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Climate Vulnerability Analysis and Land Management Strategies

Volume 2. Unit-Level Management

City of Austin, Parks and Recreation Department

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1 Unit-level Management

Land management is complex. Managers must consider an array of site characteristics as well as the physical and social context the site resides in. Management strategies for each site and vegetative community are selected according to a desired state that maximizes ecosystem services and resilience given the site's potential. Geospatial analysis and condition assessments form the first layer of decision making – helping to narrow the range of possible strategies. Land managers must then weigh more qualitative parameters as specific decisions are made for a given site. Examples include the needs and desires of the human community that live near or use the site, resource availability, maintenance capability, and adjacent site uses and influence on the project site.

This volume summarizes the analysis to this point for each management unit and provides initial recommended management target communities. Figures 1-1 through Figure 1-4 provide overview maps of the Climate Vulnerability Analysis detailed in Volume 1.

The management units have been divided by ecoregion (Blackland Prairie and Edwards Plateau) for descriptive purposes (Figure 1-5). Several of the properties have existing land management plans. These plans were considered, and incorporated, where appropriate. Of particular note, units within the Balcones Canyonlands Preserve are governed by the Balcones Canyonlands Preserve Land Management Plan (BCP 2007), which supersedes this plan for affected properties. Land managed under a Federal Incidental Take Permit, issued by U.S. Fish and Wildlife to the City of Austin and Travis County in 1996 called the Balcones Canyonlands Conservation Plan (BCCP) Permit. Land management techniques proposed on land governed by the BCCP Permit, including the Balcones Canyonlands Preserve (BCP) and BCCP cave karst fauna areas, must follow BCCP Permit regulatory requirements to ensure compliance with the BCCP Habitat Conservation Plan (USFWS 1996) and BCCP Land Management Plans. Governing documents of the BCCP Permit supersedes this plan for all affected land. References to the BCP Land Management Plan and BCCP Permit and governing documents refer to current plans and future updates. PARD will coordinate and collaborate with BCP staff for endangered and rare species management.

Fuel models are referred to throughout the report. Two systems are of interest. Sites were assessed for this project using the mitigation fuel models defined in the [Austin/Travis County Community Wildfire Protection Plan](#). Plant community and fuel model assessments were also conducted in 2014 on a subset of properties and provide a useful framework moving forward (Keith 2014a, c, d, e, f, b, g, h). The 2014 fuel model assessments used a modification of standard fire behavior fuel models (Scott and Burgan 2005) to provide recommendations for target fuel models. Where available, these fuel model recommendations are provided.

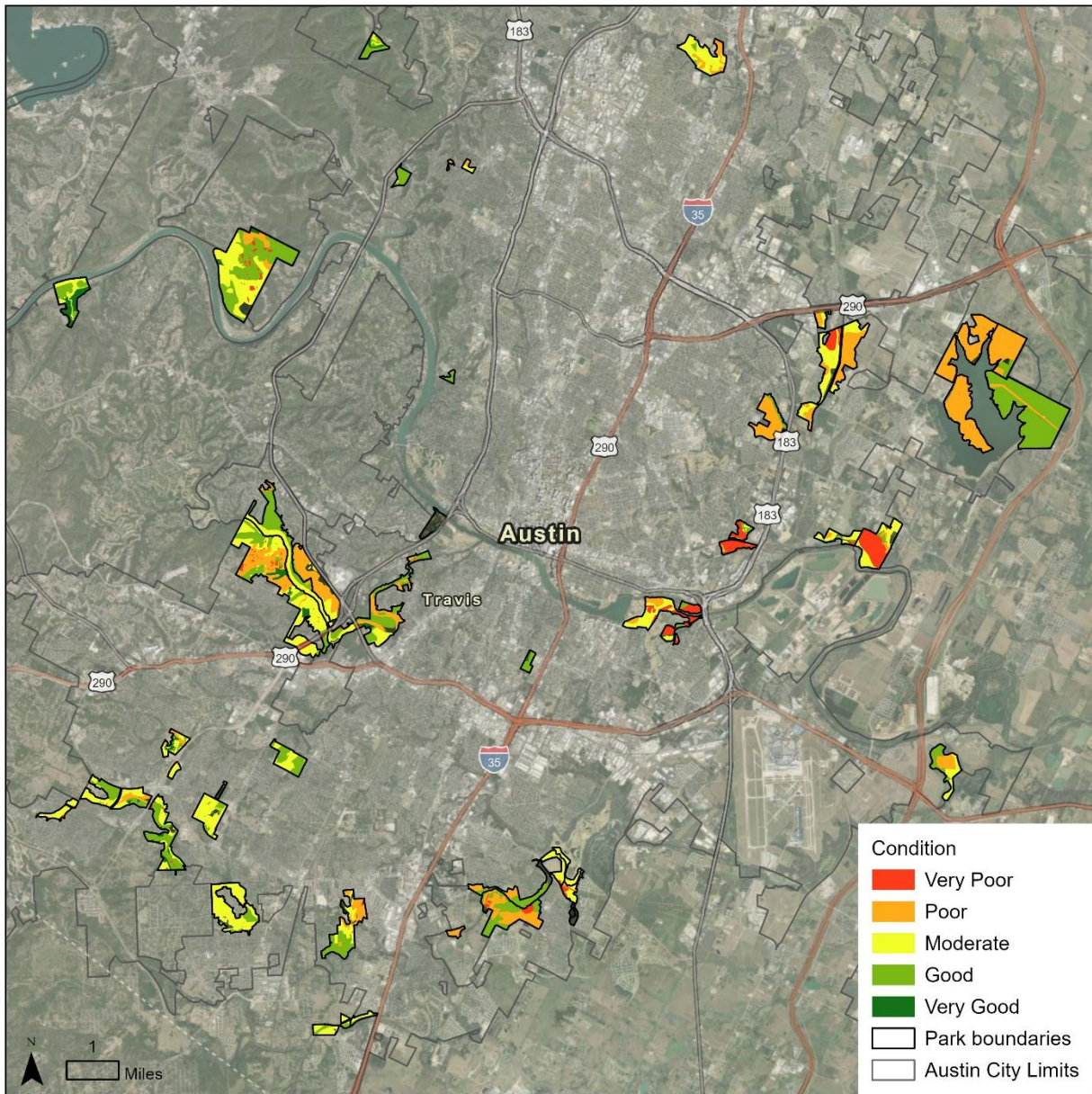


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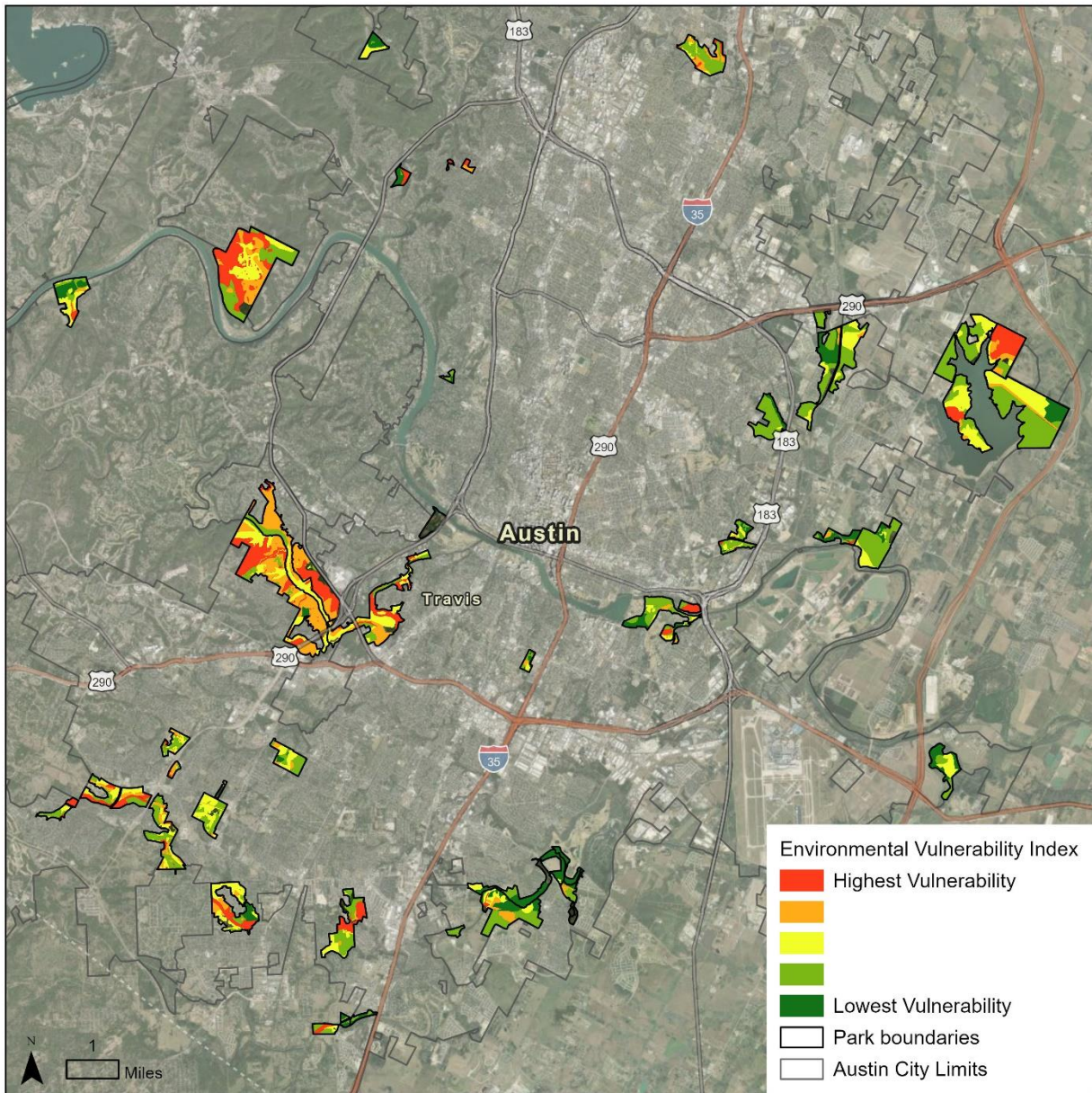


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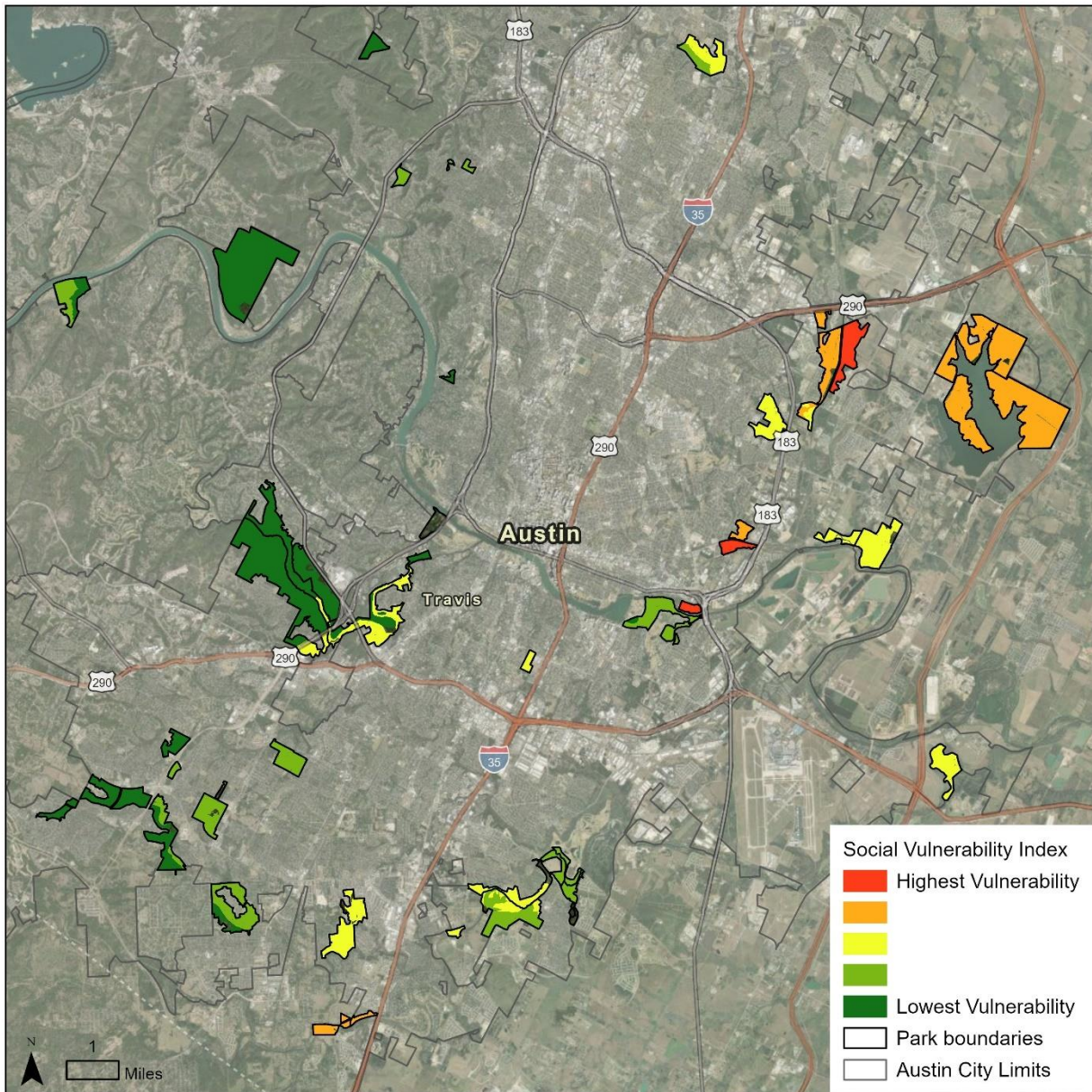


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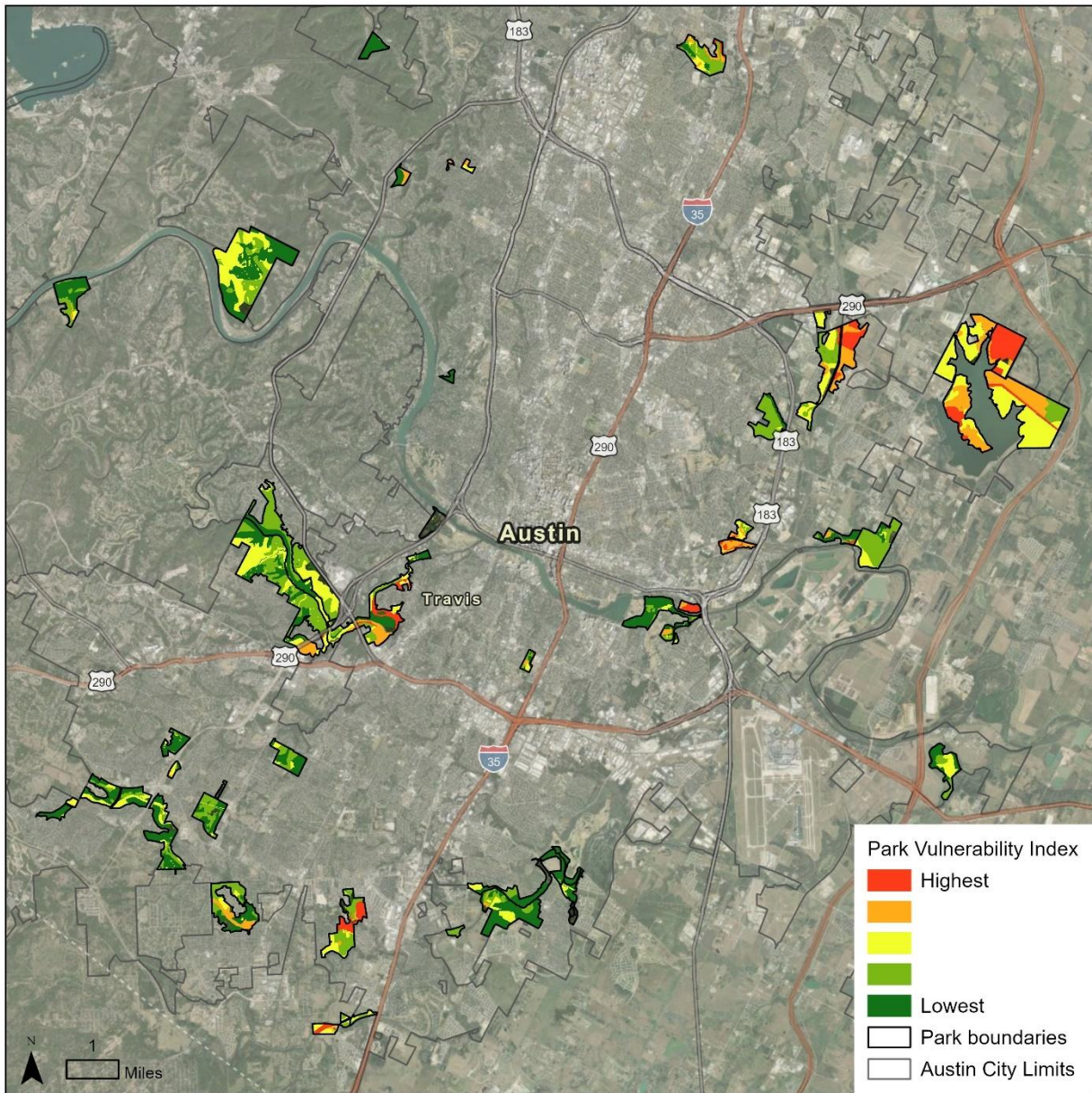
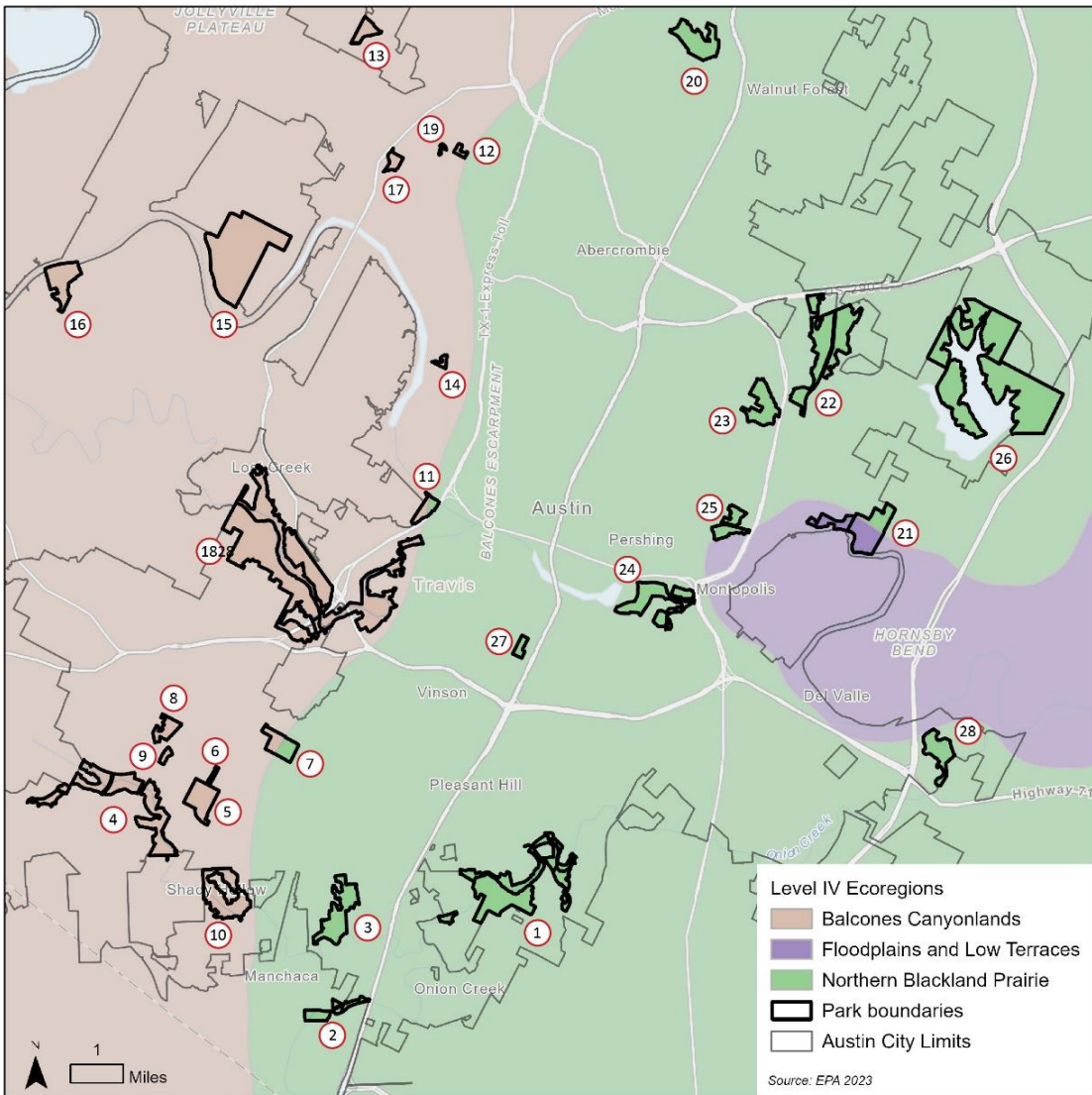


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- | | | | |
|--|-------------------------------------|-------------------------------------|------------------------------------|
| 1. Onion Creek Metro Complex | 9. Deer Park at Maple Run Preserve | 17. Bull Creek District Park | 25. East Boggy/Red Bluff Complex |
| 2. Onion Creek Old San Antonio Complex | 10. Baurle Ranch at Slaughter Creek | 18. Barton Creek Complex | 26. Decker Complex |
| 3. Mary Moore Searight Metro Park | 11. Zilker Nature Preserve | 19. Barrow Nature Preserve | 27. Blunn Creek Nature Preserve |
| 4. Slaughter Creek Metro Complex | 12. Stillhouse Nature Preserve | 20. Walnut Creek Metro Park | 28. Onion Creek Wildlife Sanctuary |
| 5. William H. Russell Karst Preserve | 13. St. Edwards Greenbelt | 21. Trevino + Walnut Complex | |
| 6. Goat Cave Karst Nature Preserve | 14. Mayfield Nature Preserve | 22. Southern Walnut Creek Greenbelt | |
| 7. Stephenson Nature Preserve | 15. Emma Long Metro Park | 23. Little Walnut Creek Greenbelt | |
| 8. Dick Nichols District Park | 16. Commons Ford Ranch Metro Park | 24. Guerrero + Co River Preserve | |

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1.1 BLACKLAND PRAIRIE

Much of the parkland within Blackland Prairie units are in the 100- and 500-year floodplain. A significant portion of land is in a converted state – formerly cropland in which the native community has been removed. Many properties are now in various stages of colonization. One of the challenges common on Blackland Prairie units is high invasive species presence. Significant erosion is also more common in these units than in Edwards Plateau units. One of the strengths shared by many properties is deep, though often damaged soil, with high water availability.

1.1.1 BLUNN CREEK NATURE PRESERVE

Blunn Creek Preserve has an existing Plant community and fuel model assessment (Keith 2014c) and the results and recommendations of that assessment will be incorporated here. Blunn Creek is primarily mixed woodland with large, scattered plateau live oak (*Quercus fusiformis*) in a matrix of younger Ashe juniper (*Juniperus ashei*), cedar elm (*Ulmus crassifolia*) and hackberry (*Celtis* spp.). Open grassland and savanna patches exist within the overall woodland matrix. Some active woody invasive removal has occurred.

The site is in an area of high Social Vulnerability.

Strengths

- Varied topographic and hydrologic conditions allow for a diversity of community types including oak-juniper woodland, live oak-midgrass savanna, cedar elm – hackberry open woodlands and bald cypress—sycamore riparian woodland
- Large live oak individuals
- Moderate to high species diversity
- Structurally diverse riparian community present, at least 25' wide

Challenges

- Varied and steep terrain limits management equipment access
- Heavy pedestrian use
- Most woodlands have high density with fuel model type shrub. Scattered old growth live oaks are surrounded denser, younger woody growth
- Significant Invasive species presence. Species of concern include paper mulberry (*Broussonetia papyrifera*), chinaberry (*Melia azedarach*), Arizona ash (*Fraxinus velutina*), Chinese tallow (*Triadica sebifera*), Chinese elm (*Ulmus parvifolia*), silktree (*Albizia julibrissin*), glossy privet (*Ligustrum lucidum*), Japanese privet (*Ligustrum japonicum*), nandina (*Nandina domestica*), thorny olive (*Elaeagnus pungens*), Chinese photinia (*Photinia serratifolia*), Japanese honeysuckle (*Lonicera japonica*), King Ranch bluestem (*Bothriochloa ischaemum*), Japanese brome, (*Bromus japonicus*), Johnsongrass (*Sorghum halapense*), and hedge parsley (*Torilis arvensis*).
- Woody encroachment into live oak-midgrass savanna

Strategies

- Shift upland closed canopy woodlands toward a timber state and direct remaining areas toward open woodlands and savanna with a combination of mechanical/chemical thinning and prescribed to reduce wildfire intensity, diversify age structure, reduce competition, and encourage recruitment of a wider range of species. The recommended fuel model and vegetation community targets from Keith (2014) are appropriate to this unit (below)

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- TU1 – low load of timber litter, shrubs and herbaceous. Juniper and hardwood leaf litter and dense herbaceous layer are the carriers of fire. This fuel model would develop in mature woodlands and create conditions where potential wildfires would be very low in intensity.
- TU2 - Mature forest and woodland timber structure with sparse herbaceous community. Recommended for riparian area and slopes. Prescribed fire through this fuel type tends to be low intensity
- TU3 – Parklike with scattered trees, dense herbaceous is a desired condition but may be challenging because it requires prescribed fire and/or frequent fuel management.
- Upland Plateau Live Oak- Midgrass with canopy cover of 25-50% - open woodland to reduce fuel load.
- Species addition in coordination with thinning and prescribed fire treatments
- Invasive management throughout, but with a focus on riparian areas
- Maintain vegetated riparian buffer at least as wide as the 25-year floodplain



Figure 1-6 Blunn Creek Nature Preserve Condition

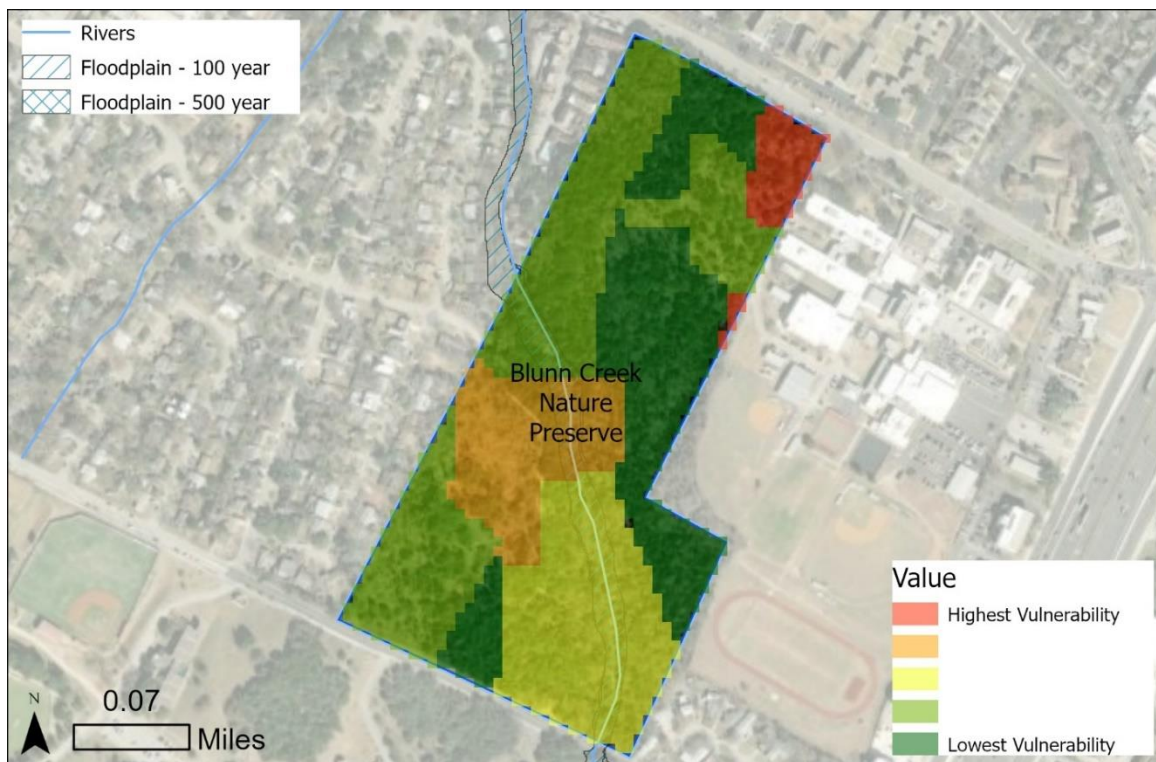


Figure 1-7 Blunn Creek Nature Preserve Environmental Vulnerability



Figure 1-8 Blunn Creek Nature Preserve Ecological Sites



Figure 1-9 Blunn Creek Nature Preserve Target Community

1.1.2 DECKER COMPLEX: DECKER TALLGRASS PRAIRIE PRESERVE, LOUIS RENE BARRERA INDIANGRASS WILDLIFE SANCTUARY, WALTER E LONG METRO PARK

Louis Rene Barrera Indiangrass Wildlife Sanctuary has an existing Management Plan (Siglo Group 2020) and a Plant Community and Fuel Model Assessment (Keith 2014d) that will be incorporated here. Walter E Long Metropolitan Park has a Master Plan (Halff 2019).

The complex contains a mosaic of Ashe juniper woodland, deciduous woodland (hackberry—elm), King Ranch bluestem dominated grassland, mesquite woodlands with herbaceous understory and some pockets of high-quality little bluestem—Indiangrass grasslands.

Communities range from very good to very poor condition with overall diversity ranging from high to very low. The site is in an area of high social vulnerability.

Strengths

- Several identified wetlands
- Many community types in different stages of recovery following prescribed fire and brush management treatments
- Scattered communities with high diversity and a high proportion of reference species from the historic climax community
- Generally moderate to high species diversity. Blackland prairie reference species such as little bluestem (*Schizachyrium scoparium*) and Indiangrass (*Sorghastrum nutans*) in drier grassland sites and eastern gamagrass (*Tripsacum dactyloides*) and switchgrass (*Panicum virgatum*) in lower, wetter areas. Rare species netleaf bundleflower (*Desmanthus reticulatus*) and shooting star (*Dodecatheon meadia*) were noted in the 2020 management plan.
- A monitoring strategy, including the establishment of photo points, was established as part of the 2020 management plan that could be incorporated into future efforts

Challenges

- High cover of invasive plant species. Invasive species are dominant in some areas. Species of concern include King ranch bluestem, Japanese honeysuckle, Chinese tallow, Chinaberry, and Johnsongrass as well as the native, but problematic cattail (*Typha* sp.).
- Feral hogs (*Sus scrofa*)
- Woody encroachment in grassland areas
- Several old field (converted land) sites previously used for agriculture have significantly altered soils and vegetation
- Moderate erosion

Strategies

- The recommended fuel model and vegetation community targets from Keith (2014c) are appropriate to this upland grassland areas within unit
 - GR4 – Moderate load, dry climate grassland representing the likely pre-European settlement type in upland grasslands
- Continue prescribed fire in grassland and savanna
- Protect identified wetlands and identify others that may exist within the complex

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- Manage eroding sections of creek bank with physical interventions such as checkdams as and introducing woody obstructions as well as encouraging woody and herbaceous stabilizer species
- Maintain vegetated riparian buffer at least as wide as the 25-year floodplain
 - Increase the diversity and cover of woody and herbaceous stabilizer species in riparian and lakeside communities. Include facultative species in species addition mixes.
- Invasive management in all communities
- Woodland selective thinning to create a timber or open woodland structure in order to reduce wildfire intensity and crown fire risk, diversify age structure, reduce competition, and encourage recruitment of a wider range of species
- Reduce woody cover in grasslands, disconnect canopies between oak mottes
- Reduce ladder fuel at woodland edges and scattered trees/mottes in grassland areas through a combination of mechanical treatment and repeated prescribed fire
- Coordinate prescribed fire, invasive management, and species addition to enhance diversity of grassland areas

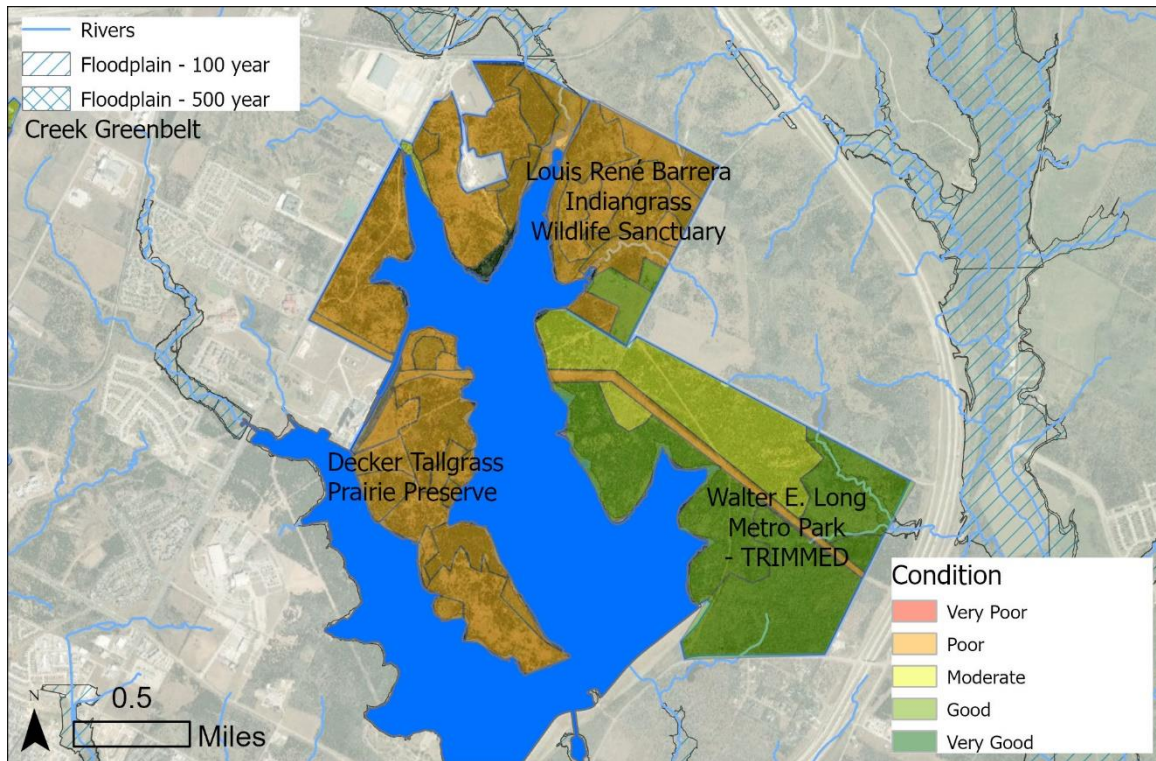


Figure 1-10 Decker Complex Condition

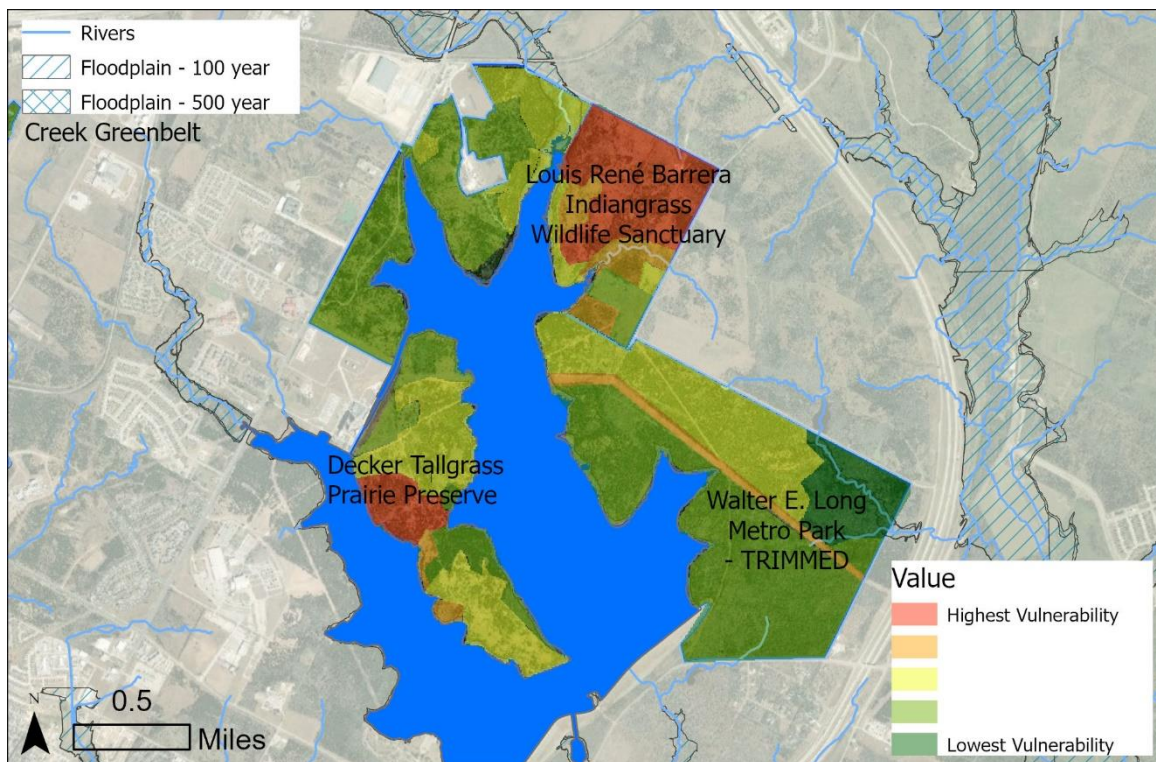


Figure 1-11 Decker Complex Environmental Vulnerability Index

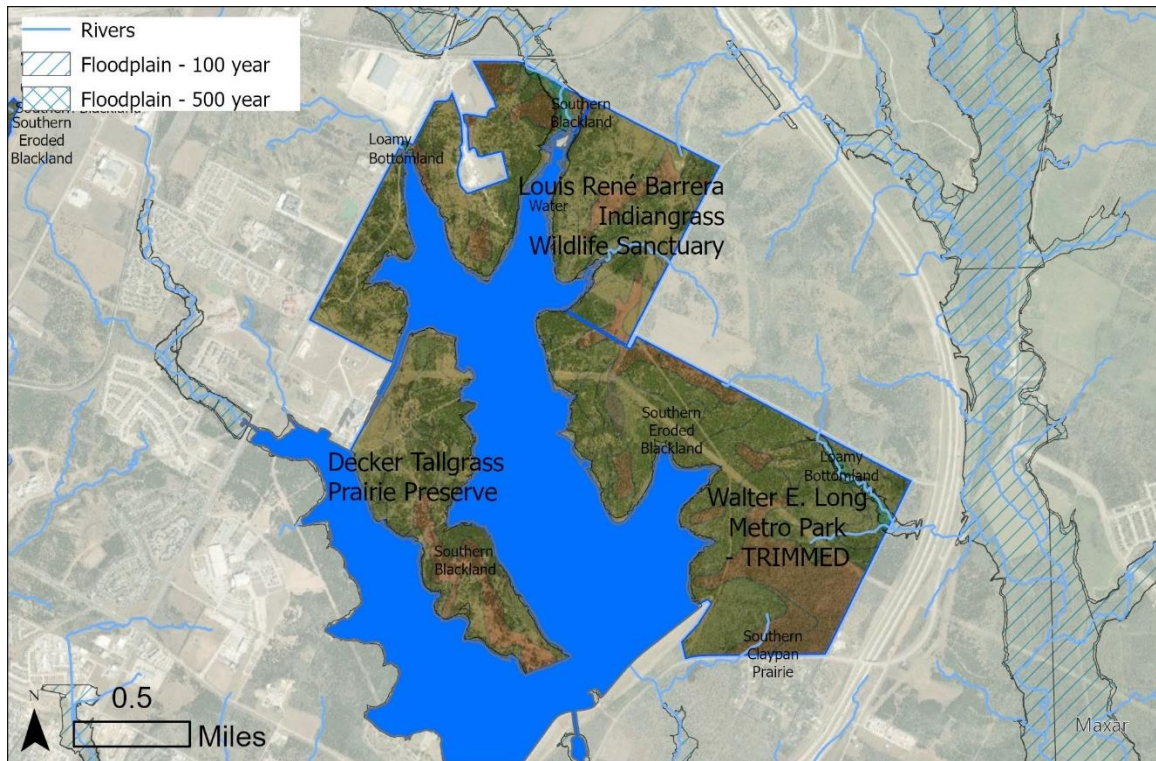


Figure 1-12 Decker Complex Ecological Sites

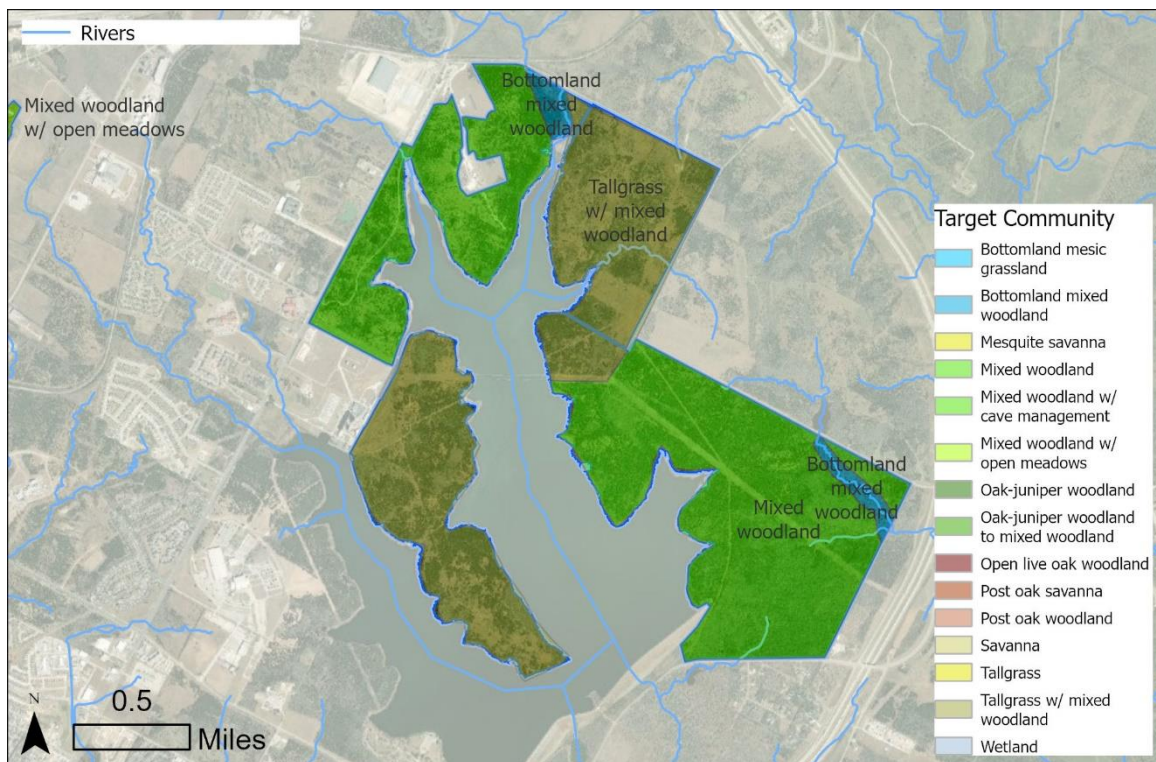


Figure 1-13 Decker Complex Target Community

1.1.3 EAST BOGGY + RED BLUFF COMPLEX

The unit is composed of primarily mixed woodland located almost entirely within the 100 and 500 year floodplain.

The site is located in an area of high social vulnerability.

Strengths

- Deep soils with high water availability and limited erosion in most of the unit, though moderate erosion is present in some areas
- Native overstory trees include pecan (*Carya illinoensis*) and Texas red oak (*Quercus buckleyi*), eastern cottonwood (*Populus deltoides*) and American sycamore (*Platanus occidentalis*) mesquite (*Prosopis glandulosa*) and hackberry are common.
- The gravelly ecological site is present which could support post-oak savanna

Challenges

- Low overall species diversity with many communities converted, though areas of high diversity exist. Herbaceous species in grassland areas are primarily decreaser natives and invasive species.
- High invasive species cover, primarily ligustrum species (*L. japonicum*, *L. sinense*). Ligustrum is the dominant cover in many areas. Other invasive species include: bermudagrass (*Cynodon dactylon*), Johnsongrass, and King Ranch bluestem.
- High canopy mortality of ligustrum at the time of the site visit, with very little remaining living vegetative cover of any kind.
- High woodland density with fuel model type – shrub.

Strategies

- Invasive management and dead wood removal
- Revegetation of areas with low to no remaining living cover
- Woodland selective thinning to create a timber structure to reduce wildfire intensity and crown fire risk, diversify age structure, reduce competition, and encourage recruitment of a wider range of species.

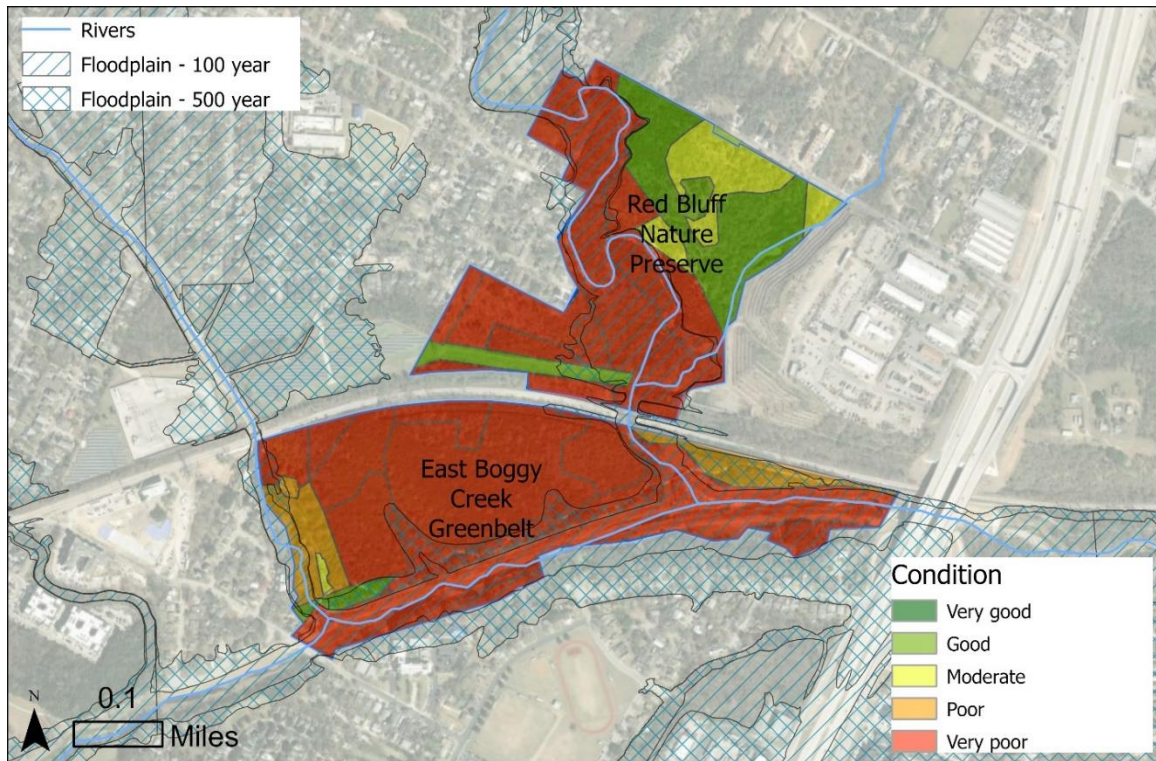


Figure 1-14 East Boggy + Red Bluff Complex Condition

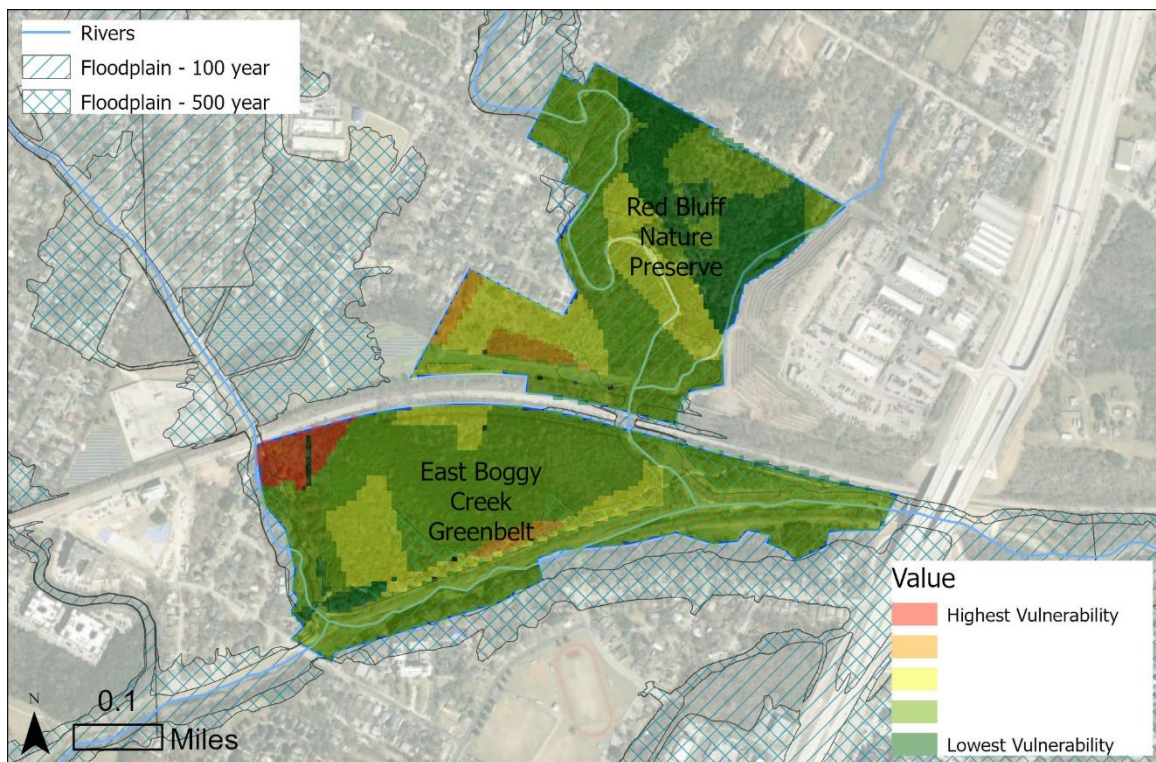


Figure 1-15 East Boggy + Red Bluff Complex Environmental Vulnerability

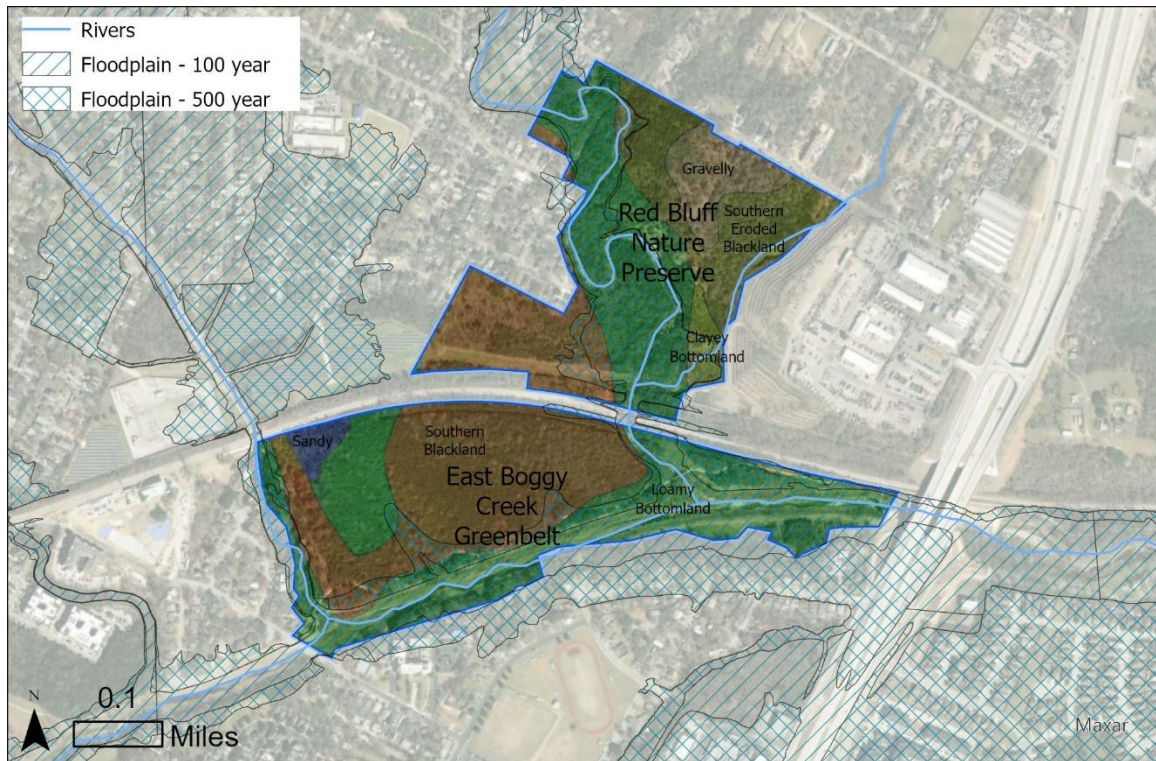


Figure 1-16 East Boggy + Red Bluff Complex Ecological Sites

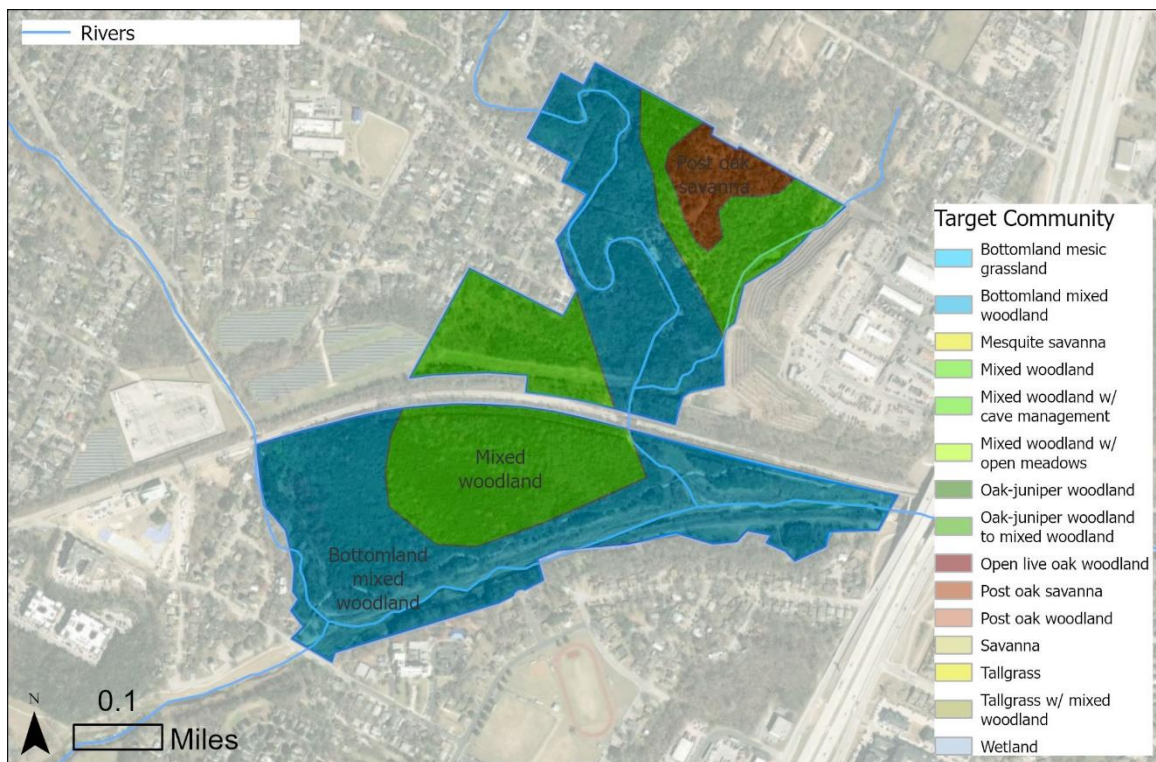


Figure 1-17 East Boggy + Red Bluff Complex Target Community

1.1.4 GUERRERO + COLORADO RIVER PRESERVE COMPLEX

The unit consists of primarily mixed woodland. Guerrero has an existing Master Plan.

The northeast portion of the unit is in an area of high vulnerability.

Strengths

- Deep alluvial soils with high water availability
- Existing riparian community at least 25' wide, and high overall vegetative cover. Stream channel is connected to floodplain.
- Some woodlands have a Timber fuel type
- Moderate overall diversity. Native overstory trees include hackberry, cedar elm, eastern cottonwood and pecan. The native cool season grass Virginia wildrye (*Elymus virginicus*) and inland seaoats (*Chasmanthium latifolium*) is common to dominant in the understory of open woodlands. Virginia wildrye and inland seaoats are valuable species in light of climate change because they have broad distributions, a wide range of tolerances and recover quickly following disturbance. Also present are mesquite, tickle-tongue (*Zanthoxylum hirsutum*) and hackberry. Stabilizer species eastern gamagrass and switchgrass (*Panicum virgatum*) are present in riparian areas. Riparian colonizer species black willow (*Salix nigra*) and box elder (*Acer negundo*) are common.

Challenges

- Significant invasive species cover areas of low overall diversity. Invasive species include Chinaberry, Johnsongrass, bermudagrass, giant reed (*Arundo donax*), *Bromus* species, and hedge parsley. Grassland areas are dominated by invasive species.
- Herbaceous cover in woodlands is present, but has low diversity
- Soil compaction and moderate erosion in some areas
- Converted land including a gravel pit
- High levels of human generated garbage
- Substantial homeless population settlements

Strategies

- Invasive management
- Shift woodland understory toward an open, timber state through mechanical/chemical thinning to reduce wildfire intensity and crown fire risk, diversify age structure, reduce competition, and encourage recruitment of a wider range of species
- Increase diversity and cover of woody and herbaceous stabilizer species in riparian community
- Increase overall species diversity through species addition.

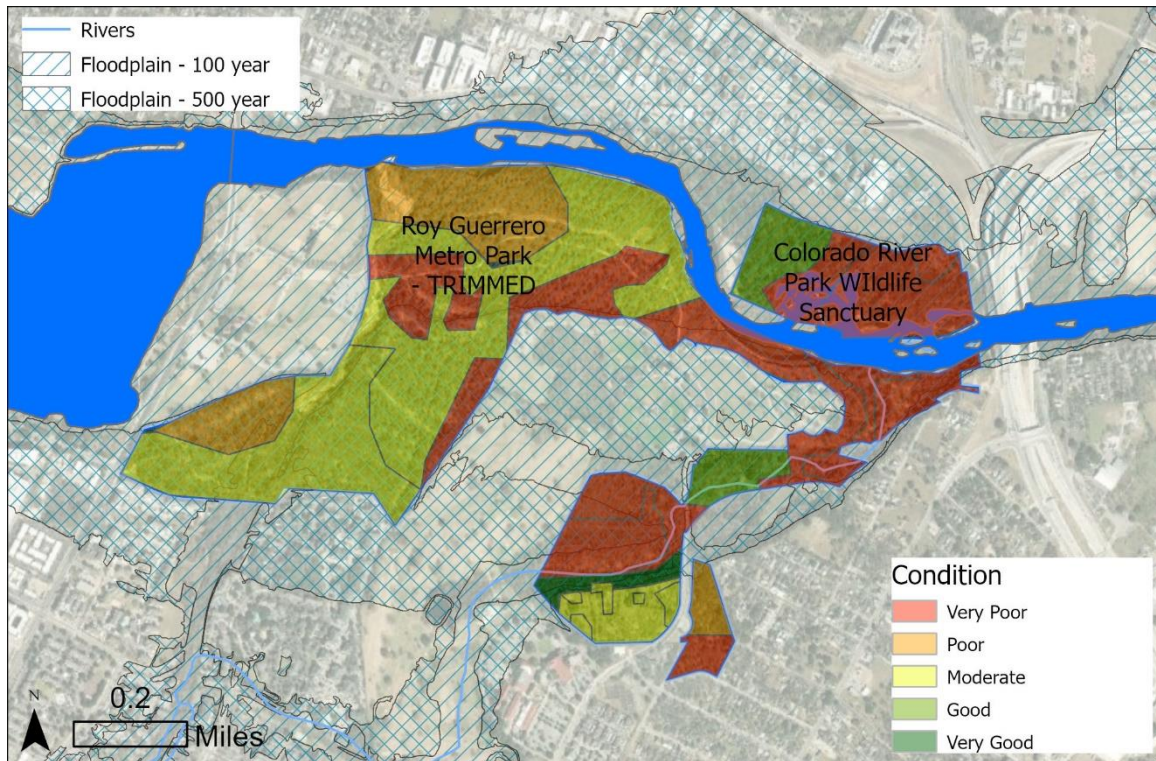


Figure 1-18 Guerrero + Colorado River Preserve Complex Condition

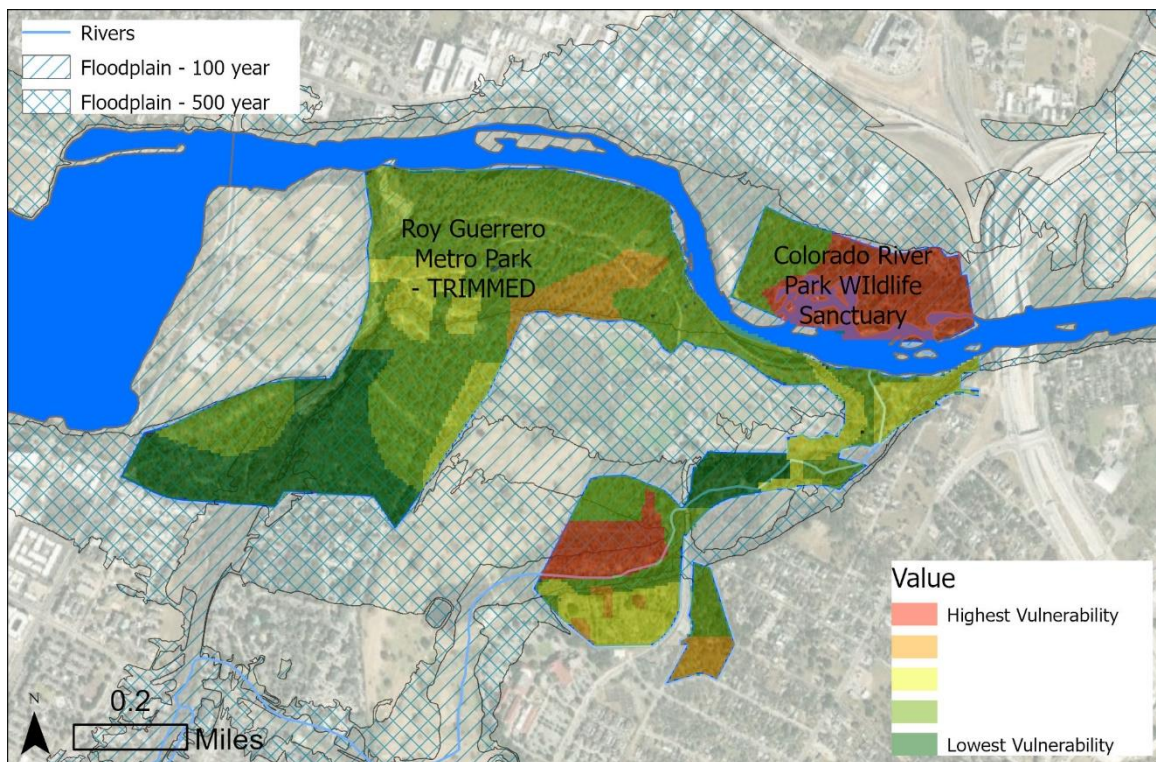


Figure 1-19 Guerrero + Colorado River Preserve Complex Environmental Vulnerability Index

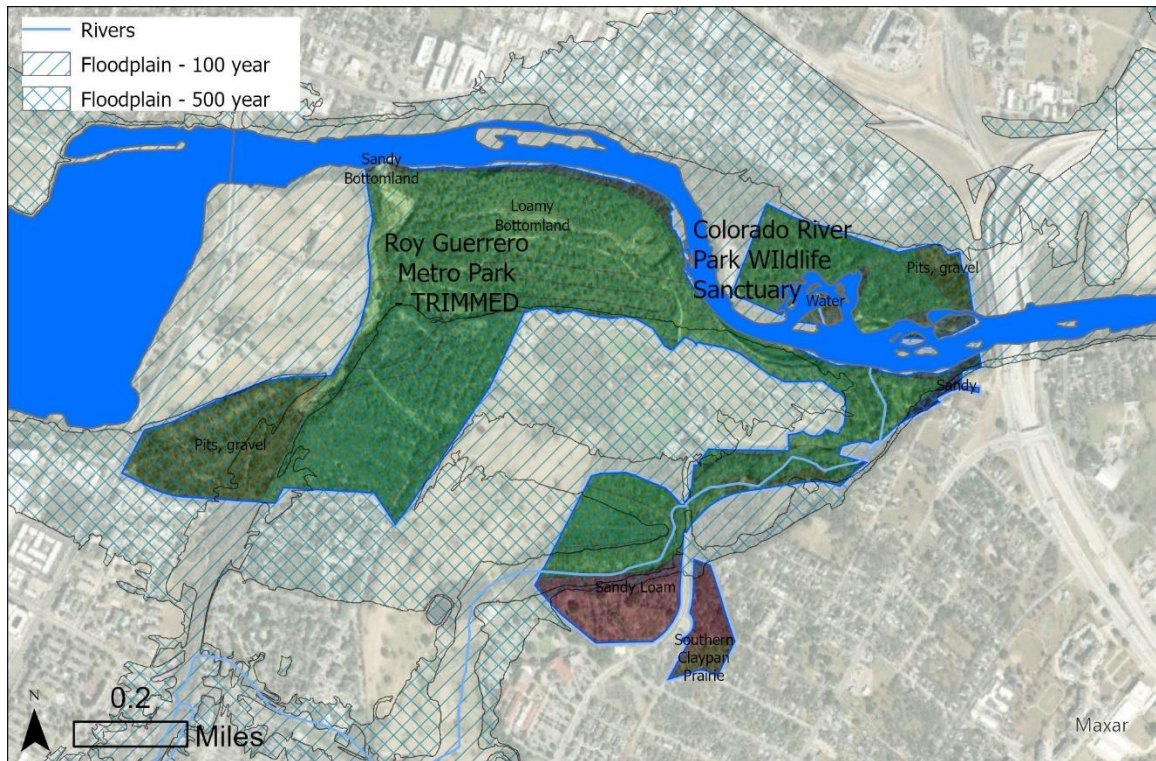


Figure 1-20 Guerrero + Colorado River Complex Ecological Sites

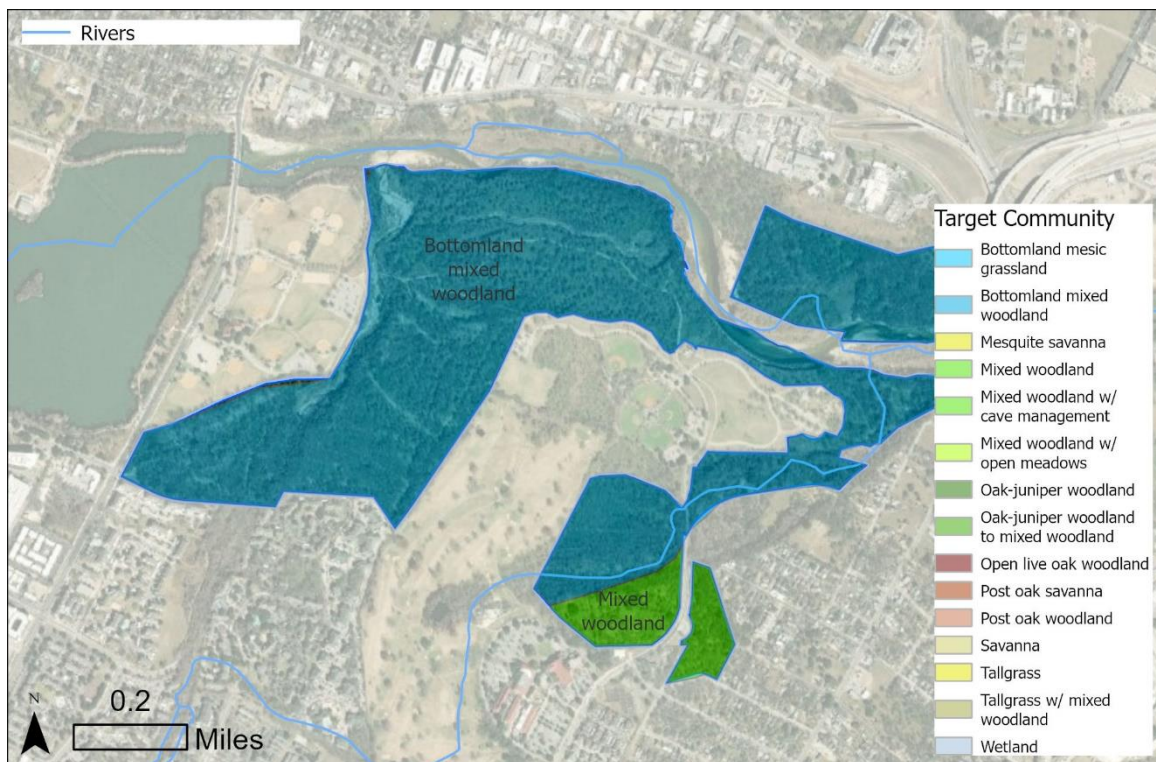


Figure 1-21 Guerrero + Colorado River Complex Target Community

1.1.5 LITTLE WALNUT CREEK GREENBELT

Little Walnut Creek Greenbelt has a 2019 Community Master Plan (Asakura Robinson 2019). Ashe juniper woodland with a sedge herbaceous layer is the dominant upland community. Elm—hackberry and cottonwood—pecan woodlands are also common.

The site is in an area of high social vulnerability.

Strengths

- Deep soils with high water availability
- Varied topographic and hydrologic conditions allows for the potential of a diversity of community types
- Pockets of high diversity communities are present with reference species from the historic climax community
- Native species include Ashe juniper, elm species, (*Ulmus* sp) mesquite, eastern cottonwood, little bluestem, Indiangrass, blazing star (*Liatris punctata*), hackberry, pecan, bushy bluestem (*Andropogon glomeratus*), and sedges (*Carex* species)
- Structurally diverse riparian community present, at least 25' wide

Challenges

- Low overall species diversity, though high diversity areas are present
- High midstory density in upland woodlands. The predominant fuel model is shrub
- Significant invasive species cover including silky bluestem (*Dichanthium sericeum*), King Ranch bluestem, Johnsongrass, Chinese tallow, ligustrum and Chinaberry
- Erosion is moderate to severe
- Infrastructure installation has negatively impacted ecological condition
- High incidence of social trails, frequently in steep areas, leading to soil compaction, vegetation cover loss and erosion

Strategies

- Invasive management
- Selective thinning to create a timber structure to reduce crown fire risk, diversify age structure, reduce competition and to encourage recruitment of wider range of species
- Management of social trails to reduce bare soil, compaction, and subsequent erosion
- Increase the structural and compositional diversity of bottomland and riparian areas to better withstand flooding and improve overall ecological function
- Maintain vegetated riparian buffer at least as wide as the 25-year floodplain

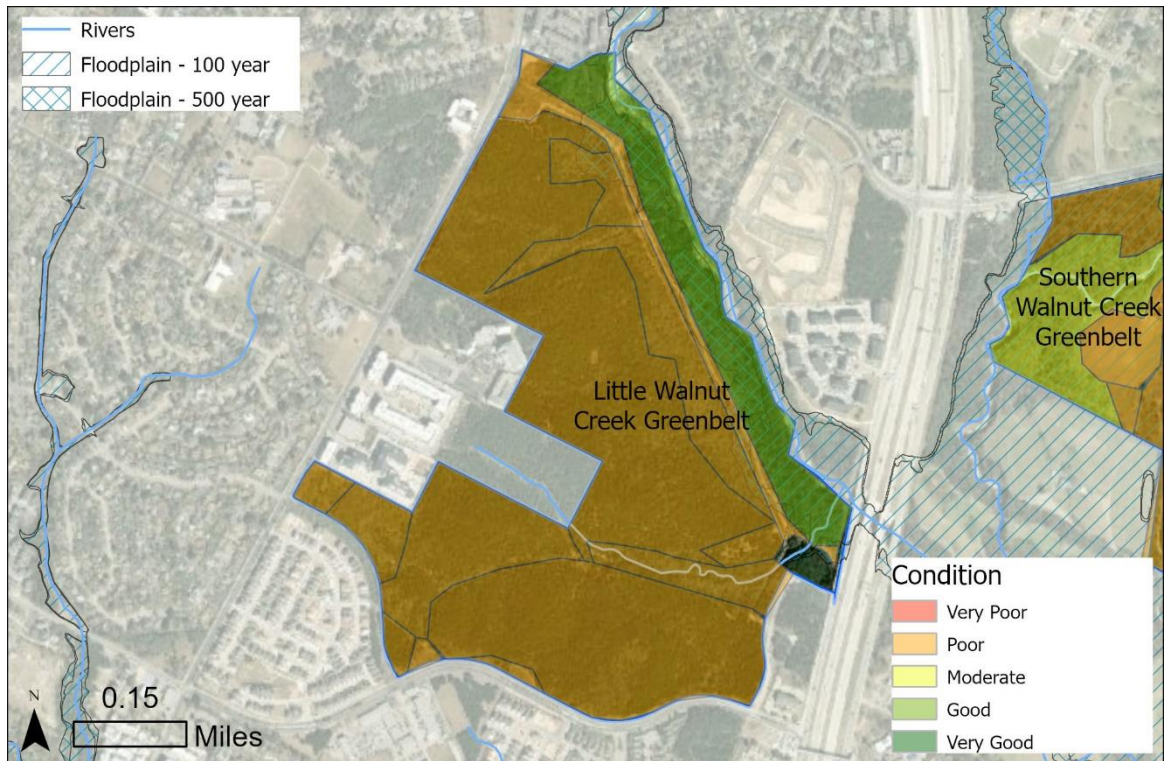


Figure 1-22 Little Walnut Creek Greenbelt Condition Class

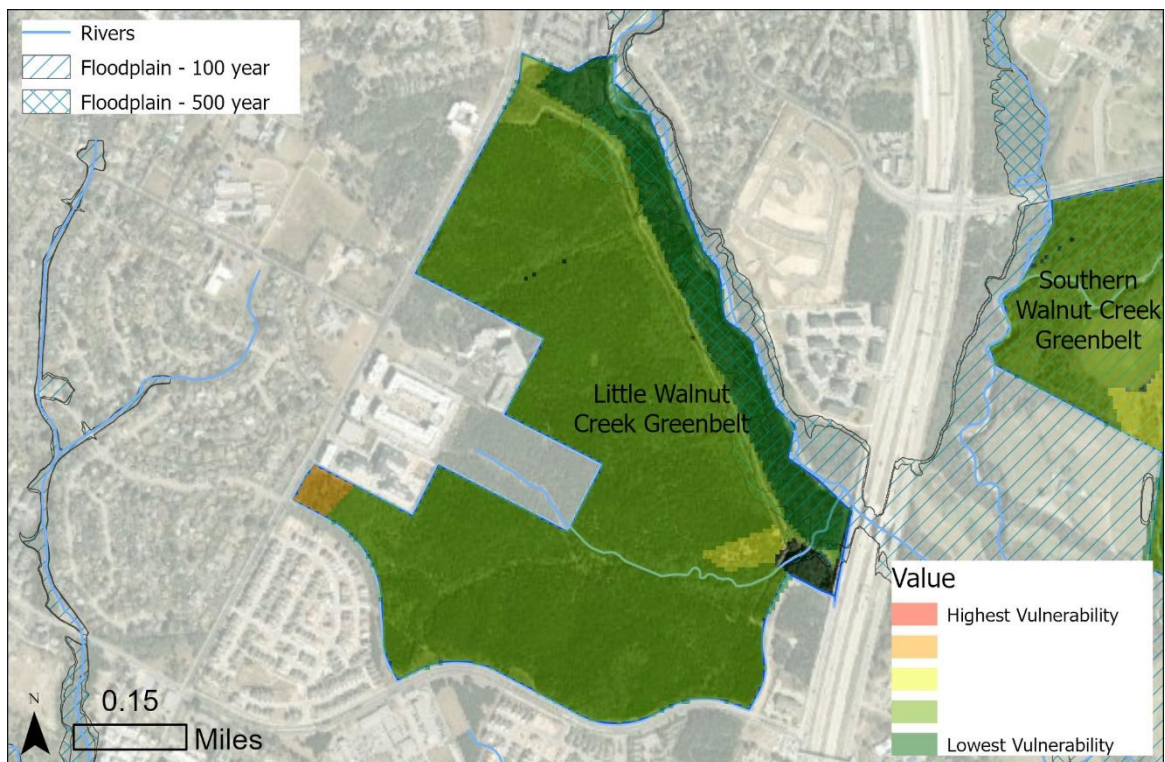


Figure 1-23 Little Walnut Creek Greenbelt Environmental Vulnerability Index

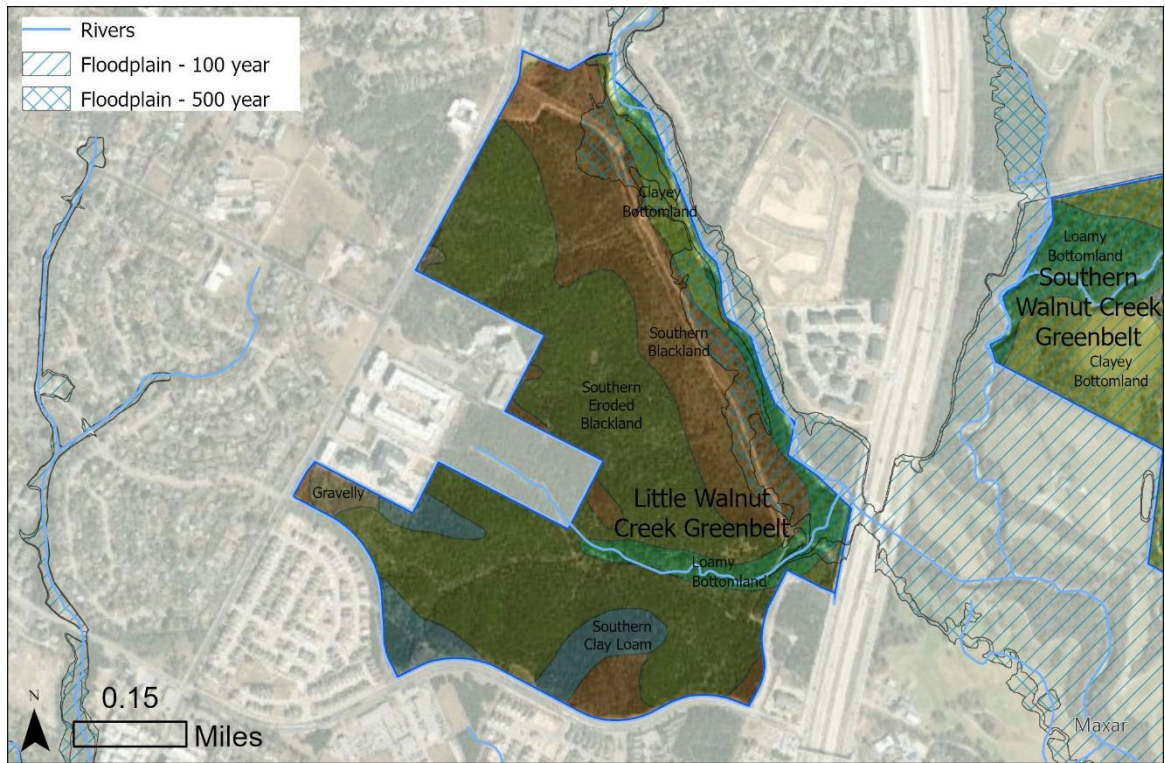


Figure 1-24 Little Walnut Creek Greenbelt Ecological Sites

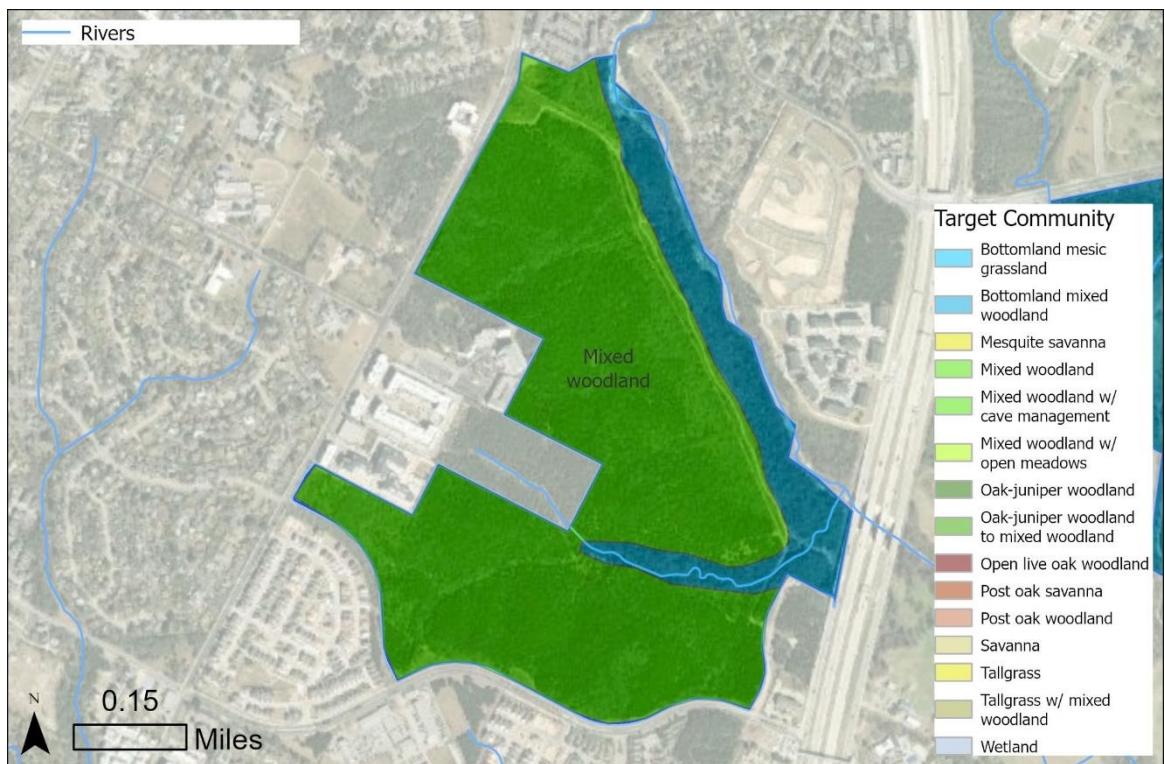


Figure 1-25 Little Walnut Creek Greenbelt Target Community

1.1.6 MARY MOORE SEARIGHT METRO PARK

Mary Moore Searight Metro Park has an existing Master Plan. The dominant upland communities are juniper woodland and oak—juniper woodland. Hackberry—elm woodland, open plateau live oak woodland, and mixed riparian communities are also present.

The site is in an area of high social vulnerability.

Strengths

- Deep soils with high water availability in some areas
- Varied topographic and hydrologic conditions allows for diversity of community types including Ashe juniper—plateau live oak woodland, Ashe juniper—Texas red oak woodland, Ashe juniper—shin oak woodland, plateau live oak woodland, hackberry—elm woodland, wet cliff community, pecan—cottonwood woodland, cypress—cottonwood—sycamore woodland, and little bluestem—Indiangrass grassland.
- Large individual oak trees
- Decreaser grasses present in uplands
- Structurally and compositionally diverse riparian community 25' wide or more with large trees and stabilizer species present
- Species diversity varies, but some areas have moderate to high overall diversity.
- Potential for cooperation with neighboring landowner for invasive species management

Challenges

- High midstory density in upland woodland. The predominant fuel model is shrub.
- Upland woodlands have moderate to low species diversity

Strategies

- Invasive management
- Woodland selective thinning to create a timber structure to reduce wildfire intensity and crown fire risk, diversify age structure, reduce competition, and encourage recruitment of a wider range of species
- Manage soil compaction and erosion caused by foot traffic by managing excessive social trails (obscure and revegetate), directing people to official trails, and when necessary, using physical interventions such as cross slope obstructions to slow and disperse water flow and encourage upslope revegetation
- Maintain vegetated riparian buffer at least as wide as the 25-year floodplain

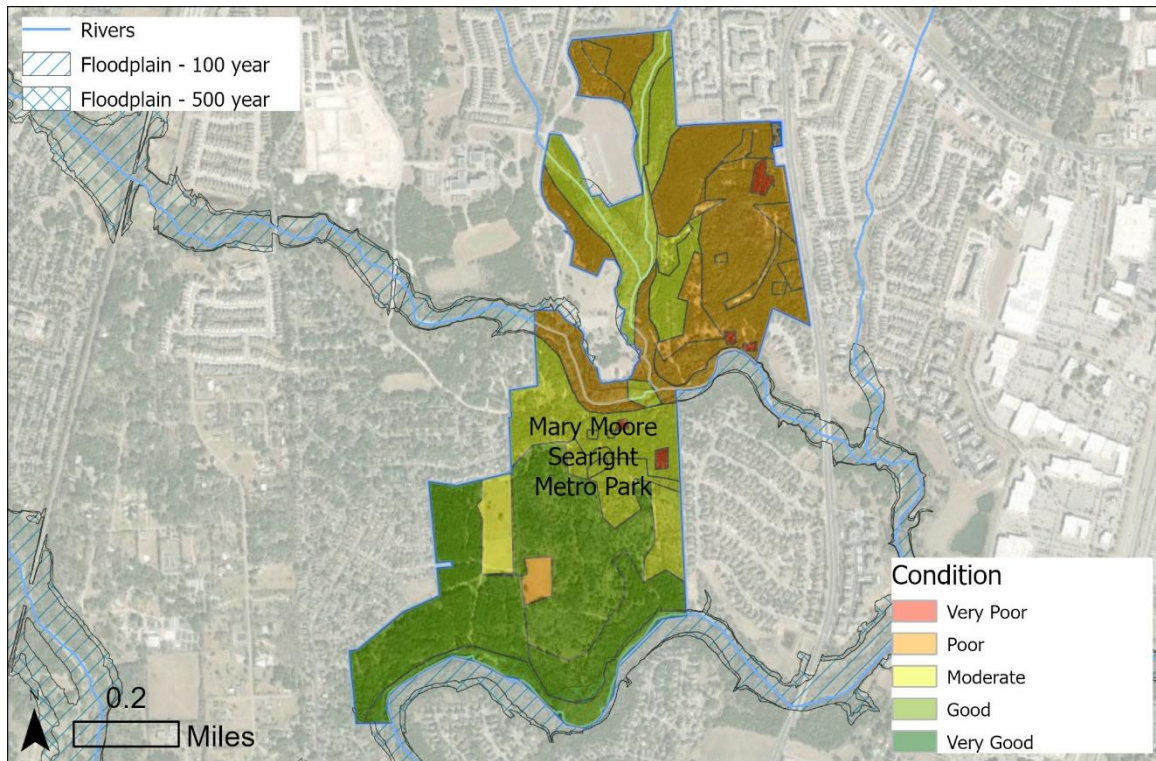


Figure 1-26 Mary Moore Searight Metro Park Condition

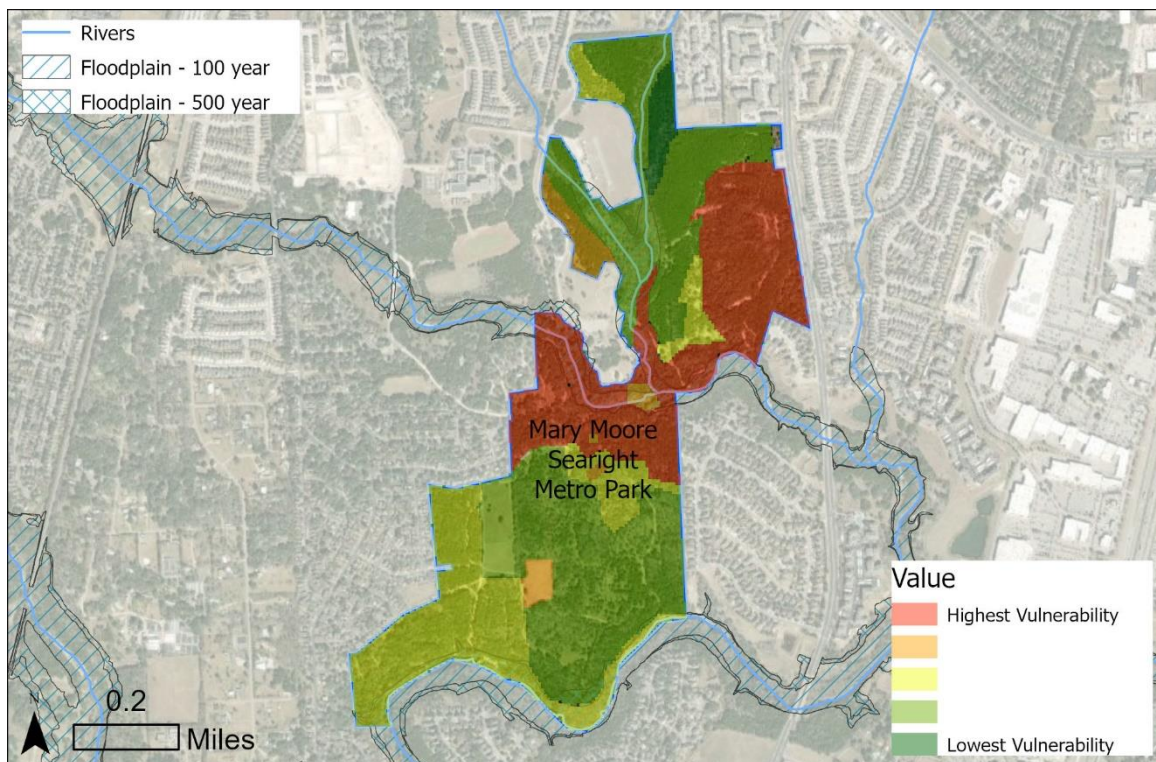


Figure 1-27 Mary Moore Searight Metro Park Environmental Vulnerability Index

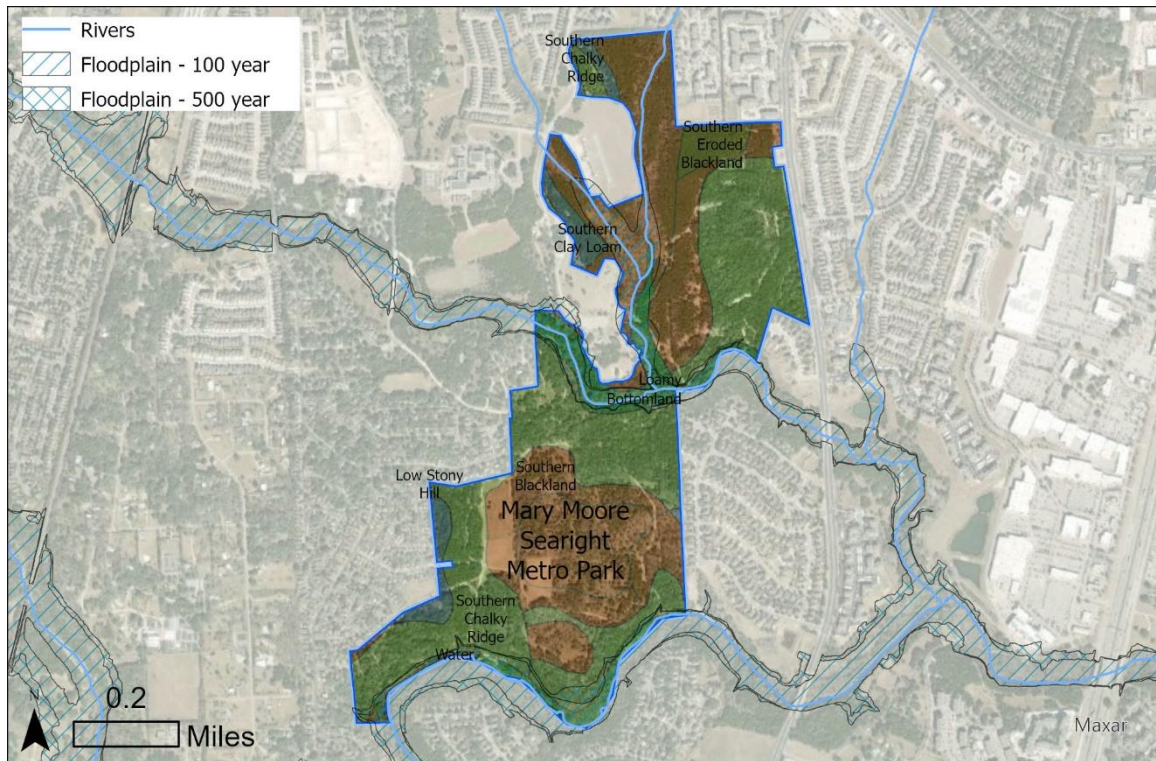


Figure 1-28 Mary Moore Searight Metro Park Ecological Site

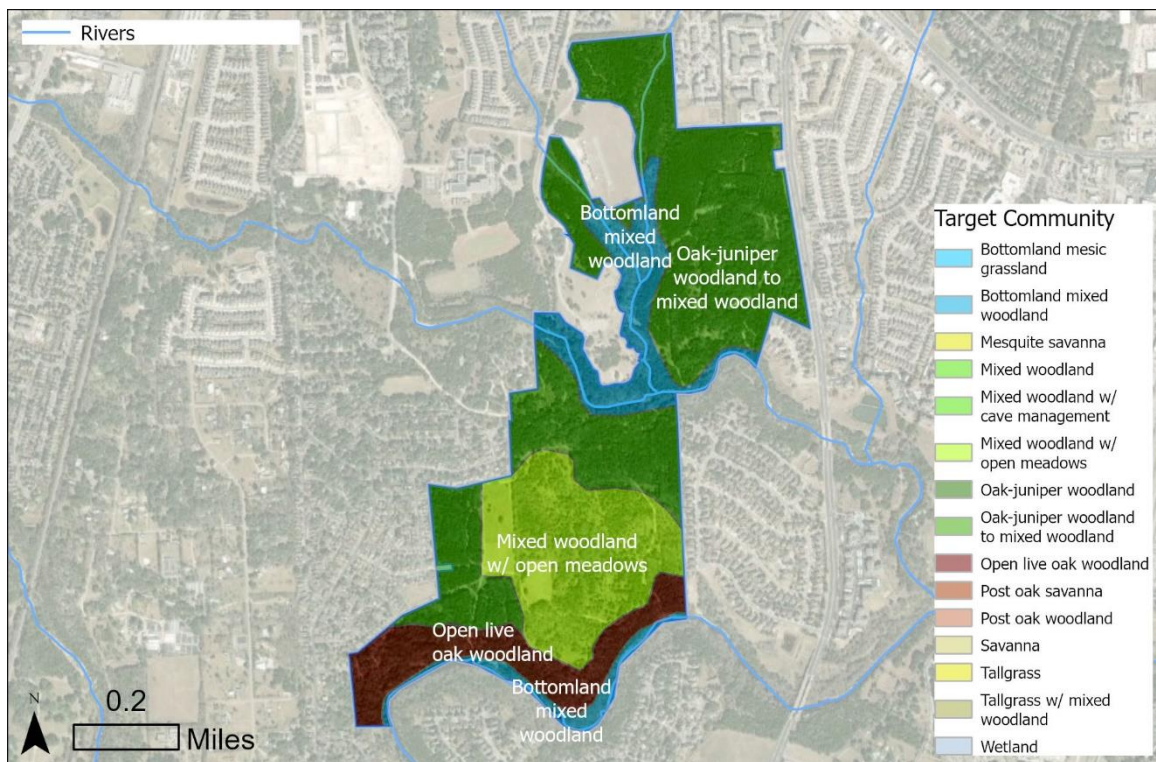


Figure 1-29 Mary Moore Searight Metro Park Target Community

1.1.7 ONION CREEK METRO COMPLEX

Onion Creek Metro Park has a Management Plan (Project team 2015)

The unit is in an area of moderate social vulnerability.

Strengths

- Deep soils with high water availability
- Varied topographic and hydrologic conditions allows for diversity of community types
- Existing structurally and compositionally diverse riparian community 25' wide or more
- Areas of high species diversity exist
- Elm-hackberry woodlands have timber structure with well-developed herbaceous layer

Challenges

- Some upland woodlands have low diversity and upland grassland communities are heavily invaded by woody species and invasive species
- High midstory density in upland woodlands. The predominant fuel model is shrub.
- Moderate Erosion
- Converted land present with highly disturbed soil and vegetation communities

Strategies

- Invasive management
- Woodland selective thinning to create a timber structure to reduce crown fire risk, diversify age structure, reduce competition and to encourage recruitment of wider range of species.
- Management of social trails to reduce bare soil, compaction and subsequent erosion.
- Species addition, particularly in converted land

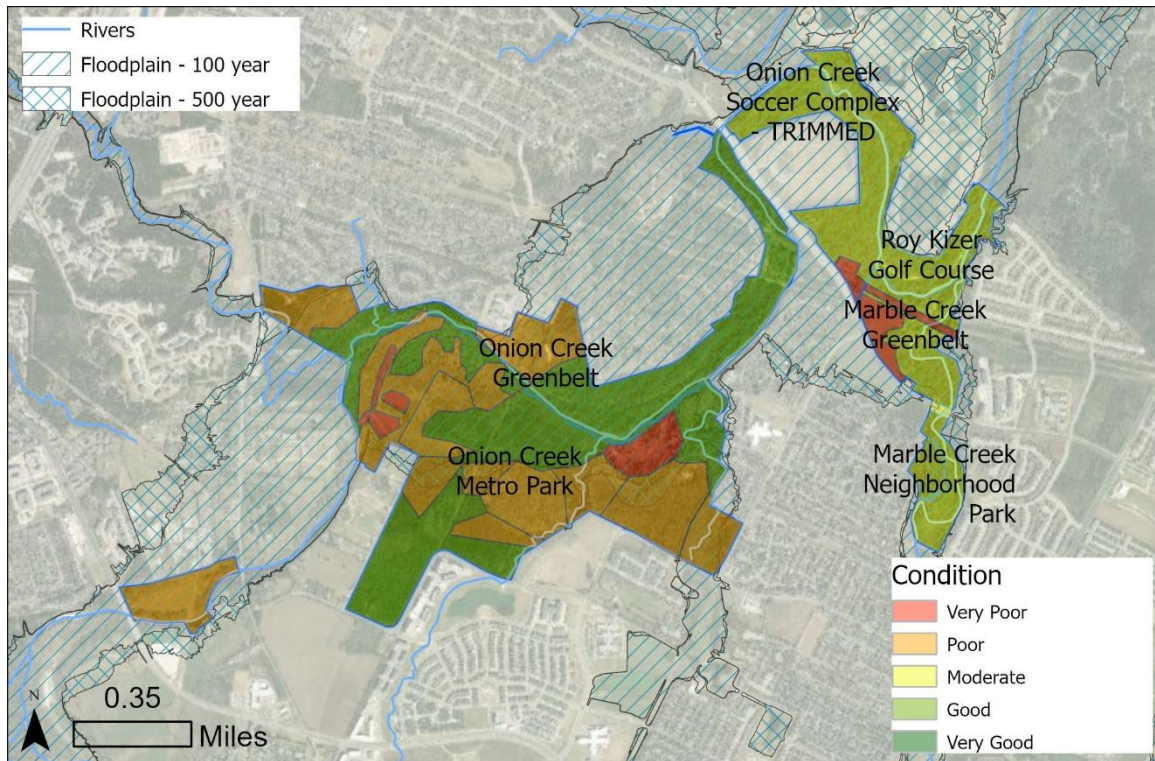


Figure 1-30 Onion Creek Metro Complex Condition

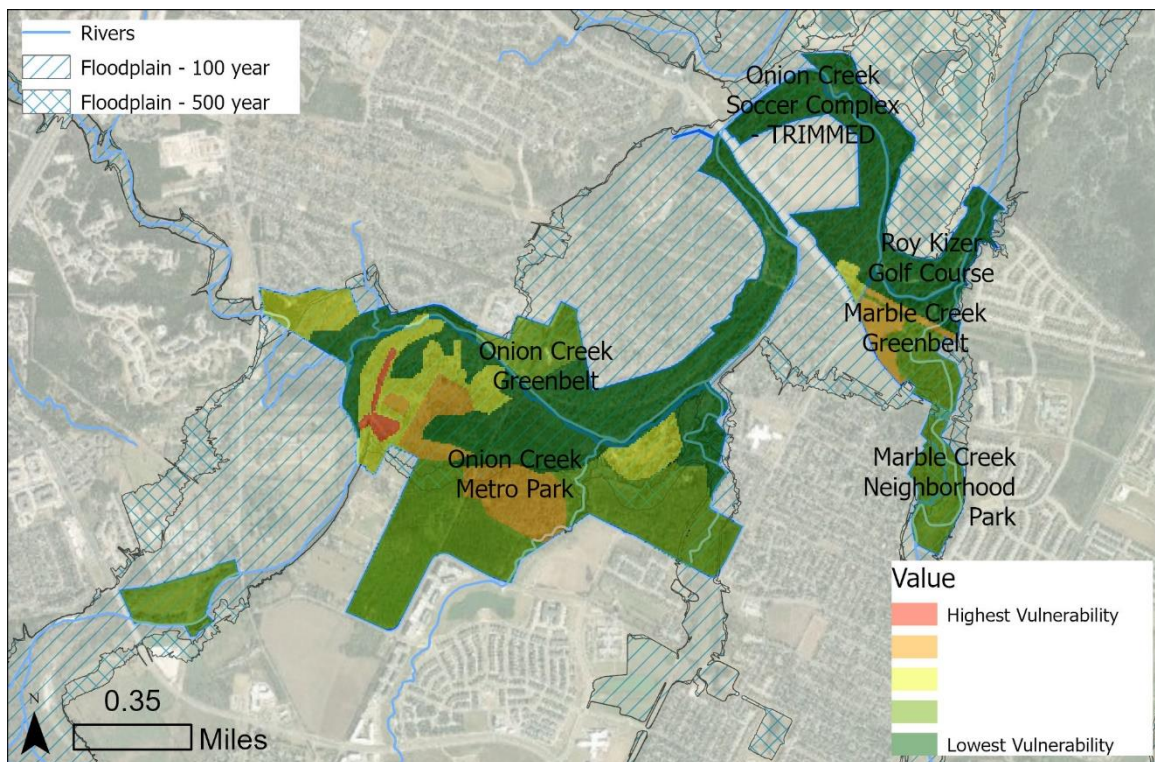


Figure 1-31 Onion Creek Metro Complex Environmental Vulnerability Index

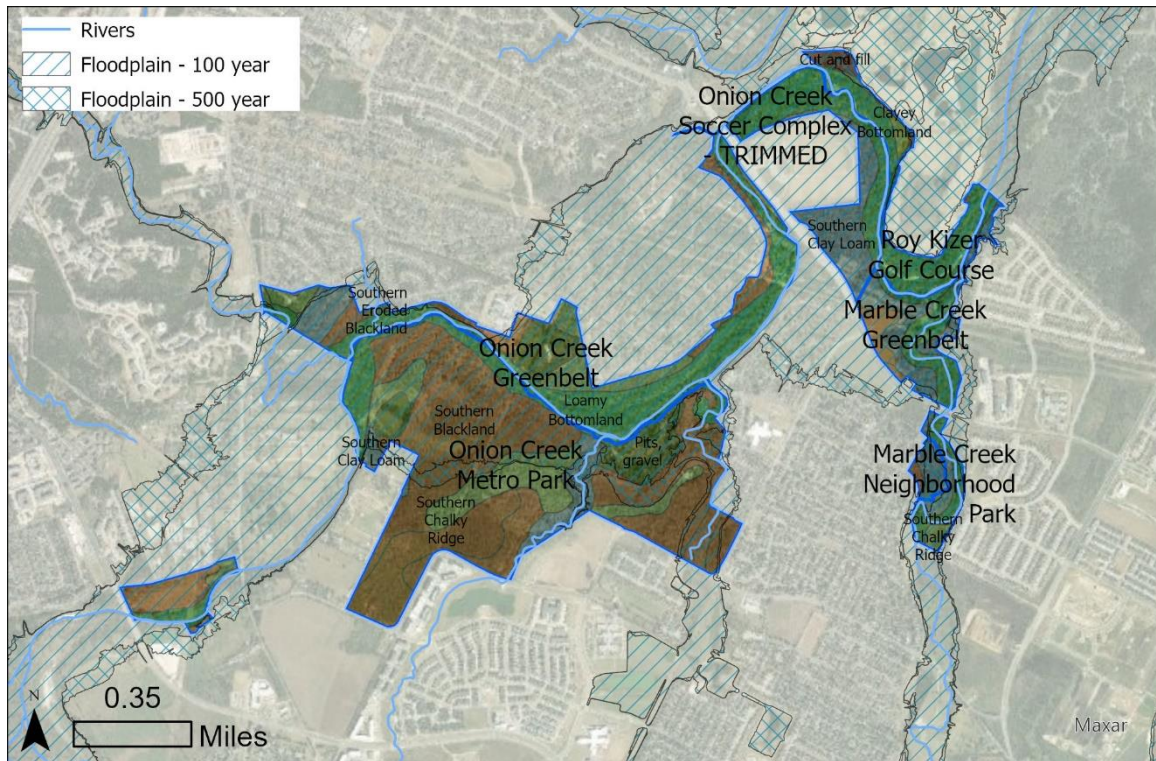


Figure 1-32 Onion Creek Metro Complex Ecological Site

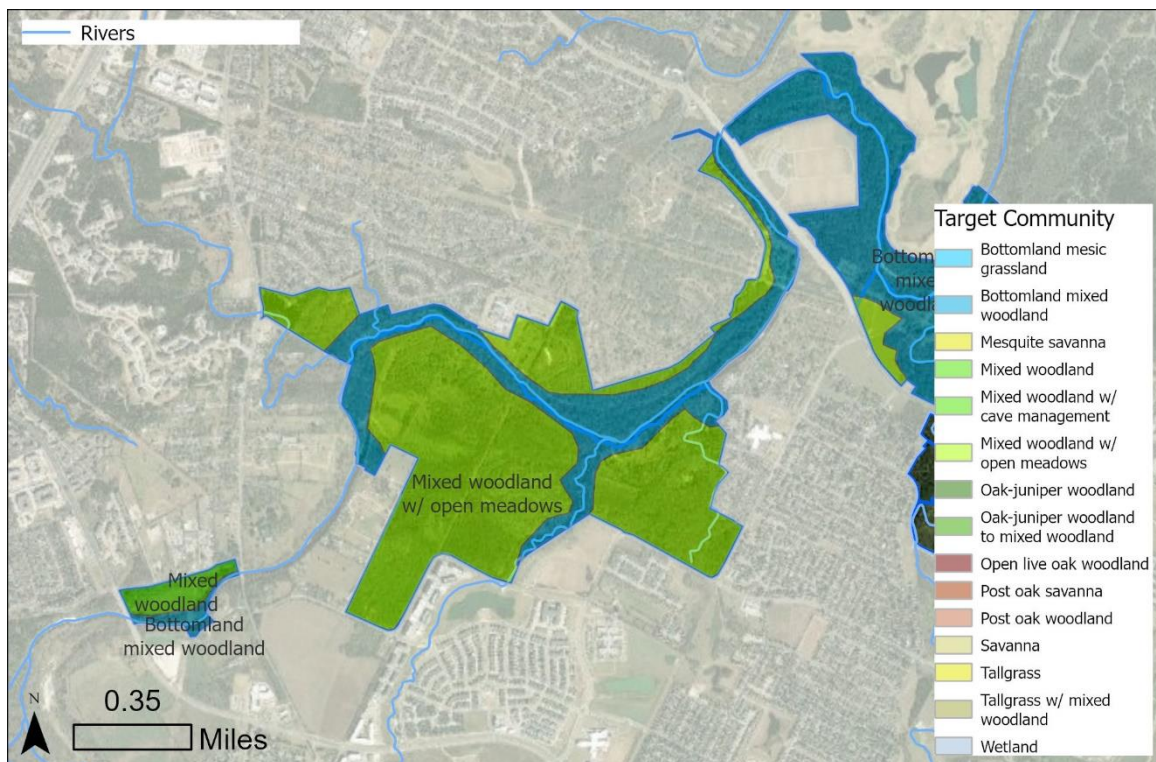


Figure 1-33 Onion Creek Metro Complex Environmental Target Community

1.1.8 ONION CREEK OLD SAN ANTONIO COMPLEX

The unit contains oak—midgrass savanna, mixed bottomland hardwood woodland riparian grassland and riparian mixed woodland communities.

The unit is located in an area of high social vulnerability.

Strengths

- Deep soils with high water availability
- Existing structurally and compositionally diverse riparian community 25' wide or more
- Moderate to high species diversity
- Limited erosion
- Open savanna structure in uplands
- Adjacent parcel is owned by the Native Prairie Association of Texas, with a COA easement, opening the possibility of land management coordination and cooperation

Challenges

- Moderate invasive species presence

Strategies

- Invasive management
- Prescribed fire to maintain savanna
- Mechanical thinning as need to supplement prescribed fire

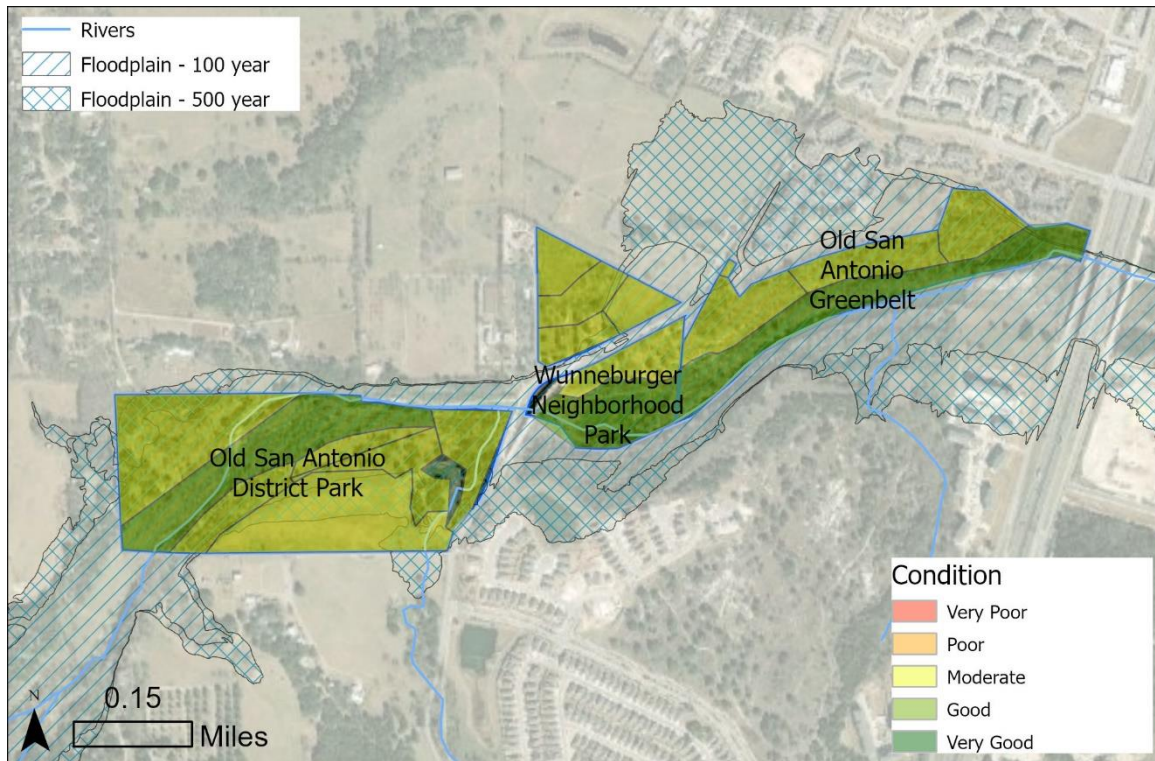


Figure 1-34 Onion Creek + Old San Antonio Complex Condition

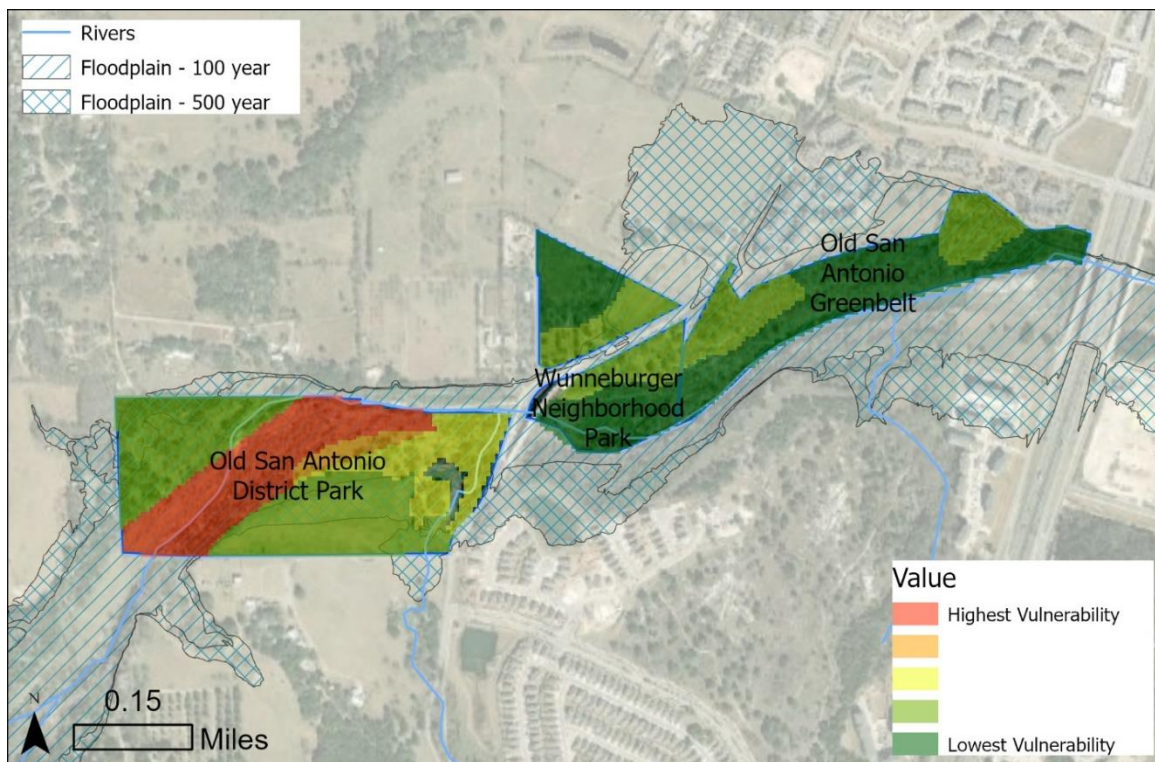


Figure 1-35 Onion Creek + Old San Antonio Complex Environmental Vulnerability Index

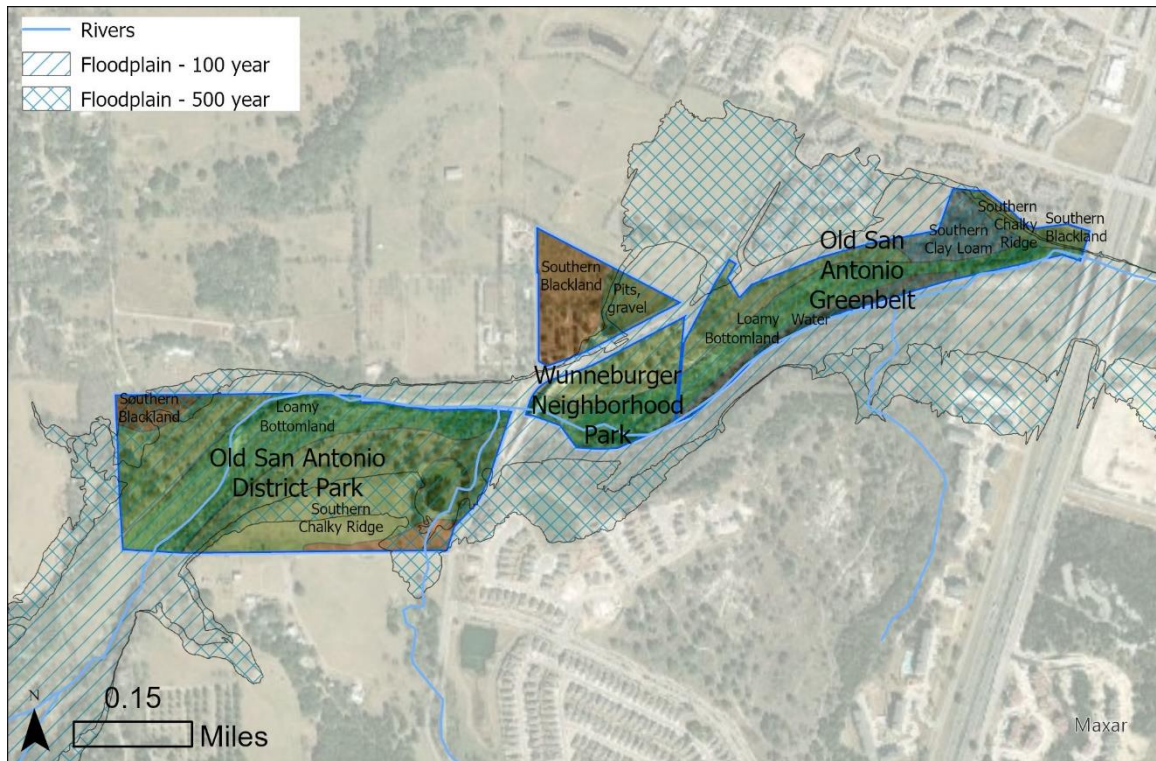


Figure 1-36 Onion Creek + Old San Antonio Complex Ecological Sites

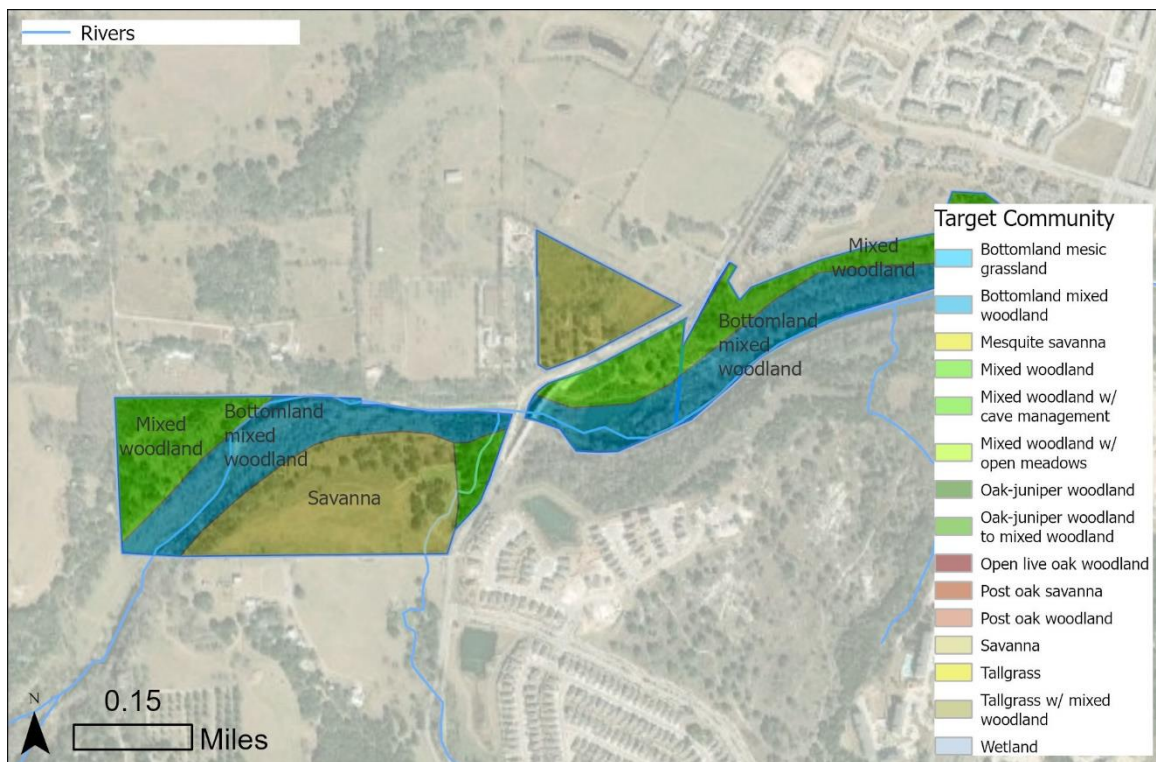


Figure 1-37 Onion Creek + Old San Antonio Complex Target Communities

1.1.9 ONION CREEK WILDLIFE SANCTUARY

Uplands are primarily mesquite-midgrass communities dominated by increasers. Bottomland communities are dominated by mature, open bottomland forest with mature pecans and well-developed herbaceous layer. Hackberry-elm woodlands have shrub structure with lower diversity. The unit has a plant community and fuel model assessment (Keith 2014f).

The unit is in an area of high social vulnerability.

Strengths

- Deep soils with high water availability
- Diverse conditions and community types
- Moderate to high species diversity including mature post oaks (*Quercus stellata*)
- Large pecan individuals
- Existing structurally and compositionally diverse riparian community at least 25' wide

Challenges

- Moderate invasive cover
- Grasslands experiencing significant woody encroachment
- Converted land
- High midstory density in upland woodlands. The predominant fuel model is shrub

Strategies

- Invasive management
- Prescribed fire in uplands with grassland potential in coordination with mechanical/chemical thinning of encroaching woody species
- Woodland selective thinning to create a timber structure to reduce crown fire risk, diversify age structure, reduce competition and to encourage recruitment of wider range of species

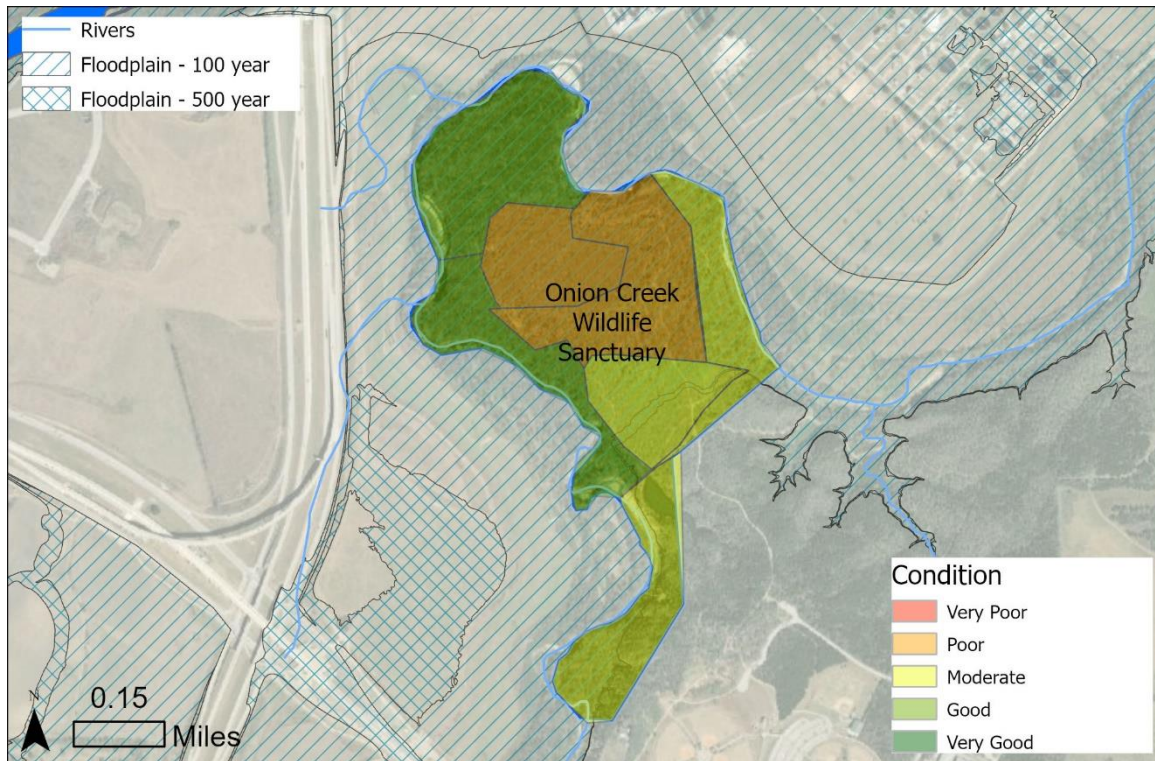


Figure 1-38 Onion Creek Wildlife Sanctuary Condition

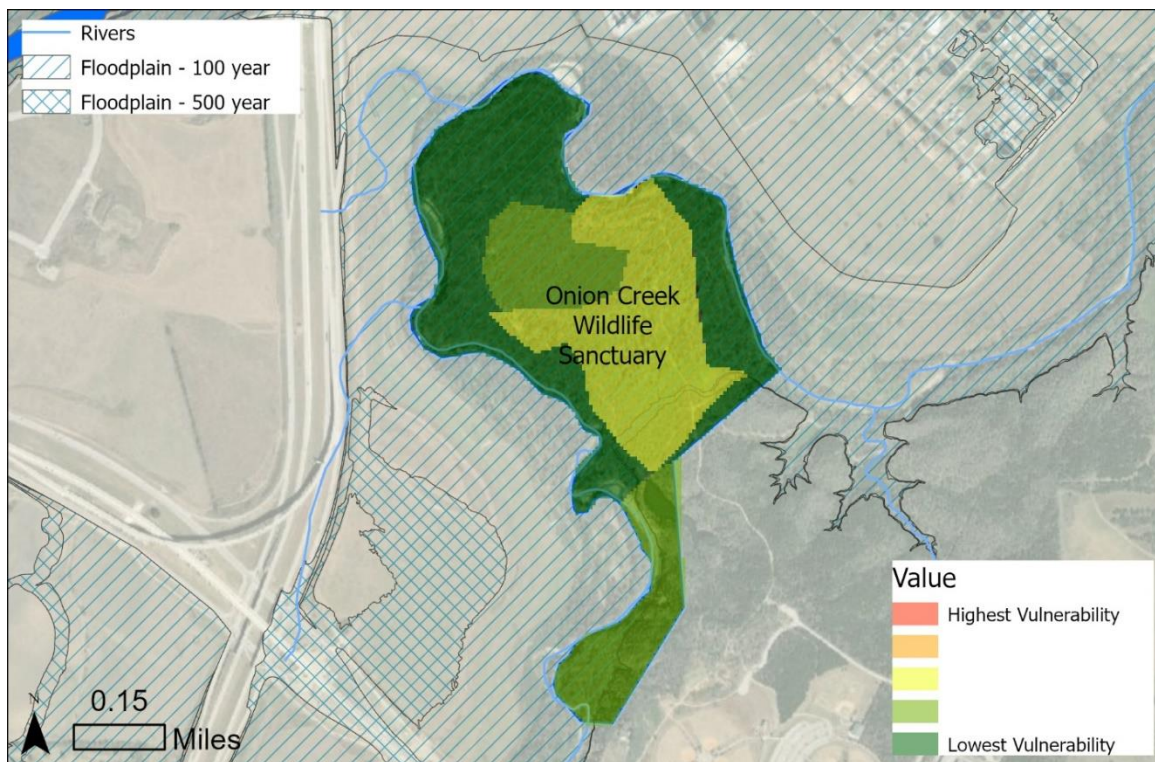


Figure 1-39 Onion Creek Wildlife Sanctuary Environmental Vulnerability Index

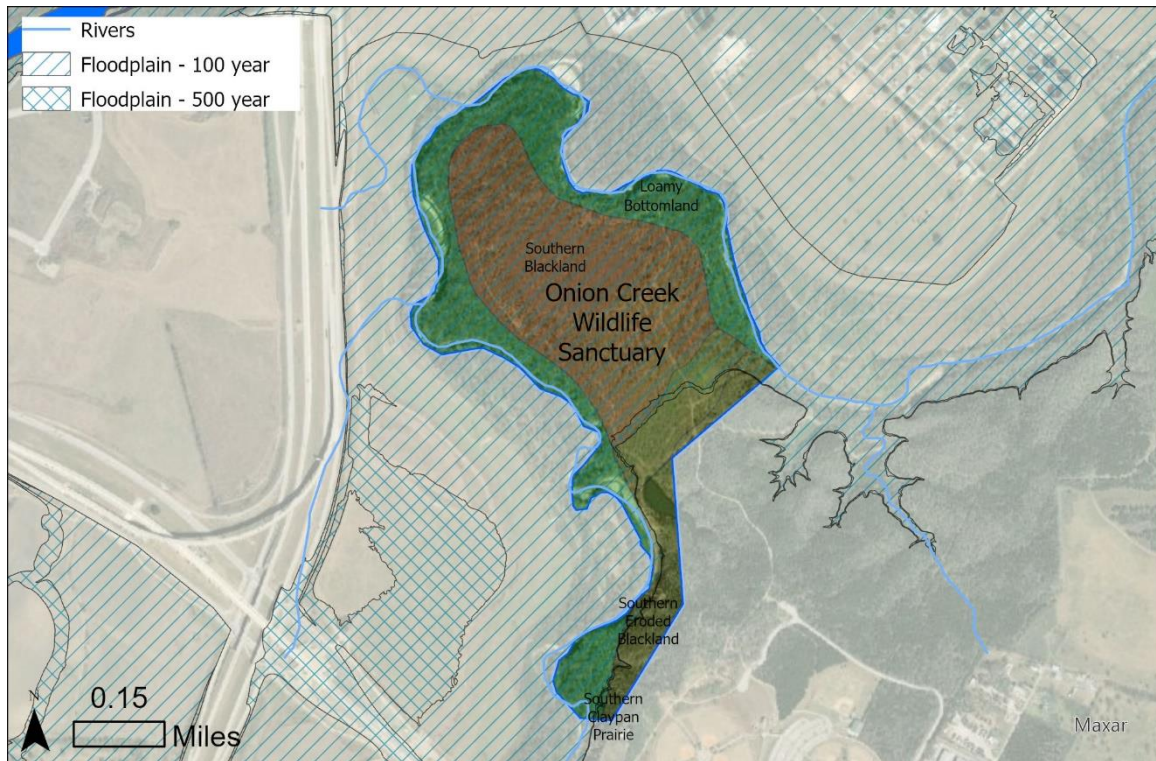


Figure 1-40 Onion Creek Wildlife Sanctuary Ecological Sites

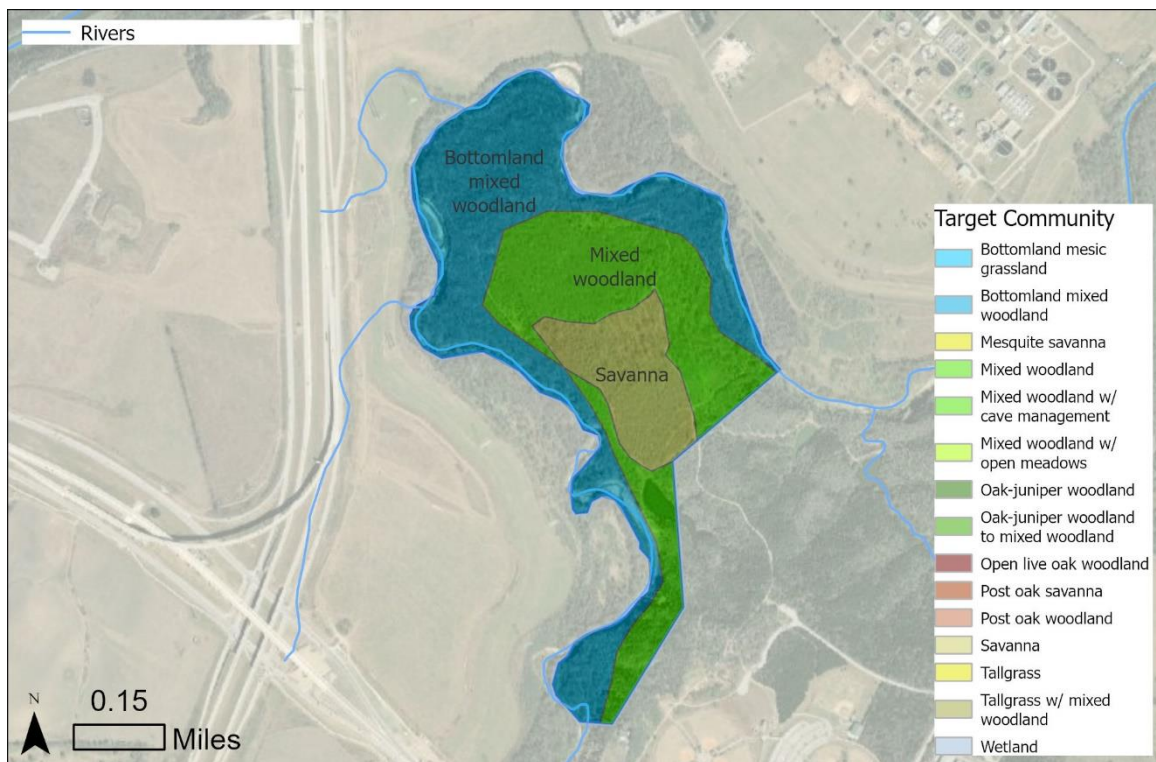


Figure 1-41 Onion Creek Wildlife Sanctuary Target Communities

1.1.10 SOUTHERN WALNUT CREEK GREENBELT

Uplands are dominated by oak-juniper woodlands while bottomland areas contain mixed bottomland hardwood communities. The unit is in an area of high social vulnerability.

Strengths

- Deep soils with high water availability
- Some woodlands exhibit timber structure, though most are classified with the fuel model shrub
- Woodland canopy is diverse
- Native overstory species include live oak, Texas red oak, elm, hackberry and pecan. Virginia wildrye is dominant in the understory.
- Structurally diverse riparian community present, at least 25' wide
- Austin Fire Department has planned prescribed burns adjacent to this unit, opening the possibility of cooperation.

Challenges

- Grassland area dominated by invasive species including King ranch bluestem, bermudagrass, and Johnsongrass
- Significant overall invasive species cover including ligustrum and nandina
- Moderate erosion
- Trail revegetation efforts appear to have introduced the invasive Willman lovegrass (*Eragrosis lehmanniana*)
- Converted land

Strategies

- Invasive management
- Woodland selective thinning to create a timber structure in order to reduce crown fire risk, diversify age structure, reduce competition and to encourage recruitment of wider range of species.
- Species addition, particularly in converted lands and riparian communities. Support conversion of converted lands to bottomland hardwood forest. Increase the diversity of woody and herbaceous stabilizer species in riparian areas and include facultative species in species addition mixes.

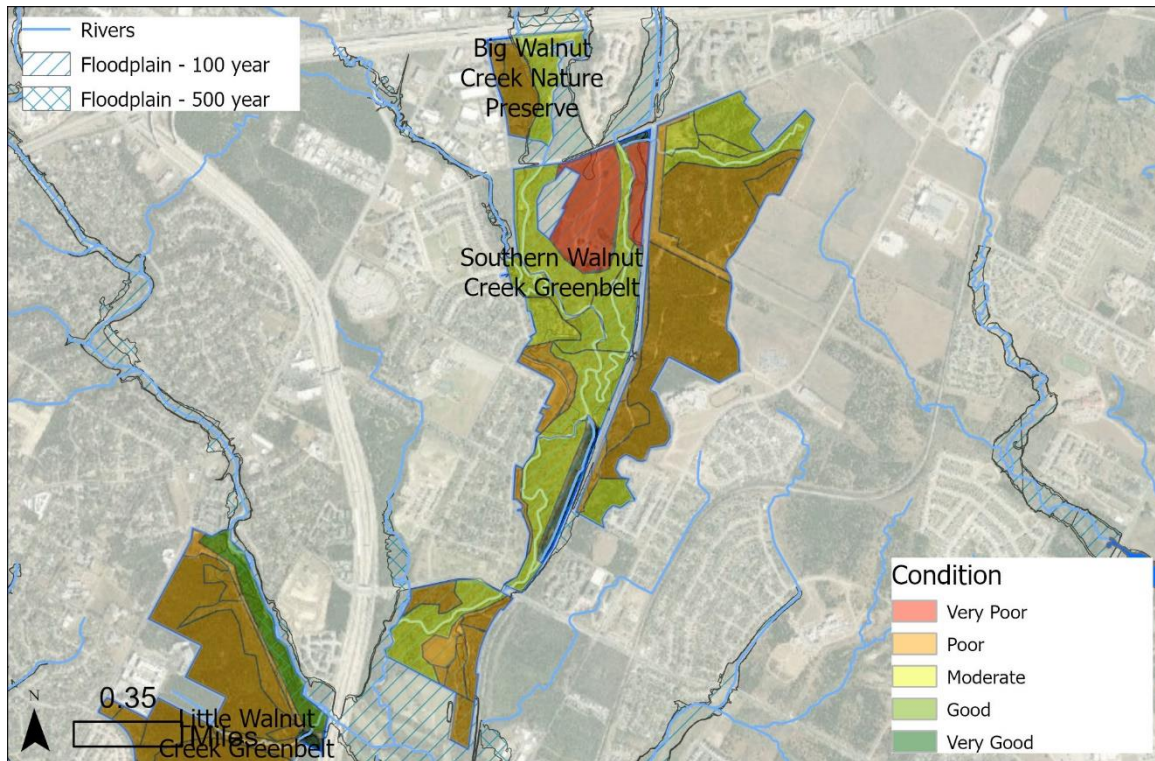


Figure 1-42 Southern Walnut Creek Greenbelt Condition

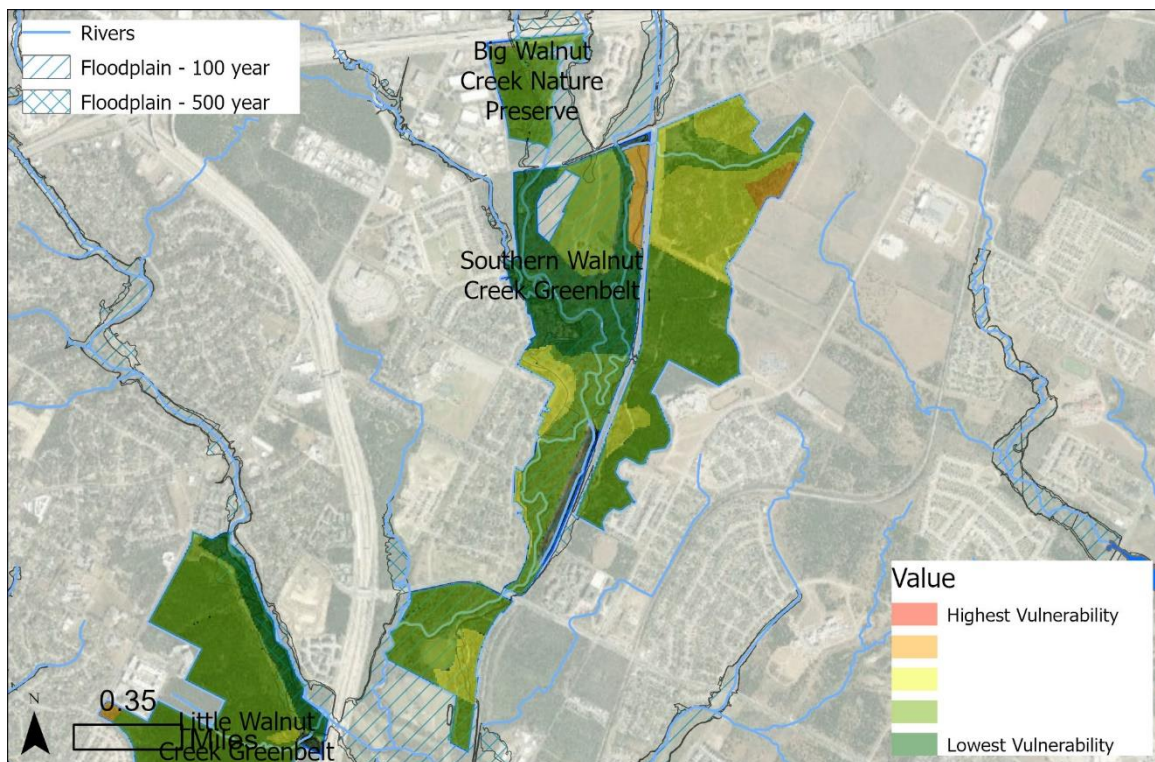


Figure 1-43 Southern Walnut Creek Greenbelt Environmental Vulnerability Index

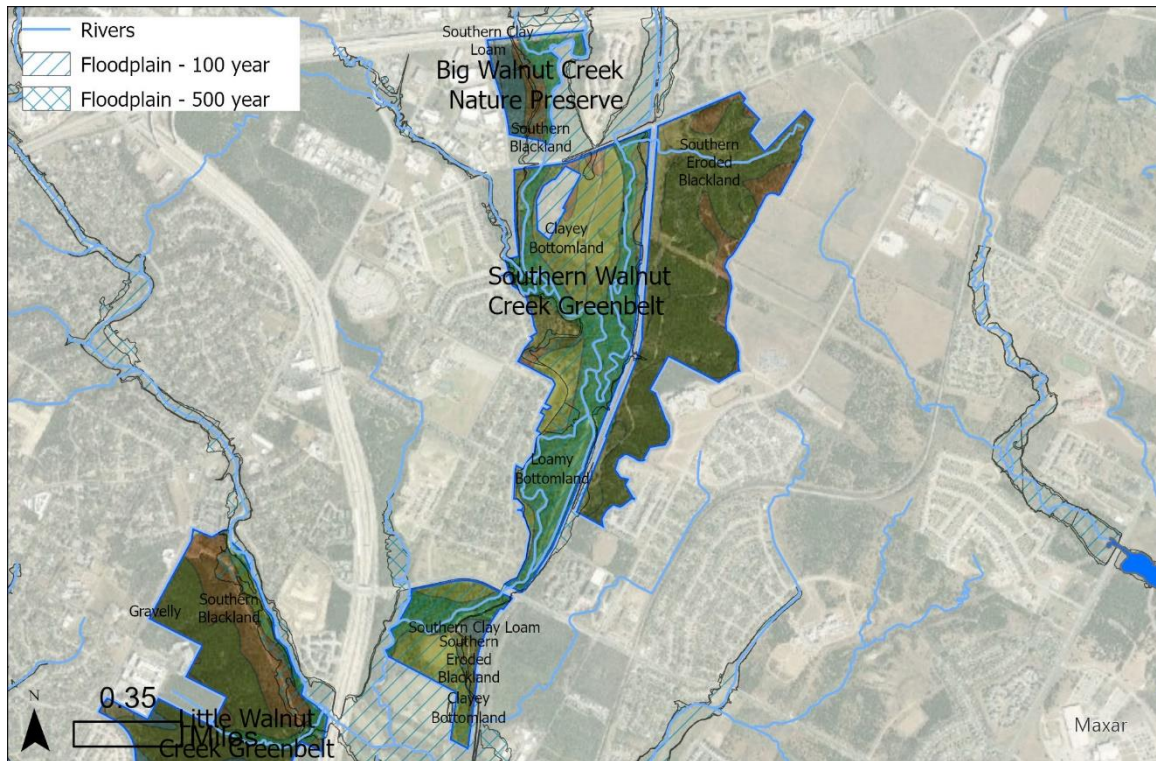


Figure 1-44 Southern Walnut Creek Greenbelt Ecological Sites

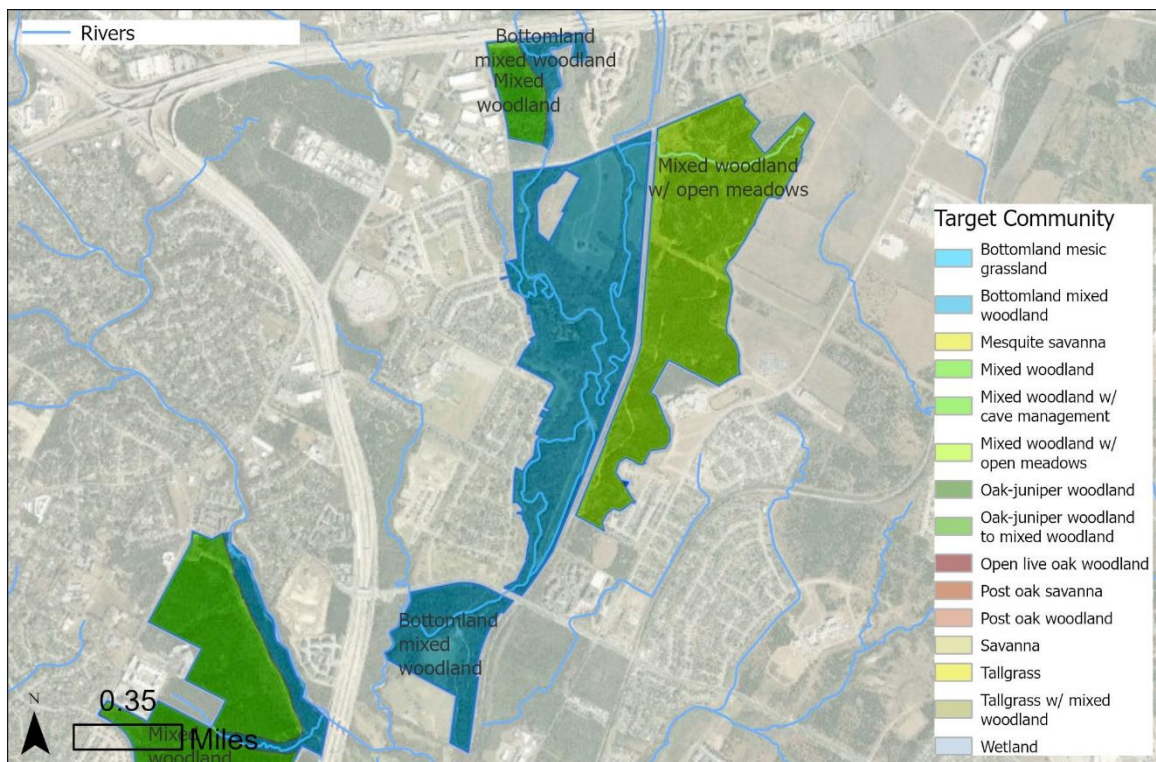


Figure 1-45 Southern Walnut Creek Greenbelt Target Communities

1.1.11 TREVINO + WALNUT COMPLEX

The Trevino + Walnut Complex has an existing master plan that included natural area management recommendations that will be incorporated here (Nichol 2020). The complex is in primarily moderate to poor condition bottomland woodland with high cover of invasive species, poor soil condition and very low diversity. However, its position along the Colorado River in a bottomland area provides an opportunity to improve wildlife corridors, provide refugia, as well as slowing and cleaning water.

The unit is in an area of high social vulnerability.

Strengths

- Most of the complex is located in areas with high water availability, simplifying species addition
- Bottomland communities have open structure with well-developed herbaceous layer
- Bird habitat – high use during site visit
- Low risk of crown fire

Challenges

- The complex will continue to experience significant flooding pressure
- The complex is heavily invaded by invasive species, and open areas are dominated by them. Species of concern include: golden bamboo (*Phyllostachys aurea*), Chinaberry, Chinese tallow, bermudagrass, King Ranch bluestem, Malta star thistle (*Centaurea melitensis*), ligustrum, Japanese honeysuckle, bastard cabbage (*Rapistrum rugosum*), and giant cane. Overall diversity is low to very low. Several old field areas with former agricultural use exist at the center of the park with heavily altered soils and vegetation.
- Feral hogs
- High presence of human generated garbage
- Moderate to severe erosion is present in the riparian and bottomland areas
- Converted land dominated by invasive species, primarily bermudagrass
- Travis State jail is adjacent and may complicate management access

Strategies

- Invasive management in all communities
- Address soil erosion
- Species addition, particularly in converted lands and riparian communities. Support conversion of converted lands to bottomland hardwood forest. Increase the diversity of woody and herbaceous stabilizer species in riparian areas and include facultative species in species addition mixes.
- Upland woodland understory selective thinning to create a timber structure
- Maintain or develop vegetated riparian buffer of to the 25-year floodplain or beyond
- Increase the structural and compositional diversity of bottomland areas to better withstand flooding
- Diversify woodland age class structure.
- The site can enhance existing wildlife corridors and habitat because of its position on the Colorado river.

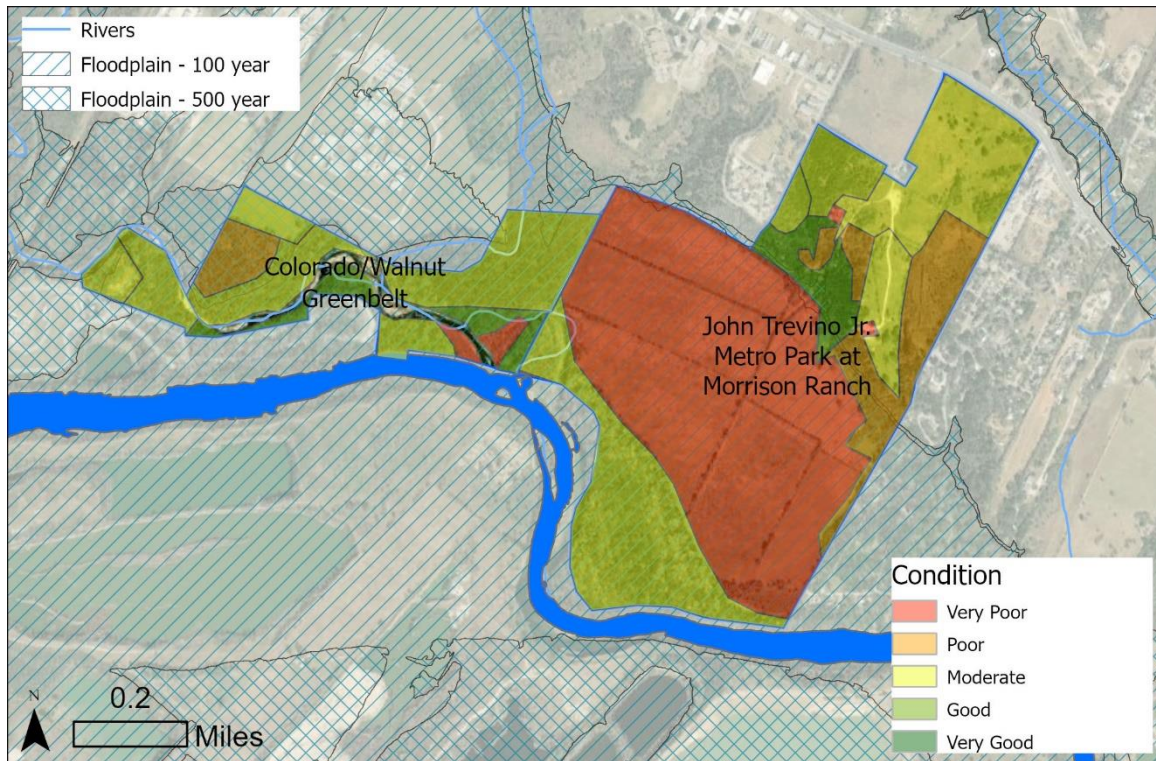


Figure 1-46 Trevino + Walnut Complex Condition

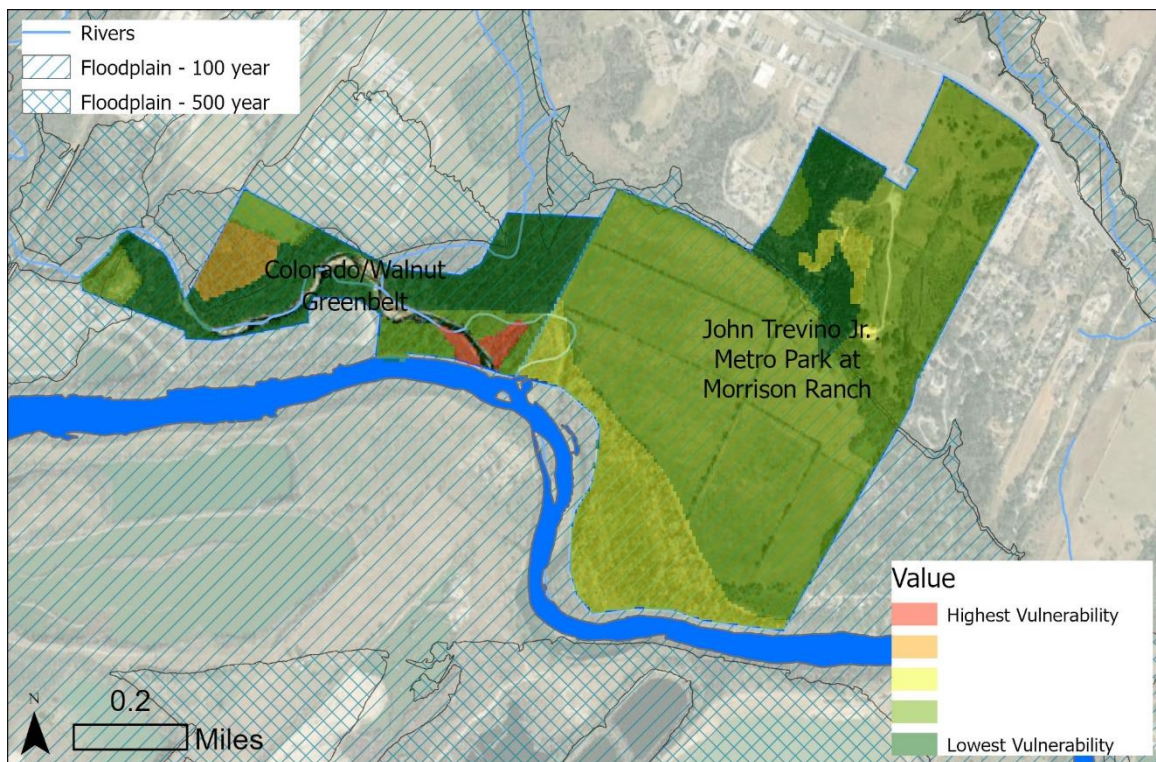


Figure 1-47 Trevino + Walnut Complex Environmental Vulnerability Index

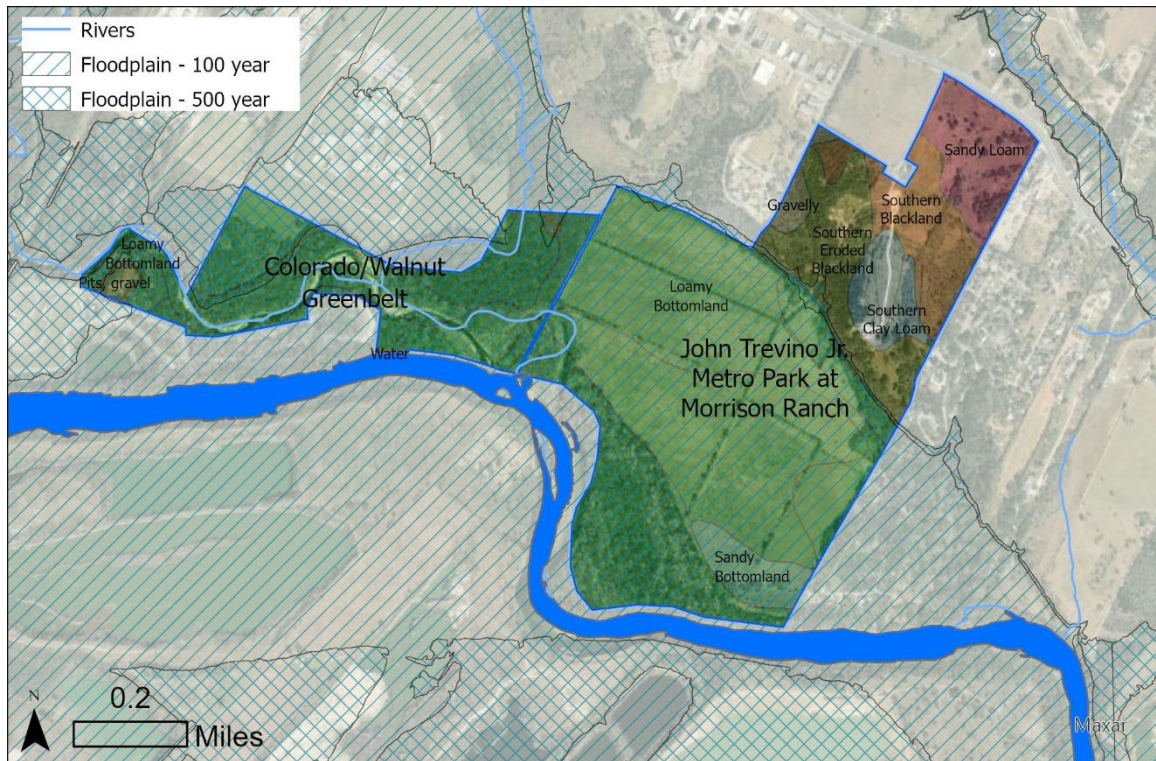


Figure 1-48 Trevino + Walnut Complex Ecological Sites

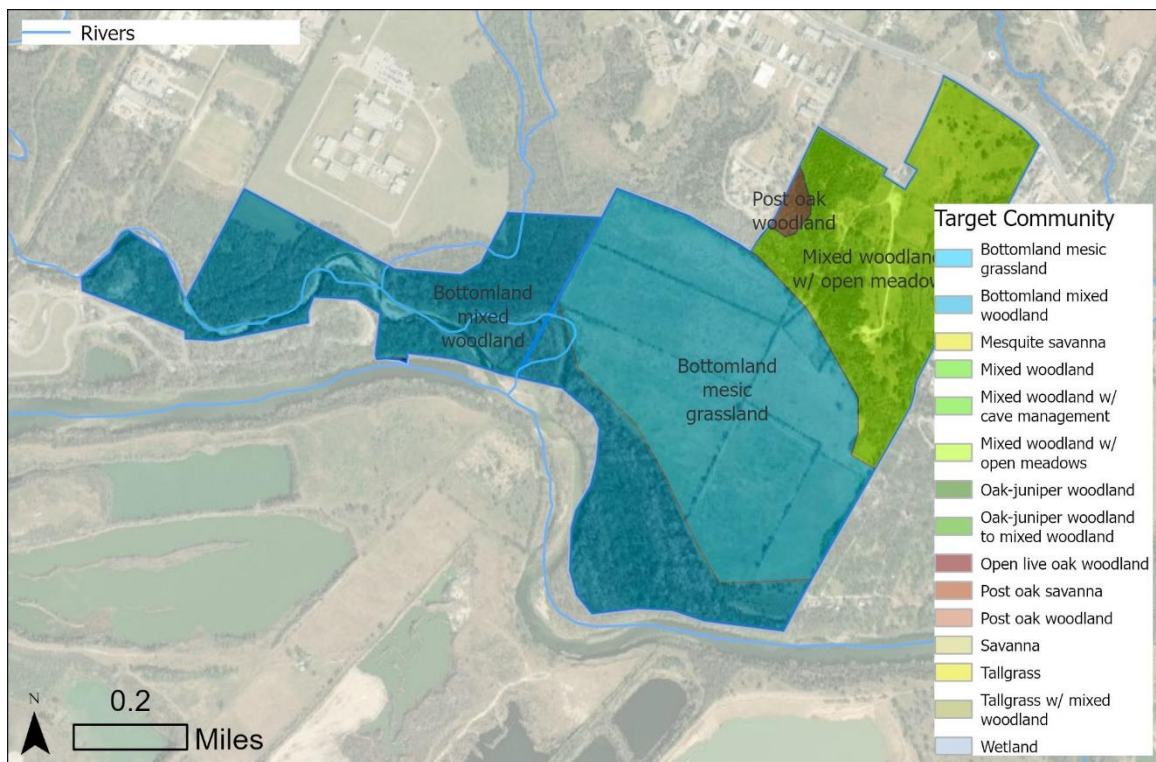


Figure 1-49 Trevino + Walnut Complex Target Communities

1.1.12 WALNUT CREEK METRO PARK

The unit is in an area of high social vulnerability. The northern half of the unit is part of the BCP.

Strengths

- Variable conditions allowing a variety of community types. Pockets with high diversity exist with high proportion of species from historic climax community.
- Variable species diversity. Moderate in some areas, very low in others. Upland overstory dominants are Ashe juniper and plateau live oak, though Texas red oak and shin oak (*Quercus sinuata*) are present.
- Decreaser grasses include little bluestem and increasers include wintergrass (*Nassella leucotricha*) and silver bluestem (*Bothriochloa laguroides*). Elm species, pecan and hackberry are dominant in bottomland areas.
- Structurally diverse riparian community present, at least 25' wide. Stabilizer species such as switchgrass present. The colonizer green ash (*Acer negundo*) is present.

Challenges

- Moderate to high invasive species cover including ligustrum, Tree of Heaven (*Ailanthus altissima*), nandina, chinaberry, Johnsongrass, King Ranch bluestem
- Widespread moderate erosion
- High midstory density in upland oak-juniper woodlands. The predominant fuel model is shrub

Strategies

- Invasive management
- Woodland selective thinning to create a timber structure in order to reduce wildfire intensity and crown fire risk, diversify age structure, reduce competition, and encourage recruitment of a wider range of species
- Maintain vegetated riparian buffer at least as wide as the 25-year floodplain

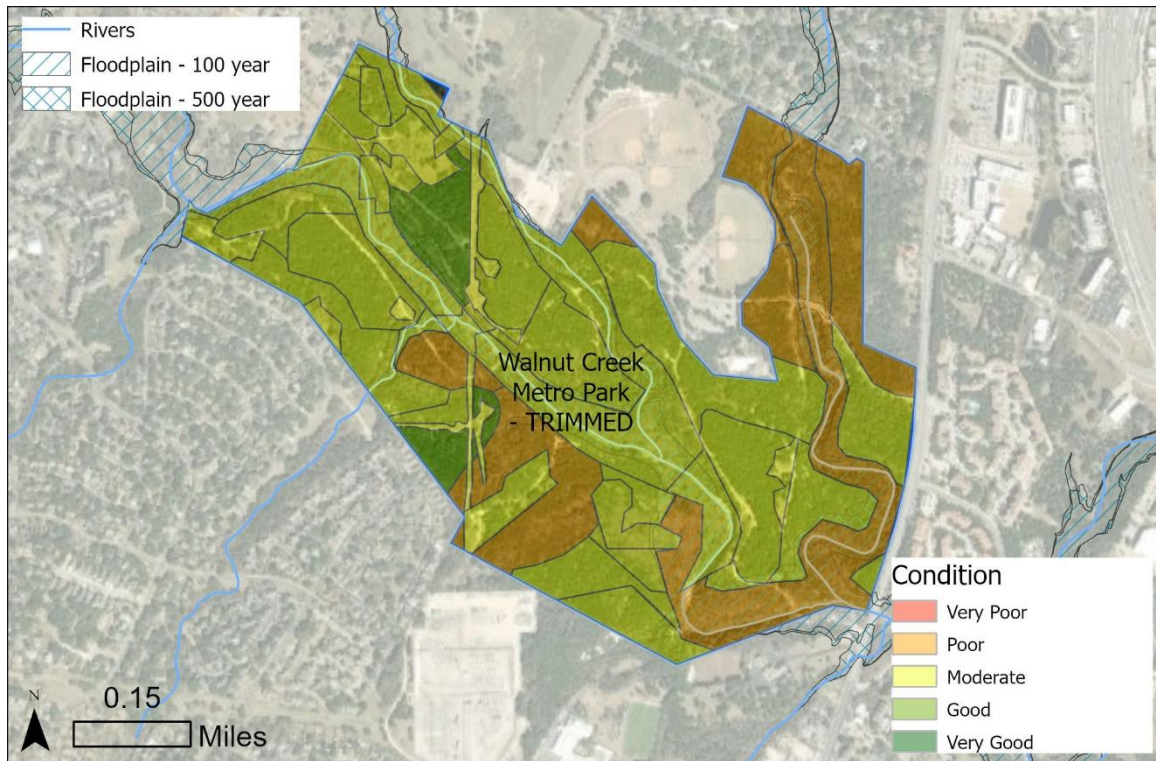


Figure 1-50 Walnut Creek Metro Park Condition

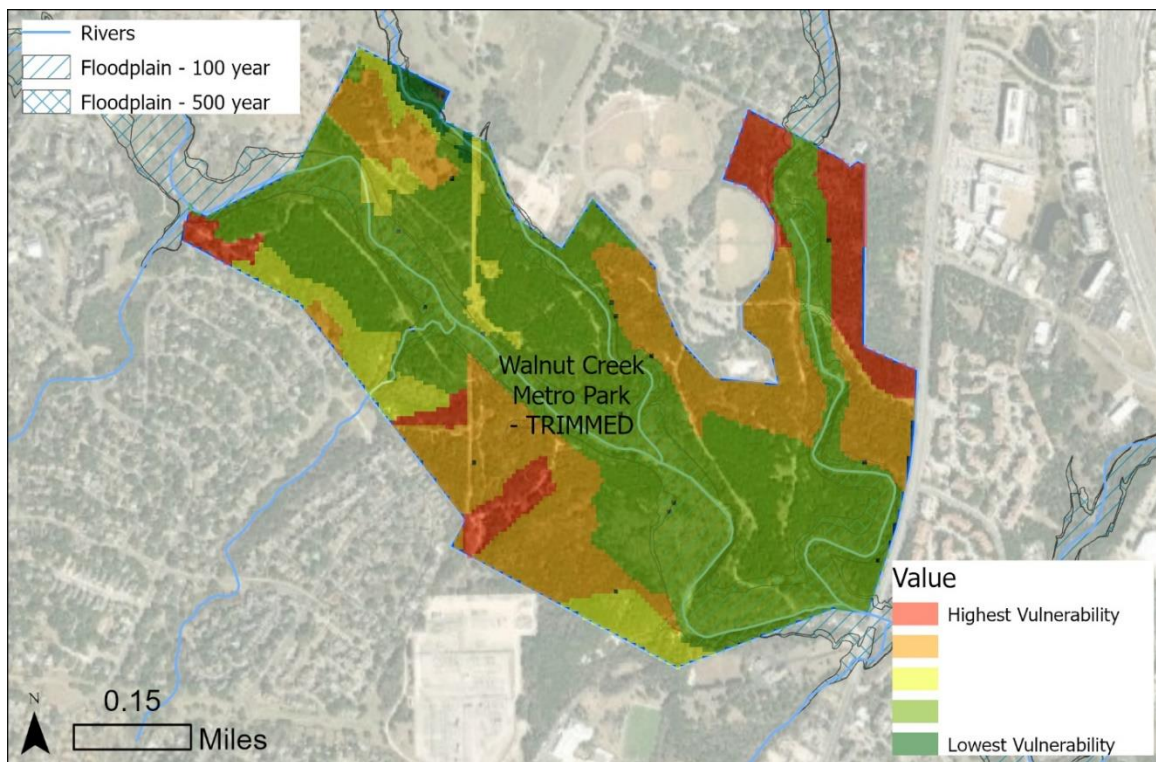


Figure 1-51 Walnut Creek Metro Park Environmental Vulnerability Index

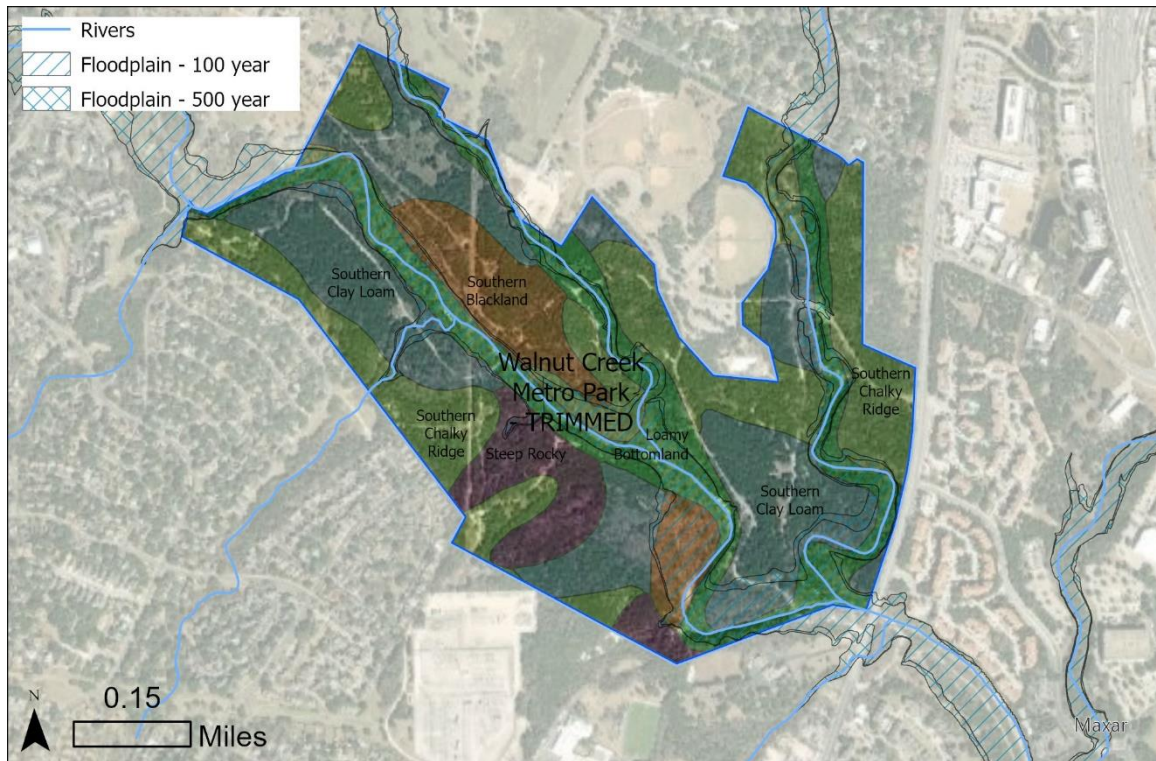


Figure 1-52 Walnut Creek Metro Park Ecological Sites

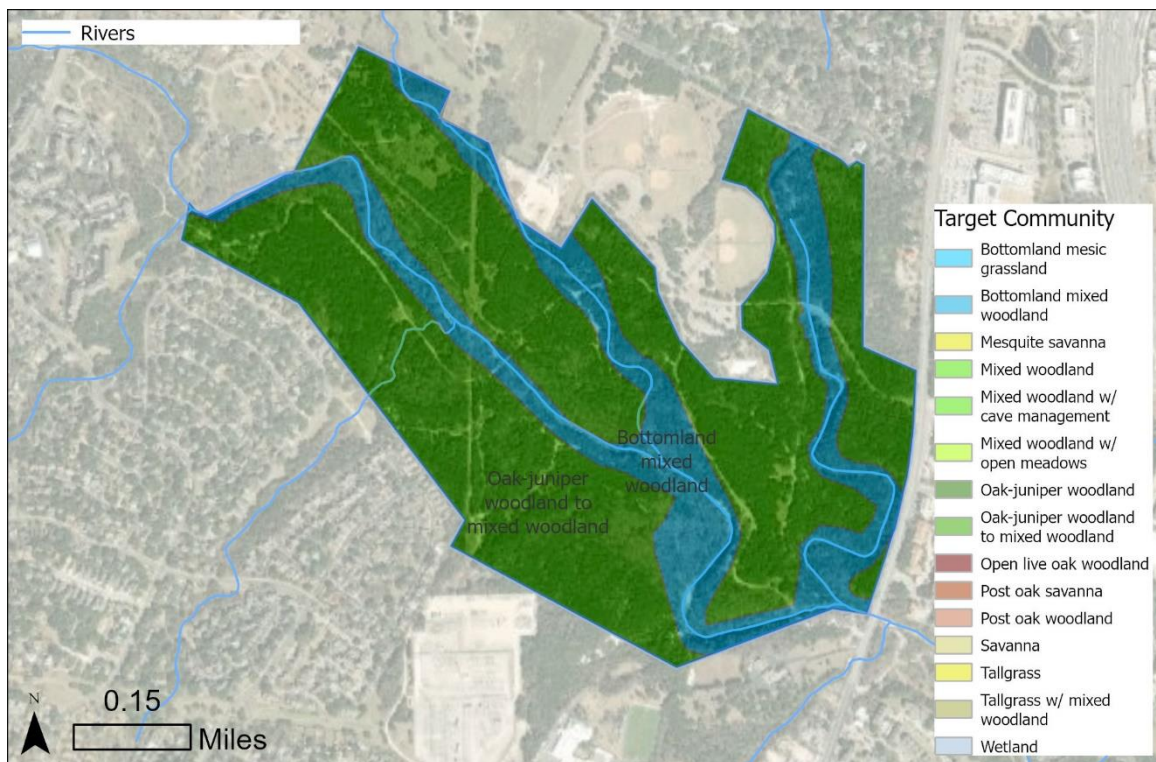


Figure 1-53 Walnut Creek Metro Park Target Communities

1.2 EDWARDS PLATEAU

The parks in this plan are in the Balcones Canyonlands subregion of the Edwards Plateau Ecoregion. Many have karst geology and are part of the Edwards and Trinity Aquifer recharge zones. This portion of the park system has the most varied topography and soil depth. Several of the parks are part of the Balcones Canyonlands Preserve.

1.2.1 BARROW NATURE PRESERVE

The Barrow Nature Preserve has 2014 plant community and fuel model assessment (Keith 2014a). The unit is part of the Balcones Canyonlands Preserve.

The unit is in an area of low social vulnerability.

Strengths

- Varied topographic and hydrologic conditions allow for a diversity of community types including Ashe juniper—Texas red oak woodland, Ashe juniper—plateau live oak woodland, hackberry—elm woodland and a wet cliff community (Keith 2014a).
- Limited erosion
- High vegetative cover
- Structurally diverse riparian community present, at least 25' wide
- Woodland age diversity
- Native woody species documented include live oak, Nuttall oak (*Quercus texana*) Ashe juniper, hackberry, elm species, shin oak, and pecan. Inland seaots is common in woodlands.

Challenges

- High woodland density with fuel model type – shrub.
- Moderate to low diversity in oak-juniper woodlands
- Significant invasive species cover. In some areas, the midstory is dominated by invasive species such as nandina, ligustrum species, and Chinese parasol tree (*Firmiana simplex*).

Strategies

- Woodland selective thinning to create a timber structure in order to reduce crown fire risk, diversify age structure, reduce competition and to encourage recruitment of wider range of species. Keith (2014) recommends the following fuel models:
 - TL2 – woodlands and forests with timber litter the common carrier of fire. Wildfires in this fuel model tend to be low intensity unless very dry.
 - TU1 – Juniper and hardwood leaf litter and a dense herbaceous layer are the carriers of fire.
 - These fuel models would develop in mature forests and woodland and create conditions where potential wildfires would be very low in intensity.
- Invasive management

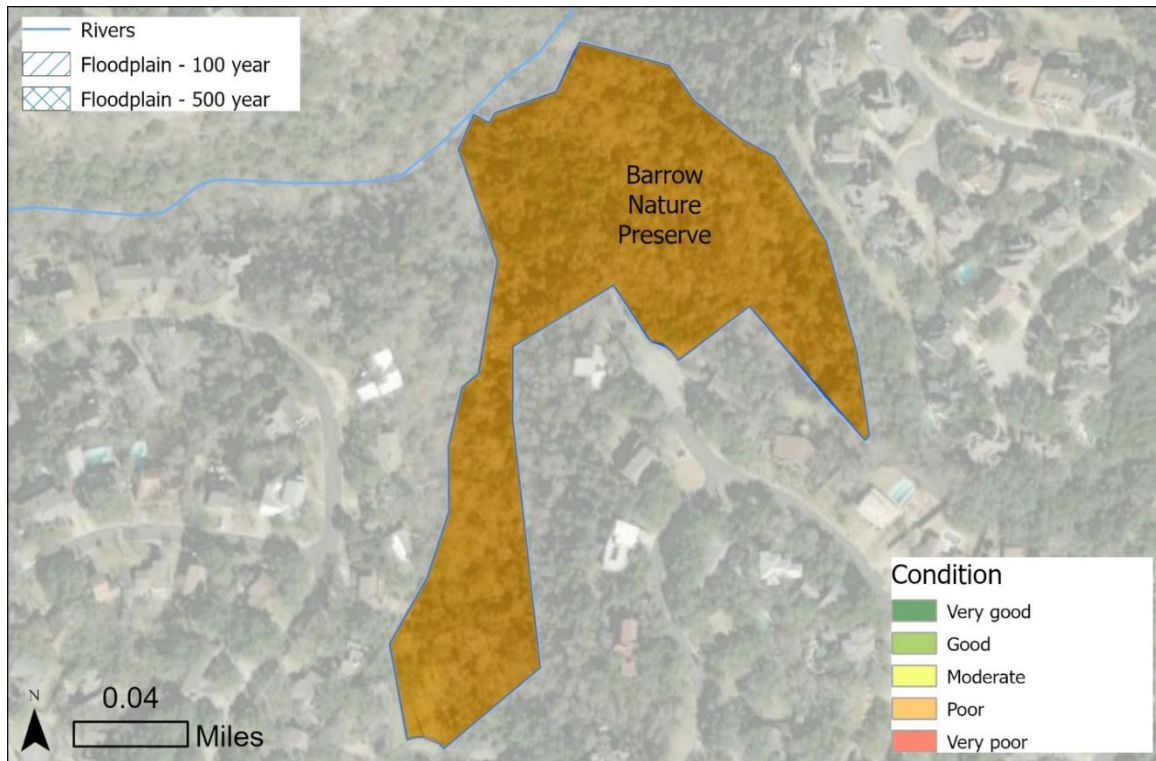


Figure 1-54 Barrow Nature Preserve Condition

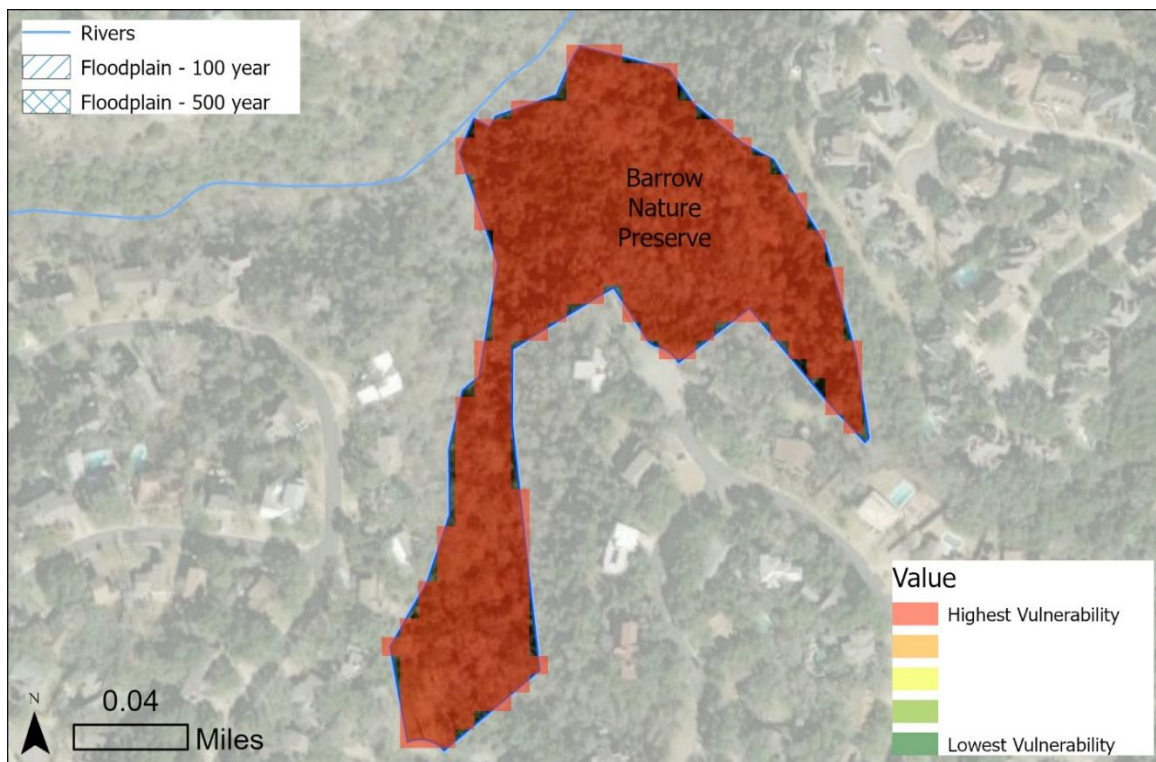


Figure 1-55 Barrow Nature Preserve Environmental Vulnerability Index

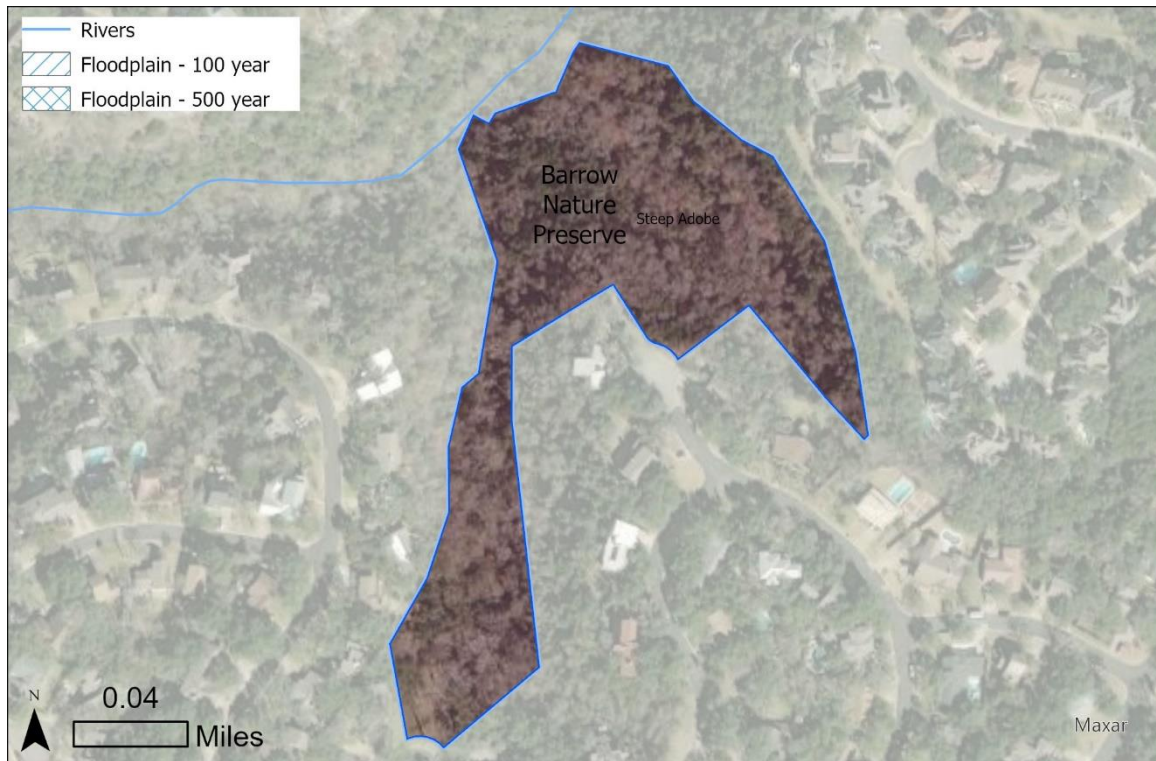


Figure 1-56 Barrow Nature Preserve Ecological Sites

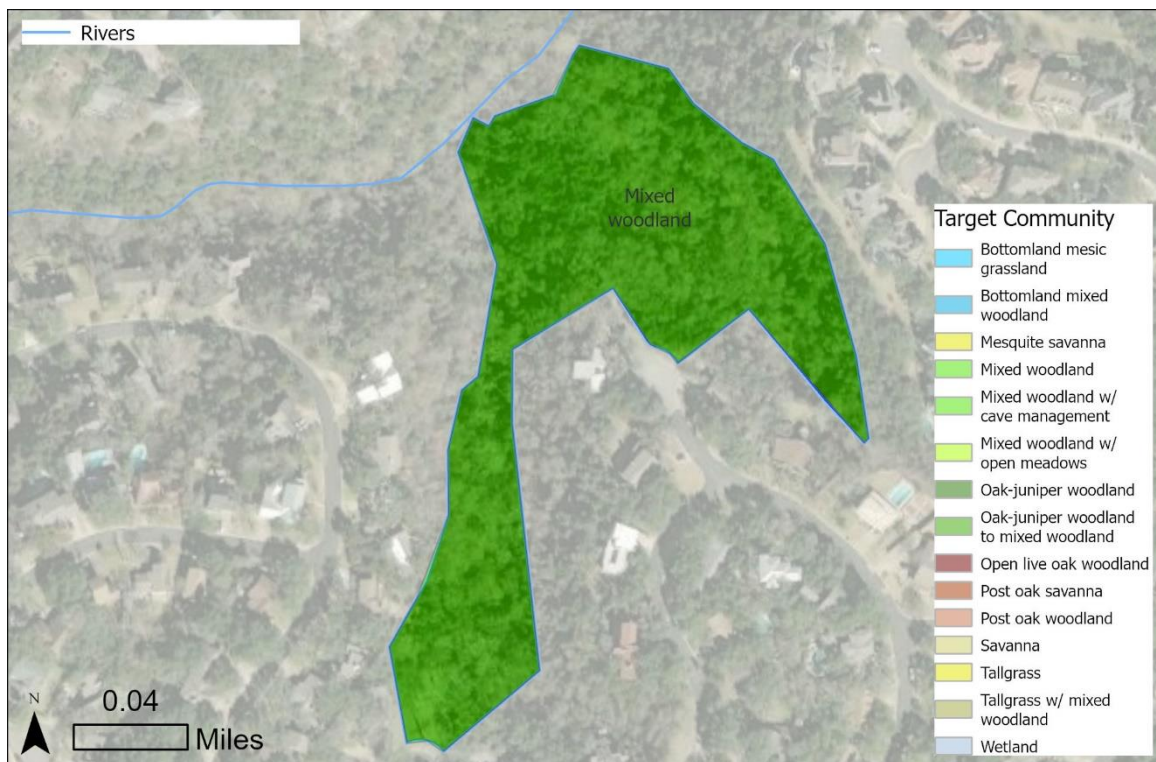


Figure 1-57 Barrow Nature Preserve Target Community

1.2.2 BARTON CREEK COMPLEX

The Barton Creek Complex is part of the BCP and protects habitat for the Golden-cheeked warbler (*Setophaga chrysoparia*), karst species, Barton Springs salamander (*Eurycea sosorum*), and the bracted twistflower (*Streptanthus bracteatus*). The vegetation communities are primarily oak-juniper woodland.

The unit is located in an area of low social vulnerability.

Strengths

- Varied topographic and hydrologic conditions allowing for diversity of community types
- Hillslope herbaceous communities found on the thin, rocky slopes of ecological sites like steep adobe contain a diverse mix of native herbaceous species can accommodate changing conditions including high heat, frequent drought, and flashy precipitation patterns. These communities tend to have lower invasive species cover than communities in areas with flatter terrain, deeper soils and higher water availability.
- High vegetative cover and minimal erosion in majority of unit, though foot traffic related soil compaction and erosion exists in high traffic areas
- Diverse age classes in woodland
- Native species documented include the dominant Ashe juniper and Plateau live oak, sedge species, yucca (*Yucca* sp.), Texas red, and American elm is occasional. Hackberry – elm woodlands dominate some areas and tend to carry higher overall diversity than dense oak – juniper woodlands and include a more robust herbaceous layer
- Riparian areas are frequently narrow due to terrain, but the areas surrounding creeks are well vegetated

Challenges

- Most oak-juniper woodlands had high density with fuel model type shrub. However, some areas had timber structure
- Low species diversity in oak-juniper woodlands
- Invasive species present in some areas, particularly along waterways and in areas with deeper soil. Invasive species documented include nandina, Japanese honeysuckle and ligustrum species.
- Social trails exist along Barton Creek, in some high traffic areas reducing overall vegetative cover and increasing erosion

Strategies

- Adhere to appropriate protocols for management within potential and documented Golden-cheeked warbler habitat.
- Woodland selective thinning to create a timber structure to reduce the intensity of wildfire and crown fire risk, diversify age structure, reduce competition and to encourage recruitment of wider range of species, particularly resprouting woody species that can recover following wildfire
- Invasive management

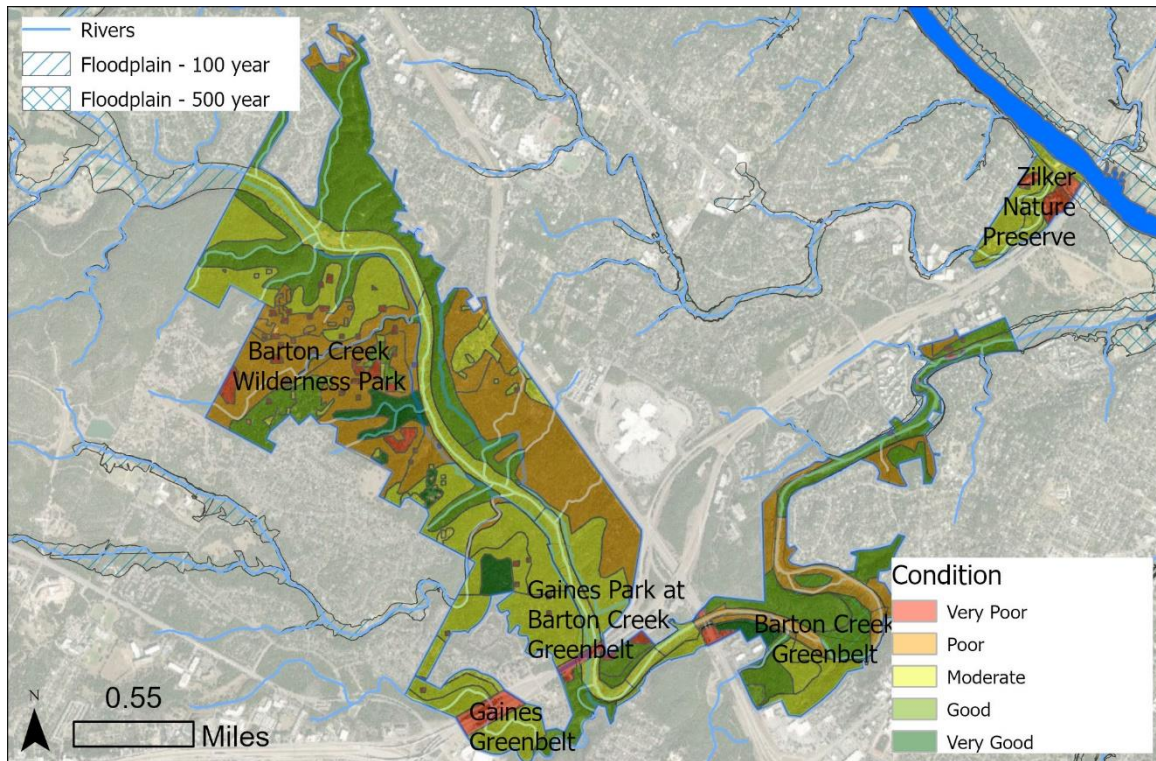


Figure 1-58 Barton Creek Complex Condition

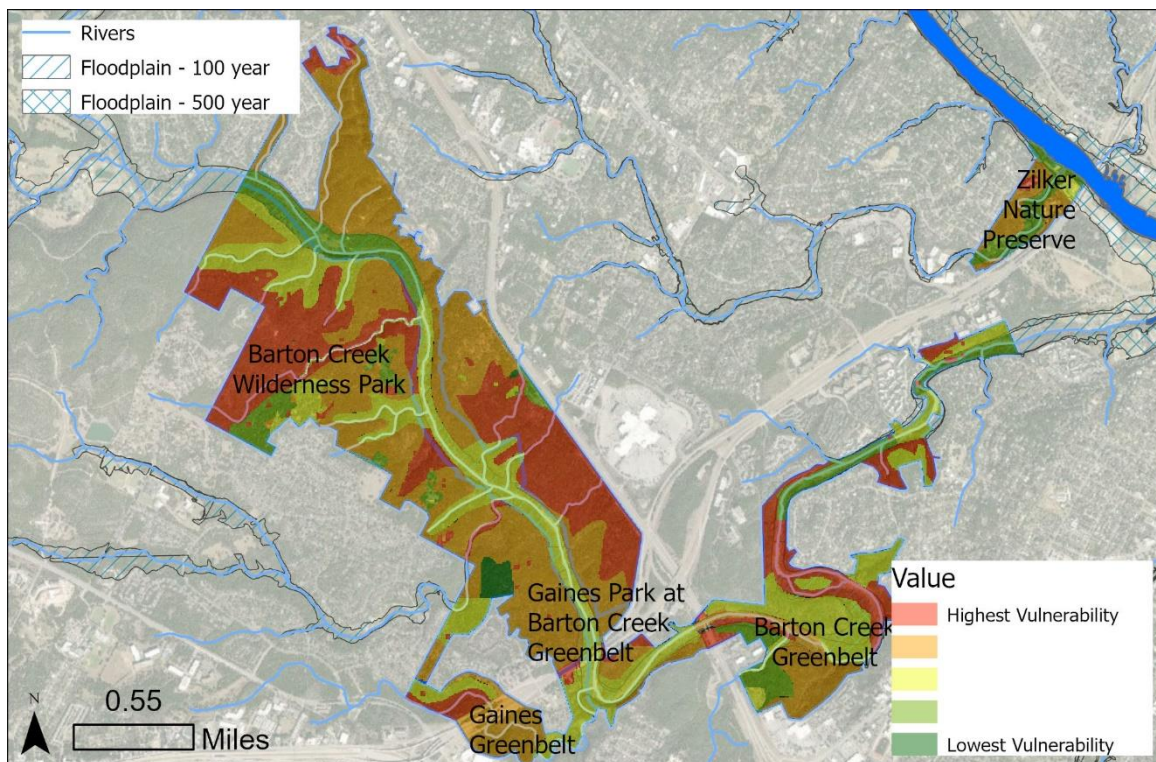


Figure 1-59 Barton Creek Complex Environmental Vulnerability Index

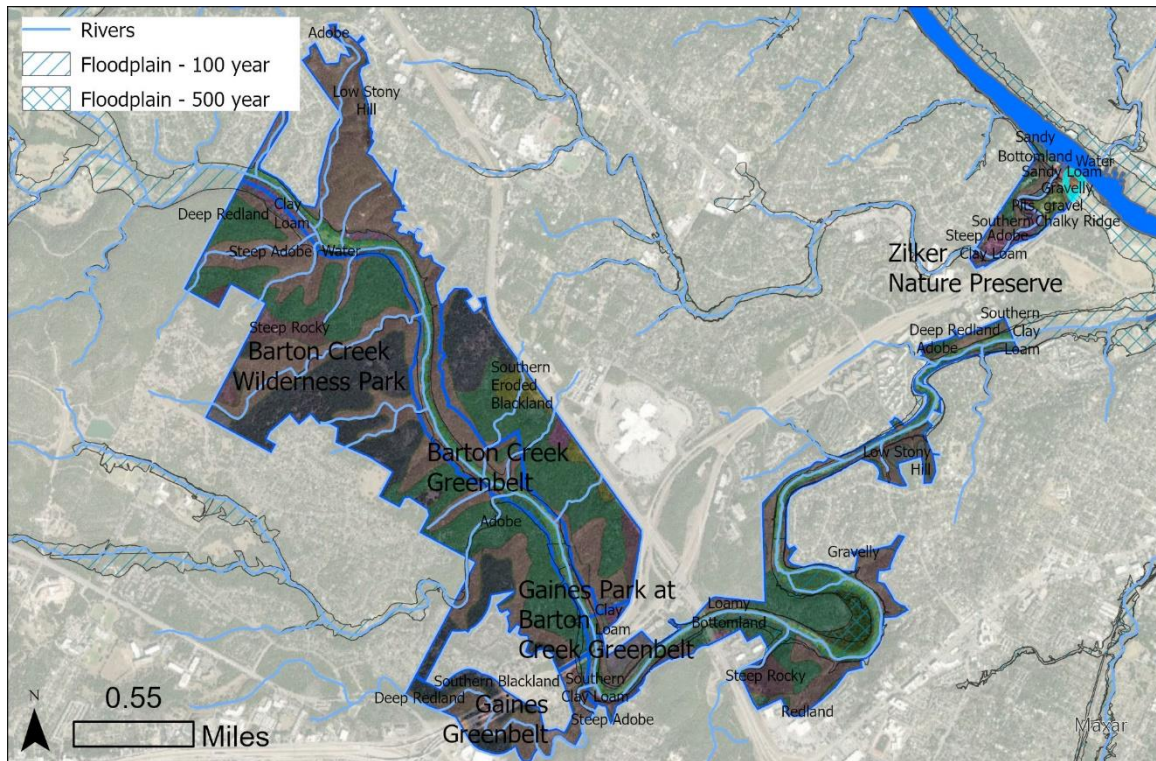


Figure 1-60 Barton Creek Complex Ecological Sites

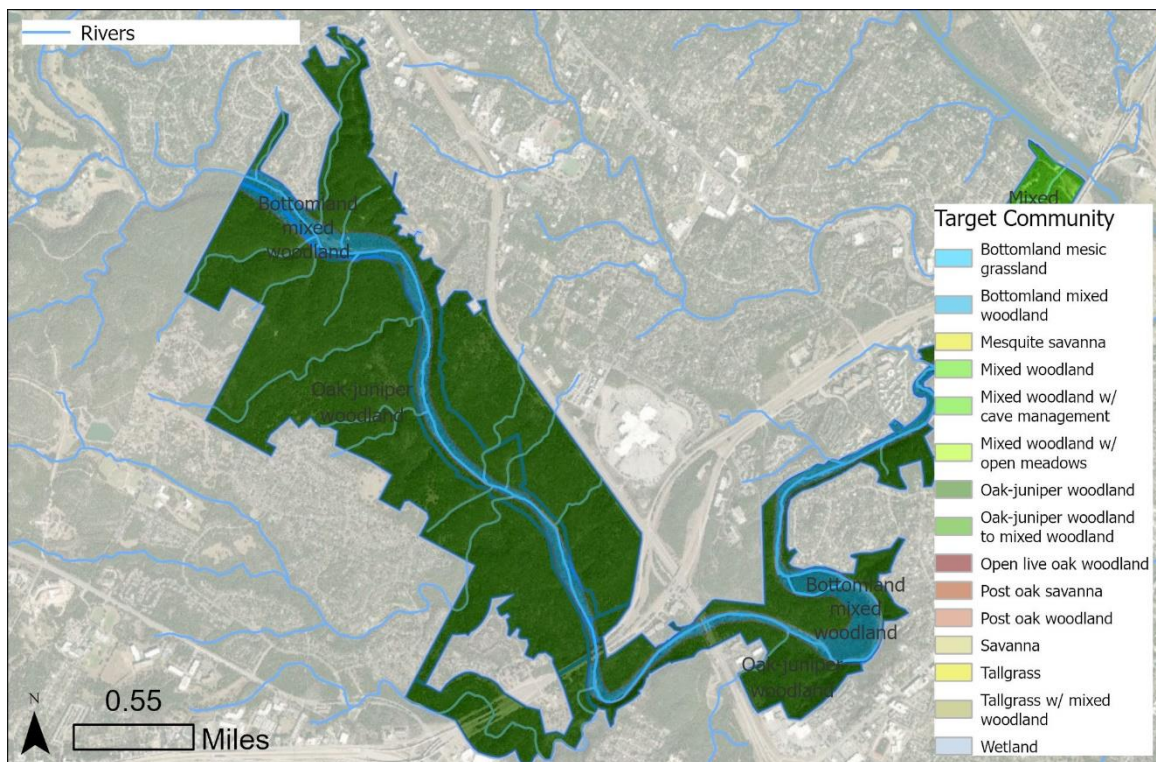


Figure 1-61 Barton Creek Complex Target Communities

1.2.3 BAUERLE RANCH AT SLAUGHTER CREEK

Mesquite-midgrass communities dominate the area. The herbaceous component has moderate diversity with a high incidence of increaser native species and moderate invasive cover.

The unit is in an area of low social vulnerability.

Strengths

- High vegetative cover
- Existing structurally diverse grassland riparian community containing scattered mature trees and herbaceous stabilizer species such as switchgrass.
- Soils in good condition with limited erosion

Challenges

- Overall species diversity is moderate to low
- Moderate invasive species cover including Johnsongrass and King Ranch bluestem
- Woody encroachment into grasslands

Strategies

- Invasive management
- Maintain vegetated riparian buffer at least as wide as the 25-year floodplain
- Increase the structural and compositional diversity riparian communities including cover of woody and herbaceous stabilizer species.

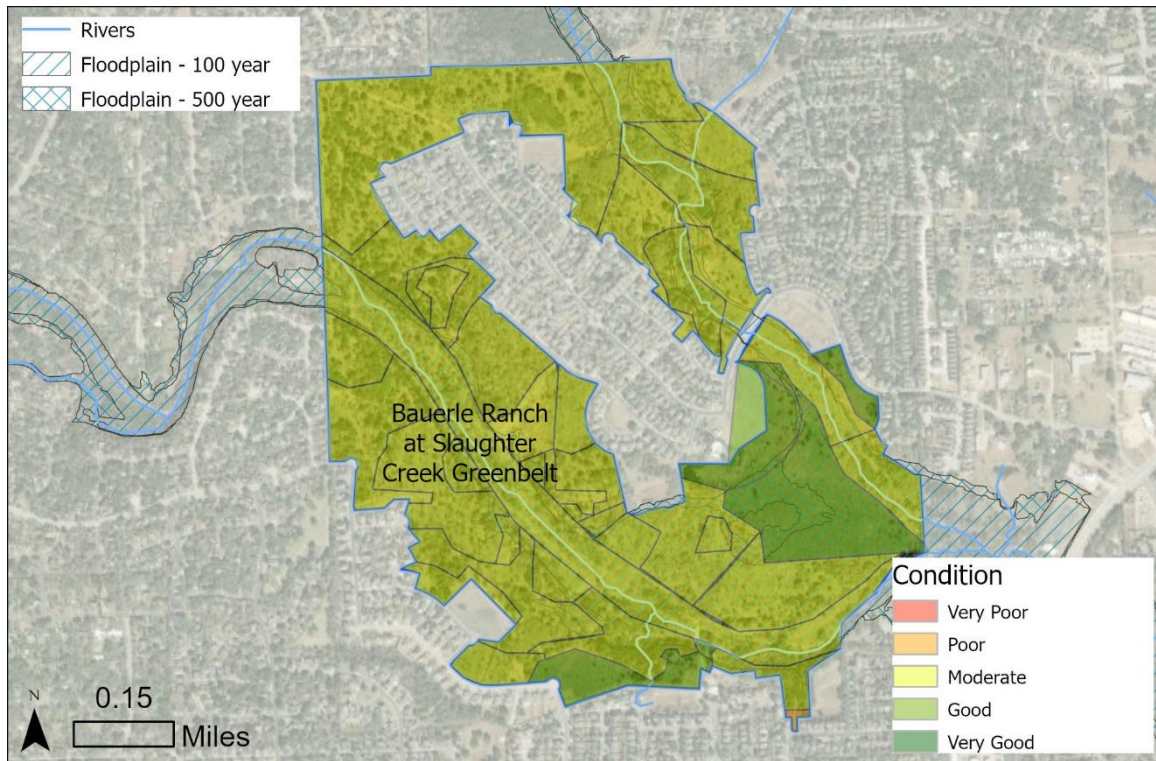


Figure 1-62 Bauerle Ranch Condition

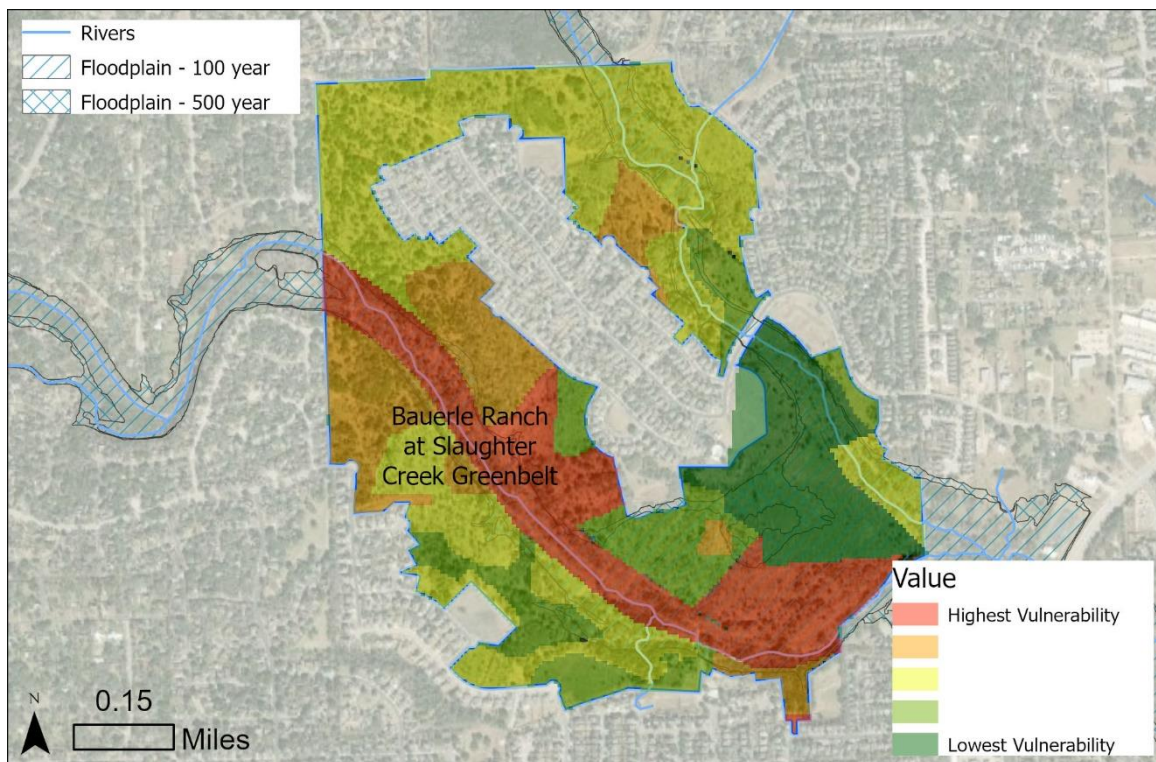


Figure 1-63 Bauerle Ranch Environmental Vulnerability Index

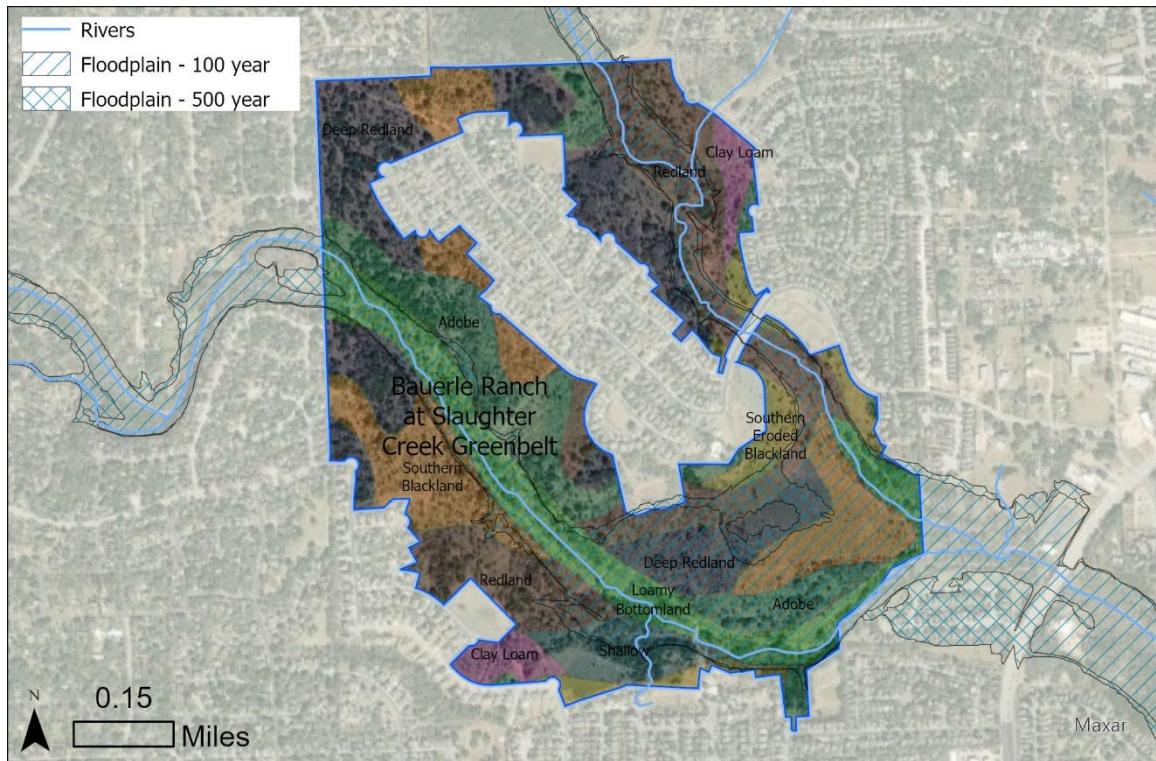


Figure 1-64 Bauerle Ranch Ecological Sites

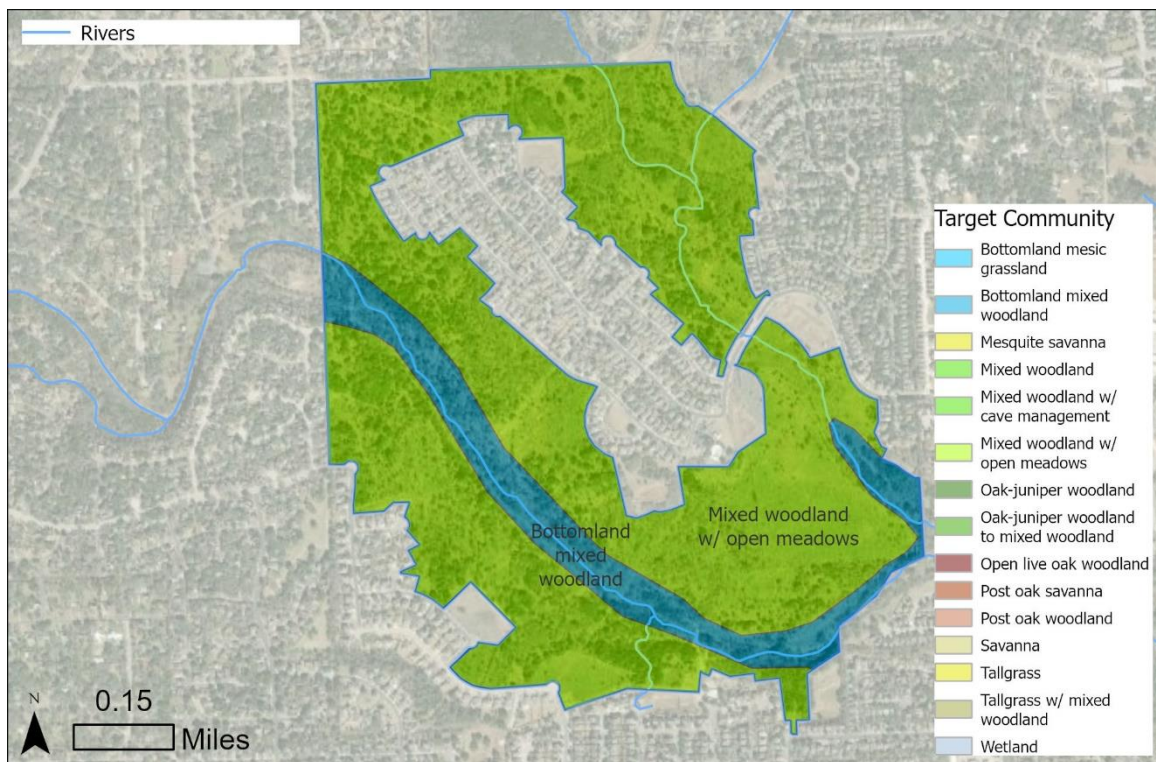


Figure 1-65 Bauerle Ranch Target Communities

1.2.4 BULL CREEK DISTRICT PARK

Steep rocky and Steep Adobe ecological sites are dominated by oak-juniper woodland. Clay loam areas have oak—juniper woodland, oak—juniper—hackberry woodland, scattered grassland, and mixed pecan—sycamore and hackberry—elm communities. Converted land exists. The unit is part of the Balcones Canyonlands Preserve. The park is one of the few remaining sites for bracted twistflower, and the species should be considered in management considerations.

The unit is in an area of low social vulnerability.

Strengths

- Elm—hackberry and pecan-sycamore and hackberry--elm woodlands have timber structure
- Oak—juniper woodlands have lower invasive presence and less erosion than deciduous communities
- Structurally diverse riparian community present, at least 25' wide

Challenges

- Low species diversity in all communities
- High density in oak—juniper communities with a shrub fuel model. Yaupon holly (*Ilex decidua*), Ashe juniper, ash (*Fraxinus* sp.), elm (*Ulmus* sp.), form a dense midstory with little to no herbaceous cover.
- Moderate to high invasive species cover particularly in hackberry—elm and pecan—sycamore communities. Species include Chinaberry and perennial rye (*Lolium perenne*)
- Moderate erosion present in bottomland and riparian areas and converted land
- Converted land

Strategies

- Adhere to appropriate protocols for management within potential and documented Golden-cheeked warbler habitat
- Woodland selective thinning to create a timber structure in order to reduce wildfire intensity and crown fire risk, diversify age structure, reduce competition, and encourage recruitment of a wider range of species
- Invasive management
- Maintain vegetated riparian buffer at least as wide as the 25-year floodplain. Increase the diversity of woody and herbaceous stabilizer species in riparian areas

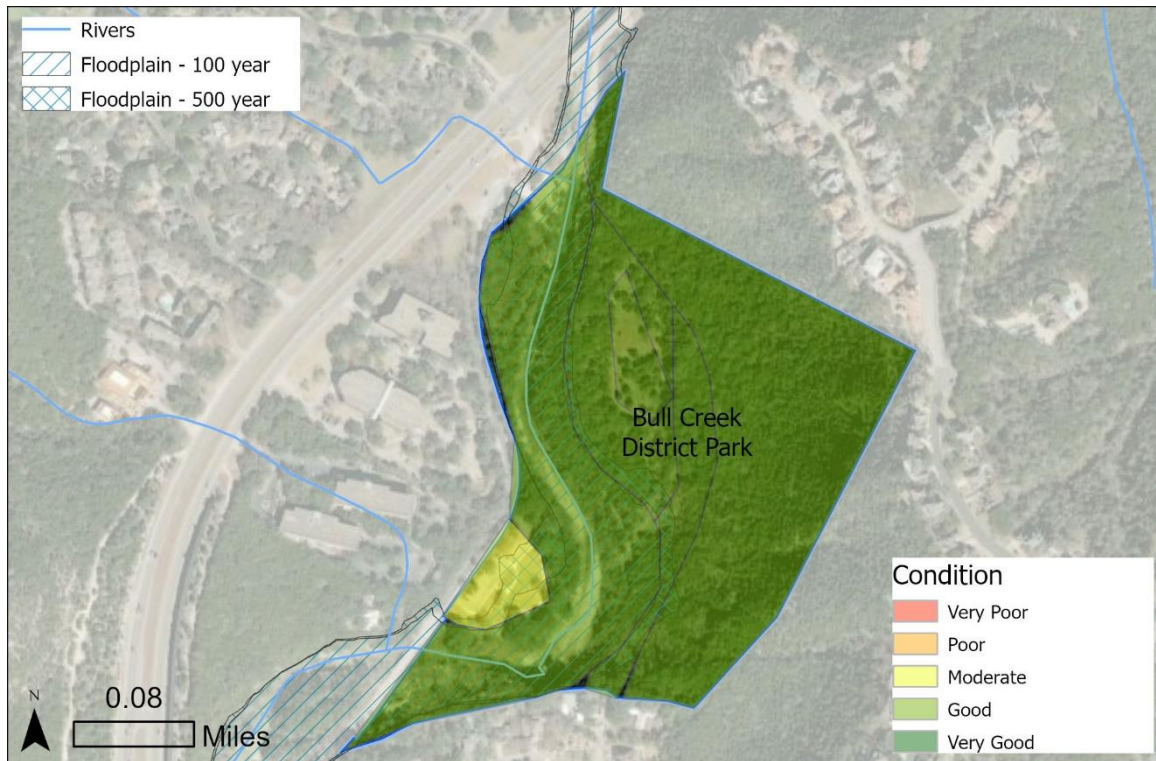


Figure 1-66 Bull Creek District Park Condition

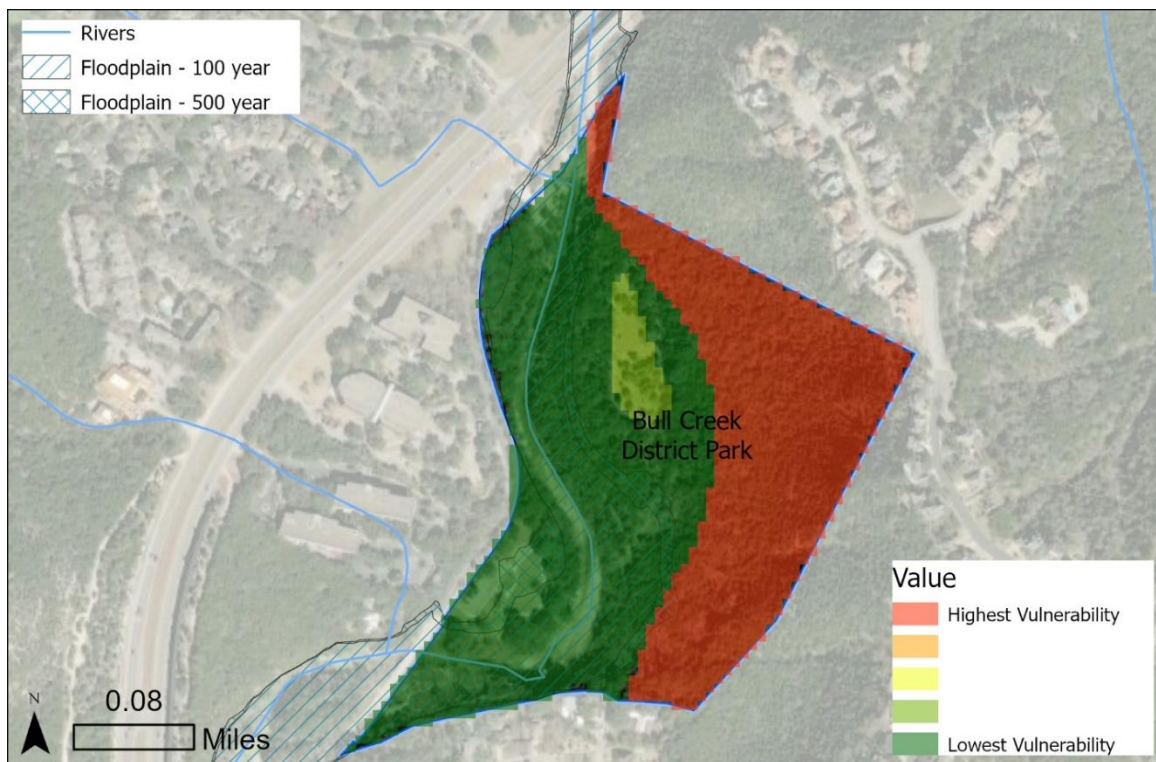


Figure 1-67 Bull Creek District Park Environmental Vulnerability Index

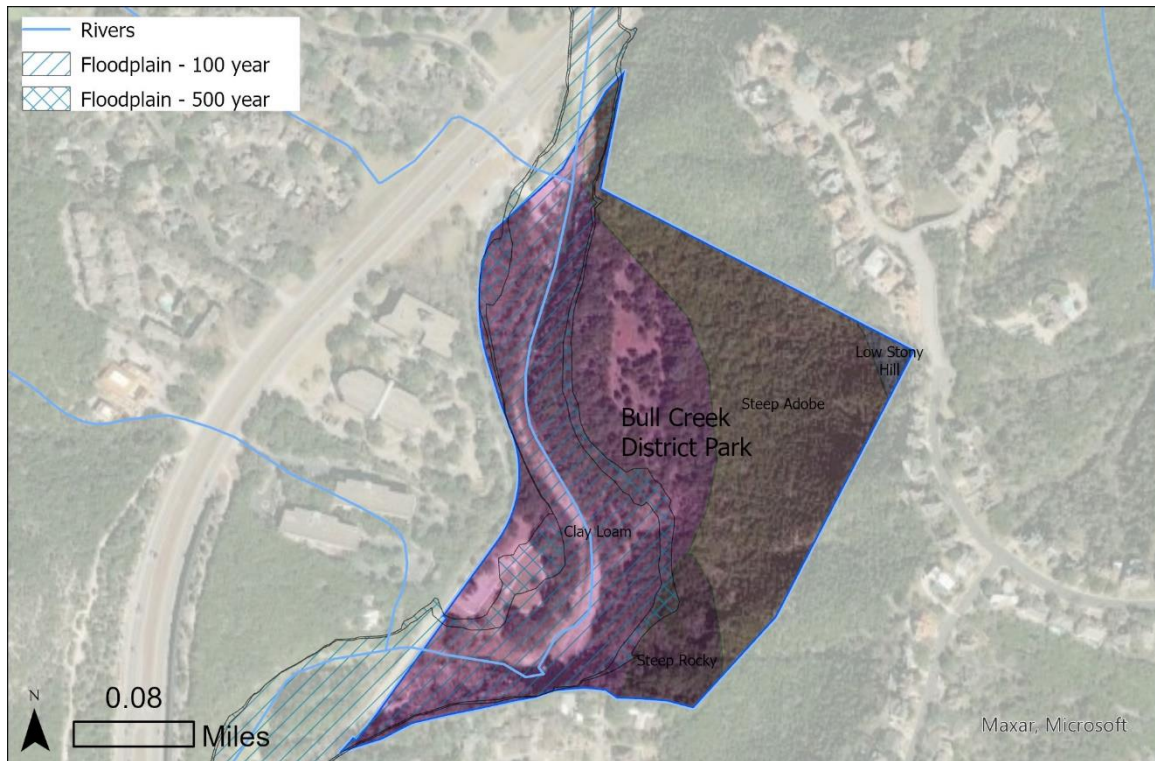


Figure 1-68 Bull Creek District Park Ecological Sites

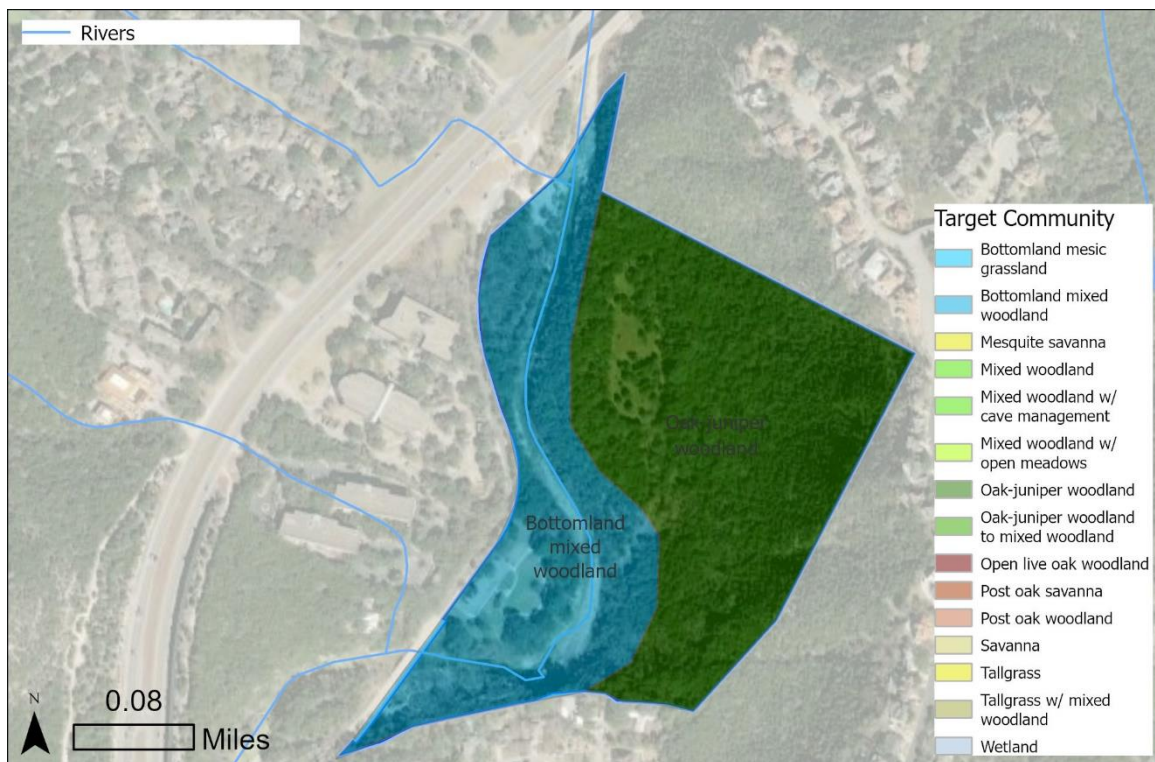


Figure 1-69 Bull Creek District Park Target Community

1.2.5 COMMONS FORD RANCH METRO PARK

The unit has three distinct characters: Oak—juniper woodland to the south on the Adobe ecological site, and prairie savanna in the north on sandy loam and southern clay loam ecological sites, grading into riparian shrubland in sandy bottomland along the Colorado river. Prairie and woodland restoration is underway in the northern portion of the unit. Large, planted pecans are present along the river within a mixed shrubland community. The unit is part of the Balcones Canyonlands Preserve.

The unit is in an area of low social vulnerability.

Strengths

- Deep soils and high water availability in the northern portion of the property
- Varied conditions allowing for diversity of community types
- Existing structurally diverse riparian shrubland community with scattered mature pecans that is at least 25' wide
- Upland juniper-oak woodlands have varied densities with moderate midstory diversity, somewhat open structure and some herbaceous cover
- Mature oak-juniper woodlands with timber structure exist within the park.
- Moderate to high species diversity including
- Restored prairie community with high diversity and high cover of species found in the historic climax community
- Soil in good condition with limited overall erosion

Challenges

- Moderate invasive cover in grassland and riparian communities
- Some of oak-juniper woodland has high density with shrub fuel model
- Moderate erosion from boaters in grass launch area.

Strategies

- Invasive management
- Prescribed fire in restored grassland
- Riparian management along the Colorado River and erosion management
- Adhere to appropriate protocols for management within potential and documented Golden-cheeked warbler habitat.
- Woodland selective thinning to create a timber structure in order to reduce wildfire intensity and crown fire risk, diversify age structure, reduce competition, and encourage recruitment of a wider range of species
- Species addition

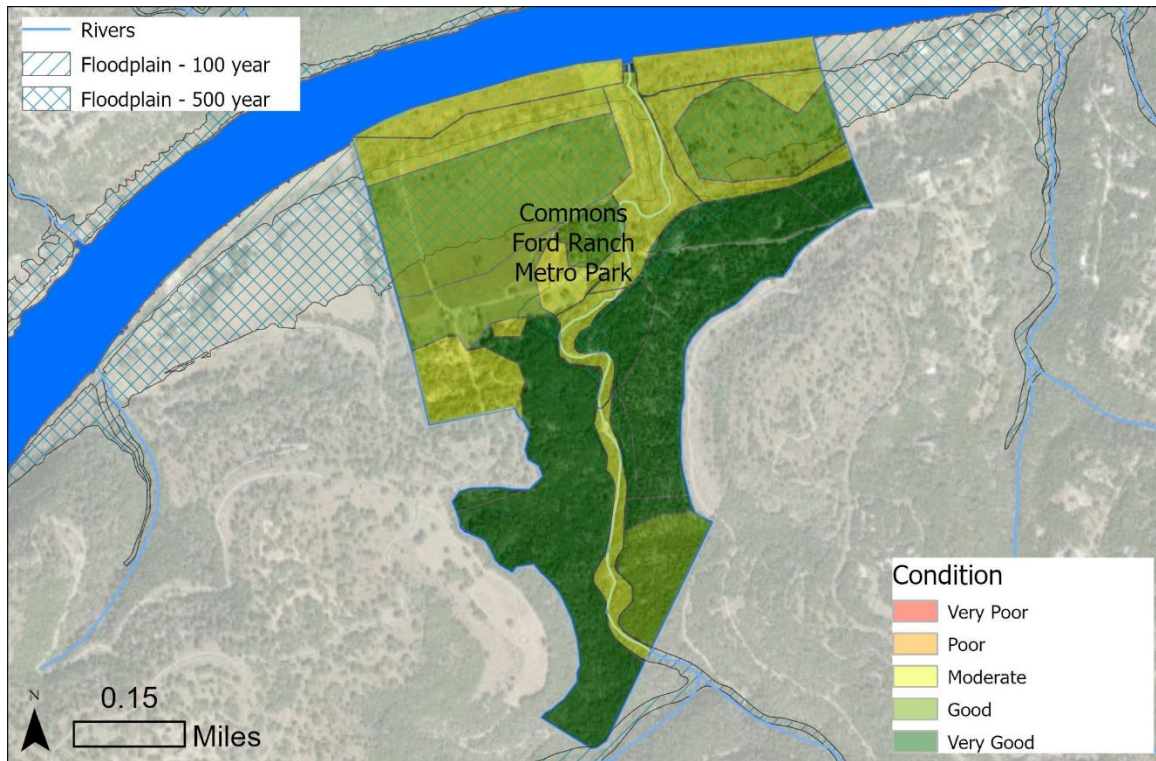


Figure 1-70 Commons Ford Ranch Metro Park Condition

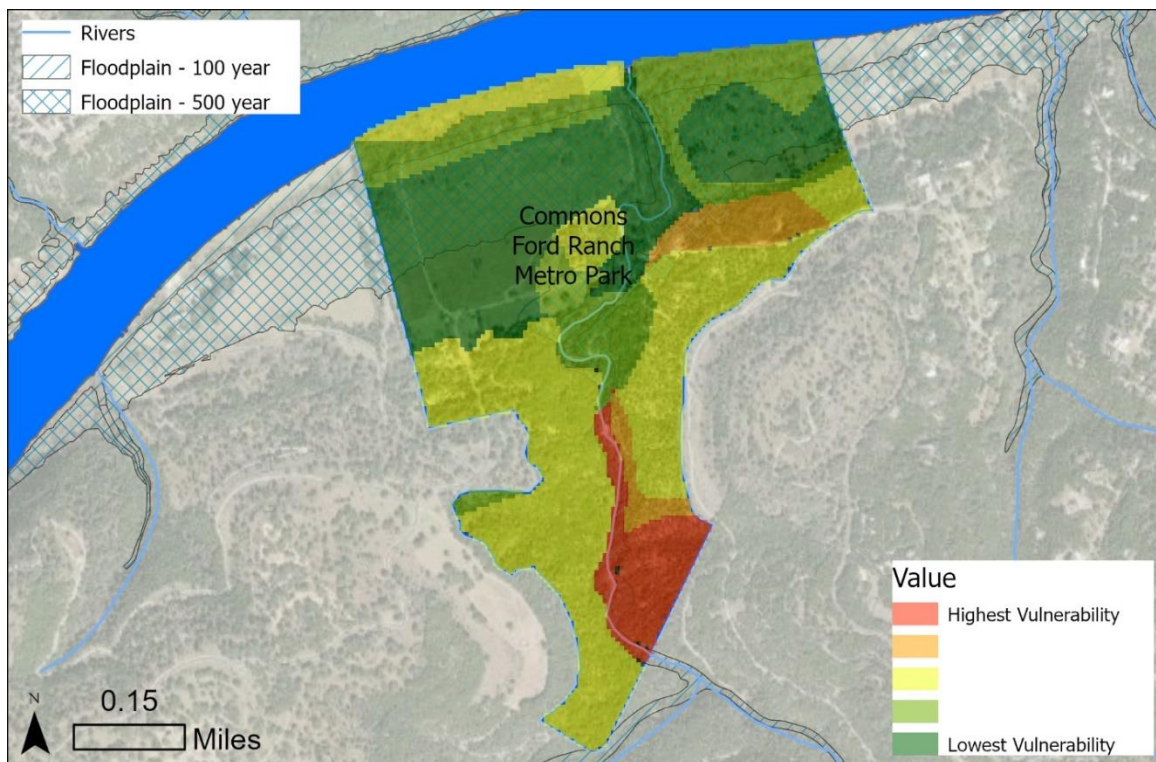


Figure 1-71 Commons Ford Ranch Metro Park Environmental Vulnerability Index

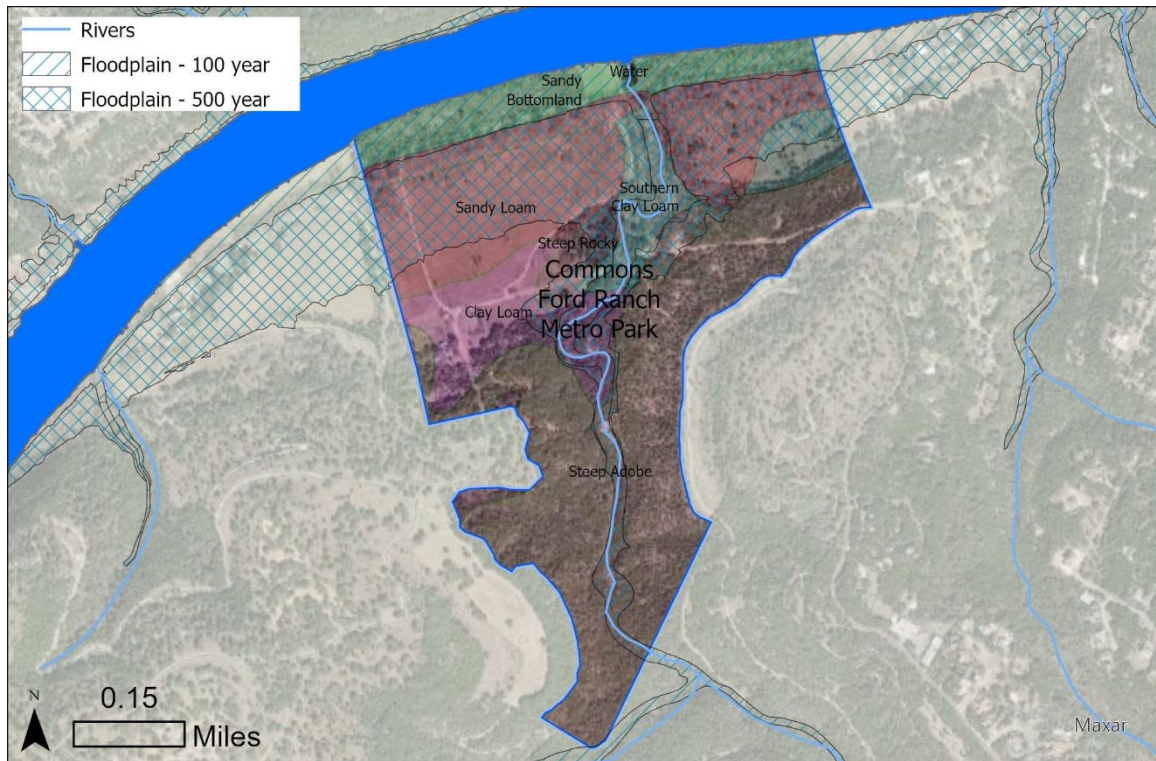


Figure 1-72 Commons Ford Ranch Metro Park Ecological Sites

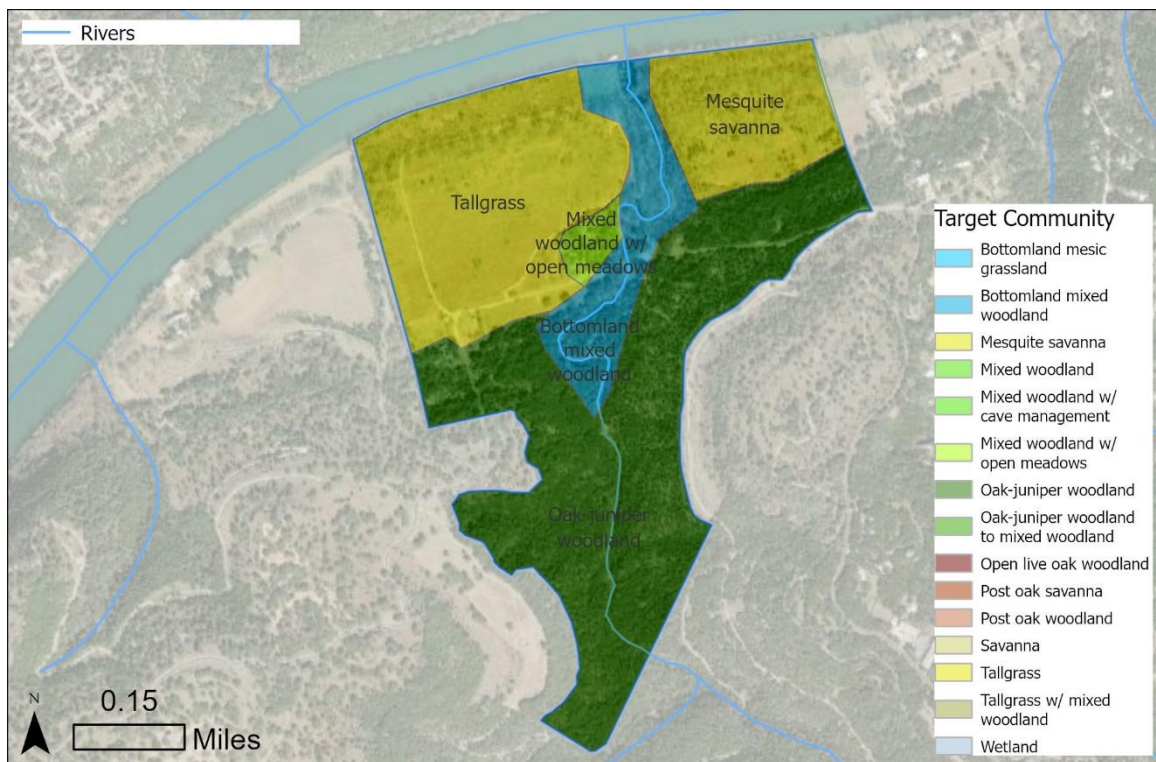


Figure 1-73 Commons Ford Ranch Metro Park Environmental Target Community

1.2.6 DEER PARK AT MAPLE RUN PRESERVE

The unit is dominated by oak—juniper woodland with small grassland openings. The unit is part of the Balcones Canyonlands Preserve.

The unit is in an area of low social vulnerability.

Strengths

- Soils in good condition with limited erosion
- High vegetative cover
- Moderate species diversity

Challenges

- Oak-juniper woodland has high density with shrub fuel model
- Moderate invasive cover

Strategies

- Adhere to appropriate protocols for management within potential and documented Golden-cheeked warbler habitat
- Woodland selective thinning to create a timber structure in order to reduce the intensity of wildfire and crown fire risk, diversify age structure, reduce competition and to encourage recruitment of wider range of species, particularly resprouting woody species that can recover following wildfire.
- Invasive management

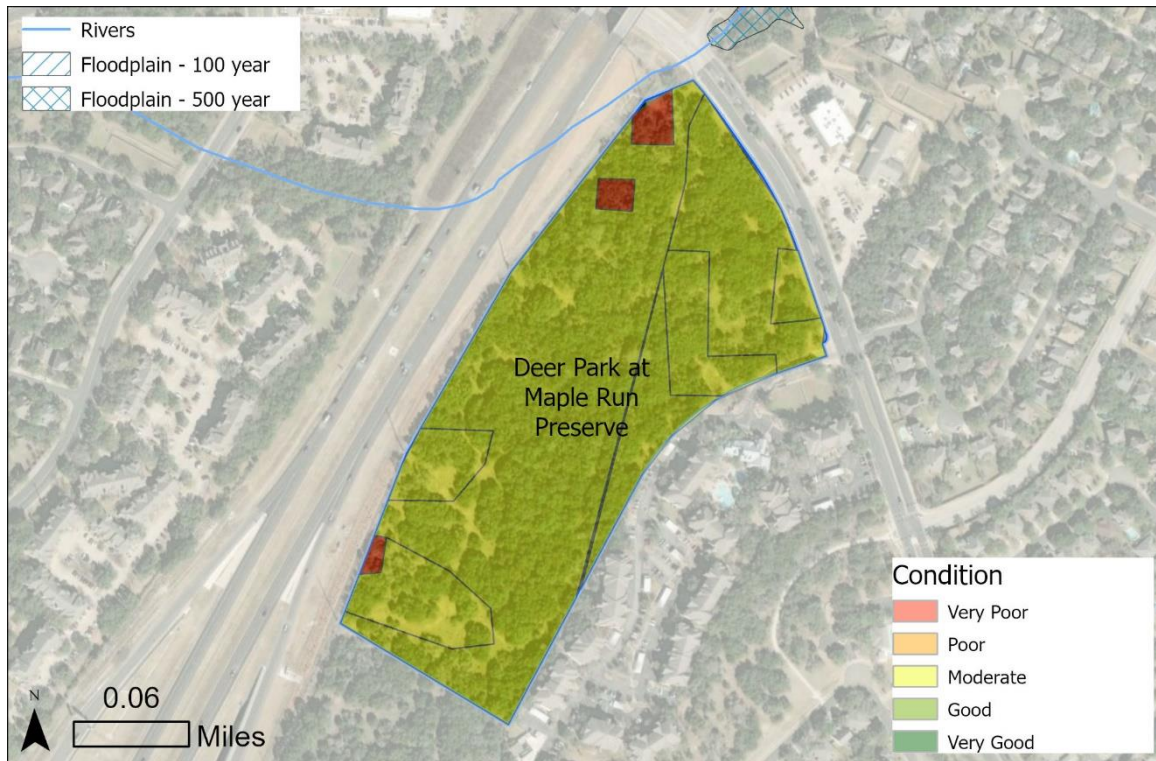


Figure 1-74 Deer Park at Maple Run Preserve Condition

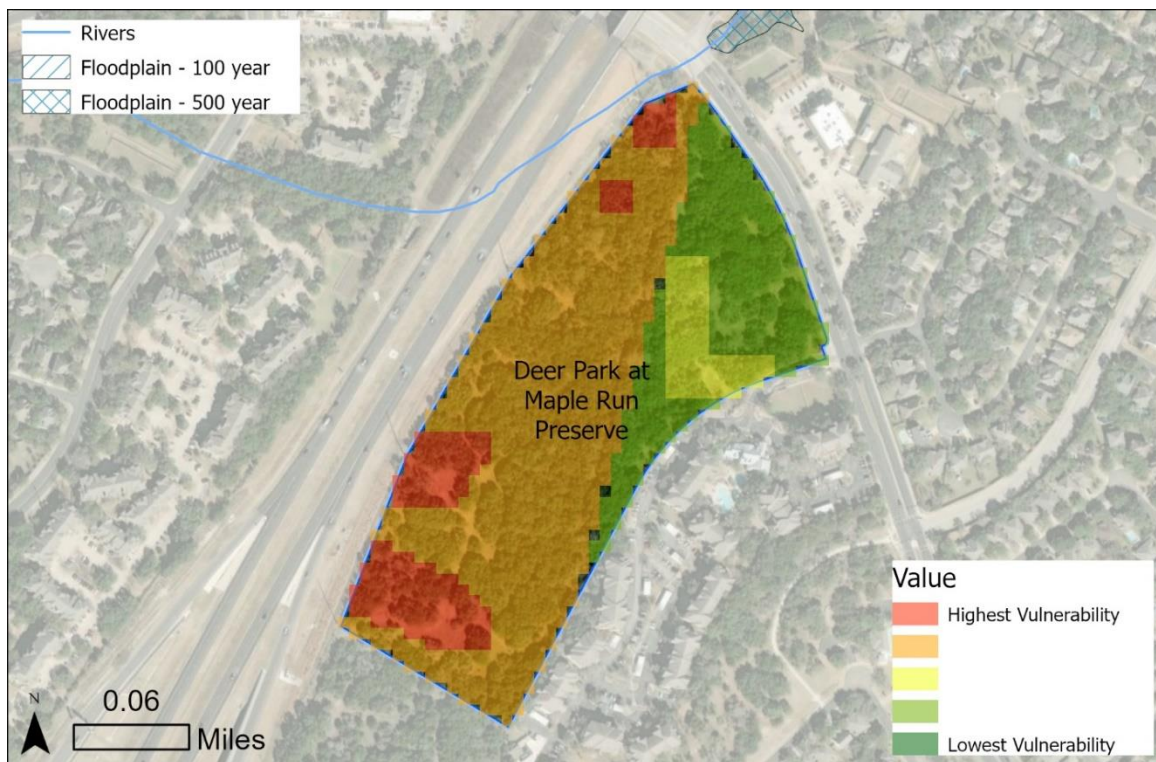


Figure 1-75 Deer Park at Maple Run Environmental Vulnerability Index

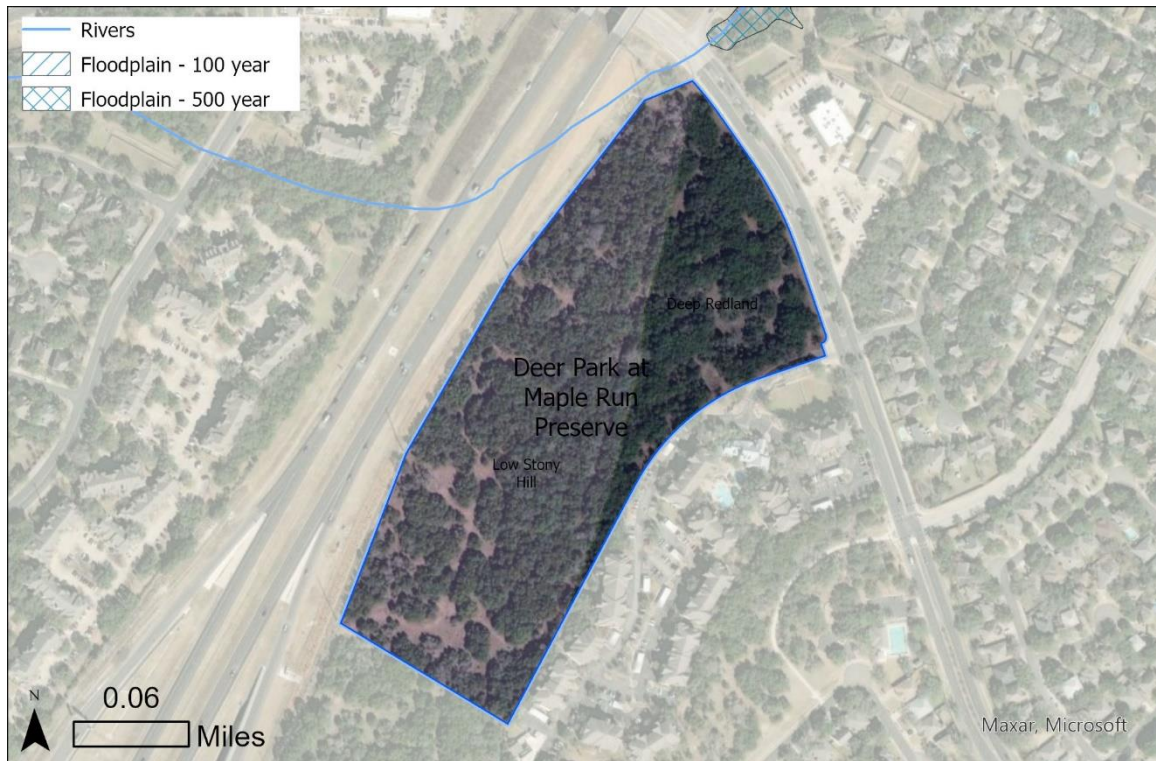


Figure 1-76 Deer Park at Maple Run Preserve Ecological Sites

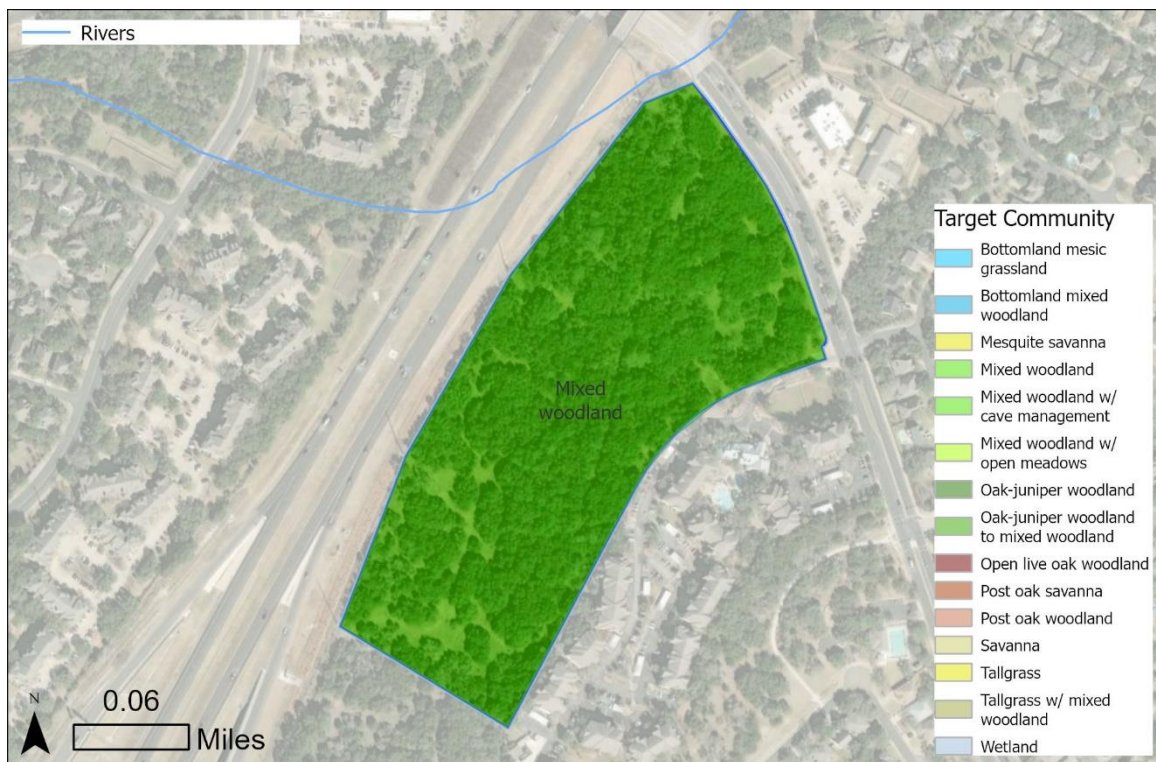


Figure 1-77 Deer Park at Maple Run Target Community

1.2.7 DICK NICHOLS DISTRICT PARK

Dick Nichols is dominated by oak—juniper communities with several large plateau live oak and Ashe juniper individual and a dense understory of younger juniper and several shrub species with little to no herbaceous layer. Scattered open grasslands exist with high invasive cover, though increaser grasses such as little bluestem exist as to pockets of high forb and grass diversity. Hackberry—elm-juniper woodlands exist along the drainage with moderate diversity and limited erosion.

The unit is in an area of low social vulnerability.

Strengths

- Pockets of high diversity herbaceous communities with reference species from historic climax community and moderate to high forb cover and diversity
- Soils in good condition with limited erosion
- Large live oak and Ashe juniper individuals
- Structurally diverse riparian community present, at least 25' wide

Challenges

- High woodland density with fuel model type – shrub. Dense midstory species include yaupon holly, juniper, and elbowbush (*Forestiera pubescens*)
- Moderate to low diversity in oak-juniper woodlands
- High invasive cover in hackberry-elm woodlands along drainage. Species include Chinaberry, Chinese tallow, Chinese pistache (*Pistacia chinensis*) ligustrum, Johnsongrass and perennial rye.
- Woody encroachment into grassland and high invasive herbaceous cover including King Ranch bluestem, bermudagrass and bastard cabbage.
- Several areas of standing dead canopy, likely resulting from a combination of winter storms and drought

Strategies

- Woodland selective thinning to create a timber structure to reduce the intensity of wildfire and crown fire risk, diversify age structure, reduce competition and to encourage recruitment of wider range of species, particularly resprouting woody species that can recover following wildfire.
- Mechanical thinning in grassland areas to improve savanna condition
- Invasive management
- Prescribed fire
- Maintain vegetated riparian buffer of to the 25-year floodplain or beyond
- Increase the structural and compositional diversity of bottomland and riparian areas

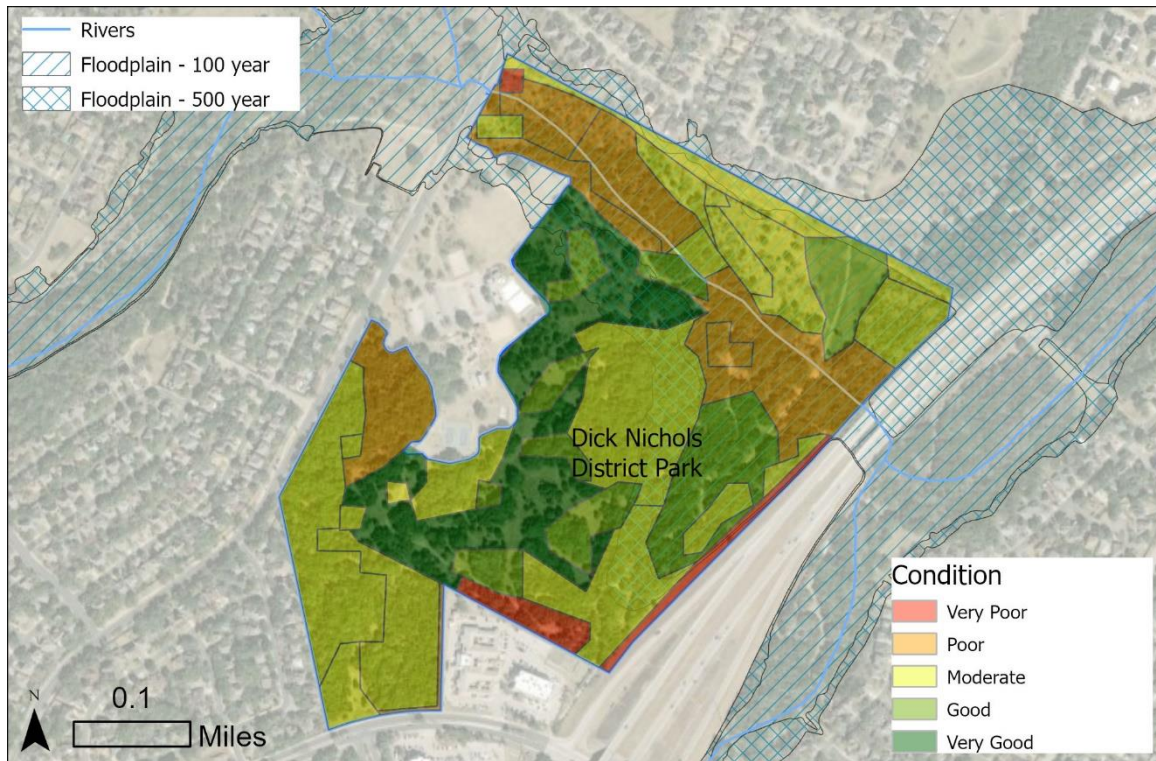


Figure 1-78 Dick Nichols District Park Condition

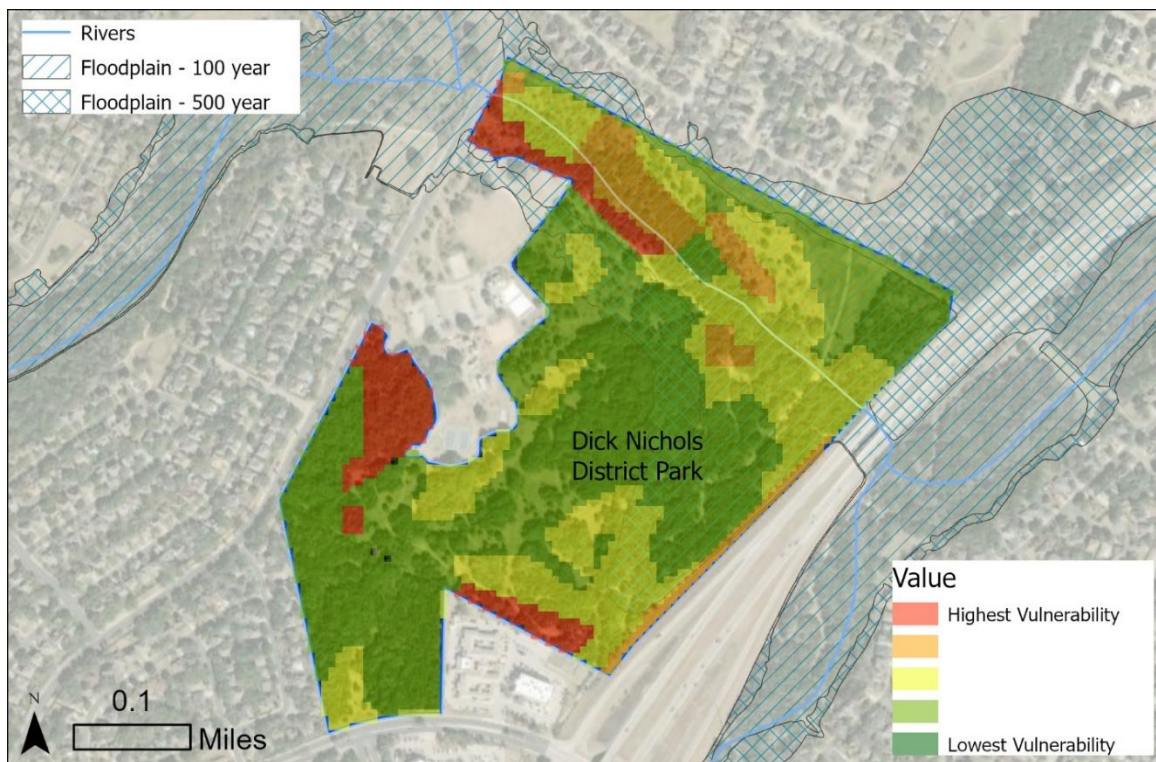


Figure 1-79 Dick Nichols District Park Environmental Vulnerability Index

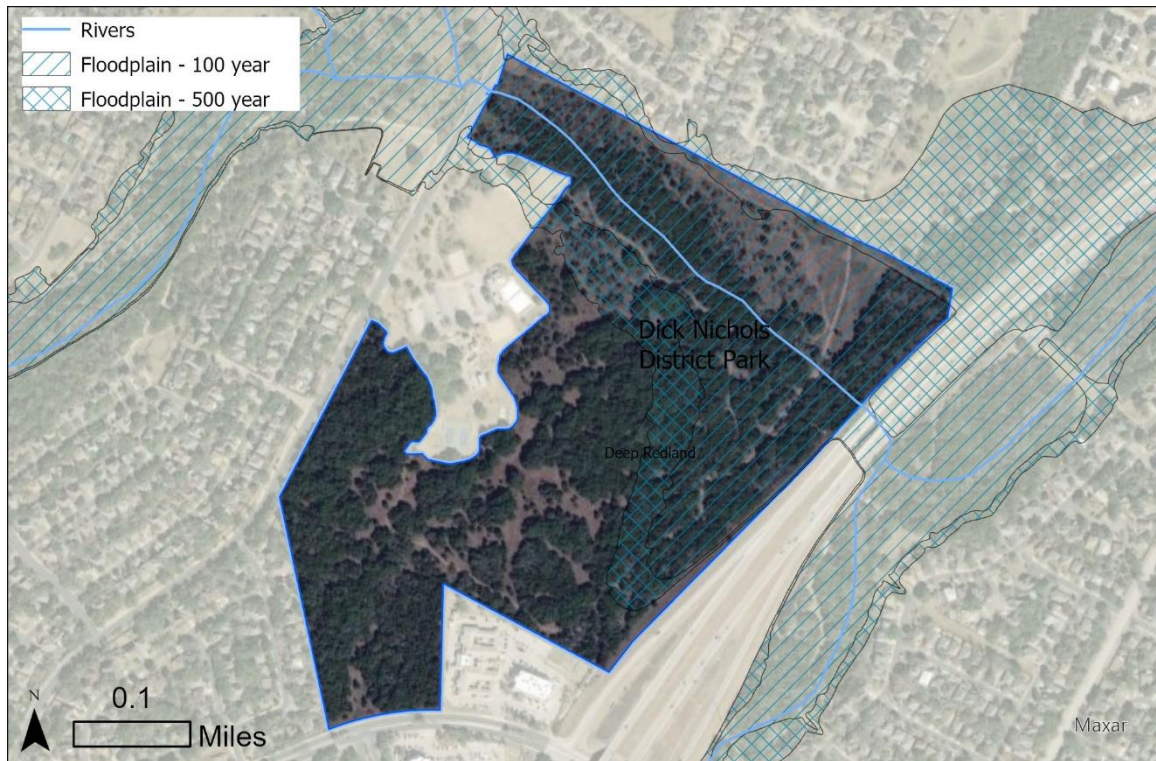


Figure 1-80 Dick Nichols District Park Ecological Sites



Figure 1-81 Dick Nichols District Park Target Community

1.2.8 EMMA LONG METRO PARK

Oak—juniper woodlands dominate the unit. Emma Long is part of the Balcones Canyonlands Preserve.

The unit is located in an area of low social vulnerability.

Strengths

- Varied topographic and hydrologic conditions allowing for diversity of community types
- Hillslope herbaceous communities found on the thin, rocky slopes of ecological sites like steep adobe contain a diverse mix of native herbaceous species are able to accommodate changing conditions including high heat, frequent drought, and flashy precipitation patterns. These communities have lower invasive species cover than flatter, deeper soils.
- Diverse age classes in woodland
- Structurally diverse riparian community present, at least 25' wide
- Native species documented include: Ashe juniper, plateau live oak, Texas red oak, American sycamore, little bluestem, Texas persimmon (*Diospyros texana*), elm species, and hackberry

Challenges

- Most oak-juniper woodlands had high density with fuel model type shrub. However, some areas had timber structure. Dense midstory consisted of Ashe juniper, elm, nandina, elbowbush, yaupon holly, and live oak.
- Low species diversity in oak-juniper woodlands
- Significant sheet erosion and vegetation loss in high traffic areas
- Moderate to high invasive species cover. Midstory in some areas was dominated by ligustrum. Invasive species documented include nandina, Japanese honeysuckle, and ligustrum species.
- Known site with active tawny crazy ant (*Nylanderia fulva*) colonies. Management activities should take this into account to reduce the spread of this species within the site and to new sites.

Strategies

- Adhere to appropriate protocols for management within potential and documented Golden-cheeked warbler habitat
- Woodland selective thinning to create a timber structure to reduce the intensity of wildfire and crown fire risk, diversify age structure, reduce competition and to encourage recruitment of wider range of species, particularly resprouting woody species that can recover following wildfire.
- Invasive management
- Maintain vegetated riparian buffer of to the 25-year floodplain or beyond

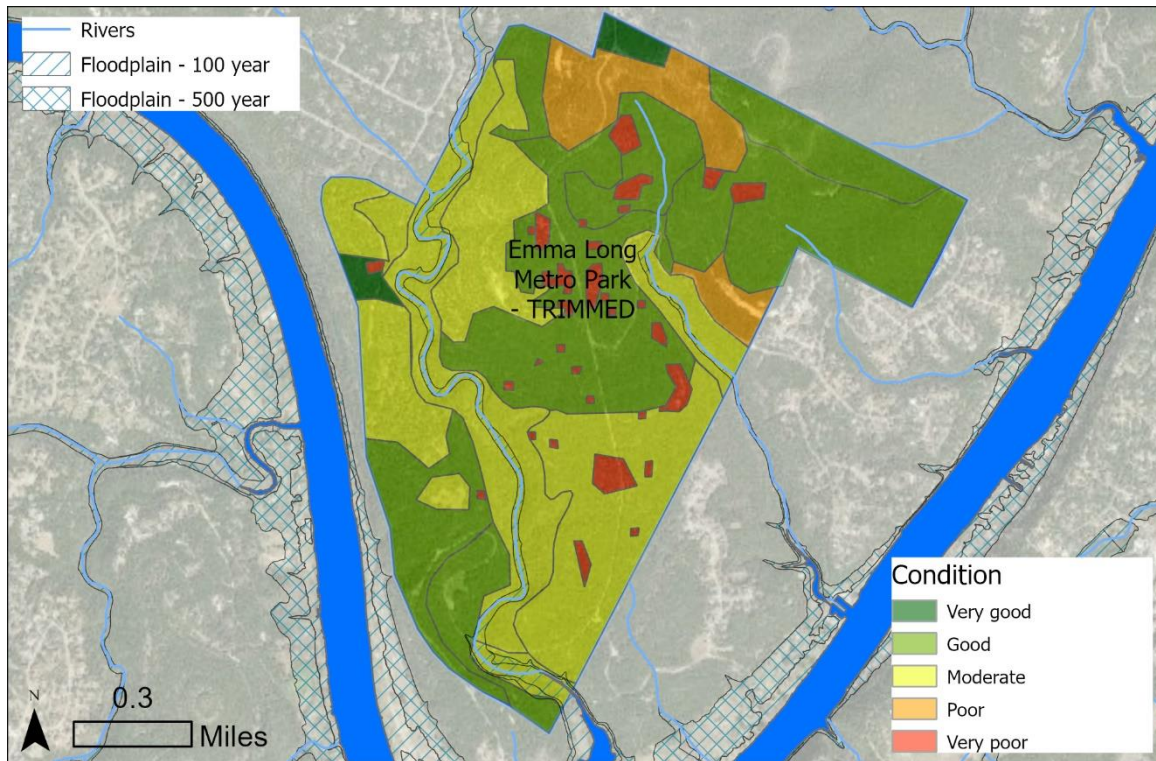


Figure 1-82 Emma Long Metro Park Condition

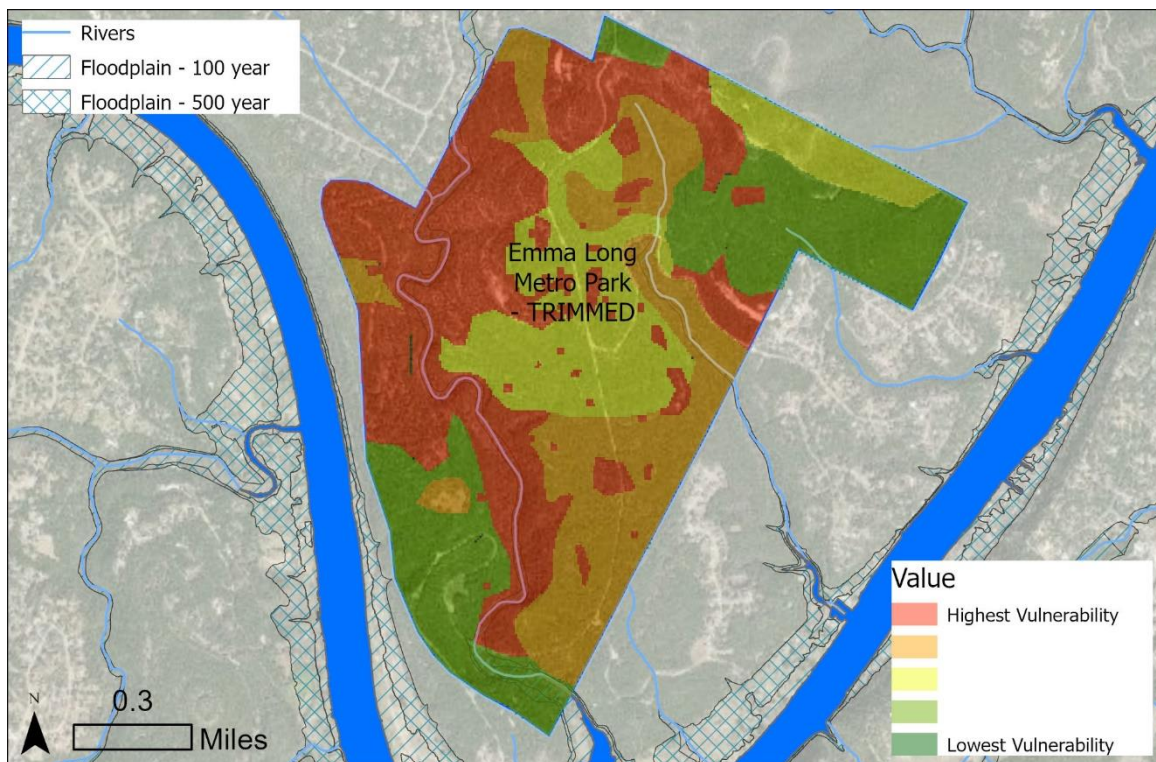


Figure 1-83 Emma Long Metro Park Environmental Vulnerability Index

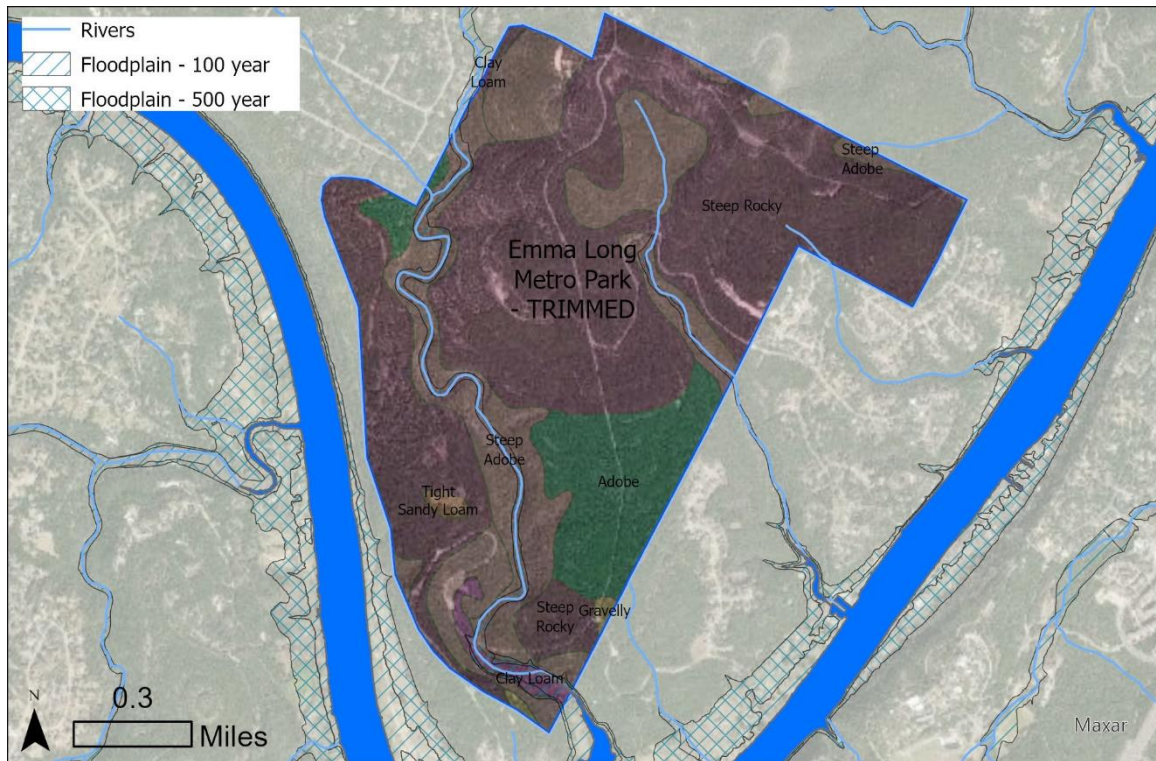


Figure 1-84 Emma Long Metro Park Ecological Sites

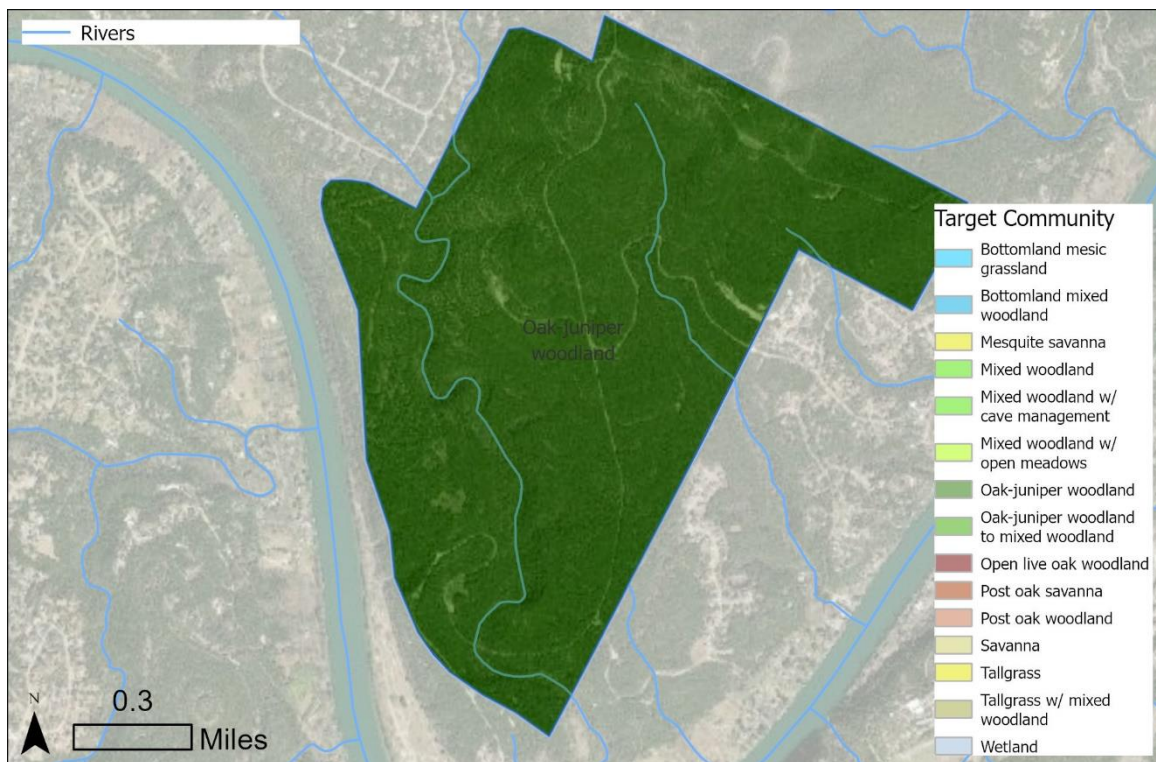


Figure 1-85 Emma Long Metro Park Target Community

1.2.9 MAYFIELD NATURE PRESERVE

Mayfield Nature Preserve is dominated by oak-juniper woodland. Pecan, hackberry, and elm are common throughout the park and some areas include Texas red-oak. The unit has a 2014 vegetation community and fuel model assessment (Keith 2014e).

The unit is in an area of low social vulnerability.

Strengths

- Varied topographic and hydrologic conditions allows for diversity of community types
- Soils in good condition with limited erosion
- Pockets of high diversity communities are present with reference species from the historic climax community and some woody species diversity

Challenges

- High woodland density with fuel model type – shrub
- Low overall species diversity, though high diversity areas are present
- Moderate to high invasive species cover. Nandina is common and dominates the midstory in some areas

Strategies

- Woodland selective thinning to create a timber structure in order to reduce wildfire intensity and crown fire risk, diversify age structure, reduce competition, and encourage recruitment of a wider range of species
- Invasive management

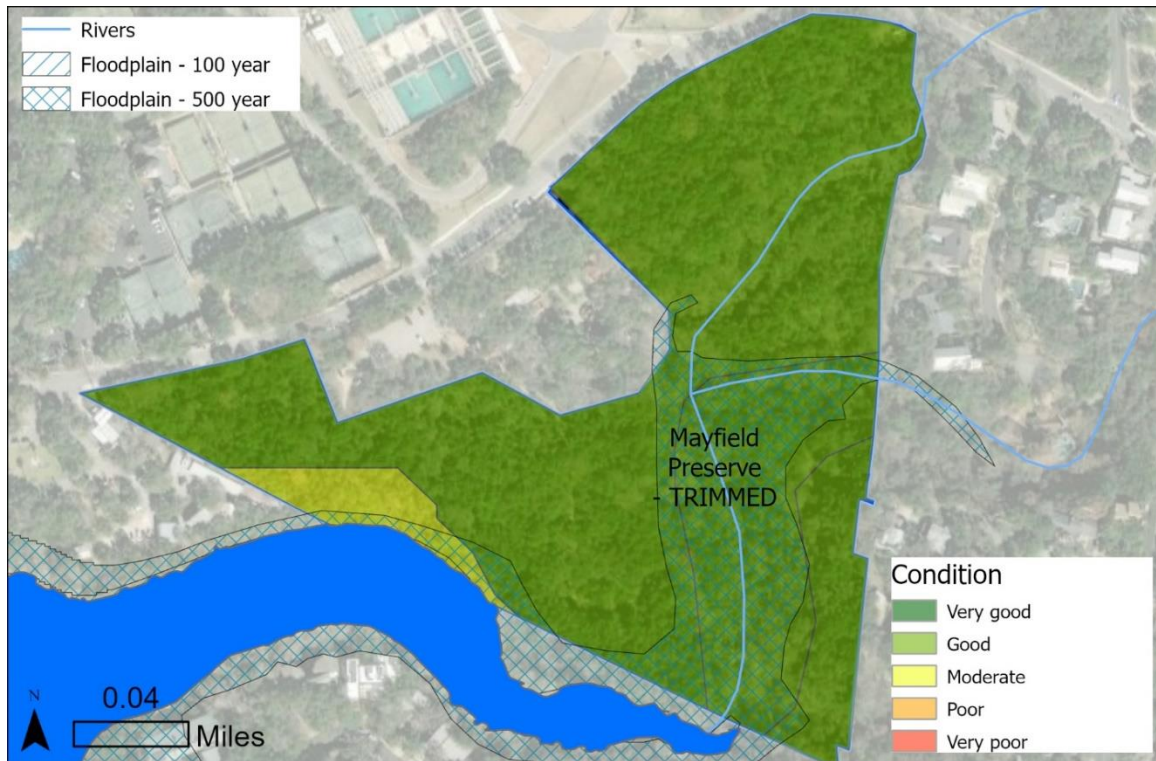


Figure 1-86 Mayfield Nature Preserve Condition

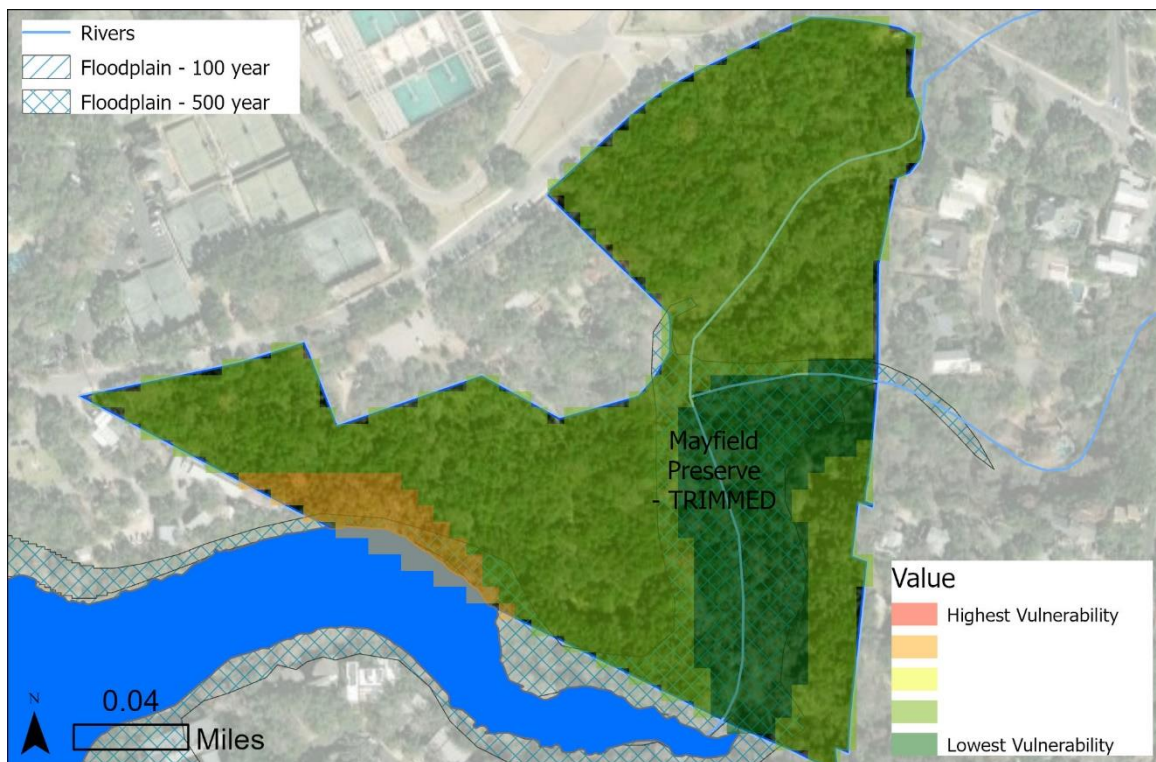


Figure 1-87 Mayfield Nature Preserve Environmental Vulnerability Index

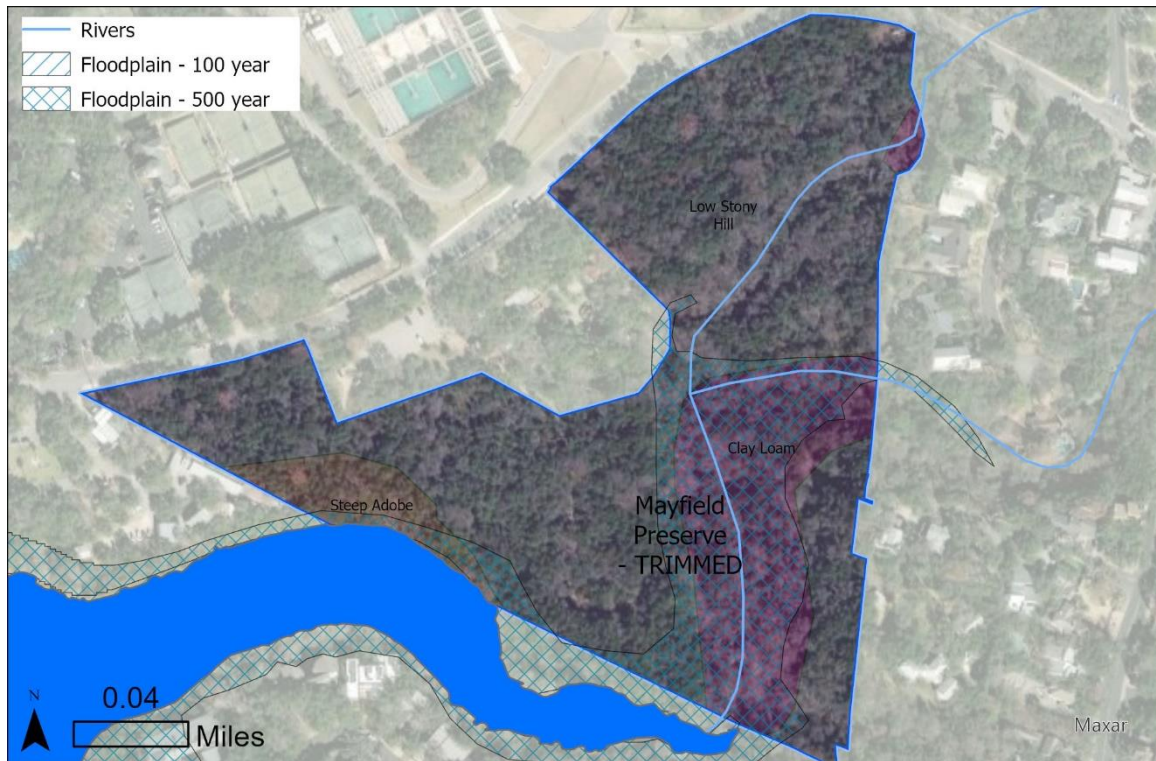


Figure 1-88 Mayfield Nature Preserve Ecological Sites

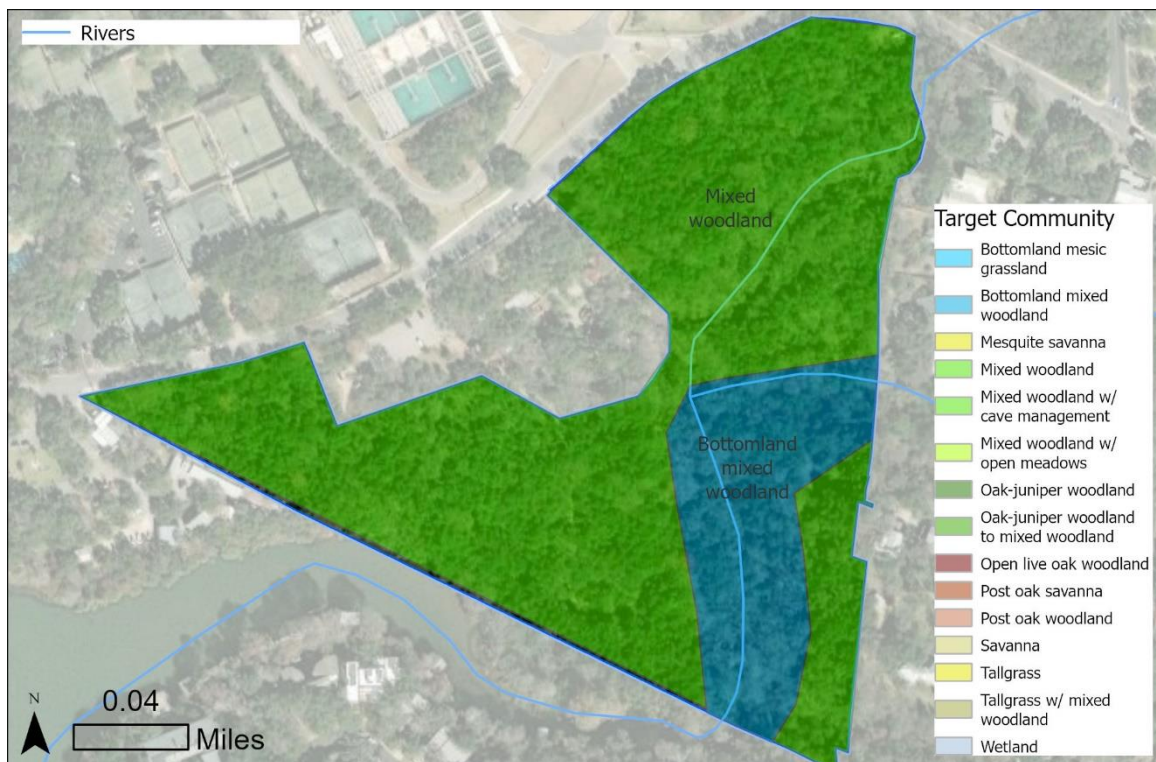


Figure 1-89 Mayfield Nature Preserv Target Community

1.2.10 SLAUGHTER CREEK METRO COMPLEX

The unit contains a mixture of oak—juniper woodland with high density, oak—midgrass savanna, riparian woodland and mixed woodland.

The unit is in an area of low social vulnerability.

Strengths

- Varied topographic and hydrologic conditions allows for diversity of community types
- Areas exist with moderate to high species diversity. Reference species from the historic climax community are present. Reference species from the historic climax community such as little bluestem and Indiangrass in upland grassland sites and eastern gamagrass and switchgrass in lower, wetter areas.
- Pockets of high diversity communities are present with reference species from the historic climax community
- Microtopography present
- Soils in good condition with limited erosion
- Structurally diverse riparian community present, at least 25' wide, frequently with stabilizer species present
- Collaboration with the Lady Bird Wildflower Center and the WQPL is possible

Challenges

- Most oak—juniper woodlands have high density with fuel model type shrub. However, some have timber structure
- Converted land with high invasive cover and disturbed soil along major roadways
- Woody encroachment in grassland areas
- Generally, riparian areas are in good condition with wide buffers, but areas with low vegetative cover and high erosion are present
- High foot traffic areas have vegetation loss, soil compaction and sheet erosion
- Invasive cover is variable, but some areas are dominated by invasive species

Strategies

- Woodland selective thinning to create a timber structure in order to reduce wildfire intensity and crown fire risk, diversify age structure, reduce competition, and encourage recruitment of a wider range of species
- Invasive management
- Reduce ladder fuel at woodland edges and scattered trees/mottes in grassland areas through a combination of mechanical treatment and repeated prescribed fire
- Reduce woody cover in aggrading woodlands and disconnect canopies between mottes
- Manage soil compaction and erosion caused by foot traffic by managing excessive social trails (obscure and revegetate), directing people to official trails, and when necessary using physical interventions such as cross slope obstructions to slow and disperse water flow and encourage upslope revegetation
- Maintain vegetated riparian buffer at least as wide as the 25-year floodplain
- Increase the diversity of woody and herbaceous stabilizer species in riparian communities.

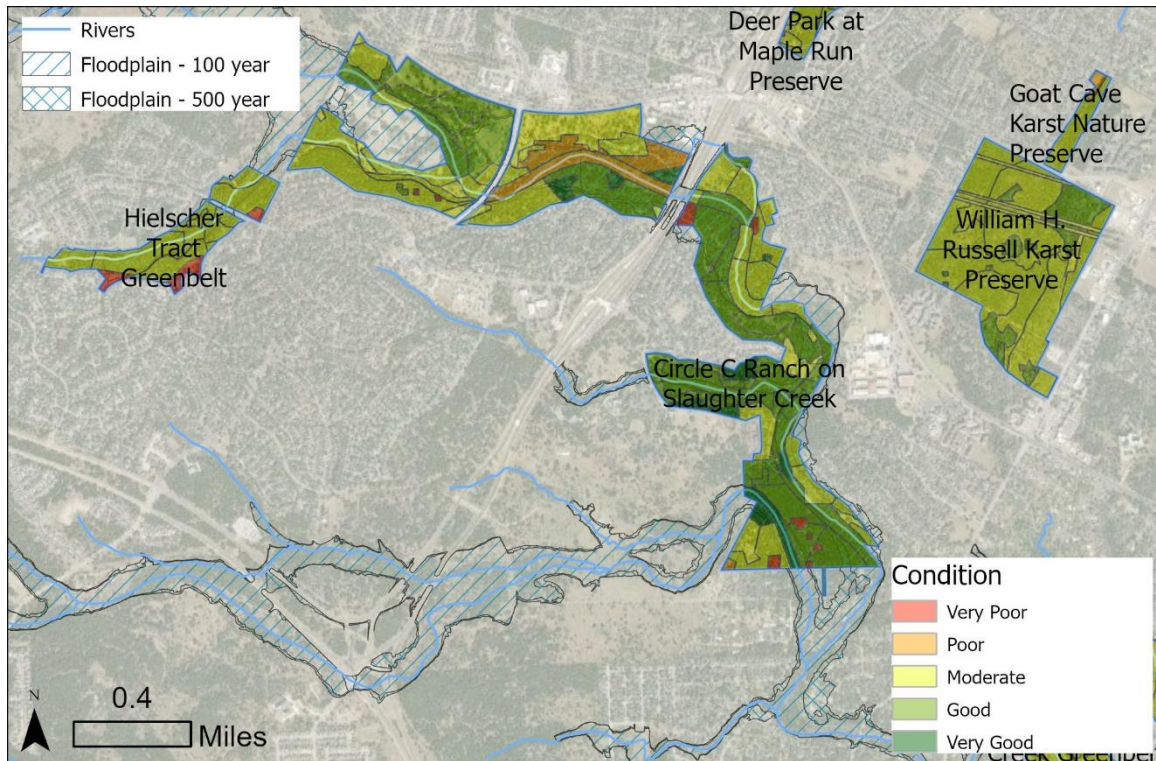


Figure 1-90 Slaughter Creek Metro Complex Condition

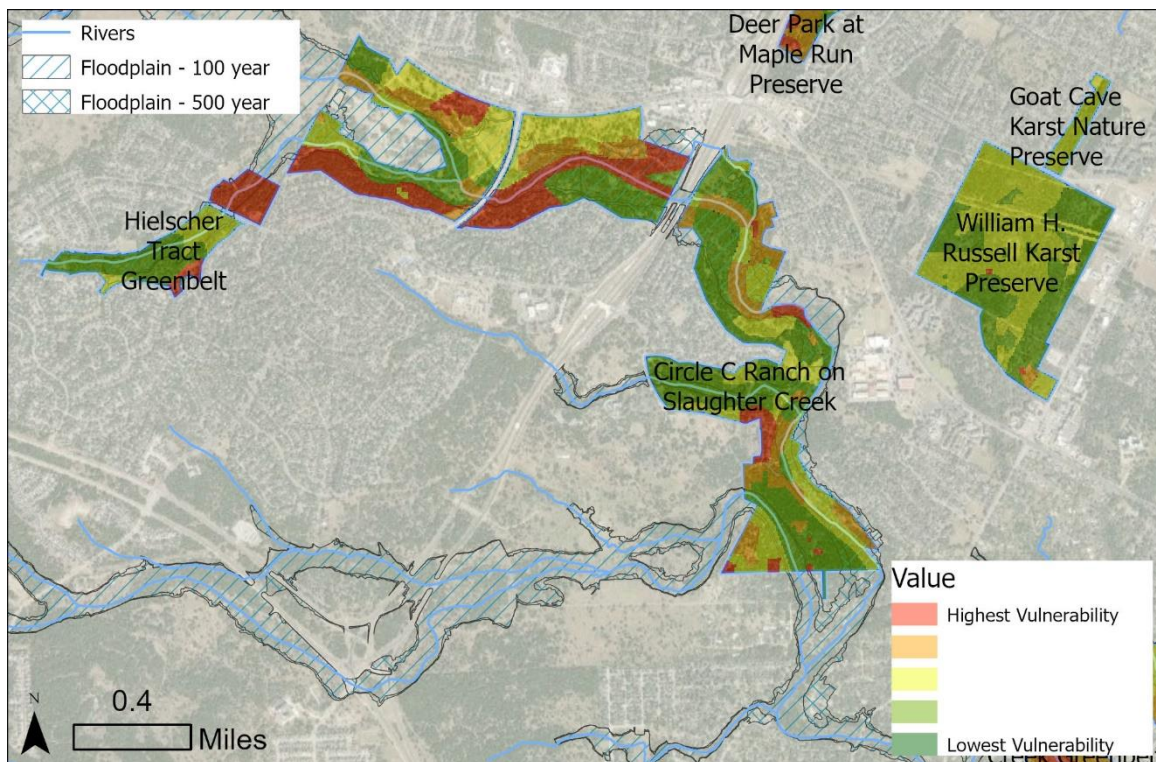


Figure 1-91 Slaughter Creek Metro Complex Environmental Vulnerability Index

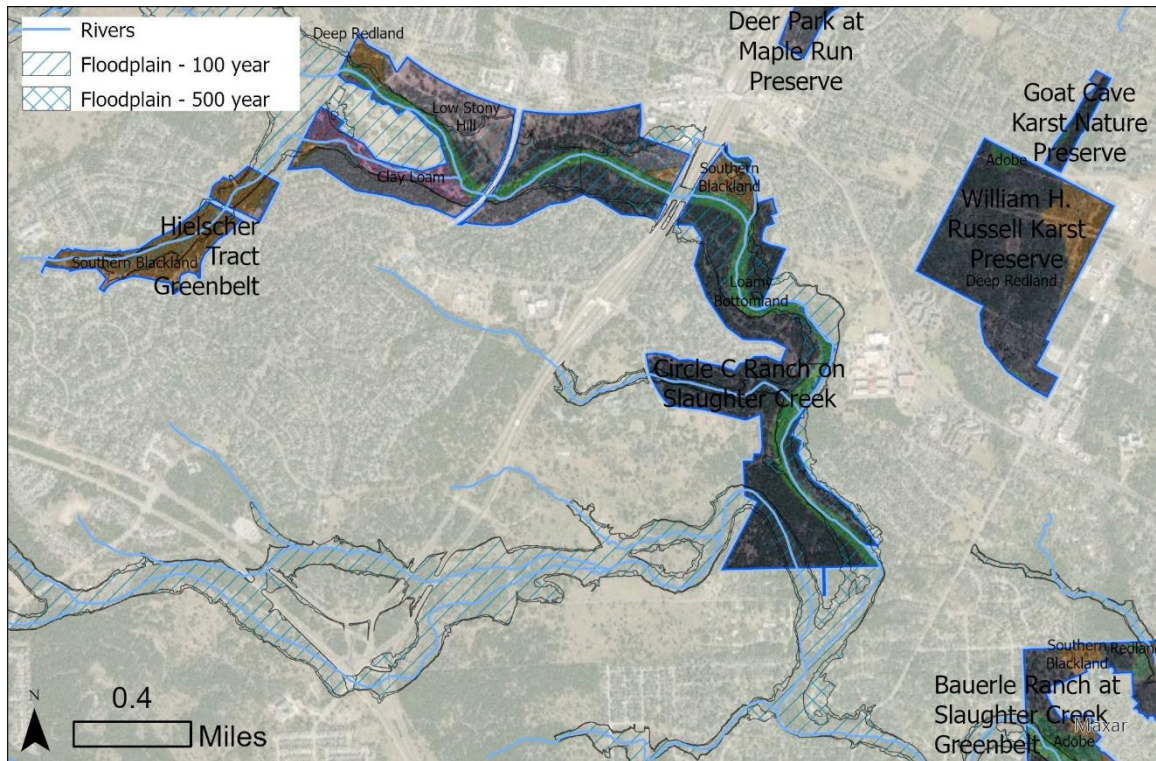


Figure 1-92 Slaughter Creek Metro Complex Ecological Sites

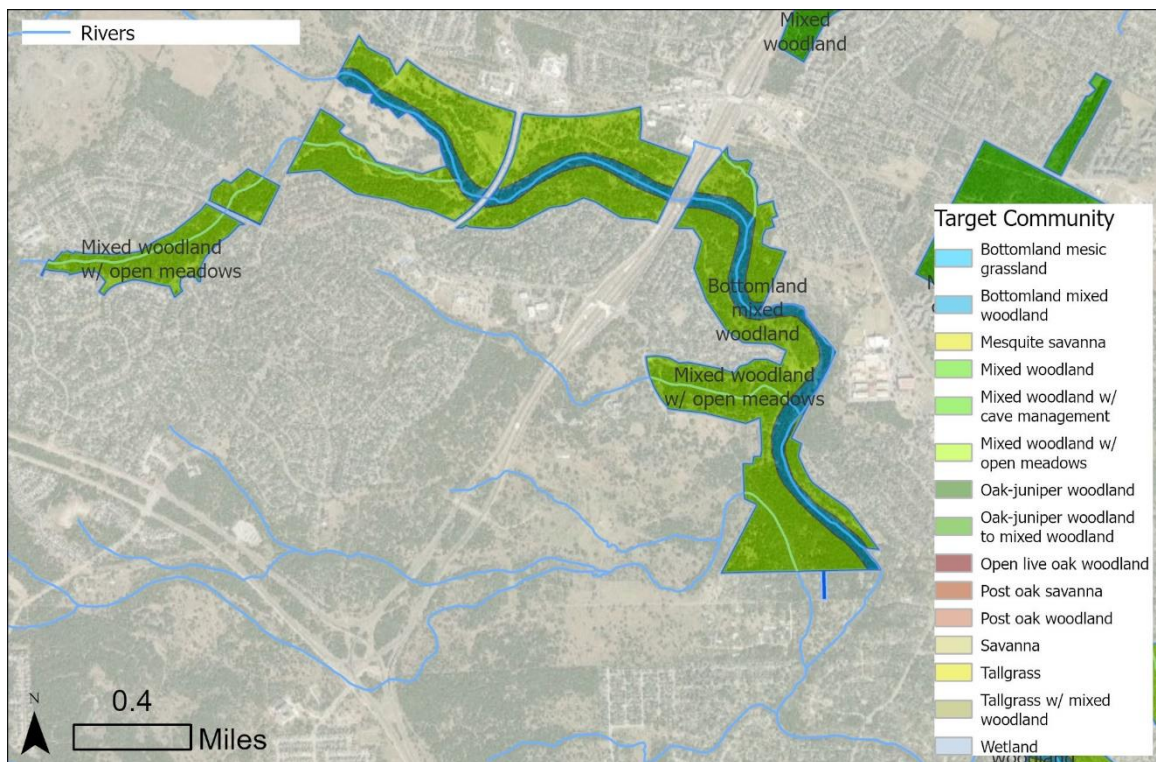


Figure 1-93 Slaughter Creek Metro Complex Environmental Target Community

1.2.11 ST. EDWARDS GREENBELT

The unit is dominated by oak-juniper woodland with some grassland and converted land. It is part of the Balcones Canyonlands Preserve.

The unit is in an area of low social vulnerability.

Strengths

- Varied topographic and hydrologic conditions allowing for diversity of community types
- Hillslope herbaceous communities found on the thin, rocky slopes of ecological sites like steep adobe contain a diverse mix of native herbaceous species can accommodate changing conditions including high heat, frequent drought, and flashy precipitation patterns. These communities have lower invasive species cover than flatter, deeper soils.
- High vegetative cover
- Diverse age classes in woodland
- Minimal erosion
- Structurally diverse riparian community present, at least 25' wide.

Challenges

- Most oak-juniper woodlands had high density with fuel model type shrub. However, some areas had timber structure
- Low species diversity in oak-juniper woodlands
- Moderate invasive species presence

Strategies

- Golden-cheeked warbler breeding habitat is found within the preserve. Management should adhere to appropriate protocols for management within potential and documented golden-cheeked warbler habitat.
- Woodland selective thinning to create a timber structure to reduce the intensity of wildfire and crown fire risk, diversify age structure, reduce competition and to encourage recruitment of wider range of species, particularly resprouting woody species that can recover following wildfire.
- Invasive management

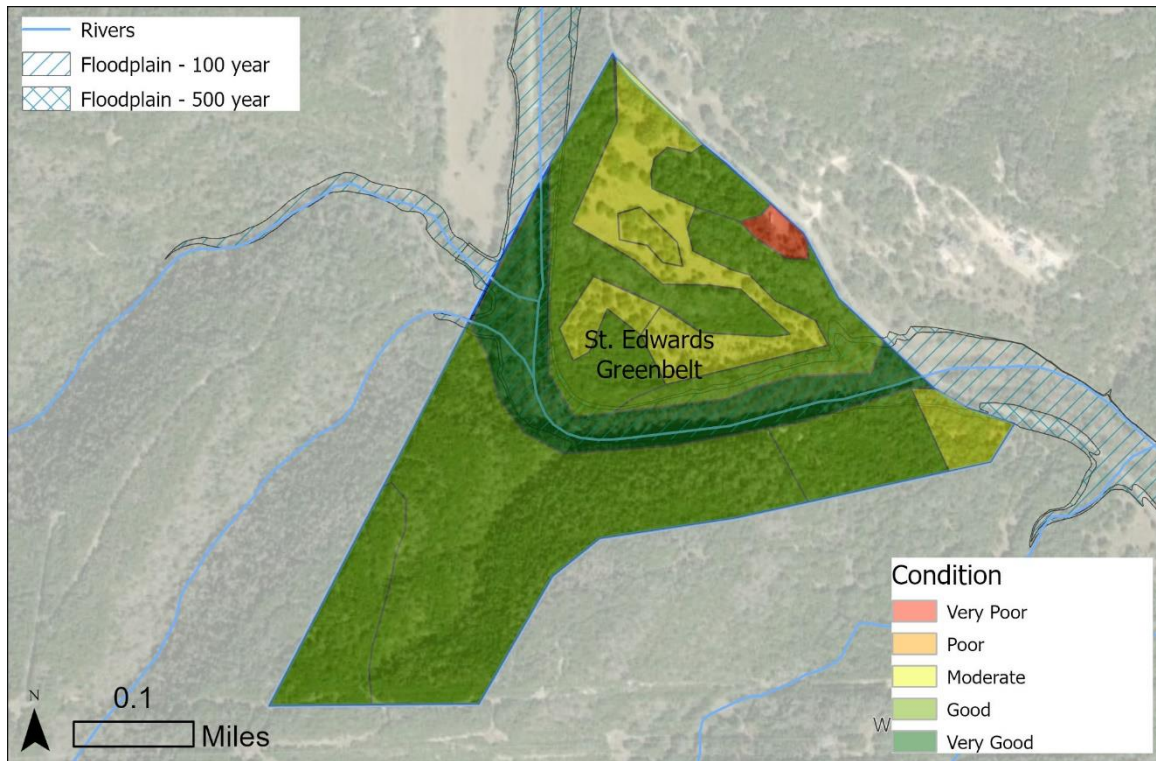


Figure 1-94 St. Edwards Greenbelt Condition

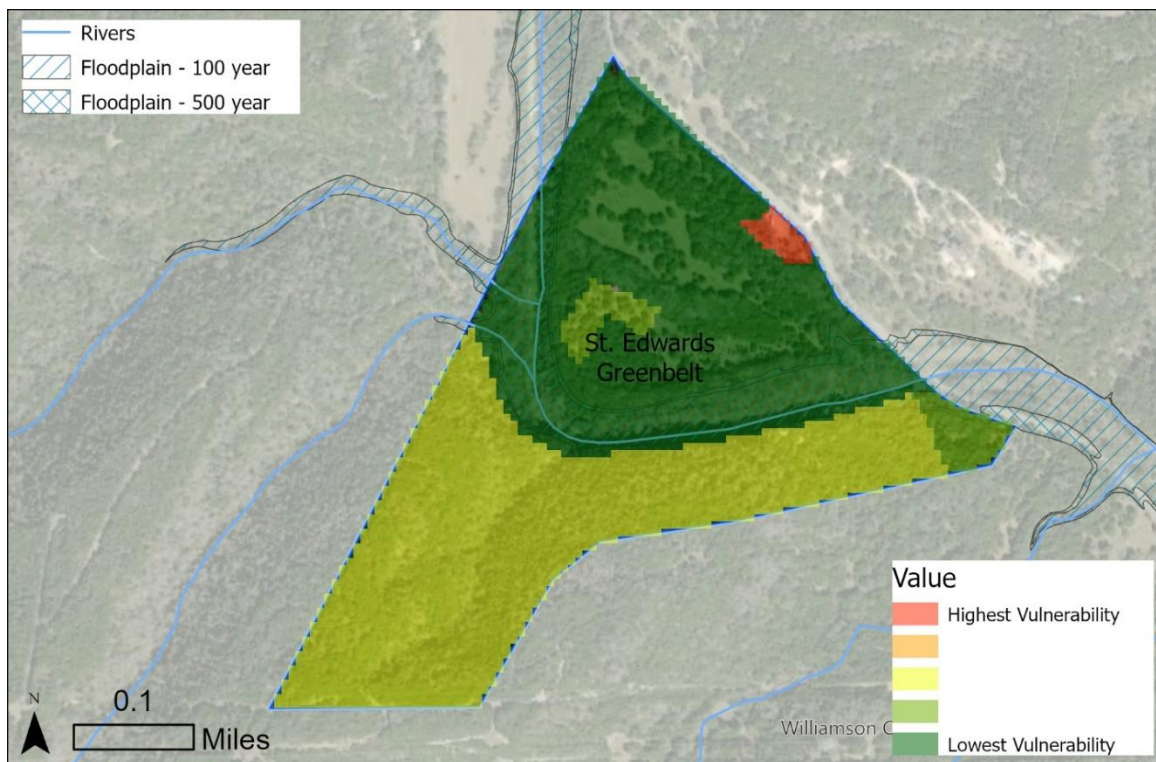


Figure 1-95 St. Edwards Greenbelt Environmental Vulnerability Index

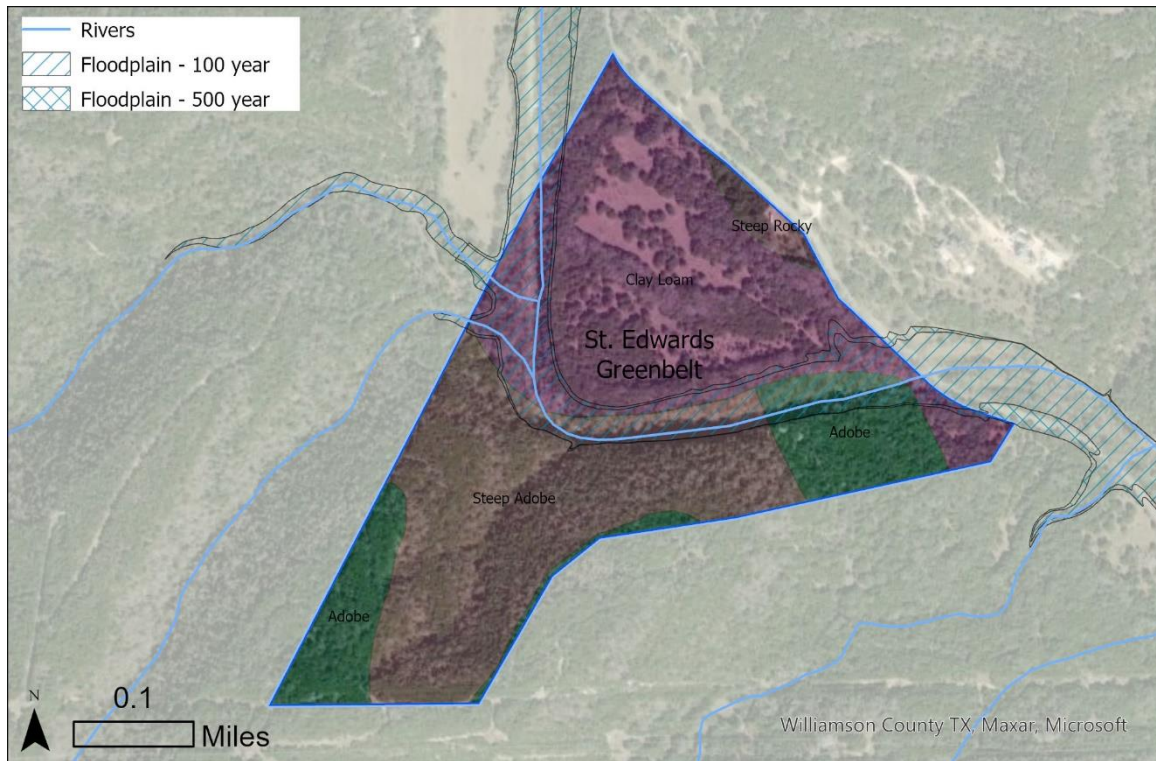


Figure 1-96 St. Edwards Greenbelt Ecological Sites

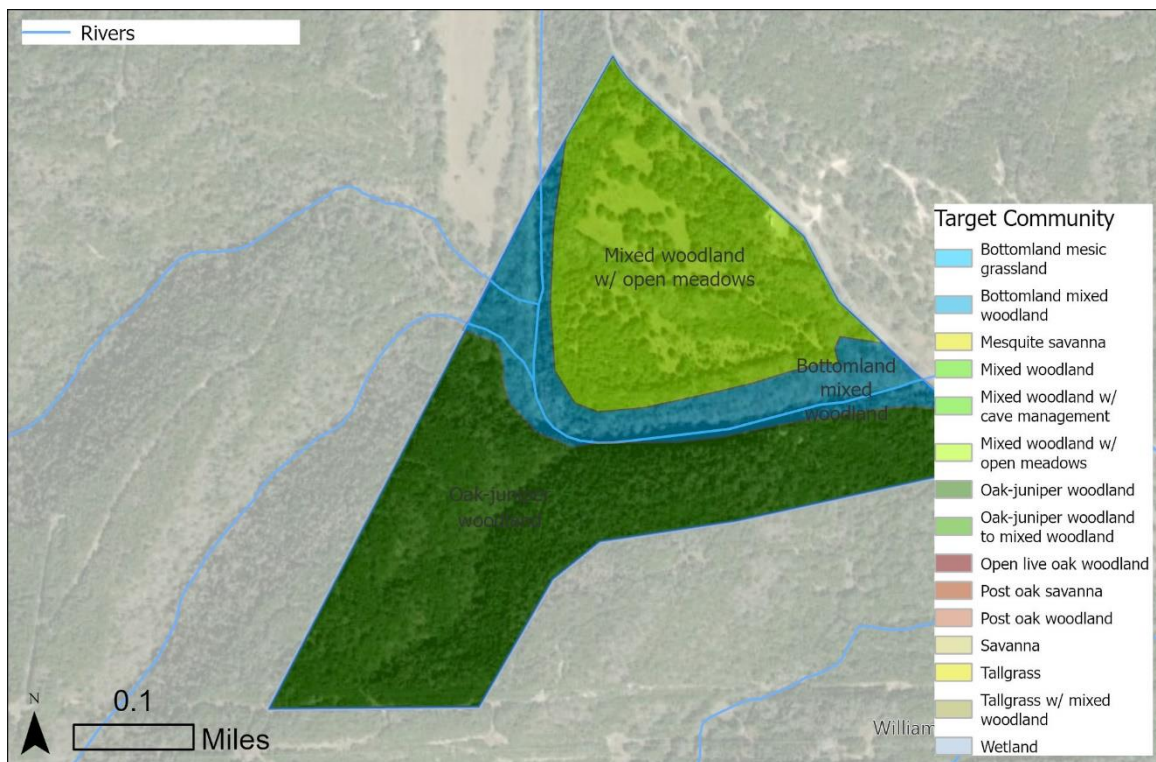


Figure 1-97 St. Edwards Greenbelt Target Communities

1.2.12 STEPHENSON NATURE PRESERVE

The unit has multiple community types including mesquite-midgrass savanna, oak—juniper woodland, and riparian woodlands. The herbaceous community in open eastern areas is dominated by increaser grasses and invasive species such as King Ranch bluestem, though isolated pockets of little bluestem exist. Oak—juniper woodlands with low diversity and high density occupies the central portion of the site. Western areas are a mosaic of mixed woodland. The unit has a plant community and fuel model assessment (Keith 2014g).

The unit is in an area of low social vulnerability.

Strengths

- Soils in good condition with limited erosion
- High vegetative cover
- Diversity of community types
- Large individual live oaks and Ashe juniper
- Bottomland cedar-elm hackberry woodlands have open structure and well-developed herbaceous cover with moderate diversity
- Structurally diverse, riparian woodland community at least 25' wide exists with limited erosion

Challenges

- Oak – juniper woodland trails have moderate erosion
- Oak-juniper woodlands have very low diversity and dense shrub structure, though some areas with open timber structure exist
- Grassland areas have high invasive species coverage, predominantly King Ranch bluestem
- Riparian areas have moderate invasive species coverage including Johnsongrass

Strategies

- Woodland selective thinning to create a timber structure in order to reduce wildfire intensity and crown fire risk, diversify age structure, reduce competition, and encourage recruitment of a wider range of species
- Invasive management
- Species addition

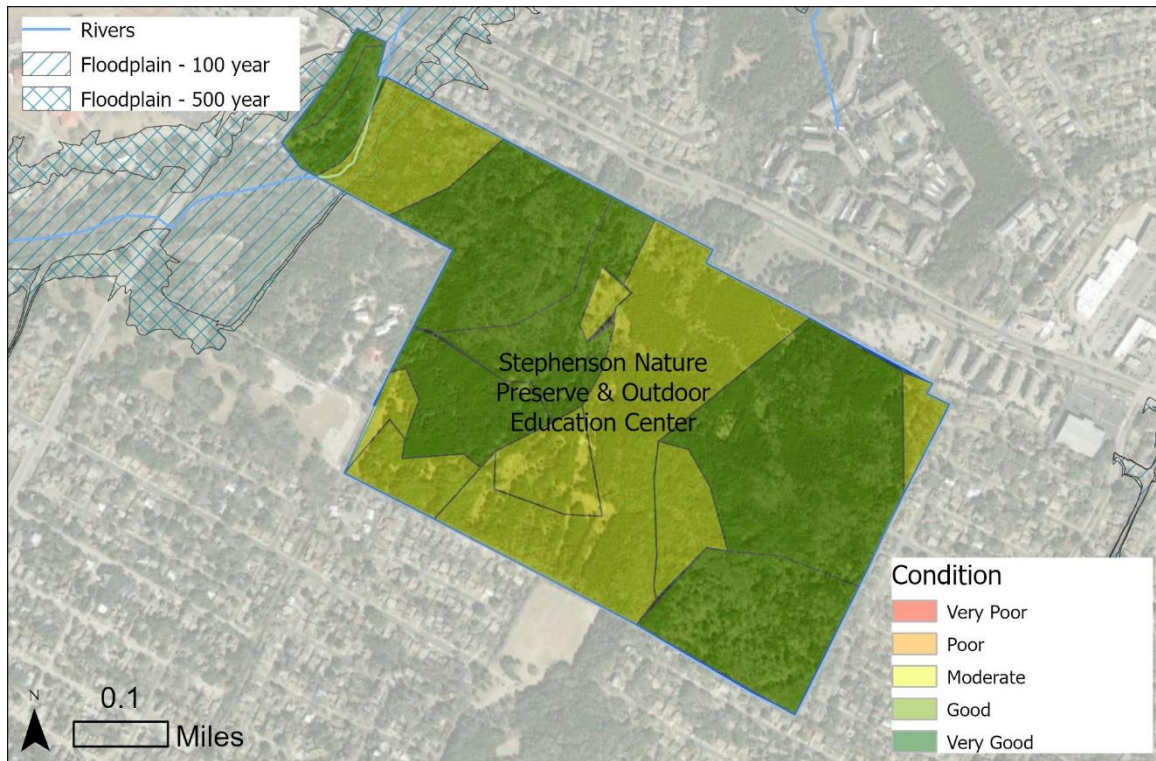


Figure 1-98 Stephenson Nature Preserve Condition

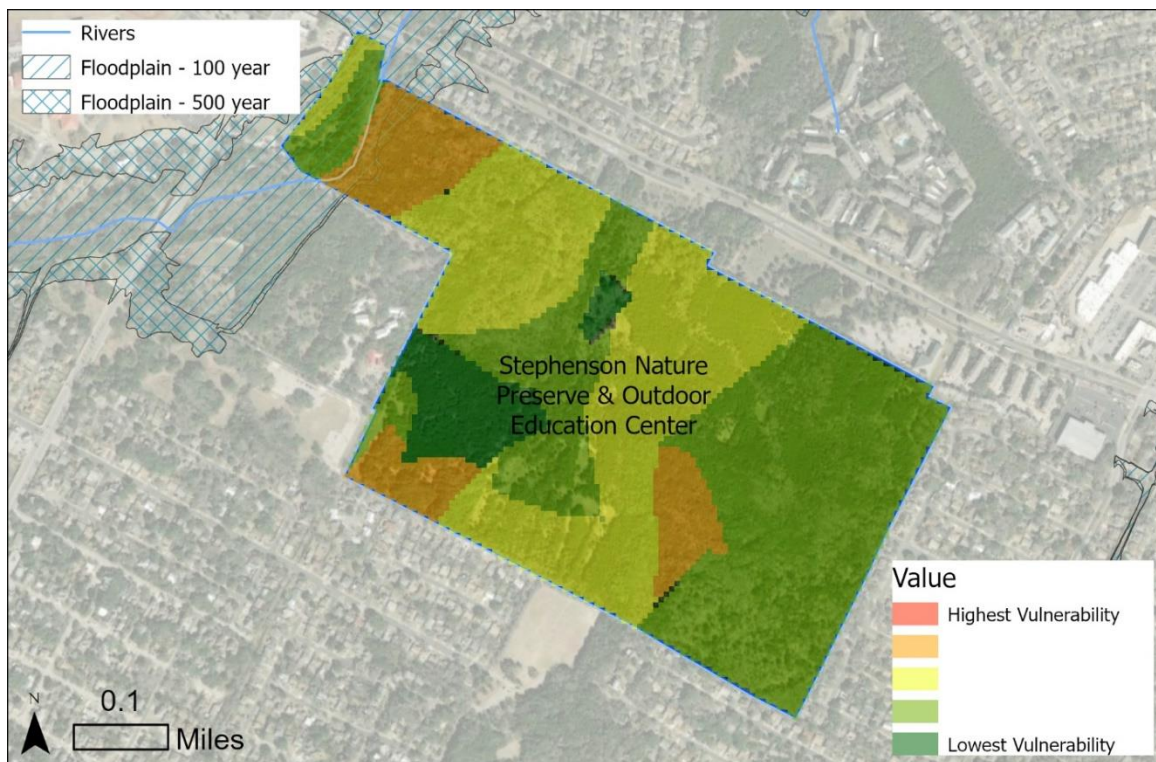


Figure 1-99 Stephenson Nature Preserve Environmental Vulnerability Index

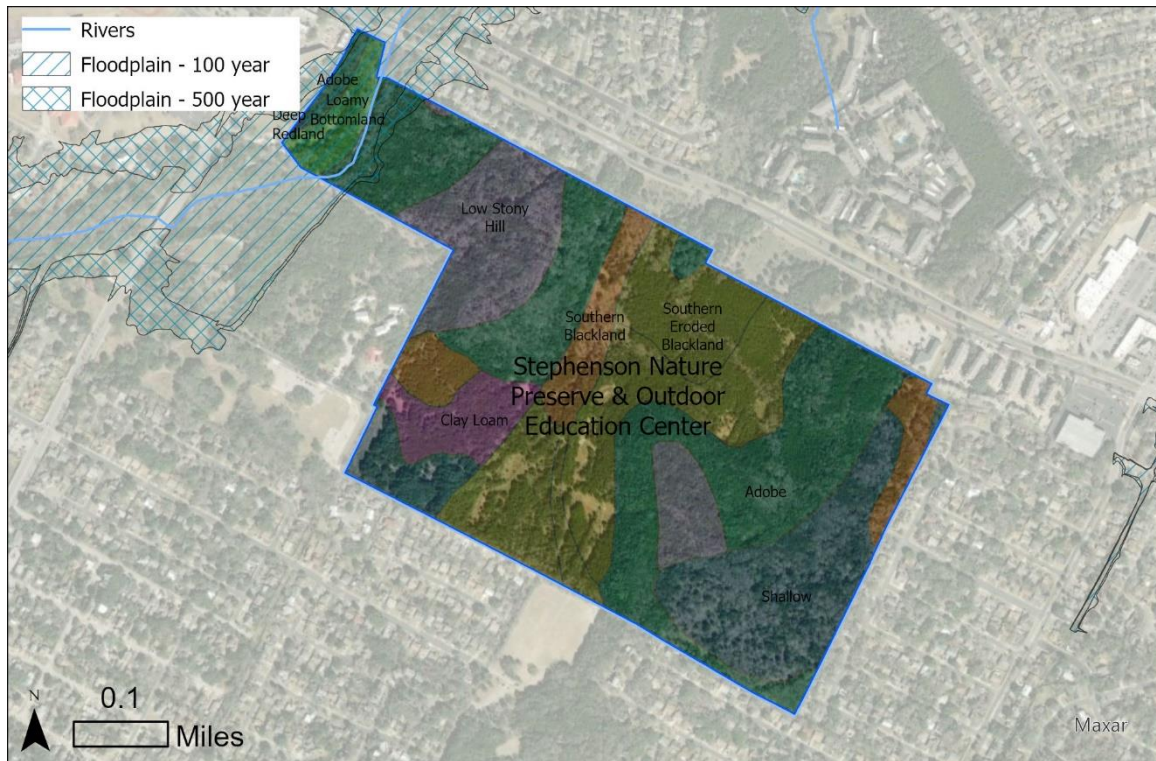


Figure 1-100 Stephenson Nature Preserve Ecological Sites

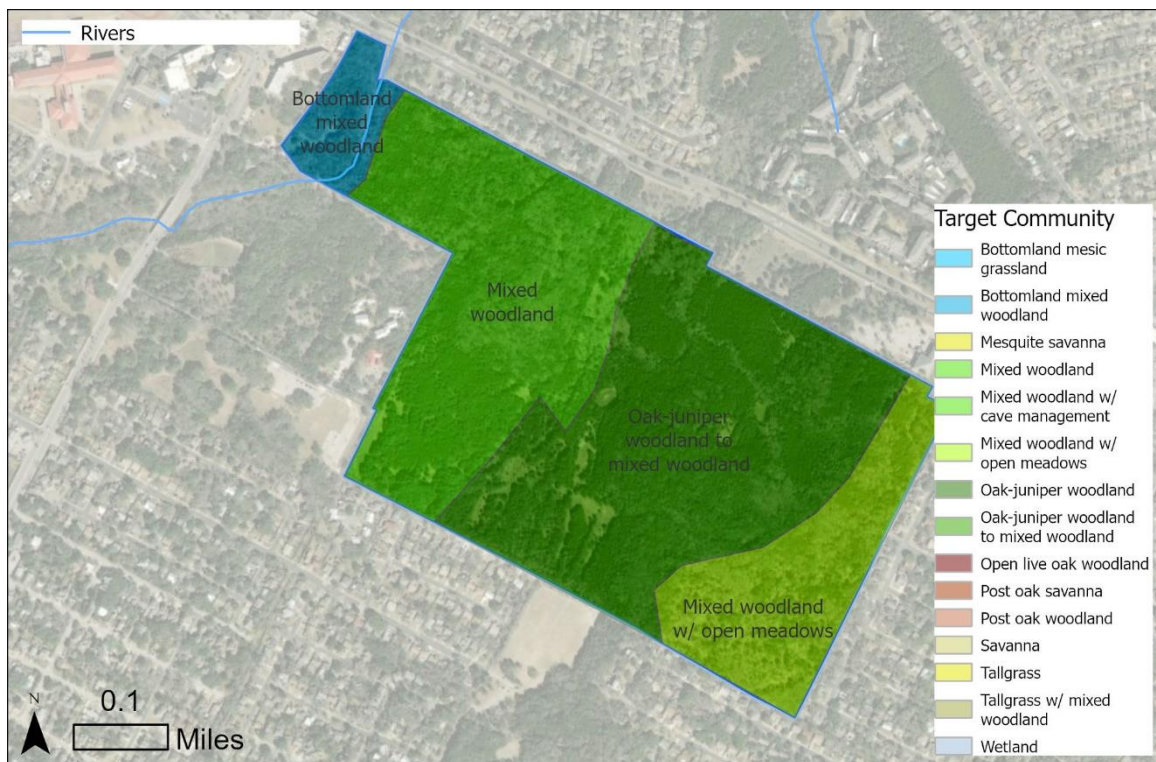


Figure 1-101 Stephenson Nature Preserve Environmental Target Communities

1.2.13 STILLHOUSE NATURE PRESERVE

Stillhouse nature preserve is dominated by high density juniper-oak woodland. The unit has a 2014 Plant Community and Fuel Model Assessment (Keith 2014h). The unit is part of the Balcones Canyonlands Preserve.

The unit is in an area of low social vulnerability.

Strengths

- Limited invasive species
- Soils in good condition with limited erosion
- Native woody species include pecan, hackberry, Ashe juniper, plateau live oak, lacey oak (*Quercus laceyi*), and elm species.
- Several rare and endangered species including the federally threatened Jollyville Plateau salamander (*Eurycea tonkawae*) and the federally endangered bone cave harvestman (*Texella reyesi*) as well as several karst invertebrate species of concern.

Challenges

- Low overall diversity
- High woodland density with fuel model type – shrub.

Strategies

- Adhere to appropriate protocols for management within potential and documented Golden-cheeked warbler habitat
- Adhere to appropriate protocols for rare and endangered species found within the unit.
- Woodland selective thinning to create a timber structure in order to reduce wildfire intensity and crown fire risk, diversify age structure, reduce competition, and encourage recruitment of a wider range of species

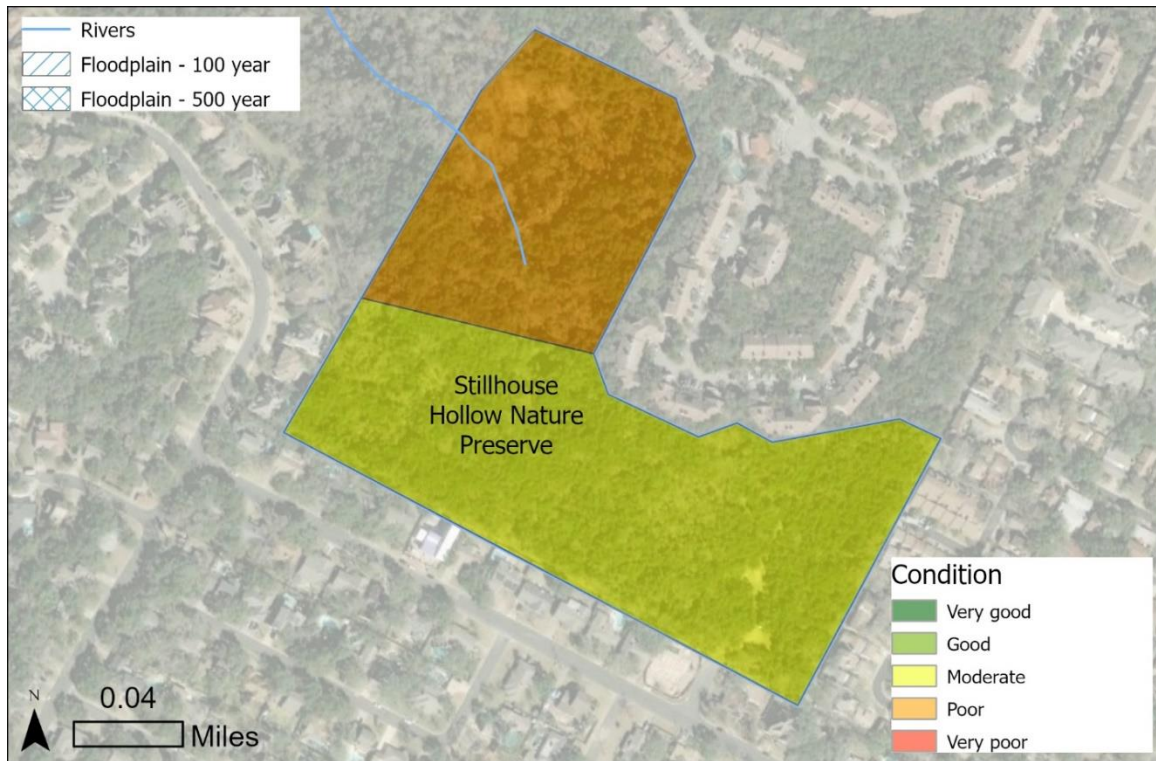


Figure 1-102 Stillhouse Nature Preserve Condition

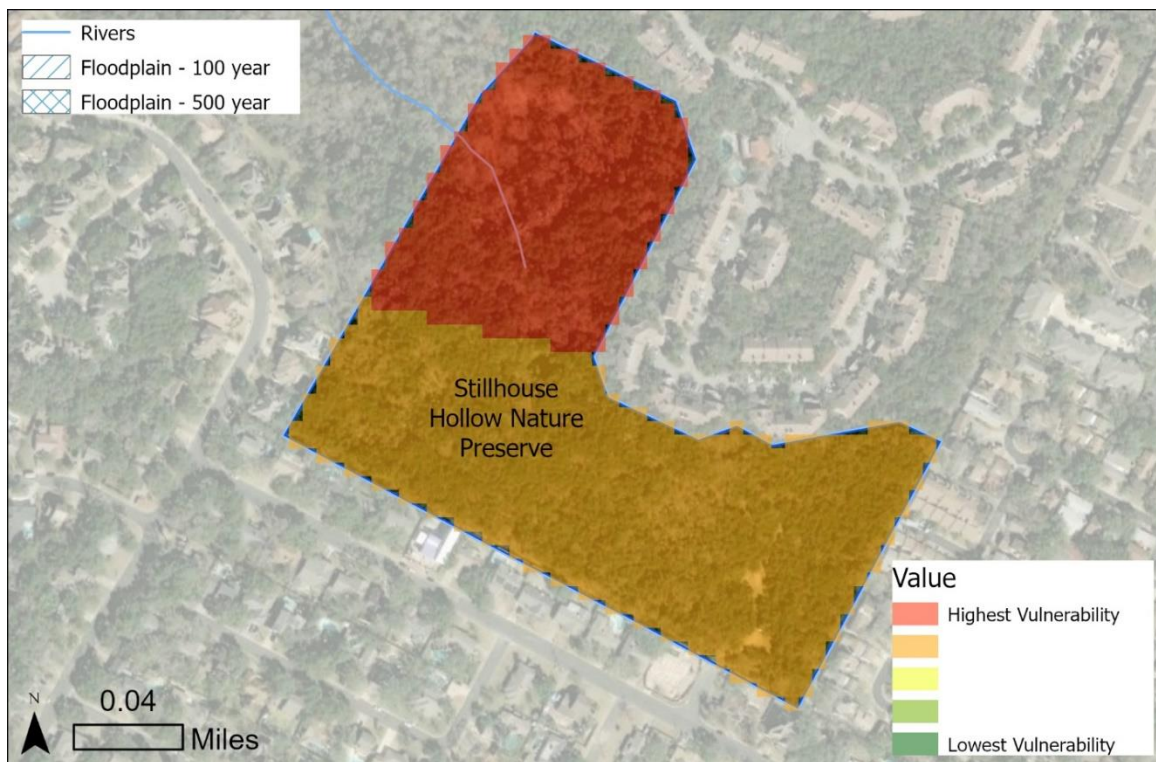


Figure 1-103 Stillhouse Nature Preserve Environmental Vulnerability Index



Figure 1-104 Stillhouse Nature Preserve Ecological Sites



Figure 1-105 Stillhouse Nature Preserve Target Community

1.2.14 WILLIAM H. RUSSEL KARST PRESERVE AND GOAT CAVE KARST PRESERVE

The William H Russel Karst Preserve has a 2020 land management plan (City of Austin 2020) and a 2014 fuel assessment study (Keith 2014b). The tract contains Blowing Sink Cave, a permit cave requiring protection under the U.S. Fish and Wildlife Service (USFWS) Balcones Canyonland Conservation Plan (BCCP) for the preservation of rare karst invertebrates. The site is also important for the preservation of the Barton Springs salamander (*Eurycea sosorum*). The site contains potential Golden-cheeked warbler habitat. The adjacent Goat Cave Karst Preserve has similar topography and vegetation to William H. Russel Karst Preserve but does not have a current land management plan.

The unit is located in an area of low social vulnerability. Both units are part of the Balcones Canyonlands preserve.

Strengths

- Moderate overall diversity including presence of reference species from the historical climax community
- Wetland community present
- Soils in good condition with limited erosion

Challenges

- Moderate invasive species
- High woodland density with fuel model type – shrub

Strategies

- Cave management as outlined in the 2020 land management plan
- Adhere to appropriate protocols for management within potential and documented Golden-cheeked warbler habitat
- Invasive management
- Woodland selective thinning to create a timber structure in order to reduce wildfire intensity and crown fire risk, diversify age structure, reduce competition, and encourage recruitment of a wider range of species

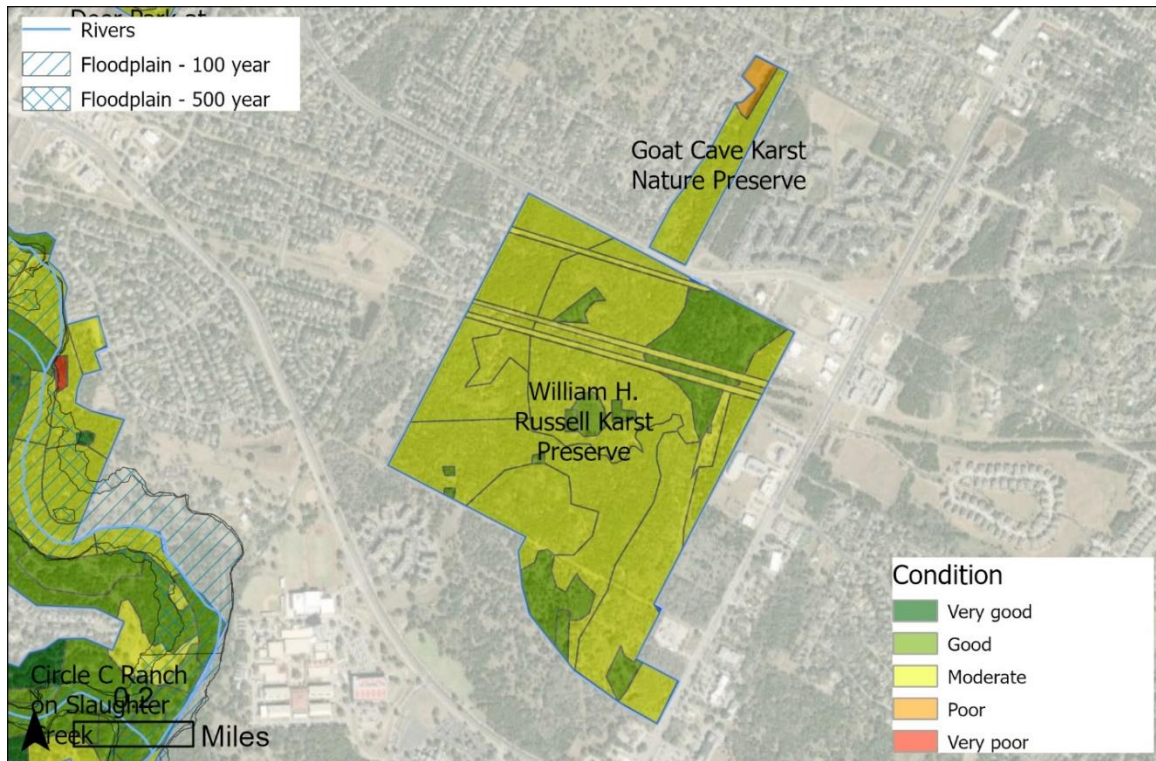


Figure 1-106 William H. Russel and Goat Cave Karst Preserve Condition

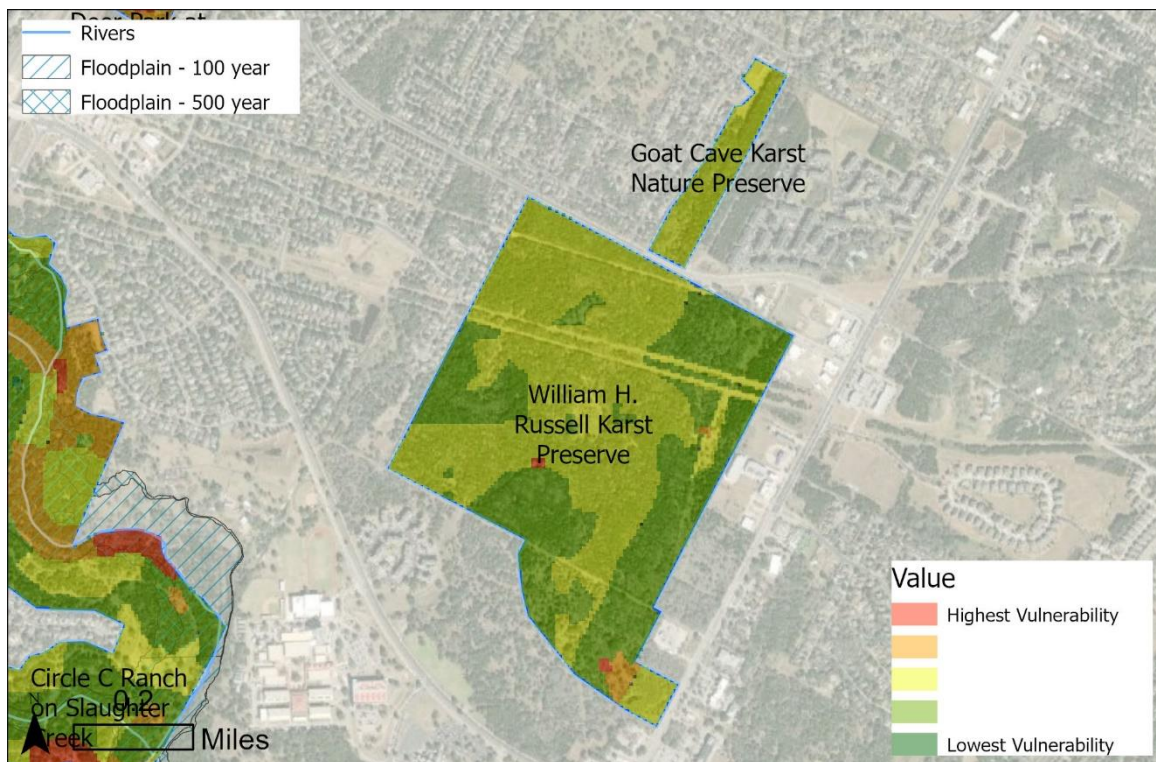


Figure 1-107 William H. Russel and Goat Cave Karst Preserve Environmental Vulnerability Index

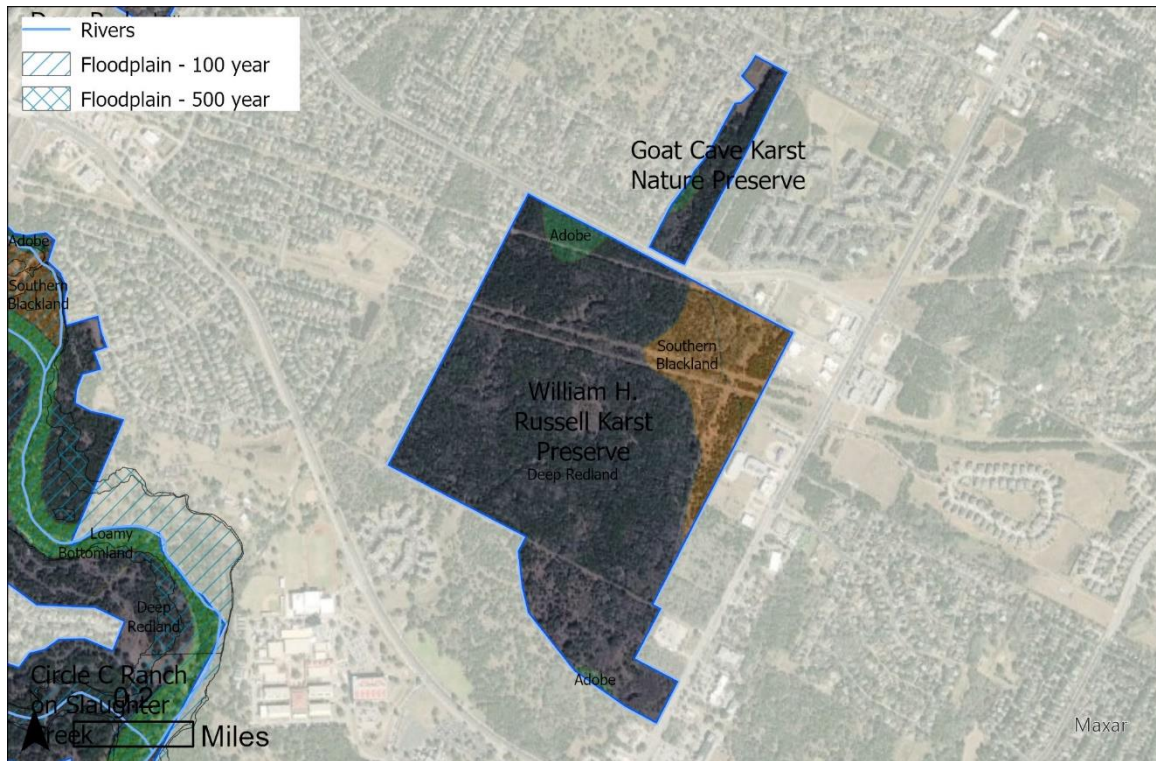


Figure 1-108 William H. Russell and Goat Cave Karst Preserve Ecological Sites

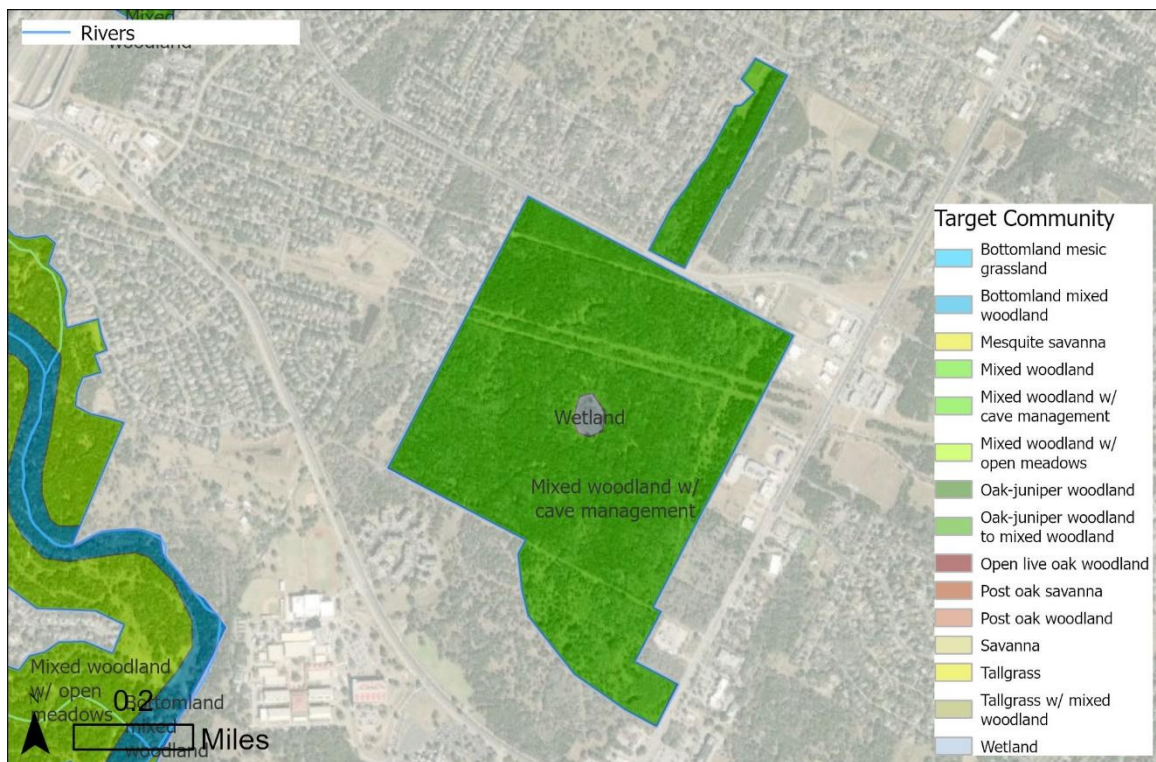


Figure 1-109 William H. Russell and Goat Cave Karst Preserve Target Communities

1.2.15 ZILKER NATURE PRESERVE

The unit is composed of a mosaic of oak-juniper woodland and deciduous woodland in the uplands and deciduous elm—hackberry—cottonwood woodlands in drainages. The woodland and converted grassland communities along Ladybird Lake are highly disturbed.

The unit is located in an area of low social vulnerability.

Strengths

- Varied topographic and hydrologic conditions allows for diversity of community types
- Varied topographic and hydrologic conditions allowing for diversity of community types
- Mixed woodlands have moderate diversity

Challenges

- Significant disturbance along Ladybird Lake with moderate to severe erosion and high invasive species cover
- Converted land
- Moderate to high invasive species cover
- Low diversity and high density in oak-juniper woodlands

Strategies

- Woodland selective thinning to create a timber structure in order to reduce wildfire intensity and crown fire risk, diversify age structure, reduce competition, and encourage recruitment of a wider range of species
- Invasive management

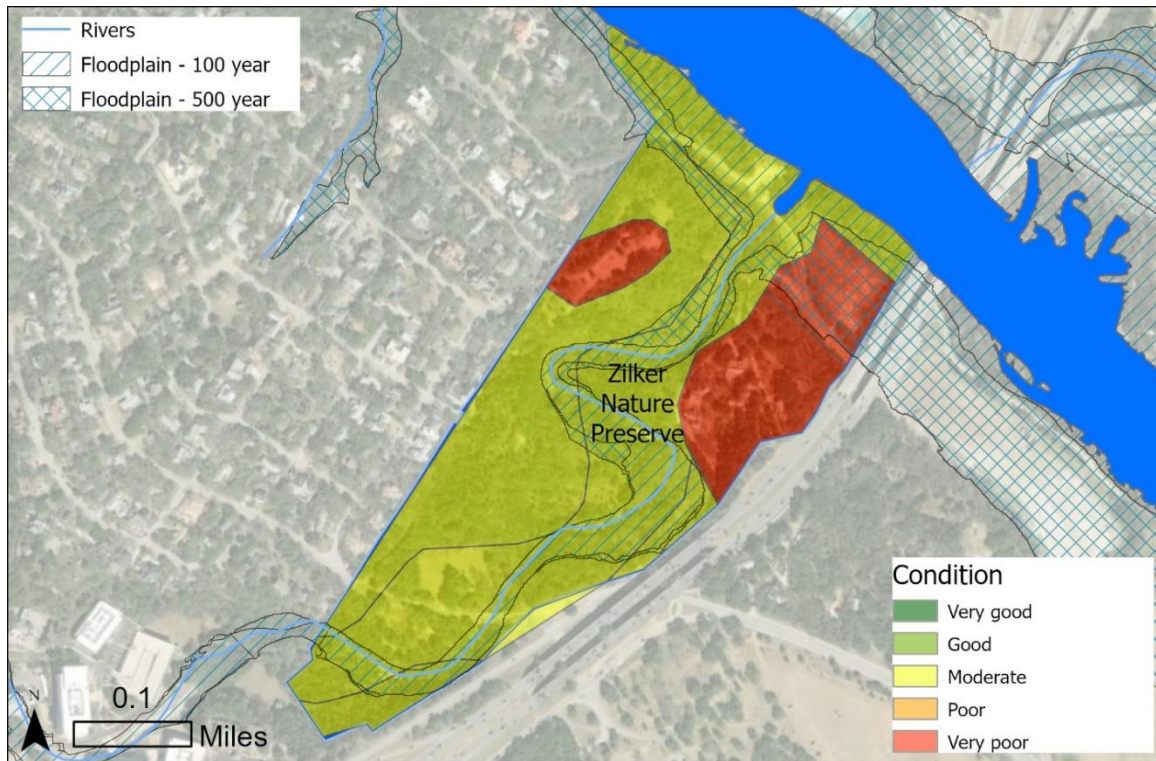


Figure 1-110 Zilker Nature Preserve Condition

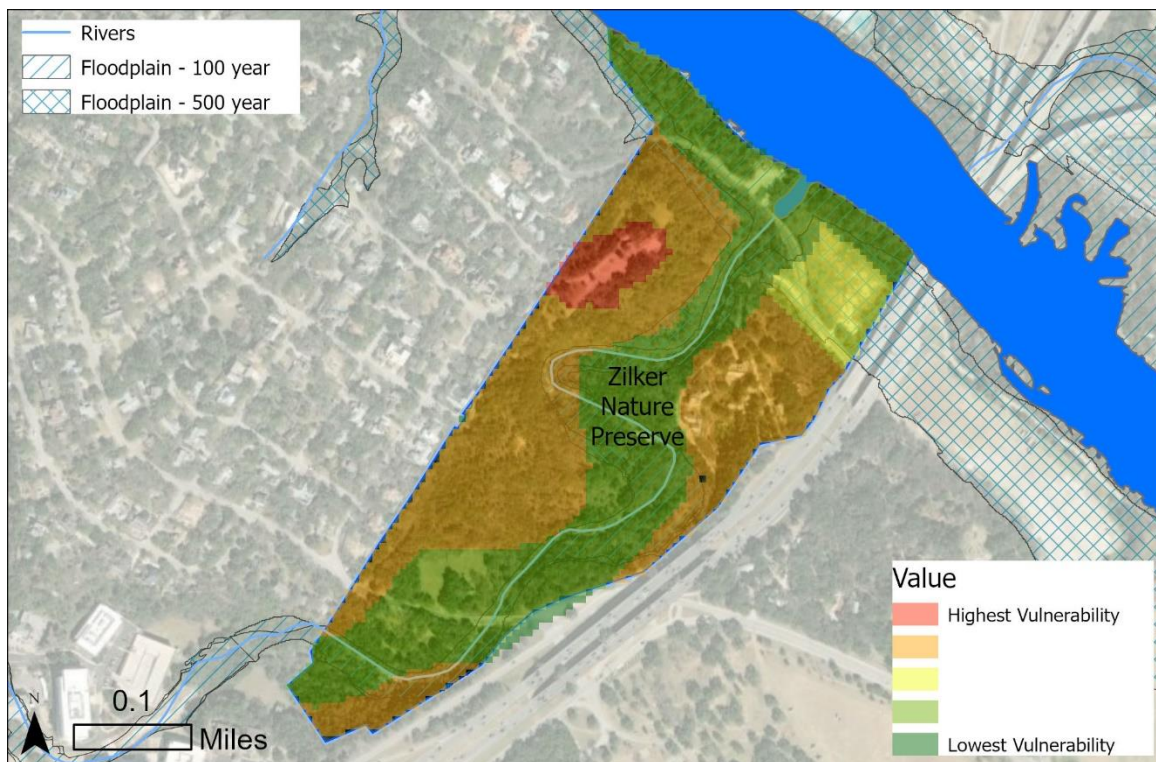


Figure 1-111 Zilker Nature Preserve Environmental Vulnerability Index

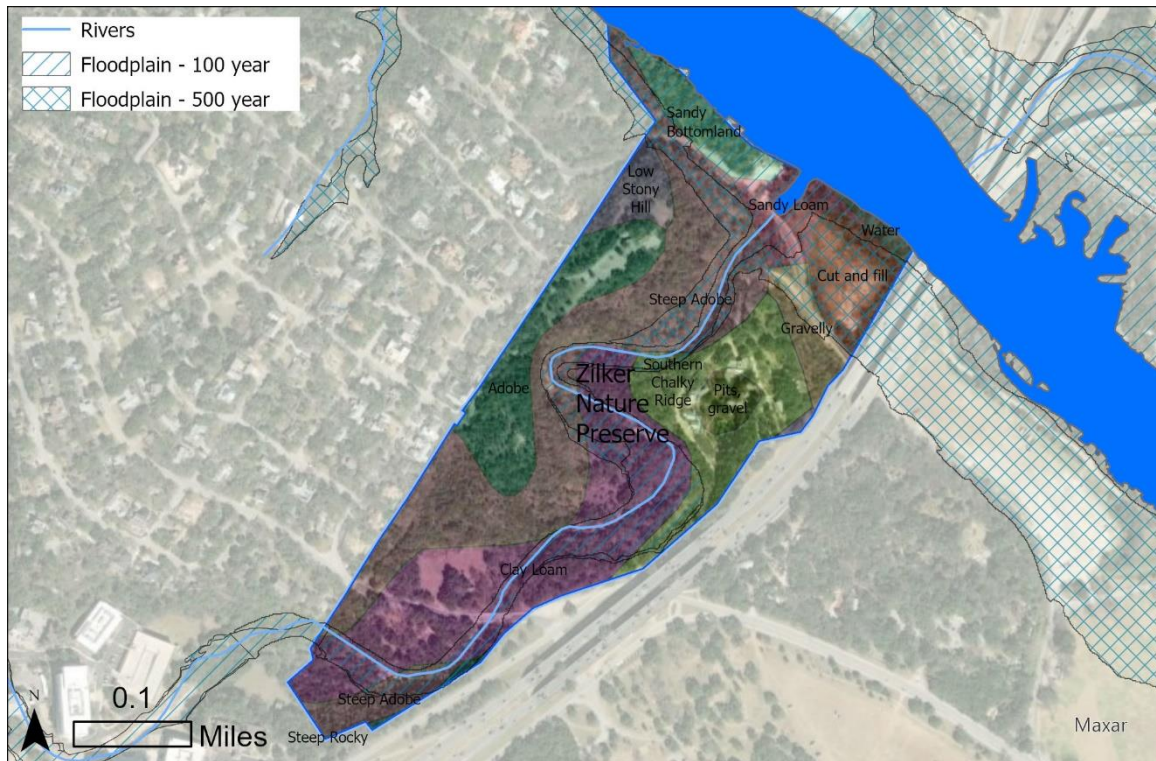


Figure 1-112 Zilker Nature Preserve Ecological Site



Figure 1-113 Zilker Nature Preserve Target Communities

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