

**PRELIMINARY FINDINGS AND RECOMMENDATIONS**  
**LOWER YADKIN RIVER BASIN LOCAL WATERSHED PLANNING**  
**(PHASE II)**  
**ROCKY RIVER BASIN, NORTH CAROLINA**

**Prepared For:**

**NORTH CAROLINA WETLANDS RESTORATION PROGRAM**  
**320 West Jones Street**  
**Raleigh, NC 27603**

**Prepared By:**

**MACTEC Engineering and Consulting, Inc.**  
**3301 Atlantic Avenue**  
**Raleigh, NC 27604**

**December 10, 2003**

**MACTEC Project 6470030020**

## TABLE OF CONTENTS

	<u>Page</u>
<b>List of Appendices.....</b>	<b>iii</b>
<b>List of Tables .....</b>	<b>iii</b>
<b>List of Figures.....</b>	<b>iv</b>
<b>1.0 Introduction.....</b>	<b>1</b>
<b>2.0 Preliminary Watershed Characterizations.....</b>	<b>5</b>
2.1 Coddle Creek Local Watershed (HU 03040105020010).....	5
2.1.1 Physical Features of the Watershed.....	7
2.1.2 The Human Environment.....	9
2.1.3 Land Use and Cover.....	13
2.1.4 Water Quality and Aquatic Habitat.....	13
2.1.5 Watershed Functions.....	17
2.1.6 Threats to Watershed Function.....	24
2.2 Mallard Creek Local Watershed (HU 03040105010040).....	26
2.2.1 Physical Features of the Watershed.....	26
2.2.2 The Human Environment.....	30
2.2.3 Land Use and Cover.....	32
2.2.4 Water Quality and Aquatic Habitat.....	32
2.2.5 Watershed Functions.....	35
2.2.6 Threats to Watershed Function.....	41
2.3 Reedy Creek Local Watershed (HU 03040105010050).....	42
2.3.1 Physical Features of the Watershed.....	42
2.3.2 The Human Environment.....	46
2.3.3 Land Use and Cover.....	46
2.3.4 Water Quality and Aquatic Habitat.....	46
2.3.5 Watershed Functions.....	49
2.3.6 Threats to Watershed Function.....	58
2.4 Rocky River Local Watershed (HU 03040105010030).....	59
2.4.1 Physical Features of the Watershed.....	59
2.4.2 The Human Environment.....	61
2.4.3 Land Use and Cover.....	61
2.4.4 Water Quality and Aquatic Habitat.....	61
2.4.5 Watershed Functions.....	64
2.4.6 Threats to Watershed Functions.....	68
<b>3.0 Preliminary Potential Opportunities.....</b>	<b>70</b>
<b>4.0 Detailed Assessment Scoping.....</b>	<b>73</b>
4.1 Missing Data.....	73
4.2 Preliminary Targeted Subwatersheds.....	73
4.3 Objectives.....	79
4.3.1 Hydrology.....	79
4.3.2 Water Quality.....	80
4.3.3 Habitat.....	80

4.4 Recommended Indicators and Methods.....	81
4.4.1 Riparian Inventory .....	81
4.4.2 Detailed Analyses of Prioritized Subwatersheds .....	83
4.4.3 Identify Restoration and Management Opportunities.....	86
<b>5.0 References .....</b>	<b>88</b>

### LIST OF APPENDICES

Appendix A	GIS and Data Collection
Appendix B	Demographic Summary and Historic Trends

### LIST OF TABLES

<u>Table</u>	<u>Page</u>
1. Coddle Creek Subwatershed Characteristics .....	8
2. Watershed Protection Measures.....	13
3. Potential Threats to Coddle Creek Local Watershed Functions .....	25
4. Mallard Creek Annual Mean Streamflow (1995-2001).....	26
5. Mallard Creek Subwatershed Characteristics .....	28
6. Mecklenburg County SWIM Stream Buffers .....	31
7. Watershed Protection Measures.....	32
8. Potential Threats to Mallard Creek Local Watershed Functions .....	41
9. Reedy Creek Annual Mean Streamflow (1989-1992) .....	42
10. Reedy Creek Subwatershed Characteristics.....	44
11. Potential Threats to Reedy Creek Local Watershed .....	58
12. Rocky River Subwatershed Characteristics .....	59
13. Potential Threats to Rocky River Local Watershed.....	68
14. Preliminary Potential Restoration / Preservation Opportunities .....	70
15. Subwatershed Scoring.....	75
16. Subwatershed Categorization.....	77
17. Targeted Subwatersheds .....	79
18. Office Inventory Indicators.....	82
19. Stream Visual Assessment Indicators .....	82
20. Degradation Indicators.....	83
21. Water Quantity Modeling Indicators .....	84
22. Stormwater System Indicators .....	85
23. Stream Geomorphology Indicators .....	86

## LIST OF FIGURES

<u>Figure</u>	<u>Page</u>
1. Project Study Area Location .....	3
2. Coddle Creek Local Watershed .....	6
3. Coddle Creek Soil Erodibility.....	10
4. Coddle Creek Impervious Cover .....	14
5. Coddle Creek Floodplain Encroachment .....	19
6. Stream downcutting along Afton Run at Dorton Park, 04/15/03 (CC10).....	20
7. Sedimentation in Park Creek at Plum Road, 07/29/03 (CC08).....	20
8. Straightened channel along Afton Run at Dorton Park, 04/15/03 (CC10) .....	21
9. Lake Howell Subsurface Discharge, 07/29/03 (CC11).....	23
10. Culvert Aquatic Barrier along Afton Run at NC-73, 07/29/03 (CC10).....	23
11. Kudzu in Coddle Creek Riparian Corridor at Brumley Road, 07/29/03 (CC01).....	24
12. Mallard Creek Local Watershed .....	27
13. Mallard Creek Soil Erodibility.....	29
14. Mallard Creek Impervious Cover .....	33
15. Mallard Creek Floodplain Encroachment .....	37
16. Stream Widening along Mallard Creek at Morehead Road, 07/31/03 (MC03).....	38
17. Bank Erosion along Mallard Creek at Morehead Road, 07/31/03 (MC03) .....	38
18. Sedimentation along Mallard Creek at Morehead Road, 07/31/03 (MC03).....	39
19. Piped tributary to Clark’s Creek near Dearmon Road, 07/31/03 (MC01).....	39
20. Mallard Creek at Mallard Creek Road, 7/29/03 (MC05).....	40
21. Reedy Creek Local Watershed.....	43
22. Reedy Creek Soil Erodibility .....	45
23. Reedy Creek Impervious Cover.....	47
24. Reedy Creek Floodplain Encroachment .....	51
25. Stormwater Management near Robinson Church Road, 07/31/03 (RC07).....	52
26. Sediment-Laden Runoff near Robinson Church Road, 07/31/03 (RC07) .....	52
27. Sedimentation at Reedy Cr. tributary near Robinson Ch. Rd., 07/31/03 (RC07).....	53
28. Bank Erosion/Channel Widening in McKee Creek at SR-2808, 07/31/03 (RC08).....	53
29. Turbidity in Reedy Creek at Lower Rocky River Road, 07/31/03 (RC06) .....	54
30. Riffle in Fuda Creek near Stallings Road, 07/31/03 (RC03).....	55
31. New Residential Development near Robinson Church Road, 07/31/03 (RC07) .....	56
32. Cattle and Debris in McKee Cr. near Peach Orchard Rd., 07/31/03 (RC08).....	57
33. Livestock Impacts along McKee Cr. at Peach Orchard Road, 07/31/03 (RC08).....	57
34. Rocky River Local Watershed .....	60
35. Rocky River Soil Erodibility .....	62
36. Rocky River Impervious Cover .....	63
37. Rocky River Floodplain Encroachment.....	66
38. Turbidity and Sedimentation in the Rocky River near US-29, 07/31/03 (RR02).....	67
39. Erosion Control Measures at Concord Mills Parkway, 07/31/03 (RR01) .....	67
40. Preliminary Potential Restoration / Preservation Locations .....	72
41. Subwatershed Scores .....	76
42. Preliminary Targeted Subwatersheds.....	78

## **1.0 INTRODUCTION**

The North Carolina Wetlands Restoration Program (NCWRP) has initiated comprehensive watershed planning efforts in certain high-priority local watersheds in order to meet the following primary objectives:

1. Assessment of historical and current watershed conditions;
2. Identification of the major causes and sources of watershed degradation (including water quality impairment, aquatic habitat degradation, and flooding problems);
3. Involvement of local stakeholder groups in determining major watershed issues and high-priority focus areas;
4. Prediction of future watershed conditions under alternative land use & watershed management scenarios;
5. Development of a consensus-based package of watershed restoration and protection recommendations to be brought before local decision-making bodies, including:
  - a) identification of restoration, enhancement, and preservation opportunities in order to assist the North Carolina Department of Transportation (NCDOT) in meeting future compensatory mitigation needs for stream, riparian buffer and wetland impacts;
  - b) identification of non-traditional mitigation projects (e.g., stormwater Best Management Practices [BMPs], urban retrofits, agricultural practices) for targeted sites or subwatersheds; and
  - c) identification of a long-term follow-up strategy to assist localities in implementation of the specific watershed protection recommendations developed during the planning process.

The NCWRP selects certain local watersheds (14-digit Hydrologic Units, or "HUs") - typically a contiguous cluster of two to four HUs - as high-priority areas for watershed planning due to three primary factors:

1. Documented water quality and aquatic habitat problems in selected stream segments;
2. The opportunity to partner with local agencies and municipalities that have already initiated watershed protection or restoration efforts; and
3. Ongoing threats to local watershed health attributable to agricultural activities, urban/suburban development, planned highway construction projects, clearing of riparian buffers, and other non-point sources.

The NCWRP Local Watershed Planning (LWP) efforts are moving toward a watershed assessment approach that emphasizes lost or impaired (and restorable) functions of key watershed components (streams, riparian buffers, wetlands, and contributing uplands) - within the context of an integrated landscape or ecosystem approach. These functions generally fall into three primary categories:

- water quality protection;

- habitat; and
- floodwater storage.

These three functional areas are often the focus of watershed assessment and restoration efforts associated with the LWP process.

Whereas the NCWRP has funding to implement specific restoration, enhancement and preservation projects that may receive compensatory mitigation credit, the primary responsibility for watershed solutions that are not traditional mitigation projects (e.g., stormwater management practices) will rest with local governments and other non-profit entities. As part of the development of Local Watershed Plans, the NCWRP and its consultants will work with local stakeholder groups to recommend politically and financially feasible watershed solutions, including assistance in identifying possible funding sources for the recommended solutions.

The NCWRP has retained MACTEC Engineering and Consulting, Inc. (MACTEC) to conduct a technical assessment of watershed conditions within the Phase II LWP Study Area (Phase I addressed the Upper Rocky River and Clark Creek Local Watersheds) of the Upper Rocky River Subbasin (Figure 1) and to provide other support services in the development of the final Local Watershed Plan for the study area.

MACTEC's support services to the NCWRP began in January of 2003 and are scheduled for completion by September of 2004. The major tasks and subtasks of MACTEC's watershed assessment are outlined below:

*Task 1 Characterization of Water Quality and Habitat Issues*

*Task 1.1 Available GIS and Data Resources*

*Task 1.2 Identification of Missing Data Needed*

*Task 1.3 Historical Trend Analysis*

*Task 1.4 Data Presentation and Preliminary Report*

*Task 2 Detailed Assessment of Representative Subwatersheds and Preliminary Identification of Watershed Improvement Projects*

*Task 2.1 Riparian Inventory and Reconnaissance*

*Task 2.1.1 Office Inventory*

*Task 2.1.2 Stream Visual Assessments*

*Task 2.1.3 Assessments of General Causes and Effects of Degradation*

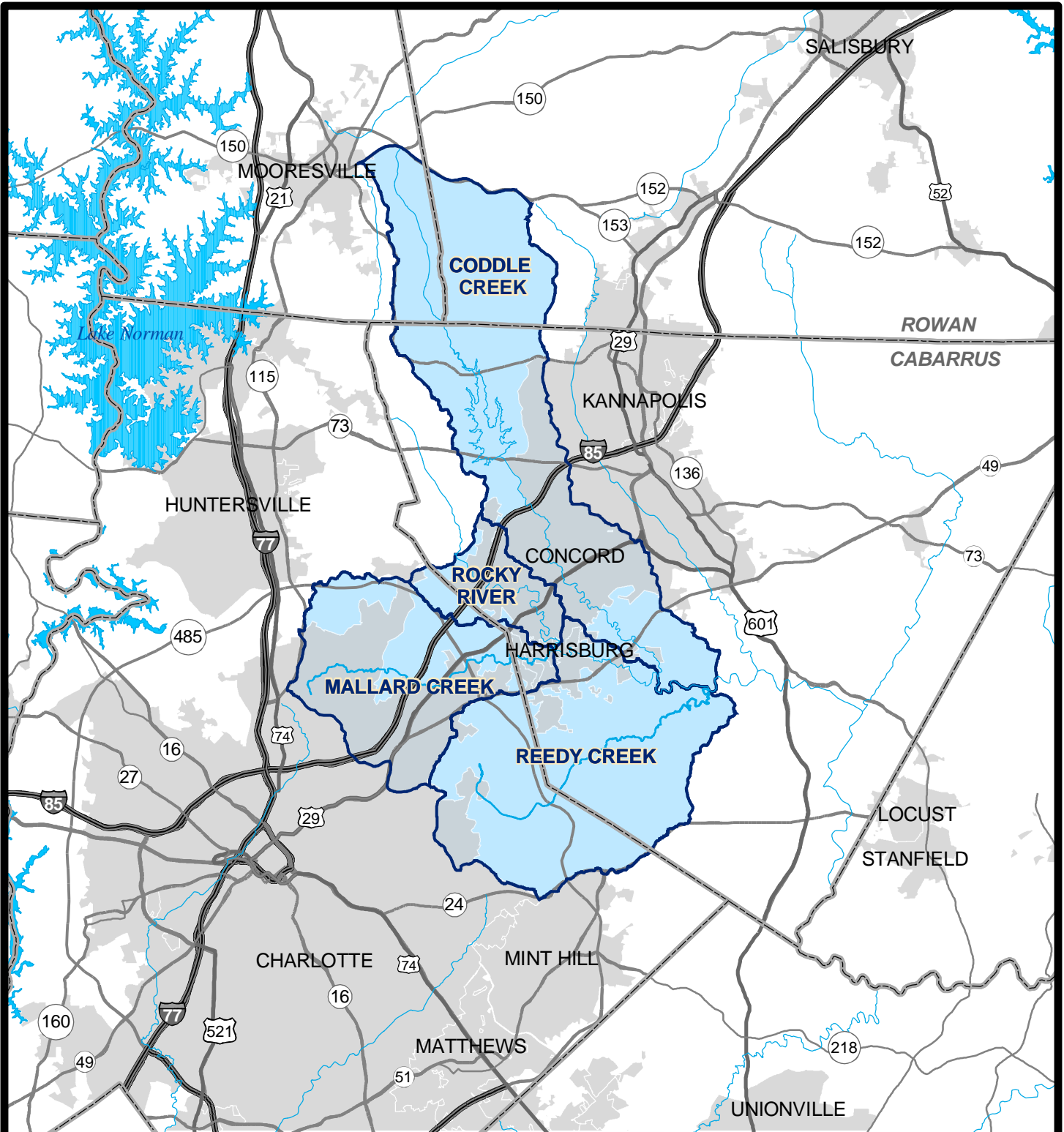
*Task 2.1.4 Documentation of Findings*

*Task 2.2 Detailed Analyses of Prioritized Subwatersheds*

*Task 2.2.1 Water Quantity Modeling*

*Task 2.2.2 Stormwater System Outfall Review*

*Task 2.2.3 Compile / Collect Stream Geomorphology Data*



0 2 4 8 Miles  
 0 3 6 12 Kilometers



Data Source(s): NCCGIA  
 Prepared / Date:  
 Checked / Date:

NC Wetland Restoration Program  
 Lower Yadkin LWP (Phase II)  
 Rocky River Subbasin (03040105)



Project Study Area Location

Project 6470030020

Figure 1

*Task 2.3 Identify Restoration and Management Opportunities*

*Task 2.3.1 Priority Opportunities*

*Task 2.3.2 Cataloging Unit-Wide Restoration Opportunities*

*Task 3 Development of Watershed Management Plans*

*Task 3.1 Develop Build-Out / Resource Degradation Model*

*Task 3.2 Illustrate Model Predictions*

*Task 3.3 Watershed Management Plans*

*Task 3.4 Stakeholder Interaction*

The purpose of this Preliminary Findings and Recommendations Report is to summarize the results of Task 1 and provide vital information regarding the Coddle Creek, Mallard Creek, Reedy Creek, and Rocky River Local Watersheds (14-Digit HUs). It compiles and summarizes key watershed characterization findings including technical memoranda (Appendices), Geographic Information Systems (GIS) products (Appendix A), and tables and presents information collected pertaining to the condition of wetlands, streams, riparian buffers, contributing uplands, and water quality within the local watersheds. Specifically, this report includes local watershed summaries for the following general categories:

- Physical Features of the Watershed
- The Human Environment
- Land Use and Cover
- Water Quality and Aquatic Habitat
- Watershed Functions
- Threats to Watershed Functions

Preliminary watershed characterizations for each local watershed were developed based on the information collected during Task 1 and are summarized in Section 2.0. These characterizations provide essential data needed to successfully conduct Task 2 (Detailed Assessment of Representative Subwatersheds and Preliminary Identification of Watershed Improvement Projects). The majority of available data sources in the watersheds have been compiled. Additional data may be collected during the remaining phases of the project. Watershed characterizations may be modified to reflect additional data obtained in future tasks. These changes will be documented in subsequent technical memoranda.

