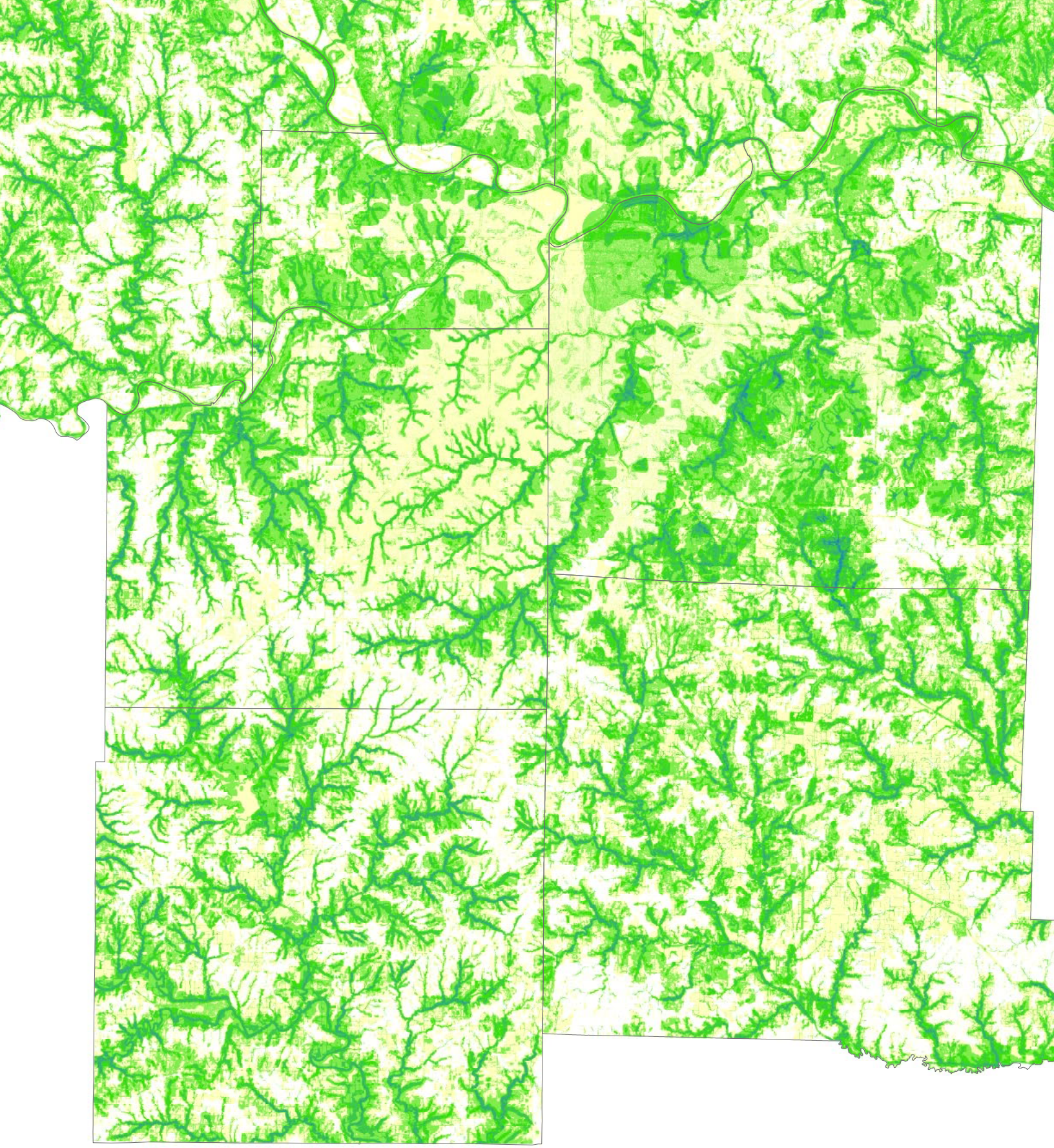


APPENDIX

PHASE 1 GREEN INFRASTRUCTURE FRAMEWORK

CONTENTS

D ANALYSIS PROCESS

After the stakeholder workshop, discussions over the analysis process began with creating a geospatial analysis with an ecological value focus in relation to impacts to, and needs of, regional ecosystems. The following tables and maps represent the factors and process.

See digital pdf and files for larger versions of images depicted.

ECOLOGICAL ANALYSIS

The team considered and tested a range of possible ways to group the data layers into resource and need categories, to aggregate information, and to use surrogates for data gaps. Consistent use of data layers from previous evaluations conducted by MARC and partners such as The Conservation Fund was also a consideration.

Data Processing

To develop the GIS analysis, the layers of primary criteria were compiled into a geodatabase and organized into feature datasets by analysis step (see the following table). The first step of analysis assigned all data the same projected coordinate system, NAD 1983 State Plane Missouri West, to ensure spatial accuracy and alignment. All data were then clipped to the MARC extents to ensure each feature represented the same area of interest. Buffers were then created for glades (open, rocky areas within woodland-dominated terrain) and for hydrology features such as streams, lakes and wetlands. (A 100-meter buffer distance was selected to be conservative in selecting areas of potential use by riparian wildlife and for analysis at the regional scale. In implementation at the project

scale, a narrower buffer may be more feasible in densely developed areas).

Before converting vector data to raster format, a union between each individual feature and the project boundary was required to create a cohesive layer representing all potential values throughout the site. When converted to raster format, areas where criteria features exist were scored as 1 (for present) and as 0 (where criteria were not present). All raster data was processed at 2.5-meter x 2.5-meter cells to match the resolution of the regional NRI 2.0 landcover data and to provide high resolution for zooming into watersheds and priority areas.

Three ecosystem service-based analyses by The Conservation Fund from the 2014 "GIS Assessment of Regional Forest and Natural Resource Priorities for the Mid-America Regional Council" (TCF 2014) were also selected for incorporation. These floating point rasters, with a value scale of 0 to 100, were converted to integer value rasters to increase processing speed and flexibility. A metric for each criterion was developed, and The Conservation Fund rasters were reclassified as either 1 (falling within the value threshold for the metric) or 0 (not meeting the value threshold).

The final step of each model performed a raster sum with the ArcGIS Spatial Analyst Raster Calculator tool, with each criterion weighted equally.

Ecological Value Model

The ecological value model incorporates criteria of the presence of aquatic and riparian-focused features such as streams, lakes, wetlands and floodplains; it also uses more terrestrially-focused criteria in the presence of forest, large herbaceous patches, caves and karst, and glades. Thus, more prevalent ecosystems and landcover types such as streams and forests are included, as well as less common, sensitive ecosystems such as caves and karst, and glades that may also support rarer flora and fauna. The Clean Water Benefits and Wildlife Benefits analyses in TCF 2014 were also included in the model, with a value threshold selected for each. All ten criteria were summed, with equal weight to each criterion.

The goal of this analysis is to identify areas where multiple ecological value criteria overlap, and where green infrastructure networks could be most effective for protecting and improving existing high value resources. In the following maps, higher values, represented in darker color tones, have an overlap of more ecological value criteria.

Impact/ Need Model

To identify areas in need of green infrastructure focused on restoration and improvements, a second analysis was performed. Impervious surface and a 100-meter buffer from major roads were combined to create one criterion. These features are used a surrogate for areas with higher water, air, and noise pollution which impact adjacent ecosystems, human, animal and plant health. Additionally, vehicular traffic acts as a barrier to animal movement, while collisions between vehicles and animals reduce species populations. Major roads will typically have more vehicular traffic, therefore the 100-meter buffer for is incorporated that category of road to account for a more wide-spread impact. The second and final criteria for this model is derived from the Forest Restoration Suitability analysis from TCF 2014. These areas with high suitability for forest restoration would have the greatest effect in improving ecosystem services if restored, and therefore are considered to have high restoration need. These two criteria were weighted equally and summed. Values of two indicate an overlap of both criteria, and therefore highest impact and need.

Combining Ecological Value with Impact/Need

The maps that follow show the results of the ecological value model and the impact/need model, as well as combinations of the two models. The combination of the two models is displayed through two approaches: a sum overlay and a two-variable (bivariate) analysis. The sum overlay sums all values of the two models. In this approach, higher values indicate a higher overlap of any combination of ecological value and/or impact/need criteria.

Therefore, this model provides a simplified output with higher values indicating areas of greater ecological interest without distinguishing between ecological value and impact/need categories. As the ecological value model has ten criteria and the impact/need model has two criteria, this summary is going to have an emphasis on high existing ecological value. This combination could be most useful as a general geospatial summary of ecologically-related resources and as a simplified base for overlays of additional categories of data such socio-economic factors.

The two-variable analysis maintains a distinction between existing ecological value and impact/ need, and presents a more detailed picture of their intersection. Impact/need values are on the x-axis of the rating matrix legend, using different color hues to indicate the amount of impact/need criteria present. Ecological value is on the y-axis of the legend, using darkness of tone to portray higher overlap of criteria from the ecological value model. The combinations of the two axes in the rating matrix legend thus indicate the various combinations of how many criteria are present from the two models, and where they overlap. This method illustrates where there is high ecological value and no impact/need overlap (which might indicate a greater conservation focus would be appropriate) and where there is an overlap of both high ecological value and impact/need (which might have a greater restoration focus). The map variation labeled "4-Classes" groups values into fewer color ranges, which simplifies the display of the data, but could be easier for some to interpret. The map variation labeled "Non-Zero Classes" shows only areas where there is overlap between the two models, allowing an easier visual identification of where green infrastructure restoration and improvements would have the greatest impact.

Ecological Characterization

The green infrastructure framework is rooted in the integration of natural systems with human systems, and it is intended to help prioritize implementation project areas where stacked benefits can be achieved. Ecological resources of the MARC region are related to physical resources and landscape context.

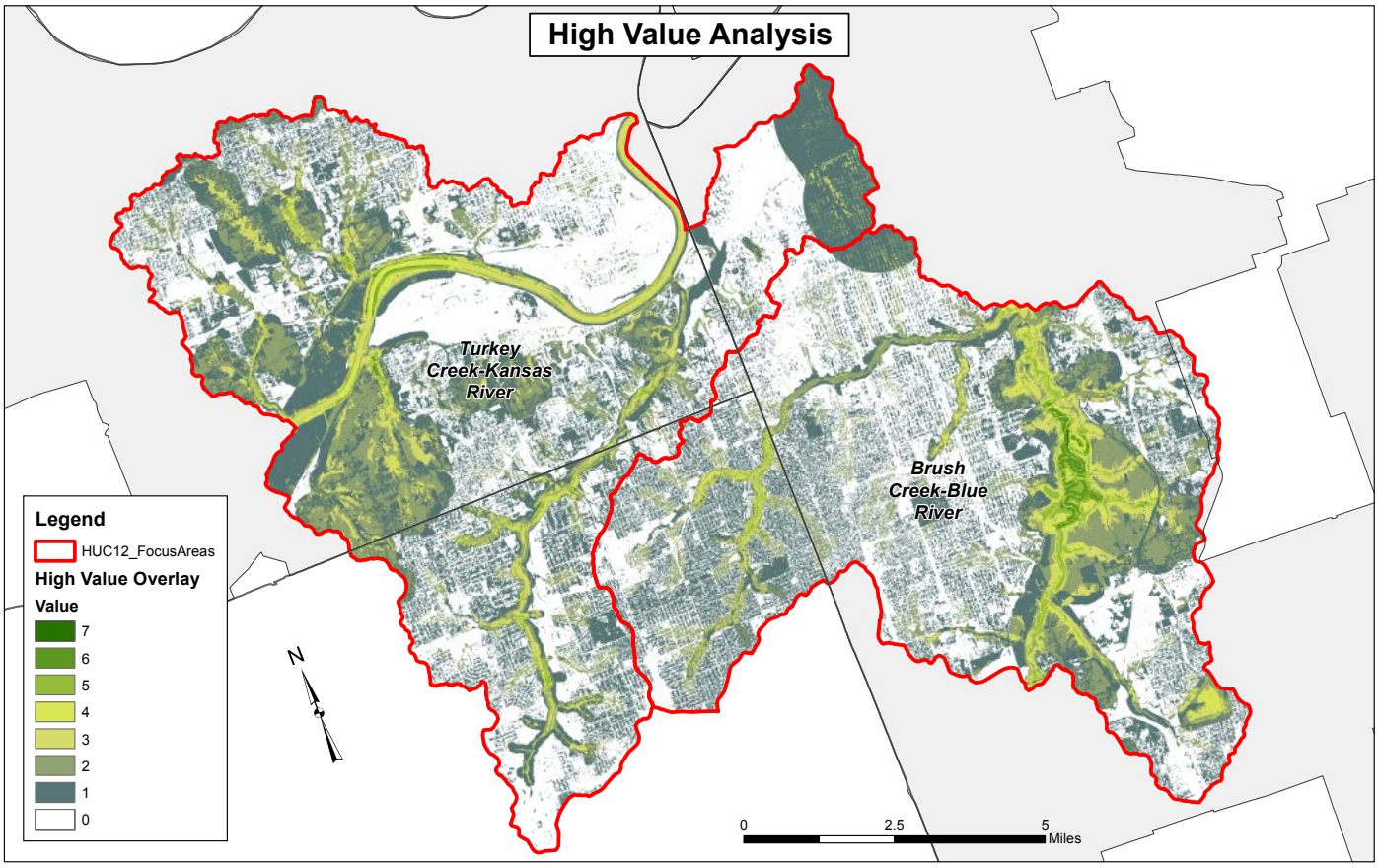
The model results suggest that the network of aquatic and riparian resources are typically the higher ecological value areas in this analysis. Areas where roads intersect the riparian zones, and where those riparian zones lack existing forest result in the greatest overlap of ecological value and impact/need for restoration and improvement of green infrastructure resources. The following maps further illustrate the analysis results and process.

ECOLOGICAL VALUE SUITABILITY ANALYSIS TABLE

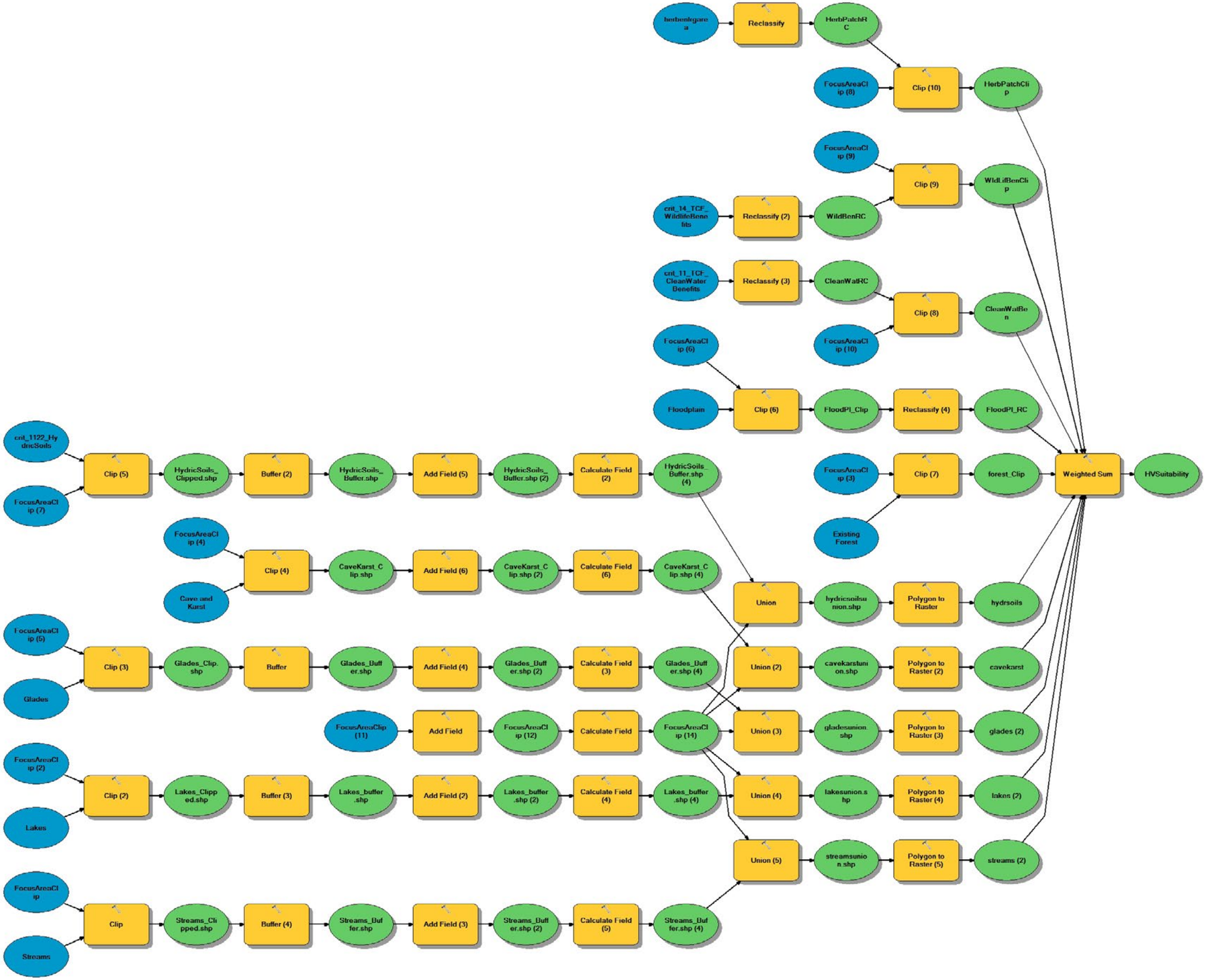
DATA INPUT	LAYER NAME	METRIC
High Ecological Value Model		
Streams	Streams	Streams plus 100m buffer= 1
Lakes	Lakes	Lakes plus 100m buffer= 1
Wetlands	wetland_comp	Wetlands plus 100m buffer= 1
Floodplains	crit_1115_Floodplain	100 and 500 yr floodplain= 1
Ex Forest	forest	Forest= 1
Large Herbaceous Patches	herb_lrgpatch	Herbaceous patches ≥101,171 sq m= 1
Caves and Karst	Cave_and_Karst	Cave and Karst areas 1
Glades	Glades	Glades plus 100m buffer= 1
Clean Water Benefits	crit_11int	Top 1/5 of Jenks Natural Breaks, value ≥ 62= 1
Wildlife Benefits	crit_14_int	Top 3/5 of Jenks Natural Breaks, value ≥ 32= 1
Impact/ Need Model		
Impervious Surface	impervious	Impervious surface plus 100m buffer to each side of Major Roads= 1
Major Roads	Highways	Impervious surface plus 100m buffer to each side of Major Roads= 1
Highest Forest Restoration Priority	restore_msk_high	Top 2/5 of Jenks Natural Breaks, value ≥ 29= 1

NOTES (All data extents are to the MARC boundary unless otherwise noted).	SOURCE
100m bufffer applied to both sides of streams.	USGS, EPA, ESRI, 2013, US Rivers and Streams
100m buffer applied to lakes.	Mid-America Regional Council, 2009, Lakes in the 9-county Kansas City region
Derived from Union of TCF 2014 "Criteria 1122, Water Retention/ Hydric Soils" and USFWS NWI 2016 wetlands. Both sources are used for more comprehensive coverage of wetlands and potential wetlands. 100m buffer applied to the resulting union.	The Conservation Fund (TCF), 2014, GIS Assessment of Regional Forest and Natural Resource Priorities For the Mid-America Regional Council & US Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI), 2016
Derived from TCF 2014, "Criteria 1115, Floodplain Location."	The Conservation Fund (TCF), 2014, GIS Assessment of Regional Forest and Natural Resource Priorities For the Mid-America Regional Council
Derived from NRI 2.0, Level 2 classification of "Forest."	Mid-America Regional Council, 2013, NRI 2.0 Natural Resources Inventory landcover data.
Derived from NRI 2.0 landcover data, Level 4 classification "Herbaceous." Herbaceous patches ≥101,171 sq m (25 acres) are selected based on habitat recommendations for grasshopper sparrow, a regionally characteristic prairie/grassland species.	Mid-America Regional Council, 2013, NRI 2.0 Natural Resources Inventory landcover data.
This data only available for Missouri. Areas have a buffer of unknown distance applied by Missouri Dept. of Conservation to protect sensitive cave locations.	Missouri Resource Assessment Partnership (MoRAP), 2008
This data only available for Missouri. 100m buffer applied to Glades.	Missouri Department of Natural Resources, 2014, Natural Glades
Derived from TCF 2014 "Criteria 11, Clean Water Benefits." Criteria 11 includes a weighted combination of: Water Purification Service. Erosion Control Service, Slope, Proximity to Drainage Network, Floodplains, Water Flow Regulation by Landcover, Water Retention/ Hydric Soils, Groundwater Recharge Service, and Groundwater Transmission Rate.	The Conservation Fund (TCF), 2014, GIS Assessment of Regional Forest and Natural Resource Priorities For the Mid-America Regional Council
Derived from TCF 2014, "Criteria 14, Wildlife Benefits."Top 3/5 of values are incorporated, because the TCF study favored large forest patches ≥ 75 acres. This model also focuses on the value of smaller patches more common in urban and suburban areas. Thus this model selects a larger range of values for this criteria to indirectly weight the data towards other subcriteria of wildlife benefit from the TCF 2014 study, such as proximity to forest patches. Criteria 14 includes a weighted combination of: Forest Patch Size (75 acres and greater), Forest Interior Habitat, Proximity to Ex. Forest Patches (within 250m to core forest), and Forest Patch % by Watershed (percent of forest within +/-HUC14, normalized to 100).	The Conservation Fund (TCF), 2014, GIS Assessment of Regional Forest and Natural Resource Priorities For the Mid-America Regional Council

Impervious Surface and Major Roads combined into a single criteria. Impervious Surface derived from NRI 2.0, Level 1 classification of "Impervious."	Mid-America Regional Council, 2013, NRI 2.0 Natural Resources Inventory landcover data.
Impervious Surface and Major Roads combined into a single criteria. Major Roads= "FuncClass" of Freeway/Expressway, Interstate, and Principal Arterial. 100m buffer applied to each side of Major Roads.	Mid-America Regional Council, 2008, Highway System
Derived from TCF 2014 Forest Restoration Suitability Value raster.	The Conservation Fund (TCF), 2014, GIS Assessment of Regional Forest and Natural Resource Priorities For the Mid-America Regional Council



HIGH VALUE ECOLOGICAL ANALYSIS GEOSPATIAL ANALYSIS MODEL (RIGHT) AND RESULTING MAP (ABOVE)


herbenlgare a
Reclassify
HerbPatchR C
FocusAreaCl ip (8)
Clip (10)
HerbPatchCli p
FocusAreaCl ip (9)
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WldLifBenCli p
crit_14_TCF_ WildlifeBene fits
Reclassify (2)
WildBenRC
crit_11_TCF_ CleanWater Benefits
Reclassify (3)
CleanWatRC
Clip (8)
CleanWatBe n
FocusAreaCl ip (10)
FocusAreaCl ip (6)
Floodplain
Clip (6)
FloodPl_Clip
Reclassify (4)
FloodPl_RC
crit_1122_Hy dricSoils
Clip (5)
HydricSoils_ Clipped.shp
Buffer (2)
HydricSoils_ Buffer.shp
Add Field (5)
HydricSoils_ Buffer.shp (2)
Calculate Field (2)
HydricSoils_ Buffer.shp (4)
FocusAreaCl ip (7)
FocusAreaCl ip (3)
Clip (7)
forest_Clip
Weighted Sum
HVSuitability
Existing Forest
FocusAreaCl ip (4)
Clip (4)
CaveKarst_C lip.shp
Add Field (6)
CaveKarst_C lip.shp (2)
Calculate Field (6)
CaveKarst_C lip.shp (4)
Cave and Karst
Union
hydricsoilsu nion.shp
Polygon to Raster
hydrsoils
FocusAreaCl ip (5)
Clip (3)
Glades_Clip. shp
Buffer
Glades_Buff er.shp
Add Field (4)
Glades_Buff er.shp (2)
Calculate Field (3)
Glades_Buff er.shp (4)
Glades
Union (2)
cavekarstun on.shp
Polygon to Raster (2)
cavekarst
FocusAreaClip (11)
Add Field
FocusAreaCl ip (12)
Calculate Field
FocusAreaCl ip (14)
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Polygon to Raster (3)
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Lakes_Clipp ed.shp
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Calculate Field (4)
Lakes_buffer .shp (4)
Lakes
Union (4)
lakesunion.s hp
Polygon to Raster (4)
lakes (2)
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Polygon to Raster (5)
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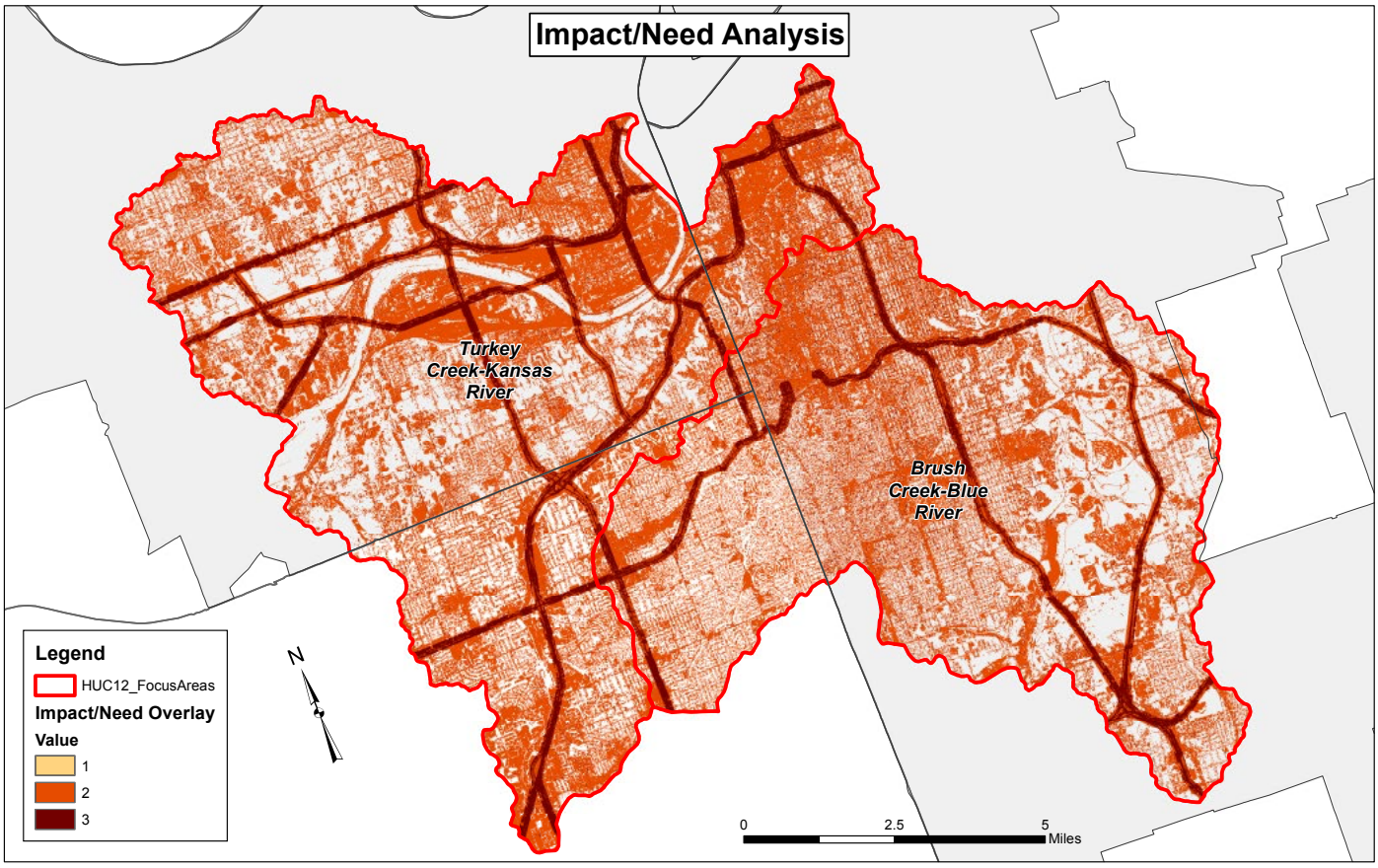
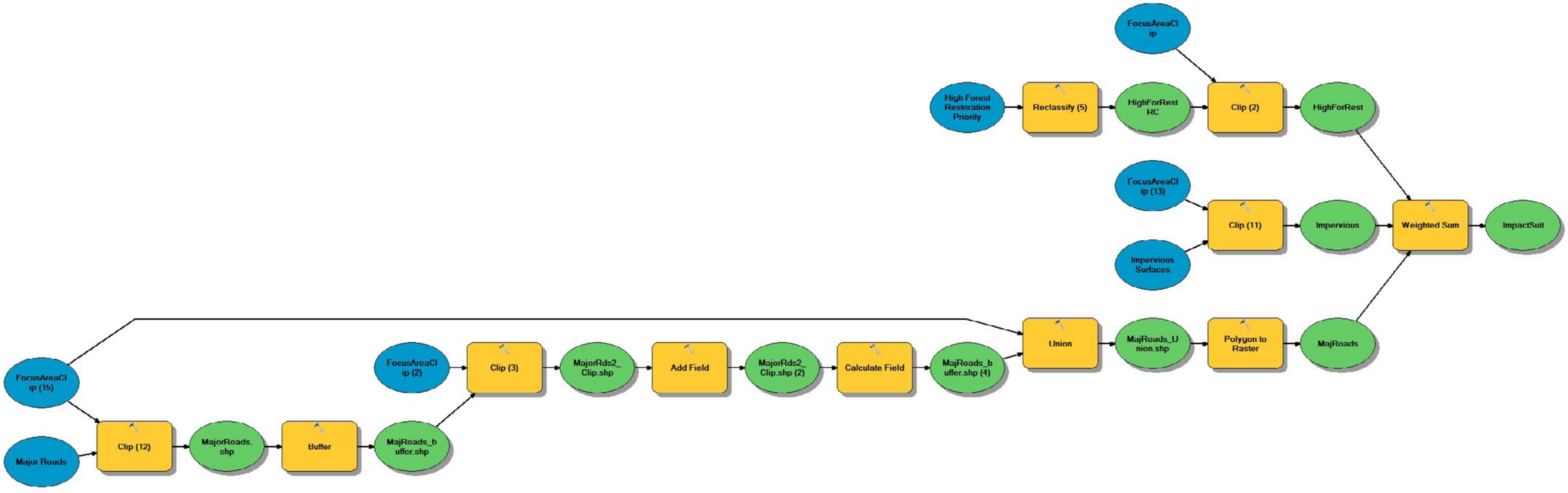
Streams



IMPACT/NEED ECOLOGICAL ANALYSIS GEOSPATIAL ANALYSIS MODEL (RIGHT) AND RESULTING MAP (ABOVE)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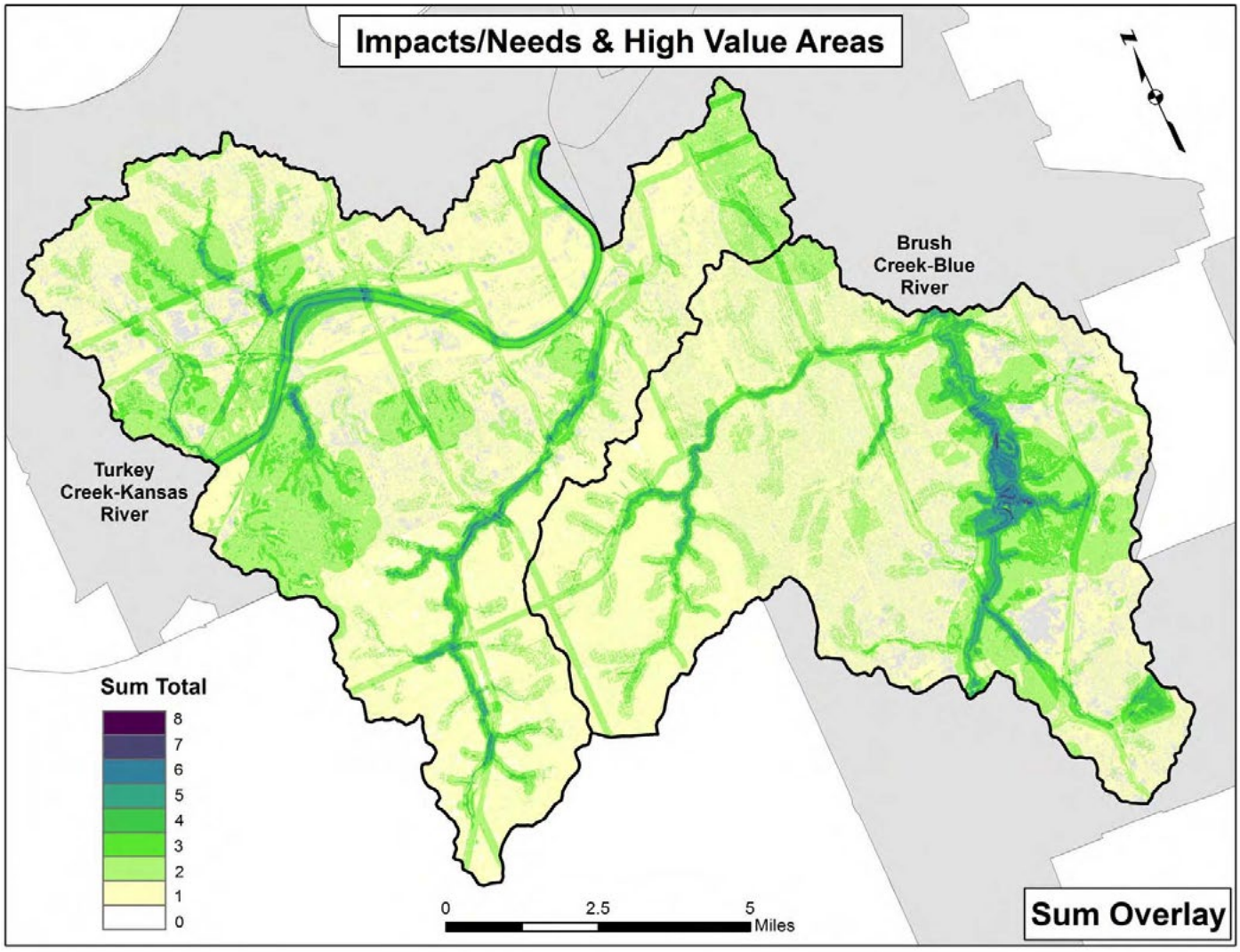
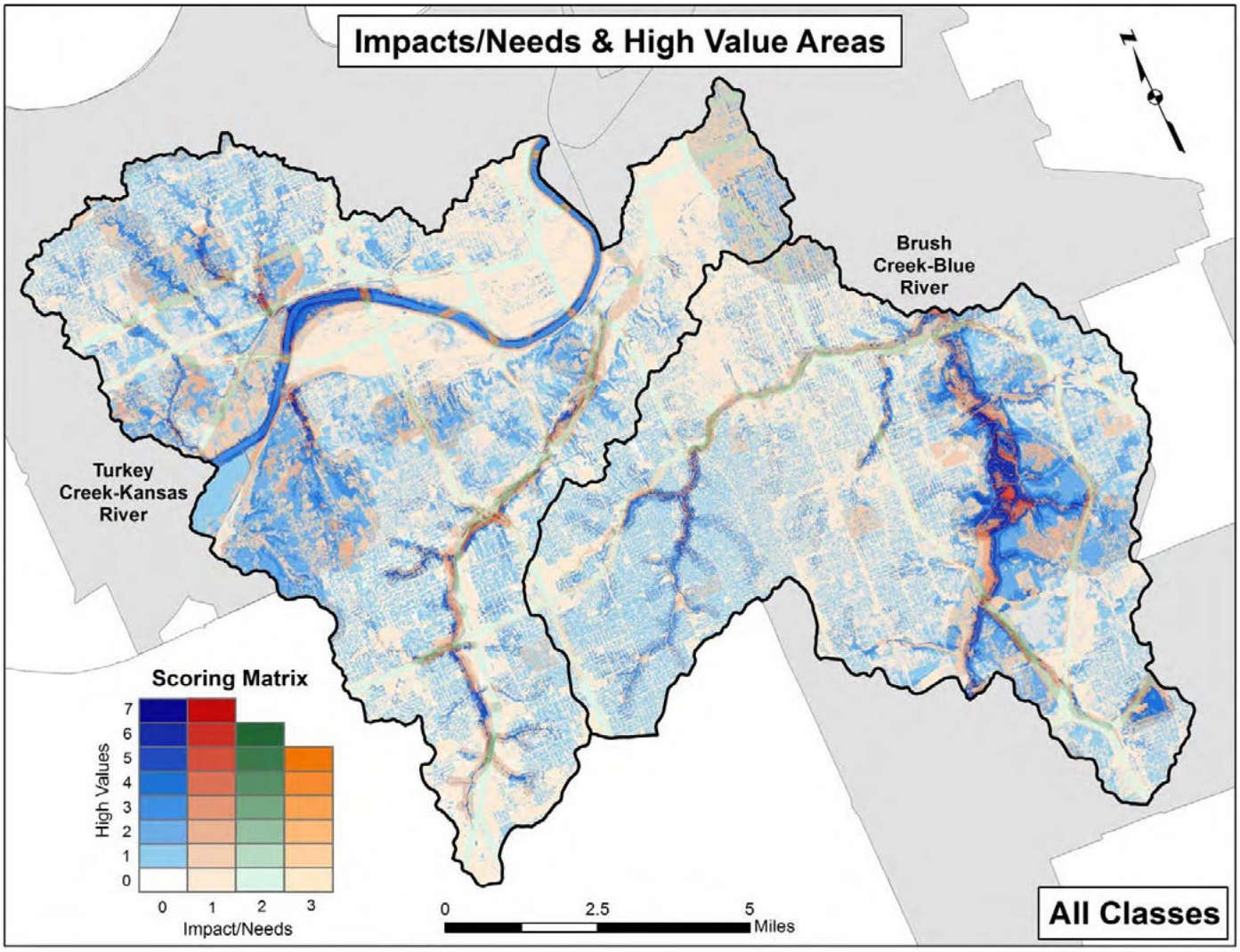
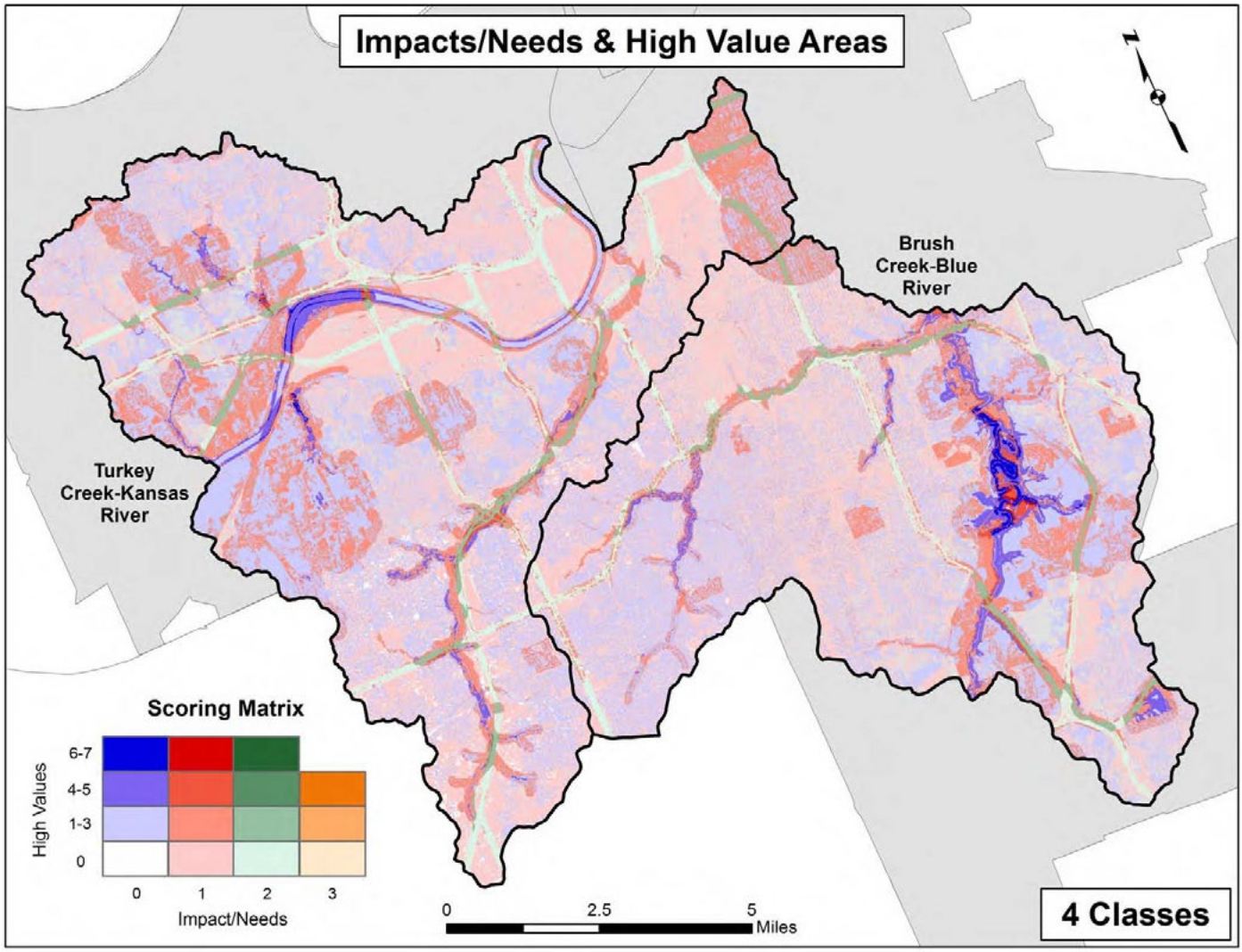
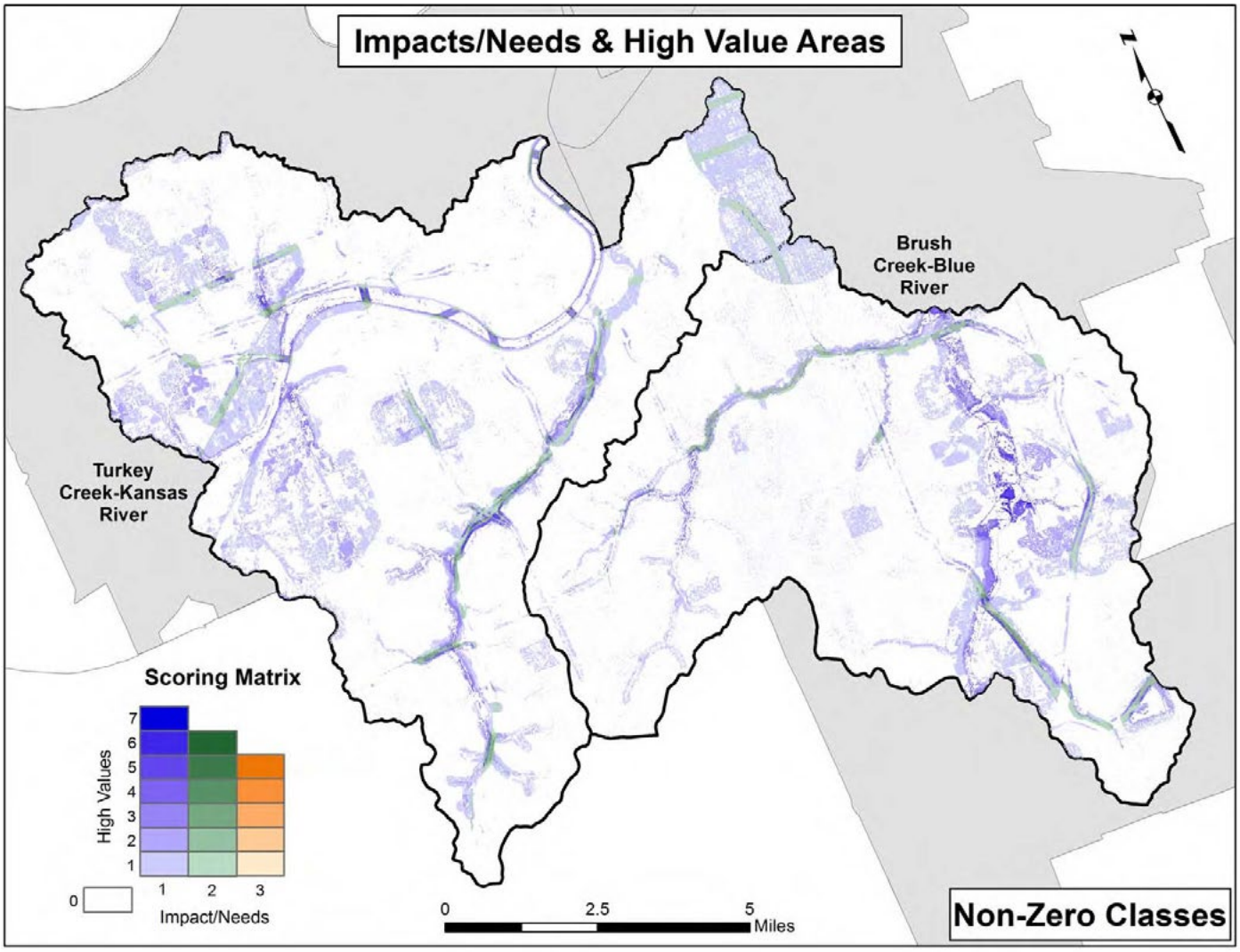
Reclassify (5)
HighForRestRC
Clip (2)
HighForRest
FocusAreaClip (13)
Impervious Surfaces
Clip (11)
Impervious
Weighted Sum
ImpactSuit
Union
MajRoads_Union.shp
Polygon to Raster
MajRoads
FocusAreaClip (15)
FocusAreaClip (2)
Clip (3)
MajorRds2_Clip.shp
Add Field
MajorRds2_Clip.shp (2)
Calculate Field
MajRoads_buffer.shp (4)
Major Roads
Clip (12)
MajorRoads.shp
Buffer
MajRoads_buffer.shp



COMBINED HIGH VALUE AND IMPACT/NEED ECOLOGICAL ANALYSIS GRAPHIC COMMUNICATION PROCESS MAPS


Impacts/Needs & High Value Areas
Brush Creek-Blue River
Turkey Creek-Kansas River
Scoring Matrix
High Values
7
6
5
4
3
2
1
0
0
1
2
3
Impact/Needs
0
2.5
5
Miles
All Classes


Impacts/Needs & High Value Areas
Brush Creek-Blue River
Turkey Creek-Kansas River
Scoring Matrix
High Values
6-7
4-5
1-3
0
0
1
2
3
Impact/Needs
0
2.5
5
Miles
4 Classes


Impacts/Needs & High Value Areas
Brush Creek-Blue River
Turkey Creek-Kansas River
Scoring Matrix
High Values
7
6
5
4
3
2
1
0
1
2
3
Impact/Needs
0
2.5
5
Miles
Non-Zero Classes

HUMAN AND SOCIAL ANALYSIS

The benefits, feasibility, and effectiveness of green infrastructure is dependent on not only ecological factors, but human factors as well. A geospatial analysis of human physical and social factors was conducted and then overlaid with the final ecological analysis results. In conducting this analysis, the criteria of momentum, accessibility, proximity and need were considered.

Data Processing

The first steps of the GIS analysis were the same for both BNIM and Biohabitats: the layers of primary criteria were compiled into a geodatabase and organized into feature datasets by analysis step (see the following table). The first step of analysis assigned all data the same projected coordinate system, NAD 1983 State Plane Missouri West, to ensure spatial accuracy and alignment. All data were then clipped to the MARC extents to ensure each feature represented the same area of interest.

Data Input Selection

Each human and social data input included in the analysis was considered due to its relevance to at least one of the four criteria for the green infrastructure framework: momentum, accessibility, proximity, and need.

- Momentum

For the purposes of the analysis, data inputs related to momentum were those which measured existing capacity to implement green infrastructure in a short or medium time frame. These included public ownership of land and projects already funded, underway, or recently completed. The projects included in this analysis do not comprise a comprehensive list of all projects within the studied watersheds, but represent relatively well publicized efforts which BNIM is currently aware of. Development pressure, as measured by large changes in population, was included due to the development activity associated with population fluctations.

- Accessibility

Accessibility was primarily measured in the level of human activity and the presence of publicly visible potential demonstration sites. Therefore, MARC identified activity centers, institutions, and cultural sites were included.

- Proximity

Existing MetroGreen trails were included for the high value of their benefit to the local community and for their role as highly accessible network connections between potential project sites.

- Need

The most disadvantaged populations and those population which stand most to gain from green infrastructure improvements were prioritized for considering data inputs measuring need. These populations were identified through demographic measures, such as poverty and transportation need (as developed by BikeWalkKC), but also by spatial proximity to 'goods' or 'bads', such as limited access to healthy food, and proximity to contaminated sites. However, need also represents the impact of human development and behaviors on sensitive ecological systems. Therefore, measures intensive land uses associated with ecological stress such as industrial land uses in urbanized areas and cultivated farmland in rural areas were included.

Some data inputs were relevant to multiple criteria. Measures of gaps and opportunities related to healthy lifestyles were included as a measure of both need and momentum following conversations with stakeholders that healthy living is important to regional organiations and unevenly accessible. A separate, intensive transportation analysis was included for the role transportation plays in all four criteria.

Finally, the human and social data inputs included in the final analysis were customized according to their relevance of the three geographies under study: the region, the Brush Creek watershed, and the Turkey Creek watershed.

Depending on their appropriate relevance, data inputs were analyzed in one of two ways: as an inventory overlay, or as an intersection analysis with the ecological analysis.

Inventory Analysis

Some data inputs were analyzed as a standalone inventory of what currently exists in within the region. These data inputs were then directly overlaid on the final ecological analysis to study both intersections and potential proximities to areas of high ecological value and need.

These data inputs were largely those mapping physical land uses, connective elements, and measures of existing capacity. This approach was chosen for land use and connective elements because of their impact on ecological features which may not intersect the human feature, but lie nearby or downstream. Measures of exiting capacity were also mapped as an inventory because such an inventory for all current projects does not currently exist, and because projects worthwhile for short term implementation may not necessarily reside within ecologically critical areas.

The regional maps on pages 30 - 35 in the Atlas and Playbook which were created this way were: Transportation Investments, MetroGreen Corridors, and Human Impact on Land.

Intersection Analysis

Some data inputs were analyzed as an isolated intersection with high value/high need ecological areas. These data inputs were clipped to areas which received a score of 3 or greater in Biohabitats's ecological analysis. Factors which were analyzed as an ecological intersection were primarily social and demographic factors related to need and accessibility based on the conclusion that improving access to green infrastructure for vulnerable populations will provide the most benefits in areas of high ecological value and sensitivity. Development pressure in the form of population change is also most pressing in these high value/high need ecological areas and so was also analyzed as an intersection.

he regional maps on pages 30 - 35 in the Atlas and Playbook which were created this way were: Transportation Equity, Activity Centers, and Social Conditions.

The human and social analysis was an iterative process. The maps and analysis evolved as inputs were tested for relevance for the region, for each transect, and in relationship to other inputs. The mapping process continued in an iterative fashion to test and understand the clearest way to communicate key relationships. The following maps are some 'process' maps which show a series of snapshots of this evolutionary process.

HUMAN AND SOCIAL VALUE SUITABILITY ANALYSIS TABLE

Regional Social Atlas	
Data Input	**LAYER NAME**
high value	
MetroGreen trails	metrogreen_quartmi_buffer
impact & need	
Food deserts	Food Deserts
Environmental justice areas of concern poverty EPA brownfields	environmental_justice_eco_intersect percent poverty by census tract hazardous sites
Population growth	PopulationGain_eco_intersect
Population loss	Population_loss_eco_intersect
land use	
Parks	Parks
activity centers	Activity Centers
Industrial land use	lusimp_v3
cultivated land use	MARC_LULC_Final

Turkey Creek Human + Social Analysis	
LAYER	**LAYER NAME**
Transportation	
+BWKC	
Funded Transportation projects	TIP
Major roads	roads
MetroGreen	metrogreen
Healthy Living	
trails	Rosedale_Trails
parks	Parks
healthcare	Hospitals
health indiators obesity diabetes cancer	CDC_health_tracts
Existing Capacity	
Native Plants Initiatives	NativePlantIniativeLocations
Parks	Parks
renew the blue sites	Re_Blue
Existing KCMO GI	KCMO_GI
Human Activity Spatial Access	
Activity Centers	Activity Centers
Cultural Density	cultural density
Development Pressure	
Population growth	PopulationGain_eco_intersect
Population loss	Population_loss_eco_intersect

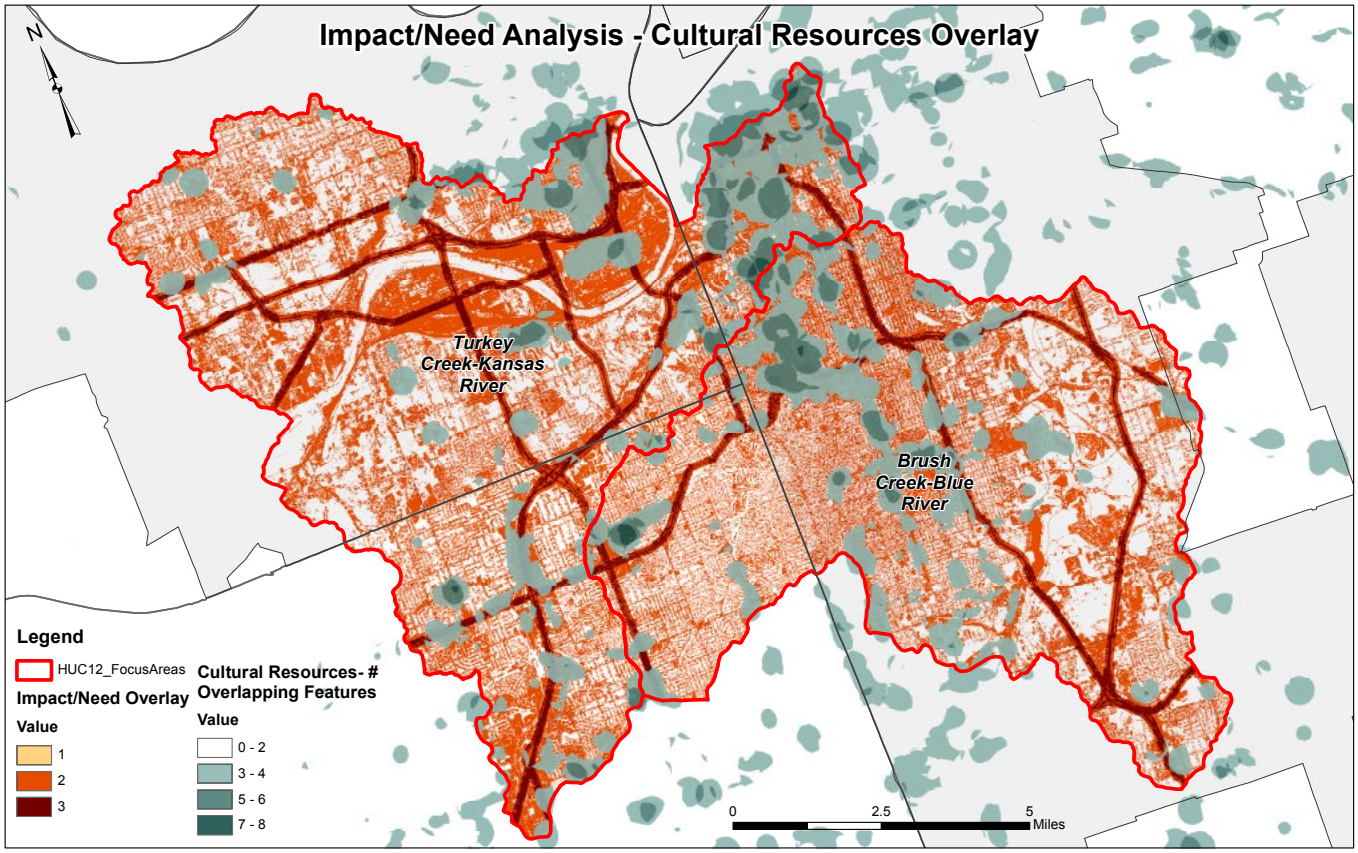
METRIC	NOTES	SOURCE
with 1/4 mile buffer	buffer used to identify walkable access distance to trail; trails represent high value recreational infrastructure	MARC
Limited Inome limited access within 1 urban or 10 rural miles	Census tract geography	USDA Economic Research Service
% poverty > 10% brownfield density = >50/sq mi	areas of concentrated overlaps of poverty and site contamination	U.S. Census, 2010 EPA
2010-2040 Population Gain per Sq. Mi > 500 persons	areas facing development pressure, increased activity + potential for strategic mitigation of possible negative environmental effects	MARC
2010-2040 Population Loss per Sq. Mi > 500 persons	areas facing development challenges related to population loss + potential for restoration on previously occupied vacant lands	MARC
park present? Yes/no	capacity for projects associated with public ownership	MARC
MARC's metrics for determining activity centers	areas of potential heightened social and environmental impact due to human use of land	MARC
Current Industrial land use	areas of potential heightened social and environmental impact due to human use of land	MARC
current cultivated vegetative land cover	areas of potential heightened social and environmental impact due to human use of land	MARC

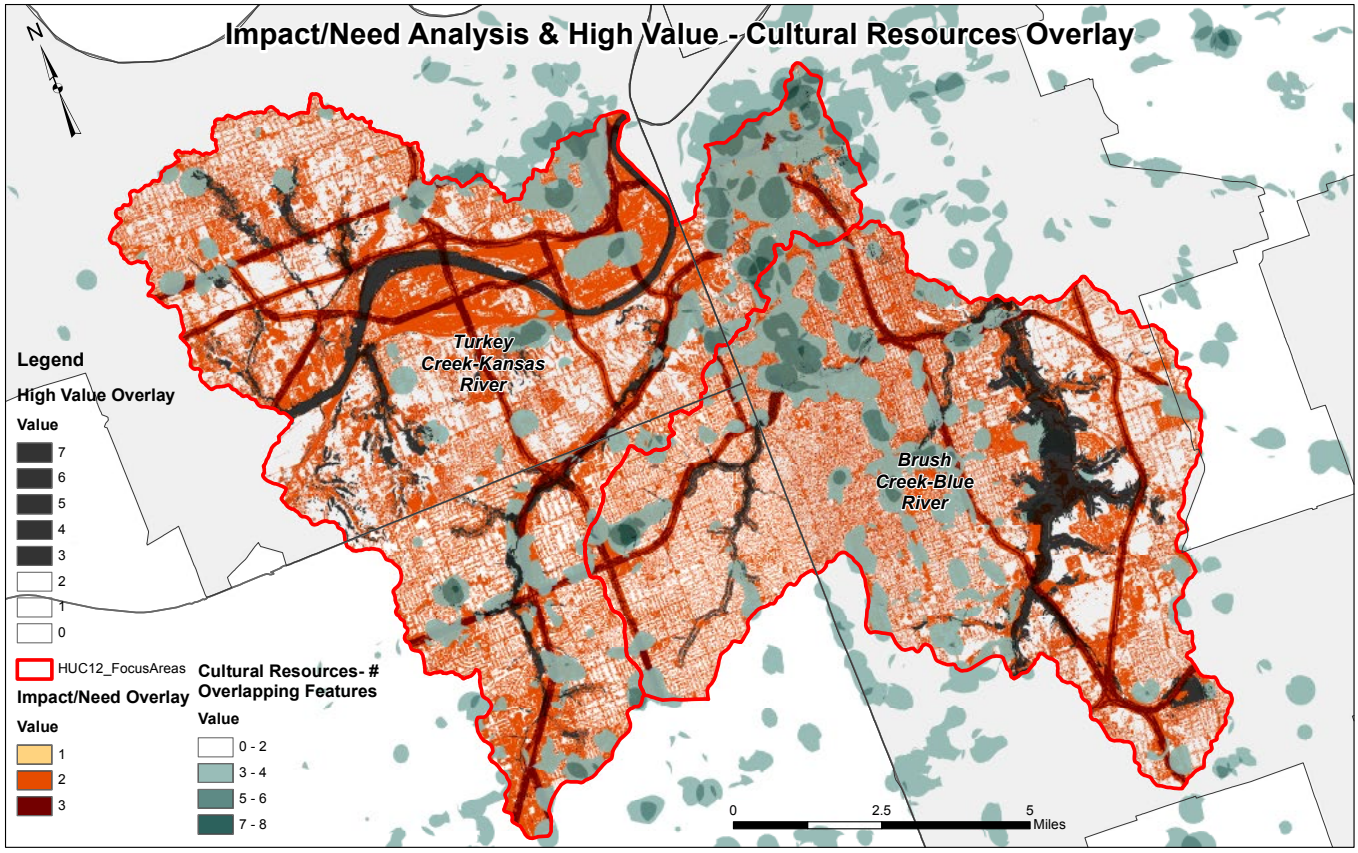
METRIC	NOTES	SOURCE
	layers provided by BikeWalkKC's transportation analysis	
	Project status by: Funded, planned, and application	MARC
		MARC
		MARC
		Rosedale Master Plan
	parks and trails offer opportunities for active living	KCMO
	access to healthcare: hospitals, clinics	KCMO
"'OBESITY_CrudePrev" >= 39.6 OR "DIABETES_CrudePrev" >= 13.2 OR "CANCER_CrudePrev" >= 8.8	health indicators for preventable diseases associated with environmental factors, including air quality, food access, and active living Based on national averages from CDC - selected tracts with rates at least 10% higher than national average	CDC 500 cities project
	NPI Project sites	Native Plants Initiative
		MARC
	Renew the blue project sites	
	Existing BMP Projects - marlborough coalition	Burns & McDonald
MARC Activity Centers		MARC
hospitals, police stations, colleges, schools	Activity centers and institions used to measure human access to potential GI projects	KCMO Land Bank, UG of Wyandotte County Land bank
2010-2040 Population Gain per Sq. Mi > 500 persons	areas facing development pressure, increased activity + potential for strategic mitigation of possible negative environmental effects	MARC
2010-2040 Population Loss per Sq. Mi > 500 persons	areas facing development challenges related to population loss + potential for restoration on previously occupied vacant lands	MARC

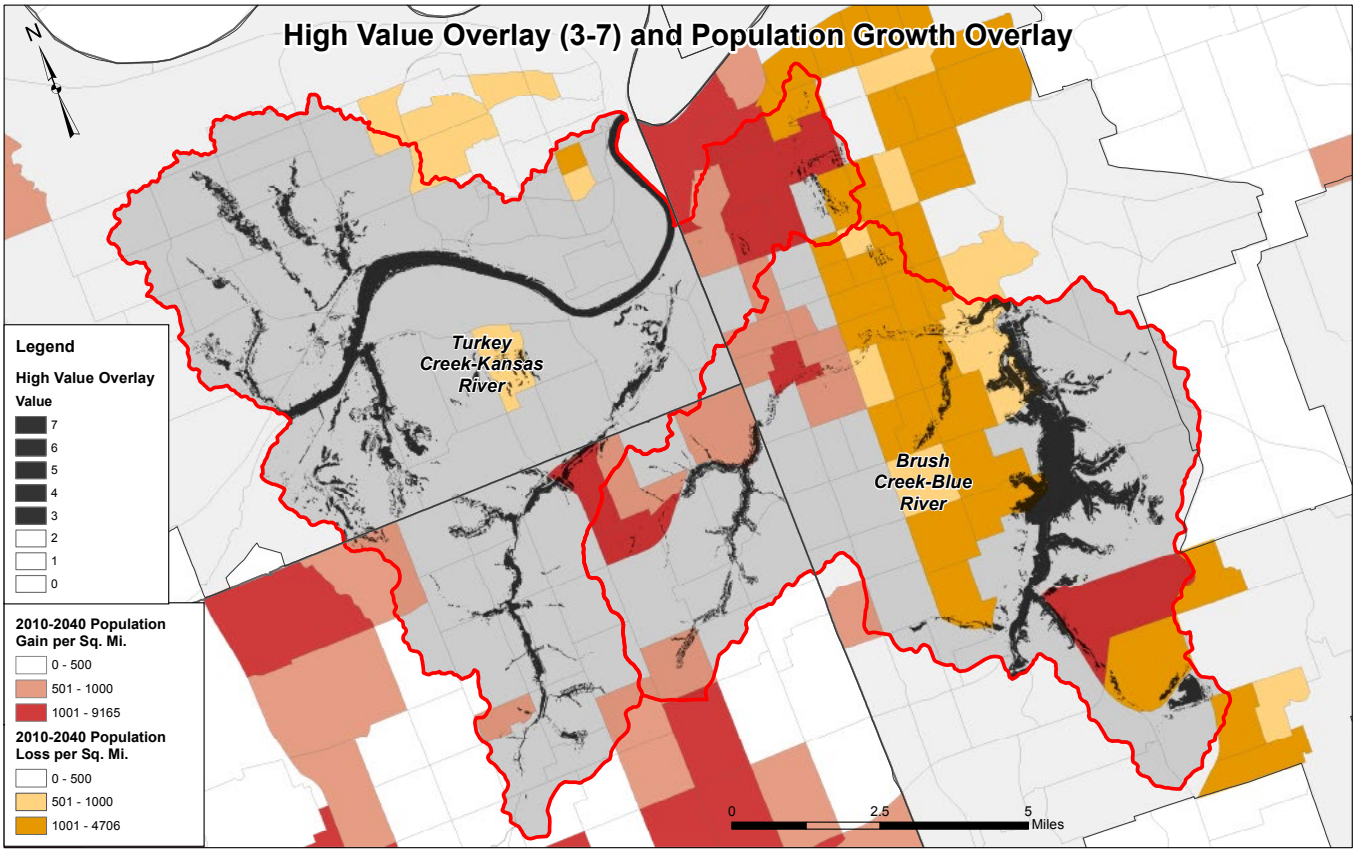
HUMAN AND SOCIAL VALUE SUITABILITY ANALYSIS TABLE

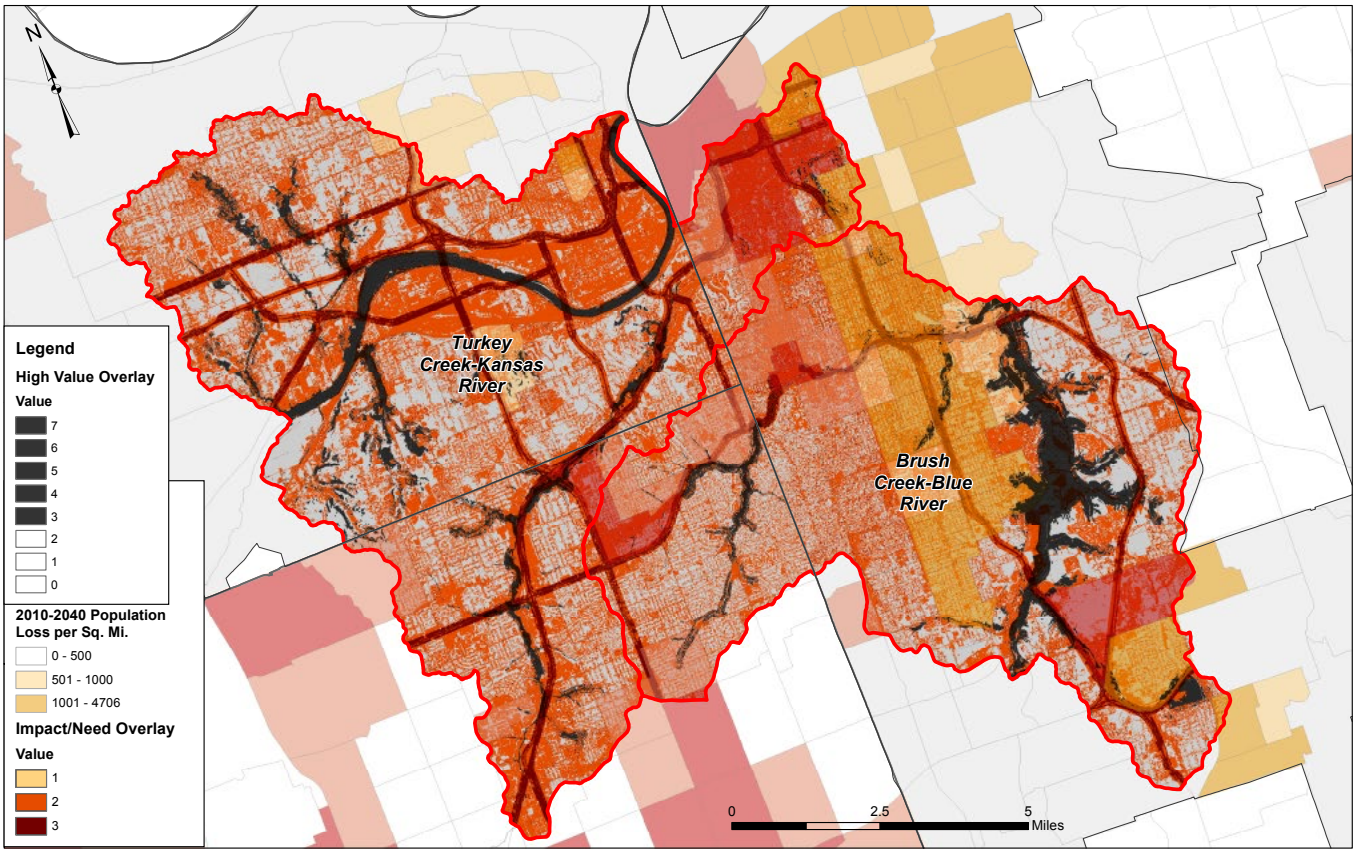
Brush Creek Human + Social Analysis	
Data Input	**LAYER NAME**
Transportation	
+BWKC	
Funded Transportation projects	TIP
Major roads	roads
MetroGreen	metrogreen
Healthy food access	
Land bank parcels	KCMO_Land_Bank; WyCO_Land_Bank
Food deserts	Food Deserts
poverty per acre	poverty
health indiators obesity diabetes cancer	CDC_health_tracts
Human Activity Spatial Access	
Activity Centers	Activity Centers
Cultural Density	cultural density
Development Pressure	
Population growth	PopulationGain_eco_intersect
Population loss	Population_loss_eco_intersect
Existing Capacity	
Native Plants Initiatives	NativePlantIniativeLocations
Parks	Parks
renew the blue sites	Re_Blue
Existing KCMO GI	KCMO_GI
EPA Blue River Urban Waters Projects	EPA

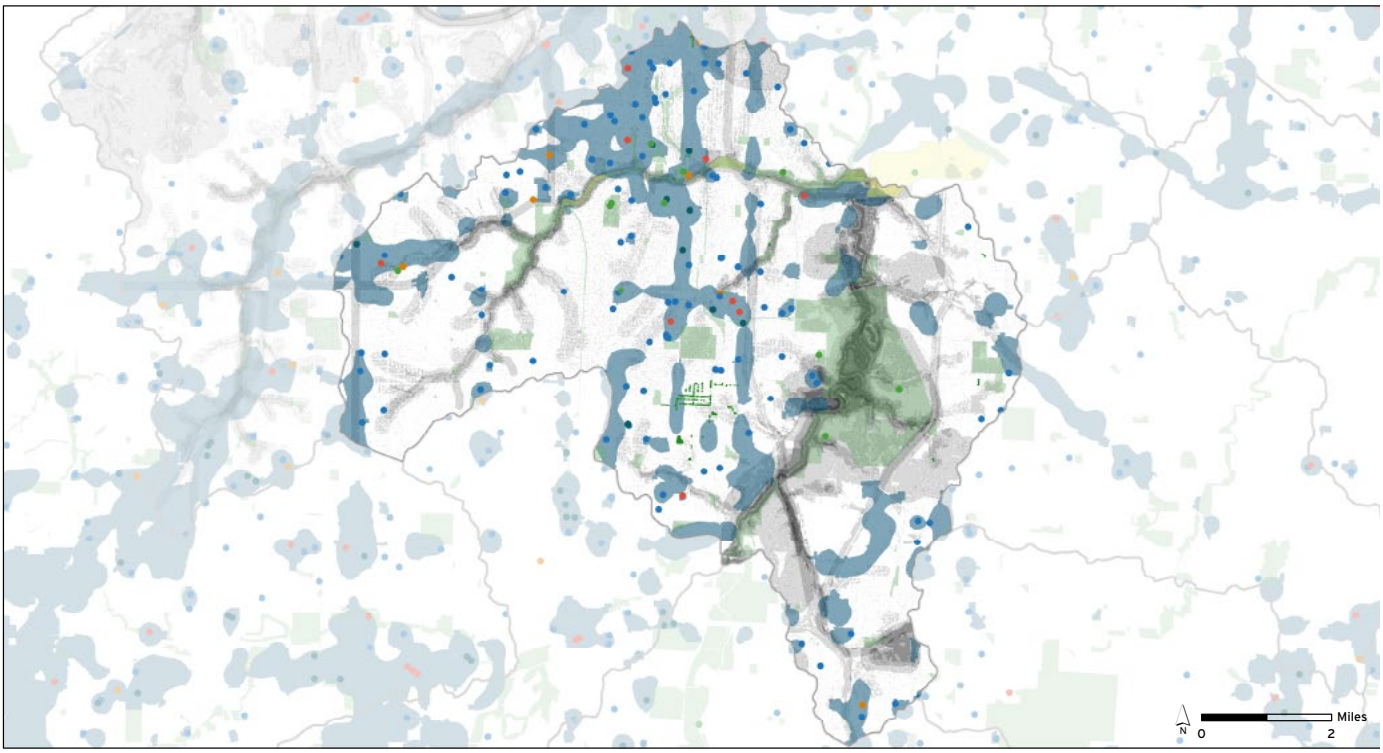
METRIC	NOTES	SOURCE
	layers provided by BikeWalkKC's transportation analysis	
	Project status by: Funded, planned, and application	MARC
		MARC
		MARC
tax-defaulted parcels owned by the land banks of Kansas City, MO and Wyandotte County	city-owned vacant parcels offer potential for urban agriculture	KCMO Land Bank, UG of Wyandotte County Land bank
Limited Inome limited access within 1 urban or 10 rural miles	GI potential solution for gaps in healthy food access	USDA Economic Research Service
>= .5 persons per acre	Poverty enhances liklihood of food insecurity	U.S. Census, 2010
"'OBESITY_CrudePrev" >= 39.6 OR "DIABETES_CrudePrev" >= 13.2 OR "CANCER_CrudePrev" >= 8.8	health indicators for preventable diseases associated with environmental factors, including air quality, food access, and active living Based on national averages from CDC - selected tracts with rates at least 10% higher than national average	CDC 500 cities project
MARC Activity Centers		MARC
hospitals, police stations, colleges, schools	Activity centers and institions used to measure human access to potential GI projects	KCMO Land Bank, UG of Wyandotte County Land bank
2010-2040 Population Gain per Sq. Mi > 500 persons	areas facing development pressure, increased activity + potential for strategic mitigation of possible negative environmental effects	MARC
2010-2040 Population Loss per Sq. Mi > 500 persons	areas facing development challenges related to population loss + potential for restoration on previously occupied vacant lands	MARC
	NPI Project sites	Native Plants Initiative
		MARC
	Renew the blue project sites	
	Existing BMP Projects - marlborough coalition	Burns & McDonald
	Blue River Federal Partnership Core Projects	EPA

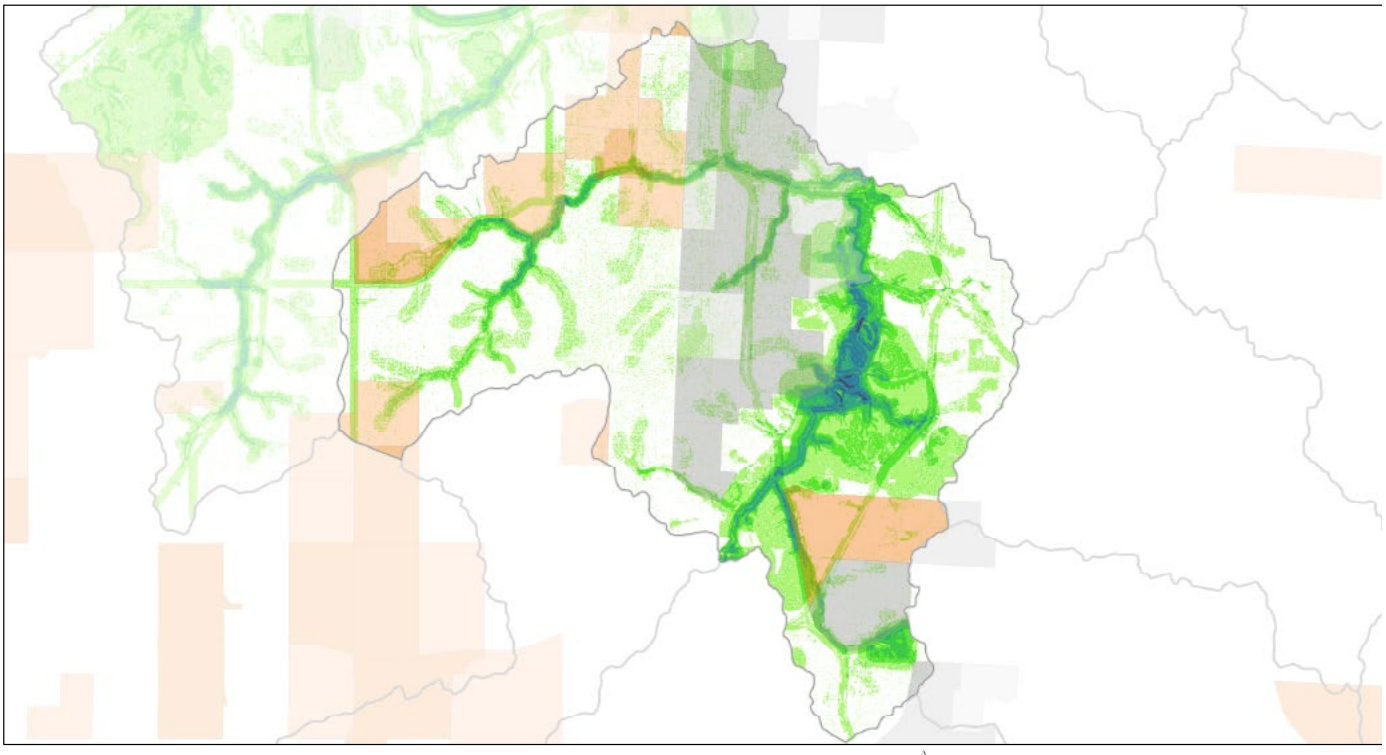

Impact/Need Analysis - Cultural Resources Overlay
N
Turkey Creek-Kansas River
Brush Creek-Blue River
Legend
HUC12_FocusAreas
Impact/Need Overlay
Value
1
2
3
Cultural Resources- # Overlapping Features
Value
0 - 2
3 - 4
5 - 6
7 - 8
0
2.5
5
Miles

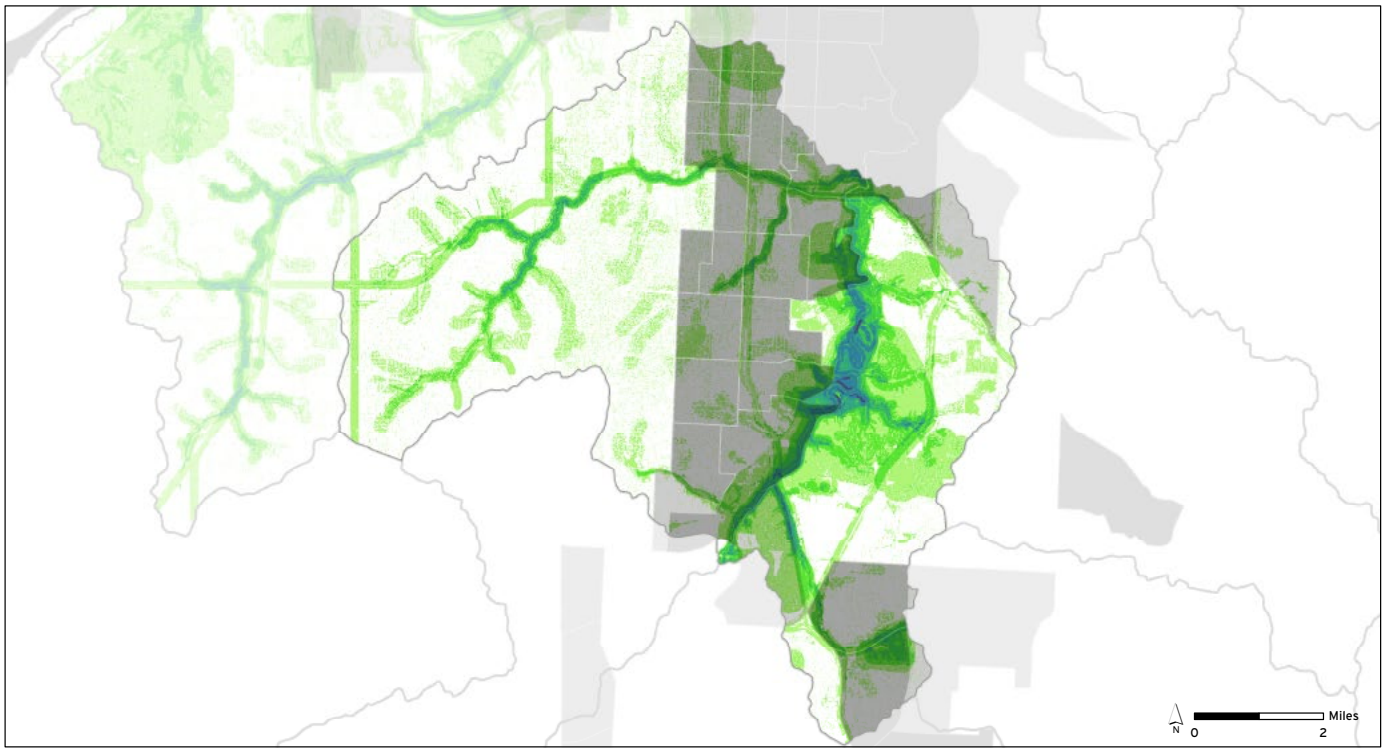

Impact/Need Analysis & High Value - Cultural Resources Overlay
N
Turkey Creek-Kansas River
Brush Creek-Blue River
Legend
High Value Overlay
Value
7
6
5
4
3
2
1
0
HUC12_FocusAreas
Impact/Need Overlay
Value
1
2
3
Cultural Resources- # Overlapping Features
Value
0 - 2
3 - 4
5 - 6
7 - 8
0
2.5
5
Miles


High Value Overlay (3-7) and Population Growth Overlay
N
Legend
High Value Overlay
Value
7
6
5
4
3
2
1
0
2010-2040 Population Gain per Sq. Mi.
0 - 500
501 - 1000
1001 - 9165
2010-2040 Population Loss per Sq. Mi.
0 - 500
501 - 1000
1001 - 4706
Turkey Creek-Kansas River
Brush Creek-Blue River
0
2.5
5
Miles


N
Legend
High Value Overlay
Value
7
6
5
4
3
2
1
0
2010-2040 Population Loss per Sq. Mi.
0 - 500
501 - 1000
1001 - 4706
Impact/Need Overlay
Value
1
2
3
Turkey Creek-Kansas River
Brush Creek-Blue River
0
2.5
5
Miles


N
0
2
Miles
Watershed
NativePlantIniativeLocations
RenewTheBlueLocations
KCMO_GI
Hospitals
Colleges
Schools
Police
Parks
EPA
Activity Centers
Ecological Value/Environmental Impact
No Impact/Value
Some Impact/Value
Highest Impact/Value


Middle Blue River Human Activity Density
2010-2040 Population Gain per Sq. Mi.
0 - 500
501 - 1000
1001 - 9165
2010-2040 Population Loss per Sq. Mi.
0 - 500
501 - 1000
1001 - 4706
sumoverlayint
Value
0; 1
2
3
4
5
6
7
8
Watershed
N
0
2
Miles



Watershed

OBESITY_CrudePrev

Above National Average (39.6 -

DIABETES_CrudePrev

Above National Average (13.2 -

CANCER_CrudePrev

Above National Average (8.8 -

sumoverlayint

Value

0; 1

2

3

4

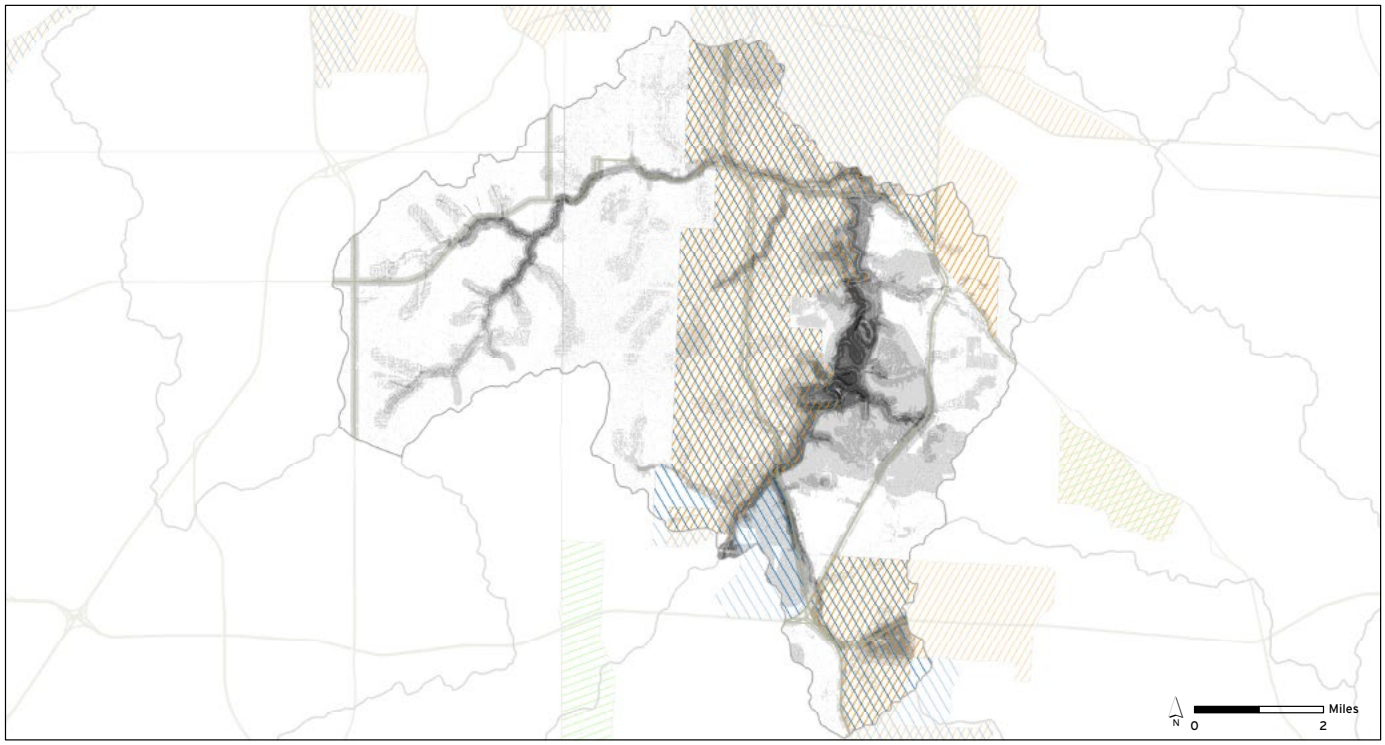
5

6

7

8

BNIM Biohabitats BIKE WALK KC



Watershed

OBESITY_CrudePrev

Above National Average (39.6 -

DIABETES_CrudePrev

Above National Average (13.2 -

CANCER_CrudePrev

Above National Average (8.8 -

SumOverlayInt_BlueRiver

Value

0; 1

2

3

4

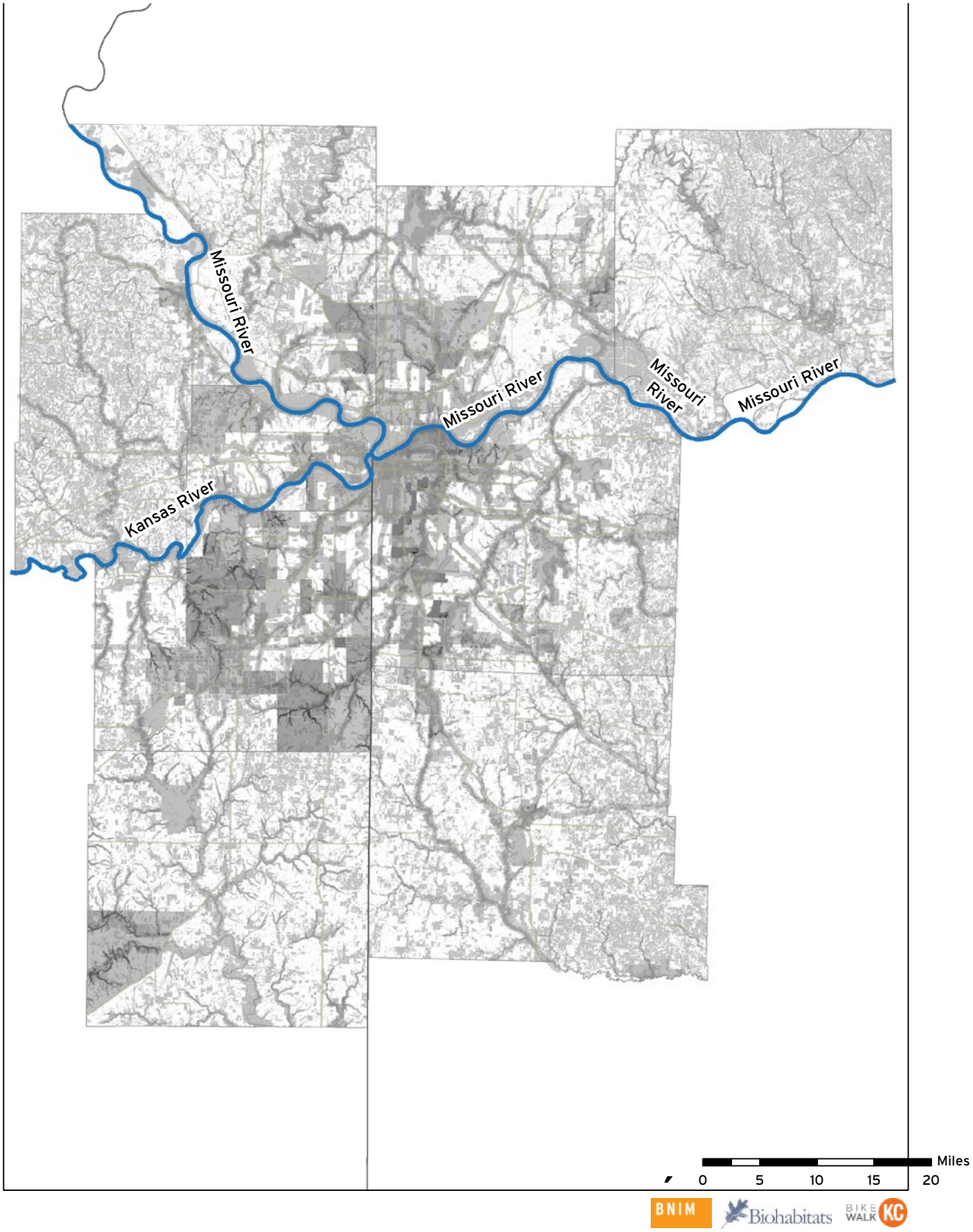
5

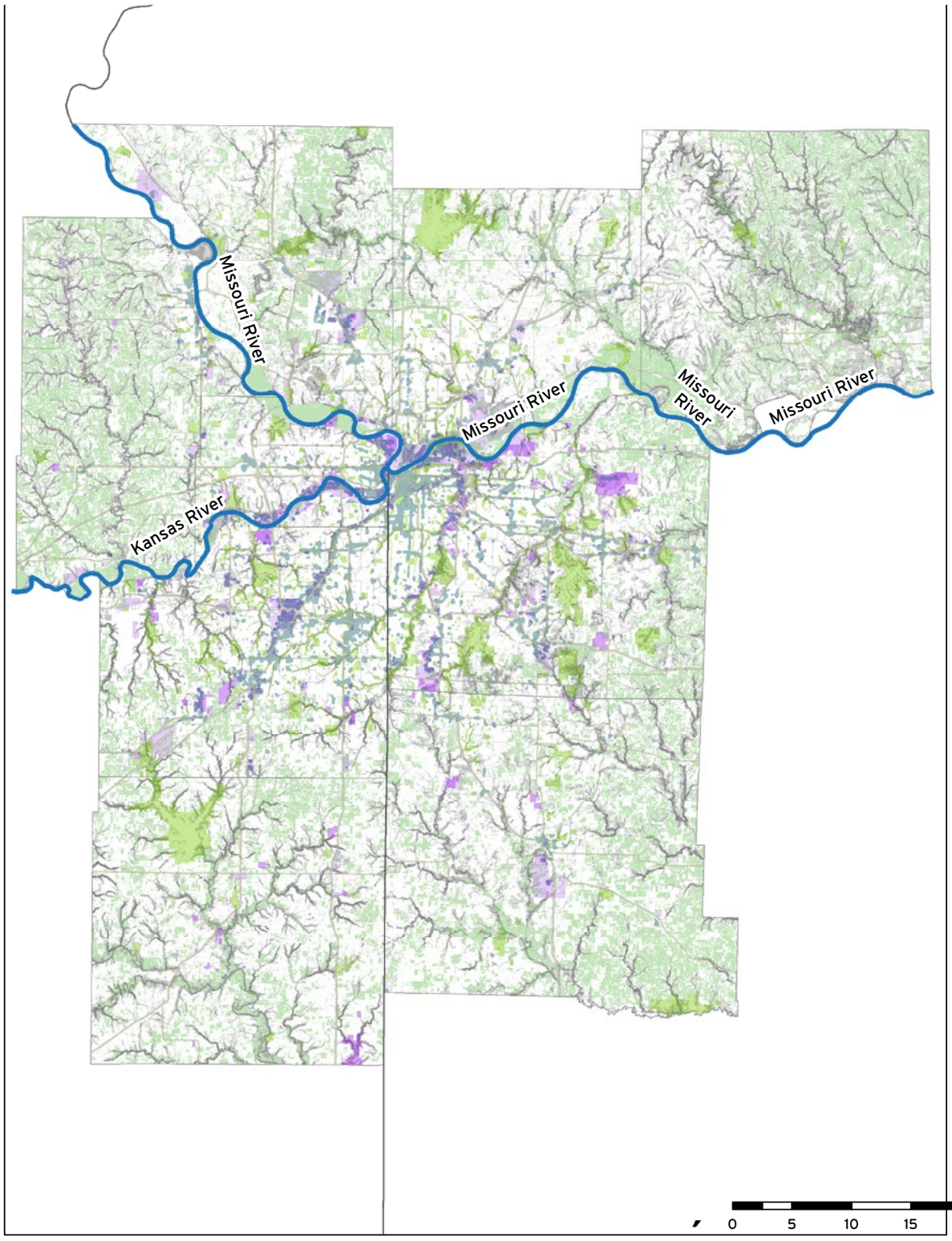
6

7

8

BNIM Biohabitats BIKE WALK KC


Missouri River
Missouri River
Missouri River
Missouri River
Kansas River
Miles
0
5
10
15
20
BNIM
Biohabitats
BIKE WALK KC


Missouri River
Missouri River
Missouri River
Missouri River
Kansas River
Miles
0
5
10
15
20
BNIM
Biohabitats
BIKE WALK KC
Parks
Cultivated Lands
Activity Centers
Existing Industrial Use
Future Industrial Use
Ecological value
Value
High : 5
Low : 2

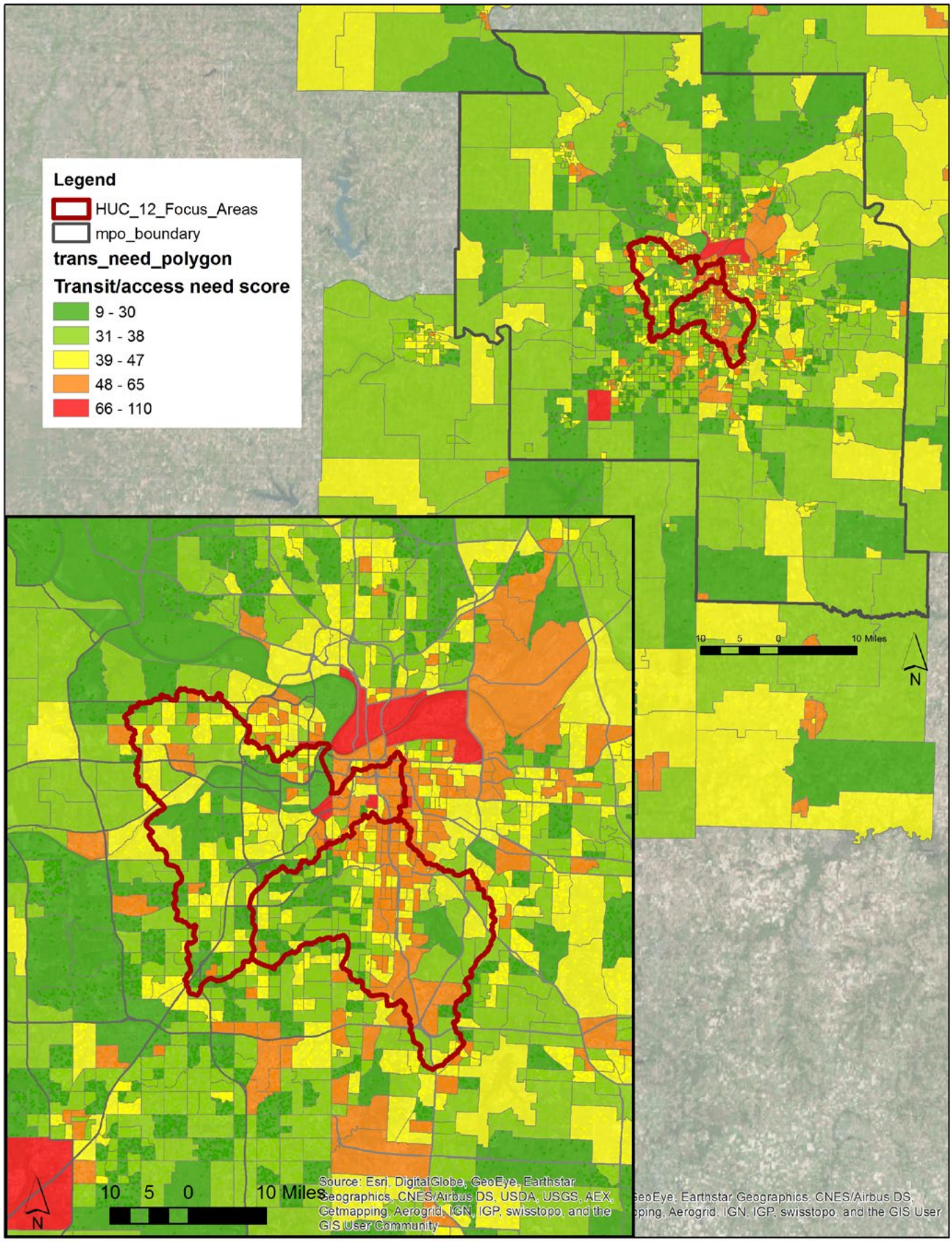
TRANSPORTATION ANALYSES

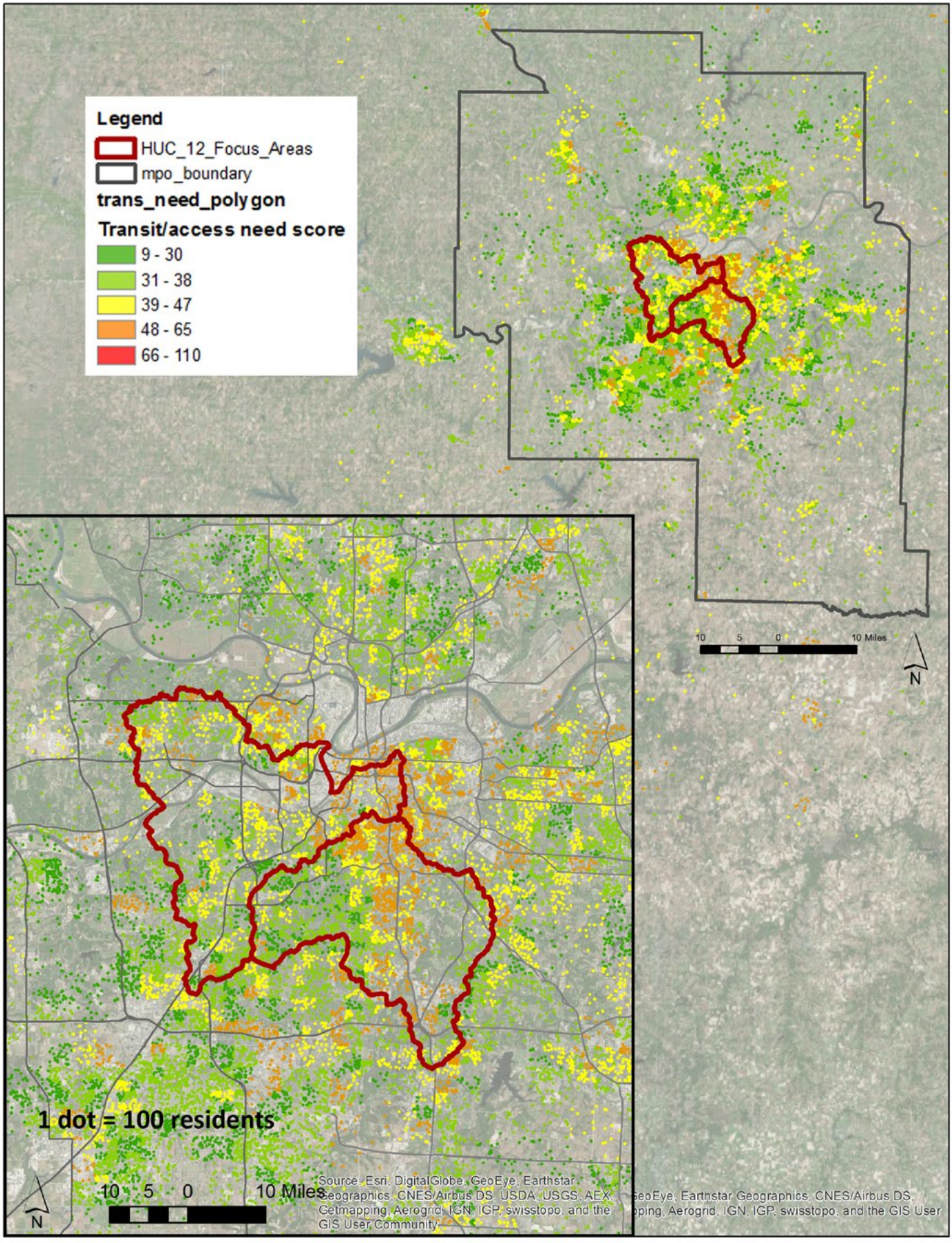
The BikeWalk team wanted to share a couple of rough drafts of maps we're working on to help us think about a methodology for weighing transportation needs, opportunities, and impact. The maps here display "multimodal access need" and are based on the following demographic factors by Census block group. These factors are associated with greater need for multimodal transportation:

- % residents aged under 18
- % residents aged over 65
- % households in poverty
- % zero-car households
- % workers commuting via transit
- % workers commuting commuting via bike
- % workers commuting on foot
- % residents disabled
- job-worker balance

All the factors were reclassified on 0-10 scales, and then summed together with equal weight. The first map attached shows the score by natural jenks breaks. The second map was then converted back to a polygon, and population was symbolized by dot density and "access need" score. (One dot represents 100 residents.) This is the more population-focused map, highlighting need by where people are living (those red zones from the first map don't show up because they are industrial districts and have next to no residents).

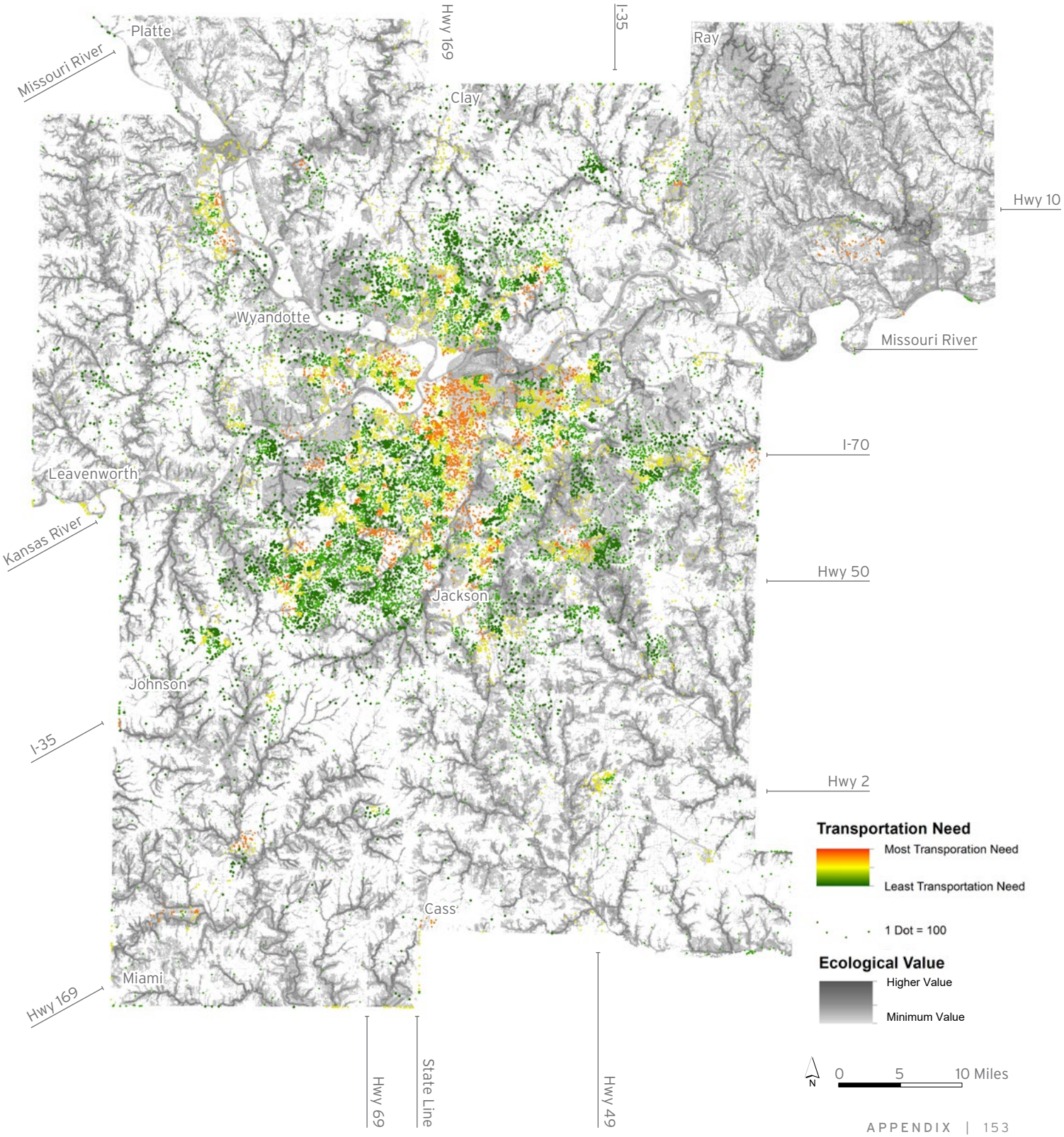
These would differ from MARC's "areas of greatest transit need" maps in that 1) they're more population focused (we've so far de-emphasized or not included jobs/activity centers) and 2) they don't actually weigh planned or existing transit service -- and as such, they represent a broader "multimodal access needs" map rather than just areas with need for transit service.


Legend
HUC_12_Focus_Areas
mpo_boundary
trans_need_polygon
Transit/access need score
9 - 30
31 - 38
39 - 47
48 - 65
66 - 110
10 5 0 10 Miles
N
10 5 0 10 Miles
N
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community


Legend
HUC_12_Focus_Areas
mpo_boundary
trans_need_polygon
Transit/access need score
9 - 30
31 - 38
39 - 47
48 - 65
66 - 110
10 5 0 10 Miles
N
1 dot = 100 residents
10 5 0 10 Miles
N
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
GeoEye, Earthstar Geographics, CNES/Airbus DS, pping, Aerogrid, IGN, IGP, swisstopo, and the GIS User

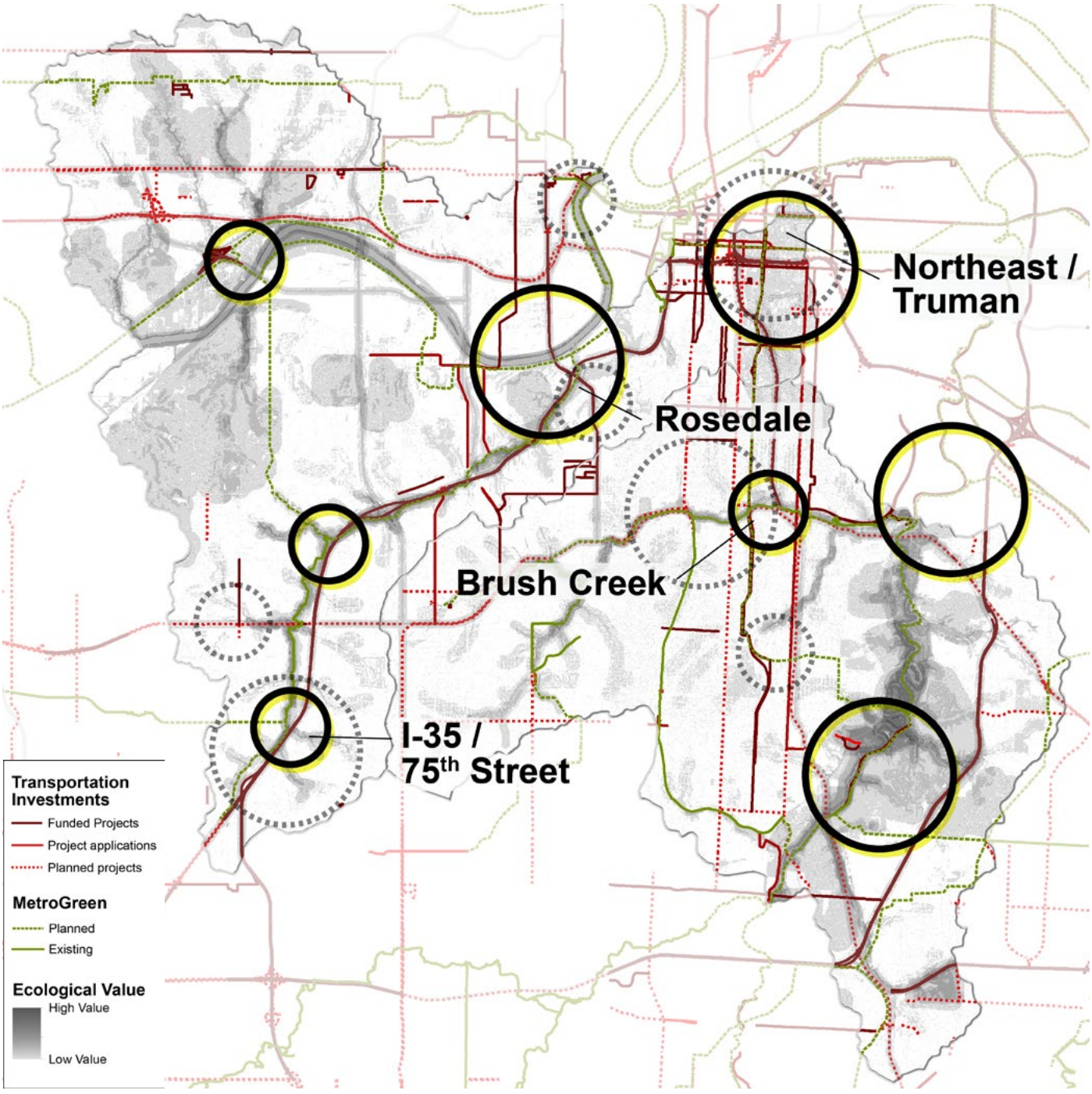
Transportation Equity

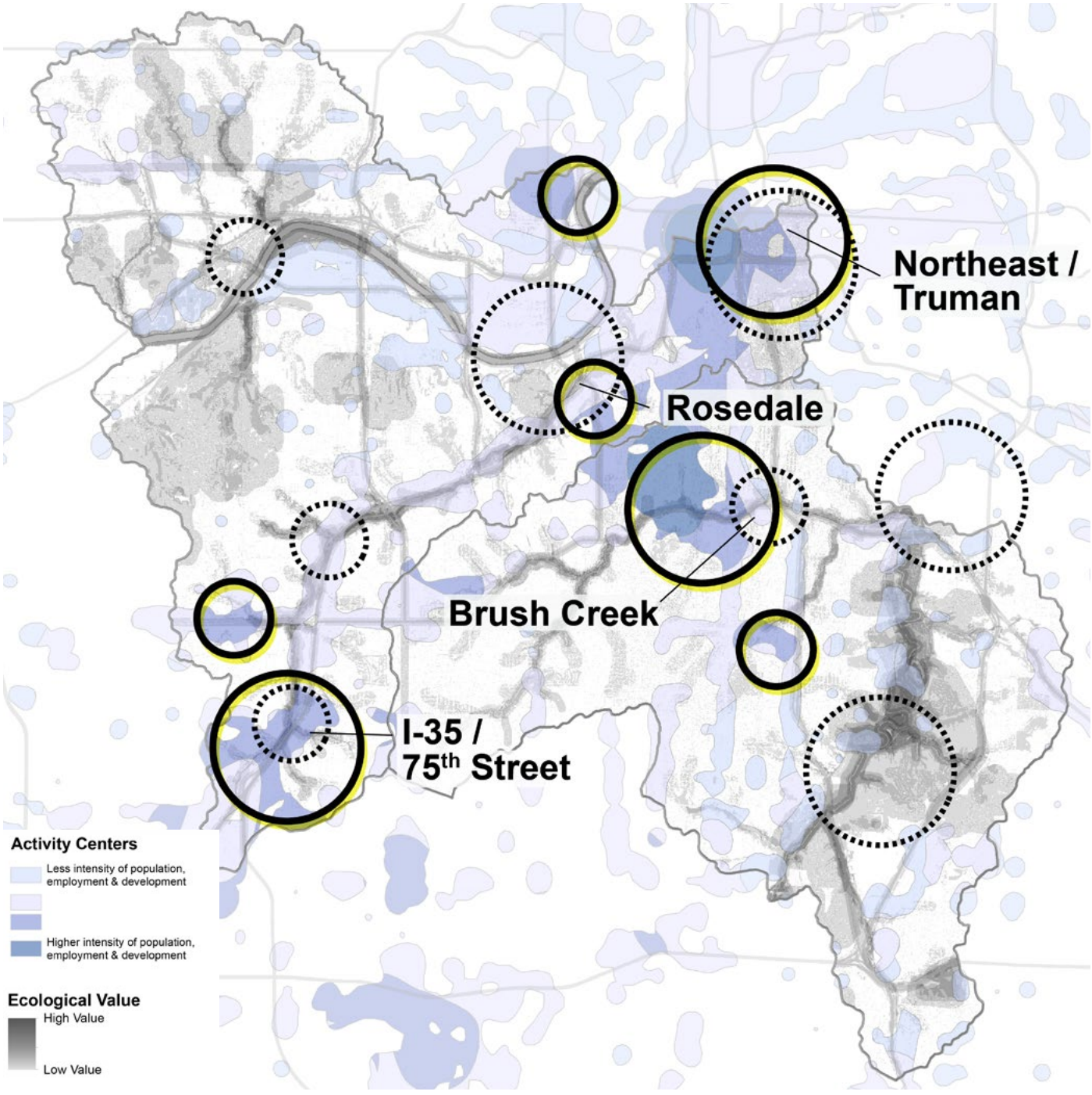
This map is the result of this previous work. This analysis map identifies areas with a transit high need and other alternative modes of transportation, with orange representing greater need and green representing less need. This transportation need index is a composite of a variety of demographic and socieconomic factors related to mobility (including: % residents aged under 18, % residents aged over 65, % households in poverty, % zero-car households, % workers commuting via transit, bike, or on foot, % residents disabled, and job-worker balance). The dots on the map show population density, with each dot representing one hundred residents.



Waterrshed Scale Transportation Intersection Analysis

These maps identified transportation investments, metrogreen trails, and activity centers in relation to high ecological areas. The circles indicate where these occur and look at where there is momentum from a transportation viewpoint (Circles are created in Adobe Illustrator, not ArcGIS)




Northeast /
Truman
Rosedale
Brush Creek
I-35 /
75th Street
Activity Centers
Less intensity of population, employment & development
Higher intensity of population, employment & development
Ecological Value
High Value
Low Value