# Managing Human Land Use for Sustainability in the Potomac Basin



Autumn in the Shenandoah Watershed. Photo source J. Palmer, ICPRB.

Comprehensive Plan Advisory Committee November 8, 2017

#### Outline

• Context

- Land Use
- Impervious Cover

 Impacts of Human Land Use on Water Quantity, Water Quality, and Ecological Health

• Role of the Plan

• Example Recommendations

#### Context

Land use is primarily managed at the local level in the Potomac basin. The focus of this section of the plan is to promote local decision-making based on sound science, specifically on issues of interstate and/or basin-wide significance.

### 2011 Land Use

Land Cover	Change 2006 to 2011 (sqmi)
Developed	38
Crops	-15
Forest	-57
Wetlands	0
Other	34

0



Data source: 2011 NLCD.

## Impervious Cover



#### Impervious Cover > 2%



Data source: 2011 NLCD impervious cover.

## Managing Impervious Cover



Susceptibility to alteration in stream flashiness from impervious cover -DRAFT. ICPRB phase 2 impervious cover study, funded by US EPA Section 106 grant.

#### Impacts of Human Land Uses



## Impacts of Human Land Uses: Water Quantity



Potomac River at Great Falls,147,000 cfs March 12, 2011 Photo source J. Palmer, ICPRB.



- Highly Agricultural (>50%, with <0.7% impervious, no I, W, D)</li>
- Large Withdrawals (>65%, in >75% Forest)
- ▲ Large Discharges (>20%, in 29%-35% Forest)
- Large Impoundments (>30%, in >75% Forest)

Middle Potomac River Watershed Assessment (MPRWA). USACE, TNC, ICPRB 2014.

## Impacts of Human Land Uses: Water Quality



Road salts. Photo source EPA.



Effect of forest cover on drinking water quality and associated treatment cost.



Pesticides and herbicides. Photo source Link TV.



Erosion on Cabin John mainstem. Photo source http://www.cabinjohn.org.

## Impacts of Human Land Uses: Ecological Health

Connecting land and water uses to biological community status (using High Pulse Count as an example, MPRWA - USACE, TNC, ICPRB 2014)

- 1. Increasing % impervious surface area strongly alters (increases) High Pulse Count
- 2. As High Pulse Count increases, the average habitat quality score declines
- 3. As habitat quality declines, stream community status decreases



## Role of Plan in Addressing Land Use Concerns

#### • LU Goal:

• Human land use in the basin supports sustainable water resource management.

#### • LU Challenges:

- Managing stormwater and impervious surfaces to protect water quality, support natural flows, and control flood risks
- Promoting the planning, creation, and protection of riparian buffers and other interconnected green infrastructure elements throughout the basin
- Preserving agricultural lands
- Protecting groundwater recharge areas
- Discouraging development on steep slopes
- Promoting best management practices in forestry and agriculture
- Focusing development in areas with existing transportation, water, and wastewater infrastructure and services
- Managing for land subsidence and sea-level rise

#### • Role of the Plan:

 Interstate planning, research, education, coordination, and information sharing to promote local decision-making based on sound science.

#### **Example Recommendations**

#### <u>Research</u>

- 1. Study correlation of drinking water treatment costs and water quality, as well as correlation to conserved lands. (E.g. WRF Forestry Project)
- 2. Identify and/or develop creative use of zoning regulation, water/sewer service provisions, and insurance rules to achieve goals

#### **Communication**

- 1. Assist with BMPs prioritization and promotion of most effective; improve implementation through enhanced communication and coordination
- 2. Encourage multi-jurisdictional synergy/cooperation

#### **Education**

- 1. Guidance on getting "bang for your buck" out of preservation/conservation areas; improve ecosystem services in protected areas
- 2. Onsite infiltration and reuse of stormwater
- 3. Improved protection of riparian buffers

List compiled from email distribution list responses and GMU student feedback.