

UNITED STATES DEPARTMENT OF THE INTERIOR, Douglas McKay, Secretary  
FISH AND WILDLIFE SERVICE, John L. Farley, Director

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CONTROL OF SNAKES

By William H. Stickel, Branch of Wildlife Research

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Introduction

"A weed is a plant out of place," and snakes, like plants, can be weeds when they occur where they are not wanted. Many snakes are beneficial because of the numbers of rodents and other pests they eat, but this seldom makes them welcome in yards and homes. Harmless snakes should be tolerated wherever possible, but some control may be needed when they are common at duck nesting marshes, bird sanctuaries, fish hatcheries, or around dwellings. Venomous snakes are dangerous enough to man and domestic animals that their control is justified to the limit of practicality except in wilderness areas and other nature preserves.

Before starting snake control, it is important to estimate the cost of the method you have selected, and to decide whether or not the expense and effort are justified. Too often control is practiced when it is neither needed nor economical. If extensive outdoor control is considered, it is advisable to get the opinion of your state fish or game experts on the merits of the program. Such advice may save much money by increasing effectiveness of the program or by preventing needless if not undesirable control. It is also wise to find out what kind of snake is making the trouble and to learn something of its habits.

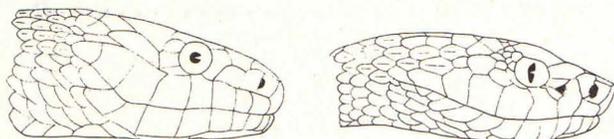
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This leaflet supersedes Wildlife Leaflet 257, Facts About Snakes (July 1944)

Snake control has been studied relatively little, and the Fish and Wildlife Service does not do research on the subject. This leaflet has been compiled in response to many inquiries. It describes various procedures that have proved useful under certain conditions. No single method works under all conditions, and at times it may be necessary to adapt two or more methods to fit circumstances. Information on other methods that have proved their worth will be welcome.

### Recognition of Dangerous Snakes

Harmless snakes greatly outnumber venomous ones. Most reports of venomous snakes from thickly settled parts of the country are based on mistaken identification of harmless species. Such mistakes and the fright they create are needless, for it is easy to tell if a snake that has been killed is of a dangerous kind. All rattlesnakes, copperheads, and cottonmouth water moccasins have an easily seen pit on each side of the face between eye and nostril (see drawing). They also have vertical pupils in their eyes (cat eyes). None of our harmless snakes have these pits. Vertical pupils are a little less reliable for identification, for they occur in a few southwestern snakes that are not dangerous. Also, vertical pupils may appear round at night or, occasionally, after death.



HEAD OF HARMLESS WATERSNAKE (*NATRIX SIPEDON*), LEFT, AND HEAD OF COTTONMOUTH WATER MOCCASIN, RIGHT. NOTE PIT AND VERTICAL PUPIL OF COTTONMOUTH. ALL DANGEROUS AMERICAN SNAKES EXCEPT CORALSNAKES HAVE PITS AND VERTICAL PUPILS.

Our only other dangerous snakes are coralsnakes. These are found in the South, from Arizona to North Carolina and Florida. They are marked with red and black rings separated by yellow or whitish rings, and they have black snouts. A few harmless snakes also have red, black, and light rings, but the red adjoins the black; those living within the range of coral-snakes do not have black snouts.

You can be quite sure that a snake of the United States is not dangerous unless it has pits or red rings bounded by yellow or white rings. North and west of coralsnake range, any snake without pits is harmless.

### Control Around Buildings

The question is often asked whether there is not some substance that can be sprayed or scattered around to repel snakes. Unfortunately, no successful snake repellent is known. The possible value of DDT powder is mentioned on page 4.

### Snake-proof fence

The best and most practical method known to keep venomous snakes away from a house is to put up a snake-proof fence. The fence will keep out

rattlesnakes, copperheads, cottonmouths, and many--but not all--harmless snakes. Costs of fencing a whole yard may be high but it costs little to enclose a play space for children who are too young to recognize dangerous snakes. The fence is made of heavy galvanized screen 36 inches wide and with  $\frac{1}{4}$ -inch mesh. The lower edge is buried a few inches in the ground. The fence slants outward from bottom to top at a 30° angle. Supporting stakes are inside the fence. Any gate must be tightly fitted. Gates should be hinged to swing inward because of the outward slope of the fence. There must be no openings under the fence; if any appear they should be firmly filled. Tall vegetation just outside the fence should be kept cut or killed with herbicide, for snakes might use the plants to climb over the fence. If children tend to crush the fence, it can be supported by more and sturdier stakes and by strong wire connected to its upper edge.

#### Persistent killing

Often the most practical way to control snakes is to club or shoot them when they are found. This is the best way to get rid of troublesome individuals around a house. Continual killing of all snakes seen in a limited area can greatly reduce their numbers. Venomous snakes are scarce enough in many localities that persistent searching and killing can keep them thinned out; it may eliminate them if they have few suitable areas in which to live in the vicinity.

#### Removal of food and cover

Snakes can be discouraged from staying about grounds and buildings by getting rid of food and cover that is attractive to them. Many snakes like to feed on mice and rats, so it is advisable to rodent-proof buildings and to keep rodents from food supplies. Directions for rodent-proofing can be obtained from the U. S. Fish and Wildlife Service.

Closely mowed lawns and fields are less favorable to snakes than areas of tall grass, weeds, and brush. Snakes like to hide under boards, flat rocks, trash piles and similar materials. Eliminate such shelter and the premises will be much less inviting to them. This approach may not be practical around farms, but is of real value at suburban dwellings, summer homes, and resorts. Along water margins, snakes hide under driftwood, rocks, and old boats. They sun on logs, old jetties, or brush hanging over water. They are seldom seen on clean, open beaches where they are exposed to enemies.

#### Snakes in houses

Snakes occasionally enter houses, sometimes by accident, sometimes when searching for hibernating quarters or hunting mice. They are almost always of harmless kinds. There is no need to fear that they will breed in the house, but they have been known to lay eggs in or under foundations. The problem is to get rid of the snake that has been seen and to prevent others from entering. If the snake can be found, disposing of it is simple. Often, however, a snake hides before it can be killed. A trick

that sometimes works in locating such snakes is to put wet cloths on the floor near where the snake is thought to be, and then cover the wet cloths with dry cloths or burlap bags. Snakes like moisture and shelter, so they tend to crawl under or between the cloths. Those found there can be disposed of.

Another measure that has been used is to dust 50% DDT powder on the floor next to the wall, into cracks, and onto ledges. This approach has not been tested experimentally, but it is known that DDT is very poisonous to reptiles. It is not likely that snakes would continue to live in a basement or attic heavily treated with DDT. The DDT powder will also kill mice and many kinds of insects. It should not be used where it may contaminate food, or where people are apt to stir up and breathe much of the dust, or where children or pets can get into it.

If these methods do not succeed within a few days, you will have to decide whether it is worth while to fumigate the building. From a practical view, one or two harmless snakes (that may have left the house already) do not justify the expense and trouble of fumigation, but this may be necessary for the peace of mind of a member of the family. A local exterminator should be employed if fumigation is done.

To keep other snakes from getting in the house, all points where they might enter must be blocked. This may be difficult and costly but is the only solution known. The main things to remember are that snakes can pass through extremely small openings, and that they usually get in near or below ground level. Cellar doors, windows and screens must fit tightly. Walls and floors should be searched for crevices. Masonry of foundations, fireplaces, and chimneys should be inspected and if necessary pointed up or coated with cement. Spaces around pipes that go through outside walls can be plugged. Galvanized screen can be fastened over drains or ventilators, or even over large areas of loose construction that otherwise could be made snake-proof only at great expense.

#### Use of domestic animals

The proficiency of turkeys in locating snakes and giving an alarm is so great that farmers and ranchers have been encouraged to keep a few turkeys if there are venomous snakes around the house. Turkeys cluster around any unusual object and their gobbling quickly attracts attention. Geese, ducks, and chickens will kill and eat snakes, harmless or venomous, of sizes they can manage. For best results, these birds should be fenced in the area that is to be protected.

Some dogs become expert snake killers, and others that do not kill snakes may detect them and give warning. Aggressive, noisy terriers should be adaptable to this work. A group of Welsh terriers is said to have cleared harmless snakes from the grounds of a country home. Some cats will kill small snakes, including venomous ones.

### Control at Fish Hatcheries

Two methods of control have proved practical at fish hatcheries. One is the snake-proof fence previously described. The other is persistent killing; this is slow, but has greatly reduced snake populations when continued for two or three years.

### Control Over Large Areas

The best way to control snakes over large areas is to attack concentrations of them at dens as described on pages 6 to 8. Other techniques can be used where dens do not occur or cannot be found. It is sometimes worthwhile for a resort owner, club, or other group to engage a paid hunter, who is or can become expert at finding snakes. Snake hunting may be one of the functions of guards or workmen on a property.

#### Poisoned water

A plague of gartersnakes at Inwood, Manitoba, apparently was stopped by use of water poisoned with nicotine. The method probably worked there only because of drought conditions; it is worth trying in arid regions and during unusually dry periods elsewhere. A mixture of one part of 40% nicotine sulfate (sold commonly as trade-named insecticide) to about 250 parts of water was used. Shallow metal trays nearly filled with the solution were placed in areas of snake concentrations. A screen to keep livestock and birds from the poison was held a short distance above each tray by stapling it to stakes driven in the ground. Two days after the trays were exposed the area around them was littered with hundreds of dead snakes, and no living snakes were seen in the village.

#### Funnel traps

Funnel traps with drift fences have given moderate reduction in snake numbers on a waterfowl nesting marsh. Many traps must be used for long periods to obtain satisfactory results, so the cost is considerable. The worst feature of these traps, however, is that huge numbers of all sorts of animals, including game and other legally protected birds, wander into them. These animals slowly die unless the traps are kept well shaded and visited with a frequency that has proved impractical. Consequently, the traps cannot be recommended for general use. Workers having particular need for such traps can find descriptions of them and discussions of their use in papers listed at the end of this leaflet.

#### Fumigation of burrows

Rattlesnakes often rest or hibernate in burrows made by other animals. They can be killed there easily with crude calcium cyanide. About two table-spoonsful of cyanide are placed in a single heap, deep in the burrow, by means of a long handled ladle. All entrances to the burrow are tightly stopped with sod or rock; loose soil will not serve because it may cover the

cyanide. Hydrocyanic gas is formed and diffuses through the burrow, remaining effective for several hours. This method works under a wide range of conditions, but may be unsatisfactory in rainy weather or when snakes are hibernating. Larger amounts of cyanide should be used in very large burrows or small caves. In general, two tablespoonsful of cyanide are enough for five cubic feet.

It must be remembered that cyanide and its gas are deadly to man and domestic animals. Store it in a safe place in an air-tight container and use only in open air.

Extensive gassing of burrows should not be done unless strongly needed, for many fur-bearers and other forms of wildlife are certain to be killed.

#### Use of hogs

Hogs are not immune to snake venom, but fat under the hide of adult hogs is so thick and releases venom into the system so slowly that they are seldom injured. Hogs will eat venomous snakes just as they will other animals, and there is little likelihood of snakes remaining where hogs are confined. Free-ranging hogs are of less value in snake control because their activities are not concentrated where they are wanted. A greater disadvantage to the use of free-ranging hogs is their wholesale destruction of game and much other desirable wildlife.

#### Control at Dens

Snakes hibernate in many sorts of places, singly or in large groups. Rattlesnakes may come from miles around to hibernate where small caves or rocky crevices are available. Hundreds of rattlers have been found at a single den, a condition that favors effective control. Den locations are often known to local people and others can be found by searching in likely places when snakes are sunning near dens just before hibernating in the fall and before leaving in the spring. Rattlers caught sunning can be shot or clubbed. Those in the den often can be trapped or gassed.

#### Den-trapping

The late A. M. Jackley of South Dakota caught hundreds of prairie rattlers by trapping them at dens. In using this technique all openings to the den--except one leading to the trap--are blocked by ramming in stones or wood, or by sealing them with concrete. Packed earth or sod are not sufficiently resistant. Large openings can be closed with screen tacked to a wooden frame that is set deeply in the ground.

The trap is a wood-framed box covered with hardware cloth. Good dimensions are 40 inches long, 32 inches wide, and 16 inches high. The top is removable. A wooden chute is firmly seated in the den opening and runs into the trap. The chute has an inside diameter of 4 or 5 inches. It opens a few inches above the floor of the trap; this prevents it from

being blocked by snakes piling up against it. The end of the chute that projects into the trap is cut at a 45° angle, so that the bottom projects farther than the top. The board covering this end of the chute has a 2¼-inch hole bored near its top. A piece of mica or weather-resistant, transparent plastic is hung loosely over the hole. One good way to hinge the flap is to cut two holes, each nearly as large as the head of a shingle nail, near the top of the flap and then drive a shingle nail through each hole and into the chute. These nails should project far enough that a snake can push up the flap and crawl out of the chute. As a snake leaves the chute the flap falls back into place and the snake cannot reenter.

Traps are set in early spring while snakes are still hibernating. Snakes seeking to leave the den can go only through the chute and into the trap. Traps should be kept shaded and visited frequently at this time in order that harmless snakes may be released and venomous ones may be killed or taken alive for venom production, display, or other purposes.

It is safest to remove dangerous snakes from traps by means of hooked sticks, noose sticks, or long tongs. Care should be taken in killing these snakes and in handling supposedly dead ones, for the head can inflict dangerous bites after it is cut off or the body has been cut in two. Break the neck and crush the head well to be sure a snake is put out of action.

#### Den gassing

Gassing of snake dens has not been studied sufficiently that specific instructions for it can be given. Experiments have shown that although the method is valuable there are several complications that must be considered in practice: 1. Size and shape of den cavity are usually unknown. One can allow for size by using enough gas to fill any likely amount of space, but he must decide whether to use a light or heavy gas on the probability of the snakes being above or below the point of application. Possibly a mixture of light and heavy gases could be used. 2. Snakes breathe slowly and can live for some time without breathing. This makes it necessary to maintain a killing gas concentration in the den for a considerable period. 3. Tests show that it is necessary to seal gas into the den, which is often difficult. Much gas may escape before taking effect if material of a den is cracked or porous. 4. Hibernating snakes breathe very little, which means (a) that gassing should be done in the fall soon after snakes enter the den or in the spring shortly before they leave it; or (b) that a contact or vesicant gas should be used if the work must be done in the winter.

Gases that have been used successfully include chlorine, tetrachloroethane, methyl bromide, carbon bisulfide, and formaldehyde. Tear gas and two types of chemical cartridges did not give good results. No doubt mustard gas, phosgene, and almost any other deadly gas will serve the purpose if (1) it is of the right weight or if it disperses throughout the den, (2) if enough is used, and (3) if the den is sealed tightly after

treatment. A number of reported tests apparently failed simply because dens were not sealed.

A gas that will kill snakes will also kill man; even a dose that does not kill may cause severe injury. Poisonous gases should be used only by professional exterminators, control experts, or others who are trained and equipped to handle them safely.

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