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, __2013___ (Due April 15th)
- ☐ April 1- June 30, _____ (Due July 15th)
- ☐ July 1 – September 30, _____ (Due October 15th)
- ☐ October 1 – December 31, _____ (Due January 15th)

Project Title: "Protection and monitoring of Watershed Partnerships' Water Resources"

Project Start/Completion Date: NTP issued 4.20.10, Completion date 8.19.13

Estimated % of Project Completed: __50.8_____%

Estimated % of Grant Funds Previously Requested: _38____%

Quarterly Status Report Number:___12_____

Name, telephone number, and e-mail of person to be contacted for questions regarding this report: __Chris Brosius, WMMWP Coordinator – 808-661-6600
brosius@westmauiwatershed.org

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.
   A. Summary of work completed (list all tasks and deliverables)

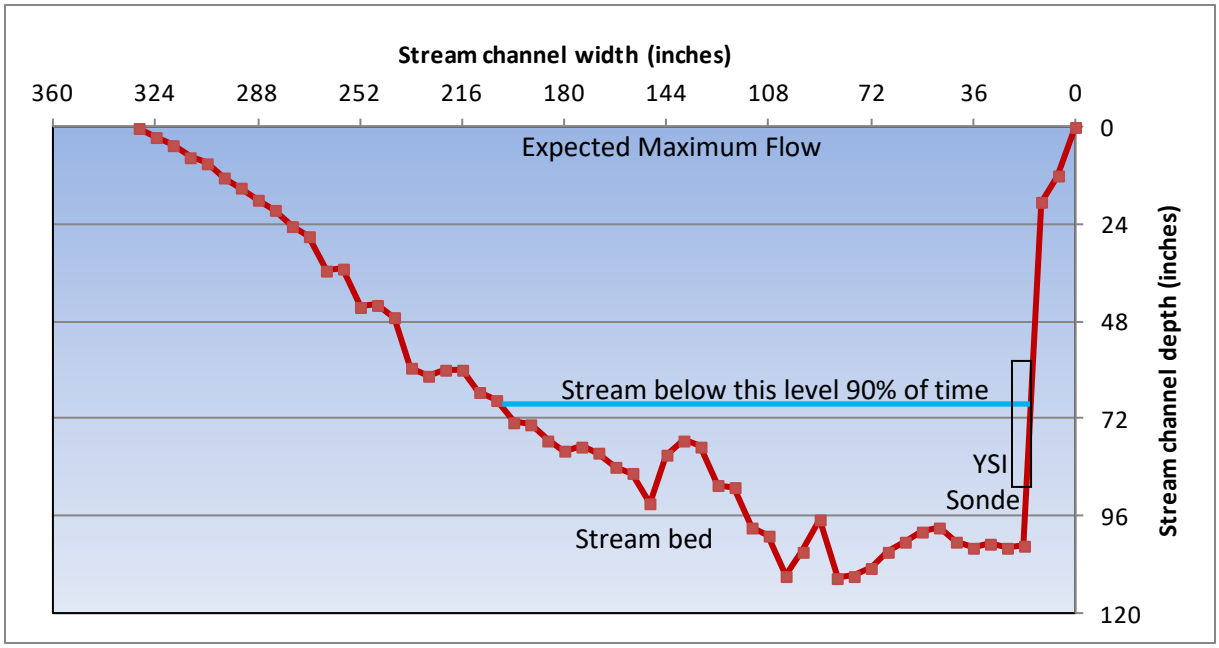
Task/Deliverable	Due Date	Date Task Completed/ Deliverable Submitted
Fence materials and installation Commenced in Honolua Watershed	Ongoing	~99.9% materials deployed. 99.9% installed.
Fence materials and installation Commenced in Hana Watershed	Ongoing	?
Draft Water Monitoring Plan (Guide)	May 6th, 2011	Still in Progress
Final Implementation Plan For Honolua and Hana	July 1st, 2011	Completed
Water and Watershed Monitoring	August 26th , 2011	Baseline Completed and post monitoring beginning for WMMWP, In progress for EMWP

B. Narrative Progress Report

- Yumi Miyata is continuing work on a second draft of the "Water Quality Monitoring Guide" to include more Hawaii specific methodology.
- The YSI units in Honolua and Hana are still collecting data, and a one-year baseline data set for Honolua is complete as of April 9, 2013.
- 202 meters of 8' ungulate fence were constructed along the Honolua ditch trail this period (photo at right). Completion of the entire fence-line is expected within the next quarter.
- Three base flow and three storm samples were collected during this period and have been sent to the lab for analysis.

- To date, a total of 10 base flow and 10 storm samples have been analyzed for Nitrite (NO2)+Nitrate(NO3), Total Nitrogen (TN), Total Carbon (TC), Total Phosphorus (TP), and Total Suspended Solids (TSS). These values will be used to test the hypothesis that "*Total Suspended Sediment produced by erosion of soils in the watershed will decrease following ungulate exclusion"*. Data will eventually be analyzed pre- and post fence construction, however we also wanted to see if there was a statistically significant difference between our baseline storm and base flow samples. Using a t-test with a p-value of 0.05, there is a significant difference between the base flow and Storm samples for TN, TOC, and TOP. Using a p-value of 0.10, TSS is also significantly different. This just reinforces the hypothesis that the nutrient levels in the storm samples should be higher than the base flow samples. The results are shown in Table 1, P.6.

- For further data analysis, we measured the cross sectional area of the stream channel at the Honolua sample site. This was performed by tying a string (keeping it taught and level) across the channel at the expected maximum flow. A measuring tape was then dropped vertically (to the bottom of the stream bed) and height was recorded every 6" to measure the major features of the channel cross section (See photos and graph below). These numbers were recorded on the Excel spreadsheet created by John Pipan (YSI data Analysis) and can be used to estimate the cross sectional area of flow for different stream depths.



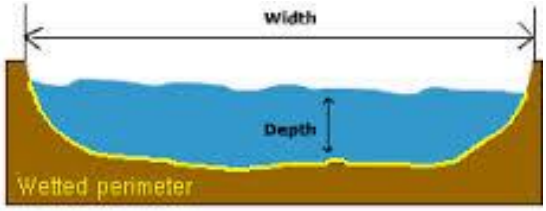
- An average slope of 4.33 degrees was also calculated for the study site in Honolua stream. This is equivalent to 0.076 or a 7.6% grade).

- Therefore, using a calculation called the Manning equation:

$$Q = \frac{KAR^{2/3}S^{1/2}}{n}$$

Where: Q = flow rate
A = cross sectional area of flow
R = hydraulic radius (A divided by the wetted perimeter)
S = slope of the hydraulic gradient
n = Manning coefficient of roughness
K = constant depending on units used

(n = 0.07, S=0.076, K=1.49)



We then can approximate stream flow rate (Q). For example, when the water depth is 2.5 feet, the cross section area (A) is 16.75 ft^2, and the approximate flow rate (Q) = 83.9 cfs (cubic feet per second). When the water depth is 3.0 feet, the cross section area (A) is 23.25 ft^2, and the approximate flow rate (Q) = 128.5 cfs.

% of time	depth (ft)
10%	2.06400
20%	2.14100
80%	2.49300
90%	2.67300
95%	3.03700
99%	3.90800

- Using one year's worth of baseline data (April 9, 2012-April 9, 2013), we calculated the division between high and low flows by ranking all of the depths. Each rank is divided by the maximum rank to get percentile. See table below. For example, 90% of recorded flows were below 2.673 feet, so therefore this number is the threshold we will be using as the division between high and low flows. Only 1% of the time did the depth reach over 3.908 feet. It is important to note that as more data is recorded, these numbers will fluctuate. This is just an example of the data we will be able to provide.

2. 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.)

- The cover we installed above the storm samples to prevent rain from seeping into our sample bottles seems to be helping, however still not one hundred percent; therefore, we installed a second cover above the lowest storm sample for added protection against rain water. This seems to be effective thus far.

- The Noise problem on the YSI Unit has gotten better and been relatively consistent since the re-calibration in April 2012. Therefore, as of April 9, 2013, we have one year of baseline data.

- We did have a data gap from October 15-23, 2012, due to battery failure.

- We are currently in the process of evaluating the number of storm events during this baseline data period and calculating the Event Mean Turbidity for these storms. These should be ready by the next report.

3. Description of any significant finding, results, or conclusions. If none, please indicate so.

- One year of pre-fence completion baseline data was completed on April 9, 2013. We are still analyzing our data and will report on our findings in the next report

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

- We anticipate further collection of working data from the water quality monitoring in field locations.
- We anticipate completion of fence construction in Honolua and near completion in Hana.
- We anticipate completion of Water Quality Monitoring baseline and an aggregation of results to be available for Honolua.

BASELINE DATA:

Erosion Bridge Sites

Ten random erosion bridge sites were installed (8 on two ridges, 2 in valley). These sites will be visited annually and the measurements will allow us to generate soil erosion estimates to compare over time.

SSU# (each rod measurement. Left to right, facing mauka). Each measurement in milimeters!

PSU (Site#)	Date	Ridge/ Valley	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	06/27/2012	Ridge	188	188	172	172	161	152	168	172	174	183	181	189	182	172	158	142	159	157	147	144
2	06/27/2012	Ridge	157	148	146	156	161	150	132	131	142	136	134	125	124	120	129	129	129	131	144	136
3	06/28/2012	Ridge	145	148	154	134	138	133	126	130	152	135	122	128	128	140	140	139	145	151	156	153
4	06/28/2012	Ridge	162	166	172	174	164	153	154	159	148	136	142	137	143	136	151	137	157	151	140	143
5	06/28/2012	Ridge	134	134	128	129	129	126	128	132	133	135	136	130	143	131	141	137	140	135	142	141
6	07/25/2012	Ridge	89	90	94	97	114	115	118	136	130	134	134	139	146	155	147	153	157	158	164	173
7	07/25/2012	Ridge	164	172	172	169	175	172	166	167	169	169	166	162	168	166	165	167	160	156	161	151
8	07/25/2012	Ridge	174	172	173	172	170	170	176	178	178	183	184	183	176	178	180	174	181	181	179	166
9	07/26/2012	Valley	190	190	190	190	182	182	185	187	191	186	198	198	186	182	178	175	174	179	172	167
10	07/26/2012	Valley	172	170	169	175	181	185	188	196	194	195	195	193	192	199	200	200	204	201	196	198

Transects

Ridge Transects: The two existing PKW transects running mauka to makai along the north and south rims of this project area were read for a baseline survey of ungulate sign and presence of weeds. These transects consist of 187 and 167 stations measuring 5X50 meters each. No new sign was recorded, but old ungulate disturbance (>2 weeks old) was found on eleven of the 187 stations on Transect 2. The average disturbance along the transect was 0.13%. No new or old sign was found on Transect 3. Although this data shows little or no disturbance, it is important to note that

there is pig sign in the area, just not specifically on the transects. Ungulate sign will be recorded annually and weeds are recorded every two years, and these can be compared to the pre-fence data to assess spread or management success.

Valley Transect: Thirty new 5X50m transect stations were installed in Honolua valley. No new ungulate sign was recorded, but old disturbance was found on 9 of the 30 stations. The average disturbance along the transect was 1.0%

Transect	Date Read	Type	Avg. New Disturbance	Avg. Old Disturbance	# of Stations	# of Stations with sign
PKW2	6/7/12	Ridge	0	0.13	187	11
PKW3	7/25/12	Ridge	0	0	167	0
Honolua	5/22/12	Valley	0	1.00	30	9

Water Quality Monitoring

The YSI Sonde has collected one year of pre-fence installation turbidity and water depth data as of April 9, 2013. Data will eventually be analyzed pre- and post fence construction and these values will be used to test the hypothesis that *"Turbidity, a measure of optical clarity of water, will decrease following ungulate exclusion."* We are still in the process of analyzing our baseline data and will present on these findings in the next report.

Ten base flow and ten storm samples have been analyzed for nutrient and suspended sediment. Three more of each has been sent to the lab for analysis. Base flow samples will continue to be collected monthly and storm samples within a 24-hour window if possible. Data will eventually be analyzed pre- and post fence construction and these values will be used to test the hypothesis that "*Total Suspended Sediment produced by erosion of soils in the watershed will decrease following ungulate exclusion"*.

For Hana Data was collected monthly starting in January to record stream depth and turbidity in Waiohonu Stream and Rainfall at about 2800' elevation in Waiho`i Valley.

Fencing

In Honolua, 99.9% of the 1.2 miles of proposed fence has been completed. Remaining fence curtains and short strategic panels and gates still need to be installed. Fence completion is expected within the next quarter.

For the Hana Fencing project 12 stream crossings with curtains were installed along with 250 meters of fence brushed and 150 meters of fence constructed.

Table 1. Analysis Results for Base flow and Storm Samples in Honolua Stream. All units are mg/L

Sample Name	Storm or BaseFlow?	Nitrite (NO2) + Nitrate (NO3)	Total Nitrogen (TN)	Total Organic Carbon (TOC)	Total Phosphorus (TP)	Total Suspended Solids (TSS)
20120306_HonoluaBase01	BaseFlow	0.003	0.126	4.52	0.007	22
20120409_HonoluaBase01	BaseFlow	0.002	0.196	7.26	0.011	5.8
20120430_HonoluaBase01	BaseFlow	0.006	ND<0.070	2.92	ND<0.015	12.2
20120530_HonoluaBase01	BaseFlow	ND<0.001	ND<0.070	2.53	ND<0.015	10.5
20120621_HonoluaBase01	BaseFlow	0.010	0.118	4.98	ND<0.015	10.6
20120726_HonoluaBase01	BaseFlow	0.005	0.090	2.57	ND<0.015	12.0
20120829_HonoluaBase01	BaseFlow	0.002	0.211	8.85	ND<0.015	10.0
20120927_HonoluaBase01	BaseFlow	0.002	0.166	6.94	ND<0.015	11.2
20121024_HonoluaBase01	BaseFlow	0.027	0.104	2.20	ND<0.015	6.9
20121218_HonoluaBase01	BaseFlow	0.047	0.199	6.46	ND<0.015	8.0
20111214_HonoluaStorm01	Storm	0.022	1.429	23.8	0.458	366
20120313_HonoluaStorm01	Storm	0.015	1.99	37.2	0.308	539
20120409_HonoluaStorm01	Storm	0.001	0.299	7.86	0.141	28
20120829_HonoluaStorm01	Storm	0.006	0.661	18.0	0.081	12.0
20120927_HonoluaStorm01	Storm	0.003	2.23	85.0	0.391	165
20121024_HonoluaStorm02	Storm	0.071	0.901	13.6	0.290	14.2
20121127_HonoluaStorm01	Storm	0.611	2.48	20.4	0.377	16.0
20121218_HonoluaStorm01	Storm	0.189	0.788	21.0	0.133	13.2
20121227_HonoluaStorm01	Storm	0.052	0.293	11.1	0.063	6.0
20130102_HonoluaStorm01	Storm	0.029	1.83	36.2	0.053	137

Averages	NO2+NO3	TN	TOC	TP	TSS
BaseFlow	0.012	0.151	4.92	0.009	10.92
Storm	0.100	1.290	27.43	0.229	129.63

T-TEST	**0.172**	**0.002**	**0.01**	**0.001**	**0.07**

with a p-value of 0.05, there is significant difference between base and storm samples for TN, TOC, and TP
with a p-value of 0.1, there is a significant difference between TN, TOC, TP, and TSS

Grant Funds

No.	Description	Original Contract Amount	Revised Contract Amount After Previous Quarterly Status Reports	Expenditures during this Quarterly Reporting Period	Remaining Contract Amount
A	Personnel Services	$ 175,272.42	$ 112,799.95	$ 14,037.40	$ 98,762.55
B.	Travel	$ 6,480.00	$ 6,480.00	$ 0.00	$ 6,480.00
C.	Operating Expenses	$ 848.00	$ 848.00	$ 0.00	$ 848.00
D.	Equipment	$ 5,000.00	($ 6,166.89)	$ 0.00	($ 6,166.89)
E.	Professional Services	$ 30,811.05	$ 17,743.07	$ 8,821.29	$ 8,921.78
F.	Construction Materials and Supplies	$ 0.00	($ 3,016.95)	$ 43.47	($ 3,060.42)
G.	Other Misc. Expenses	$ 31,588.53	$ 23,293.22	$ 1,837.83	$ 21,455.39
	TOTALS	$ 250,000.00	$ 151,980.40	$ 24,739.99	$ 127,240.41

In-Kind Contributions (Matching Funds)

No.	Description	Original Contribution Amounts	Revised Contribution Amounts After Previous Quarterly Status Reports	Contributions reported during this Quarterly Reporting Period	Remaining In-kind Contribution Amounts
A	Personnel Services	$ 98,771.50	$ 81,504.50	$ 0.00	$ 81,504.50
B.	Travel	$ 5,900.00	$ 3,986.76	$ 1,013.28 [a]	$ 2,973.48
C.	Operating Expenses	$ 18,830.35	$ 4,067.20	$ 209.98 [b]	$ 3,857.22
D.	Equipment	$ 1,700.00	$ 1,700.00	$ 0.00	$ 1,700.00
E.	Professional Services	$ 28,750.00	$ 21,695.43	$ 3,964.59 [c]	$ 17,730.84
F.	Construction Materials and Supplies	$ 101,500.00	$ 10,613.34	$ 7,195.84 [d]	$ 3,417.50
G.	Other Misc. Expenses	$ 0.00	$ 0.00	$ 0.00	$ 0.00
	TOTALS	$ 255,451.85	$ 123,567.23	$ 12,383.69	$ 111,183.54

[a] An amount of $579.97 that was under-reported in FY13 Q2 is recorded here. Match contribution for FY13 Q3 is $433.31.

[b] Recorded here are: an amount $30.28 that was under-reported in FY12 Q2; an amount of $30.20 that was under-reported in FY12 Q3; and an amount of $146.50 that was under-reported in FY12 Q4. Match contribution for FY13 Q3 is $0.00.

[c] An amount of $2,016.67 that was under-reported in FY12 Q4 is recorded here. Match contribution for FY13 Q3 is $1,947.92.

[d] An amount of $2,002.49 that was under-reported in FY12 Q4 is recorded here. Match contribution for FY13 Q3 is $5,193.35.