3.0 INDIVIDUAL WATERSHED DESCRIPTIONS

TMDLs will be developed for several assessment units for which constituent (or pollutant) concentrations measured during the 2001 water quality survey indicated impairment. Because characteristics of each watershed, such as geology, land use, and land ownership provide insight into probable sources of impairment, they are presented in this section for the individual watersheds within the Upper Rio Grande (Part 2) basin; except for the mainstem Rio Grande watershed which was previously describe in Section 2.1. In addition, the sampling stations established for the 2001 intensive water quality survey are presented in detail, and the 2004-2006 Integrated §303(d)/§305(b) listings within the Upper Rio Grande (Part 2) river/stream reaches are discussed.

3.1 Embudo Creek Watershed

The Embudo Creek watershed is approximately 317 mi^2 and includes Chamisal Creek, Rio Chiquito, Rio Pueblo, Rio Santa Barbara, and Trampas Creek tributaries. Embudo Creek originates at the confluence of the Rio Pueblo and Rio Santa Barbara within the boundaries of Picuris Pueblo. Embudo Creek then flows approximately 12.5 miles before it flows into the Rio Grande just upstream of Embudo, NM. The Rio Santa Barbara originates in the Sangre de Cristo mountains with the confluence of the east, west, and middle forks of the Rio Santa Barbara. The Rio Santa Barbara then flows approximately 12 miles before converging with the Rio Pueblo forming Embudo Creek. As presented in Figure 3.1, land ownership for the Embudo Creek watershed is 74% U.S. Forest Service (USFS), 9% private, 8% Native Lands (Picuris Pueblo), 7% Bureau of Land Management (BLM), and 2% State. Land use includes 89% forest, 4% agriculture, 3% barren tundra, 2% rangeland, 1% built-up land, less than 1% water, and less than 1% wetlands (Figure 3.2).

The geology of the Embudo Creek watershed consists of a complex distribution of Precambrian metamorphic rocks and Tertiary volcanics. The Embudo Creek watershed lies within the central Española Basin which consists of preserved Tertiary sedimentary rocks and several Pliocene and Pleistocene alluvial deposits (New Mexico Geologic Society, 1979). The eastern most boundary of the Española Basin is delineated by the Sangre de Cristo Mountains.

Eleven sampling stations were established in the Embudo Creek watershed during the 2001 survey (Table 2.1, Figure 3.1). Surface water grab samples from all of the above stations were analyzed for a variety of chemical/physical parameters. The chemical data were collected, assessed, and summarized in a water quality survey report (NMED/SWQB 2004b). Data results from grab sampling will be uploaded to USEPA's STORET database. Therefore, TMDLs were developed for the following assessment unit in the Embudo Creek watershed:

- ***Stream Bottom Deposits***: Embudo Creek (Rio Grande to Canada de Ojo Sarco)
- ***Turbidity***: Embudo Creek (Rio Grande to Canada de Ojo Sarco) and Rio Santa Barbara (Picuris Pueblo bnd to USFS bnd)

Photo 3.1 Embudo Creek at Highway 68 near Dixon

Photo 3.2 Rio Santa Barbara at Mouth

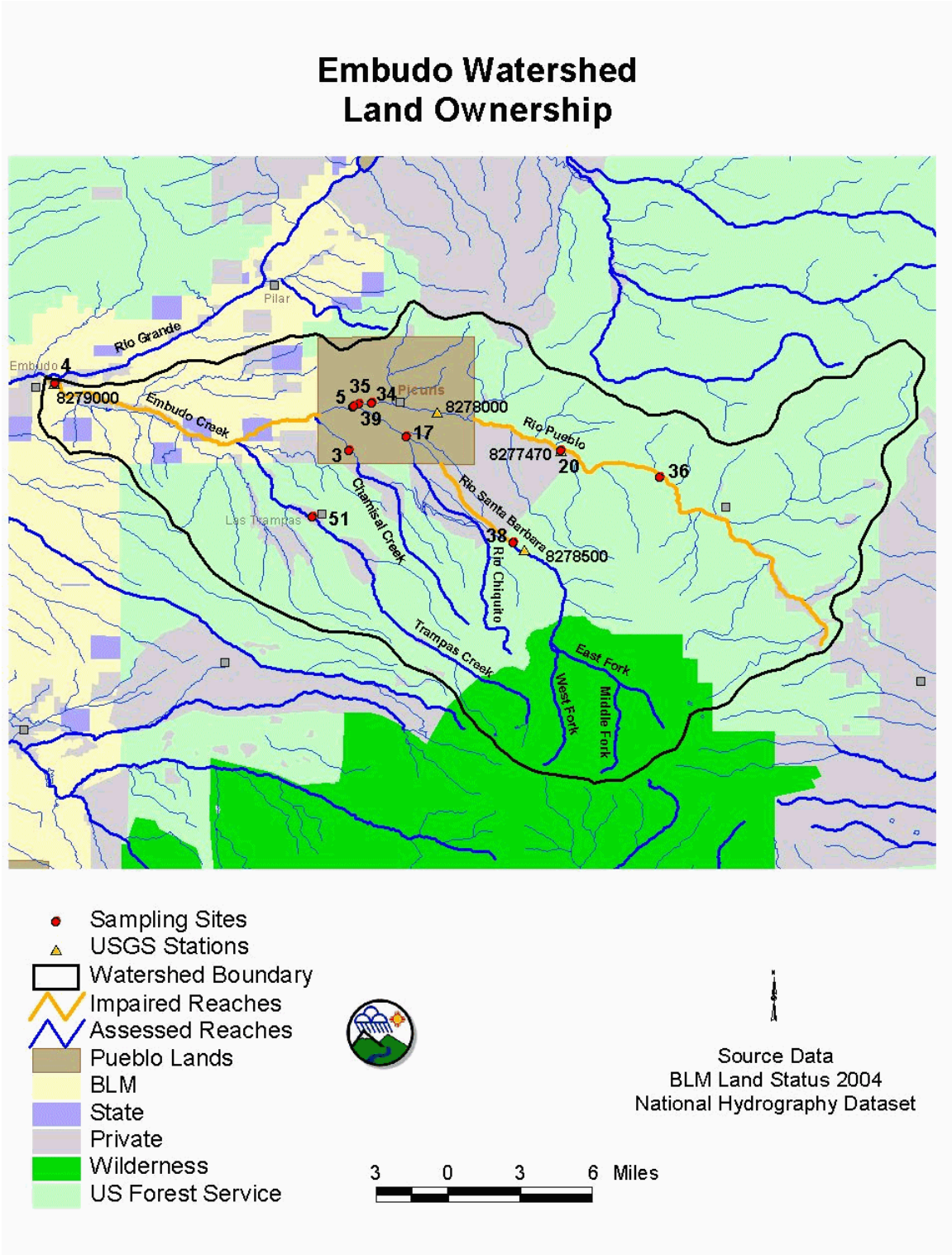

Figure 3.1 Embudo Creek Watershed Land Ownership and Sampling Stations

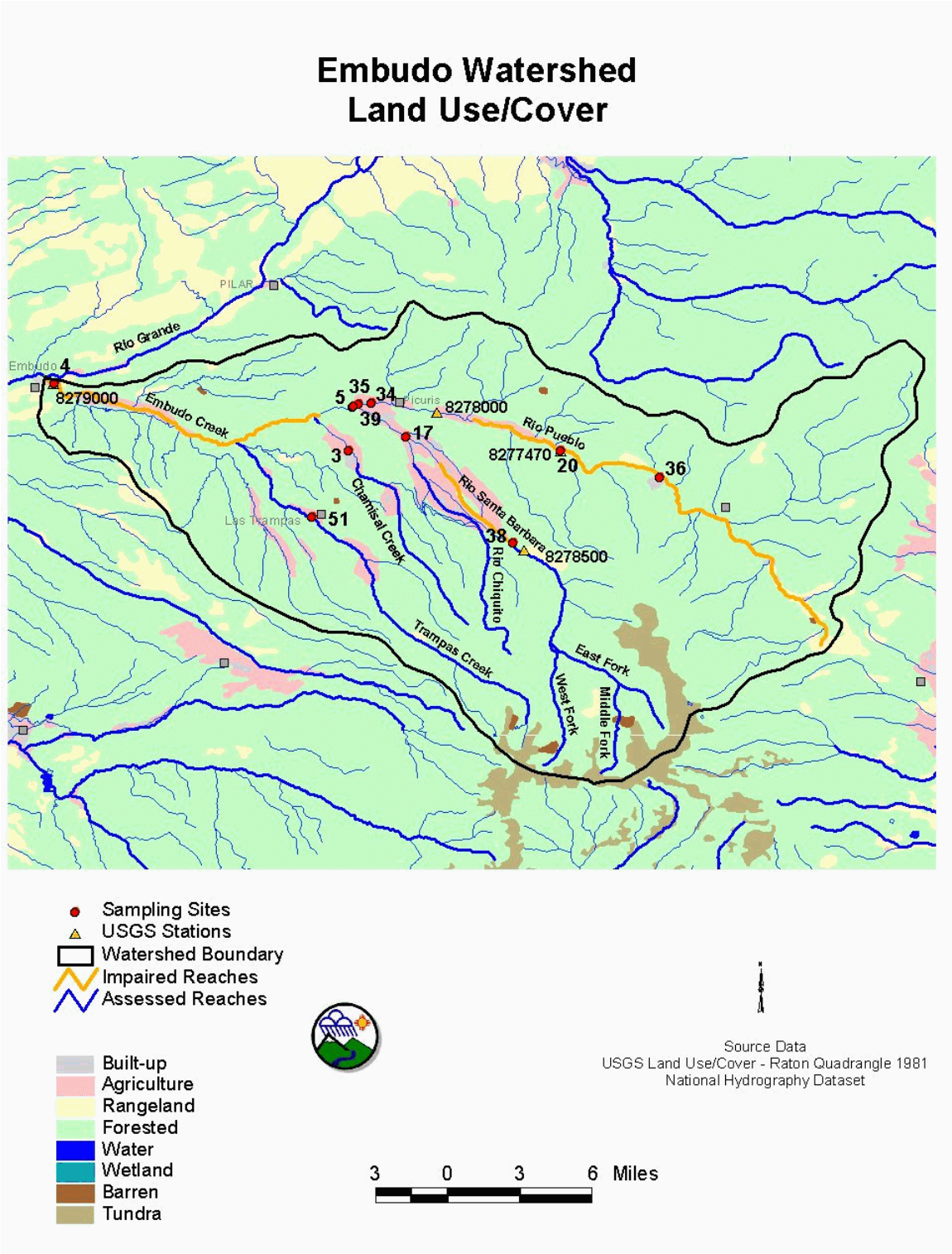

Figure 3.2 Embudo Creek Watershed Land Use and Sampling Stations

3.2 Rio Tesuque Watershed

The Rio Tesuque watershed is roughly 78.4 mi^2 and includes the Rio Tesuque, Tesuque Creek, the North and South Tesuque Forks, and Little Tesuque Creek. Tesuque Creek originates in the Sangre de Cristo Mountains and flows approximately 6 miles to its confluence with the Rio Tesuque. The Rio Tesuque then flows approximately 14 miles to its confluence with the Pojoaque River. Little Tesuque Creek also originates in the Sangre de Cristo Mountains and flows approximately 8.3 miles to the confluence with Tesuque Creek and Rio Tesuque. As shown in Figure 3.3, land ownership is 29% private, 40% Native lands (Tesuque and Pojoaque Pueblos), and 31% USFS. Figure 3.4 presents the land use in this watershed, which is predominately forest (91%), rangeland (4%), built-up lands (3%), agriculture (less than1%), and barren tundra (less than 1%).

The geology of the Rio Tesuque watershed consists of a complex distribution of Precambrian metamorphic rocks and Tertiary volcanics (Table 2.2, Figure 2.2). The Borrego Fault runs the length of the Santa Fe Range and divides the geology of the Rio Tesuque watershed area into two parts (New Mexico Geological Society, 1995). The lower portion west of Hyde State Park consist mainly of Proterozoic supracrustal rocks, felsic geniss, and amphibolite, intruded by granite and granitic pegmatite. This portion of the Santa Fe Range contains the only known outcrops of Paleozoic rocks. Hyde State Park lies within the trace of the Borrego Fault and to the east of Hyde State Park, the geology transitions into metasupracrustal and plutonic rocks that form the batholithic assemblages of the central and northern Santa Fe Range. This portion of the Sangre de Cristo range is highly mineralized and heavily mined, as a result.

Six sampling stations were established in the Rio Tesuque watershed during the 2001 survey (Table 2.1, Figure 3.5). Surface water grab samples from all of the above stations were analyzed for a variety of chemical/physical parameters. The chemical data were collected, assessed, and summarized in a water quality survey report (NMED/SWQB 2004b). Data results from grab sampling will be uploaded to USEPA's STORET database. The following TMDLs were developed for this watershed:

- ***Aluminum (chronic)***: Little Tesuque Creek (Rio Tesuque to headwaters)

Photo 3.3 Little Tesuque Creek at first crossing of Hyde Park Road (Hwy 475)

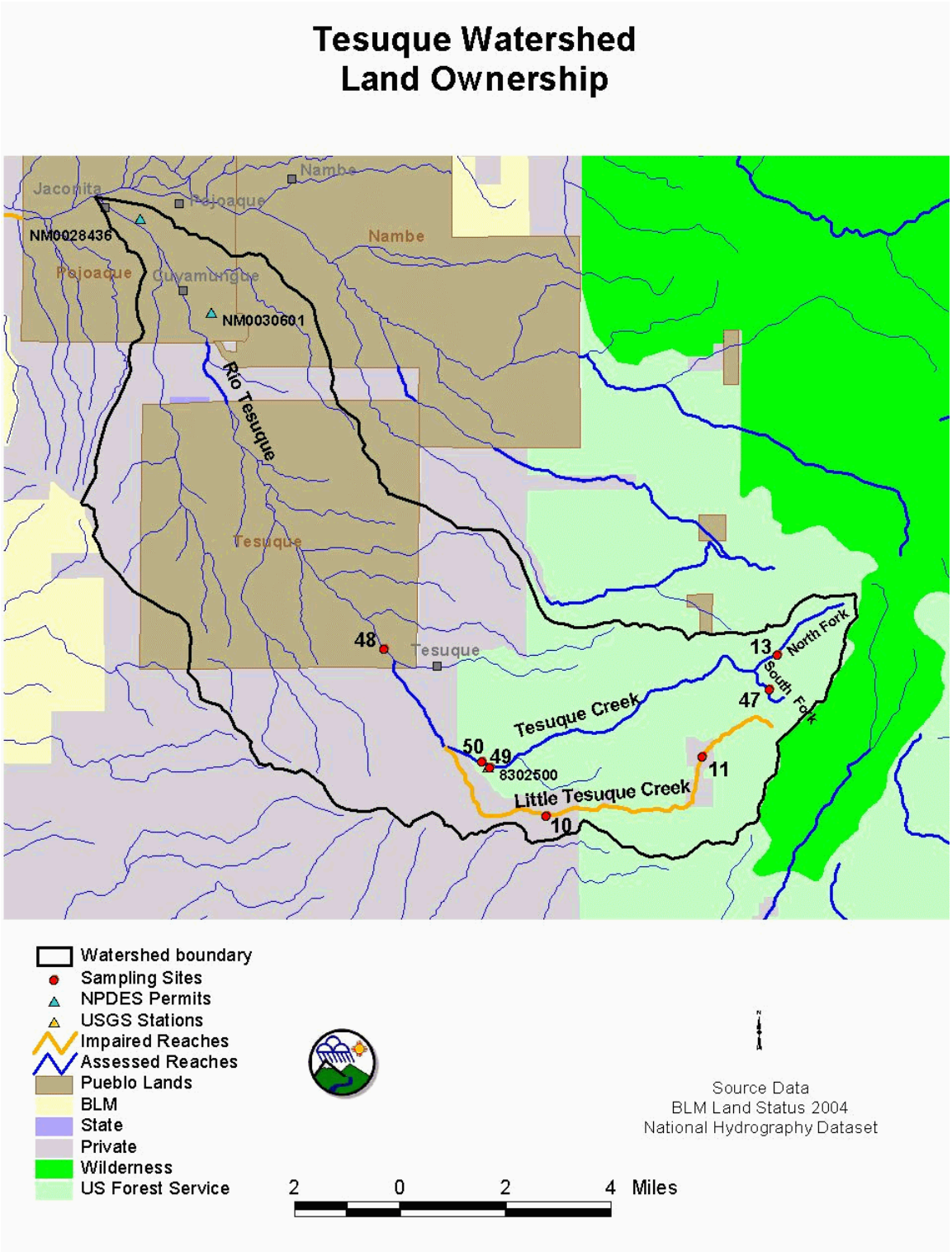

Figure 3.3 Rio Tesuque Watershed Land Ownership and Sampling Stations

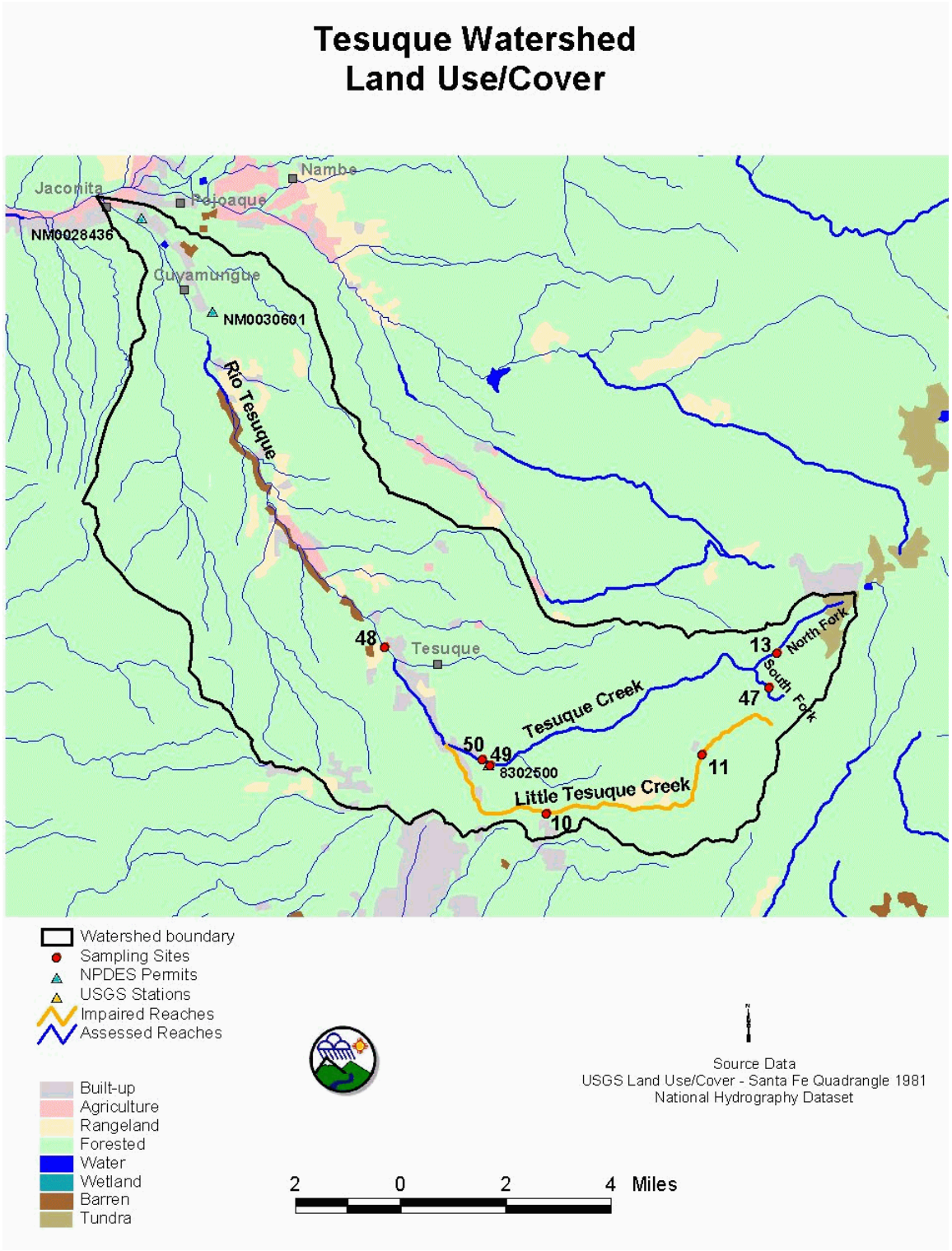

Figure 3.4 Rio Tesuque Watershed Land Use and Sampling Stations