Control Number: 37448

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TEXAS PARKS & WILDLIFE

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December 23, 2009

Mr. Brian Almon, P.E.
Public Utilities Commission
P.O. Box 13326
Austin, TX 78711-3326

RE: PUC Docket No. 37448 – Application of LCRA Transmission Services Corporation (LCRA TSC) to Amend Its Certificate of Convenience and Necessity (CCN) for the Gillespie to Newton 345-kiloovlt (kV) CREZ Transmission Line in Gillespie, Llano, San Saba, Burnet and Lampasas Counties

Dear Mr. Almon:

Texas Parks and Wildlife Department (TPWD) reviewed the LCRA TSC Application To Amend Its CCN for the Gillespie to Newton 345-kV Transmission Line which includes the Environmental Assessment (EA) (CCN Application Attachment 1) prepared by PBS&J. TPWD would like to offer the following information, comments and recommendations.

Please be aware that a written response to a TPWD recommendation or informational comment received by a state governmental agency on or after September 1, 2009 may be required by state law. For further guidance, please see the attached Texas Parks and Wildlife Code, Section 12.0011. For tracking purposes, please refer to TPWD project number 14640 in any return correspondence.

Project Description

The proposed project entails construction of a new double-circuit-capable 345 kV transmission line from the existing Gillespie Station in Gillespie County to the proposed Oncor Newton Switching Station in Lampasas County. The proposed transmission line would be approximately 85 miles long and built on double-circuit 345 kV 120-feet to 185-feet tall lattice steel-V tower structures on 100-feet to 160-feet wide right-of-way (ROW).

Of the 11 alternatives considered to be acceptable by LCRA TSC, Route GN11 was selected [CCN Application Attachment 1 (EA, Section 6.1.4)] as the

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preferred alternative. The selection was based on consideration of potential environmental, cultural and land use impacts, engineering constraints, maintenance and construction considerations, public input and community values, estimated costs, system planning, and landowner and agency concerns and preferences. Based on these factors, LCRA TSC selected route GN11 because "best balances community values, potential impacts to the environmental and aesthetics and paralleling and using existing ROW with reasonable cost and effort."

TPWD Coordination History

TPWD provided preliminary information and recommendations regarding the entire CREZ Scenario 2 Project to the PUC on January 21, 2009. TPWD provided project-specific information regarding the development of this EA for in a letter to PBS&J dated May 12, 2009. This letter provided a summary of Texas Natural Diversity Database (TXNDD) records of rare and protected species for the project study area and recommended that PBS&J obtain the most current TXNDD Element Occurrence Data Records (EOIDs) from TPWD. The TPWD letter attached the previous January 21, 2009 TPWD correspondence, which includes maps of all known TXNDD records for the CREZ scenario. The May 12, 2009 letter referred PBS&J to the January 21, 2009 letter Figure 17, Edwards Plateau and Llano Uplift, which contains the map of TXNDD records for the project area. The May 12, 2009 letter also made recommendations for routing and avoiding impacts to vegetation, water resources and migratory birds. Please review these letters, because they still apply.

Federally Protected Species and Use of TXNDD Records

TPWD is concerned that the TXNDD information has been misinterpreted and misused in Table 6-1 of the EA. As a result, real information on potential adverse impacts to species has not been evaluated as a constraint in the alternatives analysis and preferred route selection, nor are potential impacts addressed.

The EA provides the following information regarding the use of endangered species information in Chapter 3, Environmental and Land Use Constraints. Section 3.3 defines "Known habitat of federally listed endangered/threatened species" as a "Constraint Area" to be avoided, if practicable, by all alternative routes" or "crossed with special care and possible mitigation." The EA Table 6-1, Environmental Data for Primary Alternative Route Evaluation, lists constraint

#28, "Length of ROW across known habitat of federally endangered/threatened species," as equal to zero for all alternatives. The EA, Section 5.1.4.4 states "According to TPWD (2009b), several previously documented records of protected wildlife species exist from within the study area; however, no previously documented occurrences occur along the proposed alternative routes."

Comment: This information is not consistent with TXNDD information provided to PBS&J. TPWD review of the TXNDD indicates that TXNDD records for federally endangered species are present either directly on or within the action area of 8 of the 11 proposed alternative routes, including preferred alternative GN11. The "action area" is defined by federal regulation (50 CFR §402.02) as all areas to be affected directly or indirectly by the action and not merely the immediate area involved in the action. The definition is not limited to the "footprint" of the action. Rather, it is a biological determination of the reach of the proposed action on listed species.

TXNDD records for federally endangered Golden-cheeked Warbler (*Dendroica chrysoparia*) and Black-capped Vireo (*Vireo atricapilla*) occur within the action area of Links C20 and C22. TXNDD records for Bald Eagles (*Haliaeetus leucocephalus*) occur within the action area of Links C13-15, C20 and C22. Although Bald Eagle was removed from the Endangered Species list in July 2008, it remains federally protected from take by the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. Bald Eagle remains listed as threatened (and is protected) by the State of Texas.

Links C13-15, on alternatives GN1, GN2, GN3, GN4, GN5, GN9, GN10 and GN11 are located on the Llano River, 1.6 miles from a Bald Eagle nest (EOID 2298) and within the eagle habitat management zone. Link C20 on GN1, GN9, and GN10 crosses Black-capped Vireo (EOID 2670) habitat and habitat for the Buchanan Lake Bald Eagle wintering population (EOID 3318). Link C20 is also located within the action area (less than a mile) of Golden-cheeked Warbler territory (EOID 6864). Link C22, on GN2, GN3 GN5 and GN11 crosses habitat for the Buchanan Lake Bald Eagle (EOID 3318) wintering population. TPWD review of aerial imagery indicates that potential habitat for Golden-cheeked Warbler (EOID 6864) and Black-capped Vireo (EOID 2670) may extend into the action area of Link C22 as well.

Request: TPWD requests that Row 28 be removed from Table 6-1 since it is not a valid criterion upon which decisions about route selection should be based.

Recommendation: TPWD recommends Table 6-1, Row 28 be replaced with an objective criterion stating whether endangered species/habitat is present **within the action area.** The answer would be "yes," "no" or "potential." TPWD recommends that this information be used as a constraint in the alternatives analysis and selection of the preferred alternative.

Recommendation: Before a determination can be made as to whether the project would affect protected species, the evaluation would have to be carried further with appropriate use of the TXNDD records. Use of TXNDD records should be used only within the context described above. As noted in previous TPWD correspondence to PBS&J, TXNDD records, including mapped boundaries, do not necessarily indicate the extent of "known" habitat. The boundary of any mapped record is a best estimate and does not necessarily represent the total real extent of the element occurrence. The true boundary may actually be smaller or larger.

As noted in the May 12, 2009 letter, TPWD recommends identifying any preferred habitat for rare and protected species within the areas being considered in the alternative analysis. On-ground surveys by qualified biologists should be conducted to identify potential habitat throughout the project action area(s). If habitat is present, a survey for the presence of the species should be conducted during the season when the species is most likely to be found on-site. Determination of species impacts should be based on review of current and best scientific available data, including the TXNDD, and on-ground surveys for potential habitat and species.

As noted in TPWD correspondence of May 12, 2009, consultation with the U.S. Fish and Wildlife Service (USFWS) would be required for adverse effects to federally listed or protected species. Any take (incidental or otherwise) of state listed species is prohibited. State listed species may only be handled/relocated by permitted individuals authorized by TPWD. Any harm to rare species should be avoided. There are penalties and restitution values associated with unauthorized take of state listed species. ***Protection of State-Listed Species - Texas Parks and Wildlife Department***

Guidelines, which lists penalties, is attached. If impacts to rare species are unavoidable, contact this office for further guidance.

Route GN11- Preferred Alternative

Route GN11 – Federally Protected Species

Llano River Crossing – Route GN11 would cross the Llano River approximately 1.6 miles west of a known Bald Eagle nest (EOID 2298) and within the eagle habitat management zone, as noted above. Placement of the line in close proximity to eagle nesting habitat may put eagles at risk for collisions and electrocutions. Removal of trees and other woody vegetation for the transmission line corridor ROW may adversely affect the existing habitat that eagles utilize for food, shelter and nesting.

Recommendation: TPWD recommends that LCRA TSC address the potential for Route GN11 to adversely affect Bald Eagles at the Llano River crossing. If impacts are determined to be adverse, then this finding should be used as a constraint in route selection.

Colorado River Crossing – Route GN11 would cross the Colorado River approximately 2 miles north of Lake Buchanan. At the crossing, the line would be located along the existing 80-foot-wide Seminole Natural Gas Pipeline ROW for approximately 1.6 miles (1.3 miles on the west of the river and 0.3 mile on the east). Otherwise, the supporting links (C16, C22, C26, C27, C28, C29 and 31A) would be located on new location ROW to the east and west.

Placement of Route GN11 on the Seminole Natural Gas Pipeline crossing has potential to adversely affect rare and protected species. As noted above, Route GN11 crosses the Colorado River in known habitat for Bald Eagle and potential habitat for Golden-cheeked Warbler and Black-capped Vireo. These and other migratory birds would be at risk from construction harassment, habitat loss/fragmentation, and collisions/electrocutions once the transmission line is built. Although the existing Seminole Natural Gas Pipeline is cleared of woody vegetation at the crossing, clearing of this segment from 80-feet-wide to 160-feet-wide would likely impact adjacent forest which contains potential habitat for all three bird species.

TXNDD records indicate that the crossing would be located in the middle of the residential range of wintering Bald Eagle habitat (the river, the cliffs and

vegetation) between the LCRA Buchanan Lake Canyon of the Eagles Nature Park and Colorado Bend State Park. Review of records for known locations of Black-capped Vireo and Golden-cheeked Warbler place territories for both species along the river to the north and south, approximately 4.5 miles distant, respectively, of the crossing. This data indicates that both Golden-cheeked Warbler and Black-capped Vireo territories could also be present adjacent to the pipeline ROW.

TXNDD records identified a cave containing a large maternity colony of Mexican free-tailed bats (*Tadarida brasiliensis mexicana*) located 4.3 miles south of the crossing and 1.5 miles east of the river. The record is a historical one, dating to 1958. The cave is no longer accessible to researchers, so the present day status of the bat population is unknown. Gorman Cave and other caves in Colorado Bend State Park host numerous bat colonies, including the Cave myotis bat (*Myotis velifer*), a species of concern. Bats are known to collide with transmission line towers along migratory flyways (Jim Kennedy, Bat Conservation International, pers. comm.). Recent research indicates that bats avoid electromagnetic frequencies. Such avoidance may adversely affect bat foraging and roosting behavior along the Colorado River. (See The Aversive Effect of Electromagnetic Radiation on Foraging Bats—A Possible Means of Discouraging Bats from Approaching Wind Turbines. B. Nicholls and P. A. Racey , PLoS One. 2009; 4(7): e6246; http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2705803/.

> **Recommendation:** TPWD recommends that LCRA TSC address the potential for Route GN11 to adversely affect Bald Eagles, Golden-cheeked Warbler, Black-capped Vireo and other rare and protected species that would be affected by the Colorado River crossing. If impacts are determined to be adverse, then this finding should be used as a constraint in route selection.

Route GN11 - Impacts to Vegetation and Wildlife Habitat in General

Of its total 85-mile length, GN11 would cross approximately 50 miles x 160 feet (969 acres) of new ROW (Links C13, C16, C22, C26, C27, C28 and C30). ROW construction along Links C13, C16, C22 and C26 of the GN11 transmission line ROW would impact approximately 30 more miles x 160 feet (528 acres) of rangeland and undeveloped woodland than would GN6, the TPWD recommended alternative, discussed below. Habitat for many of the rare and protected species on the ***TPWD Annotated County Lists of Rare Species*** for Llano, Burnet and Lampasas counties as well as wildlife in general, is present in this area. All of

these species could be expected to experience presently unquantified adverse impacts from construction of these links.

Comment: TPWD does not recommend selection of Route GN11 as the preferred route because of the presence of federally listed species, and the potential adverse impacts to the large amount of undeveloped wildlife habitat present along this route, including a segment of the Colorado River. Fifty-nine percent of GN11 would be built on new location compared to Route GN6, of which 25 percent would be built on new location ROW.

Other Alternatives

Routes GN1, GN2, GN3, and GN4 - Potential Impacts to Enchanted Rock State Natural Area, Colorado Bend State Park, and Protected Species

Comment: TPWD does not recommend the selection of Routes GN1, GN2, GN3 or GN4 for the following reasons. Construction of these routes would have a permanent, adverse impact on Enchanted Rock State Natural Area. Link C7 of Routes GN1 and GN 2 would be located 2.8 miles west of the summit of Enchanted Rock. Link C8 of Routes GN3 and GN 4 would be located 2.1 miles east of the summit of Enchanted Rock. The granite batholith that makes up Enchanted Rock is a world-renown geologic feature which provides an unobstructed 360-degree view of the Texas Hill Country from its summit. Construction of either of these routes in such close proximity to the summit would permanently diminish the scenic beauty of the Enchanted Rock view shed and seriously threaten the viability of the park.

Comment: Route GN1 crosses the Colorado River approximately 0.9 mile south of Colorado Bend State Park. TPWD is concerned that such close proximity to Colorado Bend State Park would compromise park use and may have unforeseen effects on the wildlife within. Like Enchanted Rock, the viability of the park may be threatened. Routes GN2, GN3 and GN4 would cross the Colorado River 4 miles south of Colorado Bend State Park in the same location as GN11, the preferred alternative. Routes GN1, GN2, GN3 and GN4 cross the Llano River in the same location as GN11, within 1.6 miles of known Bald Eagle nesting habitat. As discussed above, placement of transmission lines at these crossings could adversely impact wintering Bald Eagles, Golden-cheeked Warbler, and/or Black-

capped Vireo in addition to potential habitat for currently undocumented rare and protected species.

Route GN6

Based on the information provided, Route GN6 would have the least amount of adverse impact on biological resources, and substantially less than Route GN11, the preferred route, as noted above. TPWD recommends selection of GN6 in keeping with ***TPWD Recommendations for Electrical Transmission/ Distribution Line Design and Construction*** (attached) to minimize potential project effects on wildlife. Of the 11 proposed routes, Route GN6 would be located on the greatest amount of existing transmission line ROW, 47 miles of its total 85-mile length. Further, an additional 17 miles of GN6 would be located parallel to already developed existing transmission line or other utility/highway ROW. As a result, impacts to existing vegetation and habitat for rare and protected species and wildlife in general would be substantially minimized compared to any of the other routes. Most importantly, GN6 would cross 30 fewer miles of comparable new ROW (Links C27, C29 and C31a) than on GN11. GN6 would best afford protection of the view sheds of Enchanted Rock State National Area and Colorado Bend State Park. Route GN6 would cross the Colorado River on the developed south side of Buchanan Lake along the existing transmission line corridor, an area of less favorable habitat for wintering eagles, Golden-cheeked Warbler and Black-capped Vireo.

Mitigation

Impacts to Wildlife Habitat

Request: All of the proposed alternatives would permanently convert various amounts of existing native wildlife habitat to grass and herbaceous cover. TPWD requests in-kind replacement/conservation of all existing native wildlife habitat (both regulated and unregulated) that would be permanently altered by the proposed project. Mitigation values would be commensurate with the habitat value. TPWD recommends that the EA be amended to include a compensatory mitigation plan.

Recommendation: ***TPWD Guidelines for Construction and Clearing within Riparian Areas*** is attached. Please review since they apply to this project.

Invasive Species and Revegetation

Recommendation: Invasive species pose a significant threat to the existence of native plant communities in disturbed areas. In accordance with Executive Order on Invasive Species (EO 13112) and the Executive Memorandum on Beneficial Landscaping, TPWD recommends that practices be implemented to prevent the establishment of invasive species and sustain native species, particularly during the early stages of revegetation. Assistance on invasive prevention can be obtained from several natural resource agencies including the U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS). The NCRS can provide standards and specifications for revegetation using native species within the project area. A copy of ***TPWD Guidelines for Revegetation of Disturbed Landscapes*** is attached. Assistance on selection of native plants for landscaping and revegetation may be found in the **Texas Parks and Wildlife Texas Plant Information Database (TPID)** online at http://tpid.tpwd.state.tx.us/PlantFind.asp. or the **TPWD Wildscapes** website at http://www.tpwd.state.tx.us/huntwild/wild/wildscapes/ guidance/plants/.

I appreciate the opportunity to review and comment on this CCN Application and EA. Please contact me at (512) 389-8054 if you have any questions.

Sincerely,

Karen H. Clary

Karen H. Clary, Ph.D.
Wildlife Habitat Assessment Program
Wildlife Division

KHC:gg.114640

Attachments (5)

cc: Ms. Martha Henson, Oncor EDC (w/attachments)

Sec. 12.0011. RESOURCE PROTECTION.

(a) The department is the state agency with primary responsibility for protecting the state's fish and wildlife resources.

(b) The department's resource protection activities include:

(1) investigating fish kills and any type of pollution that may cause loss of fish or wildlife resources, taking necessary action to identify the cause and party responsible for the fish kill or pollution, estimating the monetary value of lost resources, and seeking restoration through presentation of evidence to the agency responsible for permitting or through suit in county or district court;

(2) providing recommendations that will protect fish and wildlife resources to local, state, and federal agencies that approve, permit, license, or construct developmental projects;

(3) providing information on fish and wildlife resources to any local, state, and federal agencies or private organizations that make decisions affecting those resources; and

(4) providing recommendations to the Texas Department of Water Resources on scheduling of in-stream flows and freshwater inflows to Texas estuaries for the management of fish and wildlife resources.

(c) An agency with statewide jurisdiction that receives a department recommendation or informational comment under Subsection (b) shall respond to the department in writing concerning the recommendation or comment. A response must include for each recommendation or comment provided by the department:

(1) a description of any modification made to the proposed project, fish and wildlife resource decision, or water flow schedule resulting from the recommendation or comment;

(2) any other disposition of the recommendation or comment; and

(3) as applicable, any reason the agency disagreed with or did not act on or incorporate the recommendation or comment.

(d) A response under Subsection (c):

(1) must be submitted to the department not later than the 90th day after the date the agency makes a decision or takes other action related to the recommendation or informational comment provided by the department; and

(2) is public information under Chapter 552, Government Code.

Protection of State-Listed Species
Texas Parks and Wildlife Department Guidelines

Protection of State-Listed Species

State law prohibits any take (incidental or otherwise) of state-listed species. State-listed species may only be handled by persons possessing a **Scientific Collecting Permit** or a **Letter of Authorization** issued to relocate a species.

- **Section 68.002 of the Texas Parks and Wildlife (TPW) Code** states that species of fish or wildlife indigenous to Texas are endangered if listed on the United States List of Endangered Native Fish and Wildlife or the list of fish or wildlife threatened with statewide extinction as filed by the director of Texas Park and Wildlife Department. Species listed as Endangered or Threatened by the Endangered Species Act are protected by both Federal and State Law. The State of Texas also lists and protects additional species considered to be threatened with extinction within Texas.

- **Animals** - Laws and regulations pertaining to state-listed endangered or threatened animal species are contained in **Chapters 67 and 68 of the Texas Parks and Wildlife (TPW) Code** and **Sections 65.171 - 65.176 of Title 31 of the Texas Administrative Code (TAC).** State-listed animals may be found at **31 TAC §65.175 & 176**.

- **Plants** - Laws and regulations pertaining to endangered or threatened plant species are contained in **Chapter 88 of the TPW Code and Sections 69.01 - 69.9 of the TAC**. State-listed plants may be found at **31 TAC §69.8(a) & (b).**

Prohibitions on Take of State Listed Species

Section 68.015 of the TPW Code states that no person may capture, trap, take, or kill, or attempt to capture, trap, take, or kill, endangered fish or wildlife.

Section 65.171 of the Texas Administrative Code states that except as otherwise provided in this subchapter or **Parks and Wildlife Code, Chapters 67 or 68**, no person may take, possess, propagate, transport, export, sell or offer for sale, or ship any species of fish or wildlife listed by the department as endangered or threatened.

"Take" is defined in **Section 1.101(5) of the Texas Parks and Wildlife Code** as:

> *"Take," except as otherwise provided by this code, means collect, hook, hunt, net, shoot, or snare, by any means or device, and includes an attempt to take or to pursue in order to take.*

Penalties

The penalties for take of state-listed species (**TPW Code, Chapter 67 or 68**) are:

- 1ST Offense = Class C Misdemeanor:
  $25-$500 fine

- One or more prior convictions = Class B Misdemeanor
  $200-$2,000 fine and/or up to 180 days in jail.

- Two or more prior convictions = Class A Misdemeanor
  $500-$4,000 fine and/or up to 1 year in jail.

Restitution values apply and vary by species. Specific values and a list of species may be obtained from the TPWD Wildlife Habitat Assessment Program.

TPWD Guidelines for Revegetation of Disturbed Landscapes

Establishing plant cover onto disturbed landscapes should occur as a result of careful consideration of the management objectives, existing site characteristics, and the ecological factors affecting the area. In general, selecting native plant species which mimic naturally occurring plant communities in similar habitat situations will create landscapes which meet the developer's goals and have value for wildlife while preventing loss of soil resources. (Keeping the soil in place is fundamental to any vegetation management scheme.)

The following management goals will generally create or improve habitat for wildlife and are compatible with agricultural production and rural residential situations:

- **Ecosystem Functioning** (climax plant communities known to occur historically, e.g., Water Tupelo-Cypress swamp or Little bluestem-Indiangrass grassland)

- **Increased Biodiversity** (i.e., incorporation of tree and shrub communities within a grassland landscape or mixed edge associations for game and nongame species)

- **Plant Communities for Specific Habitat Needs** (may be needed for specialist/endangered wildlife)

Information concerning species components of native plant communities within a given locality can be obtained from Soil Conservation Service *Range Site Descriptions* and county *Soil Surveys*, investigation of undisturbed sites within the local area, and historical botanical and ecological reports for the local area. Remember that many of our historical climax plant communities developed under a regime of natural processes which are no longer functioning because of the influence of man (e.g., fire). Climax plant communities may be difficult to establish and maintain without continued manipulation to simulate these natural processes.

If "tailored" plant associations (non-climax) are being developed to maximize certain objectives, then the following criteria and notes can be used to develop a species list which will provide for wildlife habitat value while providing soil erosion protection:

- Selected plants should be native and adapted for the same local climatic and ecological region, topography, and soil conditions.

- Selected plants should be compatible.

- The association should cover as much area as possible (overlapping canopies).

- The association should form at least 2 canopy layers above the soil surface.

- Selected plants should include a mixture of physical and habitat forms, e.g., deciduous, evergreen, tree, shrub, vine, forb, grass.

- The association should provide annual, all-season fruits.

- The association should provide areas of adequate cover for the species being managed for.

- A ground cover should be established quickly to prevent solid erosion.

- Selected plants should include species which improve fertility (i.e., nitrogen-fixing species).

- In as much as they can be found suitable with slope, soil characteristics, aspect, source of moisture and wind direction, plants should be arranged in irregular groups rather than uniform rows so that the association will produce a more natural form.

- Native plants are adapted to the local environment and will persist through periods of environmental stress. Most exotic plants cannot similarly persist and are also overrated as wildlife food and cover. However, a few exotic species can establish themselves by out-competing native plants. They then become serious persistent pests, difficult if not impossible to control or eradicate. Exotic species should, therefore, be omitted from permanent revegetation plans.

- Weedy, invader native species can be problematic as they have great capacity for dispersal and are adapted to disturbed solid sites. Selecting species associated with climax or near climax plant communities may be slightly more difficult to establish but be more useful as wildlife habitat.

Landscape planning and erosion control assistance can be obtained from several natural resource agencies. For instance, the Soil Conservation Service (SCS) maintains standards and specifications for revegetation within each county of the state. These standards include information concerning site and seedbed preparation, litter requirements to reduce erosion, solid moisture and temperature requirements for germination and growth, seeding and planting methods, weed control, fertilizer rates and nutrient requirements, etc. The Texas Forest Service and the U.S. Forest Service can also provide assistance in revegetation of forest and shrubland landscapes. Texas Parks & Wildlife Department. U.S. Fish & Wildlife Service, and the U.S. Corps of Engineers can provide additional assistance in development of vegetation for use by fish and wildlife (i.e., habitat).

Texas Parks & Wildlife Department Guidelines for Construction and Clearing Within Riparian Areas

A. Summary of Impacts Anticipated With Clearing of Rights-of-Way and Construction Within Riparian Habitats

The following discussion lists a portion of the adverse impacts often incurred to natural resources with clearing of vegetation along streams and rivers as a result of construction disturbance and right-of-way (ROW) preparation.

(1) Direct Vegetation Loss

Removal of vegetation along stream systems is usually very damaging to fish and wildlife habitat and to natural processes associated with these systems. Vegetation associated with forested stream systems usually reflects highest value wildlife habitats. The degree of adverse impact to habitat resulting from this vegetation loss relates directly to the quantity of the vegetation loss and quality of the vegetation assemblage in fulfilling life requisites of those organisms using it.

(2) Disruption of Habitat Continuity

Habitat fragmentation is a serious threat to biological diversity. Because of the high use of riparian systems in general by wildlife, TPWD recommends that forest systems associated with floodplains be managed so as to avoid habitat fragmentation. Wildlife use river corridors to travel across the landscape and to move between food, cover, and breeding locations. Fish use habitat features within stream systems where appropriate physical parameters of light, temperature and water quality exist. As human development activity continues to compete for the natural resources existing within these riverine systems, remaining forested floodplains become increasingly valuable and scarce. Clearing for construction and utility ROW's, widening of utility ROW's, realignment of roadways crossing riverine systems, and abandonment of roads which cross these systems contribute significantly to increasing fragmentation of high value riparian habitats.

(3) Impacts to Protected and Rare Species and Natural Resources

Riverine systems are more prone to function as protected species habitat than upland areas because they tend to be less disturbed and represent higher value systems. Consequently, endangered species and natural plant community investigations should always be conducted when disturbance of these systems is projected or planned.

(4) Impacts to Natural Functions Associated with Forested Stream Systems

Riparian area management, which was once considered to be essentially a fish and wildlife concern, is a broader issue that cuts across various agency functions, including not only fish and wildlife but also range management, watershed management, and soil management. Streamside forests are complex ecosystems vital to the protection of our streams and rivers. Functions served by these forested riparian systems include:

Improving the quality of water resources by removing or ameliorating the effects of pollutants in runoff; Increasing biological diversity and productivity of stream communities by improving habitat and adding organic matter to the food base; Removing sediment and sediment-attached phosphorus by filtration;

Transforming nitrate to nitrogen gas as a part of nutrient cycling;

Acting as a sink by storing nutrients for extended periods of time;

Dampening sedimentation and erosion and providing organic energy to downstream reaches.

B. Recommendations Concerning Construction in Riparian Areas

Construction and clearing of vegetation for development can drastically affect natural resources and natural processes associated with stream systems. These resources and processes are fundamental to the development of habitat for fish and wildlife. The following general recommendations concerning disturbances within riparian systems should be followed to minimize adverse impacts to fish, wildlife, and plant resources.

(1) Channel Modification (channelization, realignment, relocation, modification, "improvement")

Channel modification projects serve to destroy natural aquatic and riparian habitats through direct removal of woody vegetation along streamsides and alteration of the physical attributes affecting the stream's configuration and flow characteristics. Therefore, TPWD supports channel modification projects only if vegetation impacts are avoided or mitigated and the reconstructed channel provides for a stream floodplain, natural stream meandering, pools and riffles, streamside vegetation, overhead canopy vegetation and appropriate width/depth/velocities.

(2) Stream Crossing Structures ((culverts, bridges, transmission lines, pipelines, utility rights-of-way)

- cross at right angles to the stream;
- locate crossings where the channel is straight and exhibits unobstructed flows;

- avoid crossing at bends;
- structure design (span) must ensure that the natural stream-bed and bank remains intact;
- during construction, work from only one bank;
- vegetation and overstory canopy should be preserved (i.e. preserve the streamside vegetation corridor), especially the more southerly or westerly banks to maximize shading;
- construction of conduit for fluids or transmission lines across waterways should be installed by boring under streams versus trenching through the stream substrate;
- accommodate low-flow fish passage,
- Avoid vegetation buffer areas adjacent to wetlands and riparian corridors by a minimum of 100'.

(3) Stream Maintenance (stream cleaning and desnagging)

- Rocks and boulders are usually part of the natural stream-bed and should not be removed unless they cause significant ponding, sediment deposition, or accumulation problems with logs, small debris, or garbage.
- Trees should not be removed from stream banks unless they: are dying, dead, or have damaged root systems; are leaning over the channel at an angle greater than 30 degrees off vertical; have root systems undercut to the degree that they rely on adjacent vegetation for support (if so, leave the root system for stabilization).
- Logs should not be removed from streams if they: are isolated or single logs that are embedded, jammed, rooted, or water logged in the channel or floodplain; are not subject to displacement by the current; are not blocking flows; are embedded logs parallel to the channel or stabilizing a shoreline.

(4) General Mitigation Measures

- Restore, replant, or revegetate with native vegetation (85% survivability required) all areas incurring minor or temporary disturbance.
- If soil replacement is required, the replacement soils should be native to the area (similar physical and chemical characteristics) and non-toxic.
- If wetland disturbance is involved, in-kind, in-basin replacement is recommended.

Wetland creation should not destroy good to excellent quality upland habitat.

(5) General Stream Conservation Criteria

- Construction and development activities should occur in such a manner to prevent or minimize damage to any stream, river or lake from pollution by debris, sediment, foreign material or from the manipulation of equipment and/or materials in or near such waterways.

- Water used for wash purposes or any other operation which might cause the water to become polluted with sand, silt, cement, oil or other impurities should not be returned directly to a stream, river or lake or to a ditch immediately flowing into a stream, river or lake. Such waters should be detained and treated prior to release to the natural ecosystem.

- Any water used from a stream, river or lake should be taken in such a manner that maintains water rights and sustains fish life downstream or around a stream, river or lake's perimeter.

- If the proposed development indicates substantial disturbance or removal of the State-owned streambed material, a permit from TPWD under Chapter 86, Parks & Wildlife Code may be required. Application forms and instructions are available by contacting the Inland Fisheries Division at (512) 389-4639.

TPWD Recommendations for Electrical Transmission/Distribution Line Design and Construction

Construction of the line should be performed to avoid adverse impacts not only to the environment but the local bird populations and to restore or enhance environmental quality to the greatest extent practical. In order to minimize the possible project effects upon wildlife, the following measures are recommended.

TPWD recommends that each electrical company develop an Avian Protection Plan to minimize the risks to avian species that are protected by the Migratory Bird Treaty Act.

Avian Electrocution Risks

Birds can be electrocuted by simultaneously contacting energized and/or grounded structures, conductors, hardware, or equipment. Electrocutions may occur because of a combination of biological and electrical design. Biological factors are those that influence avian use of poles, such as habitat, prey and avian species. The electrical design factor most crucial to avian electrocutions is the physical separation between energized and/or grounded structures, conductors, hardware, or equipment that can be bridged by birds to complete a circuit. As a general rule, electrocution can occur on structures with the following:

- Phase conductors separated by less than the wrist-to-wrist or head-to-foot (flesh-to-flesh) distance of a bird;
- Distance between grounded hardware (e.g. grounded wires, metal braces) and any energized phase conductor that is less than the wrist-to-wrist or head-to-foot (flesh-to-flesh) distance of a bird (Avian Power Line Interaction Committee 2006).

To protect raptors and eagles, procedures should be followed as outlined in:

Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 2006. by Avian Power Line Interaction Committee (APLIC). 2006. Distributed by the Avian Power Line Interaction Committee (APLIC).

Mitigating Bird Collisions with Power Lines: the State of the Art in 1994.
Avian Power Line Interaction Committee (APLIC). 1994. Edison Electric Institute. Washington D.C.

Line alterations to prevent bird electrocutions should not necessarily be implemented after such events occur, as all electrocutions may not be known or documented. Incorporation of preventative measures along portions of the routes that are most attractive to birds (as indicated by frequent sightings) prior to any electrocutions is much preferred.

Preventative measures include: phase covers, bushing cover, arrester covers, cutout covers, jumper wire hoses, and covered conductors. In addition, perch discouragers may be used to deter birds from landing on hazardous (to birds) pole locations where isolators, covers, or other insulating techniques cannot be used (Avian Power Line Interaction Committee 2006).
Use wood or non-conducting cross arms, for distribution lines, to minimize the possibility of electrical contact with perching birds.

When possible, for distribution lines, install electrical equipment on the bottom cross arm to allow top cross arm for perching.

TPWD recommends using nest management strategies which include installing nesting platforms on or near power structures to provide nesting sites for several protected species while minimizing the risks of electrocution, equipment damage, or outages (Avian Power Line Interaction Committee 2006).

Avian Collisions Risks

Birds typically establish flight corridors along and within river and creek drainages. Transmission lines that cross or are located very near these drainages should have line markers installed at the crossings or closest points to the drainages to reduce the potential of collisions by birds flying along or near the drainage corridors.

If transmission lines are located in an area with tall trees, the height of the transmission line should not be taller than the trees to reduce collision risks.

Transmission lines should be located to avoid separating feeding and nesting areas. If this cannot be avoided lines should be clearly marked to minimize avian collisions with the lines (Avian Power Line Interaction Committee 1994).

Transmission lines should be buried, when practical, to reduce the risks of avian collisions.

Habitat Impacts

Construction should avoid identified wetland areas. Coordination with appropriate agencies should be accomplished to ensure regulatory compliance. Construction should occur during dry periods.

Construction should attempt to minimize the amount of flora and fauna disturbed. Reclamation of construction sites should emphasize replanting with native grasses and leguminous forbs.

Existing rights-of-way should be used to upgrade facilities, where possible, in order to avoid additional clearing and prevent adverse impacts associated with habitat loss and fragmentation of existing blocks of wooded habitat.

Forest and woody areas provide food and cover for wildlife, these cover types should be preserved. Mature trees, particularly those which produce nuts or acorns, should be retained. Shrubs and trees should be trimmed rather than cleared.

Transmission lines should be designed to cross streams at right angles, at points of narrowest width, and/or at the lowest banks whenever feasible to provide the least disturbance to stream corridor habitat.

Implementation of wildlife management plans along rights-of-way should be considered whenever feasible.

All pole design should be single phase (without arms), where possible, to preserve the aesthetics of the area.