



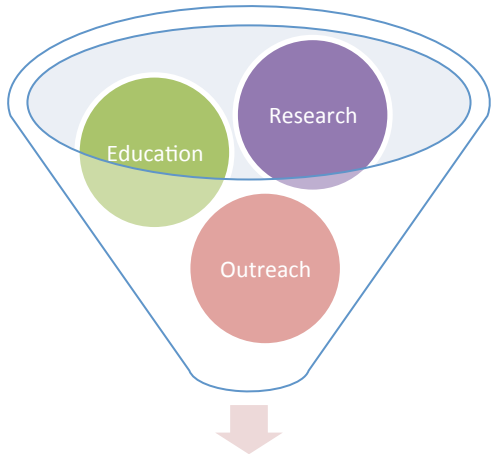
# The Red Butte Creek Project

- Vachel Carter – Geography
- Youcan Feng – Civil & Environ Eng
- Shima Hamidi – City & Metro Plan
- John Heiberger – Civil & Environ Eng
- Olivia Miller – Geology
- Tim Price – Mechanical Eng
- Gerald Schneider – Biology
- Kyle Steffen – Mathematics
- Thomas Walsh – Civil & Environ Eng





Images courtesy <http://redbuttecanyon.net>, Sensing and Processing Across Network (SPAN)



# The University of Utah

A World Class Institution for Higher Education



**Education**

- Students, Faculty and Staff
- Community
- Schools

**Research**

- Students, Faculty and Staff
- Inter-institutional and Intra-departmental

**Outreach**

- Prospective Students
- Community
- Schools



**Outreach**

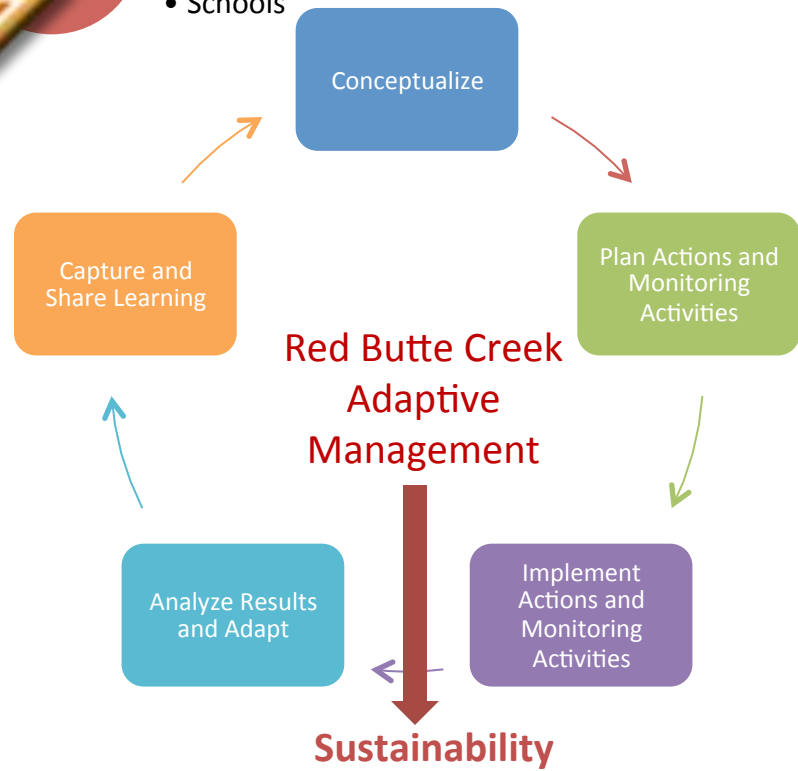
- Red Butte Gardens
- Utah Museum of Natural History

**Education**

- Student-led projects
- Faculty-tailored research
- Long-term monitoring

**Research**

- Monitoring
- Modeling
- Assessment



# Survey results on Red Butte Creek

242 respondents

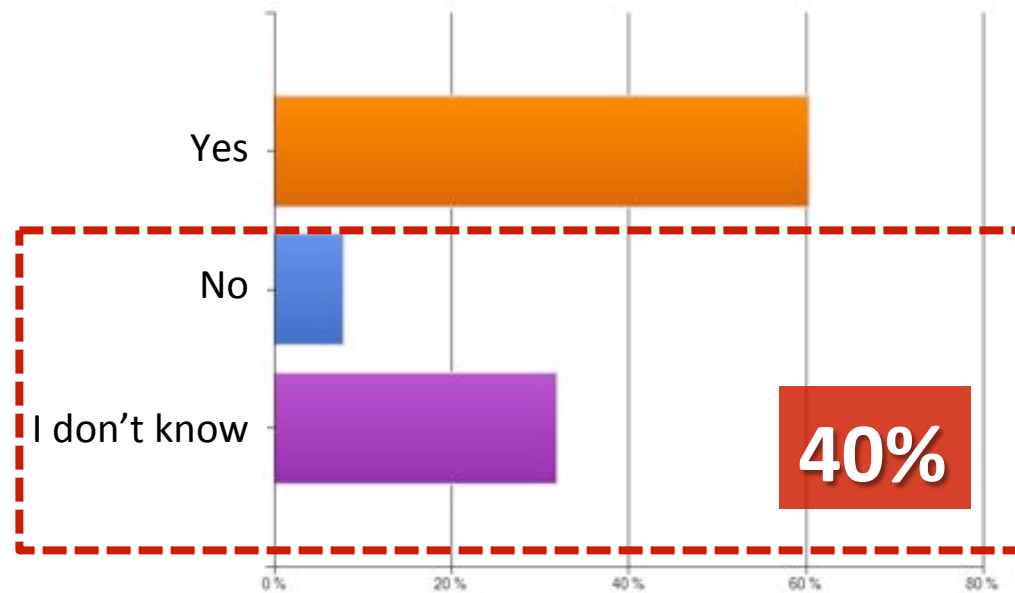




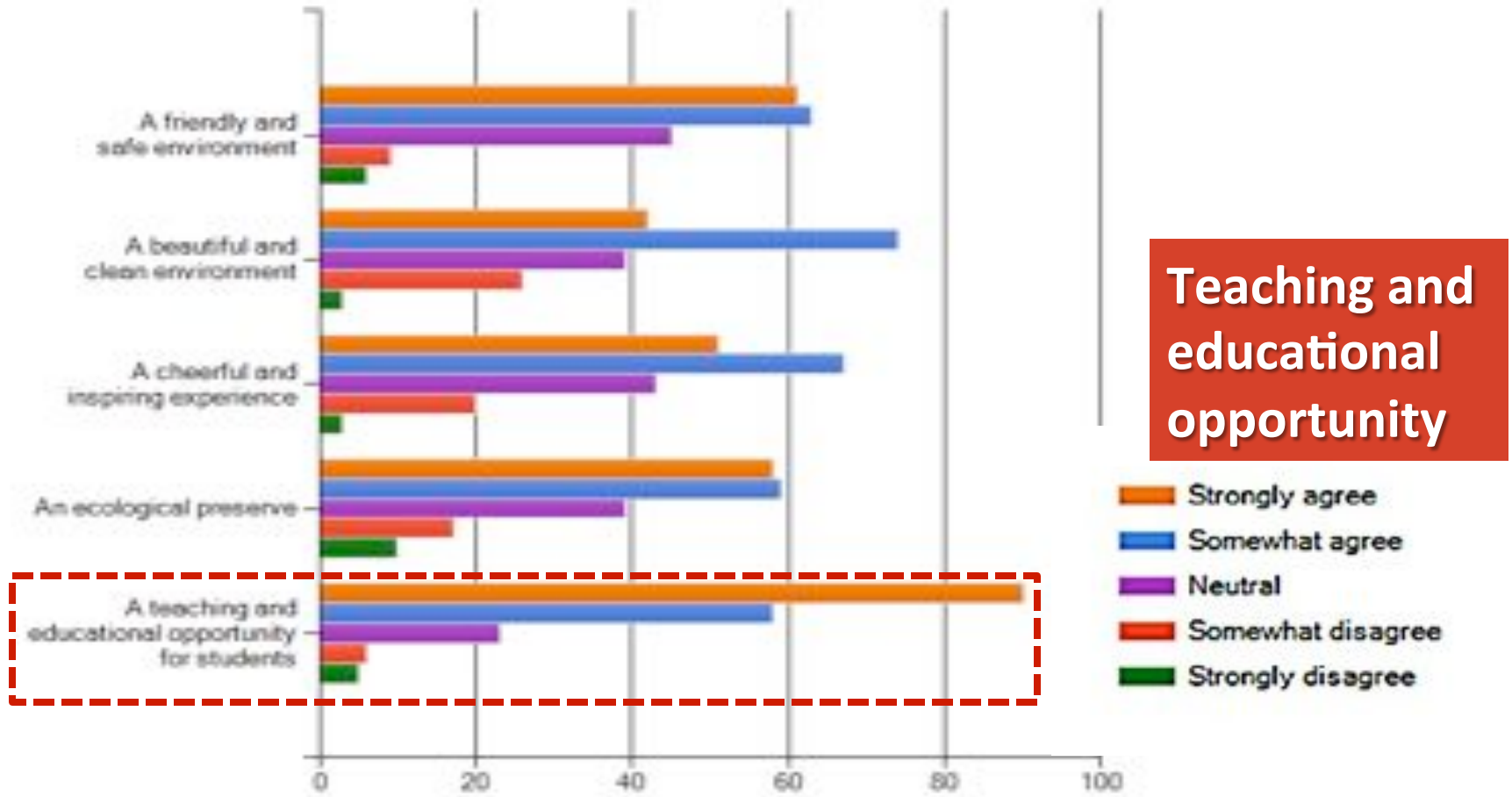
# Familiarity of respondents with the area and Red Butte Creek in particular

- **10%** of respondents are internationals and **50 %** of respondents are from outside of Utah
- **53 %** of them have been in University of Utah **more than 3 years**.

## Does Red Butte Creek pass through the University of Utah?



# To what extent do you believe that Red Butte Creek and surrounding area provide:

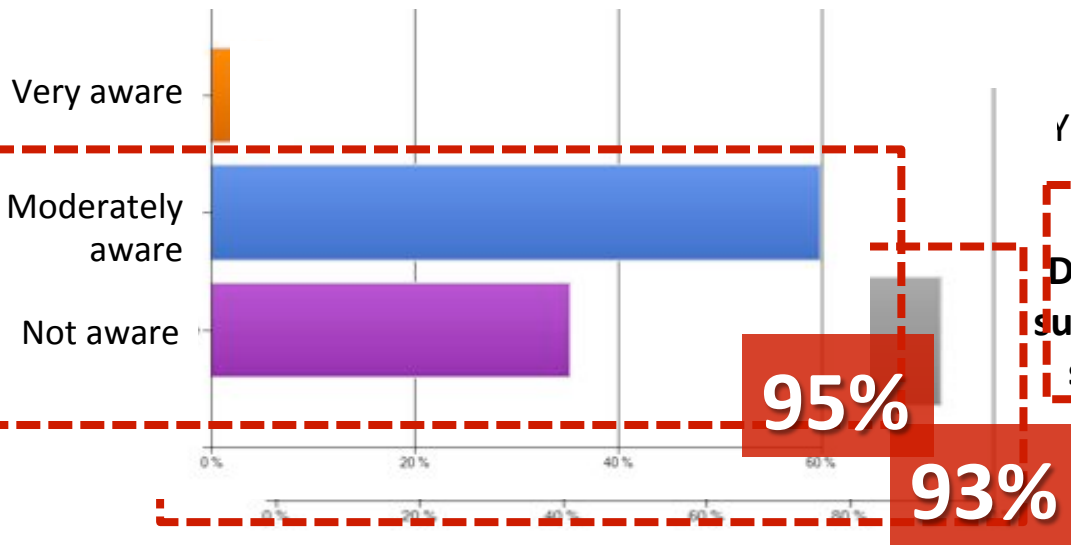


Teaching and educational opportunity

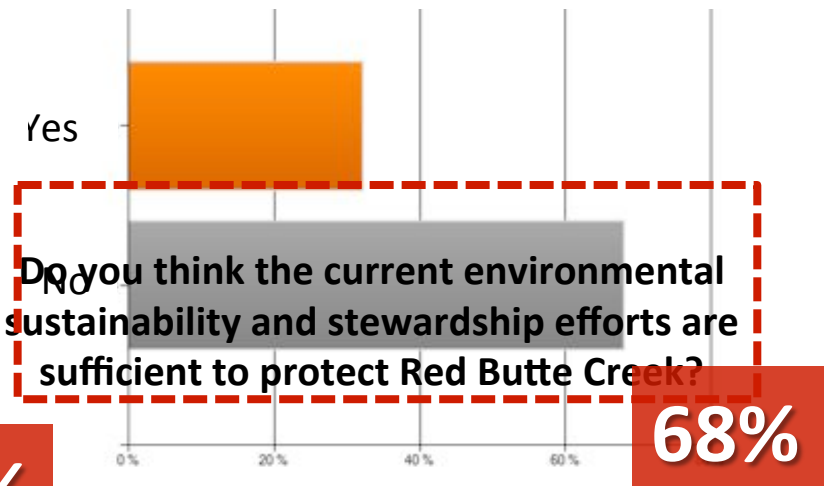
- They do not use the Red Butte Creek mainly because it is **not easily accessible**
- The majority of respondents became aware of Red Butte Creek through **Red Butte Garden** and **Bonneville Shoreline trail** (62 %)

# Respondents awareness of sustainability issues on campus and at Red Butte Creek

### The awareness of environmental and sustainability programs at the University?



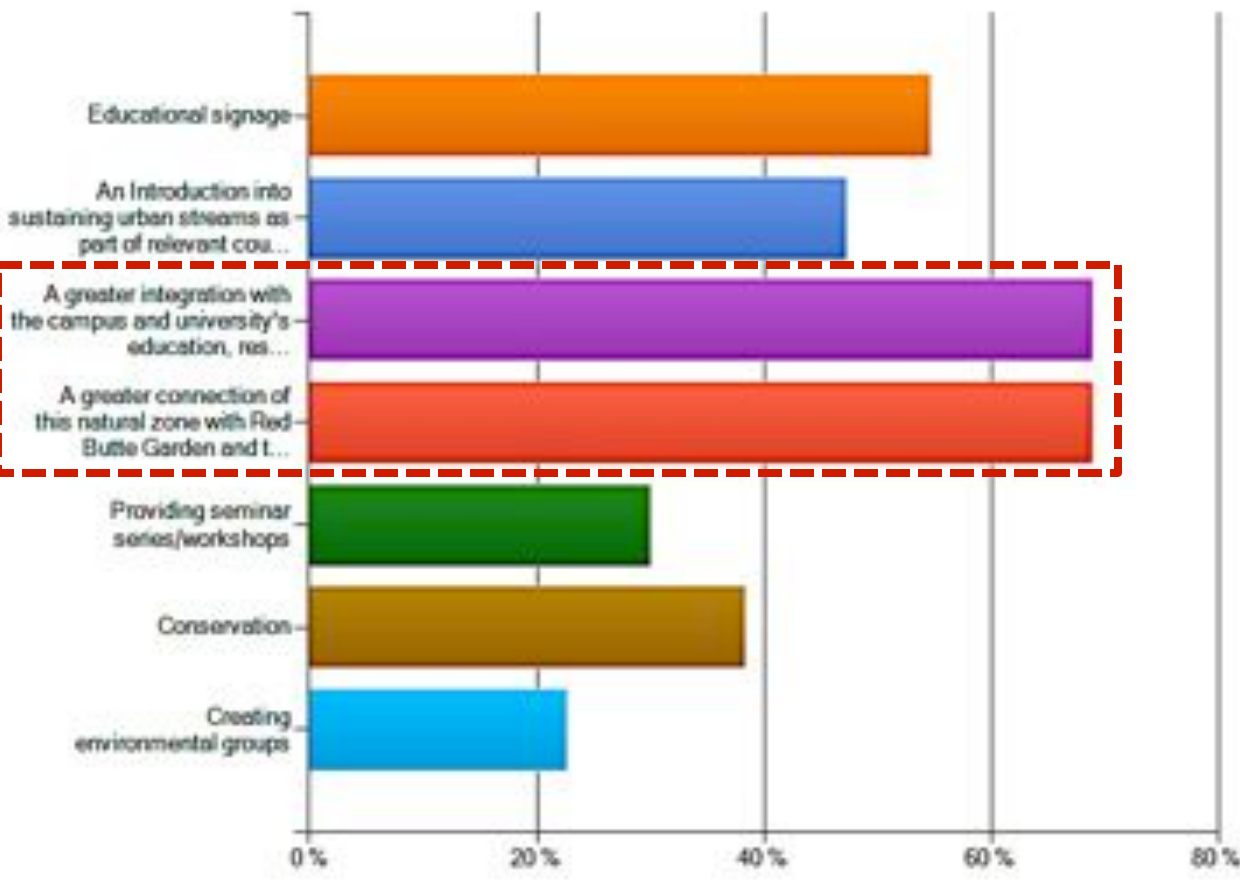
### The awareness of education opportunities offered by the University about Red Butte Creek?



Do you think the current environmental sustainability and stewardship efforts are sufficient to protect Red Butte Creek?

68%

# What do you feel would be the best ways for the university to increase awareness of Red Butte Creek?



86% of the respondents are **interested to donate** time and efforts to preserve Red Butte creek

79% of the students are willing to contribute as part of their **students fee**.

**Physical and educational connection to the university**



# Current Opportunities: Teaching

- **Unique and Effective Teaching Environment**
  - Hands-on learning in an urban riparian environment
  - On-campus field trips for real-world experience
  - Increased student experience and awareness of sustainability issues
- **Curriculum Enrichment**
  - Data collection, data analysis, ecological assessment and sampling, hydrology, etc



# Current Opportunities: Research

- **Laboratory Without Walls**
  - Nexus of University Research
  - Unique University asset as protected natural ecosystem enters a highly developed area
  - Encompasses many current research interests and strengths
- **Valuable Research Possibilities**
  - Environmental monitoring to measure future effects of stewardship and global changes
  - Incorporate into research such as now occurs at Rio Mesa Center



- **Sharing our Resources with the Public**
  - Community education and outreach
  - Red Butte Creek riparian area as a educational, academic, and cultural community resource
  - More accessible and integrated with Red Butte Garden, Natural History Museum of Utah, and Bonneville Shoreline Trail



# Opportunities for physical connections: **A path**

**Objective:** to create functional and educational connectivity among Red Butte Creek, Miller Park, Bonneville Shoreline Trail, Red Butte Garden, and the Natural History Museum of Utah



## **A place for**

- Gathering
- Education & research
- Recreation & transportation

Designed with ecological and restoration considerations in mind



# Conceptual overview of a path

Gathering, education & research, recreation & transportation

Interpretive information along themes of Museum of Natural History & Red Butte Gardens

Red Butte Garden

Bonneville Shoreline Trail

Museum of Natural History

Campus

Stream monitoring stations can be used by students, professors, and public agencies monitoring the stream.

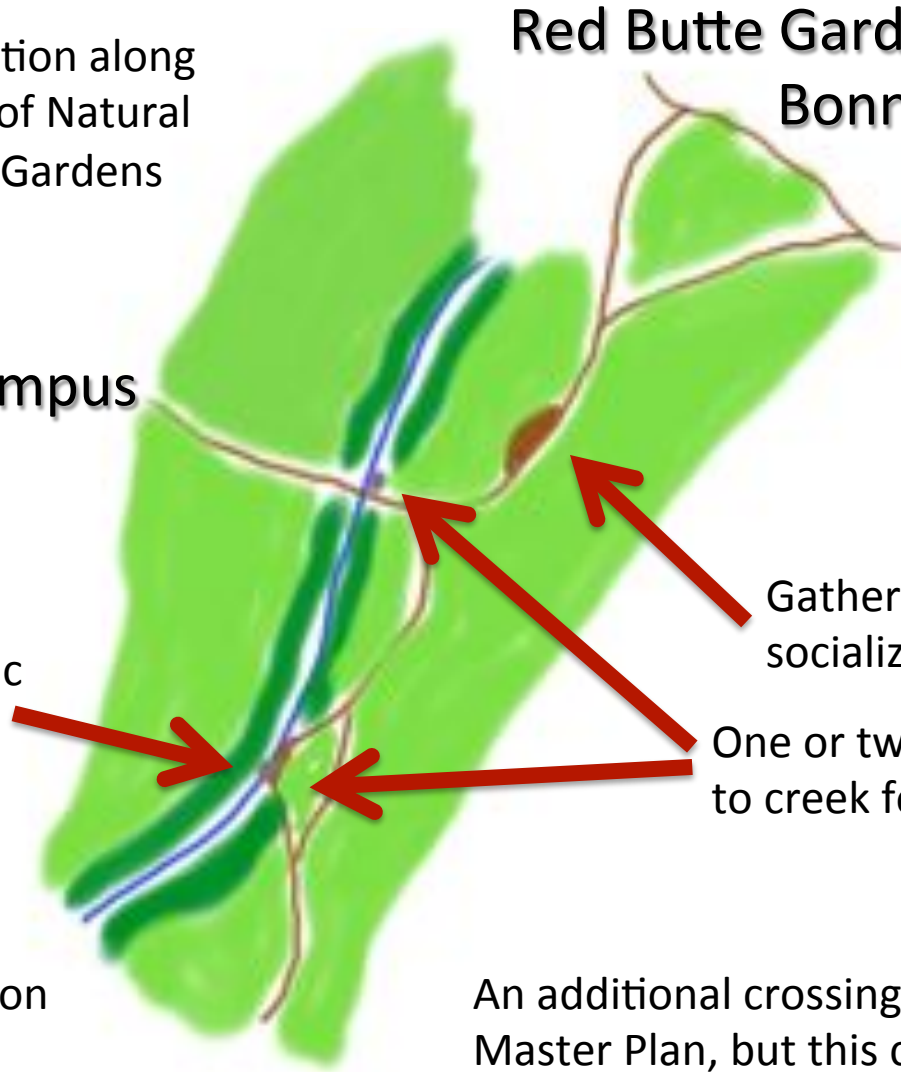
Gathering place for classes or socializing

One or two direct access points to creek for classes & research

Orientation information throughout

Miller Park

An additional crossing is proposed in the Campus Master Plan, but this could be expanded to a path that parallels the Creek to improve usability and preservation.

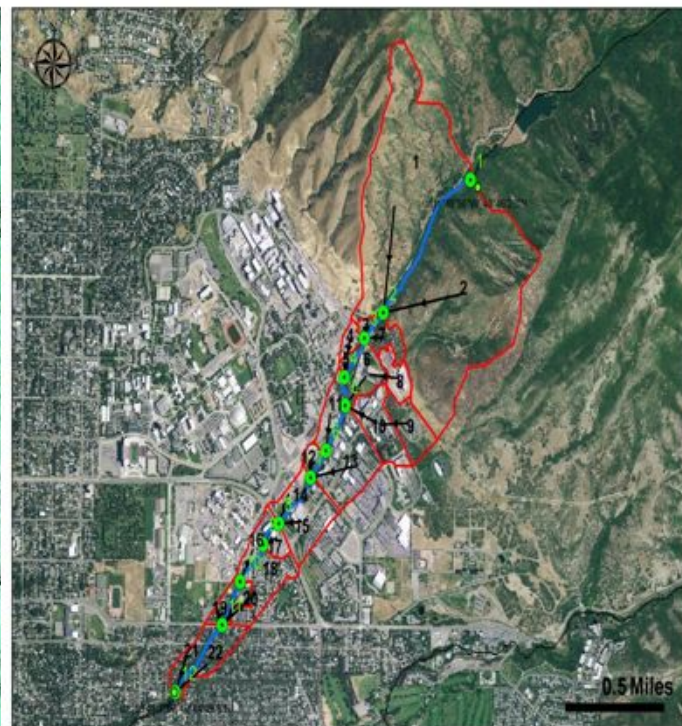
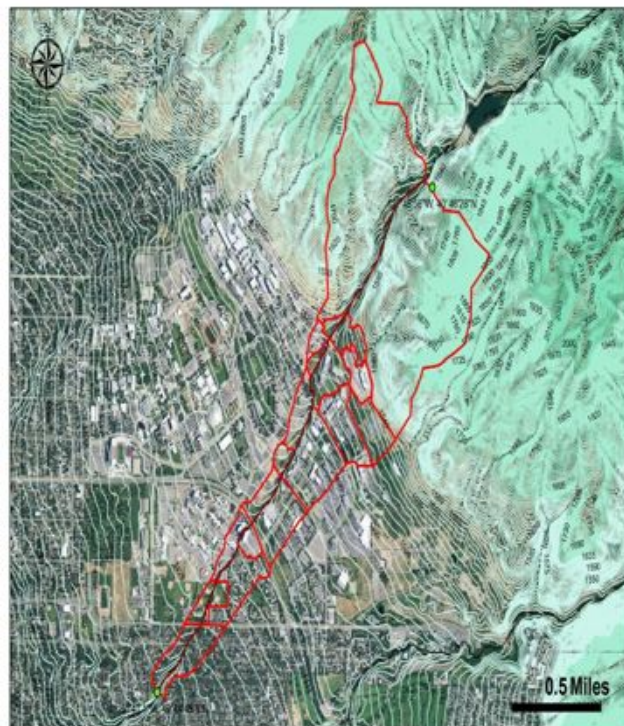


# Opportunities to be a stewardship leader: Hydrology Modeling

- **Natural Watershed & Urban Watershed**

## Urban Model

- Utah GIS Portal (AGRC)
  - Digital Elevation Model (DEM)
- Inlet: USGS Streamflow Gage #10172220
- Outlet: Salt Lake County Streamflow Gage #740





## Upstream Steward

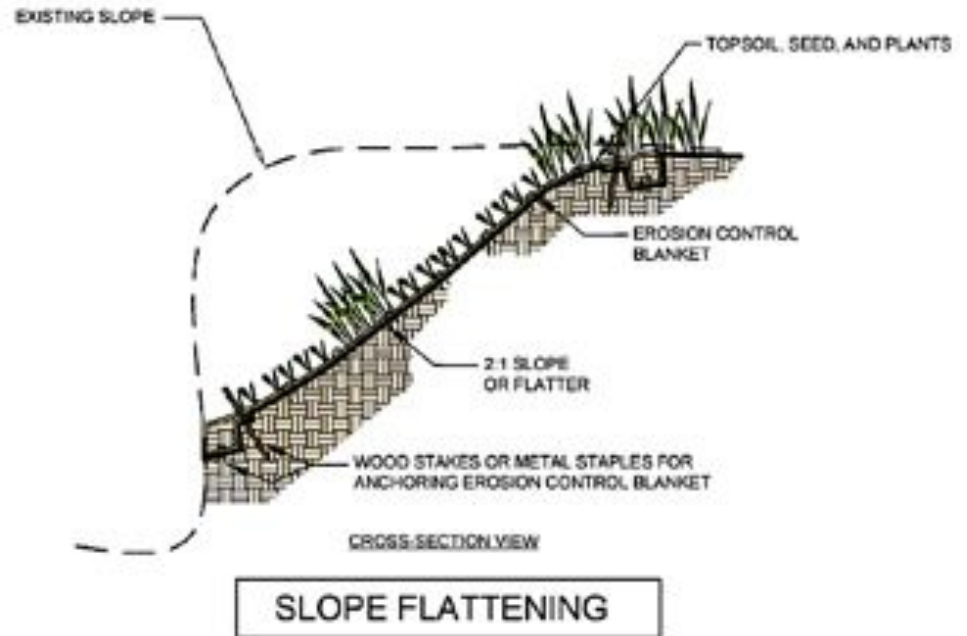
### Low Impact Development (LID)

- Bioretention
- Pervious Pavement
- Rainwater Harvesting
- Vegetative Swales
- Slope Flattening
- Vegetative Storm Drain Outfalls
- Pole Plantings



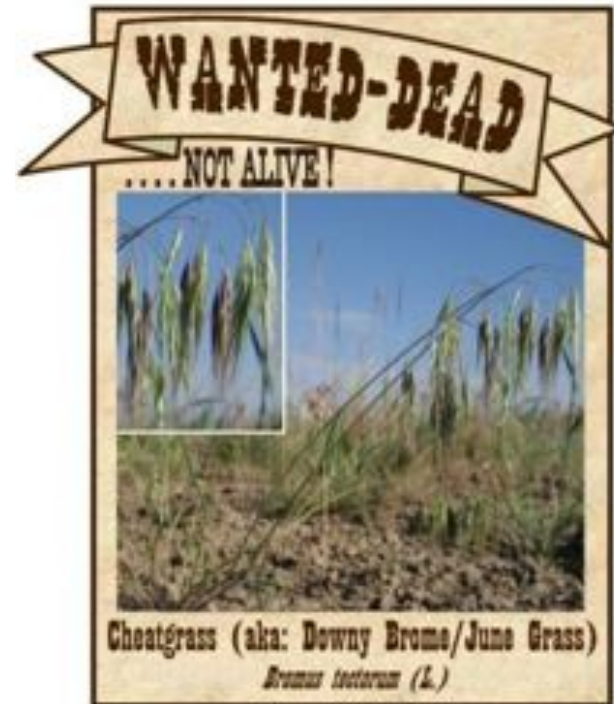
### Benefits

- Erosion Control
- Reduced Peak Flows
- Retention
- Reduced Channel Incision
- Reduced Sediment Transport
- Pollution Mitigation
- Public Perception



# Local Faces of Global Change: Current and Projected Challenges to Red Butte Creek

- Climate Change
  - Diminishing spring snowpack and more episodic precipitation
  - For plants, drought stress compounded by longer growing season
- Invasive Species
  - Threats to ecosystem function
  - Cheatgrass and fire susceptibility
- Population Pressures
  - Increased runoff from developed land
    - Nutrient loading, erosion
  - Increased demand on watersheds
    - Depletion of groundwater for mature trees





# Planning for Global Change: The University of Utah as a Stewardship Leader

The Red Butte Creek Project

- **Climate Change**

- Diminishing spring snowpack and more episodic precipitation
- For plants, drought stress compounded by longer growing season

- **Invasive Species**

- Threats to ecosystem function
- Cheatgrass and fire susceptibility

- **Population Pressures**

- Increased runoff from developed land
  - Nutrient loading, erosion
- Increased demand on watersheds
  - Depletion of groundwater for mature trees

## Research and Apply

- Ecophysiology of riparian organisms
- Engineering for groundwater management

## Research and Apply

- Ecological impacts of invasives
- Removal and restoration

## Research and Apply

- Low-impact Development
- Water conservation



# University of Utah: A Stewardship Leader

- Under utilized resource
- Interdisciplinary Teaching, Research and Sustainability
- Campus Master Plan

## Immediate actions

- Courses
- Monitoring stations

## Future actions

- Walking/biking path
- Gathering areas
- Engineering solutions