CHAPTER 11: WATER QUALITY TREATMENT LEVEL OF SERVICE

11.1 Overview

This chapter describes the results of the pollutant loading analysis performed in Chapter 10. Based on these results, a water quality treatment level of service was determined at the subbasin and watershed levels within the Rocky/Brushy Creek watershed. This type of analysis will facilitate prioritization of water quality improvement alternatives (projects) for the Rocky/Brushy Creek watershed.

Water quality treatment levels-of-service (LOS) criteria were used as part of this watershed study to allow comparisons of existing and proposed stormwater treatment conditions to pollutant loading goals and to help prioritize alternatives throughout the watershed.

Excess nitrogen can stimulate algal growth resulting in reduced light penetration through the water column and subsequent shading and loss of seagrass. The nitrogen reduction goal is based on loads generated by several potential inputs including point sources, atmospheric deposition, and non-point source runoff from various land uses. The intent of this management effort is to protect water quality and, ultimately, valuable natural resources in the Rocky/Brushy Creek watershed. Other factors that affect light availability in the bay are also of concern, including excess total suspended solids (TSS) loads.

11.2 Water Quality Treatment Level of Service

The identification of problem areas and pollutant load reduction goals is an important step in protecting the river, reservoir, lakes, and groundwater within the watershed, as well as the downstream estuary. For this analysis, three specific pollutants were identified and discussed in greater detail due to their importance in local water (quality) management programs. These parameters include total suspended solids (TSS), total phosphorus, and total nitrogen. In addition, based on specific concerns, some subbasins required assessment of other parameters, including heavy metals and bacteria. The results of this modeling effort and the implementation of alternatives proposed in later chapters of this report will be an important step in restoring and protecting the surface water within the Rocky/Brushy Creek watershed.

The modeling effort in this plan focuses on land use and soil conditions as a basis for evaluating sources of pollutant loads and does not include any routing of pollutants. For comparison purposes, pollutant loads based on stormwater runoff from single family (low to medium density)

residential land use were selected as the standard (benchmark) for comparison. In this manner, the calculation of pollutant loads is consistent with the concept of standard residential unit (SRU) sometimes used for stormwater utility assessments.

The procedure to identify a treatment LOS designation for each subbasin consisted of the following steps:

1. Net pollutant loads were calculated for each pollutant of interest based on 2004 land uses, soils, and existing stormwater treatment best management practices (BMPs) (completed in Chapter 10);

2. Benchmark pollutant loads were calculated for each pollutant based on the assumption that 100% of the watershed area was developed for low/medium residential land uses and there is no existing stormwater treatment;

3. Ratios of net load/gross load were calculated;

4. Criteria described below were applied to each subbasin for each pollutant to determine the LOS for the subbasin.

Based on the following ranges, water quality LOS criteria were defined as a score from A through F:

- **LOS A**, net load equivalent to 20% or less of untreated single family residential. A LOS equal to A for a subbasin would indicate the presence of a high percentage of undisturbed natural systems, or high percentages of developed areas treated with BMPs capable of removing pollution levels to those representing natural systems. Areas where typical land uses (residential) exhibit stormwater treatment levels above the minimum required per 62-40.432(5) F.A.C. (Water Policy) would also receive LOS A.

- **LOS B**, net load equivalent to between 20 and 40% of untreated single family residential areas. A LOS equal to B would indicate the presence of BMPs with removal efficiencies consistent with those representing adequately designed and maintained conditions and a relatively even mix of developed and natural land uses.

- **LOS C**, net load equivalent to between 40 and 70% of untreated single family residential areas. A LOS equal to C would indicate the presence of treatment systems showing removal efficiencies consistent with those representing average to poorly maintained conditions and a greater percentage of developed versus natural land uses.

- **LOS D**, net load equivalent to between 70 and 100% of untreated single family residential areas. A LOS equal to D would indicate minimal treatment of sub-basin discharges and relatively high percentage of developed land uses.

- **LOS F**, net load equal to or greater than 100% of untreated single family residential areas. A LOS equal to F would indicate no treatment for sub-basin discharges, or the presence of extensive areas of land uses producing larger pollution loads per unit area than typical residential land uses.

11.2.1 Water Quality Level-of-Service Pollutant Load Calculations

Benchmark pollutant loads were calculated for each pollutant based on the assumption that 100% of the watershed area was developed for low/medium residential land uses and no existing stormwater treatment existed in any of the subbasins. Appendix 11-1 provides a summary of the benchmark loads by subbasin for Rocky/Brushy Creek watershed.

11.2.2 Water Quality Level-of-Service Scores

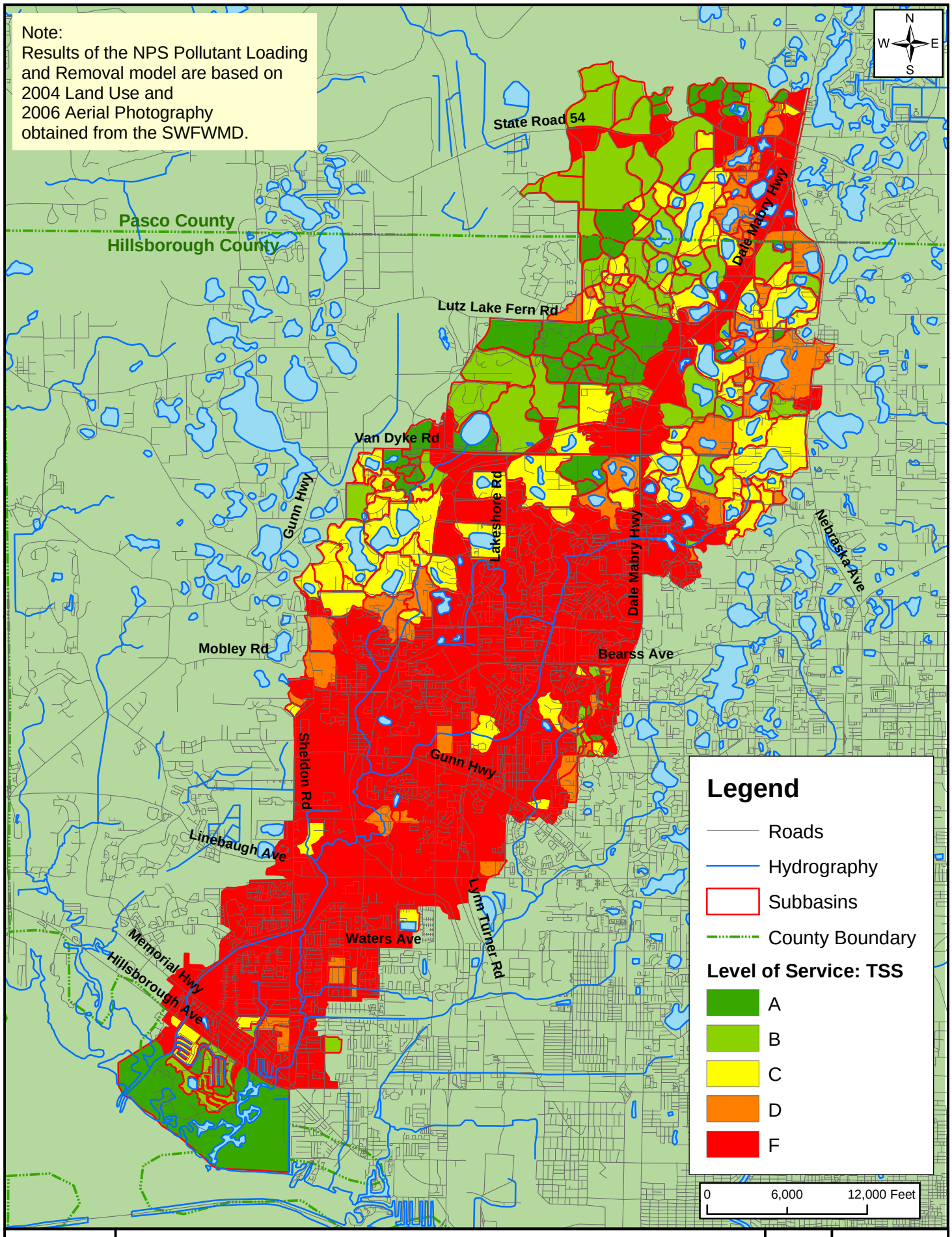
Based on the criteria described above, the treatment level of service designation were developed for each parameter for each subbasin, which are summarized in the Appendix 11-2.

As mentioned earlier, the three most important parameters of concern in this watershed are total suspended solids, total nitrogen, and total phosphorus. The observations on these three parameters are discussed in detail in the following section.

Total Suspended Solids

Total suspended solids (TSS) LOS values were highest in areas dominated by existing natural systems, such as wetlands, upland forests, and rangeland (Figure 11-1). These land uses do not contribute any loads based on the model's EMC value input dataset. On an areal basis, subbasins to the north of the Rocky/Brushy Creek watershed had the greatest coverage of A scores. These areas are comprised of mainly wetlands, upland forests, and rangeland, as well as some open land, recreational, and low density residential land uses. Another area containing a score of A is located to the south of the watershed. This subbasin consists largely of wetlands and serves as an outlet into Old Tampa Bay for a number of creeks and channels, including Rocky and Brushy creeks. Overall, the proportion of subbasins with high TSS LOS scores in the Rocky/Brushy Creek watershed is significantly smaller than the proportion of similar subbasins within Brooker and Double Branch watersheds. The Rocky/Brushy Creek watershed seems to be heavier polluted than other watershed in the northwest Hillsborough County region.

The remaining subwatersheds were dominated by the scores of C, D, and mostly F and were primarily characterized by high density residential, transportation and utilities, and small patches of other land use types. Developed land uses are characterized by relatively large impervious surface area (such as roads, buildings, parking lots, etc.), which have relatively high runoff coefficients and TSS loads. As was indicated in chapter 10, EMC values for highways/utilities land use category are the highest out of all other land uses. According to the Hillsborough County NPS Pollutant Loading and Removal Model, this land use contributes approximately 261mg of total suspended solids per every liter or runoff.



Water Quality Treatment Level of Service by Subbasin for Rocky/Brushy Creek Watershed: TSS

Figure 11-1

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Rocky/Brushy Creek watershed encompasses a number of major roads, including Dale Mabry Highway and Veterans Expressway, as well as a dense network of smaller roads. As Figure 11-1 indicates, almost all subbasins located in the center and to the south of the watershed have LOS values of F. Central portion of the watershed contains several large residential neighborhoods, such as Northdale, Carrollwood, and Citrus Park, as well as many smaller residential subdivisions. South of the Rocky/Brushy Creek watershed also contains a number or residential subdivisions. They include Byars Hights, Bay Port Colony, Timberlane, and Town'n'Country. All of these subdivisions are densely populated and contribute substantial amounts of TSS and other pollutants into the watershed every year.

Total Nitrogen

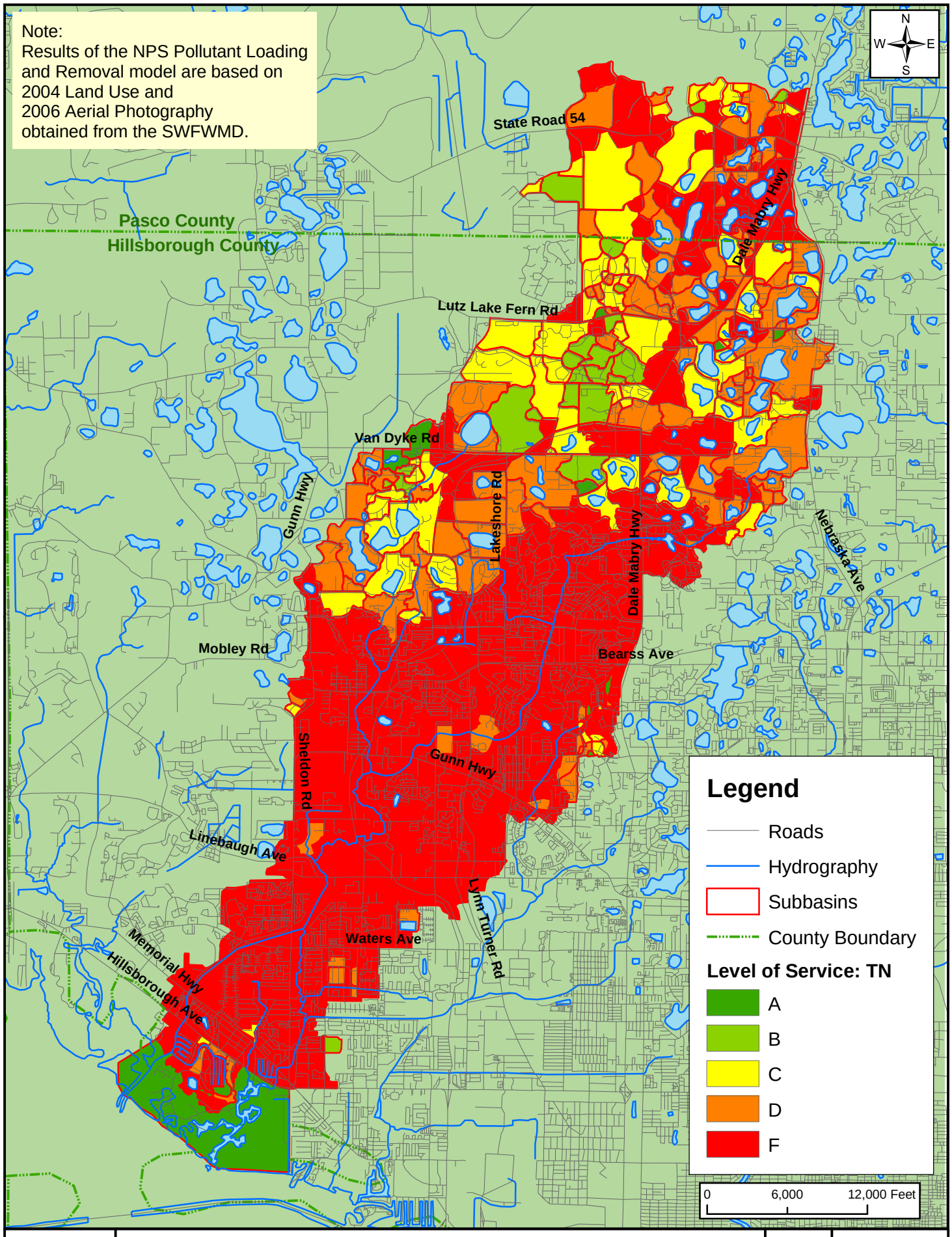
Total nitrogen LOS values were also highest in the few areas dominated by existing natural systems (wetlands and uplands) (Figure 11-2). These land uses do not contribute any loads based on the model's EMC value input dataset, and are concentrated within the northern portion of the watershed. Unlike the distribution of TSS scores, fewer A scores occurred throughout the watershed for TN. This is mainly due to greater contributions of total nitrogen from agricultural and residential land uses than TSS. The remaining areas surrounding the Rocky/Brushy Creek watershed had predominantly C, D, but mostly F scores. Lower scores in the central and southern subbasins were primarily due to extensive high density residential land uses contained within various residential subdivisions that dominate these areas of the Rocky/Brushy Creek watershed. Central portion of the watershed contains such subdivisions as Northdale, Carrollwood, and Citrus Park, while Byars Hights, Bay Port Colony, Timberlane, and Town'n'Country are located to the south.

The remaining subbasins with low scores were primarily dominated by agriculture, low density residential, and natural land uses. A number of golf courses also exist around the watershed. The distribution of poor scores was consistent with total nitrogen loading calculations for representative stations based on actual concentration and discharge data described in Chapter 7.

Total Phosphorus

A number of subbasins containing concentration of A LOS scores for total phosphorus are located in the northern portion of the watershed (area to the north of Van Dyke Road and to the west of Dale Mabry Highway), and the southern portion of the watershed (the southernmost subbasin of the watershed, draining into the Old Tampa Bay) (Figure 11-3). These areas are comprised of a variety of land uses, such as wetlands, forested wetlands, upland forests, low density residential, recreational, and others. Some subbasins with LOS scores of B and C are also located to the north of the watershed (north of Van Dyke Road) and towards the center of the watershed (around the Linebaugh Avenue area). These subbasins include water, wetlands, upland forested, rangelands, recreational, and residential lands.

The remaining areas were dominated by D and F scores due to the extensive presence of high-density residential land uses.



Water Quality Treatment Level of Service by Subbasin for Rocky/Brushy Creek Watershed: TN

Figure 11-2

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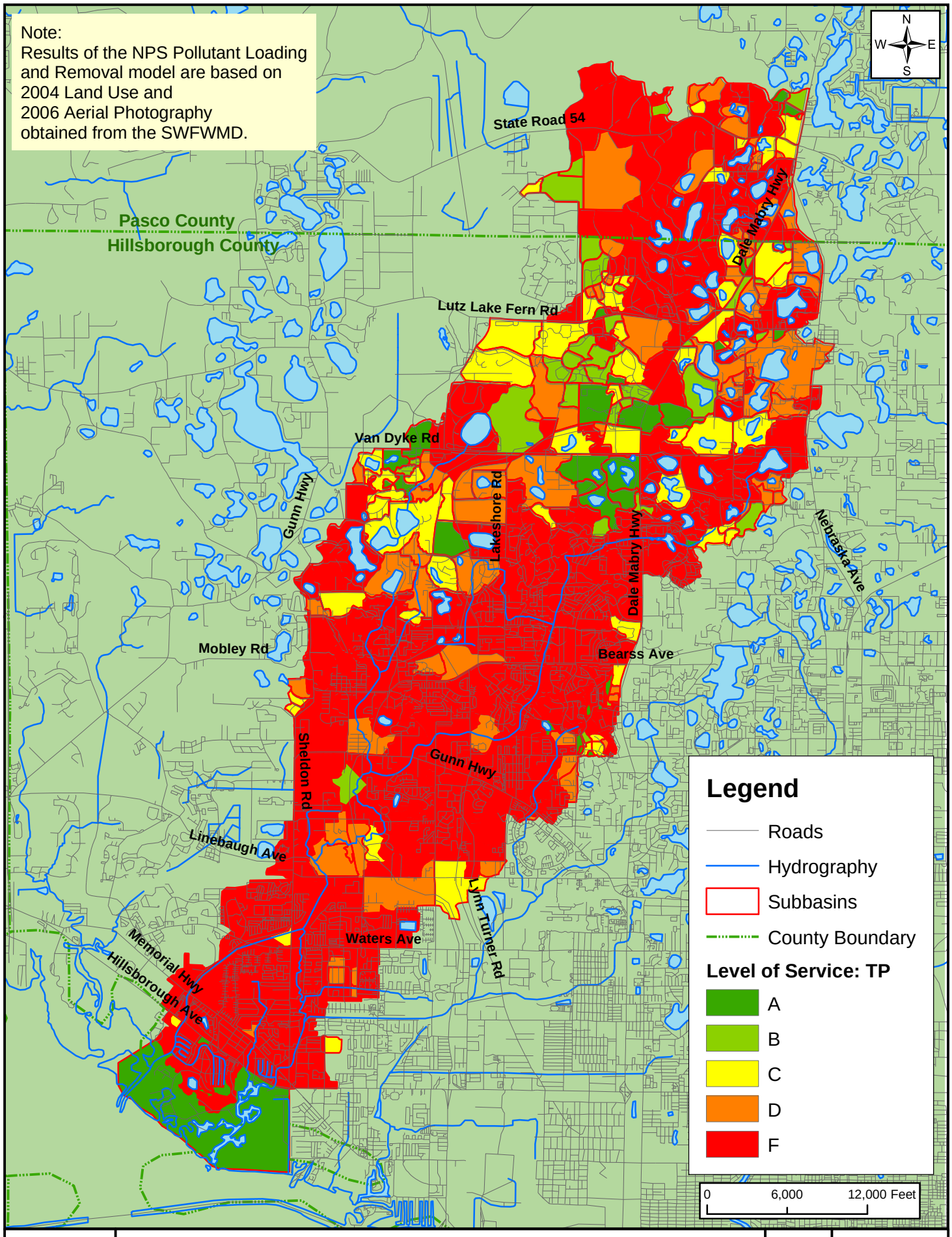


Water Quality Treatment Level of Service by Subbasin for Rocky/Brushy Creek Watershed: TP

Figure 11-3

AVRES ASSOCIATES

Once again, Rocky/Brushy Creek watershed is a home to such major residential subdivisions as Northdale, Carrollwood, Citrus Park, Byars Hights, Bay Port Colony, Timberlane, and Town'n'Country.

Overall Water Quality

The overall LOS score for the entire Rocky/Brushy Creek watershed is an F (using an average score for all parameters combined). The scores of D and F for total nitrogen, total phosphorus, and TSS dominated the watershed, with greatest concentrations located towards the center and south of the watershed, where major residential neighborhoods are located. This area is predominantly comprised of various density residential land uses. These land uses contribute large quantities of various pollutants into surface water bodies. The overall low LOS score for the entire watershed (F) indicates that most subbasins have been developed and extensive contiguous natural systems do not exists in the watershed.

Unless appropriate treatment measures are implemented, continued loading to surface waters in the watershed, eventually, into Old Tampa Bay may result in significant water quality degradation in the future. Efforts to reduce loading of pollutants to the Rocky and Brushy creeks and their tributaries, lakes, sinkholes, and groundwater should be incorporated into future management activities for the watershed. Future efforts to reduce pollutant loading may include implementation of local and regional stormwater best management practices (BMPs - wet detention ponds, baffle boxes, alum treatment, etc.), low impact development, source reduction (e.g., education programs for home and business owners to reduce fertilizers and illicit discharges), improved wastewater treatment practices (extending centralized sewer systems to areas treated by on-site disposal systems or septic tanks), and restoration/conservation of natural lands and riparian buffer areas to reduce current and future pollutant loads.

In order to determine the magnitude of pollutant load reduction needed to achieve an LOS score of A, differences between net loads (from Chapter 10) and benchmark loads that would result in an LOS score of A were calculated (Table 11-1). It was observed that average reductions of pollutants would need to be very high (>86%) for all 12 parameters to achieve A LOS scores. Considering the removal efficiencies of the available stormwater BMPs, achieving these goals would require an extremely aggressive implementation program. In some cases, it may not even be possible to achieve the extent of reduction needed if the options are limited to the BMPs considered in this model. For example, the Rocky/Brushy Creek watershed exhibited low LOS scores for total nitrogen. Figure 11-4 compares the percent reduction of TN loading in the Rocky/Brushy Creek watershed necessary to achieve an LOS score of A with the removal efficiencies of various BMPs. The load reduction required to achieve an LOS score of A in this subwatershed is over 82%. Even with the best BMP available in the model for total nitrogen (percolation), such reduction cannot be achieved. This means that if all of the runoff for the watershed is treated through percolation ponds, only 80% reduction in loading would be realized as opposed to the higher percent reduction that would be necessary to achieve an LOS A designation.

Table 11-1 Estimated Pollutant Loads (lbs/year/acre) and Percent Reductions needed to equal LOS A loads for Rocky/Brushy Creek Watershed

	BOD5	TSS	TKN	NO3 +NO2	TN	TP	TDP	Oil and Grease	Cd	Cu	Pb	Zn
Benchmark Loads	3.80	72.22	4.11	1.07	5.18	1.52	1.07	4.11	0.00	0.05	0.03	0.08
Allowable Load to Achieve LOS A	0.76	14.37	0.82	0.21	1.03	0.30	0.21	0.82	0.00	0.01	0.01	0.02
Net Loads Based on Existing Land Use and Treatment	14.214	90.567	4.410	1.298	5.667	2.335	1.320	2.782	0.015	0.102	0.179	0.152
Percent Reduction Required to Achieve LOS A	95%	84%	81%	84%	82%	87%	84%	71%	95%	90%	97%	89%
Load Reduction Required to Achieve LOS A	13.46	76.20	3.59	1.09	4.64	2.03	1.11	1.97	0.01	0.09	0.17	0.14

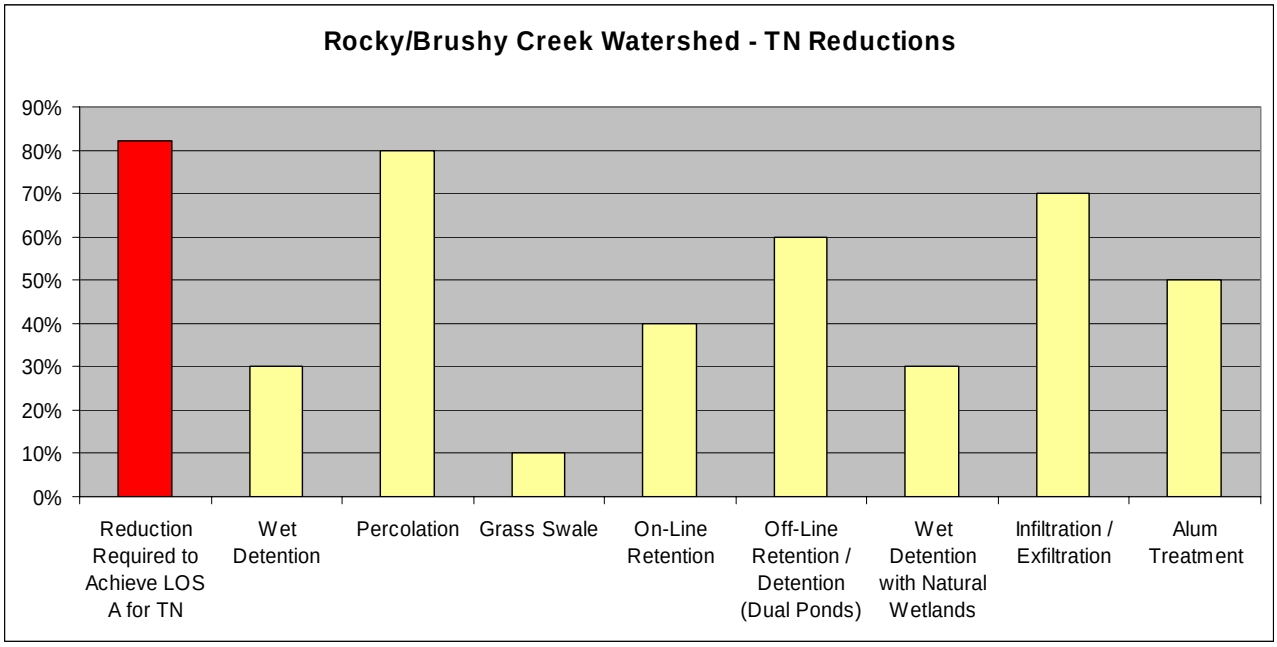
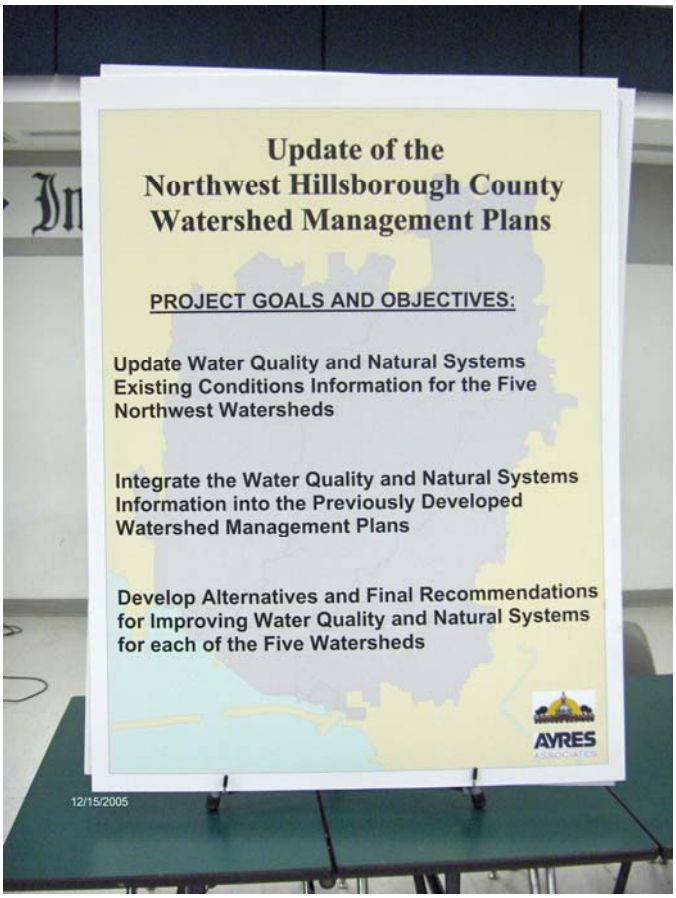


Figure 11-4 Comparison of the Reduction required to achieve an LOS A Designation with the removal efficiencies of various best management practices for TN

CHAPTER 12: PUBLIC MEETING

The first public meeting was held on December 14, 2005 at Sickles High School (Hillsborough County, Florida). The meeting began at approximately 6:30 p.m. and ended at approximately 8:30 p.m. EDT.



A handout containing the project description, project history, and a list of project contacts was made available to the public (Appendix 12-1), along with comment forms.

The format of the public meeting was relatively informal and was conducted for the purposes of sharing information about the project and providing the public with information about the state of water quality in the Brooker Creek, Double Branch, Rocky/Brushy Creek, Sweetwater, and Lower Sweetwater watersheds. The meeting agenda included the following topics:

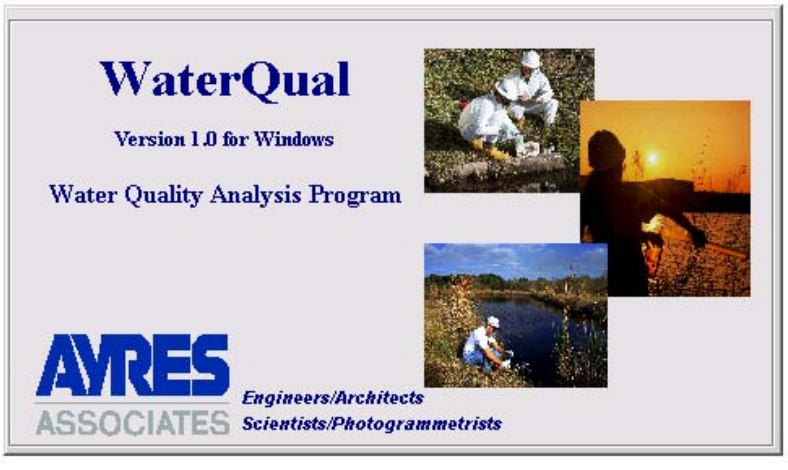
- Introduction
- Goals and objectives of the project
- Description and purpose of the project
- Brief description of other similar projects currently conducted in the area
- Description of the current state of water quality within the project area.
- Questions and answers
- Answering individual questions at the stations.

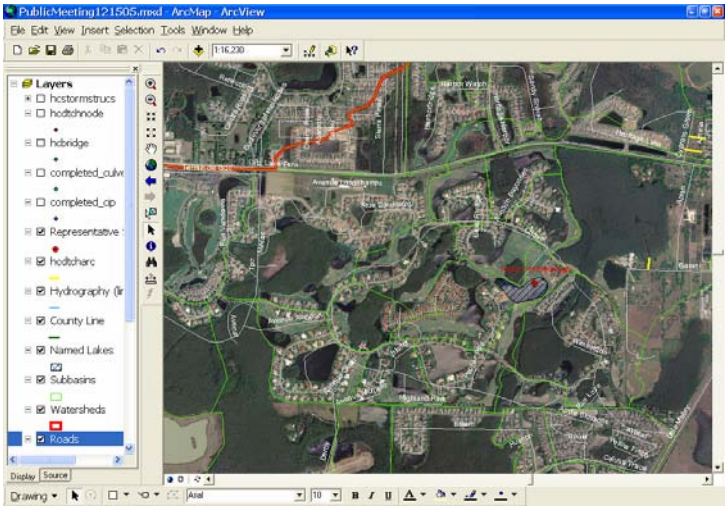
The first portion of the meeting was in the form of a speech, which helped acquaint the local residents with the water quality state of their watersheds and the objectives of the project. A number of poster-sized maps were positioned around the room.

They included:

- Goals and objectives of the project.
- Detailed location map of the project area.
- Aerial photography map of the project area.
- Brooker Creek watershed: location of selected water quality sampling stations and TSI and dissolved oxygen concentration graphs for those locations.
- Double Branch watershed: location of selected water quality sampling stations and TSI and dissolved oxygen concentration graphs for those locations.
- Rocky/Brushy Creek watershed: location of selected water quality sampling stations and TSI and dissolved oxygen concentration graphs for those locations.
- Sweetwater Creek watershed: location of selected water quality sampling stations and TSI and dissolved oxygen concentration graphs for those locations.
- Lower Sweetwater Creek watershed: location of selected water quality sampling stations and TSI and dissolved oxygen concentration graphs for those locations.

Two laptops with GIS capabilities were connected to projectors. One of them contained a GIS database with the following data layers: aerial photography, land use (1999), ELAPP, watershed and subbasin boundary, lakes, water quality stations, CIPs, culverts, and bridge locations. Knowing the name of a lake or a street intersection, an interested resident could obtain a variety of information about a specific area of concern. The second laptop was geared with the WaterQual, a software capable of quickly analyzing and graphically presenting water quality data for different contaminants. By obtaining the name of a water quality station from either the GIS database or one of the posters, an interested resident had an ability to view various historical and recent water quality data trends for a specific location.





Following the Hillsborough County personnel presentation regarding the general description of the project, as well as the state of water quality in the aforementioned watersheds, the floor was opened for questions. The residents of the area asked a number of interesting questions regarding various concerns. One participant asked about the impacts of leaking septic systems on water quality in the watershed. She also requested additional information regarding the preventive maintenance of her septic system that could prevent bacteria from entering ground and surface waters. Another resident requested additional description of the TMDL process. Other questions were pointing at the sufficiency of existing regulations for accidental or deliberate release of chemicals.

After the question and answer session, residents were encouraged to look at the posters and utilize the laptop stations that presented additional information about water quality in the area. Hillsborough County and Ayres Associates staff assumed positions at different stations around the room and spent the next hour answering individual questions of the meeting participants.

For further information about the state of the watershed, the public was encouraged to visit the Hillsborough County Watershed Atlas website at *http://www.hillsborough.wateratlas.usf.edu.*

CHAPTER 13: IDENTIFICATION OF POTENTIAL SOURCES OF CONTAMINATION

13.1 Overview

This chapter describes the potential sources of contamination within the Rocky/Brushy Creek watershed. Identifying sources of contamination for the area will facilitate prioritization of water quality improvement alternatives for the Rocky/Brushy Creek watershed.

13.1.1 Dairy Farms

Dairy farming is an important part of Florida's agricultural industry. Milk and cattle sales from dairies contributed about $459 million to Florida's economy in 2001, about $45 million more than in 2000 (Geisy et al., 2003). However, some elements of today's agriculture, such as dairy farms tend to contribute large amounts of nutrients (primarily nitrogen and phosphorus) into the environment.

According to the US EPA, agriculture was reported to be the most common pollutant of rivers and streams. Nutrients were identified to be among the five leading pollutants causing water quality impairments in lakes, streams, and estuaries of the U.S. (US EPA, 2002).

While searching for potential sources of nutrients in the Rocky/Brushy Creek watershed, we analyzed the existence and locations of dairy farms in the watershed. Eight dairy farm related facilities have been identified in the vicinity of Hillsborough County; however, none were located within the proximity to Rocky/Brushy Creek watershed.

Figure 13-1 shows a map of the Tampa Bay area designating dairy farms in the area. Table 13-1 shows the corresponding numbers from the map which gives the names and addresses of these dairy farms.

While agriculture may still be a major contributor of nutrient pollution in the watershed and will be discussed in more detail in the next section of this chapter, dairy farms were not identified as major sources of pollution in the Rocky/Brushy Creek watershed.

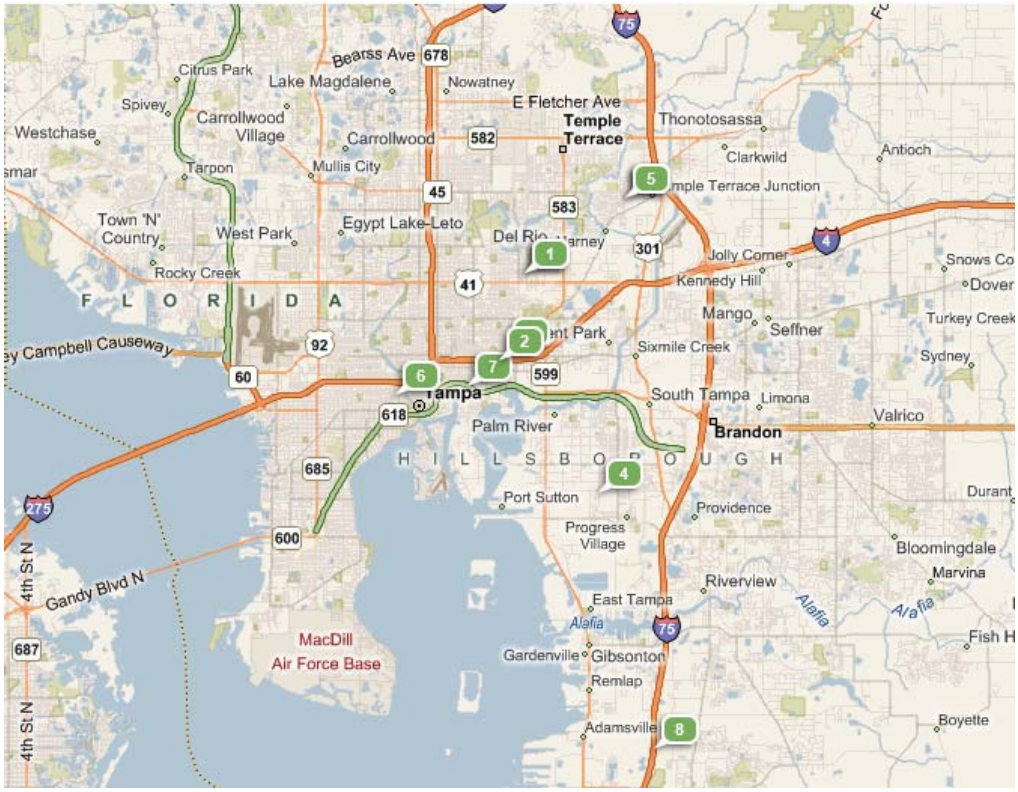


Figure 13-1 Location Map of Dairy Farms Located in the Tampa Bay Area

Table 13-1 Dairy Farm Name and Address from Location Map

1	Sweetheart Dairy & Foods	5610 North 50th Street Tampa, FL 33610
2	Sunny Florida Dairy Inc	2209 North 40th Street Tampa, FL 33605
3	TG Lee Foods	4219 E 19th Avenue Tampa, FL 33605
4	Tower Dairy No 1	4221 78th Street South Tampa, FL 33619
5	Gustafson Dairy	8601 Harney Road Tampa, FL 33637
6	Sunny Florida Dairy	Adamo Drive and N 28th Street Tampa, FL 33605
7	Aprile Farms	11513 Balm Riverview Road Tampa, FL 33602
8	Aprile Farms	9914 Cowley Road Tampa, FL 33602

13.1.2 High Pollutant Contributor Land Use Types

Rocky/Brushy Creek watershed exhibits extremely high concentrations of a number of different pollutants, such as total nitrogen, total phosphorus, and total suspended solids.

The highest contributor of total nitrogen appears to be Highway/Utility land use category, following by Agricultural, Commercial, High Density Residential, Institutional, and Light Industrial land use types.

The highest contributors of total phosphorus are Agricultural and High Density Residential, while contribution of total suspended solids seems to depend largely on the presence of Highway/Utilities land use category.

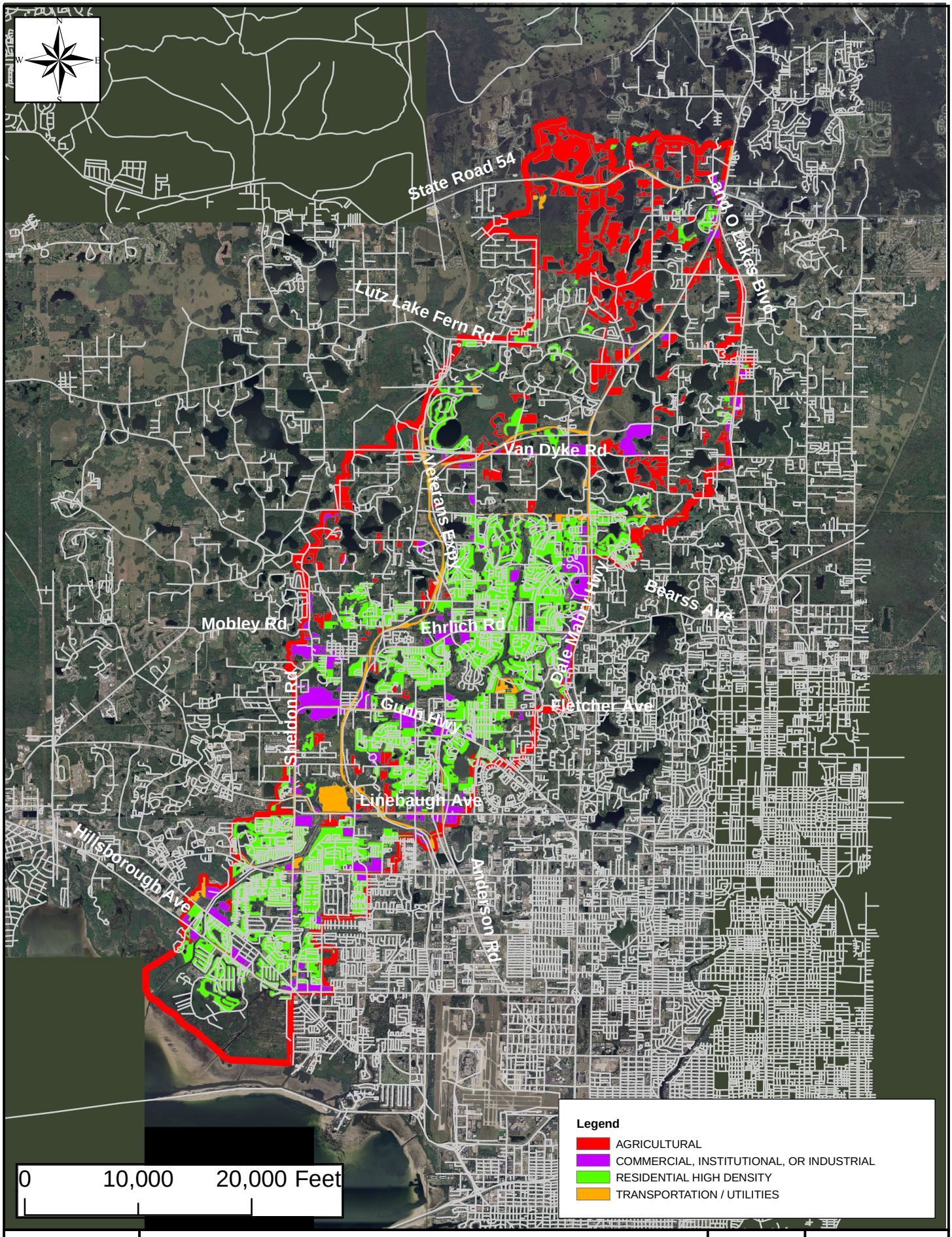
This information is summarized in Table 13-2.

Table 13-2 High Pollutant Contributor Land Use Types per Individual Pollutants

	Total Nitrogen	Total Phosphorus	Total Suspended Solids
Highway/Utility	X		X
Agricultural	X	X	
Commercial	X		
High Den. Residential	X	X	
Institutional	X		
Light Industrial	X		

Figure 13-2 shows the distribution of high pollutant contributor land use types in the Rocky/Brushy Creek watershed.

It is evident from Figure 13-2 that the center and south of the watershed are dominated by various types of residential and other up-built land uses, while north of the watershed contains large agricultural areas. South of the watershed contains a large wetland area adjacent to the Old Tampa Bay; there is a number of small forested and wetland parcels located throughout the watershed.



High Pollutant Contributor Land Use Types in the Rocky/Brushy Creek Watershed

Figure 13-2

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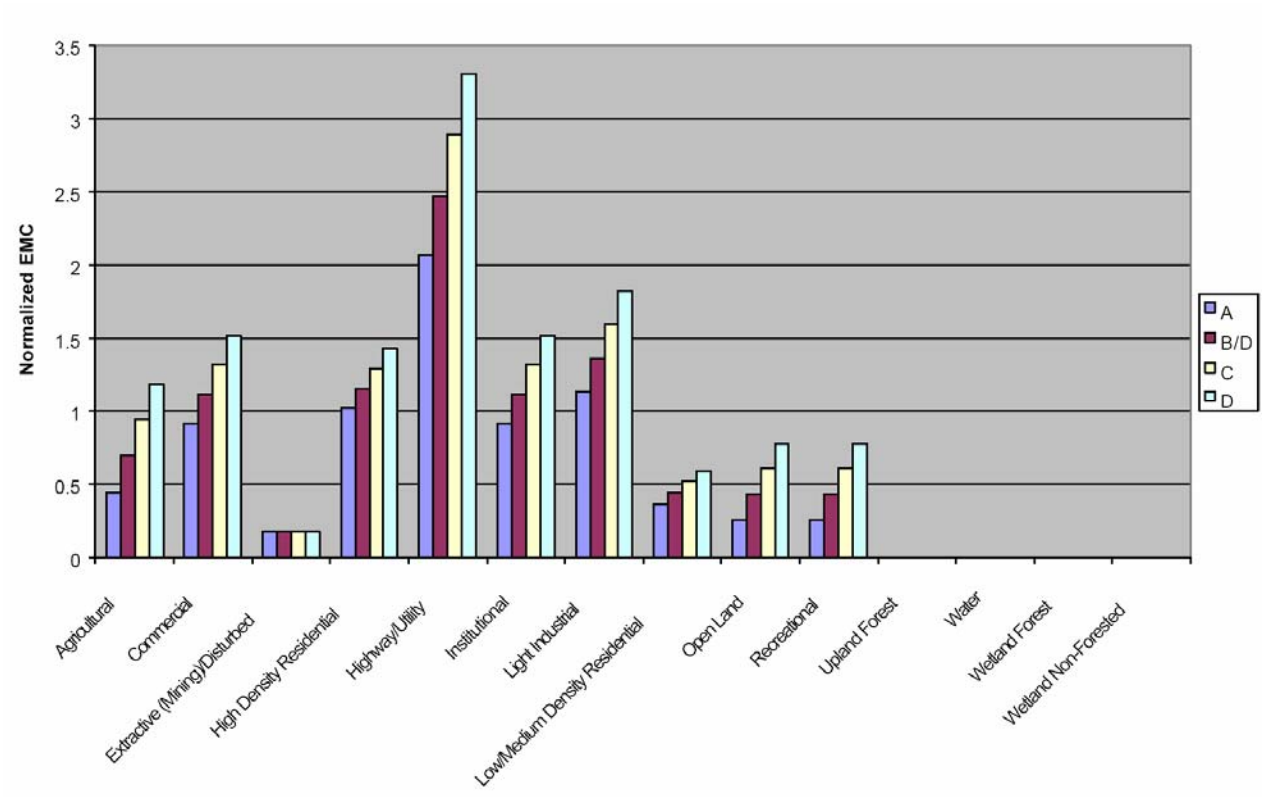
Total Nitrogen

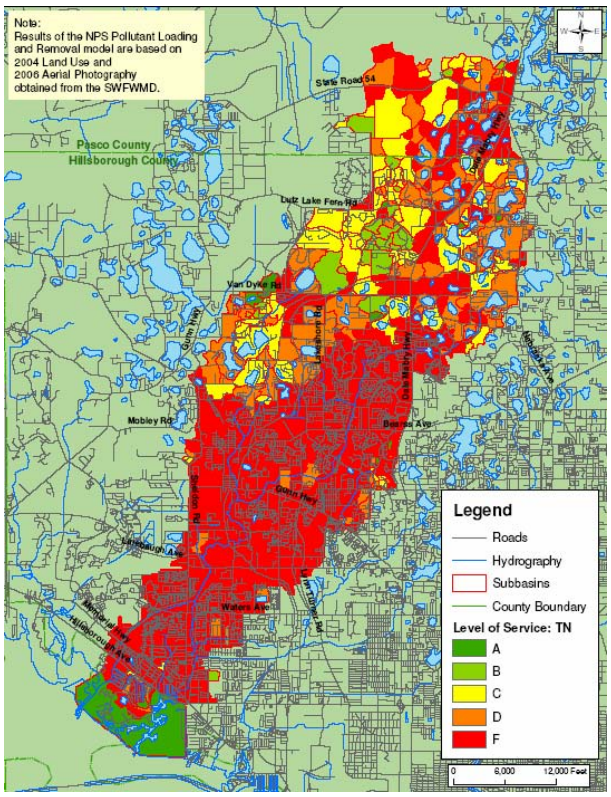


Total Nitrogen Loading Potential by Land Use and Hydrologic Group

As evident from the bar graph above, which shows the total nitrogen loading potential by various land use types and hydrologic groups, the majority of total nitrogen is contributed by the Highway/Utilities land use category.

Figure 13-3 shows the visual correlation between land use types and high concentrations of total nitrogen. When comparing the TN LOS map with the land use distribution map, it is evident that high concentrations of total nitrogen correlate highly with the distribution of high-density residential and Highway/Utilities land uses in the watershed. Since residential and built-up land use types dominate the Rocky/Brushy creek watershed, scores for TN are low throughout the majority of the watershed area.

This watershed contains many residential neighborhoods of various densities; they include Bay Port Colony, Town'n'Country Park, parts of Westchase, Country Run, Carrollwood Meadows, and numerous others. In addition to residential areas, the watershed contains many other up-built land uses, such as commercial and institutional that also contribute large amounts of TN into surface waters of the Rocky/Brushy Creek watershed.



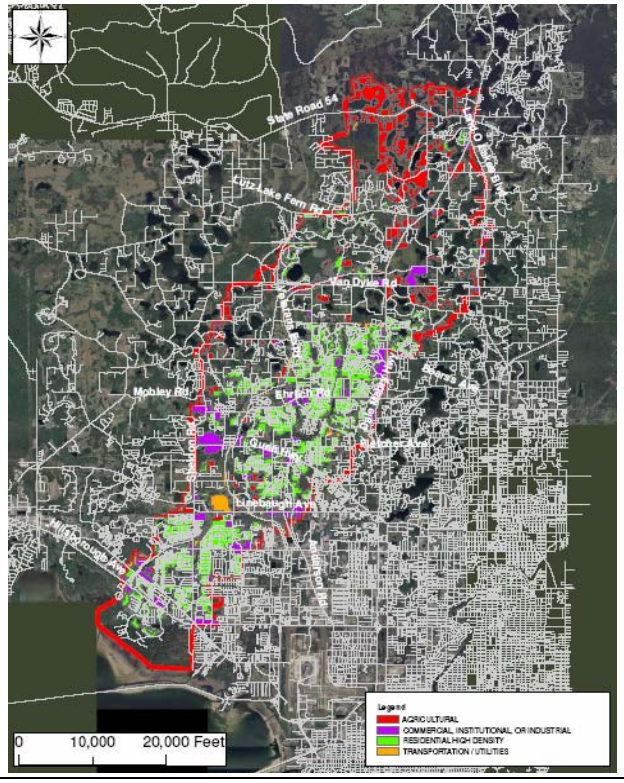
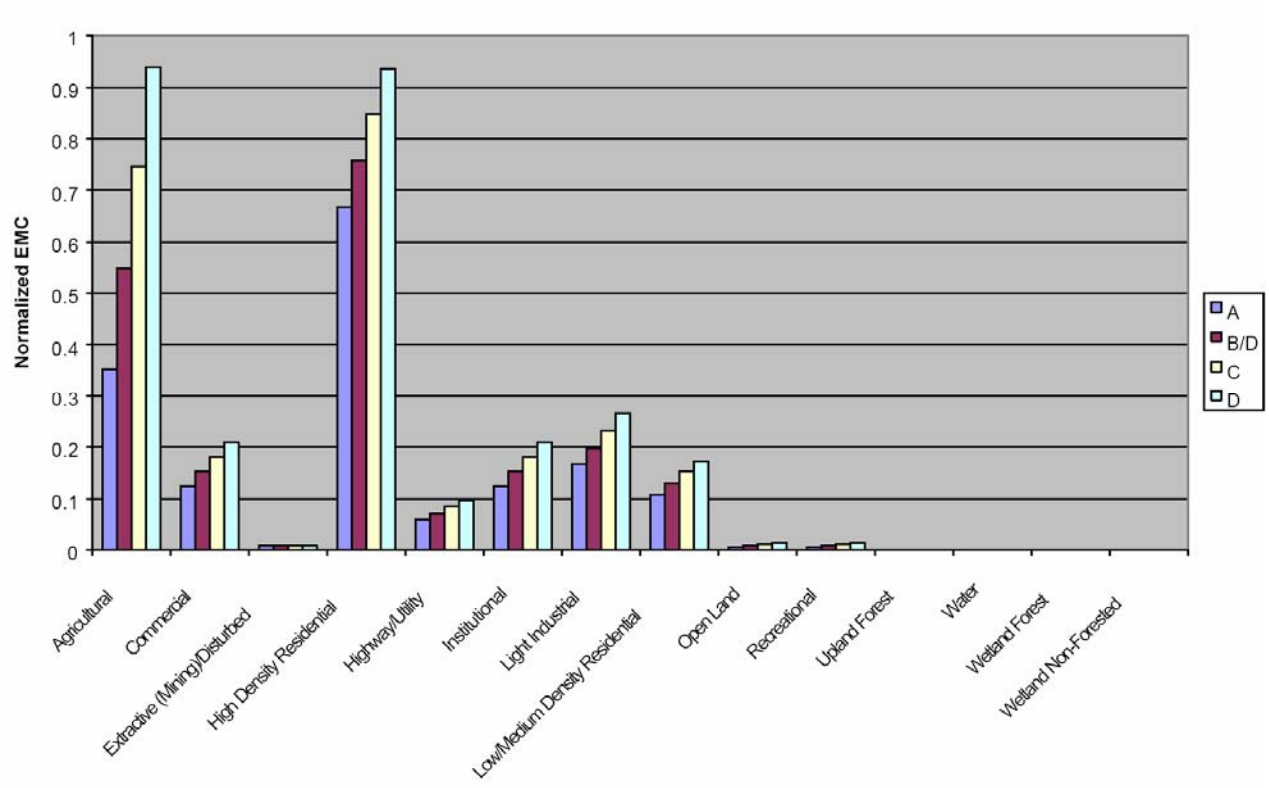


Figure 13-3 Visual Correlation between Land Use and High Concentrations of TN

Total Phosphorus



Total Phosphorus Loading Potential by Land Use and Hydrologic Group

High concentrations of total phosphorus is correlated with agricultural and high-density residential land uses. As noted earlier, the Rocky/Brushy Creek watershed is dominated by residential land use types (Figure 13-2). In addition, northern sections of the watershed is dedicated to various agricultural activities.

When comparing the map of the total phosphorus level of service to the land use distribution map, an overall pattern is apparent (Figure 13-4). Concentrations of total phosphorus are high throughout the majority of the watershed. All areas covered with residential and agricultural land use types contribute large amounts of TP into surface waters, therefore yielding low TP LOS scores of F.

In contrast, areas dominated by natural land use types exhibit favorable LOS scores for TP. These subbasins include areas near Van Dyke Road, such as Lake Park (forested and non-forested upland), TPC of Tampa Bay Golf Course (upland and wetlands), and the wetland areas adjacent to the Old Tamp Bay located to the south of the Rocky/Brushy Creek watershed.

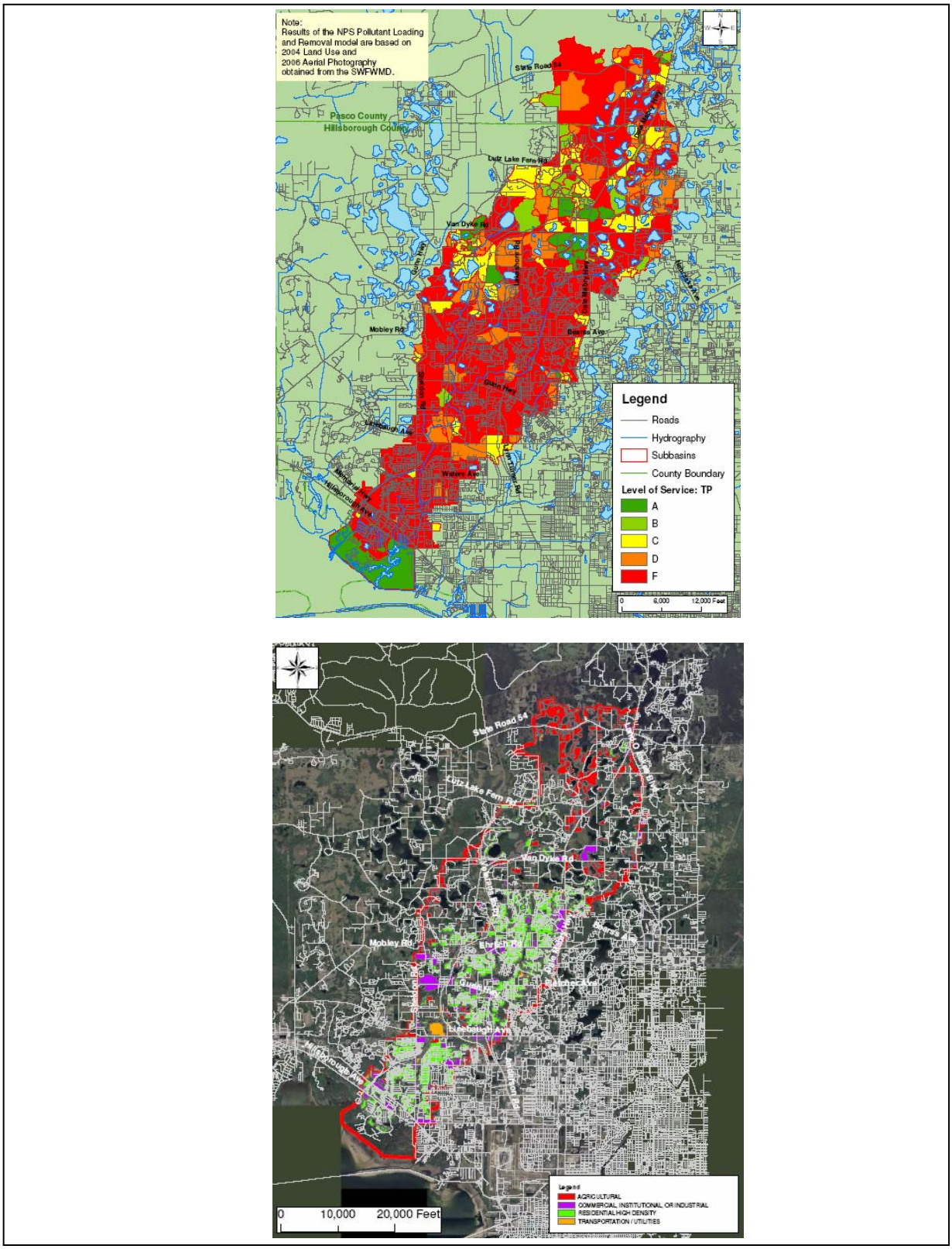
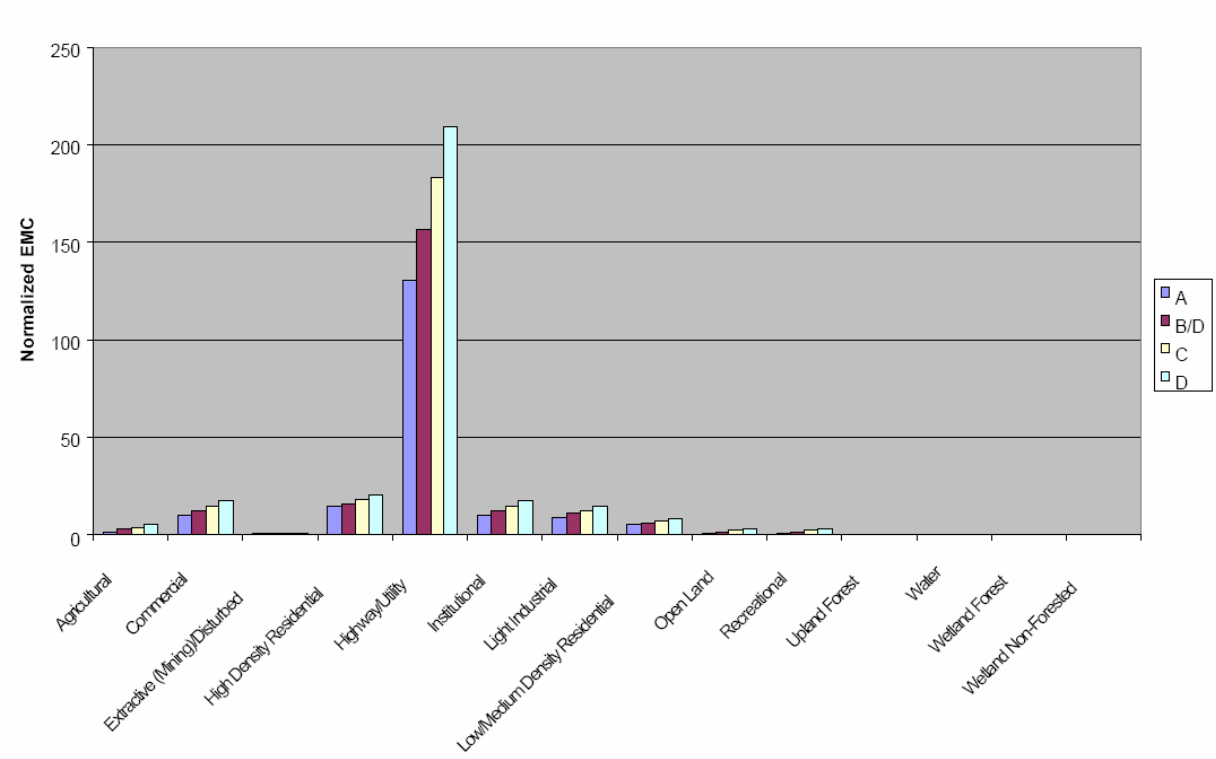


Figure 13-4 Visual Correlation between Land Use and High Concentrations of TP

Total Suspended Solids



Total Suspended Solids Loading Potential by Land Use and Hydrologic Group

Concentrations of total suspended solids are high in the Rocky/Brushy Creek watershed. Highway/Utilities land use category is the highest contributor of the TSS into surface waters and not surprisingly, this watershed encompasses many major highways and a dense network of local roads. In addition, parcels serving such purposes as solid waste and water treatment related operations are also designated as Highway/Utilities. Figure 13-5 shows the visual correlation between land use types and high concentrations of total suspended solids. When comparing the TSS LOS map with the land use distribution map, it is evident that high concentrations of total suspended solids correlate to areas of Highway/Utilities and residential land use categories in the watershed.

Some major roadways crossing the Rocky/Brushy creek watershed include Veterans Expressway, Hillsborough Avenue, Memorial Highway, Linebaugh Avenue, Sheldon Road, Gunn Highway, Erlich Road, Dale Mabry Highway, Van Dyke Road, and many others. These areas on non-pervious surfaces that contribute high amounts of TSS into surface waters of Rocky/Brushy Creek watershed. In contrast, subbasins located to the north of the watershed, as well as the Old Tampa Bay adjacent subbasin to the south, contain natural land use types and therefore exhibit more favorable TSS LOS scores.

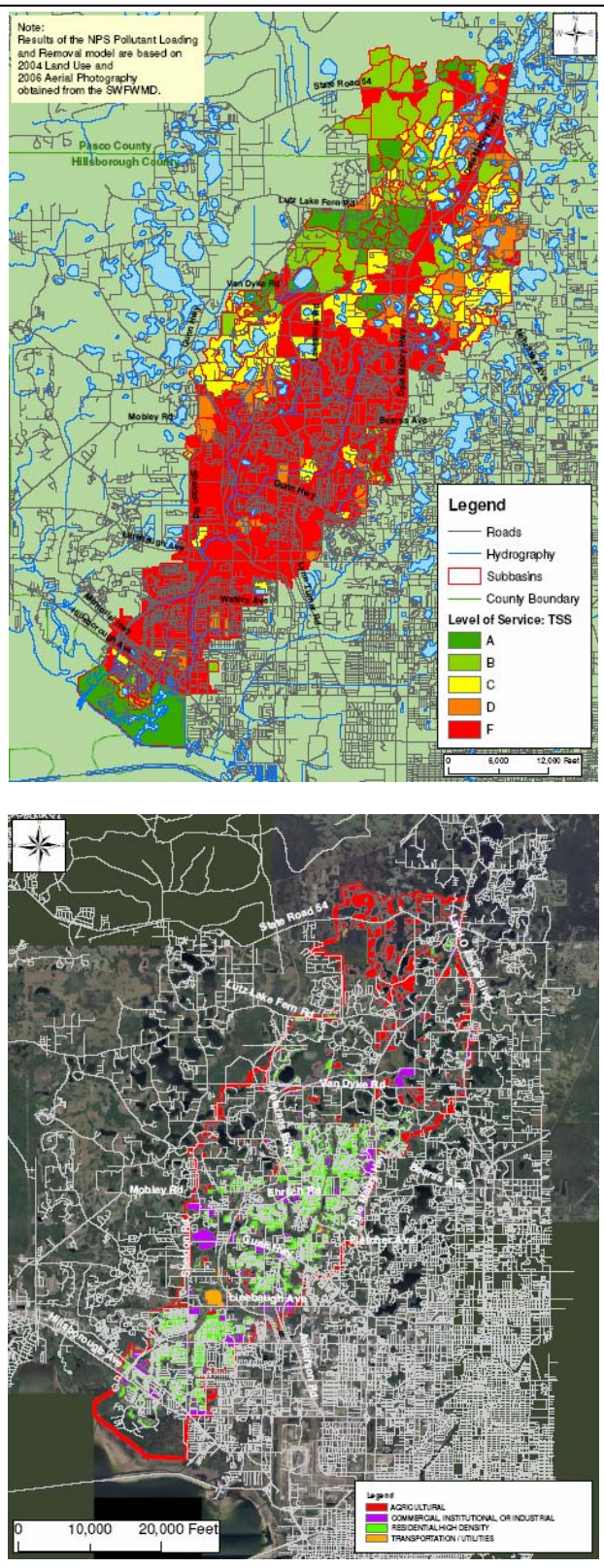


Figure 13-5 Visual Correlation between Land Use and High Concentrations of TSS

13.1.3 Other Contamination Sources - Brownfield Sites, Superfund sites, Sewage and Solid Waste Treatment Facilities

Figure 13-6 shows there are no Superfund sites located within the Rocky/Brushy Creek watershed. On the other hand, a number of solid waste and sewage treatment facilities, as well as a Brownfield site can be located within the watershed (Figure 13-7).

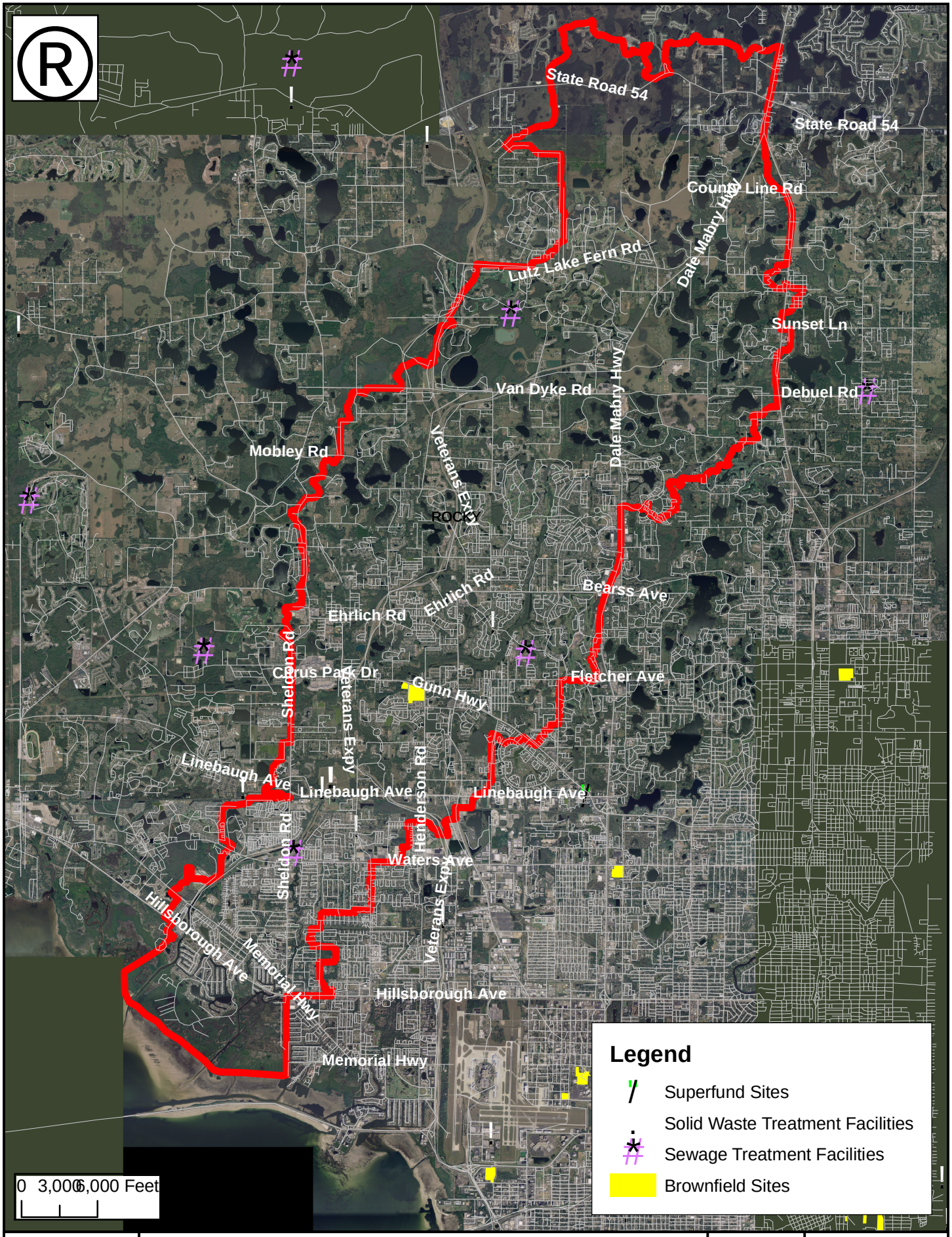
Northwest Hillsborough Class I and Class III solid waste treatment facilities located along Linebaugh Avenue and east of Sheldon Road have been closed with groundwater monitoring program in place for over the past 15 years. The Northwest Regional Sludge Management Facility located near Sheldon Road and Mobley Road has remained inactive since 1988.

The active solid waste storage and treatment facilities located in the Rocky/Brushy Creek watershed include Northwest Hillsborough Transfer Station located near Wilsky Road and Linebaugh Avenue. This facility is operated by the Hillsborough County Solid Waste Department. The University Community Hospital located along Fletcher Avenue is another active site dedicated for biohazardous waste storage.

Sewage treatment facilities located with the Rocky/Brushy Creek watershed or impacting the watershed surface waters include Dale Mabry WWTP – an advanced treatment facility, located at the end of Delwood Road. River Oaks Waste WWTP is another advanced treatment facility located along Sheldon Road. The watershed also contains a Hillsborough County Municipal Separate Storm Sewer System (NPDES number FLS000006). These facilities impact such water bodies as Rocky Creek, Channel A, and Brushy Creek, which is a tributary to Rocky Creek (http://epa.gov/region4/water/tmdl/florida/documents/rocky_creek_Nutrient_DO_TMDL.pdf).

The only Brownfield site in the Rocky/Brushy Creek watershed is located at the intersection of Gunn Highway and Normandie Road (Figure 13-7). This is Wal-Mart Buckley-Shuler Area covering approximately 36 acres. The Brownfield Site Rehabilitation Agreement for the site been executed in April of 2002 (http://www.dep.state.fl.us/waste/quick_topics/publications/wc/brownfields/BSRAs/BF290202001c_BSRA.pdf).

See Appendix 13-1 for more detailed location and site information on these areas.



Other Contamination Sources in the Rocky/Brushy Creek Watershed

Figure 13-6

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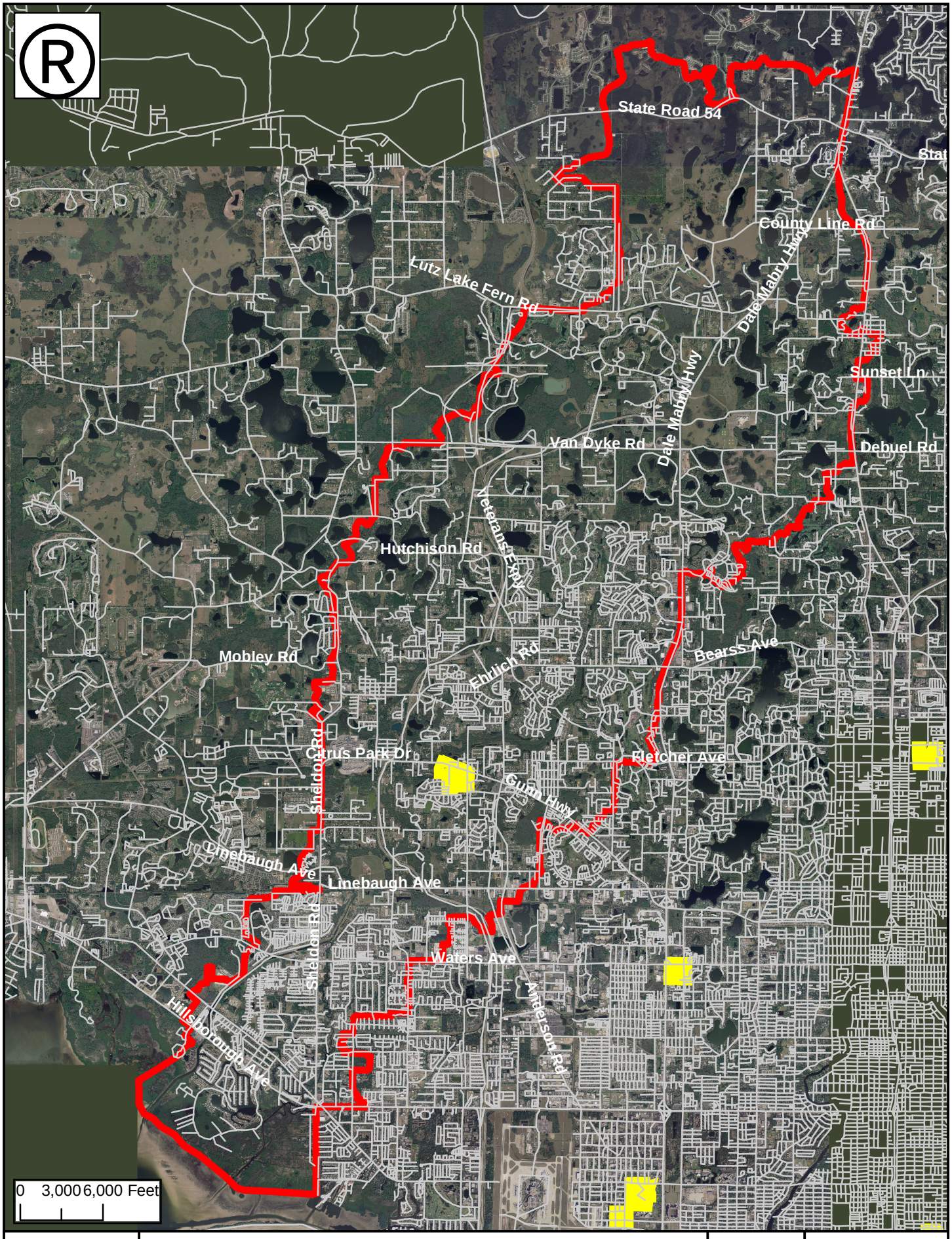

Brownfield Sites in the Rocky/Brushy Creek Watershed

Figure 13-7

AYRES ASSOCIATES

13.2 Bibliography

The attached bibliography includes a list of references used for this study and additional references that could be cited by readers.

Giesy, R., de Vries, A., Zylstra, M., Kilmer, R., Bray, D., Webb, D. 2003. *Florida Dairy Farm Situation and Outlook 2003*. Department of Animal Sciences, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. Document No. AN138. Gainesville, Florida.

US EPA, 2002. *Agriculture - Dairy Production*. Purdue Research Foundation, West Lafayette, Indiana. (http://www.epa.gov/agriculture/ag101/printdairy.html).