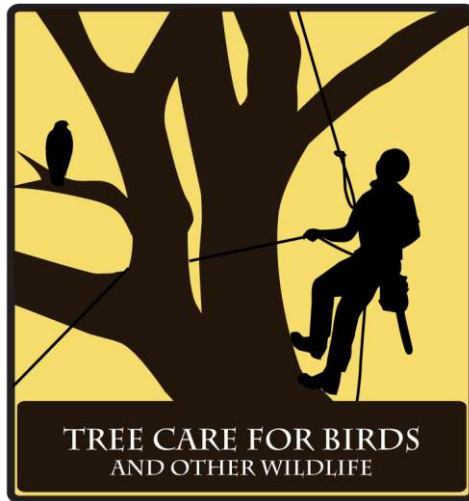


Tree Care for Wildlife Best Management Practices

with Western Chapter ISA Appendices



Corey Bassett, Kara Donohue, and Ryan Gilpin



Tree Care for Birds is a program of the Western Chapter of the International Society of Arboriculture. Paper copies of these Best Management Practices are available for purchase at www.wcisa.net at an affordable cost thanks to the generous support of West Coast Arborists, Inc and the Western Chapter.

Electronic PDFs of this material are freely available at www.treecareforbirds.com. Contact bmp@treecareforbirds.com for access to the text, illustrations, comments, or questions. Illustrations were created by Brian French, Monica Edwards, and Catie Michel. This version was published on April 13, 2022.

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Acknowledgements

We, the authors, would like to thank the many extended teams of experts who have contributed to this publication. This group came together across traditional disciplinary boundaries, representing many areas of expertise and organizations with diverse purposes across California, Arizona, Nevada, and Hawai'i, to establish guidelines for tree care and wildlife in this region. This publication is a significant revision and expansion of the first guidelines, *Tree Care for Birds & Other Wildlife: Best Management Practices in California*, published in 2018.

Too many professionals have contributed resources and guidance for us to enumerate here. We especially thank those who contributed through the public comment process. You helped to improve this document's content and usability for all professionals who will read and apply it.

Many thanks to the cohorts of biologists, agency staff, wildlife rehabilitators, and arborists from each state who contributed valuable local expertise to the making of this document. Each state appendix was authored and led by the following representatives from each state.

- Arizona: Beverly Babb and Jon Orona
- California: Kara Donohue, Ryan Gilpin, and Corey Bassett
- Hawai'i: Ilana Nimz
- Nevada: Doug Chang, Matt Flores, and Mike Volmer

We are grateful for the indispensable support of the Western Chapter International Society of Arboriculture in supporting the Tree Care for Birds and other Wildlife Program. For this publication, we thank them for opening and sharing their immense network of professionals throughout this region which enabled the creation of our state-specific working groups. They were also key in disseminating, sharing, and facilitating activities like our public comment period, as well as other key program administration activities.

We thank Gillian Martin, of Cavity Conservation Initiative, and Andy Trotter, of West Coast Arborists, Inc., for their visionary leadership and steadfast encouragement throughout this revision and expansion process. The Tree Care for Birds and other Wildlife Steering Committee has likewise supported and contributed to this document immeasurably.

Finally, we thank our past and present employers and supervisors at Southern California Edison, Nidus Consulting, Bartlett Tree Experts, and the University of British Columbia, for their support of our contribution and leadership to this important effort.

Corey, Kara, and Ryan

Purpose

This document was written to provide guidance to the tree care and landscape industry about how to minimize impacts to wildlife and manage wildlife habitat during tree work. Many wildlife species are in decline, due primarily to habitat loss and fragmentation, raising the importance of the work done by the tree care and landscape industry. Urban foresters create and manage habitat important to many resident and migratory wildlife, and most tree care workers and managers wish to act responsibly around wildlife. This document provides a general framework, coupled with regional examples for Arizona, California, Hawai'i, and Nevada, for how to minimize impacts to wildlife during tree care.

The federal, state, and local wildlife regulations are complex and carry significant consequences in terms of fines and public criticism. It is not always simple for tree care workers to understand how these layers of regulations and policy may apply to their work.

This document should be taken as guidance, and compliance is meant to be voluntary. These Best Management Practices (BMPs) are not meant to impose new regulations on the tree care industry, but rather aim to support wildlife and help those in the industry follow current laws and regulations.

Introduction

The tree care industry recognizes the importance of wildlife in the urban forest. Much of the guidance on industry standards includes discussions of wildlife, along with the challenges and opportunities for arborists working with wildlife. For instance, the Best Management Practices for Pruning (International Society of Arboriculture, 2019) recommends inspecting trees for signs of nesting wildlife prior to tree care, and lists managing wildlife habitat as a pruning objective. This document is designed specifically to address these challenges that arborists may face when balancing their work with care for wildlife and habitat.

Tree, shrub, and landscape care can disturb wildlife in a variety of ways. These activities may cause direct harm, such as injuring or killing wildlife or removing a nest with eggs or young wildlife within. However, some activities may cause indirect harm, such as leaving a nest intact but removing vegetation that protects it from exposure to weather or predators. Many factors go into whether tree care near nesting wildlife will be harmful, including wildlife biology, intensity and duration of work, and proximity of work to nests. The section [Minimizing Impacts to Wildlife](#) (*page 3*) outlines methodology for pre-work inspections and other practices that can help minimize the chances of killing, injuring, or otherwise impacting wildlife, but they cannot eliminate the

possibility. Similarly, these are only recommendations and should not be viewed as regulations or the only methods to minimize impacts to wildlife.

Pruning, removing, and planting trees alters habitat structure, but effective planting and maintenance of trees can both maintain existing habitat and create new ones to benefit wildlife. How tree decisions affect wildlife should be considered; for instance, removing dead branches because of risk should be balanced with the habitat value that the dead branches provide. Many species of wildlife depend on dead branches, especially cavity nesting wildlife. The section [Managing Wildlife Habitat](#) (page 19) outlines principles and ideas to consider when managing urban forests.

Thousands of species of wildlife migrate through or are residents of the United States. Much of the guidance provided in this document focuses on birds, because there are more state and federal laws focused on birds than the other groups of wildlife. Also, most adult wildlife are capable of leaving an area when they are disturbed, but nests with eggs and chicks are more vulnerable. However, when applicable, guidance for other taxa is provided, and many of the methods that will protect birds will provide protection and habitat for other species as well. In the section [Wildlife](#) (page 24), more information is provided about the different types and terminology used to describe wildlife.

This publication was created for arborists in the Western Chapter of the International Society of Arboriculture. The geographic area covered by this Chapter is [Arizona](#) (page 48), [California](#) (page 52), [Hawai'i](#) (page 59), and [Nevada](#) (page 64). However, the main body of this document is intended to be broad enough that these recommendations can be applied throughout the country, and perhaps internationally. For state specific wildlife issues, such as local laws and regulations and ecology, see the appropriate Appendix at the end of the document.

Minimizing Impacts to Wildlife

Not all tree care work poses the same level of risk to wildlife. Knowing how to prepare prior to work and how to act on site can help reduce impacts of tree care to wildlife. This section provides a step-by-step guide, divided into subsections on:

- Training
- Project Preparation
- Fieldwork
- Considerations for Work Performed Near Active Bird Nests
- Emergencies

Categories of tree care work are defined based on how likely workers are to encounter and impact wildlife. Each category has its own guidelines for what level of training and expertise may be most appropriate for each situation. [Table 1](#) (page 9) and [Figure 5](#) (page 14) bring these guidelines in this section together into a reference flowchart.

There are many ways an organization may minimize their impacts to wildlife. Some organizations may choose to develop a programmatic approach. For example, rather than evaluating BMP recommendations as they apply to each individual work site, a company program could assess their area as a whole for potential conflicts and develop a program specific to their activities and impacts. An organization with a robust program in place may not follow these BMPs. However, these BMPs can provide a starting point for an organization beginning to develop a program.

Training

In the field, tree care workers should be aware of wildlife and respond to their presence by involving those with the appropriate training to handle complex situations that may arise. Without training, tree care professionals may not be able to recognize and react properly to situations with the potential to harm wildlife. Each category of work will require involvement of professionals with different levels of training in order to assess and conduct work safely.

Three tiers of training and associated knowledge expectations:

- Tree care workers with awareness training have received a brief overview with general information on looking for signs of nesting wildlife, which may be specific to the work location. This awareness training can be provided by a **Wildlife Biologist** or **Wildlife Trained Arborist** at the project site during the daily job briefing, or more generally when unrelated to a specific project.
- **Wildlife Trained Arborists** are tree care workers with training and/or experience in the following: knowledge of wildlife protection regulations, determining habitat value, conducting pre-work nesting inspections, identifying signs of nesting wildlife, determining if nests are active (contain eggs or young wildlife), responding to wildlife emergencies, and contacting **Wildlife Biologists** when needed.
- **Wildlife Biologists** are knowledgeable and experienced in identifying wildlife species that may occur in an area, and are familiar with wildlife behavior, nesting requirements, tolerance to impacts, and suitable survey methods.

Training materials, such as an awareness training video, and other resources can be found at www.treecareforbirds.com.

Project Preparation

Preparation prior to visiting the site will help minimize impacts to nesting wildlife. The goals of the project preparation phase are to assess the breeding season and habitat value of a work site and use this information to select a Category for the fieldwork phase ([Table 1](#), page 9). Categories are based on two criteria: the time of year (breeding season or non-breeding season) and the habitat value of the work area (low, high, or sensitive). The breeding season and habitat value are two indicators for how likely wildlife are to be present at the work site and how vulnerable they could be to tree work impacts.

Breeding Season

To minimize impacts, it is critical to identify, avoid, and protect wildlife nests. Adult wildlife will likely flee when tree care workers arrive at a work area, allowing work to proceed. During breeding and nesting season, however, eggs and young wildlife are often immobile. Because they are vulnerable and stationary during this time period, nesting wildlife are likely to be impacted by tree and shrub care activities close by, either through exposure to the elements or through lack of parental care, such as regular feedings, because the activities are keeping the adults away from the area.

Nesting wildlife can be found in any type of habitat at any time of year. However, certain types of habitats (for example, riparian areas or nature preserves) are more likely to contain nesting wildlife, and wildlife are more likely to nest during certain times of the year. Pruning branches near a nest with eggs or young in it may cause the parents to abandon the nest. It may also expose the nest and young to the elements or predators. Disturbance may cause older young to prematurely bolt from the nest.

It is important to note that breeding seasons vary by factors such as location, elevation, and species, and that climate change will also likely impact the timing of breeding season in the future. Even if work is scheduled outside of the breeding season, it is important to actively look for nests and breeding wildlife activity.

Habitat Value

Different types of landscapes have habitats of different value to wildlife. Habitat value is defined here as the likelihood of finding wildlife using an area throughout the year. The habitat values listed in this document are low, high, and sensitive. These definitions are not all encompassing, and many projects occur in areas that are not easy to classify using the below descriptions. The

goal of classifying habitat is not to determine whether wildlife will nest in that location, but to be more aware of areas that are likely to have nesting wildlife. Even though wildlife do often nest in low value habitat areas, assessing the habitat value at a site during the project preparation phase can better identify a project's likelihood to impact breeding wildlife.



Figure 1. Low value habitat - areas where wildlife are less likely to nest such as areas with high human use, high impervious surfaces, low plant species diversity, far from water bodies, few mature trees, few dead and dying trees, and few/no wildlife observed. For example, an urban area with high coverage of hardscape such as this parking lot is a low value habitat.



Figure 2. High value habitat - areas where wildlife are likely to nest, such as areas with low human use, low impervious surfaces, high plant species diversity, high plant structural diversity, nearby bodies of water, many mature trees, many dead or dying trees, and/or abundant wildlife. For example, an open space used for non-intensive recreation, such as this park, has high value habitat.



Figure 3. Sensitive habitat - areas where wildlife are very likely to nest such as riparian areas, critical habitat, nature preserves, known locations of special status species, and areas of previous nesting. These areas are often intact ecosystems which will vary widely from place to place. See the state sections for description of sensitive habitats in Arizona, California, Nevada, and Hawai'i.

Determining habitat value of a site can be challenging. Early in the process, aerial photography and online mapping software can give arborists an idea of what to expect on their site. Later, visiting the site gives arborists a chance to update their impressions of the habitat value of the site. When working in potentially sensitive habitats, a desktop review can add further detail to the habitat value of the site.

Desktop Review

Conducting a desktop review of the biological resources potentially present at a project location can help identify the appropriate category prior to tree care activities. Sources of information include U.S. Fish and Wildlife Service (USFWS) Critical Habitat Online Mapper, public lands maps (USFS, BLM, State Parks, etc.), and local Audubon Society chapters. Some state agencies have databases available to the public with locations of sensitive wildlife. See the state-specific appendices for more information. Should a desktop review reveal the project

location is in or near USFWS designated critical habitat, special status species locations, or sensitive habitat, the project activities may require more caution. Prior to performing the work, also check to see if any special status species have been recently seen or are known to rely on the area. Google Street View is a useful tool for determining what an area may look like and what habitat may be present prior to a site visit.

Laws, local regulations, and policies may also exist and should be researched for individual areas prior to work. These laws and regulations tend to focus on whether wildlife were disturbed, injured, or killed. The agencies provide little information about what type of activities may be in violation of the laws. More information can be found in the [US Wildlife Laws](#) (page 35) and in the state appendices.

Work Categories

Tree care work can be roughly divided into three categories, based on the level of expertise and caution required to mitigate impacts to wildlife. The last step of the project preparation phase is to determine which category applies to the project in question, using information gathered during the desktop review stage on the habitat value and breeding season ([Table 1](#)). However, keep in mind that the level of expertise required for these projects may be dictated by other factors. Many construction projects with environmental permits will require **Wildlife Biologists** to be involved in the project, in which case one should be contacted rather than simply relying on the categories below.

Table 1. Determining Category

	Low value habitat	High value habitat	Sensitive habitat
Non-breeding season	Category 1	Category 2	Category 3
Breeding season	Category 2	Category 3	Category 3

Category 1 is low value habitat during the non-breeding season where nesting wildlife are least likely to be encountered. A pre-work inspection by a tree care worker with awareness training is recommended.

Category 2 covers two situations. The first is low value habitat during the breeding season where nesting wildlife are more likely to be encountered. The second is high value habitat during the non-breeding season where habitats valuable to wildlife are more likely to be encountered. A pre-work inspection by a **Wildlife Trained Arborist** is recommended.

Category 3 covers high value habitat during the breeding season or sensitive habitat at any time of the year, where nesting wildlife and habitats valuable to wildlife are more likely to be encountered. Generally, best practice for this category is to contact a **Wildlife Biologist** for direction, but companies who have taken a programmatic approach to protecting wildlife may be able to use a well-trained arborist to minimize impacts in these locations. The **Wildlife Biologist** will collect information about the job, timing, and location to provide recommendations on how the project can proceed. They may be able to approve the work as planned, or they may need to visit the site and recommend timing or methodological changes to the project. For projects in sensitive areas, permits from regulatory agencies may be required for tree and vegetation pruning and removal.

Because wildlife can nest year-round in any type of habitat, the Category level assessed at the time of planning may change once fieldwork is underway. Encountering signs of wildlife during fieldwork may require further expertise to handle the situation.

After selecting the appropriate Category, the final step of project preparation is to gather contact information for a **Wildlife Biologist** and local wildlife rehabilitator. This information will be important if a wildlife emergency or situation that needs expertise arises during fieldwork. A wildlife emergency is a situation where wildlife are injured, orphaned, or in danger, or where nests are abandoned or disturbed.

Fieldwork

After the [Project Preparation phase](#) (page 5), the appropriate Category of BMP determines how to proceed in the Fieldwork phase. For a **Category 1** job, a person with awareness training should perform a pre-work inspection. For a **Category 2** job, a **Wildlife Trained Arborist** should perform a pre-work inspection. For a **Category 3** job, a **Wildlife Biologist** should advise workers when and how to safely work in the area. For any job, contact information for a **Wildlife Biologist** and wildlife rehabilitator should be on-hand in the field. [Figure 5](#) (Page 14) is a graphical depiction of this text.

The pre-work inspection should occur prior to starting work, but not more than a week before the work is planned to begin ([Figure 4](#), page 12). The pre-work inspection can be part of the site walk to discuss the work for the day, safety precautions, etc., but is best done at a quiet time when wildlife activity can be observed. Wildlife activity is often greatest in cool mornings, so pre-work inspections should be scheduled for cool times of the day to increase the chances of discovering active nests before work begins. Work occurring in low habitat value areas that are in close proximity to high or sensitive habitat areas, such as work in a parking area next to a nature preserve or work along a street

that is adjacent to critical habitat for an endangered species, may impact species in those areas.

Wildlife present on a site does not mean that they will be negatively impacted by the work. It is important to look for active nests and signs of nesting wildlife.

Signs of nesting include:

- Nests that are difficult to determine if they are active, such as cavities, high in trees, or pendulous nests
- Wildlife breeding behaviors, such as carrying sticks and other nesting material, carrying food, acting agitated, distress calling (often harsh, repeating calls), dive-bombing crew members
- Concentrations of wildlife droppings

When a nest is discovered during the pre-work inspection or during fieldwork, a **Wildlife Trained Arborist** should perform an evaluation to determine whether the nest is active and what type of nest it is (see [Figure 9](#), page 26, series for examples of types of nests). If it cannot be determined whether the nest is active or whether the nest is a raptor nest (typically a platform nest or cavity nest), a **Wildlife Biologist** should be called in to make this determination. If necessary due to tree removal, inactive nests can be destroyed provided no possession of the nest occurs. Local laws may protect inactive raptor nests (see [California appendix](#), page 52).

Cavity nests cannot be directly observed to determine whether they are active. Instead, pre-work inspections will likely require observing signs of nesting wildlife to determine if there are eggs or chicks inside of the cavity. Snags (standing dead trees) are good habitat for many cavity nesting species. Additional scrutiny during pre-work inspections of snags is recommended. When pruning or removing snags, consider having a **Wildlife Biologist** conduct a pre-work inspection or delaying work until the non-breeding season.



Figure 4. A tree care worker conducting a pre-work inspection is looking for signs of wildlife. Signs of nesting wildlife shown in this illustration are: 1. a bird singing, 2. an active nest, 3. a bird carrying nesting material, 4. a tree squirrel, 5. a cavity that may contain a nest, 6. a bird flying away, 7. whitewash excrement.

Category 1

- Low value habitat during the non-breeding season,
- Nesting wildlife are unlikely to be encountered, and
- A pre-work inspection by someone with awareness training is recommended.

If any signs of wildlife are observed during the site walk or during the work, a **Wildlife Trained Arborist** or a **Wildlife Biologist** should be contacted. If there are no signs of nesting wildlife during the pre-work inspection, the work can proceed as normal. While working, be aware of wildlife, cavities, and nests.

Category 2

- Low value habitat during the breeding season, or
- High value habitat during the non-breeding season where
- Nesting wildlife are more likely to be encountered, and
- A pre-work inspection by a **Wildlife Trained Arborist** is recommended.

If no active nests are found that may be impacted by the tree work, the work may proceed. If active nests are found that may be impacted by the tree work, the best option is to delay the work until the young no longer depend on the nest and work can safely proceed. Most **Wildlife Trained Arborists** will not be able to identify the species of wildlife and predict when the nest is likely to become inactive. The **Wildlife Trained Arborist** may be able to recommend actions to minimize impacts to the nest besides delaying the work, but in most cases, it would be more appropriate to involve a **Wildlife Biologist**.

Category 3

- Sensitive habitat anytime,
- High value habitat during the breeding season,
- Nesting and/or sensitive wildlife are likely to be encountered, and
- A pre-work inspection by a **Wildlife Biologist** is recommended.

For Category 3 sites, which include a high value habitat during the breeding season or when working in sensitive habitats, there is a higher chance of disturbing nesting wildlife or impacting special status species or their habitat. Follow the direction provided by the **Wildlife Biologist**. This may mean work may proceed as planned, similar to **Category 2**, but more likely the **Wildlife Biologist** will recommend inspection and periodic monitoring until the work is complete.

If no active nests are found that may be impacted by the tree work, the **Wildlife Biologist** will instruct the crew to proceed with work while maintaining awareness of any wildlife in the area.

Next Steps When an Active Nest is Discovered

If active nests are found that may be impacted by the tree work, the best option is for the **Wildlife Biologist** to delay the work until the young no longer depend on the nest and work can safely proceed. In some cases the **Wildlife Biologist** may be able to suggest alternative methods to use near the nest ([Considerations for Work Performed Near Active Nests](#), page 15) or suggest that work starts on a portion of the site, but that some areas are left until after the young have left the nest.

The best option is to implement a no-activity buffer around the active nest and delay work in the area until the young no longer depend on the nest. For birds, refer to the table in [Appendix A](#) (page 43) for suggested no-activity buffers and amount of time incubation and chick rearing takes based on species groups. The buffer ranges provided in this table are meant as starting points. State appendices provide more state-specific buffer information when appropriate.

Land managers and wildlife agencies may have buffer requirements for work performed on lands they manage.

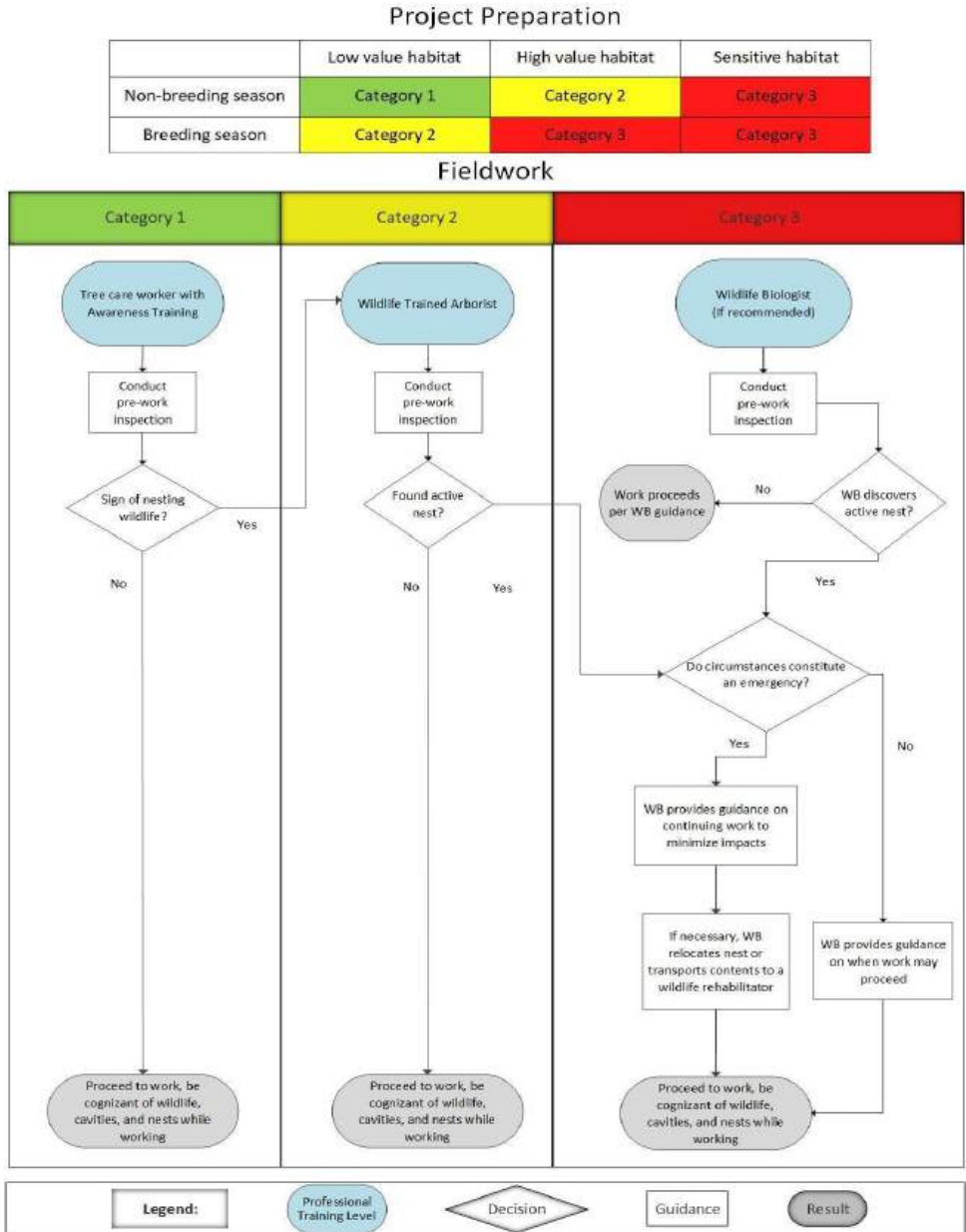


Figure 5: Project Preparation and Fieldwork phase decisions flowchart

A **Wildlife Biologist** can help refine the buffer to suit the situation and give a more precise estimate of when the nest will become inactive. A **Wildlife Biologist** can further refine the estimate for when work can resume in the area by periodically monitoring the nest.

Considerations for Work Performed Near Active Bird Nests

This section provides information to better understand what a **Wildlife Biologist** does when evaluating work near an active nest. The focus of this section is on bird nests due to tree care activities being more likely to impact birds than other species of wildlife. They are more likely to be exposed to unfavorable weather conditions or be abandoned by the parents when work activities change the structure of the vegetation or keep the parents away from a nest for extended periods of time. However, some of these principles may aid when working near other wildlife nests as well.

When an active bird nest is discovered in a work area, it is best to delay work until the nest becomes inactive. In the absence of direction from a **Wildlife Biologist**, setting larger, more conservative no-activity buffers around the nest may help reduce the likelihood of impacts. However, there are circumstances when it may be possible to continue work in the vicinity of an active nest without resulting in the abandonment of a nest. When circumstances are such that imminent danger exists and may result in an emergency, or there is a public safety concern, it may be necessary to complete a minimal amount of work until the nest becomes inactive.

Key considerations for work near active nests include:

- the duration of the work to be completed,
- the tools used,
- the species involved,
- distance of the work to the active nest,
- the status of the nest (e.g. eggs present, parent incubating, young unable to fly, mature nestlings close to fledging),
- location specifics (e.g. urban vs. rural), and
- environmental conditions (temperature and wind).

Typically, a no-activity buffer, or an area in which no work should occur, would be established around the nest. The buffer should be large enough to allow for parents to continue normal nesting behaviors, such as incubating and caring for young. For example, if an active nest is discovered in a tree near a project, establish a cylindrical or circular area radiating out from the nest where no work activities may occur. This area should be large enough that the adult birds continue their normal activities of tending to the nest ([Figure 6](#), page 17).

Work Duration and Temperature

An active nest is less likely to fail if the work duration nearby is kept to a minimum. When adults are kept away from an active nest during moderate weather conditions for short periods of time, they are less likely to abandon the nest, and mortality to the eggs or young is also less likely. However, if work duration is several hours or if weather conditions are extreme, the adults are likely to abandon their nest and mortality may result due to starvation, predation, or the eggs or hatchlings being too hot or cold. Keep in mind that eggs are more sensitive to overheating than to cold. The ideal temperature for an egg is similar to a human's body temperature, and adult birds maintain the eggs' temperature by modifying the time spent directly on eggs or hovering over eggs based on the ambient temperature. Eggs exposed to 104°F temperatures and higher die quickly, while eggs exposed to freezing temperatures will stop developing, but take longer to die (Ehrlich et al. 1988).

Tools

Often, disturbance level can be minimized by tool selection. A **Wildlife Biologist** may recommend hand or battery-powered tools instead of gasoline-powered tools to reduce noise. However, if hand tools significantly increase the duration of work at a location, the benefit from reduction of noise may be canceled out by the longer duration of work.

Species, Species Behavior, and Distance Considerations

Buffers for active nests should consider species-specific tolerances for disturbance, if known. Typically, larger buffers are used for large bird species and for species that are not tolerant of disturbance. Smaller buffers are generally used for smaller avian species and species that have a high tolerance for disturbance, such as those that are commonly found nesting close to development. [Appendix A](#) (page 43) provides approximate buffer distances to use as a starting point.

Some species differ in tolerance based on location, and therefore the appropriate buffer may vary. For example, a nest in a thicket or understory may be less likely to be disturbed than a nest in a more exposed location in a shrub or small tree, even though both nests are the same distance from the activity. Likewise, a bird that has acclimated to human activities may be less likely to be disturbed at its nest than one that is not accustomed to human activity.

For ground-based activities, vertical separation of the nest from the construction area may be considered when selecting the appropriate buffer. Some species build their nests very high in trees and structures. For example, a nest 50 feet off the ground is less likely to be affected by groundwork occurring directly below than a nest 10 feet off the ground. Nests close to the ground may be better suited to a cylinder shaped no-activity buffer area, while spherical no-

activity buffer areas may be suitable for nests farther from the ground ([Figure 6](#), page 17).

The observed behavior of an individual bird during the nest search process and consequent nest monitoring will help determine the appropriate buffer distance. For example, an incubating adult that appears more skittish and is readily disturbed may require a larger buffer than an incubating adult that sits tight and appears more acclimated to disturbance.

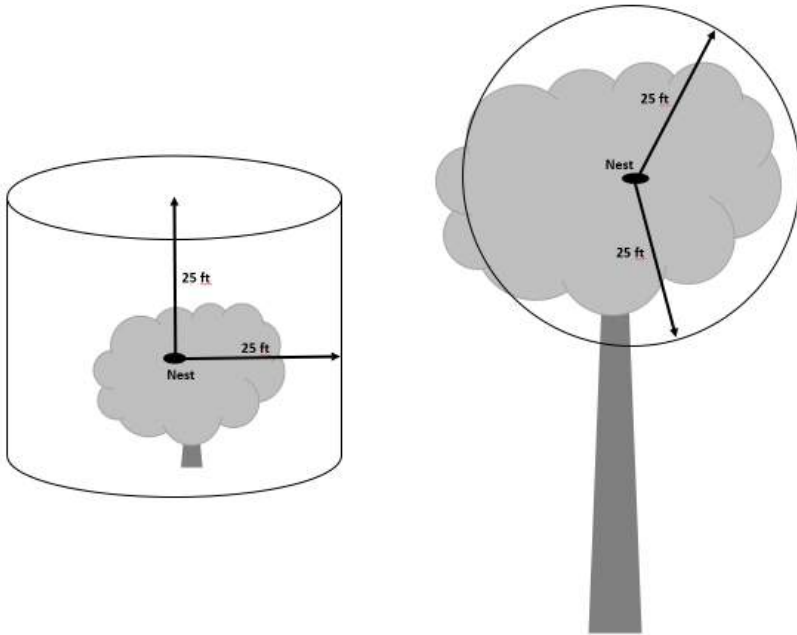


Figure 6: Three-dimensional no-activity buffer around a nest

Nest Status

Generally, nesting birds are most susceptible to failure early in the nesting cycle, when fewer resources have been invested towards the nest. Therefore, it is more important to reduce disturbances during egg laying rather than later in the nesting cycle. This means a larger buffer may be necessary early on, but its size could be reduced later in the nesting season.

If disturbance occurs when a nest is close to fledging, young may be more likely to leave the nest prematurely, unable to adequately fly, and therefore more susceptible to predation or injury. Similar to early in the nesting cycle, a larger buffer may be necessary until the young have fledged.

Environmental Conditions

Extreme weather events may produce conditions that would increase the likelihood of nest failure. Combined with the stress of nearby activity, a nest might fail that would otherwise succeed. On unseasonably hot, cold, or windy days, buffers may need to be increased.

Maintaining Sufficient Nest Cover

Many nests require sufficient cover to provide protection from the elements and disguise from predators. It is important to ensure enough cover remains around a nest to prevent exposure to sun, wind, and rain, and to keep the nest obscured from the sharp eyes of predators such as corvids (ravens, crows, and jays), cats, coyotes, racoons, snakes, and others. Minimize removal of vegetation near nests and pay attention to how vegetation obscures a nest from various angles.

Summary

The appropriate buffer (area surrounding the nest where no activity may occur) for each nest often should be determined in consultation with a **Wildlife Biologist**. The **Wildlife Biologist** can use information from the above categories to judge the buffer size needed to avoid or reduce the likelihood of the abandonment of an active nest. When long work duration is combined with hot weather and the nest is in the early incubation stage, larger buffers will be needed. Alternatively, smaller work buffers may be possible when work can be accomplished in a few minutes, requires only hand tools, and occurs during cool weather. Considering all these factors when establishing buffers minimizes work activity impacts to nesting birds.

Emergencies

Wildlife emergencies occasionally occur during tree work. A wildlife emergency is a situation where wildlife are injured, orphaned, or in danger or where nests are abandoned or disturbed. While the priority is to try to avoid these emergencies, it is important to respond appropriately when they occur. If wildlife are injured or young wildlife or eggs are abandoned by their parents because of the tree work, contact a local wildlife rehabilitator.

Be prepared to describe the situation clearly and in detail, including any information that can be provided about the species involved. The wildlife rehabilitator can offer guidance on how to proceed. In some situations, they may advise doing nothing and allowing the parents to return and care for the eggs or young. In other situations, they may ask you to deliver the wildlife and will provide instruction as to how to safely transport it. To continue working after a wildlife emergency, a **Wildlife Biologist** should be contacted.

If no wildlife emergencies occur and no signs of nesting wildlife are observed, continue working while being aware of wildlife, cavities, and nests. If at any time the crew feels uncomfortable or unsure of how to work in the area, contact a **Wildlife Trained Arborist** or a **Wildlife Biologist**.

To find a local wildlife rehabilitator, refer to each state section for additional resources. When working in other areas, conduct a web search for “wildlife rehabilitator (City, State)” or contact the local Audubon chapter, other wildlife groups, or your state wildlife agency to connect to local resources.

A human health and safety emergency is an immediate risk posed to human health and/or safety that requires action to alleviate dangerous circumstances. In the case of a human health and safety emergency, a **Wildlife Biologist** can help coordinate permission to remove an active nest with the US Fish and Wildlife Service and other agencies. Wildlife agencies can grant permission for removal of an active nest when deemed appropriate. If a tree with an active nest needs to be removed for human health and safety, a Tree Risk Assessment Qualified (TRAQ) arborist should perform a Level 2 inspection, show that the tree risk exceeds risk tolerance of the property owner, and seek USFWS and state agency approval. In a time-sensitive situation, action may need to be taken before permission can be received, but this should only be done in the most extreme situations.

Managing Wildlife Habitat

Resident and migrant wildlife visit and live in cities because of their urban forests. Cities would have significantly less habitat available if not for the tree care industry. When tree care crews work in landscapes, they change the structure and availability of potential habitats for wildlife. Many factors go into tree care decisions, such as plant health, branch structure, clearance requirements, aesthetics, risk, and climber safety, but wildlife habitat should also be considered.

Any time that a crew is working near, or may encounter, nesting or sensitive wildlife, they should be following the recommendations for [Minimizing Impacts to Wildlife](#) (Page 3). This section is not intended to provide mitigation for removing active nests or sensitive habitat, but to provide guidance for urban forest management.

Managing wildlife habitat includes both attempting to increase and decrease habitat value. Most of this chapter will focus on ways to increase habitat value. Decisions to reduce habitat for species considered pests should not be taken lightly but are necessary in some situations. Possible reasons to decrease habitat value include minimizing human wildlife conflicts due to planned

construction, excessive feces or noise in use areas, and wildlife damaging infrastructure. Research, experience, and common sense can guide tree care workers in managing wildlife habitat.

What Wildlife?

Whether wildlife is considered valuable or considered a nuisance is, for the most part, based on subjective opinion. For instance, both peregrine falcons (*Falco peregrinus*) and rock pigeons (*Columba livia*) live on tall buildings that mimic cliff faces in urban centers. But falcons are often celebrated, and pigeons are generally not appreciated, even though pigeons are the main food source for the falcons. Some people love wildlife that others consider pests.

Although it would be impossible to determine exactly what effects different urban forestry management decisions would have on all wildlife species, arborists should consider that not all wildlife are apparent at all times of the day and seasons of the year. Additionally, impacts may not be apparent immediately, or for a long time. Commonly, impacts are less apparent to the public and are only noted as a result of intentional and informed observation.

Arboricultural Practices for Wildlife

Generally, expanding landscapes by planting trees, shrubs, and groundcover will create more habitat for wildlife. The hundreds of species of wildlife that visit and live in urban landscapes have many different habitat requirements. Supporting diverse arrays of habitats is often the best way to support diverse wildlife populations.

Proper pruning, plant health care, planning, irrigation, pest and disease management, and managing risk are important to keep trees and shrubs healthy and thriving in human-dominated settings. Decades of research and experience have gone into growing and maintaining landscapes, and many of these topics are covered in *International Society of Arboriculture Best Management Practices*. Research in urban ecology and habitat restoration is fast evolving to further understand how our actions affect urban wildlife.

Some practices in the tree care industry that are of importance to wildlife include:

Tree Planting & Species Selection

- Plant young trees and ensure proper establishment (irrigation, support, structural pruning, etc.) and lifetime maintenance.

- Increase tree species diversity. Regardless of current diversity, when planning tree planting, look to increase species diversity, especially those likely to be resilient in future climates.
- Increase groundcover and shrub cover. Landscapes should contain shrubs and groundcovers important for wildlife. The shrub layer is especially important for escape cover, allowing wildlife to hide from predators and seek shelter from the elements.
- Increase native species cover. Some native trees have low suitability to urban situations which makes it difficult to meet tree diversity targets using only native trees. A wider variety of native bushes and ground covers may also be available and are likely underrepresented.
- Increase tree age diversity. Diverse landscapes have young trees and mature trees. Young trees are planted each year and mature trees are managed and protected to extend their lifespan.
- Increase spatial diversity. The above factors will be more beneficial if distributed unevenly throughout an area. For example, a new species should be planted throughout a city, not just in one area.
- Avoid planting invasive plants. Even when planted in dense urban centers where invasiveness may not be locally problematic, seeds of invasive plants can travel long distances and cause problems in parks, backyards, and riparian areas. Invasive plants may provide habitat to wildlife, but often outcompete native vegetation and cause significant ecological and economic impacts. Invasiveness is regionally specific, so use local guides in determining whether plants are invasive.

Integrated Pest Management (IPM)

- Maintain insect communities by providing diverse habitats, using biological and mechanical treatments, and limiting widespread use of broad-spectrum pesticides. An IPM approach uses only narrow-spectrum pesticides when pest populations reach intolerable levels.

Pruning

- Trees should be inspected periodically. Branches and trees should only be removed to meet objectives. The value of the branch for wildlife habitat should be balanced with the needs of the pruning objectives.
- Retrenchment is a natural progression that many trees go through later in life, and retrenchment pruning is practiced in some areas to extend the life of declining mature trees. The goal of these practices is typically to extend the life of an aging tree, which can be beneficial to wildlife as well.

Cavities

- Preserve trees and branches with cavities to support cavity nesting bird populations.

- Installing nest boxes may be one way to replace the loss of cavities from dead, dying, and decaying tree and branch removal. Preserving trees with cavities is preferred, but artificial cavities or nest boxes are a secondary option.
- Where needed for specific cavity nesters, diversify habitats through methods such as girdling trees to kill them in areas where dead trees are not common, cutting the tops off of trees to create snags, and using chainsaws to cut artificial cavities into trees to increase the habitat value for secondary cavity nesters. Forestry researchers have investigated the effectiveness of some of these techniques, and tree care workers are actively experimenting with them in urban settings.

Nest Boxes: When nest boxes are provided, they can be quickly occupied and sometimes lead to an immediate rise in breeding density. Cavity nesting bird populations are not solely limited by the availability of cavities. When managing habitat for these species, the availability of suitable food and types of predators in the habitat should be considered. Dead, dying, and decayed trees and branches are complex ecosystems and simply attaching a nest box to a young tree cannot replace the lost value of those ecosystems. If installing nest boxes, the correct design, height, protection, and maintenance need to be considered. Cornell's NestWatch Program is a valuable source of information regarding these requirements, as well as what regional cavity-nesting species may benefit from a nest box ([Additional Resources](#), Page 42).

Preserving Dead, Dying, and Decaying Trees and Branches (Wildlife Trees)

- Leave dead and decaying trees where they pose low risk to humans. Wildlife that nest exclusively in dead, dying, and decaying trees and branches benefit greatly from awareness of their habitat requirements and efforts to preserve these types of trees. Many dead, dying, and decaying trees and branches are removed when they pose little risk but could greatly benefit wildlife. Local **Wildlife Biologists** and Audubon Chapters may be able to help with specific needs and recommendations for an area or project.
- Snags with nearby targets should be managed to an acceptable level of risk and monitored over time.
- Many species of wildlife benefit when sections of trunks and branches, brush piles, or toppled trees can be incorporated into the landscape aesthetically and with an acceptable level of risk (Figure 7, page 23).

Balancing Wildlife Habitat and Risk

- Consider different hazards when managing for wildlife habitat. For example, dead trees should be preserved or managed for safety, and whole or portions of dead branches should be left in trees, primarily in low occupancy areas, where they are unlikely to strike people and power lines. When removed, portions of trunks and branches can be left on the ground as long as they are not an excessive tripping or fire hazard.
- Standing dead trees, down woody debris and dense shrubs are highly flammable vegetation. These habitat features should be preserved primarily in low fire-risk areas, away from structures, or as non-continuous features to break up fuels.



Figure 7: Snags are important habitat for wildlife and can be aesthetically incorporated into a landscape. Dead trees can be preserved or managed for risk, and whole or portions of dead branches can be left in trees, primarily in low occupancy areas, where they are unlikely to strike people and other important targets.

Wildlife

Wildlife is a general term used to describe non-domesticated animals. There are millions of species of mammals, birds, reptiles, and insects in the world, and thousands of species of wildlife migrate through or are residents of the United States. Many resources are available to learn more about local wildlife; see the state appendices for wildlife information specific to Arizona, California, Hawai'i, and Nevada.

To understand how tree care decisions affect wildlife, it is important to first have some understanding about the different kinds of wildlife and their habits. This section discusses wildlife that may be encountered during tree work that arborists should be aware of. These are the wildlife that rely on trees and landscapes for food and shelter as they feed, nest, and reproduce.

Wildlife Terminology

Native, Non-native, Invasive

A native species is present in its known range by a natural process as opposed to an introduced or non-native species. A non-native species is one that has been brought to a new geographic region beyond its normal range. An invasive species is a species exhibiting a strong ability to colonize an area and harm other, usually native, species. Invasive species are often non-native, such as European starlings and house sparrows. Occasionally however, some may consider native species invasive when they colonize new areas due to human alteration of habitat, and then impact species in those areas. These native species are still protected by law despite being considered invasive. An example is the brown-headed cowbird. This open country species has benefitted from habitat fragmentation, which provides them with access to interior forests where they lay their eggs in the nests of several other bird species. Then, the host species raises the birds' young, at the expense of their own.

Endangered, Threatened, Special Status

An endangered species is one that is very likely to soon become extinct, either globally or in a specific geographic area, while a threatened species is one that is at risk of becoming endangered. To prevent species extinctions, international, federal, and state authorities give certain wildlife, plant, and fungi species special legal status, entitling them to various protections under law.

How species are added to these protected lists, and what these legal designations mean in terms of ability to preserve the species, varies between each legislation. Additionally, there are many species known to be sensitive to human disturbance and/or in decline that are not legally designated as

endangered, threatened, or of another special status. Nevertheless, these species should still be treated with special awareness.

Birds

These BMPs focus specifically on birds for four main reasons:

- More laws protect birds than other wildlife, and so more methods for protecting nesting birds and managing bird habitat during tree care have been developed than for most other groups of wildlife.
- Birds are a diverse group of wildlife making up a large percentage of the wildlife diversity worldwide.
- Many people are fascinated by birds. There are far more bird watchers and bird related conservation organizations than for other groups.
- Many bird species heavily depend on trees, so tree care will likely affect bird species (both positively and negatively) more than other groups of wildlife.

Bird species have varied behaviors and life cycles that affect how they interact with the environment. Trees and other vegetation serve as food sources, nesting locations, and roosting sites. Nests are built in trees, shrubs, other vegetation, and on man-made structures, and they may be found high in trees, in burrows underground, or anywhere in between (Figure 8). These same locations are often used by adult birds to roost (or sleep) during the day or night, depending on the species.



Figure 8. Nest locations may be high in trees, on the ground, and everywhere in between. Certain wildlife tend to build nests in certain locations.

Tree care workers should be aware of the variety of types and locations of nests ([Figure 9 series](#), page 26). Nests can be hard to find, but birds will visit the nest to deliver food to their young brood or to a nesting parent bird. Some birds can be very noisy around their nests when you approach it. When protecting their nests, birds may fly or swoop at apparent threats, make repeated warning calls, or stay put and attempt to camouflage their nests. Pre-work inspections are the best way to investigate if birds are using the site or not.



Figure 9a. Cup nests are common among small songbirds like robins, finches, and hummingbirds. Whatever their size, cup nests always have a deep depression. They tend to be sturdy, founded on supportive coarse woody twigs, sometimes bound with mud, and are lined inside with softer vegetation or feathers.



Figure 9b. Hanging/pendulous nests hang from palm fronds or tree branches and are made by species like bushtits and orioles. These nests are supported by slings of strong but flexible material.



Figure 9c. Excavated cavity nests are among the most difficult to detect and to determine whether vacant or occupied. Their entrances are characteristically round, carefully chiseled, and generally no more than 2-3 inches in diameter and can occur almost anywhere on the trunk or branches. Though initially made by woodpeckers, birds like Western bluebirds, house wrens, owls, and other wildlife use these nests as well. Cavity nesters are especially relevant to the tree care industry because most cavity nesters are wholly reliant on trees for their nesting success and because these cavities indicate potentially weak internal tree structure. Nest boxes are replications of cavity nests.

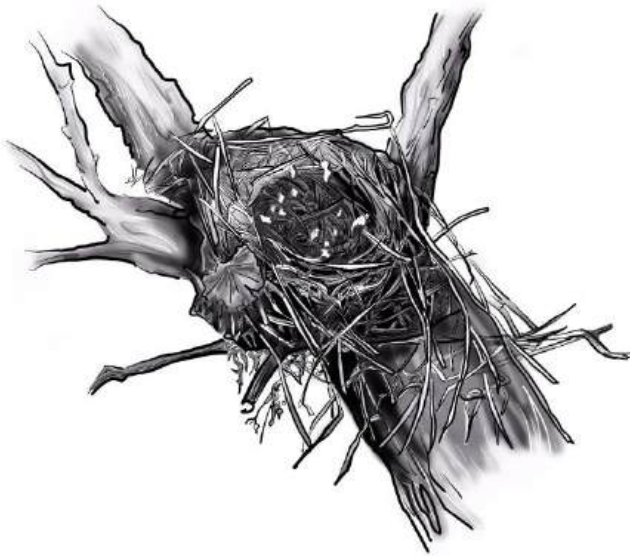


Figure 9d. Natural cavity nests have openings that are highly irregular in shape and size. Occupancy increases during the nesting season, but some cavity nesters use them as roosts all year. Often these cavities are formed from branch failures decaying in living or dead trees. Mammals also use these cavities during the nesting season.

Figure 9e. Scrape nests are slight depressions on the ground or on ledges that have been slightly cleared to create a nest. They are made by birds such as killdeer, shorebirds, peregrine falcons, and a few owls.



Figure 9f. Inactive nests have no eggs or young that are reliant on the nest. Sometimes the nest structure is damaged, material is loosened, and many bird droppings are present. This example shows a nest from a previous season that is clearly inactive.



There are two groups of birds that are important to differentiate from other birds:

- Raptors, which include hawks, eagles, owls, vultures, and falcons, have distinct life cycles and biology. Raptors are typically predators and are also referred to as birds of prey. Raptor nests can be easier to spot as they are larger nests (Figure 10), often with animal debris located below them. It is important to distinguish them from other types of birds because they may have specific legal protections (such as eagles) and are often more sensitive to disturbance. Raptors often require larger no-activity buffers to prevent impacts.

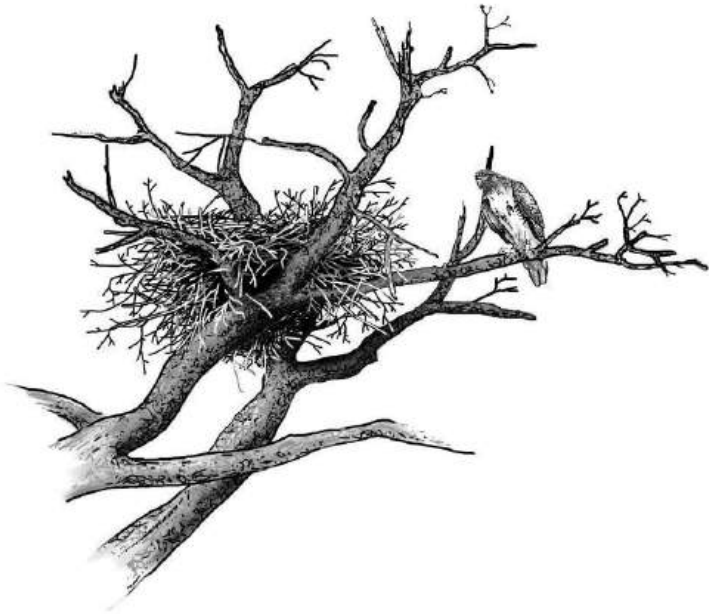


Figure 10. Platform nests are most often made by large, heavy birds like raptors, doves, and others. Upper canopies and tree tops are ideal for these large nests. Nest materials are primarily woody. These structures, which take considerable time and effort to construct, can last several seasons.

- Colonial nesters, which include waterbirds and other species, can nest together in a large group called a colony or rookery (Figure 11). Most waterbirds nest on rocks or cliffs, but egrets, cormorants and herons can create colonies in trees. These colonies are often messy, noisy, and considered a nuisance.



Figure 11: Rookeries are colonies of waterbirds nesting together in one location.

Birds typically build and lay eggs in a nest. After the eggs hatch, the birds develop, grow feathers, and learn to fly. During this period, they cannot flee and are dependent on protection from their parents. Leaving the nest can be fatal when they are very young. As they get closer to fledging, leaving the nest is more common and may be part of their natural cycle. Often, young birds found on the ground are still protected and fed by their parents as they continue to develop. Wildlife rehabilitators specialize in determining the status and needs of birds in these types of situations, based on their expert knowledge of species and habitats ([Emergencies](#), page 18).

Mammals

Many mammal species can be encountered during tree care. Species such as tree squirrels and some bats depend on trees for food and shelter. Other common mammals, such as raccoons and opossums, use trees for shelter and denning but will also use other convenient places. In some areas, arborists may

also find coyotes, bobcats, rabbits or other mammals in shrubs and grasses around trees.

There are many sensitive and protected mammal species that arborists should be aware of, despite a reduced likelihood of an encounter during tree care. No federal law provides broad protection to mammals like the Migratory Bird Treaty Act does for birds, but some mammal species are covered by the Endangered Species Act [e.g. Riparian woodrat (*Neotoma fuscipes riparia*), Hawaiian hoary bat (*Aeorestes semotus*)] or state-specific laws and regulations. Check the State Appendices for further information on protected mammal species.

Most tree squirrels build nests called dreys which are an aggregation of leaves or other locally available material at branch intersections (Figure 12). At times, dreys may be hard to distinguish from bird nests, as squirrels will use old bird nests (and vice-versa) to build a new drey. They also use cavities in trees as dens, and may prefer them in the harsh winter months because they offer more protection from the elements. Many tree squirrels build multiple nests and rotate their young through them. Squirrels tend to have two broods, one in spring and one in fall. Flying squirrels are less common and typically nest in cavities in trees.



Figure 12. Tree squirrels raise their young in nests built out of leaves called dreys.

Some bat species use trees as temporary, daytime, and/or long-term roosts or maternity sites, though many bats prefer to roost in caves, buildings, and structures like bridges. Those that use trees do not construct nests, but instead find shelter in cavities, cracks, and crevices, under loose bark, or hanging among the foliage (Figure 13). For example, palms with dead, hanging fronds provide excellent shelter. Depending on species, they may roost or raise their young as individuals or in colonies – tree dwelling bats are more likely to be solitary or in small groups. Bats are inactive in the day (unless disturbed) and are rarely seen, except at dusk when they emerge from roosts to feed on flying insects. Bats are also less active and may not fly away during the cold fall and winter months.



Figure 13: Bats don't construct nests but instead find shelter in cavities, cracks, and crevices, under loose bark, or hanging among the foliage.

In some areas, it may be important to differentiate the black rat (*Rattus rattus*) from woodrats (*Neotoma* spp.). Woodrats build large stick nests in tree canopies, at the base of trees, and in shrubs (Figure 14, page 33), and some species of woodrats have special status-specific protections. However, the black rat does not have these protections and can be found nesting in trees as well.



Figure 14: Woodrats build large (up to 8 feet tall by 8 feet wide) stick nests in tree canopies, at the base of trees, and in shrubs.

Reptiles and Amphibians

Shelter and cover are critical to the life cycles of reptiles and amphibians. They are ectothermic, or “cold blooded,” and rely on environmental heat sources like the sun to regulate their body temperatures. On trees, they can be found basking in the sun and living in cavities. Areas with downed wood, bark, or large pieces of decaying wood are ideal sites for amphibians and reptiles, as they serve as both shelter and food source.

Examples of reptiles and amphibians that may be found during tree care:

- The arboreal salamander (*Aneides lugubris*), an amphibian native to California, is adapted for climbing and has been found high in tree top canopies.
- Tree frogs are another group of amphibians often found on trees, especially near waterways.
- The endangered Yosemite toad (*Anaxyrus canorus*), lives in holes in the ground; however, they are usually not found in turf-covered areas.

There is no federal law providing broad protection to reptiles and amphibians such as the Migratory Bird Treaty Act for birds, but some are covered by the Endangered Species Act [e.g. Yosemite toad (*Anaxyrus canorus*), desert tortoise (*Gopherus agassizii*)] or state-specific laws and regulations. Check the state appendices for further information on protected reptile and amphibian species.

Snakes are rarely found in trees (though occasionally found in tree cavities) but can often be found on the ground or at the base of trees and shrubs (Figure 15). Some snakes are venomous.



Figure 15: Down woody debris is important habitat to reptiles; snakes often are found beneath logs.

Insects

Over 90,000 species of insects are identified in the United States. Insect species occur in almost every habitat and niches within habitats. There is no federal law providing broad protection to insects or other invertebrates such as the Migratory Bird Treaty Act for birds, but some insect species are covered by the Endangered Species Act [e.g. Delhi Sands flower-loving fly (*Rhaphiomidas terminatus abdominalis*), Valley Elderberry longhorn beetle (*Desmocerus californicus dimorphus*)] or state-specific law and regulations. Check the State Appendices for further information on protected insect species.

Insects are a foundational part of the food web. Insect populations provide the base of the food web for many species of wildlife, and are important pollinators

for trees and other plants. High insect diversity can also act as a buffer to limit insect pests. Pest species are in the minority of insects and should be managed when populations exceed thresholds, while healthy insect populations contribute to landscape health.

US Wildlife Laws & Other Regulations

The United States federal wildlife agency is the U.S. Fish and Wildlife Service (www.fws.gov) which enforces federal wildlife laws and regulations.

Below is a list of laws and regulations pertaining to wildlife that are relevant to the tree care and landscape industry. The specific language from these laws is provided in quotations for reference. Language not in quotations is explanatory and paraphrased.

Federal Wildlife Regulations

The primary Federal laws protecting birds as well as other wildlife include:

Migratory Bird Treaty Act (MBTA)

- Protects most species of birds in North America along with their parts (e.g. feathers), eggs, young, and nests.
- Upland game bird species (such as quail and grouse) are not protected by MBTA, but rather are regulated by states.
- “The MBTA provides that it is unlawful to pursue, hunt, take, capture, kill, possess, sell, purchase, barter, import, export, or transport any migratory bird, or any part, nest, or egg of any such bird, unless authorized under a permit issued by the Secretary of the Interior. Some regulatory exceptions apply.” Take is defined in regulations as: ‘pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture, or collect.’”

Endangered Species Act (ESA)

- Protects species listed as threatened or endangered by U.S. Fish and Wildlife Service. Take is defined as “harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct”. In addition to protecting species, the Endangered Species Act also protects the habitat a species depends on.

Bald and Golden Eagle Protection Act (BGEPA)

- Protects bald and golden eagles. Take is defined as “pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb”. Unlike MBTA, BGEPA also protects eagles from disturbance.

- Eagle nests are protected year-round, regardless of status, and require a permit to remove or destroy.

Federal Utility Regulation

North American Electric Reliability Council (NERC) Standard FAC-003-4: Transmission Vegetation Management Standard

- “To maintain a reliable electric transmission system by using a defense-in-depth strategy to manage vegetation located on transmission rights of way (ROW) and minimize encroachments from vegetation located adjacent to the ROW, thus preventing the risk of those vegetation-related outages that could lead to Cascading.”
- Provides minimum required clearances from vegetation based on voltage and altitude.

Tree Care Ordinances

Tree care is often regulated by local ordinances and policies as well as private organizations (HOAs, tree boards, etc.). These regulations may cover tree species, tree planting, spacing and distances from curbs and other infrastructure, pruning and other maintenance practices, tree removal, landscape provisions in community plans and development permits, compliance enforcement, and establishment of an advisory board.

Glossary

Awareness training - a brief overview with general information on looking for signs of nesting wildlife, which may be specific to the work location. This awareness training can be provided by a **Wildlife Biologist** or **Wildlife Trained Arborist** at the project site during the daily job briefing, or more generally when unrelated to a specific project.

Breeding season - the time of year when most wildlife breed, nest, and care for offspring that cannot care for themselves. In some years, variable weather patterns or abundance of food may cause early or late breeding.

Buffers - areas established around an active nest in which no-activity can occur to prevent detrimental impact on eggs or young, abandonment or nest destruction.

Category 1 - For a low value habitat during the non-breeding season, pre-work inspection by a tree care worker with awareness training is recommended.

Category 2 - For a **low value habitat** during the breeding season or a high value habitat during the non-breeding season, pre-work inspections by a **Wildlife Trained Arborist** are recommended.

Category 3 - For high value habitat during the breeding season or sensitive habitat areas at any time of the year, the project should follow recommendations from a **Wildlife Biologist**.

Endemic - a plant or animal that is native only to a specific area.

Habitat value - the likelihood of finding wildlife using an area throughout the year.

Sensitive habitat - areas where wildlife are very likely to nest, such as riparian areas, critical habitat, nature preserves, known locations of special status species and areas of previous nesting.

High value habitat - areas where wildlife are likely to nest, such as areas with low human use, low impervious surfaces, high plant species diversity, high plant structural diversity, close to water bodies, many mature trees, many dead or dying trees, and/or with abundant wildlife.

Low value habitat - areas where wildlife are less likely to nest, such as areas with high human use, high impervious surfaces, low plant species diversity, far from water bodies, few mature trees, few dead and dying trees, and few/no wildlife observed.

Human health and safety emergency - immediate risk posed to human health and/or safety. Requires action to alleviate imminent danger circumstances.

Invasive species - species exhibiting a strong ability to colonize an area and harm other species.

Nest - a structure or place made or chosen by wildlife for laying of eggs or sheltering its young.

Active nest - eggs or young present

Inactive nest - no eggs or young present

Abandoned - eggs or young present, but adults are no longer returning to tend the nest

Native species - species that is present in its known range by a natural process as opposed to an introduced species.

Non-native species - species that has been brought to a new geographic region beyond its normal range.

Non-breeding season - the time of year when most wildlife are not breeding, nesting, or caring for offspring that cannot care for themselves. Depending on the region, most wildlife do not breed during a period usually corresponding to fall and early winter months, in most years. In some years, variable weather patterns or abundance of food may cause early or late breeding. See the state Appendices for specific information.

Raptors - birds of prey such as owls, hawks, eagles, vultures, and falcons which are in the orders *Strigiformes*, *Accipitriformes*, and *Falconiformes*.

Riparian habitat - areas that are the interface between land and constant or intermittent rivers or streams and generally provide the highest value habitat for wildlife. Riparian areas can be identified by their distinctive soils and vegetation. This may include concrete channels when the associated riparian vegetation and soils are present.

Signs of nesting wildlife - nests that are difficult to determine if they are active, such as cavities, high in trees, or pendulous nests; wildlife breeding behaviors, such as carrying sticks and other nesting material, carrying food, acting agitated, distress calling (often harsh, repeating calls), dive-bombing crew members; concentrations of wildlife droppings.

Sensitive habitat - habitat that is home to special status species and/or the habitat itself may be rare and could be easily disturbed or degraded by human activities and developments.

Special status - species of wildlife that have one or more designations from authorities. The U.S. Fish and Wildlife Service establishes lists of endangered, threatened, and candidate species. Individual state wildlife agencies also frequently maintain their own lists of special status wildlife. These lists may or may not be affiliated with a legal or regulatory status. If there is potential to encounter special status species, contact the agency responsible for the species or a **Wildlife Biologist** familiar with the species for further guidance.

Tree - a woody perennial, usually having one dominant vertical trunk and a height greater than 15 ft.

Tree care worker - a term that can describe any professional working with trees including but not limited to arborists, tree climbers, trimmers, ground workers, consultants, managers, etc.

Wildlife - undomesticated living animals, especially birds, mammals, amphibians, and lizards.

Wildlife Biologist - a person with knowledge and experience in identifying wildlife species that may occur in an area and is familiar with wildlife behavior, nesting requirements, tolerance to impacts and suitable survey methods.

Wildlife emergency - a situation where wildlife are injured, orphaned, or in danger or where nests are abandoned or disturbed.

Wildlife rehabilitator - an individual or organization with training, experience, and (if required) applicable permit(s) allowing them to care for injured or abandoned wildlife.

Wildlife Trained Arborist - a tree care worker with training and/or experience in: knowledge of wildlife protection regulations, determining habitat value, conducting pre-work nesting surveys, identifying signs of nesting wildlife, determining if nests are active, responding to wildlife emergencies, and contacting **Wildlife Biologists** when needed.

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Additional Resources

Audubon Near You: Find your local Audubon Chapter

<https://www.audubon.org/about/audubon-near-you>

Baby Bird Rescue Guide

<http://www.arlboston.org/wp-content/uploads/2014/05/2014-ARL-Found-Baby-Bird-Rescue-Guide.pdf>

Cavity Conservation Initiative

www.cavityconservation.com

Conserving Waterways - Preventing Impacts from Human Activity

<https://rcrcd.specialdistrict.org/files/5f43d25b4/Conserving-Waterways2018web.pdf>

Cornell Lab of Ornithology - Natural history and identification

- Birds of the World
<https://birdsoftheworld.org>
- All About Birds
<https://allaboutbirds.org>
- Merlin
<https://merlin.allaboutbirds.org/>

Living with Wild Reptiles and Amphibians

<http://www.californiaherps.com/info/livingwithherps.html>

NestWatch - All About Birdhouses

<http://nestwatch.org/learn/all-about-birdhouses/>

Tree Care for Birds and Other Wildlife

<https://treecareforbirds.com/>

U.S. Fish and Wildlife Critical Habitat Online Mapper

<https://ecos.fws.gov/ecp/report/table/critical-habitat.html>

USFWS Wetland Mapper

<https://www.fws.gov/wetlands/data/mapper.HTML>

Urban Wildlife Group

<http://urbanwildlifegroup.org/urban-wildlife-information>

Appendix A - Nest Buffers

Bird Group	Typical Breeding Season	Incubation (Eggs)	Chicks	Buffer LHV ¹ (Radius in feet)	Buffer HHV/S ² (Radius in feet)
Waders (eg. herons, egrets)	January through August	19-29 days	21-81 days	200	200
Eagles	December through July	35-46 days	10-14 weeks	Bald 660 feet Golden 1 mile	Bald 660 feet Golden 1 mile
Birds of Prey (e.g. hawks, vultures, falcons)	February through August	25-42 days	4-12 weeks	300	500
Doves and Pigeons (e.g. mourning doves and band-tailed pigeons)	February through November	13-20 days	13-30 days	100	300
Owls Burrowing owls	January through July February through June	26-37 days	28-77 days	300	500

¹ Low Habitat Value area

² High Habitat Value or Sensitive Habitat area

Bird Group	Typical Breeding Season	Incubation (Eggs)	Chicks	Buffer LHV ¹ (Radius in feet)	Buffer HHV/S ² (Radius in feet)
Hummingbirds	December through July	13-18 days	20-28 days	100	300
Woodpeckers Acorn woodpecker ³	March through August March through October	11-16 days	~30 days	100	300
Many songbirds (e.g. finches, kingbirds, mockingbirds)	February through August	10-18 days	9-28 days	100	300
Corvids (e.g. crows, ravens, jays)	February through August	15-25 days	18 days Jays 35 days Crows 5-6 weeks Ravens	100	300

Sources:

Birds of North America, Cornell Lab of Ornithology: <https://birdsna.org/Species-Account/bna/home>

Southern California Edison Nesting Bird Management Plans

³ Acorn woodpeckers have a different breeding season than most species in their group.

The general nesting seasons described here are conservative and cover the time periods when almost all active nests may be found for a species group in California, Arizona, and Nevada, but seasonal and regional variances do occur. The buffer ranges provided in this table are meant as starting points. State appendices provide more state-specific buffer information when appropriate. Land managers and wildlife agencies may have buffer requirements for work performed on lands they manage. Refer to [Considerations for Work Performed Near Active Nests](#) (page 15) for further guidance on determining the appropriate distance work may be conducted from an active nest. It is important to seek the aid of a **Wildlife Biologist** when attempting to work near active nests, especially when work may cause the nest to fail. **Wildlife Biologists** may recommend different buffers based on individual situations, and programmatic approaches may use different sized buffers or a different system for minimizing impacts to wildlife. Regardless of time of year, caution should be used in areas with special status.

Appendix B - Pre-Work Inspection Form Guidelines

Pre-work inspection forms are commonplace and recommended within the tree care industry. Adding a wildlife component into these practices is essential to mitigate impacts to wildlife during tree work.

The following inspection criteria can be integrated into existing pre-work inspection protocols, such as pre-work safety inspections, or established as a separate checklist or process. These inspections should be completed during the project preparation phase and are in addition to the desktop review (See [Minimizing Impacts to Wildlife](#) section, page 3).

Timing the Inspections

Depending on the breeding season, results of the desktop review, and the duration and complexity of tree work being performed, it may be appropriate to conduct one or more pre-work inspections in the days or weeks prior to the scheduled work. Knowing that there are nesting wildlife in the area prior to the scheduled work can save time and resources by allowing for proper planning to minimize impacts to the wildlife, using methods described in the BMPs.

Note the date, time and duration of each inspection conducted (ex. April 4, 2021, 7:00 - 7:25 AM).

Habitat Inspection

The goal of the habitat inspection is to establish the habitat value of the site to aid in determining the BMP category for work, and the required expertise. Observations from the habitat inspection can be combined with information collected during the desktop review (e.g. known ranges of sensitive species or habitats) to determine habitat value. There are many potential indicators of habitat that are valuable for wildlife. In urbanized settings, these checklists can help determine habitat value:

Low Value

- Low plant species diversity
- Low plant structural diversity
- High human use and infrastructure
- High impervious surfaces
- Far from water bodies
- No riparian vegetation
- Few mature, dead, or dying trees
- Few/no wildlife present

High Value

- High plant species diversity
- High plant structural diversity
- Low human use and infrastructure
- Low impervious surfaces
- Close to water bodies
- Riparian vegetation present
- Many mature, dead, or dying trees
- Abundant wildlife present

Wildlife Inspection

Spotting wildlife during a pre-work inspection can inform what types of wildlife are using the site and how they are using it. Keep in mind that even if no wildlife are found during a pre-work inspection, they may still be using the site and be impacted by tree work operations.

Where and how to look: It is important to take time to observe not just the trees where work will be performed, but also the base of trees, nearby vegetation, and the surrounding area. Wildlife inspections should be conducted prior to starting work, before any disruptive or noisy activities begin, and before any equipment is turned on.

- Scan the sky, trees, ground, shrubs, and branches
- Check trunk or branch cavities and holes in the ground
- Listen for wildlife sounds
- Look for wildlife flying or running away

Signs of nesting wildlife include:

- Nests that are difficult to determine if they are active, such as cavities, high in trees, or pendulous nests
- Wildlife breeding behaviors, such as carrying sticks and other nesting material, carrying food, acting agitated, distress calling (often harsh, repeating calls), dive-bombing crew members
- Concentrations of wildlife droppings

If a nest is found, note the following information to communicate with the crew and other professionals involved in the work, especially wildlife biologists and wildlife rehabilitators.

- Location of nest
- Species
- Nest type
- Buffer distance
- Active nest? (Y / N)

Appendix C - Arizona

Arizona is a diverse landscape with a wide variety of flora and fauna. Forests range from riparian gallery forests in the low deserts to sub-alpine and montane forests above 9,000 feet in elevation. Most people in Arizona live and work below 3,000 feet of elevation in a hot, arid climate. Arizona's urban forests are trees and vegetation primarily located on private property, but they also include urban parks, street trees, landscaped boulevards, public gardens, washes and wetlands, greenways, and nature preserves.

Arizona's urban and community forests provide habitat to a broad diversity of wildlife. Although urban species vary in their use of developed areas, many come into contact with humans either in cities or on the wildland urban interface. As many Arizona cities, towns, and communities are realizing the benefits of green infrastructure through open space, afforestation, and natural landscaping, many species of wildlife are finding new habitat within cities. To reduce impacts to wildlife and promote the value of wildlife in our urban and community forests, Arizona arborists will be essential.

Minimizing Impacts to Wildlife

One of the leading causes of tree care-related wildlife emergencies in Arizona is the pruning and trimming of trees during the breeding season. For example, in 2019 a single wildlife rehabilitation facility in Phoenix documented 38 instances where wildlife were treated for injuries sustained during tree care (Personal communication, Laura Hackett, Liberty Wildlife). Additional tree care related wildlife emergencies occur and go unreported.

The Best Management Practices framework [Minimizing Impacts to Wildlife](#) (page 3) combined with these details specific to Arizona are designed to decrease the impacts to wildlife in Arizona.

Project Preparation

A desktop review can be done using resources publicly available online such as Arizona's Online Environmental Review Tool (<https://ert.azgfd.gov/>). If the desktop review finds sensitive areas, a **Wildlife Biologist** should be contacted.

When assessing habitat value in Arizona, there are many types of sensitive habitats that tree care professionals may encounter in their work. Here are some examples:

- **Riparian areas:** It is common for arborists to encounter riparian areas where they could potentially impact sensitive wildlife. **Riparian areas** in Arizona can be identified by their distinctive soils and vegetation, particularly willows (*Salix spp.*), mulefat (*Baccharis salicifolia*), sycamore (*Platanus spp.*), and cottonwood (*Populus spp.*). This may include

concrete channels when the associated riparian vegetation and soils are present.

- **Critical habitat:** Critical habitat has been designated for several species; for example, the Mexican spotted owl (*Strix occidentalis lucida*) has critical habitat within Arizona’s mixed conifer forests. Vegetation work within a designated critical habitat should involve working with a **Wildlife Biologist** and the landowner or manager.

The Arizona Game and Fish Department recommends the following breeding seasons dependent on elevation in Table 2.

Table 2. Arizona Breeding Season

Elevation	Breeding season
Below 3,000 feet	January 15 - June 15
3,000 to 6,000 feet	March 15 to July 30
Above 6,000 feet	April 15 to August 15

Most tree care operations occur below 3,000 feet in altitude, so most arborists in Arizona can use January 15 to June 15 as the breeding season.

Additional scrutiny during pre-work inspections of palm trees would help minimize impacts to nesting wildlife. Palm trees provide nesting habitat for a wide variety of avian wildlife, especially when the dead fronds that create the skirt are intact. Pre-work inspections can be difficult because of the dense, dead fronds and height of the trees. When working with palm trees with full skirts, pre-work inspections will likely require observing signs of nesting wildlife. Prior to pruning or removing palm trees, consider having a **Wildlife Biologist** conduct a pre-work inspection, or delaying work until the non-breeding season.

Considerations for Work Performed Near Active Nests

Arizona can be very hot in the summer months. It is worth emphasizing the danger of extreme heat to young nestlings. Adults will often shade nestlings and protect them from the sun before they develop their own thermoregulation. What might be a minor disturbance during cool times, for example, the parents leaving a nestling for a few minutes because of tree care, could be fatal on a June afternoon in Arizona. Additionally, maintaining sufficient nest cover is particularly important in locations with extreme temperatures. Work performed near active nests should consider site temperatures in determining the best course of action.

Managing Wildlife Habitat

In desert environments, palms are commonly planted and provide suitable habitat for a wide variety of wildlife. However, many city, town, and homeowner's associations require palm skirts or dead palm fronds to be removed. When safe and appropriate, consider preserving the skirt for wildlife habitat.

Wildlife

People who live and work in Arizona can expect to see many species of wildlife. Arizona has over 550 species of birds, 107 species of native reptiles, 145 species of mammals, and hundreds of species of plants, fungi, and arthropods. Of these wildlife species, some have special protective listed status under the Endangered Species Act due to population declines and habitat loss. Arizona currently has 72 listed species known to occur in the state ([USFWS](#)). Notable listed avian forest species that might be encountered by tree care professionals include the Mexican spotted owl, southwestern willow flycatcher (*Empidonax traillii extimus*), and yellow-billed cuckoo (*Coccyzus americanus*).

Examples of common urban wildlife species in Arizona include native species such as coyotes, red-tailed hawks, and mourning doves.

Laws and Agencies

Agencies

The Arizona Game and Fish Department and the Game and Fish Commission are tasked with creating and upholding wildlife laws and regulations in Arizona.

Laws

[Arizona Revised Statutes §17-236 Taking birds; possession of raptors.](#)

- primary state law protecting birds and their nests

Additional Resources

Arizona Audubon

<https://az.audubon.org/>

Arizona Community Tree Council

<https://www.aztrees.org/>

Arizona Department of Forestry and Fire Management

<https://dffm.az.gov/>

Arizona Game and Fish Department

<http://azgfd.com/>

Arizona's Online Environmental Review Tool

<https://ert.azgfd.gov/>

Urban & Community Forestry Program

<https://dffm.az.gov/forestry-community-forestry/urban-community-forestry>

US Fish and Wildlife Service Arizona Species

<https://www.fws.gov/office/arizona-ecological-services/species>

Wildlife Rehabilitators

<https://www.azgfd.com/wildlife/urbanrehab/>

Appendix D - California

Compared to the other states in the Western Chapter region, California has two main features important to tree care for birds and other wildlife: the scale of urban communities and the laws protecting wildlife.

California is the most populous state in the country, with very dense population centers and large expanses of urban and rural populations. The urban forests managed for the benefit of the people are vast and widely used by wildlife. Because of the wide expanse of wildland urban interface and urban forests, the ability to alter wildlife habitat and impact nesting wildlife is high.

California has its own set of laws that broadly protect wildlife similar to, and sometimes more strictly than, the federal laws. Several California laws protect more species of birds, and in certain cases with higher restrictions, than similar federal laws. For example, inactive (no eggs or chicks) raptor nests are protected in California, but not in other states.

Minimizing Impacts to Wildlife

The Best Management Practices framework in [Minimizing Impacts to Wildlife](#) (page 3) combined with the below details specific to California are designed to minimize the chance of injuring wildlife and decrease the impacts to wildlife during tree care overall.

Project preparation

A desktop review can be done using resources publicly available online such as the California Natural Diversity Database (CNDDDB) (<https://www.wildlife.ca.gov/Data/CNDDDB>). If a desktop review finds sensitive areas, a **Wildlife Biologist** should be contacted.

Some areas have specific requirements for nest buffers that may be different than those recommended here. For example, the Tahoe Regional Planning Agency provides no activity “Disturbance Zones” for certain bird species for work performed within the area of their authority. Check with your local agencies about regional regulations.

When assessing habitat value in California, there are many types of sensitive habitats that tree care professionals may encounter in their work. Here are some examples:

- **Riparian areas:** It is common for arborists to encounter riparian areas where they could potentially impact sensitive wildlife. **Riparian areas** in California can be identified by their distinctive soils and vegetation, particularly willows (*Salix spp.*), mulefat (*Baccharis salicifolia*), sycamore (*Platanus spp.*), and cottonwood (*Populus spp.*). This may include

concrete channels when the associated riparian vegetation and soils are present.

- **Critical habitat:** Critical habitat has been designated for several species. For example: California gnatcatcher (*Polioptila californica*) critical habitat within California is coastal sage-scrub which is often at the wildland urban interface.

CDFW does not define a standard breeding season. However, across the different habitats of California, most wildlife breed between February 1 and August 31. This varies by region and species. For example, the breeding season starts earlier in the desert and later in the mountains, and species such as hummingbirds and eagles can start as early as December, while acorn woodpeckers (*Melanerpes formicivorus*) can be nesting as late as October. Some municipalities in California have local restrictions on tree care activities during the breeding season.

Additional scrutiny during pre-work inspections of palm trees would help minimize impacts to nesting wildlife. Palm trees provide nesting habitat for a wide variety of wildlife, especially when the dead fronds that create the skirt are intact. Pre-work inspections can be difficult because of the dense, dead fronds and height of the trees. When working with palm trees with full skirts, pre-work inspections will likely require observing signs of nesting wildlife. Prior to pruning or removing palm trees, consider having a **Wildlife Biologist** conduct a pre-work inspection or delaying work until the non-breeding season. As discussed below, palms are also an important habitat feature for California wildlife.

Because raptor nests have additional protection in California, if a nest is potentially a raptor nest (typically a platform nest or cavity nest), a **Wildlife Biologist** should make this determination. Raptors may reuse their nests, and they should not be removed without consulting a **Wildlife Biologist**.

Managing Wildlife Habitat

Arborists in California can take specific actions to preserve wildlife habitat in the course of their work. For example, in desert environments, palms are commonly planted and provide suitable habitat for a wide variety of wildlife. However, many city, town, and homeowner's associations require palm skirts or dead palm fronds to be removed. When safe and appropriate, consider preserving the skirt for wildlife habitat.

Wildlife

Special Status Wildlife

The California Department of Fish and Wildlife maintains a list of animals of special interest and concern. For more information see the CDFW [Special Animals List](#).

Birds

Hundreds of bird species live in California. One important species to arborists in California is the acorn woodpecker, which creates its nests in cavities of trees and stores acorns in granaries in snags, dead branches, and other wooden structures. To preserve this unique species, it is important to both be conscious of where they live to avoid unnecessary habitat destruction, and to protect dead trees and branches that it could use as future habitat. Heron and egret rookeries are also important to look out for.

Raptors are subject to specific protected status, and generally have nests that are protected by regulation even when inactive.

Mammals

All bats (order *Chiroptera*) and woodrats (*Neotoma* spp.) are protected. Woodrats build large stick nests in tree canopies and at the base of trees. Several species of woodrats have special status ([Wildlife, mammals](#), Page 30) and have specific protections. Bats are nocturnal mammals that may use trees as temporary, daytime, and/or long-term roosts. They do not construct nests but find shelter in cavities, loose bark, and cracks. Bats are inactive in the day and rarely seen, except at dusk when they emerge from roosts and feed on insects. Many species of bats are in decline.

Many consider some small mammals nuisance species, such as opossums, mice, squirrels, and other rodents. The black rat (*Rattus rattus*), eastern gray squirrel (*Sciurus carolinensis*), fox squirrel (*Sciurus niger*), and Virginia opossum (*Didelphis virginianus*), which are common in urban areas, are not protected in California. Rats are commonly found nesting in palm trees. Contact your local university's agricultural extension ([California Additional Resources](#), Page 57) for information on the best way to deal with nuisance species in your area.

Reptiles

All native reptiles and amphibians are protected in California. Rattlesnakes (*Crotalus* sp.) are the only group of venomous snakes native to California and they are frequently encountered. They are rarely found in trees (though occasionally found in tree cavities) but can be found on the ground or at the base of trees and shrubs. In general, they will only strike when provoked. Arborists should look for snakes when performing pre-work inspections and should not approach them if found.

Insects

Insects lack broad legal protection in California, but several species of insects have special status and are protected. For instance, the Valley Elderberry longhorn beetle is protected by the Federal Endangered Species Act as a threatened species. The California Department of Pesticide Regulation maintains a database on special status species and sensitivities ([California Additional Resources](#), Page 57).

Laws and Agencies

There are many state laws and regulations about wildlife pertinent to the tree care and landscape industry in California. Of note to California arborists are the California Fish and Game Codes 3503 and 3503.5, which apply to most birds.

Agencies

The lead agency for wildlife issues in California is the California Department of Fish and Wildlife (wildlife.ca.gov/)

Laws

The primary Fish and Game Code (FGC) sections protecting birds as well as other wildlife include:

[Sections 2050-2115.5](#) - *California Endangered Species Act (CESA)*

- Protects species listed as threatened or endangered by the California Department of Fish and Wildlife.

[Section 3503](#) - *All Birds*

- Protects all birds and protects nests from needless destruction.
- “It is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by this code or any regulation made pursuant thereto.”

[Section 3503.5](#) - *Raptors*

- Protects birds of prey or raptors, and their eggs and nests. Current taxonomy places these species in three orders rather than the two stated in the Code: *Accipitriformes*, *Falconiformes*, and *Strigiformes*. These include owls, eagles, falcons, hawks, and vultures.
- “It is unlawful to take, possess, or destroy any birds in the orders *Falconiformes* or *Strigiformes* (birds-of-prey) or to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by this code or any regulation adopted pursuant thereto.”

[Section 3505](#)

- “It is unlawful to take, sell, or purchase any egret, osprey, bird of paradise, gaura, numidi, or any part of such a bird.”

[Section 3511](#) - Fully Protected Birds

- This section provides a list of bird species protected from take and possession for which there are no permits allowed except for scientific purposes.

[Section 3513](#) - References MBTA

- Migratory nongame bird as designated in the MBTA, or any part of such migratory nongame bird, except as provided by rules and regulations adopted by the Secretary of the Interior under provisions of the MBTA.

[Section 3801](#) – Exceptions

- House sparrows and European starlings are not protected by section 3503.

[Section 86](#) - Definition of Take

- To hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill.

Environmental Protection

[California Environmental Quality Act \(CEQA\)](#)

- It should be uncommon for routine tree care activities to require going through the CEQA process. However, tree care work that is part of a “project” as defined under CEQA would be required to undergo CEQA review and follow any mitigation measures resulting from the environmental document. In such circumstances, the CEQA environmental document supersedes the guidance provided here.
- “The term project refers to the whole of an action that has the potential, directly or ultimately, to result in a physical change to the environment (CEQA Guidelines Section 15378). This includes all phases of a project that are reasonably foreseeable, and all related projects that are directly linked to the project.” (UC CEQA Handbook 2002).

Riparian Habitat

[California Fish and Game Code Section 1602](#)

(a) “An entity may not substantially divert or obstruct the natural flow of, or substantially change or use any material from the bed, channel, or bank of, any river, stream, or lake, or deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake, unless all of the following occur:...”

Electric Utility

[Public Resource Code, Section 4292: Power Line Hazard Reduction](#)

- Poles and towers of electrical transmission or distribution lines in wildland areas must be at least 10 feet clear of any flammable vegetation.

[Public Resource Code, Section 4293: Line Clearance Guidelines](#)

- Electrical lines in wildland areas must be clear of vegetation at a distance depending on voltage. “Dead trees, old decadent or rotten trees, trees weakened by decay or disease and trees or portions thereof that are leaning toward the line which may contact the line from the side or may fall on the line shall be felled, cut, or trimmed so as to remove such hazard.”

[General Order 95, Rule 35: Tree Pruning](#)

- “Where overhead conductors traverse trees and vegetation, safety and reliability of service demand that certain vegetation management activities be performed in order to establish necessary and reasonable clearances the minimum clearances set forth in Table 1, Cases 13 and 14, measured between line conductors and vegetation under normal conditions, shall be maintained.”
- Summary of Table 1 (above) - For Supply Conductors and Supply Cables (750 - 22,500 Volts), the radial clearance of bare line conductors from tree branches or foliage must be 18 inches. The radial clearance of bare line conductors from vegetation in Extreme and Very High Fire Threat Zones in Southern California must be 48 inches.

Additional Resources

California Agricultural Extension Offices

<https://ucanr.edu/About/Locations/>

California Audubon Chapters

<http://ca.audubon.org/about/chapters>

California Department of Pesticide Regulation

<http://calpip.cdpr.ca.gov/county.cfm>

California Endangered Species Act Lists

<https://www.wildlife.ca.gov/Data/CNDDDB/Plants-and-Animals>

California Forest Practice

http://calfire.ca.gov/resource_mgt/resource_mgt_forestpractice

California Fully Protected Species

http://www.dfg.ca.gov/wildlife/nongame/t_e_spp/fully_pro.html

California Herps

www.californiaherps.com

California Natural Diversity Database (CNDDDB)

<https://www.wildlife.ca.gov/Data/CNDDDB>

California Rattlesnakes

<https://wildlife.ca.gov/News/snake-rattle-and-roll-rattlesnake-season-is-here1>

California Special Animals List

<https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=109406>

California Wildlife Habitat Relationships

<https://www.wildlife.ca.gov/Data/CWHR>

California Wildlife Rehabilitators

<https://www.wildlife.ca.gov/Conservation/Laboratories/Wildlife-Investigations/Rehab/Facilities>

Tahoe Regional Planning Agency Ordinances

<https://www.trpa.gov/wp-content/uploads/documents/TRPA-Code-of-Ordinances-2.pdf>

Appendix E - Hawai'i

Hawai'i is a global hotspot for tropical biodiversity and invasive species. Many **endemic** species have suffered extinction from urbanizing and landscape scale pressures, and there are significant efforts by community and government agencies to reverse this trend. With a few notable exceptions, most native and sensitive species are believed to live and breed primarily on designated conservation lands, and are rarely if ever sighted in urban, residential, or even rural or agricultural areas.

Minimizing Impacts to Wildlife

Since most native wildlife species appear to live and breed outside of the urban forest, arborists should focus on minimizing impacts to two special status species: the threatened white tern (*Gygis alba*) and the endangered Hawaiian hoary bat. The white tern (Manu-o-Ku) has been well studied, and the *Tree Care Guidelines and Best Practices of Manu-o-Ku Breeding Sites* was published in 2019 by the Aloha Arborist Association. It is recommended that everyone working in the Honolulu area read and follow these guidelines. However, at the time of this writing, little is known about roosting behavior of the Hawaiian hoary bat in the urban forest, and population sizes are relatively unknown. Hawaiian hoary bats occur on all of the main Hawaiian Islands. These bats feed nocturnally and roost in woody vegetation over 15 feet in height during the day. Tree care industry professionals should adhere to the guidelines provided by the Department of Land and Natural Resources in the most [recent Hawaiian Hoary Bat Guidelines white-paper](#) document.

The Best Management Practices framework in [Minimizing Impacts to Wildlife](#) (page 3), combined with these details specific to Hawai'i, are designed to decrease the impacts to wildlife in Hawai'i.

Project preparation

A desktop review can help to determine the Category of work to be performed. Assessing Categories in Hawai'i using breeding season can be difficult, as breeding seasons for different species vary widely. Habitat value and the potential presence of sensitive species in the area should determine the Category of work in these cases.

When assessing habitat value in Hawai'i, there are several types of sensitive habitats that tree care professionals may encounter in their work. Native forest, State of Hawai'i Department of Forestry and Wildlife (DOFAW) managed lands, and Natural Area Reserves are likely to have nesting native and special status species that could be sensitive to tree work.

Table 3. Hawai'i Categories

	Outside Tern Breeding Range	Inside Tern Breeding Range	Native Forest
Bat Pupping June 1 to Sept 15	Category 3	Category 3	Category 3
Bat Non-Pupping Season Sept 16 to May 31	Category 1	Category 2	Category 3

The white tern currently only breeds in dense urban areas of Honolulu, O’ahu, often in trees along busy streets and in highly-managed landscapes. Despite the low habitat value of the areas they breed in, because of their endangered status and their year round breeding season, any tree care planned within that range is Category 2 and should include a pre-work inspection by a **Wildlife Trained Arborist**. In Hawai’i, a **Wildlife Trained Arborist** is someone who has completed the training created by the Aloha Arborist Association.

To protect the Hawaiian hoary bat, the U.S. Fish and Wildlife Service recommends not removing or pruning woody vegetation greater than 15 feet tall during the pupping season, from June 1 through September 15. This bat’s range is not very well understood, and so this recommendation is intended for all vegetation on all Hawaiian Islands, including highly urban areas. Currently, there are no methods to determine whether bats are using the tree. It is likely that a **Wildlife Biologist** will recommend delaying the work, but nonetheless it is recommended to contact a **Wildlife Biologist** from the State of Hawai’i Department of Land and Natural Resources.

Managing Wildlife Habitat

Tree care professionals can support wildlife through their work in many ways, such as preventing the spread of invasive species and diseases, like Rapid ‘Ōhi’a Death, that destroy Hawaiian ecosystems. Tree care professionals can also plant and care for native Hawaiian plants and ecosystems through their work managing human-dominated landscapes. See the resources at the end of the section for planning, designing, and caring for native landscapes.

Wildlife

Special Status Wildlife

The Division of Forestry and Wildlife (DOFAW) maintains several lists of animals of special status.

- Species of Greatest Conservation Need: <https://dlnr.hawaii.gov/wildlife/hswap/>
- Injurious Wildlife: <https://dlnr.hawaii.gov/wildlife/invasives/injurious-wildlife/>
- List of Species of Indigenous Wildlife in Hawai'i
 - EXHIBIT 1 - Ch. 13-124
<https://dlnr.hawaii.gov/dofaw/files/2013/09/Chap124a-Ex.pdf>
 - EXHIBIT 3 - Amendment - Ch. 13-124
<https://dlnr.hawaii.gov/dofaw/files/2013/09/HAR-13-124-Draft.pdf>

Birds

Tree care professionals are most likely to encounter non-native bird species, like starlings and cardinals, throughout their work. The manu-o-ku, or white tern, is the native bird most likely to be encountered (see above). Native forest birds are almost never sighted in the urban landscape, but some can be present in wildland urban interface areas. The Hawaiian hawk, the `io, currently only found on Hawai'i Island, is the only native hawk in Hawai'i and is listed as endangered at the state level.

Mammals

The only endemic terrestrial mammal in Hawai'i is the Hawaiian hoary bat. Young Hawaiian hoary bats are called "pups." Bats are vulnerable to tree trimming during pupping season, as pups are unable to fly away. It is illegal to harm these bats. All other common mammals in Hawai'i have been introduced and are injurious to native Hawaiian ecosystems, such as rats, wild boar, and cats.

Reptiles

There are no terrestrial reptiles **endemic** to Hawai'i.

Insects

There is a high diversity of insects endemic to Hawai'i. The Blackburn's sphinx moth (*Manduca blackburni*) is listed as federally endangered and is thought to be threatened by roadway development.

Mollusks

Over 250 species of endemic tree snails are found throughout the forests of the Hawaiian Islands, many of which are endangered.

Protected Wildlife Not Native to Hawai'i

The Migratory Bird Treaty Act protects birds that are native to any part of the United States throughout the entire United States. Urban areas in Hawai'i often have bird species that are native to the United States but non-native to Hawai'i, such as the northern mockingbird, northern cardinal, and house finch. These birds are legally protected in Hawai'i.

Laws and Agencies

Agencies

State of Hawai'i, Department of Land and Natural Resources (DLNR), Division of Forestry and Wildlife (DOFAW, dlnr.Hawai'i.gov/dofaw/)

Laws

[Section 195D-4](#) - Endangered species and threatened species

[Section 183D-62](#) - Taking, injuring, or destroying wild birds prohibited.

- Except as provided in section 183D-61, no person shall intentionally, knowingly, or recklessly take, catch, injure, kill, or destroy, or attempt to take, catch, injure, kill, or destroy, any wild bird, or to keep or have possession of any wild bird, dead or alive, or to damage or destroy a nest of any wild bird.

Additional Resources

DOFAW Hawaiian Hoary Bat guidelines

https://dlnr.Hawai'i.gov/wildlife/files/2018/07/Bat-White-Paper-Guidance_2015-FINAL.pdf

DOFAW Natural Areas Reserve System

<https://dlnr.Hawai'i.gov/ecosystems/>

Hawaiian Hoary Bat Fact Sheet, DOFAW

<https://dlnr.hawaii.gov/wildlife/files/2019/03/SWAP-2015-Hawaiian-hoary-bat-Final.pdf>

Hawaiian Hoary Bat, USFWS

<https://ecos.fws.gov/ecp/species/770>

Hui Manu-o-Ku (information and breeding site map)

<https://www.whiteterns.org/>

Injurious Wildlife, DOFAW

<https://dlnr.Hawai'i.gov/wildlife/invasives/injurious-wildlife/>

Oahu Urban Garden Center

<https://cms.ctahr.Hawai'i.edu/ougc>

Plant Pono - Hawai'i Pacific Weed Risk Assessment

<https://plantpono.org/>

Rapid 'Ōhi'a Death

<http://www.rapidohiadeath.org>

Tree Care Guidelines and Best Practices for Manu-o-Ku Breeding Sites

<https://alohaarbort.com/tree-care-near-manu-o-ku/>

Wildlife Programs, DOFAW

<https://dlnr.Hawai'i.gov/wildlife/>

Appendix F - Nevada

Nevada is the most arid and mountainous state in the nation. At the same time, Nevada is a state of contrast and beauty with a wide variety of habitats and exceptional biodiversity. Given the aridity of the state, Nevada has contrasting areas of high biodiversity often associated with mountains and the increased precipitation they generate. Riparian areas can also generate high levels of biodiversity. Large riparian areas are critically important to migratory birds for both nesting and foraging, and for structure to rest in during migration.

In Nevada, the urban environment can also provide surprisingly diverse habitats for wildlife, and being in an urban environment does not exclude the possibility of rich nesting habitat. Urban areas often have resources not present in the surrounding environment, like fruit trees or large shade trees. Many areas in Nevada do not naturally support tree cover, and in many cases climate adapted, non-invasive, introduced tree species can perform well in the urban landscape.

Minimizing Impacts to Wildlife

The Best Management Practices framework in [Minimizing Impacts to Wildlife](#) (page 3) combined with these details specific to Nevada are designed to decrease the impacts to wildlife in Nevada.

Project Preparation

The desktop review can be done using resources publicly available online such as the [Western Association of Fish & Wildlife Agencies - Crucial Habitat Assessment Tool](#). If the desktop review finds sensitive areas, a **Wildlife Biologist** should be contacted.

Some areas have specific requirements for nest buffers that may be different than those recommended here. For example, the Tahoe Regional Planning Agency provides no activity “Disturbance Zones” for certain bird species for work performed within the area of their authority. Check with your local agencies about regional regulations.

While it is recommended to have the contact information of a wildlife rehabilitator on hand while performing tree work in case of an emergency, there may not be wildlife rehabilitators in all urban areas of Nevada. NDOW and Red Rock Audubon both maintain lists on their websites.

When assessing habitat value in Nevada, there are many types of sensitive habitats that tree care professionals may encounter in their work. An important example is riparian habitat:

- **Riparian areas:** It is common for arborists to encounter riparian areas where they could potentially impact sensitive wildlife. **Riparian areas** can be identified by their distinctive soils and vegetation, particularly

willows (*Salix spp.*), seep willow (*Baccharis spp.*), cattails (*Typha spp.*), and cottonwood (*Populus spp.*). This may include concrete channels when the associated riparian vegetation and soils are present.

- **Critical habitat:** Critical habitat has been designated for several species; for example, the southwestern willow flycatcher (*Empidonax traillii extimus*) has designated critical habitat within Nevada's riparian areas. Vegetation work within critical habitat should involve working with a **Wildlife Biologist** and the landowner or manager.

In southern Nevada, most wildlife breed between March 1 and August 31, while in northern Nevada, most wildlife breed between April 1 and August 31.

However, this varies by region and species. Some municipalities in Nevada have local restrictions on tree care activities during the breeding season.

Additional scrutiny during pre-work inspections of palm trees can help minimize impacts to nesting wildlife. Palm trees provide nesting habitat for a wide variety of avian wildlife, especially when the dead fronds that create the skirt are intact, but pre-work inspections can be difficult because of the dense, dead fronds and height of the trees. When working with palm trees with full skirts, pre-work inspections will likely require observing signs of nesting wildlife. Prior to pruning or removing palm trees, consider having a **Wildlife Biologist** conduct a pre-work inspection, or delaying work until the non-breeding season.

Considerations for Work Performed Near Active Nests

Nevada reaches extreme temperatures in the summer months. It is worth emphasizing the dangers of extreme heat to young nestlings. Adults will often shade nestlings and protect them from the sun before they develop their own thermoregulation. So, what might be a minor disturbance during cool times - for example, the parents leaving a nestling for a few minutes because of tree care - could be fatal on a June afternoon in Nevada. Additionally, maintaining sufficient nest cover is particularly important in locations with extreme temperatures. Work performed near active nests should consider site temperatures in determining the best course of action.

Managing Wildlife Habitat

In desert environments, palms are commonly planted and provide suitable habitat for a wide variety of wildlife. However, many city, town, and homeowner's associations in Nevada require palm skirts or dead palm fronds to be removed. When safe and appropriate, consider preserving the skirt for wildlife habitat.

Wildlife

Wildlife are often encountered in an urban setting. The specific wildlife and types of challenges they present will vary by region and activity.

- The Nevada Department of Wildlife maintains lists of protected, threatened, and sensitive animals in Chapter 503 of the Nevada Administrative Code: <https://www.leg.state.nv.us/NAC/NAC-503.html>
- A total of more than 480 species of birds have been recorded in Nevada, and of these, 300 species have either nested or are estimated to occur with regularity in the state.
- Raptors have special status under Federal and Nevada state law, and their nests warrant a different level of protection.
- Some species of squirrels that use trees for breeding, foraging, and resting are protected under Nevada law.
- Of the 23 species of bats in Nevada, four of these species have state “protected” status, four species have an elevated “sensitive” status and one species (spotted bat *Euderma maculatum*) has “threatened” status.
- Nevada has 52 species of reptile known to inhabit the state. Reptiles can use trees for a variety of reasons but are unlikely to lay eggs in trees. Although encounters in urban areas are rare, riparian areas can increase the likelihood of encountering reptiles.

Laws and Agencies

Agencies

- Nevada Department of Wildlife (NDOW) (ndow.org) - state agency that oversees wildlife and wildlife laws within the state.
- Nevada Division of Forestry (forestry.nv.gov) - state agency that provides natural resource services and wildfire management.
- Nevada Heritage Program (heritage.nv.gov) - non-regulatory state agency that provides information on Nevada’s rare and endemic species.

Wildlife Laws

- NRS 501: Definitions of wildlife categories in Nevada
<https://www.leg.state.nv.us/NRS/NRS-501.html#NRS501Sec088>
 - NRS 501.055 As used in this Title, “migratory game birds” means and includes the band-tailed pigeon, the mourning dove, *the white-winged dove*, the Anatidae or waterfowl, commonly known as geese, brant, swans, river and diving ducks, the snipe, the rails and the coots.
 - NRS 501.088 “Took,” “taken,” “taking” and “to take” defined. The words “to take” and their derivatives, “took,” “taken” and

- “taking,” when used in reference to wildlife, mean to kill, capture, shoot, trap, catch, wound, possess, collect, seine, snare or net, and every attempt to do so.
- NRS 501.095 As used in this Title, “upland game birds” means and includes the sagehen and sagecock [,] *and all other grouse*, wild turkey, [pheasant,] *all pheasants*, bobwhite quail, mountain quail, valley quail, Gambel’s quail [,] *and all other quail*, and Hungarian, chukar and all other partridge.
 - NRS 501.097 “Wildlife” defined. “Wildlife” means any wild mammal, wild bird, fish, reptile, amphibian, mollusk, or crustacean found naturally in a wild state, whether indigenous to Nevada or not and whether raised in captivity or not.
 - NRS 503 Current list of: protected, game, and pest species. Regulatory actions surrounding wildlife. <https://www.leg.state.nv.us/NAC/NAC-503.html>
 - NRS 503.595 Prevention or alleviation of damage caused by wildlife. After the owner or tenant of any land or property has made a report to the Department indicating that such land or property is being damaged or destroyed, or is in danger of being damaged or destroyed, by promulgate, cause such action to be taken as it may deem necessary, desirable and practical to prevent or alleviate such damage or threatened damage to such land or property.
 - NRS 503.610 Protection of bald eagle and golden eagle. Except as otherwise provided in subsection 2, it is unlawful for any person, firm, company, corporation or association to kill, destroy, wound, trap, injure, possess dead or alive, or in any other manner to catch or capture, or to pursue with such intent the birds known as the bald eagle and the golden eagle, or to take, injure, possess or destroy the nests or eggs of such birds. The Department may issue permits to take bald eagles or golden eagles whenever it determines that they have become seriously injurious to wildlife or agricultural or other interests in any particular area of the State and the injury complained of is substantial and can only be abated by taking some or all of the offending birds. The issuance of such permits must be consistent with federal law.
 - NRS 503.620 Protection of birds included in Migratory Bird Treaty Act. Except as otherwise provided by this title or a regulation adopted pursuant thereto, it is unlawful for any person to hunt or take any dead or alive birds, nests of birds or eggs of birds protected by that certain Act of Congress

commonly known and referred to as the Migratory Bird Treaty Act of July 3, 1918, as amended, 16 U.S.C. §§ 703 et seq., or protected by a regulation of the Commission.

Additional Nevada Resources

Birdwatching in Nevada

<https://www.audubon.org/news/birding-nevada>

Federal Endangered Species Known to Exist in Nevada

<https://www.fws.gov/office/southern-nevada-fish-and-wildlife/species>

Great Basin Bird Observatory Breeding Bird Atlas

<https://www.gbbo.org/breeding-bird-atlas>

Lake Tahoe Wildlife Care

<https://ltwc.org/>

NDOW - Commonly Asked Questions

<https://www.ndow.org/library/#>

NDOW Wildlife Rehabilitator List

<https://www.ndow.org/wp-content/uploads/2022/03/2022-2023-Rehabilitators.pdf>

Nevada's Bird Checklist

<https://www.gbbo.org/nevada-state-checklist>

Nevada Bird Conservation Plan

<https://www.gbbo.org/bird-conservation-plan>

Nevada Division of Forestry

<http://forestry.nv.gov/>

Nevada Division of Natural Heritage

<https://heritage.nv.gov/>

Nevada At-Risk Species

<https://heritage.nv.gov/documents/ndnh-current-tracking-list>

Nevada Watch Species

<https://heritage.nv.gov/documents/ndnh-current-watch-list>

Red Rock Audubon Wildlife Rehabilitator List

<https://www.redrockaudubon.com/contact.html>

Southern Nevada Water Authority Guide for Choosing Plants

<https://www.snwa.com/assets/pdf/water-smart-plant-list.pdf>

Tahoe Regional Planning Agency Ordinances

<https://www.trpa.gov/wp-content/uploads/documents/TRPA-Code-of-Ordinances-2.pdf>

University of Nevada Native Trees for Home Landscaping

<https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.558.95&rep=rep1&type=pdf>

Western Association of Fish & Wildlife Agencies, Crucial Habitat Assessment Tool

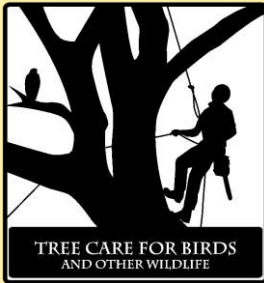
<https://wafwa.org/initiatives/chat/>

About the Authors

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