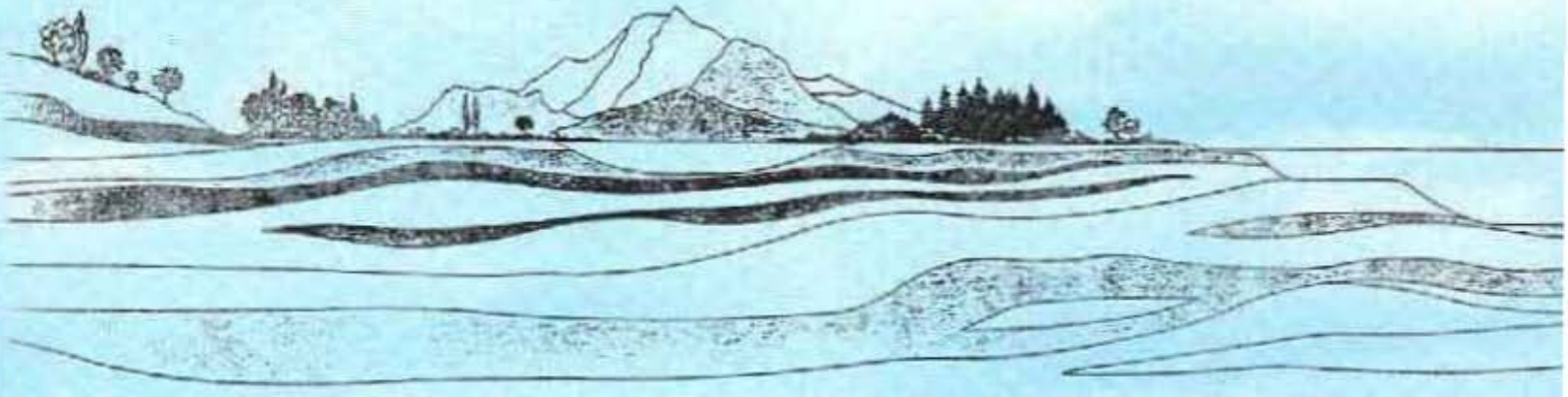
FUGRO WEST, INC.

SAN ANTONIO CREEK SOUTHERN STEELHEAD HABITAT CHARACTERIZATION VENTURA COUNTY, CALIFORNIA

Prepared for:
VENTURA COUNTY FLOOD CONTROL DISTRICT

February 1996



SAN ANTONIO CREEK
SOUTHERN STEELHEAD HABITAT CHARACTERIZATION
VENTURA COUNTY, CALIFORNIA

* * * * *

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February 1996

Project Number 96-61-0301

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1.0 INTRODUCTION

1.1 PROJECT OBJECTIVES

1.1.1 Steelhead Habitat Assessment

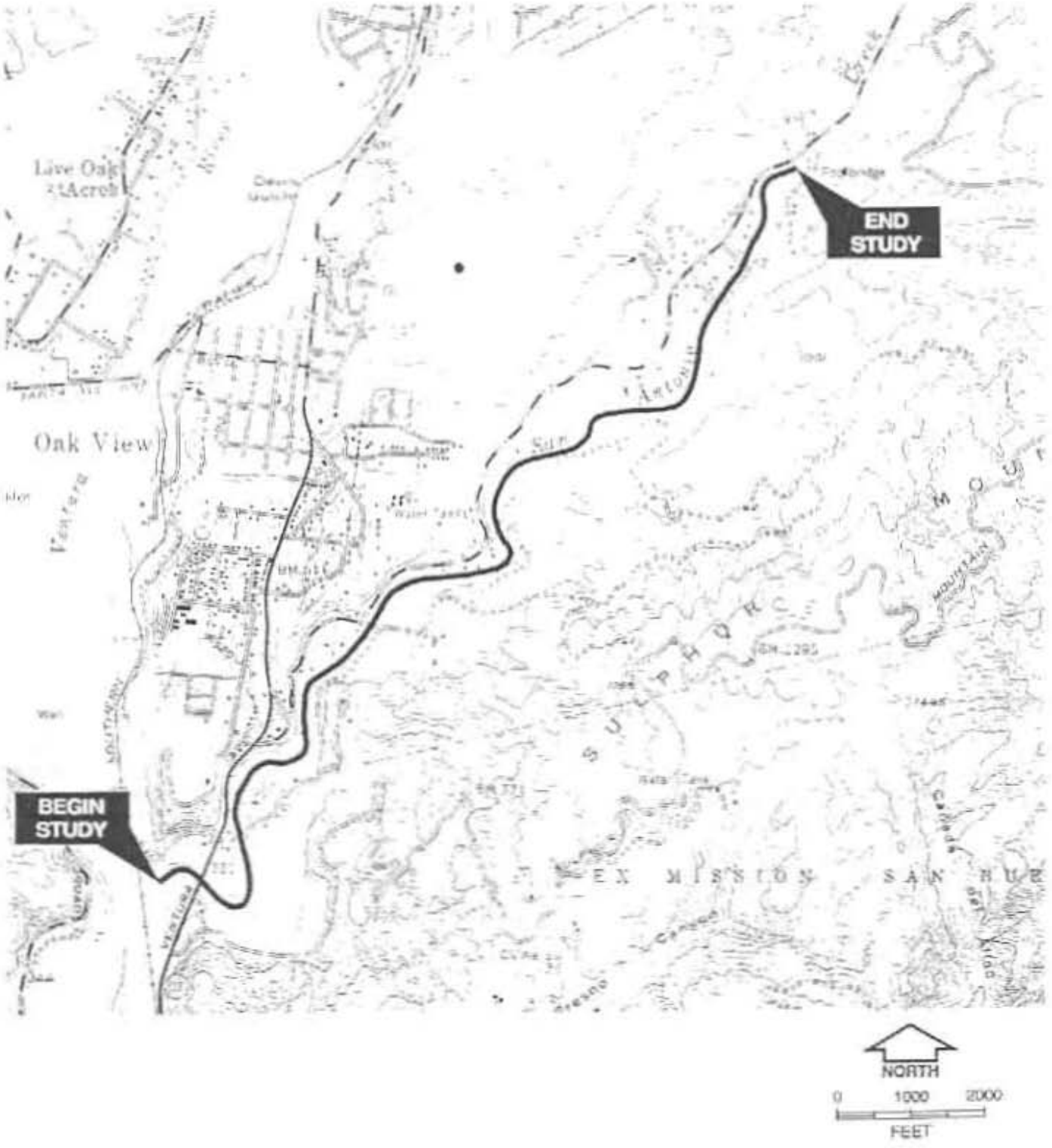
The purpose of the San Antonio Creek Habitat Characterization Study is to provide the Ventura County Flood Control District (VCFCD) detailed mapping and descriptions of habitat present within the project area, focusing on habitats for southern steelhead (*Oncorhynchus mykiss*) spawning, rearing, and migration. Habitats for southern steelhead located within San Antonio Creek were identified and characterized through field surveys conducted by Fugro biologists on January 23 through 25, and February 1, 1996. Instream habitats associated with San Antonio Creek, including all identified suitable spawning habitats occurring within the study area, were mapped as part of the field surveys. Riparian habitats associated with San Antonio Creek and occurring within the study area, were also classified and mapped as part of the habitat characterization study.

1.1.2 Study Limitations

The San Antonio Creek Habitat Characterization Study is based on data collected in the field over a four-day period. Although detailed site-specific information relating to steelhead habitat availability was obtained during the field surveys, the following habitat characterization provides an isolated view of steelhead habitat availability within the study area under current weather and flow conditions only. Fugro did not consult with resource agencies (e.g., California Department of Fish and Game [CDFG] and U.S. Fish and Wildlife Service), nor were historical data potentially available through the resource agencies relating to status of steelhead and habitat availability within San Antonio Creek researched for this study.

1.2 STUDY AREA

San Antonio Creek is a major tributary to the Ventura River, along with Matilija Creek, the North Fork of Matilija Creek, and Coyote Creek. The location of San Antonio Creek, in relation to the Ventura River, is illustrated in Figure 1, San Antonio Creek Study Area. San Antonio Creek originates on the southern slopes of the Topa Topa Mountains and Nordhoff Ridge in the northeastern portion of the Ventura River Basin. It flows approximately 18.4 kilometers (11.5 miles) from Senior Canyon, in a southwesterly direction, to the stream's confluence with the Ventura River. The confluence of San Antonio Creek and the Ventura River is located in the Casitas Springs area, approximately 13 kilometers (8.1 miles) upstream from the mouth of the Ventura River. The total drainage area for the San Antonio Creek watershed is 135 square kilometers (83.9 square miles) (Moore, 1980).



SAN ANTONIO CREEK
HABITAT STUDY AREA

FIGURE 1

1.3 BACKGROUND

1.3.1 Southern Steelhead Status and Life History

Southern steelhead are currently designated as a State Species of Special Concern (CDFG, 1994). Although the southern steelhead currently has no official listing status on the federal level, a species status review is currently being conducted by National Marine Fisheries Service (NMFS) to obtain all information required for proposing the listing of the species under the federal Endangered Species Act.

The historical spawning range of steelhead trout has included suitable coastal streams along the Pacific Coast from Alaska to the California-Mexico border (Moore, 1980). Available data indicate that the Ventura River is most likely the southernmost stream currently supporting a steelhead run during most years, although steelhead have been reported as occurring in limited numbers in the Santa Clara River and Malibu Creek to the south (Moore, 1980). Southern steelhead are unique in that they represent the southernmost portion of the native steelhead range of North America (Titus et al., 1994). Southern steelhead differ from steelhead occurring in more northern locations in that southern steelhead are considered to be ecologically and physiologically adapted to the seasonally warm and intermittent coastal streams of California ranging from approximately San Luis Obispo County southward to Baja California, Mexico (Titus et al., 1994).

Within the central and southern coastal areas of California, southern steelhead generally spawn in the spring. They will often move up coastal streams following the first substantial rainfall in the fall and then wait until the spring to spawn (Moore, 1980). Spawning generally takes place in well-oxygenated riffle areas that contain clean, coarse gravel. After the eggs hatch, fry emerge from the gravel and disperse throughout the creek, typically occupying shallow areas along stream margins (Barnhart, 1986). Juvenile southern steelhead generally move to deeper pools as they grow and will remain in freshwater for an average of 2 years before migrating to the ocean (Titus et al., 1994). Downstream movement of adult, following spawning, and juvenile southern steelhead usually occurs from March through July, depending on suitable instream flow conditions. Those adults that do not migrate to the ocean following spawning will typically move to deeper pools within the stream to hold throughout the summer and fall months (Titus et al., 1994).

1.3.2 Southern Steelhead Habitat Requirements

Optimal habitat for steelhead trout throughout its entire range on the Pacific Coast can generally be characterized by clear, cool water with abundant instream cover, well-vegetated stream margins, relatively stable water flow, and a 1:1 pool-to-riffle ratio (Raleigh et al., 1984). Maintenance of a well-developed riparian corridor along the stream course is considered an essential component in steelhead trout streams. A well-developed riparian community inhibits

substantial erosion of streambanks during high flows, maintains lower stream temperatures, and provides organic input to the stream (Faber et al., 1989).

Particle size suitable for steelhead spawning is dependent on the size of spawners, but is documented as averaging between 1.5 to 6.0 centimeters (cm) (0.5 to 2.4 inches) in diameter for steelhead less than 50 cm (20 inches) total length and between 1.5 to 10.0 cm (0.5 to 4 inches) in diameter for steelhead greater than 50 cm (20 inches) total length. Optimum spawning substrate conditions are considered to include less than 5 percent fine sediments. Although steelhead will spawn in substrates containing greater than 5 percent fine sediments, the presence of greater than 30 percent fine sediments within the substrate results in high mortality of embryos and emerging fry (Raleigh et al., 1984).

1.3.3 San Antonio Creek - Historical Habitat Availability

The Ventura River system historically supported substantial runs of steelhead trout (Titus et al., 1994). However, the status of this species continues to be threatened by a variety of factors including water quality degradation (e.g., siltation, urban, and agricultural pollutants), loss of riparian vegetation, low instream flows, and degradation or loss of spawning habitat (Moore, 1980). Major historic spawning and/or rearing areas within the Ventura River watershed have become inaccessible to adult steelhead due to construction of large barriers and diversion structures (Moore, 1980), such as the Las Robles Diversion structure, Matilija Dam, and Lake Casitas Dam. Tributaries of the Ventura River that provide suitable spawning and rearing habitat for southern steelhead include San Antonio Creek and Coyote Creek below Lake Casitas Dam (Titus et al., 1994).

Titus et al. (1994) indicates that CDFG conducted surveys for southern steelhead trout on San Antonio Creek. However, data associated with previous CDFG surveys were not obtained as part of this habitat characterization; therefore, conclusions about the status of steelhead populations associated with San Antonio Creek could not be determined during this study.

1.4 PROPOSED FLOOD CONTROL PROJECT

1.4.1 Purpose and Objectives

The VCFCD is proposing to perform flood control-related work on San Antonio Creek to protect approximately 30 structures located within the current floodplain. The VCFCD will be applying to the U.S. Army Corps of Engineers (USACE) for permit pursuant to Section 404 of the Clean Water Act to perform work within waters of the U.S. located in San Antonio Creek. The proposed project would consist of enlarging and realigning the low-flow stream channel to accommodate a 25-year frequency storm. To provide 25-year flood event protection of privately-

owned structures located within the floodplain of San Antonio Creek, streambed sediments and vegetation within various locations would be removed and relocated offsite.

1.4.2 Study Area Reaches

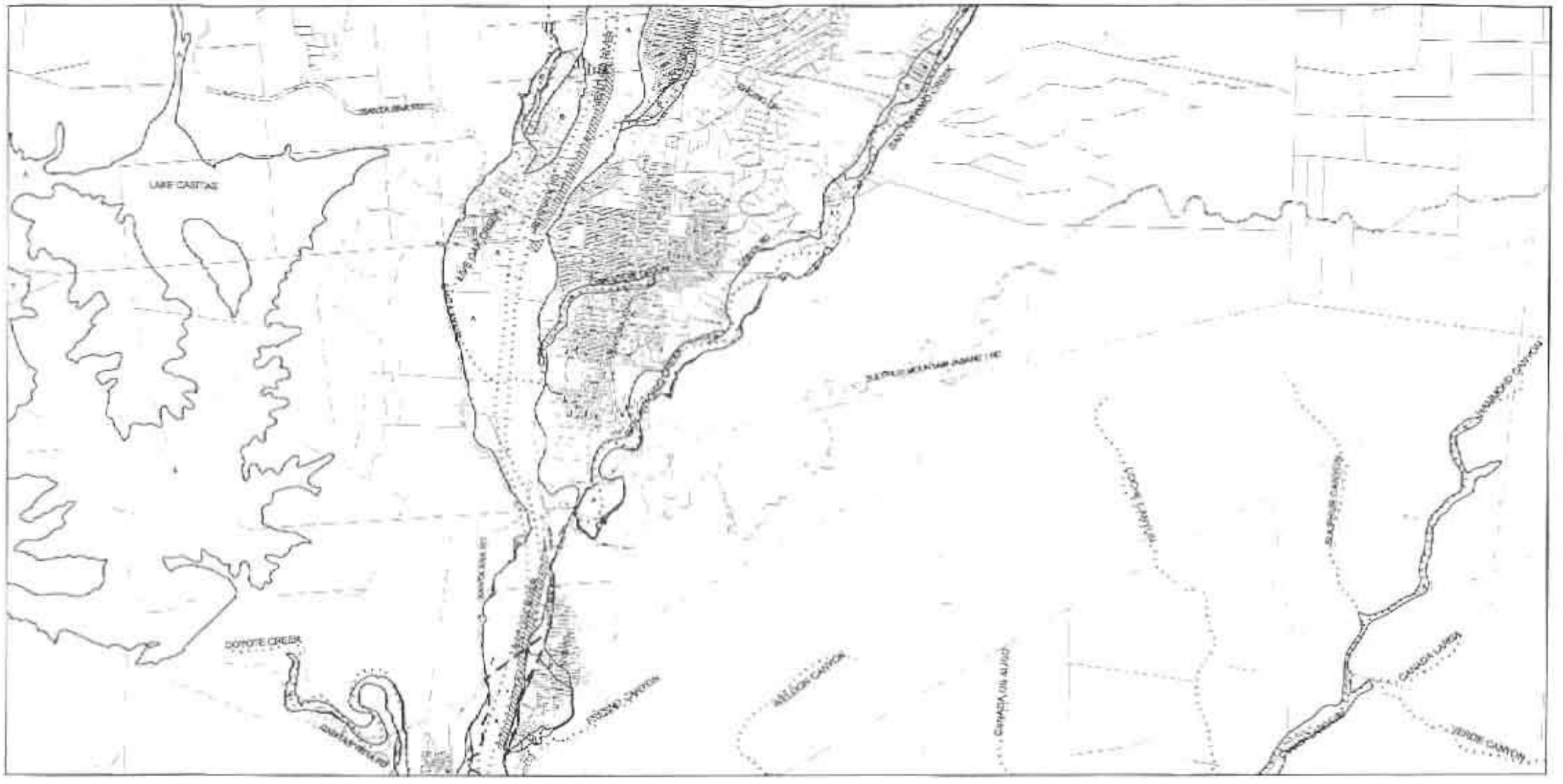
The project study area is located on San Antonio Creek, and ranges from approximately 152 meters (m) (500 feet) upstream of the confluence with the Ventura River to approximately 4,877 m (16,000 feet) upstream. Figure 2, San Antonio Creek - Proposed Project Area Stream Reaches, illustrates the location of the project study area of San Antonio Creek. The uppermost extent of the study area is located just upstream of the Fraser Street crossing on San Antonio Creek. The VCFCD has designated five separate reaches within the study area that reflect the various areas proposed for flood control work. These defined areas, designated as reaches A through E, are not contiguous throughout the San Antonio Creek study area, and in some cases are separated by as much as 457 m (1,500 feet). A brief description of the approximate range of each study reach is provided below.

- Reach A - Approximately 152 m (500 feet) upstream of Ventura River confluence to State Route 33 bridge
- Reach B - State Route 33 bridge to just upstream of Old Creek Road crossing.
- Reach C - Just below and south of the State Route 33 and Creek Road intersection to just downstream of New Civilization.
- Reach D - Between New Civilization and just downstream of Fraser Street crossing.
- Reach E - Just upstream of Fraser Street crossing to approximately 579 m (1,900 feet) upstream.

Flood control work proposed by the VCFCD currently does not include activities in all reaches; however, Fugro studied each reach of the study area and purposefully includes all areas between each proposed work area. Currently, flood control project work is only proposed in those areas upstream of Old Creek Road.

- The uppermost portion of Reach B (upstream of Old Creek Road crossing);
- Reach C;
- Reach D; and
- Reach E.

All work is proposed to occur outside the current wetted area of the creek, regardless of how the project work sites are presented on the habitat maps presented in this report.



Legend

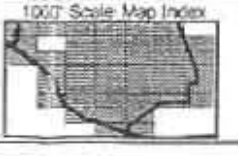
Flood Control Right-of-Way
ACCESS EASEMENT - ACCESS ROAD
EASEMENT
FEE
FLOWAGE EASEMENT
MAINTENANCE EASEMENT
OFFERS
PARCELS
GOLF CLUB
SLOPE EASEMENT

Flood Zone Designation
A - 100 Year Flood Plain
B - 500 Year Flood Plain
C - Minimal Flooding
100'FCD Radius Clearance
City Boundaries

2500 0 2500 Feet

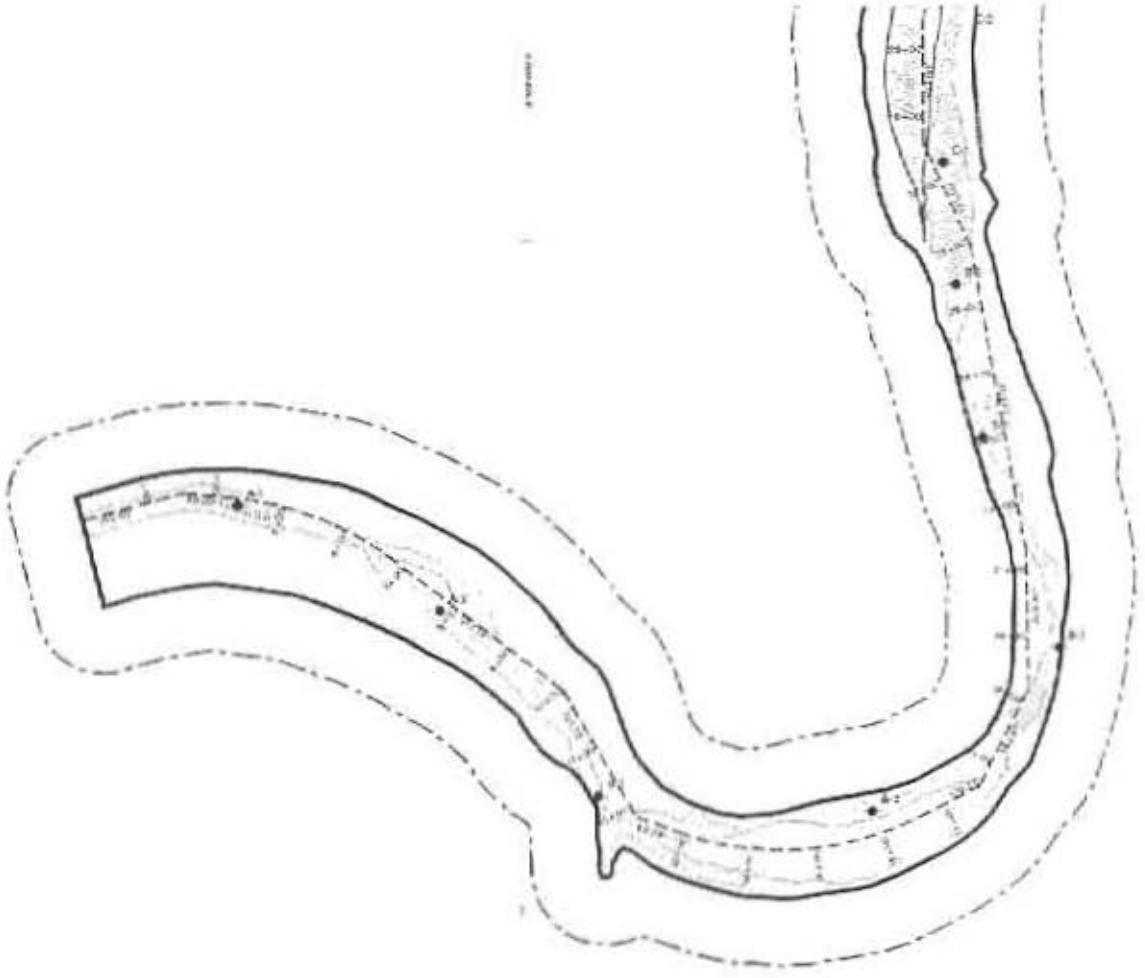
Scale: 1" = 2500'

1000' Scale Map Index



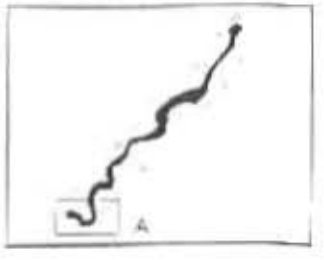
316-1592

1000' Scale Basemap For Ventura County South Half



Legend

- Spawning (Inundated)
- Spawning (Exposed)
- Rearing with Abundant Cover
- Rearing with Moderate Cover
- Rearing with Minimal Cover
- Migration Corridor
- Impact Areas
- Waters of the U.S. Boundary
- Study Limits Boundary
- Data Collection Site

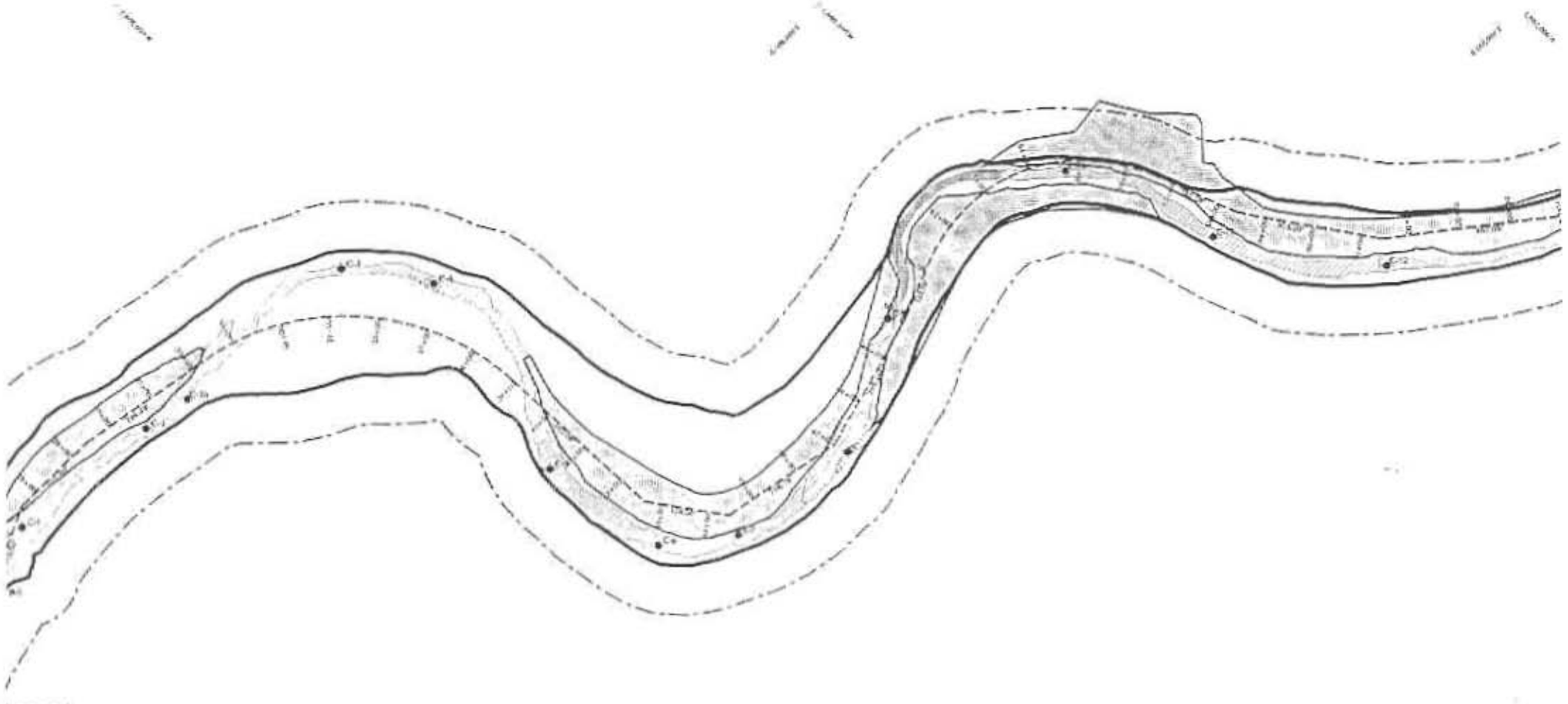


Steelhead Habitats

San Antonio Creek Study Area

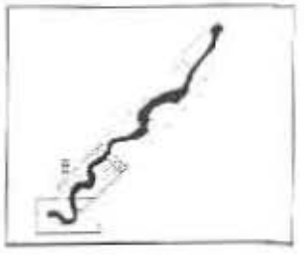
Figure 3a

Scale: 1"=200'



Legend

- Spawning (Inundated)
- Spawning (Exposed)
- Rearing with Abundant Cover
- Rearing with Moderate Cover
- Rearing with Minimal Cover
- Migration Corridor
- Impact Areas
- Waters of the U.S. Boundary
- Study Limits Boundary
- Data Collection Site

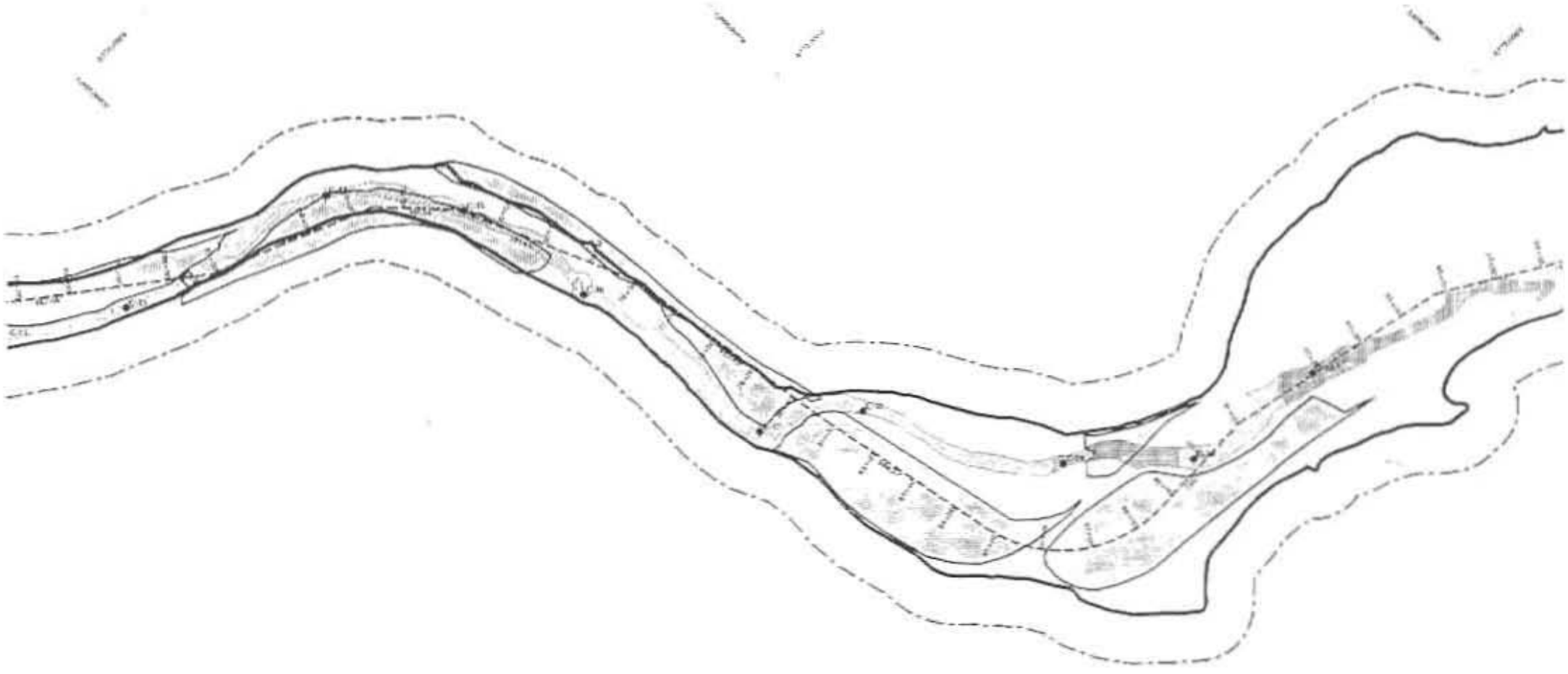


Steelhead Habitats

San Antonio Creek Study Area

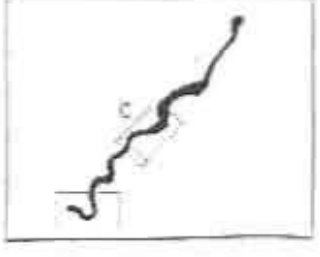
Figure 3b

Scale: 1"=200'



Legend

- Spawning (Inundated)
- Spawning (Exposed)
- Rearing with Abundant Cover
- Rearing with Moderate Cover
- Rearing with Minimal Cover
- Migration Corridor
- Impact Areas
- Waters of the U.S. Boundary
- Study Limits Boundary
- Data Collection Site

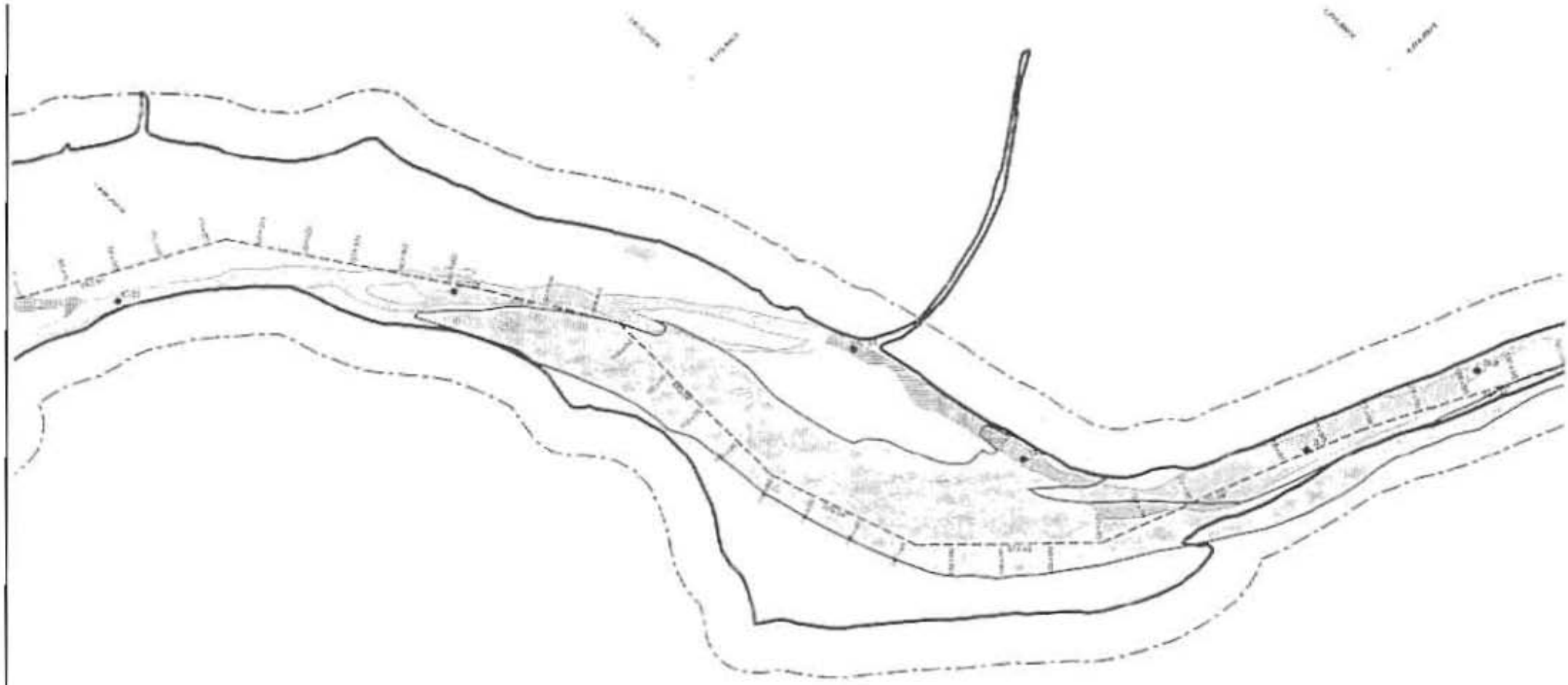


Steelhead Habitats

San Antonio Creek Study Area

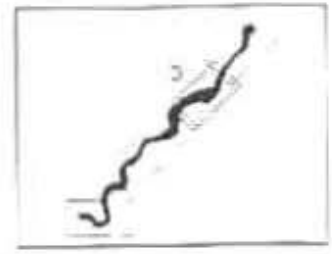
Figure 3c

Scale: 1" = 200'



Legend

- Spawning (Inundated)
- Spawning (Exposed)
- Rearing with Abundant Cover
- Rearing with Moderate Cover
- Rearing with Minimal Cover
- Migration Corridor
- Impact Areas
- Waters of the U.S. Boundary
- Study Limits Boundary
- Data Collection Site

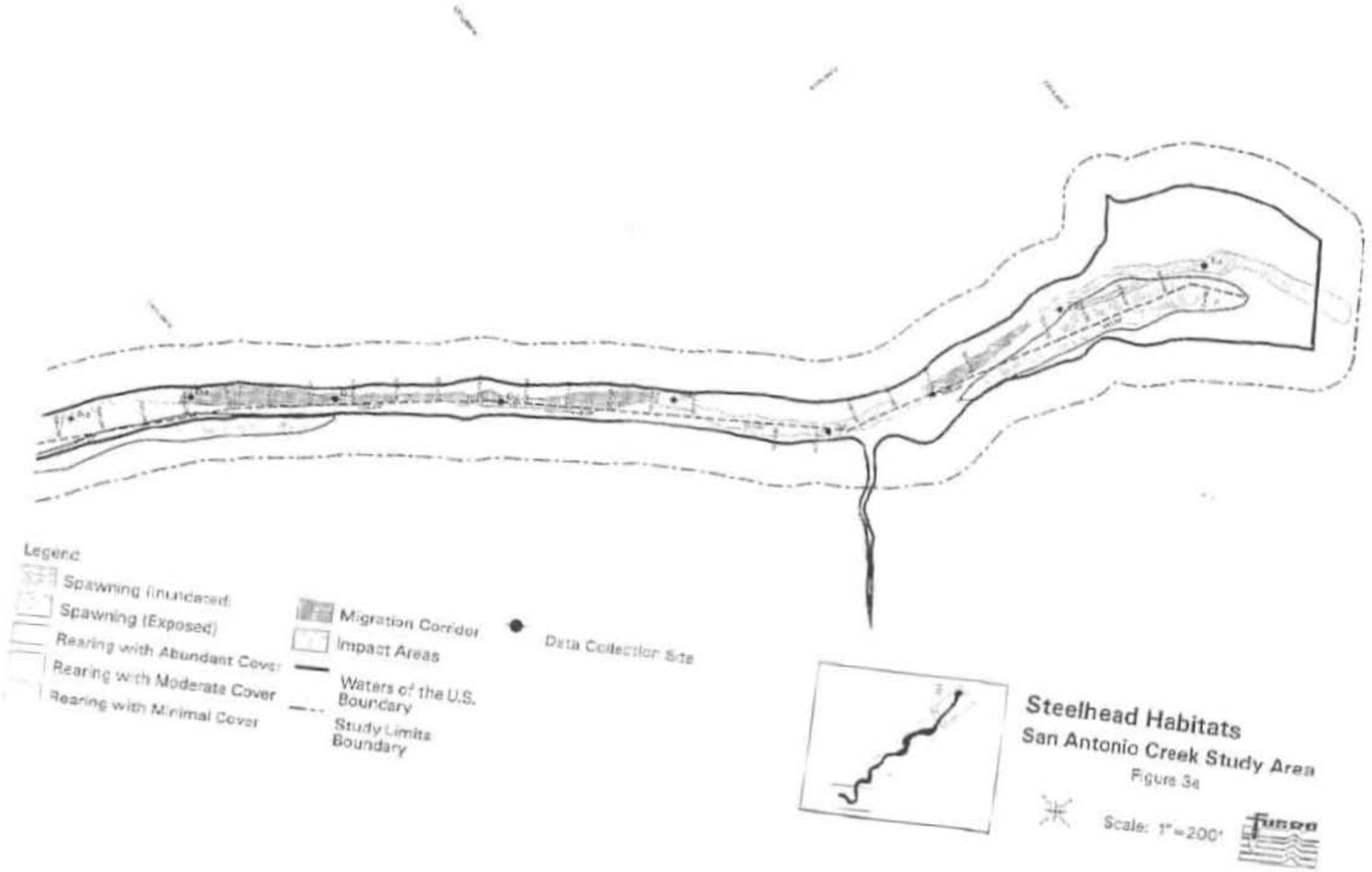


Steelhead Habitats

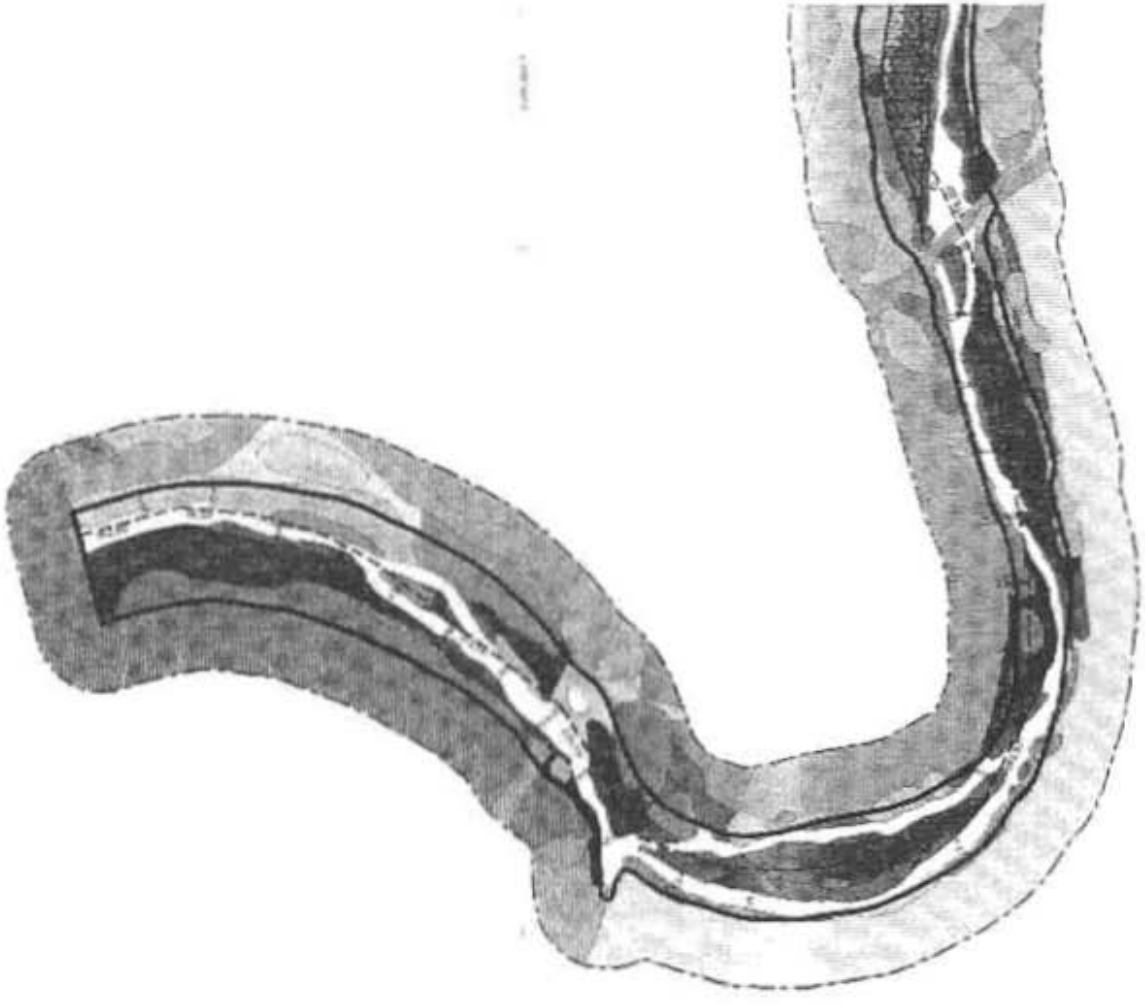
San Antonio Creek Study Area

Figure 3d

Scale: 1" = 200'

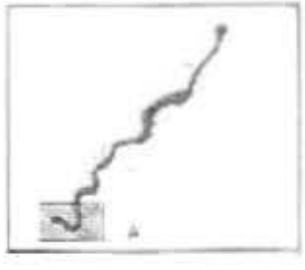


Steelhead Habitats
San Antonio Creek Study Area
Figure 3e



Legend

- Open Water
- Aquatic Bed
- Cobble Bed
- Mule Fat Scrub
- Willow Scrub
- Willow Forest
- Cottonwood-Willow
- Willow-Alder Forest
- Giant Reed
- Oak Woodland
- Coastal Sage Scrub
- Annual Grassland
- Barren/Riprap
- Developed
- Crops/Plantings
- Bedrock
- Impact Areas
- Waters of the U.S. Boundary
- Study Limits Boundary

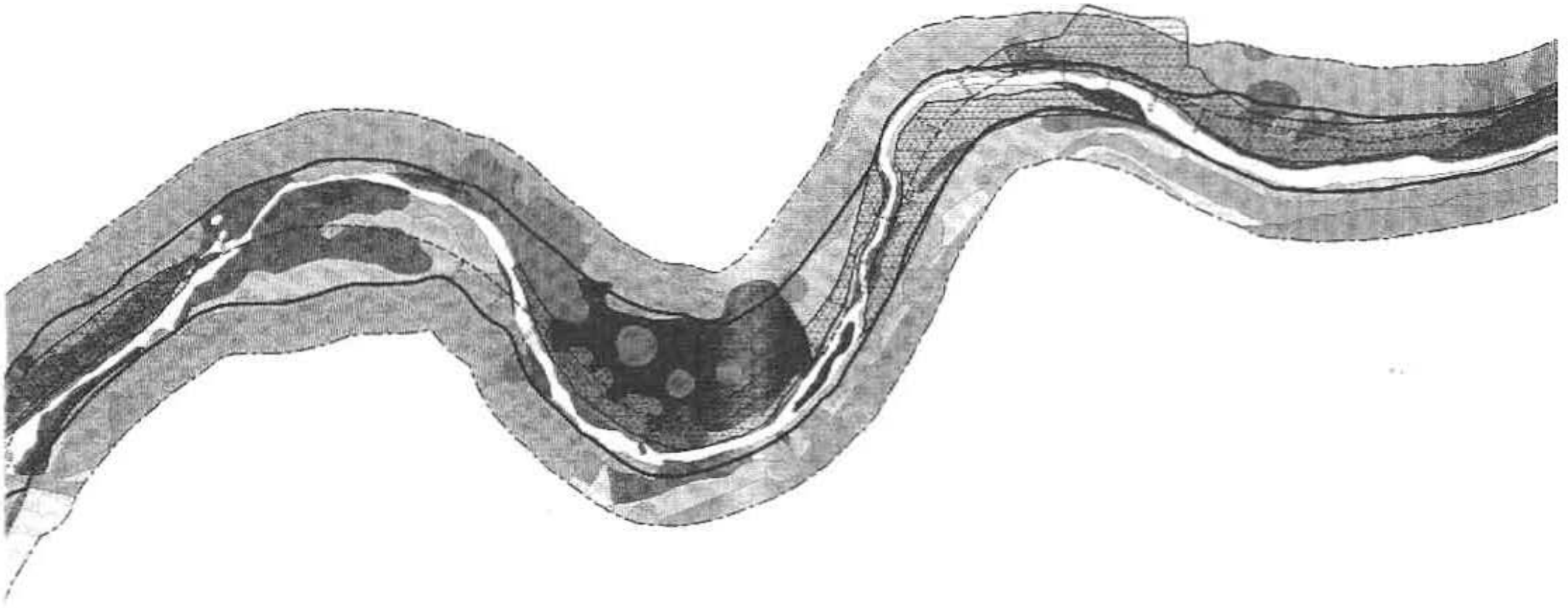


Vegetation/Habitat Types

San Antonio Creek Study Area

Figure 4a

Scale: 1" = 200'



Legend

- Open Water
- Aquatic Bed
- Cobble Bed
- Mule Fat Scrub
- Willow Scrub
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- Developed
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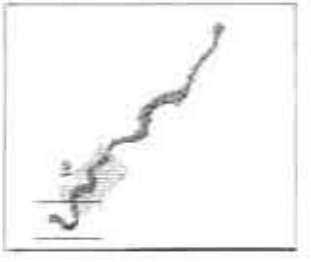
- Bedrock
- Impact Areas
- Waters of the U.S. Boundary
- Study Limits Boundary



Vegetation/Habitat Types

San Antonio Creek Study Area

Figure 4b

Scale: 1" = 200'

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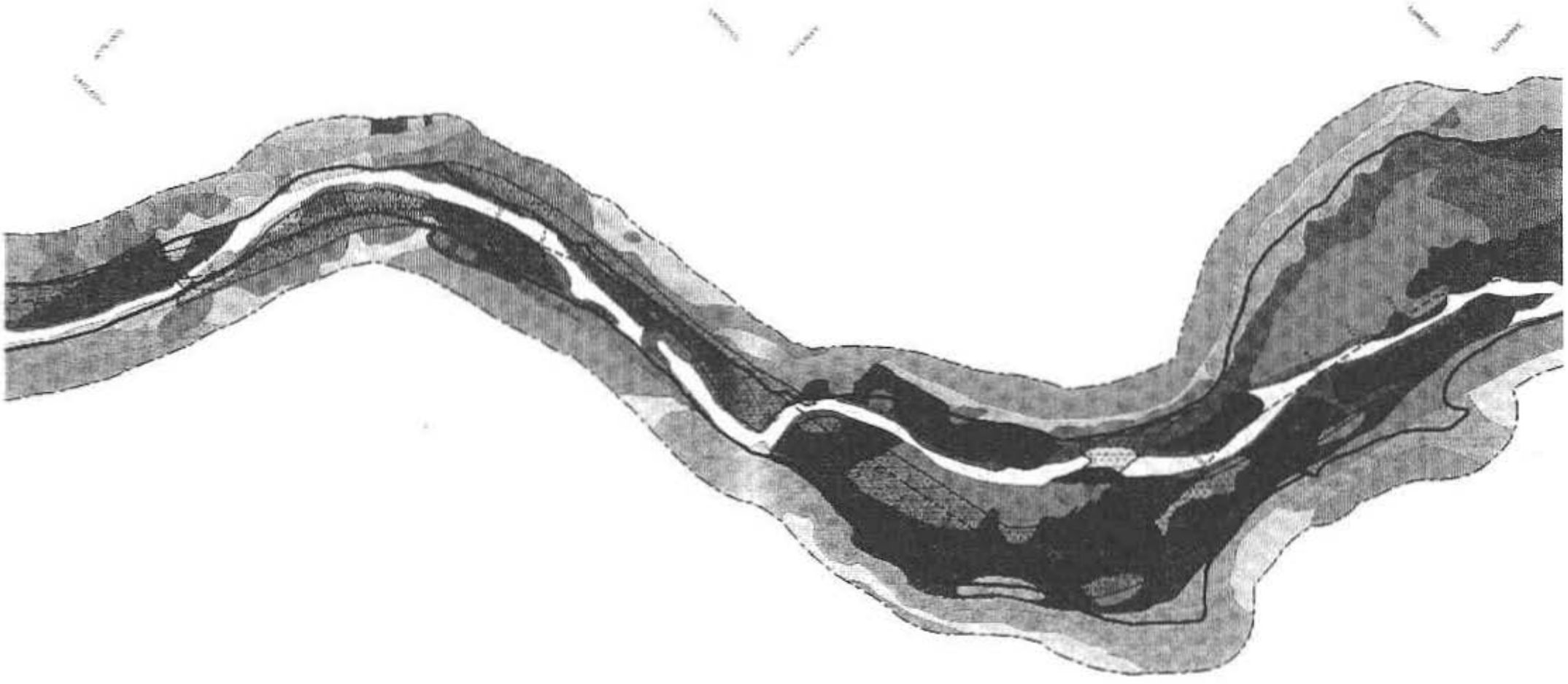


Legend

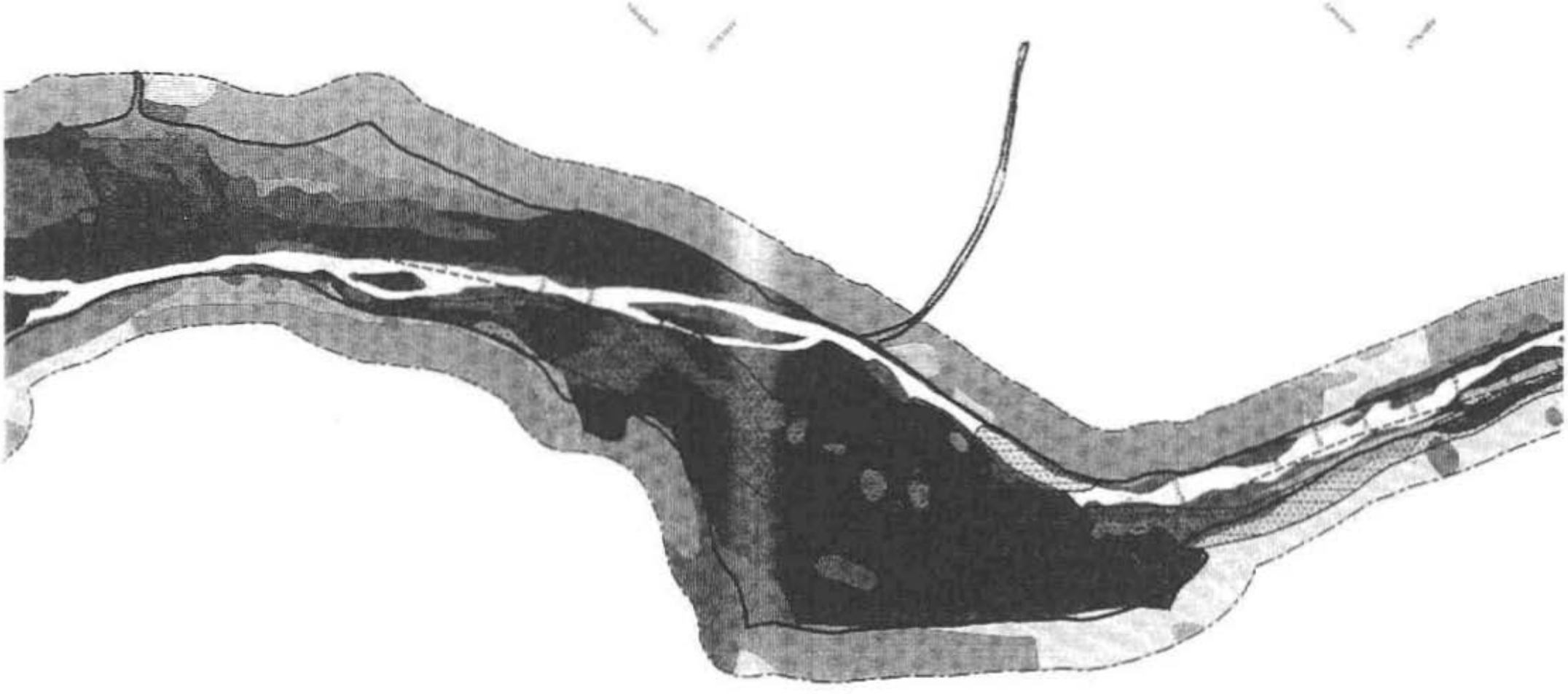
- Open Water
- Aquatic Bed
- Cobble Bed
- Mule Fat Scrub
- Willow Scrub
- Willow Forest
- Cottonwood-Willow
- Willow-Alder Forest
- Giant Reed
- Oak Woodland
- Coastal Sage Scrub
- Annual Grassland
- Barren/Riprap
- Developed
- Crops/Plantings
- Bedrock
- Impact Areas
- Waters of the U.S. Boundary
- Study Limits Boundary

Vegetation/Habitat Types

San Antonio Creek Study Area

Figure 4c

Scale: 1" = 200'



Legend

- Open Water
- Aquatic Bed
- Cobble Bed
- Mule Fat Scrub
- Willow Scrub
- Willow Forest
- Cottonwood-Willow
- Willow-Alder Forest
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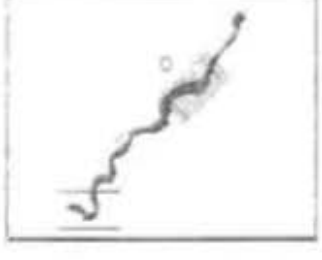
- Annual Grassland
- Barren/Riprap
- Developed
- Crops/Plantings
- Bedrock
- Impact Areas
- Waters of the U.S. Boundary
- Study Limits Boundary



Vegetation/Habitat Types

San Antonio Creek Study Area

Figure 4d

Scale: 1" = 200'

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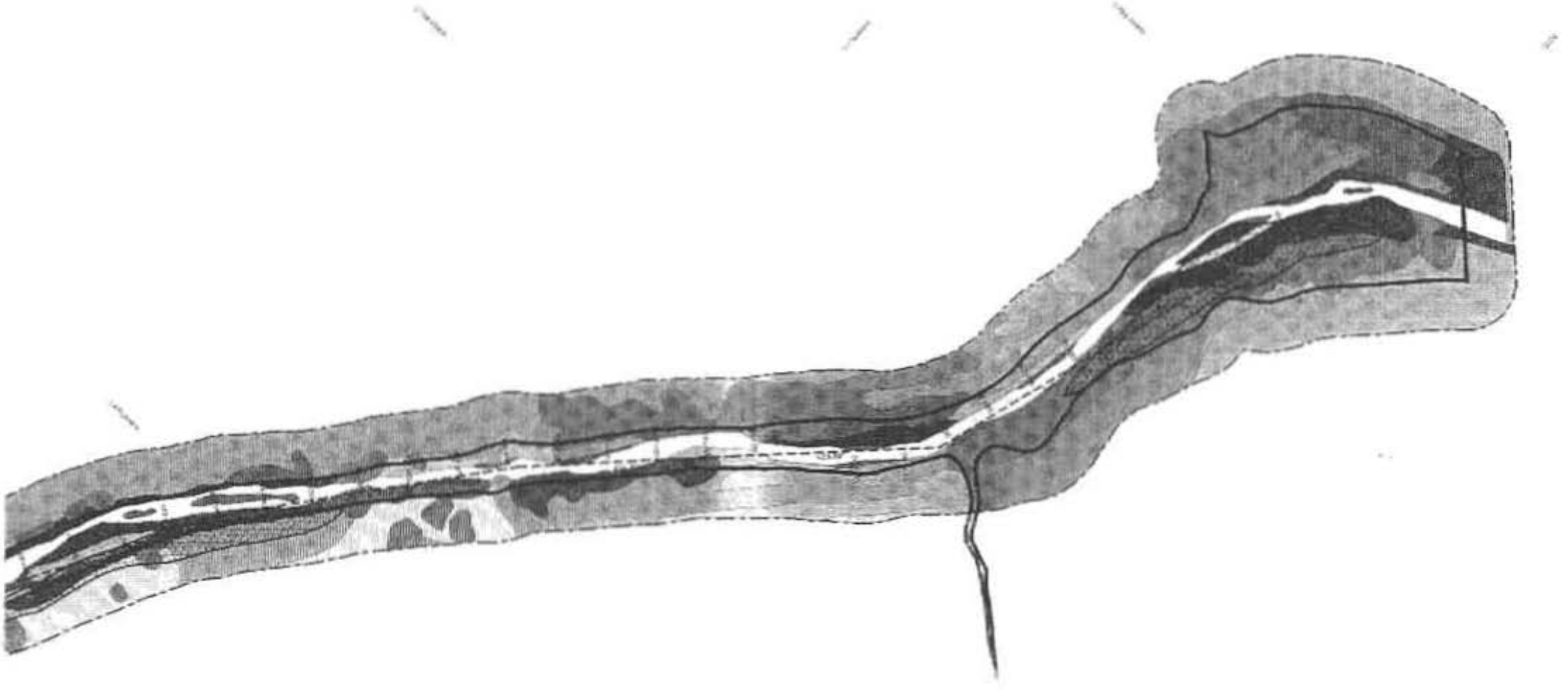

Legend

- Open Water
- Aquatic Bed
- Cobble Bed
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- Cottonwood-Willow
- Willow-Alder Forest
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- Bedrock
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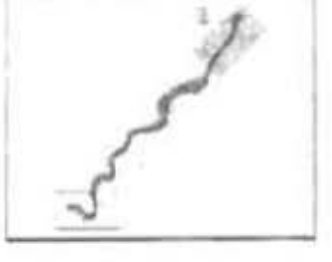
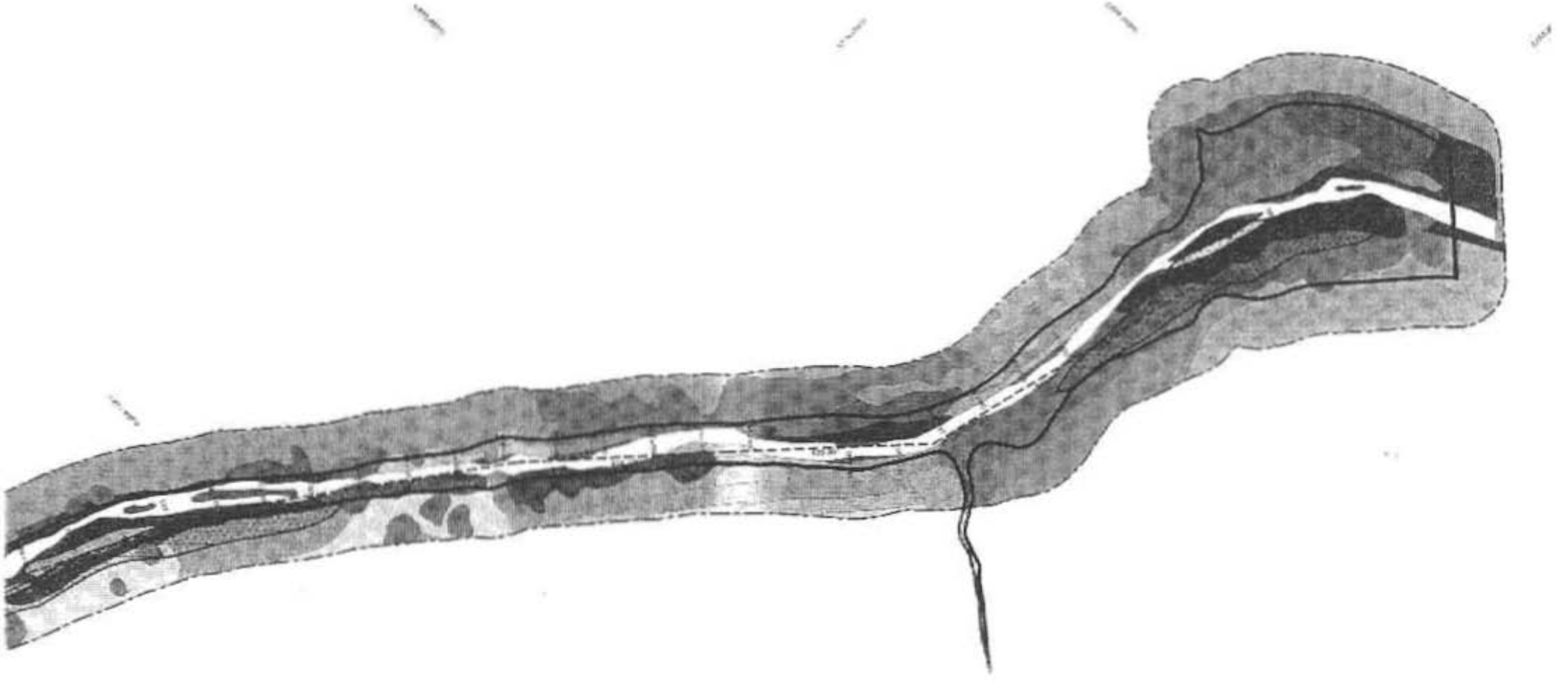


Vegetation/Habitat Types

San Antonio Creek Study Area

Figure 4a

Scale: 1" = 200'



Legend

- Open Water
- Aquatic Bed
- Cobble Bed
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- Cottonwood-Willow
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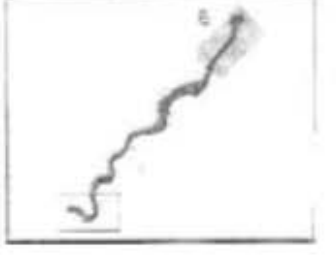

Vegetation/Habitat Types

San Antonio Creek Study Area

Figure 4a

Scale: 1" = 200'

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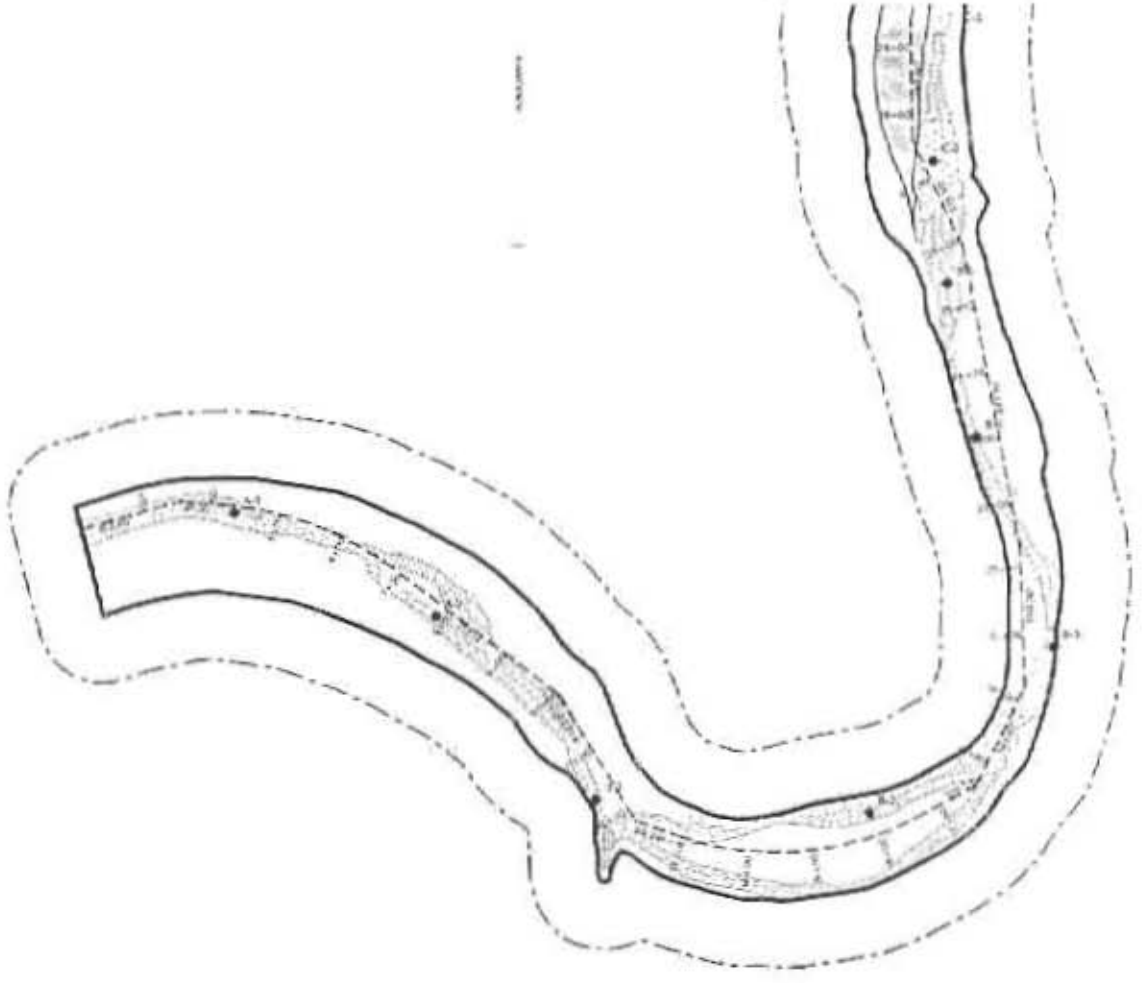
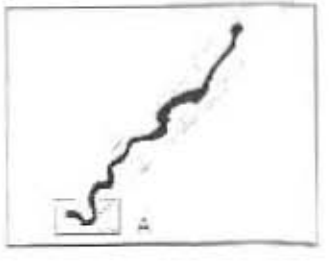


Legend

- Riffle
- Run
- Glide
- Shallow Pool (Less than 2 ft. depth)
- Deep Pool (Greater than 2 ft. depth)
- Cascade
- Impact Areas
- Waters of the U.S. Boundary
- Study Limits Boundary
- Data Collection Site

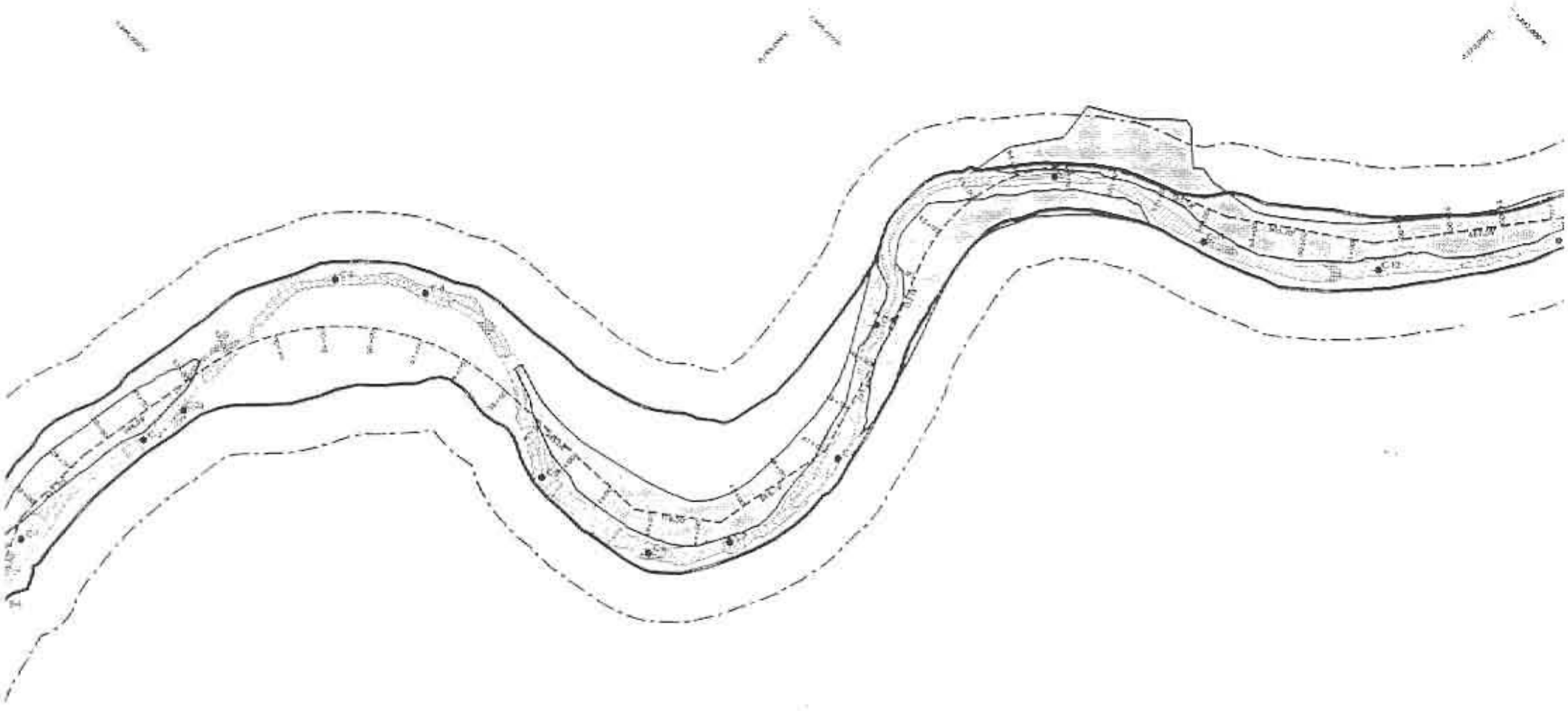


Instream Morphology

San Antonio Creek Study Area

Figure 5a

Scale: 1" = 200'



Legend

- Riffle
- Run
- Glide
- Shallow Pool (Less than 2 ft. depth)
- Deep Pool (Greater than 2 ft. depth)
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- Impact Areas
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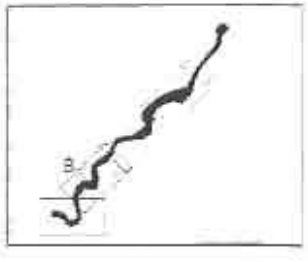
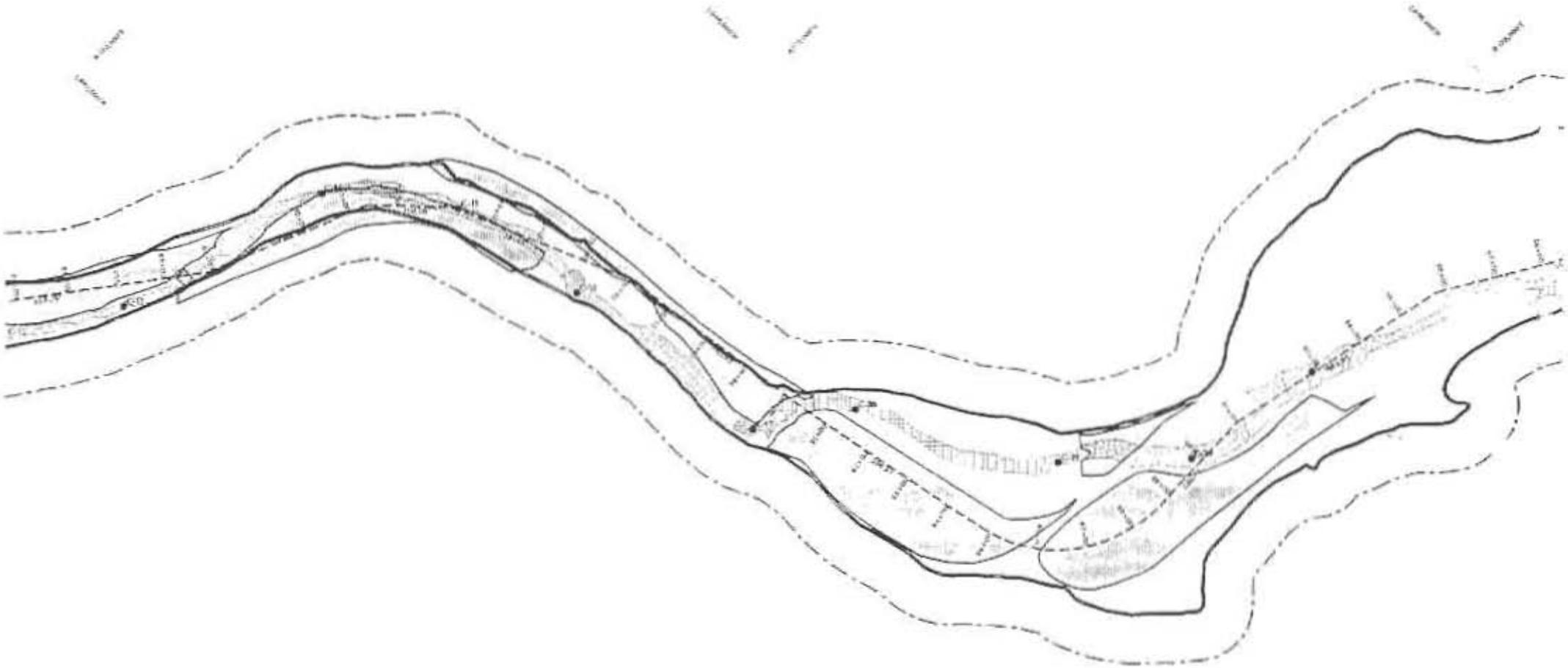


Instream Morphology

San Antonio Creek Study Area

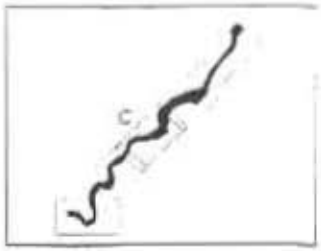
Figure 5b

Scale: 1" = 200'



Legend

- Riffle
- Run
- Glide
- Shallow Pool (Less than 2 ft. depth)
- Deep Pool (Greater than 2 ft. depth)
- Cascade
- Impact Areas
- Waters of the U.S. Boundary
- Study Limits Boundary
- Data Collection Site

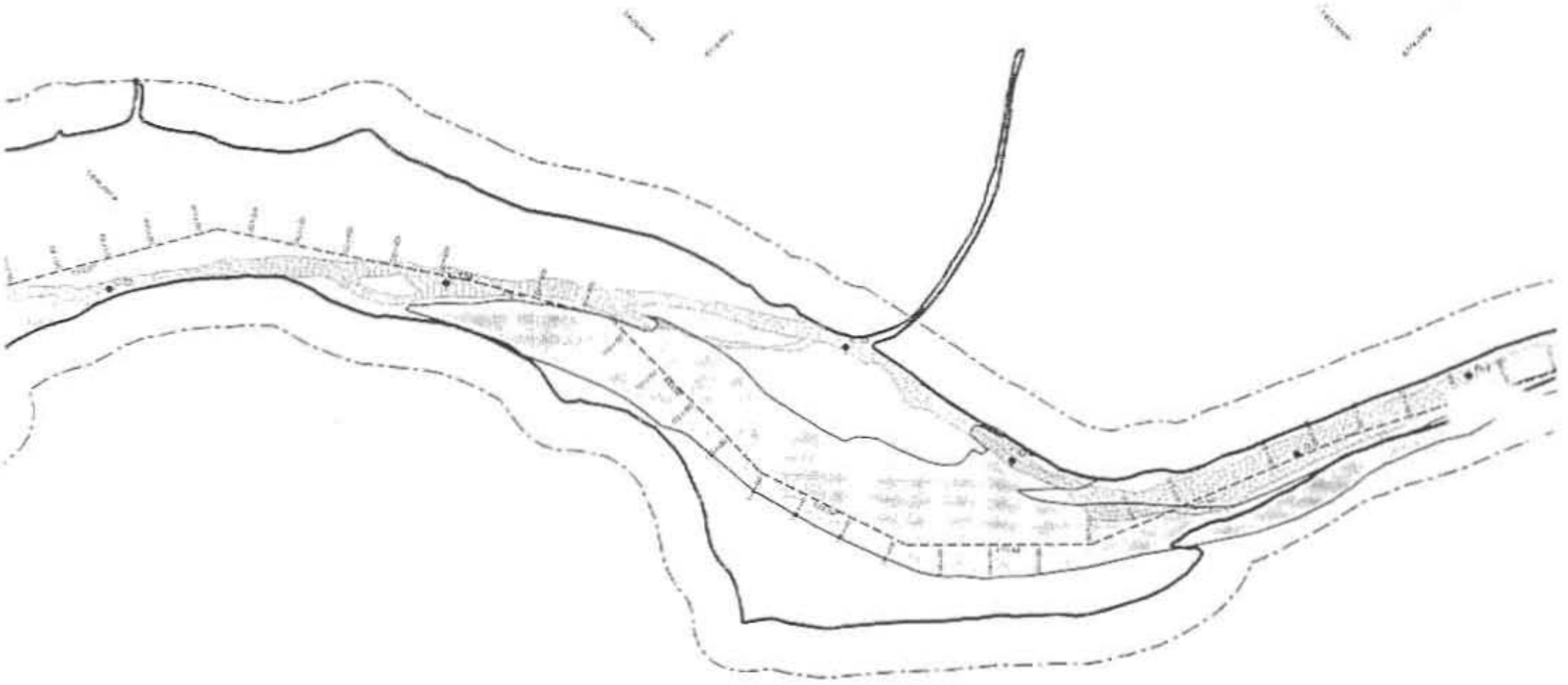


Instream Morphology

San Antonio Creek Study Area

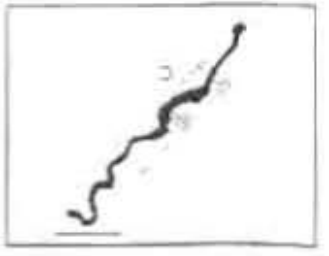
Figure 5c

Scale: 1"=200'



Legend

- Riffle
- Run
- Glide
- Shallow Pool (Less than 2 ft. depth)
- Deep Pool (Greater than 2 ft. depth)
- Cascade
- Impact Areas
- Waters of the U.S. Boundary
- Study Limits Boundary
- Data Collection Site



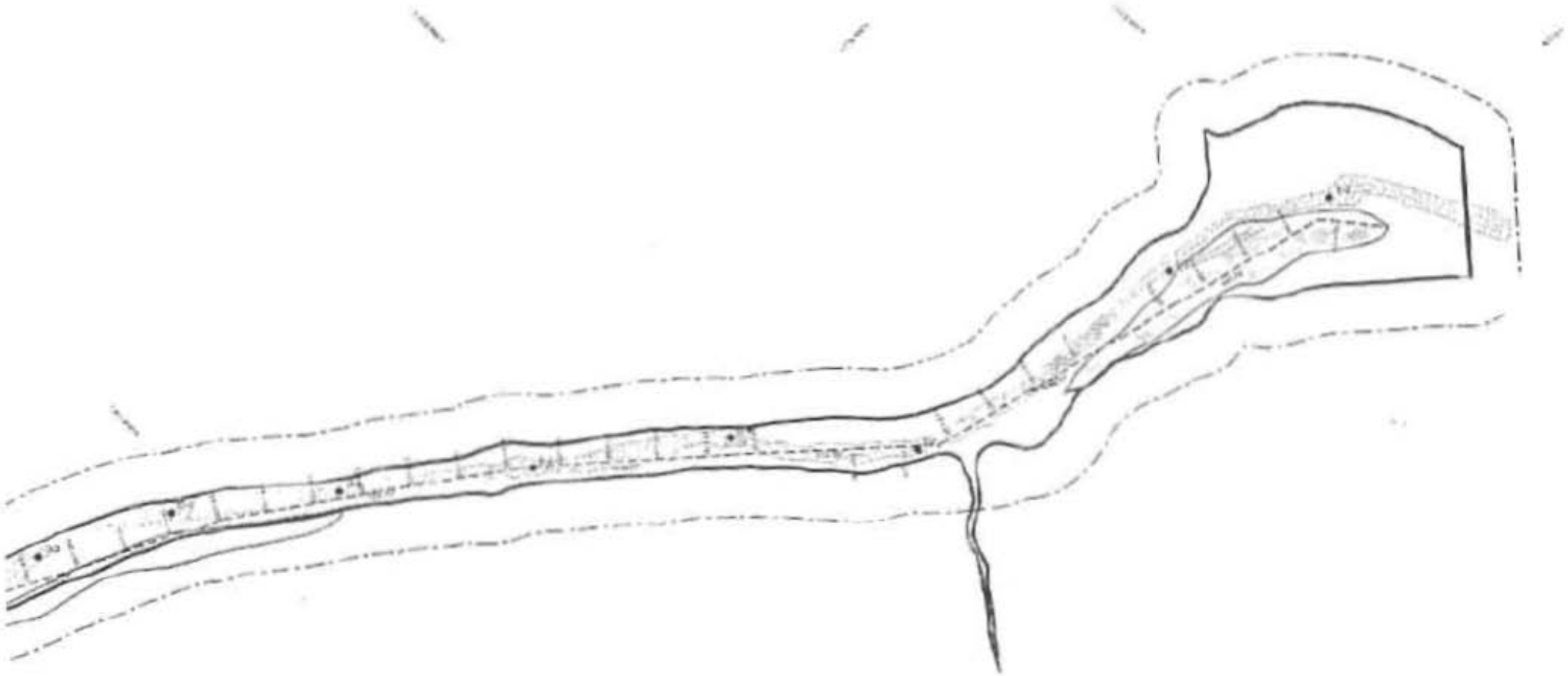
Instream Morphology

San Antonio Creek Study Area

Figure 6d

Scale: 1" = 200'

FUGRO



Legend

- Riffle
- Run
- Glide
- Shallow Pool (Less than 2 ft. depth)
- Deep Pool (Greater than 2 ft. depth)
- Cascade
- Impact Areas
- Waters of the U.S. Boundary
- Study Limits Boundary
- Data Collection Site

Instream Morphology

San Antonio Creek Study Area

Figure 5e

Scale: 1"=200'

TUGRO

4.0 CONCLUSIONS

Existing steelhead habitat suitability data were compared to site-specific habitat information collected during the field surveys of the San Antonio Creek study area. Based on this information, a significant portion of the study area was found to provide suitable rearing habitat for southern steelhead fry and juveniles, under current conditions. Rearing habitat was considered to be any portion of the flowing stream channel that contained adequate cover for steelhead fry and/or juveniles. Various types of cover observed throughout the field surveys included: deep pools, overhanging and submerged vegetation, emergent vegetation, undercut banks, submerged woody debris, submerged root wads of riparian vegetation, boulders, and emergent vegetation. Rearing habitats for southern steelhead fry and juveniles, with varying amounts of cover, were found to occur in riffles, runs, and pools throughout the San Antonio Creek study area. Moderate to high quality rearing habitats for southern steelhead were observed at various locations within all VCFCD study reaches during the field surveys.

Based on existing habitat suitability data, seven locations were identified within the study area that were determined to provide suitable substrate characteristics for spawning at the time of the field surveys. Of the seven locations identified as providing suitable substrate for spawning, two areas were exposed and were located outside of the baseflow channel. Although these two identified areas were not inundated at the time of the field survey, both locations would likely provide suitable spawning habitat for steelhead during years where the identified areas were inundated for a minimum of 45 to 75 consecutive days throughout the rainy season and stream velocities were sufficient. The five remaining spawning habitats were located in riffle areas with various types of adjacent cover that could provide protection for spawners and/or newly emergent fry.

Due to the absence of physical barriers that could obstruct or inhibit the upstream or downstream movement of fish, the entire San Antonio Creek study area, from the upstream portion of reach E to the Ventura River confluence, can be considered a migration corridor for southern steelhead. Portions of San Antonio Creek that may not provide rearing habitat of suitable quality for southern steelhead, function as migration corridor under current conditions, and may function as important food producing areas for southern steelhead, as well as arroyo chub.

The amount and composition of riparian vegetation along a reach of stream are essential factors in the maintenance of downstream water quality. Riparian vegetation stabilizes streambanks by reducing the erosion potential of rainfall and flowing water. The composition and structure of a riparian community significantly affect the overall quality of the instream environment for steelhead. A well-established riparian corridor is important for fish in that the shade provided by the vegetation is critical for maintaining cooler stream temperatures. Overhanging tree branches, submerged woody debris, and tangled roots provide protection from predators and

refuge for fish during extreme high flow periods (Faber et al., 1989). Established riparian vegetation is also important for preventing or reducing sedimentation into the stream, which can smother steelhead eggs and inhibit the production of bottom dwelling organisms consumed by fish.

The structure and composition of riparian habitat associated with the San Antonio Creek varied extensively throughout the study area. In general, areas containing the most well-developed riparian corridor, with minimum establishment of stands of giant reed, included all of reach A, the lower portion of reach B, the lower portion of reach C, and areas located upstream of the Fraser Street crossing (reach E).

Based on the observations made during the field survey, and review of existing suitability criteria, substantial portions of the San Antonio Creek study area contain areas considered suitable for rearing of southern steelhead. Several locations were also identified throughout the study area that either provided suitable spawning habitat for steelhead, at the time of the field survey, or would likely provide suitable spawning habitat during any given year where flow within San Antonio Creek results in inundation of an identified area for a sufficient duration to allow for spawning, incubation, and emergence (approximately 45 to 75 consecutive days). All areas identified as providing suitable spawning habitat for steelhead, contained various forms of instream and riparian cover nearby.

5.0 ACKNOWLEDGMENTS

This report was written by Ms. Gaylene Tupen and Mr. David Magney, with assistance from Mr. James Castle. Mr. Magney managed the study and edited the report. Mr. Magney described and classified the vegetation and Mr. Matt Ingamells mapped the vegetation habitats. Ms. Tupen, Mr. Castle, and Mr. Bill O'Leary characterized the instream and streambed habitats. Ms. Dawn Scott, Ms. Karin Cooper, and Mr. Lionel Kimura developed the map layers and performed area calculations.

Ms. Annette Varner, Ms. Dottie Colleran, and Ms. Tina Scrivner word processed the report and Mr. Ryan Kaulback reproduced it.

Bill Lockard and Alex Sheydayi of the VCFCD, and Art Goulet, director of Ventura County Public Works Agency, reviewed a draft report and have provided Fugro with assistance and direction throughout this study. Lisa Mangione of the Los Angeles District of the USACE also reviewed the draft report and provided Fugro with input.

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SAN ANTONIO CREEK HABITAT CHARACTERIZATION
APPENDIX A
FIELD DATA SHEETS

January 1996
Project No. 96-61-0301

FUGRO

Code = R1
Sp1

SAN ANTONIO CREEK HABITAT CHARACTERIZATION

Date: 2/1/96 Site I.D. No. A1

Observer: SMT Photo No. 18, 19 & 20 (between 4 & 5)

Time: 12:19 Station Transect No. 5+00

Location: Downstream of Hwy 33
Near Vista River camp
just up from hike crossing,
Downstream of Hwy 33

General Flow Conditions:

Channel Morphology: (Include Stream Banks) Split channel upstream
Converges to single channel
prim. channel along east stream bank

Habitat Type: (Circle one) Pool Riffle Run Inundated Yes/No

Depth: 0.5' in shallow areas, 2' in pool

Cover: (Circle) overhanging veg. submerged boulders logs root weeds woody submerged vegetation

Rank = 4 Undercut banks Other: (Describe) submerged woody debris

Instream: (Describe) Abund. instream cover.
Abund submerged woody debris

Riparian: (Describe) Dense willows on east side w/ overhanging branches

Rank = 3

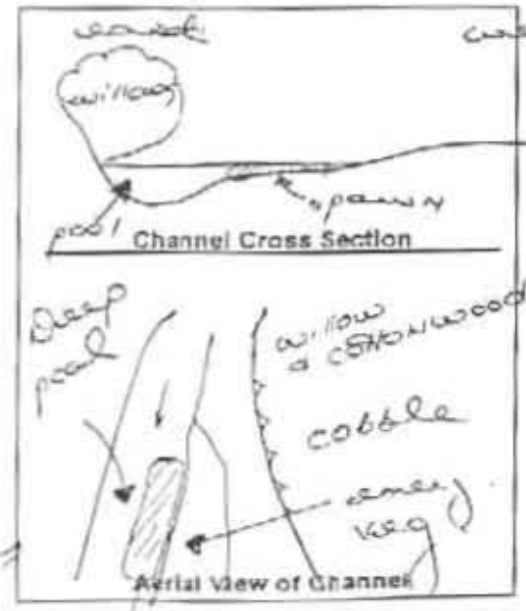
Shading: Moderate

Substrate Composition: Small cobbles & gravel w/ some gravel & silt

Embedd = 4

Particle Size Range: .5" to 3"

Approximate Area: 5' x 20'



Potential Spawning ☒ Potential Rearing: ☒

Other Observations

Very clean gravel in spawning area
Deeper backwater area along east side of channel, that provides abund cover.

January 1996
Project No. 96-61-0301

FUGRO

R 2

SAN ANTONIO CREEK HABITAT CHARACTERIZATION

Date: 2/1/96 Site I.D. No. A-2 up and Transect

Observer: CSBR Photo No. 15, 16, & 17

Time: 11:51 Station Transect No. 8+00

Location: Just downstream of Hwy 33 crossing

General Flow Conditions: Beginning of Split Channel. Split into west & east channels

Channel Morphology: (Include Stream Banks) Split channel w/ cobble island w/ dense willows

Habitat Type: (Circle one) Pool, (Riffle) Run Inundated (Yes/No) primary channel

Depth: 1' to 1½'

Cover: (Circle) (overhanging veg.) (submerged boulders 12 to 3") logs (root weeds willows) (submerged vegetation)

Rank = 4

Undercut banks Other: (Describe) shady veg. (Veronica, Watercress)

Instream: (Describe) Submerged willow branches. Submerged woody debris

Riparian: (Describe) Cottonwoods or willows w/ some Arundo. Dense willows on Island

Rank = 3

Shading: Moderate to Abund on west side

Substrate Composition: cobbles (med to lg) w/ silt (minimal) some sm bldrs.

Subtotal = 3

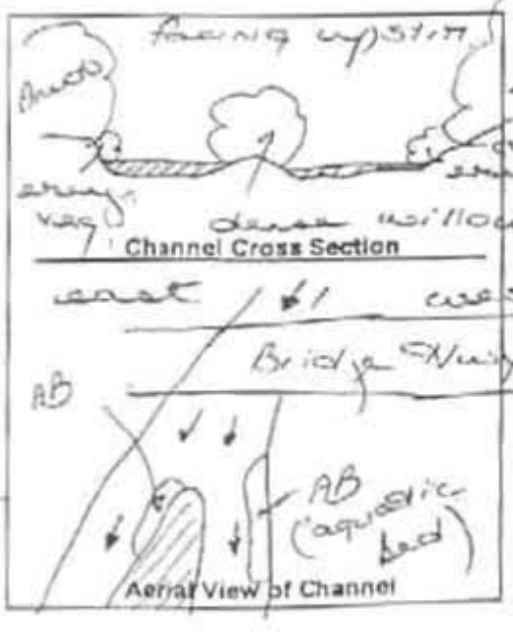
Particle Size Range: (12 to 3) 4" to 12"

Approximate Area: w/ silt (minimal)

Potential Spawning ☐ Potential Rearing: ☒

Other Observations

Very shallow water. Dense instream cover. Split channel. Abund cover along stream margins.



January 1996
Project No. 96-61-0301

FUGRO

R1

SAN ANTONIO CREEK HABITAT CHARACTERIZATION

Date: 2/1/96 Site I.D. No. B-1

Observer: SMRT Photo No. 10, 13&14 between 11&12

Time: 11:33 Station Transect No. 11 + 00

Location: At base of steep rock cliffs just upstream of Hwy 33 crossing

General Flow Conditions: Full flow/velocity but confined to 1 low flow channel(s)

Channel Morphology (Include Stream Banks): Split channel upstream. Converges to 1 channel just below cliffs. Deep pool (backwater area) w/ deep pool on west side of stream

Habitat Type: (Circle one) Pool Riffle Run Inundated Yes/No

Depth: 1' to 1½'

Cover: (Circle) overhanging veg. submerged boulders logs root wads submerged vegetation

Rank = 2

Undercut banks Other: (Describe) rock ledges submerged

Instream: (Describe) submerged woody debris or emergent vegetation

Riparian: (Describe) Thick shade willows on east side of main channel cliff faces along west side

Rank = 3

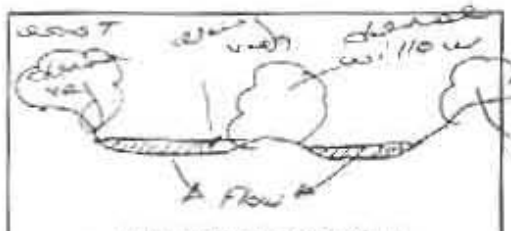
Shading: Moderate

Substrate Composition: cobbles w/ gravel & silt interspersed

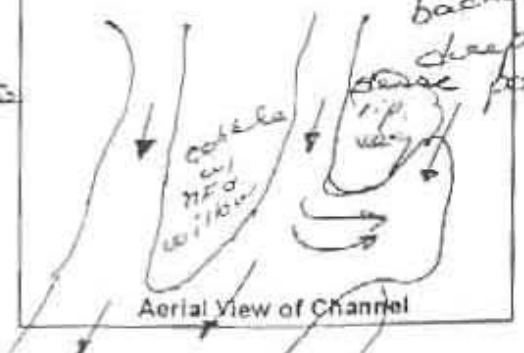
Particle Size Range: <.5" to 10"

Approximate Area:

Embeddedness = 3



Channel Cross Section



Aerial View of Channel

Potential Spawning ☐ Potential Rearing: ☒

Other Observations: Limited silt in substrate. Varied cover provides many areas for refuge from fish or flow

January 1996
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TUGRO

R1

SAN ANTONIO CREEK HABITAT CHARACTERIZATION

Date: 3/1/96 Site I.D. No. B-2 (east side)

Observer: CRT Photo No. 9, 10, 11 (looking west view)

Time: 11:03 Station Transect No. 16+00

Location: Near Where Arundo, upstream of Hwy 33 bridge crossing

General Flow Conditions: Hwy flows following storm were recent but confined to low-flow channel

Channel Morphology: (Include Stream Banks) Split channels w/ large cobble island in center of channel. Broad channel (Exposed)

Habitat Type: (Circle one) Pool Riffle Run Inundated Yes/No

Depth: west side (1'); east side (1½')

Cover: (Circle) overhanging veg. submerged boulders logs root wads submerged vegetation

Rank = 4

Undercut banks Other: (Describe) many veg (Veronica, watercress, Carex)

Instream: (Describe) Many Veronica & watercress, some emergent tules, submerged branches

Riparian: (Describe) Red & yellow willows (mod. dense)

Rank = 3

Shading: Moderate willows & Arundo

Substrate Composition: cobbles (stratified) w/ silt

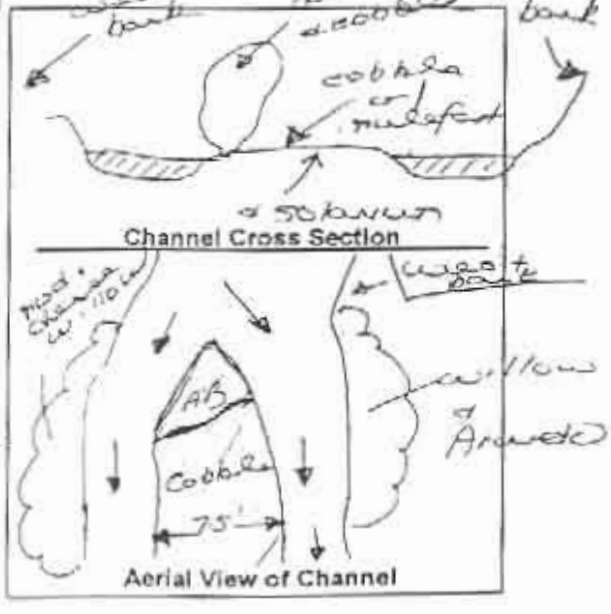
east side = 1" to 6" cobbles w/ silt

west side = 2" to 7"

Particle Size Range: 1" to 7"

Embeddedness 2

Approximate Area:



Potential Spawning ☐ Potential Rearing: ☒

Other Observations

Good cover for spawning

Turbid water

Dense Riparian Veg

January 1996
Project No. 96-61-0301

FUGRO

R3

SAN ANTONIO CREEK HABITAT CHARACTERIZATION

Date: 2/1/96 Site I.D. No. B-3

Observer: CBH Photo No. 6-7948

Time: 10:46 Station Transect No. 19/20 + 00

Location: Adjacent to stable @ mouth of stream Downstream of Old Cub Rd

General Flow Conditions: Turbid water. Heavy rainfall on previous day (1/31/96)

Channel Morphology: (Include Stream Banks) Brush used for bank protection located on S side

Habitat Type: (Circle one) Pool Riffle Run Inundated Yes/No

Depth: 1-5'

Cover: (Circle) overhanging veg. submerged boulders logs root weeds submerged vegetation

Rank = 2

Undercut banks Other: (Describe) many veg. (View N. Watercress Cover)

Instream: (Describe) Some submerged willow branches. Emergent veg used. Veronica

Riparian: (Describe) Sparse Rip corridor; Dense arundo to north

Rank = 1

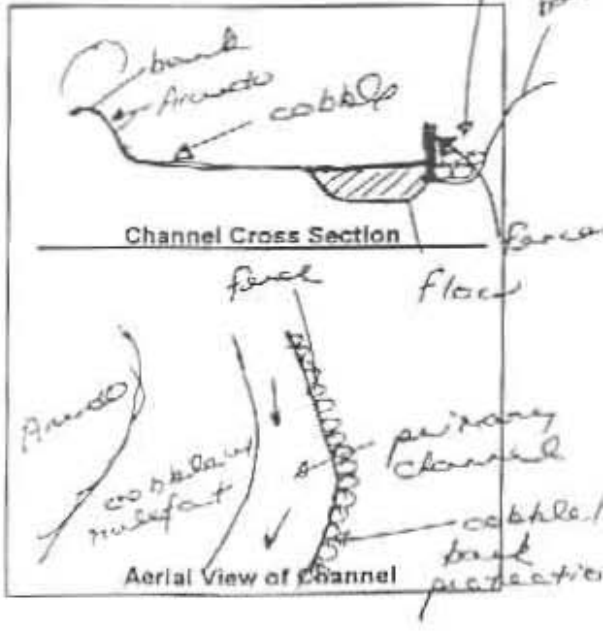
Shading: giant reed only on N. side

Substrate Composition: Fair silt w/ some scattered cobble

Embedd = 2

Particle Size Range: <.5" to 5"

Approximate Area:



Potential Spawning ☐ Potential Rearing: ☒

Other Observations

Minimal cover. Water very turbid. Confined pure to low-flow channel

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FUGRO

Sp/ R3

SAN ANTONIO CREEK HABITAT CHARACTERIZATION

Date: [illegible] Site I.D. No. B-4

Observer: [illegible] Photo No. —

Time: 10:30 Station Transect No. [illegible]

Location: Near large stakes. South side of channel. Elevation of [illegible] Rd

General Flow Conditions: [illegible] pools containing spawning substrate. Flow is limited to low flow channel located on N side of creek.

Channel Morphology (Include Stream Banks)

Habitat Type: (Circle one) Pool Riffle Run Inundated Yes/No

Depth: N/A

Cover: (Circle) overhanging vegetation submerged boulders logs root weeds submerged vegetation

Fair = 2

Undercut banks Other: (Describe) Emergent veg. along margin of main channel

Instream: (Describe) Adjacent cover limited. [illegible] of stream channel

Riparian: (Describe) [illegible] Willow [illegible] Reed/ Arundo located on S bank

Low K = 2

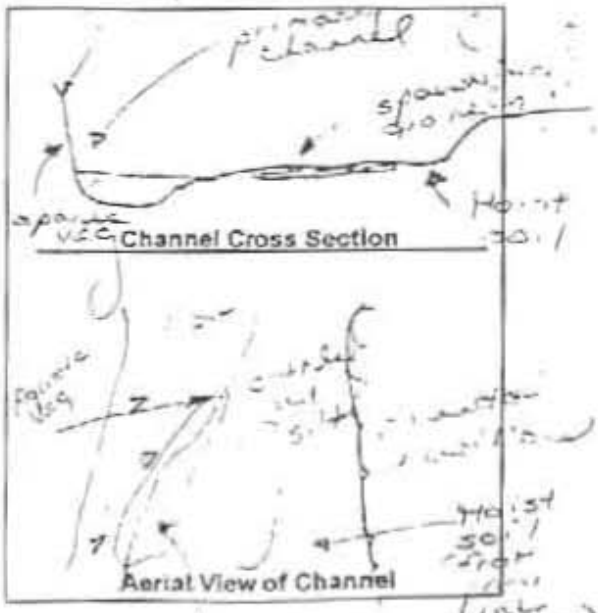
Shading: [illegible]

Substrate Composition: [illegible] silt & sand

Embedd = 4"

Particle Size Range: .75" – 4"

Approximate Area: 8' x 30'



Potential Spawning ☒ Potential Rearing: ☒

Other Observations [illegible]

FUGRO-C3001 FORM 1/3

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R3

SAN ANTONIO CREEK HABITAT CHARACTERIZATION

Date: [illegible] Site I.D. No. B-5

Observer: [illegible] Photo No. [illegible]

Time: [illegible] Station Transect No. [illegible]

Location: [illegible]

General Flow Conditions: [illegible] 1/31/96
[illegible] Velocity

Channel Morphology: [illegible]
(Include Stream Banks)

Habitat Type: (Circle one) Pool Riffle Run Inundated Yes/No

Depth: [illegible]

Cover: (Circle) overhanging submerged boulders logs root wads submerged vegetation 2-3"

Rank = 2

Undercut banks Other: (Describe) [illegible]

Instream: (Describe) [illegible] boulders on north side of primary channel

Riparian: (Describe) [illegible] and young [illegible] (Very sparse)

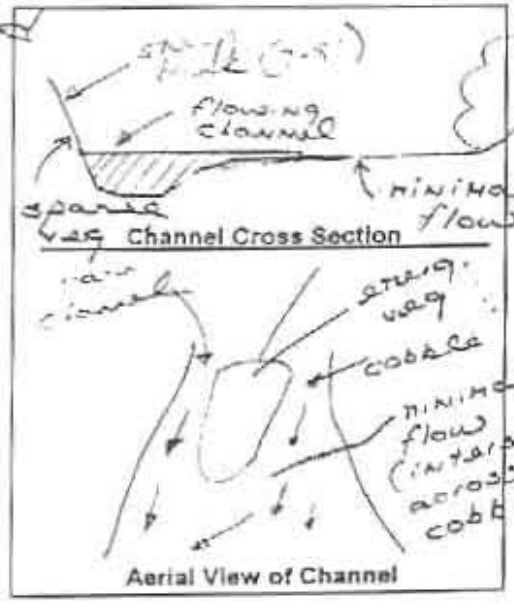
Rank = 2

Shading: a few sycamores on N. side

Substrate Composition: cobble [illegible] w/ silt [illegible] [illegible]

Particle Size Range: 3" TO 6"

Rank = 2 Approximate Area:



Channel Cross Section

Aerial View of Channel

Potential Spawning ☐ Potential Rearing: ☒

Other Observations: Water [illegible] flow velocity [illegible] primary channel. Limited cover

$\bar{I} \ldots = R_3$

January 1996
Project No. 96-61-0301

SAN ANTONIO CREEK HABITAT CHARACTERIZATION

Date: [illegible]/23/96 Site I.D. No. C-1

Observer: [illegible] Photo No. [illegible]

Time: [illegible] Station Transect No. 17

Location: [illegible] on 1/23 [illegible]

General Flow Conditions: [illegible] channel [illegible] observed flow [illegible]

Channel Morphology (Include Stream Banks): [illegible] channel [illegible] [illegible] exposed [illegible] cobble/gravel w/ [illegible] silt in [illegible]

Habitat Type: (Circle one) Pool Riffle Run [illegible] Inundated (Yes/No)

Depth: 6" to 5' [illegible] [illegible] for gravel/cobble [illegible]

Cover: (Circle) overhanging submerged boulders logs root weeds submerged vegetation (like figure)

rank = 2

Undercut banks Other: (Describe) [illegible]

Instream: (Describe) [illegible] along north side. [illegible]

Riparian: (Describe) [illegible] Dominant

Rank = 2

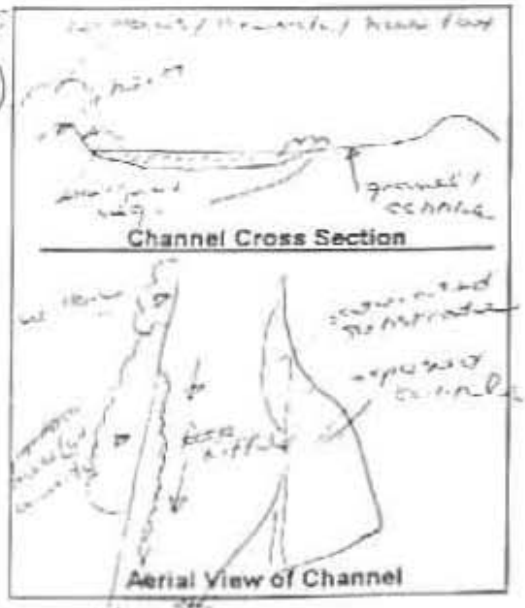
Shading: [illegible]

Substrate Composition: [illegible] (covered w/ filam. algae) in silt (abundant)

Particle Size Range: [illegible]

unbuildedness rank = 4

Approximate Area:



Potential Spawning ☐ Potential Rearing: ☒

Other Observations: gravel / cobble embedded in fine sand. [illegible] Stickleback & [illegible] aquatic [illegible] permanent

January 1996
Project No. 96-61-0301

SAN ANTONIO CREEK HABITAT CHARACTERIZATION

Date: [illegible] Site I.D. No. [illegible]

Observer: [illegible] Photo No. [illegible]

Time: 3:15 Station Transect No. 30 to [illegible]

Location: [illegible] Flow = 39 cfs ([illegible])

General Flow Conditions: low flow channel. Flows [illegible] [illegible] channel [illegible] [illegible] side.

Channel Morphology (Include Stream Banks): Channel [illegible] [illegible] (i.e. [illegible]) to south [illegible]

Habitat Type: (Circle one) Pool Riffle Run Inundated Yes/No

Depth: [illegible]

Cover: (Circle) overhanging veg. submerged boulders logs root weeds submerged vegetation

Undercut banks Other: (Describe) [illegible]

Rank = 3 [illegible] high [illegible]

Instream: (Describe) [illegible] submerged willows [illegible] backwater/pool area

Riparian: (Describe) [illegible] on north. [illegible] oaks on cliff to south.

Rank = 2

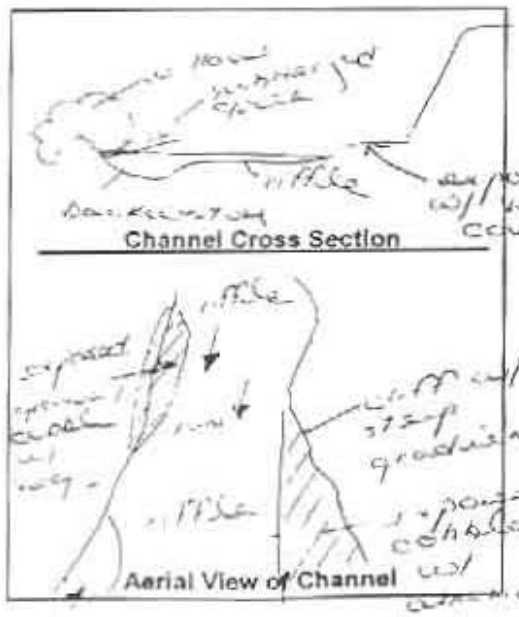
Shading: [illegible] some [illegible] oak

Substrate Composition: gravel [illegible] w/ silt/[illegible] (some [illegible] algae)

Particle Size Range: 5" to 5"

Rank = 2 embedded w/ [illegible] silt

Approximate Area:



Potential Spawning ☐ Potential Rearing: ☒

Other Observations: Riffle/run/[illegible] habitat. Heavy silt [illegible] remaining cobble & gravel. Filamentous algae. Areas along margins [illegible] good rearing/[illegible] habitat.

R2

SAN ANTONIO CREEK HABITAT CHARACTERIZATION

Date: [illegible] Site I.D. No. [illegible]

Observer: [illegible] Photo No. [illegible]

Time: [illegible] Station Transect No. 31

Location: [illegible] approx. 50 ft.

General Flow Conditions: low flow [illegible]
[illegible] (1/23)

Channel Morphology: (Include Stream Banks) Channel [illegible] cliff [illegible]

Habitat Type: (Circle one) Pool Riffle Run Inundated (Yes/No) low flow

Depth: 2' to 3'

Cover: (Circle) overhanging veg. submerged boulders logs root weeds submerged vegetation

Rank = 3

Undercut banks Other: (Describe) [illegible]

Instream: (Describe) Terminal bedrock bar, [illegible] break, deep pool.

Riparian: (Describe) Arroyo overhanging from cliff.

Rank = 2 Shading: from trees on bank

Substrate Composition: sand/gravel cobble in riffle

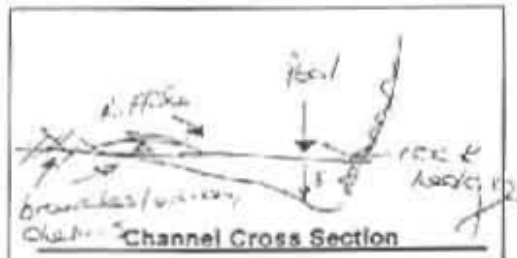
Particle Size Range: <.5" to 5"
pool = 50% sand

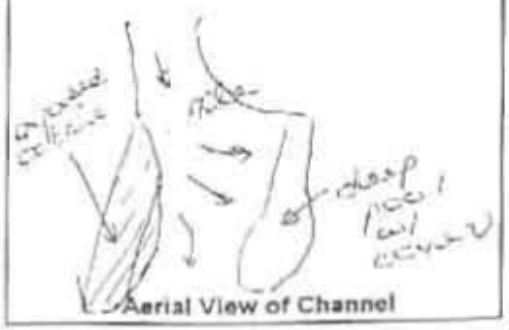
Approximate Area: 20-30' x 3'

embeddedness = 4 in riffle

Potential Spawning ☐ Potential Rearing: ☑

Other Observations [illegible] Veronica in [illegible] deep pool at end of riffle. Stickleback & Arroyo chub present





R2.

January 1996
Project No. 96-61-0301

SAN ANTONIO CREEK HABITAT CHARACTERIZATION

Date: 1/23/96 Site I.D. No. C 3

Observer: [illegible] Photo No. [illegible]

Time: 4:30 Station Transect No. [illegible]

Location: upstream of [illegible] Rd Crossing
[illegible] Highway 33

General Flow Conditions: Flow [illegible] channel, [illegible] logs
[illegible]

Channel Morphology: [illegible] channel
(Include Stream Banks) Exposed gravel/cobble fine [illegible]
[illegible]

Habitat Type: (Circle one) Pool Riffle Run Inundated Yes/No
Depth: 4-6"
high flow [illegible] not inundated

Cover: (Circle) overhanging veg submerged boulders logs root weeds submerged vegetation

Rank = 3

Undercut banks Other: (Describe) [illegible]

Instream: (Describe) a few small boulders (10-12") instream [illegible]
provide some cover. [illegible]

Riparian: (Describe) overhanging willow branches
provide cover over backwater areas

Rank = 2

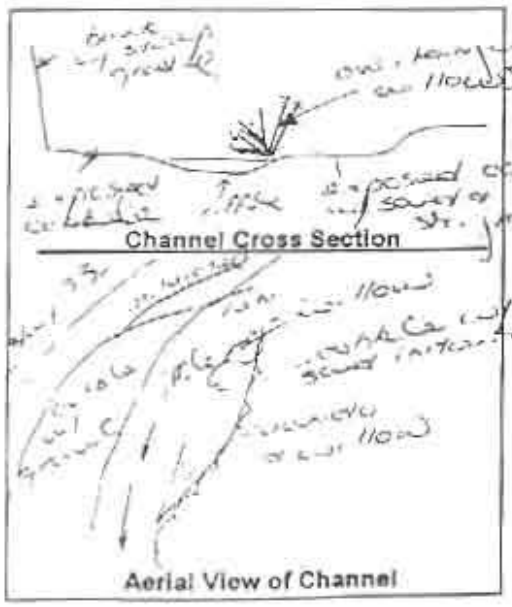
Shading: some from trees in flows
[illegible]

Substrate Composition: cobble embedded
in silt/sand
some of boulders

Embedded = 3

Particle Size Range: 3" to 10"
w/ silt intermixed

Approximate Area:



Potential Spawning ☐ Potential Rearing: ☒

Other Observations [illegible]
[illegible] on [illegible] side
of stream bank
Substrate throughout x-sect
contains mixed silt
mixed in w/ cobble sizes
of 6" or larger. Sticklebacks & [illegible] cyprinids
[illegible] shallow areas

Sp/K1

January 1996
Project No. 96-61-0301

SAN ANTONIO CREEK HABITAT CHARACTERIZATION

Date: 11/23/96 Site I.D. No. C-4

Observer: CSAT Photo No. Pics 8

Time: 4:45 Station Transect No. 33 x 00

Location: upstream end of Mission Northwest. Cell y 33.

General Flow Conditions: low flow, channel. Channel confined to south side of creek (Flow = 3.72 cfs)

Channel Morphology: (Include Stream Banks) North side of channel exposed. Steep grass covered bank on north. Small bank (armored?) on south.

Habitat Type: (Circle one) Pool Riffle Run Inundated Yes/No

Depth: 3 to 6"

Cover: (Circle) overhanging veg. submerged boulders logs root weeds (cattails) submerged vegetation

Rank = 4

Undercut banks Other: (Describe) [illegible]

Instream: (Describe) [illegible] boulders cover deeper portion on S. side

Ripanan: (Describe) willows on S side of creek providing shading & roots stabilize bank

Rank = 3

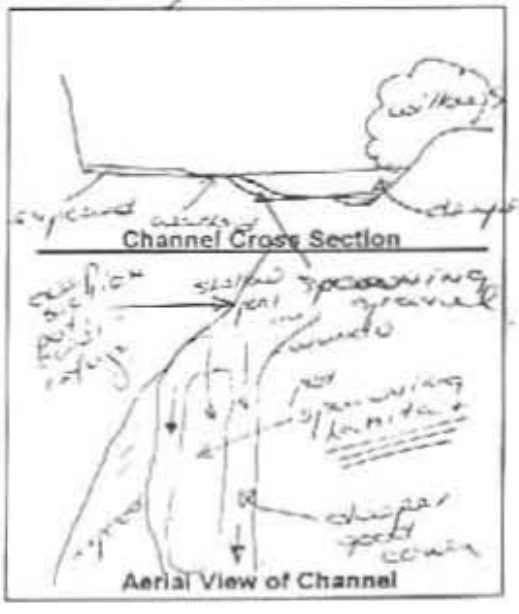
Shading: Moderate (sycamores, cottonwoods, willows)

Substrate Composition: gravel / sm. cobble

Substrate Rank = 5 very small size & sand intermixed

Particle Size Range: .5" to 3"

Approximate Area: 30' length x 3 wide



Potential Spawning ☒ Potential Rearing: ☒

Other Observations: [illegible] exposed with suitable microdevices. This area may provide appropr. spawn. habitat. Clean gravel / sm. cobble. Marginal [illegible], [illegible] located @ head of long riffle / run.

R3

January 1996
Project No. 96-61-0301

SAN ANTONIO CREEK HABITAT CHARACTERIZATION

Date: 1/23/96 Site I.D. No. C-5

Observer: [illegible] Photo No. 9

Time: 4:10 Station Transect No. 41 100

Location: Reaches just below Thornoff to Cook Rd. off of Hwy 33

General Flow Conditions: Low flow conditions
Flow: 3.93 cfs Turbid 6.2 (1/25)

Channel Morphology: (Include Stream Banks) Channel braided. Gradient slightly steeper than previous reaches

Habitat Type: (Circle one) Pool Riffle Run Inundated Yes/No
Depth: 6 vs. 5"

Cover: (Circle) overhanging veg. submerged boulders logs root weeds submerged vegetation

Rank = 2

Undercut banks Other: (Describe) some emergent vegetation

Instream: (Describe) a few 12 to 18" sized boulders in stream

Riparian: (Describe) Overhanging arundo only mulefat & [illegible] along stream banks

Ranking = 3

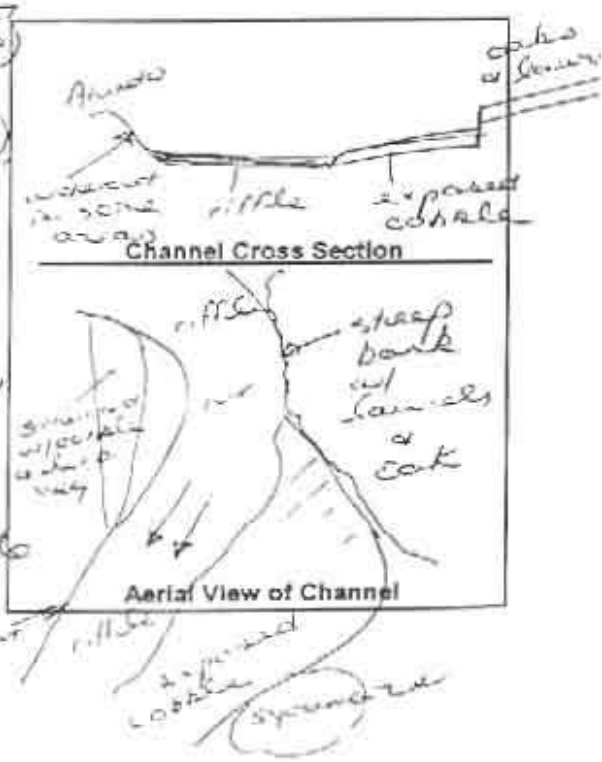
Shading: Abundant (only [illegible] on east

Substrate Composition: small cobbles (80%) w/ silt overlying substrate

embeddedness = 2

Particle Size Range: 4" to 8" (80%) occas. cobbles > 10"

Approximate Area:



Potential Spawning ☐ Potential Rearing: ☒

Other Observations Streambed composed of cobbles primarily. Scattered boulders. Silt or algae covering substrate in some areas

January 1996
Project No. 96-61-0301

R2

SAN ANTONIO CREEK HABITAT CHARACTERIZATION

Date: 1/24/96 Site I.D. No. C-6

Observer: [illegible] Photo No. 12 of 12 (Photo 13 too dark to [illegible])

Time: 10:41 Station Transect No. 45 43 [illegible]

Location: Downstream of Transect 45 approaching Cal Cal Rd

General Flow Conditions: Flow = 3.92 cfs Flow G Trans 5.2 (1/22)

Channel Morphology: (Include Stream Banks) shallow pool on NE bank w/ deep pool on other channel. south side

Habitat Type: (Circle one) Pool Riffle Run Inundated Yes/No

Depth: 2' to 3'

Cover: (Circle) overhanging vegetation submerged boulders logs root weeds submerged vegetation

Rank ~~4~~ 3/2 Undercut banks Other: (Describe) overhanging west side ledge

deep pool, shallow pool

Instream: (Describe) organic debris, streambank submerged logs.

Riparian: (Describe) scattered (willows)

Shading: Rank=2 some riparian cover

Substrate Composition: G 70% cobble (60%) w/ silt & 3" cobble (30%)

embeddedness = 3

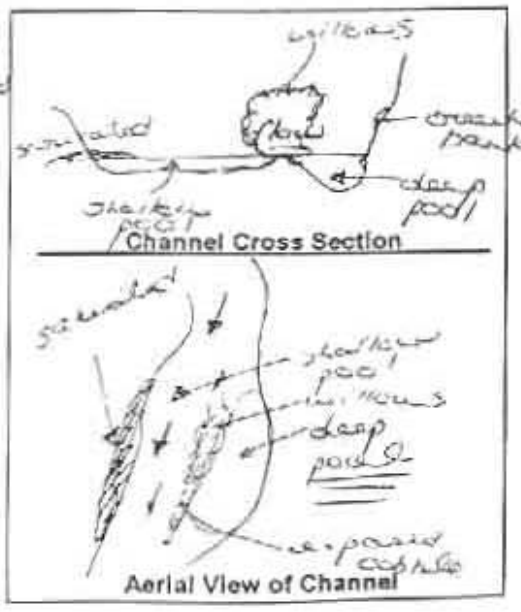
Particle Size Range:

Approximate Area: 40' x 2' deep pool habitat

Potential Spawning ☐ Potential Rearing: ☒ or overwintering

Other Observations

Not good overwintering rearing habitat. Good green algae stream margins



January 1996
Project No. 96-61-0301

SAN ANTONIO CREEK HABITAT CHARACTERIZATION

Date: 1/24/96 Site I.D. No. C-7 Did not develop

Observer: [illegible] Photo No. [illegible]

Time: [illegible] Station Transect No. 4/5 (between [illegible])

Location: Near [illegible] Old Cob Rd a [illegible] [illegible]

General Flow Conditions: Low flow conditions
Flow - 3.0 cfs

Channel Morphology: (Include Stream Banks) channel bisected or confluence approx 35 meters including [illegible] stream banks

Habitat Type: (Circle one) Pool (Riffle) Run Inundated (Yes/No) area of channel bottom inundated

Depth: 6" to 3"

Cover: (Circle) (overhanging veg) (submerged boulders) logs root weeds submerged vegetation (vertical vegetation)

Rank = 2

Undercut banks Other: (Describe) [illegible]

Instream: (Describe) small boulders in substrate. Very little instream cover.

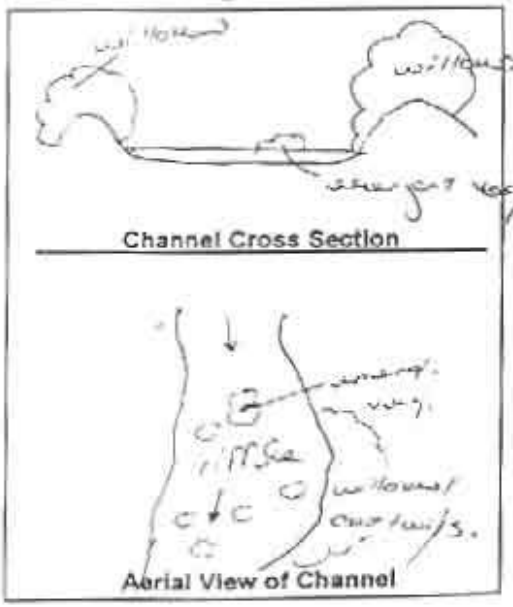
Riparian: (Describe) willows, cottonwoods, a few alder, good shade but not much overhanging veg.

Shading: minimal rank = 2

Substrate Composition: 40 % small cobble, 40 % med cobble, 20 % large cobble (50-80 3-4")

Particle Size Range: 1.5 to 10" cross bars 10-12"

Approximate Area:



Potential Spawning ☐ Potential Rearing: ☒

Other Observations Algae (red and [illegible]) covering substrate. Not a lot of it in channel (sides). Aquatic invertebrate larvae present in areas w/ higher velocity

Sp/K

January 1996
Project No. 96-61-0301

SAN ANTONIO CREEK HABITAT CHARACTERIZATION

Date: 1/24/96 Site I.D. No. C-7

Observer: [illegible] Photo No. 3 4

Time: 11:00 Station Transect No. 47 + 00

Location: Adjacent to Old Cinder House, upstream of old house

General Flow Conditions: [illegible] split into 2 parallel channels (low flow channels)

Channel Morphology: (Include Stream Banks) channels 3 to 4' in width, separated by large exposed cobble bar w/ abundant willows

Habitat Type: (Circle one) Pool (Riffle) Run Inundated (Yes/No) 2 channels

Depth: 3 to 6"

Cover: (Circle) (overhanging) submerged boulders (logs) (root weeds) submerged vegetation

Undercut banks Other: (Describe) overhanging veg.

Instream: (Describe) Submerged debris and 6" to 2' boulders. Overhanging branches

Riparian: (Describe) Overhanging willows; submerged branches

Shading: 3 (abundant willows)

Substrate Composition: [illegible] cobble, fine gravel (90%) w/ fine sand interstitial w/ fine silt (< 5%)

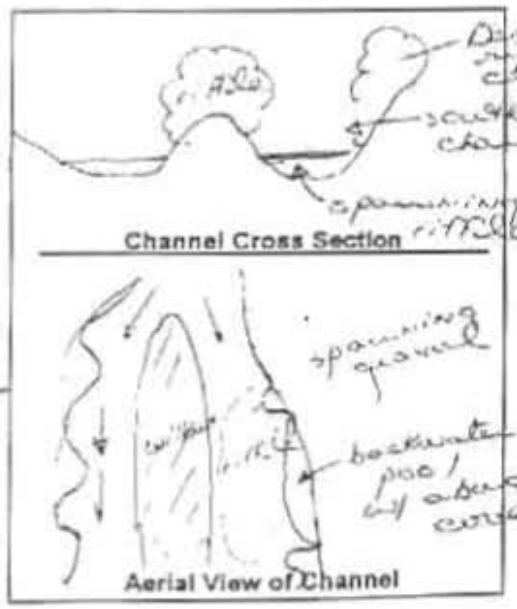
Particle Size Range: .5 to 1.5'

Approximate Area: 25' x 6'

Embeddedness = ≤ 5

Potential Spawning ☒ Potential Rearing: ☒

Other Observations: [illegible] algae, good refuge adj. to spawning area. Clean gravel w/ minimum fines. Escape cover nearby. Abundant aquatic invertebrates (caddis, mayflies, damselflies etc.), isopods, [illegible]



Rank = 3 (long uniform margins)

Rank

[illegible]

January 1996
Project No. 96-81-0301

SAN ANTONIO CREEK HABITAT CHARACTERIZATION

Date: [illegible] Site I.D. No. [illegible]

Observer: [illegible] Photo No. [illegible]

Time: [illegible] Station Transect No. [illegible]

Location: [illegible]

General Flow Conditions: [illegible]

Channel Morphology: [illegible]
(Include Stream Banks)

Habitat Type: (Circle one) Pool Riffle Run Inundated Yes/No

Depth: [illegible]

Cover: (Circle) overhanging submerged boulders logs root weeds submerged vegetation

Undercut banks Other: (Describe) [illegible]

Instream: (Describe) [illegible]

Riparian: (Describe) [illegible]

Shading: [illegible]

Substrate Composition: [illegible]

Particle Size Range: [illegible]

Approximate Area: [illegible]

Channel Cross Section

Aerial View of Channel

Potential Spawning ☐ Potential Rearing: ☐

Other Observations [illegible]

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SAN ANTONIO CREEK HABITAT CHARACTERIZATION

Date: 1/24/96 Site I.D. No. C-10 approx 30 upstream station C-10

Observer: [illegible] Photo No. [illegible]

Time: [illegible] Station Transect No. 54 [illegible]

Location: Approx [illegible] upstream of head [illegible]

General Flow Conditions: [illegible] flow [illegible] flows

Channel Morphology (Include Stream Banks): [illegible] meandering [illegible] pool [illegible] flow [illegible] bottom w/ exposed cobble [illegible] 3 [illegible] (rounded) [illegible]

Habitat Type: (Circle one) Pool Riffle Run Inundated Yes/No

Depth: 2 to 2.5 (deepest [illegible])

Cover: (Circle) overhanging veg submerged boulders logs root weeds submerged vegetation

Undercut banks Other: (Describe) [illegible]

Instream: (Describe) [illegible] fallen willows [illegible] Arundo.

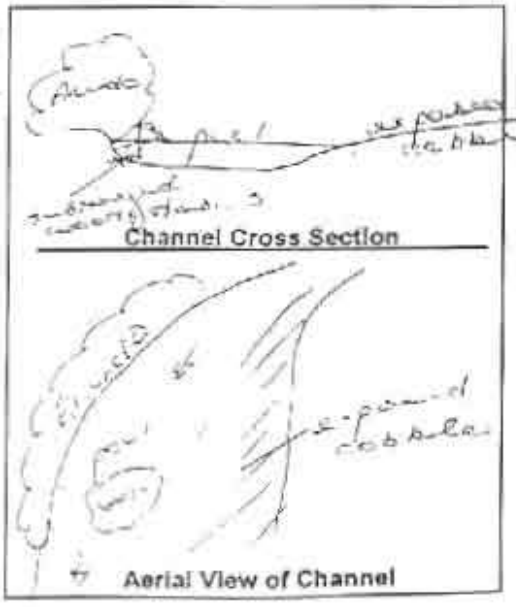
Riparian: (Describe) Dominated by Arundo on N. side. Heavily devoid of veg on S side. Some young willows [illegible] shading

Shading: Very minimal (some [illegible])

Substrate Composition: silty sand (90%) w/ some [illegible] cobble

Particle Size Range: [illegible] (90%) cobble [illegible]

Approximate Area:



Potential Spawning ☐ Potential Rearing: ☒

Other Observations

Cover occurs along north stream margin. Min. amount avail. in relation to total area of pool

January 1996
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R2

SAN ANTONIO CREEK HABITAT CHARACTERIZATION

Date: [illegible] Site I.D. No. C 11

Observer: [illegible] Photo No. [illegible]

Time: [illegible] Station Transect No. 56, 57/58

Location: Cottonwood [illegible] property.

General Flow Conditions: Open flow channel
Flow - 3.73 to 7.62

Channel Morphology: (Include Stream Banks) Clay peat [illegible] steep banks
Stream flows on [illegible] of clay peat.

Habitat Type: (Circle one) Pool Riffle Run Inundated Yes/No

Depth: 6.1' max see [illegible]

Cover: (Circle) overhanging veg. submerged boulders logs root weeds submerged vegetation

Rank = 3

Undercut banks Other: (Describe) [illegible]

Instream: (Describe) Steep bank structure (Concrete supports?)

Instream structure is some benches

Riparian: (Describe) Alnus [illegible] of the sycamore
[illegible] vegetation. Greatly sloping exposed cobble bar on bank

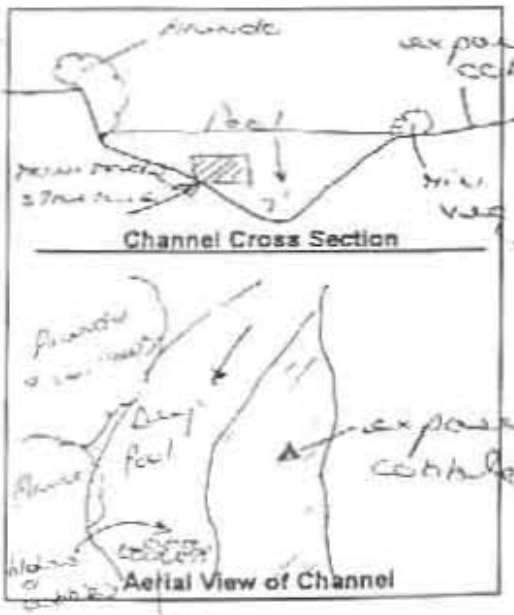
Rank = 1

Shading: Moderate

Substrate Composition: [illegible] to 3 to 6 (pure) abundant silt connected w/ silt

Particle Size Range: 3" to 6"

Approximate Area:



Potential Spawning ☐ Potential Rearing: ☒

Other Observations Some refuge provided.
Often inundated w/ bathtub shape w/ peat is exposed. Little protection, little overhanging cover. Almost always [illegible] on one side
Nonexistent streambank

[illegible]

January 1996
Project No. 96-61-0301

R3

SAN ANTONIO CREEK HABITAT CHARACTERIZATION

Date: 1/24/96 Site I.D. No. C-12

Observer: [illegible] Photo No. [illegible]

Time: 1:42 Station Transect No. [illegible]

Location: [illegible]

General Flow Conditions: low flow channel

Flow = 3.72 cfs 7-62

Channel Morphology: (Include Stream Banks) [illegible]

Habitat Type: (Circle one) Pool Riffle Run Inundated Yes/No

Depth: 15 12"

Cover: (Circle) overhanging vegetation, submerged boulders, logs, root weeds, submerged vegetation

Rank = 2

Undercut banks Other: (Describe) [illegible]

Instream: (Describe) [illegible]

Riparian: (Describe) [illegible]

Rank = 2

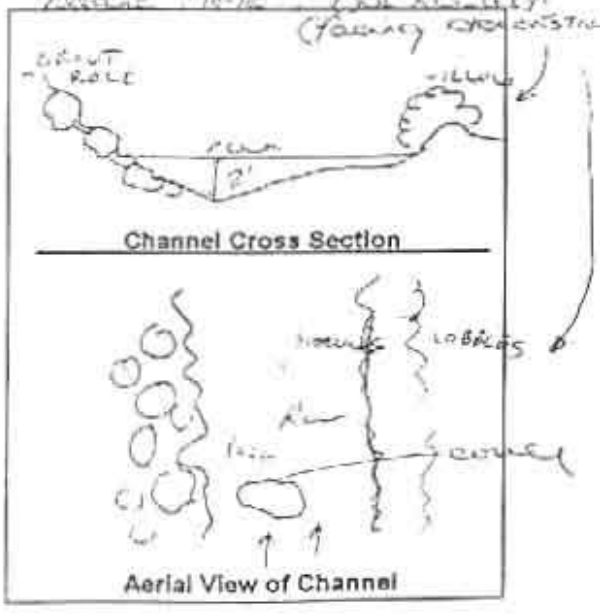
Shading: [illegible]

Substrate Composition: [illegible]

embedded/mess = 2

Particle Size Range: [illegible]

Approximate Area:



Potential Spawning ☐ Potential Rearing: ☒

Other Observations

[illegible]

January 1996
Project No. 96-61-0301

R2

SAN ANTONIO CREEK HABITAT CHARACTERIZATION

Date: 1/24/96 Site I.D. No. C-13

Observer: [illegible] Photo No. 16 & 17

Time: 3:12 Station Transect No. 100

Location: Downstream of [illegible] River on Creek Rd, just above [illegible] area.

General Flow Conditions: Low flow conditions

Flow = 3.92 cfs

Channel Morphology: channel width averaged 10-15' width, (Include Stream Banks) gently sloped on one bank, approx. 25% of wetted stream bed, on 3 sides. Some backwater [illegible] on 3 sides.

Habitat Type: (Circle one) Pool Riffle Run Inundated Yes/No

Depth: 6-8"

Cover: (Circle) overhanging veg. submerged boulders logs root weeds (roots) submerged vegetation

Rank = 3

Undercut banks Other: (Describe) fallen submerged trees

Instream: (Describe) scattered 12-14" boulders. Abundant submerged branches on south stream margin.

Riparian: (Describe) Dense willows (species) on south bank N side has few, much overhanging cover (mulefat & willow)

Rank = 2 moderate

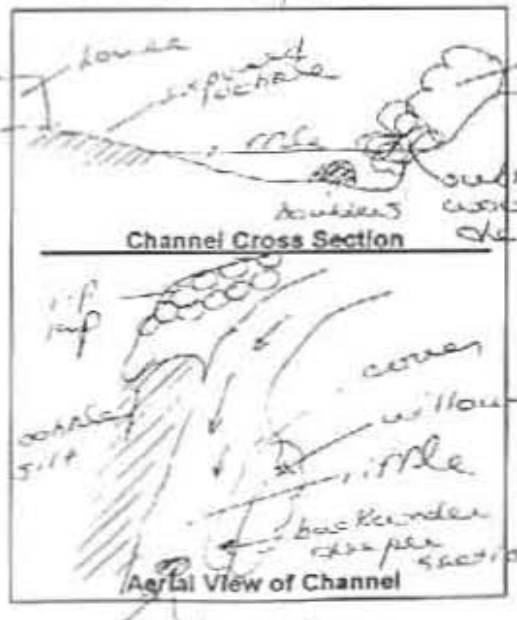
Shading: Some from willows

Substrate Composition: gravel/cobble w/ silt & sand interspersed

embeddedness = 3

Particle Size Range: 3" to 5" (70%)

Approximate Area:



Potential Spawning ☐ Potential Rearing: ☒

Other Observations

Long riffle section with abundant cover providing refuge/escape cover. Deeper channel (>10") beneath some submerged woody debris. Moderate amts of algae (see substrate) -1-

FORM 123

R

SAN ANTONIO CREEK HABITAT CHARACTERIZATION

Date: 1/24/96 Site I.D. No. C-14

Observer: C Photo No. 18 : 19

Time: 2:15 Station Transect No. ~70+00

Location: ~70+00 San Antonio Creek

General Flow Conditions: Pool

Flow: 3.92 @ 1.62

Channel Morphology: (Include Stream Banks) large riprap 1-4' DIAM!, RIGHT BANK RIPRAP LEFT BANK: Disturbed/WILLOW COTTONWOOD

Habitat Type: (Circle one) (Pool) Riffle Run Inundated Yes/No

Depth: 3' primary channel

Cover: (Circle) overhanging (submerged boulders) logs root weeds submerged vegetation

rank 3

Undercut banks Other: (Describe)

Instream: (Describe) RIPRAP PLACED INTO LIVE WATER ON RIGHT BANK (no UNDERCUT BANKS)

Riparian: (Describe) NONE

rank 1

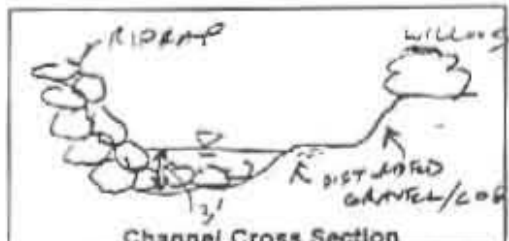
Shading: NONE

Substrate Composition: BOULDER (RIPRAP)

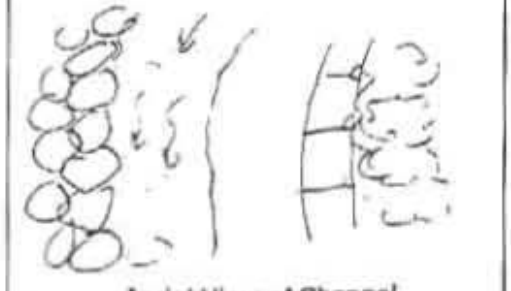
embeddedness 5

Particle Size Range: 1.5-4'

Approximate Area: 90%



Channel Cross Section


Aerial View of Channel

Potential Spawning ☐ Potential Rearing: ☒

Other Observations

embed 5-6%

Several submerged boulders provide areas of refuge

January 1996
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Sp_1/K_3

SAN ANTONIO CREEK HABITAT CHARACTERIZATION

Date: 1/28/96 Site I.D. No. C-15

Observer: A. Photo No. 20 · 21

Time: 2 40 Station Transect No. 74+00

Location: San Antonio Creek

General Flow Conditions: Riffle relatively stable banks
Flow [illegible] (1/25)

Channel Morphology: (Include Stream Banks) Shallow gravel channel, w/ bifurcated side channel

Habitat Type: (Circle one) Pool (Riffle) Run Inundated Yes/No
Depth: 4"

Cover: (Circle) (overhanging) in side channel submerged boulders logs root wads (submerged vegetation) aquatic veg in side channel

Rank 2 Undercut banks Other: (Describe)

Instream: (Describe) gravels clean in main channel, covered in aquatic veg in side channel

Riparian: (Describe) arundo and willow

Rank 2

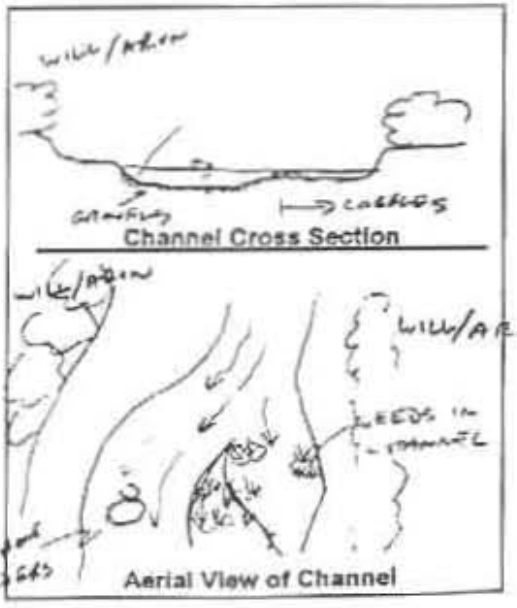
Shading: some willow overhang

Substrate Composition: gravels and cobbles

unbiased 4

Particle Size Range: fine grav – 1"

Approximate Area: 60%



Potential Spawning ☒ Potential Rearing: ☒

Other Observations a bit shallow for spawning
May provide some habitat for spawning if inundated to a bit for prolonged periods throughout rainy season.

January 1996
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S1/2 / K1

SAN ANTONIO CREEK HABITAT CHARACTERIZATION

Date: 1/24/96 Site I.D. No. C-16

Observer: [illegible] Photo No. 22 + 23

Time: 2:44 Station Transect No. 75 to 76

Location: San Antonio Creek

General Flow Conditions: low flow conditions. Flow primarily confined to south side of channel

Flow = 3.72 @ 76

Channel Morphology: (Include Stream Banks) Somewhat braided w/ primary channel bounded w/ boulder riffle placed into secondary pool (Gauge channel Nonsh)

Habitat Type: (Circle one) Pool Riffle Run Inundated Yes/No

Depth:

Cover: (Circle) overhanging veg. submerged boulders logs root weeds submerged vegetation

Rank = 3/4 (pool) riffle pool

Undercut banks Other: (Describe) emergent veg.

Instream: (Describe) Abund. submerged branches & veg

Riparian: (Describe) Abundo, willows on south side

Rank = 3

Shading: moderate (in flows)

Substrate Composition: Gravel 37% cobble 37% silt, fine sand & silt intermixed

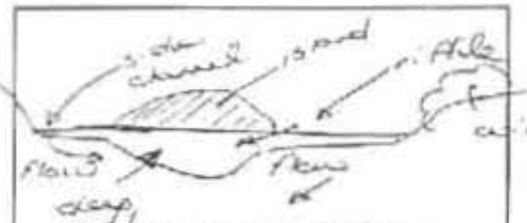
Particle Size Range: 1.5" - 3.5"

embeddedness 4

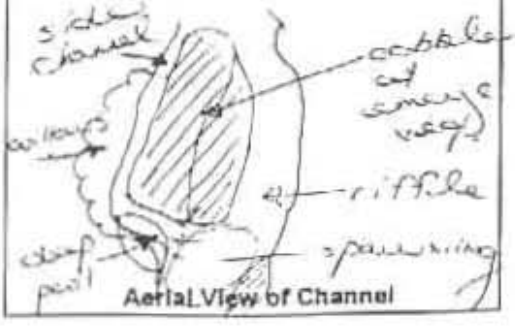
Approximate Area: 30' x 10'

Potential Spawning: Marginal ☒ Potential Rearing: in adjacent pool ☒

Other Observations: Fairly clear. Green filamentous algae. Saturated sediment/mud in middle of channel w/ emergent veg. Numerous clubs or sticklebacks. Riffle is spawning substrate. Feeds oxygenated water into deep pool



Channel Cross Section



Aerial View of Channel

January 1996
Project No 96-61-0301

R3

SAN ANTONIO CREEK HABITAT CHARACTERIZATION

Date: 1/24/96 Site I.D. No. C-17

Observer: CRT Photo No. 24-25

Time: 3:19 Station Transect No. 80+00

Location: San Antonio Creek

General Flow Conditions: Flow = 3.72 @ 1/23 or 1/25

Channel Morphology: (Include Stream Banks) Deep pool located at downstream end of short riffle. Steep bank on north

Habitat Type: (Circle one) Pool Riffle Run Inundated Yes/No

Depth: 4 to 5'

Cover: (Circle) overhanging submerged boulders logs root weeds submerged vegetation

Rank = 2/3

Undercut banks Other: (Describe) submerged branches

Instream: (Describe) large boulders 2 to 3' diam. submerged branches

Riparian: (Describe) minimal. Mulefat on north, oaks on steep bank to south

Rank = 2

Shading: moderate

Substrate Composition: small gravel cobbles and sand

Embeddedness = 3

Particle Size Range:

Approximate Area:

Channel Cross Section

Potential Spawning ☐ Potential Rearing: ☒

Other Observations

Exposed, not fast flows But adequate cover to provide some rearing

Aerial View of Channel

R3

SAN ANTONIO CREEK HABITAT CHARACTERIZATION

Date: 1/24/96 Site I.D. No. C-18

Observer: [illegible] Photo No. 26-27

Time: 350 Station Transect No. ~83+00

Location: San Antonio Creek

General Flow Conditions: series of riffles interspersed w/ small pools

Channel Morphology: cascading riffles w/ plunge pools
(Include Stream Banks) boulder riffles

Habitat Type: (Circle one) Pool Riffle Run Inundated Yes/No

Depth: 7"

Cover: (Circle) overhanging submerged boulders logs root weeds submerged vegetation

rank 2

Undercut banks Other: (Describe)

Instream: (Describe) no, but some large boulders on bank

Riparian: (Describe) set back, not @ live water aquatic plants abound on banks

rank 1

Shading: none

Substrate Composition: Boulders

Particle Size Range: 6" – 1.5'

Approximate Area: [illegible]

Channel Cross Section

Aerial View of Channel

Potential Spawning ☐ Potential Rearing: ☒

Other Observations

H

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SAN ANTONIO CREEK HABITAT CHARACTERIZATION

Date: 1/24/96 Site I.D. No. C-17

Observer: [illegible] Photo No. 28 & 29

Time: 4:15 Station Transect No. 88

Location:

General Flow Conditions: Very minimal flow; Est. = 3.72 cfs @ 7.62 (1/25)

Channel Morphology: Trifurcated channel below another channel below (40' width)
(Include Stream Banks)

Habitat Type: (Circle one) Pool (shallow) Riffle Run Inundated Yes/No

Depth: 6" to 9"

Cover: (Circle) overhanging (submerged boulders) logs root weeds (submerged vegetation)

Rank = 1

Undercut banks Other: (Describe) [illegible]

Instream: (Describe) Minimal cover. Few scattered boulders (2-2.5')

Riparian: (Describe) Willows/mulefat w/ mostly Arundo on N. & S. sides

Rank - 2 Shading: Minimal

Substrate Composition: Gravel w/ small cobble & silt

Embeddedness = 2

Particle Size Range: 2" to 4"

Approximate Area:

Channel Cross Section

Aerial View of Channel

Potential Spawning ☐ Potential Rearing: ☐

Other Observations

Long shallow pool w/ cobble consist of substrate of instream structure. Abundant algae

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R_2

SAN ANTONIO CREEK HABITAT CHARACTERIZATION

Date: 1/24/96 Site I.D. No. C-2C

Observer: [illegible] Photo No. 30, 31

Time: 1130 Station Transect No. 82

Location: Parallel to Creek Rd Downstream of end of Site C.

General Flow Conditions: ~~[illegible]~~ channel w/ high velocity. Flow: 3.32 cfs (1/26)

Channel Morphology: (Include Stream Banks) circle channel riffle w/ cascading pools located downstream of long pool

Habitat Type: (Circle one) Pool Riffle Run Inundated Yes/No

Depth: 4 - 8"

Cover: (Circle) overhanging veg. submerged boulders logs root weeds submerged vegetation

Rank = 3

Undercut banks Other: (Describe) submerged weed clumps

Instream: (Describe) Numerous boulders in some scattered across channel Non-native channel

Riparian: (Describe) Arundo (dense) on south side w/ willow, mulefat (sparse) on north side

Rank = 2

Shading: Minimal

Substrate Composition: only high flows small cobble to small boulders w/ small amount of silt

Embeddedness = 2

Particle Size Range: intermixed

Approximate Area:

Channel Cross Section

Aerial View of Channel

Potential Spawning ☐ Potential Rearing: ☒

Other Observations Abundant algae. Causes flow due to boulders in channel. Thick mat covers wide pool upstream created by man-made barrier (rocks)

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M

SAN ANTONIO CREEK HABITAT CHARACTERIZATION

Date: [illegible] Site I.D. No. [illegible]

Observer: [illegible] Photo No. [illegible]

Time: [illegible] Station Transect No. [illegible]

Location: [illegible]

General Flow Conditions: [illegible]

Channel Morphology: [illegible]
(Include Stream Banks)

Habitat Type: (Circle one) Pool Riffle Run Inundated Yes/No

Depth: [illegible]

Cover: (Circle) overhanging submerged boulders logs root weeds submerged vegetation

Undercut banks Other: (Describe) [illegible]

Instream: (Describe) [illegible]

Riparian: (Describe) [illegible]

Shading: [illegible]

Substrate Composition: [illegible]

Particle Size Range: [illegible]

Approximate Area: [illegible]

Channel Cross Section

Potential Spawning ☐ Potential Rearing: ☐

Other Observations [illegible]

Aerial View of Channel

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R_3

SAN ANTONIO CREEK HABITAT CHARACTERIZATION

Date: 1/25/96 Site I.D. No. C-22

Observer: JCI Photo No. 354 ABC #18+17 Photo exposure

Time: 9:50 Station Transect No. 100

Location: New house [illegible] just downstream of non-work st. channel w/ cobbling

General Flow Conditions: Low flow channel

Flow - 332 cfs (@ 760 cfs) Flow - 332 cfs

Channel Morphology (Include Stream Banks) Channel width approx. 15' Approx. 4' bank to N. [illegible] Cattle [illegible] on S side [illegible]

Habitat Type: (Circle one) Pool Riffle Run Inundated Yes/No

Depth: 5-7"

Cover: (Circle) overhanging submerged boulders logs root weeds submerged vegetation

Rank = 2

Undercut banks Other: (Describe) [illegible] veg.

Instream: (Describe) Several med size boulders (10-25") in stream

Riparian: (Describe) Minimal riparian veg. Many willows or [illegible]

Rank = 1

Shading: Minimal Canopy

Substrate Composition: Med cobbles & lg. cobbles (50%) w/ sand & gravel

Embedd. = 3

Particle Size Range: 6" to 10" [illegible]

Approximate Area:

Channel Cross Section

Aerial View of Channel

Also, silt layer

Potential Spawning ☐ Potential Rearing: ☒

Other Observations Abundant filar. algae. Very limited cover. Emergent veg & bldrs are only cover. Kingfishers & black phoebe present

January 1996
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Sp2/R3

SAN ANTONIO CREEK HABITAT CHARACTERIZATION

Date: 1/[illegible]/96 Site I.D. No. C-[illegible]

Observer: CSIT Photo No. [illegible]

Time: [illegible] Station Transect No. 107

Location: [illegible]

General Flow Conditions: [illegible] — low flow

Flow: 3.92 cfs (1/23) [illegible] confined to south

Channel Morphology: broad channel [illegible]
(Include Stream Banks) with flow [illegible]

Habitat Type: (Circle one) Pool Riffle Run Inundated (Yes/No) spawning substr

Depth: 7-8 low flow channel

Cover: (Circle) overhanging veg. submerged boulders logs root weeds submerged vegetation

Rank = 2

Undercut banks Other: (Describe) [illegible]

Instream: (Describe) 1-2 bow [illegible] scattered

[illegible]

Riparian: (Describe) Very sparse on north side

Dense willows & Arundo on south side.

Rank = 1

Shading: Minimal tree canopy

Substrate Composition: [illegible]

potent. spawning area (coarse [illegible]) [illegible] silt/sand [illegible]

Rank = 4

Particle Size Range: .5 to 3"

Approximate Area: 55' x 10'

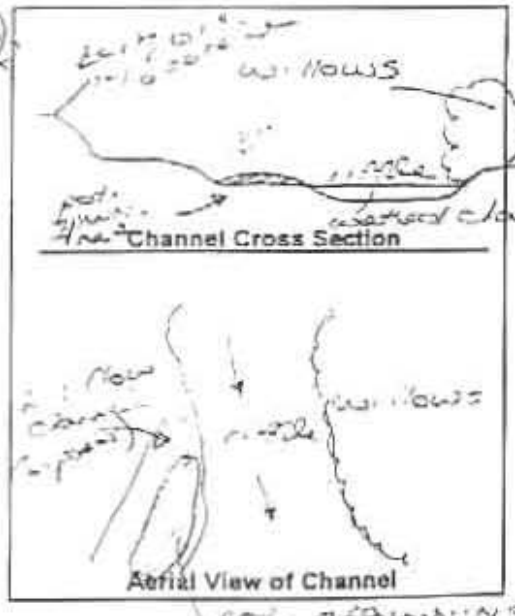
may be similar [illegible]

Potential Spawning ☒ Potential Rearing: ☒
north bank south bank

Other Observations

Pot. spawning area along exposed north bank, [illegible] side of channel. Pot. rearing also south stream margin. Submerged willow branches [illegible] other than pot. spawn area. [illegible] pot. inundated [illegible]

pot. spawning (exposed)



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M

SAN ANTONIO CREEK HABITAT CHARACTERIZATION

Date: _____ Site I.D. No. C – 23

Observer: _____ Photo No. [illegible]

Time: _____ Station Transect No. [illegible]

Location: _____

General Flow Conditions: [illegible] a new channel by side channel
Flow: 392 (@ TCDF/25)

Channel Morphology: [illegible] boulder [illegible]
(Include Stream Banks) boulder and [illegible]

Habitat Type: (Circle one) Pool Riffle Run Inundated Yes/No

Depth: _____

Cover: (Circle) overhanging submerged boulders logs root weeds submerged vegetation

Undercut banks Other: (Describe) _____

Instream: (Describe) [illegible]

Riparian: (Describe) [illegible]

Shading: [illegible]

Substrate Composition: [illegible]

Particle Size Range: [illegible] – 1'

Approximate Area: _____

Channel Cross Section

Potential Spawning ☐ Potential Rearing: ☐

Other Observations

[illegible] of large [illegible] on
[illegible] boulders [illegible] to and in
the [illegible] water

Aerial View of Channel

January 1996
Project No. 96-61-0301

R3

SAN ANTONIO CREEK HABITAT CHARACTERIZATION

Date: 1/25/96 Site I.D. No. D-a

Observer: [illegible] Photo No. [illegible]

Time: 10:23 Station Transect No. 115/117

Location: first sec of [illegible] off [illegible] on north side of creek

General Flow Conditions: base flow (broad channel) w/ alt. riffle pools

Flow = 3.92 cfs TEO (1/25)

Channel Morphology: (Include Stream Banks) Channel approx 90 30' x 40' steep 6 to 8' banks on north side (secondary banks) [illegible]

Habitat Type: (Circle one) Pool Riffle Run Inundated Yes/No

Depth: 8 to 10"

Cover: (Circle) overhanging submerged boulders logs root weeds submerged vegetation

Rank = 2

Undercut banks Other: (Describe) [illegible]

Instream: (Describe) boulders instream (2 to 2.5') Emerg. Veronica [illegible]

Riparian: (Describe) Very sparse riparian veg on south side (mulefat, willow) [illegible]

Rank = 1

Shading: minimal

Substrate Composition: [illegible] (inches) w/ sand intermixed [illegible]

Embed = 1

Particle Size Range: 1.5 to 3"

Approximate Area: Heavy infestation

Channel Cross Section

Aerial View of Channel

Potential Spawning ☐ Potential Rearing: ☒

Other Observations

Abund filam. algae & clustered Veronica emerg. Some some bank & boulders but minimal.

Some isolated pools w/ 4-5" standing water or small stream [illegible]

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R3

SAN ANTONIO CREEK HABITAT CHARACTERIZATION

Date: 1/25/96 Site I.D. No. A-1

Observer: CJP Photo No. 9:19

Time: 9:21 Station Transect No. 123 100

Location: Just upstream of [illegible] Stables

General Flow Conditions: Base flow confined to 15 to 20' channel

Flow: 3.92 cfs
7.62 (1/25)

Channel Morphology: (Include Stream Banks) High flow channel was cut 70' wide outside of flowing channel. Upstream was braided channel w/ high channel on north side

Habitat Type: (Circle one) Pool Riffle Run Inundated Yes/No

Depth: 4-8"

Cover: (Circle) overhanging veg. submerged boulders logs root weeds submerged vegetation

Rank = 2

Undercut banks Other: (Describe) emergent veg. (cattails & watercress)

Instream: (Describe) Instream cover [illegible] small barbs created by boulders & some concrete. Watercress in water & very sparse emergent veg. (cattail & [illegible]) some young willows

Riparian: (Describe)

Rank = 1

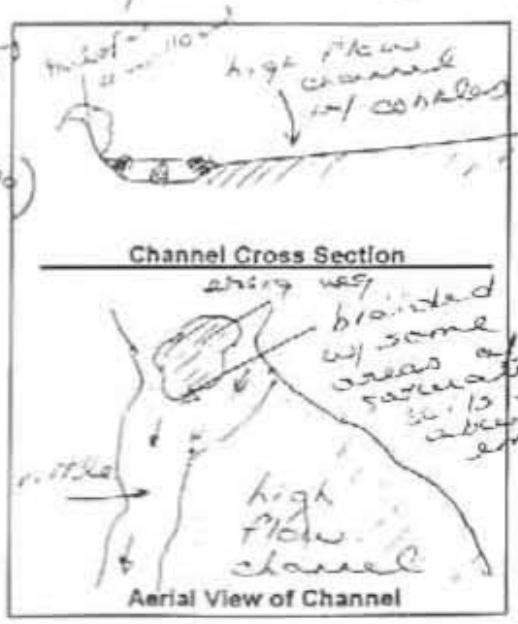
Shading: Minimal canopy

Substrate Composition: small to med cobbles w/ scattered 3" to med boulders w/ gravel [illegible]

Rank = 4

Particle Size Range: 3" to 10 (90%)

Approximate Area:



Potential Spawning ☐ Potential Rearing: ☒

Other Observations

Aquatic invertebrates present (Sawyer)
Very minimal cover
Riffle may function as food-producing areas w/ filamentous algae & watercress.
Upstream is area where stream fans out

R3

SAN ANTONIO CREEK HABITAT CHARACTERIZATION

Date: [illegible]

Site I.D. No. [illegible]

Observer: [illegible]

Photo No. [illegible]

Time: [illegible]

Station Transect No. [illegible]

Location: [illegible]

General Flow Conditions: Low Flow - 392 cfs Tod (1/25)

Channel Morphology: [illegible] in channel
(Include Stream Banks)

Habitat Type: (Circle one) Pool Riffle Run Inundated Yes/No

Depth: 10

Cover: (Circle) overhanging submerged boulders logs root weeds submerged vegetation

rank 2

Undercut banks Other: (Describe)

Instream: (Describe) [illegible] undercut [illegible] [illegible] [illegible]

Riparian: (Describe) Tall overbank trees willow and sycamore (bubble [illegible] effect)

rank 2

Shading: [illegible] on right bank

Substrate Composition:

rank 1

Particle Size Range: [illegible] small cobble (3")

Approximate Area:

Channel Cross Section

Aerial View of Channel

Potential Spawning ☐ Potential Rearing: ☒

Other Observations

rearing habitat on right bank
2.5' deep on right bank
(approximately present)

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SAN ANTONIO CREEK HABITAT CHARACTERIZATION

Date: 1/25/95 Site I.D. No. D-3

Observer: CWT Photo No. 13 & 14, 15

Time: 9:49 Station Transect No. 132

Location: Downstream of Fremont Rd

General Flow Conditions: Baseflow Conditions (Even flow) Low primary flowing channel

Flow: 3.92 (or 762 cfs)

Channel Morphology: (Include Stream Banks) Good channel w/ uniform bottom (channel width 30-35')

Habitat Type: (Circle one) Pool Riffle Run Inundated Yes/No

Depth: 3-5"

Cover: (Circle) overhanging submerged boulders logs root weeds submerged vegetation

Rank = 1

Undercut banks Other: (Describe) Cleared & maintained

Instream: (Describe) Instream cover almost absent w/ exception of some 2.5-3' boulders & some root wads in places

Riparian: (Describe) Riparian corridor sparse on north side (barren bank) south side has willow & mulefat w/ some Arundo

Rank = 2/1

Shading: Minimal tree canopy

Substrate Composition: Med to coarse gravel (50%) w/ sand (25%) & silt

Embedd = 3

Particle Size Range: unsorted

Approximate Area: .5 to 4"

Channel Cross Section

Marginal hab. for rearing.

Potential Spawning ☐ Potential Rearing: ☐

Other Observations Filar algae along banks

Very limited cover. Occurs along stream banks primarily. Black phoebe & quail in sp corridor

Fish: stickleback

Aquatic: aquatic insects

Aerial View of Channel

R3

SAN ANTONIO CREEK HABITAT CHARACTERIZATION

Date: [illegible] Site I.D. No. [illegible]

Observer: [illegible] Photo No. [illegible]

Time: [illegible] Station Transect No. [illegible]

Location: [illegible]

General Flow Conditions: low

Flow [illegible] 700 (.125)

Channel Morphology: [illegible]
(Include Stream Banks)

Habitat Type: (Circle one) Pool Riffle Run Inundated Yes/No

Depth: [illegible]

Cover: (Circle) overhanging submerged boulders logs root weeds submerged vegetation

rank 2

Undercut banks Other: (Describe)

Instream: (Describe) [illegible] adjacent banks

Riparian: (Describe) willows on both banks (native willow)

rank 4

Shading:

Substrate Composition: [illegible]

rank 1

Particle Size Range: [illegible] – 3"

Approximate Area:

Channel Cross Section

Potential Spawning ☐ Potential Rearing: ☒

Other Observations

Aerial View of Channel

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R3

SAN ANTONIO CREEK HABITAT CHARACTERIZATION

Date: 1/25/96 Site I.D. No. D-5

Observer: CART Photo No. 7350.24

Time: 11:39 Station Transect No. 139+00

Location: At Fulton St. Crossing
first upstream of crossing

General Flow Conditions: Baseflow
Flow - 392 @ Tech (1/25)

Channel Morphology (Include Stream Banks): 25-30' channel
Broad high flow channel

Habitat Type: (Circle one) Pool Riffle Run Inundated Yes/No

Depth: 8-10"

Cover: (Circle) overhanging veg. submerged boulders logs root weeds submerged vegetation

Rank = 2

Undercut banks Other: (Describe) Emergent veg.

Instream: (Describe) Limited to backwater only around behind boulders & emergent veg. (Veronica & sedge)

Riparian: (Describe) Riparian veg. set back from channel (willows & sycamore)

Rank = 3

Shading: Moderate - some canopy cover

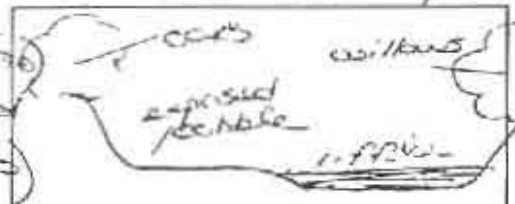
Substrate Composition: Well - Mod cobble & boulders 50% (60%) gravel - silt intermixed

Rank = 2

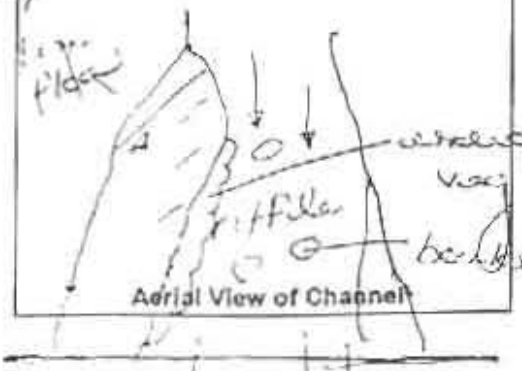
Particle Size Range: 1" to 8" (25%)

Approximate Area:

Channel Cross Section



Aerial View of Channel



Potential Spawning ☐ Potential Rearing: ☒

Other Observations

Barrier located just downstream may inhibit migration. Although not passable during higher flows. Deep pool located base of

R1

SAN ANTONIO CREEK HABITAT CHARACTERIZATION

Date: [illegible] Site I.D. No. [illegible]

Observer: [illegible] Photo No. [illegible]

Time: [illegible] Station Transect No. [illegible]

Location: [illegible]

General Flow Conditions: [illegible] Flow [illegible] @ 7 cfs (1/25) [illegible]

Channel Morphology: [illegible]
(Include Stream Banks)

Habitat Type: (Circle one) Pool Riffle Run Inundated Yes/No

Depth: [illegible]

Cover: (Circle) overhanging submerged boulders logs root weeds submerged vegetation

Undercut banks Other: (Describe) [illegible]

Instream: (Describe) [illegible] submerged [illegible] [illegible] [illegible] [illegible]

Riparian: (Describe) [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]

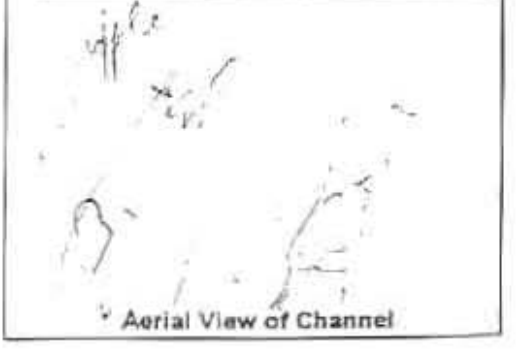
Shading: [illegible]

Substrate Composition: [illegible] [illegible]

Particle Size Range: [illegible]

Approximate Area: [illegible]

Channel Cross Section



Aerial View of Channel

Potential Spawning ☐ Potential Rearing: ☒

Other Observations [illegible]

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K2

SAN ANTONIO CREEK HABITAT CHARACTERIZATION

Date: 1/25/96 Site I.D. No. D-7

Observer: [illegible] Photo No. 25 & 26

Time: 12:04 Station Transect No. 147

Location: Upstream of Francis Crossing

General Flow Conditions: Baseflow
Flow: 3.92 cfs Temp (1/25)

Channel Morphology: (Include Stream Banks) Broad channel w/ numerous large boulders within front channel. Cascading step pools or sources gentle gradient

Habitat Type: (Circle one) Pool (Riffle) Run Inundated Yes/No to North

Depth: [illegible]

Cover: (Circle) overhanging veg. (submerged boulders) logs root weeds (submerged vegetation)

Rank = 3

Undercut banks Other: (Describe) Emergent veg.

Instream: (Describe) Cobbles, pools, numerous boulders to provide cover

Riparian: (Describe) A few to better piles w/ overhanging branches. Riparian veg very sparse on both sides. Some mature a young willow on North side

Rank = 2

Shading: Minimal tree canopy

Substrate Composition: boulders & med. cobble surrounded by patches of sand or gravel

Particle Size Range: boulders 1 to 1.5' width

Substrate = 3

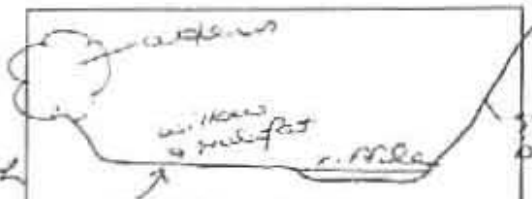
Approximate Area:

Very little silt overlying substrate.

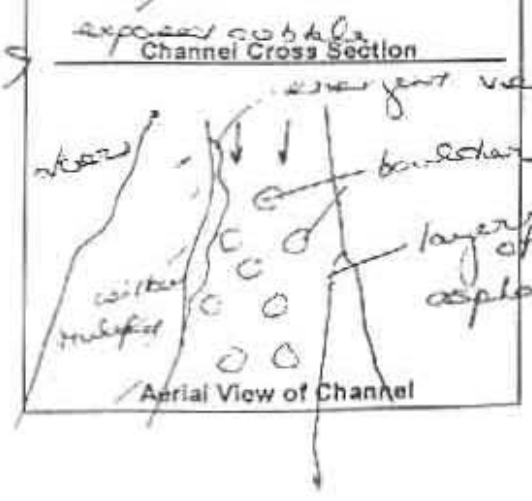
Potential Spawning ☐ Potential Rearing: ☒

Other Observations

Boulders & small cobbles may provide very good rearing habitat & cover. Although riparian cover is limited.



Channel Cross Section



Aerial View of Channel

LWR1 96W6 03001-FORM 123

January 1996
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17

SAN ANTONIO CREEK HABITAT CHARACTERIZATION

Date: _____ Site I.D. No. _____

Observer: _____ Photo No. _____

Time: _____ Station Transect No. _____

Location: _____

General Flow Conditions: _____

Flow: 372 to 760 (1/25)

Channel Morphology: _____
(Include Stream Banks)

Habitat Type: (Circle one) Pool Riffle Run Inundated Yes/No

Depth: _____

Cover: (Circle) overhanging submerged boulders logs root weeds submerged vegetation

Undercut banks Other: (Describe) _____

Instream: (Describe) some large boulders in stream

Riparian: (Describe) south bank - dense willow
the bank - more

Shading: more

Substrate Composition: cobble w some boulders

Particle Size Range: _____

Approximate Area: _____

Channel Cross Section

Potential Spawning ☐ Potential Rearing: ☐

Other Observations _____

Aerial View of Channel

R2

SAN ANTONIO CREEK HABITAT CHARACTERIZATION

Date: 1/25/96 Site I.D. No. E-2

Observer: CSPT Photo No. 32-33

Time: 12:25 Station Transect No. 154+00

Location: Near Creek Rd.

General Flow Conditions: 25-30' wide Channel
Baseflow, Flow = 3.92 @ T62 (1/25

Channel Morphology: (Include Stream Banks) Splits upstream, channels unite, & then bisect downstream

Habitat Type: (Circle one) Pool Riffle Run Inundated Yes/No

Depth: 6-5" w/ some deeper pockets

Cover: (Circle) overhanging veg. submerged boulders logs root weeds submerged vegetation (Epi Nasturtium (water cress) or Veronica) Undercut banks Other: (Describe) Emergent veg.

Rank = 3

Instream: (Describe) Numerous boulders 1.5 to 2.0' provide good structure instream

Riparian: (Describe) Very sparse riparian corridor. Mostly Arundo or large willows set back from channel. Halfway up willows near water edge

Rank = 2

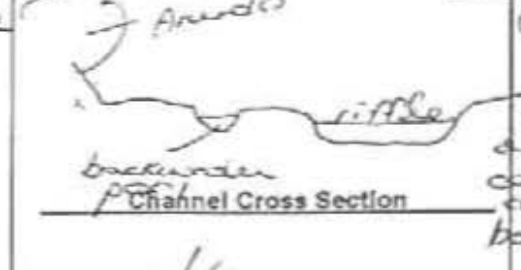
Shading: Minimal

Substrate Composition: coarse gravel & sm. to med. cobble w/ ~~some~~ silt

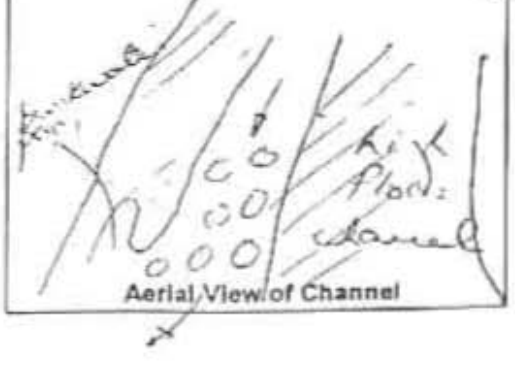
Embeddd = 4

Particle Size Range: intermixed

Approximate Area:



Channel Cross Section



Aerial View of Channel

Potential Spawning ☐ Potential Rearing: ☒

Other Observations A lot of good instream structure provides areas of refuge or cover. Abund. Filamentous algae

January 1996
Project No. 96-61-0301

R3

SAN ANTONIO CREEK HABITAT CHARACTERIZATION

Date: 1/25/96 Site I.D. No. E-3

Observer: [illegible] Photo No. [illegible]-36

Time: 12:40 Station Transect No. 15200

Location: St Creek

General Flow Conditions: low Flow: 3.92 @ T62 on 1/25/96

Channel Morphology: (Include Stream Banks) rapid riffle [illegible] 4' wide

Habitat Type: (Circle one) Pool Riffle Run Inundated Yes/No

Depth: [illegible]

Cover: (Circle) overhanging submerged boulders logs root weeds submerged vegetation

rank 2

Undercut banks Other: (Describe)

Instream: (Describe) aquatic plants on both banks
emergent vegetation

Riparian: (Describe) mostly bank vertical walls w/ salt
brush, cypress and sage brush

rank 2

Shading: low

Substrate Composition: small med cobbles
w/ silt

rank 4

Particle Size Range: 4"-6"

Approximate Area:

Channel Cross Section

Aerial View of Channel

Potential Spawning ☐ Potential Rearing: ☒

Other Observations
abundant filamentous algae

LWP\96\96-0301-FORM.123

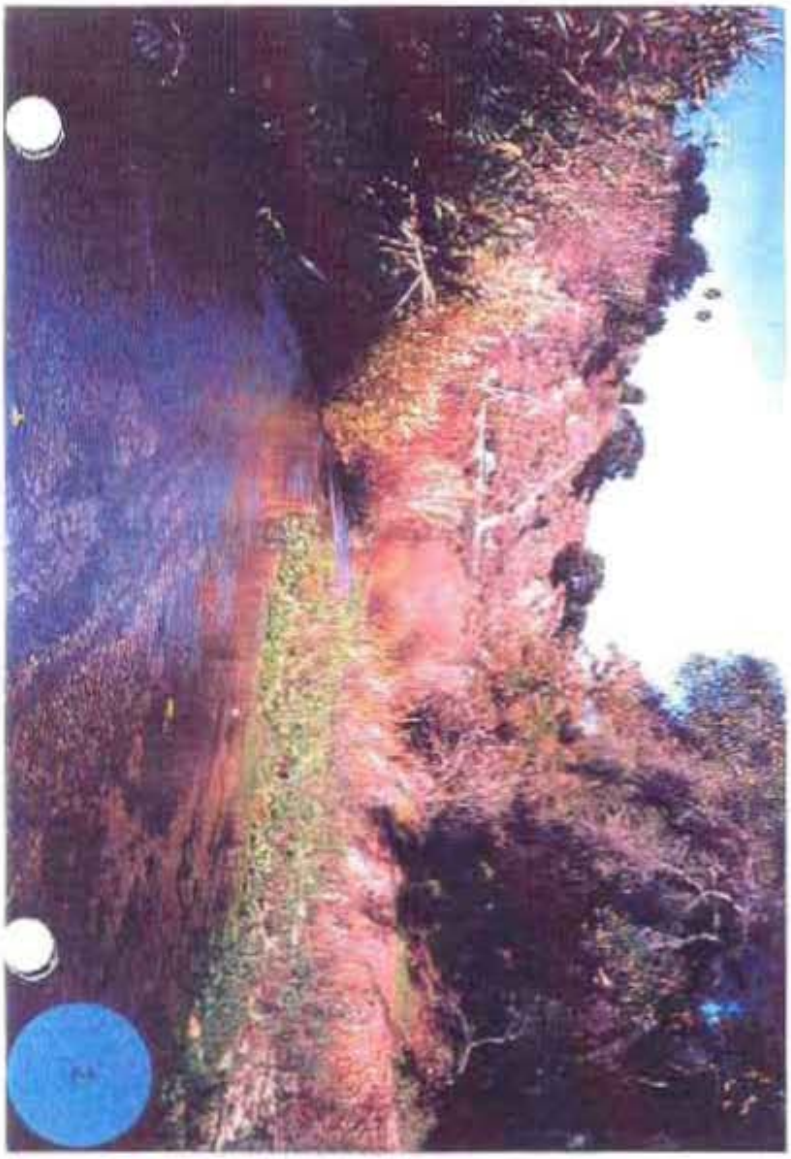
SAN ANTONIO CREEK HABITAT CHARACTERIZATION
APPENDIX B
SITE PHOTOGRAPHS

San Antonio Creek Habitat Characterization
Photo Identification

Photo Number	Site I.D. Number	Transect Number	View (D = downstream U = upstream)
1	C-1	27	D
2	C-1	27	U
3	C-2	31	D
4	C-2	31	U
5	C-2a	31	D
6	C-2a	31	U
7	C-3	35	D
8	C-3	35	U
9	C-4	38	U
10	C-4	38	D
11	C-5	41	D
12	C-6	43	D
13	C-7	45	U
14	C-7	45	D
15	C-8	47	U
16	C-8	47	D
17	C-9	49	U
18	C-9	49	U
19	C-9	49	D
20	C-9	49	U
21	C-10	54	D
22	C-10	54	D
23	C-10	54	U
24	C-11	57/58	D
25	C-11	57/58	U
26	C-12	62	U
27	C-12	62	D
28	C-13	66	U
29	C-13	66	D
30	C-14	70	U
31	C-14	70	D
32	C-15	74	D
33	C-15	74	U
34	C-16	75/76	D
35	C-16	75/76	U

Photo Number	Site I.D. Number	Transect Number	View (D = downstream U = upstream)
36	C-17	80	D
37	C-17	80	U
38	C-18	83	U
39	C-18	83	D
40	C-19	88	U
41	C-19	88	D
42	C-20	92	U
43	C-20	92	U
44	C-21	96	U
45	C-21	96	D
46	C-22	100	U
47	C-22	100	D
48	C-22	100	U
49	C-22	100	U
50	C-22a	107	U
51	C-22a	107	U
52	C-22a	107	U
53	C-23	114	D
54	C-23	114	U
55	C-23	114	U
56	D-a	118/119	U
57	D-a	118/119	D
58	D-1	123	U
59	D-1	123	D
60	D-2	128	D
61	D-2	128	U
62	D-2	128	D
63	D-3	132	U
64	D-3	132	U
65	D-3	132	D
66	D-4	135	D
67	D-5	139	U
68	D-6	143	D
69	D-6	143	D
70	D-6	143	U
71	D-7	147	U
72	D-7	147	D
73	E-1	151	D
74	E-1	151	D
75	E-2	154	U

Photo Number	Site I.D. Number	Transect Number	View (D = downstream U = upstream)
76	E-2	154	D
77	E-3	157	U
78	E-3	157	D
79	E-3	157	D
80	B-5	24/25	U
81	B-5	24/25	U
82	B-5	24/25	D
83	B-4	22/23	U
84	B-4	22/23	D
85	B-3	19/20	U
86	B-3	19/20	D
87	B-3	19/20	D
88	B-2s	16	U
89	B-2	16	U
90	B-2	16	D
91	B-1	11/12	U
92	B-1	11/12	U
93	B-1	11/12	U
94	A-2	8	U
95	A-2	8	D
96	A-2	8	D/west
97	A-1	4/5	U
98	A-1	4/5	U
99	A-1	4/5	D
100	A-1	4/5	D

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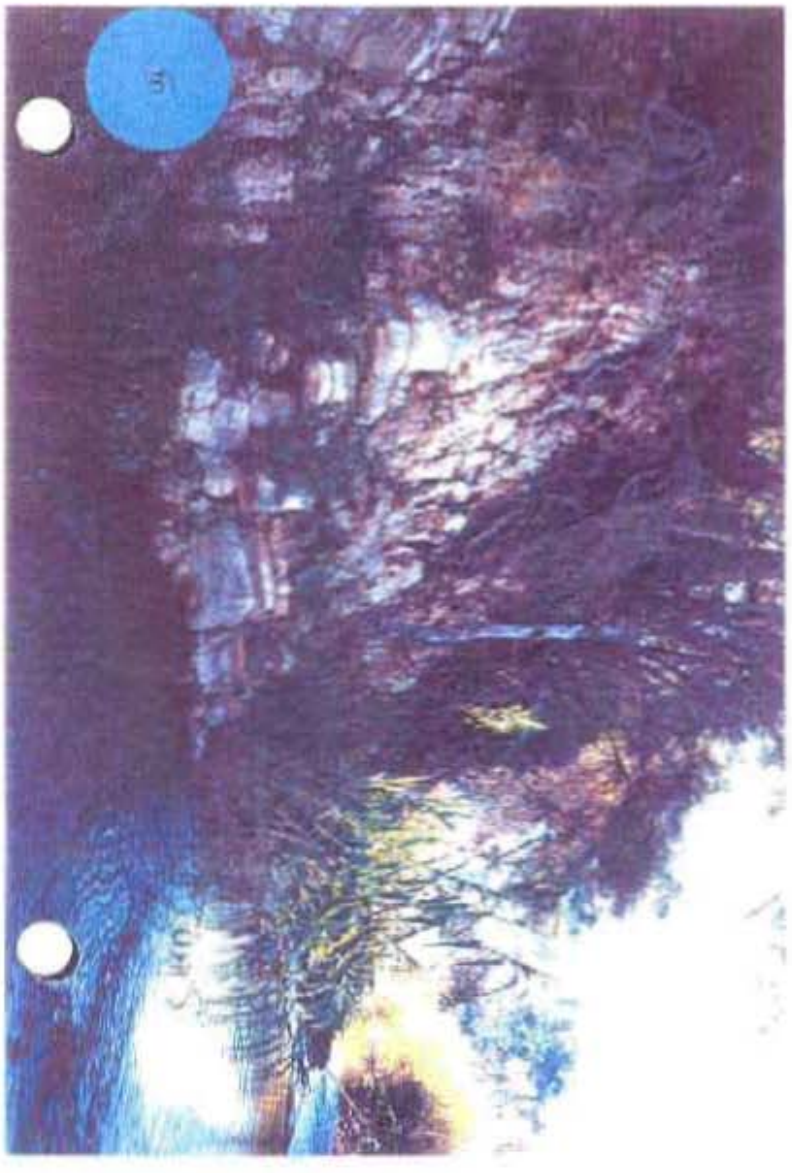
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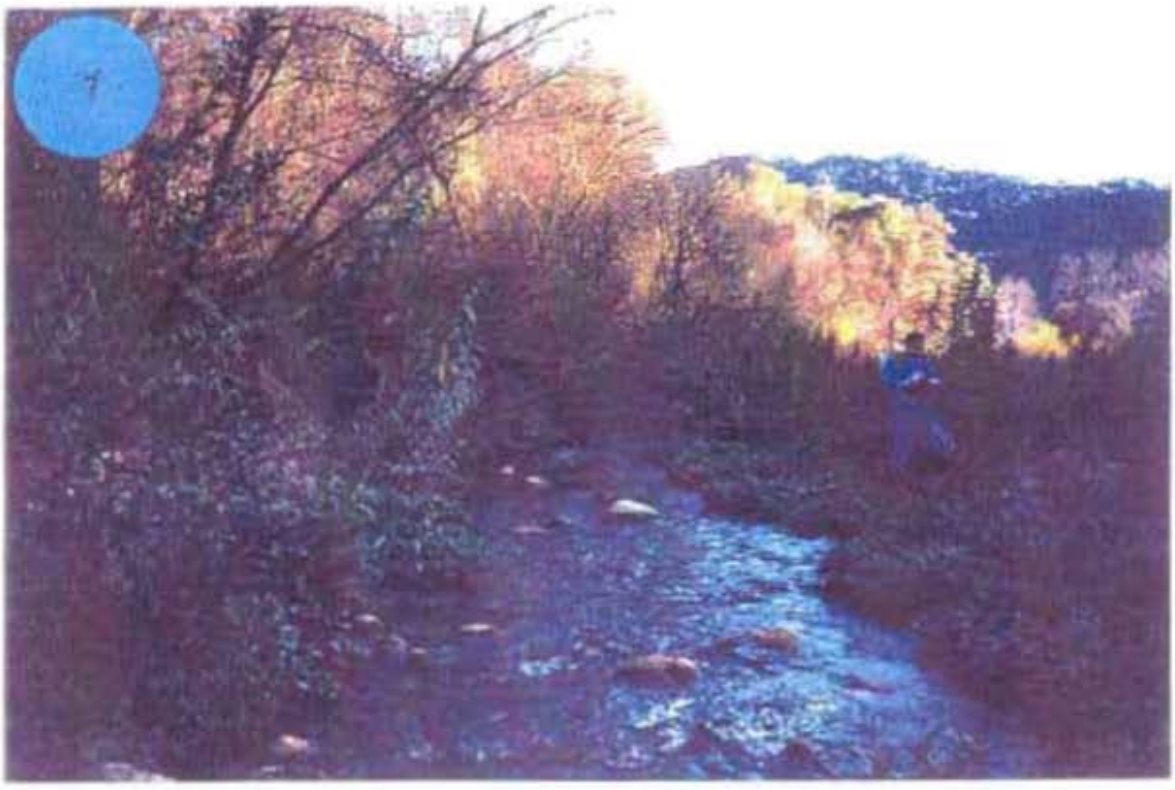

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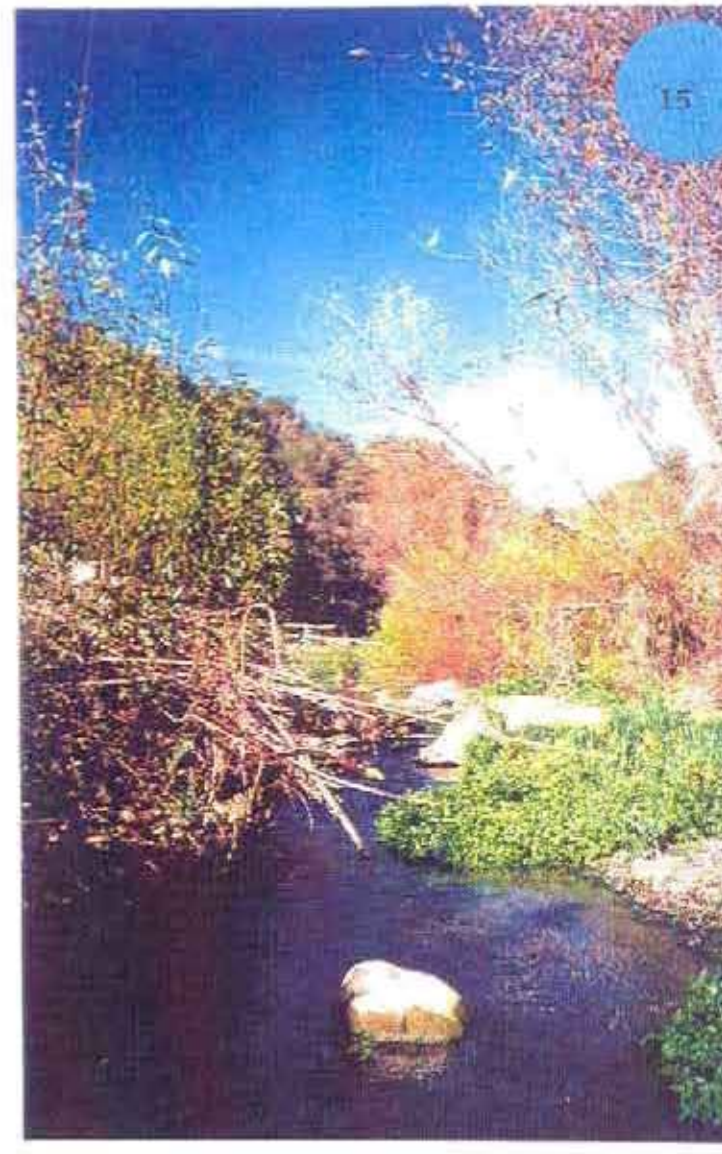
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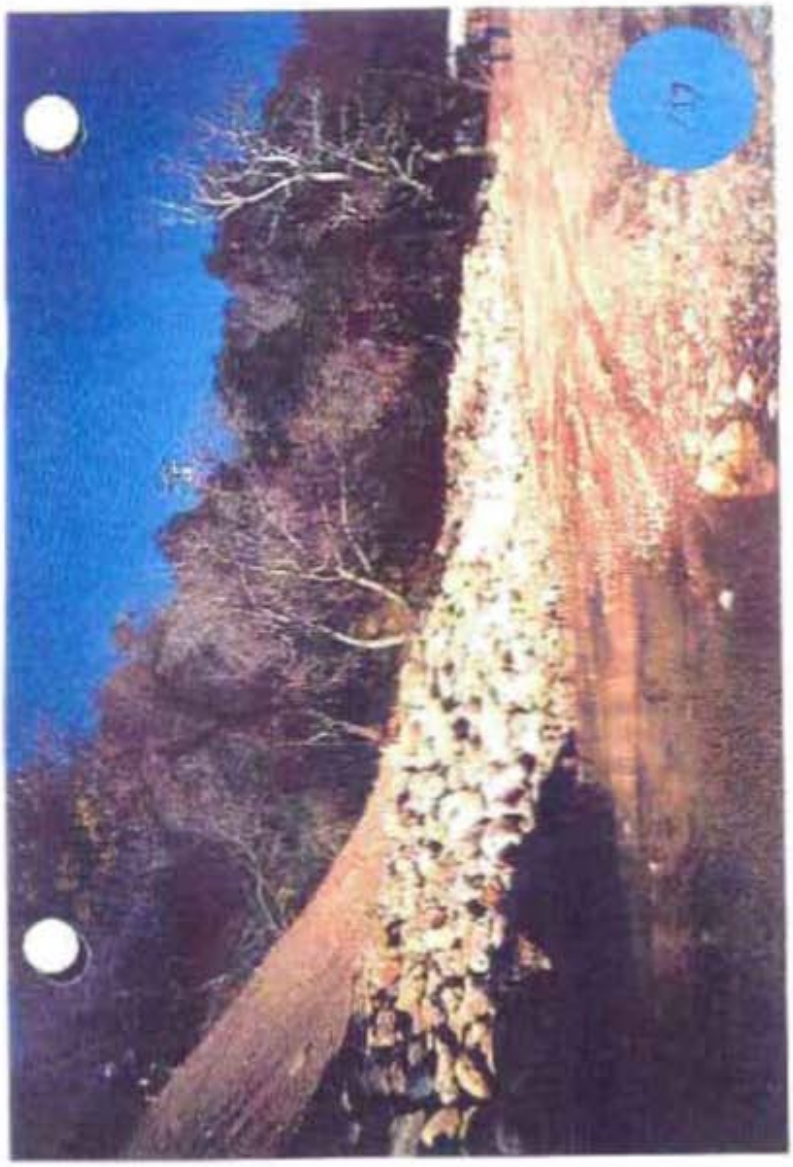
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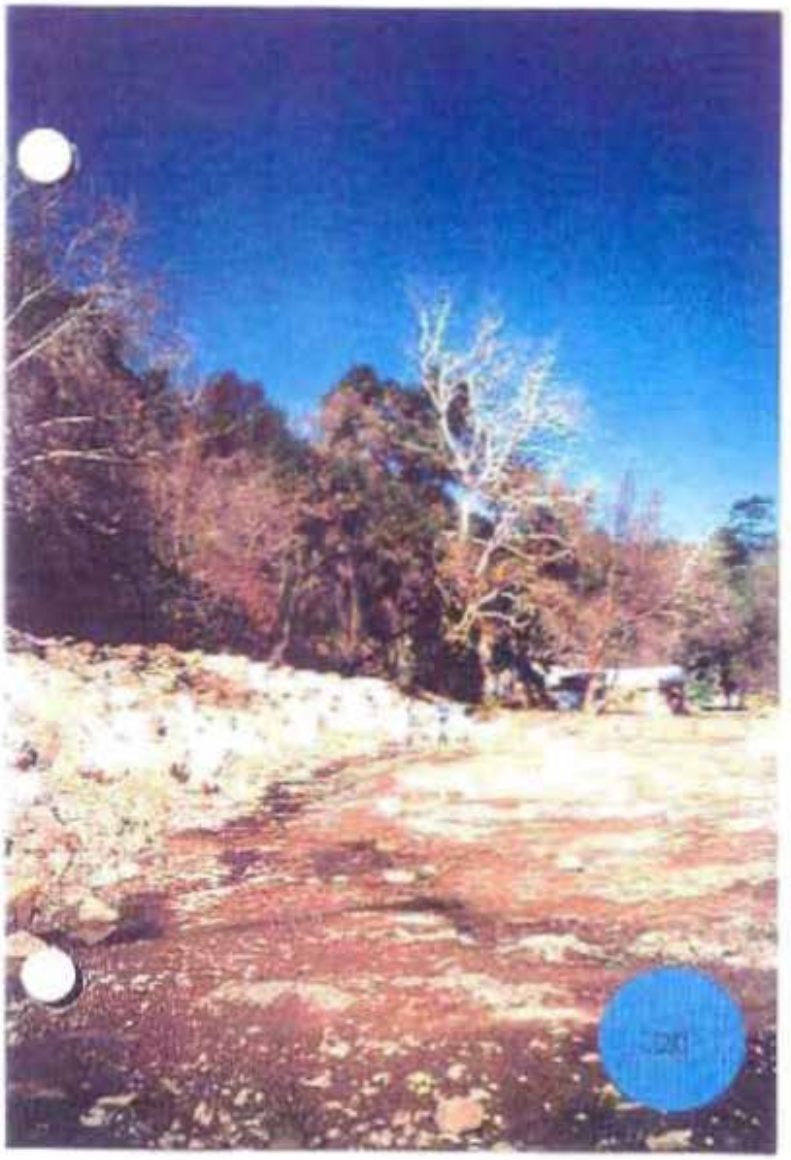
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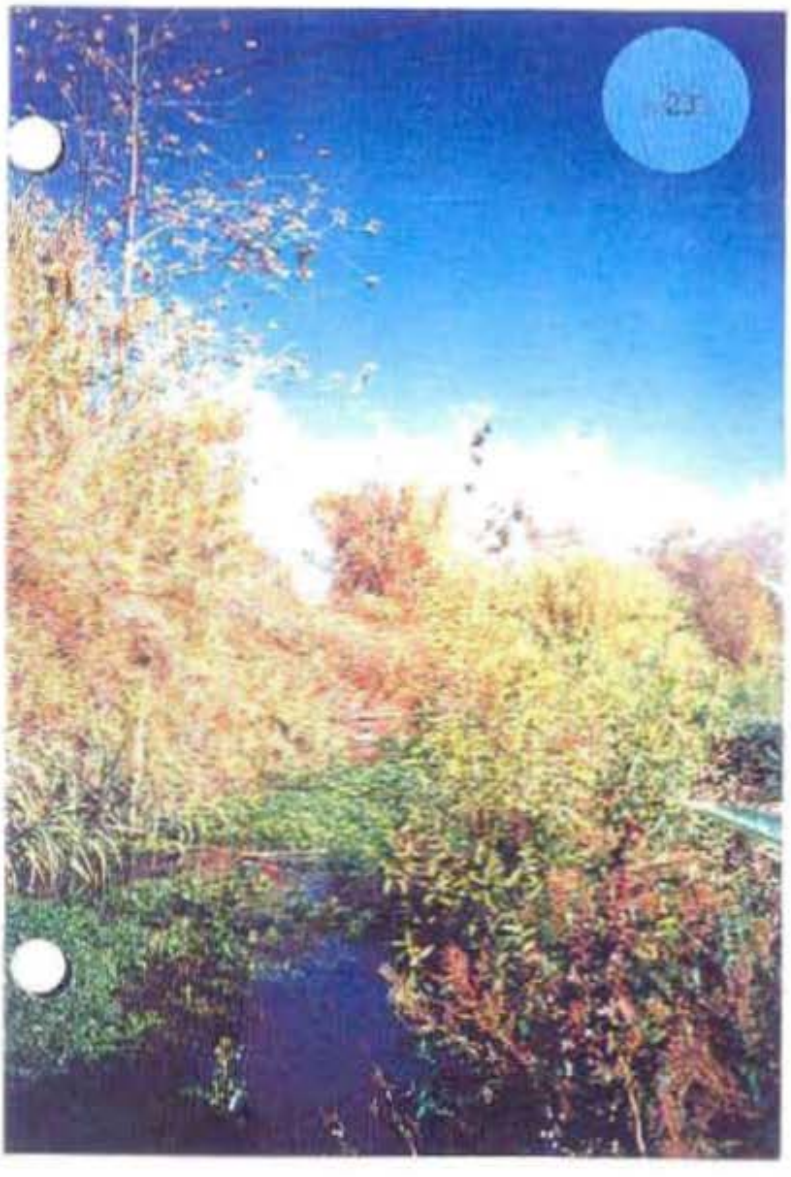
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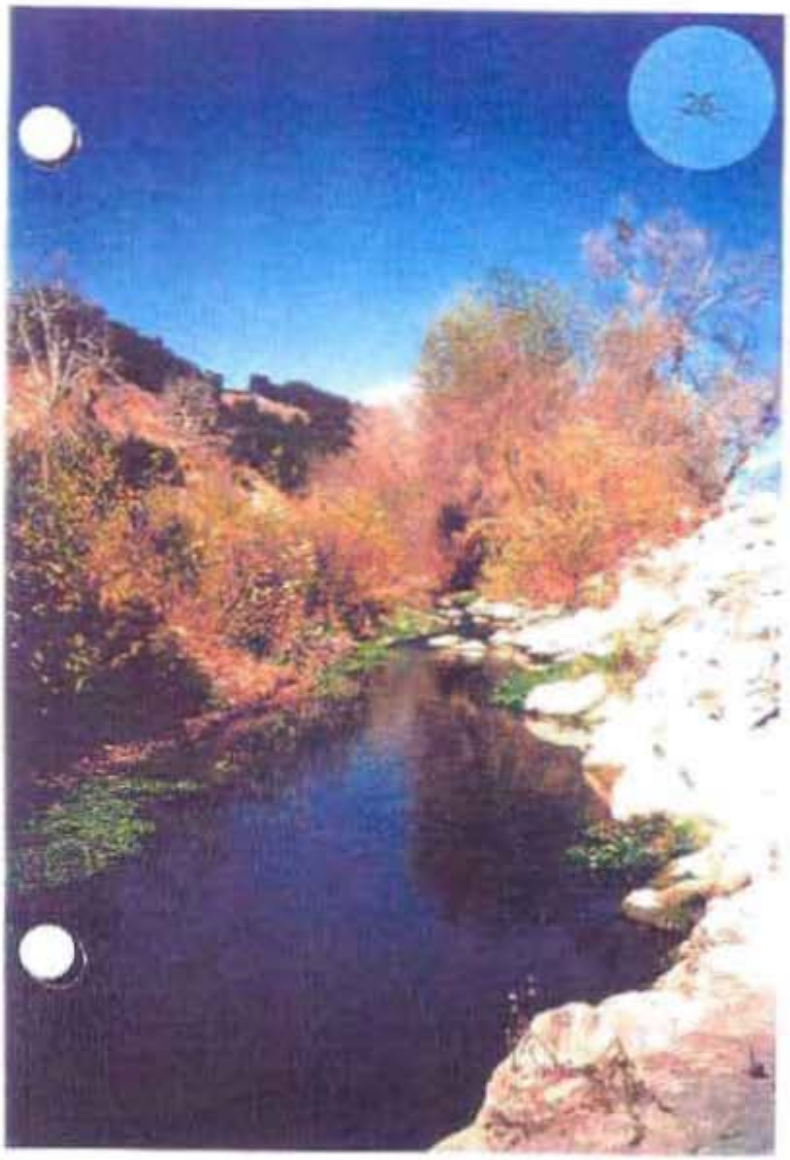
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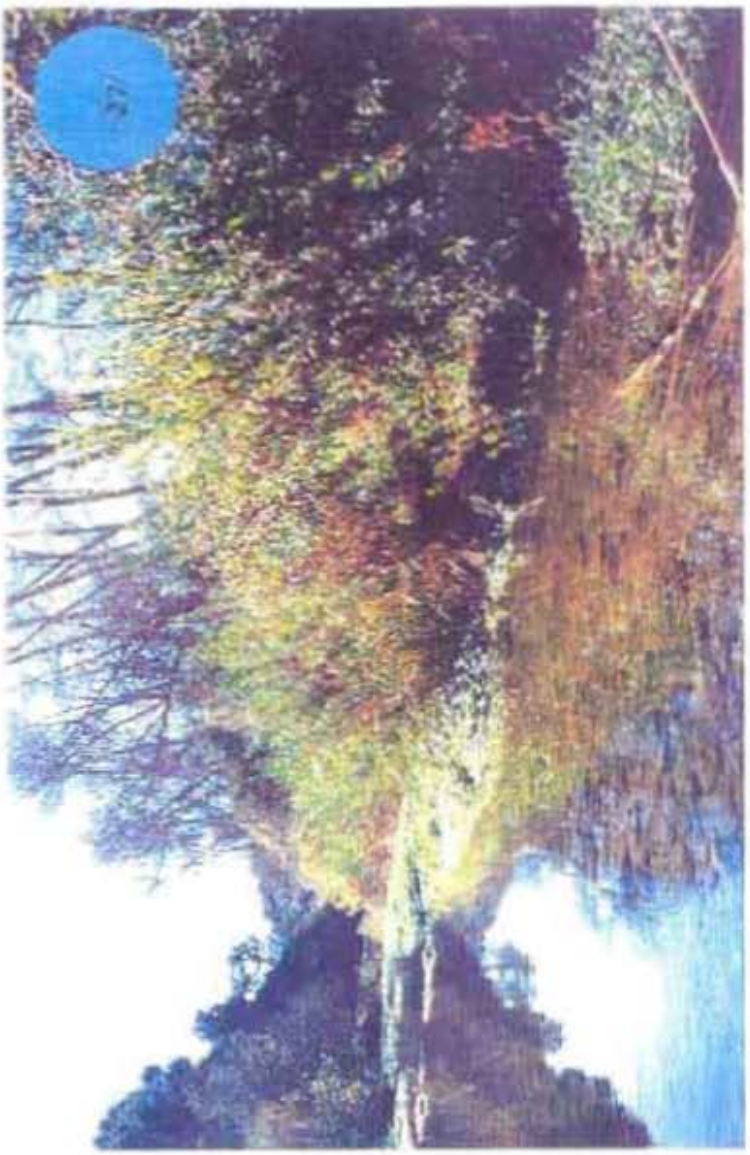
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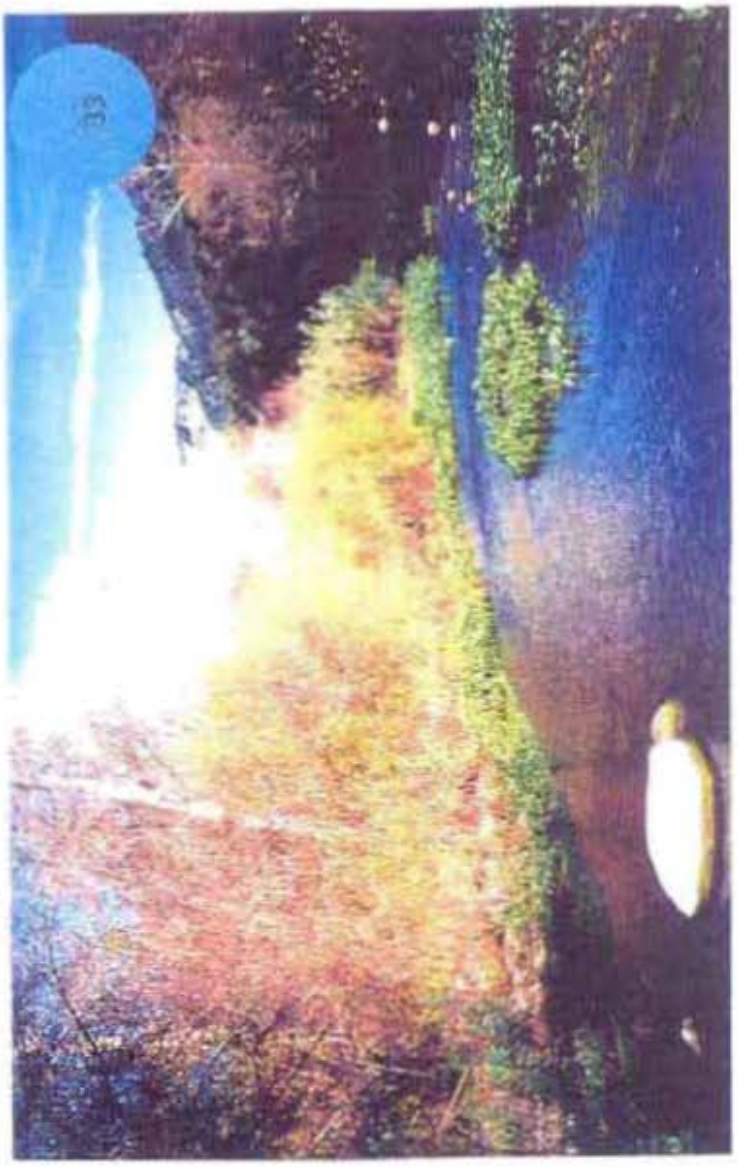
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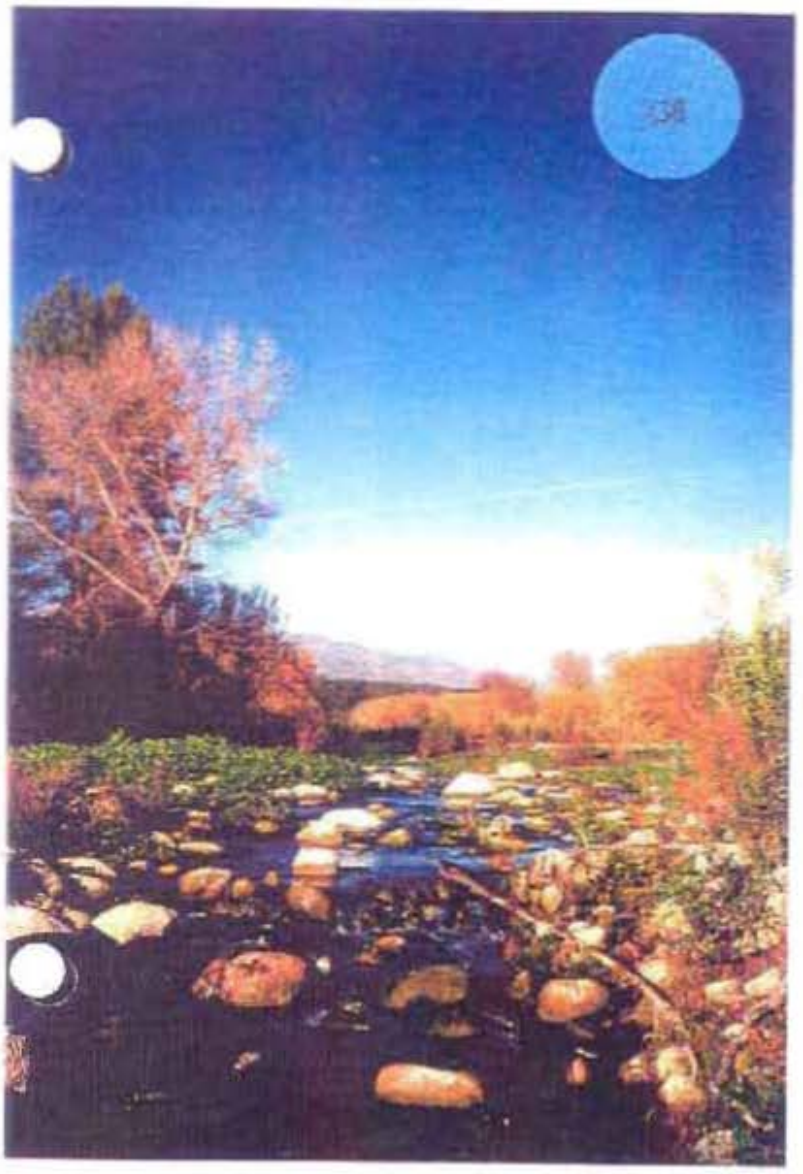
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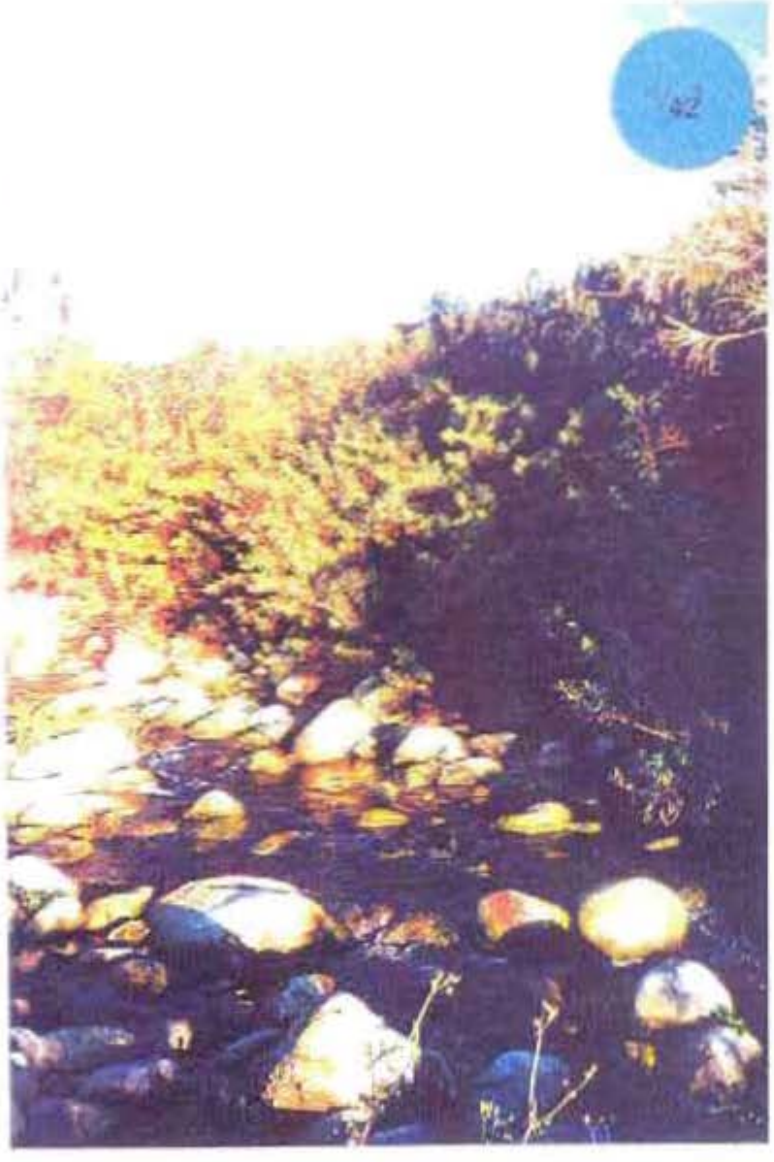
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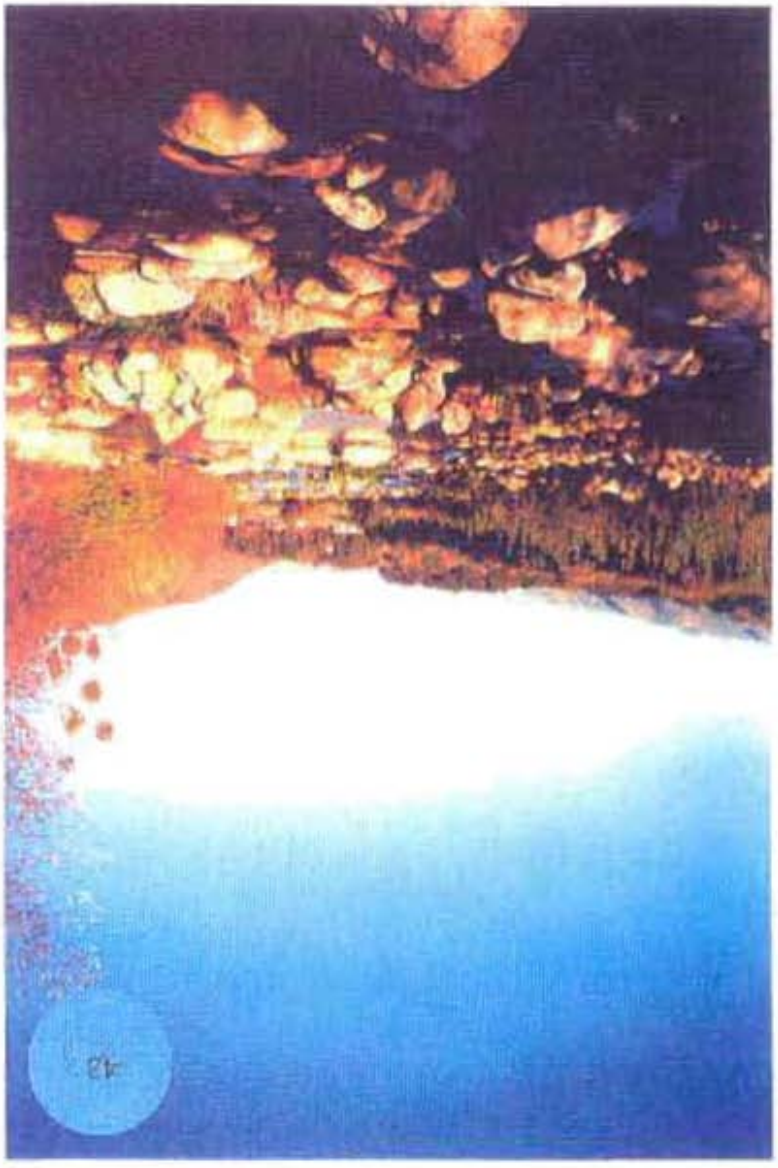
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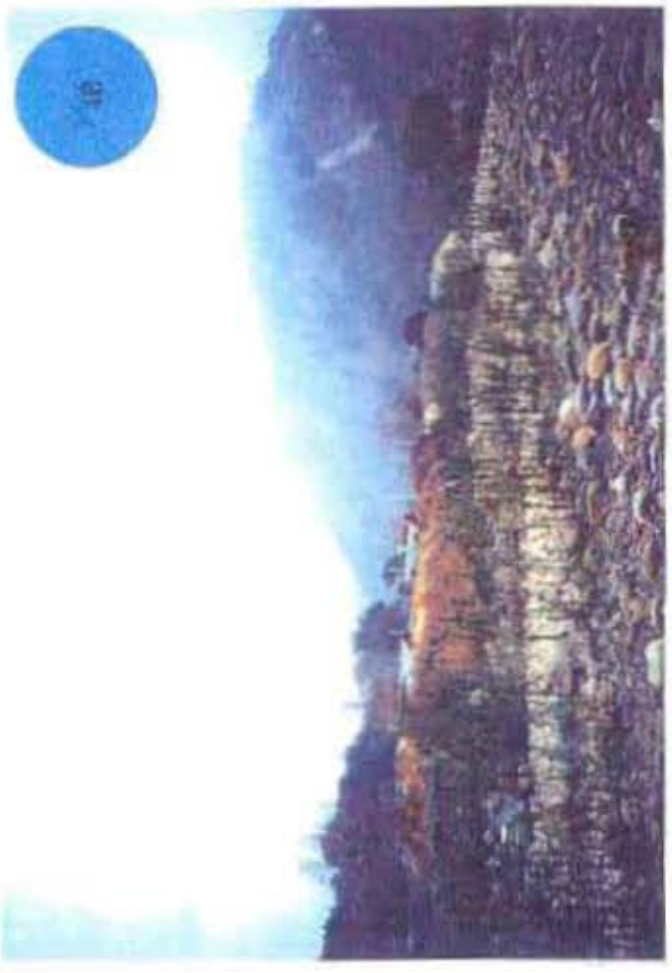


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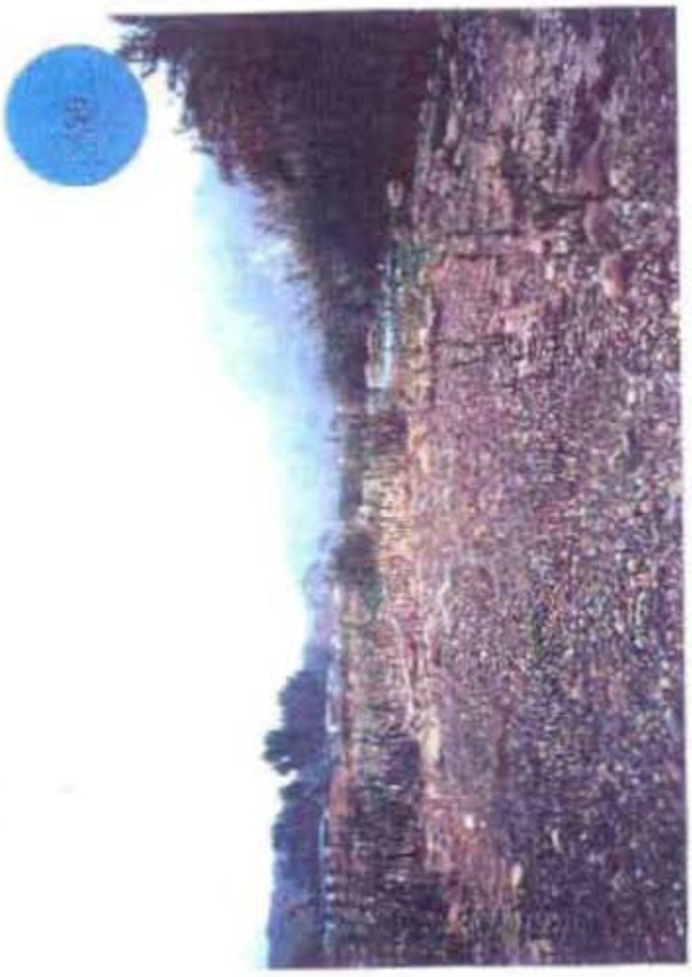
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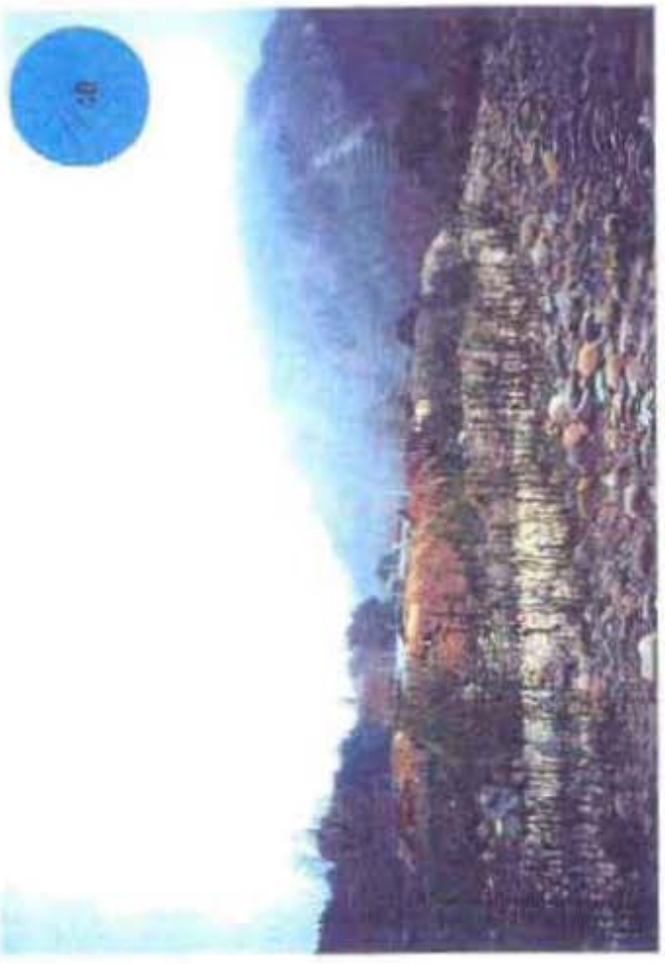

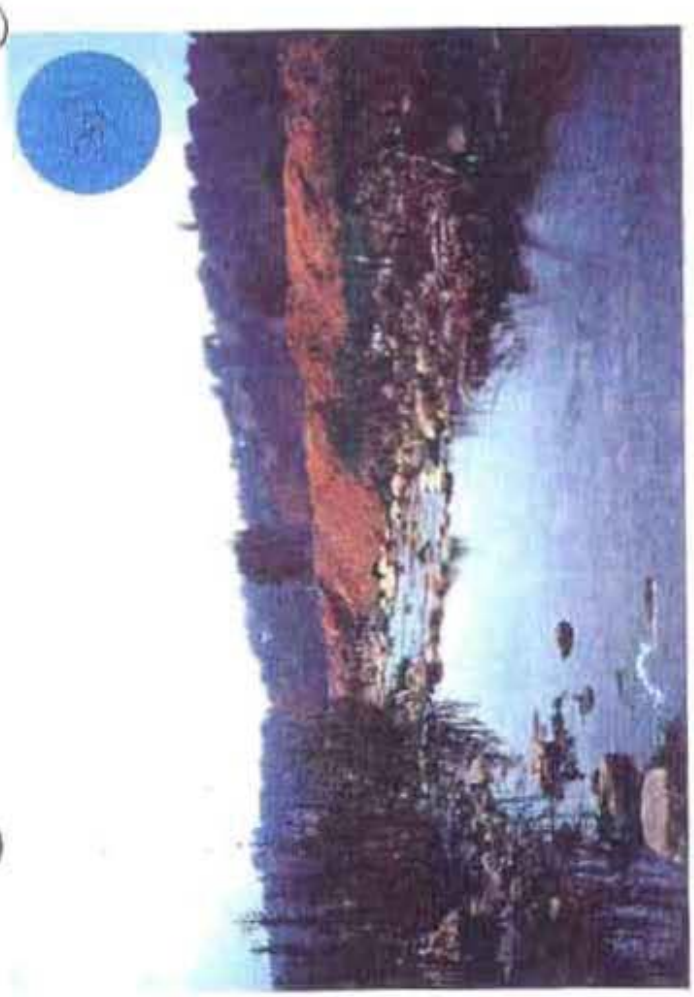

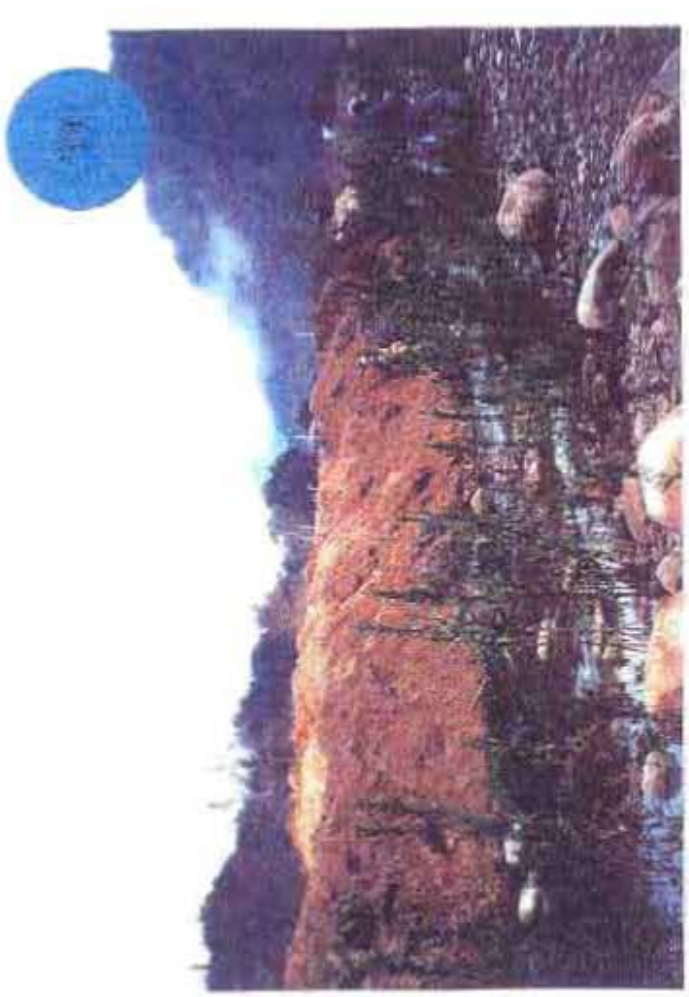

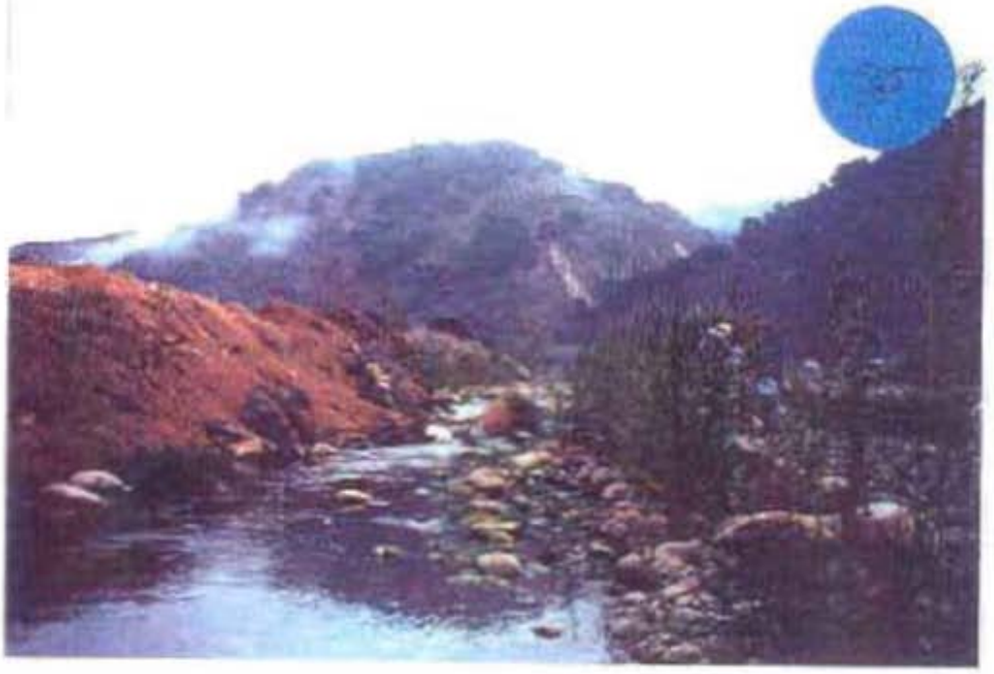

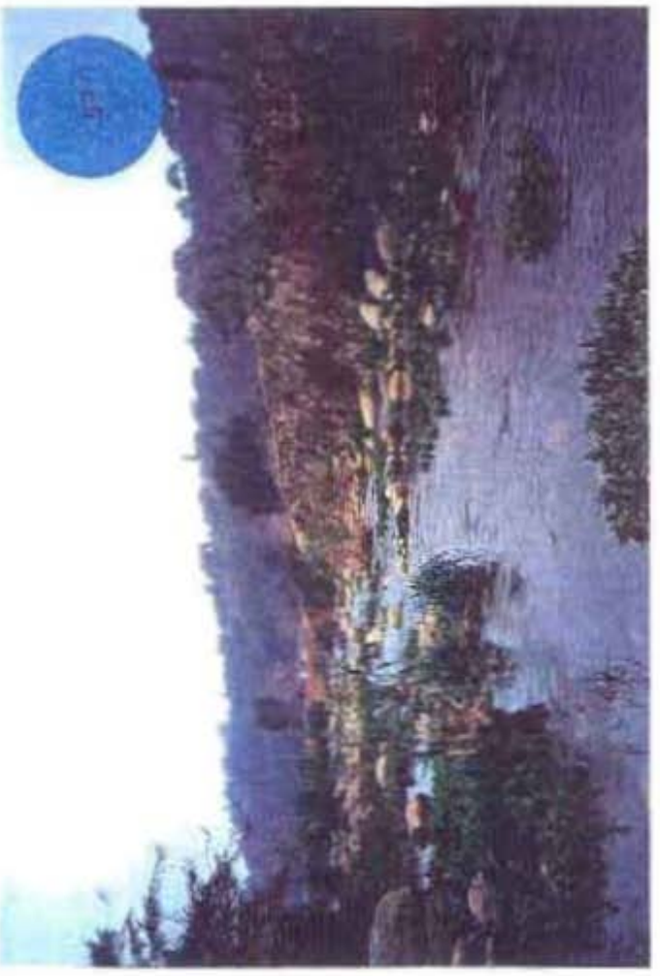


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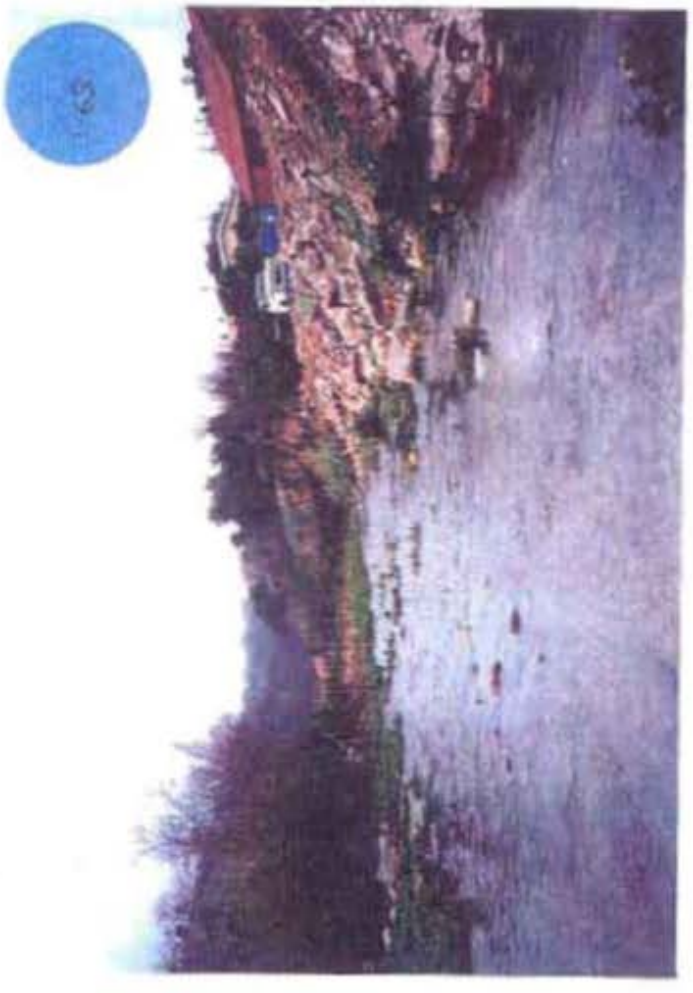
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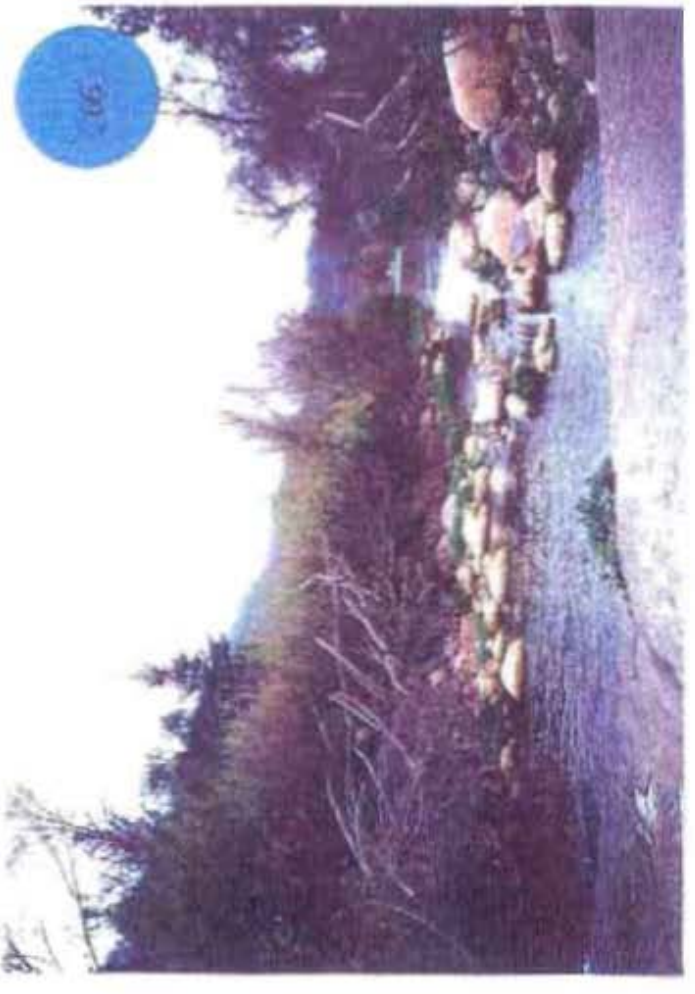
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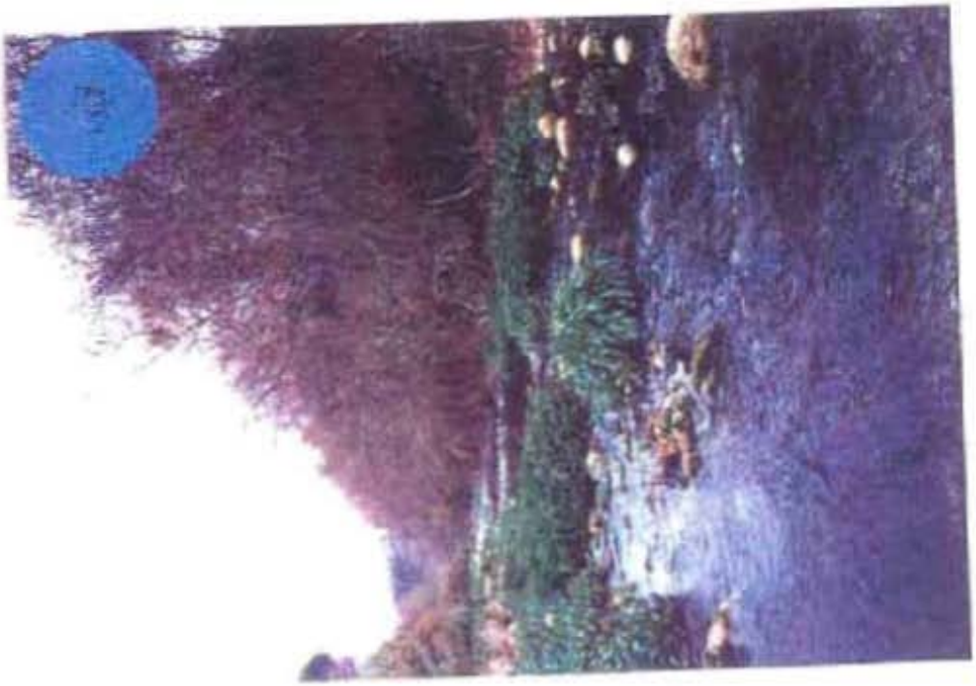

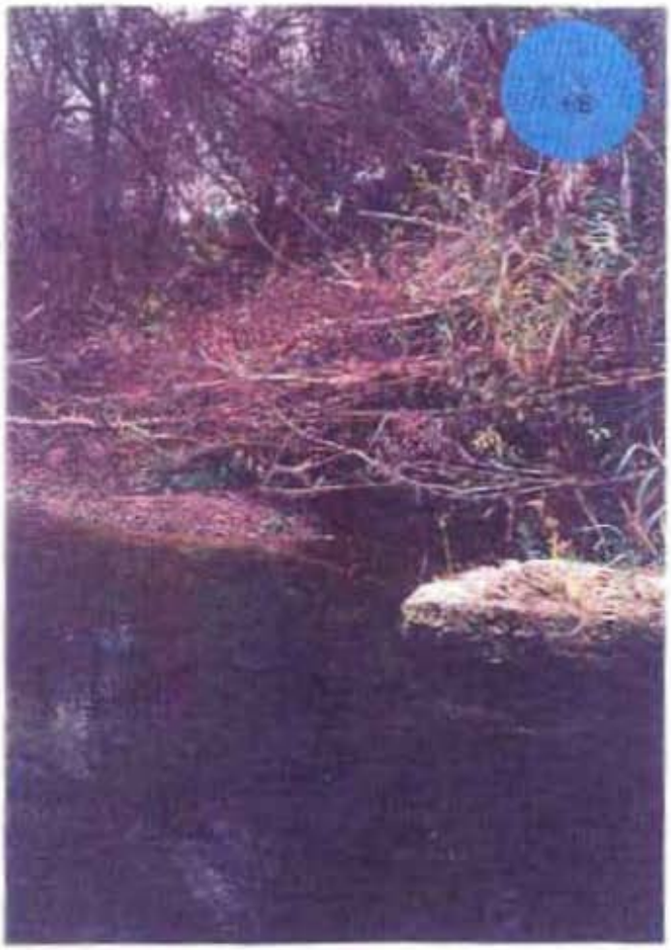


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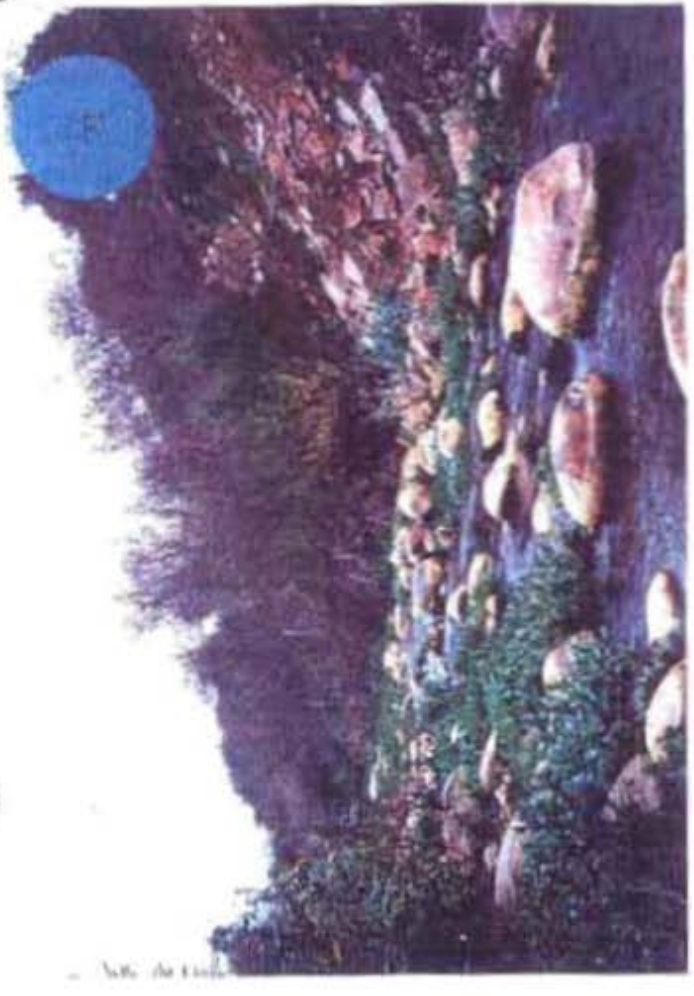
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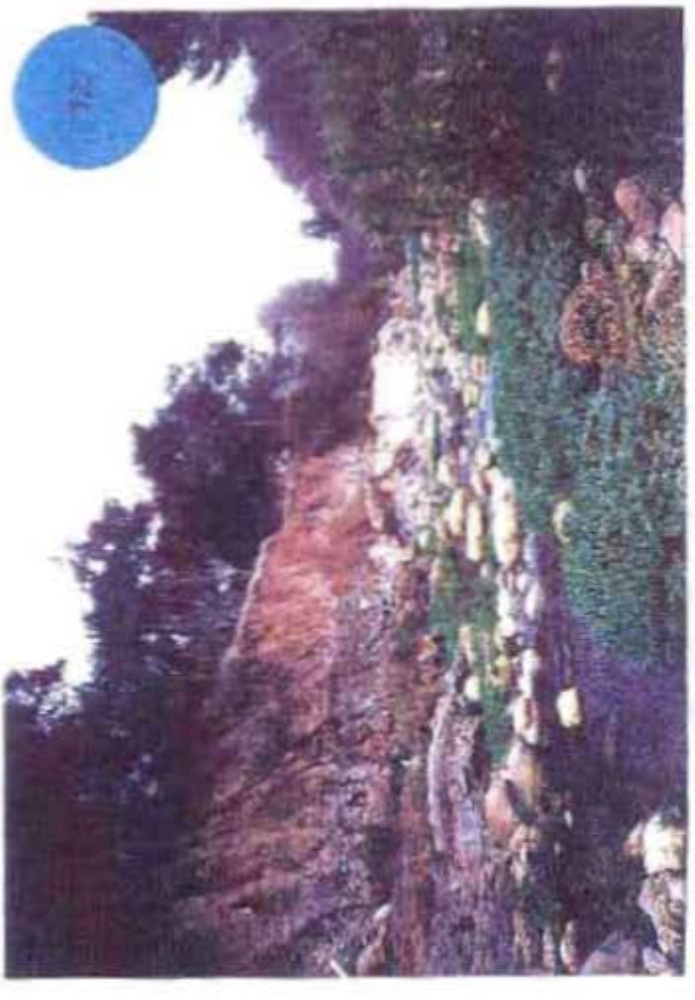


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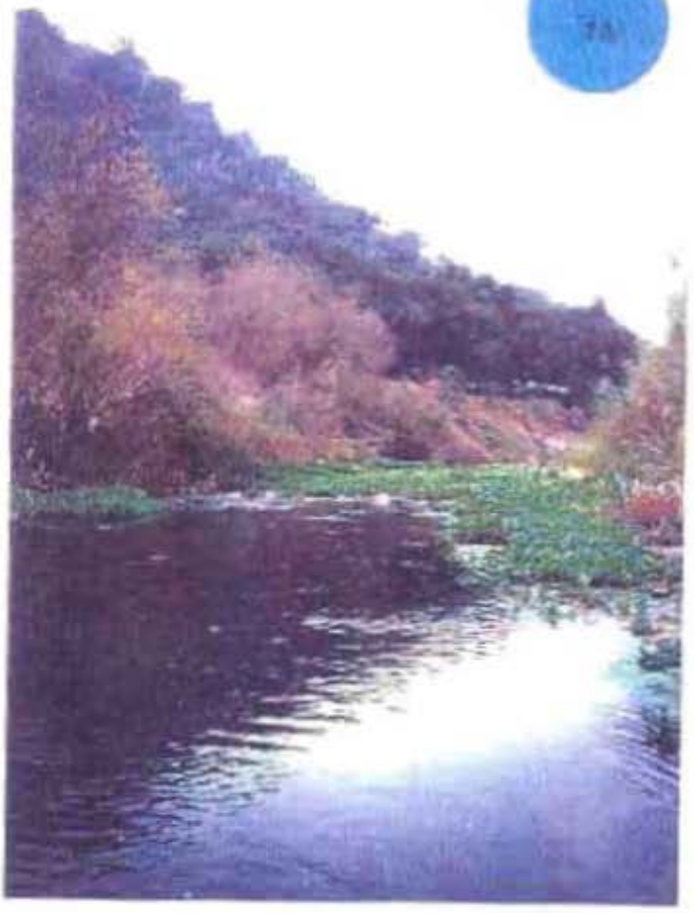
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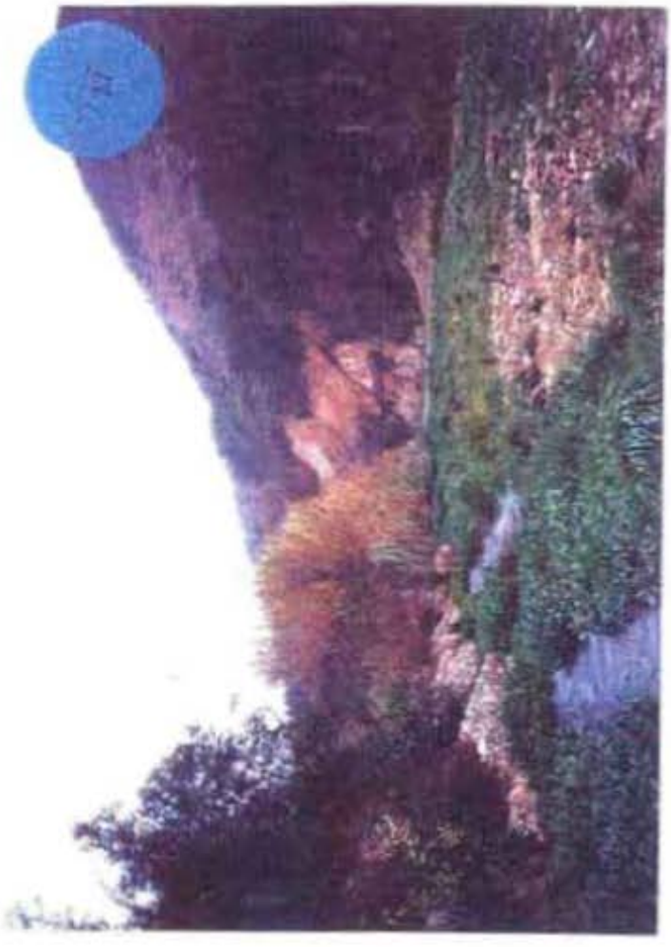
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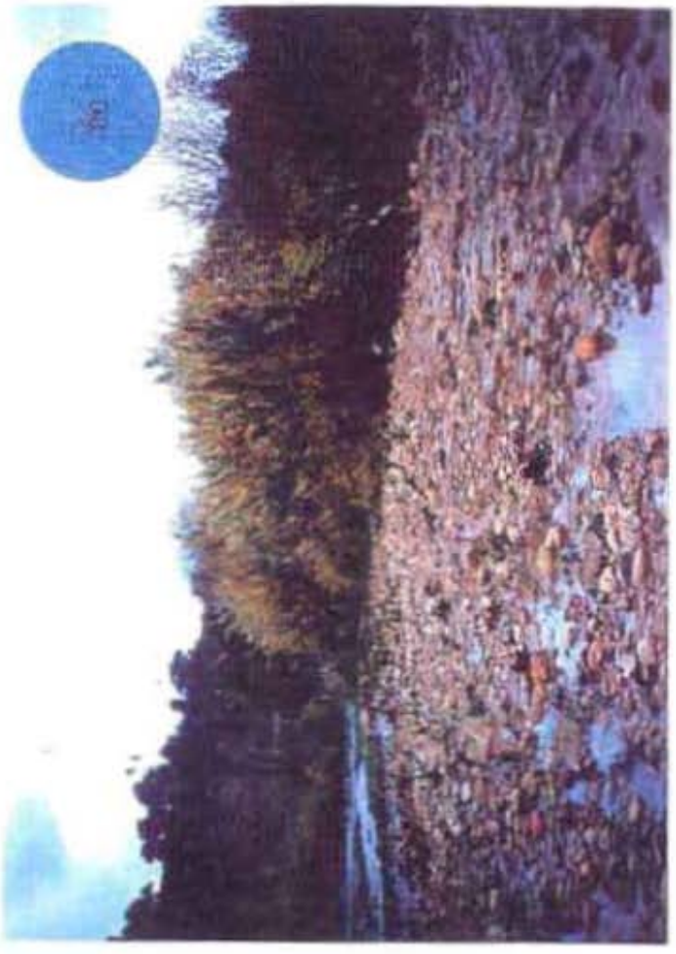
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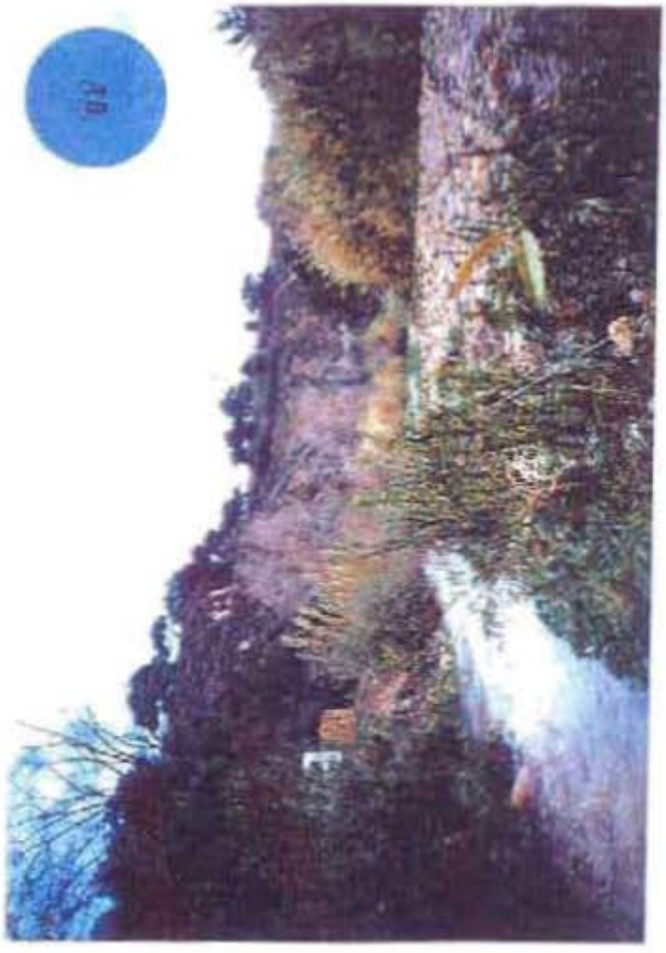
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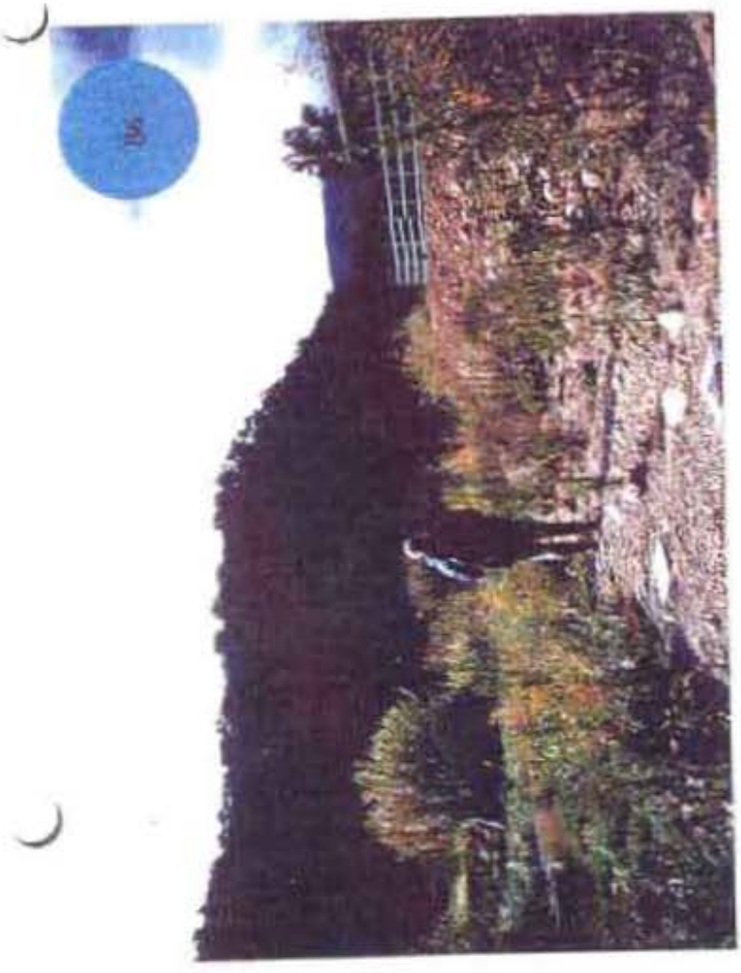
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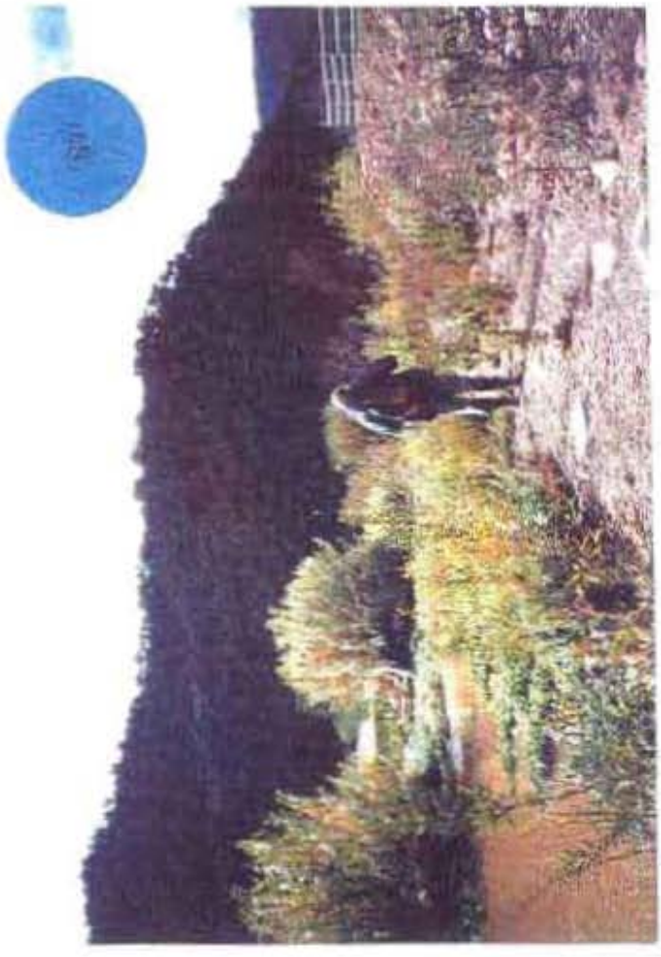
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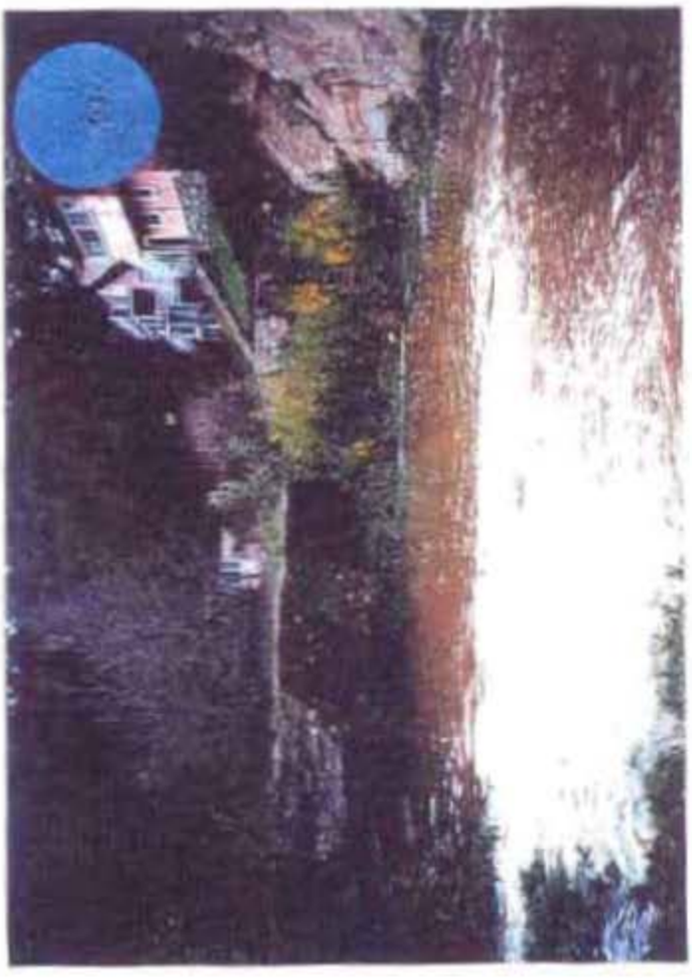

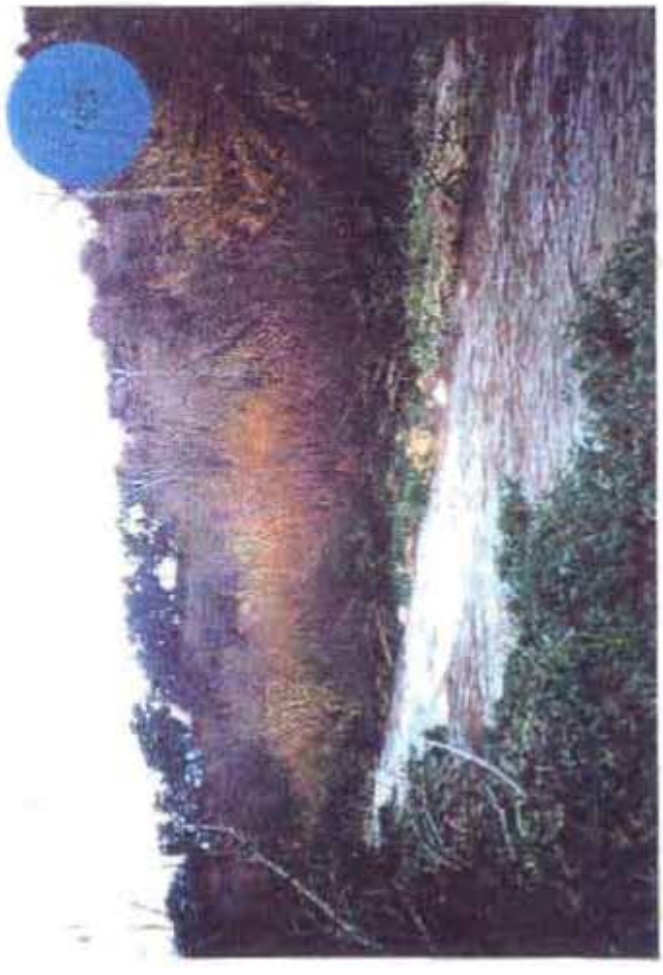


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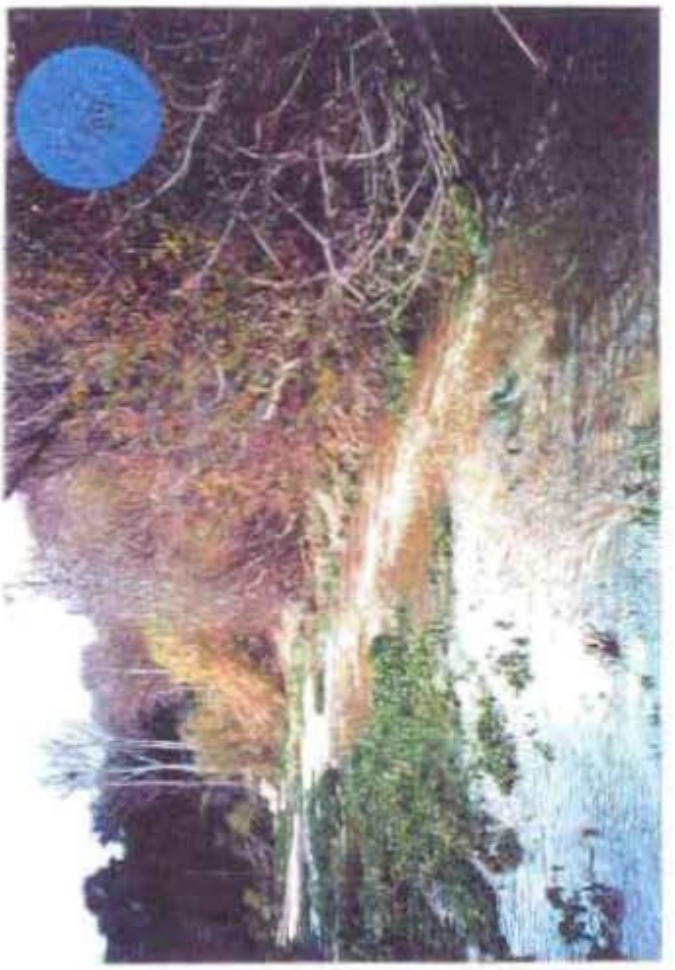
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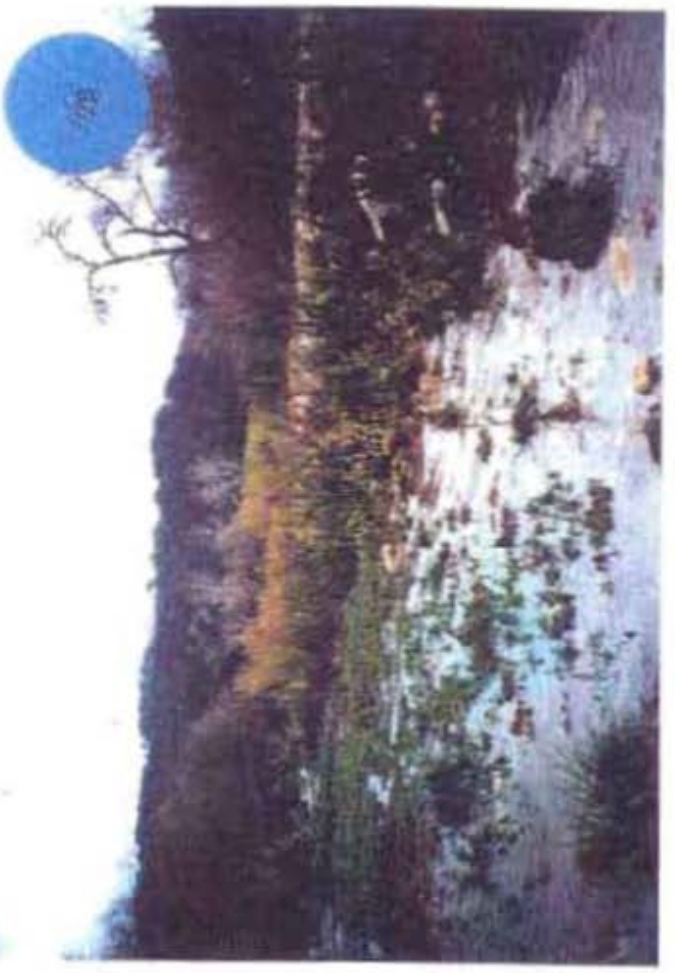
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