FINAL REPORT
MARICAO FISH HATCHERY OPERATIONS AND MAINTENANCE

State:	Puerto Rico
Grant Number:	F-35.14 (F12AF00451)
Grant Title:	Maricao Fish Hatchery Operations and Maintenance
Project Proposal Period:	July 1, 2012 to June 30, 2017
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Project Leader:	María de Lourdes Olmeda

MAINTENANACE
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 not possible on all structures, but we painted those that were not possible to paint last year.

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. However it was not possible to paint the concrete 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 activity, all of them were performed as proposed. The hatchery structures were supposed to be painted two times per year. This activity was not completed during segment 2011-2012 and nor was it completed during this segment. Nonetheless, we painted the structures that were not painted in the previous proposal segment. Since 2011, unusual rain activity has occurred in Puerto Rico that has affected our ability to paint the hatchery structures. Because of the rain and the high humidity at Maricao we are changing the painting activity frequency to every other year instead of two times per year, but using a high quality product that should last longer.

Significant Deviation

- As in year 2011, during June 2012 - July 2013 unusual rain activity occurred. Long periods of intensive rain and high humidity at the Maricao Fish Hatchery impeded us to paint all the structures and the concrete tanks 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 2012 to June 2013.

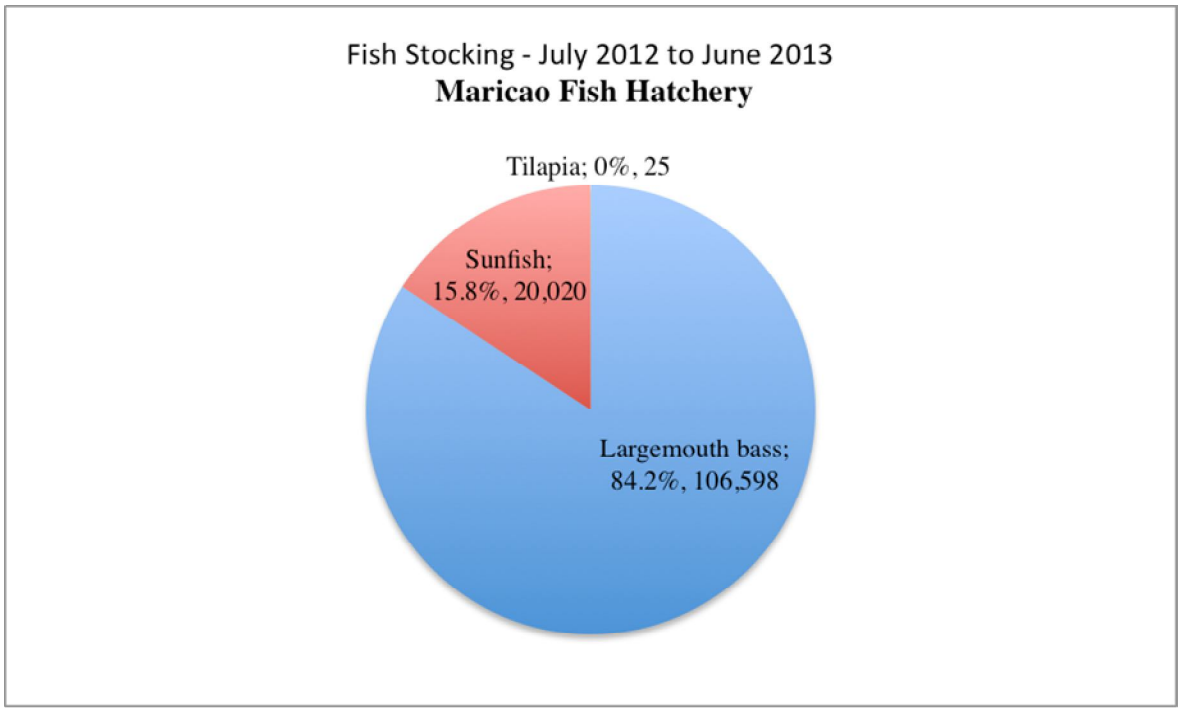
		Jul 12 – Jun 13
T°C	Mean	24.06
	Std Dev	1.81
	Max	28.50
	Min	19.40
O_2 mg/l	Mean	7.41
	Std Dev	1.57
	Max	11.09
	Min	2.05
pH	Mean	8.32
	Std Dev	0.51
	Max	9.50
	Min	6.50

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

Fish production

Coordination of broodstock capture, broodstock capture 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 2012 to June 2013, a total of 145,827 fingerlings were produced at the Maricao Fish Hatchery.
- Of this quantity, approximately 19,184 were tilapias and sunfish used to feed broodstock at the hatchery.
- Nearly 126,643 fingerlings were stocked in four reservoirs and private ponds. Among the stocked reservoirs are La Plata, Guajataca, Caonillas and Dos Bocas.
- From the total fingerlings stocked 106,598 (84.2%) were largemouth bass, 20,020 (15.8%) were sunfish and 25 (0.0%) were tilapias.
- The following is a representation of the quantity of fingerlings stocked per species form July 2012 to June 2013.



- Adult largemouth bass, peacock bass and guavinas 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 30, 2013

- 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 (2.05 mg/l) on September 4, 2012, 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 been used to support the development of new fishing opportunities-the peacock bass and the bigmouth sleeper. These initiatives are collaborative efforts with other institutions and the outcomes are reported separately.

Overall, the MFH fulfilled its role for the Sportfish 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:
  Minnesota (September 2012) - American Fisheries Society meeting
  Tennessee (20-26 February 2013) – World Aquaculture Society, Aquaculture 2013
- 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 tires and batteries, construction materials to repair the walkway at the growout ponds, welder equipment and materials, rotary hammer, etc.
- For this segment, it was not necessary to acquire new aeration equipment because we had two spares. 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 ($6,000 in this segment).
- In “Personnel”, there is a balance of approximately $25,000. This comes as a result of the resignation of a biologist in mid-September, 2012, who was replaced in March of 2013. We were able to maintain hatchery operation, since the biologist’s work was temporarily assumed (as an emergency measure) by other hatchery and central office staff including the office Director.
- This balance also includes salary differentials that were budgeted, but not requested, due to administrative complications (electoral ban and government administration transition period).
- Another employee who was fired under Law 7 had his salary reduced to approximately 75% while working as a transitory employee. Since he was about to be reinstated as a regular employee, the complete salary was budgeted. His reinstatement was effective almost by the end of project segment.

Prepared by:
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