

STORMWATER RUNOFF

INTRODUCTION

Increased development, percent impervious cover, and severe rain events has caused increases in stormwater runoff

Stormwater is generally untreated because it is nonpoint source pollution

Main water quality issues associated with stormwater runoff:

- Nutrient loading from fertilizers, pesticides, and animal waste result in eutrophication
- Fecal bacteria contamination
- Heavy metal contamination
- Sedimentation

As a result of Nitrogen loadings from stormwater runoff, eutrophication has been described as the “single largest threat to the integrity of coastal ecosystems”.



INFRASTRUCTURE ASSESSMENT

CURRENT ACTIONS

STORMWATER RUNOFF

Constructed Stormwater Wetlands

- Removes pollutants such as bacteria and fertilizers
- Limits flooding
- Decreases amount of contaminated sediments in runoff due to reduced erosion
- Improves fish and wildlife habitat

Natural Stormwater Runoff Filtration Systems

- Filters suspended solids and fecal bacteria from water
- Reduces pollutant concentrations
- Increases natural vegetation for habitat

Stormwater Runoff BMPs and Nature- Based Stormwater Strategies

- Reduces risk of nutrient loading and fecal bacteria pollution
- Decreases amount of stormwater discharge

Lead Organizations

- UNCW Center for Marine Science
- NC State Stormwater Engineering Group
- NC Department of Environmental Quality



INFRASTRUCTURE ASSESSMENT

RECOMMENDED FUTURE ACTIONS

STORMWATER RUNOFF

Sustainable Development

- Reduces stormwater runoff discharge
- Preserves habitat
- Filters contaminants from runoff

Replacement of Current Stormwater Outfalls

- Decreases drainage into beaches and shellfishing waters
- Reduces contamination of coastal waters

Improve Stormwater Management Strategies for Flooding

- Reduces quantity of runoff discharge
- Increases filtering capabilities and decreases water contamination

Evaluate Hurricane and Flooding Impacts on Stormwater Infrastructure and Update Technologies Accordingly

- Reduces overloading of stormwater control systems
- Decreases risk of water contamination

Lead Organizations

- NC State Extension
- NCSU Crop and Soil Sciences Department
- USDA Natural Resources Conservation Services
- NC Division of Water Resources



POLICY AND ENFORCEMENT ASSESSMENT

CURRENT ACTIONS

STORMWATER RUNOFF

Coastal Area Management Act

- Preserves ecological conditions of estuaries
- Encourages sustainable water resources use
- Reduces permitted amount of stormwater discharge

Fisheries Reform Act

- Improves aquatic habitat quality
- Increases fish populations
- Reduces nonpoint source pollution runoff

DEMLR Stormwater Program

- Reduces sedimentation and erosion
- Decreases stormwater contamination
- Limits amount of stormwater discharge from entering coastal waters

Administrative Codes Setting Stormwater Runoff Standards

- Decreases sedimentation at development sites
- Protects ORW and HWQs
- Reduces pollutants from entering waters

Lead Organizations

Coastal Resources Commission
Coastal Resources Advisory Council
NC Division of Water Resources

Division of Energy, Mineral, and Land Resources

Environmental Management Commission under the DWQ

NC Department of Environmental Quality

Each Locality's Stormwater Management Program

20 Coastal Counties Stormwater Law

- Reduces runoff by limiting impervious surface development
- Decreases runoff contamination

Phase II Post-Construction Law

- Improves drainage, limiting the amount of runoff
- Filters stormwater runoff before entering surface waters



POLICY AND ENFORCEMENT ASSESSMENT

RECOMMENDED FUTURE ACTIONS

STORMWATER RUNOFF

Green Infrastructure Policies

- Reduces stormwater runoff discharge on-site
- Filters contaminants in runoff
- Maintains healthy ecosystems

Government Funding for Stormwater Infrastructure and Treatment Systems

- Decreases surface water pollution
- Increases the use of effective stormwater reduction methods

Stormwater Contamination Source Control

- Reduces stormwater contamination on-site
- Filters pollutants such as chemicals, nutrients, and metals from runoff

Lead Organizations

- Coastal Resources Commission
- Coastal Resources Advisory Council
- NC Division of Water Resources
- Division of Energy, Mineral, and Land Resources
- Environmental Management Commission under the DWQ
- NC Department of Environmental Quality
- Each Locality's Stormwater Management Program



RESEARCH ASSESSMENT

CURRENT ACTIONS

Effectiveness of Stormwater Infrastructure and Strategic Placement

- Reduces stormwater discharge
- Decreases surface water contamination
- Prevents nutrient overload
- Decreases sedimentation

Correlational Studies of Water Quality and Percent of Impervious Surface

- Reduces turbidity and pollution from bacteria, metals, and nutrients
- Decreases sedimentation

Nutrient Analyses

- Prevents nutrient overload
- Decreases risk of eutrophication and fish kills

North Carolina Coastal Habitat Protection Plan Research

- Protects aquatic habitat
- Decreases anthropogenic threats to coastal habitat
- Restores habitat and water quality

Water Quality Monitoring in Coastal Watersheds

- Decreases anthropogenic effects on water quality
- Protects water resources and aquatic habitats
- Prevents water toxicity

STORMWATER RUNOFF

Lead Organizations

- UNCW Center for Marine Science
- NC Sea Grant
- National Monitoring Network
- NC Department of Environmental Quality
- NC Division of Water Resources



RESEARCH ASSESSMENT

RECOMMENDED FUTURE ACTIONS

STORMWATER RUNOFF

Enhance Monitoring of Stormwater Runoff

Research Effectiveness of Stormwater Management Control Efforts, Including Buffer Zones

Lead Organizations

- Evaluates areas of concern for water quality
- Decreases pollution levels
- Restores aquatic habitat

- Reduces stormwater runoff discharge
- Filters contaminants in runoff
- Protects fish populations
- Restores aquatic habitat

- UNCW Center for Marine Science
- NC Sea Grant
- National Monitoring Network
- NC Department of Environmental Quality
- NC Division of Water Resources



Advocacy, Outreach, and Education Assessment

CURRENT ACTIONS

STORMWATER RUNOFF

NC Stormwater Plan

- Reduces stormwater discharge through professional training on stormwater management strategies
- Decreases surface water contamination

Public Releases of Stormwater Research

- Educates public on implications of stormwater runoff and current water quality statuses
- Reduces runoff discharges once management strategies are implementing

Guidebooks for Water Quality Protection Strategies (CHHP and the Stormwater Design Manual)

- Reduces effects of flooding on stormwater systems
- Protects fishery habitats
- Utilization of filtration systems reduces amount of contaminants in runoff

Lead Organizations

North Carolina Coastal Federation

NC State Stormwater Engineering Group

UNCW Center for Marine Science

National Oceanic and Atmospheric Administration

NC Department of Environmental Quality



Advocacy, Outreach, and Education Assessment

RECOMMENDED FUTURE ACTIONS

STORMWATER RUNOFF

Guidebooks for Homeowners

- Reduces stormwater runoff discharge from suburban settings
- Filters contaminants from stormwater runoff

Outreach to Business Owners

- Decreases urban runoff into surface waters
- Filters contaminants from stormwater runoff

Publicizing Successful Stormwater Control Efforts

- Improves a town or company's participation in BMPs
- Reduces city-wide stormwater runoff discharge
- Decreases the quantity of nutrient and contaminants from entering bodies of water

Lead Organizations

North Carolina Coastal Federation

NC State Stormwater Engineering Group

UNCW Center for Marine Science

National Oceanic and Atmospheric Administration

NC Department of Environmental Quality

