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Class-Gated Spatial Prioritization for Multifunctional Green Infrastructure in Southeast Michigan

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Abstract

The application of multifunctional green-infrastructure planning calls for more than the use of a ranked map. A priority value is useful when its class-gating threshold, spatial scale, weights and implementation context are properly interpreted together. In this research, an approach to class-gate the prioritization of green-infrastructure evidence into practical actions in Southeast Michigan was designed. Six criteria were considered at a common 30 m spatial scale where possible: stormwater management, social vulnerability, green space access, summer land surface temperature, $PM_{2.5}$ and ozone air quality, and habitat connectivity. In addition, evidence related to planting priorities was considered for Detroit and property-based conservation evidence for Washtenaw County. At the regional level, there was a high priority band starting at 5.05 in the 0–7.77 range which can be used in metropolitan coordination. At the urban level, the high priority band started at 6.87 in the 0–7.91 range which would identify first-review planting priorities in the urban area. For conservation, Washtenaw County had a priority weighting scheme with the weights of stormwater management, habitat connectivity, air quality, and heat being 25%, and social vulnerability and access to green space being 10%. The top properties varied in the different categories: Lambuth Farms and Conservation Easement–Northfield Twp–01 were the best in the category of conservation easements; Meadows Preserve and Northfield Woods Preserve were the best in the preserved recreation lands; while Newman, Morehouse 1, and Morehouse 2 were the best in the category of inactive nominations.

Keywords: green infrastructure; spatial prioritization; class gates; urban greening; land conservation; Detroit; Washtenaw County

1. Introduction

Green infrastructure is increasingly relied upon to manage flooding, reduce heat exposure, improve air quality, increase tree canopy coverage, protect biodiversity, and improve access to green space. Green infrastructure encompasses street trees, parks, greenways, stormwater swales, riparian buffers, vacant lot plantings, reforestation areas, and conservation lands. Its planning relevance derives from the ability of a single strategy to produce multiple public goods simultaneously [15, 45, 51, 53]. Street trees can reduce perceived heat, intercept rainwater, and enhance pedestrian comfort. Forest reserves can maintain habitat connections, stabilize soils, filter runoff, and provide recreational opportunities. Small-scale neighborhood green spaces may not represent ecological abundance

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but will provide greater access and health opportunities. Multi-functionality thus poses an allocation challenge for planners, requiring the identification of places where such benefits intersect and overlap sufficiently to warrant action, and the specification of appropriate action form.

The challenge is that green-infrastructure benefits tend not to peak at the same locations. High levels of urban heat and impervious runoff will tend to cluster in dense urban corridors, while habitat connectivity may thrive in more naturalized riparian or forest contexts. Areas of social vulnerability may be associated with low canopy and low access to parks, while air-quality burden areas may align with transportation and industrial corridors. Composite multi-criteria prioritization provides one solution to this set of overlapping geographies [13, 33, 38]. It enables the combination of different criteria into a prioritized map, in which various weights can be assigned and normalized. But the legend of the composite surface can carry more authority than it warrants. What might be a high priority may include an expansive score range or a tight score crest. High may arise from moderate scores in all criteria, from the dominance of one or two criteria, or even from the assignment of greater weight to certain planning goals.

This article will explore the translation of multi-functional green infrastructure scores into action guidance across seven county region, city planting program, and county property portfolio. The fundamental question will be one of contextually based decision making: a high class in a regional map should not necessarily be treated as a high-priority site for action within an urban planting program or a high-priority conservation easement for a county property portfolio. The environmental and social criteria are the same, but what they signify is determined by the scale of decision making, the decision-making entity, and the land use in question.

The approach will advance a class-gated decision model, drawing attention to the lower gate of the highest class, the span of each criterion interval, the distribution of weight among multiple criteria, and the positioning of named sites relative to their own class intervals. These elements do not override technical and operational decision making, including hydrology, planting feasibility, or owner engagement. Instead, they provide a bridge between evidence and decision. The resulting model will allow a regional agency to identify broad intergovernmental geographies, an urban planting program to set planting priorities based on stricter gate requirements, and a conservation agency to distinguish high-ranking properties from properties that need further consideration.

Southeast Michigan is an ideal setting for an analysis of green-infrastructure planning because it includes dense urban development, post-industrial landscapes, shoreline settlements, suburban developments, agricultural landscapes, forest fragments, parks, and conservation lands. The seven-county Southeast Michigan Council of Governments region is composed of Wayne, Washtenaw, Monroe, Livingston, Oakland, Macomb, and St. Clair counties. The city of Detroit contains dense urban development, abandoned lots, heat exposure areas, industrial and transportation corridors, and public health concerns. The conservation lands in Washtenaw County include county preserves and private easements, both of which have distinctive stewardship and reforestation needs. This variety of geographic environments allows for the examination of green infrastructure priorities across regional, urban, and property contexts, all based on the same set of environmental and social evidence domains.

A green infrastructure analysis will demonstrate the value of contextual decision making regarding multi-benefit priorities. The highest regional classes identify broad inter-governmental coordination geographies. The highest urban classes will help to identify planting priorities based on a stricter high-priority gate. Property rankings will identify high priority categories, but without imposing a countywide ordering of properties. These observations are supported by the observed ranges of class intervals, the weight distribution of individual criteria, and the positioning of properties within their own respective high-priority class intervals. All of the above is based on the evidence presented by Goodspeed et al. [19], and that citation refers to the specific values analyzed below.

2. Literature background

2.1. Environmental functions of urban green spaces

Many studies document the environmental and social contribution of urban forests and green spaces, including tree canopy coverage, forest cover, recreational areas, and parks. Trees in urban environments have the potential to store

carbon, moderate local temperatures, influence energy consumption, intercept rainfall, stabilize soils, and support biodiversity [21, 22, 43, 44, 47, 50]. Green spaces also promote recreation and restoration activities, offer social interactions, create sense of neighborhood, and have a positive effect on mental health [14, 23, 24, 48]. However, these green areas are often concentrated in affluent neighborhoods and lack in low-income neighborhoods. Planting activities can fail to reach neighborhoods that have limited access to green space or tree canopy. In general, tree canopy coverage is negatively associated with income, while planting and greenery are positively correlated with housing value.

2.2. Selective urban greening and environmental justice

The example of urban tree-planting and green-space campaigns highlights the problem of spatial selectivity. Despite high numbers of trees planted, urban greening programs may still fail to address the needs of underserved areas with low canopy coverage. The case of stormwater infrastructure is similar, since runoff reduction is a valuable function, which must be supplemented with other benefits, such as heat protection and access to green spaces [34, 42]. A similar problem exists with conservation planning tools that identify high value ecosystems but ignore the need for social accessibility or environmental protection in urban areas. This problem requires decision making that considers multiple priorities and criteria.

2.3. Spatial multicriteria decision analysis

One tool to address the problem of planning decisions based on multiple criteria is spatial multi-criteria decision analysis. By translating different factors into standardized and comparable maps, assigning weight to each factor, and calculating a composite priority surface, a multi-criteria analysis offers a transparent planning decision making [33]. Various applications of this methodology to environmental planning consider tree planting [30], stormwater infrastructure [4, 40], air pollution mitigation [7, 37], social equity, and other ecosystem services [5, 39]. The strength of this approach is that it provides planners with comprehensive and clearly articulated information about criteria used and weight assigned to each one. At the same time, it may overlook the internal structure of the resulting surface.

2.4. Class structure and decision sequencing

The internal structure is important for any planning decision, since staff members need to rank projects according to immediate and future needs. While the broad classification of sites with high priority serves as an initial screening tool, it leaves open questions related to field review, planting, and acquisition. Class intervals that are broad or shallow do not indicate high priority, while intervals that extend almost to the highest possible score point to urgent action. Weighting of factors reflects decision makers' preferences and can change the interpretation of the result. Finally, a property within a priority class may or may not be ranked highest within that class, depending on its absolute score.

This paper offers a model of class-gated decision making for environmental planning. The model is aimed at interpreting the existing spatial evidence and reading the information it carries, without adding new layers of complexity. In particular, the model is based on the understanding of class intervals, gates, and weights assigned to various criteria. The model does not estimate costs, planting viability, or landowners' consent, although this information is critical in the subsequent steps of decision making. Instead, the model interprets the available evidence and reads information about priorities that it carries. In the case of green infrastructure, a score can lead to different decisions regarding street-tree repair, vegetative buffer planting, reforestation of open land, management of nature reserve, or outreach efforts to conservation nominees.

3. Study area and data

3.1. Region setting

This paper analyzes green infrastructure in the seven-county Southeast Michigan Council of Governments region, an area with about 4.7 million people residing across 4,598 square miles. The seven counties include large urban cores, suburbs, agriculture, woodlands, and coastal environments. Major cities located in this region include Detroit, Ann Arbor, Monroe, Pontiac, Port Huron, and Warren. The pattern of green infrastructure across these communities includes urban heat islands, canopy coverage, runoff and stormwater control, and conservation lands.

3.2. Region evidence record

The evidence record used for region-wide planning analysis includes six different criteria. Stormwater infrastructure is assessed based on road areas receiving runoff treatments and land-use runoff coefficients. Social vulnerability is measured at the census-tract level and is calculated using 27 variables and principal component reduction. Access to green space is represented by proximity to parks and recreation areas. Urban heat island exposure is assessed using summer Landsat land-surface temperature. Air quality is calculated using the estimated concentration of $PM_{2.5}$ and ozone. Habitat connectivity is evaluated using a forest-based connectivity measure, created based on core habitats and stepping stones. Almost all criteria are mapped using 30 m grid.

3.3. Detroit urban planting program

Detroit urban planting program provides another context for a discussion of green infrastructure, specifically for planting. Detroit occupies 142.9 square miles and has a population of 713,777 people. The planting evidence record consists of nine city-wide factors divided into four groups. Among these groups there are air-quality-related, stormwater management, and public health factors. Air quality factors include estimates of $PM_{2.5}$ and ozone concentrations, whereas stormwater management involves factors related to runoff from different land uses. Public health-related factors include traffic volume, low canopy coverage, heat vulnerability index, and heat islands. In addition, there are factors related to neighborhood parks and asthma rates. The nine factors are associated with six planting settings: neighborhood tree canopy improvement, vegetative buffering, land-based projects, parks and greenways, commercial corridor plantings, and low-population areas.

3.4. Washtenaw County property record

Washtenaw County property evidence is used to evaluate the third and smallest scale of green infrastructure. This county has an area of 722 square miles and includes cities of Ann Arbor, Chelsea, Dexter, Milan, Saline, and Ypsilanti. Within the county there are 21 conservation lands, 33 preserved recreation lands, and 107 inactive nominations. The latter represents property records that were submitted and considered, but eventually withdrawn. Conserved lands and preserved recreation lands are privately owned and managed by the county. In the former case, private land is protected by conservation easements, while in the latter case lands are held by the county in order to conserve biological diversity. The weighting scheme in Washtenaw County is 25% for stormwater management, 25% habitat connectivity, 20% for air quality, and 10% each urban heat, social vulnerability, and access to green space.

The above geographic description highlights the importance of decision context in relation to green infrastructure planning. The regional map encompasses diverse urban, suburban, agriculture, woodland, and coastal geographies. The dense streetscape and urban parcels of Detroit make planning decisions dependent on traffic conditions, vacancy of sites, canopy deficiency, urban heat, public health risks, and landownership. Washtenaw County has a distinct geography of conservation land and preservation lands with unique challenges for reforestation.

The six surfaces in 2 describe different spatial mechanisms. Runoff is tied to land use and roads; vulnerability follows social geography; access depends on the distance to parks; heat follows summer surface temperature; air quality reflects regional pollution gradients; habitat connectivity follows the size and arrangement of forest patches. Their value comes from being read together, but each retains a different planning interpretation. The harmonized

Figure 1. Geography of the study.

30 m grid makes the layers comparable without implying that a road-dominated runoff cell, a vulnerable census tract, and a forest core represent the same kind of decision.

Weights in Figure 3 reveal two distinct contexts for decision-making. The regional surface assumes equality among all six criteria because the aim here is to make comparisons between regions on an extensive and diverse landscape. The Washtenaw schedule allocates higher weightage to stormwater management, habitat connectivity, and air quality since the county-level decisions involve conservation lands, recreation lands, and possibly reforestation efforts. This difference highlights the fact that weighting of criteria is not just a mathematical procedure, but a matter of the planning mission of the organization that utilizes the scores.

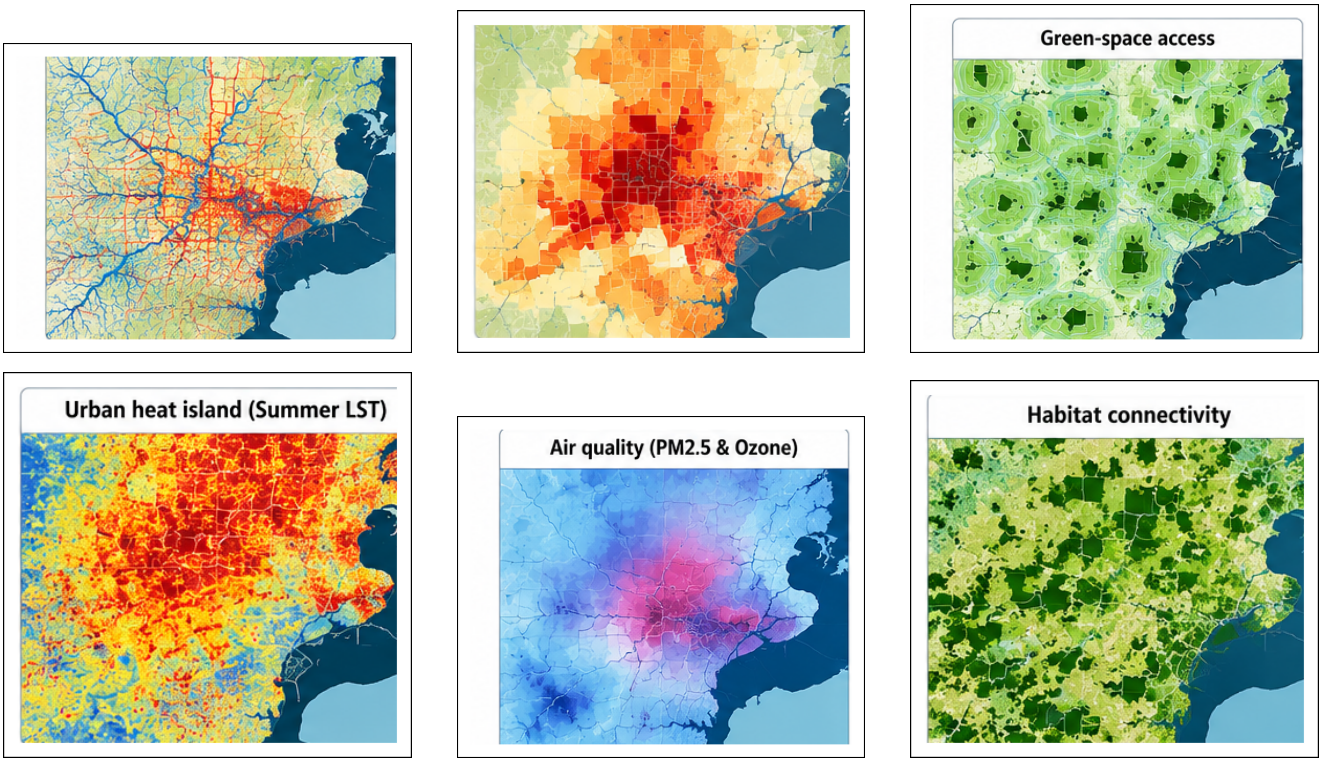

Figure 2. Regional evidence surfaces.

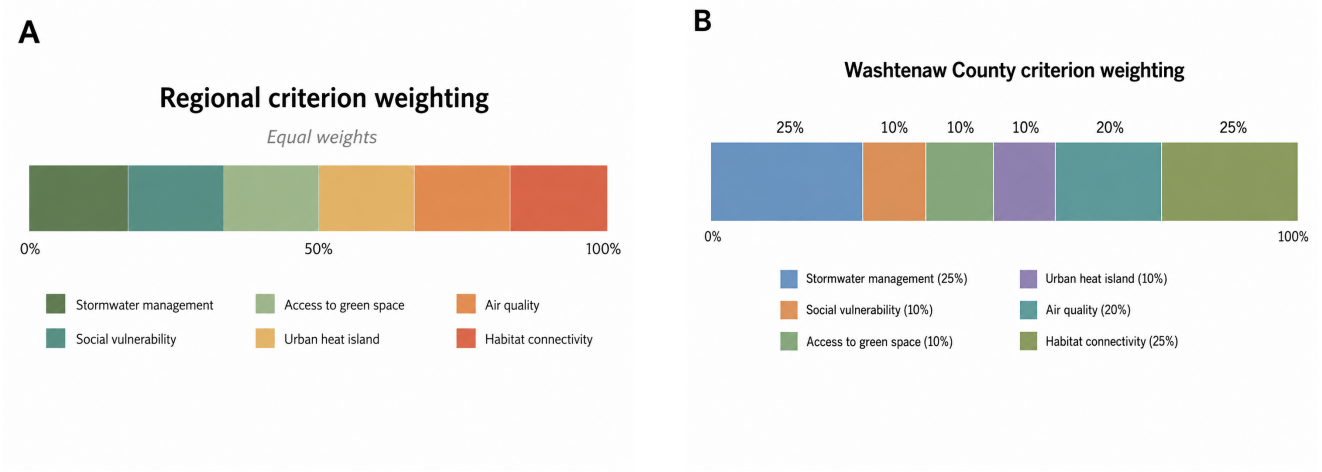

Figure 3. Criterion weights.

4. Materials and methods

4.1. Class-span calculation

In class-gated interpretation, four values are required to interpret the significance and action connotations of the mapped priority surface. First is the class span. Given a class having a lower bound L_c and an upper bound U_c with the observed range going from m to M, class span is calculated as follows,

$$S_c = \frac{U_c - L_c}{M - m}. \tag{1}$$

This value tells us how large a portion of the observed range the class occupies. Large high classes are particularly valuable for regional screening because they capture a large proportion of upper-end locations. Narrow high classes are more demanding as first review signals. However, span does not directly site selection; rather, it prevents a class

label from carrying the same significance in all locations.

4.2. Upper-priority gate

Second is the upper gate value. It shows how close a location needs to be to the observed maximum value to enter the high-priority class:

$$G = \frac{L_H}{M}. \tag{2}$$

Here L_H is the lower bound of the high class. A large gate is indicative of a strict upper-class threshold. This factor becomes particularly relevant in comparative analysis where we seek to compare Detroit's high-class definition against the rest of the region. Detroit's gate is much closer to the maximum value; therefore, its high class should be taken as a more discriminating planting recommendation than those from the rest of the region.

4.3. Weight breadth

Third is the weight breadth. We assume weights w_i that sum up to unity; then breadth is calculated as follows,

$$B = \frac{1}{\sum_i w_i^2}. \tag{3}$$

This value denotes the number of equally weighted criteria. A weight breadth of six indicates that all six criteria hold equal importance. The lower the value, the higher the concentration of weightage on a selected set of criteria. Even as it allocates higher weightage to stormwater management and habitat connectivity, the Washtenaw schedule maintains a weight breadth above five indicating multi-functionality.

4.4. Property crest position

Fourth is property crest position. For a property score x_j falling within the high interval of its property group, the crest position is calculated as follows,

$$C_j = \frac{x_j - L_H}{U_H - L_H}. \tag{4}$$

A crest position near one indicates that the property is at the top of its property group's high class interval. On the other hand, a value near zero indicates a property that falls into the high class but close to the lower boundary of the interval. This is significant for Washtenaw County since it makes all the top five properties high in their categories, but they are not equally urgent.

The span values in 1 define the main interpretive contrast. The regional high class covers 35.0% of the observed regional range, while the Detroit high class covers only 13.1% of the Detroit range. The regional high class therefore marks a broad coordination zone. The Detroit high class marks a stricter upper band for first planting review. The wide Detroit medium-low interval is also important because it contains many places that may fit specific planting purposes even though they are not in the strict upper class.

However, the results of the breadth shown in 2 indicate that the schedule of priorities in the Washtenaw county is not a single-benefit strategy. Stormwater management and habitat connectivity contribute to more than half of the total score. The remaining fifth goes to air quality; nevertheless, the factors like heat, social vulnerability, and access are still included in the assessment process. As a consequence, the highest-ranked parcel within Washtenaw County could be considered as multifunctional.

Table 1. Class span values.

Geography	Class	Lower	Upper	Span	Midpoint
Regional	Low	0.00	2.10	0.270	1.05
Regional	Medium-low	2.20	4.20	0.257	3.20
Regional	Medium	4.30	4.62	0.041	4.46
Regional	Medium-high	4.63	5.04	0.053	4.84
Regional	High	5.05	7.77	0.350	6.41
Detroit	Low	0.00	2.80	0.354	1.40
Detroit	Medium-low	2.90	6.02	0.394	4.46
Detroit	Medium	6.03	6.44	0.052	6.24
Detroit	Medium-high	6.45	6.86	0.052	6.66
Detroit	High	6.87	7.91	0.131	7.39

Table 2. Washtenaw weighting breadth.

Criterion	Weight	Squared weight	Planning role
Stormwater management	0.25	0.0625	Runoff-sensitive land management and watershed value
Habitat connectivity	0.25	0.0625	Forest continuity and stepping-stone connectivity
Air quality	0.20	0.0400	Atmospheric burden and public-health relevance
Urban heat island	0.10	0.0100	Thermal exposure and cooling need
Social vulnerability	0.10	0.0100	Distributional concern and exposure sensitivity
Access to green space	0.10	0.0100	Recreational access deficit and service geography
Total	1.00	0.1950	Effective criterion breadth: 5.13

5. Results

5.1. Regional Priority Structure

As a result of analyzing a seven-county priority map, we have identified an upper band located within Detroit, southern Macomb County, and Monroe. Other small clusters of parcels with the highest scores have been revealed in suburban and exurban parts of the region. This priority surface has a spatial structure determined by the mixed nature of this region. Urban clusters are characterized by high heat, imperviousness, exposure, air burden, and canopy deficit. However, rural and suburban parcels could also belong to this group.

Figure 4 can be analyzed as an example of metropolitan area of concern. There is a distinct concentration of high values in and around Detroit as well as in and around Monroe to the south. The high class starts at 5.05 and goes to 7.77, which is a very wide range of values and would be suitable for interjurisdictional collaboration. This range is too wide to act as a site list for immediate planting actions.

5.2. Detroit planting settings

For Detroit, the analysis result is more refined in terms of the upper gate. The high class starts at 6.87 and ends at a maximum value of 7.91, meaning that the upper gate will be 0.869. Therefore, a cell will have to be almost on the upper edge of the range to be considered in the high class. The city needs to set this gate and keep using the wide medium-low range for planting projects such as buffering traffic, repairing low-canopy streets, planting park edges, converting vacant lots into greenspaces, and enhancing commercial corridors.

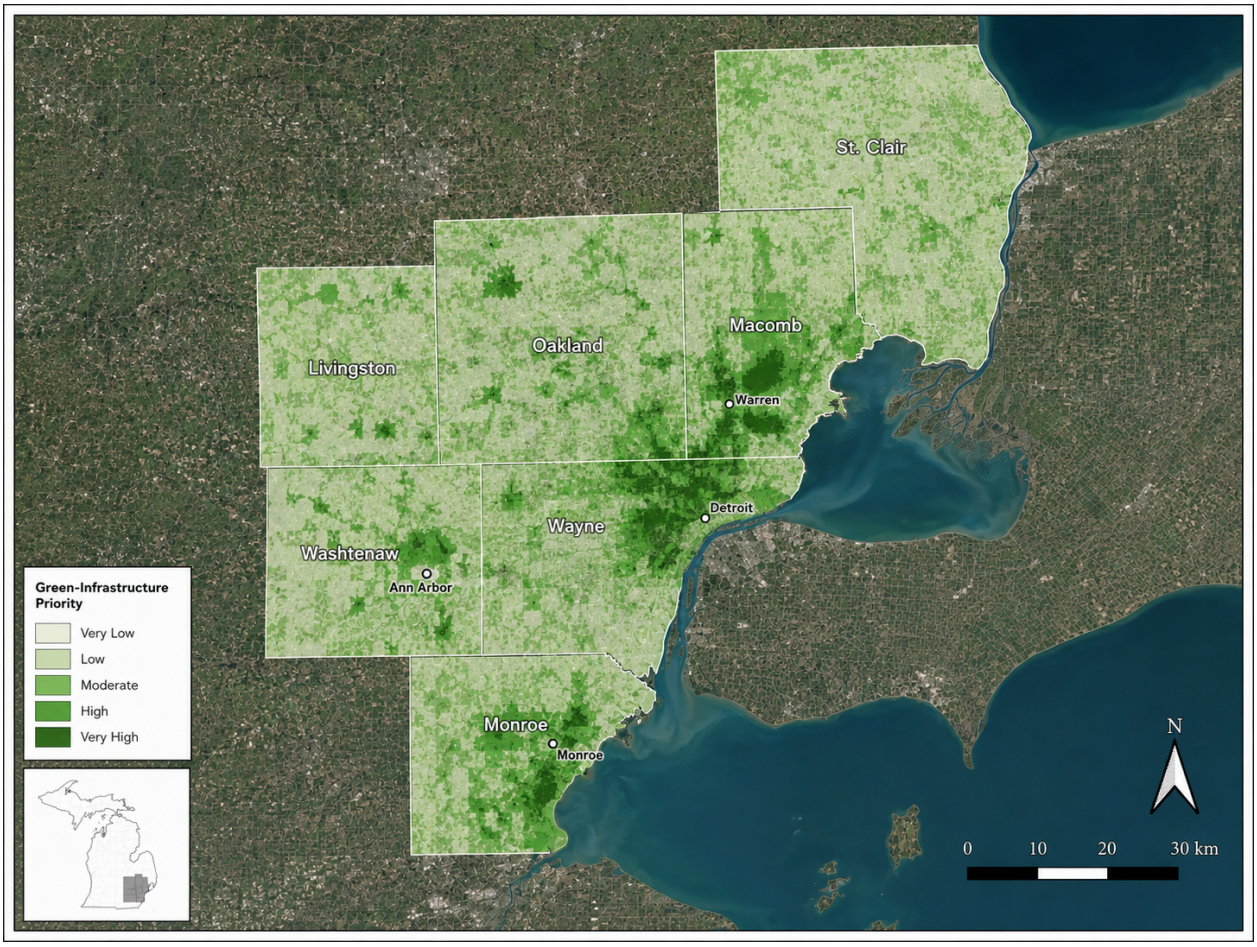

Figure 4. Regional priority surface.

Figure 5. Detroit planting settings.

The planting settings presented in Figure 5 explain why a single priority value for Detroit cannot be used without considering local objectives. Neighborhood tree canopy projects will cover low canopy, density, and vulnerability

areas. Vegetative buffer plantings will target areas with traffic corridors and schools in proximity. Land-based initiatives are based on contiguous vacant lots and nearby institutions or training sites. Park and greenway projects will address areas with low tree canopies around parks. Commercial corridor projects will address areas that need heat mitigation. Areas with low population densities might need reforestation projects.

5.3. Washtenaw County property ranking

In this case, a different kind of result is produced due to differences in how the administrative data was organized. Properties in conservation lands, preserved recreation lands, and inactive nominations should not be mixed. Private conservation easements need agreement between the owner and the municipality for planting. Properties within preserved recreation lands are publicly owned preserve lands where access and maintenance is needed. Inactive nominations require careful contacts and reviews.

Table 3. Washtenaw top-property positions.

Property group	Property	Score	Crest position	Planning attention
Conservation lands	Lambuth Farms	6.07	1.000	First queue
Conservation lands	Conservation Easement–Northfield Twp–01	6.06	0.944	First queue
Conservation lands	Liberty Glen Farms Easement	6.01	0.667	Field verification
Conservation lands	Conservation Easement–Lima Twp–02	5.96	0.389	Stewardship watch
Conservation lands	Uphaus	5.94	0.278	Stewardship watch
Preserved recreation lands	Meadows Preserve	5.94	1.000	First queue
Preserved recreation lands	Northfield Woods Preserve	5.88	0.917	First queue
Preserved recreation lands	Highland Preserve	5.83	0.847	Field verification
Preserved recreation lands	Arbor Woods Preserve	5.78	0.778	Field verification
Preserved recreation lands	Scio Woods Preserve	5.78	0.778	Field verification
Inactive nominations	Newman	6.53	1.000	First queue
Inactive nominations	Morehouse 1	6.48	0.930	First queue
Inactive nominations	Morehouse 2	6.48	0.930	First queue
Inactive nominations	DPG-Malick	6.38	0.789	Field verification
Inactive nominations	Poate	6.24	0.592	Stewardship watch

The property sequence in 3 is more specific than a top-five list. Lambuth Farms and Conservation Easement–Northfield Twp–01 sit at the upper crest of the conservation-easement group. Meadows Preserve and Northfield Woods Preserve lead the preserved recreation group. Newman, Morehouse 1, and Morehouse 2 lead the inactive nominations. DPG-Malick, Highland Preserve, Arbor Woods Preserve, Scio Woods Preserve, and Liberty Glen Farms Easement remain strong enough for field verification, while Poate, Uphaus, and Conservation Easement–Lima Twp–02 should remain visible for stewardship or later contact.

The three maps in Figure 6 preserve the difference between ecological signal and program status. Conservation lands, preserved recreation lands, and inactive nominations are all evaluated with the same weighted criteria, but each group enters a different decision path. This separation prevents a high inactive nomination from being treated as equivalent to a county-owned preserve while still keeping it visible for future contact and partnership.

5.4. Cross-scale interpretation

The strongest cross-scale result is that priority cannot be moved between geographies as a raw number. A regional cell with a score of 5.10 lies in the regional high class, but it would not enter Detroit's high class. Meadows Preserve at 5.94 sits at the top of its preserved recreation group, while Newman at 6.53 leads the inactive nomination group. These values are meaningful only inside their own class gates and property categories.

The comparison in Figure 7 highlights the role of context in guiding interpretation. The block-level environment of Detroit includes streets, vacant lots, residential areas, fragments of canopy, and impervious surfaces. The

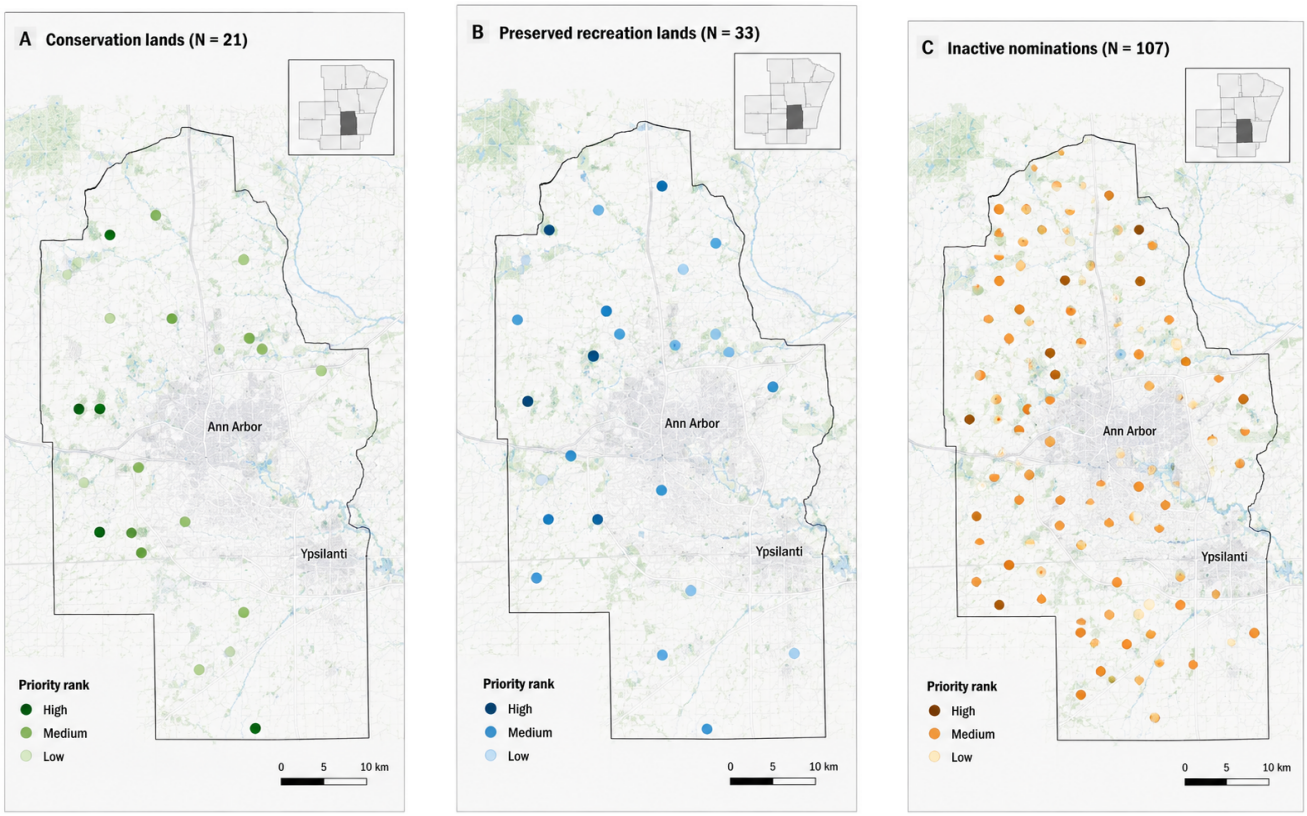

Figure 6. Washtenaw parcel priority.

Figure 7. Urban and rural settings.

environmental setting of Washtenaw includes forest blocks, farmland, riparian corridors, and open land. Both cases include the same multifunctional language. However, the former suggests actions such as planting, buffering, greening of vacant lots, and cooling, while the latter encourages forest stewardship, easement assessment, reforestation, and corridor protection.

6. Discussion

6.1. Planners' understanding of priority classes

As the analysis reveals, a classification of high priority is inherently ambiguous and requires explanation. For the regional surface, high priority starts at around 65% of the maxima and spans more than one third of the range.

Such breadth is appropriate for regional consideration because it accommodates several kinds of needs. Yet it is insufficient for identifying individual properties for consideration. In Detroit, the starting point is at nearly 87%, with a range that spans just 13%. This strict definition can inform the process of preliminary review, especially if low canopy, heat, air pollution, runoff, traffic volume, park distance, and public health issues are concerned.

6.2. Priority class weighting and property review

The property scores in Washtenaw reveal how weighting breadth affects the interpretation. Priority weighting is determined by stormwater management, habitat connectivity, and air quality. Social vulnerability, heat, and access are still relevant factors, although secondary compared to the former. Therefore, a top Washtenaw property can be described as an opportunity for conservation-oriented multifunctional development, with emphasis on stormwater management, connectivity of natural habitats, and improvement of air quality. It is more informative than saying that the place represents the highest multifunctional score.

6.3. Tree-planting and local decision making

The examples of Detroit reveal that priority is a conditional concept, depending on tree-planting setting. A priority area for neighborhood planting would focus on low-canopy residential areas. A vegetation buffer could consider residential or school areas near major streets. Land development initiatives may depend on the existence of contiguous vacant lots and institutional backing. Commercial corridors would be considered primarily in terms of heat reduction, walkability, and overall public domain condition. The definition of the class gate will show the strength of the priority. But the planting type will be determined by the local conditions.

The inactive nominations in Washtenaw are worth noting. Newman, Morehouse 1, and Morehouse 2 are upper-class candidates despite being administratively inactive. It does not mean immediate acquisition. It only suggests that the current property status cannot preclude the possibility that those locations will be revisited by county planning agencies. As such, class interpretation provides clear distinction between land value and program timing. The advantage of class gates is that they are based on property value without assuming any further actions.

The paper improves clarity of communication regarding priority. Instead of reporting the priority level of the property, planners can report the fact that the regional high class is broad and the Detroit high class is relatively narrow. The same statement can also include the claim that Washtenaw properties occupy the upper ends of their priority ranges. This language can be helpful in reports, interagency discussions, public presentations, and even landowner contacts. Finally, it helps to prevent exaggeration of priority effects on decision-making.

6.4. Analytical limitations and field validation

There are a number of limitations to the analysis. First, the interpretation is conditioned by the accuracy of the spatial layers and the appropriateness of class gates and weightings. Second, the paper does not account for capital cost, maintenance capacity, hydrological performance by soil/watershed position, likelihood of tree survival, willingness of landowners, or specific habitat conditions. Third, the analysis is unable to recommend any planting or conservation strategies or determine the optimal planting technique. Those decisions can be made after the initial field verification and stakeholder consultations.

As seen in Figure 8, field conditions matter to the classification outcomes. Low-canopy blocks, heat-exposed streets, impervious surfaces, and socially vulnerable residential areas of Detroit suggest tree-planting activities within the context of canopy management, runoff reduction, and public health. Forest cores, conservation lands, recreation trails, and reforestation opportunities of Washtenaw County imply habitat management, easement evaluation, trail maintenance, and acquisition/reevaluation of land rights. Only when class priority is combined with a feasible setting can it help decision-makers.

Figure 8. Settings of the implementation.

7. Conclusion

The paper addressed the challenge of translating multi-benefit priorities of multifunctional green infrastructure into actionable guidance in regional, urban, and property settings. The key recommendation is that class-based prioritization requires proper interpretation prior to decision sequencing. Class span shows if a high class is wide or relatively selective. The gate threshold reveals how close is the location to the maxima. Weighting span shows if the score is multifunctional or dominated by certain criteria. Property position shows if a property belongs to an upper end of a category or enters the priority.

In the Southeast Michigan application, three important findings emerge. First, the regional surface of the entire region should be used as guidance for interjurisdictional coordination. Its high class starts at 5.05 out of a 0–7.77 range and spans 35.0% of the range. Second, the Detroit high class should serve as guidance for stricter review of potential sites, with starting point of 6.87 out of a 0–7.91 range and span of 13.1%. Third, Washtenaw property records should be considered category by category: Lambuth Farms and Conservation Easement-Northfield Twp-01 for easements; Meadows Preserve and Northfield Woods Preserve for protected recreational lands; and Newman, Morehouse 1, and Morehouse 2 for inactive nominations.

Green-infrastructure prioritization should, therefore, be treated as a class-based decision signal. A regional high value implies interjurisdictional investigation. A Detroit high value suggests urban planting review and prioritization of canopy, heat, traffic, vacant lots, access, runoff, and health concerns. A high property score in Washtenaw indicates a property-specific queue for easement, conservation, reforestation, or contact with landowner. Multi-benefit evidence can inform all three categories of decisions, but only in conjunction with priority class gate, weighting, and implementation setting.

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