

Appendix A

WARP Report Executive Summary

Executive Summary

Assessment Report: Biological Impairment in the Stoney Creek Watershed

**Neuse River Basin
Wayne County, N.C.**

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**North Carolina Department of Environment and Natural Resources
Division of Water Quality
Planning Branch**

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Executive Summary

Introduction

This report presents the results of the Stoney Creek water quality assessment, conducted by the North Carolina Division of Water Quality (DWQ) with financing from the Clean Water Management Trust Fund (CWMTF). Stoney Creek is considered impaired by the DWQ because it is unable to sustain an acceptable community of aquatic organisms, indicating that the stream does not fully support its designated uses. The goal of the assessment is to provide the foundation for future water quality restoration activities in the Stoney Creek watershed by: 1) identifying the most likely causes of biological impairment; 2) identifying the major watershed activities and pollution sources contributing to those causes; and 3) outlining a general watershed strategy that recommends restoration activities and best management practices (BMPs) to address the identified problems.

Study Area and Stream Description

Stoney Creek is located in Wayne County, in subbasin 03-04-05 of the Neuse River basin (see Figure 1.1). From its headwaters north of Goldsboro, the stream flows southward for 10.7 miles joining the Neuse River near Seymour Johnson Air Force Base (SJAFOB). The current study area includes Stoney Creek and its tributaries upstream of Slocumb Street in Goldsboro, encompassing approximately 27.6 square miles of the 29.5 square mile watershed.

The upper portion of the watershed (north of New Hope Road) is primarily agricultural (37 percent in row crops), although development activity is increasing. The majority of the lower watershed lies within the City of Goldsboro, where a mixture of residential, military (SJAFOB), commercial and light industrial land uses predominates. As of 1998, impervious areas (e.g., roads and buildings) covered approximately 20 percent of the study area, with higher levels (29 percent) evident in the lower study area below New Hope Road. There are no permitted wastewater discharges in the study area.

Streams in the watershed are classified as C-NSW (nutrient sensitive waters). North Carolina's 303(d) list designates Stoney Creek as impaired for its entire length in the study area. Stoney Creek is located in North Carolina's inner coastal plain, an area characterized by low velocity streams and extensive swamp areas. These characteristics are particularly evident in the upper portion of the watershed, where swamp-like conditions predominate and there is often little observable streamflow. Visual assessment suggests that significant portions of the mainstem and major tributaries were channelized (dredged and straightened) at some point. The study area is described in more detail in Section 2.

Approach

A wide range of data was collected to evaluate potential causes and sources of impairment. Data collection activities included: benthic macroinvertebrate sampling; assessment of stream habitat, morphology, and riparian zone condition; water quality sampling to evaluate stream chemistry and toxicity; and characterization of watershed land use, conditions and pollution sources. Precipitation levels were below normal in 2001 and the first half of 2002, when most field work for the study was conducted. Data collected during the study are presented in Sections 2, 4, 5, and 6 of the report.

Conclusions

Benthic communities in Stoney Creek are impaired downstream of East Ash Street in Goldsboro. Impairment has been evident at Slocumb Street since the site was first sampled in 1995. The stream could not be rated upstream of East Ash Street due to stream size and swamp conditions.

Aquatic organisms in the watershed are impacted by multiple stressors (see Section 7 for additional discussion):

- Habitat degradation is most severe upstream of East Ash Street, especially in the area of Wayne Memorial Drive, where channel morphology is uniform and organic habitats are lacking. Some habitat degradation is evident further downstream, but in general the impaired portion of Stoney Creek appears to contain habitat adequate to support more diverse and abundant aquatic communities than those currently present. Riparian areas along lower Stoney Creek (below New Hope Road) are sometimes sparsely vegetated and are often dominated by non-native invasive species that provide limited bank protection.
- Toxicity is considered a primary cause of impairment. The most important toxicants cannot be identified definitively and may be variable, although the insecticide diazinon and several metals appear to be the most likely causes during one period of toxicity. Existing water quality data point to the urban lower half of the watershed as the most important source of toxicants. However, agricultural pesticides could not be completely characterized during the study and potential impacts from these chemicals cannot be ruled out.
- Low dissolved oxygen (DO) also contributes to biological degradation. Low DO conditions are due, at least in part, to natural swamp drainage from the upper watershed, although inputs of nutrients and oxygen-consuming wastes from developed and agricultural areas probably worsen the situation. Low DO stress declines substantially in the lower study area, where streams are free-flowing.
- Impairment in lower Stoney Creek is likely also impacted by a lack of benthic colonization sources due to low DO stress in the headwaters as well as the degraded nature of many urban tributaries.
- Scour (excessive removal of organisms and microhabitat during storms) is also a contributing factor. While the smaller tributaries draining developed areas of Goldsboro were not evaluated in detail, scour and resulting habitat degradation is likely in these streams given the high level of impervious cover in tributary watersheds and the incised nature of some of these small streams.

Recommendations

The most important factors leading to impairment in the study area are systemic in nature. Addressing these problems will require actions that are similarly broad in scope. Mitigating the potential impacts of future watershed development on watershed hydrology and pollutant loading is also critical, or improvements resulting from efforts to control current sources of impairment may be short lived.

The following actions are necessary to address sources of impairment in Stoney Creek (see Section 8 for further discussion). The intent of these recommendations is to describe the types of actions necessary to improve conditions in the Stoney Creek watershed, not to specify particular administrative or institutional mechanisms for implementing remedial practices. Actions one

through five are all important to the restoration of aquatic communities throughout the study area. Of these, actions one, three and four are considered most critical. Actions six through eight are important in order to protect streams in the watershed from the impacts of new development.

1. **A strategy to address toxic inputs from the urban portions of the watershed should be developed and implemented, including a variety of source reduction and stormwater treatment methods.** These measures should be applicable both to municipal areas and to the Seymour Johnson Air Force Base (SJAFB). As an initial framework for planning toxicity reduction efforts, the following general approach is proposed:
 - a) Development and implementation of a broad set of source reduction activities focused on: reducing nonstorm inputs of toxicants; reducing pollutants available for washoff during storms; and managing water to reduce storm runoff.
 - b) Implementation of stormwater treatment Best Management Practices, aimed primarily at pollutant removal, at appropriate locations.
 - c) Development of a stormwater and dry weather sampling strategy in order to facilitate the targeting of pollutant removal and source reduction practices.
2. **Given the extensive crop acreage in the upper watershed, agricultural pesticides must be considered a potential risk that merits further evaluation,** although existing data provide no clear evidence of agricultural pesticide impacts. A review of current pesticide usage and application practices by appropriate agricultural agencies would provide more information on potential risks and pathways. Relevant agencies include the NC Department of Agriculture and Consumer Services (NCDACS), the NC Division of Soil and Water Conservation, local Soil and Water Conservation Districts, the NC Cooperative Extension Service and the US Department of Agriculture Natural Resources Conservation Service.
3. **Native woody riparian vegetation along Stoney Creek and its tributaries should be reestablished where it has been removed to provide an adequate supply of woody material to the stream and improve bank stability.** Where riparian vegetation is of poor quality due to dominance by non-native species, invasive species should be replaced with native riparian vegetation.
4. **In order to reduce stormflow scour and bank erosion, especially in tributaries draining developed areas, feasible and cost-effective stormwater retrofit projects should be implemented in the urban portions of the watershed to mitigate the hydrologic effects of development.** Over the short-term, currently feasible retrofit projects should be identified and implemented in both the municipal areas of the watershed and in SJAFB. In the longer term, additional retrofit opportunities should be sought out in conjunction with infrastructure improvements and redevelopment of existing developed areas. Projects already implemented through the efforts of the Mid-Neuse Nonpoint Source Team provide examples of retrofit activities.
5. **While low DO levels in the watershed are likely due in part to natural swamp drainage, nutrient reduction efforts should be implemented so that human inputs do not significantly worsen the situation.** Nutrient reduction activities currently underway as part of the Neuse River basin efforts could well have an impact, and actions recommended above (e.g., retrofit BMPs to address toxicity and stormwater quantity) are likely to reduce organic and nutrient loading to some extent. Additional efforts may be necessary, however. Activities recommended to address organic loading include the identification and elimination of illicit discharges; education of homeowners, commercial applicators, and others regarding proper fertilizer use; street sweeping; catch basin clean-out practices; and the installation of

additional BMPs targeting removal of biochemical oxygen demand and nutrients at appropriate sites.

6. Prevention of further channel erosion and habitat degradation will require effective post-construction stormwater management for new development in the study area, whether accomplished through the Neuse stormwater rules, Phase II requirements or voluntary local action. A proactive approach to reduce the risks to Stoney Creek from future development impacts would include: promotion of development design approaches that minimize the generation of storm runoff; active promotion of infiltration practices; requiring post-construction stormwater control for all but the lowest density development; exploration of retrofit opportunities for existing developed areas; limited use of the allowed exemption to the Neuse stormwater rules for development activities which are projected to increase peak flows by 10 percent or less.
7. Effective enforcement of sediment and erosion control regulations on the part of the NC Division of Land Resources will be essential to the prevention of additional sediment inputs from construction activities. Development of improved erosion and sediment control practices may be beneficial.
8. It is important to protect existing wetlands and forested riparian buffers along all waterbodies, including ephemeral streams. The protection of these areas is critical to limiting the hydrologic impacts of development and to the attenuation of pollutant inputs. Education of landowners regarding the functions of riparian areas and discouraging removal of additional riparian vegetation would be useful both in newer development constructed under the Neuse buffer regulations and in older developments. Existing swamps and other wetland areas in the upper portion of the watershed should be protected from both direct modification and the indirect impacts of encroaching development.

