Use of Rocket Netting and Airboat Nightlighting for Capturing Mottled Ducks in Texas

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Abstract: From June–August 1977, we compared the relative efficiency of airboat nightlighting and rocket netting for capturing mottled ducks (*Anas fulvigula*) along the Texas coast. We expended 151 rocket net hours in 15 rocket net shot attempts and captured 568 mottled ducks. Age class distribution of captured mottled ducks was 79% hatch-year and 21% after-hatch-year. The largest individual rocket net capture, using a double net, was 116 mottled ducks (60 hatch-year, 56 after-hatch-year). In addition to mottled ducks, 69 fulvous whistling ducks (*Dendrocygna bicolor*) and 34 black-bellied whistling ducks (*D. autumnalis*) were captured during rocket netting. We expended 56 airboat hours during 24 nightlighting trips and captured 581 mottled ducks. Age class distribution of captured mottled ducks was 53% locals, 29% hatch-year, and 18% after-hatch-year. The largest nightlighting capture was 101 mottled ducks (61 locals, 34 hatch-year, 6 after-hatch-year). We believe that rocket netting is an effective tool for capturing pre-season (June–September) mottled ducks and will prove valuable in capturing large numbers of molting adults. We believe that a combination of rocket netting and nightlighting will provide the most efficient and effective means of capturing a well distributed sample of mottled ducks for banding purposes.

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Recent banding programs for mottled ducks in Florida and Louisiana have employed airboat nightlighting as the primary capture method. Stutzenbaker (1988) used bait traps, nightlighting, and trained retrievers to conduct the only extensive mottled duck banding project in Texas, banding 5,827 mottled ducks from 1962–1977. Rocket netting has been used to capture a variety of avian species, including waterfowl (Schemnitz 1994). The use of rocket nets for capturing wintering waterfowl is well documented (Cox and Afton 1995). We know of no studies examining the effectiveness of rocket nets for capturing brood rearing and/or molting

(pre-basic) mottled ducks. In June 1997, Texas Parks and Wildlife Department (TPWD) initiated a long-term mottled duck banding study. Our objectives were to evaluate the use of rocket nets for capturing brood-rearing and molting mottled ducks and to compare the relative efficiency between rocket netting and nightlighting.

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Methods

This study was conducted along the middle Texas coast (Fig. 1) during summer 1997 and included work on TPWD Wildlife Management Areas (WMAs) and private lands. Banding was conducted from 1 June to 31 August which encompasses brood rearing and portions of the adult pre-basic molt (Stutzenbaker 1988, Moorman and Gray 1994). Rocket netting and nightlighting were used to capture adult ducks and their broods in freshwater impoundments and coastal brackish/intermediate marsh.

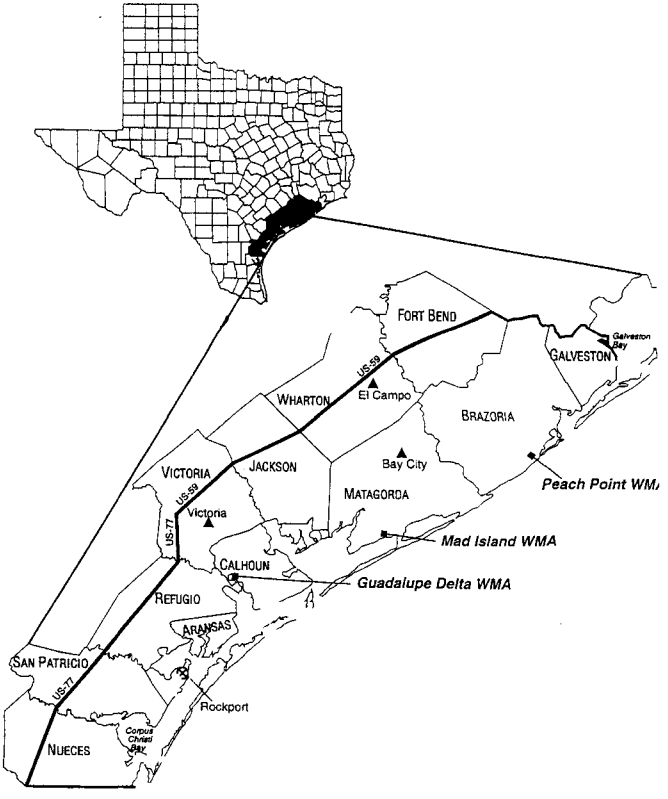

Figure 1. Area of the Texas coast and Texas Parks and Wildlife Department Wildlife Management Areas where mottled duck banding was conducted, June–August 1997.

Aluminum leg bands were placed on captured ducks following U.S. Fish and Wildlife Service protocol. Mottled ducks were classified as locals (pre-fledging, Class II–III), hatch-year (fledged young), and after- hatch-year ($\geq$1 year old).

Rocket nets were set in a variety of sites where mottled ducks tended to concentrate or could be attracted to bait, but were generally set on dry land with an area of shallow water ($<$10 cm) baited in front of the net. In wet areas or when shooting over water, we placed nets on wooden platforms (Afton and Cox 1994). We generally used single nets (12.2 $\times$ 18.3 m), but 1 shot involved the use of a double net (12.2 $\times$ 18.3 m). Single rocket nets were launched with 4 rockets and double nets were launched with 8 rockets.

All rocket net detonations occurred either soon after sunrise or late in the evening. One or 2 observers sat in a small blind usually within 46 m of the net site. Observers entered the blind about 1 hour before sunrise for morning rocket net shots, with detonations occurring about sunrise or soon thereafter. Observers entered the blind about 3 hours before sunset for evening rocket net shots, with detonations occurring from within 30 minutes after entering the blind until almost dark. While the observer was in the blind, 1–3 persons awaited nearby to assist with captured ducks. A 12-volt ATV battery was used to detonate the net charges. Upon detonation, the observers and support personnel would remove all ducks from the net before initiating banding procedures. Ducks were placed in mesh decoy bags (15–25 ducks per bag) as they were removed from the net.

Rocket net sites were prebaited with rice for 3–14 days. We initially placed 45–68 kgs of rice at a net site, but subsequently only placed 23 kg as the ducks began responding to bait. We generally prebaited a site for several days prior to net placement so that ducks would become accustomed to the site. Net sites were always baited prior to personnel entering a blind and attempting a net shot.

Rocket net hours were defined as the cumulative clock hours involved with prebaiting, setting the net, shooting the net, resetting the net, etc. Approximate clock hours associated with each activity was 3 hours for prebaiting a site (inclusive of any time incurred from first day bait was placed at site until first net was detonated), 1 hour for setting or re-setting a net, 3 hours for a successful rocket net shot (e.g., sitting in blind, detonating the net, and banding ducks), 2 hours for an unsuccessful rocket net shot (e.g., sitting in blind without detonating the net), 2 hours for re-baiting a site (time from successful shot until next shot), and 1 hour for net disassembly and storage. We used clock hours instead of man-hours because numerous personnel were involved in the training of rocket net use and safety as well as in training to correctly age, sex, band, and record data on captured ducks. Also, pre-baiting and monitoring of sites for mottled duck use were often incorporated into other daily work activities.

Nightlighting was conducted via airboat with a 3-man crew (driver and 2 spotters/grabbers). Q-beam spotlights (300,000 candlepower) were used to search for ducks as the airboat was slowly maneuvered through marshy areas. Ducks were grabbed by hand and placed in mesh decoy bags. We attempted to maintain brood integrity as much as possible by capturing as many individual brood members as possible, and then immediately banding and releasing them at the capture site. When

numerous broods were simultaneously encountered, we captured as many total ducks as was possible. When approximately 15–25 ducks were captured, we stopped and banded the ducks, and then resumed operations. Brood members were always released within the same marsh pond and within about 183 m of where captured. Nightlighting hours were defined as the number of clock hours expended from the time the airboat was launched until we returned to the launch site. *T*-tests were used to compare relative catch rates (e.g., ducks captured per event) and catch efficiency (e.g., ducks caught per hour) between the 2 methods.

Results

One hundred and fifty-one rocket net hours were expended on 15 rocket net shots at 5 different sites. A total of 568 mottled ducks were captured. On average, we captured 37.9/net shot (range 13–116, SE = 10.1), or about 3.8/net hour. One mortality occurred, and no local age class mottled ducks were captured. Age class distribution of captured ducks was 79% hatch-year and 21% after-hatch-year. The largest capture (using a double met) was 116 mottled ducks at a site near Guadalupe Delta WMA. The largest single net capture was 75 mottled ducks at Mad Island WMA. In addition to mottled ducks, a total of 69 fulvous whistling ducks and 34 black-bellied whistling ducks were captured during the 15 rocket net shots.

The number of days between rocket net shots varied by location. A Calhoun County site was shot twice the same day (morning and evening) resulting in 24 mottled ducks captured/shot with no recaptures. This same site was shot 5 times from 15–30 July with a total of 148 mottled ducks being captured. A site at Mad Island WMA was shot 5 times from 4–28 July with as few as 4 days elapsing between shots. One hundred and sixty-three different mottled ducks were captured at this site, 13 of which were recaptures from previous shots.

Fifty-six airboat hours were expended on 24 nights at 13 different sites. A total of 581 mottled ducks were captured, 24.2/night (range = 1 to 101, SE = 5.1), or about 10.4/nightlighting hour. One mortality occurred. Age class distribution among captured mottled ducks was 53% locals, 29% hatch-year, and 18% after-hatch-year. The largest single capture night was 101 mottled ducks (61 locals, 34 hatch-year, 6 after-hatch-year) in 5 hours at Peach Point WMA. In addition to mottled ducks, 64 black-bellied whistling ducks, 26 fulvous whistling ducks, and 23 blue-winged teal (*Anas discors*) were captured during the 24 nightlighting trips.

Generally, 7–10 days elapsed between nightlighting efforts at a given site. At Peach Point WMA, 2 sites (197 ha) were nightlighted 5 times from 16 June to 1 August. Two hundred and fifty-seven different mottled ducks were captured along with 25 recaptures.

When comparing a nightlighting trip to a rocket net shot, there was no difference ($t = 1.27$, df = 34, $P > 0.10$) between the methods. However, ducks caught per hour was significantly greater ($t = 4.42$, df = 34, $P > 0.001$) with nightlighting than with rocket netting.

Discussion

We were successful in using rocket nets to capture relatively large numbers of mottled ducks (about 38 per net shot) along the Texas Coast. To our knowledge, such methodology has not been conducted for mottled ducks in Texas, or elsewhere along the Gulf Coast. The most extensive banding work in Texas was conducted by Stutzenbaker (1988); however, rocket netting was not a method that was employed. Although our largest net capture was 116 mottled ducks, we estimated as many as 500 mottled ducks routinely foraged within the net vicinity. Clearly, rocket netting offers potential for capturing large numbers of pre-season mottled ducks.

Rocket netting was only 36% (3.8 ducks captured/net hour vs 10.4 ducks captured/nightlight hour) as effective as nightlighting in capturing brood-rearing and molting mottled ducks along the Texas Coast. Most time inefficiency was due to multiple pre-baiting trips and time associated with baiting and surveillance of the net site between shots. Some of this inefficiency can be minimized as staff become more experienced with rocket netting. Our capture rate with airboat nightlighting (10.4 mottled ducks/hour), was similar to those (9.3 and 12.0 ducks/hour) reported by Fogarty and LaHart (1971).

We made repetitive rocket net shots on the same site during the same day (morning and evening) and made rocket net shots at as few as 3 days intervals. Once mottled ducks have established use of a bait site, we believe that rocket net shots can be made as often as conditions and manpower availability permit, without fear of the ducks abandoning the site.

Pre-baiting (e.g., the time between the initial baiting of a site and the shooting of a net) varied from 3 to 14 days. Generally, the ducks responded to bait within a few days of placement. Although a rocket net works similar to a bait trap, it is probably not necessary to conduct extensive pre-baiting because the folded rocket net has a low profile, and ducks do not have to be wary of entering a trap. Also unlike a bait trap, the rocket net does not require daily attending and predation of captured ducks is not a concern. Baiting can occur at 2–3 day intervals, rather than daily as with a bait trap.

Water level fluctuations in tidal areas sometimes inundated rocket nets or exposed vast mud flats in front of the baited areas. On 1 occasion, a rocket net was inundated by wind driven tides, negating a shot opportunity. A low tide on another occasion resulted in an expansive mud flat in front of the rocket net. On that occasion, mottled ducks were observed to be cautious of leaving the water to feed, and a shot attempt was negated. We were generally unsuccessful in luring mottled ducks into the range of the net when bait sites were located on dry land or exposed mud flats. Mottled ducks were seemingly much less cautious of the rocket net and readily approached sites where we shot over water.

Nightlighting was most effective on flightless ducks (either local or molting adults), whereas rocket netting was most effective on ducks capable of flight (hatch-year and after-hatch-year). Johnson et al. (1995) reported that local and hatch-year mottled ducks could be combined for band analyses purposes due to similar direct

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recovery rates, but such a scenario has not been evaluated in Texas. If flightless locals have differential survival and recovery rates than hatch-year ducks, then rocket netting may subsequently increase effectiveness of banding efforts by providing a sampling of immatures that may contribute more to subsequent harvest and recovery analyses.

The percentage of after-hatch-year mottled ducks was similar between the 2 methods (21% for rocket netting, 18% for nightlighting), but our efforts were terminated on 1 August which is fairly early in the adult pre-basic molt period (Stutzenbaker 1988, Moorman and Gray 1994). We believe that rocket netting large numbers of molting adults is likely if sites harboring large numbers of molting ducks can be located. During preliminary baiting trials, over 500 molting mottled ducks were observed on a baited site in Calhoun County.

The possibility of severe injury to personnel should be the foremost concern when using rocket nets. Prior to implementing a rocket netting program it is imperative to ensure that all personnel are fully trained in the proper use of the explosive charges and in safe conduct around a charged net. Also, to minimize loss (mortality and escape) and stress of captured ducks, sufficient personnel (1 person/20 ducks), should be available so ducks can quickly be removed from the nets (Cox and Afton 1994).

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