CHAPTER 3: EXISTING CONDITIONS IN THE WATERSHEDS

Hodges Watershed

Water Sources -

The primary function of Hodges Reservoir is to store runoff water from its 243-square- mile watershed including water that spills over Sutherland Dam (Figure 5-3.1). The reservoir and associated facilities are owned and operated by the City of San Diego. Although the Hodges Watershed is a large watershed in the City system, it is not considered a major contributor to the City water supply system. All impounded water at Hodges Reservoir is sold as raw water to San Dieguito Water District (SDWD) and Santa Fe Irrigation District (SFID). The Badger Water Treatment Plant (BWTP), which is jointly owned by the SDWD and SFID, treats water transferred from Hodges Reservoir via the Hodges Flume to San Dieguito Reservoir. All water that flows over the dam flows directly to the Pacific Ocean.

The management of the water supply system typically attempts to regulate the reservoir levels to maximize the use of local water. Hodges reservoir is not considered a reliable source of emergency water supply due to high evaporative rates which result in low reservoir levels. There is also a relatively high-spill risk over Hodges Dam during storm events.

The City of San Diego currently has no means of delivering the water impounded in Hodges Reservoir to its service area. However, Hodges is currently involved in phase three of the San Diego Water Authority's Emergency Storage Project. During this phase (2004 – 2008), a pipeline and pump station are under construction between Hodges and Olivenhain Reservoir. Once completed, this connection will provide the ability to transfer water between Hodges Reservoir

and the SDCWA Aqueduct System via Olivenhain Reservoir. Therefore, the City of San Diego will have the ability to utilize the storage capacity of Hodges Reservoir providing a greater volume of emergency water supply to the Miramar Water Treatment Plant.

Raw Water Reservoir -

The Hodges Dam is a multiple-arch, reinforced concrete structure with a 342-foot-long uncontrolled over pour spillway. The spillway crest consists of 202-foot-long Ogee weir section and 140-foot-long broad-crested weir section. The spillway design capacity is 67,440 cfs. The dam crest has a length of 729 feet (342 feet spillway and 387 feet non-overflow length) and stands roughly 130 feet above the streambed. The reservoir has a storage capacity of 30,251 acre-feet and a surface area of 1,234 acres at spillway crest at 315 feet MSL.

Raw Water Intake and Conveyance Facilities -

The Hodges Dam outlet consists of four downspouts on the face of the dam. The elevations from which water may be drafted from the reservoir are 275, 284, and 294 feet MSL. The downspouts are 20-inch diameter cast iron pipes with concrete embedded gate valves. The maximum discharge at Hodges Reservoir is 181 cfs (117 mgd). The dam is also equipped with four, 24-inch sluicing outlets in the central arches for draining of the reservoir. The outlets are located at an invert elevation of 206 feet. Water released from Hodges Reservoir flows by gravity through the 4.5 mile-long Hodges Flume to San Dieguito Reservoir. The concrete flume was constructed in 1917 and has a maximum capacity of 21 cfs (13.5 mgd). Supported by trestles through steep terrain, portions of the 72-year-old flume are highly susceptible to damage resulting from earthquake movement. The flume receives considerable sediment inflow and is subject to recurrent vandalism.

Treated Water Facilities -

The City of San Diego has no treatment facilities for water stored in Hodges Reservoir. However, at the completion of phase three of the Emergency Storage Project, the City of San Diego will have the option to treat the water from Hodges Reservoir at the Miramar Treatment Facility. The BWTP, jointly owned by the SDWD and SFID, treats water transferred from Hodges Reservoir through the Hodges Flume to the San Dieguito Reservoir.

Emergency Plans -

There are no written emergency plans addressing accidental or intentional disposal of contaminants to the raw water supply system for the City. However, the City does have the following two procedures which are understood policies, should an emergency occur relating to water quality:

- If a treatment plant cannot treat the water to an approved health standard level, due to upstream contaminants or treatment plant failures, the treatment plant shall be shut down. Treated water shall then be re-directed to the downed service area, through the distribution system from other treatment plants.

- If any emergency exists, the City has a chain of communication procedure for notification of City staff.

NATURAL SETTINGS

Slope

Slope is recognized as a critical factor in generating soil slips/landslides. In Southern California a direct relationship exists between frequency of soil slips

and slope. USGS estimates that 70% of soil slips originate in slopes between 20° and 36°.These soil slips have the potential to increase sedimentation in streams and reservoirs.

Water falling on steeply-sloped land runs off with greater velocity and infiltrates less than water falling on flat land. This response leads to increased erosion and limits the soils natural ability to absorb contaminants. Information on slope was derived from a digital elevation model provided by San Diego Data Processing Corporation and United States Geological Survey (USGS).

Hodges Watershed -

No changes in slope have occurred since 2000 (Figure5-3.2, Table 5-3.1).

Table 5-3.1Hodges Watershed Slope

Slope	Acres	Percent
0 - 15°	79473.27	50.17
16 - 25°	32710.01	20.65
26 - 50°	38534.68	24.33
> 50°	7697.98	4.86
Total	158415.94	100.00

Soils

Most of the soils within the watershed are susceptible to erosion. The erosion of these soils is mitigated through the anchoring affect of natural vegetation (see Vegetation). Impacts to the vegetation through fire, development or other means could cause increased erosion and impact surface water quality (see Fires, Land Use, Rainfall and Runoff).

Hodges Watershed -

No changes in soils have occurred since 2000. Except for exposed bedrock areas, soils in the Hodges Watershed are predominantly well-drained sandy loams (Figure 5-3.3).

Vegetation

Vegetation cover provides several ecological services pertinent to water quality. The root systems of plants anchor soil that could otherwise erode into streams and reservoirs (see Soils). Wetlands and other riparian plant communities act as natural filters, removing suspended sediments and contaminants. Sediments are trapped by densely growing wetland plants, and many contaminants are absorbed or chemically altered by the vegetation.

The description of the different plant communities found in the watershed (Sawer and Keeler-Wolf classification, 1995) and their respective response to fire is from the 2003 Southern California Fires Burned Area Emergency Stabilization and Rehabilitation Plan prepared by the Interagency Burned Area Emergency Response Team November, 2003.

The maps and corresponding table of vegetation communities (Figure 5-3.4, Table 5-3.3) have been updated using current SANDAG GIS data.

Oak Woodlands

Vegetation Types:

Oak woodlands typically occur in the foothills and transition into mixed conifer/oak woodlands at higher elevations. Each community type can vary from open savannas in broad valleys and rolling hills, to dense woodlands in canyons

and along streams. Oak woodlands are dominated by live oak trees species that include Black Oak, Coast Live Oak, Engelmann Oak, and Canyon Live Oak.

Response to Fire:

Oak woodlands have evolved with fire. Dense woodlands typically experience low frequency stand destroying fires. Oak trees that experience some canopy fire often survive unless the ground fire temperature is extreme enough to kill the root system. The complex of species associated with dense oak woodlands will either re-sprout or germinate from seed. Frequent or hot fires can affect the seed bank and the root system of Oak Woodland species, resulting in degraded habitat that is susceptible to habitat conversion.

Eucalyptus Woodland

Vegetation Types:

Eucalyptus Woodland is a non-native closed canopy community. This community is typically a monotypic stand of Eucalyptus trees with a thick mulch of Eucalyptus tree leaves.

Response to Fire:

Eucalyptus stands can be fire retardant to low intensity fires. Low intensity fires will consume the leaf litter and can be carried into the canopy where leaves are singed or tops are burned. High intensity fires are typically stand destroying.

Forests

Vegetation Types:

Coniferous forests occur in the lower to upper montane zone in the Peninsula Ranges. The lower montane forests typically include the Southern Interior Cypress Forest which is intermixed with oak woodlands and chaparral. Upper montane forests include Coulter Pine Forest, Jeffery Pine Forest, and mixed Sierran Forest. They range from pure stands of a single species, to mixed conifer forests intermixed with oak woodlands and chaparral.

Response to Fire:

Montane forests are typically surrounded by chaparral or adjacent to forests subject to fire, and are therefore susceptible to fire. When fires occur more frequently than twenty-five years, Coulter pine habitat conversion to chaparral may result. Jeffery Pine Forests and Mixed Coniferous Forests historically experience periodic low-to-moderate intensity fires in the under story. Fuel buildup due to fire suppression can increase the risk of stand replacing crown fires.

Chaparral

Vegetation Types:

Chaparral occurs throughout the coastal lowlands, foothills, and montane region. This community typically forms a dense, almost impenetrable shrub community with no herbaceous layer. Chaparral is a highly variable plant community that includes; Chamise Chaparral, Coastal Sage-Chaparral Scrub, Mixed Chaparral, Montane Chaparral, Semi-desert Chaparral, and Scrub Oak Chaparral.

Response to Fire:

Chaparral is a fire adapted community that stumps sprouts or germinates from seed after a low-to–moderate intensity burn. Large fires often result in homogenous stands of chaparral. Frequent fires and hot fires can burn the root system and surface seed bank, resulting in a loss of diversity and low-density vegetative communities. For a few years after a fire, annual forbes germinate and establish on site, until the woody shrubs mature.

Coastal Sage Scrub

Vegetation Types:

Locally, Coastal Sage Scrub consists of low, woody soft-shrubs and is classified as Diegan Coastal Sage Scrub (DCSS). DCSS is dominated by California sagebrush and/or flat-topped buckwheat and often intergrades with Chaparral communities.

Response to Fire:

DCSS species are fire adapted and quickly regenerate from seed after a fire. However, frequent fires in an area can reduce the seed bank for native shrub species and increase the presence of non-native grasses and forbs resulting in degraded habitat. Once this habitat conversion occurs, DCSS species typically do not re-colonize the area due to competition from dense populations of invasive grasses that increase the fire frequency. Areas with moderate to highly degraded DCSS may convert to non-native grasslands due to the 2003 fires.

Big Sagebrush Scrub

Vegetation Types:

Locally, big sagebrush is dominated by; flat-topped buckwheat, broom snakeweed, deerweed, sawtoothed goldenbrush, and includes a variety of DCSS species.

Response to Fire:

The fire ecology of Big Sagebrush Scrub in eastern San Diego County is not well documented. Many of the associates in this community occur in DCSS and are fire adapted. Frequent fire in the vegetative community will result in habitat conversion to non-native grasslands.

Grasslands

Vegetation Types:

Perennial Grasslands vary among Valley Needlegrass and Valley Sacaton grasslands. Valley Needle Grassland is dominated by the tussock forming purple needlegrass, with a variety of native forbs including colar lupin, rancher's fireweed, and adobe popcorn-flower; and the native bunchgrasses, foothill needle grass, and coast range melic. The species composition can vary as it transitions into the foothills and montane zone. Valley Sacaton Grassland is dominated by sacton or salt grass. This community typically occurs in the areas with a high seasonal water table and is often associated with Alkali Seeps and Alkali Meadows. Non-native grasslands are dominated by Red brome, Ripgut brome, and Softchess brome. Non native grasslands are often intergraded with open oak woodlands and disturbed DCSS communities.

Response to Fire:

Grassland communities in San Diego County have evolved with, and are typically maintained by fire. Fire in non-native grasslands maintains dominance by invasive grasses and prevents establishment by native shrub species.

Meadows

Vegetation Types:

Montane Meadows occur in the montane zone and are dense growth of sedges and perennial herbs that experience wet cold winters. Montane Meadows are typically interspersed with montane forests. Wildflower Field is an amorphous community of herbaceous plant species where dominance varies from site to site and year to year, depending on climatic factors. Wildflower Field is typically associated with grasslands and oak woodlands in the valleys and foothills.

Response to Fire:

Wet meadows typically do not burn since the moisture content in the plants and soils retard fire advance. During drought times and in dry meadows fire will quickly burn through these communities. Fall fires typically have little impact on local meadows since most plants are dry and have dispersed their seed.

Riparian

Vegetation Types:

Riparian communities vary depending on the aquatic system they are associated with and can have seral stages of community succession. Mulefat Scrub and Southern Willow Scrub are typically early seral stages for Southern Cottonwood-

Willow Riparian Forest, which develops into Southern Coast Live Oak Riparian Forest. In steep drainages, Mulefat Scrub and Southern Willow Scrub may be early stages for Southern Sycamore-Alder Riparian Forest or White Alder Riparian Forest.

Response to Fire:

Riparian communities often resist fire since riparian species do not experience drought. During drought, riparian species become more susceptible to fire. Stand destroying fires can assimilate flooding events in that they set communities back to early seral stages. Stump sprouting species can reestablish in the early successional communities. Most mature trees that experience high intensity fires will die.

Wetlands

Vegetation Types:

Wetland communities are highly variable. Riparian and Wet Meadows are communities that can establish in areas with sufficient hydrology to be considered wetlands. In addition, emergent wetlands occur along seeps and as emergent wetlands in shallow water. These wetlands include Alkali Seep, Freshwater Seep, and Freshwater Marsh.

Response to Fire:

Historically, fire impacts to wetlands in San Diego County are not documented. Wetlands typically do not experience fire. Many wetland species are rhizomous and will likely survive fires. Woody species in scrub and forested wetlands may recover from fire by epicormic sprouting from stems or basal sprouting from roots.

Hodges Watershed:

Several vegetation communities exist within the Hodges Watershed. The most common native communities include scrub and chaparral, oak woodlands, and grasslands (Figure 5-3.4, Table 5-3.3). In many areas, native vegetation has been altered due to agriculture and urban development. These areas possess the potential to negatively impact water quality (see Land Use, Rainfall and Runoff).

Riparian and wetland vegetation communities occur around Hodges Reservoir and within canyons and drainages. These communities include Willow Scrub, Mulefat Scrub, Wet Montane Meadow, a variety of riparian forest types, Lakeshore Fringe, emergent wetland, Freshwater Marsh, Freshwater Seep, and Vernal Pools. In addition, disturbed wetlands occur just east of Hodges Reservoir and in a few scattered locations along streams. Tamarisk Scrub is a non-native community that has invaded some riparian areas within the watershed.

Table 5-3.3 Vegetation in the Hodges Watershed

Vegetation Type	**Acres**	**% of Watershed**
Wetlands	268	0
Forest	128	0
Grasslands, Vernal Pools, Meadows, other Herb Communities	14786	9
Non-Native Vegetation, Developed or Un-vegetated Habitat	44022	28
Riparian	4086	3
Scrub and Chaparral	73890	47
Woodland	21237	13
Total	158417	100.0

Rainfall and Runoff

The climate of San Diego County is classified as a Mediterranean dry summer type where 90% of the annual rainfall occurs between the months of November and April. Annual precipitation varies from 9 inches at the coast to 25 inches near the Mountains. Storm water runoff occurs when water from rain or snowmelt flows over the ground. Impervious surfaces like driveways, sidewalks, streets and parking lots prevent the runoff from naturally soaking into the ground. Storm water runoff can collect debris, sediment, nutrients, bacteria, pathogens, chemicals and deposit them directly into a lake, stream, river, wetland, or coastal water.

Rainfall and Runoff information in this section was supplied by the City of San Diego Water Department, Hydrography Section. Rainfall data is collected at each reservoir by a weather station. Runoff data is estimated monthly by measuring the following: amount of rainfall, rain amount on surface of lake, other inputs, evaporation, draft, leaks, and change in lake level.

Hodges Watershed:

Table 5-3.4 shows annual rainfall and runoff at Hodges Reservoir. Rainfall totals for years 2001-2003 were average or below average. The winter of 2004-2005 was the third wettest on record.

Table 5-3.4 Rainfall and Estimated Runoff for Hodges Reservoir

Reservoir	Year	Rainfall (in.)	Runoff Entering Reservoirs (M.G.)
Hodges	2001	14.94	2232.51
	2002	8.5	260.84
	2003	13.15	1157.16
	2004	15.74	1269.86
	2005	19.54	31061.19

Fires

The California Department of Forestry (CDF) addresses all large brush fires within the watershed. The local fire districts handle structural fires only. CDF has an extensive fire prevention plan which includes three fire safe guidelines: residential, railway, and electrical power lines. CDF also provides an evaluation of burned sites and a re-growth plan to prevent erosion immediately following a fire.

Fire can indiscriminately devastate certain vegetation and wildlife communities, but is very important to the sage scrub and chaparral communities. Many taxa of coastal sage scrub plants are adapted to fire by stump sprouting or high seed production (Skinner et al., 1994). Similarly, many chaparral plants are adapted to frequent fires either through resprouting or seed carry-over (see Vegetation). While these communities are adapted

to fire and usually recover in three to five years following such an event, the soils are subject to increased erosion immediately following a burn (see Fires, Soils).

Sediment from the burned areas can impact streams and the aquatic organisms within those streams, ultimately feeding into reservoirs where sediment loads may affect treatment procedures. Control of large fires is important from both a preservation perspective as well as a watershed management perspective.

The fire and water districts in the watershed do not measure the water quality impacts of the runoff from burned areas (Calhoun, Justice, Bratton, 1995). In most cases the County Office of Emergency Response or the local Fire Department contacts the RWQCB to visit the site after the fire is contained. The RWQCB participates in assessing the impact of the fire on the surface water quality, and will determine if monitoring is necessary.

Fire information in this report is supplied by the California Department of Forestry. The current data available from CDF is through December 31, 2004.

Hodges Watershed:

Since 2000, there have been three fires in the Hodges Watersheds (Figure 5-3.5*,* Table 5-3.5*).* The Paradise Fire started on October 26, 2003. This fire burned an area of 56,545 acres consisting of; chaparral, riparian woodland, and grasslands. The fire destroyed 221 residential structures and 192 other outbuildings. The

remaining three fires were considered insignificant because of their small size and distance from the reservoir.

Table 5-3.5 Hodges Watershed Fires		
Name	Alarm Date	Acres Burned
Camino	8/6/2004	101
Cedar	10/25/2003	371
Brandy	9/6/2004	8
Paradise	10/26/2003	27,165

SUMMARY OF POTENTIAL CONTAMINANT SOURCES

Land Use -

The section on land use includes; land ownership, existing land use, agriculture, grazing, population density and mines.

Land Ownership

The land ownership information discussed in this section is primarily derived from SanGIS data. SanGIS maintains a database of land ownership information, by parcel, for San Diego County.

Hodges Watershed:

Approximately 64% of Hodges Watershed is privately owned; while 34% is in public ownership (Figure 5-3.6, Table 5-3.6) The City of San Diego owns 18,267 acres, or 10.2% of the watershed.

Table 5-3.6 Land Ownership in Hodges Watershed

Ownership Category	Area (acres)	% of Watershed
Indian Reservation	2628	1.7
Publicly Owned		
Local	27453	17.3
State	2336	1.5
Federal	23575	14.9
Subtotal Publicly owned	53364	33.7
Private	102425	64.7
Total	158417	100

Existing Land Use

The information discussed in this section is based on SanGIS data. It is important to note that some areas reported in the 1996-2000 Watershed Sanitary Survey (WSS) as vacant and undeveloped land use have been updated by SanGIS to reflect its correct land use type, parks and open space preserves (Figure 5-3.7, Table 5-3.7).

Hodges Watershed:

Land use in the Hodges Watershed has experienced little change since 2000. The majority of the Hodges Watershed is undeveloped with approximately 67% of its land use type fitting into the following categories: vacant and undeveloped (53.6%), parks and open space preserves (13.2%), and water (0.6%). Approximately 15% of the watershed is occupied by residential and other types of urban development. These areas include residential, commercial and industrial developments in Escondido, Ramona, Rancho Bernardo, Poway and other smaller communities (see Rainfall and Runoff). Agriculture accounts for approximately 19% of the land area in the Hodges Watershed.

Table 5-3.7 Existing Land Use in the Hodges Watershed		
Land Use Category	**Area (acres)**	**% of Watershed**
Agriculture	30003.69	18.94
Commercial Recreation	2143.26	1.35
Commercial	515.85	0.33
Industrial	204.82	0.13
Junkyard, Dump, Landfill	66.00	0.04
Parks	20853.31	13.16
Schools, Hospitals, Public & Private Institutions	628.39	0.40
Group Quarters Residential	62.57	0.04
Mobile Home Park	190.45	0.12
Multi Family Residential	611.00	0.39
Single Family Residential	8119.51	5.13
Spaced Rural Residential	14376.66	9.08
Under Construction	15.42	0.01
Transportation, Communications & Utilities	4471.56	2.82
Water	1015.10	0.64
Subtotal	83277.59	52.57
Vacant and Undeveloped	75138.60	47.43
Total	158416.19	100.00

Agriculture

Agricultural practices can be a significant source of non-point source contaminants. Contaminants that are often found in typical agricultural surface runoff include sediment, nutrients, pesticides and bacteria. Increases in salinity may also pose a significant water quality problem in the future. The United States Environmental Protection Agency (USEPA) has estimated that about 75% of the sediment, 52% of the nitrogen loading, and 70% of the phosphorus loading that enters waterways of the 48 contiguous states originates in agricultural settings. Most contaminants are transported to the water supply through either surface runoff or irrigation return flows. Agricultural practices consist of field crops, orchards and vineyards, and intensive agriculture. Home gardens and hobby farms are not included in this report.

Field crops include; grain, alfalfa and sod. Due to the minimal use of pesticides and other chemicals, this agricultural practice is considered to have the lowest potential of impacting water quality.

Orchards and Vineyards include; apples, avocados, citrus, grapes and other non-evergreen fruit, while intensive farm plots include; row crops such as herbs, vegetables, poultry ranches, and dairy farms. Due to their reliance on pesticides and other chemicals, these practices are considered to have a greater potential of impacting water quality.

Poultry ranches are regulated by the San Diego County Department of Environmental Health for fly breeding and facilities are inspected annually. Poultry Farms do not discharge a significant amount of wastewater, but impact to water quality is possible during periods of rain when runoff could carry manure into nearby drainages. Manure management methods include frequent cleaning, drying and coning. Manure is generally spread on the ground to dry, pushed into windrows and then removed from the ranch.

Dairy farms are permitted by the Regional Water Quality Control Board (RWQCB) and facilities are inspected quarterly. The RWQCB issues orders specific to individual dairies. These orders contain facility designs, operation specifications and discharge specifications, along with other guidelines for complying with the Watershed Basin Plan. Dairy farms are then required to submit quarterly reports to the RWQCB that describe herd size, manure disposal, groundwater monitoring results including nitrates and dissolved solids. Milk cows, corrals and barns are generally washed daily. Dairies typically have retention ponds for wastewater discharge which during periods of rain could overflow and impact the water quality of nearby streams.

Hodges Watershed:

The information discussed in this section is based on SanGIS data and two layers created by RECON Environmental Consultants using information from the San Diego County Department of Environmental Health and RWQCB. Since 2000, Hodges Watershed has seen a slight decrease in the total acres of land used for agriculture, 31,591 acres to 31,135 acres (Figure 5-3.7, Table 5-3.8).

Table 5-3.8 Agriculture in the Hodges Watershed

Type of Agriculture	Acres	% of Watershed
Orchard and Vineyards	7213	4%
Intensive	3199	2%
Field Crops	20723	13%
Total	**31135**	**19%**

Thirteen poultry ranches exist in the Hodges Watershed (Figure 5-3.1, Table 5-3.9), which is a decrease since 2000.

Table 5-3.9 Hodges Watershed Poultry Ranches

Facility Name	Address	Maximum Number	Manure Management	Product
Fluegge Jr. Ranch	24120 CROWN HILL LN	25000	frequent cleanout	eggs
Hidden Villa Ranch	2900 HARMONY GROVE	40000	frequent cleanout	eggs
Pine Hill Ranch	25818 HIGHWAY 78	1100000	frequent cleanout	eggs
Cebe Farms - Lilac Road	P O BOX 1404	98000	floor litter	chicks
Dowle's Ranch	18409 RANGELAND RD	80000	floor litter	meat bird
Armstrong Egg Farms – Ramona #2	29550 COLEGRADE RD	100000	drying & coning	eggs
Cebe Farms – Ash/Oak Street	P O BOX 649	10000	floor litter	chicks
RAMONA EGG RANCH	941 OLD JULIAN HIGHWAY	100000	drying & coning	eggs
Swiss Mountainview Egg Ranch	249 STEFFY LN	42000	drying & coning	eggs
Armstrong Egg Farms – Ramona #3	P O BOX 1129	160000	frequent cleanout	eggs
RAMONA RANCH	1941 DYE RD	45000	floor litter	chicks
Armstrong Egg Farms – Ramona #4	P O BOX 742	110000	frequent cleanout	eggs
Ramona Duck Farm	1415 Pamo RD	N/A	N/A	ducks

Since 2000, the number of dairy farms in the Hodges Watershed has decreased by one. Currently, four dairies exist within the Hodges, with the John Van Tol Dairy straddling the Hodges and San Vicente Watershed Figure 5-3.1, Table 5-3.10).

Table 5-3.10 Hodges Watershed Dairy Farms

Facility Name	City	Acres in Watershed	# of Milk Cows	Herd Size
Bert Verger Dairy	Escondido	198	480	1070
Frank J. Konyn	Escondido	300	670	1205
John Van Tol Dairy	Ramona	NA	NA	NA
Valley View Dairy	Ramona	50	534	765

Grazing

The animal grazing data presented derives from the United States Forest Service (USFS). Although grazing on private land occurs in this watershed, no spatial data was available for such areas, and grazing on these lands is not included in this report. The USFS allows an average density of one animal per 160 acres; therefore, the risk of water contamination from manure is low. However, loss of vegetation cover associated with grazing may increase soil erosion and sedimentation of streams and reservoirs (see Vegetation, Rainfall and Runoff).

Hodges Watershed:

A total of 5,175 acres of USFS land are permitted for grazing in the Hodges Watershed (Figure 5-3.1, Table 5-3.11), which is a decrease of 7,065 acres since 2000. This is due to the closure of Quail Springs and Pamo rangelands. The

Mesa Grande Range crosses a substation portion of Temescal Creek. If permit status is activated, grazing in this area has a potential of adversely affect water quality.

Table 5-3.11 Grazing in the Hodges Watershed

Range Name	Number of Head	Acres in Watershed	Ownership	Permit Status
Lusardi	8	383	USFS	Nonuse-Since Paradise Fire
Mesa Grande	65	4009	USFS	Nonuse-Since Paradise Fire
Gem Hill	1	311	USFS	Nonuse-Since Paradise Fire
Black Mountain	5	454	USFS	Active

Population Density

Population density is a good indicator of the level of urbanization within an area. Land areas with small population densities are usually rural areas with natural landscapes that trap rainwater and allow it to filter slowly into the ground (see Rainfall and Runoff). In contrast, large population densities are associated with urbanized areas. These areas contain impervious surfaces that prevent rain from infiltrating into the ground which increases the amount and velocity of runoff. Urbanization increases the variety and amount of pollutants carried into streams, rivers, and lakes. These pollutants can harm fish and wildlife populations, kill native vegetation, foul drinking water supplies, and make recreational area unsafe and unpleasant. The population data presented was derived form SANDAG's 2000 Census.

Hodges Watershed:

The estimated 2005 population of the watershed shows that 199,786 people reside in the Hodges Watershed (Figure 5-3.8, Table 5-3.12). This reflects an increase in the total population by 44%, in the past five years. The major population centers occurred in the southern and western portions of the watershed in the communities of Rancho Bernardo, Escondido, Del Dios, Poway, and Ramona.

Table 5-3.12 The Hodges Watershed Population

Area	Population	Density (persons per Acre)
City of San Diego	37,548	6.8
City of Escondido	24,783	6.6
City of Poway	13,921	3.9
City of Ramona	15,691	3.4
SD Country Estates	4,548	8.8
County of San Diego	23,295	1.2
Total	119,786	.75

Mines

The mine data presented was obtained from USGS and SWRCB. The SWRCB and the RWQCB are given authority over mines. The most common environmental hazard is: heavy metals associated with acid-rock drainage; methyl mercury from mercury-contaminated sediments; arsenic; asbestos and chromium.

Hodges Watershed:
In the 1996-2000 Watershed Sanitary Survey there were 18 mines listed by the State Water Resources Control Board (SWRCB). Currently, there is one active mine within the Hodges Watershed, the Stoddard Borrow Pit which quarries Dimension Stone (Figure 5-3.1).

Hazardous Material / Waste

The data presented in this section was obtained from the San Diego County Health Department, RWQCB, and the Solid Waste Assessment Test Program. The hazardous materials were put into three categories: Liquid Hazardous Waste, Solid Hazardous Waste and Liquid Hazardous Storage (capacity). The majority of liquid waste is stored in 55 gallon drums and hauled away by licensed waste haulers. Automotive and Tractor fuels make up the majority of permitted liquid hazardous storage. These fuels are stored in underground fiberglass-reinforced plastic, cathodically protected steel, or steel clad with fiberglass-reinforced plastic. These tanks are installed with a leak interception and detection system.

The State Resources Control Board affected changes to the underground storage tank regulations on October 13, 2005. These changes can be found in Title 23, California Code of Regulations, Chapter 16.

Hodges Watershed:

Hazardous Materials/Waste amounts and locations for the Hodges Watershed are illustrated in Figure 5-3.1, Table 5-3.13. The area of Hodges Watershed is divided into four sub-areas: Escondido, Rancho Bernardo, San Pasqual and Ramona.

Table 5-3.13 Summary of Permitted Hazardous Material

Location	Liquid Waste (gal)*	Solid Waste (lbs)*	Liquid Storage (gal)*
Escondido	16,501	157,176	569,590
Rancho Bernardo	107,937	4,483,084	1,059,980
San Pasqual	5,477	4,630	73,760
Ramona	64,179	211,094	897,600
Total	**194,094**	**4,855,984**	**2,600,930**

*Figures are maximum capacities

Recreation

Hodges Watershed:

The primary purpose of Hodges Reservoir is for domestic water supply, while recreation is a secondary use of the reservoir. The reservoir is open to the public for boating and fishing, three days a week, February through October, water contact activities, two days a week, April through October, and to all other recreational activities seven days a week, year around. Recreational activities include; boating, fishing, windsurfing, jogging, biking, and picnicking (Table 5-3.14).

Table 5-3.14 Hodges Reservoir Number of Permits Sold					
Year	Fishing	Launch	Body Contact	Rentals	
				Motor	Row
2001	10240	2654	1143	NA	1423
2002	7192	657	335	NA	1271
2003	4052	749	0	NA	0
2004	4801	1110	0	NA	0
2005	Figures not reconciled				

The facilities consist of concession, launch, rental boats, trash receptacles, portable toilets, two floating restroom facilities, and a comfort station. These facilities are owned and operated by the City of San Diego. There are no boat-holding tank pump-out stations, marinas, or berths available at the reservoirs. Trash cans and portable toilets are placed above current water levels.

The potential sources of contamination associated with the recreational activities include; erosion, trash, microorganisms associated with humans and animals, spillage of petroleum products, and production of combustion byproducts. Title 22 contaminates are monitored quarterly and nutrients monthly (Figure 5-3.1). Microorganisms including Total Coliforms, E. coli, and Enterococcus are monitored monthly.

Wastewater / Reclaimed water

The Wastewater / Reclaimed water treatment facilities permitted by the RWQCB in the Hodges Watershed are identified in Table 5-3.15 and Figure 5-3.1. In 2002 The San Pasqual Aquatic Reclamation Facility (ARF) was taken out of operation.

Table 5-3.15 Wastewater / Reclaimed Water Facilities					
RCQCB Facility I.D.	**Facility Name**	**Address**	**Highest level of Treatment**	**Discharge To:**	**Land Disposal Order #**
9000000076	Santa Maria WWTP	260 Sawday Street	Tertiary	Recycled Water Use, Spray Field	2000-177
9000000109	San Pasqual Wild Animal Park STP	15500 San Pasqual Valley Road	Tertiary	Recycled Water Use	99-04
NA	Hanson Elementary School	1825 Hanson Lane	Un-disinfected Secondary	Subsurface Drip Disposal	R9-2004-00409
9000000336	San Pasqual Academy	17701 San Pasqual Valley Road	Un-disinfected Secondary	Percolation Ponds	94-004

Santa Maria Wastewater Treatment Plant (WWTP):

The Ramona Municipal Water District is the agency responsible for this facility. RWQCB Order No. 2000-177 establishes the discharge specifications for the Santa Maria WWTP (Table 5-3.16). The treatment system is comprised of; an equalization basin and pump station, aeration basins, secondary clarifiers, and an aerobic biosolids digester. The RWQCB requirements permit a 30-day average dry weather effluent flow of up to 1.00 mgd. The permit also specifies a maximum 30-day average flow of .35 mgd tertiary treated water and a twelve month total discharge of effluent to the Rangeland Road disposal fields not exceeding 873.6 acre feet per year.

The two spray fields are located approximately 2.5 miles northwest of the plant. One of the spray fields is owned by the RMWD and the other is leased. The District-owned and leased disposal fields are located directly west and east, respectively, of Rangeland Road. Two effluent storage reservoirs are located on

the disposal field owned by the RMWD. The vegetation on the fields is mainly used for grazing cattle. Effluent for tertiary treatment is sent from the Santa Maria WWTP to the Mt Woodson Tertiary Treatment facility which is co-located with the disposal fields northwest of the plant. The tertiary treated water is used at the Mt Woodson Golf Course for irrigation.

Biosolids Disposal Practices:

Biosolids from the Santa Maria WRP are treated in an aerobic digester, and then dewatered by centrifuge or in drying beds at the plant site. The waste is routinely hauled to a landfill for final disposal.

Table 5-3.16 Santa Maria Wastewater Reclamation Plant Effluent Discharge Limitations, Order # 2000-177

Constituent	Unit	Daily Maximum[1]	30-day Average[2]	12-Month Average[3]
Biochemical Oxygen Demand (BOD_5 @ 20^0C)	mg/L	45	30	-
Total Suspended Solids	mg/L	45	30	-
pH	Within the limits of 6.0 to 9.0 at all times			
Total Dissolved Solids	mg/L	1000	-	800
Chloride	mg/L	250	-	200
Sulfate	mg/L	250	-	200
Manganese	mg/L	0.06	-	0.05
Iron	mg/L	0.4	-	0.3
Boron	mg/L	0.6	-	0.5
Fluoride	mg/L	1.2	-	1

1. The daily maximum effluent limitation shall apply to the results of a single composite or grab sample.
2. The 30 day average effluent limitation shall apply to the arithmetic mean of the results of all samples collected during any 30 day consecutive calendar day period.
3. The 12 month average effluent limitation shall apply to the arithmetic mean of the results of monthly averages of all samples collected during the previous 12 months.

San Pasqual Wild Animal Park Sewage Treatment Plant (STP):

The San Diego Zoological Society is the agency responsible for this facility. RWQCB Order No. 99-04 establishes the discharge specifications for the San Pasqual Wild Animal Park STP (Table 5-3.17). The treatment and disposal system is comprised of; a headwork's facility, a flow equalization basin, extended aeration and sedimentation basins, a chlorine contact tank, biosolids holding tank, and a 2.3 million gallon storage/percolation pond. The RWQCB requirements certify an average daily design flow of up to 0.150 mgd. The treated wastewater is blended with ground water to maintain an optimal operating level in the storage/percolation pond. The water is then used for irrigation within animal exhibits.

Table 5-3.17 San Pasqual Wild Animal Park STP Effluent Discharge Limitations, Order # 99-04

Constituent	Unit	Daily Maximum[1]	Monthly Average[2]
Biochemical Oxygen Demand (BOD_5 @ 20^0C)	mg/L	45	30
Total Suspended Solids	mg/L	45	30
pH	Within 6.0 to 9.0 at all times		
Total Dissolved Solids	mg/L	1000	-
Chloride	mg/L	400	-

1. The daily maximum effluent limitation shall apply to the results of a single composite or grab sample.
2. The monthly average limitation shall apply to the arithmetic mean of the results of all samples collected during any 30 day consecutive calendar day period.

Biosolids Disposal Practices:

Biosolids from the San Pasqual Wild Animal Park STP are stored at the plant site under controlled conditions. The waste is routinely hauled to a landfill for final disposal.

Hanson Elementary School:

The Ramona unified School District is the agency responsible for this facility. RWQCB Order No. R9-2004-0409 establishes the discharge specifications for the San Pasqual Wild Animal Park STP (Table 5-3.18). The treatment and disposal system is comprised of; 2,000 gallon grease interceptor, 12,000 gallon primary settling tank with four P80 Pirana denitrification units, two AX100 packed bed trickling filters, 5,000 gallon recirculation tank, 5,000-gallon dosing tank, and a rotating subsurface drip disposal system. The RWQCB requirements certify a maximum discharge of 3,645 gpd. The dispersal field is divided into four zones located at the southern end of the school.

Table 5-3.18 Ramona Unified School District, Hanson Elementary School Effluent Discharge Limitations, Order # R9-2004-0409

Constituent	Unit	Daily Maximum[1]	12-Month Average[2]
Total Dissolved Solids (TDS)	mg/L	1785	889
Nitrate (as NO_3)	mg/L	18	9
Boron	mg/L	1.3	0.67
Chloride	mg/L	714	356
Sulfate	mg/L	892	445
Manganese	mg/L	0.089	0.044
Fluoride	mg/L	1.78	0.89
Methylene Blue Active Substances (MBAS)	mg/L	0.89	0.44
Iron (Fe)	mg/L	0.54	0.27

1. The daily maximum effluent limitation shall apply to the results of a single composite or grab sample.
2. The 12 month average effluent limitation shall apply to the arithmetic mean of the results of all samples collected during any 12 consecutive calendar month period.

Biosolids Disposal Practices:

Biosolids from Hanson Elementary School are removed on an annual basis, or as needed depending on solids build-up, by a licensed hauler.

San Pasqual Academy:

The County of San Diego has recently taken over responsibility for this facility and the RWQCB is in the process of updating the Land Disposal Order.

Septic Systems

Hodges Watershed:

The primary goal in this section is to identify areas where septic systems may pose a threat to water quality. Septic systems treat and disperse relatively small volumes of wastewater from individual or small numbers of homes and commercial buildings. Poorly managed systems have been named as a concern by nearly every federal and state program that deals with water resource issues. San Diego County's Department of Environmental Health maintains records of septic tank permits at their San Marcos and El Cajon offices. Prior to 2002, no electronic database existed to query the location, type, etc. of these permits. There are an estimated 90,000-100,000 homes county-wide on septic systems.

Estimates of septic system density for the 1996-2000 WSS were calculated by using the 1990 census tract data to determine population density with in each watershed. Next, a data layer of sewered and un-sewered areas was created from the City data base and from SanGIS community plan data. The sewered areas layer was overlaid with population density to create a new data layer. This data layer was queried to pull out polygons that were un-sewered with a population density greater than zero. Graduated color was applied to the septic density field to enable visual assessment of high potential concentrations of septic tanks.

In 2002 the County of San Diego Department of Environmental Health initiated an electronic database to track septic system permits issued throughout the County. The database does not contain historical permits issued before 2002, so an exact number of permits in a given community cannot be determined. However, the database indicates where new permits are being issued and if these permits are for new construction, repair, fire rebuild, etc. In addition, the permit records the hydrologic sub area where the septic system is located.

A data layer of the hydrologic sub areas of San Diego County was obtained from SanGIS. Numbers of permits issued in each hydrologic sub area was determined from the Counties database. Graduated colors were applied to the hydrologic sub area within each watershed to enable visual assessment of high issuant of septic system permits (Figure 5-3.9).Table 5-3.19 lists the communities within the watershed along with the number and type of septic system permits issued since 2002.

Table 5-3.19 Number and Type of Septic System Permits in the Hodges Watershed

	Type of System			
Community	**New**	**Repair or Modified**	**Fire Rebuild**	**Other**
Escondido	104	130	0	12
Ramona	187	143	0	5
Del Dios	0	3	0	2

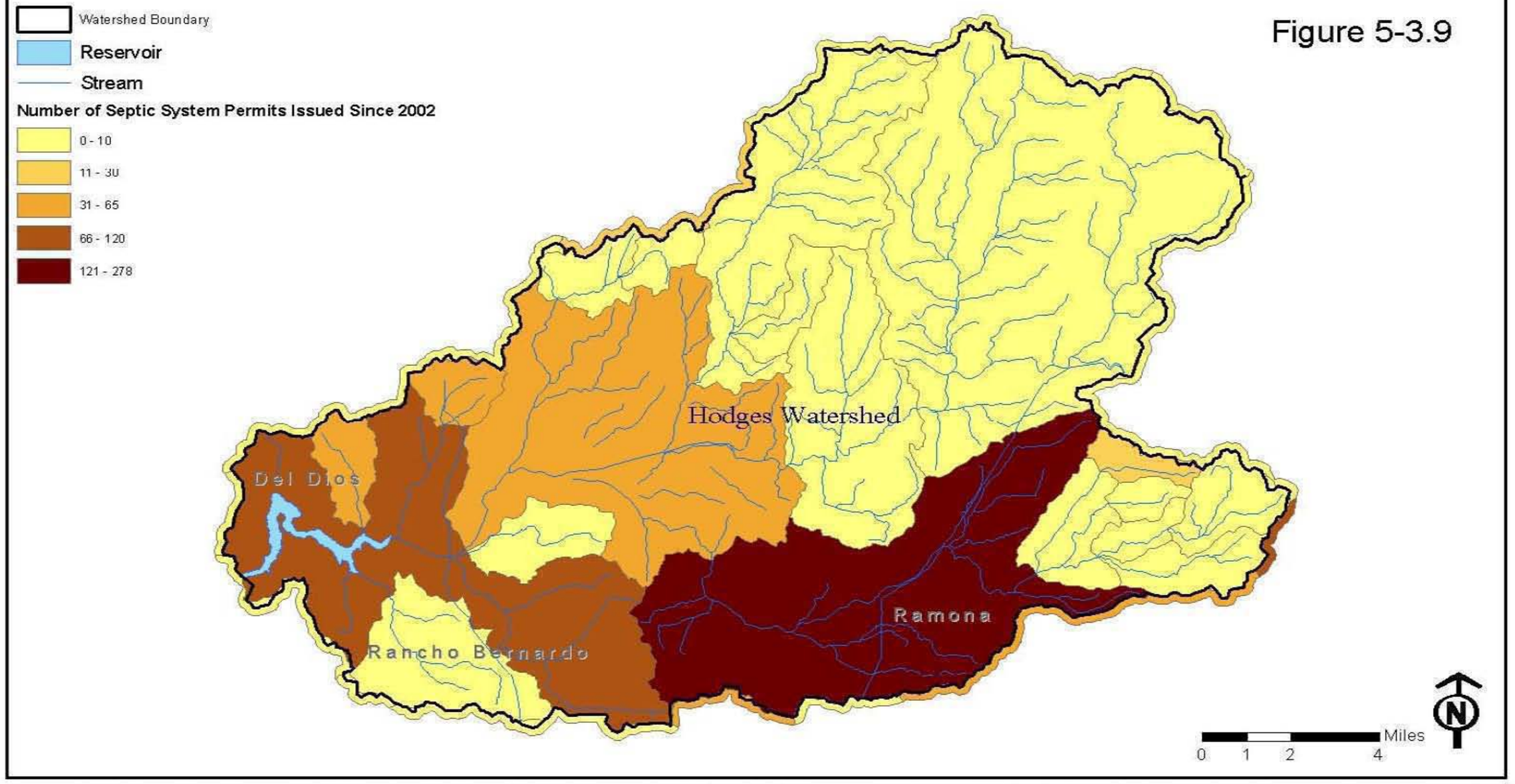
Sanitary Sewer Overflows

There were 37 sanitary sewer overflows in the Hodges Watershed reported to the Regional Water Quality Control Board (RWQCB) from 2001 through 2004 (Table 5-3.20). The current data available from the RWQCB is through June 30, 2004. Detailed information regarding sanitary sewer overflows is available at the Regional Water Quality Control Board website (www.swrcb.ca.gov/rwqcb9).

Table 5.3-20 Hodges Watershed Sanitary Sewer Overflows 2001 - 2004					
Year	RWCQB Tracking Number	Total Overflow Volume (Gallons)	Overflow Volume Released to Environment (Gallons)	Reach Surface Waters other than Storm Drain?	Receiving Waters
2001	001003	75	75	N	
2001	001004	25	0	N	
2001	001006	90	80	Y	Green Valley Creek
2001	001031	90	90	N	
2001	001036	20	0	N	
2001	001038	1500	1490	Y	Kit Carson/Dead Horse Creek
2001	001046	20	15	N	
2001	001048	710	360	Y	Pond at Kit Carson Park
2001	001224	200	20	Y	no information listed
2001	012002	450	400	N	
2001	012002	200	0	N	
2001	012004	450	120	N	
2001	012005	480	480	N	
2001	012014	50	0	N	
2001	012018	315	65	Y	Kit Carson Creek
2001	012019	300	0	N	
2001	012021	50	30	Y	Felicita Creek
2001	012022	5000	5000	Y	Felicita Creek
2001	162980	530	530	Y	"Canyon"
2001	186801	1575	1575	Y	Moon Song Creek
2001	201034	860	760	N	
2002	012001	25000	0	N	
2002	012023	750	650	Y	Felicita Creek
2002	023001	200	150	N	
2002	023002	300	100	N	
2002	023003	120	70	Y	Green Valley Creek
2002	023007	30	0	N	
2002	276811	15450	13950	Y	"Creek Bed"
2003	023004	630	630	N	
2003	023018	450	450	Y	Dead Horse Creek
2003	023019	750	750	Y	Dead Horse Creek
2003	034001	200	200	Y	Green Valley Creek
2003	034001	250	250	N	
2003	034002	500	500	Y	Green Valley Creek
2004	034002	3000	2750	Y	Santa Maria Creek
2004	034003	200	200	N	
2004	034005	500	400	Y	Green Valley Creek

Septic System Permits Issued in the Hodges Watershed Since 2002

Figure 5-3.9



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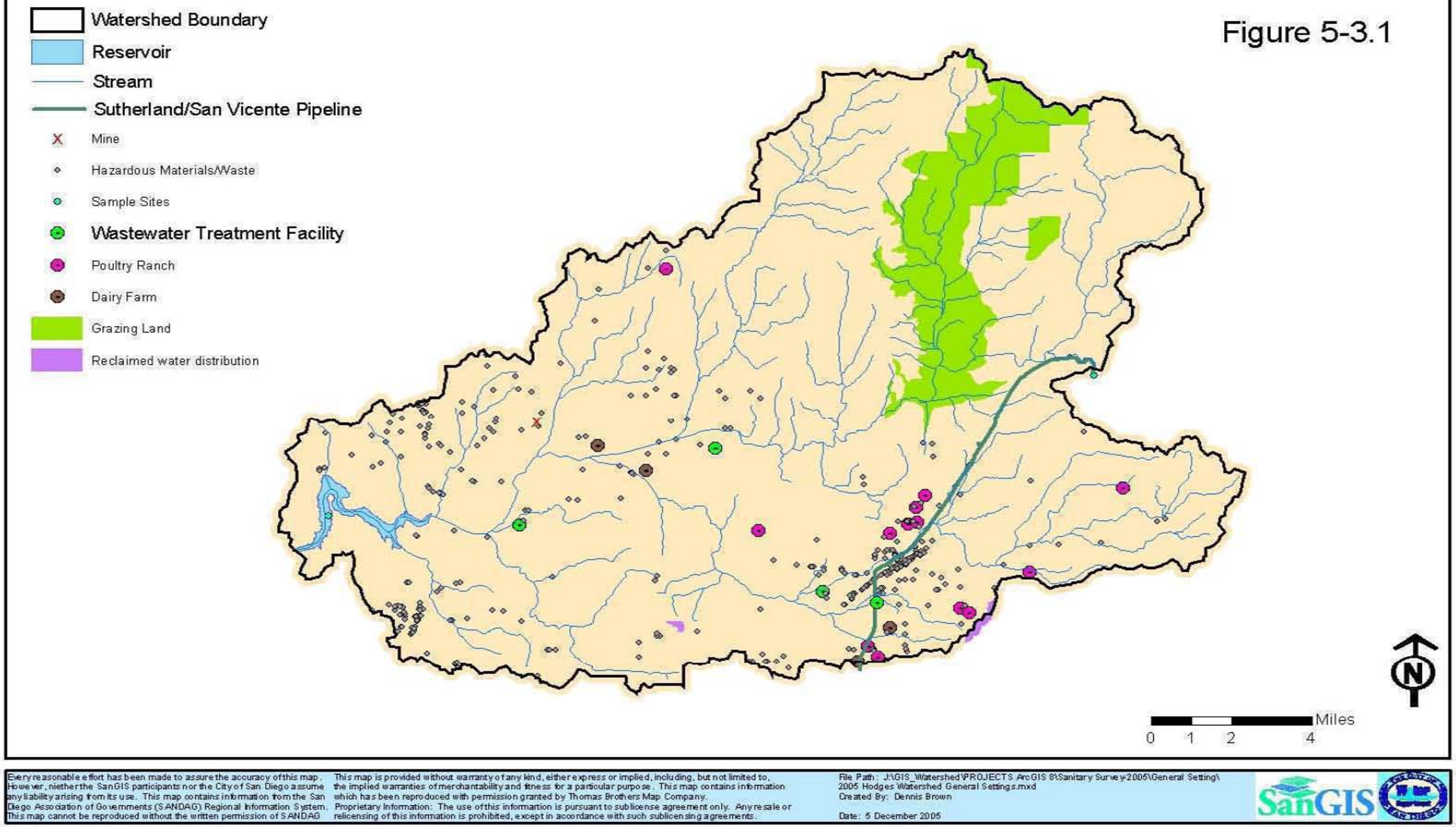
Created By: Dan Datt
Date: 11/10/05

SanGIS

Hodges Watershed GENERAL SETTING

Figure 5-3.1



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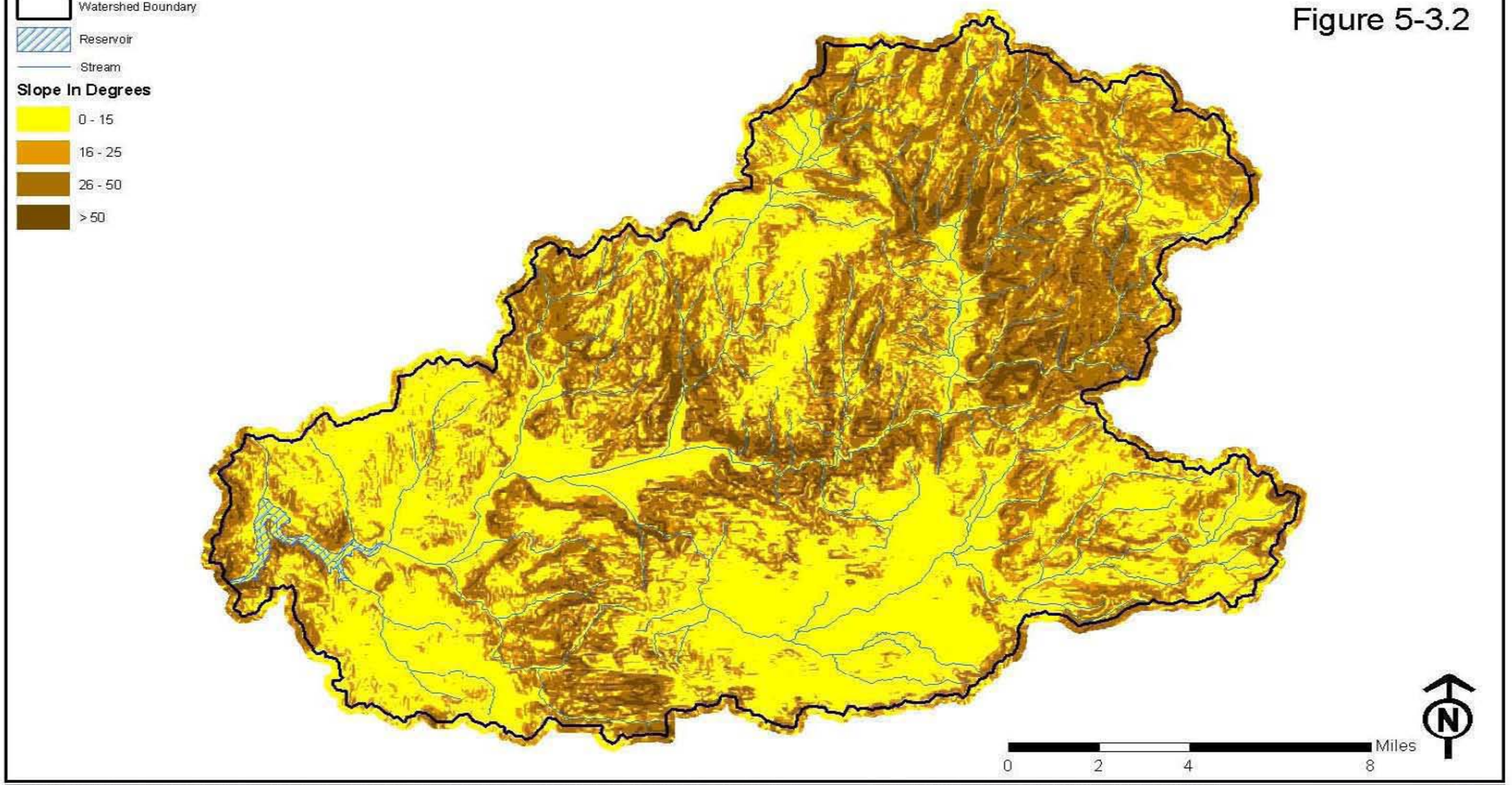
Date: 5 December 2005

SanGIS

Hodges Watershed SLOPE

Figure 5-3.2



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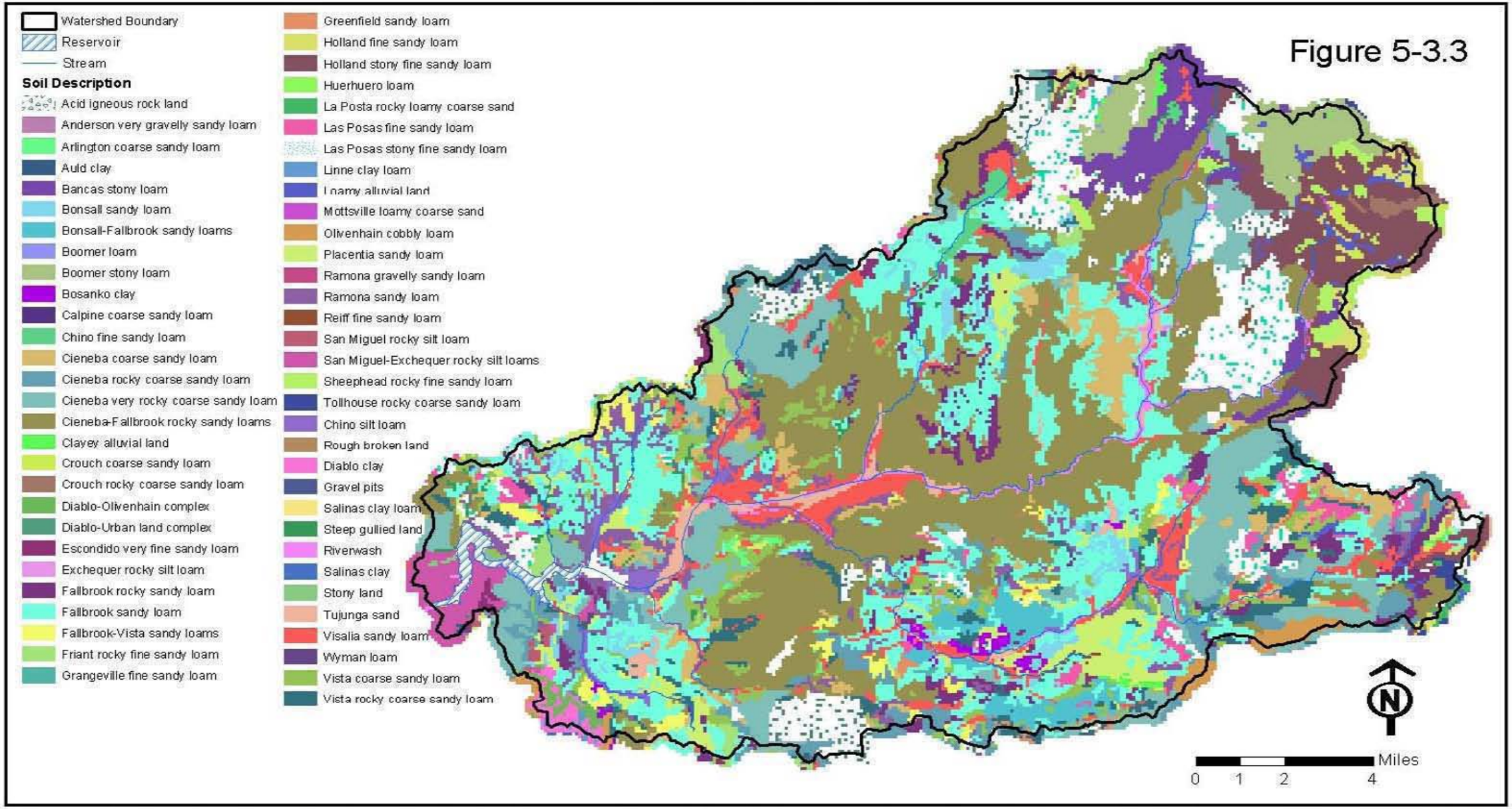
Date: 08.02.05

SanGIS

Hodges Watershed SOILS

Figure 5-3.3



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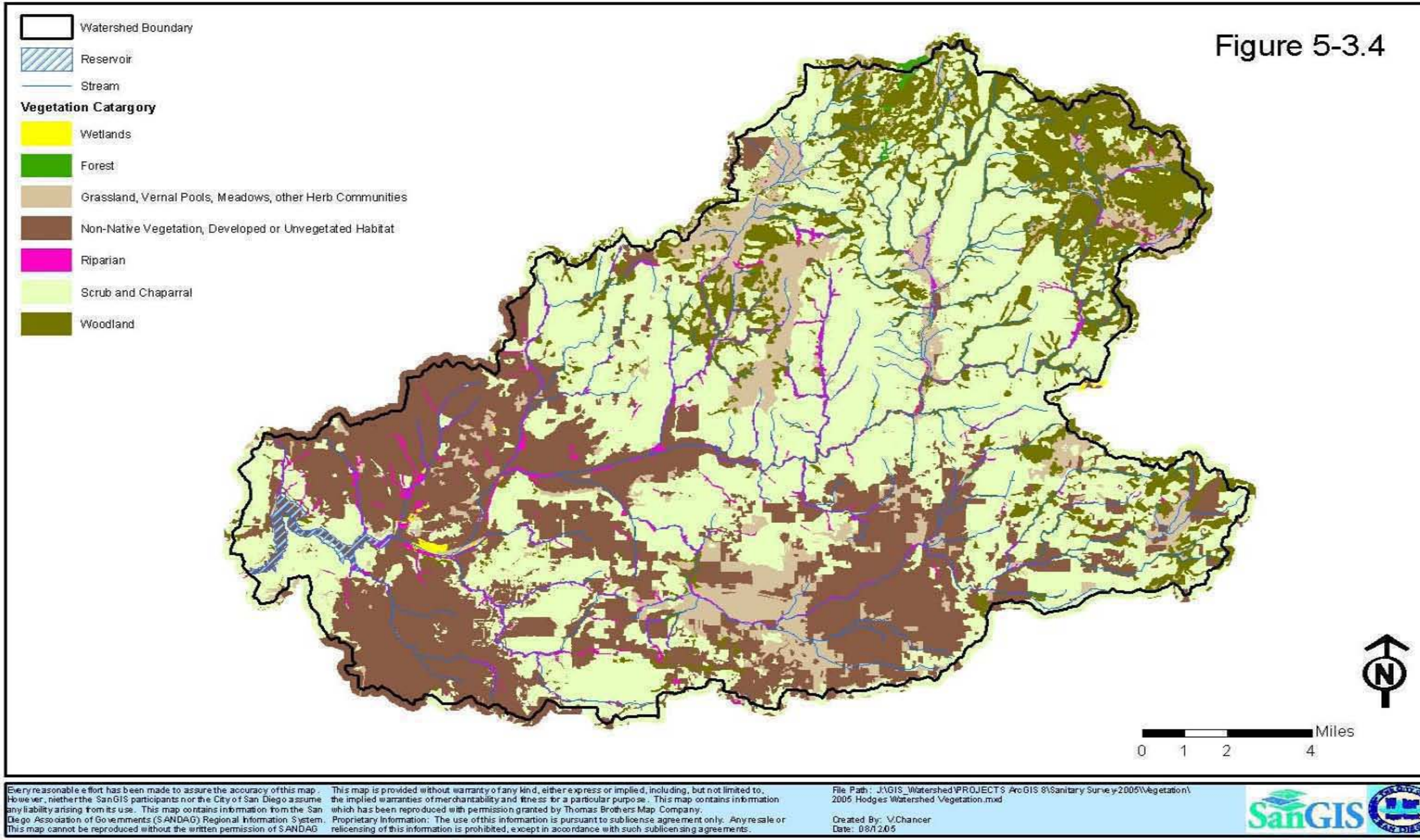
Date: 7 September 2005

SanGIS

Hodges Watershed VEGETATION

Figure 5-3.4



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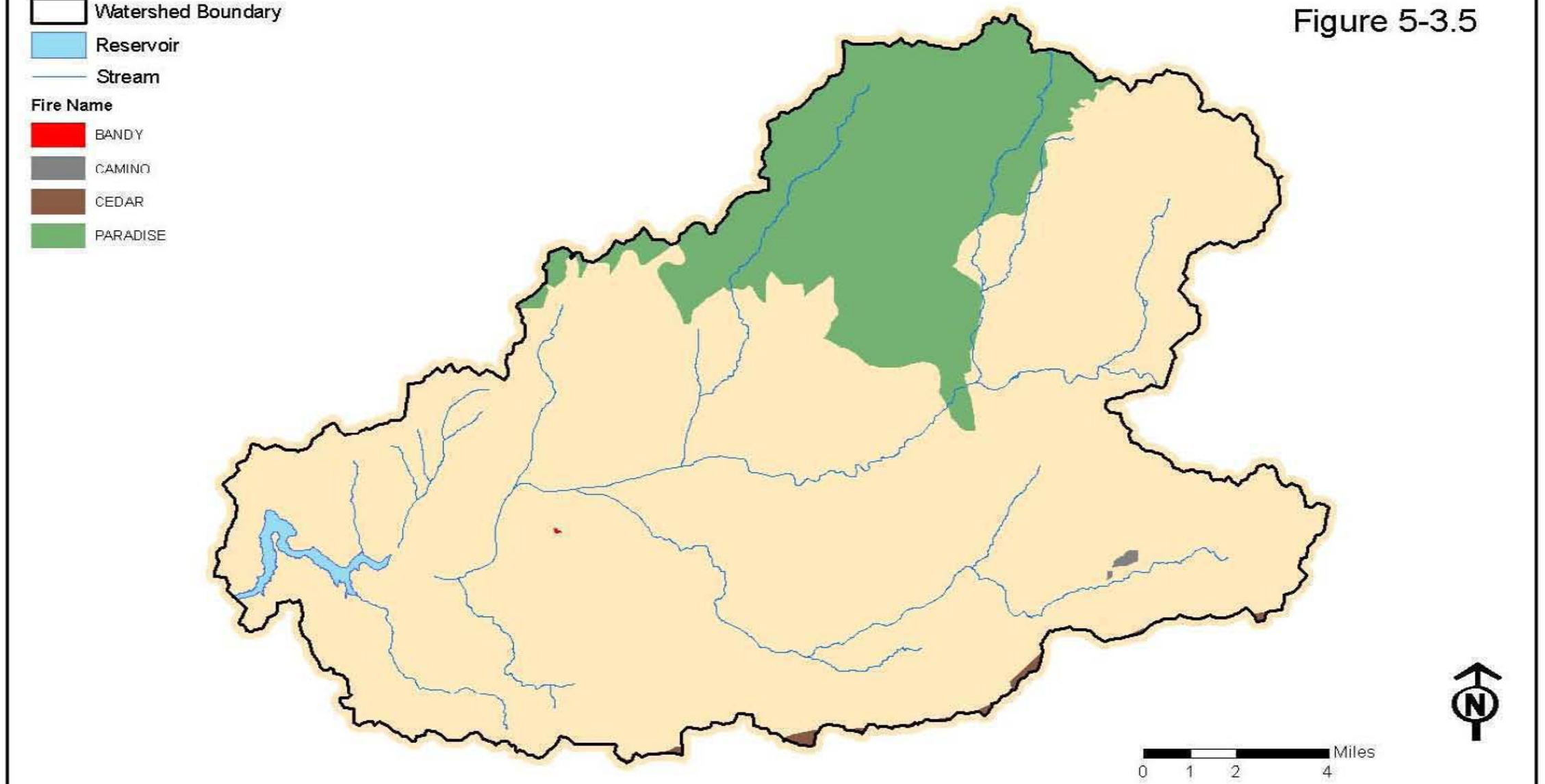
Created By: V.Chancer
Date: 08/12/05

SanGIS

Fire Perimeters for the Hodges Watershed

Figure 5-3.5



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Created By: Dan Datt
Date: 11/28/05

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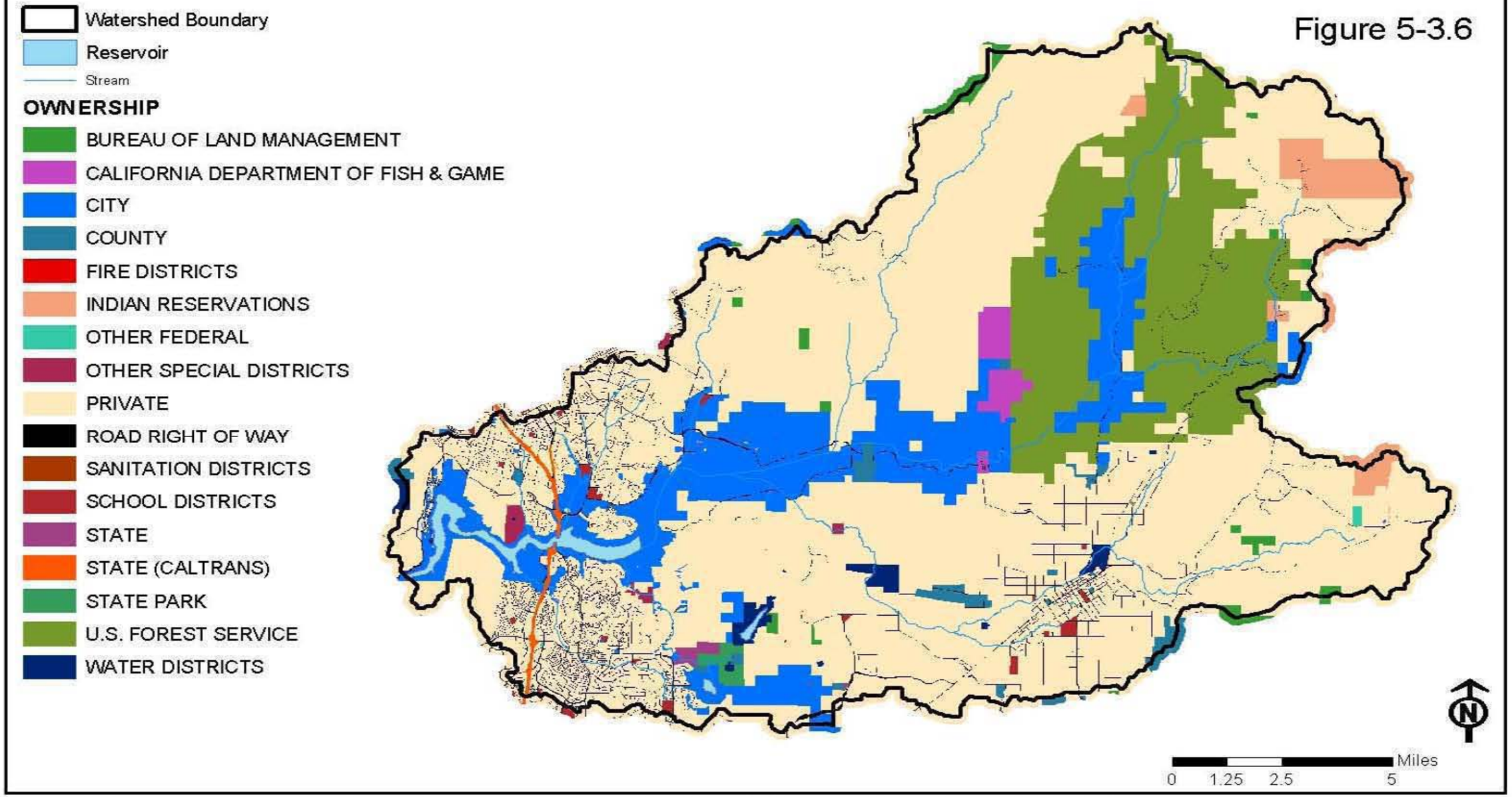
Hodges Watershed LAND OWNERSHIP

Figure 5-3.6



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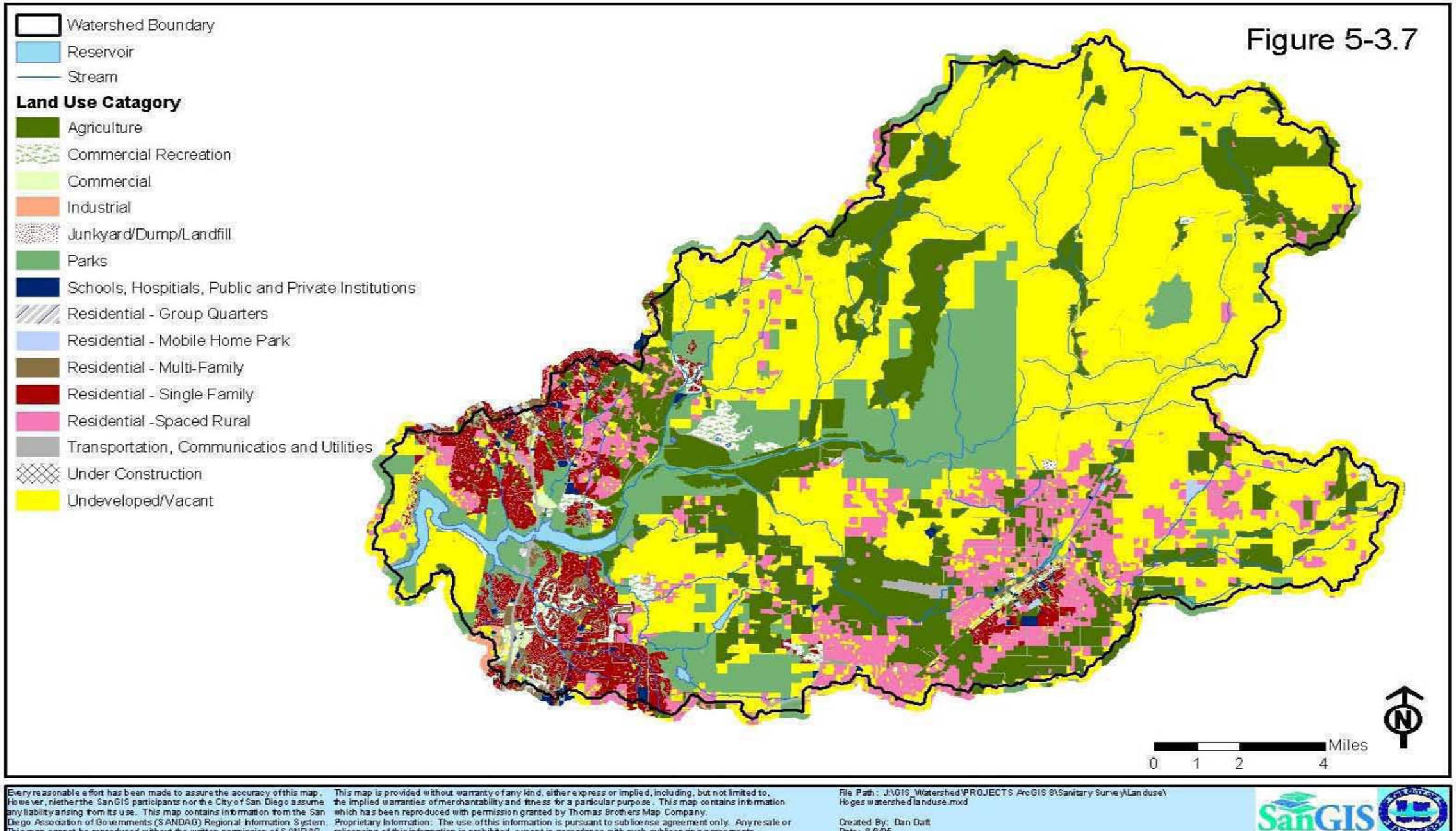
Created By: Dennis Brown
Date: 4 January 06

Hodges Watershed LANDUSE

Figure 5-3.7



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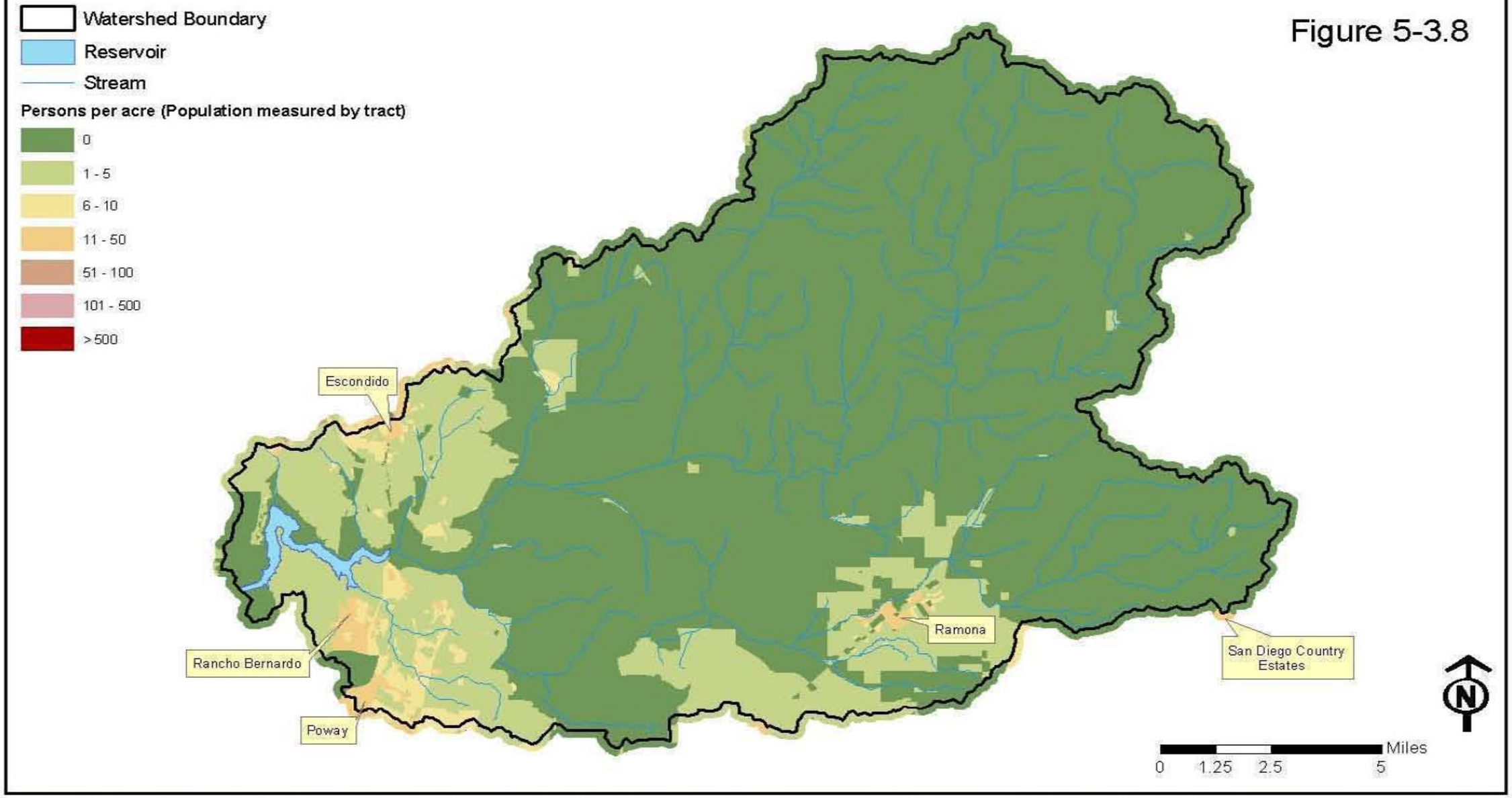
Date: 8/6/05

SanGIS

Hodges Watershed POPULATION DENSITY

Figure 5-3.8



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Date: 22 December 2005

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