

Linkages Between Agricultural, Urban and Environmental Water Concerns

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Is Water An Economic Commodity(1)?

- **Water is Necessary for Life**
- **Water is an Input to Production**
 - **Residential**
 - **Industrial**
 - **Commercial**
 - **Agricultural**
- **Water Users Respond to Price**
- **Water Users Respond to Appeals for Conservation**



Is Water An Economic Commodity(2)?

- **Water is Publicly Owned**
- **Water Produces Public Goods & Amenities**
 - **Environmental Quality**
 - **Fisheries**
 - **Recreation**
 - **Navigation**



Is Water An Economic Commodity(3)?

- **Consumptive Use versus Multiple Uses**
 - **Urban Uses and Waste Water Returns**
 - **Industrial Cooling**
 - **Agricultural**
 - **Irrigation Return Flows**
 - **Animal Facility Wash**
 - **Aquaculture**



Environmental Water Demand

Fisheries, Recreation, Water Quality, ...

- **In-Stream Flow Protection for Fisheries & Recreation**
 - **Minimum Flows for Drought Years**
- **In-Stream Flows Effect Chesapeake Bay Water Quality**
 - **Flows Part of Load Calculations**
 - **Flows Impact Salinity Concentrations**



Environmental Water Quality

**Runoff & Returns Impacts Stream Water Quality and
Chesapeake Bay Water Quality**

**Chesapeake Bay Water Quality Protection Could Alter
Water Demand**

- Restrict Nutrient Loads from Point Sources



Environmental Water Quality

Chesapeake Bay Water Quality Protection Could Alter Water Demand

- **Restrict Nutrient Loads from Nonpoint Sources**

 - **Agricultural Best Management Practices**

 - Cover Crops, Riparian Forest Buffers, ...

 - **Weather Uncertainty and Agricultural
Production**

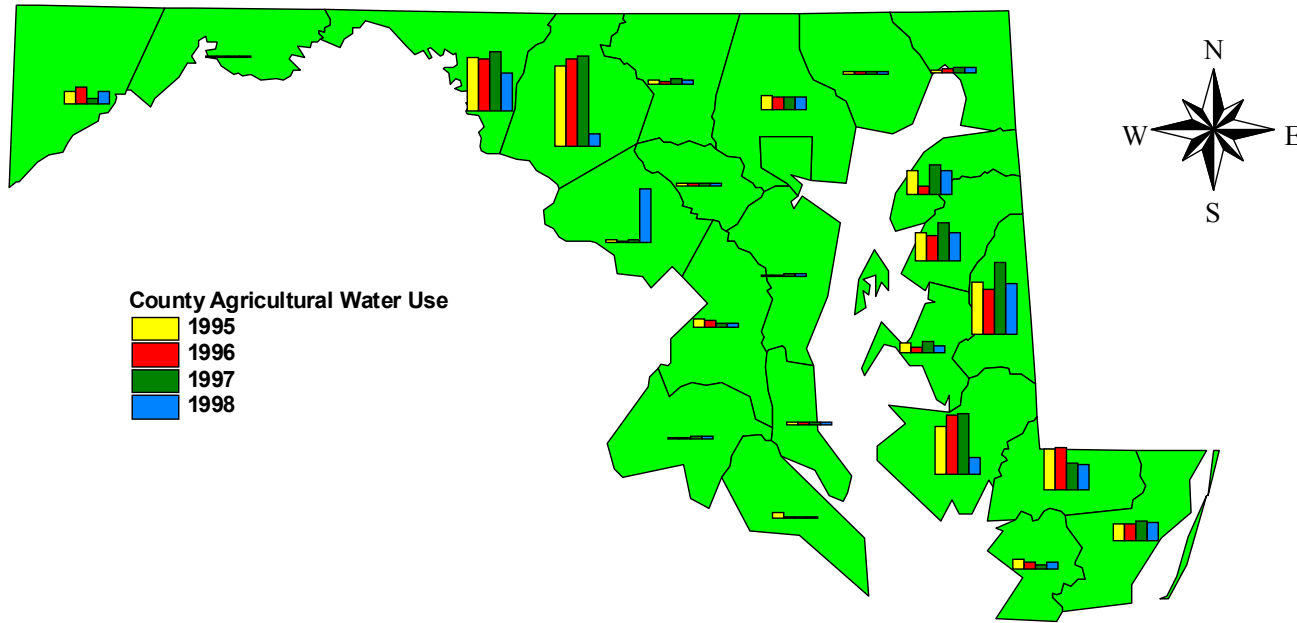
 - **Expected Crop Nutrient Needs**

versus

 - **Realized Nutrient Uptake**

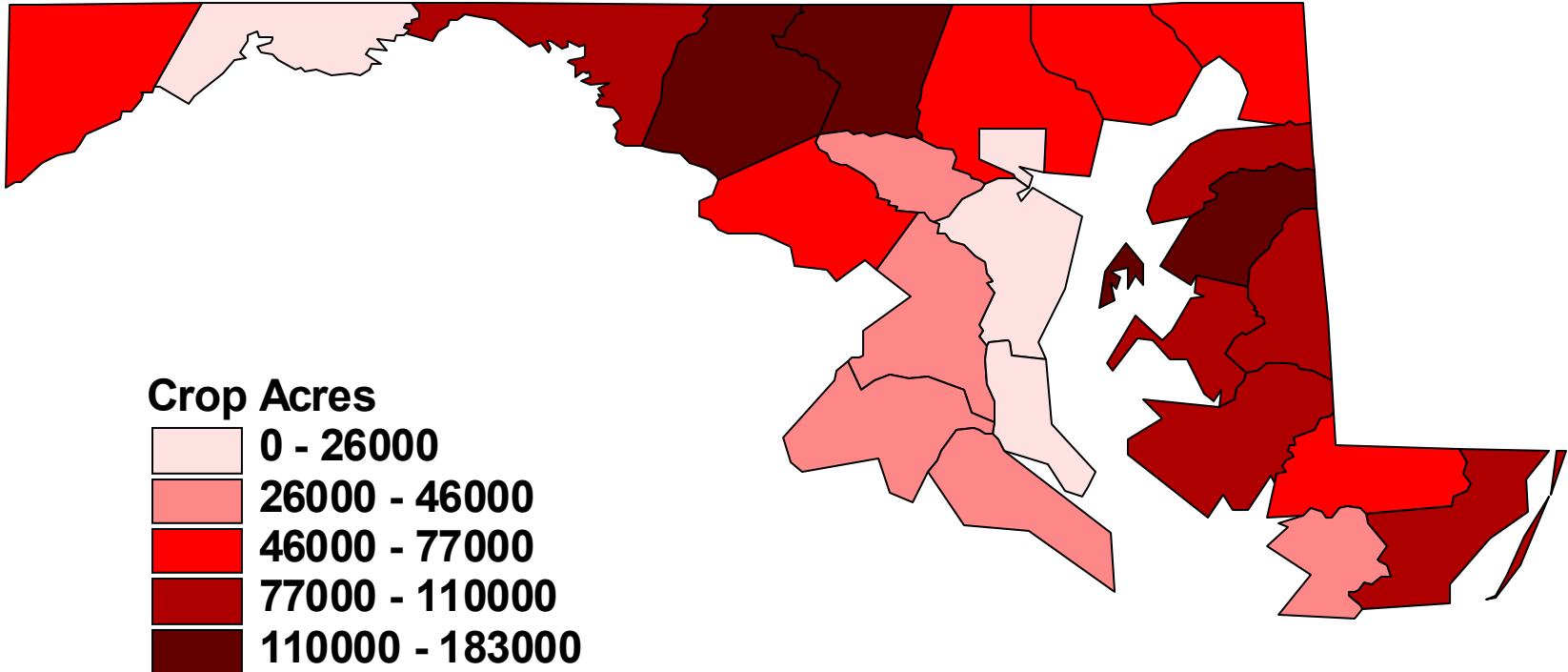


Agricultural Water Use: 1995 - 1998



0 70 Miles

Agricultural Acres



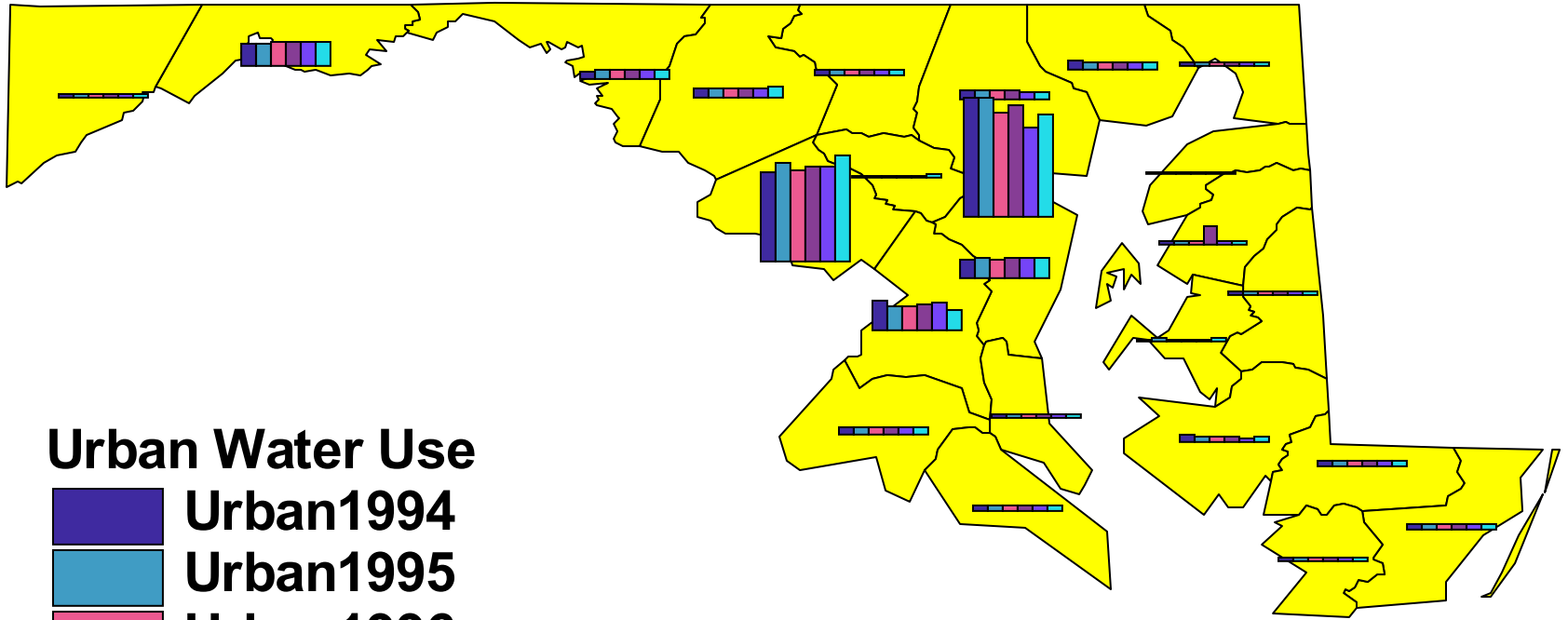
Agricultural Water Demand

Future Demand for Agricultural Water Use Uncertain

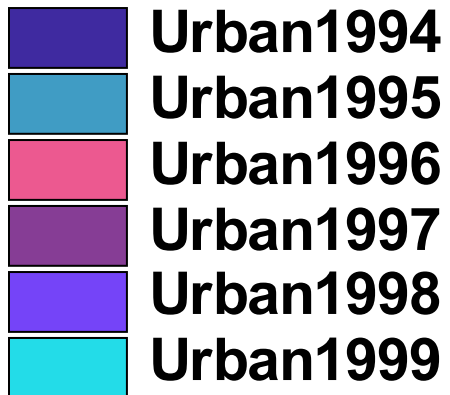
- Acreage Declining Throughout State**
- Changes In Crop Choice As Area Urbanizes Could Increase Acres Under Irrigation**
- Profitability of Irrigation Dependent Upon Weather**
 - Reduces Risk and Can Increase Yield**
 - Efficient Nutrient Use May Limit Future Runoff**
 - Annual Precipitation versus Seasonal Precipitation**



Urban Water Use



Urban Water Use



Urban Water Demand

Future Demand Dependent Upon Economic Activity and Population

Industrial Demand Based Upon Activity and Industries

Residential Demand

Population Growth

Housing Types

Water Use Efficiency



Water Equilibrium

Expect Stability in Environmental Needs

Expect Growth in Urban Demand

Uncertainty in Agricultural Demand

Should Expect Localized Shortages

Especially in Drought Years

Especially where Source Types are Limited



Policy Options

Address Environmental Needs

Set and Maintain Environmental Flows

Establish Water Quality Goals/Restrictions



Policy Options

Address Water Quality Goals

Allow Users Flexibility to Meet Water Quality Goals

Trading or Markets Between Sources to Meet or Exceed Goals

Urban – Urban Transactions

- Allow More Efficient Plants to Go Beyond Needs

Agricultural – Agricultural Transactions

- Allow Entities to Work Together to Improve Water Quality (Crop and Animal Based Agriculture)



Policy Options

Address Water Quality Goals

Allow Users Flexibility to Meet Water Quality Goals

Trading or Markets Between Sources to Meet or Exceed Goals

Urban – Agricultural Transactions

- **Implement Additional BMPs**
- **Increase Irrigation in Drought Years to Reduce Variability**

Environment and Recreation

- **Allow Organizations to Purchase Improvements That Exceed Government Restrictions**



Policy Options

Address Water Demand

Allow Providers and Users Flexibility to Meet Water Demand

- Ensure Provider Pricing Promotes Efficient Water Use

Trading or Markets Between Sources to Meet Demand

Agricultural – Urban Transactions

- Permanent Transactions
- Conditional Transactions (Drought Year Only)

Agricultural – Agricultural Transactions

- Allows Agriculture to Adjust to Market Changes
Vegetables, Horticulture

Environment and Recreation

- Allow Organizations to Purchase In-Stream Water
That Exceeds Government Restrictions



Policy Conflicts

Conflict Between Water Quality and Water Quantity

Direct Conflicts

Flow Restrictions

Indirect Conflicts

Agricultural BMPs that Improve Water Quality but Reduce In-Stream Water Flows

