Chesapeake Bay & Watershed Report Card 2022

Bay Indicators

Total phosphorus measures the amount of phosphorus in bay waters.

Total nitrogen measures the amount of nitrogen in bay waters.

Dissolved oxygen is critical to the survival of aquatic life.

Benthic community measures the condition of organisms living in or on the bottom areas of the bay.

Water clarity is a measure of how much light penetrates through the water column.

Chlorophyll *a* is used as a measure of phytoplankton (microalgae) biomass.

Aquatic grasses, or submerged aquatic vegetation, are one of the most important habitats in the bay.

Fisheries index is made of up striped bass, bay anchovy, and blue crab. It is not included in the Bay Health score.

Watershed Indicators

ECONOMIC

Median household income is a traditional measure of economic vitality and uses data from the U.S. Census.

Jobs growth measures the percentage of jobs gained or lost (net) per capita from the past four years.

Income inequality uses the Gini coefficient that measures the inequality in income distribution.

Housing affordability measures how much housing is available at a cost that people can afford based on their income.

ECOLOGICAL

Water quality indicators include total phosphorus and total nitrogen.

Stream benthic community measures the condition of the organisms living on the bottom of streams.

Protected lands measures the amount of all lands protected in the watershed.

Fish community, an index developed by the EPA, examines river health in categories including native species and pollution tolerance.

SOCIETAL

Stewardship index examines citizen stewardship in categories of behavior, volunteerism, and civic engagement.

Heat vulnerability index indicates climate-safe neighborhoods and includes metrics for tree canopy, impervious surface, land surface temperature, and households in poverty.

Social index uses data about social vulnerability from the U.S. Census and measures how a community can respond to hazardous events.

Walkability measures how many people can walk to a park in 10 minutes and includes metrics for the total population and for diverse groups.

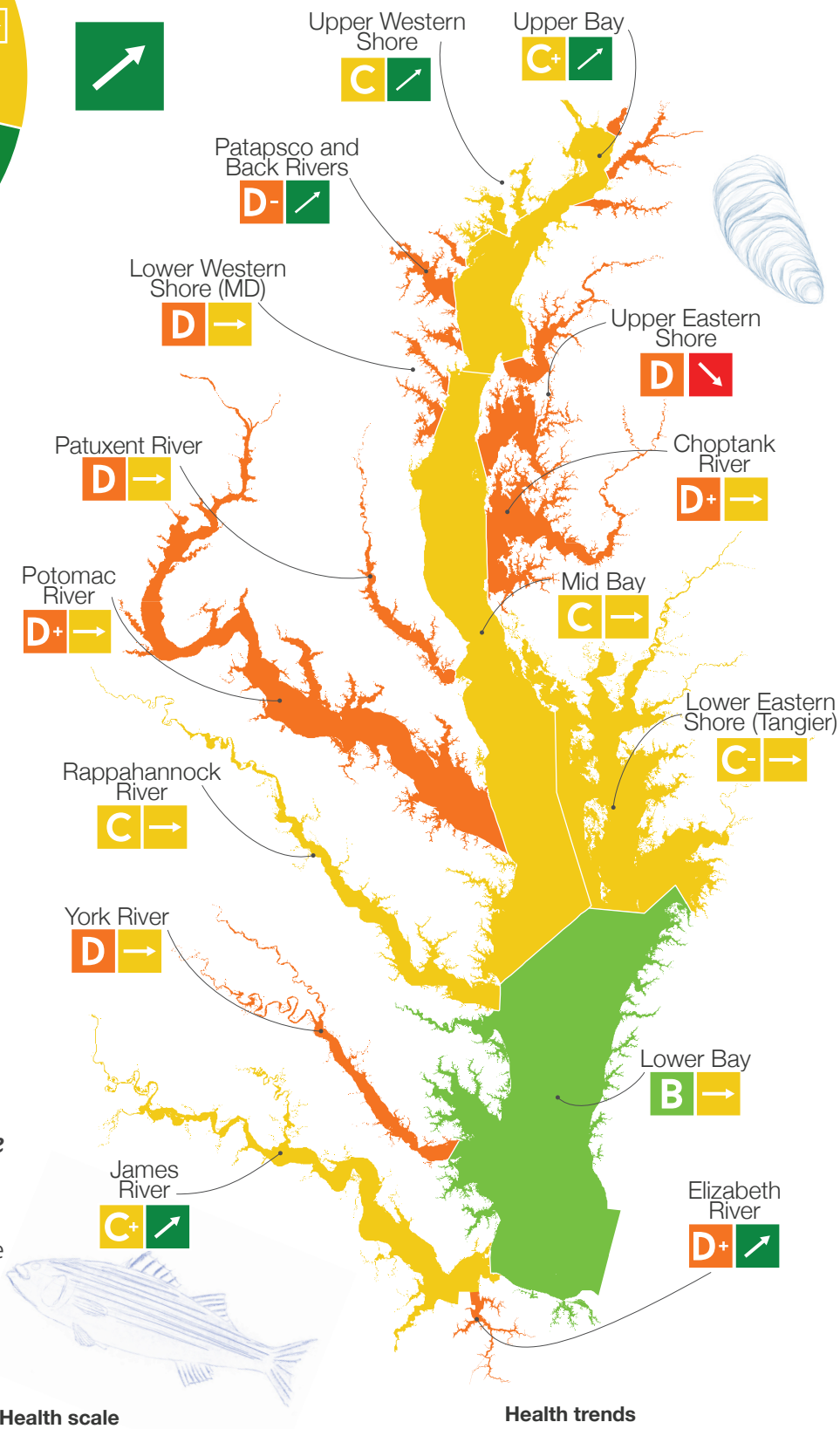
Overall Bay score improving, but most tributaries scored poorly

The overall Chesapeake Bay score is showing a significantly improving trend. This is an exciting sign that progress is being made in bay restoration. The overall health score was 51% in 2022, up 6% in the past two years. Dissolved oxygen, total phosphorus, total nitrogen, and aquatic grasses scores all have significantly improving trends. Although water clarity still has a declining long-term trend, the overall score had a strong improvement from 12% in 2021 to 20% in 2022.

Nine region scores increased and six region scores decreased. The highest-scoring region was the Lower Bay (69%), and the lowest-scoring was the Patapsco and Back Rivers (24%). Regions with strong declines were the Choptank River (36%) with a 14-point decrease from the previous year, and the Upper Eastern Shore (27%) which decreased by four points and is showing a significantly declining trend. Regions with significantly improving trends were the James, Elizabeth, Patapsco and Back Rivers, Upper Bay, and Upper Western Shore.

Fisheries index shows moderate blue crab score

The overall Fisheries Index for 2022 was 65% (B). Striped bass scored 61% (B-), blue crabs scored 45% (C), and bay anchovies scored 89% (A). Blue crabs had the lowest score seen in several years.



Health scale

Very good — A (100%) — B (80) — C (60) — D (40) — F (20) — Very poor (0) — ID*

Moderate

*insufficient data

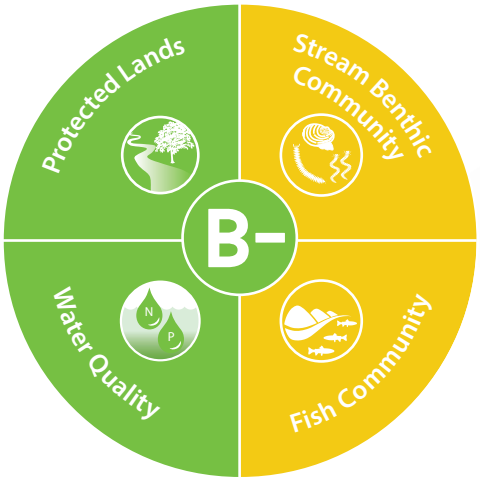
Health trends

Significantly improving — Slightly improving — No change — Slightly declining — Significantly declining

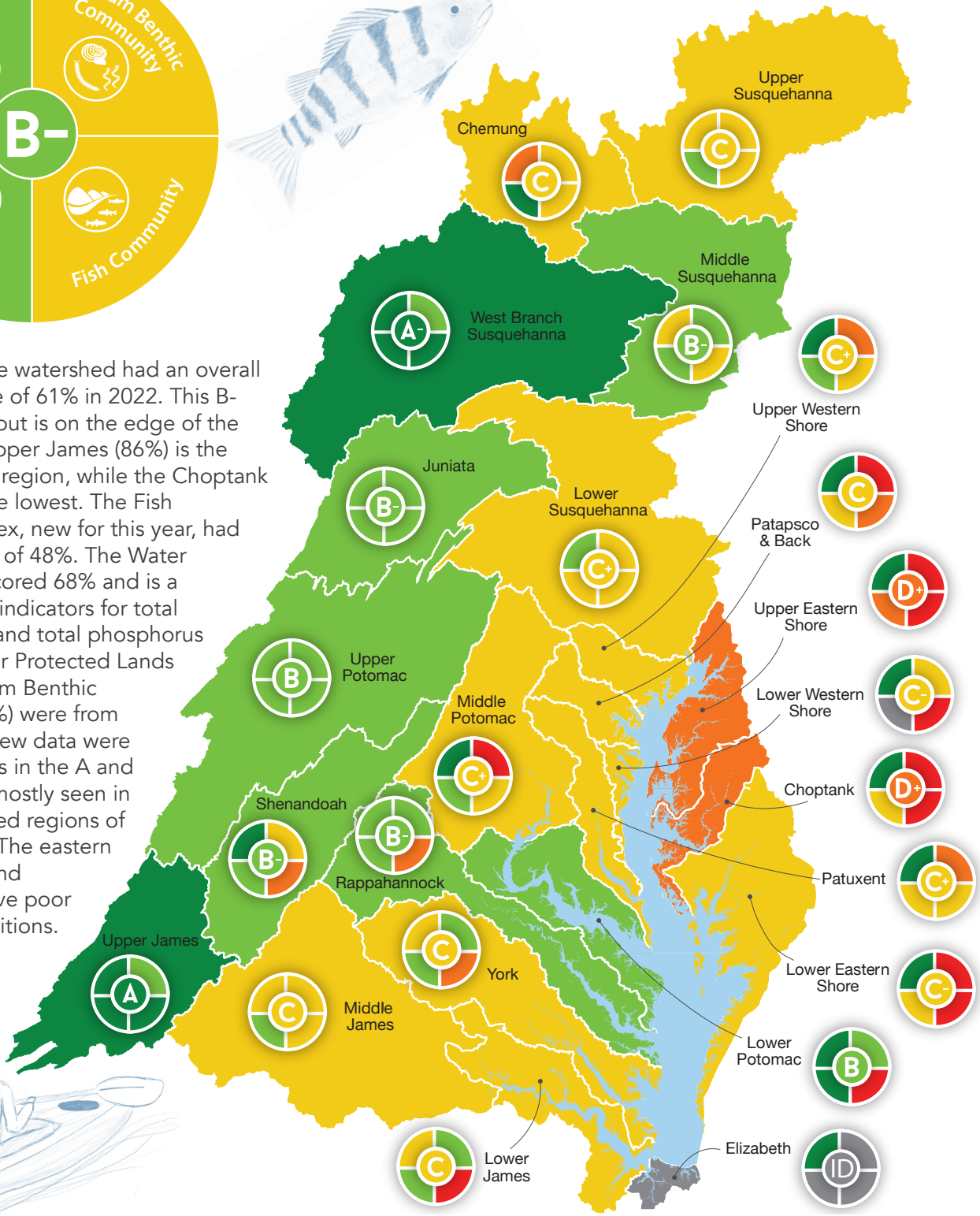
Ecological, Social, and Economic conc

Overall, Chesapeake Bay watershed health scored 52% in 2022. This score is made up of indicators in three categories: Eco
(C). While there are many C grades overall, there is variability in the scores for specific indicators and regions. The following
will be added to provide a more complete picture of the watershed.

Overall good ecological conditions in the watershed



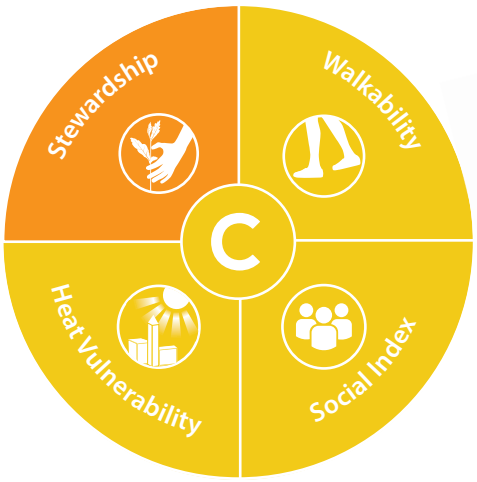
The Chesapeake watershed had an overall Ecological score of 61% in 2022. This B- grade is good, but is on the edge of the C range. The Upper James (86%) is the highest-scoring region, while the Choptank (35%) scored the lowest. The Fish Community Index, new for this year, had an overall score of 48%. The Water Quality Index scored 68% and is a combination of indicators for total nitrogen (74%) and total phosphorus (62%). Scores for Protected Lands (74%) and Stream Benthic community (52%) were from 2020 since no new data were available. Scores in the A and B ranges were mostly seen in the more forested regions of the watershed. The eastern shore of Maryland continues to have poor ecological conditions.



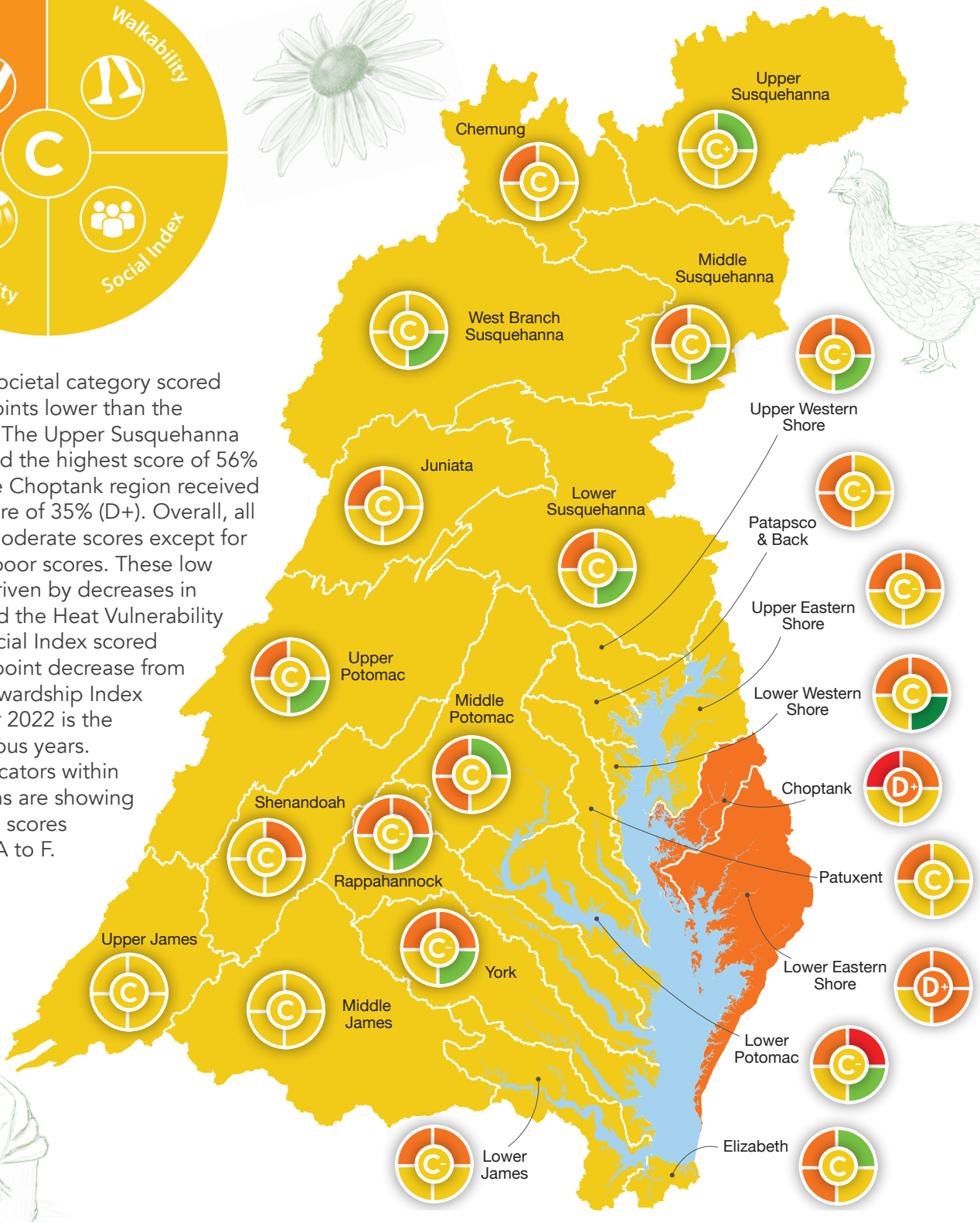
ditions vary across the watershed

ological, Societal, and Economic. In 2022, Ecological scored 61% (B-), Societal scored 47% (C), and Economic scored 51%
category specific maps illustrate these details. As the Chesapeake Bay Watershed Report Card develops, new indicators

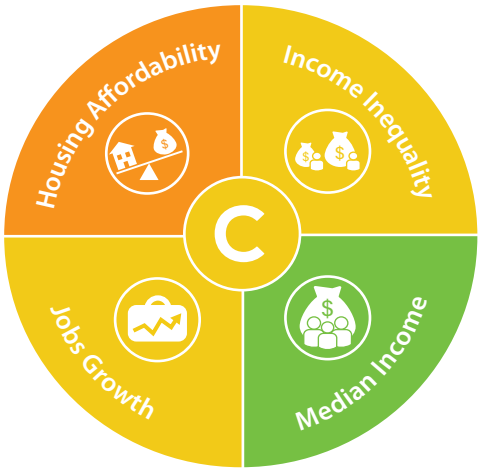
Moderate societal conditions in the watershed need improvement

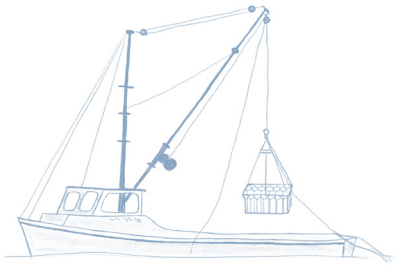


In 2022, the Societal category scored 47%, seven points lower than the previous year. The Upper Susquehanna region received the highest score of 56% (C+), while the Choptank region received the lowest score of 35% (D+). Overall, all regions had moderate scores except for two that had poor scores. These low scores were driven by decreases in Walkability and the Heat Vulnerability Index. The Social Index scored 57%, a three-point decrease from 2021. The Stewardship Index (36%) used for 2022 is the same as previous years. Individual indicators within specific regions are showing variability with scores ranging from A to F.

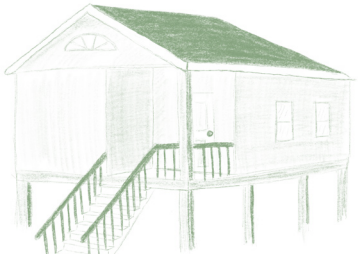


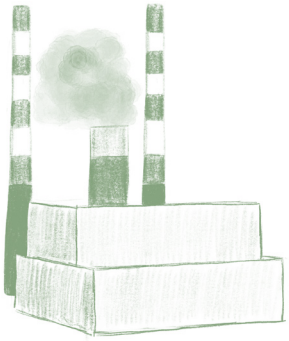
Overall economic conditions are moderate, but strong disparities exist at the county level

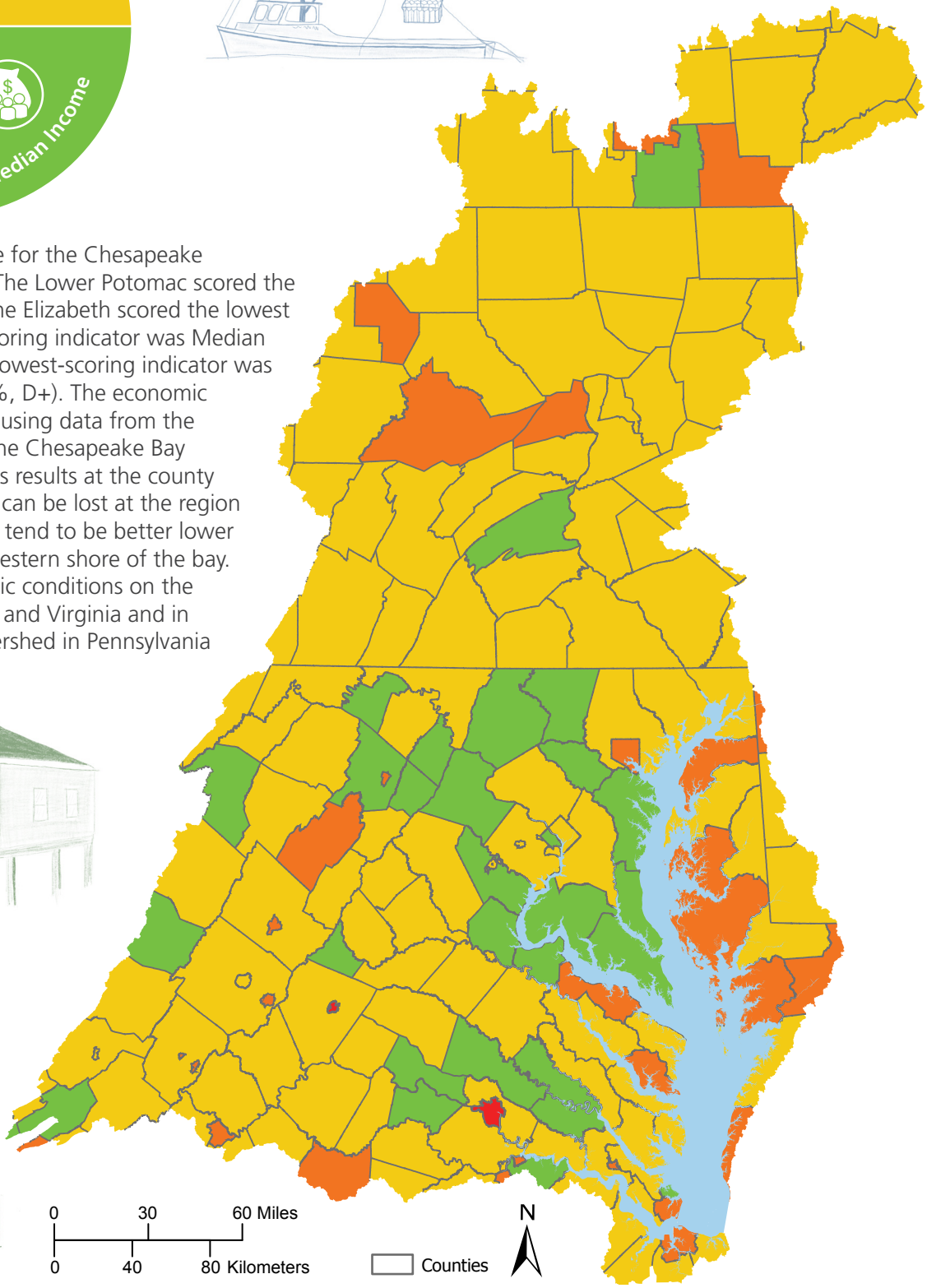




The overall economic score for the Chesapeake Watershed was 51% (C). The Lower Potomac scored the highest (63%, B-), while the Elizabeth scored the lowest (38%, D+). The highest-scoring indicator was Median Income (65%, B) and the lowest-scoring indicator was Housing Affordability (39%, D+). The economic indicators were calculated using data from the 197 counties comprising the Chesapeake Bay watershed. The map shows results at the county level to provide detail that can be lost at the region level. Economic conditions tend to be better lower in the watershed on the western shore of the bay. There were worse economic conditions on the eastern shore of Maryland and Virginia and in the upper part of the watershed in Pennsylvania and New York.



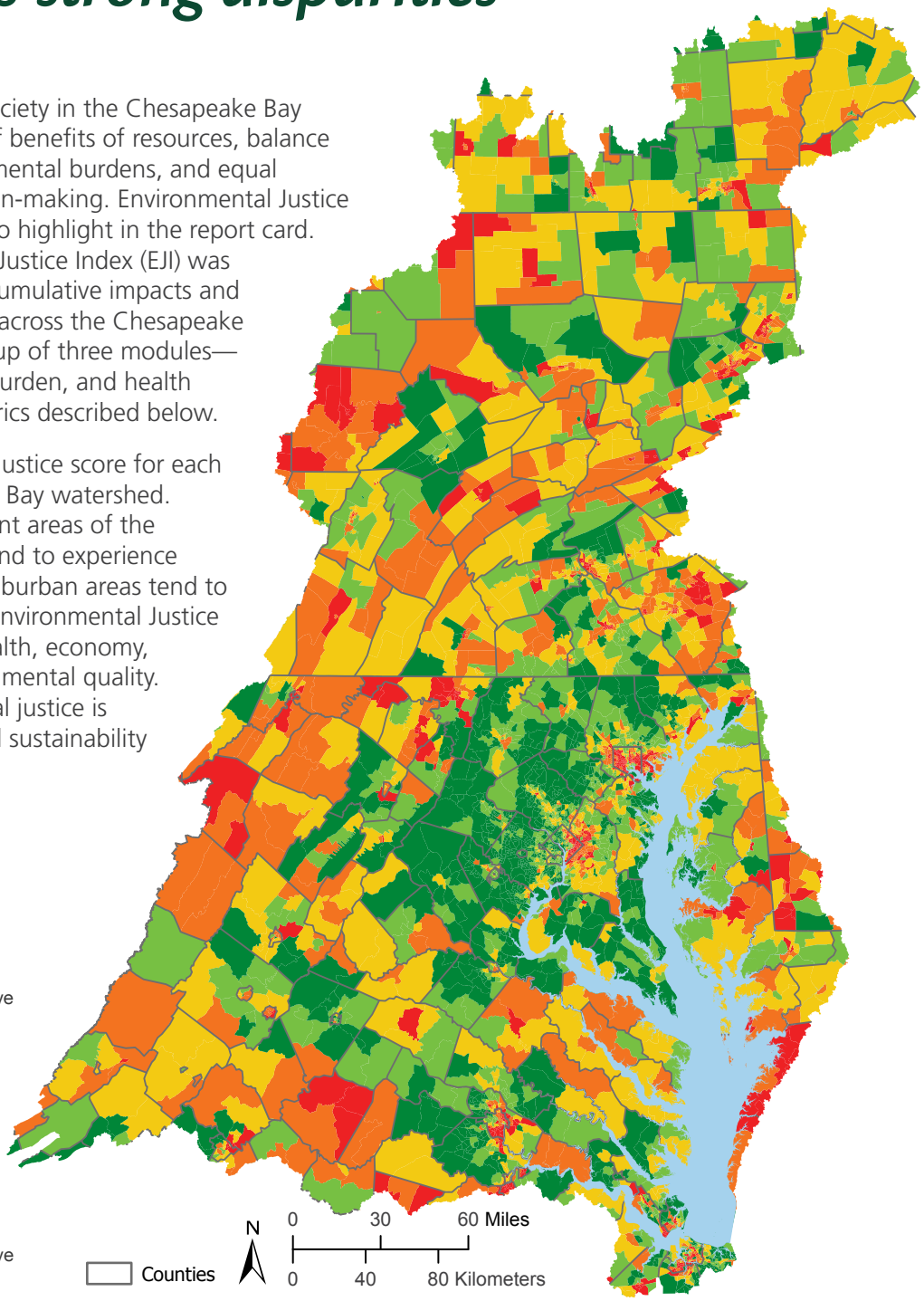




New environmental justice index shows strong disparities

Creating a healthy and equitable society in the Chesapeake Bay watershed requires equal sharing of benefits of resources, balance in the distribution of socio-environmental burdens, and equal opportunity to participate in decision-making. Environmental Justice is a priority issue that is important to highlight in the report card. This year, the CDC's Environmental Justice Index (EJI) was used to map and characterize the cumulative impacts and patterns of environmental injustice across the Chesapeake Bay Watershed. The index is made up of three modules—social vulnerability, environmental burden, and health vulnerability—that include sub-metrics described below.

The map shows the environmental justice score for each census tract within the Chesapeake Bay watershed. It shows strong disparities in different areas of the watershed. Cities and rural areas tend to experience higher relative impacts and more suburban areas tend to experience lower relative impacts. Environmental Justice considers aspects of life such as health, economy, and social justice, as well as environmental quality. Therefore, addressing environmental justice is crucial for the long-term health and sustainability of the Chesapeake Bay watershed.



Social Vulnerability

- Racial/Ethnic Minority Status
- Socioeconomic Status
- Household Characteristics
- Housing Type

Environmental Burden

- Air Pollution
- Potentially Hazardous & Toxic Sites
- Built Environment
- Transportation Infrastructure
- Water Pollution

Health Vulnerability

- Pre-existing Chronic Disease Burden

Engaging stakeholders through listening sessions

To achieve a sustainable and equitable Chesapeake Bay watershed, diverse stakeholders must be engaged in the decision-making process. By doing so, it ensures that the needs and concerns of everyone involved are considered and addressed. Stakeholder listening sessions in the Chesapeake Bay watershed serve to accomplish this. Last year's events were in the Middle Potomac, Patuxent, Choptank, and Patapsco regions. The goal for the coming years is to continuously engage different communities, particularly those who have traditionally been excluded from the environmental decision-making process. Only by working together can an inclusive and collaborative environment be developed to protect the Chesapeake Bay watershed for future generations.

Residents value recreation, animals, and the natural ecosystem of the Chesapeake Bay watershed. Focusing on accessibility and conservation of the area should be a priority in the future.

Concerns for the Chesapeake Bay watershed include pollution, development, and climate change. Effective management and education can begin to address these concerns.

UMCES scientists and visiting student scholars engage with local stakeholders at the Potomac Listening Sessions at Hood College in Frederick, Maryland. These have occurred across the Chesapeake Bay watershed, with additional events planned for the future.

Acknowledgments

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