

**STATEMENT OF WORK  
BIO-MONITORING OF ALOSINES  
IN THE SUSQUEHANNA RIVER AND TRIBUTARIES  
IFB 6100035231**

**CONTRACT OVERVIEW:** The Department of General Services (DGS), Bureau of Procurement (BOP) is issuing this Invitation for Bid (IFB) to procure the services of a Contractor to perform Bio-monitoring of Alosines in the Susquehanna River and Tributaries on behalf of the Pennsylvania Fish and Boat Commission (PFBC), herein referred to as Using Agency. This Contract will require the Contractor to focus on detecting the occurrence and abundance of juvenile American shad and river herring in the Susquehanna River and its tributaries. In addition, the Contractor will be required to operate the West Fish Lift (WFL) at the Conowingo Dam to collect, monitor and tank spawn adult American shad during the spring spawning migrations. This service will be similar to the bio-monitoring work done in previous years by the Susquehanna River Anadromous Fish Restoration Committee (SRAFRC) and the PFBC, with the addition of monitoring adult spawning stock. Jobs and corresponding deliverables described within this document are intended to cover a five-year sampling period and will result in a five-year Contract.

**PRICING:** Bidders shall enter their bid prices on the line items of their bid in the PA Supplier Portal. Bidders must bid on all line items by entering each per unit cost for the services identified. Bidders should base their bid prices on the requirements identified in this Statement of Work. See Tables 1 through 5 below for a summary of the bid line items by job # and project year.

**Table 1) 2015 - 2016 Alosine bio-monitoring format for bid (Project Year 1).**

Job #	Bid Internal Item #	Job Title	Unit of Effort	Estimated Effort
1	5	2015 Lower River Haul Seining	6 seine hauls per day	1 unit per week for 15 weeks (15 total units)
1	6	2015 Reporting Lower River Haul Seining	1 Report	1 annual report each year of the contract
2	7	2016 West Fish Lift	Sampling day	20 sampling days per season (20 total units)
2	8	2016 Reporting West Fish Lift	1 Report	1 annual report each year of the contract

**Table 2) 2016 - 2017 Alosine bio-monitoring format for bid (Project Year 2).**

Job #	Bid Internal Item #	Job Title	Unit of Effort	Estimated Effort
1	9	2016 Lower River Haul Seining	6 seine hauls per day	1 unit per week for 15 weeks (15 total units)
1	10	2016 Reporting Lower River Haul Seining	1 Report	1 annual report each year of the contract
2	11	2017 West Fish Lift	Sampling	20 sampling days per season (20 total units)
2	12	2017 Reporting West Fish Lift	1 Report	1 annual report each year of the contract

**Table 3) 2017 - 2018 Alosine bio-monitoring format for bid (Project Year 3).**

Job #	Bid Internal Item #	Job Title	Unit of Effort	Estimated Effort
1	13	2017 Lower River Haul Seining	6 seine hauls per day	1 unit per week for 15 weeks (15 total units)
1	14	2017 Reporting Lower River Haul Seining	1 Report	1 annual report each year of the contract
2	15	2018 West Fish Lift	Sampling	20 sampling days per season (20 total units)
2	16	2018 Reporting West Fish Lift	1 Report	1 annual report each year of the contract

**Table 4) 2018 - 2019 Alosine bio-monitoring format for bid (Project Year 4).**

Job #	Bid Internal Item #	Job Title	Unit of Effort	Estimated Effort
1	17	2018 Lower River Haul Seining	6 seine hauls per day	1 unit per week for 15 weeks (15 total units)
1	18	2018 Reporting Lower River Haul Seining	1 Report	1 annual report each year of the contract
2	19	2019 West Fish Lift	Sampling day	20 sampling days per season (20 total units)
2	20	2019 West Fish Lift Reporting	1 Report	1 annual report each year of the contract

**Table 5) 2019 - 2020 Alosine bio-monitoring format for bid (Project Year 5).**

Job #	Bid Internal Item #	Job Title	Unit of Effort	Estimated Effort
1	21	2019 Lower River Haul Seining	6 seine hauls per day	1 unit per week for 15 weeks (15 total units)
1	22	2019 Reporting Lower River Haul Seining	1 Report	1 annual report each year of the contract
2	23	2020 West Fish Lift	Sampling day	20 sampling days per season (20 total units)
2	24	2020 West Fish Lift Reporting	1 Report	1 annual report each year of the contract

**METHOD OF AWARD:** This will be a single award to the lowest responsive and responsible Bidder. Award will be based on the lowest, total aggregate cost for all line items.

**DESCRIPTION OF SERVICES:** The PFBC, upon notification to the DGS, reserves the right to adjust the estimated effort or discontinue job(s) based on availability of funds, number of fish stocked, low fish capture, bad weather, stream flows, et cetera.

**Job 1) Lower River Haul Seining:** Services to occur upon issuance of a fully executed purchase order to October, 2015 through 2019.

**Objective:** Collection of alosines from the lower Susquehanna River to monitor abundance, species composition, growth, out-migration, and to provide specimens for otolith analysis (for tracking hatchery contribution to restoration). Expectations are to capture a minimum of thirty juvenile shad per sampling day or a minimum of 100 shad per sampling season.

**Approach:** Contractor will be required to conduct weekly sampling using a 400-ft x 6-ft seine with 3/8-in stretch mesh. Sampling is to be performed at one of five possible sites located on the main-stem of the lower Susquehanna River: (1) Wrightsville Landing north of the Rt. 462 bridge in Wrightsville, (2) Columbia Borough Boat Launch off River Road in Columbia, (3) Marietta Boat Club Access off Front Street in Marietta, (4) River Front Park off Vinegar Ferry Road in East Donegal Township, and (5) Long Level Boat Launch. Exact locations of seining will be determined by consultation between the Contractor and the Using Agency Coordinator based on river flow, substrate composition and previous capture information.

The Using Agency Coordinator may wish to negotiate for equal effort sampling on other reaches of the Susquehanna River based on alosine distribution and sampling needs. Sampling will be conducted July through October. Specific dates of sampling will be determined by Contractor and approved by Using Agency Coordinator. Sampling is to be performed after sunset at an estimated rate of one day per week over a fifteen-week period with a minimum of six seine hauls per day (15 units total). Seine hauls will be made at a minimum of six locations within the site and these locations will be standardized and described thoroughly in the report. Seine hauls will be performed by anchoring one end of the seine to shore and maneuvering the unattached end in a semicircle downstream by boat. In the past, four to five individuals were required to successfully perform seining operation. Contractor is responsible for supplying equipment and labor.

#### **Deliverables:**

Sampling & Summary: The first 30 American Shad collected at each site, on each sampling date are to be frozen for otolith analysis. Shad are to be covered with water and frozen whole in zip lock freezer bags with a maximum of 30 fish per bag. Two waterproof labels are to be provided for each bag, listing the time and date of capture, sampling site and number of shad per package. One label is to be affixed to the outside of bag and one is to be placed inside the bag. Packaged fish should be transported frozen and delivered monthly to Josh Tryniewski, PFBC Fish Production Services, Benner Spring State Fish Hatchery, 1735 Shiloh Road, State College, Pennsylvania 16801. Flexibility with regard to delivery date is expected since catch rates and processing time by PFBC research staff is variable. A brief summary of weekly sampling results are to be submitted to the Using Agency Coordinator on Monday of each week throughout the sampling period.

Annual Report: Contractor is responsible for providing an annual report in a format used by scientific journals that includes: (1) a detailed description of the materials and methods used, including detailed site descriptions with corresponding latitudes and longitudes and a comprehensive description of sampling gear and methodologies, (2) a summary of the catch of alosines in each seine haul and corresponding time and date of capture, water temperature, turbidity (secchi disk), and flow (cfs. from nearest gauge), (3) length frequencies of alosines captured, (4) a summary of catch per unit effort of alosines at each site on each date with appropriate variance and confidence intervals, and; (5) a summary of geometric mean CPUE (all sampling dates combined), with appropriate variance and

confidence intervals. Reported results should include a brief narrative summary of the significant outcome of sampling, as well as references to tables and a brief discussion of the results including comparisons with historical haul seining data. No color tables or graphs should be used in these reports.

The Contractor shall prepare and provide a draft summary report by December 30<sup>th</sup> of each year of the Contract. The PFBC will comment on the draft report and the Contractor will submit three copies of a final report within 30 days of receipt of those comments. The summary report should include the following: Abstract, Introduction, Materials and Methods, Results, Discussion, Recommendations, Literature Cited, and Figures and Tables as appropriate. Further, raw data, tables, charts, and report body must be provided in electronic format compatible with Microsoft Excel and Word.

Invoices for Services Completed: Invoices may be submitted by the Contractor on a monthly basis for those units of service/reports successfully completed pending review and verification by the Using Agency Coordinator.

**Job 2) Conowingo Dam, West Fish Lift (WFL) Operation for the Collection and Tank Spawning of Adult Alosines:** Services to occur March to June, 2016 through 2020.

**Objective:** Collection of pre-spawn alosines to monitor abundance, species composition, provide specimens for otolith analysis (monitor hatchery contribution of returning stock), collection of live, pre-spawn, adult alosines for tank spawning to support restoration stockings of larval alosines throughout the Susquehanna River Basin.

**Approach:** Since its operation began in 1972, the West Fish Lift (WFL) at Conowingo Dam has been a cornerstone in efforts to restore migratory fishes to the Susquehanna River. The West Fish Lift (WFL) operation provides the only source of Susquehanna River American Shad eggs for stock rebuilding initiatives. Additionally, the WFL provides otolith specimens for tracking hatchery contributions to restoration efforts, and providing fisheries independent data for reporting to the Atlantic States Marine Fisheries Commission (ASMFC).

The WFL operations are typically conducted during a 7-week period from early April through late May with 20 to 30 days of sampling. Sampling objectives include identifying and counting fish caught by the lift, sacrificing every 25<sup>th</sup> American Shad caught, sacrificing the first 50 of each river Alewife and Blueback Herring caught (followed by every 25<sup>th</sup> of each species), and returning any re-captured Maryland Department of Natural Resources (MDNR) tagged American Shad from the current year of sampling to the tailrace below Conowingo Dam (recapture of MDNR tagged American Shad from previous years of tagging will be sacrificed for study). All sampled shad and herring will be decapitated and heads frozen on-site for later delivery to the PFBC Van Dyke Hatchery. Lengths, weights, sex, and scale samples will be taken from sacrificed fish, fish mortalities (resulting from handling, tank spawning and lifting). Any MDNR tagged American Shad that are sampled will be frozen whole and delivered to the PFBC Van Dyke Hatchery. Information and data related to collection and processing of MDNR tagged shad (including all scale samples) will be coordinated through the PFBC Van Dyke Hatchery Supervisor and provided to the appropriate MDNR personnel.

The WFL tank spawning will be operated in a manner that maximizes tank spawning efforts for American Shad (discussed below) during the 7-week period from early April through late May. The Contractor (in cooperation with Conowingo Dam hydroelectric station staff), will set-up a minimum of two circular spawning tanks at the WFL facility. These tanks will be assembled on-site in late March/early April and plumbed in a configuration similar to that used in past years. Both tanks will be supplied with 25-40 gallons per minute of river water

through a wall mounted 2-inch fitting. A screened 4-inch PVC center drainpipe in the bottom of each tank will provide the only exit for the demersal shad eggs and water from the tank. The water level in both spawning tanks will be maintained by an external standpipe that will also provide a source of water for the rectangular 72x36x16 inch raised egg collection tank. The volumes for the small and large spawning tanks will be 1,690 and 2,430 gallons respectively. An egg sock fastened to the discharge pipe from each spawning tank will collect shad eggs released during spawning.

American Shad spawning trials require the use of hormones (as pelletized injections) which will be purchased by the Contractor from Syndel Labs, Vancouver, BC under an Investigative New Animal Drug (INAD) program (administered by the USFWS). Each American Shad will be injected with a hormone implant in the thick muscles of the dorsal fin area. Fish will not be anesthetized prior to injection. The Contractor will register as a cooperator with the USFWS Aquatic Animal Drug Approval Partnership (AADAP) program and conduct all spawning trials according to protocols approved by AADAP.

American Shad brood fish will be collected from the WFL or by other means approved by PFBC. Planned densities are 75 fish in a 12-ft. tank and 50 in a 10-ft. tank, both at a 3:2 M:F ratio, when available. Each fish will receive a hormone implant. Up to two trials will be attempted per tank per week and fish will be allowed to spawn on their own over 2-4 days. Collected eggs will be delivered to Van Dyke Hatchery. Tank spawning trials without the use of hormone injections may also be attempted.

Egg socks, installed on the effluent pipe of each spawning tank, will be examined daily during spawning trials. If eggs are present, they will be transferred into a framed nylon net, sieved to remove scales and measured for volume (with a graduated 2 liter measuring cup). Up to five liters of water hardened eggs will be mixed with 5 liters of ambient river water in double plastic bags. Pure oxygen will be introduced into the inner bag before being sealed with tape, cable ties or rubber castration bands. The bags will be placed into insulated shipping containers and driven to the PFBC Van Dyke Hatchery by the contractor. All shipments of eggs will be driven to Van Dyke Hatchery on the same day they are collected. If less than 5 liters of eggs are collected in a day, the contractor will consult PFBC's Van Dyke Hatchery Supervisor for instruction (typically, egg volumes of less than 5 liters are released into the river below the dam).

Upon trial completion, spawning tanks will be drained and mortalities recorded. No attempts will be made to hand-strip shad following the egg pulse. Fish spawned without the use of hormones will be released back into the river, while fish treated with hormone injections will be disposed of at an off-site location (landfill/composted). The Contractor will maintain daily contact with personnel at the Van Dyke Hatchery to advise them of spawning trial status, egg collections and anticipated egg shipments. The Contractor will prepare an annual report summarizing WFL tank spawning operations and submit to PFBC by December 31<sup>st</sup>.

Hickory Shad tank spawning may be conducted on a limited basis should the MDNR Manning Hatchery require fertilized eggs for fish culture research. The Contractor may work with MDNR and/or PFBC to collect Hickory Shad brood stock from the Conowingo tailrace, Lapidum boat launch and/or the mouth of Deer Creek. Collection methods may involve angler collections, angling or boat electrofishing (MDNR operation). Collected hickory shad will be placed into spawning tanks at densities up to 100 fish for a 12-ft. tank and 60 fish for a 10-ft. tank at a 3:2 M:F ratio, when available. Hormone injections will be administered by MDNR biologists based on study needs. Up to two spawning trials (one with hormone

and one without hormone injections) will be conducted, provided there is adequate tank space and time before / between American Shad tank spawning trials. MDNR Manning Hatchery will be responsible for collecting spawned eggs and disposal of hormone treated fish. Fertilized eggs in excess of MDNR Manning Hatchery needs will be delivered to PFBC Van Dyke Hatchery by the Contractor.

The Contractor will maintain regular contact with the PFBC's Van Dyke Hatchery Supervisor to resolve any problems and to make joint decisions on project adjustments. Daily records of WFL operations (catch composition, fish transfers, water conditions, hydroelectric project generation details, etc.) will be provided to the PFBC Van Dyke Hatchery Supervisor and lift operations may be adjusted (i.e. abbreviate or extend the number of fishing hours or days) to take advantage of fish availability and seasonal timing. To avoid competition with attraction flow at the WFL, adjacent hydroelectric units 1 and 2 should be shut down on lifting dates whenever total project discharge is less than 60,000 cfs. It is recognized that the operating protocol may be adjusted (hours or days) to take advantage of fish availability, but that such adjustments may further abbreviate (or extend) the fishing season to stay within the approved budget for this activity.

**Deliverables:**

Sampling & Spawning Trials: During an approximate seven-week operation period, April through June, the WFL will conduct 20 days of sampling where: captured fish are identified and enumerated; every 25th American Shad caught is sacrificed for study, the first 50 of each river Alewife and Blueback Herring caught (followed by sacrifice of every 25th of each) are sacrificed for study, any re-captured Maryland Department of Natural Resources (MDNR) tagged American Shad from the current year of sampling are returned to the tailrace below Conowingo Dam (whereas, recaptured MDNR tagged American Shad from previous years of tagging will be sacrificed for study); sacrificed alosines are measured for length, weight, sex, scale samples collected, and decapitated heads frozen for later delivery to the PFBC Van Dyke Hatchery, Thompsontown, PA. The WFL operation during the 20 days of sampling will also conduct up to four tank spawning trials per week as described above. Eggs resulting from spawning trails will be packaged and delivered to the PFBC Van Dyke Hatchery, Thompsontown, PA the same day that they are collected. The Contractor is responsible for submitting a brief summary of daily and/or every-other-day sampling results to PFBC's Hatchery Supervisor throughout the biological sampling and tank spawning trial period.

Annual Report: The Contractor shall prepare and provide a draft summary report by November 30 each year of the contract. The PFBC will comment on the draft report and the contractor will submit three copies of a final report within 30 days of receipt of those comments. The report should include the following: Abstract, Introduction, Materials and Methods, Results, Discussion, Recommendations, Literature Cited, and Figures and Tables as appropriate. Further, raw data, tables, charts, and report body must be provided in electronic format compatible with Microsoft Excel and Word.

**REPORTING REQUIREMENTS:** The Contractor is required to provide weekly project updates, including a brief summary of sampling results as stated above. Weekly project updates are to be provided to the PFBC to the attention of Joshua Tryninewski. Updates can be submitted via e-mail ([jtryninews@pa.gov](mailto:jtryninews@pa.gov)) or telephone (814) 353-2239 on Monday of each week throughout the Summer and Fall juvenile alosine sampling period (Job 1) and several days per week during the Spring spawning migration season (Job 2). Additional persons of contact may be required on email correspondence and will be provided later. Any

proposed changes to the sampling protocols must be approved by the PFBC prior to implementation.

**INVOICE APPROVAL:** Prior to submitting invoices for payment in accordance with the Contract Terms and Conditions, the Contractor must submit a copy of the invoice to Joshua Tryniewski at [jtryniewski@pa.gov](mailto:jtryniewski@pa.gov) of the PFBC. The invoices should be submitted at the end of each month for those units of service/reports successfully completed. Once the invoice has been reviewed and verified the Contractor may submit the official invoice for payment.

**POST AWARD ADMINISTRATION:** The Contractor's performance shall be monitored and evaluated in accordance with the requirements outlined in the Contract. At a minimum, the Contractor's performance shall be evaluated on an annual basis. Contractor may be required to attend Contract Performance Review meetings. These meetings will be for the purpose of providing Contractor performance reviews, discussion of issues either party may have concerning the Contract or to evaluate the overall progress of the Contract. The meetings will be held quarterly, semi-annually or annually at the discretion of the Department of General Services, or upon special request of the using agency.

**INQUIRIES:** Direct all questions concerning this bid/contract to:

Wanda Bowers, Contracting Officer  
Department of General Services  
Bureau of Procurement  
555 Walnut Street, 6<sup>th</sup> Floor  
Harrisburg, PA 17103  
717-346-3840 (phone)  
[wbowers@pa.gov](mailto:wbowers@pa.gov) (email)