

Kirtland's Warbler Observations
Trip 1 (17 – 18 March 2002, Eleuthera, The Bahamas)

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Here we summarize observations and captures of Kirtland's Warblers (KW) on 17 and 18 March 2002 at a site along Madiera Rd. between Tarpum Bay and Rock Sound, Eleuthera. KWs were first observed on 9 and 10 March 2002 made by the Ornithology Group of the Bahamas National Trust (BNT) which included Eric Carey, Paul Dean, Carolyn Wardle, and others. As reported elsewhere, members of this group first observed 3 different individual KWs here on 9 March and 5 KWs on the following day.

Tape recorded playback of KW vocalizations was not used on the 17th but was used to locate KWs on the 18th. Our observations were as follows:

17 March 2002 – We arrived at the site at approximately 8:00 am and searched for approximately 1 hour before hearing and subsequently observing the first KW. Most of our observations were made at different locations along Madiera Rd which runs west to east off Queen's Highway.

- Individual # 1 (9:00 – 9:10 am) – Located first by its distinctive chip note. This bird was presumed to be a male KW given the distinct black lores and gray crown and nape. This individual was observed at a distance of approximately 2.5 -3 m and was foraging within 1 – 1.5 m from the ground in 2 – 2.5 m tall shrubs and on one occasion dropped down to the ground where it foraged in the leaf litter. The individual was observed gleaning leaf surfaces, presumably for insects. Three gleaning movements directed at the undersides of leaves were observed, as well as a hover glean movement all within 1 m of the ground. The bird also picked at the surface of the leaf litter on the ground. The bird was actively foraging during the period of our observations.
- 9:20 AM – After entering the brushland where the first KW was last seen, I again saw a KW (individual # 1?) and at the same time heard separate KW chip notes to the south and east. Although the calling

birds were not seen, I estimate that at least 3 KWs were present within 25 m of my location in the shrubby second growth.

- 10:00 AM – KW chip note heard approximately 20 m to east of location of individual #1.
- 10:30 – 10:36 AM – Individual # 2, likely another male given black lores and was located while giving chip notes approximately 30 m to east of individual # 1. Three gleaning movements directed at the undersides of leaves were observed all within 1 m of the ground in approximately 2 m tall shrubs.
- 11:30 – 11:33 AM – Individual # 3, presumed to be a female given the presence of grey and not black lores was located by its chip notes, approximately 20 m from individual #2. The bird appeared to be foraging at approximately 1 – 2 m from the ground, although movements were not recorded.
- Approximately 12:00 – 12:05 PM a female KW was found on the north side of the Madiera Rd., possibly Individual #4. The bird lacked black lores. It was initially found foraging at approximately 1 – 2 m on the edge of the tall coppice on the north side of Madiera Rd. The bird moved up to about 3 m height before it disappeared.

We departed the site at approximately 12:20 PM on the 17th. We believe that there were at least four different individuals (2 males, 2 females) on the site on that date. We returned to the site at approximately 4:45 PM and captured one KW (see below).

18 March 2002 – We returned to the site at 7:00 AM and used tape playback of song and chip notes to locate and capture KWs as summarized in the capture and banding record below. Three individual KWs were captured and banded on the 18th, a fourth individual bounced out of the net and was not captured, and an unbanded bird was seen briefly just prior to our departure at about approximately 12:40 PM.

Capture & Banding Records

All KWs were captured in a 6 m 30 mm mist net using tape recorded playback of primary song and chip notes. A short net lane was cut in the shrubs in the vicinity of the site of first encounter of a KW. A speaker was placed upright on the ground approximately 1 m from the center of the net on the side opposite of the observer who was positioned approximately 5-6 m away from the net. A cable connected the speaker to a tape recorder operated by the observer. Playback alternated between the speaker and tape recorder depending on the location of the bird. By changing the position of the tape vocalization it was possible to stimulate the bird to move in the direction of the net. Captured birds were sexed primarily on the basis of the color of the lores and amount of black streaking on the breast. The observer was not familiar with methods for determining age class (e.g., SY vs ASY) and appropriate references such as Pyle (1987) were unavailable. Fat class was determined by inspection of the region between the furcula and ranged from 0 to 4 based on the method described in Wunderle and Latta (2000). A summary of captures is provided below:

1. Male KW, Band No. 1540-22883, Colorband combination: X – R (= aluminum band on bird's right tarsus, red band on left tarsus) ASY? Based on gray head, nape to upper back, black distinct streaking on flanks. Sex determination based on distinct black forecrown and lores. Fat class = 3. Captured 17 March 2002, at 5:30 PM. The net was placed in a shrubby site approximately 15 m from where the bird was initially observed in the morning. Bird responded initially to playback of song and approached speaker silently, but flew back and forth over net before capture. It began giving chip notes after approximately 5 minutes of silent response. The bird was captured approximately after approximately 10 minutes of tape playback. This individual was observed within approximately 15 m of its capture site on the 18th.
2. Male KW, Band No. 1540-2284, Colorband combination: Bu – X (= blue band on bird's right tarsus, aluminum band on left tarsus). Age class uncertain as upperparts grayish with distinct brownish wash on head, nape and upper back. Sex determination based on distinct black forecrown and lores. Fat class = 2. Captured 18 March 2002, at 8:15 AM located 21 m (paced on road) to the east of X – R capture site. Bird located with tape playback at 7:05 AM, net setup at 7:45 AM and bird subsequently captured after approximately a half hour of playback. This individual responded to playback with chip notes and

avoided the net by flying over and around the net. Also this bird actively foraged on the ground and one occasion hopped under the net.

3. Male KW, Band No. 1540-22885, Colorband combination: X – W (=aluminum band on bird's right tarsus, white band on left tarsus). Age class uncertain as upperparts grayish with distinct brownish wash on head, nape and upper back. Sex determination based on distinct black forecrown and lores. Fat Class = 2. Captured 18 March 2002, at 9:46 AM located 33 m (paced on road) to the east of Bu - X. Bird located with tape playback of song and chip notes at 8:30 am, net set up by 9:40 and bird captured after less than one minute of playback.
4. Male KW, Band No. 1540-22886. Colorband combination: Y – X (=yellow band on bird's right tarsus, aluminum band on left tarsus). Age class uncertain as upperparts grayish with distinct brownish wash on head, nape and upper back. Sex determination based on distinct black forecrown and lores. Fat Class = 3. Captured 18 March 2002, at 12:15, after 2 min of playback. Capture site located 72 m (paced on road) to the east of X – W.

Summary & Discussion

Four male KWs were captured with tape playback of song and chip notes on 17 – 18 March 2002. In addition, another individual eluded capture on the 18th and an additional unbanded bird was observed just before our departure on the 18th. Thus we are confident that 6 individual KWs were present at the Madiera Rd. site on Eleuthera during the 2-day period, and we believe that additional KWs may have been present.

The KWs could be located without the use of tape playback as the ornithology group of the BNT discovered. During our observations on the 17th we found most of our birds by first detecting the distinctive chip note. Although we did not attempt to quantify the chip note calling rate on the site, I would estimate that we heard a chip note or notes once every 15 or 20 minutes, at least during 9 – 11:00 am. This seems to be a high calling rate for most wintering warblers, especially in late winter, and likely reflects the high density of birds at the site. No primary song was detected during our observations.

The capture sites of the 4 individuals were remarkably close together, with distances of 21, 33, and 72 m between neighbors. The distances are closer, if the uncaptured bird is included so that the net site distances become 21, 33, 27, and 45 m apart from adjacent neighbors. These proximities seem surprising given the studies of Sykes and Clench (1998 Wilson Bull. 110:244-261) which documented a winter home range of 8.3 ha on Eleuthera. The strong response to tape playback of KW vocalizations suggests that the birds were attempting to maintain exclusive areas or small territories.

Currently it is unknown if the Madiera Rd. site is occupied by a high density of KWs throughout the winter, or if the observed abundance indicates that the site represents a staging area, just prior to spring migration. Planned observations and banding next winter should help determine if a high density of KWs overwinter at the site, or if KWs only congregate there just prior to migration.

The fat scores of the captured KWs (2 – 3) were indicative of migrant warblers just preparing to migrate north. My previous studies of wintering migrants in the Caribbean have found that fat scores of 0 and 1 are characteristic of most winter warblers, but scores of 2 and 3 are usually observed a few weeks prior to departure.

Another issue of importance is why were the birds so abundant at this site? What is it about the Madiera Rd. site which attracted the KWs? Although my few foraging observations indicate that the birds were mostly feeding on insects or spiders, Paul Dean did have at least one observation of a KW consuming fruit. In addition, the dark purple stain of the feces of one captured bird suggests that it had been feeding on fruit. However, my search for fruit indicated that fruit was present (at least on black torch), but only in relatively low quantities. The abundance of black torch and the fact that the birds appeared to be feeding on insects and fruit from this species suggests that it may be an important species contributing to the species' abundance at this site.

The four captured birds were all males, but given the low capture sample I am currently reluctant to attach much importance to this skewed sex ratio in captures. Female KWs were definitely present on the site and

females did respond to tape playback with chip notes and approached the observer during playback.

In summary, the BNT ornithology group's discovery of a site on Eleuthera with a relatively high density of KWs is an important finding for our understanding of the wintering ecology of the KW. Obviously these exciting observations raise more questions than they answer, and therefore this site will serve as a focus of our next year's field studies.

Other Bird Species Observed Or Heard In The KW Site
Or Adjoining Tall Coppice Site on 17 & 18 March 2002:

Limpkin
Ground Dove
White-crowned Pigeon
Key West Quail Dove
Mangrove Cuckoo
Great Lizard Cuckoo
La Sagre's Flycatcher
Cuban Pewee
Bahama Mockingbird (captured in net set for KW)
Gray Catbird
Thick-billed Vireo (captured in net set for KW)
White-eyed Vireo
Bahama Yellowthroat
Prairie Warbler (most common migrant on site)
Worm-eating Warbler
Cape May Warbler
Ovenbird (2)
Bananaquit
Greater Antillean Bullfinch

Vegetation In The KW Site – The site south of Madeira Road where the KWs were mostly observed was shrubby second growth with a variable canopy of 2.0 – 2.5 m height with lower vegetation along the road and in small widely scattered openings in the site. Ground cover included a mix of unidentified herbs and scattered low thin grasses of 10 – 15 cm tall, with scattered areas of leaf litter and some exposed limestone rocks. Leaf litter seemed deeper here than other sites examined on Andros. Soils also were better developed than found on Andros and included sandy-silt loam and

possibly some clay. Soils were better developed along the south side of the road than further to the south on the slope of a small hillside.

Thorny vines (*Smilax* spp.?) were also present. The history of the site is currently unknown, but is presumed to be abandoned agricultural land or old housing site. Scattered casuarinas in the site suggest previous disturbance. Black torch (*Erithalis fruticosa*, Rubaceae) appeared to be a dominant shrub on the site and had some flowers and small fruit, which appear to fruit asynchronously. The KWs fed on fruit from black torch and foraged for insects on the leaves. However, overall fruit abundance on the site appeared to be low. Other plants on the site as identified by Paul Dean and Aileen Bainton included:

Rams horn (*Pithecellobium guadelupense*)
Five finger (*Tabebuia bahamensis*)
Cinnecord (*Acacia choriophylla*)
Poisonwood (*Metopium toxiferum*)
Madeira (*Swientenia mahagoni*)
Rockbush (*Phyllanthus epiphyllahtyus*)
Cocoplum (*Chryobalanus icaco*)
Pigeon plum (*Coccoloba diversifolia*)
Gum elemi (*Bursera simaruba*)
Willow bustic (*Bumelia salicifolia*)
Palmetto (*Coccothrinax* spp.)
Hog Cabbage or Buckaneer palm (*Pseudophoenix sargentii*)
Wild Tamarind (*Lysiloma latisiliquum*)
Long-leafed blolly (*Guapira discolor*)
Casuarina (*Casuarina litorea*)
Darling plum (*Reynosia septentrionalis*)
Broad leaf blolly (*Guapira obtusa*)
Randia (*Randia aculeata*)
Maidenbush (*Savia bahamensis*)
Wild alamanda (*Angadenia berterii*)
Bay marigold or sea oxeye (*Borrichia arborescens*)
Passion flower (var?)

Vegetation surrounding the site – The north side of Madiera road was tall coppice (12 – 15 m tall canopy), which appeared to be undisturbed, with the exception of a small turnoff and an abandoned road clearing which ran north & south. East side of the site was also tall coppice which appeared

to be somewhat disturbed. To the south was a second growth woodlands which bordered an abandoned resort housing development (not fully explored). The west side of the site had a homesite with lawn and ornamental plantings.

ADDITIONAL OBSERVATIONS OF KIRTLAND'S WARBLERS TRIP 2 (3 – 6 APRIL 2002)

Joseph M. Wunderle & D. Jean Lodge

We re-visited the Madiera Rd. site again on 3 –6 April 2002 to search for banded KWs, capture and band additional KWs, obtain KW foraging observations, measure vegetation characteristics of the site, as well as to obtain preliminary insect collections from the site.

We used tape playback to relocated KWs and were able to relocate the four previously banded birds (X-R, Bu-X, X-W, Y-X). All marked KWs were found within an estimated 20 m of their original capture location and all were observed in the east-west sequence of their capture suggesting stable, albeit small territories, at least along Madiera Rd.

Two additional KWs were captured with the use of tape playback during this trip as summarized below:

5. Male KW, Band No. 1540-22891. Colorband combination: RX- (=red band over aluminum band on bird's right tarsus, no bands on left tarsus). Age class uncertain as upperparts grayish with brownish coloration on bac. Sex determination based on black lores, distinct black streaking on flanks. Fat Class = 3. Captured 4 April 2002, at 8:40, after approx. 12 min of playback. Capture site located approx. 15 m west of the last telephone pole along Madiera Rd.
6. Female KW, Band No. 1540-22892, Colorband combination: - XBu (= no bands on bird's right tarsus, aluminum band over blue band on left tarsus). Little black in lores, mostly grayish; indistinct black streaking on flanks, bright yellow in throat but more whiter in breast. Fat class = 3. Captured 6 April 2002 at 5:30 pm after approx. 15 min of playback. Made numerous passes over net and may have initially seen the net.

Additional Observations, Impressions, & Discussion

Six colorbanded KWs were observed on the Madiera Rd. site during our 3 – 6 April visit and we observed two other unbanded birds suggesting that at least 8 KWs were present on this site at this time. The incredible density of KWs in this site is apparent when it is realized that 6 individual KWs were captured within 235 m transect along the Madiera, Rd and at least two unbanded KWs also occurred along this transect. Nets were set within 10 – 20 m of the south side of the road, so capture sites can be visualized along a 235 m transect paralleling the road with the first capture at 0 m and last capture at 235 m. Average distance between neighboring capture sites was 59 m (range 21 – 108 m). Both a male and female were captured at the first capture site.

It is difficult at this stage to estimate the size of the habitat patch used by the KWs, but approximately 400 m of Madiera Rd is bordered by shrubby habitat typical of the capture sites. The shrubby habitat appears to extend to the south of the road for at least 100 m and possibly further (not paced).

Territories appeared to be stable, at least from mid-March to April. Without grid markings and only limited landmarks, it does appear that some overlap occurred in the territories of the marked males. Limited observations suggest that female territories overlap those of males, but that males defend territories from other males. Chases and chipping as well as agnostic displays (dropped wing displays) were observed between neighboring males.

It is difficult to evaluate how many females were actually present on the site as they were not as reactive to playback as males (to song or chip notes).

Chipping was heard in the absence of playback as during the previous visit, but no primary songs were heard during this period, with one exception. During tape playback of song and chip notes while trying to capture an unbanded male, I observed a male (Y-X) as it sang a weak partial primary song. The song was of short duration and barely audible at approx. 10 m, suggestive of a subsong. This vocalization appeared to be given in response to tape playback and was not heard in the absence of playback.

The resightings of the four KWs originally colorbanded in March suggests that the Madiera Rd. site serves as a wintering site and not just a sprint staging area. The behavior of the birds and stability of their territories suggest to us that this site is not just a staging site, but is a site used for the entire winter. Obviously, observations in October will enable a confirmation of this hypothesis.

We obtained foraging observations during this visit as well as fecal samples from the two captured KWs and one unbanded foraging individual. Seeds found in the fecal sample from one individual tentatively suggest that it was feeding on fruits of black torch, but this awaits confirmation of microscopic comparison with voucher seeds which we collected. Several KWs were observed feeding on black torch fruits this trip. In addition, we observed KWs gleaning for insects on leaves of black torch as well as other species. Picking or gleaning unidentified arthropods from the surface of the leaf litter on the ground was also observed.

What is it about this site which attracts a high density of KWs? - It is hard to escape the conclusion that the high density of black torch contributes to the abundance of KWs on this site. The KWs feed on black torch fruits and take invertebrate prey from leaves and stems, as well as foraging in the leaf litter below the plants. Flowering and fruiting within an individual black torch plant appears to be asynchronous, suggesting that fruits may be available for a long period of time, possibly spanning the entire winter. Fruiting may also be asynchronous among individual shrubs, although this remains to be verified. The KWs did glean invertebrates from other species of plants however.

Fruit levels, or at least availability of fruit potentially consumed by KWs, appear to be low. However, this may reflect high removal rates of ripe fruit by foraging birds, including KWs. Unripe fruit does appear to be relatively abundant on some black torch shrubs and there was no rotting or fallen fruit observed beneath them. Thus it maybe that the relatively low standing crop of ripe black torch fruit reflects relatively high removal rates by KWs and other birds at the site.

Soils, at least by Andros standards, appeared to be deeper and richer in some areas of the site (near the road, but rockier further from the road). We preliminarily describe the soils here as sandy-silt or silty-sand

loams. Leaf litter was relatively well developed in some sites and a small organic layer was observed in some places. Overall we think this site has deeper and richer soils than any we casually observed on Andros. The soils here may be more nutrient rich than those observed on Andros and have a higher capacity to retain moisture (due to higher clay content?). As a preliminary hypothesis, we suggest that this site has richer soils than many observed on Andros and this may account for higher primary productivity. The presence of several Ovenbirds at the site also suggests that the leaf litter is relatively rich in invertebrate prey, or at least in ants.

Preliminary sweep samples of foliage, however, did not indicate noticeably higher numbers of invertebrates than found in shrub sites on Andros. However, taxa composition of the sweep samples did appear to differ from the Andros site, with more stink bugs and fewer Homopterans on Eleuthera. More rigorous invertebrate sampling will be needed to document abundance on this site relative to other sites.

The presence of wind thrown shrubs on the site suggest that high winds may help to open up the site for shrub colonization. It is possible that hurricane winds may be an important natural factor in providing openings in tall coppice for secondary succession in which a shrub stage may develop. Hurricane winds could be especially effective in creating wind throw openings in the shallow soils of many Bahamian islands. It may be that frequent hurricanes can contribute to the production of shrubby sites used by wintering KWs on coppice islands. Thus natural fires in pine forests, may not be the only natural force producing KW winter habitat. Detailed studies at the Madiera Rd. site have the potential to provide valuable insight into the winter habitat requirements of the KWs and the factors that produce KW winter habitat in the Bahamas.