**Photo 4-2: Landscape with Proposed Lake Ralph Hall at elevation of 541 ft msl with mudline.**

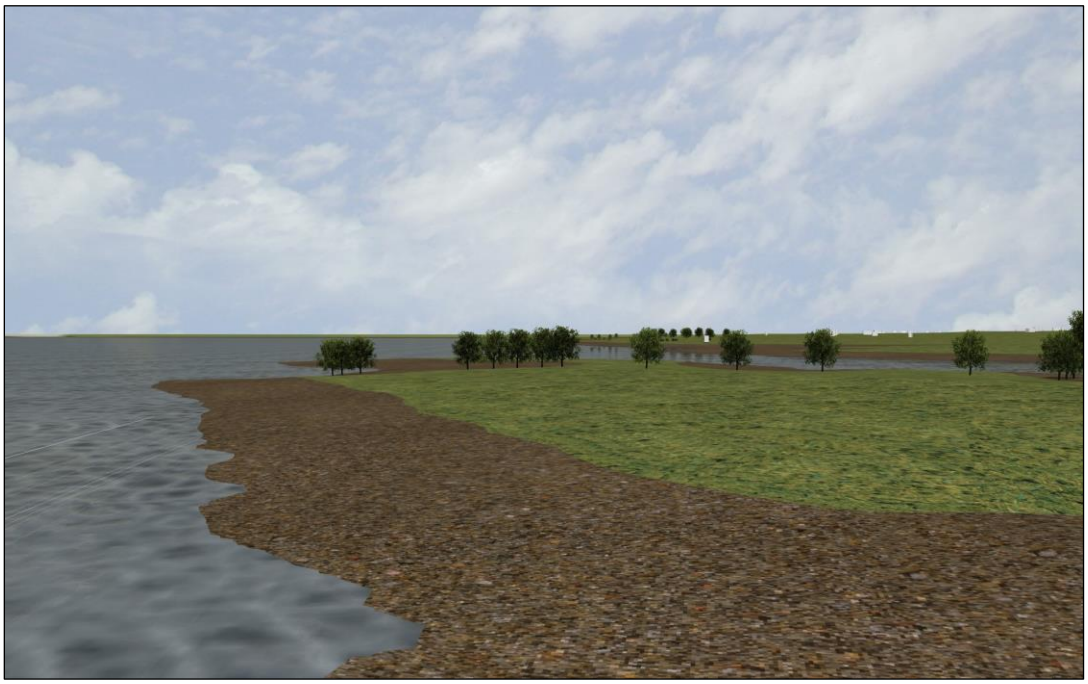


**Photo 4-3: Simulated view of Proposed Lake Ralph Hall shoreline**

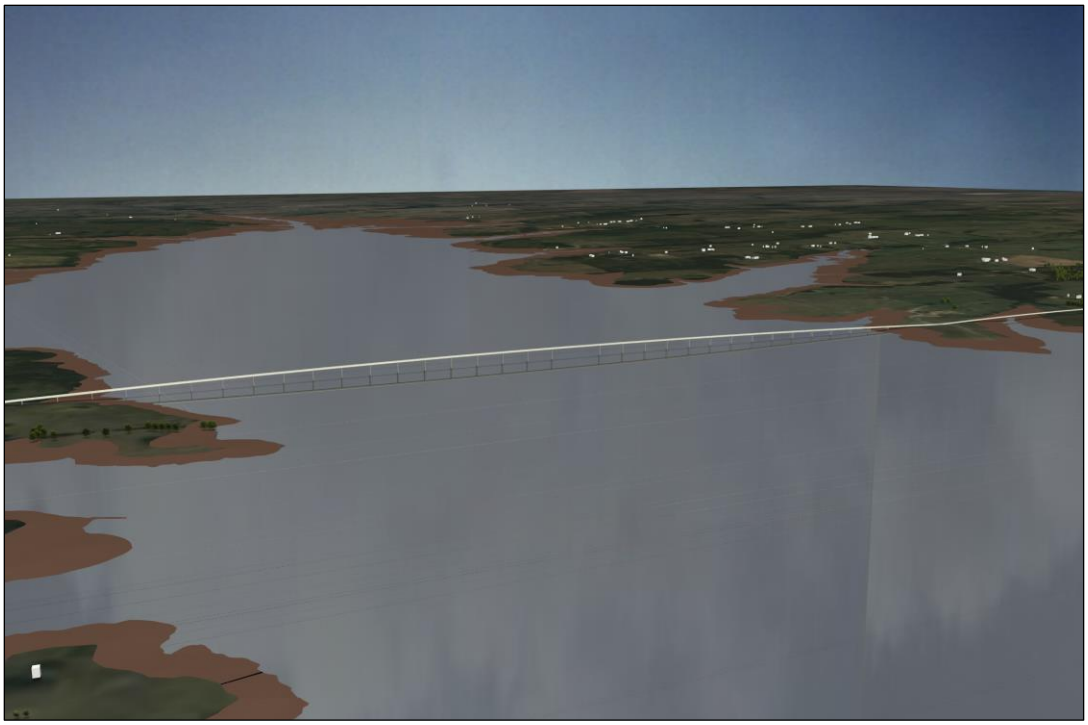
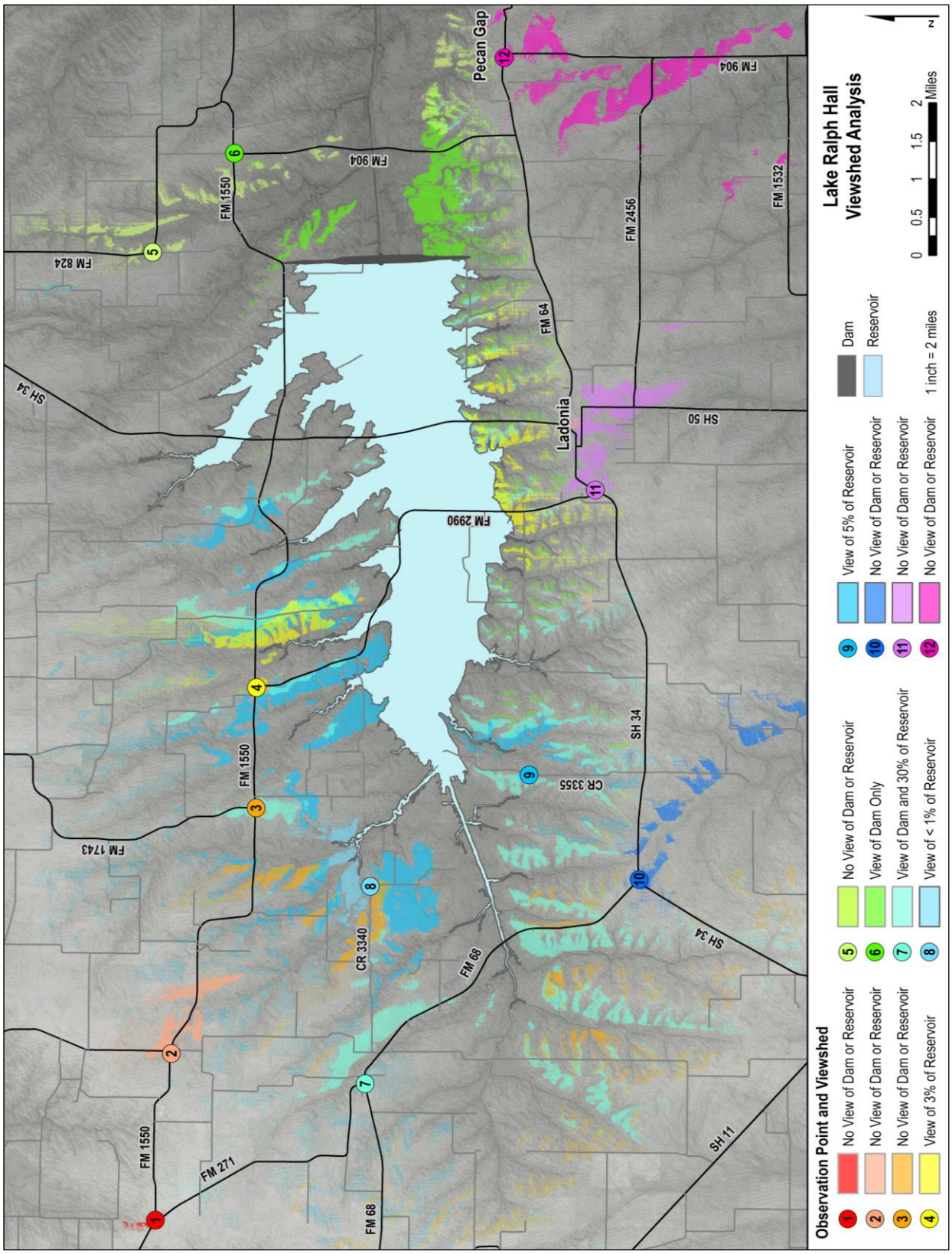


**Photo 4-4: Simulated view of Proposed Lake Ralph Hall looking at the SH 34 Bridge**

## Figure 4-6: Viewshed Analysis




Source: Michael Baker International

### 4.10.2 Cumulative Effects

#### 4.10.2.1 No Action Alternative

The No Action Alternative would not change the appearance of the North Sulphur River or the surrounding area. Cumulatively, over the long run, by not developing a lake with a protected green perimeter, the No Action Alternative may be considered more or less attractive to observers than the proposed project depending on what types of development occur within the area instead of the proposed project. Continued erosion of the river and its tributaries along with additional bank failures would be consistent with the current condition.

#### 4.10.2.2 Proposed Action

The proposed Lake Ralph Hall would cause a large change to the existing visual appearance of a part of Fannin County, which is now largely rural and agricultural. This change of more than 7,000 acres, coupled with the visual changes to more than 17,000 acres resulting from the LBCR, can be considered substantial to Fannin County, although both projects do not share a common viewshed. Over time, as the population of the county increases, its rural appearance would gradually fade as it becomes more developed and populous. In this scenario, the open space and "natural areas" represented by both lakes and their adjacent areas could become a valued asset of the county.

## 4.11 Biological Resources

### 4.11.1 Environmental Consequences

#### 4.11.1.1 No Action Alternative

**Habitat**

Under the No Action Alternative, the project area would not be flooded. However, the North Sulphur River and its major tributaries would continue to erode and degrade habitat surrounding these areas.

**Wildlife**

Current conditions of the North Sulphur River would exist under the No Action Alternative. The wildlife species more intolerant of human activity have declined, while the more tolerant species have flourished in this area. The area could continue to experience changes primarily related to agriculture and local recreation related to hunting and fishing.

**Aquatic Biota**

Current conditions of the North Sulphur River would exist under the No Action Alternative. The aquatic organisms inhabiting the North Sulphur River and its tributaries would continue to experience limited habitat due to continued erosion.

**Invasive Species**

Current conditions of the North Sulphur River would exist under the No Action Alternative. Increased urbanization and development could cause surface disturbances through construction activities facilitating the establishment and spread of invasive noxious weeds. During construction, aggressive non-native species could become established if ground disturbance is extensive and lengthy. Invasive species could be transported to other areas by construction equipment (U.S. Federal Highway Administration [FHWA], 1999). In general, invasive species can harm native flora and fauna in a number of ways, such as by preying on them, out-competing them for food and other resources (e.g., sunlight), preventing them from reproducing, changing food webs, and modifying ecosystem conditions. Overall effects of invasive species under the No Action Alternative are expected to be minimal.

### 4.11.1.2 Proposed Action

**Habitat**

The Wildlife Habitat Appraisal Procedure (WHAP) was used to quantify land use cover type acreages to be eliminated within the project area including the conservation pool, dam embankment, and spillway areas (**Table 4-7**). The *Memorandum Summary of SWAMPIM and WHAP Data Set and Reports for the Proposed Lake Ralph Hall Project Site* is provided in **Appendix F-2.**

**Table 4-7: Habitat Area Lost by Cover Type for the Proposed Action**

| Land Use Cover Type | Area (acres) |
|---|---|
| Grasses | 1,435 |
| Pasture | 2,192 |
| Partially Wooded Areas | 516 |
| Young Forest | 1,299 |
| Forest | 602 |
| Cropland | 1,720 |
| **Total Assessment Area** | **7,764** |

Source: UTRWD, 2009b.

Since the overall quality of vegetative resources within the proposed project area has been substantially degraded by agricultural usage and the significant continuing erosion problems experienced as a result of historical channelization projects along the river, minimal loss of moderate quality vegetative resources is anticipated as a result of the proposed project. Beneficial opportunities exist with the development of the proposed Lake Ralph Hall. The reservoir would help stabilize the North Sulphur River watershed by reducing habitat loss and conversion from currently on-going severe erosion. The reservoir would also create and enhance habitat for local and migratory wildlife through the anticipated creation of at least eight acres of fringe wetlands

along the proposed reservoir shoreline (UTRWD, 2018a). Mudflats may also be created in shallow flooded areas, especially in the upstream portion of the reservoir.

Approximately 69 percent of the potential vegetated impact area for the proposed reservoir is currently under agricultural production (cropland, grasses, and pasture). Land use area identified as partially wooded areas, representing another 6.6 percent, is also used for grazing livestock. Acreage with woody vegetation (forest, young forest, and partially wooded areas) represents approximately 31 percent of the proposed project area, but over half of this acreage is in young regrowth forest with areas classified as partially wooded areas, characterized as grassland with scattered trees, representing about one-quarter of the wooded vegetation area. The remaining wooded vegetation area is characterized as more mature re-growth following historical clearing of the area for cotton growing in the late 1800s and early 1900s. These wooded areas provide some moderate quality habitat, but these areas are fragmented reducing their overall ability to support wildlife populations.

Approximately 300 acres of Federal land (within the Caddo National grasslands – Ladonia Tract representing the Caddo Wildlife Management Area (WMA) – Ladonia Unit), currently administered by the U.S. Forest Service, would be acquired by the applicant and converted to open water as a result of the proposed project. These native grassland areas are being managed to preserve and enhance native prairie habitat and currently provide moderate quality habitat. Due to the discontinuity of the managed lands (the Ladonia Unit of the Caddo National Grassland WMA consists of separate, non-contiguous land tracts) effectiveness of management plans as well as wildlife and public utilization of these areas are reduced. Woody invaders such as eastern red cedar, honey locust, and cedar elm currently dominate substantial areas being managed as native grassland. Overall, although the type of vegetation communities to be impacted are common and degraded, because of the large size of the area to be converted to another and more uncommon type, the effects would be considered major.

The Lake Ralph Hall Raw Water Pipeline Alignment is within the Blackland Prairie Ecoregion which consists of agricultural lands and grasslands with isolated forested or wooded areas. During construction of the Lake Ralph Hall Raw Water Pipeline Alignment existing vegetation would be disturbed. The pipeline route would be maintained with a 100-ft ROW. The majority of vegetation within this pipeline corridor consists of cropland, pasture/hay, and herbaceous grasslands. This area would be re-vegetated and certain non-structural uses such as agriculture and rangeland could be used along the alignment. The pipeline does not impact the Caddo National Grasslands, however it does impact some wooded areas.

The proposed project would convert approximately 4.5-acres of disturbed grassland to a balancing reservoir. Construction of the proposed balancing reservoir would not affect habitat.

**Wildlife**

Although some displacement of wildlife would occur with the inundation as a result of the proposed project, the overall current state of degradation of habitat and isolation of remaining moderate quality habitat within the project area indicates that these impacts would be moderate. In some cases, animal burrows may be inundated if they are located within the conservation pool of the reservoir. This would impact individuals of a particular species but would not constitute population level effects. Some ground nesting bird species could be accidentally displaced, injured or killed as a result of inundation. Similarly, birds nesting and/or foraging in this area could also be disturbed. All required permits would be obtained prior to construction. Nesting birds, wildlife in burrows, and less- mobile wildlife would also be impacted by vegetation clearing and ground disturbance within the lake footprint and construction of the dam and State Highway (SH) 34 bridge. Construction can result in temporary increases in noise due to the presence of workers and equipment needed to perform construction. Increase in noise and presence of workers may cause any wildlife to leave the area temporarily. Typically, wildlife would return after construction is completed and the heavy equipment vacates the area.

Wildlife that could occur along the pipeline ROW would potentially experience varying degrees of adverse impacts. The majority of the vegetation within this pipeline corridor consists of cropland, pasture/hay, and herbaceous grasslands. Wildlife species that inhabit this vegetation type include quail, mourning doves, meadowlark, field sparrow, hawks, cottontail, and red fox. Game species within this vegetation type include quail, mourning dove, fox squirrel, and waterfowl.

There are also 105 acres of wooded areas that would be impacted by the Lake Ralph Hall Raw Water Pipeline Alignment. Wildlife within wooded areas could include mourning dove, quail, squirrel, rabbit, raccoon, skunk, opossum, wild turkey, ruffed grouse, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, deer, and bear. In some cases, animal burrows may need to be removed or filled when they are located in close proximity to the pipeline alignment. Such activities would impact individuals of a particular species but would not constitute population level effects. Construction can result in temporary increases in noise which may cause any wildlife to leave the area temporarily. Wildlife would typically return after construction is completed and the heavy equipment vacates the area.

In Texas, pursuant to a U.S. Court of the Appeals for the Fifth Circuit 2015 decision, and pursuant to a legal memo issued by the Department of Interior dated December 22, 2017, the MBTA prohibits intentional acts (not omissions) that directly (not indirectly or accidentally) kill migratory birds. Consequently, UTRWD is only required to comply with the MBTA in a way to avoid intentional takings of migratory birds.

Construction activities would have minimal effects on migratory birds, their nests, or eggs. Some ground nesting species could be accidentally displaced, injured or killed as a result of construction activities but personnel would be trained to avoid disturbing birds and nests when present within

a work area. Similarly, birds nesting and/or foraging in this area could also be disturbed during construction activities. All required permits would be obtained prior to construction.

The proposed project would convert approximately 4.5-acres of disturbed grassland to a balancing reservoir. Impacts to wildlife from construction of the proposed balancing reservoir would be negligible.

**Aquatic Biota**

As described in **Section 3.11.3**, aquatic organisms occupy pools within the North Sulphur River in the proposed Lake Ralph Hall footprint. The North Sulphur River within the proposed Lake Ralph footprint is an intermittent stream that normally experiences periods of no flow. Fish species sampled in the North Sulphur River within the proposed Lake Ralph Hall footprint are included in **Table 4-8**.

**Table 4-8: Fish Species Sampled in the North Sulphur River within the Proposed Lake Ralph Hall Footprint**

| Scientific Name | Common Name |
|---|---|
| *Ameiurus melas* | Black bullhead |
| *Ameiurus natalis* | Yellow bullhead |
| *Campostoma anomalum* | Central stoneroller |
| *Cyprinella lutrensis* | Red shiner |
| *Fundulus notatus* | Blackstripe topminnow |
| *Gambusia affinis* | Western mosquitofish |
| *Ictalurus punctatus* | Channel catfish |
| *Lepomis cyanellus* | Green sunfish |
| *Lepomis humilis* | Orangespotted sunfish |
| *Lepomis macrochirus* | Bluegill |
| *Lepomis megalotis* | Longear sunfish |
| *Micropterus salmoides* | Largemouth bass |
| *Pimephales vigilax* | Bullhead minnow |

Source: SRBA, 2008

The limited aquatic habitat in the North Sulphur River would be converted to open water and a more stable lacustrine environment. With the exception of the central stoneroller, all the species in **Table 4-8** occupy lacustrine environments and are found in other Texas reservoirs. Additional species that normally occur in Texas reservoirs could also be abundant in the proposed Lake Ralph Hall once constructed.

Invertebrates occupying the North Sulphur River within the Lake Ralph Hall footprint consist of those that typically inhabit intermittent streams. However, due to the limited available habitat within the existing stream, impacts to these species is expected to be minimal. The aquatic habitat available for invertebrates would be converted from an intermittent stream habitat to a lacustrine habitat. Therefore, the invertebrate species community would change from riverine species to a community more adapted for a lacustrine habitat.

As previously described, aquatic organisms occupy pools within the North Sulphur River channel downstream from the proposed Lake Ralph Hall Dam location. The aquatic biological community within these pools is dependent on water quality conditions and available habitat within each pool. Changes in water levels within stream pools can lead to changes in water quality including changes in pH, dissolved oxygen, conductivity, siltation level, and concentrations of ions, toxins, or pollutants (Williams, 1987; Stanley et al., 1994; Lake, 2000). These changes affect the composition and interactions of the macroinvertebrate communities within stream pools. Taxa can vary seasonally within pools as flow velocities and water levels change in intermittent streams. In addition, water quality in adjacent pools within the same reach can vary substantially in nutrient concentrations and dissolved oxygen levels as water levels decrease. As water quality within stream pools change, the macroinvertebrate community changes and adapts to conditions within the pool. In addition, other factors such as species competition, and predators such as fish, amphibians, and birds can affect the abundance, density, and taxonomic composition of the macroinvertebrate community (Xerces Society for Invertebrate Conservation, n.d.).

In order to provide a conservative estimate of impacts to aquatic organisms within North Sulphur River pools, model calculations for pools >75 full were used. This method assumes aquatic organisms are impacted in pools experiencing decreasing levels from 100 percent full to 75 percent full.

Sampling conducted by the applicant and Sulphur River Basin Authority (SRBA) indicated the presence of opportunistic invertebrates sustained by pools within the river channel. These pools ranged in depth from five centimeters to 22 centimeters. The majority of organisms sampled are tolerant to poor water quality and low dissolved oxygen levels. Based on the biological sampling effort conducted, it is assumed similar aquatic organisms occupy pools downstream of the proposed Lake Ralph Hall Dam location. Therefore, similar aquatic organisms would be impacted in downstream pools experiencing decreasing flows and water levels.

According to the DiNatale Water Consultant (2016b) Daily Model, the majority of impacts to pools >75 percent full in the North Sulphur River would occur between the Lake Ralph Hall Dam site and Baker Creek (**Figure 4-7** and **Table 4-9**). This reach of the North Sulphur River will also be filled with earthen fill consisting of native clay soils excavated from the project area, eliminating this pool area. Pools in reaches below Baker Creek would experience lower levels of change ranging from 0.0 percent to 6.0 percent. It is anticipated impacts to aquatic organisms in pools with decreasing levels would occur between the proposed Lake Ralph Hall dam and the Cooper Gage. These effects would be minor. Both the RiverWare Model and WAM Model indicated almost no change to reaches below the Cooper Gage. Impacts to aquatic biota would be moderate.

**Figure 4-7: Percent Change to Pools Greater Than 75 Percent Full**

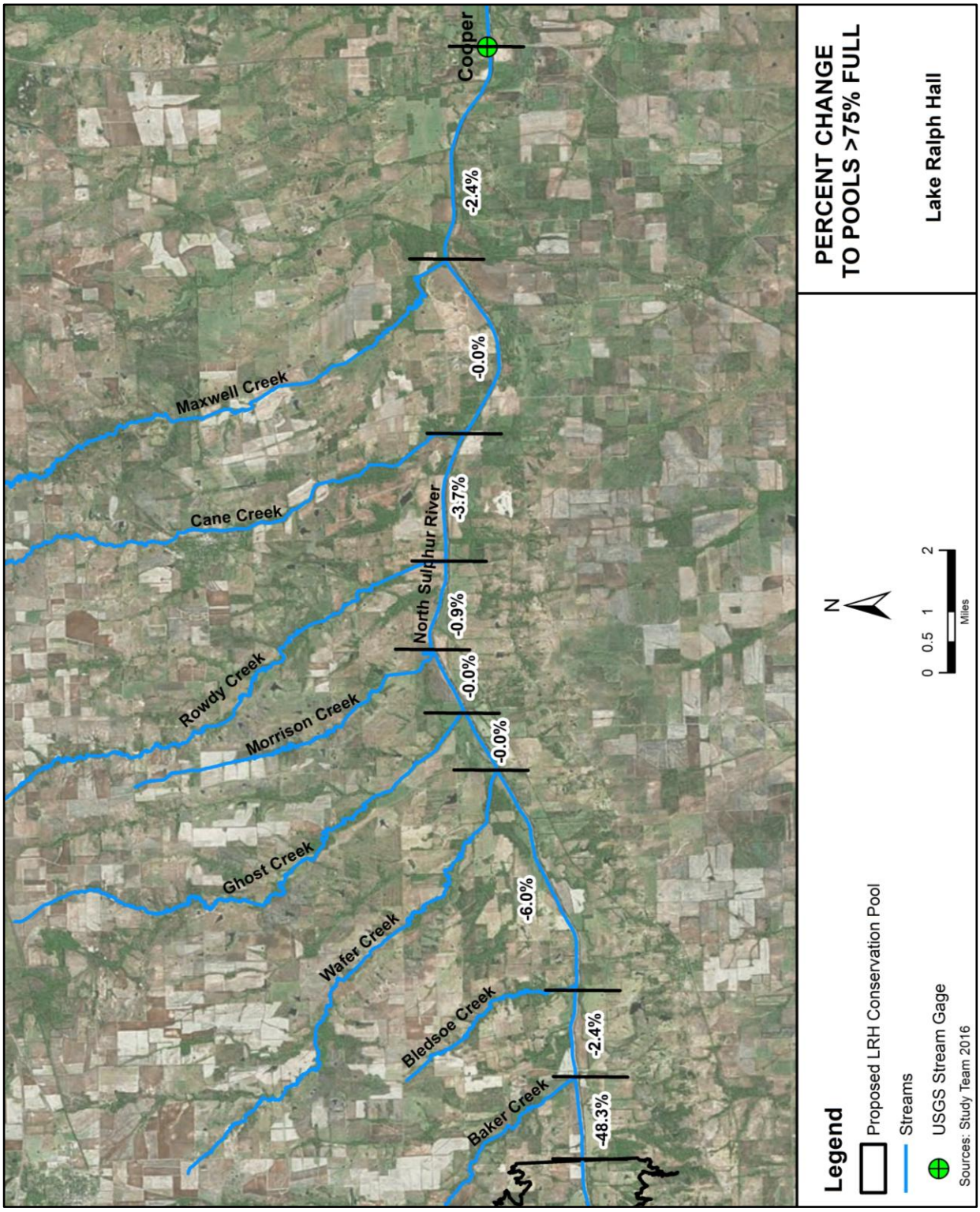


**Table 4-9: Percent of Time Pools are > 75 Percent Full (1994 to 2014 Study Period)**

| Reach | Without LRH | With LRH | Difference |
|---|---|---|---|
| Downstream of Lake Ralph Hall Dam Site | 81.9% | 33.6% | -48.3% |
| Downstream of mouth of Baker Creek | 80.2% | 77.8% | -2.4% |
| Downstream of mouth of Bledsoe Creek | 76.6% | 70.5% | -6.0% |
| Downstream of mouth of Wafer Creek | 77.2% | 77.2% | 0.0% |
| Downstream of mouth of Ghost Creek | 80.3% | 80.3% | 0.0% |
| Downstream of mouth of Morrison Creek | 73.5% | 72.6% | -0.9% |
| Downstream of mouth of Rowdy Creek | 71.9% | 68.2% | -3.7% |
| Downstream of mouth of Cane Creek | 74.2% | 74.2% | 0.0% |
| Downstream of mouth of Maxwell Creek* | 68.3% | 65.9% | -2.4% |

Source: DiNatale Water Consultant, 2016b

*Reach Ends at Cooper Gage

Temporary impacts to aquatic biota would be avoided by using horizontal directional drilling to install the pipeline at significant stream crossings and staging areas would be located within uplands. Once the pipeline is constructed, all pre-construction contours would be restored, exposed slopes and stream banks would be stabilized, and disturbed areas would be revegetated. Overall impacts from pipeline construction to aquatic biota would be none to negligible.

The proposed project would convert approximately 4.5-acres of disturbed grassland to a balancing reservoir. Construction of the proposed balancing reservoir would have no effect on aquatic biota.

**Invasive Species**

The spread of invasive plant species is often attributed to disturbed soils. During the construction phase, invasive terrestrial plant species may invade disturbed areas and continue to inhabit these areas during the long-term operation of the proposed Lake Ralph Hall.

Aquatic invasive species known to occur in Texas reservoirs (e.g., Zebra mussels) may spread to Lake Ralph Hall if recreational boating is allowed. Aquatic invasive species are known to be transported from reservoir to reservoir via watercraft and/or trailers.

Impacts from invasive species would be moderate.

## 4.11.2 Cumulative Effects

### 4.11.2.1 No Action Alternative

Under the No Action Alternative, the continued erosion of the North Sulphur River downstream of the proposed project and degradation of habitat surrounding these areas would continue. In addition, this trend would also continue to degrade habitat and impact aquatic biota in the North Sulphur River. While urbanization will also occur in Fannin County and likely include the North Sulphur watershed, no adverse cumulative impacts to wildlife are anticipated from the No Action

Alternative. Additionally, the No Action Alternative would not increase or reduce the spread of invasive species within the study area.

### 4.11.2.2 Proposed Action

Past and present actions that contribute to the cumulative effect on vegetation, wildlife and aquatic biota within the North Sulphur River Watershed includes approximately 19,070 acres of urban areas and roadways (0.6 percent of the North Sulphur River Watershed). Past and present development of cities and roadways within the watershed can cause a decrease in natural habitat vegetation, wildlife utilization as well as indirect effects to the aquatic environment. These impacts are local and the development of urban areas and roadways has had a low relative contribution to cumulative effects on these factors in the North Sulphur River Watershed.

Minimal to no production from wells that have been drilled has occurred within the North Sulphur River Watershed. The land area required for drilling and production of a well is approximately two acres. Since there is minimal to no production from wells within the watershed and with more stringent environmental regulations and requirements for wells, impacts to vegetation and wildlife within the North Sulphur River Watershed are minimal. Well placement does not normally occur within major streams and rivers but may include some actions within wetlands. Due to these factors, the relative contributions of oil and gas production to effects on vegetation, wildlife and aquatic biology in the North Sulphur River Watershed have been low.

Logging operations cause a decrease in vegetation type and associated wildlife utilization; an increase in soil erosion, which results in an increase in suspended sediments in surface water; and an increase in runoff from the areas that have been logged. Nonpoint source pollution can impact water quality and also aquatic species. The amount of forest land within the North Sulphur Watershed is relatively low and timber production via logging operations has had a low relative contribution to cumulative effects on water quality and aquatic species.

Local land uses in the vicinity of Lake Ralph Hall predominantly consist of agricultural uses. Decreases in diversity of vegetation have occurred as well as associated wildlife utilization. However, such conditions are not major departures from initial conditions. Channelization of the North Sulphur River also was an action related to agricultural land use which has greatly modified the conditions of the river and its tributaries. Non-point source contributions to the aquatic ecosystem have also occurred from such uses and contribute to the conditions that exist. No additional agricultural reasonable foreseeable future actions (RFFA) have been identified that would contribute to cumulative effects to vegetation, wildlife or aquatic biota resources. Trends in land use as described in **Section 4.1** would involve positive and negative contributions to these resource categories.

There is also a small portion of the Caddo National Grasslands, scattered residential associated with the agricultural land, and timbering operations on forested areas. Local wildlife related

recreational activities such as hunting and fishing within the project footprint would also be affected. Hunting activities that occur on the Caddo National Grasslands within the project footprint would cease upon construction and operation of Lake Ralph Hall. Past and present hunting and fishing within the project area have had low contributed effects on wildlife and are expected to continue. However, fishing opportunities may be provided by Lake Ralph Hall and hunting would still occur on the remaining portion of the Caddo National Grasslands.

If recreational activities are allowed in Lake Ralph Hall, they would contribute positively to cumulative effects on aquatic species in the vicinity of Lake Ralph Hall. These relative contributions in relation to aquatic species due the creation of a large waterbody, associated habitats and possible stocking for recreational use would be considered moderate.

Overall, the above factors indicate limited past and present actions that contribute to cumulative effects. Those, coupled with no identification of any major RFFAs or expected changes in the watershed lead to the conclusion that cumulative effects to vegetation, wildlife and aquatic biota will be minor.

The local land use within the 100-ft corridor for the pipeline primarily consists of agricultural land. Once the pipelines are in place and the disturbed lands are properly reclaimed, previous land uses and associated vegetation with the exception of forested communities can be restored within the pipeline corridors. Contribution of the pipeline activities to cumulative effects is considered negligible.

## 4.12 Threatened and Endangered Species

### 4.12.1 Environmental Consequences

#### 4.12.1.1 No Action Alternative

No impacts to threatened or endangered species would result from the No Action Alternative.

#### 4.12.1.2 Proposed Action

The proposed Lake Ralph Hall would be located in Fannin County. As mentioned in **Section 3.12**, the U.S. Fish and Wildlife Service (USFWS) lists the least tern (*Sterna antillarum*) as an endangered species occurring or potentially occurring in Fannin County. In addition, the USFWS lists the piping plover (*Charadrius melodus*) and red knot (*Calidris canutus rufa*) as threatened species occurring or potentially occurring in Fannin County (USFWS, 2018).

Impacts to the interior least tern nesting habitat would not result from the project because traditional habitats such as sand and gravel bars are not present within the project area. Due to the eroded and channelized state of the North Sulphur River riparian zone, preferred habitat for the

red knot and piping plover does not occur in the project area. Therefore, impacts to these species would not result from the construction of the Proposed Action. Designated critical habitat is not present for any of the federal-listed endangered or threatened species in this area, and none of the species were observed during the on-site investigations.

The Texas Parks and Wildlife Department (TPWD) also lists species that have a high potential to be federally listed in the future if conservation actions are not implemented. The following species are state listed as endangered within Fannin County: whooping crane, Eskimo curlew, and red wolf. The following species are state listed as threatened within Fannin County: bald eagle, American peregrine falcon, wood stork, blackside darter, blue sucker, creek chubsucker, paddlefish, shovelnose sturgeon, black bear, Louisiana Pigtoe, southern hickorynut, Texas pigtoe, alligator snapping turtle, Texas horned lizard, and timber/canebrake rattlesnake.

Habitat suitable for the Eskimo curlew or the whooping crane is not present within the project area, therefore impacts to these species would not result from the Proposed Action. Although whooping cranes use a variety of habitats during migration, they prefer isolated areas away from human disturbance (TPWD, 2009b). The red wolf is thought to be extirpated in Texas and there are no continuous tracts of preferred habitat within or near the project area. Also, since there are no bottomland hardwood forest and only limited upland hardwood forest in discontinuous forested tracts, the black bear is unlikely to occur within the project area.

Based on observations during the on-site investigations and evaluations of preferred habitat for the federal and state listed protected species, the Proposed Action could impact the timber rattlesnake. The timber rattlesnake prefers moist lowland forests and hilly woodlands or thickets near permanent water sources such as rivers, lakes, ponds, streams and swamps where tree stumps, logs and branches provide refuge. Therefore, the species could be impacted if it is present in forested riparian areas.

Inundation due to the Proposed Action could potentially provide feeding and stopover habitat for the piping plover and red knot. Also, species such as the bald eagle, interior least tern, and American peregrine falcon may occur near surface-water reservoirs.

The Lake Ralph Hall Raw Water Pipeline Alignment crosses through Fannin, Hunt, and Collin counties. The USFWS lists the least tern and whooping crane as endangered species occurring or potentially occurring in Fannin, Hunt, or Collin Counties. In addition, USFWS lists the piping plover and red knot as threatened species occurring or potentially occurring in Fannin, Hunt, or Collin counties.

TPWD also lists the Eskimo curlew and red wolf as endangered within Fannin, Hunt, or Collin counties. In addition, TPWD also list the following species as threatened within Fannin, Hunt, or Collin counties: white faced ibis, wood stork, bald eagle, American peregrine falcon, shovelnose sturgeon, paddlefish, blue sucker, creek chubsucker, blackside darter, black bear, alligator

snapping turtle, Texas horned lizard, timber rattlesnake, Texas pigtoe, southern hickorynut, Louisiana pigtoe, and Texas heelsplitter.

The pipeline alignment crosses habitat that mainly consists of agricultural lands and grasslands with isolated forested or wooded areas. Cropland, pasture/hay, and herbaceous grasslands make up the majority of the vegetation within the 100-ft ROW pipeline corridor. The timber rattlesnake has been known to occur in forested riparian zones. The pipeline crosses several streams and riparian areas. This species could be potentially impacted by the construction of the pipeline if the snake is present within riparian zones.

There is no suitable habitat for the Eskimo curlew, least tern, piping plover, red knot, bald eagle, American peregrine falcon, alligator snapping turtle, or the Texas horned lizard and the red wolf is thought to be extirpated from Texas. Therefore, impacts to these species would not result from the construction of the Lake Ralph Hall Raw Water Pipeline Alignment. The white-faced ibis, whooping crane, and wood stork could possibly be seen migrating through the area, but would not be impacted by construction.

There are also 74 acres discontinuous forest that would be impacted by the Lake Ralph Hall Raw Water Pipeline Alignment. The black bear is currently only listed within Fannin County and there are no bottomland hardwood forests and only limited upland hardwood forest in discontinuous forested tracts, therefore the black bear is unlikely to occur within the project area.

Four mollusks that can be found within the Sabine and Sulphur River basins include the Louisiana pigtoe, southern hickorynut, Texas heelsplitter, and the Texas pigtoe. The Lake Ralph Hall Raw Water Pipeline Alignment crosses the Sabine and Sulphur River Basins and has 59 stream crossings with 11,893 linear feet of stream impacts and 0.4 acres of stock tanks located within the 100-ft ROW. If the mollusks occur within the creeks that the alignment crosses, they have the potential to be impacted. The blackside darter, blue sucker, creek chubsucker, paddlefish, and shovelnose sturgeon are listed only within Fannin County and the pipeline does not cross any water resources that would have suitable habitat for these species. Therefore, it is unlikely they would be impacted by the construction of the Lake Ralph Hall Raw Water Pipeline Alignment.

Based on species research and evaluations of preferred habitat for the federal and state listed protected species, it is unlikely there would be impacts to any of the federal listed species for Fannin, Hunt, or Collin counties. The state listed timber rattlesnake, as well as the four state listed mollusks, have the potential to be impacted by the construction of Lake Ralph Hall and the Raw Water Pipeline Alignment.

Impacts to threatened and endangered species would be minor.

### 4.12.2 Cumulative Effects

#### 4.12.2.1 No Action Alternative

No adverse cumulative impacts to threatened and endangered species are anticipated under the No Action Alternative.

#### 4.12.2.2 Proposed Action

As described above there are 24 federal and/or state listed species within Fannin, Hunt, and Collin counties. There are two species federally listed as endangered species within Fannin, Hunt, and Collin counties (least tern and whooping crane) and two federally listed threatened species (piping plover and red knot). Within those same counties, TPWD state listed eight birds (bald eagle, Eskimo curlew, least tern, peregrine falcon, piping plover, white-faced ibis, whooping crane, and wood stork); five fish (blackside darter, blue sucker, creek chubsucker, paddlefish, and shovelnose sturgeon); two mammals (black bear and red wolf); four mollusks (Louisiana pigtoe, southern hickorynut, Texas heelsplitter, Texas pigtoe); and three reptiles (alligator snapping turtle, Texas horned lizard, and timber rattlesnake) as either threatened or endangered (see **Table 3-23**). Adverse effects to the federally listed threatened or endangered species are not expected to occur as a result of the construction and operation of the Proposed Action. Therefore, no examination of cumulative effects associated with other past, present, and future actions was performed.

## 4.13 Traffic and Transportation

### 4.13.1 Environmental Consequence

#### 4.13.1.1 No Action Alternative

Under the No Action Alternative, land use changes within the region are expected to occur as a result of long-term population growth and associated development pressure. This growth may result in an increase in traffic on the local and regional transportation network. The existing roadway network is expected to be able to accommodate increases in traffic resulting from this long-term growth. However, as discussed later in **Section 4.17**, the actions to be taken due to the issues associated with developing groundwater and other actions under the No Action Alternative could influence growth patterns within the UTRWD service area as well as elsewhere in the Dallas metropolitan area.

#### 4.13.1.2 Proposed Action

During construction of the dam, reservoir, and principal and emergency spillways congestion would increase in the immediate area due to additional construction vehicles, delays caused by construction activities (i.e., roads temporarily reduced to a single lane), and road closures and

detours. As discussed later in **Section 4.17**, an estimated 290 workers per year are anticipated to be needed to construct Lake Ralph Hall, with the majority of them driving from Bonham, Paris, and Greenville. While the existing transportation infrastructure not directly affected (e.g., road eliminations and reconstruction) or associated with construction of the dam, reservoir, and principal and emergency spillways would be sufficient to support the increase in vehicle traffic resulting from the construction activities described above and because some roadways would be relocated, moderate impacts on traffic and transportation resources would occur.

State Highway 34 crosses the project boundary near the east/west center of the proposed Lake Ralph Hall. The construction of two bridges over separate portions of the proposed lake will require realignment of the existing highway in order to maintain access during construction. The adjustments made to SH 34 will consist of a new parallel alignment to the west of the existing roadway north and south of the North Sulphur River and north and south of Merrill Creek. The new roadway will consist of two 12-foot wide lanes with two 10-foot wide shoulders. The proposed roadway will connect back to the existing roadway north and south of the project boundaries. All ROW necessary for the construction of the new alignment and the bridge structures will be dedicated to TxDOT by UTRWD prior to construction.

The proposed Lake Ralph Hall Bridge will be approximately 6,000 foot in length with an overall deck width of 46’ to accommodate two-12’ wide lanes (one lane in each direction) with 10’ wide shoulders. The proposed Merrill Creek Bridge will be approximately 625’ in length with an overall deck width of 46’ to accommodate two-12’ wide lanes (one lane in each direction) with 10’ wide shoulders.

In order to successfully implement the proposed Lake Ralph Hall, key roads would require adjustments to alignment and grade (**Figure 4-8** and **Table 4-10**). The following County Roads would be abandoned or partially abandoned as a result of the impoundment of the proposed Lake Ralph Hall; FM 2990, CR 1550, CR 3360, CR 3365, CR 3370, CR 3380, CR 3600, CR 3605, CR 3610, and CR 3640. SH 34 and CR 3444 would require vertical adjustment. A short segment of CR 3640 would be adjusted vertically and/or horizontally. County Roads 3443 and 3444 would be re-aligned horizontally and vertically and would include new drainage culverts and a 24-foot road surface with drainage swales on both sides.

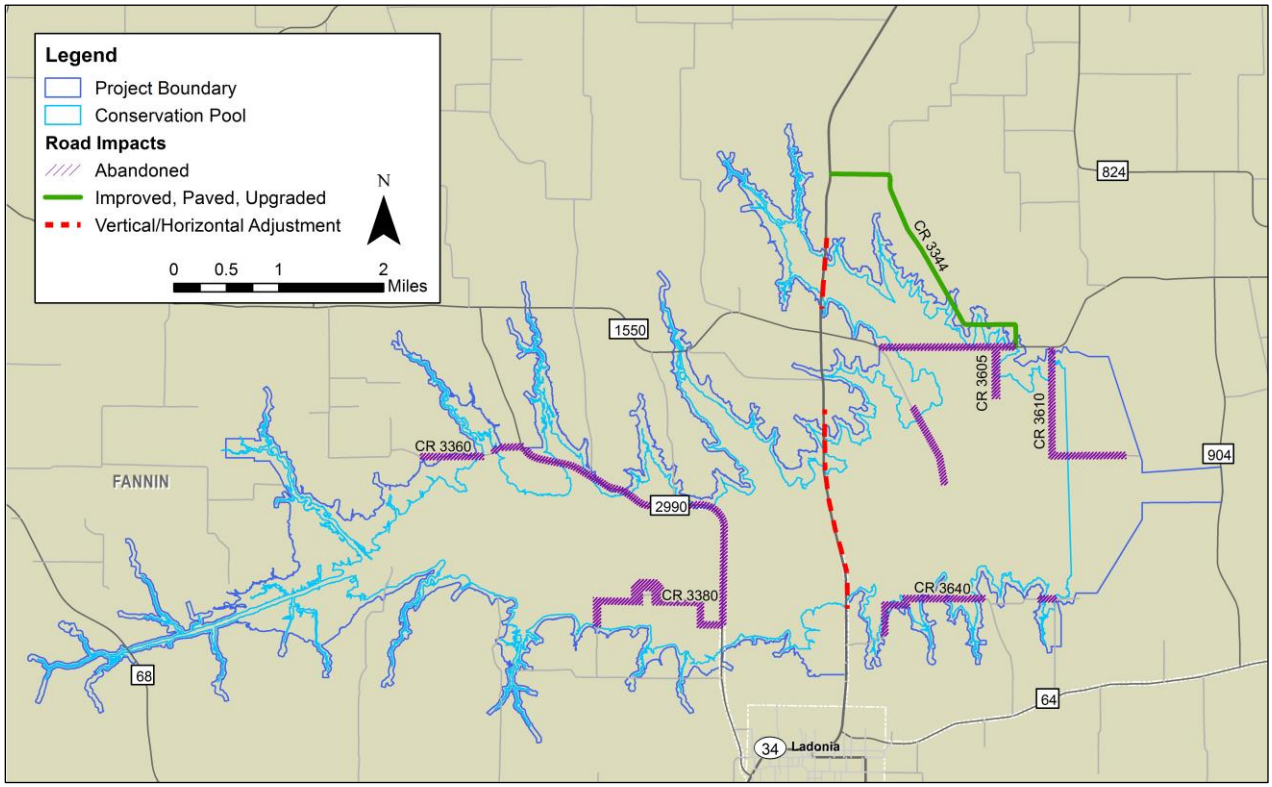
The establishment of the proposed dam, reservoir, and principal and emergency spillways would have noticeable long-term beneficial and adverse effects on transportation resources and traffic. The permanent closure of roadways and rerouting of traffic from some secondary and tertiary roadways in the area would result in adverse effects, while new roads and road improvements would result in beneficial effects.

**Table 4-10: Lake Ralph Hall Roadway Impacts**

| Impacted Roadway | Length of Abandoned Roadway (linear feet) | Length of Horizontal and Vertical Adjustments (linear feet) | Length of Roadway Upgrades (linear feet) | Length of Culvert Improvements (linear feet) |
|---|---|---|---|---|
| SH 34 | 0 | 6,625 | 12,000 | 0 |
| FM 2990 | 19,100 | 0 | 0 | 0 |
| FM 1550 | 7,000 | 0 | 0 | 0 |
| CR 3360 | 5,500 | 0 | 0 | 0 |
| CR 3365 | 500 | 0 | 0 | 0 |
| CR 3370 | 2,100 | 0 | 0 | 0 |
| CR 3380 | 7,710 | 0 | 0 | 0 |
| CR 3443 | 0 | 0 | 3,000 | 50 |
| CR 3444 | 0 | 1,600 | 12,540 | 400 |
| CR 3600 | 3,800 | 0 | 0 | 0 |
| CR 3605 | 2,500 | 0 | 0 | 0 |
| CR 3610 | 9,000 | 0 | 0 | 0 |
| CR 3640 | 7,015 | 0 | 200 | 200 |
| **Total** | **64,225** | **8,225** | **27,740** | **650** |

Source: *Proposed Modifications to State and County Roads Due to the Effects of the Proposed Lake Ralph Hall Technical Memorandum*. August 2018.

**Figure 4-8: Lake Ralph Hall Roadway Impacts**




Source: Proposed Modifications to State and County Roads Due to the Effects of the Proposed Lake Ralph Hall Technical Memorandum August 2018.

Construction of the proposed raw water pipeline would have short-term negligible effects to transportation resources primarily due to construction of pipeline road crossings, additional traffic because of workers' commutes, and additional traffic associated with delivery of equipment and supplies to the proposed sites. When appropriate, use of existing roads and trails to facilitate construction activities would occur.

Operation of the proposed pipeline would not conflict with any existing roadway or interfere with traffic. There would be some very small increases in traffic due to maintenance activities around the pipeline and pump stations; however, overall conditions would remain comparable to existing conditions. Effects on transportation resources would be negligible.

Overall impacts to traffic and transportation would be minor.

## 4.13.2 Cumulative Effects

### 4.13.2.1 No Action Alternative

The No Action Alternative would have no direct or indirect effects on transportation in Fannin County; however, land use changes within the region are expected to occur as a result of long-term population growth and associated development pressure, independent of the proposed project.

With population growth and correspondingly increased vehicle miles traveled in the future, Fannin and Hunt Counties will need to add capacity to its ground transportation network as do all areas in the process of growth and development. Maintenance and repair of roads will continue.

#### 4.13.2.2 Proposed Action

The study area for the transportation cumulative effects assessment consists of Fannin County and northern Hunt County (to encompass the pipeline footprint). This area was selected as the study area because the roadways affected by the project are local transportation routes and not part of a broader region or statewide transportation network.

The proposed reservoir footprint is traversed by a number of roads and bridges and several of these would be impacted by Lake Ralph Hall, as shown in **Table 4-10** and **Figure 4-8**. The past, present, and reasonably foreseeable actions anticipated to cumulatively impact transportation within the study area include past reservoir projects in the county, the proposed LBCR, and the growth of Fannin County.

Based on current proposed construction schedules, the construction phases of Lake Ralph Hall and the LBCR would overlap for four years. The LBCR FEIS indicates that local economic construction impacts would include 5,000 jobs, with some workers commuting from Collin, Delta, Lamar, Grayson, and Hunt Counties. The two projects combined would cause an additive, short-term moderate effect on transportation facilities and traffic.

## 4.14 Hazardous Materials

### 4.14.1 Environmental Consequences

#### 4.14.1.1 No Action Alternative

Under the No Action Alternative, the construction of the dam, reservoir, and pipeline would not occur. No further action is expected to be necessary to address concerns over toxic/hazardous substances or contaminants. There would be no change to the existing conditions discussed in **Section 3.14**.

#### 4.14.1.2 Proposed Action

As described in **Section 3.14**, the August 2018 radius report **(Appendix G**) contained one listing in the conservation pool boundary, one within the project area, and three near the proposed pipeline footprint. Mann Dairy is listed with the Facility Registry System (FRSTX) under the classification of dairy farm, registered as "Wastewater Agriculture Non-Permitted". The property is located along CR 3640 within the proposed inundation area. The property has already been acquired by UTRWD. A search of TCEQ records indicated a violation in 2004 stating "The facility failed to

construct and operate waste control facilities and land application areas to protect surface and groundwater in accordance with the technical requirements of 321.38-321.40 of Subchapter B" and was noted as resolved in 2008 when "The operator submitted a Water Quality Plan from the Texas State Soils and Water Conservation Board (TSSWCB)." As the original violation noted dead animals buried onsite and improperly stockpiled manure, it is recommended that the property be inspected and potential water quality contaminants removed prior to inundation.

The Greg Morris Property is listed as an FRSTX due to an air quality complaint filed in 2003 relating to smoke from burning wire on the property. The case is listed as closed and no other complaints or reports are listed for the site. No violations were issued. The site is located west of SH 34 on Country Lane, within the project boundary and just outside the conservation pool boundary. Since no violation was issued and the case was closed to issue are anticipated due to this listing.

The former Ladonia landfill is listed in the Closed and Abandoned Landfill Inventory (CALF), located on FM 64, approximately 530 feet from the proposed pipeline. It was identified in 1968 and closure was confirmed in 1976. The facility accepted all types of waste, including household, industrial, tires, brush, and agricultural. The CALF notes that the site cannot be verified. The site limits should be verified prior to construction and avoided.

The City of Celeste landfill is listed as a Municipal Solid Waste Landfill Site (MSWLF). The site is located approximately 740 feet from the proposed pipeline. The site permit was revoked in 1979 and the facility is listed as closed. The site limits should be verified prior to construction and avoided.

A replacement of a portion of an Atmos Energy pipeline was reported as an FRSTX, Enforcement and Compliance History Information (ECHOR06), and Integrated Compliance Information System National Pollutant Discharge Elimination System (ICISNPDES). The site is listed as a "minor discharger" and has no inspections or violations reported. The site is located approximately 95 feet from the proposed pipeline, west of US 69. Coordination with Atmos Energy would need to occur prior to construction of the raw water pipeline.

## 4.14.2 Cumulative Effects

### 4.14.2.1 No Action Alternative

Under the No Action Alternative, the construction of the dam, reservoir, and pipeline would not occur. There would be no change to the existing conditions discussed in **Section 3.14.** Therefore, there would be no cumulative impacts relating to hazardous materials for the No Action Alternative.

#### 4.14.2.2 Proposed Action

No impacts related to hazardous materials are anticipated from the proposed action, or from the proposed LBCR. Therefore, no cumulative impacts relating to hazardous materials are anticipated.

## 4.15 Cultural Resources

### 4.15.1 Environmental Consequences

#### 4.15.1.1 No Action Alternative

Historic Resources

Although the proposed project would not be built under the No Action Alternative, historic surveys have been completed for 75 properties. Many of the sites that have been surveyed are no longer on private property as they have been purchased by UTRWD. It is unknown what would happen to these sites under the No Action Alterative. However, none of the sites surveyed at this time were recommended as eligible for the National Register of Historic Places (NRHP), therefore it is anticipated that impacts to historic resources, if any, from the No Action Alternative would be minor.

Archeological Resources

Although the proposed project would not be built under the No Action Alternative, archeological survey has already been conducted along with trench testing for approximately 15 percent of the project area. Many of the sites that have been surveyed and tested are no longer on private property as they have been purchased by UTRWD. Under the No Action Alternative, the impacts from investigations already conducted for the proposed project could be considered as minor impacts to archeological resources, in addition to those experienced periodically under existing conditions. Under existing conditions, erosion of the North Sulphur River channel and its major tributaries could expose cultural resources.

#### 4.15.1.2 Proposed Action

Historic Resources

*National Register Properties*

The Proposed Action would have no effect on properties currently listed on the NRHP because none are present on-site.

*Historical Markers*

There is one historic marker near the proposed pipeline footprint, Marker Number 7822, Texas Sites Atlas 5231007822, representing the "Old National Road Crossing". No impacts to the

marker are anticipated, but if it is determined that the marker needs to be removed during construction it would be reinstalled after construction.

*Historic Cemeteries*

Two cemeteries were surveyed as part of the 2010 *Historic Resources Survey*. Pleasant Grove and New Harmony Center cemeteries are both located outside the project area, but within the area of potential effects (APE), and not recommended as eligible for the NRHP. The *Historic Survey* contains a list of properties within the APE that were not surveyed due to lack of access. This list includes McFarland Cemetery, Merrill Cemetery, Henslee Cemetery, and Willow Grove Cemetery. However, Merrill Cemetery was included in the archeological survey, as discussed below.

*Historic Buildings and Structures*

As discussed in **Section 3.15.1.2**, the 2009 field surveys identified 75 properties within the surveyed portions of the APE that include 114 resources. A summary of the historic resources surveyed is listed in **Table 3-25**. None of the resources were recommended as eligible for the NRHP. No properties identified during the initial phase of the survey were recommended for intensive-level study.

Additional historic-age properties may be found in the APE at a later date. Not all resources were able to be seen from the ROW. Lack of right of entry, heavy rains on unpaved roads and heavy vegetation all hindered the survey process. Using a 1964 topographic map, current aerial photographs and previous archeological survey, the properties that appear to have historic-age resources present have been identified in the *Historic Resources Survey*. While the project may be permitted before verification of the presence of these resources is undertaken, the proposed project may not proceed until these resources have been identified, documented and determined eligible or ineligible for NRHP listing.

All future cultural resource survey will be done in accordance with the Programmatic Agreement (PA) (**Appendix M**). The PA states that the USACE will determine the NRHP eligibility of all archeological and historical resources identified within the APE in consultation with the State Historic Preservation Office (SHPO) and the Tribes. For all resources determined eligible for inclusion in the NRHP, the USACE will apply the Criteria of Effect to assess whether or not adverse effects will occur to historic properties as a result of the project. In consultation with the SHPO and Tribes, the USACE shall make a determination of effect. For all historic properties that will be adversely affected, an avoidance plan or mitigation plan will be developed in consultation with all consulting parties.

Impacts to historic resources are currently anticipated to be minor, but further study is required.

Archeological Resources

As described in **Section 3.15.2**, an intensive pedestrian archeological survey was conducted along with trench testing of selected areas within the project area in 2005. The *Cultural Resources Survey Report* was submitted to and reviewed by the Texas Historical Commission (THC), the SHPO for Texas. A copy of the correspondence from the THC is included in the *Cultural Resources Survey Report* (UTRWD, 2006b). On April 17, 2006, the SHPO concurred with the findings of the report.

The survey covered approximately 15 percent of the Proposed Action with the primary focus on the dam site. A total of 17 archeological sites were recorded, which includes seven prehistoric sites and 10 historic sites. **Table 3-27** lists the archeological site numbers, descriptions, and eligibility recommendations for the surveyed sites. Eleven sites were recommended as ineligible for the NRHP or as a State Antiquities Landmark (SAL). Five sites were recommended for further testing or further definition of the deposit. One site, the Merrill Family Cemetery, was recommended to be avoided.

Based upon the results of the survey, the report included recommendations for additional survey of the first terrace surfaces, the lake margin, and deep testing in the proposed borrow pit areas and along the old river and creek channels to search for deeply buried sites. The report concluded that excavation of several prehistoric sites may be required to mitigate the loss of select significant resources and several historic sites warrant preservation.

All future cultural resources survey will be done in accordance with the PA. The PA states that the USACE will determine the NRHP eligibility of all archeological and historical resources identified within the APE in consultation with the SHPO and the Tribes. In consultation with the SHPO and Tribes, the USACE shall make a determination of effect. For archeological sites, the mitigation plan will specify the areas to be excavated, the methods to be used, special samples to be collected, the specialists who will conduct specialized analyses, the problems set forth in the research design that can be addressed by data from the site being excavated, and include reporting methods and curation of artifacts and records.

Impacts to archeological resources would be major.

## 4.15.2 Cumulative Effects

### 4.15.2.1 No Action Alternative

Historic and Archeological Resources

There is a continuing, cumulative loss of heritage resources in the area and elsewhere as a result of development, destruction, neglect, and natural processes such as weathering, erosion, and decay. However, construction projects in Fannin County that would impact cultural resources would need to reduce those impacts to below the threshold of significance in order to comply with federal and state laws. Therefore, the cumulative impacts from the No Action Alternative would be minimal

and primarily associated with the existing conditions including destruction, neglect, and natural processes such as weathering, erosion, and decay.

#### 4.15.2.2 Proposed Action

Historic and Archeological Resources

There is a continuing, cumulative loss of heritage resources in the area and elsewhere as a result of development, destruction, neglect, and natural processes such as weathering, erosion, and decay. In addition, both large reservoir projects (Lake Ralph Hall and the LBCR) and other construction projects in Fannin County would impact cultural resources, although both would need to reduce those impacts to below the threshold of significance in order to comply with federal and state laws.

The PA guides all cultural resources investigations and analysis related to this project. The PA serves as a guidance document that will be relied upon by all parties to ensure that Section 106 requirements are met throughout the life of the project. The PA will be in place for a period of ten years from signing, and is renewable by amendment. For all cultural resources that will be adversely affected, an avoidance plan or mitigation plan will be developed in consultation with all consulting parties. The LBCR project has a separate PA that guides the cultural resource investigations and analysis for that project. According to the FEIS, although there would be impacts to cultural resources from the LBCR, primarily archeological resources, implementing mitigation measures, as appropriate, would reduce the level of impact on cultural resources in general to below the threshold of significance (USACE, 2017b). Therefore, overall, it is anticipated that there is minimal potential for cumulative effects to cultural resources.

Both the Proposed Action and the proposed LBCR would also cause benefits related to cultural resources. The Lake Ralph Hall and LBCR projects have triggered intensive research leading to the discovery of previously unknown cultural information that otherwise might have remained unknown and been ultimately lost due to the natural processes associated with weathering and decay.

## 4.16 Paleontological Resources

### 4.16.1 Environmental Consequences

#### 4.16.1.1 No Action Alternative

Under the No Action Alternative, no reservoir would be constructed. As discussed in **Section 3.16**, the channelization of the Sulphur River enhanced erosion, which exposes fossils. Under the No Action Alternative, the Ladonia Fossil Park (aka Pete Patterson Fossil Park) would remain in the current location and allow for continued fossil hunting.

### 4.16.1.2 Proposed Action

Under the Proposed Action paleontological resources in the inundation footprint would no longer be accessible following completion of the proposed project. During construction a paleontologist would be available to identify and manage potentially significant fossil finds. The Ladonia Fossil Park (aka Pete Patterson Fossil Park) would no longer be accessible for fossil hunters.

UTRWD anticipates mitigating the impact to the existing Pete Patterson Fossil Park by providing a similar park near the intersection of FM 904 and the North Sulphur River. The relocated park is anticipated to be comprised of a gravel parking area, signage, a covered pavilion and a path accessing the North Sulphur River Channel. The access to the North Sulphur River Channel is anticipated to be provided by a series of steps leading from the upper bank of the channel to the channel bottom.

## 4.16.2 Cumulative Effects

### 4.16.2.1 No Action Alternative

The No Action Alternative would not change existing paleontological processes or access to the Ladonia Fossil Park (aka Pete Patterson Fossil Park) and therefore would not contribute to cumulative impacts to recreation.

### 4.16.2.2 Proposed Action

The cumulative impacts study area is the Sulphur River Basin. Past projects include the channelization of the Sulphur River. Reasonably foreseeable future actions include growth in Fannin County, which could lead to development in the Sulphur River Basin that could cause loss of paleontological resources. Cumulative impacts would include the possible loss of scientific data and education value associated with potential fossil resource in the region.

# 4.17 Socioeconomics

This section describes the socioeconomic impacts of the No Action and Action Alternative associated with Lake Ralph Hall. For each alternative, the following socioeconomic issues are addressed:

- Construction workers and related expenditures
- Inundation or pipeline ROW effects
- Economic effects of recreation
- Economic effects of land use changes, including land development
- Effects on public facilities and services
- Fiscal impacts

- Financial impacts of water costs for UTRWD members and customers

For each of the above socioeconomic issues, this section presents impacts within the primary impact area (PIA) which consists of Fannin County for the Dam Site Alternative and the footprint of the pipeline for the Pipeline Alternative. The secondary impact area (SIA) includes the surrounding counties where the work force would be drawn from and construction expenditures would occur, and counties the pipeline would pass through. Effects for the State of Texas are also provided as a basis of comparison; little, if any, socioeconomic effects, would take place outside the State of Texas.

## 4.17.1 Environmental Consequences

### 4.17.1.1 No Action Alternative

The socioeconomic impacts of the No Action Alternative are examined in this section. Under the No Action Alternative, the USACE would deny UTRWD's application for an individual Section 404 permit. As a result, the proposed Lake Ralph Hall project would not be developed. One of three events would then have to occur:

1) UTRWD would find an alternative source of water;
2) UTRWD's members and customers would find alternative sources of water other than Lake Ralph Hall, including:
    a. Purchasing additional Dallas Water Utilities (DWU) water;
    b. A substitute non-UTRWD water supply project;
    c. Increased groundwater use by members and customers;
    d. Use of agricultural irrigation water.
3) Neither UTRWD nor their members or customers would be able to find sufficient alternative water resources and chronic shortages would occur among UTRWD members and customers.

Under the No Action Alternative, UTRWD would not be able to provide alternate supplies to its members and customers in a timely fashion. **Section 2.0** of this DEIS describes alternatives UTRWD might pursue in lieu of Lake Ralph Hall, but in sum, these alternatives will not meet expected demands in a timely fashion. Members and customers would need to identify alternate supplies on their own. It is anticipated that modest amounts of groundwater and the DWU supplies to certain members under the UTRWD/DWU contract would be fully utilized and/or provided. If all the unused groundwater in Region C was fully deployed, that groundwater would meet Member and customer needs for only an additional decade. If the growth in the UTRWD service area was somehow redirected to those members and customers relying on DWU supplies, those members would reach build out more quickly.

As water becomes less available, UTRWD's members and customers would have to implement more severe and possibly permanent water use restrictions until additional water supplies were

secured. These restrictions would have economic effects on those water supply areas, one of which could be to limit and discourage growth in those areas. Dallas is still contractually obliged to provide water for the named entities in the UTRWD/DWU contract. However, as discussed in **Section 2.4.1**, UTRWD has no assurances that these cities will have water available when UTRWD has a need in 2024. This would change the pattern of growth in the UTRWD service area; the named entities would be able to grow more rapidly than currently expected as they absorb growth that would have gone to the parts of the UTRWD service area that can no longer accommodate growth, until they develop additional supplies. The named entities would reach build out sooner than currently expected. Eventually, growth and development would slow within portions of the UTRWD service area until UTRWD or customers and members secure additional water supplies. Some growth that would have gone to the UTRWD service area could be displaced to other areas in and around the Dallas/Fort Worth metropolitan area.

However, according to the Region C and Region G Water Plans, the counties in or surrounding the Dallas/Fort Worth area already have to develop new water supplies to meet currently anticipated future growth. Any redirected growth from UTRWD would accelerate and possibly expand the need for new water supplies and development in those areas. Growth in the UTRWD service area region would be slowed or become more expensive until and unless other longer-term future water projects can be completed.

The socioeconomic impacts of the No Action Alternative would be propelled by UTRWD's commitment to provide water to its members and customers and by the members and customer's commitment to provide water to their service areas. Without Lake Ralph Hall, UTRWD and its members and customers would be forced to deplete their available groundwater resources, impose various levels of water use restrictions, reduce any supply margins of protection such as safety factors, and eventually develop other, non-UTRWD water supplies. Some members and customers might attempt to aggressively acquire additional supplies through markets or trans-basin transfers, and these efforts might forestall shortages. The lack of Lake Ralph Hall or other new supply could cause some municipalities within the UTRWD service area to lower their build out population if they had trouble obtaining additional water supplies. In sum, the actions that would be taken by UTRWD's members and customers are unknown, but it must be recognized that this region will face shortfalls in water supply until another large water supply project is developed.

The socioeconomic impacts of the No Action Alternative would occur as a result of:

1. Slower or lower growth and lower build out population among the non-named entities,
2. Faster growth among the named entities, reaching build out earlier than planned,
3. Additional growth diverted to other areas in the Dallas Metroplex, and
4. Groundwater withdrawals would increase at least to the maximum allowable amount.
5. Members and customers would pursue their own, likely more expensive, water supply opportunities. This could include pursuing their own contracts from others, requiring

development entities to bring their own supplies, or other water acquisition strategies, i.e. agricultural water.

*Non-Named Entities*

As discussed previously, without Lake Ralph Hall, the non-named entities (from the UTRWD/DWU contract) might not be able to identify sufficient alternate supplies on their own, except for a modest amount of groundwater. This could slow their growth, or cause their build out to arrive sooner than planned and at a lower population as water becomes harder or more expensive to obtain. A smaller population would generate fewer tax revenues and lower public sector facility and service costs. However, many of the typical municipal obligations are reliant on fixed costs, i.e., equipment, or other capital outlay. It is generally more efficient to spread these costs out over a larger number of people. Having to pay for large infrastructure projects from a smaller tax base could create financial issues, especially for smaller entities.

Municipal planning efforts would also be negatively impacted. Long-term growth plans lead to capital investment plans, transportation plans and other municipal commitments. If the water supply is unreliable, these plans would be jeopardized, and the municipality's financial commitments become imperiled.

A lack of water also limits the attraction of businesses to an area and the type of businesses that can be accommodated within the municipality. Only businesses with minimal water use (e.g. office or administrative businesses) would be attractive to these water-short municipalities, limiting the commercial base, tax base, as well as the employment opportunities in the area. The inability to meet service and facility demands would lead to public dissatisfaction.

While a lack of growth in the area due to an absence of water is a worst case outcome, a slowdown in, or irregular, growth would still cause harm to the non-named entities as discussed above. The likelihood of the impacts are inversely related with their severity. It is quite likely that with a lack of water growth will slow and/or become more expensive and that water-reliant businesses would choose other locations. However, it is less likely that all growth would cease unless there was no water available at any price.

*Named Entities*

While the named entities in the UTRWD/DWU contract would still receive all the water they need from DWU, the shortage of water in the surrounding communities would cause issues for these named entities as well. When it is no longer possible in the non-named entities, growth would tend to concentrate within the named entities, causing a higher than planned growth rate and a more rapid build out. Orderly planning could be disrupted. The need for infrastructure could occur sooner than planned. Infrastructure hastily developed would lead to unnecessarily higher costs and

further risks of inadequate planning. The result is likely to be inefficient, inadequate planning leading to higher costs and public dissatisfaction.

*Other Areas in the Dallas Metroplex*

Other areas in the Dallas Metroplex could experience a moderated version of the issues described above for the named entities but on a reduced scale: somewhat higher levels of growth, and build out sooner than planned. While this impact would be noticeable over the long term if another large water supply project is not developed, it would be less concentrated throughout the Dallas Metroplex than in the named entities because the Dallas Metroplex has a greater capacity to absorb the displaced growth. This assumes that the other areas in the Dallas Metroplex continue their water development progress. If their water development stalls, they would quickly be subject to the same type of growth limitations and lower build out issues as the non-named entities described above, at a much greater scale.

*Groundwater Withdrawals*

Without Lake Ralph Hall, UTRWD's members and customers would be forced to increase groundwater pumping over and above their planned levels in an attempt to maintain their water supply. However, if all the members and customers developed new groundwater supplies as required to meet demands until they reached the maximum available amount, it would delay the need for a new water supply by approximately 10 years or more.

If UTRWD's members and customers are forced to rely on groundwater as their main source of new water, there would be increased pressure on the limited groundwater resources contained in the local aquifers. TWDB has modeled the aquifers in the North Texas area and developed values for the Modeled Available Ground Water (MAG) for those aquifers. MAG is the value for annual pumping from Ground Water Management Areas (GMA) to achieve the Desired Future Conditions (DFC) for the aquifer. Given the current groundwater pumping rates from the North Texas aquifers, the quantity of local groundwater available to UTRWD members and customers is much less than their need. Increasing pumping beyond the MAG limits would draw down the aquifer beyond what is able to be replenished, causing interference with other groundwater users in the area. Users would no longer be able to practice prudent use of groundwater, as a backup supply during droughts and replenished from surface water during wet years. Users would rely on groundwater every year and as the aquifer gets drawn down, shortages would be exacerbated and occur more often. This level of pumping may not be allowed if the North Texas Groundwater Conservation District's final management plan includes production limitations based on the MAG, as expected. It is possible that members and customers will seek water supplies in other regions, but the costs would be sufficiently high that scale economies would be required. This suggests that UTRWD would be the logical entity to pursue that option; this alternative was rejected in **Chapter 2.0** but might be re-considered under more dire circumstances.

*Agricultural Water*

The 2016 Region C plan has about 8,700 AF of irrigation supply and about 15,500 AF of livestock supply listed in Region C, for a total of around 24,200 AF. While this total amount would cover the excess demand for UTRWD until almost 2040, it would also require the complete cessation of irrigated agriculture in the 16 Region C counties. The willingness of all irrigators to give up all their water is highly uncertain, but selected opportunities might become evident for agricultural transfers, forestalling shortages for a period of time. Some of this water may be available for municipal use, but it would be expensive and the sources would be very spread out and difficult to aggregate and deliver to a municipality.

*Water Restrictions*

UTRWD members and customers could resort to more severe and permanent water use restrictions to extend their existing supplies further. However, as noted in the conservation analyses in **Section 1.8**, water use in the UTRWD is reasonably efficient, which suggests that these restrictions would cut into landscaping efforts, and other mostly outdoor uses currently viewed as necessary. Under these circumstances, a negative public response is anticipated.

Recognizing substantial uncertainties, the No Action Alternative could cause moderate to major socioeconomic impacts on UTRWD's members and customers, especially the non-named entities from the Dallas/DWU contract. The difficulties involved in obtaining other water supplies could displace and/or slow growth in the area. The impacts of displaced growth could be considered major, affecting planning, urban service costs, and public satisfaction with local government.

### 4.17.1.2 Proposed Action

#### Construction Impacts of the Dam

This section details the direct and indirect impacts of Lake Ralph Hall during construction on the key economic sectors in the PIA, SIA and Texas. All the indirect effects are calculated using the RIMS II from the Bureau of Economic Analysis (n.d.) multipliers for the appropriate region and industry.

In general, the socioeconomic impacts of construction are short-term, i.e., the economic stimulus only occurs during the construction period and ceases when construction is completed. The construction of Lake Ralph Hall is scheduled to commence in late 2019 and take five years to complete. **Table 4-11** breaks down the total costs of the project into the relevant categories to calculate the direct and indirect economic effects of building Lake Ralph Hall.

**Table 4-11: Construction Costs for Lake Ralph Hall, 2015 dollars**

| Project Costs | Cost (millions of dollars) |
|---|---|
| Materials | $93.8 |
| Labor | $53.6 |
| Supplies | $21.4 |
| Engineering | $47.3 |
| Land Acquisition and Mitigation | $31.1 |
| **Total Project Costs** | **$247.2** |

Note: The engineering and contingency costs (35 percent of the net construction costs) were split into engineering costs (10 percent of the net construction costs) and contingency costs (25 percent of the net construction costs). The contingency costs were then allocated among materials, labor and supplies based on the relative share of each category.

Source: UTRWD, "RFI#3 Response Letter and Attachments", 2010c; HE, 2015

Materials and supplies account for almost half the total project costs and labor accounts for just under one quarter. Spending on these three items would account for the bulk of the benefits to the local area from the project.

The dam-site construction workforce is assumed to be evenly spread over a three-year period; the remainder of the construction activity occurs from the pipeline. To determine the number of workers required for Lake Ralph Hall, the total annual labor costs for the dam were divided by the weighted mean construction wage for the region. The weighting is done to reflect that the workers would come from the PIA, the SIA and the rest of the region. Lake Ralph Hall would require an estimated 290 workers per year to complete. Construction would require various trades, including operators, laborers, carpenters, ironworkers, surveyors, electricians and plumbers. These workers would be drawn from the local and regional workforce. **Table 4-12** shows the mean annual wages and number of employed construction workers for all the PIAs and SIAs, plus Dallas.

**Table 4-12: Mean Construction Wages and Number of Workers Employed for Selected Areas, 2nd Quarter 2015**

| Area | Mean Construction Wages (Annual) | Workers Employed |
|---|---|---|
| Fannin County | $30,888 | 50 |
| Hunt County | $37,752 | 108 |
| Lamar County | $47,632 | 373 |
| Collin County | $66,508 | 3,145 |
| Denton County | $59,592 | 3,747 |
| Dallas County | $61,880 | 10,693 |

Note: The wages are for workers in the Heavy Civil and Engineering Construction industry.

Source: Quarterly Employment and Wages, Texas Workforce Commission Website www.tracer2.com. Accessed November 2015.

There are not enough construction workers in Fannin County to supply the workforce for the dam. However, from the table above, the total number of construction workers in the region is more than adequate to supply the needed workers. There are likely enough workers in the SIA to provide the entire workforce. Some of the specialized skills or less common trade workers may have to come from the Dallas area.

It is assumed that all the workers would commute from their homes daily. There are no hotels and very few transient dwellings in Ladonia for the workers to reside. Most of the construction workers for Lake Ralph Hall would come from the main population centers for the PIA (Bonham) and the SIA (Paris and Greenville), both within 30 miles of the Lake. From the center of Dallas, it is an 80-mile drive to the lake, taking approximately one and a half hours. It is assumed that 10 percent of the workers would come from the PIA and 75 percent from the SIA. The remaining 15 percent would come from elsewhere in Texas, most likely the Dallas area.

The construction of the Lake Ralph Hall Dam would add about $5.4 million in payroll to Fannin County households, $40.2 million to the SIA and a total of $53.6 million in Texas.

Spending on materials and supplies makes up almost half the total spending on Lake Ralph Hall construction. As such, it would have an impact on the regional economy. **Table 4-13** depicts the total materials and supplies costs and where they would be purchased.

**Table 4-13: Sales Location of Goods and Services Purchased for Lake Ralph Hall Construction (millions of dollars)**

| | Total Materials &Supplies Costs | Amount Purchased in: | | | |
|---|---|---|---|---|---|
| | | PIA | SIA | Texas | Out of State |
| LRH | $115.2 | $11.5 | $28.8 | $63.4 | $11.5 |

Source: UTRWD, "RFI#3 Response Letter and Attachments", 2010c; HE, 2015

It is assumed that 10 percent of the materials and supplies would be purchased in the PIA. A further 25 percent would be obtained in the SIA, with 55 percent purchased elsewhere in Texas, and the remaining 10 percent sourced from out of state. While the PIA and the SIA do not have the capacity to provide all the materials required to construct the dam, their proximity to the construction site means that what is available and competitively priced in the area would be purchased there. Texas has a large diversified economy that would be able to provide almost everything required to construct the dam. However, in large construction jobs, there are typically specialty products that are only available from out of state.

*Summary of Construction Impacts*

In addition to the direct impacts of spending on labor and materials and supplies for Lake Ralph Hall, there would be indirect or induced benefits from the money circulating in the local economies. For example, the 290 new construction workers would spend their wages and increase the incomes of local merchants or the purchase of materials would cause a local supplier to hire new workers to complete the order. These indirect benefits, along with the total benefits, are summarized in **Table 4-14**.

**Table 4-14: Summary of Employment, Income and Total Expenditures for the Construction of Lake Ralph Hall**

| | Direct | Indirect | Total |
|---|---|---|---|
| **Employment** | | | |
| PIA | 29 | 127 | 156 |
| SIA | 217 | 228 | 445 |
| Rest of Texas | 43 | 1,353 | 1,396 |
| **Total (Texas)** | **290** | **1,708** | **1,998** |
| **Income (millions of dollars)** | | | |
| PIA | $5.4 | $7.4 | $12.7 |
| SIA | $40.2 | $41.9 | $82.1 |
| Rest of Texas | $8.0 | $61.6 | $69.6 |
| **Total (Texas)** | **$53.6** | **$110.8** | **$164.4** |
| **Total Expenditures for Goods and Services (millions of dollars)** | | | |
| PIA | $16.9 | $19.3 | $36.2 |
| SIA | $69.0 | $81.9 | $150.9 |
| Rest of Texas | $71.4 | $171.6 | $243.0 |
| **Total (Texas)** | **$157.3** | **$272.9** | **$430.2** |

Note: Out-of-state impacts are excluded from this table. An estimated 9.5 percent of additional economic effects would occur outside Texas as a result of the project.
Source: HE 2015.

The large indirect effects of the project on the remainder of Texas are attributable to the purchase of construction materials and supplies. The Texas economy is sufficiently diverse to provide almost all construction materials. The total increase in employment would have a small effect in the PIA and the SIA (about a one percent increase in each area). Adding two thousand jobs to the Texas economy, while still a positive impact, would have a negligible relative effect.

Adding $13 million of income to Fannin County (the PIA) would increase total income in that area by about two percent. Aggregate income in the SIA would increase by almost four percent, while the overall impact to Texas is again, positive but negligible.

The increase to the overall economy, as measured by sales of goods and services, follows a similar pattern. The impacts to the PIA and SIA are nine percent and two percent respectively, whereas the overall impacts to Texas are small, but still beneficial.

Overall, the construction phase of Lake Ralph Hall would have temporary but positive economic effects on the local area (PIA and SIA). Employment, income and the size of the local economy would all increase slightly. The construction of Lake Ralph Hall would provide very small short-term benefits to Texas.

### Inundation Impacts at Lake Ralph Hall

This section details the direct and indirect impacts on the physical footprint of Lake Ralph Hall. As opposed to the impacts of construction, the inundation impacts are generally long-term in nature. The Lake Ralph Hall project area, the land UTRWD would acquire and retire from current use, would amount to 11,915 acres. The area inundated by Lake Ralph Hall reservoir water would

amount to approximately 7,568 acres. The various land types included in the project area and inundation area are provided in **Table 4-15**.

**Table 4-15: Lake Ralph Hall Dam Project Area by Land Use Type (acres)**

| Land Use Type | Conservation Pool | Project Boundary | Approved Jurisdictional Determination Assessment Area |
|---|---|---|---|
| Roads and Buildings | 78 | 128 | 132 |
| Stream Channels | 325 | 378 | 387 |
| Cropland | 1,654 | 2,604 | 2,928 |
| Forest | 1,584 | 2,673 | 3,065 |
| Grasses | 100 | 180 | 183 |
| Park Like | 229 | 538 | 730 |
| Pasture | 2,344 | 3,603 | 3,732 |
| Young Trees | 1,146 | 1,669 | 1,784 |
| Stock Tanks | 52 | 79 | 83 |
| On-Channel Ponds | 56 | 63 | 70 |
| **Total** | **7,568** | **11,915** | **13,094** |

Source: UTRWD email, April 2011 and confirmed in July 2017

The Lake Ralph Hall project area accounts for about two percent of the land area of Fannin County. About half the land affected by Lake Ralph Hall is productive agricultural land, cropland or pasture. This makes up slightly more than one percent of the agricultural land in Fannin County. Forests, grasses and park-like land make up slightly less than half the affected area and account for around six percent of that type of land in Fannin County. As stated in **Section 3.11.1**, there is no bottomland hardwood in the Lake Ralph Hall project area, so that industry would not be impacted.

*Economic Output of Agriculture*

Although Lake Ralph Hall would inundate only a small portion of the agricultural land in Fannin County, there would still be economic impacts from this loss of production. The total loss of agricultural production revenues and government payments for the agricultural land taken by Lake Ralph Hall amount to an estimated $837,000 per year (U.S. Department of Agriculture [USDA] 2012, UTRWD 2010c). Total lost agricultural revenue is approximately two percent of the total market value of agricultural products from Fannin County as of 2012.

*Households and Population*

In addition to agricultural land, Lake Ralph Hall would require some houses and residents to relocate. UTRWD has purchased from willing sellers a little over half of the project area. As of August 2018, one residence remained in the project boundary and would need to be acquired prior to construction (UTRWD, 2018b).

The number of persons and houses within the project area is negligible relative to the County total, but the project would have an important effect on those required to relocate. From 2009 to 2013, Fannin County had over 250 vacant houses for sale. While this would be more than enough to

house the people whose homes would be inundated by Lake Ralph Hall, it is assumed that half the people affected would leave the county, because of Lake Ralph Hall's location in the very southeast end of the county and the immediate proximity to three other counties. House prices in the portions of these three counties closest to Fannin are similar to those in the Lake Ralph Hall area, whereas house prices elsewhere in Fannin County are higher (Shannon, 2011). Lake Ralph Hall would have a minimal impact on the population and number of houses in Fannin County.

**Summary of Inundation and Project Area Impacts**

The UTRWD acquisition and retirement of project area lands, including inundation, would have a negligible socioeconomic impact in Fannin County. Agriculture-related losses are expected to be $837,000. The loss of agricultural production due to Lake Ralph Hall would cause a loss of 17 jobs in Fannin County, about one tenth of one percent of total employment in the county. The loss of agricultural land also causes a loss of $247,000 in aggregate income to the whole county, a loss of less than one half of one percent of total income for the county. Finally, the overall impact to the economy is a loss of $3.1 million, approximately three quarters of one percent of the local economy. One house occupied as of August 2018 would need to be acquired prior to construction.

**Land Development near Lake Ralph Hall**

As described in **Section 3.1**, current land use in the project area of the proposed Lake Ralph Hall dam sites is primarily rural and agricultural, similar to unincorporated Fannin County. The Lake Ralph Hall project area includes a conservation pool of about 7,568 acres and a total project area of almost 12,000 acres. This land would be lost to its current use but could be available for water-based recreation, as discussed as a reasonably foreseeable future action, in the cumulative impacts section.

Under the Proposed Action, the Ladonia Fossil Park (aka Pete Patterson Fossil Park) would no longer be accessible for fossil hunters. UTRWD anticipates mitigating the impact to the existing Pete Patterson Fossil Park by providing a similar park near the intersection of FM 904 and the North Sulphur River. The relocated park is anticipated to be comprised of a gravel parking area, signage, a covered pavilion and a path accessing the North Sulphur River Channel. The access to the North Sulphur River Channel is anticipated to be provided by a series of steps leading from the upper bank of the channel to the channel bottom. Because the fossil park would be replaced in kind, it is anticipated that economic impacts associated with tourism to the fossil park would be minimal.

Changes in land use would arise from the inundation and from the change in character for lands surrounding Lake Ralph Hall. Land around the lake would become lake view property. New residential developments are also likely, although the timing of such development is uncertain. Other land use impacts due to the creation of Lake Ralph Hall would come from commercial development to support new residents, as discussed in the cumulative impacts section.

*Local Governance*

The City of Ladonia is adjacent to the southern edge of the lake footprint and the local government is interested and supportive of the lake. It is likely that Ladonia would annex the lake and surrounding acres in the future (Strickland, 2011). City officials see the potential for the lake to bring commerce and jobs to the city. The City has a development plan that anticipates development of Lake Ralph Hall that includes infrastructure improvement recommendations (City of Ladonia, 2007). The development plan found that:

- Almost 80 percent of the City's streets are in poor condition;
- About 67 percent of the City's drainage system were found to be blocked, crushed, or overgrown with vegetation; and
- The water and wastewater systems need to be upgraded

These improvements and possibly other infrastructure upgrades may be necessary to support residential development related to Lake Ralph Hall if the lake is annexed by the City. However, Ladonia has a small tax base which will limit the funds available for needed improvements, and it is unknown if the city will have the funds to make those improvements. The city might eventually bond for facility improvements and institute new customer fees. No tangible planning, zoning or infrastructure improvements or commitments have occurred to date.

Despite the infrastructure challenges, Lake Ralph Hall's proximity to one of the fastest growing metropolitan areas in the country and the lower cost of housing compared with nearby metropolitan counties suggest conditions that will be favorable for residential development. Nearby Collin and Denton counties have seen substantial growth over the past decade and rapid growth is projected to continue. Lake Ralph Hall is suitable for development for a wide range of uses including primary residences, weekend or second homes, and retirement properties.

## Public Facilities and Services

The construction of Lake Ralph Hall may create new demands on government facilities and services including police and emergency services (fire departments), health services and schools. The existing conditions for these services were described in **Section 3.17.5**. Temporary impacts would be related to lake construction and from other potential construction activities such as home and commercial building. Long term impacts to these services related to Lake Ralph Hall would come from changes in population related to land development and from visitor impacts from recreation, as discussed in the cumulative impacts section.

### Lake Ralph Hall Law Enforcement

*Construction Impacts*

During the three year Lake Ralph Hall dam-site construction period almost 300 workers would be engaged in building the lake, annually. Most of these workers would commute from outside the PIA, primarily from the SIA. This influx of workers along with transportation of construction materials and heavy equipment would increase traffic in the area which may lead to more accidents

or may increase the need for patrols to monitor speeds on access routes. However, these demands are likely to be minor, and temporary. The Fannin County Sherriff's Department should be able to accommodate these additional demands in the PIA. Impacts from construction on law enforcement within the SIA would be related to traffic impacts and would be temporary, negligible, but negative.

*Land Development Impacts*

The resulting population growth due to land development near Lake Ralph Hall is projected to occur over many years and at a modest rate. After 20 years, Lake Ralph Hall land development induced population would account for about one percent of total county population. By year 50, this figure would increase to about four percent. The demands created from the new population would require Ladonia to employ its own police force or to increase coverage by the Fannin County Sheriff. Either of these options would create an additional expense for the City and would create a long-term, negative impact for the city. There would be almost no impacts to law enforcement in the SIA as a result of land development around Lake Ralph Hall.

**Emergency services**

*Construction Impacts*

Construction work is statistically more dangerous than most occupations. For every 100 employees engaged in the construction of heavy and civil engineering construction, there are 1.1 injuries that result in days away from work each year (U.S. Bureau of Labor Statistics, 2014c). In addition, in 2014 there were 105 fatalities in Texas in the construction industry (U.S. Bureau of Labor Statistics, 2014a). This suggests that additional calls for emergency medical technicians (EMTs) might occur during lake construction. The lake footprint is currently served by the Ladonia and Honey Grove volunteer fire departments. Additional emergency medical calls related to lake construction may strain these small, volunteer agencies. Arrangements for assistance from other agencies, such as the Bonham Fire Department, may be required. This would be a temporary and negative impact. It is unlikely that there would be any impacts to emergency services within the SIA.

*Land Development Impacts*

The projected population growth around the lake would create a modest increase to the demand for emergency services in the PIA, especially in the area of Lake Ralph Hall. The impacts would be permanent and negative. Impacts to emergency services in the SIA would be negligible.

**Health services**

*Construction Impacts*

In the event of construction or traffic related accidents, TMC Bonham (formerly Red River Community Hospital) provides emergency services. In the event of serious or multiple injuries, there are several large medical centers in the SIA that provide a full range of emergency services and that are well-equipped to handle increased demand resulting from Lake Ralph Hall

construction activities. Impacts to health services in the PIA and SIA during Lake Ralph Hall construction would be temporary, negative and negligible.

*Land Development Impacts*
Extensive and well-developed services are available at nearby facilities within the SIA. Any additional demands for health services from the new population would be served by existing facilities and impacts within the PIA and SIA would be negligible.

**Education**
*Construction Impacts*
Construction workers are expected to commute to the Lake Ralph Hall site and are not expected to relocate. As a result there would be no increase in population and no impacts to area school districts.

*Land Development Impacts*
New residential development in the Lake Ralph Hall area would create additional demands on the local school districts. Impacts would occur primarily in the Fannindel Independent School District (ISD), however Honey Grove ISD and Bonham ISD would also be affected. After 30 years, it is projected that there would be about 900 new, full-time residents in developments around the lake. Based on current age distribution in Fannin County, this would suggest a new school age population of around 230. These impacts would occur over a number of years but would require planning for space and personnel by the districts. There would be negligible impacts to education in the SIA.

*Inundation Impacts*
Some roads surrounding Lake Ralph Hall would be re-routed, others would dead-end at the lake, and some roads would be inundated. Law enforcement and emergency service vehicles may need to adopt new routes and devise the best way to traverse the area around the lake. Certain area residents would also need to alter their travel patterns around the area. While the changes from inundation would be permanent, residents and other drivers would adjust to the change over time.

The inundation of Lake Ralph Hall lands would have little direct impact on other public facilities and services. As of 2011, there are no public facilities within the proposed footprint.

**Summary of Public Facilities and Services Impacts**
In general, all the impacts to the public facilities and services from the construction phase would be minor and temporary. Any impacts would disappear once the construction is completed. The impacts from, land development and inundation would all be long-term and range from minor to moderate.

**Fiscal Impacts Related to Lake Ralph Hall**
Building and operating Lake Ralph Hall would also have impacts upon local and state government revenues. Both sales and property tax revenues would be affected and different aspects of the

project would have positive or negative impacts to government revenues. For example, sales of materials to construct the dam would increase sales tax revenues, while inundating the land would remove it from the property tax rolls, lowering property tax revenue. Fiscal impacts of Lake Ralph Hall are identified below.

*Sales Tax*

The construction of the dam and future land development would all have a positive effect on sales tax revenues while the inundation would have a negative effect. The net effect overall would be positive.

*Construction*

The construction phase of Lake Ralph Hall would increase sales tax revenue for the PIA, SIA and the State of Texas. Both a portion of the construction workers wages and the induced income would be spent on taxable items and some of the spending on materials and supplies would be subject to sales tax. **Table 4-16** shows the Lake Ralph Hall sales tax revenue impact on affected jurisdictions.

**Table 4-16: Total Sales Tax Generated from the Construction of Lake Ralph Hall**

| | Area | Employee Spending | Sales of Materials and Supplies | Total |
|---|---|---|---|---|
| Amount Subject to Sales Tax | | $18,383,000 | $56,053,000 | $74,436,000 |
| Percentage Spent in Region | Fannin | 15% | 10% | |
| | SIA | 72% | 25% | |
| | Texas | 100% | 100% | |
| Sales Tax Rates | Fannin | 0.5% | 0.5% | |
| | SIA | 0.5% | 0.5% | |
| | Texas | 6.25% | 6.25% | |
| Sales Tax Collected | Fannin | $13,000 | $28,000 | $41,000 |
| | SIA | $66,000 | $70,000 | $136,000 |
| | Texas | $1,149,000 | $3,503,000 | $4,652,000 |

Note: (1) Assumes that the workers from the SIA and Texas spend a small amount (5 percent) of money in the PIA, but that most of the spending subject to sales tax is done in the workers' home region.
(2) All the sales subject to the local taxes are also subject to Texas state sales tax.
(3) Assumes half the materials and supplies costs are subject to sales tax.
(4) Includes direct and indirect effects.

Source: Texas Window on State Government Local Sales and Use Tax, http://www.window.state.tx.us/taxinfo/local/city.html Accessed December 2015; Consumer Expenditure Survey, U.S. Bureau of Labor Statistics, October, 2014b; HE, 2015

For all jurisdictions, the spending on materials and supplies has the most impact on sales tax revenues. An increase of $41,000 corresponds to a six percent increase in sales tax revenue for Fannin County. The increase to the SIA is just over one percent and the relative impact to Texas is negligible. These impacts would be short-term; once construction is completed, this increase in sales tax revenue would cease.

*Inundation*

The inundation of property would have a negligible impact upon sales tax revenue in Fannin County and no impact to either the SIA or Texas. As previously discussed, two homes would be displaced by the inundation and half of their residents are expected to leave the county. This represents a loss of less than $300 annually in lost sales tax revenue, less than one tenth of one percent of the total.

*Land Development*

Sales tax impacts from land development would come from two sources, home construction and expenditures by residents in those new homes. The purchase of goods and services for construction, as described earlier in this section, would result in sales tax revenue within the PIA, SIA and Texas. Sales tax projections related to the purchase of materials for home construction at Lake Ralph Hall are provided in **Table 4-17**.

**Table 4-17: Sales Tax Revenue Related to Residential Land Development at Lake Ralph Hall, for the PIA, SIA and Texas, Year 1 through Year 50**

| Area | | Year 1 | Year 10 | Year 20 | Year 30 | Year 40 | Year 50 |
|---|---|---|---|---|---|---|---|
| **PIA** | Ladonia | $300 | $1,520 | $3,000 | $5,700 | $8,300 | $12,300 |
| | Honey Grove | $150 | $800 | $1,520 | $2,800 | $4,200 | $6,200 |
| | Fannin County | $200 | $1,010 | $2,000 | $3,800 | $5,600 | $8,200 |
| **SIA** | | $1,400 | $6,800 | $13,700 | $17,100 | $18,800 | $22,200 |
| **Texas** | | $35,400 | $177,000 | $353,900 | $438,800 | $478,600 | $551,000 |

Note: All amounts in 2015 dollars.
Source: Harvey Economics, 2016.

The new residents who purchase homes in the developments around Lake Ralph Hall would make expenditures within the local economy. For the purposes of the analysis, it is assumed that in the early years of development, both full and part-time residents would make most of their purchases in the SIA due to a lack of retail outlets in the PIA. Over time, it is assumed that more purchases would be made in the PIA as commercial development occurs. **Table 4-18** provides projected sales tax revenue from expenditures by new full and part-time Fannin County residents, year 1 through year 50.

**Table 4-18: Sales Tax Revenue from Expenditures by New Fannin County Residents, for the PIA, SIA and Texas, Year 1 through Year 50**

| Area | | Year 1 | Year 10 | Year 20 | Year 30 | Year 40 | Year 50 |
|---|---|---|---|---|---|---|---|
| **PIA** | Ladonia | $20 | $1,600 | $5,800 | $14,500 | $27,400 | $45,900 |
| | Honey Grove | $20 | $2,400 | $8,700 | $21,700 | $41,100 | $68,800 |
| | Fannin County | $20 | $1,600 | $5,800 | $14,500 | $27,400 | $45,900 |
| **SIA** | | $150 | $5,300 | $15,500 | $25,800 | $34,100 | $40,400 |
| **Texas** | | $2,400 | $99,100 | $305,500 | $579,100 | $882,800 | $1,239,600 |

Note: All amounts in 2015 dollars.
Source: Harvey Economics, 2015

The Fannin County 2016 adopted budget projected receipts of about $652,000 in sales tax revenue. The long-term impacts to Fannin County would be positive, increasing revenues about seven percent.

In 2015, the City of Ladonia collected about $24,000 in sales tax revenue. By year 20 of Lake Ralph Hall operations, land development sales tax revenue would have a major, positive impact on the City. By year 50, revenues are projected to increase almost 200 percent over 2015 receipts. Honey Grove would also experience long-term, major, positive impacts from land development sales taxes. Within the much larger economies of the SIA and Texas, sales tax revenue impacts would be long-term, positive, but negligible.

*Property Tax*

Lake Ralph Hall would affect property tax revenue in Fannin County, but have no impact on property tax revenues in the SIA. Texas does not levy property taxes.

*Construction*

For the purposes of this analysis it is assumed that the entire project area would be owned by UTRWD and completely vacated when dam construction begins. The impacts to the project area will be discussed in the inundation section.

*Inundation*

Since UTRWD is a tax-exempt entity, Lake Ralph Hall would remove almost 12,000 acres from the Fannin County property tax rolls. The assessed value of the affected parcels is totaled in **Table 4-19.**

**Table 4-19: Total Property Value for Lake Ralph Hall Inundated Parcels (millions of dollars)**

| | Value of Buildings | Value of Land | Agricultural Land Valuation | Total Market Value |
|---|---|---|---|---|
| LRH | $1.4 | $3.7 | $20.0 | $25.1 |

Note: The total Timber Market Valuation for the LRH affected parcels was zero. Therefore it was not included.
Source: 2016 Update Dam C Land Value Spreadsheet – June 20, 2016.xls, UTRWD, 2016.

The Fannin County Appraisal District appraises the value of land and buildings at market value, but has two special categories for agricultural and timber land. These are assessed based on the best use as agricultural (or timber) land, not the market value for other uses (e.g. potential housing developments). The total property value for the affected area is 0.8 percent of the total assessed value for Fannin County. About eighty percent of the total value of property affected by Lake Ralph Hall is for agricultural value, again showing the importance of agriculture to the area.

The annual loss in property taxes to Fannin County, Ladonia and the three local school districts due to the inundation of Lake Ralph Hall is presented in **Table 4-20**.

**Table 4-20: Lost Property Taxes Due to Lake Ralph Hall**

| 2016 Project Area Assessed Value | Lost Property Taxes | | | |
|---|---|---|---|---|
| | Fannin County | School Districts | Ladonia | Total |
| $7,095,000 | $16,000 | $30,000 | $700 | **$46,700** |

Note: The project area of LRH covers portions of three school districts. Most of the project area is in Fannindel ISD, with parts in Honey Grove ISD and Bonham ISD.
Source: 2016 Update Dam C Land Value Spreadsheet – June 20, 2016.xls, UTRWD, 2016.

The lost property taxes for Fannin County, the school districts and Ladonia are less than one percent of the total property taxes collected by each jurisdiction. Additionally, the loss of property taxes would be reduced through an arrangement reached between UTRWD and Fannin County. Once UTRWD acquired 5,000 acres of land for the development of the lake, it began making payments to Fannin County to help offset the loss. The first payment occurred in October of 2015. Fannin County will apportion the payments amongst the various local government agencies. The schedule of payments is shown in **Table 4-21**.

**Table 4-21: Schedule of UTRWD Payments to Offset Fannin County's Property Tax Loss**

| Year | Payments |
|---|---|
| 1 | $58,000 |
| 2 | $58,000 |
| 3 | $58,000 |
| 4 | $50,500 |
| 5 | $43,500 |
| 6 | $36,000 |
| 7 | $29,000 |
| 8 | $21,500 |
| 9 | $14,500 |
| 10 | $7,000 |
| **Total** | **$376,000** |

Source: Upper Trinity Regional Water District and Fannin County, Texas Agreement Concerning the Development of Proposed Lake Ralph Hall in Fannin County. UTRWD, 2010d.

As seen in **Table 4-21**, the payments start off at approximately the estimated loss to Fannin County and then after three years they begin to decline, until after ten years, the payments cease. However, as the payments are triggered when UTRWD acquired 5,000 acres (44 percent of the total project area), Fannin would still receive property tax revenue from the remainder of the project area. Similarly, by the tenth year, the lake should be completely constructed and development should have started to occur around it. This development would increase the taxable value of the area surrounding the lake and potentially offset the lost revenue from the inundated land. UTRWD acquired the necessary amount of land in 2015, with the first payment occurring in October of that year.

*Land Development*

The residential land development around Lake Ralph Hall would also generate property tax revenue for the cities, county and school districts, as shown in **Table 4-22**.

**Table 4-22: Projected Property Tax Revenue Related to Residential Land Development at Lake Ralph Hall, for the PIA, Year 1 though Year 50**

| PIA | Year 1 | Year 10 | Year 20 | Year 30 | Year 40 | Year 50 |
|---|---|---|---|---|---|---|
| Ladonia | $2,000 | $83,300 | $257,000 | $487,200 | $742,700 | $1,042,800 |
| Honey Grove | $1,100 | $45,100 | $139,100 | $263,600 | $401,900 | $564,300 |
| Fannindel ISD | $6,000 | $251,500 | $775,600 | $1,470,300 | $2,241,500 | $3,147,300 |
| Honey Grove ISD | $400 | $18,800 | $57,900 | $109,700 | $167,300 | $234,900 |
| Bonham ISD | $200 | $9,700 | $29,800 | $56,500 | $91,700 | $128,700 |
| Fannin County | $3,100 | $131,100 | $404,300 | $766,400 | $1,168,400 | $1,640,600 |

Note: All amounts in 2015 dollars.
Source: Fannin County Appraisal District http://www.fannincad.org/ and Harvey Economics, 2016b.

In the early years of development, property tax revenue would be quite small and would have little impact on fiscal conditions within the PIA. Over time, these revenues would grow and would have a major, positive impact on the Ladonia, Honey Grove and school districts. For Fannin County,

these projected revenues would be moderate and positive. There would be no property tax impacts in the SIA.

As discussed above, it is likely that visitors at Lake Ralph Hall would necessitate additional law enforcement and emergency medical services, either at the county or city level. Additional law enforcement and emergency services are projected to cost about $100,000 beginning in year 1 and reaching about $500,000 by year 50 (Fannin County, 2016a). The increased law enforcement and emergency services expenditures required by the additional land development at Lake Ralph Hall are assumed to be adequate to handle any new demands created by the increased population.

**Summary of Fiscal Impacts**

The fiscal impacts of Lake Ralph Hall are twofold; there would be losses in both sales and property tax revenue from the inundation of the land, but gains from increased spending due to construction, and land development. The losses in sales tax revenue would be minor, and would be outweighed by the gains. The losses in property tax revenue would similarly be minor and UTRWD is providing money to Fannin County to offset this loss, and the increase in property tax revenue from land development would dwarf the losses.

## Lake Ralph Hall Water Pipeline Alignment

The impacts (direct and indirect) of the Lake Ralph Hall pipeline are addressed in this section. The Lake Ralph Hall pipeline travels in a southwesterly direction from the Lake through Fannin and Hunt counties until it reaches Collin County. There, it turns west and connects to the City of Irving pipeline.

The pipeline is a smaller project than the lake (about 30 percent of the total costs), and the effects are spread over multiple counties, rather than at one location, so the benefits are anticipated to be smaller and more spread out. For the pipeline, the PIA is defined as the actual footprint of the pipeline so the impacts to the PIA are expected to be minimal; almost all of the impacts would affect the SIA and the remainder of Texas. The pipeline footprint (PIA) consists of a 70-ft temporary ROW easement for construction, then a 30-ft permanent ROW easement for the operation of the pipeline. The permanent easement is for ROW only, the area should be able to be returned to its original use once construction has ceased.

**Construction Impacts**

The economic effects of construction are short-term in nature; once construction ceases, the benefits cease. These benefits are enumerated in this section. The construction of the Lake Ralph Hall pipeline is expected to take three years to complete and is scheduled to commence in 2021. **Table 4-23** provides a categorization of the total costs to install the Lake Ralph Hall pipeline.

**Table 4-23: Construction Costs for the Lake Ralph Hall Pipeline**

| Project Costs | Cost (millions of dollars) |
|---|---|
| Materials | $45.5 |
| Labor | $17.4 |
| Supplies | $7.2 |
| Engineering | $5.6 |
| Right-of-Way Easements | $0.6 |
| **Total Project Costs** | **$76.3** |

Note: As with the dam, the contingency costs were allocated amongst the other costs.

Source: UTRWD, "RFI#3 Response Letter and Attachments", 2010c; HE, 2015

About 70 percent of the Lake Ralph Hall pipeline costs are for materials and supplies. Labor makes up almost a quarter of the costs. Much like the lake, spending on these three items would account for the majority of the economic impact to the local areas.

*Construction Workforce*

The construction workforce is assumed to be evenly spread over the entire period. The Lake Ralph Hall pipeline would require 94 workers per year to install. Unlike the construction of the dam alternatives, no workers would be drawn from the PIA. The SIA is assumed to provide almost all (85 percent) of the workers, with some specialized skills or less common trades workers coming from the Dallas area. Again, all the workers are assumed to commute daily to the job site. Compensation per worker was shown earlier in **Table 4-12** and is assumed to be the same for the pipeline construction workers.

*Construction Worker Income*

The Lake Ralph Hall pipeline would add $15 million in payroll to the SIA for a total of over $17 million in Texas.

*Construction Materials and Supplies*

**Table 4-23** shows that spending on construction materials and supplies makes up the majority of the spending on the Lake Ralph Hall pipeline. Therefore it would have the greatest impacts on the

regional economy. **Table 4-24** displays the total materials and supplies costs for the Lake Ralph Hall pipeline and where they would be sourced from.

**Table 4-24: Sales Location of Materials and Supplies Purchased for the Lake Ralph Hall Pipeline (millions of dollars)**

| | Total Materials &Supplies Costs | Amount Purchased in: | | | |
|---|---|---|---|---|---|
| | | PIA | SIA | Texas | Out of State |
| LRH Pipeline | $52.8 | $0.0 | $5.3 | $42.2 | $5.3 |

Source: UTRWD "RFI#3 Response Letter and Attachments", 2010c; HE, 2015

As most of the costs for materials and supplies would be spent on pipe, which is assumed to be available in Texas, an estimated 80 percent of the purchases would occur in the state (outside the SIA). Both the SIA and out of state vendors would likely each supply 10 percent of the materials and supplies.

*Summary of Construction Impacts*

The indirect or induced benefits of construction arise from the direct spending being re-circulated through the economy. **Table 4-25** depicts the direct, indirect and total benefits arising from the construction of the Lake Ralph Hall pipeline.

**Table 4-25: Summary of Employment, Income and Total Expenditure for the Construction of the Lake Ralph Hall Pipeline**

| | Direct | Indirect | Total |
|---|---|---|---|
| **Employment** | | | |
| PIA | 0 | 0 | 0 |
| SIA | 80 | 124 | 203 |
| Rest of Texas | 14 | 933 | 947 |
| **Total (Texas)** | **94** | **1,057** | **1,150** |
| **Income (millions of dollars)** | | | |
| PIA | - | - | - |
| SIA | $14.7 | $13.0 | $27.7 |
| Rest of Texas | $2.6 | $37.9 | $40.5 |
| **Total (Texas)** | **$17.4** | **$50.9** | **$68.2** |
| **Total Expenditures for Goods and Services (millions of dollars)** | | | |
| PIA | - | - | - |
| SIA | $20.0 | $20.3 | $40.4 |
| Rest of Texas | $44.8 | $111.2 | $156.0 |
| **Total (Texas)** | **$64.9** | **$131.5** | **$196.3** |

Note: Out-of-state impacts are excluded from this table. An estimated 9 percent of additional economic effects would occur outside Texas as a result of the project.

Source: HE, 2015.

For reasons discussed previously, there are no economic benefits accruing to the PIA. Any temporary impacts that occur to the PIA during the construction phase are addressed in the Right-of-Way Aspects section below.

Adding 200 new jobs to the SIA, or 900 jobs to Texas is a positive but negligible impact in terms of the overall jobs market in those areas. The addition of about $28 million in income would result in a 0.1 percent increase in total income for the SIA. The impact to Texas would also be positive, but negligible. There is projected to be a 0.1 percent increase to the overall economy in the SIA from the sales of goods and services, while the impacts to Texas are small, but favorable. Overall the construction of the Lake Ralph Hall pipeline would have a small benefit to the SIA and negligible benefits to Texas, but the impacts would be positive.

**Right-of-Way Aspects**

This section outlines the ROW impacts of the Lake Ralph Hall pipeline. UTRWD would purchase ROW easements that would allow the land user to return the land to its prior use once construction is finished. The future land is mostly unaffected as long as UTRWD can access the pipeline should that be necessary. **Table 4-26** shows the acreage affected by the Lake Ralph Hall pipeline ROW broken down by land use type.

**Table 4-26: Lake Ralph Hall Pipeline Right-of-Way by Land Use Type (acres)**

| Land Use Type | Right-of-Way |
|---|---|
| Roads & Buildings | 6 |
| Stream Channels | 2 |
| Cropland | 80 |
| Forest | 74 |
| Grasses | 11 |
| Park Like | 15 |
| Pasture | 180 |
| Young Trees | 17 |
| Stock tanks | 0 |
| On-Channel Ponds | 0 |
| **Total** | **384** |

Note: Rows may not sum due to rounding
Source: Pipeline Alt Land Use Table, UTRWD, 2010

The majority of the land use on the pipeline route is agricultural or wooded areas. This will minimize the disruption during installation.

Overall, the disruptions to the ROW would be minor (during the construction phase) and would only impact a portion of the ROW at a time. Also, they would be spread over a number of land owners, so the impact to any particular land owner would be minimal. At worst, farmers would lose a small portion of their cropland for one growing season or pasture land for a few weeks. The disruption would not last for the whole season, but trench digging for a pipeline would mean that

a crop would not be grown on that land that season. The permanent impacts would be negligible as the land could be returned to it prior use once installation was completed.

**Public Facility and Services Impacts**

Since the PIA is the pipeline footprint only, there would be no impacts to public facilities and services related to the Lake Ralph Hall pipeline. SIA impacts are described below.

*Law enforcement*

Potential impacts to law enforcement arising from pipeline construction would likely be related to increased traffic from commuting workers and transportation of construction equipment. Temporary road closures may also be necessary, which would create a need for traffic control officers. These effects should be quite small and easily handled by the existing law enforcement agencies within the SIA. These negative impacts would be negligible and temporary.

*Emergency Services*

Workers engaged in the construction of the Lake Ralph Hall pipeline might be injured or become ill while on the job. Commuting workers might be involved in traffic accidents. The number of such incidents from 94 construction workers is likely to be low and can be handled by the existing emergency services available in the SIA. These negative impacts would be negligible and temporary.

*Health Services*

A full range of health services are available at several area hospitals and medical centers in the SIA. These existing facilities would be sufficient to handle any additional demand due to construction of the Lake Ralph Hall pipeline. These negative impacts would be negligible and temporary.

*Education*

There would be no population impacts resulting from construction of the Lake Ralph Hall pipeline and as a result, no impacts to education in the SIA.

Overall, the impacts to public facilities and services from the construction of the Lake Ralph Hall pipeline would be negligible and temporary. The impacts from the operation of the pipeline would be even smaller, but long-term.

**Fiscal Impacts Related to the Lake Ralph Hall Pipeline**

Building and operating the Lake Ralph Hall pipeline would affect sales tax revenues in the affected regions, but it is not expected to impact property tax revenues. The Lake Ralph Hall pipeline is not expected to significantly change the assessed value of any of the properties that it passes through and consequently, would not change the property taxes collected by the various jurisdictions.

*Sales Tax*

The impact of the Lake Ralph Hall pipeline on sales tax revenues would be from sales of goods and services and employee spending. These impacts would be temporary and positive.

*Construction*

The increased spending in the economy, both by workers and for materials and supplies would increase the sales tax revenues to the SIA and Texas. **Table 4-27** shows the sales tax revenue collected by the various jurisdictions from the construction of the Lake Ralph Hall pipeline.

**Table 4-27: Total Sales Tax Collected from the Construction of the Lake Ralph Hall Pipeline**

| | Area | Employee Spending | Sales of Materials and Supplies | Total |
|---|---|---|---|---|
| Amount Subject to Sales Tax | | $7,627,616 | $27,567,134 | $35,194,760 |
| Percentage Spent in Region | PIA | 0% | 0% | |
| | SIA | 86% | 10% | |
| | Texas | 100% | 100% | |
| Sales Tax Rates | PIA | 0.0% | 0.0% | |
| | SIA* | 0.5% | 0.5% | |
| | Texas | 6.25% | 6.25% | |
| Sales Tax Collected | PIA | $0 | $0 | $0 |
| | SIA* | $21,802 | $9,189 | $30,991 |
| | Texas | $476,727 | $1,722,946 | $2,199,672 |

Note: (1) Assumes that the workers from Texas spend a small amount (5 percent) of money in the SIA, but that most of the spending subject to sales tax is done in the workers' home region.
(2) All the sales subject to the local taxes are also subject to Texas state sales tax.
(3) Assumes half the materials and supplies costs are subject to sales tax.
(4) Includes direct and indirect effects.
(5) Purchases are assumed to be spread evenly over the three counties making up the SIA. However, Collin County does not levy a county sales tax, so no county taxes are collected on sales in Collin County

Source: Texas Window on State Government Local Sales and Use Tax, http://www.window.state.tx.us/taxinfo/local/city.html Accessed April, 2016; Consumer Expenditure Survey, U.S. Bureau of Labor Statistics, http://www.bls.gov/cex/ Accessed April, 2016; HE, 2016

For the SIA, employee spending has the most impact on sales tax revenues. The increase in sales tax collected due to spending on the Lake Ralph Hall pipeline would be very modest (less than one percent) in all the jurisdictions affected. Also, these impacts are short term, once construction ceases, the revenue ceases.

*Right-of-Way*

There would be no sales tax impacts to the Lake Ralph Hall pipeline ROW because it is not a taxing entity and there would be no increase (or decrease) of sales to that area.

The fiscal impacts of the Lake Ralph Hall pipeline are limited to a small sales tax increase from the purchase of materials during construction. No other fiscal impact is expected.

**Operational Impacts for Lake Ralph Hall**

Once the dam and pipeline are completed, UTRWD plans to employ eight full-time and two part-time workers in the Ladonia area. The full-time workers would include a reservoir manager, a senior operator, a senior mechanic, an electronic technician, three operator/maintenance workers and a mechanic. The expected salaries for these positions range from just over $46 thousand per year to about $80 thousand, all of which are higher than the median earnings in Fannin County, which was $25,894 for 2011-2015 (USCB 2011-2015 American Community Survey [ACS]). The two part-time employees would be a special assistant for property services and a property management assistant. They would be employed for up to twenty hours per week at annualized salaries ranging from about $53 thousand to around $80 thousand per year. The electronic technician, the three operator/maintenance workers and the mechanic would only spend 50 percent of their time in the Ladonia area, while the others would be there all the time. While the sales and property taxes paid by these employees would have a positive effect on the area, it would be negligible compared to the land development impacts. Similarly, their impacts on the public facilities and services would be negligible.

**Rate Impacts on UTRWD Members and Customers**

In addition to the impacts from construction, inundation, and future development, the Lake Ralph Hall project would also impact the rates and fees charged by UTRWD to its members and customers, since project capital and operating costs must be repaid. This section estimates the incremental change to UTRWD's rates and fees caused by the Lake Ralph Hall project (both the lake and pipeline together). UTRWD sells water only to its members and customers, all of whom are resellers of this water to various other entities and traditional water customers (municipal, industrial, etc.). UTRWD does not sell to individual water consumers. This rate impact examines the impact on UTRWD rates and fees charged to members and customers. The charges to ratepayers served by each Member and Customer would be different and depend on the individual cost recovery techniques and policy decisions of each Member and Customer.

*UTRWD Charges and Fees*

UTRWD levies three charges and fees for water services: the Demand Charge, the Volume Charge, and the Flat Rate. Members and customers are levied one or more of these charges and fees depending on their individual circumstances; none pay all three charges at once. The most commonly applicable charges are the Demand Charge and the Volume Charge.

The Demand Charge is calculated to cover the fixed costs of providing water. UTRWD calculates the expected fixed costs for the upcoming year and divides those by the subscribed amounts to calculate the demand charge. This charge is based on the subscribed or contracted water demand. For Fiscal Year (FY) 2017, the Demand Charge was $411,500 per subscribed million of gallons delivered daily (mgd).

The Volume Charge recovers all variable costs, i.e., any cost that can be related back to the volume of water delivered. It is billed on a monthly basis for water supplied to the Member's or Customer's master meter. This charge is set by dividing the expected variable costs by the expected amount of water to be delivered. Each member or customer has a minimum actual take requirement to ensure that the water treatment plant is kept running, but that minimum is rarely an issue since they have historically taken more than the minimum. Customers pay a seven percent surcharge on the Volume Charge that Members do not. In 2016, the Volume Charge was $1.11 ($1.19 for Customers) per thousand gallons.

The Flat Rate ($4.33/1,000 gal in 2016) is used in place of a demand plus volume charge for smaller customers and for other irregular sales such as construction water. The Flat Rate is seldom applied.

Generally, a Member or Customer would only pay the Demand Charge and Volume Charge once their water distribution system is connected to the UTRWD system and they are being supplied water. These two charges would be impacted by the construction and operation of Lake Ralph Hall.

*Cost Recovery Calculations*

As discussed previously, the Demand and Volume Charges are the total fixed and variable costs, respectively, divided by the subscribed and expected amounts of water to be delivered.

To calculate the Demand Charge, the fixed costs of Lake Ralph Hall dam and pipeline construction costs plus the fixed costs of running the lake and pipeline are totaled for the year in which they are spent. For capital construction costs, UTRWD would employ various methods of financing to spread the costs over time, so the annual costs would be the costs for debt service. Annual debt service is divided by the amount of water (mgd) delivered by UTRWD that year to derive the Lake Ralph Hall capital expenses per mgd in that year. The annual charges in this calculation, compared with the 2016 Demand Charge, represent the percentage change in the Demand Charge each year. Fixed annual operation and maintenance costs are added to the capital costs to calculate the total Demand Change per mgd.

The variable costs of getting water from Lake Ralph Hall to the members and customers, including variable lake operating costs, pumping costs for conveying the water and water treatment costs are calculated on a per 1,000 gallon basis to determine the Volume Charge for Lake Ralph Hall. The overall Volume Charge levied by UTRWD is based on a blended cost of acquiring water from multiple sources, then treating and delivering it to the members and customers. The variable costs of Lake Ralph Hall water would be incorporated into this blended cost.

*Rate Impacts*

For the purposes of the rate impact analysis, the Demand Charge and the Volume Charge have been combined into one wholesale effective rate per 1,000 gallons (NewGen Strategies and

Solutions, 2016). This allows the overall rate impacts of the lake and the pipeline to be calculated and presented in a simplified manner. In 2016, the effective wholesale rate was $4.33 per 1,000 gallons. These rate impacts are projections since actual financial conditions and borrowing strategies would be addressed prior to project commencement. All impacts are presented in 2016 constant dollars.

Over the whole period, the average annual difference in the wholesale effective rate is 2.9 percent (or about 24 cents per 1,000 gallons in any year). However, these increases are not consistent. Generally, the wholesale effective rate rises slowly while the lake and pipeline are being constructed; once the lake is in operation, the rate differences are more substantial, until the debt service for the dam is fully repaid. Rate impacts diminish thereafter.

From 2016 until 2024, when the project is expected to be completed, the average annual rate difference is 1.5 percent (about 9 cents per 1,000 gallons) per year. Between 2025 and 2035, the annual rate differences attributable to Lake Ralph Hall are fairly consistent, an average 5.7 percent (40 cents per 1000 gallons), a high of 6.1 percent and a low of 4.7 percent. After 2035, the annual rate differences fall off every year, from 5.3 percent in 2035 down to 0.3 percent in 2060. The average change in the wholesale effective rate in this period is 2.1 percent.

## Socioeconomic Impact Summary for the Proposed Alternative

A summary of the net socioeconomic effects of the Proposed Alternative is provided below. This summary consolidates all of the individual socioeconomic issues and related impacts discussed earlier in this section. The dam site and pipeline alternatives are addressed separately. The water rate and fee impacts on UTRWD customers are presented earlier in this section and reflect the dam site and pipeline combined.

**Table 4-28** provides the short-term socioeconomic impact summary for Lake Ralph Hall, which covers the three-year dam construction period, beginning in the year 2019.

**Table 4-28: Short-Term Socioeconomic Impact Summary for Lake Ralph Hall**

| | PIA | SIA | Rest of Texas | Total (Texas) |
|---|---|---|---|---|
| Sales of Goods and Services (000s) | $36,230 | $150,932 | $242,992 | $430,154 |
| Personal Income (000s) | $12,726 | $82,060 | $69,615 | $164,401 |
| Annual Employed Persons (FTE)* | 156 | 445 | 1,396 | 1,998 |

Note: Includes direct and indirect impacts.
*Full Time Employee (FTE)

The net effects on sales of goods and services from Lake Ralph Hall amounts to almost $430 million, with about $36 million expended in Fannin County, the PIA for Lake Ralph Hall. Fannin County personal income would increase by $12.7 million during the three-year dam construction period, although the largest part of the income benefits would accrue to the SIA because of construction related expenditures in those areas. Total short-term employment effects for each of

the three construction years would amount to 156 in the PIA and about 2,000 throughout the State of Texas.

Lake Ralph Hall would inundate about 7,600 acres and retire a total of about 12,000 acres of land in Fannin County representing about two percent of the total County land. Agricultural revenue losses from land retirement are estimated to be about $0.8 million or two percent of the County total. An estimated one home would be lost and their residents would be displaced from the project footprint.

**Table 4-29** presents the summary of long-term net socioeconomic impacts for Lake Ralph Hall, which account for losses from inundated agriculture (not accounting for UTRWD land purchases and payments to Fannin County) which are more than offset by gains from land development after the project is completed.

**Table 4-29: Long-Term Socioeconomic Impact Summary for Lake Ralph Hall**

| | Area | Year 10 | Year 20 | Year 30 | Year 40 | Year 50 |
|---|---|---|---|---|---|---|
| **Sales of Goods and Services (000s)** | PIA | $(2,561.5) | $(1,468.6) | $723.7 | $3,830.3 | $8,308.8 |
| | SIA | $2,824.8 | $7,224.8 | $10,876.3 | $13,508.0 | $16,009.1 |
| | Rest of Texas | $1,696.3 | $3,908.4 | $5,833.4 | $7,597.9 | $9,426.9 |
| | **Total (Texas)** | **$1,959.6** | **$9,664.5** | **$17,433.5** | **$24,936.2** | **$33,744.7** |
| **Personal Income** | PIA | $639.8 | $1,677.6 | $2,572.5 | $3,509.8 | $4,967.4 |
| | SIA | $584.7 | $1,510.9 | $2,348.1 | $2,983.0 | $3,535.1 |
| | Rest of Texas | $229.2 | $602.7 | $1,018.6 | $1,451.0 | $1,978.7 |
| | **Total (Texas)** | **$1,453.7** | **$3,791.2** | **$5,939.2** | **$7,943.7** | **$10,481.1** |
| **Employed Persons** | PIA | 8 | 37 | 64 | 93 | 139 |
| | SIA | 17 | 41 | 64 | 90 | 106 |
| | Rest of Texas | 6 | 17 | 29 | 42 | 58 |
| | **Total (Texas)** | **31** | **95** | **157** | **226** | **303** |

Note: Includes net positive direct, indirect and induced effects from lost agricultural revenue and lakeside land development.

Once completed, the net positive effects from Lake Ralph Hall would be modest in the early years, but grow steadily to make a substantial contribution after year 30, following the initial reservoir fill. Total spending on goods and services in the PIA would amount to $0.7 million by year 30 and approximately $17.4 million total by that year throughout the state. PIA income levels would reach almost $2.6 million by year 30 and an increase of 64 employed persons. A summary of the tax revenues generated from Lake Ralph Hall is shown in **Table 4-30**.

**Table 4-30: Summary of Long-Term Net Tax Revenues Generated by Lake Ralph Hall (Thousands of dollars)**

| Area | | Year 10 | Year 20 | Year 30 | Year 40 | Year 50 |
|---|---|---|---|---|---|---|
| **PIA** | Ladonia | $81.8 | $228.6 | $433.6 | $660.9 | $928.7 |
| | Honey Grove | $41.1 | $126.0 | $238.9 | $364.0 | $511.4 |
| | School Districts | $433.5 | $678.1 | $1,321.3 | $2,045.1 | $2,887.8 |
| | Fannin County | $229.5 | $352.2 | $684.6 | $1,053.4 | $1,487.1 |
| **PIA Total** | | $786.0 | $786.0 | $1,384.8 | $2,678.4 | $4,123.4 |
| **SIA Total** | | $6.8 | $6.8 | $13.7 | $17.1 | $18.8 |
| **Rest of Texas Total** | | $155.8 | $155.8 | $311.7 | $386.4 | $421.5 |
| **Total (Texas)** | | $948.7 | $948.7 | $1,710.2 | $3,081.9 | $4,563.8 |

Notes: (1) All Amounts are in 2016 dollars.
(2) UTRWD has an arrangement with Fannin County to help offset the loss of property taxes due to Lake Ralph Hall. The amount shown above is the total amount paid over a ten-year period. See Exhibit 4-x for details. Honey Grove would not lose any property taxes due to the inundation of LRH. It is also not a beneficiary of the UTRWD payments.
(3) The School districts do not receive any sales tax.

The net tax revenues reflect property taxes from land development, sales taxes from visitors and land development , and payment in lieu of property tax by UTRWD, which together more than offset lost property taxes from the Lake Ralph Hall inundation and land retirement. The City of Ladonia would experience net increases of more than $400,000 per year by year 30 and more than $900,000 per year by year 50. Fannin County is projected to experience net positive increases in revenues of $685,000 by year 30. The total net revenues generated by Lake Ralph Hall in the State of Texas are projected to exceed $1.7 million by year 30 and $4.6 million by year 50.

With Lake Ralph Hall, the local jurisdictions would experience an increase in law enforcement and emergency service demands during construction and operation. School enrollment and related demands would also increase. Project related revenues should more than offset these impacts.

The water rate increases for Lake Ralph Hall, expressed through the wholesale effective rate per 1,000 gallons, would be an average of 2.9 percent higher in each year between 2016 and 2060, as compared to without Lake Ralph Hall. However, wholesale rates will be an average of 5.7 percent higher than without Lake Ralph Hall once Lake Ralph Hall is filled, for an extended period

The socioeconomic impact summary for the Lake Ralph Hall pipeline is shown in **Table 4-31**.

**Table 4-31: Short-Term Socioeconomic Impact Summary for the Lake Ralph Hall Pipeline**

| | PIA | SIA | Rest of Texas | Total (Texas) |
|---|---|---|---|---|
| Sales of Goods and Services (000s) | - | $30,641 | $47,801 | $78,441 |
| Personal Income (000s) | - | $27,734 | $40,479 | $68,213 |
| Employed Persons (FTE) | 0 | 203 | 947 | 1,150 |

Note: Includes direct and indirect impacts.

The pipeline would result in an increase of about $78 million in purchases for goods and services in the State of Texas over the three-year pipeline construction period. None of the benefits would occur in the PIA, which is the footprint of the pipeline. The pipeline would generate total

employment in the state of Texas of about 1,100 persons per year for the three-year pipeline construction period, including direct, indirect and induced workers. Personal income would amount to about $68 million over this three-year period.

Affected lands disturbed by the ROW for the pipeline would amount to almost 400 acres. These lands would be disturbed temporarily; farmers might lose a portion of their crop during one growing season for affected pasture lands. Public facilities and services would not be affected by the construction of the pipeline.

The sales tax benefits from the construction of the pipeline are indicated in **Table 4-32**.

**Table 4-32: Total Sales Tax Collected from the Construction Phase of Lake Ralph Hall Pipeline**

| Jurisdiction | Total |
|---|---|
| PIA | $0 |
| SIA | $30,991 |
| Texas | $2,199,672 |

Note: Assumes half the materials and supplies costs are subject to sales tax and none of it is subject to property tax. Purchases are assumed to be spread evenly over the three counties making up the SIA. However, Collin County does not levy a county sales tax, so no county taxes are collected on sales in Collin County

Source: HE, 2010

In total, approximately $2.1 million in state taxes would be generated from the construction of this pipeline, of which only $31,000 would be generated in the SIA.

## 4.17.2 Cumulative Effects

### 4.17.2.1 No Action Alternative

Under the No Action Alternative, growth patterns could differ from that of the Proposed Action, as discussed in **Section 4.17.1.1**, because growth would be displaced outside the UTRWD service area. In addition, impacts to current residents within the UTRWD service area would potentially be impacted by water restrictions and higher water costs.

### 4.17.2.2 Proposed Action

There are two large reservoirs that are currently proposed to be built in Fannin County; Lake Ralph Hall and the LBCR . Lake Ralph Hall is described extensively in other sections of this report. The LBCR will be located a little north of the center of Fannin County and about 30 miles north-west of Lake Ralph Hall's proposed location. Under the applicant's proposed action, the project area for the LBCR will cover about 17,000 acres and the reservoir would have a storage capacity of over 367,000 acre-feet. This is over 40 percent larger than Lake Ralph Hall by project area. The

cumulative impact of the construction and operation of these two reservoirs is discussed in this section.

Lower Bois d'Arc Reservoir

The LBCR will impound up to about 367,600 acre-feet of water and divert up to 175,000 acre-feet per year, with an estimated firm yield of 120,665 acre-feet per year, into an approximately 16,600-acre lake. The raw water from the reservoir would then be transported by approximately 35 miles of new pipeline to a proposed new terminal storage reservoir and water treatment plant – the "North Water Treatment Plant" – just west of the City of Leonard in southwest Fannin County.

The LBCR will have about a 17,000-acre footprint, on largely rural countryside, with some residences. Approximately 38 percent is cropland and 37 percent consists of bottomland hardwoods and riparian woodlands, with the remaining 25 percent consisting of mostly upland deciduous forest.

The NTMWD webpage on the LBCR states that final permitting and construction is scheduled for early 2018 with completion by 2022 (NTMWD, 2017). The 404 permit was issued in January 2018. The LBCR FEIS states that construction of the LBCR dam, pipeline and associated infrastructure will create over 5,000 person years of employment. Averaging this workforce over the four-year construction period yields about 1,250 workers required per year. Overall, the entire project is estimated to cost just under $600 million for construction, with just over $51 million in annual costs to operate.

Existing recreation activities in LBCR footprint would cease once the construction phase begins, and last the duration of the three- to four-year construction phase and beyond. The size or physical extent of such adverse impacts would be small (localized), given the relatively few number of people that would be affected. These activities will cease once the creek becomes inundated by the reservoir. However, the reservoir would serve as a major new outdoor recreation asset for Fannin County and the region. At this stage, no specific recreational facilities, activities, designs or locations have been chosen. However, Fannin County's Comprehensive Plan for the LBCR, adopted October 18, 2016, includes plans for public access points, opportunities for both passive and active recreation, and trail connections. Additionally, residential homes (e.g., single family, two-family, manufactured home) are also planned for development around the lake, the majority on larger properties (i.e., one acre) in an effort to maintain the rural character of the area (Fannin County, 2016b). At least 2,100 new dwellings would be constructed in the area surrounding the reservoir as weekend/vacation homes and investment properties.

**Construction Impacts**

The LBCR Revised FEIS states "At the time the LBCR EIS began and even at the time of the March 2012 meeting to discuss cumulative impacts of LBCR and LRH, it appeared that their construction schedules could overlap, which would cause short-term cumulative impacts. However, this situation has changed and the current construction timeframe for LRH is estimated

to occur between 2025 and 2030. This would be subsequent to the proposed construction of LBCR. It is thus likely that both projects would not be built concurrently." However, as noted in the **Section 4.17.1.2**, the construction of Lake Ralph Hall and the pipeline is expected to begin in 2019 and finish in 2023. Hence, for four years (2019 through 2022), both projects may be under construction concurrently. As discussed in **Section 4.17.1.2**, Lake Ralph Hall will require approximately 300 workers per year for construction of the dam and about 100 persons per year for the pipeline (these workers will be needed consecutively, pipeline work will not commence until the dam is finished). And, as noted above, the LBCR will require about 1,250 workers per year from 2018 to 2022. Combining these workers with the maximum number of workers required for Lake Ralph Hall indicates about 1,550 workers per year for a couple of the years where construction overlaps.

While this is many more construction workers than are available in Fannin County, **Table 4-12** indicates that there are more than enough workers in the SIA and in Dallas to meet this need. And given the proximity of Dallas, it is reasonable to expect workers to commute to Fannin County to work on either project.

Despite the potential competition for construction workers, the cumulative impacts of the construction phases of the two reservoirs are similar. Both lakes cause some short-term adverse impacts, mostly due to inundation of agricultural land and protection services. Regarding loss of associated property tax receipts, both proposing entities also have agreements where they make payments to offset some of these tax losses. These short-term adverse impacts are also weighed against the short-term economic stimulus provided by the construction of the projects.

**Operational Impacts**

While the main cumulative impacts of the two lakes will be recreational (the recreational impacts are discussed in the Recreation section below), there will be operational socioeconomic impacts that derive from this anticipated increased recreation. These impacts include the income and employment for permanent residents and the local tax impacts to Fannin County.

The socioeconomic impacts sections for Lake Ralph Hall described in **Section 4.17.1.2** project that, 50 years after lake completion, Fannin County will have over 1,000 new houses. The LBCR combines the impact of permanent and weekend residents for a total of 2,100 new houses. Additionally, the new permanent residents will provide the population base and demand for goods and services leading to increased employment, and income in the area. This will also lead to an increase in sales and property tax revenues for the county and the other taxing entities. These impacts are detailed in the socioeconomic sections of the LRH DEIS and LBCR FEIS.

However, with the two lakes, there may be some competition between them for new lake-oriented visitors and residents and therefore some sharing of the benefits. People are unlikely to buy two lake-view properties just because two new lakes are being built, and they will choose which lake to visit on a given weekend. Lake Ralph Hall will not have lakeside homes – only lake view homes,

while The LBCR will have both lakeside and lake-view homes. Lakeside homes are in higher demand than lake-view homes, which will likely be reflected in the price for these properties and the sales of lakeside homes could occur faster than lake-view homes. This could delay the housing development at Lake Ralph Hall as the lakeside homes are developed first. Overall, this will cause a modest reduction in the overall effects (i.e. the total impacts of the two lakes will be somewhat less than the sum of the impacts projected for each lake) due to this competition.

As mentioned above, the inundation of the two reservoirs will remove land from Fannin's tax rolls. However, both proposing entities have agreements to help make up the temporary loss of property taxes until the construction of new houses can increase the total taxable value for the County. In both cases the total taxable amount from the new house construction is expected to substantially outweigh the loss due to inundation. Additionally, these new residents will increase the sales tax revenue with their local purchases. Again, there will be competition between the two lakes and people are likely to choose one or the other, leading to a modest reduction in the overall tax impacts to the County.

The Fannin County Planning Commission is working to develop a zoning plan that will improve prospects for quality development at Lake Ralph Hall. Developers will be required to go through the Fannin County Subdivision committee before getting a permit. Effective zoning laws should have a positive impact on the quality of development around Lake Ralph Hall. Some lakes in Texas have developed without the benefit of zoning and in those cases the quality of lake properties are often uneven and of lower value. In addition to zoning, developments could require site-built homes, adopt deed restrictions and put in place a homeowners association. These restrictions would improve the quality of development around the lake, but may tend to slow the rate of growth. This DEIS assumes that effective zoning would be enacted and that deed restrictions would be put in place to ensure quality, long-term development.

**Growth Projections**

Employment forecasts are not available for Fannin County, but are available for the Texoma Workforce Development Area (WDA), which is comprised of Cooke, Fannin and Grayson Counties. The Texas Workforce Commission projects the average annual employment in the Texoma WDA to be about 92,350 in 2024, up about 13 percent from the 81,790 people who worked there in 2014. This equates to an average annual growth rate of about 1.2 percent.

The Texas Demographic Center expects Fannin County to grow to about 40,500 people by 2050, from their 2010 base of 33,915. This represents an average annual growth rate of 0.45 percent. However, the growth rate starts out around 0.6 percent per year in the early years and drops to about 0.25 percent in the later years.

Neither the employment projections for the three-county WDA nor the population projections for Fannin County specifically address the impact of either Lake Ralph Hall or LBCR. While neither show any sudden increase due to the construction or later housing and recreation development, of

Lake Ralph Hall or the LBCR, this is more likely due to the forecasting methodology and timing than to the lack of impact of the two projects.

With the moderate to slow growth projected in the employment and population forecasts, along with the slow rate of recreation and housing development forecast in the Lake Ralph Hall DEIS and LBCR FEIS, the marketplace and Fannin County should have sufficient time to respond to demands for the necessary housing, infrastructure and services necessary to meet this growth.

**Recreation Impacts**

Although there is no specific recreational plan for Lake Ralph Hall, it is a reasonably foreseeable future action that recreation will occur on the lake and that the associated recreational amenities will be developed. While Fannin County does have a number of tourist attractions, its rural nature lends itself to recreational activities that take advantage of the outdoors. During the construction phase, each lake would cause some minor negative impacts upon recreation mostly due to the activity in the area. Once the lakes are operational, there will be an overall increase in the recreational amenities in Fannin County, but this increase will not be evident across all recreation types. Both the LRH DEIS and LBCR FEIS project a large increase in recreational activity once their reservoirs are finished. While the county's water-based recreation (fishing, boating, swimming, etc.) will increase, it is likely that the hunting opportunities would decrease because hunting is not generally compatible with the higher levels of people the lakes are expected to attract due to safety concerns and potentially less game.

The primary purpose of Lake Ralph Hall is to provide a water supply for the UTRWD service area and secondarily for the City of Ladonia. The reservoir could also become a recreational resource for the area. This analysis assumes that basic recreational facilities would be constructed at the time the lake is built and that these facilities would be ready for use when the North Sulphur River is impounded. UTRWD is assumed to construct basic amenities such as boat ramps, docks and parking areas, however, no assumptions have been made about the locations of these facilities. UTRWD would not manage these recreational facilities on an ongoing basis. Thus, future operation and maintenance of these facilities would need to be taken over by another entity, most likely the City of Ladonia.

The physical characteristics of Lake Ralph Hall would impact recreational use and development of the lake. At its deepest point, Lake Ralph Hall would be slightly more than 90 feet deep and is expected to be an excellent fishing lake. At about 7,000 surface acres, Lake Ralph Hall is relatively small, as compared to other area lakes, which may limit boating activity. Other characteristics that would impact development and visitor numbers, such as water clarity, are not known at this time.

The water levels in Lake Ralph Hall will vary by season. However, about 95 percent of the time, the annual water level fluctuations are projected to be less than eight feet per year. This compares to an average annual fluctuation of 12.9 feet for five of Texas' more popular recreational lakes (Lewisville Lake, 8.7 feet; Lake Grapevine, 13.1 feet; Eagle Mountain Lake, 5.9 feet; Lake

Texoma, 10.8 feet; and Lake Travis, 26.2 feet) for the 2000 to 2017 period. Only Eagle Mountain Lake has an average fluctuation of less than eight feet per year and Lake Travis has fluctuated more than 10 feet per year for 17 of the previous 18 years. This indicates that the projected water level fluctuations in Lake Ralph will not deter recreational activity on the lake.

*Visitor projections*

Average annual visitation for four comparable lakes was used to project Lake Ralph Hall visitation at year 30 of operation. Year 1, defined as the year in which the reservoir is completely filled and fully operational, was assumed to be 10 percent of year 30 attendance. After year 30, it is assumed that the bulk of development would have been achieved and growth would slow to about one percent a year. After 30 years, when Lake Ralph Hall would likely have amenities completed that are similar to the comparable lakes and a substantial amount of residential and commercial development has occurred, total visitation is projected to reach over 330,000 persons for Lake Ralph Hall. By the 50th year of operation, visitation is projected to be more than 400,000. Recreational visitation is not reported for the LBCR.

*Purchases of goods and services*

Recreational users of Lake Ralph Hall would purchase goods and services associated with travel and activities at the lake. These expenditures would include food, fuel, equipment rentals, bait, sporting equipment, etc. Over time, it is assumed that the majority of these expenditures would take place in close proximity of the lake, such as in Ladonia or Honey Grove. It should be noted that as of 2016, Ladonia has very limited commercial development. It is assumed that during lake construction some additional commercial outlets would open and as the lake attracts more visitors, further commercial development would occur.

In addition, people traveling to Lake Ralph Hall would make purchases such as gasoline and food en route. These expenditures would accrue benefits to the SIA and Texas. Expenditures related to lake recreation are estimated to be $32.31 per person, per day (USACE, 2016). These direct visitor expenditures would be re-spent within the economy leading to additional or indirect effects. **Table 4-33** provides projected expenditures for goods and services related to recreation at Lake Ralph Hall.

**Table 4-33: Direct and Indirect Impacts of the Sales of Goods and Services Related to Lake Ralph Hall Recreation, Year 1 through Year 50 (thousands of dollars)**

| Area | Effect | Year 1 | Year 10 | Year 20 | Year 30 | Year 40 | Year 50 |
|---|---|---|---|---|---|---|---|
| PIA | Direct Effects | $803.8 | $1,642.5 | $3,633.6 | $8,038.3 | $8,879.3 | $9,808.3 |
| | Indirect Effects | $327.9 | $669.9 | $1,482.0 | $3,278.6 | $3,621.6 | $4,000.5 |
| | **Total** | **$1,131.7** | **$2,312.4** | **$5,11.6** | **$11,316.9** | **$12,500.9** | **$13,808.7** |
| SIA | Direct Effects | $214.4 | $438.0 | $969.0 | $2,143.5 | $2,367.8 | $2,615.5 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Indirect Effects | $160.3 | $327.5 | $724.5 | $1,602.7 | $1,770.4 | $1,955.6 |
| | **Total** | **$374.6** | **$765.5** | **$1,693.5** | **$3,746.3** | **$4,138.2** | **$4,571.2** |
| Remainder of Texas | Direct Effects | $53.6 | $109.5 | $242.2 | $535.9 | $592.0 | $653.9 |
| | Indirect Effects | $65.9 | $134.6 | $297.8 | $658.8 | $727.7 | $803.8 |
| | **Total** | **$119.5** | **$244.1** | **$540.0** | **$1,194.7** | **$1,319.6** | **$1,457.7** |
| **Total (Texas)** | | **$1,625.8** | **$3,322.1** | **$7,349.1** | **$16,257.8** | **$17,958.7** | **$19,837.6** |

Note: All amounts are in 2015 dollars.
Source: Value to the Nation, Fast Facts. http://www.corpsresults.us/recreation/recfastfacts.cfm, Bureau of Economic Analysis, RIMS II Multipliers, and HE, 2016b.

By year 30, total economic impacts from recreation related spending within the PIA for Lake Ralph Hall are projected to be $11.3 million. In 2014, retail sales in Fannin County subject to sales tax were $79.1 million. The projected increase of about 14 percent would provide a moderate, positive impact to the PIA. By year 50, sales rise to about $13.8 million or 17 percent of 2014 total county retail sales. This is in addition to the $17 million to $22 million in economic activity that LBCR recreational visitors are expected to contribute to the area. The sum of these recreational visitor sales for lakes could increase Fannin County sales by about 44 percent. However, similarly to the socioeconomic impacts, there will be an element of competition between the two lakes. The recreational amenities and visitation in Fannin County will increase dramatically, but not quite additive for the individual impacts. These recreation expenditures would be a moderate to major, long-term benefit to the PIA. Impacts to the SIA and to Texas, which have much larger economies, would be long-term and positive, but negligible to minor.

*Employment*

As described above, recreational use of Lake Ralph Hall would likely start out at a relatively low level and grow as the recreation aspects become established and as facilities are further developed. Employment opportunities from recreational activities at Lake Ralph Hall are likely to be somewhat seasonal. Although most lakes in the region remain open year-round, almost all Lake Ralph Hall activity is expected in the spring through the fall, with the heaviest usage taking place in the summer months. Direct employment created by recreation at Lake Ralph Hall is likely to be primarily in retail trade, food and other services sectors. As of 2014, almost 14 percent of Fannin County employment was in the retail sector and about five percent was in accommodation and food services sectors. Employment in these sectors is typically relatively low paying. As wages of these direct employees are spent in the local economies, additional jobs, or indirect employment would be created in other economic sectors in the PIA and SIA.

In the early years of operation, employment impacts from recreation would be minimal. By year 30 of operation, total Lake Ralph Hall employment is projected to be 213, with 160 direct and indirect jobs within the PIA, 38 total jobs in the SIA and 15 total jobs for the remainder of the

state. LBCR is projected to support between 300 and 400 jobs. Within the PIA, these impacts would be minor and positive. Within the SIA and Texas, impacts would be negligible and positive.

*Income*

Income from recreational activities at Lake Ralph Hall would also be relatively low in the early years of operation. Direct employment, which is projected to be somewhat seasonal, would supply income to area residents. As this income is spent in the local economy, more jobs and resulting income would be generated. **Table 4-34** provides projected income from recreation related employment at Lake Ralph Hall in year 1 of operation through year 50.

**Table 4-34: Direct and Indirect Income Related to Lake Ralph Hall Recreation for the PIA, SIA and Texas, Year 1 through Year 50 (thousands of dollars)**

| Area | Effect | Year 1 | Year 10 | Year 20 | Year 30 | Year 40 | Year 50 |
|---|---|---|---|---|---|---|---|
| PIA | Direct Effects | $275.1 | $562.2 | $1,243.8 | $2,751.5 | $3,039.3 | $3,357.3 |
| | Indirect Effects | $58.6 | $119.7 | $264.8 | $585.8 | $647.1 | $714.8 |
| | **Total** | **$333.7** | **$681.9** | **$1,508.5** | **$3,337.2** | **$3,686.4** | **$4,072.1** |
| SIA | Direct Effects | $63.0 | $128.7 | $284.6 | $629.6 | $695.5 | $768.3 |
| | Indirect Effects | $22.9 | $46.8 | $103.5 | $228.9 | $252.8 | $279.3 |
| | **Total** | **$85.8** | **$175.4** | **$388.1** | **$858.5** | **$948.3** | **$1,047.5** |
| Remainder of Texas | Direct Effects | $22.8 | $46.5 | $102.9 | $227.7 | $251.6 | $277.9 |
| | Indirect Effects | $12.9 | $26.4 | $58.4 | $129.1 | $142.6 | $157.5 |
| | **Total** | **$35.7** | **$72.9** | **$161.3** | **$356.9** | **$394.2** | **$435.4** |
| **Total (Texas)** | | **$455.2** | **$930.2** | **$2,057.9** | **$4,552.6** | **$5,028.9** | **$5,555.0** |

Source: Value to the Nation, Fast Facts http://www.corpsresults.us/recreation/recfastfacts.cfm Bureau of Economic Analysis, RIMS II Multipliers, and HE, 2016b.

By year 50, direct and indirect income within the PIA would reach almost $4.1 million. This represents 0.4 percent of total 2014 personal income in Fannin County and about two percent of earnings. The income from recreational activities at LBCR would be between $6.2 million and $8.3 million, an additional 0.8 percent of income and 4 percent of earnings, at the high end. Thus, the long-term impacts from recreation related income within the PIA would be positive but modest. Long-term impacts within the SIA and Texas would also be positive, but negligible.

**Conclusion**

As discussed in **Section 4.17.1.2,** the socioeconomic and recreational impacts of Lake Ralph Hall will be minor, and positive, in the long-term. Similarly, the LBCR FEIS concluded that the recreational opportunities from Alternatives 1 and 2 are likely to be moderately beneficial and long-term. Overall, the cumulative impacts on recreation from both lakes would be generally beneficial. The LBCR is expected to have a larger socioeconomic impact than Lake Ralph Hall,

but, in the long-term, the beneficial impacts from recreational revenue and land development would be additive and considerable for Fannin County.

# 4.18 Environmental Justice and Protection of Children

## 4.18.1 Environmental Consequences

### 4.18.1.1 No Action Alternative

Under the No Action Alternative, growth patterns could differ from that of the Proposed Action, as discussed in **Section 4.17.1.1**, because growth would be displaced outside the UTRWD service area. Current water distribution operations would be expected to have the same effects on populations of concern as the general population, discussed in **Section 4.17.1.1**, including the potential for water restrictions and higher water costs.

### 4.18.1.2 Proposed Action

Minority Populations

Fannin County does not constitute an environmental justice population because the percentage of minority population neither exceeds 50 percent nor is substantially higher than the percentage of minorities in the five surrounding counties. As such, there would be no disproportionate environmental justice impacts to Fannin County minority populations overall.

However, a closer look at the distribution of minority populations within Fannin County using block group (BG) data reveals that Honey Grove, Ladonia, and Bonham consist of environmental justice populations, as established in **Section 3.18.1** and shown in **Figure 3-27**. Potential impacts to these environmental justice populations resulting from the construction and operation phases are evaluated below.

*Construction Phase*

The construction phase of the Proposed Action could have minor adverse impacts on minority populations in Ladonia during construction. The types of impacts from the construction equipment, vehicles, and activities that were evaluated include:

1. Noise Disturbances: As discussed in **Section 4.8**, the primary noise disturbance during construction would occur within 1,600 feet of the dam. No noise impacts to Ladonia residents from dam construction are anticipated. Disturbances could occur from an increased level of noise created by construction equipment and vehicles moving throughout the area. No noise impacts would occur in Honey Grove or Bonham.
2. Congestion: Congestion would increase in the immediate area due to additional vehicles and traffic delays near the pipeline, affecting environmental justice populations in Ladonia.

3. Community Cohesion: An increase in travel time or miles traveled during the construction of the pipeline could reduce access to community centers, neighborhood parks, and recreation areas for Ladonia residents.
4. Human Health and Safety: Construction workers are inherently exposed to safety risks such as injury by unguarded machinery and dust inhalation by operating heavy machinery and working on construction sites.
5. Job opportunities: Beneficial impacts could include the availability of short-term construction jobs for area residents, including minority populations in Bonham, Ladonia, and Honey Grove.

During at least a portion of the construction phase, the Proposed Action could result in adverse impacts on Ladonia residents. As discussed in **Section 4.8**, the primary noise impact would be from dam construction and locations more than 1,600 feet from use of heavy equipment would seldom experience appreciable levels of construction noise. Noise from the construction of pipeline to the WTP would not be fixed in one location but would progress along the pipeline as construction progresses; and the pipeline would not traverse any of the minority populations. Some nearby Ladonia residents may experience annoying levels of noise; however, given the distance to the pipeline, impacts would be indirect. Such indirect impacts would be temporary and intermittent, and last for the duration of pipeline-related construction activities but not for the full duration of the construction phase. To minimize the effects of noise impacts, construction would primarily occur during normal weekday business hours in areas adjacent to noise sensitive land uses such as residential and recreation areas; and construction equipment mufflers would be properly maintained and in good working order.

As discussed in **Section 4.13**, congestion would increase in the immediate area due to additional construction vehicles, delays caused by construction activities (i.e., roads temporarily reduced to a single lane), and road closures and detours. Contractors would route and schedule construction vehicles to avoid conflicts with other traffic, and strategically locate staging areas to minimize traffic impacts.

As discussed in **Section 4.17.1**, short-term job opportunities would be a beneficial impact to local and regional workforce and could beneficially impact the minority populations within Fannin County. Construction of the proposed project would also create a number of indirect or induced jobs from project-related spending and the spending decisions of workers.

*Operation Phase*

The operation phase of the Proposed Action would not have adverse impacts on minority populations. Some roads in the project area would be upgraded to higher speed standards which would benefit all users, including minority populations. The proximity of Honey Grove, Ladonia, and Bonham to the reservoir might be advantageous for local recreationists and job-seekers. The

proposed reservoir would introduce the potential for a new recreational resource in the county, which would be beneficial impact for all residents, including minority populations.

Low-Income Populations

As established in **Section 3.18.1**, Fannin County does not meet the regulatory definition of a low-income population, but block group level analysis showed that Bonham and Wolfe City are low-income compared with the county and are therefore considered environmental justice communities (**Figure 3-28**).

*Construction Phase*

The construction phase of the Proposed Action is not anticipated to have adverse impacts on low-income populations in Bonham due to the distance from the proposed project. Beneficial impacts could include the availability of short-term construction jobs available to the entire population, including low-income populations. All construction workers – low-income or otherwise – could inherently be exposed to safety and health risks due to operating heavy machinery and working on-site. Any health and safety risks associated with construction activities would not disproportionately affect low-income construction workers. The construction of the pipeline could have minor, temporary traffic impacts for residents of Wolfe City.

*Operation Phase*

The operation phase of the Proposed Action would not disproportionately impact low-income populations. Some roads in the project area would be upgraded to higher speed standards which would benefit all users, including low-income populations. The proximity of Bonham and Wolfe City to the reservoir might be advantageous for local recreationists and job-seekers. The proposed reservoir would introduce the potential for new recreational resource in the county, which would be beneficial impact for all residents, including low-income populations.

Protection of Children

In compliance with Executive Order (EO) 13045, *Protection of Children From Environmental Health Risks and Safety Risks,* this analysis examines local, regional, and national demographic data; evaluates the number and distribution of children in the area; and discerns whether these children could be exposed to environmental health and safety risks from the Proposed Action. The analysis considers that physiological and social development of children makes them more sensitive to health and safety risks than adults. It also recognizes that children in minority and low-income populations are more likely to be exposed to, and have increased health and safety risks from, environmental contamination than the general population. Activities that result in air emissions, water discharges, and noise emissions are considered to have severe environmental health and safety risks if they were to generate disproportionately high environmental effects on youth populations within the study area. Potential effects include health and safety concerns such

as respiratory issues, hearing loss, and interruption of communication or attention in nearby residences and schools with children present.

Fannin County overall does not meet the regulatory definition of a minority or low-income population, or an environmental justice population. Analysis at the BG-level identified high concentration "pockets" of minority populations in Ladonia, Bonham, and Honey Grove, and high concentration "pockets" of low-income populations in Bonham and Wolfe City. However, because the safety risks are higher in the vicinity of the proposed project, places where children "learn, live, and play" in Ladonia are the focus of this analysis for disproportionate impacts as it relates to their health and safety.

*Construction Phase*

The construction phase of the Proposed Action could have disproportionate impacts on children in the vicinity of Ladonia. This analysis considers that the following types of adverse impacts on children from the construction equipment, vehicles, and activities could include:

1. Noise Disturbances: Increased level of noise created by construction equipment and vehicles could affect children's learning, especially near homes, schools, and recreational areas.
2. School Funding: Decreased tax revenue from a decrease in taxable land that would be impounded could affect funding for teachers, classroom materials, or maintenance and improvement projects in the Fannindel ISD. As discussed in **Section 4.17.1**, UTRWD is making payments to Fannin County to offset decreases in property tax revenue.
3. Mobile Source Air Pollutant Emissions (including traffic): Children living, learning, or playing in close proximity to the project area could be impacted by construction activities and vehicles. Children are believed to be especially vulnerable due to higher relative doses of air pollution, smaller diameter airways, and more active time spent outdoors and closer to ground-level sources of vehicle exhaust.
4. Congestion and Obesity Factors: Increased congestion in the immediate area due to additional vehicles and traffic delays near the site could reduce opportunities for children to exercise outdoors and the accessibility of neighborhood parks, green spaces, and recreation areas.
5. Safety: Children living, learning, and playing in close proximity to the project area are inherently at a higher risk of accident or incident that could result in bodily harm.

Possible impacts under the Proposed Action to youth community and recreational facilities such as childcare centers, places of worship, schools, recreation facilities, hospitals, public health facilities, and social welfare facilities located Ladonia would determine the characterization of impacts as posing a concern to the protection of children. Potential impacts to children at relevant youth community and recreational facilities in Ladonia are discussed below, and are included based on their location and proximity relative to the project area. The types of potential adverse

impacts listed above in combination with impact factors (size, duration, likelihood, severity) are used to qualify the magnitude of impacts.

Fannindel High School is located in Ladonia and serves grades sixth through twelfth, including students from both Ladonia and Pecan Gap. Traffic and time delays during the construction phase could adversely impact families commuting in the area. Given the distance of the school to the project area, any increase in noise levels created by construction equipment and vehicles would not affect learning. Similarly, it is unlikely that increased congestion and mobile source air pollutant emissions from construction vehicles in the project area would reduce opportunities for children to exercise or play outdoors or increase the risk of dust inhalation or other pollutants at Fannindel High School.

As discussed in **Section 4.17.1**, tax revenues could initially decrease due to taxable land that would be impounded. However, the UTRWD has committed to offsetting tax losses by making payments to Fannin County as shown in **Table 4-21**. As such, impacts to Fannindel ISD from lost tax revenues would be minimal. Beneficial tax impacts from ancillary development (i.e., real estate and businesses) discussed in **Section 4.17.1** could occur during and extend after the construction phase.

*Operation Phase*

The availability of water and recreational opportunities at the reservoir could potentially influence land uses in the greater vicinity to become more industrialized and/or developed, creating both adverse and beneficial impacts to children. Since children are at greater risk due to developing bodies and increased exposures, if herbicides are applied for the purpose of maintenance around the periphery of the reservoir and/or pipeline ROW, it could result in adverse health impacts to children. However, the likelihood of this occurring is considered low and would result in slight impacts.

As the population grows with economic development during the operation phase of the dam and reservoir, the tax base would also expand, eventually boosting property tax revenues in local taxing jurisdictions. This net increase in tax revenue would enable the cities and county to increase the number of schools and teachers and provide community services for the increased population. It should, however, be noted that it is unclear whether the increased revenue would be in fact used to address these needs. Those decisions are a function of the political process of local government and may also depend on other outstanding needs.

As discussed in **Section 4.17**, revenue related to residential land development at Lake Ralph Hall is projected to generate over $3 million for Fannindel ISD.

Although recreation is not considered a direct result of the proposed project, if Lake Ralph Halls becomes a recreational facility close to Ladonia and Honey Grove it could potentially offer boating, fishing, swimming, and other outdoor activities would represent a benefit for all area

youth. The visual and aesthetic value of the reservoir and the green space around it would also be considered by many as beneficial in the long-term.

**Conclusion**

The Proposed Action would not result in environmental justice impacts in the overall Region of Influence (ROI). Census BG data identified Honey Grove, Ladonia, and Bonham as "pockets" of minority populations and Bonham and Wolfe City as "pockets" of low-income populations. The Proposed Action could create slightly adverse disproportionate impacts relating to noise and/or traffic for Ladonia, for at least a portion of the construction phase, though not during the operational phase. The likelihood of all noise and air-quality related adverse impacts on environmental justice populations outside of Ladonia would be low given their distance(s) to the project area. Overall, adverse impacts on environmental justice populations within the study area would be minor. Project benefits, including employment opportunities, increased tax revenue, roadway improvements, and access to a potentially new recreational facility would be shared by all residents in the study area, including environmental justice populations.

### 4.18.2 Cumulative Effects

#### 4.18.2.1 No Action Alternative

The No Action Alternative would not result in any cumulative impacts on environmental justice.

#### 4.18.2.2 Proposed Action

As previously discussed, adverse impacts from the Proposed Action on environmental justice populations would be minor and primarily short term. Other future actions include the LBCR, which also would have negligible adverse impacts on environmental justice populations. Any long-term cumulative effects from the Proposed Action and the LBCR on environmental justice populations would be slight but likely beneficial (from increased economic and recreational opportunities). No cumulative effects on environmental justice populations are expected from the other reasonably foreseeable actions.

## 4.19 Climate Change

### 4.19.1 Environmental Consequences

#### 4.19.1.1 No Action Alternative

Under the No Action Alternative, there would be no raw water pipeline, or reservoir to affect greenhouse gas (GHG) emissions. This alternative would not have any direct impact on the climate, and would not contribute to climate change. As discussed in **Section 3.19**, the National Climate Assessment (U.S. Global Change Research Program [USGCRP], 2014) predicts that the

project region would be at moderate to high risk for water supply sustainability (shortages) with no climate change effects and high to extreme risk with climate change effects. The report also indicates that a 25-50 percent increase in water withdrawals is projected in the project region with climate change effects. Although there would be no GHG emissions, the No Action Alternative, by foregoing the development of greater water storage capacity that could be drawn upon during dry periods and droughts, would constitute a riskier approach to water management under future climatic conditions compared to the Proposed Action.

#### 4.19.1.2 Proposed Action

The proposed project would require energy associated with pumping from the reservoir to the service area, which could be a minor long-term effect on GHG. Long-term slight beneficial effects from augmenting water storage capacity in North Texas would be expected. Although there would be negligible direct effects from the emissions on climate change, the Proposed Action would constitute a more effective approach to water management under future conditions when compared to the No Action Alternative. As noted above, it is predicted that the region will be at a high risk for water supply sustainability with climate change effects, and a 25-50 percent increase in water withdrawals is projected in the project region. Maintaining adequate water storage capacity is an important strategy in adapting to predicted climate change in Texas.

## 4.20 Unavoidable Adverse Impacts

Sec. 102(C)(ii) of NEPA [42 USC § 4332] requires an EIS to list "any adverse environmental effects which cannot be avoided should the proposal be implemented." The following section lists the anticipated adverse environmental effects for each resource. Some of the adverse effects of the proposed project could be mitigated to some extent as described in **Chapter 5**. **Table 4-35** includes a summary of impacts from the No Action Alternative and the Proposed Action Alternative.

Land Use

The proposed project would result in long term conversion of existing land use to water supply use. The project may indirectly cause additional changes in land use in adjacent areas. These changes could be regarded as adverse by residents who value the rural landscape.

Physiography and Topography

Topography of the proposed project area would be permanently altered by inundation due to construction of the proposed Lake Ralph Hall and project dam. The modified area would total more than 8,000 acres for all associated project features. The proposed reservoir is anticipated to accumulate between 2,570 ac-ft and 3,700 ac-ft of sediment over a 50-year period. The proposed project would not alter physiography.

Geology and Soils

Original characteristics of the surficial material, such as existing stratification, would be permanently altered by construction activities including excavating soils to construct the proposed pipeline. Impacts to soils would include excavation, transport, and compaction of soils to construct several project elements (impoundment dam, SH 34 roadway embankment, and fill required for the North Sulphur River downstream of the dam). Other impacts would include inundation of soils within the reservoir footprint and periodic flooding of soils within the littoral zone.

Water Resources (Groundwater and Surface Water)

The proposed project would alter hydrology of the North Sulphur River and major tributaries including Allen Creek, Bear Creek, Pot Creek, Brushy Creek, Pickle Creek, Davis Creek, Leggets Branch, Bralley Pool Creek, Merrill Creek, Hedrick Branch, and Long Creek. Details on impacts to surface water hydrology are provided in **Section 4.6.1.2**. The proposed project would result in impacts including fill (dam embankment) and inundation of 445,488 lineal feet of ephemeral stream channel, 55,570 lineal feet of intermittent stream channel, and approximately 56.19 acres of on-channel impoundments. Approximately 325.11 acres of stream channel would be excavated, inundated, or filled within the conservation pool, embankment/dam, and spillway area. Flows from ephemeral and intermittent streams inundated from the construction of the reservoir would be converted from flowing (lotic) to a still (lentic) state. No impacts to groundwater are anticipated.

Air Quality

The proposed project would result in up to five years of construction-related emissions, and long-term emissions from pumping-related energy use.

Noise

The proposed project would result in a short-term increase in noise during the five-year construction period and minor long-term increases due to potential cumulative impacts from recreation.

Recreation/Public Lands

Approximately 300 acres of Federal land (Caddo National Grasslands- Ladonia Unit), currently administered by the U.S. Forest Service, would be acquired by the applicant and converted to open water as a result of the proposed project and would no longer be available to the public.

The Ladonia Fossil Park (aka Pete Patterson Fossil Park) would no longer be accessible for fossil hunters. UTRWD anticipates mitigating the impact to the existing Pete Patterson Fossil Park by providing a similar park near the intersection of FM 904 and the North Sulphur River. The relocated park is anticipated to be comprised of a gravel parking area, signage, a covered pavilion and a path accessing the North Sulphur River Channel. The access to the North Sulphur River Channel is anticipated to be provided by a series of steps leading from the upper bank of the channel to the channel bottom.

Visual Resources

The proposed project would result in long-term changes to the visual environment by changing the rural landscape to a reservoir and dam, which could be viewed as an adverse impact by viewers who value the rural, agricultural landscape.

Biological Resources/Threatened and Endangered Species

The proposed project would result in the loss of habitat including grasses, pastures, partially wooded areas, young forest, forest, and cropland. Approximately 69 percent of the potential vegetated impact area for the proposed project is currently under agricultural production (cropland, grasses, and pasture). Approximately 300 acres of Federal land (Caddo National Grasslands-Ladonia Unit), currently administered by the U.S. Forest Service, would be acquired by the applicant and converted to open water as a result of the proposed project. The limited aquatic habitat in the North Sulphur River would be converted to open water and a more stable lacustrine environment. The spread of invasive plant species is often attributed to disturbed soils. During the construction phase, invasive terrestrial plant species may invade disturbed areas and continue to inhabit these areas during the long-term operation of the proposed Lake Ralph Hall.

Aquatic invasive species known to occur in Texas reservoirs (e.g., Zebra mussels) may spread to Lake Ralph Hall if recreational boating is allowed. Aquatic invasive species are known to be transported from reservoir to reservoir via watercraft and/or trailers.

Based on species research and evaluations of preferred habitat for the federal and state listed protected species, it is unlikely there would be impacts to any of the federal listed species for Fannin, Hunt, or Collin counties. The state listed timber rattlesnake, as well as the four state listed mollusks, have the potential to be impacted by the construction of Lake Ralph Hall and the Raw Water Pipeline Alignment.

Transportation

The proposed project would require partial or complete abandonment of some FM Roads and CRs and the constructions of two new bridges.

Historic Resources

Inundation would result in the loss of existing structures including any historic property or NRHP-eligible site located within the reservoir footprint. The adverse impacts would be mitigated in accordance with the PA.

Archeological Resources

Inundation would result in the loss of existing archeological resources within the reservoir footprint. The adverse impacts would be mitigated in accordance with the PA.

Paleontological Resources

The Ladonia Fossil Park (aka Pete Patterson Fossil Park) would no longer be accessible for fossil hunters. UTRWD anticipates mitigating the impact to the existing Pete Patterson Fossil Park by providing a similar park near the intersection of FM 904 and the North Sulphur River. The relocated park is anticipated to be comprised of a gravel parking area, signage, a covered pavilion and a path accessing the North Sulphur River Channel. The access to the North Sulphur River Channel is anticipated to be provided by a series of steps leading from the upper bank of the channel to the channel bottom.

Socioeconomics

The proposed project would permanently remove some agricultural land from production and require sale of parcels in the project area to UTRWD. As of May 2017, there are two residences remaining within the project area that would have to be purchased before construction could begin.

Environmental Justice and Protection of Children

The proposed project could result in minor adverse impacts to environmental justice populations such as increased noise and air emissions during construction. Children could be adversely impacted by increased noise and potential safety concerns during construction.

**Table 4-35: Summary of Impacts from the No Action Alternative and Proposed Action Alternative**

| Resource/Impact Issue | No Action Alternative | Proposed Action Alternative |
|---|---|---|
| Land Use | Present trends in land use would continue and remain predominantly rural and undeveloped. UTRWD has purchased a little over half of the project area. | Effects would be major due to the inundation of more than 7,000 acres including retirement of approximately 1,600 acres of agricultural lands. Land use of lands surrounding the reservoir could change to residential and commercial development. Effects associated with the pipeline would be minor since existing land use could continue after construction. The proposed balancing reservoir would convert approximately 4.5 acres of grassland to a reservoir. Overall land use impacts would be major. |
| Ownership | UTRWD has purchased a little over half of the project area. | UTRWD has purchased a little over half of the project area- the remainder (including one residence) would be purchased prior to construction. Impacts would be moderate. |
| Public Lands | Impacts to public lands are anticipated to be negligible. Increased water restrictions could result in changes to parklands due to limited watering capabilities. | Approximately 300 acres of Federal land (Caddo National Grasslands- Ladonia Unit), currently administered by the U.S. Forest Service, would be acquired by the applicant and converted to open water as a result of the proposed project. The impact to public lands with the project would be major, but would be reduced through compensatory mitigation acreage. |

| Resource/Impact Issue | No Action Alternative | Proposed Action Alternative |
|---|---|---|
| Physiography | No Effect | No Effect |
| Topography | Topography of the proposed project area would be altered by continued erosion in the North Sulphur River and its tributaries. These impacts are considered to be major. | The topography of the proposed project area would be flooded. Area to be modified topographically will be in excess of 8,000 acres for all associated project features. Sediment yield to the reservoir over a 50-year period is between 2,570 ac-ft and 3,700 ac-ft. Flooding a portion of the river basin and some tributaries as well as the development of the dam would occur. Erosion along the proposed shoreline could alter topography. Impacts to topography are considered to be moderate. Impacts to topography from the pipeline are anticipated to be negligible. |
| Geology | Geologic formations within the North Sulphur River channel and tributaries would continue to erode. | Construction of the Proposed Action would slow erosion within the North Sulphur River and its tributaries. Along the pipeline alignment, the original characteristics of the surficial material would be permanently altered by construction activities. Impacts would be moderate and beneficial. |
| Geologic Hazards | No Effect | No Effect |
| Mineral Resources | No Effect | The proposed pipeline alignment would be precluded from any future surface mineral resource use. Oil and gas could potentially be produced using direction drilling technology. Impacts would be minor. |
| Soils | Soils within the proposed project area could be altered by continued erosion in the North Sulphur River. | Impacts to soils would include excavation, transport, and compaction during construction. Other impacts within the proposed reservoir footprint would include inundation of the soils within the conservation pool and periodic flooding of the soils within the littoral zone. Tributaries and contributing watersheds above the reservoir are anticipated to experience some decrease in erosion rates due to lowering of channel gradients from the halting of North Sulphur River channel degradation behind the dam. During construction of the Lake Ralph Hall Raw Water Pipeline Alignment at least 384 acres of existing soils would be disturbed. Impacts would be major. |
| Prime Farmland | Continued erosion in the North Sulphur River and its tributaries, prime farmland could be impacted. | Impacts to prime farmland would include inundation of approximately 1,168 acres of prime farmland and 1,131 acres of farmland of statewide importance within the conservation pool of the proposed reservoir. The pipeline route would be maintained within a 100-ft ROW. This 384-acre area may be precluded from other uses, with the possible exception of certain non-structural uses such as agriculture and rangeland. There may be a potential loss of prime farmlands if the pipeline is constructed in such areas. Impacts would be major. |

| Resource/Impact Issue | No Action Alternative | Proposed Action Alternative |
|---|---|---|
| Groundwater | Substantial increases in groundwater usage in the UTRWD service area. | No impacts to groundwater quantity or quality within the project area are expected. Impacts would be negligible. |
| Surface Water – Hydrology | The North Sulphur River and its major and minor tributaries would continue to deepen and widen as a result of erosion. | Reduced flow of the North Sulphur River would occur immediately downstream of the proposed Lake Ralph Reservoir to Baker Creek. Impacts would be major. |
| Surface Water – Water Quality | Surface water quality would remain similar to the existing conditions. | Downstream site calculations indicate a slight increase in pollutant concentrations due to decreased flow. Impacts would be minor. |
| Surface Water – Floodplains | Floodplains would remain similar to the existing conditions. | Floodplains would remain similar to the existing conditions in that there are no active floodplains within the project area. The proposed impoundment would restore some floodplain function to the headwaters of the North Sulphur River and tributaries above the proposed conservation pool elevation. Impacts would be negligible. |
| Surface Water – Wetlands and Other Waters of the U.S. | Development of on channel stock ponds as well as actions taken to halt soil erosion and tributary degradation is expected to continue. | The proposed reservoir project site would result in impacts including fill and inundation of 445,488 lineal feet of ephemeral stream channel, 55,570 lineal feet of intermittent stream channel, and approximately 56.19 acres of on-channel impoundments. Approximately 325.11 acres of stream channel would be excavated, inundated, or filled within the conservation pool, embankment/dam, and spillway area. A total of eight acres of lacustrine fringe wetlands would be impacted within the conservation pool, embankment, and spillway area. The Lake Ralph Hall Raw Water Pipeline Alignment has 59 stream crossings with 11,893 linear feet of stream impacts and 0.4 acres of stock tanks potentially impacted within the 100-ft ROW. Impacts are considered to be major but would be reduced through mitigation. |
| Air Quality | No substantial changes in air quality within the immediate Lake Ralph Hall study area are anticipated. There could be a slight decrease in air quality within the region due to minor projected population growth and associated development and land use changes. | During the construction phase of the project, temporary impacts to air quality would increase due to local fugitive dust levels and diesel powered heavy construction equipment. To the extent that visitation to the area is increased and boats are operated for fishing and other recreation, there would be a corresponding increase in emissions. Minor, temporary impacts to air quality are anticipated during construction. |
| Noise | Slight increase in ambient noise levels caused by the projected population growth | During the construction, no noise impacts are anticipated for Ladonia residents but single residences located at each end of the dam embankment would be |

| Resource/Impact Issue | No Action Alternative | Proposed Action Alternative |
|---|---|---|
| | and associated development and land use changes. | subjected to noise levels in the 55-dbA range. There would be a corresponding increase in noise levels to the extent that visitation to the area is increased and boats are operated for fishing and other recreation. Construction of the bridge for SH 34 and improvement of portions of CR 3444 would generate construction noise near four noise receptors located within 1,600 feet of the road/bridge. Increase in noise levels would be expected over the length of the pipeline in the areas where construction is occurring. Impacts associated with the project are considered to be minor. |
| Recreation | No impacts to recreation in the area. | The Ladonia Fossil Park would no longer be accessible for fossil hunters. Recreational impacts are considered to be minor. No causal recreational benefits have been identified associated with the reservoir, although such development is likely to occur and could represent minor beneficial impacts. Approximately 300 acres of Federal land (Caddo National Grasslands- Ladonia Unit), currently administered by the U.S. would be converted as a result of the proposed project and reduce hunting opportunities. USFS also anticipates an increase in visitation and administrative burden. These impacts are considered moderate. |
| Visual Resources | No immediate impacts to visual resources. | During construction of the proposed dam and embankment the viewshed of travelers along FM 1550, FM 904, and SH 34 would be affected as the construction would be visible from the roadway. Impacts to visual resources related to construction of the proposed dam, reservoir, and principal and emergency spillways would be 'moderate' and end once construction activities are completed. After construction, the visual resource contrast rating for the Build Alternative would be 'strong'. The form, line, color, and texture of the environment would all change noticeably under the proposed project. |
| Biological Resources – Habitat | The North Sulphur River and its major tributaries would continue to erode and degrade habitat surrounding these areas. | Minimal loss of moderate quality vegetative resources is anticipated as a result of the proposed project. The reservoir would help stabilize the North Sulphur River watershed by reducing habitat loss and conversion from currently on-going severe erosion. The reservoir would also create and enhance habitat for local and migratory wildlife through the anticipated creation of at least eight acres of fringe wetlands along the proposed reservoir shoreline. Mudflats may also be |

| Resource/Impact Issue | No Action Alternative | Proposed Action Alternative |
|---|---|---|
| | | created in shallow flooded areas, especially in the upstream portion of the reservoir. The potential vegetated impact area includes agricultural production and woody areas. Approximately 300 acres of Federal land (Caddo National Grasslands- Ladonia Unit), currently administered by the U.S. Forest Service, would be acquired by the applicant and converted to open water as a result of the proposed project Overall, although the type of vegetation communities to be impacted are common and degraded, because of the large size of the area to be converted to another and more uncommon type, the effects would be considered major. |
| Biological Resources – Wildlife | Current conditions of the North Sulphur River would continue to exist. | Although some displacement of wildlife would occur with the inundation as a result of the proposed project, the overall current state of degradation of habitat and isolation of remaining moderate quality habitat within the project area indicates that these impacts would be moderate. Increase in noise and presence of workers during construction may cause any wildlife to leave the area temporarily. Wildlife that could occur along the pipeline ROW would potentially experience varying degrees of adverse impacts. |
| Biological Resources – Aquatic Biota | Current conditions of the North Sulphur River would continue to exist. | The existing aquatic biota community would change from intermediate stream species to a community more adapted for a lacustrine habitat. Impacts would be moderate. Impacts to aquatic organisms in pools with decreasing levels would occur between the proposed Lake Ralph Hall dam and the Cooper Gage. Models indicate almost no change to reaches below the Cooper Gage. Impacts would be moderate. Overall impacts from pipeline construction to aquatic biota would be none to minimal. |
| Biological Resources – Invasive Species | Current conditions of the North Sulphur River would continue to exist. | During the construction phase, invasive terrestrial plant species may invade disturbed areas and continue to inhabit these areas during the long-term operation of the proposed Lake Ralph Hall. Aquatic invasive species known to occur in Texas reservoirs (e.g., Zebra mussels) may spread to Lake Ralph Hall if recreational boating is allowed. Impacts would be moderate. |
| Threatened and Endangered Species | No impacts to threatened or endangered species. | Impacts unlikely to any of the federal listed species for Fannin, Hunt, or Collin counties. The state listed timber rattlesnake, as well as the four state listed mollusks, have the potential to be impacted by the |

| Resource/Impact Issue | No Action Alternative | Proposed Action Alternative |
|---|---|---|
| | | construction of Lake Ralph Hall and the Raw Water Pipeline Alignment. Potential impacts to mollusks avoided through proposed use of directional drilling or tunneling of major streams. Impacts would be minor. |
| Traffic and Transportation | Land use changes within the region are expected to occur as a result of long-term population growth and associated development pressure. This growth may result in an increase in traffic on the local and regional transportation network. | During construction of the dam, reservoir, and principal and emergency spillways, congestion would increase in the immediate area due to additional construction vehicles, delays caused by construction activities (i.e., roads temporarily reduced to a single lane), and road closures and detours. In order to successfully implement the proposed Lake Ralph Hall, key roads would require adjustments to alignment and grade while other roads would be partially or completely abandoned. The establishment of the proposed dam, reservoir, and principal and emergency spillways would have noticeable long-term beneficial and adverse effects on transportation resources and traffic. The permanent closure of roadways and rerouting of traffic from some secondary and tertiary roadways in the area would result in adverse effects, while new roads and road improvements would result in beneficial effects. Effects on transportation resources would be minor. |
| Hazardous Materials | No change to the existing conditions. | One listing in the conservation pool boundary. It is recommended that the property be inspected and potential water quality contaminants removed prior to inundation. One listing outside conservation pool but inside project area not anticipated to be an issue. Three sites identified near the proposed pipeline footprint. The site limits should be verified prior to construction and avoided. Impacts would be minor. |
| Cultural Resources – Historic | Impacts to historic resources, if any, would be minor. | Due to a lack of access, not all properties within the APE were surveyed. None of the resources surveyed were recommended as eligible for the NRHP or recommended for intensive-level study. Additional historic-age properties may be found in the APE at a later date during surveys conducted in accordance with the PA. Impacts are currently anticipated to be minor, but further study is required. |
| Cultural Resources – Archeological | Continued erosion of the North Sulphur River channel and its major tributaries could expose archeological resources. | Survey covered approximately 15 percent of the Proposed Action. A total of 17 archeological sites were recorded with five sites recommended for further testing or further definition of the deposit. One site, the Merrill Family Cemetery, was recommended to be avoided. All future cultural resources survey will be |

| Resource/Impact Issue | No Action Alternative | Proposed Action Alternative |
|---|---|---|
| | | done in accordance with the PA. Impacts would be major. |
| Paleontological Resources | Continued erosion of the North Sulphur River would continue to expose fossils. The Ladonia Fossil Park would remain in the current location and allow for continued fossil hunting. | Paleontological resources in the inundation footprint would no longer be accessible following completion of the proposed project. The Ladonia Fossil Park would no longer be accessible for fossil hunters, but would be replaced with a similar park downstream. Impacts would be major. |
| Socioeconomics | The No Action Alternative could displace and/or slow growth in the area. The impacts of displaced growth could be considered major, affecting planning, urban service costs, and public satisfaction with local government. | Impact includes losses in both sales and property tax revenue from the inundation of the land, but gains from increased spending due to construction, and land development. The losses in sales and property taxes revenue would be minor, and would be outweighed by the gains. Increase in property tax revenue from land development would dwarf the losses. Over the whole period, the average annual difference in the wholesale effective rate is 2.9 percent. The wholesale effective rate rises slowly while the lake and pipeline are being constructed; once the lake is in operation, the rate differences are more substantial, until the debt service for the dam is fully repaid. Rate impacts diminish thereafter. Overall impacts would be minor and positive. |
| Environmental Justice and Protection of Children | Current water distribution operations would be expected to have the same effects on populations of concern as the general population, including the potential for water restrictions and higher water costs. | The Proposed Action would not result in environmental justice impacts in the overall ROI. The Proposed Action could create slightly adverse disproportionate impacts relating to noise and/or traffic for Ladonia, for at least a portion of the construction phase, though not during the operational phase. Overall, adverse impacts on environmental justice populations within the study area would be minor. Project benefits, including employment opportunities, increased tax revenue, roadway improvements, and access to a potentially new recreational facility would be shared by all residents in the study area, including environmental justice populations. |
| Climate Change | The No Action Alternative would not have any direct impact on the climate, and would not contribute to climate change. | The proposed project would require energy associated with pumping from the reservoir to the service area, which could be a minor long-term effect on GHG. Long-term slight beneficial effects from augmenting water storage capacity in North Texas would be expected. Although there would be negligible direct effects from the emissions on climate change, the Proposed Action would constitute a more effective approach to water management under future |

| Resource/Impact Issue | No Action Alternative | Proposed Action Alternative |
|---|---|---|
| | | conditions when compared to the No Action Alternative. |

## 4.21 Relationship between Short-term Uses of the Environment and the Maintenance and Enhancement of Long-Term Productivity

Sec. 102(C)(iv) of NEPA [42 USC § 4332] and 40 CFR 1502.16 require an EIS to address "the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity." This involves the consideration of whether a Proposed Action is sacrificing a resource value that might benefit the environment in the long term, for some short-term value to the project proponent or the public.

The purpose of the Proposed Action is to capture, conserve, manage, and use a vital natural resource, water, in a manner that would benefit society. Hypothetically, Lake Ralph Hall could help meet water needs for North Texas municipalities for a period of time measuring a century or more, which would qualify as long-term. Therefore, the Proposed Action would not be sacrificing long-term productivity for short-term use or gain.

The USACE acknowledges that there are tradeoffs inherent in any allocation of natural resources. In the present instance, implementation of Lake Ralph Hall would necessitate the permanent loss of Waters of the U.S. on site. Prime Farmland Soils in certain upland areas, some of which are currently used as agricultural land (cropland and pasture) and all of which could be used as such would also be permanently lost. Effects on Waters of the U.S., in any case, as mandated by Section 404 of the Clean Water Act, would require compensatory mitigation.

## 4.22 Irreversible and Irretrievable Commitment of Resources

Sec. 102(C)(v) of NEPA [42 USC § 4332] requires an EIS to address "any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented." Irreversible and irretrievable commitments of resources mean losses to or impacts on natural resources that cannot be recovered or reversed.

More specifically, "irreversible" implies the loss of future options. Irreversible commitments of resources are those that cannot be regained, such as permanent conversion of wetlands and loss of cultural resources, soils, wildlife, agricultural, and socioeconomic conditions. The losses are permanent, incapable of being reversed. "Irreversible" applies mainly to the effects from use or depletion of nonrenewable resources, such as fossil fuels or cultural resources, or to those factors, such as soil productivity, that are renewable only over long periods of time.

"Irretrievable" commitments are those that are lost for a period of time, such as the temporary loss of timber productivity in forested areas that are kept clear for use as a ROW, road, or winter sports site. The lost forest production is irretrievable, but the action is not irreversible. If the use changes back again, it is possible to resume timber production.

### 4.22.1 Irreversible Commitments of Resources

Under the construction and operations of the Proposed Action, the following irreversible commitments of resources would occur:

• Consumption of fossil fuels (primarily diesel) and lubricants used during construction of dam, pipeline, balancing reservoir, and bridges as well as for road relocations, and to clear the reservoir footprint.

• Materials used to construct the dam and all other facilities, including cement/concrete, soil cement, slurry material, clay, sand, gravel, steel, iron, and other metallic alloys, copper wiring, PVC pipe, plastic, and so forth.

• Energy, supplied by fossil fuels or some other source of electricity, used over the operational life of the dam/reservoir to pump water from the intake/pump station at Lake Ralph Hall.

• Portions of the North Sulphur River and its tributaries permanently inundated at the site of the reservoir footprint.

• Prime Farmland Soils inundated at the site of the reservoir footprint permanently removing potential agricultural production.

• Existing wildlife habitat inundated within the reservoir footprint.

• Possible undiscovered archeological resources within the reservoir footprint, which would be permanently inundated by the reservoir and eventually buried under layers of sediments over the coming century and beyond, likely moving them beyond the reach of future investigations.

• One remaining home and associated structures that have to be purchased, demolished, and removed prior to impoundment.

### 4.22.2 Irretrievable Commitments of Resources

As noted above, "irretrievable" commitments of resources are those that are lost for a period of time, but not permanently. The Proposed Action would entail certain irretrievable commitments:

• Short-term loss of agricultural production during construction along the raw water pipeline ROW from the reservoir to the WTP.

# 5.0 Mitigation

This chapter summarizes the anticipated impacts of the Lake Ralph Hall and Lake Ralph Hall Raw Water Pipeline Proposed Action Alternatives and identifies proposed mitigations measures. Potential monitoring and mitigation measures for identified impacts are identified by the U.S. Army Corps of Engineers (USACE) for individual resources. Mitigation measures described are intended to address the requirements of the National Environmental Policy Act (NEPA), USACE's Public Interest Review and the 404(b)(1) guidelines, and the USACE Regulatory Guidance Letter 02-2. The project application was submitted prior to the establishment of the USACE Compensatory Mitigation Regulations (April 2008) and is not subject to those requirements, but is instead subject to the 2002 Compensatory Mitigation Regulatory Guidance Letter 02-2. The mitigation measures are not part of Upper Trinity Regional Water District's (UTRWD) proposed project but could be added as special conditions to any Section 404 permit that may be issued by USACE or as stipulations of approval or authorizations of regulatory agencies. **Table 5-1** includes a summary of Proposed Mitigation Measures.

**Table 5-1: Summary of Proposed Mitigation Measures**

| Resource/Impact Issue | Impacts from the Proposed Action Alternative | Proposed Mitigation for the Proposed Action Alternative |
|---|---|---|
| Land Use | Land use impacts would include inundation of more than 7,000 acres including retirement of approximately 1,600 acres of agricultural lands. | No mitigation is required for this resource. |
| Ownership | UTRWD has purchased a little over half of the project area- the remainder (including one residence) would be purchased prior to construction. | No mitigation is required for this resource. |
| Public Lands | Approximately 300 acres of Federal land (Caddo National Grasslands- Ladonia Unit), currently administered by the U.S. Forest Service, would be acquired by the applicant and converted to open water as a result of the proposed project The Ladonia Fossil Park would no longer be accessible for fossil hunters. | UTRWD is working with the USFS relative to a land exchange to offset these effects.<br>UTRWD will relocate fossil park. |
| Physiography | No Effect | No mitigation is required for this resource. |
| Topography | The topography of the proposed project area would be flooded and erosion along the proposed shoreline could alter topography. | No mitigation is required for this resource. |
| Geology | Construction of the Proposed Action would slow erosion within the North Sulphur River and its tributaries. | No mitigation is required for this resource. |
| Geologic Hazards | No Effect | No mitigation is required for this resource. |

| Resource/Impact Issue | Impacts from the Proposed Action Alternative | Proposed Mitigation for the Proposed Action Alternative |
|---|---|---|
| Mineral Resources | The proposed pipeline alignment would be precluded from any future surface mineral resource use. Oil and gas could potentially be produced using direction drilling technology. | No mitigation is required for this resource. |
| Soils | Impacts to soils would include excavation, transport, and compaction during construction. Other impacts within the proposed reservoir footprint would include inundation of the soils within the conservation pool and periodic flooding of the soils within the littoral zone. During construction of the Lake Ralph Hall Raw Water Pipeline Alignment at least 384 acres of existing soils would be disturbed. | Sediment and Erosion Control Plan |
| Prime Farmland | Impacts to prime farmland would include inundation of approximately 1,168 acres of prime farmland and 1,131 acres of farmland of statewide importance. | Prime Farmland soils found in areas of proposed water supply reservoirs are exempt from restrictions under the Farmland Protection Policy Act (FPPA). |
| Groundwater | No impacts to groundwater quantity or quality within the project area are expected. | No mitigation is required for this resource. |
| Surface Water – Hydrology | Reduced flow of the North Sulphur River would occur immediately downstream of the proposed Lake Ralph Reservoir to Baker Creek. | Directional Drilling During Construction of Pipeline at Stream Crossings; Restoration of Stream Contours, Stabilization of Stream Banks; Revegetation of Disturbed Areas After Pipeline Construction |
| Surface Water – Water Quality | Downstream site calculations indicate a slight increase in pollutant concentrations due to decreased flow. | Stormwater Pollution Prevention Plan (SWPPP) and Texas Pollution Discharge Elimination System (TPDES) General Permit During Construction |
| Surface Water – Floodplains | No loss of existing floodplain function would occur. | No mitigation is required for this resource. |
| Surface Water – Wetlands and Other Waters of the U.S. | The proposed reservoir project site would result in fill and inundation of ephemeral/intermittent stream channels, on-channel impoundments, and lacustrine fringe wetlands. | Implement *Mitigation Plan for Impacts to Aquatic Resources and Terrestrial Habitats* |
| Air Quality | Minor, temporary impacts to air quality are anticipated during construction. | Implement Best Management Practices (BMP) During Construction |
| Noise | Noise impacts are anticipated to be minor. | BMPs would be implemented to reduce potential impacts. |

| Resource/Impact Issue | Impacts from the Proposed Action Alternative | Proposed Mitigation for the Proposed Action Alternative |
|---|---|---|
| Recreation | The Ladonia Fossil Park would no longer be accessible for fossil hunters. Recreational impacts are considered to be minor. No causal recreational benefits have been identified associated with the reservoir, although such development is likely to occur and could represent minor beneficial impacts. Approximately 300 acres of Federal land (Caddo National Grasslands- Ladonia Unit), currently administered by the U.S. would be converted as a result of the proposed project and reduce hunting opportunities. USFS also anticipates an increase in visitation and administrative burden. These impacts are considered moderate. | UTRWD will relocate fossil park. UTRWD is currently coordinating with the USFS. No other mitigation is required for this resource. |
| Visual Resources | Moderate impacts are anticipated during construction and major impacts are anticipated in the long-term. | No mitigation is planned for this resource. |
| Biological Resources - Habitat | Major impacts to degraded and moderate habitat due to large size of area to be inundated. | Implement *Mitigation Plan for Impacts to Aquatic Resources and Terrestrial Habitats;* Re-Vegetate Disturbed Areas After Pipeline Construction |
| Biological Resources - Wildlife | Moderate impacts are anticipated with inundation of degraded and moderate habitat. | All Requirements Regarding Migratory Birds Would be Met Prior to Construction |
| Biological Resources – Aquatic Biota | The exiting aquatic biota community would change from intermediate stream species to a community more adapted for a lacustrine habitat. Impacts would be moderate. Impacts to aquatic organisms in pools would occur between the proposed Lake Ralph Hall dam and the Cooper Gage with decreasing levels. | Implement *Mitigation Plan for Impacts to Aquatic Resources and Terrestrial Habitats* |
| Biological Resources – Invasive Species | Invasive terrestrial plant species may invade disturbed areas during and following construction. Aquatic invasive species (e.g., zebra mussel) may spread to Lake Ralph Hall if recreational boating is allowed. | No mitigation is required for this resource. |
| Threatened and Endangered Species | The state listed timber rattlesnake and four state listed mollusks have the potential to be impacted during construction of Lake Ralph Hall and the Raw Water Pipeline Alignment. | Contractors would be advised of potential occurrence of timber rattlesnake and to avoid harming species. Directional drilling during construction of the pipeline at stream crossings. |

| Resource/Impact Issue | Impacts from the Proposed Action Alternative | Proposed Mitigation for the Proposed Action Alternative |
|---|---|---|
| Traffic and Transportation | The Proposed Action includes adjustments to alignment and grade, partial or complete abandonment, and relocation of roads. During construction of the dam and reservoir, congestion would increase in the immediate area. | All construction vehicles would be equipped with backup alarms, two-way radios, and 'slow moving vehicle' signs when appropriate. Routing and scheduling construction vehicles to avoid conflicts with other traffic. |
| Hazardous Materials | One listing in the conservation pool boundary. It is recommended that the property be inspected and potential water quality contaminants removed prior to inundation. One listing outside conservation pool but inside project area not anticipated to be an issue. Three sites identified near the proposed pipeline footprint. The site limits should be verified prior to construction and avoided. | Inspection and Removal of Contaminants at Identified Sites if Needed |
| Cultural Resources - Historic | Due to a lack of access, not all properties within the area of potential effects (APE) were surveyed. None of the resources surveyed were recommended as eligible for the National Register of Historic Places (NRHP) or recommended for intensive-level study. | Implement Programmatic Agreement |
| Cultural Resources – Archeological | Survey covered approximately 15 percent of the Proposed Action. A total of 17 archeological sites were recorded with five sites recommended for further testing or further definition of the deposit. One site, the Merrill Family Cemetery, was recommended to be avoided. | Implement Programmatic Agreement |
| Paleontological Resources | Paleontological resources in the inundation footprint would no longer be accessible. The Ladonia Fossil Park would no longer be accessible for fossil hunters. | Relocate Fossil Park |
| Socioeconomics | Socioeconomic impacts of Lake Ralph Hall would be minimal, and positive, in the long-term. Impact includes losses in both sales and property tax revenue from the inundation of the land. | Loss of property taxes would be reduced through an arrangement reached between UTRWD and Fannin County. |
| Environmental Justice and Protection of Children | Adverse impacts on environmental justice populations within the study area would be minor and primarily related to air, noise, and safety. | Impacts to EJ populations would be reduced through implementations of BMPs for noise and air quality during construction. All construction vehicles would be equipped with backup alarms, two-way radios, and 'slow moving vehicle' signs when appropriate. Routing and scheduling construction vehicles to avoid conflicts with other traffic. |
| Climate Change | Climate Change and greenhouse gas (GHG) impacts are anticipated to be minor to negligible. | No mitigation is required for this resource. |

## 5.1 Land Use and Ownership

The proposed Lake Ralph Hall dam and reservoir would take an estimated five years to construct and would impact approximately 11,915 acres of forest, crop, grasslands, and ranch land. As of August 2018, one residence remains within the project area and would need to be purchased prior to construction. The effects of the Proposed Action on land use would be major due to the inundation of more than 7,000 acres including retirement of approximately 1,600 acres of agricultural lands. The effects of the pipeline and balancing reservoir associated with the proposed action on land use and ownership would be minor. No mitigation is being proposed for impacts to land use and ownership.

## 5.2 Public Lands

The Ladonia Unit of the Caddo National Grasslands is located in the southwest portion of the project area. Approximately 300 acres of Federal land (Caddo National Grasslands- Ladonia Unit), currently administered by the U.S. Forest Service, would be acquired by the applicant and converted to open water as a result of the proposed project. The impact to public lands with the project are considered major but would be reduced by compensatory mitigation acreage. UTRWD is undertaking efforts and coordinating with the Caddo National Grassland relative to mitigation in the form of a land exchange. Lands to be offered to the Caddo National Grassland by UTRWD are not identified at this time and will be addressed in the USFS separate NEPA analysis concerning that action.

Under the Proposed Action, the Ladonia Fossil Park (aka Pete Patterson Fossil Park) would no longer be accessible for fossil hunters. UTRWD anticipates mitigating the impact to the existing Pete Patterson Fossil Park by providing a similar park near the intersection of FM 904 and the North Sulphur River. The relocated park is anticipated to be comprised of a gravel parking area, signage, a covered pavilion and a path accessing the North Sulphur River Channel. The access to the North Sulphur River Channel is anticipated to be provided by a series of steps leading from the upper bank of the channel to the channel bottom.

## 5.3 Physiography and Topography

The topography of the proposed project area would be altered due to the construction of the Lake Ralph Hall reservoir as well as the project dam. Area to be modified topographically will be in excess of 8,000 acres for all associated project features. Impacts to topography are considered to be moderate. Physiography under the Proposed Action would not be altered. Since the pipeline would be buried, impacts to the topography are transitory and do not represent long term alteration. No monitoring or mitigation is being considered for impacts to physiography or topography.

## 5.4 Geology and Soils

Construction of the Proposed Action would reduce the rate of erosion of the Ozan Formation and terrace deposits within the North Sulphur River and its tributaries. No adverse downstream impacts on channel morphology or capacity are expected as a result of the Proposed Action (**Appendix C**). Watershed sediment yields would be reduced by implementation of best soil conservation management practices, reduction in the area under cultivation and re-establishment of riparian buffer areas along the channel margins where they have been cleared. Along the Lake Ralph Hall Raw Water Pipeline Alignment, the original characteristics of the surficial material, such as existing stratification, would be permanently altered by construction activities, which includes excavating soils to lay the pipeline into place. Construction activities would occur within the 100-ft right-of-way (ROW) along the pipeline alignment.

The Proposed Action is not expected to magnify effects from geologic hazards or effect mineral resources in the project area.

Several project elements would be constructed from local soils. Impacts to soils would include excavation, transport, and compaction during construction of these elements. Borrow areas are to occur within the project area. Other impacts within the proposed reservoir footprint would include inundation of the soils within the conservation pool and periodic flooding of the soils within the littoral zone. Tributaries and contributing watersheds above the reservoir are anticipated to experience some decrease in erosion rates due to lowering of channel gradients from the halting of North Sulphur River channel degradation behind the dam.

During construction of the Lake Ralph Hall Raw Water Pipeline Alignment at least 384 acres of existing soils would be disturbed. A sedimentation and erosion control plan would be prepared and implemented to mitigate potential impacts during construction, such as an increase in erosion.

Impacts to prime farmland would include inundation of approximately 1,168 acres of prime farmland and 1,131 acres of farmland of statewide importance within the conservation pool of the proposed reservoir. However, the Natural Resources Conservation Service (NRCS) considers Prime Farmland soils found in areas of proposed water supply reservoirs to be exempt from restrictions under the FPPA.

The pipeline route would be maintained within a 100-ft ROW. This 384-acre area would be precluded from other uses, with the possible exception of certain non-structural uses such as agriculture and rangeland. There may be a potential loss of prime farmlands if the pipeline is constructed in such areas.

Overall, impacts to geology and soils are expected to be moderate due to the amount of loss due to conversion to open water and the dam but buffered by the benefits of reduced erosion rates.

Impacts associated with the proposed pipeline would be negligible. No additional monitoring or mitigation is being considered for geology and soils.

## 5.5 Groundwater

There are no significant groundwater sources in the immediate project area and no major or minor aquifer outcrops. No impacts to groundwater quantity or quality within the project area are expected. No mitigation for groundwater is anticipated.

## 5.6 Surface Water

**Hydrology**

Under the Proposed Action, the North Sulphur River and major tributaries would be affected by the construction and operation of the reservoir. The most significant effects on the flow regime of the North Sulphur River occur immediately downstream of the proposed Lake Ralph Reservoir to Baker Creek.

The Lake Ralph Hall Raw Water Pipeline Alignment crosses several intermittent streams. Temporary impacts to hydrology would be avoided by using horizontal directional drilling to install the pipeline at significant stream crossings and staging areas would be located within uplands. Once the pipeline is constructed, all pre-construction contours would be restored, exposed slopes and stream banks would be stabilized, and disturbed areas would be revegetated. Overall impacts from pipeline construction to hydrology would be negligible to minor.

**Water Quality**

Pollutant loading at the proposed dam location was calculated and indicates lower pollutant concentrations at the proposed Lake Ralph Hall dam compared to existing conditions. The reduction in pollutant concentrations is attributed to decrease of overland runoff area as a result of the construction of Lake Ralph Hall. Downstream site calculations indicate a slight increase in pollutant concentrations due to decreased flow as a result of Lake Ralph Hall.

A Stormwater Pollution Prevention Plan (SWPPP) would be prepared and implemented to protect against loss of soil due to erosion from the construction sites during rainfall events. A Texas Pollution Discharge Elimination System (TPDES) general permit exists for construction activities. The SWPPP is a requirement of the general permit. The Texas Commission on Environmental Quality (TCEQ) would review the SWPPP to determine that potential threats to water quality are addressed, and would inspect the implementation and maintenance of measures to control erosion during the construction process. Approved engineering and construction best management practices (BMPs) would be used to minimize erosion during construction. Erosion and sedimentation controls typically used include but are not limited to the following:

- Re-establishment of vegetative cover as soon as practicable to any areas of exposed soil within the construction areas outside the footprint of the proposed reservoir. Erosion control mats or comparable protection would be required for stream banks to provide protection until vegetation is reestablished.

- Sprinkling with water on exposed soil in traffic areas at appropriate intervals to minimize wind erosion.

- Implementation of temporary sediment control measures on slopes with exposed soils. These measures may include silt fencing, rock-check dams, and/or hay bales.

- Management of stockpiles formed from excavations located near streams, gullies or steep slopes by silt fences, rock berms, or geotextiles at the contractor's discretion to prevent direct discharge of sediments to streams.

- Grading of construction areas to a finished smooth condition at the conclusion of construction to discourage the formation of gullies and to facilitate reestablishment of vegetative cover.

- Construction of sediment detention ponds below large areas of excavation, stockpiles, or filling in order to collect sedimentation on site rather than allow it to be carried to the area streams.

Implementation of the above measures would limit adverse effects due to siltation and sedimentation during construction.

**Floodplains**

No loss of existing floodplain function would occur since there is no overbank storage or filtration of floodwaters in the present setting. However, the proposed impoundment would restore some floodplain function to the headwaters of the North Sulphur River and tributaries above the proposed conservation pool elevation.

The Lake Ralph Hall Raw Water Pipeline Alignment would be designed so that it would not increase the base flood elevations of any floodplains that the pipeline may cross. Ground elevations would return to pre-construction elevations once construction of the Lake Ralph Hall Raw Water Pipeline Alignment is complete.

**Wetlands and Waters of the U.S.**

The proposed reservoir project site would result in impacts including fill (dam embankment) and inundation of 445,488 lineal feet of ephemeral stream channel, 55,570 lineal feet of intermittent stream channel, and approximately 56.19 acres of on-channel impoundments (33 in number). Based on the Stream Watershed Assessment and Measurement Protocol Interaction Model

(SWAMPIM) protocol, these impacts equate to 381 Functional Capacity Units (FCU) of ephemeral streams and 49 FCU of intermittent streams for a total of 430 FCU. Impacts to on-channel impoundments equate to a Resource Capacity of 28.6 (UTRWD, 2018a). A total of eight acres of lacustrine fringe wetlands would be impacted within the conservation pool, embankment, and spillway area.

The Lake Ralph Hall Raw Water Pipeline Alignment has 59 stream crossings with 11,893 linear feet of stream impacts and 0.4 acres of stock tanks potentially impacted within the 100-ft ROW.

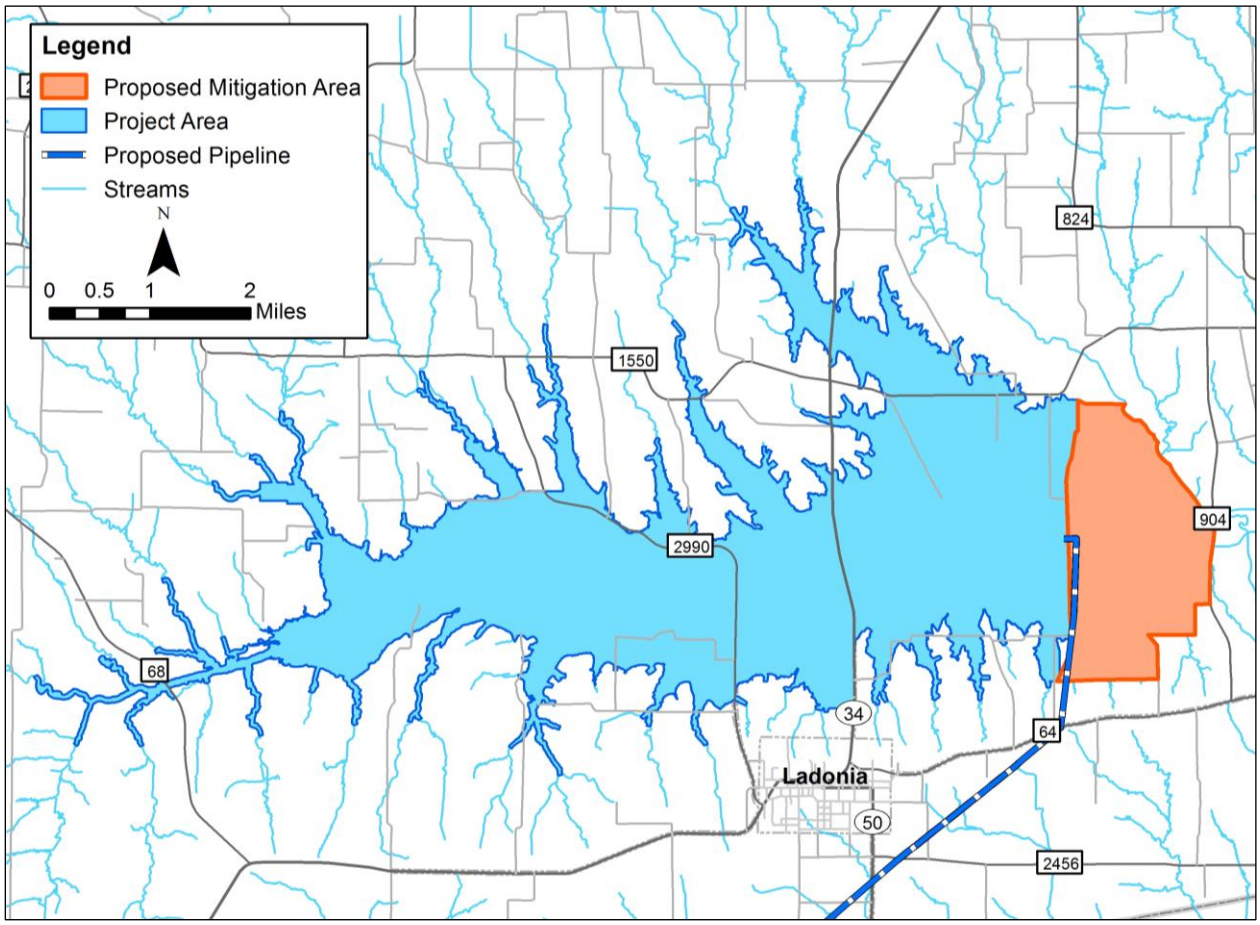
Projects subject to Clean Water Act (CWA) regulations must comply with CWA Section 404(b)(1) Guidelines (40 CFR, Part 230) for the discharge of dredge and fill material into waters of the U.S. The Section 404(b)(1) Guidelines require that the USACE permit only the least environmentally damaging practicable alternative (LEDPA), unless the LEDPA has other significant adverse environmental consequences. The USACE's evaluation typically includes a determination of whether the applicant has taken sufficient measures to mitigate the project's likely adverse impact on the aquatic ecosystem.

In a Memorandum of Agreement (MOA) signed February 6, 1990 between the USACE and the Environmental Protection Agency (EPA), mitigation was clarified as required under the 404(b)(1) guidelines as a sequential process of avoiding, minimizing, and compensating for adverse impacts to the aquatic ecosystem:

> Avoid: Take all appropriate and practicable measures to avoid adverse impacts to the aquatic ecosystem that are not necessary.
>
> Minimize: Take all appropriate and practicable measures to minimize adverse impacts to the aquatic ecosystem that cannot reasonably be avoided.
>
> Compensate: Implement appropriate and practicable measures to compensate for adverse project impacts to the aquatic ecosystem that cannot reasonably be avoided or further minimized. This step is also referred to as compensatory mitigation. The purpose of compensatory mitigation is to replace aquatic ecosystem functions that would be lost or impaired as a result of a USACE-authorized activity.

The principal goal of the proposed *Mitigation Plan for Impacts to Aquatic Resources and Terrestrial Habitats* (**Appendix L**) is to provide compensation for impacts to existing functions of aquatic resources resulting from the impoundment of water and operations following construction of the proposed dam and its associated appurtenances, and construction of the raw water conveyance pipeline (UTRWD, 2018a). A second objective is to provide aquatic resource compensation within the North Sulphur River watershed in close proximity to the proposed project. **Figure 5-1** shows the proposed mitigation area relative to the proposed reservoir.

**Figure 5-1: Proposed Mitigation Area**




Based on the proposed mitigation actions outlined hereafter, mitigation activities are intended to replace aquatic functions within the project watershed area such that no net loss of aquatic functions is achieved. Further, it is proposed that a net gain of functions for aquatic resources would be realized. Accordingly, the proposed mitigation plan focuses on functional restoration and enhancement activities for the identified aquatic resources within the mitigation boundary downstream of the proposed dam site, which includes areas between the dam and Baker Creek and FM 904.

Mitigation activities proposed would include the following:

- Restoring/creating approximately 19,200 linear feet of the former North Sulphur River channel within the mitigation boundary downstream of the proposed dam;

- Restoring, creating, or enhancing approximately 58,000 linear feet of ephemeral tributary channels which convey watershed runoff to the restored former North Sulphur River channel downstream of the dam;

- Restoring or creating approximately 22,400 linear feet of ephemeral tributary channels which convey watershed runoff directly to the North Sulphur River Main Channel downstream of the proposed dam;

- Enhancing approximately 6,900 linear feet of ephemeral tributary channels which convey watershed runoff to Baker Creek upstream of its convergence with the North Sulphur River Main Channel;

- Creating approximately 8,800 linear feet of intermittent stream channel within the North Sulphur River Main Channel downstream of the proposed dam to just upstream of the confluence of Baker Creek at FM 904;

- Establishing appropriate vegetative cover in wooded riparian corridors along all channels within the downstream mitigation boundary as well as herbaceous vegetative cover to stabilize banks; and

- Implementation of positive measures to prevent uncontrolled access from outside the aquatic mitigation boundary.

In 2012, field investigations were conducted to identify streams within the North Sulphur River, Middle Sulphur River, and South Sulphur River watersheds in an attempt to locate a reference site that could be used for the proposed Lake Ralph Hall mitigation design. No appropriate reference sites that would qualify as a "least-disturbed stream" were located. Since a reliable and accurate reference site was not available, mitigation design concepts were developed based on the physical dimensions of remnant former North Sulphur River channel segments within the proposed project area that are no longer hydraulically connected (i.e., do not currently function as tributaries to the existing North Sulphur River). These isolated remnants have not been adversely affected by the significant erosion characteristic of the channels that are hydraulically connected to the channelized North Sulphur River. Descriptions of historical conditions prior to the North Sulphur River channelization project were also considered in the development of design parameters for the proposed creation and restoration of stream channels within the downstream aquatic resources mitigation boundary described in the following sections as well as review of the SWAMPIM metrics. The projected functional uplift for the aquatic resources within the downstream aquatic resources mitigation boundary are considered realistic based on the proposed mitigation activities, hydrologic modeling, and preliminary design. A detailed description of the proposed mitigation is included in *Mitigation Plan for Impacts to Aquatic Resources and Terrestrial Habitats* (UTRWD 2018a).

**Table 5-2** includes a summary of pre-project baseline functional capacity and post-project projected functional capacity for aquatic resources based on the proposed project mitigation activities. The resulting net uplift of functional capacity projected within the downstream aquatic resources mitigation boundary is 437 FCUs.

**Table 5-2: Functional Capacity of Aquatic Resources Within Proposed Aquatic Resources Mitigation Boundary**

| Category | Activity | Length (feet) | Pre-Project Baseline FCU | Post-Project FCU |
|---|---|---|---|---|
| Intermittent Stream | Filled | 6,579 | 8 | 0 |
| Intermittent Stream | Restoration/Creation | 28,018 | 0 | 244 |
| Ephemeral Stream | Filled | 24,012 | 11 | 0 |
| Ephemeral Stream | Enhancement | 37,655 | 39 | 107 |
| Ephemeral Stream | Restoration/Creation | 49,690 | 0 | 144 |
| TOTAL | | — | 58 | 495 |
| Net Functional Capacity Uplift for Mitigation Activities (495 – 58) | | | | 437 |

The functional capacity for existing aquatic resources to be lost in the area of the conservation pool, dam, and spillway is 430 FCUs. The proposed mitigation activities to be conducted in the downstream aquatic resources mitigation boundary are projected to generate a net functional capacity for aquatic resources of 437 FCUs. Since the projected functional capacity of the mitigation activities is greater than those impacted with the proposed Lake Ralph Hall constructed as reflected in **Table 5-3**, the Project and associated mitigation as proposed will meet the goal of no net loss of aquatic resources.

**Table 5-3: Comparison of Aquatic Resources Functional Capacity Impacts as a Result of Proposed Project Versus Functional Capacity from Proposed Mitigation Activities**

| Description | FCU |
|---|---|
| Pre-Project Aquatic Resources FCUs (Aquatic Resources Impacted with the Proposed Lake Ralph Hall Constructed | 430 |
| Post-Project Aquatic Resources FCUs with the Proposed Mitigation Activities Implemented | 437 |
| **Net Functional Capacity Uplift for Project** | **7** |

Existing open water resources characterized as on-channel impoundments are located within the proposed project boundary. Approximately 56.19 acres of on-channel impoundments would be inundated by the proposed reservoir. Approximately eight acres of lacustrine fringe wetland area associated with the on-channel impoundments located within the proposed conservation pool footprint would also be inundated. The existing on-channel impoundments functions were evaluated using SWAMPIM to determine the resource capacity. The impacts to on-channel impoundments and approximately eight acres of associated lacustrine fringe wetlands within the proposed conservation pool footprint are considered to be offset by the substantially increased resource capacity score, as outlined in **Table 5-4**, resulting from the proposed Lake Ralph Hall. Therefore, no specific compensatory mitigation for those losses is proposed. The increase in shallow lake edge along the shoreline of the proposed Lake Ralph Hall reservoir is anticipated to develop substantially more than eight acres of lacustrine fringe wetland area as well as an increase in open water area.

**Table 5-4: Current Condition and With-Project Comparison of Impoundment Resource Capacity Scores**

| Impoundments | Pre-Project | | Post-Project | |
|---|---|---|---|---|
| | Area (Acres) | Resource Capacity | Area (Acres) | Resource Capacity |
| Within Conservation Pool, Dam, Spillway | 56.19 | 28.64 | 7,568 | 5,784 |
| Outside Conservation Pool | 13.69 | 5.46 | 13.69 | 5.46 |
| **Total** | **69.88** | **34.10** | **7,582** | **5,789** |
| **Pre and Post-Project Impoundment Resource Capacity Difference** | | | | **5,755** |

Pipeline installation would include open trenching and backfilling as well as directional installation techniques. Necessary measures and BMPs would be incorporated into the engineering design and construction to minimize impacts to waters of the U.S. associated with construction activities. Impacts are considered to be negligible to minor.

## 5.7 Air Quality

During the construction phase of the project, temporary impacts to air quality would increase due to local fugitive dust levels and diesel powered heavy construction equipment. Although some air quality impacts inevitably would occur during construction, they would be transitory and limited in duration.

Once project construction is complete air quality should return to its current conditions. To the extent that visitation to the area is increased and boats are operated for fishing and other recreation, there would be a corresponding increase in emissions.

BMPs would be implemented and all provisions of state laws governing the maintenance and operations of construction equipment and regulations governing fugitive dust would be complied with. Emissions due to construction operations would be mitigated by implementing BMP measures such as fugitive dust control. Strategies to control fugitive dust may include wetting or watering, chemical stabilizations, planting vegetative cover, providing synthetic cover, wind breaks, or other equivalent approved methods or techniques. Other emissions controls could include reducing idling, adhering to burning restrictions, and minimizing hauling.

## 5.8 Noise

During the construction phase, heavy equipment on the site would include dump trucks, scrapers, dozers, loaders, backhoes, and other heavy construction equipment. No noise impacts are anticipated for residents in the City of Ladonia. Single residences located at each end of the dam embankment would be subjected to noise levels tolerable for day time activity, but may be of bother at night if night time operations are conducted. Four noise receptors would be subjected to increased noise levels from construction of bridges and roadways. Increased noise levels would also be expected over the length of the pipeline where construction is occurring. Once construction

is completed, noise levels would return to existing conditions. Impacts associated with the project are considered to be minor.

An increase in noise levels to the extent that visitation to the area is increased and boats are operated for fishing and other recreation could occur. However, local authorities such as lake operators, cities, or counties can set noise regulations to reduce noise levels.

BMPs to reduce noise could include limiting construction to normal weekday business hours in areas adjacent to noise sensitive land uses such as residential areas and recreational areas when possible, and ensuring that construction equipment mufflers are properly maintained.

## 5.9 Recreation

Approximately 300 acres of Federal land (Caddo National Grasslands- Ladonia Unit), currently administered by the U.S. Forest Service, would be acquired by the applicant and converted to open water as a result of the proposed project. Recreation within this portion of the grasslands is limited to hunting as there are no lakes or trails. Therefore, there would be 300 fewer acres of land available for recreational hunting due to the Proposed Action, which is considered minimal.

Under the Proposed Action, the Ladonia Fossil Park (aka Pete Patterson Fossil Park) would no longer be accessible for fossil hunters. UTRWD anticipates mitigating the impact to the existing Pete Patterson Fossil Park by providing a similar park near the intersection of FM 904 and the North Sulphur River. The relocated park is anticipated to be comprised of a gravel parking area, signage, a covered pavilion and a path accessing the North Sulphur River Channel. The access to the North Sulphur River Channel is anticipated to be provided by a series of steps leading from the upper bank of the channel to the channel bottom.

The reservoir has the ability to provide the potential benefit as a recreational resource for the area. However, no development plans or specific use of the proposed project for recreational purposes has been identified. Therefore, no causal recreational benefits have been identified associated with the reservoir, although such development is likely to occur independently and was addressed in the cumulative section.

## 5.10 Visual Resources

During construction of the proposed dam and embankment the viewshed of travelers along FM 1550, FM 904, and SH 34 would be affected as the construction would be visible from the roadway. Overall, the impacts to visual resources related to construction of the proposed dam and reservoir would be moderate and end once construction activities are completed.

Based on the large size of the proposed reservoir, dam, and change in land use that would occur under the proposed project, the visual resource contrast rating for the Build Alternative would be

'strong'. The form, line, color, and texture of the environment would all change noticeably under the proposed project. However, whether this impact would be regarded as adverse or beneficial would depend on the values of each individual observer. No mitigation for visual resources is anticipated.

## 5.11 Biological Resources

**Habitat**

Since the overall quality of vegetative resources within the proposed project area has been substantially degraded by agricultural usage and the significant continuing erosion problems experienced as a result of historical channelization projects along the river, minimal loss of moderate quality vegetative resources is anticipated as a result of the proposed project. The reservoir would help stabilize the North Sulphur River watershed by reducing habitat loss and conversion from currently on-going severe erosion. The reservoir would also create and enhance habitat for local and migratory wildlife through the anticipated creation of at least eight acres of fringe wetlands along the proposed reservoir shoreline (UTRWD, 2018a). Mudflats may also be created in shallow flooded areas, especially in the upstream portion of the reservoir.

To facilitate evaluation of potential impacts to these habitats, Texas Parks and Wildlife Department's (TPWD) Wildlife Habitat Appraisal Procedure (WHAP) was selected to assess the terrestrial habitat within the proposed project area. The habitat assessment included classification of land cover within the proposed conservation pool area and evaluation of habitat quality using the WHAP (UTRWD, 2011a). In the documentation of its Decision Order, the TCEQ listed Findings of Fact including many which detailed the impacts of the historical North Sulphur Channelization Project, the existing conditions of the North Sulphur River watershed, and its evaluation of the habitats within the proposed project area. The final Water Use Permit No. 5821 (dated December 11, 2013) includes several Special Conditions. Special Conditions related to aquatic resources are met with the proposed mitigation activities described in the mitigation plan. Special Condition M related to terrestrial resources mitigation is included below:

Special Condition Excerpted from Water Use Permit No. 5821:

*M. Permittee shall establish and maintain a riparian buffer zone of permanent vegetation around the perimeter of the reservoir averaging at least 50 feet in width with the exception of reasonable access areas and the area of the dam and spillway. Permittee shall also establish and maintain riparian buffer zones 25 to 50 feet wide at or below elevation 560 feet msl along Bear Creek, Brushy Creek, Pickle Creek, Davis Creek, Leggets Branch, Bralley Pool Creek, Merrill Creek, the North Sulphur River, and along unnamed tributaries within the area of the reservoir project. The buffer zones shall be planted with native vegetation as necessary to ensure complete coverage at maturity.*

During construction of the Lake Ralph Hall Raw Water Pipeline Alignment existing vegetation would be disturbed. The pipeline route would be maintained with a 100-ft ROW. The majority of vegetation within this pipeline corridor consists of cropland, pasture/hay, and herbaceous grasslands. This area would be re-vegetated and certain non-structural uses such as agriculture and rangeland could be used along the alignment.

**Wildlife**

Although some displacement of wildlife would occur with the inundation as a result of the proposed project, the overall current state of degradation of habitat and isolation of remaining moderate quality habitat within the project area indicates that these impacts would be moderate. Wildlife that could occur along the pipeline ROW would potentially experience varying degrees of adverse impacts. In some cases, animal burrows may need to be removed or filled when they are located in close proximity to the pipeline alignment. Such activities would impact individuals of a particular species but would not constitute population level effects. Increase in noise and presence of workers during construction may cause wildlife to leave the area temporarily. Typically, wildlife would return after construction is completed and heavy equipment vacates the area.

Construction activities would have minimal effects on migratory birds, their nests, or eggs. Some ground nesting species could be accidentally displaced, injured or killed as a result of construction activities but personnel would be trained to avoid disturbing birds and nests when present within a work area. Similarly, birds nesting and/or foraging in this area could also be disturbed during construction activities. All required permits would be obtained prior to construction. In accordance with the Migratory Bird Treaty Act (MBTA), UTRWD would avoid intentional takings of migratory birds. In addition, BMPs would be put into place that minimizes and avoids disturbance to migratory birds by:

- Not disturbing, destroying, or removing active nests during the nesting season;
- Avoiding the removal of unoccupied, inactive nests, as practicable; and
- Not collecting, capturing, relocating, or transporting birds, eggs, young, or active nests without a permit.

**Aquatic Biota**

The limited aquatic habitat in the North Sulphur River would be converted to open water and a more stable lacustrine environment. With the exception of the central stoneroller, all species sampled in the North Sulphur River occupy lacustrine environments and are found in other Texas reservoirs. Additional species that normally occur in Texas reservoirs could also be abundant in the proposed Lake Ralph Hall once constructed.

Due to the limited available habitat for invertebrates within the existing stream, impacts to these species is expected to be minimal. The aquatic habitat available for invertebrates would be

converted from an intermediate stream habitat to a lacustrine habitat. Therefore, the invertebrate species community would change from riverine species to a community more adapted for a lacustrine habitat.

Aquatic organisms occupy pools within the North Sulphur River channel downstream from the proposed Lake Ralph Hall Dam location. The majority of impacts to pools >75 percent full in the North Sulphur River would occur between the Lake Ralph Hall Dam site and Baker Creek. This reach of the North Sulphur River will also be filled with earthen fill consisting of native clay soils excavated from the project area materials eliminating this pool area. Pools in reaches below Baker Creek would experience lower levels of change ranging from 0.0 percent to 6.0 percent. It is anticipated impacts to aquatic organisms in pools with decreasing levels would occur between the proposed Lake Ralph Hall dam and the Cooper Gage. These effects would be minor. Both the RiverWare Model and Water Availability Model (WAM) Model indicated almost no change to reaches below the Cooper Gage.

Temporary impacts to aquatic biota would be avoided by using horizontal directional drilling to install the pipeline at significant stream crossings and staging areas would be located within uplands. Once the pipeline is constructed, all pre-construction contours would be restored, exposed slopes and stream banks would be stabilized, and disturbed areas would be revegetated. Overall impacts from pipeline construction to aquatic biota would be none to minimal.

**Invasive Species**

The spread of invasive plant species is often attributed to disturbed soils. During the construction phase, invasive terrestrial plant species may invade disturbed areas and continue to inhabit these areas during the long-term operation of the proposed Lake Ralph Hall.

Aquatic invasive species known to occur in Texas reservoirs (e.g., Zebra mussels) may spread to Lake Ralph Hall, particularly if recreational boating is allowed. Aquatic invasive species are known to be transported from reservoir to reservoir via watercraft and/or trailers. The control of these species is often very difficult once they become established. The Texas Parks and Wildlife Department (TPWD) has increased public awareness and education for these species and provides information on prevention of introduction. Any USACE permit has the ability to require additional actions be taken as appropriate if such new conditions occur.

## 5.12 Threatened and Endangered Species

Based on species research and evaluations of preferred habitat for the federal and state listed protected species, it is unlikely there would be impacts to any of the federal listed species for Fannin, Hunt, or Collin counties. The state listed timber rattlesnake, as well as the four state listed mollusks, have the potential to be impacted by the construction of Lake Ralph Hall Raw and the Water Pipeline Alignment. No mitigation is proposed.

## 5.13 Traffic and Transportation

During construction of the dam and reservoir, congestion would increase in the immediate area due to additional construction vehicles, delays caused by construction activities (i.e., roads temporarily reduced to a single lane), and road closures and detours.

The establishment of the proposed dam and reservoir would have noticeable long-term beneficial and adverse effects on transportation resources and traffic. The permanent closure of roadways and rerouting of traffic from some secondary and tertiary roadways in the area would result in adverse effects, while new roads and road improvements would result in beneficial effects.

Construction of the proposed raw water pipeline would have short-term negligible effects to transportation resources. Operation of the proposed pipeline would not conflict with any existing roadway or interfere with traffic.

Planning, development, and implementation of the proposed roadway improvements would be coordinated through TxDOT planners and engineers as well as Fannin County authorities. Potential construction BMPs could include requiring construction vehicles to be equipped with backup alarms, two-way radios, and 'slow moving vehicle' signs when appropriate. In addition, construction vehicles would be routed to avoid conflicts with other traffic when possible.

## 5.14 Hazardous Materials

As described in **Section 3.15**, the August 2018 radius report **(Appendix G)** contained one listing in the conservation pool, one outside conservation pool but within the project area and three near the proposed pipeline footprint. The listing located within the inundation areas is registered as "Wastewater Agriculture Non-Permitted". The property has been acquired by UTRWD and will be inspected and potential water quality contaminants will be removed prior to inundation. Limits of the two landfill listings near the proposed pipeline footprint will be verified prior to construction and avoided. Coordination with Atmos Energy would need to occur prior to construction of the raw water pipeline.

## 5.15 Cultural Resources

**Historic Resources**

The Proposed Action would have no effect on properties currently listed on the National Register of Historic Places. One historic marker is located near the proposed pipeline footprint. No impacts to the marker are anticipated, but if it is determined that the marker needs to be removed during construction it would be reinstalled after construction. Two cemeteries were surveyed as part of the 2010 *Historic Resources Survey.* Both cemeteries are located outside the project area, but within the APE, and are not recommended as eligible for the NRHP. Other historic cemeteries are located within the APE but were not surveyed due to lack of access. Field surveys of historic

buildings and structures identified 75 properties within the APE including 114 resources. None of the resources were recommended as eligible for the NRHP or recommended for intensive-level study. Not all potential resources were surveyed due to lack of right of entry, heavy rains on unpaved roads, and heavy vegetation. Using a 1964 topographic map, current aerial photographs and previous archeological survey, the properties that appear to have historic-age resources present have been identified in the *Historic Resources Survey*. While the project may be permitted before verification of the presence of these resources is undertaken, the proposed project may not proceed until these resources have been identified, documented and determined eligible or ineligible for NRHP listing.

All future cultural resource survey will be done in accordance with the Programmatic Agreement (PA) (**Appendix M**). The PA states that the USACE will determine the NRHP eligibility of all archeological and historical resources identified within the APE in consultation with the State Historic Preservation Office (SHPO) and the Tribes. For all resources determined eligible for inclusion in the NRHP, the USACE will apply the Criteria of Effect to assess whether or not adverse effects will occur to historic properties as a result of the project. In consultation with the SHPO and Tribes, the USACE shall make a determination of effect. For all historic properties that will be adversely affected, an avoidance plan or mitigation plan will be developed in consultation with all consulting parties.

**Archeological Resources**

An intensive pedestrian archeological survey was conducted along with trench testing of selected areas within the project area in 2005. The *Cultural Resources Survey Report* was submitted to and approved by the Texas Historical Commission (THC) in April 2006.

The survey covered approximately 15 percent of the Proposed Action with the primary focus on the dam site. A total of 17 archeological sites were recorded, which includes seven prehistoric sites and 10 historic sites. Eleven sites were recommended as ineligible for the NRHP or as a State Antiquities Landmark (SAL). Five sites were recommended for further testing or further definition of the deposit. One site, the Merrill Family Cemetery, was recommended to be avoided.

Based upon the results of the survey, the report included recommendations for additional survey of the first terrace surfaces, the lake margin, and deep testing in the proposed borrow pit areas and along the old river and creek channels to search for deeply buried sites. The report concluded that excavation of several prehistoric sites may be required to mitigate the loss of select significant resources and several historic sites warrant preservation.

All future cultural resources survey will be done in accordance with the PA. The PA states that the USACE will determine the NRHP eligibility of all archeological and historical resources identified within the APE in consultation with the SHPO and the Tribes. In consultation with the SHPO and Tribes, the USACE shall make a determination of effect. For archeological sites, the mitigation plan will specify the areas to be excavated, the methods to be used, special samples to

be collected, the specialists who will conduct specialized analyses, the problems set forth in the research design that can be addressed by data from the site being excavated, and include reporting methods and curation of artifacts and records.

## 5.16 Paleontological Resources

Under the Proposed Action paleontological resources in the inundation footprint would no longer be accessible following completion of the proposed project. During construction a paleontologist would be available to identify and manage potentially significant fossil finds. The Ladonia Fossil Park (aka Pete Patterson Fossil Park) would no longer be accessible for fossil hunters due to the proposed project. However, proposed mitigation includes involving an equivalent or better park downstream of the proposed reservoir, including parking, signage, and a covered pavilion.

## 5.17 Socioeconomics

As discussed in **Section 4.17.1.2,** the socioeconomic and recreational impacts of Lake Ralph Hall will be minimal, and positive, in the long-term. As discussed previously, the loss of property taxes would be reduced through an arrangement reached between UTRWD and Fannin County. Once UTRWD acquired 5,000 acres of land for the development of the lake, it began making payments to Fannin County to help offset the loss. The first payment occurred in October of 2015. Fannin County will apportion the payments amongst the various local government agencies. No other mitigation is planned for this resource.

## 5.18 Environmental Justice and Protection of Children

The Proposed Action would not result in environmental justice impacts in the overall Region of Influence (ROI). Overall, adverse impacts on environmental justice populations within the study area would be minor, primarily relating to noise, air, and safety. Impacts to EJ populations would be reduced through implementations of BMPs for noise and air quality during construction. Safety concerns would be reduced through by ensuring that all construction vehicles would be equipped with backup alarms, two-way radios, and ‘slow moving vehicle’ signs when appropriate, and routing and scheduling construction vehicles to avoid conflicts with other traffic. Project benefits, including employment opportunities, increased tax revenue, roadway improvements, and access to a potentially new recreational facility would be shared by all residents in the study area, including environmental justice populations.

## 5.19 Climate Change

The proposed project would require energy associated with pumping from the reservoir to the service area, which could be a minor long-term effect on GHG. Although there would be negligible direct effects from the emissions on climate change, the Proposed Action would constitute a more

effective approach to water management under future conditions. No mitigation for climate change is anticipated.

# 6.0 Consultation and Coordination

## 6.1 Public Participation and Scoping

Public participation for the DEIS began with the scoping process and involved actively soliciting input from the public and interested federal, state, and local agencies about the Proposed Action. The process provides a mechanism to identify and analyze potential environmental impacts and alternatives to be addressed in detail and disclosed to the public through the preparation of an EA or EIS. The USACE Fort Worth District's overall scoping goal for the DEIS was to engage a diverse group of public, tribal, and agency participants in the NEPA process, solicit relevant input, and provide timely information during the DEIS process.

On March 14, 2008, the USACE published and distributed a Public Notice to parties on the USACE Regulatory Branch mailing list for projects located in Fannin, Delta, and Lamar Counties, Texas, adjacent landowners, and other interested parties. The purpose of the Public Notice was to inform interested parties about the proposed Lake Ralph Hall, to solicit comments relevant to the Section 404 permit application, and to inform the public of an April 15, 2008, scoping meeting, proposed to be held at the Fannindel High School Gymnasium, in Ladonia, Texas. To further publicize the meeting, a notice providing information on the meeting was published in several local newspapers.

On Tuesday April 15, 2008, the USACE held an informal public scoping meeting from 4:00 to 8:30 pm at the Fannindel High School, located at 601 West Main Street, Ladonia, Fannin County, Texas. The purpose of this meeting was to disseminate information about the proposed lake project and its potential effects to the human environment. The USACE held this meeting to seek public comment on the applicant's proposal and assist the agency in determining whether the proposed project would significantly affect the quality of the human environment. Meeting participants were offered two options to provide comments, either in written form or through verbal comment recorded by a stenographer.

The formal 45-day comment period for the Public Notice and scoping process closed on April 28, 2008. The USACE did not receive any requests to extend the 45-day comment period. As the Public Notice comments and scoping comments were received, the USACE cataloged and recorded each comment with a unique number. All original copies, including transcript of verbal comments have been incorporated into the administrative record for this project. The comments were identified relative to environmental/human resource type and by specific issue within each resource to identify public and agency concerns related to the proposed project.

This summary of scoping comments presents a preliminary identification of those issues that appear to be relevant to the NEPA process and the USACE's decision whether to prepare an EA or EIS for this project. A number of comments were received regarding issues unrelated to the proposed action or for which the relationship appears to be weak or poorly defined. The USACE determined such comments to be outside the scope of the Section 404 and NEPA evaluations. As such, these comments were purposely omitted from this analysis.

The scoping phase of the NEPA process is designed to encourage public input to the environmental analysis and document preparation process. As such, the number of comments received at this point in the process provides an indication of the level of public interest and participation in the proposed project.

The following tables **(Table 6-1** through **Table 6-13)** provide a general overview of the number of comments by resource and by issue. Some comments concern more than one subject; therefore, some comments have been included in more than one table, although they were counted only once for the total comments in **Table 6-1**. Although all reasonable efforts were put forth to provide the most accurate information, the numbers provided in **Table 6-1** represent an approximate, not absolute accounting of comments.

**Table 6-1: Total Written and Verbal Comments Transcribed**

| | |
|---|---|
| Number of Submission (Letter/transcript) | 49 |
| Number of Comments | 255 |
| Number of Individual Commenters | 41 |

**Table 6-2: Number of Comments Concerning Water Resources**

| Subject | Number of Comments |
|---|---|
| Effects to stream receiving inter basin transfer | 2 |
| Concern regarding accuracy of Jurisdictional Determination | 4 |
| Need to increase riparian and shoreline buffers | 3 |
| Need for performance bonds (mitigation) | 1 |
| Concerns regarding mitigation design | 13 |
| Impacts to aquatic resources associated with water transmission lines | 2 |
| Need for additional mitigation | 2 |
| Effects to downstream areas losing water due to interbasin transfer | 1 |
| Effects of altered flow regime (downstream) | 3 |
| Effects to downstream channel geomorphology | 4 |
| Effects to floodplain and need for map revisions | 1 |
| Need for review by Floodplain Administrator | 1 |
| Effects to water quality associated with receiving waters and source waters | 5 |
| Effects to water quality associated with lakeshore development-recreation | 4 |
| Effects to isolated wetlands and other isolated waters | 2 |
| Effects to overall water quality | 6 |
| Effects associated with increased flooding | 2 |
| Need to prohibit clearing/grazing within shoreline buffer | 1 |
| Effects associated with leakage of underground gas reserves into lake water | 2 |

**Table 6-3: Number of Comments Concerning Loss of Soils Erosion-Sedimentation**

| Subject | Number of Comments |
|---|---|
| Loss of valuable farmland | 3 |
| Sedimentation within conservation pool | 6 |
| Effects to downstream sediment transport | 4 |
| Need to control erosion without construction of a lake | 1 |
| General concerns regarding erosion | 4 |

**Table 6-4: Number of Comments Concerning Biological Resources (Vegetation and Wildlife)**

| Subject | Number of Comments |
|---|---|
| Loss of bottomland hardwood forests | 2 |
| Adverse effects to wildlife | 3 |
| Concern regarding aquatic life movement | 1 |
| Lack of data on effects (adverse) to fish and wildlife | 1 |

**Table 6-5: Number of Comments Concerning Cultural and Paleontological Resources**

| Subject | Number of Comments |
|---|---|
| Effects to paleontological resources | 2 |
| Effects to cultural resources subject to the National Historic Preservation Act | 3 |
| Effects to cemeteries | 1 |

**Table 6-6: Number of Comments Concerning Air Quality**

| Subject | Number of Comments |
|---|---|
| Effects to air quality (development, traffic, recreational boats) | 2 |

**Table 6-7: Number of Comments Concerning Property Rights**

| Subject | Number of Comments |
|---|---|
| Loss of mineral rights | 3 |
| Loss of private property | 5 |
| Need for more accurate mapping of affected properties | 13 |
| Affects to property/displacement of residents | 24 |

### Table 6-8: Number of Comments Concerning Social and Economic Resources

| Subject | Number of Comments |
|---|---|
| Lack of an economic development plan | 1 |
| Lake not needed for water supply | 3 |
| Reallocation of rural water resources to urban areas | 5 |
| Concerns relating to anticipated future water shortages | 3 |
| Effects associated with increased land values | 1 |
| Effects associated with increases in property taxes | 3 |
| Need for zoning to regulate lakeshore development | 3 |
| Need for overall water conservation | 3 |
| Effects to local economy (beneficial) | 2 |
| Effects to local economy (adverse) | 2 |
| Effects (adverse) associated with loss of tax base (lake no longer on tax rolls) | 3 |

### Table 6-9: Number of Comments Concerning Noise and Visual Resources

| Subject | Number of Comments |
|---|---|
| Adverse aesthetics effects due to significant fluctuations of lake levels | 5 |
| Adverse effects to rural nature of Fannin County | 2 |

### Table 6-10: Number of Comments Concerning Transportation

| Subject | Number of Comments |
|---|---|
| Effects associated with road closures | 2 |

### Table 6-11: Number of Comments Concerning Recreation

| Subject | Number of Comments |
|---|---|
| Concerns about excessive public access | 1 |
| Need for adequate public access | 2 |

### Table 6-12: Number of Comments Concerning Project Design and Management

| Subject | Number of Comments |
|---|---|
| Overall project design concerns | 1 |
| Underestimated project costs | 2 |
| Water transmission method | 2 |
| High cost of water to be sold Lake Ralph Hall | 2 |
| Concerns regarding long-term capacity of reservoir | 6 |
| Accuracy of firm yield estimates | 2 |
| Responsibility for shoreline maintenance | 1 |
| Dam design, construction, and safety | 2 |
| Availability of water for local use | 1 |
| Need for additional project alternatives | 10 |

| | |
|---|---|
| Concerns regarding high cost of project | 4 |
| Purchase of water from Oklahoma as possible alternative | 2 |
| Concerns regarding lake size | 3 |
| Concerns regarding lake levels | 8 |
| Lake not needed for local water supply | 4 |
| Concerns regarding water allocation | 1 |
| Project timing | 4 |

**Table 6-13: Number of Comments Concerning the Regulatory Process**

| Subject | Number of Comments |
|---|---|
| Lack of agency coordination | 1 |
| Overall lack of data | 4 |
| Requests for an EIS | 6 |
| Requests for a formal Public Hearing | 5 |

The USACE determined that the project could result in significant effects to the human and natural environment requiring the preparation of an EIS. A Notice of Intent (NOI) for the Lake Ralph Hall EIS was published in the *Federal Register* on October 17, 2008 (Vol. 73, No. 2028, p. 61827-61828).

On January 21, 2011, the USACE held a meeting in Ladonia to educate the public on the role of the USACE in evaluating the historic, prehistoric, and paleontological resources that could be affected by construction of the lake. On March 22, 2011, the USACE held a meeting at Southern Methodist University (SMU) to provide an overview of the proposed project and the EIS process and discuss potential mitigation opportunities. Meeting attendees included members of the Dallas Paleontological Society, paleontologists from SMU, a staff member from the Museum of Nature & Science, and representatives from the USACE and UTRWD.

## 6.2 Consultation and Coordination with Federal, State, and Local Government Agencies

Specific regulations require the USACE to coordinate and consult with federal, state, and local agencies concerning the potential for a proposed action and alternatives to affect sensitive environmental and human resources. The USACE Fort Worth District initiated these coordination and consultation activities through the scoping process. In addition, the District invited interested agencies to serve as cooperating agencies for preparation of the DEIS. The EPA, USFWS, USFS, THC, TPWD, and TCEQ are serving as cooperating agencies. Numerous site visits have occurred with EPA, USFWS, and TPWD. Coordination meetings held with federal, state, and local agencies are shown in **Table 6-14**.

**Table 6-14: Coordination Meetings held with Federal, State, and Local Government Agencies**

| Date | Agencies | Topics |
|---|---|---|
| November 4, 2008 | USACE, EPA, USFWS, TPWD, TCEQ, USFS, UTWRD | DEIS scope, alternatives, environmental consequences, mitigation |
| February 2009 | USACE, USFWS, TPWD, TCEQ, UTRWD | Habitat assessment |
| April 21, 2009 | Fannin County Historical Commission | Historic Resources |
| September 2009 | USACE, EPA, USFWS, TPWD, TCEQ, UTRWD | Site visit/review and validation of water impact metrics and scoring for both aquatic and terrestrial resources |
| March 8, 2011 | USACE, EPA, USFWS, TPWD, TCEQ, UTWRD | Mitigation Plan |
| May 5, 2015 | USFWS, USACE, EPA, TCEQ, TPWD | Mitigation Plan |
| October 1, 2015 | USACE, USFWS, TPWD, UTRWD | Site Visit |
| January 9, 2017 | USACE, EPA, USFWS, TWPD, UTRWD | Mitigation Plan |

## 6.3 Tribal Government-to-Government Consultation

In compliance with NHPA and USACE Policy Guidance Letter No. 57 (Indian Sovereignty and Government-to-Government Relations with Indian Tribes) the USACE is required to establish regular and meaningful consultation and collaboration with Native American tribal governments on development of regulatory policies that could significantly or uniquely affect their communities. The USACE Fort Worth District initiated consultation with Native American tribes by sending letters dated May 2, 2017, to federally recognized tribes (as identified below). The Caddo Nation of Oklahoma and the Choctaw Nation of Oklahoma requested consulting party status by phone. The USACE invited the Caddo Nation of Oklahoma and the Choctaw Nation of Oklahoma to be Consulting Parties to the PA.

- Caddo Nation of Oklahoma
- Choctaw Nation of Oklahoma
- Comanche Nation of Oklahoma
- Tonkawa Tribe of Oklahoma
- Wichita and Affiliated Tribes

## 6.4 Distribution of Notifications or Copies of this DEIS

Section will be updated after distribution of notifications or copies of this DEIS.

# 7.0 EIS Preparers and Reviewers

| Responsibility | Affiliation / Name | Degree and Experience |
|---|---|---|
| **U.S. Army Corps of Engineers EIS Team** | | |
| Chief, Evaluation Branch, Regulatory Division | Jennifer Walker | BS Environmental Science/Biology<br>32 Years Experience |
| Planning Division | Mary Verwers | MS Wildlife Science<br>19 Years Experience |
| Regulatory Division | Brent Jasper | BS Forest Resource Management<br>31 Years Experience |
| Regulatory Division | Chandler Peter | BS Biology<br>31 Years Experience |
| **Michael Baker International (MBI) EIS Team** | | |
| Project Manager | Tim Smith<br>MBI<br>Round Rock, TX | MS Wildlife Biology<br>BS Forest Biology<br>25 Years Experience |
| Project Manager | Matt Barkley<br>MBI<br>Round Rock, TX | MA Organizational Management<br>BS Environmental Resource Management<br>20 Years Experience |
| Deputy Project Manager | Michael Weeks<br>MBI<br>Round Rock, TX | BS Aquatic Biology<br>19 Years Experience |
| Document Manager | Rain Nox<br>MBI<br>Round Rock, TX | MS Applied Geography, GIS<br>PhD Environmental Geography<br>11 Years Experience |
| Socioeconomics | Edward Harvey<br>Harvey Economics<br>Denver, CO | MS Economics<br>29 Years Experience |
| Hydrology | Matt Bliss<br>DiNatale Water Consultants<br>Denver, CO | MS Civil Engineering<br>BS Mathematics<br>12 Years Experience |
| **CH2M Hill** | | |
| Mitigation Plan | Ed Motley<br>Dallas, TX | MS Civil Engineering<br>38 Years Experience |
| **Robert J Brandes Consulting** | | |
| Hydrology | Robert Brandes<br>Austin, TX | PhD<br>34 Years Experience |

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# 9.0 Glossary

Abiotic: Of or characterized by the absence of life or living organisms.

Alluvial: Of or relating to the sedimentary matter deposited within recent times, especially within valleys of large rivers.

Alluvium: The sedimentary matter deposited within recent times, especially within valleys of large rivers.

Ancillary: Providing necessary support to the primary activities operation of an organization, institution, industry, or system.

Annual (firm) yield: Maximum water volume a reservoir can provide each year under a repeat of the drought of record.

Aquiclude: Any geological formation that absorbs and hold water but does not transmit it at sufficient rate to supply springs, wells, etc.

Aquitard: A geologic formation or stratum that lies adjacent to an aquifer and that allows only a small amount of liquid to pass.

Benthic: Of, pertaining to, or occurring at the bottom of a body of water.

Benthic macroinvertebrate: Organisms without backbones that inhabit the bottom substrates for at least part of their lifecycle.

Biogeochemical: Of or pertaining to the science dealing with the relationship between the geochemistry of a given region and its flora and fauna, including the circulation of such elements as carbon and nitrogen between the environment and the cells of living organisms.

Biotic: Of, relating to, or caused by living organisms.

Brackish: Water or briny water with higher salinity than fresh water but less than seawater, such as the mixture of river water and seawater in estuaries.

Calcareous: Consisting of or containing calcium carbonate.

Channelization: The act of straightening a stream, typically widening and deepening the stream as well as to improve the flow of water.

Channel Morphology: Form and structure that describes the shape of a stream or river bed.

Collector-gatherers: Macroinvertebrate functional feeding group which collect fine particulate organic matter from the stream bottom.

Conservation pool: Water in a reservoir that lies above the dead pool (water in a reservoir that cannot be drained by gravity through a dam's outlet works) and below the normal maximum operating level. When a reservoir's conservation pool is full, the reservoir is considered full.

Conservation storage: The amount of water present within a reservoir's conservation pool; if the reservoir is shared with another state or country then conservation storage refers only to the portion that belongs to Texas.

Conveyance: The action or process of transporting something from one place to another.

Cumulative effects: Changes to the environment that are caused by an action in combination with other past, present and future actions.

Deciduous: Referring to a plant (usually a tree or shrub) that sheds its leaves at the end of the growing season.

Desalination: The process of removing salt from sea water, typically to make it drinkable.

Detritus: Rock in small particles or other material worn or broken away to form a mass, as by the action of water or glacial ice.

Easement: The right of a person, government, agency, or public utility company to use or restrict public or private land owned by another for a specific purpose.

Effluent: Treated waste material (such as smoke, liquid industrial refuse, or sewage) discharged into the environment especially when serving as a pollutant.

Ephemeral stream: An ephemeral stream has flowing water only during, and for a short duration after, precipitation events in a typical year. Ephemeral stream beds are located above the water table year-round. Groundwater is not a source of water for the stream. Runoff from rainfall is the primary source of water for stream flow.

Emergent wetlands: Wetlands characterized by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. These wetlands are usually dominated by perennial plants.

Emissions: Substances discharged into the air (as by a smokestack or an automobile engine).

Erosion: The removal of sediment or rock from a point in the landscape.

Expenditures: The act of expending something, especially funds; disbursement; consumption.

Extirpated: Something which has been wiped out or destroyed completely.

Firm Yield: The maximum amount of water that can be diverted from a reservoir on an annual basis during a repeat of the historical drought of record without shortage, assuming that all of the water in the reservoir is available for use.

Forb: Any herbaceous plant that is not a grass.

Functional capacity: The rate or magnitude at which a wetland ecosystem performs a function. Functional capacity is dictated by characteristics of the wetland ecosystem and the surrounding landscape, and interaction between the two.

Functional capacity units (FCU): The value derived by multiplying the functional capacity index

for a wetland unit area by the size of the wetland area.

Geomorphology: The scientific study of the formation, alteration, and configuration of landforms and their relationship with underlying structures.

Herbaceous: Designating or relating to plants or plant parts that are fleshy as opposed to woody.

Hydraulic gradient: A line joining the points of highest elevation of water in a series of vertical open pipes rising from a pipeline in which water flows under pressure.

Hydrology: The science dealing with the occurrence, circulation, distribution, and properties of the waters of the earth and its atmosphere.

Impoundment: A body of water confined within an enclosure, as a reservoir.

Interbasin transfer: The taking or diverting of state water from a river basin and transferring such water to any other river basin.

Intermittent stream: An intermittent stream has flowing water during certain times of the year, when groundwater provides water for stream flow. During dry periods, intermittent streams may not have flowing water. Runoff from rainfall is a supplemental source of water for stream flow.

Inundation area: Areas that would be flooded as a result of the dam and reservoir construction.

Invertebrates: Any animal lacking a backbone or spinal column, including all species not classified as vertebrates.

Lacustrine: Any large body of water that is greater than 8 hectares. Found in a topographic depression or is a dammed river channel.

Lithic Scatter: A scatter on the ground surface of cultural artifacts and debris consisting entirely of lithic (rock), tools and chipped stone debris.

Macrobenthic community: The relatively large organisms living on or in the bottom of bodies of water.

Mainstem: The primary, and generally largest, branch of a river.

Marl: A loose or crumbling earthy deposit (as of sand, silt, or clay) that contains a substantial amount of calcium carbonate.

Maximum available groundwater: The amount of groundwater that can be pumped while maintaining desired future conditions in an aquifer.

Mitigation: The act of lessening the force or intensity of condition or impact less severe.

Moratorium: A legally authorized period of delay in the performance of a legal obligation or the payment of a debt.

Nonpoint source pollution: A source of pollution (such as runoff from farmland) that is not confined to a single point or does not arise from a single identifiable source.

Noxious: Harmful or injurious to health or physical well-being.

Nektonic: The aggregate of actively swimming aquatic organisms in a body of water, able to move independently of water currents.

Oxbow: A bow-shaped bend in a river, or the land embraced by it. Also applicable as oxbow lake, when a bow-shaped lake is formed in a former channel of a river.

Per capita income: The measurement of the average income earned per person in a given area (city, region, country, etc.) in a specified year.

Perennial: A stream that normally has water in its channel at all times.

Permitted diversion: The amount of water that can be legally withdrawn from a water source in accordance with a Texas water right.

Photosynthesis: Process by which green plants and some other organisms use sunlight to make food from carbon dioxide and water.

Physiography: The study of physical patterns and processes of the Earth, such as the forces that produce and change rocks, oceans, weather, and global flora and fauna patterns.

Prime Farmland Soils: land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and that is available for these uses.

Reliable Supply: Amount of water that is considered available 100 percent of the time during a repeat of the historical drought of record. This is commonly based on the firm yield of the water source and may differ from permitted diversions or contract amounts.

Reuse: To use again especially in a different way or after reclaiming or reprocessing.

Right-of-way: The legal right, established by usage or grant, to pass along a specific route through grounds or property belonging to another.

Riparian: Areas adjacent to rivers and streams. These areas often have a high density, diversity, and productivity of plants and animal species relative to nearby uplands.

Riverine: Of, like, relating to, or produced by a river.

Run and riffle habitats: Runs refer to an area where the water is flowing rapidly, generally located downstream from riffles. Riffle is an area of a stream where the water breaks over cobbles, boulders and ravel or where the water surface is visibly broken. Runs are typically deeper than riffles.

Sedimentation: The deposition or accumulation of mineral or organic matter by water, air, or ice.

Slaking: The disintegration of lime in which it reacts with water or moist air to produce calcium hydroxide.

Socioeconomic: Of, relating to, or signifying the combination or interaction of social and economic factors.

Stratification: When water forms layers because of differences in salinity, oxygen levels, density, or temperature. These layers often act as a barrier to water mixing.

Swale: A low place in a tract of land, usually moister and often having ranker vegetation than the adjacent higher land.

Tax Roll: A breakdown of all taxable property that can be taxed within a given jurisdiction, such as a city or county. The tax roll lists each property separately in addition to its assessed value, and is usually created by the taxing assessor or other authority within the jurisdiction.

Texas water right (Certificate of Adjudication or Permit): Legal instrument issued by the State of Texas to divert, use and/or store waters of the state.

Topography: The three-dimensional arrangement of physical attributes (such as shape, height, and depth) of a land surface in a place or region. Physical features that make up the topography of an area include mountains, valleys, plains, and bodies of water. Human-made features such as roads, railroads, and landfills are also often considered part of a region's topography.

Tributary: Stream or river that flows into a larger stream or main stem river or a lake.

Undulating: To move with a sinuous or wavelike motion; display a smooth rising-and-falling or side-to-side alternation of movement.

Upland: Land or an area of land lying above the level where water flows or where flooding occurs.

Urbanization: The process by which a predominantly rural area or city becomes more industrialized and increases in population size and density.

Viewshed: The natural environment that is visible from one or more viewing points.

# 10.0 Index