

QSR5

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, 2016 (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: Implementation of Best Management Practices to Reduce
Nonpoint Pollution and Storm water Runoff in the Wai'ula'ula Watershed

Project Start/Completion Date: December 15, 2014 – December 14, 2016

Estimated % of Project Completed: 45 %

Estimated % of Grant Funds Previously Requested: spent approximately 19%

Quarterly Status Report Number: QSR5

Name, telephone number, and e-mail of person to be contacted for questions regarding this report:

Lisa Ferentinos, 808-313-2653, lisa.ferentinos@hawaii.edu
Darren Okimoto, 808-956-7031, okimotod@hawaii.edu

Or for budget related questions please contact

Bruce Hamakawa, 808-956-3571, bhamakaw@hawaii.edu

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

Exhibit "C"

1

ADM. SERV. OFFICE

LOG NO. 15-028

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)

No.	Task	Due Date	Date Completed/Status
1	Provide names and credentials of personnel and notify DOH of any changes	As needed	01/25/2016. See Attachment 1 for new project manager credentials.
2	Establish Stream Team to plan/implement BMPs, meet quarterly	Quarterly	01/20/2016. Quarterly meeting held.
3	Submit Work Plan prior to installing BMPS	To be revised	01/29/16. Site visit completed. Waiting for plan from SRGII. Will revise due date upon receipt.
	a. Federal , State, local permits and approvals, ROEs		
	SMA for Queen Emma Coastal Site		03/10/2016. Site visit with land manager. Waiting for plan from SRGII.
	Queen Emma ROE		03/10/2016. Site visit with land manager. Waiting for plan from SRGII.
	Waimea Center PATDI ROE		3/15/16. Met with landowner Mr. Andrew Chun. Verbal agreement and will finalize via email when site map is available.
	Parker School ROE		Waiting for plan from SRGII. Verbal agreement was previously obtained and will meet to finalize when site map is available.
	Waimea Outdoor Circle ROE		1/28/16. Met with WOC Chair Cheryl Langton during SRGII site visit. Verbal agreement made. Waiting for plan and maps to draft written ROE.
	Waimea Trails and Greenways ROE		02/29/16. Met with WTG Chair Clem Lam. Waiting for plan and maps to draft written ROE.

Exhibit "C"

2

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LOG NO. 15-028

	b. BMP list, size, materials, documentation, GPS locations	To be revised	01/29/16. Site visit completed. Waiting for plan from SRGII. Will revise due date upon receipt.
			4/1/16. First seeds sown at State Tree Nursery
4	Operations and management Plan	To be revised	01/29/16. Site visit completed. Ongoing coordination with land managers regarding capacity to maintain areas. Waiting for plan from SRGII. Will revise due date upon receipt.
	a. Provide intervals, steps, costs		Will be provided by SRGII plan.
	b. Training - maintenance & record keeping to owners/groups		Will be provided by SRGII. Ongoing coordination with land managers.
5	Monitoring Plan to measure efficacy of BMPs	Previously completed. To be revised	2/22/16. Met with UH Water Resources Research Center regarding monitoring plan revision. 3/9/16. Met with MKSWCD to request use of their automated samplers. 2/25/16. Met with Dr. Tracy Weigner of UH Hilo regarding monitoring strategy and potential engagement of UH Hilo students.
6	Monitoring		Working with UH Hilo, TNC, and MKSWCD to revise existing monitoring plan to include automated samplers and modify sites.
	a. Site surveys- length/area, cover, erosion, rain, plant survival and growth.	Semi-annual	Initial surveys need to be re-done when sites are finalized.
	b. Erosion- Photo points, erosion stakes	Quarterly + Post Storm	Most erosion stakes installed can no longer be located due to growth of vegetation or flooding. GPS was not accurate to the level required. Will be re-installed.
	c. Water Quality: nutrients, temp, turbidity, salinity, DO, pH	Quarterly + During Storms	Completed for this quarter. See Attachment 2. Water Quality Data for results to date.

Exhibit "C"

7	Install BMPS	To be revised	Develop SOWs when SRGII plans are final for procurement process.
	a. Waimea Center Rain Garden- 440 sq ft to treat 35,000 sq ft		As planned. Currently maintaining trial plantings of a‘ali‘i and ‘ulei which are doing well.
	b. Waimea Center Riparian-Restore 1800 linear ft to treat 25,000 sq ft		Will replace linear revegetation with raingardens to treat roof runoff.
	c. Ulu La‘au Park 1300 linear ft to treat 55,000 sq ft.		Site will be expanded substantially to include all eroding banks within the park. Currently utilizing for plant material for project.
	d. Ala Kahawai - 8,000 linear ft to treat 435,000 sq ft.		Site will be reduced to include only plans for critical erosion areas.
	e. Mau‘umae Beach - treat 45,000 sq. ft., fuel break, revegetation, mats.		As planned. The site has been cleared through a major donation from the adjacent landowner.
8	Education and Outreach		
	a. Hold 6 public stakeholder meetings		Fire workshop previously completed. Ongoing planning for additional meetings to be held when site plans are finalized.
	b. 5 signs - one at each site		Cost estimates determined.
	c. 6 stream and 3 coastal cleanups		Completed. See Attachment 3.

B. GRTS Load Reductions

	Estimated Load Reduction
Nitrogen (lbs/yr)	0
Phosphorus (lbs/yr)	0
Sediment (tons/yr)	0

BMPs have not yet been installed so there are no estimates of load reduction.

C. Narrative Progress Report

1. Personnel

Project manager Sierra Tobiason has been replaced by Lisa Ferentinos, who started on January 4, 2016 (see Attachment 1 for her credentials). The gap in project management was capably filled by Maria “Didi” Diaz-Lyke, who continued with monitoring and volunteer activities.

Exhibit “C”

4

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LOG NO. 15-028

Lisa has reviewed the status of the deliverables, met with key partners and has begun to move forward on all fronts.

2. Stream Team/Working Group

The quarterly meeting was held on 1/20/2016 in combination with the South Kohala Coastal Partnership meeting at the Spencer House in Waimea. In attendance were representatives from Waimea Outdoor Circle (2), Surfrider Foundation, Hawai'i Wildfire Management Organization, Waikoloa Dry Forest Initiative, The Nature Conservancy, USDA Natural Resources Conservation Service, Mauna Kea Soil and Water Conservation District, Hawai'i DLNR Division of Aquatic Resources, and NPS Ala Kahakai National Historic Trail. Lisa summarized her background and experience and gave a power point presentation showing examples of raingardens that have been installed on O'ahu. There was a discussion of potential species to include at the revegetation sites and the need to check for archeological information and lineal descendants who know the history at the coastal site. NPS agreed to assist with this task. The group reviewed the status of the goals of the Conservation Action Plan and the target actions of the coastal partnership. The need to move forward with community-based fisheries management was one of the main topics discussed. Lisa has followed up with a number of the attendees to gather further information and has received assistance from all those who attended. The next meeting will be held when the draft work plan has been received from the contractor to allow for them to review and comment on the plan.

3. Work Plan

A contract was signed with Sustainable Resources Group International, Inc. (SRGII) in August of 2015. As soon as Lisa was hired, Hawai'i Sea Grant contacted Andy Hood of SRGII to schedule his one week site visit to provide him with the information needed to create the work plan. During the one week visit, Lisa and Didi assisted and arranged for meetings with the land owners or managers involved in the planned project sites. The target date for the receipt of the work plan has been changed a few times due to Andy Hood's and the CAD draftsman's schedule conflicts. The draft plan was submitted to Hawai'i Sea Grant on April 18, 2016 and can be downloaded at the following Dropbox link:

<https://www.dropbox.com/sh/wbgvaxang7qxarp/AAAaVRwHzPilyRcoMhgWzluCa?dl=0>

During the week visit it became clear that some adjustments need to be made to the scope of services. A formal request to amend the contract scope of services has been delayed as we await the budget estimates being prepared by SRGII. Some of the areas to be revegetated will require professional help with site preparation and installation of erosion fabric. The fabric needs to have a smooth ground surface for proper attachment and must be tightly stretched over the

Exhibit "C"

5

ADM. SERV. OFFICE

LOG NO. 15-028

ground and firmly attached to prevent high flow events from ripping the fabric out. This will require amending the budget for the restoration sites to include labor as well as materials. Currently almost the entire budget is for materials only. Once we know how much has been estimated in labor and have amended the contract, we will be able to proceed with procuring labor and materials. Our goal is to begin site work this summer during the dry months.

- a. The Waimea Center Riparian Site (behind KTA Store): After being herbicided for 18 years, leaving bare ground that was eroding from roof and parking lot drainages, Sierra convinced the landowners to stop spraying. The result has been a profusion of growth which has stopped much of the erosion. In order to make the site easier for volunteers to maintain, SRGII is recommending that we channel much of the roof run off into a second rain garden surrounded with long lasting weed fabric in lieu of revegetating the entire bank. We are working with Parker School to engage the students at this site for installation and maintenance. The feral cat colony remains a challenge at this site. We continue to engage shopping center managers and landowners in an effort to stop the overfeeding that is happening. Trapping of cats proved fruitless as the Hawai'i Humane Society has an agreement with AdvoCats to inform them when a trapped cat is turned into them. AdvoCats was picking up all trapped cats and returning them to the site. There is a concern that children should not be digging in the dirt where cat feces exist due to the danger of contracting toxoplasmosis.
- b. Ulu La'au Park Site: Almost the entire stretch of stream bank within the park is actively eroding. SRGII is recommending that we expand this site from the original 1300' that was planned for treatment to 3700'. We will include irrigated vegetative buffers and slope stabilization with erosion mat and coir logs. Some logs will be pre-planted with sedges to reduce the time required for establishment. This site is highly visible to the public with many residents using the park on a regular basis so it is a good venue to educate other streamside residents. The park also has a large number of dedicated volunteers who will be able to maintain the site once the DOH funding ends. Their new educational pavilion will be a good place to hold trainings and workshops. They have a good tool inventory as well as locked containers to store them in. The park is also serving as source of plant material for revegetation.
- c. Ala Kahawai Site: Most of the area is not eroding. The Waimea Trails and Greenways (WTG) organization is focused on acquiring funds and easements for a planned ten foot wide concrete path that they intend to build with federal highways funds from the park to O'uli Gulch. Currently their volunteers focus solely on maintaining the trail surface, mostly through mulching with wood chips. There are many noxious weeds, including tall invasive trees such as eucalyptus, black wattle, and false olive. There is some contention with the Outdoor Circle regarding the removal of some of these trees. Revegetating this long stretch would likely require more funds than are available for all sites combined and there is little likelihood that the trails group could maintain such a large area. SRGII recommends that we focus on identifying recommended BMP's and rough budgets for three small erosion hot spots and provide this information to WTG so

Exhibit "C"

6

ADM. SERV. OFFICE

LOG NO. 15-028

that they can include these plans in their request for funds. This will allow them to install the BMPs at the appropriate time to avoid the sites being impacted by construction activities.

4. Operations and Management Plan

This will be written once the site plans being drafted by SRGII are finalized. We are working on identifying the best possible long term caretakers for each site. Parker School will take responsibility for the Waimea Center Rain Gardens since they are located on their property immediately adjacent to the school. The Waimea Outdoor Circle will take responsibility for maintaining the Ulu La'au Nature Park site. There is no group currently engaged at the coastal site but we are working with the Kailapa Community Association (Department of Hawaiian Homelands property in Kawaihae) to include them in our revised Scope of Work since they are the closest organized residential community to the site. They have a strong interest in coastal revegetation and water quality monitoring that could be further developed. They have been working closely with Hawai'i Sea Grant on marine related projects over the past few years. The adjacent private landowner has donated considerable time for their 17 person crew to clear the site but they won't be able to maintain the site.

5. Monitoring Plan

The existing monitoring plan needs to be revised due to the variability in sampling times at different locations associated with sampling during storm events. We have been looking into borrowing or purchasing automated samplers to reduce the temporal variability. The Mauna Kea Soil and Water Conservation District (MKSWCD) has ISCO samplers that they have agreed to loan to us. We contacted John Pipan who previously worked with the samplers under the district, who worked with us to put them back together to determine that three are still working. He estimates it would take approximately \$3,500 to assist in initial programming, purchase new deep cycle batteries, solar panels to keep them charged, and secure cases that could be mounted at sampling sites to prevent vandalism. There is also a significant learning curve to programming the ISCO samplers so we may need his expertise if we run into problems once they are set up. He quoted us a rate of \$60 per hour to assist in this work. This expense would be included in the request to change the budget. We are also looking into alternatives such as Global Water Samplers to see if there is less expensive equipment that would be easier for us to maintain ourselves.

It is unclear from the project files whether the existing monitoring plan that Didi has been following was ever submitted or approved by DOH. That plan depends on the use of Hach test kits and YSI photometer. The results to date have been highly variable and we would prefer to

Exhibit "C"

7

ADM. SERV. OFFICE

LOG NO. 15-028

send the samples to the UH Hilo Analytical Lab. A discussion with lab staff has confirmed that the kits being used are not very accurate and we have determined the proper handling for samples. They will be kept in a cooler during collection and can be stored in a freezer for up to a month so we don't have to drive them to UH Hilo if there is more than one storm per month.

As mentioned above, we would like to engage the Kailapa Community Association (KCA) in sampling as well as maintenance of the coastal site. They requested we take a sample at Honokoa Stream during a recent storm event. We took samples from the mouth of Wai'ula'ula Stream within half an hour of each other and found that turbidity in Honokoa was 140 FTU while it was only 18 FTU in Wai'ula'ula. The community would like us to assist them in developing a monitoring program so that they can request Honokoa Stream be added to the 303d List of impaired waters so they qualify for funding to create a management plan for their watershed. The upper watershed has been overgrazed for many years. Due to the work of KCA, DHHL has not renewed the long-term lease for ranching, instead there is just a month-to-month lease in place until the community can develop a management plan that includes development of water sources and reforestation in the upper watershed with agriculture and aquaculture projects in the lower watershed. We are working with them to seek out funding sources. We recently assisted them with a NOAA Community-based Restoration grant proposal which will include native plant revegetation in an 11 acre enclosure near the stream by the coast, as well as goat control and installation of temporary check dams in the upper watershed as a first step to encouraging vegetation to recover on its own. Plans are being developed to work with DHHL and the Kohala Watershed Partnership on ending the cattle leases and moving forward with development of water sources.

6. Monitoring

Due to El Nino conditions Wai'ula'ula Stream was dry during most of the quarter. Water quality samples were taken during the only storm on February 18, 2016. We also collated all the data to date and summarized in tables for each parameter. Please see Attachment 2. There are no clear trends showing differences in water quality at the different sites. It is unclear why there is one very high reading for nitrate at the Nature Park site and a couple at the coast. There are also occasionally high readings for turbidity but again there are no consistent patterns. It could be due to errors inherent in the methods or application of the methods. Use of the UH Hilo Analytical Lab to analyze samples going forward will hopefully remove these sources of error and give confidence in results.

Site surveys were conducted last year but will be re-done when revisions to site designs are finalized and prior to any site preparation.

Exhibit "C"

8

ADM. SERV. OFFICE

LOG NO. 15-028

Due to changes in vegetation and deposition of soil by flooding we have only been able to find a few of the existing erosion stakes which were installed flush with the ground and marked only by GPS. The GPS has not proved accurate enough to relocate pins so a metal detector was borrowed from the MKSWCD but that was not successful either. Once the sites have been finalized, we will reinstall pins that will stick up above the ground, with the ground level marked in fluorescent paint. Stakes with flags or other methods will be used to mark them so they can be seen above the vegetation. We have not found any indication in the files that photo-points were determined so we are in the process of determining the best locations and a map will be provided with the next report.

7. Install BMP's

New target dates for installation of BMP's will be provided once the procurement process for labor and materials has been completed. Once site plans have been finalized by SRGII we will need to request a budget change from DOH before procurement can begin since we need to re-budget funds from materials to contracting for skilled site preparation and installation of fabric and coir logs.

Plant species and rough estimates of numbers of each species have been determined. There are currently no nurseries on Hawai'i Island that have been growing the ground covers and sedges that we need in large numbers. There is also a serious concern about bringing plant material from areas where fire ants or coqui frogs are present since these do not yet exist in Waimea. A search for sources of seeds has been time consuming but some sedge seeds have been collected and were recently sown at the state tree nursery in Waimea. Most of the seeds had been on the plants for some time and the viability may not be good. We have located another source of seeds and are arranging for collection in the near future. We are also in discussion with nurseries on Maui and O'ahu regarding the possibility of ordering plants from them in case we are not successful in locating enough viable seed on this island.

A work day has been planned for April 16, 2016 where we will have approximately 40 volunteers helping with planting ground covers from cuttings and repotting small trees and shrubs into larger pots so they are a good size for outplanting when the sites are ready. Tree pots and pots for ground covers have been purchased and the state tree nursery is preparing the potting mix for us.

In our request to DOH to change our Scope of Services, we would also like to request that we add the Kailapa Community Association revegetation site. They received funding from the Hawai'i Tourism Association and Hawai'i DLNR Division of Aquatic Resources to fence off 11 acres and remove feral goats. The site is located just mauka of the highway along Honokoa Stream and another smaller unnamed intermittent waterway just to the north. A drip irrigation

Exhibit "C"

9

ADM. SERV. OFFICE

LOG NO. 15-028

system was installed at the site which was connected to the DHHL community water system and 2,000 natives were successfully propagated and out planted by community members. Due to a change in policy on the part of DHHL administration, the water was cut off and most of the plants have died. Although discouraged, the community does not want to give up. A tank has been purchased and a water hauler has agreed to give a discounted rate to fill the tanks. Funds to purchase water have been requested in the NOAA grant. In our request to change our scope and budget, we would like to include approximately \$8,000 in funds to provide them with water until another source of funding can be found.

8. Education and Outreach

Public Stakeholder Meetings are being planned to cover the following topics: sewage issues in the watershed, native plants for streambank vegetation and erosion control, installing coir logs and erosion matting, and using erosion models in school science classes. A GIS map has been created to identify all TMK's within a 200-foot buffer of the stream. We are working to identify mailing addresses for these TMK's through the county's website.

A site visit was held to the Hawaii Wildfire Management Organization living fuel break demonstration in Waikoloa Village to see the signs they installed. We followed up with their vendor to determine the actual cost to install signs at our sites. An art teacher at Honoka'a High School has been identified who is interested in incorporating the design and artwork for the signs into his curriculum this fall.

More than the required number of stream and coastal clean ups have been completed (see table below).

QSR#	Date	Activity	Coast	Stream
1	1/19/2015	Stream Clean-up at Site #2 with Parker School students		1
1	2/12/2015	Stream Clean-up at Site #2 with Parker School students		1
1	2/22/2015	Coastal Clean-up from Spencer to mouth of Waiulaula with c-water kit participants	1	
1	3/28/2015	Coastal Clean-up from Spencer to mouth of Waiulaula with c-water kit participants	1	
1	4/3/2015	Coastal Clean-up from Spencer to mouth of Waiulaula with c-water kit participants	1	
1	4/10/2015	Workshop partnering with HWMO		

Exhibit "C"

10

ADM. SERV. OFFICE

LOG NO. 15-028

1	4/21/2015	Counted as event with South Kohala Stream Team, HPA students, WOC and WTG- Earthy Day event		
2	6/1/2015	Coastal Clean-up from Spencer to mouth of Waiulaula with c-water kit participants	1	
3	7/11/2015	Coastal Clean-up at Spencer Beach with volunteers	1	
3	8/22/2015	Stream Clean-up at Site #1&2 with volunteers		1
3	9/18/2015	Stream Clean-up at Site #4 with volunteers		1
3	9/26/2015	Coastal Clean-up at Spencer Beach with HPA students and other volunteers	1	
3	9/28/2015	Stream Clean-up at Site #4 with volunteers		1
3	9/29/2015	Stream Clean-up at Site #3 with volunteers		1
4	10/2/2015	Stream Clean-up at Site #1&2 with volunteers with Waimea Middle School Students		1
4	10/17/2015	Stream Clean-up at Site #4 with volunteers from UH Hilo		1
4	10/25/2015	Stream Clean-up at Site #1&2 with Parker School students		1
4	12/19/2015	Stream Clean-up at Site #3 partnering with WOC's regular maintenance day		1
Total Clean-up events			6	10

Additional Educational Activities

On February 8, 2016, middle school students from Hawai'i Preparatory Academy were taught how to use the stream monitoring equipment. This included the YSI for dissolved oxygen and temperature, a pH meter and the salinity meter.

On March 5, 2016 Lisa attended the Mālama Honua festival at Kawaihae Harbor and engaged over 100 attendees in exploring an erosion model utilizing diatomaceous earth. Funds for purchase of the models were provided by Kanu o Ka 'Aina Public Charter School. The models have been incorporated into the Kohala Center's Environmental Education program and are being used in schools in Kona and Kohala.

Exhibit "C"

11

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LOG NO. 15-028

Project Challenges

The on-site project manager position was vacant for over 4 months therefore there it has taken some time for the new project manager (Lisa) to read through electronic and hard copy files, meet with partners and become familiar with the sites and monitoring protocols. Due to the lack of a project manager, there has been a delay in starting the work contracted to SRGII. They took on other projects in the meantime and have also experienced delays in getting quotes from suppliers in order to give us budget estimates. SRGII submitted the draft plan to Hawai'i Sea Grant on April 18. We will meet with project partners and circulate the draft to DOH staff for their comments and requested revisions. The revised draft plan will be provided to SRGII by May 4, 2016 if we can reach all partners by then.

Commitments made by the previous project manager (Sierra) to assist with monitoring and educational field trips have needed to be kept even though the number of these types of events called for in the scope of work have already been met. We need to keep good relationships with groups that we hope will provide volunteers once we are ready for planting at the BMP sites.

Exhibit "C"

12

ADM. SERV. OFFICE

LOG NO. 15-028

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	\$ 121,834.32	\$ 29,589.20	\$ 17,797.04	\$ 74,448.08
B.	Travel	\$ 8,080.00	\$ 631.37	\$ 656.82	\$ 6,791.81
C.	Operating Expenses	\$ 5,600.00	\$ 233.49	\$ 114.87	\$ 5,251.64
D.	Equipment	\$ 3,050.00	\$ -	\$ -	\$ 3,050.00
E.	Professional Services	\$ 55,399.00	\$ 18,357.67	\$ 4,891.01	\$ 32,150.32
F.	Construction Materials and Supplies	\$ 219,000.00	\$ 866.42	\$ -	\$ 218,133.58
G.	Other Misc. Expenses (indirect cost)	\$ 14,254.62	\$ 4,863.62	\$ 2,641.96	\$ 6,749.04
	TOTALS	\$ 427,217.94	\$ 54,541.77	\$ 26,101.70	\$ 346,574.47

In-Kind Contributions (Matching Funds)

No.	Description	Original Contribution Amounts	Contribution Amounts from Preceding QSR	Contributions during this Quarterly Reporting Period	Current Contract Amount (Remaining Funds)
A.	Personnel Services	\$ 102,077.03	\$ 11,528.61	\$ 3,216.46	\$ 87,331.96
B.	Travel	\$ -	\$ -	\$ -	\$ -
C.	Operating Expenses	\$ -	\$ -	\$ -	\$ -
D.	Equipment	\$ -	\$ -	\$ -	\$ -
E.	Professional Services	\$ 5,000.00	\$ 10,000.00	\$ -	\$ (5,000.00)

Exhibit "C"

F.	Construction Materials and Supplies	\$ -	\$ 75.00	\$ -	\$ (75.00)
G.	Other Misc. Expenses	\$ -	\$ 170.00	\$ -	\$ (170.00)
	TOTALS	\$ 107,077.03	\$ 21,773.61	\$ 3,216.46	\$ 82,086.96

Exhibit "C"
14

ADM. SERV. OFFICE

LOG NO. 15-028

Attachment 1- New staff credentials

Lisa Ferentinos

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Waimanalo, HI 96795
808-358-5376
lisa.ferentinos@gmail.com

RESUME

Education

M.S. University of Hawai'i at Manoa, Agronomy and Soil Science

B.A. College of William and Mary, Anthropology (Phi Beta Kappa)

Work Experience

Extension Agent, Sea Grant Program, University of Hawai'i. 1/2016 to present.

Coordinate the implementation of best management practices to prevent non-point source pollution in the Wai'ula'ula watershed on the island of Hawaii. Engage the community in watershed restoration through volunteer events and workshops. Provide public information and education on rainwater catchment.

Natural Resource Manager, Ko`olau Mountains Watershed Partnership, Pacific Cooperative Studies Unit, Research Corporation of the University of Hawai'i 10/2014 to 8/2015

Worked with 20 private, state, county and federal landowners and partners to produce an updated watershed management plan for 105,000 acres of priority watershed areas on O`ahu. Wrote successful grant application for 10 years of funding from the State Forest Stewardship Program. Assisted with proposals for wind power mitigation projects and albizia control. Wrote Conservation District Use Applications and Right of Entry documents to conduct watershed protection activities on private lands. Created a new website (www.koolaumountains.org). Planned a 10 acre roadside revegetation project to prevent erosion. Educated landowners on state and federal funding opportunities for watershed protection. Worked with landowners to provide testimony on watershed funding and other issues at the Hawaii legislature.

Program Coordinator, Hawaii Association of Watershed Partnerships, Pacific Cooperative Studies Unit, Research Corporation of the University of Hawaii. 08/2014 to 5/2015

Exhibit "C"

15

ADM. SERV. OFFICE

LOG NO. 15-028

Conducted all duties listed below under Watershed Planner as a half-time contractor to provide stability and support to the State Watershed Partnership Program during the transition to a new program coordinator. Trained the new coordinator and completed implementation of the geo-database planning and reporting system.

Planner IV, Division of Forestry and Wildlife, State of Hawaii Department of Land and Natural Resources. 05/2008 to 05/2014.

Managed the State Watershed Partnership Program including responsibility for an annual Request for Proposals to prioritize approximately \$5 million annually in special, general and/or capital improvement funds. Responsible for Environmental Assessments and Conservation District Use Permits including conducting public meetings and hearings. Provided leadership for planning to 11 watershed partnerships involving 2 million acres and over 70 landowners statewide. Created educational materials including print, websites and public service announcements. Served as the DLNR representative on the Hawaii Association of Watershed Partnerships, the Hawaii Conservation Alliance and the Pacific Islands Climate Change Cooperative. Provided testimony on legislative issues. Conducted all types of state procurement and wrote contracts, including to the University of Hawaii. Created a new geo-database proposal and reporting system for the watershed partnership program. Wrote, obtained, and managed multiple grants for funding from the US Forest Service and US Fish and Wildlife Service. Wrote and produced public service announcements (<https://vimeo.com/85955497>) and information for the state legislature. Completed trainings in mediation, GIS, First Aid, Helicopter Safety, Firearms, Hunting and Scenario Planning for Climate Change. Supervised program assistant and interns. Obtained three years of US Forest Service funding to create environmental education programs at the Kapapala Koa Canoe Forest in Ka`u, set up an advisory council of canoe experts and kupuna to assist a contractor in developing a long-range plan for community involvement and sustainable harvest of koa logs.

Program Coordinator, Active Living by Design, Kokua Kalihi Valley Comprehensive Family Services. 07/2006 to 03/2008.

Provided planning and management for the development of a new park, community garden and nature preserve in Kalihi Valley. Obtained funding through a Grant-In-Aid from the Hawaii State Legislature, the Forest Stewardship Program/State Department of Land and Natural Resources and private foundation grants including the Robert Wood Johnson Foundation. Supervised field staff, coordinated volunteers, created and tracked budgets, wrote all reports, grant proposals and compliance documents including Conservation District Use Permits and Environmental Assessments.

Forester III, Division of Forestry and Wildlife, Hawaii Department of Land and Natural Resources. 11/2005 to 07/2006.

Exhibit "C"

16

ADM. SERV. OFFICE

LOG NO. 15-028

Coordinated and managed contracts under state and federal landowner forestry grant assistance programs. Worked with community-based forestry planning efforts, wrote applications for federal assistance, Requests For Proposals, project agreements and reports for state and federal programs. Worked with Hawaii Community College Forest TEAM students to survey koa trees at Kapapala on Hawaii Island. Conducted island-wide community meetings to gather input on planning the Kapapala Koa Canoe Forest, 1200 acres in Ka`u set aside for producing canoe logs for future generations.

Consultant/Planner, Kailua Bay Advisory Council. 03/2005 to 09/2005

Created a scope of work, budget, and work plan for a community watershed education project focused on wetland restoration and homeowner best management practices including rain gardens.

Project Coordinator, Waimanalo Watershed Restoration, Center for Conservation Research and Training, Research Corporation of the University of Hawaii. 09/2001 to 06/2004

Provided project coordination, including state and federal grant and report writing under State Department of Health Polluted Run-off Control Program (Section 319) and the U.S. Fish and Wildlife Service Coastal Program. Wrote compliance documents, conducted water quality monitoring for a Total Maximum Daily Load (TMDL) study under Dr. Ed Laws at UH's Water Resources Research Center which included coordinating community volunteers. Continued TMDL implementation projects described below when funding was moved from the Waimanalo Health Center to UH. Supervised 3 field personnel.

Environmental Health Coordinator, Waimanalo Health Center. 04/1998 to 09/2001

I created the Waimanalo Watershed Restoration Project in response to the continued degradation of water quality in Waimanalo's streams and bay. I wrote and managed three state and federal grants. I created and managed community education and demonstration projects including streambank revegetation projects in four different areas of the watershed, community stream and beach clean ups, developed NRCS conservation plans for 20 Waimanalo farmers that included nutrient plans, provided training and outreach for farmers with animals on manure management. Coordinated a summer environmental restoration internship program for high school students from the community. Supervised field personnel, interns, and volunteers.

Educational Specialist II, College of Tropical Agriculture and Human Resources, University of Hawaii. 04/1994 to 12/2000

Coordinated UH College of Tropical Agriculture's Renewable Resources Extension, Sustainable Agriculture and Water Quality Extension programs Wrote and managed requests for proposals from extension agents, tracked project progress.. Planned and carried out educational programs and conferences for Cooperative Extension Service agents. Created educational materials including

Exhibit "C"

17

ADM. SERV. OFFICE

LOG NO. 15-028

newsletters, brochures, leaflets and video. Supervised student assistants. Edited conference proceedings related to forestry. Obtained funding from USDA for a three year project, "Covering New Ground" which researched and promoted the use of cover crops on Hawaii's farms to prevent erosion and reduce nutrients in ground and surface waters and provided training to extension agents.

Research Associate IV, Agricultural Development in the American Pacific, Research Corporation of the University of Hawaii. 05/1993 to 07/1994

Wrote and managed a USDA grant, directed and carried out on-farm research related to use of cover crops and green manures with dryland and wetland taro. Coordinated communication with other researchers at four Pacific Island land-grant institutions.

Project Manager and Administrative Officer, Agricultural Development in the American Pacific, Research Corporation of the University of Hawaii. 09/89 to 04/93

Wrote and managed a USDA Sustainable Agriculture grant. Coordinated survey teams across the American Pacific, managed budgets and travel arrangements, wrote reports and grant proposals. Responsible for day-to-day project communications. Organized a Pacific-wide taro conference and edited proceedings, wrote extension materials and carried out research.

Forestry Research Assistant, Dept. of Horticulture, University of Hawaii. 05/1988 to 09/1989

Responsible for data collection in research projects focused on evaluation of fodder trees, psyllid resistance trials, biomass production, alley farming, native tree species. Managed greenhouse and nursery operations for tree production and outplanting.

Entomology Research Assistant, Department of Entomology, University of Hawaii. 1/88 to 05/88. Responsible for lab culture of diamond back moths, field collections, and greenhouse management.

Farmer/Orchard Restorationist 1983-1987
Cortes Island, British Columbia

Caretaker, OrcaLab 1982
Hansen Island, British Columbia

Assistant Farm Manager 1980-1981
Star Route Farm, Bolinas, CA

Horticulture Apprentice 1979-1980
Farallones Institute, Occidental, CA

Exhibit "C"
18

ADM. SERV. OFFICE

LOG NO. 15-028

Research Assistant 1976-1979

Dept. of Anthropology, College of William and Mary, Williamsburg, VA

Recent Volunteer Work

Bellows Air Force Station, Waimanalo Restoration Advisory Board Member, 2002 to present.

Hui Malama I Ke Kai Foundation, Treasurer. 2001 to 2008.

Ocean/environmental after-school program for at-risk kids in Waimanalo.

Waimanalo Neighborhood Board Member. 1999-2001. Continued to serve on various committees.

Publications - Available upon request.

Exhibit "C"

19

ADM. SERV. OFFICE

LOG NO. 15-028

Attachment 2

Table 1. Water Quality Data

Site #	Date	Time	ID	Location	°C	Salinity (ppt)	D.O. (mg/l)	pH	Turbidity (FTU)	Nitrate NO3 (mg/l)	Ammonia NH4 (mg/l)	Phosphate (mg/l)
1	7/25/2015	15:00	Waikoloa Stream	Site 1 - raingarden	20	0	8.15	7.3	4	0.8	0.01	0.28
1	7/28/2015	11:00	Waikoloa Stream	Site 1 - raingarden	20	0	8.27	7.01	2	0.44	<	<
1	8/17/2015	10:57	Waikoloa Stream	Site 1 - raingarden	21	0	8.1	7.3	8	0.14	0	0.14
1	8/19/2015	no data	Waikoloa Stream	Site 1 - raingarden	20.2	0	8.26	6.8	4	0.18	0.04	0.15
1	8/25/2015	12:00	Waikoloa Stream	Site 1 - raingarden	20.5	0	7.08	7.99	<<	34*	0.02	0.36
1	9/14/2015	12:00	Waikoloa Stream	Site 1 - raingarden	22.8	0	7.47	7.11	0	0.98	0.01	0.24
1	9/29/2015	12:00	Waikoloa Stream	Site 1 - raingarden	19.8	0	8.69	6.52	2	11.6	<<	0.07
1	10/20/2015	1:30	Waikoloa Stream	Site 1 - raingarden	21	0	8.03	7.1	2	1.46	0.01	0.29
1	2/18/2016	8:15	Waikoloa Stream	Site 1 - raingarden	15.6	0	9.52	6.98	2	1.66	<<	0.14
2	2/4/2015	10:30	Waikoloa Stream	Waimea Center	22	0	5.34	6.9	2	0.08	0.01	0.08
2	6/24/2015	8:00	Waikoloa Stream	Waimea Center	17.4	0	8.85	8.75	6	1.6	<	0.02
2	7/25/2015	15:00	Waikoloa Stream	Waimea Center	20.1	0	8.2	7	4	0.84	0.01	0.33
2	7/28/2015	10:50	Waikoloa Stream	Waimea Center	20.2	0	8.35	8.13	0	0.42	<	<
2	8/19/2015	no data	Waikoloa Stream	Waimea Center	20.3	0	8.15	6.94	0	0.1	0.06	0.19
2	8/25/2015	12:15	Waikoloa Stream	Waimea Center	20.5	0	7.1	6.85	0	115.2**	0.01	0.02
2	9/14/2015	12:15	Waikoloa Stream	Waimea Center	23	0	7.19	7.1	0	0.9	0	0.13
2	9/29/2015	12:15	Waikoloa Stream	Waimea Center	19.9	0	8.43	7	6	4.18	0.23	0.07
2	10/20/2015	1:40	Waikoloa Stream	Waimea Center	21.1	0	7.76	7.26	6	1.1	0	0.07
2	2/18/2016	8:25	Waikoloa Stream	Waimea Center	15.5	0	9.56	7	0	1.8	0.01	0.13
3	1/3/2015	12:48	Waikoloa Stream	Waimea Nature Park (stage)	18.2	0	6.9	6.13	8	0.382	0.03	0.08
3	1/21/2015	12:15	Waikoloa Stream	Waimea Nature Park (stage)	20.1	0	3.7	6.46	2	0.21	0.02	0.02
3	2/4/2015	10:20	Waikoloa Stream	Waimea Nature Park (stage)	21.2	0	4.6	7.1	1	0.061	0.84	0.05
3	3/28/2015	no data	Waikoloa Stream	Waimea Nature Park (stage)	19.9	0	8.01	7.1	0	0.13	0	0.14

Exhibit "C"
20

ADM. SERV. OFFICE

LOG NO. 15-028

3	6/24/2015	9:00	Waikoloa Stream	Waimea Nature Park (stage)	17.7	0	8.82	7.4	0	1.44	<	<
3	7/25/2015	15:00	Waikoloa Stream	Waimea Nature Park (stage)	19.9	0	8.4	7.1	4	0.4	0	0.15
3	7/28/2015	10:23	Waikoloa Stream	Waimea Nature Park (stage)	20	0	8.1	7.32	4	0.44	<	<
3	8/17/2015	11:37	Waikoloa Stream	Waimea Nature Park (stage)	21.4	0	8	7	8	0.2	>>	0.51
3	8/19/2015	no data	Waikoloa Stream	Waimea Nature Park (stage)	21.7	0	7.53	6.77	0	0.3	0.04	0.18
3	8/25/2015	12:45	Waikoloa Stream	Waimea Nature Park (stage)	21.6	0	6.65	7.07	2	>>	0.01	0.06
3	9/14/2015	12:45	Waikoloa Stream	Waimea Nature Park (stage)	.	.	.	.	.	.	.	.
3	9/29/2015	12:30	Waikoloa Stream	Waimea Nature Park (stage)	20.7	0	8.37	7.15	8	5.6	0.26	0.05
3	10/20/2015	2:00	Waikoloa Stream	Waimea Nature Park (stage)	21.5	0	7.47	7.41	2	1.34	0	0.17
3	2/18/2016	9:00	Waikoloa Stream	Waimea Nature Park (stage)	15.5	0	9.49	6.78	4	2.4	<<	0.05
4	1/3/2015	12:06	Waikoloa Stream	Kahawai street	18	0	8.86	6.15	18	0.498	0.1	0.14
4	6/24/2015	9:15	Waikoloa Stream	Kahawai street	17.9	0	8.9	7.05	2	1.4	0.01	0.05
4	7/25/2015	15:00	Waikoloa Stream	Kahawai street	20.1	0	8.3	7	4	0.3	0.01	0.1
4	7/28/2015	10:00	Waikoloa Stream	Kahawai street	20.5	0	8.45	7.2	0	0.9	<	<
4	8/17/2015	10:57	Waikoloa Stream	Kahawai street	21.6	0	8.48	7.03	2	0.34	0	0.15
4	8/19/2015	no data	Waikoloa Stream	Kahawai street	21.1	0	8.42	6.72	12	0.3	0.02	0.22
4	8/25/2015	13:30	Waikoloa Stream	Kahawai street	22	0	6.82	7.44	2	>>	0.01	0.05
4	9/14/2015	13:15	Waikoloa Stream	Kahawai street	.	.	.	.	.	.	.	.
4	9/29/2015	13:00	Waikoloa Stream	Kahawai street	20.2	0	8.48	6.6	12	4.8	0.24	0.02
4	10/20/2015	2:30	Waikoloa Stream	Kahawai street	21.9	0	7.47	7.43	0	0.88	0.01	0.1
4	2/18/2016	no data	Waikoloa Stream	Kahawai street								
5	3/28/2015	no data	Coastal Site	Coastal Site 5	20.1	31	7.8	8.3	0	0.33	0.21	0.13
5	6/24/2015	10:24	Coastal Site	Coastal Site 5	27.3	32.2	7	8.19	0	34.4	0.13	0.06
5	7/25/2015	15:00	Coastal Site	Coastal Site 5	29	30.5	7.3	8.29	0	>	0.4	0.36
5	8/17/2015	9:15	Coastal Site	Coastal Site 5	28.8	30.2	7.14	8.29	0	4.4	0.72	0.15
5	8/19/2015	no data	Coastal Site	Coastal Site 5	30	28.7	5.87	8.42	50	3.7	0.64	0.95
5	8/26/2015	9:15	Coastal Site	Coastal Site 5	29.8	33.7	5.56	8.19	36	3	0.41	0.21
5	9/14/2015	9:15	Coastal Site	Coastal Site 5	30.4	28.2	7.42	8.37	0	64*	0.08	0.12

Exhibit "C"
21

ADM. SERV. OFFICE

LOG NO. 15-028

5	9/29/2015	9:15	Coastal Site	Coastal Site 5	28.8	30.3	8.38	8.31	2	22.4	0.43	0.16
5	10/21/2015	9:00	Coastal Site	Coastal Site 5	28.7	33.7	7.03	8.7	0	>>	0.41	0.04
5	2/18/2016	10:00	Coastal Site	Coastal Site 5	25.1	29.2	8.6	8.4	2	>> over	0.08	0.23
6	3/28/2015	no data	Mouth of Waiulaula	Ocean at Waiulaula	21	33	8.5	8.3	0	0.29	0.03	0.92
6	6/24/2015	10:52	Mouth of Waiulaula	Ocean at Waiulaula	27	31.6	6.62	8.09	0	43.2	>	0.03
6	7/25/2015	15:00	Mouth of Waiulaula	Ocean at Waiulaula	28.8	9	7.72	8.57	16	2.2	0.12	0.14
6	8/17/2015	9:45	Mouth of Waiulaula	Ocean at Waiulaula	28.7	33.7	8.7	8.38	4	37.6	>>	0.11
6	8/19/2015	no data	Mouth of Waiulaula	Ocean at Waiulaula	29.5	32	7.18	8.53	4	2.6	0.34	0.1
6	8/26/2015	9:40	Mouth of Waiulaula	Ocean at Waiulaula	29.3	31	7.62	8.22	62	4.1	0.15	0.33
6	9/14/2015	9:40	Mouth of Waiulaula	Ocean at Waiulaula	30.8	33	6.04	6.95	4	54*	0.08	0.12
6	9/29/2015	9:30	Mouth of Waiulaula	Ocean at Waiulaula	28.6	31.3	6.14	8.16	4	13.2	0.47	0.15
6	10/21/2015	9:15	Mouth of Waiulaula	Ocean at Waiulaula	28.2	32.7	6.31	8.45	2	84*	0.47	0.09
6	2/18/2016	10:30	Mouth of Waiulaula	Ocean at Waiulaula	24.5	30.4	7.33	8.42	0	84	0.42	0.09
7	1/3/2015	16:20	Waiulaula Stream	Waiulaula at Driveway	21.9	0	5.9	6.81	22	0.55	0.01	0.19
7	3/28/2015	no data	Waiulaula Stream	Waiulaula at Driveway	22	0	8.6	8.7	2	0.18	0.02	0.23
7	6/24/2015	11:12	Waiulaula Stream	Waiulaula at Driveway	24.3	0	8.76	7.6	2	0.26	0.11	0.07
7	7/25/2015	15:00	Waiulaula Stream	Waiulaula at Driveway	28.8	0	7.61	8.42	8	0.46	0.02	0.21
7	8/17/2015	10:00	Waiulaula Stream	Waiulaula at Driveway	29.1	0	7.3	7.82	<<	0.4	0	0.27
7	8/19/2015	no data	Waiulaula Stream	Waiulaula at Driveway	30.4	0	7.46	7.54	0	0.04	0.07	0.11
7	8/26/2015	10:10	Waiulaula Stream	Waiulaula at Driveway	26.8	0	7.32	8.19	<<	8.4*	>>	0.13
7	9/14/2015	10:30	Waiulaula Stream	Waiulaula at Driveway	28.1	0	6.51	8.39	<<	1.38	0.02	0.05
7	9/29/2015	10:00	Waiulaula Stream	Waiulaula at Driveway	23.3	0	8.63	7.75	44	4.8	0.78	<<
7	10/21/2015	9:40	Waiulaula Stream	Waiulaula at Driveway	25.4	0	5.21	7.75	<<	1.3	0.03	0.05
7	2/18/2016	10:50	Waiulaula Stream	Waiulaula at Driveway	20.2	0	10.03	7.01	6	1.58	<<	0.1

Exhibit "C"
22

ADM. SERV. OFFICE

LOG NO. 15-028

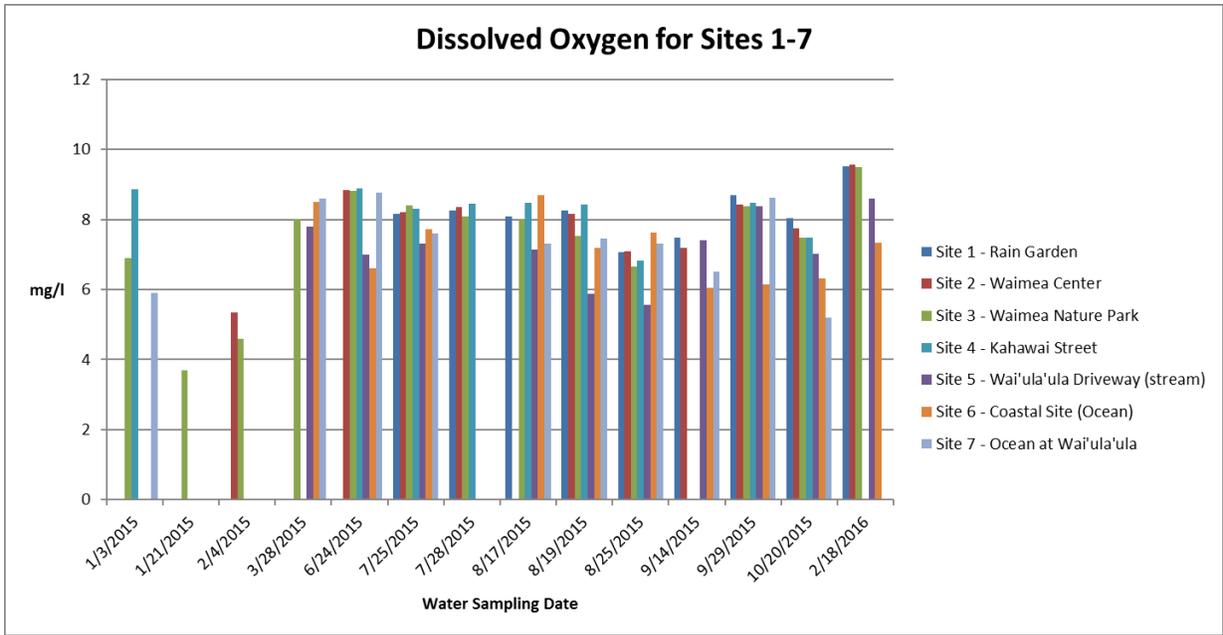


Figure 1. Dissolved oxygen data for all seven sites.

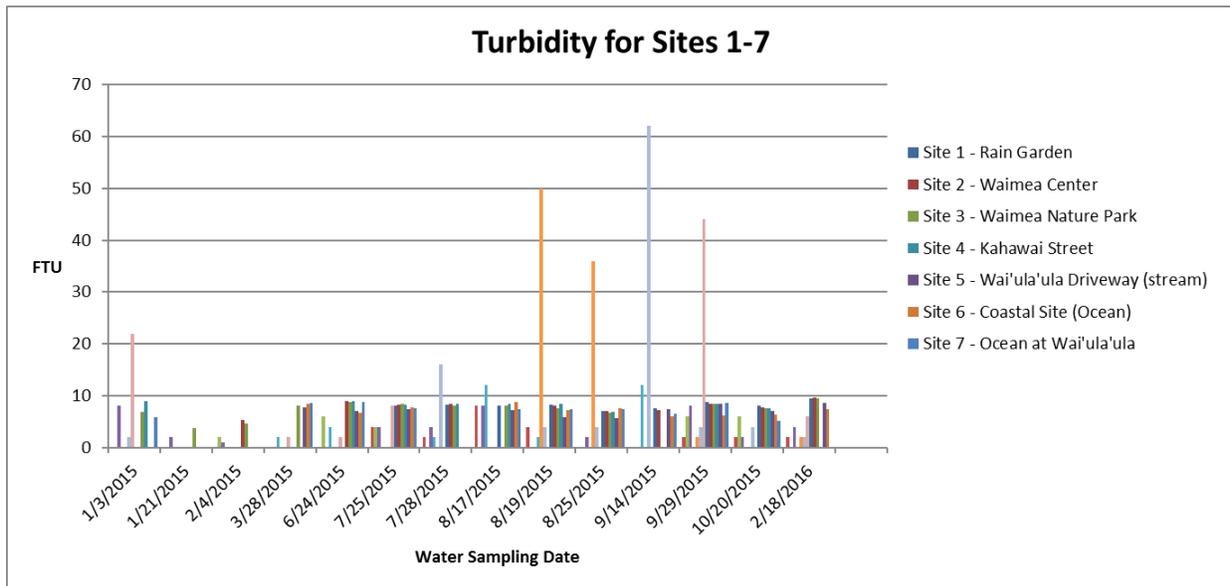


Figure 2. Turbidity data for all seven sites.

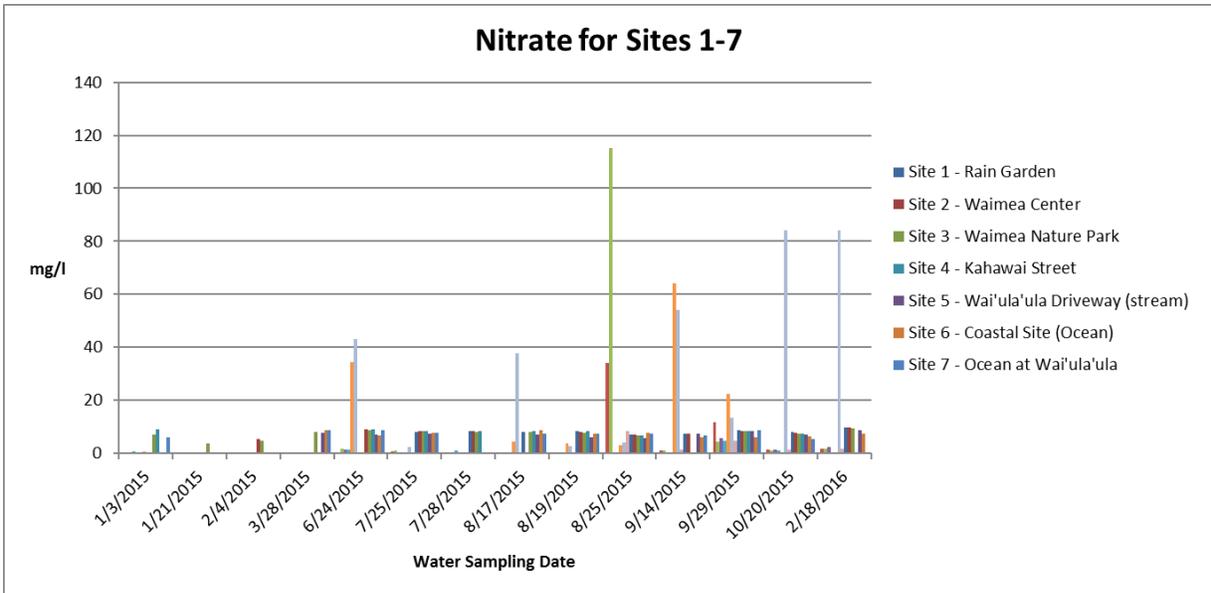


Figure 3. Nitrate data for all seven sites.

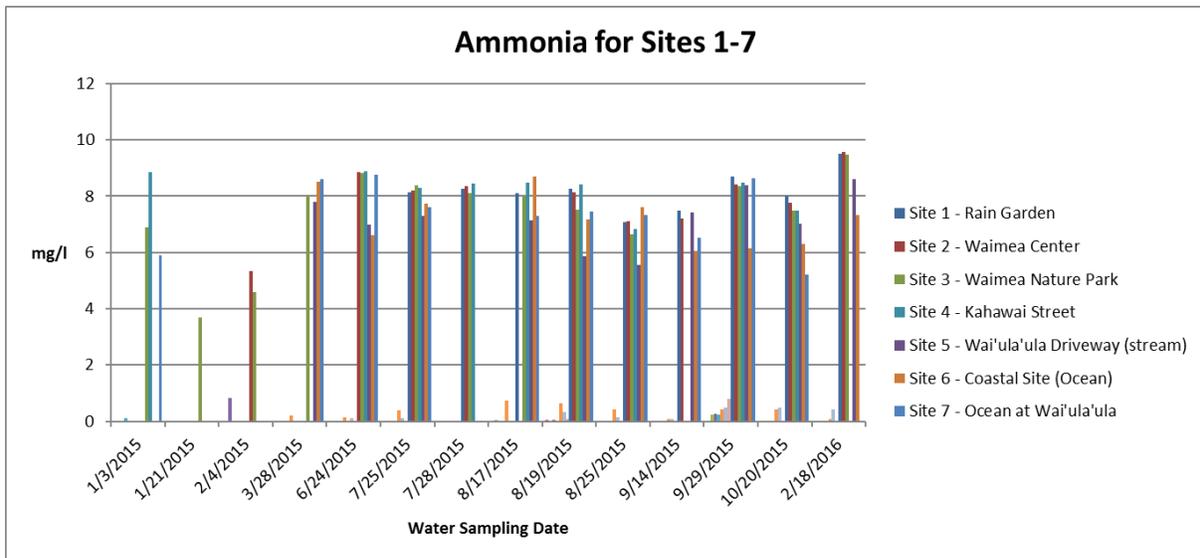


Figure 4. Ammonia data for all seven sites.

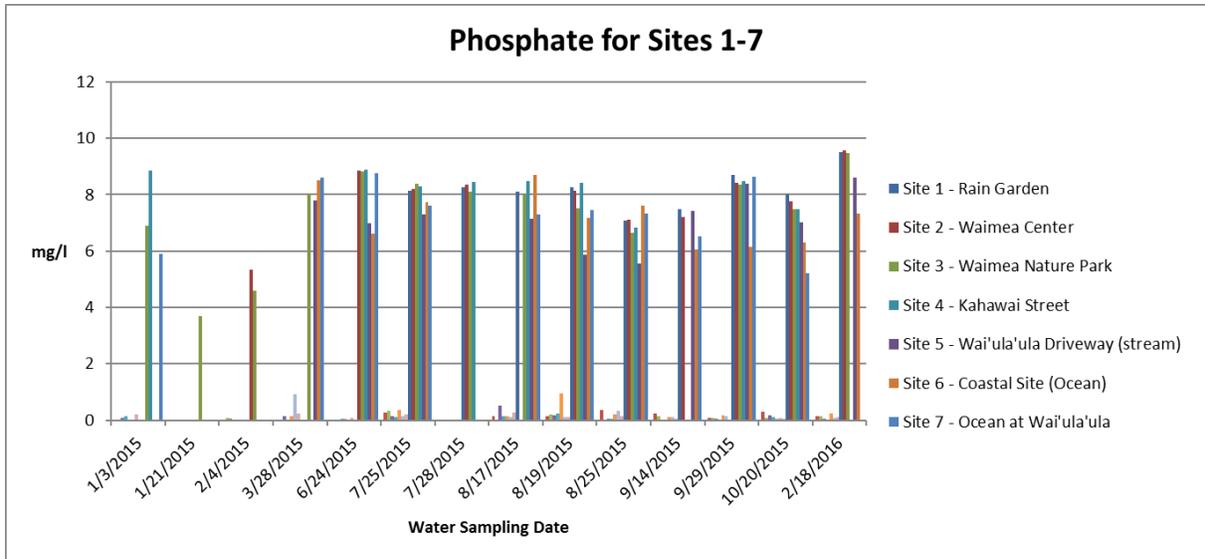


Figure 5. Phosphate data for all seven sites.