

DRAFT REQUEST FOR PROPOSALS
NOT COUNCIL APPROVED

**Conduct an Expanded Sampling and Ageing Study on
Gulf of Mexico Gray Triggerfish**

Proposal Submission Deadline: TBD

Term of Contract: 24 months

Maximum Funding Available for Work: \$250,000

The Gulf of Mexico Fishery Management Council (Council) seeks a highly-qualified contractor to organize and conduct an ageing study on Gulf of Mexico (Gulf) gray triggerfish, *Balistes capriscus*. The contractor is tasked with evaluating and proposing new techniques to efficiently sample, process, and utilize different ageing structures (i.e., spines and otoliths) for gray triggerfish in the Gulf. Proposal applicants are encouraged to develop work plans to collaborate with state and federal partners to collect representative samples across most age classes. Typically, the various Gulf state and federal creel and port samplers would be able to contribute to this work; however, otoliths are not currently taken at dockside intercepts under current sample collection protocols. Sampling gray triggerfish otoliths that are small, fragile, and difficult to extract may require obtaining filleted carcasses (i.e. racks) from fishery-dependent intercepts. If additional samples are necessary, the proposal may consider an effective method for field collection of gray triggerfish otoliths and dorsal spines.

Gray triggerfish have historically been aged by counting translucent zones in the first dorsal spine since gray triggerfish otoliths are small, fragile, and difficult to extract. During the Data/Assessment workshop deliberations for SEDAR 62, it was noted that a study applying bomb radiocarbon validation to compare spines and otolith ages routinely resulted in lower age estimates from spines versus otoliths and called into question the reliability of growth estimates derived from spine-based ages (Patterson et al. 2019: SEDAR62-WP-17).

The proposed work should clearly define how representative gray triggerfish samples will be obtained from various fleets (i.e., private recreational, for-hire, and commercial) and/or fishery-independent survey samples with the goal of constructing age-length keys from otolith-based ages. The proposed work should compare gray triggerfish ages from otoliths and spines to determine whether it is possible to develop an algorithm to convert spine-based ages to the more accurate otolith-based ages. The proposal should include detailed methodology for extracting and processing otoliths and spines and a clear rationale for that scope as well as the anticipated sample sizes of fish by age class. Proposals considering seasonal growth increment pattern validation will be ranked higher. A review team will review the proposals after the deadline and establish selection criterion. The Council will

develop an agreement with the selected contractor(s) with milestones and deliverables after the review and selection process. The selected contractor will work with Council staff to develop the contract and submit deliverables.

Background: During its January 2021 meeting, the Council identified unspent Council funds in 2020. These unspent funds were primarily due to limited travel during the COVID-19 pandemic. The Council is considering funding a research study, on the ageing of gray triggerfish, that could be completed, available, and contributory to the scheduled SEDAR Research Track assessment of Gulf gray triggerfish to begin in 2024. The last assessment for Gulf gray triggerfish (SEDAR 62) was terminated because of irreconcilable data issues, with ageing of gray triggerfish being a top concern.

Gray triggerfish have historically been aged by counting translucent zones in the first dorsal spines since gray triggerfish otoliths tend to be small, fragile, and difficult to extract. Allman et al. (2016) conducted an age validation study of gray triggerfish spines that revealed two peaks in translucent zone formation, which was interpreted as a doublet pattern (two closely spaced translucent zones) representing a single year in the life. However, during workshop deliberations for SEDAR 62, it was noted that a study applying bomb radiocarbon validation to compare spine and otolith ages resulted in otolith ages better aligning with known regional coral and otolith carbon-14 values compared to spines, which under-aged known records. Whereas, the comparison of vertebra versus otolith-derived ages indicated a close agreement (Patterson et al. 2019: SEDAR62-WP-17).

Shervette et al. (2021), conducted a study on gray triggerfish in Ghana and U.S. South Atlantic that compared ageing of spines and otoliths. They also developed a methodology for removing the otoliths from gray triggerfish. Whole otoliths were submerged in water and read against a black background with magnified stereoscope, and then each opaque zone was counted. Spines were also read and fish were aged by counting the number of translucent zones in the spine section. Two independent readers with ageing experience of 8 years⁺, read the otoliths and spines. This study found age estimates for spines ranged from 1 to 8 years and for otoliths 3 to 13 years. An age bias plot indicating a potential ageing bias starting at age-3 between spines and otoliths of gray triggerfish. Therefore, the Council is interested in funding an age study for Gulf gray triggerfish to reconcile ageing differences in hard parts.

Application Process:

Contractor Qualifications: The successful applicant or applicant team will have demonstrable experience in marine ecology.

How to Apply:

Executive Summary: A summary of the work proposed, including a brief summary of the applicant's qualifications.

Proposed Plan of Work: A proposal outlining the work such as size-at-age samples that will be utilized from the various fleets (i.e., private recreational, for-hire, and commercial) and/or fishery-independent survey samples. The proposal should include the methodology of the age validation work proposed with a clear rationale for that work such as literature cited as well as the anticipated sample sizes of fish by age class (0-14 years). Proposals considering seasonal growth increment including aging methodology and rationale. The proposal should also include the timeline of field sampling, laboratory analysis, and mid-term and final report delivery dates.

Qualifications of Applicant: A summary of the qualifications of the applicant and other team members, if applicable. A curriculum vitae should be included for each individual who is expected to work on the project.

Proposed Budget: A detailed budget, including the basis for the charges (e.g., hourly rates, fixed fees, overhead costs).

Letters of Support: Letters demonstrating collaboration with state and federal partners and fishermen to obtain adequate samples across age classes are highly encouraged.

Applicant References: Names, titles, full addresses, email addresses, and phone numbers for three clients for whom the applicant has provided similar services to those requested or are familiar with the applicant's work and the quality of the applicant's work products.

Proposal Evaluation Criteria and Next Steps: Proposals will be evaluated based on methodology and scope outlined in the proposed work plan. Ability to deliver, in a timely manner, a quality work product as determined by qualifications including prior experience, references, and budget. The Council may request additional information as deemed necessary or negotiate modifications prior to providing support for a proposal. Once a proposal is selected for funding, a formal contract will be provided to the applicants.

References:

Allman, R.J., C.L. Fioramonti, W.F. Patterson III, and A.E. Pacicco. 2016. Validation of annual growth zone formation in grey triggerfish (*Balistes capriscus*) dorsal spines, fin rays and vertebrae. *Gulf of Mexico Science* 1:68-76.

Allman, R.J., W.F. Patterson III, C.L. Fioramonti, and A.E. Pacicco. 2017. Factors affecting estimates of size at age and growth in grey triggerfish *Balistes capriscus* from the northern Gulf of Mexico. *Journal of Fish Biology*: 1-13.

Patterson, W.F. III, V.R. Shervette, and B. K. Barnett, and R. J. Allman. 2019. Do sagittal otoliths provide more reliable age estimates than dorsal spines for gray triggerfish? SEDAR62 WP-17. SEDAR, North Charleston, SC. 37pp.

Shervette, V.R., J.M. Rivera Hernandez, and F.K.E. Nunoo. 2021. Age and growth of grey triggerfish *Balistes capriscus* from trans-Atlantic populations. *Journal Fish Biology*. 1-17.