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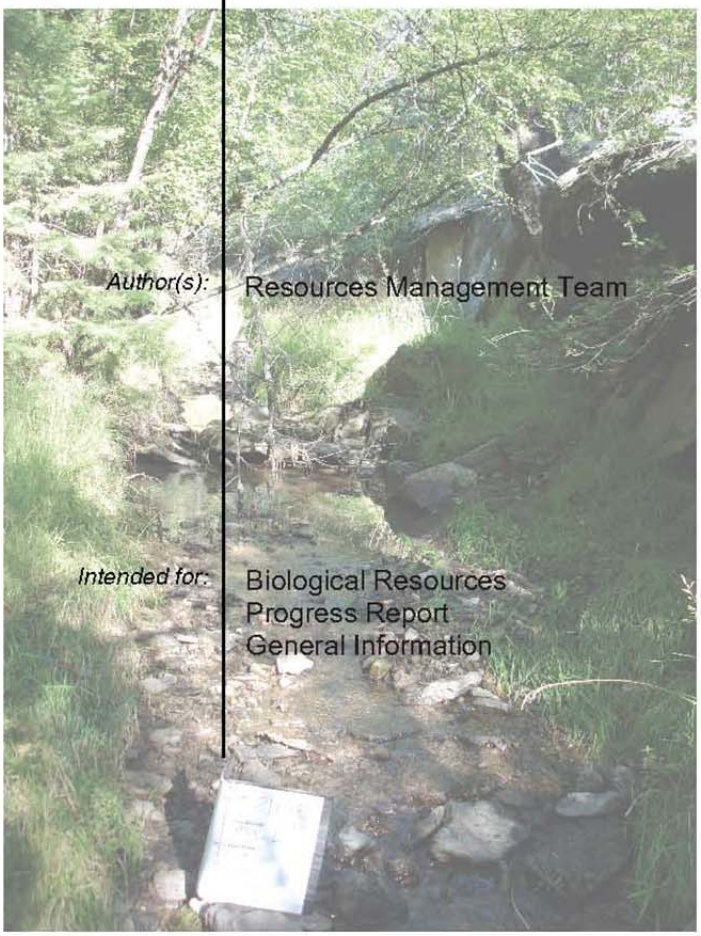
Title: 2008-9 LANL Riparian Area Inventory Results



Author(s): Resources Management Team

Intended for: Biological Resources
Progress Report
General Information

Los Alamos
NATIONAL LABORATORY
EST.1943

Form 836 (7/06)

2008-9 Los Alamos National Laboratory (LANL) Riparian Area Inventory Results

In 2005, the Environmental Protection Agency identified protection and restoration of riparian areas as a key strategy to reduce nonpoint source pollution in the United States (USEPA 2005). Riparian areas filter surface water, subsurface flow, and groundwater flow, preventing or trapping the entry of sediment, sediment-bound pollutants, and nutrients into water bodies. Enhancement of riparian areas is one of the strategies LANL is using to slow runoff velocity and reduce the transport of sediments and associated historic released contaminants off-site. In addition, vegetative communities associated with wetlands or riparian areas provide important resources for biota living in the region and contribute disproportionately to biodiversity. LANL biologists began inventorying riparian areas at LANL in 2007 as part of the implementation of LANL's Biological Resources Management Plan.

The goals of LANL's Riparian Area Inventory are to:

- Map locations of all distinct riparian vegetative community occurrences within LANL boundaries.
- Classify community type and assess functioning condition of each occurrence.
- Identify contributing risk factors for areas not functioning properly or at risk.
- Identify areas within the scope of the inventory where riparian area management could reduce risks of contaminant transport.

During 2008 and 2009, LANL biologists inventoried riparian areas in Two-Mile Canyon, Cañada del Buey, DP Canyon, Effluent Canyon, and Potrillo Canyon, and in portions of Water Canyon, Sandia Canyon, Pajarito Canyon (including Starmer's Gulch and Bulldog Gulch), and Ancho Canyon. Funding for these surveys was provided by ENV-EAQ Biological Resources Management Plan Implementation. Effluent Canyon and Potrillo Canyon had no riparian areas.

Scope of Riparian Area Inventory:

Riparian areas are areas exhibiting vegetation or physical characteristics indicating long-term surface or subsurface water influence. Excluded are such sites as ephemeral streams or washes that do not exhibit the presence of vegetation dependent upon free water in the soil (USDI BLM 1998). The U.S. Fish and Wildlife Service (USFWS) defines riparian areas in the western United States as follows (USFWS NWI 1997):

> Riparian areas have one or both of the following characteristics: 1) distinctly different vegetative species than adjacent areas, and 2)

species similar to adjacent areas but exhibiting more vigorous or robust growth forms.

Wetlands are a specific category of riparian area. Wetlands at LANL were inventoried in 2005 by a team of subject matter experts from the U.S. Army Corps of Engineers Albuquerque District (Green et al. 2005). Areas delineated as wetlands in 2005 were not included in this riparian area inventory effort.

For the purposes of this inventory effort, we considered primarily riparian areas that have characteristic number one of the USFWS definition (distinctly different vegetation than adjacent areas).

Minimum Mapping Unit: 0.1 ha (10m x 10m, or $100m^2$); no area was inventoried unless it was at least 5 m in width (including up to 1 m for stream channel); if 5 m wide, the area must be at least 20 m long.

Number of Plots: If a community occurrence of a riparian vegetative community is less than 0.25 mi long, one plot was used to characterize it. If it is longer than 0.25 mi, one plot was used per 0.25 mile section.

A detailed description of field methods can be found in the ENV-EAQ procedure EAQ-217, Riparian Area Inventory, or subsequent revisions of this procedure. Data, including geospatial data, for this inventory is maintained in the BRMP database, currently located at \\win\eshq_envgis\project\BRMP_GIS.

Maps

The maps in this report identify the stream channel reaches that have been surveyed for riparian vegetation and identify the specific locations within those reaches (if any) where riparian communities were documented.

Summary of Recommendations

Recommended Treatment	Site Name
High Priority	
Placement of obstacles (such as snags) into stream channel to encourage sediment deposition, eliminate channel incision, and expand and slow water flow across floodplain.	Pajarito FRS to 18B; Two-Mile 1; Two-Mile 2; Two-Mile 3; Sandia3
Lower Priority	
Placement of obstacles (such as snags) into stream channel to encourage sediment deposition, and eliminate channel incision.	Pajarito FRS to 18; Two-Mile – Side – West; Lower Ancho 1; DP – 1; Two-Mile 4 – P2
Remove exotic plants and feral cattle	Ancho – Rio Grande

Community Type Naming Convention

We used the naming conventions of the U. S. National Vegetation Classification to identify the community types (associations) of our riparian vegetation communities. However, our confidence in our plant identifications are low to moderate (especially for grasses and forbs), and these names generally do not represent recognized associations in the NatureServe (2008) database.

Identified Community Types

Ponderosa Pine - Box Elder / Brome sp. Woodland (*Pinus ponderosa – Acer negundo / Bromus* sp. Woodland)

Plots: Sandia3

Provisional description: Narrow strip of box elders associated with a drainage in a Ponderosa pine woodland matrix. Brome sp. are dominant in herbaceous layer. Other mesic-associated grasses and forbs may also be present. Shrubs are not common. Total tree canopy cover is >25 percent and <60 percent. Total understory ground cover and litter cover are moderate to high.

Ponderosa Pine – Box Elder / New Mexico Olive – New Mexico Locust Forest (*Pinus ponderosa – Acer negundo / Fosteria neomexicana – Robinia neomexicana* Forest)

Plots: Lower Ancho 1

Provisional description: Narrow strip of box elder associated with a drainage in a Ponderosa pine woodland matrix. Shrubs are common in the understory. Total tree canopy cover is >60 percent. Total understory ground cover and litter cover are low to moderate.

Box Elder Forest (*Acer negundo* Forest)

Plots: Two-Mile 4-P2

Provisional description: Relatively dense stand of box elders (> 60 percent total cover). Mesic-associated shrubs, grasses and forbs present at low densities in the understory. Total understory ground cover is low.

Mixed conifer – Water Birch / Mixed Grasses Forest (Mixed conifer – *Betula occidentalis* / Mixed Grasses Forest

Plots: Upper Pajarito 1

Provisional description: Mixed conifer forest with a diagnostic occurrence of water birch. May also have other riparian tree species, such as narrowleaf cottonwood, in small amounts. Gambel's oak is not present or in very small amounts. Understory is composed primarily of young trees, and some shrubs such as Fendler's barberry. Mesic-associated grasses such as redtop, brome sp. are present. Horsetails may be present. Total understory ground cover is low to moderate, but litter cover may be high.

Mixed Conifer / Gambel's Oak Woodland (Mixed Conifer / Qu*ercus gambelii* Woodland)

Plots: Bulldog Gulch, Upper Pajarito 3, Two-Mile 2, Two-Mile 3, Upper Pajarito 4

Provisional description: Overstory tree cover is composed of some combination of Ponderosa pine, Douglas fir, White fir, and flexible pine. Total tree canopy cover is >25 percent and <60 percent. A subdominant layer of deciduous shrub or small tree forms of Gambel's oak is present. Other small trees or shrubs such as Chokecherry, Wood's rose and Fendler's barberry may also be present. Shrub/small tree layer is relatively dense. Total understory ground cover and litter cover are moderate. *Note: This community type may not meet the definition of riparian in the sense of having 25 percent relative cover of a FAC, FACW, or OBL wetland species. However, in the Los Alamos area, occurrences of mixed conifer at lower elevations are specifically associated with stream channels, and are distinctly different vegetatively than adjacent areas.*

Mixed conifer / Gambel's Oak Forest (Mixed conifer / *Quercus gambelii* Forest)

Plots: Two-Mile 1, Two-Mile 4-P1, CDB 2,

Provisional description: Overstory tree cover is composed of some combination of Ponderosa pine, Douglas fir, White fir, and/or flexible pine. Total tree canopy cover is >60 percent. A subdominant layer of deciduous shrub or small tree forms of Gambel's oak is present. Other small trees or shrubs such as Chokecherry, Wood's rose and Fendler's barberry may also be present. Brome sp. grass may be present. Total understory ground cover is moderate and litter cover may be high. *Note: This community type may not meet the definition of riparian in the sense of having 25 percent relative cover of a FAC, FACW, or OBL wetland species. However, in the Los Alamos area, occurrences of mixed conifer at lower elevations are specifically associated with stream channels, and are distinctly different vegetatively than adjacent areas.*

Mixed Conifer / Box Elder – Chokecherry Forest (Mixed Conifer */ Acer negundo* –

Prunus virginiana Forest)

Plots: CDB 1, Two-Mile – Side – West

Provisional description: Mixed conifer overstory. Significant occurrence of small tree or shrub forms of chokecherry and box elder present in the understory. Shrubs are common. Total tree canopy cover is >60 percent. Total understory ground cover and litter cover are moderate.

Narrowleaf Cottonwood / Redtop – Mixed Grasses Woodland (*Populus angustifolia* / *Agrostis gigantea* – Mixed Grasses Woodland)

Plots: Lower Pajarito 4

Provisional description: Overstory dominated by narrowleaf cottonwood. Total tree canopy cover is >25 percent and <60 percent. Herbaceous layer dominated by mesic-associated grasses, sedges, and rushes. Total understory ground cover is high.

Narrowleaf Cottonwood / Red Raspberry – New Mexico Locust Forest (*Populus angustifolia* / *Rubus strigosus – Robinia neomexicana* Forest)

Plots: Upper Pajarito 2

Provisional description: Narrowleaf cottonwood dominant in overstory, with total tree canopy cover > 60 percent. Understory is diverse with a large shrub component. Red Raspberry and New Mexico Locust are present and dominant or codominant in shrub layer. Other mesic-associated grasses and forbs may also be present. Total understory ground cover and litter cover are moderate

Narrowleaf Cottonwood – Box Elder / Mixed Grasses Woodland (*Populus angustifolia – Acer negundo* / Mixed Grasses Woodland)

Plots: Pajarito FRS to 18B

Provisional description: Narrowleaf cottonwood and box elder both present in overstory. Mesic-associated grasses dominate understory, although upland shrubs and grasses present as well. Total tree canopy cover is >25 percent and <60 percent. Total understory ground cover and litter cover are moderate.

Valley Cottonwood – Box Elder / Coyote Willow Forest (*Populus fremontii – Acer negundo* / *Salix exigua* Forest)

Plots: Ancho – Rio Grande

Provisional description: Valley cottonwood and box elder dominant or codominant in overstory. Willow is common in the understory. This community type was observed along a spring-fed stream reach near the Rio Grande in White Rock Canyon. Total tree canopy cover is >60 percent. Total understory ground cover and litter cover are low to moderate.

Coyote Willow / Mixed Grasses Woodland (*Salix exigua* / Mixed Grasses Woodland)

Plots: Pajarito FRS to 18, DP - 1

Provisional description: Coyote willow >10 feet tall is dominant in overstory. Total tree canopy cover is >25 percent and <60 percent. Understory ground cover is high, composed of mesic-associated grasses such as *Agrostis* sp. and Brome sp. Litter cover is low to moderate.

Coyote Willow / Sedge sp. Shrubland (*Salix exigua* / *Carex* sp. Shrubland)

Plots: Lower Pajarito, Lower Pajarito 2

Provisional description: Coyote willow < 10 feet tall dominant in shrub layer, no trees present. Sedge sp. are dominant or codominant in herbaceous layer. Total understory ground cover is high.

Sedge sp. Wooded Herbaceous Vegetation (*Carex* sp. Wooded Herbaceous Vegetation)

Plots: Lower Pajarito 3

Provisional description: Total overstory cover is < 25 percent, composed of riparian-associated spcies such as narrowleaf cottonwood. Willows are rare or absent. Herbaceous layer is dominated or codominated by sedge species. Rushes are also likely to be present.

Chokecherry – New Mexico Olive Wooded Shrubland (*Prunus virginiana – Fosteria neomexicana* Wooded Shrubland)

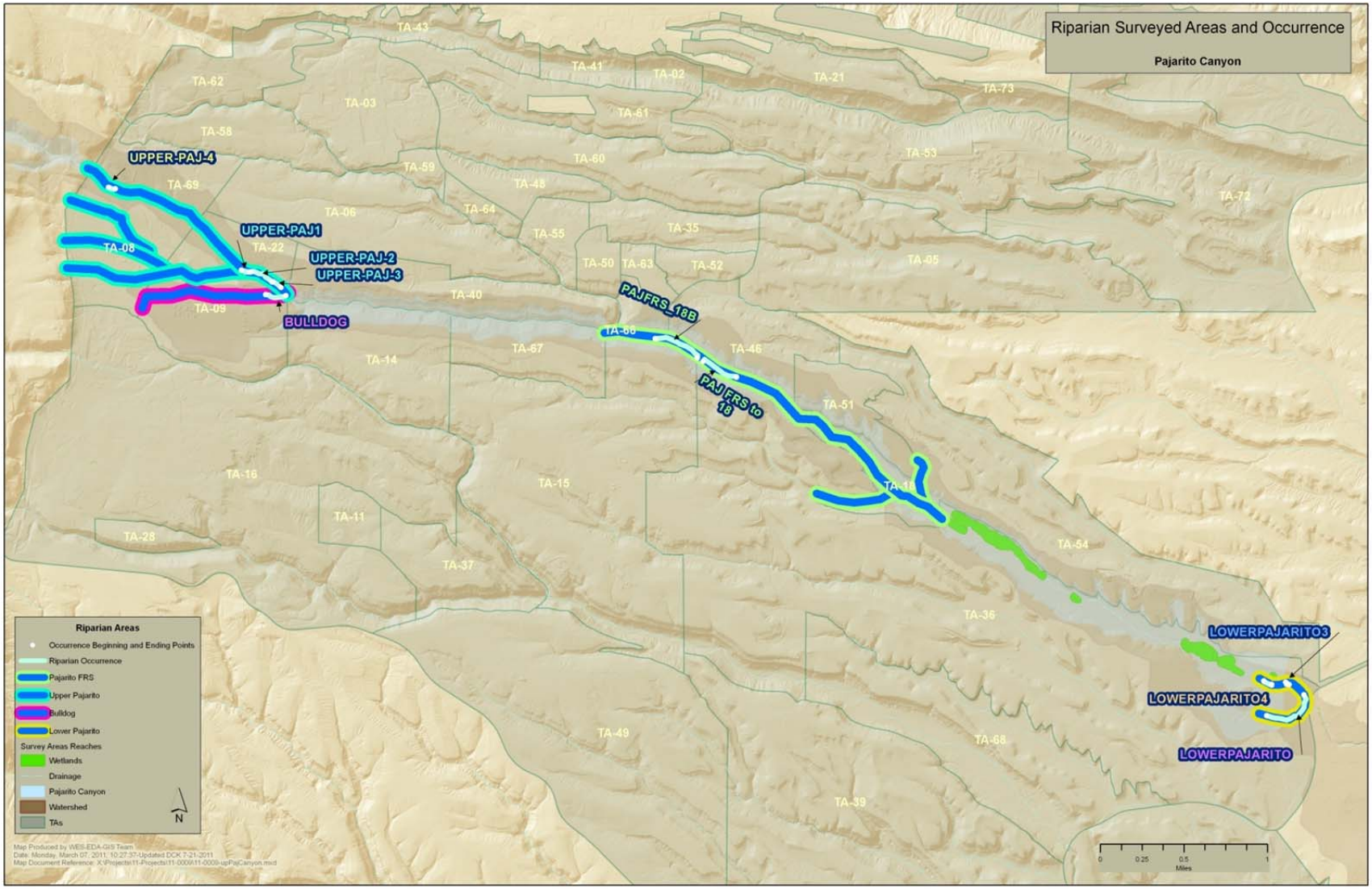
Plots: Lower Water

Provisional description: Total tree canopy cover is <25 percent. Shrub or small trees forms (< 10 feet high) of chokecherry are dominant in shrub layer. New Mexico olive is present. Total shrub and herbaceous ground cover is high.

Species codes used in this report

Species Code	Genus	Species	Common Name
ABCO	Abies	concolor	white fir
ACGL	Acer	glabrum var. neomexicanum	Rocky Mountain maple
ACNE	Acer	negundo var. interius	boxelder
AGAL	Agrostis	alba (gigantea)	redtop
AGRX	Agrostis	sp.	Wheatgrass, species unidentified
AGTR	Agropyron	trachycaulum	slender wheatgrass
ANSC	Andropogon	scoparius	little bluestem
ARDI1	Arabis	divaricata	spreading pod rockcress
ARDR	Artemisia	dracunculus	tarragon
ARFR2	Artemisia	frigida	prairie sagewort (fringed sage)
ARTR	Artemisia	tridentata	basin big sagebrush
ARTX	Artemesia	sp.	sage, species unidentified
ASCX	Asclepias	sp.	milkweed, species unidentified
ASTX	Astragalus	sp.	locoweed, species unidentified
BEFE	Berberis	fendleri	Colorado barberry
BEOC	Betula	occidentalis	water birch
BRCA1	Brickellia	californica	California brickellbush
BRCA2	Bromus	catharticus	rescuegrass
BOGR	Bouteloua	gracilis	blue grama
BRIN	Bromus	inermis	smooth brome
BROX	Bromus	sp.	brome grass, species unidentified
BRTE	Bromus	tectorum	cheatgrass
CARX	Carex	sp.	sedge, species unidentified
CHAL2	Chenopodium	album	lambsquarters
CIPA1	Cirsium	pallidum	pale thistle
CIRX	Cirsium	sp.	thistle, species unidentified
CLPS	Clematis	pseudoalpina	rock clematis
ELAN	Elaeagnus	angustifolia	Russian olive
EQUX	Equisetum	sp.	horsetail, species unidentified
ERFL	Erigeron	flagellaris	trailing fleabane
FERN			fern, species unidentified
FONE	Forestiera	neomexicana	New Mexico olive
FRAM	Fragaria	americana	woodland strawberry
GABO	Galium	boreale	Northern bedstraw
HIJA	Hilaria	jamesii	James' galleta grass
JAAM	Jamesia	americana	fivepetal cliffbush
JUMO	Juniperus	monosperma	Oneseed Juniper
JUNX	Juncus	sp.	rush, species unidentified
MELU	Medicago		black medik
MESA	Medicago	sativa	alfalfa
MUMO	Muhlenbergia	montana	mountain muhly
OECE	Oenothera	cespitosa	tufted evening primrose
PACA	Panicum	capillare	witchgrass
PAIN2	Parthenocissus	inserta	Virginia creeper
PEJA	Penstemon	jamesii	James' beardtongue

PERY	Penstemon	rydbergii	Rydberg's penstemon
PIFL	Pinus	Flexilis	flexible pine
PIPO	Pinus	ponderosa var. scopulorum	ponderosa pine
POAN2	Populus	angustifolia	narrowleaf cottonwood
POAX	Poa	sp.	Poa, unidentified species
POFE	Poa	fendleriana	muttongrass
POFR2	Populus	fremontii var. wislizeni	valley cottonwood
POTR2	Populus	tremuloides var. aurea	quaking aspen
PRVI	Prunus	virginiana var. melanocarpa	chokecherry
PSME	Pseudotsuga	menziesii var. glauca	Douglas fir
PTAQ	Pteridium	aquilinum var. pubescens	brackenfern
QUGA	Quercus	gambelii	Gambel's oak
RHTR	Rhus	trilobata	skunkbush sumac
RIBX	Ribes	sp.	gooseberry, unidentified species
RICE	Ribes	cereum	wax current
PIST	Pistia	stratiotes	water lettuce
RONE1	Robinia	neomexicana	New Mexico locust
ROWO	Rosa	woodsii	woods rose (var. unidentified)
RULA	Rudbeckia	laciniata	cutleaf coneflower
RUST	Rubus	strigosus	red raspberry
RUTR	Rumex	triangulivalvis	Mexican dock
SAEX	Salix	exigua	narrowleaf willow
SAKA	Salsola	kali	Russian thistle
SIAL	Sisymbrium	altissimum	tall tumblemustard
SIHY	Sitanion	hystrix	squirreltail
THFE	Thalictrum	fendleri var. fendleri	Fendler's meadow-rue
TORA	Toxicodendron	radicans	poison ivy
MELX	Melilotus	sp.	Sweet clover, unidentified species
UNKF			unknown forb
UNKG			unknown grass
UNKS			unknown woody shrub
URGA1	Urtica	gracilenta	mountain nettle
VEMA	Verbena	macdougalii	MacDougal verbena
VETH	Verbascum	thapsus	common mullein
VIAR	Vitis	arizonica	canyon grape


Riparian Surveyed Areas and Occurrence
Pajarito Canyon
UPPER-PAJ-4
UPPER-PAJ1
UPPER-PAJ-2
UPPER-PAJ-3
BULLDOG
PAJFRS_18B
PAJ FRS to 18
LOWERPAJARITO3
LOWERPAJARITO4
LOWERPAJARITO
TA-43
TA-41
TA-02
TA-21
TA-73
TA-62
TA-03
TA-61
TA-58
TA-60
TA-53
TA-69
TA-59
TA-48
TA-72
TA-06
TA-64
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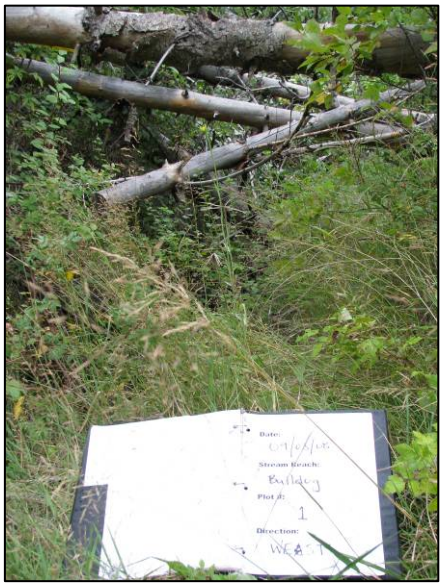
TA-35
TA-08
TA-22
TA-50
TA-63
TA-52
TA-05
TA-40
TA-09
TA-67
TA-46
TA-14
TA-51
TA-16
TA-15
TA-11
TA-28
TA-54
TA-37
TA-36
TA-49
TA-68
TA-39
Riparian Areas
Occurrence Beginning and Ending Points
Riparian Occurrence
Pajarito FRS
Upper Pajarito
Bulldog
Lower Pajarito
Survey Areas Reaches
Wetlands
Drainage
Pajarito Canyon
Watershed
TAs
N
0
0.25
0.5
1
Miles

Pajarito Canyon

In 2008 and 2009 LANL biologists completed an inventory of riparian community occurrences in approximately 70 percent of Pajarito Canyon within Laboratory boundaries. This includes the Pajarito Canyon tributary Bulldog Gulch.

Riparian vegetation community occurrences in Bulldog Gulch

Riparian Community Occurrence Site Bulldog Gulch



Community Type: Mixed conifer / Gambel's Oak Woodland (Mixed conifer / *Quercus gambelii* Woodland

Length: 204 m

Functional Condition: Functional

Data Summary:

Plot Bulldog Gulch 9/3/2008

Measurement		Value
Width of riparian occurrence (m)		10
Avg. width of unvegetated stream channel (m)		1.5
Total overstory canopy cover (percent)		50
Overstory tree cover by species (percent)	POTR2 PRVI PSME QUGA	2 4 24 20

Tree Density by species	PRVI QUGA	100/ha 100/ha
Avg. tree DBH by species (cm)	PRVI QUGA	3.6 4.1
Avg. tree height by species (m)	PRVI QUGA	3.7 5.5
Snag Density		400/ha
Understory height (m)	#Points w/ veg Min Max Avg	7 of 10 0.2 2.0 0.6
Total understory cover by species (percent)	RICE PRVI MUMO BROX BEFE ROWO, RUST, TORA, JAAM	6 12 34 6 8 <5
Ground surface covered by live understory vegetation (percent)		70
Ground surface covered by litter (percent)		88

Comments: Bulldog Gulch has natural perennial stream flow. The riparian area is in excellent condition.

Recommendations: No action required.

<u>Riparian vegetation community occurrences in Pajarito Canyon</u>

Riparian Community Occurrence Site Upper Pajarito 1

Community Type: Mixed conifer – Water Birch / Mixed Grasses Forest (Mixed conifer – *Betula occidentalis* / Mixed Grasses Forest

Length: 89 m

Functional Condition: Functional

Data Summary:

Plot UPPER-PAJ-1 8/19/08

Measurement		Value
Width of riparian occurrence (m)		8.5
Avg. width of unvegetated stream channel (m)		2.4
Total overstory canopy cover (percent)		82
Overstory tree cover by species (percent)	PSME QUGA ABCO BEOC	24 4 8 46
Tree Density by species	ABCO PSME BEOC	100/ha 100/ha 300/ha
Avg. tree DBH by species (cm)	ABCO PSME BEOC	11.9 20.0 8.2
Avg. tree height by species (m)	ABCO PSME BEOC	7.3 17.4 8.7
Snag Density		200/ha
Understory height (m)	#Points w/ veg Min Max Avg	4 of 10 0.2 3.0 1.45
Total understory cover by species (percent)	AGAL BRIN EQUX BEFE, PIST, JAAM, ACNE	6 10 10 <5
Ground surface covered by live understory vegetation (percent)		34
Ground surface covered by litter (percent)		80

Comments: None

Recommendations: No action required.

Riparian Community Occurrence Site Upper Pajarito 2

Community Type: Narrowleaf Cottonwood / Red Raspberry – New Mexico Locust Forest (*Populus angustifolia / Rubus strigosus – Robinia neomexicana* Forest)

Length: 240 m

Functional Condition: Functional

Data Summary:

Plot UPPER PAJ 2 8/19/08

Measurement		Value
Width of riparian occurrence (m)		18
Avg. width of unvegetated stream channel (m)		2.1
Total overstory canopy cover (percent)		68
Overstory tree cover by species (percent)	POAN2	68
Tree Density by species	POAN2	400/ha
Avg. tree DBH by species	POAN2	5.5
Avg. tree height by species	POAN2	5.3
Snag Density		0
Understory height (m)	#Points w/ veg Min Max Avg	5 of 10 0.1 1.9 0.7
Total understory cover by species (percent)	RUST RULA BRIN RONE1 POAX PAIN1, FERN, URGA1, JAAM, RICE, POFE,	23 8 38 18 8

	VIAR	<5
Ground surface covered by live understory vegetation (percent)		83
Ground surface covered by litter (percent)		88

Comments: Boulders are the dominant stream channel bed material.

Recommendations: No action required.

Riparian Community Occurrence Site Upper Pajarito 3

Community Type: Mixed Conifer / Gambel's Oak Woodland (Mixed Conifer / Qu*ercus gambelii* Woodland)

Length: 98 m

Functional Condition: Functional

Data Summary:

Plot UPPER-PAJ-3 8/19/08

Measurement		Value
Width of riparian occurrence (m)		18
Avg. width of unvegetated stream channel (m)		1.6
Total overstory canopy cover (percent)		58
Overstory tree cover by species (percent)	QUGA PSME ABCO	10 38 10
Tree Density by species	PSME ABCO	100/ha 100/ha
Avg. tree DBH by species (cm)	PSME ABCO	35.8 12.4

Avg. tree height by species (m)	PSME ABCO	22.6 6.1
Snag Density		0
Understory height (m)	#Points w/ veg Min Max Avg	5 of 10 0.2 2.3 0.9
Total understory cover by species (percent)	PRVI MUMO BRIN CLPS, PTAQ, PAIN2, CIPA1, RONE1, JAAM, BEOC, BEFE	16 6 38 <5
Ground surface covered by live understory vegetation (percent)		64
Ground surface covered by litter (percent)		78

Comments: Boulders are the dominant streambed material.

Recommendations: No action required.

Riparian Community Occurrence Site Upper Pajarito 4

Community Type: Mixed conifer / Gambel's Oak Woodland (Mixed Conifer / Q*uercus gambelii* Woodland)

Length: 68 m

Functional Condition: Functional

Data Summary:

Plot UPPER-PAJ-4 8/4/2008

Measurement		Value
Width of riparian occurrence (m)		10
Avg. width of unvegetated stream channel (m)		1.5
Total overstory canopy cover (percent)		46
Overstory tree cover by species (percent)	QUGA PSME PRVI ABCO	10 24 6 6
Tree Density by species	PSME PRVI ABCO	400/ha 500/ha 100/ha
Avg. tree DBH by species (cm)	PSME PRVI ABCO	13.3 4.9 14.5
Avg. tree height by species (m)	PSME PRVI ABCO	10.4 4.9 10.4
Snag Density		500/ha
Understory height (m)	#Points w/ veg Min Max Avg	5 of 10 0.3 1.2 0.8
Total understory cover by species (percent)	POAX BROX MUMO RICE UNKF, FRAM, QUGA, MELX, PRVI, ROWO	14 8 12 8 <5
Ground surface covered by live understory vegetation (percent)		50
Ground surface covered by litter (percent)		86

Comments: Upper Pajarito has natural perennial stream flow. The riparian area is in excellent condition. Data sheets from this plot were originally labeled as Upper Starmers.

Recommendations: No action required.

Riparian Community Occurrence Site Pajarito FRS to 18

Community Type: Coyote Willow / Mixed Grasses Woodland (*Salix exigua* / Mixed Grasses Woodland)

Length: 358 m

Functional Condition: Functional

Data Summary:

Plot PAJ-FRS-TO-18 6/30/09

Measurement		Value
Width of riparian occurrence (m)		15
Avg. width of unvegetated stream channel (m)		1.5
Total overstory canopy cover (percent)		26
Overstory tree cover by species (percent)	SAEX	26
Tree Density by species	SAEX	200/ha
Avg. tree DBH by species (cm)	SAEX	1.7
Avg. tree height by species (m)	SAEX	4.1
Snag Density		0
Understory height (m)	#Points w/ veg Min Max Avg	5 of 10 0.2 0.9 0.5
Total understory cover by species (percent)	AGTR SIAL RONE1 AGAL BRTE ARFR2 VEMA, THFE, ROWO, PEJA,	8 6 10 40 18 6

	VETH, OECE	<5
Ground surface covered by live understory vegetation (percent)		76
Ground surface covered by litter (percent)		82

Comments: This area is experiencing channelization and soil deposition, probably due to the Flood Retention Structure upstream from the site.

Recommendations: Restore stream conditions when the upper portion of the Flood Retention Structure is removed in accordance with the Environmental Assessment for the Proposed Future Disposition of Certain Cerro Grande Fire Flood and Sediment Retention Structures at Los Alamos National Laboratory, Los Alamos, New Mexico (DOE/EA-1408) and its Mitigation Action Plan.

Riparian Community Occurrence Site Pajarito FRS to 18B

Community Type: Narrowleaf Cottonwood – Box Elder / Brome sp. Woodland (*Populus angustifolia – Acer negundo* / Mixed Grasses Woodland)

Length: 485 m

Functional Condition: Functional

Data Summary:

Plot PAJ-FRS-TO-18B 6/30/09

Measurement		Value
Width of riparian occurrence (m)		20
Avg. width of unvegetated stream channel (m)		3.8
Total overstory canopy cover (percent)		36
Overstory tree cover by species (percent)	POAN2 ACNE	24 12

Tree Density by species	POAN2 ACNE	400/ha 100/ha
Avg. tree DBH by species (cm)	POAN2 ACNE	4.4 5.6
Avg. tree height by species (m)	POAN2 ACNE	4.0 5.5
Snag Density		0
Understory height (m)	#Points w/ veg Min Max Avg	4 of 10 0.2 0.3 0.2
Total understory cover by species (percent)	BRTE AGAL OECE, SIAL, PEJA, THFE, UNKF, CLPS, ARDR, ROWO	38 6 <5
Ground surface covered by live understory vegetation (percent)		58
Ground surface covered by litter (percent)		82

Comments: This community occurrence is experiencing excessive erosion, bank collapse, and channelization, potentially associated with augmented flows from the Pajarito Flood Retention Structure. The understory is showing a strong influence of upland vegetation. This community may be in the process of converting to upland vegetation types.

Recommendations: To slow erosion and increase deposition, consider this riparian community occurrence for in-channel placement of mechanical obstacles (such as snags) that would reduce flow rates.

Riparian Community Occurrence Site Lower Pajarito

Lower Pajarito

Lower Pajarito 2

Community Type: Coyote Willow / Sedge sp. Shrubland (*Salix exigua / Carex* sp. Shrubland)

Length: 544 m

Functional Condition: Functional

Data Summary:

Plot Lower Pajarito 7/23/08

Measurement		Value
Width of riparian occurrence (m)		53.2
Avg. width of unvegetated stream channel (m)		0
Total overstory canopy cover (percent)		0
Overstory tree cover by species (percent)		N/A
Tree Density by species		N/A

Avg. tree DBH by species (cm)		N/A
Avg. tree height by species (m)		N/A
Snag Density		0
Understory height (m)	#Points w/ veg Min Max Avg	8 of 10 0.3 3.1 1.0
Total understory cover by species (percent)	UNKF UNKG JUNX SAEX BRTE BRAN ARDR CARX MELX, POAX, VETH, CHAL2, MESA, ARTR	8 12 12 32 8 8 18 18 <5
Ground surface covered by live understory vegetation (percent)		86
Ground surface covered by litter (percent)		94

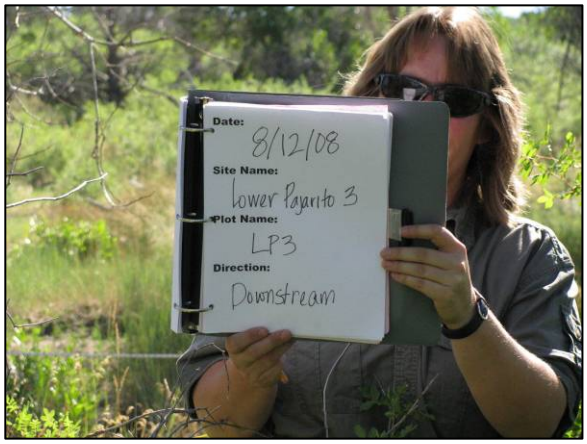
Plot Lower Pajarito 2 7/24/08

Measurement		Value
Width of riparian occurrence (m)		36.1
Avg. width of unvegetated stream channel (m)		0.7
Total overstory canopy cover (percent)		0
Overstory tree cover by species (percent)		N/A
Tree Density by species		N/A
Avg. tree DBH by species (cm)		N/A
Avg. tree height by species (m)		N/A
Snag Density		0
Understory height (m)	#Points w/ veg Min Max Avg	10 of 10 0.3 2.8 1.2
Total understory cover by species (percent)	POAX SAEX ARDR CARX AGRX UNKG, RHTR, FONE, UNKF	8 54 6 58 10 <5
Ground surface covered by live understory vegetation (percent)		96
Ground surface covered by litter (percent)		86

Comments: Cheatgrass (*Bromus tectorum*) present on plot.

Recommendations: No action required.

Riparian Community Occurrence Site Lower Pajarito 3



Community Type: Sedge sp. Wooded Herbaceous Vegetation (*Carex* sp. Wooded Herbaceous Vegetation)

Length: 37 m

Functional Condition: Functional

Data Summary:

Plot Lower Pajarito 3 8/12/08

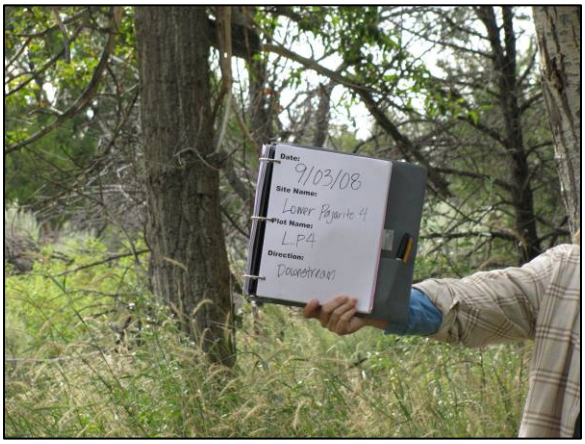
Measurement		Value
Width of riparian occurrence (m)		58.8
Avg. width of unvegetated stream channel (m)		0.45
Total overstory canopy cover (percent)		6
Overstory tree cover by species (percent)	POAN2	6
Tree Density by species	POAN2 ELAN	200/ha 100/ha
Avg. tree DBH by species (cm)	POAN2 ELAN	25.7 4.1
Avg. tree height by species (m)	POAN2 ELAN	7.6 3.2
Snag Density		100/ha
Understory height (m)	#Points w/ veg Min Max Avg	8 of 10 0.2 2.1 0.5
Total understory cover by species (percent)	ROWO	30

	BOGR JUNX CARX ANSC POAX, SIHY, POAN2, UNKG, UNKF, BRTE, SAEX,	6 10 32 14 <5
Ground surface covered by live understory vegetation (percent)		74
Ground surface covered by litter (percent)		74

Comments: Cheatgrass and Russian olive are present. Vegetative cover is not sufficient to protect banks and dissipate energy during high flows.

Recommendations: No action required.

Riparian Community Occurrence Site Lower Pajarito 4



Community Type: Narrowleaf Cottonwood / Redtop – Mixed Grasses Woodland (*Populus angustifolia / Agrostis gigantea* – Mixed Grasses Woodland)

Length: 81 m

Functional Condition: Functional

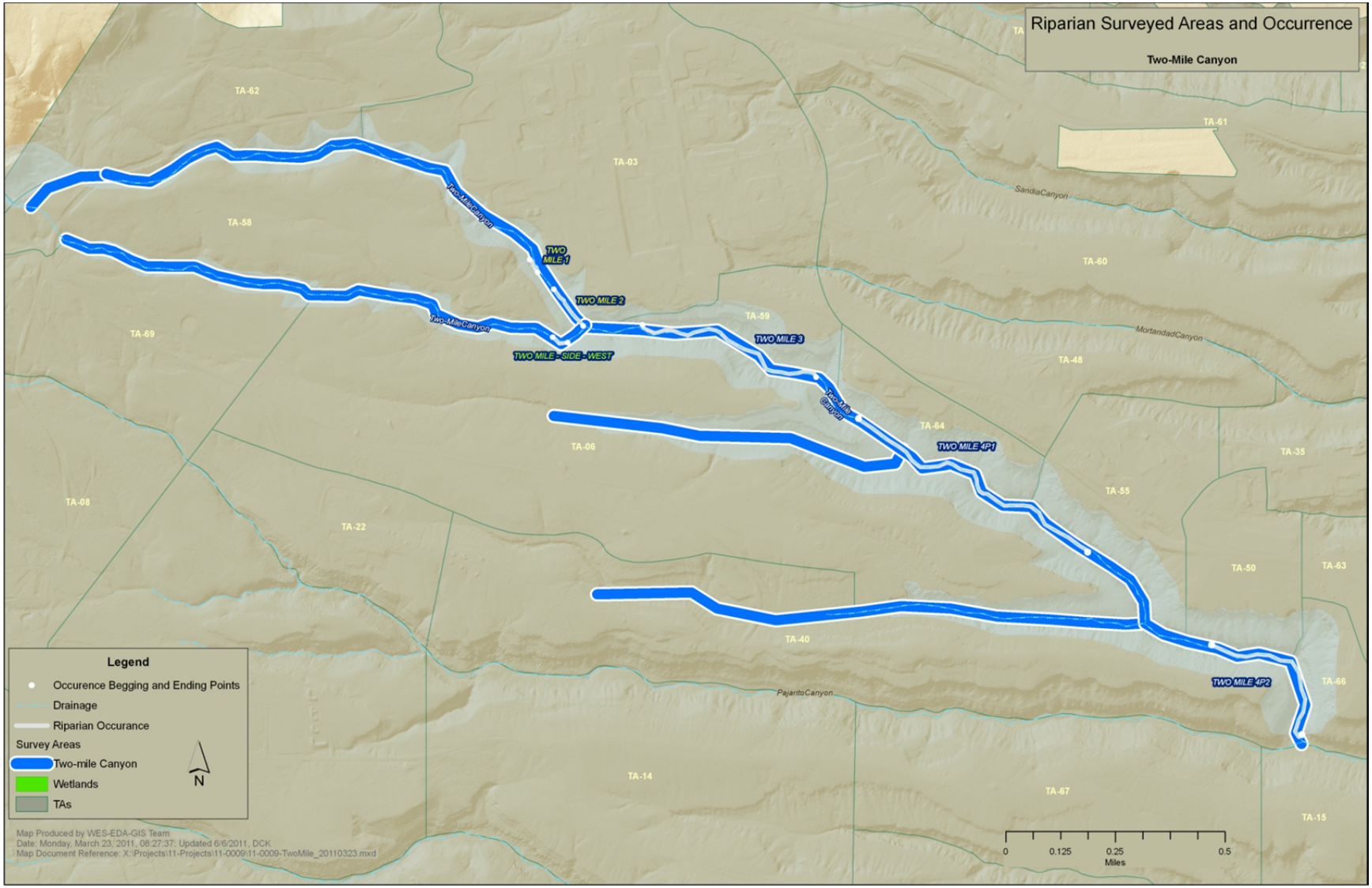
Data Summary:

Plot Lower Pajarito 4 9/3/08

Measurement		Value
Width of riparian occurrence (m)		13.9
Avg. width of unvegetated stream channel (m)		0
Total overstory canopy cover (percent)		56
Overstory tree cover by species (percent)	POAN2 ELAN	46 10
Tree Density by species	POAN2	100/ha
Avg. tree DBH by species (cm)	POAN2	33
Avg. tree height by species (m)	POAN2	10.7
Snag Density		0
Understory height (m)	#Points w/ veg Min Max Avg	10 of 10 0.2 0.6 0.4
Total understory cover by species (percent)	AGAL ANSC POAX JUNX MESA SIHY CARX BROX, UNKF, UNKG, PACA	36 14 32 8 12 14 6 <5
Ground surface covered by live understory vegetation (percent)		94
Ground surface covered by litter (percent)		84

Comments: Russian olive present on plot.

Recommendations: No action required.


Riparian Surveyed Areas and Occurrence
Two-Mile Canyon
TA-62
TA-03
TA-61
TA-58
TA-60
TA-59
TA-69
TA-48
TA-64
TA-06
TA-35
TA-08
TA-22
TA-55
TA-50
TA-63
TA-40
TA-66
TA-14
TA-67
TA-15
Two-MileCanyon
SandiaCanyon
MortandadCanyon
PajaritoCanyon
TWO MILE 1
TWO MILE 2
TWO MILE 3
TWO MILE - SIDE - WEST
TWO MILE 4P1
TWO MILE 4P2
Legend
Occurence Begging and Ending Points
Drainage
Riparian Occurance
Survey Areas
Two-mile Canyon
Wetlands
TAs
N
0
0.125
0.25
0.5
Miles
Map Produced by WES-EDA-GIS Team
Date: Monday, March 23, 2011, 08:27:37; Updated 6/6/2011, DCK
Map Document Reference: X:\Projects\11-Projects\11-0009\11-0009-TwoMile_20110323.mxd

TWO-MILE CANYON

In 2008 LANL biologists completed an inventory of 100 percent of Two-Mile Canyon within Laboratory boundaries.

Riparian Community Occurrence Site Two-Mile 1

Community Type: Mixed conifer / Gambel's Oak Forest (Mixed conifer / *Quercus gambelli* Forest)

Length: 58 m

Functional Condition: Functional – At Risk

Data Summary:

Plot TWO-MILE 1 6/3/08

Measurement		Value
Width of riparian occurrence (m)		21
Avg. width of unvegetated stream channel (m)		2.9
Total overstory canopy cover (percent)		82
Overstory tree cover by species (percent)	PSME QUGA ABCO PIFL PRVI	28 6 2 44 2
Tree Density by species	PRVI PIFL PSME	100/ha 100/ha 100/ha

	QUGA	300/ha
Avg. tree DBH by species (cm)	PRVI PIFL PSME QUGA	2.5 61.5 18.8 6.2
Avg. tree height by species (m)	PRVI PIFL PSME QUGA	 No Data
Snag Density		0
Understory height (m)	#Points w/ veg Min Max Avg	5 of 10 0.03 3 1.5
Total understory cover by species (percent)	JAAM POFE PRVI BEFE, GABO, RIBX,	8 14 22 <5
Ground surface covered by live understory vegetation (percent)		48
Ground surface covered by litter (percent)		60

Comments: Excessive erosion and channel incision observed during survey. Riparian-wetland plants do not exhibit high vigor, and do not provide sufficient cover to protect banks and dissipate energy during high flows.

Recommendations: To slow erosion and increase deposition, consider this riparian community occurrence for in-channel placement of mechanical obstacles (such as snags) that would reduce flow rates.

Riparian Community Occurrence Site Two-Mile 2

Community Type: Mixed Conifer / Gambel's Oak Woodland (Mixed Conifer / Qu*ercus gambelii* Woodland)

Length: 173 m

Functional Condition: Functional – At Risk

Data Summary:

Plot TWO-MILE 2 6/4/08

Measurement		Value
Width of riparian occurrence (m)		16
Avg. width of unvegetated stream channel (m)		4.6
Total overstory canopy cover (percent)		58
Overstory tree cover by species (percent)	QUGA PSME	16 42
Tree Density by species	PSME	600/ha
Avg. tree DBH by species (cm)	PSME	24.5
Avg. tree height by species (m)	PSME	20.1
Snag Density		300/ha
Understory height (m)	#Points w/ veg Min Max Avg	4 of 10 0.5 2.1 1.4
Total understory cover by species (percent)	POFE PRVI JAAM BROX BEFE GABO, CIRX, QUGA	8 18 6 12 6 <5
Ground surface covered by live understory vegetation (percent)		46
Ground surface covered by litter (percent)		66

Comments: Erosion, soil deposition, and channelization observed during survey, probably caused by runoff and soil transport from adjacent upland watershed.

Recommendations: Consider this riparian community occurrence for in-channel placement of mechanical obstacles (such as snags) that would reduce flow rates. Consider stabilizing adjacent upland.

Riparian Community Occurrence Site Two-Mile 3

Community Type: Mixed Conifer / Gambel's Oak Woodland (Mixed Conifer / Qu*ercus gambelii* Woodland)

Length: 731 m

Functional Condition: Functional – At Risk

Data Summary:

Plot Two-Mile 3 6/19/08

Measurement		Value
Width of riparian occurrence (m)		10
Avg. width of unvegetated stream channel (m)		1.2
Total overstory canopy cover (percent)		54
Overstory tree cover by species (percent)	PIPO PIFL PSME	24 10 20
Tree Density by species	PSME PIFL	100/ha 100/ha
Avg. tree DBH by species (cm)	PSME PIFL	28.4 36.8
Avg. tree height by species (m)	PSME PIFL	15.2 17.1
Snag Density		0
Understory height (m)	#Points w/ veg Min Max Avg	4 of 10 0.3 3 1.9
Total understory cover by species (percent)	SAEX QUGA MUMO AGRX	16 14 8 20

	TORA, ROWO, RONE1	<5
Ground surface covered by live understory vegetation (percent)		58
Ground surface covered by litter (percent)		84

Comments: Soil deposition, excessive erosion, bank collapse, channelization, and channel incision observed.

Recommendations: Consider this riparian community occurrence for in-channel placement of mechanical obstacles (such as snags) that would reduce flow rates. Consider stabilizing adjacent upland.

Riparian Community Occurrence Site Two-Mile 4-P1

Community Type: Mixed conifer / Gambel's Oak Forest (Mixed conifer / *Quercus gambelii* Forest)

Length: 1046 m

Functional Condition: Functional

Data Summary:

Plot TWO-MILE 4-P1 6/24/08

Measurement		Value
Width of riparian occurrence (m)		15
Avg. width of unvegetated stream channel (m)		3.4
Total overstory canopy cover (percent)		80
Overstory tree cover by species (percent)	ABCO QUGA SAEX	6 22 2

	ACNE PSME	18 32
Tree Density by species	ACNE ABCO PSME	300/ha 100/ha 200/ha
Avg. tree DBH by species (cm)	ACNE ABCO PSME	7.2 10.9 16.5
Avg. tree height by species (m)	ACNE ABCO PSME	6.3 8.8 9.0
Snag Density		100/ha
Understory height (m)	#Points w/ veg Min Max Avg	5 of 10 0.1 2.7 0.8
Total understory cover by species (percent)	SAEX QUGA PRVI MUMO GABO AGRX UNKX ACGL, TORA, RUST, ROWO, JAAM, CLPS, BEFE	6 6 8 24 6 10 10 <5
Ground surface covered by live understory vegetation (percent)		70
Ground surface covered by litter (percent)		66

Comments: Some soil deposition and channelization observed during survey.

Recommendations: No action required.

Riparian Community Occurrence Site Two-Mile 4-P2

Community Type: Box Elder Forest (*Acer negundo* Forest)

Length: 608 m

Functional Condition: Functional

Data Summary:

Plot TWO-MILE 4-P2 6/24/08

Measurement		Value
Width of riparian occurrence (m)		19
Avg. width of unvegetated stream channel (m)		3
Total overstory canopy cover (percent)		96
Overstory tree cover by species (percent)	ABCO ACNE PSME	4 90 2
Tree Density by species	ACNE	500/ha
Avg. tree DBH by species (cm)	ACNE	24.6
Avg. tree height by species (m)	ACNE	10.6
Snag Density		100/ha
Understory height (m)	#Points w/ veg Min Max Avg	3 of 10 0.2 0.8 0.6
Total understory cover by species (percent)	FERN RUST QUGA, VETH, MUMO, GABO	6 6 <5
Ground surface covered by live understory vegetation (percent)		24
Ground surface covered by litter (percent)		66

Comments: Some soil deposition and bank collapse observed during survey.

Recommendations: Consider this riparian community occurrence for in-channel placement of mechanical obstacles (such as snags) that would reduce flow rates.

Riparian Community Occurrence Site Two-Mile – Side – West

Community Type: Mixed conifer / Box Elder - Chokecherry Forest (Mixed conifer / *Acer negundo – Prunus virginiana* Forest)

Length: 64 m

Functional Condition: Functional – At Risk

Data Summary:

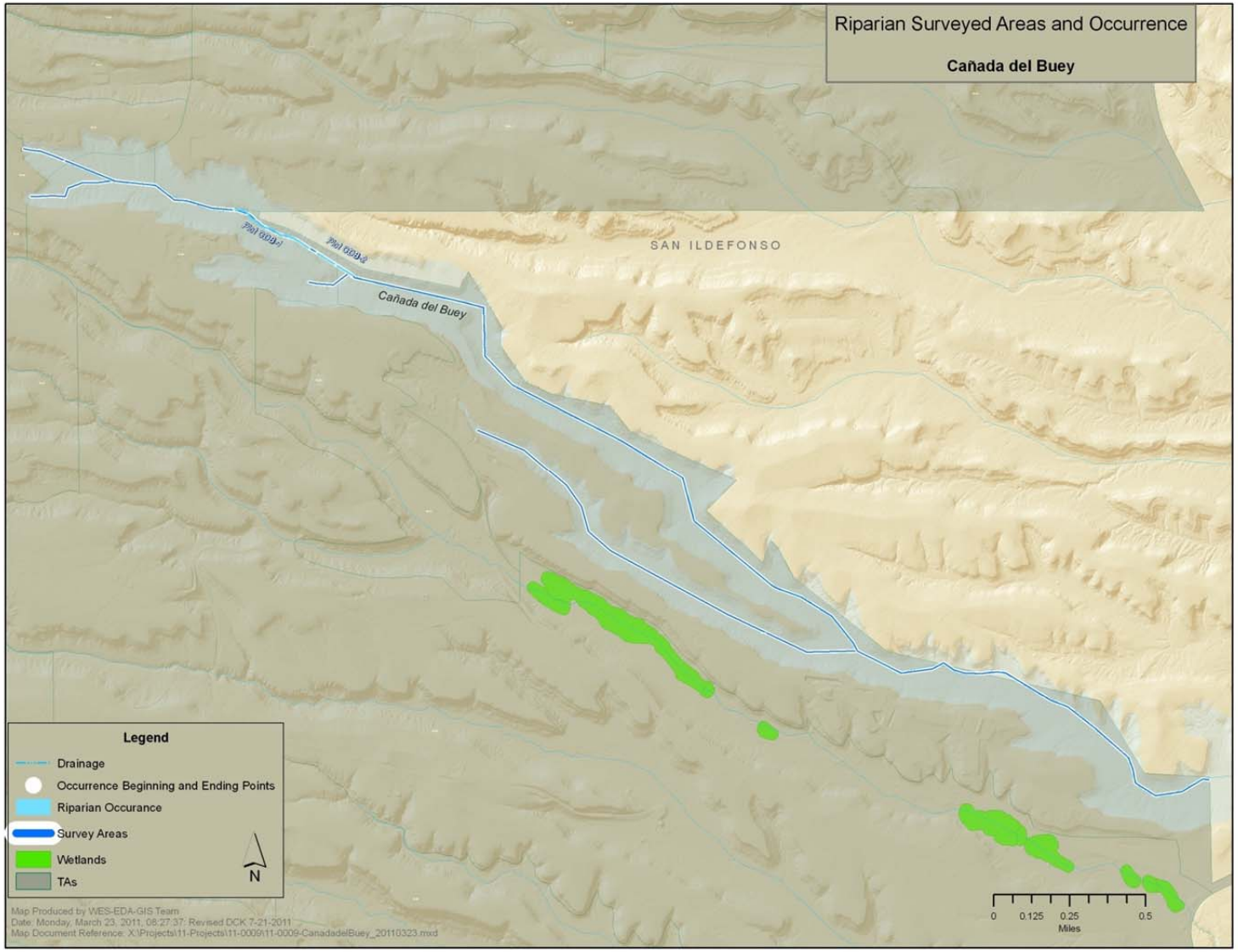
Plot Two-Mile – Side – West 6/19/08

Measurement		Value
Width of riparian occurrence (m)		14
Avg. width of unvegetated stream channel (m)		2.4
Total overstory canopy cover (percent)		72
Overstory tree cover by species (percent)	ABCO ACGL PSME QUGA	6 8 54 4
Tree Density by species	ACGL PSME PRVI POTR2	100/ha 100/ha 100/ha 100/ha
Avg. tree DBH by species (cm)	ACGL PSME PRVI	7.9 29.7 3.0

	POTR2	0.8
Avg. tree height by species (m)	ACGL PSME PRVI POTR2	8.5 20.7 5.5 3.0
Snag Density		200/ha
Understory height (m)	#Points w/ veg Min Max Avg	5 of 10 0.1 0.5 0.3
Total understory cover by species (percent)	MUMO RUST PRVI GABO ACNE UNKX, POTR2, JAAM, CLPS, AGAL	10 14 10 8 10 <5
Ground surface covered by live understory vegetation (percent)		60
Ground surface covered by litter (percent)		32

Comments: Soil deposition, excessive erosion, bank collapse, channelization, and channel incision observed during surveys. Russian olive was present. The stream channel lacked natural sinuosity and vertical stability, however, riparian-wetland vegetation has high vigor. *Acer negundo* in overstory may have been misidentified as *Acer glabrum*.

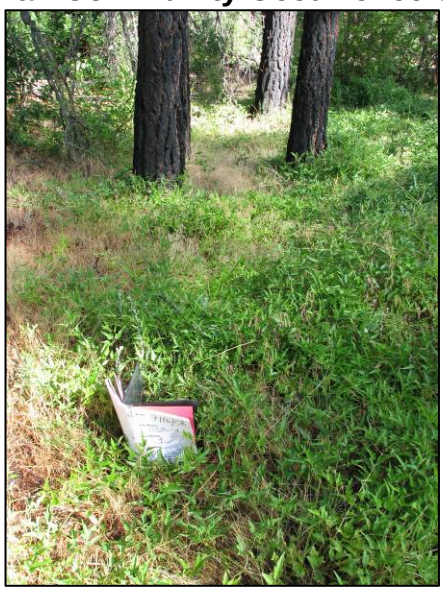
Recommendations: Consider this riparian community occurrence for in-channel placement of mechanical obstacles (such as snags) that would reduce flow rates.


Riparian Surveyed Areas and Occurrence
Cañada del Buey
SAN ILDEFONSO
Cañada del Buey
Legend
Drainage
Occurrence Beginning and Ending Points
Riparian Occurance
Survey Areas
Wetlands
TAs
N
0 0.125 0.25 0.5
Miles
Map Produced by WES-EDA-GIS Team
Date: Monday, March 23, 2011, 08:27:37: Revised DCK 7-21-2011
Map Document Reference: X:\Projects\11-Projects\11-0009\11-0009-CanadadelBuey_20110323.mxd

CAÑADA DEL BUEY

In 2008 LANL biologists completed an inventory of 100 percent of Cañada del Buey within Laboratory boundaries.

Riparian Community Occurrence Site CDB 1



Community Type: Mixed conifer / Box Elder - Chokecherry Forest (Mixed conifer / *Acer negundo – Prunus virginiana* Forest)

Length: 471 m

Functional Condition: Functional

Data Summary:

Plot CDB-1 7/16/08

Measurement		Value
Width of riparian occurrence (m)		18
Avg. width of unvegetated stream channel (m)	Check pictures	No data
Total overstory canopy cover (percent)		60
Overstory tree cover by species (percent)	PSME ACNE PIPO	26 14 20
Tree Density by species	PSME PIPO ACNE PRVI	100/ha 100/ha 300/ha 400/ha
Avg. tree DBH by species (cm)	PSME	37.3

	PIPO ACNE PRVI	58.6 4.8 2.5
Avg. tree height by species (m)	PSME PIPO ACNE PRVI	19.5 24.1 5.2 3.9
Snag Density		0
Understory height (m)	#Points w/ veg Min Max Avg	4 of 10 0.2 2.0 1.1
Total understory cover by species (percent)	ROWO BRTE PRVI PAIN1 VETH, MUMO, CLPS	10 22 14 10 <5
Ground surface covered by live understory vegetation (percent)		50
Ground surface covered by litter (percent)		47

Comments: No comments.

Recommendations: No action required.

Riparian Community Occurrence Site CDB 2

Community Type: Mixed conifer / Gambel's Oak Forest (Mixed conifer / *Quercus gambelii* Forest)

Length: 229 m

Functional Condition: Functional

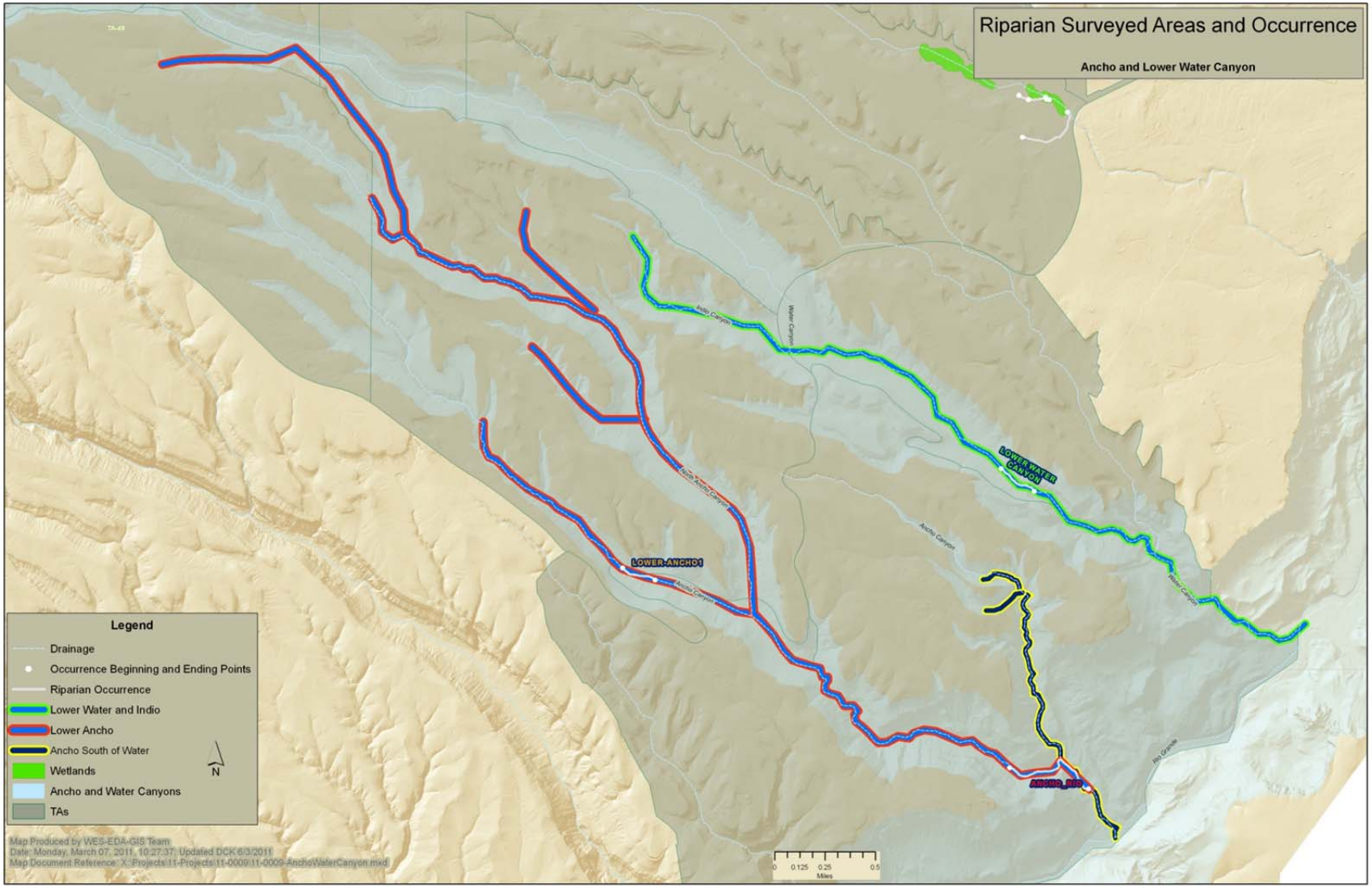
Data Summary:

Plot CDB-2 7/16/08

Measurement		Value
Width of riparian occurrence (m)		8
Avg. width of unvegetated stream channel (m)		0.65
Total overstory canopy cover (percent)		74
Overstory tree cover by species (percent)	PIPO PRVI PSME QUGA	28 6 8 32
Tree Density by species	PSME QUGA PRVI PIPO	100/ha 100/ha 500/ha 100/ha
Avg. tree DBH by species (cm)	PSME QUGA PRVI PIPO	17.5 3.6 2.5 54.9
Avg. tree height by species (m)	PSME QUGA PRVI PIPO	14.3 3.7 3.8 24.7
Snag Density		300/ha
Understory height (m)	#Points w/ veg Min Max Avg	1 of 10 na na 0.1
Total understory cover by species (percent)	PRVI BEFE POFE BRTE, VETH, MUMO	16 16 12 <5
Ground surface covered by live understory vegetation (percent)		42
Ground surface covered by litter (percent)		48

Comments: No comments.

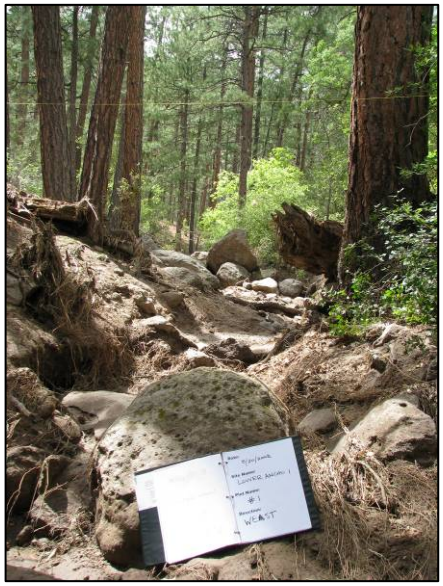
Recommendations: No action required.


Riparian Surveyed Areas and Occurrence
Ancho and Lower Water Canyon
LOWER-WATER CANYON
LOWER-ANCHO1
ANCHO_RIO
Legend
Drainage
Occurrence Beginning and Ending Points
Riparian Occurrence
Lower Water and Indio
Lower Ancho
Ancho South of Water
Wetlands
Ancho and Water Canyons
TAs
N
0 0.125 0.25 0.5
Miles
Map Produced by WES-EDA-GIS Team
Date: Monday, March 07, 2011, 10:27:37; Updated DCK 6/3/2011
Map Document Reference: X:\Projects\11-Projects\11-0009\11-0009-AnchoWaterCanyon.mxd

ANCHO CANYON

In 2008 LANL biologists completed an inventory of 70 percent of Ancho Canyon within Laboratory boundaries.

Riparian Community Occurrence Site Lower Ancho 1



Community Type: Ponderosa Pine – Box Elder / New Mexico Olive – New Mexico Locust Forest (*Pinus ponderosa – Acer negundo / Fosteria neomexicana – Robinia neomexicana* Forest)

Length: 296 m

Functional Condition: Functional – At Risk

Data Summary:

Plot Lower Ancho 1 8/20/08

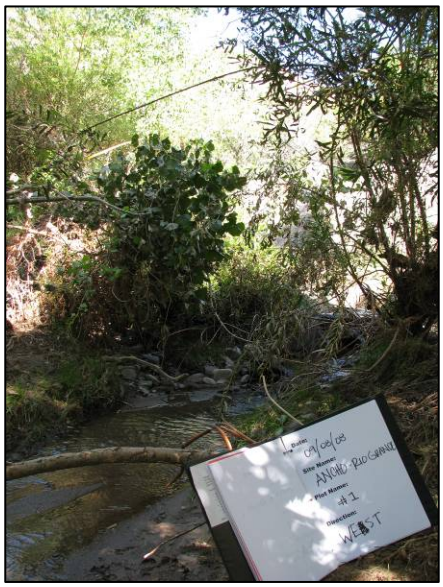
Measurement		Value
Width of riparian occurrence (m)		25
Avg. width of unvegetated stream channel (m)		3.6
Total overstory canopy cover (percent)		88
Overstory tree cover by species (percent)	ACNE PIPO	48 40
Tree Density by species	ACNE PIPO	200/ha 200/ha
Avg. tree DBH by species (cm)	ACNE PIPO	19.7 35.2

Avg. tree height by species (m)	ACNE PIPO	11.0 17.7
Snag Density		100/ha
Understory height (m)	#Points w/ veg Min Max Avg	2 of 10 1.5 2.5 1.9
Total understory cover by species (percent)	RONE1 MUMO FONE BROX, ACNE, RUTR	8 16 8 <5
Ground surface covered by live understory vegetation (percent)		42
Ground surface covered by litter (percent)		38

Comments: Excessive erosion, head cutting, and channel incision observed during survey.

Recommendations: Consider this riparian community occurrence for in-channel placement of mechanical obstacles (such as snags) that would reduce flow rates.

Riparian Community Occurrence Site Ancho – Rio Grande



Community Type: Valley Cottonwood – Box Elder / Coyote Willow Forest (*Populus fremontii – Acer negundo / Salix exigua* Forest)

Length: 847 m

Functional Condition: Functional – At Risk

Data Summary:

Plot Ancho – Rio Grande 9/8/08

Measurement		Value
Width of riparian occurrence (m)		10
Avg. width of unvegetated stream channel (m)		1.9
Total overstory canopy cover (percent)		78
Overstory tree cover by species (percent)	JUMO POFR2 ACNE	6 46 26
Tree Density by species	ACNE POFR2 JUMO	500/ha 200/ha 100/ha
Avg. tree DBH by species (cm)	ACNE POFR2 JUMO	12.7 26.3 n/a
Avg. tree height by species (m)	ACNE POFR2 JUMO	6.0 12.6 6.1
Snag Density		0
Understory height (m)	#Points w/ veg Min Max Avg	5 of 10 0.2 2.1 1.1
Total understory cover by species (percent)	ARTR SAEX ACNE BROX, MUMO	10 18 6 <5
Ground surface covered by live understory vegetation (percent)		42
Ground surface covered by litter (percent)		41

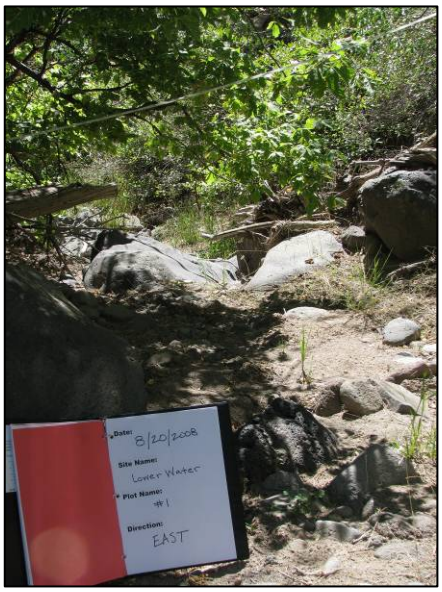
Comments: Salt cedar and signs of feral cattle use observed during survey.

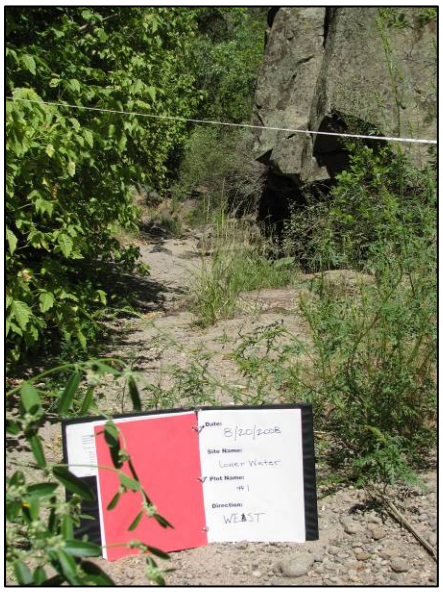
Recommendations: Consider exotic plant and feral animal removal.

WATER CANYON

In 2008 LANL biologists completed an inventory of 25 percent of Water Canyon situated within Laboratory boundaries.

Riparian Community Occurrence Site Lower Water





Community Type: Chokecherry – New Mexico Olive Wooded Shrubland (*Prunus virginiana – Fosteria neomexicana* Wooded Shrubland)

Length: 336 m

Functional Condition: Functional

Data Summary:

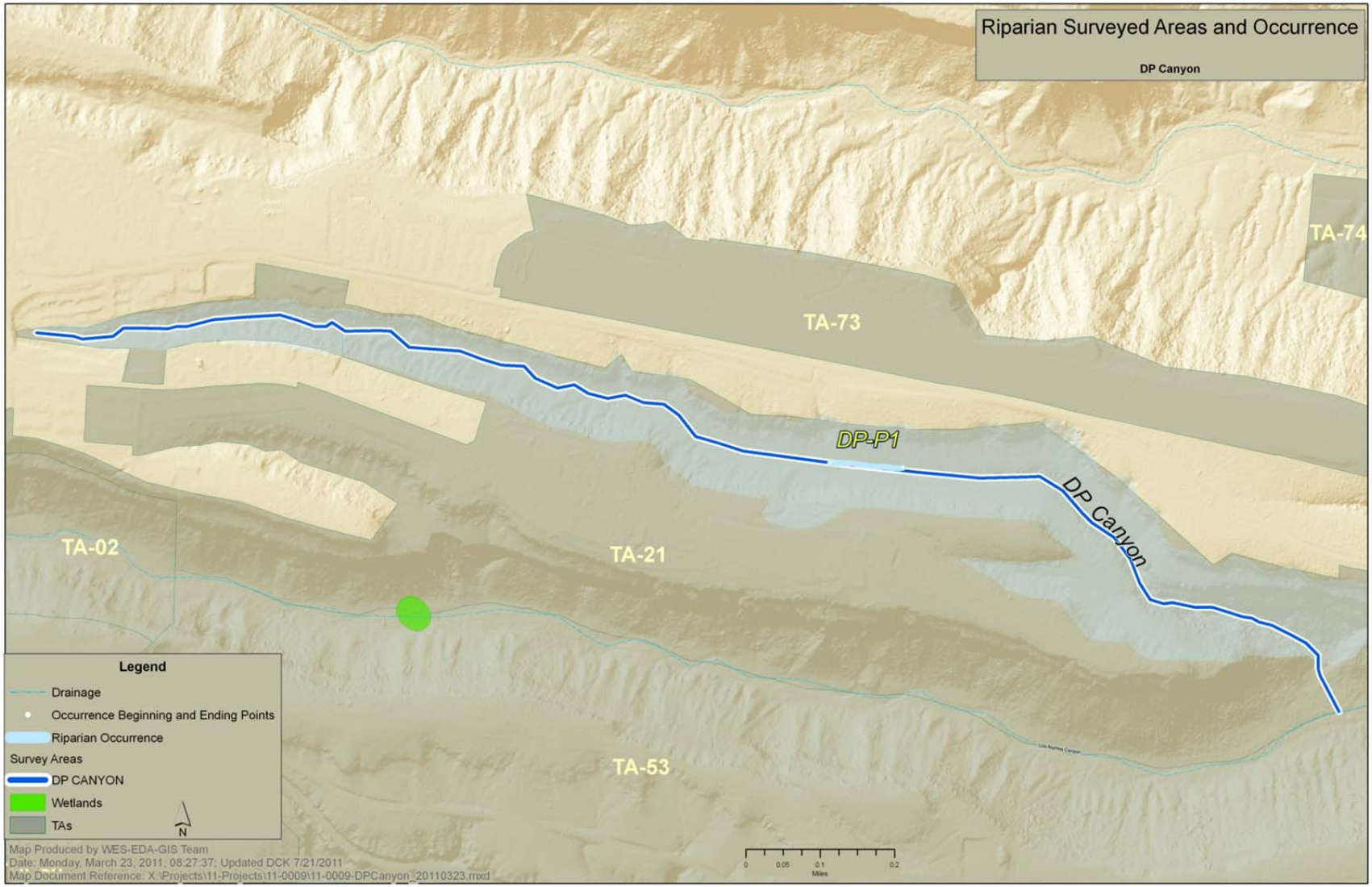
Plot Lower Water Canyon 8/20/08

Measurement		Value
Width of riparian occurrence (m)		10
Avg. width of unvegetated stream channel (m)		3.2
Total overstory canopy cover (percent)		14
Overstory tree cover by species (percent)	JUMO ACNE	4 10
Tree Density by species	ACNE	100/ha
Avg. tree DBH by species (cm)	ACNE	6.1
Avg. tree height by species (m)	ACNE	5.5
Snag Density		0
Understory height (m)	#Points w/ veg Min	6 of 10 0.5

	Max Avg	0.8 0.7
Total understory cover by species (percent)	PRVI FONE MUMO SIHY	52 18 6 <5
Ground surface covered by live understory vegetation (percent)		72
Ground surface covered by litter (percent)		41

Comments: Dominant stream channel bed material is boulders.

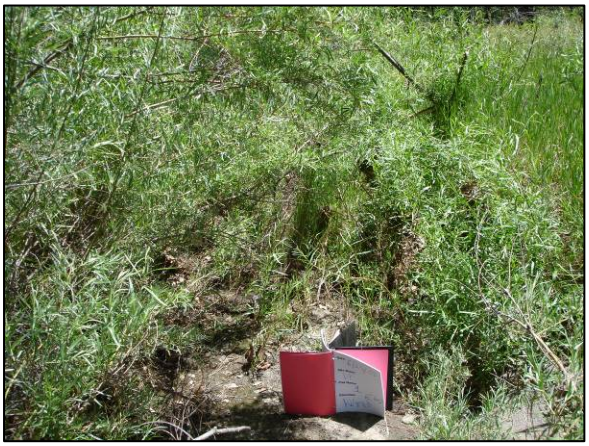
Recommendations: No action required.


Riparian Surveyed Areas and Occurrence
DP Canyon
TA-74
TA-73
DP-P1
DP Canyon
TA-02
TA-21
TA-53
Legend
Drainage
Occurrence Beginning and Ending Points
Riparian Occurrence
Survey Areas
DP CANYON
Wetlands
TAs
N
Map Produced by WES-EDA-GIS Team
Date: Monday, March 23, 2011, 08:27:37; Updated DCK 7/21/2011
Map Document Reference: X:\Projects\11-Projects\11-0009\11-0009-DPCanyon_20110323.mxd
0 0.05 0.1 0.2
Miles

DP CANYON

In 2008 LANL biologists completed an inventory of 100 percent of areas of DP Canyon located within Laboratory boundaries.

Riparian Community Occurrence Site DP - 1



Community Type: Coyote Willow / Mixed Grasses Woodland (*Salix exigua* / Mixed Grasses Woodland)

Length: 159 m

Functional Condition: Functional – At Risk

Data Summary:

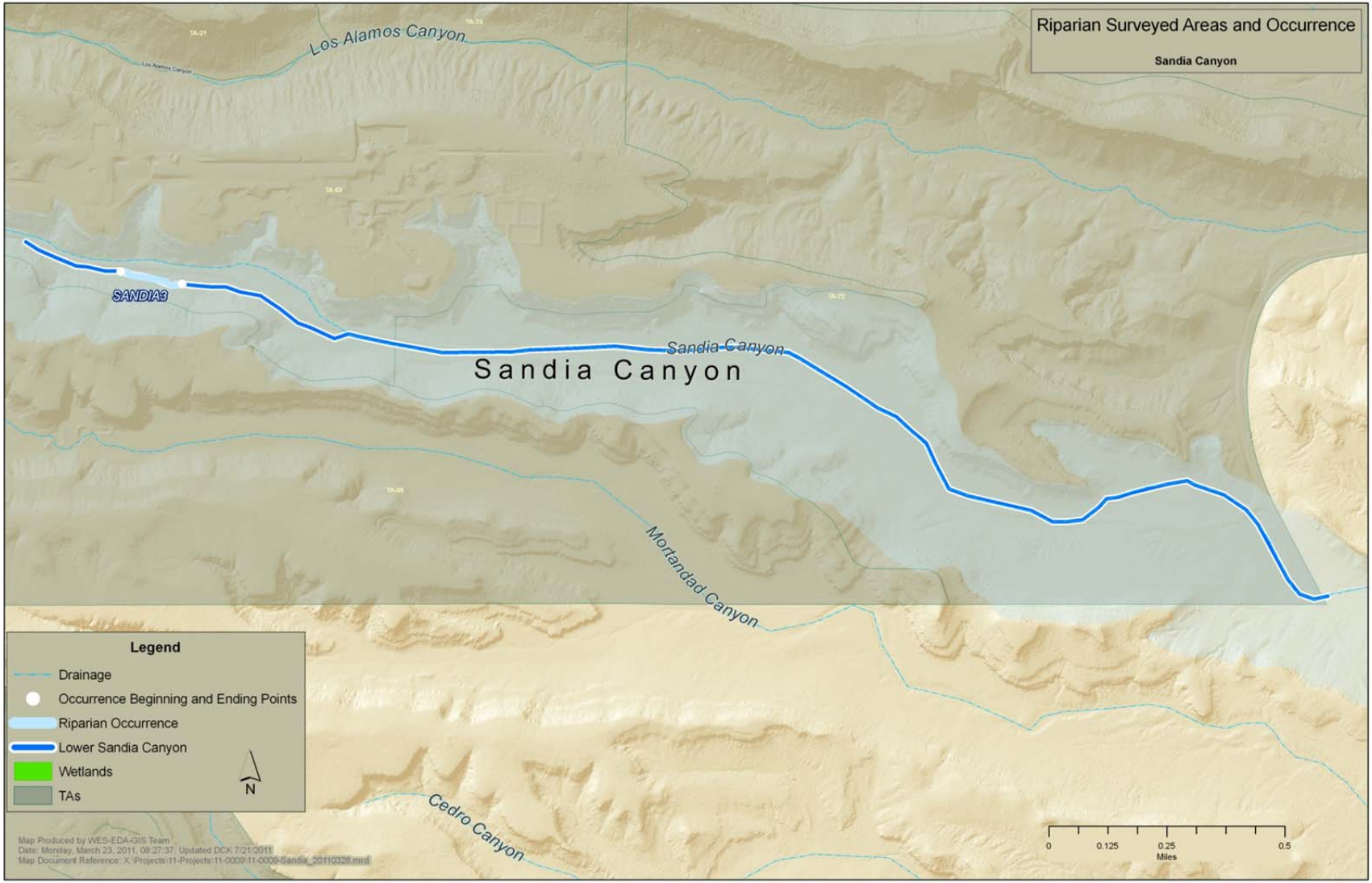
Plot DP – P1 6/25/08

Measurement		Value
Width of riparian occurrence (m)		8
Avg. width of unvegetated stream channel (m)		2.4
Total overstory canopy cover (percent)		42
Overstory tree cover by species (percent)	SAEX QUGA JUMO	28 2 12
Tree Density by species	SAEX	100/ha
Avg. tree DBH by species (cm)	SAEX	3.6
Avg. tree height by species (m)	SAEX	3.7
Snag Density		0
Understory height (m)	#Points w/ veg Min Max Avg	7 of 10 0.3 2.0 0.7
Total understory cover by species (percent)	SAEX BRGI	10 68

	ERFL, ASTX, UNKG, MUMO, PERY, RUTR	<5
Ground surface covered by live understory vegetation (percent)		82
Ground surface covered by litter (percent)		46

Comments: Condition of adjacent uplands (developed with major roads) is contributing to augmented flows, soil deposition, and channel incision in this community occurrence. A grade control structure was recently (winter of 2009-2010) installed, and will change stream channel conditions.

Recommendations: Re-evaluate community occurrence following adjustment of the community to the grade control structure.


Riparian Surveyed Areas and Occurrence
Sandia Canyon
Los Alamos Canyon
SANDIA3
Sandia Canyon
Sandia Canyon
Mortandad Canyon
Cedro Canyon
Legend
Drainage
Occurrence Beginning and Ending Points
Riparian Occurrence
Lower Sandia Canyon
Wetlands
TAs
N
0
0.125
0.25
0.5
Miles
Map Produced by WES-EDA-GIS Team
Date: Monday, March 23, 2011, 08:27:37; Updated DCK 7/21/2011
Map Document Reference: X:\Projects\11-Projects\11-0009\11-0009-Sandia_20110328.mxd

Sandia Canyon

In 2008 LANL biologists completed an inventory of the remaining 50 percent of areas of Sandia Canyon situated within Laboratory boundaries.

Riparian Community Occurrence Site SANDIA3

Community Type: Ponderosa Pine - Box Elder / Brome sp. Woodland (*Pinus ponderosa – Acer negundo / Bromus* sp. Woodland)

Length: 221 m

Functional Condition: Nonfunctional

Data Summary:

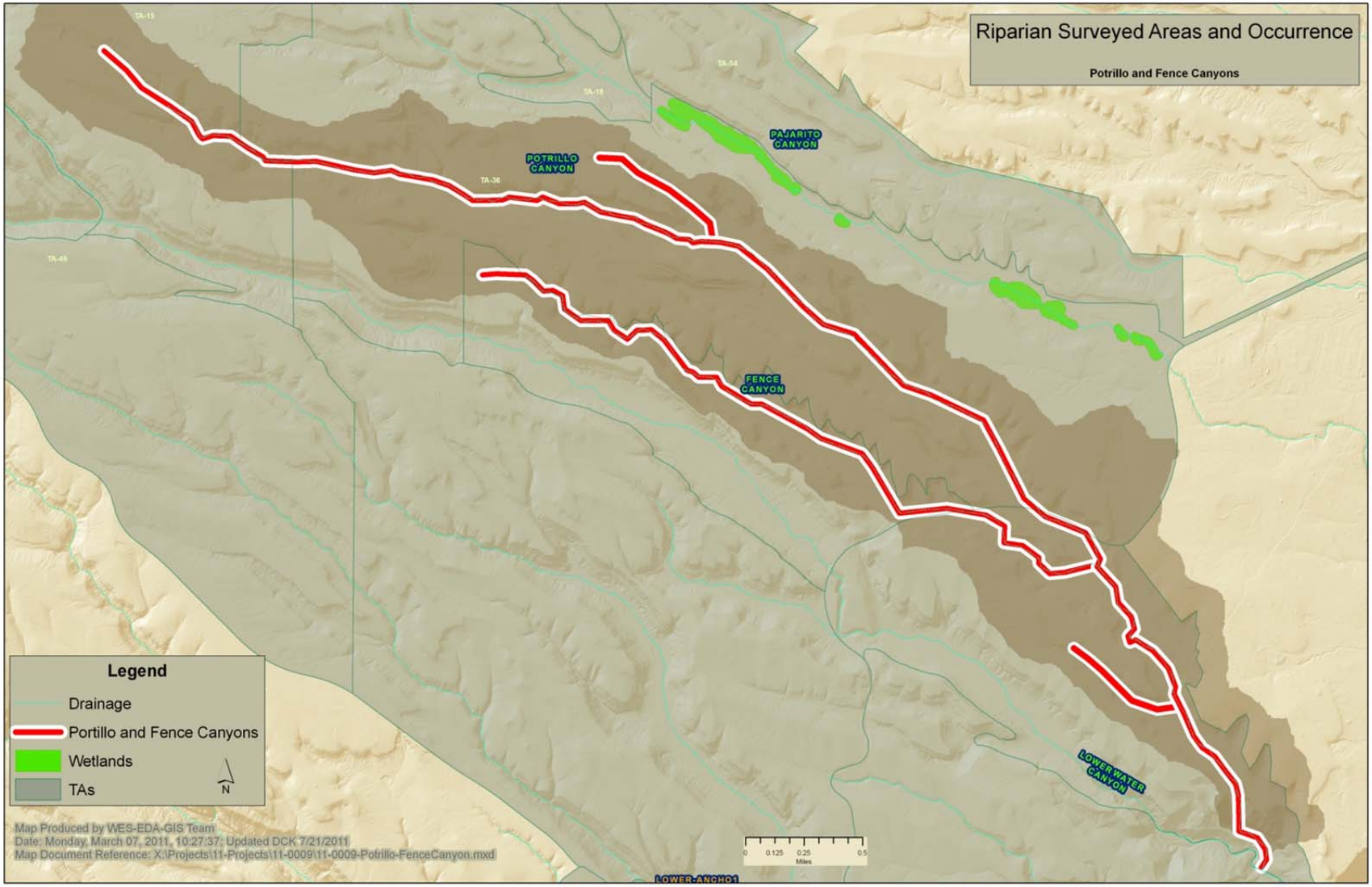
Plot SANDIA3 7/24/08

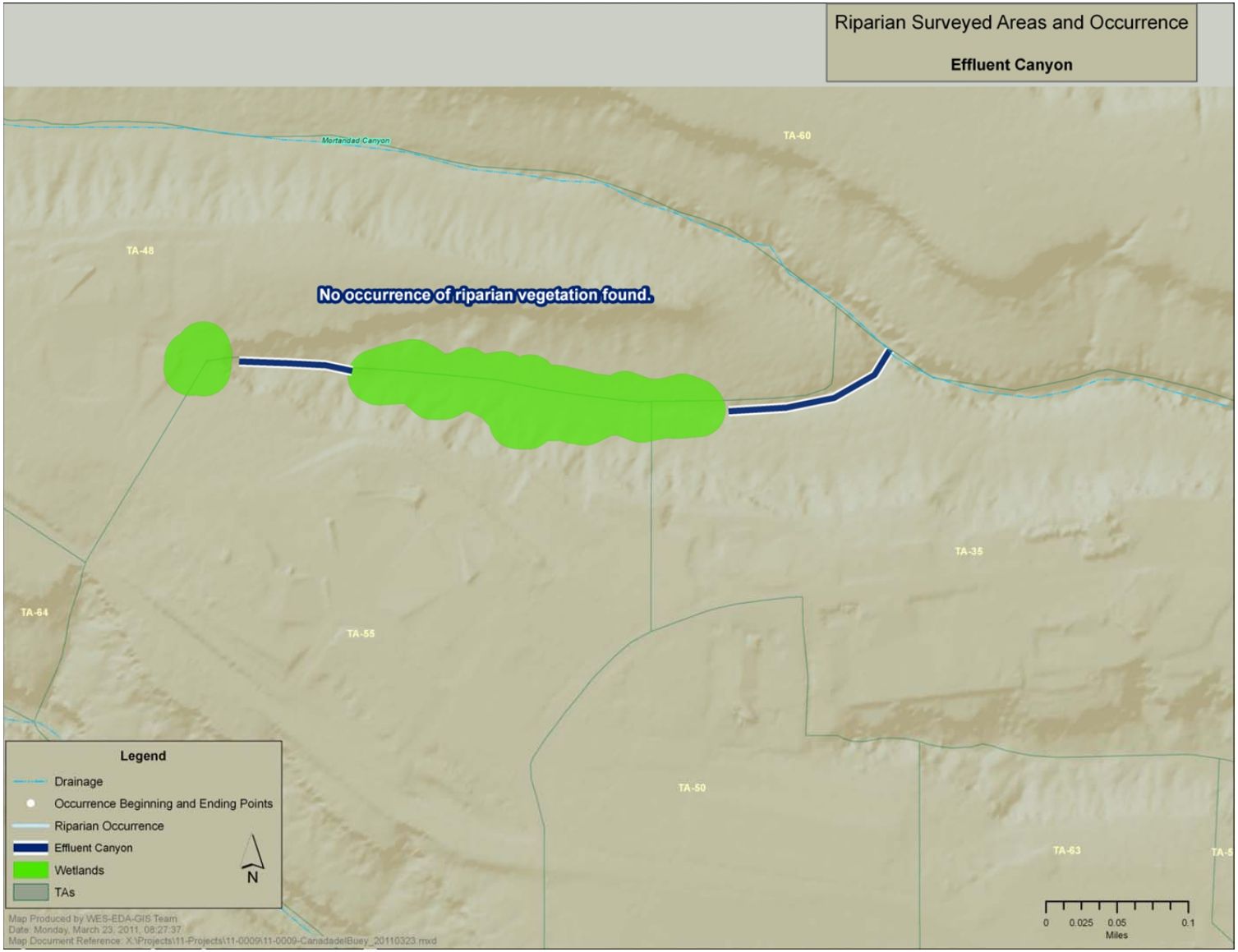
Measurement (m)		Value
Width of riparian occurrence (m)		10
Avg. width of unvegetated stream channel		2.1
Total overstory canopy cover (percent)		32
Overstory tree cover by species (percent)	ACNE PIPO RONE1	16 6 10
Tree Density by species	RONE1 ACNE	200/ha 100/ha
Avg. tree DBH by species (cm)	RONE1 ACNE	1.3 13.2
Avg. tree height by species (m)	RONE1 ACNE	3.0 7.6

Snag Density		0
Understory height (m)	#Points w/ veg Min Max Avg	5 of 10 0.2 2.2 0.7
Total understory cover by species (percent)	BRTE RUTR, ASCX, HIJA, MUMO, ROWO, SAKA, RICE	44 <5
Ground surface covered by live understory vegetation (percent)		58
Ground surface covered by litter (percent)		44

Comments: This riparian community occurrence does not have sufficient hydrology to maintain healthy floodplain vegetation, protect banks, or dissipate high flows. The stream channel is experiencing excessive erosion, head cutting, soil deposition, bank collapse, channelization, and channel incision.

Recommendations: Evaluate whether to maintain or restore this area as riparian habitat. If the objective is to maintain or restore, consider in-channel placement of mechanical obstacles that would reduce flow rates.


Riparian Surveyed Areas and Occurrence
Potrillo and Fence Canyons
TA-15
TA-54
TA-18
TA-36
TA-49
POTRILLO CANYON
PAJARITO CANYON
FENCE CANYON
LOWER WATER CANYON
LOWER-ANCHO1
Legend
Drainage
Portillo and Fence Canyons
Wetlands
TAs
N
0 0.125 0.25 0.5
Miles
Map Produced by WES-EDA-GIS Team
Date: Monday, March 07, 2011, 10:27:37; Updated DCK 7/21/2011
Map Document Reference: X:\Projects\11-Projects\11-0009\11-0009-Potrillo-FenceCanyon.mxd


Riparian Surveyed Areas and Occurrence
Effluent Canyon
Mortandad Canyon
TA-60
TA-48
No occurrence of riparian vegetation found.
TA-35
TA-64
TA-55
TA-50
TA-63
Legend
Drainage
Occurrence Beginning and Ending Points
Riparian Occurrence
Effluent Canyon
Wetlands
TAs
N
0 0.025 0.05 0.1
Miles
Map Produced by WES-EDA-GIS Team
Date: Monday, March 23, 2011, 08:27:37
Map Document Reference: X:\Projects\11-Projects\11-0009\11-0009-CanadadelBuey_20110323.mxd

EFFLUENT, POTRILLO AND FENCE CANYONS

In 2008 LANL biologists completed an inventory of 100 percent of Effluent, Potrillo and Fence Canyons situated within Laboratory boundaries. No riparian habitat outside of delineated wetland boundaries was identified during these surveys.

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