

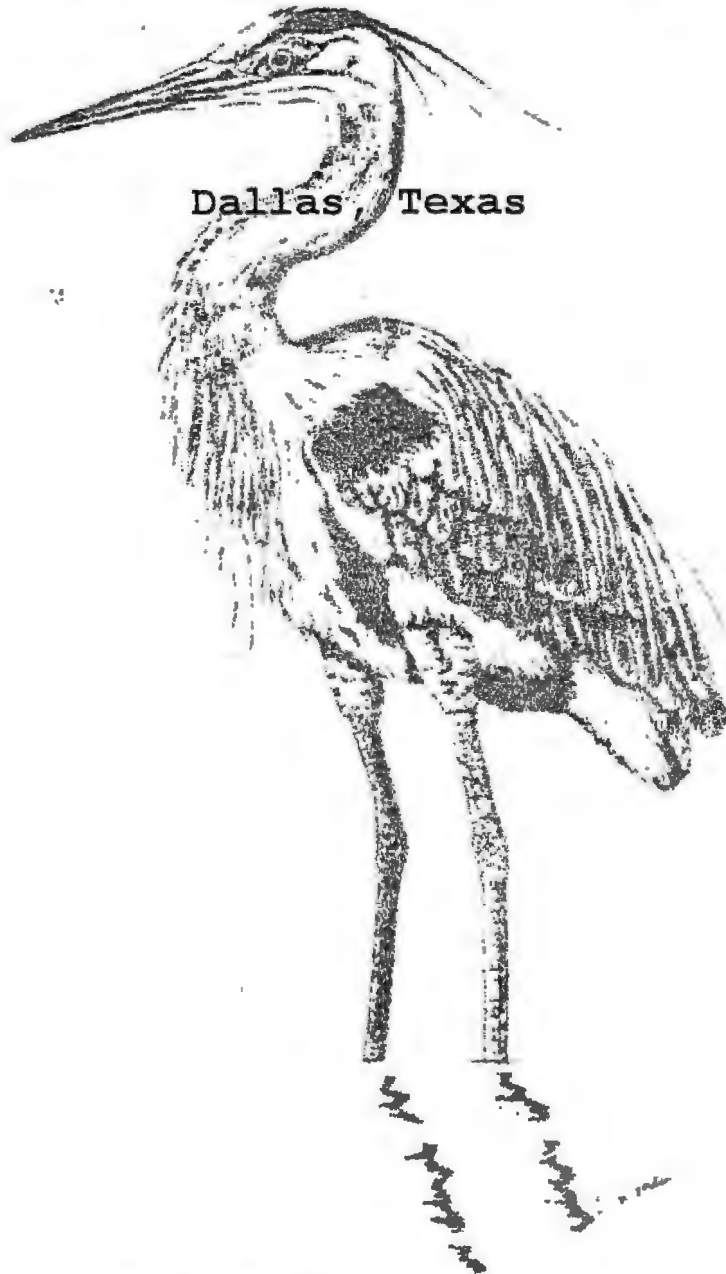
APPENDIX G

USFWS COORDINATION ACT REPORT

Report of the U.S. Fish and Wildlife Service

on the

Dallas Floodway Extension Project



Dallas, Texas



U.S. Fish and Wildlife Service
Arlington, Texas

February 1999





United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ecological Services
Stadium Centre Building
711 Stadium Drive, Suite 252
Arlington, Texas 76011

February 3, 1999

Colonel James S. Weller
District Engineer
U.S. Army, Corps of Engineers
P.O. Box 17300
Fort Worth, Texas 76102-0300

Dear Colonel Weller:

This letter constitutes the report of the U.S. Fish and Wildlife Service (Service) on the Dallas Floodway Extension project, Dallas County, Texas. It has been prepared under authority of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.) and is intended to accompany your Reevaluation Report. Our report has been coordinated with Texas Parks and Wildlife Department as indicated in the enclosed letter, dated July 23, 1997, from Dr. Ray C. Telfair III.

Authorization for this study was provided to the Corps of Engineers (Corps) by the River and Harbor Act of 1965 (Public Law 89-298). Subsequent to this authorization, the Corps conducted engineering studies and submitted a plan of improvement to higher authority which consisted of a multi-purpose channel and floodway levees downstream of the existing Dallas Floodway to the vicinity of Five Mile Creek. This previously authorized plan was suspended due to the lack of local support.

In May-June 1989, the City of Dallas experienced severe flooding along the Trinity River and White Rock Creek. As a result, the City requested that the Corps initiate a reevaluation study of the Dallas Floodway Extension and acknowledged the project cost-sharing requirements for federal water resource development projects. Reevaluation studies were initiated in Fiscal Year 1991 and have continued periodically through Fiscal Year 1999.

DESCRIPTION OF THE PROJECT AREA

The Dallas Floodway Extension lies entirely within the Blackland Prairies land resource area of Texas. Soils in this area generally consist of black, alkaline, organic clays overlying Cretaceous

limestone, with some lighter-colored sandy loams on the uplands. These soils support a native, climax plant community of mid and tall grasses such as little and big bluestem, Indiangrass, switchgrass, sideoats grama, and Texas wintergrass. Because of their fertile nature, most of these soils have been converted to agricultural production of crops and improved pasture grasses. Disturbed and overgrazed sites within the area are usually dominated by annual grasses, forbs, and mesquite.

Bottomlands within the region are characterized by a variety of woody and herbaceous vegetation. Late successional sites within the floodplain usually contain higher quality mast-producing trees such as pecan, bur oak, Shumard oak, American elm, and mulberry with little understory vegetation; whereas, disturbed or early successional sites have a greater preponderance of green ash, hackberry, cedar elm, cottonwood, and black willow in the overstory. These lower quality sites often have less tree canopy cover, thus permitting a greater abundance of invading forbs and grasses such as giant ragweed and Johnsongrass. However, in some locations, especially wetter sites, lower quality bottomlands may consist of virtual monocultures of small, even-aged green ash which may develop into extremely dense thickets.

All of the vegetation which now exists in the project area is directly affected by urban influences of Dallas and surrounding communities. Virtually all uplands along the Trinity River floodplain have been developed for residential or industrial use, and many of the lower lying areas have been protected from flooding by the construction of levees or flood channels. Abandoned sand and gravel pits and numerous landfills also dominate the floodplain areas of the Trinity River within the floodway extension area. These activities have resulted in reduced flood assimilative capacity and increased the volume and elevations of flooding within the downstream Trinity River floodplain. This periodic flooding has limited human use of the floodplain and permitted the reestablishment of a variety of forested and emergent wetland communities within the project area.

PLAN OF DEVELOPMENT

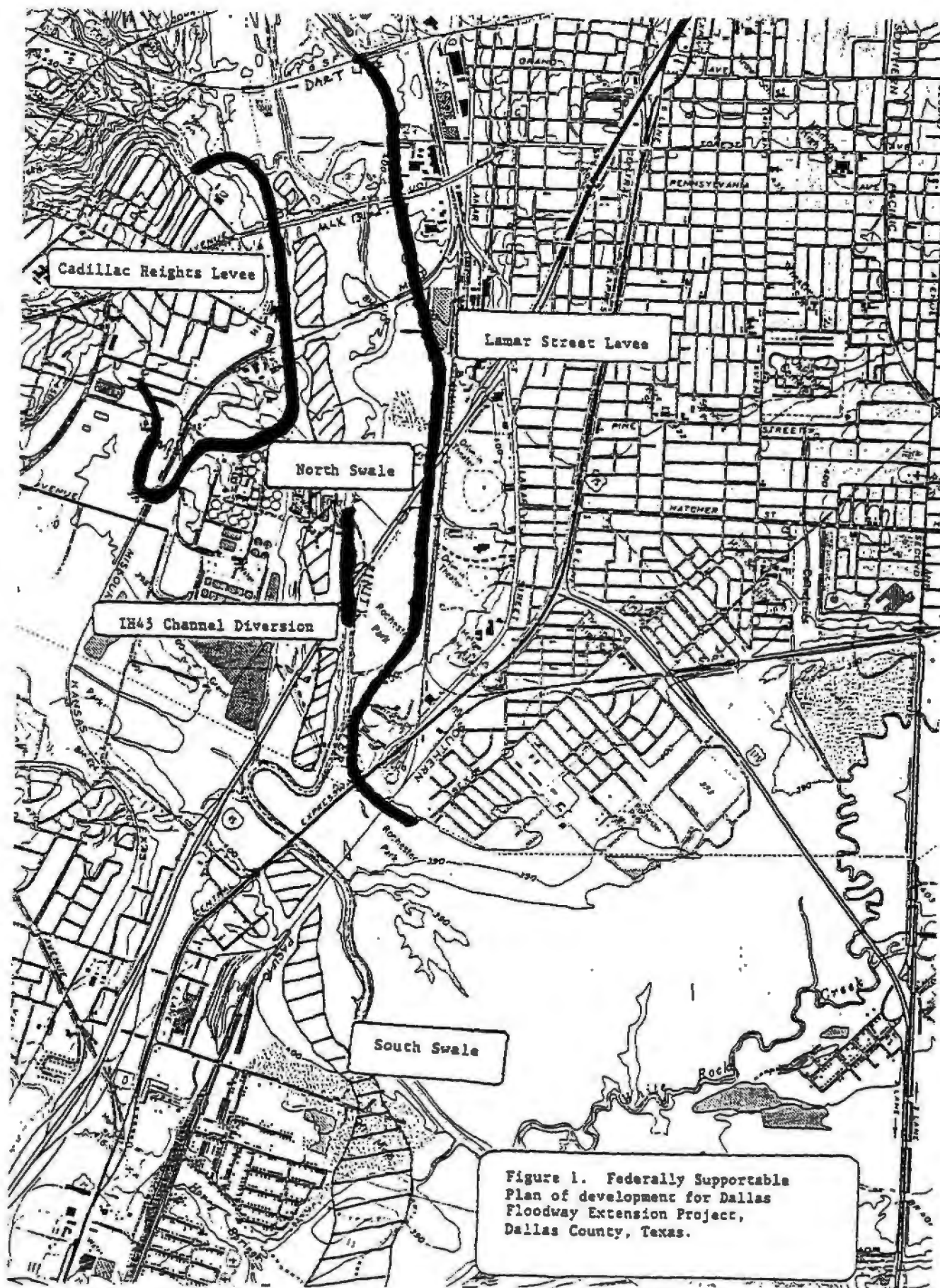
The National Economic Development (NED) plan for the project area identified during preliminary planning studies by the Corps consisted of a 1,200-foot wide flood conveyance swale on the west side of the Trinity River extending from the existing Dallas Floodway to the vicinity of the Interstate Highway 45 bridge. Downstream of the IH 45 bridge, the swale would be located on the north and east side of the river, ending at a point just south of Loop 12. The swale would be constructed by clearing all vegetation within the right-of-way and excavating a shallow ditch to convey flood flows more efficiently downstream. The swale would be

maintained in herbaceous vegetation to control erosion, and trees and shrubs would not be allowed to reestablish within the area. Normal flows would continue to remain in the natural channel of the Trinity River. Agency evaluation of this NED plan and public review indicated that it would have unacceptable, adverse impacts to the Trinity River's natural resources and the local community. Therefore, at the request of the public and the local project sponsor, additional alternatives were evaluated. These alternatives included various sizes and locations of channels, levees, flood conveyance swales, and combinations of these alternatives. The Corps has also examined non-structural solutions to the flooding problem within the project area.

The Federally Supportable Plan of development, which is also the Locally Preferred Plan, consists of three key features (Figure 1). Two flood conveyance swales ranging in width from 300 to 500 feet would be constructed along the western edge of the Trinity River floodplain. The north swale would extend from the end of the existing Dallas Floodway project southward to just upstream of the City's Central Wastewater Treatment Plant. The south swale would extend southward from the vicinity of IH 45 to just upstream of Loop 12. Both of these swales would contain a series of emergent wetlands constructed for water quality improvement, wildlife habitat, and aesthetics. This "chain of wetlands" feature is being independently evaluated by the Corps as an environmental enhancement feature of the Locally Preferred Plan.

Construction of flood protection levees would be the second key component of the project. One of these levees, the Lamar Street Levee, would extend south approximately 1.5 miles from the existing Dallas Floodway levee system to the City's Rochester Park Levee along the east side of the Trinity floodplain. The second levee, which is also about 1.5 miles in length, would be constructed on the west side of the Trinity River floodplain north of the Central Wastewater Treatment Plant in order to protect the Cadillac Heights subdivision. This levee would tie in with the existing treatment plant levee and extend to the west of the treatment plant where it would turn northward to intersect higher ground.

The final project feature involves the realignment of approximately 3,300 linear feet of the Trinity River at the IH45 bridge. The Texas Department of Transportation has requested this action in order to protect piers of the bridge which are now subject to high velocity flows and debris within the existing river channel.



EVALUATION METHODOLOGY

Wildlife evaluations were conducted on the Dallas Floodway Extension using the Service's Habitat Evaluation Procedures (HEP). This methodology permits the documentation of the quality and quantity of available habitat for selected wildlife species within a project area for both with and without-project conditions. It can be utilized to compare and/or predict available habitat under various development scenarios and time intervals, thus permitting the evaluation of development impacts on wildlife habitat and the formulation of appropriate mitigation measures.

HEP is based on the assumption that habitat for selected wildlife species can be described by a Habitat Suitability Index (HSI). This index value, which ranges from 0 (no suitable habitat) to 1.0 (optimum habitat conditions), is multiplied by the area of available habitat to obtain habitat units. The habitat units are normally annualized over the life-of-the-project in order to compare future habitat conditions under different alternatives. HSI's are obtained by comparing field measured habitat variables (e.g., tree canopy closure, number of nest sites, etc.) to optimum habitat criteria preferred by each wildlife evaluation species.

Within the Dallas Floodway Extension project area, only three major wildlife habitat cover-types were identified and evaluated. These included two successional stages of bottomland hardwood forest and mixed grass-forblands. Higher quality forests are characterized by mature, mast-producing species such as pecan, bur oak, and Shumard oak with larger specimens of American elm, cedar elm, and hackberry. Moderate quality forests are dominated by less mature green ash, cedar elm, hackberry, willow, and cottonwood. Principal herbaceous species within the mixed grass-forblands include giant ragweed, Johnsongrass, Bermudagrass, dallisgrass, and various sedges. Mapping and quantification of the acreage of these habitats was accomplished by the Corps' Environmental Resources Planning staff with the assistance of the Service utilizing low altitude aerial photographs, remote sensing data, and ground verification.

Evaluation species for the HEP analysis were selected through the application of feeding and reproductive guild matrices. This process enabled the identification of key "indicator species" which represent the entire ecological community because of their varied feeding and reproductive requirements. Whenever possible, species selection was based upon available models of species that have high public interest, economic value, or restrictive ecological requirements.

Species selected for evaluation of the habitats in the Dallas Floodway Extension project area included the raccoon, fox squirrel, red-tailed hawk, barred owl, hairy woodpecker, and Carolina

chickadee for bottomland hardwood forests and eastern cottontail, red-tailed hawk, and eastern meadowlark for the mixed grass-forblands.

Baseline field data within the project area were initially collected during 1992 and 1993 for bottomland hardwood forests, while field data collected by the Service on the Upper Trinity River Reconnaissance Study in 1989 were used to evaluate mixed grass-forblands. Recent field inspections of the project area have indicated little change in habitat conditions since the collection of the original field data. The HEP identified the average annual habitat units (AAHU's) which would occur for each habitat type within the overall project area for a 50-year period of analysis, both with and without a flood control project. A comparison of these AAHU values quantified what impacts the proposed project would have on wildlife habitats and permitted the Service to evaluate potential mitigation plans for the alternative actions.

For the purposes of the HEP analysis, it was assumed that in the absence of a federal flood control project there would be no significant change in the amount of available terrestrial habitat within the project study area, and habitat quality of the bottomland hardwoods would continue to improve slightly due to natural successional processes. Implementation of a flood control project would result in the immediate loss of habitat within the footprint of the structures, while remaining habitats would experience similar conditions to those anticipated for non-project conditions.

FISH AND WILDLIFE RESOURCES WITHOUT THE PROJECT

Aquatic Resources

Aquatic resources of the upper Trinity River Basin have been greatly influenced by the level of human development within the Dallas-Fort Worth region. Numerous flood control channels, levees, reservoirs, and wastewater discharges from this urbanized area have dramatically reduced the physical and chemical quality of the habitat and waters, which in turn has reduced the diversity and abundance of the aquatic fauna. Several studies by the Service, Texas Parks and Wildlife Department, Texas Water Commission, universities, and others have documented the direct impacts of poor water quality and habitat degradation on the distribution and health of fish within the Trinity. Some improvement in water quality has been noted in recent years; however, the Trinity River is still largely dominated by wastewater return flows which will continue to strongly influence the biotic community within the river.

Within the Dallas Floodway Extension project area, the Trinity River channel has not been significantly altered, except in the vicinity of the numerous railroad and highway bridge crossings. The river channel has relatively steep, bare banks with numerous deadfall logs and debris which have accumulated during high flow periods. The water is usually turbid, especially during high flow periods, due to the muddy, silty nature of the river's substrate. In most areas, a large canopy of cottonwood, elm, and willow trees provides fair to good shading of the river's surface.

Fish fauna within this stretch of the Trinity River is generally restricted to the more pollution tolerant species, such as common carp, river carpsucker, smallmouth buffalo, longnose gar, bullhead catfish, gizzard shad, mosquitofish, and various species of sunfish and shiners. Few gamefish species occur due to the lack of adequate habitat and poor water quality, although channel catfish, crappie, and largemouth bass may occur in some of the cleaner sites.

Terrestrial Resources

Vegetation resources within the project area are also highly influenced by man's activities and typically consist of only two major cover-types: bottomland hardwood forests and mixed grass-forblands. Some open water and emergent wetlands, primarily associated with old gravel and borrow pits, are found within the overall study area, but these are relatively limited in occurrence within the project site and have not been delineated or evaluated (Figure 2). Most wetlands within the project area are closely associated with the forested and mixed grass-forbland habitat types and are difficult to delineate due to the highly disturbed nature of the project area and their interspersions with the other cover-types.

Two distinct bottomland hardwood forest types were mapped and quantified for the study area. Pecan-oak-elm bottomland hardwoods occupy approximately 246 acres within the evaluation area and are characterized by greater overall tree species diversity and forest maturity than other hardwood dominated sites. Dominant overstory vegetation on these more mature bottomland sites includes pecan, bur and Shumard oak, American and cedar elm, hackberry, green ash, and mulberry (Figure 3).

Approximately 319 acres of ash-elm-willow bottomland hardwoods occur within the study area. This cover-type consists largely of early successional species which can successfully adapt to the extremely wet conditions within the lower portions of the Trinity River floodplain. The most prevalent vegetation in this cover-type includes green ash, boxelder, cedar elm, hackberry, black willow, and cottonwood (Figure 4).



Figure 2. Palustrine open water wetland site formed by excavation.



Figure 3. Pecan-oak-elm bottomland hardwood cover-type.



Figure 4. Green ash thicket representative of ash-elm-willow cover-type.



Figure 5. Mixed grass-forbland cover-type.

Both of the bottomland hardwood cover-types have a varied understory consisting of tree saplings, shrubs, vines, and herbaceous plants. Typical understory species include eastern redcedar, deciduous holly, coralberry, sumac, swamp privet, buttonbush, hawthorn, gum bumelia, wild plum, poison ivy, greenbriar, ratan, Virginia creeper, dewberry, wild grape, peppervine, Bermudagrass, and various sedges.

Mixed grass-forblands occupy about 496 acres within the project study area. Most of this cover-type is not well-managed and consists predominantly of abandoned agricultural sites which are reverting to a higher level of vegetative succession. Primary grass species in this cover-type include common and coastal Bermudagrass, Johnsongrass, threeawns, bushy bluestem, and various panicums and paspalums. Giant ragweed is the dominant forb, with sumpweed and sunflower locally abundant. Some shrub and tree regeneration, primarily green ash, cottonwood, and willow, is beginning to occur on some sites due to the lack of mowing (Figure 5).

Wildlife populations in the project area are relatively diverse, especially within the bottomland hardwoods and transitional areas between forest and openland. Common wildlife species typical to this urban area include fox squirrel, raccoon, opossum, eastern cottontail, skunk, and coyote. Some major bird species include cardinal, bluejay, mockingbird, Carolina chickadee, mourning dove, meadowlark, common crow, red-tailed hawk, and various species of sparrows and warblers. The margins of the river and open water areas are especially important to egrets, herons, and waterfowl. One major heron rookery is located just west of the Central Wastewater Treatment Plant near the southern terminus of the Cadillac Heights Levee.

Endangered Species

Currently, the only federally listed species known to occur in Dallas County are the endangered black-capped vireo (*Vireo atricapillus*) and interior least tern (*Sterna antillarum athalassos*). The mountain plover (*Charadrius montanus*) is a listed candidate species of potential occurrence.

Preferred habitat of the vireo consists of scattered oaks, eastern red cedar, and Ashe juniper interspersed with dense clumps of bushes and open areas of bare ground, rocks, and a sparse vegetative cover of grasses and forbs. This type of habitat is most prevalent in the escarpment area of southwest Dallas County and is not present within the Dallas Floodway project area.

Interior least terns prefer bare to sparsely vegetated river sandbars and flats or similar sites for nesting during the period April through July in north Texas. Important nest site

characteristics include barren or sparsely vegetated alluvial or sand substrates, availability of food such as small fish or invertebrates, and favorable water levels that prevent spring flooding of nests. Nesting interior least terns have been observed on the sludge drying beds and levees of the Southside Wastewater Treatment Plant located south of the project area. No suitable nesting habitat occurs along the Trinity River within the project area.

The mountain plover migrates in small numbers throughout north Texas from early March to mid-May and from early August to late October. It prefers large expansive flats of short grass prairie where it feeds on grasshoppers, beetles, crickets, and flies. No nesting is known to occur within the northcentral Texas area. The lack of suitable habitat within the project area makes it highly unlikely that this species would be affected by the proposed project.

FISH AND WILDLIFE RESOURCES WITH THE PROJECT

Aquatic Resources

Based on project evaluations, the Corps has determined that a large-scale channel plan for the Dallas Floodway Extension is not economically justified. The current flood control plans being evaluated, overflow swales and levees, would not include any direct modification or disturbance to the existing Trinity River channel or streambed. Therefore, aquatic habitats would generally remain unaffected by the project except in localized areas where the swales intersect the existing channel. Disturbance at these sites would be limited primarily to the removal of streambank vegetation which could cause increased erosion and siltation within the channel. This potential impact should have no significant effect on aquatic habitats or the fishery if proper streambank stabilization procedures are employed during construction and operations.

A realignment of approximately 3,300 linear feet of the Trinity River is being proposed at the IH 45 bridge in order to prevent undermining of the bridge support pillars which lie within the channel. Approximately 9.5 acres of Trinity River channel would be eliminated with the diversion and replaced with about 12.9 acres of new channel. Most of the old channel would be filled by the borrow from the new channel, although some of the downstream portions of the old channel may be used to develop a canoe launch or other recreational features. Most of the natural stream habitat features in this section of the Trinity, such as natural riparian vegetation, instream cover, pools and runs, etc., would be eliminated by construction, thus negatively impacting aquatic resources.

Terrestrial Resources

Implementation of the swale, levee, and IH45 channel diversion alternatives would have an unavoidable, negative impact on terrestrial habitats and wildlife species within the project area. This would result from the direct impact of the alternatives on Trinity River floodplain habitats, especially bottomland hardwood forests. Secondary impacts would occur as a result of the fragmentation of the remaining habitats in the project area and human encroachment and development of areas within the basin protected from future flooding by the flood control project. Table 1 represents the acreage of terrestrial habitats which would be impacted by the various alternatives under consideration by the Corps.

Table 1. Acreage of terrestrial habitat impacted by the Dallas Floodway Extension project alternatives.

HABITAT COVER-TYPE	SWALES	LEVEES	IH45 Diversion	TOTAL IMPACTS
Pecan-Oak BLH	6	11	4	21
Ash-Elm BLH	84	52	5	141
Mixed Grass- Forbland	126	86	0	212
TOTALS	216	149	9	374

As can be observed from Table 1, the proposed project alternatives would impact a total of 374 acres of wildlife habitat within the overall study area. Slightly more than one-half of this acreage would be bottomland hardwood forests associated with the floodplain of the Trinity River and small tributary drainages. However, recent modification of project features, such as reducing the size and location of the flood conveyance swales, has resulted in a substantial decrease in forested habitat impacts over the previously evaluated NED plan.

Impacts on mixed grass-forblands have also been reduced through redesign and relocation of the swales. Although implementation of the swale alternatives would create herbaceous habitat due to the maintenance of the swale right-of-way in herbaceous vegetation to allow conveyance of flood flows, there would still be a net loss in available mixed grass-forbland habitat as a result of more intensive maintenance (i.e., mowing) within the floodway, access

facilities, and other project features such as the "chain of wetlands".

The impact of each alternative plan on the average annual habitat units (AAHU's) provided by each habitat type is displayed in Table 2. This analysis confirms the above conclusions that the swale and levee plans would have a negative impact on all wildlife habitat types within the project area. The amount of emergent wetlands within the project area would be increased due to their inclusion as a project feature of the swale plan; however, no separate quantitative baseline evaluations of this habitat were undertaken because of their close association with other habitat types. Small, isolated emergent wetlands occur throughout the forested and mixed grass forblands; however, they were not separately evaluated. Incorporation of emergent wetlands within the swales would provide a valuable enhancement feature within the overall project area.

Table 2. Impact of alternative development plans on the average annual habitat units (AAHU's) of terrestrial wildlife habitats.

ALTERNATIVE	Pecan-Oak BLH	Ash-Elm BLH	Mixed Grass-Forbland
Baseline AAHU's	212	233	278
Swales AAHU's Change	211 -1	187 -46	202 -76
Levees AAHU's Change	207 -5	212 -21	225 -53
IH45 Diversion AAHU's Change *	213 +1	249 +16	278 0
Total Impact AAHU's Change	198 -14	142 -91	188 -90

* Construction of the IH45 diversion channel would result in a net loss of bottomland hardwood habitat rather than an increase as shown; however, overall gains in habitat quality for bottomland hardwoods in the entire project area in future years masks this loss due to the small acreage impacted by the channel when compared to the overall project area. This is an artifact which can occur in HEP when evaluating very small areas with the assumption that remaining habitats will continue to improve over time.

Endangered Species

Our data indicate that no federally listed, proposed, or candidate threatened or endangered species, or any designated critical habitat, would be affected by the proposed Dallas Floodway Extension project.

DISCUSSION

The Service has evaluated this project in accordance with the guidelines and directives contained in its *Mitigation Policy* (Federal Register 46[15]: 7644-7663, January 23, 1981). The *Mitigation Policy* provides guidance for Service biologists in the formulation of recommendations to avoid, reduce, or compensate project-related impacts on fish and wildlife resources. Our recommendations are based on the value and relative abundance of the affected habitat to the evaluation species.

Bottomland hardwood forests within the project area provide relatively high quality habitats for the evaluation species. HSI's for the highest quality bottomland hardwoods ranged from 0.50 for red-tailed hawk to 0.99 for the hairy woodpecker, averaging 0.86 for all evaluation species. The high values were generally the result of the diversity of the tree and shrub cover, which included mature, mast-producing species such as pecan, bur oak, and Shumard oak. Many evaluation sites also contained mature specimens of hackberry, green ash, and cottonwood. There were also abundant snags, cavities, and refuge sites to satisfy the evaluation species life requisites.

The average HSI value for the ash-elm bottomland hardwoods was 0.73, ranging from 0.35 for the red-tailed hawk to 0.97 for the barred owl. Although habitat values were slightly lower for the evaluation species due to reduced structural and vegetation species diversity, these bottomlands still provide high value habitat. Most of these forested sites were dominated by a mosaic of less mature green ash, cedar elm, American elm, hackberry, and black willow.

Numerous federal, state, and private studies have documented the increased vulnerability and scarcity of bottomland hardwood forests in Texas and the nation. Statewide, over 63 percent of the bottomland hardwoods have been lost since the settlement of man due to forestry, agricultural, and water resource development practices. In addition, residential, commercial, and industrial developments in urbanized areas, such as the Dallas-Fort Worth Metroplex, have resulted in increased adverse impacts to bottomland and riparian ecosystems due to encroachment on the floodplain and the need for flood control.

Based on the high value of the bottomland hardwoods to the evaluation species and their relative scarcity, we have classified them as a Resource Category 2 under the Mitigation Policy. Our mitigation planning goal for this category is "no net loss of inkind habitat value". Generally, this goal can be accomplished by avoiding negative impacts, restoring impacted areas, compensating for the impacts by creating or improving habitats at a different location, or through a combination of these measures.

The mixed grass-forblands within the project area provide medium to high quality habitat values for the wildlife evaluation species. HSI's averaged 0.56 for all evaluation species, but ranged from 0.20 for the red-tailed hawk to 0.78 for the eastern meadowlark. The overall medium quality of the grass-forblands is due to several factors, but is primarily related to improved vegetation diversity which has resulted from reduced maintenance and disturbance because of frequent flooding of the project area. Although the mixed grass-forblands provide medium quality habitat conditions, they are very abundant in the project area as well as the region, state, and nation due to prevalent land use practices. Therefore, the medium value and relative abundance of mixed grass-forblands requires that they be classified as Resource Category 3. Our mitigation planning goal for this resource category is "no net loss of habitat value while minimizing loss of inkind habitat value". Normally, this category of habitat can be easily restored, and where needed, can be utilized to mitigate or replace lost values of higher-valued habitat.

As previously noted in Table 2, implementation of all the preferred alternatives (i.e., swales, levees, and IH45 channel diversion) would result in the total loss of 105 AAHU's of bottomland hardwood forest. Based on the resource category discussions above, these losses to bottomland hardwood habitat values should be fully mitigated inkind.

Since bottomland hardwoods would be cleared for the swale and the area maintained in herbaceous cover in order to efficiently convey flood flows, mitigation of hardwood habitat values can be accomplished only by offsite improvement of existing forested areas and/or reforestation of grasslands. A small amount of trees could be established in the flood swales in association with the proposed emergent wetlands for aesthetic purposes, however, these would provide little wildlife value because of their small areal coverage and fragmented nature. Various alternative mitigation scenarios were developed and analyzed for their ability to mitigate hardwood losses under these constraints.

The alternative mitigation plans varied in acreage, habitat cover-type, and level of management in order to identify a plan which could fully compensate for the AAHU losses. Although only three mitigation plans are discussed in this report, numerous other

alternatives could be identified and evaluated for their feasibility to mitigate habitat losses resulting from construction of the proposed project. However, in developing other alternative mitigation plans it would be necessary to remember the mitigation planning goal of "inkind habitat replacement" for Resource Category 2 bottomland hardwoods and the higher costs associated with complete reforestation and management when compared to habitat improvement of existing wooded tracts.

Table 3 displays three mitigation plans (Plans A - C) which were evaluated for their ability to mitigate bottomland hardwood habitat losses for the Dallas Floodway Extension. These mitigation plans were formulated by incrementally adding tracts of floodplain lands and analyzing increased AAHU's which could be realized with intensified wildlife management practices applied to the tracts. Management practices consist of the improvement of existing bottomland hardwoods to increase their habitat values and the conversion of mixed grass-forblands to bottomland hardwoods.

A comparison of Tables 2 and 3 is needed to determine whether a specific mitigation plan would successfully compensate project-related impacts to bottomland hardwoods. For example, Mitigation Plan A includes an 849-acre tract of floodplain land adjacent to the Trinity River near Loop 12. This tract contains approximately 753 acres of bottomland hardwoods and 96 acres of mixed grass-forblands. Habitat improvement on the 753 acres of hardwoods and reforestation of 86 of the 96 acres of grasslands along with intensive management of the revegetated area would result in a gain of only 52 AAHU's for bottomland hardwoods (i.e., 9 AAHU's for pecan-oak and 43 AAHU's for ash-elm sites). A gain of 52 AAHU's in hardwood habitat value would not be adequate to compensate for the loss of 105 AAHU's resulting from project-related impacts (Table 2). Therefore, additional mitigation lands would be required for bottomland hardwood management in order to increase AAHU values and accomplish the inkind mitigation goal.

A second increment of land was added to the Loop 12 tract to provide for additional gains in AAHU's through management. This small floodplain tract, located south of the Trinity River between the Linfield Landfill and Southern Pacific Railroad, would increase the management area size to 883 acres (Mitigation Plan B). As noted in Table 3, this additional increment would not increase AAHU's for the higher quality pecan-oak bottomlands and would only increase the AAHU's of the ash-elm bottomlands from 43 to 55. Again, the addition of this small increment of land, even with highly intensive management, would not successfully compensate the loss of 105 AAHU's resulting from the proposed plan.

Table 3. Change in AAHU's for alternative mitigation plans at the Dallas Floodway Extension project.

MITIGATION PLAN ALTERNATIVE	Pecan-Oak BLH	Ash-Elm BLH	MIXED G-F
A	+9	+43	Loss
B	+9	+55	Loss
C	+14	+92	Loss

- A - 849 ac. tract east of Trinity River adjacent to Loop 12.
 B - 883 acres consisting of Loop 12 site and North site.
 C - 1,154 acres consisting of the Loop 12, North, and South tracts of floodplain lands.

Finally, a third increment of floodplain land located just north of Interstate Highway 20, identified as the South tract, was added to the previous two tracts and evaluated for its ability to compensate project impacts. These increments, evaluated collectively as Mitigation Plan C, consist of approximately 1,154 acres, including 926 acres of bottomland hardwoods and 228 acres of mixed grass-forblands.

Assuming a high level of management, it was determined that a mitigation area of this size and vegetation composition could fully compensate the losses of bottomland hardwoods resulting from construction of the Dallas Floodway Extension project. An increase of approximately 106 AAHU's could be realized by management of the mitigation land (Table 3), thus offsetting the loss of 105 AAHU's resulting from implementation of all the project alternatives (Table 2). A total of 208 acres of mixed grass-forblands would need to be converted to bottomland hardwoods and intensively managed. In addition, the existing 926 acres of bottomland hardwoods would have to receive intensive management treatments in order to improve their AAHU values. Management measures which would be required to improve habitat conditions within the mitigation lands include tree and shrub planting; selective thinning of undesirable or over-populated vegetation species; introduction of nest boxes for squirrels, passerine birds, and wood ducks; shredding and disking; burning; seeding of desirable grasses and forbs; and fencing.

In order to mitigate the adverse impacts of the selected plan, we recommend, as discussed above in Mitigation Plan C, the acquisition and management of approximately 1,154 acres of mitigation lands, consisting of approximately 926 acres of bottomland hardwoods and

228 acres of mixed grass-forblands. The approximate location of these mitigation lands are delineated in Figure 6, and consists of three separable tracts identified as the North, Loop 12, and South Mitigation Tracts, respectively. This mitigation plan would adequately compensate for the damages to bottomland hardwood forest habitat values if appropriate management measures are implemented to increase habitat values of these tracts. Therefore, we recommend that this mitigation plan be included as a project feature and submitted to Congress for authorization concurrently with the flood prevention plan. Any approved mitigation plan should also include provisions for annual operation & maintenance funding to the managing agency, since habitat improvement and restoration will occur throughout the life-of-the-project. The final amount of mitigation lands and/or revegetation measures may be modified during final plan formulation provided the loss of 105 AAHU's is fully realized.

Mitigation policy dictates that mitigation lands be located contiguous to the project area if feasible. Therefore, the three mitigation tracts evaluated included bottomland hardwood and grassland tracts located either contiguous or in close proximity to the project site. These tracts are also contiguous to existing or proposed publicly owned lands within the Trinity River corridor which will make them more amenable to long-term preservation and management.

Lands which are required to mitigate the unavoidable, adverse impacts of the floodway extension may be publicly or privately owned. However, in order to increase the habitat value of these lands it will be necessary to dedicate them specifically for wildlife management and restrict public use to compatible activities. Compatible activities could include hiking or nature trails or other similar low-density recreation opportunities. If mitigation lands remain in private ownership, they must receive long term protection through the establishment of deed restrictions or other protective covenants which would transfer with ownership of the property.

Table 4 provides an estimate of the mitigation costs associated with the development of the recommended mitigation lands. Initial acquisition costs for the 1,154 acres would be approximately \$4,154,400. In addition, approximately \$224,600 would be required to improve habitat conditions on the existing bottomland hardwoods, revegetate the grasslands with hardwood trees and shrubs, and fence and delineate the wildlife management area. Total acquisition and initial development costs associated with the recommended mitigation plan are estimated to be approximately \$4,423,920. Operation and maintenance would cost about \$18,380 annually.

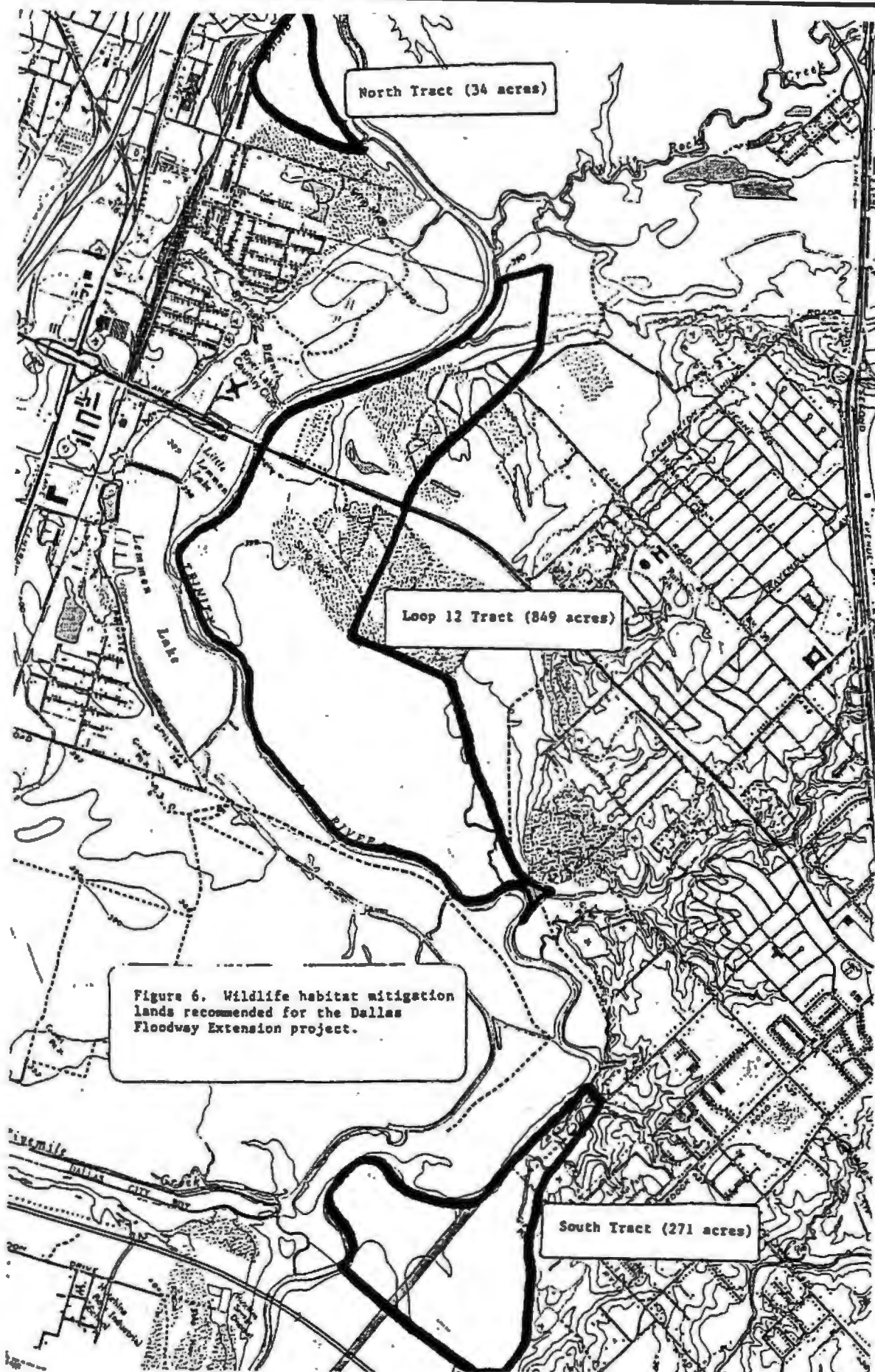


Figure 6. Wildlife habitat mitigation lands recommended for the Dallas Floodway Extension project.

Table 4. Estimated wildlife habitat development and management costs for mitigation of the Dallas Floodway Extension project.

<u>A. Acquisition</u>		<u>Estimated Cost</u>
1. 926 ac. BLH @ \$3,600/ac.		\$ 3,333,600
2. 228 ac. Mixed G-F @ \$3,600/ac.		<u>820,800</u>
	Subtotal	\$ 4,154,400
<u>B. Initial Development</u>		
1. Habitat Improvement of existing BLH's:		
a. Selective thinning (463 ac. @ \$80/ac.)	\$	37,040
b. Mast trees (containerized - \$30 ea. for 5 trees/ac. on 200 ac.)		30,000
c. Tree planting with site preparation (1,000 trees @ \$30 ea.)		30,000
d. Shear, rake, pile and bed (75 acres @ \$160/ac.)		12,000
e. Passerine & squirrel nest boxes (200 @ \$30 ea.)		6,000
2. Conversion of Mixed grass-forbland to BLH's:		
a. Shredding/disking (208 ac. @ \$40/ac.)		8,320
b. Hardwood seedlings (100 seedlings/ac. for 208 ac. @ \$ 0.20 per seedling)		4,160
c. Seedling planting (\$60/ac. for 208 ac.)		12,480
d. Passerine bird nest boxes (208 @ \$30 ea.)		6,240
3. Fencing (estimated 6 miles @ \$ 2.00/ linear ft.)		63,360
4. Signs (estimate)		<u>15,000</u>
	Subtotal	\$ 224,600
<u>C. Contingencies (20%)</u>		<u>\$ 44,920</u>
TOTAL ACQUISITION & INITIAL DEVELOPMENT COSTS		\$ 4,423,920
<u>D. Operation & Maintenance (Annual cost)</u>		
1. Existing BLH's (926 ac. @ \$10/ac.)	\$	9,260
2. Converted BLH's & remaining grasslands (228 ac. @ \$40/ac.)		<u>9,120</u>
TOTAL ANNUAL OPERATION & MAINTENANCE COSTS		\$ 18,380

Improvement of existing bottomland hardwood tracts and reforestation of the grasslands would require the planting of a large quantity of hardwood trees and shrubs. We recommend that a portion of the trees and shrubs be of a containerized size and mast-producing. Larger trees are usually established more successfully and will provide wildlife values in a shorter time period than bareroot seedlings. Containerized specimens should be used principally to improve existing forested stands, while seedlings may be more appropriate for the reforestation of the mixed grass-forblands. Initial establishment of the seedlings should utilize state-of-the-art techniques in order to maximize seedling survival from drought and animal damage. Some available techniques include the use of growth hormones, slow release fertilizers, protective sleeves, adequate irrigation, weed control, and other similar measures.

A minimum of 100 hardwood and shrub seedlings per acre should be planted on the grassland sites in order to provide greater diversity and age classes of trees. Preferred tree species include various oaks (e.g., Shumard oak, bur oak, water oak), pecan, walnut, hickories, hackberry, mulberry, and cedar elm. Trees such as green ash and cottonwood are not recommended, since these plants readily invade managed sites, have lower wildlife food values, and usually need to be controlled in order to promote the production of more valuable wildlife trees.

Recommended shrubs include species such as deciduous holly, American holly, yaupon, Mexican or wild plum, hawthorns, coralberry, native privets, roughleaf dogwood, and sumacs. All planted trees and shrubs should be adequately maintained and have a survival rate of at least 75 to 80 percent after two growing seasons.

There would be a loss of mixed grass-forblands for all of the mitigation plans, since this habitat type would be converted to bottomland hardwoods on the management area (Table 3). However, the loss of grass-forblands is not a major concern, since much of this habitat type would be reestablished within the project area by construction of the flood swales. Also, the loss of this lower valued habitat type can be compensated by gains in higher resource category bottomland hardwoods in accordance with the *Mitigation Policy*.

In order for herbaceous areas to provide acceptable habitat, sites disturbed by construction activities, including the flood conveyance swales and levees, should be revegetated with a variety of native grass and forb species which have proven food and cover values. Examples of preferred grass species include big and little bluestem, switchgrass, Indiangrass, sideoats grama, Canada wildrye, eastern gamagrass, vine-mesquite, and various panicums. Some native forbs which provide high wildlife habitat values include the

partridgepeas, crotons, Illinois bundleflower, sunflowers, coneflowers, purple prairie clover, tickclover, daisies, eryngos, lupines, and wildbeans. These native, herbaceous species may be established most successfully on sites not subject to high velocity, scouring flows.

In addition to the planting of native herbaceous species, mowing or other intensive maintenance activities should be restricted to the season of the year most compatible with wildlife reproduction, primarily late fall and winter. This would permit vegetation to go to seed, thus providing greater vegetative production. It would also provide greater cover and food values during the spring of the year, when wildlife reproduction and survival are most dependent upon adequate cover and the higher food values provided by lush vegetation (i.e., green vegetative material, seeds, and insects). Where feasible, mowing of the project area should be restricted to invasive, woody vegetation and not scheduled on a regular basis. No mowing should occur on any of the forested, wildlife mitigation lands once permanent vegetation is reestablished.

As part of the Locally Preferred Plan, a "chain of wetlands" is being evaluated for the flood conveyance swales. Approximately 123.3 acres of open water and emergent wetlands would be created through the excavation of several small wetlands in both the north and south swale areas. These wetlands would contain both deep and shallow water areas for the development of a range of submergent and emergent vegetation. Provisions for water control within the structures, including weirs and pumps, are also being evaluated in order to maximize the habitat value of the wetland sites and enable more reliable management activities. Development of the "chain of wetlands" would contribute substantially to the overall quality of wildlife habitats within the project area and should be implemented as an integral part of the proposed project.

Finally, significant impacts to aquatic habitats and water quality would occur as a result of the realignment of approximately 3,300 linear feet of the Trinity River channel at the IH45 bridge. Best management practices should be applied to this area in order to restore the morphology and hydrological characteristics of the river channel and prevent erosion and sediment runoff. Some useful practices for erosion control include the use of hay bales, fiber mats, temporary vegetation such as annual ryegrass, and hydromulching. The realigned channel should be constructed with similar substrates, slopes, stream gradients, and streamside vegetation. The amount of fill placed in the natural river channel should be limited to the minimum amount necessary to divert flows, and the natural channel downstream of the IH45 bridge should not be filled at all in order to provide a backwater refuge and nursery area for riverine fish and wildlife.

RECOMMENDATIONS

In order to avoid and reduce project-related impacts of the Dallas Floodway Extension project on fish and wildlife resources, the Service recommends the following:

1. The Corps and local project sponsor pursue development of the smaller, less environmentally damaging flood control alternative, identified as the Locally Preferred Plan, in lieu of the larger, NED plan.
2. Mitigation lands consisting of at least 1,154 acres, and comprised of approximately 926 acres of bottomland hardwoods and 228 acres of mixed grass-forblands as identified in the discussion section of this report, be acquired and specifically dedicated for wildlife management activities. Authorization for the acquisition of these mitigation lands be sought from Congress as an integral component of the Dallas Floodway Extension project.
3. The mitigation lands be managed to optimize wildlife habitat values through the improvement of existing forested habitats and reforestation of floodplain grasslands. Grassland sites should be stocked with a minimum of 100 hardwood seedlings and shrubs per acre. Existing forested sites should be stocked at a minimum rate of 5 containerized, mast-producing trees per acre and selectively thinned of undesirable vegetation. A minimum survival rate of 75 - 80 percent after two growing seasons would need to be attained for tree and shrub plantings.
4. Public recreation use of the wildlife mitigation areas be restricted to compatible, low-density activities such as hiking and nature trails, outdoor education, wildlife observation, etc.
5. Operation and maintenance funding in the amount of \$18,380, or an amount negotiated between project sponsors and the management entity, be provided annually in the project budget for management of the proposed fish and wildlife features on the mitigation lands.
6. All areas disturbed by construction activities, including the swales and levees, be revegetated with a variety of native herbaceous species beneficial to wildlife.
7. Mowing and other intensive maintenance activities on project lands be restricted, whenever possible, to the late fall and winter months in order to provide optimum wildlife food and cover during the spring and summer reproductive season. Mowing should be restricted to the removal of invasive, woody species

and not scheduled on a regular basis. No mowing should occur on the designated wildlife mitigation lands following successful reestablishment of woody vegetation.

8. The "chain of wetlands", identified in the locally preferred plan, be developed as an integral part of the proposed project and managed to enhance wetland wildlife habitat values within the floodway extension area.
9. Impacts to the Trinity River channel be avoided during construction of the flood swales and levees.
10. Realignment of the Trinity River channel at the IH45 bridge be conducted in such a manner that the morphological and hydrological features of the new channel mimic the natural channel. The amount of fill placed in the natural channel be limited to the minimum amount necessary to divert flows into the realigned channel, and no fill be placed downstream of the IH45 bridge.
11. Best management practices be employed during construction to avoid erosion and sediment runoff into the Trinity River channel.
12. The Corps of Engineers and project sponsor consult with the U.S. Fish and Wildlife Service and Texas Parks and Wildlife Department during development of detailed project plans and specifications in order to insure full consideration of fish and wildlife mitigation features as a project component.

SUMMARY

The Trinity River within the vicinity of the proposed Dallas Floodway Extension project provides relatively high quality terrestrial habitat for a variety of urban wildlife species. The river itself provides poor to fair aquatic habitat due to the influence of urban storm and wastewater runoff which dominates flow during non-flood periods. Implementation of the original NED plan identified by the Corps would have severe impacts on terrestrial wildlife habitats, especially high priority bottomland hardwood forests, which occupy much of the Trinity River floodplain. Thus, the Service prefers the implementation of a smaller, Federally Supportable flood control plan (i.e., Locally Preferred Plan), which would reduce the amount of forest clearing and require less off-site mitigation. The Locally Preferred Plan also incorporates aquatic habitat and wetland features which would be very beneficial to resident and migratory wildlife species. The current project development plan includes the channelization of approximately 3,300 linear feet of the Trinity River in the vicinity of the IH45 bridge. This realignment would require specific measures, such as

restoration of the river's morphological and hydrological characteristics and riparian vegetation, to reduce or mitigate adverse impacts to aquatic resources.

If the Locally Preferred Plan is implemented, the Service recommends the acquisition and intensive management of a minimum 1,154 acres of terrestrial habitat, including habitat improvements on 926 acres of bottomland hardwoods and reforestation of 208 acres of mixed grass-forblands. Additional measures would be necessary to limit construction impacts and promote the recovery of damaged habitats.

We appreciate the opportunity to provide our analysis and recommendations for fish and wildlife conservation during the planning of the Dallas Floodway Extension project. Our report is based on information provided prior to January 1999, and is subject to revision should the Corps modify project plans or evaluate other alternatives at some point in the future. For additional technical assistance or questions regarding implementation of our recommendations, please contact us at the letterhead address or telephone (817) 277-1100.

Sincerely,

Mike McCollum

Mike McCollum
Acting Field Supervisor

enclosure

cc: Regional Director, FWS, Albuquerque, NM (ES/HC)
Field Supervisor, FWS, Austin, TX
Executive Director, TPWD, Austin, TX (Res. Protection Div.)
Ray C. Telfair, TPWD, Tyler, TX



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July 23, 1997

ANDREW SANSOM
EXECUTIVE DIRECTOR

Mr. Robert M. Short
Field Supervisor
United States Department of the Interior
Fish and Wildlife Service
Ecological Services
Stadium Centre Building
711 Stadium Drive, Suite 252
Arlington, Texas 76011

Dear Mr. Short:

Staff biologists have reviewed your draft Fish and Wildlife Coordination Act (FWCA) report on the Fort Worth District, U.S. Army Corps of Engineer's proposed Dallas Floodway Extension project. We concur with the evaluation and recommendations for acquisition, restoration, and management of bottomland hardwood forest habitat. Also, we concur with the plan to develop a "chain of wetlands" within the flood conveyance swales for enhancement of fish and wildlife values of the floodway and for recreation and aesthetic purposes.

In addition to your evaluation and recommendations, the Department opposes the proposed plan for realignment of the Trinity River channel and strongly recommends that the project sponsors hire Mr. Dave Rosgen as their consultant. Mr. Rosgen is an expert hydrologist who works with rather than against natural river processes. His advice would be important to the project both environmentally and financially. Mr. Rosgen can be contacted at the Wildland Hydrology Conference Center, 157649 U.S. Highway 160, Pagosa Springs, Colorado 81147.

Also, considerable expertise will be needed to properly manage the "chain of wetlands". The Department recommends the hiring of a project manager who has advanced graduate training in aquatic and moist soil management. If this is not done, the conveyance swales could easily become a liability rather than an asset. The department recommends that the project sponsors consult Dr. Leigh H. Fredrickson who is an authority in wetland management. Dr. Fredrickson can be contacted at the Gaylord Memorial Laboratory, The School of Natural Resources, University of Missouri-Columbia, Puxico, Missouri 63960.

Mr. Robert M. Short
Page 2

We appreciate the opportunity to provide comments on your report concerning the planning of the Dallas Floodway Extension project.

Sincerely,

Ray C. Telfair II

Ray C. Telfair II, Ph.D.
Conservation Scientist
Wildlife Division

cc: Thomas J. Cloud, Jr., Project Biologist, USFWS, Arlington
Roy G. Frye, TPWD, Wildlife Division, Austin