

EJ Mapping Info Session Report

Oregon Environmental Justice Mapping Tool



Oregon Environmental Justice Mapping Tool Background

By Hoang-Van Nguyen

Oregon House Bill 4077 (2022) established the Environmental Justice Council and the mandate for Oregon to develop an environmental justice mapping tool to assist with identifying environmental justice communities. The Environmental Justice Council is charged with the development of this tool with a statutory deadline of September 25, 2025.

WHAT'S NEW

DECISION POINTS SUMMARY

Identify 10 decision points supporting the development of Oregon's environmental justice mapping tool.

FAQ THEMES

Themes of frequently asked questions related to Decision Points 4, 5, and 6

EJ Mapping Decision Points Summary



By Eric Main

The 10 decision points for the Environmental Justice Council are based on best practices for building composite indices used to identify communities experiencing disproportionate environmental burdens, health and social disparities, and community benefits and opportunities.

The decision points include:

1. Domain selection
2. Geographic units
3. Geographic comparisons and community designations
4. Domain/indicator weighting
5. Domain aggregation
6. Data standardization
7. Indicator selection
8. Sensitivity analysis
9. EJ community threshold
10. Visualizations

FAQ Themes

The Environmental Justice Council met with staff to learn more about upcoming decision points during information sessions on 9/9/2024, 9/10/2024, 9/11/2024, and 9/26/2024.

The following themes represent the types of questions received:

1. Indicator Selection Connection
2. Sensitivity Analysis Connection
3. Literature Reviews
4. Domain/Indicator Weighting Considerations
5. Domain Aggregation Considerations
6. Data Standardization

Frequently Asked Questions

The following frequently asked questions are organized by their respective themes.

Indicator Selection Connection

Q1: What impact does indicator selection having on weighting?

A1: The indicators chosen for the environmental justice index will be the primary drivers of the environmental justice index score. Domain/indicator weighting, domain aggregation, and data standardization will contribute to the index score, but their contributions are marginal.

Q2: How will the impacts of indicator selection be reported to the EJC?

A2: The Methodology Workgroup anticipates the Environmental Justice Council will select indicator "candidates" for each index subdomain. The indicator candidates will be evaluated during the sensitivity analysis for correlation with life expectancy at birth, correlations between the datasets, covariance, and clustering. The Methodology Workgroup will report out descriptive statistics, statistical modeling output, and interpretation of the statistics to the Environmental Justice Council. These reports are expected to help guide the council through the process of accepting or rejecting candidate indicators.

Q3: Is it possible to change weighting if we find out it does not work with the indicators selected?

A3: Yes. We do not currently know how the indicators that will be chosen for the environmental justice index will behave in the model structure defined in Decision Points #4, #5, and #6. The Methodology Workgroup encourages flexibility to modify the decision points based on model results and emerging information.

Q4: What happens if a community identifies an environmental burden or health disparity that does not have data available?

A4: We will evaluate data gaps throughout Decision Points #7 & #8 and explore all opportunities to fill the gaps. Filling data gaps will include, but are not limited to, mining Federal and not-governmental data sources, and working with State agencies to develop new data.

Q5: What is the difference between a dataset chosen as an indicator vs. a decision-support layer?

A5: Datasets chosen as core indicators will be included the Oregon EJ Mapping Tool index score. Decision support layers will be included as informational data in the EJ map can be turned on and off. Decision support layers help tool users evaluate conditions in communities that do not contribute to determining whether a community is an EJ community.

Sensitivity Analysis Connection

Q1: What happens during sensitivity analysis?

A1: The Methodology Workgroup will evaluate the indicators chosen during Decision Point #7 using a suite of statistical analysis tools including Pearson's Correlation, multiple linear regression, principal component analysis and K-means clustering. Additional GIS statistical analysis tools, including [Moran's I](#) and [Getis Ord*](#), may also be used if further clustering and hot spot analysis are needed. As mentioned in the Indicator Selection Connection section, The Methodology Workgroup will report out descriptive statistics, statistical modeling output, and interpretation of the statistics to the Environmental Justice Council. Some data gaps will also be addressed during the sensitivity analysis.

Q2: How does sensitivity analysis impact decision points #4, #5, and #6?

A2: As mentioned in the Indicator Selection Connection section, we do not currently know how the indicators that will be chosen for the environmental justice index will behave in the model structure defined in Decision Points #4, #5, and #6. The Methodology Workgroup encourages flexibility to modify the decision points based on model results and emerging information.

Q3: What types of decisions will the EJC need to decide during sensitivity analysis?

A3: At the end of the sensitivity analysis, the EJC will decide which indicator candidates should be included as core environmental justice indicators and which should be included as decision support layers. The EJC will also finalize the methods used for domain/indicator weighing, domain aggregation, and data standardization.

Literature Reviews

Q1: What literature reviews did the methodology workgroup consider when making recommendations for decision points #4, #5, and #6?

A1: The Methodology Workgroup conducted a very focused literature review for Decision Points #4, #5, and #6 that included technical guides for environmental justice tools and other composite indicators. We also reviewed citations provided in the technical guides, as well as handbooks on best practices for composite index development and online content for principal component analysis.

Q2: What other mapping tools were compared?

A2: The Methodology Workgroup compared domain and indicator weighting methods used to develop the [CDC EJI](#), [Colorado EnviroScreen](#), the [California Healthy Places Index](#), and the [EPA Environmental Quality Index](#).

Q3: Are there related case studies available?

A3: Not that we are aware of currently.

Domain/Indicator Weighting Considerations

Q1: What is the difference between domain weighting and indicator weighting?

A1: Domain weighting, for our purposes, means applying weights to domains without considering the importance of individual indicators within the domains. Indicator weighting means using statistical methods, science-based rationale, and/or community input to assign a level of importance to individual indicators. Indicator weighting usually contributes to domain weight so we are referring to indicator weighting for the EJ Mapping Tool as domain/indicator weighting.

Q2: What are the benefits and downsides of domain weighting versus indicator weighting?

A2: The primary benefit to domain weighting is indicators are weighted equally, so it's easy for end-users to understand and interpret. The downside to domain weighting versus indicator weighting is we know environmental burdens and social vulnerabilities do not impact people equally or equitably. The benefit to weighting indicators is the ability to assign levels of importance to indicators by their impact on health and/or their inequitable distribution.

Q3: Why is conjoint analysis not being recommended as an indicator weighting method for this phase of the tool?

A3: Conjoint analysis (which uses a combination of community preference surveys and technical expert input to determine indicator weights) requires more time and resources than are available for the first version of the Oregon Environmental Justice Mapping Tool, but the methodology workgroup recommends using conjoint analysis for future versions of the tool.

Domain Aggregation Considerations

Q1: What is the recommended number of indicators in each domain?

A1: There is no hard number we can refer to for recommending an optimal number of indicators per domain. However, the more indicators there are in a domain, the more difficult it is for end-users to target policies that will benefit communities. Therefore, more than 6 or 7 indicators for each domain will likely cause the index to become unwieldy for users.

Q2: Do we need to balance the number of indicators in each domain?

A2: It is preferable to balance the number of indicators in each domain because unbalanced numbers of indicators can cause the weight of domains to be unintentionally inflated.

Q3: Can multiplicative domain aggregation be seen as another form of weighting?

A3: The domain aggregation method does have an impact on how much the domains and sub-domains contribute to the final index score (as does the standardization method).

Data Standardization

Q1: Why is data standardization important?

A1: Data standardization is important because raw indicator data units can differ a lot and are often incompatible for aggregation inside a composite index. For example, it would not make sense to combine median income in census tracts with percent of population living with a disability because one value is monetary, and the other is a percentage. The method used for standardization is important because it can determine the ease of interpreting indicator scores and accuracy of the distribution of the indicator scores.

Q2: What is winsorization?

A2: Winsorization is a technique used to replace extreme outliers in a dataset with more centrally located representative values. Winsorization can be used to cap outliers at a designated standard deviation from the mean.

Q3: Was natural breaks/jenks considered as a standardization method?

A3: Yes, natural breaks were considered as a standardization method, but because of the complexity of the underlying technique, it can be difficult to explain or identify exactly why the class breaks fall where they do when using natural breaks. Other standardization methods, like percentiles or z-scores, are more widely used in applications like this, and make it possible to trace back exactly why the standardized values fall where they do. For example, the Oregon Statewide Wildfire Hazard Map used natural breaks to produce the classes in early iterations of the draft map (then known as the Statewide Wildfire Risk Map), but ended up using a percentile-based approach that was more understandable, and can be consistently applied in the future.