

# Technical Memorandum

**Subject:**

Review of Emigration Canyon Biology and Potential Impacts of Proposed Water Development.

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## Affected Environment

### Introduction

The affected environment for the Emigration Improvement District Water System Project includes the upland, riparian, and aquatic habitat in the Burr Fork and the Brigham Fork reaches of Emigration Creek in Emigration Canyon, Utah. The proposed project entails drilling a culinary well in each of these two drainages and constructing an enclosed culinary water reservoir and pipeline delivery system for the residents of Emigration Canyon. These two drainages are the largest tributaries to the main stem of Emigration Creek. Both contain mature riparian habitats and are identified as having an A4 to B4 stream channel type (Rosgen 1996). These channel types are characterized as having a relatively steep gradient with a gravelly substrate.

### Threatened, Endangered, or Sensitive Species

There are no federally listed TES species known to occur in Emigration Canyon that would be affected by the proposed project (USFWS 2001).

There are several state listed TES species that have been observed in Emigration Canyon (UDNR 2001). Table 1 outlines what species have been observed in the canyon, when it was observed, and the type of protection is offered by the State of Utah.

Table 1. State listed TES species that have been observed in Emigration Canyon.			
Common Name	Scientific Name	Last Observed	Protection*
Bonneville cutthroat trout	<i>Oncorhynchus clarki utah</i>	2001	CS
Northern goshawk (nesting)	<i>Accipiter gentilis</i>	6/29/1992	SP
Northern flying squirrel	<i>Glaucomys sabrinus</i>	3/15/1972	SD
Toquerville springsnail	<i>Pyrgulopsis kolobensis</i>	7/6/1993	None
Carved glyph	<i>Glyphyalinia indentata</i>	1886	None
American redstart (nesting)	<i>Setophaga ruticilla</i>	6/7/1923	None
Beckwith violet (bird-foot violet)	<i>Viola beckwithii</i>	4/30/1941	None
Broadleaf penstemon	<i>Penstemon platyphyllus</i>	7/12/1941	None
Utah fleabane (Wasatch daisy)	<i>Erigeron arenarioides</i>	7/17/1909	None

\*CS: Conservation Species that is receiving special management to preclude federal listing.

SP: Species of Special Concern due to decreases in population, distribution, and/or habitat availability.  
SD: Species of Special Concern due to limited distribution, i.e., occurs in limited areas and/or numbers due to a restricted or specialized habitat.  
None: Species listed in this table without state or federal government protection are considered rare and are being tracked by the UDWR's Natural Heritage Program tracking list.

Emigration Creek supports a population of Bonneville cutthroat trout (*Oncorhynchus clarki utah*). While the trout is not federally listed as threatened or endangered under the Endangered Species Act, it is considered a sensitive species by the State of Utah. The Bonneville cutthroat trout is currently managed under a Conservation Agreement (Lentsch et al. 1997) which is a voluntary cooperative plan among several resource management agencies designed to identify and resolve threats to the species. The Conservation Agreement provides a mechanism for proactive conservation and protection measures to be implemented to benefit the species. The goal of the Conservation Agreement is to significantly reduce or eliminate the threats to the Bonneville cutthroat trout that may eventually cause it to be federally listed. The major threats identified for the Bonneville cutthroat trout include, among other things, habitat degradation and water diversion. The population of trout in Emigration Creek has recently been identified as a genetically pure strain of Bonneville cutthroat trout making this population genetically valuable to wildlife managers.

The other two state listed species that have been observed in Emigration Canyon include northern goshawk (*Accipiter gentilis*) and northern flying squirrel (*Glaucomys sabrinus*). Northern goshawk and northern flying squirrel can typically be found in coniferous forests across North America.

The six other species listed in Table 1 are not listed as being protected under state or federal regulations but are considered rare and are being tracked by the UDWR's Natural Heritage Program tracking list. These species include: Toquerville springsnail (*Pyrgulopsis kolobensis*); carved glyph (*Glyphyalinia indentata*); American redstart (*Setophaga ruticilla*); Beckwith violet (bird-foot violet) (*Viola beckwithii*); broadleaf penstemon (*Penstemon platyphyllus*); and Utah fleabane (Wasatch daisy) (*Erigeron arenarioides*).

The Toquerville springsnail is a small aquatic snail associated with springs and seeps in the Bonneville Basin. Its status and distribution is currently not very well understood. The carved glyph is a widespread aquatic snail, occurring from southeastern Canada southward through much of the United States and Central America. The American redstart is a small neotropical warbler relatively common throughout North America being more numerous in the eastern United States. It prefers deciduous forests and is often found near water sources. The Beckwith violet is a small red-purple violet found in blue-bunch wheatgrass and mountain brush communities from northern Utah to the Pacific Northwest. It has been largely displaced by housing developments along the Wasatch Front. The broadleaf penstemon is a small, lavender or reddish-violet penstemon endemic to the mountain brush communities of the Wasatch

mountains. The Utah fleabane (Wasatch daisy) is a blue daisy found in limestone and quartzite outcrops and is also a northern Utah endemic.

### Vegetational Impacts

Emigration Canyon supports a relatively intact, mature riparian habitat which is important for a variety of wildlife species, including several species of mammals, song birds, and reptiles (Table 2). The riparian habitat is dominated by cottonwood, box elder, alder, and willow with an understory dominated by starry false solomons seal and Jacob’s ladder (Table 3). This riparian vegetation plays an important ecosystem function in maintaining and protecting the water quality of this drainage.

According to current plans, the proposed pipeline would make one riparian habitat crossing on the Burr Fork of Emigration Creek about 1 mile above the confluence of Killyon Canyon. The stream in this area is six to eight feet wide, six to eleven inches deep, and has a predominantly gravel substrate. The macroinvertebrate community in this reach of the Burr Fork included mayflies (Ephemeroptera), caddisflies (Tricoptera), flatworms (Platyhelminthes) and small leeches (Hirudinea). The riparian vegetation in this area is very thick and dominated by cottonwood, willow, and dogwood, as well as herbaceous species such as false solomon seal and Jacob’s ladder. Approximately 50 feet of riparian habitat would be disturbed during the installation of the pipeline in this area (pers. comm. D.Woodbury, Carollo Engineering).

The majority of the proposed water storage and delivery system is proposed to be constructed across upland oak brush habitat in pre-existing trails and roadways. This oak brush habitat is dominated by gambels oak, big sagebrush, and curleaf mountain mahogany with an understory of various grasses (Table 3). Building this storage and delivery system along pre-existing trails and roadways is expected to minimize additional disturbance in these habitats. However, several sections of these pre-existing trails and roadways would need to be widened and improved in order for equipment to access the construction zone.

Observed Wildlife	
western tanager	<i>Piranga ludoviciana</i>
black-headed grosbeak	<i>Pheucticus melanocephalus</i>
American robin	<i>Turdus migratorius</i>
broad-tailed hummingbird	<i>Selasphorus platycercus</i>

elk (scat)	<i>Cervus canadensis</i>
Table 2 (continued). Wildlife observed along the project corridor in Emigration Canyon during site visit on June 11, 2001.	
mule deer (scat)	<i>Odocoileus hemionus</i>
garter snake	<i>Thamnophis elegans</i>

Riparian Habitat		Upland Oak Brush Habitat	
narrowleaf cottonwood	<i>Populus augustifolia</i>	gambels oak	<i>Quercus gambellii</i>
box elder	<i>Acer negundo</i>	Oregon grape	<i>Mahonia repens</i>
rock mountain ash	<i>Sorbus scopulina</i>	sagewort	<i>Artemisia ludoviciana</i>
chokecherry	<i>Prunus virginiana</i>	big sagebrush	<i>Artemisia tridentata</i>
redoiser dogwood	<i>Cornus sericea</i>	antelope bitterbrush	<i>Pershia tridentata</i>
coyote willow	<i>Salix exigua</i>	green rabbitbrush	<i>Chrysothamnus viscidiflorus</i>
mountain alder	<i>Alnus incana</i>	curleaf mountain mahogany	<i>Cercocarpus ledifolius</i>
bigtoothed maple	<i>Acer grandidentatum</i>	alfalfa	<i>Medicago sativa</i>
white fir	<i>Abies concolor</i>	yellow sweetclover	<i>Melilotus officinalis</i>
mountain lover	<i>Pachystima myrsinites</i>	arrowleaf balsamroot	<i>Balsamorhiza sagittata</i>
buckbrush	<i>Ceanothus velutinus</i>	penstemon	<i>Penstemon sp.</i>
mountain snowberry	<i>Symphoricarpus oreophilus</i>	Utah sweet pea	<i>Lathyrus pauciflorus</i>
burdock	<i>Arctium lappa</i>	curley doc	<i>Rumex crispus</i>
thimbleberry	<i>Rubus parviflorus</i>	hounds tongue	<i>Cynoglossum officinale</i>
mallow-leaved ninebark	<i>Physocarpus malvaceus</i>	thistle	<i>Cirsium sp.</i>
wild rose	<i>Rosa sp.</i>	wild onion	<i>Allium sp.</i>
sedge	<i>Carex sp.</i>	scarlet gilia	<i>Ipomopsis aggregata</i>

cow parsnip	<i>Heracleum lanatum</i>	yellow salsify	<i>Tragopogon dubius</i>
Table 3 (continued). Riparian and upland oak brush vegetation observed along the project corridor in Emigration Canyon during site visit on June 11, 2001.			
Richard's geranium	<i>Geranium richardsonii</i>	sulfur buckwheat	<i>Eriogonum umbellatum</i>
sticky geranium	<i>Geranium viscosissimum</i>	whorled buckwheat	<i>Eriogonum heracleoides</i>
starry false solomons seal	<i>Smilacina stellata</i>	forget-me-not	<i>Hackelia sp.</i>
Jacob's ladder	<i>Polemonium foliosissimum</i>	yarrow	<i>Achillea millefolium</i>
stinging nettle	<i>Urtica dioica</i>	crested wheatgrass	<i>Agropyron cristatum</i>
fendlers meadowrue	<i>Thalictrum fendleri</i>	slender wheatgrass	<i>Elymus trachycaulus</i>
bluebells	<i>Mertensia sp.</i>	smooth brome	<i>Bromus inermis</i>
orchard grass	<i>Dactylis glomerata</i>	Great Basin wildrye	<i>Elymus cinereus</i>
		bulbous bluegrass	<i>Poa bulbosa</i>
		cheatgrass	<i>Bromus tectorum</i>
		foxtail barley	<i>Hordeum jubatum</i>
		needle and thread	<i>Stipa comata</i>

## Environmental Consequences

### Threatened, Endangered, and Sensitive Species

The primary concern of the proposed project is a decrease of instream flows in Emigration Canyon and its tributaries due to groundwater pumping at the two proposed well sites. Decreased instream flows have the potential to adversely affect the aquatic and the riparian habitats and the Bonneville cutthroat trout population in the canyon. Currently, culinary water is provided to existing residents in the Emigration Oaks, Emigration Place, and Pinecrest subdivisions through several small water-distribution systems supplied by public wells and springs. The residents living along Emigration Creek between the Emigration Oaks turnoff to the Pinecrest subdivision are supplied with culinary water by private, shallow, stream side wells and springs on their individual properties. It is believed that the proposed Brigham Fork well would not have an influence on stream flow in the Brigham Fork of Emigration Creek (Barnett 2001). The proposed Burr Fork well is estimated to reduce instream flow in the Burr Fork of Emigration Creek between Pinecrest and the confluence of Killyon Canyon by about 2-3 percent of the low summer instream flow. However, this water withdrawal is expected to be offset by

the closure of the private wells further downstream in Emigration Canyon resulting in an estimated 2-3 percent increase in late summer instream flow in Emigration Creek below the confluence of Killyon Canyon (Barnett 2001). The potential impacts of these proposed wells on the Bonneville cutthroat trout would likely be negligible because the proposed project would cause little net water depletion in the main stem of the Emigration Creek where most of the trout are found.

Short-term sedimentation from construction associated with the main pipeline crossing on the Burr Fork could have a detrimental effect on trout habitat in Emigration Creek. This sedimentation impact could be minimized by trenching the stream at low flows, diverting stream flows around the construction area, and revegetating and controlling erosion at the stream crossing.

There would be several additional pipeline crossings on Killyon and Burr creeks from the main water line to connect homeowners to the new water system. These pipeline crossings would all occur either over or under existing culverts and would not impact stream habitat or riparian vegetation.

The other two state listed species that have been observed in Emigration Canyon, northern goshawk (*Accipiter gentilis*) and northern flying squirrel (*Glaucomys sabrinus*), prefer coniferous forest habitat and are not considered to be directly affected by this project.

The six other species listed in Table 1 are not listed as being protected under state or federal regulations but are considered rare and are being tracked by the UDWR's Natural Heritage Program tracking list. The Toquerville springsnail and carved glyph are both small aquatic snails associated with springs and seeps in the Bonneville Basin. These species are not likely to be affected by the proposed project because habitat alterations in springs and seeps in the project area is expected to be minimal. The American redstart could possibly be affected by the project because it prefers deciduous forest habitats associated with riparian areas. However, the last recorded sighting of an American redstart in Emigration Canyon was in 1923 and the probability of a nesting pair using the canyon is low. The Beckwith violet, broadleaf penstemon, and Utah fleabane (Wasatch daisy) could possibly be affected by the project because the proposed pipeline and water storage facilities will cross their preferred habitat. Even though the last recorded sighting of these plants in Emigration Canyon are over 60 years ago and they are not state or federally listed, the proposed pipeline routes and water storage location should be surveyed during the appropriate growing season (most likely late spring) for these plants. If populations of these plants are found on the proposed pipeline routes or at the water storage location measures would be taken to minimize or mitigate the impact to the population.

### **Vegetational Impacts**

There would be some vegetational and soil disturbance associated with the installation of the water storage and delivery system. Most of this disturbance would be limited to the widening of pre-existing

roadways and trails through the upland oak brush habitat. As stated previously, there is only one riparian habitat crossing planned in the water system project that would impact riparian habitat. The crossing would be located on the Burr Fork and would impact an estimated 50 feet of riparian vegetation. The following proposed mitigation measures would be implemented to control erosion and encourage native revegetation in these areas.

**Mitigation - Threatened and Endangered Species:** Monitor water flows and minimize water depletions in areas where Bonneville cutthroat trout are known to occur in Emigration Creek.

**Mitigation - Aquatic and Terrestrial Wildlife:** Mitigation for decreased instream flows in Emigration Canyon (if observed) and disturbed vegetation and soils due to this water development project would include the following:

- Conduct a survey on the proposed construction routes for Beckwith violet, broadleaf penstemon, and Utah fleabane (Wasatch daisy) during their respective growing seasons (most likely late spring).
- Control erosion in the construction areas, revegetate disturbed areas with native vegetation, and monitor for invasive weeds.
- Construct the Burr Fork stream crossing during low flow and route water around the construction area to minimize sedimentation downstream.
- Install flumes to monitor instream flows in Emigration Canyon and adjust the quantity of water being pumped from the proposed wells if instream flows decrease beyond an acceptable level due to the groundwater withdrawal.
- Acquire approximately 300 acres of watershed property in Brigham Fork and Burr Fork of Emigration Canyon and restrict use on these properties to maintain water quality in the drainage.
- Acquire water rights from the residents along Emigration Creek once the water delivery system is in place and the residents are connected to the system. Preserve these water rights to provide instream flows in Emigration Creek.

## Literature Cited

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