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A NEW METHOD FOR CAPTURING ALLIGATORS USING ELECTRICITY

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ABSTRACT

A study was initiated on Rockefeller Wildlife Refuge in order to investigate the possibility of using an electrical current as an aid in capturing alligators. A modified 110-220 volts-A.C. fish shocking unit and a 110-220 volts-D.C. pulsating unit were used in this study.

Best results were obtained with the 110-220 volts-D.C. pulsating unit. This method is limited to areas of low water salinity and best results were obtained when the animal was partially exposed and the unit could be applied directly. Mortality occurred where alligators were repeatedly shocked and also if the prod was applied to the under surface of the stomach. The best results were obtained by applying the shock to the side of the neck just anterior to the front legs. Alligators were completely immobilized for approximately 15-25 minutes.

Field test were limited as the unit was found to be greatly affected by salinity.

INTRODUCTION

Methods of capturing alligators have been previously described by Chabreck (1963) and Jones (1965). The method described by Chabreck has been successfully employed on wild alligators at Rockefeller Wildlife Refuge, Grand Chenier, Louisiana. Over a ten-year period, approximately 2,500 animals ranging in length from 3 to 12½ feet have been captured using this method. However, alligators in our display pens and those in confinement have always been difficult to catch using this method. Capturing alligators in concrete pools usually results in much damage to the alligator, danger to the handlers, and is often time consuming. This was especially true while handling extremely large alligators in close confinement and under crowded conditions.

Due to the problems involved in capturing large animals, a method using various types of electrical current was tried in order to immobilize alligators for short periods of time. This permitted the handlers time to capture the animal and remove him from the pen with no serious damage to the animal or the handlers.

The field and tank studies were conducted on Rockefeller Refuge. The marshes of the refuge, excluding the salt marsh, support good populations of alligators. Also, approximately 20 alligators ranging in length from two to twelve feet were maintained in tanks as display animals at the main headquarters site.

MATERIALS

The units used in the alligator shocking trials were modified forms of A.C. (Alternating Current) and D.C. (Direct Current) fish shockers.

The A.C. unit was made from a boom-type shocker used by Carver (1965). It consisted of boom electrodes which were normally mounted in the shape of a triangle on the front of a flat bottom boat while electrofishing (Figure 1). The electrodes consisted of two 4-foot sections and one 3½ foot section of ⅜ inch copper coated ground rod. The front two electrodes on the front boom were 8 feet apart. A cross bar, 4 feet 8½ inches back from the front boom supported the shorter electrode

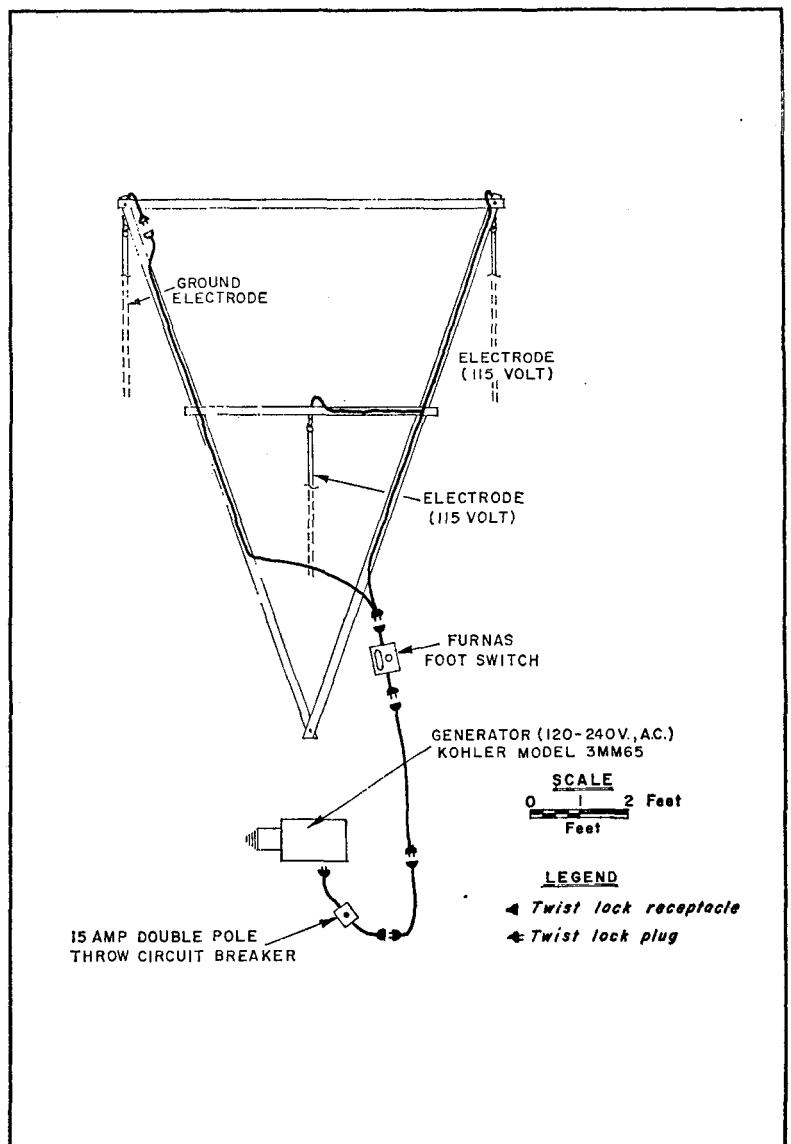


FIGURE 1. A schematic diagram of A.C. shocking unit used for Alligator capture study, 1971.

mounted in the center of the bar. Carver's unit had a foot operated switch pedal and a 15 amperage double throw safety switch located near the generator operator. Another man in the front of the boat operated the foot switch and dipped fish. In the alligator experiment this man operated the foot switch, manipulated the booms and held a noose pole in order to pull the animals ashore as the electric current stunned them.

The generator used was a Kohler Model 3MM65. The power plant had a capacity of 120/240 volts A.C., 60 cycle, single phase, 3,000 watt and 12.5 amperes A.C. at 3,600 RPM.

The pulsating D.C. unit (Figure 2) was also powered by the Kohler generator. A double pole, Square D, switch box containing 20 ampere fuses was connected to the 120 volt receptacle of the generator. Heavily insulated Number 14, two conductor wire connected an Allen Bradley-Bulletin 805—Series D "Dead Man" foot switch to the switch box. Active pressure had to be applied to this switch in order to have electrical current passing between the two electrodes. Also, one man was assigned to these safety switches.

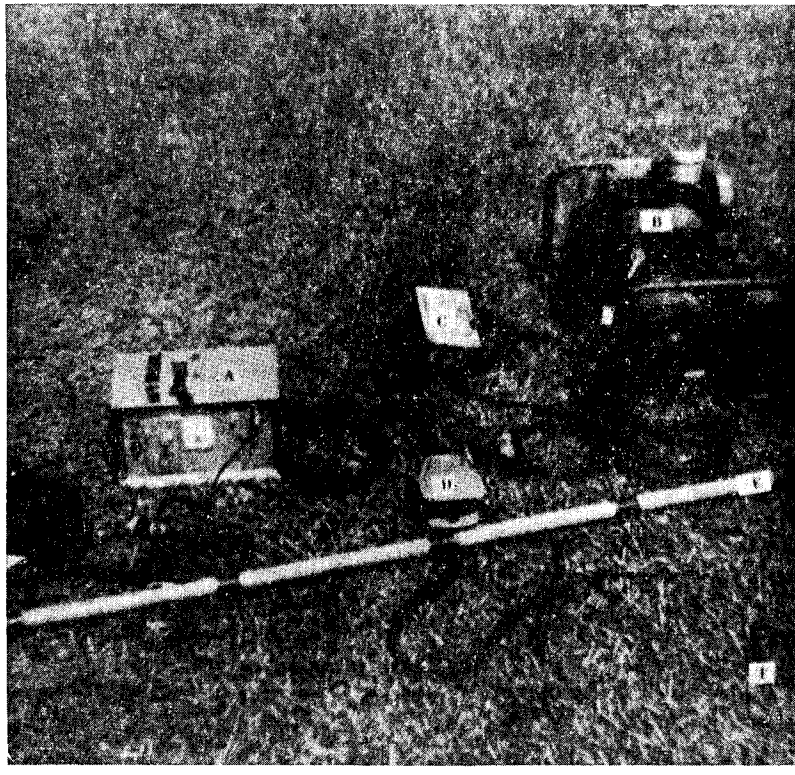
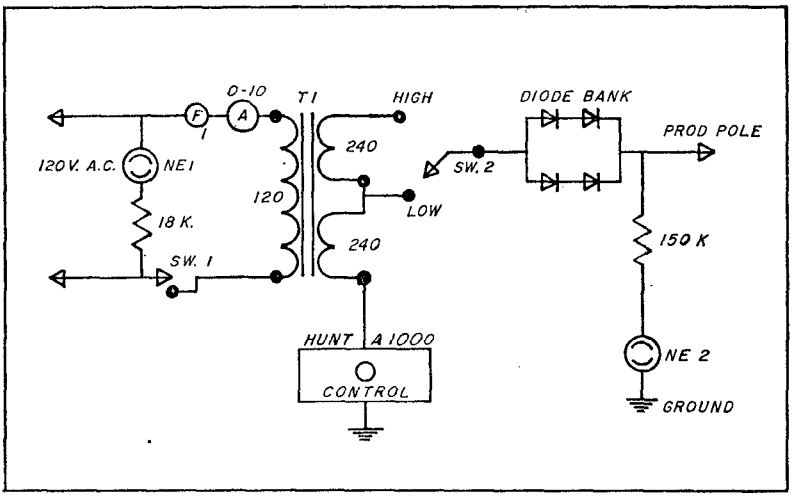


FIGURE 2. The King Fisher pulsating D.C. unit, A; Kohler 120/240 volts A.C. generator, B; Square D Switch Box, C; Allen Bradley-Bulletin 805—Series D foot switch, D; prod pole, E; and the ground, F.

Next in line was the variable voltage pulsator (King-Fisher) designed and developed by Mr. Cliff Fergerson of Monroe Communications, Monroe, Louisiana (Figure 3). The instrument was designed originally for capturing scale and skin type fish. It has a two step D.C.



FI—10 amperes fuse.

A—ampmeter—indicates power drawn from power source in proportion to output.

TI—step-up transformer with tapped output.

SWI—primary power switch.

NEI—indicates power to machine.

CONTROLS—turns output power off and on, changes wave shape and varies output.

SW2—selects high or low output.

NE2—indicates power out.

FIGURE 3. Schematic of the variable voltage pulsator unit (King Fisher) used in alligator capture study, 1971.

output with control of wave shape and voltage by use of a silicone rectifier. Low mode is rectified 220 volts peak. Maximum voltage under a load of 3 amperes gives a 75 volt pulse. A 10 amperes load on high gives a 200 volt pulse. A no load condition peak gave 440 volts pulse (Cliff Fergerson, Personal Communication). The unit contains a 10 amperes fuse to protect it against overload or direct short.

The power leaves the pulsator through a co-axial cable. In electrofishing operations, the negative is normally ground to a boat by means of battery clamps. However, in the alligator work the negative is spliced to 50 feet of Number 14, heavily insulated wire which is attached to a 24-inch, horseshoe shaped, piece of ⅜ inch copper coated ground rod. The positive electrode is connected through 50 feet of Number 14, heavily insulated wire to a portable ten-foot wooden dowel 2 inches in diameter. A two-foot section of ½ inch cooper tubing forms the conductive portion of the electrode.

The operator of the positive prod pole should be aware of the power of the unit and must understand the danger involved. The pole should never pass close to others and should never be touched to the negative. The operator wears lineman's rubber gloves and rubber boots at all times.

At least two men are required to operate the alligator shocker. However, more may be required depending upon the size and number of animals to be captured.

METHODS

The initial tests were conducted using the A.C and D.C. units at the alligator display tanks on Rockefeller Refuge. First, the boom type A.C. unit was tried. The booms were suspended over the pen so that the electrodes surrounded the alligator. However, this only stimulated them to move and did not stun them. Both, 120 and 240 volts A.C. gave negative results. The alligators used in this experiment were in the 3-7 foot size class.

The D.C. pulsating unit was first used on the 120 volt setting. If the animals were under water this stimulated them to move but when they were partially exposed, the positive prod if applied just anterior to the front legs would usually stun the animal for a short period. When the current was stepped up to 240 volts D.C. it would render him unconscious, usually for 15-25 minutes. Care had to be taken that the prod was not applied any longer than necessary (5-10 seconds) to stun the alligator and that it not be applied to the undersides since this evidently injured or would rupture vital organs causing a prolonged death over a period of 2-3 days. After the alligators were out, we tied and moved them wherever desired.

The unit was field tested several times. The alligator den was located with the aid of a marshbuggy, then the alligator was chased out and stunned using the D.C. pulsator. This was especially true in the fresher marshes during periods of low water.

DISCUSSION OF RESULTS

Using electrical current to facilitate the capturing of alligators was under investigation from 1969 to 1971 on Rockefeller Wildlife Refuge. During the early phase of this study both A.C. and pulsating D.C. were used.

The experimental pool at the refuge headquarters site was used for the majority of the tests conducted in this experiment. The tank was divided into two separate compartments by a concrete wall. Each compartment has its own water supply and could be drained without effecting the other tank.

Several attempts were made at shocking using the A.C. unit without draining the tanks. This proved unsuccessful; however, the alligators did respond to the electrical charge by simply swimming ahead of the prod poles away from and out of electrical field. The tank was later drained and efforts were made to herd the alligators through the electrical field. Several attempts were made; however, alligators were found not to be immobilized by the A.C. current. The only results obtained were that this unit stimulated the alligators to move very excitedly about the tank.

Due to the size and weight of the A.C. prod poles, we were unable to follow the alligators as they entered the electrical field. As a result, the alligators would swim out of the field in a matter of just a few seconds, reatively unaffected by the electrical charge.

The experiments conducted with the A.C. unit involved alligators in the 3-7-foot size class.

The D.C. pulsating unit was used on these alligators; however, with varied results. The D.C. unit was first used on the 120 volt setting; however, this too, merely stunned the animals for only a few seconds. After the prod pole was removed, the animals quickly recovered.

Alligators responded to the 120 volt D.C. setting much like the A.C., that is all gave a slight response to the electrical charge. When the current was applied to an alligator, it submerged in the tank and would swim out of the electrical field. A similar response was obtained when the tanks were drained and the prod pole was placed directly on the neck of the alligator.

However, with the 240 volt D.C. setting, alligators were found to be immobilized almost immediately upon receiving the electrical current. Test were run with the alligator completely submerged in water; consequently, if the alligators were not retrieved immediately, death would

result from drowning. Also, under water there was no methods of determining the amount of electrical current each alligator was receiving. The distance of the alligator in relation to the ground was found to be very critical.

Best results were obtained with the 240 volt D.C. setting by draining the pool, leaving just a few inches of standing water. Also, when the prod pole was applied to the neck region with the ground approximately 5-10 feet away from the animal, alligators could be immobilized for 15-25 minutes with no apparent injury. As stated earlier, alligators were stunned immediately upon receiving the 240 volt D.C. The prod pole was applied to the neck region for approximately 8-10 seconds.

Using this procedure, several alligators in the 9-12 foot size class were shocked and captured once a week for three consecutive weeks with no adverse affects to the animals. This phase of the study was conducted for two consecutive years.

Mortality Using the 240 D.C.

During this study, five alligators were lost as a result of the various test conducted. One nine-foot bull was killed immediately with the 240 D.C. current. This was attributed to placing the ground too close to the animal and when the current was applied he came to rest touching the ground with his stomach. Also, two alligators 4-7 foot long died several days after being immobilized with the 240 D.C. when the prod pole was applied to the stomach region. Two more alligators 5-6 foot in length were suspected to have died from drowning as a result of being only partically immobilized and allowed to remain under water. One nine-foot bull was partially paralized in the hind legs when the prod pole was applied directly to this region of the body.

Field Studies 240 D.C.

Limited field studies were conducted on capturing alligators in the wild, as this method was found to be useful only during periods of low water. However, it was found that the 240 D.C. was greatly affected by salinity. The effectiveness of the current was evidently buffered under the saline conditions which shorted out the unit. Two alligators were captured using this method and a third alligator was made to leave her den and was later captured.

Once a well was located the prod pole was inserted into the hole with the ground being placed under water and at the entrance to the well. The alligator was touched until it either bit down on the end of the prod pole or if harassed enough tried to make an exit from the well itself. At this time the prod was applied to the neck region and the alligator immobilized.

Effects of Electricity on Other Animals

Since there is no report of electricity used in alligator capture, a mention should be included of its effects on fish.

McCrimmon and Bidgood (1965) conducted *x*-ray studies and concluded that neither alternating or direct current produced an adverse effect on the skeletal system of rainbow trout. In another study Spencer (1967) reported that bluegill showed a 12.2 percent incidence of injury to vertebral colums in 230-volt alternating current. He had 4.6 percent in 115 volt alternating current and 1.5 percent for 115 volt direct current fields. Hauck (1949) also found injuries ranging from dilated blood vessels and clots to torn ligamentous connections and broken vertebrae in ten rainbow trout collected with alternating current. Electrofishing is often used in various state hatcheries to collect brood fish such as bass with no apparent harm to the fish.

No electrode design will be best for all field conditions. The design requirements may be changed depending upon application. In areas of high conductivity such as ours, it may be best that the positive electrode be made of a much shorter, straight piece of ⅜ inch ground rod rather than the tubing previously described.

We also feel that the prod pole should be equipped with a 16 ampere pressure switch as described by Stubbs (1965). This switch must be pressed for contact to be made.

SUMMARY

Studies conducted on Rockefeller Refuge involving the use of electrical current in order to immobilize alligators were under investigation from 1969 through 1971. It was found that alligators were only slightly affected by the A.C. electrical current. The only response noted was that the alligators were slightly stimulated and moved excitedly about the tank.

The D.C. pulsating unit was used on alligators with varied results. The D.C. unit was first used on the 120 volt setting; however, this, too, merely stunned the animals for only a few seconds. After the prod pole was removed, the animals quickly recovered. Best results were obtained with the 240 volt D.C. setting and applying the prod pole to the neck region with the ground approximately 5-10 feet away from the animal. Alligators were immobilized for 15-25 minutes with no apparent injury. Only limited field test were conducted, as this method was found to be useful only during periods of low water. Mortality as a result of the electrical shock was described. Five alligators were lost during the course of this study in the experimental tanks.

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