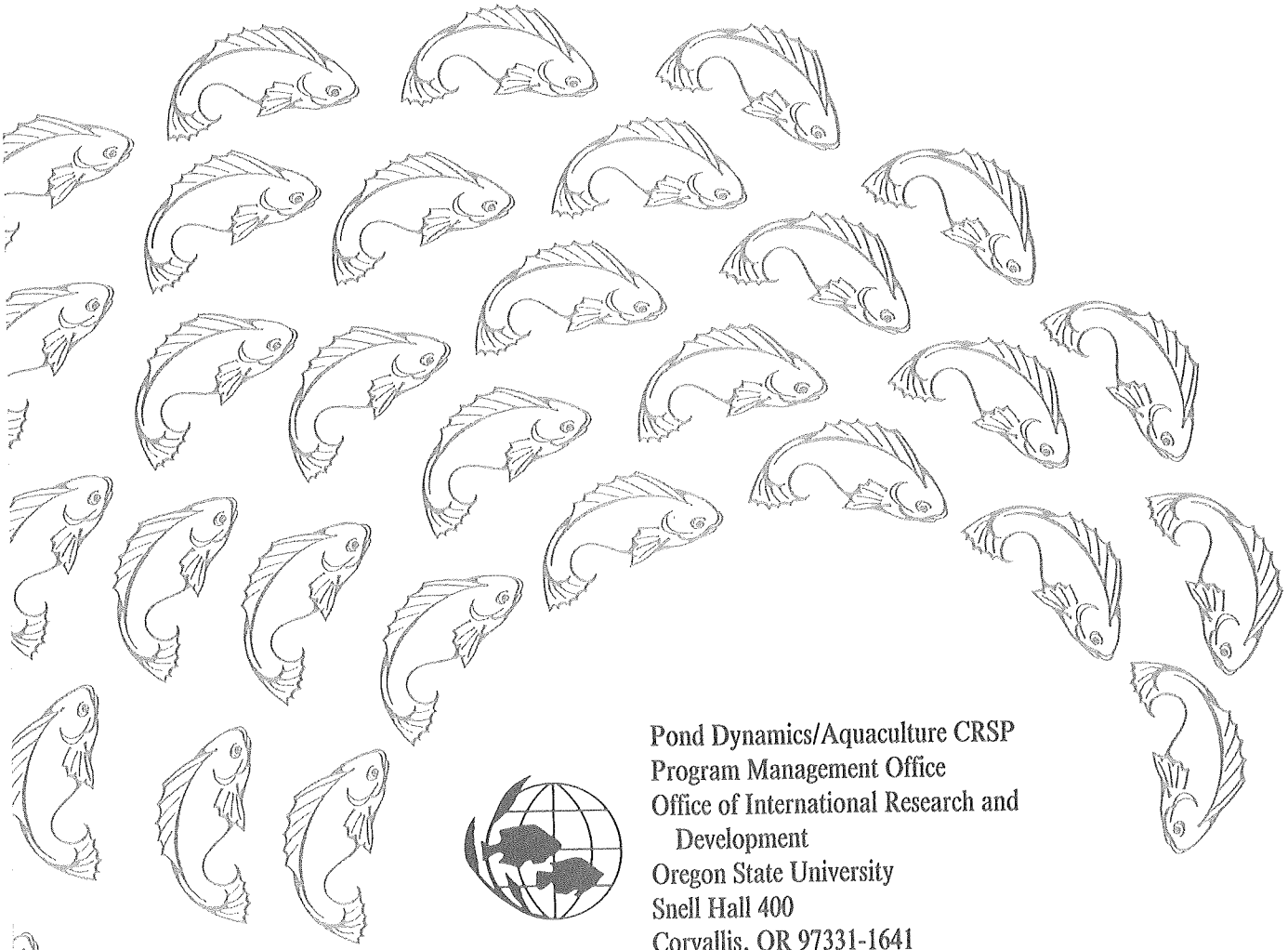
Pond Dynamics/Aquaculture Collaborative Research Data Reports

Volume Seven, Number Two
Gualaca, Panama Project

Cycle III of the CRSP Global Experiment



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POND DYNAMICS/AQUACULTURE COLLABORATIVE RESEARCH DATA REPORTS

Volume Seven, Number Two
Gualaca, Panama: Cycle III of The Global Experiment

April 20, 1990

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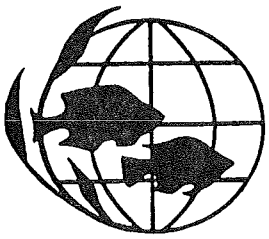

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FOREWORD

The Pond Dynamics/Aquaculture Collaborative Research Support Program (PD/A CRSP) represents an international community of researchers and institutions dedicated to strengthening health and nutrition in developing countries by improving the efficiency of pond aquaculture systems. It is one of several agricultural CRSPs supported by the U.S. Agency for International Development under the authority of Title XII of the International Development and Food Assistance Act of 1975.

The "Global Experiment" in Pond Dynamics/Aquaculture is the major CRSP research activity, covering the period from 1982 to 1987. The Global Experiment was designed to quantitatively describe the physical, chemical and biological principles of pond culture systems. The information gained from the Global Experiment will be used to improve production technologies and develop quantitative production functions to facilitate rigorous economic analyses of aquaculture systems.

Standardization is a key element of the Global Experiment. Standardization permits the comparison of data from diverse geographic locations. The experimental design involves monitoring specified environmental and fish production variables in accordance with standardized work plans in twelve or more ponds at each of seven geographical locations. The variables observed, frequency of observation, and materials and methods are uniform for all locations. The field data are filed in a centralized data base, called the CRSP Central Data Base. Statistical methods will be used to test hypotheses about correlations between variables and to evaluate the sources of variance within ponds, between ponds within locations, and between locations.

The CRSP Central Data Base will be used to develop predictive models of the processes occurring in pond culture systems. The models will be used to: provide guidance for ongoing and future research; predict the performance of existing and proposed pond systems subject to specific inputs and constraints; and improve the operation and efficiency of pond culture systems.

The Global Experiment includes three cycles of experiments. Each cycle consists of two series of observations, one during the dry season and one during the wet season. The objective of the first cycle is to create a detailed baseline of chemical, physical, and biological data on all ponds treated with a standard level of inorganic fertilizer. In the second experimental cycle, ponds treated with inorganic fertilizer are compared to ponds treated with organic fertilizer. In the third cycle, the responses of ponds to different levels of organic fertilizer are compared.

The goal of the Pond Dynamics/Aquaculture Collaborative Research Data Reports (referred to as Data Reports) is to record the CRSP Central Data Base and to present interpretations of site specific results. The Pond Dynamics/Aquaculture CRSP has conducted the Global Experiment at seven project sites in six developing countries: Thailand, Indonesia, the Philippines, Panama, Honduras, and Rwanda. The first volume of these reports provides descriptive information for each CRSP site. It presents the physical characteristics of each site, including a geographical sketch, climatology, and water and soil analyses. Experimental cycles are described in CRSP Work Plans One to Three, which are summarized in the first volume.

Volume One will serve as the reference volume for the entire report series. Subsequent volumes will focus on each site separately. Each Data Report will include one cycle (wet and dry seasons) of the Pond Dynamics/Aquaculture CRSP Global Experiment. Therefore, with few exceptions, each project site will have three Data Reports devoted to it, representing the results of the three cycles of the Global Experiment. Cycle III of the Global Experiment in Gualaca, Panama is presented in this volume.

INTRODUCTION

Pond Dynamics/Aquaculture CRSP experiments at the Gualaca Freshwater Aquaculture Experiment Station in Panama began in February 1985, one year behind the initiation of work at other CRSP sites. During the dry and wet seasons of 1985 (Cycle I), baseline chemical, physical, and biological data were collected in 12 earthen ponds to which only triplesuperphosphate fertilizer was added (Teichert-Coddington et al. 1986; Egna et al. 1987). Cycle II of the CRSP experimental protocol was omitted at the Gualaca site in order to allow data collection to become synchronized with that at the other CRSP sites. Consequently, Cycle III of the CRSP protocol was initiated in February of 1986.

During Cycle III, the effects of increased nutrient inputs on the chemical, physical and biological variables that had been studied during Cycle I were recorded. The objectives of Cycle III were to establish the optimum application rates of chicken litter for tilapia production in Panama, to measure the effects of manuring on water quality, and to measure seasonal influences on water quality and production. This report includes the experiments that were conducted during the dry and wet seasons of 1986.

MATERIALS AND METHODS

Twelve earthen ponds (868 m^2 each) were stocked with male *Oreochromis niloticus* at 1 fish/m^2 . Based on genital morphology, the males were separated from a mixed-sex population prior to the experiments. Fish mortalities that were observed during the week following stocking were replaced with fish of similar size. The water in all ponds was maintained at a mean depth of approximately 90 cm. Water was added only to replace that lost through evaporation and seepage. Chicken litter was added to ponds at 4 treatment rates with each treatment being replicated 3 times. Litter, measured as total solids, was added at 125, 250, 500, or 1000 kg/ha/week.

Selected water chemistry and productivity variables were measured weekly. All water samples for chemical analyses were taken with a column sampler between 0730 and 0930 hours and were analysed the same day or refrigerated and analyzed the following day. The methods of analyses were those recommended by the American Public Health Association (1975). The following table summarizes the variables measured and the chemical analyses employed.

VARIABLE	METHOD
Total Alkalinity	Titration to pH 5.1 end point
Total Hardness	EDTA
Total NH_3	Phenate or Distillation + Nesslerization
$NO_3 + NO_2$	Zinc reduction
Kjeldahl N	Micro-Kjeldahl
Total Phosphorus	Persulfate digestion; Stannous chloride reduction

Filterable PO_4	Stannous chloride reduction
Oxygen	Polarographic
Primary Production	Free-water diurnal oxygen curve
Zooplankton Production	Sedgewick Rafter counts
Temperature	
Chlorophyll *a*	
Secchi Disk	

Primary productivity was measured every two weeks utilizing the free-water method described by Hall and Moll (1975), whereby the oxygen change over a 24-hr period is measured directly in the pond. Measurements were corrected for oxygen diffusion across the air-water interface. The oxygen transfer coefficient was related to wind speed according to an equation given by Banks and Herrera (1977).

Evaporation from a Class A evaporation pan was measured 5 days each week utilizing a hook gauge. Rainfall was measured 5 days each week with a 10:1 rain gauge. Total water loss from ponds was measured 5 days each week utilizing stage gauges located in each pond. Wind speed was measured 5 days each week with a totalizing anemometer, and solar radiation was measured daily using a LI-COR 1776 Solar Monitor. Fish growth was monitored by taking monthly samples of at least 10% of the fish stocked in each pond.

At the beginning and end of each experiment, water samples from each pond were analyzed for minor elements, and at the end of each experiment soil samples from each pond were analyzed for minor elements and other selected variables. Samples of the chicken litter added to ponds each week were subjected to proximate analysis. During the dry season, fish were stocked on 27 January 1986 and harvested after 149 days on 25 June. During the wet season, fish were stocked on 21 July 1986 and harvested after 141 days on 9 December.

Results were tabulated as means with standard deviations for the season, by pond. Treatment differences within a season were determined by regression analysis and/or ANOVA according to Feldman and Gagnon (1986). Differences between seasons, by treatment, were tested with t-tests. Differences were declared significant at an alpha level of 0.05.

RESULTS AND DISCUSSION

In the results that follow, mean ranges for variables always commence with the lowest treatment rate and end with the highest treatment rate.

Fish Production

During the dry season, fish production ranged from 1,230 to 2,984 kg/ha for chicken litter treatment rates ranging from 125 to 1000 kg/ha/wk (Tables1 and 2). During the wet season, fish production ranged from 827 to 2729 kg/ha. Growth of adult fish (initially stocked fish) terminated after about 100 days during both seasons (Figure 1) due to competition from fingerlings produced in the ponds. Average weights of adult fish at harvest ranged from 87 to 176 g during the dry season, and from 70 to 162 g during the wet season (Tables 1 and 2). The weight of fingerling produced increased linearly with an increase of litter input, but the number of fingerlings was not significantly affected by litter input (Figure 2). Thus, the increase in fingerling production was due to an increase in the individual size of fingerlings rather than to greater numbers. The size ranges of the fingerlings at harvest were similar within treatments.

During both seasons, fish production and average fish weight increased linearly with an increase in manuring rates (Figure 3). Although fish production and average weight were numerically greater during the dry season, the difference was only significant at the treatment rate of 500 kg/ha/wk. A slightly longer growing season during the dry season may have contributed to the greater production, but higher primary productivity during the dry season was probably a more important influence.

In the presence of reproduction, adult fish growth was retarded after about 100 days, so ponds should have been harvested at that time. Earlier harvests could increase the number of harvests per year to three, and very likely, the profitability of fish production would be improved. Restocking of ponds with unmarketable-size fish after an early harvest would result in larger fish and perhaps a higher economic gain.

Chemical Variables

The results of water analyses for both seasons, by pond and by treatment, are summarized in Tables 3 and 4, respectively. Calculated t-values for detecting significant seasonal differences are found in Table 4. In the following discussion, means of variables will be reported as ranges from the lowest to the highest treatment rate of chicken litter.

Phosphorus

Mean concentrations of soluble reactive orthophosphates (SRP) ranged from 0.007 to 0.252 mg/l PO_4-P during the dry season, and from 0.029 to 0.516 mg/l PO_4-P during the wet season. Although concentrations tended to rise with litter input (Figure 4), only the 1000 kg/ha/wk treatment concentration was significantly different from the other concentrations. At all treatment rates, concentrations of SRP were significantly higher during the wet season, probably because of lower consumption by a reduced

biomass of primary producers. Indeed, there was a lower ratio of total phosphorus (TP) to SRP during the wet season than in the dry season.

Mean TP ranged from 0.12 to 0.71 mg/l P during the dry season, and from 0.12 to 1.24 mg/l P during the wet season. Concentrations increased significantly with greater inputs of litter (Figure 4). Only at the treatment rate of 1000 kg/ha/wk was total phosphorus significantly different (greater) during the the dry season. At all treatment rates, the proportion of organic to inorganic phosphorus was lower during the wet season than in the dry season. Since phytoplankton comprised the majority of organic material in the water column, it was not surprising to see that primary productivity was also lower during the wet season (Tables 4 and 6).

Nitrogen

Mean total ammonia nitrogen concentrations (TAN) ranged from 0.14 to 0.30 mg/l during the dry season, and from 0.03 to 0.12 mg/l during the wet season. At all treatment rates, TAN was significantly higher during the dry season. During both seasons, TAN was significantly greater only at the highest treatment rate (Figure 5). Concentrations were not significantly different among the other treatments.

Mean nitrate nitrogen concentrations ranged from 0.04 to0.08 mg/l during the dry season, and from 0.10 to 0.14 mg/l during the wet season. At all treatment rates, concentrations were significantly higher during the wet season. During both seasons, concentrations of nitrates were significantly greater only at the highest treatment rate. Concentrations were not significantly different among the other treatments.

Mean Kjeldahl nitrogen concentrations ranged from 0.93 to 4.53 mg/l during the dry season, and from 0.78 to 3.60 mg/l during the wet season. Although concentrations were numerically higher at all rates during the dry season, the differences were not significant. During both seasons, concentrations of Kjeldahl nitrogen increased significantly with increased rates of litter input (Figure 5).

In summary, total ammonia nitrogen concentrations were significantly greater during the dry season, nitrate nitrogen concentrations were significantly less, and concentrations of Kjeldahl nitrogen were not significantly different. It appears that the forms of nitrogen, but not the total quantity, were changing between seasons.

Total Alkalinity

Mean total alkalinity ranged from 28.4 to 48.8 mg $CaCO_3$/l during the dry season, and from 24.9 to 38.2 mg $CaCO_3$/l during the wet season. Total alkalinity tended to increase with litter input during both seasons (Figure 6), because chicken litter is high in alkalinity. Only at the highest rate of litter input was there a significant seasonal difference (greater during the dry season) in alkalinity.

Total Hardness

Mean total hardness ranged from 30.1 to 46.9 mg $CaCO_3$/l during the dry season, and from 24.4 to 38.6 mg $CaCO_3$/l during the wet season. As with total alkalinity, hardness tended to increase with litter input during both seasons (Figure 6). Also, only at the highest rate of litter input was there a significant seasonal difference (greater during the dry season) in total hardness.

Early Morning Dissolved Oxygen

Mean dissolved oxygen concentrations (DO) ranged from 6.9 to 2.1mg/l during the dry season, and from 6.8 to 1.4 mg/l during the wet season. During both seasons, DO at the two lower rates of litter input were not different, but otherwise the treatments were significantly different from each other (Figure 7). There was not a significant seasonal difference for DO.

Biological Variables

The indicators of biological productivity in pond waters all showed strong treatment effects. As the rate of chicken litter application increased, productivity, including fish production, increased.

Secchi Disk Visibility

Mean secchi disk visibilities ranged from 51 to 30 cm during the dry season, and from 59 to 30 cm during the wet season. Visibilities decreased significantly with increased litter inputs during both seasons (Figure 8). There were no significant seasonal differences.

Chlorophyll *a*

Mean chlorophyll *a* values ranged from 36.6 to 313.2 mg/m^3 during the dry season, and from 18.7 to 210.5 mg/m^3 during the wet season. Concentrations increased significantly as litter input increased (Figure 8). Chlorophyll *a* values were numerically greater for all treatments during the dry season, although the differences were only significant for the two lower manuring rates.

Primary Productivity

Primary productivity values, by pond and treatment, are summarized in Tables 5 and 6, respectively.

Mean net primary production ranged from 4.9 to 12.1 mg O_2/l/d during the dry season, and from 3.8 to 11.1 mg O_2/l/d during the wet season. Mean gross primary production ranged from 8.4 to 22.1 mg O_2/l/d

during the dry season, and from 6.4 to 19.8 mg O_2/l/d during the wet season. Mean community respiration ranged from 7.0 to 20.1 mg O_2/l/d during the dry season, and from 5.4 to 17.8 mg O_2/l/d during the wet season. Primary production and community respiration increased significantly with litter input during both seasons (Figure 9). At all treatment rates, except 500 kg/ha/wk, community respiration was significantly greater during the dry season than during the wet season. At the highest treatment rate, gross primary production and net primary production were also significantly greater during the dry season than the wet season. Seasonal differences for the other treatments were not significant.

Chicken Litter

The results of proximate analyses of the chicken litter used during Cycle III are summarized in Table 7. The same source of litter was used during both seasons, so significant seasonal differences were not expected. However, there was significantly more ash during the wet season, which we attributed to the generally higher quantities of minor elements found during the wet season. The minor elements found in the litter came predominantly from the mineral supplements that were fed the chickens.

Soils

Despite high quantities of organic material being added to ponds, the percentage organic matter in the soils did not significantly increase from Cycle I to Cycle III, nor during Cycle III (Tables 8 and 9). Apparently, biological degradation of the litter kept pace with litter input. The higher amounts of minor elements found in the litter during the wet season were reflected in soil analyses at the end of that season.

Minor Elements in Water

The results of minor element analyses of pond water at the beginning and end of each season are summarized in Table 10. There were no obvious differences between the beginning and end of the dry season, but during the wet season, Zn and Mn concentrations increased over the season due to high quantities added with the litter. Also, Mg increased at the highest manuring rates.

Hydrology

Seepage decreased at all levels of litter input (Table 11). The rate of decrease was most rapid for the highest manuring rates, although by the end of the seasons, mean seepage was not very different among treatments. Rainfall and evaporation, solar radiation and air temperature, and wind speed for Cycle III are shown in Figures 10, 11, and 12, respectively.

Relationships Among Variables

Mean results from both seasons were combined for regression analyses among selected variables. Log transformations of data were used when this resulted in better correlations.

Regression of Cycle III fish production on chicken litter application resulted in a highly significant linear prediction with a regression coefficient (r^2) of 0.78 (Figure 3). The regression model accounted for 6 to 9 percent more variation when the same regression was done by season. Thus, fish production in earthen ponds receiving chicken litter can be accurately predicted for Panama. Also, biological data now exist for the computation of optimum economic yields utilizing chicken litter. According to a partial economic analysis, the optimum economic rate was 1000 kg/ha/wk.

Fish production was highly correlated with several measures of primary productivity including primary production (Figure 13), and chlorophyll *a* and Secchi disk visibility (Figure 14). Although Secchi disk visibility is the easiest and least expensive way of measuring primary productivity, it also appears to be the least precise for predicting fish production. Some of the extra variability encountered in secchi disk visibility was probably due to mud turbidity.

Correlations among indicators of primary productivity were significant. Secchi disk visibility was less well correlated with chlorophyll *a* (Figure 15) or primary production (Figure 15) than was chlorophyll *a* with primary production (Figure 16).

CONCLUSIONS

During Cycle I, when only inorganic phosphorus was added to ponds, fish production did not exceed 400 kg/ha. However, the lowest rate of chicken litter application (125 kg/ha/wk) resulted in at least twice the fish production, and greater litter applications resulted in up to 7 times greater production.

The growth of stocked fish stopped within 90 -100 days, regardless of nutrient input, due to competition from fingerlings produced in the ponds. Thus, the inclusion of females will result in stunting of adult fish within 2 to 3 months of stocking if predaceous fish, such as guapote tigre (*Cichlasoma managuense*), are not stocked to control reproduction.

Seasonal differences manifested in rainfall, wind speed, and sunlight, resulted in productivity differences. It appears that more litter would be needed during the rainy season to achieve equal production to that experienced during the dry season. However, the use of prepared diets would probably moderate or eliminate the influence of season on fish production.

The application of chicken litter not only increased fish production, but resulted in a large reduction in

seepage. One of the serious problems at the Gualaca station had been the loss of water through seepage and the inability to replace that water fast enough during the dry season. A reduction in seepage also reduced the loss of alkalinity, which was expensive to replace through liming. Since litter is highly alkaline, total alkalinity and total hardness actually increased in ponds proportionally to litter input (Figure 5). The regular use of manures in acidic waters would probably moderate the need for additional liming materials.

ACKNOWLEDGEMENTS

Laboratory analyses of pond water were performed by Nelly Serrano and Ricardo Rios. Appreciation is expressed to the staff of the IDIAP laboratory in Gualaca for their general support of the project and specifically for their analysis of minor elements in pond water. Of course, field work of the project could not have been accomplished without help from the field staff at the Gualaca Freshwater Aquaculture Research Station.

LITERATURE CITED

American Public Health Association (APHA). 1975. Standard methods for the examination of water and wastewater. American Health Association, Washington D.C., USA, 874 pp.

Banks, R.B., and F.F. Herrera. 1977. Effect of wind and rain on surface reaeration. J. Environ. Eng. Div., Am. Soc. Civil Eng., Vol. 103, No. EE3, pp. 489-504.

Egna, H.S., N. Brown, and M. Leslie. 1987. Pond dynamics/aquaculture CRSP data reports, vol. 1. General reference: site descriptions, materials and methods for the global experiment. Office of International Research and Development, Oregon State Univ., Corvallis, OR, 84pp.

Feldman, D.S., and J. Gagnon. 1986. StatView 512+. BrainPower, Inc., Calabasas, CA.

Teichert-Coddington, D.R., M. Peralta, R.P. Phelps, and R. Pretto. 1986. Technical report of Pond Dynamics/Aquaculture CRSP, Cycle 1, Dry and Wet Seasons, Gualaca, Panama. Dept. of Fisheries and Allied Aquacultures, Auburn University, AL, USA.

Table 1. Fish production by pond during the dry and wet seasons of Cycle III, 1986 at Gualaca, Panama.

Season	Pond	Chicken Litter (kg/ha/wk)	Initial Number (fish/ha)	Initial Weight (g/fish)	Survival (%)	Final Weight (g/fish)	Total Production (kg/ha)	Adult fish Production (kg/ha)	Reproduction (kg/ha)	Reproduction (fish/ha)	Adult fish length (cm)
D	1	125	10000	37.7	94.1	99.2	1377.7	931.5	446.2	40565	18.0
D	3	125	10000	39.5	90.7	88.5	1396.6	808.3	588.3	68417	17.1
D	18	125	10000	36.1	93.1	73.2	915.6	677.5	238.2	28694	16.5
D	2	250	10000	38.4	94.6	103.5	1698.0	982.3	715.8	55061	18.2
D	6	250	10000	33.5	79.5	120.7	1752.9	961.0	791.9	71991	18.8
D	7	250	10000	36.2	90.1	118.4	2079.7	1072.3	1007.3	62954	19.1
D	4	500	10000	36.4	93.9	130.7	2060.5	1220.1	840.4	56023	19.8
D	5	500	10000	35.6	100.4	130.3	2213.7	1303.1	910.6	56916	20.0
D	8	500	10000	37.3	93.1	148.1	2408.9	1385.9	1023.0	97433	20.6
D	9	1000	10000	37.8	88.4	173.5	2693.0	1534.0	1159.0	75753	21.7
D	10	1000	10000	34.8	90.4	195.9	3418.4	1771.8	1646.6	63325	22.2
D	17	1000	10000	36.3	86.9	159.0	2841.9	1386.2	1455.6	32932	21.0
W	1	125	10000	25.9	88.3	83.5	1159.4	735.8	423.6	306923	16.2
W	3	125	10000	23.7	89.4	64.7	744.2	581.6	162.6	48245	15.0
W	18	125	10000	23.2	76.2	61.1	576.3	462.4	113.9	75410	13.9
W	2	250	10000	24.2	83.7	73.9	836.2	619.8	216.4	25941	15.5
W	6	250	10000	23.4	87.9	105.0	1625.5	924.3	701.2	131059	17.3
W	7	250	10000	23.6	98.6	78.7	1409.7	778.9	630.8	139855	16.7
W	4	500	10000	23.7	85.7	118.1	1791.9	1006.6	785.3	121006	18.5
W	5	500	10000	22.2	82.8	116.4	1488.7	965.5	523.2	164515	17.5
W	8	500	10000	24.7	87.3	107.0	1842.0	939.5	902.5	173571	17.4
W	9	1000	10000	23.2	93.4	163.2	3101.7	1524.2	1577.5	31236	20.2
W	10	1000	10000	24.2	83.9	151.1	2611.4	1269.4	1342.1	28868	19.3
W	17	1000	10000	23.0	83.7	172.6	2474.9	1448.4	1026.5	20945	20.1

Table 2. Seasonal means (±SE) of fish production during the dry and wet seasons of Cycle III, 1986 at Gualaca, Panama. Calculated unpaired t-values for the differences between seasons, is included.

Chicken Litter (kg/ha/wk)	Variable	Dry	Wet	t-Value
125	Production (kg/ha)	1230 ± 157.3	827 ± 173.3	1.72
	Adult Fish Wt (kg/ha)	806 ± 73.3	593 ± 79.1	1.97
	Fingerling Wt (kg/ha)	424 ± 101.7	233 ± 96.1	1.36
	Mean Adult Wt (g/fish)	87 ± 7.6	70 ± 7.0	1.68
	Fingerling Number (No./ha)	45,892 ± 11,772	143,526 ± 82,074	1.18
	Survival (%)	83 ± 3.5	91 ± 2.3	2.06
250	Production (kg/ha)	1844 ± 119.1	1290 ± 235.5	2.1
	Adult Fish Wt (kg/ha)	1005 ± 34.1	774 ± 87.9	2.45
	Fingerling Wt (kg/ha)	838 ± 87.3	516 ± 151.2	1.85
	Mean Adult Wt (g/fish)	114 ± 5.4	86 ± 9.7	2.56
	Fingerling Number (No./ha)	63,335 ± 4,891	98,952 ± 36,593	0.97
	Survival (%)	91 ± 3.8	92 ± 1.2	0.08
500	Production (kg/ha)	2228 ± 100.8	1708 ± 110.4	3.48 *
	Adult Fish Wt (kg/ha)	1303 ± 47.9	971 ± 19.5	6.43**
	Fingerling Wt (kg/ha)	925 ± 53.2	737 ± 112.1	1.51
	Mean Adult Wt (g/fish)	136 ± 5.9	114 ± 3.5	3.31 *
	Fingerling Number (No./ha)	70,124 ± 13,657	153,031 ± 16,225	3.91 *
	Survival (%)	85 ± 1.6	92 ± 6.2	1.04
1000	Production (kg/ha)	2984 ± 221.2	2729 ± 190.3	0.87
	Adult Fish Wt (kg/ha)	1564 ± 112.3	1414 ± 75.5	1.11
	Fingerling Wt (kg/ha)	1420 ± 142.0	1315 ± 160.0	0.49
	Mean Adult Wt (g/fish)	176 ± 10.7	162 ± 6.2	1.11
	Fingerling Number (No./ha)	57,337 ± 12,719	27,016 ± 3,112	2.32
	Survival (%)	88 ± 2.8	91 ± 1.4	0.79

* Significantly different ($P \leq 0.05$)

** Significantly different ($P \leq 0.01$)

Table 3. Seasonal means of water quality variables measured during the dry and wet seasons of Cycle III, 1986 at Gualaca, Panama.

Season	Pond	Chicken Litter (kg/ha/wk)	Pond Temp (°C)	Total Alkalinity (mg $CaCO_3$/l)	Total Hardness (mg $CaCO_3$/l)	Kjeldahl N (mg/l)	Total NH_3-N (mg/l)	NO_3+NO_2 N (mg/l)	Secchi Disk (cm)	Chloro. *a* (ug/l)	pH	Dissolved Oxygen (mg/l)	Total P (mg/l)	Sol. React. PO_4-P (mg/l)
D	1	125	28.0	28.7	27.2	0.82	0.140	0.040	45.0	32.4	8.12	7.66	0.108	0.003
D	3	125	28.0	32.0	34.5	0.89	0.116	0.040	55.4	42.5	7.99	6.80	0.109	0.001
D	18	125	27.6	24.4	28.6	1.10	0.167	0.026	52.1	35.0	7.80	6.14	0.154	0.018
D	2	250	28.0	34.3	32.4	1.07	0.139	0.039	48.0	45.9	7.93	6.65	0.139	0.001
D	6	250	27.9	28.9	29.7	1.55	0.186	0.028	42.4	63.4	8.56	6.92	0.176	0.003
D	7	250	28.0	27.9	30.2	1.17	0.116	0.031	49.5	57.7	8.61	7.50	0.172	0.004
D	4	500	27.8	40.4	41.8	2.79	0.135	0.033	37.1	146.4	8.39	5.15	0.290	0.009
D	5	500	27.6	34.4	34.0	2.94	0.142	0.039	39.3	138.4	8.38	5.50	0.295	0.017
D	8	500	27.8	29.7	31.5	1.67	0.148	0.029	45.2	94.6	8.58	7.38	0.258	0.012
D	9	1000	27.9	45.3	42.3	4.10	0.216	0.042	30.0	239.1	8.01	2.91	0.597	0.271
D	10	1000	27.9	48.0	47.0	4.40	0.371	0.071	28.1	341.8	7.74	1.78	0.748	0.278
D	17	1000	27.6	53.0	51.5	5.10	0.312	0.119	31.4	358.6	8.12	1.62	0.781	0.208
W	1	125	28.5	37.0	33.7	0.69	0.023	0.092	65.8	18.5	7.61	6.77	0.118	0.032
W	3	125	28.5	22.7	23.1	0.81	0.038	0.119	60.6	16.4	7.23	6.40	0.097	0.019
W	18	125	28.0	15.0	16.3	0.85	0.039	0.089	49.6	21.2	6.94	5.89	0.133	0.035
W	2	250	28.3	16.2	16.3	0.91	0.036	0.102	48.6	30.2	7.02	6.38	0.172	0.040
W	6	250	28.4	35.3	35.2	0.99	0.035	0.091	61.4	22.2	8.24	7.27	0.138	0.045
W	7	250	28.3	34.7	35.4	1.02	0.022	0.110	58.2	32.3	8.69	6.85	0.164	0.023
W	4	500	28.0	36.7	36.6	2.46	0.050	0.099	40.6	110.7	8.23	5.02	0.295	0.036
W	5	500	28.0	34.6	34.1	2.28	0.099	0.092	36.7	85.2	8.11	4.48	0.341	0.099
W	8	500	28.2	30.7	29.2	1.90	0.030	0.078	42.1	63.7	7.77	5.87	0.274	0.057
W	9	1000	28.1	37.3	37.3	3.34	0.079	0.123	28.8	189.8	7.26	1.39	1.035	0.442
W	10	1000	27.9	37.7	37.8	4.07	0.103	0.110	26.9	265.6	7.30	1.06	1.453	0.606
W	17	1000	28.0	39.6	40.8	3.40	0.184	0.199	34.9	176.2	7.64	1.61	1.235	0.500

Table 4. Treatment means (±SE) of water quality variables during the dry and wet seasons of Cycle III, 1986 at Gualaca, Panama. Calculated unpaired t-values for the differences between seasons, are included.

Chicken Litter (kg/ha/wk)	Variable	Dry	Wet	t-VALUE
125	Water Temperature (°C)	28.3 ± .16	27.8 ± .12	2.37
	Total Alk. (mg/l $CaCO_3$)	28.4 ± 2.20	24.9 ± 6.45	0.51
	Total Hard. (mg/l $CaCO_3$)	30.1 ± 2.24	24.4 ± 5.06	1.04
	Kjeldahl-N (mg/l)	0.93 ± .083	0.78 ± .048	1.58
	Tot. NH_3-N (mg/l)	0.14 ± .015	0.03 ± .005	6.90 **
	NO_3+NO_2-N (mg/l)	0.04 ± .005	0.10 ± .010	6.09 **
	Total-P (mg/l)	0.12 ± .015	0.12 ± .010	0.42
	Sol. React. PO_4-P (mg/l)	0.007 ± .005	0.029 ± .005	2.93*
	Secchi Disk (cm)	51 ± 3.1	59 ± 4.8	1.38
	Chlorophyll *a* (mg/m^3)	36.6 ± 3.03	18.7 ± 1.39	5.38 **
	Dissolved O_2 (mg/l)	6.9 ± .44	6.4 ± .26	1.01
	pH	7.95 ± 8.61	7.18 ± 7.58	2.08
250	Water Temperature (°C)	28.3 ± .04	28.0 ± .04	6.67 **
	Total Alk. (mg/l $CaCO_3$)	30.4 ± 1.99	28.7 ± 6.27	0.25
	Total Hard. (mg/l $CaCO_3$)	30.8 ± .83	29.0 ± 6.30	0.28
	Kjeldahl-N (mg/l)	1.26 ± .146	0.97 ± .033	1.95
	Tot. NH_3-N (mg/l)	0.15 ± .021	0.03 ± .005	5.50 **
	NO_3+NO_2-N (mg/l)	0.03 ± .003	0.10 ± .006	10.66 **
	Total-P (mg/l)	0.16 ± .012	0.16 ± .010	0.28
	Sol. React. PO_4-P (mg/l)	0.003 ± .001	0.036 ± .007	4.96 **
	Secchi Disk (cm)	47 ± 2.2	56 ± 3.8	2.14
	Chlorophyll *a* (mg/m^3)	55.7 ± 5.15	28.2 ± 3.08	4.57 **
	Dissolved O_2 (mg/l)	7.0 ± .25	6.8 ± .26	0.53
	pH	8.25 ± 8.52	7.46 ± 7.52	0.94

* Significantly different ($P \leq 0.05$)

** Significantly different ($P \leq 0.01$)

Table 4. Continued.

Chicken Litter (kg/ha/wk)	Variable	Dry	Wet	t-VALUE
500	Water Temperature (°C)	28.1 ± .07	27.7 ± .06	3.47 *
	Total Alk. (mg/l $CaCO_3$)	34.8 ± 3.10	34.0 ± 1.76	0.23
	Total Hard. (mg/l $CaCO_3$)	35.8 ± 3.10	33.3 ± 2.17	0.65
	Kjeldahl-N (mg/l)	2.47 ± .402	2.21 ± .162	0.58
	Tot. NH_3-N (mg/l)	0.14 ± .004	0.06 ± .020	3.94 *
	NO_3+NO_2-N (mg/l)	0.03 ± .005	0.09 ± .006	8.21 **
	Total-P (mg/l)	0.28 ± .012	0.30 ± .020	0.97
	Sol. React. PO_4-P (mg/l)	0.064 ± .019	0.013 ± .004	2.75 *
	Secchi Disk (cm)	41 ± 2.4	40 ± 1.6	0.25
	Chlorophyll *a* (mg/m^3)	126.5 ± 16.10	86.5 ± 13.60	1.9
	Dissolved O_2 (mg/l)	6.0 ± .69	5.1 ± .41	1.11
	pH	8.44 ± 9.30	7.99 ± 8.46	1.9
1000	Water Temperature (°C)	28.0 ± 0.06	27.8 ± .10	1.73
	Total Alk. (mg/l $CaCO_3$)	48.8 ± 2.26	38.2 ± .71	4.47 **
	Total Hard. (mg/l $CaCO_3$)	46.9 ± 2.66	38.6 ± 1.09	2.89 *
	Kjeldahl-N (mg/l)	4.53 ± .296	3.60 ± .233	2.48
	Tot. NH_3-N (mg/l)	0.30 ± .045	0.12 ± .032	3.22 *
	NO_3+NO_2-N (mg/l)	0.08 ± .022	0.14 ± .028	1.87
	Total-P (mg/l)	0.71 ± .057	1.24 ± .121	3.99 *
	Sol. React. PO_4-P (mg/l)	0.252 ± .022	0.516 ± .048	4.98 **
	Secchi Disk (cm)	30 ± 1.0	30 ± 2.4	0.14
	Chlorophyll *a* (mg/m^3)	313.2 ± 37.35	210.5 ± 27.81	2.2
	Dissolved O_2 (mg/l)	2.1 ± .41	1.4 ± .16	1.72
	pH	7.93 ± 8.49	7.37 ± 8.00	2.94 *

* Significantly different ($P \leq 0.05$)

** Significantly different ($P \leq 0.01$)

Table 5. Seasonal means of primary productivity measured as oxygen production (mg O_2/l/day) during the dry and wet seasons of Cycle III, 1986 at Gualaca, Panama.

Season	Pond	Chicken Litter (kg/ha/wk TS)	Primary Production Gross	Net	Respiration
Dry	1	125	10.3	6.4	7.8
Dry	3	125	7.7	4.3	6.9
Dry	18	125	7.1	4.0	6.2
Dry	2	250	10.8	6.4	8.8
Dry	6	250	12.3	7.7	9.2
Dry	7	250	11.7	7.0	9.3
Dry	4	500	14.2	7.7	13.1
Dry	5	500	15.6	9.5	12.3
Dry	8	500	13.3	7.9	11.0
Dry	9	1000	21.2	11.8	18.9
Dry	10	1000	22.9	12.4	21.1
Dry	17	1000	22.3	12.2	20.3
Wet	1	125	7.5	4.6	5.9
Wet	3	125	5.9	3.5	5.1
Wet	18	125	5.9	3.4	5.1
Wet	2	250	8.7	5.4	6.7
Wet	6	250	8.6	5.2	6.9
Wet	7	250	11.1	6.9	8.5
Wet	4	500	15.6	9	13.5
Wet	5	500	13.8	7.6	12.7
Wet	8	500	14.8	9.3	11.4
Wet	9	1000	19.8	11	17.9
Wet	10	1000	20.3	11.2	18.6
Wet	17	1000	19.3	11.1	16.9

Table 6. Seasonal treatment means of primary production (mg O_2/l/d) during the dry and wet seasons of Cycle III, 1986 at Gualaca, Panama. Calculated unpaired t-values (df = 4) for the differences between seasons, are included.

Chicken Litter (kg/ha/wk)	Variable	Season		t-Value
		Dry	Wet	
125	Gross Prim. Prod.	8.4 ± 0.98	6.4 ± 0.53	1.73
	Net Prim Prod.	4.9 ± 0.76	3.8 ± 0.38	1.26
	Community Resp.	7.0 ± 0.46	5.4 ± 0.27	2.99 *
250	Gross Prim Prod.	11.6 ± 0.44	9.5 ± 0.82	2.3
	Net Prim. Prod.	7.0 ± 0.38	5.8 ± 0.54	1.83
	Community Resp.	9.1 ± 0.15	7.4 ± 0.57	2.94 *
500	Gross Prim. Prod.	14.4 ± 0.67	14.7 ± 0.52	0.43
	Net Prim. Prod.	8.4 ± 0.57	8.6 ± 0.52	0.35
	Community Resp.	12.1 ± 0.61	12.5 ± 0.61	0.46
1000	Gross Prim. Prod.	22.1 ± 0.50	19.8 ± 0.29	4.06 *
	Net Prim. Prod.	12.1 ± 0.18	11.1 ± 0.06	5.57 **
	Community Resp.	20.1 ± 0.64	17.8 ± 0.49	2.84 *

* Significantly different ($P \leq 0.05$)

** Significantly different ($P \leq 0.01$)

Table 7. Proximate analyses of chicken litter that was added to ponds during the dry and wet seasons of Cycle III, 1986 at Gualaca, Panama. Values represent percentage of dry matter unless otherwise noted.

	Dry		Wet	
Variable	Mean ± SE	n	Mean ± SE	n
Dry Matter				
(% of sample)	90.1 ± 0.34	11	89.5 ± 0.25	14
Ash	23.8 ± 1.11	7	31.5 ± 1.85	14
Fiber	25.4 ± 1.33	6	27.4 ± 2.19	14
N	3.5 ± 0.3	10	2.9 ± 0.15	14
P	2.2 ± 0.46	5	2.0 ± 0.12	14
K	1.6 ± 0.08	8	1.6 ± 0.05	14
Ca	2.9 ± 0.34	8	3.8 ± 0.56	14
Mg	0.5 ± 0.04	8	0.5 ± 0.03	14
Cu (ppm)	29 ± 9.6	2	49 ± 3.4	14
Zn (ppm)	180 ± 75.1	2	246 ± 17.0	14
Mn (ppm)	267 ± 77.2	2	454 ± 15.7	14
Fe (ppm)	-	-	1.1 ± 0.11	14

Table 8. Soil chemistry measured at the end of the dry and wet seasons of Cycle III, 1986 at Gualaca, Panama.

Season	Pond	Chick. Litter (kg/ha/wk)	Org. Mat. (%)	pH	P (ppm)	Ca (meg/100g)	Mg (meq/100g)	K (ppm)	CEC (meq/100g)	Fe (ppm)	Zn (ppm)	Mn (ppm)	Cu (ppm)
D	1	125	2.48	5.44	14.6	7.5	0.75	68	30.6	24.4	1.2	167.6	2.9
D	3	125	1.49	5.46	2.5	5.8	0.58	51	28.6	16.0	1.2	141.6	1.8
D	18	125	2.48	6.38	11.9	8.1	0.92	71	30.6	21.6	1.1	81.2	4.2
D	2	250	2.48	5.61	0.5	9.3	0.58	63	27.8	15.2	0.9	186.4	1.8
D	6	250	4.96	5.36	0.6	7.5	0.67	68	32.9	14.8	1.5	149.6	1.4
D	7	250	4.47	5.59	0.3	8.3	0.67	68	29.5	30.6	0.9	129.6	3.0
D	4	500	4.96	5.58	0.4	7.0	0.58	70	29.7	13.6	1.3	102.8	1.4
D	5	500	4.96	5.47	19.0	7.0	0.67	69	31.7	7.6	1.3	154.8	1.7
D	8	500	1.49	5.47	0.0	4.1	0.58	61	30.9	29.6	1.0	128.0	3.6
D	9	1000	3.47	5.81	11.6	10.5	0.92	93	30.0	12.7	1.4	147.2	2.2
D	10	1000	3.47	5.43	15.1	4.7	0.50	104	27.2	15.0	1.4	97.2	2.2
D	17	1000	2.48	6.12	10.1	6.9	0.75	95	26.9	17.6	1.8	104.2	4.0
W	1	125	3.36	5.63	5.0	6.4	0.60	132	36.6	3.4	1.2	328.0	1.4
W	3	125	1.42	5.41	2.5	4.2	0.70	132	31.4	14.3	6.3	300.0	3.8
W	18	125	2.02	5.98	2.5	8.2	1.00	156	33.8	17.0	1.9	203.0	5.8
W	2	250	2.77	5.45	12.5	7.6	0.90	140	51.2	15.5	4.3	327.0	3.2
W	6	250	4.56	5.54	5.0	7.3	0.60	160	37.6	8.2	3.3	176.0	2.3
W	7	250	1.42	5.42	2.5	6.6	0.70	128	38.8	12.1	5.0	204.0	4.0
W	4	500	2.17	5.44	2.5	2.7	0.40	116	33.8	11.6	5.0	220.0	1.9
W	5	500	2.32	5.75	5.0	12.8	1.10	172	37.8	10.7	4.0	162.0	3.9
W	8	500	2.32	6.02	5.0	9.3	1.00	160	37.0	15.3	3.5	196.0	7.5
W	9	1000	2.62	6.18	17.5	14.2	1.10	192	34.8	7.7	2.6	211.0	1.7
W	10	1000	2.02	5.61	12.5	7.6	0.90	212	35.5	13.0	4.3	205.0	2.5
W	17	1000	2.62	6.04	30.0	8.8	1.10	316	32.4	11.9	3.0	308.0	4.5

Table 9. Mean (±SE) chemical characteristics of soil taken from ponds at the end of the dry and wet seasons of Cycle III, 1986 at Gualaca, Panama. Calculated unpaired t-values for the differences between seasons, is included.

Chicken Litter (kg/ha/wk)	Variable	Season Dry	Season Wet	t-VALUE
125	Organic Matter (%)	2.1 ± 0.33	2.3 ± 0.57	0.18
	pH	5.6 ± 5.98	5.6 ± 6.09	0.06
	P (ppm)	9.7 ± 3.67	3.3 ± 0.83	1.68
	Ca (meq/100g)	7.1 ± 0.69	6.3 ± 1.16	0.64
	Mg (meq/100g)	.75 ± 0.098	.77 ± 0.120	0.11
	K (ppm)	63 ± 6.2	140 ± 8.0	7.56 **
	CEC (meq/100g)	29.9 ± 0.67	33.9 ± 1.50	2.43
	Fe (ppm)	20.7 ± 2.47	11.6 ± 4.16	1.88
	Zn (ppm)	1.2 ± 0.03	3.1 ± 1.60	1.23
	Mn (ppm)	130 ± 25.6	277 ± 37.9	3.21 *
	Cu (ppm)	3.0 ± 0.69	3.7 ± 1.27	0.48
250	Organic Matter (%)	4.0 ± 0.76	2.9 ± 0.91	0.89
	pH	5.5 ± 6.21	5.5 ± 6.56	0.42
	P (ppm)	0.5 ± 0.09	6.7 ± 3.01	2.06
	Ca (meq/100g)	8.4 ± 0.52	7.2 ± 0.29	2.04
	Mg (meq/100g)	.64 ± 0.030	.73 ± 0.088	1.00
	K (ppm)	66 ± 1.7	143 ± 9.3	8.05 **
	CEC (meq/100g)	30.1 ± 1.50	42.5 ± 4.30	2.71 *
	Fe (ppm)	20.2 ± 5.20	11.9 ± 2.11	1.47
	Zn (ppm)	1.1 ± 0.20	4.2 ± 0.49	5.82 **
	Mn (ppm)	155 ± 16.6	236 ± 46.4	1.63
	Cu (ppm)	2.1 ± 0.48	3.2 ± 0.49	1.60

Table 9. Continued

Chicken Litter (kg/ha/wk)	Variable	Season Dry	Season Wet	t-VALUE
500	Organic Matter (%)	3.8 ± 1.16	2.3 ± 0.05	1.32
	pH	5.5 ± 6.60	5.7 ± 6.10	1.22
	P (ppm)	6.5 ± 6.27	4.2 ± 0.83	0.35
	Ca (meq/100g)	6.0 ± 0.97	8.3 ± 2.96	0.72
	Mg (meq/100g)	.61 ± 0.030	.83 ± 0.219	1.01
	K (ppm)	67 ± 2.8	149 ± 17.0	4.79 **
	CEC (meq/100g)	30.8 ± 0.58	36.2 ± 1.22	4.02 *
	Fe (ppm)	16.9 ± 6.60	12.5 ± 1.41	0.66
	Zn (ppm)	1.2 ± 0.10	4.2 ± 0.44	6.56 **
	Mn (ppm)	129 ± 15.0	193 16.8	2.84 *
	Cu (ppm)	2.2 ± 0.69	4.4 1.64	1.24
1000	Organic Matter (%)	3.1 ± 0.33	2.4 ± 0.20	1.87
	pH	5.7 ± 6.05	5.9 ± 6.25	0.64
	P (ppm)	12.3 ± 1.48	20.0 ± 5.20	1.43
	Ca (meq/100g)	7.4 ± 1.69	10.2 ± 2.03	1.07
	Mg (meq/100g)	.72 ± 0.122	1.03 ± 0.067	2.23
	K (ppm)	97 ± 3.4	240 ± 38.4	3.7 *
	CEC (meq/100g)	28.0 ± 0.99	34.2 ± 0.94	4.55 **
	Fe (ppm)	15.1 ± 1.42	10.9 ± 1.62	1.97
	Zn (ppm)	1.5 ± 0.13	3.3 ± 0.51	3.33 *
	Mn (ppm)	116 ± 15.6	241 ± 33.4	3.4 *
	Cu (ppm)	2.8 ± 0.60	2.9 ± 0.83	0.10

* Significantly different ($P \leq 0.05$)

** Significantly different ($P \leq 0.01$)

Table 10. Minor elements measured in pond water at the beginning (Initial) and end (Final) of the dry and wet seasons of Cycle III, 1986, at the Gualaca Freshwater Aquaculture Research Station, Panama.

Season	Pond	Chick. Litter (kg/ha/wk)	Time Period	Fe (mg/l)	Mg (mg/l)	Zn (mg/l)	Mn (mg/l)	Cu (mg/l)
Dry	1	125	Initial	0.30	*	Tr	Tr	Tr
Dry	3	125	Initial	0.21	*	Tr	0.07	Tr
Dry	18	125	Initial	0.48	*	Tr	0.13	Tr
Dry	2	250	Initial	0.24	*	Tr	0.07	Tr
Dry	6	250	Initial	0.21	*	Tr	0.09	Tr
Dry	7	250	Initial	0.48	*	Tr	0.10	Tr
Dry	4	500	Initial	0.20	*	Tr	0.07	Tr
Dry	5	500	Initial	0.41	*	Tr	0.09	Tr
Dry	8	500	Initial	0.24	*	Tr	0.08	Tr
Dry	9	1000	Initial	0.22	*	Tr	0.11	Tr
Dry	10	1000	Initial	0.20	*	Tr	0.08	Tr
Dry	17	1000	Initial	0.27	*	Tr	0.07	Tr
Dry	1	125	Final	0.28	*	Tr	0.02	Tr
Dry	3	125	Final	0.38	*	Tr	0.03	Tr
Dry	18	125	Final	0.70	*	Tr	0.11	Tr
Dry	2	250	Final	0.27	*	Tr	0.02	Tr
Dry	6	250	Final	0.33	*	Tr	0.05	Tr
Dry	7	250	Final	0.25	*	Tr	0.06	Tr
Dry	4	500	Final	0.32	*	Tr	0.03	Tr
Dry	5	500	Final	0.30	*	Tr	0.04	Tr
Dry	8	500	Final	0.33	*	Tr	0.07	Tr
Dry	9	1000	Final	0.24	*	Tr	0.08	Tr
Dry	10	1000	Final	0.25	*	Tr	0.10	Tr
Dry	17	1000	Final	0.22	*	Tr	0.10	Tr

Table 10. Continued

Season	Pond	Chick. Litter (kg/ha/wk)	Time Period	Fe (mg/l)	Mg (mg/l)	Zn (mg/l)	Mn (mg/l)	Cu (mg/l)
Wet	1	125	Initial	Tr	0.65	Tr	Tr	*
Wet	3	125	Initial	Tr	0.68	Tr	Tr	*
Wet	18	125	Initial	Tr	0.86	Tr	Tr	*
Wet	2	250	Initial	Tr	0.63	Tr	Tr	*
Wet	6	250	Initial	Tr	0.65	Tr	Tr	*
Wet	7	250	Initial	Tr	0.66	Tr	Tr	*
Wet	4	500	Initial	Tr	0.55	Tr	Tr	*
Wet	5	500	Initial	Tr	0.57	Tr	Tr	*
Wet	8	500	Initial	Tr	0.53	Tr	Tr	*
Wet	9	1000	Initial	Tr	0.67	Tr	Tr	*
Wet	10	1000	Initial	Tr	0.64	Tr	Tr	*
Wet	17	1000	Initial	Tr	0.58	Tr	Tr	*
Wet	1	125	Final	Tr	0.21	3.20	0.25	*
Wet	3	125	Final	Tr	0.20	0.03	0.04	*
Wet	18	125	Final	Tr	0.66	0.02	0.08	*
Wet	2	250	Final	Tr	0.85	0.03	0.16	*
Wet	6	250	Final	Tr	0.22	0.09	0.05	*
Wet	7	250	Final	Tr	0.37	0.04	0.14	*
Wet	4	500	Final	Tr	1.29	0.03	0.27	*
Wet	5	500	Final	Tr	1.04	1.00	0.25	*
Wet	8	500	Final	Tr	0.58	0.58	0.15	*
Wet	9	1000	Final	Tr	2.83	2.90	0.22	*
Wet	10	1000	Final	Tr	2.98	0.06	0.24	*
Wet	17	1000	Final	Tr	1.70	0.09	0.31	*

Table 11. Seepage in earthen fish culture ponds before (dry season 1985) and after (dry season 1986) chicken litter was added at 125, 250, 500, and 1000 kg/ha/wk total solids. Three replicate ponds were measured at each rate.

Chicken Litter (kg/ha/wk TS)	Seepage (mm/d) Dry Season 1985 Mean ± SE	Dry Season 1986 Mean ± SE	Mean Difference (%)	Seepage Reduction
125	37 ± 17.4	23 ± 10.0	14	38
250	28 ± 14.5	14 ± 2.8	14	50
500	27 ± 7.3	12 ± 2.6	15	56
1000	33 ± 11.5	9 ± 3.5	25	73

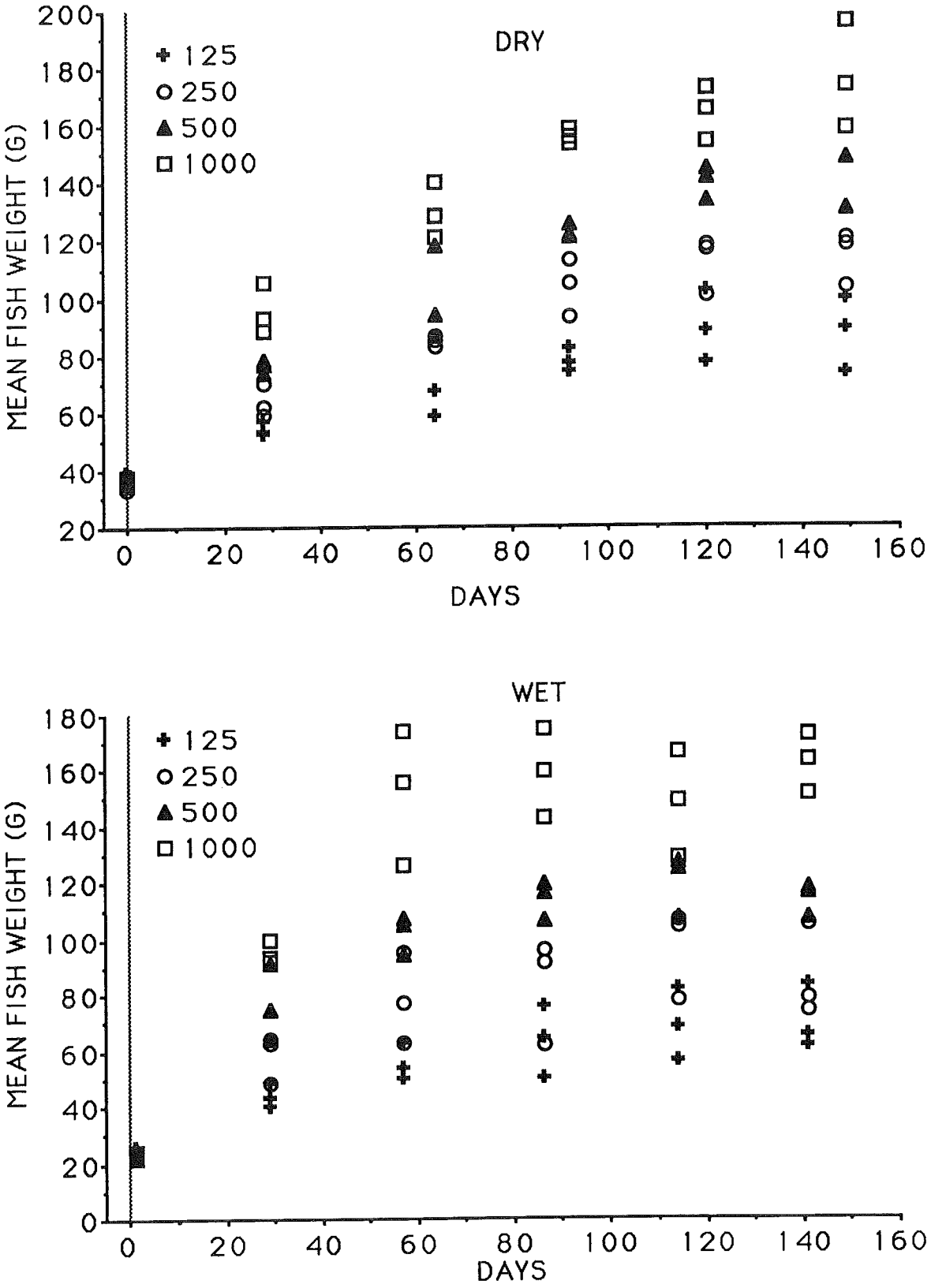
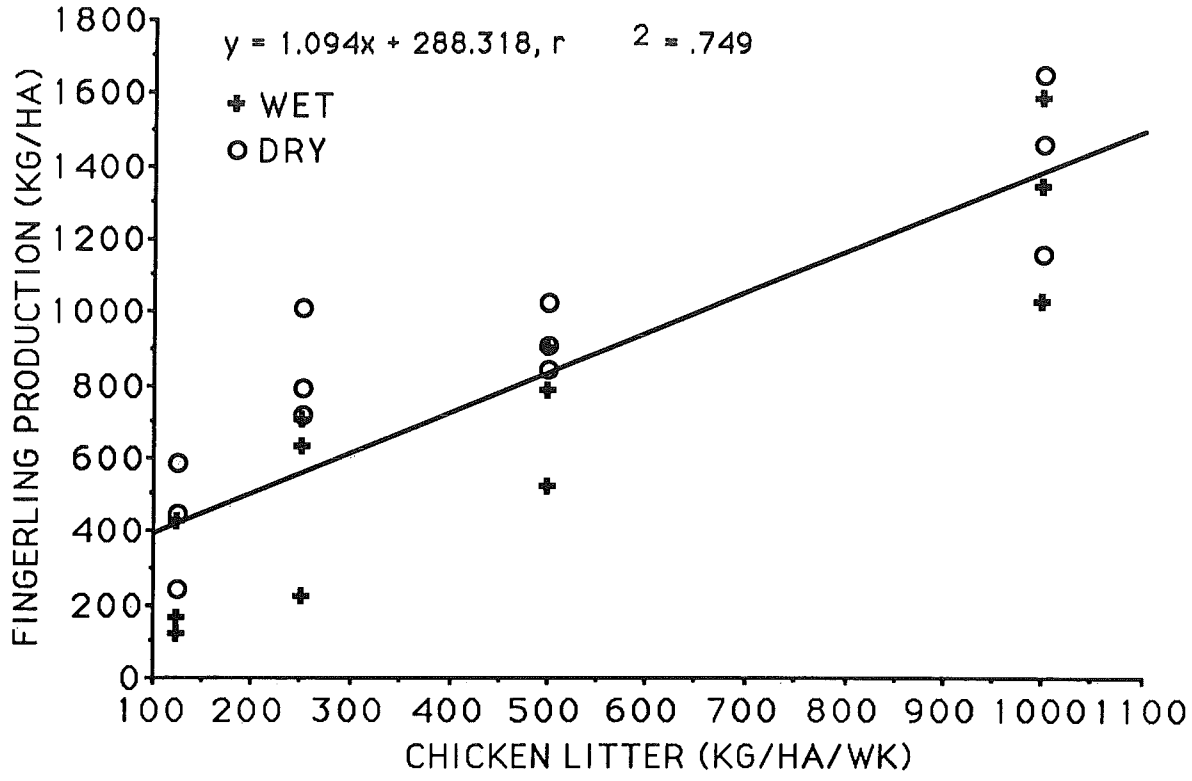


Figure 1. Mean weight gain of *Oreochromis niloticus* during Cycle III, dry and wet seasons at Gualaca, Panama. Chicken litter inputs (treatments) were 125, 250, 500, and 1000 kg/ha/wk, total solids.



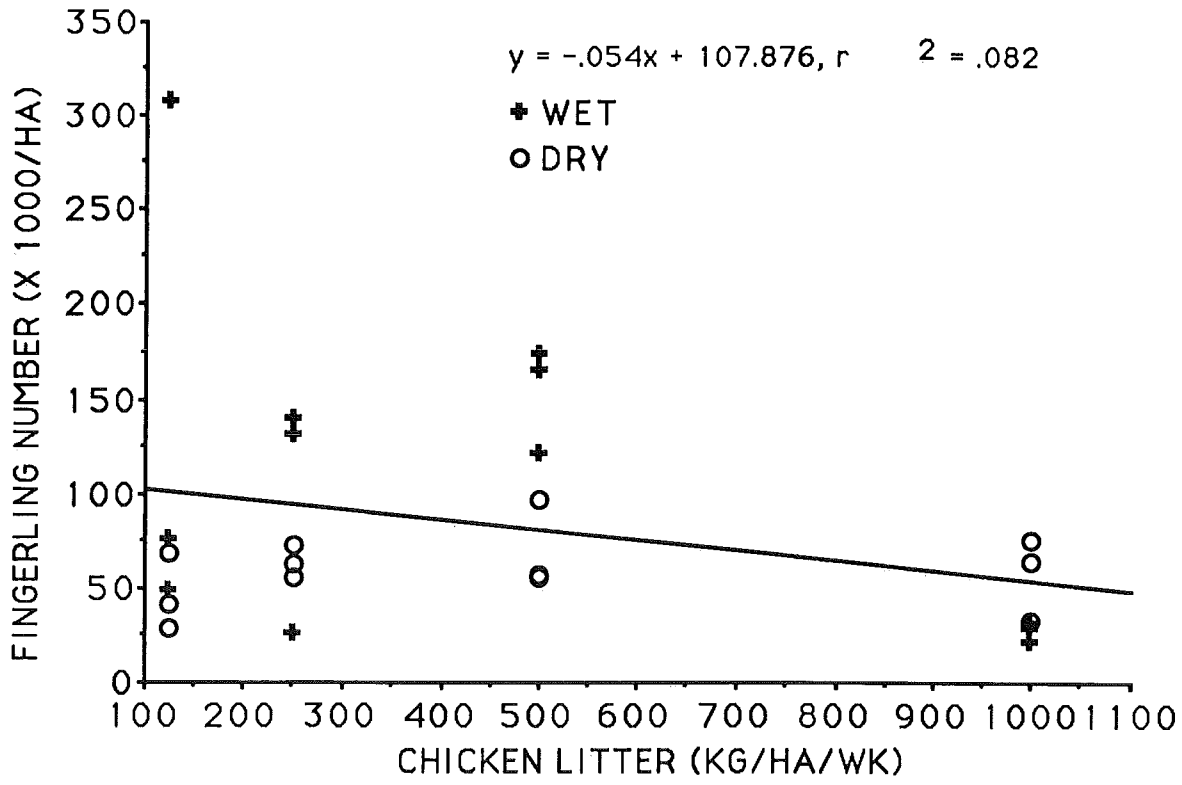


Figure 2. Regression of fingerling production and number of fingerlings on chicken litter application during Cycle III, dry and wet seasons combined, at Gualaca, Panama.

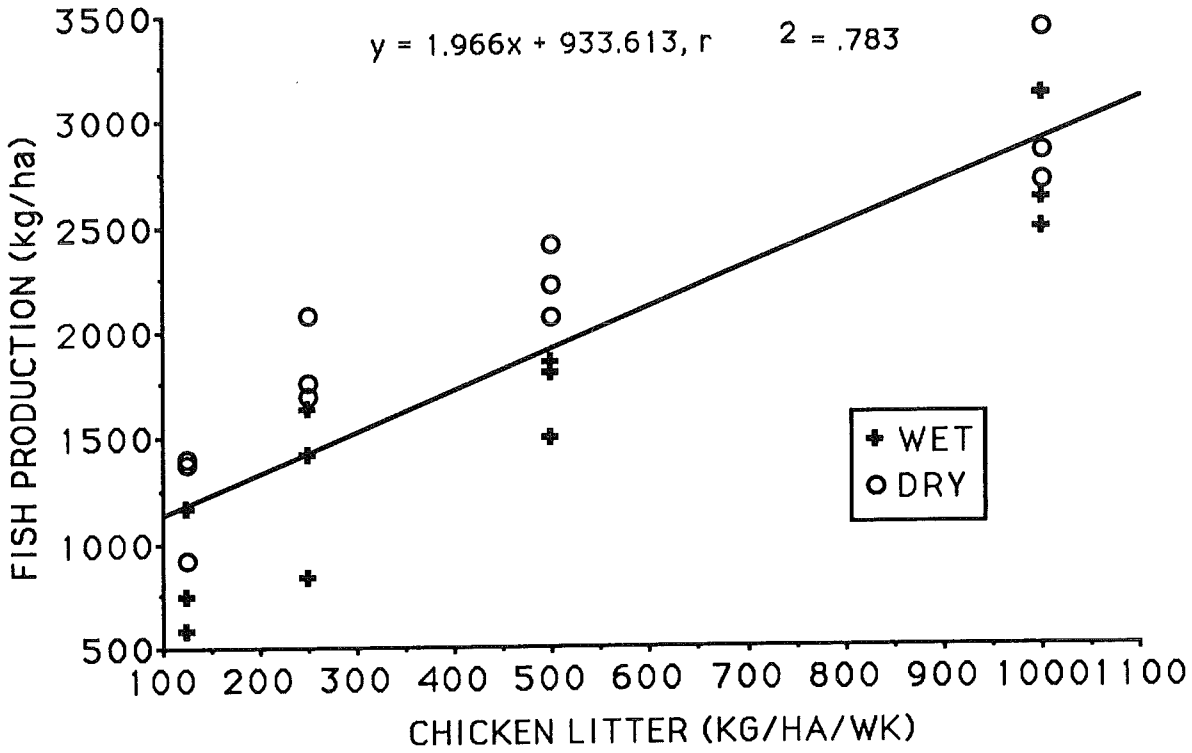
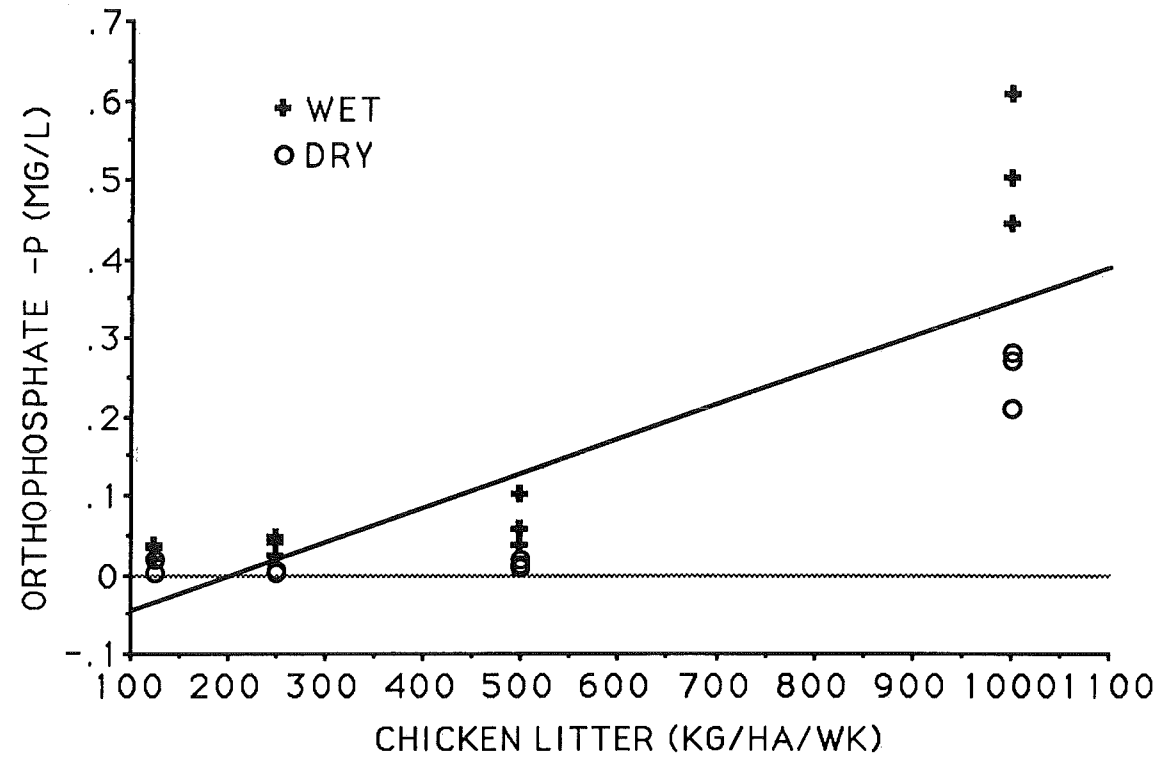


Figure 3. Regression of mean fish production on chicken litter application during Cycle III, dry and wet seasons combined, at Gualaca, Panama.



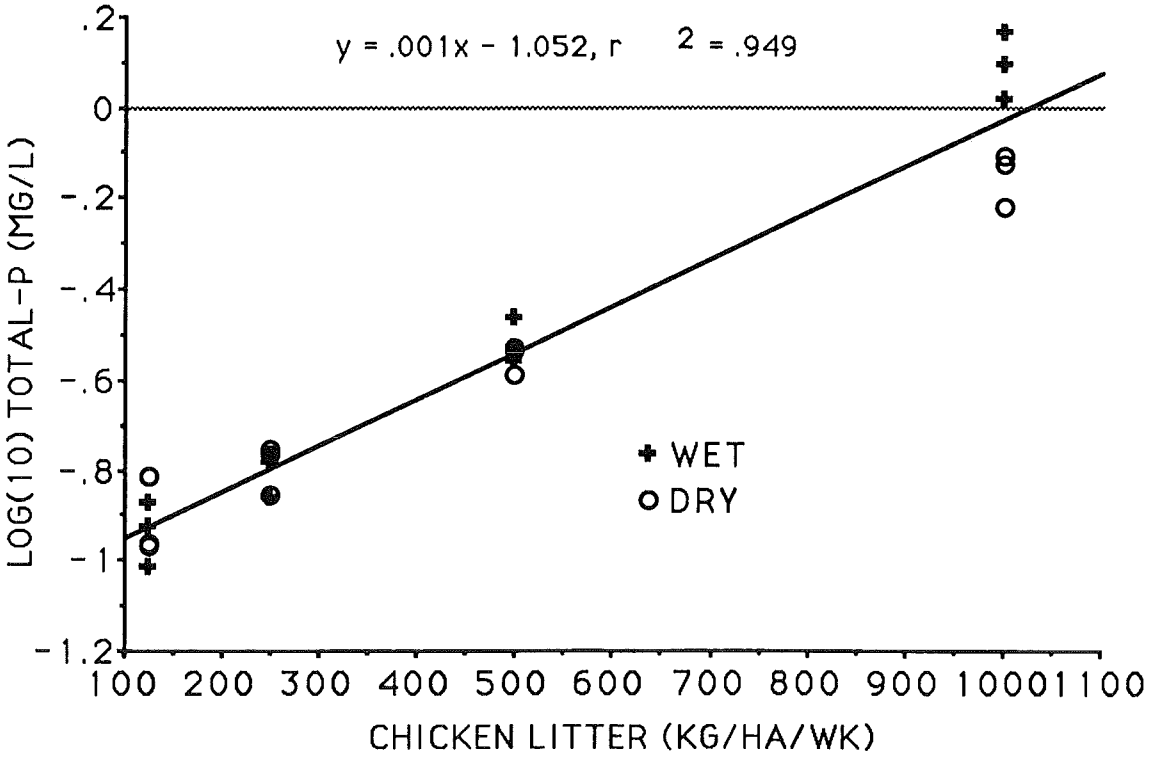


Figure 4. Regression of fingerling production and number of fingerlings on chicken litter application during Cycle III, dry and wet seasons combined, at Gualaca, Panama.

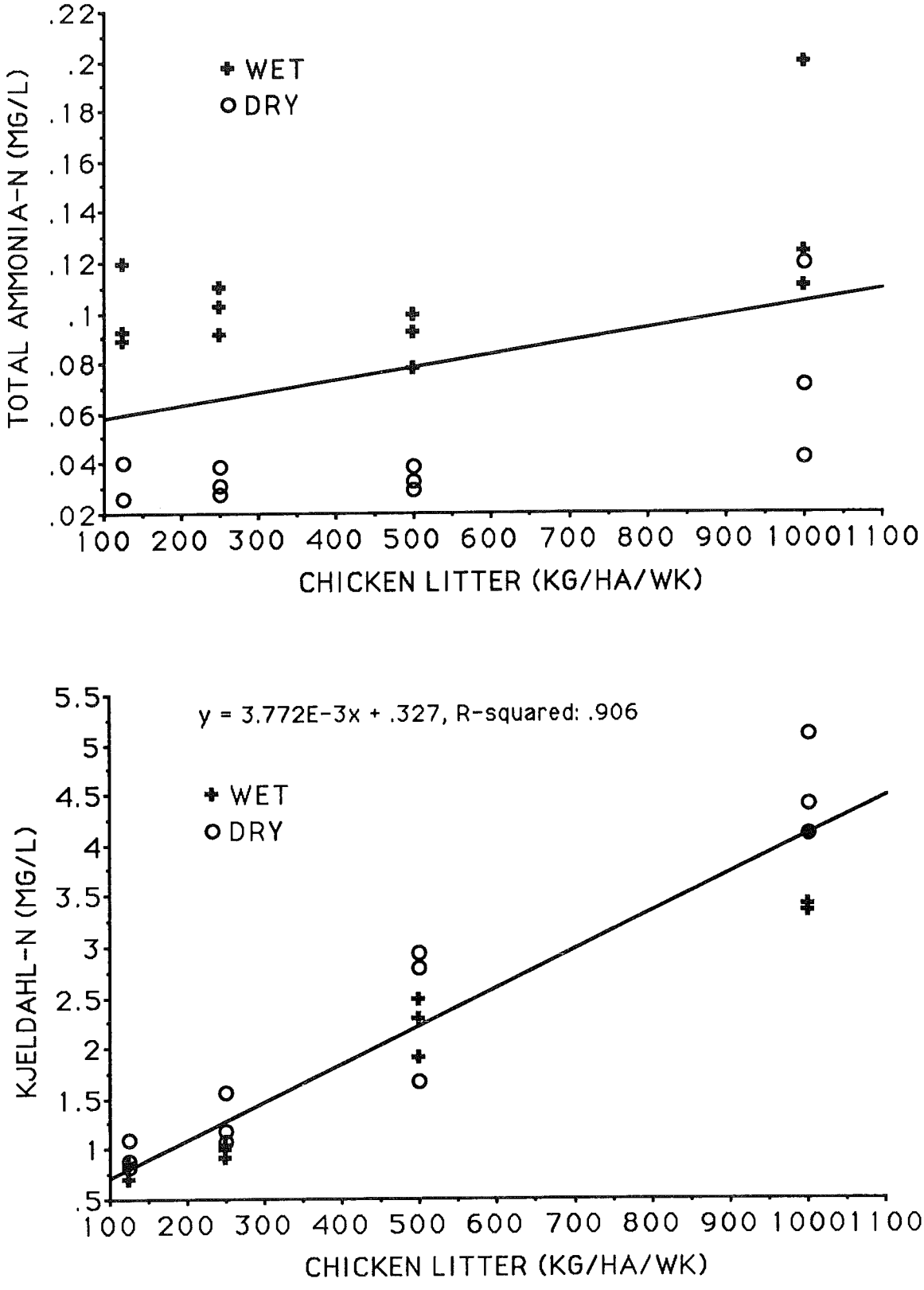
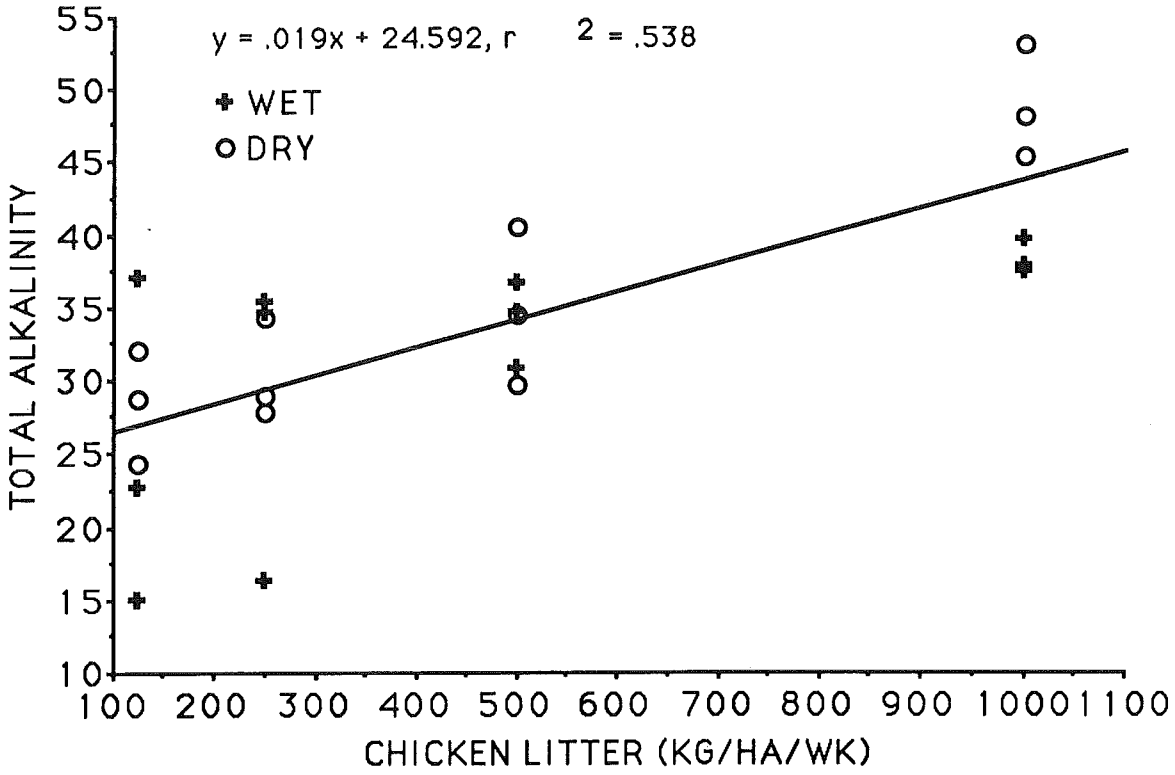


Figure 5. Regression of mean total ammonia nitrogen and Kjeldahl nitrogen on chicken litter application during Cycle III, dry and wet seasons combined, at Gualaca, Panama.



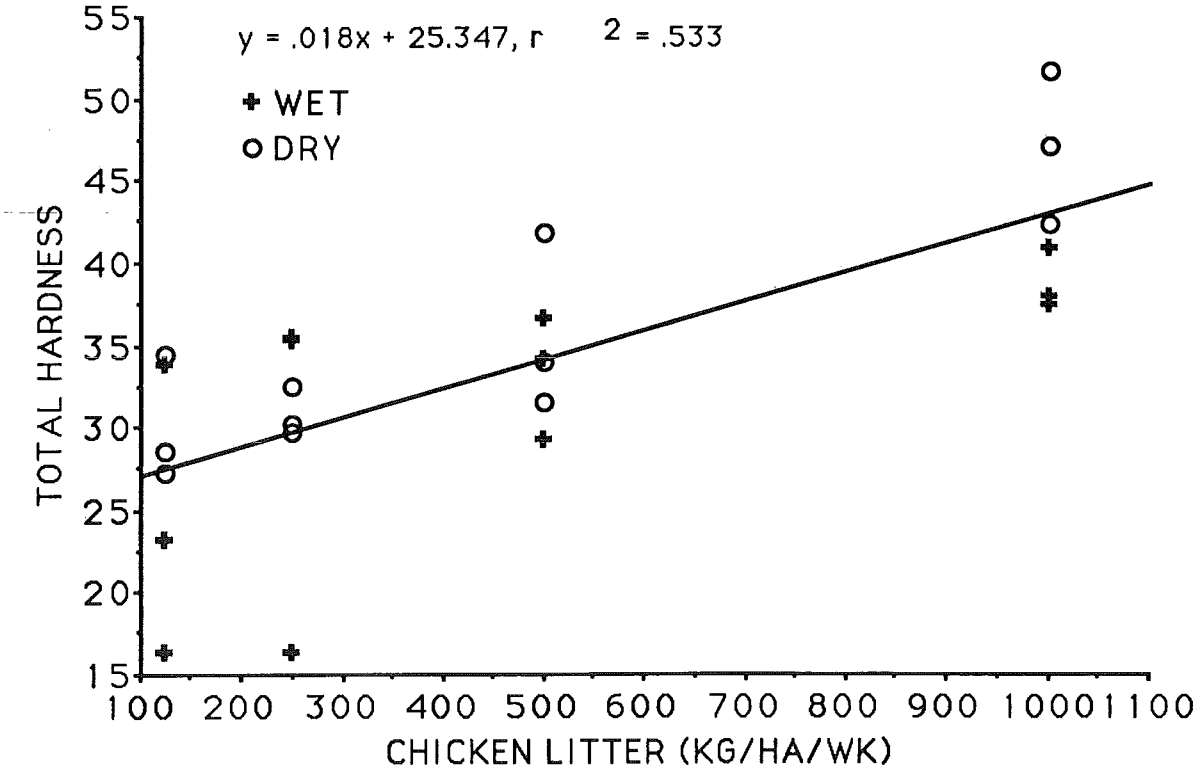


Figure 6. Regression of mean total alkalinity (mg $CaCO_3$/l) and total hardness (mg $CaCO_3$/l) on chicken litter application during Cycle III, dry and wet seasons combined, at Gualaca, Panama.

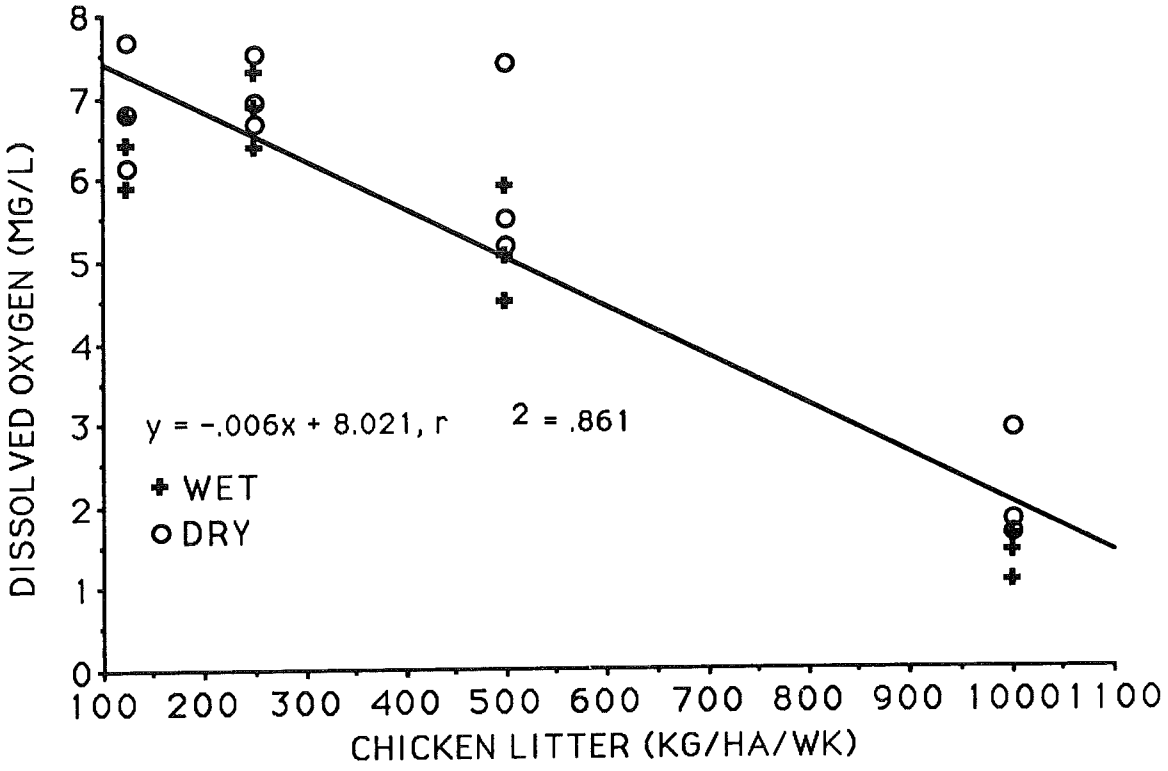


Figure 7. Regression of mean early morning dissolved oxygen concentration on chicken litter application during Cycle III, dry and wet seasons combined, at Gualaca, Panama.

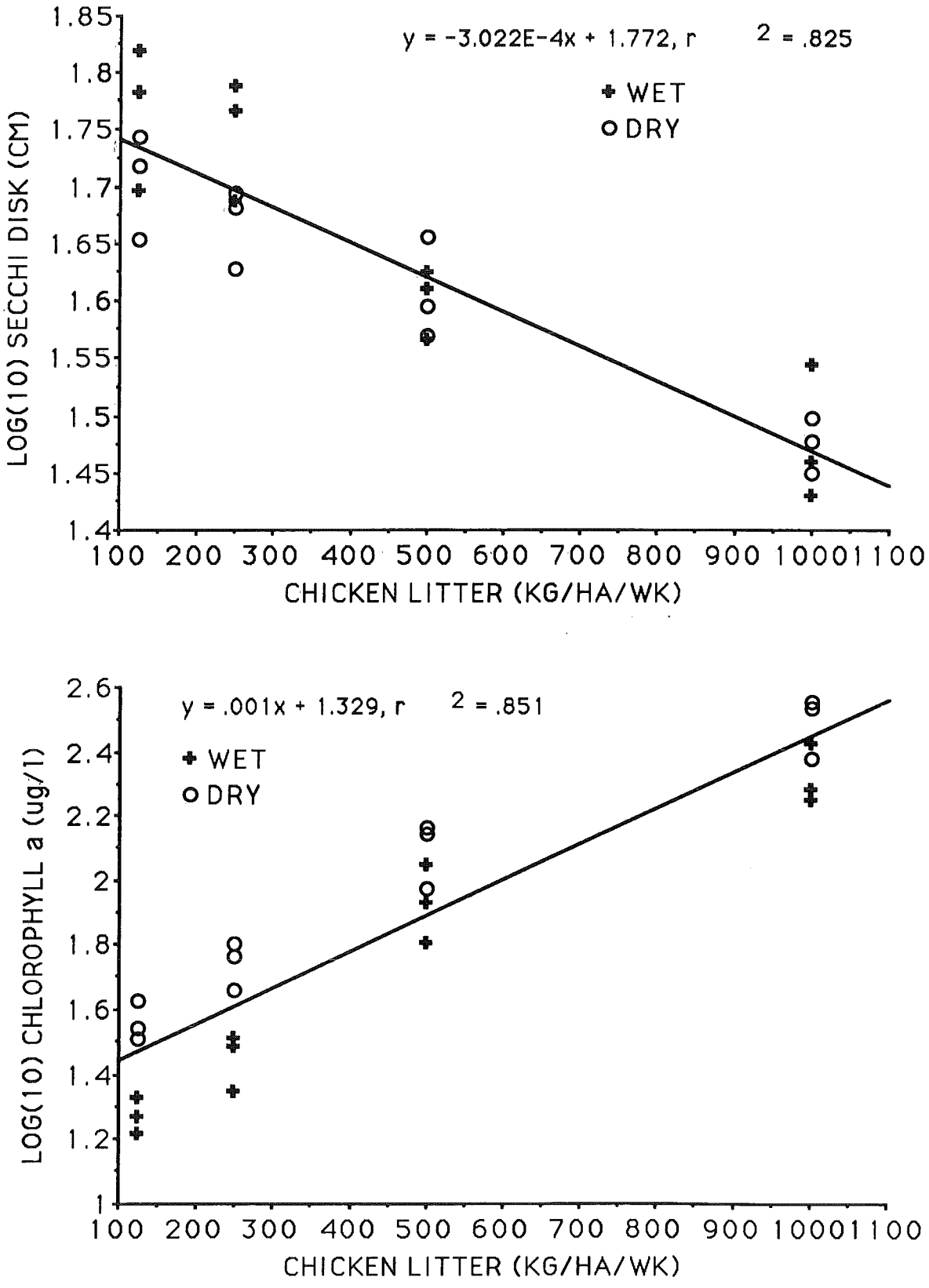


Figure 8. Regression of mean Secchi disk visibility (log transformed), and chlorophyll *a* (log transformed) on chicken litter application during Cycle III, dry and wet seasons combined, at Gualaca, Panama.

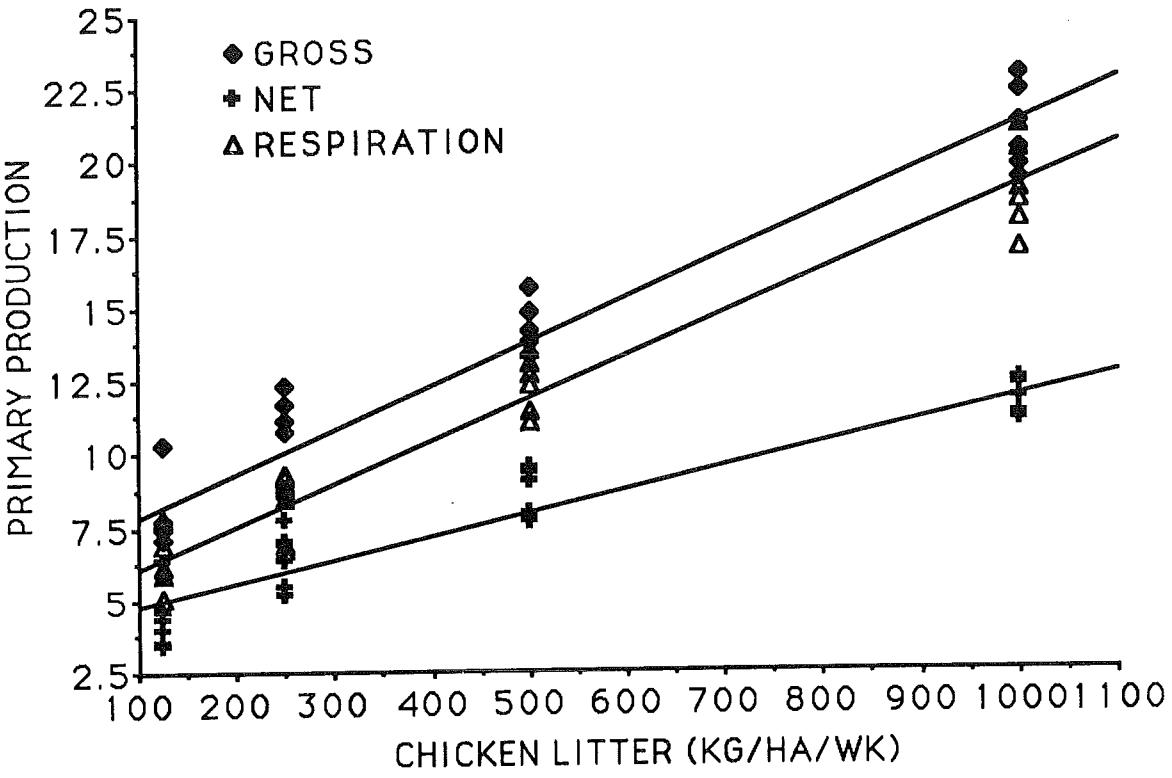


Figure 9. Regression of mean gross primary production (r^2 = 0.93), net primary production (r^2 = 0.88), and community respiration (r^2 = 0.95) on chicken litter application during Cycle III, dry and wet seasons combined, at Gualaca, Panama. Primary productivity units are mg O_2/l/d.

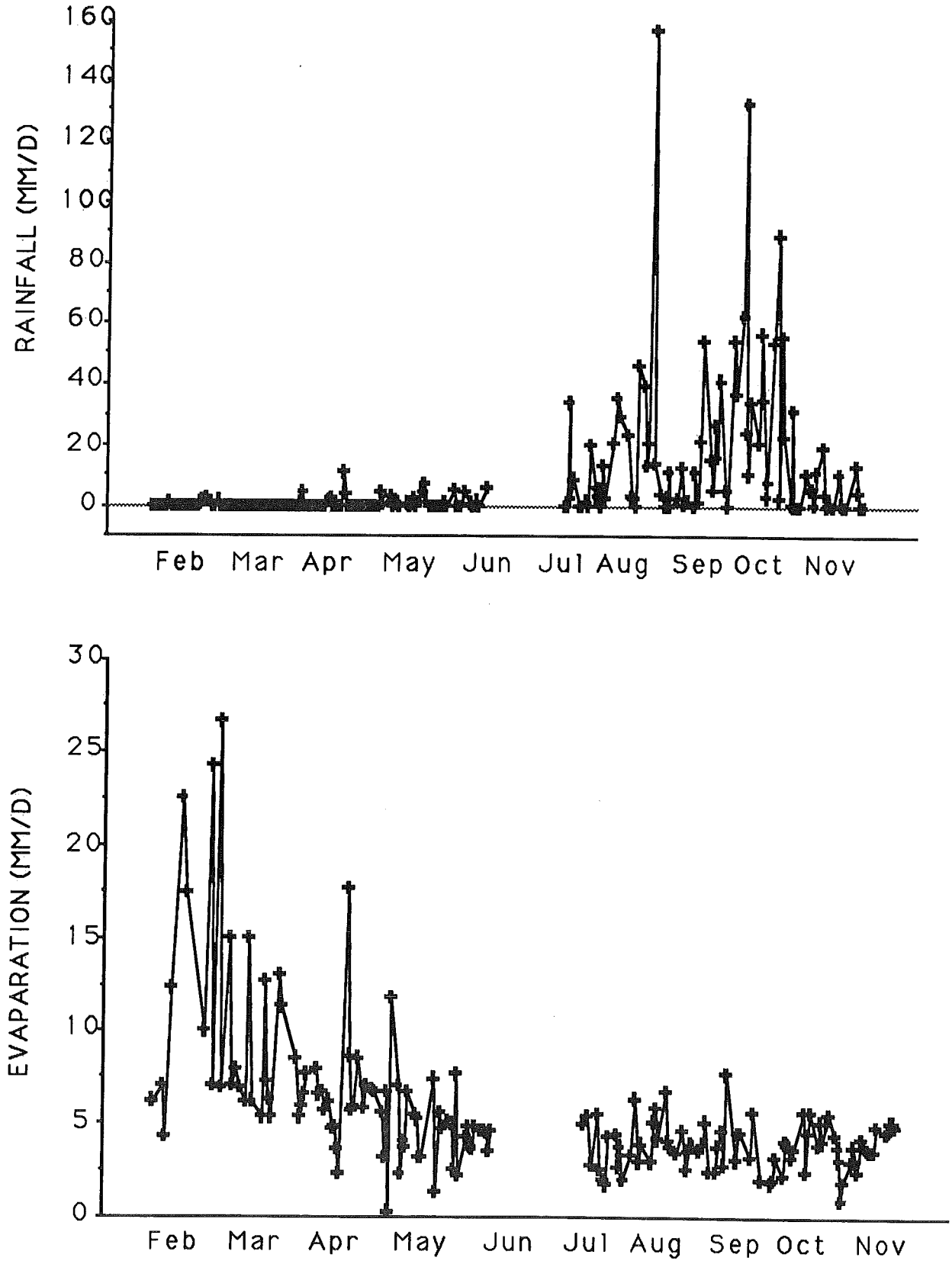


Figure 10. Rainfall and pond evaporation (pan evaporation X 0.83) during the dry (January to June) and wet (July to December) seasons of Cycle III at Gualaca, Panama.

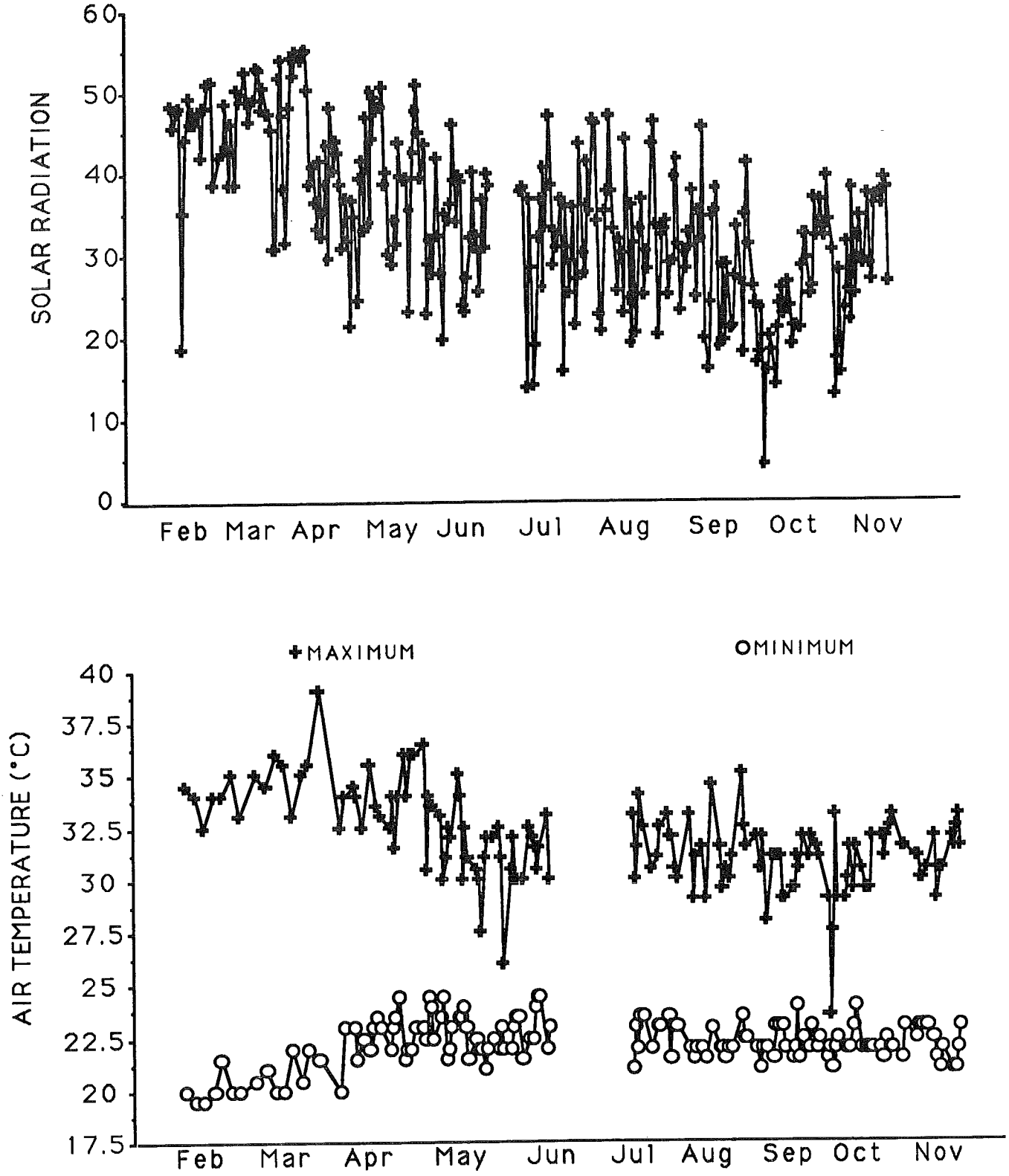


Figure 11. Solar radiation (Einsteins/m^2/d), and maximum and minimum air temperatures during the dry (January to June) and wet (July to December) seasons of Cycle III at Gualaca, Panama.

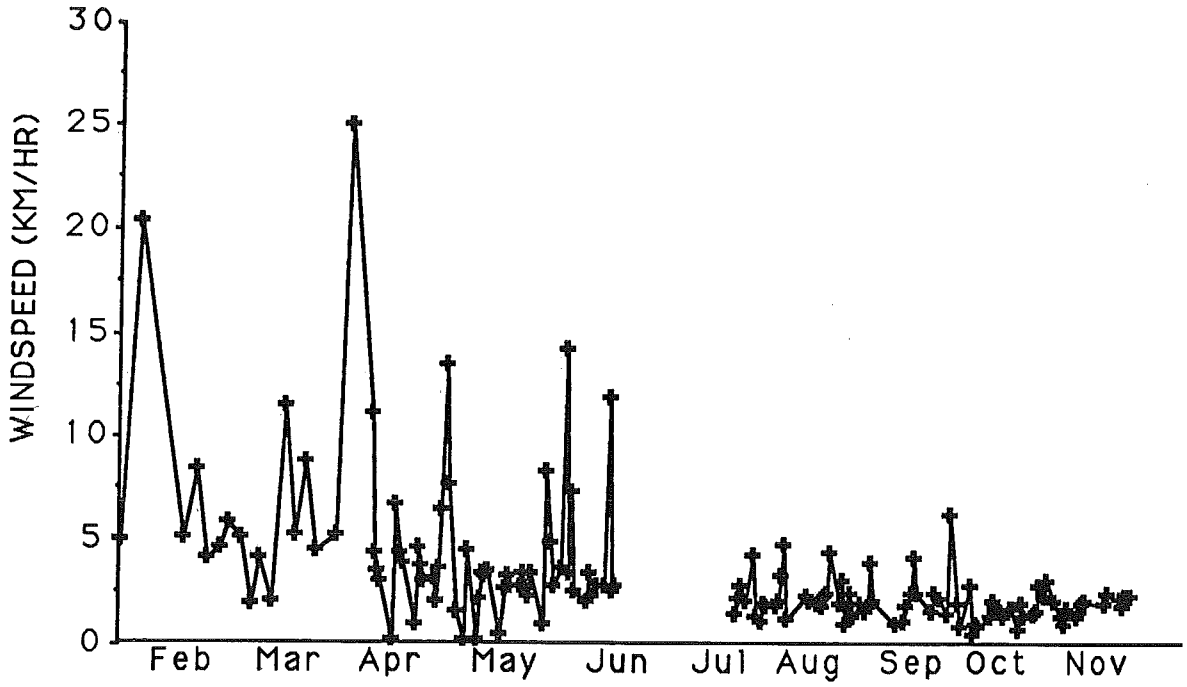


Figure 12. Wind speed during the dry (January to June) and wet (July to December) seasons of Cycle III at Gualaca, Panama.

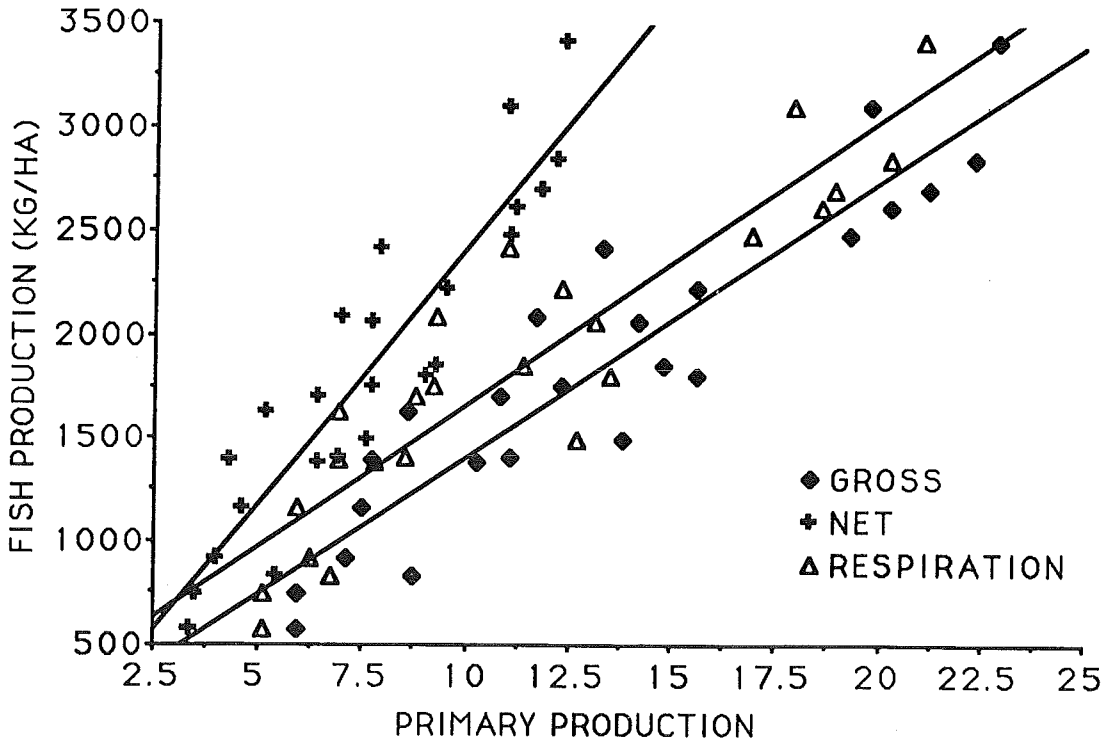


Figure 13. Regression of mean fish production on gross primary production (r^2 = 0.86), net primary production (r^2 = 0.85), and community respiration (r^2 = 0.84) during Cycle III, dry and wet seasons combined, at Gualaca, Panama.

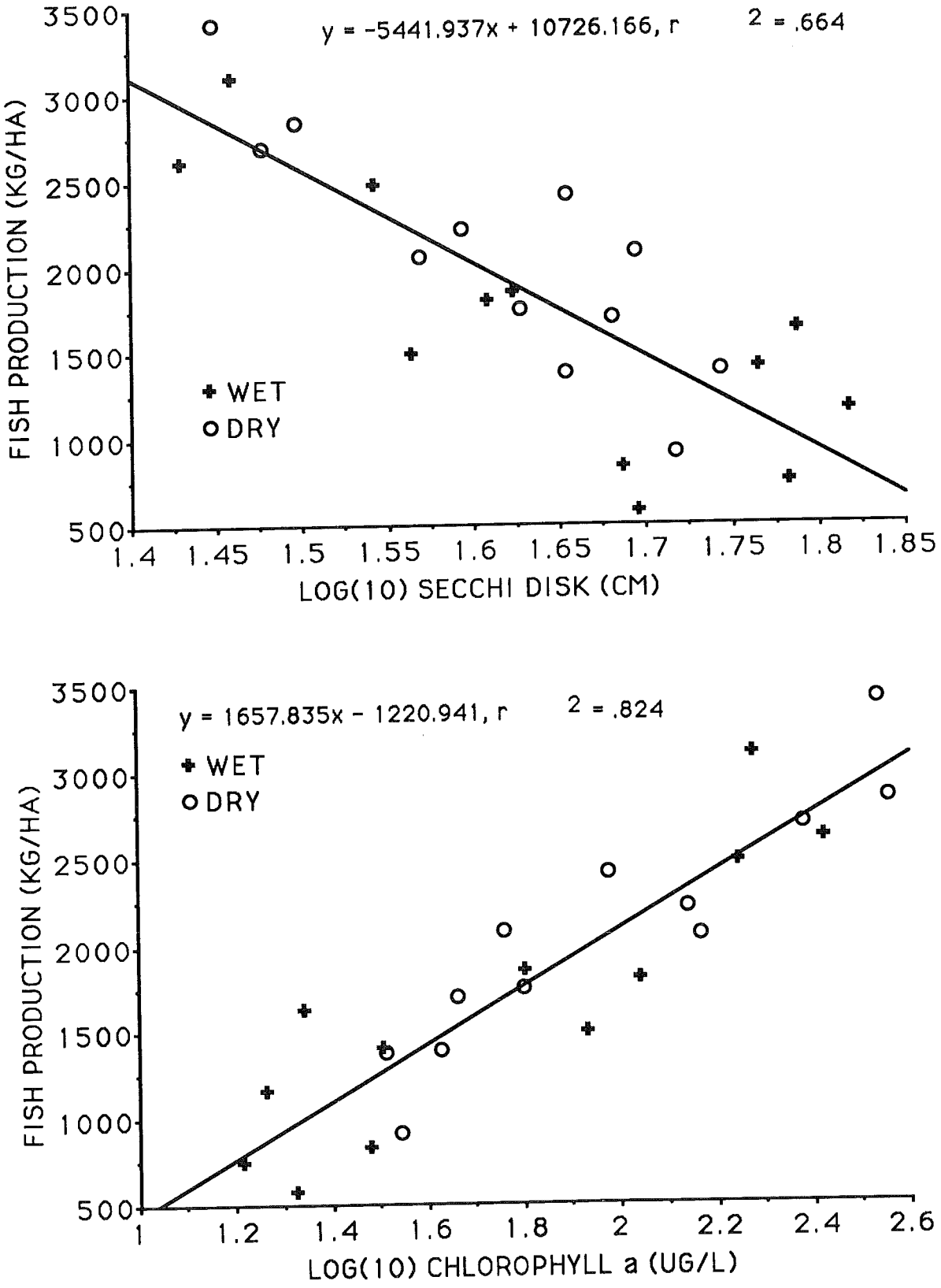
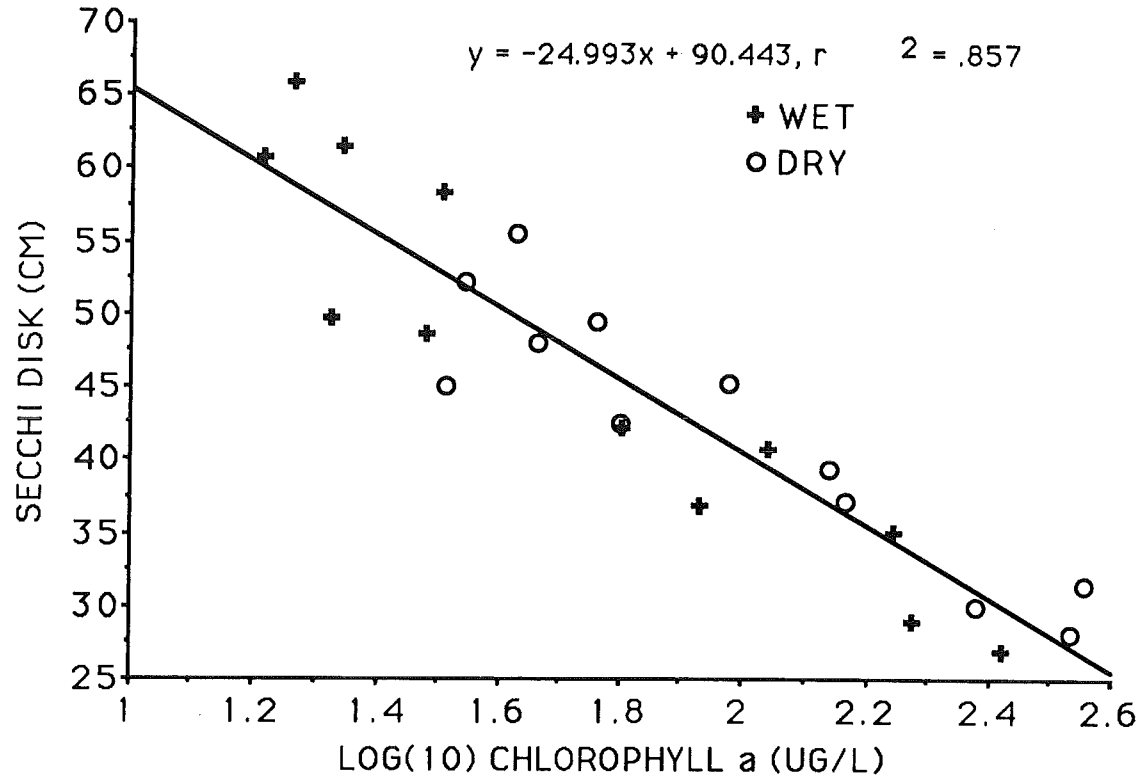


Figure 14. Regression of mean fish production on Secchi disk visibility (log transformed), and chlorophyll *a* (log transformed) during Cycle III, dry and wet seasons combined, at Gualaca, Panama.



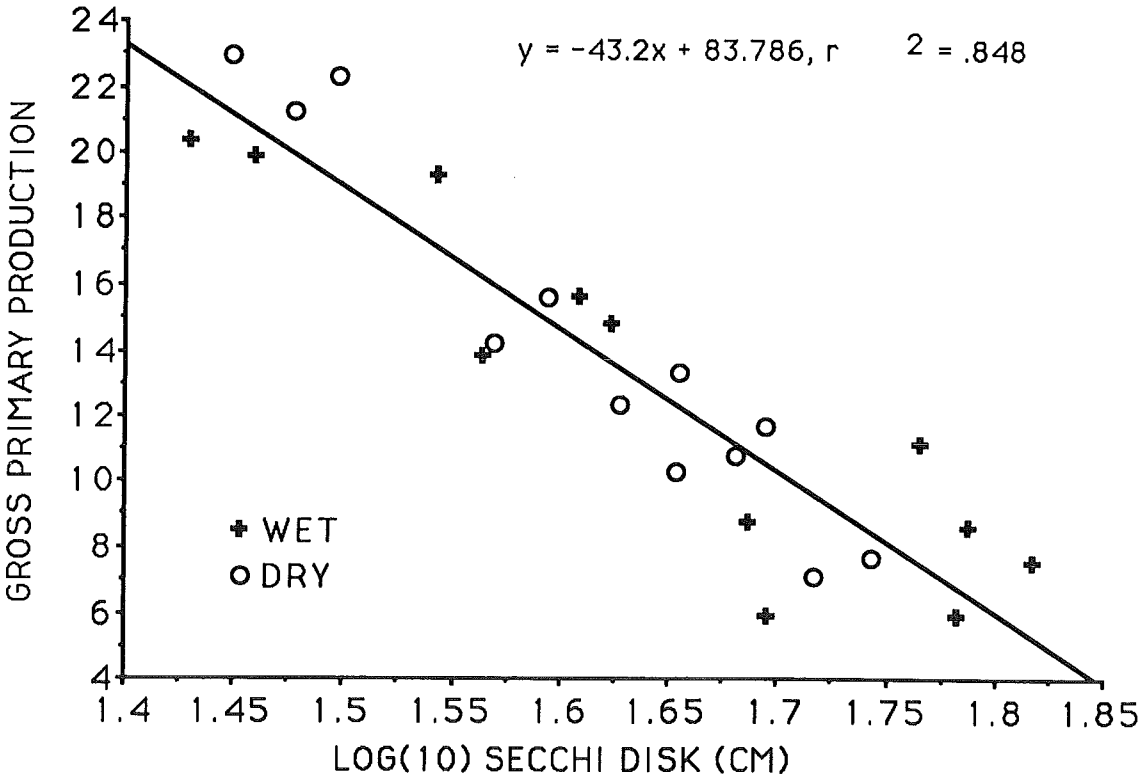


Figure 15. Regression of mean Secchi disk visibility on chlorophyll *a* (log transformed), and gross primary production (mg O_2/l/d) on Secchi disk visibility (log transformed) during Cycle III, dry and wet seasons combined, at Gualaca, Panama.

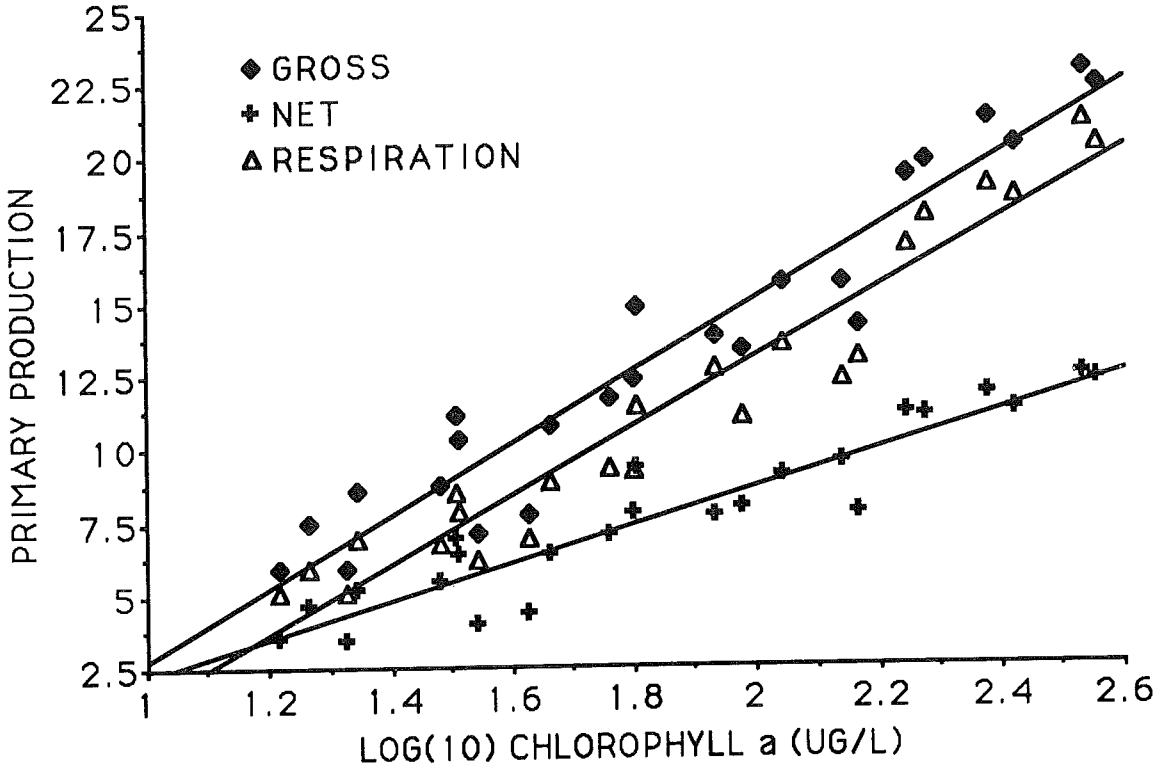


Figure 16. Regression of gross primary production (r^2 = 0.93), net primary production (r^2 = 0.89), and community respiration (r^2 = 0.94) on on chlorophyll *a* (log transformed) during Cycle III, dry and wet seasons combined, at Gualaca, Panama. Primary productivity units are in mg O_2/l/d.

APPENDIX

Complete Set of Data from Cycle III of the Pond/Dynamics Aquaculture CRSP in Gualaca, Panama.

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Table 1. Daily Weather Measurements. Gualaca, Panama, Cycle III, Dry Season

DAY	MONTH	YEAR	SOLAR1	SOLAR2	RAIN	WIND	ATEMPMAX	ATEMPMIN	EVAP
10	1	1986				5.			
17	1	1986				20.3			
29	1	1986							
30	1	1986	48.34						
31	1	1986	45.46			5.2	34.5	20.	6.2
1	2	1986	47.61						
2	2	1986	48.06						
3	2	1986	18.52						
4	2	1986	35.06			8.4	34.	19.5	7.1
5	2	1986	44.07		0.48				4.3
6	2	1986	49.17						
7	2	1986	46.01			4.1	32.5	19.5	12.4
8	2	1986	47.48						
9	2	1986	46.04						
10	2	1986	46.59						
11	2	1986	47.23			4.6	34.	20.	22.6
12	2	1986	41.96						
13	2	1986	47.96						
14	2	1986	48.05			5.9	34.	21.5	17.5
15	2	1986	50.87						
16	2	1986	51.3						
17	2	1986	38.47						
18	2	1986			0.83	5.2	35.	20.	
19	2	1986			0.869				
20	2	1986	41.78		1.57				
21	2	1986	42.26		2.18	2.	33.	20.	10.1
22	2	1986	48.57						
23	2	1986	43.34						
24	2	1986	38.48		0.02	4.1			24.4
25	2	1986	45.92						7.2
26	2	1986	38.41		1.58				
27	2	1986	50.32						26.9
28	2	1986				2.	35.	20.5	7.
1	3	1986	48.65						
2	3	1986	49.67						
3	3	1986	52.37						15.
4	3	1986	48.65			11.5	34.5	21.	7.1
5	3	1986	46.37						
6	3	1986	48.82		0.13				8.
7	3	1986	49.04		0.17	5.2	36.	20.	6.9
8	3	1986	53.						
9	3	1986	52.77						
10	3	1986	47.78						6.2
11	3	1986	50.55			8.8	35.5	20.	15.1
12	3	1986	47.35		0.08				6.2
13	3	1986	47.28						
14	3	1986	45.27			4.5	33.	22.	
15	3	1986	30.6						
16	3	1986	30.59						
17	3	1986	51.57						5.4
18	3	1986	53.96				35.	20.5	12.7
19	3	1986	46.93						7.4
20	3	1986	37.93						6.4
21	3	1986	31.4			5.3	35.5	22.	5.4
22	3	1986	47.95						
23	3	1986	54.22						
24	3	1986	51.99						13.1
25	3	1986	54.88		0.16	25.	39.	21.5	11.4
26	3	1986	54.61						
27	3	1986	53.97						
28	3	1986	54.9						
29	3	1986							
30	3	1986	50.1						
31	3	1986	38.47						8.6
1	4	1986	40.6			11.2			5.4
2	4	1986	36.27			4.4	32.5	20.	5.9
3	4	1986	32.94		0.86	3.5			6.6
4	4	1986	41.32		4.45	3.1	34.	23.	7.7
5	4	1986	32.06						
6	4	1986	38.55						
7	4	1986	43.45						
8	4	1986	29.41			0.3	34.5	23.	8.

Table 1. Daily Weather Measurements. Gualaca, Panama, Cycle III, Dry Season

DAY	MONTH	YEAR	SOLAR1	SOLAR2	RAIN	WIND	ATEMPMAX	ATEMPMIN	EVAP
9	4	1986	47.88			6.7	34.	21.5	6.6
10	4	1986	40.05			4.4			6.7
11	4	1986	43.86			3.9	32.5	22.5	5.7
12	4	1986	42.42						
13	4	1986	38.47						
14	4	1986	30.72				35.5	22.	6.2
15	4	1986	36.83		1.63	1.		23.	4.8
16	4	1986	31.62		2.3	4.7	33.5	23.5	4.9
17	4	1986	21.19		0.01	3.8			3.7
18	4	1986	36.41		0.01	3.1	33.	23.	2.3
19	4	1986	34.64						
20	4	1986	24.23						
21	4	1986	39.28		11.08	3.2			17.8
22	4	1986	41.48		3.25	2.1	32.5	22.	8.7
23	4	1986	32.89			3.6	34.	23.	5.8
24	4	1986	46.8			6.5	31.5	23.5	6.
25	4	1986	33.69			13.5	34.	24.5	8.6
26	4	1986	49.95			7.8			
27	4	1986	44.06						
28	4	1986	49.34				36.	21.5	5.8
29	4	1986	47.62			1.6	34.	22.	7.1
30	4	1986	47.92				36.	22.	
1	5	1986	50.33			0.2			6.9
2	5	1986	38.43		0.03	4.6	36.	23.	6.7
3	5	1986	40.02						
4	5	1986	29.97						
5	5	1986	28.57		0.12	0.2	36.5	23.	5.6
6	5	1986	33.93			2.3	30.5	22.5	3.1
7	5	1986	31.22		0.11	3.4	34.	24.5	6.8
8	5	1986	43.59		4.6	3.4	33.5	24.	0.3
9	5	1986	39.46		0.85	3.6	33.5	22.5	11.9
10	5	1986	38.88						
11	5	1986	39.15						
12	5	1986	23.07		2.55		33.	23.5	7.1
13	5	1986	35.22			0.4	30.	24.5	2.3
14	5	1986	42.48		0.28	2.7	31.	21.5	4.
15	5	1986	47.45		0.12	3.3	32.5	22.	3.8
16	5	1986	50.67		0.02	2.8	32.	23.	6.8
17	5	1986	44.87						
18	5	1986	39.09						
19	5	1986	43.44		0.51	2.8	35.	23.5	5.5
20	5	1986	22.72		0.02	3.4	34.	23.5	5.3
21	5	1986	28.68		0.74	2.7	30.	24.	3.1
22	5	1986	31.55		2.18	2.4	32.5	23.	3.2
23	5	1986	27.34			3.5	31.	21.5	
24	5	1986	41.68						
25	5	1986	31.99						
26	5	1986	27.54		4.46		30.5	22.5	
27	5	1986	19.55		6.86	1.	30.	22.	7.5
28	5	1986	34.82		1.28	8.3	27.5	22.	1.3
29	5	1986	34.01			4.8	31.	21.	5.6
30	5	1986	35.96		0.02	2.8	32.	22.	4.7
31	5	1986	45.88						
1	6	1986	38.88						
2	6	1986	33.7			3.6	32.	22.5	5.2
3	6	1986	39.43			14.2			5.
4	6	1986	38.74		0.52	3.4	32.5	22.	2.6
5	6	1986	23.8		0.15	7.3	31.	23.	7.7
6	6	1986	22.9		0.13	2.5	26.	22.	2.1
7	6	1986	26.83						
8	6	1986	31.78						
9	6	1986	39.86		4.67		30.5	22.	4.3
10	6	1986	30.51			2.1	32.	23.	4.9
11	6	1986	32.19			3.5	30.	23.5	3.8
12	6	1986	25.27			2.4	30.	23.5	3.7
13	6	1986	36.46			2.8	30.	21.5	4.9
14	6	1986	30.57						
15	6	1986	39.62						
16	6	1986	38.15		0.25	2.8	32.5	22.5	4.6
17	6	1986				11.8	32.	22.5	4.6
18	6	1986				2.6	31.5	24.	4.5
19	6	1986			0.94	2.8	30.5	24.5	3.5
20	6	1986					31.5	24.5	4.7

Table 1. Daily Weather Measurements. Gualaca, Panama, Cycle III, Dry Season

DAY	MONTH	YEAR	SOLAR1	SOLAR2	RAIN	WIND	ATEMPMAX	ATEMPMIN	EVAP
21	6	1986							
22	6	1986							
23	6	1986			5.59		33.	22.	
24	6	1986					30.	23.	

Table 1. Daily Weather Measurements. Gualaca, Panama, Cycle III, Wet Season

DAY	MONTH	YEAR	SOLAR1	SOLAR2	RAIN	WIND	ATEMPMAX	ATEMPMIN	EVAP
1	7	1986	37.47						
2	7	1986	37.92						
3	7	1986	13.78						
4	7	1986	36.43						
5	7	1986	28.22						
6	7	1986	13.97						
7	7	1986	18.97						
8	7	1986	31.73						
9	7	1986	36.53						
10	7	1986	25.65						
11	7	1986	40.43						
12	7	1986	33.17						
13	7	1986	46.88						
14	7	1986	38.25						
15	7	1986	28.53						
16	7	1986	32.5						
17	7	1986	30.5						
18	7	1986	36.61						
19	7	1986	15.59						
20	7	1986	35.73						
21	7	1986	30.72						
22	7	1986	24.96						
23	7	1986	35.41						
24	7	1986	21.29						
25	7	1986	26.75						
26	7	1986	43.33						
27	7	1986	29.93						
28	7	1986	27.41				33.	21.	
29	7	1986	35.74			1.51	30.	23.	5.
30	7	1986	41.19		33.4	2.22	31.5	22.	
31	7	1986	34.97		2.4	2.79	34.	23.5	5.4
1	8	1986	46.28		8.8	2.09	32.5	23.5	2.8
2	8	1986	45.8						
3	8	1986	33.69						
4	8	1986	22.44			4.23			5.5
5	8	1986	20.69			1.31	30.5	22.	2.6
6	8	1986	35.08		1.2	1.05			2.
7	8	1986	37.36			1.9	31.	23.	1.7
8	8	1986	46.86		19.5	1.87	32.5	23.	4.3
9	8	1986	37.53						
10	8	1986	32.71						
11	8	1986	25.21		2.5	1.89	33.	23.5	4.4
12	8	1986	31.69		5.6	2.11	32.	21.5	2.7
13	8	1986	29.86			3.33	32.	23.	3.8
14	8	1986	22.78		12.8	4.8	30.5	23.	3.3
15	8	1986	43.94		2.4	1.2	30.	23.	2.
16	8	1986	24.27						
17	8	1986	18.98						
18	8	1986	35.73		20.1				3.3
19	8	1986	31.19						
20	8	1986	20.25		35.4		33.	22.	6.4
21	8	1986	32.81		29.5	2.3	29.	21.5	3.
22	8	1986	36.46			2.1	31.	22.	3.9
23	8	1986	24.62						
24	8	1986	30.08						
25	8	1986	27.85		23.2		31.5	22.	
26	8	1986	43.23			1.8	29.	21.5	2.9
27	8	1986	46.04		1.8	2.3			5.1
28	8	1986	33.35			2.5			5.9
29	8	1986	20.14		46.4	4.4	34.5	22.9	4.2
30	8	1986	32.18						
31	8	1986	32.93						
1	9	1986	33.7		39.6	1.9	31.5	22.	6.7
2	9	1986	24.75			3.1	29.5	22.	4.1
3	9	1986	28.54		20.6		30.5	21.5	3.8
4	9	1986	28.89		156.4	2.4	30.	22.	
5	9	1986	39.21		13.7	1.3	31.	22.	3.4
6	9	1986	41.44						
7	9	1986	30.97						
8	9	1986	23.14		3.2				4.6
9	9	1986	29.77			1.6	35.	23.5	2.6
10	9	1986	27.92		2.9	1.8	32.5	22.5	3.5

Table 1. Daily Weather Measurements. Gualaca, Panama, Cycle III, Wet Season

DAY	MONTH	YEAR	SOLAR1	SOLAR2	RAIN	WIND	ATEMPMAX	ATEMPMIN	EVAP
11	9	1986	32.3		11.2	3.9	31.5	22.5	3.9
12	9	1986	30.56			2.1			3.8
13	9	1986	37.39						
14	9	1986	24.61						
15	9	1986	34.94		1.9		32.	22.	3.6
16	9	1986	31.67						
17	9	1986	45.32		12.2		30.5	21.	3.9
18	9	1986	19.59				32.	22.	5.2
19	9	1986	15.85				28.	22.	2.5
20	9	1986	23.92						
21	9	1986	34.33						
22	9	1986	34.97			1.1	31.	21.5	2.5
23	9	1986	37.8		10.8	1.8	31.	23.	3.8
24	9	1986	18.52		1.4	2.5	31.	23.	4.6
25	9	1986	19.42			4.2	29.	23.	2.8
26	9	1986	28.52		54.4	2.4	29.	22.	7.7
27	9	1986	19.42						
28	9	1986	28.52						
29	9	1986	20.73		15.5		29.5	21.5	16.3
30	9	1986	20.94		5.2		29.5	22.	3.1
1	10	1986	26.83		26.6	1.6	31.	24.	4.5
2	10	1986	33.11		15.7	2.4	30.5	21.5	4.5
3	10	1986	26.52		41.2	2.2	32.	22.5	
4	10	1986	17.76						
5	10	1986	34.56						
6	10	1986	40.82		4.8	1.5	31.	22.	3.2
7	10	1986	30.79			6.2	32.	23.	5.6
8	10	1986	25.7						
9	10	1986	23.71		54.3		31.5	22.	
10	10	1986	16.66		36.8		31.	22.5	2.
11	10	1986	17.89						
12	10	1986	23.38						
13	10	1986	4.12		62.4	2.8	29.	21.5	
14	10	1986	15.66		132.		23.5	22.	
15	10	1986	15.72		23.8		27.5	21.	1.8
16	10	1986	19.88				33.	22.	2.
17	10	1986	18.16		33.4		29.	22.5	3.2
18	10	1986	13.96						
19	10	1986	20.9						
20	10	1986	23.81		20.1	1.3	29.	22.	2.2
21	10	1986	25.44		56.6	2.1	30.	22.	4.
22	10	1986	22.41		34.6	1.8	31.5	22.	3.9
23	10	1986	26.13			1.6	29.5	23.	3.2
24	10	1986	23.43		8.2	1.4	31.5	24.	3.7
25	10	1986	18.79						
26	10	1986							
27	10	1986	21.18		53.3	1.7	30.5	22.	
28	10	1986	20.86		89.1		29.5	22.	5.6
29	10	1986	28.21		1.8		29.5	22.	2.4
30	10	1986	32.16		55.4	1.9	29.5	22.	4.5
31	10	1986	31.98		22.6	1.4	32.	22.	5.6
1	11	1986	29.07						
2	11	1986	24.74						
3	11	1986	25.8			1.5	32.	22.	3.9
4	11	1986	36.53		31.7	1.6	31.	21.5	5.2
5	11	1986	31.77			2.8	32.	22.5	4.1
6	11	1986	36.17			2.3	32.5	22.	5.1
7	11	1986	32.82			3.1	33.	22.	5.5
8	11	1986	31.86						
9	11	1986	39.27						
10	11	1986	33.79		10.2	2.1			4.4
11	11	1986	30.06		5.2		31.5	21.5	3.8
12	11	1986	12.71		5.8	1.3	31.5	23.	3.1
13	11	1986	17.26						0.9
14	11	1986	27.78		10.6	1.7			1.8
15	11	1986	15.33						
16	11	1986	23.35						
17	11	1986	31.18		18.9	1.3	31.	22.5	3.
18	11	1986	25.28		3.6	1.6	31.	23.	3.8
19	11	1986	21.9				30.	23.	3.1
20	11	1986	37.72			2.1	30.	23.	2.5
21	11	1986	24.68				30.5	23.	4.2
22	11	1986	31.88						

Table 1. Daily Weather Measurements. Gualaca, Panama, Cycle III, Wet Season

DAY	MONTH	YEAR	SOLAR1	SOLAR2	RAIN	WIND	ATEMPMAX	ATEMPMIN	EVAP
23	11	1986	34.2						
24	11	1986	28.84		10.3		32.	22.5	3.7
25	11	1986	28.38				29.	21.5	3.5
26	11	1986	36.92			1.9	30.5	21.	3.5
27	11	1986	28.33			2.4	30.5	22.	4.9
28	11	1986	26.38						
29	11	1986	35.83						
30	11	1986	36.79						
1	12	1986	36.89		12.8	2.2	32.	21.	4.5
2	12	1986	35.77			1.8	31.5	21.	4.6
3	12	1986	39.06			2.3	32.5	21.	5.1
4	12	1986	37.83				33.	22.	5.2
5	12	1986	26.31			2.3	31.5	23.	4.9

Table 2. Daily Pond Measurements. Gualaca, Panama, Cycle III, Dry Season

DAY	MONTH	YEAR	POND#	DEPTH	INFLOW	OVERFLOW
5	2	1986	1	0.903	N	N
5	2	1986	2	0.954	N	N
5	2	1986	3	0.855	N	N
5	2	1986	4	0.956	N	N
5	2	1986	5	0.84	N	N
5	2	1986	6	1.138	N	N
5	2	1986	7	1.028	N	N
5	2	1986	8	1.085	N	N
5	2	1986	9	0.914	N	N
5	2	1986	10	1.003	N	N
5	2	1986	17	1.035	N	N
5	2	1986	18		Y	N
7	2	1986	1	0.777	Y	N
7	2	1986	2	0.863	Y	N
7	2	1986	3	0.738	Y	N
7	2	1986	4	0.954	Y	N
7	2	1986	5	0.754	Y	N
7	2	1986	6	1.083	Y	N
7	2	1986	7	0.953	Y	N
7	2	1986	8	1.032	Y	N
7	2	1986	9	0.878	Y	N
7	2	1986	10	0.968	Y	N
7	2	1986	17	0.88	Y	N
7	2	1986	18		Y	N
11	2	1986	1	0.797	N	N
11	2	1986	2	0.791	N	N
11	2	1986	3	0.948	N	N
11	2	1986	4	0.922	N	N
11	2	1986	5	0.822	N	N
11	2	1986	6	0.94	N	N
11	2	1986	7	0.826	N	N
11	2	1986	8	0.948	N	N
11	2	1986	9	0.939	N	N
11	2	1986	10	1.035	N	N
11	2	1986	17	0.906	N	N
11	2	1986	18	0.835	N	N
14	2	1986	1	0.765	N	N
14	2	1986	2	0.685	N	N
14	2	1986	3	0.768	N	N
14	2	1986	4	0.847	N	N
14	2	1986	5	0.712	N	N
14	2	1986	6	0.85	N	N
14	2	1986	7	0.86	N	N
14	2	1986	8	0.844	N	N
14	2	1986	9		Y	N
14	2	1986	10	0.975	N	N
14	2	1986	17	0.788	N	N
14	2	1986	18	0.668	N	N
18	2	1986	1	0.71	Y	N
18	2	1986	2		Y	N
18	2	1986	3	0.748	Y	N
18	2	1986	4	0.775	Y	N
18	2	1986	5		Y	N
18	2	1986	6	0.836	Y	N
18	2	1986	7	0.815	Y	N
18	2	1986	8	0.737	Y	N
18	2	1986	9		Y	N
18	2	1986	10	0.918	Y	N
18	2	1986	17	0.775	Y	N
18	2	1986	18		Y	N
21	2	1986	1	0.785	N	N
21	2	1986	2	0.719	N	N
21	2	1986	3	0.794	N	N
21	2	1986	4	0.819	N	N
21	2	1986	5	0.754	N	N
21	2	1986	6	0.976	N	N
21	2	1986	7	0.976	N	N
21	2	1986	8	0.761	N	N
21	2	1986	9	0.849	N	N
21	2	1986	10	0.981	N	N
21	2	1986	17	0.83	N	N
21	2	1986	18	0.822	N	N
24	2	1986	1	0.714	N	N
24	2	1986	2	0.643	Y	N
24	2	1986	3	0.684	N	N
24	2	1986	4	0.768	N	N
24	2	1986	5	0.675	N	N
24	2	1986	6	0.914	N	N
24	2	1986	7	0.895	N	N
24	2	1986	8	0.688	Y	N
24	2	1986	9	0.808	N	N
24	2	1986	10	0.938	N	N
24	2	1986	17	0.75	N	N
24	2	1986	18	0.64	N	N
25	2	1986	1	0.692	Y	N
25	2	1986	2	0.754	N	N
25	2	1986	3	0.645	Y	N
25	2	1986	4	0.751	Y	N
25	2	1986	5	0.646	Y	N
25	2	1986	6		Y	N
25	2	1986	7		Y	N
25	2	1986	8	0.807	N	N
25	2	1986	9		Y	N
25	2	1986	10		Y	N
25	2	1986	17	0.727	Y	N
25	2	1986	18	0.586	Y	N
26	2	1986	1	0.711	N	N
26	2	1986	2	0.747	N	N
26	2	1986	3	0.71	N	N
26	2	1986	4	0.819	N	N
26	2	1986	5	0.683	N	N
26	2	1986	6	0.89	N	N
26	2	1986	7	0.857	N	N
26	2	1986	8	0.803	N	N
26	2	1986	9	0.798	N	N
26	2	1986	10	0.929	N	N
26	2	1986	17	0.743	N	N
26	2	1986	18		Y	N
28	2	1986	1	0.677	N	N
28	2	1986	2	0.695	N	N
28	2	1986	3	0.645	N	N
28	2	1986	4	0.784	N	N
28	2	1986	5	0.631	N	N
28	2	1986	6	0.86	N	N
28	2	1986	7	0.807	N	N
28	2	1986	8	0.751	N	N
28	2	1986	9	0.769	N	N
28	2	1986	10	0.899	N	N
28	2	1986	17	0.706	N	N
28	2	1986	18	0.509	N	N
4	3	1986	1	0.605	Y	N
4	3	1986	2	0.59	N	N
4	3	1986	3	0.52	Y	N
4	3	1986	4	0.705	N	N
4	3	1986	5	0.592	Y	N
4	3	1986	6	0.77	N	N
4	3	1986	7	0.704	N	N
4	3	1986	8	0.647	Y	N
4	3	1986	9	0.705	N	N
4	3	1986	10	0.834	N	N
4	3	1986	17	0.63	N	N
4	3	1986	18	0.468	Y	N
6	3	1986	1	0.741	N	N
6	3	1986	2	0.552	Y	N
6	3	1986	3	0.824	N	N
6	3	1986	4	0.674	Y	N
6	3	1986	5	0.805	N	N
6	3	1986	6	0.739	Y	N
6	3	1986	7	0.669	Y	N
6	3	1986	8	0.954	N	N
6	3	1986	9	0.68	Y	N
6	3	1986	10	0.812	Y	N
6	3	1986	17	0.699	Y	N
6	3	1986	18	0.692	N	N
7	3	1986	1	0.726	N	N

Table 2. Daily Pond Measurements. Gualaca, Panama, Cycle III, Dry Season

DAY	MONTH	YEAR	POND#	DEPTH	INFLOW	OVERFLOW
7	3	1986	2	0.882	N	N
7	3	1986	3	0.788	N	N
7	3	1986	4	0.914	N	N
7	3	1986	5	0.78	N	N
7	3	1986	6	0.881	Y	N
7	3	1986	7	0.832	N	N
7	3	1986	8	0.926	N	N
7	3	1986	9	0.83	N	N
7	3	1986	10	0.92	N	N
7	3	1986	17	0.859	N	N
7	3	1986	18	0.638	Y	N
8	3	1986	1		N	N
8	3	1986	2		N	N
8	3	1986	3		Y	N
8	3	1986	4		N	N
8	3	1986	5		Y	N
8	3	1986	6	0.933	N	N
8	3	1986	7		Y	N
8	3	1986	8		N	N
8	3	1986	9		N	N
8	3	1986	10		N	N
8	3	1986	17		N	N
8	3	1986	18	1.015	N	N
11	3	1986	1	0.895	Y	N
11	3	1986	2	0.767	N	N
11	3	1986	3	0.71	Y	N
11	3	1986	4	0.834	N	N
11	3	1986	5	0.739	Y	N
11	3	1986	6	0.875	N	N
11	3	1986	7	0.79	Y	N
11	3	1986	8	0.82	N	N
11	3	1986	9	0.765	N	N
11	3	1986	10	0.857	N	N
11	3	1986	17	0.753	N	N
11	3	1986	18	0.785	Y	N
12	3	1986	1	0.976	N	N
12	3	1986	2		N	N
12	3	1986	3	0.893	N	N
12	3	1986	4		N	N
12	3	1986	5	1.027	N	N
12	3	1986	6		N	N
12	3	1986	7	0.96	N	N
12	3	1986	8		N	N
12	3	1986	9		N	N
12	3	1986	10		N	N
12	3	1986	17		Y	N
12	3	1986	18	0.85	N	N
14	3	1986	1	0.92	N	N
14	3	1986	2	0.699	Y	N
14	3	1986	3	0.81	N	N
14	3	1986	4	0.783	N	N
14	3	1986	5	0.969	N	N
14	3	1986	6	0.825	N	N
14	3	1986	7	0.91	N	N
14	3	1986	8	0.756	Y	N
14	3	1986	9	0.725	Y	N
14	3	1986	10	0.819	N	N
14	3	1986	17	0.75	N	N
14	3	1986	18	0.737	Y	N
15	3	1986	1		N	N
15	3	1986	2	0.935	N	N
15	3	1986	3		Y	N
15	3	1986	4		Y	N
15	3	1986	5		N	N
15	3	1986	6		Y	N
15	3	1986	7		Y	N
15	3	1986	8	1.073	N	N
15	3	1986	9	1.021	N	N
15	3	1986	10		Y	N
15	3	1986	17		Y	N
15	3	1986	18	0.862	N	N
18	3	1986	1	0.831	Y	N
18	3	1986	2	0.872	N	N
18	3	1986	3	0.719	Y	N
18	3	1986	4	0.936	N	N
18	3	1986	5	0.865	N	N
18	3	1986	6	0.854	Y	N
18	3	1986	7	0.875	Y	N
18	3	1986	8	1.033	N	N
18	3	1986	9	0.925	N	N
18	3	1986	10	0.944	N	N
18	3	1986	17	0.69	Y	N
18	3	1986	18	0.759	Y	N
19	3	1986	1	0.874	N	N
19	3	1986	2		N	N
19	3	1986	3	0.749	Y	N
19	3	1986	4		N	N
19	3	1986	5		N	N
19	3	1986	6	0.908	N	N
19	3	1986	7	0.893	N	N
19	3	1986	8		N	N
19	3	1986	9		N	N
19	3	1986	10		N	N
19	3	1986	17	0.725	N	N
19	3	1986	18	0.801	N	N
21	3	1986	1	0.838	Y	N
21	3	1986	2	0.797	N	N
21	3	1986	3	0.802	N	N
21	3	1986	4	0.88	N	N
21	3	1986	5	0.801	N	N
21	3	1986	6	0.874	N	N
21	3	1986	7	0.851	N	N
21	3	1986	8	1.01	N	N
21	3	1986	9	0.879	N	N
21	3	1986	10	0.905	N	N
21	3	1986	17	0.694	Y	N
21	3	1986	18	0.703	Y	N
22	3	1986	1	0.851	N	N
22	3	1986	2		N	N
22	3	1986	3		N	N
22	3	1986	4		N	N
22	3	1986	5		N	N
22	3	1986	6		N	N
22	3	1986	7		N	N
22	3	1986	8		N	N
22	3	1986	9		N	N
22	3	1986	10		N	N
22	3	1986	17	0.706	Y	N
22	3	1986	18	0.704	Y	N
23	3	1986	1		Y	N
23	3	1986	2		N	N
23	3	1986	3		Y	N
23	3	1986	4		N	N
23	3	1986	5		Y	N
23	3	1986	6		Y	N
23	3	1986	7		Y	N
23	3	1986	8		N	N
23	3	1986	9		N	N
23	3	1986	10		N	N
23	3	1986	17	0.752	N	N
23	3	1986	18	0.776	N	N
25	3	1986	1	0.83	N	N
25	3	1986	2	0.685	N	N
25	3	1986	3	0.743	N	N
25	3	1986	4	0.787	N	N
25	3	1986	5	0.86	N	N
25	3	1986	6	0.965	N	N
25	3	1986	7	0.665	N	N
25	3	1986	8	0.898	N	N
25	3	1986	9	0.895	Y	N
25	3	1986	10	0.835	N	N
25	3	1986	17	0.708	N	N
25	3	1986	18	0.692	N	N
26	3	1986	1		N	N
26	3	1986	2		N	N
26	3	1986	3		N	N

Table 2. Daily Pond Measurements. Gualaca, Panama, Cycle III, Dry Season

DAY	MONTH	YEAR	POND#	DEPTH	INFLOW	OVERFLOW
26	3	1986	4		N	N
26	3	1986	5		N	N
26	3	1986	6		N	N
26	3	1986	7		N	N
26	3	1986	8		N	N
26	3	1986	9	0.952	N	N
26	3	1986	10		Y	N
26	3	1986	17		N	N
26	3	1986	18		N	N
30	3	1986	1		N	N
30	3	1986	2		Y	N
30	3	1986	3		Y	N
30	3	1986	4		N	N
30	3	1986	5		N	N
30	3	1986	6		N	N
30	3	1986	7		Y	N
30	3	1986	8		N	N
30	3	1986	9		N	N
30	3	1986	10	1.05	N	N
30	3	1986	17		N	N
30	3	1986	18		Y	N
1	4	1986	1	0.721	Y	N
1	4	1986	2	0.717	N	N
1	4	1986	3	0.758	N	N
1	4	1986	4	0.681	Y	N
1	4	1986	5	0.729	Y	N
1	4	1986	6	0.841	N	N
1	4	1986	7	0.86	N	N
1	4	1986	8	0.765	Y	N
1	4	1986	9	0.902	N	N
1	4	1986	10	1.042	N	N
1	4	1986	17	0.655	Y	N
1	4	1986	18	0.771	N	N
2	4	1986	1	0.92	N	N
2	4	1986	2		Y	N
2	4	1986	3	0.732	Y	N
2	4	1986	4	0.83	N	N
2	4	1986	5		Y	N
2	4	1986	6	0.826	Y	N
2	4	1986	7	0.841	N	N
2	4	1986	8		Y	N
2	4	1986	9	0.891	N	N
2	4	1986	10	1.029	N	N
2	4	1986	17	0.765	Y	N
2	4	1986	18	0.736	Y	N
3	4	1986	1	0.914	N	N
3	4	1986	2	0.806	N	N
3	4	1986	3	0.963	N	N
3	4	1986	4	0.826	N	N
3	4	1986	5	1.219	N	N
3	4	1986	6	1.287	N	N
3	4	1986	7	0.835	N	N
3	4	1986	8		Y	N
3	4	1986	9	0.89	N	N
3	4	1986	10	1.027	N	N
3	4	1986	17	0.881	N	N
3	4	1986	18	1.33	N	N
4	4	1986	1	0.948	N	N
4	4	1986	2	1.121	N	N
4	4	1986	3	0.982	N	N
4	4	1986	4	0.867	N	N
4	4	1986	5	1.223	N	N
4	4	1986	6	1.29	N	N
4	4	1986	7	0.874	N	N
4	4	1986	8	1.168	N	N
4	4	1986	9	0.939	N	N
4	4	1986	10	1.111	N	N
4	4	1986	17	0.918	N	N
4	4	1986	18	1.224	N	N
8	4	1986	1	0.875	N	N
8	4	1986	2	0.737	Y	N
8	4	1986	3	0.845	N	N
8	4	1986	4	0.81	N	N
8	4	1986	5	1.113	N	N
8	4	1986	6	1.185	N	N
8	4	1986	7		Y	N
8	4	1986	8	1.03	N	N
8	4	1986	9	0.888	N	N
8	4	1986	10	1.014	N	N
8	4	1986	17	0.846	Y	N
8	4	1986	18	0.933	N	N
9	4	1986	1	0.857	Y	N
9	4	1986	2	0.847	N	N
9	4	1986	3	0.815	Y	N
9	4	1986	4	0.985	N	N
9	4	1986	5	1.089	N	N
9	4	1986	6	1.16	N	N
9	4	1986	7	1.008	N	N
9	4	1986	8	1.08	N	N
9	4	1986	9	0.888	N	N
9	4	1986	10	1.001	N	N
9	4	1986	17	1.075	N	N
9	4	1986	18	0.895	N	N
10	4	1986	1	0.978	N	N
10	4	1986	2	0.83	N	N
10	4	1986	3	1.115	N	N
10	4	1986	4	0.971	N	N
10	4	1986	5	1.065	N	N
10	4	1986	6	1.135	N	N
10	4	1986	7	0.991	N	N
10	4	1986	8	1.041	N	N
10	4	1986	9	0.866	N	N
10	4	1986	10	0.992	N	N
10	4	1986	17	1.047	N	N
10	4	1986	18	0.863	N	N
11	4	1986	1	0.957	N	N
11	4	1986	2	0.811	Y	N
11	4	1986	3	1.038	N	N
11	4	1986	4	0.952	N	N
11	4	1986	5	1.044	N	N
11	4	1986	6	1.121	N	N
11	4	1986	7	0.972	N	N
11	4	1986	8	1.024	N	N
11	4	1986	9	0.855	Y	N
11	4	1986	10	0.981	N	N
11	4	1986	17	1.024	N	N
11	4	1986	18	0.834	N	N
12	4	1986	1		N	N
12	4	1986	2	0.865	N	N
12	4	1986	3		N	N
12	4	1986	4		N	N
12	4	1986	5		N	N
12	4	1986	6		N	N
12	4	1986	7		N	N
12	4	1986	8		N	N
12	4	1986	9	0.977	N	N
12	4	1986	10		N	N
12	4	1986	17		N	N
12	4	1986	18		N	N
14	4	1986	1	0.907	N	N
14	4	1986	2	0.826	Y	N
14	4	1986	3	0.986	N	N
14	4	1986	4	0.912	N	N
14	4	1986	5	0.981	N	N
14	4	1986	6	1.064	N	N
14	4	1986	7	0.915	N	N
14	4	1986	8	0.97	N	N
14	4	1986	9	0.949	N	N
14	4	1986	10	0.946	N	N
14	4	1986	17	0.972	N	N
14	4	1986	18	0.754	Y	N
16	4	1986	1	0.924	N	N
16	4	1986	2	0.868	N	N
16	4	1986	3	0.97	N	N
16	4	1986	4	0.93	N	N
16	4	1986	5	0.985	N	N

Table 2. Daily Pond Measurements. Gualaca, Panama, Cycle III, Dry Season

DAY	MONTH	YEAR	POND#	DEPTH	INFLOW	OVERFLOW
16	4	1986	6	1.066	N	N
16	4	1986	7	0.922	N	N
16	4	1986	8	0.983	N	N
16	4	1986	9	0.979	N	N
16	4	1986	10	0.973	N	N
16	4	1986	17	0.988	N	N
16	4	1986	18	1.135	N	N
17	4	1986	1	0.91	N	N
17	4	1986	2	0.852	N	N
17	4	1986	3	0.945	N	N
17	4	1986	4	0.917	N	N
17	4	1986	5	0.968	N	N
17	4	1986	6	1.057	N	N
17	4	1986	7	0.909	N	N
17	4	1986	8	0.97	N	N
17	4	1986	9	0.974	N	N
17	4	1986	10	0.964	N	N
17	4	1986	17	0.976	N	N
17	4	1986	18	1.078	N	N
18	4	1986	1	0.895	N	N
18	4	1986	2	0.833	N	N
18	4	1986	3	0.918	N	N
18	4	1986	4	0.906	N	N
18	4	1986	5	0.951	N	N
18	4	1986	6	1.044	N	N
18	4	1986	7	0.89	N	N
18	4	1986	8	0.955	N	N
18	4	1986	9	0.964	N	N
18	4	1986	10	0.955	N	N
18	4	1986	17	0.964	N	N
18	4	1986	18	1.024	N	N
21	4	1986	1	0.994	N	N
21	4	1986	2	0.92	N	N
21	4	1986	3	0.994	N	N
21	4	1986	4	1.012	N	N
21	4	1986	5	1.049	N	N
21	4	1986	6	1.145	N	N
21	4	1986	7		N	N
21	4	1986	8	1.05	N	N
21	4	1986	9	1.106	N	N
21	4	1986	10	1.09	N	N
21	4	1986	17	1.082	N	N
21	4	1986	18	1.054	N	N
22	4	1986	1	1.015	N	N
22	4	1986	2	0.941	N	N
22	4	1986	3	1.008	N	N
22	4	1986	4	1.038	N	N
22	4	1986	5	1.07	N	N
22	4	1986	6	1.169	N	N
22	4	1986	7	1.026	N	N
22	4	1986	8	1.093	N	N
22	4	1986	9	1.14	N	N
22	4	1986	10	1.122	N	N
22	4	1986	17	1.112	N	N
22	4	1986	18	1.049	N	N
23	4	1986	1	0.994	N	N
23	4	1986	2	0.916	N	N
23	4	1986	3	0.98	N	N
23	4	1986	4	1.023	N	N
23	4	1986	5	1.051	N	N
23	4	1986	6	1.151	N	N
23	4	1986	7	1.006	N	N
23	4	1986	8	1.075	N	N
23	4	1986	9	1.122	N	N
23	4	1986	10	1.098	N	N
23	4	1986	17	1.085	N	N
23	4	1986	18	1.006	N	N
24	4	1986	1	0.976	N	N
24	4	1986	2	0.896	N	N
24	4	1986	3	0.953	N	N
24	4	1986	4	1.008	N	N
24	4	1986	5	1.033	N	N
24	4	1986	6	1.132	N	N
24	4	1986	7	0.986	N	N
24	4	1986	8	1.06	N	N
24	4	1986	9	1.107	N	N
24	4	1986	10	1.096	N	N
24	4	1986	17	1.068	N	N
24	4	1986	18	0.973	N	N
25	4	1986	1	0.955	N	N
25	4	1986	2	0.87	N	N
25	4	1986	3	0.925	N	N
25	4	1986	4	0.99	N	N
25	4	1986	5	1.008	N	N
25	4	1986	6	1.1	N	N
25	4	1986	7	0.965	N	N
25	4	1986	8	1.042	N	N
25	4	1986	9	1.075	N	N
25	4	1986	10	1.08	N	N
25	4	1986	17	1.05	N	N
25	4	1986	18	0.94	N	N
28	4	1986	1	0.906	N	N
28	4	1986	2	0.813	N	N
28	4	1986	3	0.856	N	N
28	4	1986	4	0.947	N	N
28	4	1986	5	0.954	N	N
28	4	1986	6	1.056	N	N
28	4	1986	7	0.906	N	N
28	4	1986	8	0.992	N	N
28	4	1986	9	1.051	N	N
28	4	1986	10	1.048	N	N
28	4	1986	17	1.006	N	N
28	4	1986	18		N	N
29	4	1986	1	0.89	N	N
29	4	1986	2	0.793	N	N
29	4	1986	3	0.834	N	N
29	4	1986	4	0.932	N	N
29	4	1986	5	0.939	N	N
29	4	1986	6	1.042	N	N
29	4	1986	7	0.886	N	N
29	4	1986	8	0.975	N	N
29	4	1986	9	1.04	N	N
29	4	1986	10	1.036	N	N
29	4	1986	17	0.992	N	N
29	4	1986	18		Y	N
1	5	1986	1	0.858	N	N
1	5	1986	2	0.755	Y	N
1	5	1986	3	0.79	Y	N
1	5	1986	4	0.903	N	N
1	5	1986	5	0.903	N	N
1	5	1986	6	1.008	N	N
1	5	1986	7	0.849	Y	N
1	5	1986	8	0.944	N	N
1	5	1986	9	1.016	N	N
1	5	1986	10	1.017	N	N
1	5	1986	17	0.966	N	N
1	5	1986	18	0.759	Y	N
2	5	1986	1	0.842	N	N
2	5	1986	2	0.768	N	N
2	5	1986	3	0.807	N	N
2	5	1986	4	0.892	N	N
2	5	1986	5	0.885	N	N
2	5	1986	6	0.991	N	N
2	5	1986	7	0.854	N	N
2	5	1986	8	0.927	N	N
2	5	1986	9	1.003	N	N
2	5	1986	10	0.999	N	N
2	5	1986	17	0.954	N	N
2	5	1986	18	0.775	N	N
5	5	1986	1	0.803	N	N
5	5	1986	2	0.72	N	N
5	5	1986	3	0.75	N	N
5	5	1986	4	0.857	N	N
5	5	1986	5	0.845	N	N
5	5	1986	6	0.939	N	N
5	5	1986	7	0.805	N	N

Table 2. Daily Pond Measurements. Gualaca, Panama, Cycle III, Dry Season

DAY	MONTH	YEAR	POND#	DEPTH	INFLOW	OVERFLOW
5	5	1986	8	0.886	N	N
5	5	1986	9	0.973	N	N
5	5	1986	10	1.47	N	N
5	5	1986	17	0.922	N	N
5	5	1986	18		N	N
6	5	1986	1	0.791	Y	N
6	5	1986	2	0.706	Y	N
6	5	1986	3	0.735	Y	N
6	5	1986	4	0.846	N	N
6	5	1986	5	0.83	N	N
6	5	1986	6	0.935	N	N
6	5	1986	7	0.792	Y	N
6	5	1986	8	0.874	N	N
6	5	1986	9	0.963	N	N
6	5	1986	10	0.961	N	N
6	5	1986	17	0.913	N	N
6	5	1986	18	0.682	Y	N
7	5	1986	1	1.136	N	N
7	5	1986	2	0.96	N	N
7	5	1986	3	0.963	N	N
7	5	1986	4	0.836	N	N
7	5	1986	5	0.816	Y	N
7	5	1986	6	0.923	N	N
7	5	1986	7	0.802	N	N
7	5	1986	8	0.862	N	N
7	5	1986	9	0.956	N	N
7	5	1986	10	0.95	N	N
7	5	1986	17	0.903	N	N
7	5	1986	18	0.973	N	N
8	5	1986	1	1.158	N	N
8	5	1986	2	0.991	N	N
8	5	1986	3	0.998	N	N
8	5	1986	4	0.884	N	N
8	5	1986	5	0.996	N	N
8	5	1986	6	0.972	N	N
8	5	1986	7	0.85	N	N
8	5	1986	8	0.912	N	N
8	5	1986	9	1.015	N	N
8	5	1986	10	1.003	N	N
8	5	1986	17	0.955	N	N
8	5	1986	18	0.99	N	N
9	5	1986	1	1.106	N	N
9	5	1986	2	0.978	N	N
9	5	1986	3	0.984	N	N
9	5	1986	4	0.882	N	N
9	5	1986	5	0.989	N	N
9	5	1986	6	0.966	N	N
9	5	1986	7	0.845	N	N
9	5	1986	8	0.907	N	N
9	5	1986	9	1.012	N	N
9	5	1986	10	1.002	N	N
9	5	1986	17	0.954	N	N
9	5	1986	18	0.965	N	N
12	5	1986	1	1.143	N	N
12	5	1986	2	1.006	N	N
12	5	1986	3	1.014	N	N
12	5	1986	4	0.948	N	N
12	5	1986	5	1.036	N	N
12	5	1986	6	1.021	N	N
12	5	1986	7	0.898	N	N
12	5	1986	8	0.968	N	N
12	5	1986	9	1.083	N	N
12	5	1986	10	1.068	N	N
12	5	1986	17	1.031	N	N
12	5	1986	18	0.966	N	N
13	5	1986	1	1.119	N	N
13	5	1986	2	0.985	N	N
13	5	1986	3	0.996	N	N
13	5	1986	4	0.936	N	N
13	5	1986	5	1.023	N	N
13	5	1986	6	1.011	N	N
13	5	1986	7	0.886	N	N
13	5	1986	8	0.958	N	N
13	5	1986	9	1.076	N	N
13	5	1986	10	1.056	N	N
13	5	1986	17	1.025	N	N
13	5	1986	18	0.941	N	N
14	5	1986	1	1.097	N	N
14	5	1986	2	0.965	N	N
14	5	1986	3	0.976	N	N
14	5	1986	4	0.93	N	N
14	5	1986	5	1.009	N	N
14	5	1986	6	1.001	N	N
14	5	1986	7	0.872	N	N
14	5	1986	8	0.92	N	N
14	5	1986	9	1.065	N	N
14	5	1986	10	1.055	N	N
14	5	1986	17	1.014	N	N
14	5	1986	18	0.916	N	N
15	5	1986	1	1.076	N	N
15	5	1986	2	0.945	N	N
15	5	1986	3	0.956	N	N
15	5	1986	4	0.919	N	N
15	5	1986	5	0.993	N	N
15	5	1986	6	0.987	N	N
15	5	1986	7	0.858	N	N
15	5	1986	8	0.884	N	N
15	5	1986	9	1.061	N	N
15	5	1986	10	1.044	N	N
15	5	1986	17	1.002	N	N
15	5	1986	18	0.891	N	N
16	5	1986	1	1.056	N	N
16	5	1986	2	0.925	N	N
16	5	1986	3	0.935	N	N
16	5	1986	4	0.905	N	N
16	5	1986	5	0.979	N	N
16	5	1986	6	0.974	N	N
16	5	1986	7	0.844	N	N
16	5	1986	8	0.841	N	N
16	5	1986	9	1.053	N	N
16	5	1986	10	1.036	N	N
16	5	1986	17	0.991	N	N
16	5	1986	18	0.866	N	N
19	5	1986	1	1.017	N	N
19	5	1986	2	0.905	N	N
19	5	1986	3	0.896	N	N
19	5	1986	4	0.887	N	N
19	5	1986	5	0.95	N	N
19	5	1986	6	0.95	N	N
19	5	1986	7	0.812	N	N
19	5	1986	8	0.897	N	N
19	5	1986	9	1.039	N	N
19	5	1986	10	1.021	N	N
19	5	1986	17	0.976	N	N
19	5	1986	18	0.814	N	N
20	5	1986	1		N	N
20	5	1986	2	0.865	N	N
20	5	1986	3	0.88	N	N
20	5	1986	4	0.877	N	N
20	5	1986	5	0.934	N	N
20	5	1986	6	0.936	N	N
20	5	1986	7	0.797	Y	N
20	5	1986	8	0.884	N	N
20	5	1986	9	1.029	N	N
20	5	1986	10	1.012	N	N
20	5	1986	17	0.962	N	N
20	5	1986	18	0.791	Y	N
21	5	1986	1	0.99	N	N
21	5	1986	2	0.857	N	N
21	5	1986	3	0.871	N	N
21	5	1986	4	0.876	N	N
21	5	1986	5	0.928	N	N
21	5	1986	6	0.93	N	N
21	5	1986	7	0.921	N	N
21	5	1986	8	0.93	N	N
21	5	1986	9	1.03	N	N

Table 2. Daily Pond Measurements. Gualaca, Panama, Cycle III, Dry Season

DAY	MONTH	YEAR	POND#	DEPTH	INFLOW	OVERFLOW	DEAD#	SPECIES
21	5	1986	10	1.01	N	N		
21	5	1986	17	0.963	N	N		
21	5	1986	18	1.158	N	N		
22	5	1986	1	0.995	N	N		
22	5	1986	2	0.861	Y	N		
22	5	1986	3	0.878	N	N		
22	5	1986	4	0.889	N	N		
22	5	1986	5	0.939	N	N		
22	5	1986	6	0.944	N	N		
22	5	1986	7	0.931	N	N		
22	5	1986	8	0.893	N	N		
22	5	1986	9	1.045	N	N		
22	5	1986	10	1.037	N	N		
22	5	1986	17	0.985	N	N		
22	5	1986	18	1.111	N	N		
23	5	1986	1	1.074	N	N		
23	5	1986	2	1.061	N	N		
23	5	1986	3	0.959	N	N		
23	5	1986	4	0.975	N	N		
23	5	1986	5	1.019	N	N		
23	5	1986	6	1.027	N	N		
23	5	1986	7	1.013	N	N		
23	5	1986	8	0.981	N	N		
23	5	1986	9	1.137	N	N		
23	5	1986	10	0.697	N	N		
23	5	1986	17	1.081	N	N		
23	5	1986	18	1.138	N	N		
26	5	1986	1	1.068	N	N		
26	5	1986	2	1.142	N	N		
26	5	1986	3	1.071	N	N		
26	5	1986	4	1.102	N	N		
26	5	1986	5	1.141	N	N		
26	5	1986	6	1.155	N	N		
26	5	1986	7	1.141	N	N		
26	5	1986	8	1.121	N	N		
26	5	1986	9	1.235	N	Y		
26	5	1986	10	1.283	N	N		
26	5	1986	17	1.095	N	N		
26	5	1986	18	1.116	N	N		
27	5	1986	1	1.221	N	N		
27	5	1986	2	1.196	N			
27	5	1986	3	1.129	N	N		
27	5	1986	4	1.171	N	Y		
27	5	1986	5	1.21	N	N		
27	5	1986	6	1.226	N	N		
27	5	1986	7	1.211	N	N		
27	5	1986	8	1.178	N	Y		
27	5	1986	9		N	Y		
27	5	1986	10	1.362	N	N	1	NIL
27	5	1986	17	1.245	N	N		
27	5	1986	18	1.155	N	N		
28	5	1986	1	1.203	N	N		
28	5	1986	2	1.177	N	N		
28	5	1986	3	1.12	N	N		
28	5	1986	4		N	Y		
28	5	1986	5	1.207	N	N		
28	5	1986	6	1.216	N	N		
28	5	1986	7	1.206	N	N		
28	5	1986	8	1.174	N	Y		
28	5	1986	9		N	Y		
28	5	1986	10	1.361	N	N		
28	5	1986	17	1.191	N	N		
28	5	1986	18	1.119	N	N		
29	5	1986	1	1.176	N	N		
29	5	1986	2	1.149	N	N		
29	5	1986	3	1.092	N	N		
29	5	1986	4	1.15	N	N		
29	5	1986	5	1.191	N	N		
29	5	1986	6	1.21	N	N		
29	5	1986	7	1.189	N	N		
29	5	1986	8	1.16	N	N		
29	5	1986	9	1.226	N	N		
29	5	1986	10	1.342	N	N		
29	5	1986	17	1.163	N	N		
29	5	1986	18	1.073	N	N		
30	5	1986	1	1.15	N	N		
30	5	1986	2	1.121	N	N		
30	5	1986	3	1.07	N	N		
30	5	1986	4	1.136	N	N		
30	5	1986	5	0.971	N	N		
30	5	1986	6	1.193	N	N		
30	5	1986	7	1.168	N	N		
30	5	1986	8	1.142	N	N		
30	5	1986	9	1.217	N	N		
30	5	1986	10	1.328	N	N		
30	5	1986	17	1.142	N	N		
30	5	1986	18	1.049	N	N		
2	6	1986	1	1.086	N	N		
2	6	1986	2	1.051	N	N		
2	6	1986	3	1.015	N	N		
2	6	1986	4	1.095	N	N		
2	6	1986	5	1.128	N	N		
2	6	1986	6	1.145	N	N		
2	6	1986	7	1.109	N	N		
2	6	1986	8	1.1	N	N		
2	6	1986	9	1.185	N	N		
2	6	1986	10	1.288	N	N		
2	6	1986	17	1.078	N	N		
2	6	1986	18	0.971	N	N		
3	6	1986	1	1.065	N	N		
3	6	1986	2	1.03	N	N		
3	6	1986	3	0.994	N	N		
3	6	1986	4	1.085	N	N		
3	6	1986	5	1.112	N	N		
3	6	1986	6	1.129	N	N		
3	6	1986	7	1.087	N	N		
3	6	1986	8	1.086	N	N		
3	6	1986	9	1.178	N	N		
3	6	1986	10	1.271	N	N		
3	6	1986	17	1.055	N	N		
3	6	1986	18	0.948	N	N		
4	6	1986	1	1.053	N	N		
4	6	1986	2	1.012	N	N		
4	6	1986	3	0.98	N	N		
4	6	1986	4	1.075	N	N		
4	6	1986	5	1.102	N	N		
4	6	1986	6	1.118	N	N		
4	6	1986	7	1.072	N	N		
4	6	1986	8	1.075	N	N		
4	6	1986	9	1.17	N	N		
4	6	1986	10	1.264	N	N		
4	6	1986	17	1.041	N	N		
4	6	1986	18	0.926	N	N		
5	6	1986	1	1.037	N	N		
5	6	1986	2	0.993	N	N		
5	6	1986	3	0.991	N	N		
5	6	1986	4	1.065	N	N		
5	6	1986	5	1.09	N	N		
5	6	1986	6	1.105	N	N		
5	6	1986	7	1.06	N	N		
5	6	1986	8	1.061	N	N		
5	6	1986	9	1.161	N	N		
5	6	1986	10	1.248	N	N		
5	6	1986	17	1.031	N	N		
5	6	1986	18	0.916	N	N		
6	6	1986	1	1.023	N	N		
6	6	1986	2	0.975	N	N		
6	6	1986	3	0.946	N	N		
6	6	1986	4	1.066	N	N		
6	6	1986	5	1.08	N	N		
6	6	1986	6	1.091	N	N		
6	6	1986	7	1.044	N	N		
6	6	1986	8	1.052	N	N		
6	6	1986	9	1.151	N	N		
6	6	1986	10	1.24	N	N		
6	6	1986	17	1.016	N	N		

Table 2. Daily Pond Measurements. Gualaca, Panama, Cycle III, Dry Season

DAY	MONTH	YEAR	POND#	DEPTH	INFLOW	OVERFLOW	DEAD#	SPECIES
6	6	1986	18	0.886	N	N		
9	6	1986	1	1.149	N	N		
9	6	1986	2	1.092	N	N		
9	6	1986	3	1.064	N	N		
9	6	1986	4	1.157	N	N		
9	6	1986	5	1.208	N	N	1	NIL
9	6	1986	6	1.229	N	N		
9	6	1986	7	1.18	N	N		
9	6	1986	8	1.16	N	N		
9	6	1986	9	1.23	N	Y		
9	6	1986	10	1.383	N	N		
9	6	1986	17	1.135	N	N	1	NIL
9	6	1986	18	1.011	N	N		
10	6	1986	1	1.129	N	N		
10	6	1986	2	1.072	N	N		
10	6	1986	3	1.06	N	N		
10	6	1986	4	1.143	N	N		
10	6	1986	5	1.202	N	N		
10	6	1986	6	1.212	N	N		
10	6	1986	7	1.163	N	N		
10	6	1986	8	1.146	N	N		
10	6	1986	9	1.221	N	N		
10	6	1986	10	1.365	N	N		
10	6	1986	17	1.113	N	N		
10	6	1986	18	0.987	N	N		
11	6	1986	1	1.11	N	N		
11	6	1986	2	1.052	N	N		
11	6	1986	3	1.036	N	N		
11	6	1986	4	1.134	N	N		
11	6	1986	5	1.192	N	N		
11	6	1986	6	1.195	N	N		
11	6	1986	7	1.143	N	N		
11	6	1986	8	1.132	N	N		
11	6	1986	9	1.208	N	N		
11	6	1986	10	1.345	N	N		
11	6	1986	17	1.075	N	N		
11	6	1986	18	0.965	N	N		
12	6	1986	1	1.095	N	N		
12	6	1986	2	1.034	N	N		
12	6	1986	3	1.019	N	N		
12	6	1986	4	1.125	N	N		
12	6	1986	5	1.17	N	N		
12	6	1986	6	1.183	N	N		
12	6	1986	7	1.127	N	N		
12	6	1986	8	1.12	N	N		
12	6	1986	9	1.201	N	N		
12	6	1986	10	1.332	N	N		
12	6	1986	17	1.056	N	N		
12	6	1986	18	0.946	N	N		
13	6	1986	1	1.139	N	N		
13	6	1986	2	1.064	N	N		
13	6	1986	3	1.055	N	N		
13	6	1986	4	1.161	N	N		
13	6	1986	5	1.218	N	N		
13	6	1986	6	1.216	N	N		
13	6	1986	7	1.15	N	N		
13	6	1986	8	1.158	N	N		
13	6	1986	9	1.238	N	N		
13	6	1986	10	1.382	N	N		
13	6	1986	17	1.207	N	N		
13	6	1986	18	0.989	N	N		
16	6	1986	1	1.086	N	N		
16	6	1986	2	1.018	N	N		
16	6	1986	3	1.029	N	N		
16	6	1986	4	1.14	N	N		
16	6	1986	5	1.187	N	N		
16	6	1986	6	1.178	N	N		
16	6	1986	7	1.114	N	N		
16	6	1986	8	1.126	N	N		
16	6	1986	9	1.217	N	N		
16	6	1986	10		N	N		
16	6	1986	17	1.076	N	N		
16	6	1986	18	0.926	N	N		
17	6	1986	1	1.066	N	N		
17	6	1986	2	0.998	N	N		
17	6	1986	3	0.989	N	N		
17	6	1986	4	1.126	N	N		
17	6	1986	5	1.173	N	N		
17	6	1986	6	1.161	N	N		
17	6	1986	7	1.095	N	N		
17	6	1986	8	1.11	N	N		
17	6	1986	9	1.198	N	N		
17	6	1986	10	1.321	N	N		
17	6	1986	17	1.055	N	N		
17	6	1986	18	0.903	N	N		
20	6	1986	1	1.031	N	N		
20	6	1986	2	0.961	N	N		
20	6	1986	3	0.954	N	N		
20	6	1986	4	1.109	N	N		
20	6	1986	5	1.151	N	N		
20	6	1986	6	1.13	N	N		
20	6	1986	7	1.052	N	N		
20	6	1986	8	1.082	N	N		
20	6	1986	9	1.191	N	N		
20	6	1986	10	1.298	N	N		
20	6	1986	17	0.961	N	N		
20	6	1986	18	0.858	N	N		
23	6	1986	1	1.187	N	N		
23	6	1986	2	1.215	N	N		
23	6	1986	3	1.112	N	N		
23	6	1986	4	1.168	N	Y		
23	6	1986	5	1.236	N	Y		
23	6	1986	6	1.295	N	Y		
23	6	1986	7	1.226	N	N		
23	6	1986	8	1.173	N	Y		
23	6	1986	9	1.241	N	Y	2	NIL
23	6	1986	10	1.321	N	Y		
23	6	1986	17	1.215	N	N	1	NIL
23	6	1986	18	1.021	N	N		

Table 2. Daily Pond Measurements. Gualaca, Panama, Cycle III, Wet Season

DAY	MONTH	YEAR	POND#	DEPTH	INFLOW	OVERFLOW
28	7	1986	1	1.1	N	N
28	7	1986	2	1.017	N	N
28	7	1986	3	0.995	N	N
28	7	1986	4	0.89	N	N
28	7	1986	5	0.876	N	N
28	7	1986	6	1.105	N	N
28	7	1986	7	1.08	N	N
28	7	1986	8	0.827	N	N
28	7	1986	9	0.65	N	N
28	7	1986	10	1.245	N	N
28	7	1986	17	0.986	N	N
28	7	1986	18	0.864	N	N
29	7	1986	1	1.076	N	N
29	7	1986	2	1.004	N	N
29	7	1986	3	0.981	N	N
29	7	1986	4	0.983	N	N
29	7	1986	5	0.96	N	N
29	7	1986	6	1.09	N	N
29	7	1986	7	1.062	N	N
29	7	1986	8	0.803	N	N
29	7	1986	9	0.65	N	N
29	7	1986	10	1.155	N	N
29	7	1986	17	0.967	N	N
29	7	1986	18	0.831	N	N
30	7	1986	1	0.65	N	N
30	7	1986	2	0.65	N	N
30	7	1986	3	0.65	N	N
30	7	1986	4	0.65	N	N
30	7	1986	5	0.65	N	N
30	7	1986	6	0.65	N	N
30	7	1986	7	0.65	N	N
30	7	1986	8	0.778	N	N
30	7	1986	9	0.65	N	N
30	7	1986	10	0.65	N	N
30	7	1986	17	0.65	N	N
30	7	1986	18	0.8	N	N
31	7	1986	1	1.044	N	N
31	7	1986	2	0.974	N	N
31	7	1986	3	0.953	N	N
31	7	1986	4	0.962	N	N
31	7	1986	5	0.907	N	N
31	7	1986	6	1.075	N	N
31	7	1986	7	1.043	N	N
31	7	1986	8	0.961	Y	N
31	7	1986	9	0.942	Y	N
31	7	1986	10	1.131	N	N
31	7	1986	17	0.932	N	N
31	7	1986	18	0.888	Y	N
1	8	1986	1	1.03	N	N
1	8	1986	2	0.965	N	N
1	8	1986	3	0.944	N	N
1	8	1986	4	0.961	N	N
1	8	1986	5	0.893	N	N
1	8	1986	6	1.065	N	N
1	8	1986	7	1.033	N	N
1	8	1986	8	1.007	N	N
1	8	1986	9	0.942	N	N
1	8	1986	10	1.117	N	N
1	8	1986	17	0.922	N	N
1	8	1986	18	0.861	N	N
4	8	1986	1	0.963	N	N
4	8	1986	2	0.906	N	N
4	8	1986	3	0.887	N	N
4	8	1986	4	0.921	N	N
4	8	1986	5	0.829	N	N
4	8	1986	6	1.021	N	N
4	8	1986	7	0.98	N	N
4	8	1986	8	0.85	N	N
4	8	1986	9	0.909	N	N
4	8	1986	10	1.083	N	N
4	8	1986	17	0.865	N	N
4	8	1986	18	0.753	N	N
5	8	1986	1	0.906	Y	N
5	8	1986	2	0.884	Y	N
5	8	1986	3	0.907	Y	N
5	8	1986	4	0.952	Y	N
5	8	1986	5	0.812	Y	N
5	8	1986	6	1.033	Y	N
5	8	1986	7	0.964	Y	N
5	8	1986	8	0.828	Y	N
5	8	1986	9	1.08	Y	N
5	8	1986	10	1.044	Y	N
5	8	1986	17	1.049	Y	N
5	8	1986	18	0.708	Y	N
6	8	1986	1	0.65	N	N
6	8	1986	2	0.65	N	N
6	8	1986	3	0.65	N	N
6	8	1986	4	0.65	N	N
6	8	1986	5	0.796	N	N
6	8	1986	6	0.65	N	N
6	8	1986	7	0.65	N	N
6	8	1986	8	0.808	N	N
6	8	1986	9	0.65	N	N
6	8	1986	10	0.65	N	N
6	8	1986	17	0.65	N	N
6	8	1986	18	0.65	N	N
7	8	1986	1	0.825	N	N
7	8	1986	2	0.855	N	N
7	8	1986	3	0.878	N	N
7	8	1986	4	0.934	N	N
7	8	1986	5	1.086	Y	N
7	8	1986	6	1.006	N	N
7	8	1986	7	0.934	N	N
7	8	1986	8	1.04	Y	N
7	8	1986	9	1.071	N	N
7	8	1986	10	1.014	N	N
7	8	1986	17	1.035	N	N
7	8	1986	18	0.83	Y	N
8	8	1986	1	0.832	N	N
8	8	1986	2	0.861	N	N
8	8	1986	3	0.886	N	N
8	8	1986	4	0.948	N	N
8	8	1986	5	1.091	N	N
8	8	1986	6	1.019	N	N
8	8	1986	7	0.945	N	N
8	8	1986	8	1.031	N	N
8	8	1986	9	1.089	N	N
8	8	1986	10	1.028	N	N
8	8	1986	17	1.041	N	N
8	8	1986	18	0.825	N	N
11	8	1986	1	0.792	N	N
11	8	1986	2	0.818	N	N
11	8	1986	3	0.843	N	N
11	8	1986	4	0.947	N	N
11	8	1986	5	1.042	N	N
11	8	1986	6	0.977	N	N
11	8	1986	7	0.906	N	N
11	8	1986	8	0.924	N	N
11	8	1986	9	1.04	N	N
11	8	1986	10	0.997	N	N
11	8	1986	17	0.943	N	N
11	8	1986	18	0.736	N	N
14	8	1986	1	0.771	N	N
14	8	1986	2	0.795	N	N
14	8	1986	3	0.819	N	N
14	8	1986	4	0.904	N	N
14	8	1986	5	1.008	N	N
14	8	1986	6	0.955	N	N
14	8	1986	7	0.881	N	N
14	8	1986	8	0.861	N	N
14	8	1986	9	1.057	N	N
14	8	1986	10	0.984	N	N
14	8	1986	17	0.843	N	N
14	8	1986	18	0.671	N	N
15	8	1986	1	0.863	Y	N

Table 2. Daily Pond Measurements. Gualaca, Panama, Cycle III, Wet Season

DAY	MONTH	YEAR	POND#	DEPTH	INFLOW	OVERFLOW
15	8	1986	2	0.899	Y	N
15	8	1986	3	1.012	Y	N
15	8	1986	4	0.896	N	N
15	8	1986	5	0.993	N	N
15	8	1986	6	0.949	Y	N
15	8	1986	7	0.87	N	N
15	8	1986	8	0.957	Y	N
15	8	1986	9	1.05	N	N
15	8	1986	10	0.974	N	N
15	8	1986	17	0.827	N	N
15	8	1986	18	0.745	Y	N
18	8	1986	1	0.914	N	N
18	8	1986	2	0.945	N	N
18	8	1986	3	1.061	N	N
18	8	1986	4	0.948	N	N
18	8	1986	5	1.014	N	N
18	8	1986	6	0.998	N	N
18	8	1986	7	0.913	N	N
18	8	1986	8	0.968	N	N
18	8	1986	9	1.112	N	N
18	8	1986	10	1.031	N	N
18	8	1986	17	0.896	N	N
18	8	1986	18	0.758	N	N
20	8	1986	1	0.984	N	N
20	8	1986	2	1.015	N	N
20	8	1986	3	1.121	N	N
20	8	1986	4	1.025	N	N
20	8	1986	5	1.084	N	N
20	8	1986	6	1.068	N	N
20	8	1986	7	0.988	N	N
20	8	1986	8	1.018	N	N
20	8	1986	9	1.206	N	N
20	8	1986	10	1.116	N	N
20	8	1986	17	0.995	N	N
20	8	1986	18	0.81	N	N
21	8	1986	1	0.65	N	N
21	8	1986	2	0.65	N	N
21	8	1986	3	0.65	N	N
21	8	1986	4	0.65	N	N
21	8	1986	5	0.65	N	N
21	8	1986	6	0.65	N	N
21	8	1986	7	0.65	N	N
21	8	1986	8	0.65	N	N
21	8	1986	9	0.65	N	N
21	8	1986	10	0.65	N	N
21	8	1986	17	0.65	N	N
21	8	1986	18	0.977	Y	N
22	8	1986	1	0.986	N	N
22	8	1986	2	1.015	N	N
22	8	1986	3	1.105	N	N
22	8	1986	4	1.04	N	N
22	8	1986	5	1.077	N	N
22	8	1986	6	1.07	N	N
22	8	1986	7	0.996	N	N
22	8	1986	8	1.012	N	N
22	8	1986	9	1.22	N	N
22	8	1986	10	1.13	N	N
22	8	1986	17	1.002	N	N
22	8	1986	18	0.94	N	N
25	8	1986	1	1.063	N	N
25	8	1986	2	1.192	N	N
25	8	1986	3	1.161	N	N
25	8	1986	4	1.122	N	N
25	8	1986	5	1.138	N	N
25	8	1986	6	1.142	N	N
25	8	1986	7	1.071	N	N
25	8	1986	8	1.067	N	N
25	8	1986	9	1.298	N	N
25	8	1986	10	1.227	N	Y
25	8	1986	17	1.104	N	N
25	8	1986	18	0.984	N	N
26	8	1986	1	0.65	N	N
26	8	1986	2	0.65	N	N
26	8	1986	3	0.65	N	N
26	8	1986	4	0.65	N	N
26	8	1986	5	0.65	N	N
26	8	1986	6	0.65	N	N
26	8	1986	7	0.65	N	N
26	8	1986	8	0.65	N	N
26	8	1986	9	1.295	N	Y
26	8	1986	10	0.65	N	N
26	8	1986	17	0.65	N	N
26	8	1986	18	0.65	N	N
27	8	1986	1	1.035	N	N
27	8	1986	2	1.061	N	N
27	8	1986	3	1.13	N	N
27	8	1986	4	1.106	N	N
27	8	1986	5	1.117	N	N
27	8	1986	6	1.124	N	N
27	8	1986	7	1.05	N	N
27	8	1986	8	1.047	N	N
27	8	1986	9	1.286	N	N
27	8	1986	10	1.209	N	N
27	8	1986	17	1.066	N	N
27	8	1986	18	0.915	N	N
28	8	1986	1	1.015	N	N
28	8	1986	2	1.041	N	N
28	8	1986	3	1.106	N	N
28	8	1986	4	1.092	N	N
28	8	1986	5	1.1	N	N
28	8	1986	6	1.105	N	N
28	8	1986	7	1.031	N	N
28	8	1986	8	1.028	N	N
28	8	1986	9	1.271	N	N
28	8	1986	10	1.197	N	N
28	8	1986	17	1.049	N	N
28	8	1986	18	0.65	N	N
1	9	1986	1	1.137	N	N
1	9	1986	2	1.17	N	N
1	9	1986	3	1.217	N	N
1	9	1986	4	1.201	N	Y
1	9	1986	5	1.22	N	N
1	9	1986	6	1.252	N	N
1	9	1986	7	1.186	N	N
1	9	1986	8	1.171	N	N
1	9	1986	9	1.295	N	Y
1	9	1986	10	1.368	N	N
1	9	1986	17	1.192	N	N
1	9	1986	18	0.986	N	N
2	9	1986	1	1.122	N	N
2	9	1986	2	1.162	N	N
2	9	1986	3	1.202	N	N
2	9	1986	4	1.201	N	Y
2	9	1986	5	1.222	N	Y
2	9	1986	6	1.238	N	N
2	9	1986	7	1.173	N	N
2	9	1986	8	1.162	N	N
2	9	1986	9	1.295	N	Y
2	9	1986	10	1.353	N	N
2	9	1986	17	1.171	N	N
2	9	1986	18	0.964	N	N
4	9	1986	1	1.299	N	N
4	9	1986	2	1.254	N	Y
4	9	1986	3	1.231	N	Y
4	9	1986	4	1.203	N	Y
4	9	1986	5	1.222	N	Y
4	9	1986	6	1.325	N	Y
4	9	1986	7	1.306	N	Y
4	9	1986	8	1.179	N	Y
4	9	1986	9	1.305	N	Y
4	9	1986	10	1.38	N	Y
4	9	1986	17	1.288	N	N
4	9	1986	18	1.147	N	N
5	9	1986	1	1.27	N	N
5	9	1986	2	1.244	N	N
5	9	1986	3	1.224	N	Y

Table 2. Daily Pond Measurements. Gualaca, Panama, Cycle III, Wet Season

DAY	MONTH	YEAR	POND#	DEPTH	INFLOW	OVERFLOW
5	9	1986	4	1.201	N	Y
5	9	1986	5	1.22	N	Y
5	9	1986	6	1.319	N	Y
5	9	1986	7	1.304	N	Y
5	9	1986	8	1.179	N	Y
5	9	1986	9	1.295	N	Y
5	9	1986	10	1.38	N	Y
5	9	1986	17	1.264	N	N
5	9	1986	18	1.119	N	N
8	9	1986	1	1.195	N	N
8	9	1986	2	1.191	N	N
8	9	1986	3	1.169	N	N
8	9	1986	4	1.182	N	N
8	9	1986	5	1.191	N	N
8	9	1986	6	1.276	N	N
8	9	1986	7	1.255	N	N
8	9	1986	8	1.141	N	N
8	9	1986	9	1.29	N	N
8	9	1986	10	1.345	N	N
8	9	1986	17	1.182	N	N
8	9	1986	18	1.029	N	N
10	9	1986	1	1.155	N	N
10	9	1986	2	1.152	N	N
10	9	1986	3	1.127	N	N
10	9	1986	4	1.162	N	N
10	9	1986	5	1.164	N	N
10	9	1986	6	1.241	N	N
10	9	1986	7	1.216	N	N
10	9	1986	8	1.111	N	N
10	9	1986	9	1.272	N	N
10	9	1986	10	1.314	N	N
10	9	1986	17	1.14	N	N
10	9	1986	18	0.97	N	N
12	9	1986	1	1.132	N	N
12	9	1986	2	1.128	N	N
12	9	1986	3	1.101	N	N
12	9	1986	4	1.156	N	N
12	9	1986	5	1.148	N	N
12	9	1986	6	1.218	N	N
12	9	1986	7	1.191	N	N
12	9	1986	8	1.09	N	N
12	9	1986	9	1.266	N	N
12	9	1986	10	1.3	N	N
12	9	1986	17	1.119	N	N
12	9	1986	18	0.93	N	N
15	9	1986	1	1.084	N	N
15	9	1986	2	1.078	N	N
15	9	1986	3	1.049	N	N
15	9	1986	4	1.13	N	N
15	9	1986	5	1.111	N	N
15	9	1986	6	1.173	N	N
15	9	1986	7	1.138	N	N
15	9	1986	8	1.045	N	N
15	9	1986	9	1.243	N	N
15	9	1986	10	1.262	N	N
15	9	1986	17	1.07	N	N
15	9	1986	18	0.857	N	N
17	9	1986	1	1.066	N	N
17	9	1986	2	1.051	N	N
17	9	1986	3	1.038	N	N
17	9	1986	4	1.125	N	N
17	9	1986	5	1.092	N	N
17	9	1986	6	1.154	N	N
17	9	1986	7	1.114	N	N
17	9	1986	8	1.039	N	N
17	9	1986	9	1.237	N	N
17	9	1986	10	1.251	N	N
17	9	1986	17	1.067	N	N
17	9	1986	18	0.827	N	N
19	9	1986	1	1.045	N	N
19	9	1986	2	1.034	N	N
19	9	1986	3	1.004	N	N
19	9	1986	4	1.108	N	N
19	9	1986	5	1.066	N	N
19	9	1986	6	1.125	N	N
19	9	1986	7	1.081	N	N
19	9	1986	8	1.008	N	N
19	9	1986	9	1.225	N	N
19	9	1986	10	1.234	N	N
19	9	1986	17	1.038	N	N
19	9	1986	18	0.798	N	N
22	9	1986	1	1.005	N	N
22	9	1986	2	0.988	N	N
22	9	1986	3	0.956	N	N
22	9	1986	4	1.091	N	N
22	9	1986	5	1.039	N	N
22	9	1986	6	1.091	N	N
22	9	1986	7	1.041	N	N
22	9	1986	8	0.959	N	N
22	9	1986	9	1.208	N	N
22	9	1986	10	1.206	N	N
22	9	1986	17	0.996	N	N
22	9	1986	18	0.736	N	N
24	9	1986	1	0.987	N	N
24	9	1986	2	0.961	N	N
24	9	1986	3	0.948	N	N
24	9	1986	4	1.073	N	N
24	9	1986	5	1.021	N	N
24	9	1986	6	1.065	N	N
24	9	1986	7	1.021	N	N
24	9	1986	8	0.938	N	N
24	9	1986	9	1.187	N	N
24	9	1986	10	1.171	N	N
24	9	1986	17	0.984	N	N
24	9	1986	18	0.65	N	N
26	9	1986	1	1.056	N	N
26	9	1986	2	1.034	N	N
26	9	1986	3	1.006	N	N
26	9	1986	4	1.159	N	N
26	9	1986	5	1.088	N	N
26	9	1986	6	1.147	N	N
26	9	1986	7	1.088	N	N
26	9	1986	8	1.01	N	N
26	9	1986	9	1.288	N	N
26	9	1986	10	1.277	N	N
26	9	1986	17	1.075	N	N
26	9	1986	18	1.291	Y	N
29	9	1986	1	1.061	N	N
29	9	1986	2	1.04	N	N
29	9	1986	3	1.015	N	N
29	9	1986	4	1.186	N	N
29	9	1986	5	1.099	N	N
29	9	1986	6	1.16	N	N
29	9	1986	7	1.093	N	N
29	9	1986	8	1.02	N	N
29	9	1986	9	1.295	N	Y
29	9	1986	10	1.305	N	N
29	9	1986	17	1.093	N	N
29	9	1986	18	1.176	N	N
30	9	1986	1	0.65	N	N
30	9	1986	2	0.65	N	N
30	9	1986	3	0.65	N	N
30	9	1986	4	0.65	N	N
30	9	1986	5	0.65	N	N
30	9	1986	6	0.65	N	N
30	9	1986	7	0.65	N	N
30	9	1986	8	0.65	N	N
30	9	1986	9	1.286	N	N
30	9	1986	10	0.65	N	N
30	9	1986	17	0.65	N	N
30	9	1986	18	0.65	N	N
1	10	1986	1	1.063	N	N
1	10	1986	2	1.046	N	N
1	10	1986	3	1.019	N	N
1	10	1986	4	1.203	N	Y
1	10	1986	5	1.095	N	N

Table 2. Daily Pond Measurements. Gualaca, Panama, Cycle III, Wet Season

DAY	MONTH	YEAR	POND#	DEPTH	INFLOW	OVERFLOW
1	10	1986	6	1.156	N	N
1	10	1986	7	1.082	N	N
1	10	1986	8	1.026	N	N
1	10	1986	9	1.301	N	Y
1	10	1986	10	1.373	N	N
1	10	1986	17	1.086	N	N
1	10	1986	18	1.121	N	N
3	10	1986	1	1.076	N	N
3	10	1986	2	1.066	N	N
3	10	1986	3	1.055	N	N
3	10	1986	4	1.185	N	Y
3	10	1986	5	1.133	N	N
3	10	1986	6	1.203	N	N
3	10	1986	7	1.127	N	N
3	10	1986	8	1.065	N	N
3	10	1986	9	1.299	N	Y
3	10	1986	10	1.385	N	N
3	10	1986	17	1.146	N	N
3	10	1986	18	1.136	N	N
6	10	1986	1	1.062	N	N
6	10	1986	2	1.048	N	N
6	10	1986	3	1.026	N	N
6	10	1986	4	1.185	N	N
6	10	1986	5	1.128	N	N
6	10	1986	6	1.184	N	N
6	10	1986	7	1.106	N	N
6	10	1986	8	1.05	N	N
6	10	1986	9	1.296	N	N
6	10	1986	10	1.355	N	N
6	10	1986	17	1.136	N	N
6	10	1986	18	1.082	N	N
9	10	1986	1	1.143	N	N
9	10	1986	2	1.129	N	N
9	10	1986	3	1.108	N	N
9	10	1986	4	1.192	N	N
9	10	1986	5	1.212	N	N
9	10	1986	6	1.284	N	N
9	10	1986	7	1.206	N	N
9	10	1986	8	1.145	N	N
9	10	1986	9	1.3	N	Y
9	10	1986	10	1.38	N	Y
9	10	1986	17	1.244	N	N
9	10	1986	18	1.151	N	N
10	10	1986	1	1.182	N	N
10	10	1986	2	1.171	N	N
10	10	1986	3	1.152	N	N
10	10	1986	4	1.203	N	Y
10	10	1986	5	1.222	N	Y
10	10	1986	6	1.323	N	Y
10	10	1986	7	1.242	N	N
10	10	1986	8	1.175	N	Y
10	10	1986	9	1.298	N	Y
10	10	1986	10	1.38	N	Y
10	10	1986	17	1.289	N	N
10	10	1986	18	1.169	N	N
13	10	1986	1	1.358	N	Y
13	10	1986	2	1.258	N	Y
13	10	1986	3	1.23	N	Y
13	10	1986	4	1.203	N	Y
13	10	1986	5	1.222	N	Y
13	10	1986	6	1.322	N	Y
13	10	1986	7	1.3	N	Y
13	10	1986	8	1.175	N	Y
13	10	1986	9	1.298	N	Y
13	10	1986	10	1.38	N	Y
13	10	1986	17	1.301	N	Y
13	10	1986	18	1.323	N	Y
14	10	1986	1	1.361	N	Y
14	10	1986	2	1.261	N	Y
14	10	1986	3	1.235	N	Y
14	10	1986	4	1.201	N	Y
14	10	1986	5	1.222	N	Y
14	10	1986	6	1.324	N	Y
14	10	1986	7	1.31	N	Y
14	10	1986	8	1.175	N	Y
14	10	1986	9	1.298	N	Y
14	10	1986	10	1.38	N	Y
14	10	1986	17	1.303	N	Y
14	10	1986	18	1.325	N	Y
15	10	1986	1	1.355	N	Y
15	10	1986	2	1.255	N	Y
15	10	1986	3	1.229	N	Y
15	10	1986	4	1.198	N	Y
15	10	1986	5	1.22	N	Y
15	10	1986	6	1.32	N	Y
15	10	1986	7	1.304	N	Y
15	10	1986	8	1.173	N	Y
15	10	1986	9	1.298	N	Y
15	10	1986	10	1.38	N	Y
15	10	1986	17	1.298	N	Y
15	10	1986	18	1.31	N	Y
16	10	1986	1	1.305	N	N
16	10	1986	2	1.213	N	N
16	10	1986	3	1.206	N	N
16	10	1986	4	1.185	N	N
16	10	1986	5	1.204	N	N
16	10	1986	6	1.304	N	N
16	10	1986	7	1.284	N	N
16	10	1986	8	1.161	N	N
16	10	1986	9	1.284	N	N
16	10	1986	10	1.364	N	N
16	10	1986	17	1.279	N	N
16	10	1986	18	1.272	N	N
17	10	1986	1	1.332	N	N
17	10	1986	2	1.258	N	Y
17	10	1986	3	1.23	N	Y
17	10	1986	4	1.203	N	Y
17	10	1986	5	1.222	N	Y
17	10	1986	6	1.322	N	Y
17	10	1986	7	1.3	N	Y
17	10	1986	8	1.175	N	Y
17	10	1986	9	1.298	N	Y
17	10	1986	10	1.38	N	Y
17	10	1986	17	1.301	N	Y
17	10	1986	18	1.29	N	N
20	10	1986	1	1.303	N	N
20	10	1986	2	1.232	N	Y
20	10	1986	3	1.207	N	Y
20	10	1986	4	1.196	N	Y
20	10	1986	5	1.214	N	Y
20	10	1986	6	1.309	N	Y
20	10	1986	7	1.262	N	Y
20	10	1986	8	1.163	N	Y
20	10	1986	9	1.298	N	Y
20	10	1986	10	1.38	N	Y
20	10	1986	17	1.275	N	N
20	10	1986	18	1.253	N	N
21	10	1986	1	1.336	N	N
21	10	1986	2	1.253	N	Y
21	10	1986	3	1.229	N	Y
21	10	1986	4	1.201	N	Y
21	10	1986	5	1.22	N	N
21	10	1986	6	1.321	N	Y
21	10	1986	7	1.302	N	Y
21	10	1986	8	1.175	N	Y
21	10	1986	9	1.298	N	Y
21	10	1986	10	1.38	N	Y
21	10	1986	17	1.294	N	Y
21	10	1986	18	1.292	N	N
22	10	1986	1	1.312	N	N
22	10	1986	2	1.24	N	N
22	10	1986	3	1.215	N	Y
22	10	1986	4	1.189	N	N
22	10	1986	5	1.21	N	N
22	10	1986	6	1.31	N	N
22	10	1986	7	1.293	N	N

Table 2. Daily Pond Measurements. Gualaca, Panama, Cycle III, Wet Season

DAY	MONTH	YEAR	POND#	DEPTH	INFLOW	OVERFLOW
22	10	1986	8	1.158	N	N
22	10	1986	9	1.287	N	Y
22	10	1986	10	1.356	N	Y
22	10	1986	17	1.286	N	N
22	10	1986	18	1.38	N	N
23	10	1986	1	1.319	N	N
23	10	1986	2	1.226	N	N
23	10	1986	3	1.201	N	N
23	10	1986	4	1.184	N	N
23	10	1986	5	1.2	N	N
23	10	1986	6	1.308	N	N
23	10	1986	7	1.279	N	N
23	10	1986	8	1.152	N	N
23	10	1986	9	1.281	N	N
23	10	1986	10	1.356	N	N
23	10	1986	17	1.273	N	N
23	10	1986	18	1.254	N	N
24	10	1986	1	1.307	N	N
24	10	1986	2	1.226	N	N
24	10	1986	3	1.195	N	N
24	10	1986	4	1.186	N	N
24	10	1986	5	1.202	N	N
24	10	1986	6	1.306	N	N
24	10	1986	7	1.274	N	N
24	10	1986	8	1.152	N	N
24	10	1986	9	1.284	N	N
24	10	1986	10	1.358	N	N
24	10	1986	17	1.268	N	N
24	10	1986	18	1.233	N	N
27	10	1986	1	1.346	N	N
27	10	1986	2	1.253	N	N
27	10	1986	3	1.253	N	Y
27	10	1986	4	1.203	N	Y
27	10	1986	5	1.222	N	Y
27	10	1986	6	1.322	N	Y
27	10	1986	7	1.3	N	Y
27	10	1986	8	1.175	N	Y
27	10	1986	9	1.298	N	Y
27	10	1986	10	1.38	N	Y
27	10	1986	17	1.301	N	Y
27	10	1986	18	1.323	N	N
28	10	1986	1	1.351	N	N
28	10	1986	2	1.256	N	Y
28	10	1986	3	1.256	N	Y
28	10	1986	4	1.202	N	Y
28	10	1986	5	1.222	N	Y
28	10	1986	6	1.322	N	Y
28	10	1986	7	1.3	N	Y
28	10	1986	8	1.175	N	Y
28	10	1986	9	1.298	N	Y
28	10	1986	10	1.38	N	Y
28	10	1986	17	1.296	N	Y
28	10	1986	18	1.315	N	N
29	10	1986	1	1.309	N	N
29	10	1986	2	1.228	N	N
29	10	1986	3	1.207	N	N
29	10	1986	4	1.186	N	N
29	10	1986	5	1.205	N	N
29	10	1986	6	1.3	N	N
29	10	1986	7	1.28	N	N
29	10	1986	8	1.15	N	N
29	10	1986	9	1.28	N	N
29	10	1986	10	1.33	N	N
29	10	1986	17	1.27	N	N
29	10	1986	18	1.271	N	N
30	10	1986	1	1.35	N	Y
30	10	1986	2	1.258	N	Y
30	10	1986	3	1.23	N	Y
30	10	1986	4	1.203	N	Y
30	10	1986	5	1.222	N	Y
30	10	1986	6	1.322	N	Y
30	10	1986	7	1.3	N	Y
30	10	1986	8	1.175	N	Y
30	10	1986	9	1.298	N	Y
30	10	1986	10	1.38	N	Y
30	10	1986	17	1.301	N	Y
30	10	1986	18	1.316	N	Y
31	10	1986	1	1.331	N	N
31	10	1986	2	1.241	N	N
31	10	1986	3	1.217	N	N
31	10	1986	4	1.188	N	N
31	10	1986	5	1.204	N	N
31	10	1986	6	1.314	N	N
31	10	1986	7	1.296	N	N
31	10	1986	8	1.159	N	N
31	10	1986	9	1.286	N	N
31	10	1986	10	1.368	N	N
31	10	1986	17	1.281	N	N
31	10	1986	18	1.291	N	N
3	11	1986	1	1.265	N	N
3	11	1986	2	1.208	N	N
3	11	1986	3	1.181	N	N
3	11	1986	4	1.176	N	N
3	11	1986	5	1.19	N	N
3	11	1986	6	1.284	N	N
3	11	1986	7	1.253	N	N
3	11	1986	8	1.134	N	N
3	11	1986	9	1.272	N	N
3	11	1986	10	1.335	N	N
3	11	1986	17	1.235	N	N
3	11	1986	18	1.216	N	N
4	11	1986	1	0.65	N	N
4	11	1986	2	0.65	N	N
4	11	1986	3	0.65	N	N
4	11	1986	4	1.203	N	Y
4	11	1986	5	1.222	N	Y
4	11	1986	6	0.65	N	N
4	11	1986	7	0.65	N	N
4	11	1986	8	0.65	N	N
4	11	1986	9	1.298	N	Y
4	11	1986	10	0.65	N	N
4	11	1986	17	0.65	N	N
4	11	1986	18	0.65	N	N
5	11	1986	1	1.257	N	N
5	11	1986	2	1.223	N	N
5	11	1986	3	1.195	N	N
5	11	1986	4	1.186	N	N
5	11	1986	5	1.205	N	N
5	11	1986	6	1.299	N	N
5	11	1986	7	1.261	N	N
5	11	1986	8	1.246	N	N
5	11	1986	9	1.285	N	N
5	11	1986	10	1.35	N	N
5	11	1986	17	1.253	N	N
5	11	1986	18	1.205	N	N
6	11	1986	1	1.223	N	N
6	11	1986	2	1.192	N	N
6	11	1986	3	1.159	N	N
6	11	1986	4	1.167	N	N
6	11	1986	5	1.179	N	N
6	11	1986	6	1.267	N	N
6	11	1986	7	1.237	N	N
6	11	1986	8	1.115	N	N
6	11	1986	9	1.251	N	N
6	11	1986	10	1.321	N	N
6	11	1986	17	1.216	N	N
6	11	1986	18	1.161	N	N
7	11	1986	1	1.201	N	N
7	11	1986	2	1.178	N	N
7	11	1986	3	1.147	N	N
7	11	1986	4	1.158	N	N
7	11	1986	5	1.17	N	N
7	11	1986	6	1.255	N	N
7	11	1986	7	1.212	N	N
7	11	1986	8	1.101	N	N
7	11	1986	9	1.246	N	N

Table 2. Daily Pond Measurements. Gualaca, Panama, Cycle III, Wet Season

DAY	MONTH	YEAR	POND#	DEPTH	INFLOW	OVERFLOW
7	11	1986	10	1.311	N	N
7	11	1986	17	1.199	N	N
7	11	1986	18	1.139	N	N
11	11	1986	1	1.169	N	N
11	11	1986	2	1.18	N	N
11	11	1986	3	1.145	N	N
11	11	1986	4	1.18	N	N
11	11	1986	5	1.179	N	N
11	11	1986	6	1.26	N	N
11	11	1986	7	1.202	N	N
11	11	1986	8	1.091	N	N
11	11	1986	9	1.27	N	N
11	11	1986	10	1.308	N	N
11	11	1986	17	1.195	N	N
11	11	1986	18	1.096	N	N
13	11	1986	1	1.129	N	N
13	11	1986	2	1.153	N	N
13	11	1986	3	1.115	N	N
13	11	1986	4	1.161	N	N
13	11	1986	5	1.153	N	N
13	11	1986	6	1.231	N	N
13	11	1986	7	1.17	N	N
13	11	1986	8	1.06	N	N
13	11	1986	9	1.252	N	N
13	11	1986	10	1.282	N	N
13	11	1986	17	1.157	N	N
13	11	1986	18	1.055	N	N
14	11	1986	1	1.112	N	N
14	11	1986	2	1.146	N	N
14	11	1986	3	1.107	N	N
14	11	1986	4	1.163	N	N
14	11	1986	5	1.153	N	N
14	11	1986	6	1.228	N	N
14	11	1986	7	1.167	N	N
14	11	1986	8	1.062	N	N
14	11	1986	9	1.253	N	N
14	11	1986	10	1.281	N	N
14	11	1986	17	1.152	N	N
14	11	1986	18	1.051	N	N
17	11	1986	1	1.136	N	N
17	11	1986	2	1.19	N	N
17	11	1986	3	1.15	N	N
17	11	1986	4	1.189	N	N
17	11	1986	5	1.2	N	N
17	11	1986	6	1.276	N	N
17	11	1986	7	1.211	N	N
17	11	1986	8	1.096	N	N
17	11	1986	9	1.287	N	N
17	11	1986	10	1.339	N	N
17	11	1986	17	1.201	N	N
17	11	1986	18	1.06	N	N
19	11	1986	1	1.103	N	N
19	11	1986	2	1.169	N	N
19	11	1986	3	1.126	N	N
19	11	1986	4	1.178	N	N
19	11	1986	5	1.181	N	N
19	11	1986	6	1.26	N	N
19	11	1986	7	1.186	N	N
19	11	1986	8	1.066	N	N
19	11	1986	9	1.27	N	N
19	11	1986	10	1.316	N	N
19	11	1986	17	1.169	N	N
19	11	1986	18	1.03	N	N
21	11	1986	1	1.055	N	N
21	11	1986	2	1.134	N	N
21	11	1986	3	1.088	N	N
21	11	1986	4	1.153	N	N
21	11	1986	5	1.149	N	N
21	11	1986	6	1.224	N	N
21	11	1986	7	1.161	N	N
21	11	1986	8	1.036	N	N
21	11	1986	9	1.241	N	N
21	11	1986	10	1.282	N	N
21	11	1986	17	0.65	N	N
21	11	1986	18	1.056	N	N
24	11	1986	1	1.057	N	N
24	11	1986	2	1.144	N	N
24	11	1986	3	1.091	N	N
24	11	1986	4	1.171	N	N
24	11	1986	5	1.16	N	N
24	11	1986	6	1.235	N	N
24	11	1986	7	1.159	N	N
24	11	1986	8	1.031	N	N
24	11	1986	9	1.262	N	N
24	11	1986	10	1.29	N	N
24	11	1986	17	1.122	N	N
24	11	1986	18	0.97	N	N
26	11	1986	1	1.029	N	N
26	11	1986	2	1.118	N	N
26	11	1986	3	1.066	N	N
26	11	1986	4	1.156	N	N
26	11	1986	5	1.138	N	N
26	11	1986	6	1.208	N	N
26	11	1986	7	1.127	N	N
26	11	1986	8	1.001	N	N
26	11	1986	9	1.242	N	N
26	11	1986	10	1.261	N	N
26	11	1986	17	1.084	N	N
26	11	1986	18	0.93	N	N
27	11	1986	1	1.025	N	N
27	11	1986	2	1.097	N	N
27	11	1986	3	1.055	N	N
27	11	1986	4	1.137	N	N
27	11	1986	5	1.114	N	N
27	11	1986	6	1.189	N	N
27	11	1986	7	1.117	N	N
27	11	1986	8	0.986	N	N
27	11	1986	9	1.222	N	N
27	11	1986	10	1.24	N	N
27	11	1986	17	1.06	N	N
27	11	1986	18	0.895	N	N
1	12	1986	1	1.01	N	N
1	12	1986	2	1.117	N	N
1	12	1986	3	1.057	N	N
1	12	1986	4	1.17	N	N
1	12	1986	5	1.14	N	N
1	12	1986	6	1.211	N	N
1	12	1986	7	1.128	N	N
1	12	1986	8	0.992	N	N
1	12	1986	9	1.264	N	N
1	12	1986	10	1.264	N	N
1	12	1986	17	1.085	N	N
1	12	1986	18	0.9	N	N
3	12	1986	1	0.981	N	N
3	12	1986	2	1.097	N	N
3	12	1986	3	1.039	N	N
3	12	1986	4	1.16	N	N
3	12	1986	5	1.12	N	N
3	12	1986	6	1.19	N	N
3	12	1986	7	1.105	N	N
3	12	1986	8	0.965	N	N
3	12	1986	9	1.246	N	N
3	12	1986	10	1.238	N	N
3	12	1986	17	1.057	N	N
3	12	1986	18	0.867	N	N

Table 3. Miscellaneous Observations Including Fish Health. Gualaca, Panama, Cycle III, Dry Season

DAY	MONTH	YEAR	POND#	OBSERVATIONS
27	5	1986	10	One mortality
4	6	1986	17	One mortality
9	6	1986	5	One mortality
9	6	1986	17	One mortality
20	6	1986	5	One mortality
23	6	1986	9	Two mortalities
23	6	1986	17	One mortality
		1986	9	Fish observed "piping" for air on surface of ponds when dissoved oxygen
		1986	10	concentrations fell below 1 in the early mornings.
		1986	17	

Table 4. Weekly and Twice Weekly Measurements. Gualaca, Panama, Cycle III, Dry Season

DAY	MO.	YEAR	EXTRA DATA?	POND#	DO TIME	DO @ TOP	DO @ MID	DO @ BOTTOM	WATER TEMP @ TOP	WATER TEMP @ MID	WATER TEMP @ BOTTOM	WATER TEMP @ TOP-MAX	WATER TEMP @ BOT-MAX	WATER TEMP @ TOP-MIN	WATER TEMP @ BOT-MIN	ALKA.	HARD.	pH	KJELDAHL N	NH3-N	NO2-N	NO3-N	TOTAL NO2 & NO3-N	TOTAL P	ORTHO PO4-P	SECHII DISK A	SECHII DISK B	CHLOR-OPHYLL A
30	1	1986		1	630											16.5	22.4	7.4										0.
30	1	1986		2	630											19.1	25.5	7.6										0.
30	1	1986		3	630											19.1	21.9	7.6										0.
30	1	1986		4	630											21.3	26.5	7.4										0.
30	1	1986		5	630											20.9	22.4	7.5										26.
30	1	1986		6	630											19.1	23.9	7.4										0.
30	1	1986		7	630											19.1	20.8	7.4										0.
30	1	1986		8	630							28.5	25.5	23.5	24.5	18.3	20.8	7.4										0.
30	1	1986		9	630											26.1	28.1	7.4										0.
30	1	1986		10	630											14.8	25.5	7.4										0.
30	1	1986		17	630							28.8			23.5	20.9	23.9	7.3										0.
30	1	1986		18	630											15.7	21.9	7.5										0.
3	2	1986		1	630		8.45			26.									0.				0.	0.03	0.			
3	2	1986		2	630		9.2			26.5									0.				0.	0.06	0.			
3	2	1986		3	630		7.9			27.									0.				0.	0.	0.			
3	2	1986		4	630		7.35			27.									0.				0.	0.12	0.05			
3	2	1986		5	630		8.2			25.5									0.				0.	0.1	0.06			
3	2	1986		6	630		8.5			26.8									0.04				0.	0.04	0.			
3	2	1986		7	630		8.3			26.8									0.				0.07	0.07	0.02			
3	2	1986		8	630		7.6			26.5									0.04				0.07	0.16	0.09			
3	2	1986		9	630		6.95			26.5									0.				0.	0.27	0.23			
3	2	1986		10	630		7.4			27.									0.14				0.	0.38	0.21			
3	2	1986		17	630		6.05			25.5									0.				0.	0.19	0.07			
3	2	1986		18	630		7.4			26.									0.				0.	0.03	0.			
5	2	1986		1	630											21.8		8.8								110.		0.
5	2	1986		2	630											24.4	31.2	7.6								110.		0.
5	2	1986		3	630											22.6	27.1	8.3								110.		0.
5	2	1986		4	630											26.1	31.2	9.2								105.		0.
5	2	1986		5	630											25.7	29.7	8.3								110.		0.
5	2	1986		6	630											20.4	27.1	8.8								100.		0.
5	2	1986		7	630											20.9		9.4								110.		0.
5	2	1986		8	630								29.5	25.5	25.5		28.1	9.2								110.		0.
5	2	1986		9	630											33.5		7.3								110.		0.
5	2	1986		10	630											24.8	31.8	9.3								72.		0.
5	2	1986		17	630							32.5	29.5		24.5		33.8	8.7								68.		41.
5	2	1986		18	630											16.5	21.3	7.2								110.		0.
7	2	1986		1	630		8.3			27.8																		
7	2	1986		2	630					27.8																		
7	2	1986		3	630		6.1			27.8																		
7	2	1986		4	630		10.1			27.8																		
7	2	1986		5	630		10.7			28.																		
7	2	1986		6	630		6.6			27.8																		
7	2	1986		7	630		10.3			28.																		
7	2	1986		8	630					27.5																		
7	2	1986		9	630		2.05			28.3																		
7	2	1986		10	630		9.45			28.																		
7	2	1986		17	630		4.9			27.3																		
7	2	1986		18	630		6.65			27.3																		
13	2	1986		1	630											24.4	35.4	9.6								50.		0.
13	2	1986		2	630												47.9	9.2								60.		0.
13	2	1986		3	630											33.9	47.9	8.7								110.		0.
13	2	1986		4	630											33.1	39.6	9.9								39.		22.
13	2	1986		5	630											34.8	43.7	9.4								50.		2.
13	2	1986		6	630											27.8	34.4	10.								53.		0.
13	2	1986		7	630											30.5	40.6	9.1								110.		0.
13	2	1986		8	630							29.5				29.6	38.5	9.4								70.		17.
13	2	1986		9	630											37.4	43.7	9.9								45.		6.
13	2	1986		10	630											38.3	48.9	9.8								40.		92.
13	2	1986		17	630											53.9	64.5	7.6								110.		303.

Table 4. Weekly and Twice Weekly Measurements. Gualaca, Panama, Cycle III, Dry Season

DAY	MO.	YEAR	EXTRA DATA?	POND#	DO TIME	DO @ TOP	DO @ MID	DO @ BOTTOM	WATER TEMP @ TOP	WATER TEMP @ MID	WATER TEMP @ BOTTOM	WATER TEMP @ TOP-MAX	WATER TEMP @ BOT-MAX	WATER TEMP @ TOP-MIN	WATER TEMP @ BOT-MIN	ALKA.	HARD.	pH	KJELDAHL N	NH3-N	NO2-N	NO3-N	TOTAL NO2 & NO3-N	TOTAL P	ORTHO PO4-P	SECHII DISK A	SECHII DISK B	CHLOR-OPHYLL A
16	2	1986		3	630														0.12	0.1				0.03	0.			
16	2	1986		4	630														0.12	0.16				0.16	0.			
16	2	1986		5	630														0.54	0.15				0.1	0.			
16	2	1986		6	630														0.42	0.11				0.09	0.			
16	2	1986		7	630														0.58	0.05				0.06	0.			
16	2	1986		8	630														0.	0.11				0.14	0.			
16	2	1986		9	630														0.	0.22				0.42	0.1			
16	2	1986		10	630														3.4	0.2				0.51	0.3			
16	2	1986		17	630														1.8	0.18				0.23	0.03			
16	2	1986		18	630														0.18	0.1				0.04	0.			
20	2	1986		1	630		8.05			26.8						20.9	11.5	9.					0.			40.		
20	2	1986		2	630		7.3			27.						42.2	39.6	8.6					0.			41.		
20	2	1986		3	630		6.5			27.3						38.7	41.1	7.7					0.			58.		
20	2	1986		4	630		4.9			27.3						36.5		8.2					0.			35.		
20	2	1986		5	630		5.7			26.8						21.8		9.2					0.			42.		
20	2	1986		6	630		8.3			27.							56.2	8.2					0.09			37.		
20	2	1986		7	630		7.2			27.						32.2	40.6	8.7					0.07			65.		
20	2	1986		8	630		5.3			27.5								8.5					0.1			62.		
20	2	1986		9	630		4.55			27.						29.6	39.6	9.					0.07			35.		
20	2	1986		10	630					27.							43.7	8.4					0.13			35.		
20	2	1986		17	630		1.4			26.8						46.1	54.1	8.1					0.09			42.		
20	2	1986		18	630		6.7			26.3						29.6	43.7	7.7					0.			72.		
21	2	1986		1	630																							0.
21	2	1986		2	630																							0.
21	2	1986		3	630																							0.
21	2	1986		4	630																							0.
21	2	1986		5	630																							0.
21	2	1986		6	630																							0.
21	2	1986		7	630																							0.
21	2	1986		8	630							28.5	31.5	26.5														0.
21	2	1986		9	630																							0.
21	2	1986		10	630																							0.
21	2	1986		17	630									28.5														72.
21	2	1986		18	630																							0.
24	2	1986		1	630																							0.
24	2	1986		2	630														0.86	0.12			0.	0.11	0.			
24	2	1986		3	630														1.08	0.55			0.	0.15	0.01			
24	2	1986		4	630														0.	0.55			0.07	0.04	0.			
24	2	1986		5	630														0.	0.18			0.	0.27	0.1			
24	2	1986		6	630														1.28	0.29			0.15	0.27	0.18			
24	2	1986		7	630														1.12	0.79			0.	0.19	0.02			
24	2	1986		8	630														0.	0.25			0.	0.16	0.03			
24	2	1986		9	630									27.5					0.	0.34			0.	0.3	0.1			
24	2	1986		10	630														0.04	0.27			0.	0.65	0.37			
24	2	1986		17	630							27.5							0.16	0.4			0.19	0.74	0.3			
24	2	1986		18	630														0.32	0.6			0.15		0.22			
27	2	1986		1	630		8.55									19.1	18.7	8.3	0.74	0.38			0.06	0.1				
27	2	1986		2	630		8.95									36.1	42.7	9.2								35.		38.
27	2	1986		3	630		6.8									40.9		8.1								44.		0.
27	2	1986		4	630		2.95									47.9	56.2	7.7								65.		0.
27	2	1986		5	630		6.2									49.6	56.2	8.7								53.		33.
27	2	1986		6	630		8.9									17.4	21.9	9.5								55.		0.
27	2	1986		7	630		8.25										44.2	9.1								31.		63.
27	2	1986		8	630								30.5	28.5	27.5	32.6		9.8								58.		15.
27	2	1986		9	630		6.8									28.3	35.9	9.4								39.		50.
27	2	1986		10	630		2.45									41.2	43.7	9.6								33.		69.
27	2	1986		17	630		2.75					28.5	27.5			53.1	59.3	9.4								23.		124.
27	2	1986		18	630		5.7									46.1	55.2	8.4								28.		79.
3	3	1986		1	630																					110.		0.
3	3	1986		2	630														0.7	0.7			0.07	0.14	0.03			
																			0.52	0.27			0.11	0.15	0.			

Table 4. Weekly and Twice Weekly Measurements. Gualaca, Panama, Cycle III, Dry Season

DAY	MO.	YEAR	EXTRA DATA?	POND#	DO TIME	DO @ TOP	DO @ MID	DO @ BOTTOM	WATER TEMP @ TOP	WATER TEMP @ MID	WATER TEMP @ BOTTOM	WATER TEMP @ TOP-MAX	WATER TEMP @ BOT-MAX	WATER TEMP @ TOP-MIN	WATER TEMP @ BOT-MIN	ALKA.	HARD.	pH	KJELDAHL N	NH3-N	NO2-N	NO3-N	TOTAL NO2 & NO3-N	TOTAL P	ORTHO PO4-P	SECHII DISK A	SECHII DISK B	CHLOR-OPHYLL A
3	3	1986		6	630														1.	0.52			0.	0.17	0.01			
3	3	1986		7	630														0.7	0.4			0.	0.14	0.			
3	3	1986		8	630							32.5							1.7	0.43			0.	0.28	0.04			
3	3	1986		9	630														1.66	0.52			0.	0.27	0.07			
3	3	1986		10	630														3.18	0.4			0.	0.4	0.			
3	3	1986		17	630							37.5	31.5		23.5				2.5	1.64			0.	0.28	0.			
3	3	1986		18	630														0.6				0.		0.			
6	3	1986		1	630		7.05			27.5						15.7		8.9								26.		103.
6	3	1986		2	630		7.75			28.						29.6		9.3								37.		0.
6	3	1986		3	630					27.8						33.9		8.2								69.		103.
6	3	1986		4	630		5.65			28.3						59.2	66.1	8.9								39.		0.
6	3	1986		5	630		6.85			27.8								9.1								35.		90.
6	3	1986		6	630		6.85			28.						16.5	18.5	9.5								26.		88.
6	3	1986		7	630		8.1			28.3						33.1	35.5	9.4								36.		68.
6	3	1986		8	630		6.85			27.5			30.5		26.5			9.4								29.		81.
6	3	1986		9	630		2.6			28.5						42.6	48.5	8.6								34.		0.
6	3	1986		10	630		2.7			28.						29.6	31.5	9.1								26.		185.
6	3	1986		17	630		0.25			27.8				28.5	26.5	54.8	61.1	8.5								25.		59.
6	3	1986		18	630		6.45			27.3						33.1		8.								56.		0.
10	3	1986		1	630														0.32	0.3			0.	0.02	0.			
10	3	1986		2	630														0.7	0.15			0.	0.15	0.			
10	3	1986		3	630														0.26	0.			0.	0.01	0.			
10	3	1986		4	630														1.16	0.09			0.	0.17	0.			
10	3	1986		5	630														1.42	0.24			0.	0.22	0.			
10	3	1986		6	630														0.9	0.18			0.	0.17	0.			
10	3	1986		7	630														0.1	0.24			0.	0.14	0.			
10	3	1986		8	630							32.5		26.5					1.32	0.24			0.	0.24	0.			
10	3	1986		9	630														0.76	0.18			0.	0.17	0.			
10	3	1986		10	630														0.66	0.3			0.	0.27	0.06			
10	3	1986		17	630							35.5							1.5	0.21			0.	0.22	0.			
10	3	1986		18	630														0.	0.09			0.	0.01	0.			
13	3	1986		1			9.5			28.3						17.4		9.2								38.		58.
13	3	1986		2			8.7			28.3						26.5		9.5								28.		19.
13	3	1986		3			6.35			28.8						37.4		7.9								70.		0.
13	3	1986		4			4.7			28.8							61.1	8.3								38.		59.
13	3	1986		5						28.						28.7		9.5								36.		136.
13	3	1986		6			7.6			28.3						20.9		9.5								31.		107.
13	3	1986		7			9.8			28.3						24.4		9.5								36.		118.
13	3	1986		8			7.8			28.5			31.5	26.5		22.6		9.4								35.		91.
13	3	1986		9			5.6			28.8						62.6	65.1	8.8								33.		529.
13	3	1986		10			0.15			29.							50.1	7.5								30.		504.
13	3	1986		17			5.7			28.3		38.5				57.4	58.1	9.3								31.		466.
13	3	1986		18			6.95			28.5						29.6		7.9								51.		
17	3	1986		1															0.52	0.11			0.1	0.1	0.			
17	3	1986		2															0.58	0.11			0.1	0.11	0.			
17	3	1986		3															0.3	0.16			0.08	0.03	0.			
17	3	1986		4															1.32	0.07			0.1	0.14	0.			
17	3	1986		5															0.94	0.18			0.	0.15	0.			
17	3	1986		6															1.6	0.11			0.	0.24	0.			
17	3	1986		7																0.18			0.	0.1	0.			
17	3	1986		8															0.98	0.16			0.08	0.14	0.			
17	3	1986		9															1.46	0.11			0.08	0.1	0.			
17	3	1986		10															2.64	0.11			0.12	0.26	0.01			
17	3	1986		17															1.92	0.04			0.11	0.22	0.			
17	3	1986		18															1.	0.18			0.1	0.04	0.			
20	3	1986		1			10.4			28.3						20.9		9.5								35.		0.
20	3	1986		2						28.						28.7		9.7								34.		54.
20	3	1986		3			7.9			28.5						39.2		8.7								63.		0.
20	3	1986		4			11.6			27.8						49.6	51.1	9.5								27.		101.
20	3	1986		5			7.7			27.						28.7		9.6								26.		68.

Table 4. Weekly and Twice Weekly Measurements. Gualaca, Panama, Cycle III, Dry Season

DAY	MO.	YEAR	EXTRA DATA?	POND#	DO TIME	DO @ TOP	DO @ MID	DO @ BOTTOM	WATER TEMP @ TOP	WATER TEMP @ MID	WATER TEMP @ BOTTOM	WATER TEMP @ TOP-MAX	WATER TEMP @ BOT-MAX	WATER TEMP @ TOP-MIN	WATER TEMP @ BOT-MIN	ALKA.	HARD.	pH	KJELDAHL N	NH3-N	NO2-N	NO3-N	TOTAL NO2 & NO3-N	TOTAL P	ORTHO PO4-P	SECHII DISK A	SECHII DISK B	CHLOR-OPHYLL A
20	3	1986		9			6.1			28.3						55.7	56.1	9.3								23.		167.
20	3	1986		10						28.						53.9	56.1	8.8								19.		174.
20	3	1986		17			2.45			28.						59.2	60.1	9.4								26.		63.
20	3	1986		18			7.45			28.5						30.5		8.7								51.		0.
24	3	1986		1															0.6	0.18			0.01	0.16	0.			
24	3	1986		2															1.04	0.3			0.01	0.22	0.01			
24	3	1986		3															0.	0.11			0.	0.08	0.			
24	3	1986		4															1.92	0.07			0.	0.23	0.			
24	3	1986		5															2.5	0.04			0.01	0.35	0.01			
24	3	1986		6															1.5	0.13			0.01	0.18	0.01			
24	3	1986		7															1.	0.18			0.01	0.19	0.			
24	3	1986		8										21.5					1.76	0.16			0.	0.24	0.			
24	3	1986		9															2.82	0.11			0.01	0.32	0.			
24	3	1986		10															4.76	0.16			0.02	0.57	0.			
24	3	1986		17									31.5	23.5					4.22	0.16			0.01	0.48	0.			
24	3	1986		18															0.06	0.2			0.	0.11	0.			
29	3	1986		1																						25.		
29	3	1986		2																						25.		
29	3	1986		3																						45.		
29	3	1986		4																						22.		
29	3	1986		5																						24.		
29	3	1986		6																						29.		
29	3	1986		7																						30.		
29	3	1986		8																						30.		
29	3	1986		9																						24.		
29	3	1986		10																						14.		
29	3	1986		17																						18.		
29	3	1986		18																						28.		
31	3	1986		1															0.86	0.24			0.01	0.03	0.			0.
31	3	1986		2															1.32	0.24			0.01	0.04	0.			0.
31	3	1986		3															0.94	0.1			0.01	0.06	0.			0.
31	3	1986		4															4.06	0.			0.01	0.14	0.			16.
31	3	1986		5															2.36	0.05			0.01	0.15	0.			0.
31	3	1986		6															2.42	0.27			0.01	0.04	0.			0.
31	3	1986		7															1.12	0.21			0.	0.09	0.			0.
31	3	1986		8															2.9	0.39			0.01	0.16	0.			4.
31	3	1986		9															4.2	0.1			0.01	0.21	0.			207.
31	3	1986		10															5.86	0.3			0.01	0.42	0.			458.
31	3	1986		17															6.26	0.39			0.02	0.38	0.			354.
31	3	1986		18															1.	0.21			0.	0.	0.			0.
1	4	1986		1												16.5		9.3								48.		
1	4	1986		2														9.5								38.		
1	4	1986		3														9.1								48.		
1	4	1986		4														9.1								25.		
1	4	1986		5												18.3		9.3								63.		
1	4	1986		6												20.9		9.1								47.		
1	4	1986		7												18.3		9.5								41.		
1	4	1986		8								30.5	31.5	28.5		18.3		9.3								56.		
1	4	1986		9												36.5		8.9								26.		
1	4	1986		10												34.8		8.5								19.		
1	4	1986		17								35.5	30.5	23.5		37.4		9.1								18.		
1	4	1986		18												16.5		8.6								53.		
3	4	1986		1		8.65	8.65	8.65		27.5																		
3	4	1986		2		7.5	7.4	7.3		27.5																		
3	4	1986		3		8.85	8.75	8.6		27.3																		
3	4	1986		4		3.4	3.4	3.4		27.5																		
3	4	1986		5		7.85	7.75	7.45		26.8																		
3	4	1986		6		6.45	6.45	6.25		26.8																		
3	4	1986		7		8.05	8.05	8.05		28.3																		
3	4	1986		8		10.7	10.7	9.5		26.5																		

Table 4. Weekly and Twice Weekly Measurements. Gualaca, Panama, Cycle III, Dry Season

DAY	MO.	YEAR	EXTRA DATA?	POND#	DO TIME	DO @ TOP	DO @ MID	DO @ BOTTOM	WATER TEMP @ TOP	WATER TEMP @ MID	WATER TEMP @ BOTTOM	WATER TEMP @ TOP-MAX	WATER TEMP @ BOT-MAX	WATER TEMP @ TOP-MIN	WATER TEMP @ BOT-MIN	ALKA.	HARD.	pH	KJELDAHL N	NH3-N	NO2-N	NO3-N	TOTAL NO2 & NO3-N	TOTAL P	ORTHO PO4-P	SECHII DISK A	SECHII DISK B	CHLOR-OPHYLL A
3	4	1986		18		8.2	8.2	8.2		25.8																	
7	4	1986		1		6.95	6.95	6.85		26.8								7.8	0.	0.14			0.	0.	0.	41.		7.
7	4	1986		2		7.05	6.95	6.95		26.8								9.4	1.28	0.11			0.	0.15	0.	38.		27.
7	4	1986		3		7.95	7.9	7.85		26.8						13.5		9.2	0.98	0.			0.	0.12	0.	39.		40.
7	4	1986		4		1.75	1.75	1.75		27.						19.6		8.5	1.56	0.16			0.	0.16	0.	60.		0.
7	4	1986		5		4.25	4.2	4.15		27.3						13.5	32.5	7.5	1.	0.07			0.	0.08	0.	60.		18.
7	4	1986		6		6.85	6.85	6.8		27.						12.6	28.5	9.2	1.66	0.07			0.	0.13	0.	46.		31.
7	4	1986		7		7.05		6.95		26.8						10.4		9.5	1.08	0.01			0.	0.1	0.01	42.		42.
7	4	1986		8		7.55	7.5	7.4		27.		30.5	27.5	26.5				9.6	0.94	0.			0.	0.17	0.	51.		1.
7	4	1986		9		2.85	2.8	2.8		27.						21.3	45.5	8.9	3.18	0.11			0.	0.57	0.	29.		1.
7	4	1986		10		2.9	2.9	2.8		26.8						19.6		9.3	4.38	0.13			0.	0.57	0.01	20.		230.
7	4	1986		17		0.15	0.15			26.8		38.5	26.5	28.5		20.9	46.5	8.	4.76				0.	0.59	0.04	28.		66.
7	4	1986		18		7.45	7.45	7.35		26.8						8.7	22.5	9.	0.54				0.	0.14	0.02	38.		15.
14	4	1986		1		9.15	9.05	8.35		28.8						26.1		9.6	1.46	0.13				0.13	0.	34.		0.
14	4	1986		2		8.8	8.7	8.6		28.3						28.69		9.5	1.42	0.13				0.13	0.	33.		97.
14	4	1986		3		10.2	10.2	9.9		28.5						26.1	23.5	9.8	1.7	0.25				0.12	0.	40.		84.
14	4	1986		4		8.65	8.55	8.5		28.8						54.8	47.5	9.1	2.28	0.19				0.16	0.	41.		15.
14	4	1986		5		9.05	8.95	8.65		28.5						43.6	36.5	9.7	4.76	0.17				0.17	0.	43.		55.
14	4	1986		6		9.9	9.85	9.7		28.5						29.9	27.5	9.9	1.46	0.12				0.13	0.01	43.		32.
14	4	1986		7		9.2	9.15	9.2		28.5						26.8		9.7	1.32	0.1				0.18	0.02	42.		90.
14	4	1986		8		8.2	8.1	7.5		28.5			27.5	26.5				9.6	1.12	0.1				0.22	0.02	44.		0.
14	4	1986		9		4.3	4.25	4.2		28.3						58.5	46.5	9.4	2.56	0.09				0.38	0.11	25.		0.
14	4	1986		10		0.15	0.15	0.15		28.5						57.9	54.6	9.4	1.92	0.14				0.45	0.15	26.		159.
14	4	1986		17		2.4	2.3	2.3		28.		34.5	27.5	25.5		57.9	50.1	9.3	4.56	0.06				0.37	0.11	19.		141.
14	4	1986		18		7.4	7.3	7.7		28.5						26.1		9.4	3.	0.46				0.61	0.32	35.		13.
21	4	1986		1		5.45	5.45	5.45		26.5								9.1	0.94	0.12			0.	0.15	0.	42.		84.
21	4	1986		2		4.85	7.8	4.65		26.5						24.3	25.5	9.2	1.24	0.18			0.	0.18	0.	46.		385.
21	4	1986		3			5.95	5.95		26.5							21.5	9.4	1.08	0.08			0.	0.22	0.	30.		232.
21	4	1986		4		2.9	2.7	2.65		26.5						48.6		9.3	2.56	0.12			0.	0.29	0.	33.		59.
21	4	1986		5		2.45	2.45	2.45		26.5						37.4		9.4	2.82	0.16			0.	0.17	0.	31.		22.
21	4	1986		6		4.95		4.95		26.5							26.5	9.4	1.32	0.1			0.	0.18	0.	43.		28.
21	4	1986		7		5.25	5.2	5.15		26.5						23.7		9.3	1.	0.29			0.	0.27	0.	44.		0.
21	4	1986		8		3.1				26.5			29.5				31.5	9.2	2.04	0.33			0.	0.45	0.	33.		63.
21	4	1986		9						26.5						51.7		9.3	4.76	0.36			0.	0.45	0.09	23.		274.
21	4	1986		10		0.15	0.15	0.15		26.3						61.6	54.6	7.8	5.24	0.33			0.	0.57	0.21	23.		208.
21	4	1986		17		0.35	0.25	0.15		26.3		30.5	29.5	27.5			49.1	9.2	4.56	0.22			0.	0.68	0.04	21.		588.
21	4	1986		18		4.25	4.15	4.1		26.5								7.6	1.08	0.18			0.	0.13	0.	51.		67.
28	4	1986		1		8.6	8.5	8.5		28.3									1.7	0.06			0.	0.16	0.	36.		30.
28	4	1986		2		8.9	8.8	8.6		28.									1.28	0.11			0.	0.18	0.	32.		48.
28	4	1986		3		7.6	7.55	7.5		28.									1.32	0.07			0.	0.17	0.	38.		19.
28	4	1986		4		8.3	8.15	8.1		28.8									4.28	0.08			0.	0.27	0.	36.		163.
28	4	1986		5		6.1		5.95		27.5									3.24	0.1			0.	0.15	0.	32.		193.
28	4	1986		6		7.8	7.7	7.3		28.									2.3	0.15			0.	0.12	0.	41.		39.
28	4	1986		7		7.5	7.4	7.35		28.3									1.92	0.07			0.	0.11	0.	41.		46.
28	4	1986		8		8.8	8.7	8.7		28.			25.5						1.86	0.07			0.	0.15	0.	36.		10.
28	4	1986		9		3.35	3.35	3.3		27.5									7.58	0.27			0.	0.53	0.19	19.		197.
28	4	1986		10		1.3	1.35	1.2		27.5									6.36	0.1			0.	0.63	0.26	23.		440.
28	4	1986		17			0.25	0.25		27.3		37.5							8.14	0.29			0.	1.03	0.05	16.		322.
28	4	1986		18		6.95	6.8	6.75		28.									1.36	0.17			0.	0.12	0.	38.		32.
5	5	1986		1		6.2	6.1	6.05		28.						27.4	33.5	9.4	1.66	0.			0.	0.15	0.	44.		49.
5	5	1986		2		4.6	4.55	4.5		27.8						28.6	27.5	9.4	1.76	0.03			0.	0.22	0.	61.		47.
5	5	1986		3		7.05	7.05	6.95		28.						27.4	26.5	9.8	2.16	0.03			0.	0.1	0.	34.		76.
5	5	1986		4		3.8	3.75	3.7		28.						43.6		9.5	2.8	0.06			0.	0.31	0.	39.		24.
5	5	1986		5		4.15	4.05			27.8						44.8		9.5	2.96	0.			0.	0.26	0.	26.		137.
5	5	1986		6		6.5	6.45	6.35		27.8						54.2		9.5	2.22	0.15			0.	0.26	0.	34.		76.
5	5	1986		7		6.7	6.6	6.55		27.8						30.5		9.8	2.22	0.			0.	0.28	0.	30.		143.
5	5	1986		8		5.6	5.6	5.6		27.8			25.5	24.5		43.6		9.8	3.34	0.			0.	0.43	0.	33.		179.
5	5	1986		9		1.1	1.05	1.05		27.5								9.5	6.66	0.2			0.	0.83	0.36	15.		632.
5	5	1986		10		3.15	3.05			27.5							62.6	9.3	7.1	0.18			0.	1.	0.26	13.		634.
5	5	1986		17		0.15				27.5			28.5			78.4	57.6	9.5	8.14	0.12			0.	1.4	0.23	16.		576.

Table 4. Weekly and Twice Weekly Measurements. Gualaca, Panama, Cycle III, Dry Season

DAY	MO.	YEAR	EXTRA DATA?	POND#	DO TIME	DO @ TOP	DO @ MID	DO @ BOTTOM	WATER TEMP @ TOP	WATER TEMP @ MID	WATER TEMP @ BOTTOM	WATER TEMP @ TOP-MAX	WATER TEMP @ BOT-MAX	WATER TEMP @ TOP-MIN	WATER TEMP @ BOT-MIN	ALKA.	HARD.	pH	KJELDAHL N	NH3-N	NO2-N	NO3-N	TOTAL NO2 & NO3-N	TOTAL P	ORTHO PO4-P	SECHII DISK A	SECHII DISK B	CHLOR-OPHYLL A
12	5	1986		3		7.4	7.4	7.25		27.8						23.7		9.6	0.82	0.04			0.11	0.22	0.02	41.		112.
12	5	1986		4		6.4	6.3	6.2		29.						48.6		9.3	2.3	0.06			0.11	0.33	0.02	35.		45.
12	5	1986		5		3.35	3.25	3.1		29.						42.3		9.3	2.88	0.03			0.15	0.23	0.03	38.		193.
12	5	1986		6		6.75	6.75	6.6		29.						42.3		9.6	1.82	0.02			0.08	0.24	0.01	38.		70.
12	5	1986		7		6.35	6.3	6.25		29.						24.9		9.5	2.04	0.04			0.11	0.29	0.	37.		79.
12	5	1986		8		4.4	4.35	4.3		29.		33.5	31.5		28.5	42.3		9.3	2.72	0.1			0.08	0.38	0.	36.		82.
12	5	1986		9		1.6	1.55	1.5		28.5						52.3		9.3	5.54	0.08			0.22	0.88	0.39	22.		216.
12	5	1986		10				0.15		28.5							53.1	8.9	7.58	0.14			0.08	1.23	0.21	19.		424.
12	5	1986		17		0.15	0.15			28.5		37.5		30.5	28.5		54.1	9.2	7.84	0.2			0.03	1.53	0.46	22.		618.
12	5	1986		18		5.9	5.7	5.7		28.8						23.7		9.1	1.2	0.01			0.11	0.22	0.	35.		35.
19	5	1986		1		6.3	6.2	6.2		30.								8.2	0.68	0.05			0.15	0.12	0.01	55.		25.
19	5	1986		2		4.3	4.75	4.25		30.						52.3		8.2	1.4	0.05			0.22	0.26	0.	51.		24.
19	5	1986		3		7.15	7.1	7.05		29.8						27.4		9.6	1.06	0.04			0.11	0.22	0.	42.		45.
19	5	1986		4		5.05	5.05	4.9		26.8						52.3		9.5	3.66	0.11			0.15	0.35	0.	35.		
19	5	1986		5		3.75	3.8	3.8		29.8								9.1	3.34	0.12			0.15	0.3	0.	34.		95.
19	5	1986		6		7.15	7.1	7.05		29.8						37.4		9.6		0.07			0.11	0.26	0.	42.		81.
19	5	1986		7		6.6	6.45	6.4		29.8						36.1		9.3	1.5	0.1			0.18	0.36	0.01	40.		319.
19	5	1986		8		7.75	7.7	7.6		29.8		33.5				38.6		9.5	0.08	0.19			0.11	0.38	0.	42.		103.
19	5	1986		9		3.9	3.85	3.8		29.5								9.4	5.12	0.14			0.15	0.92	0.51	30.		232.
19	5	1986		10		0.95		0.85		29.3							58.1	8.7	6.7	0.17			0.18	1.23	0.46	25.		744.
19	5	1986		17		0.15		0.15		29.3					28.5	75.9	64.1	9.2	4.74	0.14			0.41	1.61	0.51	21.		566.
19	5	1986		18		4.7	4.6	4.55		29.3						27.4		8.4	1.66	0.08			0.08	0.18	0.	31.		37.
26	5	1986		1		6.95	6.9	6.85		28.								7.6	0.98	0.14			0.	0.06	0.	50.		21.
26	5	1986		2		2.5	2.4	2.35		28.						43.6		7.2	0.9	0.16			0.04	0.12	0.	72.		40.
26	5	1986		3		3.9	3.8	3.75		27.8						29.9		8.	1.06	0.27			0.11	0.18	0.	59.		15.
26	5	1986		4		2.85	2.65	2.5		27.5						43.6		9.3	3.76	0.28			0.04	0.46	0.	32.		141.
26	5	1986		5		3.55	3.3	3.15		27.5						39.8		9.2	3.76	0.41			0.03	0.46	0.	31.		234.
26	5	1986		6		6.1	6.05	6.05		27.5						33.6		9.5	1.76	0.13			0.	0.28	0.	35.		76.
26	5	1986		7		5.2	5.15	5.05		27.5						28.6		9.1	1.66	0.			0.	0.26	0.	46.		21.
26	5	1986		8		6.6	6.55	6.5		27.8			33.5	28.5	27.5	31.1		9.2	2.22	0.01			0.	0.26	0.	46.		142.
26	5	1986		9		1.9	1.85	1.85		27.5						46.1		9.1	6.06	0.07			0.	0.9	0.53	25.		254.
26	5	1986		10			0.15	0.15		27.5						62.3	53.1	7.2	5.22	0.73			0.15	0.88	0.56	37.		240.
26	5	1986		17		0.25				27.5		40.5	32.5			59.8		8.1	5.54	0.25			0.18	1.23	0.6	34.		464.
26	5	1986		18		6.95	6.9	6.85		27.5						19.9		8.9	1.28	0.48			0.08	0.2	0.	39.		25.
2	6	1986		1		8.1		7.95		29.8						49.8		8.7	0.9	0.04			0.	0.13	0.	46.		33.
2	6	1986		2		5.6	5.55	5.5		29.8						38.6		7.6	0.74	0.06			0.	0.05	0.	61.		37.
2	6	1986		3						30.						49.8		7.1	0.9	0.02			0.	0.06	0.	71.		3.
2	6	1986		4		3.45	3.2	3.05		28.8						43.6		9.7	4.42	0.2			0.	0.5	0.	24.		260.
2	6	1986		5		2.35	2.2	2.15		28.5						36.1		9.7	5.02	0.16			0.	0.59	0.01	25.		296.
2	6	1986		6		7.5	7.45	7.4		29.5						31.1		9.5	1.46	0.01			0.	0.19	0.	45.		56.
2	6	1986		7		6.85	6.8	6.7		29.5						37.4		9.3	1.18	0.06			0.	0.14	0.	57.		44.
2	6	1986		8		7.75	7.8	7.65		29.5		31.5	30.5	27.5	26.5	37.4		9.6	1.92	0.08			0.	0.22	0.	50.		47.
2	6	1986		9		0.65	0.55			28.8						48.6		9.1	6.38	0.03			0.	1.1	0.58	21.		286.
2	6	1986		10						29.3						62.3	50.1	7.6	6.38	0.58			0.18	1.23	0.58	27.		235.
2	6	1986		17		0.55		0.25		29.		35.5			27.5	64.7	54.1	9.	18.	0.12			0.	1.31	0.58	26.		374.
2	6	1986		18		3.4	3.4	3.25		29.3						17.4		7.2	1.5	0.05			0.	0.02	0.			22.
9	6	1986		1		6.75	6.05	5.9		27.8										0.01			0.18	0.15	0.01	42.		11.
9	6	1986		2		5.45	5.45	5.35		28.										0.01			0.04	0.04	0.	50.		60.
9	6	1986		3		6.3	6.25	6.25		28.										0.01			0.11	0.13	0.	45.		44.
9	6	1986		4		2.15	2.1	2.1		27.3										0.15			0.08	0.54	0.01	22.		356.
9	6	1986		5		2.15	2.1	2.05		27.3										0.05			0.04	0.53	0.04	23.		362.
9	6	1986		6		1.6	1.55	1.55		27.8										0.1			0.15	0.15	0.01	60.		61.
9	6	1986		7		6.3	6.3	6.25		27.8										0.			0.08	0.18	0.	45.		1.
9	6	1986		8		4.75	4.7	4.65		27.5			31.5	29.5	28.5					0.01			0.04	0.28	0.	36.		150.
9	6	1986		9						27.5										0.07			0.11	1.05	0.53	23.		254.
9	6	1986		10				0.05		27.5										0.91			0.15	1.19	0.68	37.		168.
9	6	1986		17		2.65	2.55	2.55		27.3				28.5						0.09			0.53	0.87	0.44	27.		378.
9	6	1986		18			3.9	3.85		27.5										0.03			0.	0.14	0.	45.		1.
16	6	1986		1		7.1	7.05									49.8	38.1	9.1	0.9	0.05			0.03	0.12	0.	55.		42.
16	6	1986		2		5.3	5.3	5.3								78.4	35.1	9.1	1.48	0.05			0.04	0.14	0.	51.		61.

Table 4. Weekly and Twice Weekly Measurements. Gualaca, Panama, Cycle III, Dry Season

DAY	MO.	YEAR	EXTRA DATA?	POND#	DO TIME	DO @ TOP	DO @ MID	DO @ BOTTOM	WATER TEMP @ TOP	WATER TEMP @ MID	WATER TEMP @ BOTTOM	WATER TEMP @ TOP-MAX	WATER TEMP @ BOT-MAX	WATER TEMP @ TOP-MIN	WATER TEMP @ BOT-MIN	ALKA.	HARD.	pH	KJELDAHL N	NH3-N	NO2-N	NO3-N	TOTAL NO2 & NO3-N	TOTAL P	ORTHO PO4-P	SECHII DISK A	SECHII DISK B	CHLOR-OPHYLL A
16	6	1986		6		6.2	6.25	6.15									41.3	9.7	2.16	0.04			0.08	0.18	0.	46.		58.
16	6	1986		7		5.05		4.85								36.1	36.1	9.6	1.78	0.01			0.03	0.11	0.	45.		57.
16	6	1986		8		5.25	5.25	5.2				33.5	31.5	28.5		38.6		9.6	3.08	0.06			0.03	0.27	0.01	38.		145.
16	6	1986		9			0.05	0.05								52.3	46.4	7.5	10.6	0.23			0.04	0.76	0.7	17.		268.
16	6	1986		10				0.05								63.5	50.5	7.2	7.2	0.75			0.04	1.05	0.68	35.		143.
16	6	1986		17		1.5	0.05	0.05				36.5	30.5	29.5			50.5	8.	6.46	0.14			0.65	0.92	0.42	27.		484.
16	6	1986		18		4.15	4.05	4.05								21.2	17.5	7.3	1.72	0.05			0.04	0.18	0.	30.		39.
23	6	1986		1												39.8		7.6	1.16	0.08			0.08	0.15	0.	49.		7.
23	6	1986		2												27.4	24.7	7.6	1.72	0.05			0.03	0.22	0.	38.		27.
23	6	1986		3												37.4	35.1	7.6	2.02	0.08			0.03	0.18	0.	39.		40.
23	6	1986		4												33.6	30.9	9.3	8.14	0.01			0.04	0.54	0.	20.		0.
23	6	1986		5												37.4		9.1	8.14	0.08			0.08	0.69	0.	24.		18.
23	6	1986		6												38.6		9.1	2.74	0.46			0.03	0.26	0.	36.		31.
23	6	1986		7												34.9		9.1	1.84	0.			0.04	0.2	0.	47.		42.
23	6	1986		8									30.5		25.5	34.9	29.9	9.	3.64	0.03			0.04	0.28	0.	39.		1.
23	6	1986		9													41.2	7.3	8.52	0.93			0.11	1.16	0.66	17.		1.
23	6	1986		10													44.3	7.1	4.72	1.02			0.11	1.41	0.62	27.		230.
23	6	1986		17												57.3	44.3	7.7	5.66	0.77			0.08	1.31	0.35	36.		66.
23	6	1986		18												12.5	13.4	8.4	1.78	0.01			0.03	0.42	0.	28.		15.

Table 4. Weekly and Twice Weekly Measurements. Gualaca, Panama, Cycle III, Wet Season

DAY	MO.	YEAR	EXTRA DATA?	POND#	DO TIME	DO @ TOP	DO @ MID	DO @ BOTTOM	WATER TEMP @ TOP	WATER TEMP @ MID	WATER TEMP @ BOTTOM	WATER TEMP @ TOP-MAX	WATER TEMP @ BOT-MAX	WATER TEMP @ TOP-MIN	WATER TEMP @ BOT-MIN	ALKA.	HARD.	pH	KJELDAHL N	NH3-N	NO2-N	NO3-N	TOTAL NO2 & NO3-N	TOTAL P	ORTHO PO4-P	SECHI DISK A	SECHI DISK B	CHLOR-OPHYLL A
28	7	1986		1	630											33.7	32.	8.02	0.	0.018			0.061	0.019	0.013			25.7
28	7	1986		2	630											24.8	26.8	9.02	0.	0.037			0.	0.048	0.013			16.5
28	7	1986		3	630											28.7	30.9	7.93	0.07	0.094			0.		0.019			10.4
28	7	1986		4	630											41.6	43.3	7.62	0.51	0.194			0.092	0.117	0.073			19.4
28	7	1986		5	630											47.5	43.3	7.33	0.77	0.581			0.	0.105				
28	7	1986		6	630											29.7	36.1	8.74	0.35	0.056			0.061	0.058	0.019			
28	7	1986		7	630											33.7	36.1	9.12	0.04	0.			0.					26.8
28	7	1986		8	630											36.6	37.1	9.56	1.12	0.			0.023	0.068	0.047			103.5
28	7	1986		9	630											40.6	42.3	7.47	1.36	0.632			0.	0.257				115.7
28	7	1986		10	630											39.6	40.2	7.71	1.83	0.853			0.	0.324				140.6
28	7	1986		17	630											44.5	33.	8.04	1.51	0.943			0.023	0.27				39.7
28	7	1986		18	630											29.7	32.	7.66	0.25	0.			0.					12.7
4	8	1986		1	630	8.75	8.55	8.65								42.1	35.	9.08	0.	0.016			0.	0.073	0.013	67.		31.1
4	8	1986		2	630	9.4	9.35	9.35		29.8						24.8	23.7	9.63	1.23	0.022			0.		0.028	52.		23.8
4	8	1986		3	630	5.45	5.35	5.4								38.6	37.1	8.1	0.62	0.152			0.	0.01	0.009	92.		12.9
4	8	1986		4	630	4.75	4.65	4.65		29.8						38.6	43.3	8.89		0.014			0.	0.105	0.033	110.		24.
4	8	1986		5	630	4.35	4.2	4.2		29.5						52.5	46.4	9.31	0.22	0.204			0.061	0.245	0.147	69.		34.5
4	8	1986		6	630	6.7	6.65	6.65		29.8						44.5	45.4	9.15	0.	0.017			0.	0.073	0.089	91.		14.3
4	8	1986		7	630	8.5	8.35	8.35		29.8						47.5	36.1	9.65		0.056			0.	0.122	0.009	70.		13.5
4	8	1986		8	630	10.7	10.7	10.7		29.8			32.5		27.5	46.	41.2	9.8		0.033			0.	0.305	0.053	46.		75.5
4	8	1986		9	630	2.65	2.55	2.5		29.5						46.5	49.5	9.76	1.56	0.045			0.	0.586	0.57	34.		125.
4	8	1986		10	630		0.15	0.15		29.5						49.5	48.5	7.91	2.4	0.056			0.023	0.741	0.57	41.		141.6
4	8	1986		17	630	1.3	1.25	1.2		29.5		34.5	32.5	29.5	28.5	48.5	61.9	7.77		0.873			0.	0.833	0.794	110.		17.8
4	8	1986		18	630	4.9	4.8	4.85		29.5						40.1	36.1	7.7		0.103			0.	0.073	0.023	110.		
11	8	1986		1	630		10.4									32.7	30.9	9.43	0.73	0.045			0.	0.147	0.095			
11	8	1986		2	630		8.4									25.7	23.7	9.45	0.81	0.045			0.061	0.23	0.084			17.4
11	8	1986		3	630					30.5						44.5	44.3	7.96	0.28	0.			0.	0.094	0.053			35.
11	8	1986		4	630		5.5									61.4	59.8	8.62	0.85	0.091			0.	0.179	0.053			24.8
11	8	1986		5	630		1.8									50.5	49.5	7.68	1.13	0.217			0.	0.207	0.095			
11	8	1986		6	630					30.5						45.5	45.4	9.28	0.66	0.091			0.	0.141	0.073			16.6
11	8	1986		7	630		9.8									33.7	35.	9.58	0.58	0.045			0.	0.122	0.068			26.8
11	8	1986		8	630		8.5						32.5		26.5	37.6	32.	9.03	1.27	0.045			0.	0.262	0.1			18.6
11	8	1986		9	630		1.6			29.5						53.5	50.5	8.57	3.41	0.045			0.	0.8	0.57			58.5
11	8	1986		10	630		1.2									52.5	52.6	8.66	3.62	0.091			0.	1.051	0.389			196.6
11	8	1986		17	630							35.5	32.5			66.3	67.	8.22		0.522			0.315	0.8	0.422			155.
11	8	1986		18	630											35.6	37.1	8.31	0.16	0.045			0.023	0.117	0.058			
18	8	1986		1	630	7.55	7.4	7.4		27.8						30.7	24.7	9.27	0.32	0.033				0.253	0.037			25.9
18	8	1986		2	630	7.15	7.05	7.1		27.5						19.8	21.6	9.3	0.48	0.152				0.23	0.058			14.1
18	8	1986		3	630		5.95	5.95								39.6	40.2	7.92	0.04	0.115					0.009			11.4
18	8	1986		4	630	2.75	2.65	2.75		27.8						57.4	55.7	8.35	1.27	0.056				0.186	0.009			63.8
18	8	1986		5	630	1.85	1.75	1.65								55.4	54.6	7.67	0.97	0.022				0.179	0.236			36.1
18	8	1986		6	630		4.9	4.9								43.6	42.3	8.65	0.38	0.115				0.1	0.028			25.4
18	8	1986		7	630	6.1		6.05		27.5		34.5				31.7	33.	9.48	0.51	0.				0.122	0.023			62.2
18	8	1986		8	630	5.9	5.85	5.85		27.8		34.5		28.5	28.5	30.7	28.9	9.38	0.89	0.				0.193	0.009			22.
18	8	1986		9	630	0.75	0.55	0.55		27.5						52.5	51.5	7.69	3.03	0.033				0.605	0.301			123.8
18	8	1986		10	630	0.45	0.35	0.35		27.5						53.5	52.6	7.63	2.54	0.01				0.691	0.329			219.8
18	8	1986		17	630	0.35	0.35			27.5		36.5	31.5		29.5	65.3	66.	7.78	2.85	0.01				0.568	0.207			155.2
18	8	1986		18	630	6.05	5.9	5.9		27.5						28.7	28.9	8.29	0.19	0.127				0.135	0.028			
21	8	1986		1	630																					48.	
21	8	1986		2	630																					47.	
21	8	1986		3	630																					80.	
21	8	1986		4	630																					46.	
21	8	1986		5	630																					57.	
21	8	1986		6	630																					72.	
21	8	1986		7	630																					51.	
21	8	1986		8	630																					45.	
21	8	1986		9	630																					37.	
21	8	1986		10	630																					35.	
21	8	1986		17	630																					20.	

Table 4. Weekly and Twice Weekly Measurements. Gualaca, Panama, Cycle III, Wet Season

DAY	MO.	YEAR	EXTRA DATA?	POND#	DO TIME	DO @ TOP	DO @ MID	DO @ BOTTOM	WATER TEMP @ TOP	WATER TEMP @ MID	WATER TEMP @ BOTTOM	WATER TEMP @ TOP-MAX	WATER TEMP @ BOT-MAX	WATER TEMP @ TOP-MIN	WATER TEMP @ BOT-MIN	ALKA.	HARD.	pH	KJELDAHL N	NH3-N	NO2-N	NO3-N	TOTAL NO2 & NO3-N	TOTAL P	ORTHO PO4-P	SECHII DISK A	SECHII DISK B	CHLOR-OPHYLL A
25	8	1986		3	630											33.7	38.1	8.73	1.56	0.			0.		0.033	67.		
25	8	1986		4	630											49.5	44.3	8.77	2.2	0.018			0.		0.028	75.		13.2
25	8	1986		5	630											48.5	49.5	8.47	2.47	0.036			0.		0.037	61.		27.4
25	8	1986		6	630											47.5	41.2	7.69		0.			0.		0.053	81.		12.4
25	8	1986		7	630											25.7	23.7	9.26		0.			0.	0.186	0.019	70.		16.1
25	8	1986		8	630							34.5	31.5			25.7	19.6	9.48	1.89	0.			0.	0.295	0.023	53.		23.3
25	8	1986		9	630											44.5	51.5	7.8	3.52	0.018			0.	0.551	0.276	60.		86.6
25	8	1986		10	630											46.5	46.4	8.08		0.036			0.	0.833	0.367	36.		238.6
25	8	1986		17	630							36.5	27.5	27.5		54.5	54.6	8.3	3.21	0.036			0.	0.906	0.377	46.		32.
25	8	1986		18	630											14.8	21.6	8.3	2.01	0.018			0.	0.172	0.013	51.		14.2
27	8	1986		1	630		9.8			29.5																		
27	8	1986		2	630					29.2																		
27	8	1986		3	630		9.2			29.3																		
27	8	1986		4	630		7.35			29.3																		
27	8	1986		5	630		7.8			29.2																		
27	8	1986		6	630		8.15			29.5																		
27	8	1986		7	630		8.7			29.5																		
27	8	1986		8	630		10.6			29.2																		
27	8	1986		9	630		3.3			29.3																		
27	8	1986		10	630		3.6																					
27	8	1986		17	630		1.95			29.3																		
27	8	1986		18	630		7.6			29.5																		
1	9	1986		1	630	6.8	6.3			28.5						24.8	22.7	9.1	0.				0.131	0.135	0.047			
1	9	1986		2	630	6.2		5.2								20.8	20.6	8.36	0.16				0.061	0.179	0.078			11.5
1	9	1986		3	630	6.3	6.3	6.1		28.5						28.7	28.9	8.66	0.42				0.061	0.122	0.047			26.6
1	9	1986		4	630	5.1		4.5								47.5	44.3	8.65	0.58				0.092	0.186	0.047			25.4
1	9	1986		5	630	4.2	3.5	3.3								42.6	42.3	8.7	0.35				0.023	0.122	0.053			62.
1	9	1986		6	630	6.2	6.2	5.9								39.6	38.1	8.84	0.16				0.061	0.166	0.042			22.5
1	9	1986		7	630	4.4	4.2									28.7	29.9	8.38	0.16				0.023	0.147	0.084			10.8
1	9	1986		8	630	5.4		4.8				33.5	30.5			30.7	23.7	9.14	0.28				0.061	0.237	0.1			30.5
1	9	1986		9	630											38.6	43.3	7.36	0.58				0.092	0.646	0.389			60.
1	9	1986		10	630			0.35								49.5	42.3	7.2	0.55				0.061	1.051	0.458			159.7
1	9	1986		17	630		0.15					35.5			28.5	52.5	52.6	7.37	0.73				0.023	0.833	0.482			17.2
1	9	1986		18	630		5.9	5.3		27.5						15.8	17.5	7.33	0.04				0.023	0.135	0.068			11.1
4	9	1986		1	630																					58.		
4	9	1986		2	630																					61.		
4	9	1986		3	630																					54.		
4	9	1986		4	630																					46.		
4	9	1986		5	630																					45.		
4	9	1986		6	630																					73.		
4	9	1986		7	630																					61.		
4	9	1986		8	630																					85.		
4	9	1986		9	630																					21.		
4	9	1986		10	630																					26.		
4	9	1986		17	630																					35.		
4	9	1986		18	630																					54.		
8	9	1986		1	630	6.8	6.75	6.6		30.3						26.7	27.8	8.7	0.42	0.			0.023	0.245	0.068	70.		
8	9	1986		2	630	6.35	6.2	6.15		30.3						22.8	21.6	7.64	0.62	0.009			0.023	0.117	0.073	67.		
8	9	1986		3	630	7.1	7.05			30.3						26.2	26.8	8.15	0.35	0.			0.092	0.078	0.047	71.		
8	9	1986		4	630	10.3	10.2									38.1	37.1	9.42	1.09	0.018			0.023	0.153	0.053	56.		30.7
8	9	1986		5	630	5.9	5.7	5.8								38.6	37.1	8.65	1.36	0.018			0.	0.237	0.058	44.		45.8
8	9	1986		6	630	6.6	6.6	5.95		30.5						43.6	37.1	8.4	0.35	0.018			0.092	0.135	0.047	78.		
8	9	1986		7	630	5.7	5.6	5.55		30.5						34.6	35.	8.36	0.59	0.009			0.	0.111	0.028	92.		
8	9	1986		8	630	9.1	8.75	8.45								30.7	13.4	9.2	1.27	0.009			0.061	0.141	0.042	45.		38.8
8	9	1986		9	630	0.75	0.65	0.65		29.8						46.5	36.1	7.09	2.62	0.028			0.023	0.535	0.252	30.		204.5
8	9	1986		10	630	3.25	3.15	3.15		29.5						38.6	38.1	8.02	2.94	0.037			0.	0.906	0.482	25.		133.2
8	9	1986		17	630		0.15	0.15							28.5	45.5	44.3	7.2	1.46	0.037			0.023	0.625	0.358	45.		67.5
8	9	1986		18	630	6.6	6.5	6.5								13.9	13.4	7.3	0.19	0.			0.	0.078	0.042	57.		
15	9	1986		1	630	7.3	7.2	7.15		29.3						25.7	36.6	8.16	0.62				0.023	0.089	0.033	47.		25.1
15	9	1986		2	630	6.2	6.1			29.3						24.8	25.8	7.2	0.59				0.131	0.111	0.028	60.		34.1

Table 4. Weekly and Twice Weekly Measurements. Gualaca, Panama, Cycle III, Wet Season

DAY	MO.	YEAR	EXTRA DATA?	POND#	DO TIME	DO @ TOP	DO @ MID	DO @ BOTTOM	WATER TEMP @ TOP	WATER TEMP @ MID	WATER TEMP @ BOTTOM	WATER TEMP @ TOP-MAX	WATER TEMP @ BOT-MAX	WATER TEMP @ TOP-MIN	WATER TEMP @ BOT-MIN	ALKA.	HARD.	pH	KJELDAHL N	NH3-N	NO2-N	NO3-N	TOTAL NO2 & NO3-N	TOTAL P	ORTHO PO4-P	SECHII DISK A	SECHII DISK B	CHLOR-OPHYLL A
15	9	1986		6	630	7.2	7.1	7.1		29.3						39.6	45.3	7.18	0.79				0.061	0.122	0.013	64.		38.9
15	9	1986		7	630	6.7	6.55	6.4								48.5	45.4	8.7	0.66				0.023	0.1	0.033	73.		31.3
15	9	1986		8	630	7.4	7.4	7.2		28.8					27.5	33.7	32.	9.24	1.72				0.023	0.262	0.047	38.		133.6
15	9	1986		9	630	2.2				28.8						42.6	41.2	7.12	2.2				0.092	0.535	0.301	26.		122.8
15	9	1986		10	630	1.2	1.15	1.15		28.5						43.6	42.3	7.5	3.74				0.061	1.051	0.587	10.		450.7
15	9	1986		17	630		0.85			28.8		35.5				51.5	49.5	7.3	2.66				0.092	0.715	0.276	38.		132.4
15	9	1986		18	630	6.2	6.1	5.95		28.5						11.9	13.4	7.	0.51				0.022	0.186	0.028	55.		46.3
22	9	1986		1	630		5.35			28.5						43.6	39.2	8.7	0.66	0.043			0.131	0.344	0.028	56.		18.3
22	9	1986		2	630		5.95			28.5						24.2	23.7	7.32		0.025			0.131	0.141	0.023	57.		22.7
22	9	1986		3	630		6.2			28.5						28.2	28.9	8.5	0.53	0.017			0.169	0.147	0.009	55.		
22	9	1986		4	630											38.6	37.1	9.45	1.89	0.052			0.061	0.237	0.009	40.		132.4
22	9	1986		5	630		6.4									39.6	39.2	9.15	1.72	0.052			0.023	0.461	0.013	32.		106.8
22	9	1986		6	630		6.5			28.5						45.5	44.3	8.84	1.13	0.034			0.023	0.2	0.013	58.		
22	9	1986		7	630		6.6			28.5						47.5	46.4	9.05	1.37	0.025			0.131	0.186	0.009	60.		28.1
22	9	1986		8	630		5.5			28.5			31.5			36.6	34.	7.58	1.67	0.07			0.131	0.172	0.037	57.		26.8
22	9	1986		9	630		2.05			28.3						47.5	45.9	7.23	3.31	0.07			0.131	0.742	0.293	28.		134.9
22	9	1986		10	630		0.85			27.5						46.5	45.4	7.34	5.47	0.079			0.023	1.56	0.587	20.		522.6
22	9	1986		17	630		2.4						30.5		27.5	54.5	52.6	7.36	3.12	0.136			0.431	0.691	0.301	35.		20.9
22	9	1986		18	630		5.8			27.5						9.9	10.3	7.5	1.41	0.034			0.092	0.215	0.033	30.		70.
29	9	1986		1	630	4.3	4.1	4.1		27.5						48.5	36.1	7.38	0.66	0.025			0.131			63.		48.2
29	9	1986		2	630	6.5	6.4	6.35		27.3						19.8	20.6	7.91	1.27	0.043			0.061			44.		33.7
29	9	1986		3	630	6.1	6.1			27.3						24.8	24.7	7.59	0.85	0.025			0.061			50.		13.
29	9	1986		4	630	3.55	3.5	3.4								37.6	37.1	8.93	2.47	0.043			0.			35.		107.2
29	9	1986		5	630	3.95	3.65	3.5								29.7	32.	8.9	2.47	0.034			0.061			34.		74.1
29	9	1986		6	630	6.6	6.55	6.3		27.3						46.5	43.3	8.6	1.46	0.025			0.023			40.		34.3
29	9	1986		7	630	5.65	5.55	5.5								44.5	47.4	9.	1.83	0.034			0.131			47.		31.9
29	9	1986		8	630	5.65	5.55	5.4				32.5	31.5	29.5	26.5	35.6	35.	9.14	2.69	0.034			0.131			39.		65.5
29	9	1986		9	630			0.75								43.6	43.3	7.02	3.85				0.131			31.		113.3
29	9	1986		10	630	0.65		0.25		26.8						41.6	41.2	7.5	5.96	0.079						16.		516.8
29	9	1986		17	630	1.12							30.5	26.56	27.5	42.6	43.3	7.56	4.39	0.07			0.061			27.		137.6
29	9	1986		18	630	6.8	6.7	6.6		26.5						9.9	10.3	8.2	1.09	0.016			0.023			35.		23.
6	10	1986		1	630		7.85	7.45								54.5	49.5	7.99	0.42				0.	0.153	0.	57.		31.4
6	10	1986		2	630	8.2	8.2	7.85		28.8						14.8	16.5	8.7	0.				0.	0.179	0.009	51.		43.2
6	10	1986		3	630	6.95	6.8	6.75								22.8	23.7	7.93	1.89				0.061	0.1	0.	62.		25.
6	10	1986		4	630	7.45	7.35	7.1		28.5						37.6	37.1	9.49	1.46				0.	0.27	0.019	43.		153.2
6	10	1986		5	630	7.05	6.95	6.65		28.5						31.7	35.	9.15	1.67				0.061	0.344	0.111	45.		118.1
6	10	1986		6	630	10.9	10.9	10.3		28.8						36.6	36.1	9.65	1.				0.061	0.159	0.073	52.		59.
6	10	1986		7	630	7.4	7.3	7.1								43.6	51.5	9.27	1.18				0.131	0.147	0.009	73.		25.2
6	10	1986		8	630	9.5	9.45	9.85		28.8			31.5	29.5		31.7	27.8	9.55	1.41				0.	0.287	0.058	52.		65.7
6	10	1986		9	630	2.9	2.8	2.7		28.5						41.6	42.3	7.43	4.54				0.131	0.997	0.347	28.		813.4
6	10	1986		10	630	2.2	2.15	2.1								41.6	41.2	8.18					0.131	1.56	0.721	17.		659.7
6	10	1986		17	630	1.3	1.15	1.2		28.5						29.7	42.3	8.4	3.85				0.061	1.278	0.699	25.		586.1
6	10	1986		18	630	4.4	4.2	4.2		28.5						9.9	12.4	7.	1.23				0.	0.179	0.058	44.		36.2
13	10	1986		1	630	6.3	6.3	6.3								36.6	35.	7.52	1.46	0.019			0.092	0.062	0.019			12.6
13	10	1986		2	630			5.8								9.9	10.3	6.74	1.	0.029			0.092	0.135	0.023			18.8
13	10	1986		3	630	6.4	6.3			25.5						13.9	14.4	6.73	0.97	0.019			0.238	0.089	0.009			19.
13	10	1986		4	630	3.7	3.7	3.4								33.7	38.1	7.25	3.22	0.029			0.169	0.278	0.009			166.9
13	10	1986		5	630	5.5	5.5	5.5								22.8	16.5	8.95	2.47	0.1			0.169	0.324	0.053			95.7
13	10	1986		6	630	6.1	5.9	5.9								26.7	28.9	8.8	1.32	0.049			0.092	0.147	0.028			
13	10	1986		7	630	5.4	5.4	5.4		25.5						35.6	39.2	8.52		0.019			0.159	0.129	0.009			31.7
13	10	1986		8	630	4.9	4.8	4.4		25.5						25.7	26.8	7.62	1.89	0.019			0.092	0.287	0.047			52.4
13	10	1986		9	630	2.5	2.4	2.3		25.5						31.7	34.	6.9	3.85	0.049			0.2	0.996	0.347			212.4
13	10	1986		10	630											32.7	33.	6.8	3.31	0.069			0.169	1.285	0.768			58.5
13	10	1986		17	630	2.4	2.4	2.3								30.7	33.	7.	3.41	0.049			0.131	0.78	0.555			202.
13	10	1986		18	630	6.2										7.9	9.3	6.5	0.97	0.029			0.092	0.122	0.019			21.1
14	10	1986		1	630											36.6	34.	7.2	0.55	0.027			0.061	0.048	0.009	63.		
14	10	1986		2	630											8.9	9.3	6.6		0.027			0.169	0.1	0.019	50.		48.8
14	10	1986		3	630											11.9	13.4	6.98		0.027			0.131	0.052	0.	55.		19.
14	10	1986		4	630											26.7	29.9	8.07	2.69	0.027			0.131	0.222	0.	32.		152.1
14	10	1986		5	630											20.8	21.6	9.	2.4	0.018				0.262	0.037	29.		115.4

Table 4. Weekly and Twice Weekly Measurements. Gualaca, Panama, Cycle III, Wet Season

DAY	MO.	YEAR	EXTRA DATA?	POND#	DO TIME	DO @ TOP	DO @ MID	DO @ BOTTOM	WATER TEMP @ TOP	WATER TEMP @ MID	WATER TEMP @ BOTTOM	WATER TEMP @ TOP-MAX	WATER TEMP @ BOT-MAX	WATER TEMP @ TOP-MIN	WATER TEMP @ BOT-MIN	ALKA.	HARD.	pH	KJELDAHL N	NH3-N	NO2-N	NO3-N	TOTAL NO2 & NO3-N	TOTAL P	ORTHO PO4-P	SECHII DISK A	SECHII DISK B	CHLOR-OPHYLL A
14	10	1986		9	630											25.7	23.7	6.99	3.85	0.027			0.169	0.878	0.276	37.		164.9
14	10	1986		10	630											27.7	33.	6.92	4.54	0.036			0.131	1.42	0.658	63.		176.1
14	10	1986		17	630											25.7	28.9	8.	3.98	0.046			0.131	0.928	0.358	28.		213.6
14	10	1986		18	630											6.9	8.2	6.65	0.85	0.036			0.131	0.094	0.013	51.		10.1
20	10	1986		1	630	7.1	7.05	6.85		27.5						38.6	36.1	7.47	0.51	0.017			0.131		0.105	70.		26.3
20	10	1986		2	630	6.6	6.55	6.4		27.3						14.3	7.2	6.74	1.18	0.034			0.131	0.129	0.058	45.		31.5
20	10	1986		3	630	8.1	8.05	7.7		27.3						10.9	11.3	7.8		0.034			0.169	0.215	0.028	47.		22.5
20	10	1986		4	630	3.9	3.6	3.45								29.7	33.	8.17	2.77	0.043			0.169	0.245	0.037	28.		104.8
20	10	1986		5	630	5.3	5.15	4.9								22.8	22.7	9.17	3.52	0.052			0.169	0.376	0.105	26.		67.8
20	10	1986		6	630	8.45	8.3	8.15		27.3						26.2	27.8	9.17	1.27	0.043			0.169	0.111	0.068	51.		32.3
20	10	1986		7	630	7.6	7.5	7.2		27.3						35.6	38.1	8.7	1.23	0.034			0.315	0.222	0.013	60.		21.6
20	10	1986		8	630	7.7	7.7	7.45				30.5			25.5	26.7	28.9	9.24	2.2	0.034				0.287	0.095	35.		50.7
20	10	1986		9	630		0.25	0.25								28.7	28.9	6.92	4.25	0.052			0.2	0.833	0.422	17.		79.1
20	10	1986		10	630											29.7	29.9	7.	5.47	0.052			0.169	1.478	0.743	14.		75.
20	10	1986		17	630		0.45							25.5	27.5	28.7	29.9	7.69	4.39	0.061			0.131	1.597	0.603	27.		132.7
20	10	1986		18	630	5.55	5.4	5.15								7.9	10.3	6.4	1.36	0.052			0.385	0.141	0.047	47.		13.2
27	10	1986		1	630											36.6	32.	7.36	0.85	0.026			0.092	0.048	0.023	75.		13.7
27	10	1986		2	630											5.9	6.7	6.6	0.48	0.026			0.131	0.172	0.028	39.		13.2
27	10	1986		3	630											8.9	8.8	7.13	1.05	0.034			0.131	0.073	0.019	44.		20.
27	10	1986		4	630											25.7	26.8	8.84	2.77	0.043			0.169	0.354	0.023	30.		105.5
27	10	1986		5	630											23.8	24.7	7.6	2.85	0.079			0.131	0.344	0.172	30.		72.4
27	10	1986		6	630											25.7	26.8	8.63	1.18	0.017			0.061	0.111	0.105	54.		26.8
27	10	1986		7	630											31.7	33.	8.85	1.23	0.017			0.092	0.159	0.	56.		31.3
27	10	1986		8	630							32.5		29.5		24.8	25.8	7.1	2.2	0.079			0.092	0.262	0.042	41.		21.3
27	10	1986		9	630											25.7	25.8	7.28	3.62	0.034			0.061	0.827	0.358	27.		134.9
27	10	1986		10	630											25.7	28.9	6.96	4.39	0.061			0.238	1.391	0.743	35.		39.7
27	10	1986		17	630							34.5		26.5	26.5	24.8	25.8	8.4	3.52	0.043			0.023	1.334	0.51	30.		195.8
27	10	1986		18	630											5.9	8.2	6.6	0.79	0.026			0.131	0.089	0.023	57.		21.7
28	10	1986		1	630		5.35			27.2																	
28	10	1986		2	630		4.9			26.8																	
28	10	1986		3	630		5.7			26.8																	
28	10	1986		4	630		2.15			26.5																	
28	10	1986		5	630		2.55			26.5																	
28	10	1986		6	630		5.65																				
28	10	1986		7	630		4.9																				
28	10	1986		8	630		1.15			26.8																	
28	10	1986		9	630					26.5																	
28	10	1986		10	630					26.8																	
28	10	1986		17	630	1.35	1.35	1.35																			
28	10	1986		18	630		5.35			26.8																	
5	11	1986		1	630	6.15	6.2	6.2								36.6	30.9	7.15		0.03			0.169	0.033	0.	87.		19.9
5	11	1986		2	630	6.2	6.3	6.2		28.5						5.9	7.2	6.7	1.18	0.04			0.092	0.153	0.009	37.		28.6
5	11	1986		3	630	6.65	6.6	6.5		28.8						13.9	7.2	7.5		0.04			0.092	0.083	0.004	35.		23.8
5	11	1986		4	630			3.9								23.8	23.7	9.23	3.31	0.083			0.131	0.376	0.009	25.		36.1
5	11	1986		5	630	3.9	3.85	3.85								20.8	21.6	8.94	2.77	0.105			0.131	0.387	0.068	23.		168.6
5	11	1986		6	630	8.4	8.4	8.35								24.8	25.8	9.1		0.03			0.061	0.105	0.013	57.		22.2
5	11	1986		7	630		9.1									27.7	28.9	9.49	0.81	0.03			0.131	0.153	0.	51.		33.6
5	11	1986		8	630	2.05	2.05	2.05		28.5		33.5	30.5	30.5		25.7	28.9	7.36	1.72	0.04			0.023	0.262	0.004	30.		90.1
5	11	1986		9	630	1.85	1.8	1.7		28.5						18.8	22.7	8.15	2.85	0.04			0.131	1.478	0.347	26.		233.3
5	11	1986		10	630	1.25	1.25	1.25		28.5						24.8	24.7	7.4	3.52	0.051			0.092	1.783	0.51	29.		253.9
5	11	1986		17	630	2.45	2.35	2.35					29.5	26.5	26.5	20.8	23.7	9.03	2.61	0.062			0.061	1.362	0.496	26.		235.1
5	11	1986		18	630	6.1	6.1	6.1		28.5						5.9	7.2	6.59	0.85	0.062			0.131	0.105	0.033	42.		18.6
11	11	1986		1	630											38.6	34.	7.17	1.72	0.02			0.092	0.043	0.023	98.		
11	11	1986		2	630											5.9	7.2	6.5	0.69	0.041			0.169	0.159	0.073	42.		35.3
11	11	1986		3	630											6.9	7.2	6.5	1.13	0.03			0.2	0.083	0.019	54.		
11	11	1986		4	630											25.7	25.8	9.03	4.11	0.01			0.2	0.296	0.023	24.		169.7
11	11	1986		5	630											24.8	25.8	8.2	4.11	0.072			0.131	0.535	0.095	30.		44.4
11	11	1986		6	630											25.7	27.8	9.22	1.05	0.03			0.169	0.215	0.042	62.		11.8
11	11	1986		7	630											26.7	26.8	9.65	1.41				0.061	0.186	0.	50.		32.2
11	11	1986		8	630							33.5	30.5		26.5	27.7	29.9	7.38	2.77	0.072			0.092	0.324	0.009	30.		92.1
11	11	1986		9	630											24.8	26.8	7.6		0.062			0.131	1.658	0.743	25.		268.3
11	11	1986		10	630											24.8	26.8	7.11	5.47	0.105			0.092	2.549	0.639	28.		261.8
11	11	1986		17	630								30.5	26.5	26.5	24.8	25.8	8.8	5.7	0.116			0.061	2.182	0.699	27.		221.6

Table 4. Weekly and Twice Weekly Measurements. Gualaca, Panama, Cycle III, Wet Season

DAY	MO.	YEAR	EXTRA DATA?	POND#	DO TIME	DO @ TOP	DO @ MID	DO @ BOTTOM	WATER TEMP @ TOP	WATER TEMP @ MID	WATER TEMP @ BOTTOM	WATER TEMP @ TOP-MAX	WATER TEMP @ BOT-MAX	WATER TEMP @ TOP-MIN	WATER TEMP @ BOT-MIN	ALKA.	HARD.	pH	KJELDAHL N	NH3-N	NO2-N	NO3-N	TOTAL NO2 & NO3-N	TOTAL P	ORTHO PO4-P	SECHII DISK A	SECHII DISK B	CHLOR-OPHYLL A
11	11	1986		18	630											6.9	8.2	6.7	1.36	0.072			0.023	0.117	0.033	40.		52.
17	11	1986		1	630	7.1	6.95									38.6	38.1	7.23	1.05	0.029			0.277	0.073	0.009	72.		
17	11	1986		2	630	2.85	2.8	2.75		27.5						11.9	12.4	6.58	1.83	0.029			0.315	0.153	0.023	54.		14.5
17	11	1986		3	630	5.1	5.05			27.8						12.9	13.4	6.7	1.05	0.019			0.385	0.078	0.009	65.		21.7
17	11	1986		4	630	3.7	3.6	3.55		27.3						25.7	26.8	8.73	4.54	0.019			0.169	0.503	0.037	23.		99.6
17	11	1986		5	630	2.95	2.9	2.85		27.3						26.7	27.8	7.85	3.98	0.029			0.354	0.398	0.111	26.		34.9
17	11	1986		6	630	7.75	7.7	7.65		27.8						28.7	27.8	8.85	1.41	0.009			0.315	0.166	0.042	58.		28.5
17	11	1986		7	630	6.95	6.9	6.85		27.8						27.7	28.9	9.3	2.01	0.009			0.315	0.186	0.019	45.		45.7
17	11	1986		8	630	1.25	1.2	1.2		27.5		33.5			26.5	26.7	28.9	7.24	3.52	0.019			0.277	0.398	0.111	25.		39.4
17	11	1986		9	630	0.25				27.5						30.7	27.8	6.98	5.26	0.049			0.469	1.42	0.587	24.		202.6
17	11	1986		10	630					27.5						26.7	26.8	7.16	5.26	0.039			0.385	1.912	0.678	26.		134.5
17	11	1986		17	630		0.95	0.95		27.3						25.7	24.7	7.6	4.7	0.039			0.839	1.72	0.794	29.		140.7
17	11	1986		18	630		5.95	5.95		27.5						13.9	14.4	7.05	0.51	0.019			0.315	0.068	0.028	49.		
24	11	1986		1	630	7.5	7.75	7.75								42.6	39.2	7.68	0.77	0.02			0.238	0.083	0.013	66.		24.8
24	11	1986		2	630					28.3						9.9	12.4	7.11	1.41	0.03			0.2	0.215	0.019	33.		75.
24	11	1986		3	630	4.7	4.65	4.6		28.8						14.8	16.5		1.23	0.03			0.169	0.083	0.013	74.		19.
24	11	1986		4	630	4.5	4.45	4.3		27.8						26.7	27.8	8.81	4.11	0.072			0.238	0.716	0.078	19.		342.9
24	11	1986		5	630	5.55	5.55	5.6		27.8						25.7	26.8	8.92	4.11	0.041			0.277	0.586	0.141	17.		234.9
24	11	1986		6	630	7.7	7.7	7.7		28.5						29.7	30.9	9.12	1.32	0.02			0.238	0.141	0.053	46.		37.9
24	11	1986		7	630	6.7	6.8	6.75		28.2						29.7	32.	9.5	1.89	0.01			0.354	0.253	0.033	34.		53.7
24	11	1986		8	630	2.75	2.7	2.7					28.5	28.5		28.7	30.9	7.56	3.52	0.01			0.238	0.474	0.095	22.		151.
24	11	1986		9	630	1.2	1.2	1.2		28.2						30.7	29.9	7.18	4.7	0.03			0.238	3.212	0.721	15.		273.2
24	11	1986		10	630	1.25	1.2	1.2								29.7	29.7	7.28	5.26	0.051			0.238	4.119	0.768	16.		521.1
24	11	1986		17	630	2.3	2.3	2.25		27.8					26.5	26.7	27.8	8.58	4.39	0.051			0.708	4.008	0.793	21.		489.9
24	11	1986		18	630	6.45	6.35	6.3		28.2						12.9	13.4	7.07	1.	0.02			0.2	0.135	0.023	40.		32.2
1	12	1986		1	630	1.75	1.65	1.6		27.5						39.6	37.1	7.65		0.02			0.092	0.159	0.028	61.		
1	12	1986		2	630	4.75	4.6	4.5		27.5						8.9	9.3	7.73	1.72	0.02			0.169	0.474	0.023	30.		108.1
1	12	1986		3	630			5.9		28.7						15.8	15.5	7.1	1.18	0.01			0.2	0.147	0.019	73.		12.7
1	12	1986		4	630	2.5	2.4	2.35		27.3						27.7	25.8	8.96	4.7	0.041			0.169	0.679	0.129	24.		318.
1	12	1986		5	630	2.5	2.6	2.7		27.5						26.7	26.8	8.8	4.54	0.02			0.061	0.742	0.222	26.		223.5
1	12	1986		6	630	7.75	7.8	7.7		28.2						31.7	32.	9.24	2.69	0.02			0.061	0.207	0.047	53.		26.8
1	12	1986		7	630	7.3	7.3	7.2		27.8						27.7	27.8	9.68		0.041			0.092	0.344	0.042	31.		95.3
1	12	1986		8	630	2.9	2.8	2.7		27.5		33.5	29.5			28.7	28.9	8.3		0.02			0.061	0.519	0.129	29.		158.5
1	12	1986		9	630											30.7	28.9	7.43	5.06	0.051			0.131	2.113	0.85	24.		268.8
1	12	1986		10	630					27.5						29.7	32.	7.62	6.91	0.041			0.169	1.912	0.913	20.		410.3
1	12	1986		17	630	7.4	7.3	7.4		28.5						28.7	29.9	8.46	4.7	0.041			0.669	2.045	0.88	25.		330.9
1	12	1986		18	630	5.5	5.4	5.4		27.5						11.9	13.4	6.98	1.36	0.01			0.092	0.237	0.053	41.		

Table 5. Diurnal Measurements. Gualaca, Panama, Cycle III, Dry Season

DAY	MONTH	YEAR	D.O. TIME	POND#	DO-TOP	DO-MID	DO-BOT	WATER TEMP TOP	WATER TEMP MID	WATER TEMP BOT	PH
20	2	1986	630	1		8.05			26.8		8.15
20	2	1986	630	2		7.3			27.		
20	2	1986	630	3		6.5			27.3		7.65
20	2	1986	630	4		4.9			27.3		7.75
20	2	1986	630	5		5.7			26.8		7.05
20	2	1986	630	6		8.3			27.		7.8
20	2	1986	630	7		7.2			27.		
20	2	1986	630	8		5.3			27.5		7.75
20	2	1986	630	9		4.55			27.		7.85
20	2	1986	630	10					27.		7.75
20	2	1986	630	17		1.4			26.8		
20	2	1986	630	18		6.7			26.3		7.75
20	2	1986	1000	1	10.2	10.8	9.5		28.		8.7
20	2	1986	1000	2	9.1	9.4	8.7		28.		8.35
20	2	1986	1000	3	7.3	7.2			28.		8.15
20	2	1986	1000	4	7.6	7.3	5.5		28.		8.45
20	2	1986	1000	5	9.6	8.95			28.		8.4
20	2	1986	1000	6	11.3	11.6			28.		8.85
20	2	1986	1000	7	8.45	8.6			28.		8.6
20	2	1986	1000	8	6.1	5.95	5.25		28.		8.35
20	2	1986	1000	9	14.4	7.4	5.2		27.		8.95
20	2	1986	1000	10		8.2	3.5		28.		8.35
20	2	1986	1000	17	8.7	7.7			28.		8.5
20	2	1986	1000	18	7.45	7.55	7.3		28.		8.2
20	2	1986	1400	1	15.2		15.6		31.		9.15
20	2	1986	1400	2			14.4		31.		8.9
20	2	1986	1400	3	9.3	9.4	9.2		31.		8.6
20	2	1986	1400	4	11.5	12.4	11.		30.		9.05
20	2	1986	1400	5	17.5	18.8	15.5		30.		9.1
20	2	1986	1400	6	16.6	17.6	16.6		30.5		9.25
20	2	1986	1400	7	11.8	12.4	13.		30.5		8.85
20	2	1986	1400	8	10.2	10.5	9.2		31.		8.8
20	2	1986	1400	9	20.	20.	10.4		30.		9.2
20	2	1986	1400	10	20.	20.	7.5		30.		9.15
20	2	1986	1400	17	19.4	17.2	8.4		33.		9.05
20	2	1986	1400	18	9.4	9.2	10.		31.		8.45
20	2	1986	1715	1	11.2	11.1	11.		29.8		8.75
20	2	1986	1715	2	11.1		10.9		30.		8.45
20	2	1986	1715	3	8.2	8.1	8.1		30.		8.2
20	2	1986	1715	4	9.8	9.6	9.5		30.		8.55
20	2	1986	1715	5	12.6	12.4	12.6		30.		8.7
20	2	1986	1715	6		12.1	12.		30.		8.9
20	2	1986	1715	7		10.2	10.		30.		8.55
20	2	1986	1715	8					30.3		8.4
20	2	1986	1715	9	13.2		13.9		30.5		8.95
20	2	1986	1715	10	16.4	16.5	15.6		30.		8.752
20	2	1986	1715	17	10.8	10.8	10.8		29.5		8.65
20	2	1986	1715	18	8.4	8.3	8.3		29.		8.3
21	2	1986	630	1		7.15			26.5		7.85
21	2	1986	630	2		6.65			26.7		7.57
21	2	1986	630	3		6.05			27.		7.25
21	2	1986	630	4		4.2			26.8		7.42
21	2	1986	630	5		6.35			26.5		7.55
21	2	1986	630	6		7.852			26.5		7.65
21	2	1986	630	7		6.55			26.8		7.1
21	2	1986	630	8		3.6			27.		6.8
21	2	1986	630	9		4.3			26.5		6.9
21	2	1986	630	10		1.95			26.8		6.25
21	2	1986	630	17		0.85			26.5		7.4
21	2	1986	630	18					26.5		7.35
27	2	1986	630	1		8.55			27.5		8.05
27	2	1986	630	1		8.5			28.		8.15
27	2	1986	630	2		8.95			27.5		7.95
27	2	1986	630	3		6.8			27.8		7.5
27	2	1986	630	4		2.95			27.8		7.5
27	2	1986	630	5		6.2			27.8		7.752
27	2	1986	630	6		8.9			27.5		
27	2	1986	630	7		8.25			28.		7.8
27	2	1986	630	8					27.8		7.95
27	2	1986	630	9		6.8			27.5		7.45
27	2	1986	630	10		2.45			27.5		6.6
27	2	1986	630	17		2.75			27.5		7.85
27	2	1986	630	18		5.7			27.3		7.6
27	2	1986	1000	1	10.9	11.1	10.15		28.8		8.4
27	2	1986	1000	2		11.7	9.4		28.5		8.35
27	2	1986	1000	3	7.95	7.9	7.7		29.		7.8
27	2	1986	1000	4	4.15	4.75	3.75		27.8		7.85
27	2	1986	1000	5	8.15	7.95	7.55		28.8		8.105
27	2	1986	1000	6	11.8	12.4	10.		28.5		8.55
27	2	1986	1000	7	9.8	9.85	9.6		28.8		8.15
27	2	1986	1000	8	16.2	16.3	13.7		28.5		8.35
27	2	1986	1000	9	9.4	9.05	7.8		28.5		7.85
27	2	1986	1000	10	17.5	6.2	1.9		28.5		7.25
27	2	1986	1000	17	14.5		4.5		28.8		8.35
27	2	1986	1000	18	6.85	6.6	6.55		28.8		7.95
27	2	1986	1400	1		15.2	14.4		31.5		8.8
27	2	1986	1400	2	12.2	16.6	14.		32.3		8.65
27	2	1986	1400	3	9.056	9.2	9.45		32.		8.1
27	2	1986	1400	4	7.3	7.65	7.3		31.5		8.15
27	2	1986	1400	5	11.8	13.9	12.		31.8		8.45
27	2	1986	1400	6	13.3	14.6	13.3		31.		8.75
27	2	1986	1400	7	12.4	13.9	13.6		31.8		8.55
27	2	1986	1400	8			20.		31.5		8.9
27	2	1986	1400	9	13.1	14.9	13.3		31.3		8.6
27	2	1986	1400	10	20.	13.3	4.6		31.3		8.35
27	2	1986	1400	17	21.	21.	9.2		32.		
27	2	1986	1400	18	8.25	8.1	8.1		32.5		8.15
27	2	1986	1715	1	13.8	16.2	14.4		32.		8.85
27	2	1986	1715	2	14.3		15.3		31.5		8.75
27	2	1986	1715	3	9.3	9.3	9.4		32.		8.15
27	2	1986	1715	4	8.7	8.8	8.4		32.		5.25
27	2	1986	1715	5	14.3	14.1	14.		32.5		8.55
27	2	1986	1715	6		14.2	13.8		31.3		8.7
27	2	1986	1715	7	13.5	15.4	15.1		32.		8.55
27	2	1986	1715	8	19.7	20.	20.		32.3		8.75
27	2	1986	1715	9	15.2	16.2	16.		32.3		8.35
27	2	1986	1715	10	20.	20.	6.1		32.5		7.75
27	2	1986	1715	17	20.	20.	7.6		32.		9.25
27	2	1986	1715	18	8.2	8.2	8.2		33.		8.35
28	2	1986	630	2					28.		8.05
28	2	1986	630	3		6.15			28.5		7.45
28	2	1986	630	4		3.15			28.5		7.5
28	2	1986	630	5		5.4			28.3		7.7
28	2	1986	630	6		8.95			27.8		8.05
28	2	1986	630	7		8.45			28.5		7.8
28	2	1986	630	8		12.2			28.3		7.95
28	2	1986	630	9		6.5			28.3		
28	2	1986	630	10					27.5		6.85
28	2	1986	630	17		3.45			28.		7.85
28	2	1986	630	18		5.1			28.		7.55
13	3	1986	630	1		9.5			28.3		9.25
13	3	1986	630	2		8.7			28.3		9.54
13	3	1986	630	3		6.35			28.8		7.88
13	3	1986	630	4		4.7			28.8		8.31
13	3	1986	630	5					28.		9.49
13	3	1986	630	6		7.6			28.3		9.5
13	3	1986	630	7		9.8			28.3		9.5
13	3	1986	630	8		7.8			28.5		9.36
13	3	1986	630	9		5.6			28.8		8.75
13	3	1986	630	10		0.15			29.		7.5
13	3	1986	630	17		5.7			28.3		9.28
13	3	1986	630	18		6.95			28.5		7.92
13	3	1986	1000	1	11.2	11.2	9.9		29.		
13	3	1986	1000	2	11.8	11.8	9.1		29.		
13	3	1986	1000	3	7.7	7.8	7.3		29.3		7.65
13	3	1986	1000	4	9.3	9.7	5.8		29.1		7.752
13	3	1986	1000	5		14.2	12.4		28.8		8.1
13	3	1986	1000	6	13.6	12.4	8.4		29.		8.05
13	3	1986	1000	7		12.05	10.9		29.		
13	3	1986	1000	8	11.8	10.4	8.4		29.		7.95
13	3	1986	1000	9	9.4	8.4	7.2		29.5		7.35

Table 5. Diurnal Measurements. Gualaca, Panama, Cycle III, Dry Season

DAY	MONTH	YEAR	D.O. TIME	POND#	DO-TOP	DO-MID	DO-BOT	WATER TEMP TOP	WATER TEMP MID	WATER TEMP BOT	PH
13	3	1986	1000	10	5.85	4.5	1.8		29.5		6.8
13	3	1986	1000	17	12.3	8.2			29.5		7.9
13	3	1986	1000	18	8.2		7.7		29.		7.7
13	3	1986	1400	1	11.2	12.4	10.7		30.		8.4
13	3	1986	1400	2	12.8	13.8	11.		30.5		8.55
13	3	1986	1400	3		8.2			31.		8.15
13	3	1986	1400	4		12.1	9.2		30.8		8.35
13	3	1986	1400	5	14.6		16.		31.8		8.9
13	3	1986	1400	6	12.2	13.9	9.6		31.		8.85
13	3	1986	1400	7	11.8	14.4	12.9		31.		8.75
13	3	1986	1400	8	13.6	14.9	12.4		31.5		8.85
13	3	1986	1400	9	16.4	17.2	11.6		31.8		8.8
13	3	1986	1400	10		13.2	7.2		32.		8.65
13	3	1986	1400	17	16.2	15.6	10.2		32.8		8.35
13	3	1986	1400	18	15.2	15.2	15.9		32.8		
13	3	1986	1715	1		12.4	12.2		31.8		8.15
13	3	1986	1715	2	12.9	13.3	11.8		31.8		8.25
13	3	1986	1715	3	8.4	8.4	8.3		32.		7.95
13	3	1986	1715	4	11.6	11.3	11.2		32.		
13	3	1986	1715	5	15.5		15.6		31.5		8.6
13	3	1986	1715	6	12.3	12.3	11.9		31.8		8.6
13	3	1986	1715	7	13.2	13.7	14.4		31.5		8.65
13	3	1986	1715	8	13.8	13.8	13.2		32.		8.75
13	3	1986	1715	9	18.4		14.4		32.		8.7
13	3	1986	1715	10	14.1	13.4			32.		8.55
13	3	1986	1715	17	17.9	17.1	11.8		32.5		8.05
13	3	1986	1715	18	8.2	8.2	8.1		32.3		6.8
14	3	1986	630	1	8.9	8.8	8.75		28.8		7.45
14	3	1986	630	2	7.45	7.4	7.15		28.1		7.65
14	3	1986	630	3	6.05	5.95	5.9		29.		7.45
14	3	1986	630	4	3.5	3.4	3.2		29.		7.3
14	3	1986	630	5	9.4	9.4	9.1		28.5		
14	3	1986	630	6	6.8	6.7	6.7		28.5		7.95
14	3	1986	630	7	9.25	9.2	9.15		28.8		
14	3	1986	630	8	7.5	7.4	7.05		28.8		8.05
14	3	1986	630	9	5.15	4.9	4.75		28.8		7.8
14	3	1986	630	10	1.2	1.15	1.15		29.		7.6
14	3	1986	630	17	4.4	4.3	4.25		28.3		7.2
14	3	1986	630	18	6.25	6.15	6.1		28.8		6.45
3	4	1986	630	1		8.65			27.5		9.3
3	4	1986	630	2	7.5	7.4	7.3		27.5		9.46
3	4	1986	630	3	8.85	8.75	8.6		27.3		9.12
3	4	1986	630	4		3.4			27.5		9.12
3	4	1986	630	5	7.85	7.75	7.45		26.8		9.27
3	4	1986	630	6	6.45	6.45	6.25		26.8		9.1
3	4	1986	630	7		8.05			28.3		9.54
3	4	1986	630	8	10.7	10.7	9.5		26.5		9.32
3	4	1986	630	9			0.1		28.		8.87
3	4	1986	630	10			0.1		28.		8.5
3	4	1986	630	17			0.05		27.3		9.1
3	4	1986	630	18	8.2	8.2	8.2		25.8		8.6
3	4	1986	1000	1		12.6	9.6	31.	28.8	28.	8.75
3	4	1986	1000	2	13.4	13.8	9.2	30.8	30.	28.5	8.35
3	4	1986	1000	3	11.6	11.8	10.9	29.	28.	27.8	8.05
3	4	1986	1000	4	13.1	7.8	3.4	30.	27.8	27.8	7.7
3	4	1986	1000	5			9.8	28.5	28.	27.	7.4
3	4	1986	1000	6	10.2		8.2	28.8	28.	27.	7.4
3	4	1986	1000	7	11.2	11.5	9.9	30.5	29.8	28.5	7.3
3	4	1986	1000	8	14.3	14.3	11.8	28.8	28.	27.	7.05
3	4	1986	1000	9	13.9	6.8	1.2	30.3	28.8	28.	6.85
3	4	1986	1000	10	18.8	6.2	2.8	31.	28.5	28.	6.85
3	4	1986	1000	17	20.	5.4	0.6	33.3	28.8	28.3	8.4
3	4	1986	1000	18	9.3	9.6	9.8	29.3	27.	269.3	8.1
3	4	1986	1400	1	13.4	14.2	12.6	31.5	30.	29.	8.95
3	4	1986	1400	2	12.1	15.2	10.2	31.5	30.5	29.	8.95
3	4	1986	1400	3	12.5	14.4	14.8	31.	30.	29.	8.8
3	4	1986	1400	4	16.3	16.2	7.1	321.5	29.3	28.3	8.9
3	4	1986	1400	5		11.5	11.4	30.	29.3	28.	8.65
3	4	1986	1400	6	13.4	15.2	13.5	30.5	29.8	28.3	8.75
3	4	1986	1400	7	12.3	14.1	12.6	321.5	31.	29.8	8.6
3	4	1986	1400	8	13.2	15.2	14.8	31.	28.5	27.	8.45
3	4	1986	1400	9	18.6	8.2	2.6	33.	29.3	28.8	8.15
3	4	1986	1400	10	18.2	7.4	0.6	34.	29.5	28.5	7.4
3	4	1986	1400	17	17.4	8.8	1.4	33.3	28.8	28.	8.95
3	4	1986	1400	18	9.4	9.4	11.	31.	30.5	27.	8.6
3	4	1986	1715	1	10.5	10.4	10.6	29.8	29.8	29.5	8.75
3	4	1986	1715	2	11.1	11.1	10.9	29.8	29.5	29.5	8.85
3	4	1986	1715	3	11.1	11.1	11.1	29.3	29.3	29.3	8.8
3	4	1986	1715	4	10.5	10.5	7.4	29.5	29.5	29.	8.95
3	4	1986	1715	5	10.1	10.1	10.	28.8	28.8	28.8	8.8
3	4	1986	1715	6	11.4	11.3	11.2	28.8	29.	28.8	8.9
3	4	1986	1715	7		10.9	10.3	30.	30.	30.	8.95
3	4	1986	1715	8	11.5	11.6	12.	28.8	28.8	28.5	8.95
3	4	1986	1715	9	9.8	8.2	6.9	29.8	30.	29.5	
3	4	1986	1715	10	10.1	9.2		29.8	29.8	29.	8.95
3	4	1986	1715	17	10.1		2.9	29.	29.	28.8	8.75
3	4	1986	1715	18	9.3	9.2	9.4	28.3	28.	27.8	8.45
4	4	1986	630	1	6.95	6.9	6.75		27.5		8.2
4	4	1986	630	2	6.55	6.45	6.4		27.5		8.15
4	4	1986	630	3	7.7	7.65	7.55		27.8		7.9
4	4	1986	630	4	2.15	2.15	2.15		27.5		7.75
4	4	1986	630	5	5.35	5.25	5.15		27.		7.7
4	4	1986	630	6	6.45	6.45	6.4		27.3		7.75
4	4	1986	630	7	6.55	6.55	6.5		28.		7.55
4	4	1986	630	8	8.55	8.45	8.3		26.8		7.25
4	4	1986	630	9			0.1		27.8		6.65
4	4	1986	630	10			0.1		27.5		6.55
4	4	1986	630	17		0.15	0.1		27.3		7.9
4	4	1986	630	18			7.95		26.8		
14	4	1986	1400	1	13.4	13.7	12.4	31.3	30.5	29.3	8.25
14	4	1986	1400	2	14.1	13.8	13.	21.5	31.	28.5	8.25
14	4	1986	1400	3	14.2	14.7	15.9	31.	30.3	28.8	8.25
14	4	1986	1400	4	15.3	15.3	13.7	31.5	31.	30.	8.1
14	4	1986	1400	5	19.3	20.3	17.9	31.3	30.5	29.3	8.3
14	4	1986	1400	6	14.5	15.1	15.9	31.	30.	29.3	8.4
14	4	1986	1400	7	14.2	14.7	14.6	31.5	30.8	29.5	8.35
14	4	1986	1400	8	14.4	15.1	13.7	31.3	30.5	29.3	8.35
14	4	1986	1400	9	20.	18.3		31.	30.	28.5	8.35
14	4	1986	1400	10	12.2	10.8	1.9	31.5	30.5	29.	7.65
14	4	1986	1400	17	20.	10.3	3.5	32.	30.3	28.8	8.25
14	4	1986	1400	18	12.6	12.7	11.5	31.5	30.5	29.5	8.15
14	4	1986	1715	1	11.6	11.5	11.2	30.	30.	30.	8.3
14	4	1986	1715	2	12.9	11.8	10.3	29.8	29.8	29.8	8.3
14	4	1986	1715	3	12.4	12.3	12.1	29.8	29.8	25.8	8.35
14	4	1986	1715	4	11.2	11.1	10.	30.3	30.3	30.	8.15
14	4	1986	1715	5	13.8	13.7	12.7	30.	30.	30.	8.35
14	4	1986	1715	6	12.4	12.4	12.2	30.	29.8	29.8	8.25
14	4	1986	1715	7	12.2	12.2	11.7	30.	30.	30.	8.2
14	4	1986	1715	8			11.1	30.	30.	29.8	8.2
14	4	1986	1715	9	12.7	12.5	9.8	29.8	29.8	29.05	8.05
14	4	1986	1715	10	7.9	7.5	5.6	30.	30.	30.	7.25
14	4	1986	1715	17	12.8	11.6		29.5	29.5	29.3	8.45
14	4	1986	1715	18	10.8	10.7	9.5	30.	30.	30.	8.35
15	4	1986	630	1	7.7	7.2	7.15		28.3		
15	4	1986	630	1			0.8		28.		7.85
15	4	1986	630	2	6.7	6.7	6.65		28.		7.9
15	4	1986	630	3		7.95	7.95		28.3		7.85
15	4	1986	630	4	4.2	4.2			28.5		7.5
15	4	1986	630	5	6.45	6.4	6.35		28.3		7.65
15	4	1986	630	6	7.9	7.85	7.75		28.5		7.45
15	4	1986	630	7	7.4	7.35	7.35		28.3		
15	4	1986	630	8	6.25	6.25	6.15		28.3		6.8
15	4	1986	630	9	1.6	1.55	1.5		28.		6.45
15	4	1986	630	10		0.15	0.1		28.		6.2
15	4	1986	630	18	5.75	5.55	5.55		28.		7.9
28	4	1986	630	1	8.6	8.5	8.5		28.3		9.13
28	4	1986	630	2	8.9	8.8	8.6		28.		9.16
28	4	1986	630	3	7.6	7.55	7.5		28.		9.44
28	4	1986	630	4	8.3	8.15	8.1		28.8		9.29
28	4	1986	630	5	6.1		5.95		27.5		9.44
28	4	1986	630	6	7.8	7.7	7.3		28.		9.37
28	4	1986	630	7	7.5	7.4	7.35		28.3		9.35

Table 5. Diurnal Measurements. Gualaca, Panama, Cycle III, Dry Season

DAY	MONTH	YEAR	D.O. TIME	POND#	DO-TOP	DO-MID	DO-BOT	WATER TEMP TOP	WATER TEMP MID	WATER TEMP BOT	PH
28	4	1986	630	8	8.8	8.7	8.7		28.		9.18
28	4	1986	630	9	3.35	3.35	3.3		27.5		9.27
28	4	1986	630	10	1.3	1.35	1.2		0.5275		7.82
28	4	1986	630	17		0.25	0.25		27.3		9.25
28	4	1986	630	18	6.95	6.8	6.75		28.		7.6
28	4	1986	1000	1	11.1	11.3	8.7	28.3	29.	30.	9.89
28	4	1986	1000	2	12.4	12.1	10.7	28.5	29.	29.5	10.09
28	4	1986	1000	3	9.4	9.5	8.7	28.5	29.	29.5	9.81
28	4	1986	1000	4		15.5	9.5	28.	28.5	29.5	10.3
28	4	1986	1000	5	16.5	12.1	5.4	27.5	29.	29.5	10.2
28	4	1986	1000	6	11.1	11.4	11.9	28.5	29.	29.5	10.19
28	4	1986	1000	7	10.4	10.3	9.1	28.5	29.	29.5	9.99
28	4	1986	1000	8		11.8	10.5	28.5	28.5	29.3	10.15
28	4	1986	1000	9	14.4	6.8	2.4	27.5	28.	29.5	10.34
28	4	1986	1000	10	17.4	8.6	2.3	27.25	28.	30.25	9.9
28	4	1986	1000	17	21.	3.6	1.5	27.5	27.75	31.75	10.04
28	4	1986	1000	18	9.1	8.8	8.05	28.5	29.5	30.	9.18
28	4	1986	1400	1	13.7	14.8	12.4	33.5	31.3	29.5	10.13
28	4	1986	1400	2	15.1	15.8	14.9	33.5	32.	29.5	10.24
28	4	1986	1400	3	11.9	11.9	11.5	33.	32.	29.5	10.01
28	4	1986	1400	4	18.7	19.6		34.	31.5	28.5	10.47
28	4	1986	1400	5	17.6	19.3		34.3	30.5	28.	10.34
28	4	1986	1400	6	14.6	15.3	15.5	32.8	30.5	29.5	10.37
28	4	1986	1400	7	12.7	14.3	14.6	33.	31.5	30.	10.26
28	4	1986	1400	8	15.5		17.1	321.5	31.	29.5	10.38
28	4	1986	1400	9		13.5	3.1	34.8	29.	27.8	10.5
28	4	1986	1400	10	21.	15.1	3.3	35.5	29.5	28.5	10.24
28	4	1986	1400	17	19.7	9.1	0.3	37.	29.5	27.5	10.09
28	4	1986	1400	18	9.4	9.7	11.2	34.	33.5	30.	9.5
28	4	1986	1715	1	13.1	13.5	12.7	32.	32.	30.	9.95
28	4	1986	1715	2			15.1	32.	32.	29.8	10.09
28	4	1986	1715	3	10.9	10.9	13.2	32.	32.	30.	9.88
28	4	1986	1715	4	14.9	147.5	11.8	32.3	32.3	29.3	10.39
28	4	1986	1715	5	14.2	14.1	5.4	32.	31.8	29.	10.36
28	4	1986	1715	6			12.7	32.	32.	31.8	10.3
28	4	1986	1715	7			12.6	32.3	32.	32.	10.17
28	4	1986	1715	8	14.7	15.1	147.6	32.	32.	30.8	10.3
28	4	1986	1715	9	15.2	16.2	1.2	32.8	32.5	28.3	10.38
28	4	1986	1715	10	21.	21.		33.	33.	29.	10.34
28	4	1986	1715	17	15.8	10.3	1.2	31.	30.	28.	9.55
28	4	1986	1715	18	10.8	11.2	10.9	31.8	31.8	29.	10.2
29	4	1986	630	1	7.45	7.3	7.25		28.5		
29	4	1986	630	2	7.9	7.75	7.65		28.5		
29	4	1986	630	3	7.65	7.5	7.5		28.5		
29	4	1986	630	4		7.95	7.95		28.		
29	4	1986	630	5	5.3	4.95	4.9		28.		
29	4	1986	630	6	7.75	7.8	7.8		28.5		
29	4	1986	630	7	7.25	7.25	7.2		28.5		
29	4	1986	630	8	9.05	8.95	8.9		28.5		
29	4	1986	630	9	3.25	3.1	3.05		27.5		
29	4	1986	630	10	2.9	2.85	2.65		27.8		
29	4	1986	630	17		0.25	0.25		27.3		
29	4	1986	630	18	6.65	6.6	6.65		28.3		
12	5	1986	630	1	6.3	6.3	6.15		29.		7.75
12	5	1986	630	2	3.25	3.25	3.25		29.5		7.38
12	5	1986	630	3	7.4	7.4	7.25		28.8		9.58
12	5	1986	630	4	6.4	6.3	6.2		29.		9.33
12	5	1986	630	5	3.35	3.25	3.1		29.		9.31
12	5	1986	630	6	6.75	6.75	6.6		29.		9.59
12	5	1986	630	7	6.35	6.3	6.25		29.		9.54
12	5	1986	630	8	4.4	4.35	4.3		29.		9.28
12	5	1986	630	9	1.6	1.55	1.5		28.5		9.3
12	5	1986	630	10			0.15		28.5		8.88
12	5	1986	630	17	0.105	0.15	0.1		28.5		9.17
12	5	1986	630	18	5.9	5.7	5.7		28.8		9.11
12	5	1986	1000	1	8.54	8.4	7.4	29.5	29.5	29.3	9.18
12	5	1986	1000	2	4.95		4.45	30.	29.8	29.5	7.74
12	5	1986	1000	3	11.25	11.6	8.9	29.5	29.3	29.	9.99
12	5	1986	1000	4	8.75	7.9	4.25	29.5	29.5	29.	9.6
12	5	1986	1000	5	6.4	6.45	4.1	29.5	29.5	29.	9.6
12	5	1986	1000	6	9.6	9.65	7.05	29.8	29.3	29.	9.94
12	5	1986	1000	7	9.9	9.8	6.4	29.5	29.3	29.	10.03
12	5	1986	1000	8	7.7	5.5	3.9	29.8	29.5	29.5	9.73
12	5	1986	1000	9		0.43	0.85	29.3	28.8	28.5	9.97
12	5	1986	1000	10	11.6	3.3	0.05	29.	28.5	28.3	10.07
12	5	1986	1000	17	19.6	2.4	0.25	30.3	28.5	28.5	9.52
12	5	1986	1000	18	9.05	8.1	6.35	30.	29.	28.8	9.42
12	5	1986	1400	1	10.5	10.3		29.8	30.3	30.3	9.27
12	5	1986	1400	2	7.7	7.3	6.5	30.5	30.5	30.5	8.26
12	5	1986	1400	3	13.3	13.7	11.1	29.5	30.3	30.3	9.94
12	5	1986	1400	4	13.6	12.1	4.7	29.8	30.3	30.5	9.73
12	5	1986	1400	5	12.9	11.3	6.1	29.5	30.3	30.3	9.48
12	5	1986	1400	6	14.3	12.6	7.5	29.5	30.	30.3	9.72
12	5	1986	1400	7	14.7	12.4	7.4	29.5	30.3	30.5	10.07
12	5	1986	1400	8	13.5	12.3	7.1	29.8	30.3	30.5	9.8
12	5	1986	1400	9	15.2		6.4	29.5	29.8	30.	9.98
12	5	1986	1400	10	16.3	6.9	2.5	29.	29.5	30.	9.51
12	5	1986	1400	17	20.5	8.6		29.	29.5	30.	9.9
12	5	1986	1400	18	10.8	10.3	8.9	29.5	30.3	30.3	
12	5	1986	1715	1	11.5	11.4	7.8	30.3	30.3	30.	9.5
12	5	1986	1715	2		7.7	5.8	30.25	30.5	30.5	8.6
12	5	1986	1715	3	13.8	13.8	12.2	30.3	30.3	30.	10.12
12	5	1986	1715	4	13.7	13.6	7.6	30.3	30.3	30.	9.81
12	5	1986	1715	5			6.9	30.3	30.3	30.	10.05
12	5	1986	1715	6		14.8	8.6	30.3	30.3	30.	10.15
12	5	1986	1715	7	14.8	14.7		30.3	30.3	30.	10.21
12	5	1986	1715	8	14.7	12.8	6.8	30.3	30.3	30.	9.94
12	5	1986	1715	9	15.3	9.2	4.2	30.	29.8	29.8	9.93
12	5	1986	1715	10	20.	10.2	1.6	30.	29.8	29.3	10.08
12	5	1986	1715	17	20.	11.2	3.4	30.3	30.	29.3	
12	5	1986	1715	18	11.6	11.5	7.5	30.3	30.3	29.8	9.66
13	5	1986	630	1	5.15		5.05		28.8		8.99
13	5	1986	630	2	3.2	3.15	3.1		29.		7.55
13	5	1986	630	3	6.55	6.45	6.45		28.5		9.65
13	5	1986	630	4	4.3	4.15	4.15		28.8		9.27
13	5	1986	630	5	2.4	2.2	2.2		28.8		9.26
13	5	1986	630	6	5.95	5.85	5.8		28.5		9.6
13	5	1986	630	7	6.45	6.35	6.35		28.5		9.72
13	5	1986	630	8	3.45	3.35	3.35		28.8		9.26
13	5	1986	630	9	1.1				28.5		9.15
13	5	1986	630	10		0.15	0.15		28.3		9.13
13	5	1986	630	17	0.25		0.15		28.3		9.71
13	5	1986	630	18	5.7	5.654	5.65		28.5		9.1
26	5	1986	630	1	6.95	6.9	6.85		28.		7.67
26	5	1986	630	2	2.5	2.4	2.35		28.		7.15
26	5	1986	630	3	3.9	3.8	3.75		27.8		8.13
26	5	1986	630	4	2.85	2.654	2.5		27.5		9.27
26	5	1986	630	5	3.55	3.3	3.15		27.5		9.12
26	5	1986	630	6	6.1	6.05	6.05		27.5		9.48
26	5	1986	630	7	5.2	5.15	5.05		27.5		9.1
26	5	1986	630	8	6.6	6.55	6.5		27.8		9.45
26	5	1986	630	9	1.9	1.85	1.85		27.5		8.99
26	5	1986	630	10		0.15	0.15		27.5		7.09
26	5	1986	630	17	0.25		0.2		27.5		8.12
26	5	1986	630	18	6.95	6.9	6.85		27.5		8.99
26	5	1986	1000	1	7.65	7.9	7.7	30.5	29.5	28.8	8.98
26	5	1986	1000	2	3.4		3.1	30.	29.3	29.	7.28
26	5	1986	1000	3	4.8	4.85	4.65	30.3	29.3	29.	8.81
26	5	1986	1000	4	11.5	6.4	1.8	30.5	29.	28.3	9.75
26	5	1986	1000	5		8.3	5.2	31.	28.5	28.3	10.04
26	5	1986	1000	6	9.4	9.35	9.5	30.5	29.	28.5	9.95
26	5	1986	1000	7		6.5	6.35	30.	29.	28.5	9.56
26	5	1986	1000	8	9.9	8.5	7.6	30.	29.5	28.5	9.93
26	5	1986	1000	9			2.3	30.5	28.5	28.	10.1
26	5	1986	1000	10	6.9	2.65	0.3	30.5	29.5	28.5	7.65
26	5	1986	1000	17		9.6	0.9	30.3	29.8	28.5	9.18
26	5	1986	1000	18	7.95	7.7	7.2	30.5	29.5	28.3	9.31
26	5	1986	1400	1	10.4	10.8	9.1	32.	31.	29.5	9.32
26	5	1986	1400	2	4.75	4.75	4.35	31.	30.5	30.	7.45
26	5	1986	1400	3	6.2	6.2	6.2	31.3	31.	30.	9.1
26	5	1986	1400	4	19.1	10.3	5.1	31.3	30.	28.5	10.18
26	5	1986	1400	5	14.7		6.2	31.5	29.8	28.3	10.18

Table 5. Diurnal Measurements. Gualaca, Panama, Cycle III, Dry Season

DAY	MONTH	YEAR	D.O. TIME	POND#	DO-TOP	DO-MID	DO-BOT	WATER TEMP TOP	WATER TEMP MID	WATER TEMP BOT	PH
26	5	1986	1400	6	14.8	15.2	10.7	31.5	30.8	29.	10.18
26	5	1986	1400	7	10.2	10.8	9.2	31.3	30.3	29.5	9.89
26	5	1986	1400	8	15.6		10.2	31.3	30.5	29.3	10.24
26	5	1986	1400	9		11.23	4.4	31.5	29.	28.5	10.23
26	5	1986	1400	10	11.3	7.3	1.4	32.5	31.	29.	8.08
26	5	1986	1400	17	20.5	20.2	1.5	32.5	32.	28.8	9.6
26	5	1986	1400	18	9.1	9.1		32.	31.5	28.3	9.52
26	5	1986	1715	1		7.1			29.8		9.29
26	5	1986	1715	2		4.6			29.5		7.3
26	5	1986	1715	3					29.8		8.79
26	5	1986	1715	4		8.15			29.		9.89
26	5	1986	1715	5		7.8			29.		9.81
26	5	1986	1715	6		10.4			29.3		10.06
26	5	1986	1715	7		8.2			29.5		9.69
26	5	1986	1715	8		10.8			29.5		10.04
26	5	1986	1715	9		13.4			28.8		9.57
26	5	1986	1715	10		3.6			29.3		7.21
26	5	1986	1715	17		9.4			29.3		9.1
26	5	1986	1715	18		8.3			29.3		9.41
27	5	1986	630	1	5.5	5.5	5.45		28.		8.33
27	5	1986	630	2	3.25	3.15	3.15		28.		6.88
27	5	1986	630	3	3.85	3.8	3.75		28.		7.17
27	5	1986	630	4	2.85	2.7	2.65		27.5		8.83
27	5	1986	630	5	3.4	3.3	3.25		27.5		8.9
27	5	1986	630	6	5.35	5.25	5.15		27.5		9.25
27	5	1986	630	7	4.56	4.45	4.35		27.8		8.54
27	5	1986	630	8	4.7	4.6	4.5		27.8		9.15
27	5	1986	630	9	2.5	2.4	2.3		27.5		8.65
27	5	1986	630	10	0.25		0.05		27.5		6.94
27	5	1986	630	17	0.65	0.55	0.5		27.5		7.17
27	5	1986	630	18	5.9	5.85	5.8		27.5		7.76
9	6	1986	630	1	6.75	6.05	5.9		27.8		8.54
9	6	1986	630	2	5.45	5.45	5.35		28.		7.78
9	6	1986	630	3	6.3	6.25	6.25		28.		8.63
9	6	1986	630	4	2.15	2.1	2.1		27.3		9.26
9	6	1986	630	5	2.15	2.1	2.05		27.3		9.23
9	6	1986	630	6	1.6	1.55	1.55		27.8		7.32
9	6	1986	630	7	6.3	6.3	6.25		27.8		8.98
9	6	1986	630	8	4.75	4.7	4.65		27.5		8.68
9	6	1986	630	9			0.5		27.5		7.3
9	6	1986	630	10			0.05		27.5		7.06
9	6	1986	630	17	2.65	2.55	2.55		27.3		8.25
9	6	1986	630	18		3.9	3.85		27.5		7.1
9	6	1986	1000	1	8.7	8.6	7.85	29.5	28.5	28.	
9	6	1986	1000	2	8.05	8.1	6.8	29.3	28.5	28.	
9	6	1986	1000	3	7.95	8.15	7.65	29.	28.3	28.	
9	6	1986	1000	4	18.4	3.2	0.7	29.	27.3	27.3	
9	6	1986	1000	5	14.2	4.6	2.6	28.8	27.5	27.3	
9	6	1986	1000	6	2.8	2.8	2.45	29.	28.3	28.	
9	6	1986	1000	7	9.3	9.2	8.2	29.3	28.	28.	
9	6	1986	1000	8	11.7	8.2	4.7	29.5	28.	27.8	
9	6	1986	1000	9	9.4	2.9	0.8	29.3	27.8	27.5	
9	6	1986	1000	10	9.2	2.5	0.2	28.5	27.8	27.5	
9	6	1986	1000	17	19.9	3.8	0.8	30.	27.8	27.5	
9	6	1986	1000	18	5.35	4.75	3.75	30.	28.	27.8	
9	6	1986	1400	1	11.4	14.2	13.3	31.5	29.	27.3	9.9
9	6	1986	1400	2	10.5	12.5	11.	31.5	28.8	27.5	9.25
9	6	1986	1400	3	9.8	12.2	11.2	31.5	29.	27.3	9.45
9	6	1986	1400	4	18.3	8.6	3.63	35.8	28.5	27.3	9.6
9	6	1986	1400	5	18.3	13.9	5.9	35.5	28.5	27.3	10.05
9	6	1986	1400	6	5.3	6.05	5.6	32.5	30.5	27.8	8.5
9	6	1986	1400	7	14.4	16.9	14.7	33.3	30.	28.5	10.05
9	6	1986	1400	8	20.	20.	10.8	33.8	29.8	28.	10.65
9	6	1986	1400	9	21.	14.4	1.7	34.	29.5	28.	9.65
9	6	1986	1400	10	21.	8.8	0.6	33.	30.	28.	9.1
9	6	1986	1400	17	21.	13.3		33.5	27.8	26.5	9.25
9	6	1986	1400	18	6.5	6.9	6.2	32.5	28.8	27.	8.25
9	6	1986	1715	1	11.8	15.6	14.7		31.5		10.25
9	6	1986	1715	2	11.8	12.2	13.		31.5		9.95
9	6	1986	1715	3	10.6	10.7	11.4		32.		9.95
9	6	1986	1715	4	16.2	15.2	4.3		30.		10.1
9	6	1986	1715	5	15.4	11.2	5.5		30.2		10.25
9	6	1986	1715	6	6.25	7.4	5.6		31.9		9.05
9	6	1986	1715	7	16.4	16.8	16.2		32.		9.9
9	6	1986	1715	8	18.2	20.	10.2		33.		9.75
9	6	1986	1715	9	20.	14.2	7.1		32.		9.35
9	6	1986	1715	10	20.	17.45	0.2		32.5		8.75
9	6	1986	1715	17	20.		4.3		30.3		9.9
9	6	1986	1715	18	6.5	6.45	5.9		32.2		9.25
10	6	1986	630	1		9.55			29.		8.54
10	6	1986	630	2		8.6			29.		7.78
10	6	1986	630	3		7.5			28.5		8.63
10	6	1986	630	4		4.9			28.		9.26
10	6	1986	630	5		6.1			27.		9.23
10	6	1986	630	6					29.		7.32
10	6	1986	630	7		10.1			29.2		8.98
10	6	1986	630	8		8.85			29.		8.68
10	6	1986	630	9		3.2			29.3		7.3
10	6	1986	630	10					29.3		7.06
10	6	1986	630	17		4.3			27.8		8.25
10	6	1986	630	18		3.2			27.5		7.1

Table 5. Diurnal Measurements. Gualaca, Panama, Cycle III, Wet Season

DAY	MONTH	YEAR	D.O. TIME	POND#	DO-TOP	DO-MID	DO-BOT	WATER TEMP TOP	WATER TEMP MID	WATER TEMP BOT	PH
4	8	1986	630	1	8.75	8.55	8.65				9.08
4	8	1986	630	2	9.4	9.35	9.35		29.8		9.63
4	8	1986	630	3	5.45	5.35	5.4				8.1
4	8	1986	630	4	4.75	4.65	4.65		29.8		8.89
4	8	1986	630	5	4.35	4.2	4.2		29.5		9.31
4	8	1986	630	6	6.7	6.65	6.65		29.8		9.15
4	8	1986	630	7	8.5	8.35	8.35		29.8		9.65
4	8	1986	630	8	10.7	10.7	10.7		29.8		9.8
4	8	1986	630	9	2.65	2.55	2.5		29.5		9.76
4	8	1986	630	10		0.15	0.15		29.5		7.91
4	8	1986	630	17	1.3	1.25	1.2		29.5		7.77
4	8	1986	630	18	4.9	4.8	4.85		29.5		7.7
4	8	1986	1000	1	10.6	10.5	10.1	30.8	30.3		
4	8	1986	1000	2	11.6	11.6	11.2	30.5		29.5	
4	8	1986	1000	3	5.9	5.8	5.9	30.5	30.3		
4	8	1986	1000	4	4.6	4.5	4.35	30.5			
4	8	1986	1000	5	5.2	4.75	3.3	30.3		29.5	
4	8	1986	1000	6	7.7	7.4	7.3	30.5	30.3		
4	8	1986	1000	7	9.8	9.8	9.35	30.3		29.8	
4	8	1986	1000	8	13.6	13.1	10.2	30.3	29.8	29.5	
4	8	1986	1000	9	9.5		2.2	30.3	29.8	29.5	
4	8	1986	1000	10	6.15		0.85			29.5	
4	8	1986	1000	17	1.4	0.75	0.35	30.5		29.5	
4	8	1986	1000	18	5.6	5.3	5.3	30.3		29.8	
4	8	1986	1400	1			14.4	30.3		31.3	10.05
4	8	1986	1400	2	14.7	15.1	14.9	31.3	30.8	30.3	10.2
4	8	1986	1400	3	7.8	7.65	7.55			30.8	8.95
4	8	1986	1400	4	6.1	5.6	3.9			30.5	9.25
4	8	1986	1400	5	9.35	8.2		31.3	30.8	30.3	9.75
4	8	1986	1400	6	11.1		11.2			30.5	9.5
4	8	1986	1400	7	13.9	13.7	13.3		30.8	30.3	10.05
4	8	1986	1400	8	20.5	20.2	14.7	31.25	30.5		10.3
4	8	1986	1400	9	20.	11.8	1.7	31.8	30.3	29.8	9.5
4	8	1986	1400	10	16.9	8.8	1.7	31.5			9.1
4	8	1986	1400	17	1.2	0.75		31.5		30.3	8.1
4	8	1986	1400	18	7.1	7.05					8.4
4	8	1986	1715	1	14.5	14.4	14.2	31.3	31.3		8.25
4	8	1986	1715	2	14.1	13.8				30.8	9.9
4	8	1986	1715	3	7.35	7.25	7.3				9.05
4	8	1986	1715	4	8.7	8.55	8.65				
4	8	1986	1715	5	8.4	8.4	4.85			30.5	9.45
4	8	1986	1715	6	11.5	11.3					9.5
4	8	1986	1715	7	14.1		13.6				9.35
4	8	1986	1715	8	20.	20.					9.95
4	8	1986	1715	9	20.2	14.7	2.4	31.5			8.85
4	8	1986	1715	10	13.9	9.8	1.6	31.3		30.8	9.15
4	8	1986	1715	17	1.1	1.1	0.15	31.3		30.5	
4	8	1986	1715	18	7.2	7.05					
5	8	1986	630	1	10.7	10.5	10.5				8.45
5	8	1986	630	2	10.7	10.6	10.5		28.8		9.45
5	8	1986	630	3	5.5	5.45	5.45		29.3		8.9
5	8	1986	630	4	1.1	1.05	1.05				9.1
5	8	1986	630	5	1.9	1.9	1.9		28.8		8.55
5	8	1986	630	6	7.3	7.2	7.15				8.75
5	8	1986	630	7	9.5	9.45	9.4				9.75
5	8	1986	630	8	11.8	11.8	11.8		28.8		9.35
5	8	1986	630	9	3.65	3.35	3.5		28.8		8.55
5	8	1986	630	10							8.4
5	8	1986	630	17							8.45
5	8	1986	630	18	5.35	5.25	5.2		28.5		
18	8	1986	630	1	7.55	7.4	7.4		27.8		9.27
18	8	1986	630	2	7.15	7.05	7.1		27.5		9.3
18	8	1986	630	3		5.95	5.95				7.92
18	8	1986	630	4	2.75	2.65	2.75		27.8		8.35
18	8	1986	630	5	1.85	1.75	1.65				7.67
18	8	1986	630	6		4.9	4.9				8.65
18	8	1986	630	7	6.1		6.05		27.5		9.48
18	8	1986	630	8	5.9	5.85	5.85		27.8		9.38
18	8	1986	630	9	0.75	0.55	0.55		27.5		7.69
18	8	1986	630	10	0.45	0.35	0.35		27.5		7.63
18	8	1986	630	17	0.35	0.35			27.5		7.78
18	8	1986	630	18	6.05	5.9	5.9		27.5		8.29
18	8	1986	1000	1	9.5	9.15	8.2			27.8	10.75
18	8	1986	1000	2		9.1	8.3			27.5	10.35
18	8	1986	1000	3	6.8	6.8	6.75		28.5	28.3	8.7
18	8	1986	1000	4	5.7	5.8	3.15	28.8	28.3	27.8	9.15
18	8	1986	1000	5	3.8	3.85	3.15	29.3	28.5		8.8
18	8	1986	1000	6	5.85	5.85	5.55		28.3	285.	10.55
18	8	1986	1000	7	7.85	8.05	7.5	28.5		27.8	10.65
18	8	1986	1000	8	8.8	8.6	7.6		28.3	27.8	10.45
18	8	1986	1000	9	7.15	5.2	2.3			27.8	8.85
18	8	1986	1000	10	7.2	3.15	1.3		27.5	27.5	8.5
18	8	1986	1000	17	7.6	3.3	1.15	29.3	28.3	27.5	9.85
18	8	1986	1000	18	7.1	7.1	6.4	28.8		27.5	9.35
18	8	1986	1400	1	12.4	13.3	13.5		30.5	28.8	10.75
18	8	1986	1400	2	13.1	13.5	12.3	32.3	30.8	28.5	10.75
18	8	1986	1400	3	8.7	8.75		31.3	30.5	29.8	9.55
18	8	1986	1400	4	15.4		7.7	32.3	30.8	28.5	9.75
18	8	1986	1400	5	10.4	11.7			30.8		9.5
18	8	1986	1400	6	9.5	9.55	9.65	31.3	30.5	29.5	9.85
18	8	1986	1400	7	12.2	12.6	11.3	31.8	30.8		9.35
18	8	1986	1400	8	14.5	16.3	16.5	32.3	30.5	28.8	10.85
18	8	1986	1400	9	20.5	16.4	6.1	321.3	30.8	28.5	10.45
18	8	1986	1400	10		17.5	8.8		29.5	28.3	9.8
18	8	1986	1400	17	21.	15.8	4.6	33.5	30.8	28.5	9.95
18	8	1986	1400	18	9.35	9.5	9.6	32.3	30.5	28.8	9.65
18	8	1986	1715	1	13.2	14.4				29.8	9.65
18	8	1986	1715	2	12.9	13.4	13.4	32.3		29.3	9.95
18	8	1986	1715	3	9.6	9.4	10.5	31.5	31.5		9.45
18	8	1986	1715	4		15.8	7.6	32.5	32.5		9.95
18	8	1986	1715	5	12.3	11.9	8.1	32.3	32.3	29.5	9.75
18	8	1986	1715	6	10.8		11.2	31.8	31.8	30.8	9.95
18	8	1986	1715	7	13.8	14.6	14.8	31.8	31.8	30.3	10.15
18	8	1986	1715	8	15.8	17.4	16.8	32.3			10.15
18	8	1986	1715	9	21.	17.2	6.4	32.3		29.5	9.9
18	8	1986	1715	10	21.		7.2	32.3	31.3	28.8	9.85
18	8	1986	1715	17	21.		4.4		31.8	29.3	10.1
18	8	1986	1715	18	10.4	10.4	11.2			30.3	
19	8	1986	630	1	9.3	9.1			29.8		9.36
19	8	1986	630	2	9.8	9.7	9.4				9.45
19	8	1986	630	3	6.8	6.75	6.65		29.5		8.12
19	8	1986	630	4		5.4					8.38
19	8	1986	630	5	3.05	3.05	2.9		29.3		7.5
19	8	1986	630	6	6.15	6.05	6.05		29.5		8.63
19	8	1986	630	7	8.15	7.95	7.95		29.3		9.67
19	8	1986	630	8	11.5	11.4	11.3				9.86
19	8	1986	630	9	3.9	3.85	3.6				8.37
19	8	1986	630	10	2.35	2.2	2.1				7.88
19	8	1986	630	17	0.85	0.85	0.75				7.78
19	8	1986	630	18	7.15		6.95				8.6
1	9	1986	630	1	6.8	6.3			28.5		
1	9	1986	630	2	6.2		5.2				
1	9	1986	630	3	6.3	6.3	6.1		28.5		
1	9	1986	630	4	5.1		4.5				
1	9	1986	630	5	4.2	3.5	3.3				
1	9	1986	630	6	6.2	6.2	5.9				
1	9	1986	630	7	4.4	4.2					
1	9	1986	630	8	5.4		4.8				
1	9	1986	630	9							
1	9	1986	630	10			0.35				
1	9	1986	630	17		0.15					
1	9	1986	630	18		5.9	5.3		27.5		
1	9	1986	1000	1	8.25	8.1	8.05	29.5		28.8	8.9
1	9	1986	1000	2	7.2	7.05	6.8	29.3		28.8	8.5
1	9	1986	1000	3	8.35	8.25	7.9	29.3		28.5	8.84
1	9	1986	1000	4	8.1	7.9	6.25	29.3		28.8	8.85
1	9	1986	1000	5	8.9		5.6	29.3	28.8	28.5	8.99
1	9	1986	1000	6	7.75	7.55	7.3	29.3	29.3	28.8	8.98
1	9	1986	1000	7	5.7	5.45	5.45	29.3		28.8	8.7
1	9	1986	1000	8	7.5	7.7	7.2		28.8	28.8	9.32
1	9	1986	1000	9	8.85	7.9	4.6			28.5	8.06

Table 5. Diurnal Measurements. Gualaca, Panama, Cycle III, Wet Season.

DAY	MONTH	YEAR	D.O. TIME	POND#	DO-TOP	DO-MID	DO-BOT	WATER TEMP TOP	WATER TEMP MID	WATER TEMP BOT	PH
1	9	1986	1000	10	8.8	6.25	1.1	29.3	28.5		8.63
1	9	1986	1000	17		7.55	1.45	29.8	29.5	28.8	7.54
1	9	1986	1000	18	7.2	7.1	6.6	29.8	29.5	28.8	7.6
1	9	1986	1400	1	9.2	9.2	9.1	30.8	30.5	29.8	9.1
1	9	1986	1400	2	8.1	8.2	8.4	30.8	30.25	29.8	8.85
1	9	1986	1400	3		9.2		30.8	30.5	29.8	9.02
1	9	1986	1400	4	13.1	13.2	10.6		30.8		9.39
1	9	1986	1400	5		11.9	8.9		30.8		9.3
1	9	1986	1400	6	9.1	9.3	9.3		30.8	30.3	9.22
1	9	1986	1400	7	7.4	7.4	7.8	30.8	30.8	30.3	
1	9	1986	1400	8	9.4		9.9	30.8	30.8	29.8	9.6
1	9	1986	1400	9	16.5	14.4	7.1			29.8	9.1
1	9	1986	1400	10	17.2	12.2	2.6	31.3	30.8		9.44
1	9	1986	1400	17	16.2	9.9	6.8			29.8	8.72
1	9	1986	1400	18		7.9	7.5		30.8	29.3	9.06
1	9	1986	1715	1	9.4	9.4	9.5				9.11
1	9	1986	1715	2	8.4	8.5	8.7				8.9
1	9	1986	1715	3	8.8	8.9	9.9		30.5		9.08
1	9	1986	1715	4	13.6	13.8	12.2		30.5		9.44
1	9	1986	1715	5	12.2		11.4		30.5		9.4
1	9	1986	1715	6	9.6	9.6	9.5		30.5		9.25
1	9	1986	1715	7			8.3				9.17
1	9	1986	1715	8	10.2	10.2	11.6		30.5		9.61
1	9	1986	1715	9	14.8	13.8	10.6				9.2
1	9	1986	1715	10		13.6	4.6				9.57
1	9	1986	1715	17	9.4	9.4	8.2				8.5
1	9	1986	1715	18	7.8	7.8	7.7		30.5		8.6
2	9	1986	630	1	6.5	6.6	6.6				8.5
2	9	1986	630	2	5.7	5.6	5.6				8.11
2	9	1986	630	3	6.5	6.5	6.5				8.48
2	9	1986	630	4	5.8	5.9	5.9				8.74
2	9	1986	630	5	4.4	4.4	4.3				8.53
2	9	1986	630	6	5.7	5.7	5.7				8.59
2	9	1986	630	7	4.5	4.5			28.5		8.34
2	9	1986	630	8	5.4	5.3	5.3				8.89
2	9	1986	630	9		1.2	1.2		27.5		7.51
2	9	1986	630	10					27.5		8.33
2	9	1986	630	17					28.5		7.32
2	9	1986	630	18	5.4	5.4	5.2				7.3
15	9	1986	630	1	7.3	7.2	7.15		29.3		8.16
15	9	1986	630	2	6.2	6.1			29.3		7.2
15	9	1986	630	3	7.9	7.9	7.2				8.48
15	9	1986	630	4	8.4	8.45	8.3		28.8		9.42
15	9	1986	630	5	6.1	6.1	5.9		28.8		8.55
15	9	1986	630	6	7.2	7.1	7.1		29.3		7.18
15	9	1986	630	7	6.7	6.55	6.4				8.7
15	9	1986	630	8	7.4	7.4	7.2		28.8		9.24
15	9	1986	630	9	2.2				28.8		7.12
15	9	1986	630	10	1.2	1.15	1.15		28.5		7.5
15	9	1986	630	17		0.85			28.8		7.3
15	9	1986	630	18	6.2	6.1	5.95		28.5		
15	9	1986	1000	1	8.7	8.6	8.45		29.8	29.3	8.68
15	9	1986	1000	2	7.35	7.45	7.25	29.8	29.5	29.3	7.65
15	9	1986	1000	3	8.8	8.7	8.65	29.8	29.5	29.3	8.7
15	9	1986	1000	4		11.8	8.6	29.5		28.8	9.5
15	9	1986	1000	5	9.2	8.2	6.2	29.5		28.8	8.84
15	9	1986	1000	6	8.1	8.3	8.2	29.8	29.5	29.3	8.72
15	9	1986	1000	7		7.9	7.95	29.5	29.5	29.3	8.84
15	9	1986	1000	8	10.9	11.8	8.9	29.3		28.8	9.48
15	9	1986	1000	9	9.6	6.105	3.8	29.5	29.3		7.86
15	9	1986	1000	10	13.6	6.3	4.9	29.3	28.8	28.5	8.78
15	9	1986	1000	17	9.2	6.75	1.55		29.5	28.75	7.42
15	9	1986	1000	18	8.05	7.55	6.65	29.8	29.3	28.8	7.64
15	9	1986	1400	1	10.9	11.2	10.7	32.3	31.5	30.3	8.87
15	9	1986	1400	2	9.4	9.9	10.1		31.5	30.5	8.45
15	9	1986	1400	3		10.4	10.7		31.3	30.3	8.6
15	9	1986	1400	4	18.2	18.9	15.2	31.5	31.8	29.3	9.84
15	9	1986	1400	5	17.1	16.6	9.5	32.8			9.38
15	9	1986	1400	6	10.6		11.1		31.5	30.5	8.96
15	9	1986	1400	7	10.7	11.6	11.7		31.5	30.8	9.1
15	9	1986	1400	8	17.1		15.1	32.5	31.8	29.3	9.86

DAY	MONTH	YEAR	D.O. TIME	POND#	DO-TOP	DO-MID	DO-BOT	WATER TEMP TOP	WATER TEMP MID	WATER TEMP BOT	PH
15	9	1986	1400	9	16.4		7.3	32.3	31.5	29.8	9.1
15	9	1986	1400	10	20.	13.1	2.8		30.3	28.8	9.6
15	9	1986	1400	17	16.3	15.7	2.5	33.3		29.3	8.64
15	9	1986	1400	18	9.15	9.1	8.75		32.5	29.3	8.72
15	9	1986	1715	1							9.17
15	9	1986	1715	2	9.7	9.7	10.4		31.5		8.7
15	9	1986	1715	3			9.6				8.96
15	9	1986	1715	4	18.2	15.2					9.89
15	9	1986	1715	5		15.4					9.42
15	9	1986	1715	6	11.2	11.2	12.2		31.5		8.94
15	9	1986	1715	7	11.6	11.6	12.5		30.5		9.09
15	9	1986	1715	8	15.8	16.6	13.2		31.5		9.67
15	9	1986	1715	9	15.4	15.4	8.2				8.97
15	9	1986	1715	10	17.4		3.8				9.04
15	9	1986	1715	17	13.4	13.4	5.1		31.5		8.96
15	9	1986	1715	18	9.3	9.3	8.4				8.9
16	9	1986	630	1		7.25			28.8		8.2
16	9	1986	630	2		6.55			28.8		7.13
16	9	1986	630	3		7.7			28.5		8.2
16	9	1986	630	4		7.2			28.3		9.19
16	9	1986	630	5		6.7			28.3		8.58
16	9	1986	630	6		7.05			28.8		8.33
16	9	1986	630	7		6.9			28.5		8.57
16	9	1986	630	8		6.9			28.3		9.09
16	9	1986	630	9		2.3			28.3		7.09
16	9	1986	630	10		2.3					7.96
16	9	1986	630	17		2.55			28.5		7.16
16	9	1986	630	18		6.75					7.06
29	9	1986	630	1	4.3	4.1	4.1		27.5		7.38
29	9	1986	630	2	6.5	6.4	6.35		27.3		7.91
29	9	1986	630	3	6.1	6.1			27.3		7.59
29	9	1986	630	4	3.55	3.5	3.4				8.93
29	9	1986	630	5	3.95	3.65	3.5				8.9
29	9	1986	630	6	6.6	6.55	6.3		27.3		8.6
29	9	1986	630	7	5.65	5.55	5.5				
29	9	1986	630	8	5.65	5.55	5.4				9.14
29	9	1986	630	9			0.75				7.02
29	9	1986	630	10	0.65		0.25		26.8		7.5
29	9	1986	630	17	1.12						7.56
29	9	1986	630	18	6.8	6.7	6.6		26.5		8.2
29	9	1986	1000	1	6.6	6.4		29.8	28.8		7.39
29	9	1986	1000	2	10.1	10.8	9.4	29.3		27.3	8.78
29	9	1986	1000	3	8.2	8.2	8.2	29.5	29.3		8.17
29	9	1986	1000	4	11.2	10.8	7.2	29.8	28.8	27.8	9.42
29	9	1986	1000	5	10.3	8.4	5.8	29.8	28.8	27.5	9.29
29	9	1986	1000	6		10.8	9.9	29.8		27.8	9.34
29	9	1986	1000	7	10.4	10.6		29.5		27.8	9.29
29	9	1986	1000	8	14.3	13.2	8.8	29.8	28.8	27.5	9.74
29	9	1986	1000	9	10.1	6.4	3.2	29.8	28.8	27.5	8.36
29	9	1986	1000	10	20.	6.2	1.3	30.8		27.3	9.84
29	9	1986	1000	17	14.8	6.5	1.3		28.5	27.3	8.65
29	9	1986	1000	18	9.2	10.3	9.4	30.5	28.5	27.3	9.03
29	9	1986	1400	1	7.7	7.8	7.5	30.8	30.3	28.5	7.52
29	9	1986	1400	2		14.3	12.8	30.5		28.3	9.27
29	9	1986	1400	3		9.5	9.4		28.8	28.8	8.58
29	9	1986	1400	4	14.5	15.7	10.1	30.5	29.8	28.3	9.69
29	9	1986	1400	5	13.2	13.2		30.5		27.8	9.23
29	9	1986	1400	6		14.2	12.4	30.5	29.3		9.45
29	9	1986	1400	7	12.2	14.5	12.4	30.3	29.8	28.3	9.55
29	9	1986	1400	8	17.2	18.7	10.6	30.5	29.3		9.99
29	9	1986	1400	9	15.1	8.1		30.5	29.75		9.06
29	9	1986	1400	10	20.	5.4	2.2	31.8	28.8	27.3	9.92
29	9	1986	1400	17	20.	15.6	4.4	31.3	30.8		9.64
29	9	1986	1400	18	10.3	11.4	10.8	30.8	30.5	27.8	9.24
29	9	1986	1715	1	7.8	7.4		29.5	29.5	28.8	7.36
29	9	1986	1715	2	11.5	12.6		29.5	29.5	28.8	9.42
29	9	1986	1715	3		8.9		29.5	29.5	28.8	8.75
29	9	1986	1715	4	13.5	14.3	10.2	29.5	29.5	27.8	9.74
29	9	1986	1715	5	12.3	11.8	7.8	29.3	28.8	27.3	9.61
29	9	1986	1715	6	12.4	12.8	12.6	29.5	29.3	27.8	9.57
29	9	1986	1715	7	12.6	14.5	11.6	29.5	29.5		9.65

Table 5. Diurnal Measurements. Gualaca, Panama, Cycle III, Wet Season

DAY	MONTH	YEAR	D.O. TIME	POND#	DO-TOP	DO-MID	DO-BOT	WATER TEMP TOP	WATER TEMP MID	WATER TEMP BOT	PH
29	9	1986	1715	8	16.5	17.2	13.8	29.5	29.5	28.8	9.99
29	9	1986	1715	9	13.4		4.8	29.5	29.5	28.3	8.67
29	9	1986	1715	10	20.	11.3	1.6	29.5	28.8		9.2
29	9	1986	1715	17	14.2		1.8	29.3	29.3	29.8	9.32
29	9	1986	1715	18		10.5	11.2	29.3	29.3	27.3	9.39
30	9	1986	630	1		4.8					
30	9	1986	630	2		7.75			26.8		8.04
30	9	1986	630	3		6.6			26.8		7.45
30	9	1986	630	4		5.4			26.5		8.84
30	9	1986	630	5		4.45			26.3		8.77
30	9	1986	630	6		7.85			26.8		8.92
30	9	1986	630	7		7.15			26.5		8.97
30	9	1986	630	8		8.6			26.5		9.26
30	9	1986	630	9		1.1			26.5		7.35
30	9	1986	630	10					26.3		8.14
30	9	1986	630	17		1.85			26.3		7.83
30	9	1986	630	18		7.3			26.3		8.5
14	10	1986	630	1	6.3	6.3	6.3				7.07
14	10	1986	630	2			5.8				6.96
14	10	1986	630	3	6.4	6.3			25.5		6.93
14	10	1986	630	4	3.7	3.7	3.4				
14	10	1986	630	5	5.5	5.5	5.5				7.9
14	10	1986	630	6	6.1	5.9	5.9				7.94
14	10	1986	630	7	5.4	5.4	5.4		25.5		7.6
14	10	1986	630	8	4.9	4.8	4.4		25.5		7.17
14	10	1986	630	9	2.5	2.4	2.3		25.5		6.88
14	10	1986	630	10							6.6
14	10	1986	630	17	2.4	2.4	2.3				7.04
14	10	1986	630	18	6.2						7.15
14	10	1986	1400	1	9.4	9.5	9.3		27.3	26.5	8.07
14	10	1986	1400	2	9.7	10.4	9.2		27.5	26.3	8.74
14	10	1986	1400	3	9.3	9.7	9.2		27.3	26.3	8.67
14	10	1986	1400	4	16.7	18.1	10.1	28.3	27.3		9.6
14	10	1986	1400	5	15.5	15.8	8.9	28.3	27.5	25.8	9.52
14	10	1986	1400	6	10.9	11.1	10.6			26.3	9.24
14	10	1986	1400	7	10.5	11.5	11.3		27.3	26.5	9.1
14	10	1986	1400	8	14.3	14.7	10.2	28.3	27.3		9.49
14	10	1986	1400	9	19.9	11.2	4.8			25.8	9.18
14	10	1986	1400	10	8.8	8.6				26.3	7.1
14	10	1986	1400	17	17.7	14.5	2.4	29.3		25.5	9.32
14	10	1986	1400	18	8.5	8.5	8.2	28.8	28.5		7.8
28	10	1986	630	1		5.35			27.2		7.08
28	10	1986	630	2		4.9			26.8		6.58
28	10	1986	630	3		5.7			26.8		7.05
28	10	1986	630	4		2.15			26.5		8.5
28	10	1986	630	5		2.55			26.5		7.8
28	10	1986	630	6		5.65					8.46
28	10	1986	630	7		4.9					8.69
28	10	1986	630	8		1.15			26.8		6.99
28	10	1986	630	9					26.5		6.95
28	10	1986	630	10					26.8		6.73
28	10	1986	630	17	1.35	1.35	1.35				7.12
28	10	1986	630	18		5.35			26.8		6.69
28	10	1986	1000	1	6.75	6.5	6.35			27.5	7.24
28	10	1986	1000	2	7.5	7.15	6.3		27.5		7.28
28	10	1986	1000	3	7.5	7.3	6.8	29.5	27.5		8.28
28	10	1986	1000	4	11.2		2.8	29.5		26.5	9.09
28	10	1986	1000	5	9.4	4.9				26.5	8.8
28	10	1986	1000	6	7.15	7.1	6.8		27.8	27.5	8.81
28	10	1986	1000	7	7.7	7.1	6.8		27.8	27.5	9.08
28	10	1986	1000	8	5.7	4.6	2.4		27.5		7.48
28	10	1986	1000	9	8.1		1.5		27.3	26.8	8.52
28	10	1986	1000	10	9.2	5.5	1.8	29.5	27.5		7.72
28	10	1986	1000	17	11.2		1.6	30.3	26.5	26.3	8.32
28	10	1986	1000	18	6.6	6.5	6.2	29.5			6.91
28	10	1986	1400	1	8.3		8.2				7.55
28	10	1986	1400	2	8.9	8.6		30.5		27.5	8.63
28	10	1986	1400	3	9.1	9.1	9.1	30.5		27.5	
28	10	1986	1400	4	15.7	13.2	6.2	30.8			9.68
28	10	1986	1400	5	13.3		4.2	30.5			9.25
28	10	1986	1400	6	9.1	8.95	9.35				9.06

DAY	MONTH	YEAR	D.O. TIME	POND#	DO-TOP	DO-MID	DO-BOT	WATER TEMP TOP	WATER TEMP MID	WATER TEMP BOT	PH
28	10	1986	1400	7	10.9	11.1			29.5		9.46
28	10	1986	1400	8		10.7	7.4	30.5		27.5	9.01
28	10	1986	1400	9	16.1	11.7	3.2	30.5			9.28
28	10	1986	1400	10	14.9	13.5		30.8		27.5	8.95
28	10	1986	1400	17	14.1	12.5	3.8	30.5	28.5	26.5	9.4
28	10	1986	1400	18	7.8	8.1	7.8	30.3	29.5	27.5	7.8
28	10	1986	1715	1	8.4	8.3	8.3	29.3	29.3	28.5	7.55
28	10	1986	1715	2			8.4	29.5	29.3	27.8	7.22
28	10	1986	1715	3	9.6	9.5	9.3	29.3	29.3	27.8	9.2
28	10	1986	1715	4	14.2	12.7	4.8	29.3	29.5	27.5	9.74
28	10	1986	1715	5		9.2	3.8	29.8	29.8	29.3	9.65
28	10	1986	1715	6	9.2	9.1	9.5			28.8	9.25
28	10	1986	1715	7	10.9	10.8	10.6	29.3	29.3	28.8	9.58
28	10	1986	1715	8	10.9		6.8	29.5	29.5		9.2
28	10	1986	1715	9	13.9	12.8		29.3	29.5	29.8	9.46
28	10	1986	1715	10	14.4	12.7	5.4	29.5	29.5	28.3	9.36
28	10	1986	1715	17	13.5	11.4	3.2		28.8		9.44
28	10	1986	1715	18		7.5	7.4			27.8	8.28
29	10	1986	630	1		5.95	5.9		27.5		7.1
29	10	1986	630	2	5.9	5.9	5.7				6.8
29	10	1986	630	3	6.45	6.5	6.45				7.1
29	10	1986	630	4	4.7	4.65	4.55		26.5		8.5
29	10	1986	630	5	3.25	3.25	3.25		26.8		7.85
29	10	1986	630	6	6.8	6.8	6.75				8.45
29	10	1986	630	7	6.95	6.95	6.95				8.84
29	10	1986	630	8	3.5	3.45	3.4				7.3
29	10	1986	630	9	1.2	1.15	1.15				7.15
29	10	1986	630	10	1.5	1.5	1.5				6.86
29	10	1986	630	17	2.9	1.95	1.9		26.5		7.15
29	10	1986	630	18	5.5	5.55	5.6				6.8
11	11	1986	630	1	4.15	4.1	4.1		29.5		7.17
11	11	1986	630	2	4.8	4.9	4.9		28.5		6.5
11	11	1986	630	3	4.5	4.5	4.5		28.8		6.5
11	11	1986	630	4	3.75	3.75	3.7		2.8		9.03
11	11	1986	630	5	2.9	2.9	2.8		28.3		8.2
11	11	1986	630	6	7.7	7.7	7.7				9.22
11	11	1986	630	7	8.15	8.105	8.15		28.8		9.65
11	11	1986	630	8		0.35			28.5		7.38
11	11	1986	630	9	0.25				28.5		7.6
11	11	1986	630	10					28.5		7.11
11	11	1986	630	17		0.25	0.25				8.8
11	11	1986	630	18	5.4	5.5	5.5		28.3		6.7
11	11	1986	1000	1	5.4	5.3	5.3	30.8	30.3		7.11
11	11	1986	1000	2	8.2	7.9	6.4		29.5	28.8	7.52
11	11	1986	1000	3	7.6	7.4	6.2	30.5	29.5		7.42
11	11	1986	1000	4	17.3	8.7	2.7	30.8	29.8	28.3	9.58
11	11	1986	1000	5	12.5	8.3	2.1	30.5	29.3	28.3	9.12
11	11	1986	1000	6	9.4	9.5	9.3	30.3		29.5	9.46
11	11	1986	1000	7	11.8		11.3	30.3	29.8	29.3	9.83
11	11	1986	1000	8		8.6	1.2	30.3	29.3	28.8	8.7
11	11	1986	1000	9	16.6	6.8	1.8	30.5		28.5	9.34
11	11	1986	1000	10	13.6	5.2	1.6	30.8	29.5	28.5	9.25
11	11	1986	1000	17	17.6	4.2		32.5	28.5	28.3	
11	11	1986	1000	18	7.4	7.7	7.6	31.3		28.5	8.38
11	11	1986	1400	1	7.1						7.12
11	11	1986	1400	2	9.1	8.9		32.5	31.3	29.5	8.6
11	11	1986	1400	3	7.8	7.9	8.2	32.5		29.8	6.9
11	11	1986	1400	4	15.3				31.3	28.8	9.82
11	11	1986	1400	5	13.9	11.8					9.45
11	11	1986	1400	6	10.1	10.9	11.1				9.47
11	11	1986	1400	7		13.3	14.7	32.3	31.8	29.8	9.9
11	11	1986	1400	8	12.3	5.6		32.5	30.5		9.14
11	11	1986	1400	9	17.1	9.6	1.9	32.8	30.3		9.53
11	11	1986	1400	10	17.3	13.3	5.1	32.5	30.5	29.3	9.6
11	11	1986	1400	17	15.6	16.6	1.6	33.3	30.3	28.5	9.75
11	11	1986	1400	18	8.6	9.7	8.7		31.5		8.95
11	11	1986	1715	1	7.2	7.2	6.9				7.07
11	11	1986	1715	2	8.9	9.2	8.9	31.5			8.55
11	11	1986	1715	3	8.3			31.5		29.5	8.38
11	11	1986	1715	4		14.6	4.6			28.5	9.75
11	11	1986	1715	5	15.2					28.5	9.53

Table 5. Diurnal Measurements. Gualaca, Panama, Cycle III, Wet Season

DAY	MONTH	YEAR	D.O. TIME	POND#	DO-TOP	DO-MID	DO-BOT	WATER TEMP TOP	WATER TEMP MID	WATER TEMP BOT	PH
11	11	1986	1715	6	11.4	11.2	11.2			30.5	9.4
11	11	1986	1715	7	13.9		14.3				9.86
11	11	1986	1715	8	11.4	10.2	2.4			29.5	9.4
11	11	1986	1715	9	15.6	13.4	2.2			29.5	9.61
11	11	1986	1715	10		15.8	2.6			29.5	9.49
11	11	1986	1715	17	14.2	11.4	1.4			28.5	9.37
11	11	1986	1715	18		9.4	7.2	31.5		29.5	
12	11	1986	630	1	4.1		4.05		29.5		6.94
12	11	1986	630	2	4.75	4.75	4.65		28.5		6.23
12	11	1986	630	3	4.35	4.3	4.3		28.8		6.39
12	11	1986	630	4	3.3	3.25	3.25		28.3		8.5
12	11	1986	630	5	1.85	1.8	1.8		28.3		7.34
12	11	1986	630	6	7.1	7.1					8.96
12	11	1986	630	7	8.25	8.15	8.2				9.47
12	11	1986	630	8	0.15	0.15	0.15		28.5		7.06
12	11	1986	630	9					28.5		7.01
12	11	1986	630	10					28.8		6.93
12	11	1986	630	17		0.25			28.3		7.27
12	11	1986	630	18	5.3	5.15	5.2		28.5		6.75
24	11	1986	630	1	7.5	7.75	7.75				7.68
24	11	1986	630	2					28.3		7.11
24	11	1986	630	3	4.7	4.65	4.6		28.8		
24	11	1986	630	4	4.5	4.45	4.3		27.8		8.81
24	11	1986	630	5	5.55	5.55	5.6		27.8		8.92
24	11	1986	630	6	7.7	7.7	7.7		28.5		9.12
24	11	1986	630	7	6.7	6.8	6.75		28.2		9.5
24	11	1986	630	8	2.75	2.7	2.7				7.56
24	11	1986	630	9	1.2	1.2	1.2		28.2		7.18
24	11	1986	630	10	1.25	1.2	1.2				7.28
24	11	1986	630	17	2.3	2.3	2.25		27.8		8.58
24	11	1986	630	18	6.45	6.35	6.3		28.2		7.07
24	11	1986	1000	1	8.85	9.2	9.2		29.8		8.47
24	11	1986	1000	2	8.1	8.1	6.5	29.8		28.5	8.53
24	11	1986	1000	3	5.8	6.1	5.7	29.8	29.5		7.09
24	11	1986	1000	4	10.2	5.1	2.6	29.5		27.8	9.18
24	11	1986	1000	5	8.9	7.4	4.1	29.5			9.25
24	11	1986	1000	6	8.2	8.3	8.1	29.5		28.8	9.1
24	11	1986	1000	7	9.6	9.1	8.1	29.5	28.5	28.3	9.6
24	11	1986	1000	8		3.7	2.1	29.2	28.5		8.83
24	11	1986	1000	9	8.4	5.2	1.4	29.3	28.5	28.3	8.64
24	11	1986	1000	10	9.8	3.5	1.8	29.8	28.3		9.2
24	11	1986	1000	17	17.7		2.2		28.3		9.27
24	11	1986	1000	18	7.6	7.5	7.3			28.5	8.22
24	11	1986	1400	1	10.8	11.4		31.5	31.3	30.3	8.77
24	11	1986	1400	2	11.5	11.9	9.9	31.5	30.5		9.39
24	11	1986	1400	3	7.1	7.5	7.4	31.5	30.5	29.8	7.62
24	11	1986	1400	4	18.4	12.2	3.8		29.5		9.76
24	11	1986	1400	5	17.1	13.6		31.5	29.3	28.3	9.75
24	11	1986	1400	6	10.5	10.8	10.5	31.5	30.5	29.5	9.36
24	11	1986	1400	7	13.1	13.7	10.3		30.3	28.8	9.62
24	11	1986	1400	8		10.4	1.9	32.5	29.8	28.5	9.76
24	11	1986	1400	9	19.2			32.5	29.8	28.5	9.35
24	11	1986	1400	10	19.1	5.3	1.4		29.3	28.3	9.25
24	11	1986	1400	17	16.9	8.9	1.4		30.5	28.3	9.5
24	11	1986	1400	18	9.9	9.1	7.9		31.5		9.07
24	11	1986	1715	1	11.2	11.1		31.3	31.3	30.8	9.05
24	11	1986	1715	2	11.2	11.9	7.8	31.5	31.3	29.3	9.25
24	11	1986	1715	3	7.5	7.5	7.6	31.3	31.3	30.5	7.53
24	11	1986	1715	4		12.2	3.5	31.5		28.8	9.48
24	11	1986	1715	5		12.7	3.6	31.8	31.3	28.8	9.78
24	11	1986	1715	6	10.9	10.9		31.3	31.3	30.3	9.54
24	11	1986	1715	7	14.2	14.4	11.1	31.5	31.5	29.8	10.08
24	11	1986	1715	8		13.6	4.2	31.8		29.5	9.79
24	11	1986	1715	9		11.4	1.4	31.5	31.3	28.5	9.37
24	11	1986	1715	10	17.2	9.6	2.5	31.3	30.8		9.14
24	11	1986	1715	17	16.2	10.6		31.8			9.61
24	11	1986	1715	18	9.5	10.1	8.8	31.3	31.3	29.8	9.23
25	11	1986	630	1		7.55			28.3		7.72
25	11	1986	630	2		4.45			27.7		6.94
25	11	1986	630	3		4.2			28.3		6.71
25	11	1986	630	4		2.7					8.5
25	11	1986	630	5		2.75				27.5	8.46
25	11	1986	630	6		7.1					8.86
25	11	1986	630	7		7.5					9.28
25	11	1986	630	8		2.1				27.8	7.72
25	11	1986	630	9		0.55				27.8	7.32
25	11	1986	630	10						27.5	8.18
25	11	1986	630	17		1.9					7.52
25	11	1986	630	18						27.3	7.45

Table 6. Fish/Shrimp Stocking, Sampling, and Harvesting. Gualaca, Panama, Cycle III, Dry Season

DAY	MONTH	YEAR	POND	ACTIVITY	SPECIES	POP. WEIGHT	POP. NUMBER	SAMPLE WEIGHT	SAMPLE WT.-#	SAMPLE WT.-SD	SAMPLE LENGTH	SAMPLE LT.-#	SAMPLE LT.-SD	REPROD. WEIGHT	REPROD. NUMBER
27	1	1986	1	STK	NIL	31.33	832								
27	1	1986	2	STK	NIL	31.43	818								
27	1	1986	3	STK	NIL	32.18	815								
27	1	1986	4	STK	NIL		885								
27	1	1986	5	STK	NIL	33.08	928								
27	1	1986	6	STK	NIL	28.75	859								
27	1	1986	7	STK	NIL	29.88	826								
27	1	1986	8	STK	NIL	30.83	826								
27	1	1986	9	STK	NIL	33.65	890								
27	1	1986	10	STK	NIL	29.23	839								
27	1	1986	17	STK	NIL	37.65	1037								
27	1	1986	18	STK	NIL	31.23	865								
24	2	1986	1	SAM	NIL		214								
24	2	1986	2	SAM	NIL	10.95	177								
24	2	1986	3	SAM	NIL		177								
24	2	1986	4	SAM	NIL		127								
24	2	1986	5	SAM	NIL	13.55	173								
24	2	1986	6	SAM	NIL		160								
24	2	1986	7	SAM	NIL	12.55	178								
24	2	1986	8	SAM	NIL		122								
24	2	1986	9	SAM	NIL		89								
24	2	1986	10	SAM	NIL	12.25	116								
24	2	1986	17	SAM	NIL		118								
24	2	1986	18	SAM	NIL		268								
1	4	1986	1	SAM	NIL	11.345	169								
1	4	1986	2	SAM	NIL	10.675	129							2.65	
1	4	1986	3	SAM	NIL	8.775	131							0.175	
1	4	1986	4	SAM	NIL	11.15	119								
1	4	1986	5	SAM	NIL		127							2.55	
1	4	1986	6	SAM	NIL	16.175	190								
1	4	1986	7	SAM	NIL		132							1.35	
1	4	1986	8	SAM	NIL		83								
1	4	1986	9	SAM	NIL	25.75	201							2.45	
1	4	1986	10	SAM	NIL	7.275	52							0.625	
1	4	1986	17	SAM	NIL	22.075	182								
1	4	1986	18	SAM	NIL		158								
29	4	1986	1	SAM	NIL		78								
29	4	1986	2	SAM	NIL	17.15	184							5.35	
29	4	1986	3	SAM	NIL	12.75	166								
29	4	1986	4	SAM	NIL	17.35	138							5.45	
29	4	1986	5	SAM	NIL	8.975	74								
29	4	1986	6	SAM	NIL	11.425	109								
29	4	1986	7	SAM	NIL	11.625	103								
29	4	1986	8	SAM	NIL	11.45	94							6.725	
29	4	1986	9	SAM	NIL	27.625	180							11.03	
29	4	1986	10	SAM	NIL	10.325	65							4.405	
29	4	1986	17	SAM	NIL		173							16.6	
29	4	1986	18	SAM	NIL	16.28	220							4.98	
27	5	1986	1	SAM	NIL		83								
27	5	1986	2	SAM	NIL		76								
27	5	1986	3	SAM	NIL		116								
27	5	1986	4	SAM	NIL	10.975	76								
27	5	1986	5	SAM	NIL		41							7.85	
27	5	1986	6	SAM	NIL		62							5.925	
27	5	1986	7	SAM	NIL	4.475	38								
27	5	1986	8	SAM	NIL	7.075	53							10.3	
27	5	1986	9	SAM	NIL	43.05	260							29.8	
27	5	1986	10	SAM	NIL	29.125	169								
27	5	1986	17	SAM	NIL	20.825	135							23.85	
27	5	1986	18	SAM	NIL		81							1.975	
25	6	1986	1	HAR	NIL		781	100.	50	16.3		50	1.06	37.125	3375.
25	6	1986	2	HAR	NIL	80.35	776	106.	50	21.3	18.2	50	1.28	58.55	4504.
25	6	1986	3	HAR	NIL	65.875	744	87.	50	18.6	17.1	50	1.42	47.95	5576.
25	6	1986	4	HAR	NIL	107.975	826	135.	50	21.7	19.8	50	1.18	74.375	4958.
25	6	1986	5	HAR	NIL	121.705	934	141.	50	23.3		50	1.24	85.05	5316.
25	6	1986	6	HAR	NIL	82.55	684	117.	50	18.8	18.8	50	1.11	68.025	6184.
25	6	1986	7	HAR	NIL	88.575	748	116.	50	20.1	19.1	50	1.35	83.205	5200.
25	6	1986	8	HAR	NIL	114.475	773	147.	50	23.2	20.6	50	1.35	84.5	8048.
25	6	1986	9	HAR	NIL	136.525	787	168.	50	30.6	21.7	50	1.24	103.15	6742.
25	6	1986	10	HAR	NIL	148.65	759	195.	50	31.2	22.2	50	1.38	138.15	5313.
25	6	1986	17	HAR	NIL	143.75	904	156.	50	21.1		50	1.11	150.95	3415.
25	6	1986	18	HAR	NIL		801	74.	50	13.4	16.5	50	1.13	20.6	2482.

Table 6. Fish/Shrimp Stocking, Sampling, and Harvesting. Gualaca, Panama, Cycle III, Wet Season

DAY	MONTH	YEAR	POND	ACTIVITY	SPECIES	POP. WEIGHT	POP. NUMBER	SAMPLE WEIGHT	SAMPLE WT.-#	SAMPLE WT.-SD	SAMPLE LENGTH	SAMPLE LT.-#	SAMPLE LT.-SD	REPROD. WEIGHT	REPROD. NUMBER
21	7	1986	1	STK	NIL	21.53	832								
21	7	1986	2	STK	NIL	19.83	818								
21	7	1986	3	STK	NIL	19.28	815								
21	7	1986	4	STK	NIL	20.98	885								
21	7	1986	5	STK	NIL	20.63	928								
21	7	1986	6	STK	NIL	20.1	859								
21	7	1986	7	STK	NIL	19.53	826								
21	7	1986	8	STK	NIL	20.4	826								
21	7	1986	9	STK	NIL	20.68	890								
21	7	1986	10	STK	NIL	20.33	839								
21	7	1986	17	STK	NIL	23.85	1037								
21	7	1986	18	STK	NIL	20.08	865								
21	7	1986		STK	NIL			28.	100	13.4	11.4	100	1.8		
19	8	1986	1	SAM	NIL		193								
19	8	1986	2	SAM	NIL		229								
19	8	1986	3	SAM	NIL	12.03	278								
19	8	1986	4	SAM	NIL	12.46	167								
19	8	1986	5	SAM	NIL	16.5	181								
19	8	1986	6	SAM	NIL	18.02	281								
19	8	1986	7	SAM	NIL	16.95	271								
19	8	1986	8	SAM	NIL	9.65	150								
19	8	1986	9	SAM	NIL	24.44	261								
19	8	1986	10	SAM	NIL	18.83	188								
19	8	1986	17	SAM	NIL	27.1	294								
19	8	1986	18	SAM	NIL	12.6	312								
16	9	1986	1	SAM	NIL		134								
16	9	1986	2	SAM	NIL	10.05	161								
16	9	1986	3	SAM	NIL	13.1	245								
16	9	1986	4	SAM	NIL	8.58	80								
16	9	1986	5	SAM	NIL		58								
16	9	1986	6	SAM	NIL	4.85	51								
16	9	1986	7	SAM	NIL	11.7	151								
16	9	1986	8	SAM	NIL	14.2	150								
16	9	1986	9	SAM	NIL	20.55	132								
16	9	1986	10	SAM	NIL	3.15	25								
16	9	1986	17	SAM	NIL	8.18	47								
16	9	1986	18	SAM	NIL	14.9	297								
15	10	1986	1	SAM	NIL		78								
15	10	1986	2	SAM	NIL	10.5	169								
15	10	1986	3	SAM	NIL	7.43	116								
15	10	1986	4	SAM	NIL	19.3	166								
15	10	1986	5	SAM	NIL	18.25	153								
15	10	1986	6	SAM	NIL	12.3	128								
15	10	1986	7	SAM	NIL		91								
15	10	1986	8	SAM	NIL	14.9	140								
15	10	1986	9	SAM	NIL		195								
15	10	1986	10	SAM	NIL		63								
15	10	1986	17	SAM	NIL	32.75	205								
15	10	1986	18	SAM	NIL		110								
12	11	1986	1	SAM	NIL	4.425	54								
12	11	1986	2	SAM	NIL	17.55	226								
12	11	1986	3	SAM	NIL	10.55	155								
12	11	1986	4	SAM	NIL	12.58	99								
12	11	1986	5	SAM	NIL	18.3	147								
12	11	1986	6	SAM	NIL	4.15	39								
12	11	1986	7	SAM	NIL	12.83	123								
12	11	1986	8	SAM	NIL	21.33	199								
12	11	1986	9	SAM	NIL	42.8	257								
12	11	1986	10	SAM	NIL	22.9	154								
12	11	1986	17	SAM	NIL	19.28	150								
12	11	1986	18	SAM	NIL	6.13	110								
9	12	1986	1	HAR	NIL	61.22	733	82.	26	10.9	16.2	26	0.76	35.24	25536.
9	12	1986	2	HAR	NIL	50.7	686	69.	25	12.7	15.5	25	1.39	17.7	2122.
9	12	1986	3	HAR	NIL	47.4	733	67.	25			25	0.91	13.25	3932.
9	12	1986	4	HAR	NIL	89.08	754	109.	25	27.6	18.5	25	1.59	69.5	10709.
9	12	1986	5	HAR	NIL	89.6	770	114.	25	15.9	17.5	25	1.11	48.55	15267.
9	12	1986	6	HAR	NIL	79.4	756	101.	25	18.9	17.3	25	1.31	60.23	11258.
9	12	1986	7	HAR	NIL	64.34	818	93.	25	15.1	16.7	25	1.2	52.1	11552.
9	12	1986	8	HAR	NIL	77.6	725	106.	25	27.6	17.4	25	1.42	74.55	14337.
9	12	1986	9	HAR	NIL	135.65	831	179.	25	27.1	20.2	25	0.9	140.4	2780.
9	12	1986	10	HAR	NIL	106.5	705	154.	25	27.51	19.3	25	1.07	112.6	2422.
9	12	1986	17	HAR	NIL	150.2	870	175.	24	36.4	20.1	24	1.69	106.45	2172.
9	12	1986	18	HAR	NIL		655	58.	25	7.9	13.9	25	0.83	9.85	6523.

Table 7. Plankton and Benthos. Gualaca, Panama, Cycle III, Dry Season

DAY	MONTH	YEAR	POND#	NET PRODUCTN	GROSS PRODUCTN	BLUE-GREEN	GREEN	DIATOM	OTHER PHYTO.	ROTIFE	CLADOC	COPEPO	OTHER ZOOPL.
31	1	1986	1							3	1	1	1
31	1	1986	2							3	1	1	1
31	1	1986	3							3	1	1	1
31	1	1986	4							3	1	1	1
31	1	1986	5							3	1	1	1
31	1	1986	6							3	1	1	1
31	1	1986	7							3	1	1	1
31	1	1986	8							3	1	1	1
31	1	1986	9							2	1	1	1
31	1	1986	10							3	1	1	1
31	1	1986	17							3	1	1	1
31	1	1986	18							2	1	1	2
21	2	1986	1							2	2	1	1
21	2	1986	2							2	1	1	1
21	2	1986	3							2	1	1	1
21	2	1986	4							1	1	3	1
21	2	1986	5							3	1	1	1
21	2	1986	6							1	1	2	2
21	2	1986	7							1	2	1	2
21	2	1986	8							1	2	1	2
21	2	1986	9							1	1	1	2
21	2	1986	10							2	2	1	1
21	2	1986	17							2	2	1	1
21	2	1986	18							3	1	1	1
4	3	1986	1							1	1	2	1
4	3	1986	2							2	1	2	1
4	3	1986	3							3	1	1	1
4	3	1986	4							1	1	2	2
4	3	1986	5							2	1	1	2
4	3	1986	6							3	1	1	1
4	3	1986	7							2	1	2	1
4	3	1986	8							3	1	1	1
4	3	1986	9							1	1	2	2
4	3	1986	10							1	1	2	2
4	3	1986	17							1	1	3	1
4	3	1986	18							1	1	2	2
4	4	1986	1							1	1	2	2
4	4	1986	2							2	1	2	2
4	4	1986	3							2	1	2	1
4	4	1986	4							3	1	1	1
4	4	1986	5							1	1	1	2
4	4	1986	6							3	1	1	1
4	4	1986	7							1	1	2	2
4	4	1986	8							3	1	1	1
4	4	1986	9							3	1	1	1
4	4	1986	10							1	1	2	2
4	4	1986	17							1	1	2	2
4	4	1986	18							1	1	2	2
25	4	1986	1							1	1	2	2
25	4	1986	2							1	1	2	2
25	4	1986	3							1	1	2	2
25	4	1986	4							1	1	1	2
25	4	1986	5							1	1	2	2
25	4	1986	6							1	1	2	2
25	4	1986	7							1	1	3	1
25	4	1986	8							2	1	1	1
25	4	1986	9							2	1	2	1
25	4	1986	10							3	1	1	1
25	4	1986	17							1	1	2	2
25	4	1986	18							2	1	2	1
5	5	1986	1							1	1	2	2
5	5	1986	2							1	1	2	2
5	5	1986	3							1	1	2	1
5	5	1986	4							3	1	1	1
5	5	1986	5							1	1	1	3
5	5	1986	6							1	1	2	2
5	5	1986	7							1	1	2	2
5	5	1986	8							3	1	1	1
5	5	1986	9							3	1	1	1
5	5	1986	10							1	1	2	2
5	5	1986	17							2	1	2	2

Table 7. Plankton and Benthos. Gualaca, Panama, Cycle III, Dry Season

DAY	MONTH	YEAR	POND#	NET PRODUCTN	GROSS PRODUCTN	BLUE-GREEN	GREEN	DIATOM	OTHER PHYTO.	ROTIFE	CLADOC	COPEPO	OTHER ZOOPL.
5	5	1986	18							1	1	2	1
16	5	1986	1							1	1	2	2
16	5	1986	2							1	1	3	1
16	5	1986	3							1	1	2	2
16	5	1986	4							1	1	2	1
16	5	1986	5							3	1	1	1
16	5	1986	6							1	1	1	2
16	5	1986	7							1	1	2	1
16	5	1986	8							3	1	1	1
16	5	1986	9							3	1	1	1
16	5	1986	10							1	1	2	1
16	5	1986	17							3	1	1	1
16	5	1986	18							2	1	2	1
30	5	1986	1							2	1	2	2
30	5	1986	2							1	1	2	2
30	5	1986	3							1	1	2	1
30	5	1986	4							2	1	1	2
30	5	1986	5							3	1	1	1
30	5	1986	6							2	1	1	2
30	5	1986	7							1	1	1	2
30	5	1986	8							3	1	1	1
30	5	1986	9							1	1	1	2
30	5	1986	10							3	1	1	1
30	5	1986	17							3	1	1	1
30	5	1986	18							2	1	1	2
13	6	1986	1							1	1	1	2
13	6	1986	2							1	1	2	2
13	6	1986	3							1	1	2	2
13	6	1986	4							2	1	2	2
13	6	1986	5							2	1	1	2
13	6	1986	6							3	1	1	1
13	6	1986	7							3	1	1	1
13	6	1986	8							2	1	1	1
13	6	1986	9							3	1	1	1
13	6	1986	10							3	1	1	1
13	6	1986	17							1	1	3	1
13	6	1986	18							2	1	1	1

Table 7. Plankton and Benthos. Gualaca, Panama, Cycle III, Wet Season

DAY	MONTH	YEAR	POND#	NET PRODUCTN	GROSS PRODUCTN	BLUE-GREEN	GREEN	DIATOM	OTHER PHYTO.	ROTIFE	CLADOC	COPEPO	OTHER ZOOPL.
25	7	1986	1							3	1	1	1
25	7	1986	2							2	2	1	1
25	7	1986	3							3	1	1	1
25	7	1986	4							3	1	1	1
25	7	1986	5							3	1	1	1
25	7	1986	6							3	1	1	1
25	7	1986	7							2	2	1	1
25	7	1986	8							2	2	1	1
25	7	1986	9							3	1	1	1
25	7	1986	10							3	1	1	1
25	7	1986	17							3	1	1	1
25	7	1986	18							3	1	1	1
1	8	1986	1							2	2	1	1
1	8	1986	2							1	3	1	1
1	8	1986	3							3	1	1	1
1	8	1986	4							3	1	1	1
1	8	1986	5							2	2	1	1
1	8	1986	6							2	2	1	1
1	8	1986	7							3	1	1	1
1	8	1986	8							1	2	1	2
1	8	1986	9							2	1	1	1
1	8	1986	10							1	2	1	2
1	8	1986	17							2	2	1	1
1	8	1986	18							3	1	1	1
19	8	1986	1							1	3	1	1
19	8	1986	2							3	1	1	1
19	8	1986	3							3	1	1	1
19	8	1986	4							3	1	1	1
19	8	1986	5							3	1	1	1
19	8	1986	6							2	2	1	1
19	8	1986	7							2	2	1	1
19	8	1986	8							3	1	1	1
19	8	1986	9							3	1	1	1
19	8	1986	10							3	1	1	1
19	8	1986	17							2	1	1	1
19	8	1986	18							2	1	2	1
1	9	1986	1							3	1	1	1
1	9	1986	2							3	1	1	1
1	9	1986	3							3	1	1	1
1	9	1986	4							3	1	1	1
1	9	1986	5							3	1	1	1
1	9	1986	6							3	1	1	1
1	9	1986	7							3	1	1	1
1	9	1986	8							2	1	1	1
1	9	1986	9							2	1	1	2
1	9	1986	10							3	1	1	1
1	9	1986	17							2	1	1	1
1	9	1986	18							1	1	2	1
12	9	1986	1							3	1	1	1
12	9	1986	2							2	1	1	1
12	9	1986	3							3	1	1	1
12	9	1986	4							2	1	1	2
12	9	1986	5							3	1	1	1
12	9	1986	6							3	1	1	1
12	9	1986	7							3	1	1	1
12	9	1986	8							2	1	1	2
12	9	1986	9							2	1	1	2
12	9	1986	10							1	1	1	2
12	9	1986	17							1	1	2	2
17	9	1986	18							2	1	1	1
26	9	1986	1							3	1	1	1
26	9	1986	2							3	1	1	1
26	9	1986	3							2	1	2	1
26	9	1986	4							3	1	1	1
26	9	1986	5							2	1	2	1
26	9	1986	6							3	1	1	1
26	9	1986	7							3	1	1	1
26	9	1986	8							2	1	1	1
26	9	1986	9							2	1	1	2
26	9	1986	10							2	1	2	1
26	9	1986	17							2	1	2	1

Table 7. Plankton and Benthos. Gualaca, Panama, Cycle III, Wet Season

DAY	MONTH	YEAR	POND#	NET PRODUCTN	GROSS PRODUCTN	BLUE-GREEN	GREEN	DIATOM	OTHER PHYTO.	ROTIFE	CLADOC	COPEPO	OTHER ZOOPL.
26	9	1986	18							3	1	1	1
10	10	1986	1							2	1	1	1
10	10	1986	2							2	1	1	1
10	10	1986	3							2	1	2	1
10	10	1986	4							2	1	2	1
10	10	1986	5							1	1	2	2
10	10	1986	6							2	1	1	1
10	10	1986	7							2	1	2	1
10	10	1986	8							2	1	1	1
10	10	1986	9							3	1	1	1
10	10	1986	10							3	1	1	1
10	10	1986	17							2	1	2	1
10	10	1986	18							3	1	1	1
27	10	1986	1							3	1	1	1
27	10	1986	2							2	1	1	1
27	10	1986	3							2	1	2	1
27	10	1986	4							1	1	1	2
27	10	1986	5							1	1	2	2
27	10	1986	6							1	1	2	1
27	10	1986	7							2	1	2	2
27	10	1986	8							1	1	2	2
27	10	1986	9							3	1	1	1
27	10	1986	10							3	1	1	1
27	10	1986	17							2	1	2	2
27	10	1986	18							2	1	1	1
6	11	1986	1							2	1	1	1
6	11	1986	2							2	1	2	1
6	11	1986	3							3	1	1	1
6	11	1986	4							1	1	1	2
6	11	1986	5							2	1	1	2
6	11	1986	6							2	1	2	1
6	11	1986	7							2	1	1	1
6	11	1986	8							1	1	2	2
6	11	1986	9							2	1	1	2
6	11	1986	10							2	1	1	2
6	11	1986	17							2	1	2	2
6	11	1986	18							3	1	1	1
21	11	1986	1							2	1	2	1
21	11	1986	2							1	1	2	1
21	11	1986	3							3	1	1	1
21	11	1986	4							1	1	3	1
21	11	1986	5							1	1	2	1
21	11	1986	6							1	1	2	1
21	11	1986	7							3	1	1	1
21	11	1986	8							1	1	2	1
21	11	1986	9							2	1	1	1
21	11	1986	10							1	1	2	2
21	11	1986	17							1	1	3	1
21	11	1986	18							2	1	2	1
3	12	1986	1							2	1	2	1
3	12	1986	2							2	1	2	1
3	12	1986	3							3	1	1	1
3	12	1986	4							1	1	2	2
3	12	1986	5							2	1	2	1
3	12	1986	6							1	1	2	1
3	12	1986	7							2	1	1	2
3	12	1986	8							2	1	2	1
3	12	1986	9							1	1	2	2
3	12	1986	10							2	1	1	1
3	12	1986	17							1	1	3	1
3	12	1986	18							2	1	2	1

Table 8. Water Quality Characteristics. Gualaca, Panama, Cycle III, Dry Season

DAY	MONTH	YEAR	POND#	ALKALIN	HARDNESS	PH	NH3-N	NO2-N	NO3-N	NO2&3-N	TOTAL-P	ORTHO-P	CL-	SALT	SO4	BORON	CALCIUM	COPPER	IRON	MAGNESIU	POTASSIU	SODIUM	ZINC
24	1	1986	1															0.	0.3				0.
24	1	1986	2															0.	0.24				0.
24	1	1986	3															0.	0.21				0.
24	1	1986	4															0.	0.2				0.
24	1	1986	5															0.	0.41				0.
24	1	1986	6															0.	0.21				0.
24	1	1986	7															0.	0.48				0.
24	1	1986	8															0.	0.24				0.
24	1	1986	9															0.	0.22				0.
24	1	1986	10															0.	0.2				0.
24	1	1986	17															0.	0.27				0.
24	1	1986	18															0.	0.48				0.
23	6	1986	1															0.	0.28				0.
23	6	1986	2															0.	0.27				0.
23	6	1986	3															0.	0.38				0.
23	6	1986	4															0.	0.32				0.
23	6	1986	5															0.	0.3				0.
23	6	1986	6															0.	0.33				0.
23	6	1986	7															0.	0.25				0.
23	6	1986	8															0.	0.33				0.
23	6	1986	9															0.	0.24				0.
23	6	1986	10															0.	0.25				0.
23	6	1986	17															0.	0.22				0.
23	6	1986	18															0.	0.7				0.

Table 8. Water Quality Characteristics. Gualaca, Panama, Cycle III, Wet Season

DAY	MONTH	YEAR	POND#	ALKALIN	HARDNESS	PH	NH3-N	NO2-N	NO3-N	NO2&3-N	TOTAL-P	ORTHO-P	CL-	SALT	SO4	BORON	CALCIUM	COPPER	IRON	MAGNESIU	POTASSIU	SODIUM	ZINC
26	7	1986	1															0.	0.65				
26	7	1986	2															0.	0.63				
26	7	1986	3															0.	0.68				
26	7	1986	4															0.	0.55				
26	7	1986	5															0.	0.57				
26	7	1986	6															0.	0.65				
26	7	1986	7															0.	0.66				
26	7	1986	8															0.	0.53				
26	7	1986	9															0.	0.67				
26	7	1986	10															0.	0.64				
26	7	1986	17															0.	0.58				
26	7	1986	18															0.	0.86				
5	12	1986	1															0.	0.21				3.2
5	12	1986	2															0.	0.85				0.03
5	12	1986	3															0.	0.2				0.03
5	12	1986	4															0.	1.29				0.03
5	12	1986	5															0.	1.04				
5	12	1986	6															0.	0.22				0.09
5	12	1986	7															0.	0.37				0.04
5	12	1986	8															0.	0.58				0.58
5	12	1986	9															0.	2.83				2.9
5	12	1986	10															0.	2.98				0.06
5	12	1986	17															0.	1.7				0.09
5	12	1986	18															0.	0.66				0.02

Table 9. Pond Soil Characteristics. Gualaca, Panama, Cycle III, Dry Season

DAY	MONTH	YEAR	POND#	CLAY	SILT	SAND	ORGAN. MATTER	WET-PH	SOIL-P	SOIL CA	SOIL MG	SOIL K	SOIL NA	SOIL N	SOIL NH4	SOIL NO3	SOIL CEC	SOIL SALT	SOIL AL	SOIL FE	SOIL ZN	SOIL MN	SOIL CU
2	7	1986	1				2.48	5.44	14.6	7.45	0.75	68.					30.6			24.4	1.2	167.6	2.9
2	7	1986	2				2.48	5.61	0.5	9.3	0.58	63.					27.8			15.2	0.9	186.4	1.8
2	7	1986	3				1.49	5.46	2.5	5.8	0.58	51.					28.6			16.	1.2	141.6	1.8
2	7	1986	4				4.96	5.58	0.4		0.58	70.					29.7			13.6	1.3	102.8	1.4
2	7	1986	5				4.96	5.47	19.		0.67	69.					31.7			7.6	1.3	154.8	1.7
2	7	1986	6				4.96	5.36	0.6	7.5	0.67	68.					32.9			14.8	1.5	149.6	1.4
2	7	1986	7				4.47	5.59	0.3	8.3	0.67	68.					29.5			30.6	0.9	129.6	3.
2	7	1986	8				1.49	5.47		4.1	0.58	61.					30.9			29.6	1.	128.	3.6
2	7	1986	9				3.47	5.81	11.6	10.5	0.92	93.					30.			12.7	1.4	147.2	2.2
2	7	1986	10				3.47	5.43	15.1	4.7	0.5	104.					27.2			15.	1.4	97.2	2.2
2	7	1986	17				2.48	6.12	10.1	6.9	0.75	95.					26.9			17.6	1.8	104.2	4.
2	7	1986	18				2.48	6.38	11.9	8.1	0.92	71.					30.6			21.6	1.1	81.2	4.2

Table 9. Pond Soil Characteristics. Gualaca, Panama, Cycle III, Wet Season

DAY	MONTH	YEAR	POND#	CLAY	SILT	SAND	ORGAN. MATTER	WET-PH	SOIL-P	SOIL CA	SOIL MG	SOIL K	SOIL NA	SOIL N	SOIL NH4	SOIL NO3	SOIL CEC	SOIL SALT	SOIL AL	SOIL FE	SOIL ZN	SOIL MN	SOIL CU
15	12	1986	1				3.36	5.63		6.38	0.6	132.					36.6			3.4	1.2	328.	1.4
15	12	1986	2				2.77	5.45	12.5	7.56	0.9	140.					51.2			15.5	4.3	327.	3.2
15	12	1986	3				1.42	5.41	2.5	4.2	0.7	132.					31.4			14.3	6.3	300.	3.8
15	12	1986	4				2.17	5.44	2.5	2.7	0.4	116.					33.8			11.6	5.	220.	1.9
15	12	1986	5				2.32	5.75		12.8	1.1	172.					37.8			10.7	4.	162.	3.9
15	12	1986	6				4.56	5.54		7.3	0.6	160.					37.6			8.2	3.3	176.	2.3
15	12	1986	7				1.42	5.42	2.5	6.6	0.7	128.					38.8			12.1	5.	204.	4.
15	12	1986	8				2.32	6.02		9.3	1.	160.					37.			15.3	3.5	196.	7.5
15	12	1986	9				2.62	6.18	17.5	14.2	1.1	192.					34.8			7.7	2.6	211.	1.7
15	12	1986	10				2.02	5.61	12.5	7.6	0.9	212.					35.5			13.	4.3	205.	2.5
15	12	1986	17				2.62	6.04	30.	8.8	1.1	316.					32.4			11.9	3.	308.	4.5
15	12	1986	18				2.02	5.98	2.5	8.2	1.	156.					33.8			17.	1.9	203.	5.8

Table 10. Analysis of Nutrients and Lime. Gualaca, Panama, Cycle III, Dry Season

DAY	MONTH	YEAR	NUTRIENT TYPE	DRY MATTER %	NUTRIENT N	NUTRIENT P	NUTRIENT K
9	9	1985		89.4	4.1	2.4	1.8
3	3	1986		89.9		1.1	1.2
14	5	1986		90.4	2.4		1.7
21	5	1986		90.5	2.7		1.4
28	5	1986		90.3	4.		1.8
1	6	1986		90.4	3.4		1.9
4	6	1986		90.3	3.5		1.5
18	6	1986		91.3	2.8		1.6

Table 10. Analysis of Nutrients and Lime. Gualaca, Panama, Cycle III, Wet Season

DAY	MONTH	YEAR	NUTRIENT TYPE	DRY MATTER %	NUTRIENT N	NUTRIENT P	NUTRIENT K
5	8	1986		89.5	3.4	2.1	1.4
12	8	1986		88.8	3.4	1.8	1.5
19	8	1986		88.3	2.9	2.5	1.6
26	8	1986		90.3	2.3	2.	1.4
2	9	1986		89.	3.5	3.1	2.
9	9	1986		88.6	3.5	2.2	1.5
23	9	1986		89.9	3.2	2.2	1.5
7	10	1986		88.5	2.5	1.6	1.4
14	10	1986		89.9	2.6	1.4	1.7
21	10	1986		89.3	2.2	1.7	1.9
4	11	1986		89.5	3.8	1.6	1.8
11	11	1986		89.4	2.5	2.1	1.5
18	11	1986		90.7	2,2	2.	1.5
25	11	1986		91.8	2.6	2.3	1.4

Table 11. Nutrient and Lime Inputs. Gualaca, Panama, Cycle III, Dry Season

DAY	MONTH	YEAR	POND#	FEED TYPE	FEED QUANTITY	MANURE TYPE	MANURE QUANTITY	INORGAN. TYPE	INORGAN. QUANTITY	LIME TYPE	LIME QUANTITY
27	11	1985	1							CAC	546.
27	11	1985	2							CAC	555.
27	11	1985	3							CAC	557.
27	11	1985	4							CAC	1026.
27	11	1985	5							CAC	489.
27	11	1985	6							CAC	529.
27	11	1985	7							CAC	550.
27	11	1985	8							CAC	1099.
27	11	1985	9							CAC	510.
27	11	1985	10							CAC	541.
27	11	1985	17							CAC	438.
27	11	1985	18							CAC	2099.
3	2	1986	1			CHICK	125.				
3	2	1986	2			CHICK	250.				
3	2	1986	3			CHICK	125.				
3	2	1986	4			CHICK	500.				
3	2	1986	5			CHICK	500.				
3	2	1986	6			CHICK	250.				
3	2	1986	7			CHICK	250.				
3	2	1986	8			CHICK	500.				
3	2	1986	9			CHICK	1000.				
3	2	1986	10			CHICK	1000.				
3	2	1986	17			CHICK	1000.				
3	2	1986	18			CHICK	125.				
11	2	1986	1			CHICK	125.				
11	2	1986	2			CHICK	250.				
11	2	1986	3			CHICK	125.				
11	2	1986	4			CHICK	500.				
11	2	1986	5			CHICK	500.				
11	2	1986	6			CHICK	250.				
11	2	1986	7			CHICK	250.				
11	2	1986	8			CHICK	500.				
11	2	1986	9			CHICK	1000.				
11	2	1986	10			CHICK	1000.				
11	2	1986	17			CHICK	1000.				
11	2	1986	18			CHICK	125.				
18	2	1986	1			CHICK	125.				
18	2	1986	2			CHICK	250.				
18	2	1986	3			CHICK	125.				
18	2	1986	4			CHICK	500.				
18	2	1986	5			CHICK	500.				
18	2	1986	6			CHICK	250.				
18	2	1986	7			CHICK	250.				
18	2	1986	8			CHICK	500.				
18	2	1986	9			CHICK	1000.				
18	2	1986	10			CHICK	1000.				
18	2	1986	17			CHICK	1000.				
18	2	1986	18			CHICK	125.				
25	2	1986	1			CHICK	125.				
25	2	1986	2			CHICK	250.				
25	2	1986	3			CHICK	125.				
25	2	1986	4			CHICK	500.				
25	2	1986	5			CHICK	500.				
25	2	1986	6			CHICK	250.				
25	2	1986	7			CHICK	250.				
25	2	1986	8			CHICK	500.				
25	2	1986	9			CHICK	1000.				
25	2	1986	10			CHICK	1000.				
25	2	1986	17			CHICK	1000.				
25	2	1986	18			CHICK	125.				
4	3	1986	1			CHICK	125.				
4	3	1986	2			CHICK	250.				
4	3	1986	3			CHICK	125.				
4	3	1986	4			CHICK	500.				
4	3	1986	5			CHICK	500.				
4	3	1986	6			CHICK	250.				
4	3	1986	7			CHICK	250.				
4	3	1986	8			CHICK	500.				
4	3	1986	9			CHICK	1000.				
4	3	1986	10			CHICK	1000.				
4	3	1986	17			CHICK	1000.				

Table 11. Nutrient and Lime Inputs. Gualaca, Panama, Cycle III, Dry Season

DAY	MONTH	YEAR	POND#	FEED TYPE	FEED QUANTITY	MANURE TYPE	MANURE QUANTITY
4	3	1986	18			CHICK	125.
11	3	1986	1			CHICK	125.
11	3	1986	2			CHICK	250.
11	3	1986	3			CHICK	125.
11	3	1986	4			CHICK	500.
11	3	1986	5			CHICK	500.
11	3	1986	6			CHICK	250.
11	3	1986	7			CHICK	250.
11	3	1986	8			CHICK	500.
11	3	1986	9			CHICK	1000.
11	3	1986	10			CHICK	1000.
11	3	1986	17			CHICK	1000.
11	3	1986	18			CHICK	125.
18	3	1986	1			CHICK	125.
18	3	1986	2			CHICK	250.
18	3	1986	3			CHICK	125.
18	3	1986	4			CHICK	500.
18	3	1986	5			CHICK	500.
18	3	1986	6			CHICK	250.
18	3	1986	7			CHICK	250.
18	3	1986	8			CHICK	500.
18	3	1986	9			CHICK	1000.
18	3	1986	10			CHICK	1000.
18	3	1986	17			CHICK	1000.
18	3	1986	18			CHICK	125.
25	3	1986	1			CHICK	125.
25	3	1986	2			CHICK	250.
25	3	1986	3			CHICK	125.
25	3	1986	4			CHICK	500.
25	3	1986	5			CHICK	500.
25	3	1986	6			CHICK	250.
25	3	1986	7			CHICK	250.
25	3	1986	8			CHICK	500.
25	3	1986	9			CHICK	1000.
25	3	1986	10			CHICK	1000.
25	3	1986	17			CHICK	1000.
25	3	1986	18			CHICK	125.
1	4	1986	1			CHICK	125.
1	4	1986	2			CHICK	250.
1	4	1986	3			CHICK	125.
1	4	1986	4			CHICK	500.
1	4	1986	5			CHICK	500.
1	4	1986	6			CHICK	250.
1	4	1986	7			CHICK	250.
1	4	1986	8			CHICK	500.
1	4	1986	9			CHICK	1000.
1	4	1986	10			CHICK	1000.
1	4	1986	17			CHICK	1000.
1	4	1986	18			CHICK	125.
8	4	1986	1			CHICK	125.
8	4	1986	2			CHICK	250.
8	4	1986	3			CHICK	125.
8	4	1986	4			CHICK	500.
8	4	1986	5			CHICK	500.
8	4	1986	6			CHICK	250.
8	4	1986	7			CHICK	250.
8	4	1986	8			CHICK	500.
8	4	1986	9			CHICK	1000.
8	4	1986	10			CHICK	1000.
8	4	1986	17			CHICK	1000.
8	4	1986	18			CHICK	125.
15	4	1986	1			CHICK	125.
15	4	1986	2			CHICK	250.
15	4	1986	3			CHICK	125.
15	4	1986	4			CHICK	500.
15	4	1986	5			CHICK	500.
15	4	1986	6			CHICK	250.
15	4	1986	7			CHICK	250.
15	4	1986	8			CHICK	500.
15	4	1986	9			CHICK	1000.
15	4	1986	10			CHICK	1000.
15	4	1986	17			CHICK	1000.
15	4	1986	18			CHICK	125.
22	4	1986	1			CHICK	125.
22	4	1986	2			CHICK	250.
22	4	1986	3			CHICK	125.
22	4	1986	4			CHICK	500.
22	4	1986	5			CHICK	500.
22	4	1986	6			CHICK	250.
22	4	1986	7			CHICK	250.
22	4	1986	8			CHICK	500.
22	4	1986	9			CHICK	1000.
22	4	1986	10			CHICK	1000.
22	4	1986	17			CHICK	1000.
22	4	1986	18			CHICK	125.
29	4	1986	1			CHICK	125.
29	4	1986	2			CHICK	250.
29	4	1986	3			CHICK	125.
29	4	1986	4			CHICK	500.
29	4	1986	5			CHICK	500.
29	4	1986	6			CHICK	250.
29	4	1986	7			CHICK	250.
29	4	1986	8			CHICK	500.
29	4	1986	9			CHICK	1000.
29	4	1986	10			CHICK	1000.
29	4	1986	17			CHICK	1000.
29	4	1986	18			CHICK	125.
6	5	1986	1			CHICK	125.
6	5	1986	2			CHICK	250.
6	5	1986	3			CHICK	125.
6	5	1986	4			CHICK	500.
6	5	1986	5			CHICK	500.
6	5	1986	6			CHICK	250.
6	5	1986	7			CHICK	250.
6	5	1986	8			CHICK	500.
6	5	1986	9			CHICK	1000.
6	5	1986	10			CHICK	1000.
6	5	1986	17			CHICK	1000.
6	5	1986	18			CHICK	125.
13	5	1986	1			CHICK	125.
13	5	1986	2			CHICK	250.
13	5	1986	3			CHICK	125.
13	5	1986	4			CHICK	500.
13	5	1986	5			CHICK	500.
13	5	1986	6			CHICK	250.
13	5	1986	7			CHICK	250.
13	5	1986	8			CHICK	500.
13	5	1986	9			CHICK	1000.
13	5	1986	10			CHICK	1000.
13	5	1986	17			CHICK	1000.
13	5	1986	18			CHICK	125.
20	5	1986	1			CHICK	125.
20	5	1986	2			CHICK	250.
20	5	1986	3			CHICK	125.
20	5	1986	4			CHICK	500.
20	5	1986	5			CHICK	500.
20	5	1986	6			CHICK	250.
20	5	1986	7			CHICK	250.
20	5	1986	8			CHICK	500.
20	5	1986	9			CHICK	1000.
20	5	1986	10			CHICK	1000.
20	5	1986	17			CHICK	1000.
20	5	1986	18			CHICK	125.
27	5	1986	1			CHICK	125.
27	5	1986	2			CHICK	250.
27	5	1986	3			CHICK	125.
27	5	1986	4			CHICK	500.
27	5	1986	5			CHICK	500.
27	5	1986	6			CHICK	250.
27	5	1986	7			CHICK	250.
27	5	1986	8			CHICK	500.
27	5	1986	9			CHICK	1000.
27	5	1986	10			CHICK	1000.
27	5	1986	17			CHICK	1000.

Table 11. Nutrient and Lime Inputs. Gualaca, Panama, Cycle III, Dry Season

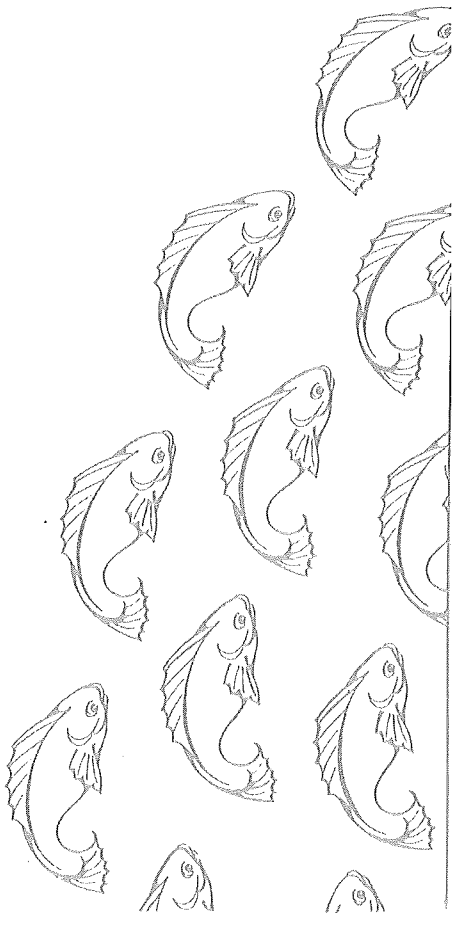
DAY	MONTH	YEAR	POND#	FEED TYPE	FEED QUANTITY	MANURE TYPE	MANURE QUANTITY
27	5	1986	18			CHICK	125.
3	6	1986	1			CHICK	125.
3	6	1986	2			CHICK	250.
3	6	1986	3			CHICK	125.
3	6	1986	4			CHICK	500.
3	6	1986	5			CHICK	500.
3	6	1986	6			CHICK	250.
3	6	1986	7			CHICK	250.
3	6	1986	8			CHICK	500.
3	6	1986	9			CHICK	1000.
3	6	1986	10			CHICK	1000.
3	6	1986	17			CHICK	1000.
3	6	1986	18			CHICK	125.
10	6	1986	1			CHICK	125.
10	6	1986	2			CHICK	250.
10	6	1986	3			CHICK	125.
10	6	1986	4			CHICK	500.
10	6	1986	5			CHICK	500.
10	6	1986	6			CHICK	250.
10	6	1986	7			CHICK	250.
10	6	1986	8			CHICK	500.
10	6	1986	9			CHICK	1000.
10	6	1986	10			CHICK	1000.
10	6	1986	17			CHICK	1000.
10	6	1986	18			CHICK	125.
17	6	1986	1			CHICK	125.
17	6	1986	2			CHICK	250.
17	6	1986	3			CHICK	125.
17	6	1986	4			CHICK	500.
17	6	1986	5			CHICK	500.
17	6	1986	6			CHICK	250.
17	6	1986	7			CHICK	250.
17	6	1986	8			CHICK	500.
17	6	1986	9			CHICK	1000.
17	6	1986	10			CHICK	1000.
17	6	1986	17			CHICK	1000.
17	6	1986	18			CHICK	125.

Table 11. Nutrient and Lime Inputs. Gualaca, Panama, Cycle III, Wet Season

DAY	MONTH	YEAR	POND#	FEED TYPE	FEED QUANTITY	MANURE TYPE	MANURE QUANTITY	INORGAN. TYPE	INORGAN. QUANTITY	LIME TYPE	LIME QUANTITY
10	7	1985	1							CAO	690.
10	7	1985	2							CAO	230.
10	7	1985	3							CAO	230.
10	7	1985	4							CAO	230.
10	7	1985	5							CAO	460.
10	7	1985	6							CAO	460.
10	7	1985	7							CAO	460.
10	7	1985	8							CAO	460.
10	7	1985	9							CAO	0.
10	7	1985	10							CAO	0.
10	7	1985	17							CAO	0.
10	7	1985	18							CAO	690.
14	11	1985	1							CAC	1150.
14	11	1985	2							CAC	1150.
14	11	1985	18							CAC	1150.
22	7	1986	1			CHICK	125.				
22	7	1986	2			CHICK	250.				
22	7	1986	3			CHICK	125.				
22	7	1986	4			CHICK	500.				
22	7	1986	5			CHICK	500.				
22	7	1986	6			CHICK	250.				
22	7	1986	7			CHICK	250.				
22	7	1986	8			CHICK	500.				
22	7	1986	9			CHICK	1000.				
22	7	1986	10			CHICK	1000.				
22	7	1986	17			CHICK	1000.				
22	7	1986	18			CHICK	125.				
29	7	1986	1			CHICK	125.				
29	7	1986	2			CHICK	250.				
29	7	1986	3			CHICK	125.				
29	7	1986	4			CHICK	500.				
29	7	1986	5			CHICK	500.				
29	7	1986	6			CHICK	250.				
29	7	1986	7			CHICK	250.				
29	7	1986	8			CHICK	500.				
29	7	1986	9			CHICK	1000.				
29	7	1986	10			CHICK	1000.				
29	7	1986	17			CHICK	1000.				
29	7	1986	18			CHICK	125.				
5	8	1986	1			CHICK	125.				
5	8	1986	2			CHICK	250.				
5	8	1986	3			CHICK	125.				
5	8	1986	4			CHICK	500.				
5	8	1986	5			CHICK	500.				
5	8	1986	6			CHICK	250.				
5	8	1986	7			CHICK	250.				
5	8	1986	8			CHICK	500.				
5	8	1986	9			CHICK	1000.				
5	8	1986	10			CHICK	1000.				
5	8	1986	17			CHICK	1000.				
5	8	1986	18			CHICK	125.				
12	8	1986	1			CHICK	125.				
12	8	1986	2			CHICK	250.				
12	8	1986	3			CHICK	125.				
12	8	1986	4			CHICK	500.				
12	8	1986	5			CHICK	500.				
12	8	1986	6			CHICK	250.				
12	8	1986	7			CHICK	250.				
12	8	1986	8			CHICK	500.				
12	8	1986	9			CHICK	1000.				
12	8	1986	10			CHICK	1000.				
12	8	1986	17			CHICK	1000.				
12	8	1986	18			CHICK	125.				
19	8	1986	1			CHICK	125.				
19	8	1986	2			CHICK	250.				
19	8	1986	3			CHICK	125.				
19	8	1986	4			CHICK	500.				
19	8	1986	5			CHICK	500.				
19	8	1986	6			CHICK	250.				
19	8	1986	7			CHICK	250.				
19	8	1986	8			CHICK	500.				

Table 11. Nutrient and Lime Inputs. Gualaca, Panama, Cycle III, Wet Season

DAY	MONTH	YEAR	POND#	FEED TYPE	FEED QUANTITY	MANURE TYPE	MANURE QUANTITY
19	8	1986	9			CHICK	1000.
19	8	1986	10			CHICK	1000.
19	8	1986	17			CHICK	1000.
19	8	1986	18			CHICK	125.
26	8	1986	1			CHICK	125.
26	8	1986	2			CHICK	250.
26	8	1986	3			CHICK	125.
26	8	1986	4			CHICK	500.
26	8	1986	5			CHICK	500.
26	8	1986	6			CHICK	250.
26	8	1986	7			CHICK	250.
26	8	1986	8			CHICK	500.
26	8	1986	9			CHICK	1000.
26	8	1986	10			CHICK	1000.
26	8	1986	17			CHICK	1000.
26	8	1986	18			CHICK	125.
2	9	1986	1			CHICK	125.
2	9	1986	2			CHICK	250.
2	9	1986	3			CHICK	125.
2	9	1986	4			CHICK	500.
2	9	1986	5			CHICK	500.
2	9	1986	6			CHICK	250.
2	9	1986	7			CHICK	250.
2	9	1986	8			CHICK	500.
2	9	1986	9			CHICK	1000.
2	9	1986	10			CHICK	1000.
2	9	1986	17			CHICK	1000.
2	9	1986	18			CHICK	125.
9	9	1986	1			CHICK	125.
9	9	1986	2			CHICK	250.
9	9	1986	3			CHICK	125.
9	9	1986	4			CHICK	500.
9	9	1986	5			CHICK	500.
9	9	1986	6			CHICK	250.
9	9	1986	7			CHICK	250.
9	9	1986	8			CHICK	500.
9	9	1986	9			CHICK	1000.
9	9	1986	10			CHICK	1000.
9	9	1986	17			CHICK	1000.
9	9	1986	18			CHICK	125.
16	9	1986	1			CHICK	125.
16	9	1986	2			CHICK	250.
16	9	1986	3			CHICK	125.
16	9	1986	4			CHICK	500.
16	9	1986	5			CHICK	500.
16	9	1986	6			CHICK	250.
16	9	1986	7			CHICK	250.
16	9	1986	8			CHICK	500.
16	9	1986	9			CHICK	1000.
16	9	1986	10			CHICK	1000.
16	9	1986	17			CHICK	1000.
16	9	1986	18			CHICK	125.
23	9	1986	1			CHICK	125.
23	9	1986	2			CHICK	250.
23	9	1986	3			CHICK	125.
23	9	1986	4			CHICK	500.
23	9	1986	5			CHICK	500.
23	9	1986	6			CHICK	250.
23	9	1986	7			CHICK	250.
23	9	1986	8			CHICK	500.
23	9	1986	9			CHICK	1000.
23	9	1986	10			CHICK	1000.
23	9	1986	17			CHICK	1000.
23	9	1986	18			CHICK	125.
30	9	1986	1			CHICK	125.
30	9	1986	2			CHICK	250.
30	9	1986	3			CHICK	125.
30	9	1986	4			CHICK	500.
30	9	1986	5			CHICK	500.
30	9	1986	6			CHICK	250.
30	9	1986	7			CHICK	250.
30	9	1986	8			CHICK	500.
30	9	1986	9			CHICK	1000.
30	9	1986	10			CHICK	1000.
30	9	1986	17			CHICK	1000.
30	9	1986	18			CHICK	125.
7	10	1986	1			CHICK	125.
7	10	1986	2			CHICK	250.
7	10	1986	3			CHICK	125.
7	10	1986	4			CHICK	500.
7	10	1986	5			CHICK	500.
7	10	1986	6			CHICK	250.
7	10	1986	7			CHICK	250.
7	10	1986	8			CHICK	500.
7	10	1986	9			CHICK	1000.
7	10	1986	10			CHICK	1000.
7	10	1986	17			CHICK	1000.
7	10	1986	18			CHICK	125.
14	10	1986	1			CHICK	125.
14	10	1986	2			CHICK	250.
14	10	1986	3			CHICK	125.
14	10	1986	4			CHICK	500.
14	10	1986	5			CHICK	500.
14	10	1986	6			CHICK	250.
14	10	1986	7			CHICK	250.
14	10	1986	8			CHICK	500.
14	10	1986	9			CHICK	1000.
14	10	1986	10			CHICK	1000.
14	10	1986	17			CHICK	1000.
14	10	1986	18			CHICK	125.
21	10	1986	1			CHICK	125.
21	10	1986	2			CHICK	250.
21	10	1986	3			CHICK	125.
21	10	1986	4			CHICK	500.
21	10	1986	5			CHICK	500.
21	10	1986	6			CHICK	250.
21	10	1986	7			CHICK	250.
21	10	1986	8			CHICK	500.
21	10	1986	9			CHICK	1000.
21	10	1986	10			CHICK	1000.
21	10	1986	17			CHICK	1000.
21	10	1986	18			CHICK	125.
28	10	1986	1			CHICK	125.
28	10	1986	2			CHICK	250.
28	10	1986	3			CHICK	125.
28	10	1986	4			CHICK	500.
28	10	1986	5			CHICK	500.
28	10	1986	6			CHICK	250.
28	10	1986	7			CHICK	250.
28	10	1986	8			CHICK	500.
28	10	1986	9			CHICK	1000.
28	10	1986	10			CHICK	1000.
28	10	1986	17			CHICK	1000.
28	10	1986	18			CHICK	125.
4	11	1986	1			CHICK	125.
4	11	1986	2			CHICK	250.
4	11	1986	3			CHICK	125.
4	11	1986	4			CHICK	500.
4	11	1986	5			CHICK	500.
4	11	1986	6			CHICK	250.
4	11	1986	7			CHICK	250.
4	11	1986	8			CHICK	500.
4	11	1986	9			CHICK	1000.
4	11	1986	10			CHICK	1000.
4	11	1986	17			CHICK	1000.
4	11	1986	18			CHICK	125.
11	11	1986	1			CHICK	125.
11	11	1986	2			CHICK	250.
11	11	1986	3			CHICK	125.
11	11	1986	4			CHICK	500.
11	11	1986	5			CHICK	500.
11	11	1986	6			CHICK	250.
11	11	1986	7			CHICK	250.
11	11	1986	8			CHICK	500.

Table 11. Nutrient and Lime Inputs. Gualaca, Panama, Cycle III, Wet Season

DAY	MONTH	YEAR	POND#	FEED TYPE	FEED QUANTITY	MANURE TYPE	MANURE QUANTITY
11	11	1986	9			CHICK	1000.
11	11	1986	10			CHICK	1000.
11	11	1986	17			CHICK	1000.
11	11	1986	18			CHICK	125.
18	11	1986	1			CHICK	125.
18	11	1986	2			CHICK	250.
18	11	1986	3			CHICK	125.
18	11	1986	4			CHICK	500.
18	11	1986	5			CHICK	500.
18	11	1986	6			CHICK	250.
18	11	1986	7			CHICK	250.
18	11	1986	8			CHICK	500.
18	11	1986	9			CHICK	1000.
18	11	1986	10			CHICK	1000.
18	11	1986	17			CHICK	1000.
18	11	1986	18			CHICK	125.
25	11	1986	1			CHICK	125.
25	11	1986	2			CHICK	250.
25	11	1986	3			CHICK	125.
25	11	1986	4			CHICK	500.
25	11	1986	5			CHICK	500.
25	11	1986	6			CHICK	250.
25	11	1986	7			CHICK	250.
25	11	1986	8			CHICK	500.
25	11	1986	9			CHICK	1000.
25	11	1986	10			CHICK	1000.
25	11	1986	17			CHICK	1000.
25	11	1986	18			CHICK	125.
2	12	1986	1			CHICK	125.
2	12	1986	2			CHICK	250.
2	12	1986	3			CHICK	125.
2	12	1986	4			CHICK	500.
2	12	1986	5			CHICK	500.
2	12	1986	6			CHICK	250.
2	12	1986	7			CHICK	250.
2	12	1986	8			CHICK	500.
2	12	1986	9			CHICK	1000.
2	12	1986	10			CHICK	1000.
2	12	1986	17			CHICK	1000.
2	12	1986	18			CHICK	125.