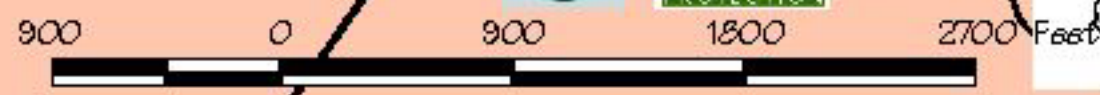


Yarmouth Creek Watershed Subwatershed 105

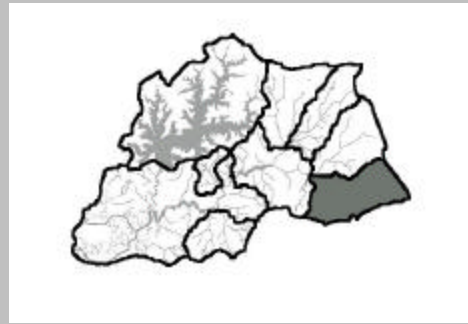
- | | | |
|--------------|---|--|
| Watershed | Potential Channel Stabilization/Restoration | Developable Parcels (1997 Zoning)
A1
B1
LB
M1
M2
MU
R1
R2
R3 |
| Subwatershed | Potential Conservation Areas | |
| Hydrology | Priority Retrofit | |
| Roads | Trash/Debris | |
| Parcels | Sensitive Fish | |
| Buildings | PSA | |
| NWI Wetlands | US Home | |



Subwatershed 105

Overall Characterization

Subwatershed 105 is currently in the SENSITIVE category with 5.5% impervious cover. Under the current zoning this subwatershed was projected to have a buildout imperviousness of 8.3%, which means it would remain in the SENSITIVE category. Recently, a significant portion of the subwatershed was rezoned and the new development will shift the classification to IMPACTED and the future impervious cover to 16.7%. Currently the subwatershed is moderately developed with most of the development located in the upper portion including commercial and residential areas. Power lines and uncontrolled stormwater runoff from a commercial development may also have impacted stream quality here. The lower reaches of the watershed are in excellent condition with good diversity of habitat. The shell-marl ravine forest is found here as well as potential habitat for the small whorled pogonia. A 264 acre forested area has been identified as a potential contiguous forest conservation area.



General Characteristics

<i>Drainage Area</i>	931 acres
<i>Length of Mapped Streams</i>	5.4 miles

Current Land Use and Stream Classification in Subwatershed 105

<i>1996 Impervious Cover</i>	5.5%
<i>Initial Stream Classification</i>	Sensitive
<i>Current Stream Condition</i>	Good

Future Land Use and Stream Classification in Subwatershed 105

<i>Buildout Impervious Cover</i>	16.7%
<i>Projected Stream Classification</i>	Impacted
<i>Developable Area</i>	609.7
<i>Developable Area %</i>	65%

Conservation Areas in Subwatershed 105

<i>Existing RPA wetland area</i>	39.1 acres
<i>Existing RPA wetland %</i>	4%

Contiguous Forest: Potential contiguous forest area, 264 acre plot

Wetlands (from NWI): 52.7 acres of wetland (6% of subwatershed), mostly riparian. Good quality wetlands associated with the floodplain and some beaver dams occur in the upper portion of the watershed.

Other Conservation Areas: none identified.

Table 105-1. Yarmouth Creek Subwatershed 105 Priority Conservation Areas						
Rank	ID	Approx. Area* (acres)		Description	Score	Management Recommendations
		Total	Developable			
6 out of 8	C6	260	190	Subwatershed 105; sensitive stream, contiguous forest, shell-marl, good fish	52	Targeted for development; RPA protection for all first order streams, BSD, stringent stormwater treatment
<p>*These are approximate areas calculated using GIS and rounded to the nearest tenth. Total area represents the total acreage within the conservation area boundary. The developable area within those conservation areas was calculated by subtracting unbuildable land and built-out land from the total area. Unbuildable land included the NWI wetlands, open water, the existing RPAs (not including RPA buffer), stream valleys (a 100-foot buffer on either side of all streams), and slopes greater than 25% (derived from 5-foot contour lines). Because this estimate was based on limited data and certain assumptions were made about how to estimate this area, it should only be used as a planning tool only and not as an actual guide for development.</p>						

General Stream Conditions in Subwatershed 105

Habitat Assessment: The upper stream reaches have been somewhat degraded by uncontrolled stormwater runoff. The upper tributary and its floodplains have also been impacted by power and sewer lines. The lower portion of the subwatershed has excellent stream conditions and contained sensitive fish species in our assessment.

Stormwater Management in Subwatershed 105

The upper stream reaches have been somewhat degraded by uncontrolled stormwater runoff. A catastrophic failure of a dry pond was also noted which caused severe erosion and a safety hazard in one tributary although it does not seem to have had major impacts downstream. Some erosion was also noted at the bottom of a concrete channel that serves as an outfall for runoff from a residential development.

Table 105-2. Retrofit Opportunities in Subwatershed 105				
ID	Facility Type	Description	Comments	Priority
105-R1	Unmanaged Runoff	Add a stilling basin at the outfall. Small drainage area estimated at 7,500 square feet. Could incorporate wet storage for water quality.	Sewer line and wetlands present potential conflicts.	Low
105-R2	Existing Dry Pond	Catastrophic failure. Undermining of the barrel has resulted in severe erosion, resulting in a roughly 20' deep canyon at the outfall, and trash in the facility. This problem should be repaired, and wet storage could possibly be incorporated as well during this enhancement.	This is a potentially high cost retrofit, but the facility in its current state is a public safety hazard, and exports sediment as well. JCC Development Management has been working to secure funding for this repair.	High
105-R3	Unmanaged Existing Development	Create a small wet pond to provide water quality and channel protection volume.	Would result in loss of at least three large trees, but can help to control runoff	Moderate

Table 105-2. Retrofit Opportunities in Subwatershed 105

ID	Facility Type	Description	Comments	Priority
			from dense development	
105-R4	Existing Dry Pond	Convert from dry to wet storage to improve water quality.	Facility also has an unlocked cover on the manhole, which can pose a safety hazard.	Moderate :Water Quality High: Unlocked manhole cover

Channel Stabilization in Subwatershed 105

One channel stabilization project was identified in Subwatershed 105. The channel stabilization project is located on two adjacent upper reaches of the subwatershed. A description of the potential channel stabilization project is located in Table 105-3 and the project location is provided in the Subwatershed 105 Map.

Table 105-3. Channel Stabilization Opportunities in Subwatershed 105

Site	Description	Type of Effort	Priority
105-S1	Upper reaches of Subwatershed 105 experiencing headcutting and erosion (Several thousand feet of channel is affected)	Channel stabilization	Medium

Yarmouth Creek Watershed Little Creek

- | | | |
|--------------|-----------------------------|-------------------------------------|
| Watershed | NWI Wetlands | Developable Parcel
(1997 Zoning) |
| Subwatershed | Potential Conservation Area | |
| Hydrology | Trash/Debris | A1 |
| Roads | PSA | B1 |
| Parcels | | M1 |
| Buildings | | R1 |
| | | R2 |
| | | R8 |



800 0 800 1600 Feet



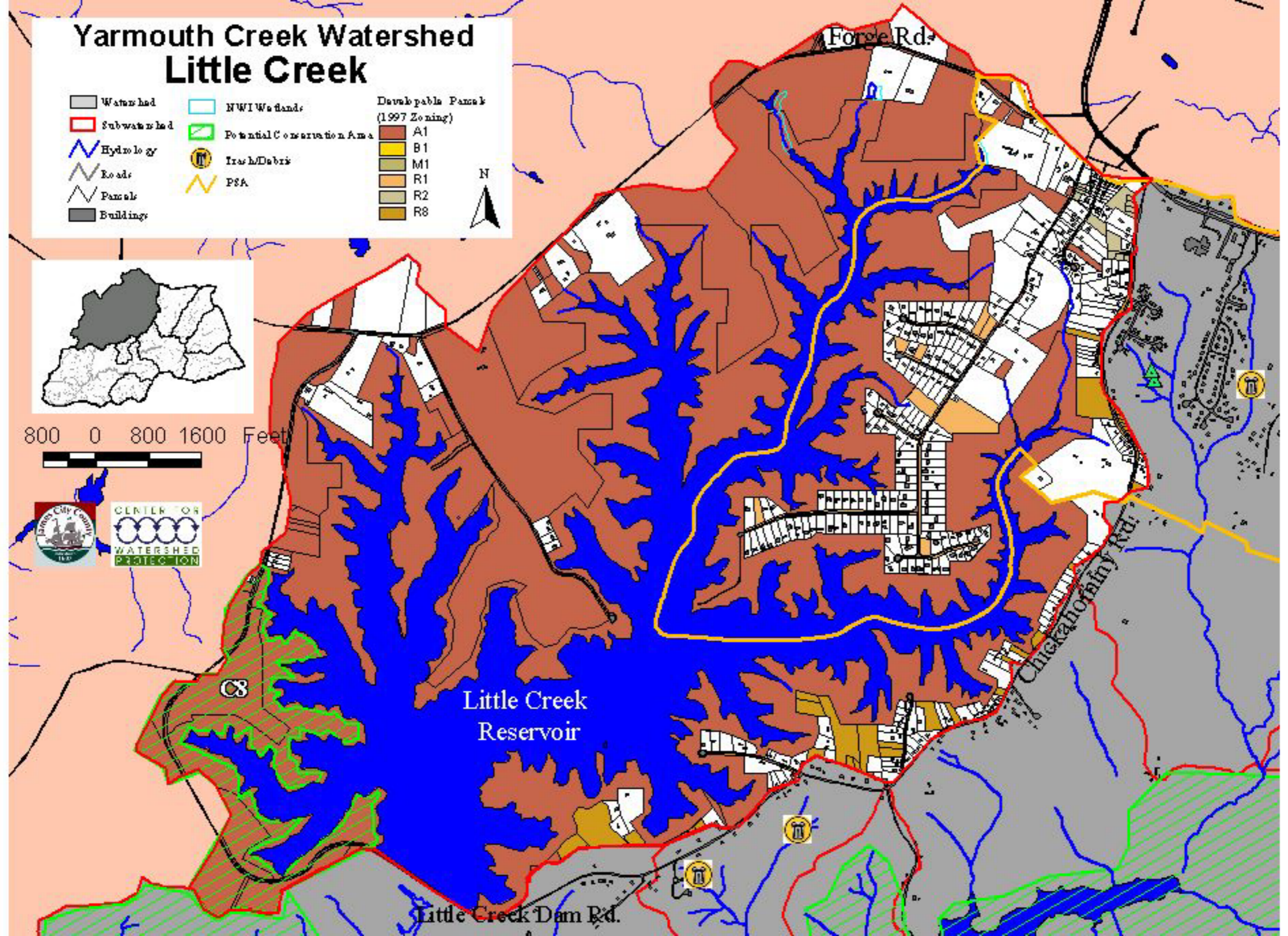
08

Little Creek
Reservoir

Little Creek Dam Rd.

Forge Rd.

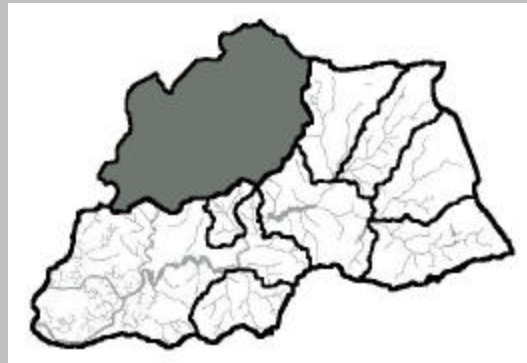
Chickahominy Rd.



Little Creek Reservoir Subwatershed

Overall Characterization

This subwatershed is composed primarily of the 996 acre Little Creek reservoir. Currently this subwatershed has less than 2% impervious cover and is comprised mainly of agricultural and forested land with a small, lightly developed area. Only one perennial stream was located in the watershed as the original streams have been inundated with the creation of the reservoir. The key water quality issue for the reservoir itself is shoreline erosion that is due primarily to the impacts of wind and wave action and beaver activity on erodible soils. However, it remains unclear how the erosion affects downstream conditions in Yarmouth Creek, simply because the water which passes over the dam is not measured. Based on a preliminary estimate, the discharge appears to be small only 0.5 cubic feet/second (CFS) on average.



General Characteristics

<i>Drainage Area</i>	2887 acres
<i>Length of Mapped Streams</i>	1.7 miles
<i>Wastewater Disposal</i>	Sewer and septic systems
<i>Number of Households (1996)</i>	331

Current Land Use in Little Creek Subwatershed

<i>Percent Forested Land (MRLC)</i>	53%
<i>Percent Agricultural Zoning</i>	88%
<i>Current Impervious Cover</i>	<2%
<i>Current Stream Classification</i>	Sensitive
<i>Developable Area</i>	1039 acres
<i>Developable Area %</i>	36%

Conservation Areas in Little Creek Subwatershed

<i>Existing RPA Wetland Area</i>	886 acres
<i>Existing RPA Wetland %</i>	46%
<i>RPA Buffer Area</i>	454.8 acres
<i>RPA Buffer %</i>	16%

Presence of RTE Species: No RTE species were identified in this subwatershed

Wetlands (from NWI): 906.3 acres of wetlands, including the reservoir itself, some riparian areas and a few small pocket wetlands.

Conservation Area: yes, 150 acres of mature hardwood contiguous forest.

Other Conservation Areas: None identified.

Table LC-1 Little Creek Reservoir Priority Conservation Areas						
Rank	ID	Approx. Area* (acres)		Description	Score	Management Recommendations
		Total	Developable			
8	C8	150	150	Mature forest in Little Creek Subwatershed; contiguous tract connecting Yarmouth with neighboring watershed		Work with utility to maintain existing forest buffer to protect water supply and maintain contiguous forest; Develop long range forest management plan
<p>*These are approximate areas calculated using GIS and rounded to the nearest tenth. Total area represents the total acreage within the conservation area boundary. The developable area within those conservation areas was calculated by subtracting unbuildable land and built-out land from the total area. Unbuildable land included the NWI wetlands, open water, the existing RPAs (not including RPA buffer), stream valleys (a 100-foot buffer on either side of all streams), and slopes greater than 25% (derived from 5-foot contour lines). Because this estimate was based on limited data and certain assumptions were made about how to estimate this area, it should only be used as a planning tool only and not as an actual guide for development.</p>						

Stormwater Management in Little Creek Subwatershed

There is one existing stormwater treatment practice in this subwatershed, which is located in the Low Density Residential area.

Land Use in Little Creek Subwatershed

Land use in the Little Creek subwatershed is a mixture of forest land, low density residential and agricultural land. The low density residential land is located primarily in the north and east portions of the subwatershed. Agricultural land is located on the western portion of the subwatershed along Norge Road and bordering the reservoir.

General Stream Conditions in Little Creek Subwatershed

Habitat Assessment

One habitat assessment was performed in the one perennial stream that was identified in the watershed. The stream was determined to be stable and habitat conditions were rated as Good. The only habitat metrics that received low scores were pool variability and substrate, which normally score low on small 1st order streams such as this. The majority of the land draining to this stable stream was forested with a small area of low density residential development, and as a result of its good condition, no management actions were recommended for this stream.

Little Creek Reservoir Assessment

General Characteristics

The lake itself has a particularly good fishery that includes largemouth bass, striped bass and catfish, and the only major management issue was shoreline erosion. The erosion

generally was most severe on the east side of the dam, on north and west facing slopes with considerable fetch, and in areas associated with the powerlines and beaver activity. The reservoir has a surface area of 996 acres with an estimated 40 miles of shoreline. It is used by Newport News Water Works (NNWW) for water supply on portions of the Virginia peninsula. The average depth is 35 ft. and in most years the water elevation is lowered approximately 8-10 ft beginning in August. The minimum allowable discharge from the reservoir is based on the 10-year, 7- day low flow event, meaning discharge has to be greater than the average flow for the lowest flow week that occurs every ten years. That minimum is estimated at less than 0.25 cfs and NNWW estimates that an average of 0.5 cfs are lost due to leaks and flow through. This is compared to a yearly daily average flow of 4 cfs, prior to the dam, based on the size of the watershed.

Shoreline erosion was identified as an important issue in Little Creek Reservoir during the Yarmouth Creek stakeholder meeting in February 2002. Potential factors that contribute to erosion are shoreline construction, beaver activity, wind and wave action during storms, and soil composition. Boat wake is not believed to be an influencing factor because, with the exception of a patrol boat, gasoline-powered engines are not allowed on the reservoir. Typical vessels include kayaks, canoes, and fishing boats with electric engines, none of which produce sufficient wake to cause shoreline erosion.

Clearing and construction on the reservoir shoreline is fairly limited because private piers are not permitted on the reservoir. Based on field observations, the only areas that have been cleared to the water's edge include some park property, power line right-of-ways, beaver slides, and several single-family lots. Beaver are a major concern in the reservoir area due to their ability to clear land and alter stream channels through the creation of dams. There are an estimated 20 beaver huts in the vicinity of the reservoir. Beaver activity (tree clearing, slides, and huts) can be found on almost all parts of the reservoir. Wind action is also a major contributor to shoreline erosion. The predominant wind is from the northeast and has an average speed of 10-15 knots. These wind speeds, when combined with the exposed, erodible clay soils found in some areas of the reservoir, can cause moderate erosion.

Field Findings

In April of 2002, CWP staff surveyed the shoreline of the Little Creek reservoir. Field findings indicated that shoreline erosion caused by wind and wave action, lack of shoreline buffers and highly erodible soils are the greatest factors influencing shoreline erosion in the Little Creek reservoir. The two areas of most severe erosion are located near the dam. One area, immediately east of the dam, experiences severe rill erosion likely due to very erodible clays that may be remnants from the original construction of the dam. This area also appears to affect water quality at least locally in the reservoir as the clays become suspended even on days with only minor wave action. The other erosion hotspots are isolated parcels of land facing the dam and areas where there is sufficient fetch for wave action to develop.