LOS ANGELES RAPTOR STUDY

2022 Report [Final]

Red-shouldered hawk pair copulating in Franklin Canyon.
This pair likely maintained a nest nearby that was never found in 2022,
illustrating the difficulty in finding nests of this secretive species.
Photo credit: Marc Millstein

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September 13, 2022

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ACKNOWLEDGEMENTS

This project was made possible through the vision and support of Friends of Griffith Park, in particular Gerry Hans, [President, Science and Conservation]. Survey volunteers conducted much of the fieldwork, and provided invaluable ecological information that would have been otherwise difficult to obtain. In particular, we wish to thank the volunteers who completed our training session and tracked active nests for 2022, including Debbie Almo, Dayna Anthony, Adrine Arakelian, Beth Armstrong-Shikano, Katie Barrett, Kathryn Barton, Jenn Bastian, Natalie Beckman-Smith, Laurie Bernhard, Shelley Billik, Reza Bloomer, Evan Boucher, Karen Boyarsky, Allison Brooker, Mary Brooks, Tad Brown, Carrie Brown-Kornarens, Ann Brunner, Carol Brusha, Ron Brusha, Kent Bullard, Andrea Cavanaugh, Taylor Chestnut, Zoe Chodosh, Carolyn Canterbury, Kali Ciesemier, Chip Clements, Akiko Crawford, Ari Cuellar, Guido Cuellar, Kchris deGelsey, Amanda demeritt, Traci DeWilde, Lillian Diaz-Przybyl, Ann Dittmer, Julie Drake, Sean Dunagan, Lee Dunkman, George Dutton, Debbie Faigen, Mickey Faigen, Lynn Ferro, Adriana Franco, Lina Gallucci, Joseph Garibay, Linda Gase, Shelley Gayton, Julia Glassman, Pilar Gonzalez, Stephanie Green, Robert Hagbom, Mari Halliday, William Hallstrom, Kat Halsey, Gohar Hamo, Gerry Hans, Sara Harris, Claudia Herrera-Lowry, Cyndi Hubach, Mark Hunter, Katherine Izumi, Jeffrey Jaimi, FeiFei Jiang, Penelope Jones, Rachel Kaplan, Nurit Katz, Darius Kay, Paul Kaye, Suzanne Kelly, Liz Kennedy, Ken Klotzle, Diana Kreshek, Marisa Kuizenga, Peter Lennon, Joanne Lin, Trevor Lyon, Greg Macek, Alex MacInnis, Lisa Marlowe-Car, Wolfgang Matthies, Sue Matz, Nancy/Marley McKinse, Tracy Mezzatesta, Robert Montalbano, Summer Moore, Andrew Mosema, Kris Mukai, Merigan Mulhern, David Mull, Corey Nickerson, Elinor Nissley, Harry Pallenberg, Michael Perry, Caitlin Pohl, William Ramirez-Watson, Danielle Rayne, Steven Recinos, Gary Regester, Lin Rhys, Susana Rinderle, JoAnna Rodriguez, Sarah James Rogers, Jenn Rose, Jeremy Rosenberg, Helene Rotolo, Elizabeth Rowin, Lydia Sanchez, Paul Sauter, Dale Schafer, Sharleen Schwartz, Susie Shapiro, Robin Share, Nancy Simpson, Eric Smith, Espirit Smith, Morrine Sosnow, Ethan Stangel, Susan Sterr, Susan Streaser, James Strzelinski, Caroline Su, Frances Tait, Joseph Taylor, Stan Thompson, Annie Thornton, Lynne Toby, Linda Topper, Gabrielle Untz, Kristina Vargas, Lisa Vebber, Jasmin Velasquez, Jen Wang, Julia Wasson, Deborah Weirick, Michelle West, Amy White, Debra Wilbur, Heather Wilson, Angela Woodside, Corrin Yep, George Young, Yu Rujin, and Julia Zepka.

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 2022, we continued monitoring within our 2021 study area (including Sepulveda Basin, Baldwin Hills, and Glendale), and again increased the number of monitored territories for the sixth year of the Griffith Park Nesting Raptor Survey (est. 2017). In 2022, we re-visited 433 territories from 2021 (185 Cooper's Hawk territories, 161 Red-tailed Hawk, 45 Red-shouldered Hawk, 42 Great Horned Owl, 2 American Kestrel territories and 1 Peregrine Falcon territory), and located additional territories (most with active nests) for 27 "new" Cooper's Hawk pairs, 13 for Great Horned Owl, 9 for Red-tailed Hawk, and 5 for Red-shouldered Hawk (not including "species switches", such as an owl taking over a hawk nest). As in prior years, we were able to confirm as active 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.

We again confirmed no active Western Screech-owl or Barn Owl nests, and while we confirmed a single Peregrine Falcon nest, we confirmed no nests of American Kestrel in 2022. As in 2021, 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.

In 2022, we have re-analyzed nest occupancy, re-use, and productivity, and present the results from the past three years (since 2020, when survey effort increased greatly, owing to the COVID-19 pandemic reducing traffic allowing us to more efficiently explore the entire study area). These nesting patterns across species are difficult to summarize and are described in the text. We also compile examples of nest trees being severely trimmed (or removed altogether), which for Red-tailed Hawks again resulted in pairs leaving these territories and not re-discovered during the season.

We 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 2022 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), 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 here. 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.

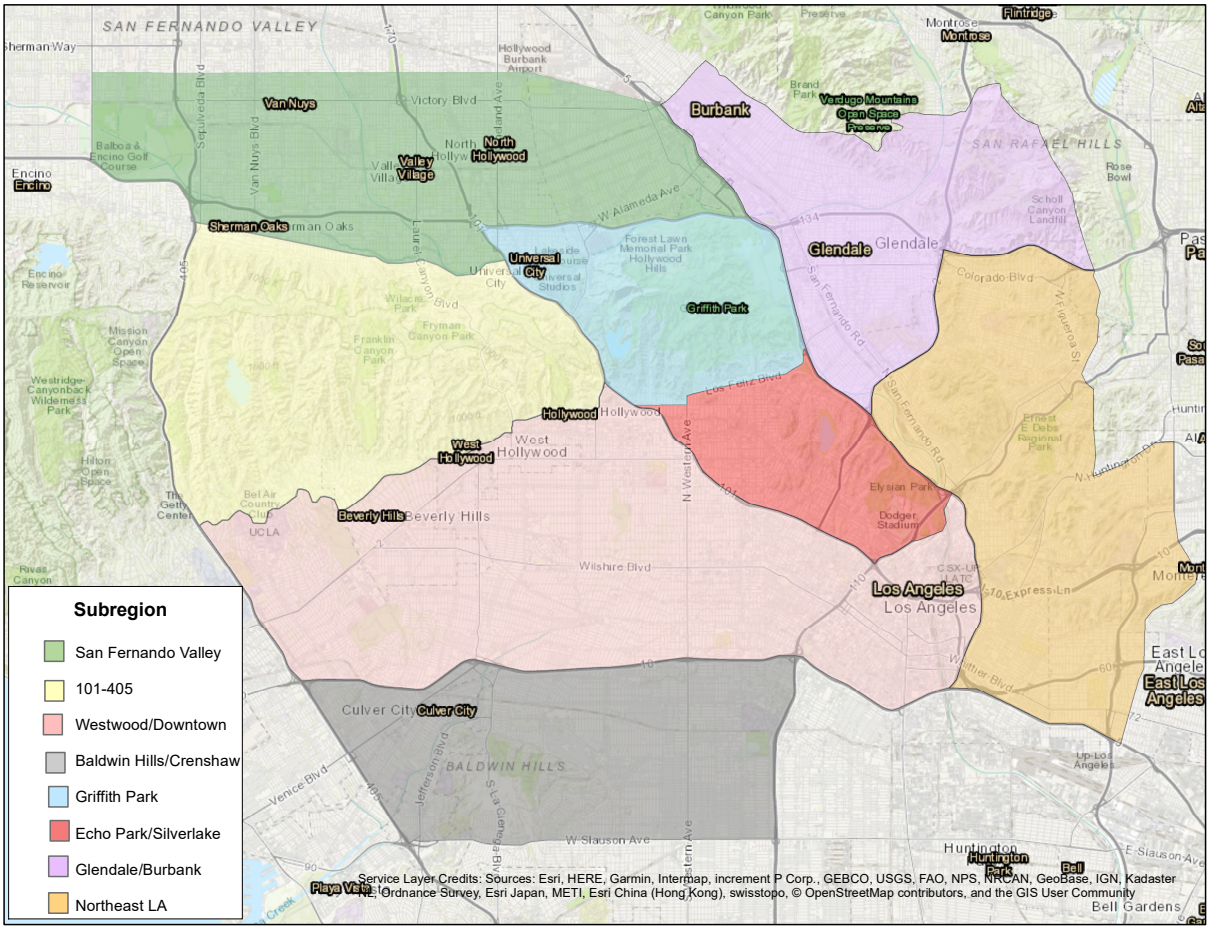

Figure 1. Study area used in 2022. In addition to the areas shown, we monitored a handful of nests outside the study area, though we generally did not include these in the quantitative analysis below unless they were close to the borders of the study area and likely foraged here during the breeding season.

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 Griffith Park and the central core of Los Angeles. 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.

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. 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 does not regularly nest 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. As of 2022, the Study Area extends 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**). A handful of raptor nests just outside this area were monitored by volunteers (e.g., Encino, Pasadena, Calabasas), but we did not specifically search for nests in these areas.

While most nests were found on private property (mainly in residential areas), important public land managers for raptor nests in the study area include the Los Angeles Department of Recreation and Parks, which manages Griffith Park, Elysian Park, Echo Park, Debs Park, and Balboa Park, as well as hiking/open space areas (including Runyon Canyon) 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 operate in the remaining open space of the eastern Santa Monica Mountains (e.g., Mountains Recreation and Conservation Authority). However, most nesting sites monitored were found around single-family homes and yards, and many nests were located in street trees, backyard trees, or those along utility easements through residential areas. The street trees are maintained by the various cities in the study area – Los Angeles, Culver City, Beverly Hills, West Hollywood, Burbank, and Glendale.

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 effects 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)[1], with above-average high temperature spikes in late May and mid-June (coinciding with local raptor fledging); rainfall in winter 2021-2022 was below average, but not extremely so (12.4 inches)[2].

[1] http://www.laalmanac.com/weather/we09a.php
[2] https://www.accuweather.com/en/us/los-angeles/90012/may-weather/347625?year=2021

As in prior years, we were denied access to several large areas of interest, including the large protected habitat area around Stone Canyon Reservoir (Los Angeles Dept. of Water and Power), which has been closed to birders/researchers for many years, Hollywood Bowl, and portions of the Los Angeles Zoo and Forest Lawn Cemetery-Hollywood Hills.

2.2 Survey Methods

Dan Cooper, Courtney McCammon, Nurit Katz, and Gerry Hans conducted opportunistic surveys in the Study Area during February-March 2022 to document the status of known and suspected raptor nests, which continued through the spring and summer. We attempted to maintain the high level of coverage afforded to the Study Area in 2020 and 2021, 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 2021, we (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.

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 one virtual (Zoom) training session, which was well-attended by volunteer "community-scientists" in late winter (February 19, 2022), and by the end of March, we had more than 400 potential raptor nests/territories located, and the over 100 trained volunteers had started their bi-monthly visits. 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 photograph if possible) by project staff to ensure data reliability and support volunteer training. Completed data sheets were kept in a central location for easy access 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.

As in 2021, McCammon input the Griffith Park Raptor Survey nest data into NestWatch in order to contribute to a nation-wide data set increasing our understanding of differences and similarities among hawk species on a larger scale. While NestWatch is a citizen science tool

used by the public in monitoring bird nests globally, we have not fully implemented it in the study. While our data is mostly used to support other raptor monitoring programs and to provide comparative data to fellow researchers, and the public cannot view the location of any nests tracked through the LA Raptor Study, safeguards provided by NestWatch appear to be sufficient such that we will likely convert the data collection to NestWatch in 2023.

2.3 Classifying Nest Structures and Territories

We largely maintained our definitions and classification of nests and territories from 2020, to account for new information learned through our more intensive monitoring and nest-searching. We continued (from 2020) our focus on territories as well as 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/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 early in the season within the territory near a known nest, but no 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 did not have enough observations to make a determination of success or status due to scheduling/access issues.

As in 2020 and 2021, we maximized our effort to determine the breeding status of territories where nests had not been located, but where we found a pair of raptors exhibiting breeding behavior such as tandem flights, copulation, stick-carrying, etc.; 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 included as "active territories" those areas where we found 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 later confirmed as "nests" and assigned a nest number when a physical nest (appropriate to the species and clearly from the current year) was located.

3.0 RESULTS

A spreadsheet with location information will be provided to Friends of Griffith Park (FoGP) separately due to the sensitive nature of the data. FoGP shares nest locations with park managers to encourage them to avoid disturbances during nesting season, including filming and tree maintenance.

3.1 Nest Use, Re-Use and Success

By 2022, our rate of finding new nests within the study area has slowed from 2020 and 2021, such that we added new nests in 2022 as follows: Red-tailed Hawk (6), Red-shouldered Hawk (4), Cooper's Hawk (26), and Great Horned Owl (7). These numbers don't include new (for 2022) territories where nests were suspected, or known territories where we had pairs (or even juveniles) in the past but only discovered physical nests in 2022. Looking at territories (some of which had nests, but not all), we located additional territories for 27 "new" Cooper's Hawk pairs, 13 for Great Horned Owl, 9 for Red-tailed Hawk, and 5 for Red-shouldered Hawk (not including "species switches", such as an owl taking over a hawk nest). This may be contrasted with 2021, when we found *35* new Red-tail nests alone.

This year (2022), we re-analyzed our data from all six years of territory re-use and success for the three focal hawk species and for Great Horned Owl in order to present these results in a more consistent, quantitative manner. 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.

We intend to analyze nest *structure* re-use in the future, as the multiple years of the study are presenting unexpected analytical challenges; for example, determining how to best consider a nest structure "re-used", particularly if a pair skipped using it for a year (or more), then returned to use it, re-built nests, and those built a few feet away in the same tree.

Looking at each species, we found that Red-tailed Hawks maintained fewer active territories in 2022 than the year prior, and 2022 saw the fewest fledged nests over the past three years, with several dozen pairs either absent from known territories, or abandoning nests midway through the season (**Figure 2**).

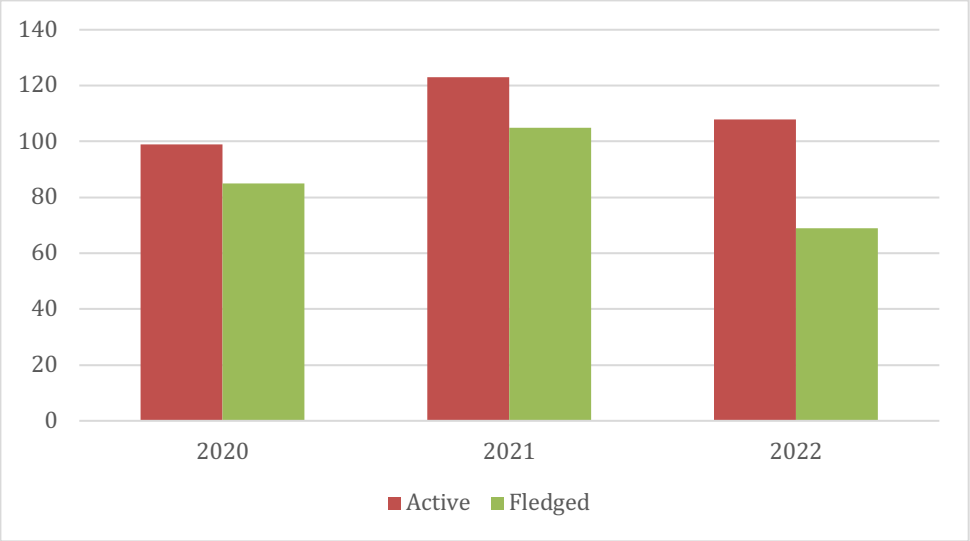

Figure 2. Red-tailed Hawk active nests and outcome, 2020-22. 2022 saw the fewest nests fledge of the past three years, though the number of *active* (occupied) nests monitored was intermediate between the two prior years. This suggests a relatively large number of nest failures occurred with this species in 2022.

Cooper's Hawks also maintained fewer territories in 2022 than in the two prior years, and fledged fewer young than in 2021, but *proportionately more* of these 2022 nests fledged young than in prior years (**Figure 3**) (in contrast to the pattern with Red-tailed Hawk, above).

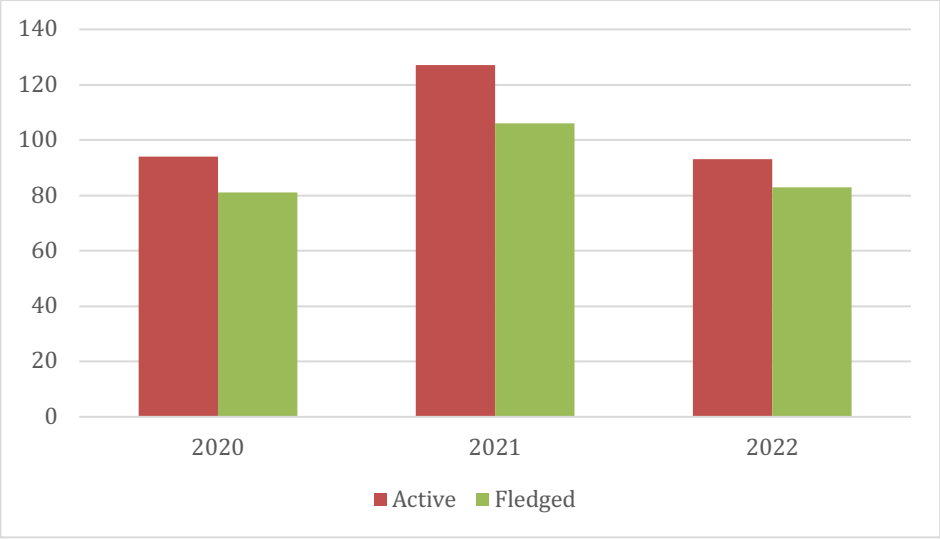

Figure 3. Cooper's Hawk active nests and outcome, 2020-22. 2022 saw the fewest active nests over the past three years, though proportionately *more* fledged versus the two prior years.

For Red-shouldered Hawk, 2022 saw more active territories, but roughly the same number of active nests fledged young, resulting in proportionately lower fledging rate per nest (**Figure 4**).

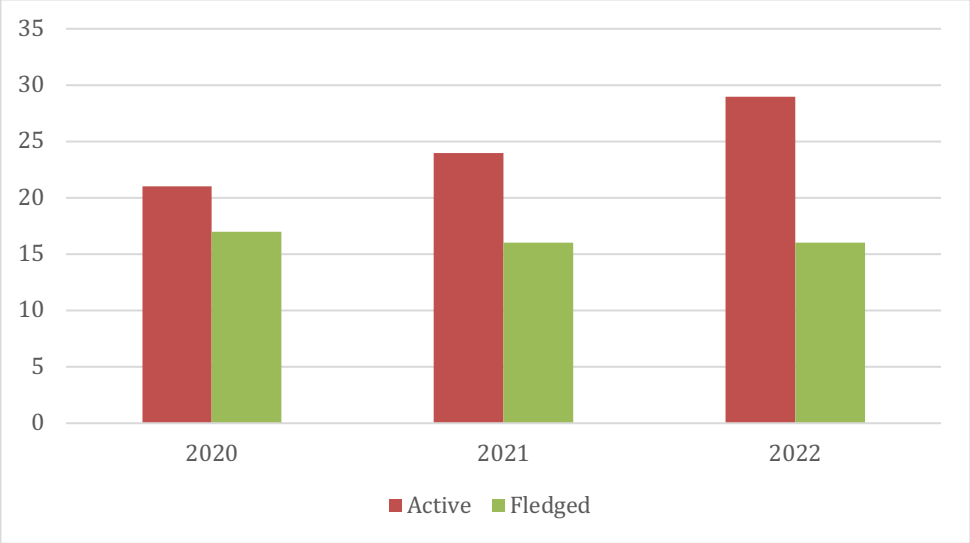

Figure 4. Red-shouldered Hawk active nests and outcome, 2020-22. 2022 saw the most active nests over the past three years, though the number of fledglings produced has remained relatively constant (resulting in a lower fledging rate over time).

For Great Horned Owl, 29 active territories were monitored (the most since the start of the project), and as in prior years, most (28) were deemed to have fledged. However, most owl territories were found by the presence of young; we did not attempt to search for owls during the study.

The number of territories that fledged young for each species (of the total active in that year is summarized in **Figure 5**; "active" implies some breeding activity at the nest). The peak in each species' fledging rates was higher in different years, but 2020 showed the highest rate of fledging *overall* across species (84%). The Red-tailed Hawk has seen the highest proportion of fledged young of the three hawk species analyzed, with at least one young at 77% of active territories monitored across the five most recent years (2018-22; SD +/- 9%). The Cooper's Hawk had a 74% fledging rate within active territories (SD +/- 17%), and the Red-shouldered Hawk had 70% rate (SD +/- 12%). As noted above, we do not consider this metric reliable for the Great Horned Owl, since most of our nesting observations were purely incidental, and we made no effort to search for or monitor territories/pairs unless a nest was found (vs. diurnal raptors, which we tried to track visually until we found a nest).

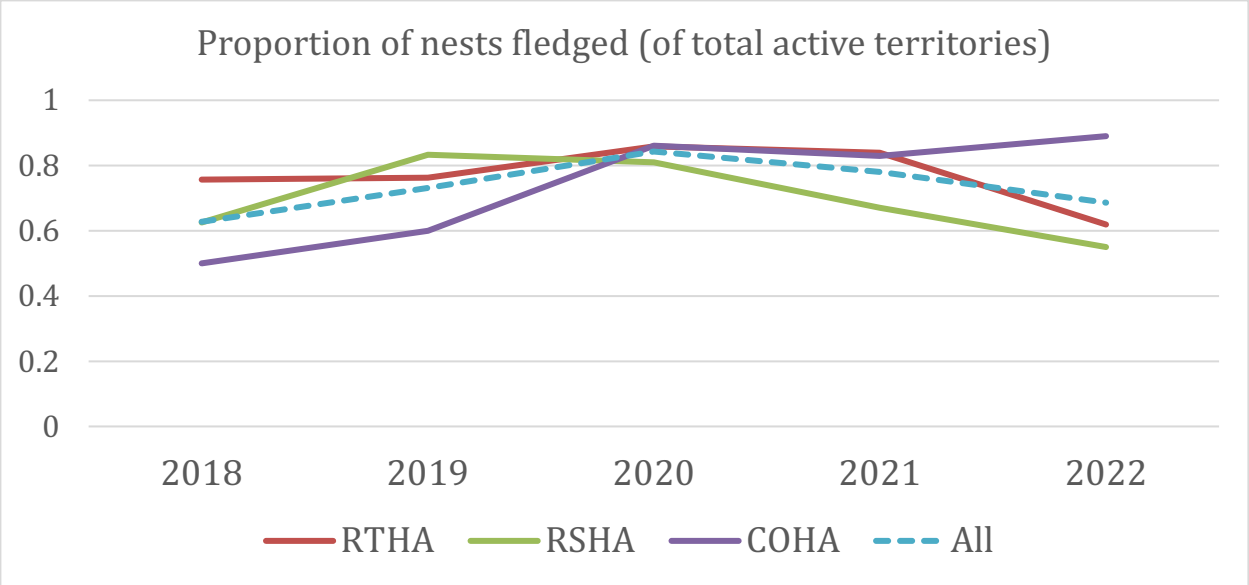

Figure 5. Annual number of territories that fledged young for each species, 2018-2022. The first year of the study (2017) was dropped due to inconsistency in checking for outcome across each species.

"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; see above). *Fewer than half* (45%) the Cooper's Hawk territories active in 2021 had birds in 2022, which contrasts with the past two years, both of which saw > 60% re-occupancy of territories. This suggests that a majority of the local Cooper's Hawk pairs essentially "took the year off", for reasons that are unclear.

Red-tailed Hawk re-occupancy also dipped, but less dramatically, from c. 76% in both 2020 and 2021, to c. 70% in 2022. Red-shouldered Hawk, with far fewer nests, showed a different pattern than the two more common hawks, particularly between the 2021-22 breeding seasons, when occupancy *increased*. This illustrates the variation among raptor species within the Los Angeles area, most of which nearly overlap territories with at least one other raptor species. However, we encountered far fewer territories of Red-shouldered Hawk each year, so these data may owe their variation to a much smaller sample size.

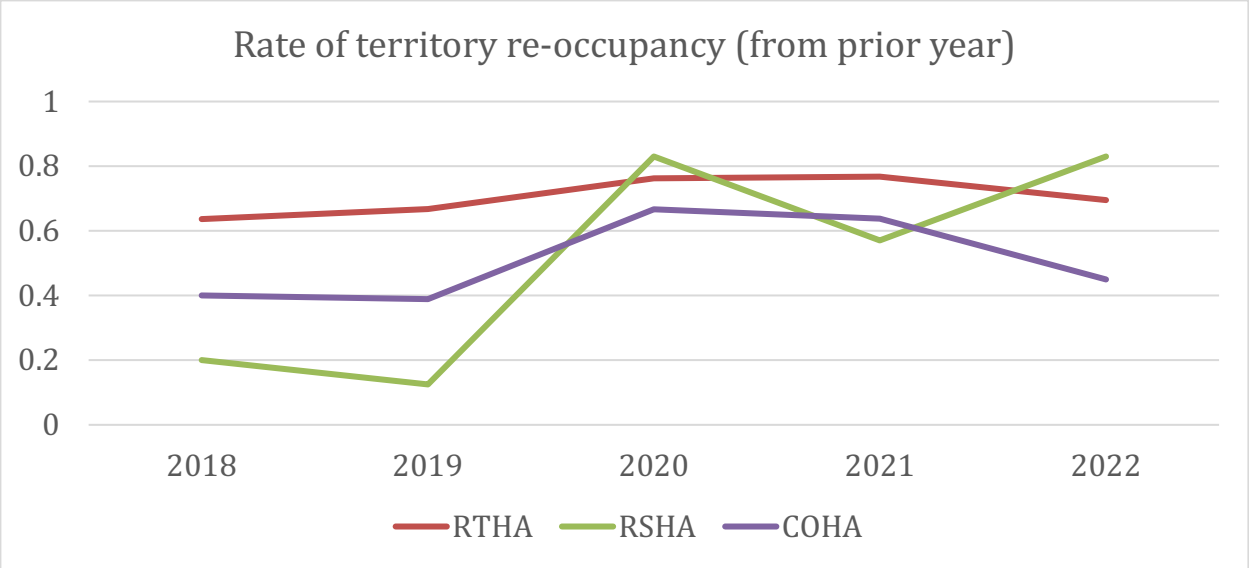

Figure 6. Annual "re-occupancy rates" of territories for the three focal hawk species, 2018-2022. This shows a strikingly similar pattern of re-occupancy for Red-tailed Hawk and Cooper's Hawk territories (albeit at different "base rates"), but a somewhat different pattern for Red-shouldered Hawk.

We compare territory success (via fledging rate) year to year in **Figure 7**, which shows that roughly 60% of Red-tailed Hawk that fledged young in a given year also fledged young the following year (the highest of all four focal species), and that this varied from a low of 51.4% (2021-2022) to 75.9% (2019-2020). This variation was much higher for Red-shouldered Hawk (20% - 100% fledging rate from year to year), and the mean was lower (49%). An average of 41% of Cooper's Hawk nests fledged the year after they were active (range 27% - 58%; peak in 2021), and only 39% of Great Horned Owls fledged the following year over the six years of the study.

Again, these numbers should be analyzed with caution, since the sample sizes of certain species in certain years was very low (< 5 nests in several cases), such that 2021 and 2022 probably represent the most accurate patterns (given the surge in nests found in 2020, which has remained high).

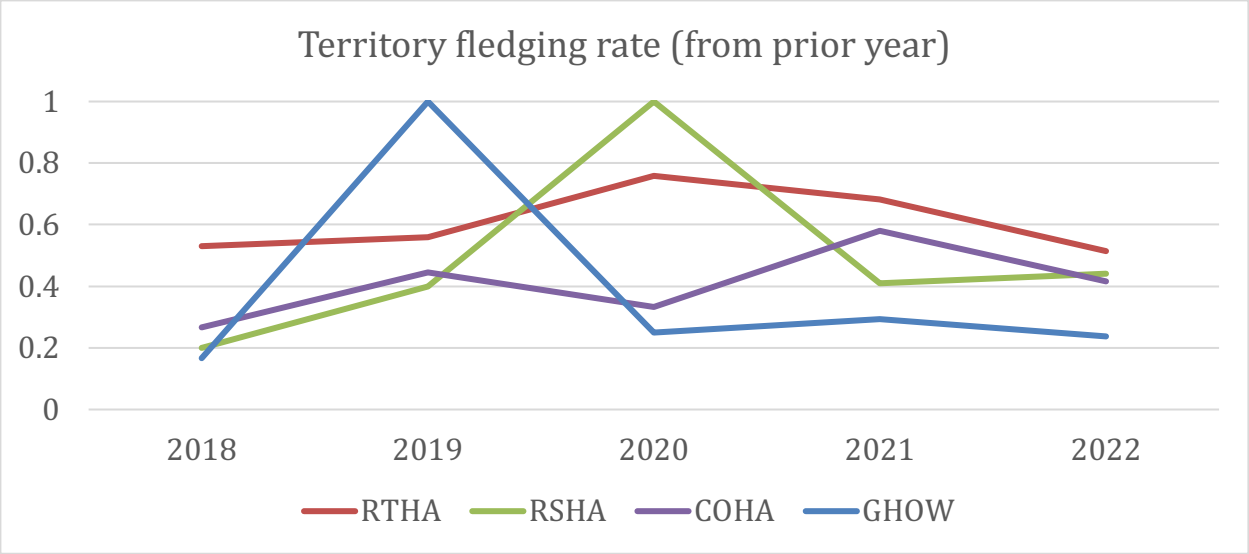

Figure 7. Annual nesting success (fledging rate) on territories that had been active the prior year, 2018-2022. Much of this variation may be due to very small sample sizes, particularly in the years 2018 and 2019.

3.2 Nest Productivity

Across all focal species, nest productivity peaked in 2020, but the differences between years was slight, and likely not statistically significant (**Figure 8**). Cooper's Hawk consistently fledged the highest mean number of chicks per (successful) nest[3], with an average of 2.43 young from 2018-2022. Red-tailed Hawk had the next-highest rate (1.92), followed by Great Horned Owl (1.89), and Red-shouldered Hawk (1.6).

[3] 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 necessarily varied. This was particularly true for Cooper's Hawks. Thus, we took the conservative approach here and only included nests with one or more young to assess productivity.

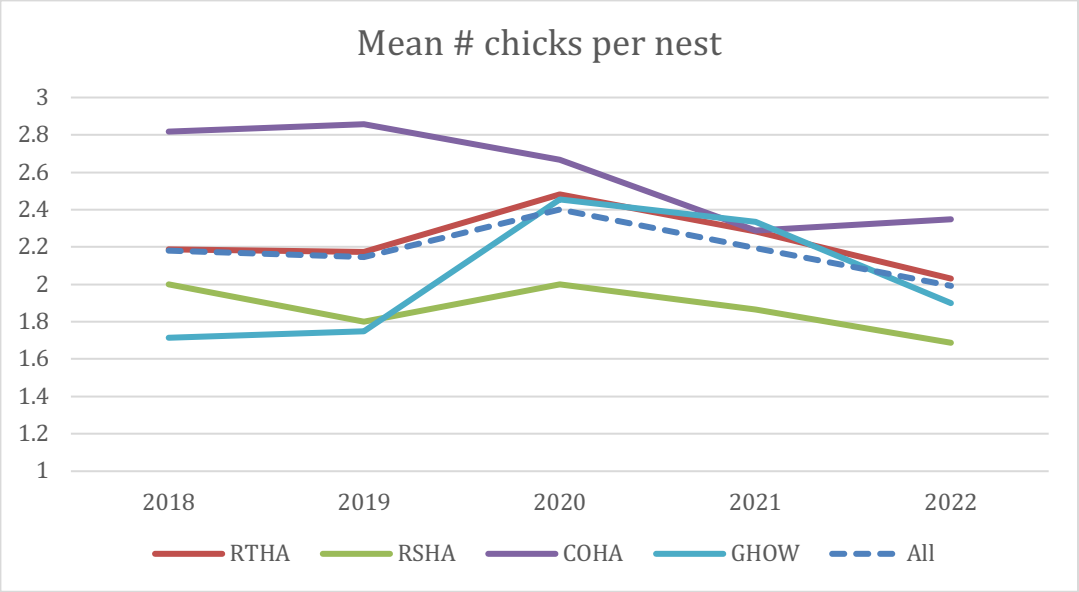

Figure 8. Nest productivity (number of chicks per nest[4]), 2018-2022. The apparent drop in productivity after 2020 may not actually be statistically significant, so inter-annual differences should be interpreted with care due to small sample size. Still, it is interesting that all four of our focal species saw drops in productivity after 2020, with three continuing to 2022.

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**)[5]. Evidently, the years following the driest winters (i.e., 2018, 2021 and 2022) all saw >20% of Red-tailed Hawk nests with single chicks (no such pattern was observed with Cooper's Hawks), which conforms to recent findings looking at precipitation and Northern Goshawk (*Accipiter gentilis*) nests (Bangerter et al. 2021).

[4] We include nests with large chicks that appear nearly fledged, as well as confirmed fledged chicks (due to the difficulty of confirming fledging at all nests in the study).

[5] 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.

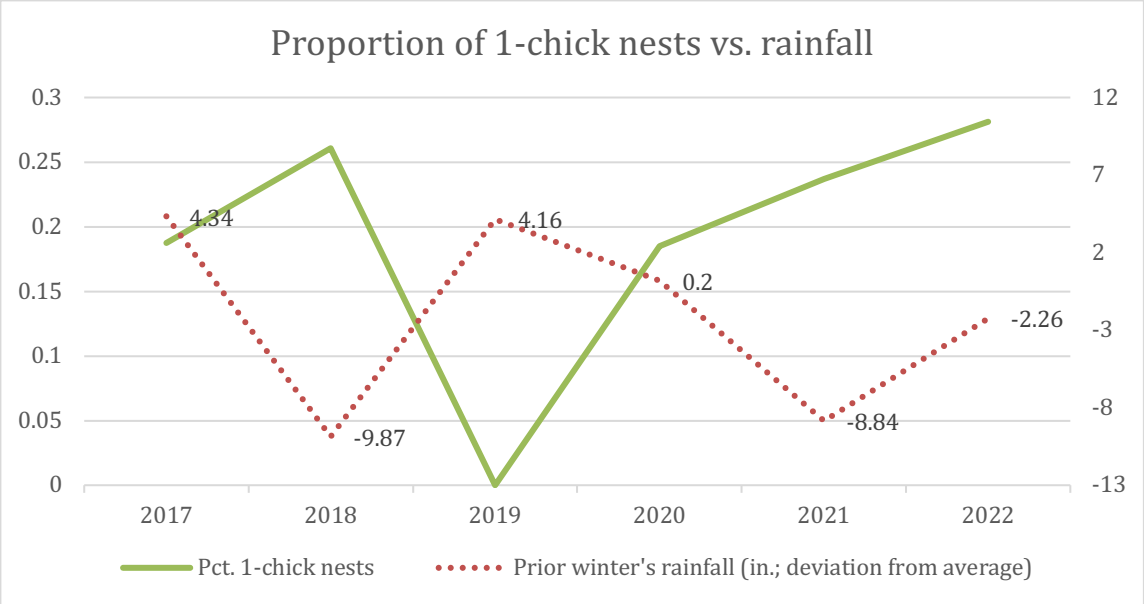

Figure 9. Proportion of single-chick nests of Red-tailed Hawks in relation to rainfall the *prior* winter. Rainfall measured from Downtown Los Angeles (see "Methods") and shown as a deviation from the c. 100-year average from the same location (see numbers at each year on the dotted red line).

3.3 Nesting Phenology

Based on prior years, Red-shouldered Hawk nestlings tend to appear a few weeks after those of the first Red-tailed Hawk chicks, and Cooper's Hawk nestlings appeared much later (c. 6 weeks after Red-tails). However, Cooper's Hawk chicks fledge in a relatively shorter amount of time as compared to Red-tailed or Red-shouldered Hawks, so all three hawk species have their mean first fledging dates in the same month (June). A future analysis will compare changes in the various stages across years.

3.4 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 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. It appears that in 2022, in contrast to prior years, we recorded *no active Red-tailed Hawks in the Sepulveda Basin, or anywhere on the San Fernando Valley floor portion of the study area*. And, while Cooper's Hawks were again found in numbers across the (urban) San Fernando Valley and in the Westwood-Downtown subregion, many 2021 territories in the San Fernando Valley were not occupied in 2022. Red-shouldered Hawks and Great

Horned Owls occur in much lower numbers and are more evenly distributed, but appear to avoid these more urban areas favored by Cooper's Hawks, occurring in more "woodsy" neighborhoods, often with historical creeks and very large, old trees.

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.

3.5 Failed Nests

As in past years, it may be instructive to review why the few failed nests did so. We summarize all Red-tailed Hawk nests believed to have failed, that were never initiated (within known territories), and that were apparently abandoned mid-season in **Table 1**. Unlike last year, when three Red-tailed Hawk pairs had their (prior year's) nest trees removed, only one Red-tailed Hawk nest tree had been trimmed prior to the start of the 2022 season (of 120+ active territories monitored in 2021)[6]; this large pine tree was in a large backyard in the Laurel Canyon neighborhood, and the owners may have been unaware of the presence of the raptor nest.

Otherwise, most inactive Red-tailed Hawk nests were still visible in the nest trees in 2022, even if the hawks were not around. In one case (RTHA-149 in Sherman Oaks), the nest was very much intact, but new home construction directly under the nest was ongoing in spring 2022, and may have been a factor in the pair not settling into that nest and breeding. No other Red-tailed Hawk nest had construction so close, though a handful of other species' nests (including inactive nests) had construction nearby (including a Great Horned Owl nest with nestlings, which was reported to the Department of Recreation of Parks when construction was discovered nearby in April).

We were also notified of the illegal trimming and removal of a long-standing Red-tailed Hawk nest in the Mt. Washington area (**Figure 10**) shortly after fledging (June 2022; not included in table due to timing being after young fledged), and of another trimming incident involving an active Cooper's Hawk nest in Los Feliz where the nesting stage was not determined at the time of trimming.

[6] In addition, we found several Cooper's Hawk nest trees had been trimmed prior to the start of the 2022 season (but after young fledged in 2021). We are not analyzing these here, because this species frequently shifts nests from year to year. No 2021 nest trees of Red-shouldered Hawk or Great Horned Owl were trimmed between the prior season and this one.

Figure 10. Nest tree in Mt. Washington area before (with Red-tailed hawks at nest) and after illegal nest removal. Photo credit: Nurit Katz

In 2022, Great Horned Owls took over just two Red-tailed Hawk nests, suggesting that they are not a major cause for hawk nest abandonment. We also observed Great Horned Owls take over a Cooper's Hawk nest in Sherman Oaks, which is a less common nest switch.

In an effort to continue outreach on tree-trimming and removal, McCammon and Katz spoke during a workshop on "Tree Care for Birds and Wildlife" for local arborists hosted by the Western Chapter International Society of Arboriculture, Cooper spoke at a meeting on urban raptors hosted by the Westlake Village Garden Club (located west of our study area), and Katz spoke to a couple Los Angeles Neighborhood Councils. McCammon and Cooper also helped organize and participated in a workshop on urban nest monitoring at the American Ornithological Society's 2022 meeting in Puerto Rico. Hopefully, ongoing education efforts like these will improve tree trimming practices in the region, and result in less disturbance for raptors. We observed one example of these practices in action, when a sign was observed on a Cooper's Hawk nest tree in Culver City indicating that tree trimming was delayed due to nesting birds (**Figure 11**).

Figure 11. Responsible tree-trimming example from a Cooper's Hawk nest tree in Culver City. Tree-trimming was delayed until after nesting season. Photo credit: Nurit Katz

We continue to suspect rodenticide in the deaths and sickness of several adult and fledgling raptors, but many other factors could be at work, which are yet to be explored. Notably, in 2022, we again failed to locate alternate (new) nests for either of the 2021 "trimmed nests", nor did we observe Red-tailed Hawk pairs (or any other species) in these territories.

Table 1. Observations of failed/abandoned Red-tailed Hawk nests (does not include territories where nesting was suspected but where no nest has ever been found, or where observation time/number of visits were insufficient to determine success[7]). All nests listed were observed intact during the 2022 breeding season unless noted.

Territory	Location	Explanation
RTHA-003	Griffith Park	Unk.; no activity.
RTHA-010	Griffith Park	Unk.; apparently abandoned mid-May with young chicks in nest.
RTHA-065	Silverlake	Unk.; no activity.
RTHA-114	Mt. Washington	Unk.; no activity.
RTHA-117	Highland Park	Unk.; no activity after incubation.
RTHA-149	Sherman Oaks	Pair never settled on (existing) nest. Home construction under nest tree noted May 2022 may have been a factor.
RTHA-153	Laurel Canyon	Unk.; single adult nearby.
RTHA-195	Los Feliz	Unk.; no activity.
RTHA-198	Burbank	Unk.; no activity.
RTHA-201	Griffith Park	Unk.; pair never settled on nest.
RTHA-205	Sepulveda Basin	GHOW in nest.
RTHA-211	Sepulveda Pass	Unk.; no activity.
RTHA-217	Elysian Park	Unk.; no activity after incubation.
RTHA-227	Sepulveda Basin	Unk.; no activity.
RTHA-228	Sherman Oaks	Unk.; no activity.
RTHA-249	Elysian Park	Unk.; single adult nearby.
RTHA-253	Beverly Hills	Unk.; no activity.
RTHA-257	West L.A.	Unk.; no activity.
RTHA-258	Mt. Washington	Unk.; no activity after incubation.
RTHA-310	Laurel Canyon	Nest tree severely trimmed, nest gone, no adults around.
RTHA-334	North Hollywood	Unk.; pair never settled on nest.
RTHA-339	East L.A.	Unk.; pair never settled on nest.
RTHA-340	Van Nuys	Unk.; no activity after incubation.
RTHA-343	Highland Park	Tree still there but entire nest gone (possibly blew out?); no adults around.
RTHA-367	Sepulveda Basin	Unk.; no activity after incubation.
RTHA-428	Studio City	Unk.; single adult nearby.
RTHA-437	Sherman Oaks	Unk.; no activity.
RTHA-438	Mt. Washington	Unk.; single adult nearby.

[7] RTHA-467 was not checked during the 2022 season, but a post-season visit (8/15/22) revealed that the nest tree (and several surrounding trees) had been severely trimmed, and the nest gone, with no whitewash on the ground. This suggests that trimming may have occurred prior to the start of the 2022 season, but without evidence and dates, it is different to speculate what may have happened.

RTHA-443	Highland Park	Nest tree branch broke, injuring/killing chicks.
RTHA-450	Lincoln Hts.	Unk.; no activity.
RTHA-468	Lincoln Hts.	Unk.; no activity.
RTHA-469	Baldwin Hills	Unk.; no activity.
RTHA-493	Culver City	Unk.; no activity; tree intact but nest mostly gone.
RTHA-498	Griffith Park	Unk.; no activity.
RTHA-512	Laurel Canyon	GHOW took over nest.
RTHA-528	Lincoln Hts.	Unk.; no activity; tree intact but nest gone.
RTHA-535	Echo Park	Unk.; no activity.
RTHA-547	Sepulveda Basin	Unk.; no activity.
RTHA-548	Sepulveda Basin	Unk.; no activity.

3.6 Raptor Mortality, Rescue, and Rehabilitation

One of the leading causes of death for raptors in urban areas are collisions. In 2022 a Great Horned Owl was found dead due to vehicle collision on Sunset Blvd. near Bel Air, and a dead Cooper's Hawk juvenile which had been flattened by a vehicle was observed in one of the nesting territories in mid-City. 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. Although some injured raptors did not survive their injuries, as in the prior years we did have a successful rescue and rehabilitation. A female juvenile Red-tailed Hawk was found by a volunteer injured on a freeway overpass in Hollywood near the nest tree in June. McCammon and Katz coordinated a rescue and the juvenile was transported to Ojai Raptor Center. The hawk had a right femoral fracture, bilateral coracosternal luxtions (coracoid dislocated from the sternum) and mild right eye trauma. With veterinary care and rehabilitation, she was able to recover and was released by Katz and others back to the area in early August (**Figure 12**).

Figure 12. Red-tailed hawk rescued and released after rehabilitation. Photo credits left to right: Asa Shumskas, Julie Drake, Nurit Katz

Another major threat to raptors is rodenticide. In 2022, a dead Red-shouldered Hawk (male) was collected by Hans two blocks from an active nest in a residential neighborhood near Griffith Park. FoGP sent the carcass to UC Davis Veterinary Laboratory for full testing. Three second-generation anticoagulant rodenticide agents (SGAR) were confirmed, suggesting a likely cause, although coagulopathy was not seen during the necropsy. A dead young Great Horned Owl was collected from a resident's backyard swimming pool in Studio City, and the death is suspected to be the result of rodenticide poisoning, which often drives animals to seek water. The owl will be tested for rodenticides. SGARs are the category now banned for most uses with the passage of legislation with effective date of January 1, 2021, so this was an especially alarming finding.

Disease can also impact urban raptors, including Trichomoniasis which is spread by members of the family Columbidae including domestic Rock Pigeon. A juvenile Cooper's Hawk was rescued in Echo Park in July after a window collision and had a burst crop (which can be due to Trichomoniasis infection). After transport it was confirmed that the juvenile had Trichomoniasis and although the injuries could have been repaired, it unfortunately had to be euthanized due to the disease.

During the prior winter, a dead juvenile Red-tailed Hawk was found in Rancho Park by a resident, cause of death unknown. The specimen was given to the Los Angeles County Museum of Natural History, Department of Ornithology.

In 2022, McCammon and Katz developed a card for Los Angeles City Recreation and Parks employees with key wildlife rescue information which aided in coordination. In 2022 we also began working with the LA Animal Services SMART team

(https://www.laanimalservices.com/about-us-2/smart/) to assist in more challenging rescues. In 2022, SMART "re-nested[8]" a Red-tailed Hawk nestling at one of the study nests, and re-nested a Great Horned Owl owlet that was on the ground in a busy park and had fledged early.

3.4 Rare Species

We confirmed a single nest of Peregrine Falcon in a wildland portion of the study area (which fledged four young!). 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 this. Incidental sightings of American Kestrel were again made in East L.A. (incl. a copulating pair at Evergreen Cemetery, and singles at two locations in El Sereno in early summer). A kestrel pair also was seen hunting and copulating next to a previously-used building cavity nest site in Downtown Los Angeles (**Figure 13**), but the nest did not appear active after, such that upon repeated visits no juveniles were observed in the area. It does appear that again, the far southeastern portion of the study area may be a productive area to search for this declining species in future years, though it remains essentially marginal as a breeder here.

Figure 13. Kestrel pair in downtown Los Angeles. Photo credit: Nurit Katz

[8] 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.

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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APPENDIX.

Maps of nest sites, by subregion.

[Please contact Friends of Griffith Park for updated maps]