



United States Department of the Interior



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Consultation No. 21450-2007-F-0111
USACE Project No. 200100546

Mr. Wayne Lea
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Dear Sirs:

This document transmits the U.S. Fish and Wildlife Service's (Service) biological opinion regarding the construction and operation of a proposed new flood control project known as Comal County Flood Retarding Structure (CCFRS) in Comal County, Texas, and its effects on the federally listed endangered golden-cheeked warbler (*Dendroica chrysoparia*) (warbler) in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.). The Federal Emergency Management Administration's (FEMA) request for formal consultation was in a letter dated April 24, 2007, which we received with the biological assessment on April 25, 2007. The Corps of Engineers' (USACE) request was in a letter dated and received on May 3, 2007.

Six other federally listed endangered species are known to occur in Comal County: Comal Springs riffle beetle (*Heterelmis comalensis*), Comal Springs dryopid beetle (*Stygoparnus comalensis*), Peck's cave amphipod (*Stygobromus pecki*), fountain darter (*Etheostoma fonticola*), and black-capped vireo (*Vireo atricapilla*). The biological assessment (BA) included the determination that the proposed CCFRS will not affect the black-capped vireo since no suitable vireo habitat was identified on the project site (Holcim tract). The BA also stated that the project is not likely to have any adverse effects on the Comal Springs riffle beetle, Comal Springs dryopid beetle, Peck's cave amphipod, and fountain darter. Based on available information and the assumption that the construction and operation of CCFRS will not adversely affect water quality in the Edwards aquifer, we concur that the CCFRS is not likely to have adverse effects on the listed endangered aquatic species (Comal Springs riffle beetle, Comal Springs dryopid beetle, Peck's cave amphipod, and fountain darter). This biological opinion will consider only the warbler.



We have reviewed the BA, dated April, 2007. This biological opinion is based on information provided in the BA, Golden-cheeked Warbler Recovery Plan (Service 1992), field investigations, and other sources of information. A complete administrative record of this consultation is on file at the Austin, Texas, Ecological Services Field Office.

Consultation History

The Service received an August 21, 2001, letter from URS Corporation on the proposed project. We responded with an October 15, 2001, letter. We visited the site 11 (and an alternative location called site 1) on April 10, 2002. On November 4, 2003, we received the SWCA report on site 11 field surveys for warblers conducted in April and May, 2002. We attended a meeting in New Braunfels with FEMA, The Texas Historical Commission, and officials of Comal County on December 5, 2003. We received the draft BA on February 4, 2004. We received the FEMA letter, dated February 11, 2004, requesting formal consultation for the warbler on February 19, 2004. We met with officials from Comal County, their consultant SWCA, and FEMA on February 18, 2004. We acknowledged receipt of FEMA's request for consultation in a March 10, 2004 letter. We provided a draft biological opinion on May 6, 2004. We received FEMA's comments on May 10, 2004, and issued the final biological opinion on May 12, 2004. Geotechnical investigations subsequently revealed the original dam location presented significant engineering difficulties.

On November 2, 2006, we met with FEMA, representatives of Comal County, and SWCA to discuss the project including: (1) a new location for the dam, (2) no plans to purchase Holcim lands for conservation of warbler habitat surrounding the project, and (3) proposed conservation measures. We subsequently reviewed a draft addendum to the 2004 BA. On March 23, 2007, we met with FEMA, Comal County, SWCA, and CH2M HILL to discuss: (1) the limits of the Federal project, (2) warbler habitat delineation, and (3) proposed conservation measures. On April 25, 2007, we received the revised BA (dated April 2007) and request for formal consultation from FEMA. We received the USACE request for formal consultation on May 3, 2007. We acknowledged (to FEMA and the USACE) receipt of their requests for formal consultation in a May 10, 2007, letter. The USACE and Texas Commission on Environmental Quality jointly provided a public notice of the proposed work under section 404 of the Clean Water Act (CWA) and for water quality certification under section 401 of the CWA on May 31, 2007 (attached). We provided a draft biological opinion on June 27, 2007. We received comments from FEMA in the form of phone conversations and e-mails in July and early August 2007. We received e-mail comments from USACE on August 10, 2007.

BIOLOGICAL OPINION

I. Description of Proposed Action

The proposed flood retarding structure (project) consists of a new flood retarding dam on an unnamed tributary of Dry Comal Creek in Comal County, Texas (Figure 1). The Soil Conservation Service's (1968) engineering studies refer to this site as the "Rock Site." The site was not included in the 1968 flood prevention work plan for a variety of reasons including expense and poor reservoir storage characteristics.

The project is expected to reduce the impacts of flooding along Dry Comal Creek, Comal River, and Guadalupe River in the vicinity of the City of New Braunfels. Freese and Nichols (1999)

estimated this project will reduce the 100-year flood water surface elevation (stage) in New Braunfels by almost one foot at the confluence of the Comal and Guadalupe rivers.

The proposed flood retarding structure would be located on a former ranch. The property is owned by Holcim International and is about 3 miles west-southwest of the City of New Braunfels. A private paved road leads north from Farm to Market Road (FM) 482 to the south end of the Holcim property. The CCFRS would be built about 1,100 feet upstream of the original location. CCFRS dimensions are provided in Table 1.

The major features of the CCFRS include:

- Construction of a roller-compacted concrete dam with principle and emergency spillways controlling runoff from a watershed of about 3,377 acres. The dam has a V shape, and is about 1,850 feet long.
- The principle spillway will use two 72-inch diameter pipes, about 90 feet long with an inlet invert at grade elevation of 700 feet NGVD 1929. The CCFRS will likely increase recharge to the Edwards aquifer (Balcones Fault Zone, all following references to the Edwards aquifer refer to this aquifer).
- The emergency spillway will have a rounded crest, at an elevation of 772 feet, about 30 feet wide, 500 feet long, and about 72 feet above the impounded creek. The emergency spillway is designed to release runoff in excess of the 100-year storm.

Natural slopes on each side of the tributary channel would be utilized as abutments to the structure. Construction would require a 100-foot wide temporary construction easement on all sides of the structure. Permanent access roads with a width of 16 feet would be built to provide access to the structure from FM 482. A staging area, about 3.5-acres, would be created in a clearing south of the proposed dam. Proposed locations for the structure, access roads, and equipment staging area, as well as limits of the temporary construction easement are shown on Figure 2. No clearing of vegetation would occur outside of the areas identified on Figure 2 of the BA.

Under the current design, all water that does not: (1) recharge the Edwards aquifer, (2) infiltrate above the dam, or (3) minimally evaporate would drain through the principle spillway. The BA states that discussions between the Edwards Aquifer Authority (EAA) and CH2M HILL indicated that recharge from CCFRS would be expected to discharge at Comal Springs within about 24 hours.

As designed, a 2-year storm event would create a temporary reservoir behind the structure with a maximum surface area of about 3.0 acres and a depth of 18 feet (CH2M HILL 2006). The structure would begin to detain water at an inflow rate of 600 cfs (CH2M HILL 2006). Based on data prepared by CH2M HILL (2006), the maximum surface area and elevation of temporary reservoir pools, and duration of inundation expected behind the new structure, for various storm event scenarios are provided in Table 1 of the BA. Note that drain times provided in the BA's Table 1 indicate the amount of time necessary for detained water to drain to a surface elevation of 710 feet and not the 700-foot grade elevation of the outlet pipes.

Table 1. Comal Co Flood Retarding Structure Site 11		Feet	Meters
Dam Length		1,850.0	563.9
Dam Height		72.0	21.9
Elevation of Top of Dam		772.0	235.3
Minimum Width of Top of Dam		15.0	4.6
Emergency Spillway Width		30.0	9.1
Access Road Width		16.0	4.9
Diameter of Outlet Pipes (n = 2)		6.0	1.8
Distance upstream from Original Site		1,100.0	335.3
Elevation increase from Original Site		10.0	3.0
Construction Easement All Sides of Dam		100.0	30.5
Elevation of Outlet Invert (NGVD 1929)		700.0	213.4
2-Year Maximum Reservoir Surface Elevation		718.0	218.8
5-Year Maximum Reservoir Surface Elevation		735.0	224.0
10-Year Maximum Reservoir Surface Elevation		747.0	227.7
25-Year Maximum Reservoir Surface Elevation		759.0	231.3
50-Year Maximum Reservoir Surface Elevation		765.0	233.2
100-Year Maximum Reservoir Surface Elevation		772.0	235.3
Potential Maximum Flood Reservoir Surface Elevation		784.0	239.0
Comal Co Flood Retarding Structure Site 11		Acres	Hectares
Watershed Controlled by Dam		3,377.0	1,366.6
Area of Dam (Plan View)		4.0	1.6
Area of 100 ft Construction Easement Buffer		12.4	5.0
Area of Dam with 100 ft Construction Buffer		16.4	6.6
Federal Project Limits		151.9	61.5
Mitigation Area for Section 404		4.1	1.7
	HOURS TO DRAIN < 710 FT	Acres	Hectares
2-Year Storm Event Area Inundated		3.0	1.2
5-Year Storm Event Area Inundated		12.1	4.9
10-Year Storm Event Area Inundated		26.9	10.9
25-Year Storm Event Area Inundated		50.0	20.2
50-Year Storm Event Area Inundated		68.4	27.7
100-Year Storm Event Area Inundated		89.4	36.2

The Holcim property is about 813 acres. The southern (slightly wider) portion of the Holcim property is about 453 acres. The Federal project limits for the CCFRS encompasses about 152

acres. The portion of the Federal project (outside the Holcim property) on the Dean Word property is about 1.7 acres.

The Federal project boundary includes about 146 acres of oak-juniper woodlands that are suitable or potentially suitable for the warbler based on: (1) extensive tree canopy cover; (2) canopy height; (3) the natural mix of Ashe juniper with oaks, elms and other hardwoods; and (4) the presence of slopes, canyons and associated creek bottoms (TPWD 2004). An area slated for staging equipment was classified by SWCA (2002) as an open mesquite woodland.

Proposed Conservation Measures

The proposed project includes measures to avoid and minimize impacts to the warblers, which are known to occur on the property.

- With the exception of proposed access roads, all clearing will be strictly within 100 feet of the proposed dam. Clearing of warbler habitat will not occur during the time of year when warblers are present (March 1 through August 1).
- Roller compacted concrete will be used instead of earthen construction, avoiding the need for developing a borrow site for soils and the haul roads for moving the soils to the dam site.
- Comal County will place a conservation easement on a 600-linear foot segment of the unnamed tributary to Dry Comal Creek down stream of the dam to protect and manage in perpetuity a total area of 4.13 acres (see Figure 10 of the USACE public notice).
- The principle spillway (outlet works) will use a pair of 6 ft diameter pipes allowing for a smaller dam than previously planned.
- Design of the emergency spillway crest will direct flows over the dam as opposed to around the side, which is typical of other flood control structures in south central Texas. This will help minimize the footprint of the structure.
- All clearing will be consistent with the current practices recommended by the Texas Forest Service to prevent the spread of oak wilt. Project design uses the minimum right-of-way needed. No warbler habitat outside the buffered dam site and access road will be adversely affected.
- Comal County has stated it has no plans to acquire the Holcim tract that surrounds the impoundment. Most of this tract currently contains woodland habitat supporting the warbler. If Holcim's or subsequent owners' plans propose any changes to woody vegetation (e.g., clearing trees, shrubs, or both) that may result in adverse effects to the warbler, Comal County will immediately discuss those plans with the Service. Similarly, if plans to build roads through the Holcim tract or adjoining tracts that support the warbler, Comal County, Texas Department of Transportation, and/or Holcim should contact the Service to discuss the available options to comply with the Act.

II. Status of the Species

A. Golden-cheeked Warbler Description

The golden-cheeked warbler was emergency listed as endangered on May 4, 1990 (55 Federal Register [FR] 18844). The final rule listing the species was published on December 27, 1990, (55 FR 53160). No critical habitat is designated for this species.

The golden-cheeked warbler is a small, insectivorous songbird, 4.5 to 5 inches (in) long with a wingspan of approximately 8 in. Average breeding weight is 0.36 ounces for adult males and 0.33 ounces for adult females. Wings are black with two distinct white wing-bars. Males have a black back, throat, and cap, and yellow cheeks with a black eye strip. Females are similar, but duller overall in color (Ridgway 1902, Bent 1953, Griscom and Sprunt 1957, Pulich 1965, Oberholser 1974, Pulich 1976).

B. Life History

Golden-cheeked warblers breed exclusively in the mixed Ashe juniper/deciduous woodlands of the central Texas Hill Country west and north of the Balcones Fault (Pulich 1976). The warbler winters in the highland pine/oak woodlands of southern Mexico and northern Central America (Pulich 1976, Service 1996, Ladd and Gass 1999). Golden-cheeked warblers require the shredding bark produced by mature Ashe junipers for nest material. Deciduous woody species supporting breeding and fledgling warblers include Texas oak (*Quercus buckleyi*), Lacey oak (*Q. glaucooides*), plateau live oak (*Q. fusiformis*), shin oak (*Q. sinuata* var. *breviloba*), blackjack oak (*Q. marilandica*), post oak (*Q. stellata*), Texas sugarberry (*Celtis laevigata*), hackberry (*C. occidentalis*), Texas ash (*Frazinus texensis*), cedar elm (*Ulmus crassifolia*), American elm (*U. americana*), big-tooth maple (*Acer grandidentatum*), sycamore (*Platanus occidentalis*), Arizona walnut (*Juglans major*), little walnut (*J. microcarpa*), Mexican persimmon (*Diospyros texana*), and pecan (*Carya illinoensis*) (Pulich 1976, Kroll 1980, Ladd 1985, Wahl *et al.* 1990, Beardmore 1994, Service 1996, Dearborn and Sanchez 2001, TPWD 2004). Woodlands supporting warblers have canopy cover ranging from 35 to 100 percent (TPWD 2004). Typically, the greater the canopy cover, the better the habitat.

Male golden-cheeked warblers arrive in central Texas around early to mid-March and begin to establish breeding territories, which they defend against other males by singing from visible perches within their territories. Females arrive a few days later, but are more difficult to detect in the dense woodland habitat (Pulich 1976). Pulich (1976) estimated territory size to range between 3.2 acres and 6 acres. Kroll (1980) estimated territory size to be 11 to 21 acres.

Three to five eggs are generally incubated in April, and unless there is a second nesting attempt, nestlings fledge in May to early June (Pulich 1976). By late July, the golden-cheeked warblers begin their migration south (Chapman 1907, Simmons 1924). Golden-cheeked warblers winter in the highland pine-oak woodlands of southern Mexico and northern Central America (Kroll 1980).

During the first week of April, females begin constructing nests primarily with the shredding bark of mature Ashe junipers over 10 feet. Ashe juniper is the most common nesting tree, but other species may occasionally be selected. Nests have been found at various heights, ranging from 5 to 46 feet (Pulich 1976, Gass 1996). Mean warbler nest height was reported as 15.75 ft

(range 6 - 32 feet (Service 1992). Gass (1996) provided data on warbler nest heights (Figure 3).

Warblers forage for invertebrates in Ashe juniper and various deciduous tree species (Beardmore 1994). Warblers feed almost entirely on insects, such as lepidopteran larvae (caterpillars), neuropterans (green lacewings), homopterans (cicadas), orthopterans (katydids), phasmids (walking sticks), dipterans (flies), and adult lepidopterans (moths and small butterflies). Warblers also feed on arachnids (spiders). Most foraging occurs in the upper two-thirds of the tree (Pulich 1976) or above five feet (Sexton 1987, Beardmore 1994). Warblers forage disproportionately more in oaks than in junipers early in the breeding season apparently because of the abundance of soft-bodied lepidopteran larvae in deciduous trees at that time (Kroll 1980, Sexton 1987, Beardmore 1994).

C. Population Dynamics

Existing estimations of population size have been based on assessments of suitable habitat and territory size. In 1974, Pulich (1976) estimated the total population at 15,000 to 17,000 adults. Wahl et al. (1990) estimated the population size to be 4,822 to 16,016 pairs. The Service corrected these estimates in 1990 to be about 13,800 territories [pairs] (Service 1992). There have been no recent estimates of population size.

Studies at Fort Hood military reservation in Bell and Coryell counties have found fledging rates ranging from 0.75 to 1.74 per adult warbler over 10 years of observations (Anders 2000). At Fort Hood, about 87 percent of all territorial males are mated (T. Hayden, US Army-CERL, pers. comm.). A summary of survival rate estimates for warblers is provided in Alldredge et al. (2002). Survival rates of warblers in their first year were estimated at 30 to 42 percent. Survival rates of warblers after their first year were estimated at 56 to 69 percent (unpublished data, Texas Nature Conservancy, Fort Hood project; Pulich 1976; unpublished data, Balcones Canyonlands National Wildlife Refuge). The dispersal distance of birds from their birth site to their first breeding site is not well known, but could possibly be as much as 124 miles (Robinson 1992). Adult warblers, on the other hand, show high site fidelity (Holiman and Craft 2000, Anders 2000). The return rate of banded birds at Fort Hood varied from 28 to 57 percent and was considered to approximate the apparent annual adult survival rate (Alldredge et al. 2002).

Pease and Gingerich (1989) used theoretical models to determine viable population numbers for warblers. However, their estimations were based on a large amount of uncertainties in the values of parameters due to lack of sufficient data on the warbler. Population viability analysis (assessments) (PVAs) have shown that the most sensitive factors affecting the continued existence of the species are population size per patch, fecundity (productivity or number of young per adult), and fledgling survival (Service 1996, Alldredge et al. 2002). Warbler occupancy and recruitment in small habitat patches are considerably lower than in larger patches (Coldren 1998, Maas 1998, D. Keddy-Hector, Austin Community College, pers. comm. 1998). The 1996 PVA found that a minimum population of 1,000 pairs would be necessary to avoid the risk of extinction in a breeding population in a single patch. At an average of 10.6 acres (4.3 hectares) per pair, based on Fort Hood data, 10,637 acres (4,305 hectares) of high quality habitat would be required. A revised PVA (Alldredge et al. 2002) increased the number of breeding pairs needed for a self-sustaining population to 3,000. If the population shows characteristics of a metapopulation, as is likely, the size of the population per patch can be lower depending on dispersal and recolonization rates (Alldredge et al. 2002).

d. Warbler Status and Distribution

The warbler's entire breeding range is found within the Edwards Plateau and the Lampasas Cut Plain (Figure 5). The species is known to occur in 26 counties and may possibly occur in another 12 counties. It no longer occurs in three counties within its historic range. However, many of the counties where it is known to occur, now or in the past, have only small amounts of suitable habitat (Pulich 1976, Service 1996, Lasley *et al.* 1997, C. Ladd pers. comm.). Diamond and True (1999 *a*), using buffered five hectare patch data, estimated the rangewide total of potential warbler habitat at 1,271,723 acres. Comal County was estimated to have 80,600 acres of potential warbler habitat. However, because of the inherent errors in the necessarily gross estimates and lack of adequate ground truthing, these numbers cannot be translated into estimates of land use change or population size. Nevertheless, in all studies, Travis County ranked first or second in having the most habitat in the largest contiguous blocks. Other large blocks of habitat occur on the Fort Hood military reservation in Bell and Coryell counties and in Real, Bandera, and Kerr counties. Comal and Bexar counties also have significant amounts of habitat. There is apparently little connectivity between the large habitat blocks in Travis County and other large blocks in adjacent recovery regions to the north and the south (Pulich 1976, Wahl *et al.* 1990, Rowell *et al.* 1995, Diamond and True 1999*a*, Diamond and True 1999*b*).

The greatest threats to warblers are loss of habitat and urban encroachment. Human activities have eliminated much warbler habitat within the central and northern parts of the warbler's range. Before 1974, the primary reason for habitat loss was clearing for livestock grazing (Pulich 1976). Since then, habitat loss has continued as suburban developments spread into prime warbler habitat along the Balcones Escarpment, especially in the growth corridor from the Austin metropolitan area (including Williamson County) to San Antonio (BAT 1990, Wahl *et al.* 1990, Engels 1995, Coldren 1998). Diamond and True (1999*b*) did not detect a significant overall change in potential habitat between 1986 and 1996/97, but stressed that the analyzed data were not comparable and that changes particularly in urbanizing areas could be better detected by comparing the raw data on a local level. However, no comprehensive study of potential habitat loss has been conducted to date. Threats to the winter habitats include forest clearing for agriculture, including grazing pastures (Rappole *et al.* 2000).

Populations of warbler and other neotropical migrants are less stable in small habitat patches surrounded by urbanization (Coldren 1998, Engels 1995, Arnold *et al.* 1996, Bolger *et al.* 1997, Moses 1996). The abundance of several bird species, including the warbler, has been shown to be reduced within 656 - 1,640 feet of an urban edge (Engels 1995, Arnold *et al.* 1996, Bolger *et al.* 1997, Coldren 1998). Coldren (1998) reported that warbler occupancy declined with increasing residential development and roadway width.

Other factors that threaten the warblers are the loss of deciduous oaks, on which the warblers forage, to oak wilt (Service 1996); nest parasitism by brown-headed cowbirds (*Molothrus ater*), which are attracted to livestock operations (Pulich 1976); and predation and competition by blue jays (*Cyanocitta cristata*) and other urban-tolerant birds (Engels and Sexton 1994, Engels 1995, Service 1996).

Warbler Recovery Region 6

The recovery strategy outlined in the Golden-cheeked Warbler Recovery Plan (Service 1992) divides the range of the warbler into eight recovery regions (regions) (Figure 4). The recovery

plan calls for the protection of sufficient habitat to support at least one self-sustaining population in each region. The regions described in the recovery plan place Comal County in Region 6 with Bexar and Kendall counties. PVA modeling indicates that a self-sustaining population would need 3,000 breeding pairs or more (Alldredge *et al.* 2002).

Protected blocks of warbler habitat in Region 6 include Government Canyon State Natural Area and Camp Bullis in Bexar County and Kerr Wildlife Management Area in Kerr County. None are known from Comal County. Large blocks of warbler habitat are known from the Canyon Reservoir vicinity and there appears to be extensive residential and road development underway near this large and scenic lake.

Warbler Recovery outside Region 6

In Region 3, there is one large protected warbler population: Fort Hood Military Reservation in Coryell and Bell counties (Weinberg 1995, Jetté *et al.* 1998). Currently, in Region 5, there are only two large warbler populations receiving some degree of protection: (1) the Balcones Canyonlands Preserve (BCP) [a regional habitat conservation plan PRT-788841] in Travis County, and (2) the nearby Balcones Canyonlands National Wildlife Refuge (BCNWR) in Travis, Burnet, and Williamson counties. Outside of the BCP and the BCNWR in Region 5, few large blocks of habitat remain in adjacent areas of southern Travis, Williamson, Hays, and Burnet counties. Other areas receiving some protection include Lost Maples State Park in Bandera County (Region 8).

Annual reports from Fort Hood and the BCP indicate that the species currently appears to be relatively stable (City of Austin and Travis County 2003, Holiman and Craft 2000, Anders 2000), but urban development is continuing in warbler habitat. The BCP has now acquired or protected 26,727 acres, most of which is warbler habitat, with a goal of protecting 30,428 acres in seven habitat blocks of 482 to 8,111 acres.

To date, ten biological opinions for the warbler have been written and 116 incidental take permits have been issued. The permits are all in the Travis/Williamson/Hays counties area and cover about 20,006 acres, about 25 percent of which was warbler habitat. Potential warbler habitat within the permit area outside of the preserve acquisition areas (called macrosites), estimated at 26,753 acres or 71 percent of warbler habitat in Travis County, is permitted for development. There are currently four active incidental take permit applications for take of warblers being considered by the Service in the Austin area, mostly in Burnet and Hays counties. These applications or pre-application consultations cover in excess of 3,687 acres, a portion of which is suitable warbler habitat; 363 acres are within the BCP preserve acquisition area.

e. Analysis of the Warbler Status

Because of the relatively extensive range of the warbler and the lack of data, it is not possible to determine the overall status of the species. However, a significant part of the warbler breeding habitat is threatened by commercial and residential developments and only a small portion of its range is protected. Therefore, the existence of the warbler continues to be at risk.

III. Environmental Baseline

a. Status of the Warbler within the Action Area

The Service considers the action area to include the Holcim and Dean Word property where the CCFRS will be located, and the parts of Comal County affected by the flood control protection of the CCFRS. The BA describes the most widespread vegetation community on the Holcim property as juniper/live oak woodland.

Comal County, Texas, which includes the CCFRS, is estimated to have more than 8,109 acres of live oak–Ashe juniper woodland core areas as defined by Diamond and True (1999 *a*). The areal extent of core woodlands in Comal County is second in size only to Travis County in the analysis of Diamond and True (1999 *a*).

The CCFRS site consists of a mostly of oak/juniper woodlands with a small open mesquite woodland. Two male golden-cheeked warblers were observed during SWCA surveys in the spring of 2002 in the uppermost and lowest areas of the Federal project area (Figure 1) (SWCA 2002; Figure 6, SWCA 2006). No warbler surveys have been conducted since 2002.

b. Factors Affecting Warbler Habitat within the Action Area

The site is southwest of the City of New Braunfels. Land use on the Holcim property has historically involved cattle (and possibly goat) grazing. The Holcim property is in a rural portion of Comal County along the Balcones escarpment and close to a large quarry operation. Interstate Highway 35 parallels the Balcones escarpment and Comal County has some growth in the commercial and residential development sector along major highways and roads.

IV. Effects of the Action

a. Factors to be Considered

Construction

The CCFRS dam footprint considered in this biological opinion is the dam surrounded by a 100-foot buffer. A 16-foot wide road for construction and access was also considered. The dam itself would impact about 4 acres of warbler habitat. The dam with the construction buffer would impact about 16.4 acres.

The combined area of the dam, construction buffer, access roads, and staging area would impact about 17 acres. The habitat will be replaced by a roller compacted concrete dam with inlet and outfall works and an access road for construction and maintenance.

Operation

Comal County will acquire a perpetual easement of about 4.1 acres for mitigation under the section 404 authorization from the USACE. This will include a 600-ft reach of the subject tributary of Dry Comal Creek.

The purpose of the CCFRS is to retard floodwater from reaching Dry Comal Creek and the Comal River in New Braunfels. The CCFRS will inundate areas upstream of various extents and duration depending on the magnitude and duration of the storm – precipitation event.

b. Analyses for Effects of the Action

The project will affect warblers and their habitats in three ways: (1) habitat lost through clearing for construction; (2) habitat lost through frequent flooding in the lowest parts of the structure (near the dam) that would adversely affect woody vegetation; and (3) warbler recruitment decreased due to infrequent flooding that may flood warbler nests during breeding season.

1. About 17.0 acres of warbler habitat would be permanently and directly modified by construction given the proposed footprint of the dam structure along with a 100-foot wide construction buffer and 16-ft wide access roads (Figure 2).
2. About 3.0 acres of woody vegetation would be altered and tree canopy decreased due to intermittent retention of flood waters associated with storm events of a two year return interval. This would result from repeated flooding at elevations between 700 and 718 feet (Table 1, Figure 2).
3. About 27 acres of suitable nesting habitat would be infrequently and directly impacted by flooding from various magnitude storms during the warbler breeding season. Warblers may nest as low 6 feet in trees of various elevations above the dam. Should a storm result in flooding of warbler nests, the entire clutch, typically 3 to 4 eggs, would likely be lost.

While the actual access road width and alignment may vary, this analysis was done to ensure the effects of heavy equipment ingress/egress are addressed in this consultation.

The woody vegetation in the 2-year storm pool will likely be affected by flooding. Morbidity or mortality of trees in this pool is expected to vary due to several factors: (1) tolerance of tree species to flooding; (2) elevation of the base of a given tree and its location within the pool; and (3) rapidity of recharge (duration of inundation) at those elevations.

The direct and indirect effects of the project would eliminate or render the habitat less suitable for warblers following completion of the proposed development, thus harming the birds. The principle spillway may become blocked with tree debris and inundate an area larger than estimated due to decreased discharge through the dam. If the site provides more recharge than expected, areas inundated would be less than those modeled.

c. Warblers Response to the Proposed Action

Warblers are sensitive to the effects of woodland removal, certain urban activities, and are not usually found in close proximity to human developments. Resident warblers in the disturbed areas would likely be unable to find suitable nesting sites or displace other warblers in remaining habitat nearby, resulting in the loss of reproductive potential. The woodland patch near the proposed dam is sufficiently large enough and of adequate habitat quality to support three or more warbler breeding pairs. Unfortunately, only one warbler survey (season) is available. Thus, annual variation in warblers occupying this habitat patch is not known. The areal extent of the CCFRS construction on the southern portion of the Holcim parcel coupled with the loss of woodland above the dam (impacted by intermittent flooding) is expected to take warblers by harassment, or to adversely impact, up to two warbler territories. Two breeding pairs are

expected to be lost due to direct construction effects of the project and one warbler per decade is expected to be lost due to flooding of nests from operation of the CCFRS. This loss of habitat represents less than one percent of the available habitat in the habitat block, and the take of two breeding pairs is less than one percent of the warbler breeding pairs potentially occupying the habitat block.

V. Cumulative Effects

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

The area in which the project is located is expected to continue to experience further land use changes from urbanization, road projects, and local rock quarry operations. Concomitantly, fragmentation of oak - juniper woodlands remaining in Comal County is expected. The Austin-San Antonio corridor, including the New Braunfels area, is among the fastest growing areas in the State of Texas.

Holcim (US) Inc. owns a 1,015 acre tract of surrounding and including most of the CCFRS. Holcim has applied for and received from TCEQ approval of a Water Pollution Abatement Plan for quarry operations (Figure 6). Currently, it is unknown whether their plans will involve a Federal nexus, such as section 404 authorization from the USACE. Thus, we do not know with certainty that section 7 consultation will occur for the Holcim New Braunfels Quarry project. The oak – juniper woodlands inside and surrounding the CCFRS provides habitat for the golden-cheeked warbler. Quarry operations in the recharge zone have the potential to affect recharge and ground water quality. We plan to discuss the quarry project with Holcim including the option of addressing incidental take of listed endangered species under section 7 and section 10(a)(1)(B) of the Act. If the woodlands surrounding the CCFRS are removed, the size and configuration of the remaining woodlands in the CCFRS may not be adequate to support golden-cheeked warblers. One assumption in this biological opinion and incidental take analysis is that the adjacent woodlands will persist.

VI. Conclusion

After reviewing the current status of the warbler, the environmental baseline for the action area, the effects of the proposed flood control project, and the cumulative effects, it is the Service's biological opinion that the construction of Comal County Flood Retarding Structure at Site 11, as proposed, is not likely to jeopardize the continued existence of the warbler. No critical habitat has been designated for this species; therefore, none will be affected.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is

defined by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7 (o)(2), taking that is incidental to, and not intended as part of, the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this incidental take statement.

Amount or Extent of Take Anticipated

The Service anticipates that two breeding pairs could be taken as a result of the construction phase of the proposed action. The incidental take is expected to be in the form of harm and harassment. Additionally, we anticipate that one warbler per decade may be taken as a result of flooding due to operation of the project. This incidental take is expected to be in the form of death of nestlings.

The project will permanently and directly modify 20 acres of warbler habitat. In addition, about 27 acres of suitable habitat would be impacted by infrequent (but predictable) flooding. Therefore, a total of about 47 acres of warbler habitat may be adversely affected by this flood control project, with associated birds harmed by the action.

Effect of the Take

In the accompanying biological opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to the species or destruction or adverse modification of critical habitat.

The Service believes that no more than two breeding pairs of warblers will be incidentally taken as a result of the construction aspects of the proposed action. We also believe that over the next 100 years, a small number of warblers will be taken due to flooding of nests. The flooding impacts are expected to occur to eggs or warblers before fledging. The reasonable and prudent measure, with its implementing terms and conditions, is designed to minimize the impact of incidental take that might otherwise result from the proposed action. If, during the course of the action, this level of incidental take is exceeded, such incidental take represents new information requiring reinitiation of consultation and review of the reasonable and prudent measures provided.

The Service will not refer the incidental take of any migratory bird or bald eagle for prosecution under the Migratory Bird Treaty Act of 1918, as amended (16 U.S.C. §§ 703-712), or the Bald and Golden Eagle Protection Act of 1940, as amended (16 U.S.C. §§ 668-668d), if such take is in compliance with the terms and conditions specified herein.

REASONABLE AND PRUDENT MEASURE

The Service believes the following reasonable and prudent measure is necessary and appropriate to minimize impacts of incidental take of warblers:

FEMA and USACE shall prescribe measures for Comal County and its contractors to

avoid and minimize adverse effects to golden-cheeked warblers and their habitat. Measures that avoid and minimize adverse effects shall include, but are not limited to, avoiding the attraction of brown-headed cowbirds to the CCFRS.

The reasonable and prudent measure, with its implementing term and condition, is designed to minimize the effects of incidental take that might otherwise result from the proposed actions. If during the course of the action this level of incidental take is exceeded, such incidental take represents new information requiring reinitiation of consultation and review of the reasonable and prudent measure.

Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the Act, the following non-discretionary terms and conditions, which implement the reasonable and prudent measure described above, must be complied with:

1. FEMA will ensure that Comal County and its contractors do not disturb woodland habitats outside the proposed project area.
2. FEMA will ensure clearing within 300 feet of warbler habitat shall not occur during the time warblers are in the area (March 1 through August 1).
3. FEMA will ensure clearing and construction by Comal County and its contractors shall be consistent with the current practices recommended by the Texas Forest Service to prevent the spread of oak wilt.
4. USACE will ensure Comal County will share the annual inspection report on the CCFRS dam.
5. USACE will ensure Comal County will provide (to the Service, USACE, and FEMA) a report on the status of woodlands in the Federal project area by December 31, 2014. The report may use site visits to the dam area, aerial photography and/or remote sensing to estimate the acreage of oak-juniper woodlands in the area inundated by the CCFRS.

Conservation Recommendations

Section 7(a)(1) of the Act directs Federal agencies to use their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of threatened and endangered species. Conservation recommendations are discretionary agency activities to avoid or minimize adverse effects of a proposed action on listed species, critical habitats, or both, to help implement recovery plans, or to develop information. The following recommendation is provided for consideration by the FEMA:

1. FEMA may work with U.S. Geological Survey, Texas Parks and Wildlife Department, Edwards Aquifer Authority, Comal County, the City of New Braunfels, and the Texas Nature Conservancy to support: (1) delineation of warbler habitat (small scale maps and/or GIS) in Comal County, (2) a flood protection strategy that avoids adverse impacts to warbler habitat, and (3) surveying and monitoring of warbler occupation of municipal, county, State, and Federal lands.

2. FEMA should work with Comal County and Edwards Aquifer Authority to study and implement best management practices in the county to maintain and enhance the quantity and quality of recharge provided by the CCFRS. Other encouraged research includes the potential for pollutants to enter the Edwards Aquifer from flood control watershed.
3. FEMA should work with Comal County to help enhance the habitat value for warblers on the Holcim tract.
4. FEMA should implement appropriate measures in the warbler recovery plan.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefits to listed species or their habitats, the Service requests notification of the implementation of any conservation recommendation.

Reinitiation Notice

This concludes formal consultation on the action outlined in the request. As provided in 50 CFR section 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law), and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation

If you have any questions regarding the Comal County flood retarding structure at site 11, please contact Patrick Connor at 512 490-0057, extension 227. Thank you for your interest in conserving our Nation's natural resources.

Sincerely,

/s/ Adam Zerrenner
Adam Zerrenner
Field Supervisor

cc: Regional Director, U.S. Fish and Wildlife Service, Albuquerque, NM
State Administrator, U.S. Fish and Wildlife Service, Austin, TX

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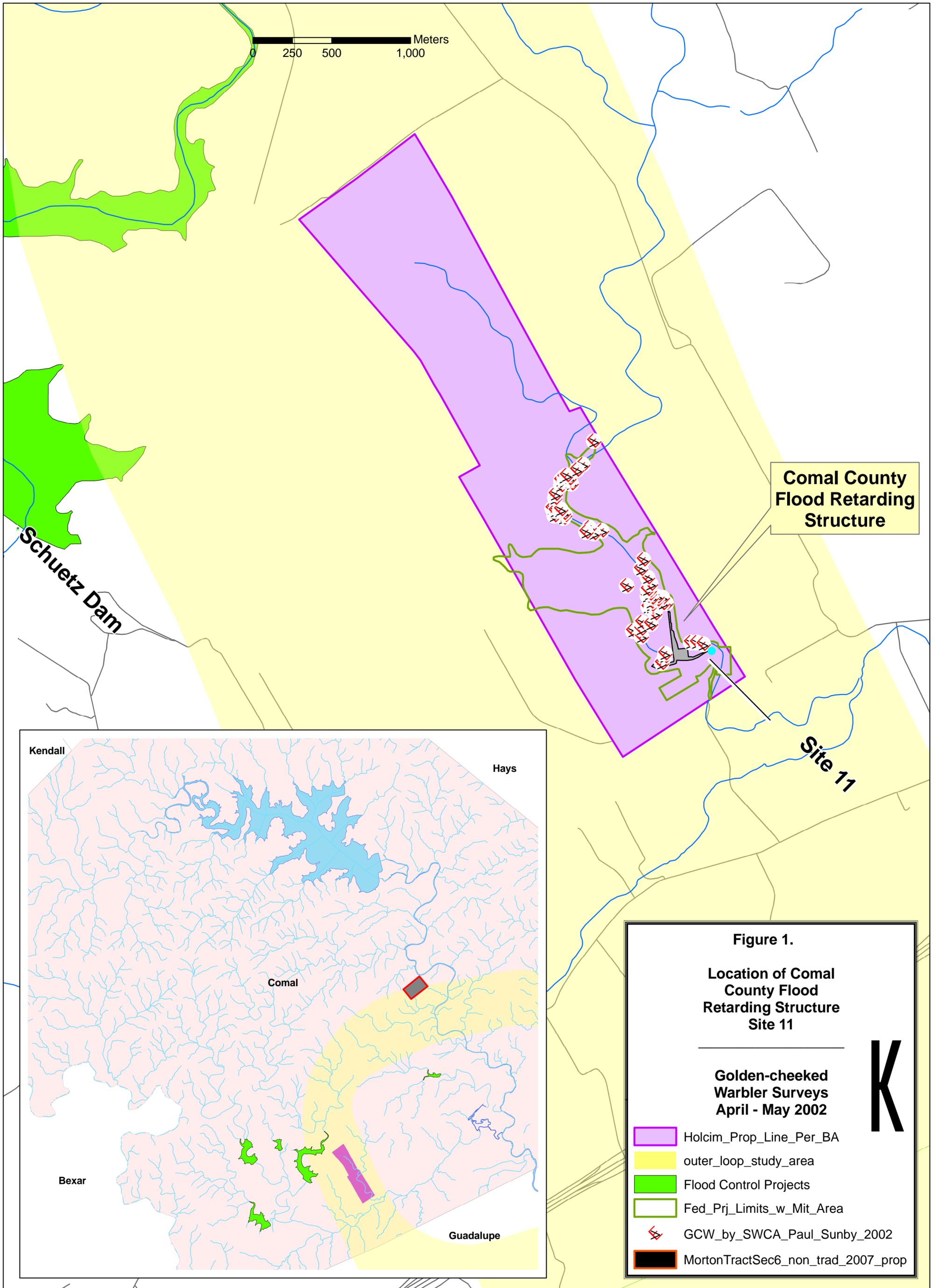
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 5. Golden-cheeked warbler breeding range, Texas counties, and proposed recovery units.
 6. Proposed CCFRS with Holcim quarry plans per TCEQ Water Pollution Abatement Plan application.
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**Comal County
Flood Retarding
Structure**

Schuetz Dam

Site 11

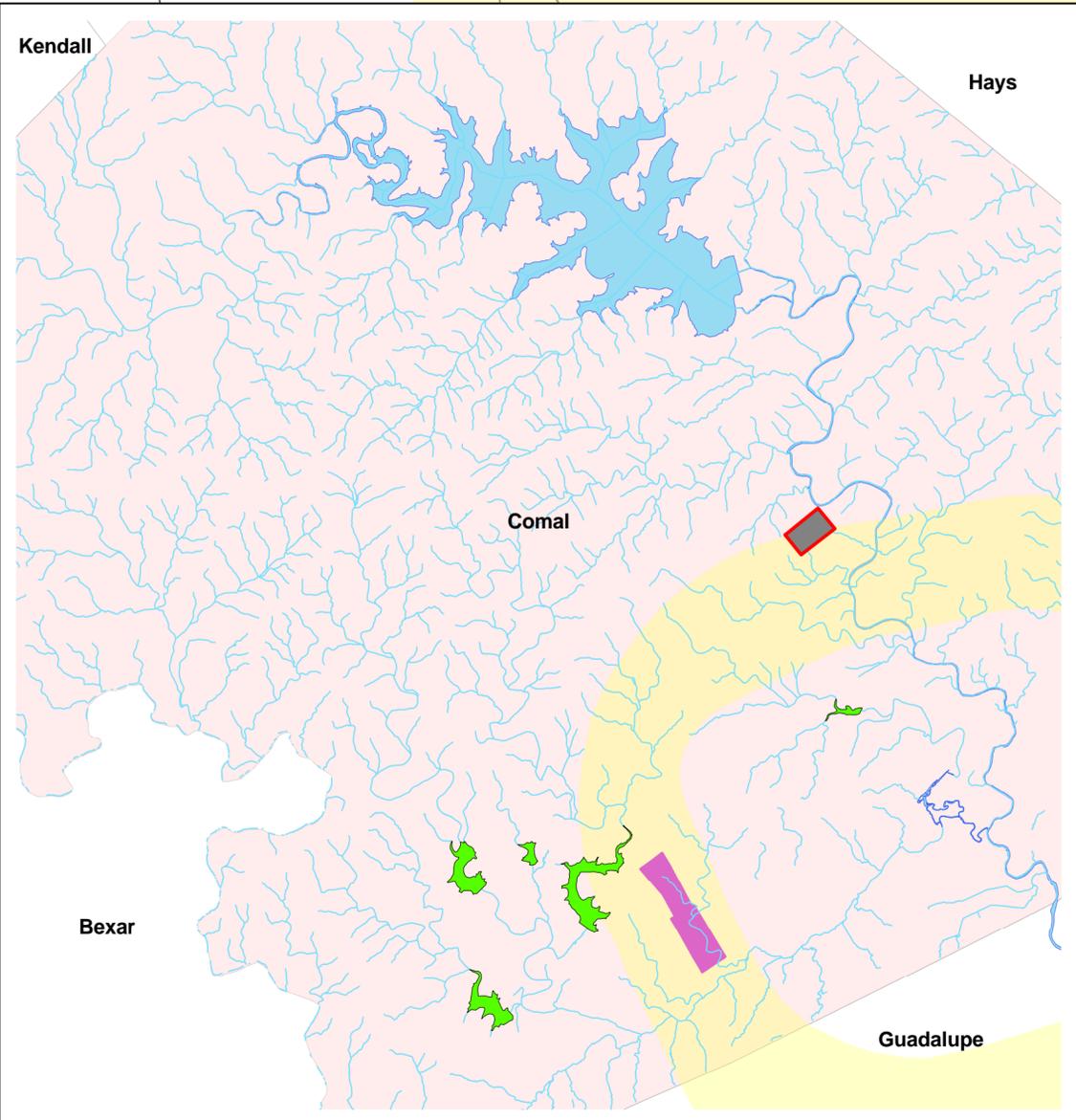


Figure 1.

**Location of Comal
County Flood
Retarding Structure
Site 11**

**Golden-cheeked
Warbler Surveys
April - May 2002**

- Holcim_Prop_Line_Per_BA
- outer_loop_study_area
- Flood Control Projects
- Fed_Prj_Limits_w_Mit_Area
- GCW_by_SWCA_Paul_Sunby_2002
- MortonTractSec6_non_trad_2007_prop

K

Figure 2.
Comal County
Flood Retarding
Structure Site 11

Storm Inundation Levels

Holcim_Prop_Line_Per_BA

Mitigation_Fig_10

Staging_Area

new_dam

AccessRoads_2007_a

Fed_Pri_Limits_w_Mit_Area

storm_events_less_CE_buffer

Storm Return Period and Pool Stage

718_2 Year

735_5 Year

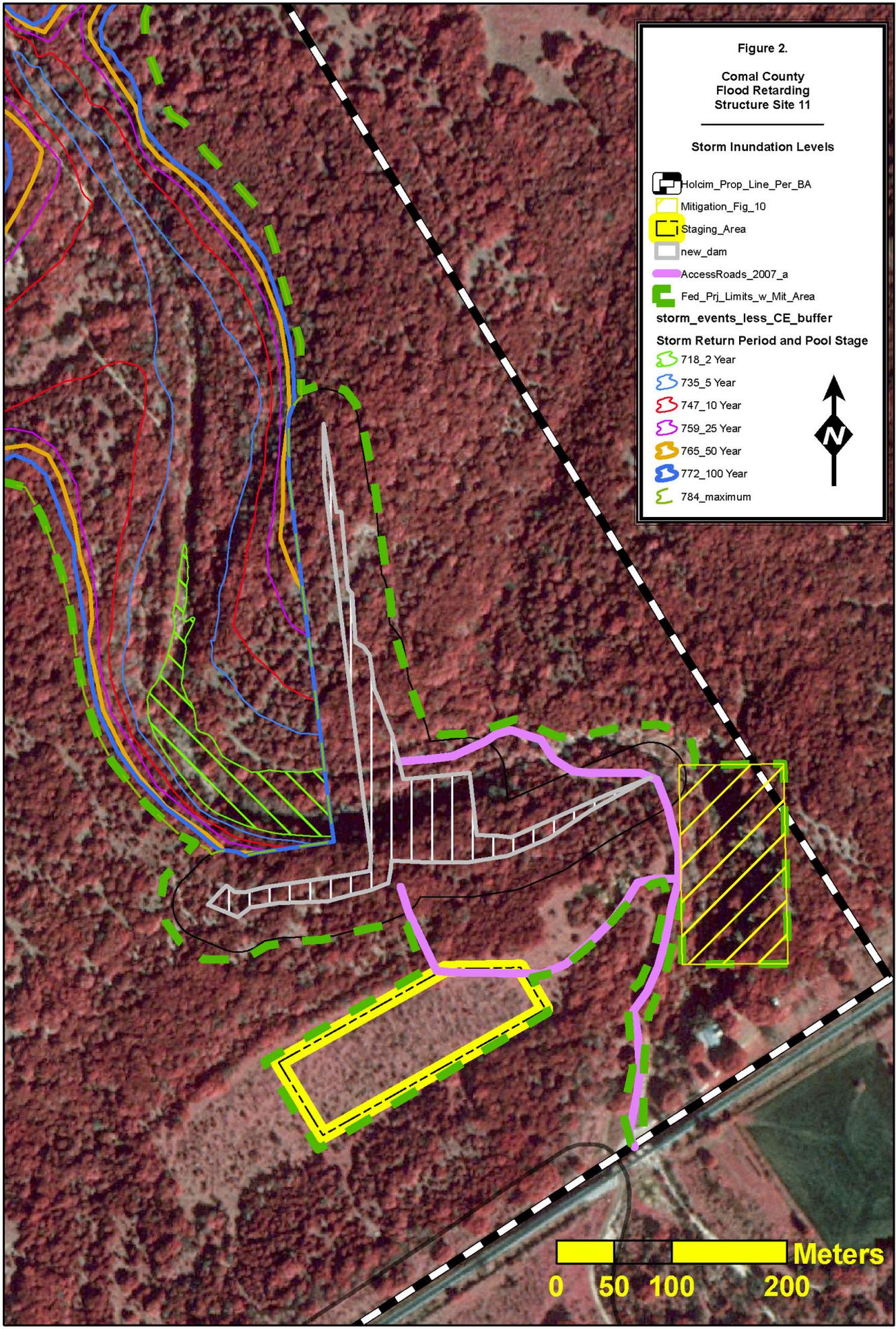
747_10 Year

759_25 Year

765_50 Year

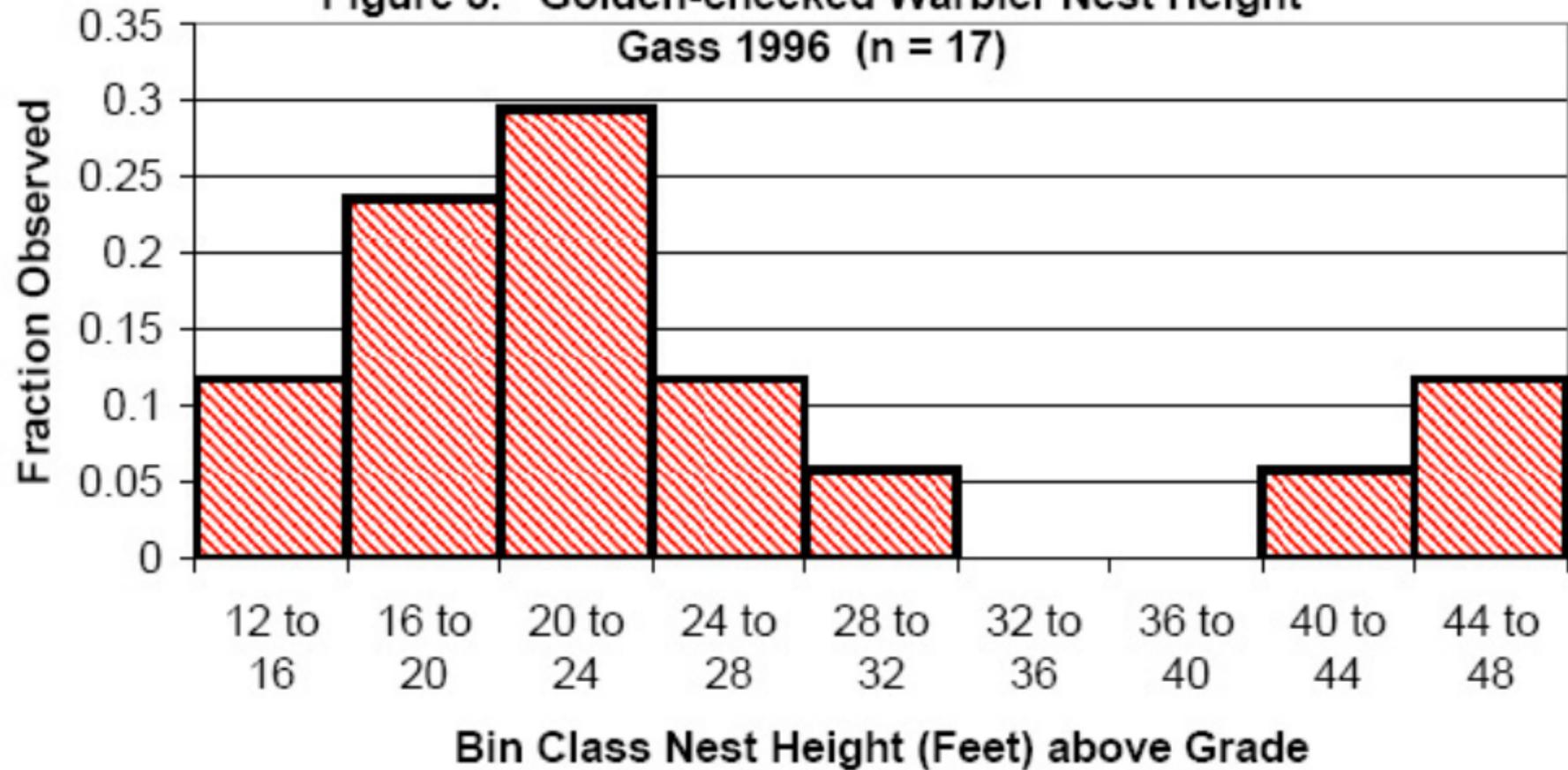
772_100 Year

784_maximum



0 50 100 200 Meters

Figure 3. Golden-cheeked Warbler Nest Height
Gass 1996 (n = 17)



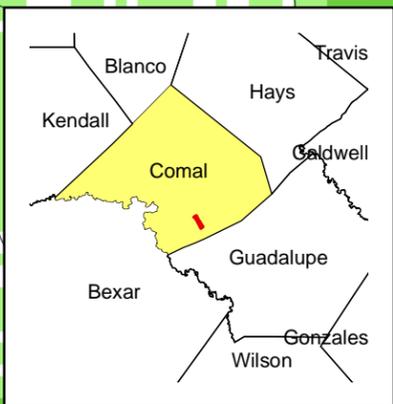
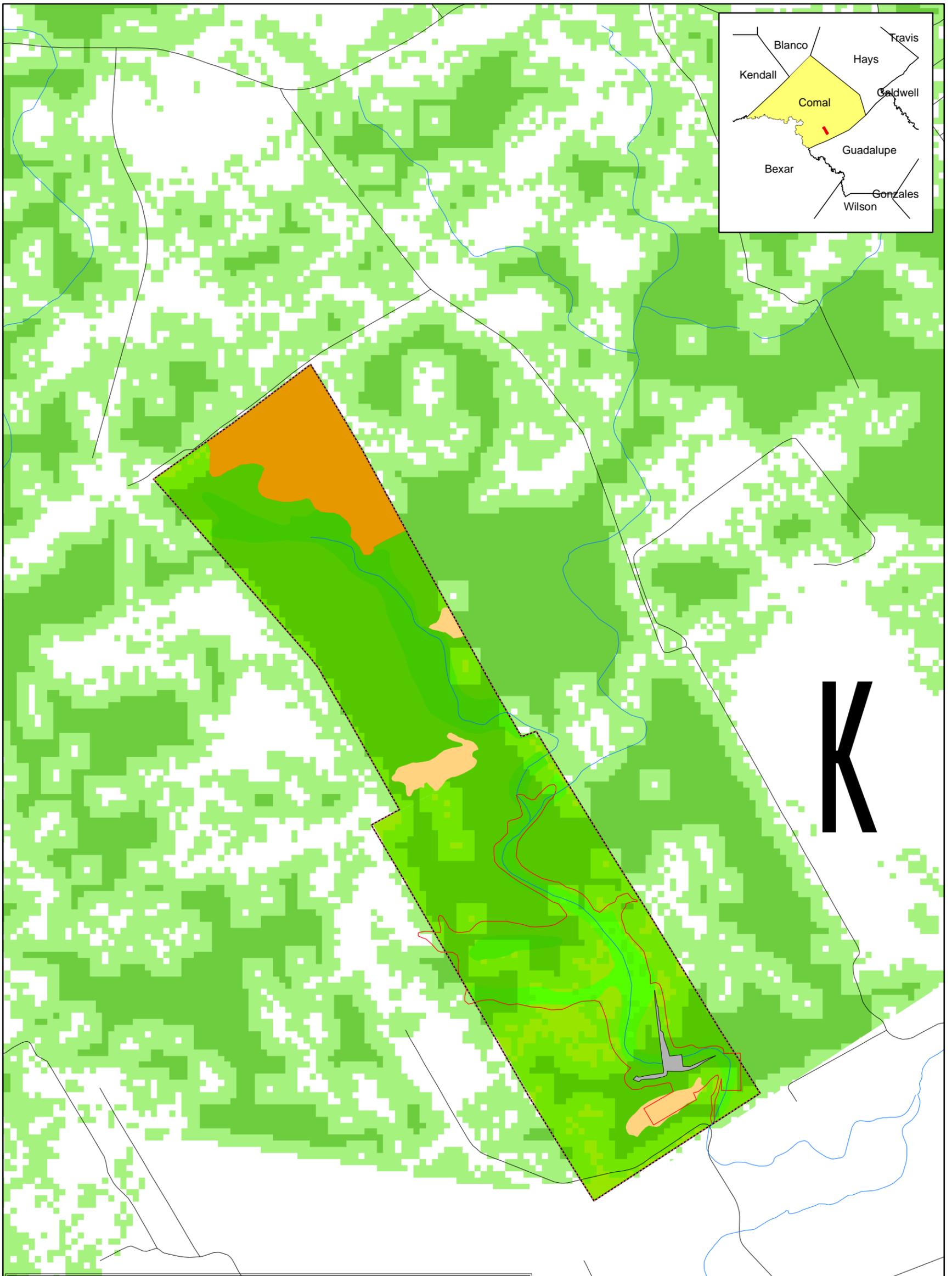


Figure 4.
Comal Co. Flood Retarding Structure
Golden-Cheeked Warbler Habitat (Shades of Green) Within and Near Federal Project Limits

- | | |
|-------------------------------------|---|
| Holcim_Prop_Line_Per_BA | Vegetation_Classes_Holcim_SWCA_Clippped vegetation |
| new_dam | Open Mesquite Woodland |
| Fed_Prj_Limits_w_Mit_Area | Juniper / Legume Scrub |
| Range | Riparian Juniper / Live Oak Woodland |
| 1997 Classification | Juniper / Mixed Deciduous Woodland |
| Core Oak Juniper1997 Diamond & TRue | Juniper / Live Oak Woodland |
| | Not_Likely_GCWA_habitat vegetation |
| | Juniper / Legume Scrub |
| | Open Mesquite Woodland |

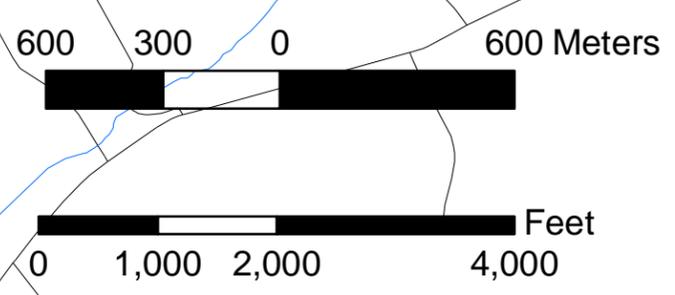
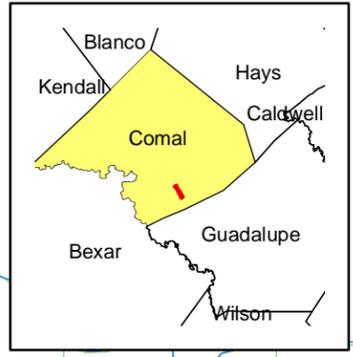


Figure 5
Golden-cheeked
Warbler
Breeding Range,
Texas Counties, &
Proposed
Recovery Units

Miles
 0 8 16 32

K



TxCo_Breeding_Range_2007

Proposed Recovery Unit

	1
	2
	3
	4
	5
	6
	Holcim_Prop_Line_Per_BA

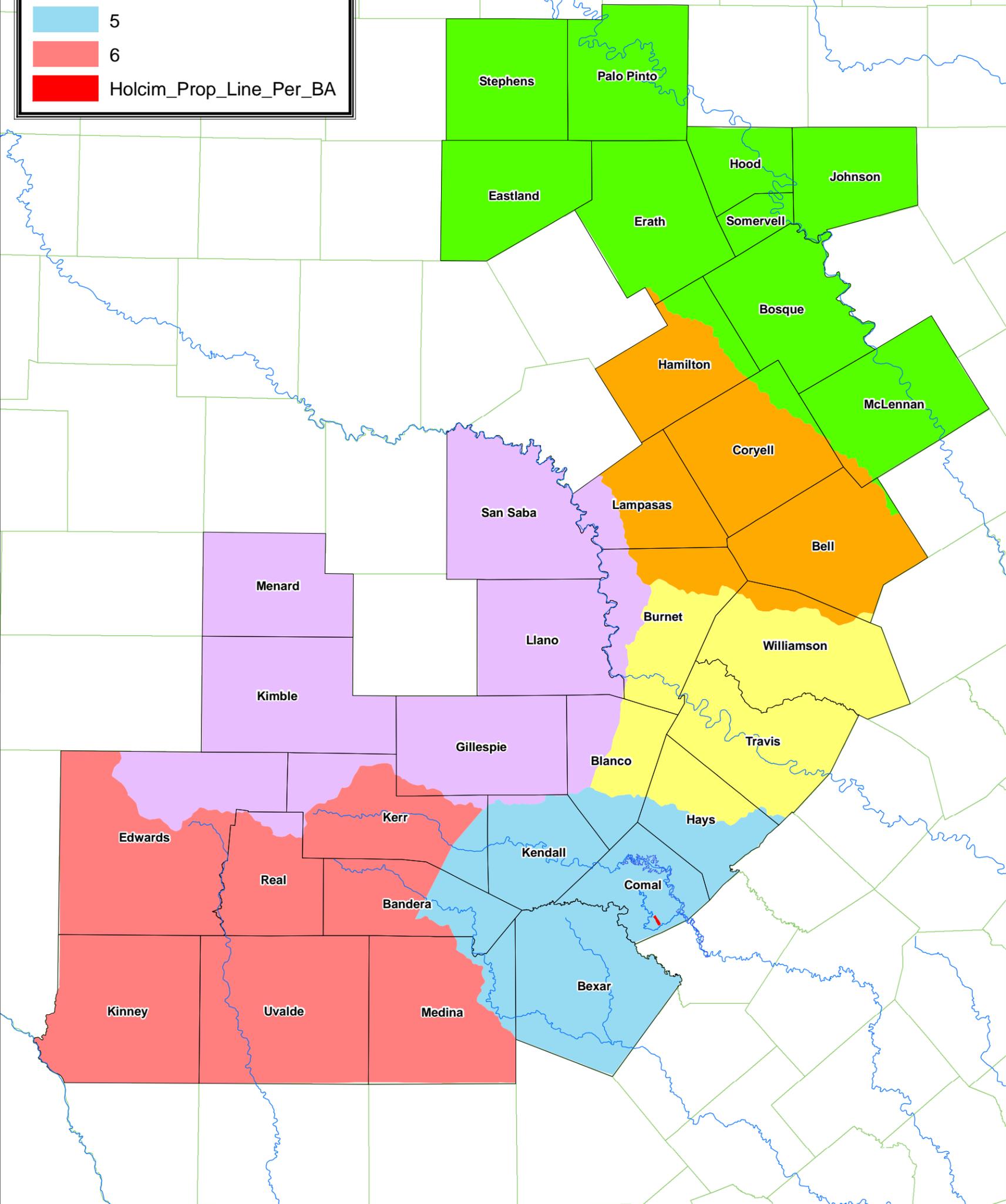
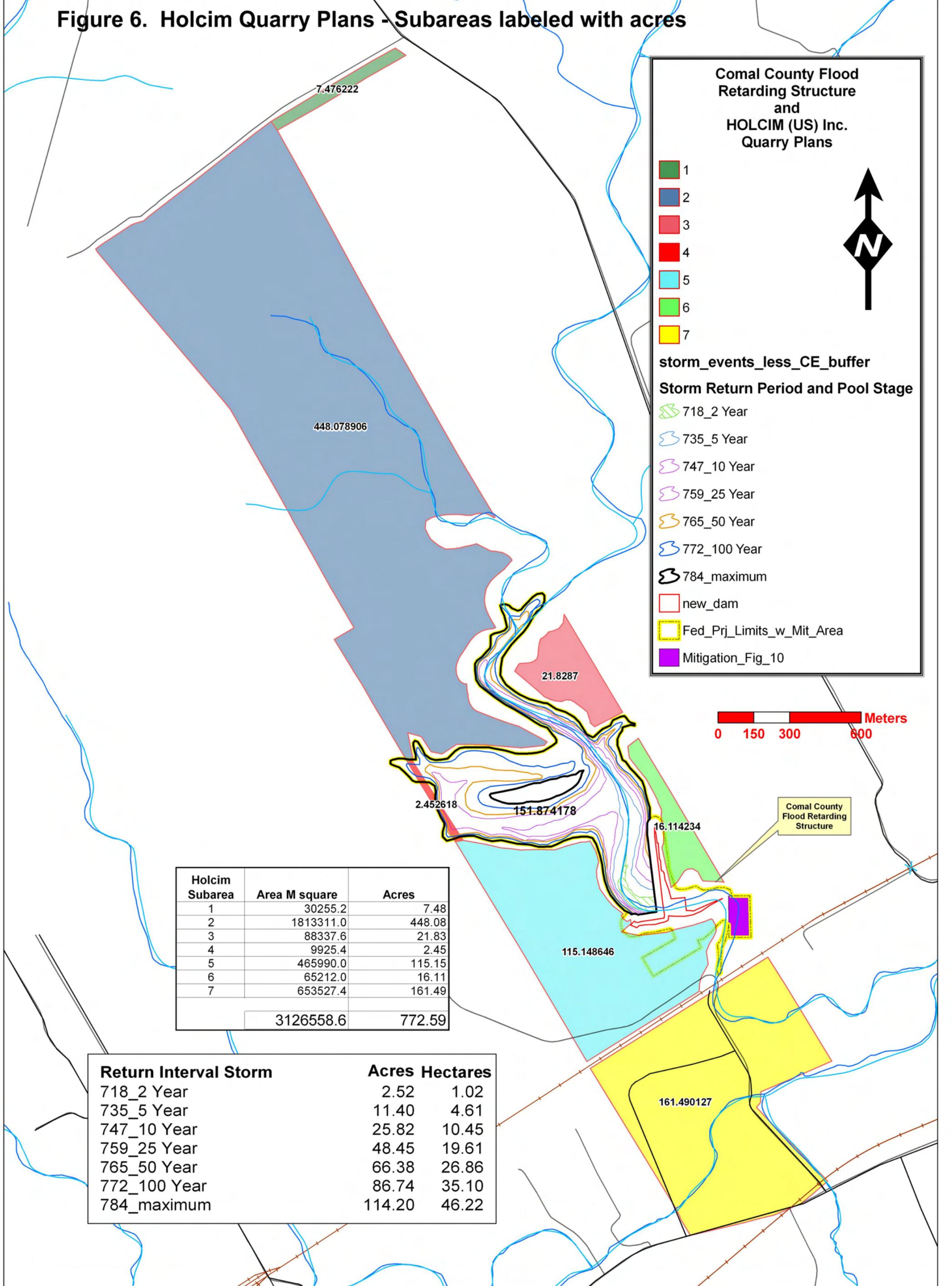


Figure 6. Holcim Quarry Plans - Subareas labeled with acres



Comal County Flood Retarding Structure and HOLLCIM (US) Inc. Quarry Plans

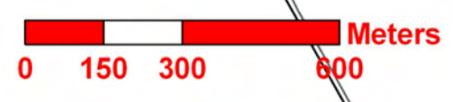
- 1
- 2
- 3
- 4
- 5
- 6
- 7

storm_events_less_CE_buffer

Storm Return Period and Pool Stage

- 718_2 Year
- 735_5 Year
- 747_10 Year
- 759_25 Year
- 765_50 Year
- 772_100 Year
- 784_maximum

- new_dam
- Fed_Prj_Limits_w_Mit_Area
- Mitigation_Fig_10



Holcim Subarea	Area M square	Acres
1	30255.2	7.48
2	1813311.0	448.08
3	88337.6	21.83
4	9925.4	2.45
5	465990.0	115.15
6	65212.0	16.11
7	653527.4	161.49
	3126558.6	772.59

Return Interval Storm	Acres	Hectares
718_2 Year	2.52	1.02
735_5 Year	11.40	4.61
747_10 Year	25.82	10.45
759_25 Year	48.45	19.61
765_50 Year	66.38	26.86
772_100 Year	86.74	35.10
784_maximum	114.20	46.22