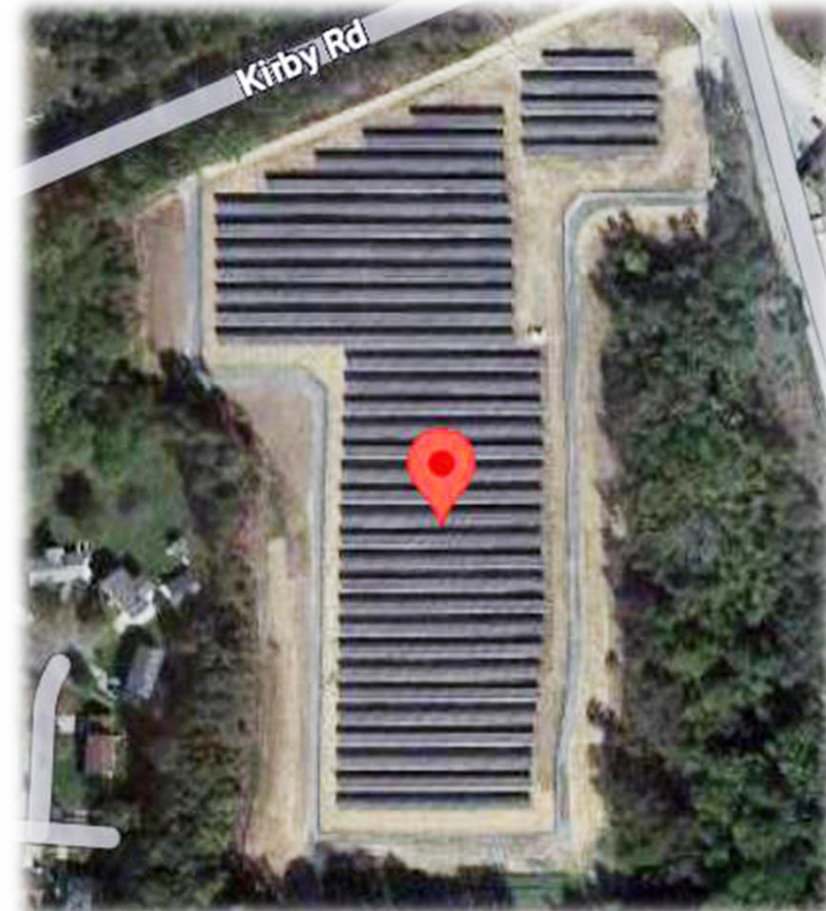
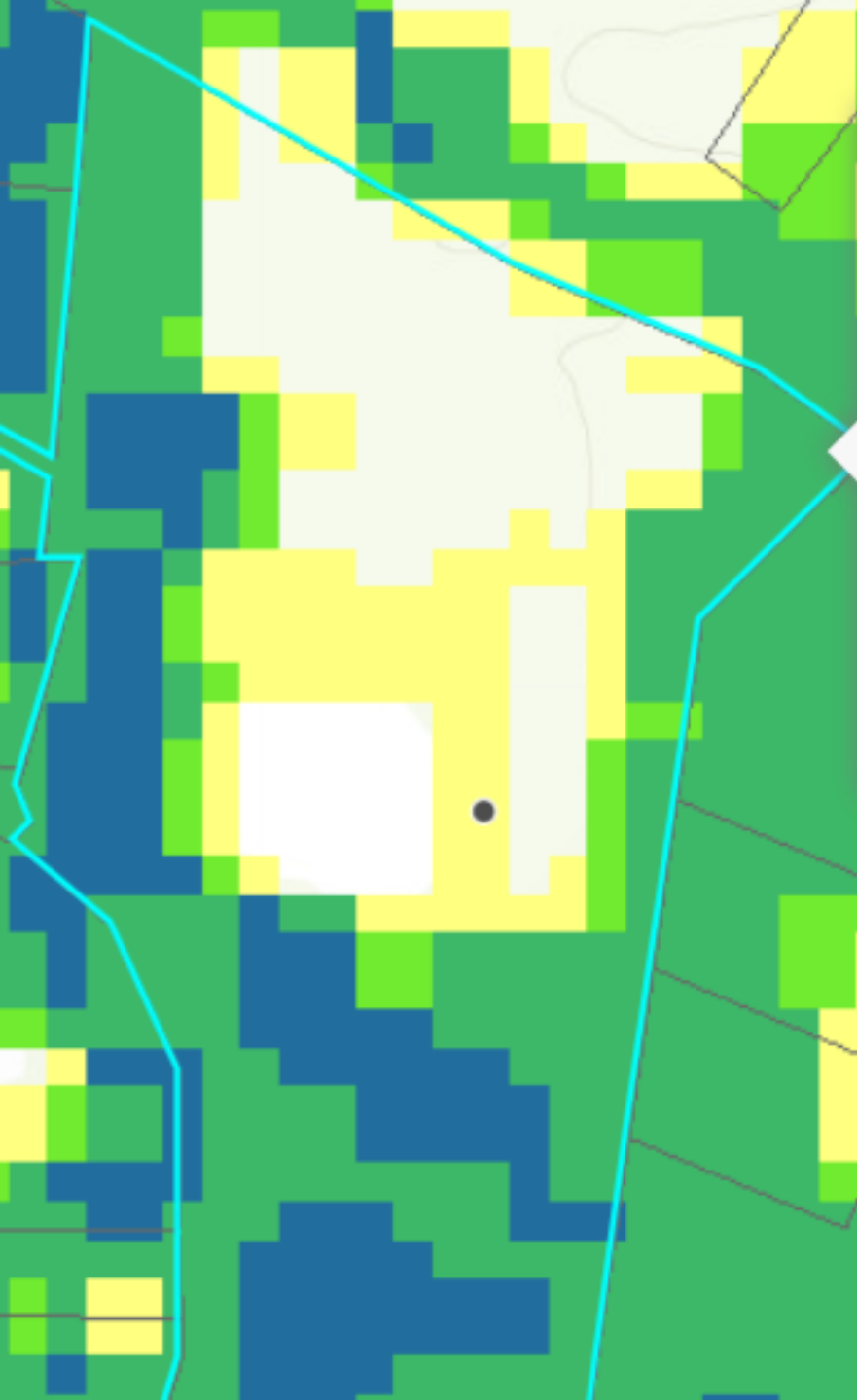


Using Ecosystem Services Values (ESV) to Inform Solar Siting Practices





ESV maps allow for rapid screening

- ESV enables solar developers and governments to quickly see:
 - parcels that should be avoided completely to protect ecologically valuable resources
 - areas within a parcel with low ESV value that may be suitable for solar arrays (e.g., area shown in white on map)
- ESV could be used to rank the priority of proposed projects, as was done by New Jersey for community solar generation

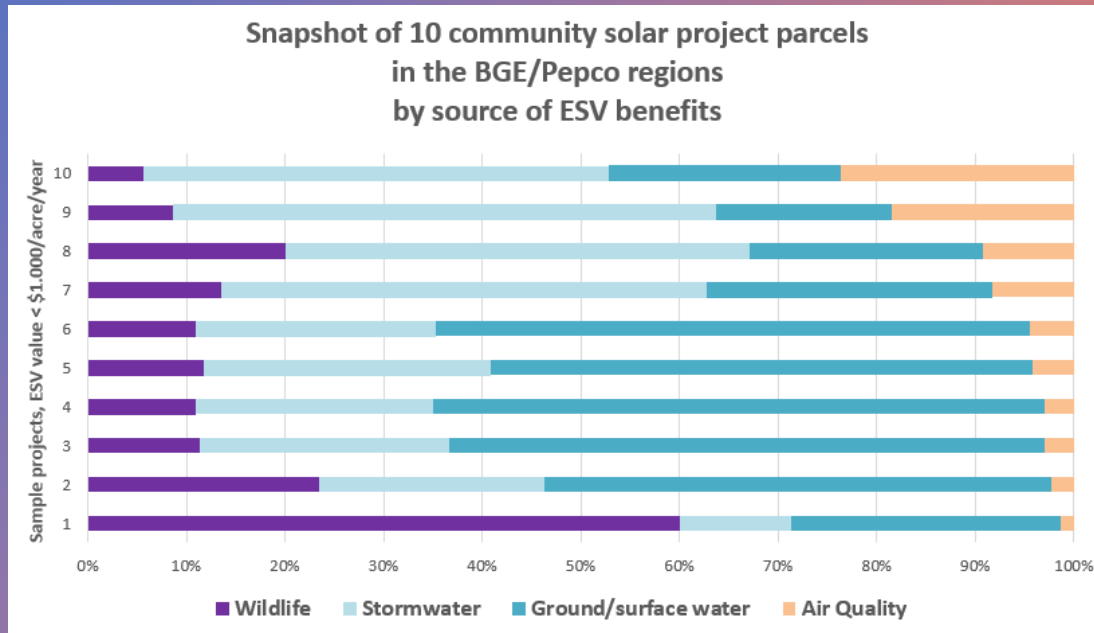
ESV estimates explain why parcels have ecological value

A snapshot of 10 projects in the BGE/Pepeco region found:

Water-related benefits accounted for > 70% of the ESV for those projects (blue in graph)

Water-related benefits include the value to surface and groundwater supplies as well as stormwater mitigation

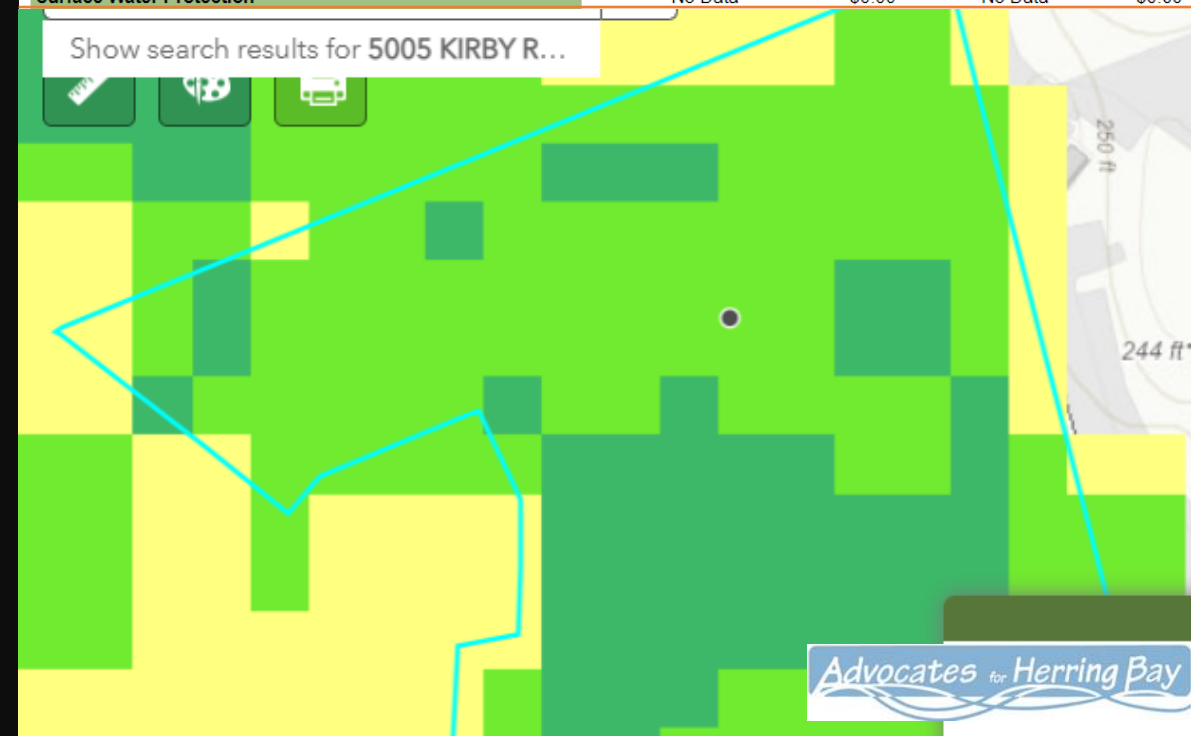
Air quality benefits may be higher in urban settings; wildlife habitat higher in rural areas



ESV estimates can inform the design of financial incentives for solar

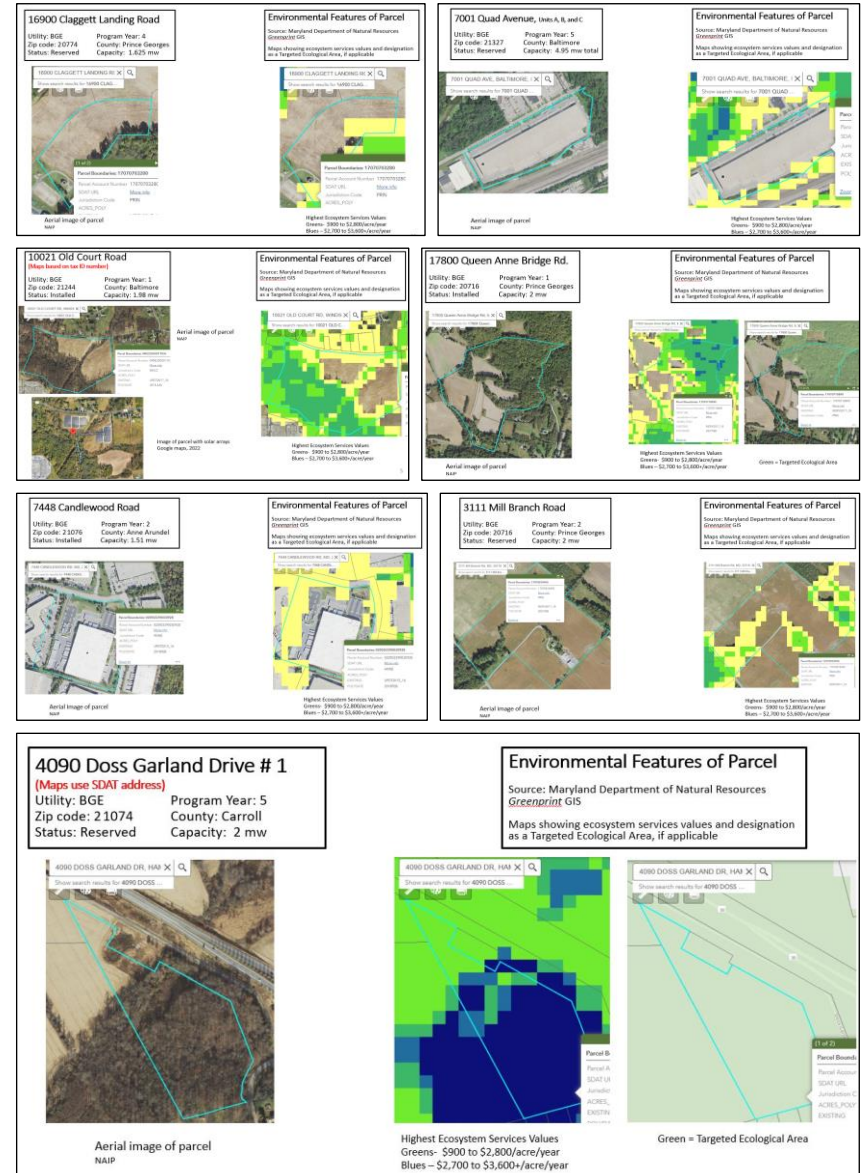
- Massachusetts' solar prices include:
 - “adders” for projects on rooftops, canopies, etc., and
 - “subtractors” for those on greenfield sites, such as forests or farmland
- Talbot County MD assesses an “impact fee” for projects on high priority farmland
- ESV estimates could give policymakers a quantitative basis for assessing ecological impact fees

Ecosystem Service Name (and biophysical unit)(range)	Annual Parcel-Level Values*		Annual Per-Acre Values**	
	Biophysical	Economic	Biophysical	Economic
Air Pollution Removal: Carbon Monoxide (CO) (kg per year)(0-1.35 kg per acre per year)	25.26	\$37.14	1.10	\$1.62
Air Pollution Removal: Nitrogen Dioxide(NO₂) (kg per year)(0- 9.01 kg per acre per year)	116.37	\$55.39	5.08	\$2.42
Air Pollution Removal: Sulfur Dioxide(SO₂) (kg per year)(0- 6.67 kg per acre per year)	52.83	\$5.36	2.31	\$0.23
Air Pollution Removal: Ozone (O₃) (kg per year)(0-34.35 kg per acre per year)	457.62	\$1,212.20	19.98	\$52.92
Air Pollution Removal: Particulate Matter(PM₁₀) (kg per year)(0-8.34 kg per acre per year)	122.97		5.37	
Air Pollution Removal: Particulate Matter(PM_{2.5}) (kg per year)(0-1.80 kg per acre per year)	32.28	\$3,718.31	1.41	\$162.32
Carbon Sequestration (mT per year)(0-4 mt per acre per year)	13.36	\$1,860.04	0.58	\$81.20
Groundwater Recharge (m3per year)(445 - 1236 m3 per acre per year)	1151.33	\$5,903.00	50.26	\$257.70
Nitrogen Uptake Potential Index (1 = low to 3 = high)*	1.00	\$763.00	No Data	\$33.31
Stormwater Mitigation Potential Index (1 = low to 5 = high)*	2.76	\$20,506.00	No Data	\$895.20
Wildlife Habitat and Biodiversity Potential Index (0 = low to 100 = high)*	12.28	\$3,245.00	No Data	\$141.66
Surface Water Protection	No Data	\$0.00	No Data	\$0.00



ESV dashboard for solar siting:

In 2022, AHB gave the MD Public Service Commission profiles of the ESV of the 198 parcels being used for installed or planned community solar projects

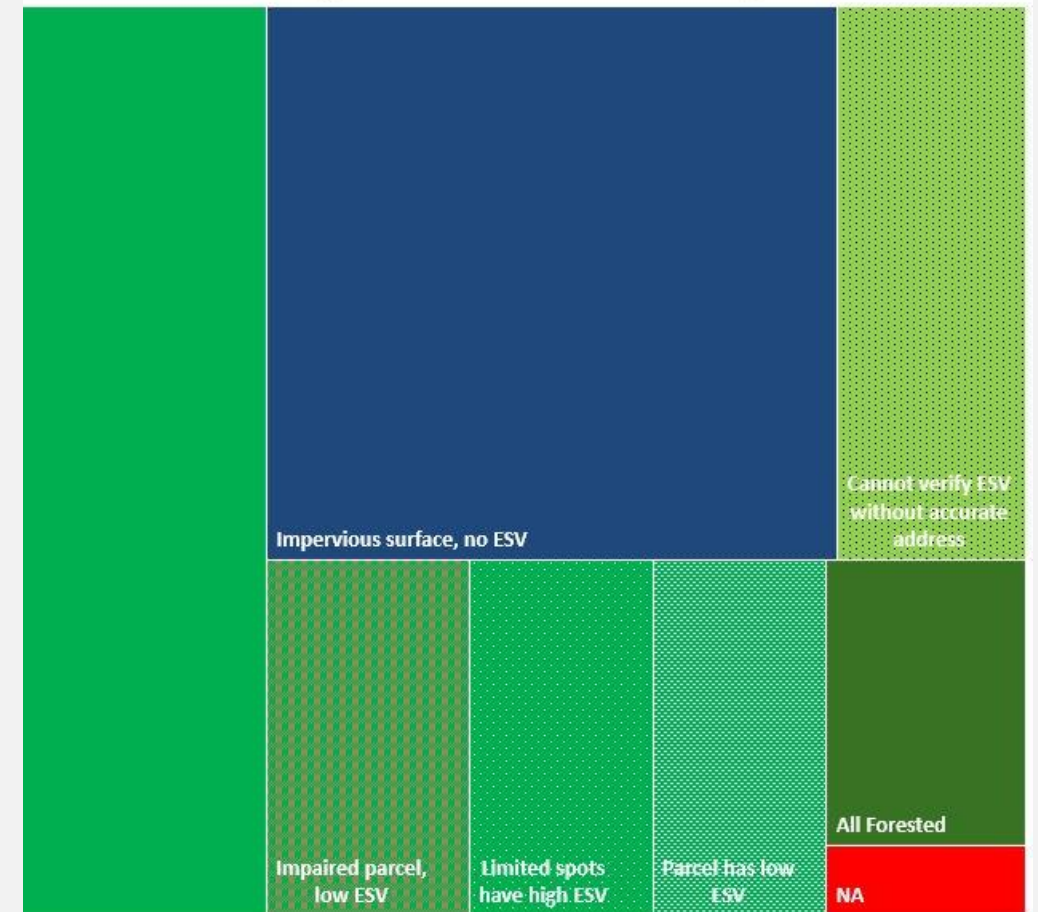


ESV dashboards identify opportunities for adding solar capacity while protecting ecological resources

Takeaways of AHB's 2022 dashboard:

- 26 percent of the capacity was on “hard” surfaces, such as building rooftops and parking canopies
- 74 percent of the capacity was on greenfield sites, some of which were completely forested
- Most of the greenfield parcels could accommodate 2-megawatt projects without impacting high ESV acreage
- Unlike New Jersey and Massachusetts, Maryland currently lacks incentives or rules to encourage developers to put arrays on areas with low ESV value

Graph 1: Ecosystem Services Value (ESV) Profile of Used for About 340 Megawatts of Active CSEGS Pilot Projects

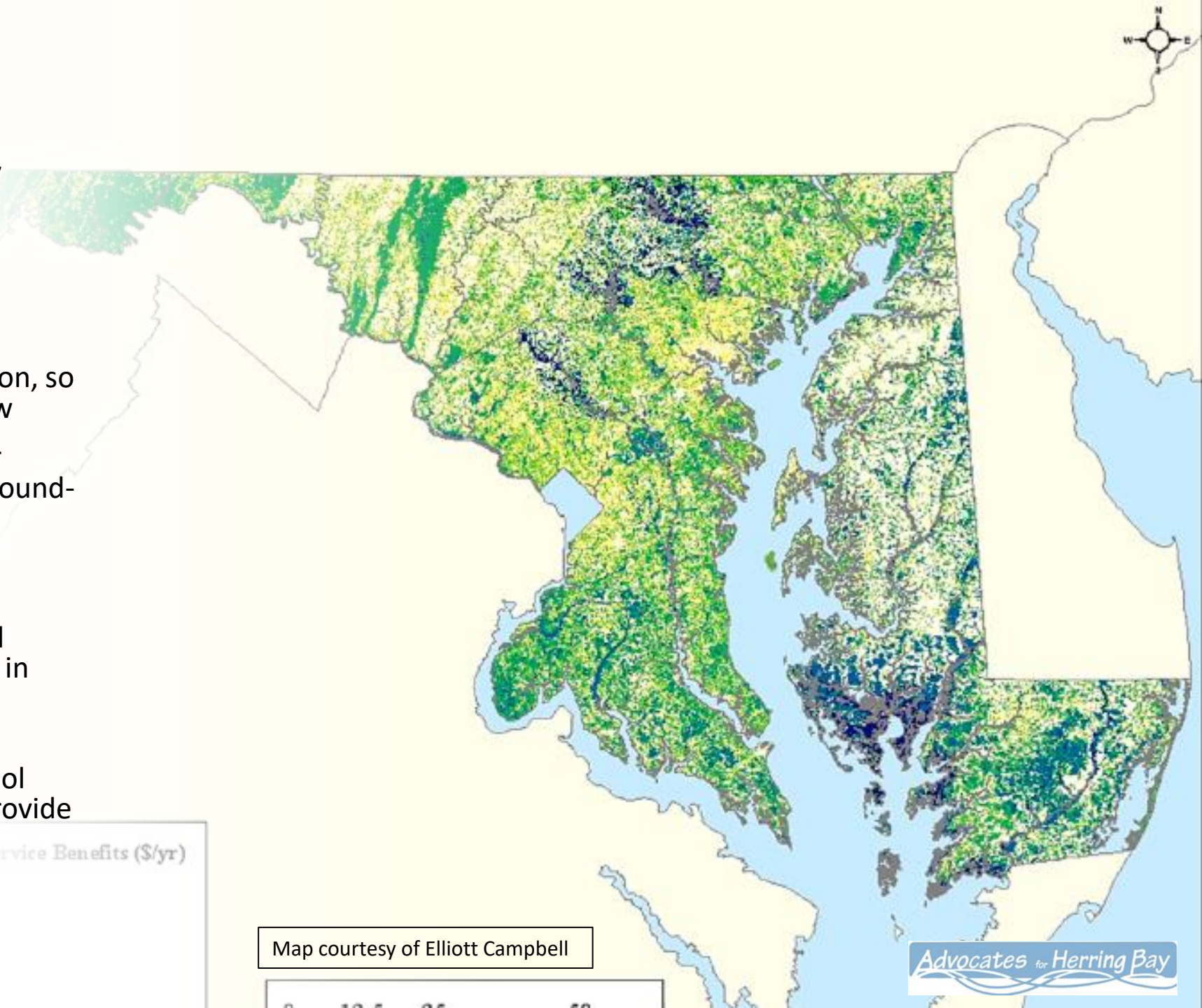
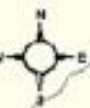


Future uses of Maryland's ESV analysis

- Values are not indexed for inflation, so current estimates may be too low
- Since maps are pixelated, use for individual parcels may require ground-truthing
- ESV programs need funding to maintain their analytical value
 - Models need to be updated regularly to reflect changes in land use
 - MD's "parcel evaluation" tool needs to be expanded to provide estimates for all parcels statewide

Service Benefits (\$/yr)

Map courtesy of Elliott Campbell





AHB's 2022 dashboard and related comments on Maryland's community solar projects are available at www.herringbay.org, Policy Positions, "Optimizing the Benefits of Solar," [CSEGS-Ecological Profiles 2022](#), and [Comments on PSC CSEGS Report, August 2022](#)

Maryland's Ecosystem Services Value estimates are available at [GreenPrint \(md.gov\)](#)

For information on New Jersey's 2021 ranking of community solar projects, see [NJ year-2 scoring criteria for community solar](#), and on the state's permanent programs that prohibit siting on certain forests, see [NJ BPU, Community Solar Program 2023](#), and [NJ, BPU Competitive Solar Incentive Program, Dec. 2022](#)

For information on Massachusetts' land-use pricing policies for solar projects, see [2023 Guidelines for Renewable Target Program](#)

For questions or comments about this presentation, contact Kathy Gramp at herringbay@gmail.com