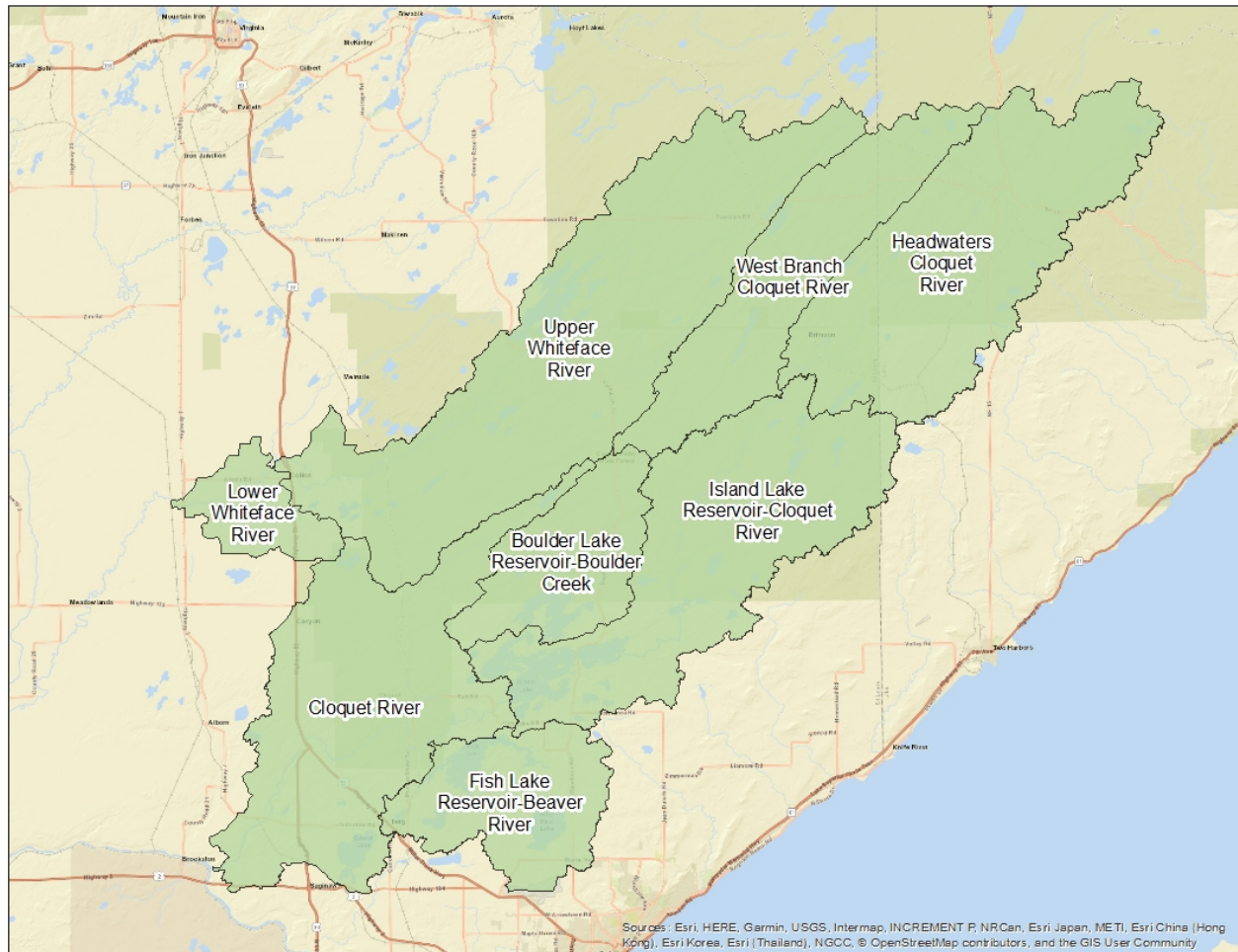
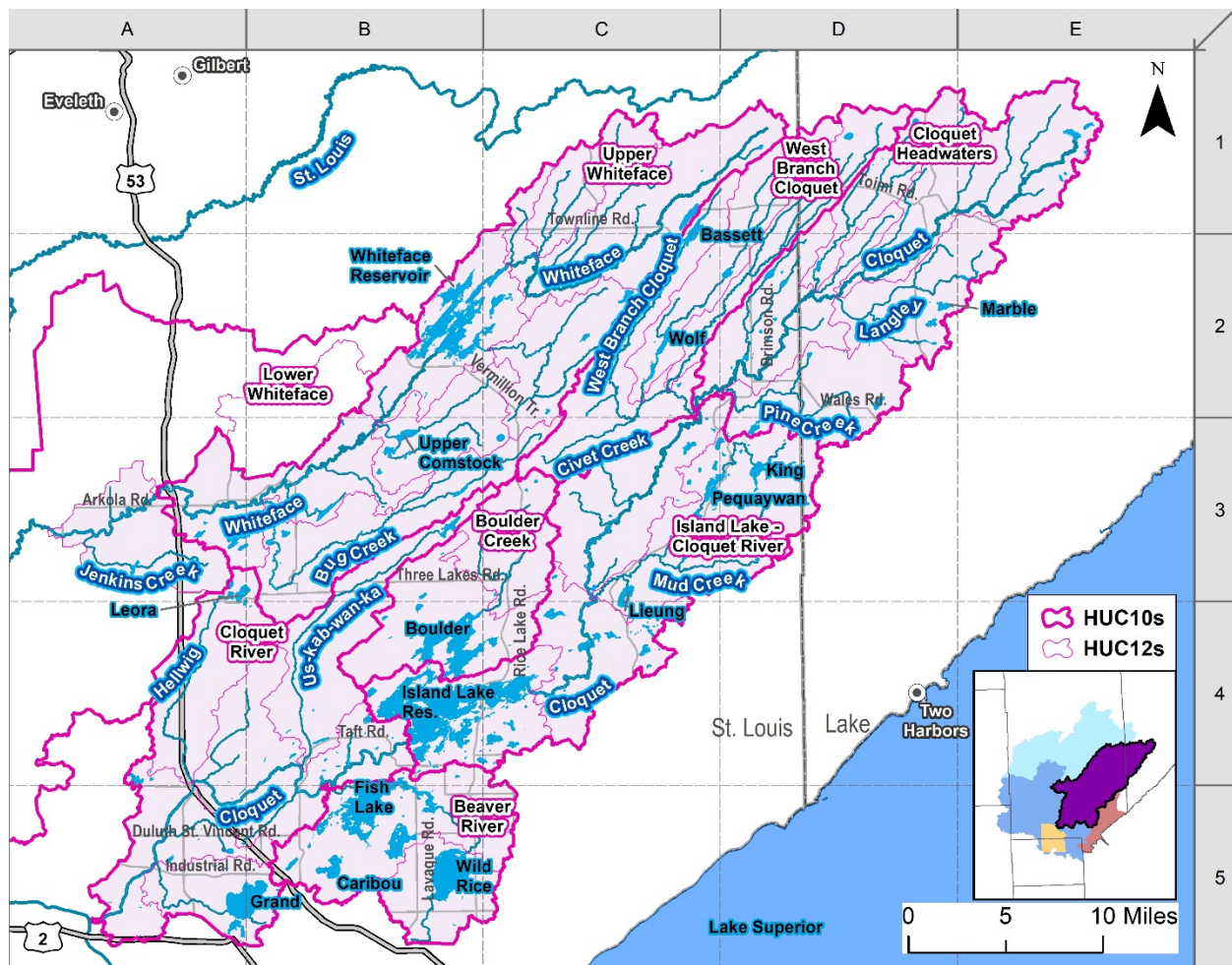
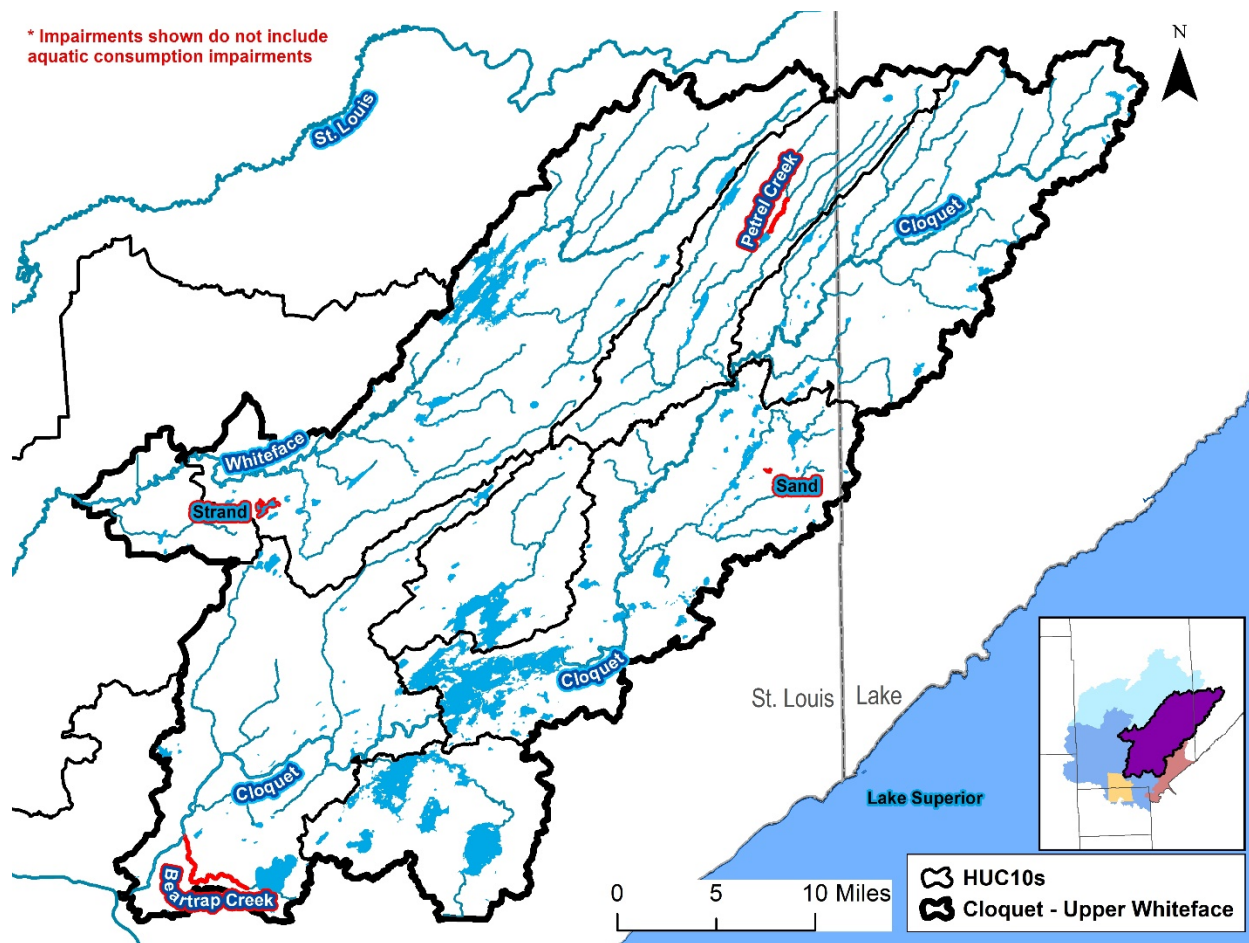


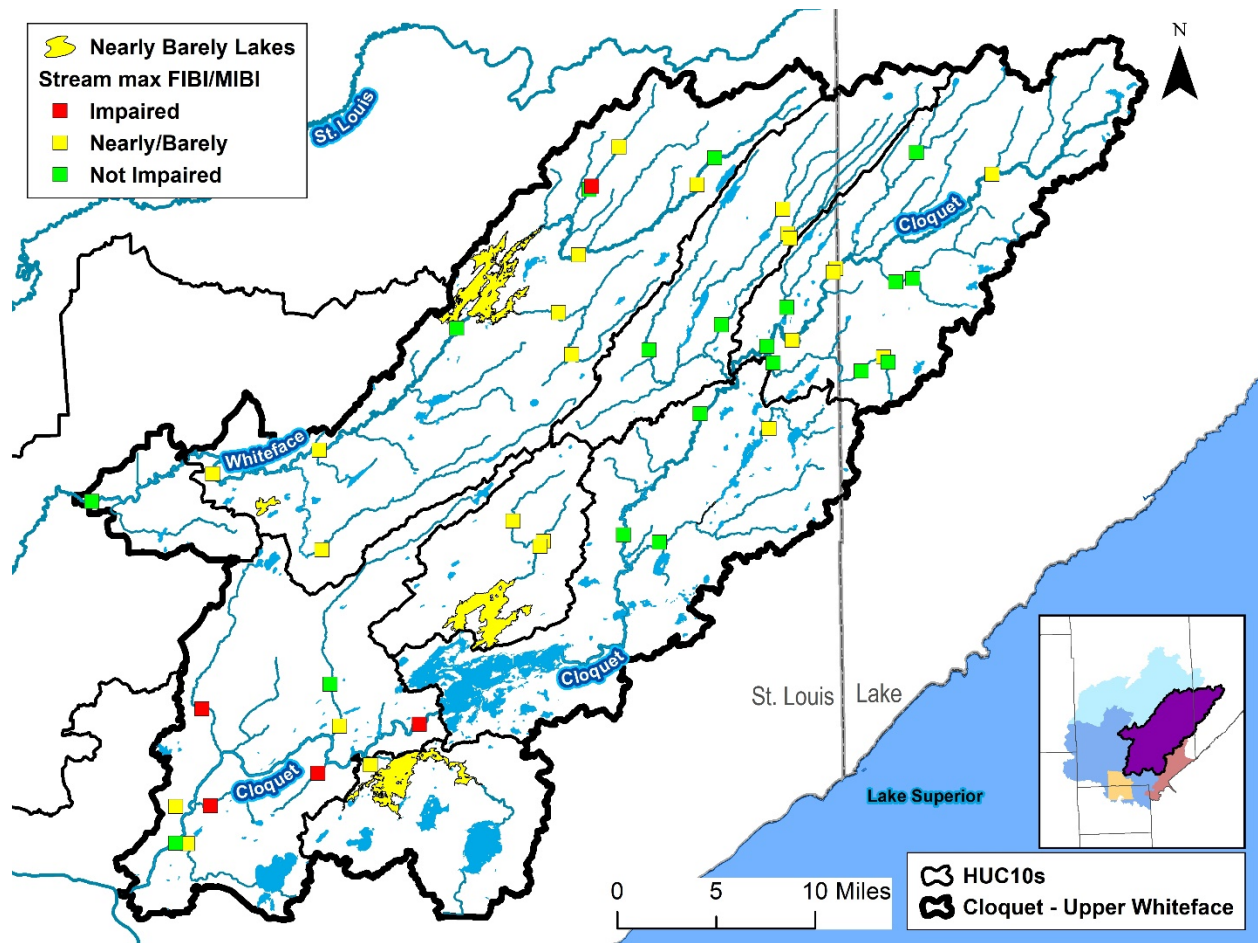
Cloquet Planning Area



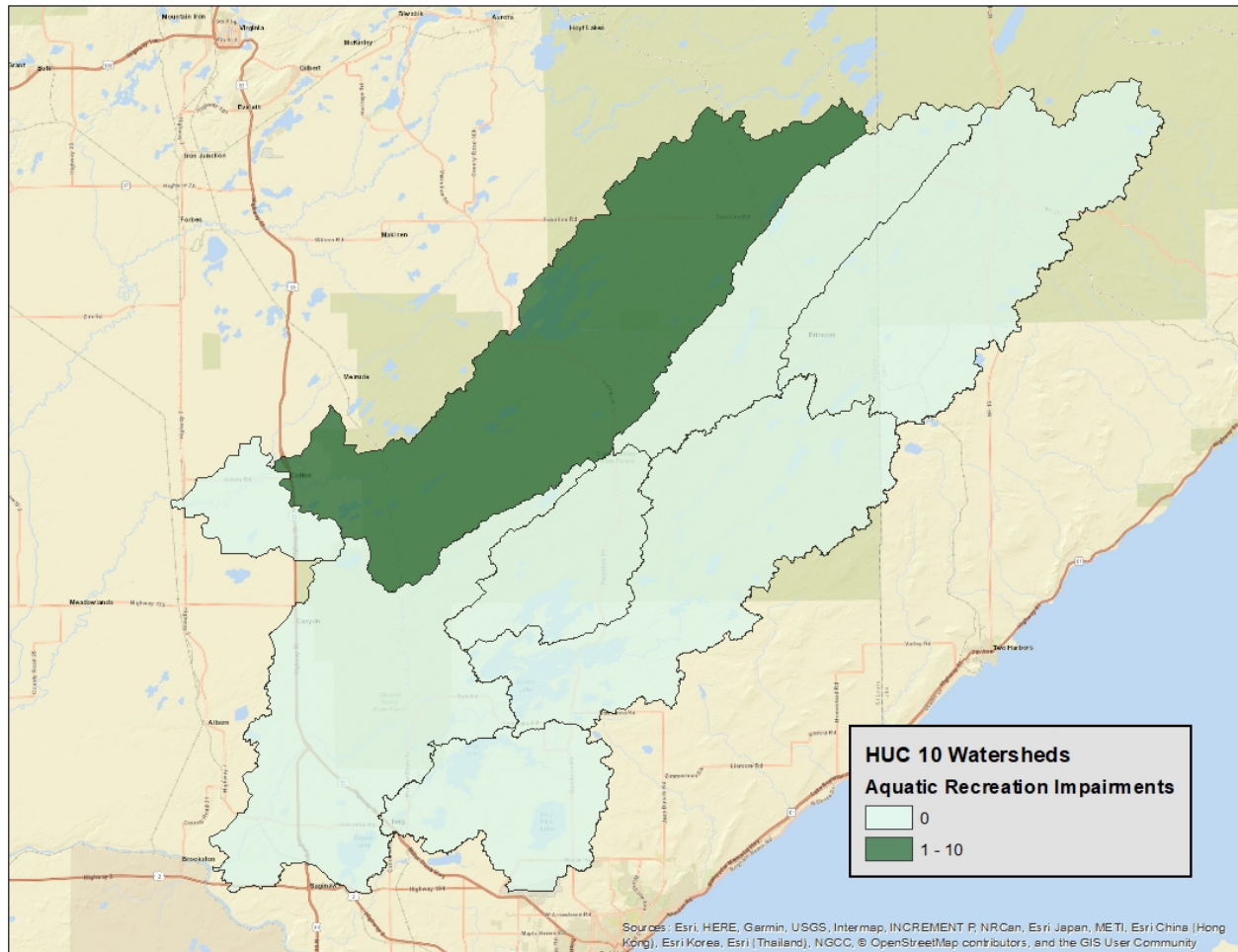


* Impairments shown do not include aquatic consumption impairments



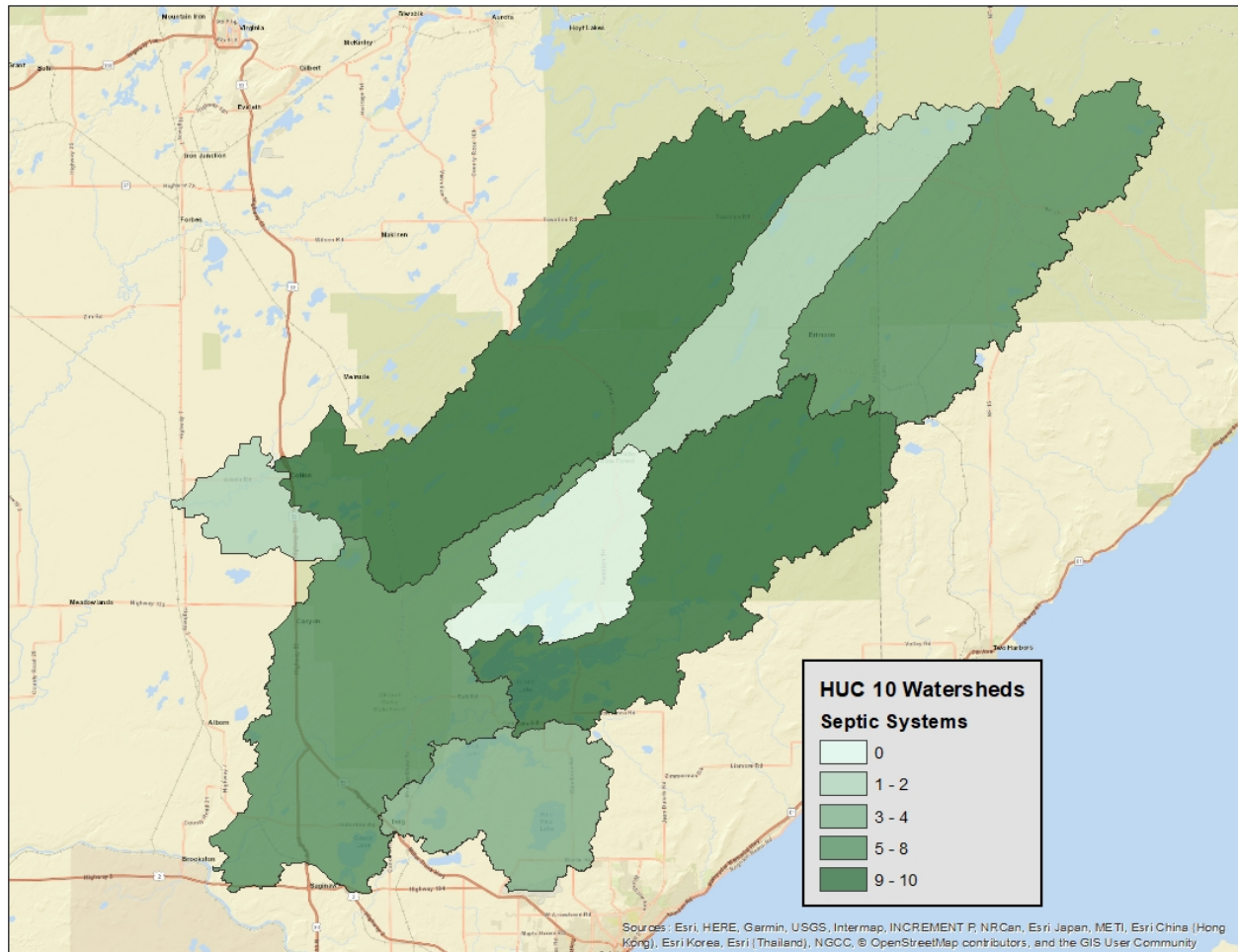


Aquatic Recreation Impairments



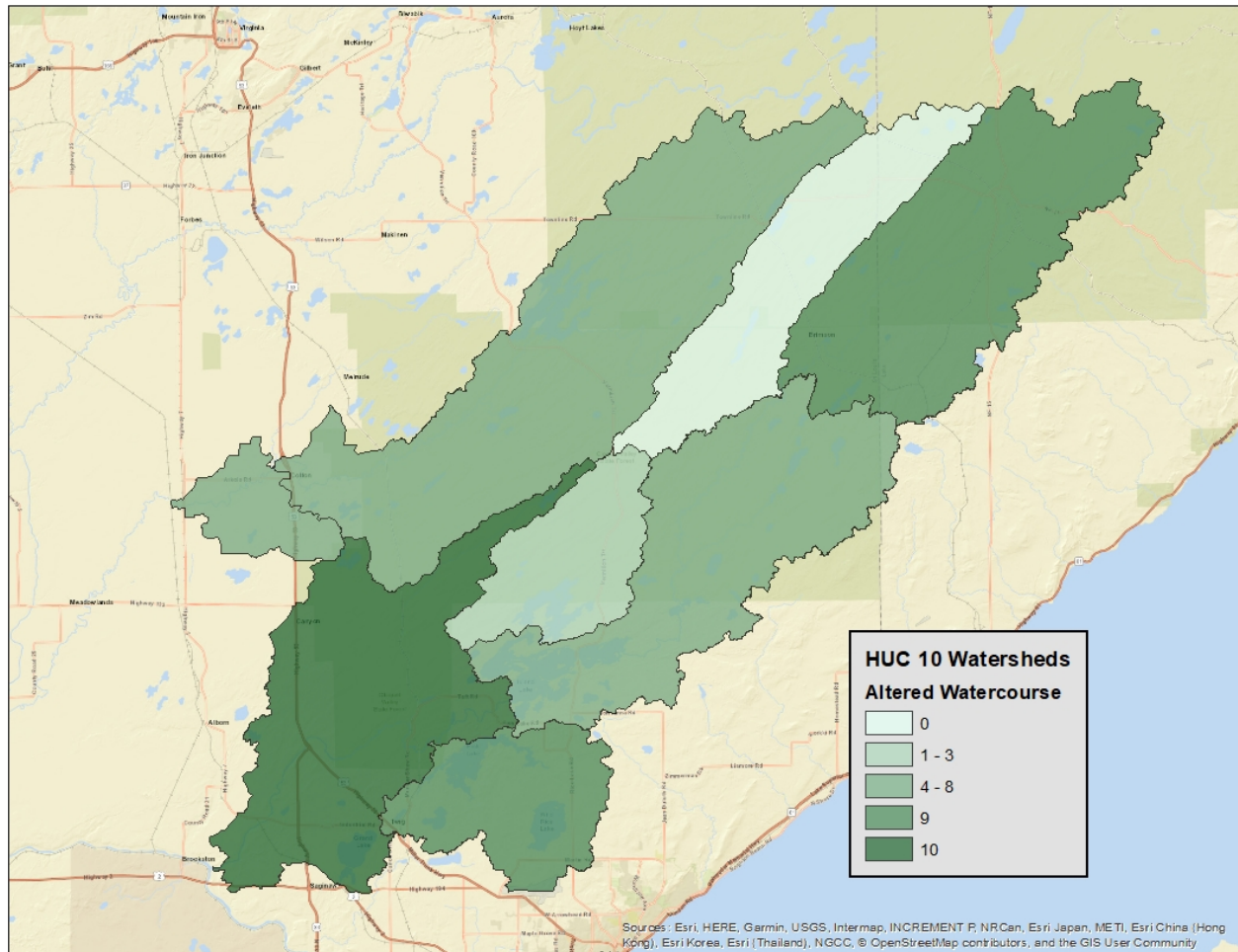
The Pollution Control Agency assesses many of Minnesota's streams, lakes and wetlands to determine if the water quality is adequate for public recreation uses. This metric calculates the percent of water bodies assessed for aquatic recreation that did not meet the standard to fully support recreational use. **Higher scores indicate more impaired waters.**

Septic Systems



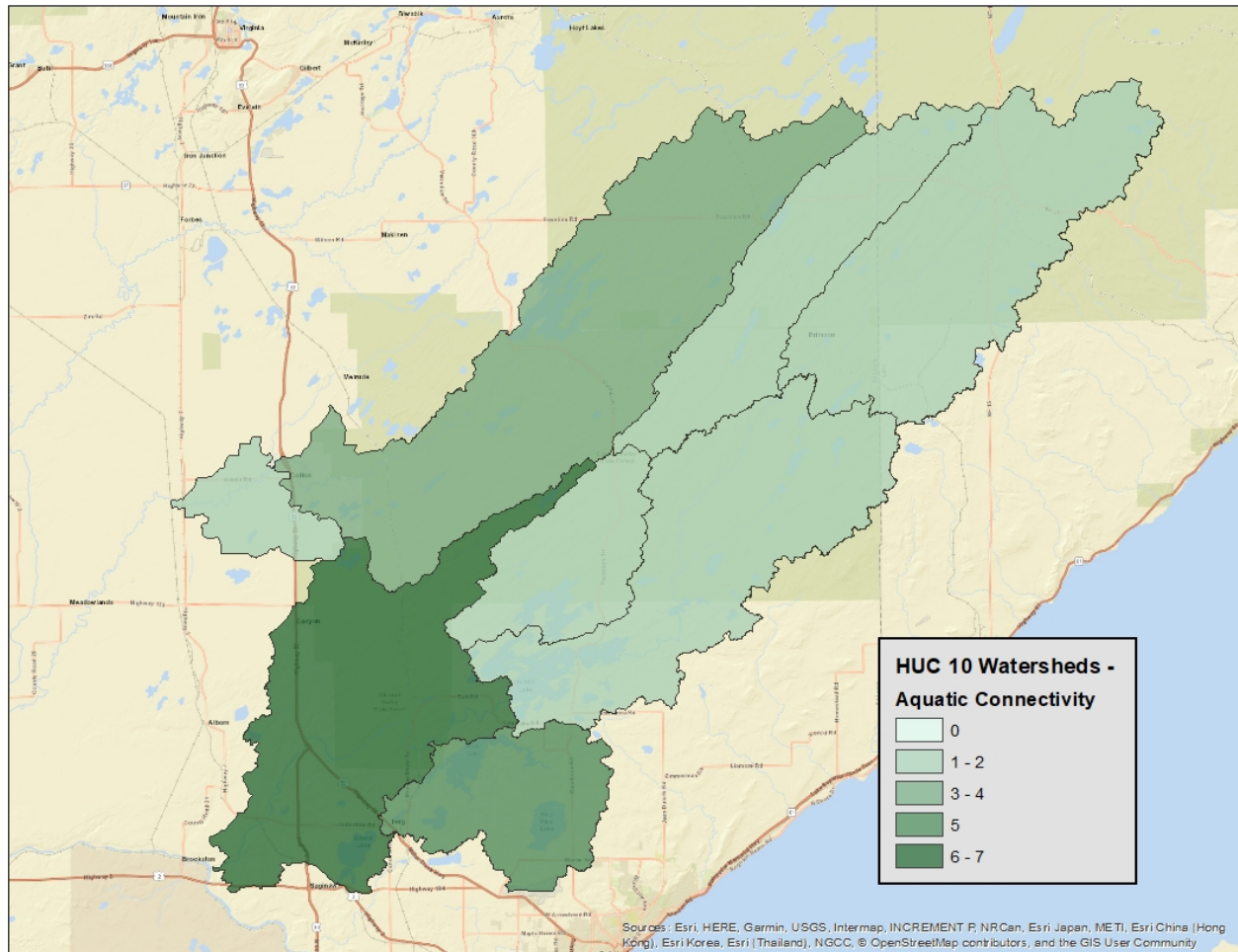
The domestic wells listed in the County Well Index (CWI) were used to approximate septic system location. Given these data assumptions and lack of historic records, this metric provides a conservative estimate of actual septic system density. The metric score is based on well density per square km of land area in a catchment. **Higher scores indicate more septic systems.**

Altered Watercourses



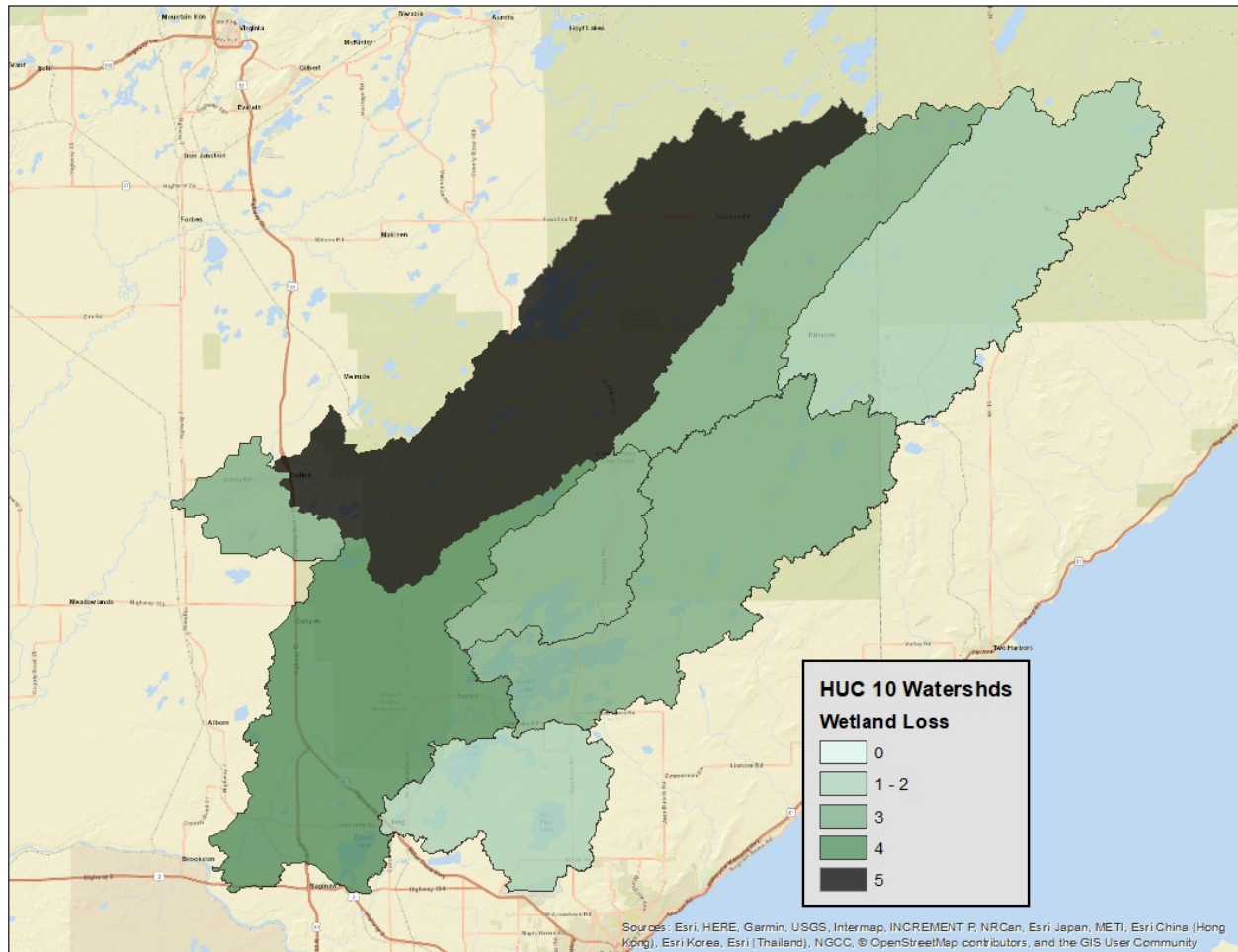
This index represents the extent to which natural streams were straightened by human activity, thereby reducing the hydrologic storage of the land. It is based on the altered watercourses dataset and refers to the length of stream segments that were altered in relation to the length of those that meander naturally. **Higher scores indicate more altered watercourses.**

Aquatic Connectivity



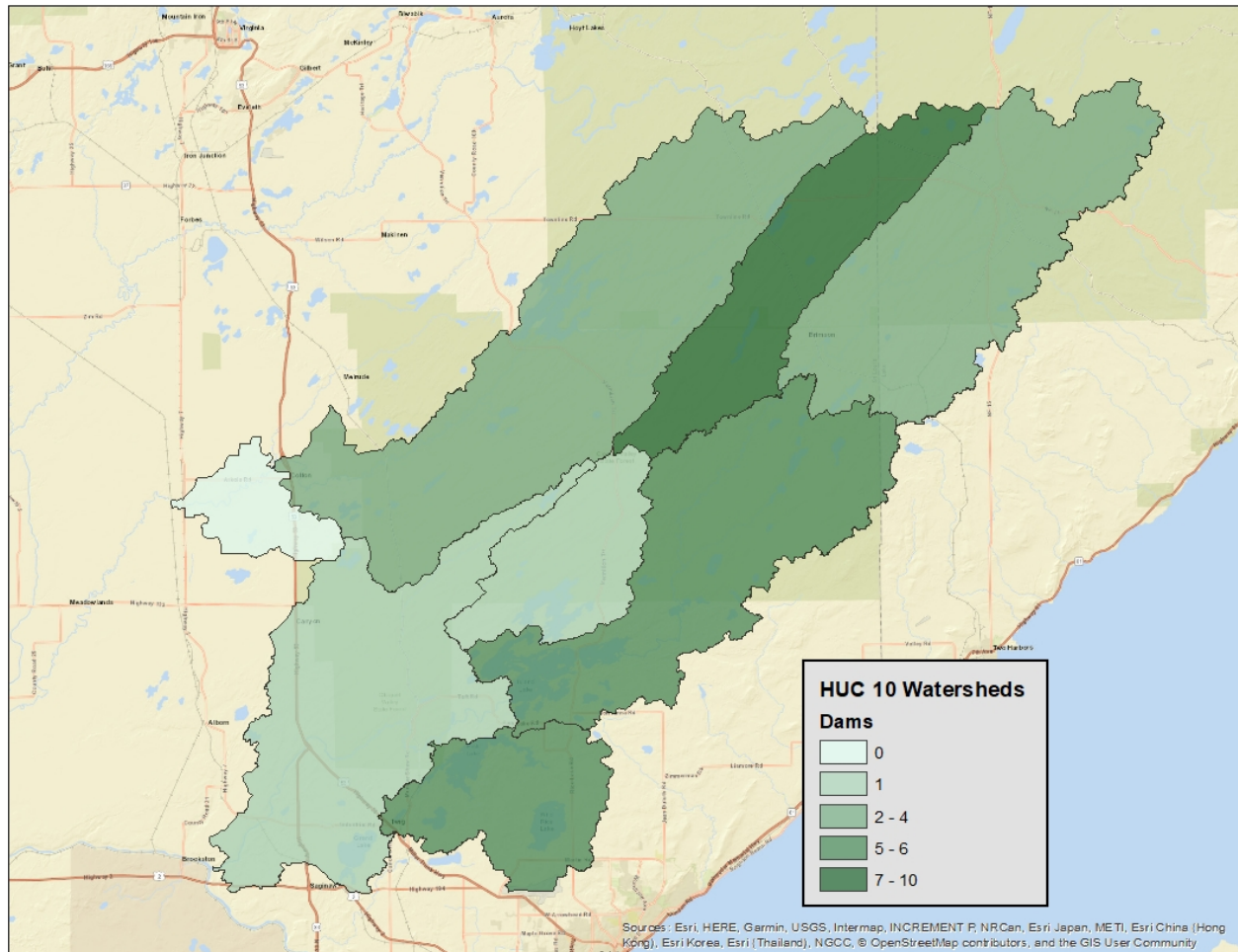
Man-made structures can limit the ability of water, organisms and energy to flow through aquatic systems. The Aquatic Connectivity Index is based on the density of culverts, bridges and dams in each watershed. **A high score indicates more opportunity to improve connectivity.**

Wetland Loss



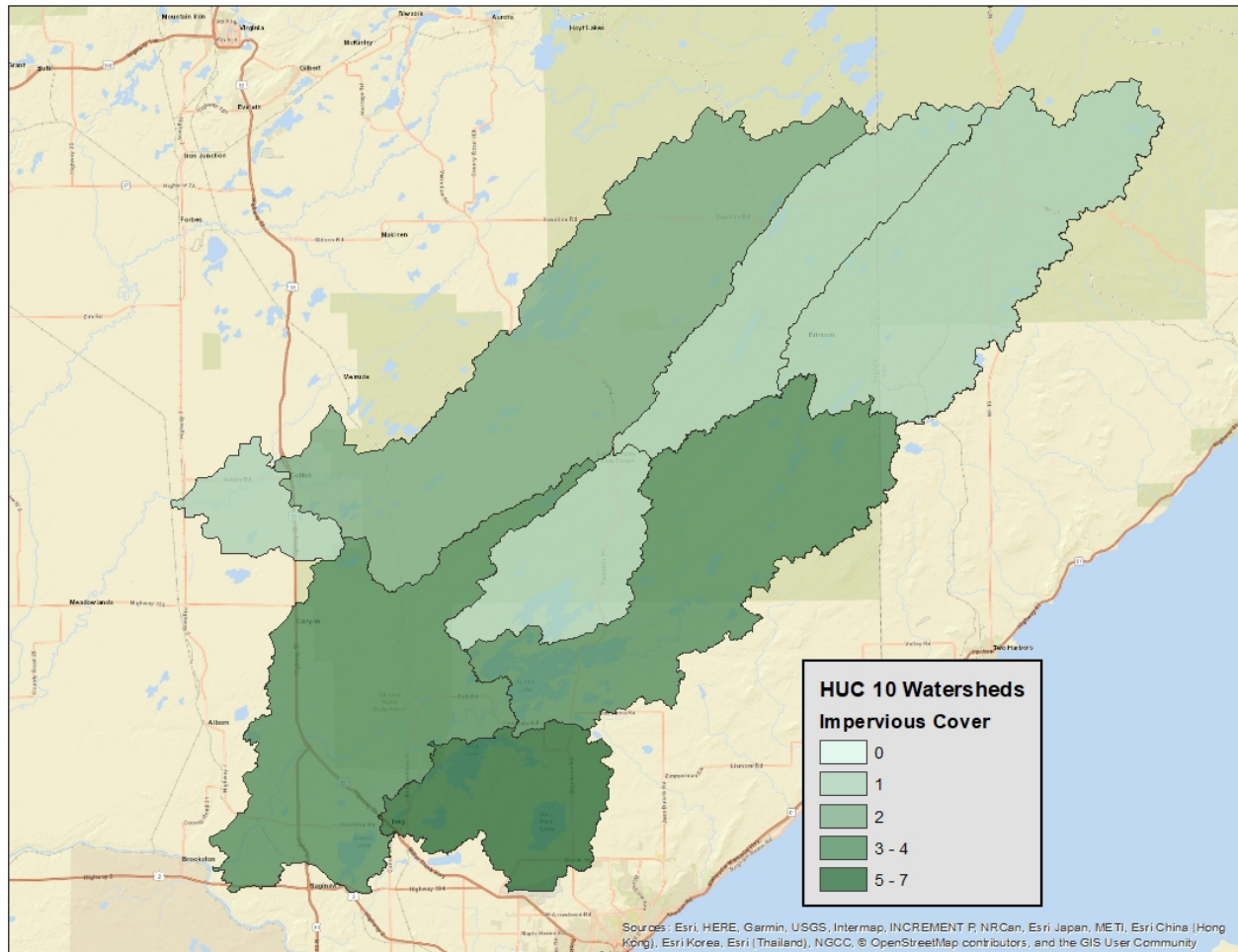
This index represents the proportion of the watershed that has been drained and converted out of wetland coverage. Wetland drainage reduces the upland hydrologic storage capacity and increases rate and magnitude that stream flow after rainfall events. Less wetland area leads to a greater delivery of contaminants to streams and lakes, and a destabilization of streams and streambanks. Pre-European settlement wetland coverage is estimated from the proportion of soils that are classified as 'Hydric', current wetland coverage is calculated from the National Wetland Inventory. **A higher score indicates more opportunities for wetland restoration.**

Dams



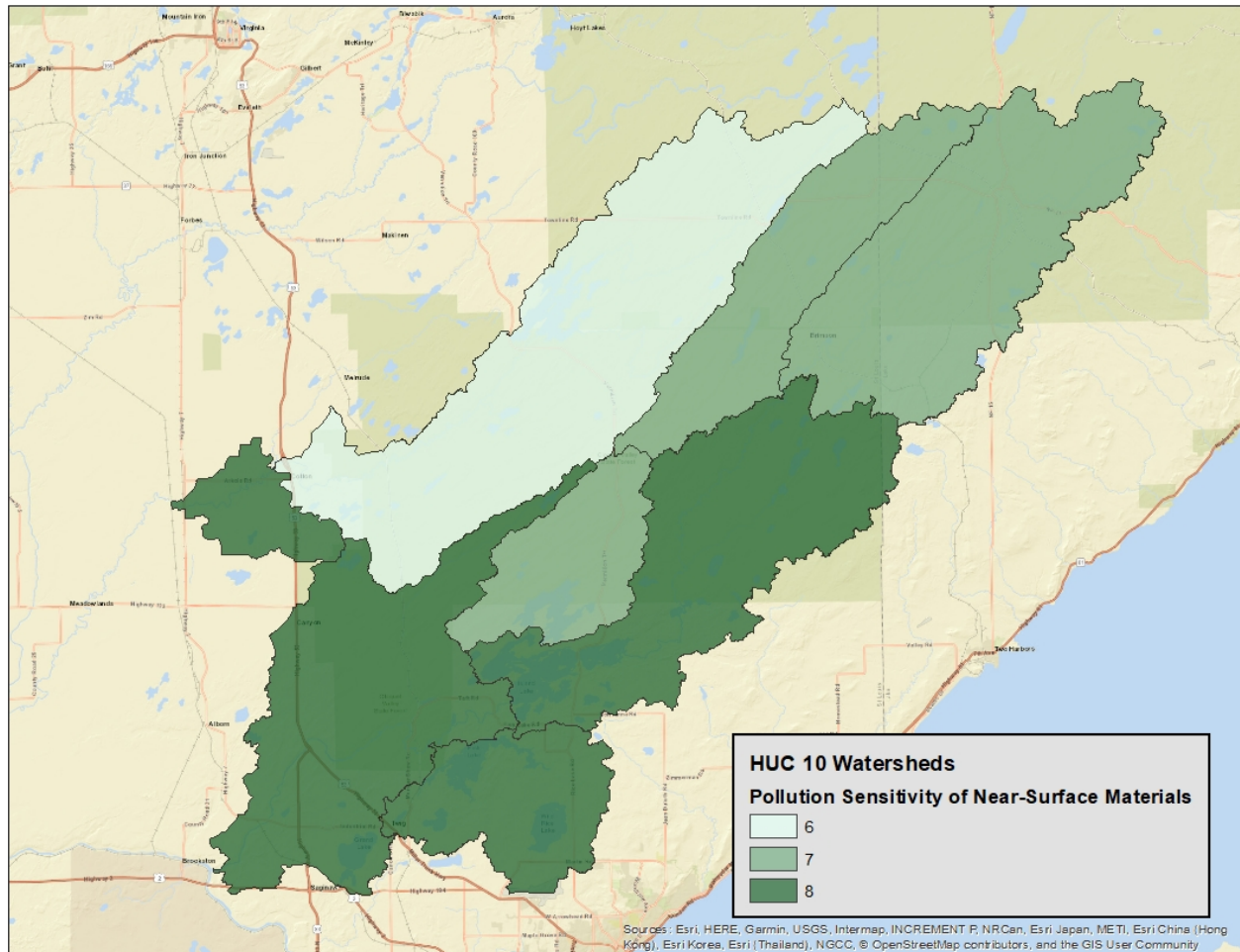
This map shows number of dams based on the MN DNR Dam Inventory.

Impervious Cover



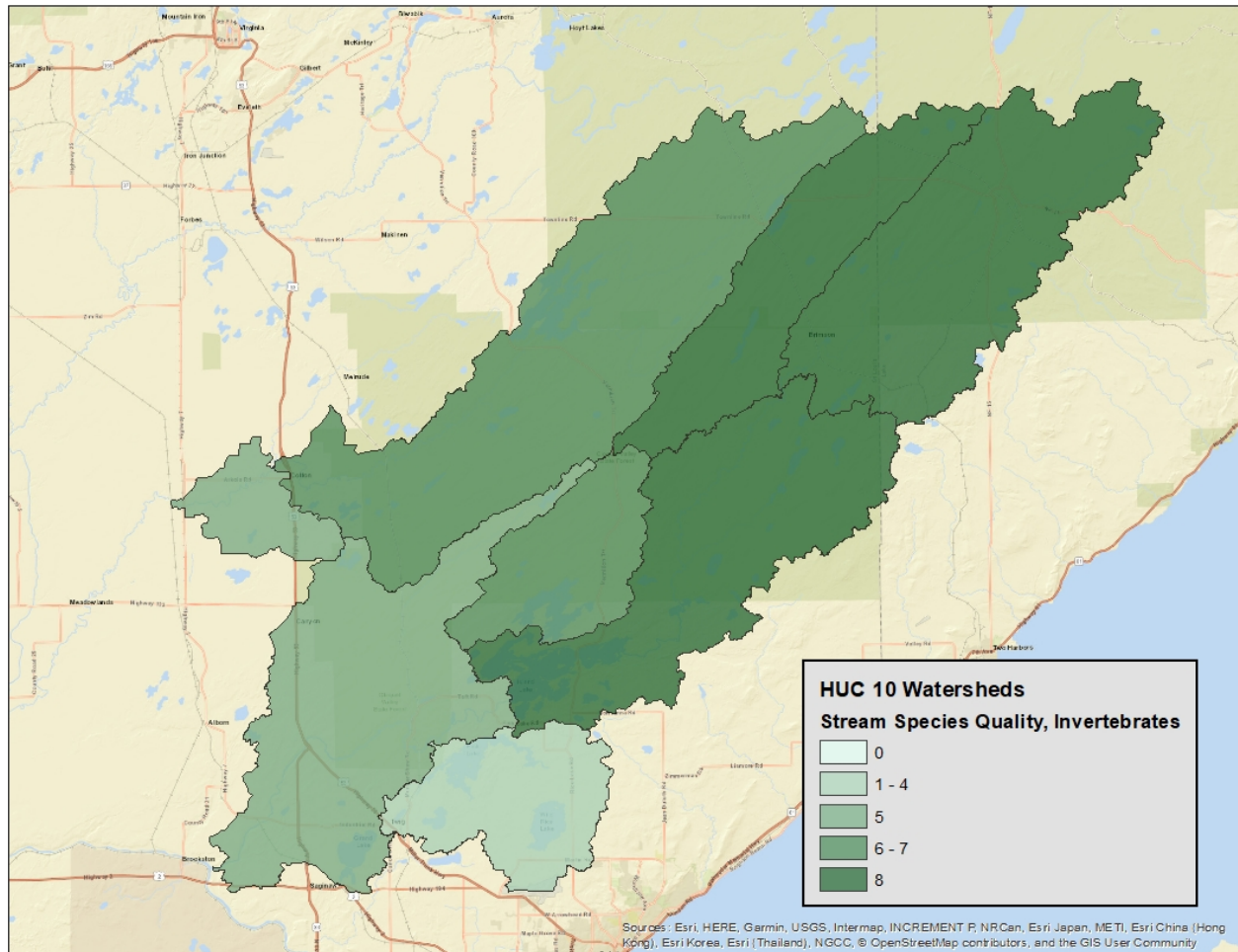
Impervious cover refers to hard surfaces that do not allow water to pass through into the soil (i.e. roads, buildings, parking lots). Hard surfaces cause water to accumulate, carry impurities and fail to recharge groundwater. **A higher score indicates more impervious surfaces.**

Pollution Sensitivity of Near-Surface Materials



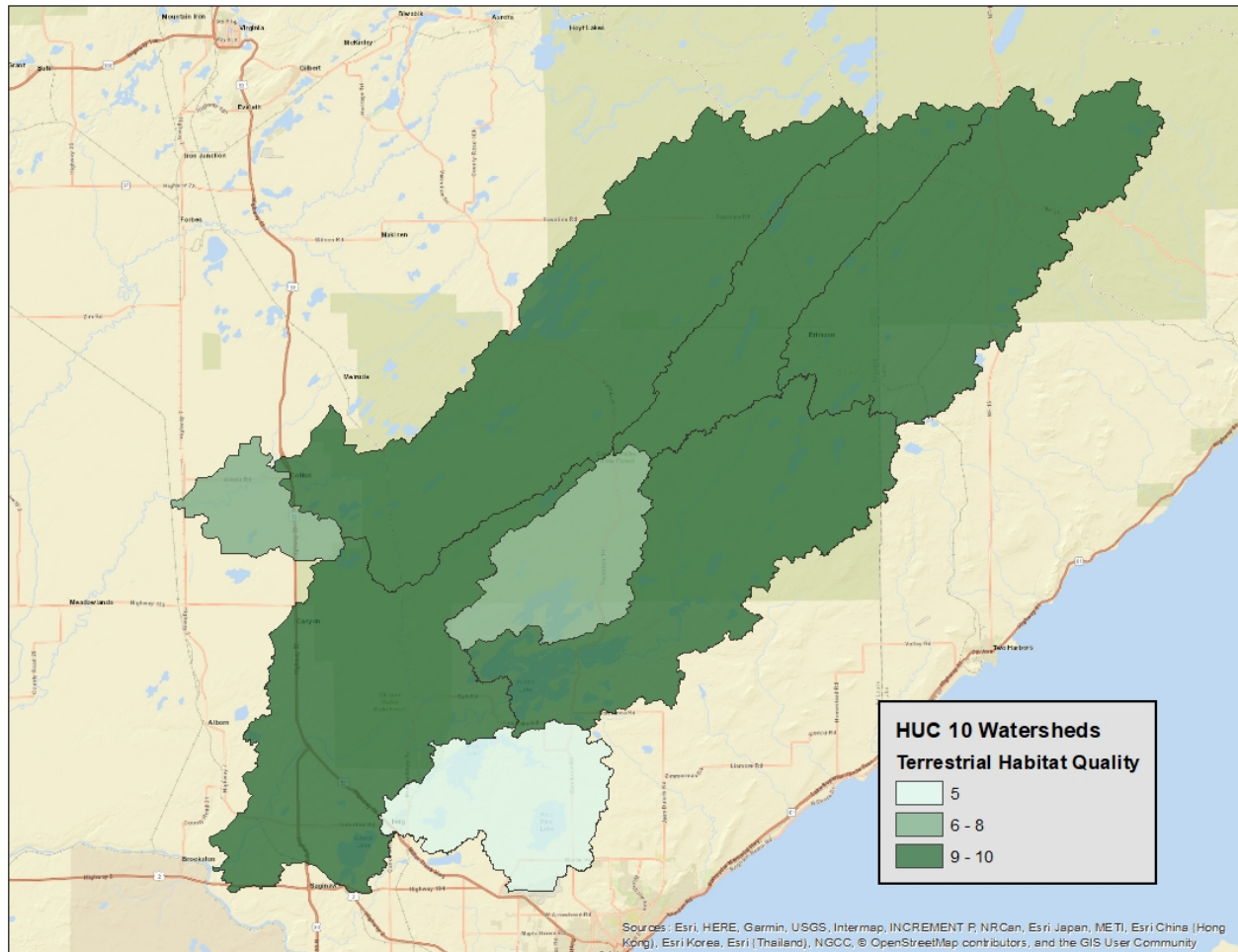
The sensitivity of groundwater to pollution is, in part, determined by the rate that water infiltrates the soil and upper geologic layers. This risk assessment is based on the state-wide Hydrogeologic Atlas (HG-02) published in 2016. This model quantified the Sensitivity of Near-Surface Materials by calculating the approximate rate of infiltration based on properties of the soil and surficial geology. **A high score indicates higher risk of groundwater contamination.**

Stream Species Quality – Invertebrates



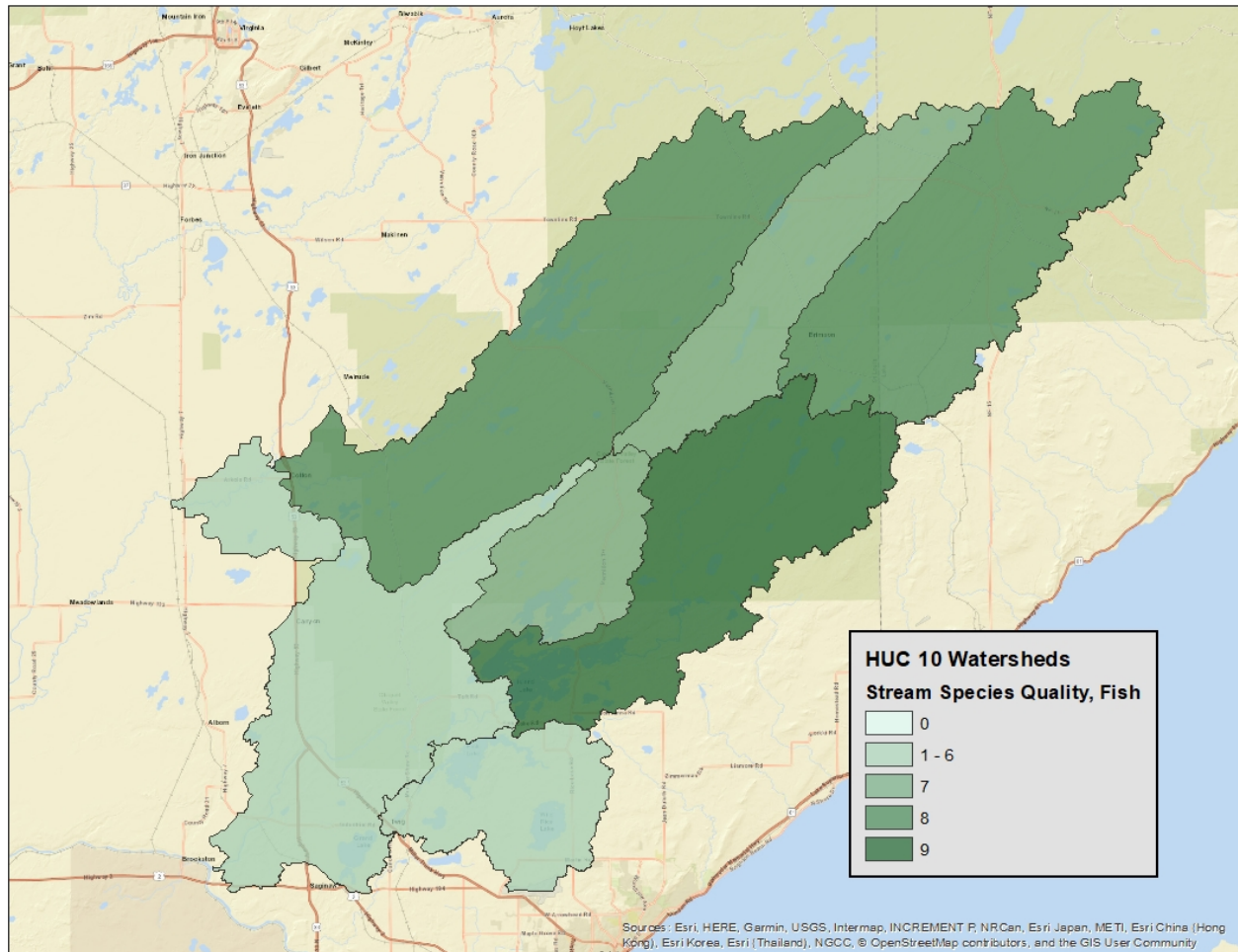
The aquatic species found in streams are often indicators of the condition of the contributing landscape. For the Stream Species Index, the fish and macroinvertebrate IBI (Index of Biotic Integrity) values were compared to expected threshold IBI values at each sampling location. Freshwater mussel survey data was used to compare the number of species found alive with the number of species found only as dead shells. These metrics were combined to create the Stream Species index. **A higher score indicates high quality.**

Terrestrial Habitat Quality



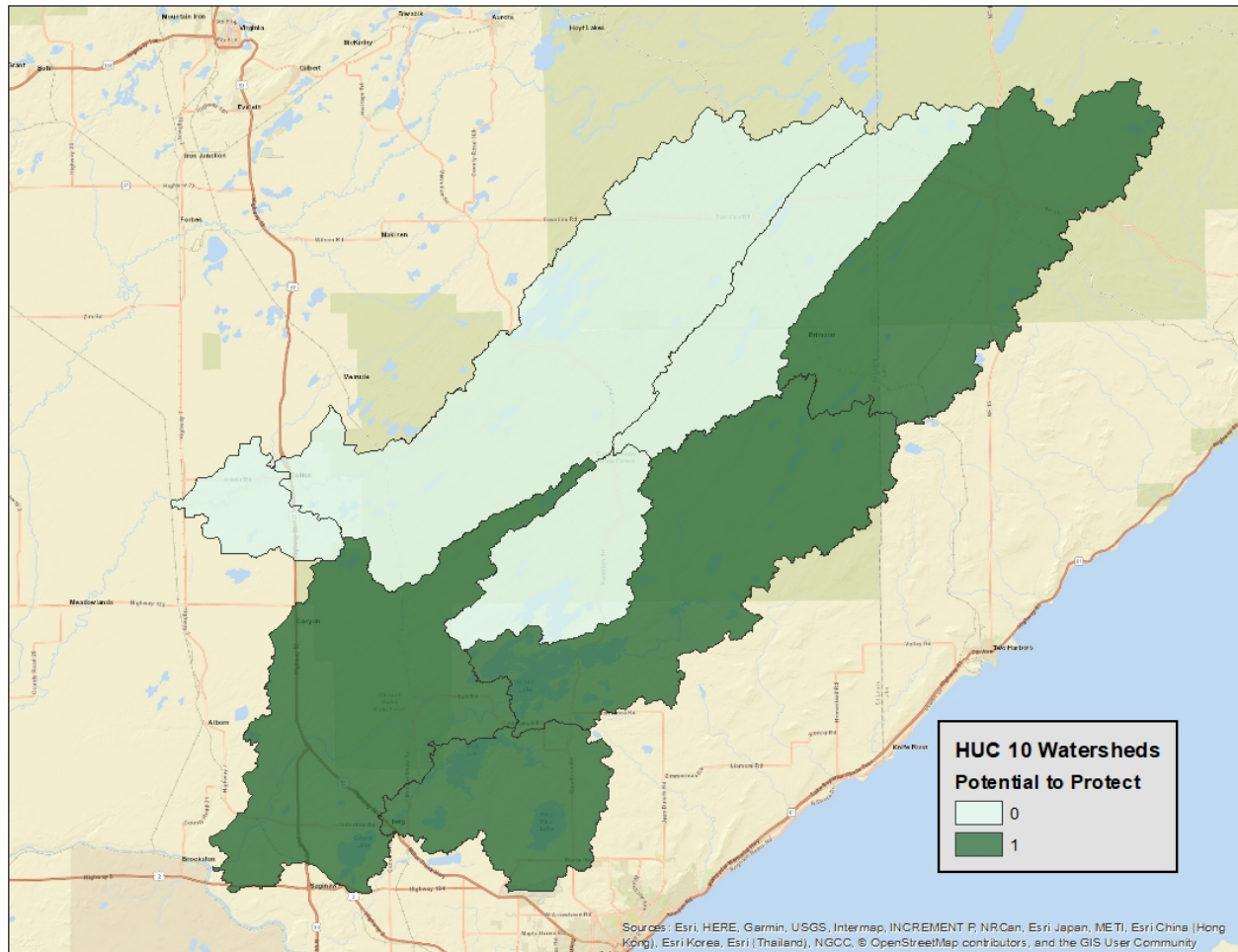
The quality of terrestrial habitat is based on its size, configuration and cover type. A computer model of wetland, grassland and forest habitat quality ranks the quality of the natural land cover in each watershed. This index compares the amount of land that is high quality habitat to the amount of land that is low quality or unsuitable habitat. **A higher score indicates higher quality terrestrial habitat.**

Stream Species Quality- Fish



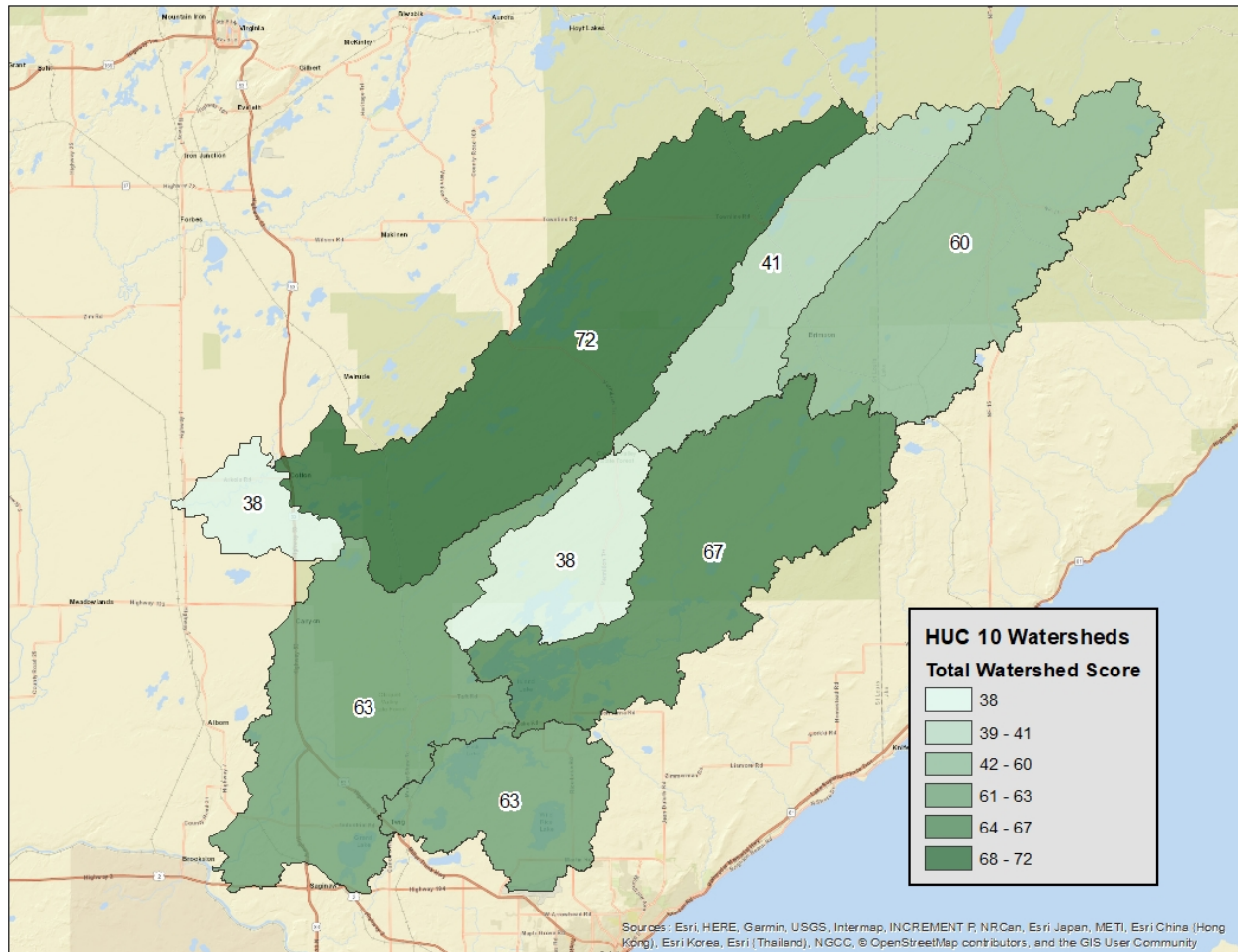
This metric is based on the fish IBI (Index of Biotic Integrity) published by the Minnesota Pollution Control Agency. IBI site scores were transformed to a 0-100 scale, whereby the threshold's score value determined by the PCA represents 50; site scores that are lower than the threshold value were transformed to a score between 0-50, while higher scores were transformed to a score between 50 and 100. Catchment scores represent an average of fish IBI scores in a given catchment.

Potential to Protect – Private Forests



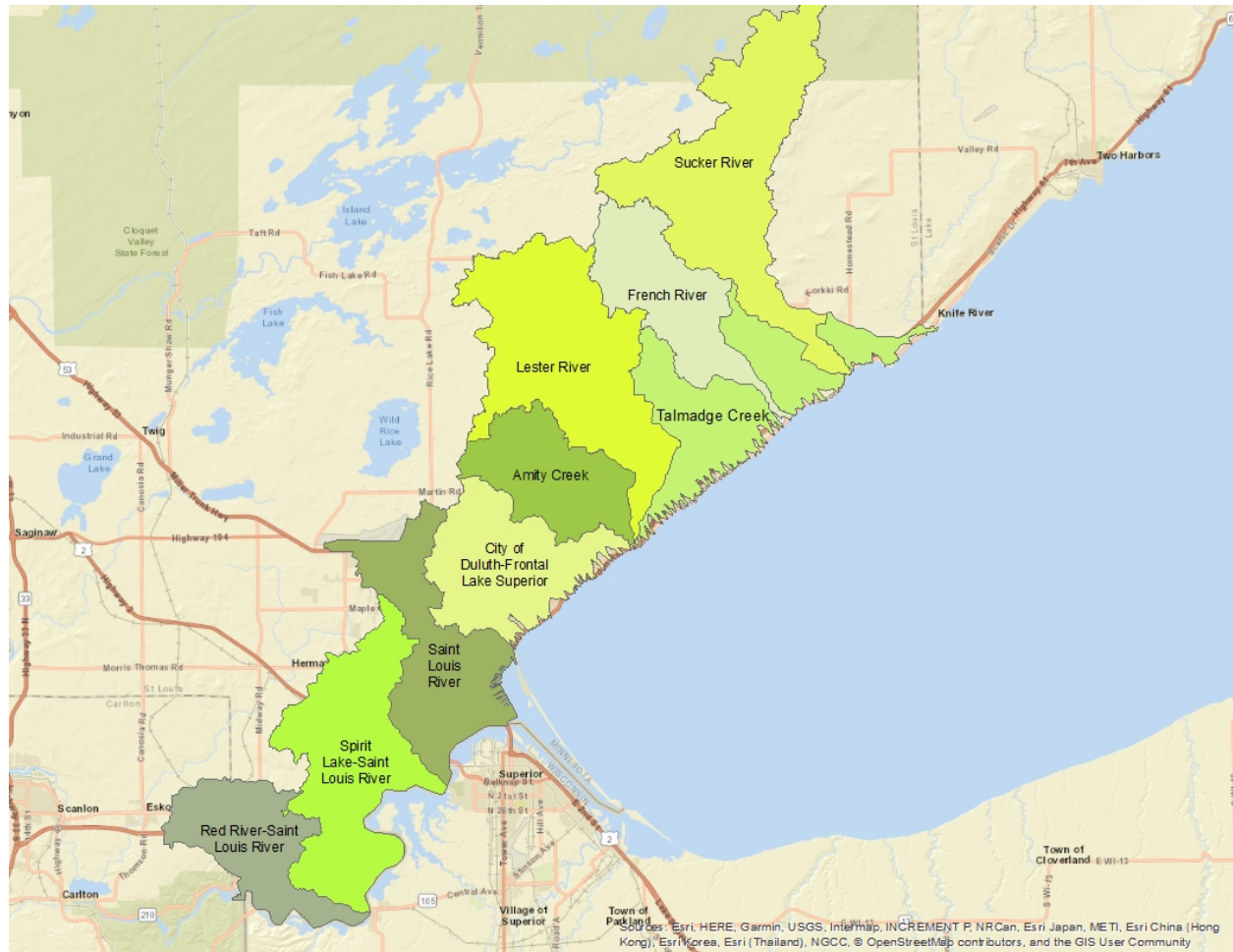
Data comes from the recently completed Landscape Stewardship Plan. A percentage of acres available for protection was evaluated per subwatershed. **A higher score indicates more privately owned forests that could be protected through easements or SFIA.**

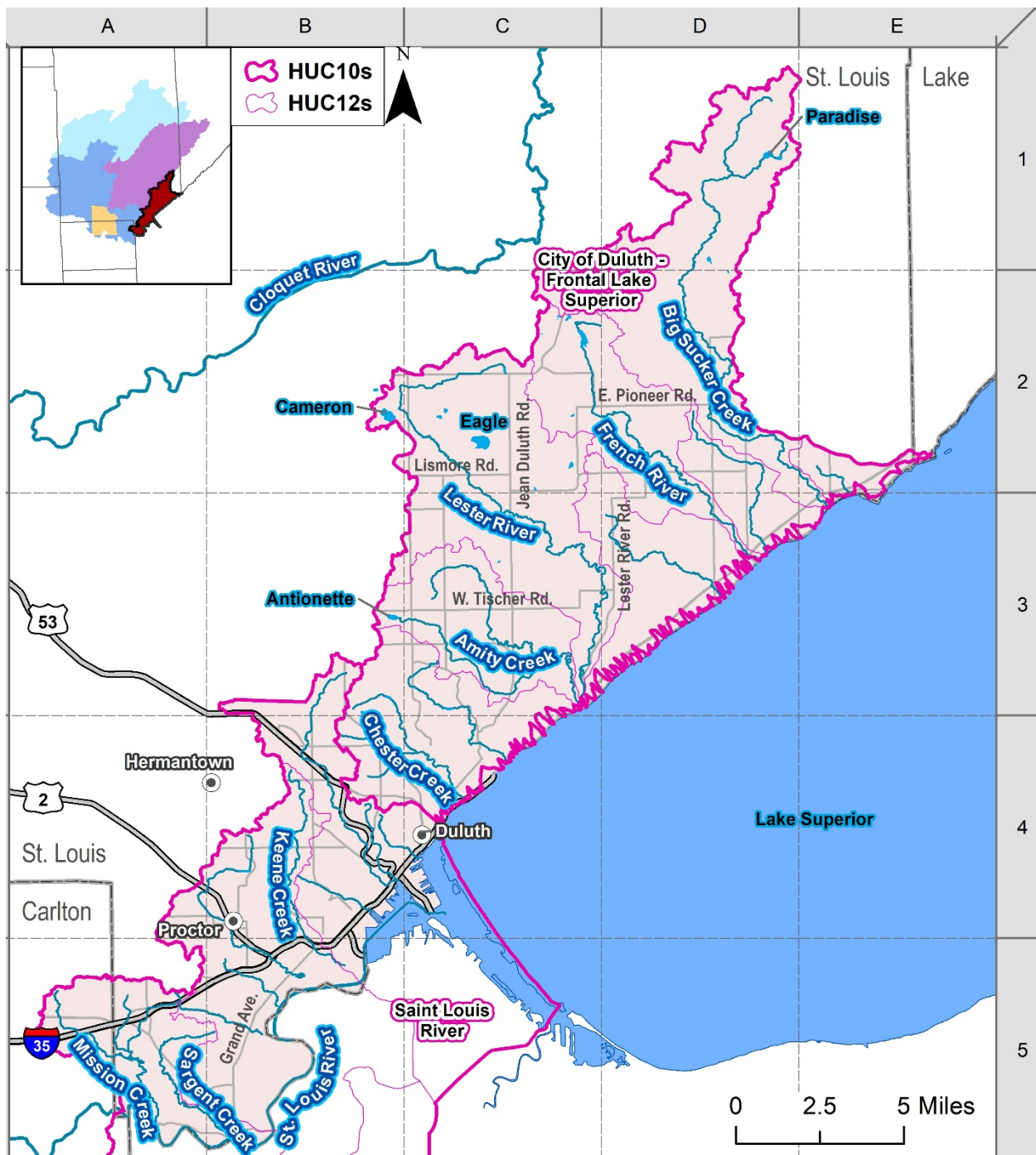
Total Watershed Score

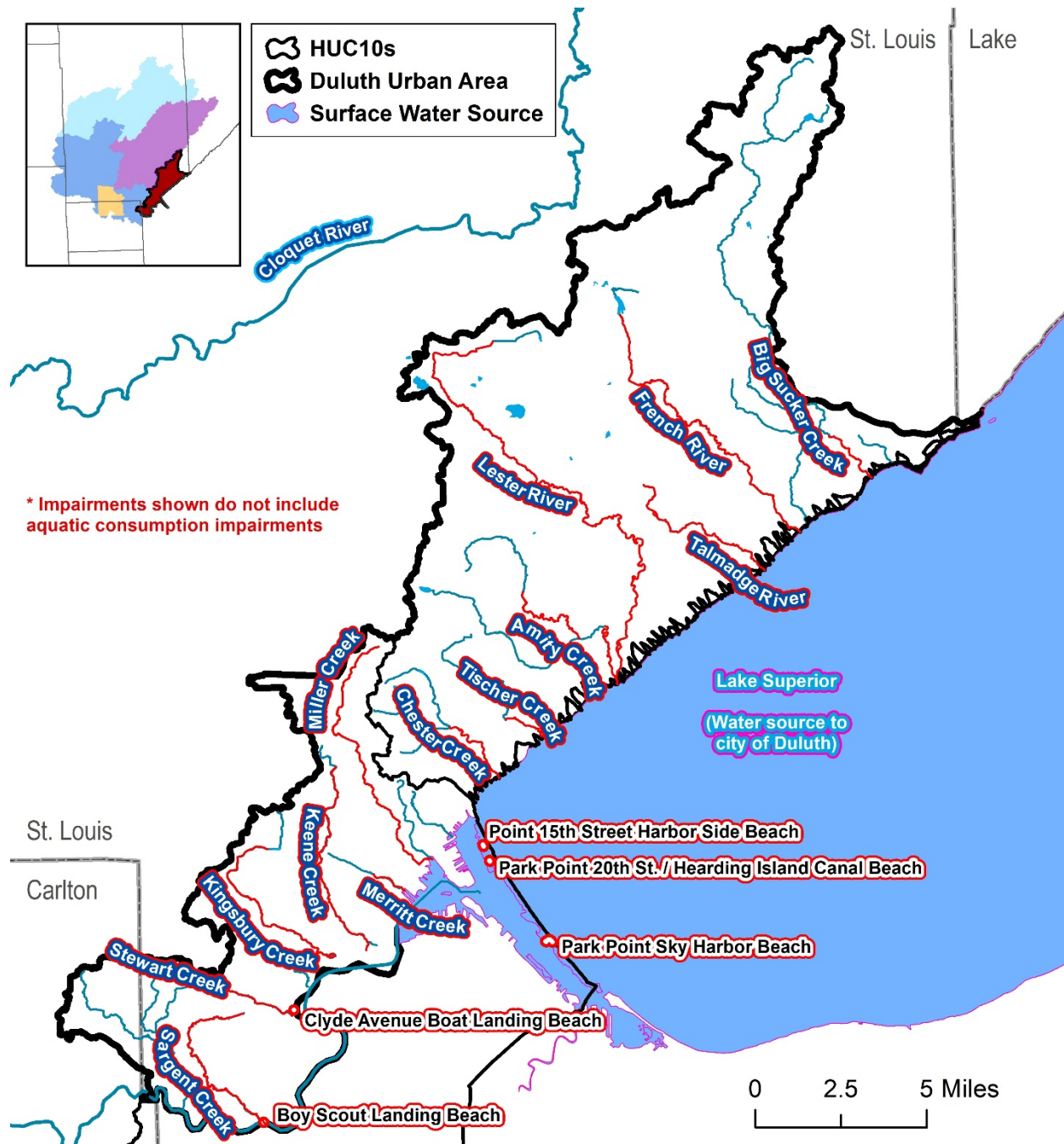


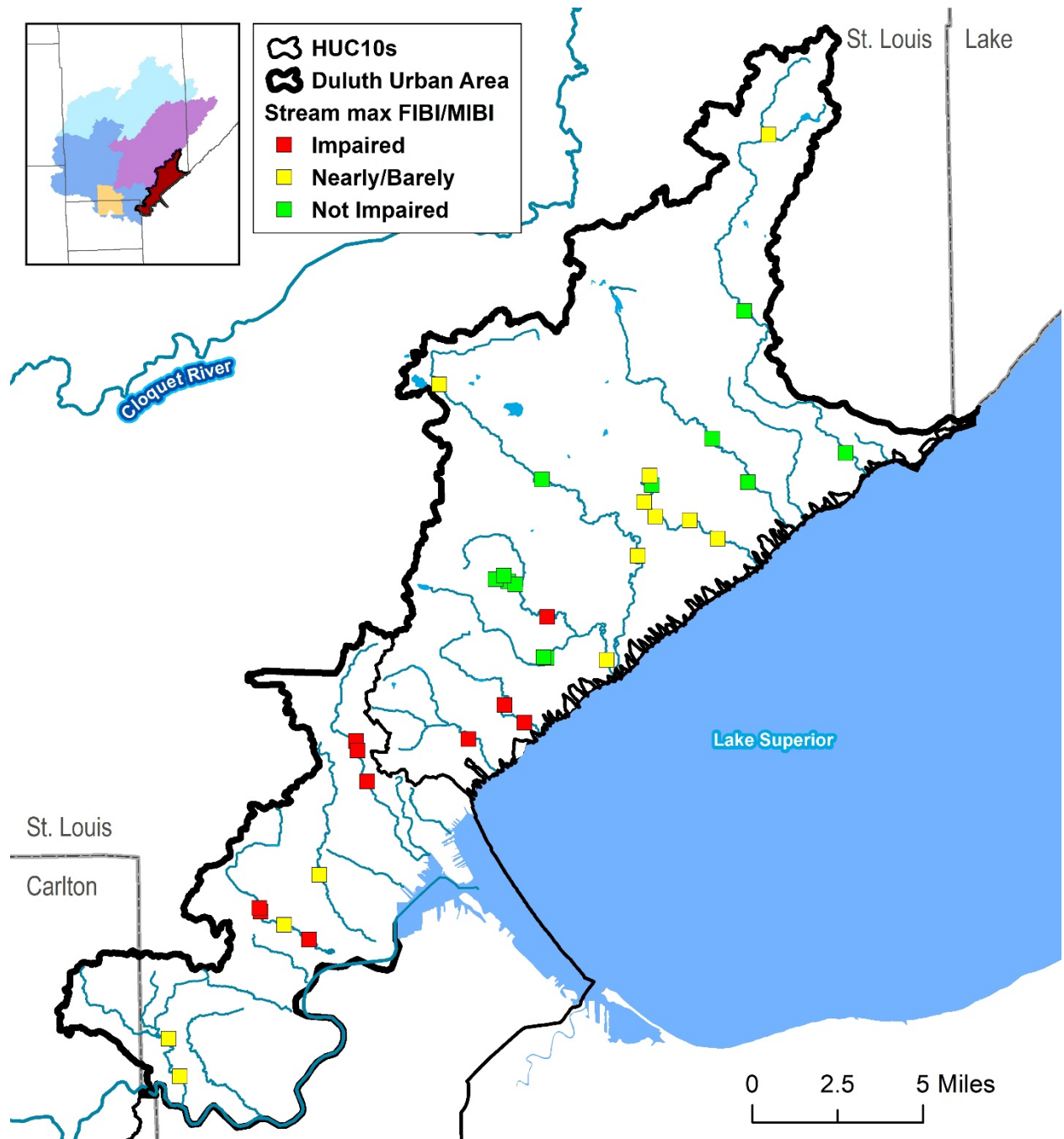
Total score based on the sum of the previous maps (all categories). **A darker color indicates a high score.**

Duluth Urban Planning Area

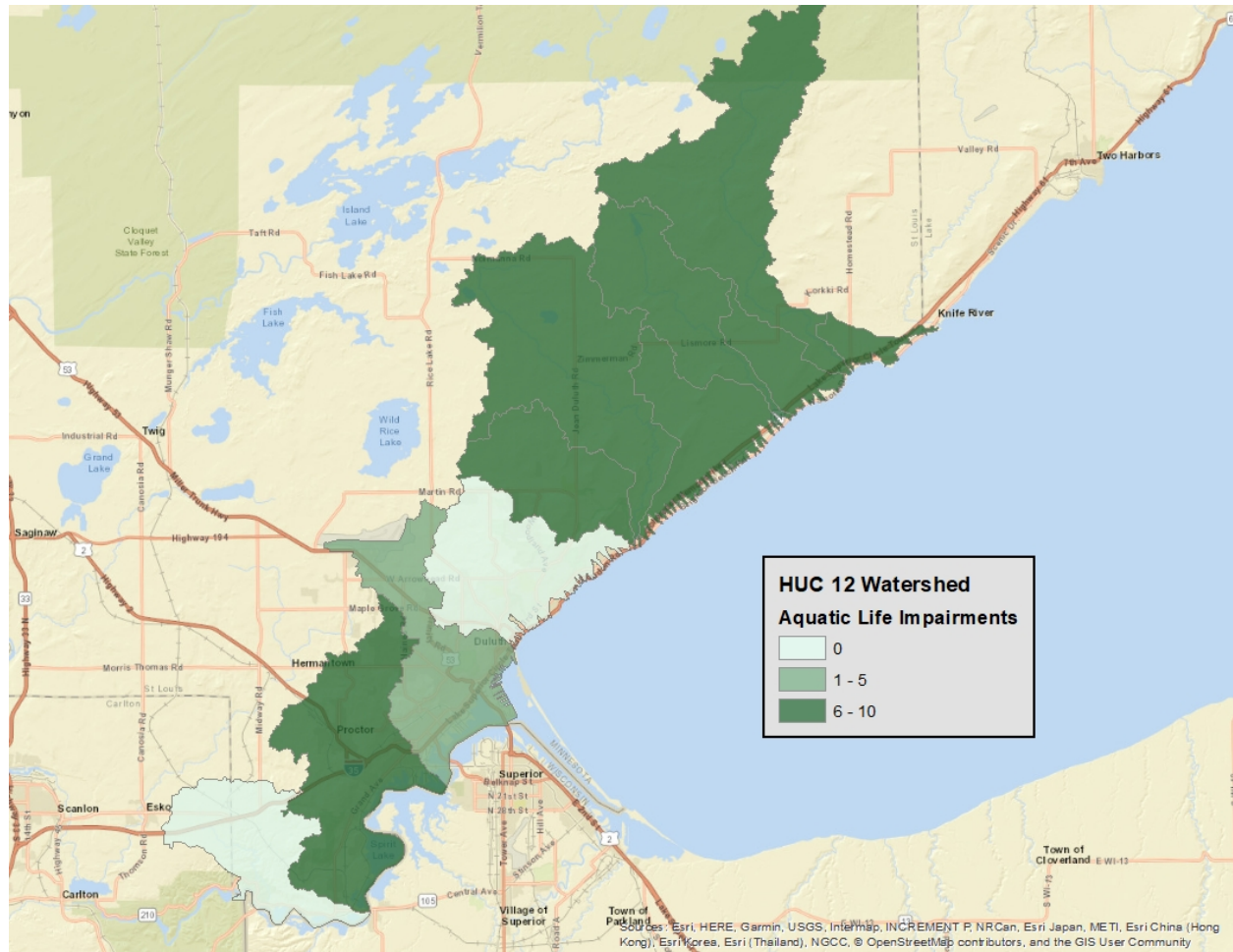






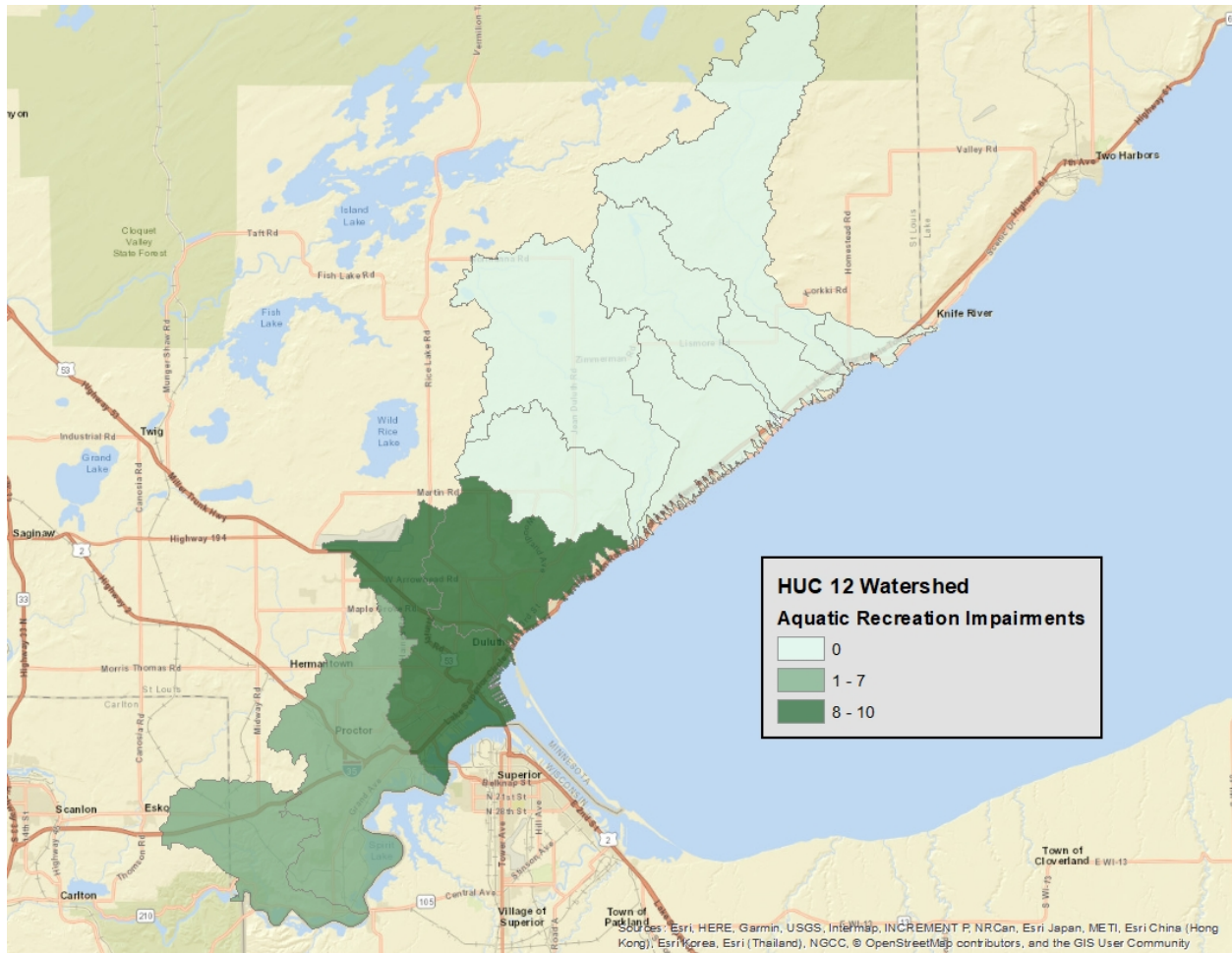


Aquatic Life Impairments



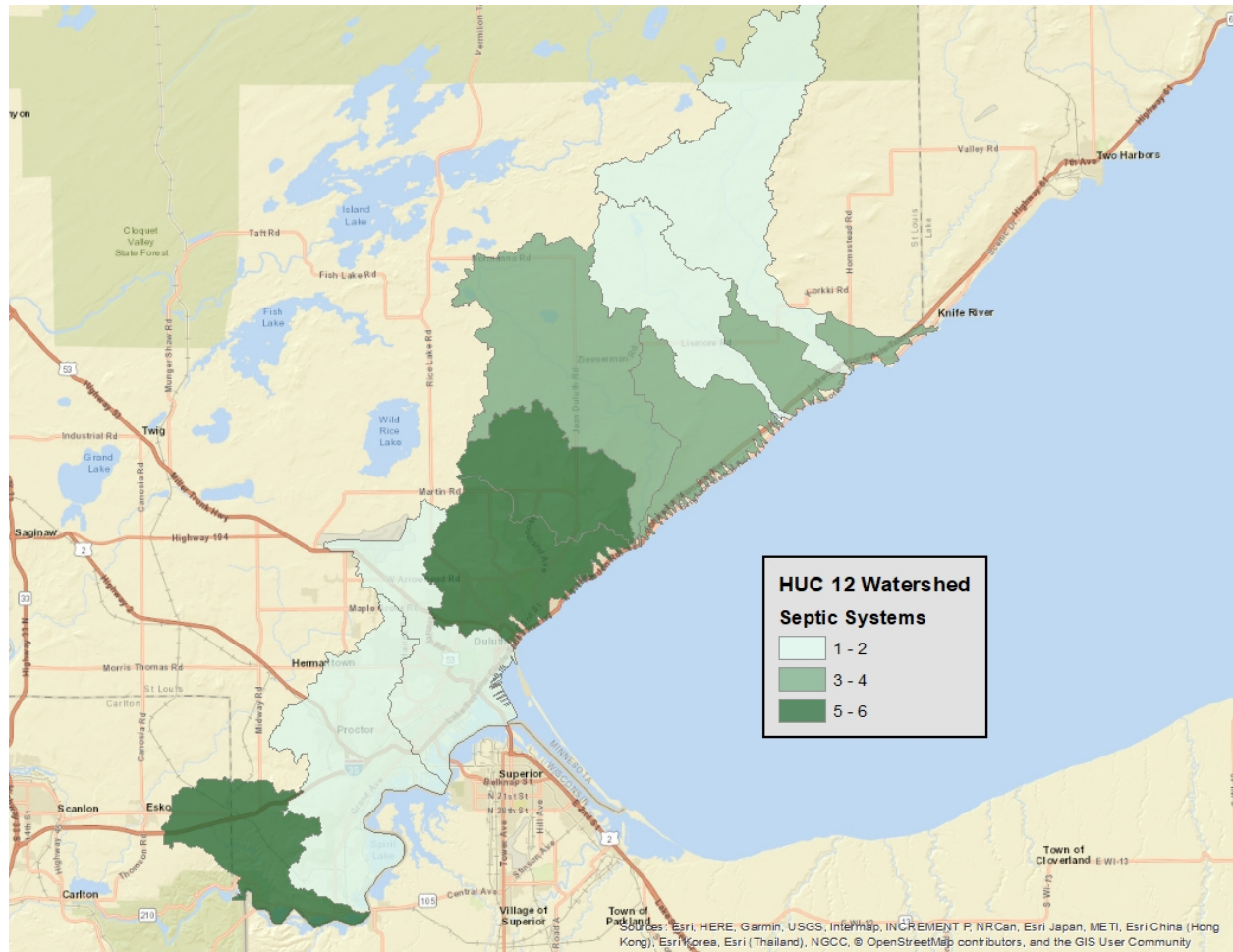
The Pollution Control Agency assesses many of Minnesota's streams, lakes and wetlands to determine if the water quality meets the needs of aquatic organisms. This metric calculates the percent of water bodies assessed for aquatic life that did not meet the standard to fully support aquatic life. **Higher scores indicate more impaired waters.**

Aquatic Recreation Impairments



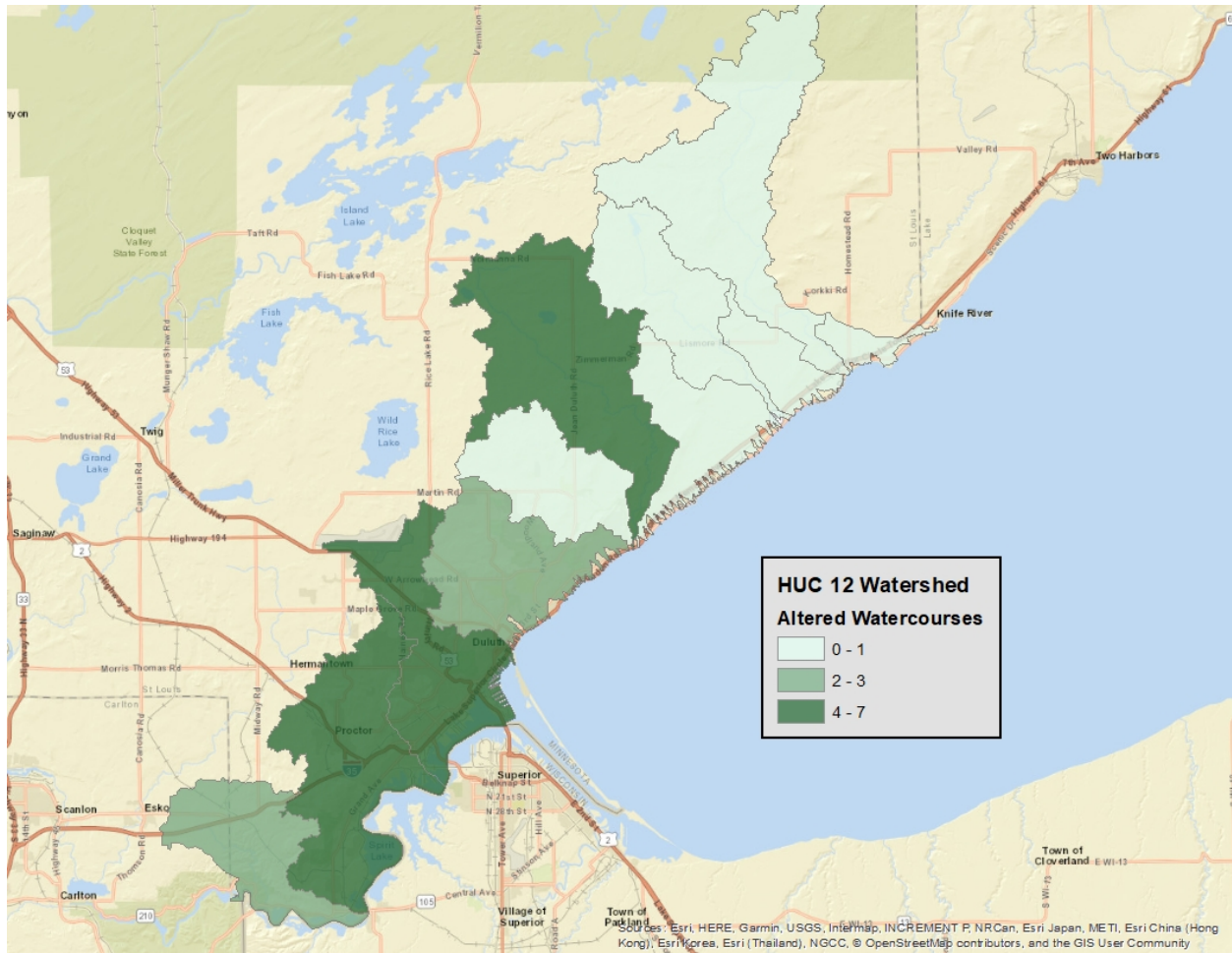
The Pollution Control Agency assesses many of Minnesota's streams, lakes and wetlands to determine if the water quality is adequate for public recreation uses. This metric calculates the percent of water bodies assessed for aquatic recreation that did not meet the standard to fully support recreational use. **Higher scores indicate more impaired waters.**

Septic Systems



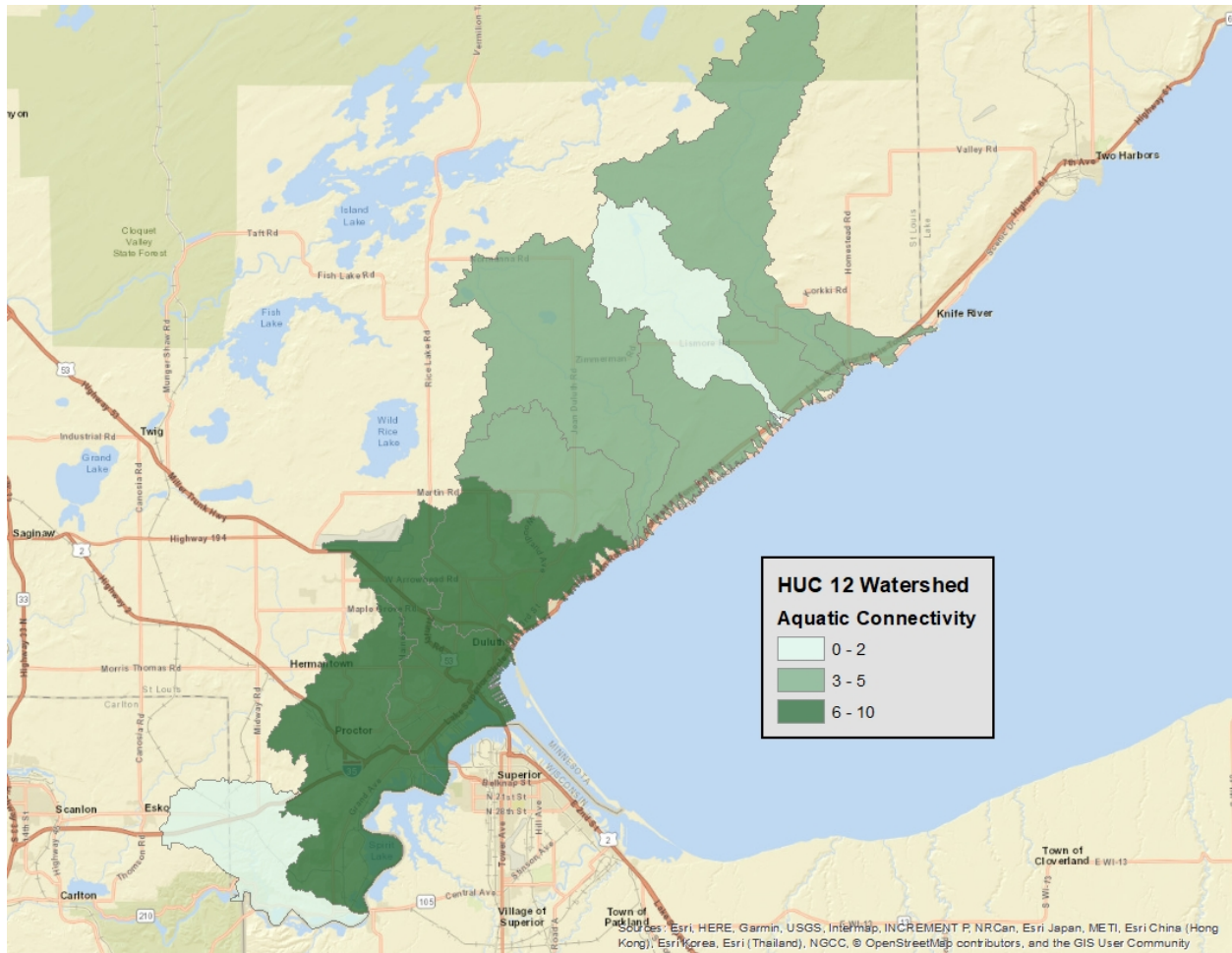
The domestic wells listed in the County Well Index (CWI) were used to approximate septic system location. Given these data assumptions and lack of historic records, this metric provides a conservative estimate of actual septic system density. The metric score is based on well density per square km of land area in a catchment. **Higher scores indicate more septic systems.**

Altered Watercourses



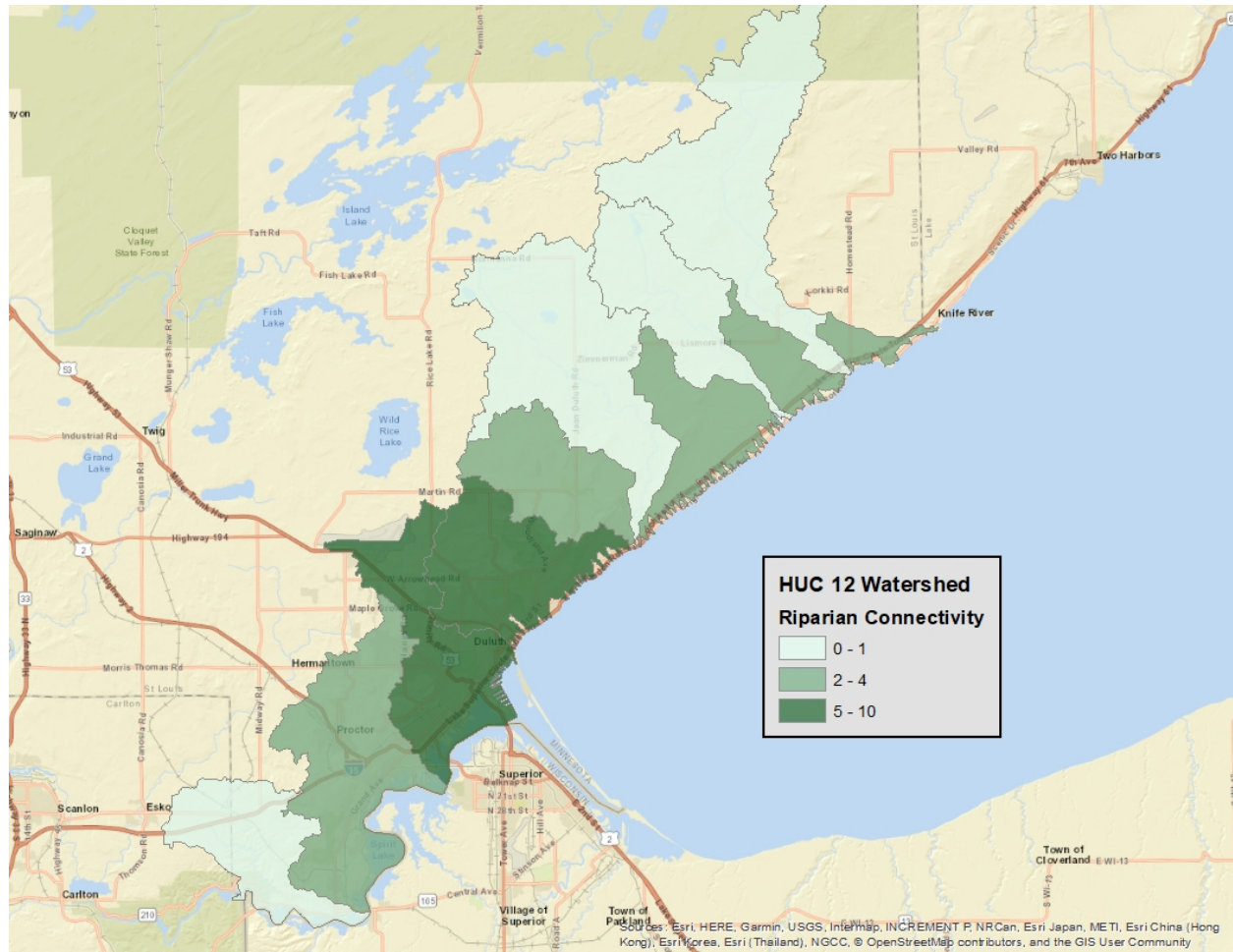
This index represents the extent to which natural streams were straightened by human activity, thereby reducing the hydrologic storage of the land. It is based on the altered watercourses dataset and refers to the length of stream segments that were altered in relation to the length of those that meander naturally. **Higher scores indicate more altered watercourses.**

Aquatic Connectivity



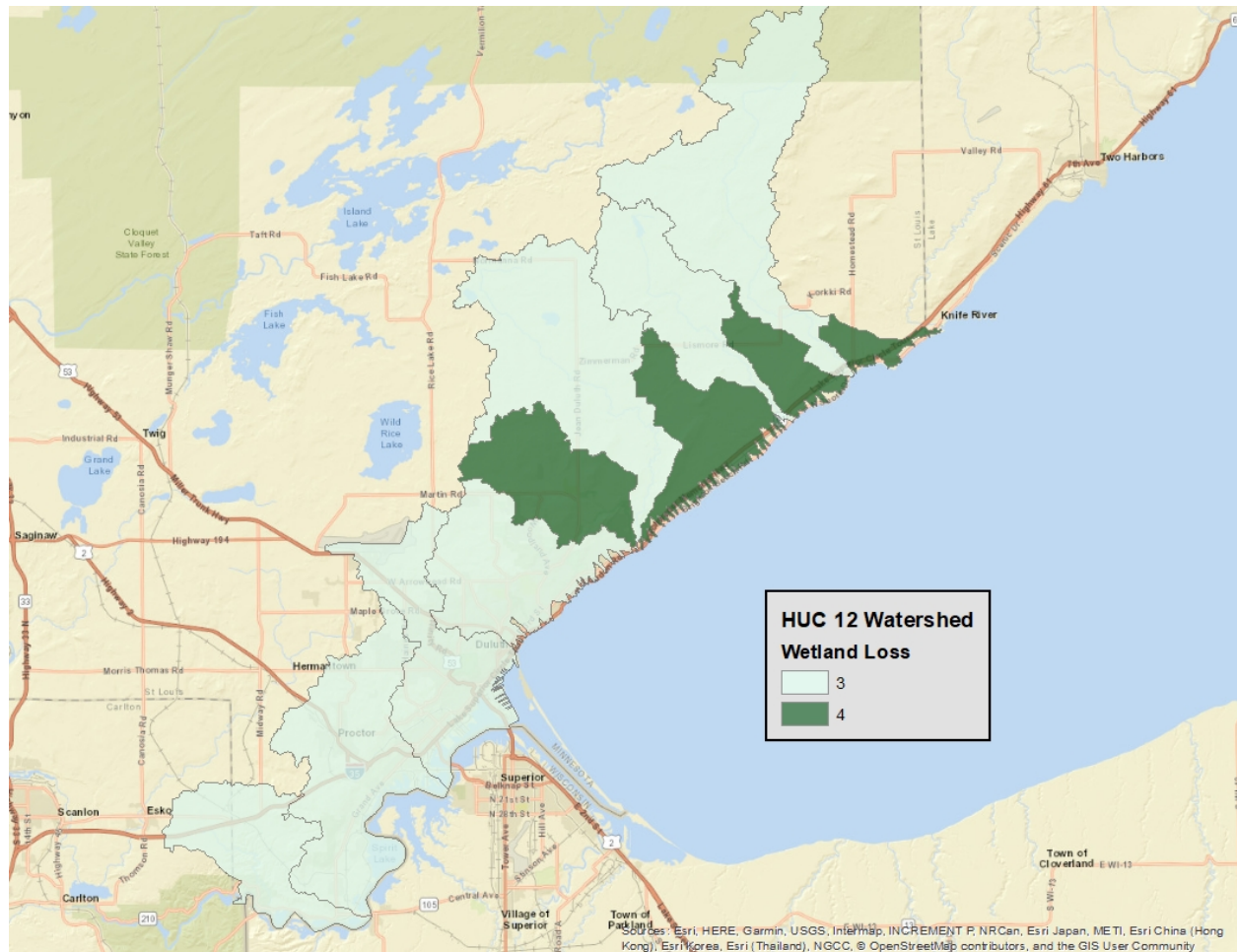
Man-made structures can limit the ability of water, organisms and energy to flow through aquatic systems. The Aquatic Connectivity Index is based on the density of culverts, bridges and dams in each watershed. **A high score indicates more opportunity to improve connectivity.**

Riparian Connectivity



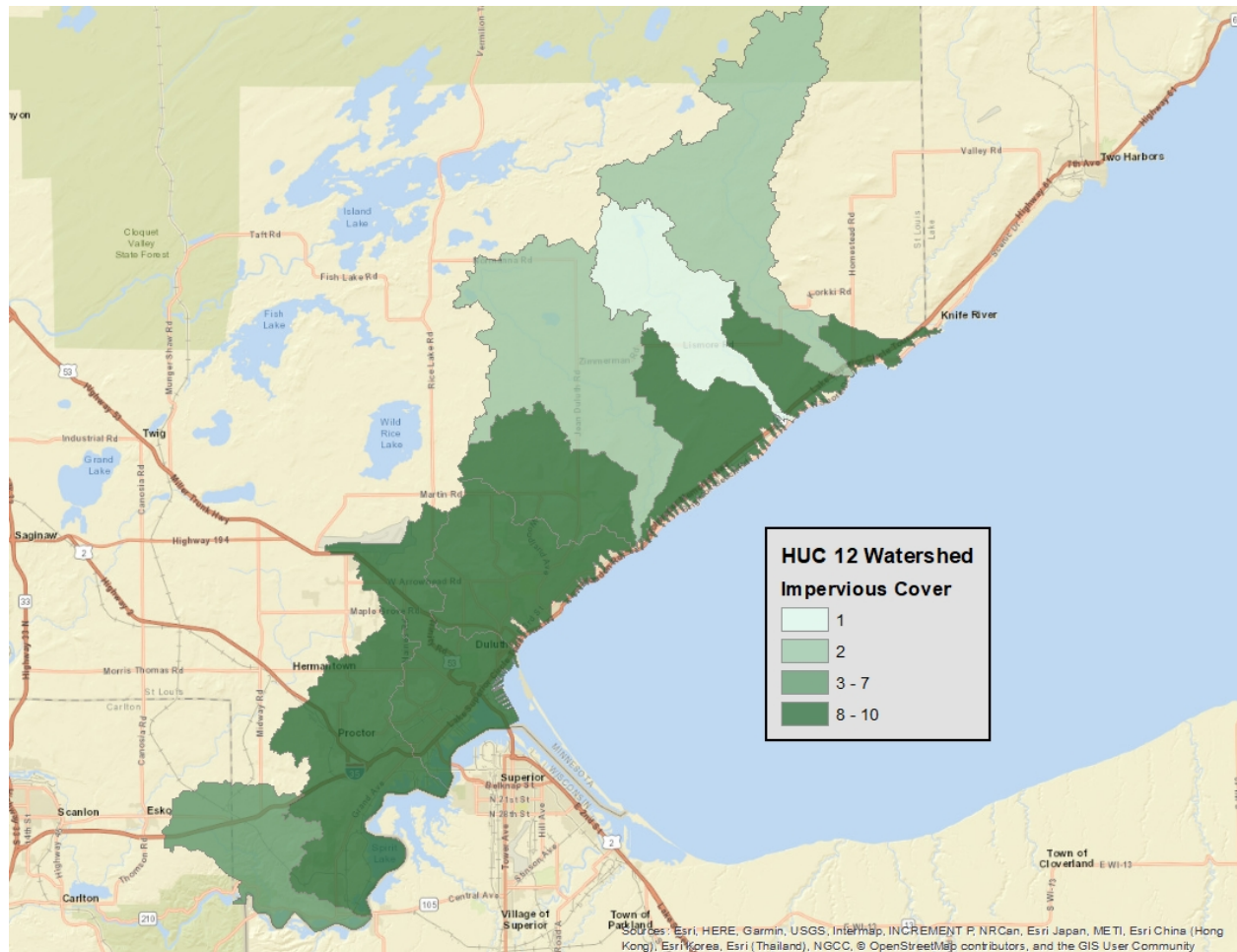
'Riparian' refers to the land immediately adjacent to water features such as lakes and rivers. Access to this area is important to aquatic and terrestrial species particularly during seasonal high flow or flood events. Riparian lands are also important year round as travel corridors and habitat connectors, often providing the only remaining natural land cover in developed landscapes. The Riparian Connectivity Index compares the amount of cropped or developed land cover to the amount of open land in the riparian area. **A high score indicates more opportunity to improve connectivity.**

Wetland Loss



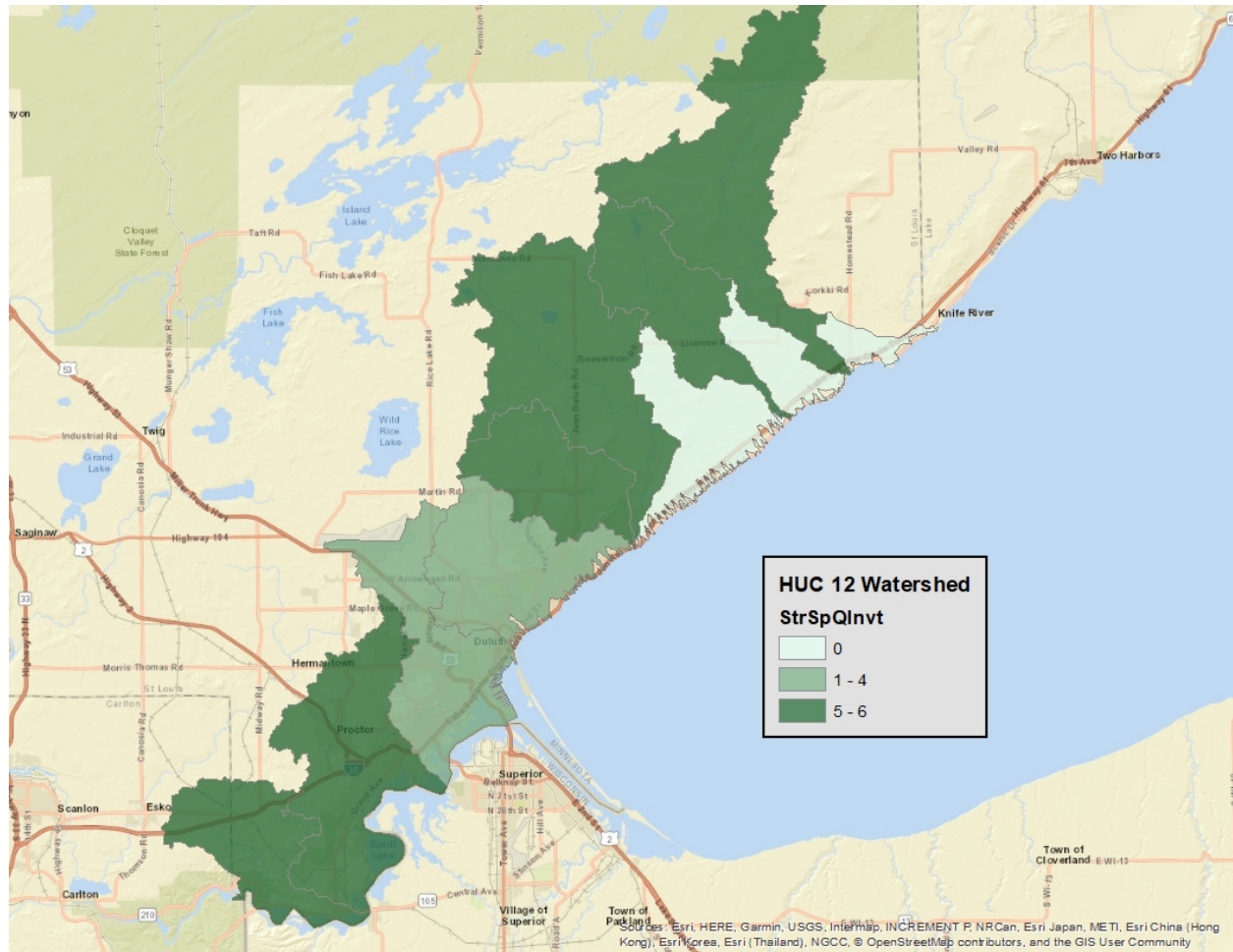
This index represents the proportion of the watershed that has been drained and converted out of wetland coverage. Wetland drainage reduces the upland hydrologic storage capacity and increases rate and magnitude that stream flow after rainfall events. Less wetland area leads to a greater delivery of contaminants to streams and lakes, and a destabilization of streams and streambanks. Pre-European settlement wetland coverage is estimated from the proportion of soils that are classified as 'Hydric', current wetland coverage is calculated from the National Wetland Inventory. **A higher score indicates more opportunities for wetland restoration.**

Impervious Cover



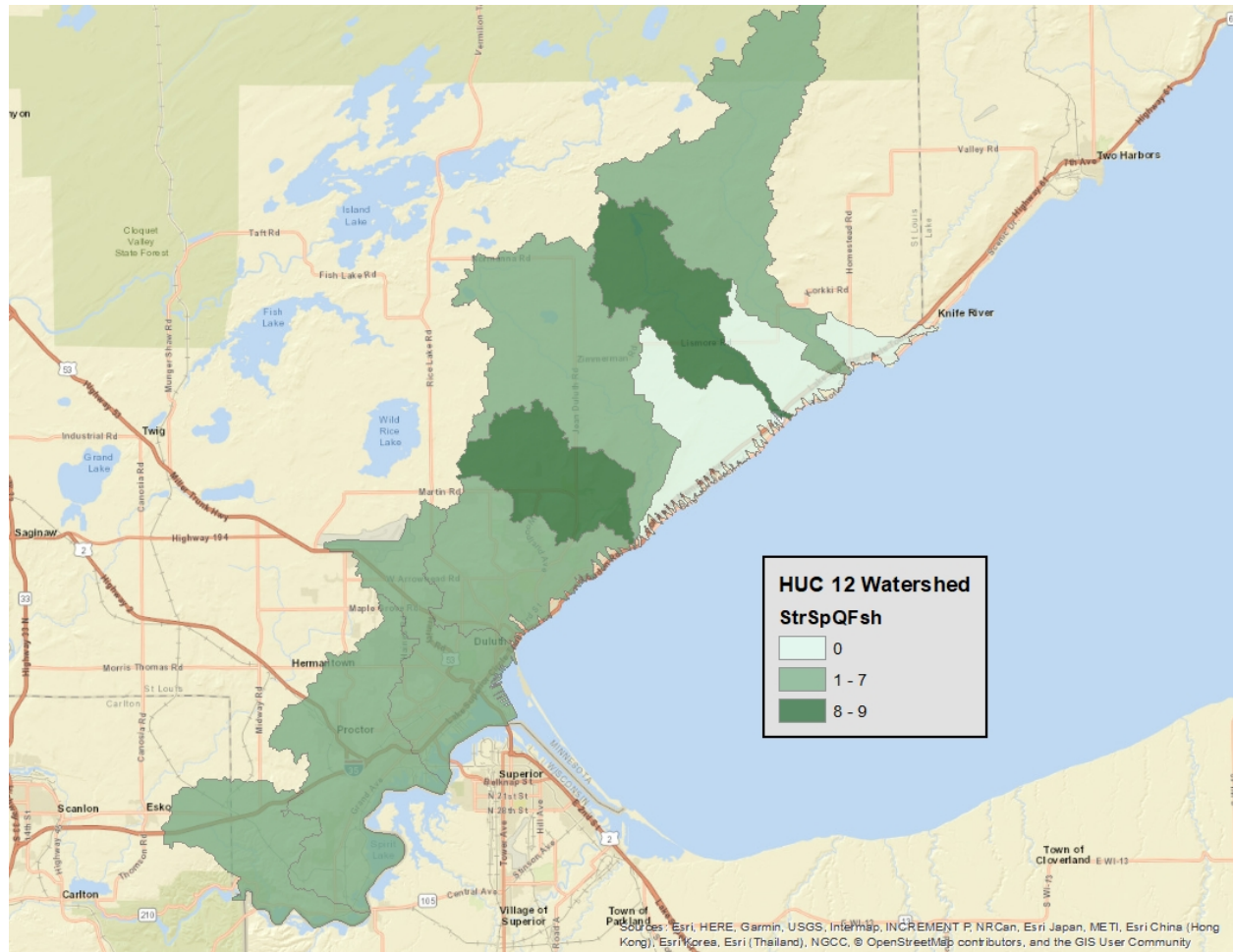
Impervious cover refers to hard surfaces that do not allow water to pass through into the soil (i.e. roads, buildings, parking lots). Hard surfaces cause water to accumulate, carry impurities and fail to recharge groundwater. **A higher score indicates more impervious surfaces.**

Stream Species Quality – Invertebrates



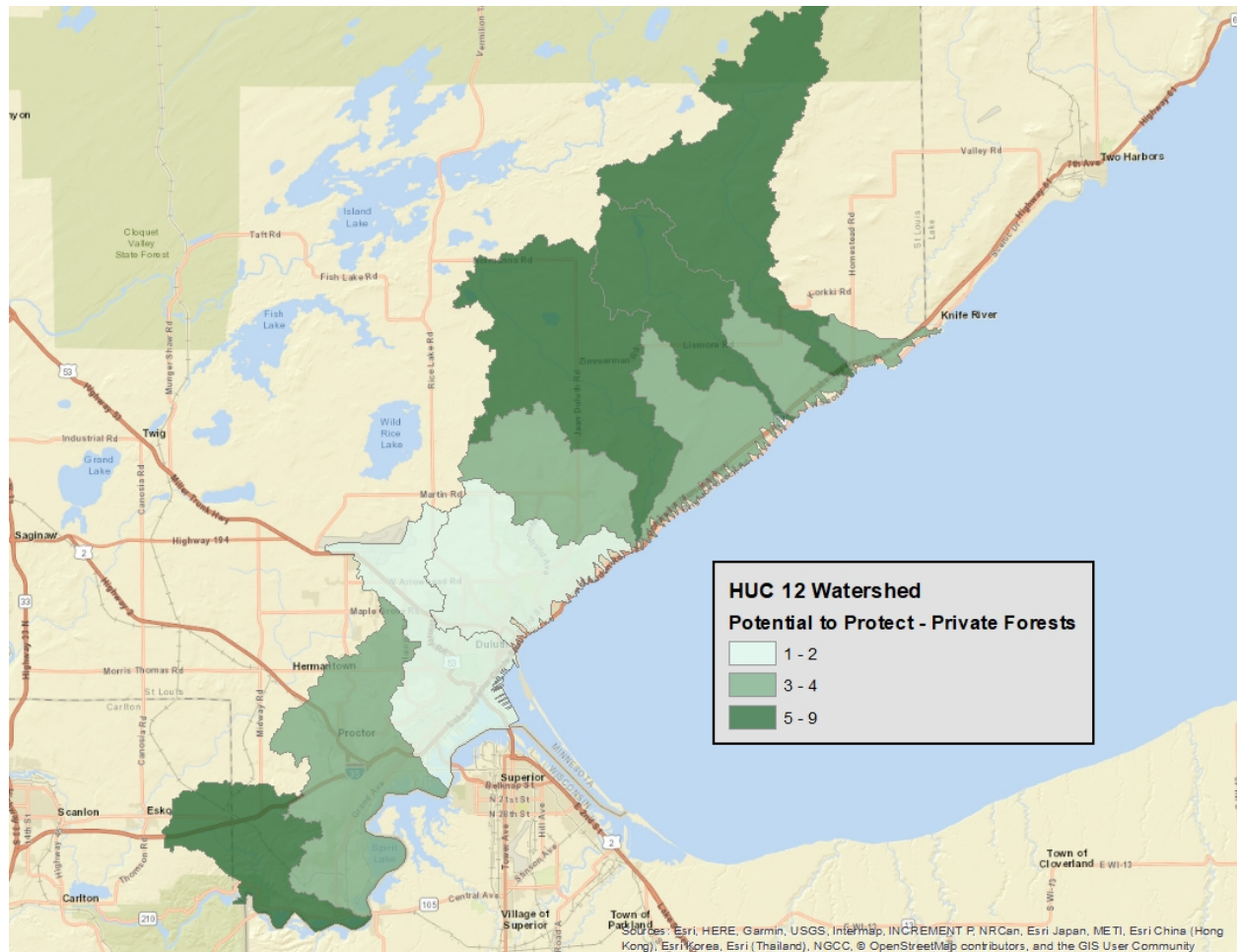
The aquatic species found in streams are often indicators of the condition of the contributing landscape. For the Stream Species Index, the fish and macroinvertebrate IBI (Index of Biotic Integrity) values were compared to expected threshold IBI values at each sampling location. Freshwater mussel survey data was used to compare the number of species found alive with the number of species found only as dead shells. These metrics were combined to create the Stream Species index. **A higher score indicates high quality.**

Stream Species Quality- Fish



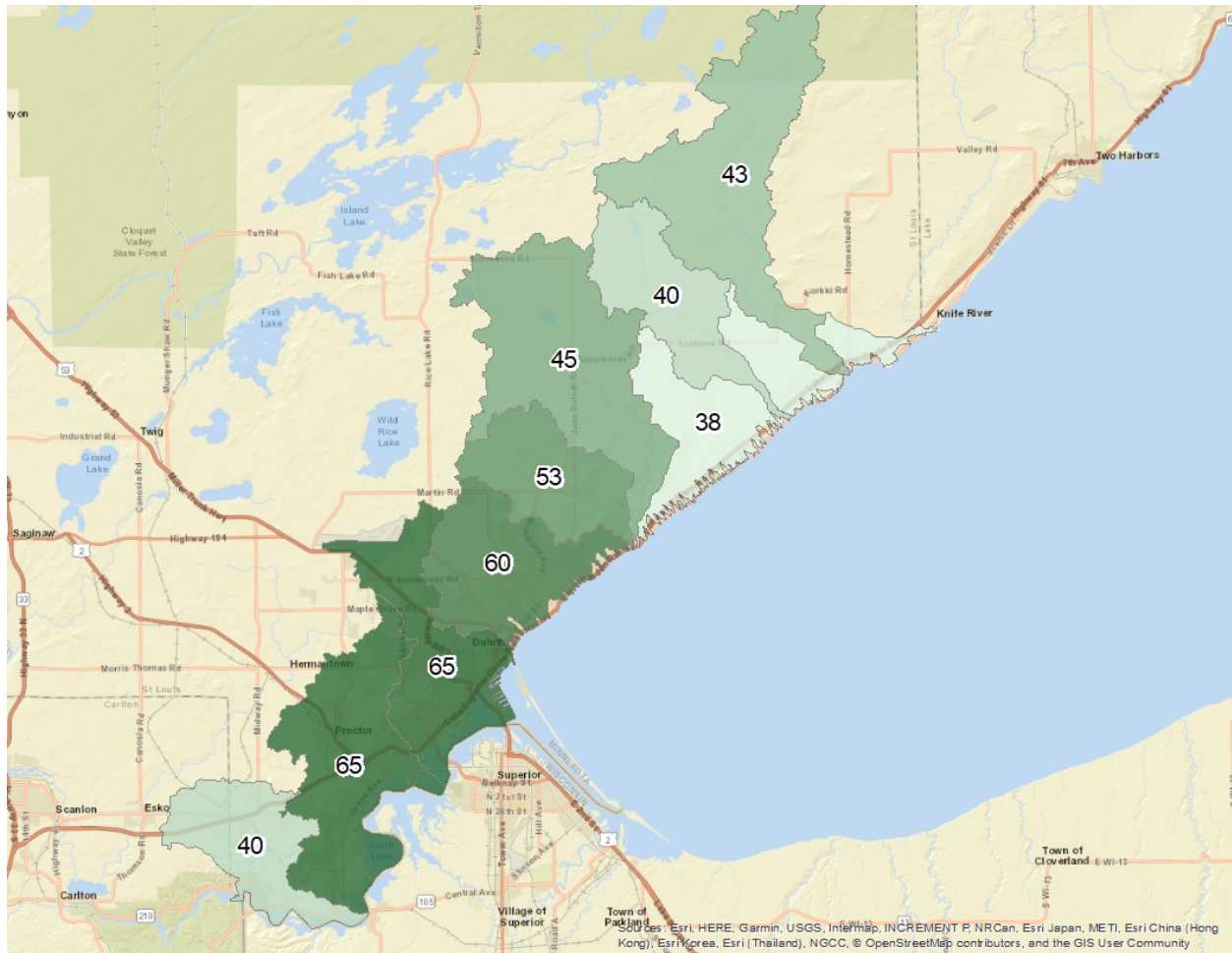
This metric is based on the fish IBI (Index of Biotic Integrity) published by the Minnesota Pollution Control Agency. IBI site scores were transformed to a 0-100 scale, whereby the threshold's score value determined by the PCA represents 50; site scores that are lower than the threshold value were transformed to a score between 0-50, while higher scores were transformed to a score between 50 and 100. Catchment scores represent an average of fish IBI scores in a given catchment.

Potential to Protect – Private Forests



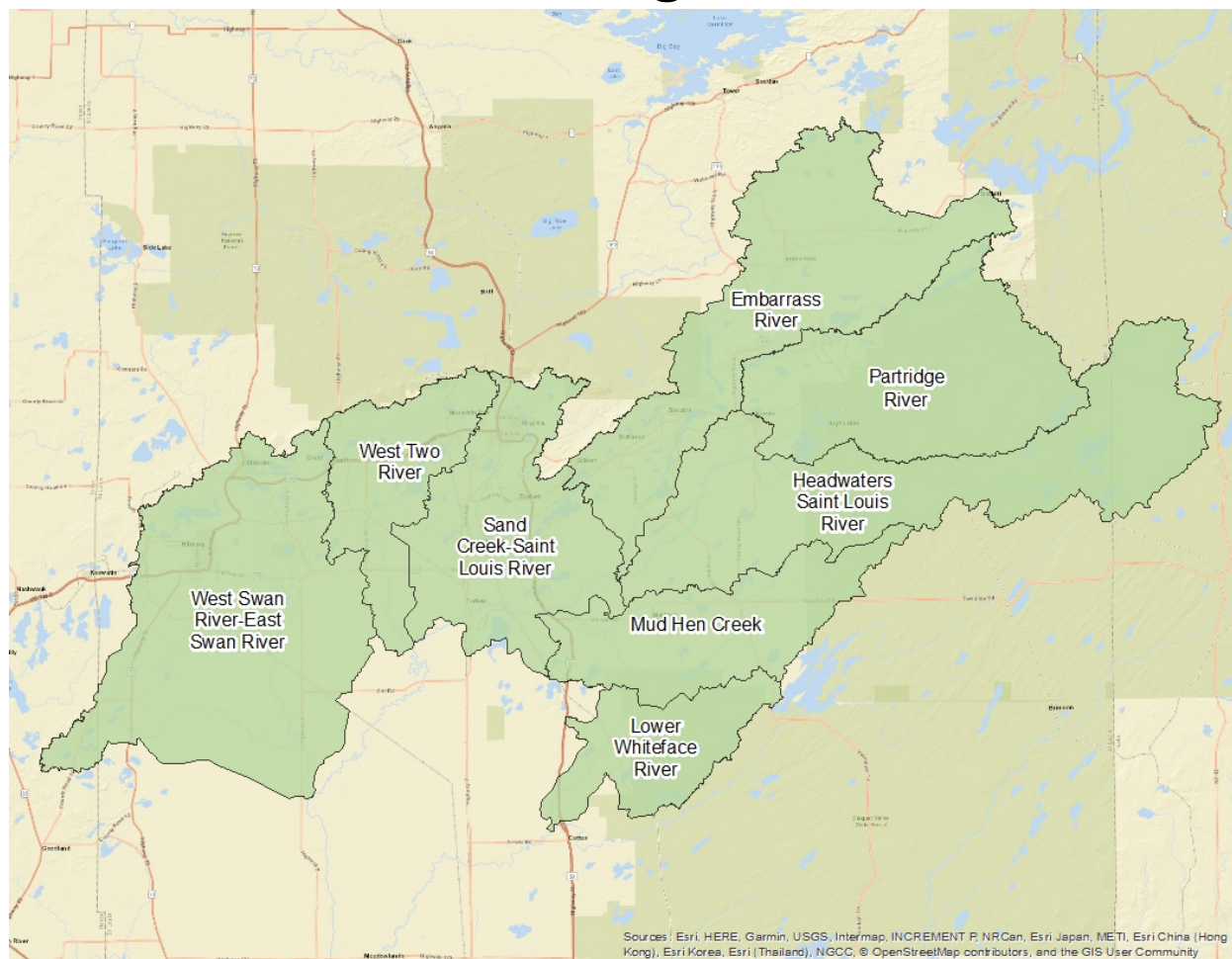
Data comes from the recently completed Landscape Stewardship Plan. A percentage of acres available for protection was evaluated per subwatershed. **A higher score indicates more privately owned forests that could be protected through easements or SFIA.**

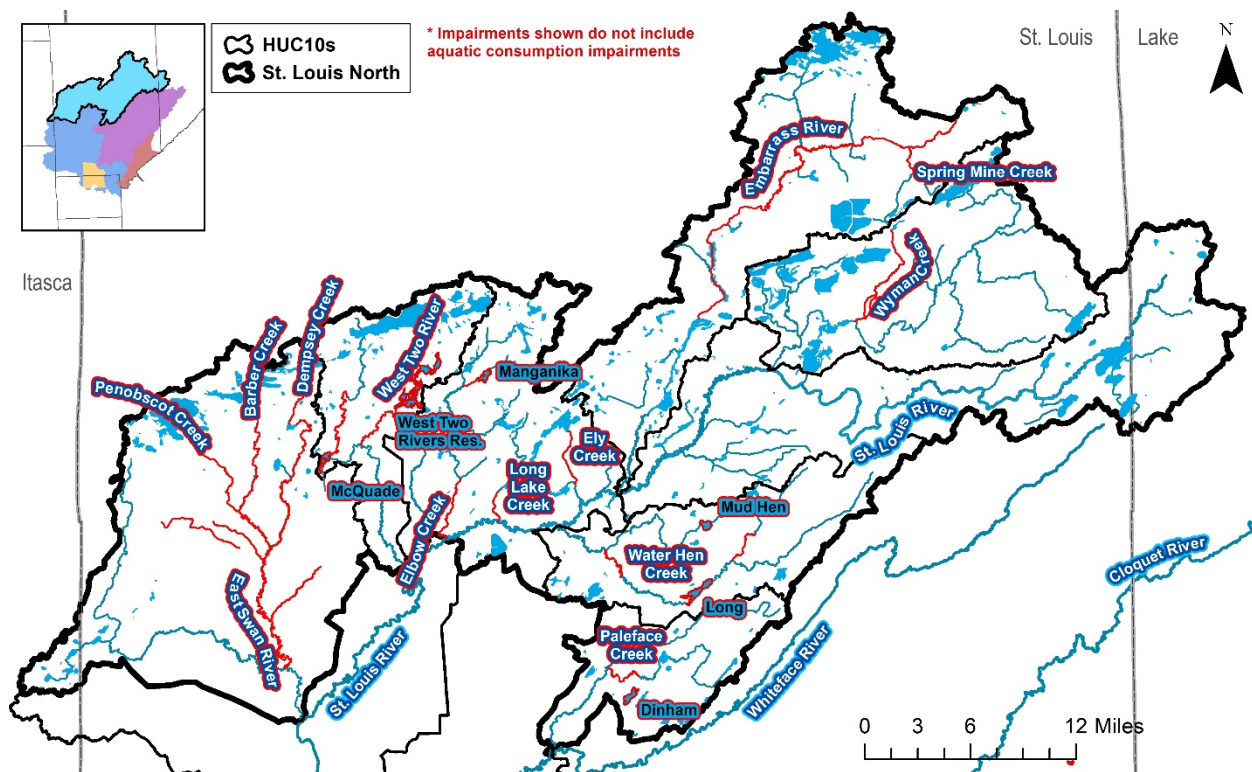
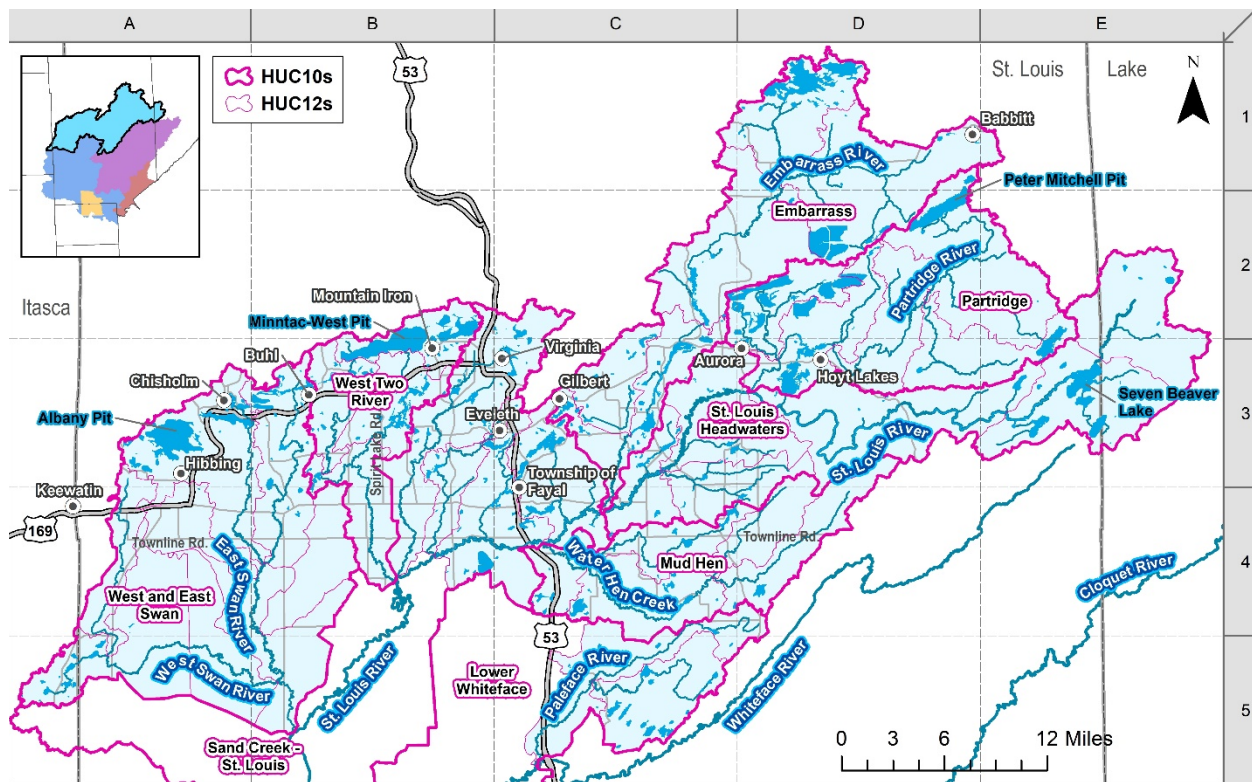
Total Watershed Score

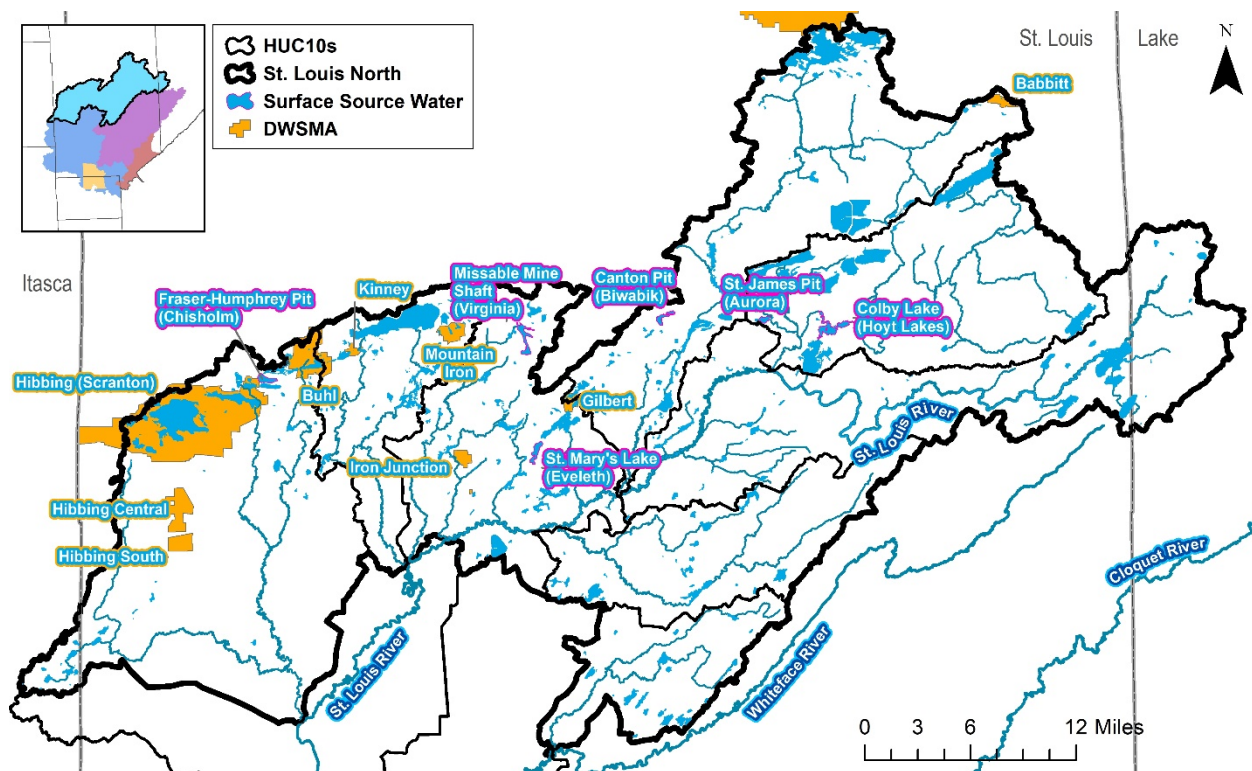
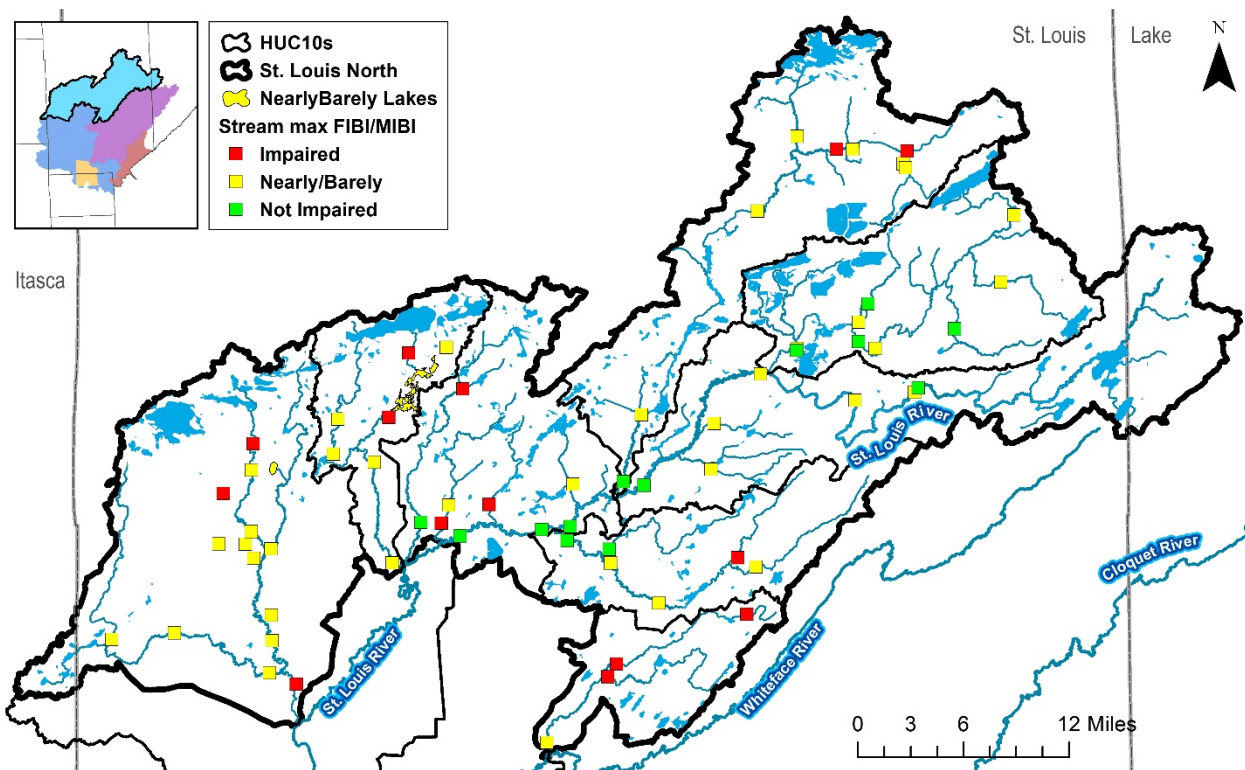


Total score based on the sum of the previous maps (all categories). **A darker color indicates a high score.**

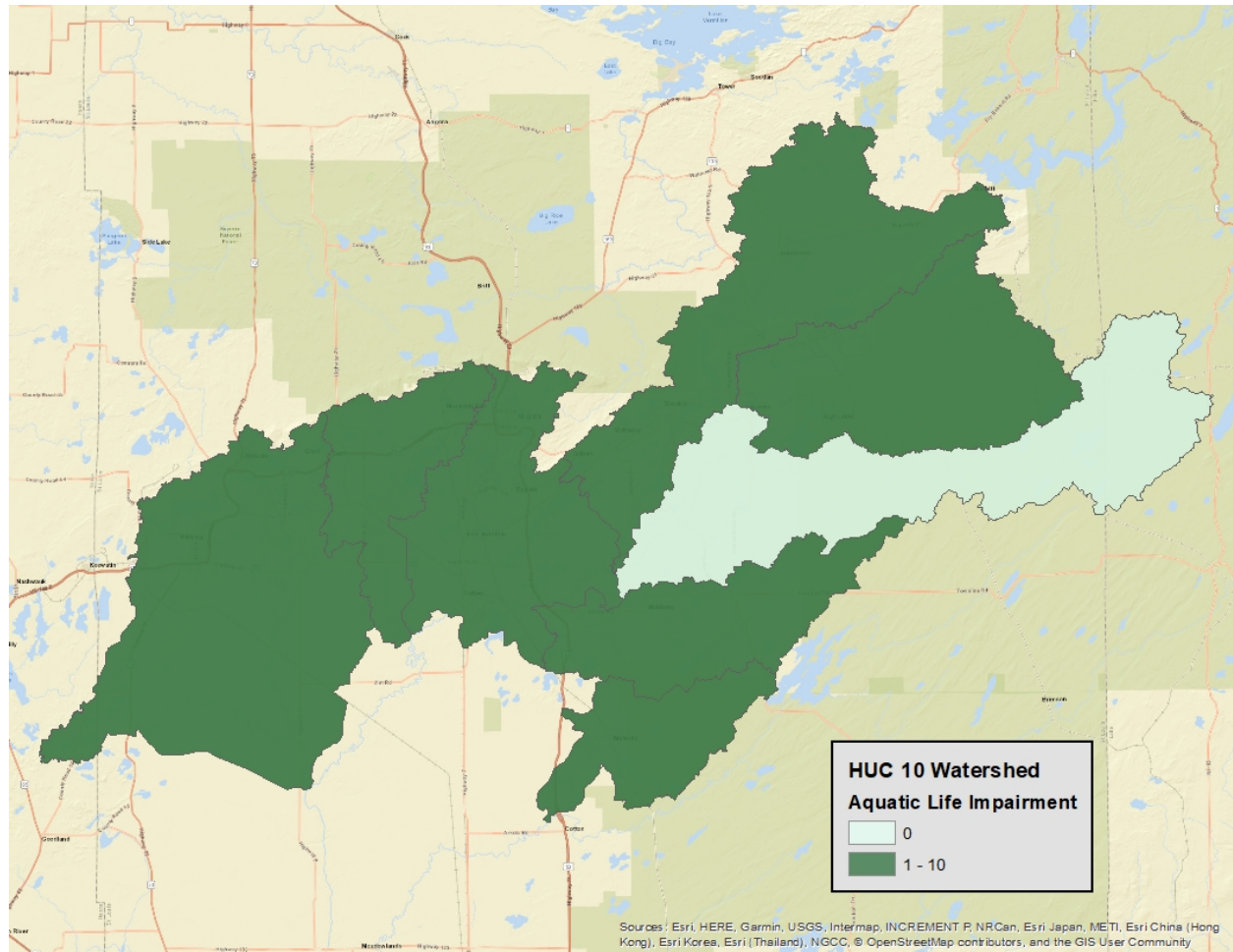
North St. Louis Planning Area





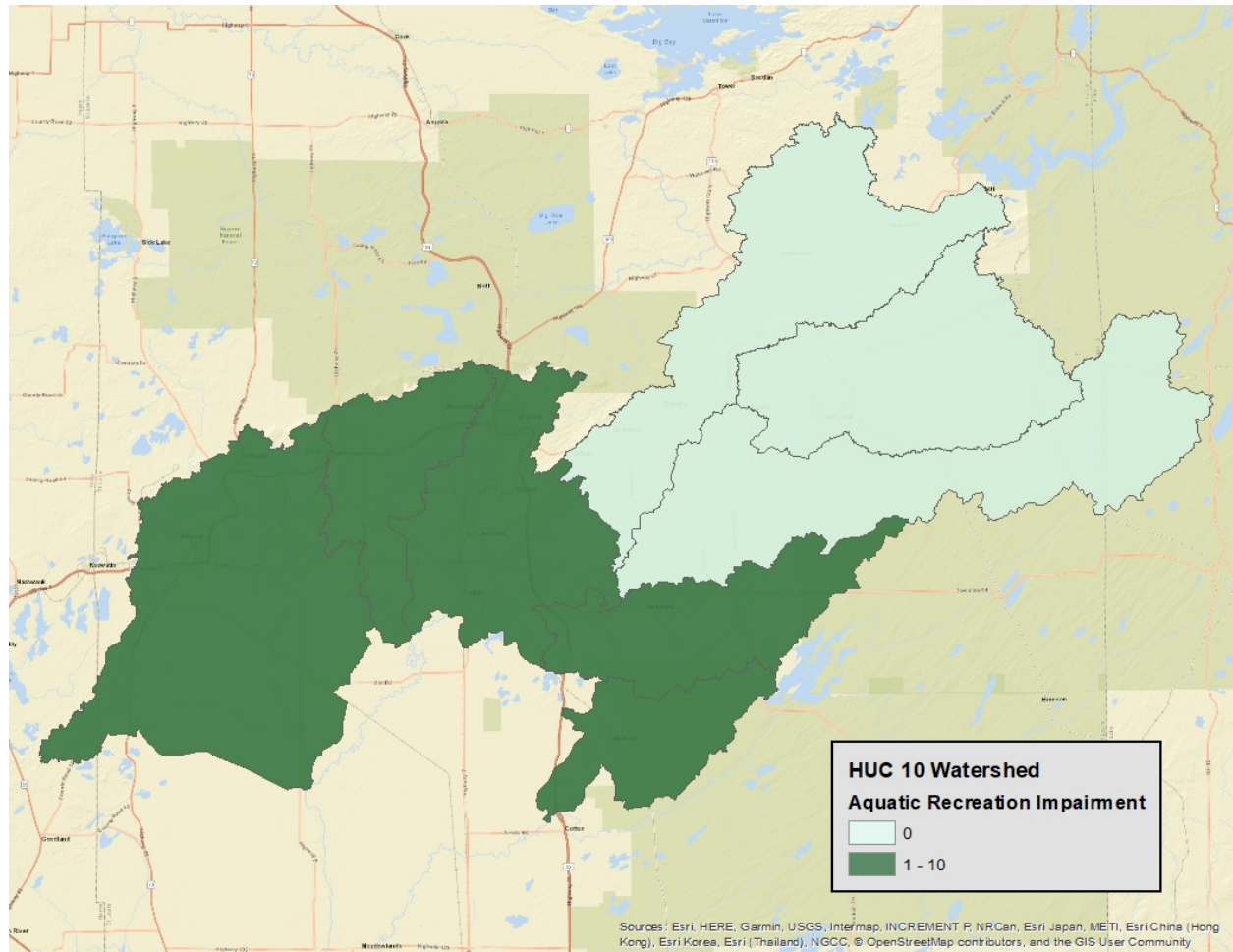


Aquatic Life Impairments



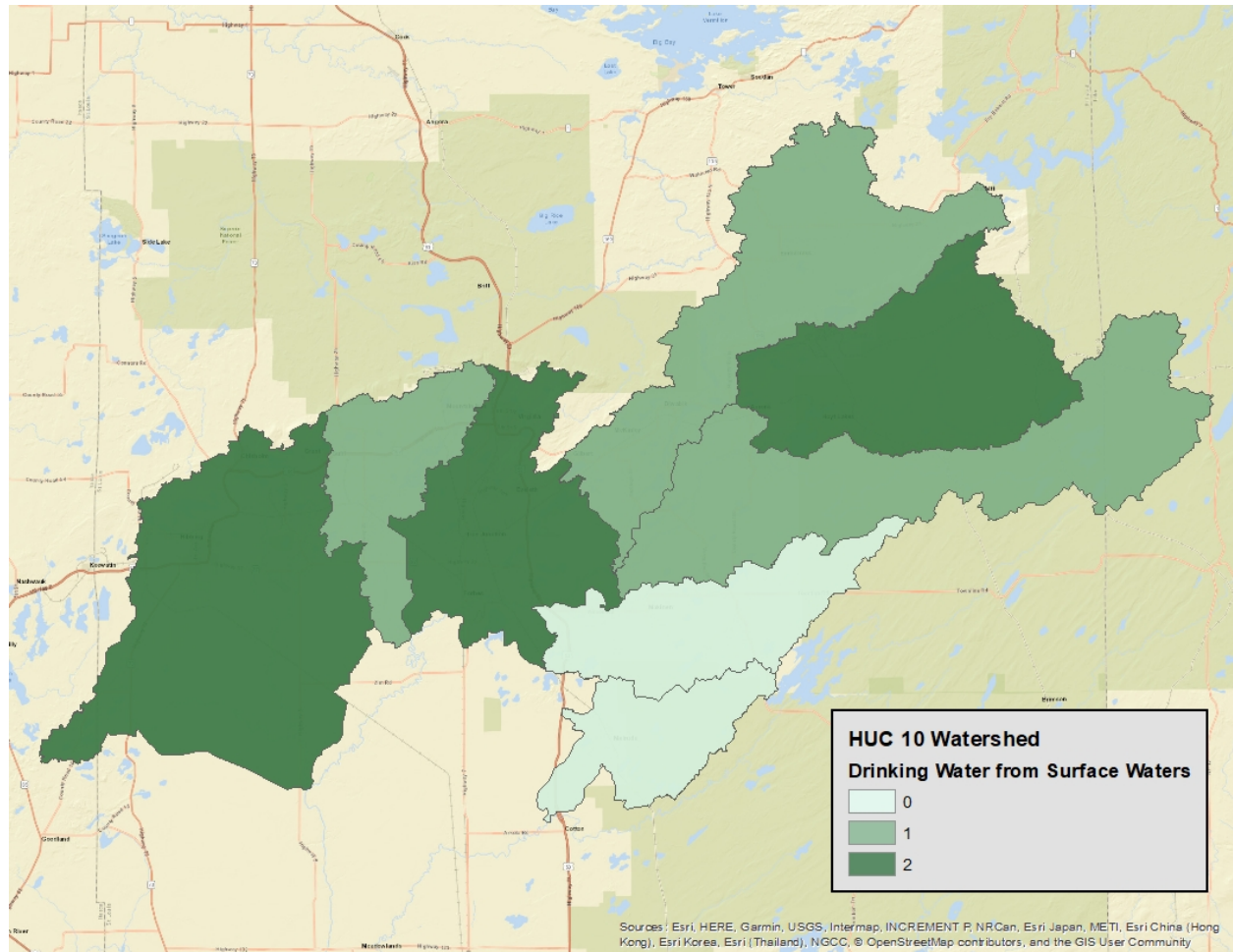
The Pollution Control Agency assesses many of Minnesota's streams, lakes and wetlands to determine if the water quality meets the needs of aquatic organisms. This metric calculates the percent of water bodies assessed for aquatic life that did not meet the standard to fully support aquatic life. **Higher scores indicate more impaired waters.**

Aquatic Recreation Impairments



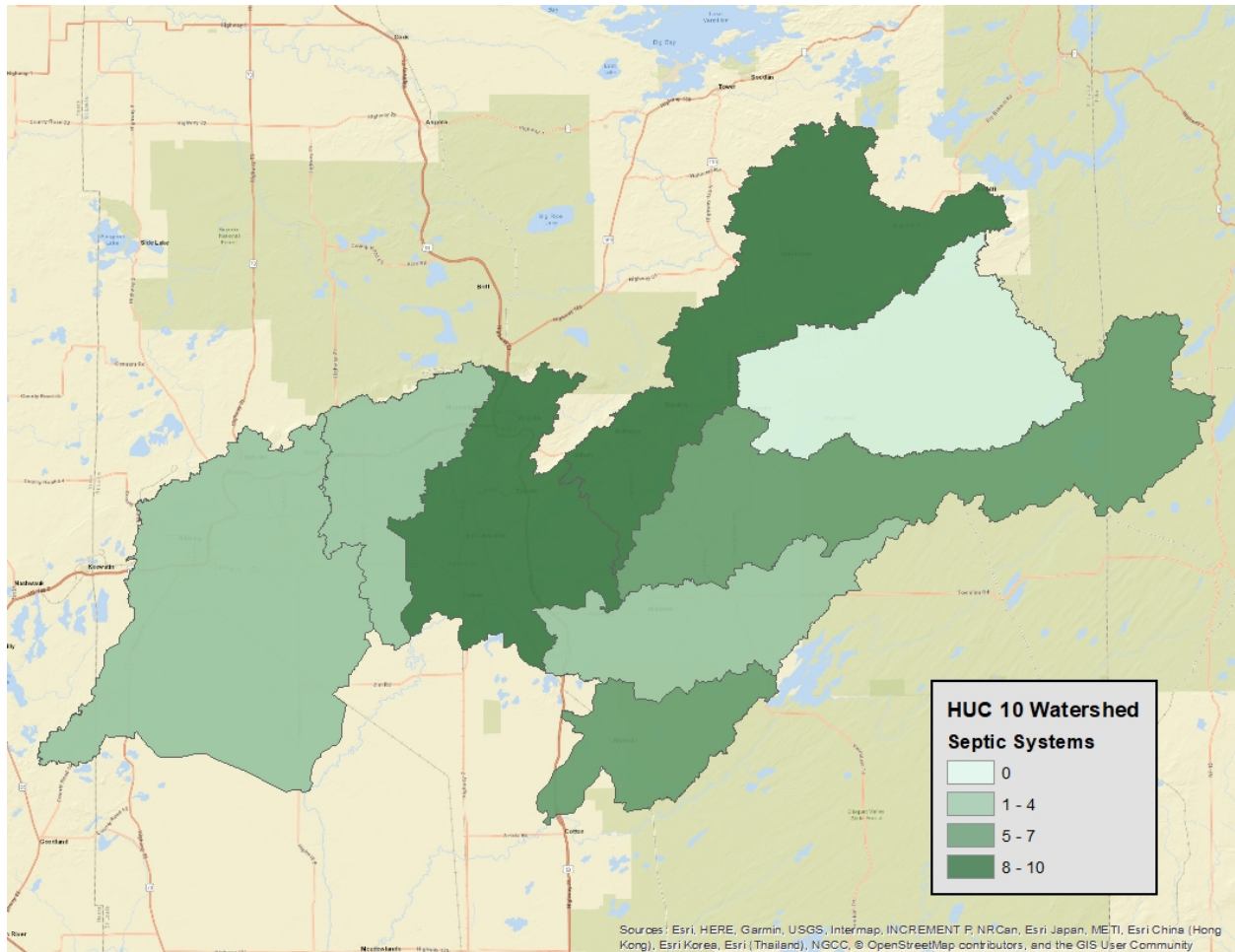
The Pollution Control Agency assesses many of Minnesota's streams, lakes and wetlands to determine if the water quality is adequate for public recreation uses. This metric calculates the percent of water bodies assessed for aquatic recreation that did not meet the standard to fully support recreational use. **Higher scores indicate more impaired waters.**

Drinking Water from Surface Waters



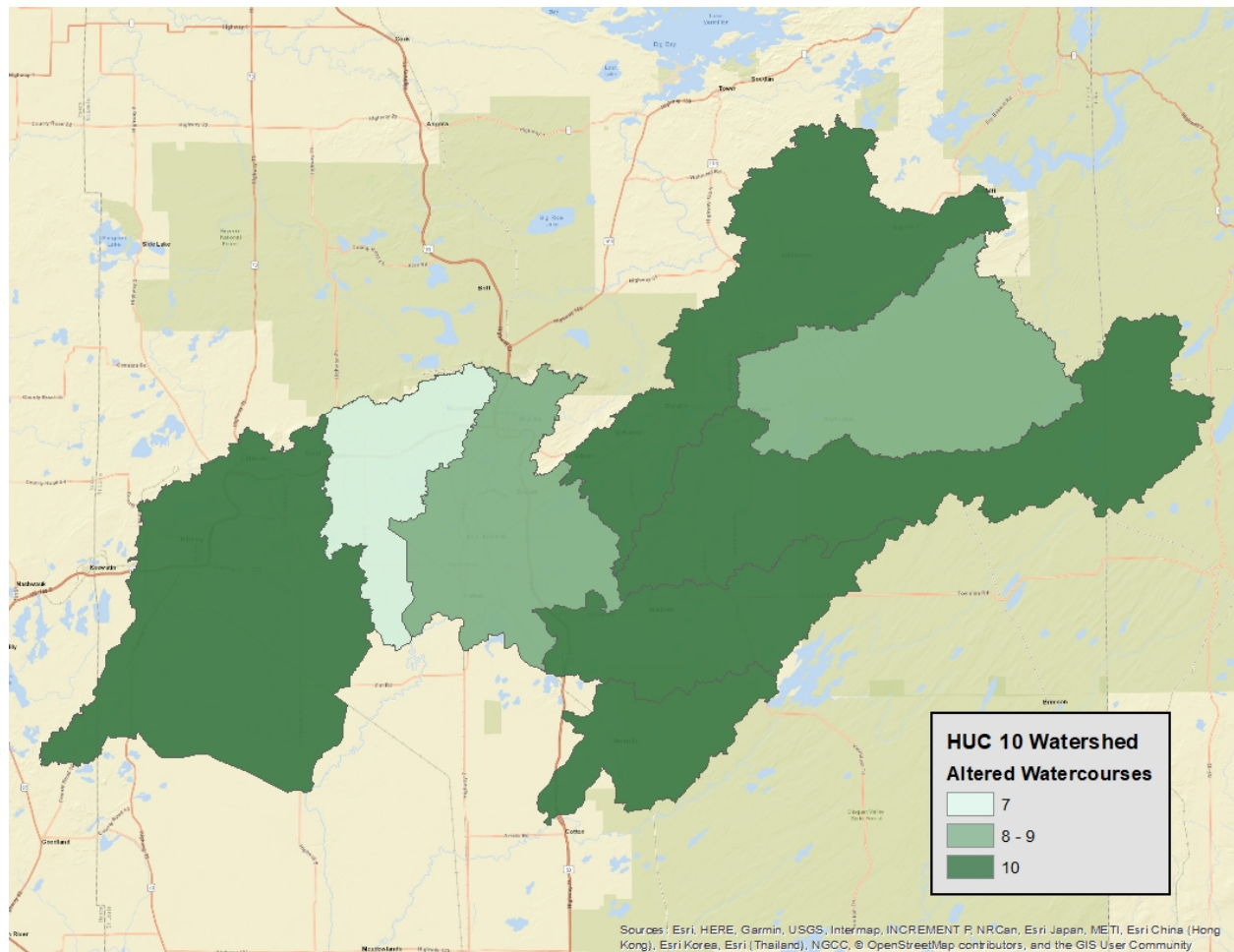
Data from the MN Department of Health Source Water Assessment that lists public drinking water supplies and their sources. **A darker color indicates a higher number of communities using surface water for drinking water.**

Septic Systems



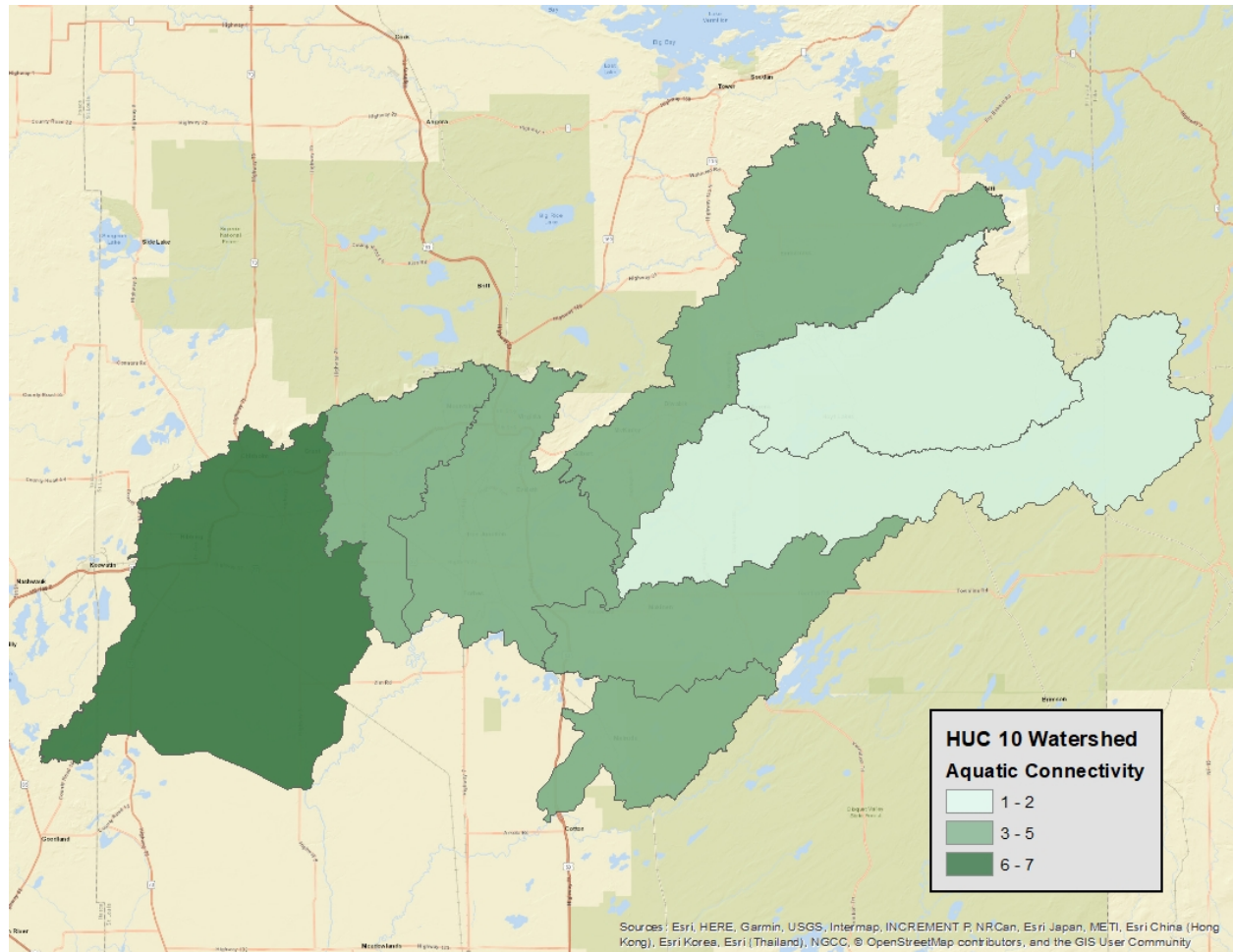
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Altered Watercourses



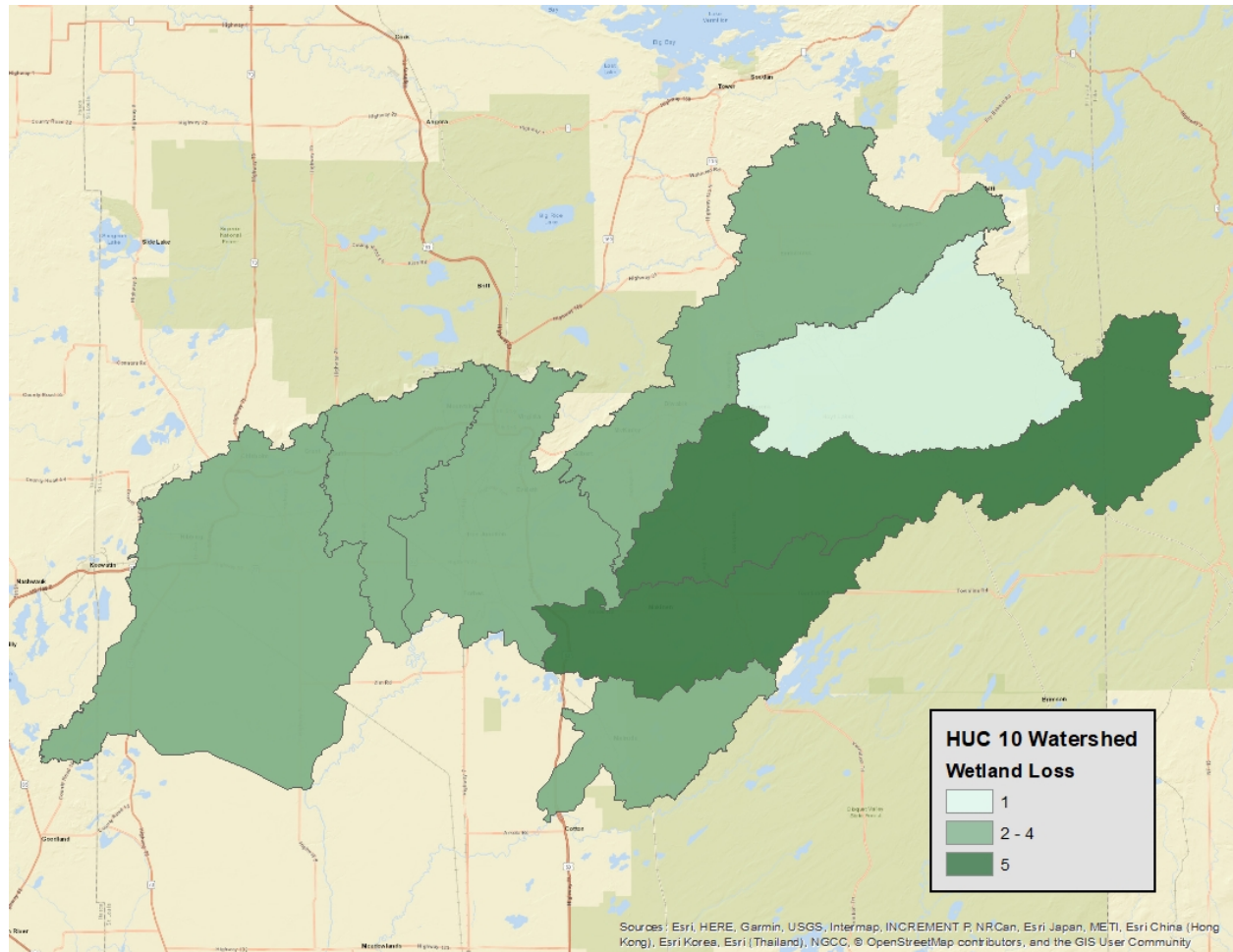
This index represents the extent to which natural streams were straightened by human activity, thereby reducing the hydrologic storage of the land. It is based on the altered watercourses dataset and refers to the length of stream segments that were altered in relation to the length of those that meander naturally. **Higher scores indicate more altered watercourses.**

Aquatic Connectivity



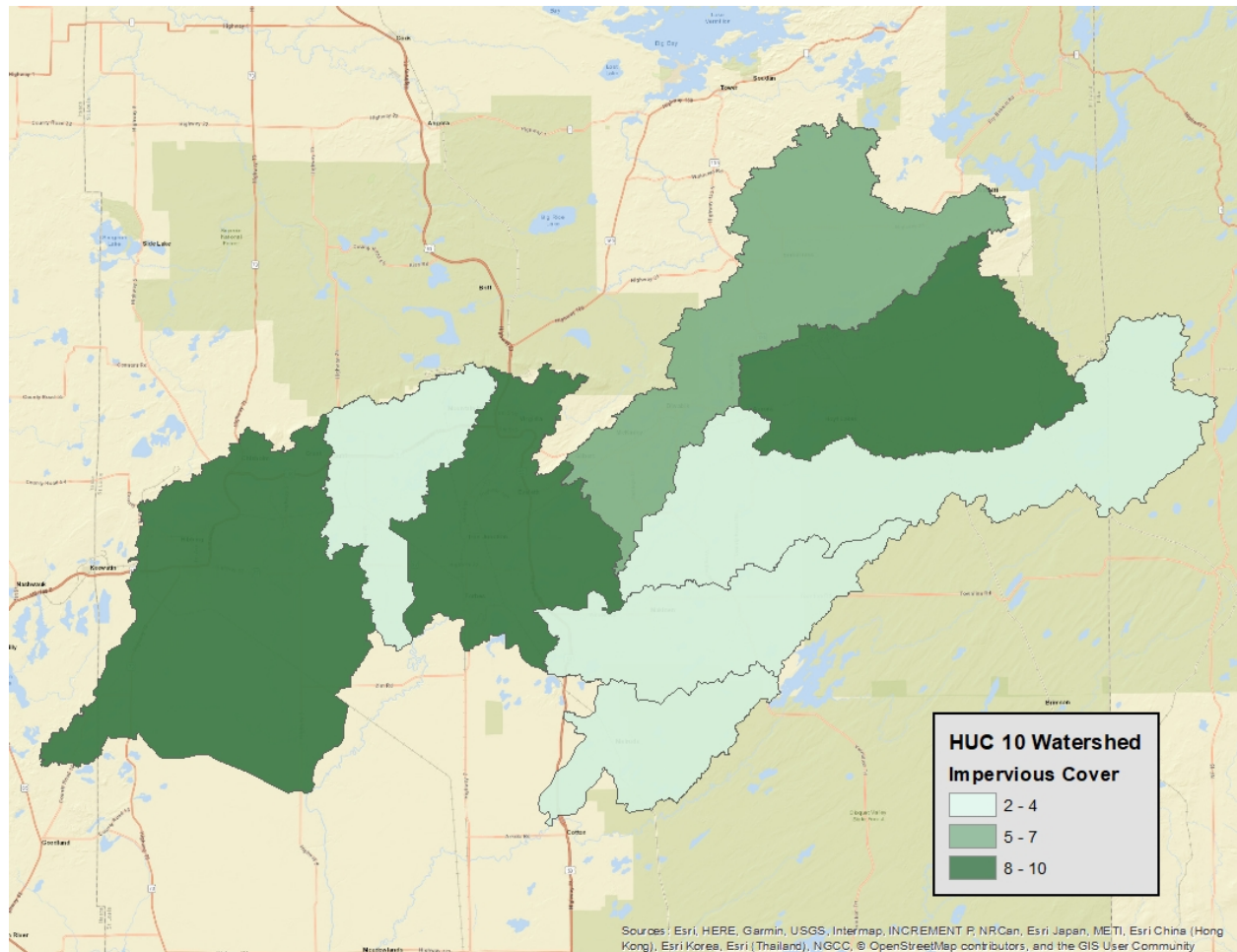
Man-made structures can limit the ability of water, organisms and energy to flow through aquatic systems. The Aquatic Connectivity Index is based on the density of culverts, bridges and dams in each watershed. **A high score indicates more opportunity to improve connectivity.**

Wetland Loss



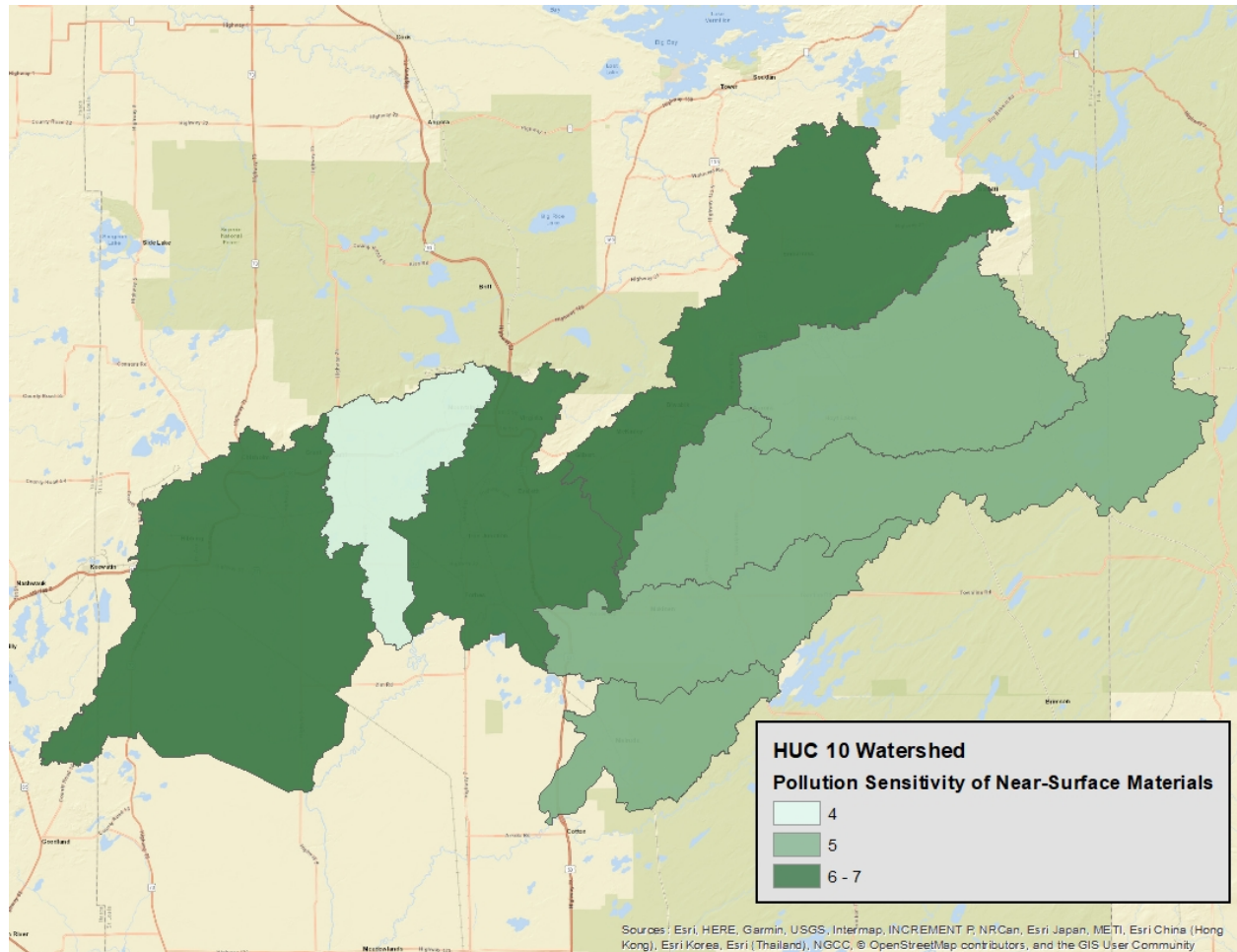
This index represents the proportion of the watershed that has been drained and converted out of wetland coverage. Wetland drainage reduces the upland hydrologic storage capacity and increases rate and magnitude that stream flow after rainfall events. Less wetland area leads to a greater delivery of contaminants to streams and lakes, and a destabilization of streams and streambanks. Pre-European settlement wetland coverage is estimated from the proportion of soils that are classified as 'Hydric', current wetland coverage is calculated from the National Wetland Inventory. **A higher score indicates more opportunities for wetland restoration.**

Impervious Cover



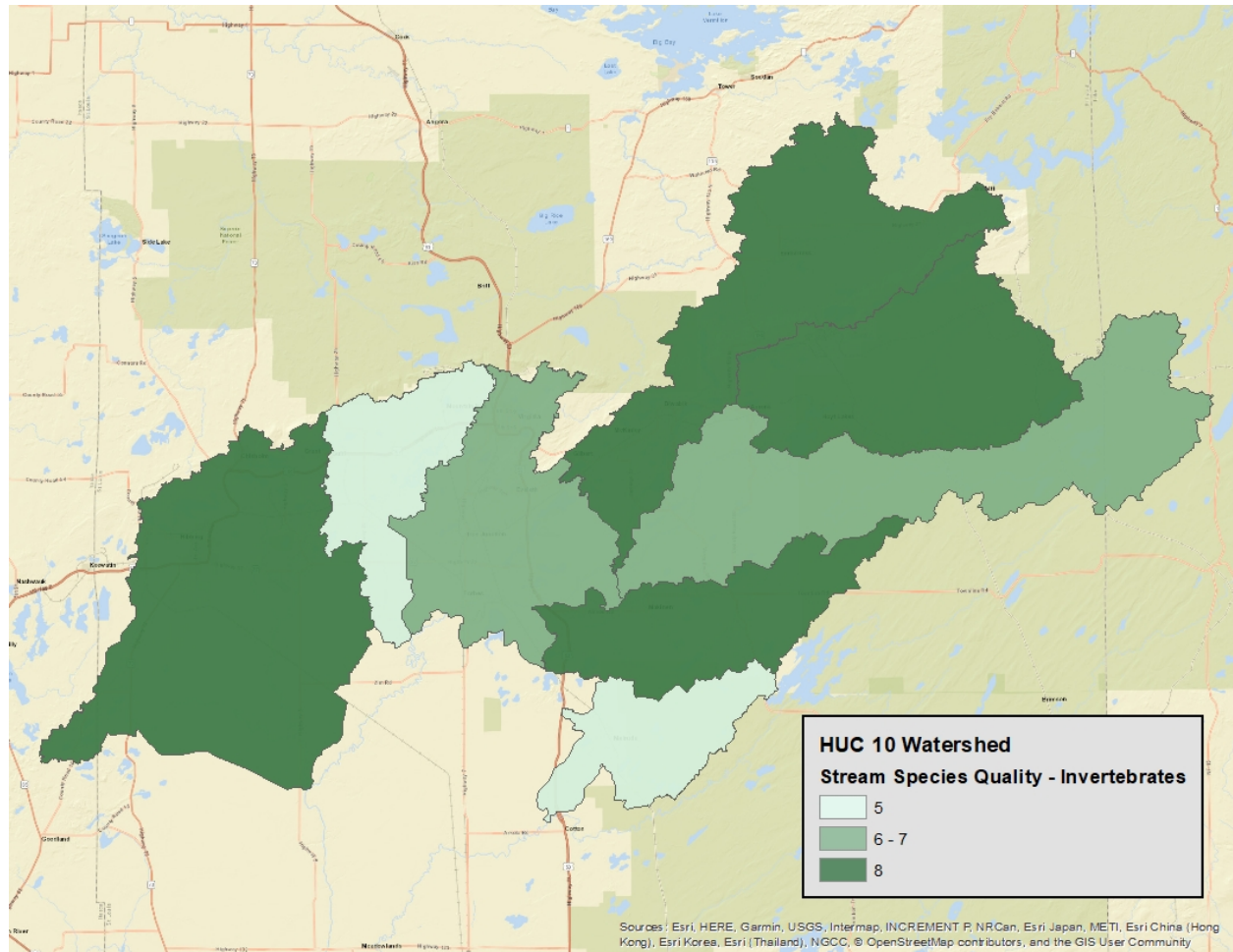
Impervious cover refers to hard surfaces that do not allow water to pass through into the soil (i.e. roads, buildings, parking lots). Hard surfaces cause water to accumulate, carry impurities and fail to recharge groundwater. **A higher score indicates more impervious surfaces.**

Pollution Sensitivity of Near-Surface Materials



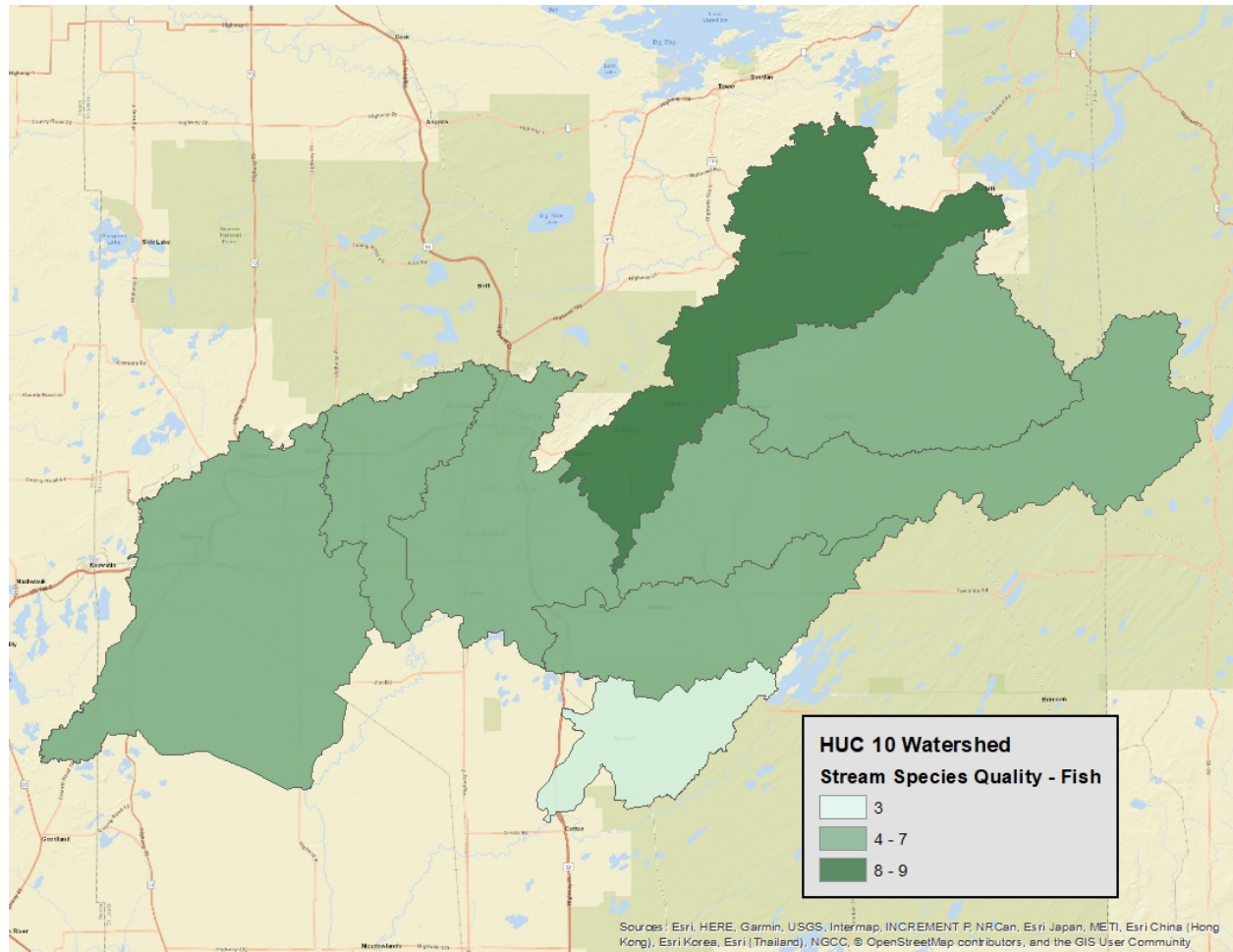
The sensitivity of groundwater to pollution is, in part, determined by the rate that water infiltrates the soil and upper geologic layers. This risk assessment is based on the state-wide Hydrogeologic Atlas (HG-02) published in 2016. This model quantified the Sensitivity of Near-Surface Materials by calculating the approximate rate of infiltration based on properties of the soil and surficial geology. **A high score indicates higher risk of groundwater contamination.**

Stream Species Quality – Invertebrates



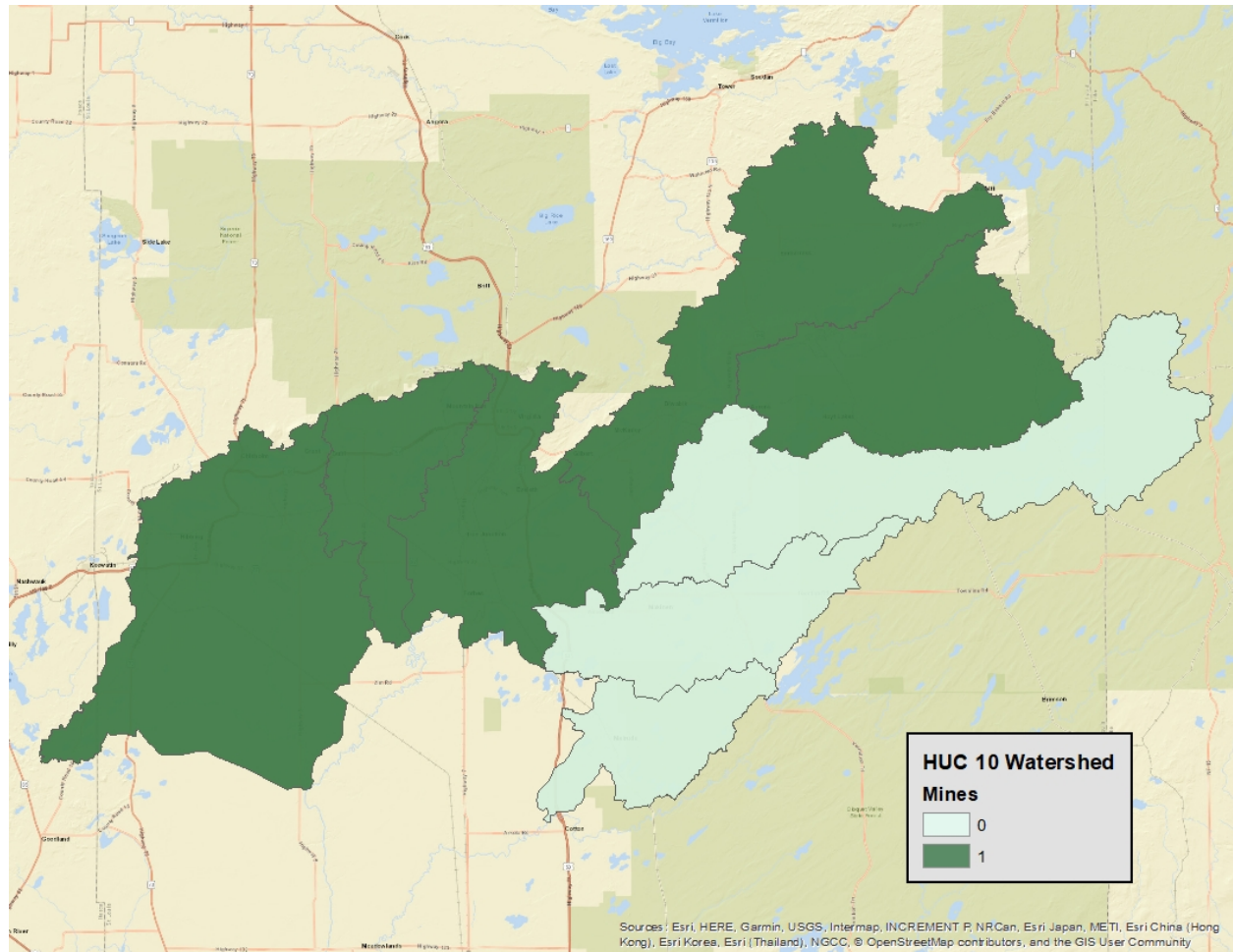
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Stream Species Quality- Fish



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Mines



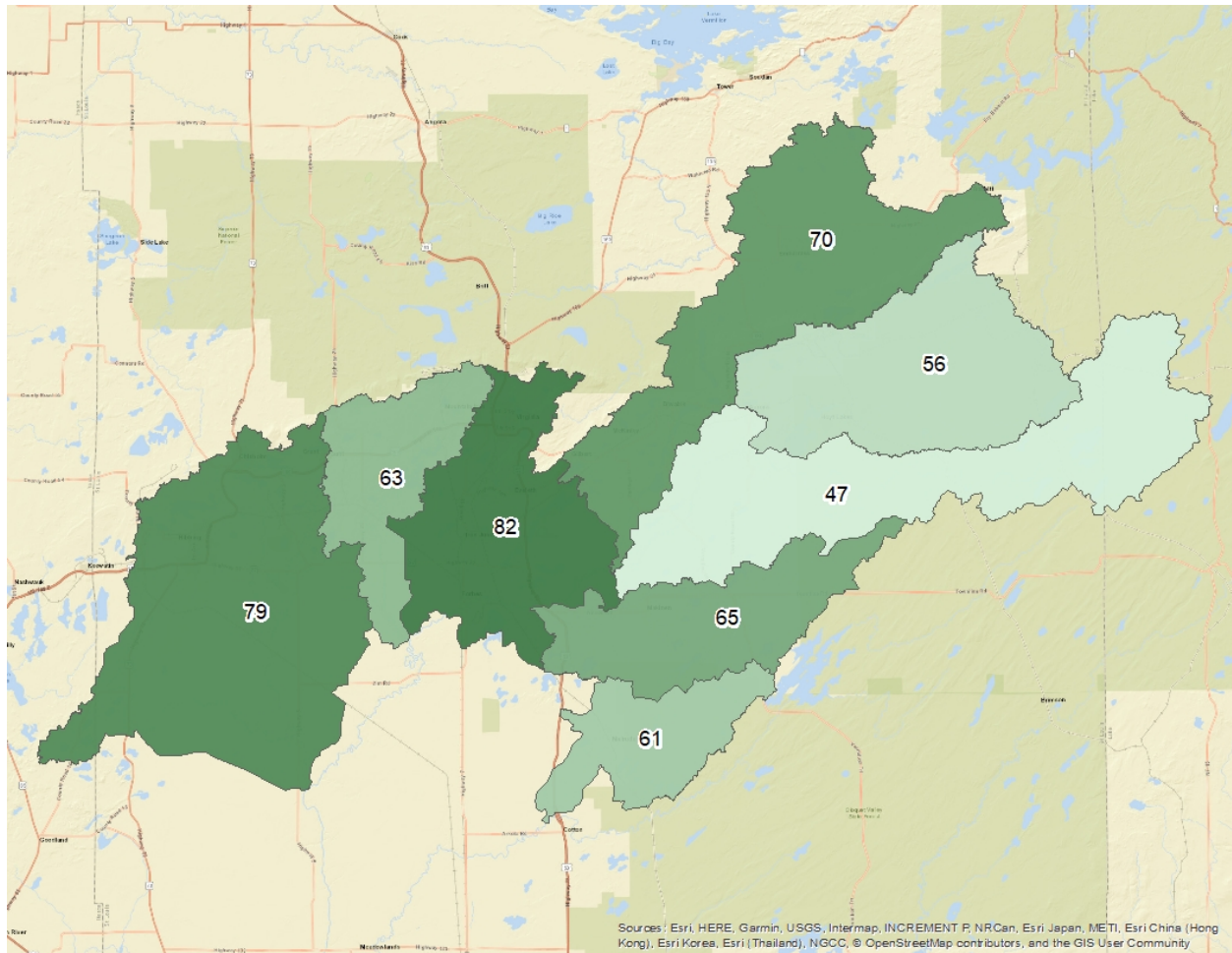
Open pit mine dataset from MN DNR. **A darker color indicates at least one open pit mine per watershed.**

HUC 10 Watershed
Potential to Protect - Private Forests

Light Green	0
Medium Green	1
Dark Green	2

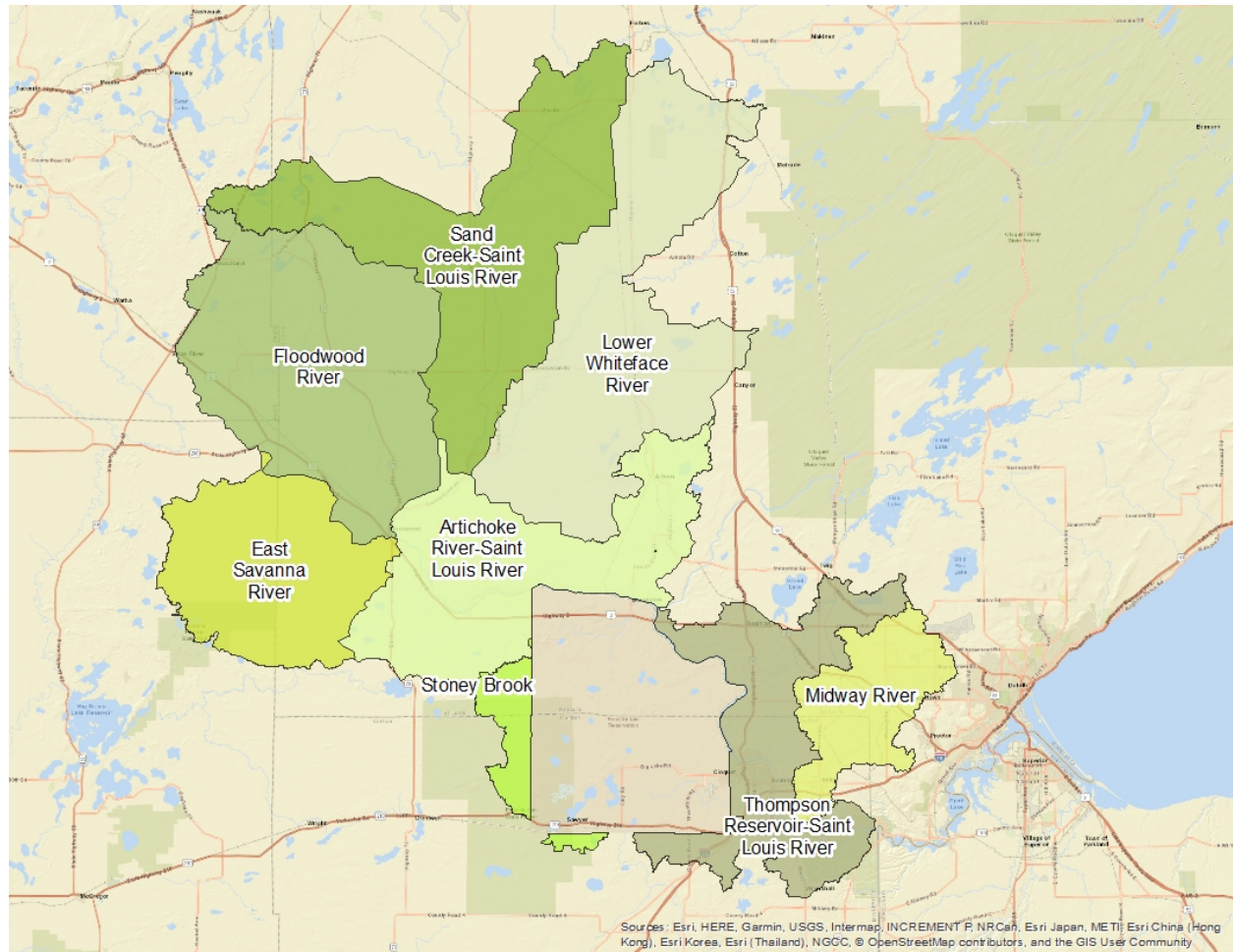
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, © OpenStreetMap contributors, and the GIS User Community

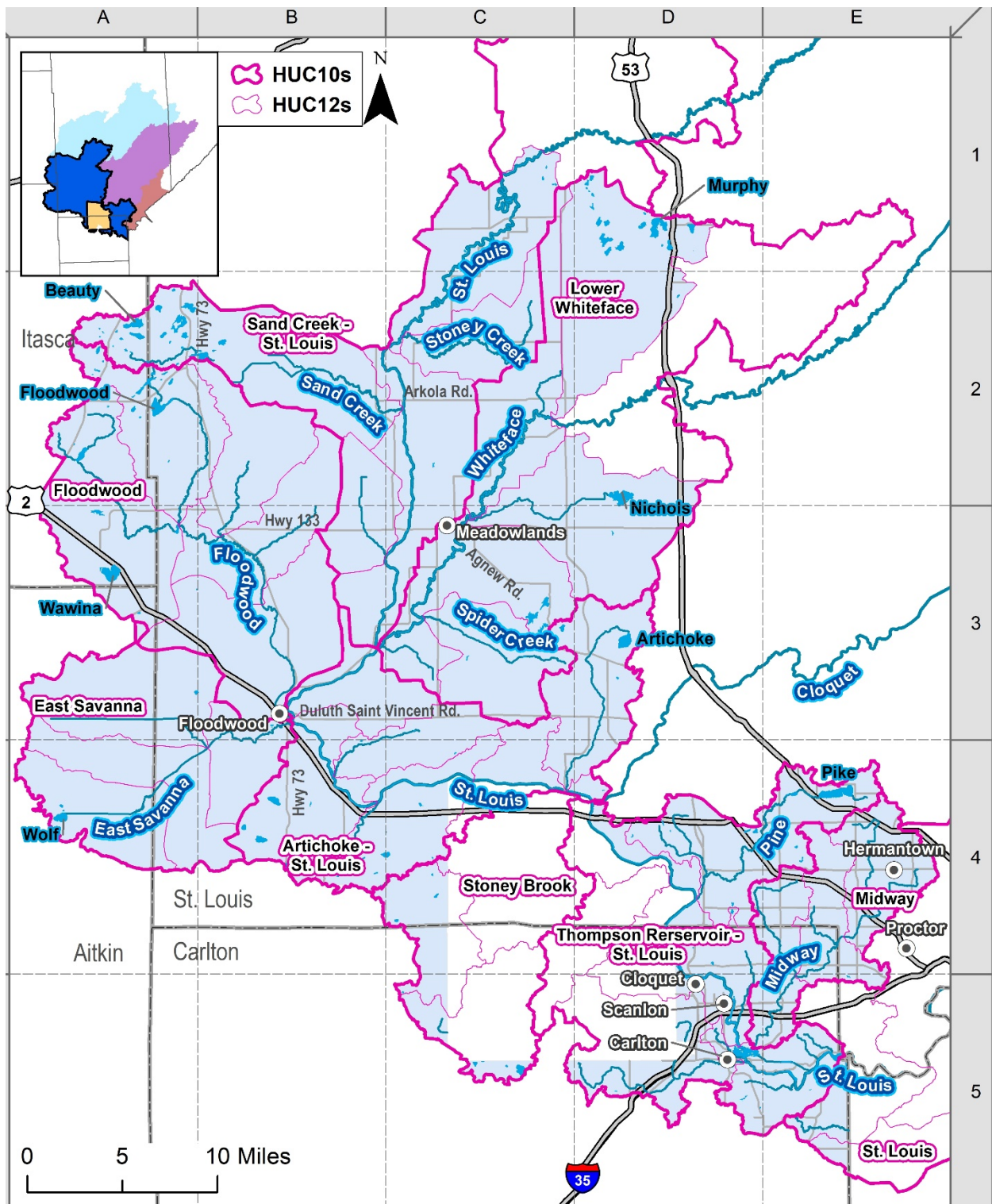
Total Watershed Score

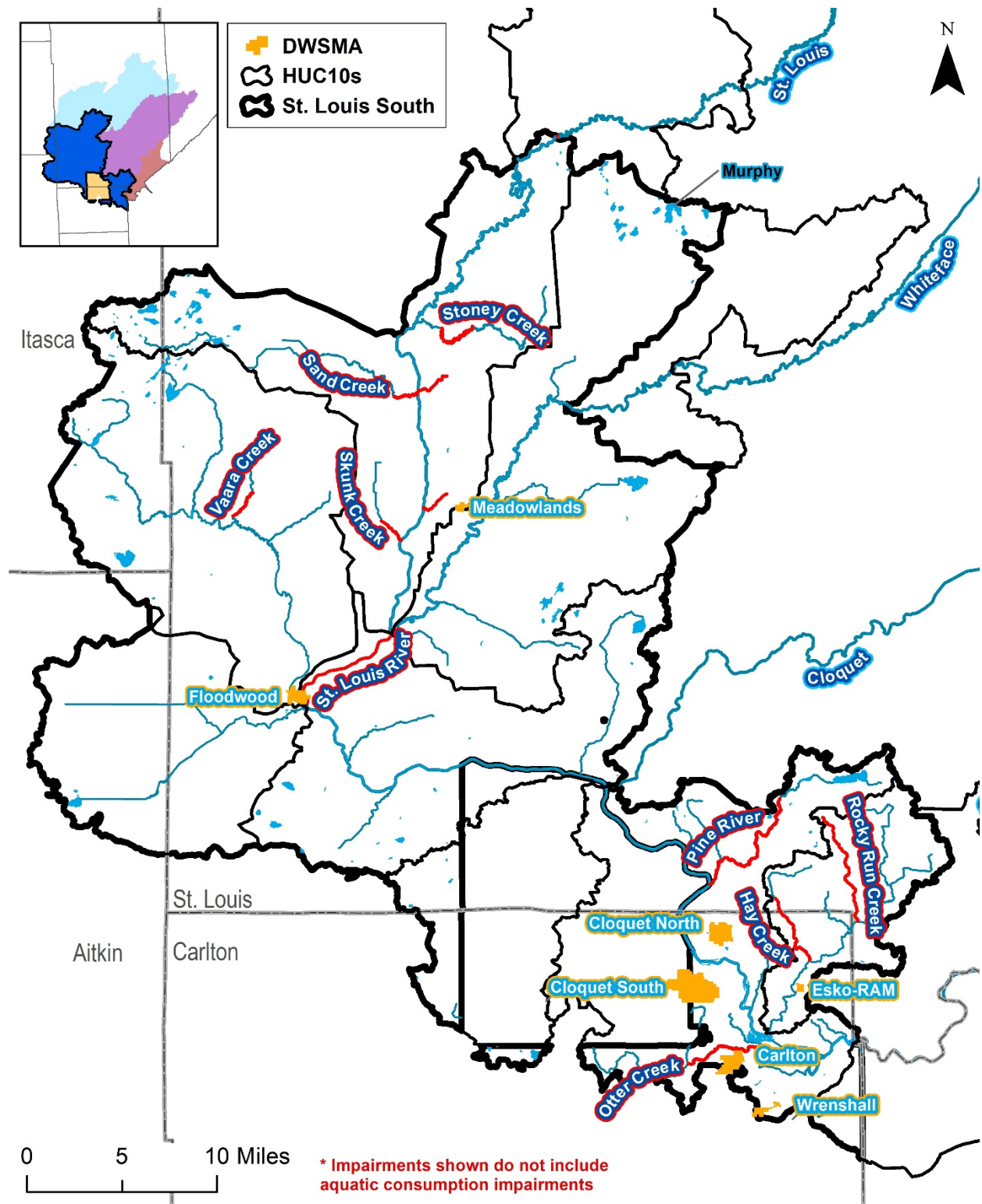


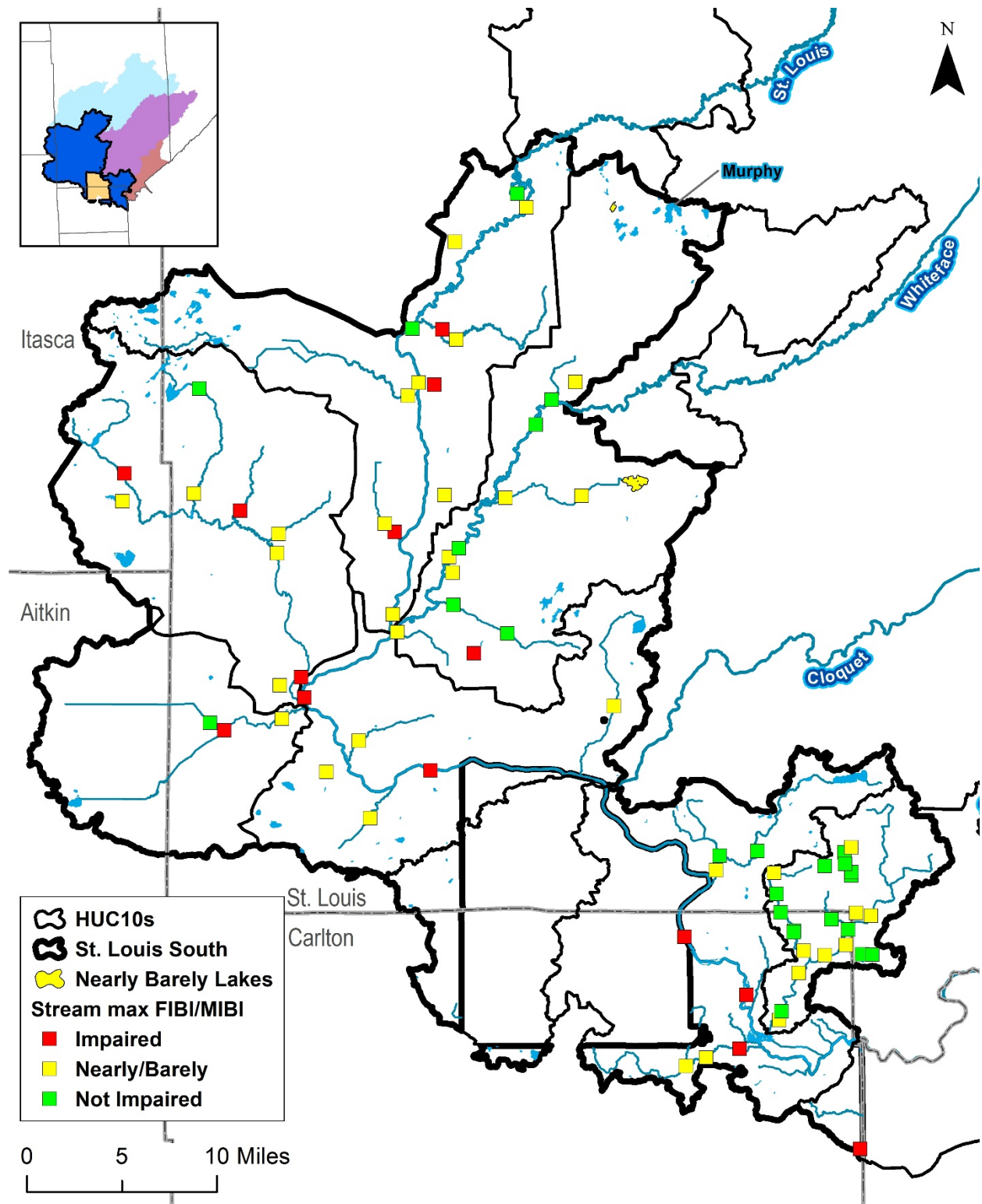
Total score based on the sum of the previous maps (all categories). A darker color indicates a high score.

South St. Louis Planning Area

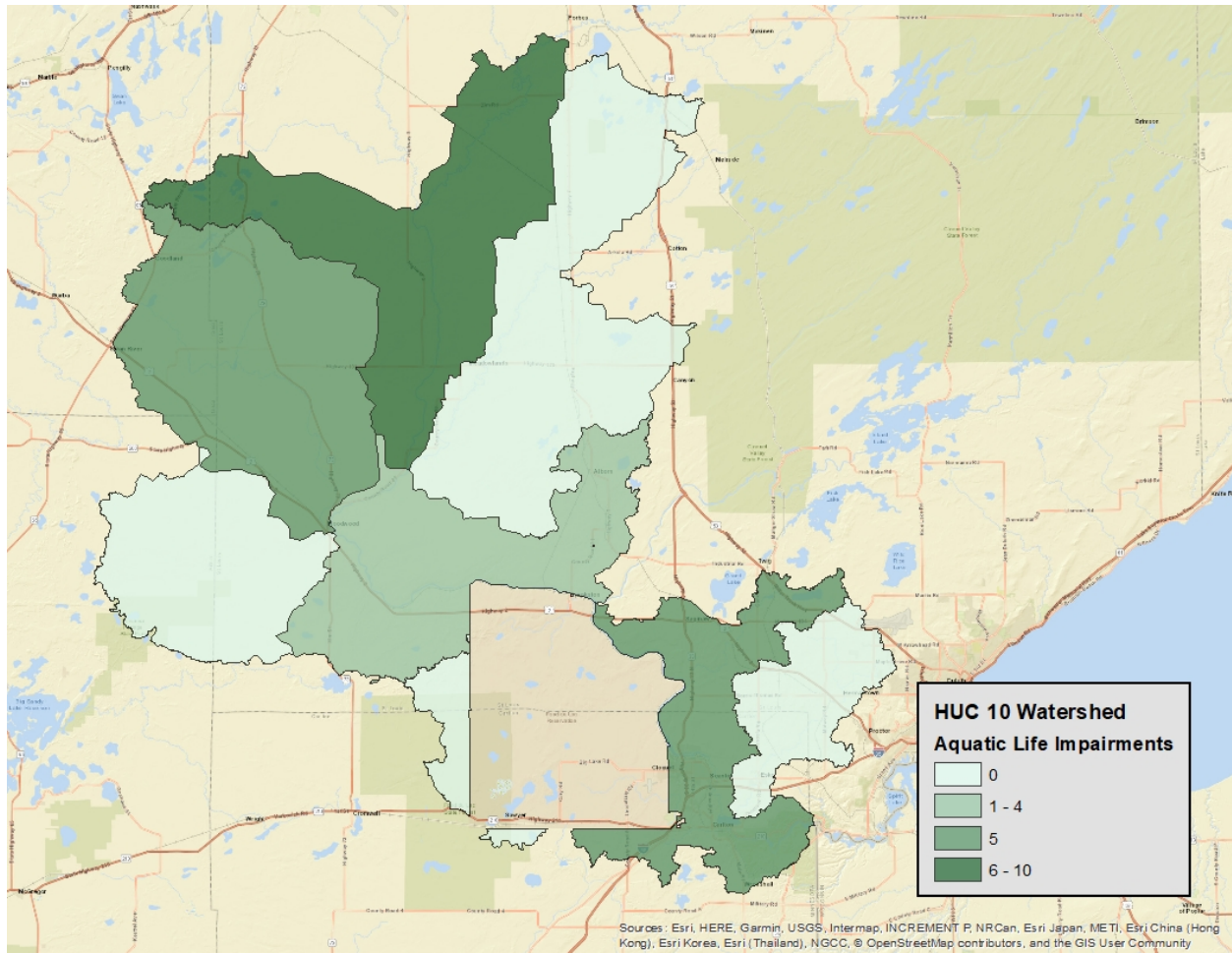






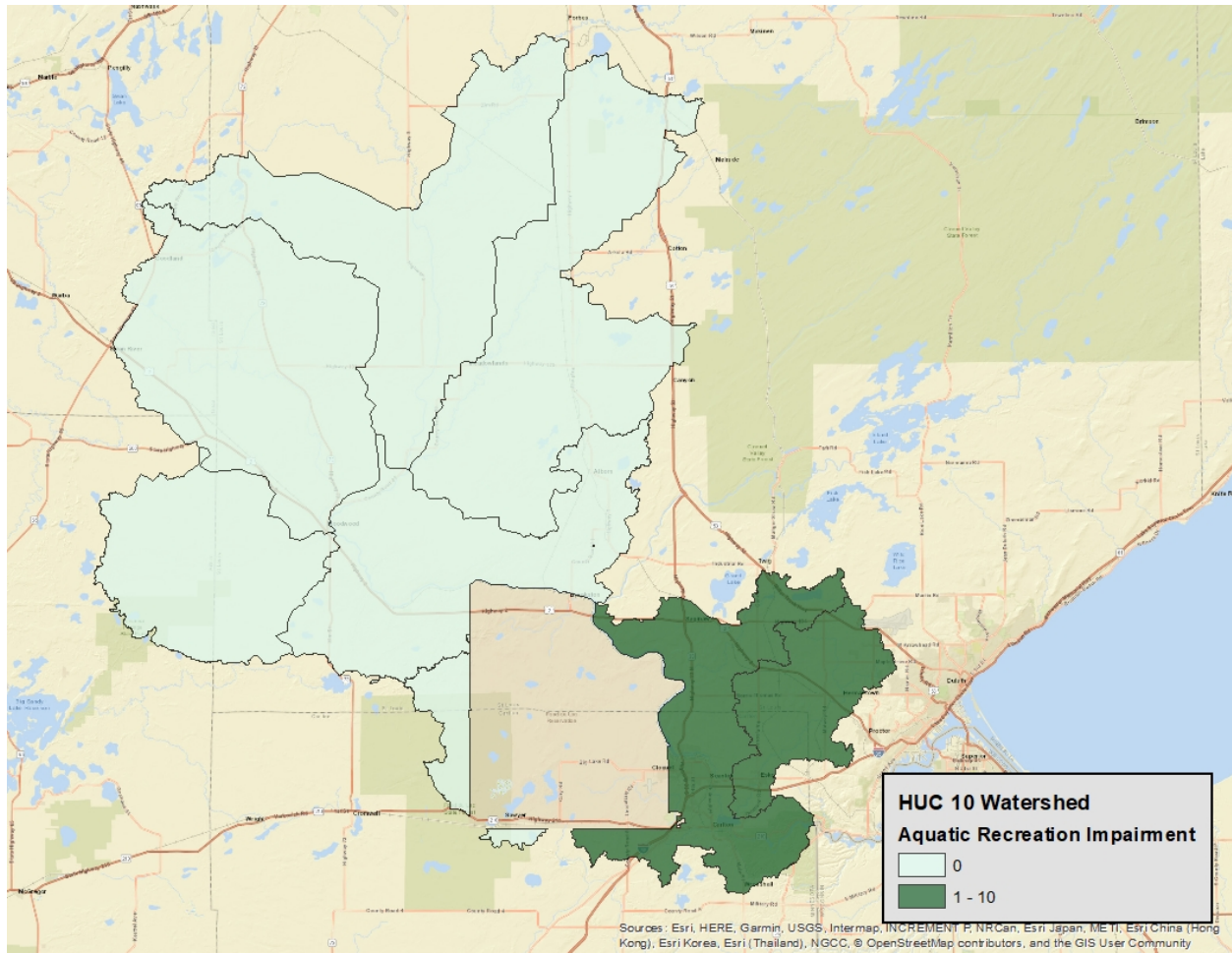


Aquatic Life Impairments



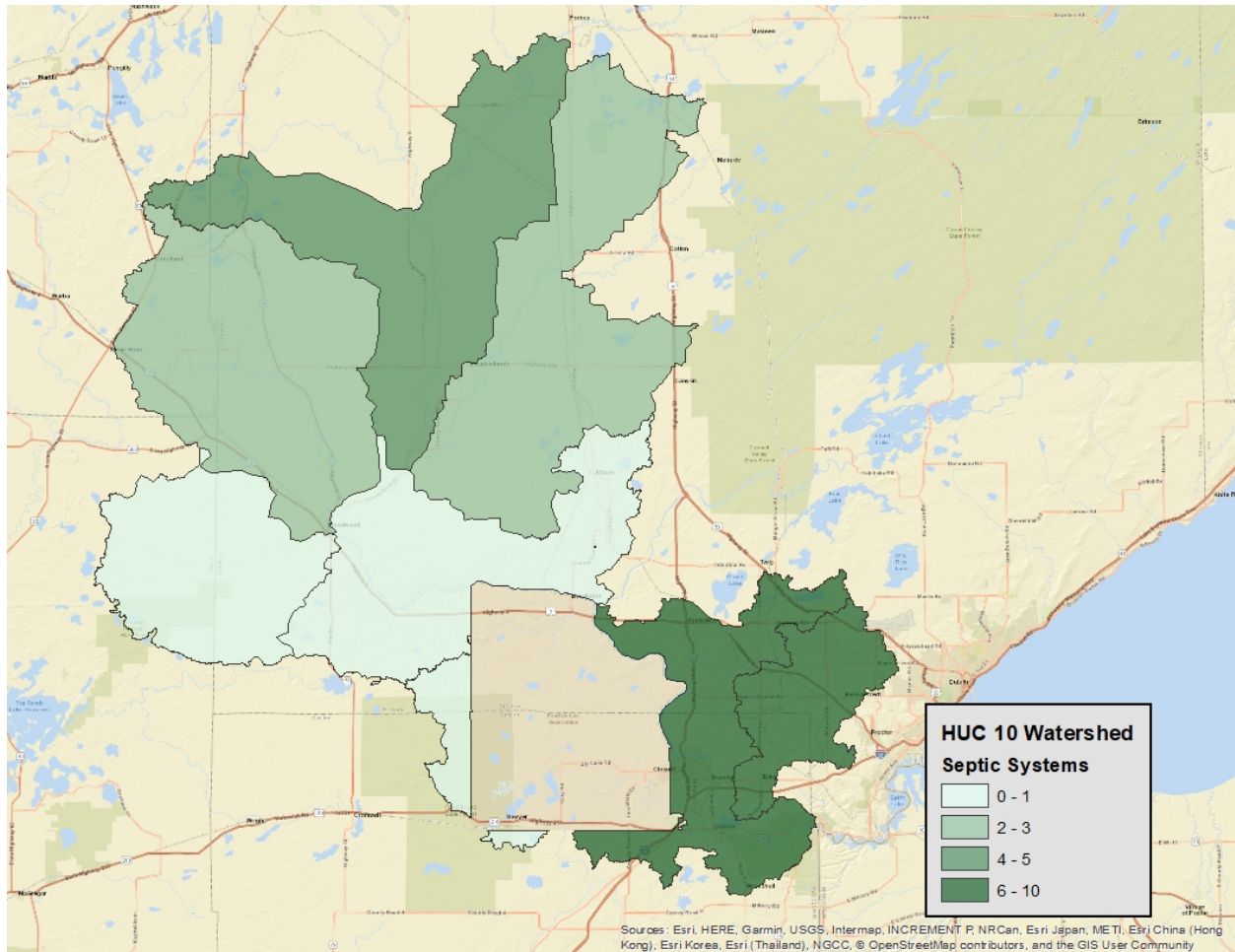
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Aquatic Recreation Impairments



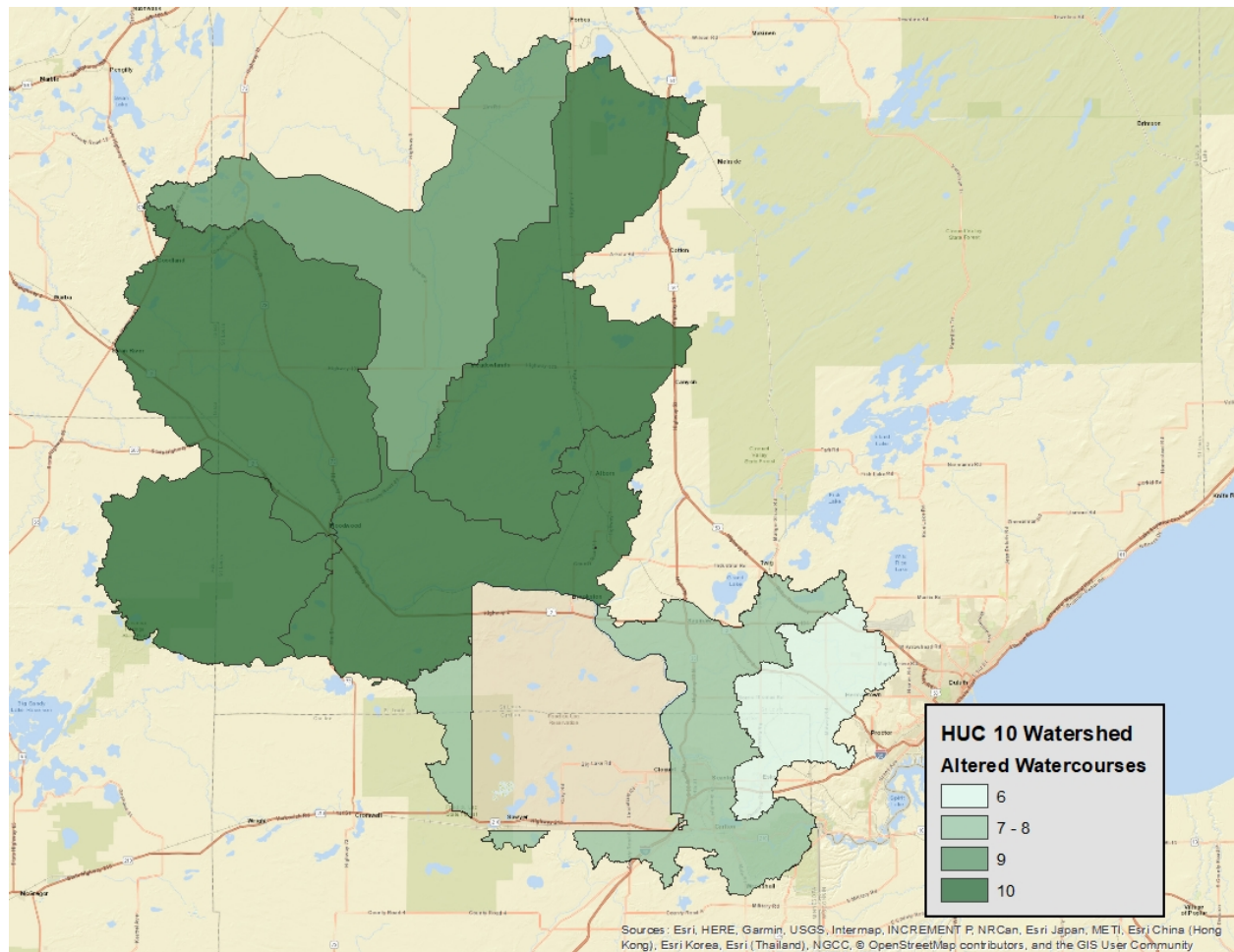
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Septic Systems



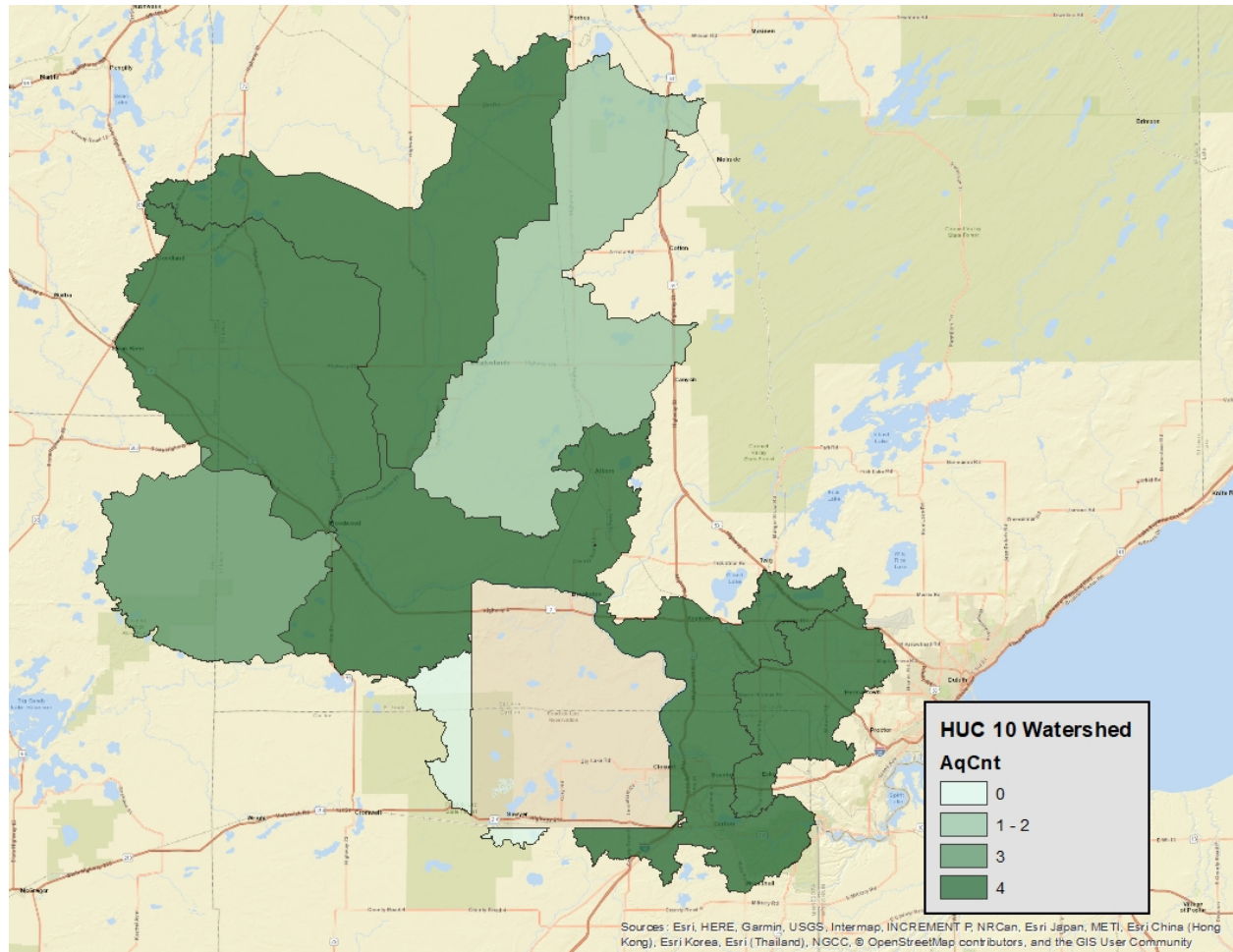
The domestic wells listed in the County Well Index (CWI) were used to approximate septic system location. Given these data assumptions and lack of historic records, this metric provides a conservative estimate of actual septic system density. The metric score is based on well density per square km of land area in a catchment. **Higher scores indicate more septic systems.**

Altered Watercourses



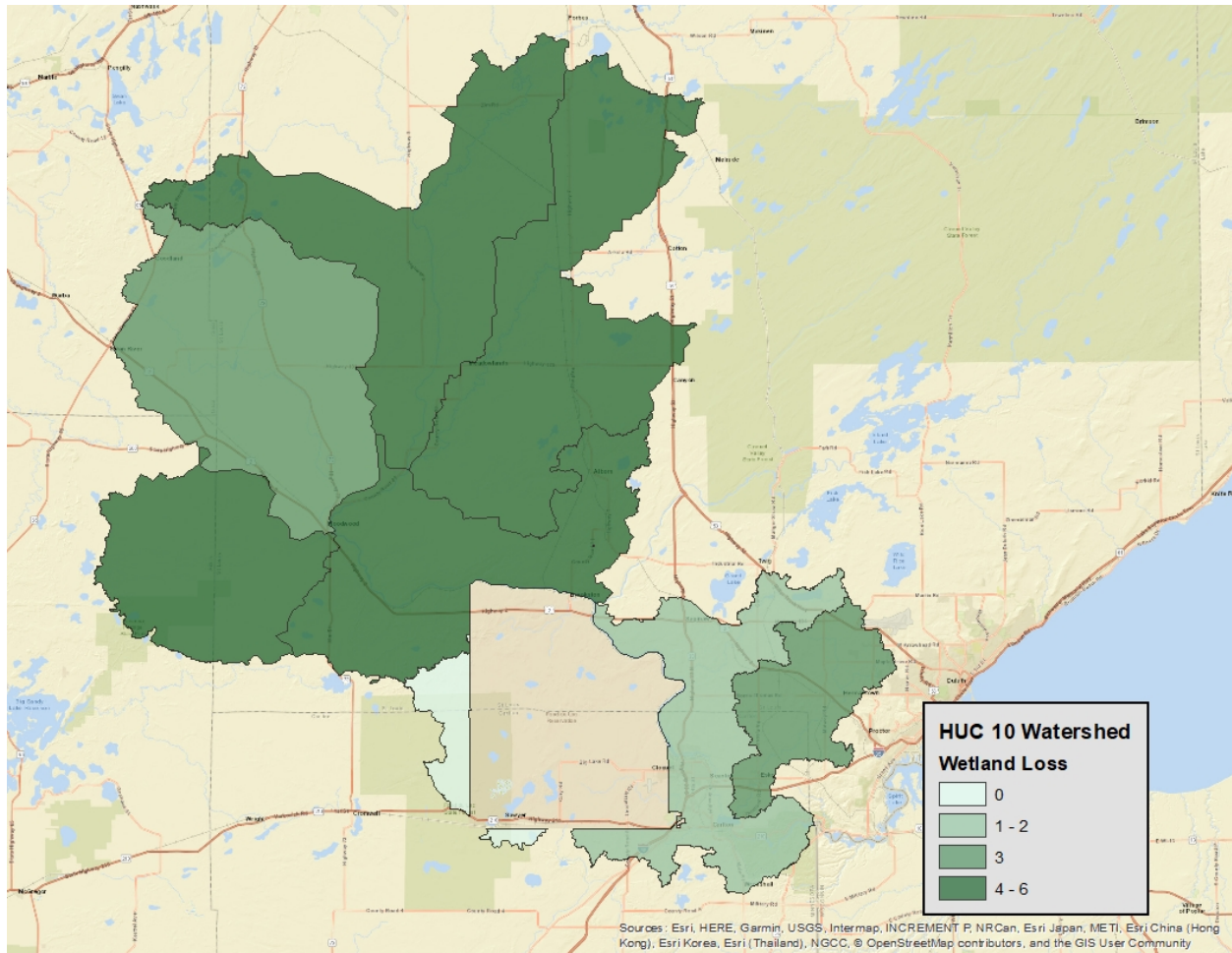
This index represents the extent to which natural streams were straightened by human activity, thereby reducing the hydrologic storage of the land. It is based on the altered watercourses dataset and refers to the length of stream segments that were altered in relation to the length of those that meander naturally. **Higher scores indicate more altered watercourses.**

Aquatic Connectivity



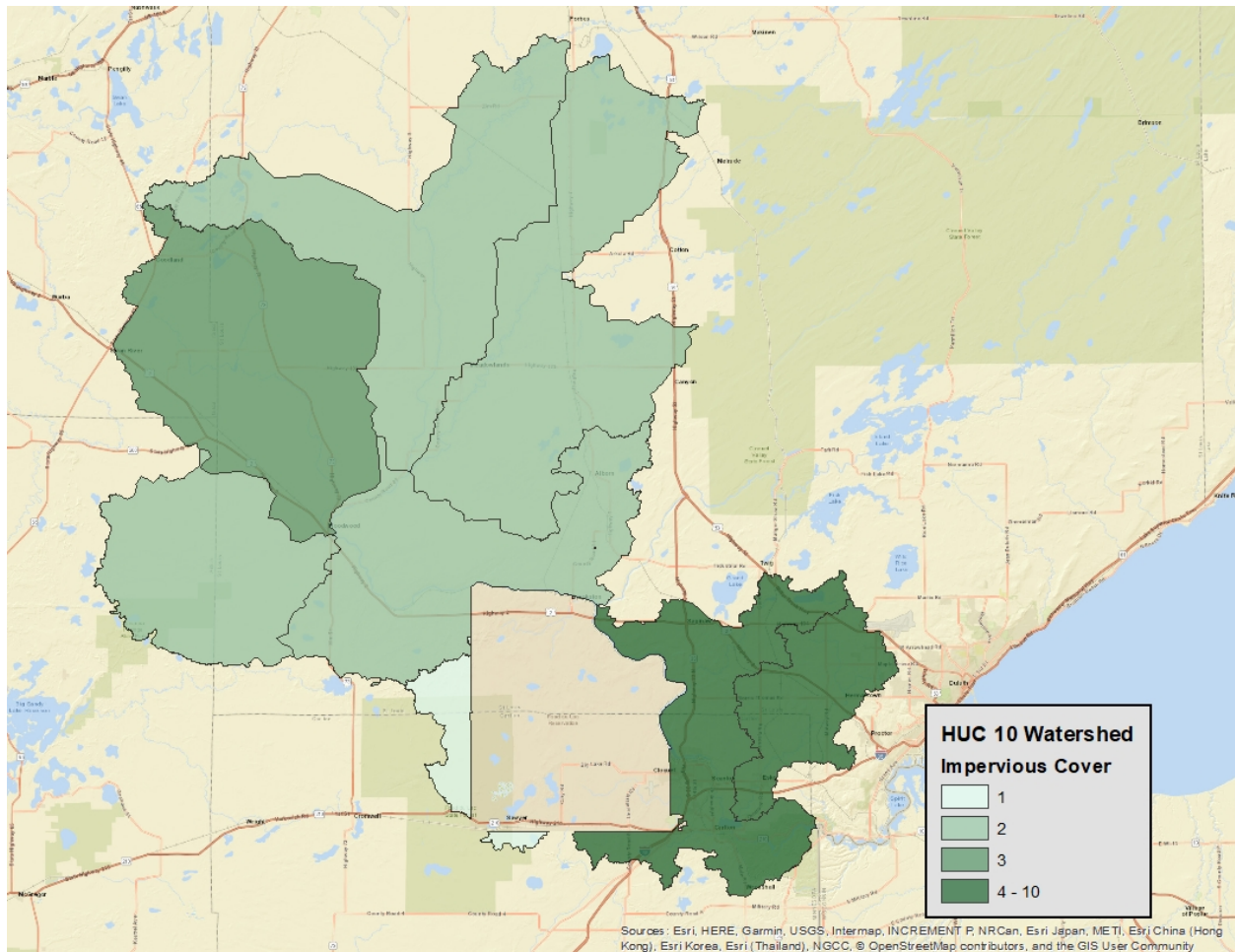
Man-made structures can limit the ability of water, organisms and energy to flow through aquatic systems. The Aquatic Connectivity Index is based on the density of culverts, bridges and dams in each watershed. **A high score indicates more opportunity to improve connectivity.**

Wetland Loss



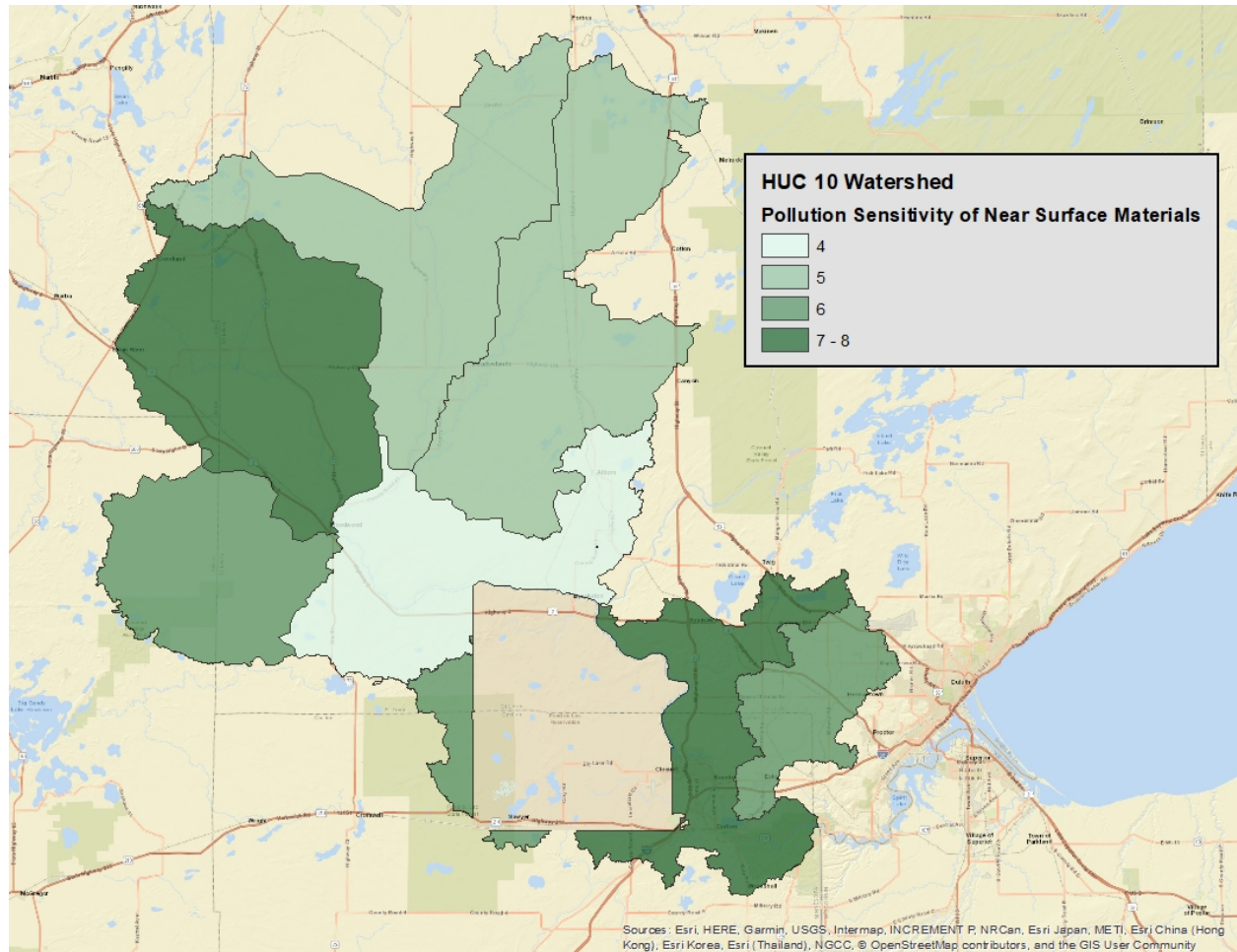
This index represents the proportion of the watershed that has been drained and converted out of wetland coverage. Wetland drainage reduces the upland hydrologic storage capacity and increases rate and magnitude that stream flow after rainfall events. Less wetland area leads to a greater delivery of contaminants to streams and lakes, and a destabilization of streams and streambanks. Pre-European settlement wetland coverage is estimated from the proportion of soils that are classified as 'Hydric', current wetland coverage is calculated from the National Wetland Inventory. **A higher score indicates more opportunities for wetland restoration.**

Impervious Cover



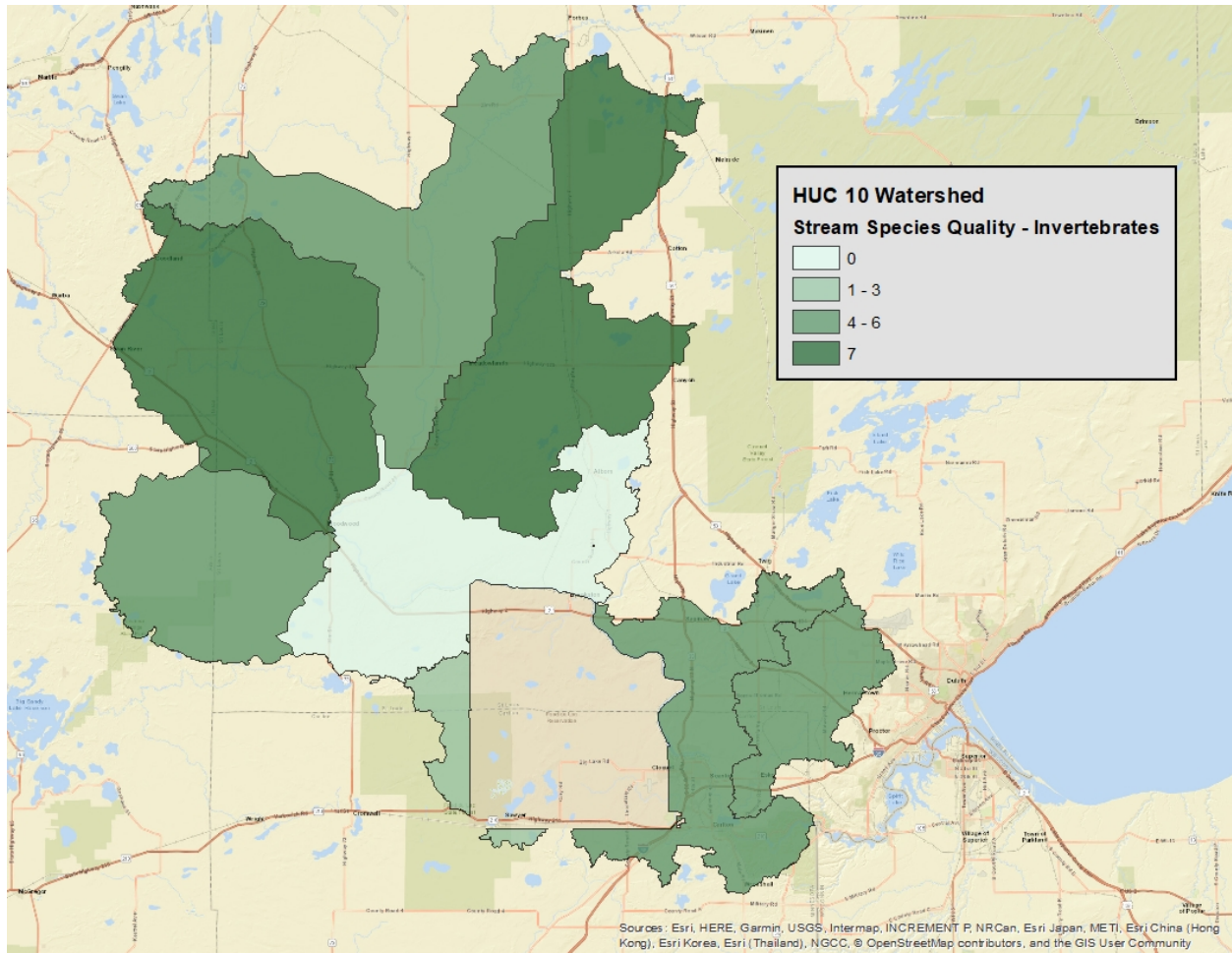
Impervious cover refers to hard surfaces that do not allow water to pass through into the soil (i.e. roads, buildings, parking lots). Hard surfaces cause water to accumulate, carry impurities and fail to recharge groundwater. **A higher score indicates more impervious surfaces.**

Pollution Sensitivity of Near-Surface Materials



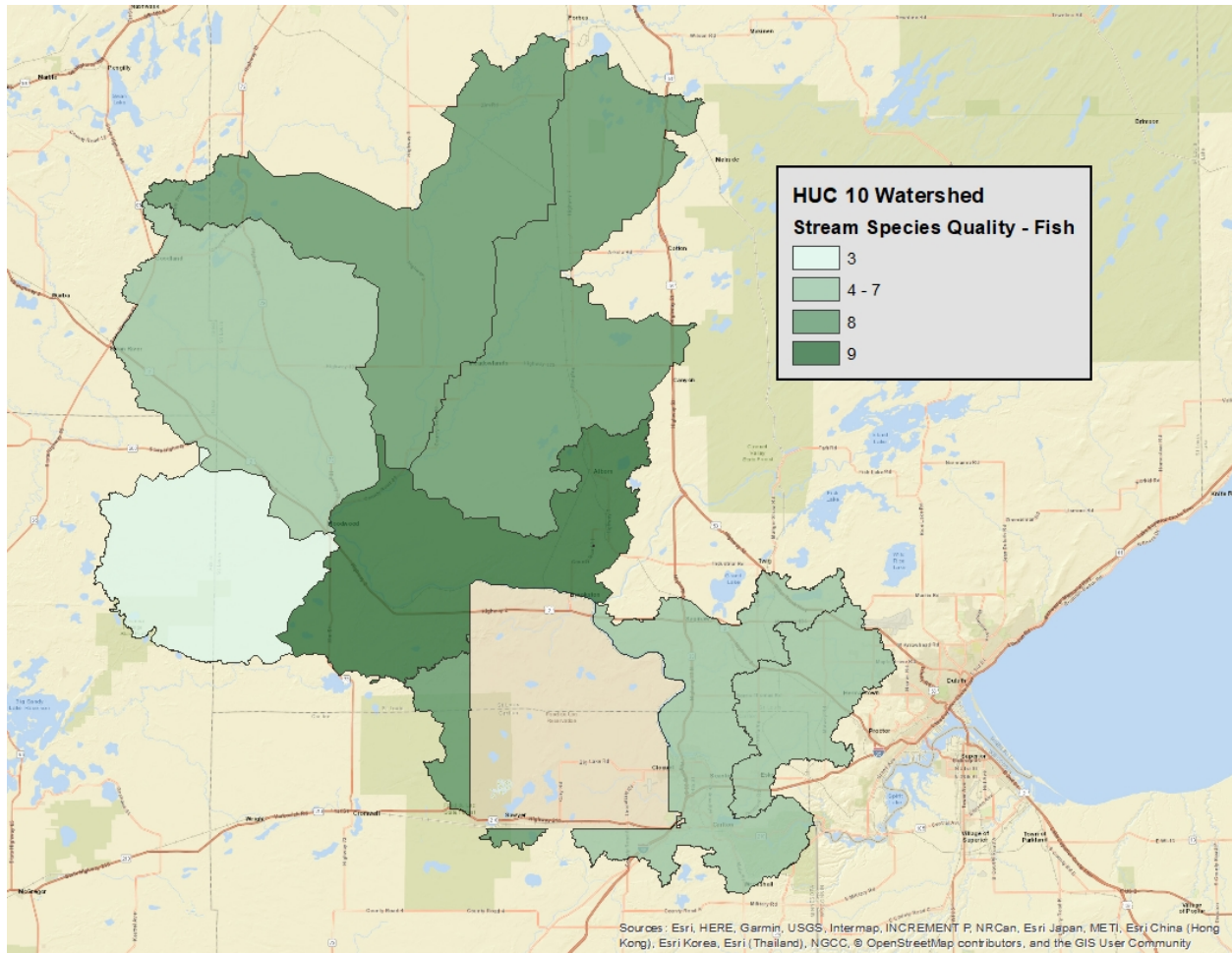
The sensitivity of groundwater to pollution is, in part, determined by the rate that water infiltrates the soil and upper geologic layers. This risk assessment is based on the state-wide Hydrogeologic Atlas (HG-02) published in 2016. This model quantified the Sensitivity of Near-Surface Materials by calculating the approximate rate of infiltration based on properties of the soil and surficial geology. **A high score indicates higher risk of groundwater contamination.**

Stream Species Quality – Invertebrates



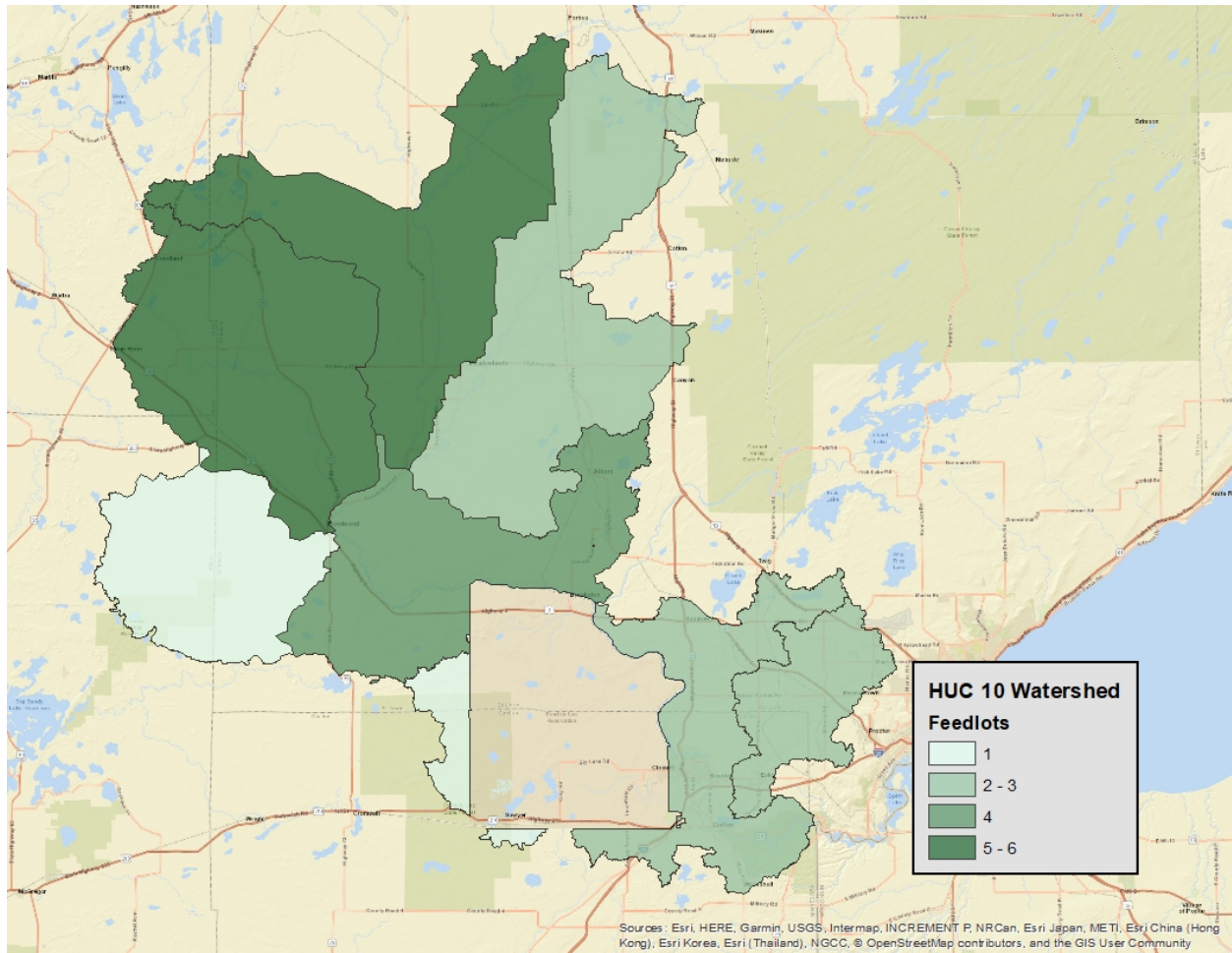
The aquatic species found in streams are often indicators of the condition of the contributing landscape. For the Stream Species Index, the fish and macroinvertebrate IBI (Index of Biotic Integrity) values were compared to expected threshold IBI values at each sampling location. Freshwater mussel survey data was used to compare the number of species found alive with the number of species found only as dead shells. These metrics were combined to create the Stream Species index. **A higher score indicates high quality.**

Stream Species Quality- Fish



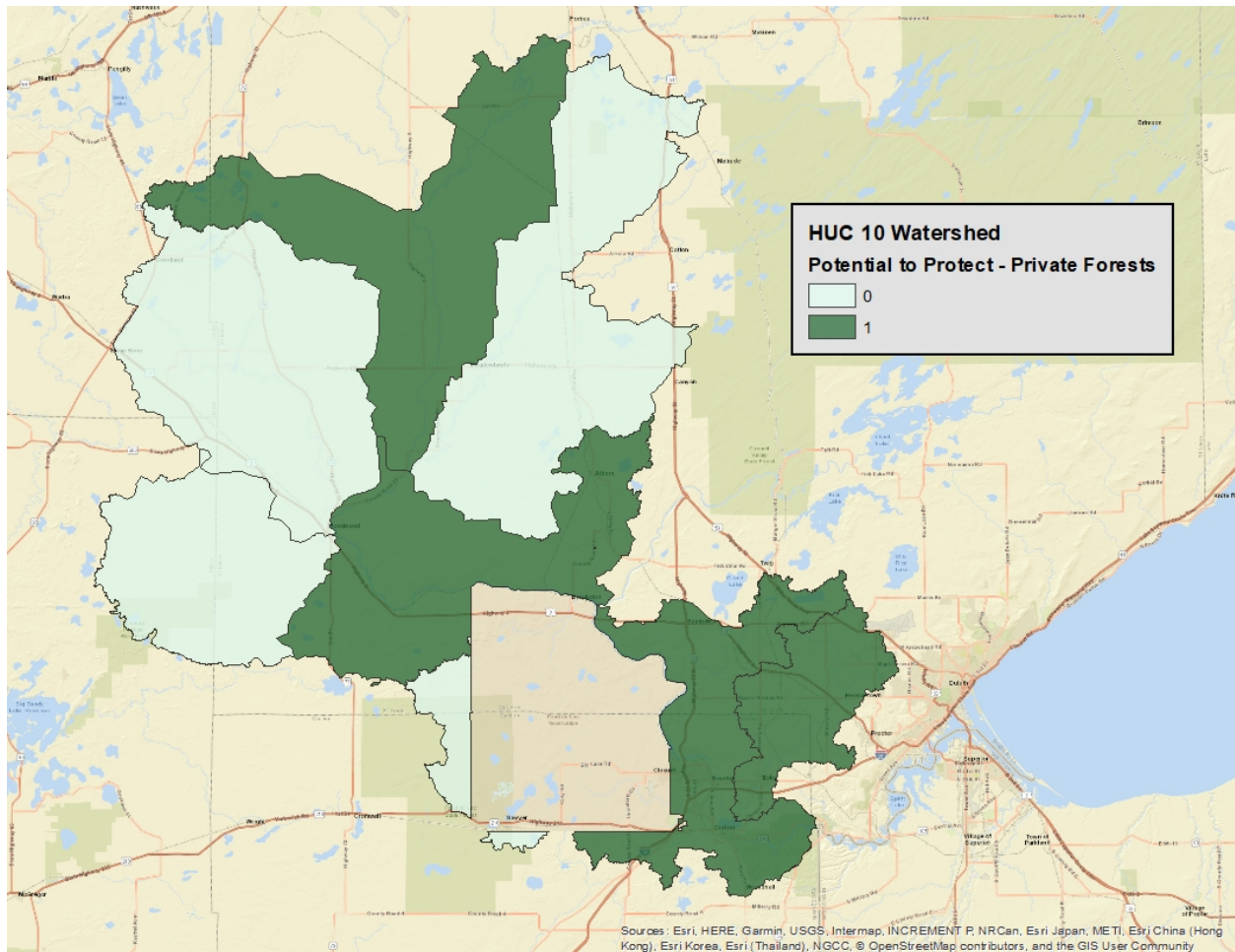
This metric is based on the fish IBI (Index of Biotic Integrity) published by the Minnesota Pollution Control Agency. IBI site scores were transformed to a 0-100 scale, whereby the threshold's score value determined by the PCA represents 50; site scores that are lower than the threshold value were transformed to a score between 0-50, while higher scores were transformed to a score between 50 and 100. Catchment scores represent an average of fish IBI scores in a given catchment.

Feedlots



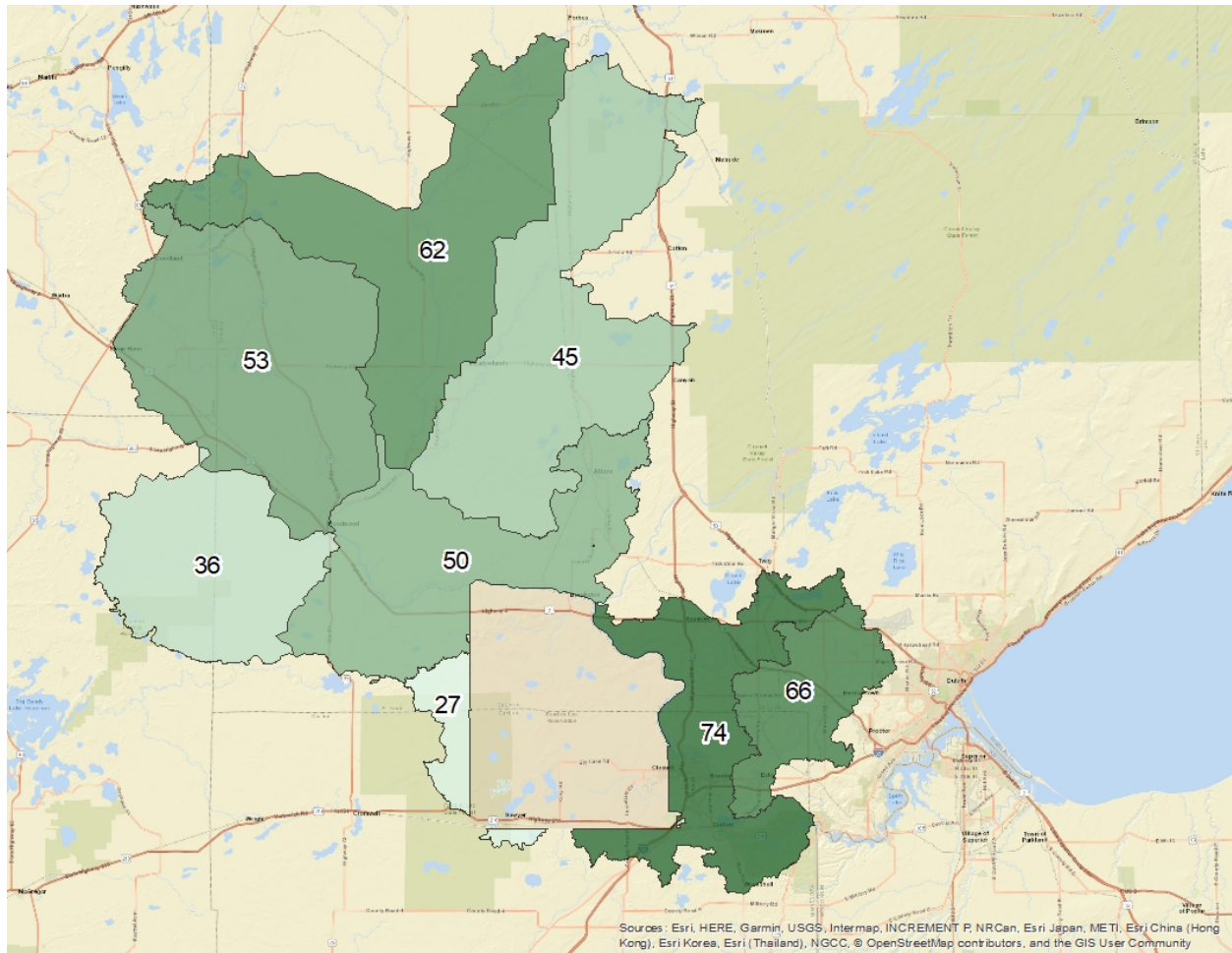
This data shows the total number of registered feedlots per HUC 10 watershed based on MPCA data. **A darker color indicates more feedlots.**

Potential to Protect – Private Forests



Data comes from the recently completed Landscape Stewardship Plan. A percentage of acres available for protection was evaluated per subwatershed. **A higher score indicates more privately owned forests that could be protected through easements or SFIA.**

Total Watershed Score



Total score based on the sum of the previous maps (all categories). **A darker color indicates a high score.**