

Chapter 2. ALTERNATIVES

2.1 Introduction

This chapter describes the two alternatives analyzed in this EA: the No action Alternative and the Proposed Action Alternative. Other alternatives considered are also documented.

2.2 Description of the Alternatives

2.2.1 No Action Alternative

Without the proposed action, the Rio Grande in this reach will maintain high water velocities, continue channelization, and maintain poor habitat diversity for the silvery minnow.

Without the placement of LWD in the Rio Grande, high water velocity will persist and prevent sediment deposition and, thus, perpetuate poor quality habitat for the flycatcher and silvery minnow.

2.2.2 Proposed Action Alternative

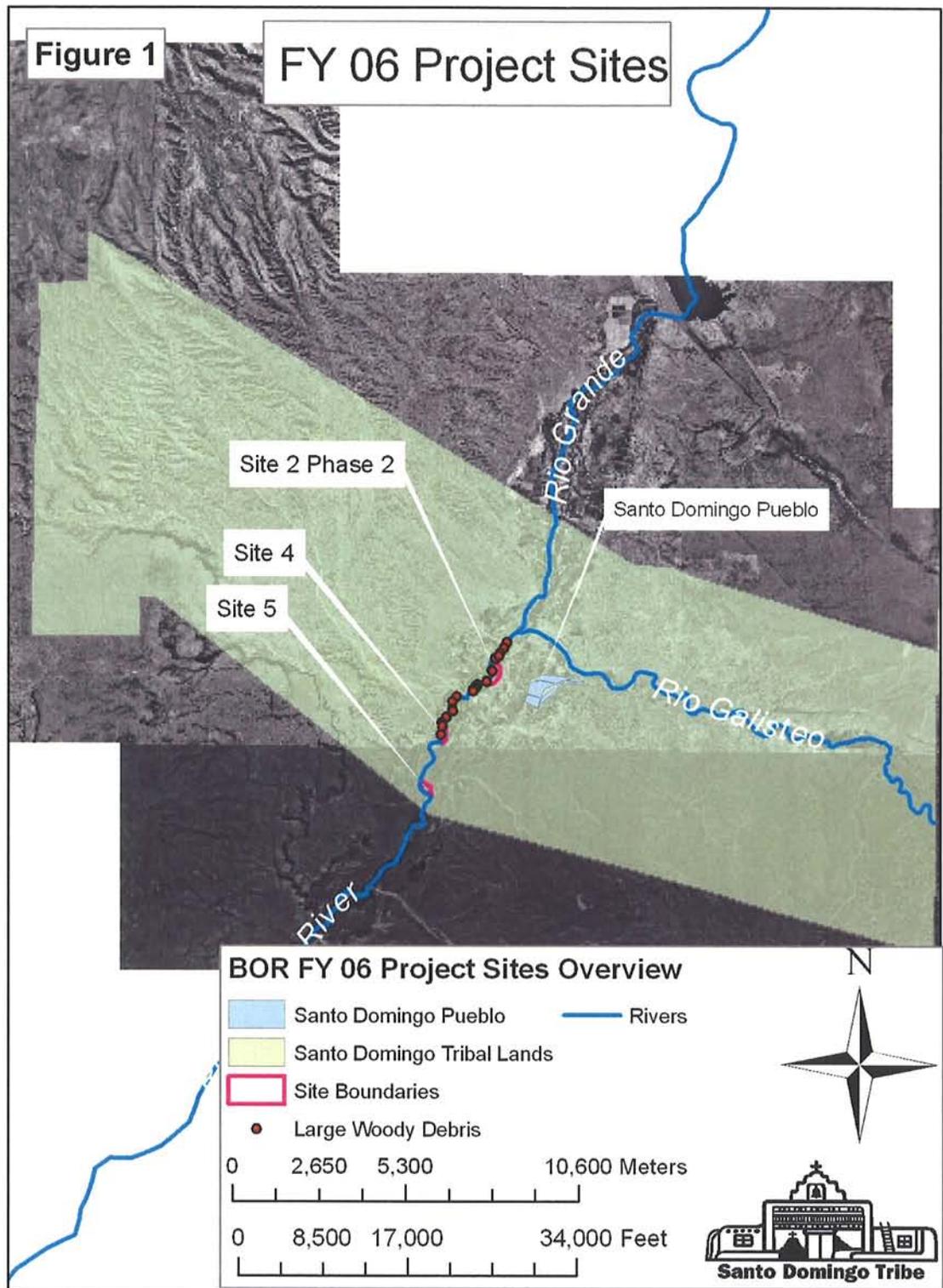
The proposed action is aimed at enhancing riverine features to accommodate the silvery minnow needs (Figure 1). Site two-Phase II is the subsequent phase of a previously constructed habitat restoration project. Phase II is the upstream portion of an abandoned oxbow that was excavated by the NRB in the fall and winter of 2006. This project is designed to be a low-flow velocity side channel, with constructed embayments. Sites four and five are located on the east side of the Rio Grande and are now abandoned fish habitat projects constructed by Reclamation in the early 1990s. The LWD project is intended to enhance fisheries habitat in this reach by placing wood material that is absent in this reach.

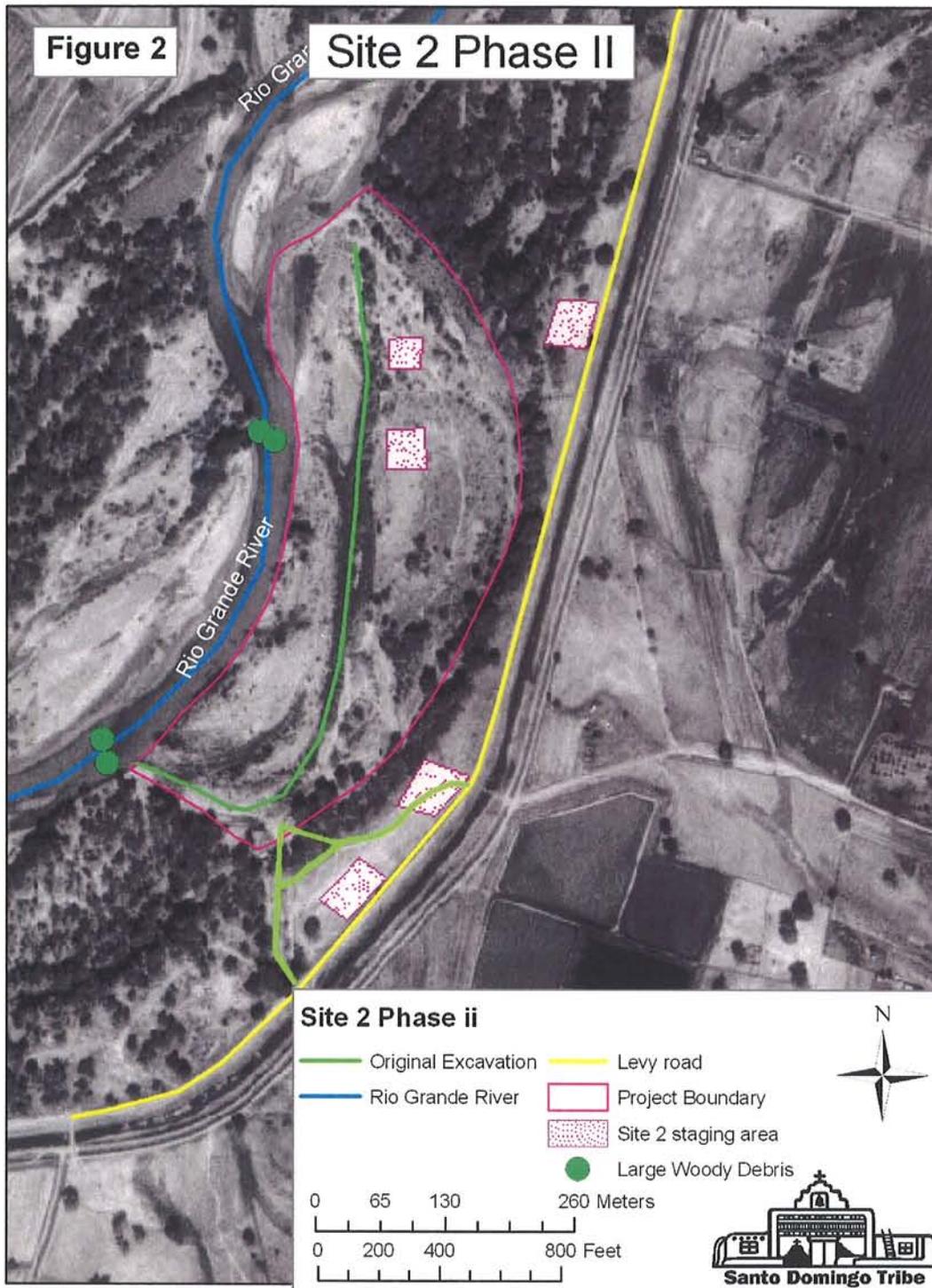
Site Two-Phase II

Site Two-Phase II is located on the east side of the Rio Grande, approximately 1.5 miles south of SP88 and Bridge No. M102. The NRB is proposing to extend the backwater into a low velocity flow-through habitat for silvery minnow. Currently, the site consists of an oxbow that is inundated only at high flows (>2,500 cfs). The oxbow is approximately 1.1 miles in length. The dominant vegetation in the project area is Russian olive, tamarisk, and coyote willow. The soils range from a sandy loam to a gravel/cobble composition. Groundwater at the project location is less than three feet below surface.

The flow-through channel will be constructed by excavating the anterior end (or mouth) of the oxbow 0.75 miles, which would connect the backwater with the Rio Grande (Figure 2). The channel will be between 10 and 20 feet wide and will be excavated to







various widths to increase habitat heterogeneity. The mouth of the channel will remain unexcavated or dammed with sandbags and a silt fence until completion. While digging the channel, embayments or scallops will be excavated and tiered into the banks to create nursery habitat. Woody debris will be placed in the newly constructed side channel to enhance habitat variability and invertebrate establishment.

A dense thicket of coyote willow is located within the project area, some of which occurs in the oxbow. During excavation, willow will be removed and replanted adjacent to the channel. In addition to the relocation of willow, a 75-foot buffer zone of non-natives trees will be cleared around the project area, which will aid in replanting efforts. The clearing will total approximately six acres. Cottonwood poles will be planted adjacent to the flow-through channel totaling nearly 3 acres at 20 poles per acre and will be planted to depths up to 8 feet with an auger.

Site Four

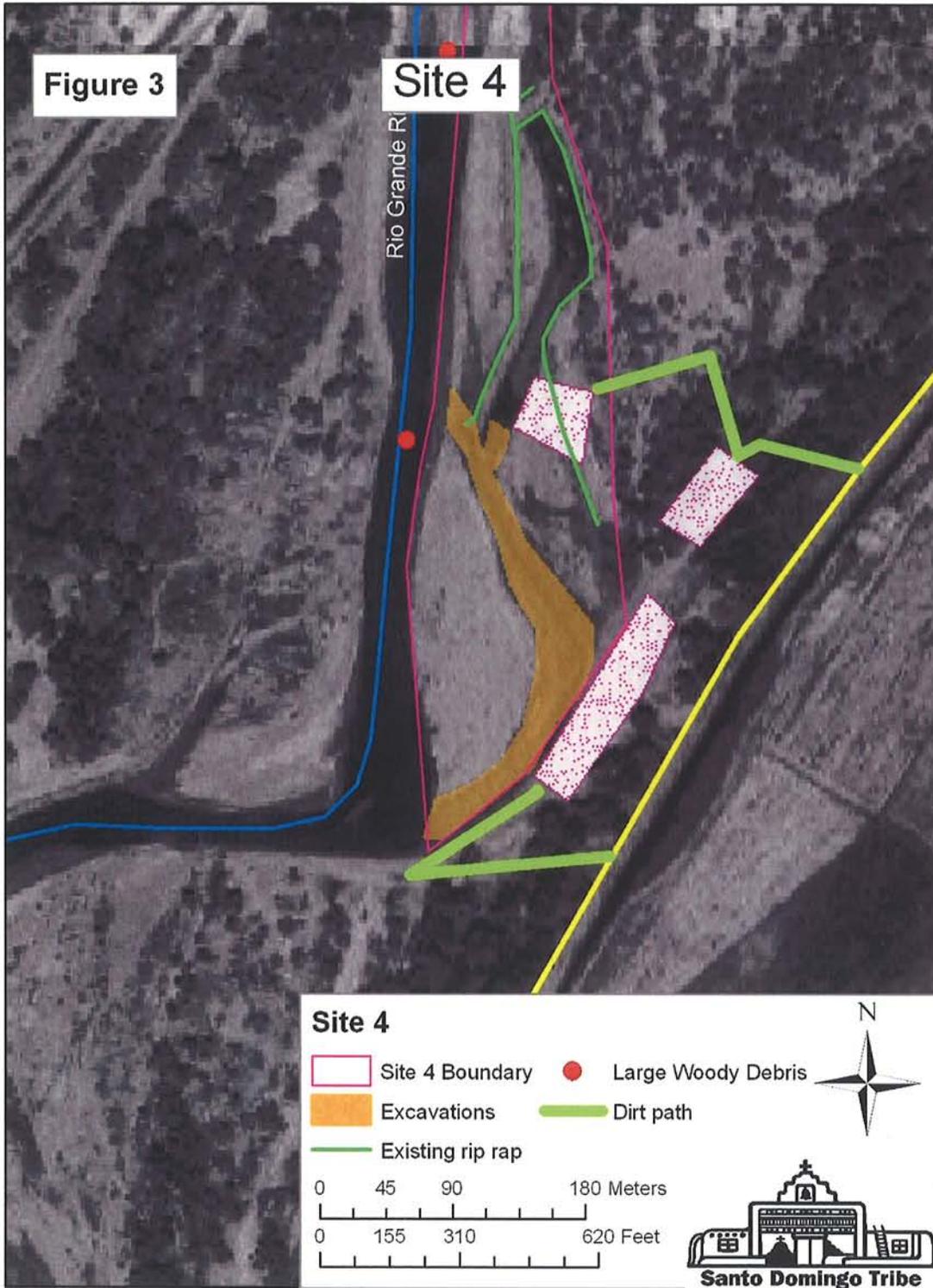
Approximately 15 years ago, Reclamation conducted a series of river maintenance activities aimed at controlling erosion in the river corridor at Santo Domingo. In addition to bank armoring, Reclamation constructed features to accommodate fish habitat. Since construction, the river's high water flows have eroded the riverbed, which has isolated the backwater from the main channel. This backwater presently contains water year-round mostly due to groundwater seepage.

The mouth of the backwater is elevated in such a manner that it is not connected to an existing side channel. The side channel is inundated only at flows greater than 1500 cfs. The side channel has three to four pools at 0.5 m deep and borders a rip-rap armored bank (Figure 3). A large stand of coyote willow intermixed with exotic trees borders the side channel in the floodplain. Excavation of the backwater and the inlet of the side channel will allow water to readily flow from the backwater to the side channel. Additional excavation of the higher elevated portions of the side channel will provide the necessary gradient for a low velocity habitat.

It is anticipated that approximately 2.6 acres of land will need to be excavated. Excavation would take place in winter months and during low flow conditions.

Precautions will be taken during the construction of the project in the event that silvery minnow are located within the project area, including preventing heavy equipment from entering the water and installing silt fences when the mouth of the side channel is excavated. To prevent equipment from operating in the river all excavation activities will occur during low flow conditions.





Site Five

Site 5 is located 3.6 miles south of the SP88 and Bridge No. M102 on the east bank of the Rio Grande (Figure 4). The water velocity at this site is slow ($\approx 25\text{cm/s}$) and the depth is shallow (.75 m) relative to other sections of the Rio Grande. The substrate composition ranges from sand and cobble to a sandy sediment mixture. This site borders an outcrop of rip-rap and, in general, has beneficial nursery habitat characteristics. The area to be restored has two main components that are in need of restoration: a backwater and a side channel. The inlet of the habitat has a higher elevation than the terminus, thus isolating any water in the habitat from the actively flowing water.

The backwater will have approximately four inches of sediment removed from its inlet, which will allow water to flow into the habitat year round. Additionally, excavation will extend to the north in a tiered manner, which will provide a variety of habitats for the various life stages in the event of elevated flows. The habitat will be nearly 150 meters in length and 20 meters in width. In addition to the tiered habitats, the NRB proposes to connect an existing low flow embayment. The connection can be easily accomplished, which will provide two parallel nursery habitat features. Up to thirty partially buried jetty jacks will be removed in this project area by utilizing a gas powered chop saw.

A large sandbar of approximately 4.5 acres is located upstream of the riprap. Between the sand bar and a 20-acre parcel of bosque is an ephemeral side channel. The NRB intends to conduct bar modification activities in which the mouth and side channel will be excavated which will permit water to flow through the side channel and back to the Rio Grande. Approximately 3.1 acres are proposed to be excavated and 20 acres of adjacent bosque will be thinned of non-natives phreatophytes.

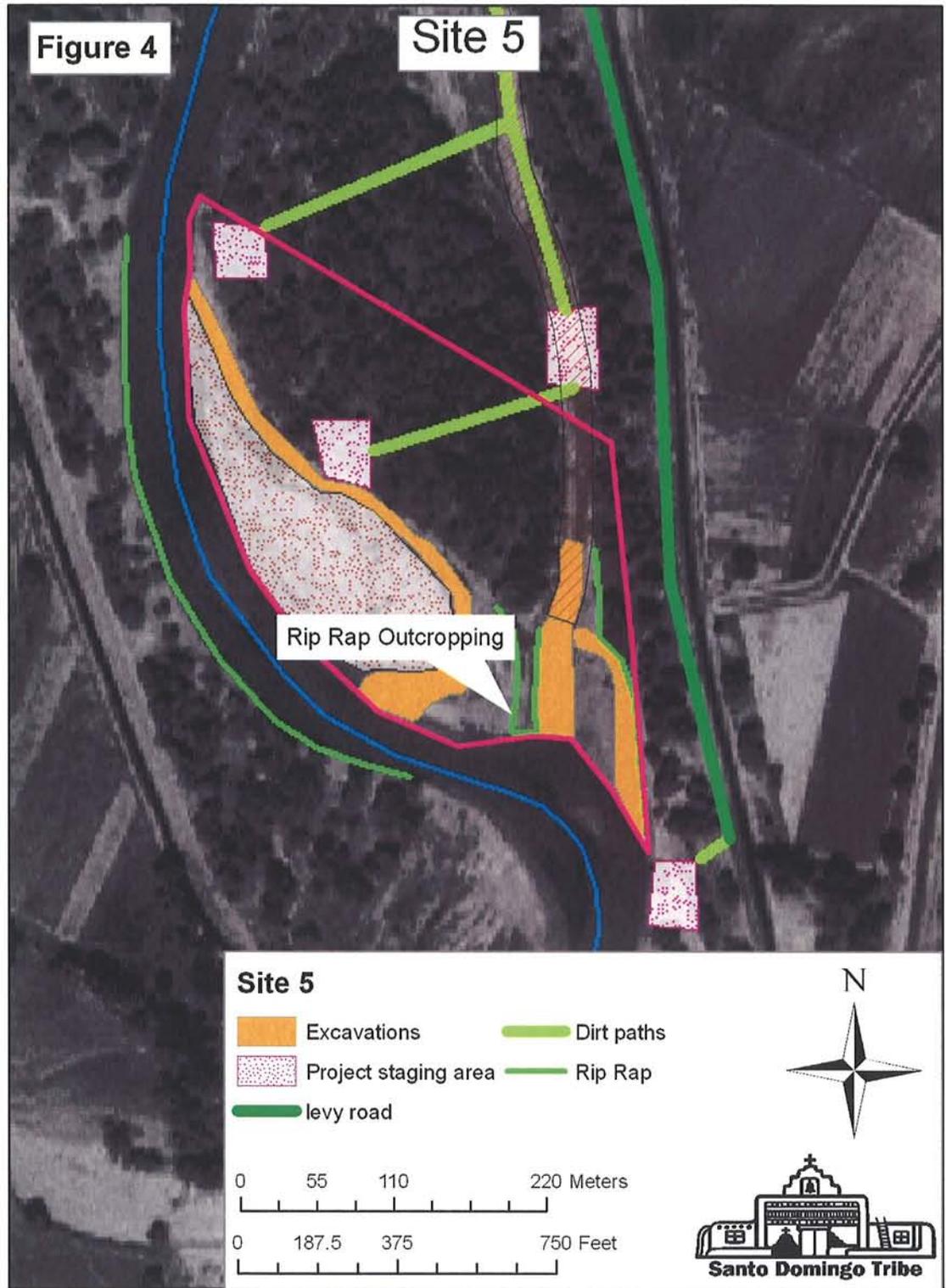
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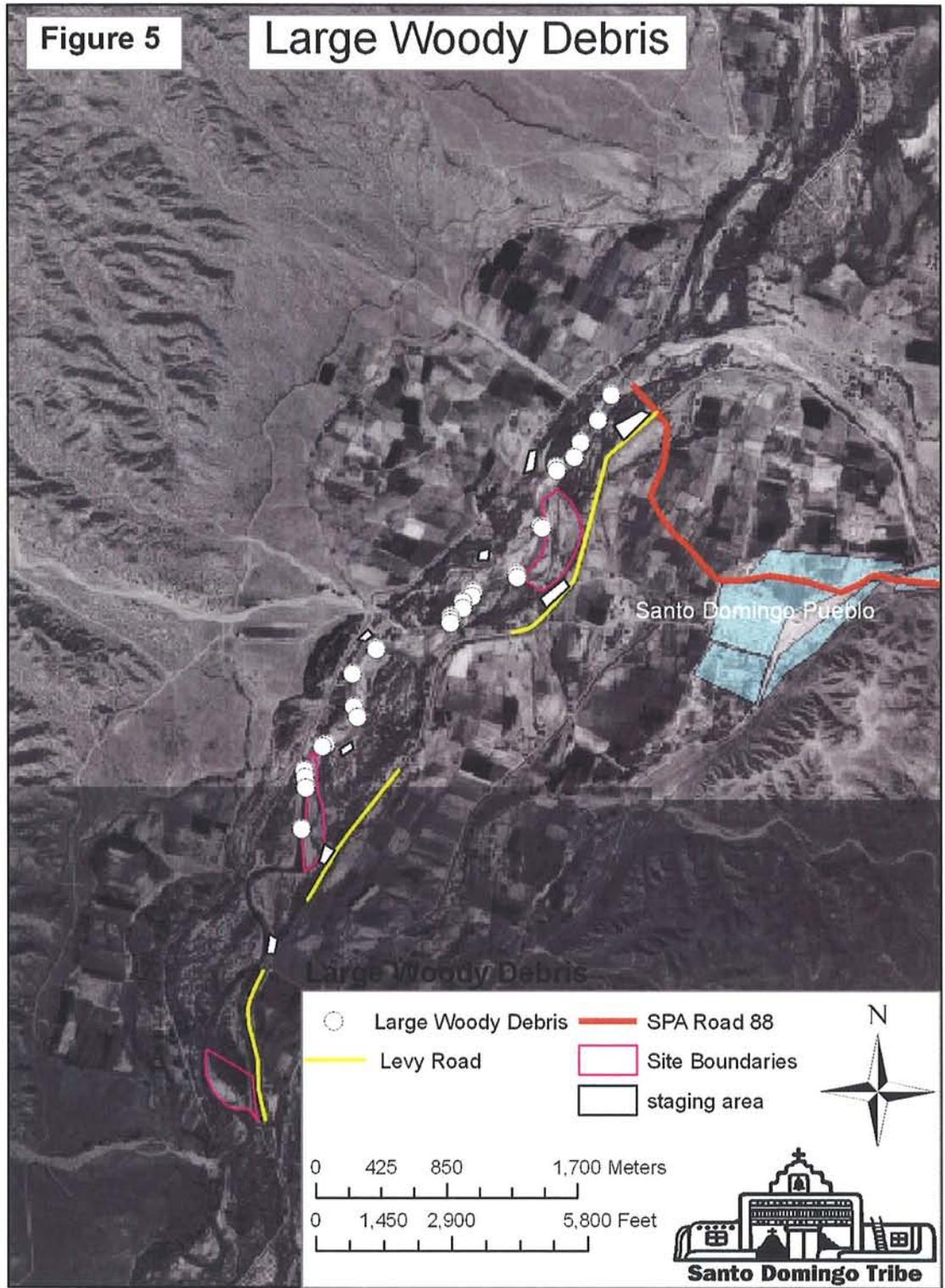
Large Woody Debris

In this reach of the river, extensive river alignment has occurred in which water velocities are high ($>90\text{cm/s}$), which hinders silt deposition. Though pulse flows from the Rio Galisteo have contributed a great deal of sediment, much of it is immediately transported downstream.

The NRB is proposing to utilize tree trunks and root balls from previous extraction projects for placement of LWD along the Rio Grande (Figure 5). Each tree trunk and root ball will be marked for tracking purposes. The desired outcome of this project is to improve habitat for invertebrate and vertebrate fauna, specifically the silvery minnow.







The LWD is intended to reduce water velocity and encourage sediment deposition. The root balls will not be secured to the shore or river bed, which is anticipated to allow natural redistribution in the river. The NRB will utilize a contractor to place the LWD via excavator with a hydrologic thumb. LWD placement with this method would preclude equipment from entering the river. The characterization (water velocity, substrate composition, etc.) of each site will be conducted before and after the project takes place. The initial and subsequent positions of each root ball placed in the river will be monitored using GPS to assess the movement of the root ball and any newly acquired habitat.

2.3 Alternatives Considered but Eliminated from Further Study

Alternative Project Areas: Less desirable, abandoned oxbows exist on Santo Domingo Tribal Lands; however, greater volumes of sediment would need to be removed to create the habitat conditions of the Proposed Action and therefore the study of these abandoned oxbows were not advanced.

Other sites were considered for restoration but were eliminated from further consideration for a number of reasons, including cost, accessibility and rank in priority. Dense stands of exotic vegetation and several rows of jetty-jacks surround several potential project sites, which would increase costs and time to complete a project.

Chapter 3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 Introduction

This section describes the environmental consequences of various resources, including geology and soils, hydrology, water resources and water balance, noxious weeds, threatened and endangered species and special status species, cultural resources, Indian trust assets, socioeconomic considerations, land use, and environmental justice. The description of the affected environment for these resources can be found in the document, Santo Domingo Tribe – Habitat Restoration for the Rio Grande Silvery Minnow and Salt Cedar Removal Project Environmental Assessment, March 2006, and is incorporated by reference in this document.

The affected environment is within the Cochiti Reach of the Middle Rio Grande. The Cochiti Reach extends from Cochiti Dam downstream to the Angostura Dam. This reach has been identified by Reclamation and the FWS, as well as the Collaborative Program, as an area where habitat/ecosystem restoration projects would be highly beneficial to all life stages of the silvery minnow.

