

United States Department of the Interior
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SOUTHERN NEVADA
COMMON RAVEN MANAGEMENT PLAN
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INTRODUCTION

This plan for common raven (*Corvus corax*: raven) management is an attempt to eliminate, to the extent practicable, the subsidies human development provides ravens, with the goal of reducing impacts to Mojave Desert Tortoise (*Gopherus agassizii*; desert tortoise, tortoise) and other sensitive species. For this plan to be successful, careful thought must be applied to the design of structures, methodology of development, materials used, and ultimately the adaptive measures taken to resolve issues during and after construction.

It is the mission of the Bureau of Land Management (BLM) to sustain the health, diversity, and productivity of public lands for the use and enjoyment of present and future generations. Multiple-use activities on BLM-managed lands include but are not limited to recreational uses, mineral extraction, environmental education, livestock grazing, lands and realty actions, and energy development. To aid consideration of potential effects associated with the variety of public land uses, the BLM provides policy for certain biological resources in its Manual 6840 - Special Status Species Management (BLM, 2008). These policies include: 1) conserve and/or recover species protected under the federal Endangered Species Act (ESA) and the ecosystems on which they depend so that ESA protections are no longer needed for these species, 2) to initiate proactive conservation measures that reduce or eliminate threats to BLM sensitive species to minimize the likelihood and need to list these species under the ESA, and 3) to manage the species and its habitat, once it is declared sensitive, to minimize or eliminate threats affecting the status of the species or to improve the condition of the species' habitat.

Since the Mojave population of the desert tortoise was listed as threatened on April 2, 1990, under the Endangered Species Act (U.S. Fish and Wildlife Service, 1994), the BLM has identified management actions to address impacts of various land-use activities. Relative to energy development, potential impacts to desert tortoise include the installation and operation of power generation facilities, transmission lines and tie-ins, and other infrastructure. The BLM assesses the potential for direct effects such as take¹ of ESA-listed species during project construction, operation and maintenance, habitat loss, and fragmentation. Indirect impacts attributable to post-construction include access-related disturbances via increased frequency of vehicle use on new and existing maintenance roads and increased vulnerability of desert tortoises to predation. Predators commonly investigate project areas to scavenge and to hunt displaced or exposed prey. Avian predators often take advantage of the new perching and nesting subsidies afforded by power transmission projects, notably tower structures and substations (APLIC, 2006; Lammers and Collopy, 2007).

Over the recent past, raven numbers have increased in the Mojave Desert (Sauer et al., 2020; Harju et al., 2021). This population expansion is driven by human population growth and development in the Mojave Desert ecoregion (Boarman, 1993; Boarman, 2003; Perry and Dmi'el, 1995; Cunningham et al., 2015). Ravens readily use structures associated with power

¹ "take" includes harassing, harming, pursuing, hunting, shooting, wounding, killing, trapping, capturing or collecting, or attempting to engage in any such conduct.

lines for nesting and perching (Sherman and Knight, 1992; APLIC, 2006; Lammers and Collopy, 2007).

Multiple studies have documented raven use of structures from human development and energy development (Sherman and Knight, 1992; Steenhof et al., 1993; APLIC, 2006; O’Neil et al., 2018; Shurtliff and Whiting, 2020). In one study, ravens spent 51% of non-flight time on transmission towers and other infrastructure in the eastern Mojave (Sherman and Knight, 1992). Another study showed 81 raven pairs nesting on transmission structures within 10 years of constructing a transmission line across Oregon and Idaho, (Steenhof et al., 1993; APLIC, 2006). These studies are reflective of observations by BLM staff in the BLM-Southern Nevada District Office (SNDO; Myers, 2022). Raven ability to quickly adapt to anthropogenic structures, in areas where such resources (e.g. nesting and perching sites) are typically limited, provides opportunities for ravens to expand their area of use to areas otherwise unavailable (Knight and Kawashima, 1993; Steenhof et al., 1993; Coates et al., 2014; Howe et al., 2014). Raven expansion into new areas is of concern when raven diets include special status species, especially threatened and endangered species (Boarman and Heinrich, 1999; Coates et al., 2008; Coates and Delehanty, 2010; Manier et al., 2013; Lau et al., 2021).

As raven populations have increased in the Mojave, raven predation on hatchling and juvenile desert tortoises has adversely affected recruitment and shifted dynamics of desert tortoise populations to skew toward older age classes (Berry et al., 1986). Insufficient recruitment is expected to occur in areas with an average raven density of more than 0.89 ravens per square-kilometer or that are located within 1.72 kilometers of an active raven nest (Holcomb et al. 2021). Therefore, minimizing raven nesting and perch sites is an important step toward reducing raven predation and increase young desert tortoise survival, thereby improving the dynamics of tortoise populations.

Raven predation and other associated impacts to sensitive species are not unique to the Mojave Desert (Boarman and Heinrich, 1999; Coates et al., 2008; Coates and Delehanty, 2010; Manier et al., 2013; Atkinson et al., 2021; Lau et al., 2021; Strong et al., 2021). For example, Greater Sagegrouse (*Centrocercus urophasianus*) nest success is impacted by ravens and is a conservation concern in sagebrush ecosystems (Coates et al., 2008; Coates and Delehanty, 2010; Manier et al., 2013). The addition of perching, roosting, and nesting sites resulting in increased predation potential by ravens on special status species has necessitated the development of this plan.

In addressing impacts involving special status species, avian management considerations include compliance with the Migratory Bird Treaty Act of 1918 (MBTA) and its subsequent amendments (16 U.S.C. 703-711). A 1972 amendment to the MBTA provided legal protection to corvids, which ravens are a part. In brief, it is illegal for anyone to take², possess, import, export, transport, sell, purchase, or barter any migratory bird or the parts, nests, or eggs of such a bird

² “Take” under Migratory Bird Treaty Act means to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture, or collect. [https://www.ecfr.gov/current/title-50/chapter-I/subchapter-B/part-10/subpart-B/section-10.12#p-10.12\(Take\)](https://www.ecfr.gov/current/title-50/chapter-I/subchapter-B/part-10/subpart-B/section-10.12#p-10.12(Take))

except under the terms of a valid permit issued pursuant to Federal regulations³. Concerning energy development, the Avian Power Line Interaction Committee (APLIC) addressed electrocution/collision risks to large birds and indicated the benefits power structures offer to raptor conservation. However, little discussion has been lent to the consequences of avian predators exploiting localized food resources inclusive of special status species such as desert tortoise. This Plan focuses on Common Raven, a bird protected under the MBTA, but which also deserves attention when conflict is implicated with the conservation of special status species. This Plan is the collaborative effort of the BLM, U.S. Fish and Wildlife Service (USFWS), and Nevada Department of Wildlife (NDOW).

COMMON RAVEN BIOLOGY

Corvids are the largest of all passerines (i.e., songbirds), very intelligent, and highly adaptable to a wide range of habitats and food items, allowing them to thrive in human-altered environments (Boarman and Heinrich, 1999; USFWS, 2008; Howe et al., 2014). Common ravens are diurnally active (daytime hours), year-round residents of the Mojave and Great Basin Deserts. While ravens are generally omnivores, they are successful predators of arthropods, amphibians, reptiles, birds (adults, chicks, and eggs), and small mammals (Sherman, 1993). In the Mojave Desert, ravens spend an equal amount of time scavenging and hunting live prey (USFWS, 2008). They have been documented foraging within 1.6 km (1 mile) of linear rights-of-way (roads, railways, transmission power lines, and telephone lines) and spending 49% of the time foraging directly on linear rights-of-way (Sherman, 1993). When human-provided food subsidies are present, ravens often concentrate their feeding at these food sources and may travel significantly shorter distances (Engel and Young, 1992). Ravens typically concentrate their feeding activity in the morning and late afternoon (Engel and Young, 1989; Sherman, 1993), which coincides with principal activity periods of desert tortoise. Boarman and Heinrich (1999) summarized raven nest material as made primarily of sticks of various origins including limbs broken from live sources or pieces collected from old nests. Nest building, incubation, and fledging of young generally occurs from late January through mid-June (Boarman and Heinrich, 1999).

PURPOSE

This Plan provides land and project managers measures intended to deter raven predation on special status species, especially hatchling and juvenile desert tortoise.

Implementing Avoidance and Minimization Measures (AMMs) and the Best Management Practices (BMPs) contained in this Plan will discourage raven occurrences within a project's cumulative effects area and not increase the rate of contemporary raven population expansion (Currylow et al., 2021). A reduction of ravens in the area will lead to reduced predation upon

³ Consult the *Code of Federal Regulations* Title 50 - Wildlife and Fisheries; retrieved online 9 Sept 2014 from: http://www.ecfr.gov/cgi-bin/text-idx?tpl=/ecfrbrowse/Title50/50tab_02.tpl.

desert tortoise and other sensitive species. In this respect, the intent is *not* to eliminate existing raven populations but rather to maintain ravens at or below the thresholds mentioned above (0.89 ravens per square-kilometer (determined by USFWS)) and exclude nests within 1.78 km of potentially affected sensitive species; (Holcomb et al. 2021).

USFWS published *Management of Conflicts Associated with Common Ravens in the United States: A Technical Review of the Issues, 2023* (USFWS, 2023). This document and the USFWS document are in partnership and strive for similar goals: The reduction of conservation conflicts associated with common ravens. The USFWS document addresses the issue across the Western US. Prescriptions from USFWS are based on regional data and regional management strategies to maintain raven populations at a regional population level. This plan (i.e. the BLM's) is focused on more localized management of ravens on projects approved by the BLM and strives to prevent the expansion of ravens at the local level due to projects approved by the BLM. Methods at the project scale are not always successful due to raven intelligence and persistence. Techniques that have been shown to work in the area are promoted, but adaptive management is required in order to keep raven populations and their impacts at a manageable level.

The goal of this plan is to:

- 1) Identify AMMs and BMPs ensuring the design of power lines and other infrastructure either eliminates or minimizes perching, roosting, and nesting opportunities.
- 2) Minimize the potential for ravens to occupy project sites during all phases of development and use (i.e., construction, operation and maintenance, and decommissioning).
- 3) Ensure ravens and other wildlife do not have access to human provided subsidies. This includes feeding and watering opportunities as well as perching and nesting sites.

AMMs and BMPs will lead to the following outcomes:

- Discourage proliferation of ravens found preying on desert tortoise and other special status species.
- Minimize the potential for ravens exploiting habitat within the cumulative effects area.
- Availability of alternate subsidized food and water resources associated with projects are precluded altogether or are limited and temporary in nature.
- Prevention of subsidized nesting and perching opportunities to the greatest extent practicable.

Effectiveness of implemented AMMs and BMPs will be monitored throughout the life of a project as identified within this Plan. Adaptive management is inherent to the Plan and is required to ensure existing raven AMMs and BMPs are effective. Innovative methods to reduce raven impacts may be allowed as opportunity arises and approved by the BLM.

Projects subject to this Plan are those that may incidentally introduce food and water subsidies or involve installation of structures⁴ that would or may provide suitable sites for raven perching, roosting, and nesting.

AVOIDANCE AND MINIMIZATION MEASURES (AMM) and BEST MANAGEMENT PRACTICES (BMP)

General

Reduce access to food

1. A litter and waste control program shall be implemented, and the project area will be kept free of waste for the life of the project and may be inspected by the BLM during any phase of project construction, operation and/or decommissioning.
2. The project-specific environmental awareness program will inform all personnel they are prohibited from intentionally feeding ravens and other wildlife.
3. All workers (for construction, O&M, and decommissioning) are prohibited from intentionally feeding ravens and other wildlife on site or in the vicinity of the project site.
4. Waste and food items will be disposed of properly in predator-proof containers with predator-proof lids, and waste containers will be emptied on a schedule so as not to allow overflow of the container. Waste will be disposed of in a certified landfill.
5. Plastic bags containing waste will not be left out for later collection nor loose in the backs of pickups where ravens have access.
6. Roadkill and other dead animals found on site will be disposed of properly in predator-proof containers with predator-proof lids upon discovery.

Limit water sources

7. Water is a limiting resource which attracts ravens and other animals to project sites. Reducing water availability will reduce attractiveness of a site to ravens.
8. Ravens and other wildlife must be excluded from all ponds constructed for the project (evaporative or storage).

⁴ Structures including but not limited to transmission towers, substations, communication towers, meteorological towers, solar energy heliostat arrays, and wind turbines.

9. If ponds are required during construction or decommissioning phases, tortoise-proof fencing will be installed around the perimeter of each pond to prevent access by desert tortoises. Additionally, raven hazing techniques may also be required on a case-by-case basis.
10. All ponds will be lined to prevent leakage outside the pond area.
11. If ponds are being utilized by ravens, project biologists will work to dissuade use of the pond including netting of ponds and/or harassment (so long as it does not incur take of a bird or nest). See adaptive measures for further discussion. If initial efforts are not effective, contact the BLM to discuss further measures to dissuade raven use of ponds.
12. Equipment cleaning areas will be kept free of standing water.
13. Water used for dust suppression will be applied at a rate so as not to incur ponding.
14. Any water used for vegetation restoration or landscape irrigation will be delivered via a system which allows water to seep into the ground without ponding.
15. Irrigation systems will be regularly maintained to prevent leaks and ponding.
16. All water storage equipment and sites will be maintained to prevent leaks and ponding water (outside designated pond sites) at any time.
17. Project biologists will inspect fencing around ponds and note any use by ravens. If raven use is observed, methods to eliminate use (netting, harassment, etc.) will be implemented.

Prevent nesting and perch sites for ravens

18. Signs, fence posts, and/or equipment will not allow for perching to occur on site.
19. If observation of ravens perching occurs, measures will be taken to reduce perching by ravens. See adaptive measures for further discussion on preventing perching.

Transmission / Distribution lines

20. Transmission and distribution lines will be constructed in a way as to not promote nesting and to limit perching to the greatest extent practicable.
21. Burying transmission lines and distribution lines should be considered during planning and design of the line where practicable and next to existing disturbance such as roads.
22. Tubular structure types which limit flat horizontal surfaces, (such as monopoles, guyed-v, or tubular H-frames) with properly placed deterrents should be used. Surveys conducted by the BLM have shown these tower types reduce nesting potential when compared to lattice type structures.

23. Any towers installed using guy wires will have the wires fitted with visual markers to prevent collisions by migratory birds and for human safety.
24. In areas with no adjacent towers (or if adjacent towers are of the type reducing raven nesting), towers which have reduced nesting potential (see measure 22 above) must be placed. Wooden structures for lines do not count toward having an adjacent structure type that does not reduce raven nesting.
25. In Critical Habitat, Areas of Critical Environmental Concern (ACECs), and National Conservation Areas (NCAs) towers must be of a style that reduces nesting potential, regardless of proximity to other tower types.
26. When existing towers/structures are maintained or replaced, it is encouraged to replace the tower with a tower type which reduces nesting potential if not already of this type.
27. If reduced nesting potential tower types are not used, efforts to prevent nesting and perching must occur.

Monitoring during construction

(While the data collected during monitoring may be used in research projects. This monitoring effort is for the purpose of discovering problem areas and determining where actions are needed to dissuade raven nesting and prevent excessive raven impacts.)

28. Monitoring for ravens can be done simultaneously by the authorized desert tortoise biologists and/or desert tortoise monitors working on site during construction or maintenance (i.e., tortoise biologists/monitors may monitor for ravens while monitoring for tortoise).
29. Nests discovered on non-project structures should be reported to BLM with location, nest activity, and number of birds present.
30. Nests discovered during construction will be observed by an avian biologist to determine activity status. Once a nest has been determined inactive (either prior to an egg being laid or post fledging), the nest will be removed. (Nest removal must comply with all MBTA regulations. See Southern Nevada Nesting Bird Management Plan 2019 for further details of nest removal).

Biologist Qualifications

31. Project biologist(s) working and implementing this Common Raven Management Plan should be approved by the grant holder. Names of the approved biologist(s) will be submitted to the BLM and resumes made available upon request.
32. All biologists will have the following minimum qualifications:

- a. A bachelor's degree in biological sciences, zoology, botany, ecology, or a related field and
- b. 1 year of experience in biological fieldwork

During construction

- 33. Observations of ravens by any crew member will be reported to a biological monitor. Biological monitors will record the raven observation location (Latitude/Longitude), number of ravens, activity, and attractant (if any) which may have been attractive to ravens (Raven/Predator Observation data sheet attached below).
- 34. If multiple observations occur under similar conditions, biologist will determine the cause of the attractant and make effort to eliminate said attractant/condition.
- 35. Biologists will note trash (especially food waste) and its location if not properly disposed of. Methods to prevent further spread of trash will be implemented.
- 36. Biologists will inspect fencing around ponds and note any use by ravens. If excessive raven use is observed, methods to eliminate use (netting, harassment, etc.) will be implemented.

Operation & Maintenance

Post Construction Monitoring

(While the data collected during monitoring may be used in research projects. This monitoring effort is for the purpose of discovering problem areas and determining where actions are needed to dissuade raven nesting and prevent excessive raven impacts.)

- 37. Transmission lines and associated structures, communication towers, billboards, etc. will be monitored for the life of the project.
- 38. Monitoring must be completed from a vantage point where potential nesting areas are visible.
- 39. The grant holder will monitor for the presence of ravens in the vicinity of the project for the life of the project (see below for monitoring requirements). Additionally, other incidental predator observations (coyote, kit fox, badgers, etc.) will also be noted in the annual report.
- 40. Monitoring the first 3 years of operation will consist of inspecting structures each month during the nesting season (between February and June), then once each in the months of August and December. The BLM may require additional years of raven monitoring (see 48 below).
- 41. Roads along transmission lines will be driven at speeds of no more than 15 mph while

searching for ravens, nests, and raven reproductive behavior (e.g., carrying nest material, courtship, copulation). Binoculars and spotting scopes will be used to observe raven activity on the grant holder's lines and/or vertical structures and any adjacent transmission lines/structures.

42. Nests discovered on non-project structures should be reported to the BLM with location, nest activity, and number of birds present.
43. Nests discovered during monitoring surveys will be observed by an avian biologist to determine activity status. Once a nest has been determined inactive, the nest will be removed. (Nest removal must comply with all MBTA regulations. See Southern Nevada Nesting Bird Management Plan 2019 for further details of nest removal). Record and report any tortoise remains in the nest observed during removal.
44. Any nest removal will be included in the annual report to the BLM. (See annual report section for guidance on report)
45. Monitors will note the frequency of occurrence and behavior of ravens observed and other incidental predators, any nesting activity, tortoise remains (see under nest surveys below), and any notable occurrence or activity associated with the project.
46. Monitors will indicate in the annual report if ravens or predators are attracted to the area and/or have been provided a subsidy which would not normally be there without the project. (See annual report section for guidance on report)
47. If a human provided subsidy (perch, nest platform, food, etc.) is involved, the method of removing the subsidy, success or failure of the removal method, or the plan and schedule to remove the subsidy will be reported to the BLM.
48. After the first three years of monitoring, the BLM will make an assessment to determine the need to continue the initial schedule.
49. Once the BLM is satisfied raven nesting isn't occurring and general use by ravens has not increased because of the project and all problem areas have been addressed; monitoring can be conducted once annually (preferably during the latter portion of the nesting season (i.e., April, May, or June).
50. Once the BLM has determined raven activity has not increased by the project and any problem areas found on the project have been resolved, the annual inspection of nests can be conducted by general inspection crews during routine inspection, noting the location of any nests or raven activity. (However, any nests or excessive raven occurrences found needs to be inspected by a biologist (see above for qualifications)).
51. Any raven nest or excessive raven activity should be addressed properly (see item # 43 and # 45)

Tortoise remains survey under nests.

52. If nests are observed during monitoring, systematic searches (see under nest search data sheet and instructions for details) under each nest for tortoise remains will be conducted. *(Reminder, collection of tortoise remains as well as avian parts and nests requires a permit. Contact the BLM before collection of such items.).*
53. Tortoise remains and other prey item remains will be identified and documented with photographs.
54. If tortoise remains are found, contact the BLM by phone or email within 24 hours. Further action to remove the ravens may be undertaken (USFWS permits may be required).

Decommissioning of lines

55. Elevated structures, including utility poles and towers, will be removed when decommissioned and dormant. Any component which has become an integral part of the utility power grid will be operated and maintained as normal by the company utilizing the structure. Retained components will be included in the annual monitoring and reporting requirements of the company maintaining the structure.

Adaptive Management

(Ravens are famously resourceful and clever, demonstrating problem-solving abilities. Flexibility and a willingness to adopt new or experimental methods and measures are crucial for the effectiveness of any long-term raven management plan.)

56. Adaptive management should be responsive to identified problems occurring within any reporting year.
57. Where nests are found and removed, deterrents to discourage the building of a nest at the same location should be placed.
58. If removal of nests is not feasible in the short term, other methods of reducing raven impacts (such as egg oiling (see section below)) is required until the nest can be removed and methods of preventing future nesting are installed/implemented. (USFWS permits may be required)

Raven egg oiling

Egg oiling has been shown to be effective in the Mojave at controlling raven populations (Holcomb, 2023) and reducing potential raven impacts in the area. Therefore, egg oiling may be an option to help reduce raven impacts. Egg oiling will require close observation of the nest during the breeding season to time oiling properly. Coordination with the BLM and USFWS is vital in using this method effectively. Egg oiling also requires a migratory bird take permit from USFWS and coordination with NDOW. Any egg oiling activity must be included in the annual report.

Annual report

Annual reports of raven observations, raven surveys, and any raven management activities undertaken should be included in the biological annual report for the project. Annual reports should include summary results of any survey conducted, incidental observations, and the forms used to record data should be attached. (See data sheets at the end of this document)

Surveys with no raven observations should also be noted in the report. Any action taken to remove or dissuade raven activity should be discussed, and the results of the activity should be provided. Thoughts on why the action either failed, or worked is encouraged.

The annual report should be no more than five (5) pages (data sheets and attachments do not count toward the page limit) summarizing the activities of the year, not a full history of the project, the biology of ravens, nor the general impacts of ravens associated with the project (discussion of direct and specific raven impacts associated with the project is acceptable).

This Plan is a living document and will be revised and updated as innovative solutions are developed to minimize impacts, agency guidance is adjusted, and conditions of individual projects warrant. Additional project specific AMMs/BMPS may be required by BLM at any time to minimize impacts.

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Reporting and Data Sheets

Bureau of Land Management Southern Nevada District Office

Raven and Predator Observation Data Sheet

The biologist is responsible for completing this form and submitting it to the BLM in the Projects biological annual report.

Raven (or other predator) observations

Project/Line Section: _____ Date: _____

GPS : Lat (N) _____ Long (E) _____

Time: _____ Weather: _____

Observer(s): _____

Raven (Y/N): _____ Other species: _____

Species Activity: _____ # Individuals: _____

Attractant present:

Steps taken to alleviate attractant:

Bureau of Land Management Southern Nevada District Office
Raven/RAPTOR NEST LOCATION DATA SHEET (COMPLETE FOR ALL NESTS)

The biologist is responsible for completing this form and submitting it to the BLM in the Projects biological annual report.

Nest name: _____ Species: _____

Project/Line Section: _____ Date discovered: _____

GPS : Lat (N) _____ Long (E) _____

Time: _____ Weather: _____

Observer(s): _____ Nest: Active / Inactive / Unknown

Species Activity: _____ # Individuals: _____

Structure Type: Lattice / Wooden H / Monopole / Guyed V/ Other: _____

Sign / Mortality Present: _____

Nest Location on structure: Platform / Crossbeams / other _____.

Elevation of nest from ground (m): _____

Comments: _____

Bureau of Land Management Southern Nevada District Office

Ground Surveys Under Nests Data Sheet (COMPLETE FOR ALL NESTS)

The biologist is responsible for completing this form and submitting it to the BLM in the Projects biological annual report.

Tower #: _____ Date: _____

GPS: Latitude (N) _____ Longitude (E) _____

Observers: _____

Weather : _____

Species Nest: Raven RTHA Other: ____ Birds observed: (Yes / No) How many birds: ____.

Bird Activity: _____ :

<u>Item Found</u>	<u>GPS point</u> (tortoise only)	<u>Photo</u> (if taken(where stored?))	<u>Carapace Length</u>
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1.

2.

3.

4.

5.

6.

7.

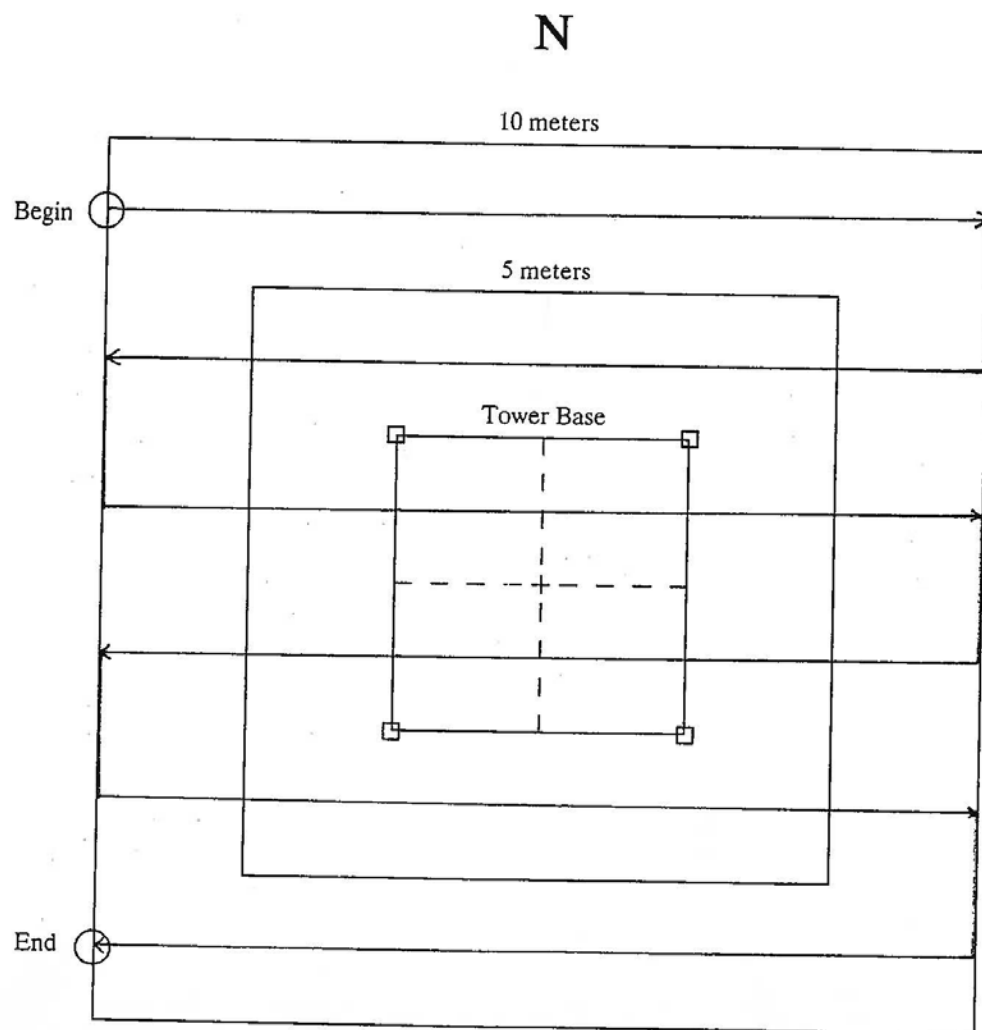
8.

9.

10.

Comments:

Figure 1. Grid pattern for how surveyor should systematically search the base of a utility tower for desert tortoise remains.



Bureau of Land Management Southern Nevada District Office

Avian Predation of Juvenile Desert Tortoises along Transmission Line Corridors

Protocol

1. As you approach each Nest, carefully scan the nest and surrounding area with binoculars for ravens and/or raptors (flying, perching, or nest). Some towers have solid plates at the top, which raptors and ravens will build their nests on. These nests can be difficult to see from the ground, so be sure to carefully look for sticks hanging over the edges of the plate at the top of each tower. Also look for nests at the lattice intersections on each tower.
2. When you arrive at a nest, fill out the Raven/Raptor Nest Location sheet and the top portion of the Under Nest datasheet.
3. Survey the area surrounding each nest for desert tortoise carcasses, bone or scute fragments, and avian predator sign including ravens and/or raptors flying, perching, nests (disarticulated or intact), feathers or fecal deposits ("white wash"). Systematically search under the nest and an area extending out 10 meters from the base.
4. Fill in the top portion of the datasheet for each nest. Note tower ID numbers do not always follow the 1-4 quarter mile naming sequence; be sure to check the tower ID number and record it during each survey. If the nest is not on a tower, give a unique name for the nest location and record this on the sheet.
5. If no desert tortoise carcasses or avian predator signs are noted, mark "NA." in the Items section. If multiple carcasses are observed at one Nest, use multiple rows in the items section. For each carcass found, record GPS point (NAD83), take a photograph (that can be attributed to the correct nest), measure the MCL if possible and remove the carcass. (Remember possession of T&E species and their parts is illegal unless a permit has been issued to do so. Remove the carcass/part to a spot where it will not be blown back under the nest in the future.)