

Western Ecological Research Center

Publication Brief for Resource Managers

Release:

February 2004

Contact:

Dr. Glenn D. Wylie

Phone:

707-678-0682 x616

Email:

glenn_wylie@usgs.gov

Dixon Field Station, USGS Western Ecological Research Center, 6924 Tremont Road, Dixon, CA 95620-9648

Bullfrogs are Significant Predators of Giant Garter Snake Young of the Year

The giant garter snake is a federally and state-listed threatened species found only in the Central Valley of California, and identifying sources of mortality are important in managing its recovery. As part of current research at Colusa National Wildlife Refuge (NWR), Colusa County, California, USGS scientists Dr. Glenn D. Wylie, Michael L. Casazza, and Michael Carpenter wanted to learn to what extent abundant, nonnative bullfrogs prey on these endemic aquatic snakes. Other studies have shown bullfrog predation on young water snakes (e.g., Mexican garter snakes) is thought to be a significant source of mortality for snake populations. Results of their study appear in a recent issue of *California Fish and Game*.

To evaluate predation by bullfrogs on giant garter snakes at Colusa NWR, the scientists collected 99 bullfrogs during three field seasons from 2000-02. Bullfrogs were collected at night from late July into September, when giant garter snakes typically give birth and young of the year are vulnerable to predation. Bullfrog stomach samples were sorted and food items were identified to the nearest discernible taxonomic level. Red crayfish were in 90 % of the bullfrogs and were usually the only food item. The scientists found 4 newborn giant garter snakes in the stomachs of 3 bullfrogs. They estimated the annual predation of neonates by bullfrogs to be about 22 % of the total number of young produced. Tail loss has been used as an indicator of bullfrog predation on larger snakes. The authors calculated a 20 % tail loss for all other size classes of giant garter snakes on the refuge.

Control of local bullfrog populations may improve survival rates for giant garter snakes. Even with mortality from bullfrogs and other predators, snake size

Management Implications:

- Bullfrogs are predators of young giant garter snakes.
- Bullfrog control in local areas may improve survival of giant garter snakes.
- Studies of the effects of bullfrog control need to be conducted.

classes indicate sustainable recruitment is occurring in the Colusa NWR giant garter snake population. Smaller bullfrogs and bullfrog tadpoles are a food source for giant garter snakes, and further studies are needed to determine the net effect of bullfrog removal on local giant garter snake populations.

Wylie, G. D., M. L. Casazza, and M. Carpenter. 2003. Diet of bullfrogs in relation to predation on giant garter snakes at Colusa National Wildlife Refuge. *California Fish and Game* 89(3):139-145.