

**RECOVERY AND CONSERVATION OF THE
GRAY-BANDED KINGSNAKE**



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ABOUT THE PLAN

Plan Review

The Recovery and Conservation Plan for the Gray-banded Kingsnake is a strategic-level document which provides guidance for the long-term management, conservation, and recovery of the gray-banded kingsnake in New Mexico. This plan was developed with the primary intent to meet statutory requirements for state recovery plans as described within the New Mexico Wildlife Conservation Act. Where possible, it has also been formatted to be consistent with New Mexico Department of Game and Fish long-range plans and other (federal) recovery plans.

This Recovery and Conservation Plan describes actions necessary to achieve downlisting of the gray-banded kingsnake (*Lampropeltis alterna*). The gray-banded kingsnake will be considered for downlisting to Threatened under the New Mexico Wildlife Conservation Act when: 1) additional localities of occurrence throughout areas currently considered as potential habitat are verified and the geographic distribution and habitat requirements of the species have been clarified, and 2) the development of a comprehensive set of conservation actions has been finalized and implemented for at least three years. Conservation and recovery actions address needs for 1) biological monitoring and research, 2) the development of educational and outreach materials to interested parties and potential cooperators, and 3) law enforcement needs for investigation of illegal collecting of gray banded kingsnakes.

The gray-banded kingsnake ranges from southeastern New Mexico and much of Trans-Pecos Texas southward into Mexico to northeastern Durango and western Nuevo Leon. There are only two verified specimen records from New Mexico; both are in southwestern Eddy County. It is likely that the species is limited to southwestern Eddy and southeastern Otero counties in New Mexico.

Gray-banded kingsnakes inhabit broken, rocky areas where they can access deep fissures and crevices for shelter and in pursuit of food. They are rarely found above ground during daylight hours. The secretive habits of this snake and ruggedness of terrain where it occurs make quantitative assessments of status impossible. However, we believe that the species is not locally abundant anywhere in New Mexico, and that its distribution may also be highly fragmented due to specific habitat needs, in which case individual populations may be small and unevenly distributed.

Unregulated take of gray-banded kingsnakes by commercial and private collectors is the most significant threat to the species in New Mexico. Specimens collected from New Mexico are highly desirable in the pet trade. Most collecting effort is conducted via road-cruising and spotlighting in suitable areas (such as limestone road cuts) and is concentrated along established roads.

Coordination and Consultation

This Recovery and Conservation Plan is based on information obtained during the listing investigations, input from public meetings and the advisory committee for this Plan, and research by Departmental staff and other experts. Public meetings were held in Carlsbad to seek input from private individuals and public officials who are interested in conservation of the gray-banded kingsnake. Advisory committee members were provided the opportunity to review and comment on many of the recovery strategies prior to their inclusion within this plan.

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Abbreviations Used Throughout This Plan

BLM = U.S. Bureau of Land Management

CCNP = Carlsbad Caverns National Park, U.S. National Park Service

NMDGF = New Mexico Department of Game and Fish

USFS = U.S. Forest Service

WCA = (New Mexico) Wildlife Conservation Act, 17-2-37 to 17-2-46 NMSA 1978

RECOVERY AND CONSERVATION OF THE GRAY-BANDED KINGSNAKE

Background and Situation Analysis Section

NATURAL HISTORY

CHARACTERISTICS

The family Colubridae, which includes the kingsnakes (*Lampropeltis* spp.), is the largest, most widespread, and diverse family of snakes, with few physical characteristics universal among all species. The family contains 70 percent of the known species of snakes, with more than 1700 species worldwide (Pough et al. 1998). Although some colubrids are dangerously venomous, most (including all New Mexico species) are harmless to humans. The gray-banded kingsnake has many of the characteristics common to many colubrids, including a head that is wider than the neck, large plate-like scales on the top of the head, and broad, overlapping scales (or scutes) on the ventral part of the body. The species is further distinguished by large, protuberant eyes, smooth and glossy body scales, and an often striking color pattern consisting of gray, orange, and black crossbands. So diverse are the color patterns seen in this species that the two variable color phases often referred to by kingsnake collectors (“alterna”, consisting of a gray background with narrow, blackish crossbands; and “blairi”, consisting of orange, black, and gray bands) were once recognized as taxonomically distinct forms (but see Remarks). Based on the specimens known from New Mexico and adjacent areas of western Texas, only the “alterna” phase likely occurs in New Mexico (Hakkila 1994) and is characterized by 15-23 thin, occasionally white-edged, black bands (sometimes split with red) separated by broad areas of light to medium gray. The black bands may or may not completely encircle the body. Total body length is typically 51 to 90 cm, but large animals may exceed 140 cm. Other characteristics of the gray-banded kingsnake are summarized by Degenhardt et al. (1996).

DISTRIBUTION

The gray-banded kingsnake ranges from southeastern New Mexico and much of Trans-Pecos Texas (east to Edwards County) southward into Mexico to northeastern Durango and extreme western Nuevo Leon. The only verified locality records from New Mexico are based on specimens from Eddy County taken on State Road 7 in Walnut Canyon, Carlsbad Caverns National Park, on 15 June 1991 (Painter et al. 1992) and on State Road 137 near El Paso Gap on 13 May 2001 (C. Lieb Pers. comm.). Other records from southeastern New Mexico are based on unconfirmed reports from snake collectors but suggest a range that includes much of the Guadalupe Mountains in Eddy County and the Otero Mesa area (including the Brokeoff Mountains) in Otero County. Based primarily on topography and geology, Hakkila (1994) mapped the potential range of this species to include much of the southern Sacramento Mountains foothills as far north as Alamogordo. However, it is most likely that the species is limited to southwestern Eddy and southeastern Otero counties. Presumably its range in New Mexico is influenced to a

large extent by elevation, moisture availability, vegetation type, and annual cold temperature extremes. Confirmed records are available from three Texas counties (Culberson, El Paso, and Hudspeth) adjacent to the southern border of New Mexico (Dixon, 2000).

HISTORICAL PERSPECTIVE

LEGAL STATUS AND AUTHORITY

The gray-banded kingsnake, *Lampropeltis alterna*, is listed by the New Mexico State Game Commission as Endangered (19 NMAC 33.6.8; first listed April 14, 2000, 19 NMAC 33.1.8). 17-2-41 NMSA 1978 annotated Section C states “It is unlawful for any person to take, possess, transport, export, process, sell or offer to sell or ship any species of wildlife appearing on the list of wildlife indigenous to the state determined to be endangered within the state as set forth by regulations of the commission”, except as otherwise provided in the WCA.

Texas laws require either a Nongame Dealer Permit or a Nongame /Collection Permit for collection of the gray-banded kingsnake, depending upon the number of specimens taken and/or the ultimate disposition of the specimens (Ref. Texas Administrative Code 65.330. Record and Reporting Requirements). The species is listed as Threatened in the Republic of Mexico (SDS 1994).

POPULATION STATUS

The secretive habits of this snake and ruggedness of the terrain where it occurs makes quantitative assessments of the population status very difficult. Throughout its known range, the gray-banded kingsnake was once believed to be among the rarest of North American snakes. Between 1901, the year of its original description, and 1940 only five specimens were formally described. Even up to the early 1970s, almost nothing was known about the natural history of this snake (Raun and Gehlbach, 1972). Miller’s (1979) study of the species in Texas indicated this paucity of information was due less to the snake’s rareness than its secretive habits. Nonetheless, population trend data are lacking even from the best known collecting localities in Texas.

Recent herpetological surveys in the Guadalupe Mountains of New Mexico that included a total of 65 person-days of field effort failed to produce additional observations of gray-banded kingsnakes (Koch and Painter 1996; Hibbitts 1997). We believe that the species is not locally abundant anywhere in New Mexico and that its distribution may also be highly fragmented due to specific habitat needs, in which case individual populations will be small and unevenly distributed. This should be especially true at the periphery of the snake’s geographic and ecological range in New Mexico.

HABITAT ASSESSMENT

Gray-banded kingsnakes inhabit broken, rocky areas where they can access deep fissures and crevices for shelter and in pursuit of food. Limestone cliffs, breaks, and deep rock piles are frequented, as are highway cuts through rolling limestone hill country. In Texas, it has been reported to most commonly occur on the summits of steep-sided rocky hills, especially where ephemeral stream channels originate (Miller 1979; Werler and Dixon 2000). Much of its range in Texas lies within the Chihuahuan Desert, and vegetation in these areas typically includes sotol (*Dasilyrion* spp.), lechugilla (*Agave* spp.), acacia (*Acacia* spp.), mesquite (*Prosopis* sp.), ocotillo (*Fouquieria splendens*), creosotebush (*Larrea tridentata*), and various species of cacti. In west Texas, the snake occurs from 450-1800 m (1475-5905 feet) elevation (Miller 1979), but most specimens apparently have been taken below 3000 feet elevation (Hakkila, 1994). New Mexico specimens were collected at 1160 m (ca. 3800 feet) and 1730 m (ca. 5675 feet) elevation, although other potentially suitable habitat ranges from 1070 to 2040 m (ca. 3510-6700 feet) in the state.

SUPPLY AND DEMAND ASSESSMENT

Discussion with law enforcement personnel from Santa Fe and Roswell confirm that an undercover investigation dealing with amphibians and reptiles in the late 1970's identified the gray-banded kingsnake as a highly sought-after species. Although no specific specimens were identified from New Mexico during that study, several were identified from adjacent areas of west Texas in similar habitats. Prices have ranged from \$500.00 per animal in the early 1970's to a low of around \$75.00 in the early 1980's. More recently, prices for captive bred hatchlings have ranged up to \$200.00, depending upon the source and the color pattern of the specimen. Snakes from different geographic areas may have distinct color and banding patterns. Therefore, the value of an individual gray-banded kingsnake may increase depending upon whether it originates from a more common or from a rare (such as New Mexico) collecting location within its range. Thus, the high value of the form known from southeast New Mexico makes New Mexico especially attractive to commercial snake collectors. However, the success of captive breeding of gray-banded kingsnakes has increased the number of captive snakes available. This has resulted in a decrease in the selling price of gray-banded kingsnakes in recent years, and has caused some reduction in the economic incentive for collecting this species from the wild.

ECONOMIC IMPACTS

The gray-banded kingsnake is a valuable species in the herpetocultural trade, with most that are traded a result of captive breeding. However, for some reptile breeders the demand for wild-caught individuals remains high to increase or retain genetic diversity in captive breeding stock. As a result, collecting pressure at well known sites may be high during certain times of the year when the snakes are thought to be most active. In New Mexico, the range of the species is remote and very limited. Therefore the number of individuals collecting the species in New Mexico is not as high as in certain well known areas of west Texas. Thus the individuals collecting in New Mexico do not represent a significant source of income to local businesses as they do at select collecting sites in

Texas. Because of the unique collecting locality and color morph of the gray-banded kingsnake from New Mexico, an individual specimen may be worth hundreds of dollars. Protection of the species from take may affect a small number of individual collectors who therefore may not profit from collecting the species.

The current listing status of the gray-banded kingsnake as State-Endangered is not expected to cause any adverse social or economic impacts to public or private interests in New Mexico. The New Mexico Wildlife Conservation Act contains no authority to designate critical habitat, nor to require consultation and concurrence for proposed actions within the potential range of State-Endangered species. Only the collectors who cannot collect free-ranging gray-banded kingsnake in New Mexico will be minimally impacted. To benefit conservation of the species, and as mitigation for protection of the New Mexico population of the gray-banded kingsnake, the Department is working to allow the possession and propagation of gray-banded kingsnakes that were legally collected in Texas or raised in captivity.

Much of the known habitat of gray-banded kingsnake occurs within CCNP and Guadalupe Mountains National Park and is therefore unavailable for resource extraction, i.e., oil and gas extraction, livestock grazing, or silviculture. Additionally, the rugged and remote nature of the habitat of the species makes it unsuitable for agriculture and greatly limits the usefulness to extractive industries. The negative impacts of tourism and off-road recreational activities are not considered significant impacts to the habitat of the gray-banded kingsnake.

Therefore, no detailed social and economic analysis is indicated, nor are any specific strategies (outside of Strategy 4.1) necessary to achieve the objective of avoidance or mitigation of adverse social or economic impacts, as required under the WCA.

Because there is no consultation necessary nor designation of critical habitat required under the WCA, we do not believe there is a need to identify further mitigation. We do not expect significant social or economic impacts as a result of the implementation of this Recovery and Conservation Plan.

SPECIAL CONSIDERATIONS

The gray-banded kingsnake rarely attempts to bite, although newly captured animals may discharge feces when seized. It is rarely found aboveground during daylight hours. In Texas, individuals are most often encountered traveling on the surface on moonless nights in May, June, and July, often immediately before or after summer rainstorms. The snake is intolerant of hot, dry weather conditions, and major drops in barometric pressure, signaling rain, appear to be an important stimulus for surface activity. The ratio of males to females in wild-caught Texas specimens is around 4.7 to 1, whereas this ratio in captive hatchlings is closer to the expected 1:1 (Miller 1979); these data suggest a collecting bias towards males that are presumably searching for receptive (i.e., reproductive) females.

Most information on reproduction is from captive specimens and has been summarized by Werler and Dixon (2000). Sexual maturity is reached between 1.5 and 2 years of age. Eggs are laid in May and June, and a second clutch may be laid in July or August. Hatching usually occurs in September, and the hatchlings are 21.6 to 29.9 cm TL.

In the wild, gray-banded kingsnakes apparently feed primarily on lizards, including skinks (*Eumeces* spp.), spiny lizards (*Sceloporus* spp.), whiptails (*Cnemidophorus* spp.), and greater earless lizards (*Cophosaurus texanus*); anurans such as canyon treefrogs (*Hyla arenicolor*) are also occasionally taken (Degenhardt et al. 1996). Presumably many of the lizard prey are captured at night when the lizards are inactive under surface materials. Small rodents also are eaten, and the domestic lab mouse (house mouse, *Mus musculus*) is a staple food item for captive specimens. This species apparently does not have the predilection for ophiophagy (“snake-eating”) exhibited by certain other kingsnake species.

A number of other reptiles that use rock fissures may be found in association with gray-banded kingsnakes including Trans-Pecos ratsnakes (*Bogertophis subocularis*), crevice spiny lizard (*Sceloporus poinsetti*), and corn snakes (*Elaphe guttata*).

Likely predators of gray-banded kingsnakes include ring-tailed cats (*Bassariscus astutus*), skunks (*Mephitis* spp. and *Conepatus mesoleucus*), badgers (*Taxidea taxus*), coyotes (*Canis latrans*), and nocturnal raptors such as great-horned owls (*Bubo virginianus*). Common kingsnakes (*Lampropeltis getula*) may also prey on this species. In areas bisected by roads, vehicle mortality and collectors may also provide additional “predation” pressure on a population.

Subspecific differentiation in the gray-banded kingsnake is difficult to assess given the extreme variability in color patterns seen among populations. Morphological characteristics used to differentiate the races *alterna* and *blairi* are inconsistent within populations or even within litters from the same female, which suggests that recognition of subspecies may be invalid (Gehlbach and Baker 1962; Gehlbach 1967). However, Hilken and Schlepper (1998) recently resurrected the names *L. a. alterna* for populations in New Mexico and Trans-Pecos Texas, and *L. a. blairi* for Texas populations east of the Pecos, and recognized a broad intergrade zone between the two. Crothers et al. (2000) followed this taxonomic arrangement.

CONSERVATION

Illegal take of gray-banded kingsnakes by commercial and private collectors is the most significant threat to the species in New Mexico. Although the effect of collection in Trans-Pecos Texas has not been studied in detail, concentrated efforts by a large number of collectors in a small geographic area could have an adverse impact on populations. Miller (1979) estimated that “well over a thousand *alterna* were removed [by collectors]” from the Langtry-Comstock area in Texas during the decade from 1969-

1979. Werler and Dixon (2000:149) stated that “possibly as many as 1,500 specimens” have been removed from the Trans-Pecos region by collectors since about 1970. Collecting pressure in Texas remained high in the 1990s with as many as 30 or more vehicles per night observed road-cruising suitable habitat in Val Verde County during optimal collecting periods. Anecdotal reports from long-time collectors in Texas suggest that roughly the same number of snakes are being taken each season as in the 1970s, but that the age structure of captured animals has shifted more toward juveniles and subadults (Troy Hibbitts, personal communication, 1996). Most collecting effort is conducted via road-cruising and spotlighting in suitable areas (e.g., road-cuts) and is concentrated along established roads. Therefore, roadless areas are not subject to any significant collecting pressure.

SUMMARY AND CONCLUSIONS

Within New Mexico, the gray-banded kingsnake has one of the smallest ranges of any of the snakes native to the state, being known from only two specimen records and a very small number of unverified sight records. As a result, the biology and population status of gray-banded kingsnakes is poorly documented in New Mexico. Because of its secretive nature and rugged habitat, detailed life history data of the species are difficult to obtain. The species is believed to be very rare in New Mexico because of the large number of collectors who routinely visit the potential habitat and the small number of specimens actually encountered. It is likely that take of even a small number of individuals from the New Mexico population could negatively impact the population status.

The gray-banded kingsnake is valuable and highly sought after by private and commercial collectors and breeders. Therefore conservation of the species should include strict enforcement of the current restrictions from take. Public awareness programs should be initiated within the habitat of the species, e.g., Carlsbad Caverns National Park.

Habitat loss or modification is not believed to be a significant threat to this species in New Mexico. However, the creation of new roads through suitable habitat could potentially increase the occurrence of road mortality and opportunities for illegal collection.

RECOVERY AND CONSERVATION OF THE GRAY-BANDED KINGSNAKE

MANAGEMENT STRATEGY SECTION

The New Mexico Wildlife Conservation Act directs the New Mexico Game and Fish Department to draft a Recovery Plan to achieve “restoration and maintenance of a viable population of the threatened or endangered species and its habitat reasonably expected to lead to the delisting of the species” (17-2-40.1 NMSA 1978). The strategies and actions within this plan are expected to be sufficient to secure the gray-banded kingsnake so that it is not in imminent danger of extirpation from the state. Due to the highly restricted distribution of this species in New Mexico, the actions identified may not be suitable to achieve full delisting under the Wildlife Conservation Act. However, the actions within this plan include a monitoring component that could provide further information on the distribution of the gray-banded kingsnake in New Mexico, and help to verify, or modify if necessary, the currently known range of this species.

The WCA defines four “objectives” to meet within Recovery Plans for state threatened and endangered species. Those “objectives” are:

- (1) restoration and maintenance of a viable population of the threatened or endangered species and its habitat reasonably expected to lead to the delisting of the species;
- (2) avoidance or mitigation of adverse social or economic impacts;
- (3) identification of social or economic benefits and opportunities; and
- (4) use of volunteer resources and existing economic recovery and assistance programs and funding available from public and private sources to implement the plan. [Section 17-2-40.1(E) NMSA 1978]

All of these “objectives” have been considered throughout the development of this Conservation and Recovery Plan, and are incorporated into the management strategies listed within this section.

GOAL:

The goal of this Recovery and Conservation Plan is that gray-banded kingsnake populations are sufficiently secured so that the species’ prospects for survival and recruitment within the state are not in jeopardy within the immediate future.

OBJECTIVE:

The recovery objective for this Recovery and Conservation Plan is that by 2006 gray-banded kingsnake recovery actions have been implemented to the extent that the species has been formally evaluated for possible downlisting to Threatened status under the WCA. An evaluation of downlisting will be based upon whether the species’ status in New Mexico reflects the following recovery criteria: 1) additional localities of occurrence throughout the habitat identified as potential (Hakkila 1994) in New Mexico

are verified, and the geographic distribution and habitat requirements of the species have been confirmed and clarified, and 2) a conservation strategy has been finalized, implemented and in effect for at least three years.

ISSUES AND STRATEGIES

Issue 1: Excessive take of gray-banded kingsnake, including that by commercial and private collectors, constitutes the most potentially significant threat to the survival and recruitment of the species in New Mexico.

Strategy 1.1: Emphasize law enforcement effort in locales and during times of high gray-banded kingsnake collecting interest.

Strategy 1.2: Evaluate the effectiveness of the recently enacted regulation for the protection of amphibians and reptiles [19-35-10, NMSA 1978] in precluding the gray-banded kingsnake from excessive collection.

Strategy 1.3: Partner with other agencies to increase awareness of gray-banded kingsnake conservation and recovery efforts and associated regulatory constraints among potential collectors and other interested parties.

Strategy 1.4: Reduce the incentive for collection of wild gray-banded kingsnake by authorizing captive breeding of legally possessed gray-banded kingsnake.

Strategy 1.5: Enlist the cooperation of existing law enforcement entities in detecting and deterring unauthorized collection of gray-banded kingsnake incidental to their current activities.

Issue 2: The gray-banded kingsnake occurs at sites under the jurisdictions of numerous entities that may be unaware of the potential negative impacts of their actions on the maintenance of gray-banded kingsnake habitat and populations.

Strategy 2.1: Maintain public and private land managers' and enforcement entities' awareness of geographic areas and human activities of concern in the protection of gray-banded kingsnake populations.

Issue 3: There are no historical distribution or population trend data against which the Department can evaluate the current or anticipated status of the gray-banded kingsnake or its habitat.

Strategy 3.1: Monitor and assess habitat and changes within the range inhabited by the gray-banded kingsnake.

Strategy 3.2: Alert the public and land management entities to the appearance and general distribution of the gray-banded kingsnake and solicit their voluntary reporting of sightings.

Strategy 3.3: Maintain a database of localities in which gray-banded kingsnake have been sighted.

Issue 4: Constraints upon the collection of free-ranging gray-banded kingsnake could cause adverse economic impacts to collectors.

Strategy 4.1: Mitigate adverse economic impacts on collectors by permitting the propagation and sale of gray-banded kingsnake possessed as a result of legal collection outside of New Mexico (e.g., in Texas) or resulting from captive breeding of legally possessed individuals.

Issue 5: The Wildlife Conservation Act [17-2-37 through 17-2-46, NMSA 1978] requires biennial review and recommendations regarding the status of New Mexico's threatened and endangered species.

Strategy 5.1: Conduct biennial reviews of the status of the gray-banded kingsnake in accordance with provisions of the Wildlife Conservation Act.

Strategy 5.2: Recommend downlisting of the gray-banded kingsnake at such time as:

- (1) Additional localities of occurrence throughout the habitat identified as potential (Hakkila 1994) in New Mexico are verified.
- (2) Distribution and habitat requirements of the species have been confirmed and clarified.
- (3) A conservation strategy has been finalized, implemented, and in effect for at least three years.

ACTION PLAN

The following actions will be conducted in support of the strategies for the conservation and recovery of the gray-banded kingsnake as expressed in this plan:

Strategy 1.1

Action 1: Perform saturation-type patrols during the times and within the areas of peak illegal collecting activity.

Action 2: Focus law enforcement activities on peak times for illegal collecting.

Strategy 1.2

Action 1: Obtain quantitative information regarding the extent and of illegal collecting activities. If found to be extensive, an undercover operation should be organized to attempt to determine the availability of gray-banded kingsnakes from New Mexico.

Strategy 1.3

Action 1: Develop a system for disseminating information among all parties concerned with protection of gray-banded kingsnakes from illegal collecting, including but not limited to NMDGF Conservation Services Division and Law Enforcement Division, CCNP, BLM, and USFS.

Action 2: Make contacts by law enforcement personnel from NMDGF and other agencies with potential gray-banded kingsnake collectors and other interested parties to increase visibility and awareness of conservation and recovery efforts for this species.

Strategy 1.4

Action 1: Allow (via permit under the WCA) limited captive breeding of gray-banded kingsnakes by those individuals who had legally possessed snakes collected outside of New Mexico prior to the listing as Endangered under the WCA in 2000. Permit requests shall be considered if and only if the purpose of possession and captive breeding is for scientific or biological (not commercial) purposes, as described within 17.2.42. (C) NMSA 1978. This precludes sale of gray-banded kingsnakes in New Mexico; however, it does not reduce the supply of captive gray-banded kingsnakes that could be used to reduce demand on wild-caught snakes. This action limits potential adverse economic impact on individuals with substantial investment in facilities to maintain and breed gray-banded kingsnakes which were originally obtained outside of New Mexico.

Strategy 1.5

- Action 1: Develop a list of contacts, definition of law enforcement responsibilities and jurisdictions, and identification of primary areas and activities of concern.
- Action 2: NMDGF Law Enforcement Division will coordinate enforcement needs and activities with CCNP, USFS, and BLM to investigate collecting activities within gray-banded kingsnake potential habitat.
- Action 3: Integrate law enforcement with existing duties of agencies involved.

Strategy 2.1

- Action 1: Identify locations and appropriate information for informative kiosks or other materials to be placed where they are most likely to be viewed by visitors, e.g., CCNP Visitors Center and BLM Carlsbad Office.
- Action 2: Coordinate with land management agencies and others to develop signs and other informational material containing information designed to increase public awareness and knowledge of Department interest in gray-banded kingsnakes and locations of their habitat.

Strategy 3.1

- Action 1: NMDGF will coordinate research efforts among all parties concerned with protection of gray-banded kingsnake, including CCNP, USFS, and BLM biologists. A thorough habitat description should be prepared at each locality known to be occupied by gray-banded kingsnake. Each description should include, but not be limited to: legal description, geology, vegetation, elevation, and site orientation. Each living specimen encountered by qualified individuals should be minimally photographed or immediately described in detail being especially careful regarding color notes. If encountered by a qualified individual, the living specimen should be palpated for stomach contents, sex determined (if female, individual should be palpated for reproductive condition), body length and tail measured, and mass taken. Living specimens should be released unharmed at the site where encountered. Specimens found dead on the road or elsewhere should be immediately frozen or placed on ice and the NMDGF District Officer or herpetologist should be immediately contacted. Detailed locality data should be provided with the specimen.
- Action 2: Regularly visit localities known to be occupied by gray-banded kingsnake to monitor habitat suitability and to track any natural or anthropogenic changes to the habitat.

Strategy 3.2

- Action 1: NMDGF Conservation Services Division will maintain a locality database

and coordinate education activities with CCNP, USFS, and BLM to insure that visitors to the area of potential gray-banded kingsnake habitat are aware of the appearance, distribution, habitat requirements, and legal status of the gray-banded kingsnake. Data on specific localities should not be disclosed unless necessary for recovery, as site specific information on the area of occurrence could increase the pressure at that site from overcollecting.

Action 2: Develop and widely distribute a gray-banded kingsnake Locality Reporting Form to increase the likelihood of receiving accurate gray-banded kingsnake locality data.

Strategy 3.3

Action 1: NMDGF Conservation Services Division will maintain a locality database of all verified or unverified gray-banded kingsnake localities.

Action 2: Conduct careful evaluations by the NMDGF herpetologist or other individual familiar with the habitat requirements of the gray-banded kingsnake each report and attempt to verify any reliable sighting.

Strategy 4.1

Action 1: Maintain and annually update a list of all individuals permitted to possess gray-banded kingsnakes under the WCA, with identifying information for each snake in possession.

Strategies 5.1 and 5.2

Action 1: Measure indices of the gray-banded kingsnake's status in New Mexico relative to recovery criteria established in this plan.

Action 2: Recommend the gray-banded kingsnake for downlisting as soon as established criteria are met.

General Implementation Schedule

(Costs include a “standard” rate of \$250/person-day for salaries + operating expenses.)

Year	Action	Task by Responsible Party	Est. Cost/Year
2002	Finalize Recovery and Conservation Plan and Reporting Form; develop computerized database of known localities; begin law enforcement activities; develop and provide educational materials to interested parties; Conduct Biennial Review and recommendations for the threatened and endangered species in New Mexico	Accumulate all available information on NM gray-banded kingsnake and organize as appropriate, NMDGF Conservation Services Division; implement law enforcement, NMDGF, CCNP, BLM, USFS; create informational materials, NMDGF, CCNP, BLM, USFS; prepare Biennial Review to include recommendations on the listing of gray-banded kingsnake	Complete plan,\$5,000; Law enforcement efforts,\$5,000; Info distribution: \$2,000; Research and permitting, \$1,000; GBKS part of Biennial Review, \$1,000. Total: \$14,000
2003-2005	Continue law enforcement; update educational materials and database; investigate any reliable sightings and characterize habitat; Conduct Biennial Review and recommendations for the threatened and endangered species in New Mexico (2004)	Coordinate law enforcement, research, and educational activities with appropriate private and public individuals and agencies, NMDGF (multiple divisions) and cooperators; prepare Biennial Review to include recommendations on the listing of gray-banded kingsnake	Law enforcement efforts,\$5,000; Info distribution: \$1,000; Research and permitting, \$1000; GBKS part of Biennial Review, \$500. Total: \$7,500
2006	Review available information and revise Recovery and Conservation Plan if needed; Review available information for consideration of downlisting; Conduct Biennial Review and recommendations for the threatened and endangered species in New Mexico (2006)	Review materials collected to date with all parties concerned with gray-banded kingsnake recovery, including advisory committee; revise materials as pertinent; NMDGF (multiple divisions); prepare Biennial Review to include recommendations on the listing of gray-banded kingsnake	Law enforcement efforts,\$5,000; Info distribution: \$1,000; Research and permitting, \$1000; GBKS part of Biennial Review, \$500. Total: \$7,500
2007-2009	Continue law enforcement; update educational materials and database; investigate any reliable sightings and characterize habitat; Conduct Biennial Review and recommendations for the threatened and endangered species in New Mexico (2008)	Coordinate law enforcement, research, and educational activities with appropriate private and public individuals and agencies, NMDGF (multiple divisions) and cooperators ; prepare Biennial Review to include recommendations on the listing of gray-banded kingsnake	Law enforcement efforts,\$5,000; Info distribution: \$1,000; Research and permitting, \$1000; GBKS part of Biennial Review, \$500. Total: \$7,500
2010	Review available information and revise Recovery and Conservation Plan if needed; Conduct Biennial Review and recommendations for the threatened and endangered species in New Mexico (2010)	Review materials collected to date with all parties concerned with gray-banded kingsnake recovery, including advisory committee NMDGF and cooperators; revise materials as pertinent, NMDGF Conservation Services Division; prepare Biennial Review to include recommendations on the listing of gray-banded kingsnake	Law enforcement efforts,\$5,000; Info distribution: \$1,000; Research and permitting, \$1000; GBKS part of Biennial Review, \$500. Total: \$7,500

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Appendix A: Public Review and Comments

Gray-banded kingsnake Conservation Plan: Issues and items addressed

1. Possible effects of listing and conservation and recovery efforts on present and future oil and gas development, livestock grazing, mineral extraction, road construction, and other habitat-altering activities within the range of the species.
2. Criteria by which NMDGF will determine if conservation and recovery have been achieved, including the methodology to be employed in status surveys. These criteria will include discussion of the goals by which the species could be considered "recovered" and thereby a candidate for de-listing, including the role of status surveys in conjunction with implementation of effective law enforcement actions.
3. The methodology by which NMDGF Law Enforcement will be used in supporting the conservation and recovery effort.
4. A protocol for coordinating status surveys and recovery and conservation efforts with surface landowners within the range of the species, in particular National Park Service (Carlsbad Caverns National Park).
5. Possible routes for linking recovery and conservation efforts to other existing wildlife protection and habitat protection/enhancement projects in SE New Mexico.
6. Possible economic opportunities, if any, that can be created in SE New Mexico in conjunction with recovery and conservation efforts.
7. A discussion of how present and future owners of gray-banded kingsnakes in New Mexico will be affected by the listing, and potential ways these individuals may be consulted or otherwise used in conservation and recovery efforts in NM (e.g., through voluntary survey efforts, captive-rearing, etc.).

Appendix B: Events and Benchmarks for Gray-banded Kingsnake Listing and Plan Development:

June 1991 -- First verified record of the gray-banded kingsnake in NM is made at Carlsbad Caverns National Park.

February 1992 -- Initial recommendation is made to NMDGF Endangered Species Program by agency herpetologist that the gray-banded kingsnake may warrant listing.

1995 -- Wildlife Conservation Act (WCA) is revised and new procedures for investigation and review of species proposed for listing are implemented (Sec. 17-2-40).

February 1996 -- As per the WCA (Sec. 17-2-40(B)), a request is sent to the six NM university presidents to identify peer reviewers to serve on an evaluation panel for the proposed listing of the gray-banded kingsnake.

5 April 1996 -- NMDGF director announces to public the initiation of an investigation to determine if the gray-banded kingsnake should be listed under WCA. A public repository file is created for all public and peer review comments pursuant to the proposed listing.

June 1999 -- Final comments and opinions are received from the peer review panel and the listing investigation is completed. A final report is provided to NMDGF director. Commercial collecting is identified as the largest potential threat to gray-banded kingsnake in NM.

9 September 1999 -- A recommendation to list the gray-banded kingsnake is presented to the Game Commission. Commission accepts the recommendation and a public comment period is initiated.

12-14 January 2000 -- Public meetings on the proposed listing of the gray-banded kingsnake are held in Carlsbad, Roswell, and Alamogordo.

14 February 2000 -- Public comment period for proposed listing ends.

3 March 2000 -- Gray-banded kingsnake is approved by Game Commission for listing as Endangered; listing becomes effective 31 March 2000.

11 October 2000 -- Public information meeting (as required under WCA Sec. 17-2-40.1(C)) is held at Carlsbad and public input on listing is acquired. An invitation to serve on the gray-banded kingsnake recovery plan advisory committee is made and about a dozen individuals sign up.

January 2001 -- Development of the gray-banded kingsnake recovery plan is assigned to CSD staff member

March 2001 -- A letter is sent out to all known and potential owners of gray-banded kingsnakes in NM requesting information on current holdings of gray-banded kingsnakes and identifying existing laws and regulations re: ownership of protected species.

Summer 2001 -- Last call to participate in advisory committee sent out. Draft recovery plan developed and one or more issues discussed in advisory committee meetings.

March 2002 --Draft Recovery and Conservation Plan is presented to State Game Commission for review and comment. Draft plan provided to advisory committee for final review; plan also provided via NMDGF web site.

May 2002--Revised Recovery and Conservation Plan is presented to State Game Commission for final approval.