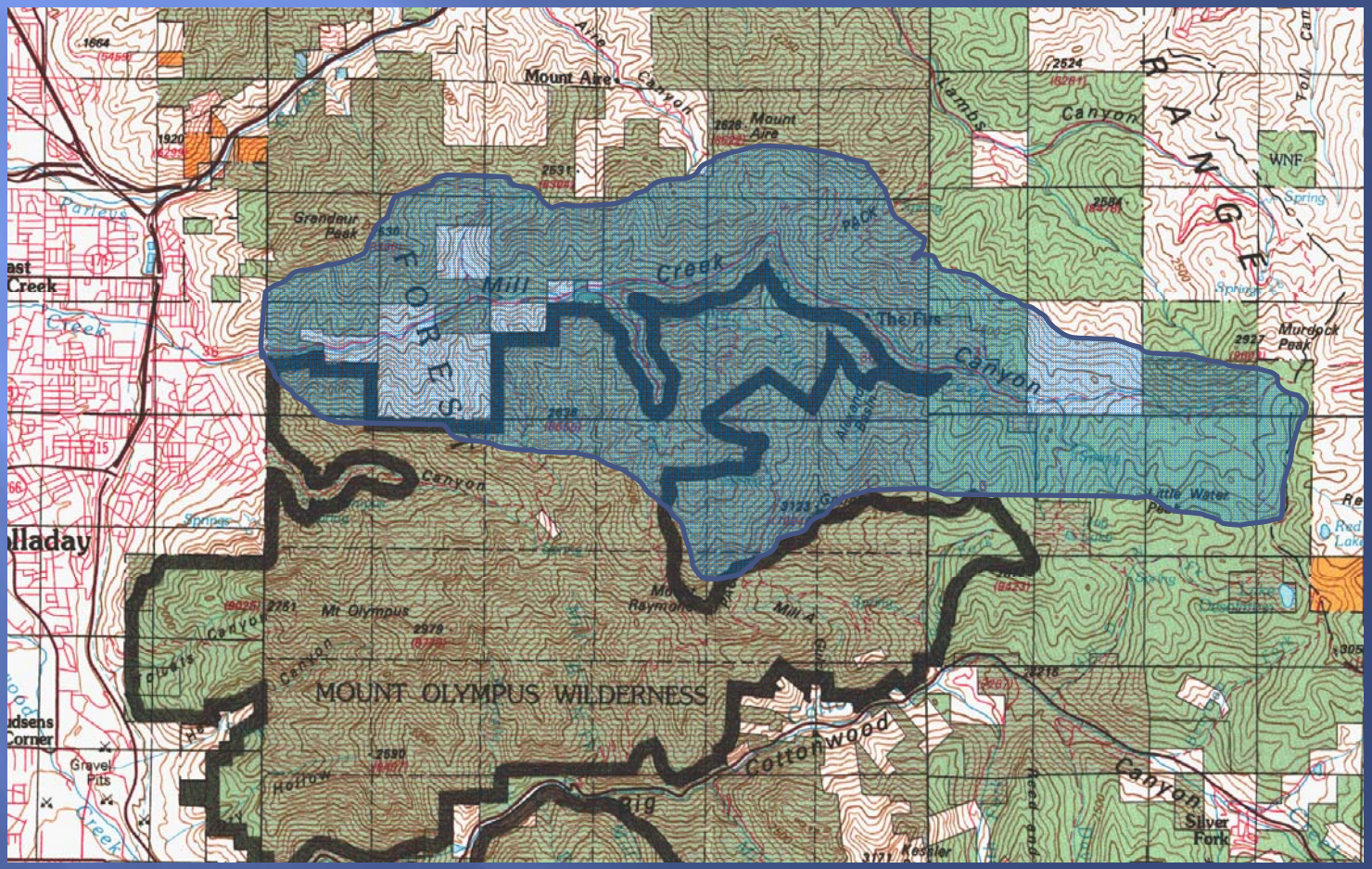
MILL CREEK

A Legacy of Natural Resources and People

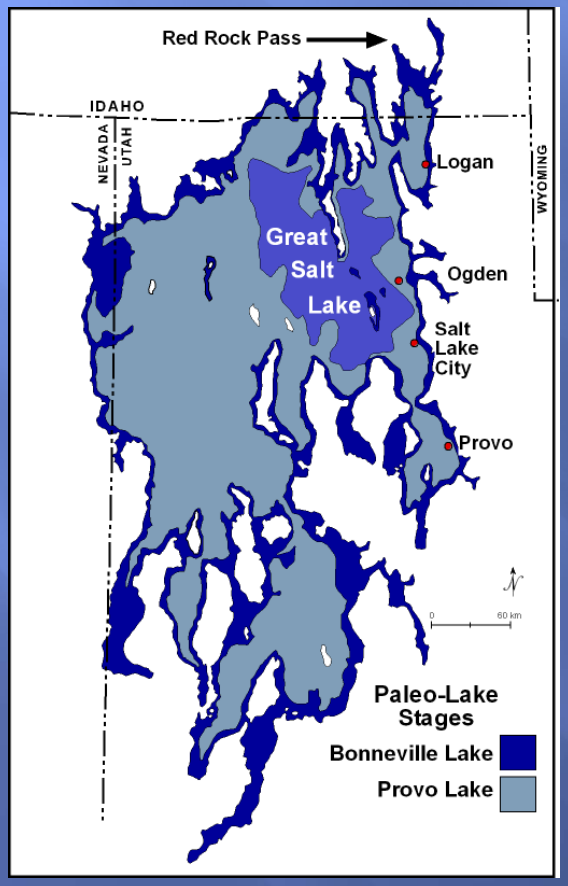
(Part of the Wasatch Watershed Legacy Partnership)

Fisheries

Project Area



Lake Bonneville (14,500 year ago)



- Maximum Shoreline height of 5,090 feet or to just below the fee collection station (Curry 1990 as cited in Link et al.)
- Native fish may have included cutthroat trout, suckers, dace, sculpin, whitefish, chub etc.

Pre 1847 (Pioneer Settlements)

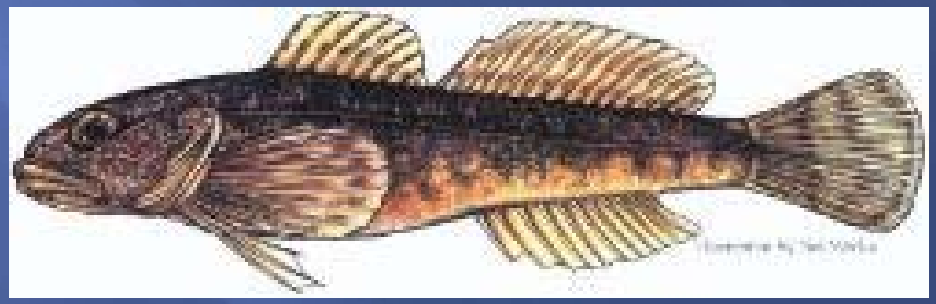
- Native American Tribes (Utes)
- Refuge for wildlife, with water draining into the Jordan River

Historic Fish Species

- Bonneville Cutthroat Trout
- Whitefish
- Sucker
- Chub

- Dace

- Sculpin



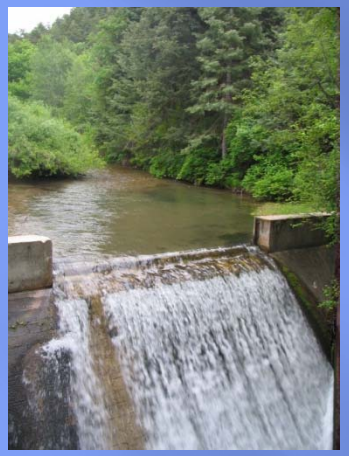
1847-1906 (Settlement, High Councils & County Courts)

(Carter 1941 & Keller 2001, Sigler & Sigler 1987)

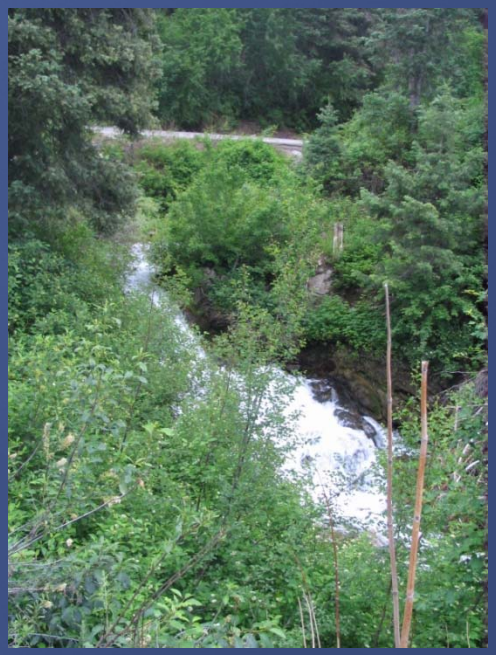
- Mills were built along the stream. (15 to 20 total)
  - Grist (1848); Timber Mills (1848 Highland Drive, 1850 mouth of Porter Fork, 1852 Elbow Fork); Shingle Mill and Fuel Wood Mills
- Power Generation (5 sites)
- Timber was Harvested
- Toll and Public Roads Constructed (1848)
- Grazing
- Recreation
- Fish Stocking 1873

1906-Present (Federal Management-USFS)

- Recreation Residents built (1920-1950)
- Picnic Areas
- Power Plants
- Mount Olympus Wilderness (1984)
- Forest Management Plans (1986, 2003)
- Stream habitat improvement (1990-1995)
- County Fee Collections (early 1990's)
- Culvert Surveys (2007)



Watershed Features



Natural

- Flashy Intense Storms
- Spring Runoff
- Natural Barriers

Man Created

- High Visitor Use
- Historic Dams and Mills
- Non-Native Fish
- Recreation Residences
- Roads, Trails & Stream Crossings
- Land Ownership

High Year-round Visitor Use

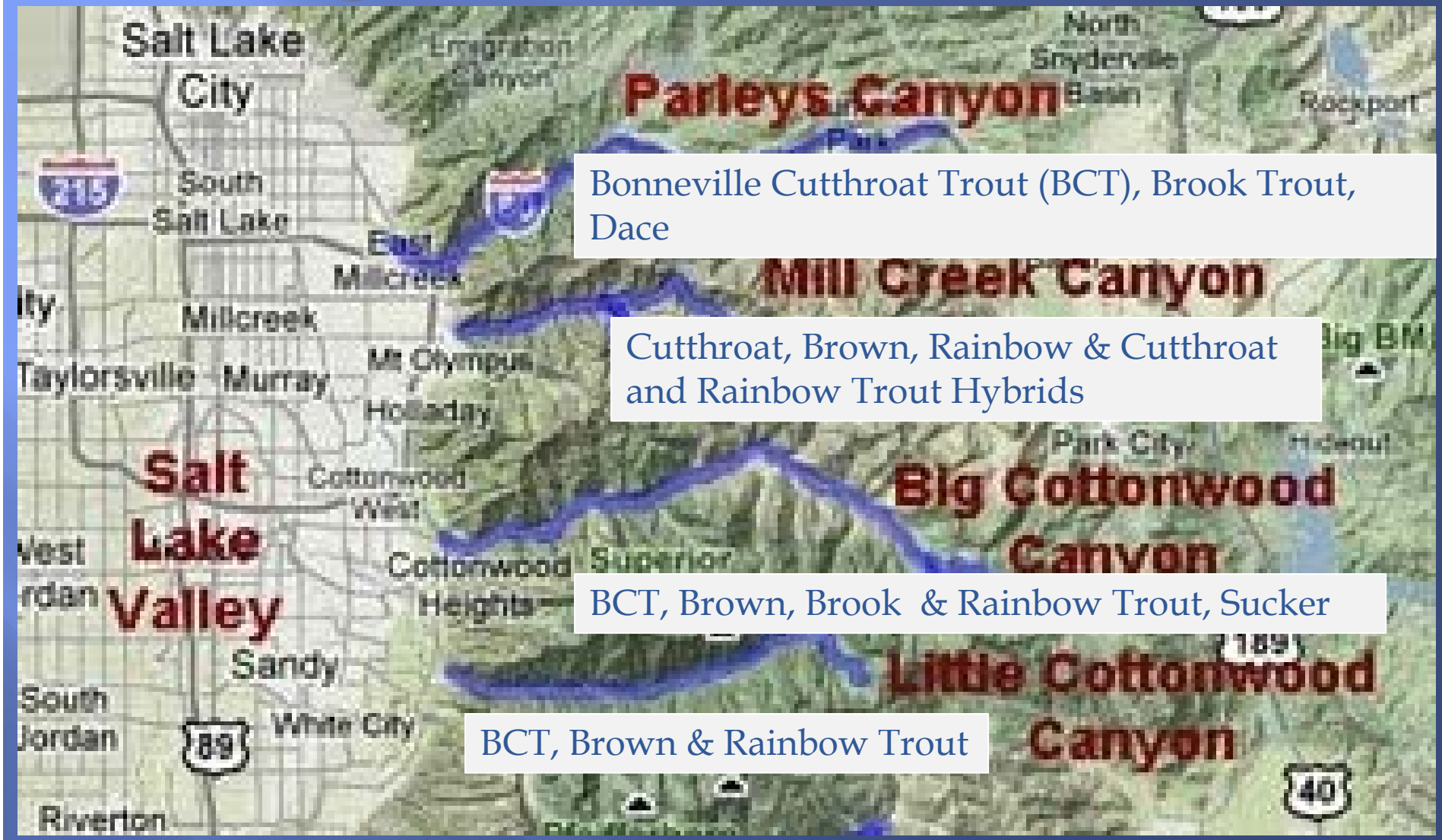
The canyon contains

- Twelve Picnic Areas
- Two Restaurants
- Two Recreation Resident Tracks (69 lots)
- Multiple Trails and Trailheads
- Multiple Boy Scout Camps and Training Facilities
- Heavy Dog Use
- Winter Ski Trails
- Mountain Bike Use

Historic Dams and Mills

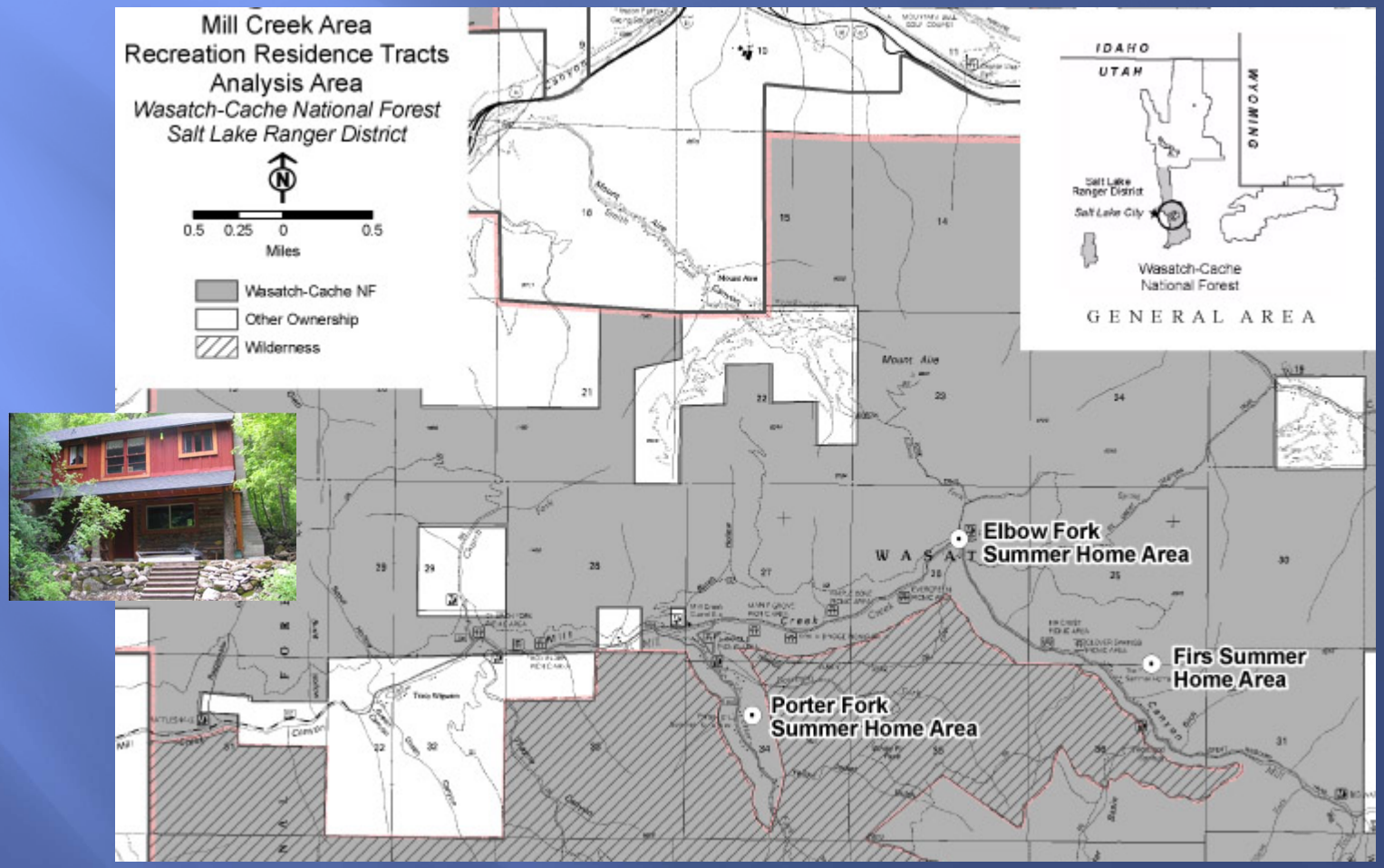
Power Generating Plants

ADJACENT FISHERIES



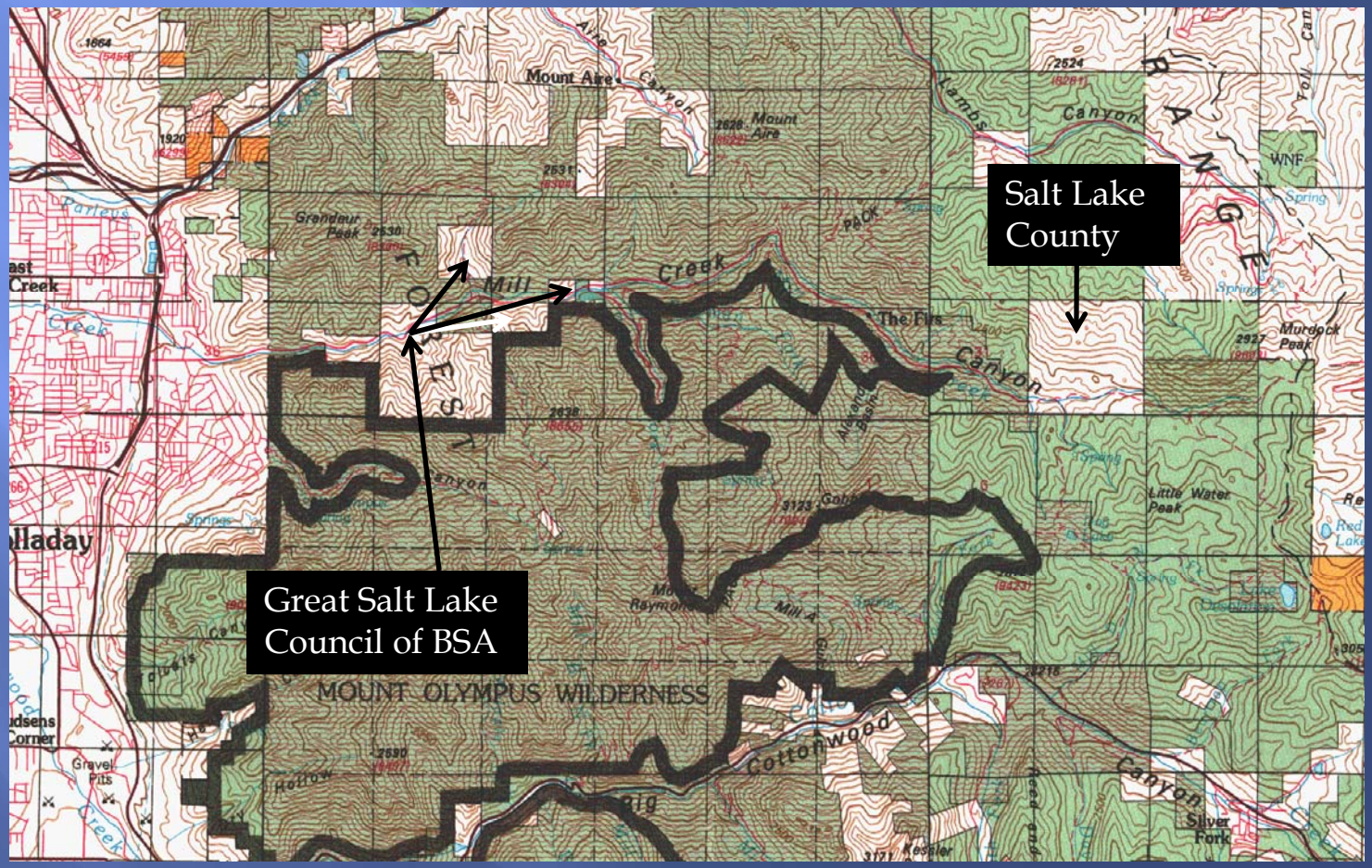
Historic Recreational Residents

(69 homes)



Elbow Fork eliminated in 2003

Land Ownership/Management



Fish Communities in the Mill Creek Canyon

- Pre-1847 fish probably consisted of Bonneville cutthroat trout, sculpin, chub, sucker, and whitefish.
- 1873 Fish stocking started in Salt Lake stream (Sigler & Sigler 1987).
- 2005 Fish consisted of cutthroat, brown, and rainbow trout and hybrid cutthroat –rainbow trout.
- Major change in historic diversity with many of the smaller non-game fish being lost and cutthroat tout being displaced in sections.

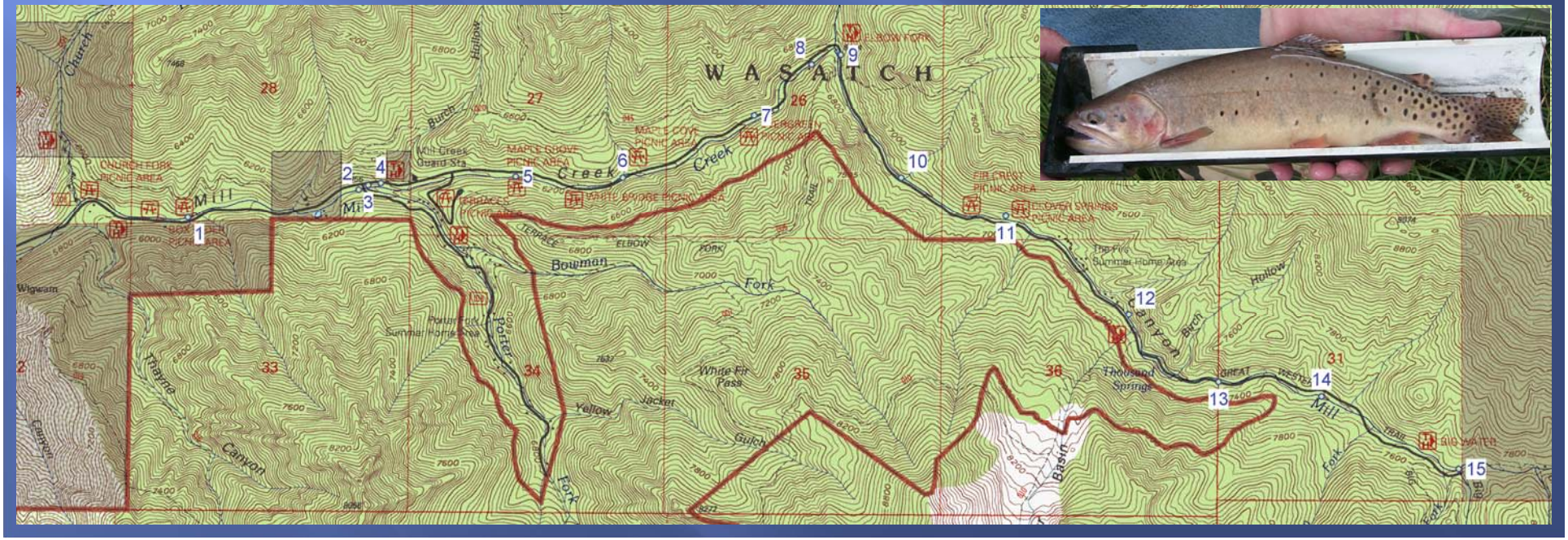
Fish Stocked into SLC Ponds Streams Over the Years

- 1871 Black Bullhead
- 1871 Brown Bullhead
- 1872 American Eel
- 1873 Lake Whitefish
- 1873 Chinook
- 1873 Sebago Salmon
- 1875 Brook Trout
- 1881 Goldfish
- 1883 Rainbow Trout
- 1899 Arctic Grayling
- 1960's Lake Trout

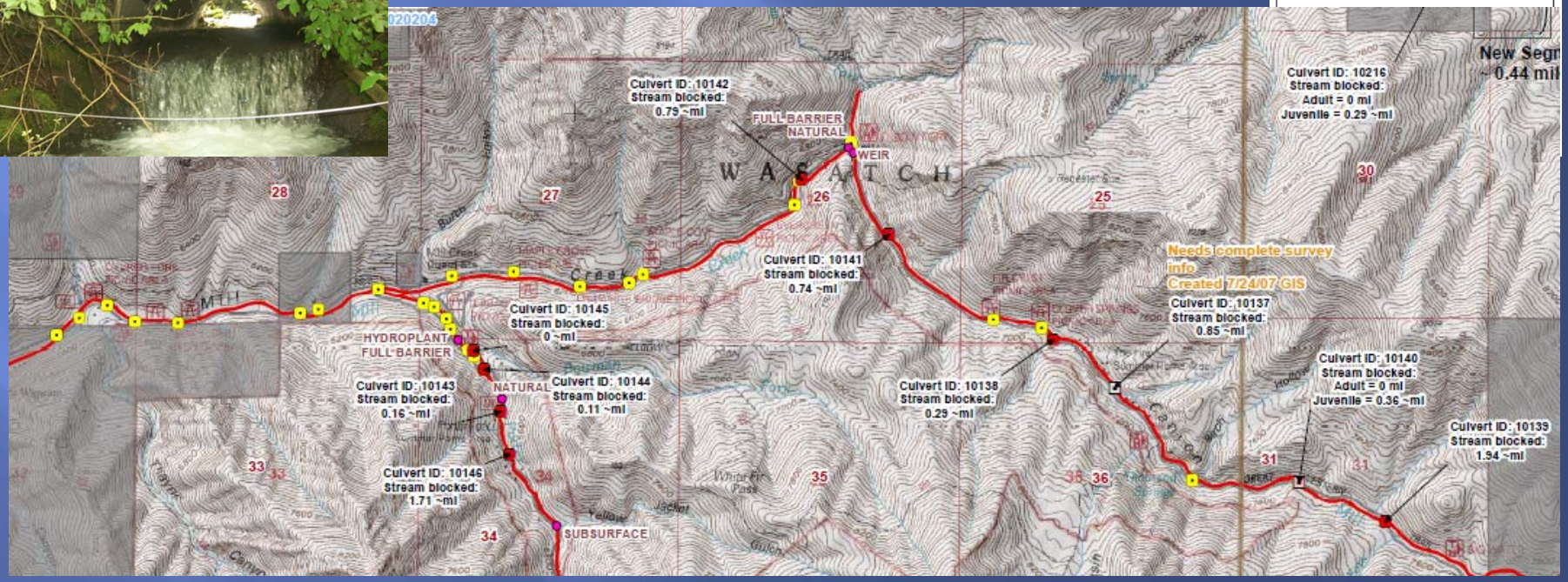
Fish Communities (2005)

- Historically Bonneville cutthroat trout would have been throughout the drainage.
- Brown and rainbow trout have been stocked and are found in the drainage.

Station	Cutthroat	Rainbow	CutXRain	Brown
13-15	--	--	--	--
12	--	50%	--	50%
9-11	--	100%	--	--
7-8	100%	--	--	--
6	71%	14%	14%	--
5	16%	5%	5%	74%
4	50%	25%	25%	--
3	40%	20%	--	20%
2	78%	--	--	23%
1	85%	--	--	15%



Road Access and Stream Crossings (2007 Surveys)



A Significantly Altered Aquatic Ecosystem

- Fragmented habitat and fish populations reduces the ability of these populations to withstand major watershed altering events (i.e. floods, fires, spills, etc.).
- Competition and interbreed with non-native fish can directly impact populations and management agencies abilities to allow for long-term persistence of a species. This can lead to Federal listed thus reducing management flexibility and potentially public use.

Partners in Mill Creek Restoration

- Bonneville Cutthroat Trout Conservation Team
- Utah Division of Wildlife Resources
- USDI Fish and Wildlife Service
- PacifiCorp
- USDA Forest Service
- Great Salt Lake Council of Boy Scouts of America
- Wasatch Watershed Legacy Partnership
- Utah Council Trout Unlimited
  - Stonefly Society
- Great Salt Lake Keepers
- Utah Anglers Coalition

Bonneville Cutthroat Trout

- Bonneville cutthroat trout are managed through state and range-wide conservation agreements.
- Brown trout will outcompete and feed on cutthroat trout and other non-game fish.
- Rainbow trout will interbreed with cutthroat trout.
- The US Fish and Wildlife Service has been petitioned to Federally list Bonneville cutthroat trout. They found that the species did not warrant listing due to ongoing efforts to reduce threats to the species.

Why here and why now?

Mill Creek is:

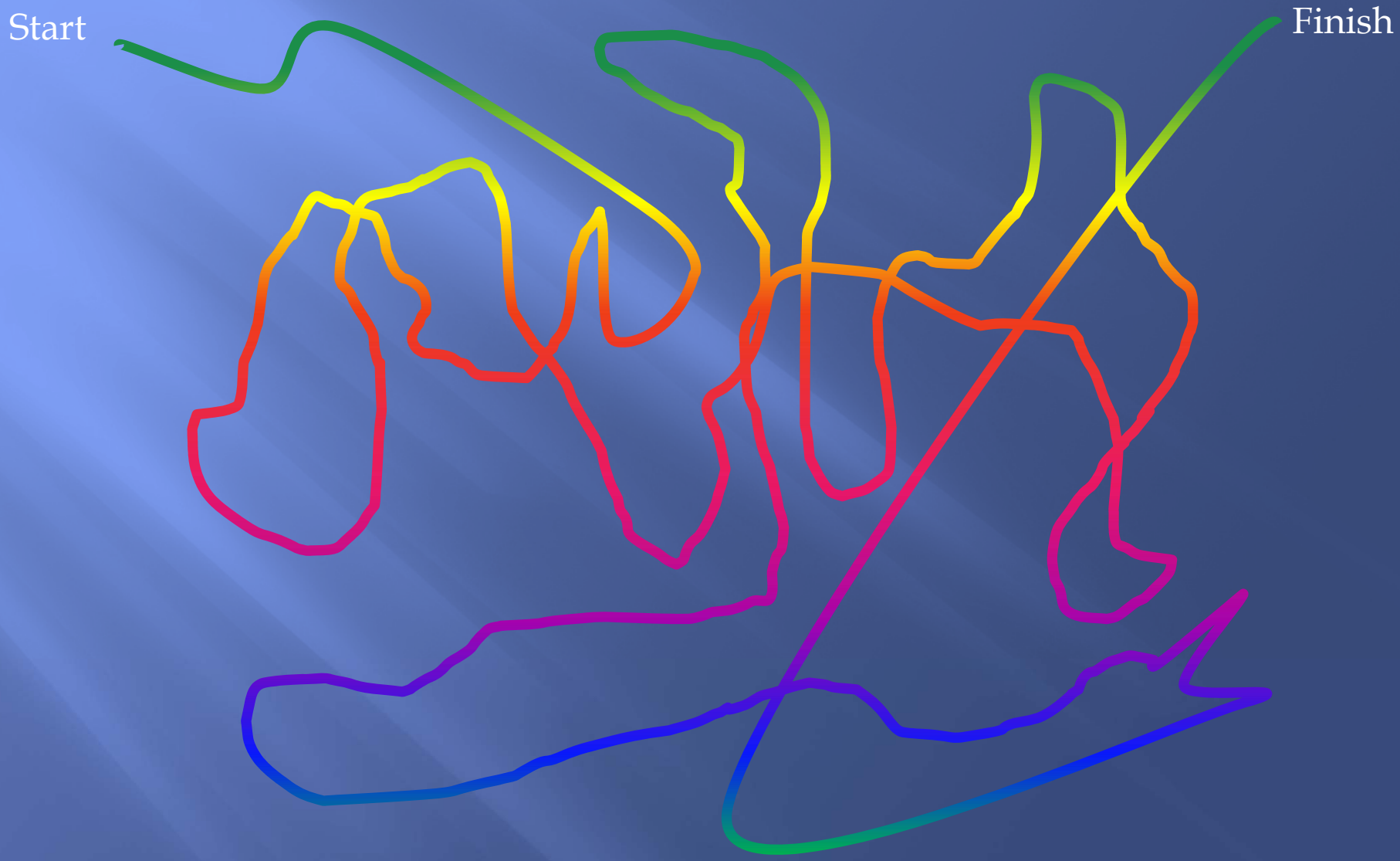
- an opportunity to help restore Utah's state fish, the native Bonneville cutthroat trout (BCT), to their historic range;
- an area that if restored will provide a greater diversity of fishing opportunities along the front,
- adjacent to Parley's Canyon and the egg-taking project at Little Dell Reservoir that can provide the eggs for restocking Mill Creek;
- a family recreation area and cutthroat trout are the easiest to catch and to be seen;
- constantly used by schools as an outdoor education area,
- a high use area on private (Boy Scout camps) & public lands, and;
- an opportunity to reduce fragmentation of the fish habitat and improve safety and the canyon's infrastructure.

Why here and why now?

The project provides the opportunity to:

- cooperatively work to improve overall watershed conditions,
- emphasize on the ground effort to restore watershed conditions under the Wasatch Watershed Legacy effort, and
- restore the native fish community in Mill Creek without affecting any municipal watershed. It is likely that Mill Creek will become a municipal watershed in the future.

WHERE FROM HERE?



Aquatic Systems

1. Restore native fish (Bonneville cutthroat trout). This may also include non-game native fish (mountain sucker, sculpin, etc.).

2. Work with appropriate entities to improve overall habitat.
   - Remove barriers where possible to connect fish populations
   - Replace culverts that are fish migration barriers improving fish and flood debris passage.
   - Improve riparian vegetation (to be inventoried in 2012).
   - Reduce sediment discharge into the channel from road and borrow areas, picnic sites, trails and trailheads.
   - Public education and information.
   - Provide public access and safety.

Native Fish Restoration Methods

- Drain or removing water to remove all fish (Red Bu
  Reservoir seen here)
- Mechanically remove all fish (8 year process in Nort
  Utah for 1 mile of stream. Generally not successful.)
- Antimycin, an approved piscicide. (Wyoming, spott
  success)
- Rotenone, an EPA approved piscicide.

Rotenone – Overview, What is it?

- Natural compound derived from roots of a tropical plant in the bean family.
- Inhibits a biochemical process at the cellular level making it impossible for fish to use the oxygen absorbed in the blood.
- Liquid formulations contain dispersants and emulsifiers to disperse the rotenone throughout the water.
- Used worldwide by people to stun and kill fish, between 1988-1997 95,000 kg (209,439 pounds) successfully/safely used.
- Fisheries management tool to control invasive species and restoration of native and T & E species.
- Rotenone is approved by the EPA to control and sample fish population in lakes, ponds and streams.

Treatments Controlled and Completed by Certified and Experienced Professionals

- The Utah Department of Environmental Quality regulates all treatments in the state.
- All personnel dispensing rotenone are required by law to have a certified Pesticide Applicators Permit.
- Personnel from multiple agencies will implement treatment.

Common Questions Regarding Rotenone

- Is rotenone harmful when used as fisheries management tool?

  No: A 132 pound person would have to drink 40,000 gallons of treated water in 24 hour period to receive a lethal dose.
- Does rotenone affect all aquatic animals the same?

  No: Fish and other gilled organisms are more susceptible. All animals have natural enzymes in the digestive tract that neutralize rotenone.
- Will wildlife or pets that eat dead fish and drink treated water be effected?

  No: For example a bird weighing 0.25 pounds would have to drink 100 quarts of treated water or more than 40 pounds of fish and invertebrates within 24 hours to receive a lethal dose.
- Is rotenone a groundwater contaminant?

  No: Wells and ground water will not be affected. Monitoring studies show that ground water in adjacent areas have not been affected.

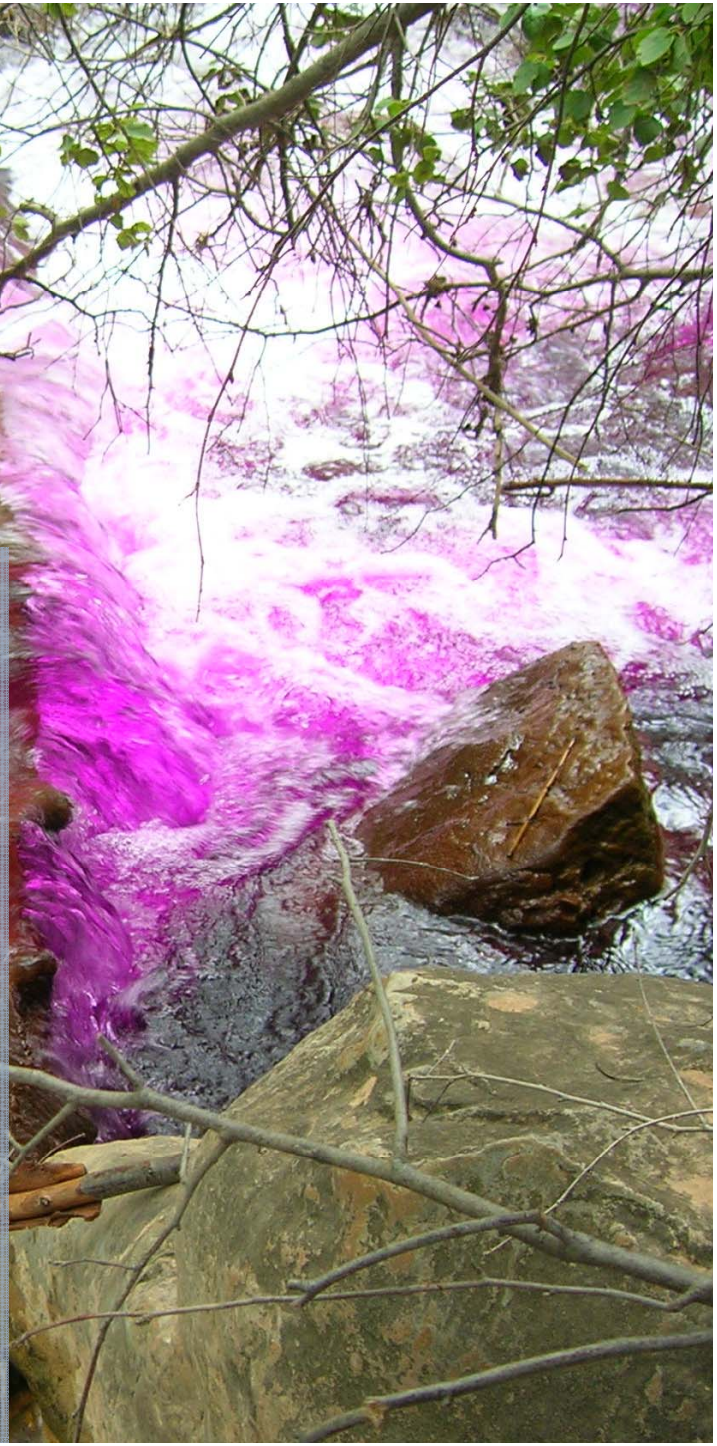
(For more information see the Rotenone Stewardship Program http://www.fisheriessociety.org/rotenone/)

Neutralization of Rotenone

- To neutralize the effects of rotenone, potassium permanganate, an oxidizing agent, can be used.
- Potassium permanganate breaks down into potassium, manganese and water. All are common in nature and have no deleterious environmental effects at concentrations normally associated with the neutralization processes.
- Potassium permanganate will turn the water a purple color until it is diluted sufficiently as it travels downstream.

Some Impacts of the Project

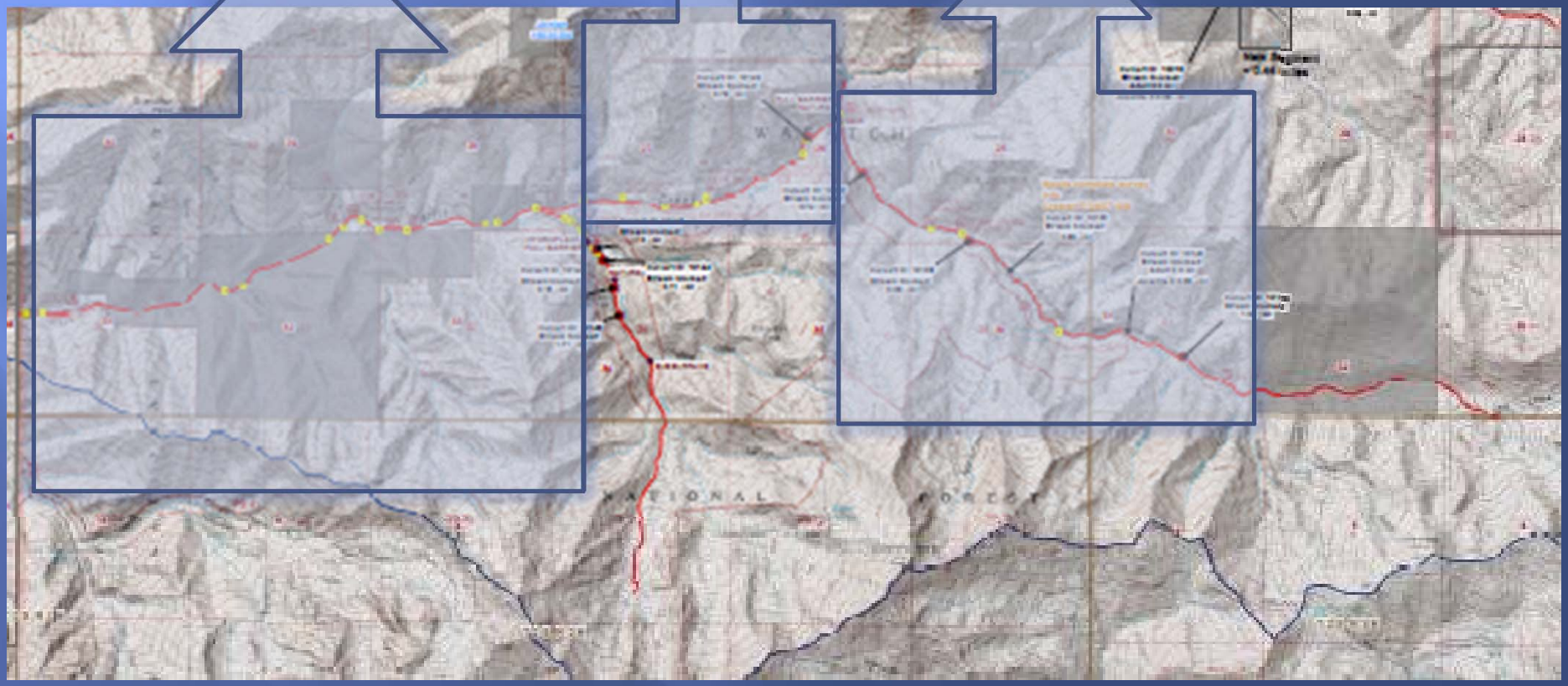
- Temporary odors, primarily from the dispersants and emulsifiers
- Temporary presence of dead fish
- Temporary change in water color/quality
- Temporary loss of fish in sections of stream
- Temporary closure of the canyon during the treatment day or days



Past Treatments with Rotenone

- Red Butte Creek 1987
- Strawberry Reservoir and its tributaries-1991
- Lambs Canyon and Parley's Creek 1995 (brood source for BCT along the Wasatch Front)
- Ninemile Reservoir (Sanpete County) 1997
- Eastern Slope of the Deep Creek Mountains (Juab County) 1995-2010
- Diamond Fork Headwaters Halls, Chase and Shinglemill Creeks (Utah County) 2006
- Deep Creek (Juab County) 2011

Treatment Timeline



Work in 2012

Public Information, Outreach, and Analysis

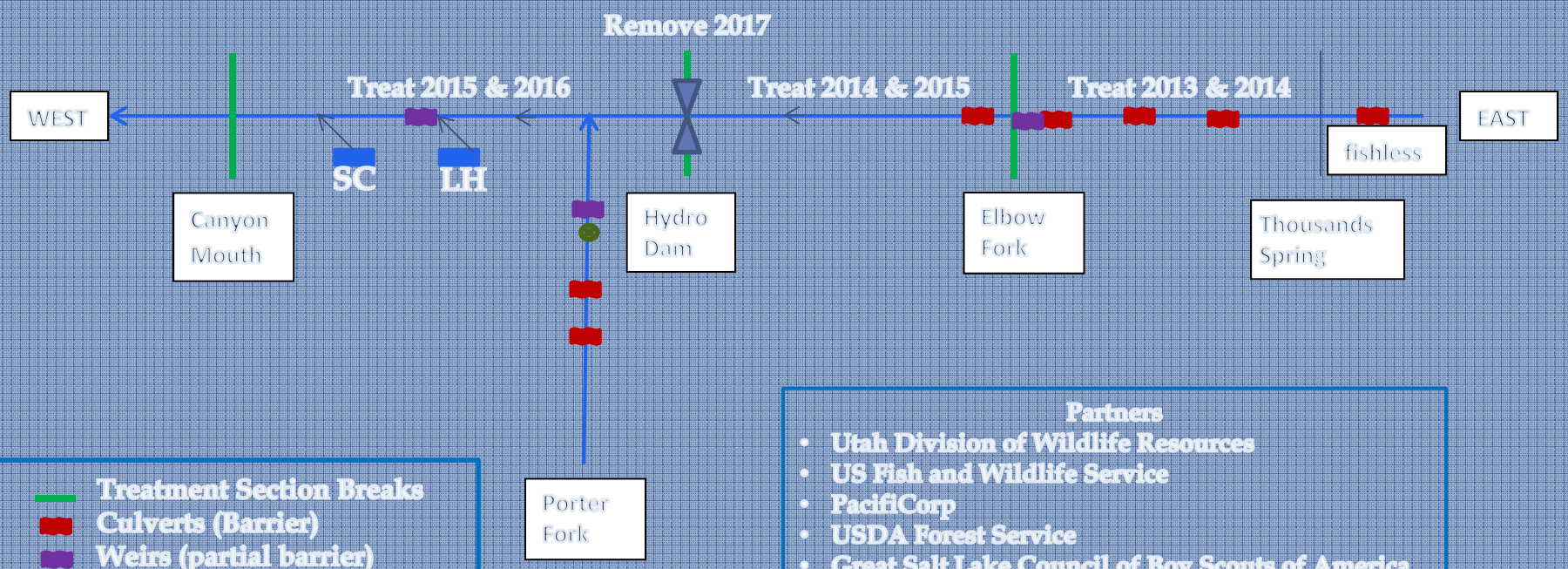
- Fish Removals
- Barrier Removals
- Fishing Access

UDWR crews collect additional information:

- Population estimates of existing fish species
- Determine carrying capacity to drive stocking numbers
- Identify potential sources of native nongame fish species and disease certify these locations?
- Aquatic insect assemblage

USFS will be working to identify potential habitat projects

Mill Creek Native Fish Restoration
Bonneville Cutthroat Trout
2013-2017



Treatment Section Breaks
Culverts (Barrier)
Weirs (partial barrier)
Water wheel (barrier)
Hydro Dam (barrier)
Ponds
SC Boy Scout Council
LH Log Haven

Partners

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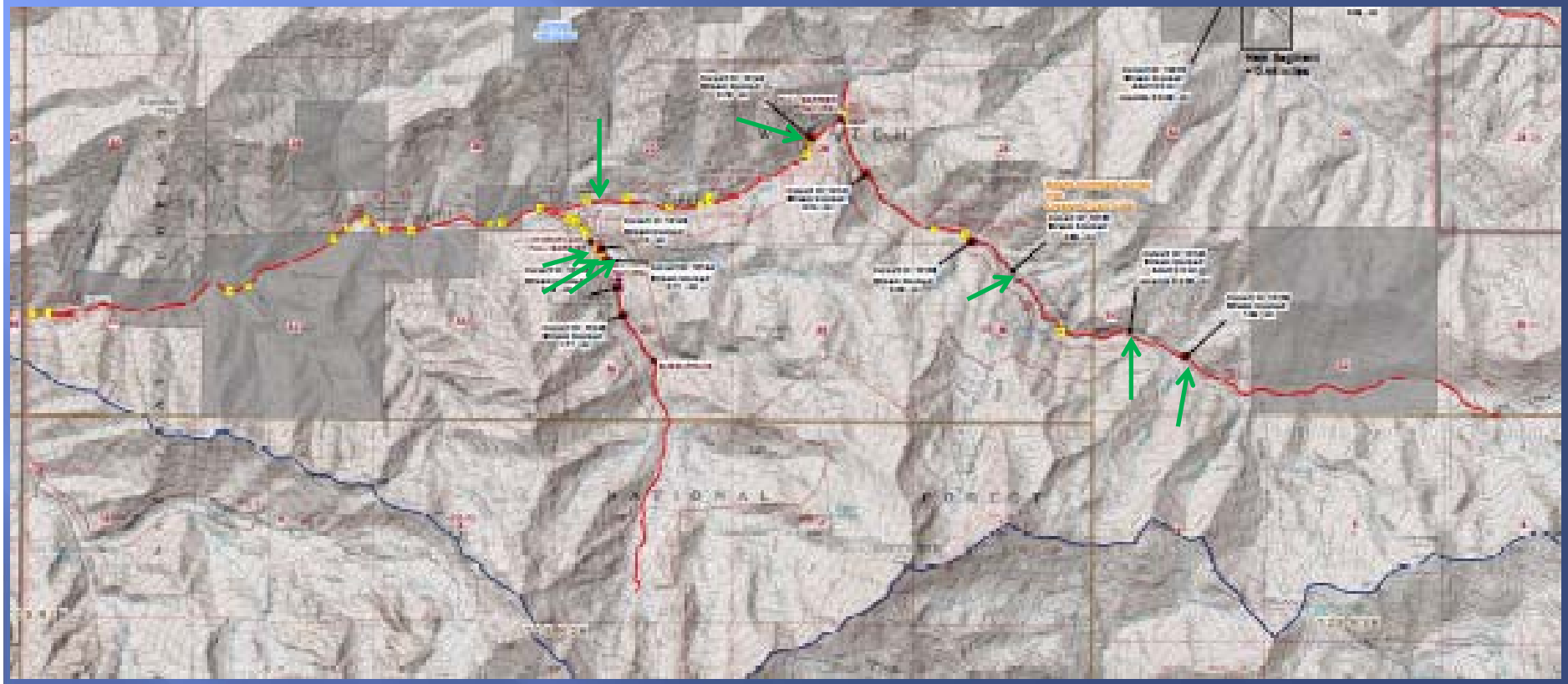
Barrier Removals 2013-2017



Questions