



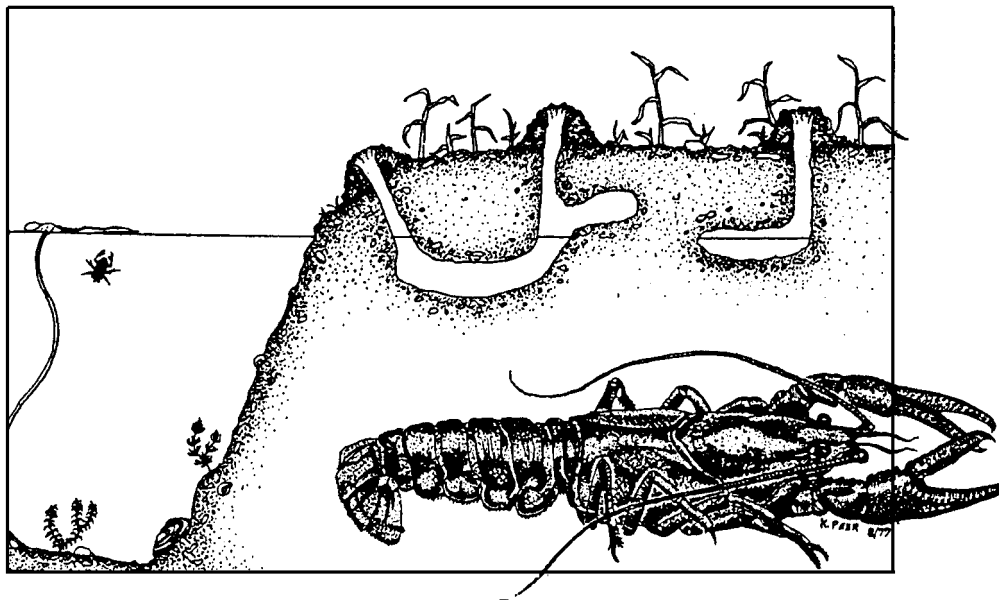
## The Control of Burrowing Crayfish in Ponds

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At times landowners may be confronted with serious water losses resulting from the sudden collapse or gradual deterioration of earthen pond dams, irrigation canals, and drainage ditches. Although the loss of water from small earthen impoundments is frequently due to faulty construction, it may also be the result of undetected biological forces. Burrowing animals such as muskrats, Norway rats, and particularly crayfish, construct their homes or "burrows" by digging into soil banks along the shorelines of waterbodies. Tunnels dug below the water level provide channels through which water can escape. Tunnels dug above the water level can decrease structural support of the embankment and increase the risk of washout during flood conditions. These hazards are multiplied in waters where burrowing animals are abundant and where water levels fluctuate. Rising and falling water levels often stimulate these animals to dig new burrows,

thereby increasing the potential for structural damage and water leaks. The most abundant invertebrate burrower in Virginia's waters is the crayfish.

Crayfish, also known as crawfish, crawdad, freshwater crab and other local names, are found in freshwaters throughout the world. There are 550 species worldwide, 390 species in North America, 338 species in the United States, and more than 25 species in Virginia. Worldwide, they range in size from the tiny dwarf crayfish of Louisiana, less than one inch in length at maturity, to the marron crayfish of Australia, which reaches a length of 16 inches and a maximum weight of 4 pounds. The world's largest crayfish is a Tasmanian species which can attain a weight of 8 pounds. The crayfish species that inhabit Virginia's waters are considerably smaller, seldom exceeding 4 inches in total length.



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## **Ecological and Economic Importance**

Crayfish play an important role in aquatic ecosystems (ponds, lakes, streams, marshes, etc.), by serving as a preferred food item for a large number of aquatic and terrestrial animals. Many sportfish (trout, bass, and larger sunfishes), birds (egrets, herons, kingfishers, ducks), amphibians (bullfrogs), and mammals (raccoons, otters, mink) consume large quantities of crayfish. Because crayfish will eat both living and dead plant and animal material, they help to reduce the amount of decaying matter, and thereby improve water quality. Most crayfish are not active predators and have difficulty capturing fast moving animals. Approximately 40 percent of their diet consists of worms and insects inhabiting the bottom muds. The remainder consists of living and decaying aquatic vegetation. In fact, crayfish have been suggested as biological controls for nuisance waterweeds.

In addition to their valuable ecological benefits, crayfish have attained economic importance as: (1) a commercial food product for human consumption, (2) fish bait, and (3) laboratory organisms for biological studies. Although not as well known as their saltwater relative - the lobster - freshwater crayfish are highly esteemed as a luxury food item in southern states, notably Louisiana, and in European countries, such as France. In these areas, wild crayfish are harvested by commercial trappers or raised in rice-field ponds. Over 10 million pounds of red-swamp crayfish - valued at \$5 million - are harvested annually from Louisiana's crayfish farms. Smaller crayfish often are sold as fish bait. Despite the fact that almost all freshwater crayfish are edible and considered a table delicacy rivaling the lobster, they generally are underutilized by man. Thus, should you be fortunate enough to be plagued by burrowing crayfish problems, an immediate solution would be to literally eat your problem away!

Although crayfish are essential components of aquatic ecosystems and represent a valuable economic resource, some burrowing species of crayfish can seriously interfere with man's multiple-uses of inland waters. As previously suggested, significant water losses may occur when the tunneling activities of burrowing crayfish weaken earthen dams or create water leaks. Lawns, gardens and agricultural crops are frequently damaged by crayfish. Therefore, landowners who have invested the time and money to construct

small water impoundments should take some precautions to prevent possible damage from burrowing crayfish. Precautions should include occasional inspection of the shorelines, especially in the vicinity of the dam, for the presence of large numbers of crayfish and evidence of extensive burrowing. Some species of crayfish are notorious burrowers, others do not burrow at all. Unfortunately, it is difficult to distinguish burrowing crayfish from non-burrowing ones.

## **Burrows and Breeding**

A crayfish burrow is a cone-shaped mound or "chimney" composed of mud pellets that mark the entrance to the burrow. Most burrows are located along the shoreline close to the water's edge. These burrows may range from a few inches to greater than 36 inches deep, and will be from 1/4 to 2 inches in diameter. Crayfish burrows may be dug straight down or at a slight angle. Burrows dug horizontally into a sloping bank often run straight for about a foot and then angle downward. Most burrows are capped with a compact plug of mud, and they may have more than one entrance hole. Male and female crayfish use the burrows as a refuge to escape from predators and as a resting place during molting and inactive periods. Female crayfish often use these burrows as a nursery for their young, particularly during periods of low water.

The breeding season peaks in early spring, but may extend throughout the summer and into late fall depending on the species and water temperatures. During mating, the male crayfish deposits sperm into an external receptacle on the female. The sperm remain here until the mature eggs pass from the oviduct and are fertilized simultaneously. A female crayfish carrying a cluster of egg is characterized as "in berry." The eggs hatch in from 2 to 20 weeks depending on the water temperature. After hatching, young crayfish may remain attached to the female for a week or two before crawling dispersing. During drought, the young will be released into the burrows, but many do not survive due to lack of food and crowding.

Extensive burrowing around ponds and lakes can undermine the structural integrity of dams. Fortunately, several control measures can be employed effectively to reduce crayfish densities to a level at which structural damage and water leaks will be minimized. Efforts at total eradication usually are futile because crayfish can migrate considerable distances and will reinvade the pond continually.

## **Biological Controls**

Biological control of crayfish refers to the deliberate introduction and establishment or encouragement of natural enemies of crayfish. An excellent method for reducing high numbers of crayfish is to stock and maintain a healthy population of sportfish in the infested waters. Trout, bass, catfish, and large bluegills (bream) eat crayfish and can help to reduce excessive numbers. Properly stocked sportfish ponds seldom have burrowing crayfish problems. Other natural predators that feed heavily on both young and adult crayfish are: amphibians (bullfrogs, salamanders), reptiles (turtle, water snakes), waterbirds (herons, kingfishers, ducks, geese), and mammals (raccoons, otters, mink). Encouraging wildlife species that eat crayfish to live near your pond by providing suitable habitat is a good strategy. They act as biological controls providing year-round protection from burrowing crayfish problems without the need for expensive trapping and potentially dangerous chemical application.

Complete elimination of all crayfish usually is not possible, seldom practical, and certainly undesirable, considering their beneficial value. Control is successful when the balance between the predator (fish, birds, mammals) and the prey species (crayfish) is reached, and excessive burrowing damage is reduced to an acceptable level.

## **Trapping Crayfish**

Trapping crayfish is a very effective control method. Several types of crayfish traps are available or can be made using one-half inch (1/2") mesh chicken wire. Funnel-end commercial minnow traps are often modified by enlarging the openings to 2 inches (2") in diameter to allow for easy entry by large crayfish. A string of funnel traps left overnight should produce a good catch. Most other traps are similar to those used to catch saltwater crabs. Drop and lift type crab traps can be used to catch crayfish. Simply lower the baited trap to the bottom, and quickly pull it up at frequent intervals (depending on the number of crayfish being caught).

Any fresh fish or meat serves as an effective bait to lure crayfish to the trap. Meat scraps, fish heads, soybean cake, perforated cans of dog food, or almost any high-protein substance will work. For overnight trap setting times, enclose the bait in hardware cloth to prevent the trapped crayfish from eating all the bait, and reducing trap effectiveness.

The habits of crayfish strongly influence how easily they are caught. Crayfish overwinter in their burrows or the bottom muds or shoreline banks, and emerge as the water warms. Mid-April is the time when crayfish first become active in Virginia. The optimal water temperature range for crayfish is between 40°F (4°C) and 75°F (24°C). As temperatures drop below or rise above this range, crayfish become inactive and stop feeding. Crayfish are nocturnal and are most active at night. Therefore, traps should be set in late afternoon and left overnight. To handle crayfish safely, grasp the body just behind the claws. For beginners, a pair of heavy gloves will ward off pinches.

## **Chemical Control**

Chemical treatments are not recommended because they: (1) threaten water quality, (2) kill beneficial plants and animals as well as pests, and (3) can be widely distributed by wind and water movements. No chemicals are currently registered for crayfish control. Never apply toxic chemicals directly to waters or near shorelines where they can seep into waterways.

## **Cleaning and Cooking Crayfish**

The freshwater crayfish not only looks like a miniature lobster, but tastes almost as good as its saltwater relative. The first step to preparing crayfish for the table is to wash the live crayfish in cool, clean water. After washing, the crayfish are blanched (par boiled) in hot water for about five minutes. This process kills and cooks the crayfish, kills any bacteria present, turns the crayfish a brilliant red color, and facilitates peeling the meat from the claws and tail. Next, remove the intestinal track by twisting and pulling the middle flipper of the tail. Some prefer to cook only the claws and tails. After simmering, remove the meat from the claws and tail, add butter, salt, and pepper, and enjoy; crayfish meat may be served hot or cold.

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