# EPA's Healthy Watersheds Initiative: Protecting Our High Quality Waters and Watersheds

**Watershed Academy Webcast**

**Wednesday, October 13, 2010**

**1:00–3:00 Eastern**

**Instructors:**

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Virginia Department of Conservation and Recreation

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# Topics for Today's Webcast

- EPA's Healthy Watersheds Initiative
- Virginia DCR: Conserving Virginia's Healthy Waters
- The Puget Sound Characterization Project: Protecting Aquatic Resources Using a Watershed - Based Approach

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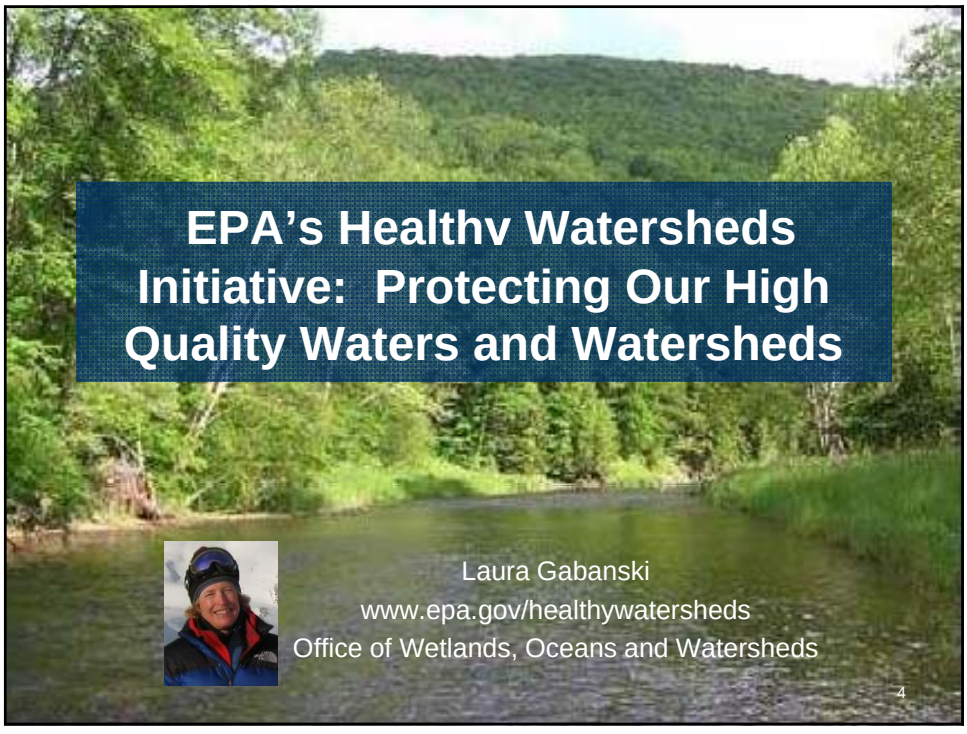

## CWA Section 101(a)

- The objective of the CWA is, "…to restore and maintain the chemical, physical, and biological integrity of the Nation's waters."
- The House Public Works report on the CWA states that the intended use of the term, "integrity," was to recognize the importance of preserving natural ecosystems, rather than simply improving water quality in a narrow sense

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## Healthy Watersheds Initiative Vision & Outcomes

Protecting and maintaining the aquatic ecological integrity of watersheds and supporting habitat networks to ensure future generations may enjoy these resources and the social and economic benefits they provide

- Healthy watersheds are maintained and increased over time
- Our country has an interconnected network of healthy watersheds

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## Healthy Watersheds Initiative Provides:

- Holistic, integrated aquatic resource protection that better protects the environment
- Bigger picture approach that integrates aquatic resource protection across state agencies and programs
- Improves our ability to protect the nation's waters

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## Key Elements of the Healthy Watersheds Initiative

- Healthy watersheds are **identified** by States using scientifically-sound, integrated assessments
- Healthy watersheds are **listed, tracked, maintained and increased in number**
- Healthy watersheds are **protected** and, if applicable, **enhanced** using the best regulatory and non-regulatory tools
- **Partnerships** are used to invest resources for conservation in healthy watersheds
- **Progress** on conserving healthy watersheds **is measured and tied to** securing and raising the overall goals of EPA's Water Program including in direct support of the public health and environmental goals established in EPA's Strategic Plan

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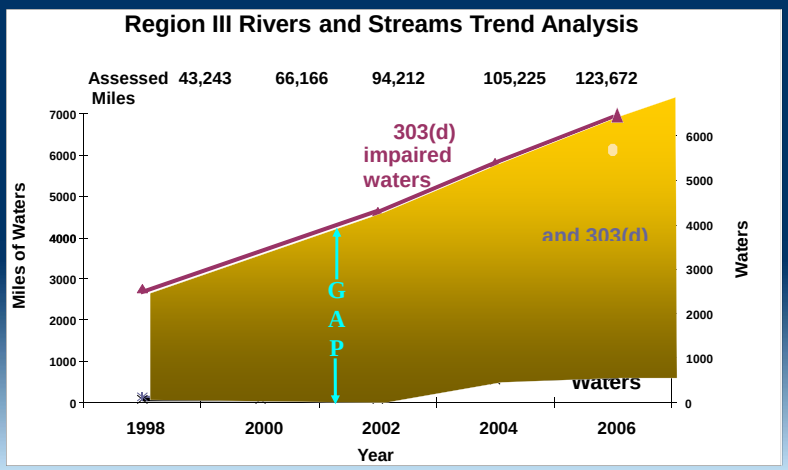
# Why a Healthy Watersheds Initiative?

Narrow the gap between impaired waters and restored waters: fewer 303(d) streams or more restoration

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# Why a Healthy Watersheds Initiative?

- EPA recognizes the need to enhance our protection approaches to keep waters off the impaired waters list and to be more successful at restoring impaired waters
- Healthy watersheds form the critical ecological support system or building blocks that anchor our water quality restoration efforts
- Cost-effective to prevent aquatic ecosystems from becoming impaired
- A priority in “Coming Together For Clean Water: EPA’s Strategy for Achieving Clean Water”

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# Benefits of Protecting Healthy Watersheds

- Minimizes ecological impacts of future land use
- Reduces costs to communities by minimizing vulnerability to floods, fires, and other natural disasters
- Reduces or eliminates costs of water treatment for drinking water by protecting aquifer recharge zones and surface water
- Ecosystems store carbon which can help offset carbon emissions, and intact river corridors can store floodwaters and support baseflow to mitigate extreme changes in precipitation
- Reduces vulnerability to invasive species and their ecological and economic impacts
- Sustains future generations

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# What is the Healthy Watersheds Approach?

- **Maintenance of aquatic ecological integrity** by conserving and protecting our highest quality watersheds & intact components of watersheds
- A **strategic, holistic systems approach** that includes protecting the key watershed processes and habitat needed for healthy aquatic ecosystems

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## A Systems-Approach for Protecting Aquatic Ecosystems

- *Coastal Ecosystem Management A Technical Manual for the Conservation of Coastal Zone Resources* by John Clark, The Conservation Foundation (1977)
- *Entering the Watershed A New Approach to Save America's River Ecosystems* by Doppelt et al., The Pacific Rivers Council (1993)

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## What is a Healthy Watershed?

Watersheds that have all or some of these characteristics:

- **Habitat** of **sufficient size** and **connectivity** for native aquatic and riparian species
- Biotic refugia or **critical habitat** (e.g., deep pools, seeps & springs for survival during droughts)
- A **natural flow regime** that supports aquatic species and habitat
- **Natural transport of sediment** and stream geomorphology that provide natural habitat
- Healthy aquatic **biological communities**
- **Water quality** that supports biotic communities & habitat
- **Green infrastructure network** of native vegetation in the landscape
- Functioning **natural disturbance regimes** (floods, fires)

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# How Do We Identify Healthy Watersheds?

Integration of assessments of:

Biota and Their Habitat

- Green Infrastructure (forest cover, headwaters, wetlands, riparian corridors, floodplains)
- Biological, chemical, & physical water quality condition (fish, macroinvertebrates, wetlands, biodiversity, nutrients, pH, temperature, riffle and pool habitat)

Key Processes That Sustain Them

- Hydrology and fluvial geomorphology (e.g, instream flows, natural channel form & movement of sediment)
- Natural disturbance (floods, droughts, fires, etc.)

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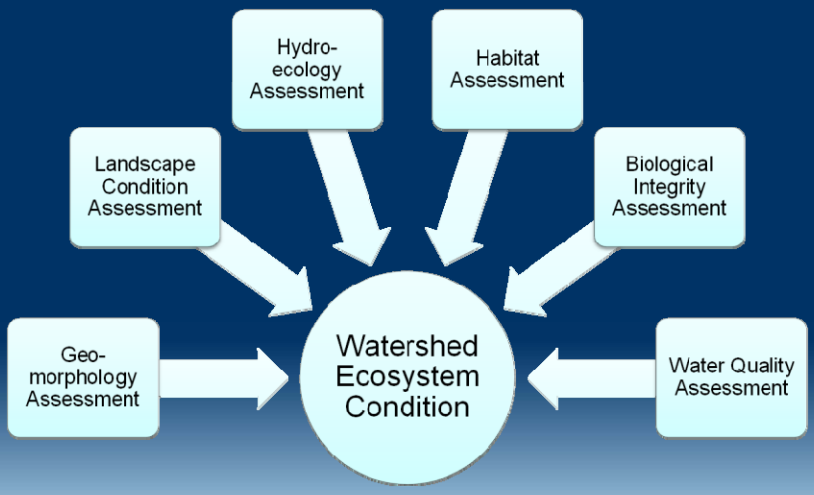
***Integrated Assessment Approach***

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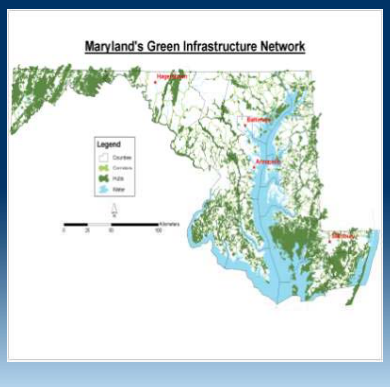
## Green Infrastructure Assessments or Landscape Condition

Pattern and structure of habitats and their importance to aquatic ecosystems, e.g., forest cover, headwaters, riparian zones, & floodplains



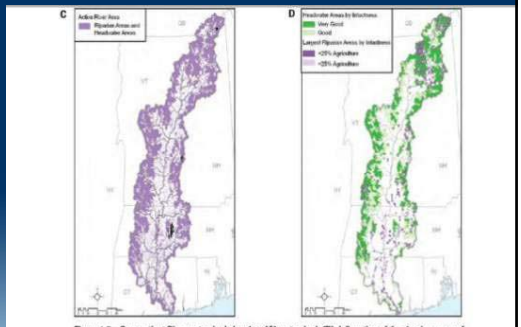




Figure 4.5 – Connecticut River watershed showing: (A) watershed; (B) delineation of the riparian areas of the *active river area*; (C) delineation of the headwater areas of the active river area; and (D) simple example showing relatively intact areas of the *active river area* components.

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## Biological Assessment:

## Kentucky Macroinvertebrate Reference sites Wadeable & Headwater Streams

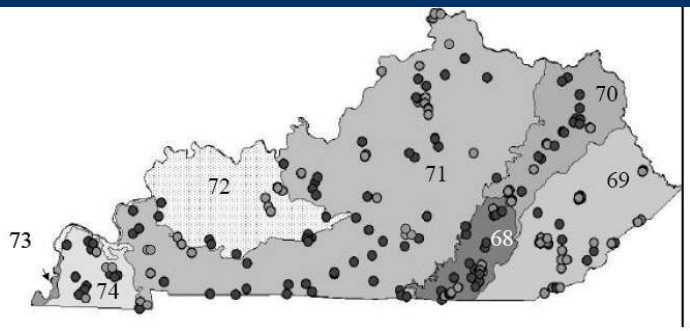


Figure 1a. Map of wadeable (dark circles) and headwater (light circles) reference sites distributed among Level III ecoregions. 68=Southwestern Appalachians, 69=Central Appalachians, 70=Western Allegheny Plateau, 71=Interior Plateau, 72=Interior River Valleys and Hills, 73, Mississippi Alluvial Plains, 74=Mississippi Valley Loess Plains.

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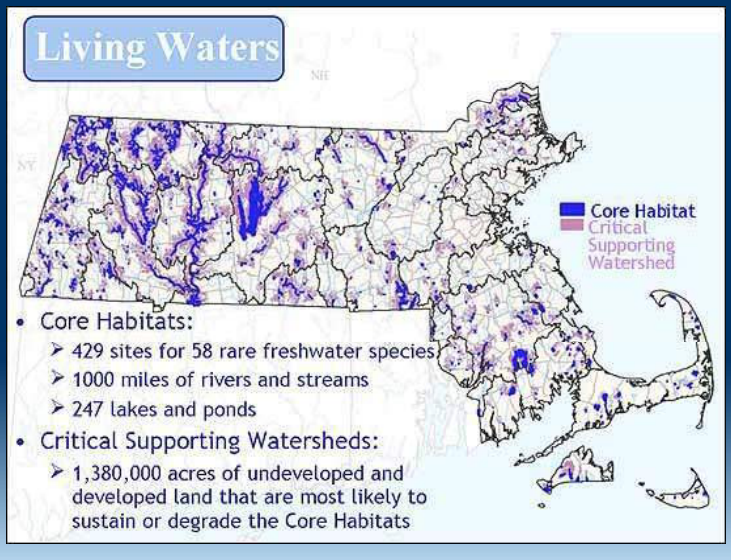
## Habitat Assessments:

## Massachusetts Statewide Living Waters Map (2003)

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## Development of the Hydroecological Integrity Assessment Process for Determining Environmental Flows for New Jersey Streams

Scientific Investigations Report 2007-5206

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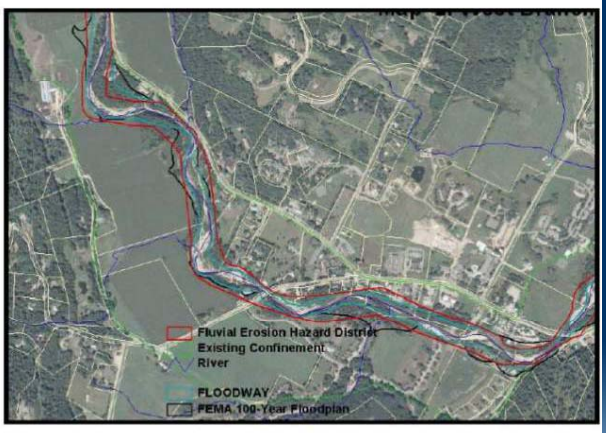
Vermont Agency of Natural Resources

# River Corridor Protection Guide




**Fluvial Geomorphic-Based Methodology**
to Reduce Flood Hazards and Protect Water Quality

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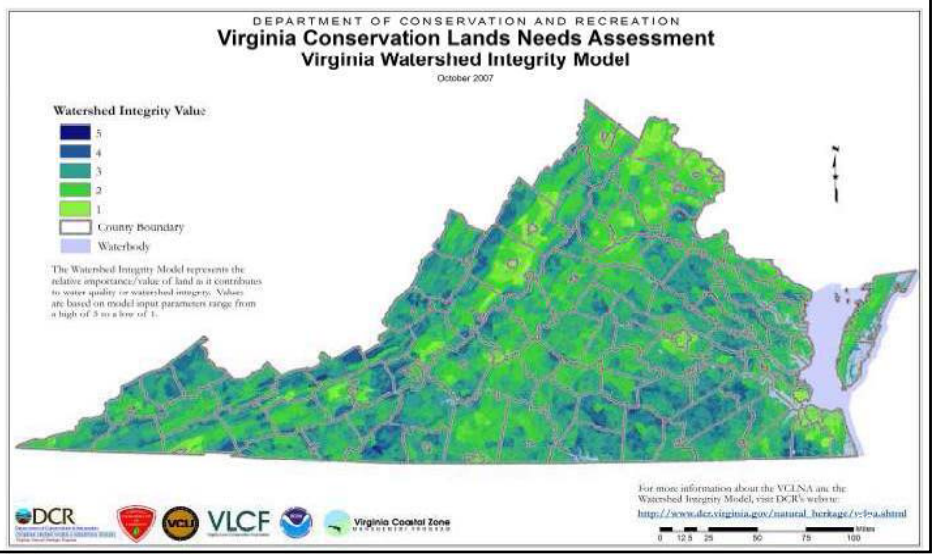
## Indicators: Headwater Streams & Contributing Areas; Source Water Protection Zones; Ecological Cores; Streams, Shorelines, & Floodplains; Index of Terrestrial Integrity; & Modified Index of Biotic Integrity

Figure 24. Statewide Watershed Integrity Model.



# MN Watershed Assessment Tool

The Watershed Assessment Tool (WAT) is a web-based tool for resource managers and others interested in the ecological health of Minnesota's watersheds.

Five components are used to describe the similarities and differences between watersheds.

The five components are:

- **Hydrology**
- **Connectivity**
- **Biology**
- **Geomorphology**
- **Water Quality**

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# How Do We Conserve and Protect Healthy Watersheds?

Habitat Protection

- Vermont River Corridor Protection Program
- Washington Growth Management Act Local Critical Areas Protection Program (e.g., codes, conservation easements)

Instream Flow Programs

- Vermont Hydrology Criteria, Maine Instream Flow & Water Level Stds, Connecticut & Washington Streamflow Regulations Proposed
- Michigan's Groundwater Withdrawal Stds & Tool, Ohio ELOHA Water Withdrawal Tool

State WQS Antidegradation Programs

Tax Credits & Landowner Stewardship

- North Carolina conservation tax credit and landowner stewardship programs
- Virginia Land Preservation Tax Credit (400,000 acre goal), VA Clean Water Revolving Loan Fund Land Conservation Loan Program

Local Watershed Zoning and other protection programs

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## HWI and EPA Programs

- Comprehensive Watershed Plans, State's Continuous Planning Process
- Compensatory Mitigation Rule (watershed approach), headwaters protection
- Targeting water quality restoration, TMDL implementation
- National Estuary Program
- Source Water Protection
- Water Quality Standards Antidegradation
- Chesapeake Bay Maintain Healthy Watersheds Goal 4 Implementation Team

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## Accomplishments

- HWI Coordinators established in EPA Regions & identified state partners
- Website and Fact Sheet (Spring 09)
- Developed HWI performance measures (12/09)
- Outreach to national state organizations (ASWIPCA, AFWA, etc) NGO's (TCF, TNC, TPL, etc), & federal agencies (USFWS, USGS, Forest Service, COE..)

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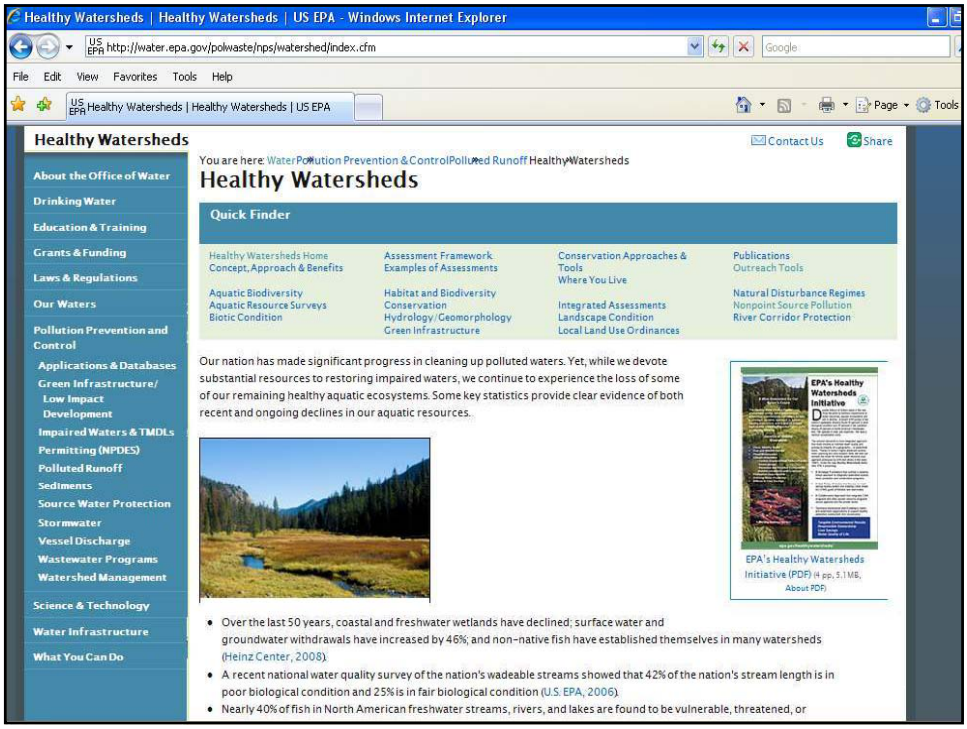


# Accomplishments cont.

- Draft *Identifying and Protecting Healthy Watersheds: A Technical Guide* (1/10)
  - Key concepts, assessment examples, integrated assessment approach, management approaches
- Draft HWI National Framework and Action Plan 2010
- National Healthy Watersheds Pilot Projects ( Fall10)

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## Participating States

New Hampshire Department of Environmental Services
New Hampshire Fish and Game
Connecticut Department of Environmental Protection
Vermont Department of Environmental Conservation
Massachusetts Department of Fish and Game
Massachusetts Executive Office of Energy and Environmental Affairs
Pennsylvania Department of Environmental Protection
Virginia Department of Environmental Quality
Virginia Department of Conservation and Recreation
Maryland Department of Natural Resources
North Carolina Department of Environment and Natural Resources
Mississippi Department of Environmental Quality
Tennessee Wildlife Resources Agency
Michigan Department of Environmental Quality
Wisconsin Department of Natural Resources
Minnesota Pollution Control Agency
Minnesota Department of Natural Resources
Ohio Environmental Protection Agency
Oklahoma Conservation Commission
Louisiana Department of Environmental Quality
Texas Commission on Environmental Quality
Iowa Department of Natural Resources
Kansas Water Office
Kansas Department of Health and the Environment
Utah Department of Environmental Quality
Oregon Department of Environmental Quality
Washington Department of Ecology
Alaska Department of Environmental Conservation
Alaska Department of Fish and Game

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# Thank you

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# Questions?



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Virginia Department of Conservation & Recreation

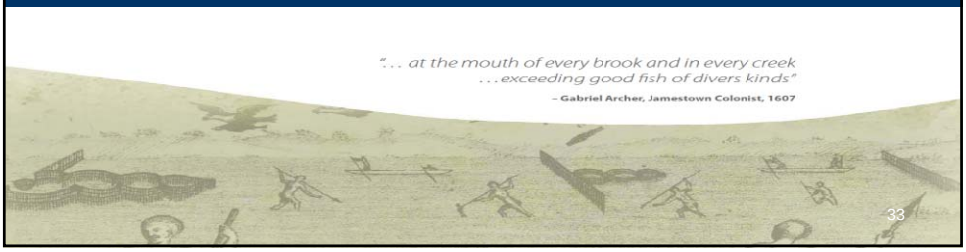
# Conserving Virginia's Healthy Waters

*"it shall be the Commonwealth's policy to protect its atmosphere, lands, and waters from pollution, impairment, or destruction…"*

Rick Hill,
Virginia Department of
Conservation & Recreation

# Why Healthy Waters?

- **It's effective and cost effective**
- **It's positive**
- **It's proactive**
- **It is the only way to ensure the long term ecological health of stream and rivers…**

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# Virginia's Healthy Waters Initiative

- Began with integration of Natural Heritage Data into Nonpoint Source Assessment Report in the 1990s
- Progressed into a pilot study to include available biological data at a watershed scale into the Assessment Report
- Advanced to systematic assessment of ecological integrity within the Bay watershed and identification of healthy streams

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# Challenges

- The challenges to conservation of healthy streams are formidable and many of the barriers to success stem from institutional inertia – essentially programs get focused on internal goals and lose their connection to natural resources
- Failure to recognize the extent of this conservation challenge is another major impediment
- Concerns about property rights and state intrusion into local decision making are also major potential challenges that must be navigated

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# Other Barriers…

- Despite continuing water quality degradation, and perhaps accelerating ecological degradation, conservation continues to take a back seat to restoration
- While the Clean Water Act clearly mandates anti-degradation, funding and measureable improvements remain focused on cleanup of impaired waters
- Most monitoring programs continue to be focused on identifying problems not assessing ecological health.
- As long as the primary measure of success is delisting our programs will be reactive

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# Growing Problem

- Thousands of known impairments
- List grows with each Integrated Report
- Daunting restoration challenge
- Anti-degradation, alone, is not adequate to protect these resources
- Declining ecological health
- Healthy watersheds = healthy Bay

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# Making A Case For Healthy Waters

- A primary impetus for the Healthy Waters Initiative was the growing recognition that a focus on impaired waters and high pollutant loadings is largely missing the threats to ecological integrity
- Making the case for conservation based on the rate at which new waters are being listed vs. the pace of restoration
- Communicate the challenges of trying to restore ecological integrity - many believe that it can not be done
- Making the case for conservation by comparing the economic benefits of conservation to the high cost of restoration
- Although ecological decline is an insidious threat to natural systems, focusing on conservation of healthy waters is a positive message that resonates with a wide audience.
- Focusing on local streams that people know and care about rather than remote resources
- **We need to conserve what we have left!**

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# What Is Virginia Doing?

- State and interstate watershed planning initiatives
- Development of natural resource inventories
- Integrating conservation messages into existing programs
- Conservation based planning assistance to local governments
- Leveraging and coordinating natural resources management programs

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## State and interstate Watershed Planning Initiatives (Chesapeake Bay Program)

- The Chesapeake Bay Program, has, as one of its core focal areas, conservation of Healthy Watersheds
- Phase II of the Bay TMDL watershed planning process will directly engage local governments in Bay restoration efforts
- This planning process presents an unprecedented opportunity to engage local governments in resource conservation
- Our goal is to take advantage of this opportunity to promote conservation of healthy waters on a scale that has not been attempted in Virginia in the past
- Information about healthy local streams, their connection to the Bay ecosystem and their importance to capping nutrient loads will provide a positive and constructive basis for local engagement

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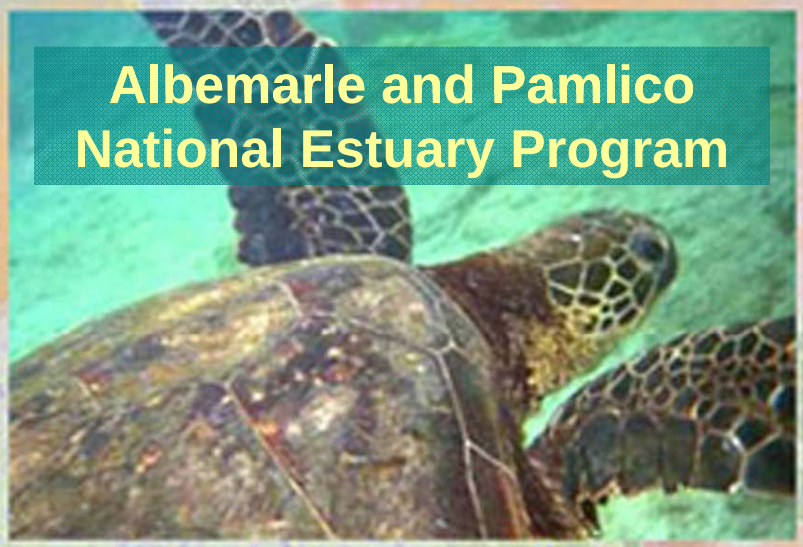
## Albemarle and Pamlico National Estuary Program



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## State and interstate Watershed Planning Initiatives (Albemarle and Pamlico National Estuary Program)

- The Albemarle and Pamlico National Estuary Program (APNEP) has as its mission “to identify, restore, and protect the significant resources of the Albemarle-Pamlico estuarine system” - this mission is perfectly aligned with conservation of healthy watersheds
- Virginia and North Carolina are working cooperatively to advance conservation of the outstanding aquatic resources in the basins of the Albemarle and Pamlico Sounds
- The healthy waters approach will compliment and expand the Comprehensive Conservation and Management Plan being developed for APNEP

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## State And Interstate Watershed Planning Initiatives (Clinch-Powell Clean Rivers Initiative)

- The Clinch, Powell and Holston rivers run nearly parallel courses through the remote mountains and valleys of southwestern Virginia and northeastern Tennessee
- These last free-flowing tributaries of the Tennessee River system harbor the nation’s highest concentrations of globally rare and imperiled fish and freshwater mussels
- The goals of the Clean Rivers Initiative are very much aligned with a Healthy Waters approach and the globally important resources of these rivers provide a focal area for advancing conservation of healthy watersheds in the southern rivers of Virginia


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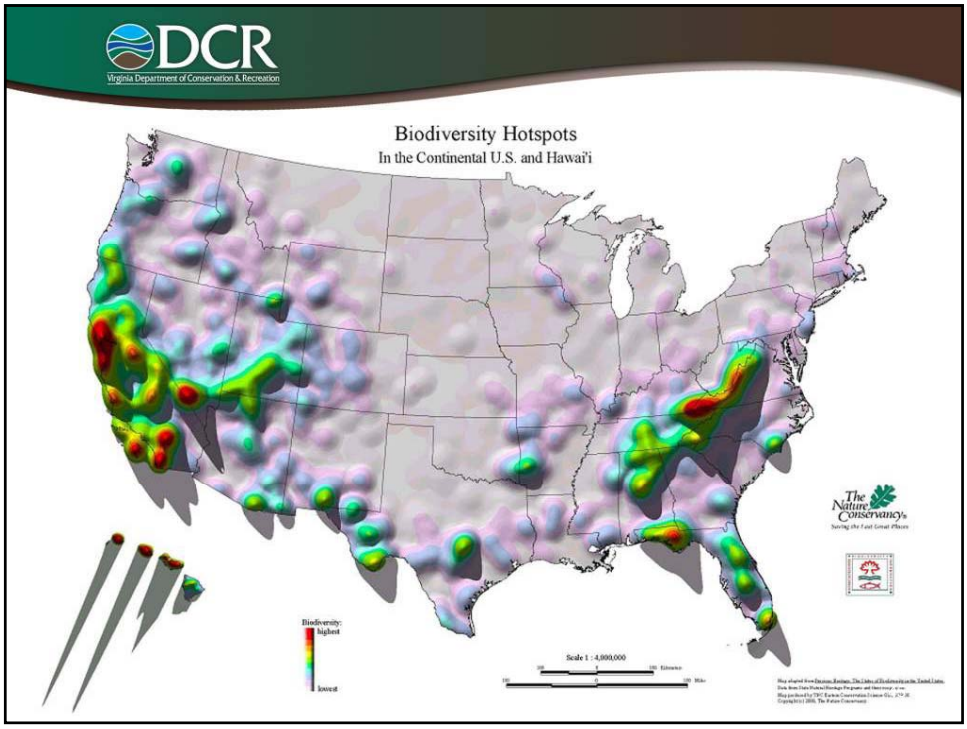


# Integrating Conservation Messages Into Existing Programs

- A quick review of training and outreach material reveals that far too often we describe what actions are needed to protect water quality but we fail to adequately make the case for conservation
- We also rarely make folks aware of the healthy streams and rivers in their back yard
- To effectively communicate the extent and context of environmental challenges, we need to discuss program efficacy in terms of environmental response and the ecological and economic benefits of implementation
- If we are to sustain Virginia's high quality of life and economic vitality, we must do a better job connecting land use activities to water quality and conservation of healthy waters

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# Development Of Natural Resource Inventories

- Scientific basis for identifying ecologically healthy streams (a common currency)
- Multi-metric ecological assessment that considers the physical condition of streams, habitat, fish communities, and macro invertebrate health
- Assessment uses high quality archival and data collected through random sampling
- Over 2500 streams and rivers have been assessed and compared to a reference condition
- Assessment completed through an interagency partnership (VCU, DCR, and DEQ)
- All data and the assessment methodology is available on an interactive, searchable website housed by VCU: http://instar.vcu.edu/
- Approximately 200 waters have been identified as having high ecological integrity (healthy)

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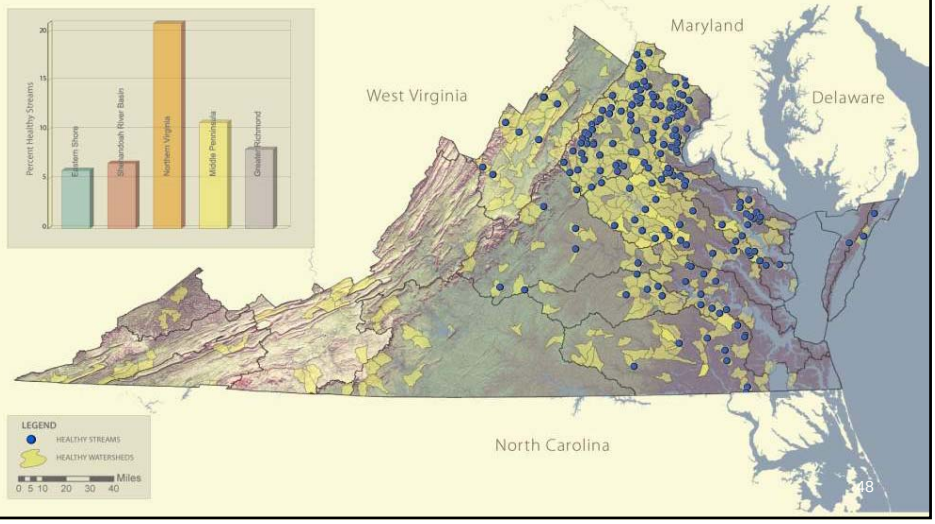
## STATUS OF HEALTHY WATERS IN VIRGINIA

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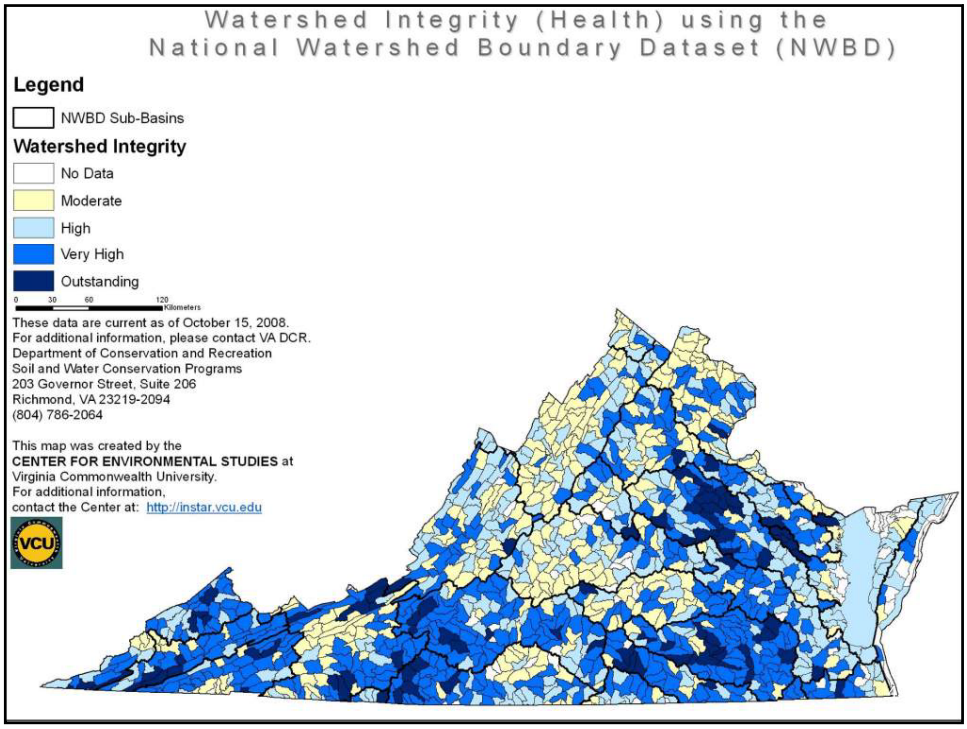


# Richmond County Pilot Bay Restoration Implementation Project

- This project involved piloting local implementation of Bay restoration actions
- It involved on the ground BMP implementation and capacity building in the form of natural resource data development and comprehensive planning
- A stream health assessment became a central theme for all elements of the Richmond Country Pilot Project
- It was directly useful for the update of the comprehensive plan
- The comprehensive nature of the stream assessment provided a baseline condition for local efforts to measure progress, impacts, identify threats and conservation priorities

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## Leveraging And Coordinating Natural Resources Management Programs

- Land Conservation
- Agricultural Incentive Programs
- Targeting Restoration
- Stormwater Management
- Natural Heritage Programs
- Ecosystem Based Management

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## Land Conservation

- Healthy waters data can inform land conservation decision making
- It can strengthen the case for conservation – not just terrestrial resources but aquatic resources
- It can expand the base for conservation because clean water is a priority for everyone
- Land conservation has broad support and is an administration priority – our challenge is to harness that support for conservation of healthy waters

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## Agricultural Cost-Share Program

- For the first time Virginia has made conservation healthy waters a priority consideration for cost-share funding allocation decisions
- Although it is not a primary driver, impaired waters are still a funding priority - opening the door for conservation is a major step forward
- By demonstrating the benefits of healthy streams for Bay restoration, we should be able to leverage additional funding in the future

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## Targeting Restoration

- In the past TMDL implementation has been driven by perceptions about achievability, local interest and they have focused on pathogen impairments
- Threats to exceptional resources have not been a major targeting consideration
- Moving forward, we hope to do a better job connecting conservation and restoration priorities
- This objective may be supported by Bay Restoration efforts because biological impairments have a more direct connection than do pathogen impairments

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## Stormwater Management

- Virginia continues to grapple with stormwater management development and implementation
- Virginia has been working to develop new stormwater regulations for nearly a half decade and it will likely be another couple of years before new regulations are in place
- Healthy waters data could inform implementation priorities and it is our goal to develop technical guidance regarding practices that would go beyond minimum requirements to help avoid or minimize stormwater impacts on healthy streams

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## Natural Heritage Data

- Virginia is in the process of incorporating healthy waters data as a layer in Virginia's Natural Heritage data base and GIS
- This accomplishment will be a major step forward for conservation of healthy waters because it will ensure that this data is considered in all NEPA and state level environmental impact reviews

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## Ecosystem Based Management

- Virginia is promoting ecosystem based management as a way to sustain quality of life and long term economic security
- Agency staff and university partners have developed decision support tools in the form of data and interactive mapping products that identify the location of healthy waters and important natural areas
- These tools inform technical assistance and facilitation support for community engagement, planning, and code and ordinance development

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## Going Forward

- Long term: work to identify and conserve healthy water resources across the state
- Mid term: complete assessment of streams within the Bay watershed and work with state and federal agencies and local governments to conserve these resources
- Short term: integrate conservation of healthy waters into existing programs including the Bay TMDL planning process, land conservation prioritization, stormwater management, and Agricultural Cost-Share Program

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# Questions?

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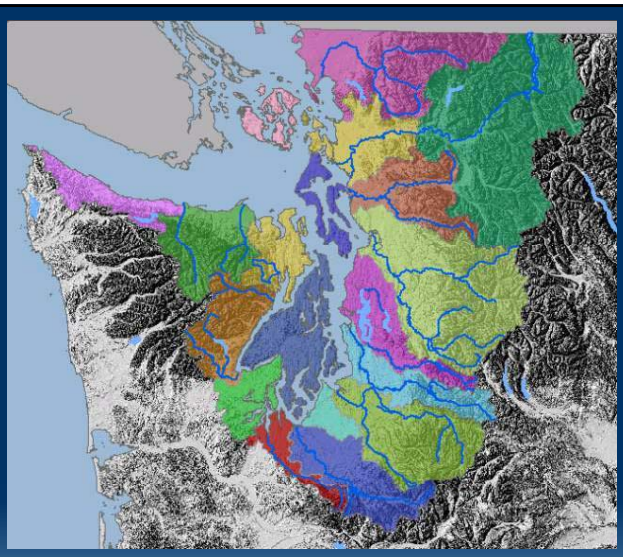
# Protecting Aquatic Resources Using a Watershed - Based Approach



Stephen Stanley

Puget Sound Characterization Project

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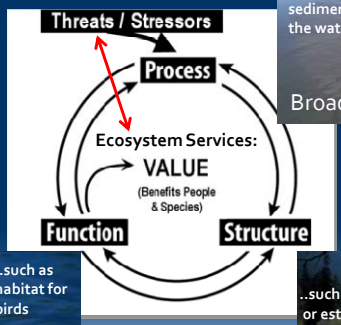
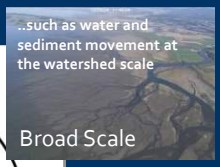
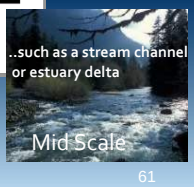
# Land Use Planning Needs…

- An Ecosystem or Watershed Approach
- Assessment of:
  - Freshwater processes
  - Nearshore processes
  - Fish & wildlife habitat
- Integration of data across temporal & spatial scales





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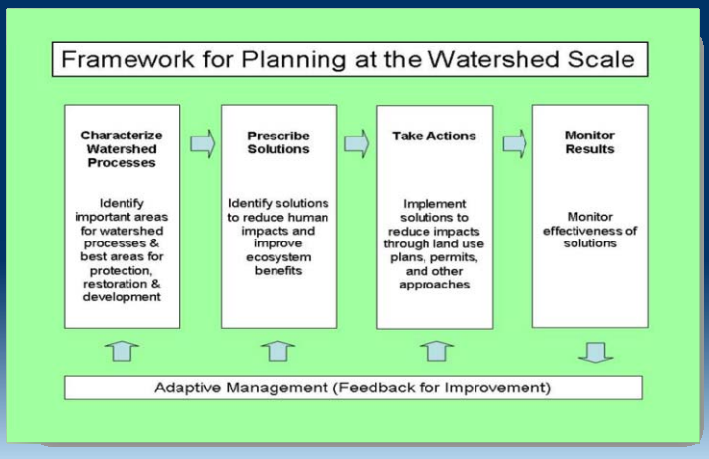
# Land Use Planning Needs…

A consistent watershed planning framework

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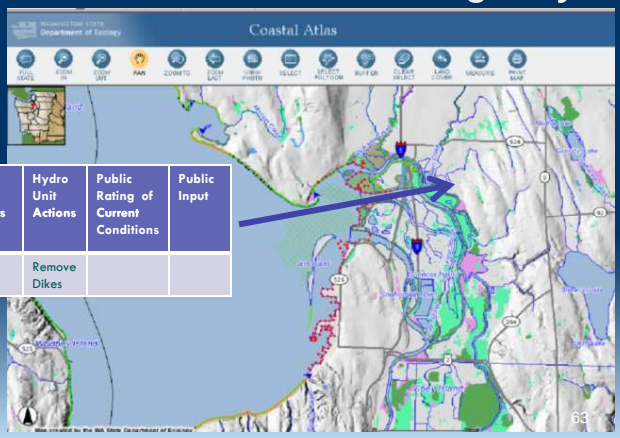
# Better Visualization of Data

- Produce and display data in manner useful to local government, tribal, NGO & agency planning




| Water Flow Index | Water Quality Index | Fish & Wildlife Index | Water-shed Issues | Hydro Unit Impacts | Hydro Unit Actions | Public Rating of Current Conditions | Public Input |
|---|---|---|---|---|---|---|---|
| 0.3 | 0.4 | 0.5 | Storm-water | Diked | Remove Dikes | | |

DO = 6mg/l
Total Coliform = 4000 colonies/ml

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# A Watershed Approach can help…

## Guide future development

- Identify and avoid development patterns that are difficult to correct
- Reduce cost of infrastructure for future development & streamline local permitting
- Supports comprehensive approach to Growth Management and Shoreline Management Acts

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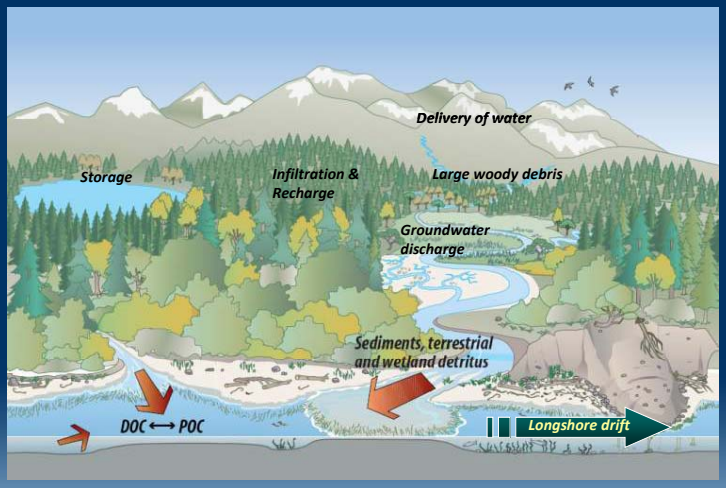
# Objectives of Puget Sound Characterization




**Identify Important Areas for Supporting Watershed Processes**

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# And How those Areas Have Been Altered


Identifies the best areas to protect, restore, & develop

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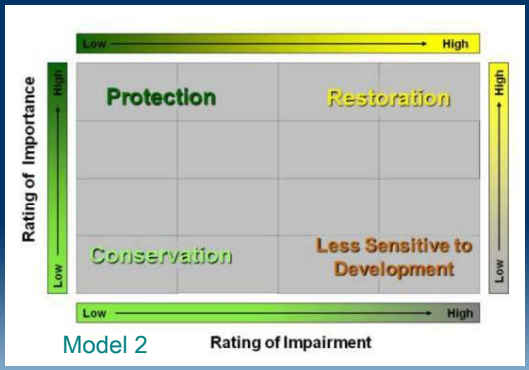
# Phase I Product Results

- Water Flow Model Results
  - Protection
  - Restoration
  - Areas suitable for Development



Model 2

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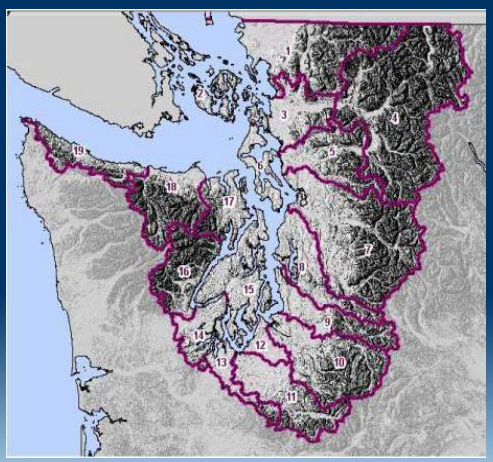
# Phase II Product Results – 6/2011

- Integrate other process models and data:
  - Fish and Wildlife Index
  - Water Quality Models (stormwater, nutrients)
  - Integrate all process models and data:
- Develop "Solution Templates
- Provide results on agency website



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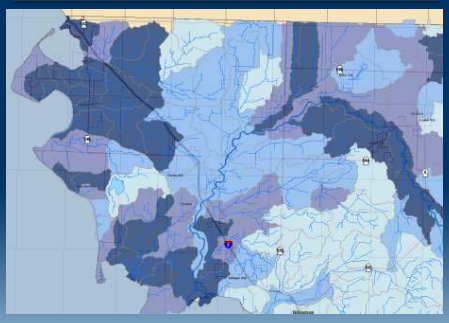
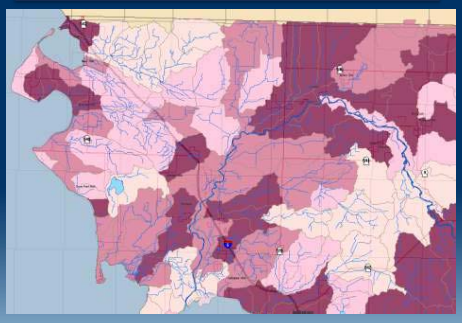
# Overall Results for Water Flow Assessment

**Importance Map**
**Based on relative area contributed to the delivery, storage, recharge and discharge of water**



Darker Blue = Higher Importance to Water Flow Process

**Impairment Map**
**Based on loss of forest , reduction in storage, recharge, and discharge and increase in impervious cover**



Darker Red = Greater Impairment to Water Flow Process

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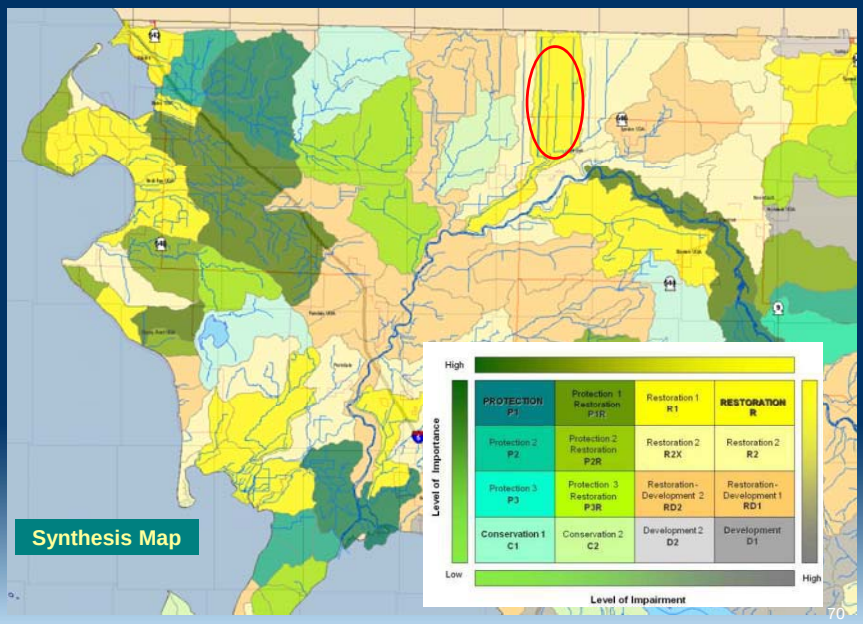
# Overall Results for Water Flow Assessment

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# Ecosystem wide characterization – Fishtrap Creek

| Ecosystem Issue<br><br>Fishtrap Creek | How have ecosystem processes been changed relative to issue? | Solution | Actions: Recommended protection & restoration measures and environment designations |
|---|---|---|---|
| Low Dissolved Oxygen. On 303 (d) list. | Delivery, storage and discharge processes have been impaired. These processes govern denitrification and removal of sediment and phosphorous | Restore depressional wetland areas downstream of agricultural lands. | Develop mitigation bank run by agricultural community. Proceeds from sale of credits would be used to retire development rights in agricultural lands at highest risk of development. |

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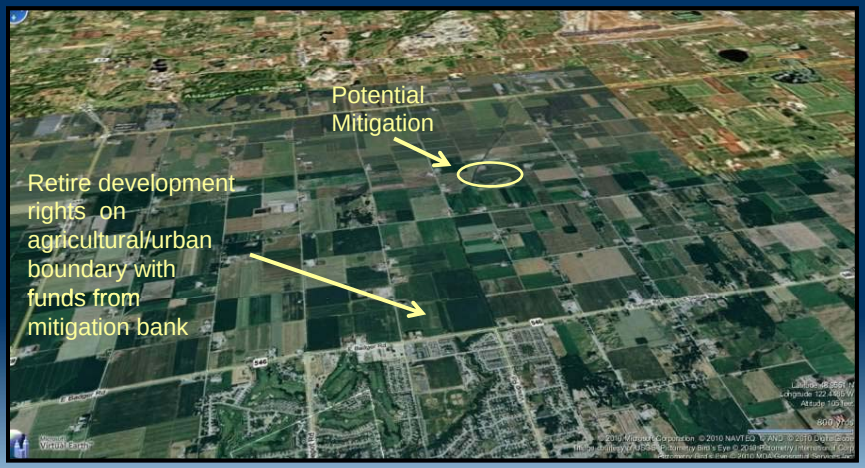
# Potential Restoration Area Fishtrap Creek Tributaries

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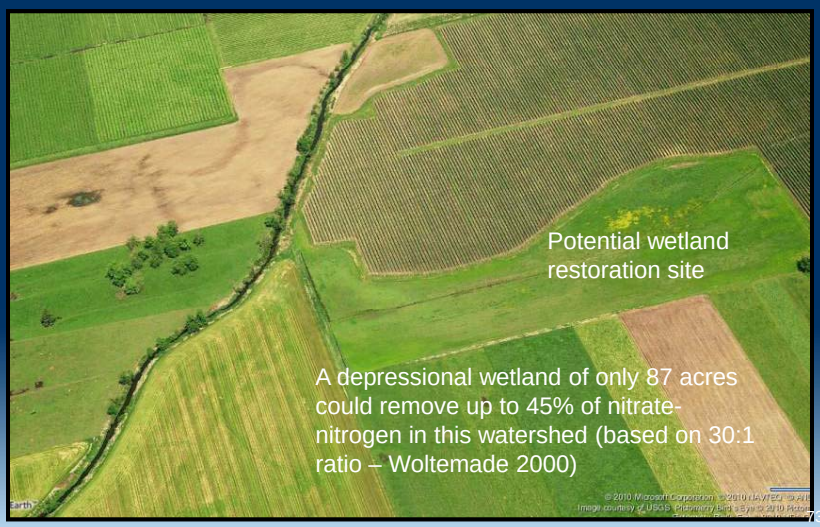
# Potential Restoration Area Fishtrap Creek Tributaries

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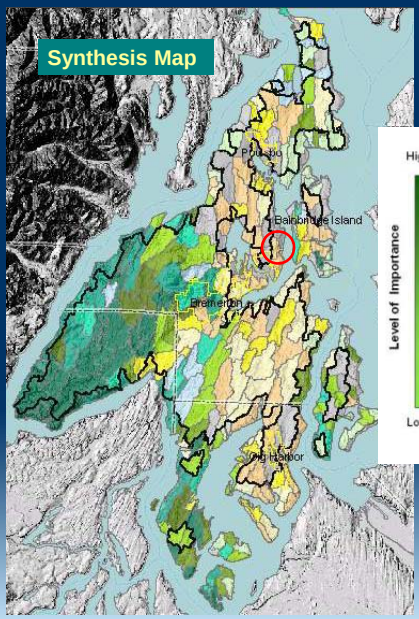
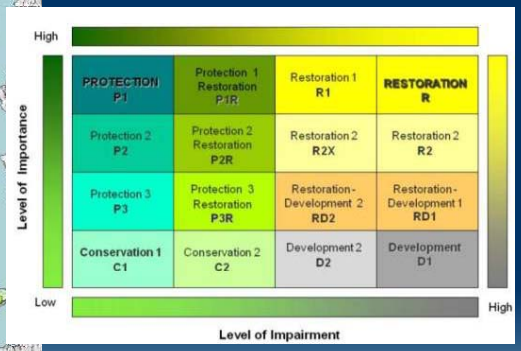
# Kitsap County - Overall Results for Water Flow Assessment

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# Illahee Creek Watershed

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# Discharge Map – Illahee Creek

## Helps establish relative importance of stream system and restoration priority

Historic salmon run – year round flows

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# Shoreline Issue – Increased Sediment Delivery


Downstream Erosion and Bedload Transport and Deposition is Occurring

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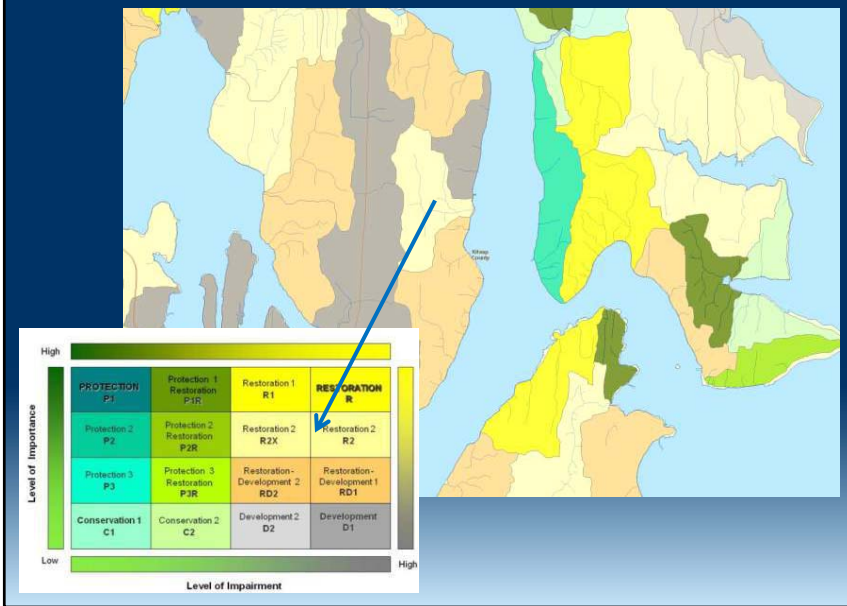
# Storage is Impaired – Illahee Creek

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# Storage & Delivery are Impaired – Illahee Creek

Headwater wetlands have been filled or impaired and forest cleared

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# Solutions and Actions– Illahee Creek

| Shoreline Issue | How have ecosystem processes been changed relative to issue? | Solution | Solutions and Actions: Recommended protection & restoration measures |
|---|---|---|---|
| High sediment delivery to shoreline. Building of delta – affecting public access to dock and habitat functions. Loss of salmon spawning habitat. | Erosion and Bedload Transport. Higher peak flows due to reduced storage and increased overland flow. | Stormwater Retrofit – Route runoff from impervious surfaces to rain gardens, infiltration galleries and detention ponds | Provisions in SMP for stormwater mitigation fee. Develop new standards for stormwater retrofit. New BMPs and larger buffers elsewhere. |

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# Additional Information…

www.ecy.wa.gov/mitigation/landscapeplan.html

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# Next Watershed Academy Webcast:

## Water and Climate Change

**Thursday, November 18, 2010**
**1:00–3:00pm Eastern**

**www.epa.gov/watershedwebcasts**

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# Participation Certificate

If you would like to obtain participation certificates for multiple attendees, click the link below:

http://water.epa.gov/learn/training/wacademy/upload/2010_10_13_certificate.pdf

You can type each of the attendee's names in and print the certificates

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