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Albuquerque District

Los Alamos NATIONAL LABORATORY EST.1943

Wetlands Delineation Report
Los Alamos National Laboratory
Los Alamos, New Mexico

Submitted to:

U. S. Department of Energy
National Nuclear Security Administration
Los Alamos Site Office

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Background

The Department of Energy (DOE), National Nuclear Security Administration (NNSA), Los Alamos Site Office (LASO), in March 2005, requested of and entered into contract with the U.S. Army Corps of Engineers Albuquerque District (Corps) for the purpose of identifying and delineating wetlands at Los Alamos National Laboratory (LANL) The Corps has regulatory authority over waters of the U.S. as legislated in Section 404 of the Clean Water Act of 1973 (33 U.S.C 1344). The results of this contract are intended to support the preparation of the Supplemental Site-wide Environmental Impact Statement (S-SWEIS) and various mitigative measures that may become part of the National Environmental Policy Act (NEPA) compliance process for LANL.

LANL occupies about 40 square miles of land in northwestern New Mexico and is located on the eastern flank of the Jemez Mountains along the Pajarito Plateau, which is characterized by a series of finger-like mesas and steep canyon drainages. The LANL reservation is divided into 49 Technical Areas (TAs) with over 2,000 structures. Much of the LANL site is forested, with buildings and other structures largely grouped together according to the type of work performed within.

During the early to mid-1990s, LANL staff biologists undertook the identification and delineation of wetlands at LANL, and the creation of computerized inventory records of the LANL wetlands and Geographic Information System (GIS) maps. The U.S. Fish & Wildlife Service, as part of their National Wetlands Inventory (NWI) project, identified about 39 acres of wetlands at LANL; this wetlands inventory was based on aerial photography interpretations and included waters of the U.S., in addition to wetlands meeting the criteria of the 1987 Corps Wetlands Delineation Manual In 1996, field surveys performed by LANL biologists resulted in the identification of about 50 acres of wetlands at LANL based on the presence of wetland vegetation, also including some waters of the U.S., in addition to wetlands meeting the criteria of the 1987 manual. About 13 acres of wetlands then located within the LANL boundaries were either created or enhanced by process effluent wastewater from 38 of LANL's National Pollutant Discharge Elimination System (NPDES) permitted outfalls. The 1996 LANL wetlands information was used, in part, to support the preparation of an environmental assessment of a proposed industrial outfall effluent reduction program (DOE/EA- 1156), for which a Finding of No Significant Impact was issued in 1996. This effluent reduction program has since been initiated at LANL facilities.

Currently, the NNSA (a semi-autonomous administration within the DOE founded by Act in 2000) is preparing S-SWEIS in accordance with DOE NEPA implementing regulation requirements that require the review of site-wide NEPA documents every 5 years. In part, NNSA's reason for supplementing the 1999 SWEIS is due to changes to the LANL environmental setting that have occurred since 1999. These changes are due to: the 2000 Cerro Grande Fire, which burned over about one quarter of the LANL reservation; subsequent post-fire forest recovery activities, including actions taken to install new culverts and clear out existing culverts and ditches, together with the construction of various surface water flow control features and retention structures; forest thinning

actions conducted over an expedited schedule during the past 3 years; and tree and vegetation die-off that has occurred directly and indirectly as a result of fire and drought conditions extending over a broad portion of the Southwest during the past 5 years. Other changes to the LANL environmental setting have also occurred since 1999. These changes have resulted from implementation of the aforementioned LANL effluent reduction program, which has eliminated numerous industrial effluent outfalls to the canyon watershed systems at LANL; as a result of new construction at LANL that may have added or eliminated facilities and redistributed waste effluent between canyons; and as a result of transfers and conveyances of land tracks away from the LANL reservation. The number of outfalls present at LANL in 1998 was 66; there are now 21 outfalls at LANL. Outfall effluent has fluctuated over the past six years from a high of 317 million gallons per year (mgy) in 1999 to a low of 124 mgy in 2001. The 2003 discharge was approximately 210 mgy.

Methods

Field work by Corps staff commenced on May 24th, 2005, after security and safety training was completed and excavation permits were obtained. Field work was completed on August 10, 2005. Three members of the Corps wetland evaluation team assigned to this project are project managers for the Regulatory Section of the Corps' Albuquerque District office. The fourth member is a Corps senior ecologist who has completed wetlands delineation training and has experience performing delineations for a national environmental engineering company.

Only wetlands meeting the criteria of the U.S. Army Corps of Engineers Wetlands Delineation Manual (WES 1987), routine method, were delineated as a part of this reconnaissance study. However, other "Waters of the United States" occur throughout LANL and are regulated by the Corps (Section 404 of the Clean Water Act [33 U.S.C. 1344]), including:

- lakes, rivers, streams (including intermittent streams), prairie potholes, mudflats, playa lakes, etc, (to the ordinary high-water mark [OHWM); isolated waters (such as prairie potholes and playas) may not be waters of the U.S., due to a recent Supreme Court decision (SWANCC).
- all impoundments of these waters (to OHWM)
- tributaries of the above listed waters (to OHWM)
- arroyos (to OHWM)

Many of these features occur at LANL and would require a permit if dredge and fill activities are planned. However, the above features were not specifically identified in this study if they did not meet the criteria of the 1987 Wetlands Delineation Manual, i.e., hydrophitic vegetation, primary or secondary indicators of surface hydrology, and hydric soils.

The landward regulatory limit for non-tidal waters (in the absence of adjacent wetlands) is the OHWM. The OHWM is the line on the streambanks or shores established by the

fluctuations of water and indicated by physical characteristics such as a clear, natural, water line impressed on the bank; shelving; changes in the character of the soil; destruction of terrestrial vegetation; the presence of litter and debris; or the appropriate means that consider the characteristics of the surrounding areas. Generally, in New Mexico, only U-shaped ephemeral and intermittent channels within dry arroyos are considered as waters of the U.S. and are regulated. V-shaped channels are considered as erosional pathways and are not regulated.

Department of the Army (DA) permits under Section 404 of the Clean Water Act (CWA) are required for most dredge and fill activities in all of the above waters.

All sites indicated as wetlands from historical surveys, as illustrated on DoE Map 05-0009-01 (February 2005) were visited by the Corps wetland team and LANL escorts. Determinations and delineations were made, except for those wetlands adjacent to the Rio Grande, which were deemed generally inaccessible and unlikely to be affected by future development activity (Sam Loftin, pers. comm.). Incidental observations of other potential wetlands (e.g., outfalls designated on DoE Map 04-0045-01) were visited and assessed as security and safety considerations permitted. Due to safety and health risk concerns of Corps personnel and consistent with Notice No. 133, January 16, 2004, Workers Rights and Responsibilities for Performing Radiological Work, the Corps wetland team did not dig soil pits on sites designated as a Potential Release Site (PRS) or downstream of such a site. In those instances, Corps staff made a wetland determination at the site based solely on presence of dominant obligate, facultative wet or facultative vegetation and visible indicators of hydrology (if present).

For soils that were sampled for hydric characteristics when it could not be assumed that the soils were hydric based on dominant obligate, facultative wet or facultative vegetation, soils were sampled according to methods in Appendix D Section 1 of the 1987 Corps Wetlands Delineations Manual and the Munsell Soil Color Book.

Data recorded from delineated wetlands and non-wetlands were recorded on Data Forms for Routine Wetland Determination (March, 1992), and are included in Appendix B. All delineated wetland boundaries were identified geographically using a Garmin XL12 Global Positioning System Receiver (GPS) and projected in UTM Meters, North American Datum 1983, Zone 13N. Boundary points (.txt files) and created polygon shapefiles (.shp;ArcGis 9.0 [ESRI]) are included on the data CD attached to this report. GPS points were not corrected using Differential GPS beacons. GPS readings were taken after several minutes in averaging mode, and at least 4 satellites were locked in; more often, seven or more satellites were engaged.

The Corps recommends that DoE follow the best management practice (BMP) of allowing a 100 ft. buffer around the perimeter of all wetlands delineated, as a protective measure. This will also envelop any possible differential error in GPS point accuracy and ensure that the wetland is protected. This recommendation is consistent with Executive Order 11990 (Protection of Wetlands) requiring the avoidance, to the greatest extent

possible, of both long and short-term impacts associated with the destruction, modification, or other disturbance of wetland habitats.

All delineated wetlands were marked with 21-inch wetland delineation pin flags or flagging tape around boundaries. Digital photos were taken of delineated and non-wetland sites, named by site, and are included on the data CD attached to this report.

Scientific names of species identified were taken from the Plants Database, Version 3.5 (USDA, NRCS 2005).

Results

Thirty wetlands occupying portions of 14 different technical areas met the criteria of the 1987 COE Wetlands Delineation Manual, Routine Method and were identified and delineated by Corps staff, totaling 33.955 acres (Table 1).

Table 1. Delineated wetlands on LANL, 2005.

Wetland Identification Number (Technical Area Number-Wetland Number)	Acreage
03-1	0.056999
03-2	0.077969
09-1	0.012338
11-1	0.189161
15-1 Three-Mile Canyon	0.295428
16-1	0.025870
16-2	0.014299
22-1	0.310261
22-2	0.349821
33-1	0.009900
36-1 Parajito Canyon	0.263660
36-2 Parajito Canyon	0.094147
36-3 Parajito Canyon	1.578811
36-4 Parajito Canyon	0.115417
36-5 Parajito Canyon	0.300533
36-6 Parajito Canyon	3.534695
36-7 Parajito Canyon	0.874092
36-8 Parajito Canyon	8.318531
36-9 Parajito Canyon	0.150036
43-1 Los Alamos Canyon	0.147192
43-2 Los Alamos Canyon	0.082978
48-1 Mortendad Canyon	0.076738
48-2 Mortendad Canyon	0.058465
48-3 Mortendad Canyon	0.916536
48-4	0.054330

53-1 Los Alamos Canyon	0.020072
55-1	1.193875
61-1 Sandia Canyon	2.955665
74-1 Pueblo Canyon	2.755046
74-2 Pueblo Canyon	9.122062
Total	**33.954927**

Dominant obligate or facultatative-wet plant species (Reed 1988) that were most commonly found in the above wetlands during the 2005 delineation were: Reed canarygrass (*Phalaris arundinacea*) , narrow-leaf cattail (*Typha angustifolia*), coyote willow (*Salix exigua*), Baltic rush (*Juncus balticus*), wooly sedge (*Carex lanuginosa*), American speedwell (*Veronica americana*), common spike rush (*Eleocharis palustris*) and curly dock (*Rumex crispus*).

Discussion

Many of the outfall wetlands that were identified as such during the 1996 LANL wetlands survey (which was based solely on vegetation) were not delineated as wetlands during this 2005 survey, due primarily to the closure or re-routing of the outfall sources of water during the past 6 years. In some cases, remnant obligate, facultative wet, or facultative vegetation still partially occupied those site(s), but those plants often were dying or decadent and were being replaced by upland species. Additionally, primary or secondary indicators of surface hydrology or presence or hydric soils were not evident at these sites. The reduction in effluent discharge at these sites over the intervening years and the application of surface hydrology and hydric soil criteria applied during the 2005 survey but not the 1999 survey, explain in part the reduction from 50 acres to 34 acres of wetlands found in 2005.

A further explanation for the difference in wetland acreage found in 1999 versus 2005 is that the methodology used in 1999 included as wetlands waters of the U.S. to the OHWM. These channel areas to the OHWM were not delineated in 2005 as wetlands that meet the criteria of the 1987 Corps Wetlands Delineation Manual,.

In areas where active outfalls have created a continuous base flow condition that has caused incision of the channel (e.g., headwaters of Pueblo Canyon, TA74), a recommendation is made to use small, low-flow riffle weirs (brush or rock) to stop the incision and reverse the degradation of the channel Zeedyk 2003). This suggested action would likely have the effect of slowing surface runoff and recharging what were once seasonal wetlands. This type of stream rehabilitation could also be useful in a small degraded channel just downstream from a culvert outfall east of State Route 501 and north of State Route 4 (photo TA16-3b-nonwet.jpg). Re-introduction of beavers in similar areas where sapling or pole sized shrubs or trees are prevalent could be expected to accomplish the same result, thus creating additional wetland acreage and habitat.

Reed canarygrass was found to be nearly monotypic in the large TA74 Pueblo Canyon wetlands. A cool season, obligate, perennial, rhizomatous and oft-considered invasive,

wetland grass, it crowds out other native species and forms thick mats across a wetland. Prescribed burning prior to seedhead formation in late May may prevent seedhead formation and winter burning every 2-3 years may reduce density of stands and improve wildlife feeding opportunities. Herbicidal control or treatment with boron may also control this invasive plant (Snyder 1992), but may be more controversial in an aquatic ecosystem.

Summary

Between May 24th and August 10, 2005, Corps wetland team reconned all known potential wetland sites on the Los Alamos National Laboratory, New Mexico. Thirty wetlands were identified and delineated based on criteria of the 1987 Corps Wetland Delineation Manual, totaling approximately 33.96 acres. Additional acreage of channel area of perennial, intermittent, and U-shaped ephemeral streams and arroyos to the OHWM were not included in this wetland study, but are considered waters of the U.S. and are protected under Section 404 of the CWA. Polygon shapefiles and coordinates of delineated wetlands and photos are submitted on CD.

References

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Snyder, S. A. 1992. *Phalaris arundinacea*. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2005, October 7].

USDA, NRCS. 2005. *The PLANTS Database*, Version 3.5 (http://plants.usda.gov). Data compiled from various sources by Mark W. Skinner. National Plant Data Center, Baton Rouge, LA 70874-4490 USA.

Waterways Experiment Station. 1987. Corps of Engineers Wetlands Delineation Manual. Technical Report Y-87-1. Department of the Army, Corps of Engineers, Vicksburg, Mississippi.

Zeedyk, B. 2003. An Introduction to Induced Meandering: A Method for Restoring Stability to Incised Stream Channels. The Quivira Coalition, Santa Fe, New Mexico.

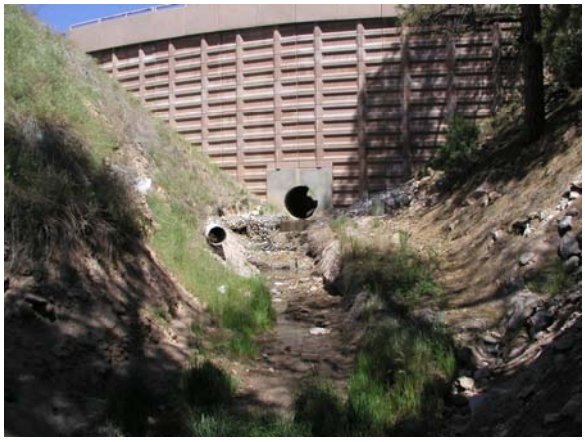
Appendices

Appendix A **Photos of Delineated Wetlands, 2005**

Appendix B **Field Sheets**

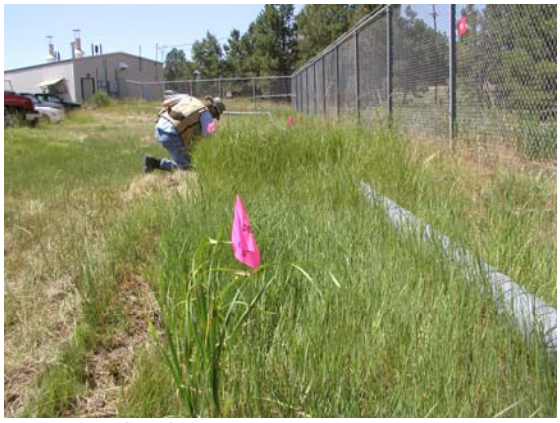
Appendix C **CoE/DoE Scope of Work and Workplan**

Appendix A
Photos of Delineated Wetlands, LANL, Los Alamos, NM, 2005.



TA03-Wetland 1

TA03-Wetland 2



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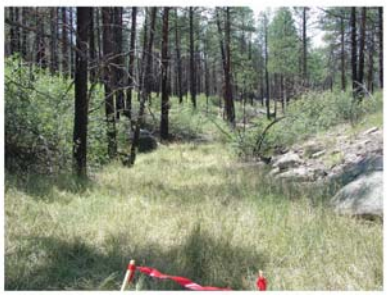
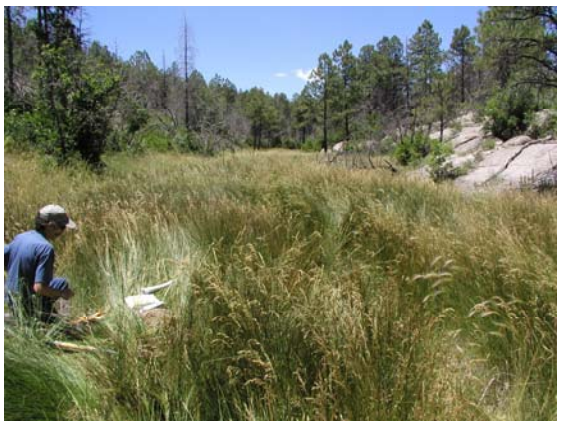
TA11-Wetland 1

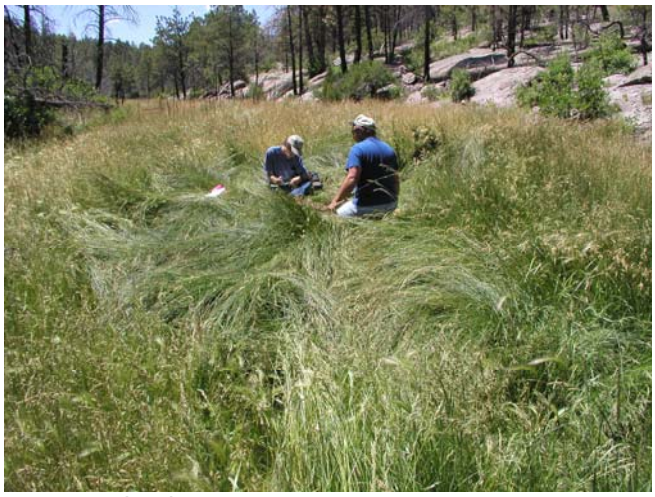


TA 15 (Three Mile Canyon-Wet Meadow Wetland)
View of vegetation at upstream end of wet meadow wetland, looking downstream. Previously-dug hole in foreground.
2 Aug 05
by Jim Wood
Corps of Engineers

TA15-Wetland 1



TA16-Wetland 1

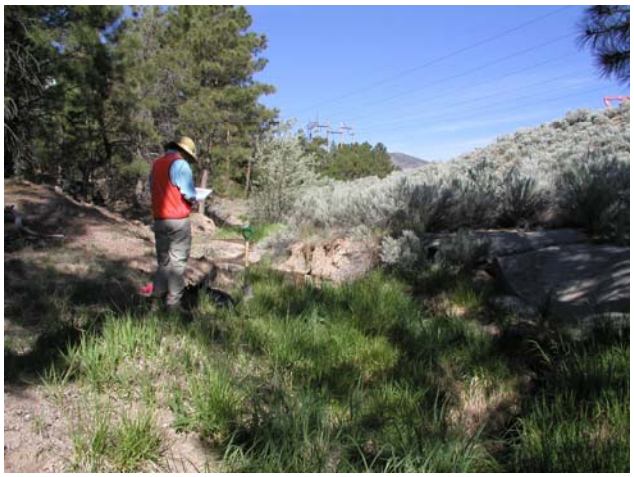


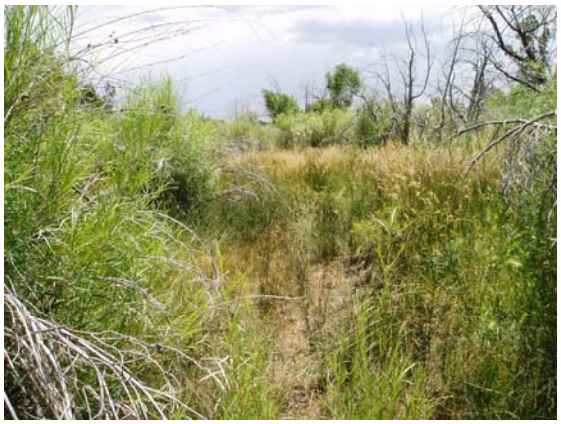
TA16-Wetland 2

TA22-Wetland 1

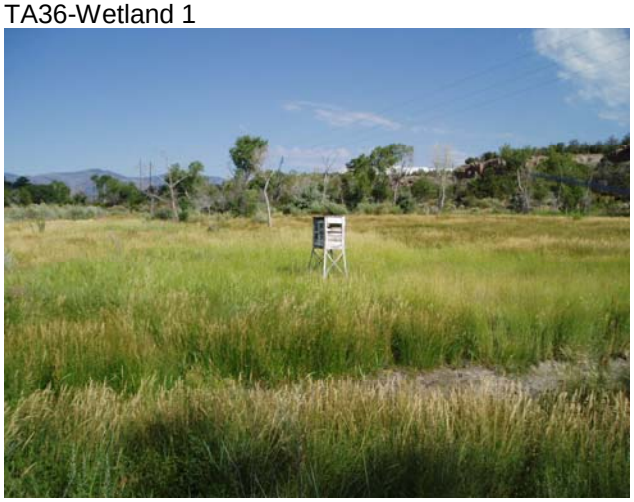
TA22-Wetland 2

TA33-Wetland 1





TA36-Wetland 1



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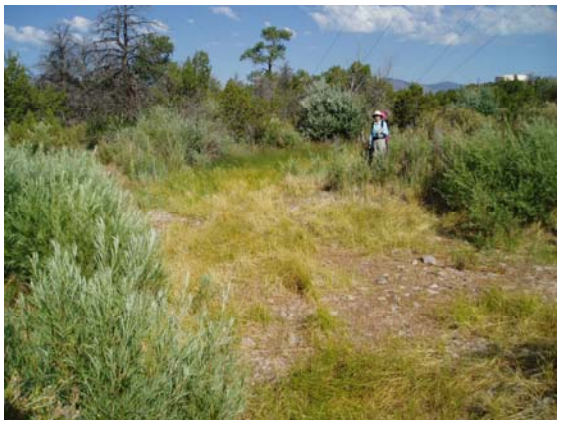

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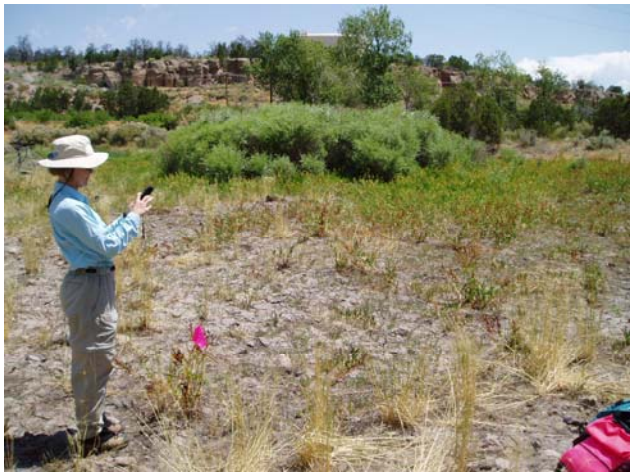
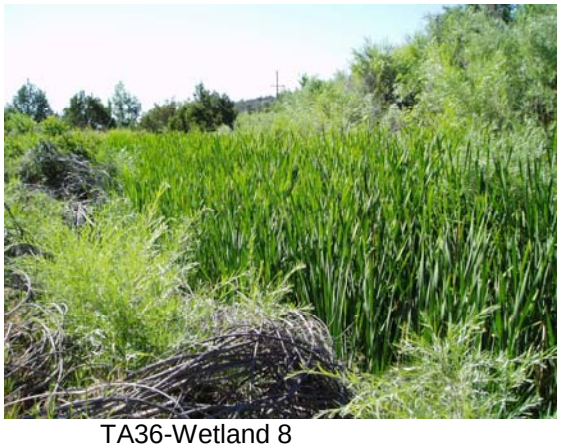


TA36-Wetland 4

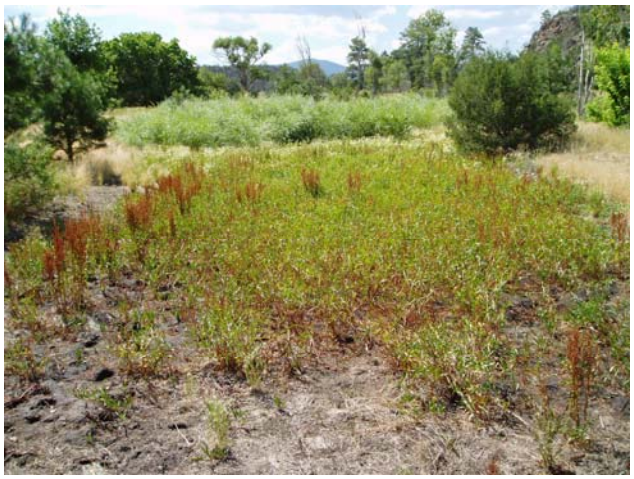
TA36-Wetland 5

TA36-Wetland 6



TA36-Wetland 7

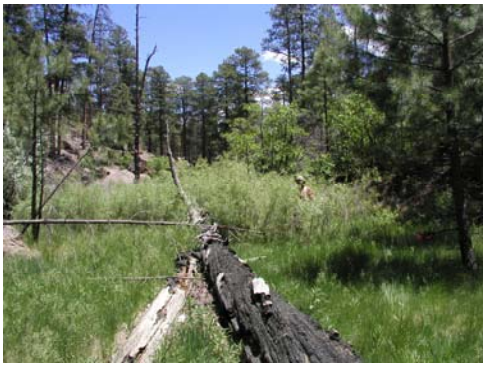
TA36-Wetland 8



TA36-Wetland 9

TA43-Wetland 1

TA43-Wetland 2



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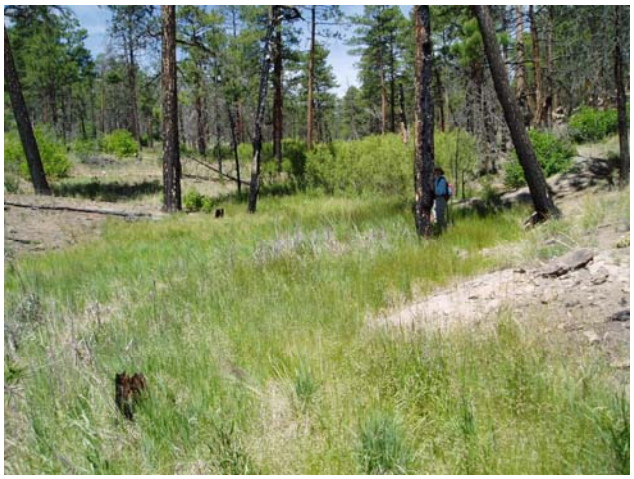
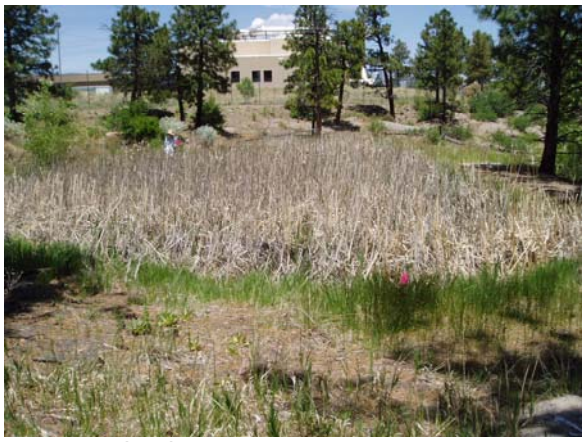


TA48-Wetland 2

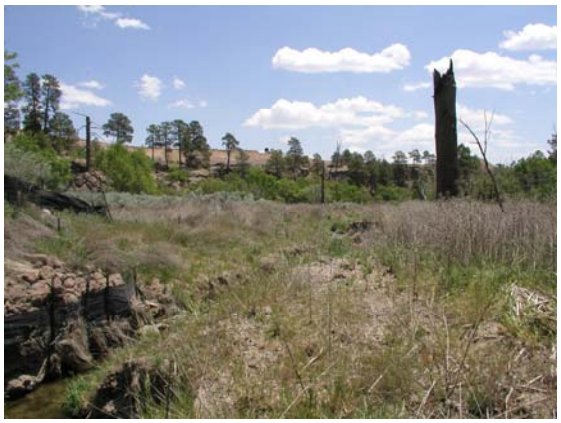
TA43-Wetland 3



TA48-Wetland 4

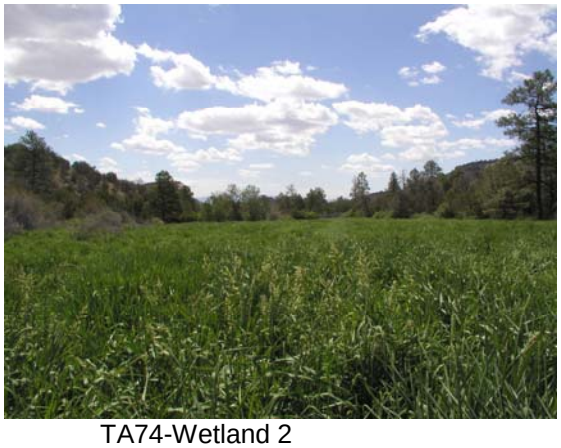
TA53-Wetland 1

TA55-Wetland 1



TA61-Wetland 1

TA74-Wetland 1



TA74-Wetland 2

Appendix B
Field Data Forms

Appendix C
Scope of Work and Workplan