Maryland Restoration Tracking Web Site

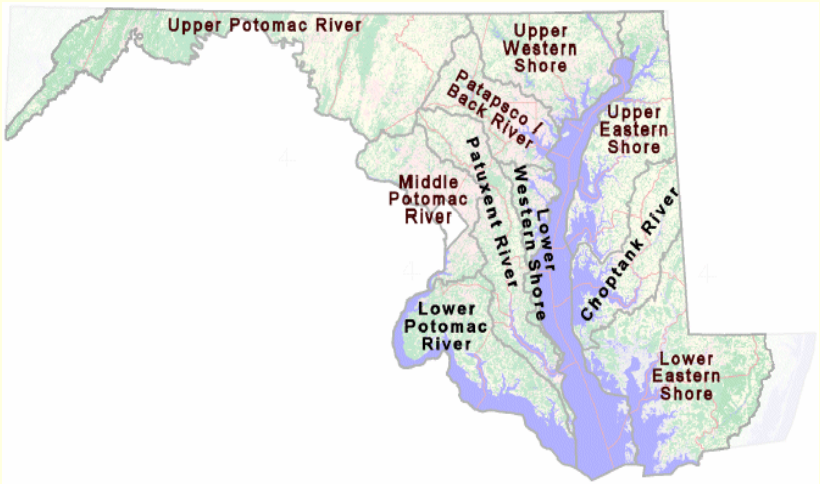
Coastal Nonpoint Source National Conference - November 2005

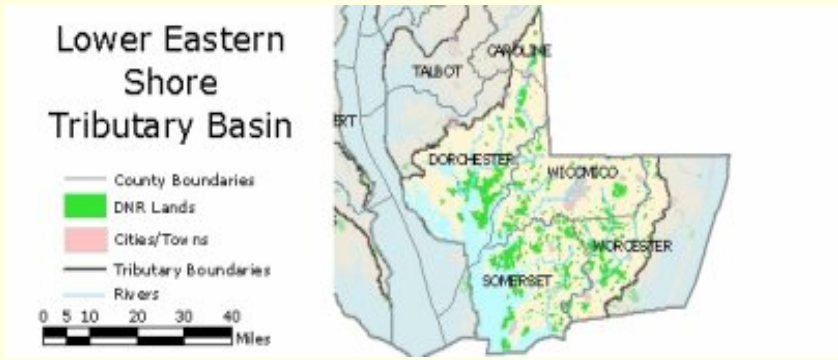
Maryland Restoration Tracking Challenges

- Responsibility for tracking restoration efforts/management measures spread over many different agencies.
- Several restoration efforts/management measures are difficult to track.

Maryland Restoration Tracking Web Site

http://dnrweb.dnr.state.md.us/watersheds/surf/bmp/





- Restoration web site builds upon previous state tracking efforts tied to Tributary Strategies.
- Watershed Services staff works closely with outside agency staff.
- Restoration tracking web site currently updated through 2003 and is based on three modules (Urban, Agriculture and Resource Protection).

Maryland Restoration Tracking Web Site

http://dnrweb.dnr.state.md.us/watersheds/surf/bmp/

Urban BMPs	Units	2000	2001	2002	2003	Strategy
Dry Detention Ponds & Hydrodynamic Structures	acres		44,568	33,194	75,388	*
Dry Extended Detention Ponds	acres		12,057	19,172	28,987	*
Erosion and Sediment Control	acres	10,450	31,713	28,689	29,060	60,935
Filtering Practices	acres		242	918	3,875	*
Infiltration Practices	acres		6,139	5,622	15,779	*
Roadway Systems	acres		241	202		*
Septic Connections	systems	10,980	10,980	11,203	10,362	14,047
Septic Denitrification	systems	312	312	312	412	347,897
Urban Nutrient Management	acres	0	0	0	0	737,342
Wet Ponds & Wetlands	acres		35,875	15,586	70,702	*

* Stormwater BMPs for the Strategy have been placed into 3 different categories. These categories and their associated implementation acres are: new (74,495), recent (192,539), and old retrofits (337,711).

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Infiltration Practices
Urban BMP

Practices that capture and temporarily store runoff to promote infiltration into the soil over a prescribed period. This BMP category includes trenches, basins and porous pavement underlaid by permeable soils or materials such as stone or sand to allow infiltration to the soil.

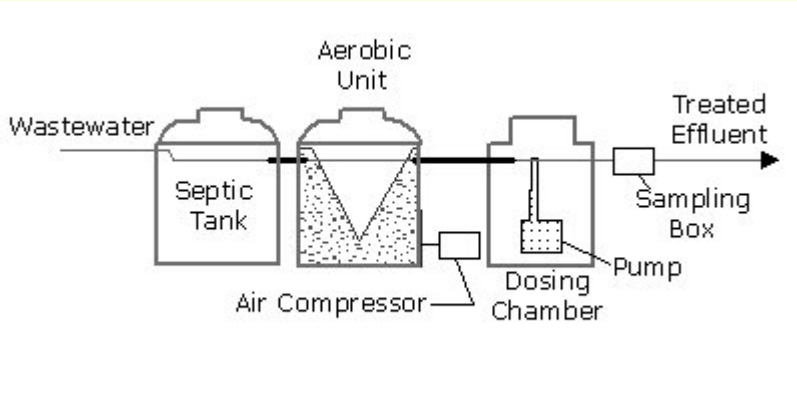
BMP Pollutant Removal Information

Applied To:	Urban Land
Nitrogen Efficiency:	50%
Phosphorus Efficiency:	70%
Sediment Efficiency:	90%

What do these efficiencies represent?

Maryland Restoration Tracking Web Site

Denitrifying Septic Systems
Urban BMP



Source: MDE

This BMP represents the replacement of traditional septic systems with more advanced systems that have nitrogen removal capabilities. Traditional septic systems usually consist of a large tank designed to hold the wastewater allowing grits and solids time for settling and decomposition. Wastewater then flows to the second component, the drainfield. An enhanced septic system like that shown can provide further treatment of nitrogen through processes that encourage denitrification of the wastewater.

BMP Pollutant Removal Information

Applied To:	Urban Land
Nitrogen Efficiency:	50%
Phosphorus Efficiency:	0%
Sediment Efficiency:	0%

What do these efficiencies represent?

Maryland Restoration Tracking Web Site

http://dnrweb.dnr.state.md.us/watersheds/surf/bmp/

Agricultural BMPs	Units	2000	2001	2002	2003	Strategy
Animal Waste Management Systems Livestock	systems	930	964	1,007	1,037	2,023
Animal Waste Management Systems Poultry	systems	990	1,014	1,034	1,057	1,247
Conservation Tillage	acres	665,037	665,037	665,037	756,754	718,037
Cover Crops	acres	152,441	70,920	97,755	113,628	600,000
Nutrient Management Plan Implementation	acres	1,030,571	1,161,180	1,446,509	1,680,350	1,064,718
Retirement of Highly Erodible Land	acres	2,557	2,585	2,593	10,879	28,922
Runoff Control	systems	605	631	668	690	1,092
Soil Conservation Water Quality Plan	acres	875,476	961,132	817,206	786,088	1,364,718
Stream Protection With Fencing	acres	1,054	1,286	1,350	1,417	11,493
Stream Protection Without Fencing	acres	25,893	26,130	26,300	26,470	29,748

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Nutrient Management Plan Implementation
Agriculture BMP

Source: Mike Herrmann, MD DNR

Nutrient management plans detail the optimum use of nutrients to minimize nutrient loss while maintaining crop yield. Soils, plant tissue, manure and/or sludge tests are used to develop application rates that meet projected crop yields based on soil productivity or historic yields of a site. With plan implementation, nutrient applications follow guidelines for the amount, timing, and placement on each crop. Plans are prepared by the Cooperative Extension and certified private consultants and are revised every two to three years to incorporate new knowledge and address changes in crop management.

BMP Pollutant Removal Information

What do these efficiencies represent?

Applied To:	Agricultural Land
Nitrogen Efficiency:	Model derived based on crop type.
Phosphorus Efficiency:	Model derived based on crop type.
Sediment Efficiency:	N/A
Comments:	Nutrient applications to lands under nutrient management are estimated to be 135% of the crop's agronomic need. Resultant nutrient reductions occur when overapplication of fertilizers and manure is prevented.

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Resource Protection & Improvement BMPs	Units	2000	2001	2002	2003	Strategy
Buffer - Forested, Urban	acres		335	337	343	1,375
Buffers - Forested, Agriculture	acres	5,473	8,628	13,376	16,484	32,506
Buffers - Grassed	acres	2,708	2,732	3,412	28,820	60,764
Forest Conservation	acres	38,766	43,883	49,224	54,480	38,766
Non-strucutral Shore Erosion Control	feet		162,507	168,887	172,585	**
Stream Restoration	feet			83,468	106,835	368,679
Structural Shore Erosion Control	feet		105,253	107,610	108,504	**
Tree Planting, Agriculture	acres	6,402	6,402	6,402	7,481	10,712
Tree Planting, Open Lands	acres	2,913	3,072	3,153	3,234	5,195
Wetland Creation	acres	1,247	3,358	4,471	6,252	16,678

** There is no strategy goal for shore erosion control.

Maryland Restoration Tracking Web Site

Riparian Forest Buffers
Urban BMP

Source: MD Forest Service

Riparian Forest Buffers are linear wooded areas along rivers and streams that help filter nutrients, sediments and other pollutants from runoff as well as remove nutrients from groundwater. In addition to their ability to improved water quality, their value at enhancing terrestrial and aquatic habitat make forest buffers an important BMP for natural resource managers.

BMP Pollutant Removal Information

Applied To:	Urban Land
Nitrogen Efficiency:	25% + Acreage Converted to Forest
Phosphorus Efficiency:	50% + Acreage Converted to Forest
Sediment Efficiency:	50% + Acreage Converted to Forest
Comments:	Urban efficiencies do not vary by region and are applied to 1 acre of urban land.

What do these efficiencies represent?

Maryland Restoration Tracking Web Site

Non-Structural Shore Erosion Control

Resource Protection & Improvement

Source: Tony Allred, MD DNR

Non-Structural Shore Erosion Control projects are those that use bioengineering techniques to create vegetated wetlands for protection of the shore-line. Non-Structural projects consist of placing clean sandy fill in the intertidal zone and planting the area with native marsh grasses such as smooth cordgrass and salt meadow hay. Placement of some stone may also be necessary to protect the newly created fringe marsh. Non-Structural projects are designed to create shallow water habitat for aquatic species and waterfowl. They also promote water quality by filtering upland runoff and trapping sediments and nutrients. NS control practices are most applicable in tidal areas where erosion rates are 2 feet per year or less.

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Stream Restoration
Resource Protection & Improvement

Source: Ken Yetman, MD DNR

Stream Restoration is used to help improve habiat and water quality conditions in degraded streams. Typically, streams in need of restoring have watershed conditions that have destabilized the stream channel and eroded stream banks. Project objectives often include reducing stream channel erosion, promoting channel stability, and creating a stable habitat suitable for diverse aquatic communities.

BMP Pollutant Removal Information

Applied To:	Urban Land
Nitrogen Efficiency:	0.02lb/ft
Phosphorus Efficiency:	0.0035lb/ft
Sediment Efficiency:	2.55lb/ft

Stream Restoration Tracking

Record # 25 Date 7/29/2002 ProjectContact Maryland Materials, Inc. Entered By Dawn

Permit Date 10/12/2000 Permit Number 200064605 Project Completion Date 12/19/2001 Box Number 302

Project Type

- [ ] Acid Mine Drainage
- [x] Bank Stabilization
- [ ] Channel Creation
- [ ] Fish Passage
- [ ] Grade Control
- [ ] HabitatEnhancement
- [ ] Hydrology Enhancement/Mgmt
- [ ] Water Quality
- [ ] Riparian Reforestation
- [ ] Wetland Creation/Enhancement
- [ ] Stream Restoration
- [x] Road Crossing

Geographical Information

Select One: (•) dd ( ) dms

Latitude: 0 Longitude: 0

State Grid: North: 153300 East: 404677

Waterway Name: Unnamed tributary to Little North E Drainage Area (acres): 0 Stream Order: 0

Major Shed: WASHINGTON MET Sub Shed: Anacostia River County:

Engineering Design Information

Length (feet): 105

Grading: [ ] Bank [ ] Floodplain [ ] Longitudinal Profile [ ] Plan Form

Stabilization: Length (feet): 105 [x] Vertical [x] Lateral

Structures: [x] Culvert [ ] Dams/Diversion [ ] Gabions [ ] Grade Controls [x] Riprap [ ] Retaining Walls

[ ] Root Wads [ ] Vanes [ ] Riffle [ ] Boulders [ ] Step Pools [ ] Fencing [ ] BioLogs [ ] Grout Bags

Vegetation: Length (feet): 0 [ ] Facines/BrushMats [ ] Live Stakes [ ] Posts [ ] Seedlings/Saplings [ ] Seed Mix

[ ] Shrubs

Engineering Design Information

Length (feet): 105

Grading: ☐ Bank ☐ Floodplain ☐ Longitudinal Profile ☐ Plan Form

Stabilization: Length (feet): 105 ☑ Vertical ☑ Lateral

Structures: ☑ Culvert ☐ Dams/Diversion ☐ Gabions ☐ Grade Controls ☑ Riprap ☐ Retaining Walls
☐ Root Wads ☐ Vanes ☐ Riffle ☐ Boulders ☐ Step Pools ☐ Fencing ☐ BioLogs ☐ Grout Bags

Vegetation: Length (feet): 0 ☐ Facines/BrushMats ☐ Live Stakes ☐ Posts ☐ Seedlings/Saplings ☐ Seed Mix
☐ Shrubs

Habitat Objectives

Features: ☐ Cover ☐ Pool/riffle

Water Quality: ☐ Flow Rate ☐ Nutrients ☑ Sediment ☐ Temperature

Hydrology Objectives

☐ Base Flows ☐ Flood Flows ☐ Storm Flows

Modeling Activities

☐ Hydraulics ☑ Hydrology
☐ Sediment ☐ Scour

Monitoring Activities

Physical: ☐ Channel ☐ Hydraulics/Hydrology

Biological: ☐ Vegetation ☐ Fish ☐ Benthos

Water Quality: ☐ Nutrients ☐ Sediment ☐ Temperature ☐ Toxics

Delete This Record ☐

☐ Data Available

Narrative:

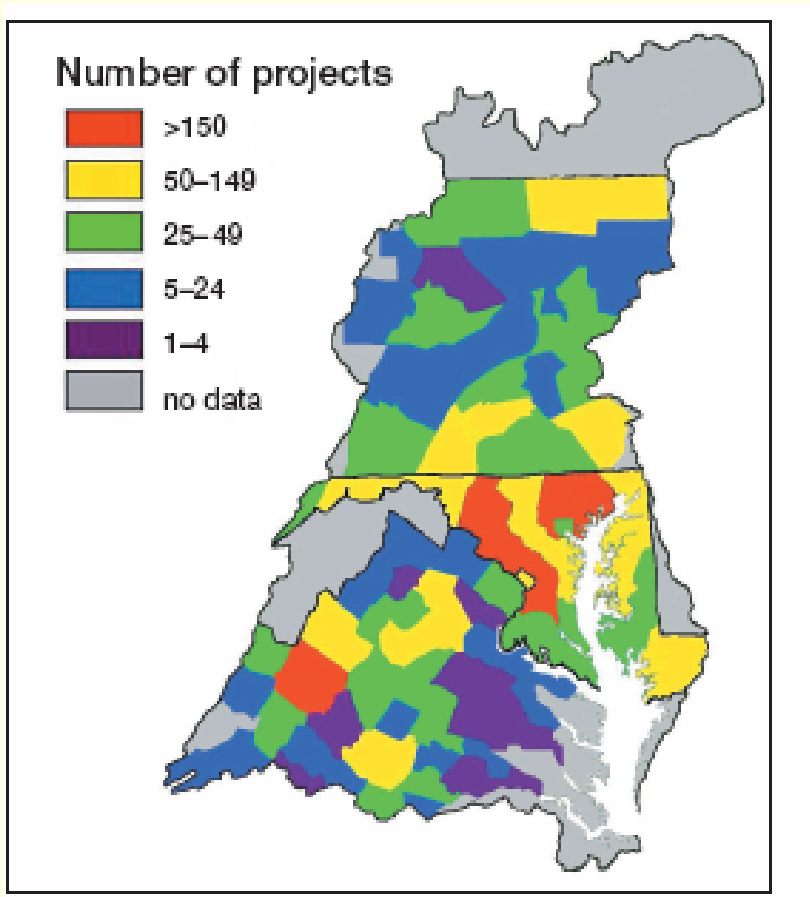
Culvert 65 ft
Riprap 40 ft
Culvert and riprap, no other restoration.

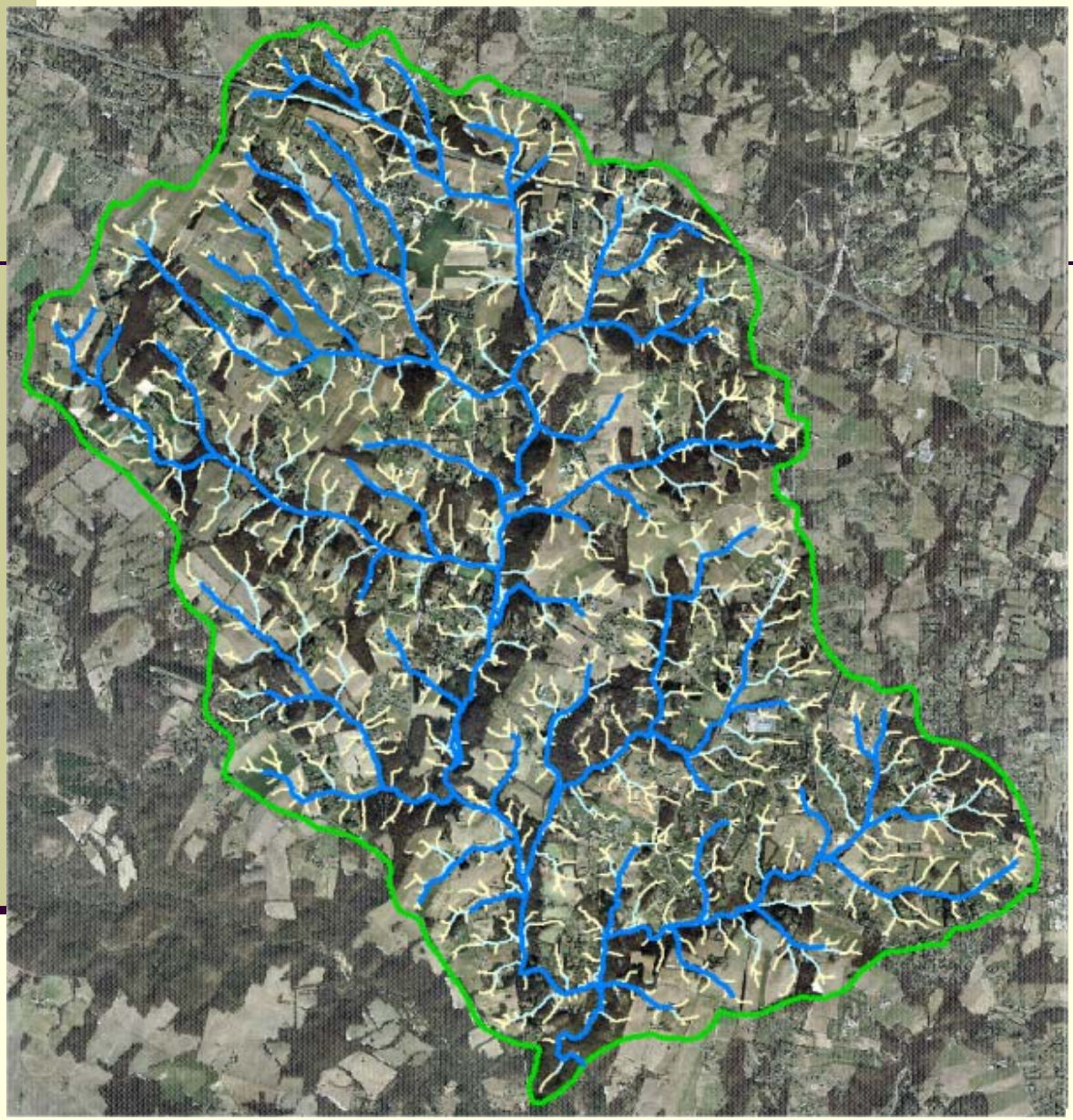
National Stream Restoration Tracking Efforts

- Maryland stream restoration information included as part of National River Restoration Science Synthesis Project (www.nrrss.umd.edu).
- Partnership of eight different universities and American Rivers collecting and evaluating stream restoration projects nationwide.

Regional Stream Restoration Efforts

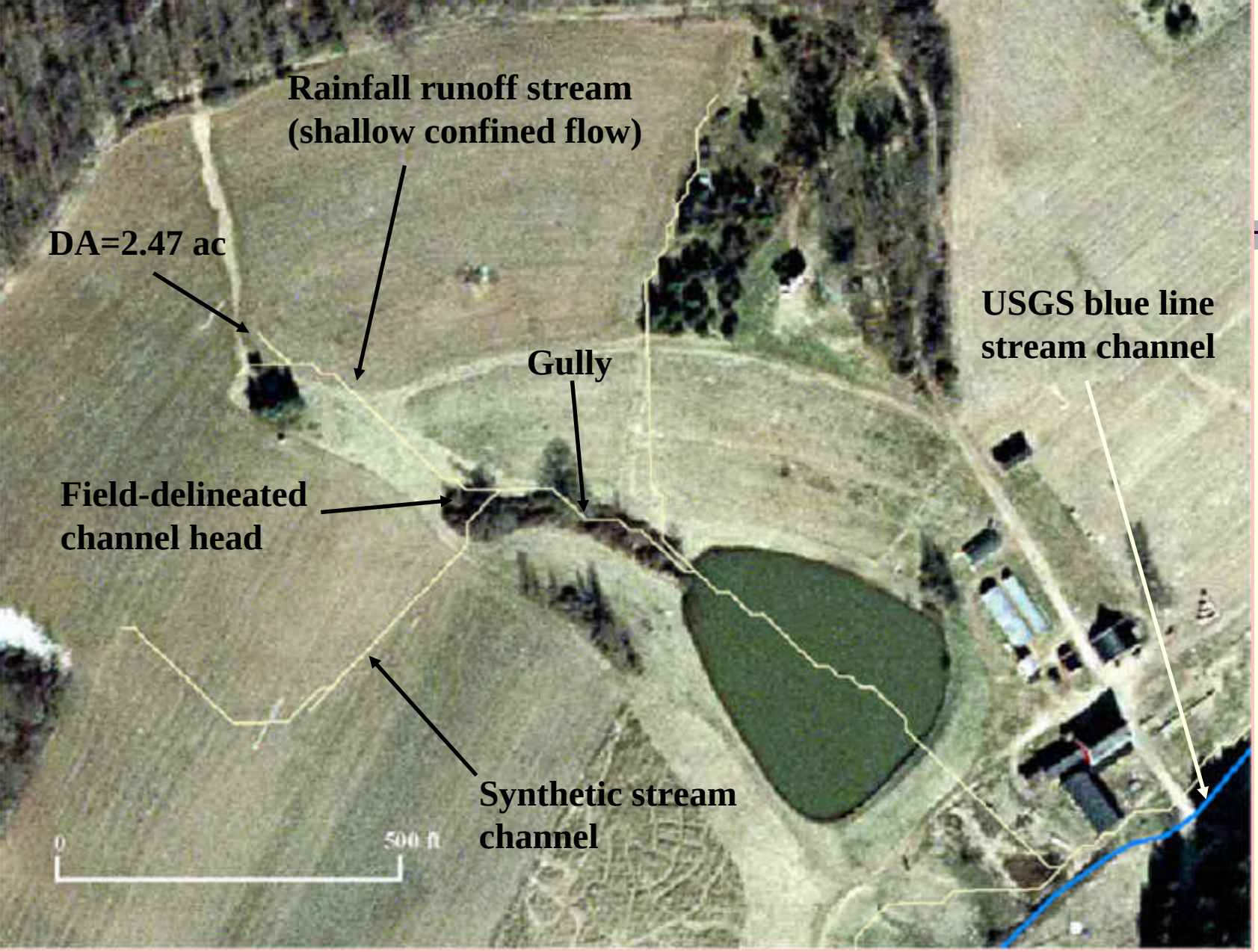
- Chesapeake Bay Region is second only to the Pacific Northwest in the number of stream restoration projects.





Example: Stream lengths estimated using different elevation data sources and drainage area criteria

Source	Stream Length
USGS 1:24k	**64 mi**
24.7 ac DA (derived from 5’ contour data, may approximate stream channel network)	**100 mi**
2.47 ac DA (derived from 5’ contour data, may approximate stream network flowing during heavy rainfall)	**242 mi**


Rainfall runoff stream
(shallow confined flow)
DA=2.47 ac
Gully
USGS blue line
stream channel
Field-delineated
channel head
Synthetic stream
channel
0
500 ft

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Future Challenges

- Tracking functions vary on state and local levels.
- Shift in tracking responsibilities between agencies.
- Need to integrate other management measure tracking.
- Coastal Bays information tracked separately.

Other MD Coastal Zone Tracking Efforts

- Maryland Clean Marina & Sewage Pumpout Programs are developing interactive web-based mapping.
- *Shoreline Onlines* web portal.
- Coastal counties have septic inventories, need to develop more GIS based tracking.

Maryland Restoration Tracking Web Site

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