



## *An Analysis of Forest Riparian Buffer Zones on Military Installations in the Chesapeake Bay*

07-305

### **Background:**

Since 1997, the Department of Defense has invested significant financial resources on streamside forest restoration at over 85 installations in the Chesapeake Bay watershed. Streamside forested wetlands or forest buffer zones have been shown to reduce the impacts of both point source and non-point source pollution by filtering pollutants and sediments before they enter the adjacent stream. Much research has been done regarding the benefits of these restored areas for water quality control and improvement, but little has been done assessing recently planted buffers in the Chesapeake Bay watershed. As of yet, no study has examined the survivorship or benefits of restored streamside forests on military lands.

### **Objective:**

This study tested the efficacy of restored forest riparian buffers along streams on military installations in the Chesapeake Bay watershed by examining stream macrobenthic invertebrate community structure, and water and habitat quality. With this information, managers will have a better idea of: 1) the extent to which restored areas can be expected to perform the desired functions (nutrient and sediment removal, preservation of habitat and in-stream conditions), and 2) the time required for the return of biological integrity. Data from this study or the methodological approach can be used in other regions of the country as a model for assessment of restored streamside forested wetlands.

### **Summary of Approach:**

For year one of this study, we chose 15 sites located on the following installations- Carlisle Barracks, Fort Meade, NWS Yorktown, Norfolk Naval Shipyard – St. Julien’s Creek Annex, Norfolk Naval Shipyard – New Gosport, US Naval Academy – Dairy Farm, and FISC Craney Island Fuel Depot.

At several sites we collected several parameters including: benthic macroinvertebrates from riffle/run habitats, instream water quality (temperature, dissolved oxygen, specific conductance and salinity) using a YSI multiparameter probe, and nutrient parameters (nitrate, ammonia-nitrogen, soluble reactive phosphorus, total phosphorus, and total suspended solids). We also conducted a habitat assessment and physical characterization of the site to determine instream and riparian conditions. Where sampling of any of the above parameters was not possible, we made recommendations for the site based on observations only.

### **Benefit:**

This project will provide land managers on installations recommendations for management actions that may be necessary to improve restored riparian buffer areas. Data from this project can also be used to address issues concerning the DoD Total Maximum Daily Load program (TMDL).

### **Accomplishments:**

According to our results, it appears that while some of the buffered sites are doing well, with improving water quality and benthic macroinvertebrate community structure, some sites are in need of additional restoration. Also, with this data, we were able to draw some tentative conclusions comparing the coastal plain and piedmont physiographic regions, a little studied area. The location of a site within a physiographic region appears to have an impact on tolerance metrics and water quality with quicker recovery time being in the piedmont as opposed to the coastal plain. However, more data is needed to more conclusively support this conclusion. Also, there were confounding factors when looking at some of the sites, such as size of stream and underlying geology. Since our choice of sites was limited due to incorrect, missing or scarce data in the database, it was often difficult to control for size of stream or tidal regime of restored area.

Overall, while the DoD has put significant resources into the restoration of forest buffers, there are several areas of improvement that can be made to the Forest Buffer Program. Below is a list of our recommendations to improve the overall program and reporting requirements needed to update buffer mileage for the Chesapeake Bay Agreement.

- **Ensure proper site selection and planting programs.**
- **Keep good and consistent records.**
- **Institute a monitoring program.**
- **Ensure proper maintenance of sites.**
- **Provide clear definition of riparian forest buffer zone.**

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