

Appendix G
Evaluation Summaries for Individual Wetlands

Wetland Evaluation

Wetland #: 40101 **Former #:** 44 (in part) **T_R_S:** T1NR71WS12

Investigator: A. Carpenter, C. Browne

Date of Visit: 5/26/2004 **Obs. Method:** Onsite

General Location: Along Four Mile Canyon Creek; about one mile section beginning upstream at northwest city boundary at Lee Hill Drive and extending to downstream end 200 yds east of Broadway.

Description: This northwest section of Four Mile Canyon Creek is located mostly west of Broadway on the edge of the foothills. It is characterized by an open meadow setting (much of which is owned/managed by City open space). The creek descends over a relatively steep gradient for most of this section. The vegetation is generally sparser than in up and downstream sections and is characterized by a mostly open canopy with an absence of trees in many places and little understory. A groundwater discharge spring was observed draining into the creek from the south. pH in groundwater from the spring was 7.5 while the pH of the nearby creek was 8.5.

Wetland Origin: Natural

Primary Water Source: Creek

Hydroperiod: Seasonally flooded

Max WaterDepth (ft): 2

Major plant communities present

narrow leaf cottonwood - plains cottonwood
coyote willow - peach leaf willow

% of wetland area

80
20

% Vegetated: 15
% Bare ground: 80
% Water: 5

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no Confidence in rating: c = high, b = medium, a = low

Groundwater infiltration, Recharge	3	b	Both groundwater recharge or discharge may occur depending on water levels. Porous alluvium allows but recharge potential limited somewhat by high groundwater & thin unconsolidated layer.
Groundwater Discharge	3	b	Groundwater discharge spring observed draining into the creek from the southwest.
Flood Storage / Floodflow Alteration	3	b	
Shoreline Anchor. / Stabilization	3	b	
Sediment Trapping / Retention	2	b	
Nutrient Retention (long-term)	2	b	No significant sediment accumulation. Minor retention in sparse cottonwoods.
Nutrient Retention (short-term)	2	b	
Food Chain Support (export)	2	b	Some production in cottonwoods and shoreline grasses, but a lower production wetland relative to others in city.
Food Chain Support (within basin)	2	b	
Fish Habitat / Aquatic Diversity	1	b	Natural variation in flows and summer dry periods make fish habitat unlikely. Aquatic insects possible in spring.
Wildlife Habitat	3	b	Open space provides protection of surrounding area.
Active Recreation	1	c	No instream active use
Passive Rec / Heritage Value	3	b	Open space park trails provide access for hiking enjoyment.

Comments: Nice band of cottonwoods along creek, garlic mustard present, precipitation in foothills to the west supports extended seasonal flows in creek, wetland defined as bankfull channel. Functional values for wildlife and passive recreation increased since 1988 probably due to open space park protection and separation of this upper reach from lower more urbanized

Wetland Evaluation

Wetland #: 40102 **Former #:** 44 (in part) **T_R_S:** T1NR70WS18

Investigator: A. Carpenter, C. Browne

Date of Visit: 5/26/2004 **Obs. Method:** Onsite and viewed from property

General Location: Along 4 Mile Canyon Creek from Broadway east to Farmer' s Ditch just east of 26th Street.

Description: Narrow, mostly forested wetland along Four Mile Creek channel through residential areas. As the creek enters the urban setting there is a noted change in vegetation to a partially covered canopy with increased density of vegetation though still less understory than further downstream. Channel manipulations using check dams and rock along streambanks are more prevalent than upstream. The creek dries in places and no groundwater discharge springs were observed. Creek flows are intermittent and highly variable.

Wetland Origin: Natural

Primary Water Source: Creek

Hydroperiod: Intermittently flooded

Max WaterDepth (ft): 3

<u>Major plant communities present</u>	<u>% of wetland area</u>	<u>% Vegetated:</u>	<u>% Bare ground:</u>	<u>% Water:</u>
plains cottonwood/Siberian elm/mixed	40	10	89	
plains cottonwood-green ash-mixed herbaceous	60			1

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no **Confidence in rating:** c = high, b = medium, a = low

Groundwater recharge	3	b	Losing stream conditions observed -- dry east of 19th Street and west of Riverside court. Both recharge or discharge may occur depending on water levels.
Groundwater Discharge	3	b	No seepage directly observed.
Flood Storage / Floodflow Alteration	3	b	Overflow channels present in places but mostly channelized flow within steep banks.
Shoreline Anchor. / Stabilization	3	b	Fewer shrubs and presence of brome result in less stabilization than downstream section.
Sediment Trapping / Retention	2	b	Pockets of sand and minor silt deposits present but likely to be flushed out with large flows.
Nutrient Retention (long-term)	2	b	Some storage in trees but absence of significant sediment trapping.
Nutrient Retention (short-term)	2	b	
Food Chain Support (export)	4	b	High velocity flow events carry leaf litter from tree canopy
Food Chain Support (within basin)	3	b	
Fish Habitat / Aquatic Diversity	1	c	Stream dries up in this section.
Wildlife Habitat	3	b	Deer present. Some open city land south of trailer park.
Active Recreation	1	b	.
Passive Rec / Heritage Value	2	b	Mostly private property so limited access.

Comments: Channel downcutting severely in western end of wetland; garlic mustard (*Alliaria peteolata*), a highly invasive plant, is present; wetland defined as bankfull channel.

Wetland Evaluation

Wetland #: 40103

Former #: 46

T_R_S: T1NR70WS17

Investigator: A. Carpenter, C. Browne

Date of Visit: 5/26/2004

Obs. Method: Onsite and viewed from property

General Location: Fourmile Canyon Creek from Farmers Ditch east to 30th Street

Description: This section of Fourmile Canyon Creek begins just east of Farmers Ditch where a drop in elevation appears to coincide with the edge of an upland steppe-like feature. Farmers Ditch leakage was observed to provide supplemental water to the creek. Localized occurrences of downcutting and channelized flow are more significant compared to further downstream, although *Salix exigua* along streambanks provides excellent shoreline stabilization in places.

Wetland Origin: Natural

Primary Water Source: Urban / industrial runoff

Hydroperiod: Intermittently flooded

Max WaterDepth (ft):

Major plant communities present

% of wetland area

crack willow- plains cottonwoods

100

% Vegetated: 10

% Bare ground: 89

% Water: 1

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no **Confidence in rating:** c = high, b = medium, a = low

Groundwater Recharge	3	b	Both groundwater recharge or discharge may occur depending on water levels.
Groundwater Discharge Minor aquifer.	3	b	USGS Hydrogeologic map indicates groundwater discharge in eastern portion of this stream section. seepage occurs in places near residences but from homeowner irrigation rather than the water table. Overall contribution of water from groundwater compared to precip appears relatively low.
Flood Storage / Floodflow Alteration most	3	b	Limited storage capacity in channel and floodplain but low opportunity given the low to dry creek conditions of the year.
Shoreline Anchor. / Stream Stabilization	4	c	<i>Salix exigua</i> along streambanks provides excellent shoreline stabilization in places. But in localized places is downcutting where banks are dominated by grasses.
Sediment Trapping / Retention packets of	3	b	Sand deposits evident along stream bed but little evidence of fine silt material except where trapped in woody debris.
Nutrient Retention (long-term)	3	b	Some nutrients stored in cottonwoods and shrubs, but dry periods and low to moderate sediments limit opportunity.
Nutrient Retention (short-term)	3	b	
Food Chain Support (export)	4	b	Tree canopy provides source of leaf litter but opportunity limited by only occasional flushing flows.
Food Chain Support (within basin)	4	b	
Fish Habitat / Aquatic Diversity	1	b	Dry sections observed during site visit.
Wildlife Habitat	3	b	
Active Recreation	1	b	
Passive Rec / Heritage Value	3	c	Bikers and pedestrians on bike path and nearby residential areas benefit from passive rec. value.

Comments: Narrow floodplain along Four Mile Creek. Garlic mustard present. Wildlife value decreased since 1980s probably due to increased urbanization.

Wetland Evaluation

Wetland #: 40104 **Former #:** 23 (in part) **T_R_S:** T1NR70WS17

Investigator: A. Carpenter, C. Browne **Date of Visit:** 5/25/2004 **Obs. Method:** Onsite

General Location: Four Mile Creek east of 30th St. and west of bike path

Description: This section encompasses wetland beyond the channel itself, and it is characterized by a broader flatter stream channel with less distinct streambanks or benches.

Wetland Origin: Natural

Primary Water Source: Urban / industrial runoff

Hydroperiod: Intermittently flooded

Max WaterDepth (ft): 0.1

Major plant communities present	% of wetland area	% Vegetated:	98
crack willow/ coyote willow/ reed canary grass	100	% Bare ground:	1
		% Water:	1

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no **Confidence in rating: c = high, b = medium, a = low**

Groundwater stream bed.	2	b	Urban runoff outfalls observed flowing from residential areas and disappearing into unconsolidated stream bed.
Recharge			But not expected to significantly recharge aquifer, and USGS geohydrologic map shows creek as receiving groundwater discharge.
Groundwater Discharge	3	b	
Flood Storage / Floodflow Alteration	3	b	
Shoreline Anchor. / Stabilization	3	b	Flood debris along edges and presence of significant sand deposits indicate periodic high flows.
Sediment Trapping / Retention	3	b	Large quantity of sand deposits present (though little fines).
Nutrient Retention (long-term)	3	a	Some retention in flood deposits and in smaller trees.
Nutrient Retention (short-term)	3	b	
Food Chain Support (export)	3	b	
Food Chain Support (within basin)	3	b	
Fish Habitat / Aquatic Diversity	1	c	Dry section of creek at time of visit
Wildlife Habitat	2	b	Connects to offsite habitat via channel but mostly surrounded by housing developments to north and south.
Active Recreation	1	b	
Passive Rec / Heritage Value	3	c	Bikers and pedestrians on bike path and nearby residential areas benefit from passive rec. value.

Comments: Relatively wide floodplain (100 ft) along creek, south of bike path

Wetland Evaluation

Wetland #: 40105 **Former #:** 23 (in part) **T_R_S:** T1NR70WS17

Investigator: A. Carpenter, C. Browne

Date of Visit: 5/25/2004 **Obs. Method:** Onsite

General Location: West of 47th St. along Four Mile Creek west to bike path, north of soccer fields.

Description: Large wetland area includes a low elevation floodplain along Fourmile Canyon Creek combined with slope wetland supported by groundwater seepage. Several functions have significantly improved since the initial evaluation in 1987 due to the removal of grazing pressures and the recovery of the vegetation. (Includes small 0.1 ac section of Four Mile creek located at just east of the Diagonal Hwy.).

Wetland Origin: Natural

Primary Water Source: Ground water

Hydroperiod: Saturated

Max WaterDepth (ft): 1

Major plant communities present

% of wetland area

% Vegetated: 98
% Bare ground: 0
% Water: 2

crack willow
cattail
Baltic rush
nebraska sedge
American three square

80
10
6
2
2

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no Confidence in rating: c = high, b = medium, a = low

Groundwater Recharge	2	b	Some recharge may occur when water table is low but not expected to be significant volume or duration.
Groundwater seepage Discharge	3	c	Geohydrologic map shows likely area of discharge. Vegetation pattern indicates a slope wetland with expected from south off of upland formation (associated with bedrock outcrop). Outflow appears greater than inflow. Water from soccer field watering and urban runoff at west end could be contributing sources.
Flood Storage / probably Floodflow Alteration	4	c	Downed trees block/slow flow in places. Flood storage function has improved since Cooper evaluation due to revegetation that has occurred since the removal of grazing pressures.
Shoreline Anchor. / Stabilization	3	b	Limited opportunity as high erosional flows appear to be limited.
Sediment Trapping / increases Retention	4	b	Evidence of sediment accumulation present along edges and overflow channels. Low water velocity opportunity for trapping.
Nutrient Retention (long-term)	4	b	Wooded wetland along south edge of creek and sediment deposits provide long-term nutrient retention
Nutrient Retention in (short-term)	4	b	Short term storage in herbaceous and aquatic veg and in short-term fine sediment deposits that flush out periodically.
Food Chain Support (export)	3	b	Occasional high flushing flows possible but infrequent.
Food Chain Support (within basin)	4	c	
Fish Habitat / Aquatic Diversity	2	b	
Wildlife Habitat	3	b	Tracks and deer bed. Song birds.
Active Recreation	1	b	
Passive Rec / provides a lot Heritage Value	4	c	Evidence of many pedestrians and bikers on Four-mile greenway trail, and proximity to soccer fields of access and passive recreational value.

Comments: Floodplain of Four Mile Creek extends south of creek nearly to bike path; outstanding, large, diverse wetland

Wetland Evaluation

Wetland #: 40106

Former #: 29

T_R_S:

Investigator: A. Carpenter, C. Browne

Date of Visit: 6/23/2004

Obs. Method: Onsite

General Location: One block west of 47th Street, immediately north of St. Johns Ave. in Four Mile Creek subdivision

Description: Isolated small pond located in subdivision within Fourmile Canyon Creek watershed. Wetland was in pasture during previous assessment, so functional values have shifted with landuse changes (w/ some improvements)

Wetland Origin: Urban/ industrial

Primary Water Source: Creek

Hydroperiod: temporarily flooded

Max WaterDepth (ft): 2

Major plant communities present

% of wetland area

open water	70
cattail	25
common reed	4
meadow foxtail	1

% Vegetated:
% Bare ground:
% Water:

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no **Confidence in rating: c = high, b = medium, a = low**

Groundwater Recharge	2	b	Although this wetland is in an area where depth to groundwater is greater than 10 ft., suggesting potential recharge, the low permeable underlying clays appear to restrict infiltration and create a perched effect. (Homeowner reported that water is supplied once per year from Farmers Ditch lateral.)
Groundwater Discharge	1	c	
Flood Storage / Floodflow Alteration was not	2	b	High water mark shows some capacity to store rainwater but extent that stormwater is directed to pond determined.
Shoreline Anchor. / Stabilization	2	b	Little erosional force other than wind on pond, but trees and cattails provide some anchoring.
Sediment Trapping / Retention into	2	b	Pond would serve as effective trap, but input is expected to be low (based on lack of obvious storm drains pond).
Nutrient Retention (long-term)	3	b	Trees, shrubs, sediments
Nutrient Retention (short-term)	3	b	Cattails
Food Chain Support (export)	1	b	No outlet observed.
Food Chain Support (within basin)	4	b	Emergent and vegetated shorelines.
Fish Habitat / Aquatic Diversity	2	a	Potentially eutrophic/low oxygen conditions from algae blooms.
Wildlife Habitat may	3	b	Geese, ducks, redwing blackbirds, butterflies present. But, small isolated system and suspect water quality limit.
Active Recreation	1	c	Active use is prohibited by HOA
Passive Rec / Heritage Value	3	c	Prior assessment probably completed prior to development, hence difference in passive rec. ranking.

Comments: Quite a nice wetland in a new subdivision, pond apparently vey shallow; surrounded by cattails, giant reed

Wetland Evaluation

Wetland #: 40201

Former #: 13

T_R_S: T1NR70WS18

Investigator: A. Carpenter, C. Browne

Date of Visit: 6/10/2004

Obs. Method: Viewed from property boundary

General Location: Along Wonderland Creek east of Broadway and west of 15th Street

Description: This is a narrow strip (1-2 ft wide) along Wonderland Creek as it flows through a greenbelt located in the back yards of a residential neighborhood.

Wetland Origin: Natural

Primary Water Source: Urban / industrial runoff

Hydroperiod: Intermittently flooded

Max WaterDepth (ft): 2

Major plant communities present

% of wetland area

% Vegetated: 95

reed canary grass 60

% Bare ground: 0

coyote willow / reed canary grass 40

% Water: 5

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no **Confidence in rating:** c = high, b = medium, a = low

Groundwater Recharge	2	b	
Groundwater Discharge	3	b	Geohydrology map indicates potential for groundwater discharge to creek, but extent that local seepage supports the creek as compared to surface water runoff unknown.
Flood Storage / Floodflow Alteration	2	b	Narrow channel with surface water flows controlled by Wonderland Lake (so opportunity limited).
Shoreline Anchor. / Opportunity Stabilization	2	c	Absence of trees in places, downcutting occurring, some signs of streambank erosion observed. limited by influence of Wonderland Lake.
Sediment Trapping / Small Retention	2	b	Streambanks slope steeply to creek but all vegetated so relatively low opportunity for input from runoff. pockets of sediments intermixed with organic matter observed in places, and few if any flushing flows expected due to Wonderland Lake.
Nutrient Retention (long-term)	2	b	Some coyote willow and pockets of sediments provide some retention.
Nutrient Retention (short-term)	2	b	
Food Chain Support (export)	2	b	Generally low productivity although coyote willow and cottonwoods provide some leaf litter.
Food Chain Support (within basin)	2	b	Low productivity system with only narrow band of vegetation and mowed to edges in places.
Fish Habitat / Aquatic Diversity	1	c	Too small and manipulated by lake outfall, expected to dry periodically.
Wildlife Habitat	2	b	Possibly small mammals, but absence of cover or diverse vegetation limit opportunity.
Active Recreation	1	b	
Passive Rec / Heritage Value	2	b	access limited to immediate homeowners

Comments: Mowed bluegrass lawn to within 5 feet of channel edge. Would benefit from improved management practices, such as reduced mowing and planting of native (and reduced pesticide and herbicides applications if used).

Wetland Evaluation

Wetland #: 40202

Former #: 13

T_R_S: T1NR70WS18

Investigator: A. Carpenter, C. Browne, J.

Date of Visit: 6/9/2004

Obs. Method: Onsite and viewed from property

General Location: Along Wonderland Creek east of 15th Street and west of 19th Street

Description: This wetland encompasses a combination of slope wetlands and a broader floodplain along Wonderland Creek. The wetland extends through the back yards of a fairly low density residential area that provides wider buffers than commonly found on private property in an urban area. As a result of the overall size, landscape and plant diversity, and hydrologic regime, the wildlife and flood storage values are greater in this section than in the adjacent segments of the creek.

Wetland Origin: Natural

Primary Water Source: Ground water

Hydroperiod: Saturated

Max WaterDepth (ft): 1

Major plant communities present

% of wetland area

% Vegetated: 95

reed canary grass

89

% Bare ground: 0

Baltic rush

10

% Water: 5

open water

1

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no **Confidence in rating:** c = high, b = medium, a = low

Groundwater Recharge	2	b	
Groundwater Discharge	4	b	Seeps present in slope wetland portion. Resident reports area is always wet (had been dug out for a duck poind in past.) Geohydrologic maps confirm potential for discharge. (Extent to which volume of water from groundwater is greater than surface water inflows is uncertain.)
Flood Storage / Floodflow Alteration	2	b	Local depressions help to store stormwater runoff.
Shoreline Anchor. / Stabilization	2	b	Downcutting evident and some sloughing, but other areas stabilized by shrubs. Limited opportunity due to upstream water control structures at Wonderland Lake.
Sediment Trapping / Retention	2	b	Minor sediment accumulation in pockets but opportunity limited by low inputs and vegetated slopes.
Nutrient Retention (long-term)	2	b	No significant sedimentation or woody species present.
Nutrient Retention (short-term)	2	b	Grasses predominate along much of bank.
Food Chain Support (export)	2	b	Not a lot of overhanging vegetation and low flows in narrow channel provide only moderate opportunity for export.
Food Chain Support (within basin)	2	b	Mowing of portions of residential area has reduced productivity.
Fish Habitat / Aquatic Diversity	1	c	At outflow creek flows through grate into pipe beneath 19th then enters buried pipe beneath Waldorf school.
Wildlife Habitat	3	b	Deer present in slope wetland. S. Dougherty reported presence of racoon, small mammals and waterfowl in '94.
Active Recreation	1	b	
Passive Rec / Heritage Value	3	b	Local residents enjoy view and passive recreational value.

Comments: Unusual complex of slope and riparian wetlands within City, with sufficient buffer to maintain functional qualities. Increased paving with subdivisions can be expected to increase runoff, erosion of shoreline, and downcutting, as well as increasing sediment and nutrient loads, and reduce habitat quality by fragmentation. Part of wetland along creek channel is subject to

Wetland Evaluation

Wetland #: 40203

Former #: 10

T_R_S: T1NR70WS18

Investigator: A. Carpenter, C. Browne

Date of Visit: 6/17/2004

Obs. Method: Onsite

General Location: Immediately west of Crestview Elementary School north of Sumac Street on school grounds. West of playground at base of slope

Description: Constructed pond and palustrine wetland supported primarily by groundwater.

Wetland Origin: Urban/ industrial

Primary Water Source: Ground water

Hydroperiod: Saturated

Max WaterDepth (ft): 1

Major plant communities present

% of wetland area

% Vegetated: 95

% Bare ground: 0

% Water: 5

cattail

65

American three square

10

reed canary grass

10

coyote willow / reed canarygrass

10

open water

5

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no **Confidence in rating:** c = high, b = medium, a = low

Groundwater features	2	b	Although regional groundwater information indicates this is a potential groundwater recharge area, local features
Recharge			and the results of construction grading suggest otherwise.
Groundwater to Discharge	4	c	Seep along western edge and site observations indicate groundwater discharge. Grading activities appear to have increased area intersecting water table and have enhanced natural slope wetland feature.
Flood Storage / Floodflow Alteration	2	b	Minor storage of local stormwater runoff may occur.
Shoreline Anchor. / Stabilization	2	b	Minor slope stabilization may occur along vegetated slopes on west and north edges.
Sediment Trapping / Retention	2	b	Minor trapping of sediments in surficial runoff may occur, but source appears limited.
Nutrient Retention (long-term)	2	b	Some retention in woody species and sediments, but limited input.
Nutrient Retention (short-term)	2	b	In cattails and herbaceous/grasses.
Food Chain Support (export)	2	b	Low flows limit export opportunity.
Food Chain Support (within basin)	4	c	
Fish Habitat / Aquatic Diversity	2	b	Though no fish observed may be present if stocked, also habitat appears good for aquatic insects.
Wildlife Habitat	2	b	Fairly small and isolated system in busy school area and not well connected to offsite habitat
Active Recreation	2	b	School children may use for educational studies.
Passive Rec / Heritage Value	4	b	Although this is a fairly small wetland, its location next to the school enhances its accessibility and passive recreational uses.

Comments: Excellent example of constructed wetland; no fish observed

Wetland Evaluation

Wetland #: 40204

Former #: 14

T_R_S: T1NR70WS18

Investigator: A. Carpenter, C. Browne

Date of Visit: 6/9/2004

Obs. Method: Onsite

General Location: Small pond; East of Centennial Middle School in commons area of residential subdivision

Description: Small pond surrounded by manicured landscape and mowed bluegrass with limited functional value. Located in Wonderland Creek drainage basin.

Wetland Origin: Urban/ industrial

Primary Water Source: Ditch

Hydroperiod: Semi-permanently flooded

Max WaterDepth (ft): 2

Major plant communities present

% of wetland area

% Vegetated: 35

cattail 33

% Bare ground: 0

American three square 2

% Water: 65

open water 65

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no **Confidence in rating: c = high, b = medium, a = low**

Groundwater Recharge 2 b

Groundwater Discharge 2 b No obvious inlet or outlet. Geohydrologic map suggests may intersect water table, but water level probably artificially maintained.

Flood Storage / Floodflow Alteration 2 b

Shoreline Anchor. / Stabilization 1 b Little vegetation and little opportunity from erosional forces

Sediment Trapping / Retention 1 b No source of significant sediments observed.

Nutrient Retention (long-term) 2 b Some long-term retention in typha with input from landscaping (no flushing flows).

Nutrient Retention (short-term) 2 b Some algae observed.

Food Chain Support (export) 1 b

Food Chain Support (within basin) 2 c Relatively low production but appears that all production stays in basin.

Fish Habitat / Aquatic Diversity 1 b Aerated system, no fish observed.

Wildlife Habitat 1 c

Active Recreation 1 b

Passive Rec / Heritage Value 2 b

Comments: Area mowed, irrigated bluegrass; pond has aerator; pipes leading out of pond suggest it may be used as an irrigation water

Wetland Evaluation

Wetland #: 40205

Former #: 45

T_R_S: T1NR70WS18

Investigator: A. Carpenter, C. Browne

Date of Visit: 6/9/2004

Obs. Method: Onsite

General Location: Wonderland Creek drainage, west of 26th street and east of Centennial Middle School.

Description: This wetland represents a re-emergence of Wonderland Creek after it was diverted into pipes and ditches upstream (and no longer supported wetland functions) A combination of urban runoff, landscape irrigation water, and groundwater drain into a channel just south of a residential development to support the wetland and re-establish creek flow. Cattails in drainage swale transition into wooded palustrine area that provides moderate nutrient retention, production and habitat -- although limited to a relatively small area.

Wetland Origin: Natural

Primary Water Source: Urban / industrial runoff

Hydroperiod: Saturated

Max WaterDepth (ft): 1

<u>Major plant communities present</u>	<u>% of wetland area</u>	<u>% Vegetated:</u>	<u>% Bare ground:</u>	<u>% Water:</u>
cattail	25	97	2	
crack willow / coyote willow / mixed graminoid	70			
reed canarygrass	5			

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no **Confidence in rating: c = high, b = medium, a = low**

Groundwater Appears Recharge	2	b	Geohydrologic map shows potential for groundwater recharge or discharge depending on water levels. semi-permanently saturated so opportunity may be limited.
Groundwater flowpaths Discharge	3	b	Seeps suggest groundwater discharge at time of visit but nto moderate size area and could be short from infiltration of landscape water or ditch leakage.
Flood Storage / Floodflow Alteration	3	b	Broad flat area just west of 26th appears to provide storage for road runoff.
Shoreline Anchor. / Stabilization	2	b	Drop in elevation but little downcutting or erosion evident. Lots of woody root mass, but little opportunity for erosion.
Sediment Trapping / Retention	2	b	
Nutrient Retention (long-term)	2	b	Lots of wood production and some organic accumulation in soils but in relativly small area.
Nutrient Retention (short-term)	2	b	Inflow of nutrients from landscaping and urban runoff, and retention in typha and sediments.
Food Chain Support (export)	2	b	
Food Chain Support (within basin)	3	b	
Fish Habitat / Aquatic Diversity	2	a	No fish but significant number of insects in limited standing water
Wildlife Habitat	2	b	
Active Recreation	1	c	
Passive Rec / Heritage Value	2	b	

Comments: May be in former channel of Wonderland Creek

Wetland Evaluation

Wetland #: 40206

Former #: 13

T_R_S: T1NR70WS17 &

Investigator: A. Carpenter, C. Browne

Date of Visit: 6/9/2004

Obs. Method: Onsite

General Location: West of 28th Street and east of 26th street along Wonderland Creek Greenway Trail

Description: Concrete-sided channel section with vegetation in channel (possible presence and extent of concrete bottom in places unknown).

Wetland Origin: Urban/ industrial

Primary Water Source: Urban / industrial runoff

Hydroperiod: Intermittently flooded

Max WaterDepth (ft): 0.2

Major plant communities present

% of wetland area

% Vegetated: 95

cattail 75

% Bare ground: 0

crack willow / cattail 20

% Water: 5

open water 5

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no **Confidence in rating: c = high, b = medium, a = low**

Groundwater 1 b Concrete sided channel restricts communication with aquifer. (Uncertain if concrete bottom extends along whole Recharge section)

Groundwater Discharge 1 b Concrete sided channel restricts communication with aquifer.

Flood Storage / Floodflow Alteration 2 b

Shoreline Anchor. / Stabilization 1 c No shoreline exposed (concrete sided)

Sediment Trapping / Retention 2 b Limited source from lightly vegetated slope. Periodically dredged to remove sediments.

Nutrient Retention (long-term) 2 b Sediment trapping occurs but are removed by dredging.

Nutrient Retention (short-term) 3 b Dense cattails fill channel.

Food Chain Support (export) 2 b No overhanging veg.

Food Chain Support (within basin) 2 b

Fish Habitat / Aquatic Diversity 1 c

Wildlife Habitat 2 b Possibly small mammals. Also red-winged blackbirds.

Active Recreation 1 c

Passive Rec / Heritage Value 2 b

Comments:

Wetland Evaluation

Wetland #: 40207

Former #: 14

T_R_S: T1NR70WS20

Investigator: A. Carpenter, C. Browne

Date of Visit: 6/15/2004

Obs. Method: Onsite

General Location: Wonderland Creek east of 28th Street and north of Kalmia Ave. Bike path runs parallel to eastern side of wetland

Description: Short section (approx. 500 ft) of Wonderland Creek which emerges from submerged section (that flows behind apartment buildings and beneath 28th). Receives stormwater drainage from 28th. Concrete and rock rip line streambanks in places to provide erosion control. Functions primarily to trap sediments and nutrients and provides passive recreational value.

Wetland Origin: Natural

Primary Water Source: Urban / industrial runoff

Hydroperiod: Intermittently flooded

Max WaterDepth (ft): 0.5

Major plant communities present

% of wetland area

plains cottonwood - Russian olive-crack willow / 99
open water 1

% Vegetated: 93

% Bare ground: 6

% Water: 1

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no **Confidence in rating: c = high, b = medium, a = low**

Groundwater Recharge	2	b	Geohydrologic map shows potential for groundwater recharge or discharge depending on water levels.
Groundwater Discharge	2	b	Geohydrologic map shows potential for groundwater recharge or discharge depending on water levels.
Flood Storage / rock Floodflow Alteration	2	b	Receives stormwater runoff from 28th Street and dense urban area. Sideslopes constructed of concrete and for erosion control; lowers infiltration and therefore flood storage.
Shoreline Anchor. / Stabilization	3	b	Cottonwoods, russian olive, and shrubs contribute to shoreline stabilization along banks not covered with concrete and rock.
Sediment Trapping / Retention	4	b	Evidence of deposits in pockets along channel and in small pool where sediments accumulate. Dense vegetation at southeast end also traps sediments.
Nutrient Retention input. (long-term)	3	b	Sediments and woody vegetation along banks provide retention. Runoff from urban irrigation provides
Nutrient Retention (short-term)	2	b	Some retention in short-resident sediments that are flushed out in high flows, and in herbaceous veg.
Food Chain Support (export)	3	b	Overhanging branches provide leaf litter and moderate flows provide export.
Food Chain Support (within basin)	2	b	Moderate productivity in small area but riprap edges limit extent of wetland vegetation.
Fish Habitat / Aquatic Diversity	1	c	Too shallow and irregular flows. Upstream sections piped and channelized. Water quality suspect.
Wildlife Habitat	2	b	Evidence of deer trail and bedding, but connection to offsite habitat limited to N.
Active Recreation	1	b	
Passive Rec / Heritage Value	3	b	Proximity to bike path offers access and passive rec. value.

Comments: Wetland defined as bankfull channel; channel armored and heavily manipulated.

Wetland Evaluation

Wetland #: 40208 **Former #:** 30 (in part) **T_R_S:** T1NR70WS20

Investigator: A. Carpenter, C. Browne

Date of Visit: 6/15/2004

Obs. Method: Onsite

General Location: South of Kalmia St. and north of Diagonal Highway

Description: This wetland is a channelized creek through a dense urban area, receiving most of its water from urban runoff. The creek corridor generally parallels a landform divide between an upland flat-topped terrace to the north and a transitional unit that slopes toward lowlands to the south.

Wetland Origin: Natural

Primary Water Source: Urban / industrial runoff

Hydroperiod: Seasonally flooded

Max WaterDepth (ft): 0.3

Major plant communities present
green ash/Siberian elm/mixed graminoid

% of wetland area
100

% Vegetated: 96
% Bare ground: 2
% Water: 2

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no **Confidence in rating: c = high, b = medium, a = low**

Groundwater levels.	3	b	Geohydrologic map indicates potential for groundwater recharge or discharge depending on the water levels.
Recharge ground			Recharge appears likely based on depth to water table map which shows groundwater 5-10 ft below surface on average.
Groundwater Discharge	2	a	Some minor local seepage possible during peak groundwater levels but relative contribution probably low.
Flood Storage / on Floodflow Alteration	3	b	Channel provides path for significant flood waters as evidenced by high water marks and debris deposits sideslopes. Abundant woody vegetation slows water, but general lack of microtopography limits retention.
Shoreline Anchor. / Stabilization	3	b	Evidence of downcutting and streambank erosion occurring in areas, but generally lots of woody debris.
Sediment Trapping / partially Retention dominagted by	3	b	Pipe beneath the Diagonal highway is relatively small diameter and significantly fille in so outflow is restricted. Nonetheless, most waters flow quickly through this wetland except for in minor areas emergent vegetation.
Nutrient Retention (long-term)	3	b	Low to moderate sediment deposits provide some retention.
Nutrient Retention temporary (short-term)	3	b	Mostly swift water over coarse sandy bottom. Some short-term retention in herbaceous veg. and sediments.
Food Chain Support (export)	3	b	Moderately high production but semi-restricted outflows limit opportunity.
Food Chain Support (within basin)	3	b	Moderately dense vegetation with tree and shrub layers, some cattails and herbaceous plants.
Fish Habitat / Aquatic Diversity	2	b	Aquatic insects observed.
Wildlife Habitat	2	b	Deer beds and raccoon prints, red wing blackbird habitat in dense urban setting fragmented by roads.
Active Recreation	1	c	
Passive Rec / Heritage Value	2	b	Residential area enjoys and bike trail provides access.

Comments: Channel widens downstream of bridge; bankfull channel defines wetland boundaries

Wetland Evaluation

Wetland #: 40209 **Former #:** 30 (in part) **T_R_S:** T1NR70WS20

Investigator: A. Carpenter, C. Browne

Date of Visit: 6/15/2004 **Obs. Method:** Onsite

General Location: Wonderland Creek channel south of Diagonal Highway and north of Iris Ave., commercial area

Description: At the upstream end, water flowing from beneath the Diagonal exits a pipe and travels for short distances in ditch along 30th Street before disappearing into a pipe. No evidence of pipe discharge into channel was observed and instead it may be either piped into a subsurface drain e.g., beneath nearby buildings or is infiltrating into the ground; wetland dries out toward southern end.

Wetland Origin: Natural

Primary Water Source: Urban / industrial runoff

Hydroperiod: Intermittently flooded

Max WaterDepth (ft): 0

Major plant communities present

	<u>% of wetland area</u>	<u>% Vegetated:</u>
reed canarygrass	65	100
coyote willow / reed canarygrass	35	0
		% Bare ground: 0
		% Water: 0

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no **Confidence in rating: c = high, b = medium, a = low**

Groundwater Recharge outfall is	2	b	Depth to water table map indicates the aquifer is about 5-10 ft below ground surface. So, potential for groundwater recharge exists. However, stormwater piping appears to intercept and redirect flows (unless hidden in vegetation), so channel may not receive water and therefore cannot recharge.
Groundwater Discharge places	2	a	Channel is incised about 20 ft from surrounding area, so opportunity to intercept groundwater may exist in when water table very high, but no evidence of discharge observed.
Flood Storage / Floodflow Alteration reduce	2	b	This is a fairly good size wide channel, N of Iris, but mowed grasses to edge and sparse tree and shrubs effectiveness. Also, currently it appears that inflows are limited by upstream stormwater management.
Shoreline Anchor. / Stabilization	2	b	
Sediment Trapping / Retention sources.	2	b	Broad channel has potential to trap sediments and nearby roads and unvegetated banks could provide But absence of water inflows limits opportunity for inputs.
Nutrient Retention (long-term)	2	b	Little input limits opportunity, and sparse vegetation reduces effectiveness.
Nutrient Retention (short-term)	2	b	
Food Chain Support (export)	2	b	Low productivity and low opportunity.
Food Chain Support (within basin)	2	b	
Fish Habitat / Aquatic Diversity	1	c	
Wildlife Habitat	2	b	
Active Recreation	1	c	
Passive Rec / Heritage Value	2	b	May provide visual benefit to workers in nearby office building and to closest residences.

Comments: Mostly dry and low productivity and functional values most likely due to interception or redirection of water away from channel.

Wetland Evaluation

Wetland #: 40210 **Former #:** 30 (in part) **T_R_S:** T1NR70WS20

Investigator: A. Carpenter, C. Browne

Date of Visit: 6/15/2004 **Obs. Method:** Onsite

General Location: South of Iris Ave. and west of railroad tracks on west side of Foothills Parkway, and wet of Boulder Whiterock Ditch.

Description: Manipulated channel located in residential area along what appears to be former flowpath of Wonderland Creek. This wetland carries urban stormwater and irrigation runoff. The channel flows through a wooded straight and narrow section along Iris, south of which it begins to broaden into cattail marshes, before discharging into Boulder Whiterock ditch at the RR tracks west of Foothills Pkwy.

Wetland Origin: Natural

Primary Water Source: Urban / industrial runoff

Hydroperiod: Intermittently flooded

Max WaterDepth (ft):

Major plant communities present

% of wetland area

% Vegetated: 99

% Bare ground: 0

% Water: 1

cattail	40
giant reed	25
coyote willow / mixed herbaceous	10
urban forest	5

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no Confidence in rating: c = high, b = medium, a = low

Groundwater recharge	2	b	Depth to groundwater map depicts groundwater at 5 to 10 ft below ground surface so potential for Recharge exists.
Groundwater Discharge	1	b	
Flood Storage / Floodflow Alteration	4	b	Broad flat channel with typha provides significant capacity and ability to slow flows.
Shoreline Anchor. / Stabilization	2	b	Little evidence of erosion on banks, low opportunity given generally low flows and flat grade.
Sediment Trapping / Retention	3	b	Source of sediments in urban runoff and abundant vegetation (cattails) effectively trap sediments.
Nutrient Retention (long-term)	3	b	Cottonwoods along banks and cattails provide retention. Urban runoff (particularly landscape irrigation) provides input.
Nutrient Retention (short-term)	3	b	
Food Chain Support (export)	3	b	Infrequent flushing flows limit opportunity.
Food Chain Support (within basin)	3	b	
Fish Habitat / Aquatic Diversity	2	c	No fish but shallow pools of duckweed in between cattails contain aquatic insects.
Wildlife Habitat	3	b	
Active Recreation	1	c	
Passive Rec / Heritage Value	3	b	Passive recreational use by residences along trails

Comments: Appears to be a new wetland (previously unmapped); reed canary grass and cattail in central portion of wetland plus shallow - water cattail marsh on eastern end.

Wetland Evaluation

Wetland #: 40211 **Former #:** 42 (in part) **T_R_S:** T1NR70WS21

Investigator: A. Carpenter, C. Browne

Date of Visit: 6/15/2004 **Obs. Method:** Onsite

General Location: Wonderland Creek east of 47th street to just east of Kings Ridge road. along Wonderland Creek Greenway Trail

Description: This wetland consists of a channel and pond, probably constructed when the Kings Ridge subdivision was built in late 1980's, and has relatively high functional values. In this section of Wonderland Creek, the channel has been directed southward across a transitional landform unit (between upland and bottomland features) where the depth to water is mapped at greater than 10 ft below ground surface. Hence, this system is located in a groundwater recharge area, and because it is supported primarily by surface water it would be expected to dry out in the absence of precipitation (or supplemental ditch water).

Wetland Origin: Natural

Primary Water Source: Urban / industrial runoff

Hydroperiod: Intermittently flooded

Max WaterDepth (ft): 1.5

Major plant communities present

% of wetland area

% Vegetated: 85
% Bare ground: 0
% Water: 15

cattail	35
coyote willow	20
plains cottonwood-peach leaf willow/ coyote	15
crack willow / mixed herbaceous	15
open water	15

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no **Confidence in rating:** c = high, b = medium, a = low

Groundwater supported Recharge	4	b	Water table map indicates that the depth to water is greater than 10 ft. This is likely a surface water system in a groundwater recharge area. At the time of the site visit, water was observed disappearing into the streambed east of pond, and much of channel was dry.
Groundwater Discharge	1	c	Depth to the water table is greater than 10 ft below ground surface and the creek channel.
Flood Storage / Floodflow Alteration	4	b	This wetland encompasses a large cattail stand (about .25-mile long) and pond with the capacity to store significant flood waters. However source of water is unclear so the opportunity to receive stormwater waters is uncertain.
Shoreline Anchor. / Stabilization	2	b	Opportunity may be limited by flat grade and infrequency of high velocity flows.
Sediment Trapping / Retention	3	b	Opportunity may be limited depending on source of water.
Nutrient Retention present (long-term)	4	b	Trees, shrubs, and sediment deposits in pond all provide good long-term retention. Source of nutrients from urban runoff.
Nutrient Retention could be (short-term)	4	b	Abundant cattails provide good short-term retention. (Difference between current and previous ranking due to different wetland boundaries used, as it appears MDG focused on pond. itself)
Food Chain Support Ridge (export)	2	b	Export opportunities limited by infrequent high volume flow. The wetland disappears in the east of King Ridge and doesn't reappear until just north of Valmont in an area supported by ditch leakage.
Food Chain Support (within basin)	4	b	
Fish Habitat / Aquatic Diversity	3	c	Fish present in pond. Uncertain as to water variability and extent to which low water levels water quality production and diversity at times.
Wildlife Habitat	3	b	Snake, blackbirds, deer.
Active pond Recreation	2	a	No direct evidence of use (such as a dock or fishing area were observed. But uncertain extent to which may be used by local residents e.g., for fishing.
Passive Rec / Heritage Value	4	c	Large size wetland with good access along Greenway trail and close proximity to residents and parks.

Comments: After Wonderland Creek discharges to the Boulder Whiterock Ditch on the west side of Foothills Parkway, some portion of the

water appears to split off under the parkway and emerges through a large concrete vault into the upper end of this wetland via a constructed creek channel that flows into the subdivision pond and then eastward to north of Valmont Street.

Wetland Evaluation

Wetland #: 40212 **Former #:** 42 (in part) **T_R_S:** T1NR70WS28

Investigator: A. Carpenter, C. Browne

Date of Visit: 6/17/2004 **Obs. Method:** Onsite

General Location: Wonderland Creek south of Valmont Street in Valmont City Park and north of Pearl Street

Description: This wetland begins just north of Valmont Road at the base of a hill where the land descends more than 10 ft. The channel flows southeastward across the bottomlands associated with Boulder Creek terminating at the intersection with Goose Creek (north channel). The source of the water in the channel appears to be a combination of leakage from Boulder and Left Hand Ditch and urban runoff.

Wetland Origin: Urban/ industrial

Primary Water Source: Ditch

Hydroperiod: Intermittently flooded

Max WaterDepth (ft): 2

Major plant communities present

% of wetland area

% Vegetated: 90

peach leaf willow/mixed herbaceous

100

% Bare ground: 5

% Water: 5

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no **Confidence in rating:** c = high, b = medium, a = low

Groundwater	3	b	Depth to groundwater is mapped at 5 to 10 ft below ground surface, so potential for recharge exists.
Though no			
Recharge			observation of losing conditions until lower end of channel (which could also be due to low flows and ET loss).
Groundwater	1	b	Ground water is not mapped as being within 5 ft of water table until down near intersection with Goose Creek.
Discharge			
Flood Storage / Floodflow Alteration	2	b	Limited opportunity in absence of significant inflows, but as natural recharge area it could have potential to increase effectiveness if additional stormwaters were directed here.
Shoreline Anchor. / Stabilization	2	b	Limited opportunity.
Sediment Trapping / limited Retention	3	b	Wetland terminates in broad flat area capable of effectively trapping sediments. Opportunity is somewhat by low sediment sources.
Nutrient Retention improved. (long-term)	2	b	Long-term nutrient retention could improve as trees mature, but current vegetation patterns could be
Nutrient Retention (short-term)	2	b	Cattails provide some short-term storage.
Food Chain Support (export)	1	b	No outlet observed
Food Chain Support (within basin)	2	b	
Fish Habitat / Aquatic Diversity	1	b	Tadpoles observed in small pools.
Wildlife Habitat	2	b	
Active Recreation	1	c	
Passive Rec / corridor Heritage Value	3	b	Park access provides passive recreational value, but influence of narrow wetland vegetation and stream is minimized by large upland areas.

Comments: Channel recently reconstructed and planted with wetland species, surrounding areas would benefit from increased diversity in upland areas. Also would benefit if additional water (e.g. from Valmont runoff) could be directed into the system.

Wetland Evaluation

Wetland #: 40213

Former #: 57

T_R_S: T1NR70WS20

Investigator: A. Carpenter, C. Browne

Date of Visit: 6/17/2004

Obs. Method: Onsite

General Location: Sale Lake; north of Kalmia Ave. and east of Island Drive

Description: Two connected ponds; Sale Lake (larger pond) appears to have minimal wetland value, it has a tiny fringe of wetland vegetation around its margin and no rooted / emergent vegetation

Wetland Origin: Urban/ industrial

Primary Water Source: Ditch

Hydroperiod: Permanently flooded

Max WaterDepth (ft): 5

Major plant communities present

% of wetland area

open water	95
cattail	2
coyote willow	3

% Vegetated:	5
% Bare ground:	0
% Water:	95

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no **Confidence in rating: c = high, b = medium, a = low**

Groundwater	2	b	Groundwater mapped at about 10 ft below ground surface so potential to recharge exists, but underlying silt and
Recharge			clay restrict infiltration
Groundwater Discharge	1	b	Unknown depth of lake.
Flood Storage / Floodflow Alteration	2	b	Limited opportunity other than local runoff from relatively small residential development.
Shoreline Anchor. / Stabilization	2	b	Banks are lined with mature trees that are effective stabilizers, but erosional forces are limited to wind (and possibly occasional wave action?).
Sediment Trapping / Retention	3	b	Relatively large lake with no significant outflow is effective sediment trap. Input somewhat limited by low source.
Nutrient Retention (long-term)	3	c	In crack willow and cottonwoods along with sediments.
Nutrient Retention (short-term)	2	b	Only small amount of cattails.
Food Chain Support (export)	1	b	
Food Chain Support (within basin)	3	b	
Fish Habitat / Aquatic Diversity	4	b	Fish present, but diversity and abundance unknown. Grass carp mentioned by Mark Grisham in 5/92 memorandum, and sunfish and bass noted by Steve Dougherty. Water quality also unknown.
Wildlife Habitat	3	b	Deer bedding and tracks, songbirds present
Active Recreation	2	b	Could be used for fishing and boating though no direct evidence observed.
Passive Rec / Heritage Value	4	c	

Comments: Relatively large lake located on upland landform, supplied by ditch and local runoff, supports high ranked fish habitat and passive recreational value.

Wetland Evaluation

Wetland #: 40301 **Former #:** 15 (in part) **T_R_S:** T1NR71WS24

Investigator: A. Carpenter, C. Browne **Date of Visit:** 6/30/2004 **Obs. Method:** Viewed from property boundary

General Location: Two Mile Creek, begins at City boundary north of Linden Ave. and runs east to Maxwell Reservoir (small pond) immediately north of Linden Ave. and west of Wonderland Hill

Description: Narrow, cobbly stream channel in low density residential area near northwest edge of the City

Wetland Origin: Natural

Primary Water Source: Urban / industrial runoff

Hydroperiod: Intermittently flooded

Max WaterDepth (ft): 1

Major plant communities present

siberian elm / coyote willow / smooth brome
plains cottonwood / mixed herbaceous

% of wetland area

40
60

% Vegetated: 60
% Bare ground: 20
% Water: 20

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no Confidence in rating: c = high, b = medium, a = low

Groundwater Recharge	2	b	Geohydrology map indicates potential for groundwater recharge. Water table is mapped at greater than 10 ft below ground surface.
Groundwater Discharge	1	c	
Flood Storage / Floodflow Alteration	2	b	Narrow downcut channel (in places) offers little storage or alteration.
Shoreline Anchor. / Stabilization	2	b	Erosional forces occur and downcutting observed, ash and coyote willow provide some stabilization in sections.
Sediment Trapping / Retention	2	b	Small pockets of sediment deposits but relatively insignificant.
Nutrient Retention (long-term)	2	b	Some long-term retention in ash and cottonwoods, though inputs appear low
Nutrient Retention (short-term)	2	b	Some herbaceous understory
Food Chain Support (export)	2	b	Some overhanging branches but not highly productive and low flows limit export opportunity.
Food Chain Support (within basin)	2	b	
Fish Habitat / Aquatic Diversity	1	b	None observed and limited by intermittent nature of system.
Wildlife Habitat	2	b	
Active Recreation	1	b	
Passive Rec / Heritage Value	2	b	

Comments: Above small pond, channel is downcut up to 5 feet, minimal active floodplain, rock gabions present in channel, vegetation weedy, wetland defined by bankfull channel

Wetland Evaluation

Wetland #: 40302

Former #: 15

T_R_S: T1NR71WS24

Investigator: A. Carpenter, C. Browne

Date of Visit: 6/30/2004

Obs. Method: Onsite

General Location: Maxwell Reservoir, immediately north of Linden Ave. only southern portion of pond under City jurisdiction

Description: Small pond with turbid water, serves as stormwater detention pond for Two Mile Creek flows.

Wetland Origin: Urban/ industrial

Primary Water Source: Urban / industrial runoff

Hydroperiod: Semi-permanently flooded

Max WaterDepth (ft): 5

Major plant communities present

% of wetland area

% Vegetated: 0

open water

100

% Bare ground: 0

% Water: 100

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no **Confidence in rating: c = high, b = medium, a = low**

Groundwater Recharge	2	b	Unconsolidated colluvium may allow infiltration in places and when water level overflows, but infiltration been reduced when resevoir constructed.
Groundwater Discharge	2	b	Groundwater contour map suggests potential to receive groundwater discharge flowing from northwest, though water in subsurface is limited by near surface bedrock. Lake is located slightly south of Pierre Shale outcrop where discharge along contact may occur.
Flood Storage / Floodflow Alteration	2	b	Low capacity as basin is fairly small
Shoreline Anchor. / Stabilization	2	b	Banks are primarily grass.
Sediment Trapping / Retention	4	b	Pond functrions as effective sediment trap as designed. Large deposits near inflow were observed, and outflow is designed to prevent export of large sediments, though some fine suspended sediments may exit. Uncertain extent to which high velocity flows could move sediments out of basin on occasion.
Nutrient Retention (long-term)	3	a	Nutrients retained in sediments (unknown if pond is periodically dredged). Sources of input uncertain.
Nutrient Retention (short-term)	2	b	Low short term due to low pductivity
Food Chain Support (export)	2	b	Leaf litter from upstream moves through system (though some is blocked at outlet)
Food Chain Support (within basin)	1	b	
Fish Habitat / Aquatic Diversity	2	a	No fish observed but abundant aquatic insects and water levels are deep enough to support fish that may migrate from upstream.
Wildlife Habitat	2	b	
Active Recreation	1	b	
Passive Rec / Heritage Value	2	b	Bikers on nearby path may enjoy view.

Comments: Area around pond has abundant noxious weeds; pond less than 0.5 acre in size

Wetland Evaluation

Wetland #: 40303

Former #: 15 (in part)

T_R_S: T1NR71WS24

Investigator: A. Carpenter, C. Browne

Date of Visit: 6/30/2004

Obs. Method: Viewed from property boundary

General Location: Two Mile Banyon Creek southeast from Maxwell Reservoir (south of Linden Ave. and Wonderland Hill Ave.) to Broadway (at Iris)

Description: Narrow intermittent channel, in northern section flows through residents backyards then along bike path north of school to Broadway. Most of water appeared to be diverted (or infiltrated) between Kalmia and Juniper. Channel appeared to be piped under Broadway and daylighted briefly along north side of Iris. (Appears to be piped along Iris and is shown on creek GIS information as discharging to Farmers Ditch just west of 19th St.)

Wetland Origin: Natural

Primary Water Source: Urban / industrial runoff

Hydroperiod: Intermittently flooded

Max WaterDepth (ft): 1

Major plant communities present

crack willow - green ash / mixed herbaceous

% of wetland area

100

% Vegetated: 50

% Bare ground: 49

% Water: 1

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no Confidence in rating: c = high, b = medium, a = low

Groundwater favors Recharge	3	b	Unconsolidated bottom, thin, losing stream conditions observed. Mapped depth to water at 10-20 ft. bgs recharge.
Groundwater Discharge	2	b	
Flood Storage / Floodflow Alteration	3	b	Infiltration provides some subsurface storage
Shoreline Anchor. / Stabilization	3	b	Fair amount of woody vegetation in places though less so in south end
Sediment Trapping / Retention	2	b	Sources limited to local runoff with upstream retention pond removing some of foothills source.
Nutrient Retention (long-term)	2	b	Trees and shrubs
Nutrient Retention (short-term)	2	b	
Food Chain Support (export)	2	b	Overhanging leaves
Food Chain Support (within basin)	2	b	
Fish Habitat / Aquatic Diversity	1	b	intermittent flows
Wildlife band of Habitat	3	b	Though roads and houses fragment, proximity to foothills and low density housing make this a fairly nice riparian corridor through city.
Active Recreation	1	b	
Passive Rec / Heritage Value	2	b	

Comments: Wetland defined by bankfull channel; sediment detention pond immediately north of Linden Ave. at Wonderland Hill Ave.

Wetland Evaluation

Wetland #: 40304

Former #: 11

T_R_S: T1NR71W24

Investigator: A. Carpenter, C. Browne

Date of Visit: 6/30/2004

Obs. Method: Onsite

General Location: Maxwell Park pond north of Linden Park Drive

Description: Pond is located in natural depression in colluvium (slope with loose unconsolidated rock debris accumulation) and near edge of Pierre shale outcrop. Water level is supported by Silver Lake Ditch inflow at northeast end. Local seepage off hillside also contributes to water supply.

Wetland Origin: Agriculture

Primary Water Source: Ditch

Hydroperiod: Vertical fluctuations

Max WaterDepth (ft):

Major plant communities present

% of wetland area

% Vegetated:
% Bare ground:
% Water:

Emory's sedge	3
smartweed	7
open water	90

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no **Confidence in rating: c = high, b = medium, a = low**

Groundwater Recharge	2	b	Unconsolidated colluvium may allow infiltration in places, e.g., when water level overflows.
Groundwater Discharge ditch Lake is	2	b	Resident reports some water present in past (though at very low level) even during drought years when no inflow. GW contour map suggests potential to receive groundwater discharge flowing from northwest. located along edge of Pierre Shale formation; seepage occurs along contact.
Flood Storage / Floodflow Alteration low	2	b	Lake serves as local catchment for rainwater runoff from hill to north, but drains a relatively small area so opportunity.
Shoreline Anchor. / Stabilization relatively low	2	b	Green ash along shore provide stabilization from wind erosion, but opportunity for erosional forces (could include minor streambank erosion from park visitors.)
Sediment Trapping / Retention minor	2	b	Absence of outlet ensures effective sediment trapping, but input low from vegetated slopes (and possibly amounts carried in ditch water.)
Nutrient Retention (long-term)	2	b	Retention in sediments and trees but relatively low input.
Nutrient Retention (short-term) on	2	b	Some aquatic vegetation and smartweed on edge. No cattails as resident reported that cattails and bullrush edges dried during recent dry years.
Food Chain Support (export) down ranking with	1	b	No outlet observed and long-time resident reported that only occasionally overflows across the path and the hill on the south edge of the wetland. (Believe previous assessor may have a typo and reversed "in basin" support.)
Food Chain Support (within basin)	2	b	Fairly narrow wetland fringe.
Fish Habitat / Aquatic Diversity	2	c	Good size pond. Fish observed (most likely carp.)
Wildlife Habitat have	3	c	Large buck observed on nearby hillside. Loss of habitat and food when cattails and bullrush died may contributed to reported departure of redwing blackbirds.
Active Recreation	2	a	No direct evidence but fishing and boating accessible by park visitors.
Passive Rec / Heritage Value	4	c	Trail and park encourage access and provides aesthetic value.

Comments: Shallow pond (about 1.5 acres) with turbid water; pond has large fish (probably carp)

Wetland Evaluation

Wetland #: 40305 **Former #:** 14 (in part) **T_R_S:** T1NR70WS19

Investigator: A. Carpenter, C. Browne

Date of Visit: 6/23/2004 **Obs. Method:** Onsite

General Location: Elmer's Two Mile Creek, north of Kalmia for about 200 feet to point where channel begins.

Description: Channel sides made of rock gabions. Bottom is concrete, wetland defined by bankfull channel

Wetland Origin: Natural

Primary Water Source: Urban / industrial runoff

Hydroperiod: Intermittently flooded

Max WaterDepth (ft): 0

Major plant communities present

% of wetland area

% Vegetated: 10
% Bare ground: 87
% Water: 3

channel concrete	90
reed canary grass	10

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no **Confidence in rating:** c = high, b = medium, a = low

Groundwater Recharge	1	c	Concrete riprap channel
Groundwater Discharge	1	c	
Flood Storage / evidence Floodflow Alteration	2	a	Appears to have been engineered to ensure stable sideslopes and transport stormwater runoff but no of functional effectiveness.
Shoreline Anchor. / Stabilization	1	c	riprap
Sediment Trapping / suburban Retention	1	c	Minor trapping near outfall pipe but low opportunity as only runoff appears to be from small area of mowed lawn.
Nutrient Retention (long-term)	1	c	
Nutrient Retention (short-term)	1	c	Dry
Food Chain Support (export)	1	c	
Food Chain Support (within basin)	1	c	
Fish Habitat / Aquatic Diversity	1	c	
Wildlife Habitat	1	c	
Active Recreation	1	c	
Passive Rec / Heritage Value	1	c	

Comments: Completely hardened, channelized creek, very little wetland vegetation (small stand of cattails)

Wetland Evaluation

Wetland #: 40306 **Former #:** 14 (in part) **T_R_S:** T1NR70WS19

Investigator: A. Carpenter, C. Browne

Date of Visit: 6/23/2004 **Obs. Method:** Onsite

General Location: Elmer's Two Mile Creek, south of Kalmia and west of 26th Street through park.

Description: Unlined channel through park, narrow strip of wetland along channel.

Wetland Origin: Natural

Primary Water Source: Urban / industrial runoff

Hydroperiod: Intermittently flooded

Max WaterDepth (ft): 2

Major plant communities present

% of wetland area

crack willow/ mixed grammoid	65
reed/ canarygrass	25
open water	10

% Vegetated:
% Bare ground:
% Water:

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no Confidence in rating: c = high, b = medium, a = low

Groundwater Recharge	2	b	Urban runoff supplies water and disappears in channel in places.
Groundwater Discharge	1	b	Localized seepage evident but based on groundwater information this is probably just localized seepage from lawn watering and rainwater infiltration
Flood Storage / Floodflow Alteration	3	b	High water mark/ debris evident about 2 ft up on either side of the banks.
Shoreline Anchor. / Stabilization	3	b	Crack willows and shrubs provide some anchoring, but typical low flows make opportunity only moderate.
Sediment Trapping / Retention	2	b	Pockets of sediments observed in places but absence of large accumulations or deep pools suggests most flushed through this section.
Nutrient Retention (long-term)	3	b	Moderate density trees and shrubs along banks provide some retention.
Nutrient Retention edges (short-term)	2	b	Only minor retention in short-term sediments and some herbaceous and grasses (but mowing close to reduces effectiveness)
Food Chain Support (export)	2	b	Doesn't appear to receive frequent high flushing flows so opportunity relatively low.
Food Chain Support (within basin)	2	b	
Fish Habitat / Aquatic Diversity	1	b	
Wildlife Habitat	2	b	possibly small mammals
Active Recreation	1	c	
Passive Rec / Heritage Value	4	b	Willows provide shade in park.

Comments:

Wetland Evaluation

Wetland #: 40307

Former #: 14 (in part)

T_R_S: T1NR70WS20

Investigator: A. Carpenter, C. Browne

Date of Visit: 6/23/2004

Obs. Method: Onsite

General Location: Elmer's Two Mile Creek, east of 26th Street and north of Iris Ave.

Description: Completely hardened channel through densely developed section of city

Wetland Origin: Natural

Primary Water Source: Urban / industrial runoff

Hydroperiod: Intermittently flooded

Max WaterDepth (ft): 1.5

Major plant communities present
none

% of wetland area

% Vegetated: 0
% Bare ground: 99
% Water: 1

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no **Confidence in rating: c = high, b = medium, a = low**

Groundwater	1	c	Concrete channel prohibits communication with subsurface. Would be expected to recharge aquifer if
Recharge			unlined as groundwater depth is mapped as 5-10 ft below ground surface and channel is not incised.
Groundwater Discharge	1	c	
Flood Storage / Floodflow Alteration	2	a	
Shoreline Anchor. / Stabilization	1	c	Concrete rip rap edges and bottom
Sediment Trapping / Retention	2	a	No accumulation of sediments observed other than small deposits beneath bridge.
Nutrient Retention (long-term)	1	c	
Nutrient Retention (short-term)	1	c	
Food Chain Support (export)	1	c	mowed lawn to edges of streambank limit production.
Food Chain Support (within basin)	1	c	
Fish Habitat / Aquatic Diversity	1	c	
Wildlife Habitat	1	c	
Active Recreation	1	c	
Passive Rec / Heritage Value	1	b	

Comments: Defined as bank full channel; no wetland vegetation present; (included as Elmer's Two Mile Creek channel)

Wetland Evaluation

Wetland #: 40308 **Former #:** 14 (in part) **T_R_S:** T1NR70WS20

Investigator: A. Carpenter, C. Browne

Date of Visit: 6/23/2004 **Obs. Method:** Onsite

General Location: Elmer's Two Mile Creek, from south of Iris to southehm park boundary

Description: Restored creek channel through park. Receives stormwater and urban runoff from Iris. Meandering channel increases functionality, good plant diversity.

Wetland Origin: Natural

Primary Water Source: Urban / industrial runoff

Hydroperiod: Semi-permanently flooded

Max WaterDepth (ft):

Major plant communities present

% of wetland area

% Vegetated:
% Bare ground: 0
% Water:

water cress	10
bulrush	45
coyote willow/ bulrush-cattail-water cress	40
open water	5

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no Confidence in rating: c = high, b = medium, a = low

Groundwater channel	2	b	Groundwater recharge possible. Water table is mapped at 5-10 ft bgs in this area and unconsolidated bottom allows some infiltration. Sumps in homeowners basements (to west of wetland) suggests possible leakage from creek.
Groundwater Discharge	2	b	
Flood Storage / Floodflow Alteration	2	b	
Shoreline Anchor. / Stabilization	3	b	Stormwater inflow from Iris at north end of creek.
Sediment Trapping / Retention	3	b	
Nutrient Retention (long-term)	3	b	Sediments and coyote willow provide retention and runoff provides input.
Nutrient Retention (short-term)	3	b	Cattails and emergent vegetation provide short-term retention.
Food Chain Support (export)	3	b	Relatively high productivity and occassional flushing flows likey to provide moderate export.
Food Chain Support (within basin)	3	b	
Fish Habitat / Aquatic Diversity	2	b	No fish observed but water bugs and dragonflies abound.
Wildlife Habitat	2	b	Relatively good habitat for birds and small mammals with diverse food supply. Shelter limited and poor connection to offsite habitat.
Active Recreation	1	b	None observed other than woman collecting watercress.
Passive Rec / Heritage Value	4	b	Park setting provides access. Close to residential areas.

Comments: This is an excellent example of a restored stream channel and wetland, different from any wetland we visited in Boulder; . Water source from Iris may include some ditch water.

Wetland Evaluation

Wetland #: 40309 **Former #:** 14 (in part) **T_R_S:** T1NR70WS20

Investigator: A. Carpenter, C. Browne

Date of Visit: 6/23/2004 **Obs. Method:** Onsite

General Location: Elmer's Two Mile Creek, south of new park located south of Iris and east of Folsom Ave. and north of Valmont and north of pipe through which flow is routed into Boulder Whiterock Ditch

Description: mostly channelized, straightened section of Elmer's Two Mile Creek, confined over most of area by concrete wall to east (along shopping center). South of Glenwood, small section of channel is unlined and flows through broad flat area and into patch of reed canary grass, though volume of water appeared to be generally low.

Wetland Origin: Natural

Primary Water Source: Urban / industrial runoff

Hydroperiod: Semi-permanently flooded

Max WaterDepth (ft): 1

Major plant communities present

% of wetland area

% Vegetated: 20

open water	55
crack willow / mixed herbaceous	25
reed canary grass	20

% Bare ground: 10
% Water: 70

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no **Confidence in rating:** c = high, b = medium, a = low

Groundwater Recharge	2	a	Water table shown at 5-10 ft bgs in general area. Unlined portion of this creek segment may lose water.
Groundwater flowpaths. Discharge	2	a	Creek receives some seepage but appears to be associated with rainwater infiltration and shallow
Flood Storage / Ditch. Floodflow Alteration	2	b	Flood storage is restricted by concrete berms and bottoms, but can transport flows into Boulder Whiterock
Shoreline Anchor. / Stabilization	2	b	Rock and concrete sidewalls limit effectiveness of sparse trees. Mowed bluegrass to bank edges in places.
Sediment Trapping / Retention	2	b	Minor amount of sediment trapping may occur just south of Glenwood where channel is unlined and flows through broad flat area and into patch of reed canary grass, but low flows limit opportunity.
Nutrient Retention (long-term)	2	b	Trees and shrubs (sparse) and sediments provide low retention.
Nutrient Retention (short-term)	2	b	Reed canary grass and herbaceous veg. provide short term retention.
Food Chain Support (export)	2	b	Minor input from overhanging willows but low flows limit export.
Food Chain Support (within basin)	2	b	Productivity is low due to channel restrictions.
Fish Habitat / Aquatic Diversity	1	b	No fish or aquatic insects observed
Wildlife Habitat	1	b	
Active Recreation	1	c	
Passive Rec / Heritage Value	2	a	Apartment building residents to west may receive some benefit but no evidence of visitors or passive rec. use.

Comments: Wetland defined by bank full channel for Elmer's Two Mile Creek.

Wetland Evaluation

Wetland #: 40310

Former #: 11

T_R_S: T1NR70WS19

Investigator: A. Carpenter, C. Browne

Date of Visit: 6/23/2004

Obs. Method: Viewed from prop. Boundary

General Location: Private pond northwest of intersection of 23rd St. and Hawthorn Ave.

Description: Small constructed pond with an island. Source of water undetermined but geohydrologic references do not suggest communication with aquifer or creek, so probably uses supplemental water supply (ditch or well?)

Wetland Origin: Urban/ industrial

Primary Water Source: Ground water

Hydroperiod: Permanently flooded

Max WaterDepth (ft): 3

Major plant communities present

% of wetland area

open water

100

% Vegetated: 0

% Bare ground: 0

% Water: 100

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no **Confidence in rating: c = high, b = medium, a = low**

Groundwater Recharge	2	a	Pond is located in an upland area where groundwater recharge is generally expected, however, pond was probably constructed so impermeable bottom limits infiltration.
Groundwater Discharge	1	b	Depth to groundwater mapped as greater than 10 feet below ground surface.
Flood Storage / Floodflow Alteration	1	c	
Shoreline Anchor. / Stabilization	1	b	Low opportunity other than wind.
Sediment Trapping / Retention indicate	2	b	Low opportunity but can't rule out since water source undetermined. Water appeared turbid which could some surficial inflows (or disturbances by carp.)
Nutrient Retention (long-term)	2	b	Any nutrients which enter via surface runoff will likely stay in pond in sediments or in woody species.
Nutrient Retention (short-term)	2	b	
Food Chain Support (export)	1	b	No visible outflow
Food Chain Support (within basin)	2	b	
Fish Habitat / Aquatic Diversity	2	a	No observed but presence likely if stocked by homeowners. Appears to be algae evident in yr old aerial photograph suggesting poor oxygen and nutrient inputs.
Wildlife Habitat	2	a	Waterfowl
Active Recreation	1	b	Homeowner may use for fishing,
Passive Rec / Heritage Value	2	b	

Comments: Small pond (.15 acre) probably dug for stock or aesthetic purposes. (Included Elmer's Two Mile Creek drainage due to

Wetland Evaluation

Wetland #: 40311

Former #: 40

T_R_S: T1NR70WS20

Investigator: A. Carpenter, C. Browne

Date of Visit: 6/17/2004

Obs. Method: Onsite

General Location: Pond, south of Glenwood Dr. east of 28th St., west of 30th St., in apartment complex (Glenwood Gardens)

Description: Constructed pond in greenspace area between townhomes and apartments

Wetland Origin: Urban/ industrial

Primary Water Source: Urban / industrial runoff

Hydroperiod: Seasonally flooded

Max WaterDepth (ft): 3

Major plant communities present
open water

% of wetland area
100

% Vegetated: 1
% Bare ground: 0
% Water: 99

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no **Confidence in rating: c = high, b = medium, a = low**

Groundwater Recharge which plastic liner	2	b	Pond is situated near topographic high and in area where water table is located about 10 ft bgs. Extent to bottom allows some minor infiltration unknown but believed to be minimal if at all (based on possible observed along edge and accumulation of natural sediments on bottom.)
Groundwater Discharge	1	c	
Flood Storage / Floodflow Alteration	2	b	
Shoreline Anchor. / Stabilization	1	c	
Sediment Trapping / Retention from	2	b	Very low source other than rainwater runoff and pond bank erosion, as does not appear to receive runoff buildings or paved parking areas.
Nutrient Retention (long-term)	1	b	
Nutrient Retention (short-term)	1	b	
Food Chain Support (export)	1	b	
Food Chain Support (within basin)	2	b	
Fish Habitat / Aquatic Diversity	2	c	Aerated and minnows present.
Wildlife Habitat	1	b	
Active Recreation	1	b	
Passive Rec / Heritage Value but	2	b	Provides some passive recreational enjoyment for residents of development in garden greenspace setting, access limited to residents.

Comments:

Wetland Evaluation

Wetland #: 40401 **Former #:** 15 (in part) **T_R_S:** T1NR70WS30

Investigator: A. Carpenter, C. Browne

Date of Visit: 6/22/2004 **Obs. Method:** Onsite and viewed from property

General Location: Goose Creek east of 19th Street to end of crack willows about 200 feet west of Folsom Ave. along Goose Creek

Description: Goose Creek daylight through a pipe outlet at 19th Street. The stream corridor flows west to east following along the edge of a Pierre Shale bedrock outcrop to the south. The creek is located in an area that is mapped as potentially receiving groundwater discharge (during high water periods).

Wetland Origin: Natural

Primary Water Source: Urban / industrial runoff

Hydroperiod: Seasonally flooded

Max WaterDepth (ft): 2

Major plant communities present

% of wetland area

crack willow / mixed graminoid
open water

75
25

% Vegetated: 50
% Bare ground: 25
% Water: 25

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no **Confidence in rating: c = high, b = medium, a = low**

Groundwater Recharge	2	b	Water table is mapped as 5-10 ft below surface and streambed is unconsolidated alluvium, so there is the potential to recharge. But thin unsaturated zone and bedrock outcrop to south limit effectiveness.
Groundwater Discharge	2	b	Groundwater discharge may occur as indicated in available regional groundwater data; however the volume of input compared to surface water inflow at the inlet is relatively low.
Flood Storage / Floodflow Alteration	4	b	Woody and flood debris observed all along banks, minor storage in small pools.
Shoreline Anchor. / Stabilization	4	a	Some evidence of high cut banks and sloughing, but abundance of well established trees provide relatively high stabilization. Unsure extent to which observed small areas of erosion are stabilized or still occurring.
Sediment Trapping / Retention	2	b	Small pockets of sediment deposits but most appear to be short residence until flushing flows clear move out.
Nutrient Retention (long-term)	4	b	Dense, mature trees and shrubs provide nutrient retention and opportunity is present from urban runoff.
Nutrient Retention (short-term)	3	b	Short term retention in some sediments
Food Chain Support (export)	4	b	Highly productive overhanging trees provide large leaf litter supply.
Food Chain Support (within basin)	3	b	
Fish Habitat / Aquatic Diversity	2	b	None observed an upstream of this creek section is piped. Probably to shallow and varying to support fish, can't rule it out.
Wildlife Habitat	3	b	Deer, fox, raccoon signs. Locally significant but fragmented to west by urban landscape.
Active Recreation	1	c	
Passive Rec / Heritage Value	3	b	

Comments: Narrow channel that carries stormwater runoff mostly, some base flow from tributary west of Unity Church

Wetland Evaluation

Wetland #: 40402 **Former #:** 15 (in part) **T_R_S:** T1NR70WS29

Investigator: A. Carpenter, C. Browne

Date of Visit: 6/22/2004 **Obs. Method:** Onsite

General Location: Goose Creek, upstream end 200 ft west of Folsom Ave (where crack willows end and improved channel begins) and runs east to 30th Street

Description: In this wetland, the Goose Creek channel broadens and flows through a restoration area. The upstream end of this wetland flows along the northeast edge of the shale outcrop briefly before continuing eastward across a transitional sloping landform. The restoration has enhanced the functional value of this wetland particularly for sediment and nutrient retention as well as stormwater management.

Wetland Origin: Natural

Primary Water Source: Urban / industrial runoff

Hydroperiod: Seasonally flooded

Max WaterDepth (ft): 2

Major plant communities present

% of wetland area

% Vegetated: 60

open water

35

% Bare ground: 5

cattail

55

% Water: 35

bulrush- cattail

10

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no **Confidence in rating: c = high, b = medium, a = low**

Groundwater Recharge	2	b	Depth to groundwater map suggests that water table is 5 to 10 ft below ground surface and therefore groundwater recharge may occur in places.
Groundwater Discharge	2	b	Regional groundwater contour map indicates slight potential for groundwater discharge when water table is high.
Flood Storage / Floodflow Alteration	3	b	Channel broadens out and includes small basins or pools.
Shoreline Anchor. / Stabilization	3	b	In channel and streambank vegetation, rocks
Sediment Trapping / Retention	4	b	Accumulation in basin, and trapping in cattails.
Nutrient Retention (long-term)	3	b	Retention in sediments and shrubs and trees (still young but will continue to increase in effectiveness)
Nutrient Retention (short-term)	4	b	in cattails
Food Chain Support (export)	3	b	Water flows slow and overhanging veg. not sig. decreaseing opportunity for export
Food Chain Support (within basin)	4	b	Productivity expected to continue to increase as restored area matures.
Fish Habitat / Aquatic Diversity	2	c	Fish and aquatic insects observed. Unknown water quality and flow manipulations (unknown extent) limit effectiveness
Wildlife Habitat	3	b	Birds, muskrat, raccoon, ducks.
Active Recreation	1	c	
Passive Rec / Heritage Value	4	b	Goose Creek Greenway trail parallels this section of creek and is well used.

Comments: Goose Creek floodplain. Channel has been drastically modified and improved throughout. Much evidence of planting of wetland species, which are expanding in size and extent

Wetland Evaluation

Wetland #: 40403

Former #: 15 (in part)

T_R_S: T1NR70WS29

Investigator: A. Carpenter, C. Browne

Date of Visit: 6/22/2004

Obs. Method: Onsite

General Location: Goose Creek east of 30th St. and west of railroad tracks

Description: This short section of Goose Creek is a rock lined channel with concrete bottom passing through a commercial/industrial area.

Wetland Origin: Natural

Primary Water Source: Urban / industrial runoff

Hydroperiod: Seasonally flooded

Max WaterDepth (ft): 2

Major plant communities present

% of wetland area

% Vegetated: 15

bulrush- mixed graminoid

15

% Bare ground: 0

open water

85

% Water: 85

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no **Confidence in rating: c = high, b = medium, a = low**

Groundwater Recharge	1	b	Concrete bottom restricts infiltration
Groundwater Discharge	1	b	
Flood Storage / Floodflow Alteration	1	b	Can transport but not store or significantly alter flood waters.
Shoreline Anchor. / Stabilization	1	c	
Sediment Trapping / move Retention	2	b	Road runoff provides source and minor deposits observed but high velocity flows would be expected to sediments out.
Nutrient Retention (long-term)	1	c	
Nutrient Retention (short-term)	2	b	Only occurring in very small cattail stands along edges.
Food Chain Support (export)	2	b	
Food Chain Support (within basin)	2	b	
Fish Habitat / Aquatic Diversity	1	c	
Wildlife Habitat	1	b	
Active Recreation	1	c	
Passive Rec / Heritage Value	2	c	Bike path users may benefit from quiet and alternative route to being on roads.

Comments: Channel of Goose Creek in this part is completely confined in a rock lined channel. Significant differences in rankings from previous evaluation suggest that at the time of Cooper's evaluation (87) the concrete channel may not have been constructed yet or was not as extensive.

Wetland Evaluation

Wetland #: 40404 **Former #:** 16 (in part) **T_R_S:** T1NR70WS29

Investigator: A. Carpenter, C. Browne **Date of Visit:** 6/22/2004 **Obs. Method:** Onsite

General Location: Goose Creek east of railroad tracks and west of Foothills Parkway

Description: This portion of Goose Creek flows through a broad cattail marsh in a commercial/industrial area which was apparently modified as part an urban drainage project.

Wetland Origin: Natural

Primary Water Source: Urban / industrial runoff

Hydroperiod: Seasonally flooded

Max WaterDepth (ft): 2

Major plant communities present

% of wetland area

% Vegetated: 95

cattail	90
reed canarygrass	5
openwater	5

% Bare ground: 0
% Water: 5

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no **Confidence in rating:** c = high, b = medium, a = low

Groundwater bottom is	2	b	Depth to water table mapped as 5-10 ft below ground surface so potential for recharge exists and creek
Recharge			unconsolidated.
Groundwater Discharge	1	b	Unlikely based on groundwater countours and depth to aquifer.
Flood Storage / effectiveness. Floodflow Alteration	4	b	Relatively broad large cattail stand interspersed with occassional pools. Retaining side walls limit
Shoreline Anchor. / Stabilization	2	b	Stabilization achieved by retaining walls not wetland vegetation so decreased ranking.
Sediment Trapping / Retention	4	b	Fine silt deposits observed amidst cattails.
Nutrient Retention (long-term)	4	b	Sediments provide long-term nutrient retention
Nutrient Retention (short-term)	4	b	Cattails provide good short-term retention.
Food Chain Support somewhat (export)	2	b	No leaf litter and cattail debris not very mobile. Also, outlet is partially dammed to east so export is restricted.
Food Chain Support (within basin)	3	b	Cattails dominate.
Fish Habitat / Aquatic Diversity	2	b	Aquatic insects land small fish limited to small pool at east end.
Wildlife Habitat	2	b	No adjoining habitat.
Active Recreation	1	b	
Passive Rec / from Heritage Value	2	b	Goose Creek Greenway path follows along this section and provides some benefits as alternative path roads, but surroundings limit aesthetic benefits. (Trail not built at time of Cooper ranking)

Comments: Goose Creek floodplain; fairly broad, well vegetated

Wetland Evaluation

Wetland #: 40405 **Former #:** 16 (in part) **T_R_S:** T1NR70WS28

Investigator: A. Carpenter, C. Browne

Date of Visit: 8/16/2004 **Obs. Method:** Onsite

General Location: Goose Creek north of Pearl Street, east of Foothills Parkway, and northwest of Pearl Parkway . (This is the north channel with a bike path paralleling to the south.).

Description: At Foothills Parkway, Goose Creek is split and directed into a north and south channel that flow across the relatively flat bottomlands associated with Boulder Creek. This northern channel of Goose Creek flows easterly and is joined by inflow from Wonderland Creek (from the north) before entering a constructed gravel channel and discharging into the wetland just west of Cottonwood Grove Lake. This section appears to flow across an area where the depth to groundwater is slightly deeper (5-10 ft below ground surface) than to the south, and surface water flows can infiltrate to recharge groundwater here. Potential to improve functionality of system (if evaluated and designed in conjunction with Wonderland Creek and Goose

Wetland Origin: Urban/ industrial

Primary Water Source: Urban / industrial runoff

Hydroperiod: Temporarily flooded

Max WaterDepth (ft): 1

Major plant communities present

% of wetland area

% Vegetated: 94

mixed grass prairie (upland plant community)

99

% Bare ground: 5

meadow foxtail

1

% Water: 1

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no **Confidence in rating:** c = high, b = medium, a = low

Wetland Evaluation

Wetland #: 40405 **Former #:** 16 (in part) **T_R_S:** T1NR70WS28

Groundwater Depth to Recharge materials	4	c	Unconsolidated channel observed to allow infiltration. Opportunity diminished by upstream diversions. water table is 5-10 ft here although just to south the water table is nearer to the surface. Subsurface may also be more permeable as result of historical activities (such as RR tracks ?)
Groundwater Discharge Creek southern channel).	1	c	
Flood Storage / into Floodflow Alteration	4	b	When waters are high enough at west end, beneath Foothills Parkway, a portion of creek flow is diverted into this northern channel.
Shoreline Anchor. / Stabilization	1	b	
Sediment Trapping / Retention	2	b	Limited effectiveness because of absence of sig. vegetation, also limited opportunity given upstream urban drainage features that trap most of sediments.
Nutrient Retention (long-term)	1	b	
Nutrient Retention (short-term)	2	b	
Food Chain Support (within basin)	2	b	Minimal vegetation, mostly found along west edge
Fish Habitat / Aquatic Diversity	1	c	
Wildlife Habitat	1	b	
Active Recreation	1	c	
Passive Rec / Heritage Value	2	b	Goose Creek Greenway trail follows alongside.

Comments: Straight channel; Goose Creek "north". Recieves minimal base flow from Goose Creek (because most of flow routed south through "Stegasaurus" channel); upper 100 yards has trickle of base flow but rest of channel is dry except after storms; wetland Defined by bank full width. Could improve conditions by replanting/seeding with more diverse native species, Divert additional water from southern channel here to support wet meadow vegetation. Need to better understand soil conditions

Wetland Evaluation

Wetland #: 40406 **Former #:** 16 (in part) **T_R_S:** T1NR70WS28

Investigator: A. Carpenter, C. Browne

Date of Visit: 6/22/2004 **Obs. Method:** Onsite

General Location: Goose Creek (south channel), east of Foothills Parkway and west of the pond immediately south of Pearl Parkway (wetland 42 Cooper)

Description: At Foothills Parkway, Goose Creek is split and directed into a north and south channel that flow across the relatively flat bottomlands associated with Boulder Creek before entering wetland just west of Cottonwood Grove Lake. This southern channel of Goose Creek appears to flow across a localized area that has a naturally higher water table (than the north channel). Restoration efforts could potentially benefit from the natural gradient and improve hydrologic connection & overall functionality of this section (if done in conjunction with modifications to the north section of Goose Creek).

Wetland Origin: Natural

Primary Water Source: Urban / industrial runoff

Hydroperiod: Seasonally flooded

Max WaterDepth (ft): 2

Major plant communities present

% of wetland area

% Vegetated: 4
% Bare ground: 0
% Water: 96

open water	96
reed canarygrass - meadow foxtail	1
meadow foxtail	1
peach leaf willow	1
coyote willow	1

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no **Confidence in rating:** c = high, b = medium, a = low

Groundwater Recharge	1	b	Concrete lined channel forms Goose Creek south
Groundwater Discharge	1	b	Groundwater references indicate high water table within 5 ft of ground surface in this area and contours show potential for creek to receive discharge if was not restricted by concrete.
Flood Storage / Floodflow Alteration	3	b	Terrace along channel offers overflow potential.
Shoreline Anchor. / Stabilization	1	b	
Sediment Trapping / Retention	2	a	Minor accumulation of sediments but large flushing flows would wash out.
Nutrient Retention (long-term)	2	a	Possibly very minor amounts in sediments that remain in channel.
Nutrient Retention (short-term)	2	a	Some algae in channel.
Food Chain Support (export)	2	a	Very little production to export
Food Chain Support (within basin)	2	a	
Fish Habitat / Aquatic Diversity	1	b	
Wildlife Habitat	1	b	
Active Recreation	1	c	
Passive Rec / Heritage Value	2	b	

Comments: "Stegasaurus" wetland along Goose Creek; channel completely constrained by concrete and cemented rock channel bottom and sides. Suggest that City gain better understanding of difference in soils, disturbances, and hydrogeology along north and south Goose Creek channels before initiating improvement work in these areas in the future.

Wetland Evaluation

Wetland #: 40407

Former #: 42 (in part)

T_R_S: T1NR70WS28

Investigator: A. Carpenter, C. Browne

Date of Visit: 6/17/2004

Obs. Method: On-site

General Location: Pond immediately south of Pearl Parkway and northwest of Cottonwood Grove Lake

Description: Large cattail stand with some open water which receives inflows from both Goose Creek channels (from north which includes Wonderland Creek inflows and from south).

Wetland Origin: Mining

Primary Water Source: Creek

Hydroperiod: Permanently flooded

Max WaterDepth (ft): 5

Major plant communities present

% of wetland area

% Vegetated: 70

cattail	50
coyote willow	18
wooly sedge	2
open water	30

% Bare ground: 0
% Water: 30

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no **Confidence in rating:** c = high, b = medium, a = low

Groundwater groundwater Recharge	1	c	In floodplain of Boulder Creek with high groundwater (less than 5 ft bgs), and contours indicate discharge likely.
Groundwater Discharge	3	b	
Flood Storage / Floodflow Alteration	4	b	Stormwater drainage from two Goose Creek channels discharge into this pond.
Shoreline Anchor. / Stabilization	3	b	
Sediment Trapping / source Retention	4	b	This is the eastern most edge of the mapped City wetlands and outflow is constricted. Uncertain extent of and upstream trapping
Nutrient Retention (long-term)	4	b	
Nutrient Retention (short-term)	4	b	
Food Chain Support (export)	3	b	outflow somewhat constricted
Food Chain Support (within basin)	4	c	primarily cattail
Fish Habitat / Aquatic Diversity	3	c	Small fish observed
Wildlife Habitat	3	c	
Active Recreation	2	b	could provide fishing location, but not observed
Passive Rec / Heritage Value	4	b	Large size and easy access, adjacent to lake to south.

Comments: Receives steady flows from south channel of Goose Creek (Stegasaurus channel), as well as stormwater runoff from north Goose Creek channel

Wetland Evaluation

Wetland #: 40501

Former #: 15

T_R_S: T1NR71WS25

Investigator: A. Carpenter, C. Browne

Date of Visit: 6/30/2004

Obs. Method: Onsite and viewed from property

General Location: Sunshine Creek from city boundary south to Pearl Street.

Description: Small intermittent stream channel that flows from north to south along backyards of residences. Narrow flowpath is controlled by geologic features -- bounded by colluvium to the west (Niobrara fock Formation) and terrace (Verdos alluvium) to the east.

Wetland Origin: Natural

Primary Water Source: Urban / industrial runoff

Hydroperiod: Intermittently flooded

Max WaterDepth (ft): 1

Major plant communities present

% of wetland area

% Vegetated: 10

green-ash / choke cherry / mixed herbaceous
open water

75
25

% Bare ground: 25
% Water: 75

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no **Confidence in rating: c = high, b = medium, a = low**

Groundwater Recharge	3	c	Losing stream conditions observed. Thin to no shallow aquifer in immediate area, so effectiveness may be limited.
Groundwater Discharge	2	b	Traverses rock features so no shallow aquifer to speak of , but local seeps possible.
Flood Storage / Unconsolidated Floodflow Alteration	3	b	High water lines indicate increased flows at times. Stormwater drain inflow pipes observed. bottom allows infiltration.
Shoreline Anchor. / Stabilization	3	b	Some erosion evident in areas but mostly stabilized by trees and shrubs along banks.
Sediment Trapping / Retention	2	b	Large flushing flows prohibit accumulation other than small temporary pockets of sediments along banks.
Nutrient Retention (long-term)	2	b	Trees and shrubs but low opportunity
Nutrient Retention (short-term)	2	b	Some short residence time sediments
Food Chain Support (export)	3	b	Leaf litter, moderate opportunity to export given irregular strong flows.
Food Chain Support (within basin)	2	b	
Fish Habitat / Aquatic Diversity	1	b	Dries up in places, probably for significant periods.
Wildlife Habitat	2	b	Too narrow of a corridor closely bounded by residences and fences to provide much significant habitat.
Active Recreation	1	b	
Passive Rec / Heritage Value	2	b	

Comments: Wetland defined by bank full channel, stream dries up between Spruce and Pearl Street

Wetland Evaluation

Wetland #: 40502

Former #: 14

T_R_S: T1NR71WS36

Investigator: A. Carpenter, C. Browne

Date of Visit: 7/2/2004

Obs. Method: Viewed from property boundary

General Location: Gregory Creek east of Mountain Parks and south of Boulder Creek

Description: Steep, rocky intermittent stream that flows northward along eastern edge of a Pierre shale bedrock formation, draining into Boulder Creek. Characterized by generally narrow active channel with fairly steep gradient. Precipitation in foothills to the west supports seasonal flows in creek. (Includes tributary to Gregory Creek which flows in from the west along the north edge of Smith Park, between Aurora and Euclid Streets.)

Wetland Origin: Natural

Primary Water Source: Creek

Hydroperiod: Intermittently flooded

Max WaterDepth (ft): 1.5

Major plant communities present

% of wetland area

% Vegetated: 90

narrow leaf cottonwood/ mixed herbaceous

35

% Bare ground: 5

urban tree/ mixed herbaceous

60

% Water: 5

open water

5

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no **Confidence in rating:** c = high, b = medium, a = low

Groundwater recharge	1	b	Geohydrologic map indicates groundwater recharge or discharge are possible. Effectiveness of the function is limited by impermeable bedrock near surface, narrow channel, and intermittent flows. Uncertain extent to which infiltration into fractures recharges water in deeper formations.
Recharge the			
Groundwater Discharge	2	b	Local discharge of rainwater infiltration into creek likely but the thin overburden limits opportunity.
Flood Storage / Floodflow Alteration	2	b	Rough streambed slows flows somewhat and small pools in lower section offer minor storage benefits.
Shoreline Anchor. / Stabilization	3	b	Fairly dense understory and tree cover along banks, though rocks are significant factor in erosion control.
Sediment Trapping / residence Retention	2	b	High velocity flows likely to transport sediments through the system, though small pockets of short sediments were observed in pockets along the bank and in pools.
Nutrient Retention (long-term)	2	b	Abundance of trees and understory
Nutrient Retention (short-term)	2	b	
Food Chain Support may (export)	3	b	Good supply of leaf litter from overhanging vegetation and good export flows. Grates and control structures trap some of larger material.
Food Chain Support (within basin)	3	b	
Fish Habitat / Aquatic Diversity	1	b	
Wildlife Habitat	3	b	deer observed and diversity of trees and understory offers food and shelter, but narrow buffer reduces effectiveness
Active Recreation	1	b	
Passive Rec / Heritage Value	3	b	

Comments: Gregory Creek runs through residential back yards starting at edge of Mountain Parks and flows north to Boulder Creek (access to the creek was generally limited to where it intersected with city streets)

Wetland Evaluation

Wetland #: 40503

Former #: 8

T_R_S: multiple

Investigator: A. Carpenter, C. Browne

Date of Visit: 8/14/2004

Obs. Method: Onsite

General Location: Boulder Creek from western boundary of city east to 30th street; Arapahoe road to Foothills Parkway

Description: Boulder Creek is the major stream flowing from west to east across the center of the city, and its perennial water and large watershed make it the centerpiece of the Boulder landscape, providing several high value ecological functions. Mostly forested wetland with plains cottonwood abundant in upper reaches and crack willow dominant in lower reaches; heavy recreational use of entire wetland. The hydrologic functions vary with location and season but generally, the creek bottomlands are associated with groundwater discharge, particularly from the south where the creek flows along the edge of a Pierre shale formation between 9th and 28th, and also in the lowland areas near 55th St (in TINR70WS27).

Wetland Origin: Natural

Primary Water Source: Creek

Hydroperiod: Seasonally flooded

Max WaterDepth (ft): 3

Major plant communities present

% of wetland area

plains cottonwood
crack willow

15
85

% Vegetated: 20
% Bare ground: 10
% Water: 70

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no Confidence in rating: c = high, b = medium, a = low

Groundwater	2	b	While local recharge may occur seasonally in certain locations, the hydrogeologic maps depict groundwater less than 5 ft below ground surface, so the effectiveness of recharge would be limited.
Recharge			
Groundwater	3	c	Geohydrology map suggests groundwater discharge may occur when the water table is high, particularly from the south where the creek flows along the edge of a Pierre shale formation between 9th and 28th, and also in the bottomland areas in TINR70WS27 near 55th St.
Discharge			
Flood Storage /	4	b	The sheer scale of Boulder Creek and its location as the major drainage corridor through the center of the city give it an important functional value for altering flood flows by receiving inflows from numerous subbasins.
Floodflow Alteration			
Shoreline Anchor. /	5	b	Local vegetation and substrate conditions may vary along this long stream corridor, but overall the shoreline stabilization function is very high.
Stabilization			
Sediment Trapping /	3	b	Perennial flows tend to move sediments through the system for deposit further downstream. Pockets of deposition along edges expected to be washed out in periods of high flows.
Retention			
Nutrient Retention	4	b	Significant retention expected in trees and shrubs and some sediments, and opportunity for input exists from the large number of nonpoint sources throughout the watershed
(long-term)			
Nutrient Retention	3	b	No significant sediment accumulation or marsh type vegetation.
(short-term)			
Food Chain Support	5	b	Plentiful overhanging trees and perennial flows for export.
(export)			
Food Chain Support	4	b	
(within basin)			
Fish Habitat / Aquatic	4	b	
Diversity			
Wildlife	4	b	
Habitat			
Active	4	c	
Recreation			
Passive Rec /	5	c	Heavy recreational use throughout. Heritage value is mostly from creek's large size and importance to the City's character.
Heritage Value			

Comments: The wetland boundaries are defined by bankful width.

Wetland Evaluation

Wetland #: 40504

Former #: 11

T_R_S: T1NR70WS29

Investigator: A. Carpenter, C. Browne

Date of Visit: 6/24/2004

Obs. Method: Onsite

General Location: Exposition Drive at intersection with 38th Ave. north of Arapahoe Ave

Description: Small constructed pond in office park located just northwest of where Boulder Creek intersects with Arapahoe.

Wetland Origin: Urban/ industrial

Primary Water Source: Ground water

Hydroperiod: Vertical fluctuations

Max WaterDepth (ft): 2

Major plant communities present

% of wetland area

% Vegetated: 20

cattail

20

% Bare ground: 0

open water

80

% Water: 80

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no **Confidence in rating: c = high, b = medium, a = low**

Groundwater evaluation	2	a	Pond bottom substrate undetermined. If unlined and not silted in, could allow some infiltration. MDG's
Recharge			indicates no interaction with underlying groundwater, but uncertain of basis for this determination.)
Groundwater edge)	2	a	High water table (<5 ft) associated with Boulder Creek could potentially discharge (e.g., along northwest
Discharge			on occasions when water table is high. See above note re 95 evaluation.
Flood Storage / Floodflow Alteration	3	b	
Shoreline Anchor. / (from Stabilization	2	a	Cattails and shrubs provide minor stabilization but most of shore is mowed and minor bank erosion evident rainfall runoff)
Sediment Trapping / Retention	2	b	Receives some sediments from runoff and no outfall observed, but relatively small drainage area.
Nutrient Retention bottom (long-term)	3	b	Relatively large source of input from geese droppings and absence of outflow means storage will occur in deposits.
Nutrient Retention (short-term)	2	b	Some short term retention in cattails.
Food Chain Support (export)	1	c	No outfall observed.
Food Chain Support (within basin)	2	b	Cattail stand.
Fish Habitat / Aquatic Diversity	2	a	Aquatic insects and dragonflies present. Water quality is possible issue and no fish observed during visit.
Wildlife Habitat	2	a	waterfowl
Active Recreation	1	c	
Passive Rec / Heritage Value	2	b	

Comments: Manicured surroundings, dense Canada goose droppings around pond, area around wetland irrigated

Wetland Evaluation

Wetland #: 40505

Former #: 21

T_R_S: T1NR70WS28

Investigator: A. Carpenter, C. Browne

Date of Visit: 8/14/2004

Obs. Method: Onsite

General Location: East of Foothills Parkway, north of bike path that runs along north side of Boulder Creek; south of parking lot for office buildings

Description: Palustrine wetland in floodplain, more or less linear features parallel Boulder Creek. Supported by stormwater runoff from parking area that serves office complex to the north and high water table.

Wetland Origin: Urban/ industrial

Primary Water Source: Urban / industrial runoff

Hydroperiod: Intermittently flooded

Max WaterDepth (ft): 0.5

Major plant communities present

% of wetland area

cattail marsh
wet meadow

15
85

% Vegetated: 98
% Bare ground: 1
% Water: 1

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no Confidence in rating: c = high, b = medium, a = low

Groundwater Recharge	2	b	Geohydrologic map indicates groundwater recharge or discharge are possible. However, effectiveness of the recharge function is limited by high water table.
Groundwater Discharge	2	b	
Flood Storage / Floodflow Alteration	2	b	Provides some storage for parking lot runoff before reaches Boulder Creek.
Shoreline Anchor. / Stabilization	1	b	No opportunity
Sediment Trapping / Retention	3	b	Parking lot runoff retained by dense Typha stand. Reduced opportunity for inflows though because of curb placements
Nutrient Retention (long-term)	3	b	Some storage in sediments and woody species
Nutrient Retention (short-term)	3	b	cattails and grasses
Food Chain Support (export)	2	b	Limited opportunity through one small outflow channel.
Food Chain Support (within basin)	3	b	
Fish Habitat / Aquatic Diversity	1	c	
Wildlife Habitat	2	b	
Active Recreation	1	c	
Passive Rec / Heritage Value	2	b	Bike path and office views

Comments: Wetland very weedy with many Russian olives and much Canada thistle; Ute ladies tresses orchid, a federally listed threatened plant species, was formerly found in wetland near western end, but was not observed in 2004 mapping project. Table 8 in Cooper's report suggests high values for this wetland for several functions, none of which were observed to be present in the 2004 evaluation. Encroaching development appears to have decreased the functional value of this wetland

Wetland Evaluation

Wetland #: 40506

Former #: 11

T_R_S: T1NR70WS28

Investigator: A. Carpenter, C. Browne

Date of Visit: 5/27/2004

Obs. Method: Onsite

General Location: West of Roche Pharmaceutical (formerly Syntex Chemical)

Description: This palustrine wetland includes a small pond located in the bottomlands associated with Boulder Creek. The source of water is a combination of urban/industrial runoff and high groundwater. Groundwater monitoring wells were installed around the wetland as part of hydrogeologic investigation at the former Syntex site to east, but detailed hydrogeology, extent of contamination, and ecologic impacts not reviewed as part of 2004 mapping project.

Wetland Origin: Urban/ industrial

Primary Water Source: Urban / industrial runoff

Hydroperiod: Permanently flooded

Max WaterDepth (ft): 3

Major plant communities present

% of wetland area

% Vegetated: 90
% Bare ground: 5
% Water: 5

crack willow / mixed graminoid
 cattail
 spike rush
 open water

75
 15
 5
 5

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no **Confidence in rating:** c = high, b = medium, a = low

Groundwater table, but Recharge	2	a	Minor infiltration of urban runoff may occur through the alluvium particularly during periods of low water unsaturated thickness is very thin.
Groundwater Discharge extent	4	b	Geohydrologic map indicates potential GW discharge area. No seeps observed but pond may intercept groundwater. Water table is mapped within 5 ft of the surface. Confidence is decreased to "low" because to which water is supplied by GW vs. surface water runoff is unknown.
Flood Storage / Creek. Floodflow Alteration	4	c	Wetland receives stormwater runoff from surrounding industrial area and is within the floodplain of Boulder Creek. Is large enough size and configuration to store significant volume.
Shoreline Anchor. / Stabilization	2	b	Little opportunity due to water sources and absence of frequent or significant erosional forces.
Sediment Trapping / Retention	4	c	
Nutrient Retention (long-term)	4	b	Woody species and sediments effectively retain sediments for long-term.
Nutrient Retention (short-term)	3	b	Cattails provide some short-term nutrient storage.
Food Chain Support of (export)	2	b	Does not appear that water frequently flows out of wetland into Boulder Creek through outfall at north end system so limited opportunity for export.
Food Chain Support former (within basin)	4	b	Some uncertainty as to whether production is reduced due to stress from possible contamination (from Syntex site -- status not reviewed).
Fish Habitat / Aquatic Diversity	2	b	Unknown water quality given history of contamination to east
Wildlife Habitat	3	b	
Active Recreation	1	b	
Passive Rec / Heritage Value	4	b	Human Society visitors and employees enjoy walking on path around wetland.

Comments: Wetland becomes wetter north to south

Wetland Evaluation

Wetland #: 40507

Former #: 11

T_R_S: T1NR70WS28

Investigator: A. Carpenter, C. Browne

Date of Visit: 6/24/2004

Obs. Method: Onsite

General Location: Immediately west of Humane Society building on 55th Street

Description: Small pond in depression at base of hill just west of Humane Society. Soils data maps area beneath Humane Society as gravel mine/dump so pond is probably located in former mined location.

Wetland Origin: Urban/ industrial

Primary Water Source: Ground water

Hydroperiod: Vertical fluctuations

Max WaterDepth (ft): 5

Major plant communities present

% of wetland area

% Vegetated: 3
% Bare ground: 0
% Water: 97

cattail	2
bulrush-cattail	1
open water	97

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no **Confidence in rating: c = high, b = medium, a = low**

Groundwater table, but Recharge	2	b	Minor infiltration of urban runoff may occur through the alluvium particularly during periods of low water thickness of unsaturated zone is very thin.
Groundwater Discharge	3	b	Extent to which pond water is supported more by groundwater or surface water runoff is undetermined.
Flood Storage / small Floodflow Alteration	2	b	No outflow observed but limited opportunity given that pond appears to receive drainage from relatively area.
Shoreline Anchor. / sides Stabilization	2	b	Mature cottonwoods and understory to north and young cottonwoods and russian olive on west and east help stabilize sloping banks (although erosional forces are limited to rainwater runoff).
Sediment Trapping / trapping. Retention	3	b	Very turbid water observed after recent stormwater inflow and absence of outflow enables effective
Nutrient Retention (long-term)	4	b	Long-term retention in sediments and mature trees, source from urban runoff.
Nutrient Retention (short-term)	3	b	Several cattail and bullrush stands along edges provide short-term retention.
Food Chain Support (export)	1	b	No outlet observed.
Food Chain Support (within basin)	2	b	Wetland consists of mostly open water with only narrow fringe vegetation.
Fish Habitat / Aquatic Diversity	2	b	Small minnows observed
Wildlife Habitat	2	b	No obvious signs of wildlife though expected to be attracted to open water. Water quality suspect based on turbidity and proximity to former Syntex site.
Active Recreation	1	c	No signs of fishing or dock.
Passive Rec / Heritage Value	2	b	Human Society visitors and employees enjoy picnic tables and walking dogs on path overlooking pond.

Comments: Small constructed pond; water very turbid and rusty brown colored; water level in pond appears to have been higher judging from presence of cottonwoods away from shoreline

Wetland Evaluation

Wetland #: 40601 **Former #:** 9 (in part) **T_R_S:** T1SR70WS6

Investigator: A. Carpenter, C. Browne **Date of Visit:** 7/5/2004 **Obs. Method:** Onsite and viewed from property

General Location: Skunk Creek south of NIST property upstream and downstream of Hollyberry Lane

Description: Narrow creek flowing through steep ravine lined with dense shrubs and trees; wetland defined by bank full channel.

Wetland Origin: Natural

Primary Water Source: Ground water

Hydroperiod: Seasonally flooded

Max WaterDepth (ft): 1

Major plant communities present

% of wetland area

% Vegetated: 25
% Bare ground: 70
% Water: 5

hackberry / chokecherry / mixed herbaceous 25
box elder / chokecherry / mixed herbaceous 70
open water 5

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no Confidence in rating: c = high, b = medium, a = low

Groundwater Recharge	2	b	Local infiltration may occur but limited by underlying materials.
Groundwater Discharge	3	c	Geohydrologic map shows upper creek as gaining reach
Flood Storage / in this Floodflow Alteration	2	b	Debris indicates high flows can occur in channel (though probably short duration). No significant storage section, but conduit for high flows.
Shoreline Anchor. / provided by Stabilization	4	b	Steep side slopes in places but dense understory provides effective stabilization. Stabilization also rocks.
Sediment Trapping / Retention	2	b	
Nutrient Retention (long-term)	3	b	
Nutrient Retention (short-term)	3	b	
Food Chain Support (export)	3	b	
Food Chain Support (within basin)	3	b	
Fish Habitat / Aquatic Diversity	1	c	Stream is shallow and ephemeral
Wildlife Habitat	3	c	wetland itself is small area but connected to adjacent open space
Active Recreation	2	a	
Passive Rec / Heritage Value	3	b	

Comments: sulfur cinquefoil a noxious weed present in adjacent upland areas; excellent wildlife habitat

Wetland Evaluation

Wetland #: 40602 **Former #:** 9 (in part) **T_R_S:** T1SR70WS6

Investigator: A. Carpenter, C. Browne

Date of Visit: 7/5/2004

Obs. Method: Onsite

General Location: Skunk Creek through Green Mountain Cemetery, north of NIST

Description: Rock sided channel with an unconsolidated bottom for approximately one half of this reach through the cemetery. At the southern end of this section, the creek passes under Anderson Ditch. Leakage from ditch contributes to channel flow as the creek flows north. To the north of the cemetery, the creek enters a concrete lined channel where all wetland functions are low to nonexistent.

Wetland Origin: Natural

Primary Water Source: Ground water

Hydroperiod: Seasonally flooded

Max WaterDepth (ft): 1

Major plant communities present

crack willow - green ash / mixed herbaceous

% of wetland area

75

% Vegetated: 5

% Bare ground: 70

% Water: 25

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no Confidence in rating: c = high, b = medium, a = low

Groundwater Recharge	2	b	Flow diminishes in cemetery but unclear extent this is do to recharge vs loss to ET or just low flows
Groundwater Discharge	2	b	Geohydrologic map shows potential for groundwater discharge when water table is high.
Flood Storage / Floodflow Alteration	2	b	High flows move through this section but no significant storage
Shoreline Anchor. / edges in Stabilization	2	b	Rock control structures provide stabilization, but vegetation not significant and includes mowed grass to places.
Sediment Trapping / areas, Retention	3	b	Source of sediments from dirt roads. Flatter grade and widening at lower end provides some deposit though flushing flows may resuspend.
Nutrient Retention (long-term)	3	b	Some long-term in crack willows and minor sediments
Nutrient Retention (short-term)	2	b	Some short resident sediments
Food Chain Support (export)	3	b	Overhanging leaves present but flushing flows are limited
Food Chain Support (within basin)	3	b	
Fish Habitat / Aquatic Diversity	1	c	Stream is shallow and ephemeral
Wildlife Habitat	2	b	
Active Recreation	1	c	
Passive Rec / Heritage Value	3	a	

Comments: Wetland defined by bankfull channel; stream channel armored; completely non-native vegetation

Wetland Evaluation

Wetland #: 40603 **Former #:** 9 (in part) **T_R_S:** T1SR70WS6 & S5

Investigator: A. Carpenter, C. Browne

Date of Visit: 7/5/2004

Obs. Method: Onsite and viewed from property

General Location: Skunk Creek downstream of Green Mountain Cemetery to Moorhead Frontage Rd. just west of US Highway 36

Description: In this section of Skunk Creek, E of BaseMar, the channel receives stormwater from nearby commercial areas and roads and begins to become downcut.

Wetland Origin: Natural

Primary Water Source: Urban / industrial runoff

Hydroperiod: Seasonally flooded

Max WaterDepth (ft): 2

Major plant communities present

% of wetland area

plains cottonwood / green ash / smooth brome
urban forest

10
90

% Vegetated: 20
% Bare ground: 50
% Water: 30

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no **Confidence in rating: c = high, b = medium, a = low**

Groundwater Recharge	2	b	
Groundwater Discharge	2	b	Geohydrologic map shows potential for groundwater discharge when water table is high.
Flood Storage / Floodflow Alteration	3	b	Channel is broader and woody debris piles across creek may help to slow flows.
Shoreline Anchor. / flows may Stabilization	3	b	Increase in understory vegetation compared to upstream section, shallower sloping bankd and slower reduce opportunity for erosional forces. Some downcutting at lower end E of Base Mar Mall.
Sediment Trapping / Retention	3	b	Silts and organic deposits in flat sections and with flood debis. Small pool with deposits to E of BaseMar.
Nutrient Retention (long-term)	3	b	Moderate productivity
Nutrient Retention (short-term)	3	b	Some bullrush at south end
Food Chain Support (export)	3	b	
Food Chain Support (within basin)	3	b	
Fish Habitat / Aquatic Diversity	1	b	Stream is shallow and ephemeral
Wildlife Habitat	2	b	
Active Recreation	1	b	
Passive Rec / Heritage Value	3	b	Bike path provides access but dense urban/commercial setting diminishes value.

Comments:

Wetland Evaluation

Wetland #: 40604 **Former #:** 9 (in part) **T_R_S:** TINR70WS32

Investigator: A. Carpenter, C. Browne **Date of Visit:** 7/5/2004 **Obs. Method:** Onsite

General Location: Skunk Creek downstream of Baseline Road to Colorado Ave.

Description: This section of Skunk Creek carries more water than upstream sections as it gains input from urban runoff and CU irrigation runoff. Increased flows and energy have created a wider downcut channel than upstream. North of Aurora there are more erosion control structures and berms as the channel narrows and downcutting is reduced. At Wellman Ditch, most of the creek water appears to be diverted into the ditch through a large headgate control structure, and the remaining water is piped under the ditch.

Wetland Origin: Natural **Primary Water Source:** Urban / industrial runoff

Hydroperiod: Seasonally flooded **Max WaterDepth (ft):** 2

Major plant communities present	% of wetland area	% Vegetated:	10
crack willow / green ash / mixed herbaceous	100	% Bare ground:	20
		% Water:	70

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no **Confidence in rating:** c = high, b = medium, a = low

Groundwater Recharge	2	b	Geohydrologic map indicates groundwater recharge or discharge are possible.
Groundwater Discharge	2	a	Depth to groundwater map shows water table is 5-10 ft below ground surface, but creek is beginning to descend from a terrace formation down to the bottomlands of Boulder Creek, and the water table is getting increasingly closer to the surface as the creek flows northward.
Flood Storage / Floodflow Alteration	2	b	
Shoreline Anchor. / Stabilization	2	c	Mature willows helping to stabilize banks in places, but in other places such as S end of Arrowhead park there is severe erosion underway.
Sediment Trapping / Retention	3	b	Dense vegetation and flat topography able to trap sediments, but upstream flow controls at ditch reduce opportunity for inputs.
Nutrient Retention (long-term)	3	b	
Nutrient Retention (short-term)	3	b	Phylarus and herbaceous vegetation provide retention
Food Chain Support (export)	3	b	Production is high but opportunity is lower because of upstream controls..
Food Chain Support (within basin)	3	b	
Fish Habitat / Aquatic Diversity	1	c	
Wildlife Habitat	2	b	small area fragmented to south and north
Active Recreation	1	c	
Passive Rec / Heritage Value	3	b	Accessible by bike path

Comments: Channel downcut up to 9 feet vertically; floodplain very narrow

Wetland Evaluation

Wetland #: 40605 **Former #:** 9 (in part) **T_R_S:** TINR70WS32

Investigator: A. Carpenter, C. Browne

Date of Visit: 7/5/2004 **Obs. Method:** Onsite

General Location: Skunk Creek channel sfrom Wellman ditch and bikepath, to the northeast to Colorado Ave.

Description: This small wetland (.25 acre) consists of dense shrub and herbaceous vegetation and itreceives the relatively low volume of water that flows beneath Wellman Ditch and remains in the Skunk Creek channel .

Wetland Origin: Urban/ industrial

Primary Water Source: Urban / industrial runoff

Hydroperiod: Seasonally flooded

Max WaterDepth (ft): 2

Major plant communities present

% of wetland area

coyote willow / reed canarygrass
crack willow / green ash / mixed herbaceous

20
80

% Vegetated: 98
% Bare ground: 1
% Water: 1

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no Confidence in rating: c = high, b = medium, a = low

Groundwater Recharge	2	b	Geohydrologic map indicates groundwater recharge or discharge are possible.
Groundwater Discharge	3	c	Geohydrologic map shows upper creek as gaining reach
Flood Storage / in this Floodflow Alteration	2	b	Debris indicates high flows can occur in channel (though probably short duration). No significant storage section, but conduit for high flows.
Shoreline Anchor. / provided by Stabilization	4	b	Steep side slopes in places but dense understory provides effective stabilization. Stabilization also rocks.
Sediment Trapping / Retention	2	b	
Nutrient Retention (long-term)	3	b	
Nutrient Retention (short-term)	3	b	
Food Chain Support (export)	3	b	
Food Chain Support (within basin)	3	b	
Fish Habitat / Aquatic Diversity	1	c	Stream is shallow and ephemeral
Wildlife Habitat	3	b	small area but may be locally important for birds and small mammals given dense development to south
Active Recreation	2	a	
Passive Rec / Heritage Value	3	b	

Comments:

Wetland Evaluation

Wetland #: 40606

Former #: 12

T_R_S: TINR70WS32

Investigator: A. Carpenter, C. Browne

Date of Visit: 6/8/2004

Obs. Method: Onsite

General Location: North of Baseline Road and east of 28th street surrounded by busy, paved roads

Description: Small pond in median parcel surrounded by roads.

Wetland Origin: Urban/ industrial

Primary Water Source: Urban / industrial runoff

Hydroperiod: Permanently flooded

Max WaterDepth (ft): 5

Major plant communities present
peach-leaved willow/mixed graminoid

% of wetland area

% Vegetated: 5
% Bare ground: 0
% Water: 95

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no **Confidence in rating:** c = high, b = medium, a = low

Groundwater substrate Recharge	2	b	Depth to groundwater is mapped at 5-10 ft below ground surface so potential recharge area, however, unknown and may limit.
Groundwater Discharge	2	a	Unlikely, but could be local seepage intersecting pond bottom during high water table periods.
Flood Storage / expected Floodflow Alteration	2	b	Small pond, that does not appear to receive stormwater drainage. (no obvious outlet observed but given volume of inflow)
Shoreline Anchor. / Stabilization	2	b	
Sediment Trapping / Retention	3	b	
Nutrient Retention (long-term)	3	b	
Nutrient Retention (short-term)	2	b	
Food Chain Support (export)	2	b	
Food Chain Support (within basin)	2	b	
Fish Habitat / Aquatic Diversity	1	b	
Wildlife Habitat	2	c	
Active Recreation	1	c	
Passive Rec / Heritage Value	1	c	

Comments: Inlet pipe (flowing at 0.5 cfs), no obvious outlet but one must exist to accommodate inflows, two pairs of red-wing blackbirds

Wetland Evaluation

Wetland #: 40607

Former #: 14

T_R_S:

Investigator: J. Sanderson, C. Browne

Date of Visit: 7/14/2004

Obs. Method: From roads

General Location: Along Bluebell Canyon Creek.

Description: Bluebell Creek is a small, sometimes ephemeral, creek flowing out of the foothills. It has a steep gradient, but low flows (spring flows likely are a few cubic feet per second; at the time of evaluation discharge was less than 1 cubic feet per second). This narrow riparian corridor winds among homes and roads.

Wetland Origin: Natural

Primary Water Source: Creek

Hydroperiod: Seasonally flooded

Max WaterDepth (ft): 1.5

Major plant communities present

% of wetland area

crack willow-green ash

5

% Vegetated: 5

% Bare ground: 5

% Water: 90

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no **Confidence in rating: c = high, b = medium, a = low**

Groundwater Recharge	2	b	Becomes losing stream but extent that reaches aquifer uncertain.
Groundwater Discharge	2	b	Discharge from hillside likely but larger volume of water contributed by precipitation
Flood Storage / Floodflow Alteration	2	b	Colluvium allows some infiltration but primarily ...carries water and no surface storage
Shoreline Anchor. / Stabilization	3	b	Shoreline anchoring (though probably more from rocks than veg.)
Sediment Trapping / Retention	2	b	
Nutrient Retention (long-term)	2	b	
Nutrient Retention (short-term)	2	b	
Food Chain Support (export)	3	b	
Food Chain Support (within basin)	2	b	
Fish Habitat / Aquatic Diversity	1	b	
Wildlife Habitat	3	b	Many prints observed, but numerous fences and proximity to homes limiting
Active Recreation	1	b	
Passive Rec / Heritage Value	2	b	access restricted to adjacent residents

Comments:

Wetland Evaluation

Wetland #: 40608

Former #: 0 (in part) **T_R_S:**

Investigator: J. Sanderson, C. Browne

Date of Visit: 10/7/2004

Obs. Method: From roads and onsite

General Location: Along King's Gulch in southwest Boulder.

Description: King's Gulch contains a small, ephemeral creek flowing out of the foothills. It has a steep gradient, but low flows (spring flows likely are a few cubic feet per second; at the time of evaluation there was no discharge. This narrow riparian corridor winds among homes and roads. Much of the channel is vegetated.

Wetland Origin: Natural

Primary Water Source: Creek

Hydroperiod: Seasonally flooded

Max WaterDepth (ft): 1.5

Major plant communities present

% of wetland area

% Vegetated: 49

open peach-leaf willow-green ash 30

% Bare ground: 1

plains cottonwood-green ash-boxelder 40

% Water: 50

Mixed graminoids 30

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no **Confidence in rating: c = high, b = medium, a = low**

Groundwater Recharge	2	b	Infiltration likely but limited effectiveness
Groundwater Discharge	2	b	Local seepage possible but thin unconsolidated limits effectiveness
Flood Storage / Floodflow Alteration	2	b	conduit only (w/ some infiltration) little surface storage
Shoreline Anchor. / Stabilization	3	b	rock wall enforcements in places
Sediment Trapping / Retention	2	b	
Nutrient Retention (long-term)	2	b	
Nutrient Retention (short-term)	2	b	
Food Chain Support (export)	2	b	
Food Chain Support (within basin)	2	b	
Fish Habitat / Aquatic Diversity	1	c	
Wildlife Habitat	3	b	
Active Recreation	1	c	
Passive Rec / Heritage Value	2	b	limited access

Comments: No photo.

Wetland Evaluation

Wetland #: 40701

Former #: 13

T_R_S: T1SR70WS7

Investigator: A. Carpenter, C. Browne, J.

Date of Visit: 6/4/2004

Obs. Method: Onsite and viewed from property

General Location: In ravine east of Table Mesa Drive, in back yards of residences

Description: Unnamed drainage north of Bear Canyon Creek (and south of Skunk Creek) which flows through a narrow steep channel located between two hills formed by Pierre shale bedrock formations. The creek channel enters a storm drain pipe near Hartford Drive and is directed beneath a residential area and discharges into Bear Canyon Creek at Table Mesa Drive. Some of the wetland area is supported by seepage from the adjacent hillside.

Wetland Origin: Natural

Primary Water Source: Creek

Hydroperiod: Intermittently flooded

Max WaterDepth (ft): 2

Major plant communities present

% of wetland area

% Vegetated: 94

% Bare ground: 5

% Water: 1

crack willow-green ash / mixed herbaceous 54
 Baltic rush - clustered field sedge 30
 Baltic rush - wooly sedge 15
 open water 1

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no **Confidence in rating:** c = high, b = medium, a = low

Groundwater Recharge	2	b	Geohydrologic map shows potential for groundwater recharge or discharge depending on water levels.
Groundwater Discharge	2	b	Groundwater discharge likely to occur along interface between bedrock and alluvial deposits, but thin unconsolidated layer and discontinuous nature of groundwater minimizes opportunity.
Flood Storage / Floodflow Alteration	3	b	
Shoreline Anchor. / Stabilization	3	b	Trees and shrubs along corridor help to stabilize slopes.
Sediment Trapping / Retention	2	b	
Nutrient Retention (long-term)	2	b	
Nutrient Retention (short-term)	2	b	
Food Chain Support (export)	2	b	Limited high flows for export.
Food Chain Support (within basin)	3	b	
Fish Habitat / Aquatic Diversity	1	c	
Wildlife Habitat	3	b	deer encountered in stream
Active Recreation	1	c	
Passive Rec / quiet Heritage Value	3	b	Steep slopes on either side limit development and preserve element of natural setting. Provides private, greenscape for adjoining properties.

Comments: Wetland very narrow, vegetation very weedy

Wetland Evaluation

Wetland #: 40702 **Former #:** 5 (in part) **T_R_S:** T1SR70WS7

Investigator: A. Carpenter, C. Browne **Date of Visit:** 7/7/2004 **Obs. Method:** Onsite

General Location: Bear Canyon Creek from City boundary east to Lehigh Street

Description: This wetland consists of a relatively high quality riparian corridor flowing through residential areas and open space in the southwestern edge of the city. The creek flows along the southeastern edge of a Pierre Shale bedrock feature (on top of which is the National Center for Atmospheric Research). There is no significant shallow groundwater in this area ("thin, discontinuous and transient"). Functional values include shoreline stability, wildlife habitat, food chain support, and passive recreation.

Wetland Origin: Natural

Primary Water Source: Creek

Hydroperiod: Seasonally flooded

Max WaterDepth (ft): 2

Major plant communities present

% of wetland area

% Vegetated: 10

narrowleaf cottonwood / chokecherry

45

% Bare ground: 50

narrowleaf cottonwood / hawthorn

45

% Water: 40

plains cottonwood / choke cherry

10

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no **Confidence in rating:** c = high, b = medium, a = low

Groundwater	2	b	There is no significant shallow aquifer in this area and the underlying rocks limit infiltration, although some
minor			
Recharge			infiltration may occur,
Groundwater	2	b	Geohydrologic map shows potential for groundwater discharge particularly upgradient along the contact
with the			
Discharge			Pierre shale formation but absence of a significant shallow aquifer limits the opportunity.
Flood Storage /	2	b	Somewhat slowed water flows and minor amounts of storage (e.g., just west of Lehigh) but generally
expect flood			
Floodflow Alteration			waters to be transported through with little alteration.
Shoreline Anchor. /	4	b	Abundant shrubs and moderate tree cover with rocky slopes effectively stabilize slopes in most of this
section.			
Stabilization			
Sediment Trapping /	2	b	
Retention			
Nutrient Retention	2	b	Some long-term retention in woody species.
(long-term)			
Nutrient Retention	3	b	In herbaceous plants and short residence time sediment deposits.
(short-term)			
Food Chain Support	4	b	Trees and shrubs provide leaf litter and flushing flows provide opportunity for export.
(export)			
Food Chain Support	4	b	High shrub productivity
(within basin)			
Fish Habitat / Aquatic	2	b	No fish habitat but aquatic insects observed.
Diversity			
Wildlife	4	b	Deer fawn & warbler nest observed. Large size buffer zone and open space access provide good
connection			
Habitat			and diversity. Lots of food choke cherry, wild plum, hawthorn, in well developed shrub layer.
Active	2	a	Hikers and kids may use.
Recreation			
Passive Rec /	4	c	Trail access through open space and natural setting increase this functional value.
Heritage Value			

Comments: Dense shrubby vegetation along stream; very nice riparian wetland; plant communities present elsewhere in study area

Wetland Evaluation

Wetland #: 40703 **Former #:** 5 (in part) **T_R_S:** T1SR70WS8

Investigator: A. Carpenter, C. Browne

Date of Visit: 7/6/2004 **Obs. Method:** Onsite

General Location: Bear Canyon Creek down stream from Lehigh Street to Broadway

Description: This section of creek flows through the median strip on Table Mesa Drive to at newly constructed wetland in 100- foot segment just west of Broadway. The channel has been straightened and contains many grade control structures.

Wetland Origin: Natural

Primary Water Source: Creek

Hydroperiod: Seasonally flooded

Max WaterDepth (ft):

Major plant communities present

% of wetland area

% Vegetated: 94
% Bare ground: 1
% Water: 5

reed canary grass	85
coyote willow / reed canarygrass	10
open water	5

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no **Confidence in rating:** c = high, b = medium, a = low

Groundwater Recharge	2	b	see below
Groundwater and Discharge	2	b	Geohydrologic map shows potential for groundwater discharge or recharge depending on water levels and location. But, thin discontinuous nature of shallow groundwater limits effectiveness of this function.
Flood Storage / Mesa Floodflow Alteration	2	b	Some small pools with relatively low storage and flood plain is restricted by edge of median strip in Table Mesa Drive.
Shoreline Anchor. / Stabilization	2	b	No significant woody veg. Engineered structures provide most of stabilization. Bank was observed to be undercut in places.
Sediment Trapping / Retention	3	b	Moderate deposits of sand from roadside runoff in vicinity of bridges and behind dams, and in settling pools. But, most expected to flow through with significant settling occurring at the new wetland just west of Broadway.
Nutrient Retention (long-term)	2	b	Some long-term storage in coyote willows and sediments but uncertain as to extent that deposits are temporary.
Nutrient Retention (short-term)	3	b	Assumes mostly short residence sediments
Food Chain Support (export)	2	b	Low to moderate overhanging limbs to supply leaf litter. (Cooper evaluation referred to larger stream segment)
Food Chain Support (within basin)	2	b	see above
Fish Habitat / Aquatic Diversity	1	b	
Wildlife Habitat	2	c	
Active Recreation	1	c	
Passive Rec / Heritage Value	2	b	

Comments: Channel completely straightened; low diversity wetland with lots of reed canarygrass

Wetland Evaluation

Wetland #: 40704 **Former #:** 5 (in part) **T_R_S:** T1SR70WS5

Investigator: A. Carpenter, C. Browne **Date of Visit:** 7/7/2004 **Obs. Method:** Onsite and viewed from property

General Location: Bear Canyon Creek from Broadway downstream (north) to US Highway 36

Description: This section of channel has been straightened and is lined with boulders on one (and sometimes both sides) for most of the length; nearly all of channel bottom is filled with cobbles; some sections of channel are concrete lined on sides and bottom; At Broadway, headgate to Anderson Ditch indicates diversions that reduce flows in this section of Bear Canyon Creek (but did not evaluate extent of flow alterations).

Wetland Origin: Natural

Primary Water Source: Creek

Hydroperiod: Seasonally flooded

Max WaterDepth (ft): 1.5

Major plant communities present

% of wetland area

% Vegetated: 5
% Bare ground: 20
% Water: 75

urban forest / mixed herbaceous	60
plains cottonwood / coyote willow	30
open water	10

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no **Confidence in rating:** c = high, b = medium, a = low

Groundwater Recharge	2	b	see below
Groundwater Discharge	2	b	Geohydrologic map shows potential for groundwater discharge or recharge depending on water levels and location. But, thin discontinuous nature of shallow groundwater limits effectiveness of this function.
Flood Storage / Floodflow Alteration	2	b	
Shoreline Anchor. / Stabilization	3	b	Water flows in this section are altered by upstream diversion into Anderson ditch so reduced opportunity. .
Sediment Trapping / Retention	2	b	Urban runoff provides source but flashing flows appear to transport out.
Nutrient Retention (long-term)	2	b	
Nutrient Retention (short-term)	2	b	
Food Chain Support (export)	3	b	Significant overhanging limbs to supply leaf litter.
Food Chain Support (within basin)	3	b	
Fish Habitat / Aquatic Diversity	1	b	
Wildlife Habitat	2	a	
Active Recreation	2	a	Kids observed playing in the stream.
Passive Rec / Heritage Value	2	b	Bear Creek greenway trail follows alongside much of the creek and creek flows through a city park

Comments: wetland defined by bankful channel; forested wetland along creek; not very weedy; channel armored downstream of Martin

Wetland Evaluation

Wetland #: 40705

Former #: 6

T_R_S: T1NR70WS33

Investigator: A. Carpenter, C. Browne

Date of Visit: 7/2/2004

Obs. Method: Onsite

General Location: Bear Canyon Creek from 300 feet southwest of Baseline Road downstream (north) into Wellman Ditch and beyond as creek channel continues north and parallel to Foothills Parkway up to inlet from Skunk Creek (Note this wetland includes former Cooper #6 as well as a portion of #7)

Description: Bear Canyon Creek flows into Wellman Ditch just west of Foothills with some water passing through a control structure to continue flowing north. Channel south of ditch is straightened and entrenched, downcutting has isolated creek from floodplain in places. Northern section is broader floodplain, more than one channel, with mature trees.

Wetland Origin: Natural

Primary Water Source: Urban / industrial runoff

Hydroperiod: Seasonally flooded

Max WaterDepth (ft): 2

Major plant communities present

% of wetland area

% Vegetated: 9
% Bare ground: 1
% Water: 90

crack willow / mixed herbaceous	75
reed canarygrass	2
open water	1
plains cottonwood - crack willow / mixed	22

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no Confidence in rating: c = high, b = medium, a = low

Groundwater Recharge	2	b	
Groundwater Discharge	2	b	High water table (within 5 ft) so potential for discharge.
Flood Storage / Floodflow Alteration	4	b	Side channels with small islands throughout. Northern section includes broad floodplain.
Shoreline Anchor. / grassy Stabilization	2	c	Signs of downcut channel and erosion occurring since Cooper evaluation. Most of shoreline consists of banks with interspersed crack willows.
Sediment Trapping / Retention	3	b	Evidence of deposits in pockets, side channels and overflow areas.
Nutrient Retention (long-term)	3	b	Some long-term retention in sediments and mature trees. (Could have higher value in north end of wetland.)
Nutrient Retention (short-term)	3	b	Could be somewhat lower value in southern portion of wetland.
Food Chain Support (export)	4	b	Abundant mature willows in north section.
Food Chain Support (within basin)	3	b	Could be higher value in north section.
Fish Habitat / Aquatic Diversity	3	b	Lots of minnows and a 6" trout observed, also crayfish.
Wildlife Habitat	3	b	
Active Recreation	1	b	
Passive Rec / Heritage Value	4	b	Bike trail has improved access and passive recreation use since previous evaluation.

Comments: Narrow strip of forested wetland along Bear Canyon Creek; mostly crack willow. Functional values of wetland are higher in northern portion of this wetland where floodplain broadens. Inflow from Skunk creek is north boundary of this wetland.

Wetland Evaluation

Wetland #: 40706

Former #: 7

T_R_S: T1NR70WS33 &

Investigator: A. Carpenter, C. Browne

Date of Visit: 8/14/2004

Obs. Method: Onsite

General Location: East of Foothills Parkway/ north and south of Arapahoe Ave

Description: Bear Canyon Creek includes section downstream of inflow from Skunk Creek. Creek flows through bottomlands as approaches Boulder Creek to the north and receives significant urban runoff from Arapahoe and Foothills Parkway. (Note that the small wetland north of Arapahoe which Cooper Id'd as No. 11 is also included in this wetland.)

Wetland Origin: Natural

Primary Water Source: Creek

Hydroperiod: Seasonally flooded

Max WaterDepth (ft): 2

Major plant communities present

% of wetland area

% Vegetated: 55

% Bare ground: 0

% Water: 45

cattail marsh

10

coyote willow

35

reed canary grass- cattail

10

open water

45

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no Confidence in rating: c = high, b = medium, a = low

Groundwater Recharge	2	b	May recharge during low water table periods, but not significant.
Groundwater Discharge	2	b	
Flood Storage / Floodflow Alteration	3	b	
Shoreline Anchor. / Stabilization	3	b	Cooper's higher value probably reflects difference in boundaries.
Sediment Trapping / Retention	4	b	
Nutrient Retention (long-term)	3	b	
Nutrient Retention (short-term)	3	b	
Food Chain Support (export)	3	b	
Food Chain Support (within basin)	3	b	Some aquatic vegetation, abundant willows.
Fish Habitat / Aquatic Diversity	3	b	Small minnows observed in channel.
Wildlife Habitat	3	b	Good for birds, fragmented by roads. Deer trails and beds.
Active Recreation	1	b	
Passive Rec / Heritage Value	2	b	Access ok but area is narrow and bounded by Parkway on the west.

Comments: Water source includes the re-routed end of Skunk Creek from outlet of wetlands north of CU research park.

Wetland Evaluation

Wetland #: 40801 **Former #:** 12 (in part) **T_R_S:** T1SR70WS8

Investigator: A. Carpenter, C. Browne, J. **Date of Visit:** 6/4/2004 **Obs. Method:** Onsite

General Location: Viele Lake, immediately south west of South Boulder Rec. Center

Description: Lake is probably located in natural depression that was enhanced for the park. Located at base of bedrock formation where it collects surface water runoff from hillside and local groundwater seepage along contact with rock interface. Water was turbid at time of visit; pond has sport fishing; used by anglers on shore.

Wetland Origin: Agriculture

Primary Water Source: Ground water

Hydroperiod: Permanently flooded

Max WaterDepth (ft): 3

Major plant communities present

% of wetland area

% Vegetated: 5
% Bare ground: 0
% Water: 95

Major plant communities present	% of wetland area
cattail	4
American three square	0.5
Baltic rush	0.5
open water	95

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no **Confidence in rating:** c = high, b = medium, a = low

Groundwater by Recharge	2	b	Some recharge may occur along the north downgradient side, but opportunity to infiltrate may be restricted by permeability of underlying rocks and thin unconsolidated layer.
Groundwater Discharge	3	b	Geohydrology maps indicate groundwater discharge likely from south and east sides along contact with Pierre shale bedrock feature. Relative inputs from subsurface inflows versus surface water runoff from hillsides is uncertain.
Flood Storage / Floodflow Alteration	3	b	Site visit probably coincided with high water levels hence no water line exposed. But, likely to have some moderate aboveground storage capacity.
Shoreline Anchor. / Stabilization	2	b	Mowed to edge in places. Limited opportunity other than wind.
Sediment Trapping / Retention	4	b	Erosion from steep hillside slopes provides source of sediments.
Nutrient Retention (long-term)	3	b	Accumulation of sediments and high input of nutrients from geese.
Nutrient Retention (short-term)	3	b	Some short-term sediments and herbaceous/emergent retention.
Food Chain Support (export)	2	b	Overhanging vegetation provides some input but flushing flows and high levels to export are probably infrequent.
Food Chain Support (within basin)	3	a	
Fish Habitat / Aquatic Diversity	4	b	Fish observed and fairly large lake.
Wildlife Habitat	3	b	Active urban park setting may limit amount of wildlife. Great blue heron observed along with waterfowl.
Active fishing Recreation	5	b	Few lakes of this size and accessibility close to residences within Boulder. Provides value for boating and uses.
Passive Rec / Heritage Value	5	b	Visitors to rec. center enjoy paths and view.

Comments: Most of Russian olives have been killed; lots of weeds surrounding the wetland

Wetland Evaluation

Wetland #: 40802 **Former #:** 12 (in part) **T_R_S:** T1SR70WS8

Investigator: A. Carpenter, C. Browne, J. **Date of Visit:** 6/4/2004 **Obs. Method:** Onsite

General Location: Drainage channel east of Viele lake and west of Broadway running along bike path

Description: Includes two disconnected sections; upper section near Viele Lake is slightly broader and mostly plains cottonwood, peach-leaf willow, and cattail; lower section is a narrow channel containing mostly has weedy species

Wetland Origin: Natural

Primary Water Source: Ground water

Hydroperiod: Intermittently flooded

Max WaterDepth (ft): 1

Major plant communities present

% of wetland area

% Vegetated: 50

cattail	25
coyote willow	30
peach-leaf willow	10
plains cottonwood	10
open water	25

% Bare ground: 25

% Water: 25

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no Confidence in rating: c = high, b = medium, a = low

Groundwater Recharge 2 b Geohydrologic map shows potential for groundwater recharge or discharge depending on water levels.

Groundwater Discharge 2 b .

Flood Storage / Floodflow Alteration 2 b Small area with limited capacity.

Shoreline Anchor. / Stabilization 2 b Little opportunity as upstream lake expected to moderate heavy flows.

Sediment Trapping / Retention 2 b

Nutrient Retention (long-term) 2 b

Nutrient Retention (short-term) 2 b

Food Chain Support (export) 2 b Limited high flows.

Food Chain Support (within basin) 2 b

Fish Habitat / Aquatic Diversity 1 c Previous evaluation higher because it included Viele Lake.

Wildlife Habitat 2 b

Active Recreation 1 c Previous evaluation higher because it included Viele Lake.

Passive Rec / Heritage Value 2 b Bike path offers access and vegetated corridor. Previous evaluation higher because it included Viele Lake.

Comments: very weedy

Wetland Evaluation

Wetland #: 40803 **Former #:** 12 (in part) **T_R_S:** T1SR70WS9

Investigator: A. Carpenter, C. Browne, J. **Date of Visit:** 6/8/2004 **Obs. Method:** Onsite

General Location: Tantra Lake and associated channels; east of Moorhead, west of Tantra Dr.

Description: Located in Tantra subdivision; heavily manicured, and shoreline of lake is heavily used by local residents

Wetland Origin: Mining	Primary Water Source: Ground water
Hydroperiod: Permanently flooded	Max WaterDepth (ft): 5
Major plant communities present	% of wetland area
plains cottonwood - peach - leaf willow - crack	10
openwater	90
	% Vegetated: 10
	% Bare ground: 0
	% Water: 90

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no **Confidence in rating: c = high, b = medium, a = low**

Groundwater is in	2	b	Though geology of area consists of unconsolidated alluvial deposits, history as a gravel pit suggests pond area that was excavated down to a less permeable layer. So, recharge potential is probably low.
Recharge			
Groundwater Primarily a	2	b	Insufficient geohydro informaion to be able to rule out potential for discharge when water table is high.
Discharge			surface water fed lake however so significance of input from groundwater is low.
Flood Storage / Floodflow Alteration	3	b	
Shoreline Anchor. / present.	2	b	Mowing to edges reduces ability for vegetation to effectively stabilize, but some typha and sparse trees
Stabilization			
Sediment Trapping / sediments to	3	a	Turbid water at outfall indicates some flowthrough, but low flows through lake typically allow heavier
Retention			drop out.
Nutrient Retention (long-term)	3	b	Very few trees and shrubs but moderate sedimentation.
Nutrient Retention (short-term)	2	b	Some typha.
Food Chain Support (export)	2	c	Low production and limited flushing flows.
Food Chain Support (within basin)	3	b	Insects, emergent veg., and small fish provide food for birds, waterfowl and fish
Fish Habitat / Aquatic Diversity	3	c	
Wildlife around Habitat	3	b	Heron, swan, geese present, and lake channel connects to nice wetland to south. But, lack of buffer lake limits habitat for wildlife.
Active Recreation	2	b	
Passive Rec / Heritage Value	4	c	Lake provides amenity for residential development but does not offer heritage value.

Comments: This wetland includes a fairly narrow channel above and below Tantra Lake

Wetland Evaluation

Wetland #: 40804 **Former #:** 12 (in part) **T_R_S:** T1SR70WS9

Investigator: A. Carpenter, C. Browne

Date of Visit: 8/16/2004 **Obs. Method:** onsite

General Location: In park south of Tantra Lake access via public sidewalk from Moorehead Circle south of Tantra Lake sales office

Description: Many leopard frogs present; concrete-lined pond; one outlet pipe in NW corner of pond; no inlet pipe observed, but S. Boulder/Bear Creek ditch to southeast may support.

Wetland Origin: Urban/ industrial

Primary Water Source: Urban / industrial runoff

Hydroperiod: Semi-permanently flooded

Max WaterDepth (ft): 2

Major plant communities present

% of wetland area

urban forest
open water

25
75

% Vegetated: 0
% Bare ground: 0
% Water: 100

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no Confidence in rating: c = high, b = medium, a = low

Groundwater Recharge	1	c	Concrete lined/No interaction with subsurface.
Groundwater Discharge	1	c	
Flood Storage / Floodflow Alteration	2	b	Receives some rainwater runoff via ditch but limited opportunity and small pond area.
Shoreline Anchor. / Stabilization	1	c	
Sediment Trapping / Retention	2	b	Some minor sediment deposits but input is limited
Nutrient Retention (long-term)	2	b	Minor amt in seds.
Nutrient Retention (short-term)	2	b	
Food Chain Support (export)	2	b	Low productivity and low vol. of export water
Food Chain Support (within basin)	2	b	
Fish Habitat / Aquatic Diversity	2	b	Frogs and dragonflies present, but small pond area.
Wildlife Habitat	2	b	small mammals and birds may visit for water supply and food
Active Recreation	1	b	
Passive Rec / Heritage Value	2	b	Paths pass by.

Comments: Very small constructed concrete lined pond surrounded by trees; leopard frogs present

Wetland Evaluation

Wetland #: 40805 **Former #:** 12 (in part) **T_R_S:** T1SR70WS9

Investigator: A. Carpenter, C. Browne **Date of Visit:** 6/8/2004 **Obs. Method:** Onsite

General Location: On Viele Channel east of Tantra Drive to CU access road

Description: Nice wetland with good wildlife habitat, Canada geese nesting, bull frogs present, evidence of past beaver activity (old beaver-chewed tree stumps).

Wetland Origin: Mining

Primary Water Source: Ground water

Hydroperiod: Saturated

Max WaterDepth (ft): 3

Major plant communities present
cattail

% of wetland area
50

% Vegetated: 50
% Bare ground:
% Water: 50

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no **Confidence in rating: c = high, b = medium, a = low**

Groundwater Recharge	2	b	Unlikely but not impossible when water table low and surface water high
Groundwater Discharge	3	b	Insufficient geohydro information reviewed to be able to evaluate extent of discharge. Primarily a ditch fed wetland, however, so significance of input from groundwater is expected to be low.
Flood Storage / waters.	3	b	upstream ditches and lake controls expected to moderate the opportunity for this wetland to receive flood waters.
Floodflow Alteration			Previous evaluation apparently included additional wetlands to the east which are outside the limits of the current study area.
Shoreline Anchor. / Stabilization	3	b	
Sediment Trapping / Retention	3	b	
Nutrient Retention (long-term)	3	b	
Nutrient Retention (short-term)	3	b	
Food Chain Support (export)	3	b	
Food Chain Support (within basin)	4	b	
Fish Habitat / Aquatic Diversity	3	c	
Wildlife Habitat	4	b	
Active Recreation	1	b	
Passive Rec / evaluation	4	c	Boardwalk and plaques in small park provide educational /heritage and passive rec. value. Previous evaluation must have preceded access and park development.
Heritage Value			

Comments: wetland weedy

Wetland Evaluation

Wetland #: 40901

Former #: 15 (in part)

T_R_S: T1SR70WS3

Investigator: A. Carpenter, C. Browne

Date of Visit: 6/2/2004

Obs. Method: Onsite

General Location: Ponds immediately south of East Boulder Recreation Center

Description: Two constructed ponds that encompass nearly 6 acres.

Wetland Origin: Urban/ industrial

Primary Water Source: Urban / industrial runoff

Hydroperiod: Permanently flooded

Max WaterDepth (ft):

Major plant communities present

% of wetland area

% Vegetated: 1
% Bare ground: 0
% Water: 99

plains cottonwood / mixed graminoid
 cattail
 wooly sedge / mixed graminoid
 mixed graminoid
 open water

2
 1
 1
 1
 95

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no **Confidence in rating:** c = high, b = medium, a = low

Groundwater Recharge	2	b	
Groundwater Discharge	2	c	
Flood Storage / Floodflow Alteration	2	c	
Shoreline Anchor. / Stabilization	2	b	
Sediment Trapping / Retention	3	b	
Nutrient Retention (long-term)	3	b	
Nutrient Retention (short-term)	3	b	
Food Chain Support (export)	2	b	low opportunity due to controls
Food Chain Support (within basin)	2	b	mowed to edges
Fish Habitat / Aquatic Diversity	3	c	
Wildlife Habitat	2	b	geese, but human activity and dogs probably reduce effectiveness of area for wildlife
Active Recreation	5	c	Frequent use of ponds in dog park area
Passive Rec / Heritage Value	4	b	Rec. center visitors

Comments: margins partially manicured (with some unmaintained areas) resident Canada goose population

Wetland Evaluation

Wetland #: 40902 **Former #:** 15 (in part) **T_R_S:** T1SR70WS3

Investigator: A. Carpenter, C. Browne, J.

Date of Visit: 6/2/2004

Obs. Method: Onsite

General Location: Constructed wetland east of East Boulder Recreation Center and west of South Boulder Creek in South Boulder Creek flood plain

Description: Palustrine wetland, cattails and grasses. Located in floodplain of South Boulder Creek and supported by high groundwater.

Wetland Origin: Urban/ industrial

Primary Water Source: Ground water

Hydroperiod: Saturated

Max WaterDepth (ft): 2

Major plant communities present

% of wetland area

% Vegetated: 90

open water	10
cattail	45
mixed graminoid	40
reed canarygrass	4
plains cottonwood/mixed graminod	1

% Bare ground: 0
% Water: 10

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no **Confidence in rating:** c = high, b = medium, a = low

Groundwater Recharge	2	b	
Groundwater and Discharge	3	c	Water table mapped within 5 ft of ground, and construction grading appears to have been designed to try intercept high groundwater
Flood Storage / Floodflow Alteration	2	b	limited opportunity
Shoreline Anchor. / Stabilization	2	b	limited opportunity
Sediment Trapping / Retention	2	b	Limited source
Nutrient Retention (long-term)	2	b	No woody species or sig. sed. Deposits
Nutrient Retention (short-term)	3	b	cattails
Food Chain Support (export)	1	b	No outflow observed nor evident from the past
Food Chain Support (within basin)	3	b	
Fish Habitat / Aquatic Diversity	2	b	Very small area of open water at south end for aquatic insects
Wildlife Habitat	3	b	
Active Recreation	1	b	
Passive Rec / Heritage Value	3	c	

Comments: Quite a nice wetland with major red wing black bird nesting area

Wetland Evaluation

Wetland #: 40903

Former #: 14

T_R_S: T1SR70WS4

Investigator: A. Carpenter, C. Browne

Date of Visit: 6/30/2004

Obs. Method: Onsite and viewed from property

General Location: South of intersection of Baseline Road and Foothills Parkway

Description: Wetland is located at interface between two landforms -- at the base an upland terrace to the southwest (associated with Pierre shale formation) and on the western edge of the lowlands associated with S. Boulder Creek. Water flows through a pipe under Foothills and along Baseline before eventually discharging into Dry Creek ditch No. 2. It is supported by a combination of urban runoff and a high water table. It receives significant urban runoff from major transportation routes as well and has a high functional value for nutrient and sediment retention. It could be easily improved by less mowing on the edges, tree plantings and/or limited regrading.

Wetland Origin: Urban/ industrial

Primary Water Source: Urban / industrial runoff

Hydroperiod: Intermittently flooded

Max WaterDepth (ft): 1

Major plant communities present

% of wetland area

% Vegetated: 99

cattail- bulrush	35
meadow foxtail	10
cattail- reed canarygrass	50
wet meadow	5

% Bare ground: 0

% Water: 1

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no **Confidence in rating:** c = high, b = medium, a = low

Groundwater Recharge	2	b	Could potentially recharge when water table declines and surface inflows are high.
Groundwater Discharge	3	b	Located at the base of a Pierre Shale bedrock formation along the base of a terrace, where groundwater discharge is likely to occur along the contact in the southwest portion of the wetland
Flood Storage / Floodflow Alteration	3	b	Receives significant stormwater runoff from Baseline and Foothills Parkway.
Shoreline Anchor. / Stabilization	2	b	Little opportunity.
Sediment Trapping / extent Retention	4	c	Cattail bullrush stands in channel trap sediments effectively. Thick deposits observed. Only uncertainty is to which large storm can resuspend sediments & transport.
Nutrient Retention (long-term)	4	b	Sediments, source from road runoff
Nutrient Retention (short-term)	3	b	cattails
Food Chain Support wetland (export)	2	b	Although in channel production is relatively high it is mostly in cattails and no mobile leaf litter. Overall area is fairly small. Also flushing flows are expected to be infrequent.
Food Chain Support (within basin)	2	b	Relatively small area and could be easily enlarged to increase effectiveness.
Fish Habitat / Aquatic Diversity	1	c	
Wildlife Habitat	2	a	possibly small mammals and birds
Active Recreation	1	c	
Passive Rec / Heritage Value	1	b	

Comments: Stormwater conveyance channel and overflow area

Wetland Evaluation

Wetland #: 40904

Former #: 12

T_R_S: T 1SR70WS4

Investigator: A. Carpenter, C. Browne

Date of Visit: 7/4/2004

Obs. Method: Onsite

General Location: Thunderbird Lake, north of Frasier Meadows Manor retirement home

Description: Pond sits in a depression on a terrace feature underlain by Pierre shale bedrock. Previous assessor noted pond was constructed in former gravel pit. Appears to have experienced significant decline in water level. Water very turbid, yellow in color.

Wetland Origin: Mining

Primary Water Source: Ground water

Hydroperiod: Permanently flooded

Max WaterDepth (ft): 2

Major plant communities present

% of wetland area

% Vegetated: 8
% Bare ground: 2
% Water: 90

bulrush	8
bare ground	2
openwater	90

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no **Confidence in rating: c = high, b = medium, a = low**

Groundwater pond	2	a	Located on a terrace, in small pocket of alluvial deposits surrounded by Pierre shale bedrock. Uncertain if bottom is bedrock as previous assessor noted pond is in former gravel pit. Some infiltration along fringe when water level is high.
Recharge possible			
Groundwater from Discharge	2	b	Appears to be a perched rainwater collection pond. Local groundwater probably contributes some inflows the southwest, but shallow aquifer is thin in this area.
Flood Storage / view).	2	b	Low opportunity due to topography and apparent absence of inflow pipes (dark water color obscured
Floodflow Alteration			
Shoreline Anchor. / Stabilization	2	c	Little opportunity other than from wind and bullrushes along edges are somewhat effective.
Sediment Trapping / Retention	2	b	Sediment accumulation is limited due to the absence of surface water inflows.
Nutrient Retention (long-term)	3	b	Long-term nutrient retention is occurring because of accumulation of waste from waterfowl and absence of significant outflow.
Nutrient Retention (short-term)	2	b	Short-term retention in bullrush stands.
Food Chain Support (export)	1	b	
Food Chain Support (within basin)	3	b	
Fish Habitat / Aquatic Diversity	2	a	Water quality suspect. (algae bloom?) Probably very high conductivity and low oxygen
Wildlife Habitat	2	b	waterfowl (baby ducks present)
Active Recreation	1	a	
Passive Rec / Heritage Value	3	a	Park surrounds pond and provides excellent access, but suspect that drought and poor water quality have degraded the pond along with its aesthetic quality.

Comments: Water level in pond down substantially from peak; mud flats abundant on western, southern sides of pond

Wetland Evaluation

Wetland #: 40905

Former #: 11

T_R_S: T1NR70S24

Investigator: J. Sanderson, C. Browne

Date of Visit: 6/29/2004

Obs. Method: Onsite

General Location: In the Meadow Glen subdivision, east of 55th and north of Baseline

Description: A series of shallow ponds with little to no fringe, connected by narrow channels in the highly manicured open space of the Meadow Glen subdivision

Wetland Origin: Mining

Primary Water Source: Ditch

Hydroperiod: Semi-permanently flooded

Max WaterDepth (ft): 3

Major plant communities present
cattail

% of wetland area
2

% Vegetated: 2
% Bare ground: 0
% Water: 98

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no **Confidence in rating: c = high, b = medium, a = low**

Groundwater limits	2	b	Geohydrology map indicates potential for groundwater recharge. But high water table <5 ft below ground
Recharge			effectiveness.
Groundwater Discharge	2	b	
Flood Storage / Floodflow Alteration	3	b	Receives stormwater inflow from Baseline Road at south end. (Increased ranking based on large size and opportunity)
Shoreline Anchor. / Stabilization	2	b	manicured lawn, rubble substrate in places
Sediment Trapping / Retention	3	c	
Nutrient Retention (long-term)	2	b	
Nutrient Retention (short-term)	3	b	
Food Chain Support (export)	2	b	
Food Chain Support (within basin)	2	b	
Fish Habitat / Aquatic Diversity	3	b	
Wildlife Habitat	3	b	
Active Recreation	1	b	prohibited by homeowners assoc.
Passive Rec / Heritage Value	4	c	

Comments: cut/poison tamarisk plants

Wetland Evaluation

Wetland #: 40906

Former #: 35

T_R_S: T1NR70WS34

Investigator: J. Sanderson, C. Browne

Date of Visit: 6/29/2004

Obs. Method: Onsite

General Location: East side of Meadow Glen Park

Description: Palustrine wetland comprised of cattails, reed canary grass and sedge. The mapped wetland area has changed much since previous mapping. Fill was placed on 1/2 of it and Meadow Glen Park was built.

Wetland Origin: Agriculture

Primary Water Source: Ditch

Hydroperiod: Saturated

Max WaterDepth (ft): 2

Major plant communities present

% of wetland area

% Vegetated: 95

% Bare ground: 0

% Water: 5

cattail	25
pond weed	3
manna	2
wooly sedge	30
reed canary grass	25

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no Confidence in rating: c = high, b = medium, a = low

Groundwater limits	2	b	Geohydrology map indicates potential for groundwater recharge. But high water table <5 ft below ground
Recharge			effectiveness.
Groundwater Discharge	4	b	Vegetation patterns on slopes suggest seepage but no seeps observed directly. High ground water.
Flood Storage / Floodflow Alteration	3	b	In puts limited, but large area with irregular surfaces has potential to be effective stormwater control.
Shoreline Anchor. / Stabilization	2	b	Little opportunity
Sediment Trapping / Retention	3	b	
Nutrient Retention (long-term)	3	b	
Nutrient Retention (short-term)	3	b	
Food Chain Support (export)	2	b	
Food Chain Support (within basin)	3	b	
Fish Habitat / Aquatic Diversity	2	a	aquatic insects may be present
Wildlife Habitat	4	b	deer , birds, small mammals
Active Recreation	1	b	prohibited by homeowners assoc.
Passive Rec / Heritage Value	4	b	located adjacent to Meadow Glen Park

Comments: There are many areas that are a mess of wetland species and upland species (sep. weeds), but don't appear to have hydric soils and hydrology; suggesting that the wetland has been affected by recent disturbances and plant communities may still

Wetland Evaluation

Wetland #: 40907

Former #: 11

T_R_S: T1NR70WS34

Investigator: A. Carpenter, C. Browne

Date of Visit: 7/6/2004

Obs. Method: Onsite

General Location: Flatirons Golf Course, south of Arapahoe ave and east of 55th Street

Description: Mostly constructed ponds and connecting channels; one area of natural wet meadow wetland in northeastern corner of golf course.

Wetland Origin: Urban/ industrial

Primary Water Source: Ditch

Hydroperiod: Seasonally flooded

Max WaterDepth (ft): 5

Major plant communities present

% of wetland area

% Vegetated: 7
% Bare ground: 0
% Water: 93

prairie cordgrass	0.5
sedge meadow	4
bulrush	0.5
open water	95

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no **Confidence in rating: c = high, b = medium, a = low**

Groundwater Recharge	2	b	In upper areas recharge may occur in select locations but clay soils limit effectiveness.
Groundwater Discharge	3	c	Although ditch water is the main source of water that maintains the extensive network of ponds on the golf course, groundwater discharge contributes as well.
Flood Storage / Floodflow Alteration	2	b	
Shoreline Anchor. / Stabilization	2	b	Main source of erosion would be from recreational use, and turf is mowed to edges in most areas.
Sediment Trapping / Retention	2	b	
Nutrient Retention manager (long-term)	3	c	Some portion of incoming nutrient load settles out in ponds and is retained in mature trees. Course reports no elevated nitrates in water samples from course (and pesticides are no longer used onsite and were higher at the inlet than outlet)
Nutrient Retention (short-term)	2	b	
Food Chain Support (export)	2	c	
Food Chain Support (within basin)	2	c	
Fish Habitat / Aquatic fish kill in Diversity	2	c	Striped bass reported, carp, bluegill, snapping turtle. Fairly abundant fish population, Cause of a recent spring 04 unknown.
Wildlife Habitat	2	c	Deer and waterfowl
Active Recreation	1	b	No boating or fishing so not active uses.
Passive Rec / Heritage Value	4	c	Golf course amenity. Only prairie cordgrass community observed in City wetlands.

Comments: Ponds typically have a narrow fringe (2-3 ft. wide) of sedges around the edge

Wetland Evaluation

Wetland #: 40908 **Former #:** 52 (in part) **T_R_S:** T1NR70WS27

Investigator: J. Sanderson, C. Browne, A. **Date of Visit:** 6/1/2004 **Obs. Method:** Onsite and viewed from property

General Location: North of Arapahoe Ave., south of railroad tracks, surrounded by industrial buildings, north of Flatirons Golf Course; includes small pond, to culvert that runs under business/ industrial complex

Description: Narrow channels and pond north of the golf course carrying water via channel identified as Dry Creek (more accurately described as Dry Creek No. 2 dtch) flowing into the wetlands to the north. Functional values are reduced somewhat by current mowing practices and limited vegetation in southern part of wetland.

Wetland Origin: Urban/ industrial

Primary Water Source: Ground water

Hydroperiod: Intermittently flooded

Max WaterDepth (ft): 0.5

Major plant communities present

% of wetland area

% Vegetated: 97

coyote willow / wooly sedge

85

% Bare ground: 0

open water

15

% Water: 3

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no **Confidence in rating:** c = high, b = medium, a = low

Groundwater Recharge	2	b	Minor amount possible when water table drops, in ponds and in southern (upgradient end)
Groundwater Discharge	3	c	Geohydrologic maps indicate groundwater discharge likely to occur, however, relative input appears to be greater from surface water from urban runoff and golf course irrigation.
Flood Storage / Floodflow Alteration	3	b	Narrow chanel mowed to edges limits effectiveness though ponds provide some storage. (Cooper was evaluating larger system which we have subdivided)
Shoreline Anchor. / Stabilization	3	b	Crack willow roots along banks
Sediment Trapping / Retention	4	b	In ponds
Nutrient Retention (long-term)	3	b	In mature trees and pond sediments
Nutrient Retention (short-term)	4	b	In cattails
Food Chain Support (export)	2	b	Relatively low op. for flushing flows
Food Chain Support (within basin)	2	b	Lawn up to edge reduces productivity
Fish Habitat / Aquatic Diversity	2	a	
Wildlife Habitat	2	b	Small mammals and birds, diverse food supply.
Active Recreation	1	b	
Passive Rec / Heritage Value	2	b	Rich plant diversity.

Comments: Vegetation weedy; adjacent grounds maintained to edge of southern reach of stream and pond. Wetland includes a pond, very narrow margin around pond, and stream channel.

Wetland Evaluation

Wetland #: 40909 **Former #:** 52 (in part) **T_R_S:** T1NR70WS27

Investigator: A. Carpenter, C. Browne

Date of Visit: 6/1/2004

Obs. Method: Onsite

General Location: Along Dry Creek east of 55th St., South of Valmont, and north of railroad tracks, office park

Description: This wetland is located in the bottomlands of two major creek systems where there is a perennial high water table. Groundwater flows from the west, south, and east converge in this area and discharge into South Boulder Creek and Boulder Creek. Bedrock formations to the east also create boundary and channel water movement into this area. Functional values are high for urban stormwater management.

Wetland Origin: Natural

Primary Water Source: Ground water

Hydroperiod: Saturated

Max WaterDepth (ft): 2

Major plant communities present

% of wetland area

% Vegetated: 93

% Bare ground: 0

% Water: 7

wooly sedge

5

reed canarygrass

5

cattail

85

coyote willow / baltic rush

2

coyote willow / reed canarygrass

3

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no **Confidence in rating:** c = high, b = medium, a = low

Groundwater Recharge	2	b	Minor amount possible when water table drops and in southern (upgradient end)
Groundwater Creek Discharge probably due	4	c	Groundwater flows from the west, south, and east converge in this area and discharge into South Boulder and Boulder Creek. High water table conditions predominate throughout. Difference in evaluations to availability of new geohydrologic information.
Flood Storage / Floodflow Alteration developments	5	b	Major urban stormwater corridor in the bottomland of two of the city's major creeks. Typha stands and topography help to slow flows and store water. Uncertain extent to which surrounding industrial have impacted effectiveness by paving infiltration areas.
Shoreline Anchor. / Stabilization	3	b	Broad corridor without distinct banks in many places.
Sediment Trapping / Retention	4	c	Very effective sediment trapping by cattails.
Nutrient Retention (long-term)	4	b	In sediments, significant loading from urban runoff (may be more industrial than when Cooper viewed)
Nutrient Retention (short-term)	4	b	In cattails
Food Chain Support (export)	3	b	
Food Chain Support (within basin)	4	a	Very productive area and generally slow moving water limits export
Fish Habitat / Aquatic Diversity	1	b	
Wildlife Habitat	3	b	Small mammals and birds, diverse food supply.
Active Recreation	1	b	
Passive Rec / Heritage Value	3	b	Rich plant diversity.

Comments: This is quite a nice wetland, with good plant diversity and relatively few noxious weeds. The shallow water ponds provide

Wetland Evaluation

Wetland #: 40910

Former #: 11

T_R_S: T1NR70WS27

Investigator: A. Carpenter, C. Browne

Date of Visit: 6/1/2004

Obs. Method: Onsite

General Location: Immediately south of Central Ave., east of 55th Street, office park area

Description: Pond is located near the base of an upland terrace (located to the southwest). Primary water source appears to be from stormwater runoff, although some groundwater discharge into the pond is likely from the south as groundwater moves north to the bottomlands associated with Boulder Creek.

Wetland Origin: Mining

Primary Water Source: Urban / industrial runoff

Hydroperiod: Permanently flooded

Max WaterDepth (ft): 5

Major plant communities present

% of wetland area

open water

100

% Vegetated: 5

% Bare ground: 0

% Water: 95

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no **Confidence in rating: c = high, b = medium, a = low**

Groundwater Recharge	3	b	Some infiltration and mounding possible on east side
Groundwater (Surface) Discharge	3	b	Pond is located along the northeast edge of a terrace, and seepage evident at the toe of the slope. water inflows appear to be more significant source of pond's water supply)
Flood Storage / Floodflow Alteration	3	b	Not on creek system so primarily stores parking lot runoff.
Shoreline Anchor. / Stabilization	2	a	Little opportunity, but mowed landscaped edges limit effectiveness
Sediment Trapping / Retention	3	b	
Nutrient Retention (long-term)	2	b	Some in sediments but few trees for retention
Nutrient Retention (short-term)	2	b	
Food Chain Support (export)	2	b	Little food to export during periods of occasional overflow
Food Chain Support (within basin)	2	b	Fish, insects, and aquatic biota provide some in basin food.
Fish Habitat / Aquatic Diversity	3	c	Blue gills and minnow and carp observed
Wildlife to Habitat	3	b	waterfowl, snapping turtle. Deer bedding to southeast. Industrial setting limits effectiveness, but proximity wetland to the east offers connection to other habitat
Active Recreation	1	b	
Passive Rec / Heritage Value	3	b	Limited access but nearby employees in office park enjoy.

Comments: Wetland includes the pond and a small seep area in the southwestern corner.

Wetland Evaluation

Wetland #: 40911

Former #: 16

T_R_S: T1NR70WS34

Investigator: A. Carpenter, C. Browne

Date of Visit: 8/16/2004

Obs. Method: Onsite and viewed from property

General Location: South Boulder Creek west of Cherryvale Road at Congregation Bonai Shalom; flood plain South of Boulder Creek

Description: Stream section that includes large meander. Wetland defined by bankful width

Wetland Origin: Natural

Primary Water Source: Creek

Hydroperiod: Permanently flooded

Max WaterDepth (ft): 3

Major plant communities present

% of wetland area

crack willow-green ash

100

% Vegetated: 35

% Bare ground: 0

% Water: 65

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no **Confidence in rating: c = high, b = medium, a = low**

Groundwater limits	2	b	Geohydrology map indicates potential for groundwater recharge. But high water table <5 ft below ground
Recharge			effectiveness.
Groundwater expected	3	b	Groundwater discharge occurs but relative volume of input as compared to inflows from surface water
Discharge			to be low.
Flood Storage / shrubs.	4	b	Large meander feature will slow flows. Evidence of flood debris 3 ft above water level on tree trunks and
Floodflow Alteration			
Shoreline Anchor. / Stabilization	4	b	Crack willows, ash, and shrub understory ancho shore. Rock has been installed at bend in the river to help stabilize, but some evidence of erosion observed on edges of rock area (hence the decrease in ranking),
Sediment Trapping / evaluated	3	b	In pockets and flood debris for short term (Difference in ranking may be because Cooper mayhave
Retention			larger section of stream))
Nutrient Retention (long-term)	4	b	Abundance of woody species
Nutrient Retention (short-term)	3	b	Some short term seds and herbaceous
Food Chain Support (export)	4	b	Extensive canopy cover provides leaf litter
Food Chain Support (within basin)	4	b	Function is lower because smaller area than previously assessed.
Fish Habitat / Aquatic Diversity	3	b	
Wildlife Habitat	4	b	
Active Recreation	1	b	
Passive Rec / Heritage Value	3	b	

Comments: .

Wetland Evaluation

Wetland #: 40912

Former #: 50

T_R_S: T1NR70WS27

Investigator: A. Carpenter, C. Browne

Date of Visit: 9/9/2004

Obs. Method: Onsite

General Location: Ditch north of Arapahoe Ave. at point where Cherryvale Road would cross wetland if Cherryvale continued north of Arapahoe Ave.; north of car dealerships

Description: Section of Leggett Inlet ditch with fairly shallow, slow-moving water, stteped ditch banks

Wetland Origin: Urban/ industrial

Primary Water Source: Creek

Hydroperiod: Saturated

Max WaterDepth (ft): 3

Major plant communities present

% of wetland area

% Vegetated: 11

% Bare ground: 0

% Water: 89

reed canary rass

9

Emory's sedge

1

aquatic bed

1

water smartweed

89

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no Confidence in rating: c = high, b = medium, a = low

Groundwater groundwater Recharge	4	b	Localized recharge/seepage occurs adjacent to ditch. Geohydrology map shows primary path for flow is to north from ditch
Groundwater Discharge	2	b	
Flood Storage / Floodflow Alteration	4	b	Control structures probably limit inflows but capacity for channel storage exists.
Shoreline Anchor. / upstream Stabilization	3	c	Moderate tree cover and moderate erosional forces. No evidence of erosion occurring except around dam structure.
Sediment Trapping / Retention	3	b	
Nutrient Retention (long-term)	2	b	
Nutrient Retention (short-term)	4	b	
Food Chain Support (export)	3	b	Good export opportunity but little leaf litter from overhanging limbs
Food Chain Support (within basin)	3	b	Fairly productive aquatic vegetation
Fish Habitat / Aquatic Diversity	2	b	
Wildlife Habitat	2	b	Relatively narrow channel adjoining commercial development. Swallows and waterfowl present.
Active Recreation	1	a	Commercial developoiment area and poor access, uncertain if may get occassional fisherman.
Passive Rec / Heritage Value	1	a	Dirt trail to north may get occassional passerby

Comments: Conveys water from South Boulder Creek to Leggett Reservoir; narrow band of wetland vegetation that grows along ditch

Wetland Evaluation

Wetland #: 40913

Former #: 53

T_R_S: T1NR70WS27

Investigator: J. Sanderson, C. Browne

Date of Visit: 7/14/2004

Obs. Method: Onsite

General Location: W of 65th, N. of Boulder Recycling Center, SE of Leggett Reservoir inlet ditch (Previously mapped portion to north of ditch not included.)

Description: Wetland 53 is a large depressional wetland with ponded water and fringe. The wetland is situated in the bottomlands along South Boulder Creek in an area that receives surface water and groundwater draining from higher elevations (terrace formation) in the south. The source of water is groundwater discharge from the south and ditch leakage from the north, supplemented by stormwater runoff. The underlying geology is characterized by a thin saturated thickness (of unconsolidated Broadway alluvial deposits overlying Pierre Shale. Soils consist of relatively low permeability sandy clay. The presence of the alkali deposits in the western portion of the wetland suggests that perched precipitation is present on the surface

Wetland Origin: Mining

Primary Water Source: Ditch

Hydroperiod: Permanently flooded

Max WaterDepth (ft): 3

Major plant communities present

% of wetland area

cattail	15
bulrush	5
American three square	35
widgeongrass	45

% Vegetated:	65
% Bare ground:	0
% Water:	35

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no **Confidence in rating:** c = high, b = medium, a = low

Groundwater soils	2	b	Regional geohydrologic maps indicate potential recharge could occur when groundwater table is low, but Recharge limit effectiveness.
Groundwater table is Discharge	3	c	Local discharge from north ditch seepage. Geohydrologic maps indicate discharge possible and water within 5 ft. Low permeable clay layer retains water in pond.
Flood Storage / heavily Floodflow Alteration	3	b	Has storage capacity but unclear where flood waters would flow from as South Boulder Creek flows are manipulated into Leggett and Valmont Reservoir.
Shoreline Anchor. / Stabilization	2	b	
Sediment Trapping / Retention	3	b	
Nutrient Retention with (long-term)	4	c	sources of nutrients from waterfowl and stormwater from recycling center are trapped in bottom sediments absence of outflow
Nutrient Retention (short-term)	4	c	cattails and bullrush
Food Chain Support (export)	1	a	No significant outlet observed.
Food Chain Support (within basin)	4	b	Very productive herbaceous layer, but tree and shrubs sparse
Fish Habitat / Aquatic Diversity	2	b	No fish observed (water quality?), but aquatic insects observed
Wildlife Habitat	3	b	
Active Recreation	1	b	
Passive Rec / Heritage Value	3	a	Workers and visitors to the recycling center may enjoy visual appeal.

Comments: pH across the site ranged from 8.4-9.2; conductivity ranged from 2350-2500.

Wetland Evaluation

Wetland #: 40914

Former #: 13

T_R_S:

Investigator: A. Carpenter, C. Browne

Date of Visit: 9/9/2004

Obs. Method: Onsite

General Location: East of Stazio Way, south of Valmont Butte, and north of Stazio ballfields

Description: Shallow-water cattail stands and saturated soils with American three-square predominate

Wetland Origin: Natural

Primary Water Source: Ground water

Hydroperiod: Saturated

Max WaterDepth (ft): 0

Major plant communities present

% of wetland area

% Vegetated: 100

baltic rush	34
Nebraska sedge	1
cattail	20
American three square	45

% Bare ground: 0
% Water: 0

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no **Confidence in rating:** c = high, b = medium, a = low

Groundwater Recharge	2	b	
Groundwater Discharge	3	a	High water table present but direct discharge uncertain. Groundwater flows from the west, south, and east converge in this area and discharge into South Boulder Creek and Boulder Creek. (Rock formations to the east also create boundary that restricts groundwater movement to this area)
Flood Storage / distance Floodflow Alteration	2	b	Low storage/collection of overland flows off terrace to east and ballfields, but opportunity limited given from streams.
Shoreline Anchor. / Stabilization	1	b	
Sediment Trapping / ballfield area Retention	3	a	Effective flat area for trapping but source limited to overland flows off terrace so opportunity limited. runoff and paved parking area runoff likely to enter wetland.
Nutrient Retention (long-term)	3	b	Source of nutrients from ballfields likely
Nutrient Retention (short-term)	3	b	Cattails
Food Chain Support (export)	2	a	Outlet into ditch to north does not appear to receive high flows, so opportunity for export low.
Food Chain Support (within basin)	3	b	
Fish Habitat / Aquatic Diversity	1	c	
Wildlife Habitat	2	b	
Active Recreation	1	b	
Passive Rec / Heritage Value	3	b	

Comments: Old floodplain south of Boulder Creek, very weedy, but has large area of three-square; wetland may be supported in part by irrigation of bluegrass turf at ballfields

Wetland Evaluation

Wetland #: 40915

Former #: 11

T_R_S: T1NR70WS27

Investigator: J.Sanderson, C. Browne

Date of Visit: 10/7/2004

Obs. Method: Onsite

General Location: "Flatiron Channel", just north of Arapahoe, east of 55th, mostly along channel on north side of RR tracks, but also including some wetlands on the south side of the tracks.

Description: Slope wetlands and cattail marsh in industrial park. Appears to have a divide near the center with drainage in either direction to northwest and northeast, but most of water at time of visit draining to northeast. Soil maps suggest wetland is located on edge of former gravel mining area .

Wetland Origin: Urban/ industrial

Primary Water Source: ditch

Hydroperiod: Saturated

Max WaterDepth (ft): 1

Major plant communities present

% of wetland area

% Vegetated: 98

cattail	33
coyote willow/mesic graminoid	30
reed canarygrass	30
mixed graminoid (very weedy)	5
plains cottonwood/mixed graminoid	2

% Bare ground: 0

% Water: 2

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no **Confidence in rating: c = high, b = medium, a = low**

Groundwater Recharge	2	b	Water table within 5 ft of surface.
Groundwater Discharge	3	b	
Flood Storage / water Floodflow Alteration	3	b	Capacity exists to receive stormwater runoff and high groundwater (but no direct connection to surface observed).
Shoreline Anchor. / Stabilization	3	b	No evidence of erosion but probably little opportunity except for precip runoff.
Sediment Trapping / Retention	4	b	accumulation of sediments observed.
Nutrient Retention (long-term)	3	b	In sediments but few woody species
Nutrient Retention (short-term)	3	b	Cattails
Food Chain Support (export)	3	b	
Food Chain Support (within basin)	3	b	
Fish Habitat / Aquatic Diversity	2	a	Small minnows observed in shallow pool
Wildlife Habitat	2	b	small mammals, connection to S. Boulder Creek corridor, but ...industrial park to north and south restrict
Active Recreation	1	c	
Passive Rec / Heritage Value	2	a	

Comments: High groundwater from upgradient ditch leakage supports hydrology. No photos taken.

Wetland Evaluation

Wetland #: 41001

Former #: 13 (in part)

T_R_S: T1NR70WS2

Investigator: A. Carpenter, C. Browne

Date of Visit: 5/27/2004

Obs. Method: Onsite

General Location: On IBM property immediately south of Tom Watson Park, east of 63rd St.

Description: Irrigation pond located on alluvial deposit terrace. Minimal fringe of wetland vegetation

Wetland Origin: Agriculture

Primary Water Source: Ditch

Hydroperiod: Semi-permanently flooded

Max WaterDepth (ft): 5

Major plant communities present

% of wetland area

open water

100

% Vegetated: 5

% Bare ground: 0

% Water: 95

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no Confidence in rating: c = high, b = medium, a = low

Groundwater Recharge	3	c	Groundwater recharge occurs from irrigation pond as evidenced by downgradient seepage to the south as groundwater flows from northwest to southeast
Groundwater Discharge	2	b	
Flood Storage / Floodflow Alteration	2	b	
Shoreline Anchor. / Stabilization	2	c	
Sediment Trapping / Retention	2	b	Little opportunity other than from park runoff
Nutrient Retention (long-term)	2	b	
Nutrient Retention (short-term)	2	b	
Food Chain Support (export)	2	b	
Food Chain Support (within basin)	2	b	
Fish Habitat / Aquatic Diversity	2	b	
Wildlife Habitat	2	b	
Active Recreation	1	c	
Passive Rec / Heritage Value	2	b	

Comments:

Wetland Evaluation

Wetland #: 41002 **Former #:** 13 (in part) **T_R_S:** T1NR70WS2

Investigator: A. Carpenter, C. Browne, J.

Date of Visit: 5/27/2004 **Obs. Method:** Onsite

General Location: Immediately south (down hill) of pond at Watson Park, 100 yds east of 63rd Street, IBM land

Description: Slope wetland I (about 1 acre) located on south facing slope; transition between flat-topped upland terrace to north and Dry Creek channel to the south.

Wetland Origin: Urban/ industrial

Primary Water Source: Pond

Hydroperiod: Saturated

Max WaterDepth (ft): 5

Major plant communities present

% of wetland area

% Vegetated: 100
% Bare ground: 0
% Water: 0

cattail	65
Baltic rush	30
American three-square	5

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no **Confidence in rating:** c = high, b = medium, a = low

Groundwater Recharge 1 b

Groundwater Discharge 3 b

Flood Storage / Floodflow Alteration 2 b

Shoreline Anchor. / Stabilization 2 b

Sediment Trapping / Retention 2 b

Nutrient Retention (long-term) 2 b Little input and no woody plants.

Nutrient Retention (short-term) 2 b Cattails but little input reduces opportunity.

Food Chain Support (export) 1 c

Food Chain Support (within basin) 3 b

Fish Habitat / Aquatic Diversity 1 c

Wildlife Habitat 3 b

Active Recreation 1 c

Passive Rec / Heritage Value 2 b

Comments: Source of water is seepage from pond to the north. observed one plant that resembled purple loosestrife in vegetative

Wetland Evaluation

Wetland #: 41003

Former #: 32

T_R_S: T1NR70WS2

Investigator: A. Carpenter, C. Browne, J.

Date of Visit: 5/27/2004

Obs. Method: Onsite

General Location: East of 63rd St. and north of Diagonal Highway on IBM land; along Dry Creek

Description: Fairly large wetland (8acres) that includes slope wetlands and riverine systems (Dry Creek) draining from Boulder Reservoir. Area also collects and transports water from Coot Lake to northwest and small channel in south with water from east of Foothills Parkway. Located in terrace upland area where bedrock is near ground surface.

Wetland Origin: Natural

Primary Water Source: surface water and groundwater

Hydroperiod: Saturated

Max WaterDepth (ft): 2

Major plant communities present

% of wetland area

% Vegetated: 96

% Bare ground: 3

% Water: 1

cattail-teasel
Baltic rush
saltgrass / alkali sacaton

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no **Confidence in rating: c = high, b = medium, a = low**

Groundwater Recharge	2	b	Little infiltration given shale bedrock near surface and saturated soils
Groundwater Discharge	3	b	Wetland is supported mostly by surface water, but references show potential for discharge.
Flood Storage / Floodflow Alteration	3	b	Capacity available but may have imted opportuntiy given upstream manipulations.
Shoreline Anchor. / Stabilization	2	b	Little opportunity
Sediment Trapping / Retention	3	c	Source of sediments reduced by upstream lakes (reservoir), nevertheless very fine deposits observed; of flushing flows l
Nutrient Retention (long-term)	3	b	Retention in sediments and organic deposits
Nutrient Retention (short-term)	3	b	Cattails
Food Chain Support (export)	3	b	
Food Chain Support (within basin)	3	b	Most production likely to stay in basin
Fish Habitat / Aquatic Diversity	2	b	Minnows and perennial flows, but relatively shallow water without shade cover
Wildlife Habitat	3	b	shorebirds
Active Recreation	1	b	
Passive Rec / value for Heritage Value	3	b	Good size area that includes slope wetland and creek supported by high water from resevoir. Heritage Distichilis habitat.

Comments: Wetland along Dry Creek; outling areas supported by groundwater

Wetland Evaluation

Wetland #: 41004

Former #: 33

T_R_S: T1NR70WS2

Investigator: A. Carpenter, C. Browne

Date of Visit: 6/11/2004

Obs. Method: Onsite

General Location: Northwest of Diagonal Highway, east of 63rd Street and south of IBM buildings

Description: Constructed retention pond potentially occupying several acres when full, now mostly cattails, shallow basin

Wetland Origin: Urban/ industrial

Primary Water Source: Urban / industrial runoff

Hydroperiod: Intermittently flooded

Max WaterDepth (ft): 6

Major plant communities present

% of wetland area

% Vegetated: 90

cattail

90

% Bare ground: 0

open water

10

% Water: 10

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no

Confidence in rating: c = high, b = medium, a = low

Groundwater Recharge 3 b

Groundwater Discharge 1 c

Flood Storage / Floodflow Alteration 4 b

Shoreline Anchor. / Stabilization 1 b

Sediment Trapping / Retention 4 b

Nutrient Retention (long-term) 4 b

Nutrient Retention (short-term) 3 b

Food Chain Support (export) 2 b

Food Chain Support (within basin) 3 b

Fish Habitat / Aquatic Diversity 1 c

Wildlife Habitat 2 b

Active Recreation 1 c

Passive Rec / Heritage Value 2 a

Comments: Cattail marsh; wetland created by IBM

Wetland Evaluation

Wetland #: 41005

Former #: 31

T_R_S: T1NR70WS2

Investigator: A. Carpenter, C. Browne, J.

Date of Visit: 7/11/2004

Obs. Method: Onsite

General Location: North of Diagonal Highway and east of 63rd St.

Description: Ephemeral wetlands, alkali flat located east of Boulder reservoir in terrace upland area with clayey soils and bedrock near ground surface.

Wetland Origin: Natural

Primary Water Source: Ground water

Hydroperiod: Intermittently flooded

Max WaterDepth (ft): 0

Major plant communities present

% of wetland area

% Vegetated: 75

Gerard's rush 30

% Bare ground: 25

cattail 30

% Water: 0

alkali grass 20

bare ground 20

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no Confidence in rating: c = high, b = medium, a = low

Groundwater Recharge	1	b	Clay and shale limit infiltration.
Groundwater Discharge	3	c	Local seepage from reservoir. High water table evident by presence of typha on slope.
Flood Storage / Floodflow Alteration	2	b	Limited opportunity as not on stream system.
Shoreline Anchor. / Stabilization	1	c	
Sediment Trapping / Retention	1	b	No source of sediments observed.
Nutrient Retention (long-term)	2	b	low productivity and inputs
Nutrient Retention (short-term)	2	b	
Food Chain Support (export)	1	c	
Food Chain Support (within basin)	2	b	
Fish Habitat / Aquatic Diversity	1	c	
Wildlife Habitat	3	b	Relatively large open space with kill deer and swallows observed, surrounded by prairie dogs
Active Recreation	1	c	
Passive Rec / Heritage Value	4	b	Salt flats are unusual wetland type in Boulder area

Comments: Some ground water may come from Boulder Reservoir; slope wetland and salt flat

Wetland Evaluation

Wetland #: 41006

Former #: 39

T_R_S: T1NR70WS2

Investigator: J. Sanderson, C. Browne

Date of Visit: 7/13/2004

Obs. Method: Onsite and viewed from property

General Location: Southeast of intersection of 119 Street and 63rd Street.

Description: Most of this wetland is a swale that receives outflow from Boulder Reservoir, urban runoff, and some groundwater discharge.

Wetland Origin: Natural

Primary Water Source: Reservoir

Hydroperiod: Permanently Flooded

Max WaterDepth (ft): 2

Major plant communities present

% of wetland area

% Vegetated: 98
% Bare ground: 0
% Water: 2

cattail	85
Zannichellia palustris	10
coyote willow / mesic graminoid	3
Open water	2

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no **Confidence in rating: c = high, b = medium, a = low**

Groundwater Recharge	2	b	Depth to regional groundwater depicted as 5-10 ft below ground, so potential for recharge exists but effectiveness limited by geology and soils.
Groundwater Discharge from the ditches in	3	c	Geohydrologic map shows this area as a very localized area of groundwater discharge receiving inflow west, south and east. These local groundwater flows are supported by infiltration from the reservoir and the area.
Flood Storage / Floodflow Alteration	4	b	Outflow is only partially restricted, receives urban runoff
Shoreline Anchor. / Stabilization	2	b	
Sediment Trapping / Retention (Note portion	4	b	Dense vegetation is effective trap and source is from stormwater drainage from fairly large paved area . that while sedimentation can be a counter-indicator of groundwater discharge, in a system this large one of the site may receive groundwater and another can receive sediment deposits.)
Nutrient Retention (long-term)	4	b	sediments
Nutrient Retention (short-term)	4	b	cattails
Food Chain Support (export)	3	b	No significant leaf litter.
Food Chain Support (within basin)	4	b	
Fish Habitat / Aquatic Diversity	3	b	minnows (& dragonflies)
Wildlife Habitat	2	b	Birds and small mammals. (Connection to offsite habitat is beneath the Diagonal so limited accessibility)
Active Recreation	1	b	
Passive Rec / Heritage Value	2	b	Intense development of the area since 1987 probably accounts for the difference in rankings.

Comments: Photo was taken on west end of wetland near 63rd Street

Wetland Evaluation

Wetland #: 41007

Former #: 16

T_R_S: T1NR70WS11

Investigator: A. Carpenter, C. Browne

Date of Visit: 6/24/2004

Obs. Method: Onsite

General Location: West of Spine Road and north of Gunpark Drive; east of office buildings

Description: Ephemeral salt flat recently constructed in office park for stormwater retention. Clayey soils retain moisture near surface.

Wetland Origin: Urban/ industrial

Primary Water Source: Urban / industrial runoff

Hydroperiod: Intermittently flooded

Max WaterDepth (ft): 0.5

Major plant communities present

% of wetland area

% Vegetated: 68

alkkali grass	62
cattail	5
American three square	1
open water	2
bare ground	30

% Bare ground: 30

% Water: 2

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no **Confidence in rating:** c = high, b = medium, a = low

Groundwater Recharge	1	b	Clay soils likey to prohibit infiltration.
Groundwater Discharge	1	c	
Flood Storage / Floodflow Alteration	4	b	Constructed to serve as stormwater retention basin for office park.
Shoreline Anchor. / Stabilization	1	b	
Sediment Trapping / Retention	3	b	Any sediments entering wetland will be trapped but limited source given relatively small drainage area.
Nutrient Retention (long-term)	3	b	accumulation in sediments
Nutrient Retention (short-term)	3	b	Cattails and herbaceous
Food Chain Support (export)	1	c	
Food Chain Support (within basin)	2	b	Low productivity due to limited water supply
Fish Habitat / Aquatic Diversity	1	c	
Wildlife Habitat	2	a	
Active Recreation	1	c	
Passive Rec / Heritage Value	2	a	

Comments: Well-vegetated with wetland species; no noxious weeds observed in wetland; small amounts of Canada thistle adjacent to (but not in) east side of wetland; no noxious weeds observed in wetland

Wetland Evaluation

Wetland #: 41008

Former #: 37

T_R_S: T1NR70WS11

Investigator: A. Carpenter, C. Browne

Date of Visit: 8/16/2004

Obs. Method: Onsite

General Location: East of commercial building and west of Gunpark Drive; east of Spike Road in Gunbarrel

Description: Alkali flat (in small shallow depression), wetland is heavily impacted by encroaching urbanization and vehicles.

Wetland Origin: Urban/ industrial

Primary Water Source: Urban / industrial runoff

Hydroperiod: Intermittently flooded

Max WaterDepth (ft): 0.5

Major plant communities present

% of wetland area

alkali sacaton
salt grass

65
35

% Vegetated: 65
% Bare ground: 30
% Water: 5

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no **Confidence in rating:** c = high, b = medium, a = low

Groundwater Recharge	2	b	clayey soils likely to prohibit infiltration.
Groundwater Discharge	1	b	
Flood Storage / Floodflow Alteration	2	b	No significant stormwater directed toward this location, but is a natural retention area for runoff
Shoreline Anchor. / Stabilization	1	b	
Sediment Trapping / Retention	2	a	Sediments entering wetland with runoff will be trapped but limited source
Nutrient Retention (long-term)	2	b	accumulation in sediments
Nutrient Retention (short-term)	2	b	herbaceous
Food Chain Support (export)	1	c	
Food Chain Support (within basin)	2	b	Low productivity due to limited water supply
Fish Habitat / Aquatic Diversity	1	c	
Wildlife Habitat	2	a	Commercial development of area limits access
Active Recreation	1	c	
Passive Rec / Heritage Value	3	a	Heritage value in these alkali flat wetlands which are not common in Boulder

Comments: Depression with heavy clay soils that fills with water after storms

Wetland Evaluation

Wetland #: 41009

Former #: 12

T_R_S: T1NR70WS10

Investigator: A. Carpenter, C. Browne

Date of Visit: 6/24/2004

Obs. Method: Onsite

General Location: Longbow Pond, located one block west of 63rd Street, immediately north of Longbow Dr., and immediately south of Boulder- White Rocks Ditch

Description: Water in pond very turbid, perhaps due to large carp in pond stirring up bottom sediment; outflow pipe created a small cattail wetland adjacent to Boulder - Whiterocks Ditch; very narrow band of wetland vegetation around pond margin.

Wetland Origin: Urban/ industrial

Primary Water Source: Urban / industrial runoff

Hydroperiod: Semi-permanently flooded

Max WaterDepth (ft): 2

Major plant communities present

% of wetland area

% Vegetated: 2
% Bare ground: 0
% Water: 98

cattail	1
bulrush- cattail	1
open water	98

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no **Confidence in rating: c = high, b = medium, a = low**

Groundwater Recharge 2 b Depth to groundwater mapped at 5-10 feet below ground so possible but pond bottom substrate unknown.

Groundwater Discharge 2 b Minor local seepage possible

Flood Storage / Floodflow Alteration 3 b receives stormwater (spillway for overflow on north side flows down into Boulder Whiterock ditch

Shoreline Anchor. / Stabilization 2 b some trees provide anchoring but low opportunity

Sediment Trapping / Retention 4 b Appears to serve as effective trap and sources present,;uncertain extent to which large flushing flows resuspend sediments for export.

Nutrient Retention (long-term) 3 b Sediments and trees

Nutrient Retention (short-term) 3 b

Food Chain Support (export) 2 b

Food Chain Support (within basin) 2 b

Fish Habitat / Aquatic Diversity 2 b

Wildlife Habitat 2 b Some connection to offsite habitat along ditchway but limited by surrounding roads an offices.

Active Recreation 1 c

Passive Rec / Heritage Value 3 b

Comments: storm water detention pond in office park, also cattail wetland between pond and Boulder. White Rocks Ditch; also small areas of wetland south of Longbow Drive

Wetland Evaluation

Wetland #: 41010

Former #: 36

T_R_S: T1NR70WS11

Investigator: A. Carpenter, C. Browne

Date of Visit: 6/24/2004

Obs. Method: Onsite

General Location: East of intersection of Nautilus Drive and Spine Road; west of Twin Lakes

Description: This is a dense stand of cattails receiving ditch inflows from the west and urban runoff from the industrial park and roads. Locally high groundwater from Twin Lakes seepage probably provides primary support for wetland hydrology.

Wetland Origin: Agriculture

Primary Water Source: Ground water

Hydroperiod: Saturated

Max WaterDepth (ft):

Major plant communities present

% of wetland area

cattail

100

% Vegetated: 100

% Bare ground: 0

% Water: 0

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no Confidence in rating: c = high, b = medium, a = low

Groundwater recharge.	2	b	Depth to regional groundwater is mapped at 5-10 ft below ground, indicating potential for groundwater recharge.
Recharge loam			However, local conditions limit effectiveness such as high ground water fromTwin Lakes and sandy clay soils.
Groundwater Lakes Discharge	2	b	Locally and seasonally high water table may intersect bottom of basin. Also local seepage from Twin Lakes
Flood Storage / Floodflow Alteration	4	b	Stormwater runoff slows in broad flat basin.
Shoreline Anchor. / Stabilization	2	b	low opportunity given flat grade
Sediment Trapping / Retention	4	b	
Nutrient Retention (long-term)	3	b	in sediments
Nutrient Retention (short-term)	4	b	in cattails
Food Chain Support (export)	2	b	
Food Chain Support (within basin)	3	b	
Fish Habitat / Aquatic Diversity	1	c	
Wildlife Habitat	3	b	
Active Recreation	1	c	
Passive Rec / Heritage Value	3	b	Some aesthetic benefits for office park and twin lakes visitors

Comments: noxious weeds encroaching on wetland periphery

Wetland Evaluation

Wetland #: 41011

Former #: 34

T_R_S: T1NR70WS11

Investigator: J. Sanderson, C. Browne

Date of Visit: 7/13/2004

Obs. Method: Onsite

General Location: Extensive wetland north of Twin Lakes; "Eaton Park"

Description: This is the largest palustrine wetland (13.8 acres) mapped within the city during the '04 remapping project. No source of surface water inflows observed. Water supply is seepage along the southern boundary from Twin Lakes. Low permeability soils likely to cause precipitation to remain on surface. Small outlet in northwest corner drains northward through concrete channel (unknown terminus). Access is from small park to the south.

Wetland Origin: Mining

Primary Water Source: Ground water

Hydroperiod: Saturated

Max WaterDepth (ft): 1

Major plant communities present

% of wetland area

% Vegetated: 100
% Bare ground: 0
% Water: 0

Major plant communities present	% of wetland area
cattail	50
roundfruit rush	45
Baltic rush	3
Phalaris arundinaceae	1
American three square	1

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no **Confidence in rating:** c = high, b = medium, a = low

Groundwater Recharge	1	b	
Groundwater Discharge	5	c	The elevated groundwater is supported by seepage from Twin Lakes. Geologic contact where upper unit of Pierre shale nears ground surface here (extending in a west to east belt just north of Twin Lakes) with groundwater discharge entering the wetland along this boundary.
Flood Storage / Floodflow Alteration	2	b	
Shoreline Anchor. / Stabilization	1	b	
Sediment Trapping / Retention	2	b	
Nutrient Retention (long-term)	3	b	
Nutrient Retention (short-term)	3	b	
Food Chain Support (export)	2	b	low outflow
Food Chain Support (within basin)	4	b	
Fish Habitat / Aquatic Diversity	1	c	
Wildlife Habitat	3	c	
Active Recreation	1	b	
Passive Rec / Heritage Value	4	b	Large wetland with adjoining parks and residential areas

Comments: Large sedge and Juncus meadows; very weedy. No standing water for pH and conductivity in main wetland, but in slough just west of Twin Lakes there was standing water with pH 7.3 and conductivity 317.

Wetland Evaluation

Wetland #: 41012

Former #: 47

T_R_S: T1NR70WS15

Investigator: A. Carpenter, C. Browne

Date of Visit: 6/24/2004

Obs. Method: Onsite

General Location: Begins 150 feet west of Orchard Creek Circle and flows east to Spine Road.

Description: This is a section of a lateral ditch from Boulder Whiterock Ditch in the west. Channel is narrow as it flows eastward through greenspace in residential area. Bike path parallels wetland

Wetland Origin: Agriculture

Primary Water Source: Ditch

Hydroperiod: Intermittently flooded

Max WaterDepth (ft): 2

Major plant communities present

% of wetland area

% Vegetated: 90

Joe Pye weed

10

% Bare ground: 5

crack willow-plains cottonwood/ mixed

75

% Water: 5

cattail

5

open water

10

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no Confidence in rating: c = high, b = medium, a = low

Groundwater of Recharge 2 b Water table is mapped at 5-10 ft below ground surface so potential exists to recharge though no evidence losing stream conditions observed.

Groundwater Discharge 2 b Potential to receive groundwater discharge indicated by groundwater contours when water table is high.

Flood Storage / Floodflow Alteration 3 b Receives and transports local runoff water but little storage

Shoreline Anchor. / Stabilization 2 b Cottonwoods and russian olive provide some stabilization but bank erosion and sloughing evident in places.

Sediment Trapping / Retention 3 b

Nutrient Retention (long-term) 2 b Trees and shrubs and some sediment accumulation along banks

Nutrient Retention (short-term) 3 b Herbaceous plants and grasses along riparian corridor

Food Chain Support (export) 3 b Leaf litter from overhanging trees,

Food Chain Support (within basin) 3 b

Fish Habitat / Aquatic Diversity 2 b Abundant aquatic insects

Wildlife Habitat 3 b small mammals and songbirds

Active Recreation 1 a

Passive Rec / Heritage Value 3 b

Comments: Channel has downcut in the past and is now establishing a new floodplain surface in the bottom of the downcut channel. Wetland defined by bankfull channel

Wetland Evaluation

Wetland #: 41013 **Former #:** 0 (in part) **T_R_S:** T1NR70WS3

Investigator: A. Carpenter, C. Browne

Date of Visit: 10/4/2004 **Obs. Method:** Onsite

General Location: Boulder Reservoir is north of the city, near the northern city limits. It is west of 63rd, north of the Diagonal Highway.

Description: All of this wetland is related to the presence of Boulder Reservoir. As delineated, this wetland excludes Coot Lakes and slope wetland north and west of the Reservoir. The wetland includes the reservoir itself plus wetland along tributaries that are mostly north and west of the reservoir. The wetland is approximately 700 acre area of which about 99% is open water and unvegetated shore. Most significant wetland vegetation and habitat are located along western side of the reservoir.

Wetland Origin: Urban/ industrial

Primary Water Source: ditch

Hydroperiod: Permanently flooded

Max WaterDepth (ft): 10

Major plant communities present

% of wetland area

% Vegetated:
% Bare ground:
% Water:

plains cottonwood	0.5
Baltic rush	1
cattail	7
American three-square	1
coyote willow	0.5

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no Confidence in rating: c = high, b = medium, a = low

Groundwater where Recharge	2	b	Groundwater recharge restricted by near surface bedrock, but evidence of recharge visible downgradient where water emerges in wetlands along 63rd St.
Groundwater water Discharge	2	b	Groundwater discharge and local seepage occur into Dry Creek and a western drainage channel, but regime is dominated by ditch inflows (and primary export is probably evaporation).
Flood Storage / structures. Floodflow Alteration	4	b	Large basin with significant capacity, unsure of extent that opportunity is limited by upstream control
Shoreline Anchor. / than wind Stabilization	3	a	Northwest edge of resevoir shows signs of bank erosion (may be exacerbated by human activity rather and waves).
Sediment Trapping / Retention	4	c	
Nutrient Retention (long-term)	4	b	
Nutrient Retention (short-term)	4	b	
Food Chain Support (export)	3	b	
Food Chain Support (within basin)	3	b	
Fish Habitat / Aquatic Diversity	5	b	
Wildlife Habitat	4	b	
Active Recreation	5	c	
Passive Rec / Heritage Value	5	c	

Comments: Among noxious weeds, Linaria vulgaris is also present, with less than 1 stem/100 m2.

Wetland Evaluation

Wetland #: 41014 **Former #:** 0 (in part) **T_R_S:** T2NR70WS34

Investigator: A. Carpenter, C. Browne

Date of Visit: 10/4/2004 **Obs. Method:** Onsite

General Location: Slope wetlands north and west of Boulder Reservoir, east of 51st street.

Description: These wetlands are not hydrologically supported by Boulder Reservoir. They are supported by ground water seeping from hillsides below adjacent gentle uplands.

Wetland Origin: Natural

Primary Water Source: groundwater

Hydroperiod: Saturated

Max WaterDepth (ft): 0

Major plant communities present

% of wetland area

Baltic rush

100

% Vegetated: 100

% Bare ground: 0

% Water: 0

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no Confidence in rating: c = high, b = medium, a = low

Groundwater Recharge	2	a	
Groundwater Discharge	3	b	
Flood Storage / Floodflow Alteration	2	c	
Shoreline Anchor. / Stabilization	2	b	
Sediment Trapping / Retention	1	b	Little opportunity
Nutrient Retention (long-term)	2	b	
Nutrient Retention (short-term)	2	b	
Food Chain Support (export)	1	b	
Food Chain Support (within basin)	2	b	
Fish Habitat / Aquatic Diversity	1	c	
Wildlife Habitat	2	b	
Active Recreation	1	c	
Passive Rec / Heritage Value	2	b	

Comments: These wetlands are on the front lines of nutrient runoff from upgradient pastures but low productivity and water source limits

Wetland Evaluation

Wetland #: 41015 **Former #:** 0 (in part) **T_R_S:** T2NR70WS34

Investigator: A. Carpenter, C. Browne

Date of Visit: 10/4/2004 **Obs. Method:** Onsite

General Location: Coot Lake and the wetlands to the west are north of Boulder Reservoir, west of 63rd Stree, about a mile north of the Diagonal Highway.

Description: This wetland complex consists of a shallow lake and palustrine emergent wetlands to the west. The lake is constructed, and the wetlands to the west were part of a mitigation effort.

Wetland Origin: Mining

Primary Water Source: groundwater

Hydroperiod: Permanently flooded

Max WaterDepth (ft): 5

Major plant communities present

% of wetland area

% Vegetated: 35

cattail
 coyote willow/reed canarygrass
 wooly sedge
 Baltic rush
 open water

25
 8
 1
 1
 65

% Bare ground: 0
% Water: 65

FUNCTION AND VALUE ASSESSMENT

Ratings: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = no Confidence in rating: c = high, b = medium, a = low

Groundwater (southeast)	2	b	Depth to water table meap indicates 5-10 ft bgs, but effectiveness of recharge on downgradient side likely to be restricted by impermeable subsurface materials.
Recharge			
Groundwater source,	3	b	Gorundwater contour map indicates discharge likely at northwest corner. No obvious inlet or other water but indirect water from numerous ditches to northwest suspected to supplement.
Discharge			
Flood Storage / Floodflow Alteration	3	b	Local precipitation (no obvious surface water inflow)
Shoreline Anchor. / 1999). Stabilization	4	b	Restoration project recently conducted ito mitigate loss of 10ft of shoreline from wind and waves (in 1989-
Sediment Trapping / Retention	3	b	Source from unvegetated banksand erosional forces of wind and waves.
Nutrient Retention (long-term)	4	b	
Nutrient Retention (short-term)	4	b	
Food Chain Support (export)	3	b	most production expected to store in basin in nw cattail marsh
Food Chain Support (within basin)	4	b	Highly productive in nw section relatively narrow to non-existant fringe around lake
Fish Habitat / Aquatic Diversity	5	b	minnows, crayfish, bass?
Wildlife Habitat	5	b	
Active Recreation	5	b	
Passive Rec / Heritage Value	5	c	

Comments: