APPENDIX B. 2005 APPROACH

A. Organizational Structure

1. Technical Committees

A core committee of LDWF staff from CNR, Inland Fisheries, Marine Fisheries, and Wildlife Divisions and Public Information Section, was formed to develop the WAP (Appendix C). The role of the core committee was to provide steering and technical guidance throughout the development of the WAP.

Technical committees formed were comprised of persons with expertise on species of concern and their habitats (Appendix C). These committees helped to develop the SGCN list and provided biological guidance on habitat, threat, and monitoring issues.

As elements of the WAP developed, the core committee presented them to a statewide focus group for review and comment. This group of federal and state agency personnel, members of non-governmental organizations, corporations and industry, and private citizens all shared a common commitment to ensuring the health and diversity of Louisiana's fish and wildlife resources.

2. Coordination with Other Government Agencies

Fifteen federal and state agencies were identified as having a potential role in the development of the WAP, and each was asked to designate a representative to be the primary contact for that agency. A list of those agencies may be found in Appendix D.

3. Public Involvement and Partnerships

LDWF recognized early in the strategy development process that to achieve success in implementing this strategy (1) public participation must be a top priority and (2) this effort must be a multi-agency endeavor.

Public meetings were held across the state in 2005 to inform the community of the WAP goals and to gather input. In order to garner further public involvement and develop partnerships, LDWF posted information about the WAP on its website (www.wlf.louisiana.gov), gave live television and radio interviews, and held statewide meetings to identify SGCN, complete habitat threat assessments, and to develop strategies to abate habitat threats. Letters that explained what LDWF planned to accomplish through the SWG program and to encourage partnerships with other parties in the creation of the WAP were mailed to more than 40 non-government organizations (Appendix D).

4. Cooperation with Other States

Meetings were held to coordinate development of the WAP, and to facilitate networking among states to solve WAP-related issues. LDWF also sponsored a meeting of adjacent states including Texas, Arkansas, and Mississippi to coordinate cross-border species and habitat issues.

B. Species of Greatest Conservation Need

1. Identifying SGCN

The primary focus of the WAP is Species of Greatest Conservation Need (SGCN), meaning those wildlife species, vertebrate and invertebrate, that show evidence of population declines within Louisiana. In order to ensure the long-term survival of SGCN and the habitats they depend upon, the 2005 plan focused on:

- Habitats in need of protection and restoration
- SGCN that depend upon these habitats
- Habitats that are presently secure but may be subject to future degradation and loss
- Species that are considered to be stable at the present but exhibit the potential for future population declines

The 2005 WAP followed a two tiered approach: a coarse filter approach focused on landscape-level habitats, and a fine filter approach focused on individual species. The coarse filter approach allowed for identification of those habitats subject to the greatest amount of stress/threats and most in need of conservation. It was anticipated that roughly 85%-90% of the species in Louisiana could be identified and protected within these habitats using this method (Hartley et al. 2000). The fine filter approach allowed for those individual species not covered by the coarse filter approach to be identified and individually managed. Species that are wide-ranging or have very local distributions may benefit from strategies developed for high-ranked or umbrella species.

The SGCN list for the WAP was developed based on the Natural Heritage methodology (Stein and Davis 2000). In order to categorize the current rarity status of Louisiana's species and habitats, the LDWF Louisiana Natural Heritage Program (LNHP), assigns ranks to the state's natural communities, vascular and nonvascular plants, vertebrate, and invertebrate species. Each species or community is assigned a state rank (S1 to S5; Appendix E) based on the following factors:

- Estimated number of Element Occurrences (EOs)
- Estimated state abundance
- State range
- Adequately protected EOs
- Threat of destruction

- Ecological fragility

NatureServe, which represents the Natural Heritage Network (public-private network of independent heritage organizations) assigns global ranks (G1 to G5) to species and natural communities based on the same factors, expanded to include consideration of the status over the entire natural range of each species or natural community.

The LNHP maintains EO data in the Geographical Information System (GIS)-based Biotics data system used by the Natural Heritage Network. Data are collected only for those species that are considered rare or threatened. EO data are collected for both rare and common natural communities (habitats) known to occur in the state. Species attaining a rank status of S1-S2-S3 formed the base list for the SGCN list in the 2005 WAP.

The 2005 WAP focused on those species that were experiencing population declines in Louisiana and in need of immediate conservation attention. In addition, the strategy focused on those species that are migratory (primarily birds, butterflies, and, to a lesser extent, marine mammals) and used habitats within Louisiana during some part of their life cycle. With regard to terrestrial and aquatic invertebrates, the strategy focused on butterflies, crawfish, and mussels in this first iteration. It was intended that future iterations of this strategy would attempt to construct conservation strategies for other groups of terrestrial and aquatic invertebrates in greater detail. However, it was expected that management strategies developed for the current taxonomic groups and their habitats would provide some benefit to terrestrial and aquatic invertebrates not mentioned in the first iteration of the WAP. The following criteria were used in the SGCN identification process in 2005:

- Species classified as state SGCN (S1-S2-S3)
- Species that were globally ranked as G1, G2, or G3
- Species that had been designated as needing immediate conservation attention through rangewide/nationwide status assessments. Examples include information contained in national bird conservation plans such as the Partners In Flight Conservation Plan, the U.S. Shorebird Conservation Plan, and the North American Waterfowl Management Plan
- Species which are locally endemic

The draft species list was developed and distributed to seven technical expert committees for review. These committees also provided input regarding species distributions by habitat type within Louisiana. No attempt was made to prioritize SGCN within the overall list in 2005.

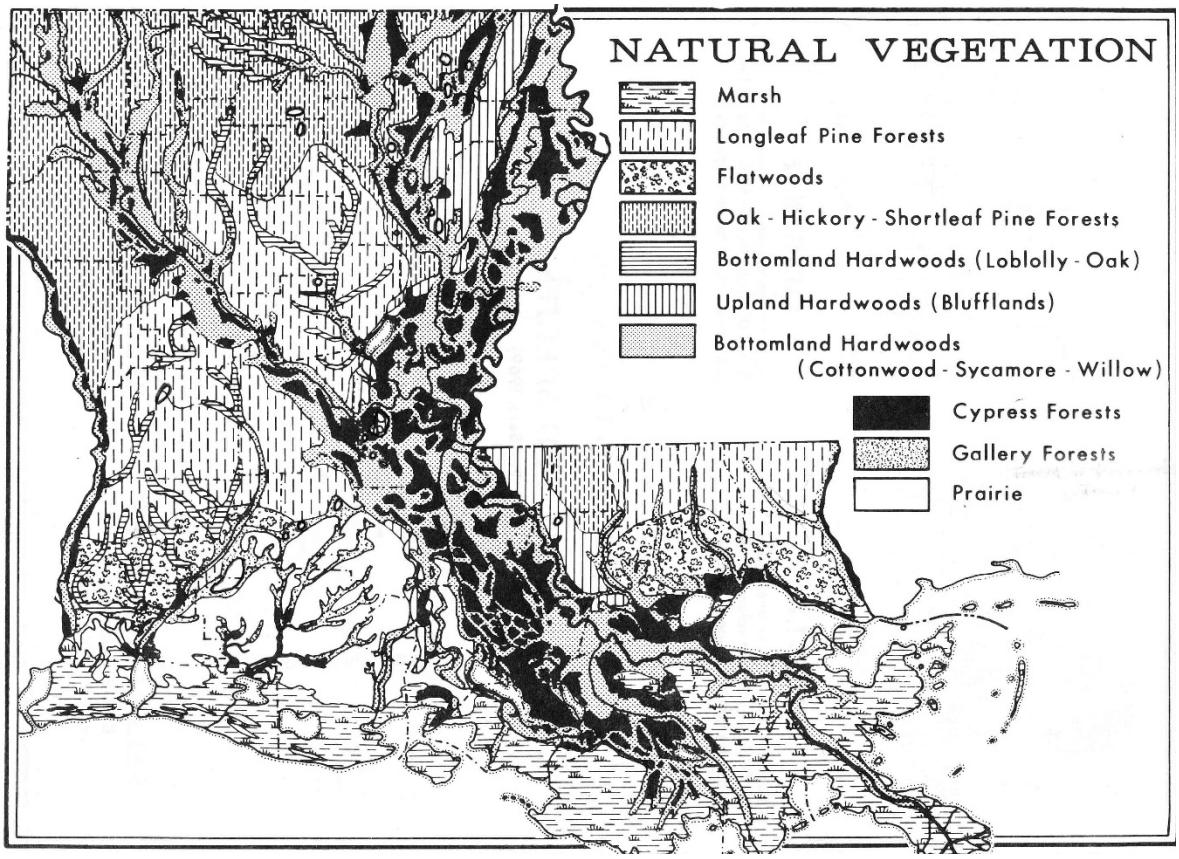

Figure 3.1. Primary natural vegetation types and presettlement distribution in Louisiana (Newton 1972).

2. Prioritizing Habitats Important for SGCN Conservation

Conservation actions or strategies were developed for each terrestrial habitat and key SGCN within each of the habitats to address threats identified by the habitat assessments. In order to maximize conservation benefits using available resources, ranking or prioritization lists of habitats were developed. These lists of priority habitats were intended to allow LDWF to direct conservation efforts to those wildlife habitats and associated species of concern that needed the most attention, and would bring the greatest benefit to the maximum number of species.

A process was formed to create the habitat priority list, and, as with the threats assessments, this process was completed by ecoregion (Chart 3.1). Within each ecoregion, the habitats were divided into two groups or tiers based on whether or not they occurred only in that ecoregion (Tier 1) or in multiple ecoregions (Tier 2). This first step in the process gave priority to those habitats with limited ranges, ensuring that threats to these habitats and conservation needs would not be overlooked.

In the second step, completed within each tier, the habitats were divided into two groups, matrix habitats or secondary habitats. A matrix habitat is a natural community that represents the primary or predominant habitat type found within a particular region (ecoregion, parish, river basin, etc.) or is considered to have dominated a region prior to European settlement. Determination of presettlement matrix habitats for a region is based

on factors such as local vegetation, soils, topography, hydrology, climate, fire history, and historic accounts and records. Secondary habitats were considered all other habitats naturally occurring in a particular ecoregion.

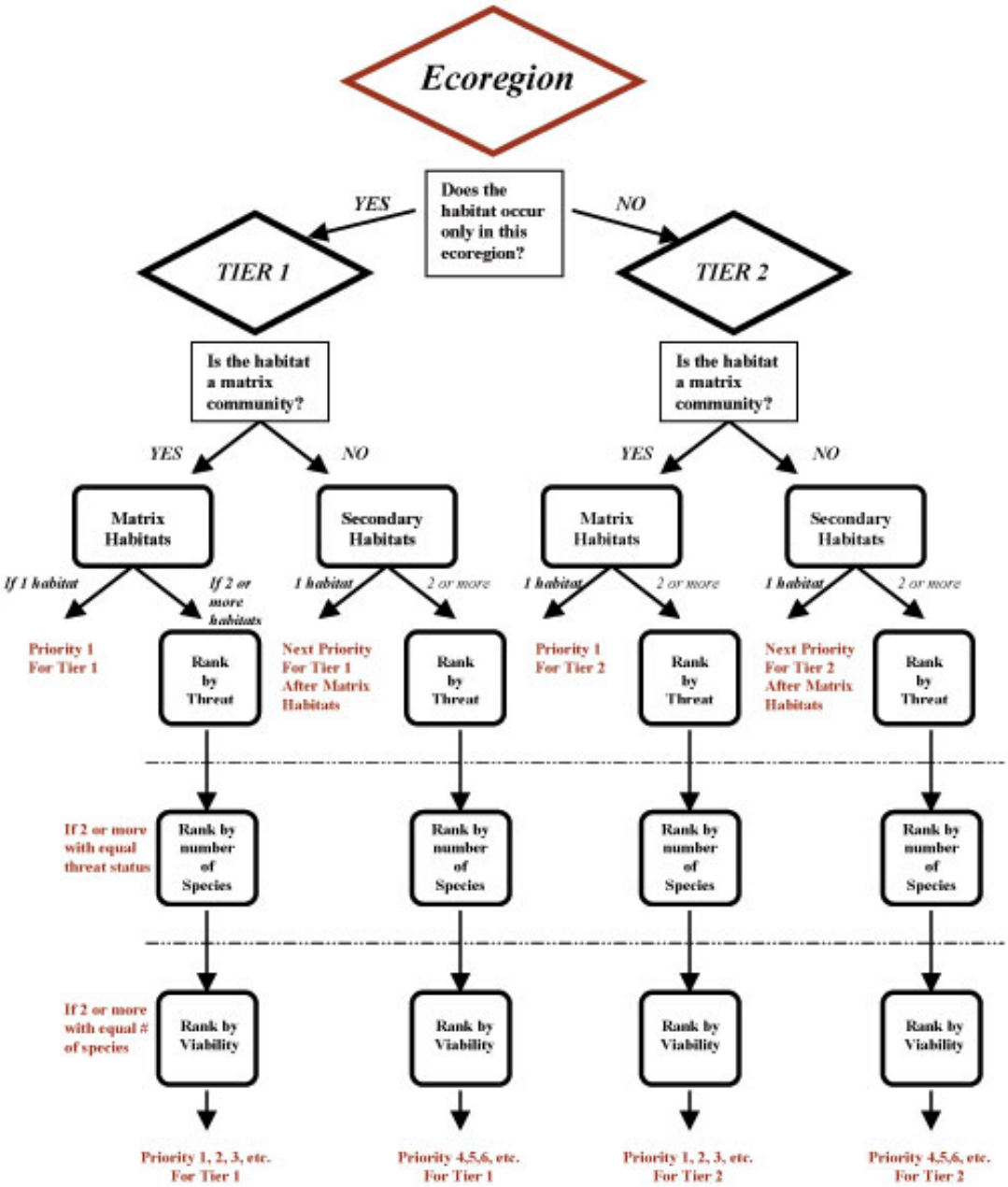

Chart 3.1. Terrestrial habitat prioritization process flowchart.

The third part of the process was completed within both the matrix and secondary habitat groups of each tier. If there was only one habitat, then it became priority one. If there are two or more habitats in a group, then they were ranked using three variables. The first variable was threat status. Habitats with a very high threat status were given first priority, followed by high threat status habitats, and then medium and low threat status

habitats. If there was more than one habitat within a threat status category, then these habitats were ranked by number of SGCN, and those habitats with the highest number of species were given preference. If the number of species between habitats was the same, then their final ranking was determined by viability rank.

Those habitats with good viability had first preference, followed by rankings of fair and poor viability. It should be noted that Agriculture-Crop-Grassland was not included in the prioritization process because it is an artificial habitat type, not a natural community. However, since many SGCN utilize this habitat type, strategies were developed to address threats to the habitat, and conservation actions were planned to implement the strategies.

Establishing priorities within aquatic habitats was difficult due to the overall lack of ecological and biological information for the majority of aquatic habitats and associated SGCN. With the first iteration in 2005, development of a priority process was not possible due to data gaps. Therefore, the highest priority for freshwater and marine systems was to initiate and support research on species assemblages to determine their ecological and biological needs.

D. Threats Assessments to Species of Greatest Conservation Need and Related Habitats

1. Threats to SGCN and Related Habitats

The majority of the threats affecting Louisiana wildlife and their respective habitats are the direct or indirect result of encroachment by human development and related development pressures. Rapid population growth and subsequent demands on the state's natural resources have resulted in substantial habitat losses. Early impacts from human activities, such as the establishment of the state's agriculture base, resulted in the clearing and cultivation of prime alluvial areas, and have all but extirpated the coastal prairies of the southwestern parishes. Cheniers and natural levee forests, found at higher elevations in the Gulf Coast Prairies and Marshes ecoregion, were the first to be developed for construction of roadways and home sites. During the last century the leveeing of the Mississippi River, construction of canal networks, and other development activities in marsh habitats have seriously degraded the state's coastal ecosystems. Expected population increases over the next century will create greater demands for residential sites, increase water usage and wastewater issues, increase the number of vehicles on the roads, and increase commercial and industrial development. All of these issues will have some impact on Louisiana's wildlife and associated habitats.

In order to effectively identify and address the widespread threats to wildlife habitats, an assessment of habitat viabilities and threats to each habitat type was needed. A listing of habitat threats and sources of those threats was compiled using TNC's Site Conservation/Measures of Success Workbook software (2000) and from input provided by the LDWF Core Committee and the WAP Habitat Assessment Committee. Habitat

types were evaluated by ecoregion, basin or coastal waters. Viability was assessed as a measure of the following three conditions:

- Size - a measure of the area of the habitat's occurrence
- Condition - an integrated measure of the composition, structure, and biotic interactions that characterize the occurrence
- Landscape Context - an integrated measure of two factors: the dominant environmental regimes and processes that establish and maintain the habitat occurrence and connectivity

Threats were then identified for each habitat type within ecoregion, basin, or coastal waters, and these threats were rated by severity (level of damage expected over the next 10 years) and scope (geographic scope of impact expected over the next 10 years). A stress rating for each threat was calculated using the combination of severity and scope ratings. Next, the sources of the threats were rated as to their contribution to the overall threat and its irreversibility potential. For example, habitat destruction/conversion was identified as a major threat to eastern longleaf pine savannas in the East Gulf Coastal Plain. Tremendous population growth has occurred in this ecoregion (20-30% increase from 1990-2000) and is expected to continue at a high level over the next decade (Fig. 2.1). This threat was given a "Very High" rating in both severity and scope due to the sources of the habitat conversion threat, namely residential development. The combined ratings for severity and scope resulted in a stress rating of "Very High". The contribution of residential development to eastern longleaf pine savanna habitat destruction/conversion was considered "Very High" and it was rated "Very High" in irreversibility potential. A source rating for the threat (residential development) was calculated from the combined scores for contribution and irreversibility. The final threat rating resulted from the combined source/stress rating from the viability table. The rankings of threats and sources of threats resulting from these assessments were used to prioritize threats to habitats within ecoregion, basin or coastal waters, and this information was then used to develop conservation strategies addressing major threats for each habitat type. In order to develop conservation strategies to address the threats to species and their associated habitats, statewide meetings were held in order to gather technical and public input.

2. Threats to Terrestrial Habitats

Threats that appeared repeatedly across terrestrial habitats and ecoregions included:

- Habitat destruction or conversion
- Habitat fragmentation
- Habitat disturbance
- Altered habitat composition and structure

Habitat destruction or conversion involves actions that permanently alter a habitat so that natural functions and values of the ecosystem are disrupted and are not considered

restorable. Historically, this threat was widespread across all habitats throughout the state, and it remains a current threat facing wildlife habitats throughout Louisiana. When habitat destruction or conversion occurs, **habitat fragmentation** follows. The remaining habitat becomes isolated on the landscape as it is divided into smaller and smaller blocks. Wildlife populations in these fragmented habitats are isolated from other breeding populations, face increased competition for limited resources, and come into conflict with other land uses.

The sources of threat for both **habitat destruction** and **habitat fragmentation** include:

- **Residential development** – This source of threat is greatest in the EGCP, UEGCP, and areas surrounding major urban centers of the state
- **Commercial/industrial development** – This source of threat follows occurrence patterns similar to residential development
- **Conversion to agriculture or other forest types** – These actions completely remove the natural plant associations of a habitat, can damage soils, and displace native wildlife species
- **Development of pipelines, roads or utilities** – Construction activities destroy habitats, result in fragmentation of surrounding habitats, and can serve as vectors for invasive and alien species introductions
- **Channelization of rivers or streams** – This source of threat directly destroys aquatic species habitat
- **Gravel mining** – These activities also destroy aquatic habitats, often impact adjacent small stream forests
- **Construction of ditches, drainage or diversion systems** – This source of threat alters natural hydrology of a site and can result in destruction of wetland habitats

Habitat disturbance involves actions that may alter some aspects of a habitat, but these changes, while serious, are generally not permanent, or can be ameliorated through restoration efforts or management actions.

The sources of threat for **habitat disturbance** include:

- **Invasive/alien species** - Invasive plant and animal species pose a serious threat for most habitat types across the state and can profoundly alter natural systems. These species can out-compete native species for limited resources, and many become pervasive, dominating entire habitats. Early detection and control are essential to halt the expansion of invasives.
- **Incompatible forestry practices -** This source of threat includes forest management activities that may alter in some way the natural processes or characteristics of a habitat type. These practices include but are not exclusive to activities such as broad application of herbicides that decrease diversity and alter composition of herbaceous plant layers, fire suppression causing denser tree and

understory cover and decreased diversity in the understory, logging on sites when soils are saturated causing rutting and compaction, even-aged forest management and monoculture stands which decrease habitat diversity, and bedding of an area to enhance timber production of off-site commercial species.

- **Residential development** – This source of threat includes indirect effects from residential communities to surrounding natural habitats such as non-point source pollution causing degradation of wetlands, recreational use that damages soils, and introduction of invasive species that out-compete native flora and fauna.
- **Development of pipelines, roads or utilities** – This source of threat includes construction and maintenance activities that alter surrounding natural habitats such as stream siltation, storage of construction equipment, application of herbicides, and clearing of rights-of-way.
- **Construction of ditches, drainage or diversion systems** – This source of threat includes activities that alter the hydrology of natural systems such as construction of drainage ditches to either remove water from or divert water to a site.
- **Channelization of rivers or streams** – As with development of pipelines, roads and utilities, this source of threat includes construction and maintenance activities that alter surrounding natural habitat.

Altered composition and structure refers to changes in plant community species composition and community structure that result from human activity. Plant species usually associated with, or naturally occurring in, a certain habitat may or may not be present, they may not occur in expected numbers, or other species generally not occurring in the habitat might become established. In addition, the natural habitat structure may be altered such that wildlife food and foraging areas, or nesting sites are no longer available. As with habitat disturbance, these changes can seriously alter a habitat type, but they can often be reversed through appropriate management or restoration efforts.

The sources of threats identified for **altered composition and structure** include:

- **Fire suppression** - Refers to the changes occurring in the historic frequency or patterns of fire in a natural habitat due to competing or surrounding land use practices, and public perceptions. Many of Louisiana's natural communities are fire adapted or dependent including all longleaf pine associations, bogs, and prairies. These plant and animal species associations developed in the presence of regular fire cycles, and fire is critical to maintaining these natural habitats. Fire has numerous benefits to natural systems (Moore 2001), including:

    - Seedbed preparation
    - Reducing woody plant competition
    - Preventing establishment and spread of invasive species
    - Recycling nutrients
    - Reducing hazardous fuel build-up
    - Maintaining herbaceous layer species diversity
    - Maintaining quality and abundance of food and nesting sites for many species

When natural fire regimes are altered or removed, all of the above benefits are lost, and the natural system composition and structure is altered through species succession and/or the establishment of invasive species.

- **Invasive/alien species** – Invasive or exotic plant species alter natural systems by out-competing native plants for habitat resources and replacing them within the plant community composition. Invasive or alien animal species can also alter composition and structure through severe disturbance of a habitat causing loss of certain native plant species in an area or allowing the introduction of invasive plants.
- **Incompatible forestry practices** – Some forestry or forest management practices such as establishment of monoculture stands, planting of off-site tree species or fire suppression alter the plant associations normally found in a habitat and change the natural community structure.
- **Construction of ditches, drainage or diversion systems** - These activities alter the hydrology of natural systems that can lead to a change in plant and animal species composition.
- **Livestock production practices** – These practices can damage aquatic habitats by decreasing water quality and related factors that, in turn, cause changes in aquatic species associations of a habitat.
- **Operation of dams and reservoirs** – As with construction of ditches, drainage or diversion systems, these activities alter the hydrology of natural systems, disrupting the transport of important nutrients and sediments and block the movement of aquatic species that can lead to a change in native species associations.

3. Threats to Aquatic Habitats

The decline of many native fish and mussel species is a result of the reduced quantity and quality of available habitat. Other specific causes of decline include levee construction, damming and channelization of the state's major rivers, including the Atchafalaya, Mississippi, Pearl, Red, and Sabine Rivers, for flood control and navigation along with agricultural uses, deforestation, erosion, pollution, and introduced species.

Threats that appeared repeatedly across basins included:

- Modification of water levels/changes in natural flow patterns
- Sedimentation
- Habitat disturbance
- Nutrient loading
- Altered composition and structure

Top sources of threats across all basins include:

- Channelization of rivers or streams

- Construction of navigable waterways
- Dam/reservoir construction
- Invasive/alien species
- Levee or dike construction
- Oil and gas drilling
- Operation of dams and reservoirs
- Commercial/industrial development
- Conversion to agriculture or other forest types

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