Little Lick Creek Watershed Plan

Project Kickoff Meeting

Monday, Dec. 6, 2004

Agenda

4:30 Welcome

4:40 Local Watershed Planning

4:50 Project Overview

5:30 Break

5:45 Community Watershed Interests

6:15 Identify Technical Stakeholders

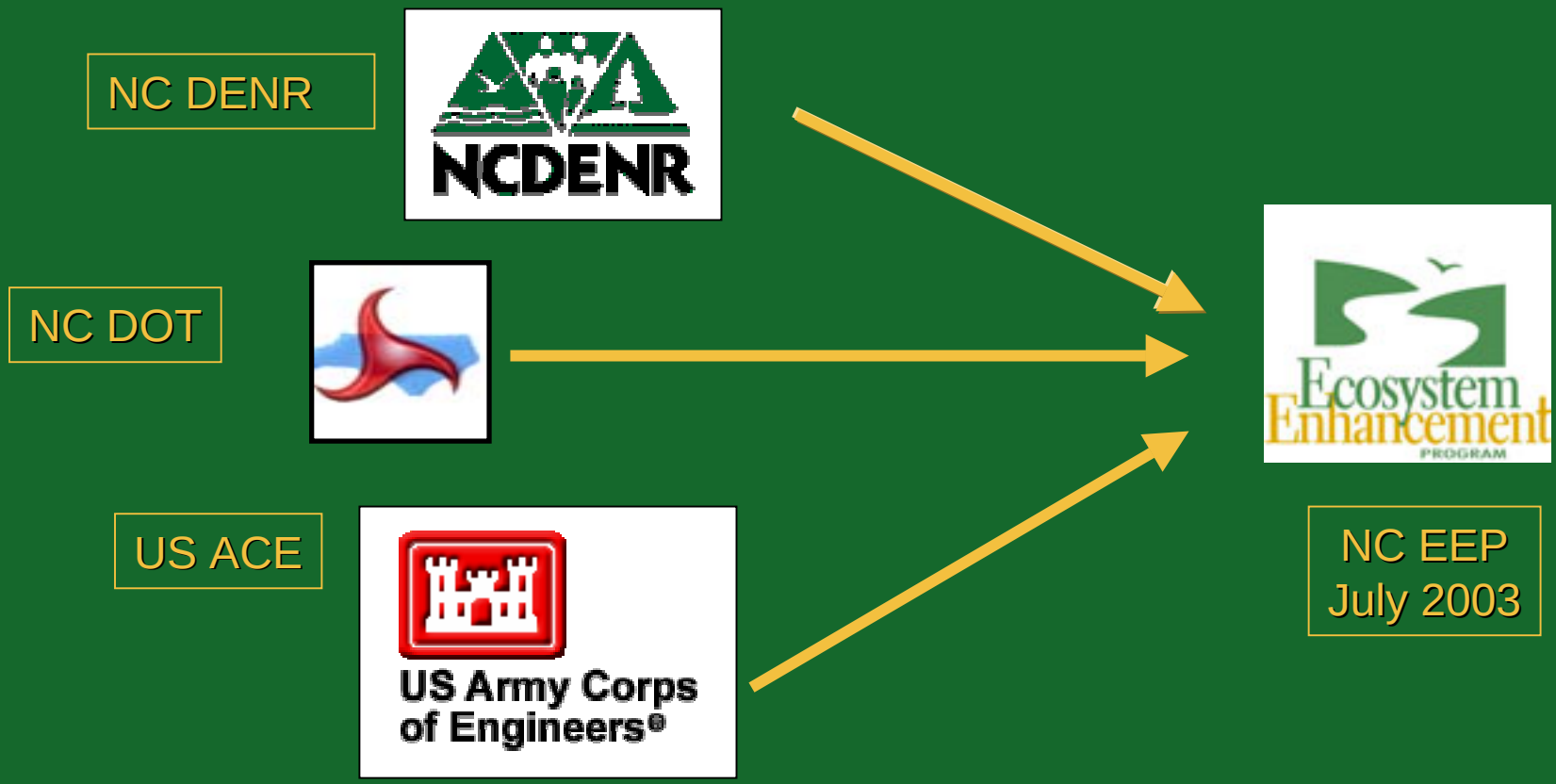
6:30 Adjourn

Little Lick Creek Watershed

Local Watershed Planning

North Carolina Ecosystem Enhancement Program

EEP: Merging Three Program Resources & Functions

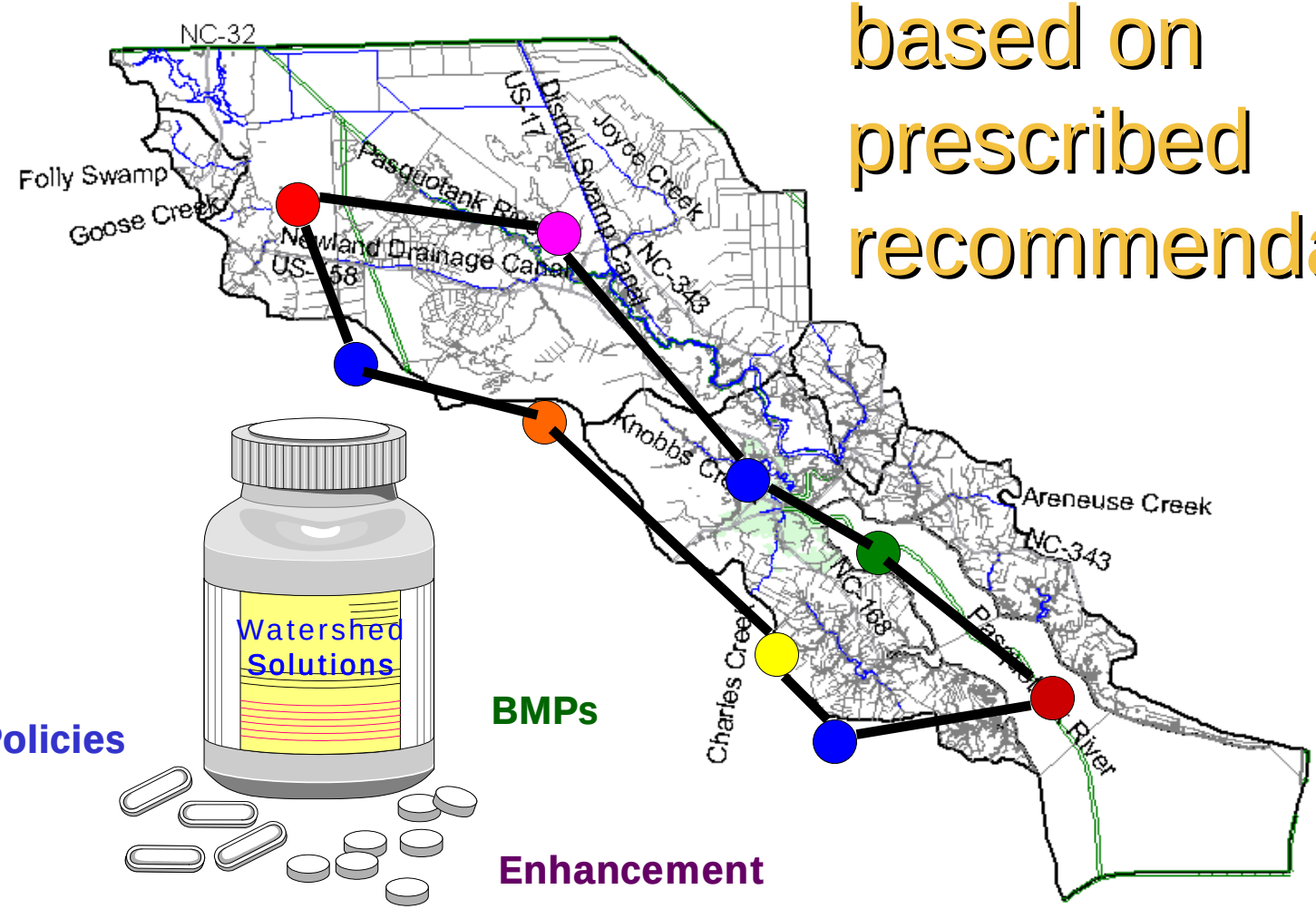


Ecosystem Enhancement Program Components

Local Watershed Planning:
Understanding Watershed Symptoms

The "Right Medicine"

based on prescribed recommendations



The “Right Medicine”

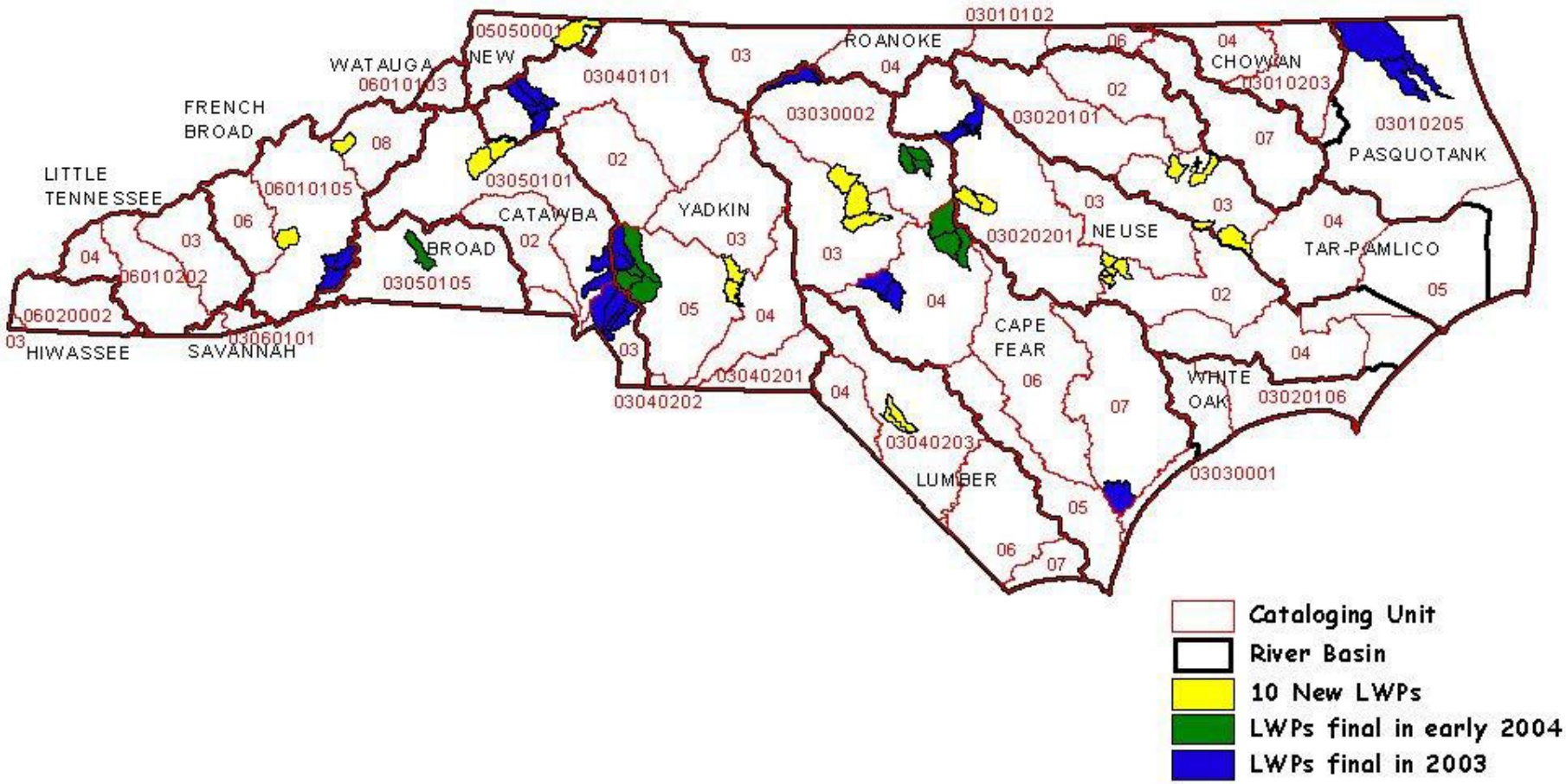
- Stream & Wetlands Restoration
- Riparian Buffer Implementation
- Best Management Practices
- Recommendations / Strategies for Improving & Protecting

✓ **Water Quality, Stormwater and Habitat**

Focus of Local Watershed Planning: to Identify the Nexus

The best projects

EEP Local Watershed Planning Areas

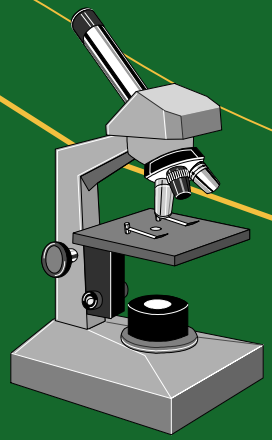


4 Key Ingredients of a *successful* Local Watershed Plan

Technical Assessment: Consultant Services

Local Stakeholders & Resource Professionals

Watershed Water Quality Monitoring



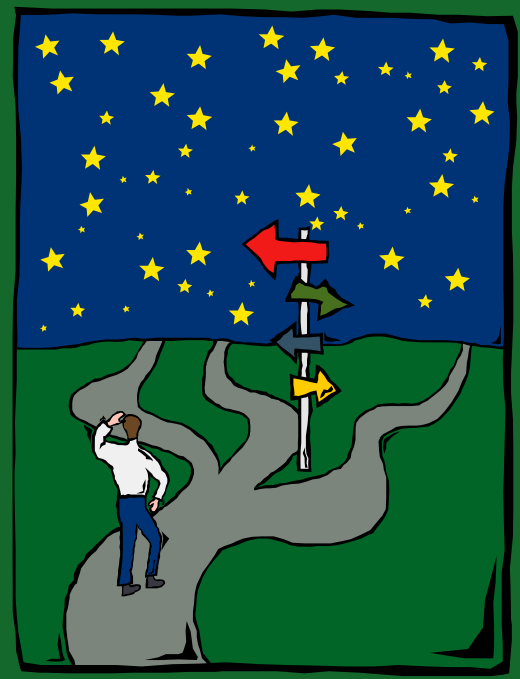
Local Partners to assist with local involvement & implementation

Potential Elements of a Local Watershed Plan

- Watershed assessment
- Wetlands and stream restoration projects
- Local growth management initiatives
- Stormwater / Ag. BMP projects
- Water supply protection strategies
- Education and technical assistance program

Components of the Technical Assessment

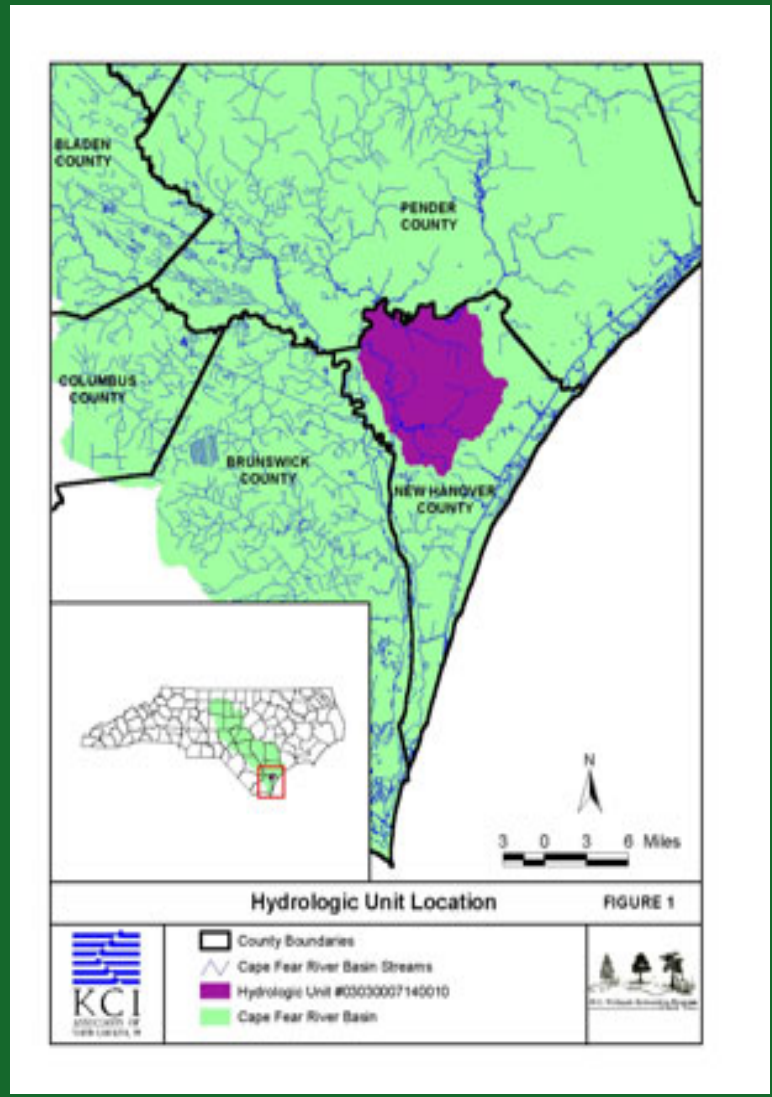
- Inventory available data & information, stakeholder identified issues
- Detailed Assessment: field assessment & modeling
- Recommendations/ Implementation



New Hanover LWP

Cape Fear River Basin, New Hanover Co.

- Stakeholder Process
  - Local interests, local government, other interested parties; technical resources
  - Watershed plan completed Dec. 2002
- Key Issues
  - 303(d) listed stream – water quality
  - Stormwater, growth & development
  - Historic channelization and poor buffers
  - Nutrient & sediment inputs
  - Habitat degradation / protection
- Outcomes
  - EEP Project Implementation, stream restoration, stormwater wetlands & other BMPs
  - 319 Grant and EPA Watershed Cooperative Agreement Grant

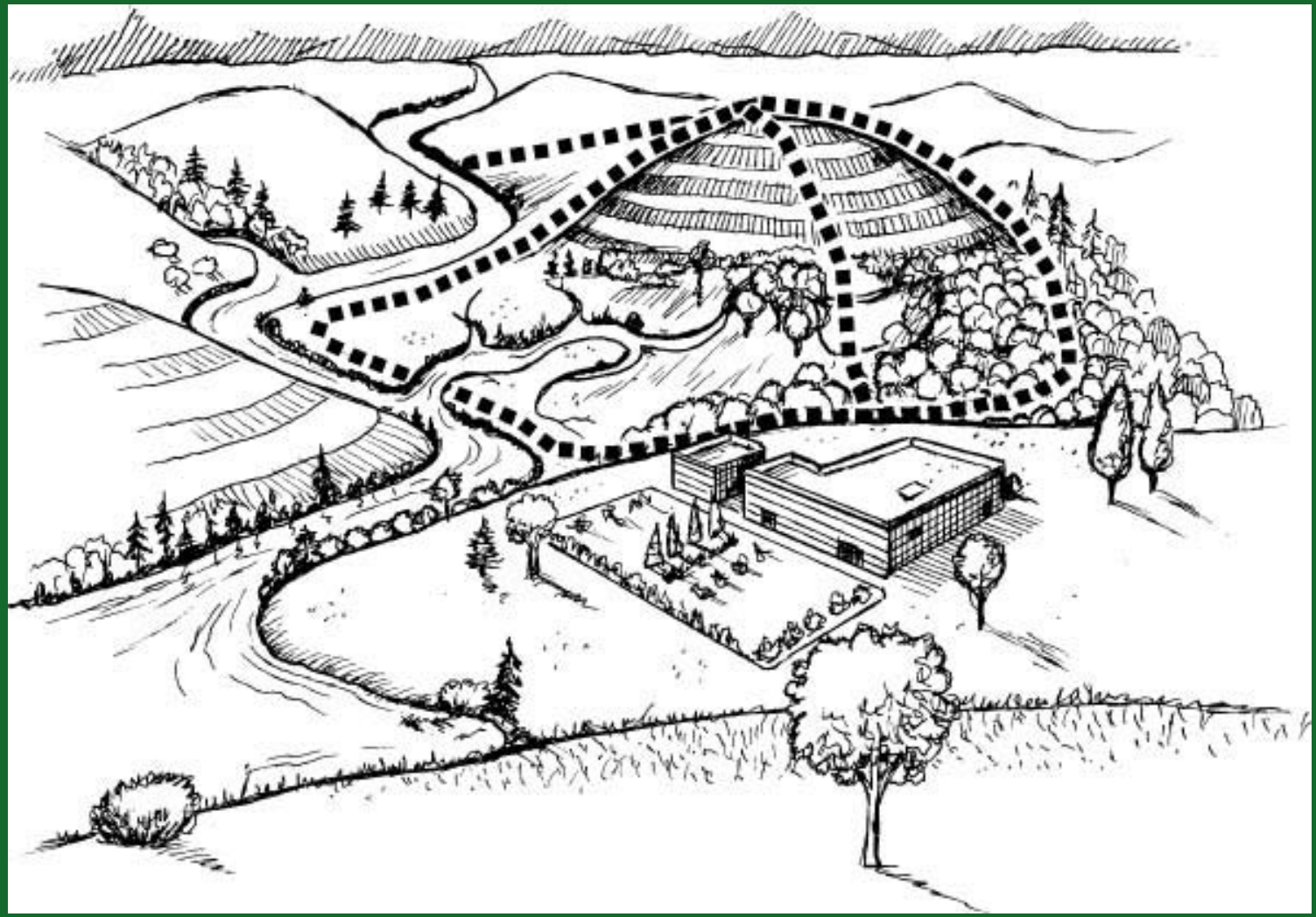


Project Overview

Little Lick Project Objectives

1. Identify watershed problems & possible causes
2. Identify projects for NC EEP
3. Recommend management strategies
4. Monitor progress
5. Partner for better planning and more effective implementation

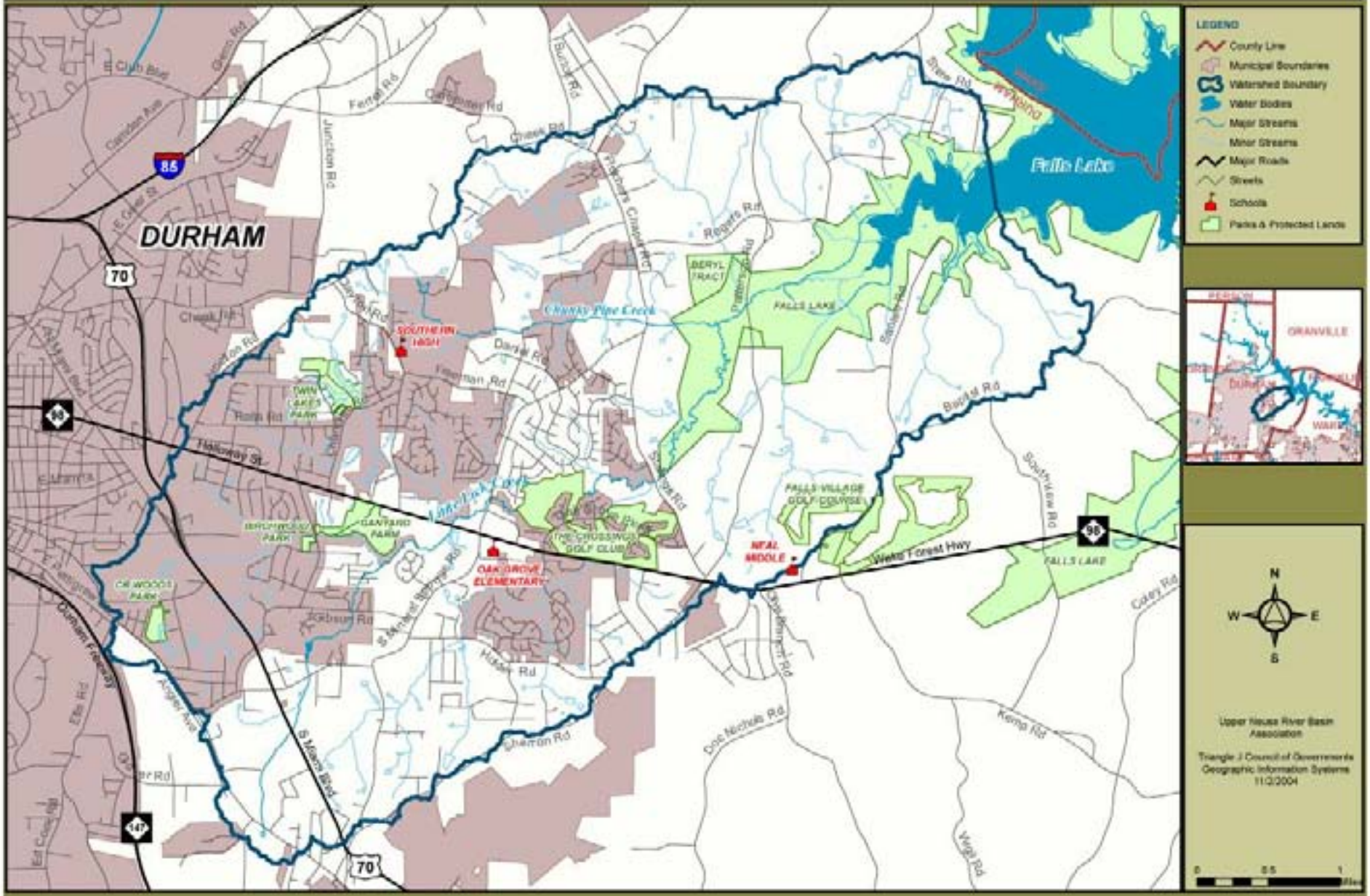
Watershed



(from www.ctic.purdue.edu/KYW/tmdl/tmdlhome.html)

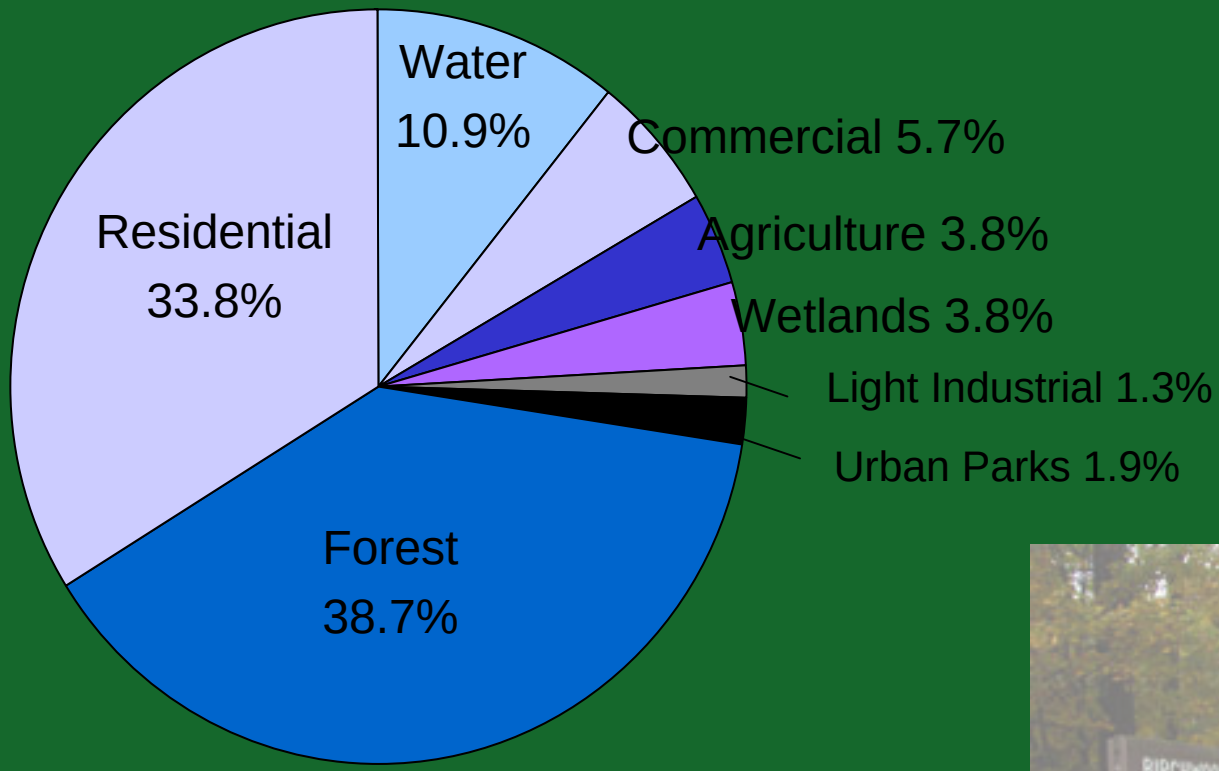
The geographic area where all water running off the land drains to a given stream, river, lake, wetland or coastal water.

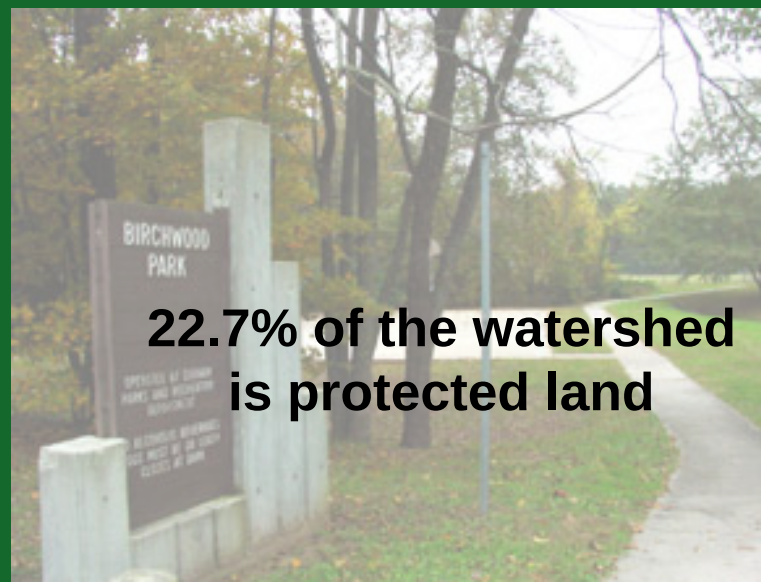
Little Lick Creek Watershed



Little Lick Creek Land Use

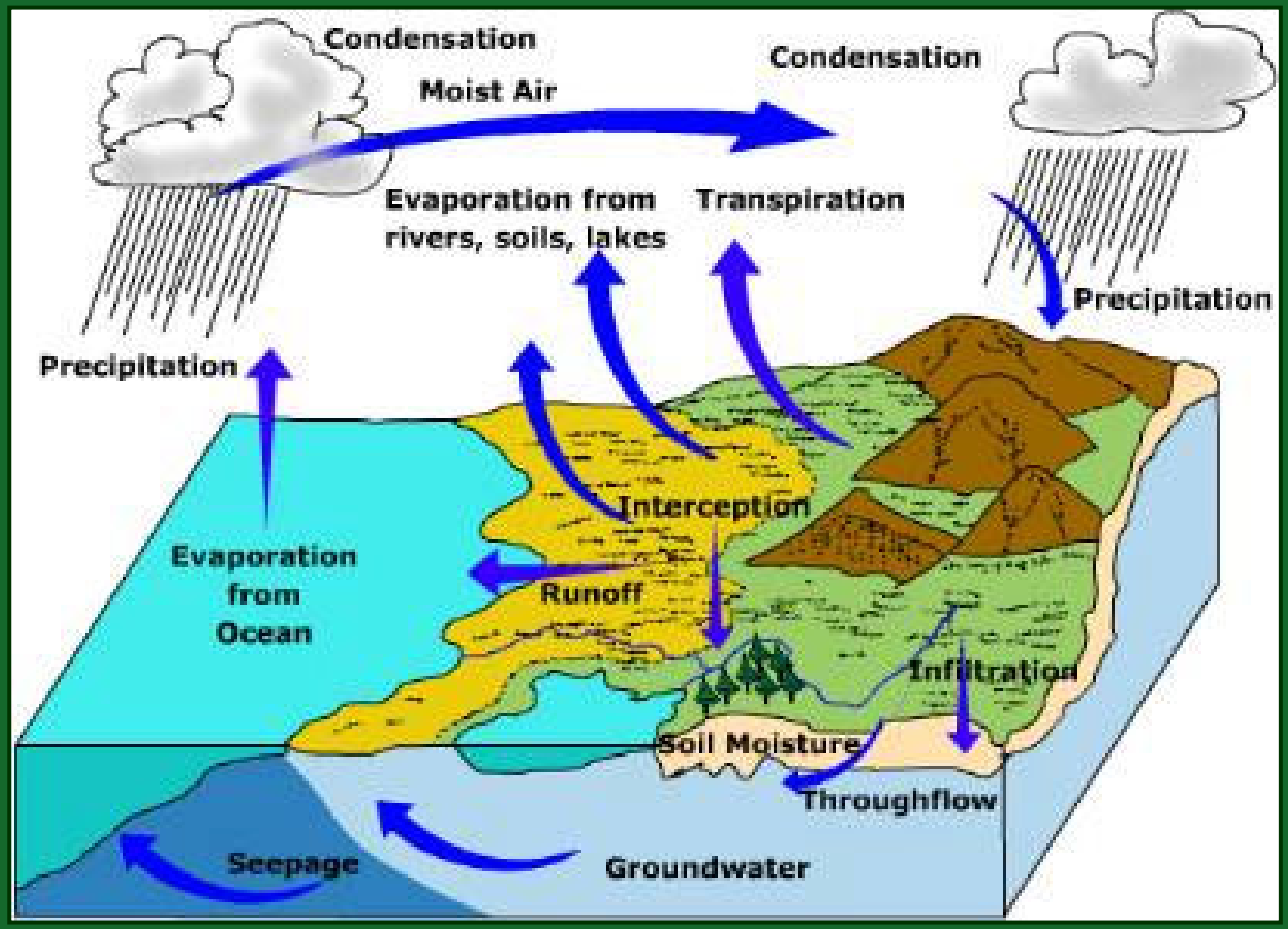
(2000 EPA land use/land cover data)





22.7% of the watershed is protected land

Hydrologic Cycle



(Redrawn after Gabler et. al., 1999)

Total Precipitation
(assume 45")

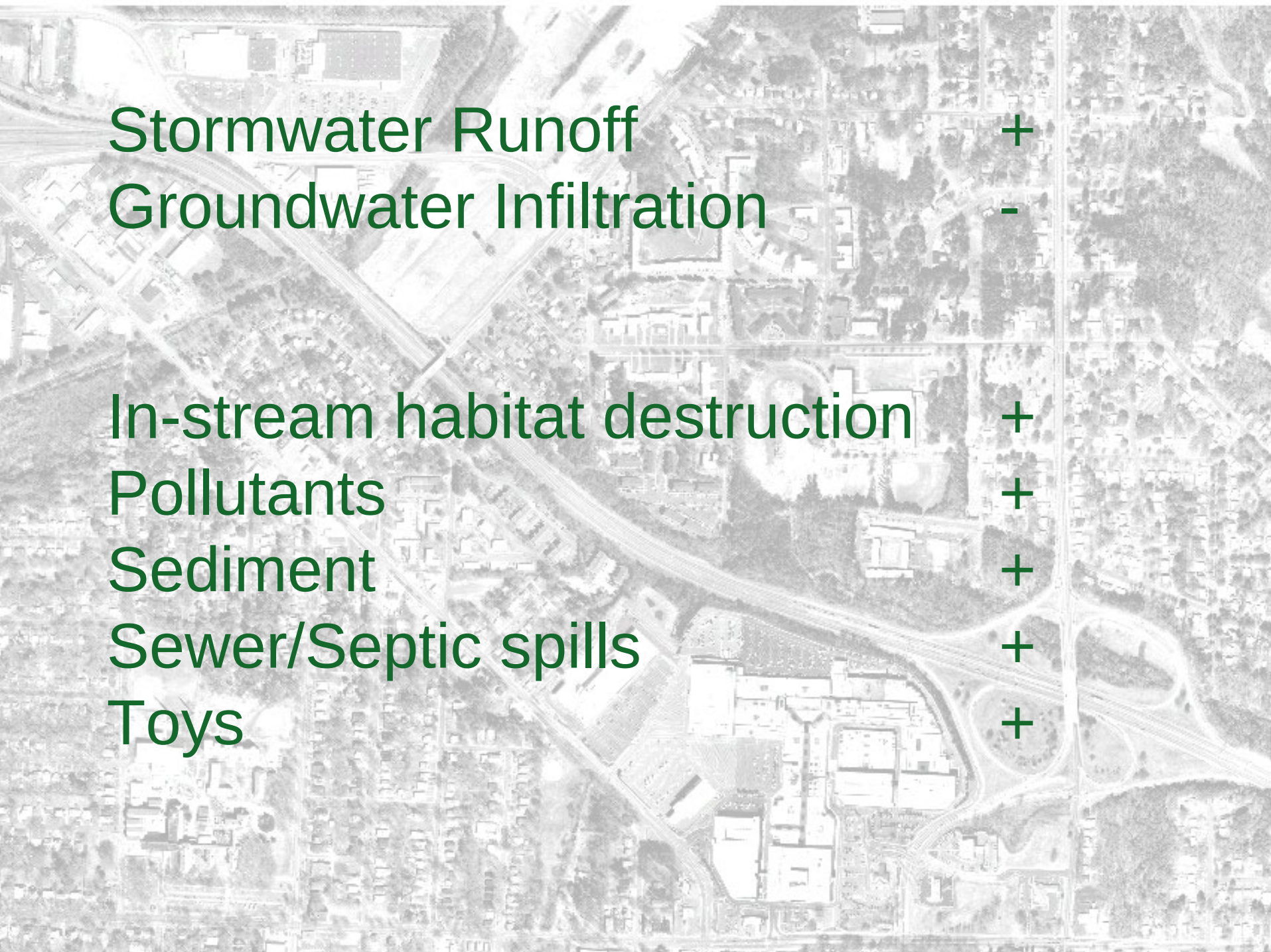
Evaporation &
transpiration
71% (32")

Surface Flow
5% (2.3")

Groundwater
21% (9.5 ")

From 2001 study of Duke Forest
(Schafer et al 2002)

Stormwater


Stormwater Runoff +
Groundwater Infiltration -
In-stream habitat destruction +
Pollutants +
Sediment +
Sewer/Septic spills +
Toys +

Little Lick Creek Water Quality

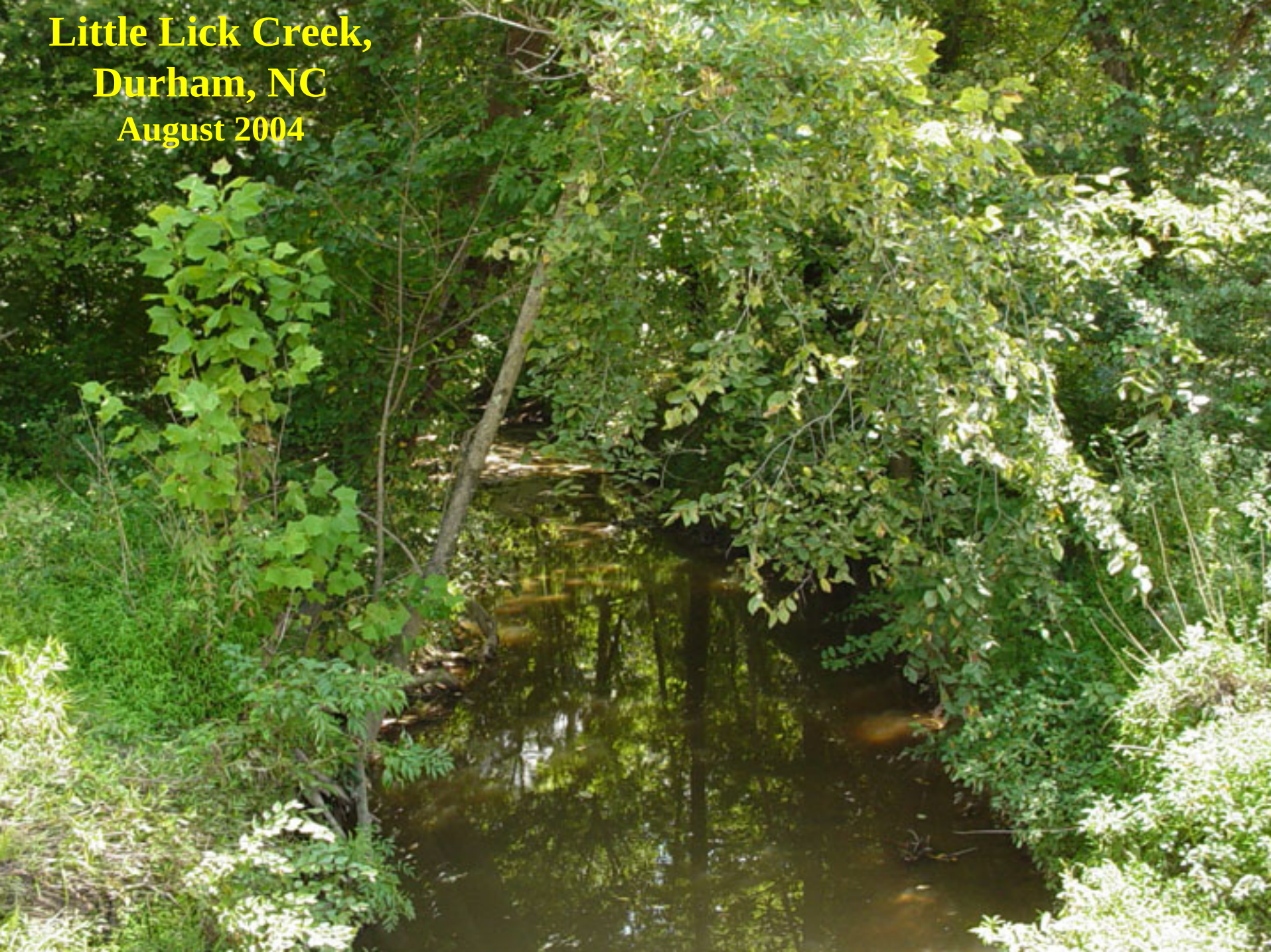
Stratford H. Kay, Ph.D.

Kathy Paull, Ph.D.

Watershed Assessment Team

Division of Water Quality

Raleigh


Little Lick Creek,
Durham, NC
August 2004

Little Lick Creek is Classified as Biologically Impaired

What is impairment, and how is it measured?

- Biological impairment – the loss or reduction of biological communities as the result of one or more external factors, such as low dissolved oxygen, toxic chemicals, excessive sedimentation, or disturbance

- Measurement:
  - Reduction in numbers of species and numbers of individuals of aquatic organisms
  - Presence or absence of sensitive indicator species


Little Lick Creek,
Durham, NC
August 2004


Little Lick Creek,
Durham, NC
August 2004

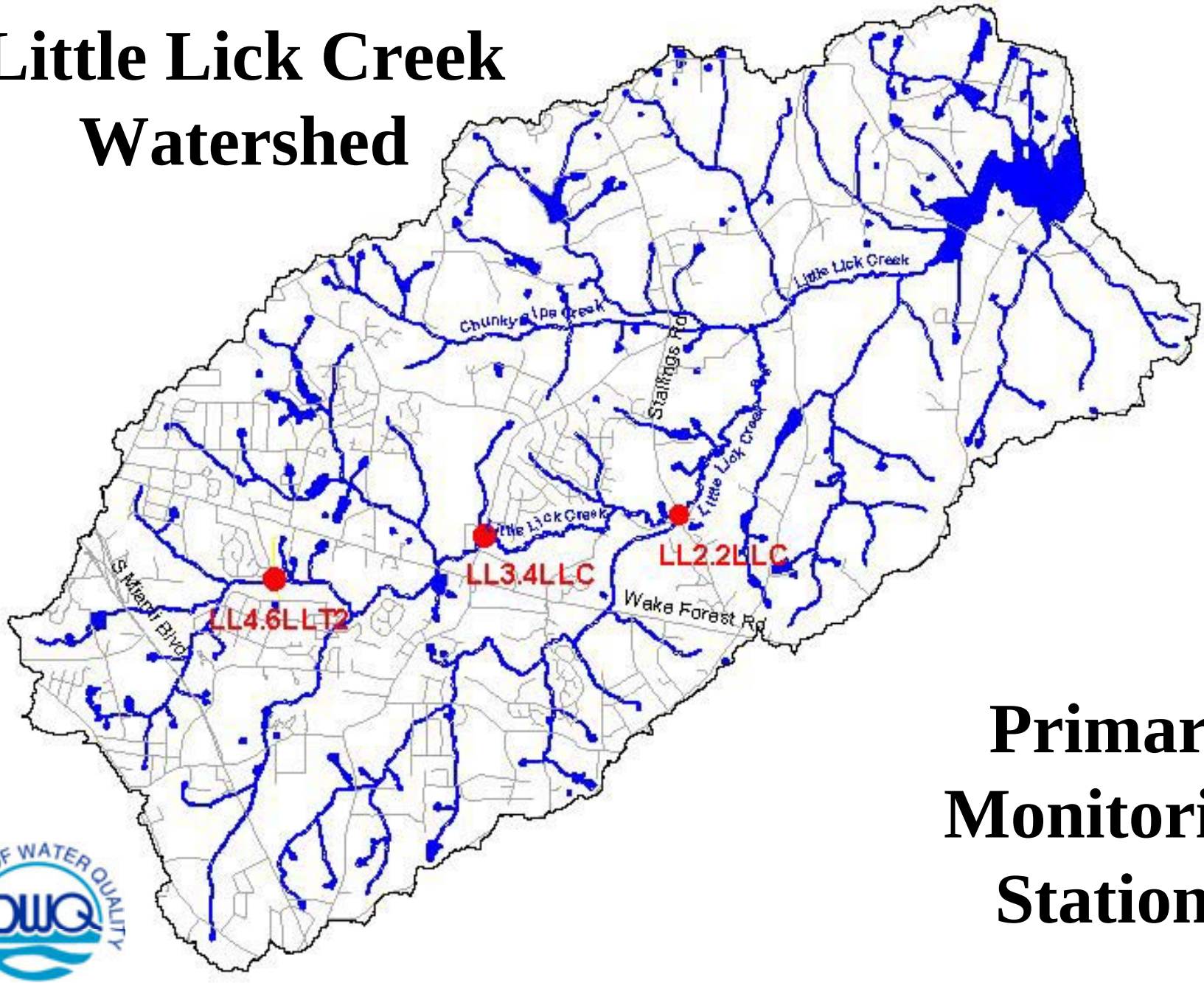

Little Lick Creek,
Durham, NC
August 2004


Little Lick Creek,
Durham, NC
August 2004

Available Data for LLC

- DWQ benthic macroinvertebrate monitoring for 2 sites, 8 samples total, 1985-2000
- City of Durham benthic macroinvertebrate monitoring for 2 sites, 8 samples total, 2001-2004 (1 site upstream from USGS sites)
- USGS ambient water quality data for 2 sites, 1982 to 2001
- City of Durham ambient water quality data for 3 sites, 2000-2004
- DWQ habitat data for 3 sites, 2000 and 2001

Little Lick Creek Watershed

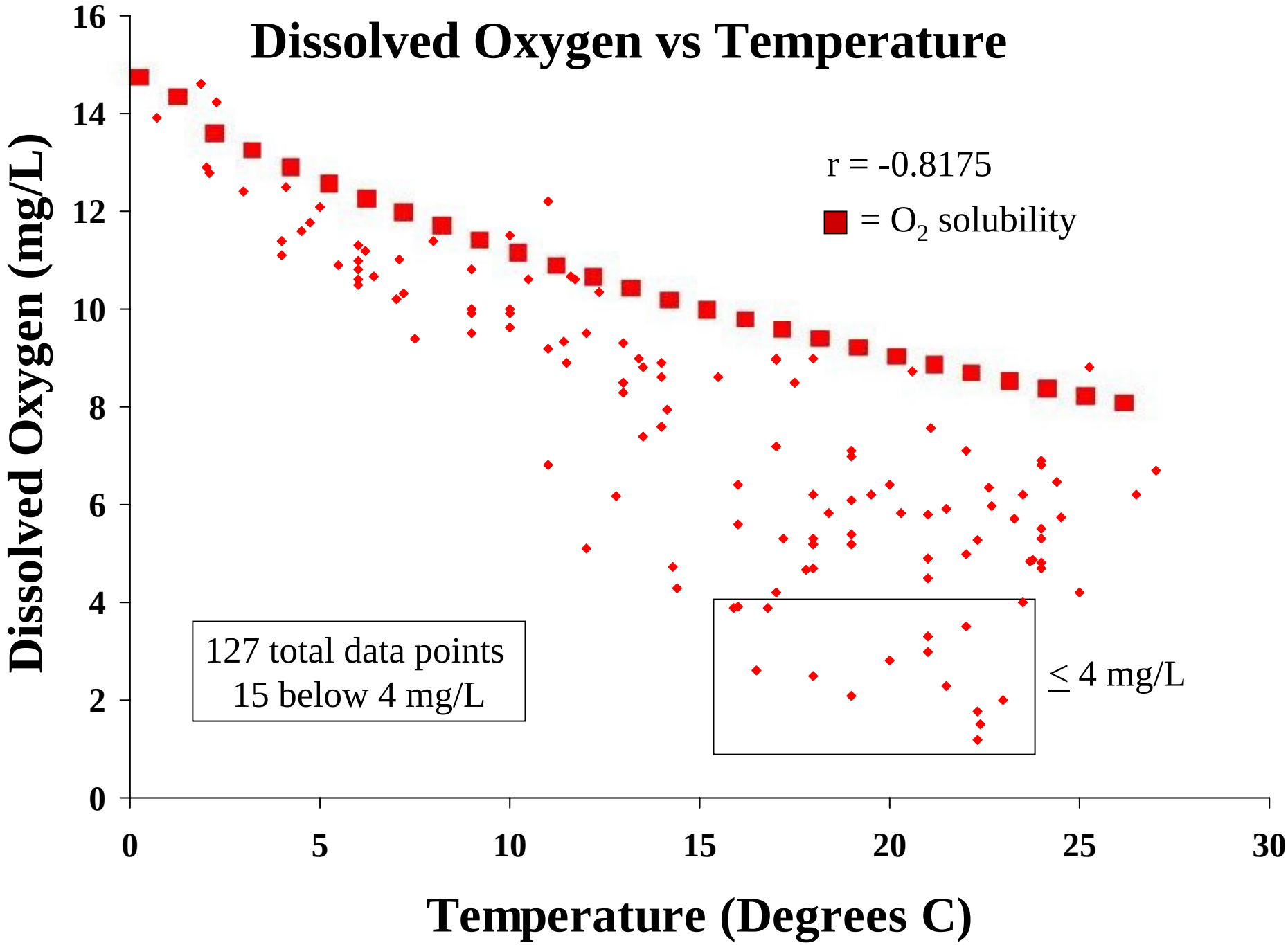


Primary Monitoring Stations

DIVISION OF WATER QUALITY
DWQ

Brief Summary of Findings from Little Lick Creek Historical Data

- Benthic macroinvertebrate data all indicated biological impairment.
- Habitat score was poor for the single downstream site in 2000 but fairly good for the two upstream sites in 2001.
- The specific cause(s) of impairment can not be determined from the available data.
- Low DO may be contributing to impairment, but other factors (sedimentation, disturbance, toxic compounds) cannot be ruled out and most likely are contributors.

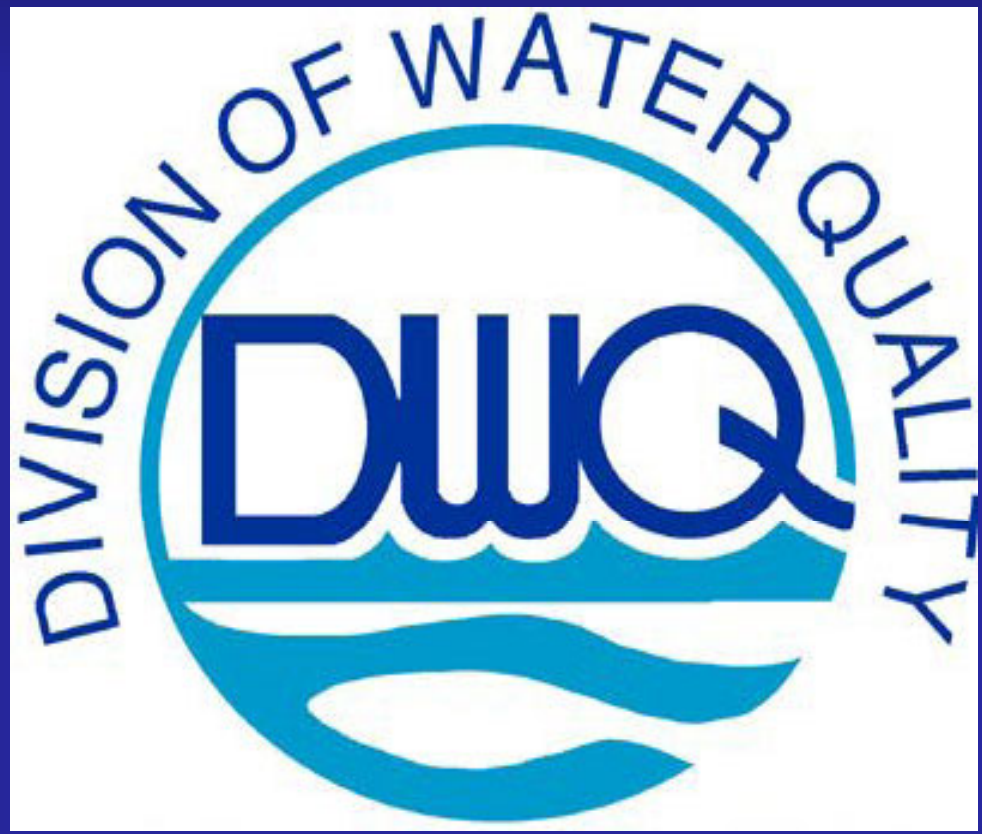

Dissolved Oxygen vs Temperature
r = -0.8175
= O2 solubility
127 total data points
15 below 4 mg/L
≤ 4 mg/L
Dissolved Oxygen (mg/L)
Temperature (Degrees C)
0
2
4
6
8
10
12
14
16
0
5
10
15
20
25
30

Short-Term Monitoring Recommendations

- Sampling of benthic macroinvertebrates at more sites on LLC and on tributaries $\geq 3^{rd}$ order
- Sampling of water quality at additional sites, including major tributaries of LLC
- Stormwater and sediment toxicity testing
- Walking of entire stream and tributaries to find possible origins of factors causing impairment
- More comprehensive habitat assessment data for LLC and tributaries
- Monitoring of stream flow
- Periodic continuous monitoring of DO

Assessment

Watershed



Team

Raleigh, NC

Watershed Management

An approach to protecting water quality and quantity that focuses on a whole watershed.

Watershed Planning Steps

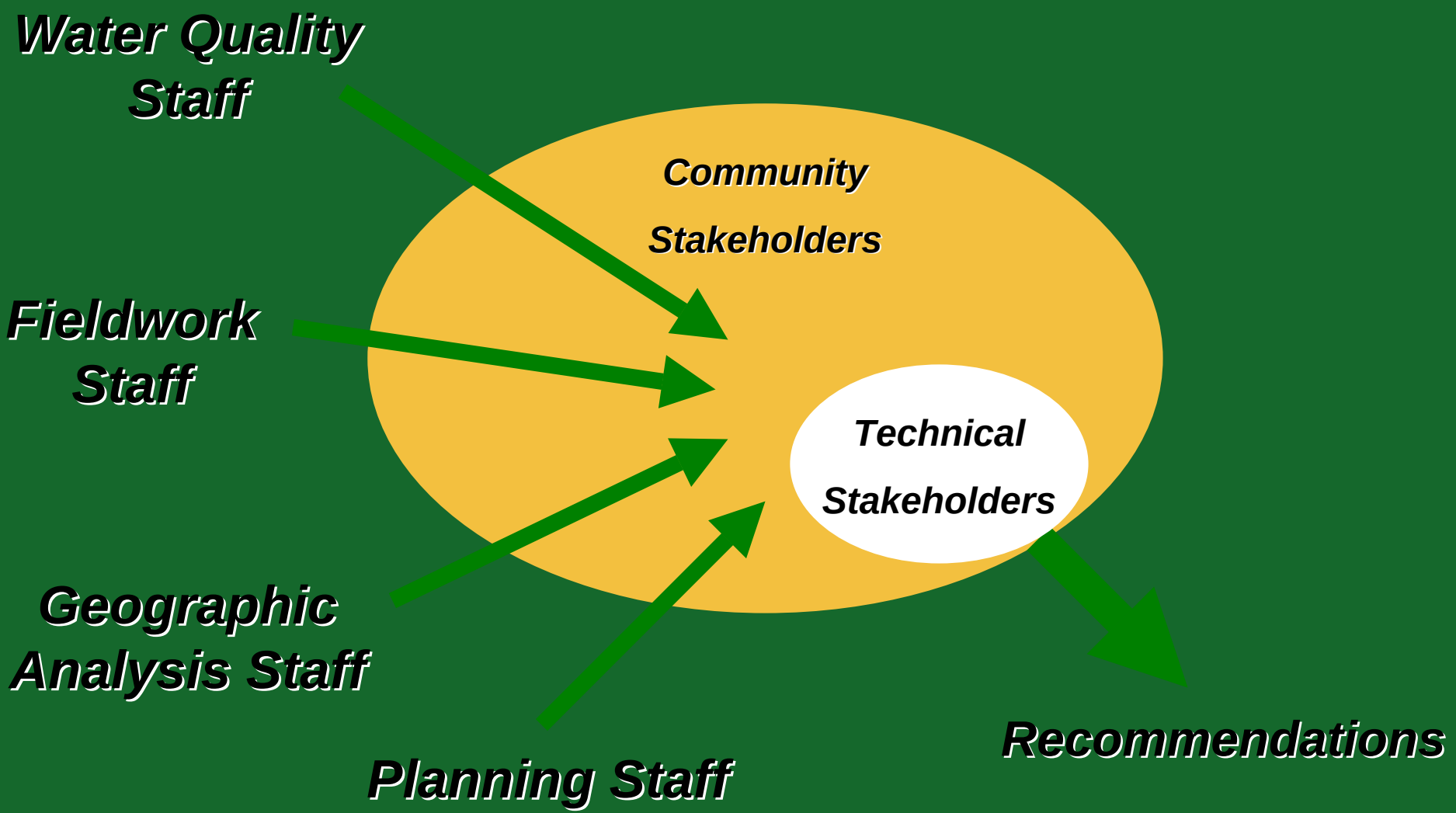
1. Involve Stakeholders
2. Analyze Data
3. Identify Project Area
4. Set Goals
5. Initial Watershed Assessment
6. Monitoring
7. Fieldwork
8. Recommend Management Strategies
9. Implement Strategies

Stakeholders

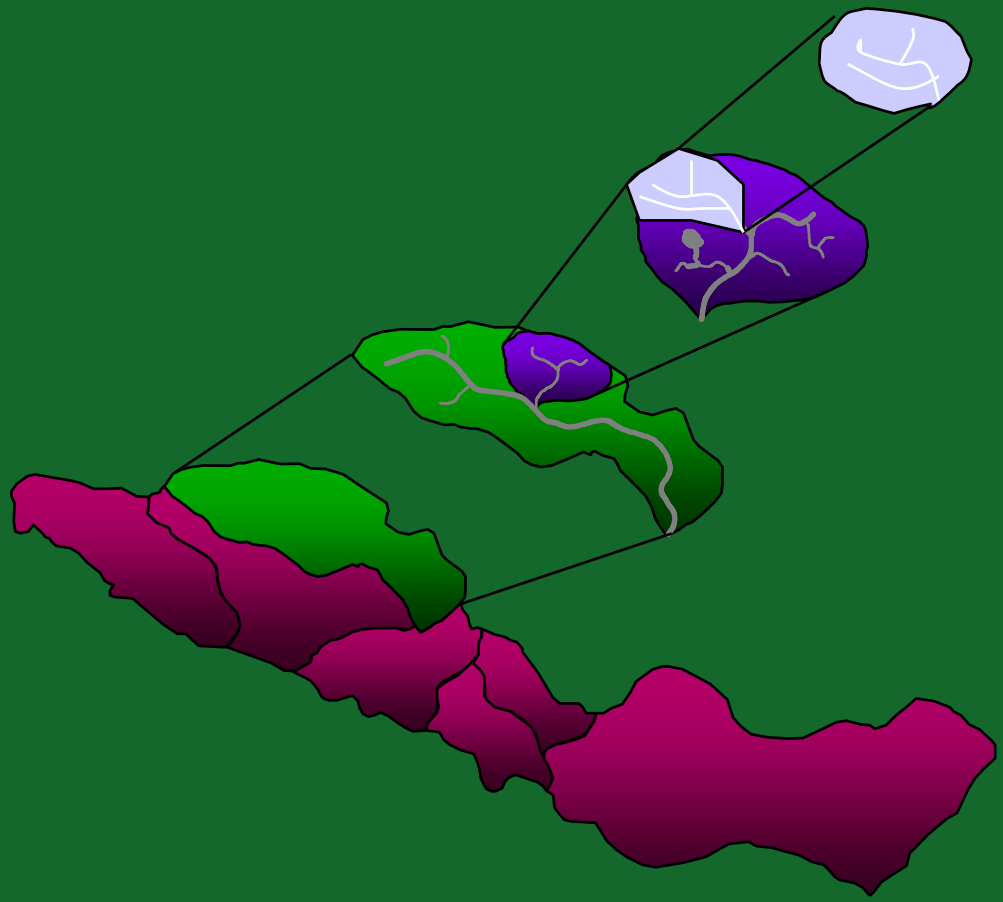
People who can affect or
are affected by a project.

- Technical Team—provide technical know-how to the project.
- Community Stakeholders—provide local knowledge to help make implementation effective and appropriate.

Stakeholders



Project Area



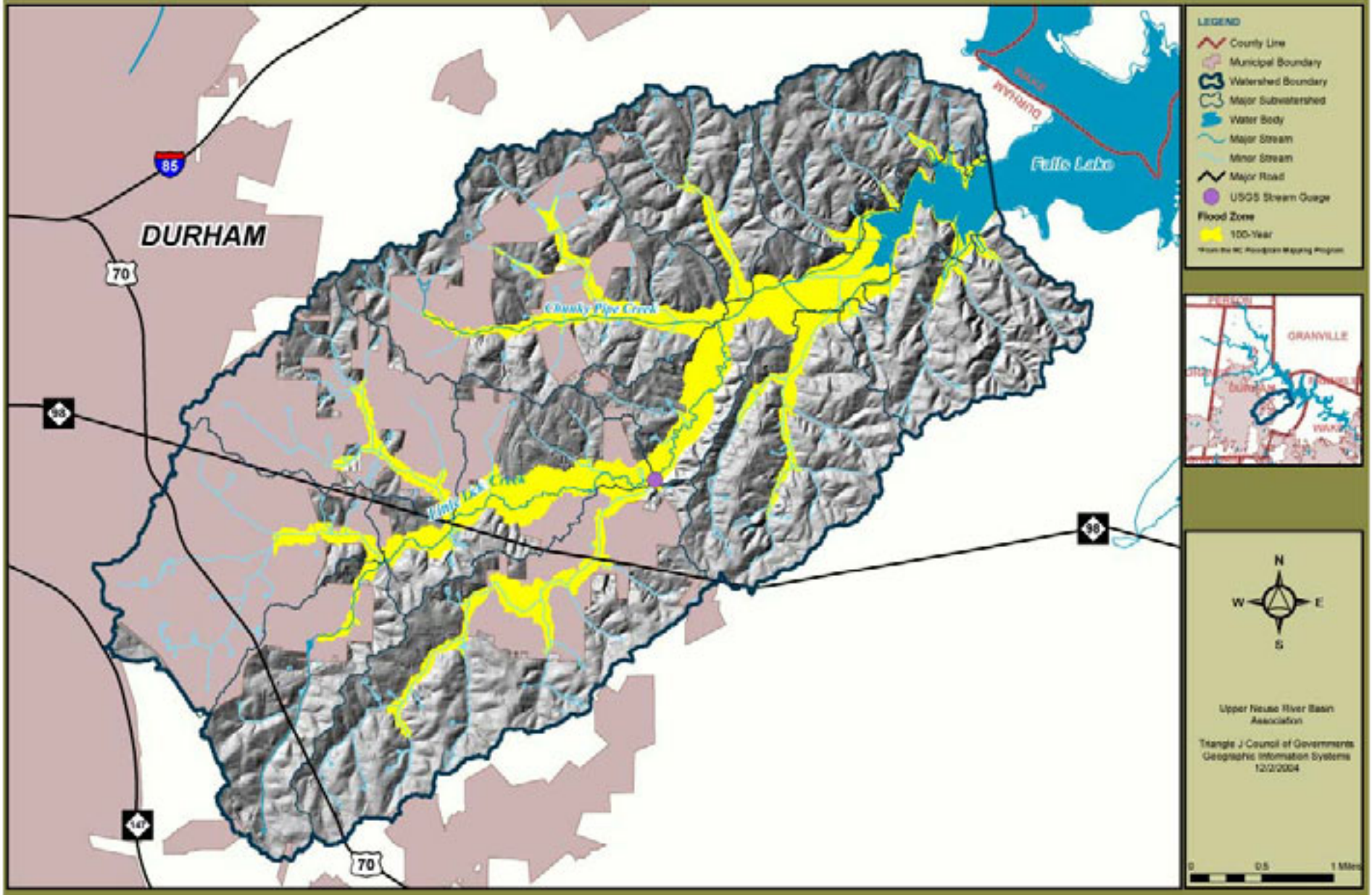
Catchment
Less than 1 mi.^{2}

Subwatershed
1 – 10 mi.^{2}

Watershed
10 – 100 mi.^{2}

River Basin
100– 10,000 mi.^{2}

Little Lick Creek Watershed Hydrology



Watershed Management Tools

(from Center for Watershed Protection)

EXHIBIT 1-5
Eight Tools of Watershed Protection

Little Lick Project Milestones

- October—Start watershed assessment
- Nov.-Dec.—Form technical stakeholder group, set project goals and start project monitoring
- Jan.-Mar.—Conduct fieldwork and identify potential projects
- Summer 2005—Draft plan and rank EEP projects
- Fall 2005—Finish draft plan and begin implementing key projects
- 2005-?—Local implementation efforts

Technical Stakeholders

- Provides technical expertise
- Meet approximately 7 times during 1 year
- Review findings of staff (have a limited amount of “homework”)
- Make consensus-based recommendations to guide the local watershed plan

Community Stakeholders

- Attend kickoff and final meetings
- May choose to attend other meetings
- Can raise issues at meetings, but not a part of consensus process of technical team
- May want to help with fieldwork