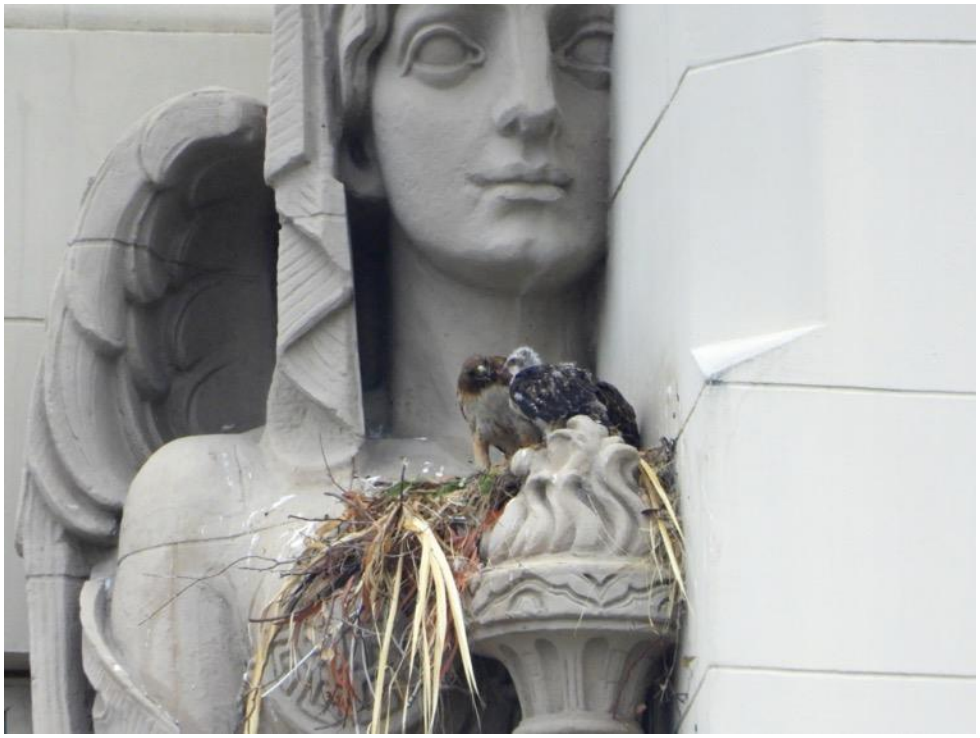
LOS ANGELES RAPTOR STUDY

2023 Report



Red-tailed Hawk adult feeding juvenile in nest on building statue high above Wilshire Blvd.

Photo credit: Nurit Katz

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Sauter, Dale Schafer, Tevin Schmitt, David Shadovitz, Robin Share, Poonam Sharma, Lisa Shipley, Amy Sims, Paul Martin Smith, Kelsi Smith, John Smith, Kathy Smith, Esprit Smith, Anita Sohus, Morrine Sosnow, Sylvia Stachura, Dana Stangel, Louise Steinman, Susan Sterr, Deanne Stillman, Susan Streaser, James Strzelinski, Caroline Su, Indu Subaiya, Frances Tait, Audrey Tawa, Joseph Taylor, Stan Thompson, Annie Thornton, Linda Topper, David Torfeh, Jose Tovar, Johnathan Tracy, Christina Van Oosten, Diana Wagman, Alexa Walters, Jen Wang, Deborah Weirick, Michelle West, Amy White, Debra Wilbur, Heather Wilson, Jason Wise, Melody Wong, Ronnie Wong, Angela Woodside, Heidi Yang, Jackson Yean, Patricia Yee, Corrin Yep, George Young, Melissa Young, Taylor Zagelbaum, and Alexandra Zedalis.

Stefanie Smith, Griffith Section Superintendent, Department of Recreation and Parks, assisted us with access to several non-public park venues. Los Angeles City Park Rangers provided patrols and maintained signage and fencing to protect a sensitive Peregrine Falcon nesting site in Griffith Park. Officer Jose Navarro and the Los Angeles Animal Services SMART team provided support for challenging re-nesting and rescue efforts, and shared helpful data on new nests. In addition, many residents responded to our outreach and shared helpful tips and notified us of local nests, and we thank them for their information and contributions to this study.

EXECUTIVE SUMMARY

In 2023, we continued monitoring within our expanded 2021 study area (including Sepulveda Basin, Baldwin Hills, and Glendale), and again increased the number of monitored territories for the seventh year of the Los Angeles Raptor Study (est. 2017 as the Griffith Park Nesting Raptor Survey). In 2023, we rechecked or discovered a total of 549 raptor territories, representing 222 Cooper's Hawk territories (vs. 185 in 2022), 184 Red-tailed Hawk territories (vs. 161 in 2022), 55 Red-shouldered Hawk territories (vs. 45 in 2022), 84 Great Horned Owl territories (vs. 42 in 2022), as well as 4 American Kestrel territories and 2 Peregrine Falcon territories. Compared to 2022, we located additional territories for 12 new Cooper's Hawk pairs (a decline from 27 found in 2022), 13 for Great Horned Owl (same as in 2022), 15 for Red-tailed Hawk (up from 9 in 2022), and 5 for Red-shouldered Hawk (same as in 2022).

Most of these new territories had active nests, but in some we observed the presence of pairs that did not appear to be nesting or we were unable to locate the nest. Some new territories were also the result of nest takeovers, where one species takes over another's nest, such as a (new) Great Horned Owl appearing in a nest that had formerly been a Red-tailed Hawk nest.

As noted before, these numbers (at least the diurnal species) more closely reflect *actual* numbers of active nests in the study than those in surveys prior to 2020 due to increased effort and our knowledge of local species ecology. We again did not confirm any active Western Screech-owl nor Barn Owl nests due to the cryptic nature of these cavity nesting species.

In 2023, we have re-analyzed nest occupancy, territory re-use, and productivity for each of the four common species. These patterns are difficult to interpret and complex, but are described in detail in the text. This year, we compiled examples of nest trees being severely trimmed (or removed altogether), which for Red-tailed Hawks again resulted in pairs leaving these territories, and their nest location not re-discovered during the season. This year, we have also compiled information on nest takeovers, which we had not explicitly analyzed in prior years.

We again did not re-analyze nest distribution by subregion, ornamental vs. native tree use, nor nest phenology (i.e., when chicks first appear, and when they fledge) for the 2023 season. Patterns of each seemed to be similar to that observed in prior years, but we plan to analyze this more rigorously in a future publication.

1.0 BACKGROUND

Launched as the "Griffith Park Raptor Survey" in 2017 (Cooper et al. 2017)[1], we renamed our effort the "Los Angeles Raptor Study" in 2021 to reflect the larger current study area now covering most of Los Angeles exclusive of the north and west San Fernando Valley, South Los Angeles, and the Harbor area (**Figure 1**). By documenting and tracking raptor nests across Los Angeles, we hope to understand how ecological dynamics change from year to year in the natural and built areas of Los Angeles, in particular how human activity is impacting wildlife. While a handful of Los Angeles-area raptor nesting sites had been documented by prior work (e.g., Allen et al. 2017), the data contained in our annual summary reports represent the first comprehensive dataset of an entire raptor community in the urban core of Los Angeles.

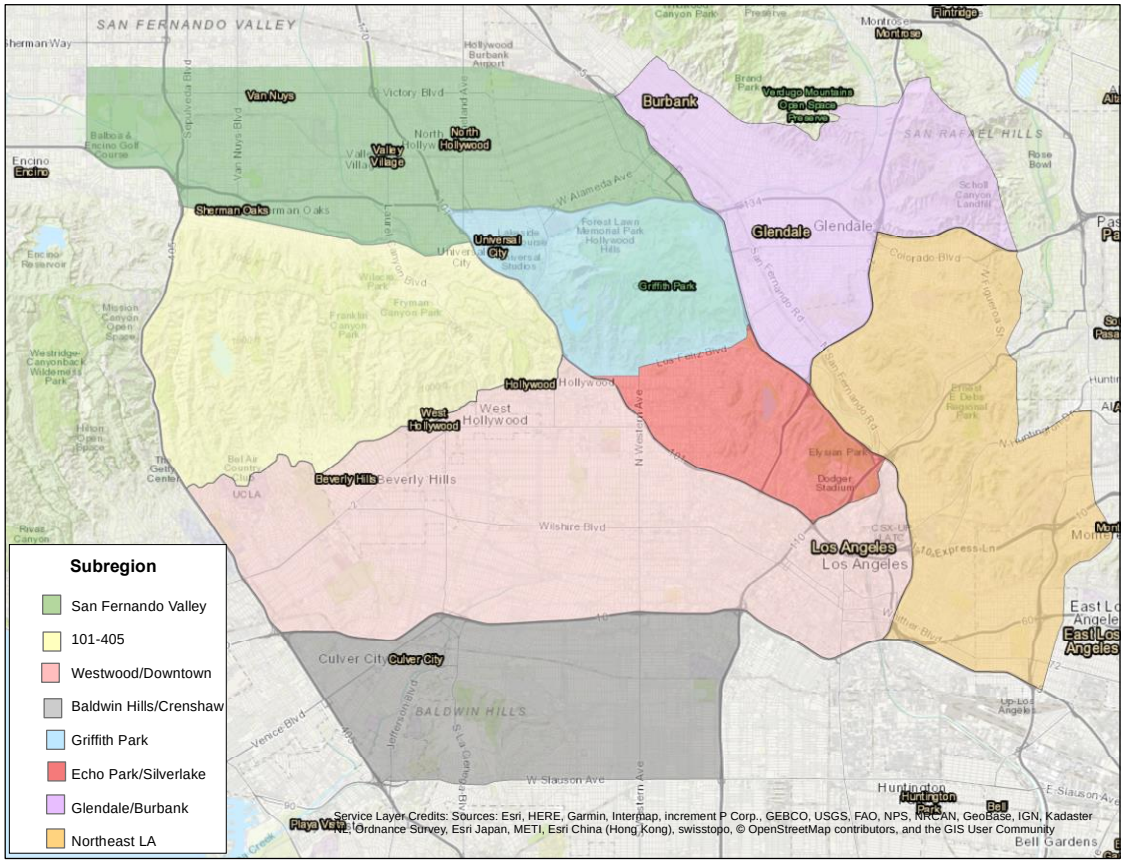

Figure 1. Study area used since 2021. In addition to the areas shown, we monitored a handful of nests outside the study area, but did not include them in the analysis.

[1] Cooper Ecological Monitoring, Inc. has been conducting surveys on the flora and fauna in Griffith Park since 2007, when the Griffith Park Wildlife Management Plan (Cooper and Mathewson 2009) first documented the park's flora and fauna and suggested best management practices for the future, including improved species monitoring.

Raptors are important apex predators in most of the earth's ecosystems, and coastal Southern California supports (or once supported) around a dozen breeding species (Garrett and Dunn 1981). Of these, eight are known to nest, or formerly nested in the central Los Angeles Basin covered by this study. Based on recent records (e.g., eBird: www.ebird.org), the study area provides *potentially* suitable nesting habitat for nine resident raptors including Turkey Vulture (*Cathartes aura*), Red-shouldered Hawk (*Buteo lineatus*), Red-tailed Hawk (*Buteo jamaicensis*), Cooper's Hawk (*Accipiter cooperii*), Great Horned Owl (*Bubo virginianus*), Barn Owl (*Tyto alba*), Western Screech-Owl (*Megascops kennicottii*), Peregrine Falcon (*Falco peregrinus*) and American Kestrel (*Falco sparverius*). Turkey Vulture has not been confirmed as breeding in the study area in modern times, though suitable conditions exist to support its nesting, and summering individuals are present every year, mainly in the Santa Monica Mountains and western Griffith Park.

Former nesters include Golden Eagle (*Aquila chrysaetos*) and Long-eared Owl (*Asio otus*), but both are rare today at any season. Osprey (*Pandion haliaetus*) is frequently seen through the nesting season (mainly along the Los Angeles River) but has not been documented as nesting in the study area (though spring and summer records appear to be increasing). A handful of species of raptors occur locally in migration and/or winter (e.g., White-tailed Kite (*Elanus leucurus*), but nesting has not been suspected as occurring in the study area in modern times.

2.0 STUDY AREA AND METHODS

2.1 Location

The "Study Area" originally centered on Griffith Park, was expanded in 2020 to include additional portions of the San Fernando Valley and coastal plain that were not covered in prior years. This year, the Study Area again extended to the 405 Freeway/Sepulveda Pass in the west (with an "extension" to include Sepulveda Basin), Sherman Way/Vanowen Blvd. in the north, Slauson Ave. in the south, and East Los Angeles in the east (see **Figure 1**). As in prior years, a handful of raptor nests just outside this area were monitored by volunteers (e.g., Pasadena and Calabasas), but we did not specifically search for nests in these areas.

The region's climate is Mediterranean, with low or no summer precipitation, cool winters, and periods of drought. February sees the highest levels of precipitation with annual average rainfall of 14 inches. Fairly regular El Niño events once or twice per decade can result in much higher annual rainfall amounts, and regular droughts can reduce rainfall to half the normal amount (or less in exceptional years). For example, the year of the project launch (2017) followed an exceptional five-year drought in the Los Angeles area, with each year well below average rainfall; however, the 2018 – 2019 rainy season saw a total of 18.82 inches in the downtown Los Angeles area, which was 4.09 inches (>20%) above the seasonal average for the area. The 2019 – 2020 season saw a return to average (14.86 inches), though roughly half of it fell during March and April (2020), which was unusually late, and which coincided directly with the start of our 2020 raptor nesting season. Rainfall in winter 2020-2021 was less than half that of normal (5.0 inches)[2], with above-average high temperature spikes in late May and mid-June, which is coinciding with local raptor fledging. Rainfall in winter 2021-2022 was below average, but not extremely so (12.4 inches)[3]. This past winter (2022-2023) had exceptionally high precipitation, with 28.4 inches recorded in downtown Los Angeles.

While most nests were found on private property (mainly in residential areas), several public land managers are responsible for raptor nests in the study area. These include the Los Angeles Department of Recreation and Parks, which manages Griffith Park, Elysian Park, Echo Park, Debs Park, and most of the Sepulveda Basin, as well as hiking/open space areas (including Runyon Canyon), golf courses (including Encino and Woodley golf courses) and numerous smaller urban parks; the Los Angeles Department of Water and Power (Stone Canyon Reservoir, Silver Lake Reservoir, Hollywood Reservoir); and Los Angeles County Department of Parks and Recreation (Kenneth Hahn Park). Various other agencies and owners manage lands in the remaining open space of the eastern Santa Monica Mountains, notably Mountains Recreation and Conservation Authority (Franklin Canyon). Important large private land owners include various golf courses, which we have gained access to in recent years. However, most nesting sites monitored were found in and around single-family homes and yards, and many nests were located in street trees, backyard trees, or along utility easements through residential areas.

[2] https://www.laalmanac.com/weather/we13.php

[3] https://www.accuweather.com/en/us/los-angeles/90012/may-weather/347625?year=2021

These street trees are maintained by the various cities in the study area, including Los Angeles, Culver City, Beverly Hills, West Hollywood, Burbank, and Glendale.

As in prior years, we were denied access to several areas of interest, including the large protected habitat area around Stone Canyon Reservoir (LADWP), Hollywood Bowl, and Forest Lawn Cemetery-Hollywood Hills. Our coverage of the Los Angeles Zoo was again absent in 2023.

2.2 Survey Methods

Dan Cooper, Courtney McCammon, Nurit Katz, and Gerry Hans conducted opportunistic surveys in the Study Area during February-March 2023 to document the status of known and suspected raptor nests and identify new territories, which continued through the spring and summer. We attempted to maintain the high level of coverage afforded to the Study Area starting in 2020, which included scanning online bird reporting platforms such as eBird and iNaturalist for reports of adults and juveniles (the latter particularly evident by June), and visiting the reported areas to track down nests, which yielded several dozen new territories/nests. As in recent years, we (Nurit Katz) posted several announcements and updates of the project to social media (Facebook, Instagram, LinkedIn, etc.) and local NextDoor boards, requesting sightings of nests and raptors. This approach was again useful, especially during the end of the Cooper's Hawk nest period when juveniles are loud and visible in neighborhoods. Occasionally new nests are discovered due to rescue calls about fallen nestlings (including a new Great Horned Owl nest in an ash tree in Griffith Park in 2023, and Cooper's Hawk nests in Culver City and Echo Park in prior years).

Our surveys were performed mostly by foot using 8-10x binoculars, 20x spotting scopes, and "super-zoom" cameras to determine nest activity and the presence or absence of raptors. Surveys were timed to avoid undue disturbance to nesting raptors and other birds during the most critical breeding periods later in spring.

We held two virtual (Zoom) training sessions followed by in person field trainings which were well-attended by volunteer "community scientists". The first set of trainings took place January 23 and 28, 2023. By the end of March, we had nearly 500 potential raptor nests/territories located, and the volunteers had started their bi-monthly visits. For the first time, we also held refresher trainings with a focus on Cooper's Hawks at the end of March (March 23 and April 16, 2023), which were well attended. As in prior years, we assigned nests to one or more volunteers based on their location preferences and birding ability. Volunteers were asked to visit their assigned nests twice per month (and no more than weekly to avoid disturbance) to identify nesting stages throughout the season, and were asked to send back completed data sheets at least monthly. Each active nest was confirmed by a project staffer and/by photograph to ensure data reliability and support volunteer training. Staff also met with new volunteers one-on-one in the field for nest orientation, and with existing volunteers if they were assigned a new nest. Completed data sheets were generally emailed and may be provided upon request. GPS coordinates of nests were collected with Google Maps or Earth app in the field, or later

using volunteers' written descriptions and Google Earth Pro. Coordinates were taken as close to the nest tree as possible, but the accuracy of nest coordinates may vary due to access issues, proximity of the edge of a tree to the nest, or the inability to obtain accurate readings under dense tree canopy.

2.3 Classifying Nest Structures and Territories

We largely maintained our definitions and classification of nests and territories solidified in 2020, which accounted for new information learned through our more intensive monitoring and nest-searching that began that year. Thus, we continued our focus on documenting use of *territories* (i.e., not just on physical nests), attempting to determine breeding activity even where we could not locate the nest structure. Definitions used as follows:

- Active (nest) – A physical nest in good condition with at least one individual of the appropriate species engaged in clear breeding behavior at the nest (e.g., nest-building, incubation, etc.);
- Active (territory) – An area with a pair of adult raptors interacting, or with an individual engaged in breeding activity. Also, "active territory" may refer to an area where we noted recently-fledged young clearly produced locally (e.g., with downy feathers, or incapable of sustained flight), even if the nest structure was unknown;
- Fledged (nest/territory) – Evidence of one or more young having successfully left the nest. Typically, this was confirmed by observations of large young in the nest, then an empty nest shortly thereafter, with copious whitewash and down feathers near the nest, and usually with at least one fledgling (dependent on adults and incapable of sustained/smooth flight) in the area. In some cases, a successful nest was identified based on whitewash/down even if no fledgling was observed nearby.
- Inactive (nest/territory) – A likely or known/historical raptor nest or territory in which no breeding activity was observed at any point in the season;
- Abandoned (nest) – A situation where adults (i.e., a pair) were present – usually only early in the season – within the territory at or near a known nest, but where no nesting activity at the nest was observed thereafter;
- Failed (nest) – An active nest that produced no young, but where nesting activity had been observed in the current season, such as incubating adults, suggesting that eggs may have failed to hatch or that young died in the nest;
- Unknown – Ambiguous observations, typically where we failed to revisit a nest in the study year due to scheduling/access issues, or where we felt we did not have enough observations to make a determination of success or status.

In some cases, we identified a territory based on the presence of a single adult, such as an adult Cooper's Hawk delivering a territorial flight display or a call associated with breeding, but most nests and territories were deemed active by the presence of a *pair during the nesting season*. We again also included as "active" territories those areas where we located fledglings (in the

current year) that appeared to have been hatched very close by (see “Fledged”, above), but where we could not locate a physical nest. Several of these territories were eventually (in 2023) confirmed as having nests, and assigned a nest number.

As in prior years, we focused our effort on determining the breeding status of territories where nests had not been located, but we (or our volunteers) frequently incidentally observed raptors exhibiting breeding behavior such as tandem flights, copulation, stick-carrying, etc. Generally, we considered two visits during the nesting season, and no reported sightings of the target species, as sufficient to consider a territory “inactive”.

As in prior years, we were able to confirm activity within many territories by the presence of recently-fledged young and recently-used nests (particularly Cooper’s Hawks), using clues learned while more closely observing known nests.

3.0 RESULTS

For this year (2023), we have expanded our analysis of nest/territory use and nesting success, again focusing on the 2020-2023 period for which we have the most complete data.

3.1 Territory Occupancy

In 2023, we rechecked or discovered a total of 549 raptor territories (not all active), representing 222 Cooper's Hawk territories (vs. 185 in 2022), 184 Red-tailed Hawk territories (vs. 161 in 2022), 55 Red-shouldered Hawk territories (vs. 45 in 2022), 84 Great Horned Owl territories (vs. 42 in 2022), as well as 4 American Kestrel territories and 2 Peregrine Falcon territories[4].

We located additional territories (i.e., new since 2022) for 12 Cooper's Hawk pairs (a decline from 27 newly-discovered in 2022), 13 for Great Horned Owl (same number as in 2022), 15 for Red-tailed Hawk (up from 9 in 2022), and 5 for Red-shouldered Hawk (same number as in 2022). Most of these with were located with active nests, but a handful were territories in which we found a pair of adults, but no indication of nesting (this year). We also again noted several cases of species takeovers, where one species takes over another's nest. We again confirmed no active Western Screech-owl nor Barn Owl nests, both known to nest within the study area in small numbers.

Comparing each species, we found that Red-tailed Hawks maintained more active territories across the study area in 2023 than in *any prior year* (n = 138; mean = 117.5 per year), and while the number of nests that fledged was higher than in the year prior, the percent of active territories that fledged young was nearly identical in 2022 and 2023 (63%). Fledging rates for Red-tailed Hawk territories these past two years were the *lowest* of all seven years studied (mean = 76%) (**Figure 2**).

[4] Importantly, our nest-searching effort increased greatly starting in 2020, so the years 2017-19 may be thought of as preliminary compared to the years 2020-22. In particular, we searched for (and located) few urban Cooper's Hawk nests in the San Fernando Valley or mid-City area prior to 2020, before we learned some of the "tricks" to finding them there.

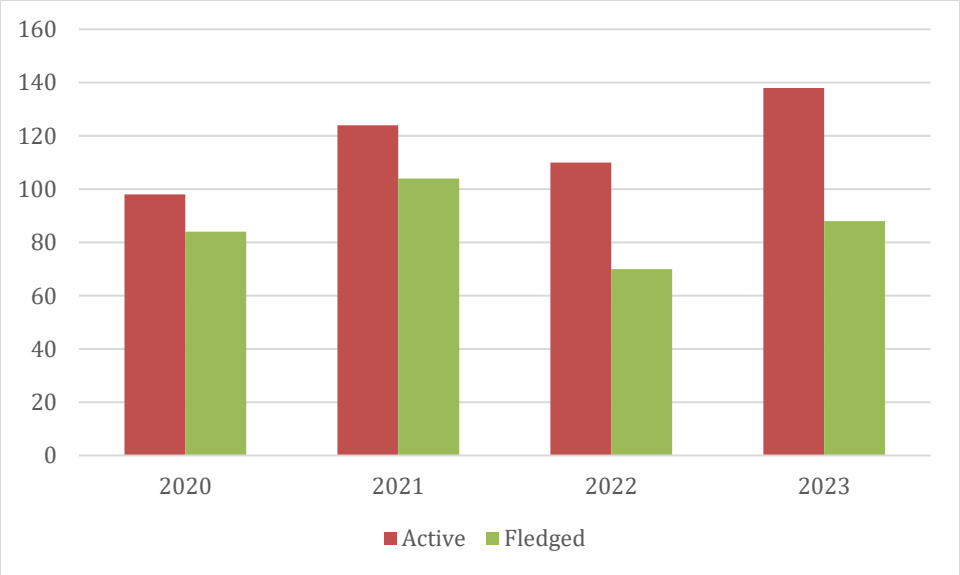

Figure 2. Red-tailed Hawk active territories and outcome, 2020-23. Proportionately fewer territories fledged in 2022 and 2023 than in any prior year.

Cooper's Hawks exhibited a different pattern than Red-tailed Hawks. This year (2023) saw the *fewest* active territories recorded in the study area since 2019 (n = 84; mean = 100), yet had the highest proportion of nests fledge young from those active territories (90%; mean = 87%) (**Figure 3**).

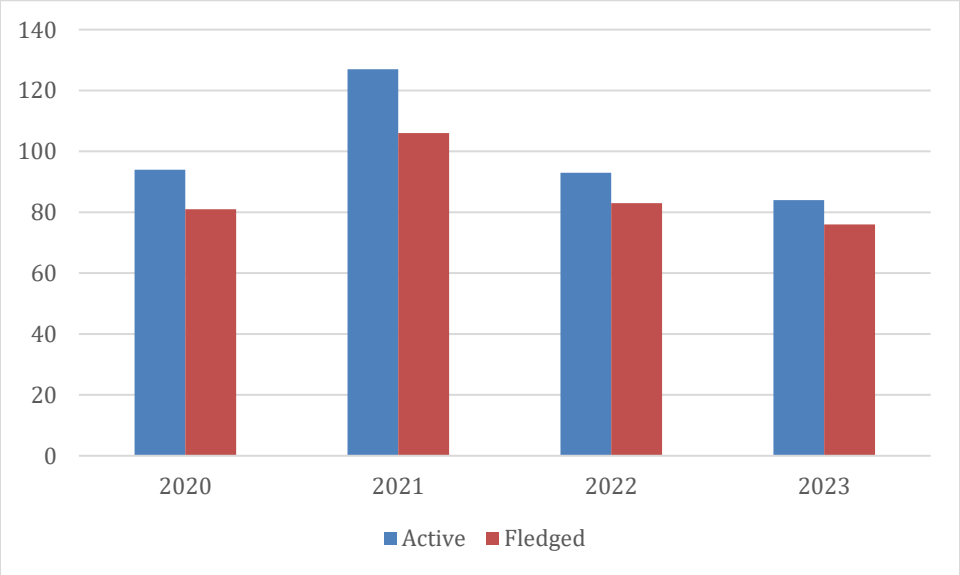

Figure 3. Cooper's Hawk active territories and outcome, 2020-23. While 2023 saw the fewest active territories, it saw the highest proportion of fledged nests within active territories.

For Red-shouldered Hawk, 2023 continued the pattern of more active territories discovered within the study area, but this resulted in only a modest increase in nests that actually fledged young, resulting in proportionately lower fledging rate per nest versus the mean since 2020 (57%; mean = 65%; **Figure 4**).

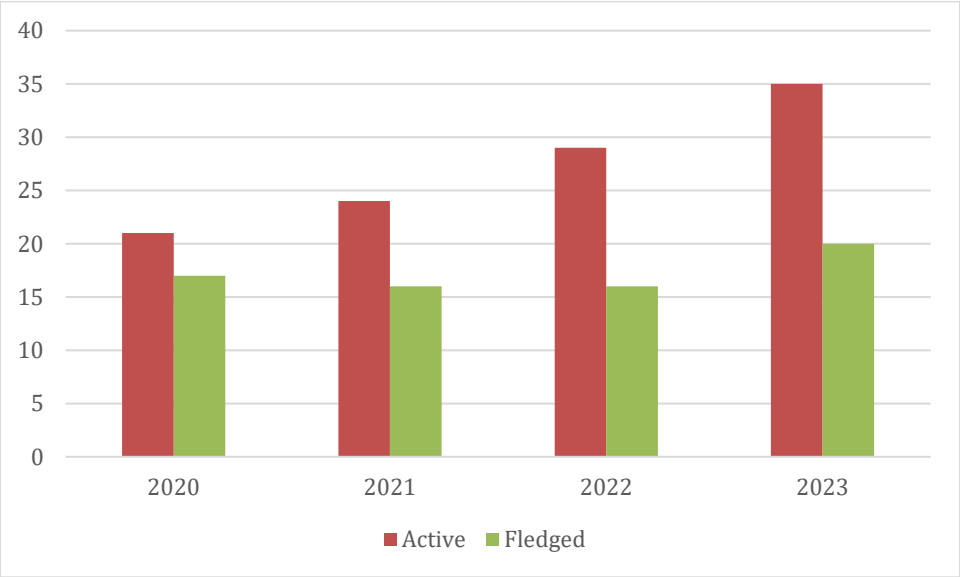

Figure 4. Red-shouldered Hawk active territories and outcome, 2020-23. 2023 saw the most active territories over the past three years, yet with only a slight rise in proportion of fledged nests compared to 2022.

We monitored 42 active territories of Great Horned Owl, and as in prior years, and while a large proportion fledged, the rate of fledged active nests was the lowest in the 2020-2023 period analyzed (79%; mean = 92%). As in prior years, we did not attempt to specifically search for owls or owl nests during the study.

The number of active (in a particular year) territories that fledged young for all species combined is summarized in **Figure 5**. We note, however, that prior to 2020, our data-collection effort was lower, and no special effort was made to find fledged nests past the end of the nesting season.

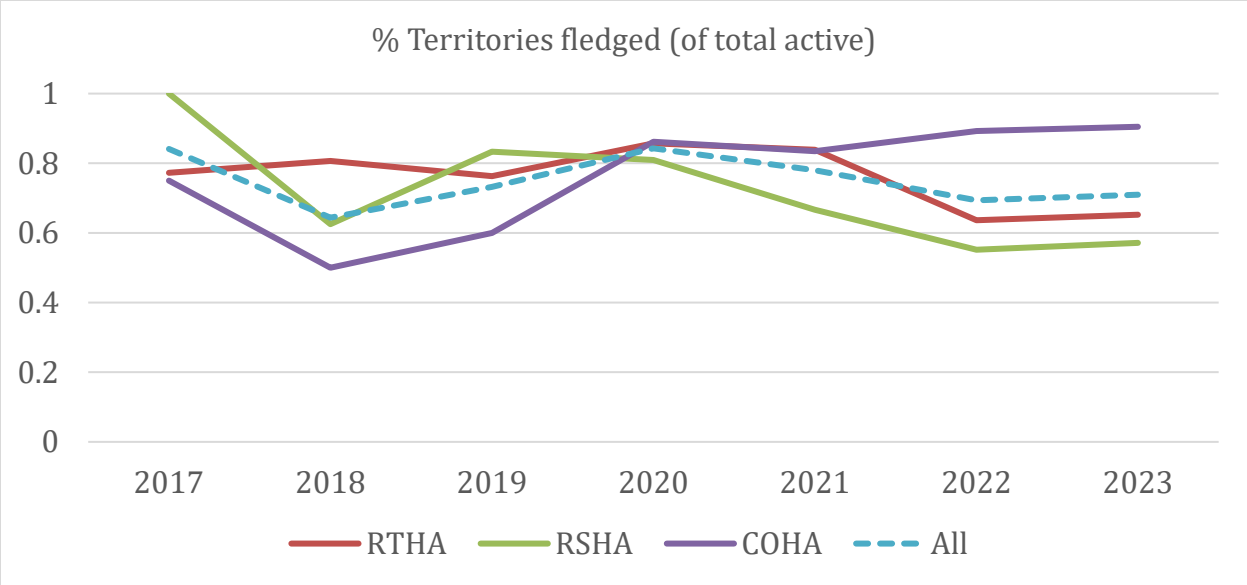

Figure 5. Proportion of territories that fledged young for each species, 2018-2023. Since 2023, Cooper's Hawks nests have consistently fledged at a higher rate than either Red-tailed or Red-shouldered hawks.

"Re-occupancy rates" of active territories year to year for the three focal hawk species are presented in **Figure 6** (such data were incompletely collected for Great Horned Owl and so are not included[5]). This illustrates the relatively low change in territory re-occupancy rate for Red-tailed Hawk as compared to the other two hawk species in the study area, with an average of nearly 80% re-occupancy of territories by Red-tails across the seven years of the study, vs. roughly 50% for Cooper's Hawks. Interestingly, both these species saw a decline in re-occupancy from 2020 to 2022, then a (slight) rise this year. Year-over-year territory *success* (as measured by active nests that fledged nests in the following year) was similar to that of territory occupancy (**Figure 7**). We will explore nest site re-use in a future publication.

[5] Due to their cryptic behavior, we made no effort to search for Great Horned Owl territories, and most nests found were occupied by an incubating adult or young, hence skewing the nesting territory re-use/success calculation.

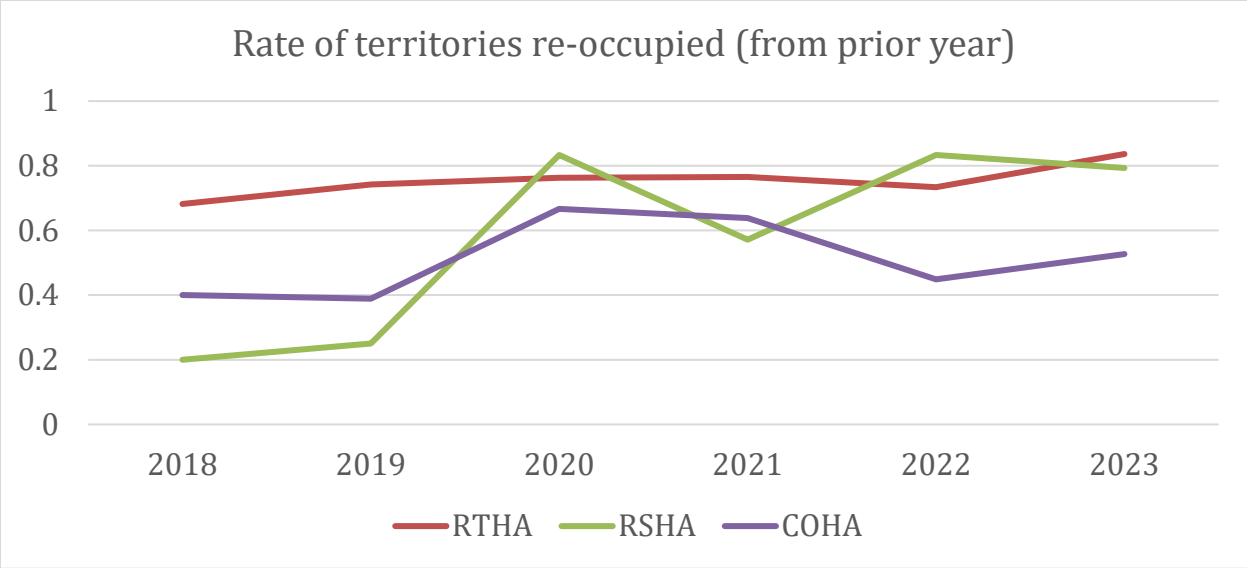

Figure 6. Annual re-occupancy rates of territories for the three focal hawk species, 2018-2023.

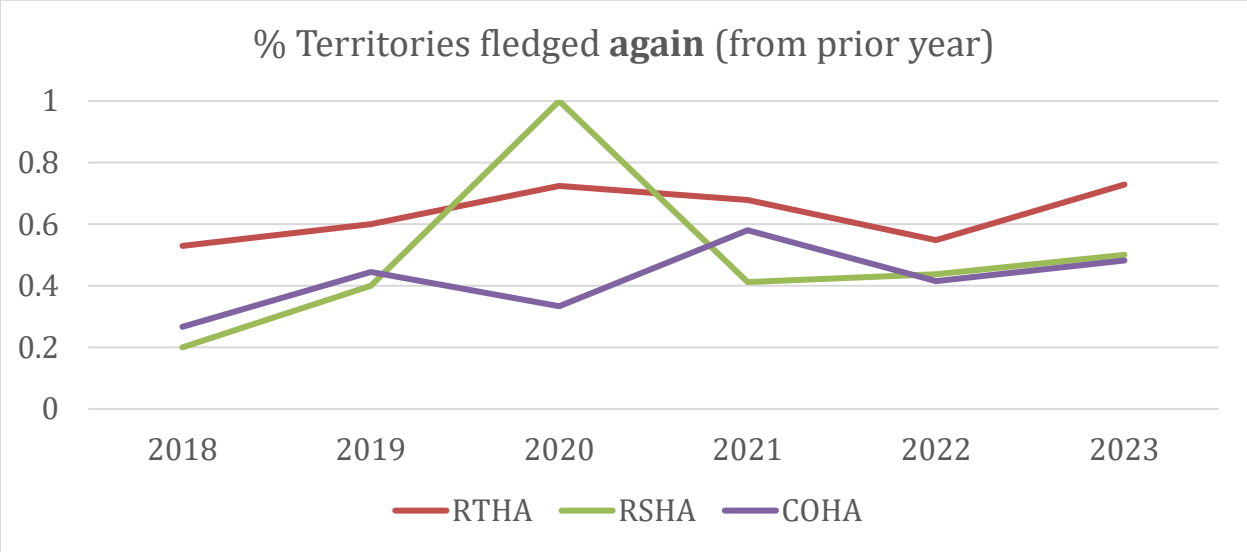

Figure 7. Annual proportion of territories that fledged for a second consecutive year for the three focal hawk species, 2018-2023.

3.2 Nest Productivity

We present a summary of the total number of young fledged per year since 2020 in **Table 1**. Note that the number of active nests monitored in each year varied, so larger numbers are not necessarily related to increased reproductive productivity (discussed below). While Cooper's Hawk and Great Horned Owls saw a surge in the number of chicks produced overall, Red-

shouldered Hawk chick numbers were slightly higher than in prior years, and the number of Red-tailed Hawk chicks was the second-lowest since 2020.

Table 1. Total number of young produced (either confirmed fledged young, or nestlings close to fledging), 2020-2023.

Species	**2020**	**2021**	**2022**	**2023**
Red-tailed Hawk	187	204	125	165
Red-shouldered Hawk	28	27	24	30
Cooper's Hawk	131	139	129	166
Great Horned Owl	35	38	49	68

Across all focal species, nest productivity rate, as measured in the mean number of chicks hatched from active nests (i.e., failed/abandoned nests excluded) peaked in 2019 (not in 2020, as asserted in prior annual reports, following a re-analysis). As shown in **Figure 8**, Cooper's Hawk consistently fledged the highest mean number of chicks per (successful) nest[6], with an average of 2.54 young from 2017-2023. Red-tailed Hawk had the next-highest rate (mean = 2.12), followed by Great Horned Owl (2.01), and Red-shouldered Hawk (1.79).

We also note that the mean number of chicks has continued to decline from a high in 2019, for which we have no definitive explanation, though it may be the impact of cumulative drought years. Additional years of monitoring may shed light on this pattern.

[6] Apparently failed and abandoned nests were omitted from this analysis (i.e., those with a chick/fledgling count of zero). Including these was problematic, since we were frequently unsure if a given pair attempted to breed and produced no young, or bred somewhere else, or bred in the territory and we (or our volunteers) simply failed to find the young. And, our assessment was frequently dependent on effort and observer skill, which has varied. Thus, we took a conservative approach and have only included nests with one or more young to assess productivity.

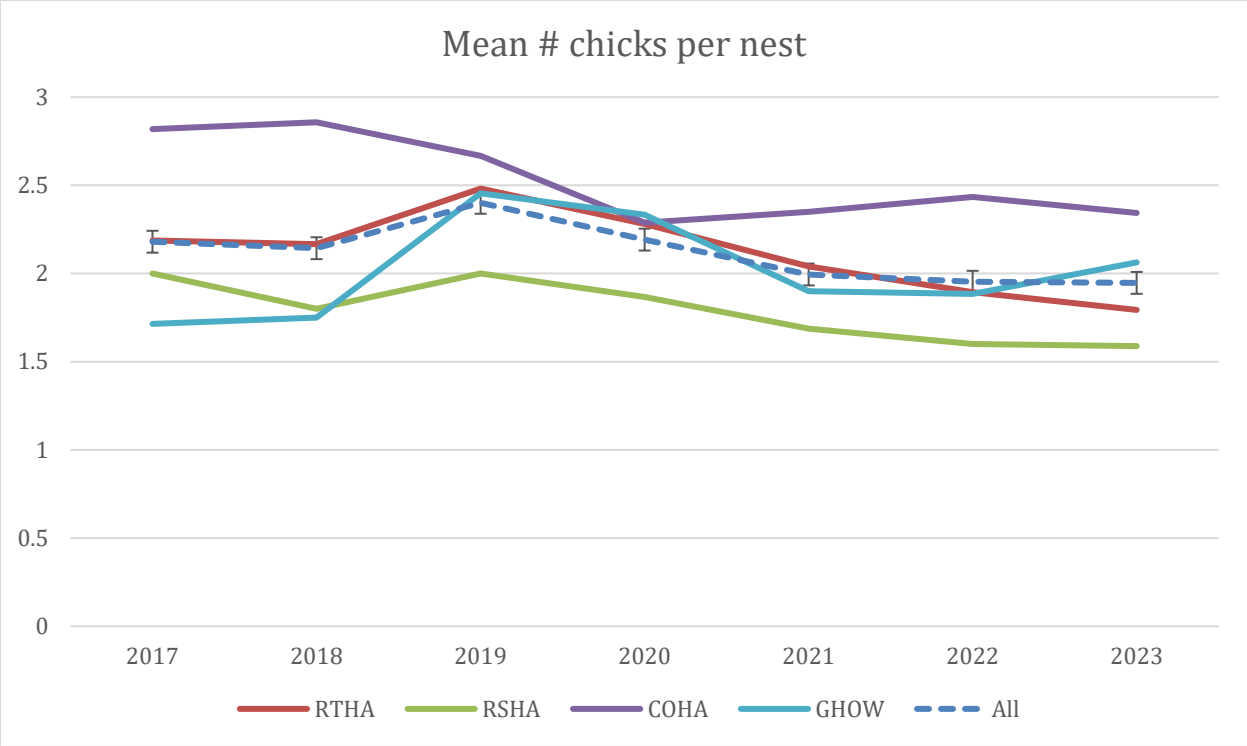

Figure 8. Mean number of chicks per nest[7], 2018-2023.

Of the many ways to measure nest productivity, another is the proportion of *single-chick nests* (nests where the maximum number of chicks was believed to be just one, versus all other nests where chicks were produced), which could indicate a shortage of food that year. Assuming that Red-tailed Hawks would be most sensitive to change in precipitation (since they take more native prey species from wildland areas than, say, Cooper's Hawk, which are well-distributed in urban areas), we examined the relationship between precipitation the prior year, and the proportion of 1-chick nests in Red-tailed Hawk (**Figure 9**)[8].

We found that the nesting seasons following the driest winters (i.e., 2018, 2021 and 2022) all saw jumps in the proportion of Red-tailed Hawk nests with single chicks, which conforms to recent findings looking at precipitation and Northern Goshawk (*Accipiter gentilis*) nests (Bangerter et al. 2021). Alas, this interesting relationship did not hold after the extreme rainfall of 2022-23, which was literally off the charts (>13" deviation from average) and may have led to the destruction of multiple nests from flooding and wind (described below). No such pattern was observed with the other raptor species (not graphed).

[7] We include nests with large chicks that were last checked when *nearly* fledged, as well as confirmed fledged chicks (due to the difficulty of confirming fledging at all nests in the study with so many nests being monitored).
[8] As with assessing the mean number of chicks, we only included nests with one (or more) young in calculating the *proportion* of single-chick nests, and left out nests where we suspected no young were produced.

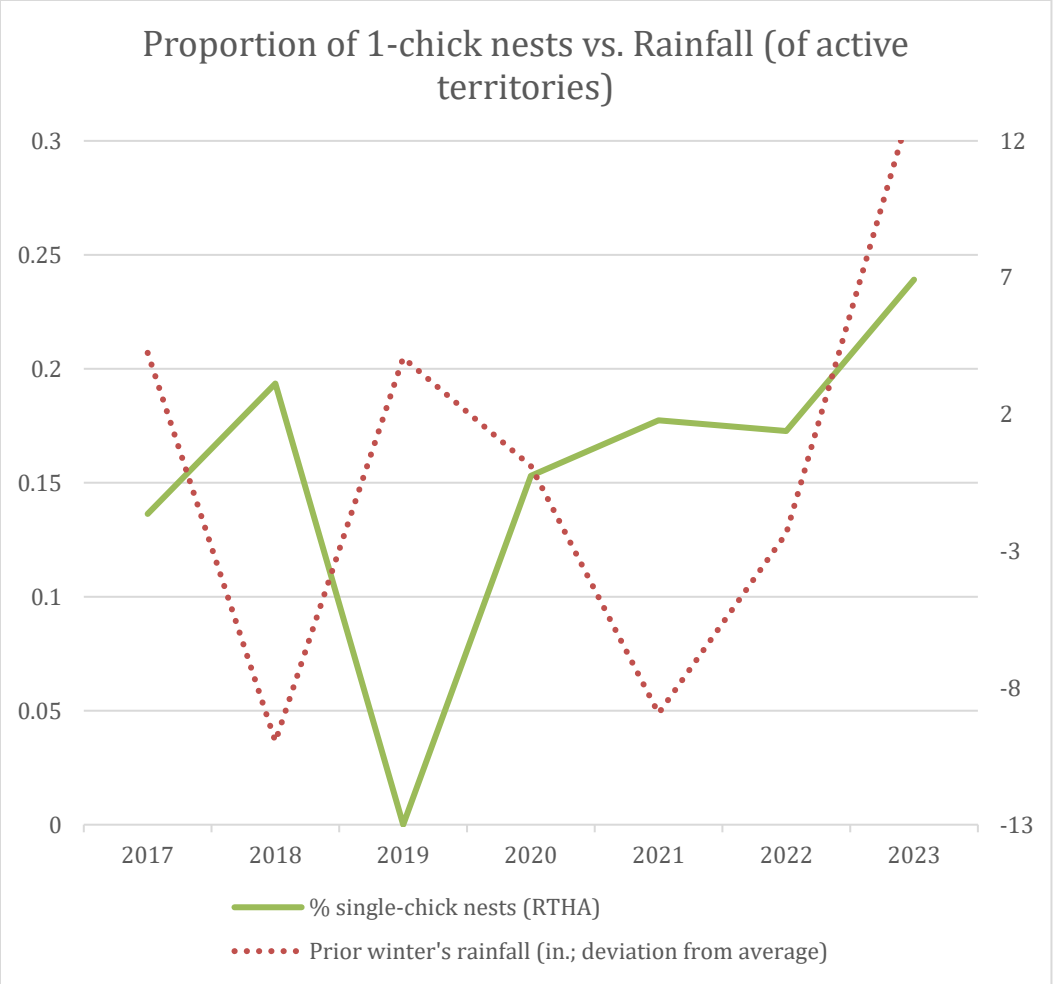

Figure 9. Proportion of single-chick nests of Red-tailed Hawks (primary y-axis) in relation to rainfall the *prior* winter (secondary y-axis). Rainfall measured from Downtown Los Angeles (see "Methods") and shown as a deviation from the c. 100-year average from the same location.

3.3 Geographic and Habitat Patterns

We intend to re-analyze geographic patterns of nesting in the future, specifically focusing on territories/nests that are active in each year of the study. As in prior years we noted Red-tailed Hawks as most numerous in the more sparsely-developed neighborhoods of the Santa Monica Mountains and Griffith Park, and still a dominant species in Northeast L.A. and in Silver Lake/Echo Park, with relative few nests on the floor of the San Fernando Valley and in the urban Los Angeles Basin between Westwood and Downtown Los Angeles. Similar to 2022, we again recorded *very few active Red-tailed Hawk nests in the Sepulveda Basin, or anywhere on the San Fernando Valley floor portion of the study area*.

We also intend to re-analyze nest tree and substrate type, specifically calculating the breakdown of trees used each year. This is complicated by nest-switches by species within the same territory, which have resulted in different tree species being used different years, and by pairs "taking the year off." Clearly, nest usage of non-native trees remains very high, with western sycamore (*Platanus racemosa*) supporting most of the few nests we found in a native tree species with most others in coast live oak (*Quercus agrifolia*).

3.4 Failed Nests

As in past years, it may be instructive to review why the few failed nests did so. In **Table 2**, we summarize all raptor nests believed to have failed, in that nesting was initiated, but was apparently abandoned mid-season.

Table 2. Observations of failed raptor nests in 2023 (does not include territories with no nesting activity, where nesting was suspected but where no nest has ever been found, or where observation time/number of visits were insufficient to determine success).

Territory	Location	Notes
RTHA-053	Hollywood Bowl	Nest failed with chicks in early May, presumably due to heavy rains.
RTHA-493	Culver City	Nest failed with chicks in early May, presumably due to heavy rains.
RSHA-162	Beachwood	Incubation initiated in early April, but only one adult seen after that (was one found dead in 2022), and nest disintegrated by mid-May.
COHA-355	Kenneth Hahn	No activity past incubation in early June.
COHA-410	North Hollywood	Apartment complex "power-washed" in mid-April, during incubation. Adults vanished after that.
COHA-516	Monterey Hills	No activity past incubation in late April.
COHA-520	Sherman Oaks	No activity past incubation in late April.
COHA-630	Glendale	No activity past incubation in late April.
GHOW-247	Elysian Park	No activity past eggs in late April.
GHOW-253	Beverly Hills (formerly RTHA)	No activity past incubation in early March.
GHOW-317	Sherman Oaks	No activity past incubation in early March.
GHOW-492	Bel Air	No activity past incubation in early March.
GHOW-609	Elysian Park	No activity past eggs in late April; note "nest flooded by storm".

Several nest failures appeared related to the record-breaking rains we experienced in late winter/spring 2023, which we summarize in **Table 3**. Wind speed may also have been a factor,

as sustained winds exceeded 20 mph on several days in late March and early April, and exceeded 10 mph on most days between late March and the end of May (ave. wind speed is 5.5-6.5 in March – May).

Table 3. Rainfall exceeding 0.1" during March-June, 2023. From Burbank/Bob Hope Airport station (https://www.wunderground.com/history/weekly/us/ca/burbank/KBUR/date/2023-3-1).

Date	Inches of rain
26 Feb.	1.53
28 Feb.	0.47
1 Mar.	1.06
11 Mar.	0.80
15 Mar.	1.54
21 Mar.	0.39
22 Mar.	0.88
23 Mar.	0.29
30 Mar.	0.76
14 Apr.	0.17
4 May	0.61
5 May	0.17

3.5 Tree-trimming and Nest disturbance

Tree-trimming/removal impacts are difficult to analyze since the timing of trimming or nest removal is not always known. Trimming itself when not during the nesting season, does not always result in disturbance to nesting hawks or their nest structures, and many pairs, especially Cooper's Hawks, will renest within the same territory (presumably the same birds as the year prior) following tree-trimming or tree-removal. This nesting may either occur in the same nest structure, or an alternate nest may be built nearby. In some cases, trimming occurs on territories where no nesting has been detected in recent years, so simply amassing examples of tree-trimming near nests can inflate its actual impact.

Often, raptor pairs may simply elect not to nest even where no visible trimming or disturbance was detected, and where the prior year's nest is still present. Or, observers note that the nest is simply be gone from the nest tree, with no sign of human disturbance (perhaps blown out by wind weeks or months before).

We hope to track and analyze these disturbances more fully in future years, and to search prior years' notes for clues about nest disturbance. **Table 4** lists apparent disturbances to nests recorded in 2023.

Table 4. Disturbances to nests noted during 2023 season. Some of these instances may have occurred in late 2022, subsequent to our data-collection effort that year, and some may not have been the cause of the abandonment of a particular territory.

Nest	Location	Disturbance	Territory Notes
COHA-102	Los Feliz	Trees heavily trimmed	No activity
COHA-108	Hancock Park	Nest gone	No activity
COHA-163	Elysian Park	Branch with nest broke off in storms	New nest built in same tree; fledged young
COHA-180	Los Feliz	Trees heavily trimmed	No activity
COHA-298	Sepulveda Basin	Both nests gone, homeless encampment below last active nest	Pair present early season only
COHA-337	Studio City	Nest tree severely trimmed (and house under construction across street)	No activity
COHA-353	Mid-City	Nest branch cut; tree heavily trimmed	No activity
COHA-361	Studio City	Nest appears to be gone	No activity
COHA-396	Silverlake	Nest gone	No activity
COHA-419	Mid-City	Tree heavily trimmed compared to prior years, nests more exposed	No activity
COHA-420	West Hollywood	Nest gone	No activity
COHA-487	West Hollywood	Nest gone	One adult seen (once) nearby, but no nesting activity
COHA-488	Echo Park	Nest gone	Alternate nest found nearby; fledged young
COHA-502	Studio City	Nest gone	No activity
COHA-508	Baldwin Hills	Branches with nest reportedly broken	Unk. (no follow-up visit)
COHA-539	Baldwin Hills	Nest trees cut down 2022-23	No activity
COHA-579	Burbank	Major tree trimming in area	Alternate nest found nearby; fledged young
COHA-622	East LA	Nest gone, trees trimmed	No activity
COHA-630	Glendale	Nest gone	Alternate nest found; abandoned during incubation
COHA-637	Hollywood	Nest gone	One adult seen (once) nearby, but no nesting activity

COHA-639	Mt Washington	Nest gone	Alternate nest found nearby; fledged young
COHA-698	Mid-City	Trees trimmed just before visit (mid-July)	Fledged young (presumably just prior to trimming?)
GHOW-023	Debs Park	Nest gone	No activity/Unk.
GHOW-125	Mt. Washington	Nest tree being cut severely	Fledged young, despite partial trimming with chicks in nest (neighbor/CDFW stopped activity)
GHOW-134	Mt. Washington	Nest gone	No activity/Unk.
GHOW-203	Studio City	Nest gone	No activity
GHOW-442	Debs Park	Nest gone	No activity/Unk.
GHOW-607	Griffith Park	Nest gone (early May)	Fledged prior to loss of nest.
GHOW-609	Elysian Park	Nest flooded (by storm)	Abandoned during incubation
RSHA-162	Griffith Park	Nest almost gone	Abandoned during incubation
RSHA-194	Silverlake	Nest gone	Alternate nest found; fledged young
RSHA-252	Beverly Hills	Nest gone	No activity
RSHA-255A	Sherman Oaks	Not trimming, but construction near nest	Presumably fledged (young in nest)
RSHA-303	Beverly Hills	Nest tree taken out between 2022(?) and 2023	Alternate nest found; fledged young
RTHA-334	Burbank	Volunteer reported tree trimmed	Pair carrying nesting material in area; nest never found.
RSHA-574	Baldwin Hills	Old nest completely gone	Alternate nest found; fledged young
RSHA-652	Rancho Park	Nest almost completely gone	No activity
RTHA-036	Griffith Park	Nest tree blew down in the storms; no adults	No activity
RTHA-058	Elysian Park	Nest gone	Adults present early in season only; no breeding activity
RTHA-100	Eagle Rock	Nest gone	Alternate nest found; fledged young
RTHA-195	Los Feliz	Trimming on another tree 100' away	Fledged young

RTHA-198	Burbank	Tree trimmed but nest intact	Adult present early in season, then no activity
RTHA-205	Sepulveda Basin	Adult remained through limb removal on adjacent tree	Fledged young
RTHA-213	Beverly Hills	Nest looked ok but neighboring trees were trimmed a bit	Unk.; adult present in area
RTHA-238	Sherman Oaks	Tree gone	Unk.; adult present in area
RTHA-247	Elysian reservoir	Alternate nest from 2022 has fallen	No activity
RTHA-269	Laurel Canyon	Old nest is gone	Pair present in area early in season, then no activity
RTHA-291	Griffith Park	Original nest blew down	Alternate nest found; fledged young
RTHA-300	Bel Air	Tree trimmed; nest gone	Pair present in area early in season, then no activity
RTHA-301	Beverly Hills	Major construction and trimming in the area. Nest gone.	No activity
RTHA-311	Laurel Canyon	Tree removed/chipped (during incubation)	Alternate nest found; fledged young
RTHA-367	Van Nuys	Nest gone	No activity
RTHA-370	El Sereno	Nest tree fell (dead eucalyptus).	Pair in area but no breeding activity noted
RTHA-382	Elysian Park	Branch with nest broke off in storms	Fledged young observed, so presumably re-nested nearby
RTHA-535	Echo Park	Nest tree trimmed, but had been inactive this year	No activity
RTHA-537	South Park (DTLA)	Damage to trees from storms significant (pair nested anyway)	Fledged young
RTHA-573	Hollywood	Nest tree reported gone; RT adult observed flying with sticks into eucalyptus 150 yards away	Alternate nest found; fledged young

3.6 Nest takeovers

We noted several instances of nest takeovers in 2023, where a nest site hosted a different species than the prior year. This most often occurs with Great Horned Owls taking over Red-tailed Hawk nests, as these owls do not build their own nests but rather take over nests from other species or utilize existing nest like features of trees or buildings. We have also observed Great Horned Owls taking over Cooper's Hawk nests, even in less common tree species for the

owls, including in a jacaranda in Sherman Oaks. These species takeover patterns will be analyzed in a future report/paper.

3.7 Raptor Mortality, Rescue, and Rehabilitation

One of the leading causes of injury and death for raptors in urban areas are collisions with vehicles and buildings. Dead adults and juveniles have been observed in the street due to vehicle collisions. Sometimes injured raptors survive and are able to be transported to licensed wildlife rehabilitators for treatment and rehabilitation. Katz serves as a volunteer with the Ojai Raptor Center, assisting with capture, transport, and release.

In recent years, a successful partnership with LA Animal Services SMART team (https://www.laanimalservices.com/about-us-2/smart/) has led to a decreased need for staff transport and capture, and SMART has been able to assist in more challenging rescues. In 2023, SMART handled a range of raptor rescues including "re-nesting[9]" multiple Great Horned Owl nestlings at known nests, and they also reported a new nest site for the study, found based on a fallen owlet. Among the rescues in 2023 were a fledgling Red-tailed Hawk from the busy site of a large sports arena at the edge of the study area (where we had not searched for nor located a nest). A second juvenile from the same nest was later found dead, and the disturbance of the large event in the nest area likely played a role, which underscores the importance of conducting nesting bird surveys *prior* to construction and potentially disruptive events.

Ojai Raptor Center reported (to Katz) fewer fledgling Cooper's Hawks brought in overall than prior years, and our experience in the study area in 2023 was similar, likely due to a later start to heat waves (heat can cause nestlings to leave the nest early). Notable finds this year included a juvenile peregrine falcon found unable to fly on top of a hotel in Hollywood (which unfortunately needed to be euthanized due to blindness). Although some injured raptors did not survive their injuries, as in the prior years there were some successful rehabilitations released in the Los Angeles area (and some beyond the study boundary) involving Cooper's and a Red-tailed hawks. Remarkably, an adult Red-shouldered Hawk was discovered waterlogged but alive in a Jacuzzi (un-covered) in the Hollywood Hills, and was brought to a local fire station, LAFD Station 97. After helpful coordination by Citizens for Los Angeles Wildlife (CLAW), Katz dried the hawk and transported her to Ojai Raptor Center. She was given veterinary care for a foxtail in her eye and made a full recovery and was released to her territory. Upon release her mate immediately flew in from across the canyon and they began flying and calling together and landed together in a nearby tree. (**Figure 10**).

[9] Re-nesting, a term used by wildlife rehabilitators, involves carefully replacing a young chick (still highly dependent on its parents) back into the nest from which it had fallen. These operations are done by trained, licensed professionals, usually with ropes, cranes, and other climbing gear, and are not attempted by Los Angeles Raptor Study staff.

Figure 10. Left: Red-shouldered Hawk rescued from a jacuzzi in the Hollywood Hills. Photo credit: LAFD via unknown resident. Right: Red-shouldered hawk after rehabilitation, reunited with mate. Photo credit: Nurit Katz

Rodenticide continues to be a major threat to local raptors, and *all* dead raptors in the study area that have been tested (Testing coordinated by Friends of Griffith Park) have had evidence of multiple rodenticides in their system, and in some specimens they were found to be the likely cause of death.

Disease can also impact urban raptors, including trichomoniasis, spread by members of the family Columbidae (pigeons and doves), including the feral Rock Pigeon. In 2022 a juvenile Cooper's Hawk was rescued in Echo Park in July after a window collision and had a burst crop (which can be a symptom of trichomoniasis infection). After transport, this juvenile tested positive for trichomoniasis, and although the injuries could have been repaired, it unfortunately had to be euthanized due to the disease.

Lastly, in 2023 a dead adult Red-shouldered Hawk was salvaged in Stone Canyon area by a resident (cause of death unknown), and the specimen will be given to the Los Angeles County Museum of Natural History.

3.4 Rare Species

Incidental sightings of American Kestrel were again made in East L.A. and a successful tree cavity nest (dead sycamore) was discovered in Burbank by Greg Slak and fledged four juveniles (**Figure 13**). It does appear that again, the far southeastern portion of the study area (northeast/east Los Angeles) may be a productive area to search for this declining species in future years, though it remains essentially marginal as a breeder here. And, we again confirmed a single nest of Peregrine Falcon in a wildland portion of the study area, which fledged a remarkable *four* young (**Figure 11**). As in prior years, we received scattered reports of Peregrine

Falcons in highly urban/“downtown” settings within the study area, but difficulty of observing their rooftop nest sites precluded our confirming these as successful.

Figure 11. Left: Kestrel nestlings in cavity nest in Burbank. Photo credit: Greg Slak. Right: Peregrine Falcon juveniles in nest at Griffith Park. Photo credit: Petyr.Whisky@gmail.com

No confirmed territories of Turkey Vultures, Western Screech-owls or Barn Owls were documented in 2022, but we made no particular effort to find these cryptic species (soaring Turkey Vultures were observed in several areas, as in prior years).

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