

resented by populations with low chances of continued existence, then additional oak scrub needs to be protected despite the current representation of oak scrub on conservation lands. On the other hand, these analyses do help to show the poor representation of upland cover types on conservation lands in comparison to wetland cover types. Increased attention needs to be given to many upland cover types.

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### LOGGERHEAD SHRIKES EAT CRAYFISH

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Loggerhead Shrikes (*Lanius ludovicianus*) are opportunistic feeders that feed largely on invertebrates (Beal and McAtee 1912, Howell 1932, Craig 1978, Scott and Morrison 1990), although they may consume mammals when insects are scarce (Judd 1898, Kridelbaugh 1982). Graber et al. (1973) showed that shrikes adjust their diet according to prey availability, and even feed on road-kills (Robertson 1930).

John Condit, of the Ohio State University's Museum of Zoology, initially discovered that loggerhead shrikes caught and impaled crayfish (*Procambrinus alleni*; Hobbs and Hobbs 1991) at the MacArthur Agro-ecology Center of the Archbold Biological Station, in February 1991. This occurred on the territory of a shrike that had a shallow canal (~ 1 m deep) flowing through its boundaries. It is unusual for shrikes to prey on crustaceans, and to date reports have implied that only isopods have been taken as prey (Scott and Morrison 1990).

In September and October 1991, the author found crayfish remains at the feeding and impaling sites of seven shrikes, all of which had shallow canals in their territories. Twenty three crayfish were found impaled, 18 of which were still alive and moved their legs and claws in an attempt to free themselves. All were impaled on barbed wire, ventral side down, immediately behind the legs at the juncture of the cephalothorax and the abdomen.

I saw shrikes eating crayfish on eight occasions. The shrikes removed the claws and walking feet of the crayfish, prior to further handling and ingestion. They reimpaled the crayfish and pulled at the abdomen so that all visceral organs were pulled out, and then the crayfish was consumed. The whole process usually took about 15 min ( $\bar{x}$  = 14.73, SD = 3.5,  $N$  = 8). Shrikes consumed the crayfish within three hours from when impaled. On three occasions Boat-tailed Grackles (*Quiscalus major*) stole the impaled crayfish.

Shrikes processed crayfish only at certain impaling sites along the fence line. Five times I moved crayfish away from where they had been impaled, and the shrikes returned them to their original location. Shrikes impaled all crayfish within a 15 cm radius of a fence post, possibly because impaling them farther away from the fencepost requires the shrike to divide its attention between maintaining its balance and dismemberment of the prey.

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