



United States Department of the Interior

FISH AND WILDLIFE SERVICE



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Guidelines for Use of Rio Grande Silvery Minnow in Research and Recovery Permits

The U.S. Fish and Wildlife Service (Service) is adopting the American Fisheries Society (AFS) *Guidelines for Use of Fishes* (AFS 2014; guidelines) in our evaluation of applications for Native Endangered and Threatened Species Permits (“Recovery Permits”) authorized under Section 10(a)(1)(A) of the Endangered Species Act for scientific research on the Rio Grande Silvery Minnow (*Hybognathus amarus*; silvery minnow). We will also use these guidelines in our evaluation of activities to enhance silvery minnow propagation and survival. Examples of such activities include presence/absence surveys, silvery minnow population monitoring, silvery minnow habitat use, capture and marking, movement behavior, health assessments, or other research involving silvery minnow eggs, larvae, juveniles, or adults. A Recovery Permit may also be required for the possession or chemical analysis of tissues or other parts of silvery minnows. Potential applicants can find Recovery Permit application forms (and instructions for how to apply) for research or other activities involving silvery minnow through the Service’s website at: <http://www.fws.gov/endangered/permits/how-to-apply.html>.

The requirements and procedures for obtaining Recovery Permits are described in Title 50 of the Code of Federal Regulations, Chapter 1, subchapter B, in parts 10, 13 and 17. A written application using Form 3-200-55 must be provided to the Service. The Recovery Permit applications for scientific research purposes or for enhancing the survival of silvery minnow must be complete and accurate. In addition to the guidelines above, we will use the following criteria to evaluate activities proposed for research, monitoring, laboratory studies, and other recovery efforts. These guidelines and criteria will help us ensure that we used the best information available during our review of Recovery Permit applications involving silvery minnow. Provision of these guidelines and criteria will help applicants understand how to disclose the information required, show responsibility, alleviate ambiguity, and engage in activities that will enhance the survival or recovery of the silvery minnow.

Criterion 1: Describe the activities completely and accurately. Applicants are reminded to develop complete, detailed, and appropriate study designs that describe who, what, when, where, how, and why activities are proposed in the application. Only those activities fully described in the application and made part of the final Recovery Permit are authorized. Activities that are not described in the application (and authorized in the permit) are prohibited. Additional or amended activities must be addressed by an amended application. The Service no longer authorizes sampling and analysis activities involving silvery minnow by email. The Service may restrict or deny certain activities involving silvery minnow where methodological weaknesses are apparent or methods are not adequately described in the application. To meet the needs for recovery (USFWS 2010), the collection of data involving silvery minnows must be based on a robust study design, use standardized collection methods (or fully describe methods used, probability of silvery minnow detection with gear proposed), and fully document the data analyses that are to be conducted and reported so that results are accurate, shared, and repeatable.

Criterion 1: Complete and accurate description of the proposed activities and of any results	The Service will approve activities when these conditions occur (based on the application, annual or summary reports, other permits, and close coordination)	The Service may approve or modify activities when these conditions occur (based on the application, annual or summary reports, or other permits)	The Service may limit activities when these conditions occur (based on application, Service investigation or inquiries about application, annual or summary reports)	The Service may deny activities when these conditions occur (inaccuracies, inadequate description of activities or methods, or any annual reports were not provided)
	Application is complete and accurate. Study design is good. Methods are standardized and repeatable. Data and methods are shared. Activities may be constrained when the silvery minnow population* is at risk (that is, the overall catch per unit effort is at or below 0.3 fish/100 m ²).	Application is complete and accurate. Applicant consents to close regulation and monitoring. Activities must cease when the silvery minnow population* is at risk (that is, the overall catch per unit effort is at or below 0.3 fish/100 m ²).	The application has failed to demonstrate a justification for the activity, or showing of responsibility for study design, the treatment of animals, or, failure to submit timely or accurate activity reports. Activities must cease when the silvery minnow population* is at risk (that is, the overall catch per unit effort is at or below 0.3 fish/100 m ²).	Application has failed to disclose material information required, contains false statements as to any material fact in connection with the application, or the activities are inadequately described or are ambiguous.

* The population status of the silvery minnow in the Middle Rio Grande is available from the most recent published results of the American Southwest Ichthyological Researchers' reports for the Rio Grande Silvery Minnow Population Monitoring Program funded by the U. S. Bureau of Reclamation (All reports available online at <http://mrgescp.dbstephens.com/Documents.aspx>).

Criterion 2: Qualifications of the applicant(s). This criterion has been developed to determine whether the applicant is qualified (that is, has the education, expertise, or experience) to safely collect and accurately identify silvery minnow. Obtaining an accurate identification of silvery minnow is critical to a Recovery Permit. The applicant must be able to accurately identify silvery minnow and report the colors of any Visible Implant Elastomers observed in tagged silvery minnows (Service 2016). Qualifications must be submitted with the permit application.

Documentation of qualifications of potential applicants must include the following:

Description of fisheries or biological expertise or training (e.g., a Bachelor of Science or graduate degree in life sciences, with at least 8 credit hours in fields such as limnology, ichthyology, fishery biology, aquatic fauna, oceanography, fish culture, or related courses in fishery biology is recommended) and experience as described below. Significant amounts of experience are necessary to safely collect, handle, and accurately identify silvery minnows.

Four classes of experience are considered for this criterion based on experience with different life stages and sizes (that is, standard length (SL) in millimeters (mm)) of silvery minnows.

Class 1 (Eggs): Applicants seeking to collect silvery minnow eggs must have a season's experience with fish egg collection and identification in the Rio Grande or Pecos River. A season of experience includes the deployment and use of a Moore Egg Collector (Altenbach et al. 2000) for at least 1 month, for 6 days a month, for 6 hours a day, or 36 hours total experience. The Service may waive *independent* Class 1 experience requirements where the proposed collection of silvery minnow eggs is for the purposes of propagation (and conducted in conjunction with the staff of a Service-approved silvery minnow propagation facility) and the applicant has adequate training with the use of a Moore Egg Collector, river safety, and the use of taxonomic keys for fish egg identification.

Class 2 (Adults): Potential applicants must have at least 108 hours of experience with fish collection and fish identification in the Rio Grande or Pecos River for proper identification and handling of adult silvery minnows over 50 mm SL. We base the requirement for at least 108 hours on a season's worth of experience beach-seining fish for at least six months, three days a month, for six hours per day. Class 2 applicants must have 108 hours of experience for any activities proposed to pursue, collect, handle, and identify adult silvery minnows over 50 mm SL. Most silvery minnows are over 50mm SL from Nov through May (Nov, Dec, Jan, Feb, Mar, Apr, May). Applicants proposing activities during November through April must demonstrate Class 2 levels of experience. Applicants proposing activities during late April and May (when most silvery minnows spawn) must contact the Service for special considerations and experience when collecting or handling gravid silvery minnows.

Class 3 (Juveniles): For proper identification and handling of juvenile or young adult silvery minnows (less than 50 mm SL and greater than 20 mm SL), applicants must have twice as much experience (or at least 216 hours of experience) with fish collection and fish

identification in the Rio Grande or Pecos River. Class 3 applicants must have at least 216 hours of experience for activities proposed to pursue, collect, handle, and identify young adult or juvenile silvery minnows. Most silvery minnows are over 20 mm SL from August through May (Aug, Sep, Oct, Nov, Dec, Jan, Feb, Mar, Apr, May). Applicants proposing activities during August, September, or October must have Class 3 experience. Additionally, applicants for Class 3 authorization may be required to collect voucher specimens as described below.

Class 4 (Larvae): Proper identification and handling of silvery minnow fry or larvae (less than 20 mm SL) is especially difficult, and applicants must have much more experience, or at least 432 hours of experience with fry or larval fish collection and identification in the Rio Grande or Pecos River. Applicants seeking collection and identification of fry or larval silvery minnows will be required to demonstrate additional experience with special apparatus (such as larval seines, light traps, microscopes) and expertise with meristematic measurements of larval fish and familiarity with larval fish taxonomic keys. Mortality of silvery minnow fry and larvae during handling is inevitable; therefore increased levels of experience, close coordination with the Service, and demonstration of accurate larval silvery minnow identification must be demonstrated in applications involving fry or larval silvery minnows. Most silvery minnows less than 20 mm SL often occur during May, June, or early July.

For all classes, all applicants must provide (or update) the dates, locations, and species included in any previously conducted fishery surveys, particularly with emphasis on experience working with, capturing, handling, and identifying the various life stages or sizes of silvery minnows they have personally captured or collected from the Rio Grande or Pecos River. Applications that fail to demonstrate the education or experiences applicable to the appropriate collection, handling, and identification of silvery minnow life stages may have their proposed activities denied or restricted by the Service for various silvery minnow life stages, sizes, or seasons of silvery minnow collection. The Service may also request copies of field notes to document experience.

For Class 3 or Class 4, Permittees may be required to collect and submit voucher specimens for validation of silvery minnow identification. For validation of silvery minnow identification, a voucher sample of up to 25 silvery minnows (by life stage) may be authorized and required for submission and accession to the University of New Mexico Department of Biology Museum of Southwestern Biology Division of Fishes. Those silvery minnows provided by the Permittee in the voucher sample must demonstrate accurate species identification to within 90 percent for adults, juveniles, fry, or larval silvery minnows when compared to species identification by the Division of Fishes staff. Failure to submit a voucher sample when requested by the Service or any failure to adequately and correctly identify silvery minnow in a voucher sample may be used by the Service to suspend, downgrade, or deny the activities of a Permittee or an applicant, thereafter. Verification in the field of Permittee silvery minnow identification may also be conducted by the Service and validated by species identification by Division of Fishes staff. Fish identification may be considered by the Service when provided photographic voucher evidence.

All activities proposed must address safety hazards encountered during silvery minnow collection and be conducted so as to prevent the loss of life or limb of any field crew members. All applicant experience levels must demonstrate their expertise in the known habitats, appearance, handling, and identification of the silvery minnows using standard operating procedures and techniques for collection of silvery minnows (Altenbach et al. 2000; Gonzales et al. 2012; Service 2010, Appendix E) and documented in the application. The Service will also consider the views of other fisheries biologists and researchers with regards to the applicant’s qualifications, education, and experiences with silvery minnows, including related *Hybognathus* species, research involving museum specimens, and especially, experience assisting other crew leaders permitted for silvery minnow collection and identification. The Service may identify available training to facilitate adherence to these guidelines, standard methods of collection, and species identification, or to certify applicants and reduce the necessary experience requirements.

Criterion 2. Applicant Qualifications	The Service will approve activities when these conditions occur (based on the application, annual or summary reports, other permits, and close coordination)	The Service may approve or modify activities when these conditions occur (based on the application, annual or summary reports, or other permits)	The Service may limit activities when these conditions occur (based on application, Service investigation or inquiries about application, annual or summary reports)	The Service may deny activities when these conditions occur (inaccurate statements, inadequate description of activities or methods, or annual reports were not provided)
	The applicant has adequate education or experience, addresses crew safety, has ability to discern color, and has over 90 percent accuracy identifying silvery minnow life stages or sizes.	The applicant has adequate education or experience, addresses crew safety, has ability to discern color, and has at least a 90 percent accuracy identifying certain silvery minnow life stages or sizes.	The applicant has inadequate education or experience, is not safe, has no ability to discern color (with assistance), and has less than 90 percent accuracy identifying certain silvery minnow life stages or sizes.	The applicant does not have adequate education, or experience, has an no ability to discern color (with assistance), or has less than 90 percent accuracy identifying certain silvery minnow life stages or sizes.

Criterion 3: Applicants must use the best available scientific and commercial information in their permit applications. Applicants must gather, review, and evaluate information from a variety of sources and assure the quality of the biological, ecological, and other information used in a Recovery Permit application to ensure that it is complete, accurate, and is comprised of the best available scientific information. Applicants should consider and document all information that is relevant (historical, current, and predictive), including qualitative and quantitative information, and explicitly identify all assumptions, data gaps, and uncertainties in their study designs described in their Recovery Permit applications. Applicants should use and address all factors described herein and in the *Guidelines for Use of Fishes* (AFS 2014) in preparation of their Recovery Permit applications for any activities proposed to be conducted in a field or in a

laboratory setting. These include: 1) development of a study hypothesis and conceptual model, 2) addressing animal care and welfare, 3) clearly stating objectives with explanations provided on the need for, type, quantity, and methods of data to be collected or analyzed, 4) adoption of project quality assurance plans and standard operating procedures or methods, 5) consideration and evaluation of confounding factors including environmental, equipment, and species variation, 6) explicit statistical designs that are valid, efficient, effective, and sampling proposals that do not result in excessive mortality or jeopardize the population of silvery minnow; 7) demonstration of data utility and comparability; and 8) address all applicable requirements.

Criterion 3: Best available information used by Applicants in their Recovery Permit applications	The Service will approve activities when these conditions occur (based on the application, annual or summary reports, other permits, and close coordination)	The Service may approve or modify activities when these conditions occur (based on the application, annual or summary reports, or other permits)	The Service may limit activities when these conditions occur (based on application, Service investigation or inquiries about application, annual or summary reports)	The Service may deny activities when these conditions occur (inaccurate statements, inadequate description of activities or methods, or annual reports were not provided)
	<p>Study design is objective, methods validated, peer reviewed. Study design maximizes the quality through assurance plans, and uses or develops standard operating procedures. Statistical design and analytical methods are sound. All associated reports are unbiased, transparent, shared, accurate, and complete. Meets most all guidelines with exceptions explained.</p>	<p>Study design is objective, methods validated, peer reviewed. Study design maximizes the quality through assurance plans, uses, or develops standard operating procedures, and statistical design is sound. All associated reports are unbiased, transparent, shared, accurate, and complete. Application meets most all of these guidelines with any exceptions explained.</p>	<p>Study design is incomplete or ad hoc. Objectives not described. The quality of data is not maximized through assurance plans. Does not use or document standard operating procedures. Statistical design is unsound or analytical methods are not described fully. Annual or summary reports are biased, inaccurate, or incomplete. Fails to address portions of these guidelines.</p>	<p>Application has failed to disclose material information required, has made any false statements as to any material fact in connection with the application. Study design is incomplete or ad hoc. Does not fully detail the activities or fully describe the data analyses, or interpretations of the data to be collected. Conclusions in summary reports are not based on data. Applicant is no longer qualified. Fails to address these guidelines.</p>

References:

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- American Fisheries Society (Use of Fishes in Research Committee - joint committee of the American Fisheries Society, the American Institute of Fishery Research Biologist, and the American Society of Ichthyologists and Herpetologies). 2014. Guidelines for the use of fishes in research. American Fisheries Society, Bethesda, Maryland. (Available online at <http://fisheries.org/docs/wp/Guidelines-for-Use-of-Fishes.pdf>)
- Gonzales, E. J., G. M. Haggerty, and A. Lundahl. 2012. Using Fyke-nets to assess daily trends in abundance of spawning Rio Grande Silvery Minnow. *North American Journal of Fisheries Management* 32:544-547. Available online at <http://dx.doi.org/10.1080/02755947.2012.675949>
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- Service (U.S. Fish and Wildlife Service). 2016. Standard Operating Procedures for Tagging Rio Grande Silvery Minnow with Visible Implant Elastomer Tags. U.S. Fish and Wildlife Service, New Mexico Fish and Wildlife Conservation Office SOP, Albuquerque, New Mexico.