

Guidelines for Use of Fish in Field Research

By the American Fisheries Society¹

Respect for all forms and systems of life is an inherent characteristic of scientists and managers who conduct field research on fishes. The respectful treatment of wild fishes in field research is both an ethical and a scientific necessity. Traumatized animals may exhibit abnormal physiological, behavioral, and ecological responses that defeat the purposes of the investigation. Because of the very considerable range of adaptive diversity represented by the over 20,000 species of fishes, no concise or specific compendium of approved methods for field research is practical or desirable. The ultimate responsibility for the ethical and scientific validity of an investigation and the methods employed must rest with the investigator.

The AFS policy regarding the use of fish in field research includes all phases of handling fish:

1. Collecting

- The number of specimens collected should be kept to the minimum the investigator determines necessary to accomplish study goals.
- Capture techniques should be as environmentally benevolent as possible within the constraints of sampling design.
- Current literature should be reviewed to ascertain when and if capture distress has been properly documented.
- Trap and net sets should be examined at a regular and appropriate schedule, particularly in warm water, to avoid excessive net mortality.
- Use of ichthyocides should be accomplished with maximal consideration of physical factors such as water movement and temperature, so as to avoid extensive mortality of natural populations and nontarget species.
- Electric currents used for electrofishing should be adjusted so as to minimize injury and harm to both the operator and the fish being collected.
- Hooks and spears are an appropriate sampling gear in special environments where other gear cannot be used.
- Fishes collected for museum deposition should be fixed and preserved so as to assure the maximum utility of each animal and to minimize the need for duplicate collecting.

¹ AFS Policy Statement #16. American Fisheries Society (AFS), American Society of Ichthyologists & Herpetologists (ASIH), and American Institute of Fishery Research Biologists (AIFRB), 1987. *Guidelines for the Use of Fisheries in Field Research*. Approved Sept. 1987, Winston-Salem, NC. Published Mar-April 1988, Fisheries 13(2):16-23.

- Fishes that do not die rapidly following immersion in a formalin solution should be killed before preservation by means of a chemical anesthetic such as sodium pentobarbital, hydrous chlorobutanol, MS-222, urethane or similarly acting substances, unless justified in writing by the investigator.
- When field fixation of formalin-resistant fishes without prior introduction of anesthetics is necessary, prior numbing of the specimen in ice water should be considered.
- Live capture should be designed to prevent or minimize injury to the animal.
- Care should be exercised to avoid accidental capture of non-target species. Those captured should be released immediately.
- Collection should be conducted so as to leave the habitat as undisturbed as possible.
- The collection of a large series of animals from breeding aggregations should be avoided if possible.

2. Restraint and Handling

- Investigators must use the least amount of restraint necessary to do the job.
- When not under study, aggressive species should not be confined with other animals (other than food) which they may injure or which may injure them.
- Animals should be handled quietly and with the minimum personnel necessary.
- Darkened conditions which alleviate stress and subdue certain species should be used whenever possible and appropriate.
- When hazardous species such as sharks are handled, (a) chosen procedures should minimize the amount of handling to reduce or eliminate contact between handler and animal, (b) a second person, knowledgeable in capture and handling techniques and emergency measures, should be present at all times, and (c) consultation with experienced workers as well as review of literature is recommended because much information on the handling of hazardous species is passed on from person to person rather than through published literature.
- Prolonged distressful restraint of hazardous fish should be avoided. In some cases, use of a general anesthesia may be advisable.
- Chemicals chosen for immobilization should consider the impacts of the chemical on target organisms.
- Users must be aware of appropriate action necessary in the event of accidental human intake of hazardous drugs used for fish collection and handling.

3. Animal Marking

- Careful testing of markers on preserved or captive animals before use on wild animals is recommended to determine effects on behavior, physiology, and survival.
- Investigators must also consider the nature and duration of restraint, the amount of tissue affected, whether distress is momentary or prolonged, whether the animal, after marking will be at greater than normal risk, whether the animal's desirability as a mate is reduced, and whether the risk of infection or abscess formation is minimal.
- Fin clipping is a recommended procedure, but the importance of each fin to the survival and well-being of target fishes must be determined on a case-by-case basis before being used.
- Marking techniques involving tissue removal or modification (branding, etc.) should be preceded by local anesthetic (aerosols containing benzocaine, such as Cetacaine, may be applied) and followed by the application of a topical antiseptic.
- Tags should not be used which could cause physical impairment or enhance the risk of entanglement in underwater vegetation.
- Brightly colored tags which compromise a fish's camouflage should not be used.
- The size, shape, and placement of tags should permit normal behavior of the animal to the greatest extent possible.
- Force-fed radiotelemetry packages should be small enough to pass through the gut without obstructing the passage of food.
- Force-fed or implanted radiotelemetry packages should be coated with an impervious, biologically inert coating.
- Implanted radio transmitters should not interfere with the function of the organs surrounding them or with the fish's normal behavior.
- Externally attached radio transmitters should neither conceal nor enhance the appearance of dorsal fins or opercular flaps, and should be attached so as to eliminate or minimize the risk of entanglement with underwater vegetation or other obstructions.
- Special training and precautions should be taken before radioisotopes are used for marking fish. A license, which specifies safety procedures for laboratory use, is required for release of isotopes into natural systems and for disposal of waste material.

4. Housing and Maintenance at Field Sites

- Restraint and ease of maintenance by animal keepers should not be the prime determinants of housing conditions.

- Normal field maintenance should incorporate, as far as possible, those aspects of the natural habitat deemed important to the survival and well-being of the animal.
- Nutritionally balanced diets should be provided or natural foods should be duplicated as closely as possible.
- Natural light and temperature conditions should be followed unless alteration of these are factors under investigation.
- Frequency of aquarium cleaning should represent a compromise between the level of cleanliness necessary to prevent disease and the amount of distress imposed by frequent handling and exposure to unfamiliar surroundings.

5. Disposition Following Studies

- Upon completion of studies, researchers should release wild-caught specimens whenever this is practical and ecologically appropriate. Exceptions are if national, state, or local laws prohibit release, or if release might be detrimental to the well-being of the existing gene pools of native fishes in a specific geographic area.
- Field-captured fishes should be released only: (a) at the site of the original capture, unless conservation efforts or safety considerations dictate otherwise (release should never be made beyond the native range of the distribution of a fish without prior approval of the appropriate state and federal agencies, and approved relocations should be noted in subsequent publication of research results), (b) if their ability to survive in nature has not been irreversibly impaired, (c) where it can be reasonably expected that the released animal will function normally within the population, (d) when local and seasonal conditions are conducive to survival, and (e) when release is not likely to spread pathogens.
- Captured animals that cannot be released or are not native to the site of intended release should be properly disposed of, either by distribution to colleagues for further study or, if possible, by preservation and disposition as teaching or voucher specimens in research collections.
- Investigators must be careful to ensure that animals subjected to a euthanasia procedure are dead before disposal.
- In those rare instances where specimens are unacceptable for deposition as vouchers or teaching purposes, disposal of carcasses must be in accordance with acceptable practices as required by applicable regulations.
- Animals containing toxic substances or drugs (including euthanasia agents like T-61) must not be disposed of in areas where they may become part of the natural food web.

References:

Murphy, B.R. D.W. Willis, editors. 1996. Fisheries Techniques 2nd Edition. American Fisheries Society Bethesda, Maryland.

Schreck, C.B., P.B. Moyle, editors. 1990. Methods of Fish Biology. American Fisheries Society, Bethesda, Maryland.