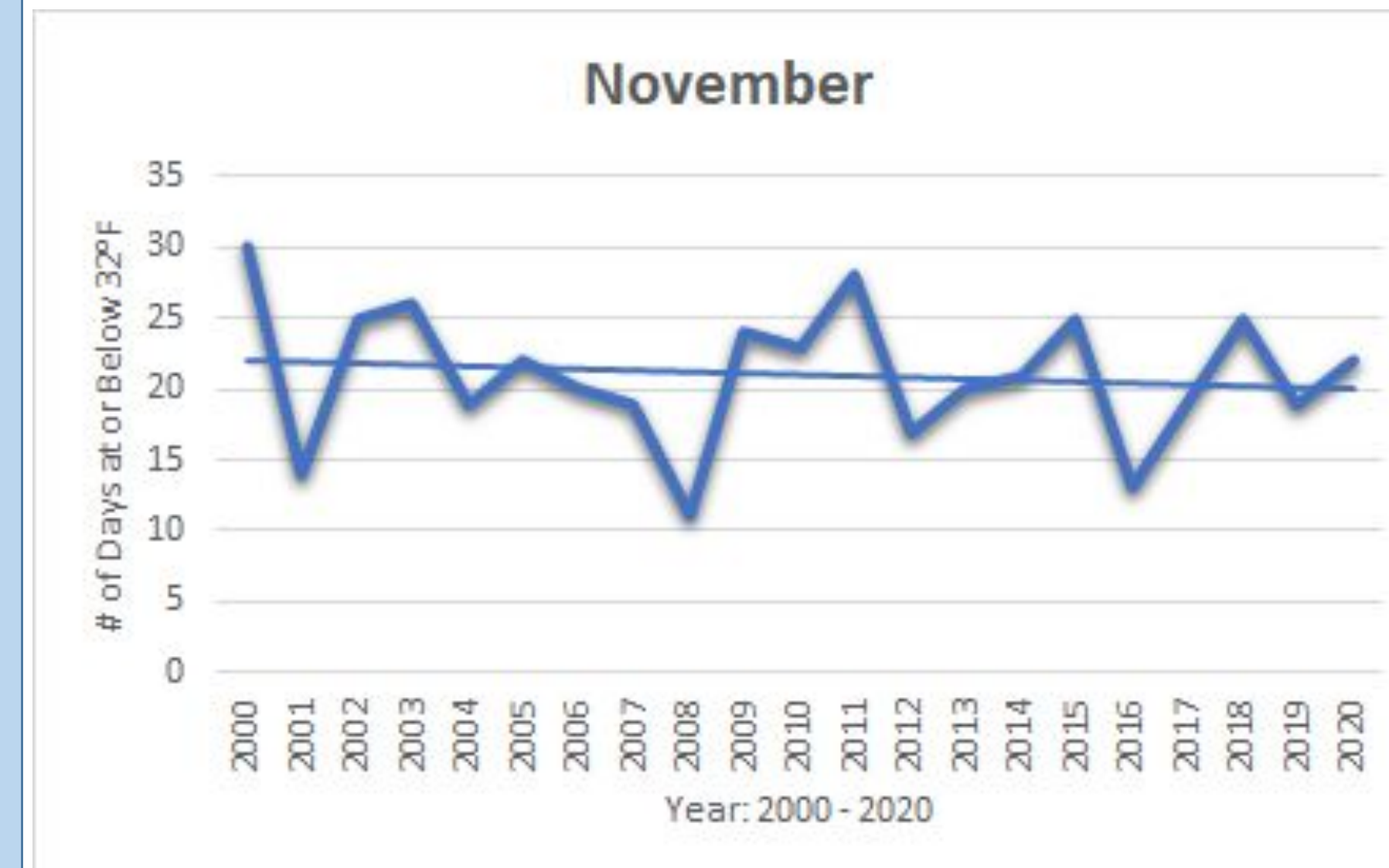
- **Stay on designated trails** – When we go off-trail (or let our pets run off-trail) crucial vegetation is trampled and restoration efforts are put at risk. Trails are widened and areas become eroded. Staying on trail means less environmental impact and happy critters.
- **Don't use muddy trails** – Footprints, paw prints, and tire tracks are left in the mud and can become a hazard to other users. Inevitably, people go off trail to avoid the mud; trampling trailside vegetation and increasing risk for erosion.
- **Choose to recreate during low use times** - Early morning or mid day
- **Control your pet during encounters with wildlife** – Uncontrolled dogs can cause stress to local animals. This could lead to a dangerous situation for the wildlife and your pet.
- **Pick up after your pets** – Dog waste is not only unpleasant for trail users, it also spreads disease! Picking up after your pets ensures disease isn't spreading to other animals, children, or our water.



Do your part to protect the Boise Foothills! Take the Happy Trails Pledge. Use your phone camera to scan the QR code for more information.



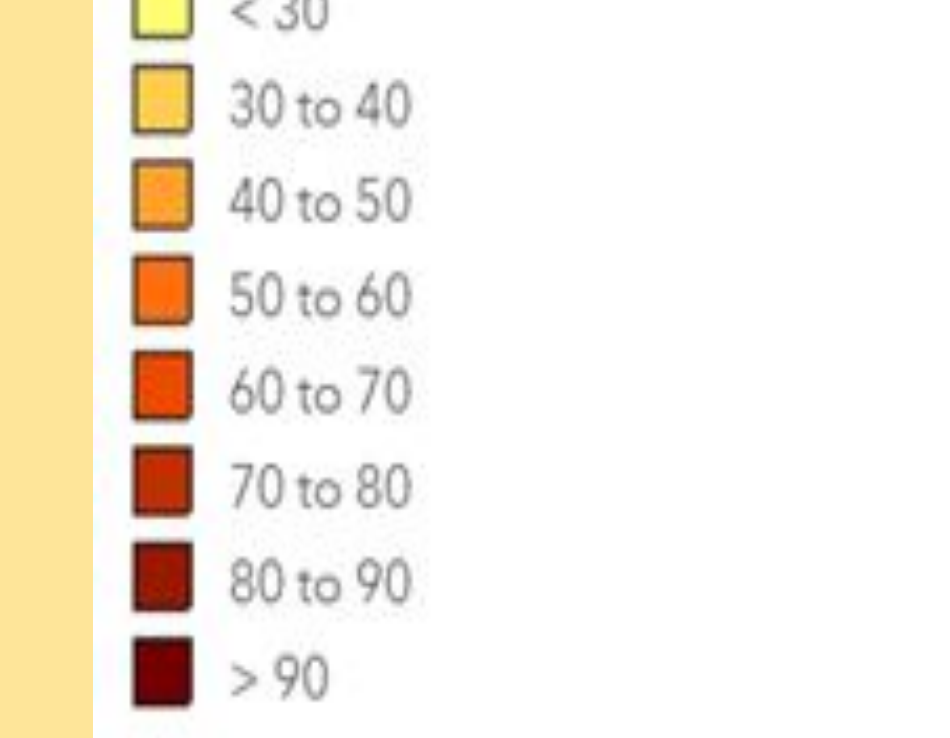
Draft of new sign for Boise Foothills trail-head



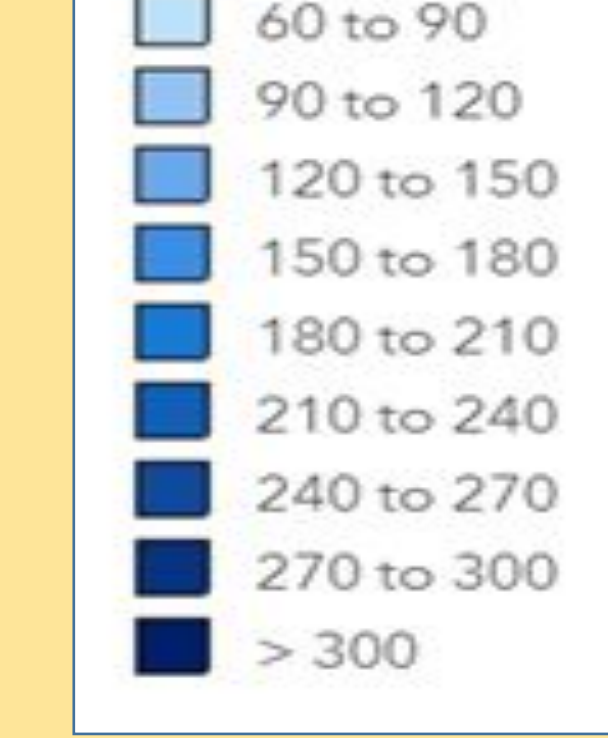
Map of Boise: Projected Increase in # of Frost Free Days



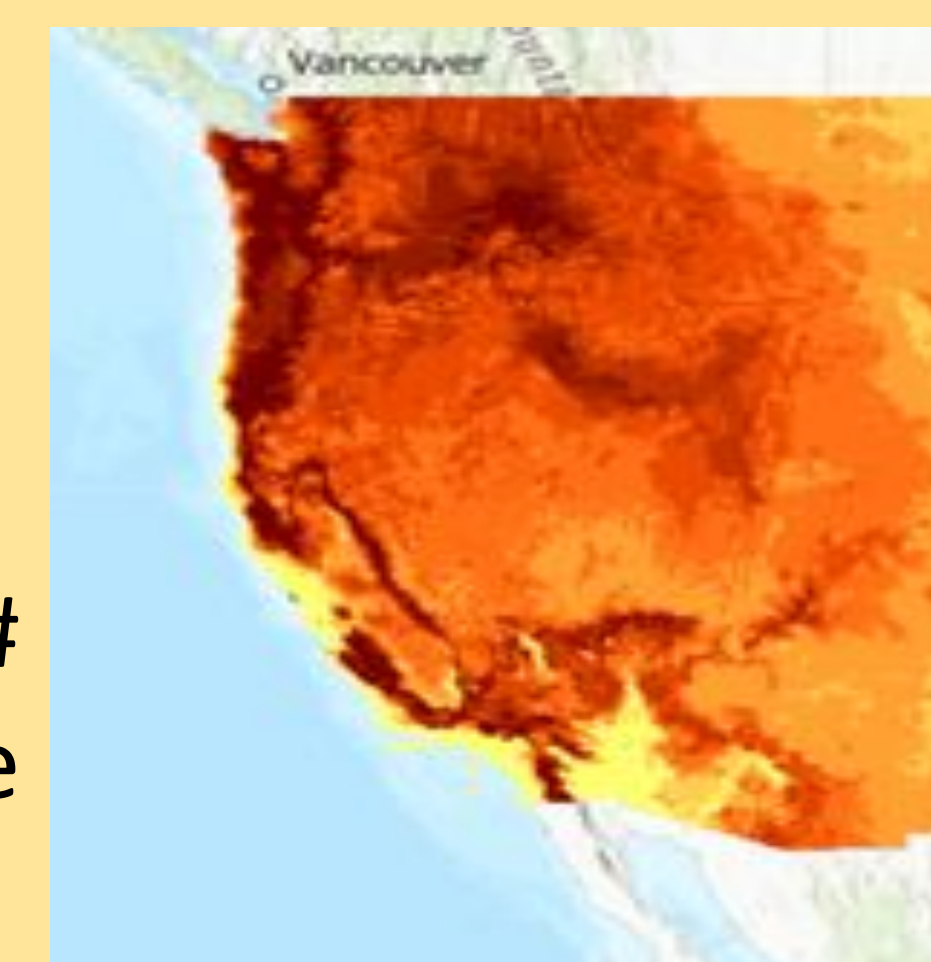
Legend  
FrostFreeDays\_01  
Change in Number of Frost-Free Days



Legend  
FrostFreeDays\_01  
Historical



Map of Eastern US: Projected (2070-2090) Increase in # of Frost Free Days



Map of Eastern US: Historical Frost Free Days



## Background:

The Boise foothills contain over 190 miles of trails that connect neighborhoods with a public outdoor recreational space. The foothills are composed of a sagebrush steppe ecosystem. Over 3 million people used the Boise foothills as of 2020. This space has grown in popularity due to COVID-19 and the closing of many indoor workout spaces. Popularity in 2020 increased by about 1 million users because of the pandemic and Boise's growing population. These foothills are used for hiking, running, cycling, and horseback riding. Many animals and plant species live in the foothills. The foothills provide for a fragile ecosystem that is overrun with invasive plant species that have created a monoculture in many areas. Therefore, the Boise foothills struggle to promote biodiversity and native species. This alters the soil, vegetation, and wildlife in the area. Many restoration efforts are focused in the foothills. It is an important space to care for and conserve due to its recreational and ecosystem values. Boise's changing climate poses a threat to the Boise foothills and recreational users. As warm temperatures increase in commonality, the snowmelt season and temperatures will change this ecosystem. Due to warming, muddy trails will increase as snow-melt occurs earlier in the year. It is often difficult to know if a trail is muddy or not (as a user travels farther down a trail, often the muddy conditions worsen). Others do not know about the hazard using muddy trails creates. Climate change is likely going to increase the muddy nature of the Boise foothills so education is vital to ensure the safety of recreational users and the health of this ecosystem.

## 04 RECREATE DURING TIMES OF LOW USE!



Choose to use the trails in the early morning or mid day



An example of social media material created to educate about proper trail use. Posted on Sustainability BSU's instagram.