An Inexpensive Low Voltage Electrofishing Device for Collecting Catfish

Marty M. Hale, *Florida Game and Fresh Water Fish Commission, Fisheries Research Laboratory, Eustis, FL 32727*

Joe E. Crumpton, *Florida Game and Fresh Water Fish Commission, Fisheries Research Laboratory, Eustis, FL 32727*

Dennis J. Renfro, *Florida Game and Fresh Water Fish Commission, Fisheries Research Laboratory, Eustis, FL 32727*

Abstract: A low voltage electrofishing device, commonly called a "monkey rig" in Florida, was used to collect catfish for a tagging study on the St. Johns River, Florida. In 40 fishing trips, 3,234 catfish were captured using the "monkey rig". This inexpensive device was selective for catfish species only. The 16-V to 18-V alternating current agitated the catfish to the surface but fish never exhibited a complete state of tetanus. When electrofishing in waters with surface temperatures warmer than 24° C and around underwater structure, the "monkey rig" was an effective collecting device for catfish.

Proc. Annu. Conf. Southeast. Assoc. Fish and Wildl. Agencies 38:342-345

Catfish are the most important fresh water commercial fish from the St. Johns River, Florida (Hale et al. 1983). Because of their importance, a tagging study to determine movement, exploitation, and other population parameters was implemented in 1983. Although hoop nets, wire traps, and pound nets have been proven effective in catching catfish on the St. Johns River, the expense and limited mobility of nets and traps precluded their exclusive use in the tagging program. Therefore, a more efficient method of collecting catfish was needed.

Electrofishing rigs have been used by fishery oiologists since the late 1930s (Haskell 1940, Haskell and Zilliox 1941). An alternate collecting device was a low voltage electrofishing machine commonly called a "monkey rig" in Florida. Another colloquial name used in the Southeast for this device

is a "telephone rig." The device is inexpensive, highly mobile and reportedly selective (Luthey, date unknown) for catfish species. Morris and Novak (1968) used a similar device with success in Nebraska to capture flathead catfish (*Pylodictis olivaris*). For these reasons, the device was selected for use in this tagging program. The objective of this paper is to describe a "monkey rig" and its operational effectiveness.

Methods

The "monkey rig" produced an alternating current from a hand crank military field telephone generator connected to a direct current automobile fan motor (Fig. 1). The fan motor was powered by a 12-V 115 amp-hour deep discharge battery. Because a 12-V rheostat capable of withstanding the heat produced from direct connection to the battery was not available, a door spring connected to the positive line from the battery provided variable resistance to control motor revolutions per minute. The generator produced a 16-V to 18-V alternating current with a pulse rate of 16.6 H_Z. A symmetrical sine curve, determined from an oscilloscope, was also produced by the generator. Approximately 15 cm of insulation was stripped from 2 14-gauge wires which were suspended 30 to 60 cm into the water off the stern and bow of the boat. The generator turned approximately 120 revolutions per minute. A "monkey rig" can be assembled for less than $200, depending on the availability of parts.

Results and Discussion

During 40 fishing trips on the St. Johns River, 3,234 catfish were collected using "monkey rigs," an average of 81 fish caught per trip. Catches ranged from 1 to 321 fish per trip. Higher average catch rates could have been obtained if electrofishing had been repeated in the more productive areas. Since distribution of tagged catfish throughout the river system was desired, even productive areas were sampled only once.

Use of the "monkey rig" resulted in no harmful effects on catfish such as ruptured blood vessels or mortality. Morris and Novak (1968) also reported that the telephone generator was not lethal to large numbers of catfish because 25% of the fish captured by that method were subsequently recaptured.

Catfish were the only species visibly affected by the "monkey rig," and no obvious size or species selectivity was observed. Although 95% of the catfish captured using the "monkey rig" were white catfish (*Ictalurus catus*), capture was related to the habitat sampled and not species selectivity. White catfish are the dominant catfish species captured by commercial fishermen comprising 70% to 85% of their catfish harvest (Hale et al. 1983). In certain habitats, brown bullheads (*I. nebulosus*) and channel catfish (*I. punctatus*) were the only species affected. Conductivity of the St. Johns River ranged from

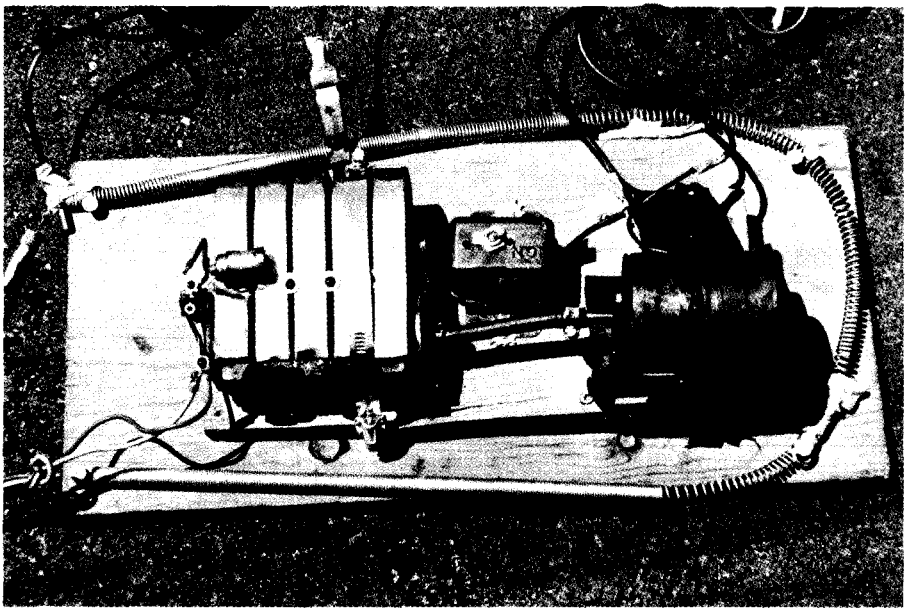

Figure 1. One of the "monkey rigs" used to collect catfish.

350 to 1,100 μmhos/cm during the study. Effectiveness of the "monkey rig" in less conductive waters is not known at this time.

The "monkey rig" was more successful in water <6 m deep, around structures (downed trees, boat docks, pilings, sand bars, and channel markers), and near the edge of the river channel, especially when the channel was close to the shoreline. Upper reaches and mouths of creeks were also productive areas. In lake and wide river habitats, concentrations of catfish were difficult to locate.

When collecting, the boat was positioned downstream of structures before electrofishing. If no structure was visible, an electric trolling motor was used to slow the boat until concentrations of catfish were located. Sometimes catfish surfaced almost immediately after activating the field, but at other times catfish did not surface until the field had been activated for at least 30 seconds. Catfish were often observed surfacing up to 1 minute after the first fish surfaced. Although most catfish surfaced within 6 m of the boat, some fish were affected as far arway as 12 m. Most catfish appeared highly agitated, swimming around in short, tight circles into the boat or onto shore. Others floated to the surface in a relaxed state. Tetanus was not observed in any catfish that surfaced.

During the first year of sampling, 2 factors were observed that adversely affected the "monkey rig's" effectiveness: low water temperature and our inability to locate large concentrations of catfish in open bodies of water. Sur-

face temperatures of 24° C or higher were necessary for the machine to work effectively. Few catfish were caught when temperatures ranged from 21° to 23° C. Catfish were not collected when temperatures were below 21° C. Morris and Novak (1968) also reported that their telephone generator was most effective at water temperatures of 24° C or warmer. However, their telephone generator did affect flathead catfish at water temperatures down to 16° C, much cooler than the minimum temperature observed in Florida. Unless structure was apparent, adequate concentrations of catfish were difficult to locate.

Conclusions

The "monkey rig's" low cost, mobility, and selectivity enable the capture and tagging of large numbers of catfish in a relatively short length of time. When electrofishing in surface waters warmer than 24° C and around underwater structure, the "monkey rig" was a very effective catfish collection device.

Literature Cited

Hale, M. M., J. E. Crumpton, and D. J. Renfro. 1983. Commercial Fisheries Investigations Report, Fla. Game and Fresh Water Fish Comm., 1982–83 Annu. Rep., Tallahassee. 168pp.

Haskell, D. C. 1940. Electrical method of collecting fish. Trans. Am. Fish. Soc. 69:210–215.

——— and R. G. Zilliox. 1941. Further developments of the electrical method of collecting fish. Trans. Am. Fish. Soc. 70:404–409.

Luthey, D. R. Date unknown. Survey findings on the Lake George and St. Johns River Fisheries Investigations. Fla. Game and Fresh Water Fish Comm., Tallahassee. 136pp.

Morris, L. A. and P. F. Novak. 1968. The telephone generator as an electrofishing tool. Prog. Fish Cult. 30:110–112.