

**COMPREHENSIVE INTEGRATED MANAGEMENT PLAN
FOR THE MAYAGÜEZ BAY WATERSHED
RESEARCH PROGRAM**

Quarterly Progress Report

Date of Report: 11 December 2003
November 2003

For Quarter Ending: 13

(nov/31, feb/28, may/31, aug/31)

Project No. CIMP-002

Project Title: Nutrient discharges from Mayagüez Bay Watershed _____

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Project Status: x On Schedule ___Suspended ___Delayed ___Cancelled ___
Completed

Percentage of Work Completed: 25 % (year) Completion Deadline: 31 August,
2004

The applicant is requesting that an extension be granted for this CIMP project through
____/____/____.

(Please attach project extension justification.)

Activities progress: (According to Work Schedule submitted with application)

Task #	Major Activity	Date Started	Estimated Date of Completion	Date Completed	% Complete	Dependant on Task (s):
1	Surface Water Resources and Geographical Information System	9/01	6/04		75	
2	Nutrient, sediment, and bacterial quantification (base flow)	5/02	12/03		90	
3	Nutrient, sediment, and bacterial quantification (storm events)	8/03	6/04		40	
4	Analysis and interpretation of water quality data (relate trends in water-quality parameters to land use, hydrologic discharge, point and non-point sources)	1/03	7/04			1,2,3
5	Quantify nutrient (total N, total P, DRP) export coefficients from watersheds	1/03	7/04		75	1,2,3,4
6	Apply a model of an indicator of actual P transport (the P index developed by USDA-NRCS) to selected farms within the subwatersheds	1/04	7/04		0	

Summary of Progress on Project this Quarter: See attached report after this sheet.

(Attach additional sheet, if necessary)

Task 1: Surface Water Resources and Geographical Information System

The land use maps for Cercada and Cerro Gordo subwatersheds generated by our group using IKONOS™ 2000 image have been verified with Añasco Extension Agent, and were found to be in accordance. The same procedure will be followed for the three other watersheds in Las Marías and Maricao municipalities.

We have collected daily precipitation data dating from 1957 to 2001 at Mayaguez Airport, 18 15 14 (latitude), 67 08 55 (longitude), 28 ft. (elevation); from 1957 to 1997 at San Sebastián, 18 20 49 (latitude), 67 00 42 (longitude) 170 ft (elevation); and from 1969 to 2001 at Maricao 18 09 04 (latitude), 66 59 20 (longitude), 2,832 ft. (elevation). This information will be used to generate precipitation data within the five subwatersheds.

Hydrographs and rating curves for Cercada and Cerro Gordo have been generated. The same procedure will be followed for the three other subwatersheds.

Flow-duration characteristics and low-flow characteristics analyses for the subwatersheds are in progress.

Task 2: Nutrient, sediment, and bacterial quantification (base flow)

We have one more sampling date to complete (15 December 2003) prior to conclusion of the projected 19 month base-flow sampling period. Chlorophyll a, total P, dissolved P,

expected that less events will occur during the coming three months.

Task 4: Analysis and interpretation of water quality data (relate trends in water-quality parameters to land use, hydrologic discharge, point and non-point sources)

With samples collected and data analyzed to 2 september 2003, the following main points are observed. Primary producers appear to be using DP as a source of nutrients. Bacterial counts were significantly related to nutrients but not to hydrologic discharge, suggesting that there are similar landtype contributing mechanisms for bacteria and nutrients. Suspended sediments were weakly correlated to hydrologic discharge. The correlation analysis is summarized in the following table. Further analysis must be done with the complete data set before any conclusion is final conclusion is drawn.

Parameter	DP	TP	Hydrologic discharge
Suspended sediments	ns	ns	0.380 (<0.01)
Clorophyll a	-0.292 (<0.01)*	0.255 (0.024)*	ns
Hydrologic discharge	ns	-0.35 (<0.01)	-
Fecal coliforms	0.289 (<0.01)	ns	ns
<i>E. coli</i>	0.250 (<0.01)	ns	ns
<i>Enterococcus</i>	0.263 (<0.01))	0.264(<0.01)	ns

Task 5: Quantify nutrient (total N, total P, DRP) export coefficients from watersheds

The annual observed TP load for each subwatershed was calculated by multiplying the mean daily discharge for a give sampling date by the TP concentration measured on that date. The annual load was obtained by summing the loads for each time interval, dividing by the sum time interval and multiplying by 365 days. The export coefficient was quantified by dividing the TP load by the area of each watershed. Results are summarized in the following table.

Subwatershed	TP load kg P/yr	Export Coefficient -----kg P/ha-----	
Cercada	103.6	0.562	1.07*
Cerro Gordo	354.3	0.505	1.37
Cerrote	197.6	0.818	1.61
Chamorro	185.1	0.541	1.50
Guaba	227.9	0.311	1.11

*Values estimated using land cover data in this study and export coefficients by Ramos-Gines (1996).

The results seem to be lower than those estimated by Ramos-Gines. The storm event contribution to the loads still has not been taken into account.

Task 6: Apply a model of an indicator of actual P transport (the P index developed by USDA-NRCS) to selected farms within the subwatersheds

This will be initiated in January 2004.

Problems Encountered and/or Assistance Needed:

(Attach additional sheet, if necessary)

Certification:

As the Principal Investigator, I certify that the information contained within this quarterly report accurately reflects the status of this CIMP project.

Principal Investigator Signature & Title

Date

CIMP Project Authorized Representative Use Only

Funding Status: ___ Unchanged ___ Overruns ___ Underruns

Funds Expended to Date \$_____ Anticipated Cost Overruns/Underruns:

\$_____

Payment Request this Quarter: \$_____ Payment Received this Quarter:

\$_____

Project Extension Authorization:

Based upon our review of the supporting documentation, the requested project extension is justified. The project director authorize an extension of this project through ____/____/____.

Director's Signature

Date