7.1 Introduction

The Little Hatchet Creek Watershed is located in the northeastern quadrant of the city of Gainesville and extends into unincorporated Alachua County encompassing approximately 19 square miles (Figure 7.1). Little Hatchet Creek flows from west to east, ultimately discharging into Newnans Lake. The creek is comprised of two main branches, the North Branch and South Branch. Upstream of SR26 the main channel bifurcates, and an East and West Branch flow into Newnans Lake (Figure 7.2). Land surface elevation ranges from 165 feet National Geodetic Vertical Datum of 1929 (NGVD) in the upper part of the watershed to 70 feet NGVD near Newnans Lake.

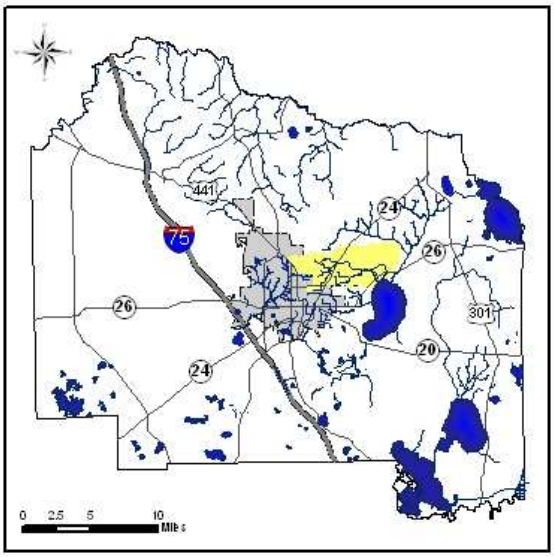


Figure 7.1 Location of Little Hatchet Creek Watershed in Alachua County

The majority of the watershed is located in the Northern Highlands physiographic province (White 1970). Land surface elevations decrease as Little Hatchet Creek crosses the Cody Scarp (toe at 100 feet NGVD) on the north side of Newnans Lake (White 1970; Hoenstine and Lane 1991). A thin mantle of Plio-Pleistocene terrace deposits and more recent materials consisting of sands, silts, clayey sands, and sandy clays overlie the entire watershed. Beneath these surface deposits lie the Hawthorn Group formations, which can be observed as clayey sand or sandy clay outcrops along the stream bank as elevations decrease downstream of Waldo Road (SR 24). Terrestrial communities in the watershed consist of pine flatwoods, forested wetlands, and mixed hardwood hammocks.

Soils in the Little Hatchet Creek Watershed are somewhat poorly drained and sandy to a depth of 40-80 inches. A small area of the watershed in the vicinity of the Newnans Lake Conservation Area exhibits soils that are very poorly drained (Thomas et al 1985). The most common soil types in the watershed include the Pomona sand, Myakka sand, and Monteocha loamy sand (Thomas et al 1985). These soils are generally level, poorly drained sandy wet flatwoods soils. The Monteocha loamy sand and Pomona sand (depressional) are found in wet ponds and shallow depressions, with the water table typically less than 10 inches below land surface for one to three months or more during the year (Thomas et al 1985). The Pomona sand and Monteocha loamy sand most commonly occur along the creek in the northern reaches of the watershed. Small areas of Millhopper sand, which is moderately well drained, are interspersed with other soil types in the lower reaches of the watershed near Newnans Lake (Thomas et al 1985). As in the Lake Forest Creek and Hatchet Creek Watersheds, the poorly drained nature of the soils reflect the presence of the lower permeability Hawthorn Group formations below the

Pliocene to recent surficial sands and clayey sands in the watershed.

Residential, commercial, and institutional land uses dominate the western portion of the watershed. Most local businesses and residences within the basin are located west of SR 24 between SR 222 (NE 39th Avenue) and north of NE 16th Avenue. The Murphree Well field and Water Treatment Plant provides potable water to Gainesville from the Floridan aquifer and is located close to the headwaters of Little Hatchet Creek. Gainesville Regional Utilities (GRU) operates the plant and owns 7,100 acres of the surrounding area as a conservation easement.

Facilities in the northern section of the watershed include the Alachua County Animal Services compound, the Airport Industrial Park, the Alachua Solid Waste Transfer Station, and the Alachua County Household Hazardous Waste Collection Center. The Gainesville Regional Airport is located on SR 222, and numerous small businesses including automobile and appliance repair shops and furniture refinishers are located in the industrial park along Waldo Road. Schools in the area include Howard Bishop Middle School, Metcalf Elementary School, and St. Patrick's School. Several State facilities are also located in the area surrounding SR 222 and include the Santa Fe Community Correctional Center, the Gainesville Correctional Institution, the Alachua County Correctional Center Department of the Jail, and the North Florida Juvenile Detention Center. The Ironwood Golf Course is situated in the western part of the watershed and owned by the City of Gainesville.

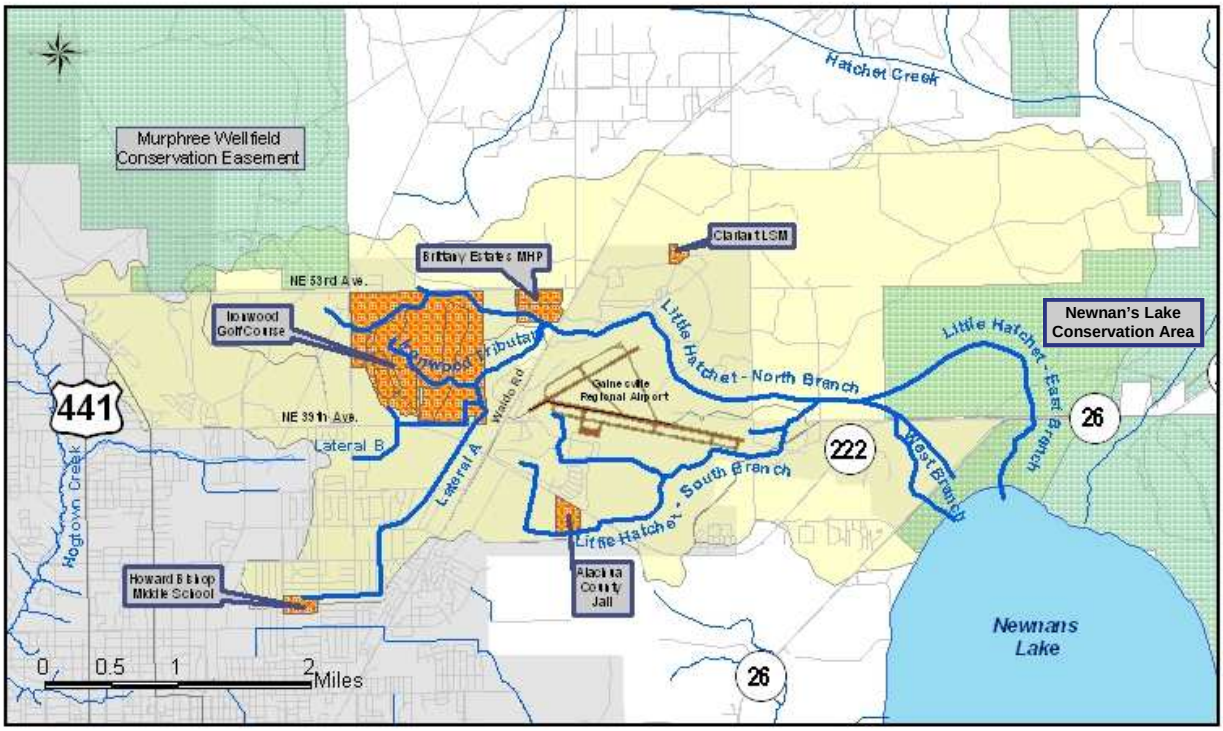


Figure 7.2 Notable features in the Little Hatchet Creek Watershed

Gum Root Park and the Newnans Lake Conservation Area, located north of Newnans Lake, are passive recreation areas that encompass 6,504 acres of forested wetlands and upland scrubby flatwoods. This acreage is used for recreation including hiking, hunting, bird watching, and nature walks. Gum Root Park and the Newnans Lake Conservation Area are cooperatively managed by the City of Gainesville and the St. Johns River Water Management District.

7.2 Watershed Description

A number of intermittent natural tributaries, dredged canals, and forested wetlands contribute flow to Little Hatchet Creek. The dredged or channelized sections of the creek tend to flow more consistently than the natural more swampy sections, some of which are dry except during periods of high rainfall. Much of Little Hatchet Creek's baseflow is from surficial aquifer springs and seeps that emerge within dredged ditches and canals in the western portion of the watershed.

7.2.1 Little Hatchet - North Branch

7.2.1.1 NE 53rd Ave. to Brittany Estates

The North Branch of Little Hatchet Creek begins in the vicinity of NE 53rd Avenue. It flows east for approximately one mile before entering Brittany Estates Mobile Home community, where it receives reclaimed water from a private domestic sewage treatment package plant. Shortly after emerging from NE 53rd Avenue, the North Branch is joined by a tributary flowing east from NE 15th Street. In this area the creek slowly meanders southeast, and is confined by low, stable banks with wide, healthy riparian zones. Streambed erosion is very slight and scouring is low.

North branch of Little Hatchet upstream of culvert

South of NE 53rd Ave, the creek flows east through Brittany Estates as a dredged channel and is joined by Lateral A and Ironwood tributaries (Figure 7.2). The banks of the channel are low, moderately stable, and reinforced with concrete and rock retaining walls. The riparian zone on either side of the creek is less than 6 feet wide. The streambed is moderately eroded with some evident scouring and sand smothering.

7.2.1.2 Brittany Estates to Gainesville Airport

From Brittany Estates, Little Hatchet Creek flows east under Waldo Road via a large 72-inch reinforced concrete pipe (RCP) and continues through the Airport Industrial Park. This area of Little Hatchet Creek is heavily sand smothered, streambed erosion is moderate with some scouring observed, and banks are moderately unstable. Little Hatchet Creek continues through airport property where severe streambed erosion is evident. Banks here are high (13 to 20 feet), steep, and unstable with a scoured streambed of exposed sandy clay. These characteristics are most likely due to the large volume of runoff contributed by the airport runways.

Severely eroded bank along Little Hatchet Creek near the airport

7.2.1.3 Lateral A Tributary

The Lateral A tributary emerges from an 18-inch concrete culvert under NE 9th Street as a uniformly dredged channel. This segment is flanked by Howard Bishop Middle School and Metcalf Elementary School on the west bank and low density housing on the east bank. The banks are steep (6 feet high) and moderately unstable in several places. From NE 9th Street to NE 17th Terrace there is no natural vegetative riparian zone on either side of the channel other than a few feet of grass and trees. The streambed is approximately 6 feet wide with little aquatic vegetation. Streambed erosion is slight and sand smothering is low in most areas except in the vicinity of storm drains, where sand up to two feet deep smothers the channel. The creek bends 90° to the north at NE 17th Terrace and the deeply incised channel continues to NE 23rd Avenue, where it is bordered by homes less than 3 feet from either bank. This unnatural bend has caused further erosion and bank instability.

The Lateral A tributary continues northeast through a commercial/industrial area of east Gainesville where it receives stormwater from many parking lots and roof drains from several businesses. Erosion has deepened the creek to a narrow channel that is less than three feet across. Flow is low here with some sections containing pools of stagnant water. The stream banks are steep and deeply incised due to heavy erosion. No natural vegetative riparian zones are present. A significant amount of asphalt rip-rap is present in the streambed. Bank failure is evident along many sections of the tributary. This channel joins the North Branch at the eastern edge of the Brittany Estates property.

7.2.1.4 Ironwood Tributary

This tributary of Little Hatchet Creek begins in a small pond on the northwestern side of Ironwood Golf Course. It flows east for almost one mile via a dredged channel before joining with the Lateral A tributary. The stream then flows northeast to join the North Branch of Little Hatchet Creek just west of Waldo Road and south of NE 53rd Avenue (the Brittany Estates property). The riparian zone of the Ironwood Tributary ranges from 0 to 16 feet wide and consists of a mixture of golf course grasses and native forested habitat. Erosion is slight and the creek banks are mostly stable. Streambed scouring and sand smothering are low. Several 24-inch corrugated metal pipe culverts direct golf course runoff to the creek. The creek then flows through a mixed pine/oak forest bordered to the north by a wide, well-maintained fire road. The streambed is scoured to sandy clay substrate in some areas.

7.2.2 Little Hatchet - South Branch

The South Branch of Little Hatchet Creek is comprised of two tributaries located south of the Gainesville Regional Airport. The northernmost tributary lies almost completely within airport property and is characterized by a straight, dredged channel that receives considerable runoff from the airport during rain events. Due to its location, this tributary was not assessed for this report.

The southernmost tributary begins in a wooded area within the Alachua County Fairgrounds. It flows southeast through grassy open fields before crossing under NW 39th Avenue. Banks are low and stable and show no signs of streambed erosion. From NW 39th Avenue, the channel emerges from a 48-inch concrete culvert and runs south, bordered by pine flatwoods on the east bank. The west bank of the channel is flanked by a retention pond. The creek then turns east and continues past the Alachua County Jail before crossing NW 39th Avenue again via a concrete culvert. The creek emerges in a narrow, dredged channel with low stable banks and a slightly scoured streambed, where it is later joined by the northernmost (airport) tributary.

The South Branch of Little Hatchet Creek continues as a dredged channel for 10-15 feet before becoming increasingly sinuous, and then braided, as it flows east. The confluence of the North and South branches of Little Hatchet Creek is located in an area of pine flatwoods. The creek flows east, through the Newnans lake Conservation Area, before separating into a distinct West and East branch. Both branches flow southeast and discharge into Newnans Lake.

7.2.3 Little Hatchet - West Branch

The West Branch of Little Hatchet flows south after splitting from the main channel. It crosses under NW 39th Ave and enters the western portion of Gum Root Swamp. The creek lacks a defined channel here, so sheet flow dominants during rain events. This section of the creek is intermittently dry and during dry periods may consist of only a few shallow pools of water near the culverts at NW 39th Avenue and SR 26. The only evidence of erosion along the West Branch can be seen at the two road crossings. After passing under SR 26, the West Branch continues flowing south through a forested wetland before flowing into Newnans Lake.

7.2.4 Little Hatchet - East Branch

The East Branch of Little Hatchet Creek flows east toward Gum Root Swamp before it becomes braided. Sheet flow dominates as the creek enters the heart of Gum Root Swamp. Braided channels continue as the creek flows south and under SR 26. Under normal weather conditions, this section tends to be intermit-

Little Hatchet Creek dry streambed near SR 26

tently dry for several months during the dry season. South of SR 26, the stream flows through a straight, dredged channel for approximately 300 feet before continuing through a forested wetland and into Newnans Lake.

7.3 Physical Habitat and Biology

Although some segments of Little Hatchet Creek contain adequate habitat to potentially support a diverse and healthy populations of macroinvertebrates and other aquatic species, many sections of the creek, especially those near the Waldo Road commercial/industrial district, are lacking natural features including sinuosity and native riparian buffers. In addition, flow patterns in the upper reaches of Little Hatchet Creek have been altered due to development in the watershed. Once the creek reaches the Newnans lake Conservation Area, however, the stream is unchannelized, with healthy riparian zones in the forested wetlands.

Three BioRecons have been completed on Little Hatchet Creek (Table 7.1). Two BioRecons were completed by ACEPD and WAV personnel in 2001 and 2002 on Little Hatchet Creek; one at the west branch on SR26 and the other near 53rd Avenue. Both segments were found to be biologically impaired. During 2003, a BioRecon was conducted on the north branch of Little Hatchet Creek. The site received a healthy rating.

7.3.1 North Branch near NE 53rd Ave.

This site (LHNB53) along the North Branch of Little Hatchet Creek received a 116, or 73%, of 160 possible points on the Habitat Assessment. This segment is characterized by artificial channelization

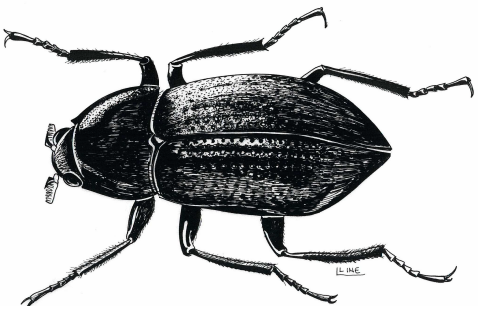
Table 7.1 BioRecon scores for Little Hatchet Creek

Metric	Target Value	2001 LHAT26	2002 LHNB53	2003 LHTNB
Taxa Richness	≥ 18	17	12	22
EPT	≥ 4	0	1	4
FL Index	≥ 10	3	4	14
Metrics Passed		0	0	3
Biological Condition		Impaired	Impaired	Healthy

which accounted for the most point deductions. The BioRecon results rated this segment impaired, as it failed all three metrics. This impaired rating is partially a result of the channelized nature of the creek segment along with less than optimal habitat availability.

7.3.2 North Branch near Airport Industrial Park

This site (LHTNB) was assessed in 2003 by WAV and ACEPD personnel. It received a score of 106 out of 160 possible points (or 66%) on the Habitat Assessment. Although it received relatively low scores for substrate availability, habitat smothering, and bank stability, LHTNB was classified as healthy by the BioRecon, since it passed all three metrics.



***Helichus* sp. - A macroinvertebrate found in Little Hatchet Creek**

7.3.3 Little Hatchet West Branch

A biological assessment was completed on the West Branch of Little Hatchet Creek by WAV and ACEPD personnel in 2001. This site (LHAT26) scored 78% of total possible points, or 125 out of 160, on the Habitat Assessment, scoring low in the water velocity and substrate (habitat) availability categories. LHAT26 was classified as impaired by the BioRecon, however, this may be misleading.

While one might expect a healthy macroinvertebrate community here, the BioRecons conducted at SR26 indicate impaired conditions. As the East and West branches flow through low-lying wetlands and swamps, they become braided and often do not have well defined channels. Streams flowing through these types of flatland wetlands typically have low primary productivity and high secondary productivity due to the near complete canopy cover, significant leaf litter and tannin concentrations, and organic matter accumulation. Low DO levels coupled with low velocities and intermittently dry streambeds, although natural in this type of system, preclude the presence of a diverse macroinvertebrate community.

7.4 Pollution Sources

7.4.1 Point Sources

The Brittany Estates Mobile Home community, located west of Waldo Road and south of NE 53rd Avenue, consists of 300 mobile home sites and treats its own wastewater with a 0.06 MGD state-permitted package treatment plant. After treatment, reclaimed water is discharged to a 0.6 acre polishing pond before entering the North Branch of Little Hatchet Creek.

Laboratory sample data collected by both the facility and by the ACEPD often show elevated concentrations of nutrients in the reclaimed water. Total phosphorus (TP-T) in the Brittany Estates reclaimed water, sampled by the ACEPD from 1999 through March 2002, ranged from 0.15 mg/L to 4.04 mg/L with a median value of 2.08 mg/L. Total nitrate plus nitrite (NO_x-T) concentrations during the same time period ranged from 0.035 mg/L to 11.8 mg/L with a median of 0.64 mg/L. Figure 7.3 compares median values of TP-T and NO_x in Brittany Estates reclaimed water to three sites on Little Hatchet Creek.

Brittany Estates wastewater treatment package plant

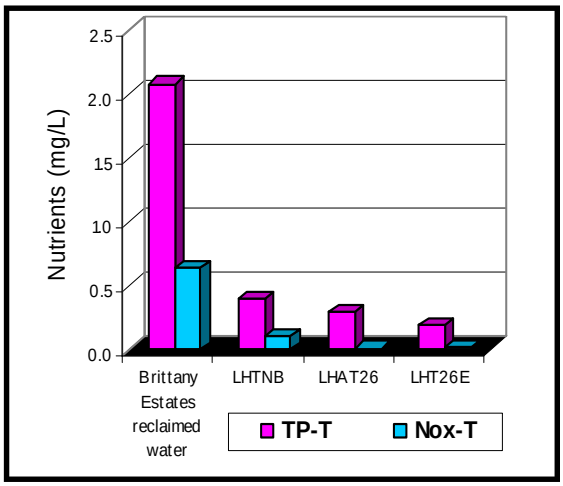


Figure 7.3 Comparison of nutrients in Brittany Estates reclaimed water with stream sites on Little Hatchet Creek

About 10% of the median flow of the North Branch of Little Hatchet Creek (LHTNB) is made up of the Brittany Estates reclaimed water based on the plant's 0.06 MGD discharge. The nutrients in the reclaimed water, however, comprise approximately 52% of the total phosphorus (TP-T) load and 60% of the NO_x-T load.

The Airport Industrial Park, located east of Waldo Road and north of the Gainesville Regional Airport, houses several facilities regulated by the Alachua County Hazardous Materials Management Code, all of which have the potential to contribute point source pollution to the watershed. Clariant Inc., formerly PCR Inc., manufactures specialty organic chemicals. Numerous chemical releases have occurred here in the past, and widespread contamination of the surficial aquifer at the site was detected in 1984. A remedial action plan for ground water cleanup began in 1999 (Bird 2000). Historical operations at several other existing and former facilities in the area impacted groundwater in the surficial aquifer, including Fabco-Air Inc., Vital Industries, the former Gainesville Airport Landfill and Burn Site, and a shooting range (ESE 1985, FDER 1986, ESE 1987, AT&E 1988, ECT 1990, and ESE 1992). Based on a review of available reports on these sites, it does not appear that water quality in Little Hatchet Creek has been impacted.

7.4.2 Nonpoint Sources

The predominant source of nonpoint pollution in the Little Hatchet Creek Watershed is untreated stormwater runoff which includes runoff from the Ironwood Golf Course and from the large number of automotive businesses located in close proximity to the creek. Runoff from the golf course has the potential to contribute nutrients and chemicals from fertilizers, herbicides, and pesticides used to maintain the turf. The Ironwood Tributary serves as a

Aerial photograph of Clariant, Inc.

drainage canal with approximately one half of its total length devoid of a natural vegetative riparian buffer zone. In addition, the golf course extends to the banks of the tributary in many sections, thereby further facilitating pollutant runoff.

Runoff containing petroleum products is also a potential source of pollution in the watershed. Numerous automotive businesses border the Lateral A tributary west of Waldo Road. The absence of a riparian buffer in this area increases the risk of polluted runoff entering the creek.

Table 7.2 Comparison of baseflow water quality data for three sites on Little Hatchet Creek

Parameter	LHTNB	LHAT26	LHAT26E
Water Temp (ºC)	20.0	20.4	19.9
pH (SU)	7.40	6.20	6.54
Sp. Cond. (uS/cm)	235	120	143
Turbidity (NTU)	3.4	2.2	1.3
DO (mg/L)	7.93	3.49	5.48

7.5 Baseflow Water Quality

ACEPD personnel have been sampling three sites on Little Hatchet Creek since February 1998: the North Branch of Little Hatchet Creek near the airport (LHTNB), the West Branch of Little Hatchet Creek at SR26 (LHAT26), and the East Branch of Little Hatchet Creek at SR26 (LHT26E). These sites are located in the less developed, eastern portion of the watershed. Water quality data from these sites may not be representative of the urban, channelized portions of the creek located in the western portion of the watershed.

7.5.1 Field Parameters

Parameters measured in the field include water temperature, pH, specific conductance, turbidity, and dissolved oxygen. Median baseflow field water quality data for the three sites on Little Hatchet Creek are shown in Table 7.2. Median values for LHTNB are similar to other urban streams, particularly those in the Hogtown Creek Watershed. LHAT26 and LHT26E, however, are similar to Hatchet and Lake Forest creeks. These creeks flow through forested wetlands and swamps upstream from the sampling sites. Water flowing through forested wetlands is tannic, naturally low in pH, and typically has low dissolved oxygen levels. Turbidity in Little Hatchet Creek is comparable to other Gainesville area streams.

7.5.2 Nutrients

Baseflow total phosphorus (TP-T) concentrations in Little Hatchet Creek are higher than those found in the other two creeks in the Newnans Lake Watershed. In fact, baseflow total orthophosphate (PO_4-T) levels in Little Hatchet Creek are higher than all creeks sampled within the Orange Creek Basin with the exception of those within the Hogtown Creek Watershed (Figure 7.4). Total orthophosphate concentrations are highest at LHTNB, largely a result of nutrient inputs from Brittany Estates reclaimed water, which makes up 52% of the total phosphorus load at this site. Natural sources of phosphorus include ground water inputs affected by the phosphatic minerals within the Hawthorn Group formations. Orthophosphate levels decrease as the creek flows through wetland/swamp areas which essentially filter out some of the nutrients prior to entering Newnans Lake.

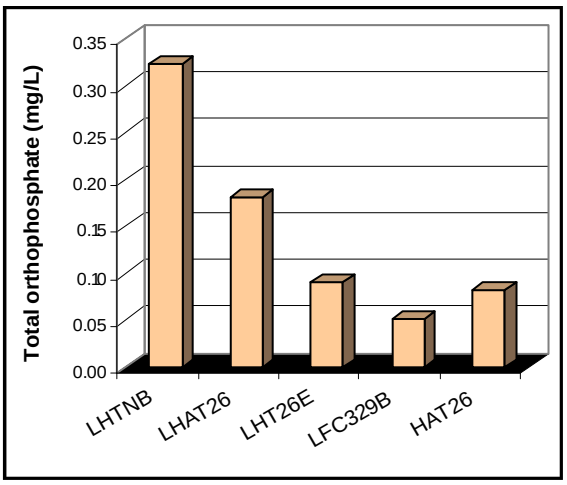


Figure 7.4 Comparison of median total orthophosphate (PO_4-T) concentrations during baseflow for streams in the Newnans Lake Watershed

Median total nitrate plus nitrite (NO_x-T) concentrations in the North Branch of Little Hatchet Creek (LHTNB) are considerably higher (Figure 7.5) than sites further downstream; however, this value is slightly lower when compared to the more urbanized creeks. LHTNB receives inputs of NO_x from the Brittany Estates reclaimed water, which makes up about 60% of the load in the North Branch. The North Branch also receives runoff from

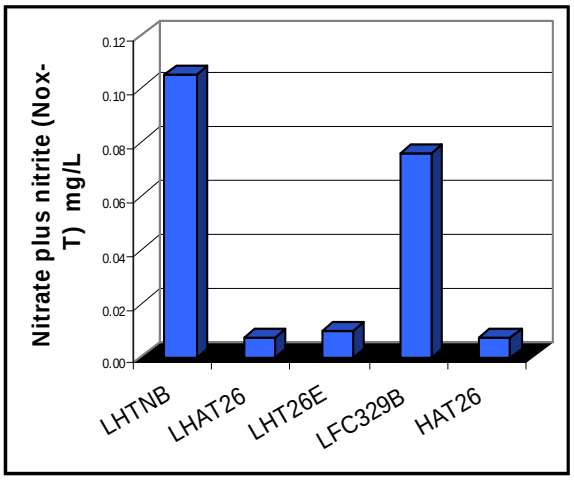


Figure 7.5 Comparison of median total nitrate plus nitrite (NOx-T) concentrations during baseflow for streams in the Newnans Lake Watershed

Ironwood Golf Course and the airport industrial park, which are likely additional sources of NO_x. Like orthophosphate, NO_x-T levels decrease as Little Hatchet Creek flows through Gum Root Swamp.

Median Total Kjeldahl Nitrogen (TKN-T) concentrations (organic nitrogen compounds plus ammonia) are highest at both Little Hatchet Creek sites at SR 26 compared to all of the urban streams surveyed in this study. These high TKN-T levels reflect significant organic matter deposition and secondary productivity in the Gum Root Swamp area of the watershed.

7.5.3 Coliform Bacteria

All sites on Little Hatchet Creek (LHTNB) showed some fecal coliform levels higher than the one time allowable limit of 800 fecal coliform colony forming units (CFU) per 100mL (FDEP 1996b). Samples were collected from March 2001 to December 2002, and generally were lower than 800 CFU/100 mL (Appendix C). Potential sources of fecal coliform bacteria include runoff from areas of animal (wild and domestic) activity, failing septic systems, and leaking sewer lines or private connections to these lines.

7.6 Stormwater

Storm events were monitored on Little Hatchet Creek by ACEPD personnel in 2000 and 2001. The most consistent changes in water quality during storm events in Little Hatchet Creek were related to increases in total ammonia (NH_4-T), total nitrate plus nitrite (NO_x-T), and turbidity. Increases in total ammonia for streams in the Newnans Lake Watershed were highest in Little Hatchet Creek (Figure 7.6), with total ammonia increasing in the

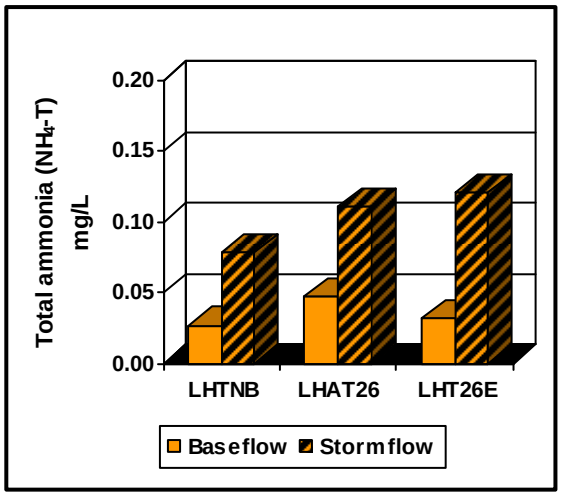


Figure 7.6 Increase in median total ammonia (NH_4-T) concentrations during stormflow at streams in the Newnans Lake Watershed

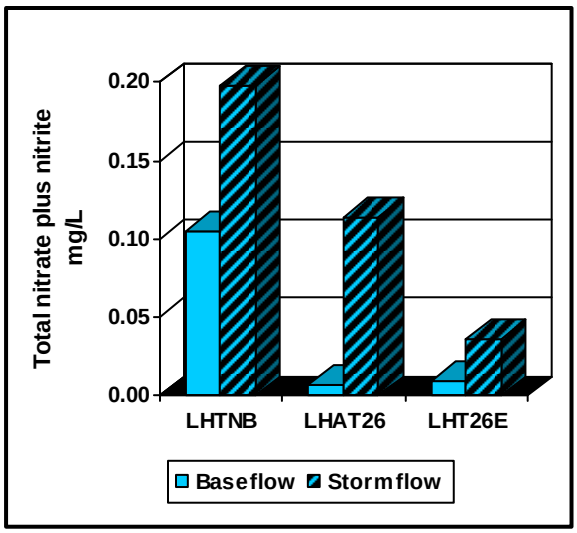


Figure 7.7 Increase in median total nitrate plus nitrite (NO_x-T) concentrations during stormflow at streams in the Newnans Lake Watershed

East Branch (LHT26E) by 275% (from baseflow value of 0.032 mg/L to 0.120 mg/L).

Increases in NO_x-T were greater than 200% during stormflow (Figure 7.7). The East Branch showed a 260% increase in NO_x-T (from a median baseflow value of 0.010 mg/L to 0.036 mg/L), while the West Branch showed a 1,521% increase (from a median baseflow value of 0.007 mg/L to 0.114 mg/L). Hatchet Creek, also in the Newnans Lake Watershed, showed a 329% increase.

The significant increase in NO_x-T concentrations during stormflow conditions in streams flowing through forested wetlands can be difficult to qualify as it influenced by several factors. First, runoff from agricultural and residential areas have the potential to contain NO_x from fertilizer application. Second, NO_x is present in rainfall due to naturally occurring atmospheric deposition. Additionally, NO_x-T levels can fluctuate in streams flowing through forested wetlands as the amount of oxygen within the water changes. Under aerobic conditions, which may occur during stormflow, ammonia is converted to NO_x by bacteria. Under anaerobic conditions .which occur more often during baseflow, NO_x is converted to ammonia, thus decreasing NO_x-T levels while increasing ammonia levels. In summary, it

Stormflow on Little Hatchet Creek West Branch (LHAT26)

can be difficult to explain increases and decrease in nitrogen species in forested wetlands during storm conditions due to the number of factors influencing concentrations.

Turbidity increased most dramatically during stormflow in the North Branch (from a median baseflow value of 3.40 NTU to 23.35 NTU) and in the West Branch (from median baseflow value of 2.20 NTU to 7.31 NTU) (Figure 7.8). Turbidity increases in the other streams flowing into Newnans Lake were less than 100% during stormflow conditions.

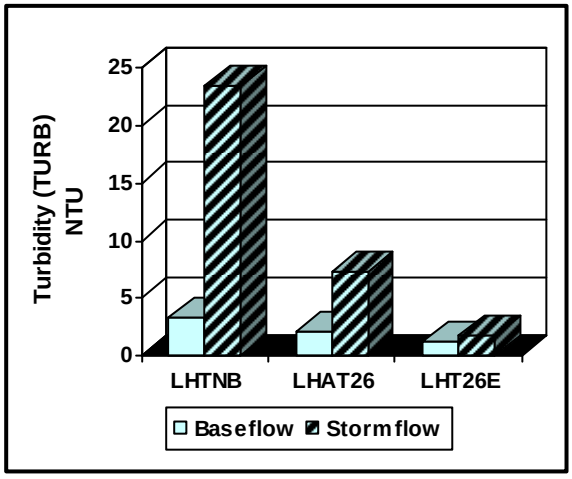


Figure 7.8 Increase in median turbidity during stormflow at streams in the Newnans Lake Watershed

7.7 Ecosystem Health

7.7.1 Biological Integrity

Many areas in Little Hatchet Creek have diverse habitats that support a wide array of avian, reptilian, and mammalian species. Portions of the Little Hatchet Creek Watershed are also a refuge for rare migrant species such as the black-headed gull spotted at the north end of Newnans Lake in May 2000 (Rare Bird Alert, Cape Cod Connection 2000).

Property surrounding Little Hatchet Creek near the Ironwood Golf Course on NE 39th Avenue, totaling 477 acres, is one of six tracts of land in Alachua County slated for preservation. The Florida Communities Trust has awarded $1.17 million for purchase of the land under the Alachua County Forever Land Conservation Program (Vardaman 2002).

Gum Root Swamp Park and Newnans Lake Conservation Area provide remarkable contiguous, diverse, and productive natural habitats capable of supporting a range of floral and faunal populations. Adjacent wetland habitats support many species, sustain water-dependent species such as fish and wading birds, and serve as wildlife corridors for many vertebrate species. Distinct among other areas in the watershed, Gum Root Swamp habitats include floodplain forests of bald cypress (*Taxodium distichum*) and blackgum (*Nyssa sylvatica* var. biflora*)* trees, upland scrubby pine flatwoods, pond cypress (*Taxodium ascendens)* domes, and mesic hardwoods.

Gum Root Swamp and Conservation Area

7.7.2 Physical Integrity

Most of the Lateral A (Figure 7.2) tributary has been dredged and channelized. Natural vegetative riparian zones are scarce in this area and stormwater runoff flows directly into the creek.

The Ironwood Tributary is maintained by the Ironwood Golf Course, and sections of the course border the edge of the creek, however, most portions of the creek are surrounded by natural vegetation. These sections with adequate riparian buffers show little erosion.

The main channel of Little Hatchet Creek exhibits many areas of natural sinuosity, and much of the creek flows through relatively pristine forested wetlands. Although the section of creek that flows through Gainesville Regional Airport has been channelized with large concrete culverts approximately 10 feet wide. Runoff from runways has caused serious problems and many areas near culverts show significant erosion or sand deposition. Erosion problems in the creek due to runoff are evident even in the more natural areas of the creek. Once the creek exits the airport, it flows through a wooded area with a wide forested riparian zone. However, the streambed in this area is deeply incised with steep and unstable banks. Inner banks along this segment are three to seven feet high while outer banks reach 20 feet. Further downstream, the creek channel becomes braided as it enters Gum Root Swamp.

Ironwood Golf Course

7.8 Hydrology

The mean streamflow of Little Hatchet Creek, measured on the North Branch, is 2.02 cubic feet per second (cfs). Flow monitoring at this location, with daily data collected by the St. Johns River Water Management District, provides the largest dataset (1,479 daily measurements) for the Little Hatchet Creek system (Appendix F). The maximum flow measured on the North Branch was 28.4 cfs. This branch, like all creeks in the Little Hatchet system, intermittently goes dry.

Further downstream in the watershed, ACEPD collected monthly flow measurements on both the West and East branches of Little Hatchet Creek. The mean streamflow for the West Branch (LHAT26) was 1.13 cfs; however, only 11 measurements were collected. The maximum flow measured by ACEPD at LHAT26 was 6.3 cfs. The mean streamflow on the East Branch (LHT26E) was 4.00 cfs with 30 monthly measurements. The maximum flow measured here was 27.3 cfs. Comparison of flows between the East and West branches, on the 9 dates when flow was monitored on both creeks, shows that flows on the East Branch are over five times higher than those on the West Branch (5.5 cfs and 1.1 cfs respectively).

The mean streamflow at LHAT26 was the lowest among all streams monitored in this report. LHT26E was similar in streamflow to Tumblin Creek, but less than Possum Creek and significantly less than both Sweetwater Branch and Hogtown Creek.

A total of 22 streamflow measurements were made on Little Hatchet Creek under stormflow conditions. Twelve measurements were made at LHT26E, while five measurements each were made at LHAT26 and LHTNB (Appendix F). Storm event flows were similar on the one event in common between the East and West branches.

Little Hatchet Creek near Waldo Road

7.9 Summary

The upper reaches of the Little Hatchet Creek Watershed are highly urbanized. Many sections of the creek in this area have been channelized to facilitate drainage and reduce flooding potential. During rain events, high volumes of water flow into the ditches and storm drains that lead to the creek. Little infiltration takes place in residential and industrialized areas in the vicinity of the airport. Much of this urban development occurred prior to state and local requirements for stormwater management. The lack of retention ponds in this area allows direct discharge of untreated stormwater to enter Little Hatchet Creek. Rainfall flows rapidly into the creek as the rain event occurs, transporting sediments directly into the creek, causing in-stream erosion and bank failure, and transporting pollutants such as petroleum products directly into the creek. In many of the urbanized and channelized sections of Little Hatchet Creek, no natural buffers protect the creek, which intensifies erosion and pollutant transport.

Little Hatchet Creek East Branch (LHT26E)

Some areas in the upper watershed have been ditched and drained to reduce flooding, but retain some natural vegetation in the form of forested wetlands. These areas are important because, although ditched and drained, they contain relatively little impervious area. The areas in the lower watershed in and around the Newnans Lake Conservation Area are important in reducing the impacts of urbanization on Newnans Lake. These forested swamps allow sheet flow, which reduces water ve-

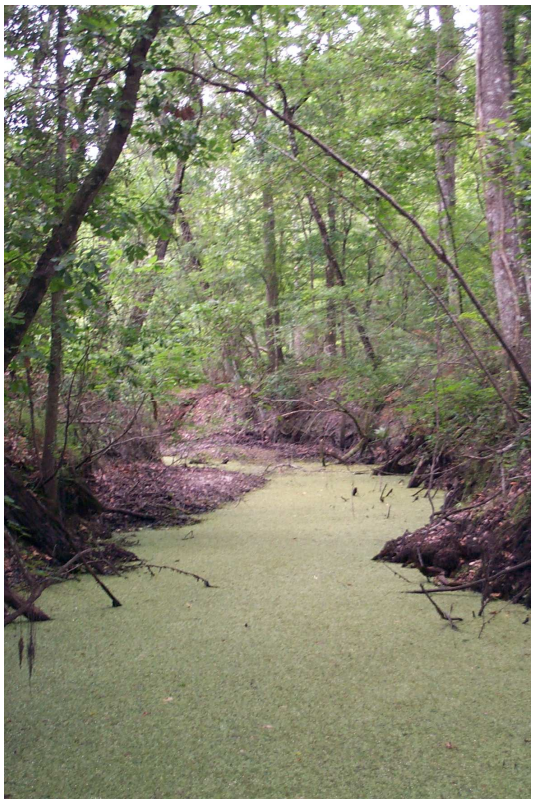
locities and turbidity. Reduced velocities also allow nutrient uptake to occur, reducing the levels of anthropogenic nitrogen and phosphorus coming from upstream sections of Little Hatchet Creek.

Major restoration activities to improve Little Hatchet Creek requiring significant capital expenditures include:

- Property acquisition in the headwaters of the watershed to retain existing natural areas
- Property acquisition and revegetation to increase natural buffer widths along the stream corridor
- Addition of stormwater basins throughout the watershed for water treatment and storage to attenuate the volume and rate at which stormwater enters the creek
- Retrofit of existing stormwater systems in the industrial and commercial areas south and west of the airport, the airport industrial park, and the airport itself to store and treat stormwater before discharge to the creek
- Investigate the need and feasibility for nutrient removal at the Brittany Estates wastewater package plant to reduce the nutrient load entering the North Branch of Little Hatchet Creek
- Continue monitoring activities at the former Airport Landfill and monitoring groundwater remediation at other commercial and industrial facilities to ensure that contaminants do not adversely impact the creek

It is critical to increase widths of riparian buffers with native vegetation. Segments of Little Hatchet Creek that have little riparian buffer include the following; (1) residential areas south of NE 39th Avenue and west of Waldo Road, (2) the industrial and commercial areas between NE 23rd Avenue and NE 53rd Avenue in the vicinity of Waldo Road, (3) The Brittany Estates Mobile Home Park, (4) The Ironwood Golf Course, (5) the Airport Industrial Park, and (6) the Gainesville Regional Airport.

Increased storage of stormwater to attenuate volume and velocity is also needed in these same areas. Public education programs are important and should be promoted. Educational activities can be targeted to specific commercial, industrial, and residential activities or neighborhoods.



Algal bloom on Little Hatchet Creek.