

Lower Yadkin Local Watershed Planning (Phase II) Status Update 06/17/04

MACTEC Engineering and Consulting, Inc. (MACTEC) is nearing completion of Task 2 (Detailed Assessment of Representative Subwatersheds and Preliminary Identification of Watershed Improvement Projects) for the North Carolina Ecosystem Enhancement Program (EEP). MACTEC is in the process of prioritizing specific watershed improvement projects throughout the study area. The prioritization process involves the development of a flexible scoring matrix that will help determine where watershed improvement projects may provide the greatest benefit to hydrology, water quality, and habitat. MACTEC will review its prioritization process at the June 17, 2004 stakeholder meeting (Fire Station 8 in Concord). The following information is provided as a general overview of the prioritization process. EEP and MACTEC are requesting stakeholder input for this important task.

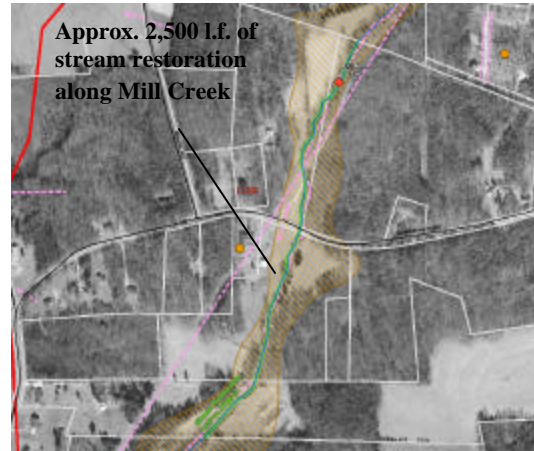
Each potential project site is being evaluated according to the following general categories:

- Current Level of Degradation;
- Project Feasibility;
- Potential Project Effectiveness; and,
- Benefit / Cost Estimate.

Each category includes indicators with associated values and scores. The value is based upon a quantitative or qualitative descriptor derived from Geographic Information System (GIS) analysis, field assessment, aerial analysis, and/or stakeholder input.

The *Current Level of Degradation* analysis includes indications of hydrological degradation, water quality impairment, and habitat degradation. Data sources include GIS analyses, 2001/2002 aerial photography, and field assessments designed to characterize hydrological, water quality, and habitat conditions within targeted areas.

Project Feasibility estimates relate to site-specific constraints associated with utility rights-of-way, access, number of parcels / ownership, tree removal, infrastructure (e.g., roads and buildings), and preliminary landowner interest.



Geographic Information System (GIS) analyses play an integral role in project prioritization.

Project Effectiveness criteria assess how each recommended project or strategy specifically addresses the identified causes of degradation and / or meets general EEP and stakeholder project criteria. It includes evaluations of potential project pollutant removal, project size requirements (i.e., minimum linear footage / acreage criteria), optimal drainage area size (i.e., <20 square miles), and educational/ recreational opportunities.

The *Benefit / Cost Estimate* predicted for each project is determined by summing potential project site scores for the *Current Level of Degradation*, *Project Feasibility*, and *Project Effectiveness* categories and dividing by the estimated cost for the given project.

An example project site summary including indicators with associated values and scores, the recommended project, estimated project cost, and benefit / cost estimate follows:



| Proposed Project Site | VALUE | SCORE | RECOMMENDED PROJECT |
|------------------------------|---------------------|-------------|--|
| Subwatershed IC (%) | 4% | 0 | STREAM RESTORATION |
| Channel Condition | 5 | 5 | |
| Hydrologic Alteration | 5 | 5 | |
| Bank Stability | 3 | 10 | |
| Flood Prone Area(s) | None | 0 | |
| Planned TIP Activity | Within Subwatershed | 5 | |
| Planned Development(s) | None | 0 | |
| HYDROLOGY SUBTOTAL: | | 25 | <u>POTENTIAL THREATS TO WATERSHED FUNCTION ADDRESSED:</u> |
| Nutrient Enrichment | 6 | 10 | Development / IC |
| Manure Presence | 2 | 20 | Urban Stormwater Flow |
| Macroinvertebrates | 5 | 10 | Buffer Disturbance <input checked="" type="checkbox"/> |
| Soil Erodibility | 0.26 | 10 | Buffer Encroachment |
| Planned TIP Activity | Within Subwatershed | 10 | Streambank Erosion <input checked="" type="checkbox"/> |
| Stream Classification | WSII-HQW CA | 20 | Livestock Access <input checked="" type="checkbox"/> |
| Trash / Debris in Stream | Rare | 0 | Channel Alteration <input checked="" type="checkbox"/> |
| Cattle Access | Unrestricted | 20 | Turbidity <input checked="" type="checkbox"/> |
| WATER QUALITY SUBTOTAL: | | 100 | Aquatic Barrier(s) |
| Riparian Zone | 2 | 15 | Invasive Species |
| In-stream Habitat | 6 | 7.5 | Nutrients <input checked="" type="checkbox"/> |
| Canopy Coverage | 1 | 15 | Other |
| Riffle Embeddedness | 1 | 15 | |
| NHEO / SNHA | Within Subwatershed | 7.5 | |
| Planned TIP Activity | Within Subwatershed | 7.5 | |
| Invasive Species | Rare | 0 | |
| Cattle Access | Unrestricted | 15 | |
| Aquatic Barrier | 0 | 0 | |
| HABITAT SUBTOTAL: | | 82.5 | |
| LEVEL OF DEGRADATION TOTAL: | | 207.5 | <u>NOTES:</u> |
| Utility Constraints | None | 10 | Cattle accessing stream. Riparian buffer absent. Gas utility present. |
| Access Constraints | Limited | 10 | Preliminary interest by landowner. 3 of 4 parcels owned by family members. |
| Parcels / Ownership | 4 | 0 | Within Water Supply Watershed. |
| Tree Removal | 2 | 10 | Bioclassification of Good/Fair at MC (located d/s of site) |
| Hydric Soils / Inclusions | Not Present | 0 | |
| Infrastructure Constraints | Limited | 10 | |
| Landowner Interest | High | 10 | |
| PROJECT FEASIBILITY TOTAL: | | 50 | |
| Pollutant Removal (TSS) | 75% | 10 | |
| Stream Length (lf) | 2792 | 2000 | |
| Drainage Area (sq.mi.) | 4 | 10 | |
| Wetland Acreage | 0 | 0 | Preservation Cost |
| Educational Opportunity | Private Property | 0 | Stream Mitigation Cost \$558,400 |
| Recreational Opportunity | Private Property | 0 | Wetland Mitigation Cost |
| PROJECT EFFECTIVENESS TOTAL: | | 2020 | BMP Cost |
| SITE TOTAL SCORE (BENEFIT): | | 2277.5 | ESTIMATED PROJECT COST: \$558,400 |
| BENEFIT / COST(\$K): | | 4.08 | |

MATRIX INDICATORS

The following is a brief explanation of the indicators and general scoring methodology used (to date) to quantify the *Level of Degradation* (for hydrology, water quality, and habitat conditions), *Project Feasibility*, *Project Effectiveness*, and *Benefit/Cost Estimate* for potential project sites within the Lower Yadkin study area:

Level of Degradation

Hydrology

- % Impervious Cover** – higher score relates to higher level of impervious cover in subwatershed
- Channel Condition** – higher score indicates a highly impacted channel (active downcutting, etc.)
- Hydrologic Alteration** – higher score indicates a highly impacted channel (straightened, no longer accessing floodplain)
- Bank Stability** – higher score indicates actively eroding banks
- Flood Prone Area(s)** – higher score indicates proximity to flood prone area
- Planned TIP Activity** – higher score indicates proximity to known TIP (NCDOT) projects
- Planned Development(s)** – higher score indicates proximity to planned developments

Water Quality

- Nutrient Enrichment** – higher score indicates potential presence of excess nutrients
- Manure Presence** – higher score indicates presence of waste or untreated discharges
- Macroinvertebrates** – higher score indicates reduced number of organisms
- Potential Soil Erodibility** – higher score indicates soils more susceptible to erosion
- Stream Classification** – higher score assigned to more sensitive waters (WS-II CA, WS-II)
- Trash/Debris in Stream** – higher score indicates high level of trash/debris within channel
- Cattle Access** – higher score indicates cattle/livestock access to stream/riparian zone

Habitat

- Riparian Zone** – higher score indicates minimal natural vegetation
- In-Stream Habitat** – higher score indicates degraded habitat (low habitat diversity, quality, etc.)
- Canopy Coverage** – higher score indicates highly impacted canopy (canopy coverage provides <50% shading)
- Riffle Embeddedness** – higher score indicative of embedded conditions
- NHEOs and/or SNHAs** – higher score indicates proximity of Natural Heritage Element Occurrences and/or Significant Natural Heritage Areas to project site
- Planned TIP Activity** - *see above*
- Invasive Species** – higher score indicative of invasive species at project site
- Cattle Access** – *see above*
- Aquatic Barrier(s)** – higher score indicates presence of aquatic barrier(s)

Project Feasibility

- Utility Constraints** – higher score associated with fewer utility constraints
- Access Constraints** - higher score associated with fewer access constraints
- Land-ownership** – higher score associated with fewer landowners
- Tree Removal** – higher score indicative of potential riparian buffer impacts required at project site
- Hydric Soils or Inclusions** – higher score assigned to site having hydric soils and/or inclusions
- Infrastructure Constraints** - higher score associated with fewer infrastructure constraints
- Preliminary Landowner Interest** – higher score indicates preliminary landowner interest

Potential Project Effectiveness

- Pollutant Removal (TSS)** – higher score indicates greater potential pollutant removal efficiency
- Stream Length** – higher score associated with projects with greater potential linear footage
- Drainage Area** – higher score associated with sites with smaller (< 20 sq. miles) drainage areas
- Wetland Acreage** - higher score associated with larger wetland sites
- Educational Opportunity** – higher score associated with potential educational opportunity
- Recreational Opportunity** - higher score associated with potential recreational opportunity

Benefit/Cost Estimate

Sum of scores from *Level of Degradation*, *Project Feasibility*, and *Project Effectiveness* divided by the estimated cost for the given project