

CATEGORY 1

Priority Conservation Actions Tied to Conservation Opportunity Areas and Statewide Broad-Based Priority Conservation Actions for Species of Greatest Conservation Need

Priority Conservation Actions Tied to Conservation Opportunity Areas by Ecological Feature

Focus habitat work on the natural communities that Wisconsin has an especially significant role in perpetuating the ecological features, natural communities, and species habitat. For Wisconsin, priority ecological features include pine-oak barrens, bur oak openings, warm water rivers, Great Lakes shoreline and estuarine communities, large sedge meadows, dry prairies, large blocks of older southern oak forest and woodland, large blocks of older northern forests, floodplains – including forests and backwaters, and cliffs/karst features of the Niagara Escarpment. Specific conservation actions arranged by ecological feature and relative significance in Wisconsin include:

Global

Great Lakes and their Shorelines

Including dune, beach, forested ridge and swale, boreal forest (restoration sites), shore fens, and estuaries.

- Protect and restore harbor and river mouth shoreline and wetland habitats.
- Preserve and maintain large expanses of sedge meadow, coastal fen and forested wetlands along the coast and manage in the context of a mosaic of community types.
- Monitor community level vegetation changes within coastal fen in light of climate change and lowering lake levels.
- Protect intact examples of forested ridge and swale sites, monitor for invasive exotic species and implement an eradication plan.
- Increase representation of near-shore boreal forest by encouraging retention of white spruce, white pine, white cedar, and balsam fir, especially in older age classes, by adaptive management and selective planting.

Northern Highland Kettle Lakes and Pine Forest

Including hemlock-hardwoods and forested wetland types in north central and pine forest in Northern Highland.

- Develop tax incentives to preserve old-growth forest.
- Manage forest adjacent to old-growth stands and ephemeral ponds to complement the ecological values of the primary feature.
- Work towards a balanced mosaic of age-classes; older age-classes are currently underrepresented.
- Increase representation of red and white pine forests, especially older age classes.
- Use adaptive management techniques to develop pine dominated forest structure and composition.
- Develop techniques for using prescribed fire to reduce other woody competition when establishing and maintaining red and white pine forests.
- Develop educational tools and demonstration areas to articulate the benefits of utilizing prescribed burning for ecological management.
- Develop reliable natural regeneration techniques for red pine and mixed red and white pine forests.

Pine-Oak Barrens

- Create financial incentives to develop jack pine – northern pin oak forests.
- Create financial incentives to address differential market values between plantation forestry and natural regeneration dry forests, for retention of old-growth patches, or prescribed burning in and around core managed areas.
- Develop educational tools and demonstration/training areas that promote prescribed fire and other barrens management practices.
- Manage the full range of barrens succession stages and diverse habitats in a landscape context. A comprehensive landscape plan requires identification and management of early succession cores. The “barrens” also needs to have places managed in a shifting mosaic utilizing timber harvest with

many clearcuts, some older than rotation age stands, some thinning of stands for savanna structure and a few protected groves. Many stands should be thinned to a safe amount of residual standing timber, and then burned for stand regeneration while leaving charred legacies. A few selected shallow, publicly owned lakes should have plans for open shorelines on the west and south sides.

- Identify additional sites containing high quality or restorable barrens.
- Develop a practical “toolkit” for maintaining structural and compositional characteristics of barrens ecosystems.
- Integrate planning efforts across federal, state, county, local and industrial ownership boundaries.

Bur Oak Openings

- Focus management and restoration efforts in the southern Kettle Moraine conservation opportunity area to emphasize oak openings, oak woodland and low prairie communities with smaller patches of dry prairie, open marshy wetlands, and patches of older closed canopy forest.
- Focus management and restoration efforts in the sandstone-influenced conservation opportunity areas to emphasize oak barrens, oak woodland and sand prairie communities with smaller patches pine relicts, dry prairie, open shrubby barrens, closed canopy oak forest, and rock outcrops.
- Create financial incentives similar to the either the Farmland Preservation Program or Managed Forest Law to protect and manage high quality examples of dry prairie, oak opening, oak woodland or retention of old-growth patches including hemlock and pine relicts, on private land.
- Create financial incentives similar to the Wisconsin Forest Landowner Grant Program (WFLGP) to address the differences in market values between oak savanna restoration and oak forest management or prescribed burning in and around prairie and savanna managed areas.
- Develop educational tools and demonstration/training areas that promote prescribed fire and other prairie and savanna management practices.
- Identify additional sites containing high quality or restorable oak barrens, oak savannas and woodlands.
- Develop a practical “toolkit” for maintaining structural and compositional characteristics of oak savanna ecosystems.

Niagara Escarpment.

- In the Niagara Escarpment Conservation Opportunity Area, encourage public and private landowners to maintain natural forest cover, protect surface areas that drain into natural fissures, minimize pesticide infiltration, and do not physically block sinkholes.
- Preserve habitat and protect from conversion to other land uses, those unique areas on the Niagara Escarpment currently occupied by SGCN species.
- On Wisconsin’s only large alvar, minimize impacts from quarrying, road construction, and housing development by acquisition of fee title, development rights, transfer of development rights, and zoning.
- Manage alvars by thinning densely vegetated areas and removing aggressive exotic shrubs.

Continental

Driftless Area Features

- Focus management and restoration efforts in the loess-influenced forest Conservation Opportunity Areas to emphasize a matrix of older oak-central hardwood forest with smaller patches of oak woodland, oak opening, regenerating younger forest, native prairies and relict forests.
- Focus management and restoration efforts in the sandstone-influenced Conservation Opportunity Areas to emphasize dry oak savanna, oak woodland and sand prairie communities with smaller embedded patches containing regenerating oak forest, pine relicts, dry prairie, open shrubby barrens, closed canopy oak forest, and rock outcrops.
- Create financial incentives similar to the either the Farmland Preservation Program or Managed Forest Law to protect and manage up to 20,000 acres of high quality examples of goat prairie, oak opening, oak woodland or retention of old-growth patches including hemlock and pine relicts, on private land.
- Create financial incentives similar to the Wisconsin Forest Landowner Grant Program (WFLGP) to address the differential market values between oak savanna restoration and oak forest management, reforestation of old fields to reduce fragmentation, or prescribed burning in and around prairie and savanna managed areas.
- Restore oak openings and woodlands and expand and enhance goat prairie and shrub habitats on public lands in appropriate Conservation Opportunity Areas through fire, ground layer enhancement, and timber management.

- Develop incentives for the start-up cost of converting from row-crop agricultural systems to a rotational grazing or biofuels production systems, which will keep permanent cover on the land, provide grassland habitat and significantly reduce soil loss into streams.
- Develop educational tools and demonstration/training areas that promote prescribed fire and other prairie and savanna management practices.
- Identify additional sites containing high quality or restorable oak barrens, oak savannas and woodlands.
- Zoning of bluffslands needs to recognize the critical importance of maintaining goat prairies, oak savanna restoration opportunities, connecting habitat corridors, migratory bird stopover sites, and forested habitat is essential for long-term maintenance of viable SGCN populations.
- Partnering with prairie/savanna/forest restoration groups to manage and protect habitats is vital to effectively keep SGCNs on the landscape.
- Conduct large-scale planning efforts with agencies, state government and partners regarding the upper Mississippi River and its adjacent bluffslands.

Large Blocks – Old Deciduous-Coniferous Forest (climate change resistant forest systems)

Baraboo Hills and Boreal Forest Transition

- Develop tax incentives to preserve old-growth forest.
- Manage forest adjacent to old-growth stands and ephemeral ponds the complement to the ecological values of the primary feature.
- Work towards a balanced mosaic of age-classes; older age-classes are currently underrepresented.
- Encourage regeneration or reestablishment of eastern hemlock, Canada yew, yellow birch, white cedar, and other conifer, where appropriate through adaptive management techniques.
- Increase representation of red and white pine forests, especially older age classes.
- Conduct an inventory and map the locations of ephemeral ponds.
- Conduct additional survey work in northern wet forest for boreal birds, invertebrates and other taxa.
- In areas free of exotic earthworms, minimize the likelihood of invasion by earthworms by preventing transportation of worms in soil, potted plants, mulch and compost.

Kettle Moraines Features

Concentrations of calcareous fens, prairies, oak woodlands, oak/central hardwood forest, forested wetlands, and glacial features.

- Focus management and restoration efforts in the middle and north Kettle Moraine areas forest conservation opportunity areas to emphasize a matrix of older oak-central hardwood forest with smaller patches of oak woodland, oak savanna, native prairies and relict forests.
- Develop a practical “toolkit” for maintaining structural and compositional characteristics of dry oak forest and oak savanna ecosystems.
- Develop cost share incentives for landowners to burn, eradicate invasive exotic species, and restore oak openings and forests, prairies, fens and sedge meadows.
- Preserve and manage all wet-mesic prairie sites, restore degraded sites (emphasizing restoration of hydrology), and manage the sites in a matrix of surrogate grasslands and other shrub and savanna habitats for area sensitive species.
- Promote private land management of small sites where possible by offering incentives to private landowners for preservation or restoration of prairies.
- Monitor wet-mesic prairies to determine whether prescribed burning and other management activities are maintaining invertebrate diversity.
- Preserve and manage all wet-mesic prairie, calcareous fen and tamarack fen sites; restore degraded sites (emphasizing restoration of hydrology), and manage the sites in a matrix of sedge meadow, surrogate grasslands and other shrub and savanna habitats for area sensitive species.

Large River Corridors, including floodplain forests and backwater areas

- Protect the ecological river corridor gradients from lowlands to uplands, along with protection of the floodplain corridor. This will enlarge the amount of habitat available, allow for the movement of species upslope and downslope as environmental conditions change over time, provide suitable habitat for species that require large areas, provide migratory bird stopover habitat, or are dependent upon a mosaic of interconnected habitats, including a full range of seral stages for their long-term survival.
- Conduct large-scale planning efforts with agencies, state’s and partners regarding the upper Mississippi River, its large river tributaries and the adjacent bluffslands.
- Manage the sand and gravel-influenced floodplains of the Lower Chippewa and Lower Black Rivers for floodplain savanna conditions to help the recovery of Eastern Massasauga Rattlesnake.

- Manage appropriate native sand prairie and sand prairie restoration sites for nesting Ornate Box and Blanding's Turtles.
- Monitor long-term population status and trends for Eastern Massasauga Rattlesnake.
- Continue head starting program for Ornate Box Turtles.
- Conduct research on the interspecies competition between increasing "channel" shiners and the greatly decreasing Pallid Shiner.
- Protection and restoration of natural lake and stream habitat, including establishment of refuge areas and appropriate management of aquatic plants, are needed for conservation of the Pugnose Shiner, which requires clear waters and littoral zone vegetation.
- Protect and restore appropriate habitat in the lower Wolf River, Mississippi and Lower Wisconsin Rivers for Shoal Chub.

Upper Midwest

Glacial Lake Wisconsin

- Maintain large blocks of open bog/muskeg habitat and other surrounding wetlands and manage as co-occurring peatland communities by maintaining hydrology and eradicating invasive plant species.
- Maintain large blocks of open sedge meadow and manage as complex in conjunction with associated wetlands such as open bog, poor fen, emergent marsh, shrub-carr, alder thicket and northern wet forest by maintaining hydrology, tree cutting and harvest, prescribed fire and eradicating invasive plant species.
- Maintain lowland shrub communities, especially alder thickets and shrub-carr, and manage the working forest surrounding the shrub communities to benefit Golden-winged Warblers by leaving scattered off site aspen, ash and tamarack in the shrub areas and manage the uplands in a shifting mosaic to provide continuous habitat.
- Survey large peatlands for presence of boreal birds, Lepidoptera and other boreal taxa.
- Restore oak barrens on sites that will increase effective landscape for area sensitive species, such sand areas between large wetlands.
- Manage oaks in the context of oak forest, oak woodland, oak savanna in a gradient from forest to open wetlands.
- Maintain or restore mixed pine-oak forests to represent the range of variability expressed by this type, in a range of patch sizes and age classes.
- Identify and restore oak/conifer barrens and shrub habitats through fire and timber management.

Large Blocks of Predominately Older Northern Forest – Blue Hills and Northeast Wisconsin Forests

- Develop tax incentives to preserve old-growth forest.
- Manage forest adjacent to old-growth stands and ephemeral ponds the complement to the ecological values of the primary feature.
- Work towards a balanced mosaic of age-classes; older age-classes are currently underrepresented.
- Encourage regeneration or reestablishment of eastern hemlock, Canada yew, yellow birch, white cedar, and other conifer, where appropriate through adaptive management techniques.
- Increase representation of white pine forests, especially older age classes.
- Develop reliable natural regeneration techniques for mixed white pine-hardwood forests.
- Conduct an inventory and map the locations of ephemeral ponds.
- Conduct additional survey work in northern wet forest for boreal birds, invertebrates and other taxa.
- In areas free of exotic earthworms, minimize the likelihood of invasion by earthworms by preventing transportation of worms in soil, potted plants, mulch and compost.

Large Sedge Meadows, Fens, and Prairies

- Maintain large blocks of habitat; manage complexes of sedge meadow in conjunction with associated wetlands such as open bog, poor fen, emergent marsh, shrub-carr, alder thicket and northern wet forest where possible.
- Maintain large blocks of open bog/muskeg habitat and other surrounding wetlands and manage as co-occurring peatland communities.
- Where possible, manage for complexes of wet prairie, calcareous fen, shrub-carr and tamarack swamp in the south.
- Utilize prescribed fire or fluctuating water levels to keep an open aspect and prevent woody species invasion.
- In high quality remnants avoid soil disturbance such as pothole creation, or level ditching.

- Focus research on the development of management techniques for maintenance of calcareous fens.

Caves and Abandoned Mines

- Develop statewide bat conservation plan.

Medium-sized Rivers and Streams.

- Protect the ecological river corridor gradients from lowlands to uplands, along with protection of the floodplain corridor. This will enlarge the amount of habitat available, allow for the movement of species upslope and downslope as environmental conditions change over time, provide suitable habitat for species that require large areas, provide migratory bird stopover habitat, or are dependent upon a mosaic of interconnected habitats, including a full range of seral stages for their long-term survival.
- Protection and restoration of natural lake and stream habitat, including establishment of refuge areas and appropriate management of aquatic plants, are needed for conservation of the Pugnose Shiner, which requires clear waters and littoral zone vegetation.

Statewide Broad-Based Priority Conservation Actions for Species of Greatest Conservation Need

Habitat/Landscape Protection and Management

- Develop a statewide ephemeral (vernal) pond management plan that encompasses maintenance of water quality, habitat disturbance, and biological legacy retention in and around the ponds.
- Protect bat hibernacula and maternity roosts from disturbance.
- Assemble a team to develop an ecological corridor map and habitat network reserve plan to address species and natural community movement opportunities in the face of a changing climate.
- Before the end of fiscal year 2009, assemble a team of wildlife biologists, foresters, researchers, and bird experts to develop a map of priority areas for management of early seral stage forest. The team would focus on the places where the Department could expend limited dollars for applying management to forests where timber sales are problematic. The sites chosen would have the greatest benefit for the greatest number of shrubland species, especially SGCN.
- Develop management objectives for public road-stream crossings that strives to have no stream constriction in priority Conservation Opportunity Areas.
- Maintain a network of stopover sites that provide quality refueling and resting habitat for the full diversity of migratory bird SGCN, particularly in highly altered landscapes along the Great Lakes and Mississippi River flyways.

Invasive Species

- Support research to find biological control agents for especially pernicious invasive exotic species. Especially important is the need to controlling glossy buckthorn, common buckthorn, garlic mustard, zebra and quagga mussels.
- Promulgate rules to prevent new invasive species from entering the state.
- Promulgate rules to prohibit the transport, possession, transfer or introduction of a listed restricted invasive species and establish control requirements for restricted species.
- Follow Best Management practices developed for reducing the spread of invasive species.
- Give priority for monitoring and control of prohibited and early detection species.
- Focus limited funding for control of restricted species in conservation opportunity areas.

Individual Species Management

- Experiment with management regimes that regenerate oaks while maintaining core areas of older forests for Cerulean Warbler.

Inventory

- Conduct a comprehensive inventory and mapping of ephemeral ponds.
- Conduct inventory efforts on the species and communities of "Information Needs", identified in the 2008 Implementation process.

Priority Conservation Actions Tied to Conservation Opportunity Areas by Ecological Landscape

Central Lake Michigan Coastal

- Protect and restore harbor and river mouth shoreline and wetland habitats.
- Improve regulations and increase education to prevent the introduction of additional exotic species and slow the spread of existing invasive species.
- Manage Great Lakes beach and dune habitat as part of a vegetation mosaic that includes forested ridge and swale, interdunal wetland, shrub-carr, and swamp conifer forest with older age classes. Promote concentrated public access points, limited recreational activities in areas where SGCN are present (particularly during breeding seasons), protecting site hydrology, and early detection and management of invasive exotic species.
- Implement new cost-sharing programs and/or continue voluntary programs to monitor for and aggressively eliminate invasive species, especially in Great Lakes beach, dune, and ridge and swale communities.
- In the Niagara Escarpment Conservation Opportunity Area, encourage public and private landowners to maintain natural forest cover, protect areas where surface waters drain into natural fissures, minimize pesticide infiltration, and maintain partially open sinkholes that serve as bat hibernacula.
- Preserve habitat on the Niagara Escarpment and protect ecologically significant areas currently occupied by SGCN from conversion to other land uses.
- Protect Wisconsin's only large alvar (Red Banks) by minimizing impacts from quarrying, road construction, and housing development through acquisition of fee title, development rights, transfer of development rights, and zoning.
- Manage alvars by thinning densely vegetated areas and removing aggressive exotic shrubs.
- Protect and restore habitat in the lower Wolf River to accommodate the habitat preferences of Shoal Chub.
- Maintain and connect large blocks of older floodplain forest to provide habitat for the large number of SGCN that use this habitat while addressing the regeneration difficulties associated with dense stands of reed canary grass.
- Initiate wetland renovation projects for Forster's Tern and use artificial nest platforms to maintain existing Forster's Tern populations.
- Maintain long-term wetland productivity on public properties by mimicking natural hydrologic regimes within an adaptive management framework.
- Protect large insular hardwood swamps from hydrological changes and fragmentation due to road and housing development.
- Develop management and response plans for hardwood swamps to prepare for the probable arrival of emerald ash borer.

Central Sand Hills

- Identify and restore oak barrens and oak forest on appropriate sites, such as old fields and pasture lands, to expand and connect existing stands.
- Manage oaks as a large-scale mosaic of patches along a successional gradient that includes oak forest, oak woodland, oak opening, and native or surrogate grassland.
- Maintain or restore mixed pine-oak forests to represent the full natural range of variability in patch sizes and age classes.
- Restore oak/conifer barrens and shrub habitats on public lands in appropriate Conservation Opportunity Areas through fire, ground layer enhancement, and timber management.
- Work with private land owners to promote the creation of smaller savanna restorations that provide habitat for Red-headed Woodpeckers.
- Preserve remaining relict old-growth oak forest patches.
- Develop cost-sharing incentives for private landowners to burn, remove invasive exotic species and regenerate oak forests, oak woodlands, and oak openings.
- Preserve and manage wet-mesic prairie, wet prairie, calcareous fen and southern tamarack swamp sites; restore degraded sites (emphasizing restoration of hydrology), and manage for area-sensitive species in a matrix of surrogate grasslands, sedge meadow, shrub carr, and savanna habitats. Monitor restored sites to determine whether the restoration is maintaining sensitive species.
- Develop educational tools and demonstration/training areas that promote prescribed fire and other oak barrens management practices.
- Develop a practical "toolkit" for maintaining structural and compositional characteristics of oak barrens ecosystems.

- Continue head starting program for Ornate Box Turtles at appropriate sites.
- Long-term Ornate Box Turtle monitoring is needed to evaluate population status and track trends, especially in light of climate change.
- Implement Karner Blue Butterfly conservation strategies.
- Conduct surveys to find additional occurrence of coastal plain marsh
- Conduct surveys to document invertebrate use of coastal plain marshes.

Central Sand Plains

- Protect white pine-red maple swamp hydrology, and promote development of older stands.
- Maintain large blocks of open bog/muskeg habitat and other surrounding wetlands as co-occurring peatland communities by maintaining hydrology and controlling invasive plant species.
- Maintain large blocks of open sedge meadow within a complex of associated wetlands such as open bog, poor fen, emergent marsh, shrub-carr, alder thicket and northern wet forest by maintaining hydrology, tree cutting and harvest, prescribed fire and eradicating invasive plant species.
- Maintain lowland shrub communities like alder thicket and shrub-carr, and manage the surrounding working forest to benefit Golden-winged Warblers by leaving scattered off-site aspen, ash and tamarack in shrub-dominated areas and managing the adjacent upland forest in a shifting mosaic of patch sizes and age classes to provide continuous habitat.
- Restore oak barrens on sites that will increase effective habitat patch size for area sensitive species, such as upland areas between large wetlands.
- Manage oaks as a large-scale mosaic of patches along a successional gradient that includes oak forest, oak woodland, oak opening, and open wetland.
- Maintain or restore mixed pine-oak forests to represent the full natural range of variability in patch sizes and age classes.
- Identify and restore oak/conifer barrens and shrub-dominated habitats through the application of prescribed fire and timber management.
- Work with private land owners to promote the creation of smaller savanna restorations that provide habitat for Red-headed Woodpeckers.
- Develop educational tools and demonstration/training areas that promote prescribed fire and other oak barrens management practices.
- Develop a practical "toolkit" for maintaining structural and compositional characteristics of oak barrens ecosystems.
- Implement the Wisconsin Whooping Crane Management Plan.
- Increase the effective size of the Buena Vista and Leola Marsh grassland landscapes by promoting the creation/maintenance/protection of surrogate grassland adjacent to existing patches.
- Reintroduce Eastern Massasauga Rattlesnake to places along the Yellow River where suitable habitat exists.
- Manage appropriate native sand prairie and sand prairie restoration sites for nesting Blanding's Turtles.
- Maintain and connect large blocks of older floodplain forest to provide habitat for the large number of SGCN that use this habitat while addressing the regeneration difficulties associated with dense stands of reed canary grass.
- Implement the Greater Prairie-Chicken Management Plan.
- Encourage landowner enrollment in federal set-aside programs, especially in the Central Wisconsin Grassland project area.
- Work with private land owners to manage wetland impoundments to conserve marsh-nesting birds.

Forest Transition

- Maintain the largest blocks of northern mesic and oak forest, especially in the identified Conservation Opportunity Areas.
- Increase connectivity of forest patches, especially in the identified conservation opportunity areas.
- Encourage regeneration and reestablishment of eastern hemlock, Canada yew, white cedar, other conifers and yellow birch, where appropriate through adaptive management techniques.
- Work towards a balance of age classes, especially in the oak conservation opportunity area.
- Research Eastern Red Bat life history, including roosting and foraging habitat, population dynamics, trends, migration and dispersal patterns.
- Identify and protect refuge areas, and restore coolwater stream Conservation Opportunity Areas to conserve Redside Dace.
- This landscape has an especially important role for managing shorebird habitat at the Big Eau Pleine Flowage and other flowages and impoundments. Through dams and dikes, water levels can be raised to flood these areas, and through water control structures, water levels can be

manipulated to benefit shorebirds. Migration phenology and specific habitat requirements must be considered when managing for shorebirds.

North Central Forest

- Develop clear targets for how much old to old-growth forest we should have.
- Protect existing old-growth stands and defined high conservation value forests on public land, look for opportunities to identify additional areas that can develop into old-growth condition, and connect corridors to accommodate old-growth species movement in the light of climate change. The identified Conservation Opportunity Areas offer the best places to apply this priority.
- Develop tax incentives to preserve relict old-growth forest on private land.
- Provide incentives for reforestation of buffers around old-growth stands and ephemeral ponds.
- Work towards a balanced mosaic of age-classes; older age-classes are currently underrepresented.
- Encourage regeneration or reestablishment of eastern hemlock, Canada yew, white cedar, yellow birch, and other conifer, where appropriate through adaptive management techniques.
- Before the end of fiscal year 2009, assemble a team of wildlife biologists, foresters, researchers, and bird experts to develop a map of priority areas for management of early seral stage forest. The team would focus on the places where the Department could expend limited dollars for applying management to forests where timber sales are problematic. Chosen sites would have the greatest benefit for the greatest number of shrubland species, especially SGCN.
- If a forested parcel lies within a Conservation Opportunity Area, use data from COA Guide as a resource for MFL applicants to encourage management plans that are complementary to the goals of the COA.
- In working forest areas, encourage enrollment of private land in MFL to maintain a high percentage of land in long-term forest cover.
- Restore complexity to the entire forest landscape by retaining biological legacies such as large and cavity trees, snags, boles, large woody debris on the forest floor, herbaceous and understory plants, and forest floor organic matter.
- Develop demonstration sites for field education and training for foresters, wildlife biologists, and land managers to tie on-the-ground application to the old-growth handbook.
- Inventory and map the locations of ephemeral ponds.
- Develop guidelines for silvicultural practices, water quality, and SGCN retention in and around ephemeral ponds.
- Conduct additional survey work in northern wet forest for boreal birds, invertebrates and other taxa.
- Evaluate the need for and reintroduce, if appropriate, American Marten to enhance existing populations and populate new areas.
- Implement a bioregional monitoring design to complete the status assessment of Northern Goshawk in Wisconsin.
- In areas free of exotic earthworms, minimize the likelihood of invasion by earthworms by preventing transport of worms in soil, potted plants, mulch and compost.
- Focus restoration of stream habitat and morphology on areas where land use and other factors suggest the most successful outcomes for Species of Greatest Conservation Need.
- Long-term monitoring and protection of wood turtle nest sites.
- Protection and restoration of appropriate natural stream habitat with focus on accommodating the habitat needs of wood turtle and water shrew.

Northeast Sands

- Create financial incentives to manage for jack pine and oak.
- Create financial incentives to address the differential market values between plantation forestry and natural regeneration, retention of old-growth patches, or prescribed burning in and around core managed areas.
- Develop educational tools and demonstration/training areas that promote prescribed fire and other barrens/bracken grassland management practices.
- Manage the full range of barrens successional stages and diverse habitats in a landscape context. A comprehensive landscape plan will require identification and management of early succession cores. The barrens also need to have areas managed in a shifting mosaic of timber harvest with many clearcuts, some older than rotation-age stands, some thinning of stands for savanna structure and a few protected groves. Many small open patches are needed to conserve rare Lepidoptera. To enhance landscape attributes, red pine plantations can be applied to appropriate sites where the historic fire regime indicates that groves occurred.
- Restore oak/conifer barrens and shrub habitats on public lands in appropriate Conservation Opportunity Areas through fire, ground layer enhancement, and timber management.

- Identify additional sites containing high quality or restorable barrens.
- Develop a practical “toolkit” for maintaining structural and compositional characteristics of barrens ecosystems.
- Develop conservation partnerships with county forests, private groups, and industrial forest landowners with the goal of planning landscape management.
- Integrate land-use planning efforts across federal, state, county, and local ownership boundaries.
- Eliminate off-trail operation of motor vehicles and off-road vehicles in barrens and bracken grassland restorations that leads to invasive plant establishment, wind and storm erosion, or dominance of Pennsylvania sedge.
- Identify northern blue butterfly habitat restoration opportunities and plant larval host and nectaring species, where appropriate.
- Maintain large blocks of northern wet-mesic forest, especially in older age classes, as habitat for area- and disturbance-sensitive species.
- Embed and maintain smaller northern wet-mesic forest patches in a matrix of upland forest.
- Focus stream habitat and morphology restoration on areas where land use and wood turtle populations suggest the best success.
- Maintain lowland shrub communities like alder thicket and shrub-carr, and manage the surrounding working forest to benefit Golden-winged Warblers by leaving scattered off-site aspen, ash and tamarack in shrub-dominated areas and managing the adjacent upland forest in a shifting mosaic of patch sizes and age classes to provide continuous habitat.
- Protect and restore large river habitat for Pygmy Snaketail and other aquatic invertebrate SGCN.

Northern Highland

- Increase representation of red and white pine forests, especially older age classes.
- Use adaptive management techniques to restore pine-dominated forest structure and composition.
- Develop techniques for using prescribed fire to reduce other woody competition when establishing and maintaining red and white pine forests.
- Develop educational tools and demonstration areas to articulate the benefits of using prescribed burning for ecological management.
- Preserve and maintain large expanses of northern sedge meadow.
- Manage wild rice areas, oligotrophic lakes, and emergent marshes as complexes within other forest and wetland types.
- Where appropriate, focus protection and management of lake and river shoreline areas on the habitat requirements for the Pugnose Shiner and Least Darter, which need shallow densely-vegetated areas for spawning.
- Implement a bioregional monitoring design to provide data needed to complete a status assessment of Northern Goshawk.
- Protection and restoration of natural lake and stream habitat, including establishment of refuge areas and appropriate management of aquatic plants, are needed for conservation of the Pugnose Shiner, which requires clear waters and littoral zone vegetation.
- Maintain large expanses of lowland coniferous forest in the context of older age classes and upland coniferous landscapes.
- Restore habitat for the Longear Sunfish in the few rivers and lakes where they occur.
- Survey large peatlands for presence of boreal birds, Lepidoptera and other boreal taxa.
- Collect more information on the status and biology of the Longear Sunfish to help focus conservation efforts.

Northern Lake Michigan Coastal

- Protect and restore harbor and river mouth shoreline and wetland habitats.
- Manage forested ridge and swale and boreal rich fen areas as part of a vegetation mosaic that includes other open wetland communities, shrub swamp, and swamp conifer forest by promoting older age classes, protecting site hydrology, and early detection and management of invasive exotic species.
- Increase near shore representation of boreal forest by encouraging retention of white spruce, white pine, white cedar, and balsam fir, especially in older age classes, by adaptive management and selective planting.
- Improve regulations and education to prevent the introduction of additional exotic species and slow the spread of existing invasive species.
- Manage Great Lakes beach and dune habitat as part of a vegetation mosaic that includes forested ridge and swale, interdunal wetland, shrub carr, and swamp conifer forest with older age classes. Promote concentrated public access points, limited recreational activities in areas where SGCN are

- present (particularly during breeding seasons), protecting site hydrology, and early detection and management of invasive exotic species.
- Implement new cost-sharing programs or continue voluntary programs to monitor for and aggressively eliminate invasive species, especially in Great Lakes beach, dune, and ridge and swale communities.
 - Preserve habitat on the Niagara Escarpment and protect ecologically significant areas currently occupied by SGCN from conversion to other land uses.
 - Protect and manage water bodies containing Hine's Emerald Dragonfly, monitor populations and conduct basic life history research.
 - Protect and restore habitat in the lower Wolf River to accommodate Shoal Chub.
 - Maintain long-term wetland productivity on state properties by mimicking natural hydrologic regimes and using adaptive management techniques.
 - Initiate wetland renovation projects to enhance Forster's Tern habitat.
 - Utilize artificial nest platforms to maintain Forster's Tern populations.
 - Keep open aspect to west shore wetlands and sedge meadows by using prescribed fire, fluctuating water levels where appropriate, and tree shearing and harvest.

Northwest Lowlands

- Maintain large blocks of open bog/muskeg habitat and other surrounding wetlands and manage as co-occurring peatland communities.
- Maintain large blocks of sedge meadow and manage as complex in conjunction with associated wetlands such as open bog, poor fen, emergent marsh, shrub-carr, alder thicket and northern wet forest.
- Maintain lowland shrub communities, especially alder thickets and shrub-carr, and manage the working forest surrounding the shrub communities to benefit Golden-winged Warblers by leaving scattered off site aspen, ash and tamarack in the shrub areas and manage the uplands in a shifting mosaic to provide continuous habitat.
- Survey large peatlands for presence of boreal birds, Lepidoptera and other boreal taxa.
- Protect and restore large river habitat for rare taxa such as freshwater mussels, dragonflies and fish.

Northwest Sands

- Create financial incentives to manage for jack pine and oak.
- Create financial incentives to address the differential market values between plantation production and natural regeneration, retention of old-growth patches, or prescribed burning in and around core managed areas.
- Develop educational tools and demonstration/training areas that promote prescribed fire and other barrens management practices.
- Implement the Northwest Sands Integrated Ecosystem Management Plan to manage the full range of barrens succession stages and diverse habitats in a landscape context. A comprehensive landscape plan requires identification and management of early succession cores. The "barrens" also needs to have places managed in a shifting mosaic of timber harvest with many clearcuts, some older than rotation-age stands, some thinning of stands for savanna structure and a few protected groves. Many stands should be thinned to a safe amount of residual standing timber then burned for stand regeneration while leaving charred legacies. Manage shallow publicly-owned lakes by maintaining open shorelines. To enhance landscape attributes, red pine plantations can be applied to appropriate sites where the historic fire regime indicates groves occurred.
- Restore jack pine and oak barrens and shrub habitats on public lands in appropriate Conservation Opportunity Areas through fire, ground layer enhancement, and timber management.
- Identify additional sites containing high quality or restorable barrens.
- Develop a practical "toolkit" for maintaining structural and compositional characteristics of barrens ecosystems.
- The landscape is especially well suited to conduct research to determine Franklin's Ground Squirrel distribution, habitat use, population, and mortality factors.
- Maintain large blocks of habitat; manage complexes of sedge meadow in conjunction with associated wetlands such as open bog, poor fen, emergent marsh, shrub-carr, alder thicket and northern wet forest where possible.
- Protection and restoration of natural lake and stream habitat, including establishment of refuge areas and appropriate management of aquatic plants, are needed for conservation of the Pugnose Shiner, which requires clear waters and littoral zone vegetation.
- This landscape has an especially important role for managing shorebird habitat on public lands at flowages and impoundments. Through dikes, water levels can be raised to flood these areas, and

- through water control structures, water levels can be manipulated to benefit shorebirds. Migration phenology and specific habitat requirements must be considered when managing for shorebirds.
- Opportunities to manage for boreal birds, Lepidoptera, and other boreal taxa are important considerations in the Brule Spillway and Blueberry Swamp.

Southeast Glacial Plains

- Focus management and restoration efforts in the Mid to North Kettle Moraine Forest Conservation Opportunity Area to emphasize a matrix of older oak-central hardwood forest with smaller patches of oak woodland, oak opening, native prairies and relict forests.
- Focus management and restoration efforts in the southern Kettle Moraine Conservation Opportunity Area to emphasize oak openings, oak woodland and low prairie communities with smaller patches of dry prairie, open marshy wetlands, and patches of older closed canopy forest.
- Create financial incentives to preserve and protect high quality examples of prairie, oak savanna, and oak opening.
- Develop educational tools and demonstration/training areas that promote prescribed fire and other prairie and savanna management practices within the context of smoke management and clean air parameters.
- Identify additional sites containing high quality or restorable oak barrens, oak savannas and woodlands.
- Develop a practical “toolkit” for maintaining structural and compositional characteristics of dry oak forest and oak savanna ecosystems.
- Develop cost share incentives for landowners to burn, control invasive exotic species, and restore oak openings and forests, prairies, fens and sedge meadows.
- Preserve and manage all wet-mesic prairie sites, restore degraded sites, and manage the sites in a matrix of surrogate grasslands and other shrub and savanna habitats for area-sensitive species.
- Where possible, promote private land management of small sites by offering incentives to private landowners for preservation or restoration of prairies.
- Monitor wet-mesic prairies to determine whether prescribed burning and other management activities are maintaining invertebrate diversity.
- Preserve and manage all wet-mesic prairie, calcareous fen and tamarack fen sites; restore degraded sites (emphasizing restoration of hydrology), and manage the sites in a matrix of sedge meadow, surrogate grasslands and other shrub and savanna habitats for area-sensitive species.
- Conduct inventories to better delineate Cerulean Warbler populations on public and private lands.
- Maintain large blocks of open sedge meadow and manage within a complex of associated wetlands such as wet prairie, emergent marsh, shrub-carr, alder thicket and floodplain forest by maintaining hydrology, tree cutting and harvest, prescribed fire and eradicating invasive plant species.
- This landscape has an especially important role for managing shorebird habitat on public lands at flowages and impoundments. Through dikes, water levels can be raised to flood these areas, and through water control structures, water levels can be manipulated to benefit shorebirds. Migration phenology and specific habitat requirements must be considered when managing for shorebirds.
- Protection and restoration of natural stream habitat for Slender Madtom is needed in areas where they still persist.
- Protect structures used by Queen Snake as hibernacula.
- Preserve and restore specialized riverine habitats used by Gravel Chub, focused on decreasing siltation.
- Protect the ecological river corridor gradients from lowlands to uplands, along with protection of the floodplain corridor. This will enlarge the amount of habitat available, allow for the movement of species upslope and downslope as environmental conditions change over time, provide suitable habitat for species that require large areas or are dependent upon a mosaic of interconnected habitats for their long-term survival, and will provide migratory bird stopover habitat.
- Preserve habitat on the Niagara Escarpment and protect ecologically significant areas currently occupied by SGCN from conversion to other land uses.
- Partner with prairie and savanna restoration groups to more efficiently accomplish habitat management.

Southern Lake Michigan Coastal

- Preserve and manage all wet-mesic prairie sites, restore degraded sites (emphasizing restoration of hydrology), and manage the sites in a matrix of surrogate grasslands and other shrub and savanna habitats for area-sensitive species
- Promote private land management of small sites where possible by offering incentives to private landowners for preservation or restoration of prairies and savannas.

- Monitor wet-mesic prairies to determine whether prescribed burning and other management activities are maintaining invertebrate diversity.
- Protect and restore harbor and river mouth shoreline and wetland habitats.
- Improve regulations and education to prevent the introduction of additional exotic species and slow the spread of existing aquatic invasive species.
- The landscape is especially well suited to conduct research to determine Franklin's Ground Squirrel distribution, habitat use, population size, and mortality factors.
- Conserve habitat for the striped shiner by protecting refuges in the Milwaukee River watershed, and through protection and restoration of natural habitat in the Milwaukee River.
- Improve habitat and water quality conditions in the Milwaukee River basin by controlling non-point pollution.
- Manage for Forster's Tern at Big Muskego Lake Wildlife Area.
- Manage portions of Richard Bong State Recreation Area to accommodate nesting and wintering grassland birds.

Southwest Savanna

- Work with Partners to protect and manage at least three 10,000-acre grassland bird conservation areas, with 2,000-acre cores of permanent grassland, including native prairie to the extent possible. Incorporate shrub-stage component for Bell's Vireo and other shrub land species.
- Work with Partners to protect prairie remnants within open landscapes that are conducive to larger prairie restoration and meta-population management of associated rare species.
- Partner with prairie and savanna restoration groups including FSA/NRCS to more efficiently accomplish habitat management.
- Actively manage appropriate patches for oak savanna and woodland restoration using prescribed fire.
- Develop educational tools and demonstration/training areas that promote prescribed fire and other prairie/savanna management practices.
- Protect and restore Ozark Minnow habitat in the watersheds and tributaries of the Platte River.

Superior Coastal Plain

- Protect and restore harbor and river mouth shoreline and wetland habitats.
- Improve regulations and education to prevent the introduction of additional exotic species and slow the spread of existing aquatic invasive species.
- Manage Great Lakes beach and dune habitat as part of a vegetation mosaic that includes forested ridge and swale, interdunal wetland, shrub carr, and swamp conifer forest with older age classes. Promote concentrated public access points, limited recreational activities in areas where SGCN are present (particularly during breeding seasons), protecting site hydrology, and early detection and management of invasive exotic species.
- Implement new cost share programs or continue voluntary programs to monitor for and aggressively eliminate invasive species, especially in beach, dune, Great lakes Barrens, and coastal fen communities.
- Increase representation of near shore boreal forest by encouraging retention of white spruce, white pine, white cedar, and balsam fir, especially in older age classes, by adaptive management and selective planting.
- Preserve and maintain large expanses of sedge meadow, coastal fen and forested wetlands along the coast and manage in the context of a mosaic of community types.
- In light of climate change and lowering lake levels, monitor community-level vegetation changes in coastal fens.
- Band all Piping Plover chicks within 7-10 days of hatching.
- Install predator exclosures over Piping Plover nests to deter mammalian predation.
- Develop a management plan for shortjaw cisco, the most vulnerable of the Lake Superior whitefish species.
- Manage forested wetlands and fens as part of a vegetation mosaic that includes other open wetland communities, shrub swamp, and swamp conifer forest.
- Work with Partners to protect and manage at least three 5,000-acre grassland bird conservation areas, with 1,000-acre cores of permanent grassland, while incorporating shrub-stage component, especially along streams for shrub land and streamside species.

Western Coulee and Ridges

- Focus management and restoration efforts in the loess-influenced forest Conservation Opportunity Areas to emphasize a matrix of older oak-central hardwood forest with smaller patches of oak woodland, oak opening, regenerating younger forest, native prairies and relict forests.

- Focus management and restoration efforts in the sandstone-influenced Conservation Opportunity Areas to emphasize dry oak savanna, oak woodland and sand prairie communities with smaller embedded patches containing oak forest, pine relicts, dry prairie, open shrubby barrens, closed canopy oak forest, and rock outcrops.
- Protect the ecological river corridor gradients from lowlands to uplands, along with protection of the floodplain corridor. This will enlarge the amount of habitat available, allow for the movement of species upslope and downslope as environmental conditions change over time, provide migratory bird stopover habitat, and provide suitable habitat for species that require large areas or are dependent upon a mosaic of interconnected habitats, including a full range of seral stages, for their long-term survival.
- Maintain and connect large blocks of older floodplain forest to provide habitat for the large number of SGCN that utilize this habitat while addressing the regeneration difficulties associated with dense stands of reed canary grass.
- Conduct large-scale planning efforts with state agencies and partners regarding the Upper Mississippi River and its adjacent blufflands.
- On private lands, create financial incentives similar to either the Farmland Preservation Program or Managed Forest Law to protect and manage up to 20,000 acres of high quality examples of dry prairie, oak opening, oak woodland or retention of old-growth patches including hemlock and pine relicts.
- Create financial incentives similar to the Wisconsin Forest Landowner Grant Program (WFLGP) to address the differential market values between oak savanna restoration and oak forest management, reforestation of old fields to reduce fragmentation, or prescribed burning in and around prairie and savanna managed areas.
- Restore oak openings and woodlands and expand and enhance dry prairie and shrub habitats on public lands in appropriate Conservation Opportunity Areas through fire, ground layer enhancement, and timber management.
- Develop incentives for the start-up cost of converting from row-crop agricultural systems to a rotational grazing or biofuel production system, which will keep permanent cover on the land, provide grassland habitat and significantly reduce soil loss into streams.
- Develop educational tools and demonstration/training areas that promote prescribed fire and other prairie and savanna management practices.
- Identify additional sites containing high quality or restorable oak barrens, oak savannas and woodlands.
- Develop a practical “toolkit” for maintaining structural and compositional characteristics of oak savanna ecosystems.
- Develop bluffland zoning that recognizes the critical importance of maintaining dry prairies, oak savanna restoration opportunities, connecting habitat corridors, migratory bird stopover sites, and forested habitat that is essential for long-term maintenance of viable SGCN populations.
- Partner with prairie/savanna/forest restoration groups to manage and protect habitats to effectively keep SGCNs on the landscape.
- Manage the sand and gravel-influenced floodplain forest of the Lower Chippewa and Lower Black Rivers for floodplain savanna conditions to help the recovery of Eastern Massasauga Rattlesnake.
- Manage appropriate native sand prairie and sand prairie restoration sites for nesting Ornate Box and Blanding’s Turtles.
- Conduct inventories to better delineate Cerulean Warbler populations on public and private lands.
- Monitor long-term population status and trends for Eastern Massasauga Rattlesnake.
- Continue head starting program for Ornate Box Turtles.
- Conduct research on the interspecies competition between increasing “channel” shiners and the greatly decreasing Pallid Shiner.
- Protect and restore appropriate habitat in the Mississippi and Lower Wisconsin Rivers for Shoal Chub.
- Focus restoration of stream habitat and morphology on areas where land use and other factors suggest the most successful outcomes.
- Initiate long-term monitoring and protection of Wood Turtle nest sites.
- Protect and restore appropriate natural stream habitat with focus on accommodating the habitat needs of Wood Turtle.
- Educate landowners on the few examples of algific talus slopes and that the need for protection of this resource is critical for Wisconsin as these sites are reference areas for understanding 10,000 years of climate change.

Western Prairie

- Promote agricultural practices that are compatible with grassland management, such as rotational grazing, greater use of small grains and hay crops and later harvesting of grass hay.
- Restore temporary and seasonal wetlands.
- Protect the ecological gradients from lowlands to uplands, along with protection of the floodplain corridor. This will enlarge the amount of habitat available, allow for the movement of species upslope and downslope as environmental conditions change over time, provide suitable habitat for species that require large areas or are dependent upon a mosaic of interconnected habitats for their long-term survival, and provide migratory bird stopover habitat.
- Maintain and connect large blocks of older floodplain forest to provide habitat for the large number of SGCN that use this habitat while addressing the regeneration difficulties associated with dense stands of reed canary grass.
- Develop incentives for private landowners to maintain native prairies and shortgrass habitats.
- Partner with prairie and savanna restoration groups to more efficiently accomplish habitat management.
- Actively manage appropriate patches for oak savanna and woodland restoration using prescribed fire.
- Develop educational tools and demonstration/training areas that promote prescribed fire and other prairie/savanna management practices.