

Studies of Great Basin Rattlesnakes on the INL Site: Behavioral Ecology of Pregnant Snakes

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The Great Basin Rattlesnake, *Crotalus oreganus lutosus*, is arguably the most abundant snake species on the INL Site. Because of research conducted by the Idaho Herpetological Laboratory at Idaho State University over the past three decades, the ecology of this snake is well documented. Great Basin Rattlesnakes form aggregations of sometimes several hundred individuals for overwintering underground. During their activity season, Great Basin Rattlesnakes make a lengthy migration away from and back to the overwintering site. The migratory routes taken are used for foraging, finding mates, and gestation by pregnant snakes. One component of this activity we know relatively little about is, what are the defining attributes of gestation sites chosen by pregnant snakes and if, and how, naïve newborn rattlesnakes born during the summer return to communal overwintering sites.

In 2018, a project was initiated on the INL site to locate gestation sites used by pregnant Great Basin Rattlesnakes and to conduct a preliminary radio telemetry of a few individuals and their corresponding offspring. Results indicate that pregnant snakes utilize rocky outcrops or large individual rocks for gestation. Eighteen different gestation sites were discovered in the southeastern portion of the INL site. Physical attributes (e.g., length, width, thickness, etc...) of these gestation rocks and nearby random rocks were measured and suggests that gravid females are not randomly choosing rocks for gestation but rather selecting rocks with certain attributes that may make them suitable for gestating young. In 2019, these gestation rocks and additional gestation rocks were measured for their thermal properties to test if pregnant snakes may be choosing rocks that maintain specific temperature ranges. Thermoregulation at appropriate temperatures is a leading hypothesis regarding the selection of gestation sites by pregnant snakes.



Within two weeks following the birth of newborns, post-parturient female snakes moved away from gestation rocks. In several cases, the newborn snakes left the rock as well. These females did not move toward the overwintering site but rather selected sites with rodent activity to apparently forage. This behavior would negate the hypothesis that newborns are returning to native overwintering sites by following pheromone trails of their mother. Additionally, no newborn snakes were observed near the foraging mothers. Three different patterns of newborn movement behavior were observed. If birth occurred near (within a few meters) the overwintering site, then newborns would easily move to the communal area. If birth occurred distant (e.g., >50 m) to the overwintering site, newborns would typically make movement forays away from the gestation rock. Some of these newborns would return and apparently overwinter near or at the gestation rock. Others would not return to the gestation rock area and would evidently have to seek alternative sites for overwintering. This work was preliminary and requires further research to better understand newborn movement behavior.

Two additional observations from this research are noteworthy. One suggests that the American Badger, *Taxidea taxus*, may be a primary predator of gestating Great Basin Rattlesnakes and their newborns. Three of the 18 gestation rocks showed evidence of soil excavation consistent with American Badgers digging, and at two of those rocks the occupying female had been killed. This suggests badgers may be able to specifically target gestation sites for foraging. Second, is that during rain events Great Basin Rattlesnakes would exhibit rain-gathering behavior. In addition to the Great Basin Rattlesnakes observed drinking, 8 gopher snakes (*Pituophis catenifer*) emerged from underground or from under rocks to drink pooled water. Such unified behavior suggests that the drinking of free water during sporadic rain events is significant for snakes within the Snake River Plain and the INL site.