Reported Water Use in the Potomac River Basin

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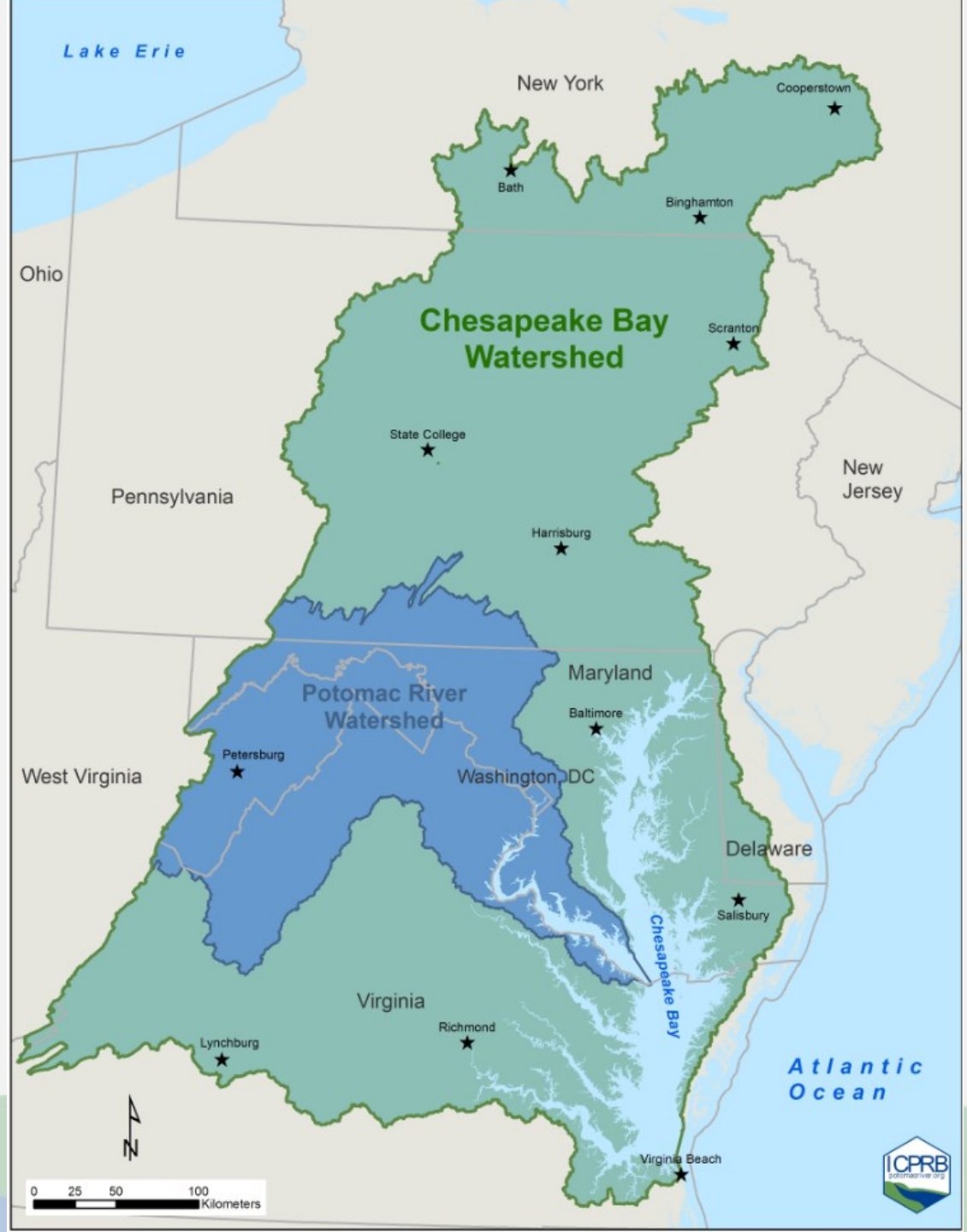
Interstate Commission on the Potomac River Basin

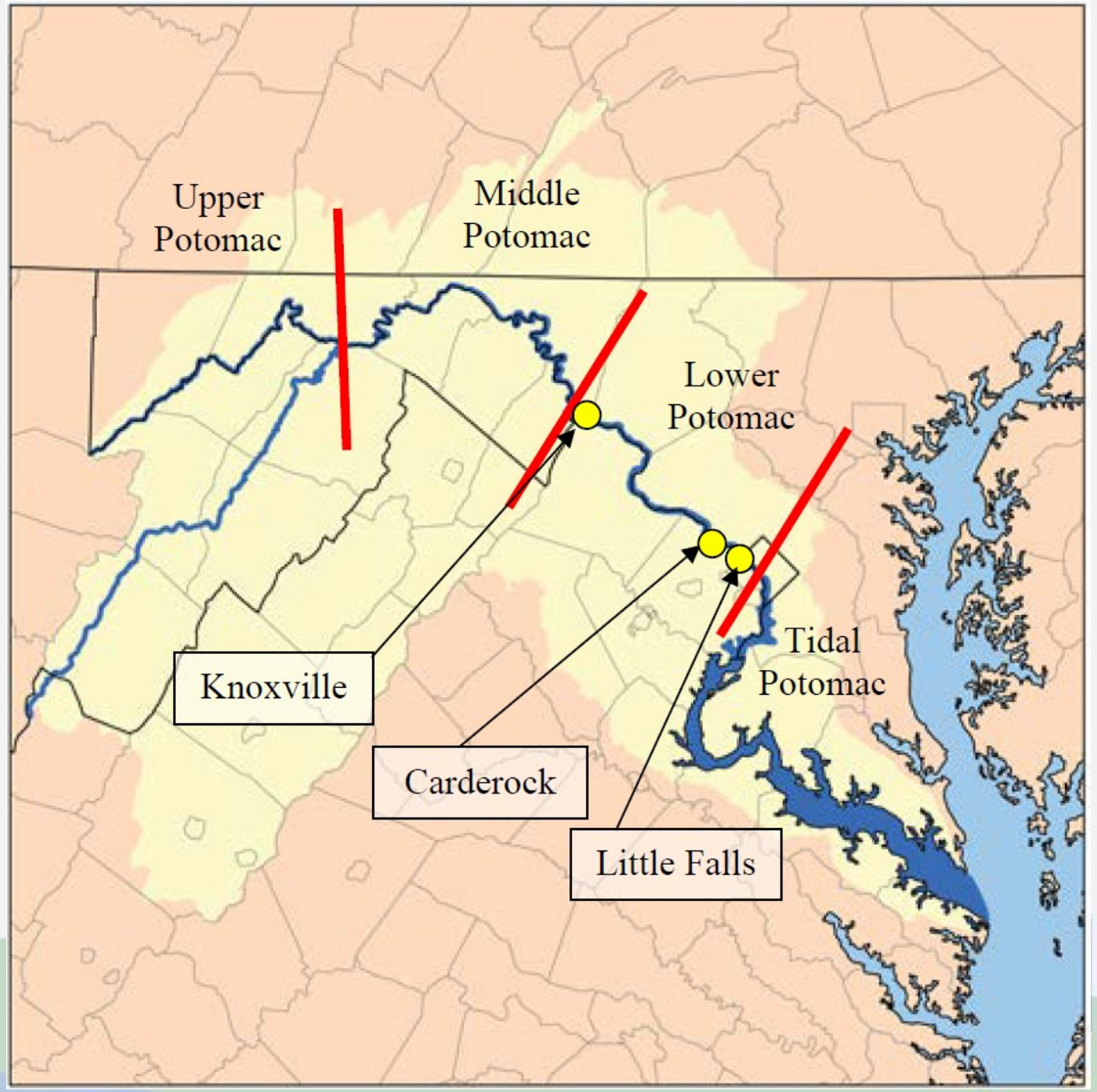
Rockville, MD

The Potomac River Basin

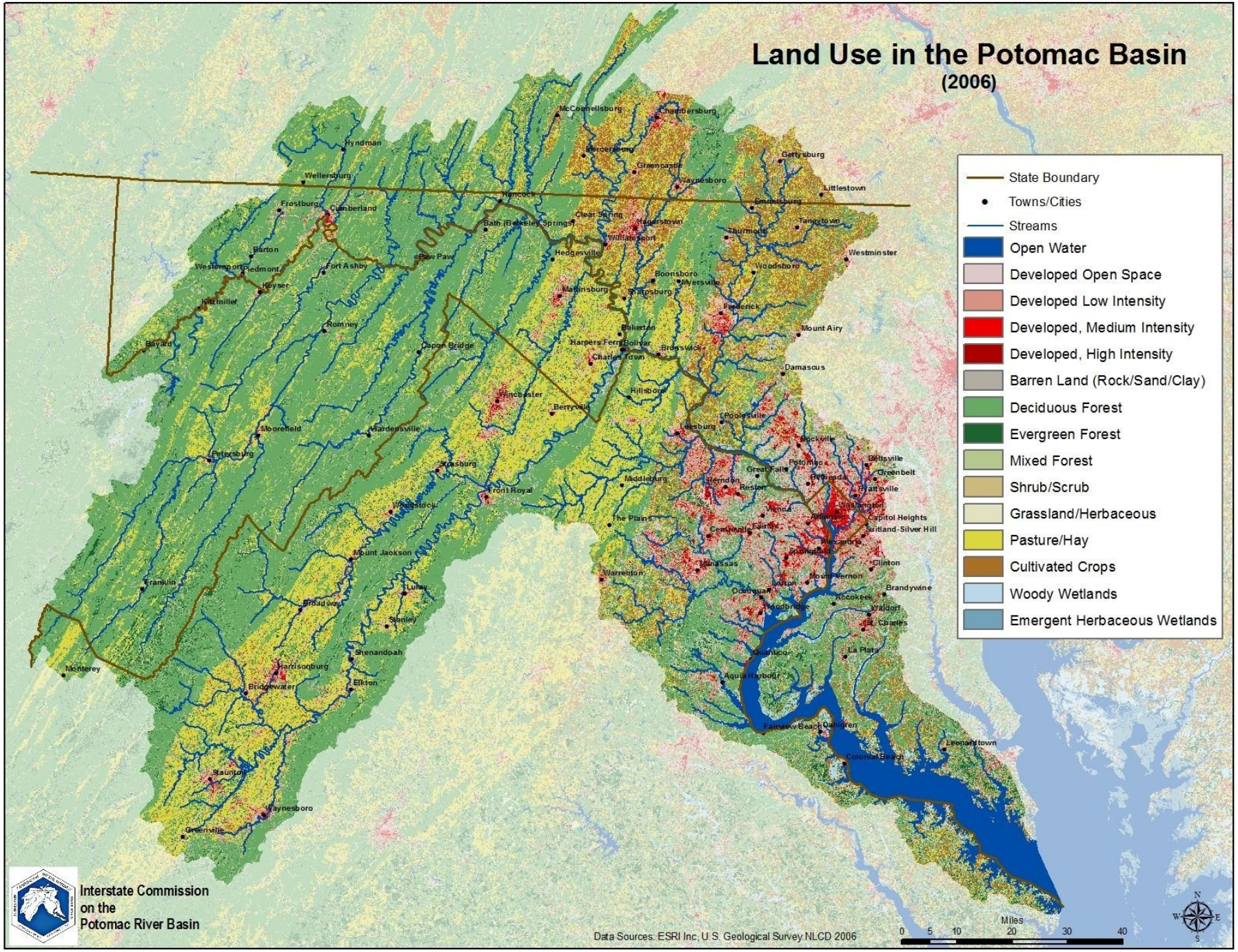


The Potomac River Basin Cont.

- Basin in comprised of a non-tidal and tidal portion
  - Non-tidal: ~ 29,950 km^2
  - Tidal: ~ 8,045 km^2

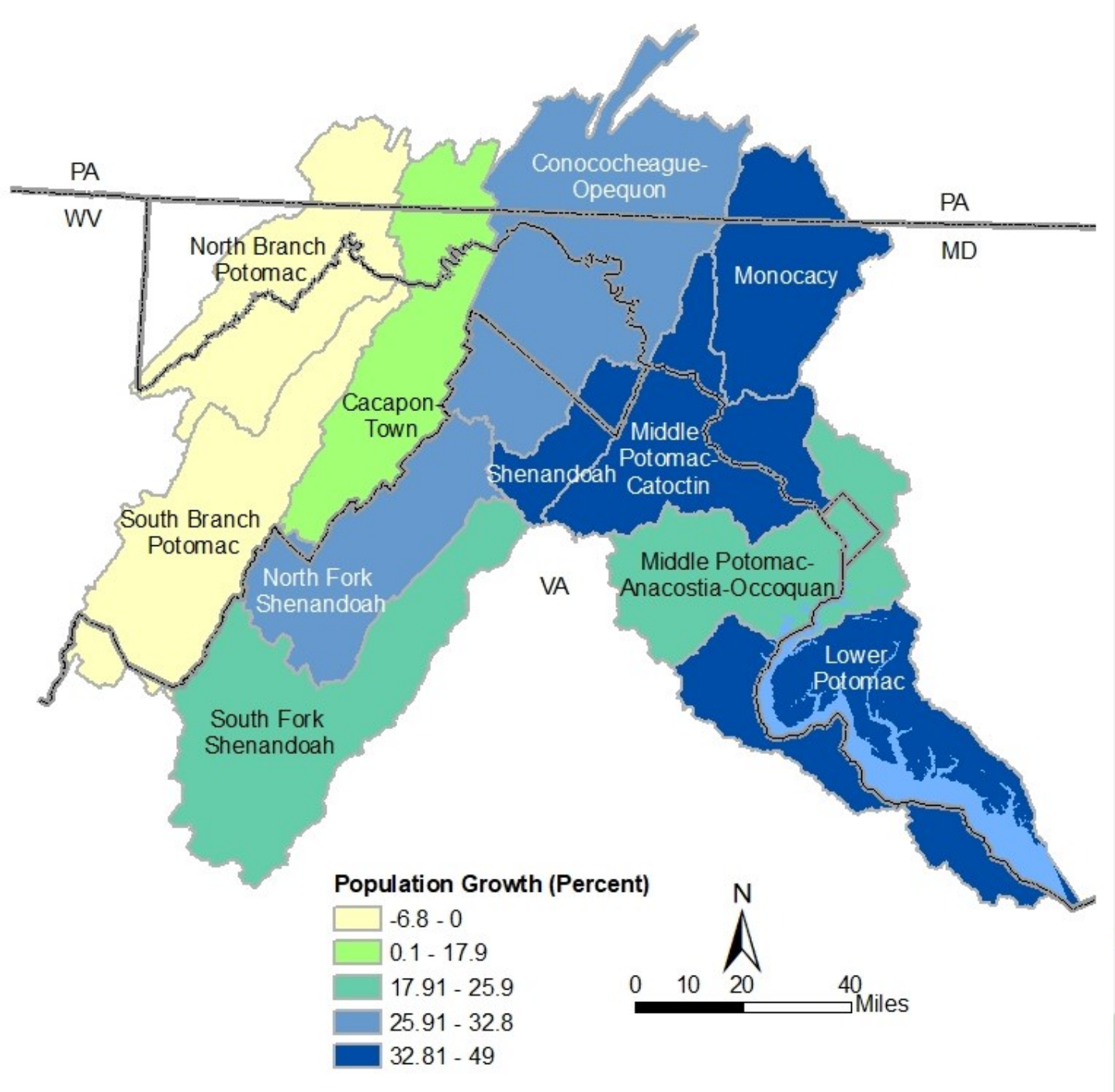


Land Use


Land Use in the Potomac Basin
(2006)
State Boundary
Towns/Cities
Streams
Open Water
Developed Open Space
Developed Low Intensity
Developed, Medium Intensity
Developed, High Intensity
Barren Land (Rock/Sand/Clay)
Deciduous Forest
Evergreen Forest
Mixed Forest
Shrub/Scrub
Grassland/Herbaceous
Pasture/Hay
Cultivated Crops
Woody Wetlands
Emergent Herbaceous Wetlands
Interstate Commission on the Potomac River Basin
Data Sources: ESRI Inc, U.S. Geological Survey NLCD 2006
Miles
0 5 10 20 30 40

Population

- ~ 6.89 million individuals
- With population growth, demand for water is expected to increase

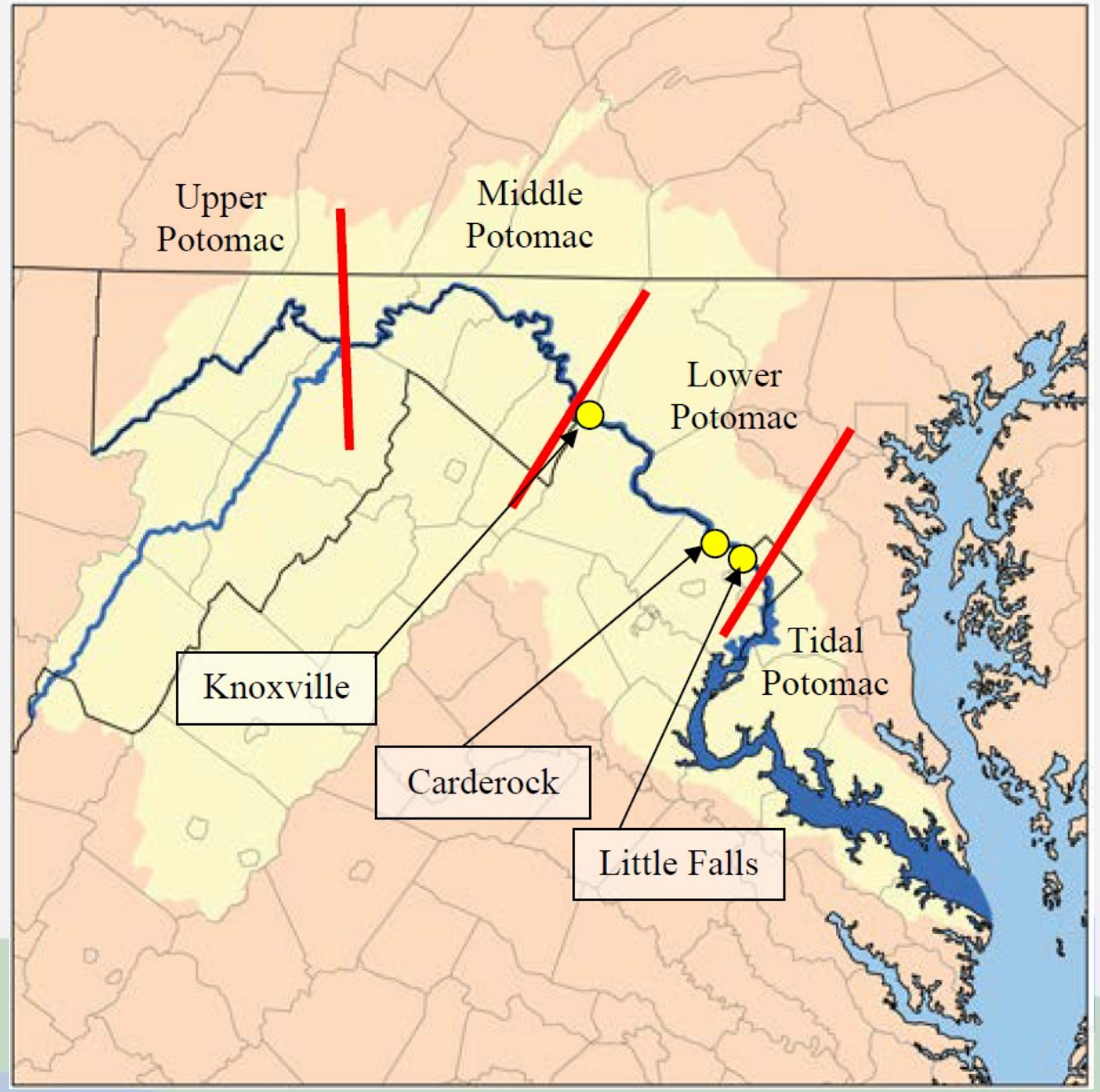


Challenges

- 5 jurisdictions = 5 different datasets
  - Housed by different organizations
  - Different data collected
    - Site descriptions
    - Units of withdrawals are reported in
  - Different data formatting
  - Requires different methods for obtaining data

Withdrawal and Consumptive Use Database

- Goal: provide withdrawal and consumptive use data
  - Monthly time-series data and consumptive use estimates
  - From 1985 to 2012
  - Non-tidal portion of Potomac upstream of fall line by Little Falls
  - With HUC8 sub-basins for each withdrawal



Studies Using the Early Database

- Ducnuigeen et al. 2015: Interactive Geospatial Analysis Tool for Estimating Watershed-Scale Consumptive Use: Potomac River Basin Case Study
  - Database with monthly water withdrawals
  - Water Balance Conveyance Model to calculate consumptive use
  - Web-based mapping tool with consumptive use information

Studies Using the Early Database

- Ahmed et al. 2015: 2015 Washington Metropolitan Area Water Supply Study – Demand and Resource Availability Forecast for the Year 2040
  - Forecast water demands
  - Determine if the current system can meet those needs through 2040
  - Use a new model that accounts for reduced indoor use
  - Considers consumptive uses of Potomac River upstream of the WMA intakes
    - Using the Withdrawal and Consumptive Use Database

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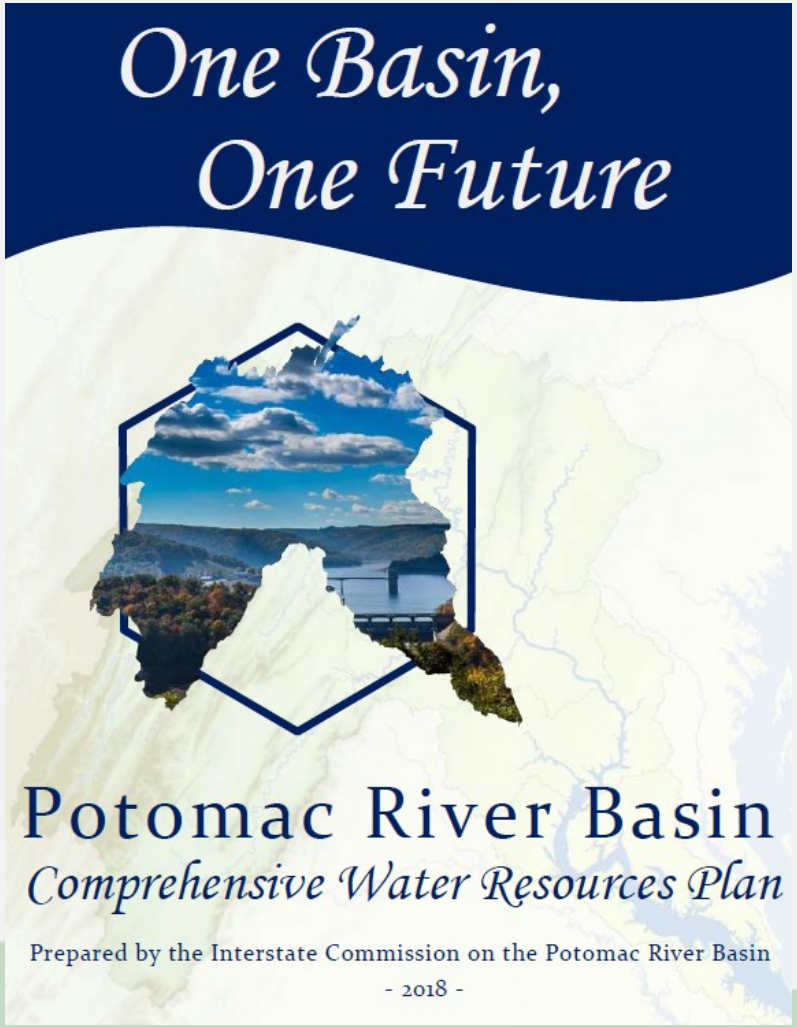
The Comprehensive Plan

- In 2018 ICPRB put forth the "Potomac Basin Comprehensive Water Resources Plan"
  - Identified 4 challenge areas
    - 14 recommendations for action



The Comprehensive Plan

Challenge: Ensure sustainable water use and supply

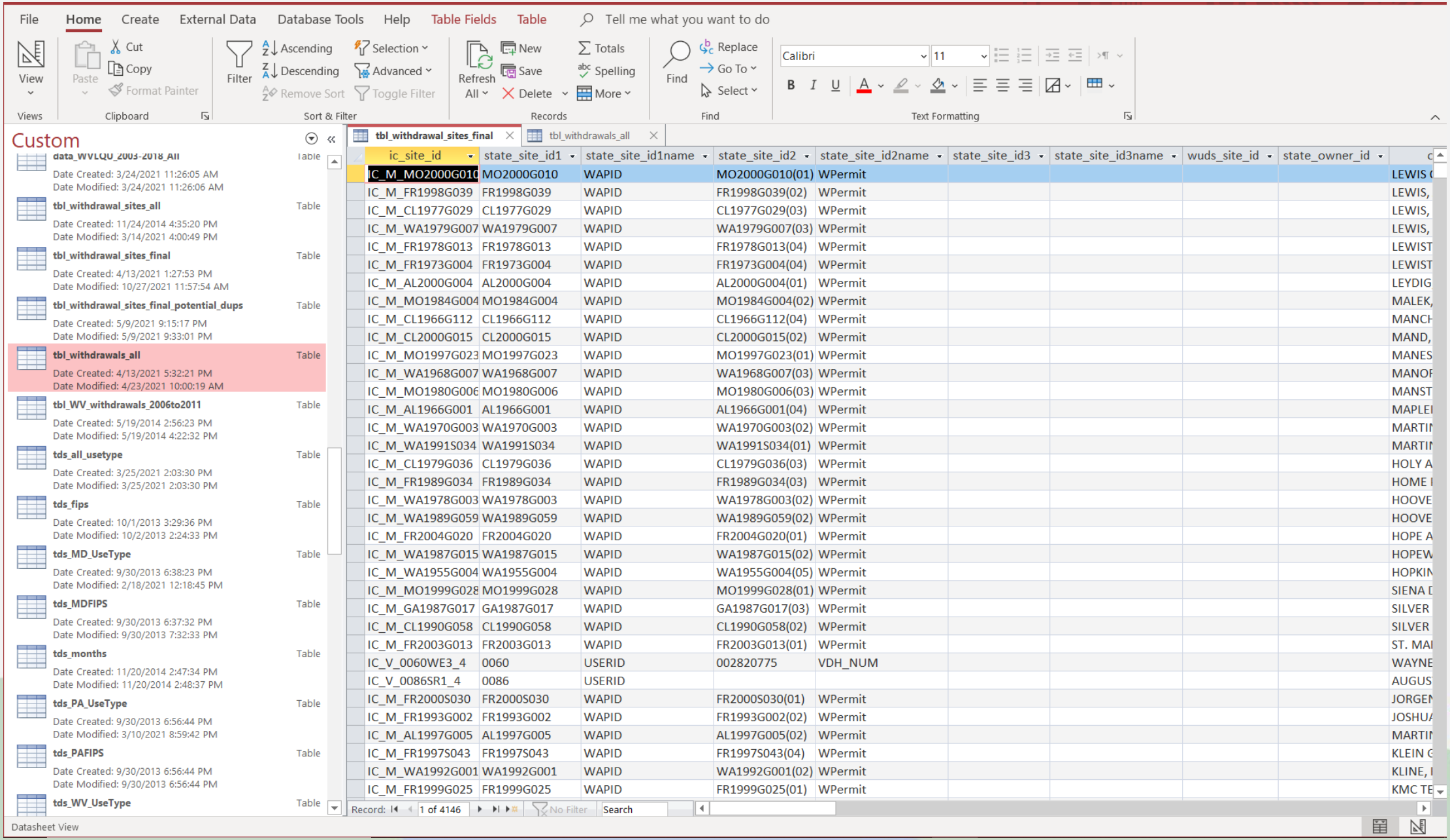
- Begins with understanding water use and supplies

- **Recommendation A: Report on basin-wide water uses, projected demands, and consumptive demands**
  - Expand the database developed and used in Ducnuigeen et al. 2015 and Ahmed et al. 2015

Edits Include

- Addition of historical data in the Tidal Potomac
- Addition of recent withdrawal data from all HUC8's
  - 2012 through 2019
  - Some 2020 data
- Quality control measures to ensure all available data is included and up to date

Current Database



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2017 Snapshot

- Using the updated database
- Aggregated monthly withdrawals from 2017 by HUC8 and water use sector
- Produced average daily withdrawals in Mega gallons per day (MGD)

HUC8	HUC8 Name	Aquaculture	Commercial	Hydroelectric	Industrial	Irrigation	Livestock	Mining	Power Generation	Public Water Supply	Self-Supplied Domestic	Other	Total
02070001	South Branch Potomac	8.41	0.01	0	0	0	0	0.10	0	4.63	0	0	**13.15**
02070002	North Branch Potomac	0.30	0.07	0	35.75	0.11	0	8.18	997.80	10.24	0	0	**1052.45**
02070003	Cacapon-Town	0	0.02	0	0	0	0	0	0	0.72	0	0	**0.74**
02070004	Conococheague-Opequon	9.32	0.92	625.46	0.13	0.38	0.04	17.81	0	35.92	0.02	0	**690.00**
02070005	South Fork Shenandoah	0.96	0.47	0	10.68	1.32	0.01	0	0	25.74	0	0	**39.17**
02070006	North Fork Shenandoah	0.73	0.34	0	3.59	0.15	0.20	0	0	11.19	0	0	**16.20**
02070007	Shenandoah	0	0.25	498.82	0.07	0.11	0.06	0	0	4.29	0	0	**503.59**
02070008	Middle Potomac-Catoctin	0.01	0.82	0	0.77	1.30	0.01	0.14	270.75	236.31	0	0	**510.10**
02070009	Monocacy	4.25	0.67	0	5.51	0.66	0.20	10.67	0.09	11.98	0.12	0	**34.15**
02070010	Middle Potomac-Anacostia-Occoquan	0	1.33	0	0.19	1.44	0	0.77	0.46	82.96	0	0.22	**87.36**
02070011	Lower Potomac	0.27	1.42	0	1.01	0.56	0	1.92	784.94	17.01	0.02	112.15	**919.31**
Total		**24.24**	**6.32**	**1124.27**	**57.70**	**6.03**	**0.52**	**39.58**	**2054.04**	**440.99**	**0.17**	**112.37**	**3866.22**

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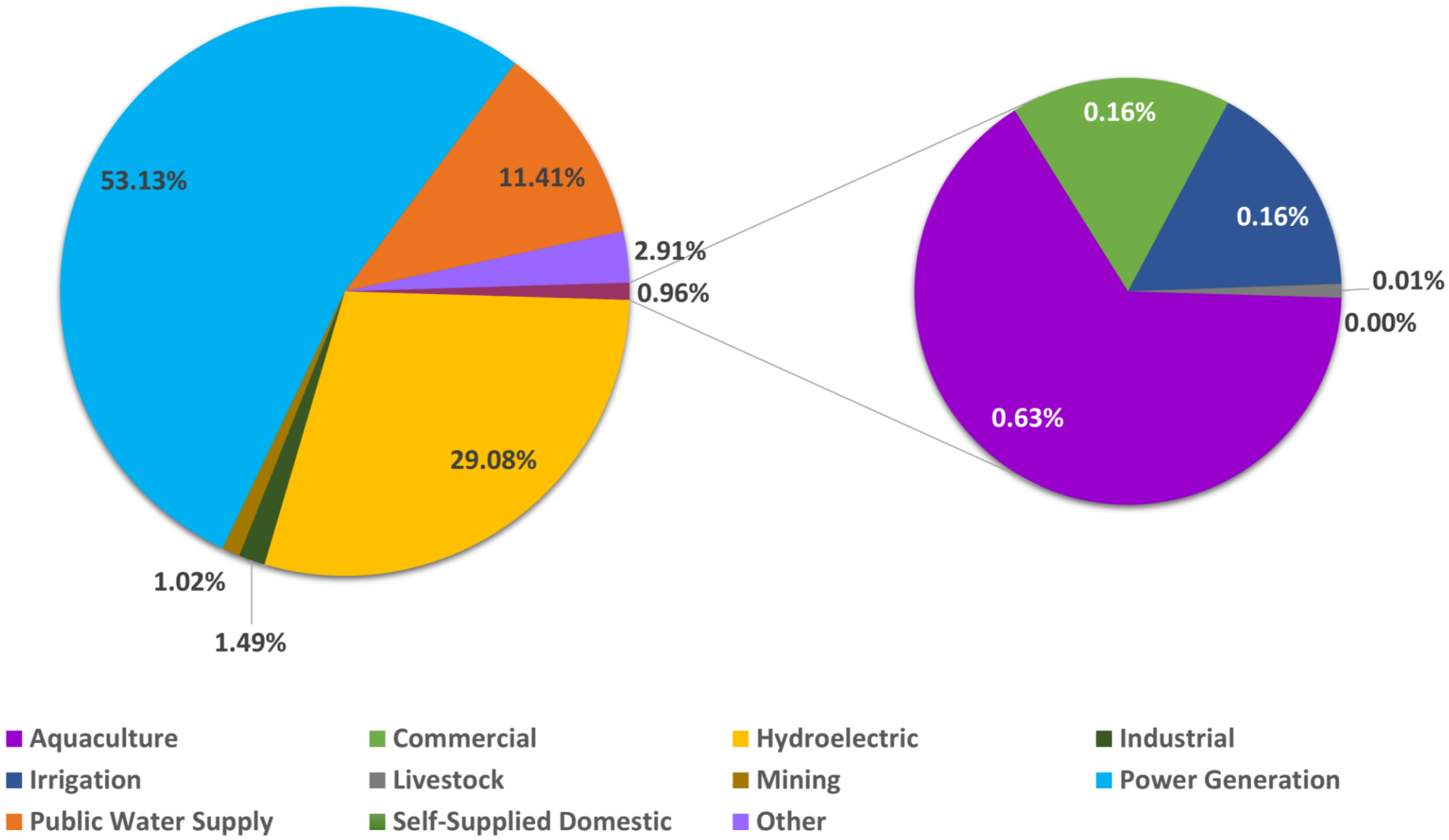

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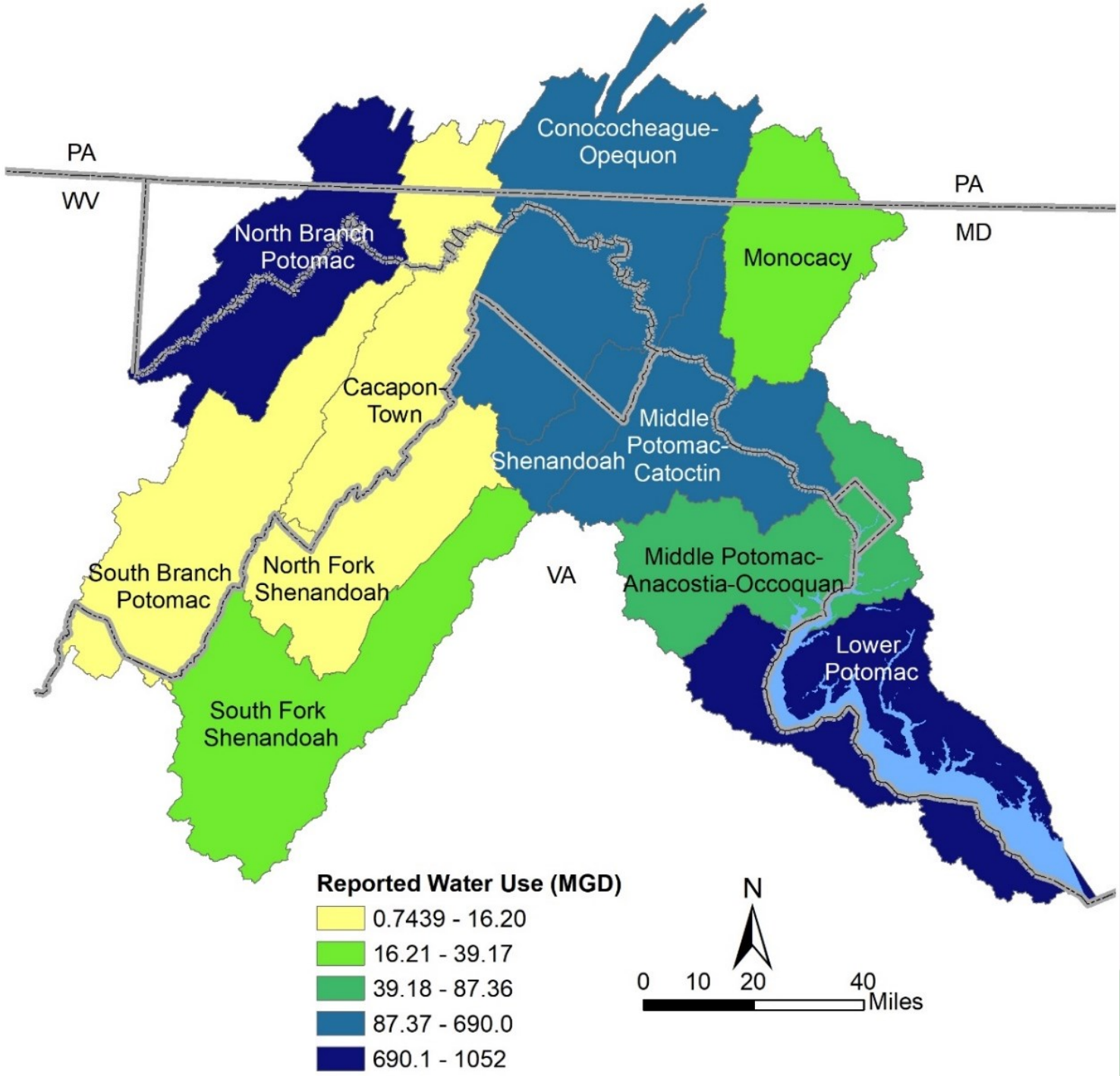

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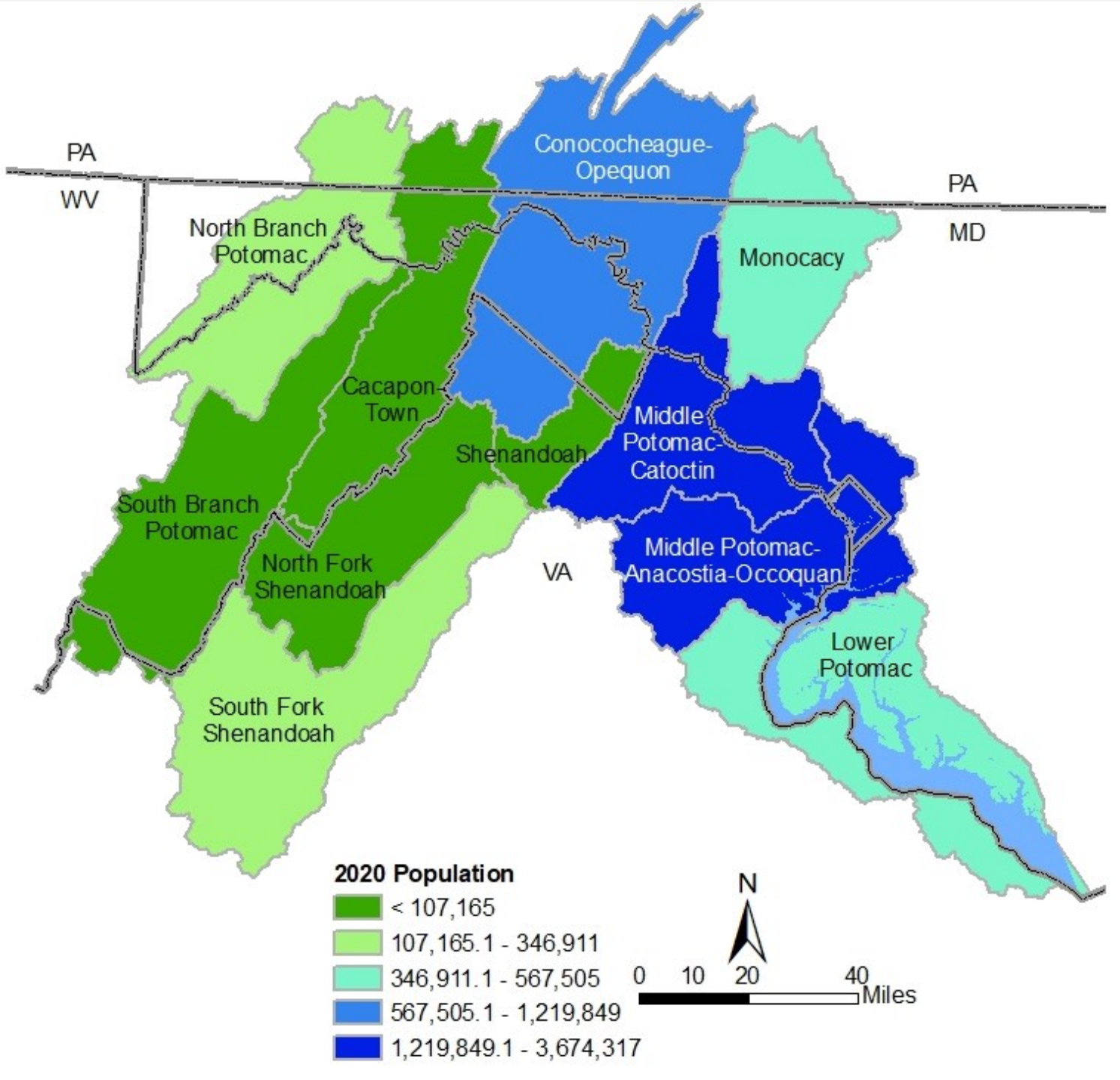
2020 Population



What's Next?

- Continued data collection to keep database current
- Further use of Withdrawal and Consumptive Use Database to address recommendations in the Comprehensive Plan
  - Withdrawal trend analysis
  - Consumptive use forecasting in basin

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Acknowledgements & Questions

- ICPRB Project Team
  - Heidi Moltz, Ph.D.
  - Andrea Nagel, M.S.
- Basin Jurisdictions
  - Maryland
  - Pennsylvania
  - Virginia
  - West Virginia
  - District of Columbia
- ICPRB COOP Section