



## APPENDIX C: STUDY REACH MAPS, SUMMARIES, AND RECOMMENDATIONS

This appendix provides summary information and maps for each of the study reaches. Maps include vegetation types and locations of features such as litter areas, storm drain outfalls, culvert crossings, access trails, artificial bank treatments, and erosion areas. A brief description and selected photographs are also provided, along with tables summarizing stream channel data and vegetation characteristics. For each study reach, a table is also provided that lists appropriate types of improvement measures for the reach and describes where within the reach the measures should be applied. Measures identified for implementation at the reach-scale will typically require additional detailed site-level design work and engineering to determine specific locations and combinations of treatment techniques.

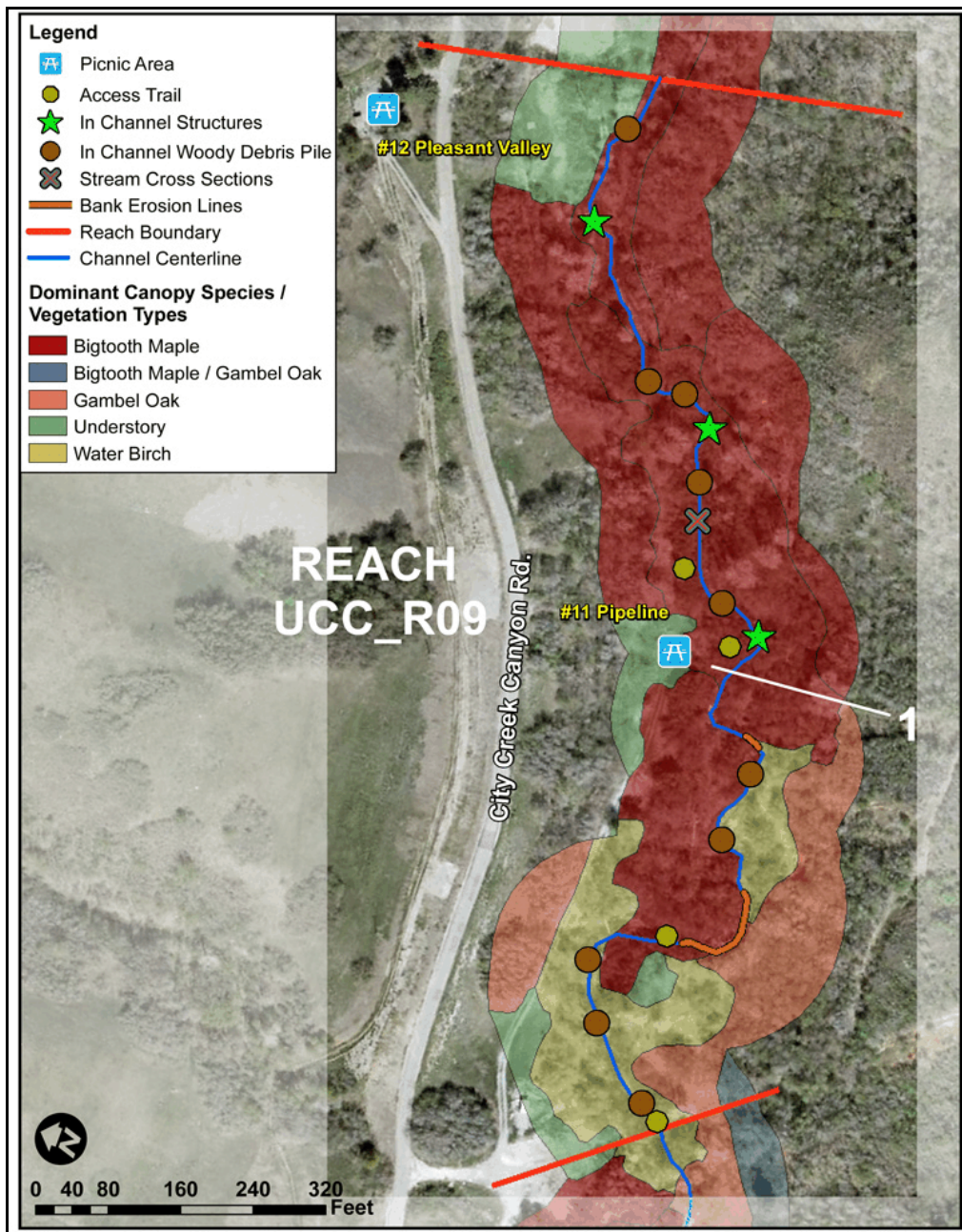
Approximate cost estimates for the items identified in the recommendations tables are provided in Appendix D. The recommendations and prioritizations included in this appendix are not intended to be exhaustive; as priorities evolve and funding becomes available for specific study reaches or treatment techniques, it may be appropriate to implement measures not included in the tables.

The summaries in this appendix are not intended to comprehensively provide all the information collected for each study reach; rather, they are meant as a reference that provides a brief characterization and overview of existing conditions, issues, and recommendations for each assessed study reach.



## REACH UCC\_R09: PLEASANT VALLEY

This reach is generally in very good condition. During the field assessment, nearly 20 trout were observed using habitat provided by undercut banks and in-channel woody debris piles. A diverse mix of native canopy, shrub, and understory species are present, and low floodplain surfaces/gravel bars are abundant. Localized weed control efforts are needed in the vicinity of developed picnic and restroom areas at the upstream and downstream ends of the reach.



### Issues affecting riparian function:

- invasive species (burdock, houndstongue, Dyer's woad, toadflax, thistle, goatgrass, cheatgrass)

### Constraints/opportunities:

- minimal infrastructure
- channel/floodplain not confined by road







REACH CHARACTERISTICS							
LENGTH (feet)	SLOPE (feet/feet)	BED MATERIAL IN RIFFLES	BANK MATERIAL	BANK HARDENING	BAR DEPOSITS	FLAT FLOODPLAIN SURFACES	WOODY DEBRIS IN CHANNEL
1565	0.029	boulder, cobble, gravel	cobble, gravel, sand/silt	none	abundant	abundant	occasionally present

VEGETATION CHARACTERISTICS					
DOMINANT CANOPY SPECIES / VEGETATION TYPE	PERCENT COVER			INVASIVE SPECIES CLASS	WOODY DEBRIS ON BANKS
	Canopy	Shrub	Understory		
bigtooth maple	26-100+	6-50	26-100+	none to moderate	sparse/moderate
Gambel oak	51-75	6-50	1-5/51-75	none	moderate
understory	0/6-25	0-5	51-75	high/majority	absent
understory	0/6-25	6-25/0	76-100+/26-50	none	absent
water birch	51-75	26-75	76-100+	high/low	sparse/dense

EXISTING INFRASTRUCTURE			
WITHIN 50 FEET OF AHWL		WITHIN 50-100 FEET OF AHWL	
North Bank	South Bank	North Bank	South Bank
none	none	low	none

**Priorities identified by stakeholders:**

- control of noxious weeds, especially yellow star-thistle

RECOMMENDATIONS	
IMPROVEMENT MEASURE	LOCATION
Invasive plant removal/control	within vegetation type(s)
Access control/trail reclamation	point 1 on map

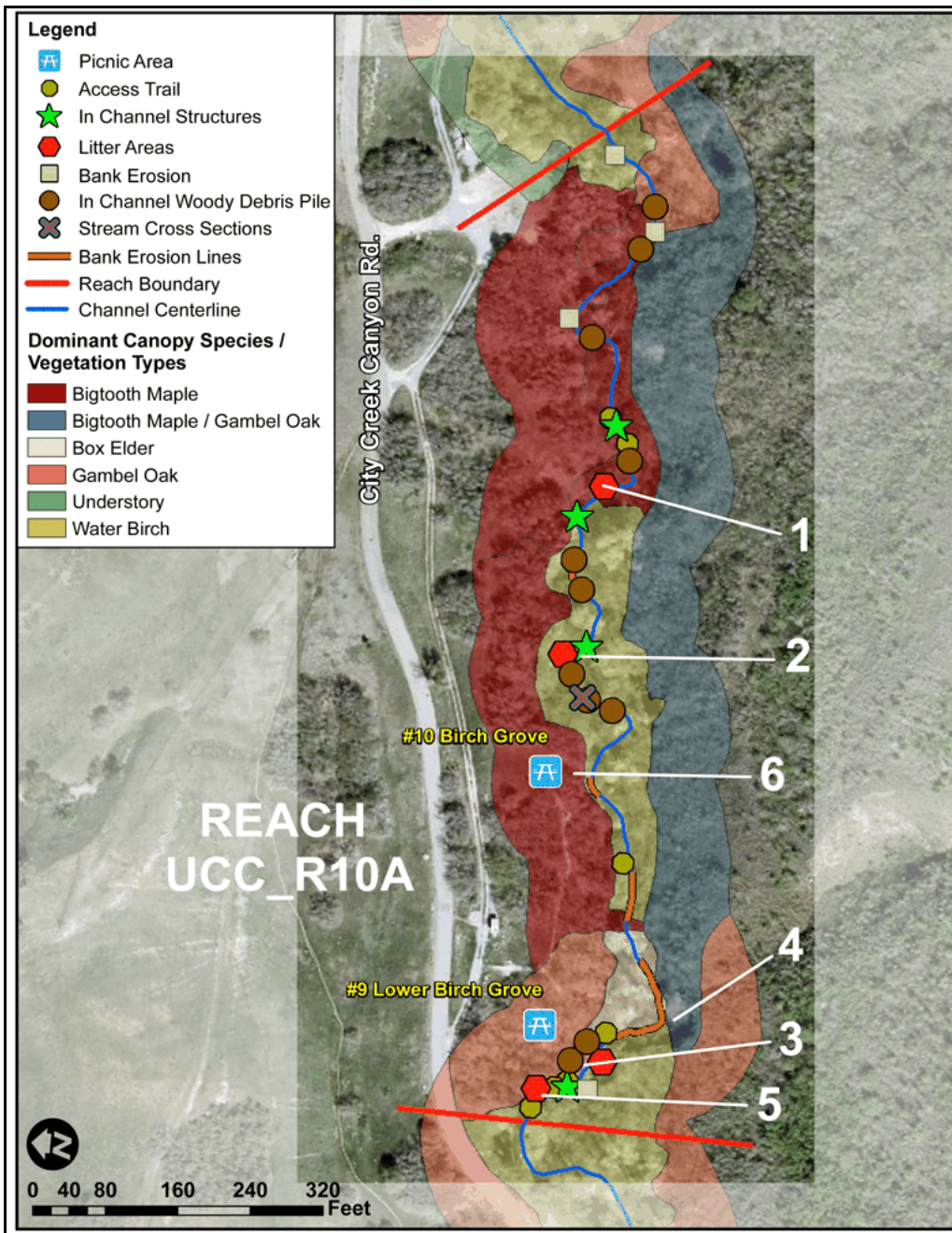






## REACH UCC\_R10A: PIPELINE

This reach includes two developed picnic sites. Beaver activity is evident in this reach, which contains many woody debris piles and a diverse mix of native canopy, shrub, and understory vegetation. Well-developed undercut banks provide excellent fish habitat, and more than 10 trout were observed during the field assessment of this reach. Several significant areas of erosion are evident where the stream has migrated into the steep hillside.



### Issues affecting riparian function:

- trash (minor)
- invasive species (thistle, burdock, goatgrass, cheatgrass, toadflax, Dyer's woad)
- eroded access trails (minor)

### Constraints/opportunities:

- minimal infrastructure
- channel/floodplain not confined by road





REACH CHARACTERISTICS							
LENGTH (feet)	SLOPE (feet/feet)	BED MATERIAL IN RIFFLES	BANK MATERIAL	BANK HARDENING	BAR DEPOSITS	FLAT FLOODPLAIN SURFACES	WOODY DEBRIS IN CHANNEL
1427	0.031	boulder, cobble, gravel	cobble, gravel, sand/silt	none	abundant	abundant	abundant

VEGETATION CHARACTERISTICS					
DOMINANT CANOPY SPECIES / VEGETATION TYPE	PERCENT COVER			INVASIVE SPECIES CLASS	WOODY DEBRIS ON BANKS
	Canopy	Shrub	Understory		
bigtooth maple	51-100+	6-25/76-100+	26-100+	low/moderate	absent/moderate
bigtooth maple-Gambel oak	76-100+	51-75	26-50	none	moderate
box elder	76-100+	51-75	26-50	low	absent
Gambel oak	51-100+	6-50/76-100+	51-75/6-25	low/none	absent/moderate
water birch	51-100+	6-25/51-75	26-75	low/moderate	moderate/dense

EXISTING INFRASTRUCTURE			
WITHIN 50 FEET OF AHWL		WITHIN 50-100 FEET OF AHWL	
North Bank	South Bank	North Bank	South Bank
none	none	low	none

**Priorities identified by stakeholders:**

- install educational/interpretive signs highlighting the role of beaver in riparian areas
- control of noxious weeds, especially yellow star-thistle

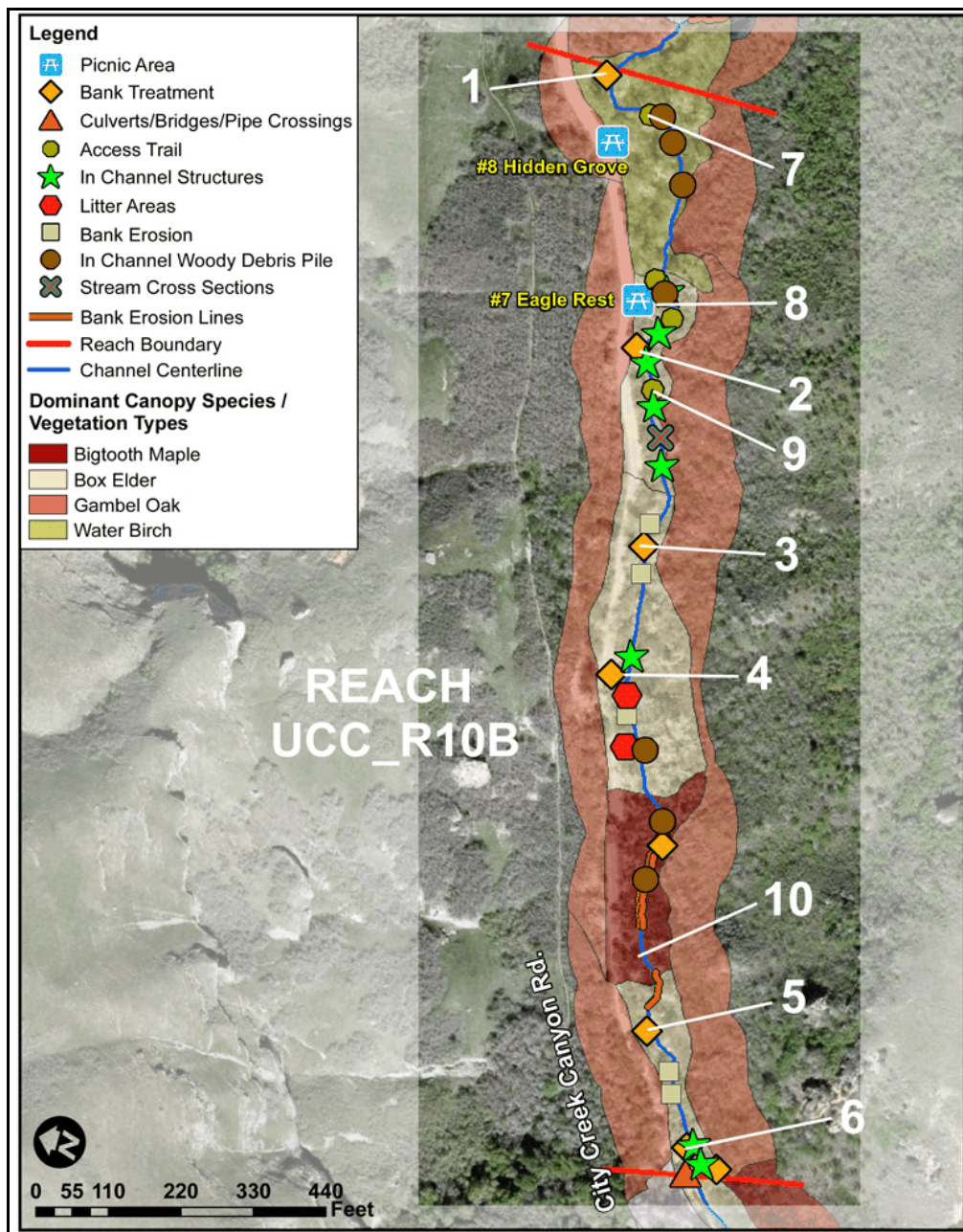
RECOMMENDATIONS	
IMPROVEMENT MEASURE	LOCATION
Invasive plant removal/control	within vegetation type(s)
Monitor terrace erosion	point 4 on map
Stream cleanup	points 1, 2, and 3 on map
Mechanized trash removal	point 5 on map
Picnic site improvements/access stabilization	points 5 and 6 on map





## REACH UCC\_R10B: EAGLES REST

Within this reach, the northern bank has been stabilized with gabion baskets in several locations. The channel passes through a conglomerate geologic formation in this reach, and bedrock is exposed in portions of the banks. Areas of steep, bare banks are common, but appear to be associated with natural processes typical of a steep canyon setting. The downstream boundary of the reach is at the red footbridge/water line crossing. Fish were observed in this reach.



### Issues affecting riparian function:

- invasive species (burdock)
- gabions
- bank erosion

### Constraints/opportunities:

- width of channel/floodplain confined by road and bedrock
- bedrock outcrops are a unique aesthetic feature







REACH CHARACTERISTICS							
LENGTH (feet)	SLOPE (feet/feet)	BED MATERIAL IN RIFFLES	BANK MATERIAL	BANK HARDENING	BAR DEPOSITS	FLAT FLOODPLAIN SURFACES	WOODY DEBRIS IN CHANNEL
1905	0.036	boulder, cobble, gravel	cobble, gravel, sand/silt	gabions	abundant	abundant	occasionally present/abundant

VEGETATION CHARACTERISTICS					
DOMINANT CANOPY SPECIES / VEGETATION TYPE	PERCENT COVER			INVASIVE SPECIES CLASS	WOODY DEBRIS ON BANKS
	Canopy	Shrub	Understory		
bigtooth maple	76-100+	26-50	76-100+	low	moderate
box elder	76-100+	26-75	51-100+	low/none	absent to moderate
Gambel oak	51-100+	6-100+	6-25/51-100+	low/none	absent/sparse
water birch	76-100+	51-75	51-75	moderate	dense

EXISTING INFRASTRUCTURE			
WITHIN 50 FEET OF AHWL		WITHIN 50-100 FEET OF AHWL	
North Bank	South Bank	North Bank	South Bank
high	none	moderate	none

**Priorities identified by stakeholders:**

- protect known American dipper nesting habitat in bedrock outcrops in this reach
- install educational/interpretive signs highlighting American dipper

RECOMMENDATIONS	
IMPROVEMENT MEASURE	LOCATION
Invasive plant removal/control	within vegetation type(s)
Gabion basket retrofit	points 1, 2, 3, 4, 5 on map
Stabilize erosion/rills at ends of gabions	points 3 and 6 on map
Access trail stabilization	points 7, 9, and 10 on map
Picnic site improvements/access stabilization	point 8 on map

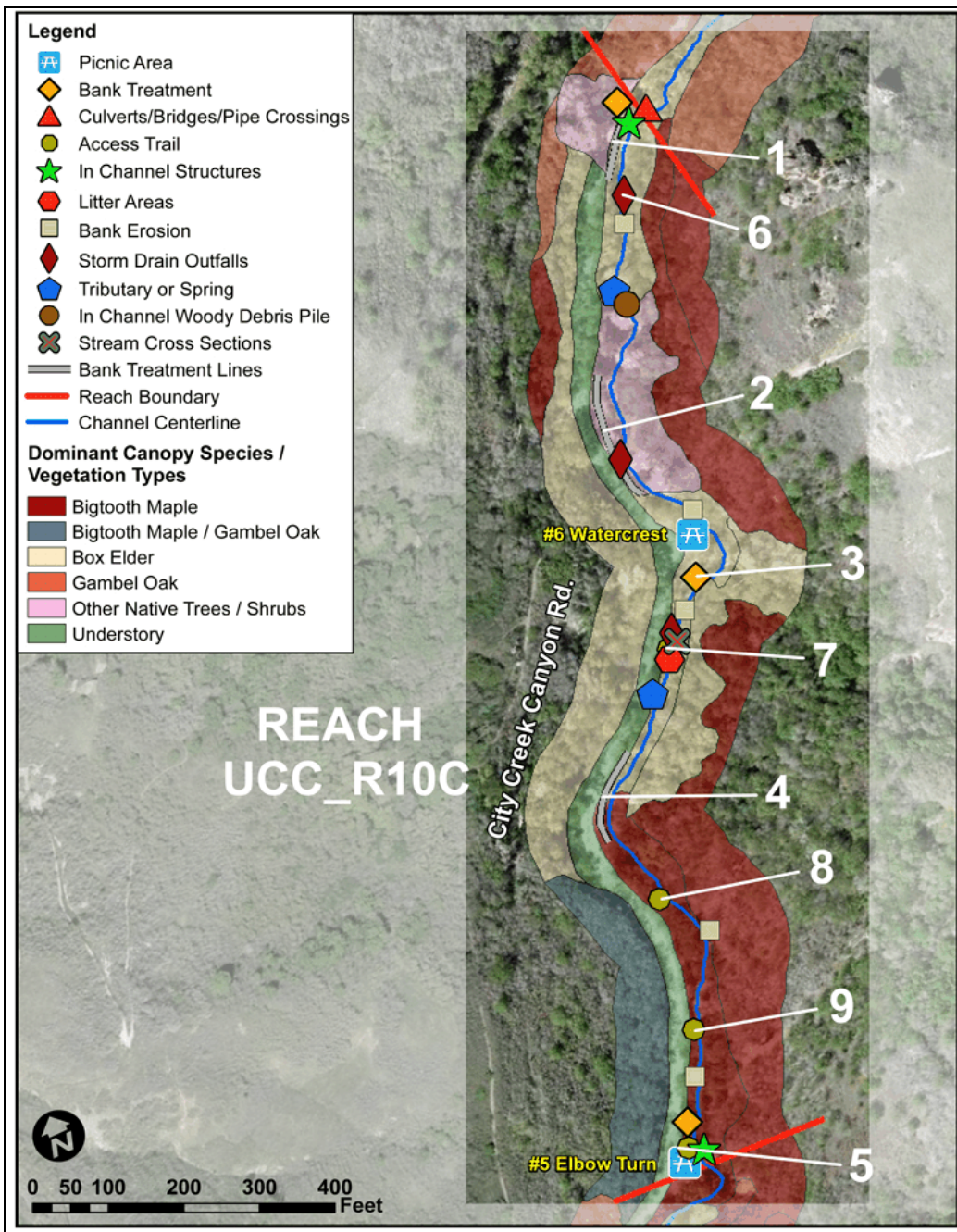






## REACH UCC\_R10C: WATERCREST

Starting at this reach, the alignment of City Creek shifts and begins to flow to the south. Several seeps/springs enter from the west bank. Fish were observed in this reach, which includes abundant undercut banks. Vegetative cover and floodplain width are limited by the proximity of the road and gabion basket protection on the west bank in several locations. Two picnic sites are present near the stream in this reach.



**Issues affecting riparian function:**

- invasive species (burdock, toadflax)
- eroded access trails
- gabions

**Constraints/opportunities:**

- width of channel/floodplain confined by road
- springs and seeps provide unique vegetation and habitat







REACH CHARACTERISTICS							
LENGTH (feet)	SLOPE (feet/feet)	BED MATERIAL IN RIFFLES	BANK MATERIAL	BANK HARDENING	BAR DEPOSITS	FLAT FLOODPLAIN SURFACES	WOODY DEBRIS IN CHANNEL
1612	0.032	boulder, cobble, gravel	cobble, sand/silt	gabions	abundant	occasionally present	occasionally present

VEGETATION CHARACTERISTICS					
DOMINANT CANOPY SPECIES / VEGETATION TYPE	PERCENT COVER			INVASIVE SPECIES CLASS	WOODY DEBRIS ON BANKS
	Canopy	Shrub	Understory		
bigtooth maple	76-100+	6-75	51-75	low/none	absent/sparse
bigtooth maple-Gambel oak	76-100+	51-75	51-75	none	moderate
box elder	76-100+	6-50	51-100+	low/none	absent/sparse
Gambel oak	76-100+	26-50	76-100+	none	absent
other native trees/shrubs	51-100+	26-50	26-75	low	absent/sparse
understory	6-25	0	26-50	moderate	absent

EXISTING INFRASTRUCTURE			
WITHIN 50 FEET OF AHWL		WITHIN 50-100 FEET OF AHWL	
West Bank	East Bank	West Bank	East Bank
high	none	low	none

**Priorities identified by stakeholders:**

- control of noxious weeds

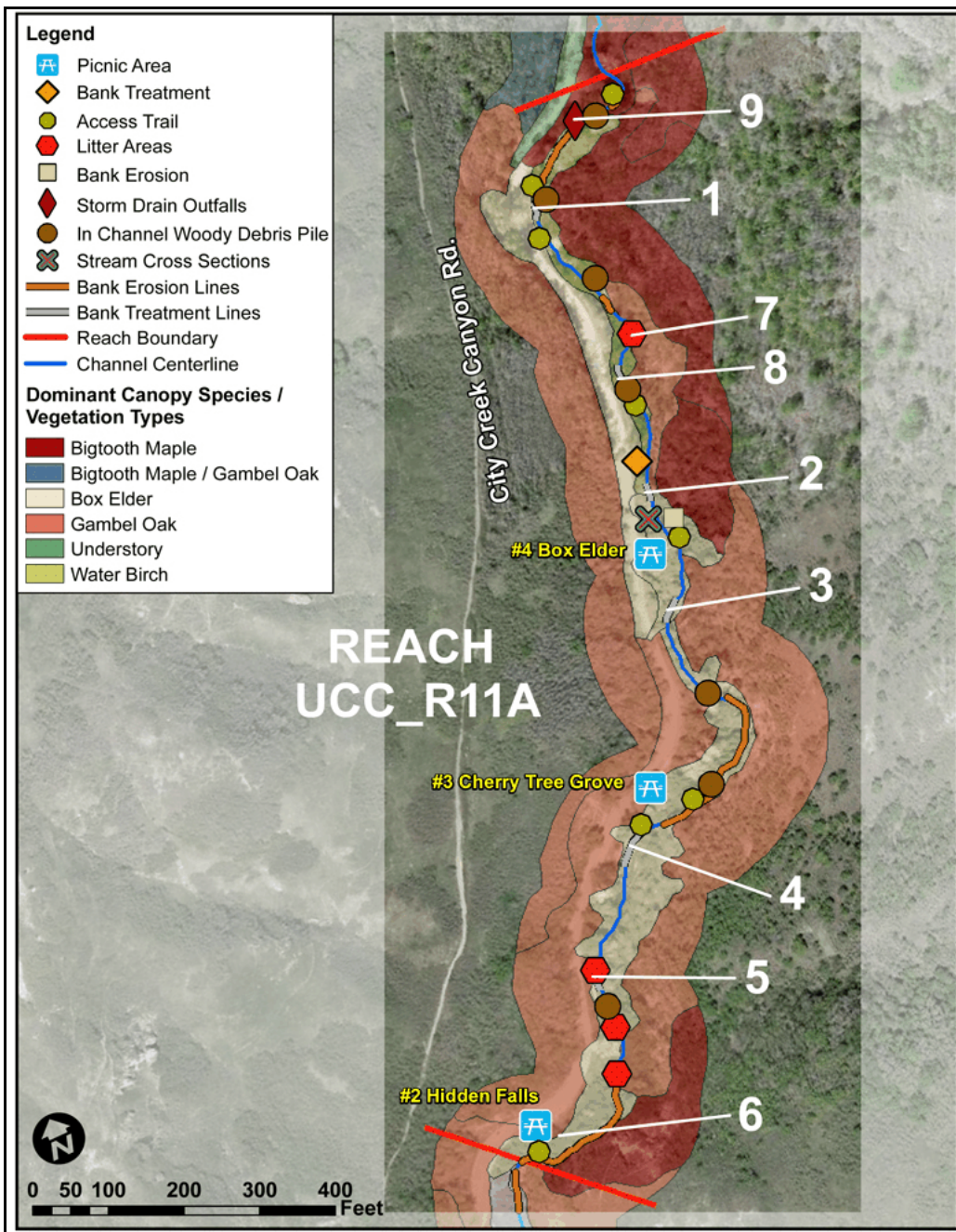
RECOMMENDATIONS	
IMPROVEMENT MEASURE	LOCATION
Invasive plant removal/control	within vegetation type(s)
Gabion basket retrofit	points 1, 2, 3, 4, 5 on map
Picnic site improvements	points 3 and 5 on map
Outfall improvements	points 2 and 6 on map
Access trail stabilization/reclamation	points 5, 7, 8, 9 on map





## REACH UCC\_R11A: ELBOW TURN

The upstream boundary of this reach is at the Elbow Turn picnic site; the reach also includes three other picnic sites. The stream channel flows very close to the road in some areas, and has meandered into some steep hillslope/rock outcrops on the east bank. Several relatively small areas of rip rap and gabion bank protection are present on the west bank. Fish were observed in this reach.



### Issues affecting riparian function:

- invasive species (burdock, toadflax, Dyer's woad, thistle, houndstongue, cheatgrass)
- eroded trails/picnic site access
- gabions
- road proximity/repair practices
- hillslope erosion

### Constraints/opportunities:

- width of channel/floodplain confined by road







REACH CHARACTERISTICS							
LENGTH (feet)	SLOPE (feet/feet)	BED MATERIAL IN RIFFLES	BANK MATERIAL	BANK HARDENING	BAR DEPOSITS	FLAT FLOODPLAIN SURFACES	WOODY DEBRIS IN CHANNEL
1836	0.033	boulder, cobble, gravel	boulder, cobble, gravel, sand	gabions, some rip rap	occasionally present	occasionally present	occasionally present

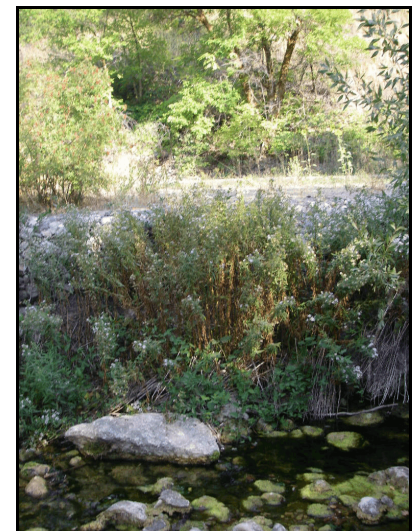
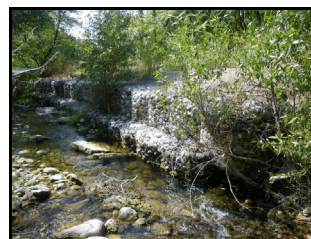
VEGETATION CHARACTERISTICS					
DOMINANT CANOPY SPECIES / VEGETATION TYPE	PERCENT COVER			INVASIVE SPECIES CLASS	WOODY DEBRIS ON BANKS
	Canopy	Shrub	Understory		
bigtooth maple	26-100+	6-75	6-25/51-100+	none to high	absent/moderate
box elder	26-100+	26-75	26-75	low/moderate	moderate/sparse
Gambel oak	51-100+	6-75	26-75	low to high	moderate/sparse
water birch	51-75	76-100+	51-75	high	absent

EXISTING INFRASTRUCTURE			
WITHIN 50 FEET OF AHWL		WITHIN 50-100 FEET OF AHWL	
West Bank	East Bank	West Bank	East Bank
high	none	low	none

RECOMMENDATIONS	
IMPROVEMENT MEASURE	LOCATION
Invasive plant removal/control	within vegetation types
Picnic site improvements	near points 3, 4 and 6 on map
Gabion basket retrofit	points 1, 2, 3, 4, 5 on map
Stabilize erosion/rills at ends of gabions	points 3 and 5 on map
Access trail stabilization/reclamation	points 1, 4, 6, 8 on map
Stream cleanup	point 7 on map
Mechanized trash removal	near point 5 on map
Protect stream from asphalt/road debris	point 8 on map
Outfall improvement	point 9 on map
Road maintenance/runoff management	reach-scale

**Priorities identified by stakeholders:**

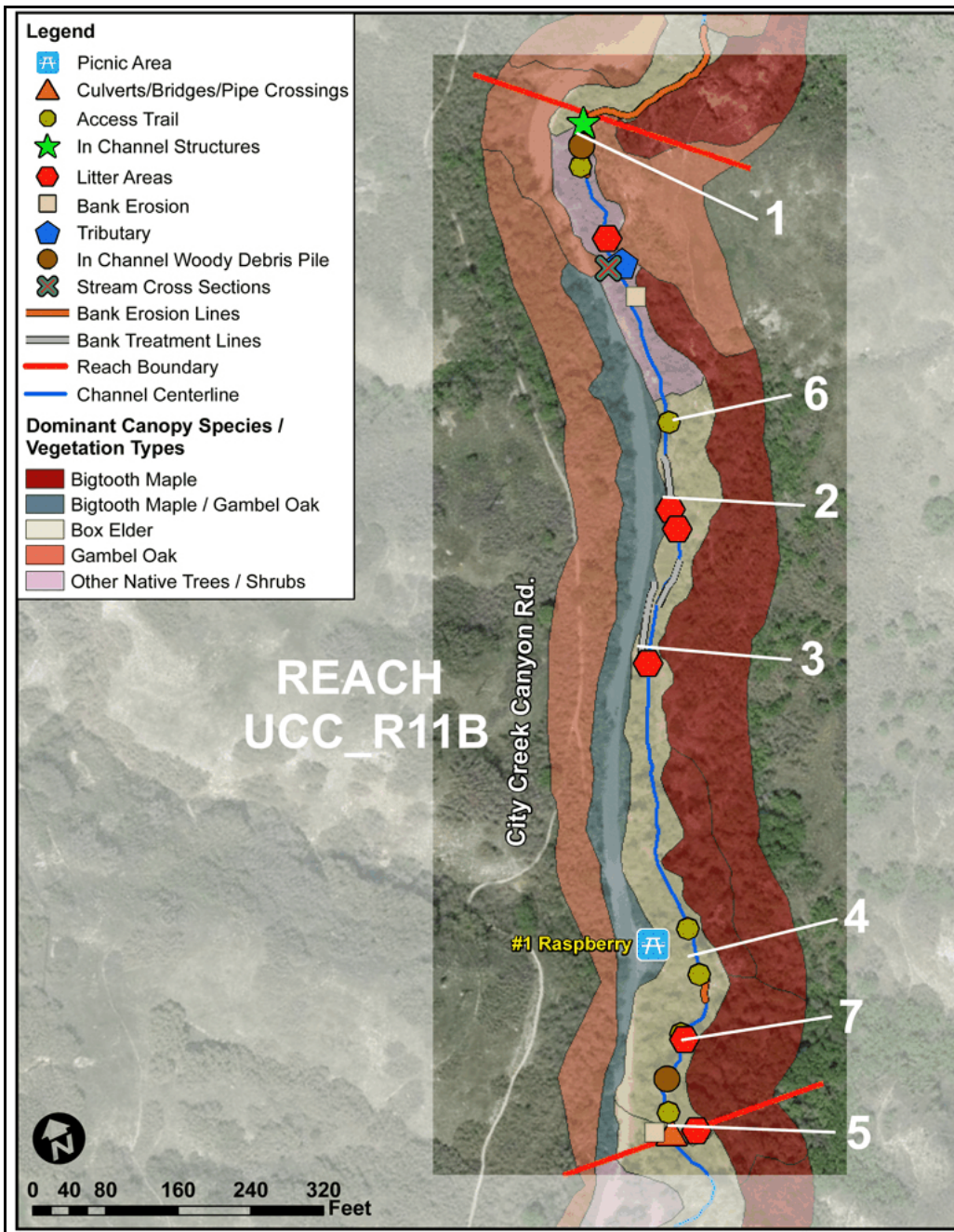
- control of noxious weeds, especially houndstongue, Dyer's woad, Dalmatian toadflax





## REACH UCC\_R11B: HIDDEN FALLS

This reach begins at a natural bedrock outcrop/waterfall feature near the Hidden Falls picnic site. Near-stream vegetation (including dense stands of horsetail) is thick through much of this reach, but limited by the proximity of the road in other areas. Fish were observed, and a spring/seep was also noted. A broken wood plank footbridge crosses the channel at the downstream end of the reach. A small footpath parallels the stream along the east bank.



### Issues affecting riparian function:

- invasive species (burdock, toadflax)
- eroded trails/picnic site access
- gabions
- trash (minor)
- road proximity/repair practices

### Constraints/opportunities:

- width of channel/floodplain confined by road
- relatively broad floodplain “shelf” on east side in some portions of reach







REACH CHARACTERISTICS							
LENGTH (feet)	SLOPE (feet/feet)	BED MATERIAL IN RIFFLES	BANK MATERIAL	BANK HARDENING	BAR DEPOSITS	FLAT FLOODPLAIN SURFACES	WOODY DEBRIS IN CHANNEL
1207	0.032	cobble, gravel	cobble, sand/silt	gabions, grouted rock	occasionally present	occasionally present	occasionally present

VEGETATION CHARACTERISTICS					
DOMINANT CANOPY SPECIES / VEGETATION TYPE	PERCENT COVER			INVASIVE SPECIES CLASS	WOODY DEBRIS ON BANKS
	Canopy	Shrub	Understory		
bigtooth maple	51-100+	26-75	51-100+	moderate/none	sparse/absent
bigtooth maple-Gambel oak	26-50	26-50	26-50	none	absent
box elder	76-100+	51-75	51-75	moderate	moderate
Gambel oak	26-100+	6-50	26-50	moderate	absent
other native trees/shrubs	26-50	51-75	26-50	moderate	sparse

EXISTING INFRASTRUCTURE			
WITHIN 50 FEET OF AHWL		WITHIN 50-100 FEET OF AHWL	
West Bank	East Bank	West Bank	East Bank
high	none	low	none

RECOMMENDATIONS	
IMPROVEMENT MEASURE	LOCATION
Invasive plant removal/control	within vegetation type(s)
Stream cleanup	points 2 and 7 on map
Gabion basket retrofit	points 1, 2, 3 on map
Picnic site access controls	point 4 on map
Access trail stabilization/reclamation	point 6 on map and at picnic sites
Remove or repair footbridge	point 5 on map
Mechanized trash removal	point 2 on map
Protect stream from asphalt/road debris	reach-scale

**Priorities identified by stakeholders:**

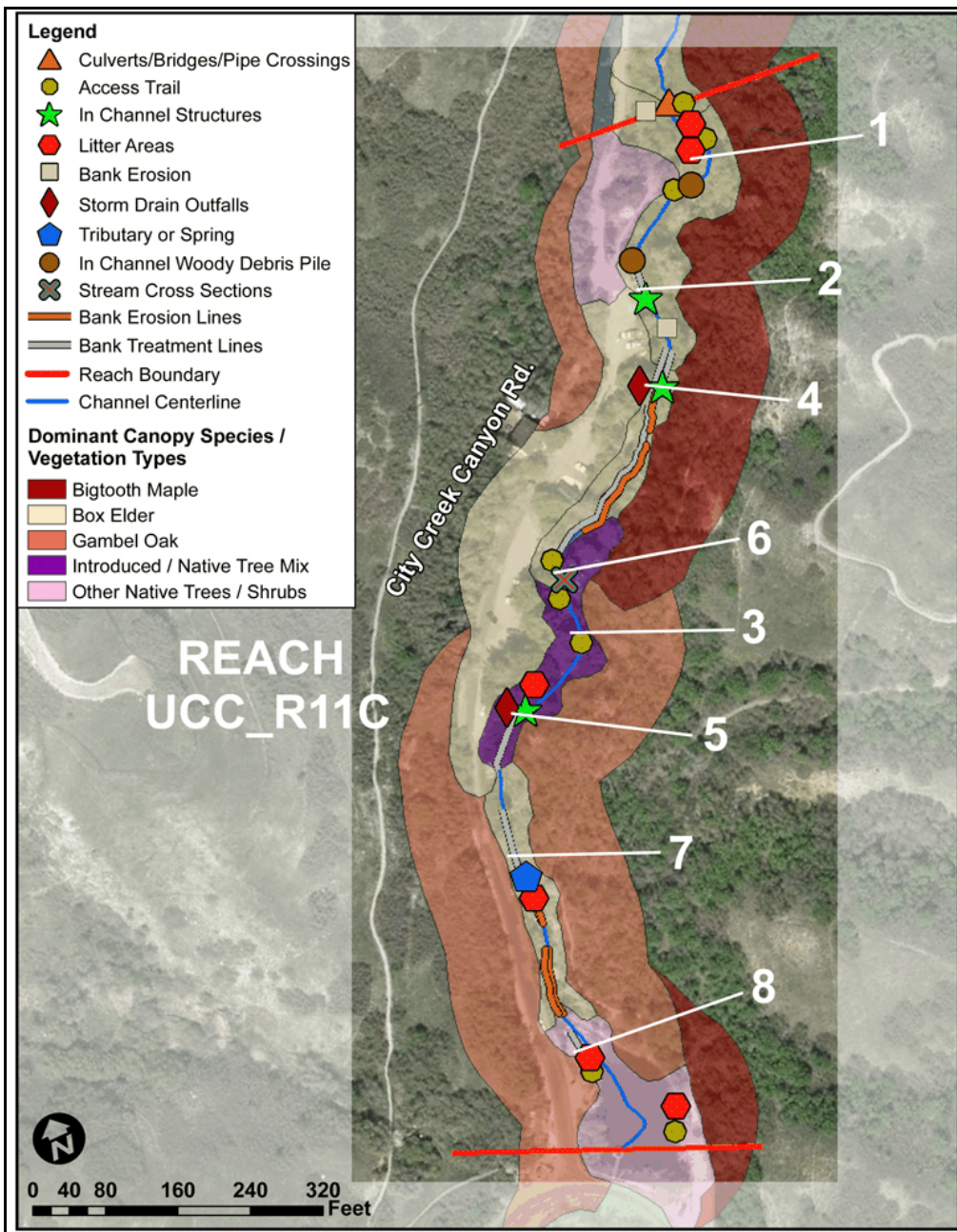
- protect known western screech owl habitat in this reach
- install educational/interpretive signs highlighting owls





## REACH UCC\_R11C: GUARD SHACK GATE AREA

This reach includes the developed entrance gate area and the upper debris basin. Multiple concrete structures affect riparian conditions and appear to be in need of repair or replacement. Most of the right bank has been stabilized with gabion baskets, concrete walls, and boulder rip-rap, and lacks vegetation in areas. A flowing tributary channel enters from the east. This is the upstream-most reach where Siberian elm was noted as present, and the only reach where Russian olive was noted.



### Issues affecting riparian function:

- invasive species (nine species)
- failing in-channel structures
- lack of vegetation along hardened bank areas
- road proximity/repair practices
- proximity of parking/maintenance areas
- eroded trails/picnic site access
- trash
- dredging/maintenance of debris basin

### Constraints/opportunities:

- debris basin limits natural riparian functions
- limited space for road, channel, parking/maintenance areas





REACH CHARACTERISTICS							
LENGTH (feet)	SLOPE (feet/feet)	BED MATERIAL IN RIFFLES	BANK MATERIAL	BANK HARDENING	BAR DEPOSITS	FLAT FLOODPLAIN SURFACES	WOODY DEBRIS IN CHANNEL
1357	0.038	boulder, cobble	cobble, gravel, sand/silt	gabions, rip rap, concrete	occasionally present	occasionally present	abundant

VEGETATION CHARACTERISTICS					
DOMINANT CANOPY SPECIES / VEGETATION TYPE	PERCENT COVER			INVASIVE SPECIES CLASS	WOODY DEBRIS ON BANKS
	Canopy	Shrub	Understory		
bigtooth maple	51-100+	26-75	6-75	none/moderate	absent/sparse
box elder	26-75	6-50	6-50	moderate to high	absent/sparse/dense
Gambel oak	51-75	26-50	6-75	none/high	sparse
introduced/native tree mix	51-75	51-75	26-50	moderate	absent
other native trees/shrubs	6-25	6-50	26-50	none/high	absent

EXISTING INFRASTRUCTURE			
WITHIN 50 FEET OF AHWL		WITHIN 50-100 FEET OF AHWL	
West Bank	East Bank	West Bank	East Bank
high	low	moderate	none

RECOMMENDATIONS	
IMPROVEMENT MEASURE	LOCATION
Invasive plant removal/control	within vegetation type(s)
Runoff management	maintenance/guard shack area
Storm drain improvement	points 4 and 5 on map
Replace/improve bank protection	point 5 on map and between points 2 and 4
Gabion basket retrofit	points 2 and 7 on map and between points 4 and 6
Replace/improve grade control structures	points 2, 4, 5 on map
Access control (fence)	between parking areas and stream
Access trail stabilization (steps)	points 1 and 3 on map
Revegetation-shrub layer	near points 2 and 8 on map
Stream cleanup	points 1 and 5 on map and around debris basin
Create vegetated buffer	reach-scale along west bank
Protect stream from asphalt/road debris	reach-scale
Install stabilized dredging access ramp	east side of debris basin

**Priorities identified by stakeholders:**

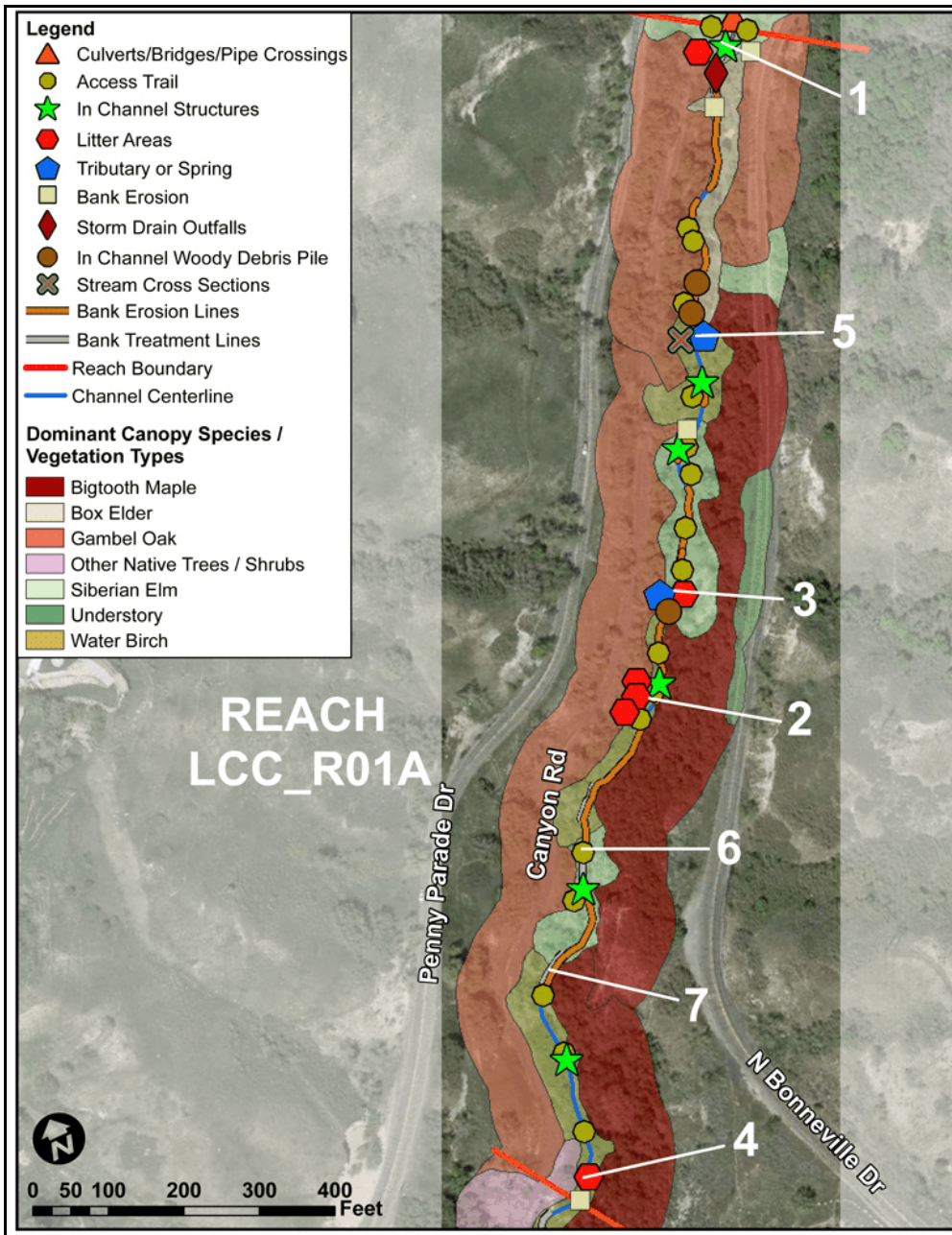
- improvements to grade control and bank structures to improve stability and facilitate fish passage





## REACH LCC\_R01A: BELOW BONNEVILLE BOULEVARD

In this reach the creek is tightly confined between a paved trail on the west side and Bonneville Boulevard and a conglomerate outcrop on the east side. Side slopes are steep and tall and lack understory cover in many areas; this appears to be primarily due to roadway fill and hillslope erosion rather than ongoing bed incision or toe failure. Access trails on the east side of the stream are steep and in poor condition. Invasive Siberian elm is the dominant tree species in portions of this reach.



### Issues affecting riparian function:

- pipe outfall erosion
- hillslope erosion/ oversteepened slopes
- road/paved trail proximity
- eroded access trails
- soil compaction from foot traffic
- limited understory and shrub cover
- invasive species (eight species)
- gabions
- trash

### Constraints/opportunities:

- limited lateral space
- high level of recreational use
- steep, tall banks make access challenging





REACH CHARACTERISTICS							
LENGTH (feet)	SLOPE (feet/feet)	BED MATERIAL IN RIFFLES	BANK MATERIAL	BANK HARDENING	BAR DEPOSITS	FLAT FLOODPLAIN SURFACES	WOODY DEBRIS IN CHANNEL
1686	0.036	cobble, gravel	cobble, gravel, sand/silt	gabions, rip rap	occasionally present	occasionally present	occasionally present

VEGETATION CHARACTERISTICS					
DOMINANT CANOPY SPECIES / VEGETATION TYPE	PERCENT COVER			INVASIVE SPECIES CLASS	WOODY DEBRIS ON BANKS
	Canopy	Shrub	Understory		
bigtooth maple	51-100+	26-50	26-50	moderate	moderate/sparse
Gambel oak	26-75	6-50	26-75	high	absent
Siberian elm	26-75	6-50	6-50	moderate to high	absent/sparse
water birch	51-100+	6-50	6-50	moderate/none	sparse/moderate
box elder	26-50	6-25	6-25	moderate	sparse
understory	6-25	6-25	26-50	moderate	absent

EXISTING INFRASTRUCTURE			
WITHIN 50 FEET OF AHWL		WITHIN 50-100 FEET OF AHWL	
West Bank	East Bank	West Bank	East Bank
high	low	moderate	moderate

**Priorities identified by stakeholders:**

- no reach-specific items identified

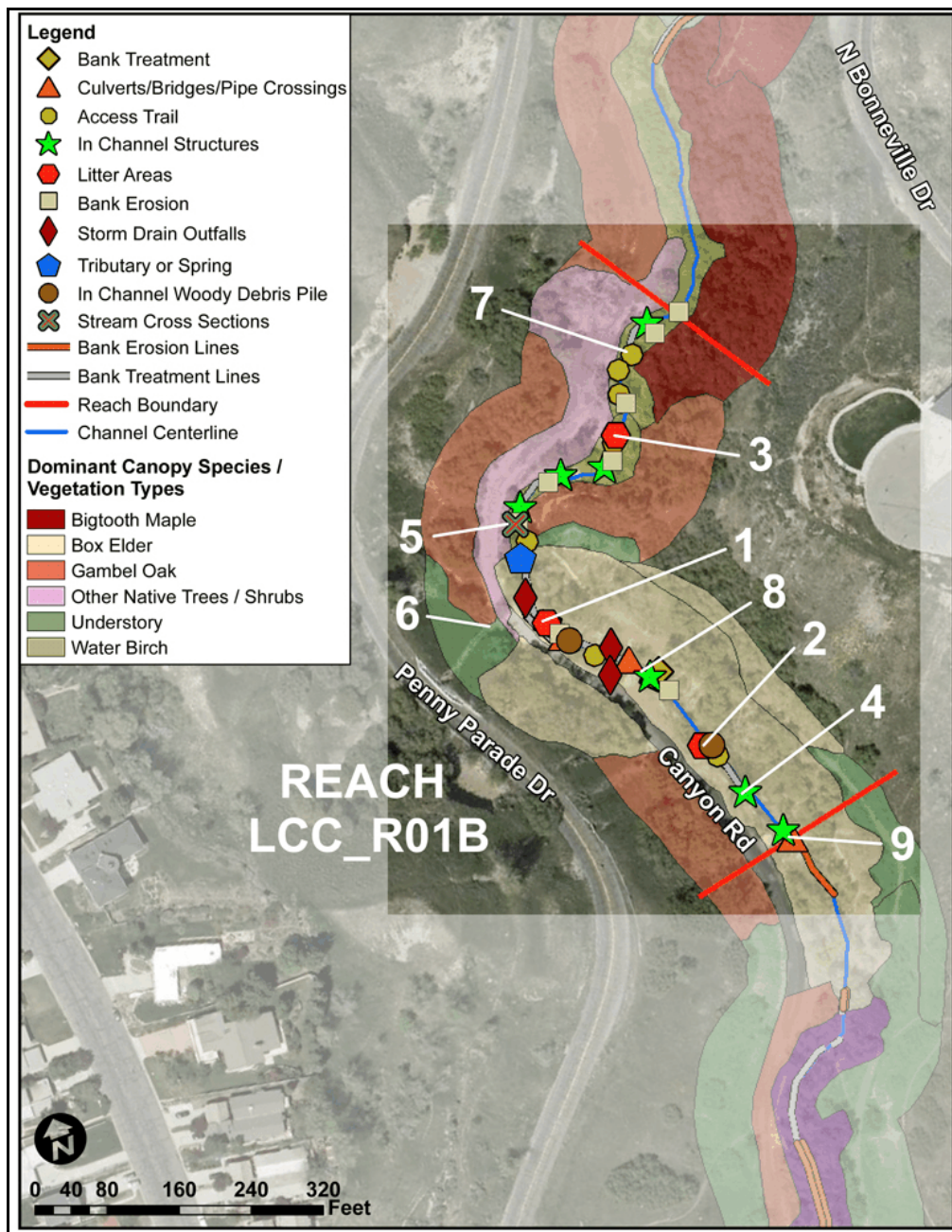
RECOMMENDATIONS	
IMPROVEMENT MEASURE	LOCATION
Invasive plant removal/control	within vegetation type(s)
Revegetation (understory)	within vegetation type(s)
Revegetation (shrub)	within vegetation type(s)
Stream cleanup	points 1 and 2 on map
Mechanized trash removal	points 2, 3, and 4 on map
Storm drain improvement	near point 1 on map
Protect/restore tributary	point 5 on map
Biotechnical slope stabilization	reach-scale
Gabion basket retrofit	points 1, 6, 7 on map
Access control/trail stabilization	reach-scale
Narrow west side trail/lay back slopes	reach-scale





## REACH LCC\_R01B: UPPER FREEDOM TRAIL AREA

A brown footbridge crosses the creek in the middle of this reach, designating the start of the east-side Freedom Trail and off-leash dog area. The channel becomes less confined in this reach. Numerous utility crossings are present and the channel has been heavily controlled with concrete bed hardening structures and gabion and stone block walls. Slope erosion and road runoff have caused a large eroding gully above the westside trail midway through the reach. Understory vegetation cover is generally limited.



### Issues affecting riparian function:

- bank hardening
- compaction from foot traffic (people and dogs)
- eroded access trails
- limited understory and shrub cover
- invasive species (seven species)
- trash
- road runoff/gully erosion

### Constraints/opportunities:

- numerous utility crossings
- high level of recreational use
- width of channel/floodplain confined by road
- excellent interpretive opportunities





REACH CHARACTERISTICS							
LENGTH (feet)	SLOPE (feet/feet)	BED MATERIAL IN RIFFLES	BANK MATERIAL	BANK HARDENING	BAR DEPOSITS	FLAT FLOODPLAIN SURFACES	WOODY DEBRIS IN CHANNEL
836	0.045	boulder, cobble	sand/silt	gabions, rip rap, asphalt chunks, stone block wall	occasionally present	absent	occasionally present

VEGETATION CHARACTERISTICS					
DOMINANT CANOPY SPECIES / VEGETATION TYPE	PERCENT COVER			INVASIVE SPECIES CLASS	WOODY DEBRIS ON BANKS
	Canopy	Shrub	Understory		
box elder	51-100+	6-25	6-50	none to moderate	absent/sparse
Gambel oak	51-100+	6-50	26-50	none to moderate	absent
other native trees/shrubs	26-50	6-25	26-50	moderate	absent
understory	6-25	0-5	51-100+	moderate/high	absent
water birch	51-75	26-50	6-50	none	absent/moderate

EXISTING INFRASTRUCTURE			
WITHIN 50 FEET OF AHWL		WITHIN 50-100 FEET OF AHWL	
West Bank	East Bank	West Bank	East Bank
high	none	low	none

RECOMMENDATIONS	
IMPROVEMENT MEASURE	LOCATION
Invasive plant removal/control	within vegetation type(s)
Revegetation (shrub)	within vegetation type(s)
Revegetation (understory)	within vegetation type(s)
Stream cleanup	points 1 and 2 on map
Mechanized trash removal	points 3 and 4 on map
Runoff management	reach-scale
Stabilize large gully	point 6 on map
Gabion basket retrofit	near points 1, 4, 5, 7 on map
Access control/trail stabilization	reach-scale
Remove asphalt debris from bank	near point 5 on map
Add interpretive displays	reach-scale
Remove/improve streambed structures	near points 3, 7, 8, 9 on map

**Priorities identified by stakeholders:**

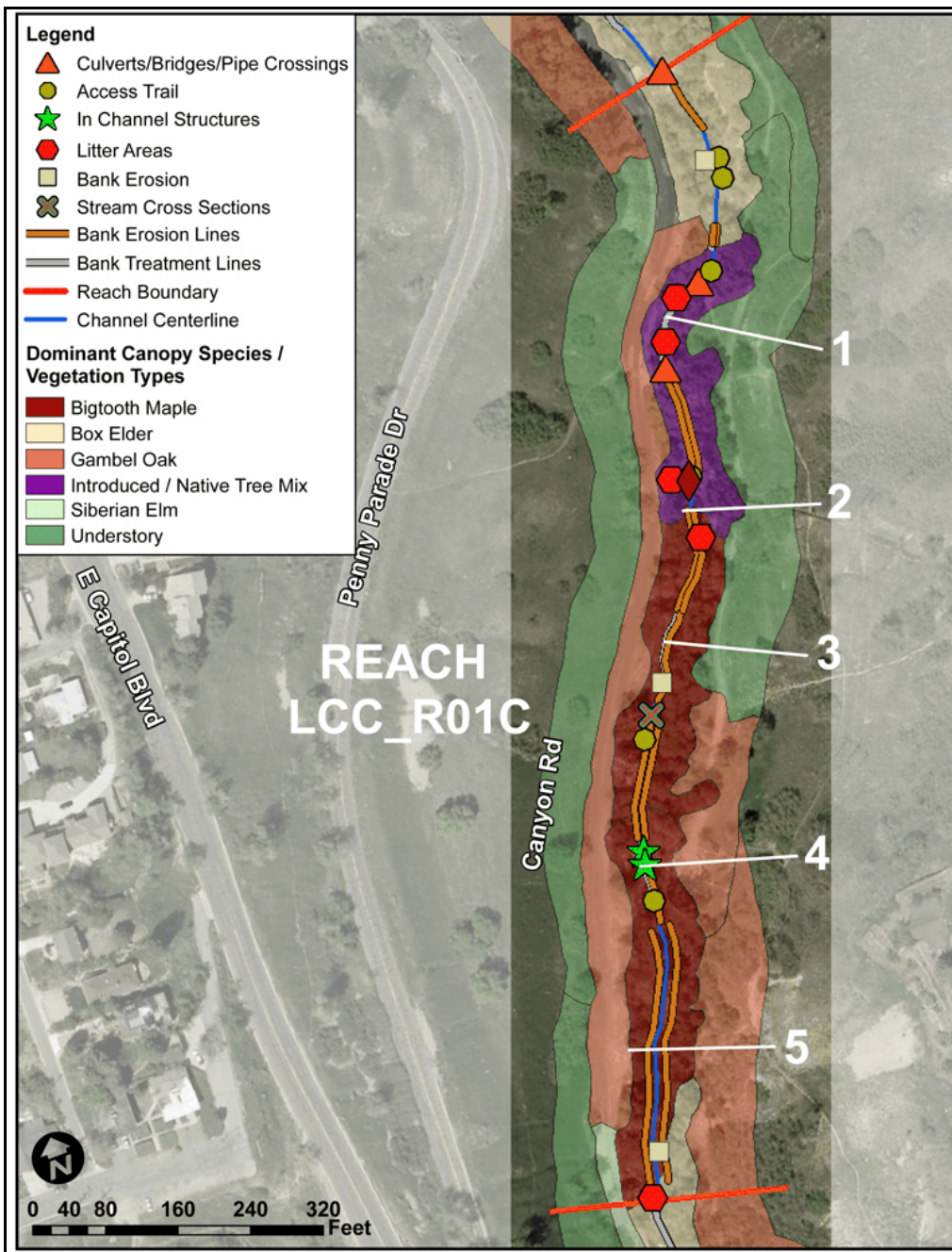
- gabion baskets are ugly; please limit
- maintain existing off-leash dog use





## REACH LCC\_R01C: LOWER FREEDOM TRAIL AREA

This reach starts at a concrete flume/stream gaging structure. Understory vegetation is lacking and most of the reach has weed classification of “high.” A concrete arch culvert that protects a utility crossing in the reach shows evidence of sedimentation. The east side of the stream is part of a designated off-leash dog area and receives heavy recreational use.



- Issues affecting riparian function:**
- gabion bank hardening
  - compaction from foot traffic (people and dogs)
  - eroded access trails
  - limited understory and shrub cover
  - invasive species (11 species)
  - storm drain outfall erosion
  - trash

- Constraints/opportunities:**
- high level of recreational use
  - width of channel/floodplain confined by road
  - multiple utility crossings
  - excellent interpretive opportunities





REACH CHARACTERISTICS							
LENGTH (feet)	SLOPE (feet/feet)	BED MATERIAL IN RIFFLES	BANK MATERIAL	BANK HARDENING	BAR DEPOSITS	FLAT FLOODPLAIN SURFACES	WOODY DEBRIS IN CHANNEL
1303	0.035	boulder, cobble, gravel	cobble, gravel, sand/silt	gabions, concrete	abundant	occasionally present	occasionally present

VEGETATION CHARACTERISTICS					
DOMINANT CANOPY SPECIES / VEGETATION TYPE	PERCENT COVER			INVASIVE SPECIES CLASS	WOODY DEBRIS ON BANKS
	Canopy	Shrub	Understory		
bigtooth maple	76-100+	6-50	0/6-25	high	sparse
box elder	76-100+	6-25	6-25	moderate	sparse
Gambel oak	26-50/76-100+	6-25	51-75	moderate/high	absent
introduced/native tree mix	51-75	6-25	6-25	moderate	sparse
understory	6-25	1-25	26-100+	high/moderate	absent

EXISTING INFRASTRUCTURE			
WITHIN 50 FEET OF AHWL		WITHIN 50-100 FEET OF AHWL	
West Bank	East Bank	West Bank	East Bank
high	none	moderate	none

**Priorities identified by stakeholders:**

- maintain existing off-leash dog use
- eliminate use of utility culvert as pedestrian crossing (safety concern)
- restore streambank vegetation
- reduce the risk of petroleum spills
- branch trimmings/trash stored on road shoulder are unsightly

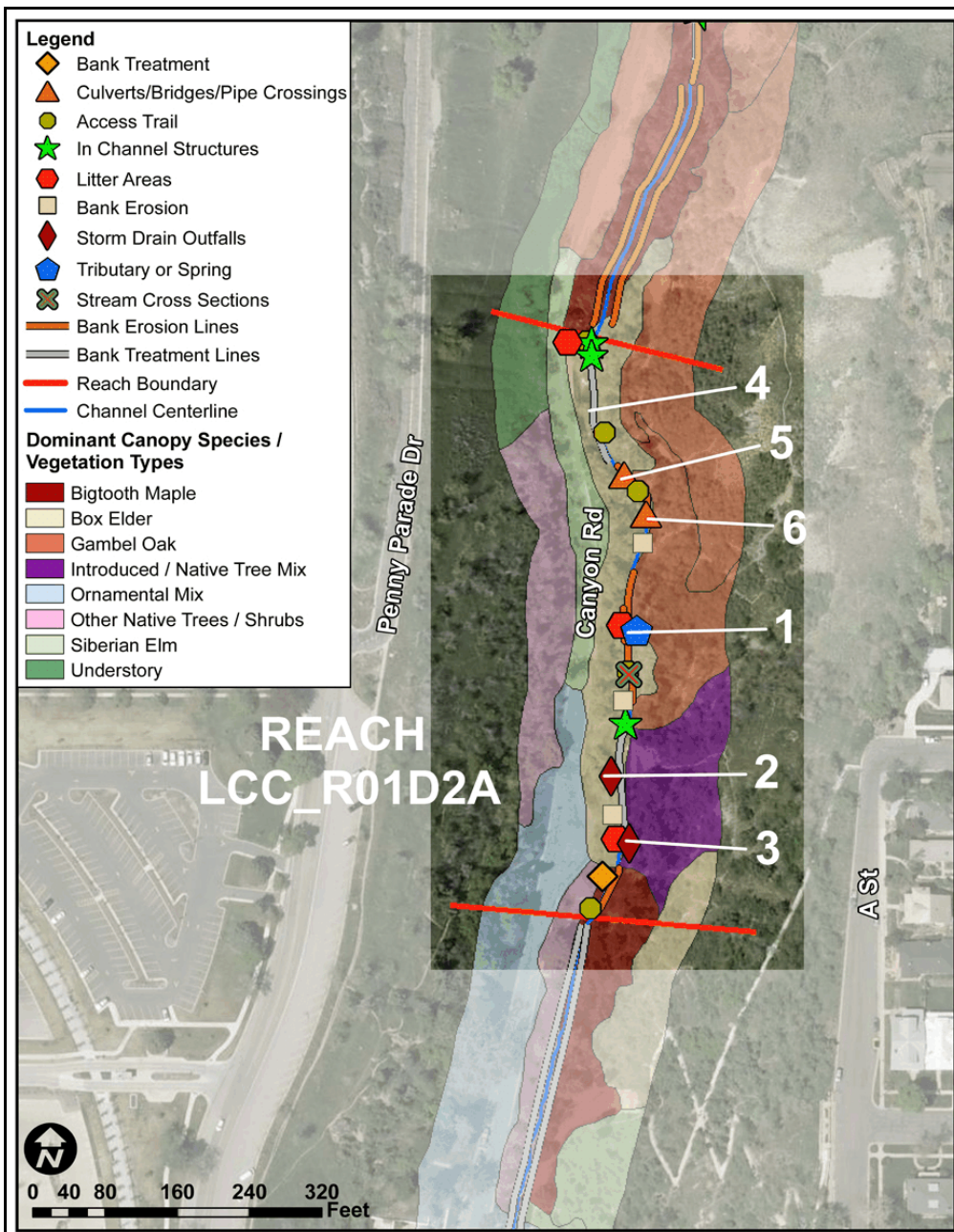
RECOMMENDATIONS	
IMPROVEMENT MEASURE	LOCATION
Invasive plant removal/control	within vegetation type(s)
Revegetation (shrub and understory)	within vegetation type(s)
Stream cleanup	near points 1 and 2 on map
Storm drain improvement and asphalt debris removal	near point 2 on map
Gabion basket retrofit	near points 1, 3, and 4 on map
Access control/trail stabilization	reach-scale
Eliminate storage of branch trimmings/trash	point 5 on map
Add interpretive displays	reach-scale
Replace arch culvert with wider-span structure	point 1 on map





## REACH LCC\_R01D02A: UPPER MEMORY GROVE PARK

This reach starts at a grouted rock drop structure and extends to the start of the artificial rock-wall channel. A concrete footbridge midway through the reach marks the end of the off-leash dog area. Foot compaction affects bank stability and limits understory cover through much of the reach, and high densities of invasive plants are present. A large storm drain outlet on river left has been reported to frequently discharge white/“milky,” foamy water into the creek.



### Issues affecting riparian function:

- gabion bank hardening
- compaction from foot traffic (people and dogs)
- eroded access trails
- limited understory cover
- invasive species (eleven species)
- storm drain outfall erosion and discharge
- trash (minor)

### Constraints/opportunities:

- high level of recreational use
- multiple utility crossings
- excellent interpretive opportunities







REACH CHARACTERISTICS							
LENGTH (feet)	SLOPE (feet/feet)	BED MATERIAL IN RIFFLES	BANK MATERIAL	BANK HARDENING	BAR DEPOSITS	FLAT FLOODPLAIN SURFACES	WOODY DEBRIS IN CHANNEL
681	0.032	cobble, gravel	cobble, gravel, sand	gabions, rip rap, grouted rock	occasionally present	occasionally present	absent

VEGETATION CHARACTERISTICS					
DOMINANT CANOPY SPECIES / VEGETATION TYPE	PERCENT COVER			INVASIVE SPECIES CLASS	WOODY DEBRIS ON BANKS
	Canopy	Shrub	Understory		
box elder	26-50/76-100+	26-75	6-25/51-75	moderate	sparse
Gambel oak	51-100+	6-50	51-75	high	absent
introduced/native tree mix	51-75	6-25	51-75	majority	sparse
other native trees/shrubs	51-75	51-75	51-75	high	absent
Siberian elm	26-50	0	51-75	high	absent
understory	6-25	6-25	76-100+	moderate	absent

EXISTING INFRASTRUCTURE			
WITHIN 50 FEET OF AHWL		WITHIN 50-100 FEET OF AHWL	
West Bank	East Bank	West Bank	East Bank
high	none	moderate	none

**Priorities identified by stakeholders:**

- maintain existing off-leash dog use
- eliminate use of utility culvert as pedestrian crossing (safety concern)
- restore streambank vegetation

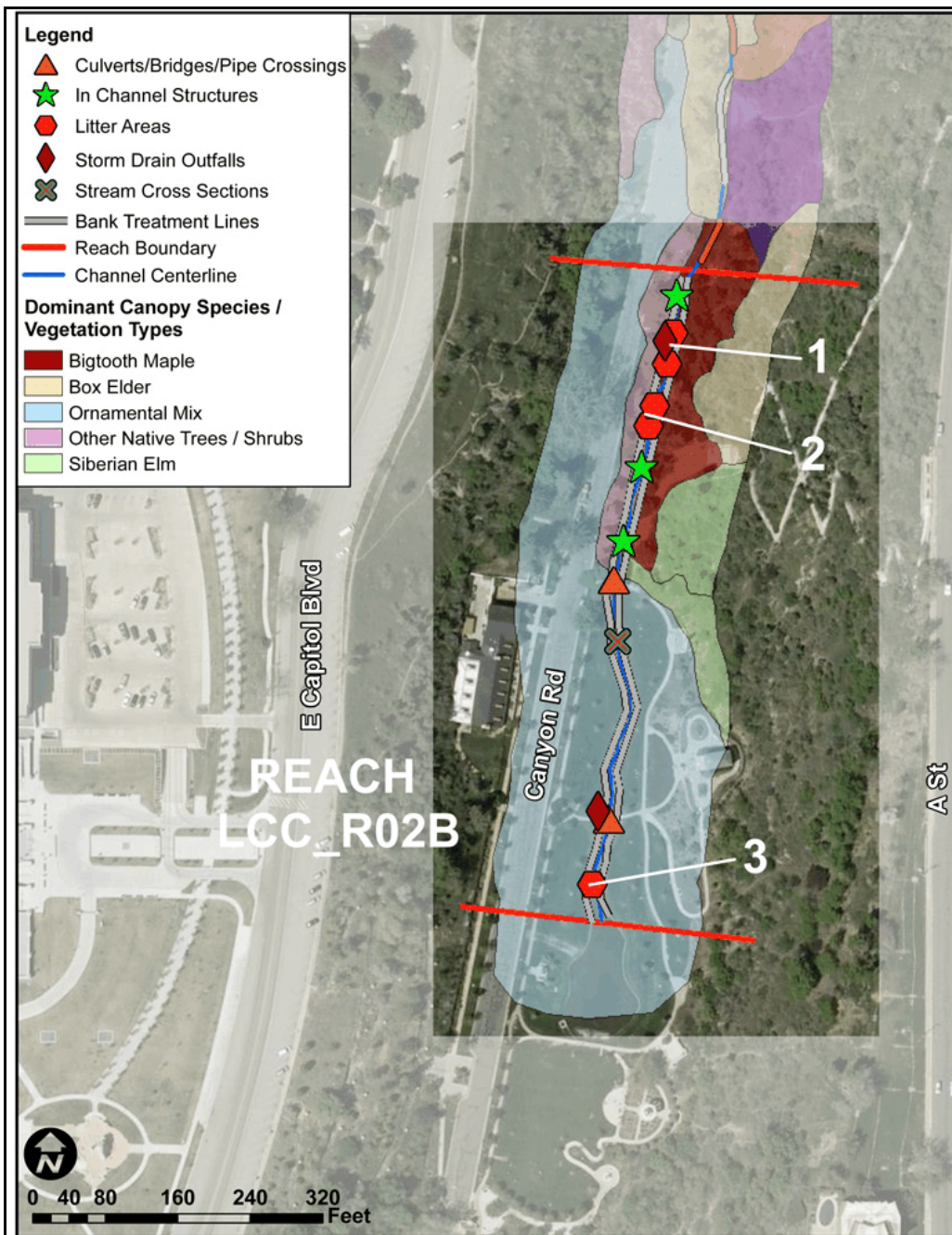
RECOMMENDATIONS	
IMPROVEMENT MEASURE	LOCATION
Invasive plant removal/control	within vegetation type(s)
Revegetation (understory)	within vegetation type(s)
Mechanized trash removal	point 1 on map
Storm drain improvement	point 2 on map
Identify and remedy source of "milky," foamy discharge	point 3 on map
Restore/protect tributary drainage	point 1 on map
Gabion basket retrofit	near points 2 and 4 on map
Access control/trail stabilization	reach-scale
Add interpretive displays	reach-scale
Replace arch culvert with wider-span structure	point 5 on map
Replace concrete footbridge with wider-span structure	point 6 on map





## REACH LCC\_R02B: LOWER MEMORY GROVE PARK

In this reach the stream is confined in a grouted rock channel and enters the N. Temple conduit at the bottom of the reach. Stream-side vegetation in the lower half of the reach is mowed grass, and the channel lacks shade. In portions of the upper half of the reach, riparian vegetation is dominated by introduced grasses and ornamental/invasive tree species. Three grouted drop structures control grade in the upper half of the reach.

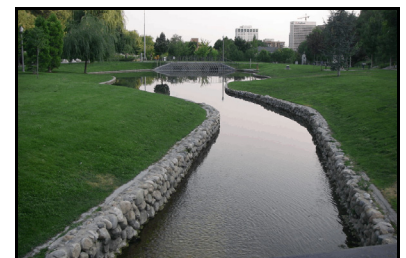


### Issues affecting riparian function:

- grouted channel
- introduced and invasive species (burdock, cheatgrass, Siberian elm, thistle)
- compaction from foot traffic
- eroded access trails
- lack of canopy and shrub cover
- limited native understory cover
- trash

### Constraints/opportunities:

- designed/managed landscape limits potential for natural riparian functions







REACH CHARACTERISTICS							
LENGTH (feet)	SLOPE (feet/feet)	BED MATERIAL IN RIFFLES	BANK MATERIAL	BANK HARDENING	BAR DEPOSITS	FLAT FLOODPLAIN SURFACES	WOODY DEBRIS IN CHANNEL
784	0.034	grouted rock	grouted rock	grouted rock	absent	absent	absent

VEGETATION CHARACTERISTICS					
DOMINANT CANOPY SPECIES / VEGETATION TYPE	PERCENT COVER			INVASIVE SPECIES CLASS	WOODY DEBRIS ON BANKS
	Canopy	Shrub	Understory		
bigtooth maple	51-75	26-50	6-25	moderate	absent
box elder	26-50	26-50	51-75	moderate	sparse
ornamental mix	0-25	0-5	51-100+	low	absent
other native trees/shrubs	26-50	0	76-100+	moderate	absent
Siberian elm	26-50	6-50	51-100+	majority	absent

EXISTING INFRASTRUCTURE			
WITHIN 50 FEET OF AHWL		WITHIN 50-100 FEET OF AHWL	
West Bank	East Bank	West Bank	East Bank
high	moderate	moderate	moderate

**Priorities identified by stakeholders:**

- no reach-specific items identified

RECOMMENDATIONS	
IMPROVEMENT MEASURE	LOCATION
Invasive plant removal/control	within vegetation type(s)
Revegetation (canopy)	within vegetation type(s)
Revegetation (shrub)	within vegetation type(s)
Restoration of native understory plants	within vegetation type(s)
Stream cleanup	near points 1, 2, and 3 on map
Establish "no-mow" buffer at edge of turf	downstream half of reach
Access control/trail stabilization	upstream half of reach



