

Estuarine Water Quality

Interim Work Plan, Honduras Study 2

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Introduction

A baseline of information has been established on selected chemical, biological, and physical characteristics of water at points along major shrimp producing estuaries in southern Honduras (Teichert-Coddington et al., 1996). The objective of this study was to continue to monitor the estuarine water quality in order to detect trends over time and evaluate the impact of shrimp farming on the water quality.

Materials and Methods

Water samples were collected every one to two weeks from at least 12 sampling sites distributed over six estuaries in the shrimp farming area of southern Honduras. Samples were collected at intake pumps of shrimp farms at about the middle of a daily pumping cycle. An additional sample site on the Choluteca River serves as a reference point. Water was analyzed for total settleable solids (APHA et al., 1992), total ammonia nitrogen (Parsons et al., 1992), filterable reactive phosphate (Grasshoff et al., 1983), chlorophyll-*a* (Parsons et al., 1992), total alkalinity by titration to 4.5 pH endpoint, salinity, and BOD₅. Total nitrogen and total phosphorus were determined by nitrate and phosphate analysis, respectively, after simultaneous persulfate oxidation (Grasshoff et al., 1983). Data were summarized by estuarine type, location, season, month, and year.

Results and Discussion

Data collection and analyses are incomplete. A preliminary analysis of total nitrogen was completed for El Pedregal estuary, which supports

over 2000 ha of shrimp ponds. Total nitrogen concentrations determined since the project began in 1993 were summarized by month and compared with total nitrogen input by feed during the same period (Figure 1). Total nitrogen concentrations have not increased with time, primarily because runoff from rainfall flushes the estuaries yearly. Nitrogen input as feed was greatest during the rainy season because shrimp growth is always two to three times greater during this season compared with the dry season (Teichert-Coddington et al., 1994). However, there was no accumulation of nitrogen from heavy feeding because of flushing by runoff. On the other hand, nitrogen concentrations in the estuary tended to increase in the dry season during periods of relatively light feeding because freshwater input was insignificant and exchange with bay water was low. Farm management to minimize effluents during the dry season is critical for preventing eutrophication of estuaries and unsustainable shrimp culture conditions.

Literature Cited

- American Public Health Association (APHA), 1992. Standard methods for the examination of water and wastewater. American Public Health Association, American Water Works Association and Water Pollution Control Federation. Washington, D.C., 874 pp.
- Grasshoff, K., M. Ehrhardt, K. Kremling, and T. Almgren, 1983. Methods of seawater analysis. Verlag Chemie, Weinheim, Germany, 419 pp.
- Parsons, T.R., Y. Maita and C.M. Lalli, 1992. A Manual of Chemical and Biological

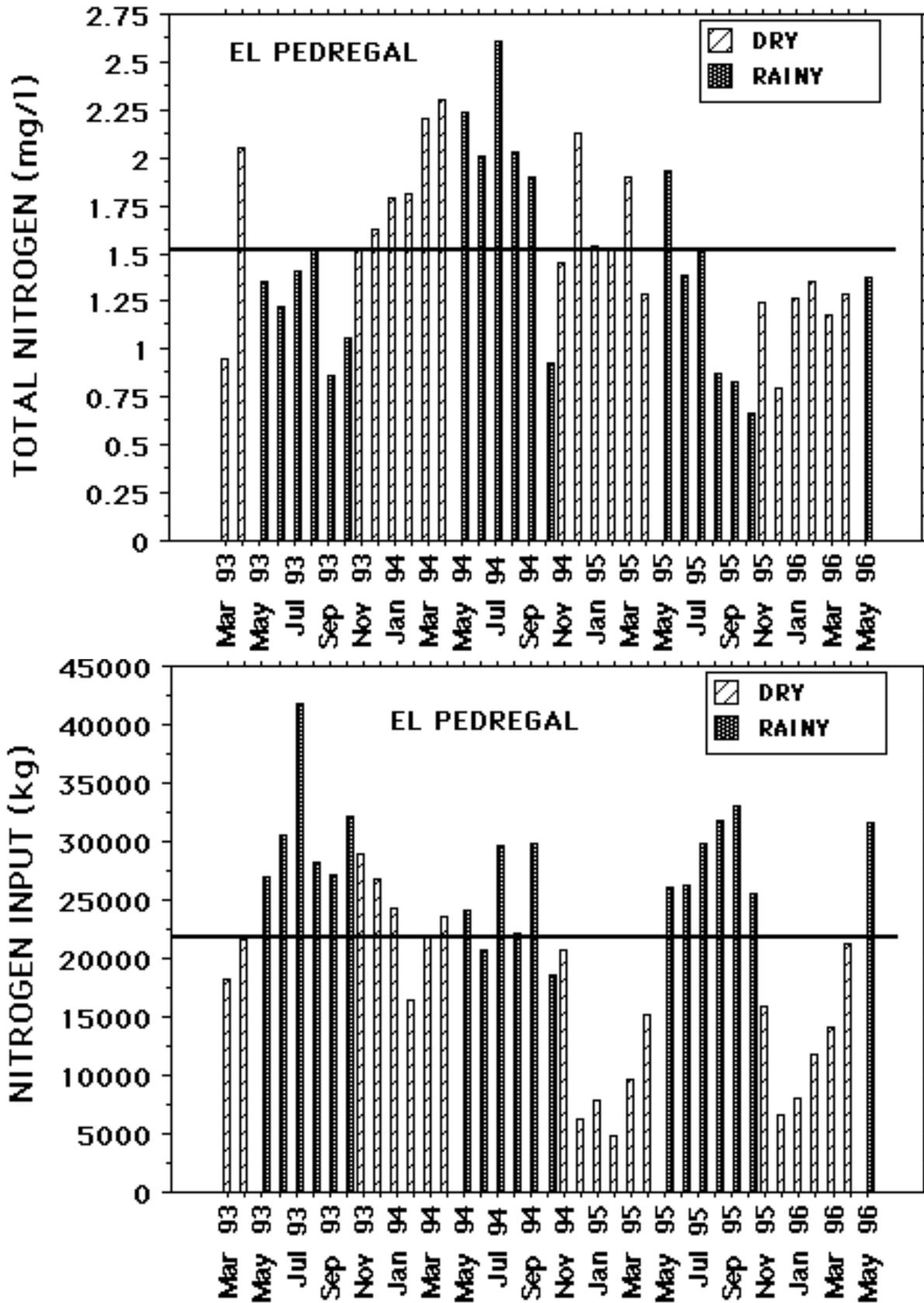


Figure 1. Mean monthly total nitrogen concentrations and nitrogen input as feed in El Pedregal estuary from March 1993 to May 1996. The horizontal black line is the mean during the sampling period.

- Methods for Seawater Analysis. Pergamon Press, New York, USA, 144 pp.
- Teichert-Coddington, D.R., D. Martinez, and E. Ramírez, 1996. Characterization of shrimp farm effluents in Honduras and chemical budgets of selected nutrients. In: H. Egna, B. Goetze, D. Burke, M. McNamara and D. Clair (Editors), Thirteenth Annual Technical Report, Pond Dynamics / Aquaculture Collaborative Research Support Program, Office of International Research and Development, Oregon State University, Corvallis, Oregon, USA, pp. 70-84.
- Teichert-Coddington, D.R., R. Rodriguez, and W. Toyofuku, 1994. Cause of cyclical variation in Honduran shrimp production. *World Aquaculture*, 25(1):57-61.