

Wetland Delineation, Golden, CO
July 6, 2006

The S.M. Stoller Corporation requested a wetland delineation to be conducted on a small rad-contaminated area in Golden, Colorado to decide whether or not the area qualified for wetland status and would therefore need permitting from the U.S. Army Corps of Engineers to continue soil removal on the site. On July 6, 2006, the survey was conducted and findings are as follows:

Wetland delineation is based on three different parameters: soil, vegetation, and hydrology. Hydrologic characteristics of wetlands are periodic inundation or saturated conditions near to the soil surface during a portion of the growing season. Both conditions persist in the area where sample point B is located. GPS points E, F, and G are also located in saturated soil conditions (Attachment A). GPS points A, D, and C may have saturated conditions at some point during the season or in wet years but not for long enough duration to facilitate wetland soil or vegetation.

Three soil pits were dug in the area, as shown on Attachment A. Typically, a county soil survey will show if the soil is a wetland or possible wetland soil before the site is visited. In this case, the area has been altered a number of times due to its proximity to the town of Golden, Colorado and Clear Creek, and being a part of the Colorado School of Mines. At least one soil removal exercise was conducted by the state to extract heavy metals in the area. The soil in pits A and C is lacking structure partially because it has been disturbed in the recent past. Pit B has a mucky texture in part because it is inundated or saturated to the soil surface for much of the year. The wetland status is indicated by a matrix chroma of 2 or less and the presence or absence of mottles.

Table 1
Soil Pit Information

Soil Point	Depth	Texture	Body Color	Mottles	Wetland Soil
A	10 in.	Crumbly	10 YR 3/2	Few, small	Possibly
B	6 in. to water	Mucky	2.5 YR 4/1	5 YR 4/4	Yes
C	8 in.	Crumbly	10 YR 3/2	No	No

The principal area of concern is that around sample point C. Evidence in that area suggests that surface water has been present at some point this spring. However, it hadn't lasted long enough for any wetland vegetation growth in the inundated area. The matrix color indicates that the soil could be a wetland soil based on the matrix chroma (2); however, there was no evidence of redoximorphic features, aka mottles in the examined sample. The soil would have to have a matrix chroma of 1 with no mottles or 2 with mottles. This sample demonstrated a 2 with no mottles and will not qualify as a wetland soil in most average conditions.

Wetland vegetation is any plant that grows in conditions that are periodically deficient in oxygen as the result of excess water content (WTI, 2003). The most common species are documented and the wetland indicator status is reviewed for each species in the correct region for the area in question. Golden, Colorado lies right on the border between wetland regions 8 and 5. In this case, both regions as well as a general community type description were used in making the

wetland determination. The following tables represent the most dominant species at each point where the soil was also sampled (Sample points A, B, and C).

Many of the plants listed in the tables are listed as either NA or NI or NO. NA refers to there being no available information pertaining to the wetland status of the species. Most often that is because the plant is an upland species in every region. NI refers to no indication. Whether or not the plant lives in wetland conditions has not been documented in this case. NO means the plant is not a wetland species. The indicator categories of those plants with a wetland status follow in Table 2 (WTI, 2003).

**Table 2
Plant Indicator Status**

Indicator Category	Symbol	Probability of Occurrence in Wetlands
Obligate	OBL	>99%
Facultative Wetland	FACW	67-99%
Facultative	FAC	34-66%
Facultative Upland	FACU	1-33%
Obligate Upland	UPL	<1%

Each symbol may carry a plus or minus behind the code to further narrow the preferred habitat of each species dependant on the region.

**Table 3
Dominant Vegetation for Sample Point A**

Scientific Name	Common Name	Strata	Wetland Indicator Status Region 8	Wetland Indicator Status Region 5
<i>Populus deltoides</i>	Eastern cottonwood	Tree	FACW	FAC
<i>Salix amygdaloides</i>	Peachleaf willow	Tree	FACW	FACW
<i>Salix calcicola</i>	Woolly willow	Shrub	NA	NA
<i>Salix exigua</i>	Narrowleaf willow	Shrub	OBL	OBL
<i>Glycyrrhiza lepidota</i>	American licorice	Herb	FAC-	FACU
<i>Hordeum jubatum</i>	Foxtail barley	Herb	FAC	FACW
<i>Thinopyrum intermedium</i>	Intermediate wheatgrass	Herb	NA	NA
<i>Calamagrostis rubescens</i>	Pinegrass	Herb	NA	NA
<i>Juncus balticus</i>	Baltic rush	Herb	FACW	OBL

Sample point A was located on a borderline area between obvious wetland (inundation) and a questionable upland. Some of these species overlap into sample point B that is a definite wetland. Sample point A is the dividing line between two community types and is showing some overlap.

Table 4
Dominant vegetation for sample point B

Scientific Name	Common Name	Strata	Wetland Indicator Status Region 8	Wetland Indicator Status Region 5
<i>Populus deltoides</i>	Eastern cottonwood	Tree	FACW	FAC
<i>Salix amygdaloides</i>	Peachleaf willow	Tree	FACW	FACW
<i>Salix exigua</i>	Narrowleaf willow	Shrub	OBL	OBL
<i>Schoenoplectus acutus</i>	Hardstem bulrush	Herb	OBL	OBL
<i>Eleocharis obtusa</i>	Blunt spikerush	Herb	OBL	OBL
<i>Agrostis gigantean</i>	Redtop	Herb	NI	NI

Sample point B was located in the saturated soil area. The soil indicated a wetland and the vegetation is also indicative of a wetland. Sample point B plus the GPS points E, F, and G all fall in this wetland area. It will lend itself to a topographic line on a map and should have fairly distinct borders based on the presence of the bulrush and spikerush.

Table 5
Vegetation for sample point C

Scientific Name	Common Name	Strata	Wetland Indicator Status Region 8	Wetland Indicator Status Region 5
<i>Populus deltoides</i>	Eastern cottonwood	Tree	FACW	FAC
<i>Salix amygdaloides</i>	Peachleaf willow	Tree	FACW	FACW
<i>Ulmus pumila</i>	Siberian elm	Tree	NA	NA
<i>Ribes aureum</i>	Golden current	Shrub	FACW	NO
<i>Rubus parviflorus</i>	Thimbleberry	Shrub	FAC	NO
<i>Prunus virginiana</i>	Choke cherry	Shrub	FACU	FACU
<i>Clematis ligusticifolia</i>	Western white clematis	Vine	FACU	FACU
<i>Parthenocissus quinquefolia</i>	Virginia creeper	Vine	NO	FAC
<i>Bromus inermis</i>	Smooth brome	Herb	NA	NA
<i>Calamagrostis rubescens</i>	Pinegrass	Herb	NA	NA
<i>Cirsium ssp.</i>	Unknown thistle	Herb	NA	NA
<i>Saxifraga ssp.</i>	Unknown saxifrage	Herb	NA	NA

Two of the species listed in the table for sample point C are unknown. The thistle is likely a noxious weed as it was only dominate in the disturbed areas. Most thistles do not have a wetland indicator status because they are considered invasive and very few are native and even fewer are wetland species. The *Saxifraga ssp.* is unknown because it was not mature enough to key to a specific species. None of the plants were flowering or had set seed which is necessary in order to select a species. Because they are unknown, the indicator status is NA.

Sample point C is located within about 20 feet of Clear Creek. The water level in a well in the close vicinity (within 10 feet of the soil pit) shows the water table to be located at about 2 feet below the surface. Many of the facultative wetland and obligate wetland species have root depths easily accessing the two foot water table. This water table is probably stable for most of the growing season as Clear Creek flows through Golden, Colorado and is channelized to prevent flooding in most cases. If the herb and vine species were wetland species, the area

would still be a borderline wetland as the soil did not reach wetland parameters. However, since the vegetation is about 50/50 wetland species to upland species, the area would not be considered a wetland.

The topography of the area is going to make soil extraction from sample point C very difficult without disturbing the wetland associated with sample point B. Another concern for the area surrounding point C is the proximity to Clear Creek and the depth to ground water. A permit from the U.S. Army Corps of Engineers may be required in order to remove soil that is below the water table connected to the Clear Creek hydrology. However, sample point C is not itself a wetland but could become one with the removal of enough soil to change the hydrology of the area.

REFERENCES

- Kershaw, L., A. MacKinnon, and J. Pojar. 1998. *Plants of the Rocky Mountains*. Lone Pine Publishing, Edmonton.
- Taylor, J. E., and J. R. Lacey. 1994. *Range plants of Montana*. Montana State University Extension Service, Bozeman.
- USDA, NRCS. 2004. The PLANTS Database, Version 3.5 (<http://plants.usda.gov>). [National Plant Data Center](#), Baton Rouge, LA 70874-4490 USA.
- Wetland Training Institute, Inc. 2003. *Lecture Notes, based on the Corps of Engineers 1987 Manual*. Glenwood, NM 88039 USA.
- Whitson, T. D., L. C. Burrill, S. A. Dewey, D. W. Cudney, B. E. Nelson, R. D. Lee, and R. Parker. 2000. *Weeds of the West*. Western Society of Weed Science, Newark.