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## **Constructed Wetlands**

*Cost Effective Treatment of  
Non-Point Source Pollution*



Tidal wetland at NAB Little Creek, Virginia.  
Constructed Fall 1996.

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# Constructed Wetlands for Treatment of Non-Point Source Pollution

**Constructed wetlands** are man-made wetlands designed to intercept and remove a wide range of contaminants from water. These wetlands can save you time and money by using natural mechanisms to treat non-point source pollution before it reaches our lakes, rivers, and oceans.

## Problem

EPA studies have shown that more than one-third of our nation's waters are too polluted for basic uses, such as swimming and fishing. The studies list contaminated stormwater runoff as the primary cause of this pollution.

Contaminated runoff from urban, industrial, and agricultural areas is highly variable and may include low concentrations of pesticides, metals, oils, nutrients, suspended solids, and other substances. These pollutants originate mainly from non-point sources, which are difficult to control. Conventional wastewater treatment plants can effectively remove non-point source pollution, but are expensive to build and operate.

## Solution

Wetlands possess the natural physical, chemical, and biological mechanisms necessary to treat the wide variety of contaminants found in runoff. Wetlands are also cost-effective to operate and maintain. Although many wetlands have been destroyed by industrial and urban developments, we can improve our water quality by constructing new wetlands to treat non-point source pollution.

## Treatment Mechanisms

- Filtration and uptake of contaminants.
- Settling of suspended solids due to decreased water velocity and trapping action of plants, leaves, and stems.
- Precipitation, adsorption, and sequestration of metals.
- Microbial decomposition of petroleum hydrocarbons and other organics.

## Benefits

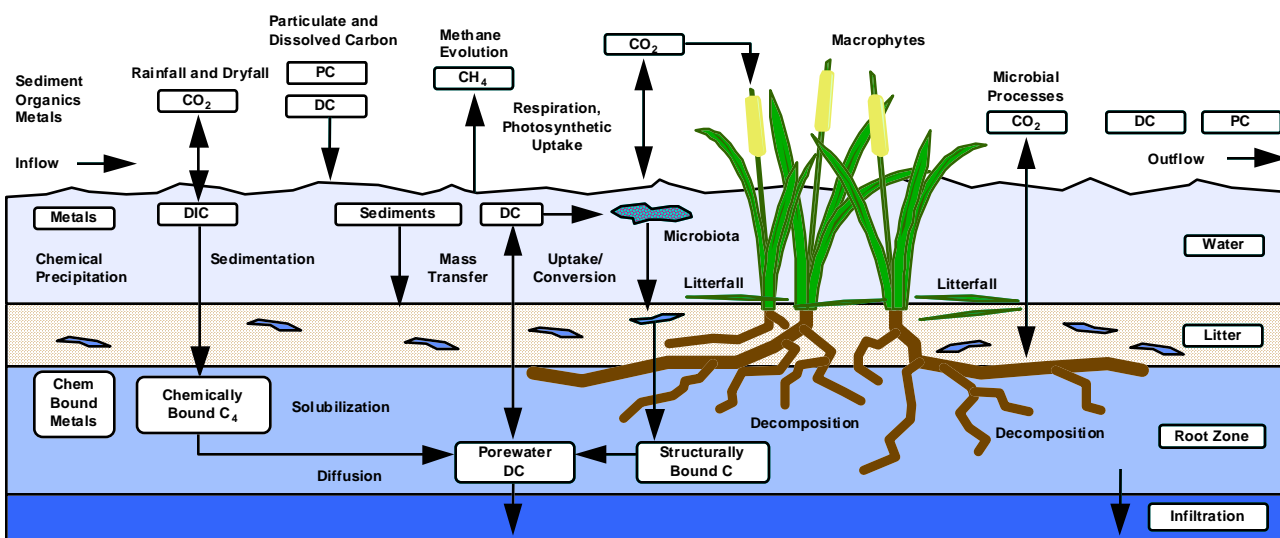
- Cost-effective treatment of non-point source pollution.
- Compliance with water quality goals.
- Reduction of operation and maintenance costs relative to conventional water treatment plants.
- Conservation of natural resources.
- Reduction of flood hazard and erosion.
- Creation of wildlife habitat and aesthetic resource.

## Research

We have constructed a tidal-zone wetland at Naval Amphibious Base Little Creek, Virginia that serves as a research facility. We use data from this wetland to optimize the operating conditions and maximize the effectiveness of constructed wetlands at other DOD locations.

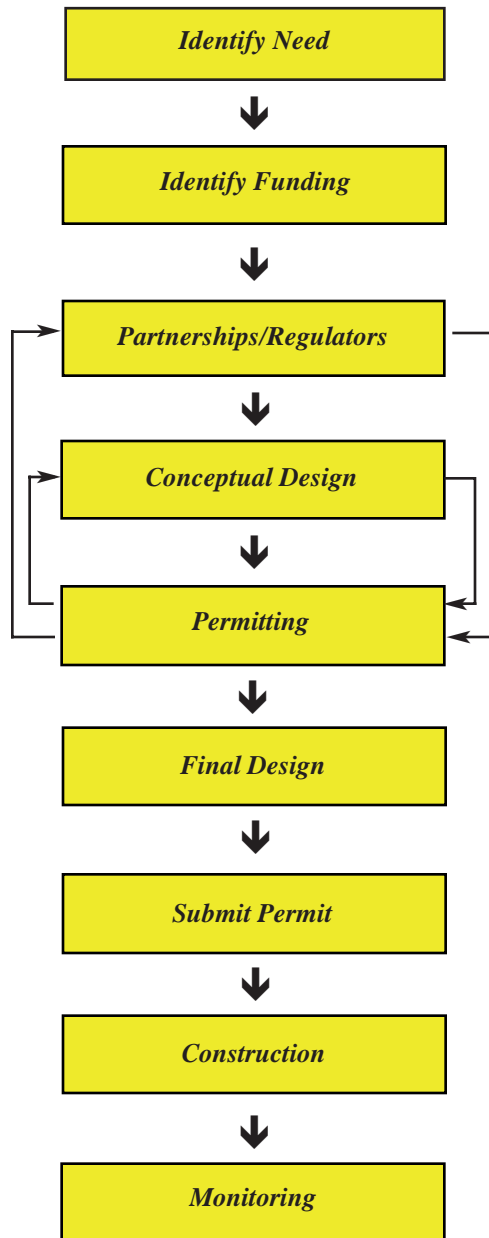
Learn more about our research. Visit our web site: <http://cayuga.nfesc.navy.mil/cc/projects/cnwthom.htm>.

## Contaminant Removal Mechanisms of Wetlands



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## *Implementation Process*



## *Technology Application Team*

Our Technology Application Team is developing the services and tools necessary for our customers to implement constructed wetlands DOD-wide.

## *Available Services*

- Technical consultations
- Feasibility analyses
- Design support
- Technical library
- “How-To” manual
- Construction and contracting support

## *Partners*

- Naval Facilities Engineering Command, Atlantic Division
- Naval Amphibious Base Little Creek
- Virginia Institute of Marine Science
- California Polytechnic University, San Luis Obispo

**For more information on  
constructed wetlands, contact:**

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Or visit our web site at:  
<http://erb.nfesc.navy.mil>