S.J. & JESSIE E. QUINNEY
COLLEGE of
NATURAL RESOURCES
UtahStateUniversity
DEPARTMENT OF WATERSHED SCIENCES

Sediment Transport in Stream Assessment and Design

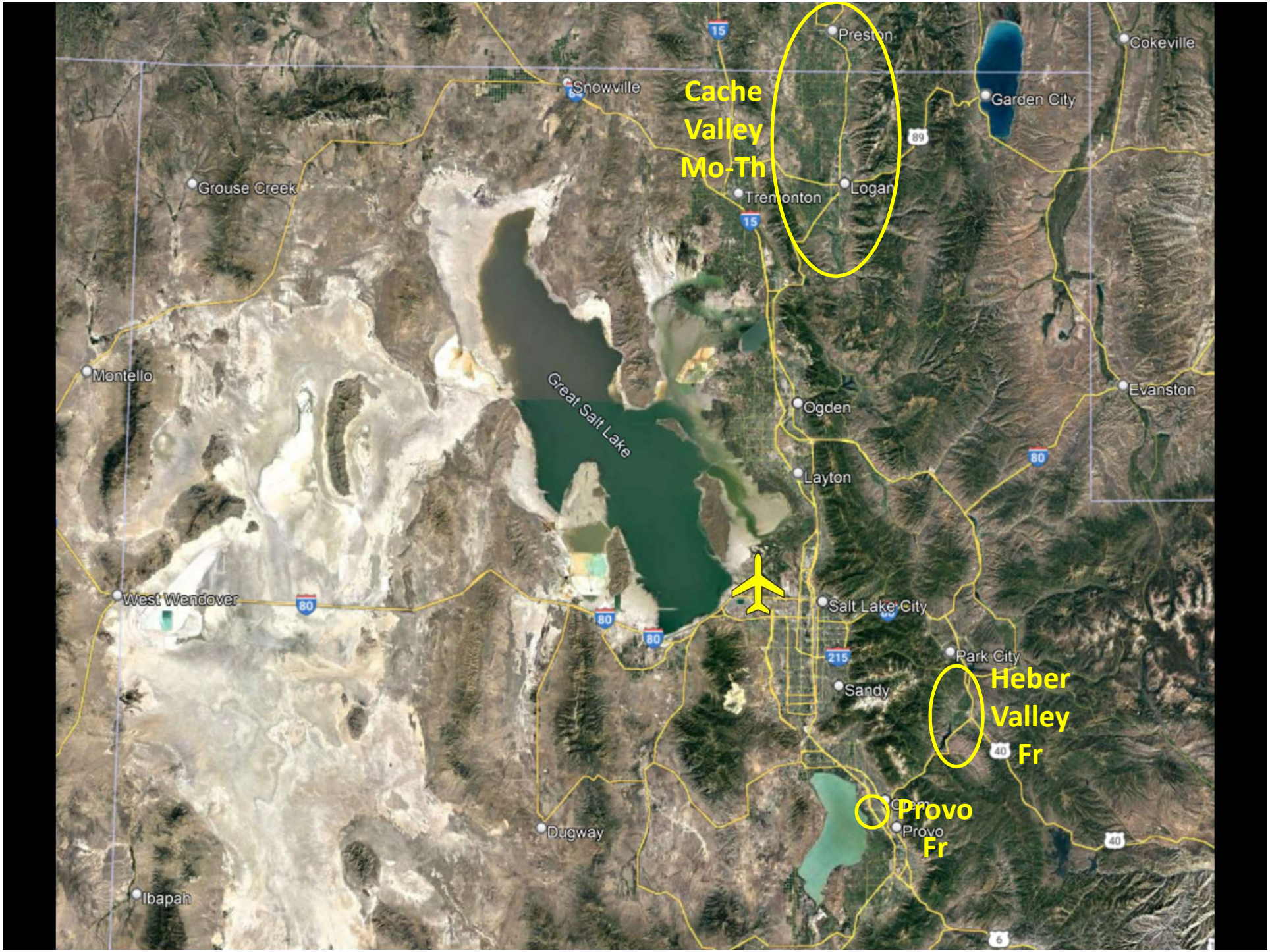
July 29 - August 2, 2024

Logan, Utah

This course is intended for those who wish to understand and apply the principles of sediment transport to alluvial channel assessment and design. Principles of open channel flow and sediment transport are combined with watershed-scale, hydrologic and sediment source analysis to place channel assessment and design in the appropriate context. Threshold and alluvial channel design methods are presented along with guidelines for assessing and incorporating uncertainty. The course balances advance reading, lecture, field work, and hands-on exercises for estimating sediment supply, calculating sediment transport rates, and forecasting channel response to water and sediment supply. This course is intended for participants who are familiar with basic principles of river geomorphology.

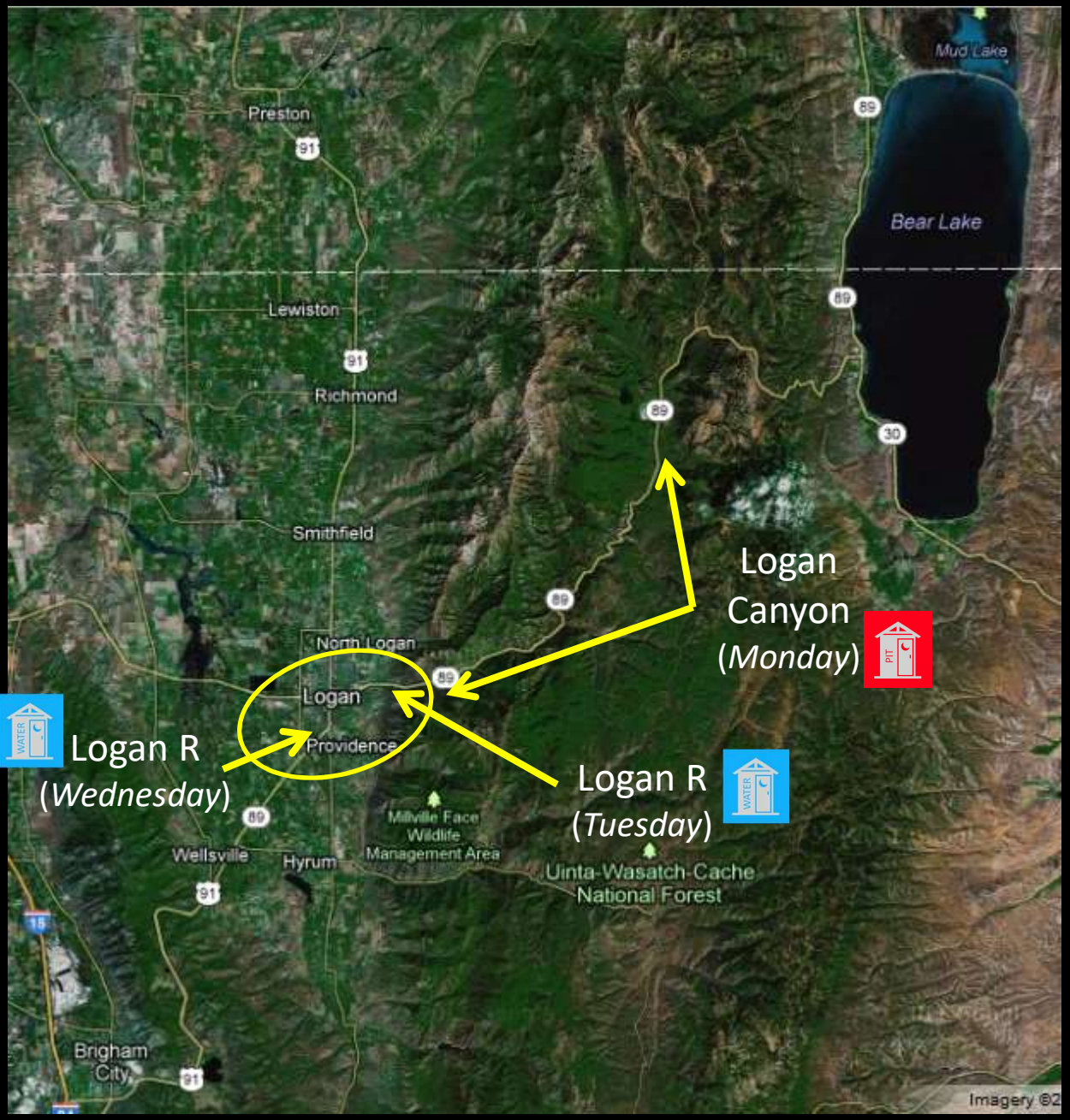
WiFi: Browse to **https://guest.usu.edu**

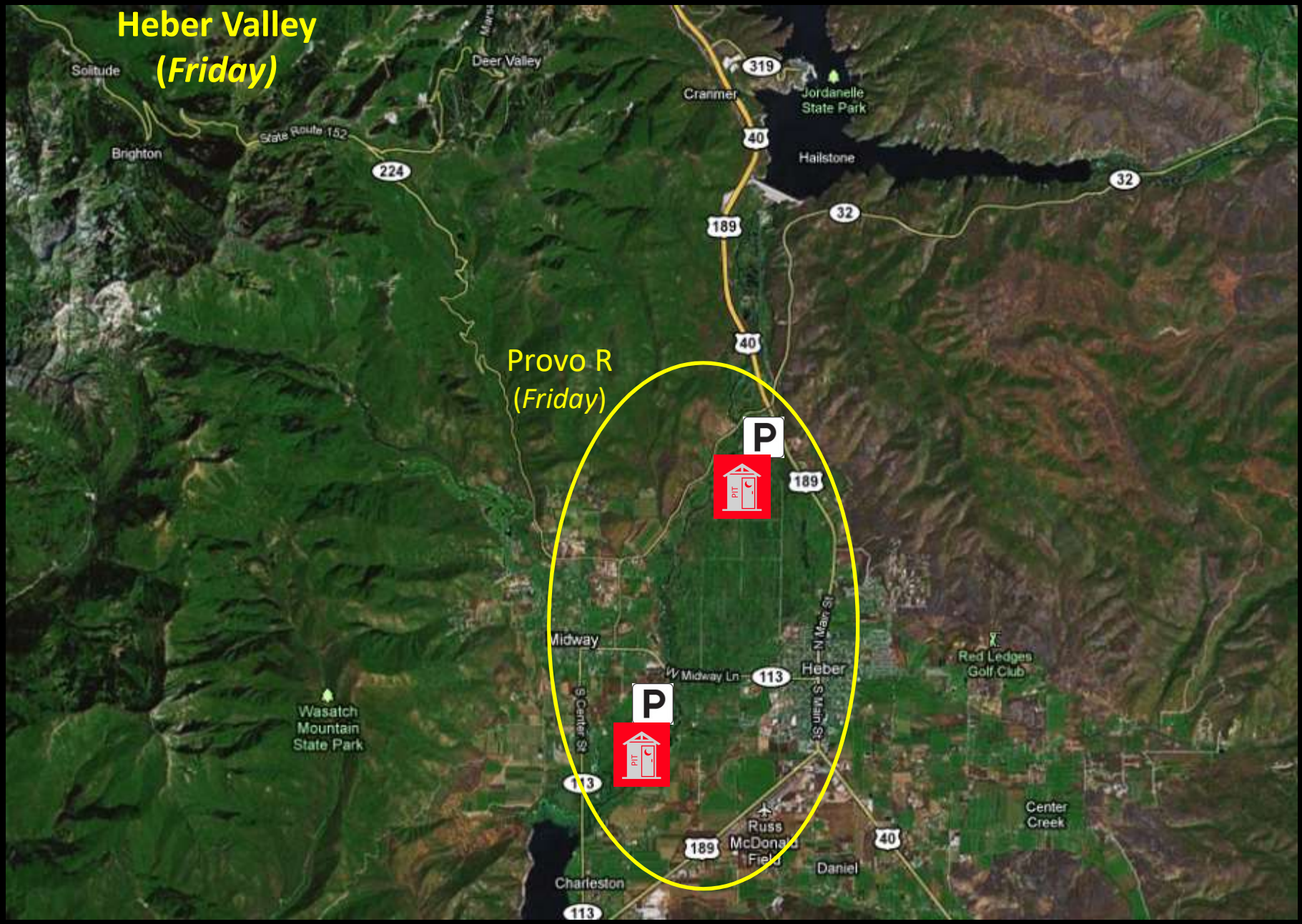
Click on the bottom right button labeled 'Connect For Today'

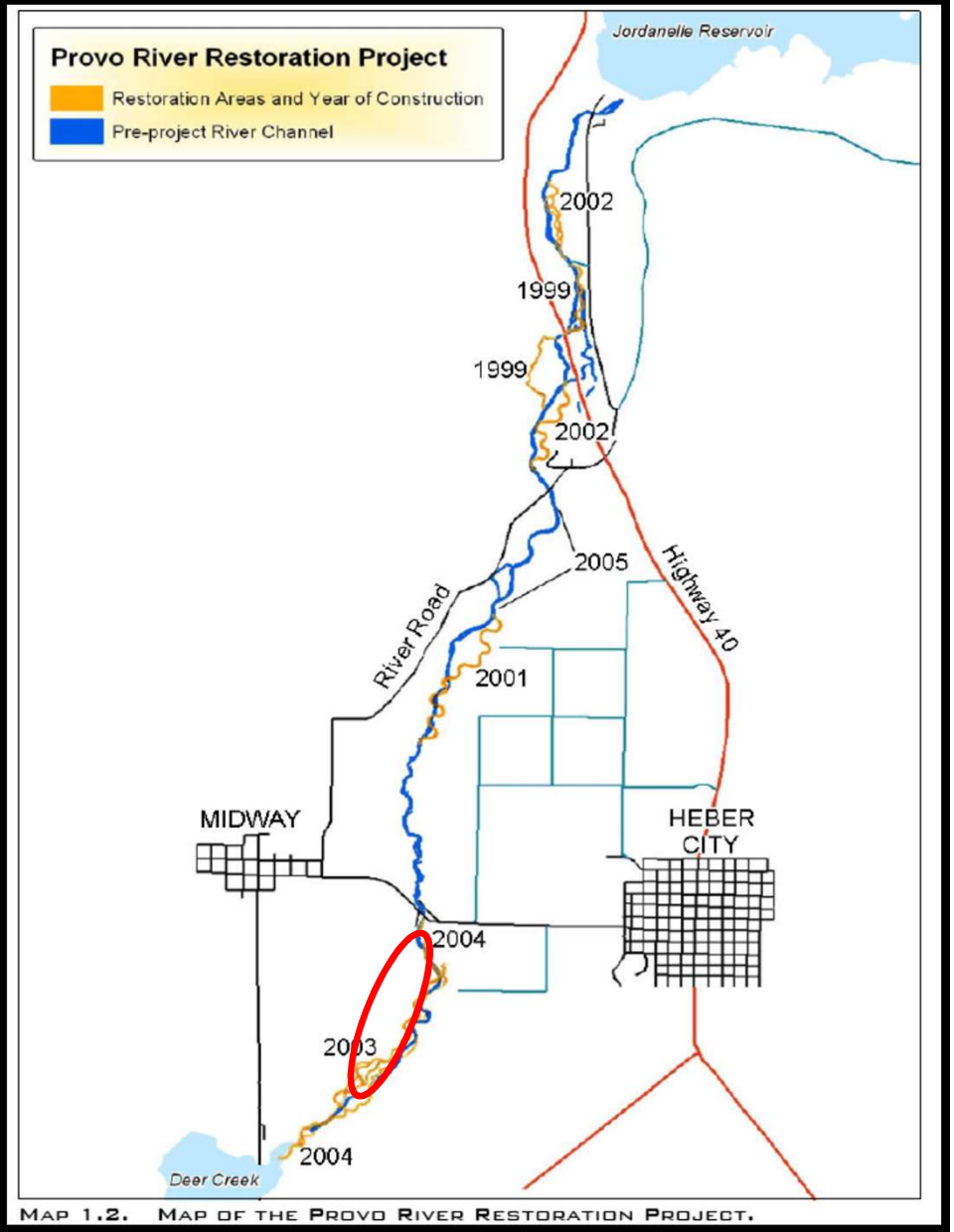

Cache Valley Mo-Th
Heber Valley Fr
Provo Fr
Preston
Cokeville
Snowville
Garden City
Grouse Creek
Tremonton
Logan
Montello
Great Salt Lake
Ogden
Evanston
Layton
West Wendover
Salt Lake City
Park City
Sandy
Dugway
Provo
Ibapah
15
89
80
215
40
6

Logan River
Logan Canyon
(*Monday – Thursday)*

On Campus
(*Thursday*)

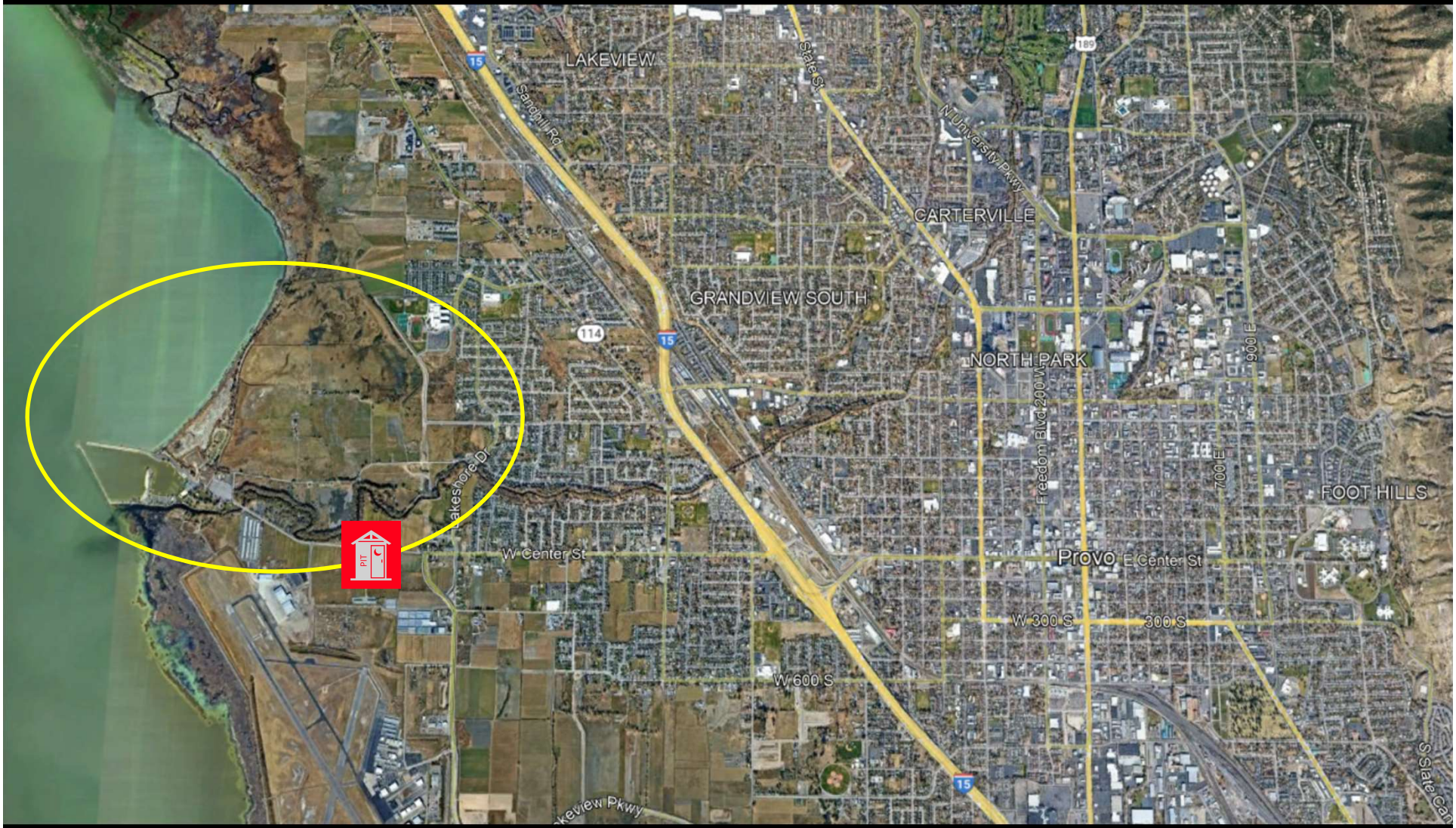



Heber Valley
(Friday)
Provo R
(Friday)
Solitude
Brighton
Deer Valley
State Route 152
224
Cranmer
319
Jordanelle
State Park
40
Hailstone
32
189
Midway
W Midway Ln
113
Heber
N Main St
S Main St
S Center St
Wasatch
Mountain
State Park
Red Ledges
Golf Club
Russ
McDonald
Field
Daniel
Center
Creek
Charleston
P
PIT



MAP 1.2. MAP OF THE PROVO RIVER RESTORATION PROJECT.

Provo Delta
(*Friday)*



PROVO RIVER DELTA

MITIGATION AND CONSERVATION COMMISSION

CENTRAL UTAH WATER CONSERVANCY DISTRICT

U.S. DEPARTMENT OF THE INTERIOR MARCH 3, 1849

Central Utah Project Completion Act Office

BUREAU OF RECLAMATION

JUNE SUCKER RECOVERY IMPLEMENTATION PROGRAM

UTAH DNR WILDLIFE RESOURCES

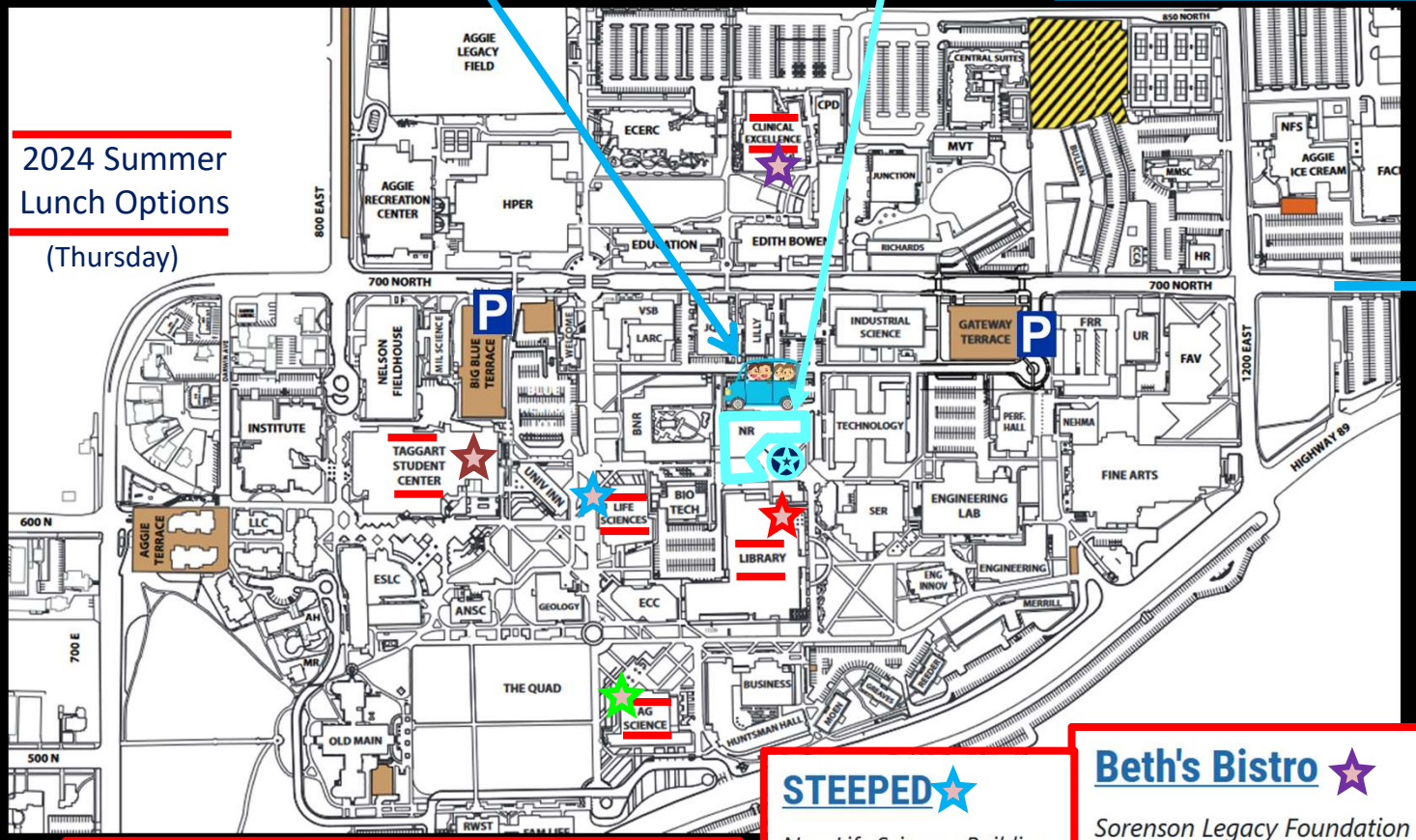
We provide lunch on
Mon, Tue, Wed, & Fri
Lunch on your own Thursday

Depart MTW: NR Parking Lot

Class NR105

Dinner Mon 7:00p
1624 Sunset Dr

Peter Wilcock 443 564-6253
Patrick Belmont 435 374-8574
Tyler Allred 801 358-1868



Scotsman's Corner

1st floor of Taggart Student Center (TSC)

Monday-Friday
8:00am - 2:00pm

The Quickstop

1st floor of Taggart Student Center (TSC)

Monday-Friday
9:00am - 5:00pm

Caffe Ibis

1st floor of Taggart Student Center (TSC)

Monday-Friday
7:30am - 2:00pm

Subway

1st floor of Taggart Student Center (TSC)

Closing July 1st

Monday-Friday
9:00am - 3:00pm
Open until 6pm in August

STEEPED

New Life Sciences Building

Monday-Friday
7:30am - 1:30pm

Beth's Bistro

Sorenson Legacy Foundation Center

Monday-Friday
8:00am - 2:00pm

The Forum Cafe

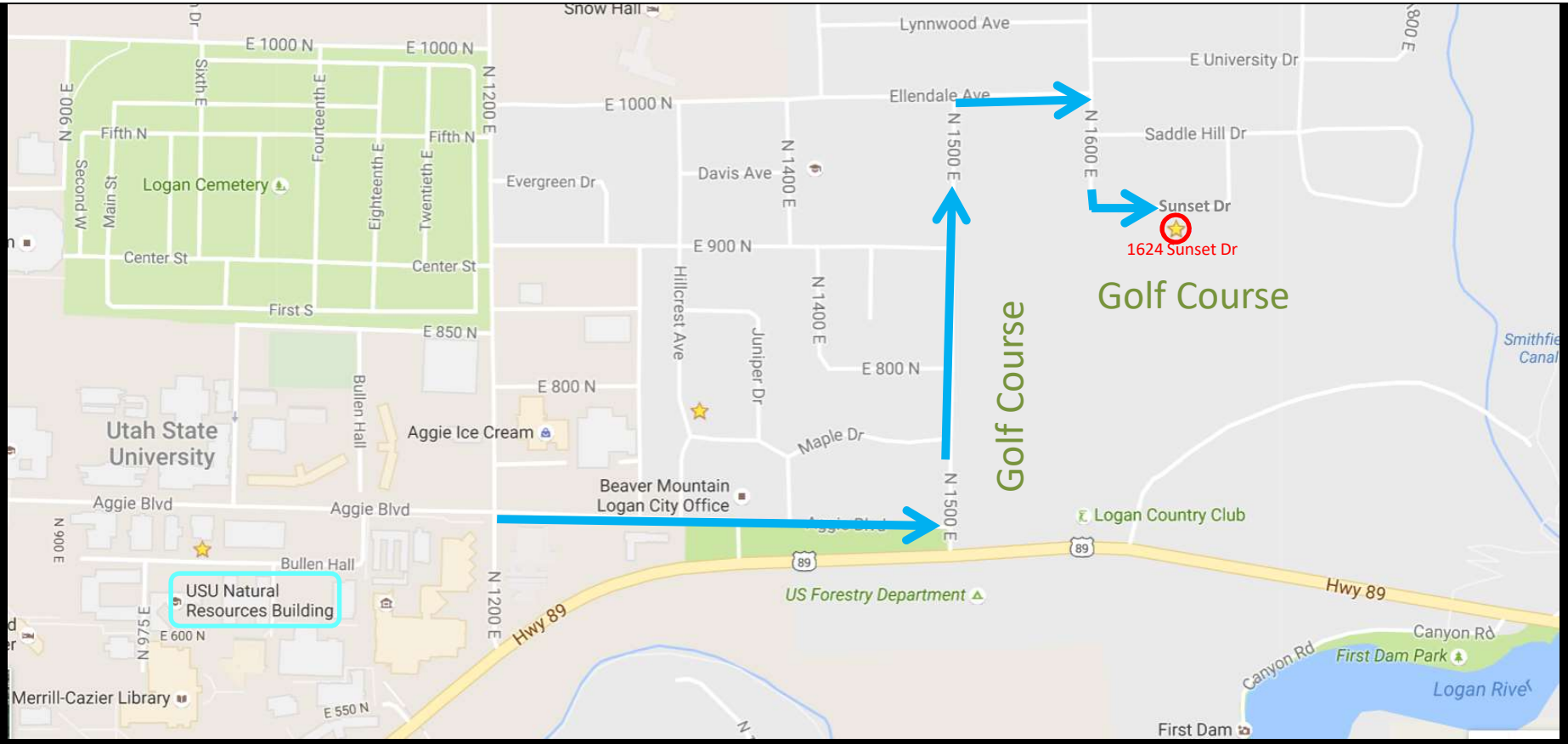
Merill-Cazier Library

Monday-Friday
9:00am - 2:30pm

Luke's Family Cafe

Agriculture & Applied Sciences

Monday-Friday
9:00am - 2:00pm



Dinner Mon 7:00p 1624 Sunset Dr

20 min walk from campus

443 564 6253

Assignment:

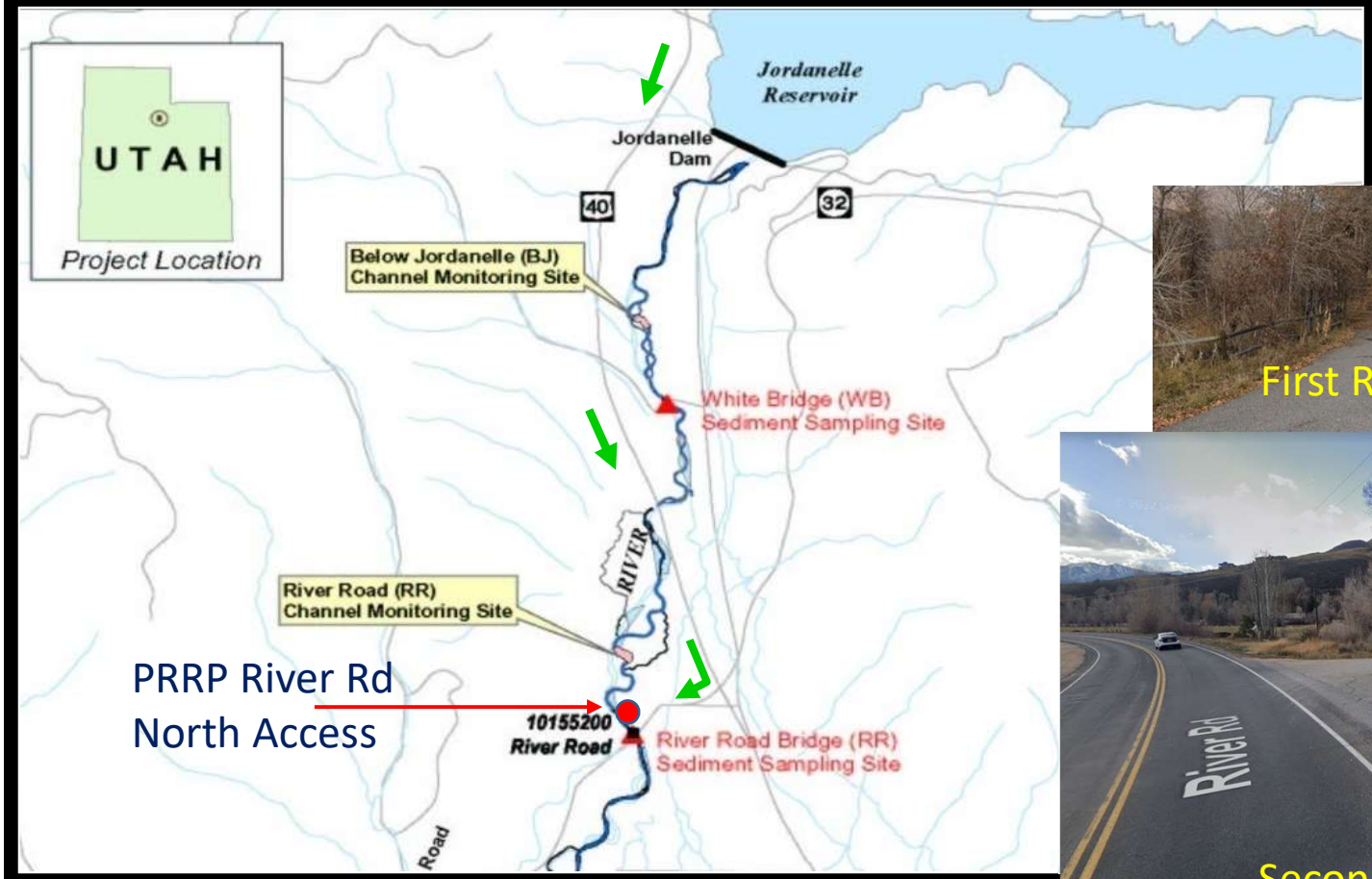
1. Where you are from now (location, professionally)
2. Where you are *really* from
3. Are you animal, mineral, or vegetatable?
4. Connection with streams and sediment

Order Wednesday lunch NOW

https://docs.google.com/forms/d/e/1FAIpQLSeqiEMZubKXL_rpnzT_xQsHERB2vo0-Z1mBg_O2AyqP4_Vhag/viewform?usp=sf_link

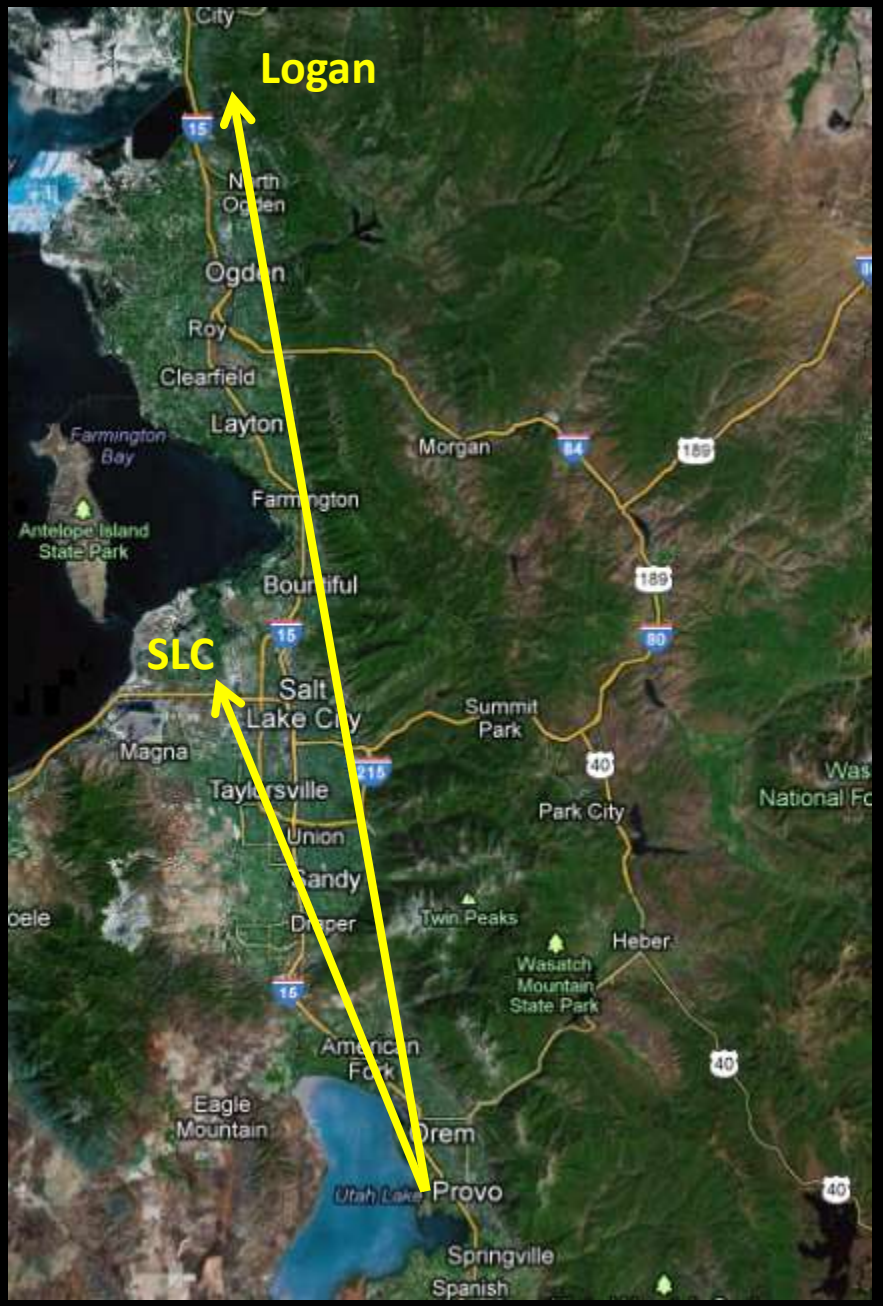
Friday Morning

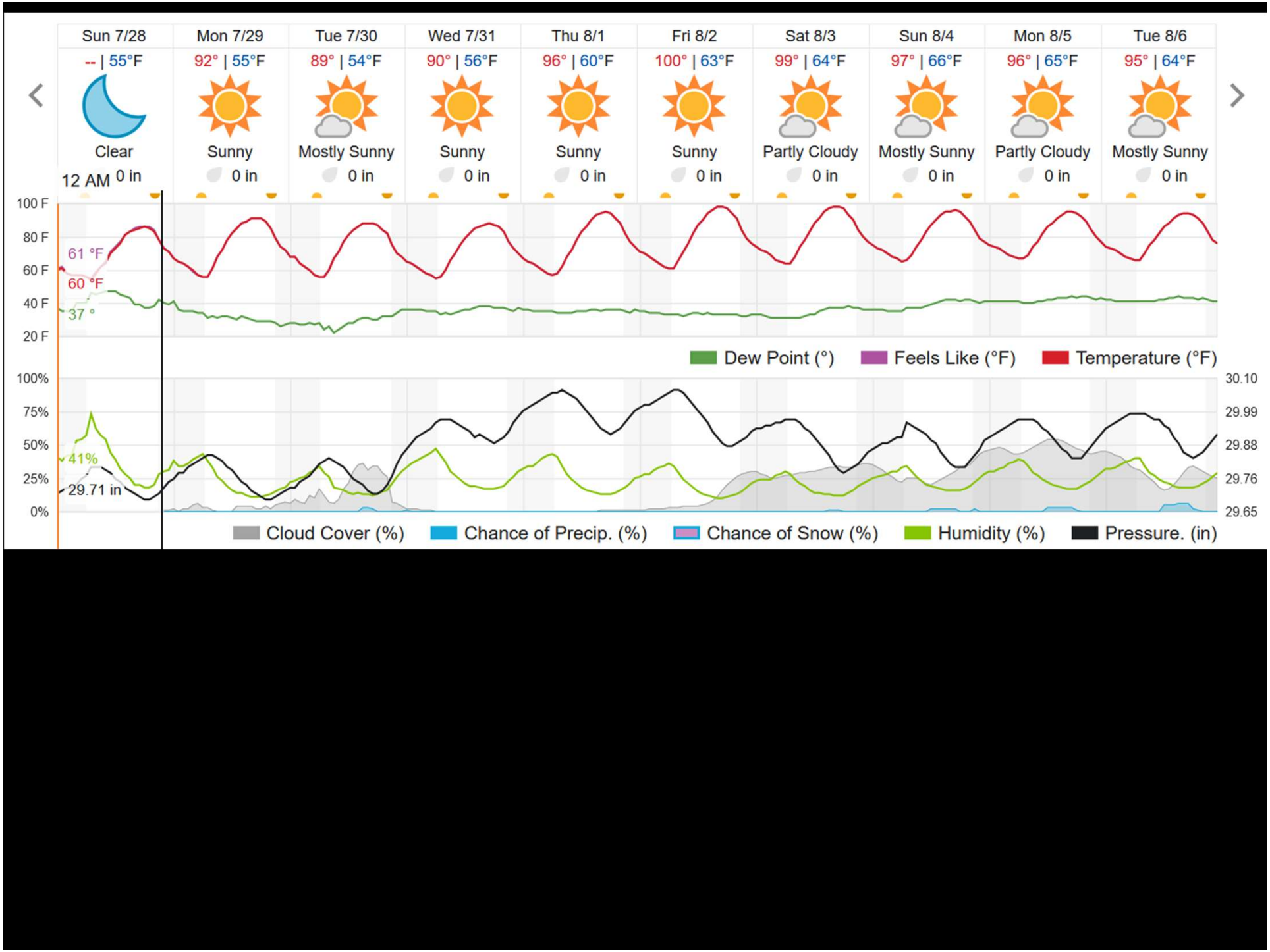
I-80 Exit 146, US 40 toward Heber, Vernal, Provo
Pass Jordanelle Reservoir on left, head down into Heber Valley
Right at first stop light, onto River Road
Right into second driveway at Provo River Restoration Project
River Road North River Access



Exit Strategy
(*Friday)*

(we will arrange exit transportation in class on Thursday)




Sun 7/28
-- | 55°F
Clear
0 in
Mon 7/29
92° | 55°F
Sunny
0 in
Tue 7/30
89° | 54°F
Mostly Sunny
0 in
Wed 7/31
90° | 56°F
Sunny
0 in
Thu 8/1
96° | 60°F
Sunny
0 in
Fri 8/2
100° | 63°F
Sunny
0 in
Sat 8/3
99° | 64°F
Partly Cloudy
0 in
Sun 8/4
97° | 66°F
Mostly Sunny
0 in
Mon 8/5
96° | 65°F
Partly Cloudy
0 in
Tue 8/6
95° | 64°F
Mostly Sunny
0 in
12 AM
100 F
80 F
60 F
40 F
20 F
61 °F
60 °F
37 °
Dew Point (°)
Feels Like (°F)
Temperature (°F)
100%
75%
50%
25%
0%
41%
29.71 in
30.10
29.99
29.88
29.76
29.65
Cloud Cover (%)
Chance of Precip. (%)
Chance of Snow (%)
Humidity (%)
Pressure. (in)

Materials

On class web page

pdf color slides of presentations posted on class web page

Electronic copies of assignments, spreadsheets, readings

On Paper

Paper print of *some* presentation slides – for in-class notes

Paper copies of field assignments

Class Web Page

https://qcnr.usu.edu/wats/programs/short-courses/sediment-transport/

Wireless

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Workshop: Sediment Transport in Stream Assessment and Design

217 Natural Resources, Utah State University, Logan Utah

Patrick Belmont (PB), Tyler Allred (TMA), Peter Wilcock (PRW)

July 29 - August 2, 2024 Sediment Workshop

M	8:30 AM	0.5 hr	PRW	Course overview; learning objectives	Sediment Sources & Sinks
M	9:00 AM	1 hr	PRW	Sediment and sediment transport overview	
M	10:00 AM	0.25 hr		Break	
M	10:15 AM	1.75 hr	PB	Watershed context: water and sediment supply; watershed geomorphic assessment	
M	12:00 PM	5 hr	PB	**FIELD** [lunch provided]: sediment sources and sinks, ***Logan Canyon*** Sediment Source Exercise	
M	5:00 PM	2 hr		Free time	
M	7:00 PM			**EVENING**: Dinner & Social 1624 Sunset Dr, Logan	
Tu	8:30 AM	1.5 hr	PB	Review of Logan R exercise; Methods for estimating sediment source, sink, supply	Sediment & Hydraulics
Tu	10:00 AM	0.5 hr		Break	
Tu	10:30 AM	0.75 hr	PB	More sediment supply. FIRE!	
Tu	11:15 AM	1.25 hr	PRW	Principles of open channel flow	
Tu	12:30 PM	1.5 hr	PRW	**PICNIC** [lunch provided]: Measuring flow. ***Logan River*** (First Dam and Ray Hugie Waterpower Park)	
Tu	2:00 PM	1.5 hr	PRW	**EXERCSISE**: 1d flow and transport modeling, AB First Dam	
Tu	3:30 PM	0.75 hr	PRW	Modeling open channnel flow and transport: morphodynamic models	
Tu	4:15 PM	0.75 hr	PRW	Flushing and routing flows	
Tu	5:00 PM			**EVENING:** Dinner on own; Homework	
W	8:30 AM	0.5 hr	PRW	Review of Logan R Exercise	Bed Material Transport
W	9:00 AM	1 hr	PRW	Estimate sediment transport rates: challenges, uncertainty; a practical approach	
W	10:00 AM	0.5 hr		Break; practice lockdown!	
W	10:30 AM	1.5 hr	PRW	Sediment transport and the equilibrium channel	
W	12:00 PM	2 hr	PRW	**PICNIC** [lunch provided]: stream mitigation project, transport sampling. ***Logan R*** . (Rendezvous Park	
W	2:00 PM	3 hr	PRW	**EXERCSISE:** estimating transport rate; cumulative transport and effective discharge	
W	5:00 PM			**EVENING:** Dinner on own; Homework	
Th	8:30 AM	0.5 hr	PRW	Review of sediment transport exercise	Sediment Transport & Channel Design
Th	9:00 AM	1 hr	PRW	Sediment transport in stream channel design	
Th	10:00 AM	0.5 hr		Break	
Th	10:30 AM	1 hr	PRW	Design strategies incorporating sediment supply and transport capacity	
Th	11:30 AM	1 hr	TMA, PRW	Provo River monitoring and sediment budget; Introduction to Provo R. design problems	
Th	12:30 PM	1 hr		**Lunch on own**	
Th	1:30 PM	1.5 hr	TMA, PRW	**EXERCISE:** Middle Provo River design problem	
Th	3:00 PM	0.5 hr	PRW	Design charts: transport, threshold, and over-capacity threshold channels	
Th	3:30 PM	1.5 hr	TMA, PRW	**EXERCISE:** Provo River Delta design problem	
Th	5:00 PM	0.75 hr		**EVENING:** Dinner on own; Submit design solutions to TMA and PRW	
F	***7:30 AM***	2.5 hr		Drive to Provo River in Heber Valley; specific travel arrangements to be made in class	The Finished Product
F	10:00 AM	2.5 hr	TMA, PRW	**FIELD:** Evaluating proposed and as-built designs: Middle Provo R at River Rd and BL Midway	
F	12:30 PM	1.5 hr		Drive to Provo River Delta; lunch in transit	
F	2:00 PM	1.5 hr	TMA, PRW	**FIELD:** Tour Provo River Delta	
F	3:30 PM	END!		**Course adjourns at the delta** (Provo UT). Transportation provided as needed to SLC airport or Logar	

Estimate sediment sources, sinks, flux

1d flow model
Critical discharge for incipient motion

Estimate transport rates; channel change

Design channel to transport sediment supply & maintain dynamics (or not)

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