

Great Salt Lake Basin *Measurement Infrastructure Gap Analysis*

Legislative Water Development Commission | May 14, 2024



UtahState
University



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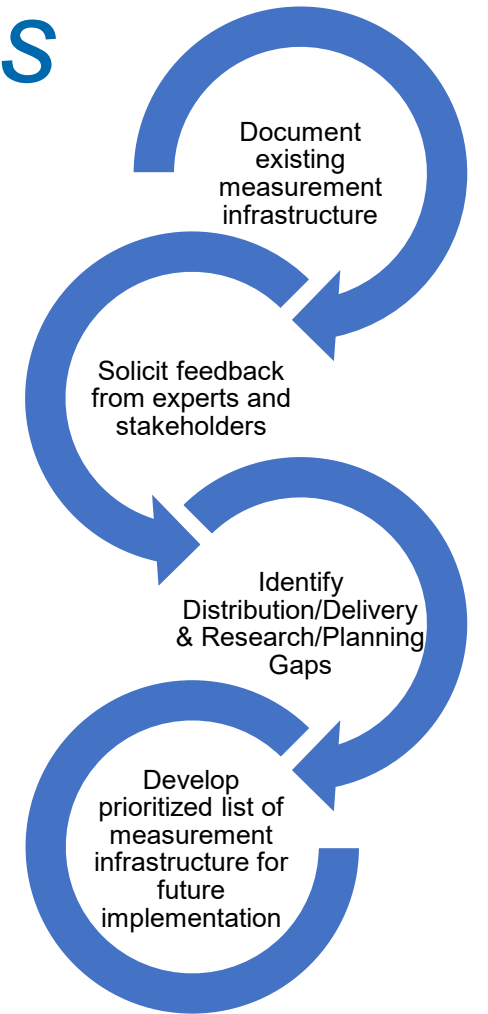
Gap Analysis | *Objectives*

- **Water Data Access and Transparency.** Additional measurement and gaging give broader access to water data and facilitate greater stakeholder transparency by providing more accurate and timely information about diversions, stream flows, and other hydrologic conditions.
- **Enhanced Water Management and Distribution.** It is critical to have sufficient data that enables the State Engineer to make informed decisions, facilitates flexibility for users to change elements of their water rights, and generally promotes wise stewardship of Utah's water resources.



Gap Analysis | *Process & Deliverables*

1. Evaluate existing stream and diversion measurement infrastructure.
2. Solicit local stakeholder input to identify new/updated measurement infrastructure.
3. Create a prioritized list of measurement infrastructure necessary for Distribution & Delivery and Research & Planning.



Gap Analysis | *Scope of Work*

Bear River Watershed

- Upper Bear River (Rich County)
- Lower Bear River (Cache & Box Elder)
- Logan River
- Little Bear River
- Blacksmith Fork
- Summit Creek
- Cub River

Weber River Watershed

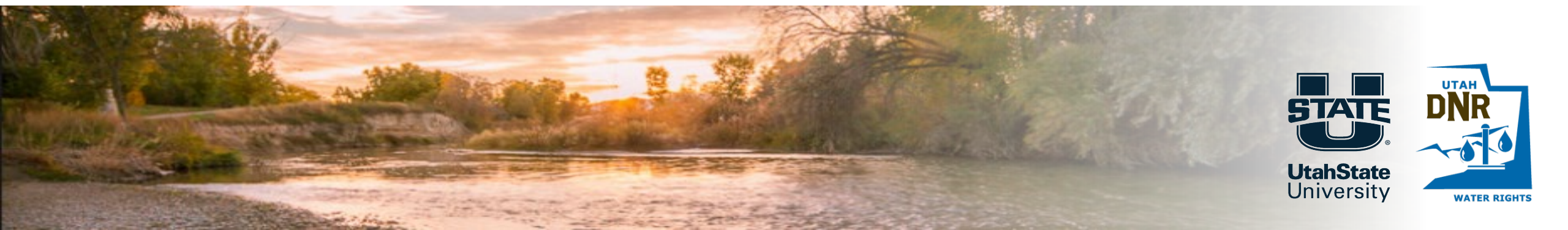
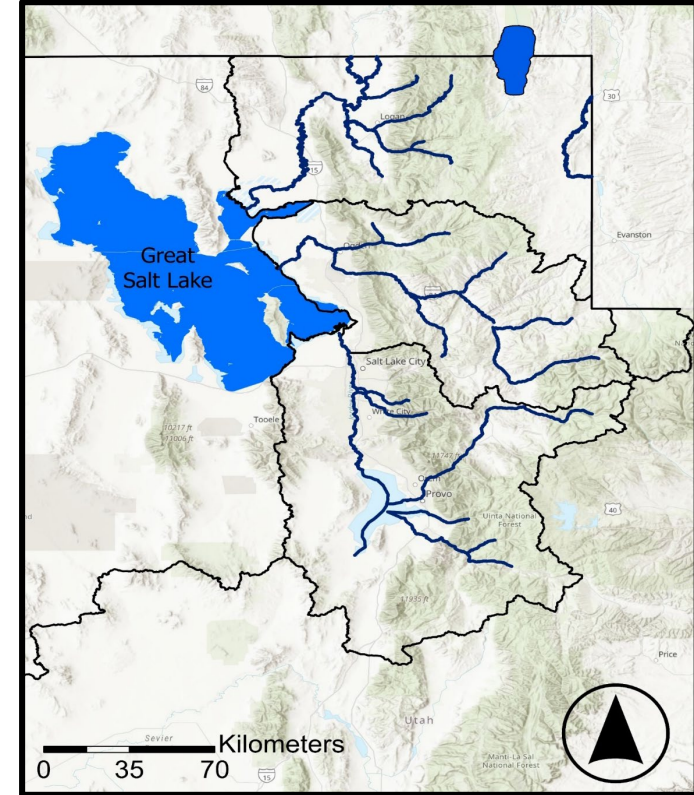
- Weber River
- Ogden River
- Chalk Creek
- Lost Creek
- East Canyon Creek

Jordan River / Utah Lake Watershed

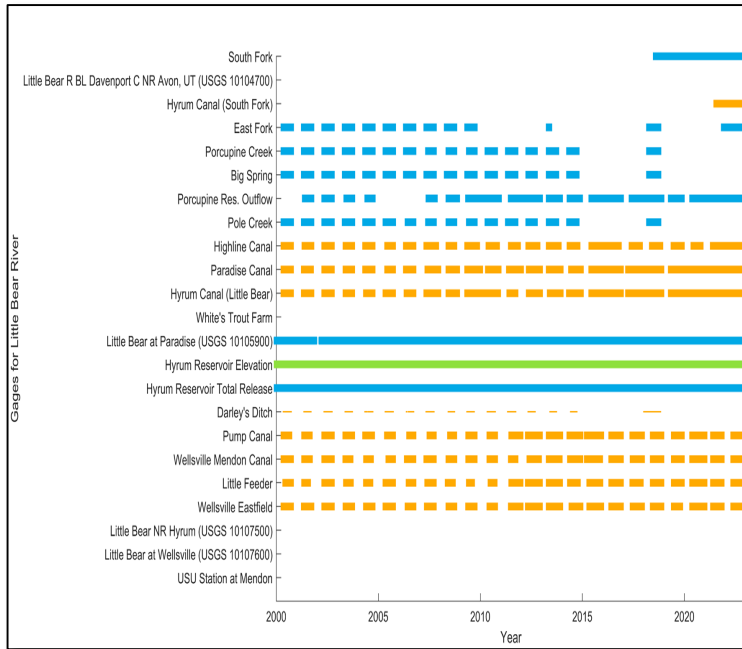
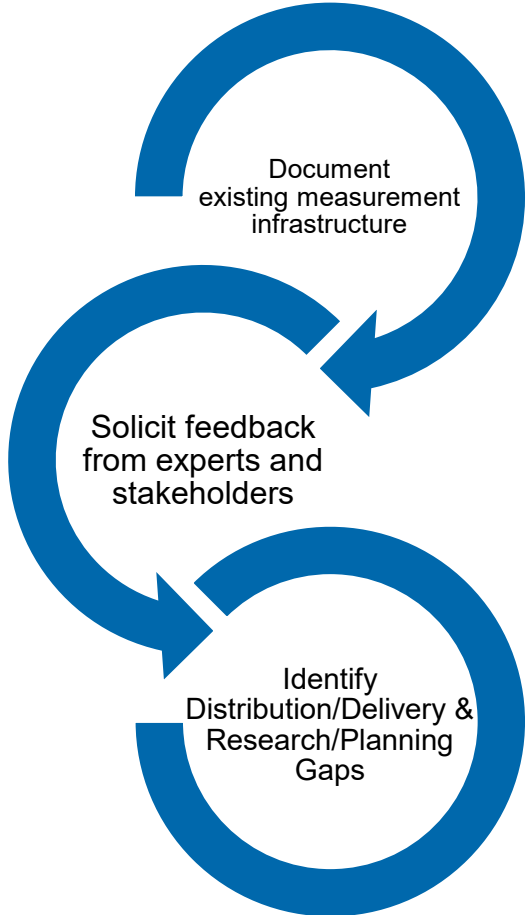
- Provo River
- Spanish Fork River
- Jordan River
- Little Cottonwood Creek
- Big Cottonwood Creek
- Hobble Creek

Great Salt Lake

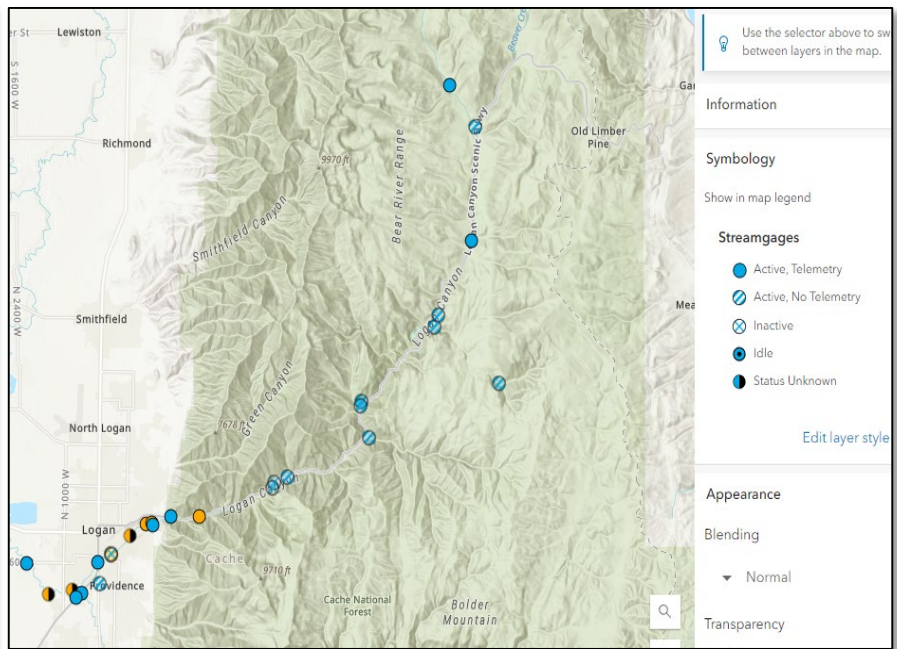
- USFWS Bird Refuge
- Wildlife Management Areas
- Duck Clubs
- Mineral Extractors



System Analysis



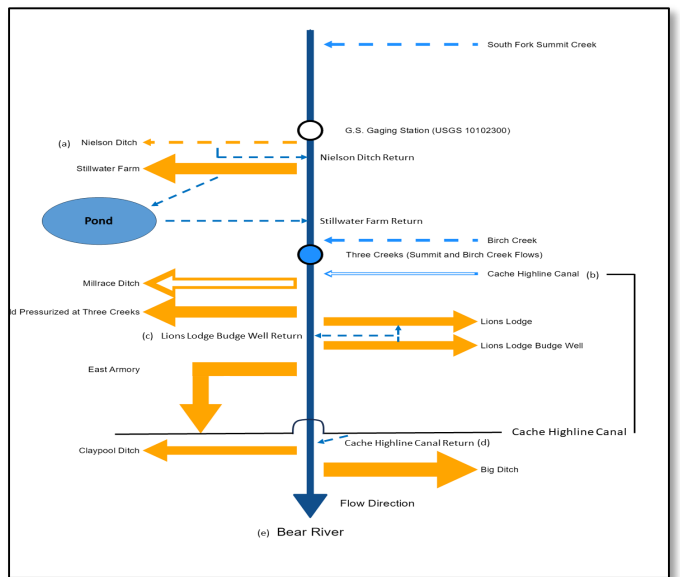
Historical Operations Interval



ArcOnline Map Interface

Diversion Questionnaire	FID		
Common or local name of the gaging / measurement station?	NAME	LOGAN AND NORTHERN AND LOGAN HOLLOW (BELOW FIRST DAM)	CACHE HIGHLINE CANAL (USGS)
Other names or identifiers for the station?	NAME_ALT	Logan Island Pipeline/Logan Hollow	USGS gage 10108400
Name of the diversion/canal being measured?	ID	Logan and Northern and Logan Hollow	Cache Highline Canal
Division of Water Rights Station_ID? (if none leave blank)	DWRI_ID	17	9840
What is the approximate distance (in feet) between the diversion point on the stream and the gaging/measurement station on the canal/diversion?	DIST	2000	500
Between the diversion point on the stream and the gaging/measurement station, is the diversion/canal lined, unlined, or piped?	LINE_ST	Piped	Piped
Is the entire diversion/canal system following this station mostly lined, unlined or piped?	LINE		
If lined or piped, what year did this occur?	LINE_YR		
Nothing of station? (Please provide as UTM Zone 12 NAD83)	NOR	4621224.064	4621540.08
Easting of station? (Please provide as UTM Zone 12 NAD83)	EAST	433812.223	436638.228
Owner of the gaging or measurement station?	OWN	Cache Highline Irrigation Company	USGS
Operator / maintenance entity responsible for maintaining the gaging or measurement station (if different from the owner)?	MAIN		
Type and description of current measurement device or gage (Pressure transducer/Bubbler/Parshall flume/Ultrasonic Flow Meter /Propeller Meter/etc...)?	MEAS	Ultrasonic Flow Meter	

Measurement Information Worksheet



Flow Balance Diagrams



DWRi Gap Analysis DRAFT

Summit Creek

Flow Balance Diagram

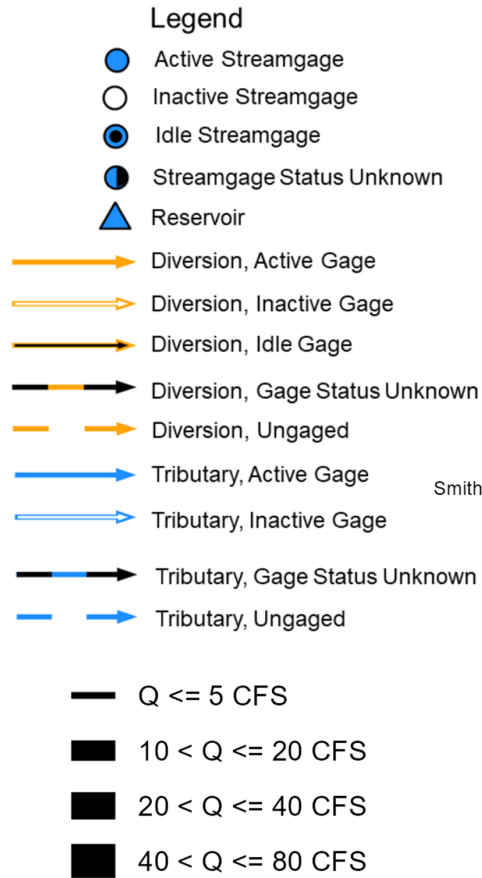


Local Expert Insights

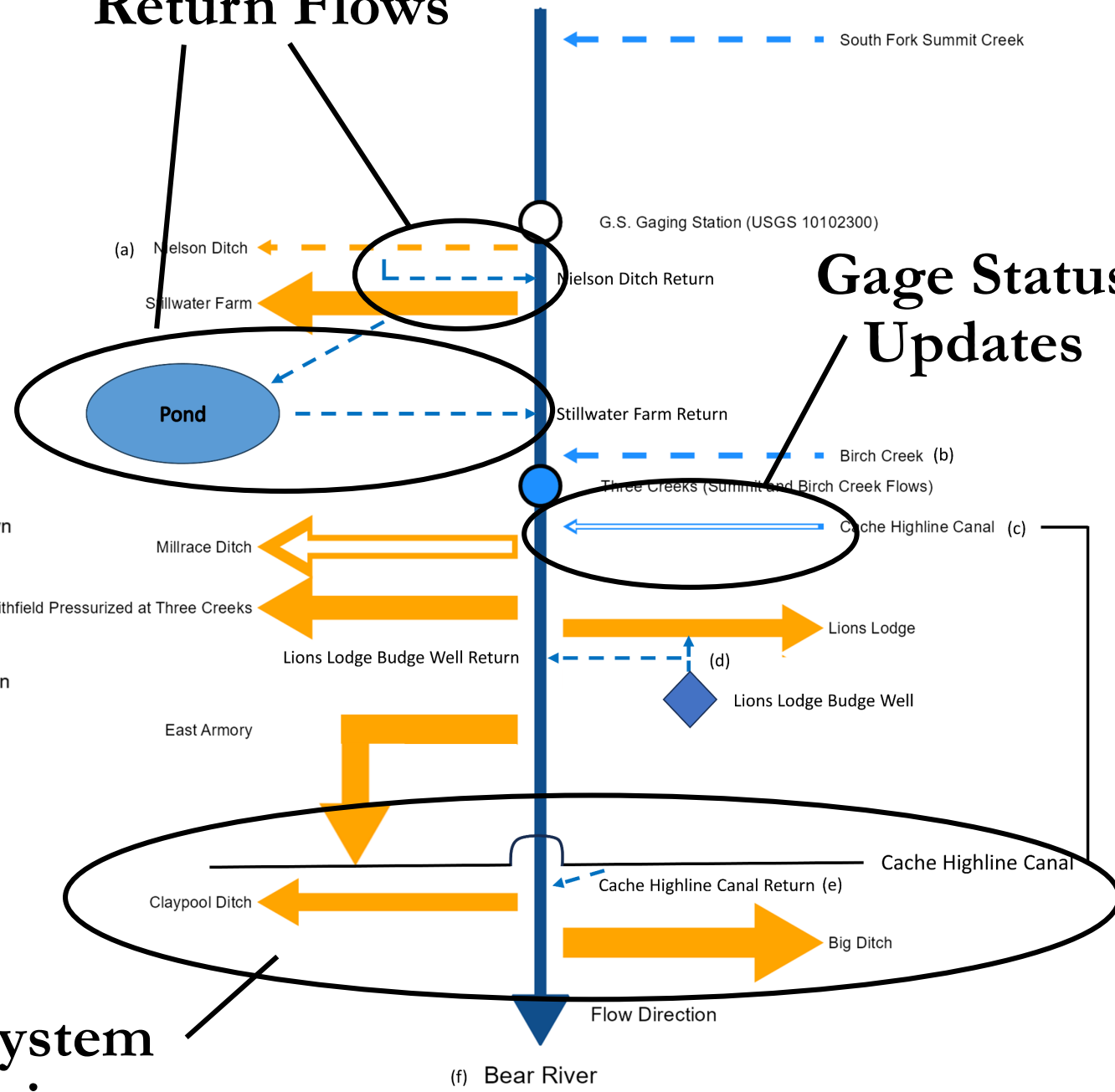
Figure Description:

Flow Balance Diagram of Summit Creek. Diversion arrows are sized to represent the maximum measured flow for the full period of record. Tributary arrows are sized to represent the median flow in July and August for the full period of record. Tributary arrow reflects status of gage nearest to the confluence with the mainstem. Tributaries with asterisks (*) indicate nearest stream gage is greater than 1 km from confluence with mainstem.

- a) Nielson ditch is only active during high water. River Commissioner estimates a maximum diversion of 3 CFS.
- b) In very dry years, Birch Creek doesn't run. When it does, it is usually dry by June or July.
- c) Gage closest to canal confluence with mainstem (USGS 10103010) is inactive, but there is a DWRi gage farther up the canal that is active.
- d) Lion's Lodge Budge Well is a source of imported water and generally only feeds Lion's Lodge diversion. It can occasionally contribute to the mainstem during flood/high runoff events.
- e) Cache Highline Canal contributes to the mainstem during flood/high runoff events.
- f) Summit Creek should terminate as a tributary to the Bear River but hasn't in recent years. This is attributed to major groundwater losses below Big Ditch.



Return Flows



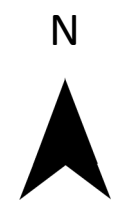
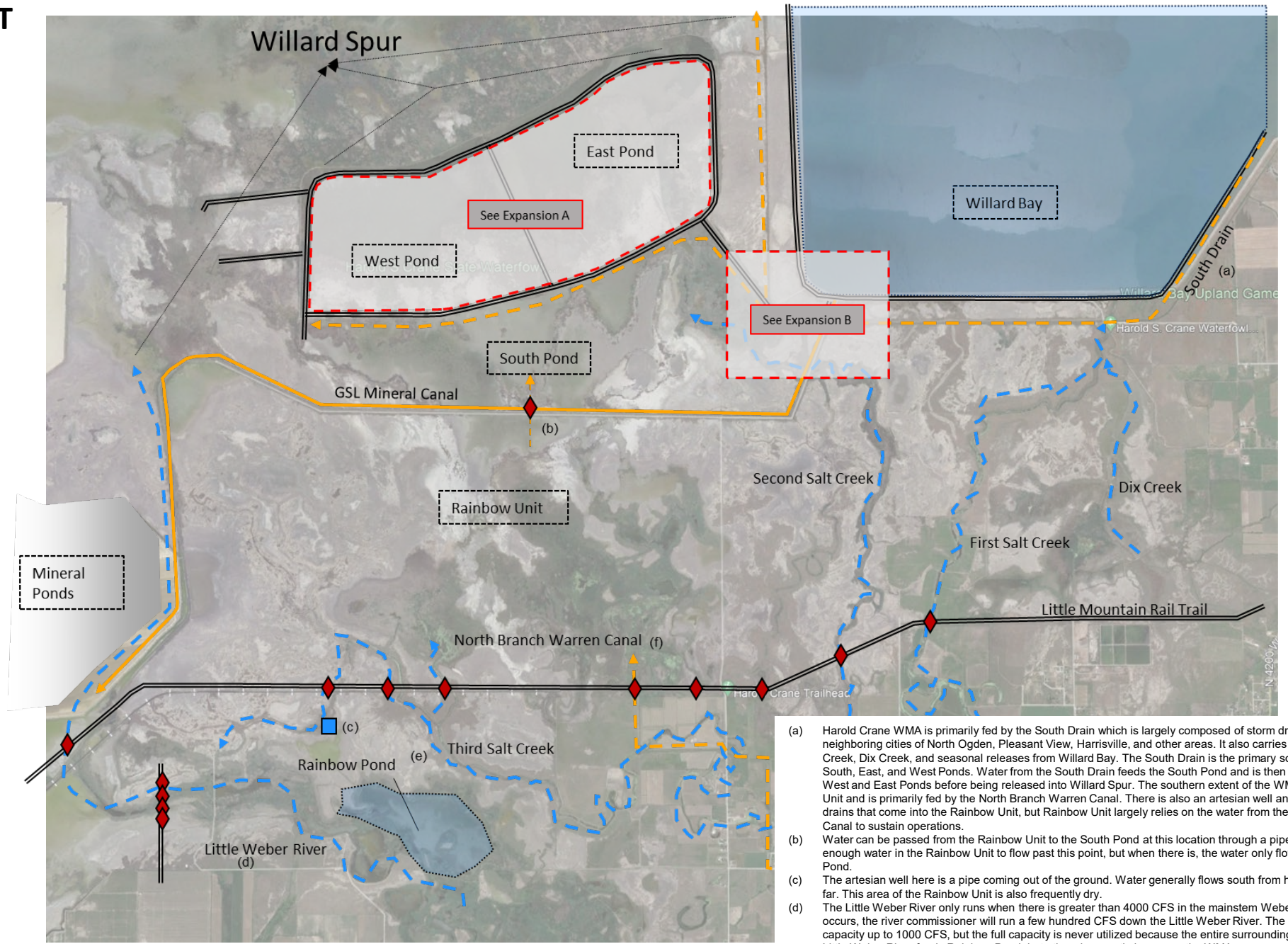
Gage Status Updates

Unique System Mechanics

DWRi Gap Analysis - DRAFT

Great Salt Lake: Harold Crane WMA Flow Balance Diagram

- Legend**
- Active Streamgauge
 - Inactive Streamgauge
 - Idle Streamgauge
 - Streamgauge Status Unknown
 - ▲ Reservoir
 - Diversion, Active Gauge
 - Diversion, Inactive Gauge
 - Diversion, Idle Gauge
 - Diversion, Gauge Status Unknown
 - Diversion, Ungaged
 - Tributary, Active Gauge
 - Tributary, Inactive Gauge
 - Tributary, Idle Gauge
 - Tributary, Gauge Status Unknown
 - Tributary, Ungaged
 - Dike
 - Artesian Well
 - ◆ Water Control Structure
 - Active Diversion Measurement Station



- (a) Harold Crane WMA is primarily fed by the South Drain which is largely composed of storm drain runoff from the neighboring cities of North Ogden, Pleasant View, Harrisville, and other areas. It also carries the inputs of First Salt Creek, Dix Creek, and seasonal releases from Willard Bay. The South Drain is the primary source of water for the South, East, and West Ponds. Water from the South Drain feeds the South Pond and is then directed through the West and East Ponds before being released into Willard Spur. The southern extent of the WMA is called the Rainbow Unit and is primarily fed by the North Branch Warren Canal. There is also an artesian well and some minor field drains that come into the Rainbow Unit, but Rainbow Unit largely relies on the water from the North Branch Warren Canal to sustain operations.
- (b) Water can be passed from the Rainbow Unit to the South Pond at this location through a pipe. There is usually not enough water in the Rainbow Unit to flow past this point, but when there is, the water only flows north to the South Pond.
- (c) The artesian well here is a pipe coming out of the ground. Water generally flows south from here and it does not flow far. This area of the Rainbow Unit is also frequently dry.
- (d) The Little Weber River only runs when there is greater than 4000 CFS in the mainstem Weber River. When this occurs, the river commissioner will run a few hundred CFS down the Little Weber River. The Little Weber River has a capacity up to 1000 CFS, but the full capacity is never utilized because the entire surrounding area would flood. The Little Weber River feeds Rainbow Pond, but otherwise mostly bypasses the WMA.
- (e) WMA managers report that Third Salt Creek and Rainbow Pond are frequently dry in the summer.
- (f) The North Branch Warren Canal is the primary source of water for the Rainbow Unit from mid-April to mid-October. It is visually estimated that 20-30 CFS typically comes through the North Branch Warren Canal.



Process Overview | *Gap Categories*

System Analysis

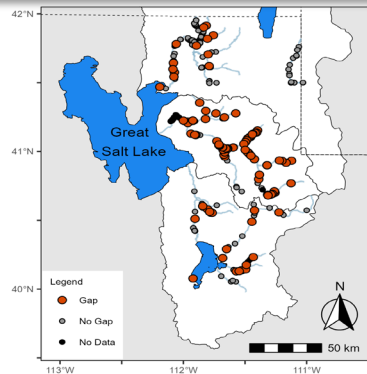
Stakeholder Feedback

Spatial Analysis

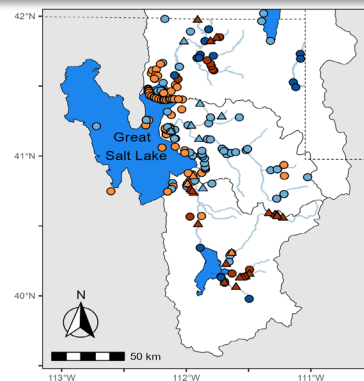
Existing Measurement Infrastructure Gaps

Stakeholder Identified Gaps

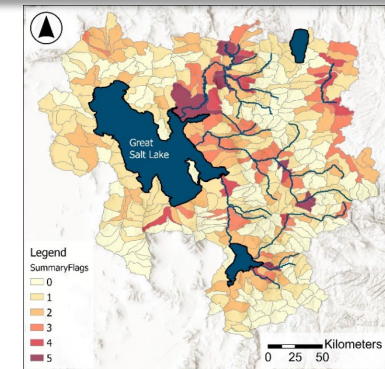
Spatial Gaps



- Telemetry
- Condition
- Interval
- Consistency

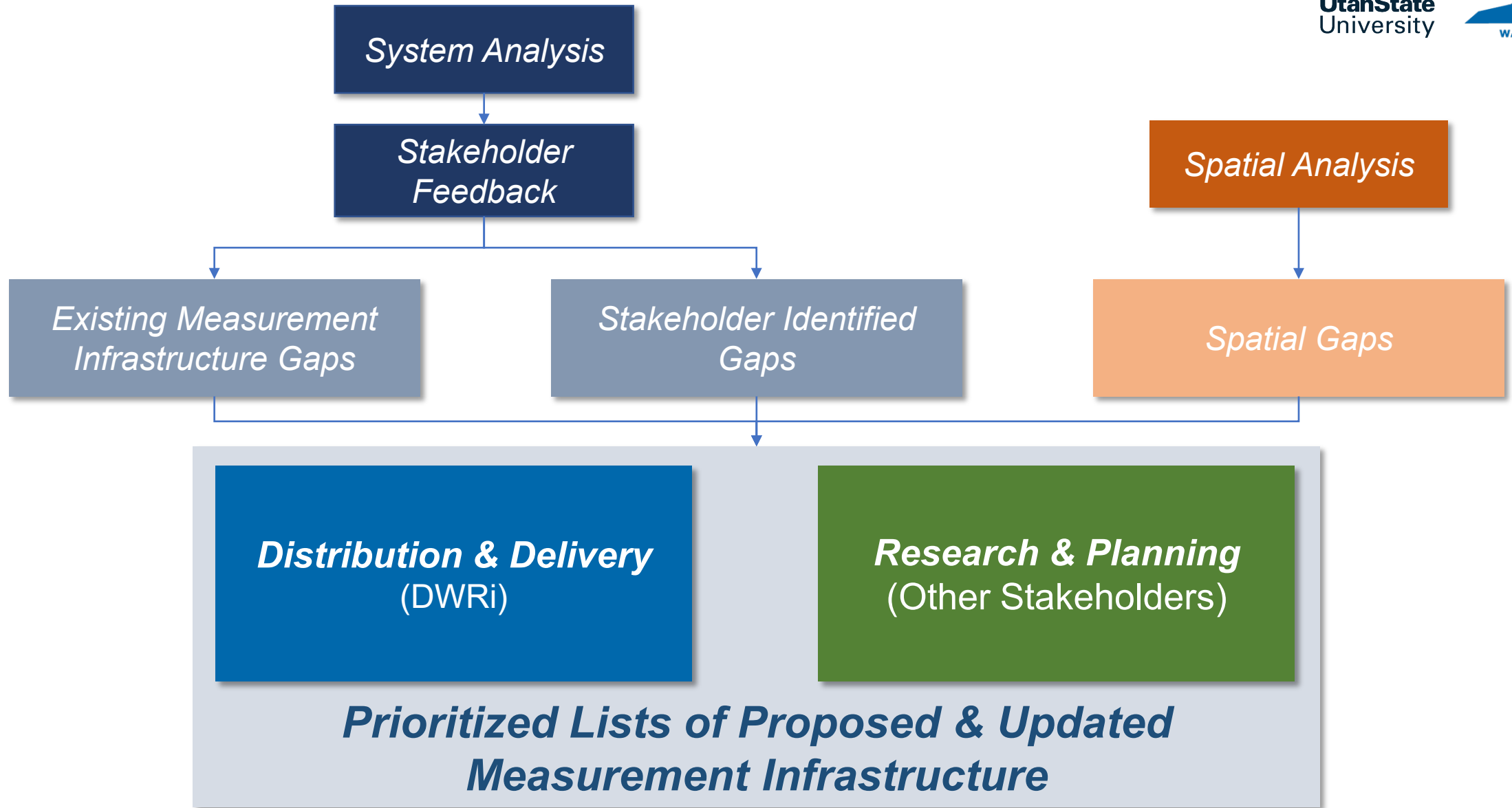


- New Infrastructure
- Requested Updates



- Ag Area
- Wetland Area
- Point Sources
- Ungaged Confluences
- Etc.

Process Overview | *Prioritized Lists*



Gap Analysis | *Preliminary Findings*

Bear River

Existing Infrastructure

- *Diversion Gaps: 25*
- *Streamgage Gaps: 2*

New Infrastructure

- *Diversion Gaps: 13*
- *Streamgage Gaps: 22*

Weber River

Existing Infrastructure

- *Diversion Gaps: 96*
- *Streamgage Gaps: 8*

New Infrastructure

- *Diversion Gaps: 8*
- *Streamgage Gaps: 70*

Utah Lake & Jordan River

Existing Infrastructure

- *Diversion Gaps: 49*
- *Streamgage Gaps: 4*

New Infrastructure

- *Diversion Gaps: 32*
- *Streamgage Gaps: 33*

- Gap Analysis report to be finalized and published July 2024.
- Additional analysis for managed wetlands and mineral extractors to be completed in FY25 (Approximately 140 suggested gages around GSL).



Thank You | *Questions*

