Department of Health Clean Water Branch Polluted Runoff Control Program

Quarterly Status Reporting Form

Clean Water Act 319(h) NPS Implementation Program

Quarterly Status Reports are required per contract terms. If no work was done during the reporting period, the CONTRACTOR must provide an explanation of the circumstances.

This Quarterly Status Report is for the period indicated below **(check only one and insert year)**:

January 1 – March 31, \_2020\_\_\_\_ (Due April 15th)

April 1- June 30, \_\_\_\_\_\_\_\_\_ (Due July 15th)

July 1 – September 30, \_\_\_\_\_\_\_\_\_ (Due October 15th)

XXXX

October 1 – December 31, \_\_\_\_\_\_\_\_\_ (Due January 15th)

Project Title: Implementing Soil Management Strategies and Soil Testing Technologies to Reduce Nutrient Loading for Intensive Farms on Oahu

Project Start/Completion Date: August 2019

Estimated % of Project Completed: 20%

Estimated % of Grant Funds Previously Requested: 0%

Quarterly Status Report Number: 3

Name, telephone number, and e-mail of person to be contacted for questions regarding this report: Jonathan Deenik, 808-956-6906, jdeenik@hawaii.edu

Please provide the following information for this reporting period. Additional sheets may be attached:

1. Progress/tasks started and/or completed as defined in the Contract’s Scope of Services during **current** reporting period.
2. Summary of work completed (list all tasks and deliverables)

|  |  |  |
| --- | --- | --- |
| Task/Deliverable | Due Date | Date Task Completed/Deliverable Submitted |
| Initial soil fertility test on each farm to determine baseline nutrient status  | December 2019 | Baseline soil fertility testing at MA’O Organic Farm completed February 2020. |
| Selection of treatment choices and configuration are based on discussion with individual participating growers  | December 2019 | Completed in February, 2020 at all participating farms.  |
| Establishment of demonstration plots with treatment choices and configurations | January 2020 | Established at Twin Bridges and Kaneshiro Farms. |
| Monitoring soil nitrate status in treatment plots | Ongoing | Monitoring in progress at Kahumana, Twin Bridges, and Tolentino farms |
| Monitoring crop yield in treatment plots | Ongoing | Harvest activities in progress at Kahumana and Tolentino farms |

1. GRTS Load Reductions

|  |  |
| --- | --- |
| Pollutant | Estimated Load Reduction |
| Nitrogen (lbs/yr) | Tolentino Farm: 1. ½ Farmer Practice = 447 lbs N/ac reduction per planting
2. ¼ Farmer Practice = 670 lbs/N/ac reduction per planting

Kahumana Farm:1. Root crops: no reductions
2. Salad mix:
	1. ½ Farmer Practice = 115 lbs N/ac reduction per planting

Twin Bridges Farm:1. ¾ Farmer Practice = 32 lbs N/ac reduction per planting
2. ½ Farmer Practice = 64 lbs N/ac reduction per planing
 |
| Phosphorous (lbs/yr) | Tolentino Farm:Kahumana Farm:1. Root crops: no reductions
2. Salad mix:
	1. ½ Farmer Practice = 30 lbs P/ac reduction per planting
	2. Feather meal treatment = 60 lbs P/ac reduction per planting

Twin Bridges Farm:1. No P treatments = 31 lbs P/ac reduction per planting
 |
| Sediment (tons/yr) | Not available |

1. Narrative Progress Report

Kahumana Farm:

* Three crop harvests (beets, carrots, and salad mix) have been completed in the demonstration plots. Soil nitrate monitoring occurred at regular intervals during all three crop cycles.

Tolentino Farm:

* Eggplant harvests in the demonstration plots began in February, 2020 and are ongoing. A total of 4 harvest events have occurred during this reporting period. Soil nitrate has been monitored since December 5, 2019 and is ongoing. A total of five soil sampling events have occurred during this reporting period. Not all samples have been analyzed for nitrate.

Twin Bridge Farm:

* Soil nitrate monitoring began April 4, 2020.

Kaneshiro Farm:

* Cover crop plots will be planted in May 2020.

Aloun Farm:

* First crop will be planted in May 2020.

MA’O Organic Farm:

* Demonstration site selected, treatments agreed upon, but COVID-19 has disrupted initiation of demonstration. MA’O is closed to outsiders.
1. Description of any major issues/problems encountered and/or resolved that may affect the CONTRACTOR’s ability to complete the project as required (i.e., weather, personnel, equipment, etc.). If there is a change in the project timeline or budget, provide an explanation, revised timeline, budget, and completion schedule. (Please note that no-cost extensions must be applied for through the Department, and will only be granted when the CONTRACTOR has demonstrated unforeseeable setbacks.)
2. Heavy rain in December 2019 and into January 2020 caused severe flooding at the Counter Culture farm site in Hale’iwa. The flooding was so severe that the land owner had to excavate a large drainage trench through the fields where we had planned to implement the demonstration plots. Due to this unfortunate sequence of events, Counter Culture has pulled out of the project.

We have initiated demonstration expansions at Twin Bridges to work on nutrient management in their corn operation as a substitute for the loss of Counter Culture. Demonstration plots will be implemented as soon as the COVID-19 situation is resolved to the point where farm visits are acceptable.

1. Heavy rain at the Aloun field site prevented implementation of plot treatments during January and February.
2. Due to the Governor’s directive to “shelter at home” on-farm activities at MA’O Organic Farm, Aloun Farm, and Kaneshiro Farm have ceased and will resume once the directive has been lifted. Crop and soil sampling activities continue, with agreement from the farmers, at Tolentino, Kahumana, and Twin Bridges farms.
3. Description of any significant findings, results, or conclusions. If none, please indicate so.

Tolentino Farm

Five demonstration plots have been established at Tolentino Farm to assess reduction in nitrogen fertilizer application on eggplant yield. The Farmer Practice applies 960 lbs N/ac per crop (65 weeks) through weekly fertigation events. We established 4 comparisons: ½ Farmer Practice (480 lbs N/ac) with and without compost, ¼ Farmer practice (240 lbs N/ac) with and without compost.

Figure 1 summarizes eggplant production in each of the five plots. Eggplant yield ranged from a low of 820 lbs/ac in the Farmer Practice on March 23 to a high of



Figure 1. Eggplant yield in the ¼ Farmer Practice plots in comparison with the Farmer Practice (1A) and in the ½ Farmer Practice plots in comparison with the Farmer Practice (1B). Points represent the mean of three replicates within each treatment plots and error bars represent the standard error.

4,559 lbs/ac in the ½ Farmer Practice with compost plot on April 13, 2020. Figure 1A shows the ¼ Farmer Practice treatments in comparison to the Farmer Practice treatment and Figure 1B shows the ½ Farmer Practice treatments in comparison to the Farmer Practice treatment. After accounting for variability in the field plots, the overlapping error bars suggest that eggplant yield in the ¼ and ½ Farmer Practice plots is not significantly different than eggplant yield in the Farmer Practice plot receiving the full dose of N fertilizer. In other words, the farmer can expect **no yield reduction** with a **fourfold reduction** in N fertilizer application.

Figure 2 summarizes soil nitrate concentrations in the top 6 inches of soil in each of the demonstration plots through January 29, 2020. Mean soil nitrate concentration ranged from a low of 9.95 mg/kg in the ¼ Farmer Practice plot on Dec 23, 2019 to a high of 96.8 mg/kg in the ½ Farmer Practice with compost plot on December 27, 2019. Mean soil nitrate concentrations over the six sampling



Figure 2. Soil nitrate concentration in the top 6 inches of soil in the ¼ Farmer Practice plots in comparison with the Farmer Practice (2A) and in the ½ Farmer Practice plots in comparison with the Farmer Practice (2B). Points represent the mean of six replicates within each treatment plots and error bars represent the standard error.

dates are presented in Table 1. As expected, we observed the lowest mean nitrate concentrations in the ¼ Farmer Practice Plots, but contrary to expectations the highest mean soil nitrate concentrations were observed in the ½ Farmer Practice with compost plot, not in the Farmer Practice plot. We note, however, that relatively high nitrate variability within the plots means that there is likely no statistical difference among the plots. We will continue to monitor soil nitrate throughout the eggplant growing season.

Table 1. Mean soil nitrate concentrations in the five demonstration plots over 6 sampling dates. Standard error in parentheses.

|  |  |
| --- | --- |
| Treatment | Nitrate Concentration(mg/kg) |
| ¼ Farmer Practice | 23.1 (±10.4) |
| ¼ Farmer Practice + Compost | 24.1 (±8.1) |
| ½ Farmer Practice | 32.7 (±7.3) |
| ½ Farmer Practice + Compost | 40.9 (±11.6) |
| Farmer Practice | 35.3 (±7.6) |

Kahumana Farm

Four demonstration plots have been established at Kahumana Farm to assess alternative strategies in fertilizer in a carrot and salad mix crop. For the carrot crop, no soil amendment was added to the Farmer Practice plot, which was compared with fish bone meal added to deliver 150 lbs N per acre, feather meal to deliver 150 lbs N per acre, and a last treatment of feather meal added to deliver 75 lbs N per acre. The three alternative treatments also received an application of compost equivalent to 20 tons per acre. For the salad crop, the treatments consisted of the following: Farmer Practice (fish bone meal at 225 lbs N/ac), Farmer Practice and Compost, Feather Meal (at 225 lbs N/ac), ½ Feather Meal (at 110 lbs N/ac).

Figure 3 summarizes the yield data for the beet (previous reporting period), carrot, and salad crops. As reported in the previous report on beets, carrot yield showed a 50% decrease with added fish bone meal, but the feather meal applications produced similar yields to the no amendment Farmer Practice (Fig. 1A). These results indicate that the farmer is making the correct choice to withhold fertilizer applications for root crop production. This makes sense given 

Figure 3. Fertilizer effects on beet and carrot yields (A) and a salad mix crop at Kahumana Farm.

that root crops have a low nitrogen requirement, and the pre-plant soil test indicated adequate levels of nutrients. It appears that the farmer is relying on residual nutrients from the fish bone meal applications to the preceding salad crop to maintain root productivity.

Yield results for the salad mix that followed the root crops showed that the farmer can reduce N application and remove P additions in the amendment without reducing yields (Fig. 1B). The Feather meal application at both the full N rate (225 lbs N/ac) and at ½ the N rate (110 lbs N/ac) achieved the same salad yields with reductions in both P and N.

1. Based on the Scope of Services, a description of tasks expected to be completed in the next reporting period.

Description of tasks for next reporting period:

1. Once the State has lifted restrictions due to the COVID-19 virus we expect to establish the remaining demonstration plots at Kaneshiro, Aloun, and MA`O farms.
2. In-season nitrate monitoring prior to and following fertilization events will continue at Kahumana, Tolentino, and Twin Bridges farms, and begin at the three other farm sites.
3. We will continue collecting yield data at Kahumana and Tolentino farms.
4. Nitrate analyses on samples collected will continue in the lab.

Summary of expenditures and in-kind contributions previously requested in comparison with the Contract’s project budget and remaining funds. The summary must be actual cumulative amounts for each line item (i.e., personnel services, travel, operating expenses, equipment acquisition, construction materials, other, etc.) current as of this quarterly status report. Please see the example on Page 4 if necessary.

Grant Funds

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| No. | Description | Original Contract Amount | Contract Amounts from Preceding QSR  | Expenditures during this Quarterly Reporting Period | Current Contract Amount (Remaining Funds)  |
| A | Personnel Services | $244,440.28 | $0 | $18,868.14 | $ |
| B. | Travel | $1560 | $0 | $0 | $ |
| C. | Operating Expenses | $16,830 | $0 | $642.83 | $ |
| D. | Equipment  | $1200 | $0 | $0 | $ |
| E. | Professional Services | $14,420 | $0 | $1,336.12 | $ |
| F. | Construction Materials and Supplies | $0 | $0 | $0 | $ |
| G. | Other Misc. Expenses | $1500 | $0 | $0 | $ |

 TOTALS $279,950.28 $0.00 $20,847.09 $250,808.79

In-Kind Contributions (Matching Funds)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| No. | Description | Original Contribution Amounts | Contribution Amounts from Preceding QSR  | Contributions during this Quarterly Reporting Period | Current Contribution Amount |
| A | Personnel Services | $94,461.44 | $625.38 | $1,876.14 | $ |
| B. | Travel | $ | $ | $ | $ |
| C. | Operating Expenses | $ | $ | $ | $ |
| D. | Equipment  | $ | $ | $ | $ |
| E. | Professional Services | $ | $ | $ | $ |
| F. | Construction Materials and Supplies | $ | $ | $ | $ |
| G. | Other Misc. Expenses | $ | $ | $ | $ |

 TOTALS $94,461.44 $625.38 $1,876.14 $91,334.54

In this ***example***, the Contract’s overall project budget for Personnel Services is $10,000.00, with $15,000.00 in Match. The Travel Budget is $1,200.00 with $1,000.00 in Match. Due to space constraints, Categories C - G were not listed in this example but shall be included with official QSRs and reimbursement requests. In the first Quarterly Grant Expense Report, the CONTRACTOR requests a $500.00 reimbursement, and claims $200.00 in Match:

Grant Funds

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| No. | Description | Original Contract Amount | Contract Amounts from Preceding QSR  | Expenditures during this Quarterly Reporting Period | Current Contract Amount (Remaining Funds)  |
| A | Personnel Services | $10,000.00 | $0.00 | $500.00 | $9,500.00 |
| B | Travel | $1,200.00 | $0.00 | $0.00 | $1,200.00 |

 TOTALS $11,200.00 $0.00 $500.00 $10,700.00

In-Kind Contributions (Matching Funds)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| No. | Description | Original Contribution Amounts | Contribution Amounts from Preceding QSR  | Contributions during this Quarterly Reporting Period | Current Contribution Amount |
| A | Personnel Services | $15,000.00 | $0.00 | $200.00 | $14,800.00 |
| B | Travel | $1,000.00 | $0.00 | $0.00 | $1,000.00 |

 TOTALS $16,000.00 $0.00 $200.00 $15,800.00

With QSR #2, the CONTRACTOR requests a $1,500.00 reimbursement and claims $500.00 in Match for Personnel, and $200.00 in Match for Travel (Note that the “Original Contract Amount” Column never changes, and the “Contract Amounts from Preceding QSR” Column in QSR #2 is identical to the “Current Contract Amounts” Column in QSR #1):

Grant Funds

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| No. | Description | Original Contract Amount | Contract Amounts from Preceding QSR  | Expenditures during this Quarterly Reporting Period | Current Contract Amount (Remaining Funds)  |
| A | Personnel Services | $10,000.00 | $9,500.00 | $1,500.00 | $8,000.00 |
| B | Travel | $1,200.00 | $1,200.00 | $0.00 | $1,200.00 |

 TOTALS $11,200.00 $10,700.00 $1,500.00 $9,200.00

In-Kind Contributions (Matching Funds)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| No. | Description | Original Contribution Amounts | Contribution Amounts from Preceding QSR  | Contributions during this Quarterly Reporting Period | Current Contribution Amount |
| A | Personnel Services | $15,000.00 | $14,800.00 | $500.00 | $14,300.00 |
| B | Travel | $1,000.00 | $1,000.00 | $200.00 | $800.00 |

 TOTALS $16,000.00 $15,800.00 $700.00 $15,100.00