Determining Mitigation Needs for NiSource Natural Gas Transmission Facilities - Implementation of the Multi-Species Habitat Conservation Plan (MSHCP)

State Plan Review

Section 6 Cooperative Endangered Species Conservation Fund Grant
(IDFW Subtasks 1.2 & 2.3)
Prepared by The Conservation Fund
DECEMBER 2010

State Planning Initiatives

- **Delaware**
- **Indiana**
- **Kentucky**
- **Louisiana**
- **Maryland**
- **Mississippi**
- **New Jersey**
- **New York**
- **Ohio**
- **Pennsylvania**
- **Tennessee**
- **Virginia**
- **West Virginia**

DELAWARE

Delaware Wildlife Action Plan

The goal of the Delaware Wildlife Action Plan is to provide strategic direction, and logistical framework, for conserving Delaware's native wildlife and habitats as vital components of the state's natural resources. The Plan identifies more than 450 Species of Greatest Conservation Need (SGCN) and 50 different types of habitat. Because this is a comprehensive plan for all wildlife, large blocks of forest and wetland habitats that support many common species are also identified. Maps depicting habitat for a full array of wildlife ("Key Habitats") are presented to show areas of the state where conservation efforts can be focused. The following is a partial list guiding principles for the Action Plan:

- Conservation of Species vs. Habitats – Target the preservation or restoration of SGCN, but emphasize the management of ecological structure and function of key habitats over management of individual species.

- Management on Private Lands – Direct private lands management toward buffering and connecting conservation lands in the Green Infrastructure Natural Resources Focus Area, and towards protecting outlying small patch habitats and SGCN.

- Partnership Development – Strengthen partnerships with other conservation agencies and organizations to link landscapes, tie together complementary approaches, and leverage investments of time, staff and money.

The green infrastructure network developed for the NiSource MSHCP utilizes many of the findings, information and methods used to complete the Wildlife Action Plan for Delaware. As with the Action Plan, the green infrastructure network takes a landscape scale approach utilizing information on the

habitat needs of particular species yet maintaining the overall focus on conserving functioning ecosystems. The green infrastructure network provides state decision makers with a prioritization strategy that identifies private landowners to work with towards conservation goals. Lands that are highlighted in mapping efforts from the Wildlife Action Plan as well as the green infrastructure network may result in leveraging additional financial resources from both initiatives towards achieving a shared conservation goal for the property.

Delaware Outdoors 2003-2008

The Delaware Statewide Comprehensive Outdoor Recreation Plan (SCORP) is required to maintain the state's eligibility to receive both the federal Land and Water Conservation Fund grants but also grants from the Delaware Land and Conservation Fund. The plan evaluates demographic trends, assesses the supply of recreational lands and facilities in the context of the demand for recreational opportunities by the public. State officials surveyed 1,800 state residents to gauge their views on the current level of success by state agencies in meeting public recreation needs as well as forecast future needs for outdoor recreation. State facilities were prioritized based on public demand to help focus the limited public funds for improving public recreation. Based on the survey results one of the highest priorities cited by the public was the need for more walking and jogging paths. In several regions of the state, survey participants also cited the need for expanded fishing areas and improved public access to fishing areas. SCORP seeks to identify areas of the state that are underserved with outdoor recreational lands and facilities. The plan provides county and municipal officials with a decision support tool to evaluate the level of recreational opportunities within their jurisdiction, using GIS and assumptions on demographics and recommended distances to current facilities and recreation lands.

While the green infrastructure plan developed for the NiSource MSHCP is not focused on outdoor recreation, there may be opportunities for dual use between providing opportunities for passive recreation and wildlife habitat. As with the SCORP, the GI network is a tool to assist decision makers understand and set priorities, evaluate a project in a regional context and protect lands with the highest utility. Policy makers can use the green infrastructure network to understand the supply and demand of conservation land by crucial wildlife species. When the GI network is used with SCORP information and decision tools, state and local officials have power method for guiding development patterns at a statewide scale.

Delaware Coastal and Estuarine Land Conservation Program Plan (CELCP Plan)

The CELCP Plan is a program plan that is crafted to guide State actions necessary to qualify and nominate coastal conservation projects for federal funding. The plan sets up a process to review and score projects, which in turn, supports the selection and nomination of projects to NOAA in response to competitive funding opportunities. The entire State of Delaware is considered within the coastal zone and is recognized in the state's approved coastal management program.

As part of the CELCP Plan key areas were identified within the state that, if acquired, would have the most impact on protecting and improving coastal and estuarine areas. Delaware's project areas are divided into a two tiered system, primary (Tier 1) and secondary (Tier 2) protection areas with projects within Tier 1 receiving a higher priority. Areas within the State of Delaware's coastal strip (one mile buffer from coast line) and the watersheds within the National Estuarine Research Reserve (NERR) components ranked as the Tier 1 areas for protection according to CELCP guidelines. Tier 2 protection areas consist of identified State Resource Areas in accordance with *7 Del. Code, Chapter 75, Land Protection Act,* critical key habitat areas identified in the State of Delaware Wildlife Action Plan and

priority conservation areas listed in the Blackbird Millington Corridor Plan. In addition, the plan acknowledges the overarching priorities of Executive Order 61 – Green Infrastructure Protection.

The green infrastructure network developed for the NiSource MSHCP will assist state officials in their broad efforts to protect coastal resources. Many of the forests, wetlands and aquatic resource areas highlighted by the GI network and may overlap with tier 1 or tier 1 priority areas as articulated in the CELCP. The shared priorities of both CELCP and the GI network may facilitate leveraging financial resources from both initiatives for the benefit of wildlife and the residents of Delaware.

Delaware Wetlands Conservation Strategy

Delaware's Wetlands Conservation Strategy guides the efforts of State agencies to improve Delaware's wetland resources through increased agency coordination, data availability, education, monitoring, and restoration efforts. The Delaware Wetlands Conservation Strategy outlines the following six goals to focus efforts with the aim of maximizing the use of resources to best protect wetland resources in the state and the services that they provide:

- Update wetland inventory maps and improve access to wetland related data.
- Increase monitoring efficiency and effort to provide insight into wetland function and health.
- Integrate wetland restoration, creation, enhancement, and protection efforts to ensure efficient use of resources.
- Coordinate information and resources sharing among wetland protection programs, professionals, and agencies.
- Enhance education and outreach efforts to broaden wetland stewardship among all wetland stakeholders.
- Work with partners to provide support and enhancement for existing regulatory programs and to provide protection of wetlands that are not covered by state and federal regulations.

Wetlands are a central component of the green infrastructure network developed for the NiSource MSHCP. Core areas, hubs and corridors for wetland depend species have been delineated for the green infrastructure network. Within the GI network, wetlands have been characterized in order to facilitate the conservation of the most viable and highest quality wetlands systems remaining in the state. Wetlands restoration activities can be prioritized and targeting using the GI network. By implementing the GI network, state officials work towards conserving an interconnect wetlands system as opposed to isolated wetlands.

Livable Delaware: The Strategies for State Policies and Spending

Livable Delaware seeks to improve the coordination of land use decision-making with the provision of infrastructure and services in a manner that make best use of natural resource and public funds. The importance of such coordination lies in the fact that land use decisions are made at the local level while the bulk of infrastructure (e.g., roads and schools) and services (e.g., emergency services and local services) that support land use decisions are funded by the State. The driving principles behind Livable Delaware are that:

1. State spending should promote quality, efficiency, and compact growth; and,
2. State policies should foster order and resource protection, not degradation.

The report provides a map series on areas of the state that are "out of play" or should not be developed, areas were the state is not in favor of development and areas where the state will support development. The report provides mapping layers depicting four levels of investment that relate to the state development and policy preferences for guiding growth. In addition to guiding where grey

infrastructure should be built, the Livable Delaware provides commitment to green infrastructure planning. The recommended goals for Green Infrastructure in Delaware:

- Preserve half of Delaware's remaining, unpreserved commercially viable forest land by 2024.
- Preserve half of Delaware's remaining, unpreserved cropland by 2024.
- Preserve 100% of the remaining natural resource and recreation priorities by 2024.

The green infrastructure network developed for the NiSource MSHCP utilizes many of the data layers, methods and techniques used to create the Livable Delaware green infrastructure model. Where appropriate and feasible, the green infrastructure network for the NiSource MSHCP will update information on land cover, species distribution and the status of conserved and developed lands. The green infrastructure network will further assist state officials in meeting the ambitious goals for land conservation in Delaware and help prioritize the use of limited state funds.

Rapid Assessment of Green Infrastructure

In an effort to plan for green infrastructure protection before development takes place, The Conservation Fund designed the Delaware Ecological Network (DEN), as a series of statewide geographic information system (GIS) layers that identify and prioritize the areas of greatest ecological importance within the State's natural ecosystems. The DEN, which is based on the principles of landscape ecology and conservation biology, provides a scientifically defensible framework for green infrastructure protection statewide. The DEM builds on the goals of Livable Delaware and the planning principles outlined in Better Models for Development in Delaware and State Strategies for Policy and Spending. The DEN allows local, county and state officials to measure progress towards the Livable Delaware goals for productive cropland, commercially viable forestland, and conservation and recreation priorities.

The green infrastructure network developed for the NiSource MSHCP will utilize DEN to provide policy makers with options for mitigation for impacts to federal listed species. Where appropriate, the DEN may be updated with new field information on species distribution and may be re-characterized with new landcover data or other additional information. As planning is an interactive process, the revised DEN is a natural evaluation of this planning tool and will continue to help policy makers achieve a range land use planning goals.

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INDIANA

Wildlife Action Plan

The green infrastructure network (GI network) developed for the NiSource Multi-Species Habitat Conservation Plan (MSHCP) will assist the Indiana Department of Natural Resources (IN DNR) in implementing the Indiana Comprehensive Wildlife Strategy (CWS) goal of preserving native biological diversity of the state. By highlighting core areas, hubs and corridors that are derived from native focal species, a GI network provides Indiana with a science based, ecologically oriented framework connecting the goals of their wildlife action plan to implement steps. The methods used in creating the GI Network are similar to the species based modeling and extrapolation process used in the CWS. The focus of the GI network at the landscape level fulfills a need identified for landscape level analysis of wildlife habitat as called for in the Indiana CWS. Please see the following section of this report for a detailed review of the State Wildlife Action Plan.

Hoosiers on the Move: The Indiana State Trails, Greenways and Bikeways Plan

Indiana is blessed with a wonderful statewide trails, greenways and bikeways plan that emphasizes the need for linkages, connections and corridors. The green infrastructure network developed for the NiSource MSHCP will create a web of corridors to facilitate wildlife movement. While these corridors are focused on the needs of focal species to move across the landscape, many of these corridors will be at a scale to serve both recreational needs as well as wildlife needs. The corridors highlighted by the GI network will help achieve the goal of establishing trails and greenways within 7.5 miles or a 15 minute drive for every citizen of Indiana. Linking Indiana with its surrounding states using an ecological framework will have benefits for identifying and supporting multi-state trail opportunities. If fully implemented, an intact GI network on the ground will bring economic benefits to the state of Indiana, its communities and citizens as expressed in the state trails plan. The spirit of partnership among federal, state, and local governments as well as with other stakeholders articulated in the state trails plan is the same as the vision for the future implementation of the GI network. Most importantly a GI network will promote a healthier lifestyle for the residents of Indiana, improving the overall quality of life.

Statewide Comprehensive Outdoor Recreation Plan (SCORP)

A major goal of the SCORP for Indiana is to increase land acquisition for public recreation and conservation. The green infrastructure network developed for the NiSource MSHCP can help guide the land acquisition process of state agencies and other partners to conserve lands that have ecological value as well as value for outdoor recreation. As the author's of SCORP have observed "[o]utdoor recreation is more than supply and demand. It is about people's need while preserving the integrity of the land. It also includes retaining or restoring natural topography, native plants and wildlife" (IDNR, 2007, SCORP 2006-2010, p. 77). The GI network can assist state agencies meet recreational needs as well as protecting native species and identifying areas for restoration of habitat for sensitive native species.

As part of the SCORP effort, Indiana's Wetlands Conservation Initiative was featured as an integral part of the outdoor recreational plan. To date Indiana has lost 85% of its wetlands, the conservation of the remaining wetlands is a high priority. Examining the landscape for wetland restoration opportunities is a goal of the state wetlands plan. Indiana has established goals for prioritizing wetlands based on water quality, flood control ability, ground water benefits and biological/ecological functions. As the GI

network utilizes species data from the Indiana Heritage program, this style of planning is in keeping with goals in Indiana's wetland initiative for integrating wetland planning with heritage data. The GI network assists the state implement its wetlands policies by delineating a high quality wetland network of core areas, hubs and corridors that if protected, will furnish benefits to wetlands and wetland dependent species. Resident of Indiana will also benefit by a conserved network of wetland through the eco-system services provided by wetlands such as water filtration.

INShape Indiana

To proactively address the public health crisis, in 2005 Governor Mitch Daniels started the IN Shape Indiana initiative to encourage residents to adopt a more active and healthy lifestyle. As regular physical activity is part of a healthy lifestyle, Indiana's trails, and greenways for passive recreation are vital infrastructure. Each state agency in Indiana is charged with coordinating and implementing this state initiative. The Department of Natural Resources has waived entrance fees several days a year for residents enrolled in the INShape program to state parks and reservoirs. Although the green infrastructure network developed for the NiSource MSHCP is not focused on recreation, clearly many of the areas highlighted as hubs or corridors may have a dual use as habitat areas for wildlife and provide passive recreational opportunities.

Indiana Coastal and Estuarine Land Conservation Plan (CELCP)

CELCP provides an assessment of priority land conservation needs and targets conservation within priority areas for three coastal counties in northern Indiana. CELCP utilized the Indiana Biodiversity Initiative (IBI) model and the following species as umbrella species in guiding its modeling effort: American Badger, Blanding's Turtle, Blue-Spotted Salamander, Eastern Massasauga, Golden-winged Warbler, Karner Blue Butterfly, Red-shouldered Hawk, and Scarlet Tanager. The green infrastructure network developed for the NiSource MSHCP may use data from the IBI model and relies on a similar model approach of umbrella species. The GI network will benefit many of the species used in the CELCP model and hence provide conservation opportunities beyond the three coastal counties examined in Indiana's coastal planning efforts.

Strategic Plan for Division of Forestry at the
Indiana Department of Natural Resources (IN DNR)

As part of its strategic organizational plan, the Division of Forestry at IN DNR established a goal of conserving 100,000 acres by 2016. The Division of Forestry seeks to manage forest lands to provide needed habitat for fish and wildlife. The restoration of Indiana's private forests for long term health of both the forest and communities is an important goal for the division. At the species scale, the Division of Forestry has committed to completing a species conservation plan for the Indiana Bat. The green infrastructure network developed for the NiSource MSHCP can further guide the acquisition effort of the Division of Forestry in implementing their acreage goal. In addition, GI networks for wetlands and aquatic systems will support the Division of Forestry's effort to manage forest land for the needs of fish and wildlife. Restoration opportunities for forest resources will also be identified by the GI network. As the Indiana Bat is a focal species for the design of the GI network, the resulting maps may assist the Division of Forestry in their efforts to conserve and restore habitat for the Indiana Bat.

Section 319 Nonpoint Source Grant Program FY 2007 Report to EPA

According to the Indiana Department of Environmental Management (IDEM), nonpoint source pollution is the largest source of water quality problems in the state. As of the 2006 water quality monitoring assessment, roughly half of the rivers and streams in Indiana did not support a healthy level of aquatic life and 67% of streams were impaired for recreational uses. IDEM is targeting impaired waters for

funding watershed planning efforts and restoration activities under the Clean Water Act Section 319 program, which provides federal funding to the states to reduce nonpoint source pollution. In recent years, IDEM has favored funding large scale 319 planning and restoration projects in order to achieve more meaningful results.

As the green infrastructure network developed for the NiSource MSHCP highlights both core wetlands and core aquatic areas, maintaining and improving water quality is a desired outcome shared by both the nonpoint program and the GI network. The GI network complements the IDEM 319 watershed planning efforts by offering recommendations on buffers for riparian corridors that will improve water quality and assisting IDEM in prioritizing watersheds by targeting restoration funds to gaps in the proposed GI network. The GI network can be used by watershed associations, communities, fishing groups and other stakeholders to understand how they can help improve water quality and provide additional resources to strengthen the strong partnerships that IDEM has developed on water quality issues.

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On Going Initiatives

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KENTUCKY

Kentucky Comprehensive Wildlife Conservation Strategy

The overarching purpose of the Kentucky Comprehensive Wildlife Conservation Strategy (KCWCS) is to provide strategies for sustaining Kentucky's biodiversity and its contribution to national and global biodiversity. The first step in this process was identifying the 251 species of greatest conservation need (SGCN) to represent this biodiversity. The KCWS is intended to highlight priorities on a state level for both species and habitats (guilds) and bring together agency partners to collaborate on restoration and conservation issues.

Within the KCWCS, the state officials set goals and objectives for either aquatic and terrestrial habitat types or guilds. The following objectives and strategies outlined by the KCWCS guilds will be advanced through the implementation of the green infrastructure network developed for the NiSource MSHCP.

- Work with partners to prioritize land protection, acquisition, and restoration projects that work toward connecting blocks of habitat and restoring ecological processes.
- Implement landscape level conservation projects in priority areas.
- Protection, restoration, and management of unique habitats.
- Acquisition and conservation easements of critical aquatic habitat.
- Financial incentives to protect riparian corridors and watersheds.
- Develop mitigation plan for impacted aquatic systems.
- Develop priorities and technology for reintroducing and enhancing aquatic populations.

At its core the GI network is a decision aid to help state policy makers, wildlife managers and partners make more holistic decisions regarding conservation. As stated in the KCWCS, the simple objective of any planning process is to promote decisions that are informed, understood, accepted, and able to be implemented and to promote ongoing learning through the planning process so that future decisions can be better informed. The GI Network will provide decision makers with detailed information regarding the landscape scale needs of species listed in the NiSource HCP as well as native species that are used a focal species to design the overall network. The GI Network is a robust and dynamic tool that is created using the best available scientific and planning practices.

Hot Spots and Priority Watersheds Identified for Imperiled Freshwater Mussels and Fishes

To help focus the conservation efforts of Kentucky's native freshwater fish and mussels and use limited financial resources wisely, the Kentucky State Nature Preserves Commission undertook a statewide assessment of "hot spots" and priority watersheds for freshwater fish and mussels. This GIS based prioritization effort found that conserving the top 10 hot spot watersheds would result in protecting populations of 88% of the imperiled mussel taxa and 58% of imperiled fish taxa.

The green infrastructure network developed for the NiSource MSHCP builds on the earlier research and GIS analysis undertaken by the Nature Preserves Commission. The GI network will provide additional context to the protection of aquatic resources by placing them in a network and a context where the ecological relationships with other landscape types such as forests and wetlands can be seen. The core areas, hubs and corridors for aquatic resources outlined by the GI network will benefit Kentucky's freshwater fish and mussels by protecting not only priority regions but an ecosystem that provided the underpinnings for aquatic resources.

Large Forest Blocks of Kentucky (poster)
The Kentucky Large Forest Block Project was initiated to address a lack of information regarding the location and quantity of large tracts of forest remaining in Kentucky. The large forest block data is now used in conjunction with Kentucky Natural Heritage Program database to assess conservation priorities. Analysis of the various datasets assists in determining where ecologically important areas occur and in designing plans for ecological corridors. The green infrastructure network developed for the NiSource MSCHCP will benefit from the forest block analysis undertaken by the Nature Preserves Commission and will seek to enhance this effort through a species based approach to selecting forest blocks that serve the habitat needs of key forest species. The additional work on conductivity and corridors that will be offered by the GI network will complement the Forest Block analysis.

Habitat Characterization Model for Federally Listed Plants (poster)
The Kentucky Nature Preserves Commission crafted habitat models using GIS for nine federally listed plant species. As with previous GIS efforts of the Natural Preserve Commission, the goal of the process was to help target limited resources and funding to the areas where the highest impact could be achieved. Although the modeling effort had limited success with Running Buffalo Clover due to limitations of available GIS data, the modeling effort was instructive. The goals of using GIS, where appropriate, to help with prioritization and find the regions where conservation dollars can bring the most benefit to sensitive plant species are embodied in the approach taken in designing the green infrastructure network developed for the NiSource MSHCP.

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LOUISIANA

Louisiana Comprehensive Wildlife Conservation Strategy (CWCS)

According the CWCS the purpose of the plan is to develop a blueprint for guiding Louisiana Department Wildlife and Fisheries (LDWF) in the development of management actions for Louisiana's fish and wildlife species with emphasis on species of conservation concern and associated habitats they depend upon. There are several important goals of the CWCS that are closely related to the green infrastructure network developed for the NiSource MSHCP. First, the CWCS seeks to provide the habitat and ecosystem functions that support healthy and viable populations of all species, avoiding the need to list additional species under the Endangered Species Act. Second, the CWCS seeks to identify, conserve, manage, and restore terrestrial and aquatic habitats which are a priority for the continued survival of species of conservation concern. The plan is supportive of education efforts, and improving the understanding of the general public. Finally, the CWCS aims to improve partnerships among all levels of government and with different sectors of the economy such as universities, nonprofit organizations and private industry.

The overarching framework of the GI network is strongly focused on protecting viable terrestrial and aquatic habitats for a wide range of species. Although many of the species of concern used in the GI network are federally listed species, there are a significant number of nonlisted species that have been used to create the network design. A comprehensive GI network is a sound approach to preserve a diverse and rich ecosystem and minimize future listings of species under the Endangered Species Act. Many of the opportunities for conservation identified in the GI Network will be sites that are appropriate for restoration for listed species as well as sites that are in prime condition that require protection through acquisition or other mechanisms. The lasting utility of the GI network is that as a multi-state plan it can help bring together stakeholders to work towards a collective solution to conservation problems.

Louisiana Department of Wildlife and Fisheries Strategic Plan 2006-2010

The strategic plan for LDWF establishes several goals that are aided through the advancement of the green infrastructure network developed for the NiSource MSHCP. The overall goal for the Wildlife Program is to enhance and conserve the habitat necessary to maintain the state's species diversity and optimum distribution and densities of wildlife populations, and to increase the opportunities for the public to enjoy their outdoor experiences. LDWF tracks the amount of acreage conserved by the state as well as the number of species listed as rare, threatened or endangered by the federal government as one method for measuring the successful achievement of its strategic plan as well as a broader state policy plan called Vision 2020.

The GI network supports the goals of the LDWF strategic plan by articulating an interconnected system of protected lands that provides habitat for both federally listed species as well as other nonlisted wildlife. By examining several different habitat types and mixtures of species, the GI network will assist LDWF in conserving the biodiversity of the state. Another benefit is that GI networks frequently provide opportunities for outdoor recreation for the public and help support viable populations of game species. Through the thoughtful implementation of the GI network, LDWF can make progress on the delisting of federal species as the network will provide stable habitat and help target habitat restoration efforts.

Louisiana State Comprehensive Outdoor Recreation Plan (SCORP)

The Department of Culture, Recreation and Tourism coordinated the creation of the state's SCORP, the guiding policy document for outdoor recreation. One of the main goals was to increase efforts to acquire recreation, conservation, wetland, preservation, and ecologically significant lands through purchase, conservation easements, donations, leases, and private development. In addition the state sought to increase buffer lands around parks, natural areas, forests and rivers. Within SCORP, states are required to examine wetland resources. As wetland resources are both vast and complex in Louisiana, the plan outlines the process by which the department would coordinate a study to identify wetland areas of statewide significance that are not in immediate danger of resource damage for acquisition and preservation.

Although the green infrastructure network developed for the NiSource MSHCP does not directly address recreation, many of the areas highlighted have potential dual uses both as ecological core areas for habitat and as centers for passive recreation. The corridor systems outlined by the GI network can have recreational benefits as paddle trails, hiking trails and other forms of passive recreation. The preservation and restoration of wetlands is a significant element of a GI network and would advance the state's policy goals for conservation of this resource.

State of Louisiana Coastal and Estuarine Land Conservation Program Plan (CELCP)

The Louisiana Coastal Resources Program (LCRP) crafted the CELCP as a guidance document to help evaluate land conservation opportunities in order to aid efforts to protect and conserve habitats that provide environmental, historical, aesthetic, and recreational benefits for the public today and for future generations. As coastal wetland and estuarine issues are complex in Louisiana the geographic area of interest to the CELCP covers 30 parishes. LA CELCP outlines criteria that will be used by coastal program staff to evaluate potential acquisition projects.

In relationship to the green infrastructure network developed for the NiSource MSHCP, the most relevant criteria are biotic production, corridors/connectivity or core conservation, landscape processes and functions, and the threat posed to the loss of genetic diversity. The proposed GI network may broadly benefit the wetlands, associated uplands within the 30 parish study area. The long term use of the GI network by state agencies may help in result in leveraging funds to protect lands with multiple benefits. The corridors and connectivity supported by the GI network will help highlight potential connections within the state between different landscape types as well as connections to the neighboring state of Mississippi.

Integrated Ecosystem Restoration and Hurricane Protection: Louisiana's Comprehensive Master Plan for a Sustainable Coast

This effort is the state's conceptual plan for the integration of coastal protection and restoration based upon the best available science and engineering. The Master Plan states a goal of integration of flood control projects and coastal restoration initiatives to help both human and natural communities survive and thrive over the long-term.

While the green infrastructure network developed for NiSource MSHCP does not directly address coastal resources, the conservation of inland wetlands and riparian areas will improve the disaster resistance of the state to storm events. Wetlands and riparian floodplain areas often serve as storage areas for flood waters and if developed, the water that would have been stored is moved more rapidly downstream, increasing the severity of flood damage as well as increasing the pace of the flood event. A GI network that conserves wetlands and aquatic areas will help store floodwaters and slow the pace of flood events in downstream coastal areas.

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MARYLAND

Wildlife Diversity Conservation Plan (WDCP)

The purpose of the Maryland WDCP is to provide the framework and overall direction for wildlife diversity conservation efforts for the state over the next decade. The WDCP identifies 502 species of Greatest Conservation Need (GCN) to represent the full array of wildlife species in Maryland. These GCN species are primarily those animals at risk in the state. To be effective, the authors of the WDCP recognized that there were overarching conservation actions that needed to be taken to implement the plan. The statewide conservation actions most directly related to green infrastructure are:

- Identify the most important sites throughout the State for wildlife diversity conservation
- Develop a core network of protected wildlife diversity conservation lands to capture the full array of Maryland's wildlife species
- Develop mechanisms to ensure adequate connectivity of important wildlife diversity conservation sites

To best address the plight of the GCN, planners focused efforts on identifying and protecting the key wildlife habitats that support the GCN species. In total, 35 key wildlife habitats were identified that encompass a number of forest, wetland, and open terrestrial habitats, as well as streams, rivers, estuaries, and the ocean. For each wildlife habitat, threats were assessed, conservation actions articulated and needs for inventory work, monitoring, and additional research identified. Below is a summary of conservation actions for major landscape types. Note: only conservation actions that were deemed closely related to green infrastructure are listed below.

Forests (combines eight wildlife habitats)

- Conserve large blocks of contiguous forest where appropriate
- Establish and maintain landscape -scale protected habitat and movement corridors
- Minimize fragmentation of large, contiguous forest blocks

Wetlands (combines nine wildlife habitats)

- Protect wetlands through acquisitions and easements, including surrounding buffers
- Establish and maintain effective buffers along wetlands by restoring natural communities where possible
- Establish and maintain protected networks of wetland sites and movement corridors within an extensive forest matrix

Grasslands (one wildlife habitat)

- Focus land preservation efforts on protecting large tracts of open grassland and minimize edge effects for area dependent grassland species
- Restore and maintain native grassland communities

Streams and Rivers (nine wildlife habitats)

- Restore and protect riparian buffers
- Develop habitat buffer guidelines for use by foresters and land managers and work with them to implement such
- Encourage reforestation within watershed

As the state of Maryland has been engaged in green infrastructure planning for the past ten years, there is a close relationship between the priorities of the WDCP and the priorities of the green infrastructure network developed for the NiSource MSHCP. The GI network promotes the conservation of large blocks of contiguous forestland, wetlands and grasslands, as a method to stem habitat fragmentation. Buffers are delineated in green infrastructure networks to conserve sensitive core habitat areas, protect streams and rivers and maintain vital corridors. Identifying the highest priority areas for restoration, which would benefit not only that location but be apart of a larger ecological system, is one of the applications of a GI network that achieves WDCP objectives. Focusing state acquisition efforts using fee simple and easement tools on high value wildlife habitat can be assisted by a GI network. While the WDCP recognizing wildlife habitat and values connectively, it is a GI network that provides clear illustrations of how and where corridors and linkages between and among wildlife habitat types must be made.

Maryland Atlas of Greenways, Water Trails and Green Infrastructure

In 2000 the state of Maryland launched an ambitious planning effort to map both recreational greenways and ecologic systems through a green infrastructure network. Accompanying the *Atlas of Greenways,* was a Green Infrastructure Assessment (GIA) of the state of Maryland, a detailed mapping exercise that highlighted 33 percent of the state as providing important green infrastructure. State officials provided the following benefits of green infrastructure as the reasoning for the planning initiative:

- It provides a balance to protecting land for recreation and agriculture with protection of ecological services;
- It ensures the continuation of natural services in each region that help clean the air and water;
- It supports Maryland's economy, especially the forest products industry, seafood industry, nature tourism, and outdoor recreation.
- It reduces the need for expensive stormwater management, flood control, and restoration projects by protecting water resources including streams, wetlands, and riparian corridors; and
- It addresses commitments in the new Chesapeake Bay Agreement to protect 20% of the watershed and to reduce the rate of sprawl development by 30%.

Over the years, state agencies have used the GIA to help evaluate potential land acquisition opportunities and spend their limited funding wisely. Recently, the Maryland Department of Natural Resources has updated the plan, and launched a user-friendly web version of the mapping effort called Maryland GreenPrint.

Mapping data layers and species information from the GIA and the GreenPrint will form a solid foundation of the green infrastructure network associated with the NiSource MSHCP. The Maryland planning efforts will benefit from the NiSource green infrastructure by providing new information on federally listed species and updates on remaining land acquisition opportunities highlighted by the proposed network. As state agencies have experience with using green infrastructure networks to guide state programs, the possibility of leveraging state resources with private funds for mitigation by using a green infrastructure network is natural extension of current practices. This green infrastructure network will assist the state of Maryland achieve its goals under the Chesapeake Bay Agreement and focus the work of other states that are parties to the Agreement through the common ecological planning framework of green infrastructure.

Maryland's Strategic Forest Lands Assessment (SFLA)

In response to the fragmentation of forests by development, the Maryland Department of Natural Resources launched a Forest Land Assessment to provide a baseline of information about forest resources and consider measurement indicators of progress towards sustainability of forestlands. The Strategic Forest Lands Assessment grew out the earlier Green Infrastructure Assessment (GIA), completed in 2000, which evaluated Maryland's sensitive natural resources, focusing on forests and wetlands, for their contribution to the network. The SFLA expands on the analysis of the earlier GIA by examining all forest lands of the State, not just those within the identified Green Infrastructure network, and assessing these lands for their long-term economic potential as well as ecological value.

The green infrastructure network developed for the NiSource MSHCP will utilize many of the findings, methods and data collected by the SFLA. The protection of forestlands as core areas or as hubs with working forestlands is a shared goal between to two planning initiatives. New information on species, forest land cover and other factors may help in updating the green infrastructure planning model in the state as well as provide state officials with a another snap shot of the forest resources. Potential mitigation funding provided through the NiSource project may provide assistance towards implementing the state's vision for green infrastructure and the preservation of working forestlands.

Maryland State Wetlands Conservation Plan

The purpose of Maryland's State Wetlands Conservation Plan is to provide an organized and comprehensive document that will guide efforts to collaborate and improve new and existing federal, State, local, and private programs for wetlands conservation and management. This document defines specific tasks developed by the Conservation Plan Workgroup, to address the immediate, intermediate, and long-term needs of wetlands resource management. The following are the stated goals and partial list of objectives for the Wetland Conservation Plan.

1) Develop a wetland baseline.
    A. Establish current inventory of wetlands
    B. Identify gaps in data, technology and other information for the wetland baseline
    C. Assess the status of determining wetland functions
2) Assess current and potential wetland threats and trends.
    A. Document and evaluate wetland threats and trends
    B. Assess the effects of indirect activities on wetlands
3) Increase efficiency and effectiveness of wetlands regulation and management in Maryland.
4) Identify wetlands for priority protection and restoration.
    A. Conduct watershed-scale identification and prioritization of key wetlands and potential restoration sites; identify mechanisms for preservation and restoration of key wetlands
5) Increase participation in wetland preservation, restoration, enhancement and stewardship.
    A. Increase ecological and economic incentives for all participants of wetlands conservation, preservation, restoration, enhancement and stewardship

The green infrastructure network developed for the NiSource MSHCP may help state officials fulfill many of the objectives and goals from the state Wetland Conservation Plan. The GI network delineates core areas, hubs and corridors for wetlands using species dependent on wetlands. The wetland network is characterized and evaluated using measures of environmental quality to provide decision makers with a comprehensive overview of both a system of wetlands and its relative health. The prioritization of wetlands based on quality, will help decision makers determine where to undertake restoration and preservation activities using limited funds. Wetlands are examined in relationship to other networks of forests lands and aquatic systems. Many species use multiple landscapes during their life cycle and

examining wetland systems as they relate to other landscape types is crucial for a holistic approach to conservation. Where appropriate, the GI network updates information on wetlands, using the latest available land cover maps and other sources of information. When GI network is used in concert with the wetlands baseline data from the Conservation Plan, decision makers can gauge progress on the preservation of high quality wetlands, gain insight on threats and trends on the health of wetlands. The GI network is a part of an innovative approach to mitigation, a response to incentives for conducting planning for future impacts of development on federally listed species. By improving the way traditional grey infrastructure projects account for species impacts, the GI plan holds the promise of directing funding and resources to the critical wetlands in Maryland.

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MISSISSIPPI

Mississippi's Comprehensive Wildlife Conservation Strategy (CWCS)

Mississippi's CWCS is a plan aimed at conserving wild species and their habitat. The overarching goal of this planning effort is to provide a guide to effective and efficient long-term conservation of Mississippi's biological diversity. The planning objectives for CWCS are based on the best currently available data on the distribution and abundance of wildlife species in the state, particularly rare and declining species which are defined as Mississippi's Species of Greatest Conservation Need (SGCN). The CWCS assesses the extent and condition of habitats required by these species, as well as existing and potential threats and conservation opportunities for these habitats. The state Heritage program list of *Animals of Special Concern* was used as the foundation for developing the list of SGCN for Mississippi's CWCS that includes 18 amphibians, 70 birds, 34 crustaceans, 74 fish, 17 mammals, 49 mussels and 35 reptiles for a total of 297 SGCN. CWCS also identified and prioritized the habitats and ecological communities for SGCN using a survey instrument. Associating SGCN with their habitats and natural communities guided the planning process of prioritizing conservation actions to be taken on a landscape level for an assemblage of species versus planning focused on the conservation of a single species.

The GI network developed for NiSource MSHCP will use many of the findings, field research and GIS data layers that were created during the CWCS planning process. As with the CWCS, the GI network is a science-based approach and relies on information about species habitat needs to outline a network of core areas, hubs of forests, wetlands and aquatic landscapes. The prioritization of habitat in the GI network is focused by the use of a collection of species for each landscape in a similar fashion to the CWCS. SGCN will benefit both the habitat areas outlined as well as a series of corridors connecting the areas, both within the state of Mississippi and to habitat areas in neighboring states. Many of the goals and objectives of the Mississippi CWCS will be achieved and refined through the GI network planning process and implementation.

Draft Mississippi Statewide Comprehensive Outdoor Recreation Plan

The purpose of the Mississippi 2009-2014 Statewide Comprehensive Outdoor Recreation Plan (SCORP) was to gather and identify the demands and support of outdoor recreation assets and opportunities within the state of Mississippi. This most recent update of the state of Mississippi's SCORP was completed using a combination of public surveys and input from public meetings with focused conversations on recreational supply and demand issues.

The SCORP survey of public recreational preferences touched on issues related to green infrastructure planning. Among the public's concerns were:

- Lack of recreational coordination and cooperation
- Greater availability of hunting and fishing opportunities
- Improving the protection and extend of Natural Areas

A detailed analysis of these concerns reveals that the public views the shortage of regional and statewide trails may be traced to the difficulties of coordinating the efforts local, county, state and federal agencies. The decrease in areas for hunting and fishing as well as the increased cost of leasing land for hunting was a concern raised by many participants. One of the most significant concerns was the public view that there is a lack of natural areas and an integrated network of conservation lands connecting the state of Mississippi. In response to these concerns, state officials pledged in the SCORP

plan to develop a system to access natural areas and develop a master plan for trail access across protect lands managed by different jurisdictions by the year 2012.

While the GI network developed for the NiSource MSHCP is not focused on recreation, the areas highlighted for conservation and the corridors conserved in many cases would be appropriate for dual use. A GI network for Mississippi can help identify areas to improve public access for hunting and fishing as well as improve the habitat for wildlife. The GI network will provide Mississippi with an ecologically based system that will connect many of the protected lands together and can contribute to the state's master planning efforts for a statewide trail network plan by 2012.

SCORP plans are also required to address wetlands issues. The state of Mississippi can be divided into two distinct areas of wetlands, the delta wetlands and the coastal wetlands. The delta wetlands include the floodplains of the Mississippi River, bottomland hardwoods, forests, oxbow lakes, and cypress swamps. Delta wetlands provide feeding grounds for one of the largest populations of migratory waterfowl in North America. Some of delta's farmlands are being reforested in order to improve ecosystems with the use of the Wetland Reserve Program. The reforestation is being accomplished through cooperative agreements between Natural Resources Conservation Service, Ducks Unlimited, Mississippi Fish and Wildlife Foundation, and Delta Wildlife. These organizations provide hardwood seedlings and construct hydrology restoration.

The GI network can help state officials identify and focus the restoration efforts on lands that can serve a corridors or buffer key core areas and hubs of a statewide network of conservation land and private lands managed in a ecologically sensitive manner. By using existing resources, such as the WRP, wisely, the GI network can help state officials by strategically targeting their limited public funds to protect lands with the maximum of public benefits.

Mississippi Forest Stewardship State Plan

Forest resources represent the state's largest single land use, covering more than 18.5 million acres. Sixty-two percent of the state's total land area is forestland. Private, non-industrial landowners make up the largest forest ownership class in Mississippi, owning 72% of the state's forestland. The goal of the Forest Stewardship Program in Mississippi is to empower landowners to make quality decisions regarding the management of their forestland. Recent studies have shown that just over 50 percent of the landowners in Mississippi replant their property after a harvest. One of the goals for the Forest Stewardship program is to encourage the replanting of forestland and promote sound stewardship practices.

The GI network developed for the NiSource MSHCP can assist state agency staff in pro-actively focusing their outreach programs to private landowners. Frequently GI networks include areas that are recommended for restoration and state officials could use this information to guide their outreach efforts to landowners on incentive programs that help with replanting and other restoration activities.

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NEW JERSEY

New Jersey Wildlife Action Plan

One of the central goals of the NJ Wildlife Action Plan is the full recovery of rare species populations. Coupled with the landscape approach taken by the state officials, the plan offers a compelling vision for land conservation. The use of innovative techniques such the use of the Delphi process to help weight the status of wildlife by state officials demonstrates an interest in using the latest science based approaches to conservation problems. According to the plan the cornerstone of this effort is the Landscape Project map, which has categorized the state into general landscape categories of forest, grasslands, forested wetlands, emergent wetland and beach/dune. From these categories contiguous patches of habitat were derived from habitat boundaries and man-made boundaries such roadways. The patches were ranked according to conservation status of the wildlife records and other factors. The NJ Wildlife Action Plan has gone beyond its mandated requirements and has been updated most recently in January of 2008. The fact that the document is heavily used and is periodically evaluated and refreshed is encouraging.

The green infrastructure network developed for the NiSource MSHCP will utilize many of the data sets collected and created for the Wildlife Action Plan. The species based approach used to create the GI network will add another piece of analytical information to assist state officials in achieving their overall goal of the full recovery of all rare species. The GI network and the planning supporting systems provided with the network embrace the same spirit of innovation as the NJ plan with the use technical tools such as analytical hierarchy process and optimization, to achieve greater objectivity and improved efficiency. The methods used by the Landscape Project are very similar to the steps and methods used for creating a GI network. The GI Network will provide value added by provided a connecting corridor system in addition to highlighting patches of important habitat. It is hoped that state official will use the GI network in a similar vein as the Wildlife Action Plan, provided context for conservation decision making and updated the network to reflect changes in scientific understanding, priorities and opportunities.

New Jersey Statewide Comprehensive Outdoor Recreation Plan 2008-2012 (SCORP)

The conservation of natural resources that are important to protecting the state's biodiversity and quality of life is a main goal of this state planning effort. The SCORP is also supportive of establishing a statewide greenways system to provide recreational corridors as well as wildlife corridors. SCORP is intended to provide guidance to state officials in the allocation of funds from the Garden State Preservation Trust, Land and Water Conservation Fund, Forest Legacy Program, Pinelands Section 502 Program.

The green infrastructure network developed for the NiSource MSHCP is designed to support a diverse set of species in several different landscape types. This approach provides the overarching framework to support biodiversity. An additional benefit is that the hub areas and corridors highlighted by GI networks are frequently the landscapes that the public enjoys for passive recreation, provide scenic views and protect sensitive water supplies. These additional benefits provided by a GI network help protect a high quality of life for residents. Many of the areas highlighted by the GI network for wildlife corridors would also be appropriate for greenways and passive recreation, supporting another goal of New Jersey's SCORP. The GI network is a tool designed to help decision makers with resource allocations and would provide useful guidance to state offices in the use of public funds for land conservation.

New Jersey Coastal and Estuarine Land Conservation Program Plan (New Jersey CELC Plan)
The New Jersey CELC Plan proposes general criteria for evaluating land conservation projects in the coastal zone and prefers work off of the priorities of partners (other state agencies, counties, municipal government, NGOs) than complete an addition prioritization mapping exercise. Although the green infrastructure network developed for the NiSource MSHCP doesn't focus on coastal resources, the coastal zone for the New Jersey CELC Plan includes at least a small part of a total of 245 municipalities in seventeen of New Jersey's twenty-one counties, making the plan a significant source of information and potential financial leverage. One of the main goals of the New Jersey CELC Plan is to protect habitat for native plant and animal species, including rare and endangered species. State officials support conserving large blocks of undeveloped land as a strategy to maintain and enhance health wildlife populations. The program favors projects that provide "greater continuity of the landscape", making proposed hubs and connecting corridors in the GI network a natural extension of this criterion. As the GI network will overlap coastal zone areas, the two planning initiatives can benefit from collaboration. The GI network will provided added clarity on conservation priorities at a landscape scale while the New Jersey CELC Plan may be a source of project funding where there is sufficient benefit for coastal species.

Garden State Greenways
A collaborative planning effort, among state agencies, foundations and universities, the Garden State Greenway is an interconnected Green Infrastructure network. The current design of the network is a result of the New Jersey Green Infrastructure Assessment (NJGIA) profiled in the next section. The goals for the NJGIA were driven by the vision established in the Garden State Greenway and are as follows:

1. Establish parks, trails or other protected lands within walking distance of every New Jersey resident.
2. Permanently protect New Jersey's critical natural resource lands: those contributing to groundwater or aquifer recharge, surface water quality, rare and endangered species habitat, and prime soils.
3. Permanently protect large, contiguous tracts of natural land for the long-term survival of native plant and animal species.
4. Permanently protect large, contiguous tracts of farmland for the long-term viability of agriculture and the maintenance of scenic and cultural landscapes.
5. Permanently protect parks, natural lands and farmland surrounding historic sites, in order to maintain their historic character, visual context and interpretive value.
6. Link together New Jersey's protected natural, agricultural, historic and recreation lands via trails and greenway connectors.
7. Grant public access and trail rights-of-way, where appropriate, across green infrastructure lands to allow the public to benefit from the scenic, recreational and interpretive opportunities provided therein.
8. Coordinate state, local and private preservation as well as land use planning efforts, around common maps and shared GIS data, towards achieving goals one through seven.

The green infrastructure network developed for the NiSource MSHCP affirms the Garden State Greenways Plan by sharing many of the goals of the greenways planning effort and using a very similar method to the NJGIA. While the GI network is focused on the habitat needs of some federal listed species and focal species, the network will have benefits to passive recreation, aquifer recharge, surface water quality, and the protection of scenic and cultural landscape. Protecting large contiguous tracts and linking these tracts in an ecologically meaningful method is the root of the proposed GI network.

While prescriptions for public access are not a part of the GI network, the underlying notion is to encourage movement of among large tracts of conservation land and the appropriateness of public access can be discussed over time. Frequently lands included in green infrastructure hubs are working landscapes of forest lands and farms lands and their management may be compatible with the ecological goals. These landscapes found in hubs are often highlighted by the public as having scenic value, cultural value and historic value, reinforcing the preservation goals of the Garden State Greenways Plan.

New Jersey Green Infrastructure Assessment (NJGIA)

Building on the work of the New Jersey Greenway Plan, NJGIA created a series of hubs and corridors to help coordinate land preservation efforts in the state. In terms of planning goals, the NJGIA works off of the goals articulated by the Greenway Plan. There are several elements of the planning methods of the NJGIA that warrant attention. The NJGIA was drafted using many of the Green Infrastructure principles articulated by TCF and the Assessment specifically mentions the following as guiding the network design:

- Protect the largest and most significant greenway hubs.
- Maintain connectivity between hubs via greenway connectors.
- Protect sufficiently wide greenway connectors and 'stepping stone' hubs.
- Provide for the highest possible greenway quality.
- Provide multiple greenway connections between hubs.

The green infrastructure network developed for the NiSource MSHCP relies on the same principals as outlined by the NJGIA. By using shared principles, many of the same regions of the state will be highlighted by both efforts and where the planning initiatives differ, they are connected by intent, method and spirit.

The NJGIA offers caveats and factors such as minimum viable population, habitat or dispersal requirements of individual species or groups of species that were build into the models. While the lands identified in the NJGIA do provide habitat for rare and endangered species, the plan does not claim that the habitat provided is sufficient to preserve viable populations. The green infrastructure network prepared for the NiSource MSHCP will use focal species over a series of landscape types (forests, wetlands, aquatics, karst) to produce a network that will support the listed species impacted by NiSource project as well as many other species of concern.

The NJGIA uses the least-cost path analysis to identify optimal corridors to link hubs. This sophisticated approach to corridor design is similar to the approach taken by the GI network. The technique utilized by TCF in outlining corridors will be compatible with the methods used in NJGIA.

As implied in the title, the NJGIA is an assessment of Green Infrastructure, making the document more of an initial inventory and test run of a methodology instead of a final comprehensive network. The GI Network for the NiSource project could be viewed as a more detailed, species based iteration of the NJGIA, taking the natural next step, moving from an assessment to a complete network design. It is hoped that state officials will utilize the GI network as a statewide planning tool to help guide land conservation planning.

New Jersey's Landscape Project

The Landscape Project is an ecological based planning initiative started in 1994 by the N.J. Division of Fish Wildlife's Endangered and Nongame Species Program (ENSP). The project goal is to protect New Jersey's biological diversity by maintaining and enhancing imperiled wildlife populations within healthy, functioning ecosystems. The project identified and mapped priority areas for imperiled species within different landscape regions. The method and products produced were peer-reviewed and based on the best available science. The critical habitat maps were designed for a wide range of end users with the goal of helping them improve approach to land use and decision making.

The GI network takes a similar approach to the Landscape Project in assessing large regions, using focal species and shares the overarching goal of aiming to conserve a fully functioning ecosystem. Green infrastructure is a science based approach and the proposed network has received input from state officials, species experts and federal agencies. Improved decision making is the goal for the use of the GI network and it is hoped that state officials will see the benefit of the approach for assisting with prioritization within their own programs.

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NEW YORK

NEW YORK

New York State Comprehensive Wildlife Conservation Plan (CWCP)

The New York CWCP plan was drafted in the spirit of collaboration among state agencies and other stakeholders in an effort to build a consensus on species-based conservation priorities. One of the aims of the planning process was to foster synergy between an ecosystem approach and an approach that recognized a "sense of place" that is important to residents of the state. By connecting lifestyles and landscapes, the plan attempts to increase public understanding and support for the conservation of ecosystems and a wide range of species. Using organizing principles such as a watershed as the geographic basis for the planning process, the planning process sought to overcome tradition organizational obstacles and focus the state's resources in a more holistic manner. The CWCP was recognized by state officials as an opportunity to improve our scientific understanding of the natural world and the processes that shape that environment.

The NY CWCP represents a considerable effort to prioritize resources for conservation. The CWCP listed 537 species of special concern. Information collected in the CWCP planning database was analyzed by DEC staff using species and species group information sorted by watershed basin. A list of species of special concern that occur in each basin was compiled and the recommended conservation actions for each species and group were examined. The following prioritization criteria were used to rank conservation actions advocated by the CWCP: species population status; state conservation status; the number of critical habitats used by that species; the number of species found in the species group; and inclusion on the Northeast Non-Game Technical Committee list of species of conservation concern. Species receiving 20 or more points based on the above criteria were considered to be of the highest priority for implementation activities over the next 5 to 10 years in New York.

The green infrastructure network developed for the NiSource MSHCP is a collaborative effort, working with a variety of state agencies, federal agencies, and other stakeholders to protect and improve species habitat. Like the NY CWCP, the GI network has taken a landscape scale approach, moving well beyond the required regulatory boundaries for evaluating mitigation opportunities. By expanding the study area for the green infrastructure network to the ecoregions, watershed and state boundaries, the network has maximized the opportunities for identifying high quality areas of habitat for federal listed species as well as other species used to guide the planning effort. The field work conducted as part of the green infrastructure planning process will further enhance the scientific understanding of species ranges, habitat needs and how these dynamics can be combined with other species requirements to build an integrated network. The GI network advances both the substance and the spirit of the NY CWCP.

Draft New York State Open Space Conservation Plan

The New York State Open Space Conservation Plan is one of the main guidance documents for directing state land acquisitions. The plan is also the forum for proposals guiding the state's approach to the Forest Legacy program and serves as the Coastal and Estuarine Land Conservation Plan. The plan is developed in consultation with nine Regional Advisory Committees that provide information and advice to the state on land policies, and land acquisition projects. The active participation of local stakeholders such as land trusts, municipal officials and county leaders provides a strong linkage between regional priorities and state level action. In recent years, the plan has considered landscape scale project areas

as a method to focus both public and private conservation activities. The Open Space Conservation Plan has several significant goals including:

- Responding to Climate Change;
- Fostering Green, Healthy Communities;
- Connecting New Yorkers with Nature & Recreation; and
- Safeguarding our Natural & Cultural Heritage.

The plan makes reference to green infrastructure in relationship to efforts to encourage urban forestry. Establishing stream and river buffers and importance of protecting wetland systems is articulated in the NY Open Space Plan. The role of corridors to link parks and provide recreational opportunities is addressed by the plan. The preservation of New York's working landscapes – both forests and farmlands - is seen as critical. The plan proposes three new Forest Legacy areas including the Allegheny Plateau, the Shawangunk to Delaware Catskill Watershed area and the Finger Lakes Forest Area.

The green infrastructure network developed for the NiSource MSHCP will help provide added clarity to the ecological priorities of land conservation at a statewide scale in planning reports such as the NY Open Space Conservation Plan. State officials may use the GI network as another tool to help evaluate potential projects, as an outreach element to help illustrate state level priorities and in concert with recreational plans to highlight the value of corridors both for wildlife and people. Landscape scale prioritization projects such as the state submissions of areas for Forest Legacy, would benefit from the GI network analysis of core areas and hubs for forest resources. Developing a GI network is a strategy to address global climate change by helping facilitate wildlife movement and allowing for other adaptive strategies in confronting climate change.

New York Statewide Comprehensive Outdoor Recreation Plan (SCORP)
As the main guidance report for active recreation in the state of New York, the SCORP focuses on the traditional assessment of supply and demand by residents for different types of recreational activities. NY SCORP is based on ten policies with supporting action strategies. The following three policies and selected strategies most directly relate the green infrastructure network developed for the NiSource MSHCP:

Policy: Preserve and protect natural and cultural resources.
• Encourage the use of fee and nonfee acquisition as well as other techniques in the protection of important open space, scenic, historic, and ecologically sensitive areas.
• Develop, maintain, evaluate and support natural and cultural resource inventories and assessments.
• Promote efforts to increase knowledge and awareness of biodiversity and develop statewide, local and regional approaches to biodiversity protection and maintenance.
• Identify and protect biodiversity "hot spots" and expand protection of habitat corridors and buffer areas

Policy: Develop comprehensive, interconnected recreationway, greenway, blueway and heritage trail systems.
• Identify and encourage the creation of recreationways, greenways, and blueways in and around metropolitan areas, along major water corridors and along other natural, abandoned railroad and utility corridors.
• Encourage the development of an interconnecting system of trails, recreationways, blueways and greenways.

• Encourage partnerships between federal, state and local governments, not-for-profit organizations, trail groups and private landowners in the development and maintenance
of trails.
• Incorporate protection and management of biodiversity within the recreationway and greenway system plans.
• Encourage the expansion of the Wild, Scenic and Recreational Rivers System.

Policy: Protect natural connections between parks and open space areas.
• Inventory and identify important ecosystems and natural connectors.
• Encourage the protection and/or acquisition of critical connectors

The GI network will assist public officials create a state scale vision for both ecological conservation and recreation priorities. The GI network and the associated field work will advance the understanding of species needs, distribution and habitat preferences. The core areas outlined in the GI network will help identify biodiversity hot spots as called for in the SCORP. Many of the corridors and hub areas highlighted by the GI network will have dual use for biodiversity conservation as well as passive recreation. The use of the GI network will be to help decision makers with evaluating mitigation sites for acquisition in association with the NiSource project. Over the long term, it is hoped that the GI network will be used by state officials to evaluate acquisition priorities and help use limited public funding for both fee and easement acquisition wisely.

A Plan for Conserving Grassland Birds in New York: Final Report
Grassland birds have been declining faster than any other habitat-species suite in the northeastern United States. One of the main reasons for these declines is abandonment of agricultural lands, causing habitat loss due to reversion to later successional stages or due to sprawl development. The primary objectives of the efforts outlined in this plan are to halt or even reverse the declining trends for populations of grassland birds in New York, and to sustain viable populations of grassland birds into the future. The key strategy for coordinating conservation efforts is the delineation focus areas which are regions of the state that support key, residual populations of grassland birds. Because grassland birds are sensitive to landscape-level factors (such as availability of suitable habitat within the surrounding landscape) and funding for conservation activities is limited, the best opportunity for achieving success is to concentrate efforts within focus areas.

The green infrastructure network developed for the NiSource MSHCP will attempt to include grasslands as a landscape type to be delineated with core areas, hubs and corridors. Grassland bird species being considered for use as indicator species within the green infrastructure network include the Sedge Wren, Henslow Sparrow and Grasshopper Sparrow. In addition, the Bobolinks and Northern Harrier are listed with the green infrastructure network methods as important grassland species. These five species are high priorities for the NY Grassland Bird Plan, hence the modeling of these species as part of the GI network may be of great use in the identification and prioritization of conservation opportunities for grassland birds. New information on grassland birds collected as part of the planning process for the GI network may be contributed to future revisions to the NY Grassland Bird Plan.

Empire State Greenway
In May 2005, then Governor George E. Pataki unveiled a proposal to create the Erie Canal Greenway, an initiative to establish a regional approach to land use planning, tourism, and recreational trail development along the New York State Canal System. Establishing a blueway recreation trail using the

canal system and connecting it to the Hudson River Greenway Trail was one of the recommendations of the report.

The green infrastructure network is focused on connecting a series of ecologically sensitive areas. While the overlap with the Erie Canal may be minimal, the concept of a state scale network providing recreational opportunities may be one of the dual benefits of the GI network for New York. The creation and implementation of the GI network will benefit similar state scale planning efforts such as the Empire State Greenway as opportunities for connectivity between protected lands or other public assets is examined more frequently by public officials.

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OHIO

Ohio Comprehensive Wildlife Conservation Strategy (CWCS)

The goal of the CWCS is to help ensure healthy fish and wildlife populations and wildlife diversity throughout Ohio, especially those species in greatest need of conservation. The Ohio CSWS is intended to highlight priorities on a state level for both species and habitats and bring together agency partners to collaborate on restoration and conservation issues.

The Ohio CWCS provides guidance and strategy for the Division of Wildlife section of the Ohio Department of Natural Resources. The Division of Wildlife's CWCS is a tactical document broadly divided into two areas of concern, terrestrial wildlife conservation and aquatic wildlife conservation. The terrestrial information is categorized by five habitat tactical plans and eight focus area plans representing forestland, wetland, grassland, and unique habitats. The aquatic portion of the strategy is divided into 11 watershed plans that represent the principal watersheds of Ohio. Each watershed plan identifies the characteristics of the watershed, the aquatic species present, the conservation issues concerning the area, as well as the proposed actions and plans for monitoring the area and the impacts of the conservation actions taken. The method used in the Ohio CWCS is similar to the landscape divisions of forests, wetlands, and aquatic areas used in GI network developed for the NiSource MSHCP to outline core areas, hubs and corridors. The GI network design will provide added context for both the terrestrial wildlife and aquatic wildlife areas.

The Ohio CWCS also provides additional materials for integration into the GI network design by identifying state level aquatic and terrestrial priorities within key focus areas. Prioritization between habitats on a state level is crucial in determining which habitats are in the greatest need of conservation. In the case of the Ohio CWCS, the approach is to focus on smaller program areas within larger tactical habitat plans. Each program area has specific issues with direction statements and strategies to address the issue. The GI network design is suited to integrate both larger tactical plan strategies and smaller program area priorities.

Trails for Ohioans

The state trails plan drafted by the Ohio Department of Nature Resources is intended to stimulate a coordinated and strategic approach for creating a system of recreational trails in Ohio by all levels of government and private trail groups and organizations. The ultimate vision of the plan is to link public lands, natural and scenic areas and communities with a multi-modal trail system. The plan will also serve as a guide for allocating resources from the Clean Ohio Trails Fund (COTF) program, the federal Recreational Trails Program (RTP) and other financial assistance programs. The plan envisions a goal of providing an easily accessible trail opportunity within 10 minutes of all Ohioans.

The linkages highlighted by the GI network will enable the movement of both wildlife and in some cases provide for passive recreational opportunities such as hiking, bird watching and other activities supported by the state trails plan. It is anticipated that the GI network will be used in the future for a wide range of projects and can serve as a guide for allocating resources, leveraging financial resources when used in tandem with the state trails plan. By highlighting corridors, the GI network will assist state officials in meeting the goal of increased access to trail opportunities within a reasonable distance of all Ohio residents.

Statewide Comprehensive Outdoor Recreation Plan (SCORP)

The primary goal of the 2008 Ohio SCORP is to provide a contemporary assessment of outdoor recreation in Ohio and to recommend ways in which public, private and independent agencies might

strive to meet identified needs within the constraints of the state's social, economic and natural resources. The green infrastructure network developed for the NiSource MSHCP provides a similar assessment of the opportunities for protecting an integrated network of conservation land and is intended to serve as map displaying partnership opportunities between the public, private and nonprofit sectors.

One of the striking findings of the SCORP assessment was that only 5.7 percent of the state's total acreage is designated for outdoor recreation use. However, in surveys conducted with Ohio residents, 48% wanted state officials to invest more in lands for passive and nature based recreation (SCORP 2008 p 9 and p73). With strong public support, one of the goals of SCORP is to promote the acquisition of lands suitable for wildlife and passive recreation on a statewide scale. In addition, Ohio SCORP has an implementation goal of identifying critical habitats and seeking to reverse, where realistic, the trends of habitat loss.

The GI network is intended to help decision-makers evaluate conservation opportunities, weighing multiple factors. It is anticipated that segments of the GI network would be appropriate for passive recreation and support the goals of promoting a healthy outdoor lifestyle for Ohio residents. The GI network is another tool that can aid the ODNR Division of Wildlife in identifying critical habitat areas and targeting habitat restoration work.

The Ohio SCORP addresses the state's broad goals for the state for wetland conservation and provides an update on the state's wetland conservation initiatives. An updated wetland inventory is under way and is expected to be completed by June 2009. According to the Ohio SCORP the following three goals will be accomplished through the new wetland research:

I. Updating of maps in areas of the state that have experienced substantial developmental pressure.

II. Analyzing changes and trends to wetlands and other aquatic habitats at ecosystem, regional or local levels.

III. The ability to better identify threats and risks to important wetland and aquatic habitats in order to promote sound decision making.

The GI network utilizes the latest wetland data in crafting core areas, hubs and corridors for wetlands across the state of Ohio. Conserving aquatic habitats as functional ecosystems at both a regional and local level is an implicit goal of the proposed GI network. The examination of wetland, aquatic and forest areas at a landscape scale is intended to help government officials address threats and risks at as large a scale as possible and to promote sound decision making.

Ohio Wetland Restoration and Mitigation Strategy Blueprint

In 1999, the Ohio Department of Natural Resources and the Ohio Environmental
Protection Agency completed a comprehensive plan for the state's wetlands that identified priority areas for the development of wetland mitigation and restoration projects and identified high quality wetland areas. The state wetlands plan also endorsed the strategies of conserving riparian habitat through the use of easements and or acquisition. At the heart of the plan were priority areas for wetland mitigation and restoration identified by a GIS model that was combined with stakeholder input. This model was created to help decision makers in targeting wetlands mitigation and restoration and was designed to foster a spirit of collaboration.

The green infrastructure network developed for the NiSource MSHCP will include wetland core areas, hubs and corridors and will utilize much of the same information as the state wetlands plan as well as updated wetlands GIS layers. Riparian zones play a central role in a green infrastructure planning effort as both a resource that provided habitat and as a connecting corridor linking habitat areas. It is hoped that the GI Network will be utilized as a decision aid by state officials and renew an attitude of partnership among stakeholders and between the public, private and nonprofit sectors.

Ohio Coastal and Estuarine Land Conservation Plan (CELCP)

The Ohio CELCP Plan provides an assessment of priority land conservation needs and guidance for nominating and selecting coastal and estuarine land conservation projects within Ohio. The planning boundary is defined as the Lake Erie watershed that encompasses 11,649 sq. mi. in 35 of Ohio's 88 counties. Ohio's CELCP process identified a number of ecosystem functions that are conservation needs, such as providing buffers for critical habitat areas and restoration of floodplain connectivity and function. Also the CELCP identified several different landscape types of importance including swamp forests, riparian corridors, and the rare and endangered species associated with these freshwater and near-shore ecosystems.

While the green infrastructure network developed for the NiSource MSHCP will not address coastal resources specifically, it will be highlighting landscape types and ecosystems that are strongly connected to coastal resources. The GI network for Ohio will benefit a wide range of species, many of which also occupy coastal ecosystems. The CELCP priorities represent both potential opportunities for financial leverage as well as other types of collaboration with the GI network initiative.

All Bird Conservation Plan for Ohio

This plan attempts to synthesize many of the findings of other national and regional conservation plans for birds in the state of Ohio with the overall goal of providing guidance on bird conservation issues. The main goals for the Ohio All-Bird Conservation Initiative (OBCI):

1) Prioritize a species list that identifies Ohio species that are at risk in the state, region, and across the continent

2) Summarize regional bird conservation plans and step down population and habitat goals to Ohio

3) Summarize the Upper Mississippi & Great Lakes Joint Venture Conservation Strategy Plan (This plan is broken down into four separate plans for waterbirds, waterfowl, landbirds and shorebirds)

4) Identify critical research and monitoring projects needed to sustain Ohio's bird populations and habitats.

5) Identify potential funding sources for collaborative conservation projects among OBCI partners

6) Describe outreach and education needs for bird conservation in Ohio

The OBCI includes suitability models for Joint Venture focal species from four primary bird groups from three breeding habitats (marsh wetlands, woodlands and uplands) and two non-breeding habitats (marsh/deep water and mudflat/shallows). The mapping information was synthesized into statewide

focus area map that highlights counties of crucial importance for bird conservation. Between the four suitability maps and the focus area maps, decision makers have tools to aid with targeting conservation actions at a regional scale within Ohio.

The OBCI will provide valuable information for the creation of the green infrastructure network developed for the NiSource MSHCP. Birds are heavily used as focal species in the process of designing core areas for wetlands, grasslands and forest as well as connecting corridors. Like the OBCI, the GI network takes a comprehensive approach to wildlife conservation, examining both rare and more common species. The GI network is a prioritization tool based on the latest science on wildlife conservation and seeks to help decision makers by providing information and focuses attention on crucial lands. When used with the OBCI focus areas, the GI network will help public officials leverage financial resources to protect lands that serve multiple purposes, including bird conservation.

Ohio Department of Natural Resources Strategic Plan 2000-2010

Over a two year period, state officials worked to craft a strategic organization plan to guide the actions of the Department of Natural Resources (DNR). In relationship to the GI network the two main issues identified by the DNR strategic plan were habitat loss and wildlife diversity. A series of program plans were also drafted for forestlands, inland waters, the Ohio River, wetlands, unique habitats and streams. Although each program plan is focused and reflects the special needs of that resource there were common themes among many of the plans. The observation that landscapes are becoming increasingly fragmented, resulting in habitat loss and declining of wildlife diversity is repeated at several junctures in the strategic plan.

To address these trends, OH DNR has set a number of goals. For forest lands, maintaining or increasing large contiguous blocks of forests within focus areas is a stated objective. For aquatic resources, preventing further loss of existing species and restoring at least two native aquatic species by 2010 is the direction set by DNR. Increasing wetland acreage and increasing wetland dependent wildlife are twin objectives. Restoring 1,000 stream miles of impaired waterways and increasing the number of protected stream corridors by 1,500 miles is another ambitious goal.

The green infrastructure network developed for the NiSource MSHCP will help the Ohio DNR achieve the goals and objectives articulated in their strategic plan. An ecologically based network fundamentally seeks to reduce fragmentation and provides a framework to nurture biodiversity. Core areas, hubs and corridors designed for species that need forests, wetlands and aquatic landscape types strongly supports the conservation goals for each of the program plans within the overall department strategic plan. For example, core areas and hubs for forest land will be contiguous blocks of forest land supporting a goal of the DNR strategic plan. Streams are often significant both as core areas for aquatic species but also as corridors, hence, the GI network will support DNR's restoration and protection goals for streams.

Ohio Department of Natural Resources, Division of Forestry, Strategic Plan

To direct the management of the state forests, the Division of Forestry released in 2008 its own strategic plan. Of the four main objectives, managing the forests to ensure their health and sustainability is the most directly connected with the goals of the green infrastructure network developed for the NiSource MSHCP. To meet the goal, state officials call for the management of site appropriate, native forest systems and species. The strategic plan also sets a goal of retaining and promoting stand and landscape-level wildlife habitat. In delineating the GI network for forests, TCF will use a suite of native species and their habitat needs. This use of native species dependent upon forested areas supports the management goals articulated in the Division of Forestry Strategic Plan. By placing the forest core areas

and hubs in the context of an interconnected network with streams and wetlands, the wildlife habitat value of forest lands highlighted by the GI network is also increased.

Balanced Growth Initiative and Watershed Pilot Plans

In 2000, the Ohio Lake Erie Commission released its ground breaking "Lake Erie Protection and Restoration Plan" that called for a new incentive based planning approach for balancing growth and conservation. The plan called for the creation of three Watershed Planning Partnerships, formed with local governments, planning agencies, nonprofit organizations, and other parties. These watershed planning partnerships would designate priority conservation areas and priority development areas within their jurisdictions. Priority conservation areas are locally-designated areas targeted for protection and restoration that would include important ecological, recreational, heritage, agricultural, and public access areas. The three pilot areas that are currently in this planning process are the Chagrin River watershed, Rocky River watershed, and Swan Creek watershed (a subwatershed of the Maumee River watershed). When the plan describing regional preferences is complete, and if 75% of the jurisdictions in the watershed agree with the plan, incentives will be available for communities to implement elements of the plan. While these three pilot plans are all in different stages of development, they remain an effort that will be useful for the green infrastructure network developed for the NiSource MSHCP in the future.

The GI network is an additional tool for helping decision makers identify opportunities that provide the greatest benefit to the affected species. Over the long term it is hoped that the GI network is widely used by state officials and other partners to balance conservation and growth efforts. The selection of a watershed as the study area for the Balanced Growth Initiative reflects a deep interest in allowing ecological and geological boundaries to frame the issues of growth and conservation. With the GI network, the study area was greatly expanded beyond the affected counties where NiSource pipeline were present to either the statewide level or 4 digit level hydrologic unit code (or HUC). By expanding the study area for the GI network, the greatest opportunities for conservation for affected species can be found and conserved.

The connection with the GI network is that each of the three watersheds will have designated Priority Conservation Areas as well as Priority Development Areas. These areas may be useful in locating matching funds for mitigation or where mitigation sites would be welcomed or discouraged by a community.

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On Going Initiatives

Chagrin River Watershed Partners: Chagrin River Watershed Balanced Growth Plan

Lake Erie Allegheny Partnership (LEAP): Lake Erie Allegheny Partnership for Biodiversity

Western Reserve Land Conservancy: Western Reserve Land Conservancy's Anchor Strategy

PENNSYLVANIA

PENNSYLVANIA

Pennsylvania's Comprehensive Wildlife Conservation Strategy (CWCS)

The Pennsylvania CWCS is a joint vision to conserve wildlife on behalf of the Commonwealth's two state agencies with jurisdiction on fish and wildlife issues: The Pennsylvania Game Commission and the Pennsylvania Fish and Boat Commission. By engaging in a collaborative planning exercise the CWCS represents a strategic and comprehensive approach to managing the Commonwealth's nongame fish and wildlife resources. The purpose of the CWCS is "to conserve Pennsylvania's diverse wildlife to maintain its role in ecological processes, and to protect and enhance species of conservation concern".

Five guiding principles of the Pennsylvania CWCS are:

- Conserve Species At Risk
- Keep common species common
- Recognize the unique role of Pennsylvania
- Engage in voluntary partnerships for species, habitat and people
- Be a comprehensive strategy

The Pennsylvania CWCS categorized the state into landscape types such as forests, wetlands, streams and grasslands. A common theme among landscape types was that large contiguous blocks of a landscape type are becoming increasingly rare and fragmented. For example, according to the CWCS only 42 percent of the forests in Pennsylvania are considered core forests and of these large forest patches over 70 percent are 5,000 acres or less. The CWCS strategy for most landscape types is to identify the highest quality habitat at a large scale and seek protection of these sites. The role of species of concern is outlined for each landscape type and how strategies to conserve these landscapes will benefit particular species is outlined within the CWCS.

The green infrastructure network developed for the NiSource MSHCP represents a vision for multi-state interconnected conservation network benefiting both wildlife and people. The green infrastructure network, like the CWCS, advocates for protection of both wildlife and their habitat. Both rare and endangered species as well as nonlisted or common species will benefit from a green infrastructure network. As the GI network is a science based planning method, the resulting network will provide additional opportunities for collaboration between the Pennsylvania Game Commission and the Pennsylvania Fish and Boat Commission.

As with the CWCS, a green infrastructure network breaks the landscape down into categories or landscape types. By using focal species that are strongly associated with a landscape type, core areas and hubs are delineated. The purpose of these areas is to conserve contiguous patches of landscape that will provide the highest quality habitat for the species specializing in that landscape. Connecting core areas and hubs with corridors serves an important ecological function as the life cycle of many species depend on moving between different landscape types or to allow for seasonal migration. Green infrastructure corridors are one step in planning for the adaptations that may be necessary to address global climate change by providing pathways for large scale migrations of a wide range of species.

Pennsylvania Statewide Comprehensive Outdoor Recreation Plan (SCORP)

The Pennsylvania SCORP describes the ***"state" of outdoor recreation opportunities, demands, (both met and unmet) and outlines its priorities/strategy to meet the needs of its citizens both now and in***

the future. At the heart of the SCORP is a statewide survey of the public on their use of recreational lands as well as their views on the types of recreational lands and facilities that they wish to see developed in future years.

The Pennsylvania SCORP uses the term green infrastructure as a landscape scale approach to open space conservation. Overall the plan is supportive of the concept of a network of conservation lands to protect functioning ecological systems. One of the main priorities in the Pennsylvania SCORP is to "Create More Healthy and Livable Communities" that include "connecting and linking communities with recreation, park and conservation resources".

The green infrastructure network developed for the NiSource MSHCP will help state officials implement the spirit and intent of the Pennsylvania SCORP. The core areas, hubs and corridors while delineated for the habitat needs of wildlife - may support uses for passive recreation by the public. The wetland areas highlighted by the GI network will assist Pennsylvania officials to illustrate state level wetland priorities and may be useful guidance for the treatment of wetlands in the next update of Pennsylvania's SCORP, helping fulfill the wetland planning requirement of SCORP. The corridors outlined in the green infrastructure network will provide a solid vision for linking communities together. By preserving ecosystems, the GI network will help foster and protect the Commonwealth's healthy and livable communities.

Pennsylvania Coastal and Estuarine Land Conservation Plan (CELCP)

The primary goal of Pennsylvania CELCP is to protect "important coastal and estuarine areas" that have significant conservation, recreation, ecological, historical, or aesthetic values – giving priority to lands which can be effectively managed and protected and that have significant ecological value. Important coastal and estuarine areas are the basis for the identification of "project areas". The CELCP guidelines define project areas as "discrete areas to be identified within a CELC Plan that describe the state's priority areas for conservation based on national and state criteria, representing the values to be protected through the program and areas threatened by conversion." The guidelines state that project areas may consist of habitat types, priority conservation areas within other coastal, estuarine, or watershed management plans, or areas that provide linkages or corridors among conservation areas.

The CELCP process examined parts of 11 counties in its study area. The identification of Pennsylvania's project areas relies in part on existing studies that identify ecologically valuable lands, including the Natural Lands Trust's (NLT's) Smart Conservation Model, DVRPC's 2030 Greenspace Network, and the Schuylkill Watershed Conservation Plan, and on individual environmental data layers generated by regional, state, and federal sources.

All of the above data layers were combined to create Project Areas Maps. These maps overlay and combine all of the individual project area layers (i.e. woodlands, wetlands, floodplains, high Smart Conservation value areas, etc.) into a single "project area" layer. This map allows applicants to determine if their project falls within or outside of Pennsylvania's project areas by examining a single map.

The green infrastructure network developed for the NiSource MSHCP may highlight opportunities for connecting the ecologically sensitive areas of the project areas outlined by the CELCP with the rest of the Commonwealth and surrounding states. Many of the factors considered in the GIS models used to create the project area maps will also be used to create the GI network. Lands highlighted by both planning efforts may benefit in rankings due to the availability of leveraged funds from each initiative.

PA Greenways: An Action Plan for Creating Connections

In 2001 DCNR released its statewide greenways plan and outlined a major greenways planning initiative for both the state agencies and the state's 67 counties. The report contains general language on encouraging greenways plans to protect ecological systems. While most of the items in the report are focused on recreation based greenways, there are related goals in the Action Plan that have a shared theme with green infrastructure network including:

- Adding 600 miles of riparian buffers by 2010 and working to conserve all existing buffers.

- Integrating the Pennsylvania Natural Diversity Index (PNDI) and the findings of other critical natural resource programs into the Greenways GIS. Identifying critical natural resources and integrating those into greenways GIS.

- Using county and local "greenway plans" as a vehicle to inventory and protect natural resources.

- Conducting a study of critical habitat locations and potential manmade conflict points (such as roadways, dams, utilities, etc). Coordinate efforts among State agencies to identify prevalent human and wildlife conflict points where greenways are a potential solution. Once identified, these locations should be integrated into the Greenways GIS and targeted for potential greenways establishment.

The green infrastructure network developed for the NiSource MSHCP will identify core areas, hubs and corridor for aquatic species. This planning work will help prioritize and target streams for the restoration of vegetated buffers and help protect existing riparian buffers. Additional field work on species distribution and habitat may be conducted as part of the GI network planning process. The opportunity to update state agency inventories with new field information and new species based modeling information are some of the benefits from the GI network. As the state greenways plan has recognized the valuable contribution of county and local plans in documenting natural resources, the statewide GI network will be a value reference for public officials.

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One of the final steps in a green infrastructure planning process is characterizing the network and examining the network in relationship to obstacles and barriers. Roadways, dams and other structures can be significant barriers and the final GI network takes those barriers into account. Working with state officials and other stakeholders on securing information on manmade conflict points will make the GI network more accurate and useful.

Pennsylvania Water Plan

The Water Plan for the Commonwealth of Pennsylvania is a comprehensive, big picture planning document aimed at helping public officials with decisions on the availability of water of adequate quantity and quality. The plan seeks to answer the following questions:

How much water do we have? How much water do we use? How much water do we need? The plan consists of inventories of water availability, an assessment of current and future water use demands and trends, assessments of resource management alternatives and proposed methods of implementing recommended actions. It also analyzes problems and needs associated with specific water resource usage such as navigation, stormwater management and flood control.

Water quantity and quality are crucial to the green infrastructure network developed for the NiSource MSHCP. The GI network delineates core areas for aquatic species and wetland species which would be

impacted by any major changes in water levels or quality due to adjustments in state water policy. When implemented, the green infrastructure network will provide a wide range of benefits including: improved flood control, water filtration, wildlife habitat and appropriate passive recreational opportunities. By following a green infrastructure approach state officials will be making progress toward their goals on protecting water quality and ensuring adequate water supply.

State Forest Resource Management Plan

Pennsylvania's 2.1 million-acre state forest system is distributed among 48 of the Commonwealth's 67 counties, comprising 12 percent of the forested area of the state. The 2007 Forest Resource Management Plan recognizes that the Commonwealth's forests provide a mix of outdoor recreational opportunities that is critically important to the state from an ecological, cultural, and economic perspective. Within the 2007 plan the Department of Conservation and Natural Resources identified four guidelines, along with the identification of strategic geographies, for prioritizing its acquisition investments. The four guidelines are:

1. Lands for Protecting Existing Public Resources
2. Lands for Ecosystem and Habitat Conservation
3. Lands to Protect and Conserve Water Resources
4. Lands for Public Recreation and Open Space Protection

Another new issue addressed in the 2007 plan was dealing with energy use and extraction. In particular, the plan, wrestles with an approach to determine appropriate and inappropriate locations for wind energy sites on state forest lands.

The green infrastructure network developed for the NiSource MSHCP recognizes the many roles that forests play in benefiting both wildlife and human communities. In designing the GI network, species that specialize in interior forest conditions are selected and their habitat needs identified to help delineate core areas of high quality forest lands. Working forestlands are often included as buffers to core areas in forest hubs, providing heightened conductivity between core areas. The GI network can assist state forestland managers and public officials in the identification of priority land acquisitions to help protect current public lands, conserving fully functioning ecosystems, protecting water resources and providing passive recreation opportunities. As a decision tool, the GI network can help public officials weigh complex land policy questions and can be used as one of several factors in determining appropriate and inappropriate locations for facilities such as wind turbines.

Pennsylvania Invasive Species Council Aquatic Invasive Species Management Plan

The goal for the Pennsylvania Aquatic Invasive Species Management Plan is to minimize the harmful ecological, economic and human health impacts of aquatic invasive species through the prevention and management of their introduction, expansion and dispersal into, within and from Pennsylvania. The plan outlines eight overarching objectives with accompanying strategies and actions to meet the challenge of aquatic invasive species (AIS). The green infrastructure network developed for the NiSource MSHCP can help state officials in guiding efforts to prevent the introduction and spread of AIS. The management plan's desired outcomes that are most relevant to the GI network for the prevention of the spread of AIS are as follows:

Objective 2. Prevention

Identify vectors and mechanisms and minimize the introduction and spread of aquatic invasive species into and throughout Pennsylvania.

Strategy 2B. Develop a system to evaluate AIS pathways and identify potential prevention strategies addressing these pathways.

Action 2B1. Identify and prioritize highest-risk pathways for the introduction of harmful aquatic species into Pennsylvania waters

Action 2B2. Develop and implement specific actions and plans to reduce the likelihood of introducing harmful non-indigenous aquatic species from both intentional and unintentional high-risk pathways.

Action 2B3. Identify "ecologically sensitive" aquatic resource areas that are relatively free of aquatic invasive species, and identify potential pathways and additional precautionary protocols, including additional outreach and enforcement, to implement for those areas.

For aquatic species, the GI network highlights core areas and hubs for habitat and corridors for movement and connections with other resource areas. In the green infrastructure methodology, the network is characterized based on attributes that improve or negatively impact the network's overall quality. The GI network can assist state agency staff with the prioritization of rivers and streams that can be targeted for the prevention of the spread of invasive species.

Frequently rivers and streams are highlighted as having the potential to serve as a corridor if environmental restoration activities are undertaken. The green infrastructure network will provide policy makers with a statewide map of aquatic corridors that, if restored, could provide crucial links within a network of conservation lands. These corridors targeted for restoration can help state officials prioritize the restoration work associated with AIS. By focusing restoration work on these corridors, state agency staff can combat invasive species while rebuilding a statewide network of conservation lands that have multiple benefits for wildlife and the residents of the Commonwealth.

Coldwater Heritage Plans (CHP)

While Pennsylvania has over 83,000 miles of streams, only 25% of these streams are considered high-quality coldwater fisheries. Of that, less than 2% of these streams are designated as highly productive waters that contain naturally reproducing wild trout. The CHP's primary focus is to foster protection and improvement of these streams and their watersheds. Information was collected on 38 CHPs that have been either completed or are underway within the counties of the NiSource covered lands. To date 21 CHPs have been completed (20 available) in 17 counties within the NiSource covered lands area. An additional 17 planning efforts are underway.

Typically, the CHPs are focused on conserving or restoring habitat for brown trout. The plans are meant to identify potential problems and opportunities for stream conservation, and may often lead to more detailed watershed studies such as a River Conservation Plan, ultimately improving the health of coldwater ecosystems. There is considerable diversity in the planning methods and the types of information collected. CHPs may contain inventory information on stream channel conditions, riparian canopy cover, stream temperature data, stream dimensions, and detailed reach-by-reach information on fluvial geomorphology and habitat. Several plans have heritage inventory information on Biological Diversity Areas, Landscape Conservation Areas, Important Bird Areas and Important Mammal Areas. Several plans contain data on macroinvertebrates collected/observed during water quality sampling as indicators of overall stream quality.

The green infrastructure network developed for the NiSource MSHCP outlines core areas and hubs for aquatic species. In addition rivers and streams are used as corridors connecting core areas and hubs in a

network. The green infrastructure network can help state and local officials with their planning efforts on coldwater streams, placing these resources in a larger ecological context. Corridors may be highlighted that would benefit from restoration work such as shrub and tree planting in buffer areas, which may provide added shade, cooling waters and improving habitat for trout.

River Conservation Plans (RCP)

RCPs identify significant natural, recreational and cultural resources. Issues, concerns and threats to river resources and values are determined locally as part of a planning process, as well as recommending methods to conserve, enhance and restore Pennsylvania's many streams and rivers. The state has a recommended outline for RCPs so there is some uniformity in these documents as to methods and types of topics covered. The plans do vary in terms of the scale of the watershed defined as their study area.

Once an RCP has been completed, the plan is reviewed by the Rivers Conservation Program at the Pennsylvania Department of Conservation and Natural Resources and may be placed on the Pennsylvania Rivers Conservation Registry. To date 83 RCP plans have been approved and their watersheds are listed on the registry. Information was collected on 69 RCPs that have been completed or are underway within a county under NiSource covered lands. Communities that lie within the watershed are eligible for grant dollars made available through the Keystone Grant Program for implementation, development and land acquisition. Roughly 20 grants per year are approved from a total grant making budget of approximately $1 million.

The implementation of the green infrastructure network developed for the NiSource MSHCP will rely on the collaboration of many stakeholders. Regions that have an overlap of rivers listed on the Pennsylvania Rivers Conservation Registry and the GI network will benefit since they can leverage greater financial resources from sources such as the Keystone Grants and NiSource mitigation funds for land acquisition for rare and endangered species habitat. The GI network may provide communities and regions without a RCP with information on species habitat needs and landscape scale priorities in their region.

County Heritage Inventories (CHI)

County Natural Heritage Inventories summarize information from the Pennsylvania Natural Heritage Program on a county's plants, animals, natural ecological communities, and other important natural resources. These inventories contain information on the locations of rare, threatened or endangered species and the highest quality natural areas in the county. In addition, the inventories describe the locations of areas that are significant on a county-wide scale and are deemed locally significant, since no species of concern were documented at these sites. The CHI's classify natural heritage areas into Biological Diversity Areas (BDA) and Landscape Conservation Areas (LCA). BDAs tend to be smaller areas, focused on the habitat of state and federal listed species and are surrounded by a buffer to provide additional protection. LCAs are larger, contiguous patches of important habitat, and may contain several BDAs. The heritage inventories rank the BDAs according to their significance as areas important to the biological diversity and ecological integrity of the county, with BDA of statewide significant having the highest ranking. According to state records, 59 counties have completed a heritage inventory. Within the NiSource covered lands, 29 counties have completed their heritage inventories.

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As the GI network relies on data collected from the Pennsylvania Natural Heritage Program, the potential linkage with CHIs is very strong. The overarching goal of both the CHIs and the GI network developed for the NiSource MSHCP is to seek a landscape scale approach to maintain a fully functioning ecosystem that fosters biodiversity. The methods used to create the green infrastructure network are

very similar to the planning process used to create the county heritage inventories. The GI network will support the protection of many of the areas highlighted by CHIs. For updating and revising a CHI, the GI network may provide additional information on species needs, habitat requirements and corridors to neighboring counties and states that may prove useful.

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TENNESSEE

Tennessee's Comprehensive Wildlife Conservation Strategy (CWCS)
Tennessee Wildlife Resources Agency (TWRA) and The Nature Conservancy (TNC) partnered to craft a truly comprehensive wildlife action plan. Among the objectives of the planning process was to consolidate biological information into a relational database for wildlife in the state. The Tennessee CWCS utilizes several GIS models that provide prioritization for species of greatest conservation need for terrestrial habitat, aquatic habitat and subterranean habitat. As a plan based on a partnership, one of the objectives was the information and models developed by in the CWCS would be used widely among the conservation community.

The green infrastructure network developed for the NiSource MSHCP uses similar landscape types to base its analysis and like the CWCS relies upon the use of focal species to prioritize the landscape. GIS models play a significant role in the GI network design process and many of the species specific models developed in the CWCS planning process will be used in the GI network. As with CWCD, it is hoped that state agencies and other partners will refer to and use the GI network in helping evaluation conservation opportunities.

Tennessee Greenways and Trails Plan
The Tennessee Greenways and Trails Plan promotes policies for creating a statewide, interconnected, and accessible network of greenways and trails. Several of the goals of the state greenways plan relate to the green infrastructure network developed for the NiSource MSHCP including the promotion of greenway corridors that protect wildlife habitat, migration patterns and buffer waterways. The plan advocates for the use of land acquisition through fee purchase and the use of easements for conservation and recreation. Maximizing public/private partnerships for the development of the greenway network is another goal.

The GI network complements the goals and many of the functions of the state greenway plan. Many of the corridors proposed by the GI network may have dual functionality, allowing for the movement of both wildlife and people engaged in passive recreation. The GI networks will assist decision maker's evaluation of land conservation opportunities for the purchase of fee lands and easements. When both the Greenways plan and the GI network are used together, decision makers will gain valuable insight into determining if a project has both recreational value as well as habitat value for crucial species. The spirit of the GI network is one based on partnership between state and federal government, the private sector as well as the nonprofit conservation community.

The Tennessee State Recreation Plan
The State Recreation Plan for Tennessee has several goals and implementation proposals that have a common interest with the green infrastructure network developed for the NiSource MSHCP. The first proposal in the state's recreation plan is to organize existing Federal, State and local resources into a seamless "Tennessee Recreation System". As part of this system the plan urges the implementation of the state greenways and trails plan to help improve connections between existing conservation and recreational resources. In addition, the recreation plan articulates the use of parks and refuges as "hubs" in the overall network design of the recreational system. Developing a comprehensive plan for land acquisition and identifying specific tracts of land for acquisition that are under threat is another proposal within the plan. Finally, implementing the state's wetland conservation strategy is echoed in the state recreation plan.

The GI network helps visualize a seamless statewide network of core areas, hubs and corridors for forest, wetland, aquatic and karst landscapes. Current parks and refuges will play an integral part in the GI network. The GI network can be used as a tool to help state officials evaluate potential acquisition projects and maximize the utility of limited state funding to ensure that projects selected for funding achieve multiple benefits. The conservation of wetlands and the species that use wetlands is a high priority within the GI network and offers state planners an integrated vision for wetlands conservation.

Tennessee's Wetlands Conservation Strategy

As the second state in the country to complete a state wetlands strategy, Tennessee has long been a leader in planning for wetlands conservation. The overall goal the state's Wetland Conservation Strategy is to help state officials "provide the maximum practicable wetlands benefits to Tennessee and her citizens by conserving, enhancing, and restoring the acreage, quality, and biological diversity of Tennessee wetlands." Another interpretation of the overall goal of the Wetlands Conservation Strategy is found in the more recent State Recreation Plan that states "the goal is to achieve no overall net loss of wetlands acreage and functions in each USGS hydrologic unit." The wetlands plan calls for the acquisition of unique, exceptionally high quality or scarce wetland communities. Wetlands that provide habitat for threatened or endangered wildlife are a high priority. Restoring and enhancing wetlands to offset previous losses is another goal of the plan. Finally, Tennessee recognizes that wetlands that are highlighted by other planning efforts such as the North American Waterfowl Plan, the National Wetlands Priority, or other cooperative programs are worthy of additional consideration.

The green infrastructure network developed for the NiSource MSHCP will help state officials achieve the goals of the state Wetlands Conservation Strategy. As the GI network will include a statewide system of wetland core areas, hubs and corridors, state officials can determine the value of a wetland within a greater system or ecological context beyond an isolated snap shot of an individual wetland. As the tools designed around the GI network are to assist with land conservation acquisition, the GI network provides a vehicle to provide state decision makers in their evaluation of potential acquisitions. GI networks include areas that are suitable for wetland restoration and enhancement, to help the state meet its goal of offsetting previous wetland loses. The wetland priorities articulated in the GI network can be recognized as priorities for the state of Tennessee as other rigorous planning efforts, such as the wetlands highlighted in the North American Waterfowl Plan, have been considered as valuable initiatives to the state.

Tennessee Heritage Conservation Trust Fund Act of 2005 – Preliminary Assessment

This preliminary assessment of conservation needs was intended to assist the Tennessee Heritage Conservation Trust as they carry out the mandate outlined in TCA-11-7 to "assist the state in permanently conserving and preserving tracts of land within the state of Tennessee for the purposes of promoting tourism and recreation, including outdoor activities such as hunting and fishing; protecting, conserving and restoring the state's physical, cultural, archeological, historical and environmental resources; and preserving working landscapes." The report identifies more than 275 significant and critical projects comprising more than 700 sites in the State. The green infrastructure network developed for the NiSource MSHCP will assist state officials in their efforts to prioritize land conservation opportunities across the state of Tennessee.

Regional Water Resources Habitat Conservation Plan and Forestry Habitat Conservation Plan (HCP)

The Tennessee Wildlife Resource Agency is working with The Nature Conservancy (TNC) and The University of Tennessee and Tennessee Tech to craft two HCPs for the Cumberland Plateau. The HCPs

are examining 20 federally listed species and a total of 80 rare plants and animals. One HCP is focused on Water Resource habitat and its objective to integrate the use and conservation of aquatic resources associated with Threatened and Endangered species by working collaboratively with local communities and other stakeholders located in Cumberland, Morgan, Scott, and Fentress counties. The other HCP is focuses on forest habitat and is examining forest management related activities on State Wildlife Management Areas in the Cumberland Plateau region. Under the current timeline, both HCPs are anticipated to be completed in 2010.

The green infrastructure network developed for the NiSource MSHCP will benefit from the research, field inventories, and mapping that has been completed in the planning of both regional HCPs. Where appropriate, the GI network can expand the habitat areas highlighted from the Cumberland Plateau to a statewide and multi-state scale, furnishing additional benefits to the species of concern from the regional HCPs. Linking the Cumberland Plateau through corridors and hubs will help improve genetic diversity for many of the species examined in the Cumberland Plateau HCPs and provide paths to help species migrate either as part of a normal life cycle or in response to global climate change.

Tennessee Aquatic Nuisance Species Management Plan

The goal of this effort is to "control existing aquatic nuisance species in Tennessee in order to minimize the adverse impacts on native species, water quality, and economies by preventing the introduction and spread of any invasive species and by managing the impacts of those that are already in Tennessee." The green infrastructure network developed for the NiSource MSHCP is supportive of efforts to control aquatic nuisance species by improving the overall quality of aquatic habitats for native species and by targeting areas for restoration of native species. By delineating core areas and hubs for sensitive aquatic species, the limited resources can be targeted at the protection of these high priority areas. Rivers and streams that are outlined as corridors in the GI network can also receive attention in the form of monitoring and removal of nuisance species.

Tennessee Wildlife Resources Agency Strategic Plan 2006-2012

The strategic plan represents the guiding vision for TWRA efforts to manage and protect lands for both wildlife and public use. For the context of the GI network the nongame and endangered species objectives are the most relevant.

Nongame Species Goal

To conserve, manage, enhance and protect Tennessee's nongame wildlife populations and diversity within their associated habitats and to provide for public use (including education and recreation), understanding and enjoyment of these resources.

Endangered Species Goal

To protect, manage and, where possible, augment, enhance and restore populations of endangered and threatened species of wildlife and their associated habitats.

The strategic plan outlines objectives for each of the two goals include targets for down listing species, reintroduction of extirpated species and acreage goals for nongame habitat. The green infrastructure network developed for the NiSource MSHCP will assist TWRA in achieving its goals from the strategic plan by providing tools to help state officials focus their attention and limited resources on areas and projects that will provide the highest ecological benefits for sensitive species. In particular, the GI network can assist state officials in evaluating acquisition opportunities across the entire state and

examine restoration opportunities. The acreage goal of 2,500 acres of nongame habitat to be conserved, enhanced or restored can be targeting using the GI network.

Together Making Nashville Green (the Green Ribbon Committee Report)
In June 2008, Nashville Mayor Karl Dean created a diverse 27-member Green Ribbon Committee to develop a shared vision of how to protect and enhance Nashville's distinctive environmental quality and livability. The Committee involved the public to generate ideas. A citizens' environmental survey was launched and completed by over 1,800 residents. A series of five public workshops were held and attended by over 300 people. Based on the public feedback and the professional expertise of the Committee members, a set of 16 goals and 71 implementation recommendations for reducing greenhouse gases, advancing education and public outreach, fostering energy and building standards, improving mobility and managing natural resources wisely were issued.

The committee set the overarching goal of "developing and executing the most progressive open space plan in the Southeast to preserve its incredibly unique ecological, cultural and historic landscape and to enhance its reputation as a desirable location for people and businesses to locate". The result of this recommendation was the Nashville: Naturally green infrastructure planning effort (described below) which was undertaken by The Conservation Fund. The green infrastructure network prepared for the NiSource MSHCP provides the statewide context for the county scale green infrastructure network prepared during Nashville Naturally.

One of the most ambitious goals of the Green Ribbon Committee was the removal of 100% of Davidson County's streams from EPA's303(d) list by 2020. According to the Green Ribbon Committee there are 350 miles of streams within Davidson County that are on the US Environmental Protection Agency's 303 (d) list of impaired waters. The NiSource green infrastructure network can help city leaders achieve the goal through strategic planning programs such as the City's storm water funds, Tennessee Stream Mitigation Program and the Nonpoint Source Pollution Program operated by the Tennessee Department of Agriculture to target preservation and restoration work along key streams and headwaters.

Nashville: *Naturally* (Release expected 2011)
Nashville: *Naturally* is the planning effort designed to achieve this recommendation for a progressive countywide open space plan from the Green Ribbon Committee (report above). The green infrastructure method is a cutting edge technique of open space planning designed to outline a network of natural lands, working landscapes, and other open spaces that conserves ecosystem values and functions and provides associated benefits to human populations. By using a green infrastructure planning method and involving the public at key points, Nashville is achieving its goal of a "progressive" plan. The planning team has completed a peer cities evaluation of important areas of achievement to help city officials, the public and conservationists measure the progress towards the city reaching its full potential as the leader in conservation in the Southeast region.

Nashville: *Naturally* shares the Green Ribbon Committee goal of the removal of 100% of Davidson County's streams from the EPA 303(d) list by 2020. Improved water quality benefits not only Davidson County residents but almost the Nashville Crayfish, a take species under the NiSource MSHCP. Extensive research was launched in Nashville: *Naturally* on riparian buffers and benchmarking peer cities. One of the key recommendations of Nashville: *Naturally* was promoting the use of variable width buffers through an overlay ordinance in targeted watersheds such as Mill Creek, - home of the Nashville Crayfish. In addition, Nashville: *Naturally* recommended robust water quality monitoring of key landowners such as the Nashville Airport is another way to identify problems early on and document

progress in water quality improvements. Although the focus of Nashville: *Naturally* was on large scale networks, site level efforts to reduce impervious surfaces through low impact development such as green roofs are supported.

Nashville/Davidson County Metropolitan Parks and Greenway Master Plan
In 2002, the city's first master plan for parks and greenways was completed. Over 9 public meetings were held to create and review planning recommendations to guide Nashville's park system into the new century. The Park Master Plan outlines two overarching planning goals, first, the majority of population of Davidson County be within a ½ mile of a park and, second, that all residents be within 2 miles of a greenway. The Park Master Plan recommended adding 2,000 acres of new parklands, improving key facilities and the maintenance budget, additional school playgrounds, building regional scale community centers and a sports complex. The Parks Master Plan was updated internally in 2008 and reviewed in detail. In particular the comparative city analysis was examined as well as Parks and Greenways Concept Plan map. The green infrastructure network developed for the NiSource MSHCP will assist County and local planners in achieving their land protection goals.

Cumberland River Greenway Preliminary Master Plan
In 2000, Hawkins Partners, working with an advisory committee, developed a preliminary Master Plan for the Cumberland River Greenway. The goal of the planning effort was to raise the awareness of Nashville residents regarding the incredible resource of the Cumberland River. In addition the plan illustrated how by making strategic investments at sites along the river over a twenty year period the City would benefit economically. A series of greenways, interpretive areas and proposed river access points were displayed. The relationship between greenways paralleling the river and nearby neighborhoods was outlined with key opportunities for linkages between neighborhood and the greenway. The floodway and floodplain were highlighted to show the true extent of the influence of the river upon the community. The Cumberland River links the county scale Nashville: *Naturally* planning effort to the larger NiSource MSHCP green infrastructure network. Many of the design ideas and sites for conservation that were featured in the Master Plan are once again, highlighted by the NiSource green infrastructure network.

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VIRGINIA

Virginia Wildlife Action Plan (WAP)

The Virginia WAP identified 925 "species of greatest conservation need" (SGCN). The list of SGCN represents considerable effort in prioritization as experts evaluated 1433 species for use in the WAP. Forty-four species of greatest conservation need are listed as Federally threatened or endangered, and 99 are State threatened or endangered. The WAP describes the location of key habitats essential to the most imperiled species (Tier 1 species). State officials acknowledged that it was "impossible to know or spatially represent all of the factors that together function as habitat for all species". According the WAP, the goal for the process was to "use spatial data that represented habitat factors that are generally recognized as important to many species, occur at a macro (between micro and landscape scale) or landscape scale, and could be mapped statewide". This landscape scale approach was reflected in the analysis of the information collected and packaging of the action items into six ecoregions.

One of the principal threats to wildlife and wildlife habitat in Virginia is the fragmentation of landscape caused by development. To address this threat, the WAP seeks to guide land acquisition to strengthen vulnerable habitats and improve linkages between patches of conserved land for species of greatest conservation need.

As the GI network for NiSource is a science-based, species-oriented approach and will use many of the existing priority land layers developed by the Commonwealth, the goals of the Virginia WAP will be advanced. As the authors of the WAP acknowledge, there are limitations in our knowledge of species, habitat needs and available data. As the WAP meets this challenge, the GI Network examines species and habitat needs at a macro level, providing a broad, landscape scale plan to address the widest range of species needs.

Virginia Outdoors Plan (VOP)

The VOP is the Commonwealth's primary policy guidance document regarding outdoor recreation and open-space needs. A central part of the VOP is a public survey on recreational demand and supply. In survey for the 2006 VOP, over 94 percent of citizens believe it is either "important" or "very important" to protect Virginia's natural and open space resources. In addition to the required surveys of public preferences, the VOP aims to shape policies on conservation issues and challenges at the landscape scale. The VOP outlines strategies for meeting the state's recreational needs and highlights both land conservation and green infrastructure as strategies for integrating local, regional and state priorities. Both local and regional government organizations are encouraged to use green infrastructure to guide land conservation as well as development, and to codify this commitment through local zoning and land use planning. Other priorities of the VOP include developing GIS data to further support green infrastructure planning and to provide added clarity on the habitat requirement of wildlife. The VOP adopts a collaborative stance towards implementation by advocating public-private partnerships, coordinating with volunteer groups and using green infrastructure to bring state agencies together. The VOP outlines priorities for greenways, blueways, historic landscapes, scenic resources and the protection of water resources. Finally, the VOP supports the development of a statewide greenway network undertaken as the Virginia Conservation Lands Needs Assessment (VCLNA) to identify and prioritize natural resource conservation targets.

The GI network for the NiSource MSHCP will utilize much of the planning work already undertaken by the Commonwealth of Virginia. Where feasible and appropriate, the GI network will update information

on a statewide scale for green infrastructure planning regarding focal species and species of concern as related to the NiSource MSHCP. The collaborative nature of the development of the GI network is in keeping with the spirit of partnership espoused by the VOP. The GI network for the NiSource MCHCP represents the large scale linking of grey and green infrastructure planning that was articulated by the VOP.

Draft Virginia Coastal and Estuarine Land Conservation Program Plan (CELCP)

The purpose of Virginia's CELCP is to outline priority areas within Virginia's coastal zone for conserving the best remaining coastal resources under the greatest threats and to serve as a guide for state agencies, and other partners to use in identifying coastal conservation priorities and meeting strategic open space/conservation goals. Virginia's coastal zone encompasses 29 counties, 17 cities, and 42 incorporated towns in Virginia. This includes all of Virginia's Atlantic Coastline, the Chesapeake Bay and its tidal tributaries (Potomac, Rappahannock, York, and James) and waters connecting to the Albemarle-Pamlico Sound in North Carolina. The primarily goals of the Virginia Department of Coastal Zone Management, the agency responsible for the CELCP, are to protect and restore coastal resources, habitats and species as well as to maintain the quality of coastal waters for human and ecosystem health.

The CELCP focuses its efforts by outlining priority areas to target conservation activities. Priority areas synthesize the best available interagency ecological assessments of potential conservation areas as defined in statewide conservation plans. The following data-layers were used to create the priority areas:

1) Natural Heritage Conservation Sites and Stream Conservation Units (SCUs)
2) Virginia Natural Landscape Assessment (VaNLA)
3) Essential and Potential Habitat for Animal Species of Greatest Conservation Need (Tiers I - IV)
4) Virginia Important Bird Areas (IBAs)
5) Lands Already Protected: Virginia Conservation Lands Database

The CELCP combines the above GIS layers into a suitability model and ranks the lands highlighted most often into the following five categories of ecological value: outstand, very high, high, moderate and general. According to draft CELCP of April 2008, of the roughly 5.7 million acres of land in Virginia's coastal zone, 145,819 acres of outstanding ecological value land and 255,677 acres of very high ecological value land remain unprotected (see CELCP, Table 4 page 24). Additional priorities for conservation outlined in the CELCP include unfragmented wetlands connected to undeveloped uplands, riparian areas as buffers and coastal forest patches. Areas highlighted by green and blue infrastructure plans are recognized as having significance by the CELCP plan. Habitats for rare species as well as buffer lands for current conservation holdings are cited as worthy of attention.

The green infrastructure network developed for NiSource MSHCP shares many of the goals of the Virginia CELCP plan. Forest, wetland and aquatic hub areas highlighted by the GI network will help maintain or improve the environmental quality of coastal resource areas. The science based approach and use of focal species by the GI Network creates a strong connect with the ecological priorities articulated by the Virginia CELCP Plan. The GI network can assist state officials to achieve the state conservation acreage goals with its use of tools such as optimization and cost effective analysis to ensure that the state is maximizing the use of its limited resources for land acquisition, restoration and management. Financial leverage to protect lands highlighted as both priority areas under CELCP and as elements of the GI network is another intended outcome.

State Goals in Relation to Chesapeake Bay Agreements

In 2006 Governor Tim Kaine announced a goal of preserving 400,000 acres of land by the end of the decade. This goal was encouraged by the Commonwealth's commitments in the 2000 Chesapeake Bay Agreement, an agreement Virginia made with other Chesapeake Bay states to protect 20 percent of the Bay watershed from development by the year 2010. Another frame for the Governor's goals was that it would be a fitting tribute to protect 1,000 acres for each of Virginia's 400 years.

Improved public access to the tidal waters of Chesapeake Bay is another policy aspiration. Virginia is committed to seeking a 30 percent increase in enhanced or new public access sites. The goal for Virginia is 66 new public access sites to the Chesapeake Bay. As of the end of 2006, 27 sites (new and enhanced) were added in the Chesapeake Bay area, leaving the state with a gap of 39 sites to meet the 2010 commitment.

The green infrastructure network developed for the NiSource MSHCP will assist state officials in their efforts to achieve many of the policy goals and commitments made as part of the Chesapeake Bay Agreements. Land conservation is one of the approaches that the GI network will rely on for implementation. Although public access and recreation are not the focus of this particular GI network, lands highlighted by the network will have multiple benefits, including recreational uses and may highlight areas that are appropriate as public access points to the Bay.

The Natural Heritage Plan entitled "Virginia's Precious Heritage"

Virginia's Precious Heritage evaluates the status of Virginia's natural heritage resources and identified conservation targets. Natural resource targets classified by physiographic province which require immediate attention for inventory, protection and stewardship are identified in the Heritage Plan. Over 206 rare species and natural communities are identified as top priorities for a statewide inventory effort of the total 1,553 plant and animal species and 105 natural community types that are tracked at Natural Heritage. The report sets the following five major goals for the conservation of biological diversity in Virginia:

1. Secure a broad-based stable funding source for land conservation, including lands that support natural heritage resources.

2. Expand the existing network of conservation lands by securing more lands for natural area dedication, promoting more land conservation by local governments and encouraging greater investment by private conservation organizations.

3. Target conservation actions on the best opportunities and measure the success of the funds spent and actions taken.

4. Enhance natural resource information and expand the public awareness and understanding of natural resource conservation by expanding efforts to inventory natural heritage resources, enhancing cooperation with other conservation agencies and increasing the availability of natural heritage data for the general public, conservation organizations and government agencies.

5. Promote more biodiversity-friendly resource management on Virginia's public and private lands.

The GI network developed for NiSource MSHCP will further advance the goals outlined in the Natural Heritage Plan. The GI network will provide additional information for targeting conservation areas for sensitive species, help decision makers use limited resources wisely and promote biodiversity of both public lands and private lands.

Virginia Conservation Lands Needs Assessment (VCLNA)

VCLNA is a direct outcome of the planning work and policy recommendations of Virginia's Precious Heritage report. As called for in the Natural Heritage Plan, the VCLNA seeks to provide conservation NGOs (e.g. land trusts); federal, state and local government officials, and policy makers with additional information to help target conservation priorities. According to the Virginia Natural Heritage Plan, there was a need to develop an "objective, science-based analysis tool using the best statewide data currently available to rank resources according to their ecosystem values, vulnerability, geographic distribution, and their relationship to resource-based land uses that have been identified in the Virginia Land Conservation Foundation Act as needing increased conservation attention to guide decisions about future land conservation efforts."

VCLNA is a collection of models, created using GIS, that identifies and prioritizes natural resource conservation targets across the Commonwealth to support green infrastructure planning. The methodology used to create the models are grounded in the green infrastructure approach and follows similar steps to the Chesapeake Bay Program's Resource Lands Assessment. The main ecological model is the Virginia Natural Landscape Assessment (VANLA) that reflects the priorities of Natural Heritage Plan and the Virginia State Wildlife Action Plan. The VANLA identifies unfragmented natural habitat areas or core areas and linkages or corridors to build a landscape scale network. In addition, the VCLNA has a recreational assets model, cultural assets model, watershed integrity model, working forest and farmland models and a resource vulnerability model.

The GI network developed for NiSource MSHCP will utilize many of the data layers and models assembled as part of the VCLNA. Both initiatives are science based efforts that rely on species-oriented, ecologically based approaches to delineate a network of core areas and corridors. The GI network is a natural extension and application of the VCLNA to help with the planning of grey infrastructure projects, place mitigation in a rich ecological network and provide useful information to decision makers to guide the allocation of limited resources.

State of the Forest Report

In 2007 the Virginia Department of Forestry released its third strategic plan for guiding the agency in its management of state forest lands and support for the business of forestry in the Commonwealth. The overall goals for the department are to:

1. Protect the citizens, their property and the forest resource from wildfire
2. Protect, promote and enhance forested watershed
3. Conserve the forest land base
4. Improve the stewardship, health and diversity of the forest resource
5. Facilitate the development and implementation of a statewide forest policy
6. Collect, maintain and communicate forest resource information
7. Manage agency resources to effectively and efficiently accomplish the strategic plan

The GI network developed for the NiSource MSHCP will assist the Department of Forestry in achieving it goals by helping identify forest lands that buffer critical riparian areas and water supplies. Ecosystem

services such as water filtration provided by forest core areas and hubs have long been benefits derived from GI networks. Targeting lands for reforestation and planting short leaf pine and long leaf pine and other restoration activities are implementation options for the GI network. Supporting the biodiversity of Virginia's forests is a central goal of the GI planning process.

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WEST VIRGINIA

WEST VIRGINIA

About Habitat: West Virginia State Wildlife Action Plan

The West Virginia State Wildlife Action Plan (WV SWAP) was prepared by the West Virginia Department of Natural Resources in consultation with other government agencies, academia, conservation organizations and individual citizens. One of the central goals of the planning effort was to close the gap in the understanding of key wildlife species, their populations, distributions and other critical information. WV SWAP identifies critical species location, record status, and specific habitats associated with species. The WV SWAP identifies state level priorities for habitat types which will be useful in crafting the green infrastructure network for the NiSource MSHCP.

Building on the science-driven planning process, the state is further enhancing the SWAP by developing landscape-oriented data that illustrates species by species likelihood of occurrence. Using maximum entropy modeling this data will be incorporated in the next version of the State Wildlife Action Plan. The green infrastructure network developed for the NiSource MSHCP utilizes similar models for outlining potential core areas for critical species. An additional value of the GI network is the linkages outlined to connect core areas to facilitate wildlife movement. Just as the WV SWAP was updated using the latest data, the GI network can be adjusted with new information on species needs, opportunities and constraints. The GI network complements both the goals and the substantive findings of the WV SWAP.

DRAFT West Virginia Statewide Comprehensive Outdoor Recreation Plan 2009-2013 (SCORP)

As this plan is under review by state and public officials, the material provided is intended to broadly outline the likely priorities of West Virginia in its approach to outdoor recreation. Currently, the draft SCORP highlights three major goals to guide the state's outdoor recreation strategies:

1. Promote Park Development
2. Promote the physical and economic health of WV communities
3. Provide Technical and Educational Assistance

SCORP advocates that WV communities pursue a designation of a Certified Healthy Community as a vehicle to move the state forward by using its natural resources as assets. As part of the certification, "neighborhood connectivity" and "capitalization of natural assets" are important elements that are evaluated for approval to become a certified healthy community.

The green infrastructure network developed for the NiSource MSHCP can assist state officials achieve the goals of the SCORP by creating a plan to protect a network of conservation lands, that strengthens existing parks by linking existing facilities and providing new opportunities for outdoor recreation. By protecting the health of the ecosystems of the state through a green infrastructure approach, state officials protect and support the health of communities and residents. Through a GI network a community's natural assets will be placed in an interconnected network, maximizing their value as assets for the community, neighboring communities and the region as whole. As the SCORP helps state officials allocate federal Land and Water Conservation funds for state priorities on outdoor recreation, the GI network can aid decision makers focusing on high value priorities that achieve multiple benefits.

Pathways to the Future: The West Virginia Statewide Trail Plan

The West Virginia Statewide Trail Plan was created as a result of recommendations made in the previous SCORP that expired in 1997. The previous SCORP called on state agencies to "develop a concept plan for an integrated system of rivers, trails and greenways." The plan defines a trail as a designated land or water corridor that provides access to recreational, aesthetic, alternate transportation or educational opportunities to motorized and nonmotorized users, for all ages and abilities.

One of the central goals of the state trails plan is to encourage the development of trails that link natural, cultural and historic and recreational areas. Establishing links between small and large scale trail projects, increasing the diversity of trails and expanding the overall mileage of trails were important elements. Another benefit of the plan was an opportunity to catalog the state's trails and identify where trail mileage and facilities are lacking. The plan has helped identify areas that were underserved by trails and had provided tools for local communities to develop and maintain trail networks.

Although recreation is not a goal of the green infrastructure network, many of the areas and corridors highlighted by the plan would be appropriate for passive recreation. Corridors that are outlined using ecological parameters tend to furnish a greater range of benefits to communities in addition to the recreational benefits provided by a trail. By using the green infrastructure approach both the ecological health and recreational identity of West Virginia are conserved and promoted.

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