## Mattawoman Creek Briefing Booklet



- I. Introduction
- II. Value of Mattawoman
- III. Vulnerabilities & threats
- IV. A 1<sup>st</sup> step of responsible stewardship: being informed.

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## **Executive Summary**

#### •Mattawoman Creek is of unusually high value.

•"<u>The</u> best, most productive tributary to the Chesapeake Bay." (MD DNR fisheries biologists, in presentation to Charles County Commissioners, June 14, 2005)

## •Mattawoman is deeply embedded in the character of Charles County.

### •Yet the Creek is highly threatened by overdevelopment:

•EPA lists its waters as impaired.

•Losing forest, the best land use for aquatic quality, at a rapid rate.

•Impervious cover, associated with degraded waters, is at the tipping point.

•Proposal for a major highway across its watershed—extension of Cross County Connector—would have severe direct & growthinducing impacts.

►Full study through a properly scoped Environmental Impact Statement for the CCC-extension is essential to determine the actual effects this highway could have before any permitting decision is made.

## I. Introduction

## **Mattawoman Watershed**



## **Thumbnail Tour**

20 miles of free-flowing stream 7 miles of tidal freshwater estuary



Approximate source



Free flowing stream



Varied habitat (beaver meadow)



Head of tide



Freshwater tidal estuary



Smallwood State Park near mouth with Potomac River

# II. Value of Mattawoman Creek to local people, the Chesapeake Bay, and beyond



#### What's good for a watershed is good for people.

Forest is the best land use for aquatic quality.<sup>b</sup> Forest also provides clean air and water, reduces global warming, creates no traffic, and is the aesthetic preferred by most people. A healthy watershed thus improves quality of life and in addition to providing quality recreational opportunities.





a. Hammil, 1984; b. Hanmer, 2007.

## Mattaowoman is renowned for fish habitat

#### Largemouth Bass

Bass are at the top of the food chain and benefit from *Mattawoman having* among the healthiest foodwebs in the Chesapeake Bay system.<sup>a</sup>

# / Migratory Fish and their fry

Mattawoman is the Chesapeake Bay's most productive nursery for migratory (or anadromous) fish,<sup>a, b</sup> which live in the ocean but spawn in freshwater. Here anglers fish for River Herring as they swim upstream to spawn

# One of the healthiest aquatic food-webs Baywide<sup>a</sup>

Regular fish assessments by Maryland's Department of Natural Resources include seine net (shown) and trawl samples.

a. Carmichael (1992); b. Uphoff (2005).







## Mattawoman's location lends unique qualities no longer attainable elsewhere

Mattawoman is the Potomac's last remaining large *tidal-freshwater* estuary beyond the urban gradient.



a. Lippson (1992); b. Uphoff (2005).

## Largemouth Bass

#### Maryland Dept. Natural Resources finds:



- •Twice the density of Largemouth Bass than the Potomac River.<sup>a</sup>
- •Three to ten times more than Piscataway Creek (depending on year).<sup>b</sup>

#### Ken Penrod, author and professional fishing guide:

"Mattawoman Creek is the most productive tributary of all the fine Potomac River branches."<sup>c</sup>





Bass fishing in tidal Mattawoman

Largemouth Bass in Maryland tidal freshwaters are specifically assessed by DNR.

## The Potomac's recreational bass fishery generates many tens of millions in commerce annually in Maryland alone.<sup>d</sup>





A weigh-in at one of over a hundred tournaments launched annually from Mattawoman's Smallwood State Park. Tournaments attract an international clientele of anglers.

## **Migratory Fish**

## Chesapeake Bay's most productive migratory-fish nursery

MD Department of Natural Resources, Fisheries Service finds that Mattawoman is *40 times* more productive of migratory fish than other Chesapeake Bay Tributary's studied.<sup>a</sup>

**River Herring** migrate from the Atlantic to spawn in free-flowing Mattawoman (picture at right) and some of its tributaries from March through May.<sup>b</sup>

Other migratory fish include: American Shad, Hickory Shad, White Perch, Yellow Perch, and Rockfish.<sup>a</sup>

American Shad caught in the Potomac River near Marshall Hall (picture at right) for propagation by the Interstate Commission on the Potomac River Basin. A Maryland moratorium on Shad fishing has been in place since 1980. Shad numbers have recently turned around in the Potomac.

However, Shad number just a few percent of historical levels and *continue to decline on the eastern seaboard as a whole.* 

Mattawoman is an unusually productive nursery.







Whether using dipnet or rod & reel, catching herring is a tradition among many. Some salt or freeze their catch for later consumption.



a. Carmichael (1992). b. O'Dell (1975); Long (1999). c. Uphoff (2005).

## **DNR Fisheries Service concludes:**



"Mattawoman represents as near to ideal conditions as can be found in the northern Chesapeake Bay, perhaps unattainable in the other systems, and should be protected from overdevelopment."<sup>b</sup>

a. Uphoff (2005). b. Carmichael (1992).

## Mattawoman is noted for high biodiversity





Exceptional tidal freshwater marshes.

Fish support unusually large numbers of egrets.







Wild Rice



One of only three MD sites with wild populations of the American Lotus.





Botanically rich.



Among the richest concentrations of reptiles & amphibians in MD.

## **III. Vulnerabilities**



Of Maryland's 138 comparably sized watersheds, only 12, including Mattawoman, were found to be both of *very high quality* (Selected Cat. 3) and at *very high risk* (Priority Cat. 1).

"These watersheds may deserve special attention in order to reverse or slow degradation before the pristine resources are lost."

In the case of Mattawoman, increased urbanization and loss of forest are the primary risk factors.





•Army Corps Mattawoman Watershed Management Plan <sup>(b)</sup> "The ecological integrity of the Mattawoman is at risk from current and future development pressures within the watershed."



•EPA lists Mattawoman as impaired under Section 303(d) of the Clean Water Act <sup>(c)</sup>

Since	<ul> <li>Excessive nutrients</li> </ul>
1996	-clouds water with algae growth
	-lowers oxygen via algal decomposition

•<u>High suspended sediment</u> -suffocates living resources -blocks visibility of predators

Since 2002 •Impacted living resources

**Example vulnerability**: Yellow Perch, a popular fish with anglers. Unlike Mattawoman, the Severn no longer supports a resident population, a consequence of watershed urbanization.

Algae spurred by excess nutrients cloud water, blocking sunlight needed by <u>submerged aquatic</u> <u>vegetation</u>, an important element of quality fish habitat. Decaying algae depletes oxygen.





(c) EPA (2004).

(a) Clean Water Action Plan (1998). (b) Army Corps (2003).

## Vulnerability to urbanization stems from Charles County's inappropriately large Development District

•35% larger than Washington DC—promotes sprawl over an exceptionally large area.

•Covers much of the Mattawoman watershed.

•Maryland Department of Natural Resources' comments on 1996 comprehensive plan:

"Protection of this watershed appears to be in direct conflict with the location and size of the development district."



# Urbanized landscapes are characterized by impervious cover, which correlates with aquatic degradation

Rooftops, sidewalks, roads, and parking lots are impervious to water infiltration.



As measured by a loss of sensitive aquatic species, a high-quality watershed cannot survive increasing impervious cover. The combined biotic index (CBI) is based on the integrity of both fish and benthic macroinvertabrate (e.g. insect larvae) communities.



#### In Mattawoman, problems are magnified because it tends to run dry

•Porous coastal plain soils are unforgiving of low groundwater

•Impervious cover exacerbates stress from natural tendency for low flow





<sup>(</sup>a). Boward (1999).

# Mattawoman's fate is tied to the amount and distribution of forest *vs* impervious cover



Mattawoman watershed (light green outline) has benefited from significant forest cover. However, forest-cover estimates and projections show an accelerating decline, *while impervious cover is projected to reach crisis proportions*.







a. State Office of Planning; b. Chesapeake Bay Program, Know your watershed website.

c. Army Corps of Engineers Mattawoman Watershed Management Plan (2003); d. Center for Watershed Protection.

## Forest Value vs Impervious Cover

"Forests are the best land cover for improving water quality in the Chesapeake Bay."(a)

The Chesapeake Bay's web of life is adapted to the ecological services provided by a forested landscape—beginning with the provision of important foodstuffs to the smallest streams.

Impervious cover and associated urbanization alters hydrology & water chemistry to the detriment of living resources (loss of species, smaller populations).





#### Forest:

- •Moderates water quantity reaching streams.
- •Slows storm flow—less erosion.
- •Permits infiltration—provides baseflow to stream.
- •Growing forests absorb the greenhouse gas  $CO_2$
- •Provides proper nutrient mix.
- •Cools streams.
- •Improves in-stream habitat.

#### **Urbanization:**

- •funnels water in erosive torrents. •prevents infiltration, diminishes water table—streams go dry
- •increases flooding.
- •alters water chemistry.
- reduces oxygen

•delivers excess nutrients leading to algal blooms
•excess sedimentation-- fish can't see; plants can't grow
•increased water temperature
•heavy metals...

a. Hanmer (2007).

## Current Best Management Practices help, BUT

## fall short of protecting living resources

#### Science-based Reality-checks:





Chesapeake Bay Program report

EPA Inspector General's report

"The pollution increases associated with land development—such as converting farms and forests to urban and suburban developments—*have surpassed the gains achieved from improved landscape design and stormwater management practices.* Pollution from urban and suburban lands *is now the only pollution sector in the Bay watershed that is still growing.*" <sup>(a)</sup>

The brown bars on this graph<sup>(a)</sup> show that growing pollution from urbanization is defeating Bay restoration goals so that, as the report concludes, "progress is negative."



## **K** Army Corps Mattawoman Watershed Management Plan<sup>(b)</sup>

"Loads are expected to increase by over 50% in the next 20 years. Even with aggressive regulatory enforcement, there is still a significant increase in the pollutants."

"During high flow events, there will be large sediment loadings associated with runoff, erosion and severe channel change. The severe alterations in hydrology will dramatically increase the rate of sediment input during high flow events. Much of the sediment will be associated with bank erosion, down-cutting, and other examples of stream instability."

<sup>(</sup>a) Chesapeake Bay Program (2007); (b) Army Corps (2003).

## New highways are detrimental to watershed health

Mattawoman is threatened by two major highway proposals that would spur very significant growth:



Connector extension (CCC-ex)
 Western Waldorf Bypass Cross County

•The Western Waldorf Bypass would fall within the mapped study area. It is endorsed by Charles Co. officials, but opposed by Prince Georges Co. and two Citizens Advisory Committees appointed by each county. Previously, the EPA and Army Corps opposed it on environmental grounds. The Eastern Waldorf Bypass has never been seriously considered. Note the viable Alternative 3, a full upgrade of Rte. 301 which passes over cross roads and impacts businesses minimally. This alternative also has much less impact on Mattawoman.

 The CCC-ex would be funded only by Charles Co. Unlike the Bypass, authorities are trying to skirt an Environmental Impact Statement, even though an EIS is common for projects of this magnitude and impacts to Mattawoman from induced growth would be severe. Again, a viable existing alternative is apparent via newly widened Middletown Road and Rte. 228.

#### A highway's direct impacts

Wetland loss.

Nitrogen generation & deposition

- •Vehicle pollutants: oil, antifreeze, tire & brake-lining debris •Floodplain loss.
  - •Chemicals—deicing, herbicides Forest loss & fragmentation
- •Direct impacts to streams (e.g. bridges, runnoff)
- •Wildlife: road kill, impeded migration, habitat loss.
- Runoff—thermal pollution
  - Increases vehicle miles traveled and global warming

#### Direct impacts are magnified many fold by highway-induced growth

Example: Intercounty Connector (ICC) (a)

45 acres direct wetland loss 200 additional acres spurred growth 795 acres direct forest loss

3500 additional acres

Plus

Increased impervious surface from the growth—tipping Mattawoman over the edge

(a) Chesapeake Bay Foundation, 2006.

## The proposed Cross County Connector extension LEGEND CCC Phases 1-4 (Complete) CCC Phases 5-7 (Proposed) Existing Roads



The top two maps make plain that the CCC-ex, if built, would promote growth in forested and less populated areas.

The top map shows the CCC and proposed CCCex at the boundary of a dense road network to the north. The CCC-ex would promote enlarging the network to the south.

The 2<sup>nd</sup> map shows forested areas around the CCC-ex. Note the gray urbanization sprawling along recently widened Rte. 228, which would similarly expand from the CCC-ex.

Bottom map shows proposed route. The Kingsview and Highgrove subdivisions were permitted in the late 90's only after Right of Way was provided by the developer for a "Western Connector" (now the CCC-ex). Neighborhoods would experience unhealthy particulate air



## **Potential Health Effects: particulates**

#### Particulate matter

"residential distance [within 500 m] from a freeway is associated with significant deficits in 8-year respiratory growth, which result in important deficits in lung function at age 18 years." <sup>(a)</sup>



The CCC-ex would split communities and runs in such close proximity to homes that some would lose yard space. Note that most homes are within the 500 m distance identified with deficient respiratory development in children. <sup>(a)</sup>





Vehicle soot aggravates asthma.<sup>(b)</sup>

Ozone

**Ozone** Ozone is generated by photochemical reaction with *vehicle exhaust*. Charles Co. is in a non-compliance area.

Ozone:

- •Is a respiratory irritant.
- Aggravates asthma.
- •Is a component of smog.

An EIS for the CCC-ex should examine these potential health issues for people near the proposed right of way.

Washington Post Metro May 7, 2007

(a) Gauderman (2007) (b) Thurston (2006).

#### New highways spur additional growth

#### Excerpts from an EPA report: †

'New highways open up land for development by increasing the accessibility of locations that once were remote or difficult to reach.' \*

...transportation infrastructure enables more land to be available for development. The availability of more land allows people to use more transportation and land resources without an increase in transport cost.

...'where transport prices do not reflect full social and environmental costs, the land market can generate inefficient land-use patterns.' \*\*

Satellite map showing sprawl following Rte. 228.

Wooded areas of the water shed that would be opened by the CCC-ex.

In addition, the CCC-ex would enable massive new growth in Bryans Road, presently a one stoplight town, at densities proposed to exceed those in Waldorf.

The CCC-ex would also clearly apply pressure to open the deferred development district (grey area in map at right). In order to save Mattawoman, we need to reconsider the size of a development district larger than the Washington DC.



CCC-ex alternative using the present 4-lane highways, Middletown Road and Rte. 228.



<sup>†</sup> http://www.epa.gov/livablecommunities/pdf/built\_chapter2.pdf
\*World Bank. Sustainable Transport: Priorities for Policy Reform. Washington, D.C.: 1996, p. 59.
\*\* Ibid, p. 61 21

## New highways lead to "induced traffic" that can *increase* congestion

•Induced traffic saturates new capacity, often within 5 yrs.

•Spurred growth causes even more traffic, increasing use of connecting roads.

#### •EPA's summary of a seminal transportation study: (a)



#### **Example: The Inter-county Connector**

Official studies have found that Maryland's proposed ICC would *increase* driving on local roads and the beltway. <sup>(b)</sup>

•Implies traffic on Billingsley would likely increase!

•It's safety issues would have to be addressed *anyway*, and in fact should be addressed *now*.

It is reasonable to include a full traffic study in an EIS for the CCC extension, including effects on local roads and Route 210 through Prince Georges County.



<sup>(</sup>a) EPA, 2001; (b) Chesapeake Bay Foundation, 2006.

## Mattawoman exemplifies how watershed loss to sprawl leads to increased emission of global warming gases

Mattawoman Creek exemplifies the threats urbanization poses to our living resources. Despite its recognized worth, a severe degradation is projected because continuing sprawl development may cover over 20% of the watershed with impervious cover. Driving this growth are proposed new highways, the Cross County Connector extension (CCC-ex) and the Western Waldorf Bypass, that would open vast tracts to new growth.

Mattawoman's value is tied to its forests, the best land use for aquatic living resources. Protecting forest against sprawl not only protects aquatic living resources, but also significantly reduces production of carbon dioxide ( $CO_2$ ), the most important human-generated greenhouse gas:

•Wood in mid-Atlantic forests secure  $\sim$ 300 tons of CO<sub>2</sub> equivalent per acre. Much of this returned to the atmosphere when forests are cleared.

•Sub-climax forests such as Maryland's convert  $\sim$ 3 tons of CO<sub>2</sub> per acre per year to wood. This "sequestration" is lost when forest is cleared.

•Today's sprawl is characterized by houses much larger than in the past, which generate disproportionately more  $CO_2$ .

•Sprawl engenders long commutes. An average commute from the CCC-ex to DC would produce ~6 tons of  $CO_2$  per year.

In the 90's, population in the Bay watershed increased 5% compared to 41% for impervious surface, a mismatch defining sprawl. By 2030, if the population projected to flood Charles County's development district (larger than the District of Columbia) instead lived more compactly and used mass transit, about ~0.4 million tons of excess  $CO_2$  per year could be averted, or 13% of the *total* now emitted.





Heating, air conditioning, and lighting the large houses of modern sprawl generate more  $CO_2$  than smaller houses. House size has increased more than 50% since the 1970's. Electricity accounts for about 38% of Maryland's  $CO_2$  emissions. <sup>(a)</sup>



Transportation accounts for ~32% of  $CO_2$ emissions in MD.<sup>(a)</sup> New exurban highways promote accelerated increases in  $CO_2$  emission.

<sup>(</sup>a) Maryland Climate Action Plan (2007).

## IV. Informed stewardship: Why an EIS is needed for the proposed CCC extension

## •Major wetland impacts should trigger an EIS.

•Over 7.5 acres, a significant fraction of the annual loss in the *entire* state.

•Does not include isolated wetlands that would be filled due to a legal technicality. Isolated wetlands also protect Mattawoman and should be of concern to County stewardship.

### Induced growth—secondary and cumulative impacts

•Probable upzoning of 15,000-acre deferred Development District.

•Town of Bryans Road: densities higher than in Waldorf

•Known to multiply wetland and forest losses many fold. How much in this case?

#### Induced traffic

•No comprehensive traffic study. Safety issues on local roads.

### Impervious surface

•How much would be induced?

#### •Health and safety issues

•Especially in Kingsview, Highgrove, Foxhall Est., Brookwood Estates.

#### Increased emission of global warming gases:

- •increased Vehicle Miles Driven
- loss of forest
- •energy usage of sprawl development

### •Air and water pollution

# •Mattawoman is too good to lose because of poorly informed decisions.

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