Columbia Habitat Monitoring Program
A day in the life

- Safety
- Professionalism
- Data Collection
  - Topographic Data
  - Auxiliary Data
- Post Data Collection Duties
  - Auxiliary Data Workflow
  - Topographic Data Workflow
- Post Sampling Duties

Safety

SAFETY REMINDER FOR ALL CHaMP SUMMER FIELD STAFF:

"No job is so important and no service so urgent that we cannot take time to perform our work safely."

---*Elliot Mainzer*, Administrator and Chief Executive Officer Bonneville Power Administration

BPA Driving Safety Reminder

Drive alert and remember these quick four tips of **GOAL** (Get Out And Look):

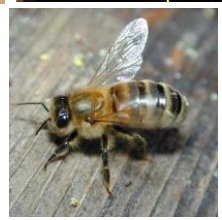
- Before entering your vehicle, look for obstacles in your path and plan how you will avoid them.
- If traveling with another employee, ask that person to be your spotter.
- Choose parking locations that will limit the risk of backing accidents.
- When possible, back into a parking spot so you can leave pulling out.

"Walking around your vehicle prior to backing is a best practice we can all use 24/7 at work, home and play. Your commitment to GOAL improves everyone's safety…." says Brad Bea, BPA's chief safety officer.

Report any accidents to your respective CHaMP crew leader or supervisor.

THINK SAFETY ALL THE TIME

Safety



BONNEVILLE POWER ADMINISTRATION

ISEMP

CHaMP

Professionalism

Bonneville Power Administration

National Oceanic and Atmospheric Administration, U.S. Department of Commerce

Oregon Fish & Wildlife

Washington Department of Fish and Wildlife

Resources Agency California Department Fish & Game

Yakama Nez Perce Warm Springs Umatilla

Shoshone Bannock Tribes of the Fort Hall Reservation Idaho

terraqua Environmental Consulting

Eco Logical Research, Inc.

QCI Quantitative Consultants Inc.

Watershed Solutions, Inc.

South Fork Research, Inc.

sitka technology group

North Arrow Research

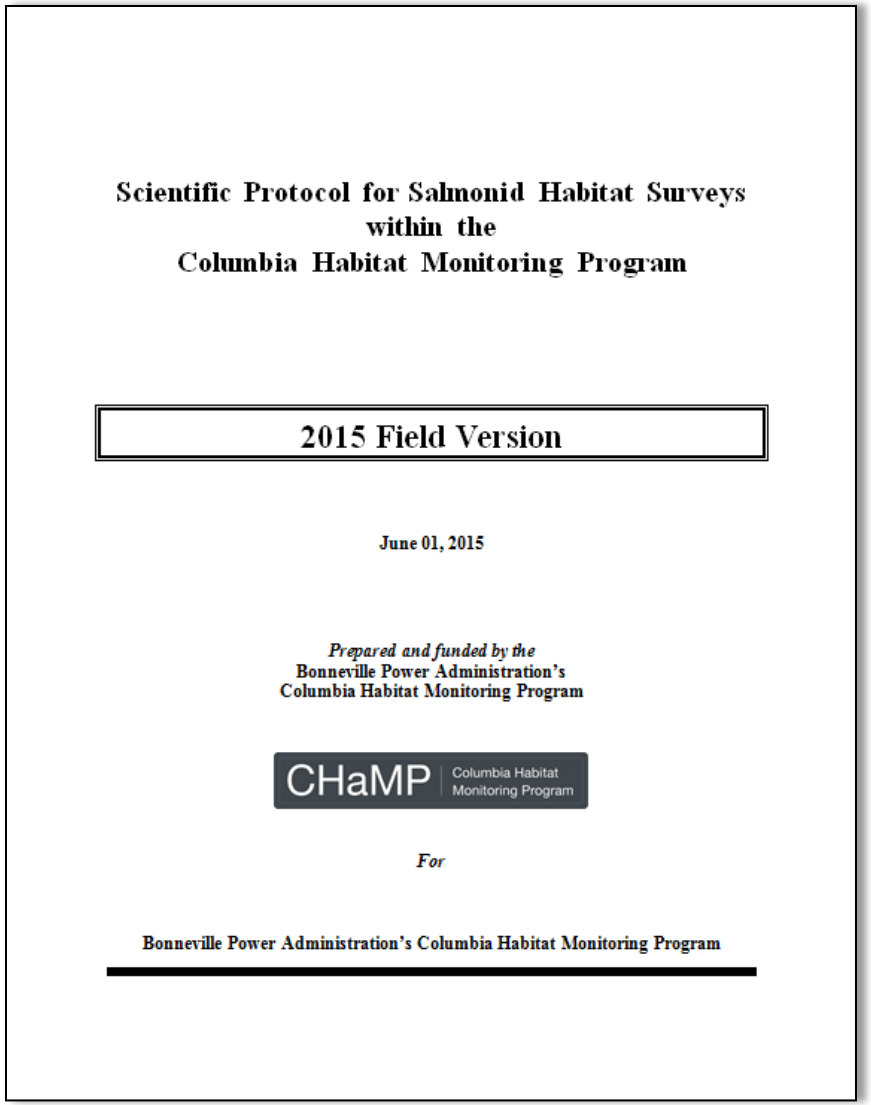
Rhithron Associates, Inc.

Nez Perce Tribe Treaty of 1855

Utah State University Ecogeomorphology & Topographic Analysis Laboratory

Tt Tetra Tech

CHaMP Protocol



Scientific Protocol for Salmonid Habitat Surveys
within the
Columbia Habitat Monitoring Program

2015 Field Version

June 01, 2015

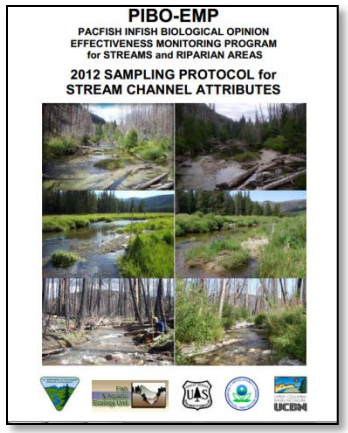
Prepared and funded by the
Bonneville Power Administration's
Columbia Habitat Monitoring Program

CHaMP Columbia Habitat Monitoring Program

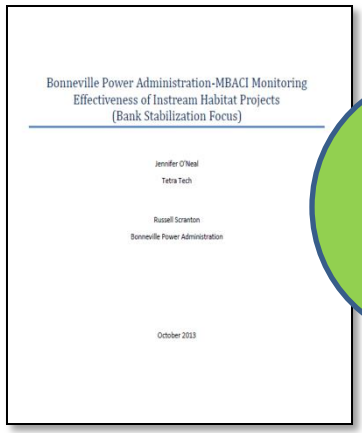
For

Bonneville Power Administration's Columbia Habitat Monitoring Program

CHaMP Protocol

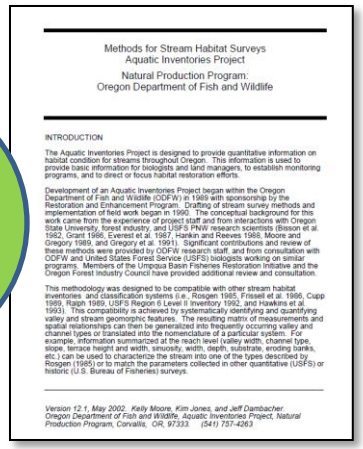


USFS - PIBO

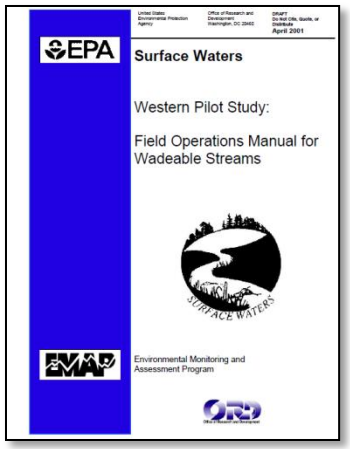


AEM

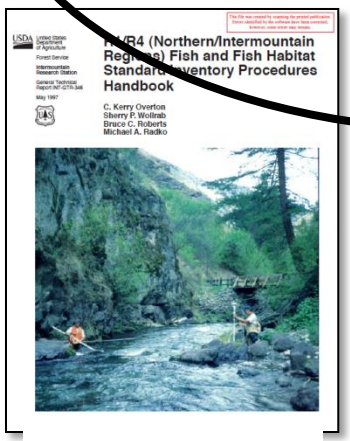
Crosswalk with other protocols



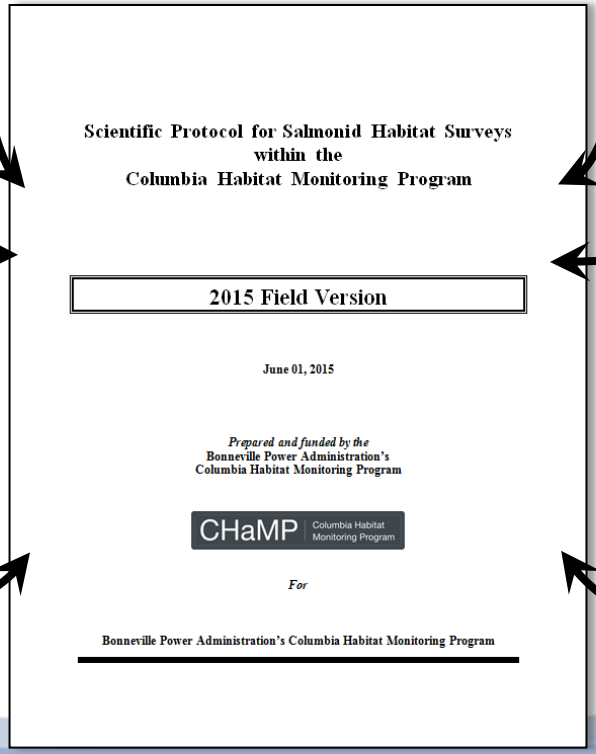
ODFW

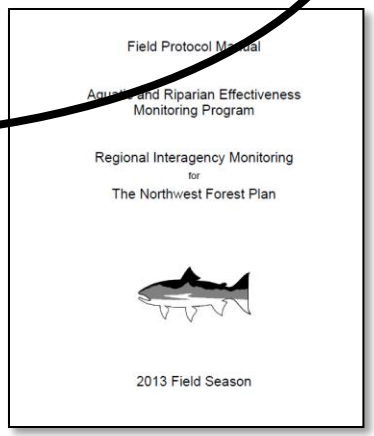


EMAP



USFS - R1/R4





AREMP

BONNEVILLE POWER ADMINISTRATION
ISEMP
CHaMP

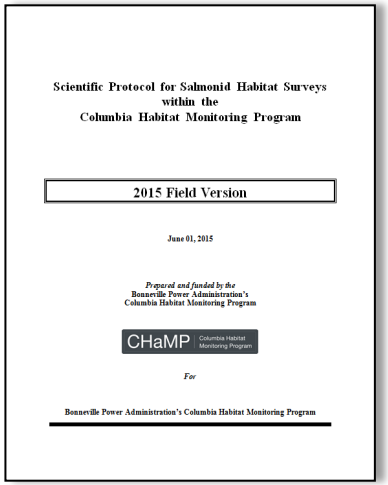
Data Integrity

This is why we are here

Garbage in, garbage out

Consistency in data collection:

- standardized methodology, repeatable



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CHaMP Columbia Habitat Monitoring Program

For

Bonneville Power Administration's Columbia Habitat Monitoring Program

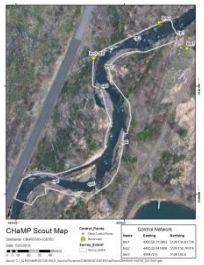
The data you collect matters!

Before You Go: Data

Site Directions & Maps

Directions

Coordinates



Maps

Photos

Before You Go: Data

Site Directions & Maps

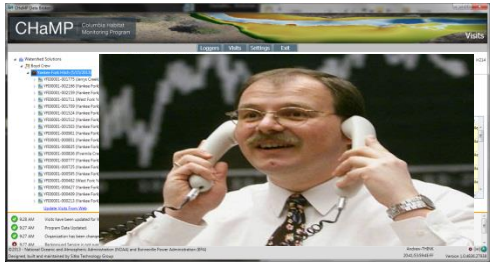
Directions

Coordinates

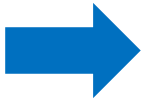
Maps

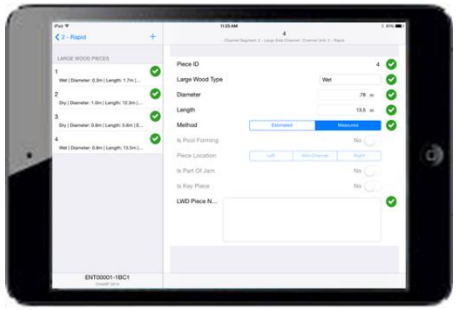
Photos

Logger Application



Data Broker
champmonitoring.org





Data Logger

Before You Go: Data

Site Directions & Maps

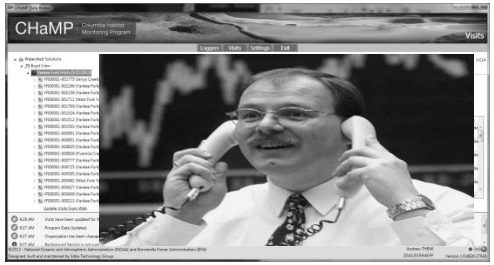
Directions

Coordinates

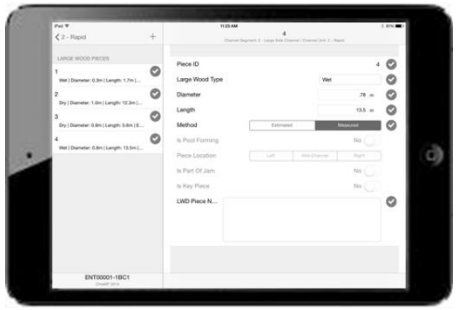
Maps

Photos

Logger Application

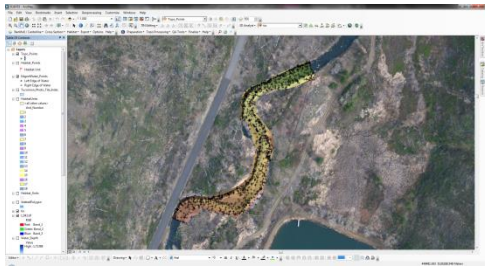


Data Broker
champmonitoring.org



Data Logger

Total Station Files



ArcGIS
champmonitoring.org

Survey Control Files

Total Station

Before You Go: Equipment

Topographic Survey Equipment

Total Station

Tripods

Prisms/Rods

Rebar/Whiskers

Radios

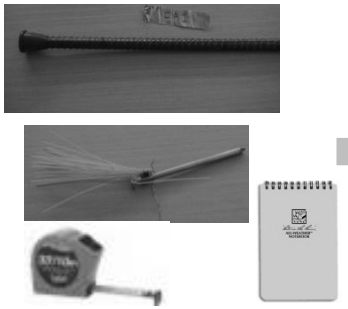
Before You Go: Equipment

Topographic Survey Equipment


Total Station


Tripods

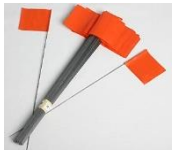

Prisms/Rods


Rebar/Whiskers


Radios

Auxiliary Data Equipment


Data Logger



Flagging


Tape

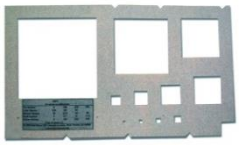

Flow Meter

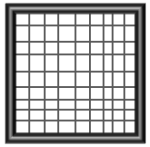

Alkalinity


Conductivity


SunEye


Temp Logger


Gravelometer


Fines Grid

Arriving at the Site

New Sites

- No previous sample
- X-Site coordinates only, navigate to point
- Establish new site location, width category
- Establish new benchmarks, markers, temperature loggers, etc.

Arriving at the Site

New Sites

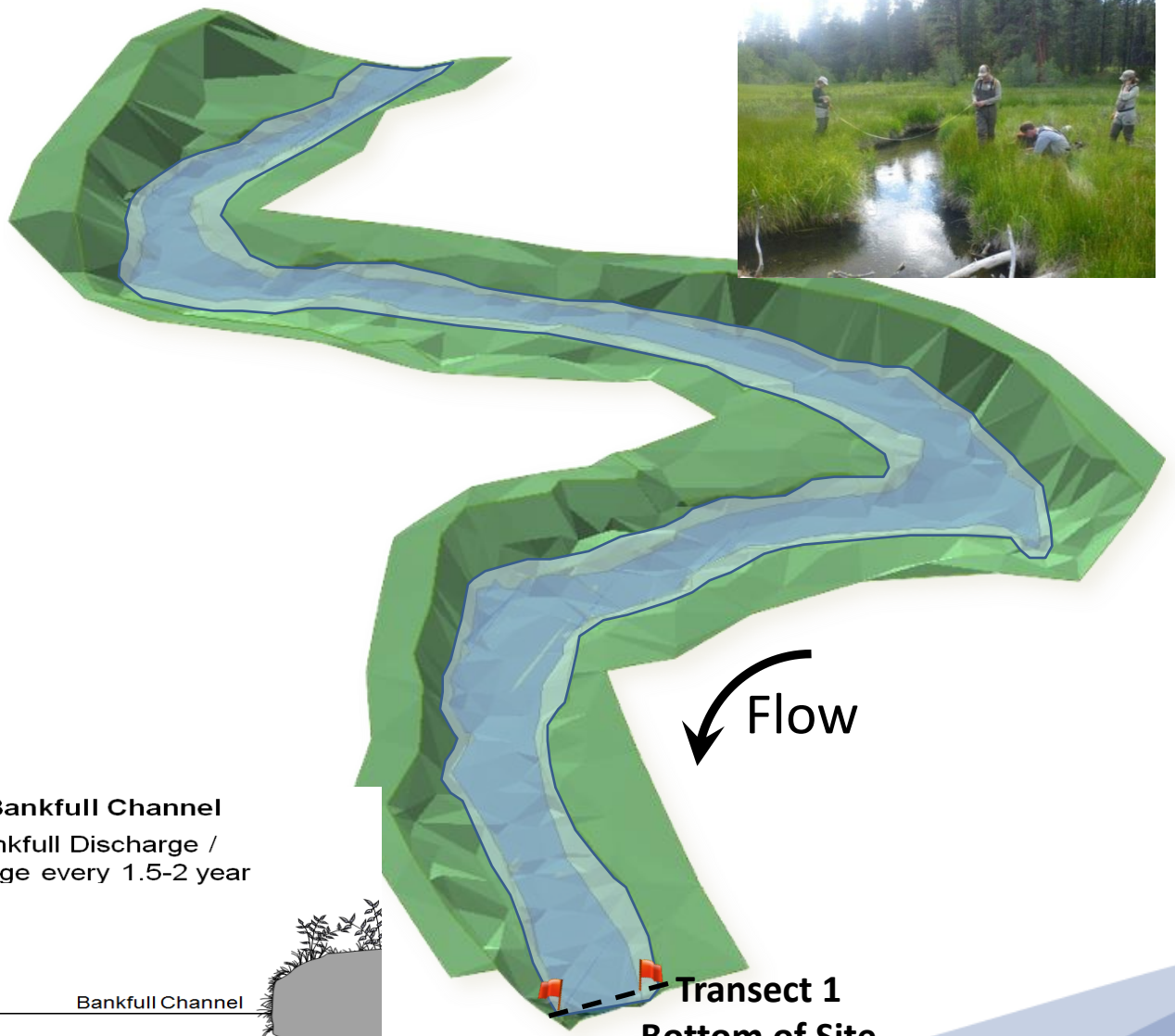
- No previous sample
- X-Site coordinates only, navigate to point
- Establish new site location, width category
- Establish new benchmarks, markers, temperature loggers, etc.

Revisit Sites

- Sampled previously
- Use existing width category
- Relocate top/bottom of site, benchmarks, markers, temperature loggers, etc.

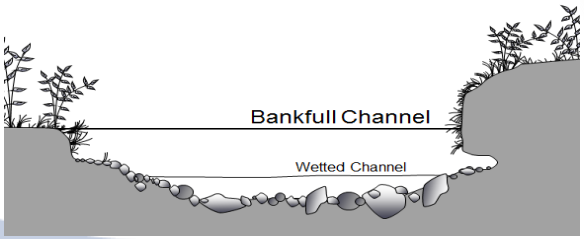
Getting Started: Site Setup

- Locate X-Site
- Establish bottom of site
- Identify bankfull
- Measure bankfull widths
- Establish width category



Bankfull Channel

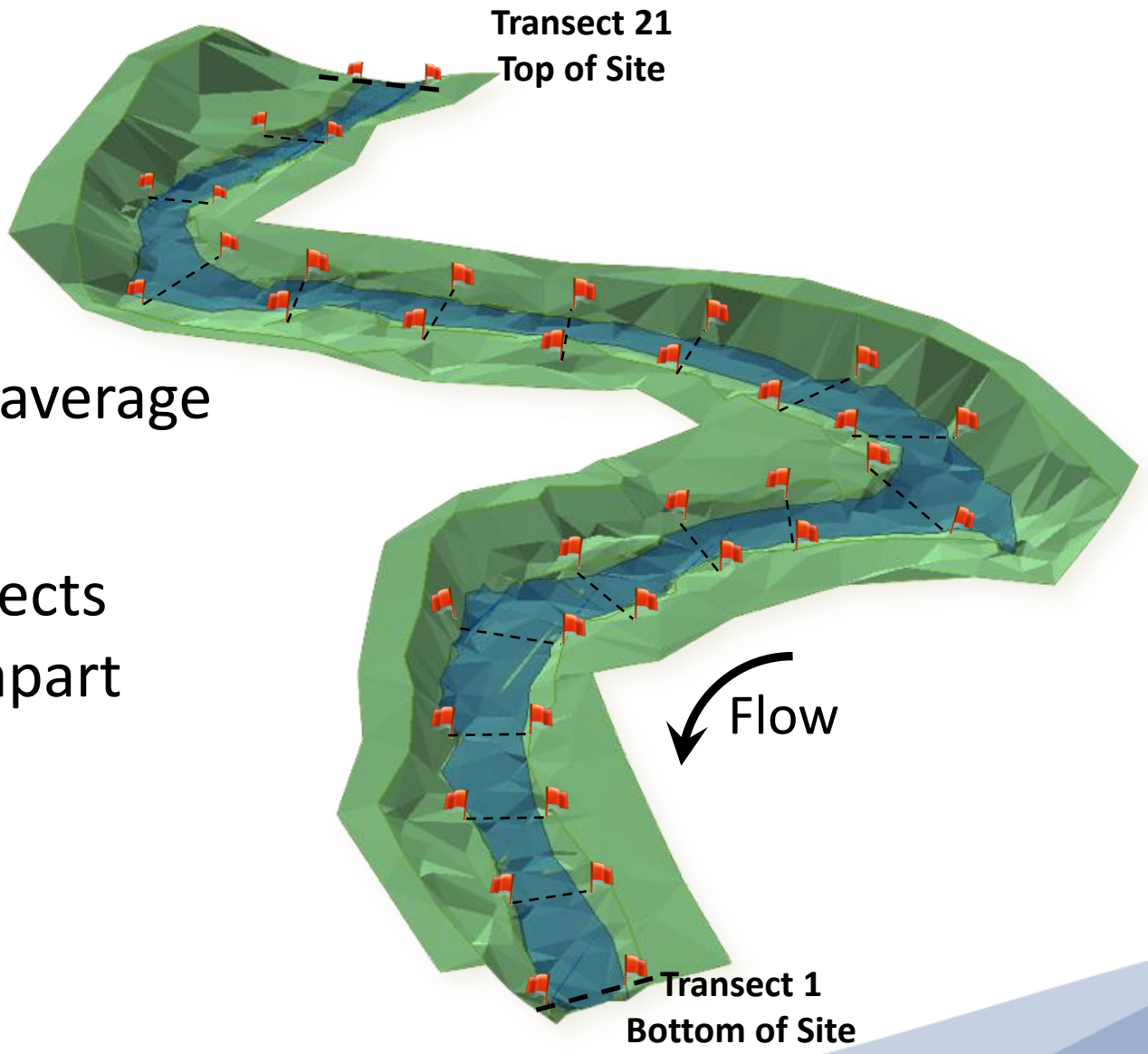
Bankfull Discharge / Stage every 1.5-2 year



Getting Started: Site Setup

Lay out site

- Site Length = 20x average bankfull width
- Establish 21 transects 1 bankfull width apart



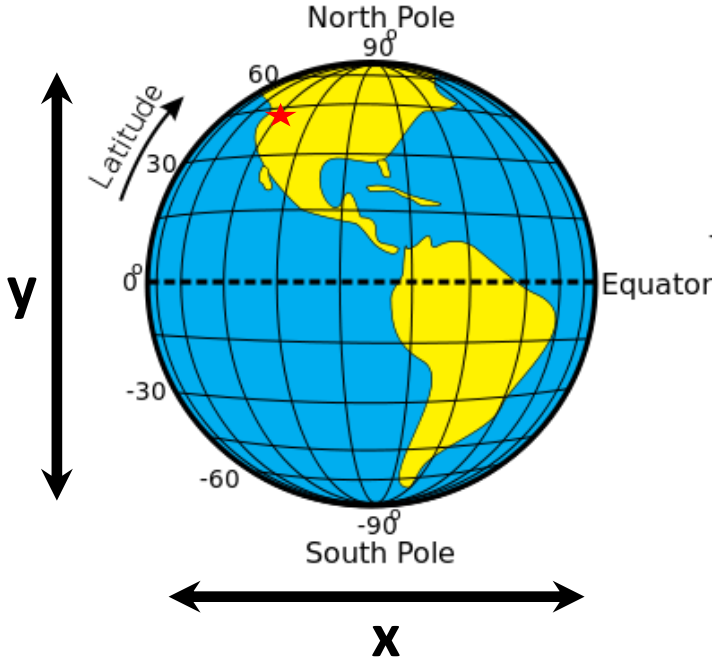
Topographic and Auxiliary Data Collection

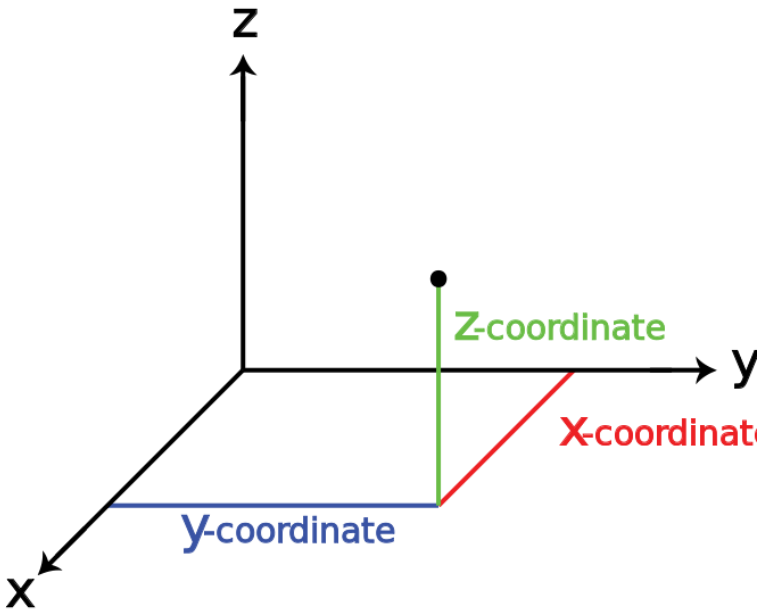
Topographic Data Collection
1 Total Station Gunner
1 Rod Person

Auxiliary Data Collection
1 Crew Member

Topographic Data Collection

Objective: Capture X, Y, and Z coordinates as points and lines that collectively represent a topographic surface of the stream channel and surrounding floodplain





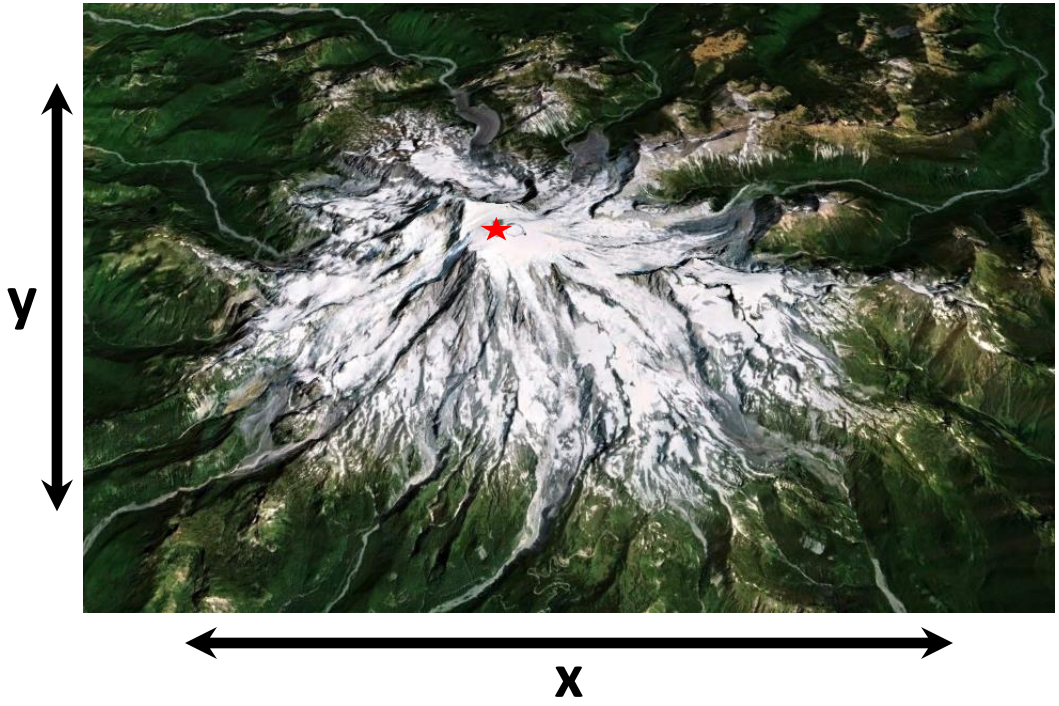
Topographic Data Collection

Mount Rainier (Summit)

Longitude (x): -121.755173

Latitude (y): 46.851382

Elevation (z): 4330 meters



Topographic Data Collection

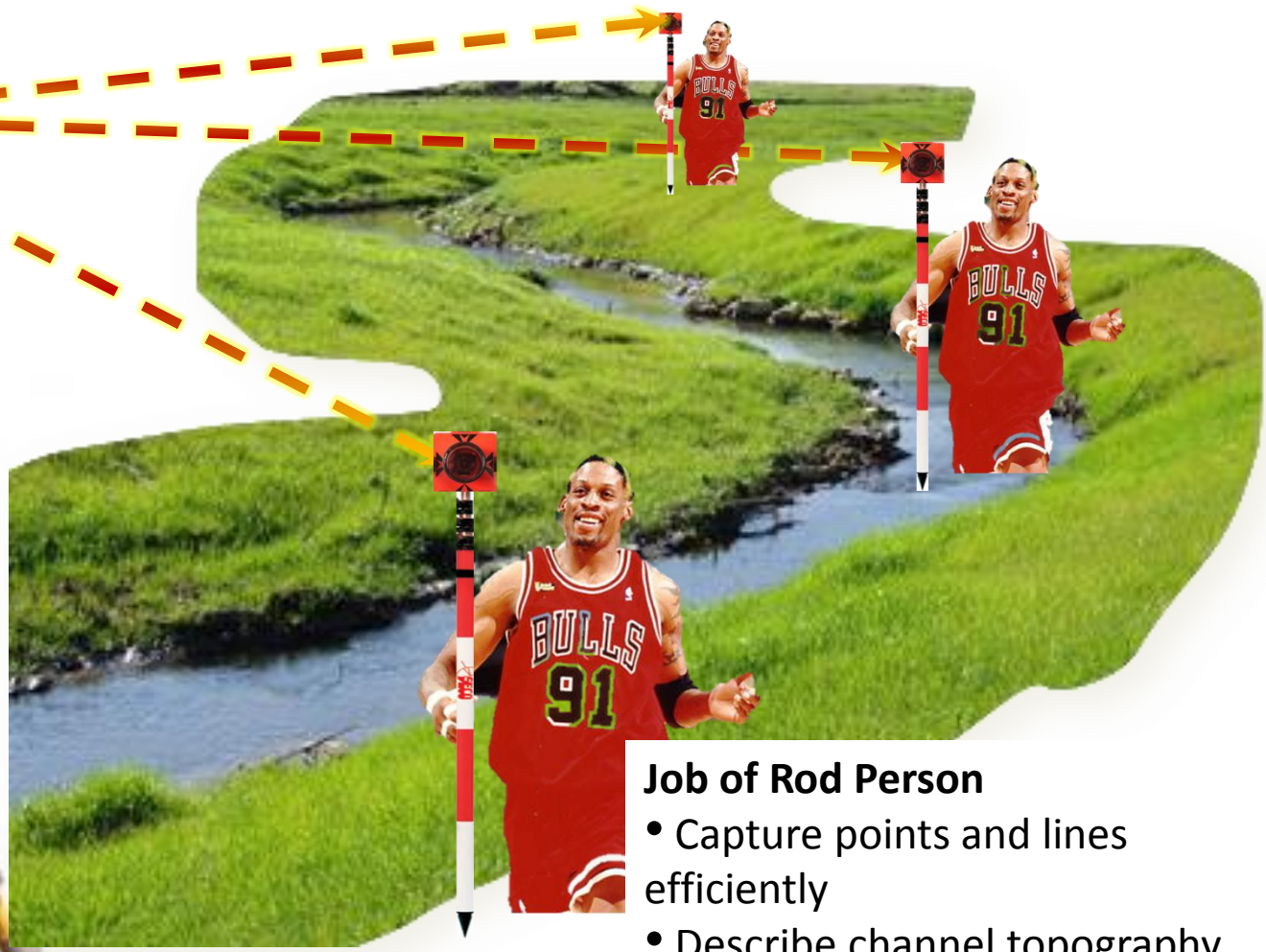
Surveying Basics

Job of Total Station Gunner

- Operate Total Station
- Code points and lines

Topographic Data Collection

Surveying Basics



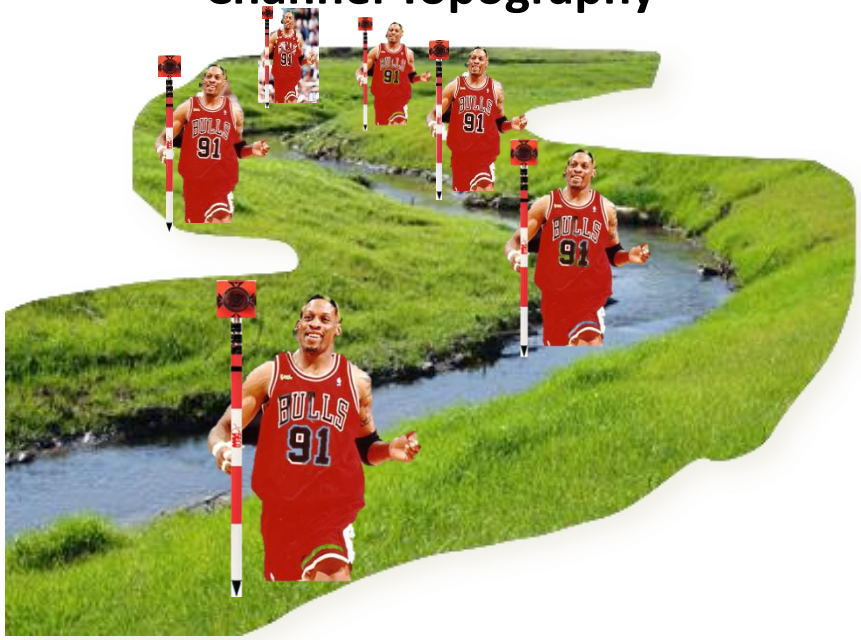
Job of Rod Person

- Capture points and lines efficiently
- Describe channel topography
- Communicate with auxiliary to delineate channel units

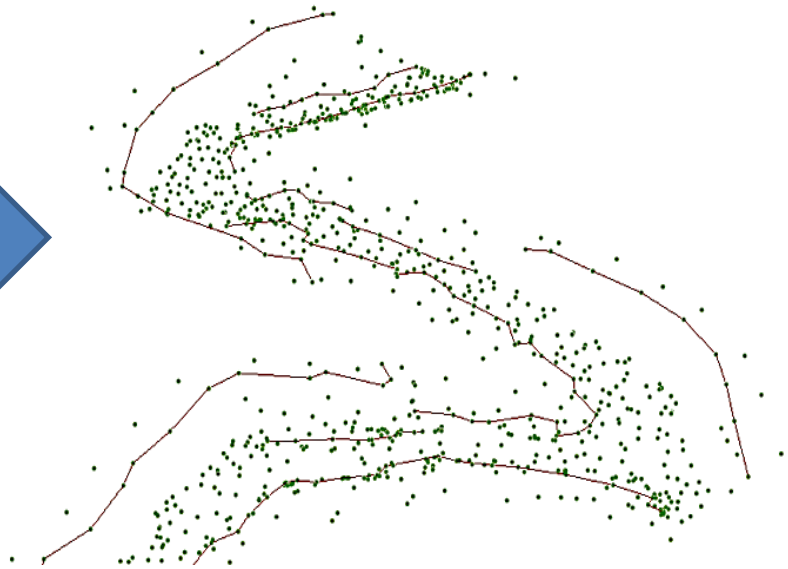
Topographic Data Collection

Surveying Basics

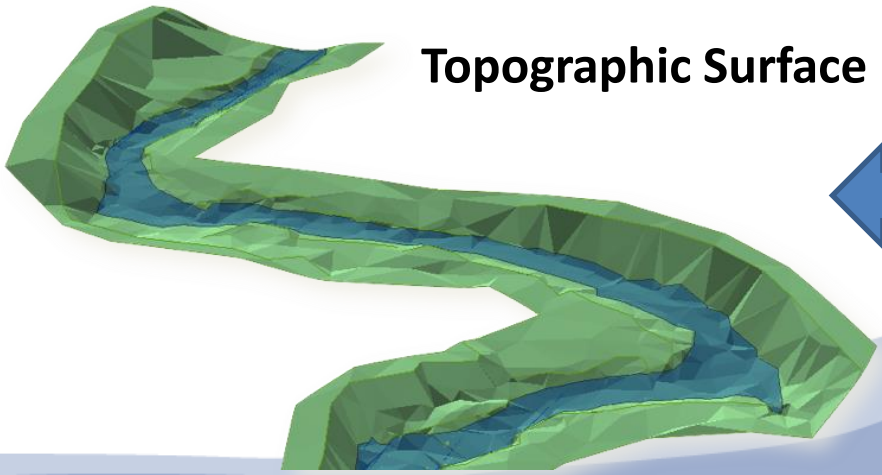
Channel Topography



Points and Lines



Topographic Surface



Topographic Data Collection

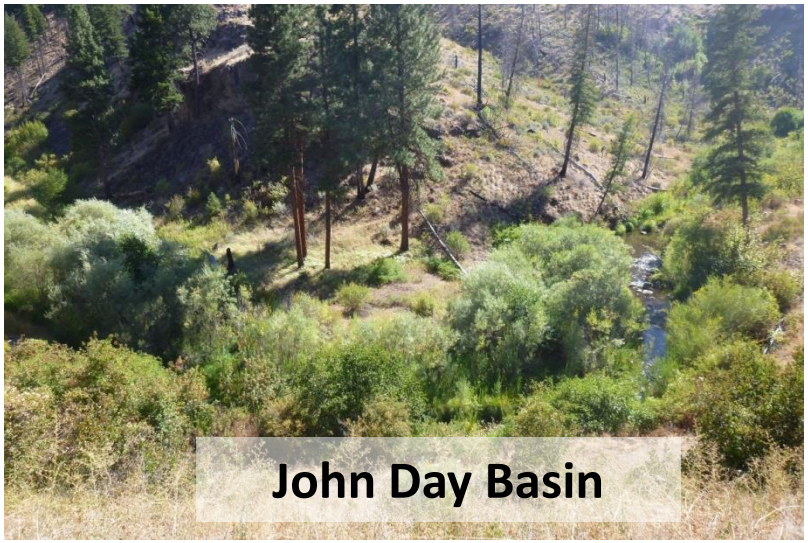
Site Types

Points per site: 600 – 1200+

Average ~ 100 points/hour

Dependent Upon:

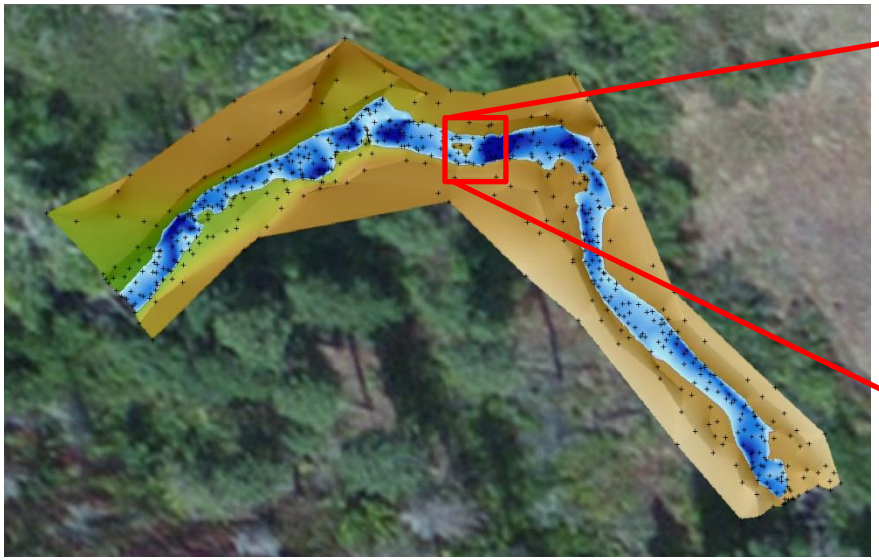
- Stream Size/Complexity
- Vegetation
- Group Objectives

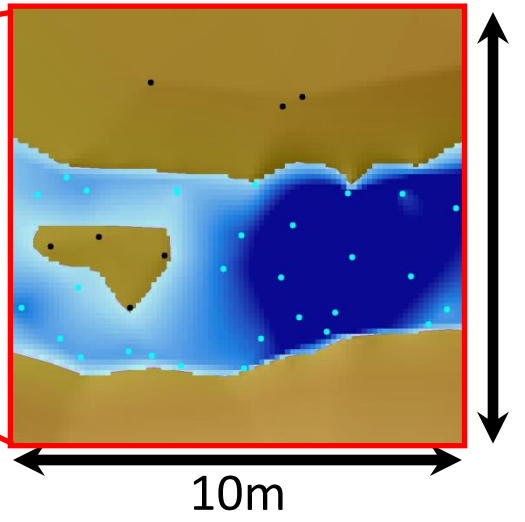


Topographic Data Collection

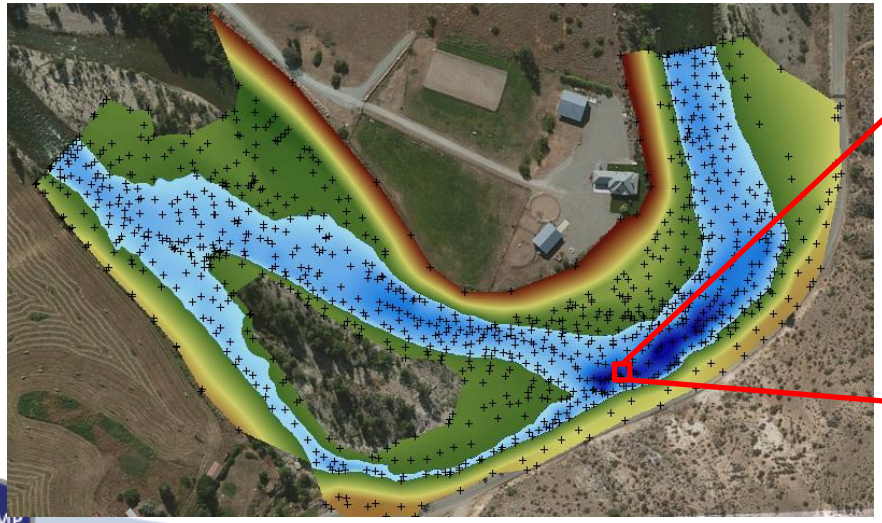
Point Density

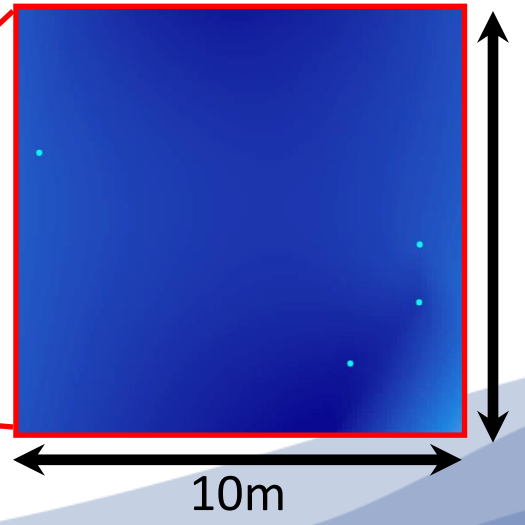
Cummings Cr.
Site Length = 120m
500 points
~1 point/1m^2





Methow River
Site Length = 600m
1200 points
~1 point/34 m^2



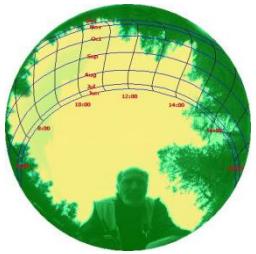


Auxiliary Data Collection

- Transect Measurements
- Channel Unit Measurements
- Site Level Measurements
- Location Information

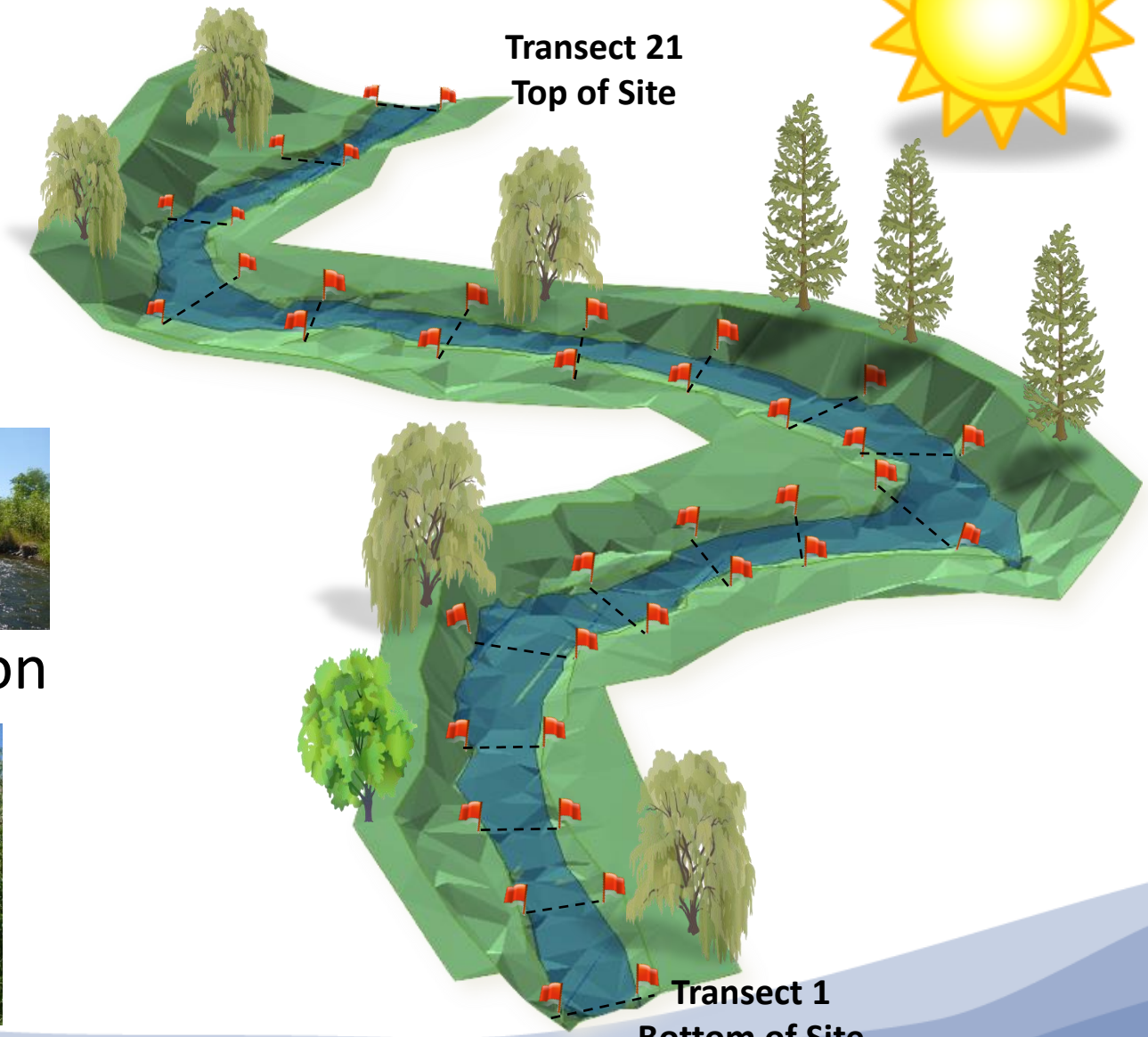
Transect Measurements

- Solar Input



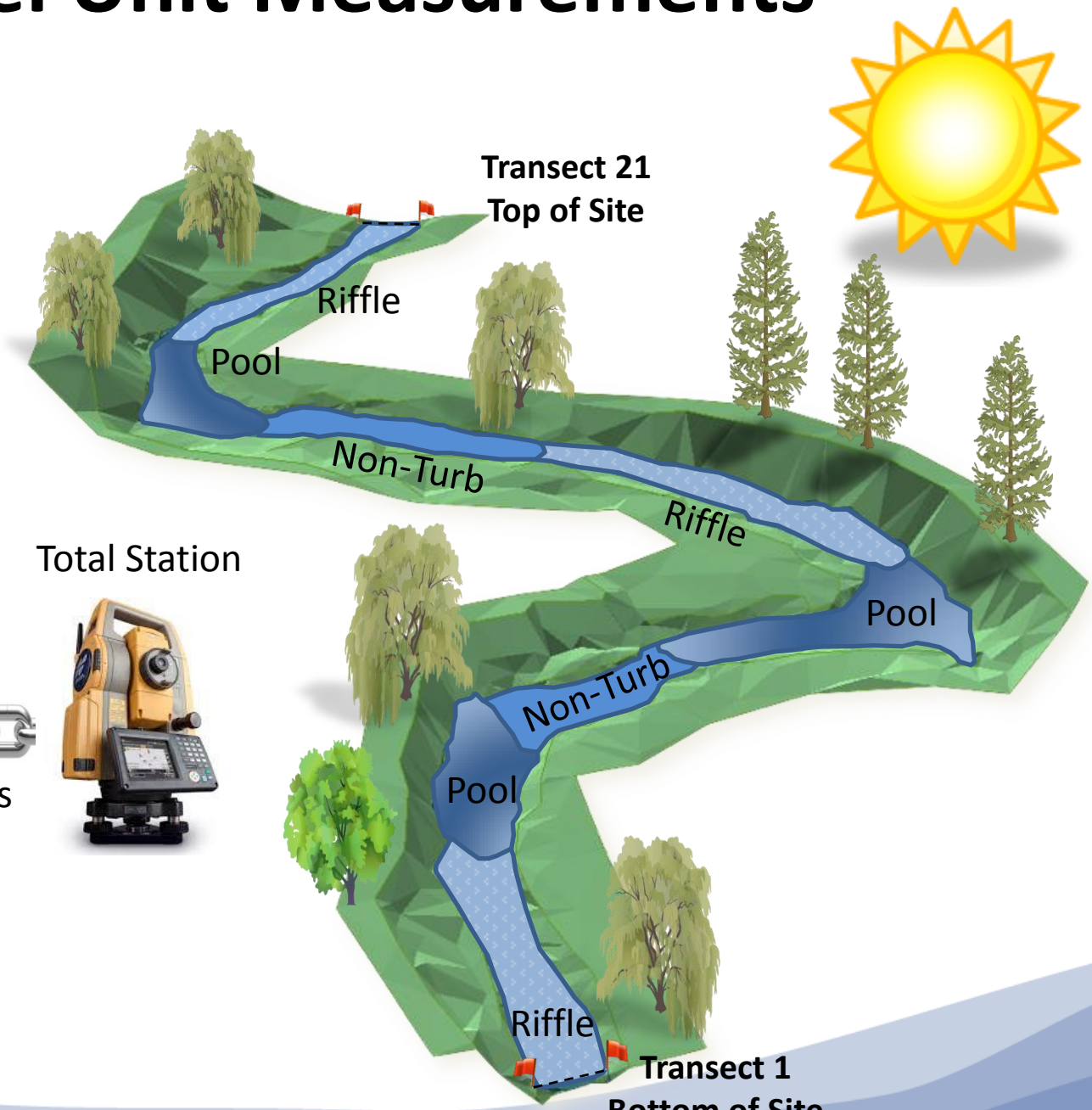
- Photos

- Riparian Vegetation

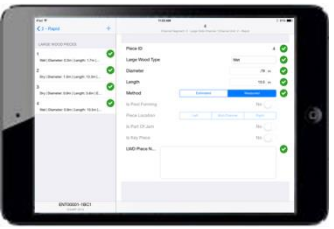


Channel Unit Measurements

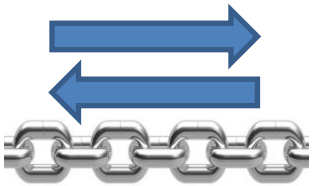
- Channel Unit Classification and Delineation



Data Logger



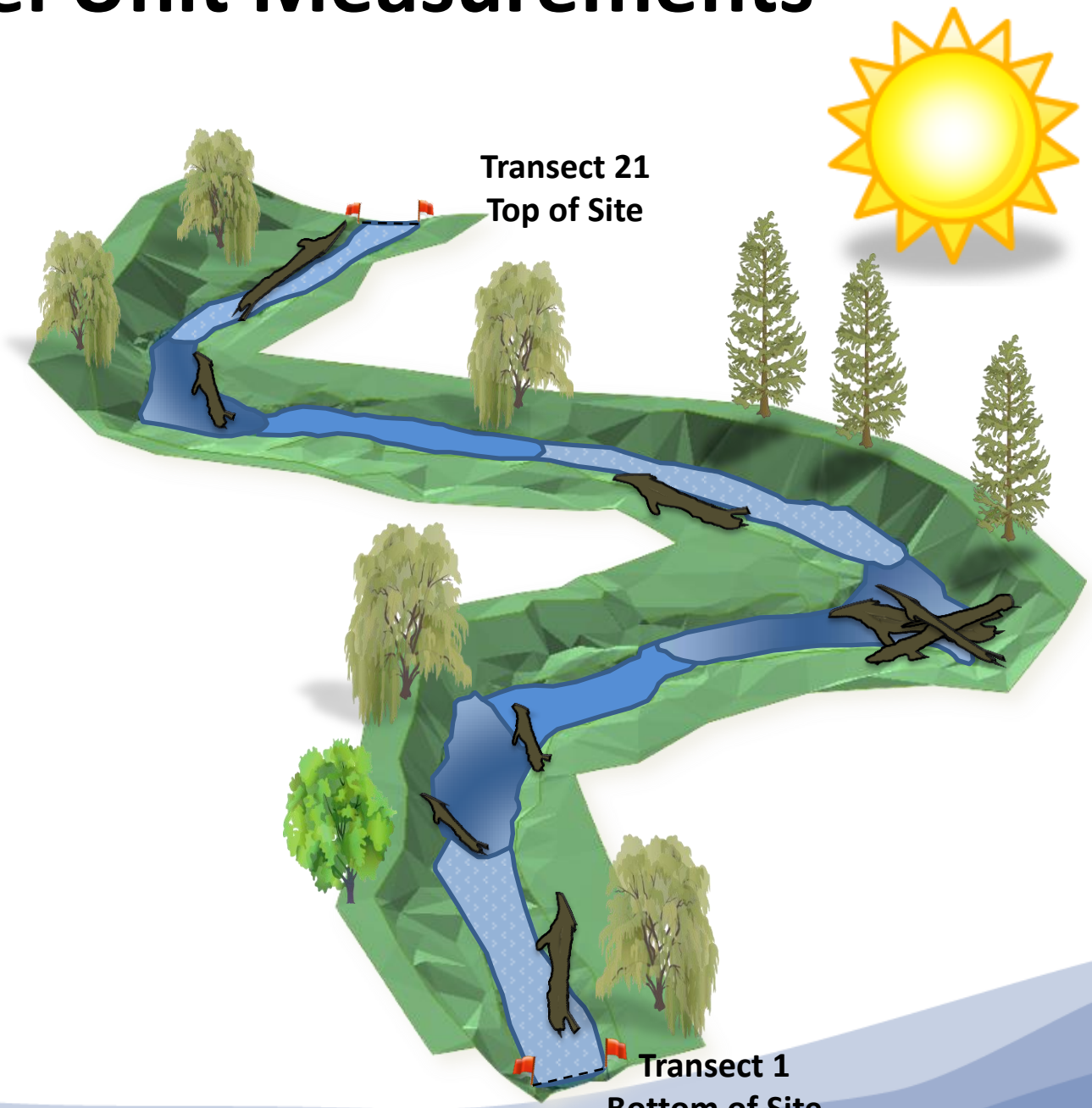
Channel Units



Total Station

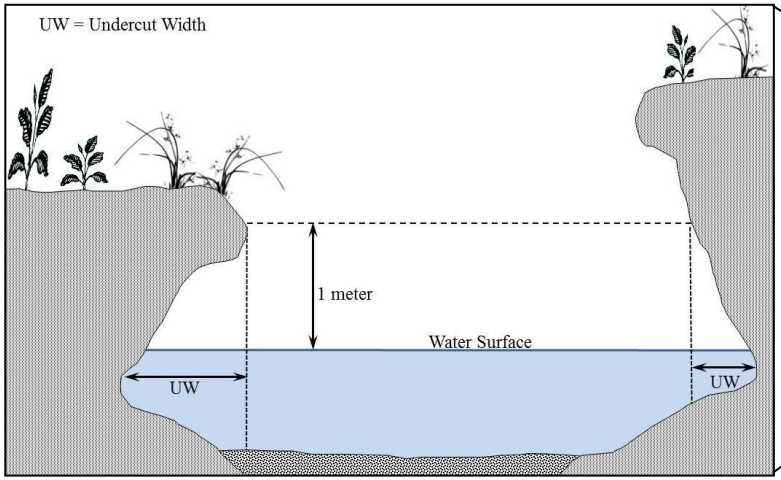
Channel Unit Measurements

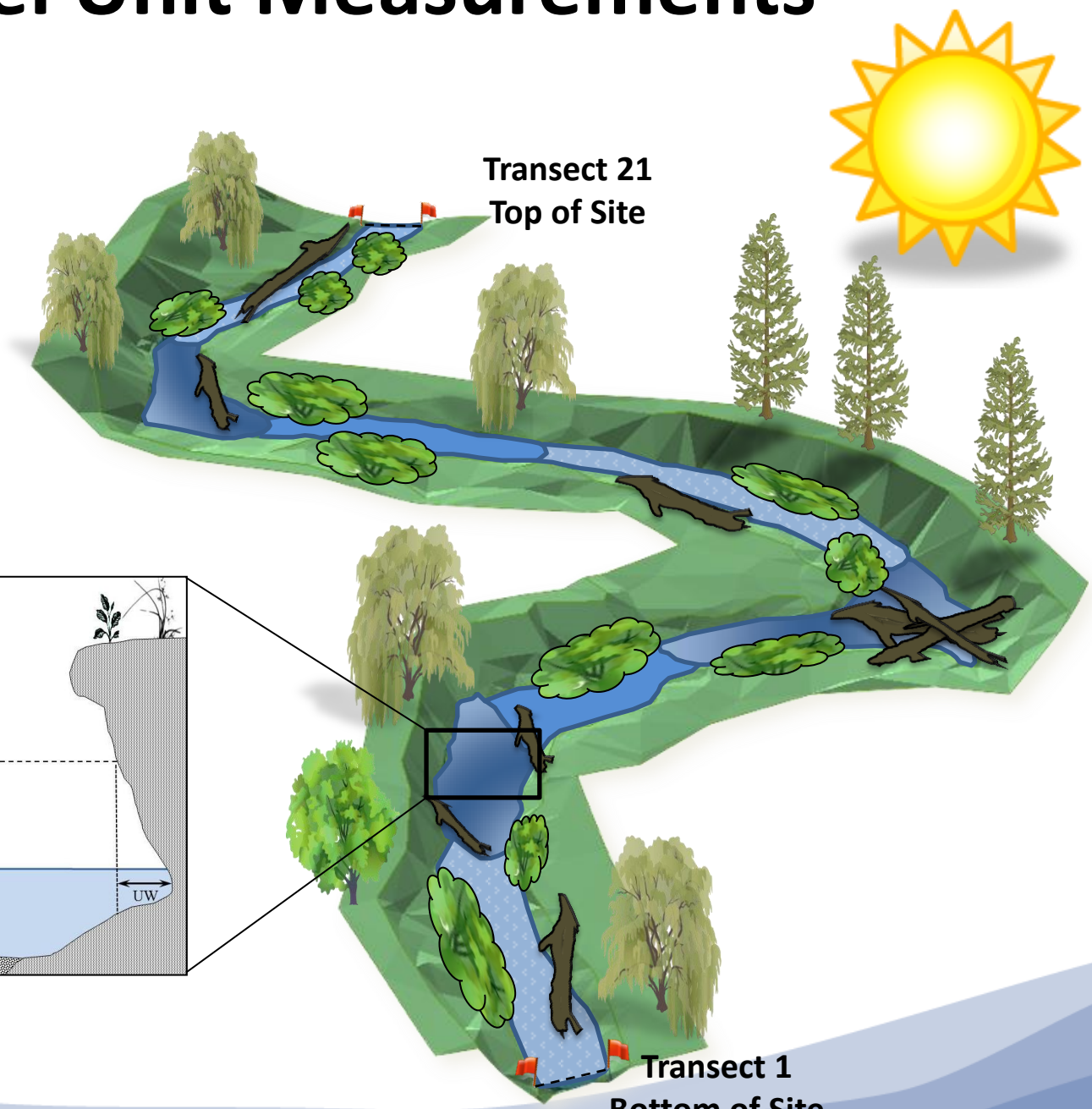
- Large Wood



Channel Unit Measurements

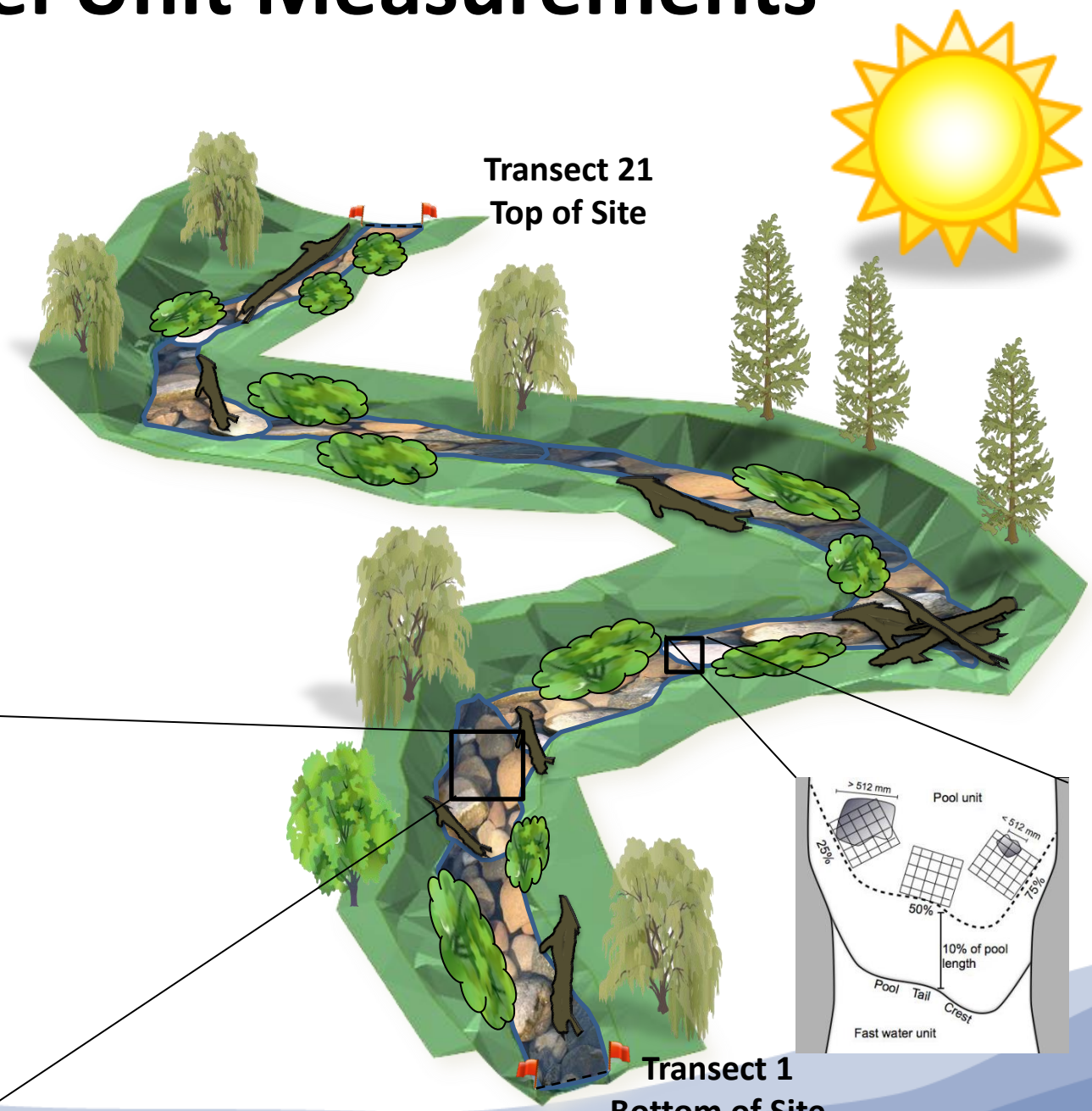
- Large Wood
- Fish Cover
- Undercut Banks





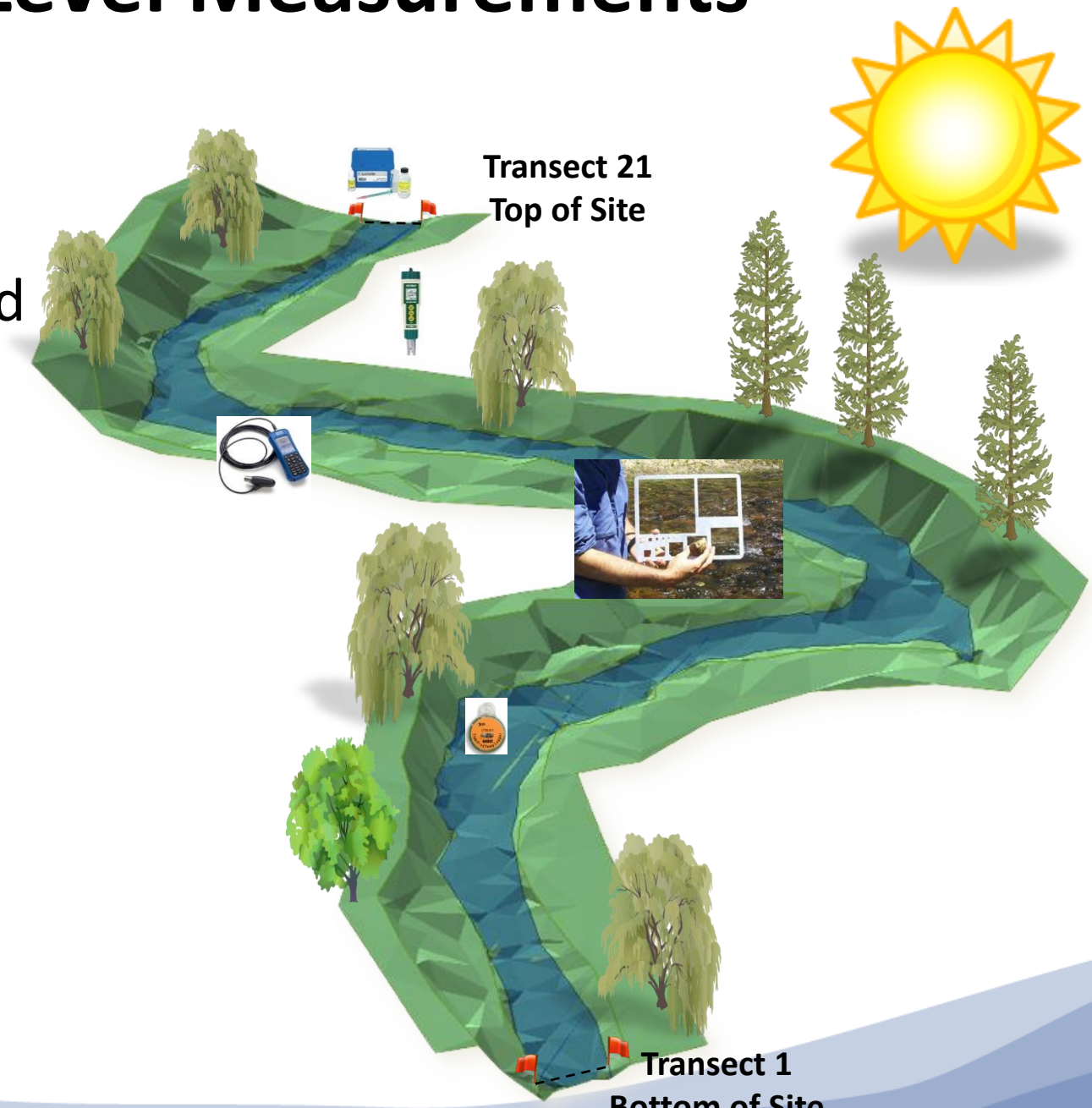
Channel Unit Measurements

- Large Wood
- Fish Cover
- Undercut Banks
- Ocular Substrate
- Pool Tail Fines



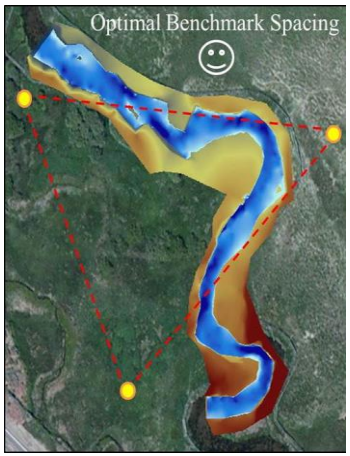
Site Level Measurements

- Discharge
- Pebble Counts and Embeddedness
- Temperature
- Water Chemistry

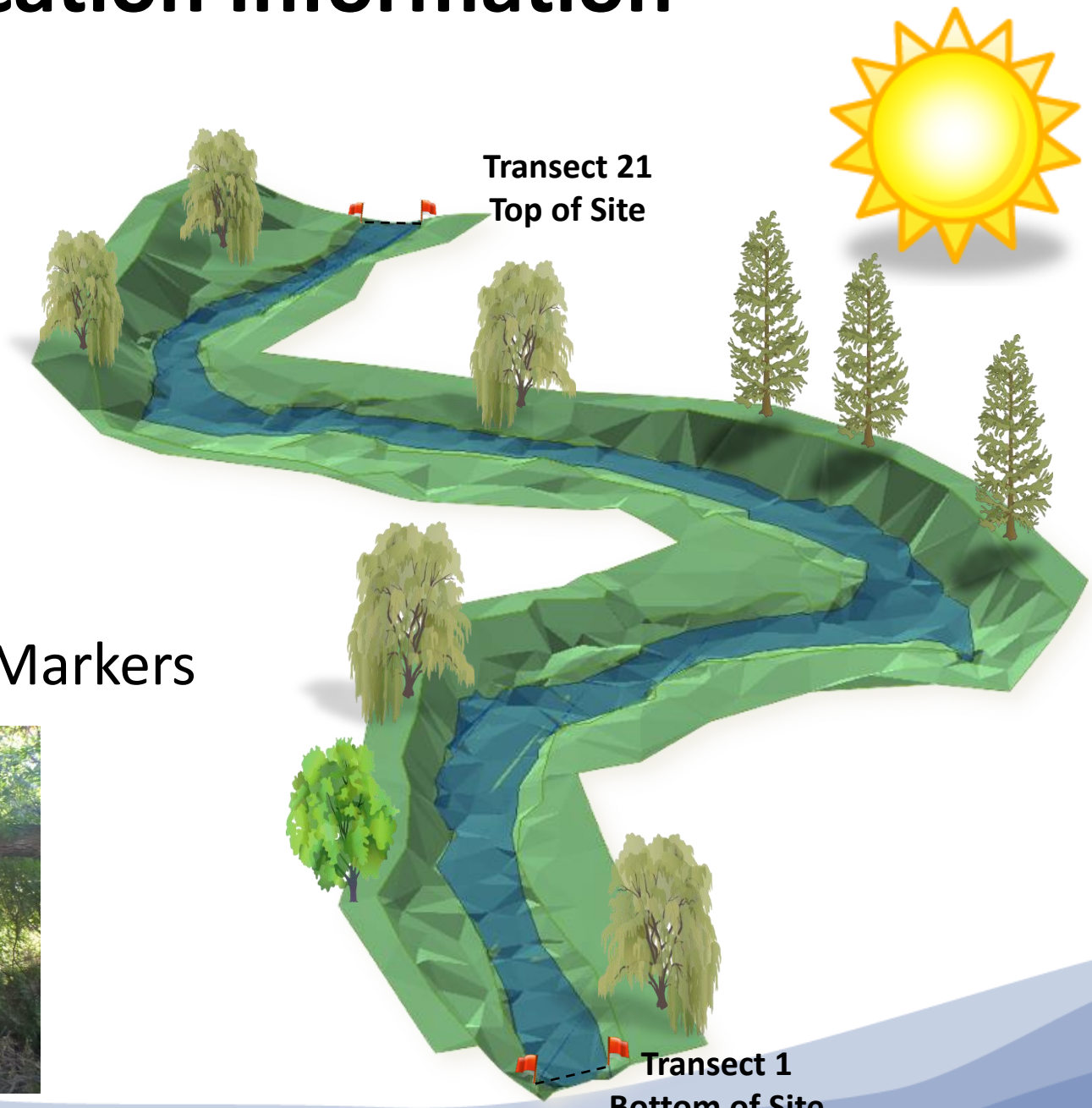


Location Information

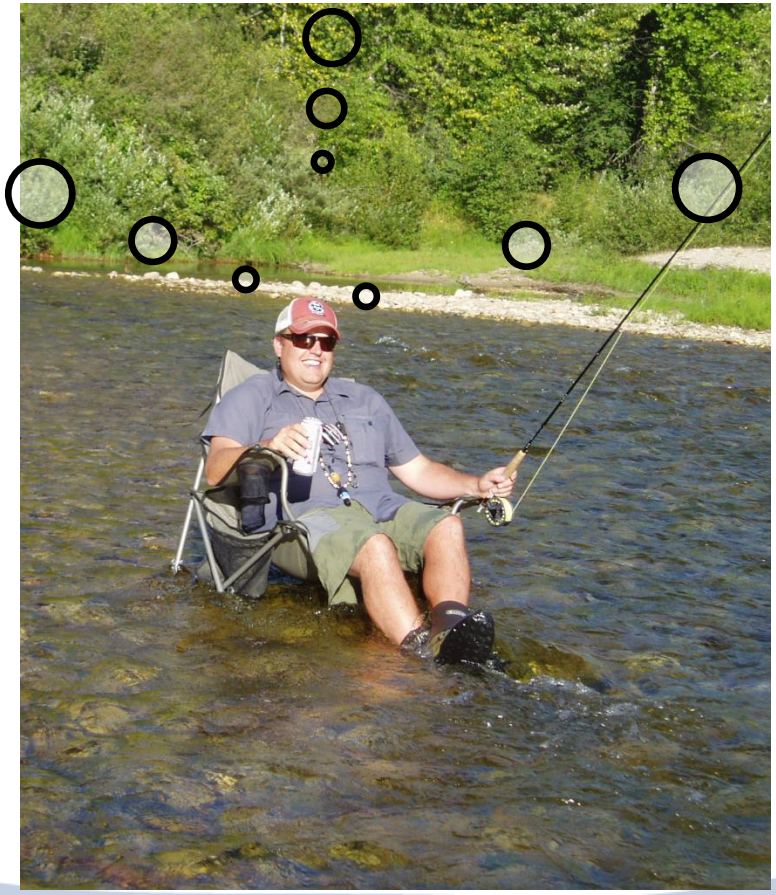
- Benchmarks



- Monuments and Markers



Post Data Collection Duties



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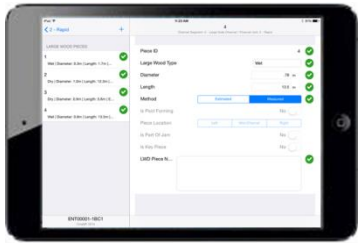
Post Data Collection Workflow

Site Directions

Site Directions

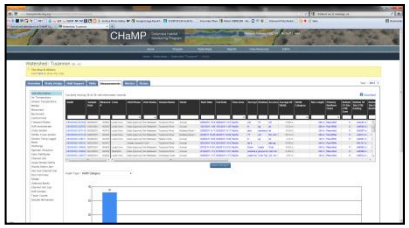
Data Entry/Edits

Auxiliary Data



Data Logger

Data Broker



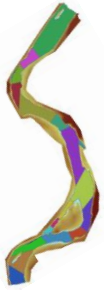
Publish Data

Topographic Data

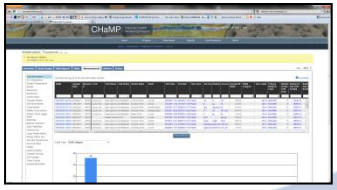
Total Station

Computer

ArcGIS



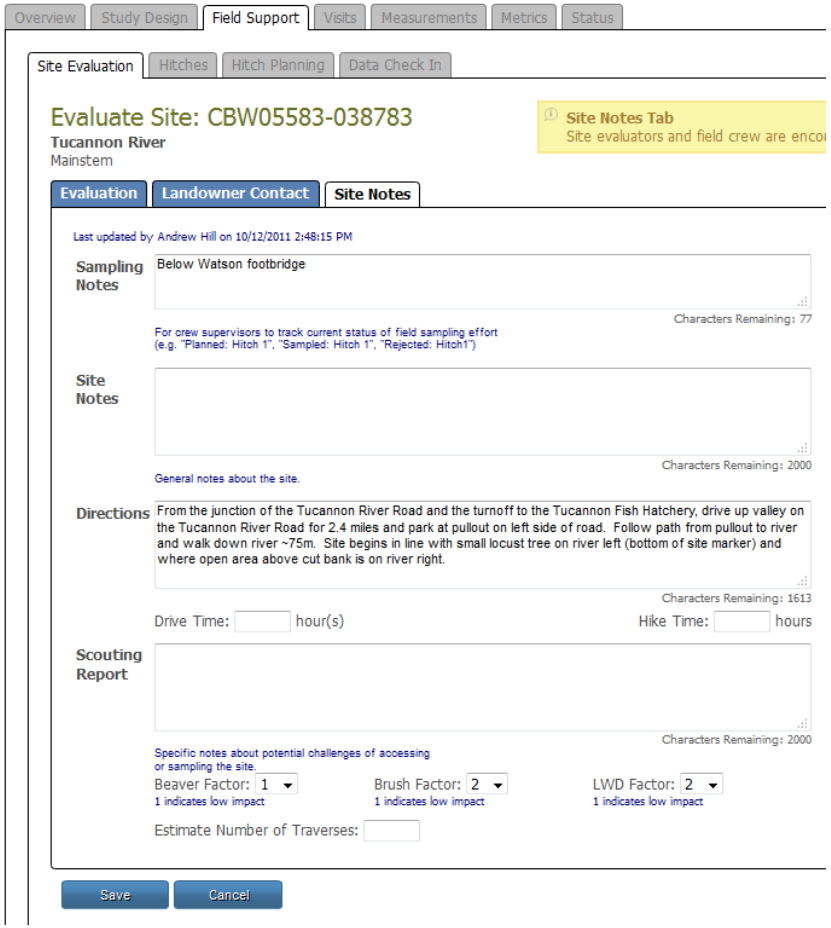
RBT



Publish Data

Site Directions

Site Directions



Data Entry/Edits

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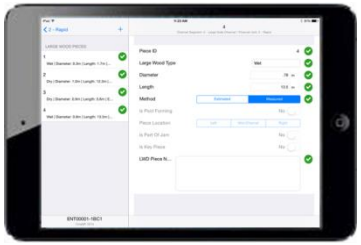
Auxiliary Data Workflow



Data Logger

Data Broker/QC

Published Data

Stream Name	Auxiliary Data Files	Site Photos	Topographic Data	Air Temp Readings	Stream Temp Readings	Solar Input Photos
Spring Creek	Quality Assurance	Quality Assurance	Quality Assurance	Quality Assurance	Quality Assurance	Quality Assurance
Dry Creek	Quality Assurance	Quality Assurance	Quality Assurance	Quality Assurance	Quality Assurance	Quality Assurance
Dry Creek	Quality Assurance	Quality Assurance	Quality Assurance	Quality Assurance	Quality Assurance	Quality Assurance
Spring Creek	Quality Assurance	Quality Assurance	Quality Assurance	Quality Assurance	Quality Assurance	Quality Assurance
Spring Creek	Quality Assurance	Quality Assurance	Quality Assurance	Quality Assurance	Quality Assurance	Quality Assurance
Dry Creek	Quality Assurance	Quality Assurance	Quality Assurance	Quality Assurance	Quality Assurance	Quality Assurance
Milk Creek	New	New	New	New	New	New
Milk Creek	New	New	New	New	New	New
Milk Creek	New	New	New	New	New	New
Milk Creek	New	New	New	New	New	New
Milk Creek	New	New	New	New	New	New
Milk Creek	New	New	New	New	New	New
Milk Creek	New	New	New	New	New	New
Milk Creek	New	New	New	New	New	New
Milk Creek	New	New	New	New	New	New
Milk Creek	New	New	New	New	New	New
Milk Creek	New	New	New	New	New	New

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Auxiliary Data Workflow

Data Broker/QC

Published Data

Additional Data

- SunEye
- Stream Temp
- Site Map

Stream Name	Auxiliary Data Files	Site Photos	Topographic Data	Air Temp Readings	Stream Temp Readings	Solar Input Photos
Spring Creek	Quality Assurance	Quality Assurance	Quality Assurance	Quality Assurance	Quality Assurance	Quality Assurance
Dry Creek	Quality Assurance	Quality Assurance	Quality Assurance	Quality Assurance	Quality Assurance	Quality Assurance
Dry Creek	Quality Assurance	Quality Assurance	Quality Assurance	Quality Assurance	Quality Assurance	Quality Assurance
Spring Creek	Quality Assurance	Quality Assurance	Quality Assurance	Quality Assurance	Quality Assurance	Quality Assurance
Spring Creek	Quality Assurance	Quality Assurance	Quality Assurance	Quality Assurance	Quality Assurance	Quality Assurance
Dry Creek	Quality Assurance	Quality Assurance	Quality Assurance	Quality Assurance	Quality Assurance	Quality Assurance
Milk Creek	New	New	New	New	New	New
Milk Creek	New	New	New	New	New	New
Milk Creek	New	New	New	New	New	New
Milk Creek	New	New	New	New	New	New
Milk Creek	New	New	New	New	New	New
Milk Creek	New	New	New	New	New	New
Milk Creek	New	New	New	New	New	New
Milk Creek	New	New	New	New	New	New
Milk Creek	New	New	New	New	New	New
Milk Creek	New	New	New	New	New	New
Milk Creek	New	New	New	New	New	New

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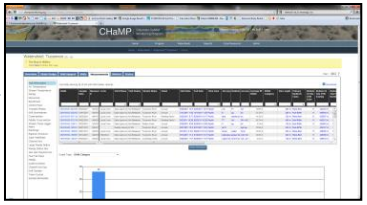
Topographic Data Workflow

Total Station

Computer

ArcGIS

Publish Data



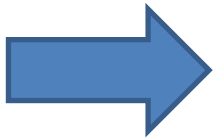
CHaMPMonitoring

Topographic Data Workflow

Total Station → Computer

Objective:

- Transfer survey points and lines from Total Station to laptop

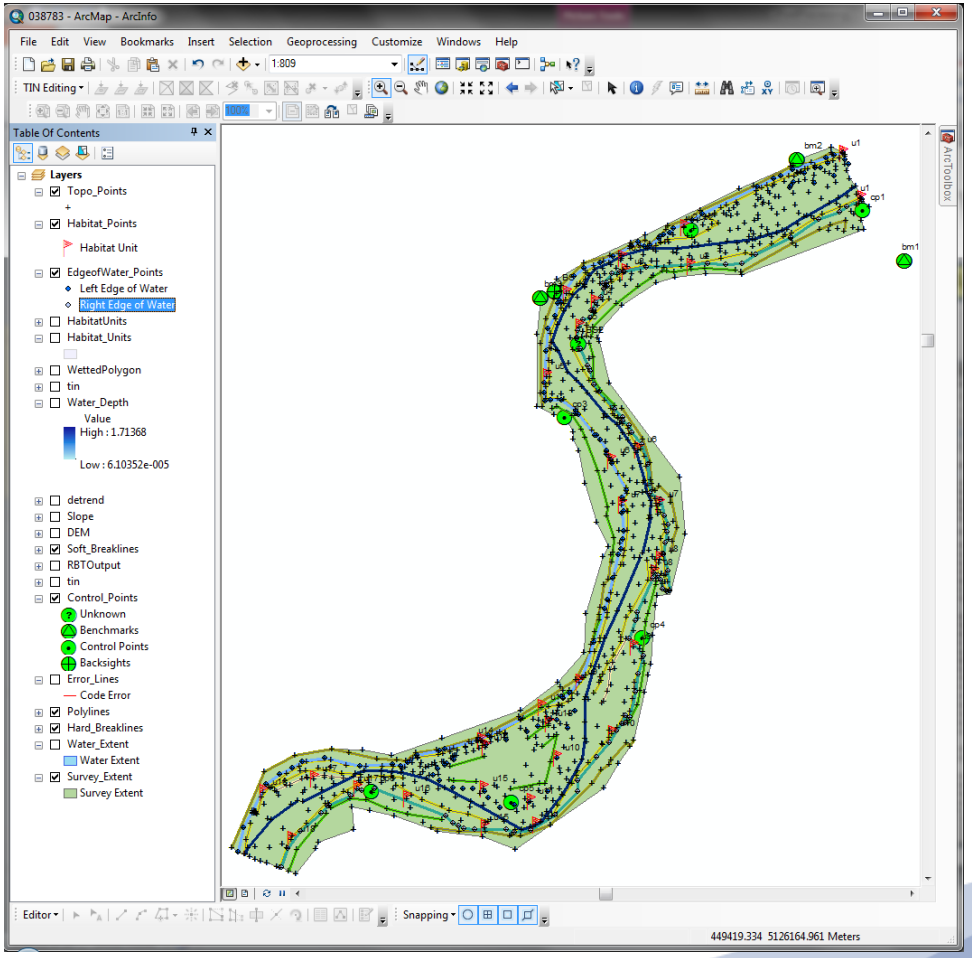


Topographic Data Workflow

ArcGIS

Objectives:

- TIN Creation
- TIN Editing
- DEM Creation
- Water Surface Delineation
- Channel Unit Delineation
- Centerlines and Cross-Sections



Topographic Data Workflow

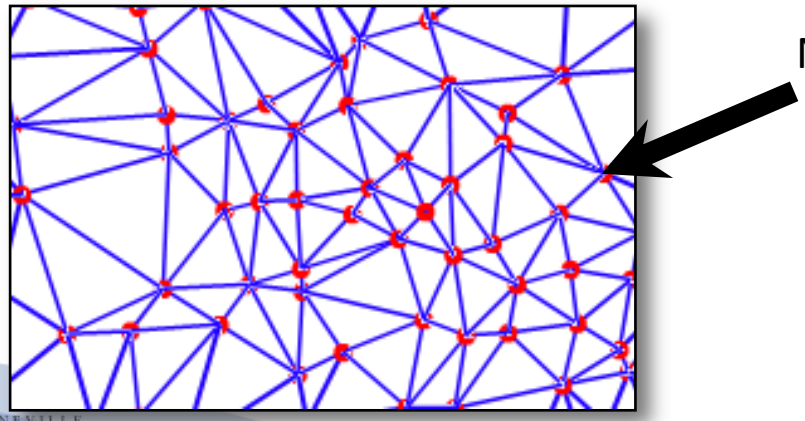
TINs

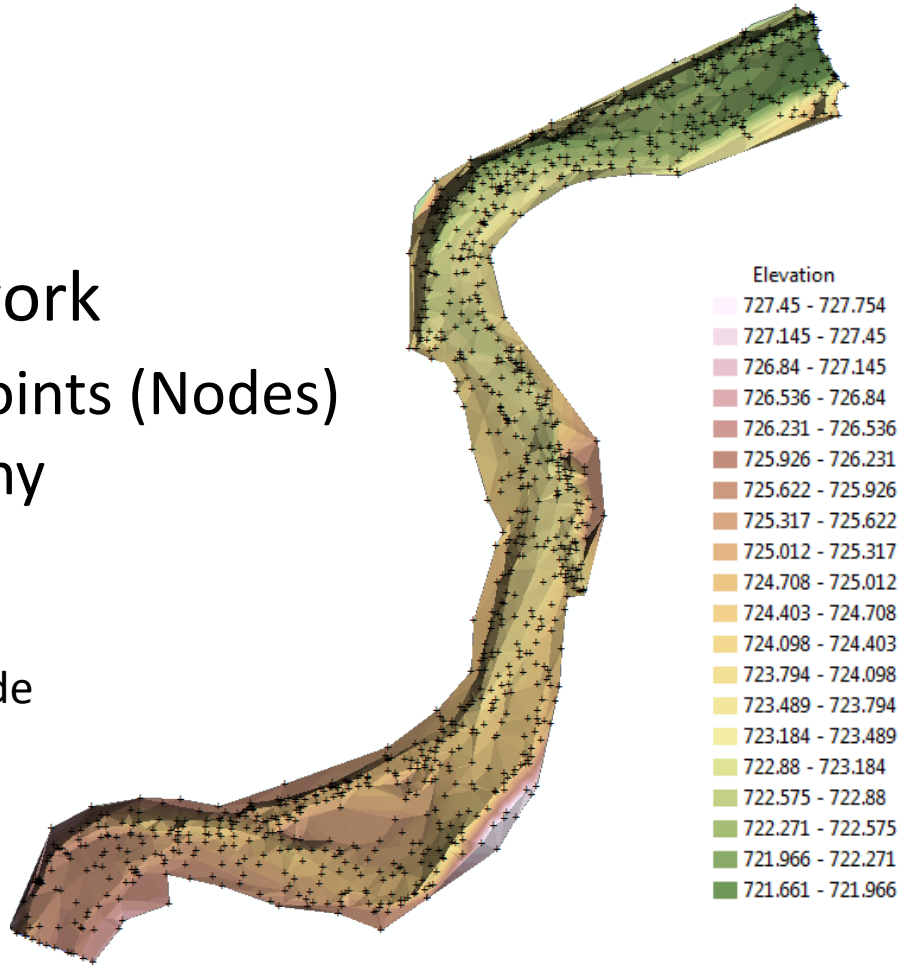
Objective:

- TIN Creation

TIN - Triangular Irregular Network

- Linear Interpolation Between Points (Nodes)
- 3D Representation of Topography
- Visualization of Survey Quality

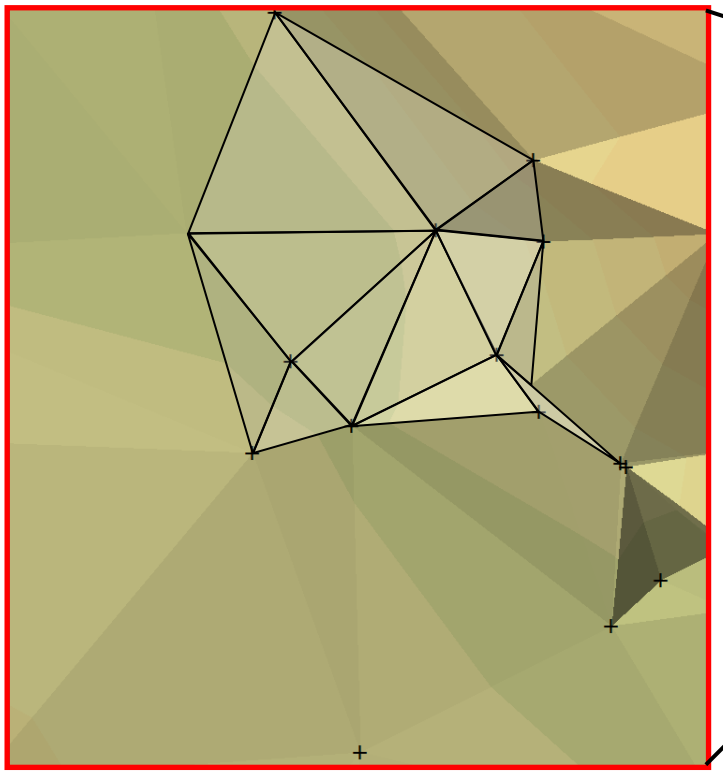




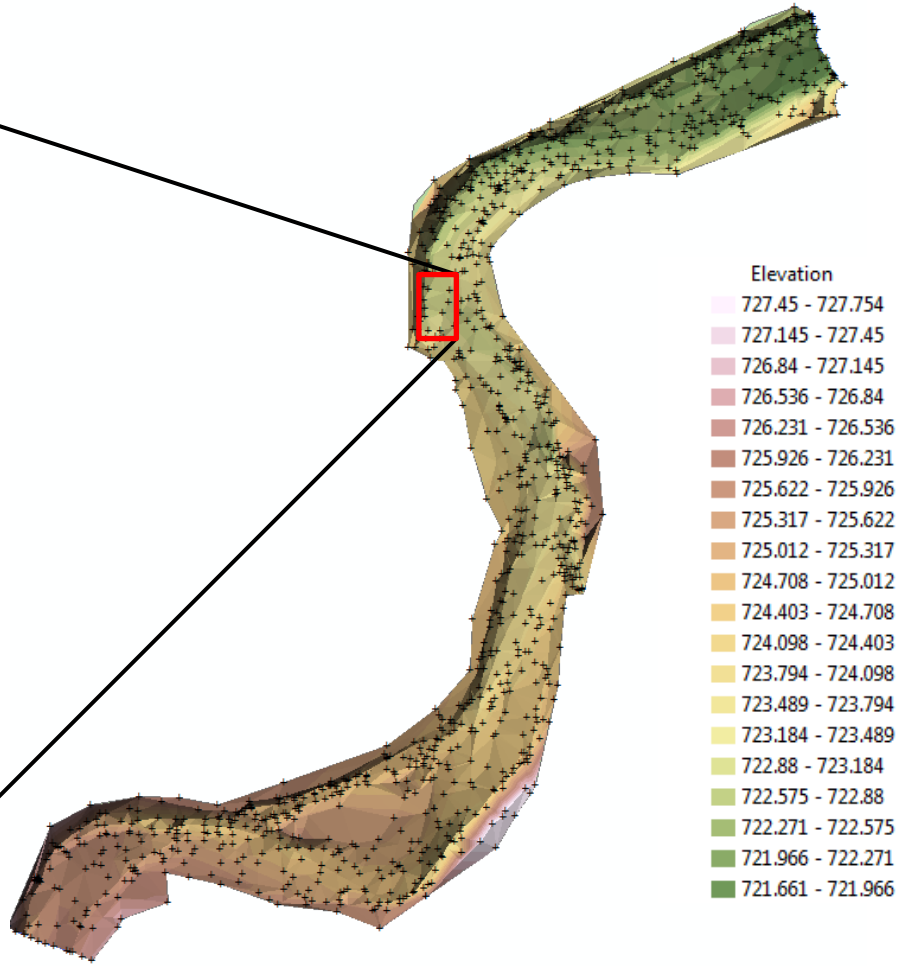
BONNEVILLE POWER ADMINISTRATION ISEMP CHaMP

Topographic Data Workflow

ArcGIS - TINs

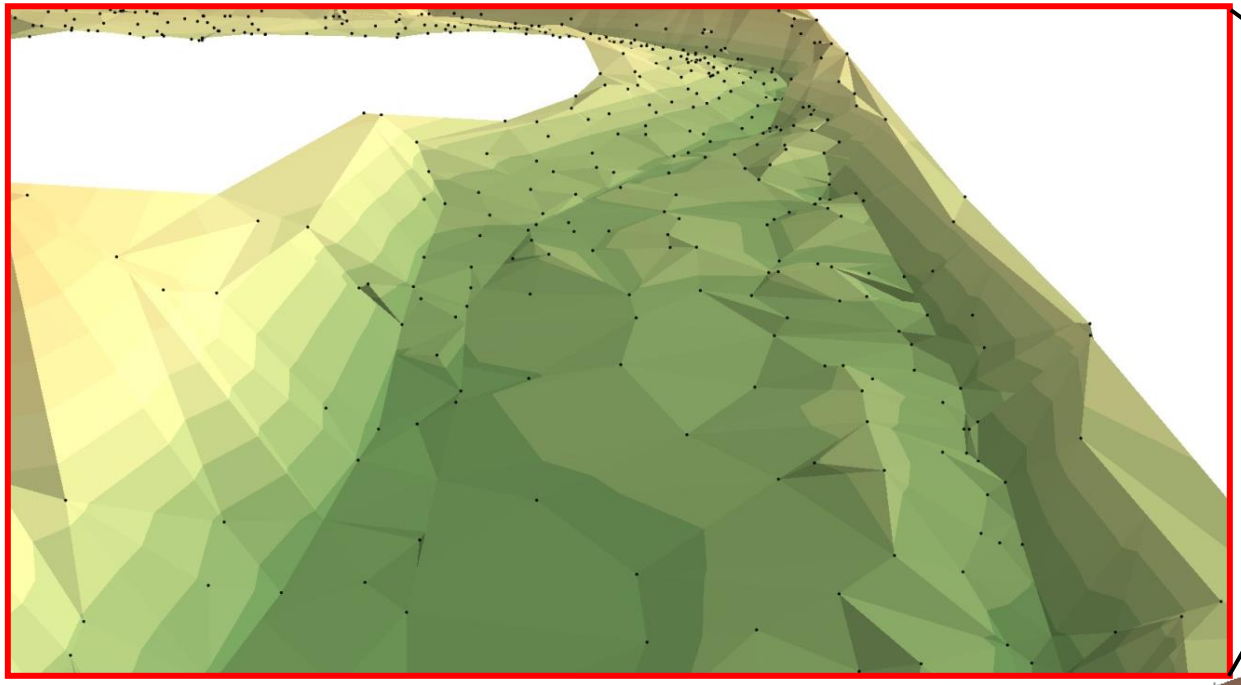


Planform View

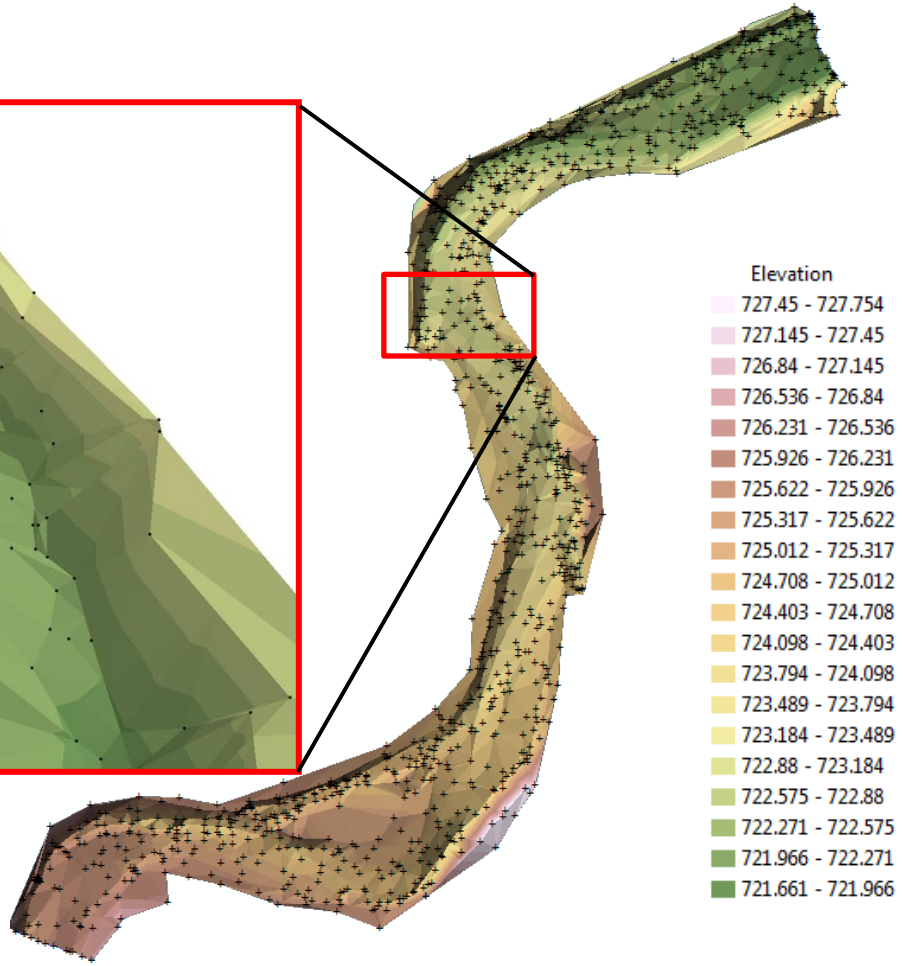


Topographic Data Workflow

ArcGIS - TINs



3D View



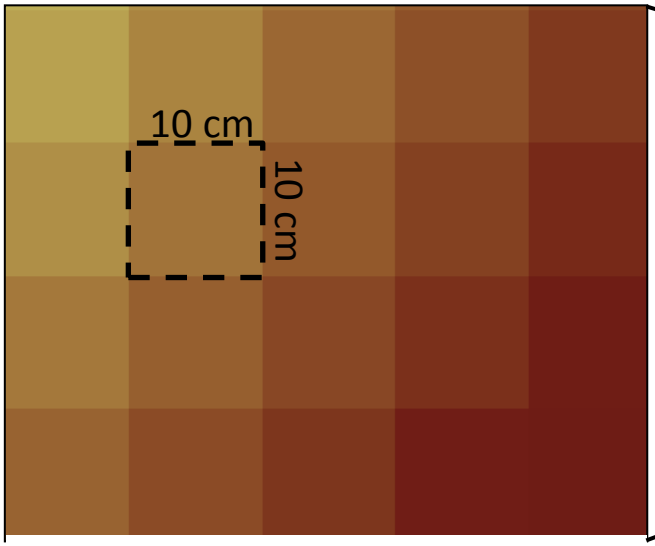
Topographic Data Workflow

ArcGIS - DEMs

Objective:

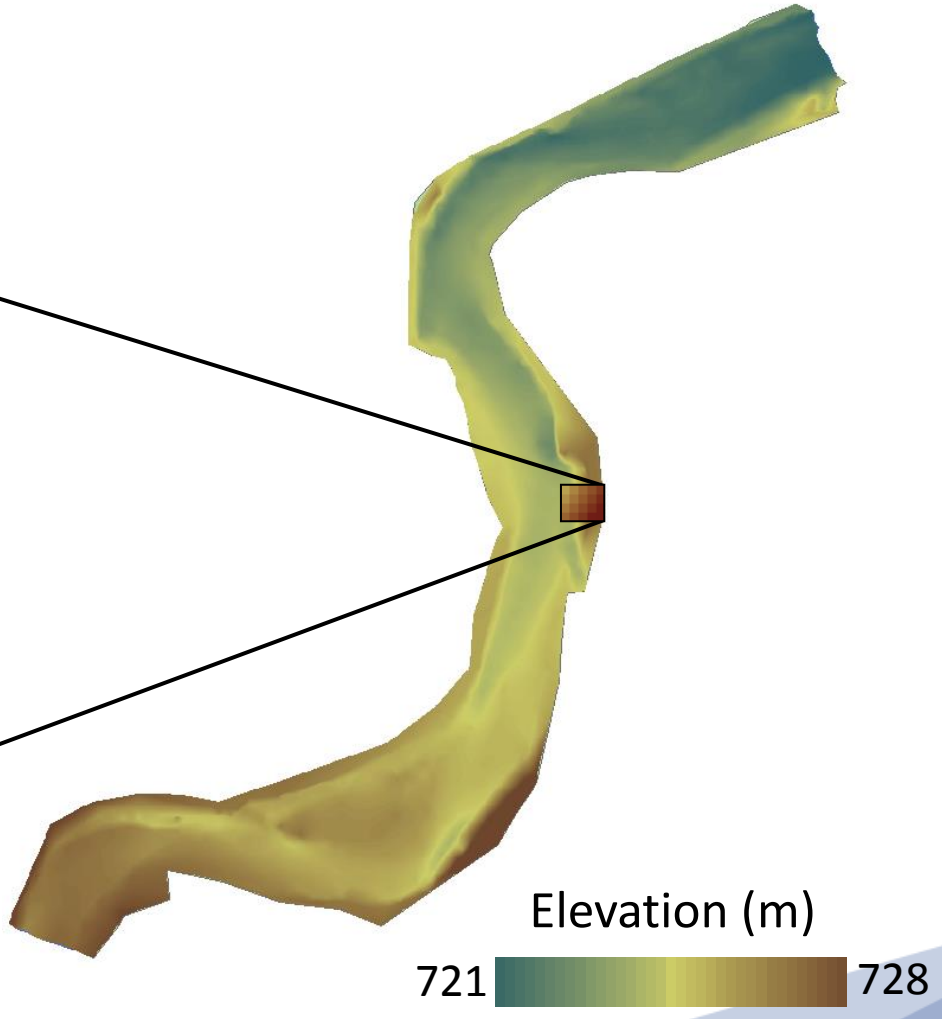
- DEM creation

DEM – Digital Elevation Model



Pixels Have:

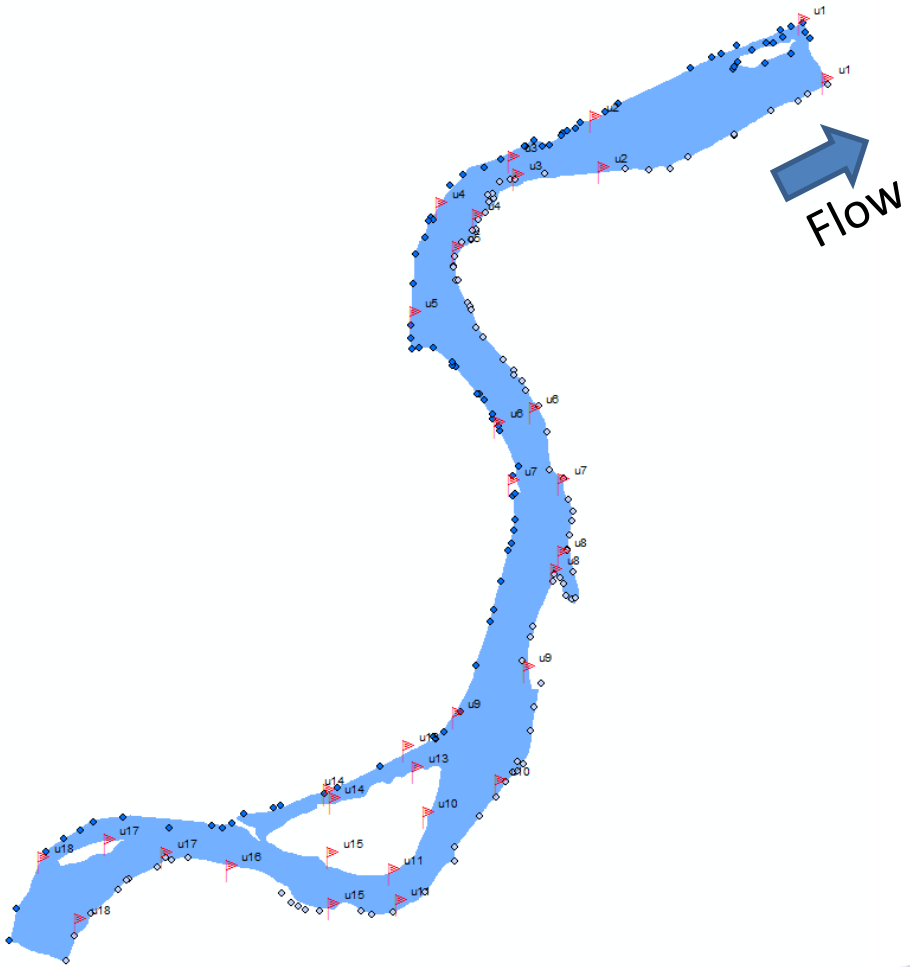
- Dimensions
- Attributes (Elevation)



Topographic Data Workflow

Objective:

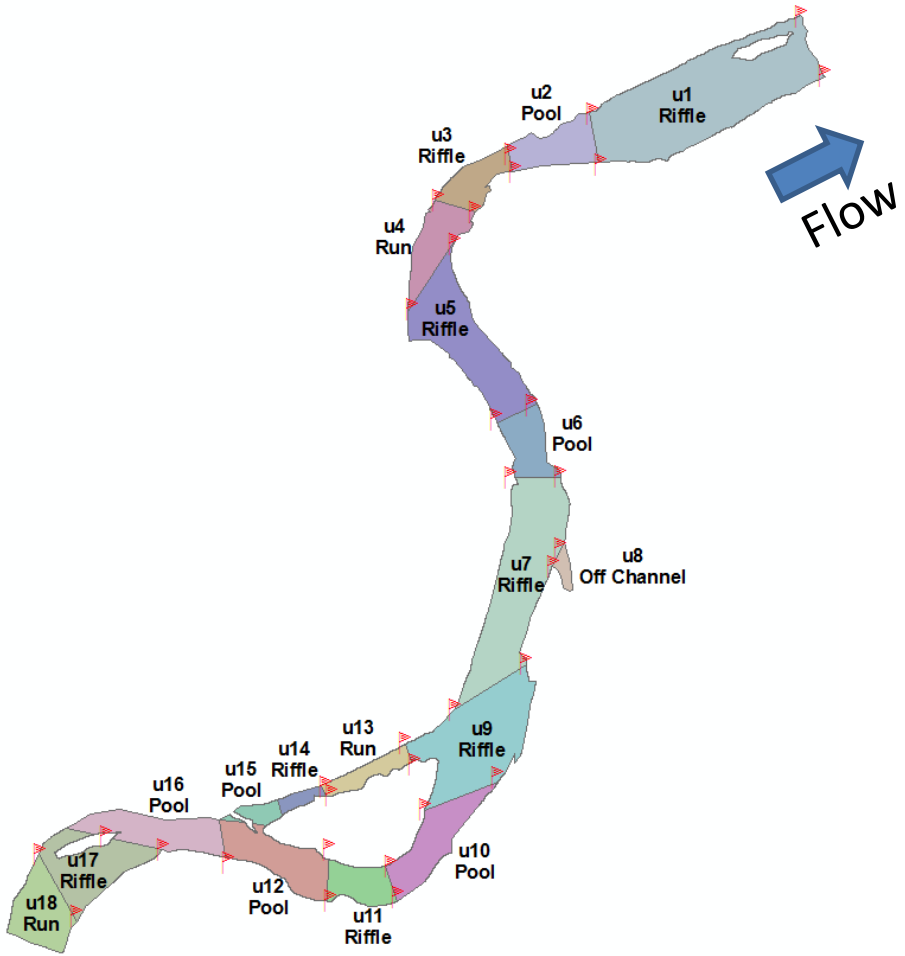
- Water Surface Delineation



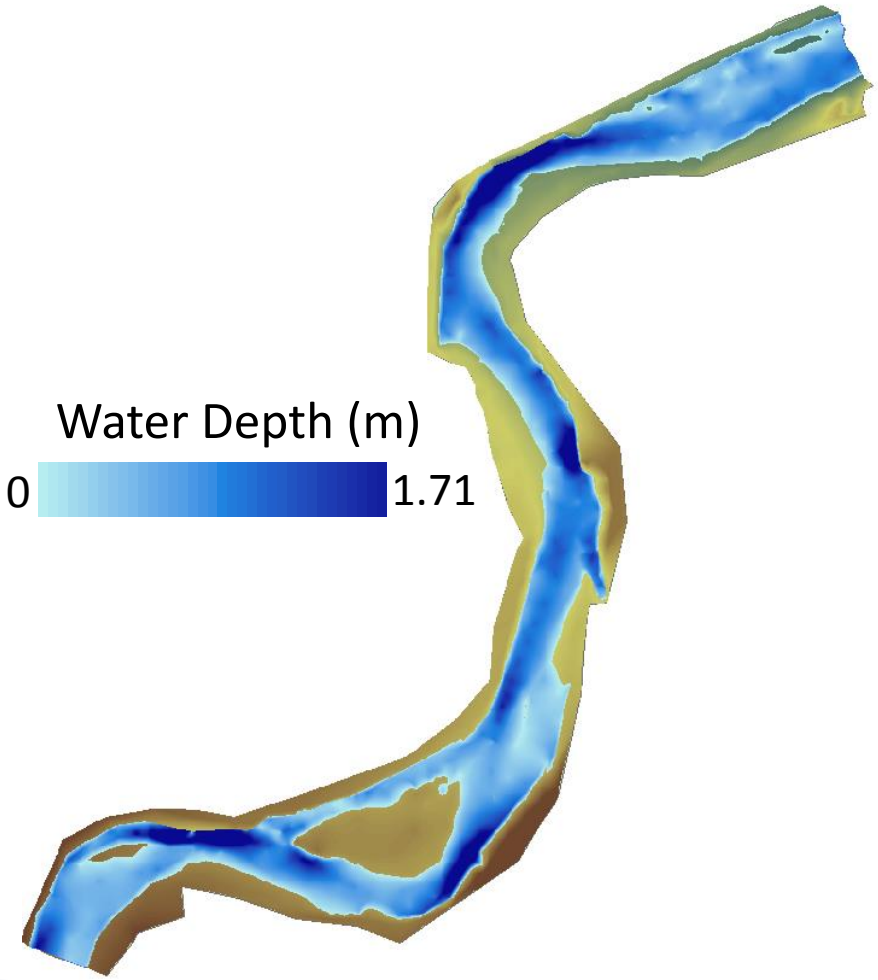
Topographic Data Workflow

Objective:

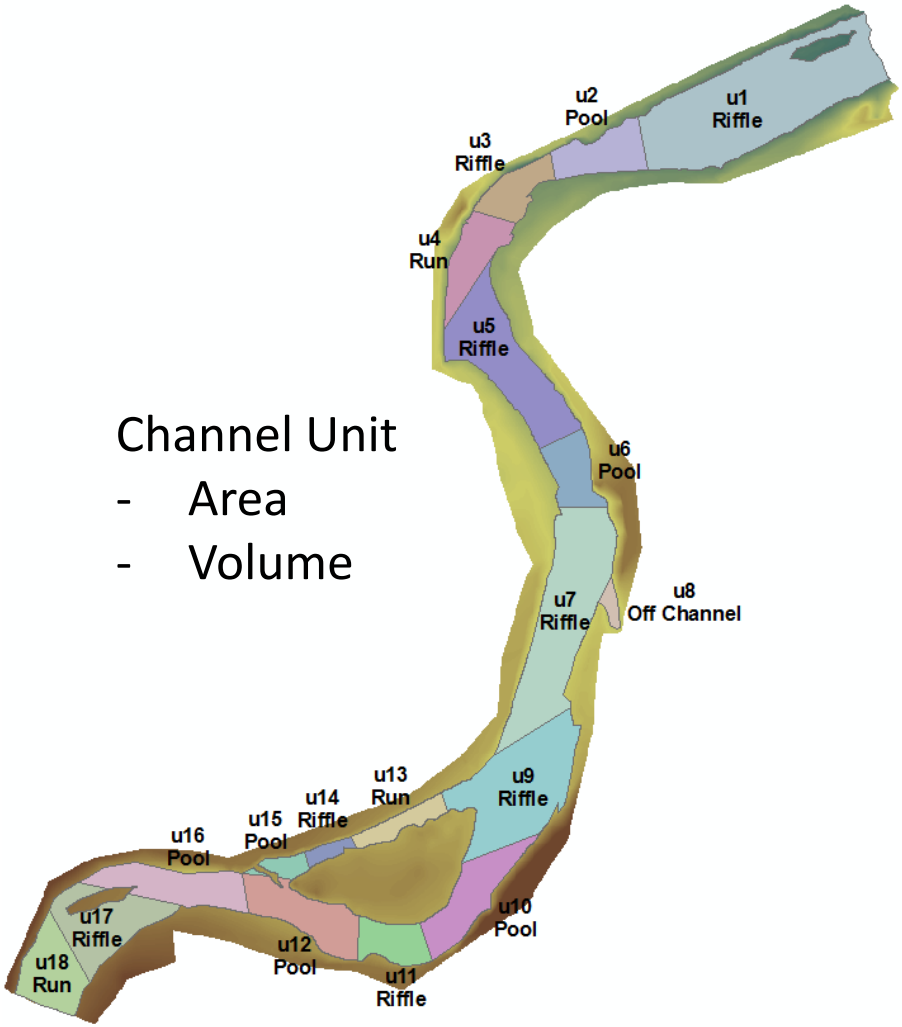
- Channel Unit Delineation



Topographic Data Workflow



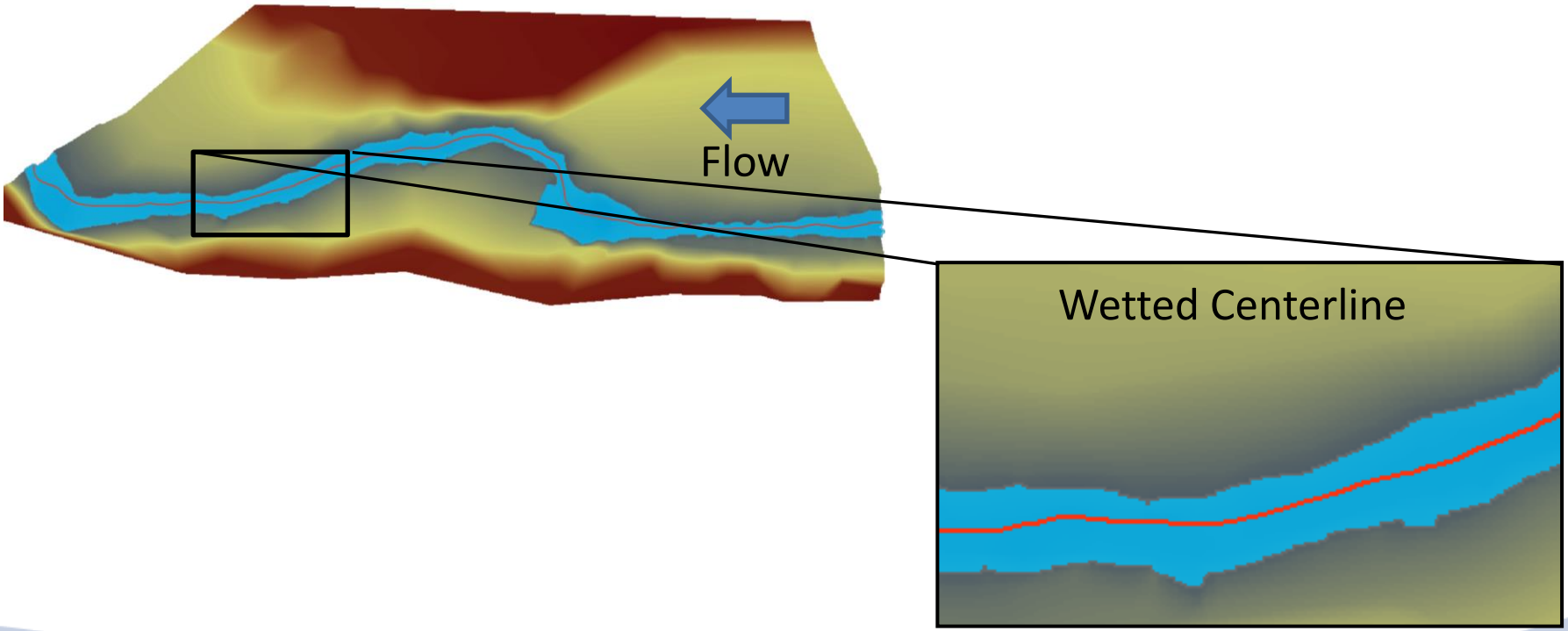
Channel Unit
- Area
- Volume



Topographic Data Workflow

Objective:

- Wetted and bankfull centerline delineation



Topographic Data Workflow

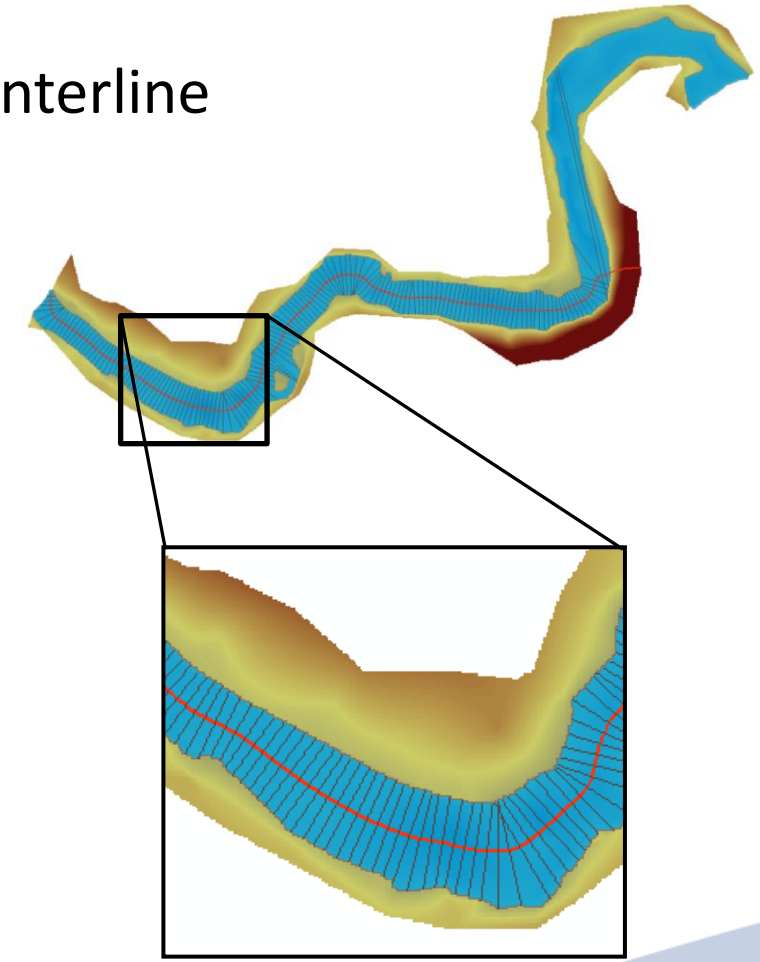
Objective:

- Delineate cross-sections from centerline

Why is this important?

- Many of our habitat metrics are based on cross-sections and wetted and bankfull polygons

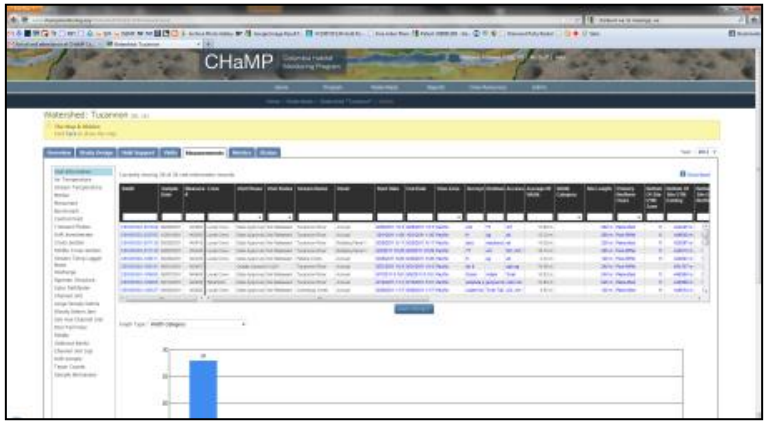
Bad surveys = Bad metrics = Bad Science



Topographic Data Workflow

Data Broker

Topographic Data
- .job/.mjf file (from Total Station)
- .dfx file (from Total Station)
- Geodatabase (from ArcGIS)



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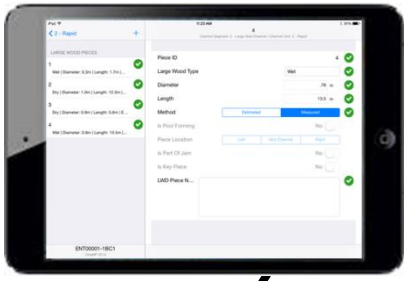
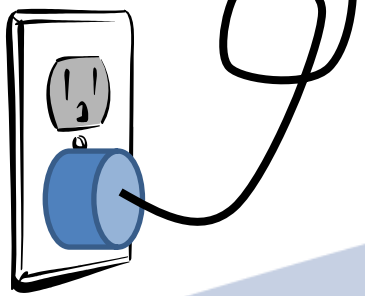
End of Day Duties



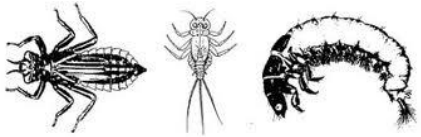
Data Backup

Battery Charging

Fix Gear



End of Hitch Duties



Bug Jars Ready For Shipping

Stream Name	Auxiliary Data Files	Site Photos	Topographic Data
Spring Creek	Quality Assurance	Quality Assurance	Quality Assurance
Dry Creek	Quality Assurance	Quality Assurance	Quality Assurance
Dry Creek	Quality Assurance	Quality Assurance	Quality Assurance
Spring Creek	Quality Assurance	Quality Assurance	Quality Assurance
Spring Creek	Quality Assurance	Quality Assurance	Quality Assurance
Dry Creek	Quality Assurance	Quality Assurance	Quality Assurance
Five Points Creek	Quality Assurance	Quality Assurance	Quality Assurance

All Data Uploaded, Complete, and Clean

Fix Gear

Clean Truck

Decontamination

New Zealand mudsnail

Whirling disease

Zebra mussel

'rock snot'

Treatment Steps 1, 2, 3	Treatment Steps 4 & 5	When and Where
Step 1: Remove visible mud/organic debris from equipment with a stiff bristled brush **Step 2:** Create a decontamination solution of High Dilution Solution 256 at **2.5 oz. per 1 gallon of water** **Step 3:** Soak for at least 10 minutes	**Step 4:** Pour solution back into carrying container for reuse. Discard when solution no longer produces suds **Step 5:** Discard solution down a drain that will run to a wastewater treatment facility	• Decontaminate gear before when moving between subbasins • Decontaminate gear at least 100 meters from a water source

GREEN SOLUTIONS™

Step 1

Step 2

Step 3

Step 4

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You Are the Key to Success

Lunch Time!

Before 12:45

- Disinfect your waders outside Kimsey Commons
- Pick up bag lunches

At 12:45

- Have your protocol, gear, and waders – pack for the weather!!!
- Meet vans for driving tour at Kimsey Commons
- Crew Supervisors: Meet outside Kimsey Commons for supervisor training