

Record of an Urban Ringtail (*Bassariscus astutus*) Outside of its Typical Geographic Range

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Abstract - We use video-trap events to study activity patterns of a Ringtail (*Bassariscus astutus*) in an urban Houston neighborhood outside of its typical geographic range. Fifty video clips of an individual Ringtail were obtained from 10 September to 15 December, 2018, with 2 additional records during 2019. The Ringtail was active from 1800–0700 hrs (peaking 2100–0100 hrs), temporally overlapping with Black Rat (1900–0700 hrs) and Virginia Opossum (1900–0200 hrs). Evening sorties were > 4–6 hours, and the Ringtail was recorded at 4 sites total with 1.2 km between the furthest sites. Results are discussed and compared to current knowledge base, and Ringtail presence and abundance in the eastern half of Texas is also discussed.

Introduction. The study of urban wildlife provides a baseline of knowledge of wildlife populations and communities that thrive in sub/urban areas by divulging the way these species are able to adapt and thrive in urban environments outside of native ecosystems. These studies lead to a better understanding and sustainability of urban ecosystems that harbor such species by promoting biodiversity and the best ecologically functioning systems possible, while fomenting positive associations between people and wildlife (HUWP 2021). Species of urban wildlife can be generally separated into those that are totally reliant upon humans to survive (synanthropic) and those that thrive in urban environments independent of humans (Adams and Lindsay 2010). In the latter case, these include species that are ecologically flexible enough to thrive in urban environments outside of nature (McCleery et al. 2014).

Bassariscus astutus Lichtenstein (Ringtail; Fig.1) is found in North America as far north as Oregon and Colorado in the United States, then southward throughout Mexico west of the Isthmus of Tehuantepec (Poglayen-Neuwall and Toweill 1988). In Texas, this species is especially common in the western half of the state where it is abundant throughout the Edwards Plateau, westward through the Trans-Pecos and the Big Bend region (iNaturalist 2021, VertNet 2021). In contrast, the Ringtail is much less common in the eastern half of Texas, where it is reported as virtually (iNaturalist 2021) to completely (VertNet 2021) absent. Yet its status is met with confusion in the eastern half of the state since the authoritative source on Texas mammals only notes absolute presence or absence in Texas counties, without commenting on variation in abundance among different regions (Schmidly and Bradley 2016).

The natural history and biology of this species was exhaustively reviewed in Poglayen-Neuwall and Toweill (1988). To summarize, Ringtails are medium-sized omnivorous carnivores that live in xeric habitats often characterized with rocky outcrops, but more recently have been found to live in a wider variety of habitats (iNaturalist 2021). They compete with a variety of species with a similar niche, as they eat an assortment of foods ranging from small vertebrates to invertebrates to fruits of different plants. They shelter

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and rear young in adopted dens, have a variety of vocalizations, and the young bond closely with the mother until weaned.

Herein, we use video-trap events to study an individual Ringtail in an urban Houston neighborhood outlying its typical geographic range (i.e., west Texas). Aspects of chronology, activity and movements are described and discussed in comparison to the current knowledge base for this species. Additionally, Ringtail presence and abundance in the eastern half of Texas is discussed.

Methods. JJS first observed the study subject on 12 August 2018 on his neighbor’s rooftop (1400 blk. Harold St., Houston, Harris Co., TX), before the animal left the area on a power line. A game camera (Browning, Dark Ops Pro XD, BTC-6PXD; Settings: video mode, 30 sec. capture delay, ultra 1080p @ 60fps quality, 20 sec. video length) was set up on 10 September 2018 at a height of 5.3 m so that the Ringtail could be captured on camera from 6 m away (distance from where it was seen), permitting minimal invasion of natural behavior.

The camera captured video records of the Ringtail the first night it was set up, when we began collecting video clips for this study. We assume that a single animal was involved considering the rarity of Ringtails in this region, along with very consistent behaviors nightly (see below).

Additional locations of the Ringtail were obtained using the NextDoor App, which permits community communication of notable events within a specific neighborhood. In this case, the Ringtail seen at various locations, vouchered with photographic evidence in some cases.

Results and Discussion. We recorded a total of 50 video events (clips <1 min, without sound) of the Ringtail from 10 September–15 December 2018, with 2 additional records during 2019 (9 January and 1 April). The Ringtail was actively traveling at a quick walk/slow run in virtually all images.

The Ringtail was generally active at nighttime from 1800–0700 hrs, with strongest activity peaks from 2100–0100 hrs (Fig. 2). There was some temporal overlap with *Rattus rattus* Linnaeus (Black Rat; N = 8) intermittently from 1900–0700 hrs, and *Didelphis*



Figure 1. Ringtail (*Bassariscus astutus*)
A) camera-trap photo, and B) photo on
NextDoor App.

virginiana Linnaeus (Virginia Opossum; N = 7) from 1900–0200 hrs, with the Opossum extending its activity to morning (0900 hrs; Fig. 2). Other species recorded (N = 1 each) include *Procyon lotor* Linnaeus (Northern Raccoon), *Otus asio* Linnaeus (Screech Owl), and *Periplaneta americana* Linnaeus (American Cockroach).

The daily activity route was unknown, but the Ringtail generally traveled west on a utility line between 2100–0100 and then traveled east on the same utility wire at 0100–0700 hrs. This would suggest these evening sorties were generally at least 4–6 hours in duration.

We recorded the Ringtail at 3 other sites besides the main study site (Fig. 3). The straight-line distance from the furthest site (6 April 2019) to the 3 sites in the same vicinity was 1.2 km.

Activity. Our study subject was encountered from late summer through mid-winter, as well as once during spring in urban residential habitat. Ringtails living in association with human dwellings have been noted before in regions such as Lakeway, Texas (Travis Co.; J. Champeney, Austin, TX, 78734 pers. obs.), as well as other regions throughout its range (Poglayen-Neuwall and Toweill 1988).

The study subject was active from 1800–0700 hrs, peaking from 2100–0100 hrs, which corroborates the findings of others, being rarely active during daytime (c.f., Poglayen-Neuwall and Toweill 1988). The diel cycle overlapped that of less frequently recorded Black Rat and Virginia Opossum. Ringtails are known to predate Murid rodents (Ackerson and Harveson 2006) but are direct competitors with other medium-sized mammalian omnivores, including opossums (c.f., Poglayen-Neuwall and Toweill 1988). Although it remains possible that the Ringtail in our study predated rats and competed with opossums, a latrine with fecal pellets was not found to perform scat analysis to determine this.

Daily sorties were approximately 4–6 hrs; we are unable to find prior information on daily travel duration, suggesting that this information is novel. Mean home ranges in Trans-Pecos Texas varied seasonally 0.28–0.63 km² (Ackerson and Harveson 2006), which is comparable to our finding of a straight-line dispersal >1.2 km.

Ringtail status in the eastern half of Texas. Despite being recorded in many Texas counties (Schmidly and Bradley 2016), Ringtails are much more abundant in the western half of the state compared to the eastern half (Fig. 4), with the location of Austin being the approximate

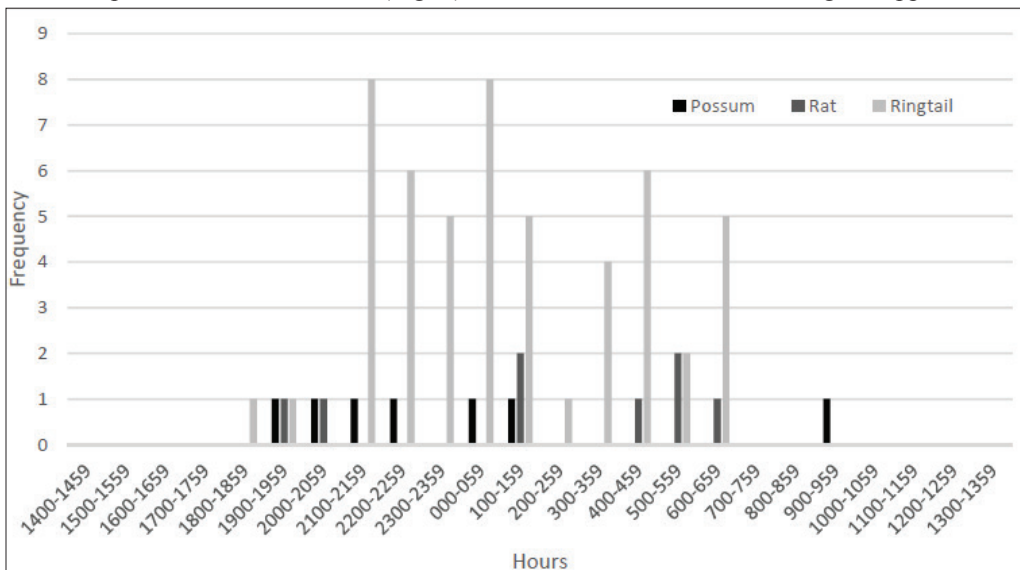


Figure 2. Ringtail (*Bassariscus astutus*) daily diel cycle with Virginia Opossum (*Didelphis virginiana*) and Black Rat (*Rattus rattus*) in Montrose (Houston, Harris Co., Texas).

dividing line between east and west Texas. Moreover, Texas Parks and Wildlife Department (TPWD hereafter) furbearer spotlight records (1978-96) only recorded Ringtails from the Trans-Pecos region (western Texas). Ringtails were completely absent from Piney woods and Post Oak surveys in the eastern half of Texas (unpubl. data provided by J. Purvis, TPWD, Austin, TX, 78744).

When our study was first initiated in 2018, the nearest cluster of records temporally coinciding to our observation site were several localities around Austin (Travis Co.), ~235 km northwest (iNaturalist 2021). It is possible that our record represents a gradual eastward expansion. Since the Ringtail reported herein was photo-trapped, more have been reported in the region: on 27 April 2019 in Nada (Colorado County, Tx) ~100 km west and slightly



Figure 3. Sightings of Ringtail (*Bassariscus astutus*) in Montrose neighborhood (Houston, Harris Co., Texas).

south of our record in Houston, on 5 June 2020 in Galveston (Galveston County, Tx) ~75 km southeast, and on 19 February 2021 in Katy (Harris County, Tx) ~45 km west (iNaturalist 2021). These 3 photo-trap records, all within ~100 km of our site, represent virtually the only recent records from the eastern half of the state (iNaturalist 2021). The reason for the sudden appearance of Ringtails in this region may be related to the increased number of camera-trap usage by the general public.

Corroborating the rarity of Ringtails from the eastern half of the state, annual TPWD trapper data (1987–2002) from these 3 counties shows only 1 Ringtail trapped each in Harris (1987) and Galveston (1995) counties, and 3 from Colorado county (1992–95) during this 15-year trapping period. Moreover, the same data from counties surrounding Harris county indicates only 1 Ringtail trapped each in Brazoria (2001), Ft. Bend (1992), and Waller (1987) counties, but none trapped in Chambers, Liberty, or Montgomery counties (TPWD, Austin, TX, 78744 unpubl. data). In sum, Ringtails are uncommon in the eastern half of the state compared to the western half, likely because the western half is more characteristic of the xeric habitats they prefer. It is possible that urban habitat in east Texas is slowly simulating the xeric, more open habitats of west Texas, and as this urban surface expands in east Texas, it is gradually occupied by Ringtails.

Conclusion. Urban environments are increasingly important for small populations of some wildlife species as natural habitat diminishes (Adams and Lindsay 2010). Large colonies of *Tadarida brasiliensis* Geoffroy (Free-tailed Bats), Northern Raccoons, Virginia Opossums, and a variety of raptors are well established in the Montrose region of Houston as an example (c.f., Winston et al. 2017; results herein). Other rarer urban wildlife in this particular area include *Dasyus novemcinctus* Linnaeus (Nine-banded Armadillo) and *Bubo virginianus* Gmelin (Great-horned Owl; DMB, unpubl. data), and more recently the Ringtail described herein. As native habitat continues to be impacted over future decades, urban habitats may serve as important reservoirs for displaced and remnant wildlife populations.

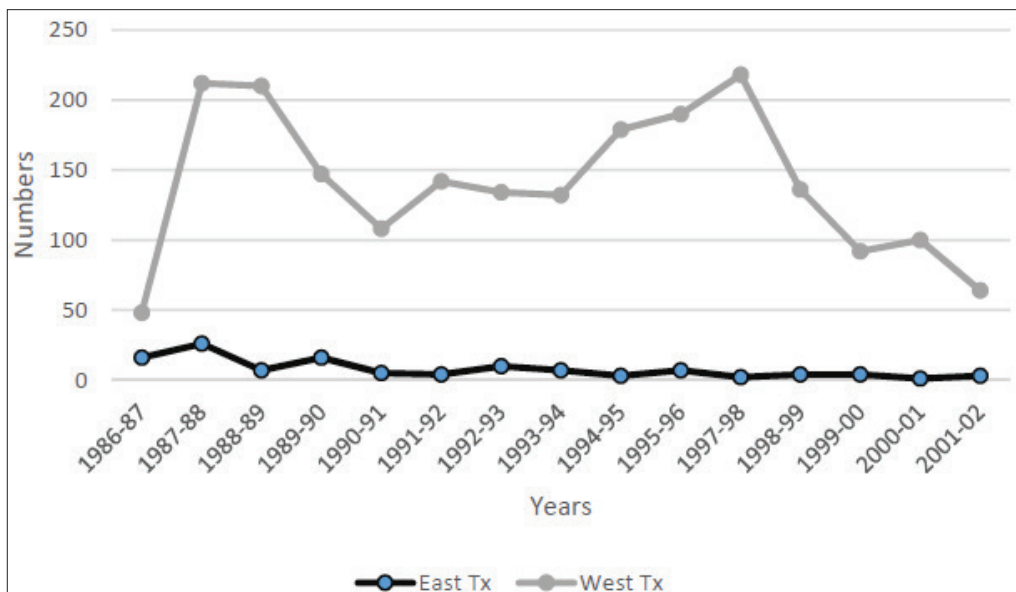


Figure 4. Numbers of Ringtails (*Bassariscus astutus*) trapped in west and east Texas, as reported by fur trappers (1986–2002) to TPWD (unpubl. data provided by J. Purvis, TPWD, Austin, TX, 78744).

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Literature Cited

- Ackerson, B. K., and L. A. Harveson. 2006. Characteristics of a ringtail (*Bassariscus astutus*) population in Trans Pecos, Texas. *Texas Journal of Science* 58:169–184.
- Adams, C. E., and K. J. Lindsay. 2010. *Urban Wildlife Management*, Second edition. CRC Press, Boca Raton, FL, USA. 403 pp.
- HUWP. 2021. Houston Urban Wildlife Project. Available online at <http://www.hmns.org/huwp>. Accessed 24 August 2021.
- iNaturalist. 2021. Ringtails (Genus *Bassariscus*). Available online at <https://www.inaturalist.org/taxa/41674-Bassariscus>. Accessed 1 June 2021.
- McCleery, R. A., C. E. Moorman, and M. N. Peterson. 2014. *Urban Wildlife Conservation: Theory and Practice*. Springer, New York, NY, USA. 420 pp.
- Poglayen-Neuwall, I., and D. E. Towell. 1988. *Bassariscus astutus*. *ASM Mammalian Species* 327:1–8.
- Schmidly, D. J., and R. D. Bradley. 2016. *The Mammals of Texas*, Seventh edition. University of Texas Press, Austin, TX, USA. 720 pp.
- VertNet. 2021. *Bassariscus astutus*. Available online at <http://portal.vertnet.org/search?q=specificcepit+het:astutus+genus:Bassariscus+stateprovince:%22Texas%22>. Accessed 1 June 2021.
- Winston, K. M., J. R. Winston, and D. M. Brooks. 2017. Swainson's Hawk (*Buteo swainsonii*) hunting behavior at an urban population of Mexican Free-tailed Bats (*Tadarida mexicana*). Pp. 27–31, In D. M. Brooks (Ed.). *Half a Century of Ornithology in Texas: the Legacy of Dr. Keith Arnold*. Miscellaneous Publication of the Houston Museum of Natural Science, Number 7, Houston. 158 pp.