Reptiles and Amphibians as Loggerhead Shrike Prey

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The Loggerhead Shrike (*Lanius ludovicianus*), also known as the Butcherbird, is a medium-sized, gray songbird that ranges throughout most of North America including Mexico (Yosef 1996). It commonly inhabits open landscapes with scattered shrubs, interspersed with grasses and forbs. Typical habitats include grasslands, scrublands, steppes, deserts, prairies, and savannas (Yosef 1996). It is famous for impaling prey on sharp objects, such as barbed wire, cacti, thorns, and even yucca (Yosef 1996, Reid and Fulbright 1981). The shrike may also store its kill between the forked branches of a shrub. Once an item is impaled, the shrike typically flies off, leaving the item behind; the impaling process may serve as a food cache method. For example, shrikes were observed visiting and pecking on the mummified carcasses of chorus frogs (*Pseudacris*) impaled on barbed wire for 8 months (Chapman and Casto 1972; see Figure 1).

Common prey items include invertebrates, such as grasshoppers and dragonflies, and vertebrates, such as birds, mammals, fish, reptiles, and amphibians. The shrike uses its hooked beak to kill vertebrate prey by precisely attacking the nape of the neck and then severing the cervical vertebrae in a series of bites (Yosef 1996). Prey is transported either by beak or talon, depending on mass (Yosef 1993). The talons are not as powerful and sharp as they are in raptors, such as eagles, hawks, or falcons. Although the Loggerhead Shrike has a hooked beak, it is not closely related to the raptors, order Falconiformes; it is actually a passerine in the order Passeriformes. The Loggerhead Shrike also has a tomial tooth in its upper mandible, which may serve as a mechanism to quickly penetrate the spinal cord, causing partial paralysis, making the prey easier to kill (Yosef 1996). Insects and other invertebrates are sometimes immediately eaten after capture; otherwise they are impaled. All vertebrate prey are killed or paralyzed, and impaled on sharp objects. Impaling has two main funtions: (1) to completely kill otherwise still living prey and (2) to compensate for lack of sharp talons; shrikes are able to feed from the thorn or barbed wire rather than having to hold prey down with their talons, as raptors do. Not all impaled prey items are consumed, however. Sloane (1991) found that 48% of the impaled prey was not eaten.

In a study of impaled prey of the Loggerhead Shrike in the Northern Chihuahuan Desert, Reid and Fulbright (1981) found 92 Round-tailed Horned Lizards (*Phrynosoma modestum*) impaled by Loggerhead Shrikes on Torrey yucca (*Yucca torreyi*). The impaled horned lizards usually faced outward from the yucca axis with the sharp leaves inserted through the head, neck, or thorax. The internal organs were missing along with the pelvis and hind legs. Other impaled lizard species usually had their head placed on the yucca blade or the entire body was inserted lengthwise through the cloacal area with the leaf point emerging from the thorax (Reid and Fulbright 1981).

Some researchers suggest that the shrike plays a part in the evolution of its prey. Young et al. (2004) suggested that Loggerhead Shrike predation drove the evolution of horn length in the Flat-tailed Horned Lizard (*Phrynosoma mcallii*). Shrikes picked the lizards with shorter horns, leaving longer-horned lizards alone, allegedly because lizards with longer horns were more effective in fight off shrike attacks. These longer-horned lizards in turn reproduced, passing the long horns to future generations. However, short-horned lizards were produced from time to time, becoming easy prey for the shrike.

Herein I provide a list of reptiles and amphibians reported in the literature as Loggerhead Shrike prey. The impaling behavior allows for easy inventory of Loggerhead Shrike prey items, aiding in the overall diet analysis of these unique birds. Some inventory studies, such as Sarkozi and Brooks (2003), reported that Loggerhead Shrikes impaled frogs, toads, snakes, and turtles, but did not identify them to species. These generalities are not included in the list. Common and Latin names are cross-referenced with Crother et al. (2008). Species occurring in Arizona (Enderson and Bezy 2010) are noted with an asterisk (*).

Figure 1. Impaled Sierran Treefrog, *Pseudacris sierra*, Alameda Co., California. Photo by Howard Clark.

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Common Name	Latin Name	Reference
ANURA — Frogs		
Northern Cricket Frog	*Acris crepitans*	Tyler 1991
Eastern Narrow-mouthed Toad	*Gastrophryne carolinensis*	Yosef and Grubb 1993
Green Treefrog	*Hyla cinerea*	Chapman and Casto 1972
Squirrel Treefrog	*Hyla squirella*	Yosef and Grubb 1993
Plains Leopard Frog*	*Lithobates blairi*	Tyler 1991
Southern Leopard Frog	*Lithobates sphenocephalus*	Yosef and Grubb 1993
Spring Peeper	*Pseudacris crucifer*	Chapman and Casto 1972
Sierran Treefrog	*Pseudacris sierra*	Clark, pers. obs.
TESTUDINES — Turtles		
Snapping Turtle*	*Chelydra serpentina*	Tyler 1991
Diamond-backed Terrapin	*Malaclemys terrapin*	Bent 1950
SQUAMATA — Lizards		
California Legless Lizard	*Anniella pulchra*	Fisher 1901
Six-lined Racerunner	*Aspidoscelis sexlineata*	Tyler 1991
Greater Earless Lizard*	*Cophosaurus texanus*	Reid and Fulbright 1981
Blunt-nosed Leopard Lizard	*Gambelia sila*	Montanucci 1965
Western Alligator Lizard	*Elgaria* sp.	Fitch 1935
Texas Horned Lizard*	*Phrynosoma cornutum*	Tyler 1991
Blainville's Horned Lizard	*Phrynosoma blainvillii*	Jennings and Hayes 1994
Desert Horned Lizard*	*Phrynosoma platyrhinos*	Pianka and Parker 1975
Round-tailed Horned Lizard*	*Phrynosoma modestum*	Reid and Fulbright 1981
Flat-tailed Horned Lizard*	*Phrynosoma mcallii*	Young et al. 2004
Southeastern Five-lined Skink	*Plestiodon inexpectatus*	Yosef and Grubb 1993
Common Sagebrush Lizard*	*Sceloporus graciosus*	Knowlton and Stanford 1942
Eastern Fence Lizard	*Sceloporus undulatus*	Reid and Fulbright 1981
Little Brown Skink	*Scincella lateralis*	Tyler 1991, Yosef and Grubb 1993
Coachella Fringe-toed Lizard	*Uma inornata*	Barrows 2006, Stebbins 1944
Colorado Desert Fringe-toed Lizard	*Uma notata*	Stebbins 1944
Common Side-blotched Lizard*	*Uta stansburiana*	Reid and Fulbright 1981, Wilson 1991
Carolina Anole	*Anolis carolinensis*	Yosef and Grubb 1993
SQUAMATA — Snakes		
Scarletsnake	*Cemophora coccinea*	Guthrie 1932
North American Racer*	*Coluber constrictor*	Tyler 1991
Ring-necked Snake*	*Diadophis punctatus*	Tyler 1991
Harlequin Coralsnake	*Micrurus fulvius*	Jackson and Franz 1981
Plain-bellied Watersnake	*Nerodia erythrogaster*	Tyler 1991
Rough Greensnake	*Opheodrys aestivus*	Bent 1950
Texas Ratsnake	*Pantherophis obsoletus*	Bent 1950
Graham's Crayfish Snake	*Regina grahamii*	Tyler 1991
Massasauga*	*Sistrurus catenatus*	Chapman and Casto 1972
Dekay's Brownsnake	*Storeria dekayi*	Guthrie 1932, Tyler 1991
Terrestrial Gartersnake*	*Thamnophis elegans*	Frye and Gerhardt 2001
Western Ribbonsnake	*Thamnophis proximus*	Tyler 1991
Common Gartersnake	*Thamnophis sirtalis*	Guthrie 1932
Lined Snake	*Tropidoclonion lineatum*	Tyler 1991
Parrot Snake	*Leptophis* sp.	Guthrie 1932

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Correction in Clark (2009)

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In Clark (2009) I discussed possible reasons for snout differences between the Blunt-nosed Leopard Lizard (*Gambelia sila*) and the Long-nosed Leopard Lizard (*G. wislizenii*). I attributed the isolation of these two species to mountain building events; in this case, the uplifting of the Transverse Range in southern California. It is true that this mountain range, along with the Sierra Nevada, separates the San Joaquin Valley from the Mojave Desert, but the uplifting of the Transverse Range was not responsible for the isolation of these two lizard species. The isolation event was likely due to a climate and vegetation change event. Best et al. (1990) states: "With return of less arid conditions at the end of the Xerothermic [8000-5000 years ago], the corridor between the Mojave Desert and the San Joaquin Valley was closed to most desert species." For example, the San Joaquin antelope squirrel (*Ammospermophilus nelsoni*) "… may have been isolated from *A. leucurus* by Wisconsin-age [~110,000 to 10,000 years ago] woodland in the Transverse ranges of California" (Best et al. 1990). The changes in climate and vegetation within the Transverse Range province are likely responsible for the isolation of these two lizards, as well as a plethora of other species, such as kit foxes, kangaroo rats, and antelope squirrels. The uplift of the Transverse Range occurred 1-2 million years ago (Jahns 1954), long before any of these species existed. I thank D. Germano, of CSU Bakersfield, for bringing this error to my attention.

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