

State: Puerto Rico
Grant Number: F-35.15 (F13AF00979)
Grant Title: Maricao Fish Hatchery Operations and Maintenance
Grant Award Period: July 1, 2013 to June 30, 2014
Project Leader: María de Lourdes Olmeda

FINAL REPORT

MAINTENANCE

To maintain and improve hatchery facilities

Maintenance of ponds, water supply system, gabions and hatchery grounds

Control undesirable vegetation in spawning pond (two times per month) and hatchery surroundings (once a week). Clean plastic liners, kettles and valves (after each harvest). Repair and clean sediment trap at the dam (as required). Maintain sidewalks, roads, landscaping and parking gate (once a week), dikes (two times per month), and repair gabions (as required).

- Undesirable vegetation in spawning ponds and hatchery surroundings was controlled as scheduled. Grass and bushes were trimmed as proposed. To achieve these activities we used some equipment and materials such as lawnmower, trimmers, riding lawnmower, blowers, brooms and lawn rake.
- Plastic liner, kettles and valves were cleaned after each harvest.
- The parking area and sidewalks were conditioned and repaired when necessary. Dike maintenance included debris removal from the water flow.

Maintenance of structures

Includes routine maintenance (daily), reparations (as required) and painting (2 times per year) of the following structures: restrooms, office, nursery, experimental tanks and their roofs, photoperiod building, quarantine building, feed and materials storage building, electrical pedestal on the six growout pond kettles, and railing at each walkway above the kettles. Cleaning and sterilization of the nursery floor (as required).

- Routine maintenance was performed on the structures. The nursery building and the restrooms were cleaned two times per week.
- The quarantine building and photoperiod building were cleaned once a week including the equipment and materials inside them.
- The storage building was cleaned and organized two times per month.
- In the same way, electrical pedestals, railings and walkways above the kettles at each pond were routinely maintained once a week and were reconstructed as necessary.
- Painting was performed once during this segment period.

- The concrete rooves of the buildings (the storage building, office building, bathroom and photoperiod building) were treated with sealant as proposed.

Maintenance of concrete tanks

Includes draining and cleaning (two times per month), repair (as necessary), and painting (once per year) five rectangular tanks (three of 60'x 17'x 4' and two of 60' x 21'x 5'), and twenty-four rectangular tanks (12'x 5'x 2 1/2' each).

- Concrete tanks were drained, cleaned and repaired as needed. The twenty-four rectangular tanks were painted. However it was not possible to paint the five rectangular tanks as planned.

Maintenance of equipment

Perform maintenance on the following hatchery equipment:

two pick-up trucks, three utility vehicles (2 Mules and 1 Kubota), trimmers, lawnmowers, blowers, aerators, live hauler tank, water pumps, welder, electrical generator, manholes at the dam, tools, (as necessary).

Perform maintenance on the following nursery equipment:

hatching jars, pumps, tanks, filters, glass aquaria, refrigerator, generator, air blower, piping, etc. (as necessary).

- Routine maintenance was performed on the hatchery equipment when necessary.

Discussion

- Maintenance activities at the Maricao Fish Hatchery (MFH) are diverse and most of the time were performed without complications. The materials and the equipment necessary to perform these activities were received on time or were available at the hatchery feed and materials storage building. Except for the painting of buildings activity, all of them were performed as proposed. The hatchery structures were supposed to be painted twice per year. They were painted once because the treatment to seal leaks in the rooves of the buildings and periods of unusual rain in the area affected our ability to paint the hatchery structures for the second time. Because of the rain and the high humidity at Maricao, we are changing the painting structures activity frequency to every other year instead of two times per year, but using a high quality product that should last longer.

Significant Deviation

- Long periods of intense rain and high humidity at the Maricao Fish Hatchery and the treatment with sealant to correct leaking of the buildings' rooves, prevented us from painting all the structures as planned.

OPERATION

To achieve optimum hatchery production of fingerling fish under prevailing conditions.

Water quality and pond preparation

Measure and record dissolved oxygen and temperature (every day), secchi disk transparency, nitrite and pH of growout pond water (three times per week), measure and record dissolved oxygen and temperature (before stocking) at each reservoir or private pond stocking site (as required), pond fertilization (as required), and zooplankton sampling and identification in growout ponds (once per week).

- Water quality was measured as proposed. The following table shows a summary of T°C, D.O. and pH for the growout ponds, for July 2013 to June 2014.

		Jul 13 – Jun 14
T°C	Mean	23.68
	Std Dev	1.98
	Max	27.50
	Min	18.50
O₂ mg/l	Mean	7.72
	Std Dev	1.21
	Max	11.55
	Min	1.92
pH	Mean	8.43
	Std Dev	0.60
	Max	9.00
	Min	7.00

- For pond fertilization, we used a combination of inorganic fertilizers and alfalfa pellets to promote microorganism growth.

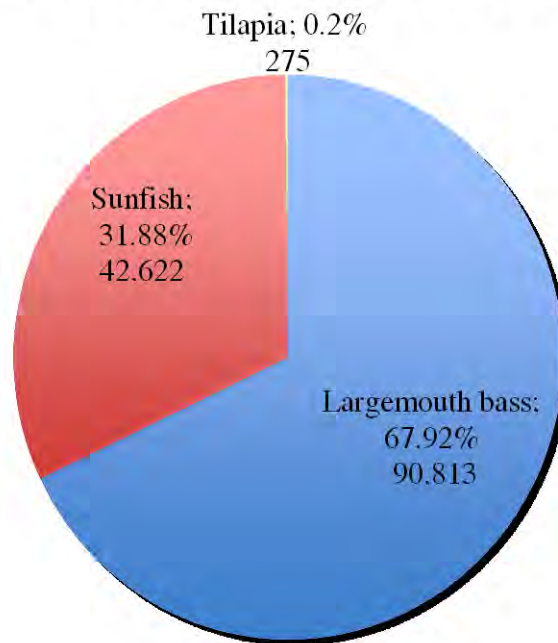
Fish production

Coordination of broodstock capture, broodstock collection and maintenance, broodstock reproduction, egg disease treatment, coordination of fingerling stocking, stocking of fingerlings, fry transfer to growout ponds, fingerling harvest and hauling to reservoir and tilapia and sunfish feeding (as required).

- During July 2013 to June 2014, a total of **167,485** fingerlings were produced at the Maricao Fish Hatchery.
- Of this quantity, approximately 33,775 were tilapias and sunfish used to feed broodstock at the hatchery.
- Nearly **133,710** fingerlings were stocked in seven reservoirs and private ponds. Among the stocked reservoirs are Guajataca, La Plata, Cidra, Caonillas, Dos Bocas, Carite and Guayabal.

- From the total fingerlings stocked, 90,813 (67.92%) were largemouth bass, 42,622 (31.88%) were sunfish and 275 (0.2%) were tilapias.
- The following is a representation of the quantity of fingerlings stocked per species from July 2013 to June 2014.

Fish Stocking - July 2013 to June 2014 Maricao Fish Hatchery



- Adult largemouth bass, peacock bass and bigmouth sleepers were fed mainly with tilapia fingerlings produced at the Maricao Fish Hatchery. Occasionally, sunfish also produced at the hatchery and green swordtail fish and guppies provided by a local private hatchery were also used to feed.

Data analysis and computerization

Acquisition and computerization of water quality data, broodstock records, fingerling production and stocking records, analysis and integration of information (as required).

- All the data generated during this segment was computerized, analyzed and integrated in a database to be used in the management of the fresh water sport fisheries in Puerto Rico.

Annual Report

Prepare annual report, by September 28, 2014

- This task was completed as scheduled.

Discussion

- Operation activities were performed as planned. Water quality data was measured and recorded as proposed. Although low dissolved oxygen level was recorded (1.92 mg/l) on August 8, 2013, the fingerling harvest was successful because of appropriate pond management including water flow application and activation of the pond aeration system. To maintain the capability of fingerling production, new broodstock were brought to the Maricao Fish Hatchery.

The largemouth bass is the most important species for the local fishermen. However, to enhance fishing opportunities, the MFH has conducted experiments aimed at developing a captive propagation program for peacock bass and bigmouth sleeper. These fishes have acquired prominence among the sport fishermen. It is important to point out that this project evolved from the recommendations of Project F-53 - *Fisheries Research and Management in Puerto Rico*.

The MFH is the cornerstone of the freshwater Sport Fish Program in Puerto Rico. This facility interconnects with the other components of the recreational freshwater fisheries-reservoirs management, fingerlings stocking, largemouth bass transfers between impoundments, scientific research and education. In summary, the MFH showcases the collaborative efforts pursued between the partner agencies for the benefit of our stakeholders.

Significant Deviation

- No significant deviations occurred.

Financial Remarks

- During this project segment, two trips were made by project personnel:
South Carolina (January 2014) – American Fisheries Society (SEAFS)
Washington (February 2014) - World Aquaculture Society, Aquaculture 2014
- A computer and software were purchased.
- Some other equipment and materials were purchased including: water quality equipment and materials, fish food and fertilizers, herbicides, vehicle batteries, etc.
- For this segment, a new aeration system it was acquired. Because of how crucial this equipment is in the hatchery operation, we always budget an amount to buy at least one aeration system in case it is necessary (\$5,000 in this segment).
- A vehicle (SUV) was acquired (cost was shared with F-52 Project - *Freshwater Sport Fish Community Assessments in Puerto Rico Reservoirs and Lagoons*).

Prepared by:

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