



Balcones Preserves Trail Master Plan Stakeholder Committee Meeting

August 12, 2008 6:00-8:00pm

Waller Creek Center, Austin Water Utility

1. Welcome and Agenda Review – Mike Hockmuller

2. Takeaways from July 29th Meeting – All

At the July 29th meeting, Dolph Scott presented an overview of the North Lake Austin macrosite.

Stakeholder Comments and Questions

- *I liked the new maps and the way they have evolved.*

3. Golden-Cheeked Warbler and Black-Capped Vireo Presentation – Lisa O'Donnell and Bill Reiner

Stakeholders requested the BCP 100-acre plot monitoring program results at the last meeting. PowerPoint handouts of these results were provided tonight. These slides will also be posted on the Trail Master Plan website

<<http://www.ci.austin.tx.us/water/wildland/bccptrailplan.htm>>.

Lisa O'Donnell, senior biologist for the City of Austin BCP, presented on the golden-cheeked warbler.

Golden-Cheeked Warbler Conservation in an Urban/BCP Interface: Management Perspectives

- GCWA was emergency listed as endangered on May 4, 1990 and permanently listed as endangered on December 27, 1990.
- The GCWA winters in pine-oak woodlands in the highlands of southern Mexico and Central America. It migrates along the Sierra Madre Oriental in coniferous forest, and breeds only in mature juniper-oak woodlands in central Texas from March to July. It uses mature Ashe junipers for nesting and food (invertebrates).
- The GCWA nests in Ashe juniper or hardwood trees in forks near the trunk (usually in the upper 2/3 of trees). It has high nesting success in forest-interior.
- Habitat loss and fragmentation are major threats to the GCWA. Habitat fragmentation is the process of environmental change when land changes from its natural state to a state altered by human needs (such as agriculture or development). This change allows predators that wouldn't normally enter the forest-interior to do so. With fragmentation, interior habitat and species decrease, while edge habitat and species increase.
 - The Lucas tract (now called Bright Leaf Preserve) had an estimated 17 GCWA per 100 acres based on published censuses. The area is now surrounded by urban development, and in 2007, the population estimate for the entire 216 acres was three GCWA.

- Fragmentation leads to edge effects, or disturbance effects along the boundary between natural habitats (such as forests) and disturbed/developed land. Edge effects include increased drying (wind, temperature, light), predation/parasitism, and invasive plant and animal species.
 - Rat snakes, jays, crows, fox squirrels, fire ants, and brown-headed cowbirds are GCWA predators commonly found along edges.
 - GCWA abundance and reproductive success tend to decrease near habitat edges. GCWA detections tend to decrease with increasing avian predators and noise, both of which decrease with distance from edge.
 - Reported edge effects range from 100m to 500m depending on the edge type and associated activities.
- The highest quality habitat in Travis County BCCP permit areas is in Bull Creek, Cypress Creek, and North Lake Austin watersheds.
- The BCCP permit allows a loss of greater than 70% of GCWA habitat provided that the remaining highest quality habitat is protected and managed to promote regeneration.
- The BCP is becoming increasingly surrounded by urbanization as development expands west of Austin.
- Breeding success is the ultimate management goal with regard to the GCWA.
- The challenge with 100-acre plot monitoring programs is determining what affects population growth (encroaching development around preserves, trails, true reproductive success, etc).
- Minimizing internal threats is a management challenge. Internal threats include:
 - Small populations/patch sizes
 - Internal fragmentation/edge effects
 - Reduced hardwood recruitment
 - White-Tailed Deer. Deer herds are actively managed on BCP lands, but not in areas with public access such as Barton Creek and Emma Long.
 - Feral Hogs. The city has an active control program for feral hogs, but they cannot be trapped in areas with public access. A big concern with hogs is that they eat all of the acorns and don't allow for future growth. They also eat anything they find on the ground, including nest eggs. They impact soil, vegetation, and water quality.
 - Oak Wilt. Cut trees should be painted black to prevent infections. If not painted, oak wilt can spread. Oak wilt can start near trails when trees are cut.
 - Invasive Plants. Exotic plants change the forest composition.
 - Nest Predators/Parasites
 - Texas rat snakes are the most commonly documented GCWA nest predator. Camera footage has tracked rat snakes at GCWA nests.
 - Predatory birds include the western scrub jay (the second most common nest predator for GCWA) and blue jays.

- Red-imported fire ants are a documented predator of GCWA nests and invertebrates, which GCWA eat. They are found less in interior forest.
 - Fox squirrels are a documented predator of GCWA nests.
 - Brown-headed cowbirds are parasites and predators of GCWA nests. Cowbirds lay their eggs in GCWA nests, and sometimes GCWA raise the cowbird fledglings.
 - Domestic animals are non-native predators of wildlife, including birds.
 - Wildfire. Risk increases with increasing human population.
 - Access Management Issues
 - Vandalism
 - Trail damage
 - Unauthorized trails
 - Litter
 - Unauthorized encampments
- The best line of defense for the GCWA is to promote contiguous woodlands with minimal disturbance.
- Recreation effects on GCWA
 - The preliminary results of the Ft. Hood mountain biking study indicate larger territory sizes and reduced nesting success.
 - Other studies focusing on habitat fragmentation show GCWA have greater reproductive success with increased distance from edge, detections of GCWA increase with distance from edge, and primary GCWA predators are edge-adapted.
- Recreation effects on other songbirds show altered behavior, diversity, abundance, distribution, and reproductive success with increased predators near trails.
- The Endangered Species Act protects species and the ecosystems on which they depend.
 - “Take” is to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.
- Assessing Potential Impacts of Recreation on GCWA
 - Direct effects
 - Indirect effects (abundance, distribution, reproductive success, conflict with management activities, ecosystem impacts)
 - Cumulative effects (existing and projected habitat loss, urban impacts, internal habitat degradation)
- Videos of GCWA
 - GCWA collecting nest materials on the ground
 - Recently fledged CGWA and a female distraction display
- Things to consider when building trails
 - Avoid additional trails in GCWA habitat.
 - Evaluate the sustainability of existing trail networks.
 - Determine whether and how non-sustainable trails can be re-designed.
 - Conduct research to evaluate success of trail rehabilitation.
 - Buffer GCWA nesting habitat and known sightings (~100m).
 - Ensure management and monitoring activities can occur as needed.

- Ensure access does not increase/exacerbate threats such as wildfire, oak wilt, trash/dumping, invasive species, and illegal access.

Bill Reiner, biologist for the City of Austin BCP, presented on the black-capped vireo.

Protecting Black-capped Vireos on the Outskirts of Austin

- Black-capped vireos were listed as endangered on October 6, 1987.
- Description
 - BCVI weighs ¼ to 1/3 ounce and are about 4 ½ inches long.
 - Males have a “black cap”, and females have a slate gray “cap”. Grey on the back of the head indicates youth.
 - BCVI food source is mainly invertebrates such as beetles, butterflies, moths, and spiders. They obtain food by gleaning from leaves and branches.
- Range
 - Winters in arid scrublands on the Pacific slope of Mexico.
 - The migration route is poorly known.
 - BCVI is probably a nocturnal migrant. The young leave Mexico first, and the adult males leave last. Males arrive in Texas in late March. Females arrive later and choose a mate.
 - The breeding range is patchy, reflecting the transitional character of the habitat.
- Habitat
 - Mosaic of low shrubs and open areas (grassy or rocky).
 - Some taller trees are acceptable, especially for song perches.
 - Generally 30% to 60% shrub cover is preferred with a height of less than ten feet.
 - Scrubby oaks are the most important habitat component in Texas. (“skinnery”)
 - A “skirt” of foliage extending to the ground is important. This hides the nest and foraging vireos.
 - The species of shrub is less critical than the structure.
- Nests
 - Usually built in a broad-leaved shrub, 1.6 to 6 feet above ground. They hang from a branch fork and are screened by low foliage.
- Young
 - Most food taken to nestlings are “soft” larvae of butterflies and moths (caterpillars), often mashed.
 - Young birds are fed small larvae, spiders, and flies. Young birds are quite vulnerable in their low habitat.
 - Katydid become more important fare later.
- BCVI on the BCP
 - The permit mandates 2,000 acres of BCVI habitat, but there are less than 400 acres currently on all BCP tracts.
 - On City BCP property, there are only two active colonies. About 90 acres are actively managed but unoccupied, and 150 planned/potential acres exist.
 - Much potential BCVI habitat is over-mature, and now occupied by GCWA.
- Threats to BCVI
 - Many of the same threats facing GCWA.

- Habitat loss due to urban sprawl or agriculture
- Invasive exotic plants replacing native plants
- Habitat fragmentation and the resulting edge effects
- BCVI population at Vireo Research Area declined from 32 territories in 1987 to 0 in 1997. Major contributing factors were maturation of habitat and increased predation (like a result of urban edge effect).
- A threat a little different from GCWA threats – deer and goats will browse lower branches of oaks and other shrubs, raising the foliage “skirt”.
- Predators of nests and young
 - Texas rat snakes
 - Rat snakes were responsible for 38% of nest failures in a Ft. Hood study.
 - Eastern fox squirrels
 - Raccoons
 - Jays
 - Red imported fire ants
 - Fire ants not only prey upon nestlings, but also compete for food.
- Fire ants were responsible for 29.6% of nest failures in a Ft. Hood study
- Succession.
 - BCVI lose habitat through natural succession from shrub land to forest.
 - Over time, junipers grow taller than the shrubs and fill in openings. Oaks grow into trees, and the open shrub land becomes a thicket, followed by second-growth woodland. Vireos will then abandon the site.
 - To set back succession, work crews mechanically remove junipers and top oaks. Prescribed burns also help maintain habitat. However, some former or potential vireo habitat is so overgrown that it is now used by GCWA.
- Cowbirds.
 - Cowbirds are nest parasites. Females lay their eggs in the nests of other birds. The host feeds the larger cowbird before its own young. Vireos raise the cowbirds rather than the vireos.
 - Cowbirds dramatically reduce the nesting success of BCVIs.
 - 90% parasitism rate at Kerr WMA (1985-6)
 - On average only two vireo young fledged per ten parasitized nests, compared to 34 young per ten unparasitized nests (of nests that successfully fledged >= one cowbird or vireo)
 - To improve nesting success of endangered birds, cowbirds are trapped.
 - Parasitism rate at Kerr WMA dropped from 90% to 3% after trapping began
 - Traps are stocked with decoy cowbirds from March to late May or June.
 - Volunteers maintain traps, visiting three times per week.
- BCVI Monitoring
 - Territory mapping from April 10th to July 1st.
 - A study is currently underway to examine natal dispersal patterns. Vireos are being mist-netted and banded. Several BCP and BCNWR sites are included in the study. The study will help determine where young birds go when they leave their nests.
 - Vegetation transects and photo points measure changes in vegetation. Points are marked with stakes and flagging in late summer or fall.

- Spotlight deer counts help determine the density of deer. Staff and volunteers drive established five-mile routes on Preserve roads after sundown. Deer counts are conducted in the late summer (three times per route).
- Public Access
 - Direct impacts
 - Low foraging height and nest placement suggest vulnerability to disturbance.
 - Studies of other birds show negative effects from trail use.
 - Few studies are specific to this species.
 - Sparkman (1996) found less song from males in more disturbed areas, but was unable to isolate statistically significant factors.
 - Vireos respond with “shrad” calls when humans approach nests or fledglings. This is the same call given in response to potential predators.
 - Hayden et al. (2008) recorded elevated stress levels in BCVI as compared to white-eyed vireos when exposed to human disturbance.
 - Indirect impacts
 - Trails will likely lead to increased populations of fire ants and other edge-adapted predators.
 - Food left by trail users attracts such species.
 - Fire ants are known to follow disturbances.
 - Cowbird traps
 - Vandalized on multiple occasions.
 - Difficult to find locations both out of public view and easy for volunteers to reach.
 - Complicates habitat maintenance
 - Public must be off tract during prescribed burns and mechanical manipulation.
 - Burns dependent upon weather conditions (little advance notice).
 - Hampers monitoring
 - How do we accommodate both monitoring and recreation in small areas?
 - Potential vandalism/removal of markers for vegetation monitoring.
 - How do we place mist-nests out of view?
 - Bias spotlight deer counts.
 - Hampers deer and hog control
 - Public must be off tract during culling.
 - Potential vandalism of traps, stands, and feeders.
 - Best shooting lanes are also choice routes for trails.

Lisa presented Jennifer Reidy’s PowerPoint “Life in the Big City,” which highlighted her Austin research findings.

Life in the Big City: Golden-cheeked Warblers in an Urban Landscape

- Jennifer Reidy monitored GCWA at three sites in Austin during 2005, 2006, and 2008 – Jester Preserve, Forest Ridge Preserve, and Emma Long Metro Park. All three sites are

considered prime GCWA habitat. Some nest locations were video monitored, and others were traditionally monitored every two to three days.

- The majority of nests were found in Ashe junipers, often in trees considered small. A table is provided in Jennifer's PowerPoint outlining nest and tree characteristics.
- Nesting chronology observed
 - Males arrive in early to mid March, following by females within two weeks.
 - Females initiate nesting activity three to seven days after arrival.
 - Females gather material from the ground and lower half of junipers. Males guard females aggressively during this time.
 - The majority of initial nests are built between the last week of March and the first week of April.
 - Adults gather food for young from trees or the ground.
 - The earliest nests begin fledgling the last week in April.
 - Later nests and re-nests continue through June.
 - Adults are seen with fledglings throughout the season.
 - Young, vulnerable fledglings are often seen near or on the ground.
- Nest survival (n=100)
 - Daily survival rate = .962
 - Period survival rate (25 day interval) = .374
 - Nest survival did not differ by study site.
- Date effects on nest survival
 - After analyzing multiple temporal and spatial factors that may affect nest survival, Jennifer found that the only strong temporal effect was day of the year.
 - Nest survival declined non-linearly from April through early June.
 - A line graph of results is included in the PowerPoint.
- Edge effects on nest survival
 - The only habitat variable Jennifer analyzed that had a strong effect on nest survival was the density of open edge in the 100m radius around nests. As the open edge density increased, nest survival decreased.
 - Jennifer also analyzed the effects of trail density and proximity to edge. Neither had much effect on nest survival.
 - Sample size limitations prevented Jennifer from making firm conclusions about the effects of canopy gaps and other small scale fragmentation
 - No conclusion can be made regarding the effects of closed-canopy trails (like Turkey Creek) because they were not included in the analysis.
 - Jennifer strongly recommends a long-term study to build up an appropriate sample size of nests at varying distances to multiple types of edge, including trails.
- Nest summary
 - Jennifer monitored 68 nests with video cameras during 2005, 2006, and 2008.
 - 45 nests fledged young with no predators visiting the nest while it was active.
 - 16 were depredated, resulting in complete loss of nest contents.
 - 4 were partially depredated, resulting in at least one young being force-fledged.
 - 2 were abandoned after the female accepted the presence of the camera.
 - 1 nest failed during a storm event.
- Nest predators

- 20 predation events by five predator species were recorded. 19 of these events were on nestlings and only one was on eggs. Texas rat snakes depredated eight nests, western scrub-jays depredated six, fox squirrels depredated three, cooper's hawks depredated two, and fire ants depredated one nest. A fox squirrel was responsible for one egg predation, and Texas rat snakes depredated three females attending nests.
- Cause-specific mortality rate
 - Jennifer calculated the overall period mortality rate and the cause-specific mortality rate for nests monitored by cameras. Almost all failures were due to predation.
- Number of predation events
 - 32% at Emma Long, 33% at Forest Ridge, and 19% of nests monitored with cameras at Jester were depredated. With small sample sizes, and for each predator species, it is impossible to know whether these patterns hold true across the BCP as a whole, or even across years. Differences in landscape composition certainly affect predators.
- Conservation implications
 - Large urban preserves can be important breeding patches.
 - Predators identified in this study are edge-adapted and therefore any increase in fragmentation could lead to lower nest survival.
 - Reducing the amount of open habitat in breeding patches may increase productivity through higher nest survival.
 - Jennifer cannot make a conclusion about interior/closed-canopy trails versus exterior/open-canopy trails.

Jennifer Reidy can be reached at reidyjl@missouri.edu or Jennifer.reidy@gmail.com.

All of the PowerPoint presentations from tonight's meeting will be posted on the Trail Master Plan website.

4. Golden-Cheeked Warbler and Black-Capped Vireo Q&A

Craig Farquhar, Texas Parks and Wildlife

Clif Ladd, Loomis Austin

Lisa O'Donnell, City of Austin BCP

Becky Peak, Nature Conservancy

Bill Reiner, City of Austin BCP

Chuck Sexton, Balcones Canyonlands National Wildlife Refuge

Stakeholder Questions and Comments

- *In Jennifer Reidy's presentation slides (pg. 14), she stated that "nest survival on monitored sites [is] adequate for a self-sustaining population." She doesn't have data in her report to support this. Do you have further information about survival rates that would be essential to make Jennifer's conclusion? Also, is there information about what conditions birds may face in their winter habitat?*

A reproductive rate of 0.25 to 0.30 is necessary for neotropical migratory songbirds. Rate of return (considered the best index of survival) for abandoned male GCWAs has ranged from 22% to 47% over the past six years at Ft. Hood.

The GCWA wintering range is from southern Mexico to Honduras and Nicaragua. They winter in pine oak forests, and farming/agriculture and forest fires are their biggest threats. In these wintering areas, only 26% of their habitat remains in tact. The rest of their habitat has been significantly reduced or eliminated.

- *I'm passing out a study summary I've created. Becky, can you please comment on the Belton Lake Outdoor Recreation Area (BLORA) Davis & Leslie study? Also, what is the difference between daily survival rate and nest survival, and what are the implications?*

Daily survival rate is the probability of survival from one nest check to the next. Period survival or nest survival is that number (daily survival rate) expanded over the nest cycle (for GCWA, this is 25 days). It is calculated by taking the daily survival rate and raising it to the power of the nest cycle. For example, the daily survival rate raised to the 25th power is the period/nest survival for the GCWA.

Whether a study uses the daily survival rate or the period/nest survival depends on the use of the information. In the instance of trails, Becky said we should be concerned with whether or not we have a sustainable population, so nest survival rate of .25-.30 mentioned above. Becky said nest survival is what she would look at rather than daily survival rate.

Chuck said he wasn't pleased with the design of that particular study, and there were many variables among the study sites that weren't included as part of the study. He said we shouldn't focus on such small arithmetic differences in probability of survival.

- *Chuck, can you please elaborate on your responsibilities with the Friends group at the Wildlife Refuge? Have the volunteers had a positive effect on your ability to manage the preserves? Do you have comments on trails and their effect on the ability to achieve your mission?*

Yes, volunteers have had a positive effect. The Balcones Canyonlands National Wildlife Refuge has about 1/10 the trail density of the BCP. One trail does go through warbler habitat. One advantage the refuge has that the City does not is that trail access is limited to certain activities. No bikes, dogs, or jogging are allowed on trails at the refuge. The trails are shoulder-width and have warbler monitors. So far, the trails don't seem to have overt affect on warblers. The trails are less visited than the city and county preserve tracts. There are a total of 7.4 miles of public use trails in the entire refuge, 1.7 miles of which are in or adjacent to GCWA habitat. The City has four times as many trails and half the acreage as the refuge.

- *Our task is to plan trails in the preserves. Do you have general advice?*

Chuck said as a warbler biologist, he would suggest that if there is a desire/need for new trails, trails should be implemented at no net loss or a net benefit to GCWAs whether that means abandoning some existing trails or something else. Designing new trails is a conundrum because you are adding to affects, so where will you negate those new effects? Craig said the premise is to reduce or eliminate take and the group should start from there.

- *Based on the directive to not reduce take, please be specific about guidelines for trail building.*

Clif said the mission of the BCP is to protect the species, so therefore trails should not be located in GCWA habitat. He would recommend staying at least 100 meters away from warbler habitat.

- *I would like more detail on fragmentation and edge effect. What defines a fragment? Is there such a thing as natural fragmentation (such as a creek or river)? Is there a specific width that is classified as fragmentation?*

Chuck said he's had trouble with that term himself. No, we can't give a number that defines fragmentation. Instead, we need to look at effects such as predators, territorial densities between broken and not broken trails, etc. He avoids the term "fragmentation" and likes to get more into the discussion of the specific effects.

Craig said we are mostly looking at human-caused disturbances. We want to avoid human-caused disturbances. Natural disturbances such as tornadoes and lightning are a natural part of succession.

- *How can we best keep predators away from the bird species?*

Chuck said, "Trap 'em and shoot 'em." Cowbirds are usually removed from the region. However, getting rid of the predator species leads to changes in other populations, which is dangerous. The bottom line is to keep trails out of prime habitat and/or to keep humans out of prime habitat during nesting season. Becky said it is best to think of long-term effects, not just snapshots in time like during breeding season.

- *Just because we can see the birds doesn't mean we can see and understand all of the effects to the birds. We should think about the birds in the same way that we thought about the karst invertebrates.*

- *When building trails, do you recommend doing it in sections with recovery time, all at once, or a different way?*

There should certainly not be trail construction during breeding season. Chuck said his trails at the refuge are built very quickly (in a day or two). He wonders how that affects returning birds. Becky recommended doing a pilot trail and monitoring it before building the rest of the trail.

Craig said a times-series of territories would be a good place to begin discussions (like the 100-acre plot studies).

- *Are wildlife trails perceived to be a disturbance? Is there something we can learn from wildlife trails?*

They are disturbances, but we are concerned with human disturbances. Chuck said even the best studies may not be able to show warbler changes from deer trails, for example, but habitat changes can be studied.

- *I'd like to point out that all animals being displaced due to development are migrating to preserves, so many animal populations are increasing on preserve land.*

- *Is it a reasonable assumption that monitoring may not really show the whole picture?*

Chuck said well controlled studies will get us where we need to be. The controls should be put into place well before effects start to happen, so that before and after study differences can be evident.

Territorial fitness is a measure of reproductive success. It is defined as the number of offspring a female can produce over her lifetime that also reach reproductive success themselves. To study this, one would need individually-marked males, young, and nests as well as to be able to follow the birds around, which is nearly impossible.

5. Next Steps – Mike Hockmuller

We will brainstorm decision-making matrix components at the beginning of the next meeting combined with the takeaways from this meeting.

Our next stakeholder meeting is next **Tuesday, August 26th 6:00-8:00pm** in Waller Creek Center room 104. The meeting will include an overview of the South Lake Austin macrosite and a presentation/Q&A session on soil, water, plants, and other species on the BCP.

The next logistics meeting is Tuesday, August 19th at 10:30am. The meeting is at the Learning and Research Center, and a link to MapQuest directions is found here:

<http://www.mapquest.com/maps/2800+Spirit+of+Texas+Dr+Austin+TX+78719-2354>.