

# 2014

## Wahikuli-Honokōwai Watershed Management Plan: 2014 Year End Progress & Adaptations



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## Executive Summary

Since the release of the Wahikuli-Honokōwai Watershed Management Plan (WMP) in Dec. 2012, momentum has built propelling significant forward motion in project implementation, research, monitoring and outreach. This report outlines the progress and learnings from 2013 and 2014 to help inform the continuing direction of the West Maui Ridge to Reef Initiative (R2R). The R2R is a collaborative network of agencies and local partners employing watershed management planning as a tool for identifying and addressing land based pollution sources adversely affecting coral reef health in West Maui.

Of the nine priority projects recommended in the WMP, four were found to be not viable, one is complete and four are in their second phase of implementation. Roughly \$1 million in grant funding was secured and augmented by ~\$400K in local match. Pollution load reductions have not been calculated for projects completed thus far, due to the pilot or report-based nature of the work. Many lessons were learned in the course of moving these projects from concept to completion, which have been documented in this report. Projects completed include a dam retrofit analysis for increased silt retention, reef friendly landscape management planning with seven resorts, fire rehabilitation and community wildfire protection plans, installation of seven curb inlet baskets on private roads, erosion control practices on three miles of agriculture roads and three rain gardens installed in a county parks.

**Table 1: Priority project status presently and after funded phase two projects (end of 2015)**

Priority Projects Identified in WMP to Address Largest Reef Stressors	Not viable	Project Initiated	Phase 1 Completed	Phase 2 Funded	% of Goal Completed After Ph.2	Additional phases needed
Agricultural Road Drainage Improvement					~75%	Yes
Fallow agricultural field stabilization					~100%	No
Alternate disposal for Waste water reclamation facility					0%	Yes
Dam Engineering Analysis for silt flow-through reduction					~33%	Yes
Wahikuli gulch stabilization					0%	No
Fertilizer reduction plan					~40%	Yes
Post-Fire Plan					~100%	No
Honokowai Baffle box					0%	No
Rain gardens in County Parks					~100%	No

While progress on implementing the measures in the WMP has been steady, new information has introduced additional stressors not initially targeted. These include the availability of large amounts of sediment in the stream channels that can be accessed and transported to the coast at relatively low rainfall intensity, and to a lesser degree, solar farms situated on gulch edges that have destabilized the footprint of the sites and lack sufficient erosion control measures. Although the in-stream sediment issue requires more field work to assess the extent and specific locations of these sediment sources, projects that reduce the impact of this stressor have emerged as a new priority that must be addressed if periodic sediment plumes and resulting damage to coastal ecosystems are to be reduced.

Monitoring efforts underway are sufficient for coral and fish, but are inadequate for water quality and pollution load reduction monitoring resulting from project implementation. A new “Coral Health” monitoring project led by NOAA, DAR and USGS has added monitoring locations for coral and sediment at the mouths of the streams, complementing the existing monitoring conducted by DLNR-DAR and CRAMP teams. In partnership with NOAA and DAR, an assessment of all benthic and fish monitoring efforts was compiled giving a much clearer picture of not only of the state of these marine resources, but also the extent of monitoring. Most of the coral monitoring completed to date was concentrated around Kahekili Beach Park where modest ecosystem improvements have been detected. The balance of Wahikuli and Honokōwai has insufficient data at this point to draw definitive conclusions. Once several years of data collection at the “Coral Health” sites has taken place, more conclusions about reef health can be drawn.

The water quality monitoring taking place by the Hawaii Department of Health has not captured sufficient nutrient or turbidity information in several years, so while the majority of the sampling sites are listed as failing to attain water quality standards, new information is needed to confirm if this is true of the present condition. A study has recently started to evaluate water quality from various urban uses, which will help to inform which urban pollution issues should be targeted. Most promising for securing baseline and trend coastal water quality information in the future, is the formation of Hui o Wai Ola. This collaboration of local groups has committed personnel to fulfil key roles in an island-wide, community-based water quality monitoring program. A quality control plan and standards are being developed, and a grant to pursue funds for sampling in Wahikuli-Honokōwai has been submitted.

By way of supporting the monitoring efforts taking place in each of the three US Coral Reef Task Force Priority Watersheds of which West Maui is one, a committee has been meeting for over a year to compile the best metrics for understanding current condition and trends. This includes ecological indicators, as well as a programmatic evaluation that gets at whether or not there is sufficient institutional support for a watershed initiative to be successful. West Maui’s monitoring plan is largely in harmony with the parameters recommended by this committee.

A couple dozen research projects are underway in the priority watersheds, the majority of which are based in the marine environment. Example topics range from groundwater analysis and mapping, to testing for contaminants, studying ocean circulation, conducting benthic mapping, biomarker work and understanding mechanisms of herbivory. Researchers were convened in March 2014 to increase collaboration between efforts and identify synergies. Land based /watershed research is generally

lacking. Examples of data gaps where additional research would further R2R goals include sediment source mapping, stream flow evaluation and research into the presence and effect of chemical substances of emerging concern.

Community engagement was achieved through a mix of events, presentations, volunteer projects and meetings. In 2014, 22 West Maui Ridge to Reef (R2R) events took place reaching ~600 people. Most outreach (~75%) was conducted to targeted audiences, while the balance engaged the general public. The emphasis on engaging local leadership (12 events) came from a NOAA grant held by CORAL, greatly increasing the capacity to provide experiential education to this important demographic. The West Maui Kumuwai campaign provided a social marketing platform from which to engage individuals in reducing their personal polluted run-off. While the marketing tactics have been developed to various degrees, they are still largely in the pilot stage and will need sustained support to fulfil the objectives.

Organizational support remains steady, and has been institutionalized by the respective groups making up the R2R. The Funding and Agency Support Team meets monthly and the R2R Working Group once every second month. Both have largely retained the same membership. The R2R Hui has grown, and has evolved to include more regular meetings as many partners have joined the West Maui Kumuwai advisory group. The US Coral Reef Task Force Watershed Partnership Working Group continues to meet every month, plus sub-committees working on specific focuses, including metrics and the planning of the Task Force meeting held in West Maui in Sept. 2014. Priority watershed boundaries were re-aligned to reflect the five in which the R2R is working.

An additional layer of planning and strategic analysis will be applied to Wahikuli and Honokōwai in 2015 during the comprehensive planning process led by the U.S. Army Corps of Engineers. Modeling and participatory processes with community involvement are being used to evaluate the optimal synergistic suite of long-term projects across Wahikuli, Honokōwai, Kahana, Honokahua and Honolulu watersheds.

# Wahikuli-Honokōwai Watershed Management Plan: 2014 Year End Progress & Adaptations

## Chapter 1: Background and Purpose

In response to the declining health of coral reefs in West Maui, priority designation for funding and management through a watershed management planning process was instigated in a collaborative effort between federal and state agencies, in consultation with the local community. This effort was formalized through the creation of the West Maui Ridge to Reef Initiative (R2R) in 2012. The goal of the R2R is to restore and enhance the health and resiliency of West Maui coral reefs and near-shore waters through the reduction of land-based pollution threats from the summit of Pu'u Kukui to the outer reef. These efforts will be guided by the values and traditions of West Maui.

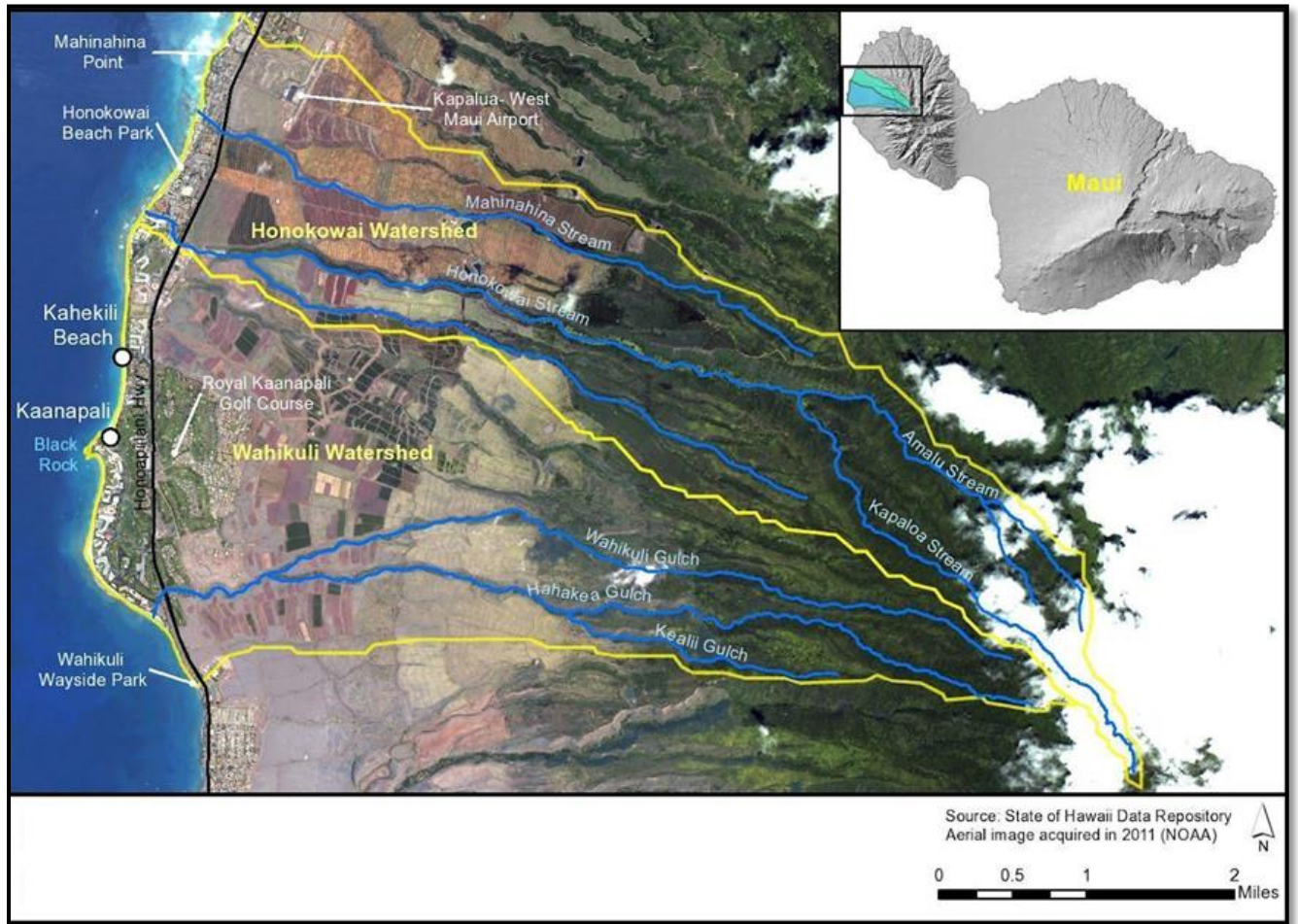


Figure 1: Wahikuli and Honokowai Watersheds- prepared by Sustainable Resources Group International, Inc.



## Organizational Structure

The priorities, funding and direction for the R2R is guided by the Funding and Agency Support Team (FAST), which includes representation from several federal and state agencies. Local guidance on implementation and on the ground considerations is provided by the R2R Working Group, made up of community representatives from a range of interests/sectors important to West Maui. The R2R Hui is the loosely defined collection of institutions, organizations and individuals whose actions further the



**Figure 2: Agencies and organizations making up the Funding and Agency Support Team**

goals of the Initiative (for example, through research or project implementation). A full time watershed coordinator for West Maui focuses on engaging the community, moving projects from concept to completion and facilitating communication amongst the many partners. A list of members of the FAST and Working Group is located in Chapter 6.

## Review Purpose

The purpose of this review is to provide an update on projects, progress and new developments in Wahikuli and Honokowai from 2013-2014. The National Oceanic and Atmospheric Association (NOAA) funded the first phase of planning which resulted in the Wahikuli-Honokōwai Watershed Management Plan in Dec.2012. The two volume plan includes a characterization of the land-based stressors and proposed solutions. Since watershed management planning is an iterative process, the intention of this document is to inform any course-corrections that may be needed to maintain the most efficient and informed path forward to addressing land based pollution that is adversely affecting coral health.

Additional information about the R2R and the complete Wahikuli-Honokowai Watershed Management Plan can be downloaded at [www.westmauiR2R.com](http://www.westmauiR2R.com). For further information requests, please contact the West Maui Watershed Coordinator at [tova@westmauiR2R.com](mailto:tova@westmauiR2R.com).

## Chapter 2: Pollution Reduction Implementation Projects

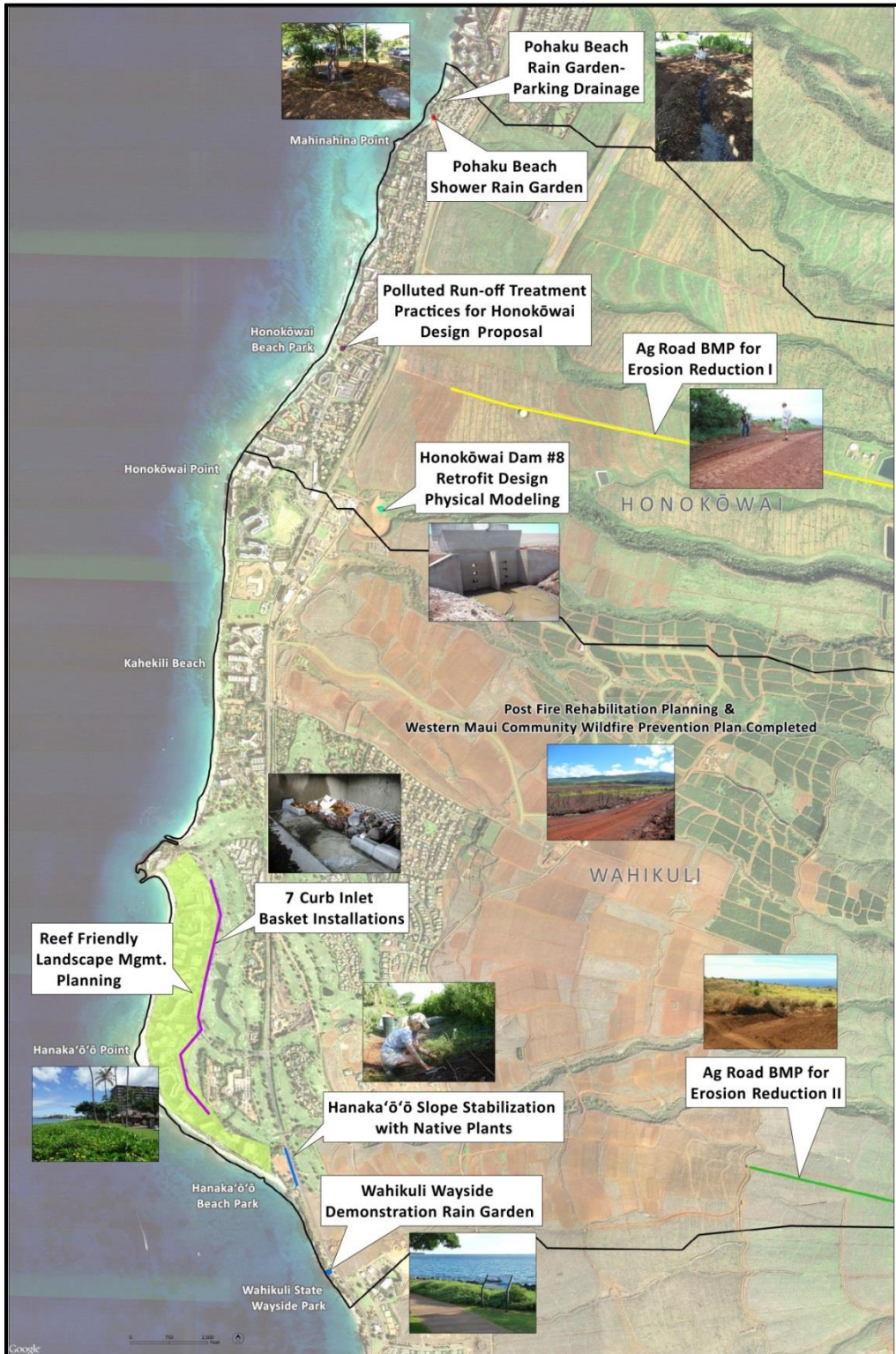


Figure 3: Approximate location of projects completed in Wahikuli and Honokowai watersheds by Dec.2014



### A. Implementation project overview & status

Implementation projects recommended in the watershed management plan (WMP) were divided into priority, being those that could achieve the most pollution reduction potential for the investment, and secondary, most of which are measures, rather than fully developed project ideas.

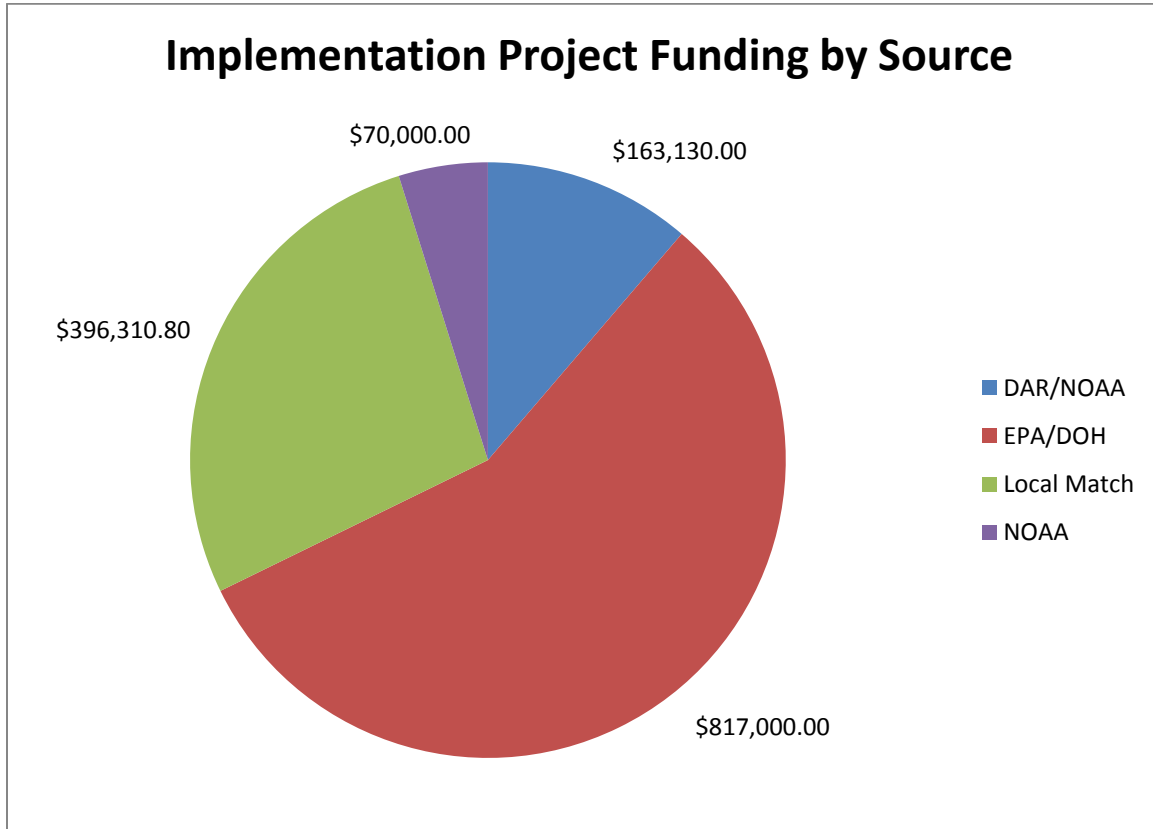
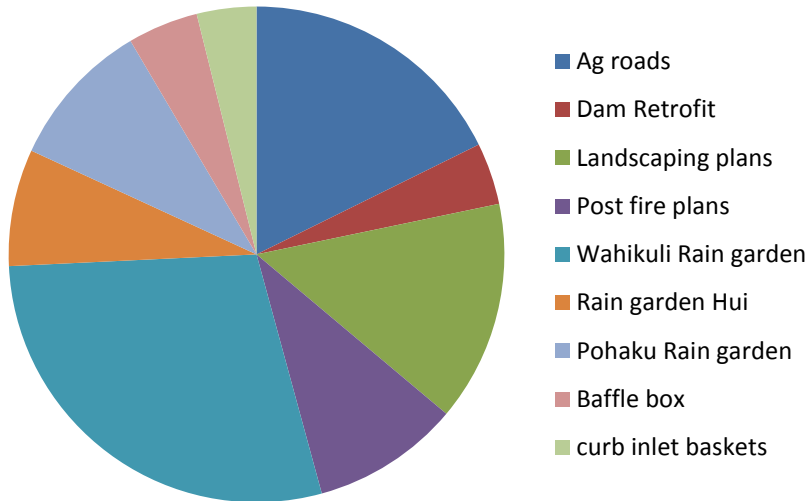


Figure 4: Approximation of funds and match used for implementation projects. Note that ~\$300,000 plus associated 25% match although secured from DOH, cannot proceed due to limited capacity for maintenance (but may be available for other West Maui projects). Match was assumed at 50% where unknown, so values should be considered approximates. Totals do not include funding used for planning or coordination.

There were nine priority projects initially identified in the WMP as seen in the table below. Four of these were found to not be viable for various reasons. All those that are viable have been started and one (recommended rain garden installations) have been completed to date. Because a quantified goal for many of these practices was not identified, determining when a project is complete is highly subjective.

## Relative email communications required by project type



Email volume is used as a proxy for administrative intensity of each project. Those projects involving communication with community volunteers such as the rain garden in Wahikuli show up as disproportionately high intensity.

Figure 5: As a measure of approximate communication intensity, this figure shows the breakdown by projects out of a total ~700 emails sent & received by the watershed coordinator.

The below list includes all priority projects identified in the Wahikuli- Honokōwai Watershed Management Plan (WMP). Several projects were able to move forward during this year, many of which were funded through the NOAA/DLNR-DAR Cooperative Agreement.

Table 2: Priority Projects Progress and Status

Project Title	Status	Next Steps	Final Goal
<b>Agricultural access roads: assessment and practices to improve drainage &amp; reduce erosion</b>  <b>Ph.1: \$30,009 (DAR/NOAA)</b> <b>Ph.2: \$484,000 (DOH 319)</b>	~3 miles of roads on DHHL and GFG land have been improved with water bars and reestablishing terraces	Phase 2 has started (SRGII lead, DOH 319 funded) and should be able to address a large percentage of the most degraded hydrologically connected roads.	Improve all of the most erosive stretches of road that have hydrologic connectivity. May be achieved in Phase 2 (depending on cost of practices used).
<b>Fallow Agricultural Fields</b>	Seed corn production stopped in June 2012 and the drought ended in the winter of 2013-14 leading to vegetative cover on previously bare fields.	Continue to observe coverage of fields.	Fields have sufficient vegetative cover to prevent erosion during rain events- achieved through natural cycles.

Project Title	Status	Next Steps	Final Goal
<b>Waste Water Reclamation Facility alternate disposal</b>	Federal court found the County of Maui to be in violation of the Clean Water Act on May 30, 2014.	Civil penalties will be assessed in March and Aug. of 2015. Following this, there should be a clearer sense of what action COM will take.	Waste water impact to coastal waters and aquatic life are addressed.
<b>Engineering analysis and Development of retrofit designs for Dam #8</b>  <b>\$51,000 DAR/NOAA</b>	UH team conducted modeling exercise and found the best solution was to address two year storm events by covering bottom ports and partially covering upper ports. This is cost effective and does not raise safety concerns.	Meet with COM DPW and DLNR Dam Safety offices and review proposed retrofit. If approved, seek funding and partners for execution of the design.	Significant reduction (within practical limits) in fines passing through dam structure.
<b>Wahikuli Gulch Stabilization</b>  <b>NRCS- in kind in professional services and travel</b>	NRCS Western Technical Team conducted analysis of options. Findings were that this stretch of stream was not the most significant contributor and stabilization efforts would not be worth the expense of the 11 permits that would be required for alternations. This notion was confirmed by USGS John Stock.	Review technical assessment from NRCS once available for relevance to erosion control in other sections of steam bank.	Not viable or the best use of resources.
<b>Fertilizer management plan</b>  <b>\$40,000 DAR/NOAA</b>	Reef Friendly Landscape Management Planning was completed with 7 Kaanapali Resort properties. They each now have specific practices to follow for fertilizer, pesticide and water management.	Continuing with ~10 properties in Honokōwai with more emphasis on engagement and integration with West Maui Kumuwai campaign. The grant is in processing.	Half of coastal properties have agreed to do ocean friendly practices. This will require additional phases.
<b>Burn Area Emergency Response Plan</b>  <b>\$10,485 DAR/NOAA</b>	Fire plans were created by the Hawaii Wildfire Management Organization. These include a Community Wildfire Protection Plan for Western Maui and a Wildfire Mitigation Plan.	A grant is in processing for Phase 2: planning to mobilize the right team following a fire and purchase and storage of supplies needed for preparedness.	Once phase 2 is complete, goals will be met. Ongoing maintenance will be needed for planting materials.

Project Title	Status	Next Steps	Final Goal
<b>Baffle Box in Honokōwai Beach Park</b>  <b>\$50,000 NOAA</b>	The technology was explored by a NOAA contractor and found to not be suitable for the volume of water. Constructed wetlands were also explored with concept designs. Neither the in-channel nor the in-field versions were suitable for the County Park's limited space.	As an alternative, concepts for smaller storm water practices for throughout the neighboring area will be provided (due in ~fall 2015). Suitable native planting for nutrient removal in the channel needs to be evaluated as a low cost alternative.	Proposed practices not viable in this location.
<b>Rain Gardens in County Parks &amp; Resorts</b> <b>Ph.1: ~\$ 20,000</b> <b>Ph.2: \$10,750</b>	Recommended gardens in Wahikuli and Pohaku Beach Park were installed.	Westin Resort is in the process of permitting for a rain garden with CORAL.	All specified areas have gardens installed. Goals have been met.

## B. Secondary Recommendation Project & Practice Status

The following list includes all secondary practices recommended in the WMP. Since most of these are practices that cannot stand alone and would likely need to be included in a larger project, it is more challenging to evaluate progress.

Table 3: Secondary Recommendations for Projects and Practices: Progress and Status

Project/Practice Title	Progress	Next Steps	Final Goal
<b>Curb inlet baskets with filter</b>  <b>Ph.1: \$19,880 DAR/NOAA</b> <b>Ph.2: \$333,000 DOH 319 (secured, but to be returned)</b>	7 were installed in Kaanapali Resort. They are being maintained by hand by the KOA crew. A DOH grant for 38 baskets was secured by SRGII. However, the COM DPW does not have the capacity to maintain at this time.	SRGII and the County are seeking alternatives with DOH to this project.	Baskets installed in most of the high use sections of road.
<b>Storm water management (inclusive of: swales, good housekeeping, debris removal, erosion control blankets, gutter downspout disconnection, illicit dumping signage, stormwater assessments etc.)</b>	A facility storm water assessment (\$20,000 DAR/NOAA funded) will begin in fall, 2015. Good housekeeping practices project to begin in summer 2015 with ~10 properties.	Continue to explore gulch clean out project and applications for use of other practices.	Storm water is actively managed in West Maui.



Project Title	Status	Next Steps	Final Goal
<b>Irrigation water &amp; pesticide management plans</b>	Pursued as a part of Reef Friendly Landscape Planning with 7 Kaanapali properties.	Will continue with phase 2 of Reef Friendly Landscaping	Water and pesticides are used as efficiently as practical by the majority of properties
<b>Native/drought resistance vegetation</b>	Native plants used in slope stabilization and three rain gardens. Identified as a behavior in the Kumuwai campaign.	Continue to promote through West Maui Kumuwai.	Where practical, drought tolerant plans are used in landscaping/treatment features.
<b>Pond sampling plan</b>	Indirectly getting at pond water quality through monitoring Urban Water Quality monitoring grant.	Once there are results, evaluate and determine if management practice adjustments should be recommended.	Water quality in golf course ponds is evaluated.
<b>Riprap</b>	None		
<b>Shoreline erosion control</b>	None	Being explored for current grant opportunities	
<b>Vehicle wash-water containment</b>	Grant submitted for kits to manage car washing fundraisers (through West Maui Kumuwai). The commercial facility cited in the plan already drains to a large vegetated swale, so is no longer of concern.	Wait on feedback for submitted grants. Develop an action plan to fully understand the logistics of community car washes so developed programs are effective.	The social norm has shifted such that community and home car washing is done in an ocean friendly manner.

### C. Lessons Learned from Project Implementation

- Institutionalized R2R support committees are very helpful: both the Funding and Agency Support Team and the R2R Working Group have been key to getting projects funded, keeping traction and ground-truthed within the community.
- Engage with the final implementers early on: meet with appropriate partners as early in the planning process as possible to listen to their existing project ideas and include in the planning process where appropriate. Be strategic to avoid stakeholder fatigue, and engage every level in chain of command if possible.
- Maintenance is a key consideration on all infrastructure projects: consider operations and maintenance carefully in the project scoping phase of planning. This can be a make or break

issue in securing landowner willingness to participate, and many funding sources cannot be used for maintenance.

- Understanding landowner concerns and limitations are central to success: having a clear picture of resources and human capital limitations, liability concerns, and existing landowner interests' assists with appropriately scoping and presenting a project idea. Incorporating this information facilitates securing written agreement to participate more easily.
- A broad, thorough investigation is needed to inform the watershed management plan: sufficient resources need to be allocated to site visits and ground truthing during the planning process so that recommended projects are well researched and understood to be the most cost effective, practical solutions including permitting and land owner considerations. The necessary data should be acquired, or identified as a critical data need if not possible to attain with the planning budget. Investment in this step will ultimately save considerable time, effort and social capital.
- Support from a local fiscal agent or non-profit is critical for accessing select grants is helpful: the R2R has been able to partner with Tri-Isle Resource Conservation and Development (a local nonprofit) to assist with accessing funding opportunities and fiscal management. This has greatly reduced the complexity of securing certain types of grants for implementation, and also outreach, education and watershed coordination funding.
- Release of funding lags project selection considerably: grant funding cycles thus far averaged ~1.5 years from the time of project development to receiving funding to start the work. Additional unforeseen administrative delays can occur, without the ability to extend the project timeline. This is likely to be an ongoing challenge as commitments must be made much before projects begin, and at times, projects as scoped will not be possible without modifications. Knowing this, going forward it will be easier to manage expectations and convey timeframes more accurately. In addition, targeting challenging, least certain projects to most flexible funding sources may help.
- Evaluation of resource improvement requires up-front consideration: To help with understanding progress and pollution load reductions, having more specific measurable targets and anticipated reductions on a per-project basis in the Watershed Management Plan would be helpful. In some cases, waiting until the scale warrants the effort of evaluation is necessary. Where possible, spelling out realistic evaluation needs clearly in project proposals would help ensure these measurements are provided by contractors.
- Constant engagement and follow up is critical to maintain momentum: while people generally agree that cleaner, healthier oceans are desirable, everyone is already busy. Regardless of whom it is, private or public, constant support for the items that have been added to on to busy workloads is needed to keep project momentum. Persistent follow up is a key function of a watershed coordinator.
- Engage the community in projects: sense of ownership and willingness to participate in maintenance of projects is increased through engagement. This could come in the form of volunteer events, green technology trainings, interpretive signage, acting on community project ideas and consultation on plans or changes made in public spaces. People generally are caring,

are generous when asked and including the public in projects helps new ideas for practices gain traction more quickly.

Additional information on lessons learned on a project specific basis is available on request through the watershed coordinator.

#### D. Gap Assessment from Non-viable Implementation projects

Given that four of the proposed priority projects and one large scale secondary project were not able to be pursued to completion, it is worthwhile to examine which targeted stressors will not be reduced, and what alternate approaches may be available.

Table 4: Gap Assessment of Pollution Reductions Unattainable through Recommended Projects

Project	Target Pollutant	Alternate Action	Next Step
<b>Fallow Agricultural Fields</b>	sediment	Unnecessary- rain has closed in open field vegetation	N/A
<b>Waste Water Reclamation Facility alternate disposal</b>	Nutrients, freshwater and human-waste related substances	None known	None possible until after lawsuit penalty and COM potential projects emerge
<b>Wahikuli gulch stabilization</b>	Sediment in eroding banks	Address sediment higher up in the system with vegetated check-dams	Grant proposal submitted for trial vetiver planting
<b>Baffle box/Honokōwai constructed wetland</b>	Urban pollutants such as hydrocarbons and heavy metals	Dispersed projects closer to source of storm water generation	Consultant developing LID suggestions for sub-watershed feeding this area
<b>Large scale curb inlet basket installations</b>	Urban pollutants such as hydrocarbons and heavy metals, sediment and debris	<i>Seeking viable ideas- coconut mat over drains and inlets?</i>	Research practices and vet with DPW and R2R

#### E. Additional Threats to Coral Health Identified

In the original WMP, stressors to coral health were identified, which provided the basis for proposing priority implementation projects. During the course of the last year of research and implementation, two additional potential sources of stress have been identified.

Erosion from solar farms in the agricultural district: in recent months, several solar farms have been installed on small sections of former agricultural land owned by Maui Land and Pineapple Company. Two of these are located in Honokōwai watershed bordering Honokōwai stream, just above DHHL land.



Figure 6: Cleared gulch shoulder in preparation for solar farm

To improve efficiency, these farms are cleared out on south facing land abutting the gulch. Land was cleared, and solar panels installed creating an open patch of soil, plus increased impervious surface. With the increased impervious surface, the velocity of rainwater directed to the gulch is likely to increase, bringing sediment with it. An environmental consultant in the region for another project flagged these areas as highly probable to become sources of future sediment runoff, in addition to possible future herbicide runoff.

In-stream legacy sediment: during two separate field visits from USGS geomorphologist John Stock conducting reconnaissance sediment source mapping in select parts of the watersheds, a good deal of sediment was found to be in the gulch areas readily mobilized with rain of moderate intensity. These areas of fine sediment appeared to be a more abundant in the gulches adjacent to former agricultural fields, where it was common practice to bull doze into the gulch to clear the land, and particularly in pineapple fields, orient the terrace system so that all excess water was directed into the gulches. Observations following a rain event in July, 2014 that resulted in sediment plumes up and down the coast suggest that while there was little to no evidence of soil movement from ag fields, on the terraces just above the central stream path in multiple gulches there was visual evidence that fine sediment had been accessed and liberated by elevated water levels.



Figure 7: Sediment deposits in stream channel and bank that are accessible with minimal rainfall

The research and implementation implications are that further study is needed to understand the relative magnitude of these stressors, and that projects that address these sources of sediment should be pursued. The sediment plume issue is not likely to be solved by addressing agricultural roads alone. More details will available is early spring from the USGS open report entitled *Reconnaissance sediment budget for selected watersheds of West Maui, Hawaii, USA*.



## Chapter 3: Monitoring & Resource Status

Monitoring efforts have been divided into long, medium and short term (project outputs). The long-term monitoring relates to tracking the changes in reef health, medium to water quality monitoring as a precursor to reef health, and short term monitoring relates to the project specific tracking that is needed to evaluate the effectiveness of implementation efforts. The following is a summary of what is taking place for each of these categories of monitoring, and in the case of coral and water quality, what is known from current data.

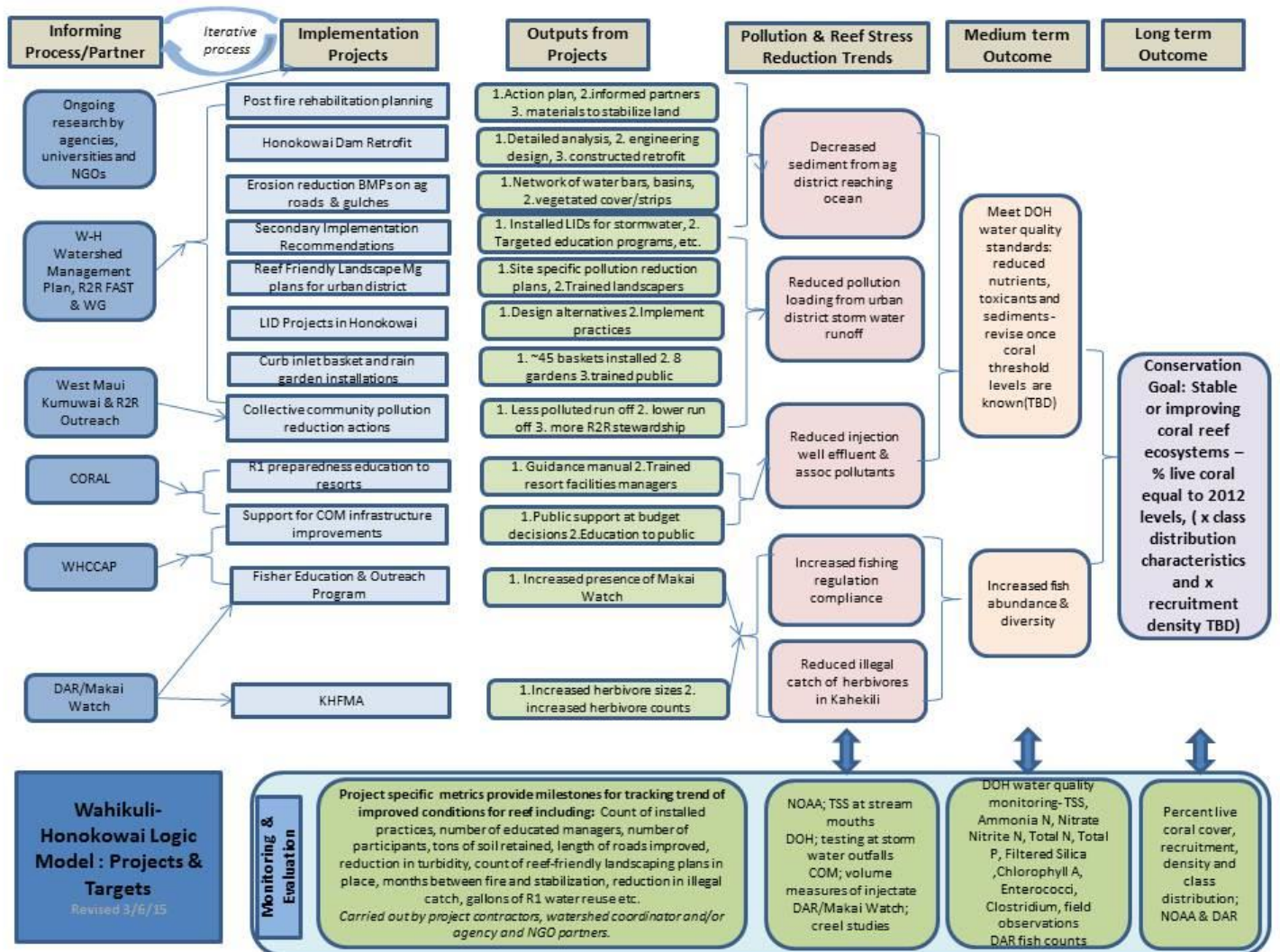


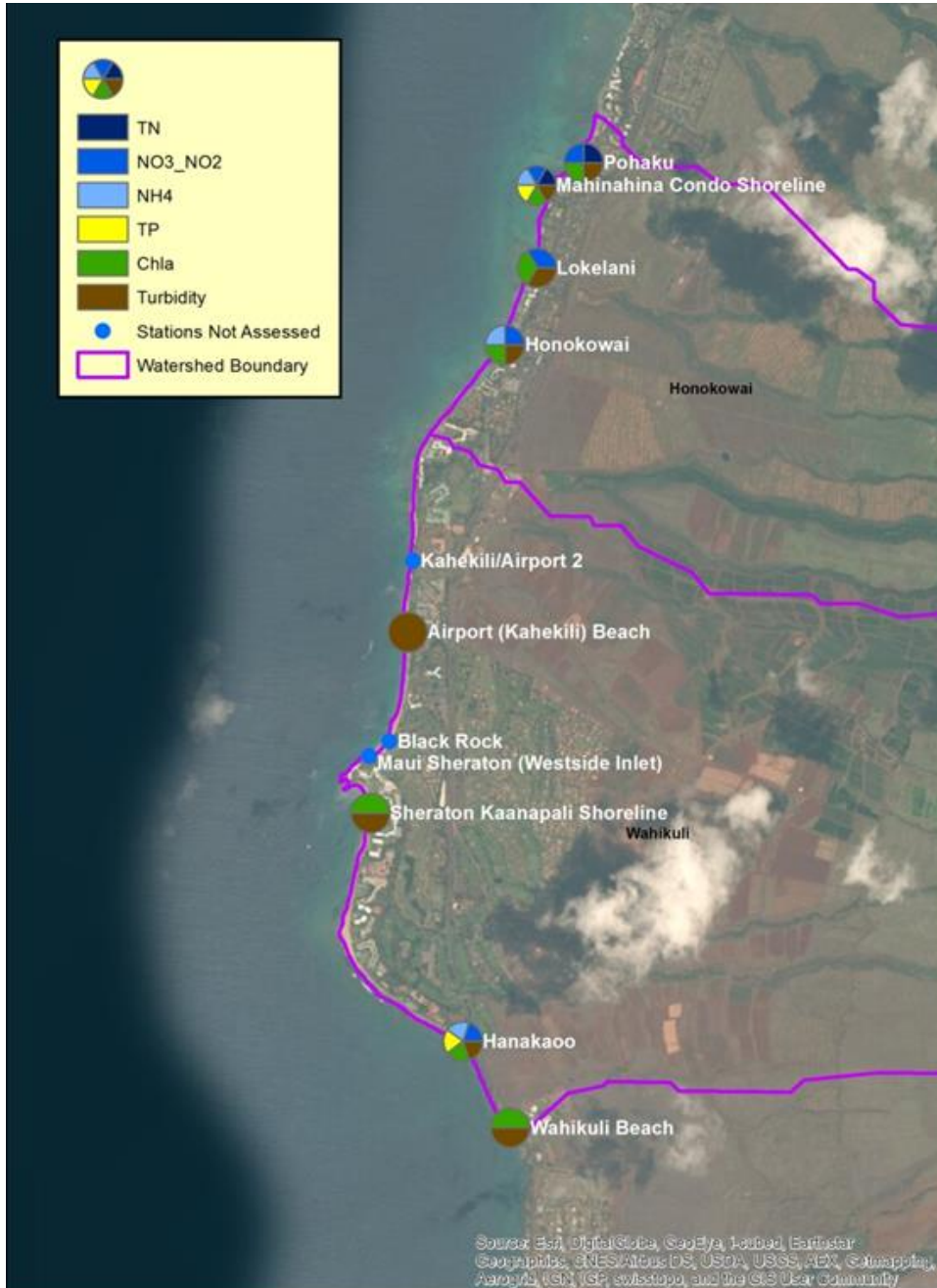
Figure 8: Relationship between projects, outputs, monitoring and evaluation

### A. Implementation Project Monitoring and Evaluation

Given the pilot and/or report generating nature of all of the projects to date, project monitoring has not been a significant element to date. As projects become larger in scale (such as the agricultural road project currently underway), more in-field monitoring will take place to track the pollution load reductions realized and other parameters as appropriate.

## B. Water Quality Monitoring

Currently, the only water quality monitoring taking place is by the state Department of Health. There are eleven sites in the two priority watersheds. The map below shows sampling location and the water quality parameters for each sites found to be impaired in the 2014 Hawaii Integrated Report.



Wahikuli Honokowai Watersheds Water Quality Impairments (per 2014 Hawaii Integrated Report)

Figure 9: Map of water quality sampling locations in Wahikuli-Honokowai and associated impairments

Table 5: Water quality summary for Wahikuli-Honokowai

Monitoring Station	Impaired	Impairments	Most recent Chemistry Data	Current sampling Frequency	Microbiology Data	Sampling frequency	Enterococcus Data-Most Recent
<b>Wahikuli Watershed</b>							
Hanaka'ō'ō County Beach Park (DOH 693)	x	NO <sub>3</sub> NO <sub>2</sub> , NH <sub>4</sub> , TP, Chl a, Turb	2001	-	Yes	2x/wk	Yes-2014
Kaanapali (Sheraton Kaanapali Shoreline) (DOH 666)	x	Chl a, Turb	1997	-	Yes	1/mos	Yes-2013
Maui Sheraton (Westside) (DOH 670)	N.A.		1983				Yes-1983
Black Rock (DOH 734)	N.A.		2014	2x/mos	Yes	2/mos	Yes-2014
Airport (Kahekili) Beach (DOH 695)	x	Turb	2014	2x/mos	Yes		Yes-2014
Kahekili/Airport 2 (DOH 733)	N.A.		2014	2x/mos	Yes	2/mos	Yes-2014
<b>Honokowai Watershed</b>							
Papakea (mouth of Honokowai stream-per Laws et al 2004)	x	Chl a, Turb	2001	-	No	-	No
Honokowai (DOH 725)	x	NO <sub>3</sub> NO <sub>2</sub> , NH <sub>4</sub> , Chl a, Turb	2014	2x/mos	Yes	2/mos	Yes-2014
Hale Oneloa Condominium Shoreline (DOH 651)	N.A.		1997	-	Yes	1/mos	Yes-1998
Lokelani (mouth of Mahinahina Stream-per Laws et al 2004)	x	NO <sub>3</sub> NO <sub>2</sub> , Chl a, Turb	2001	-	No	-	No
Mahinahina Condo Shoreline (DOH 660)	x	TN, NO <sub>3</sub> NO <sub>2</sub> , NH <sub>4</sub> , TP, Chl a, Turb	1997	-			Yes-2000
Pohaku (DOH 724)	x	TN, NO <sub>3</sub> NO <sub>2</sub> , Chl a, Turb	2010	-	'08 - 12/2013	1/quarter	Yes-2013

All of the monitoring sites included in the Department of Health 2014 Integrated Report in Wahikuli and Honokōwai were impaired for one or more indicator. Only four sites have chemical data for the past year, at which sampling takes place twice per month. The balance of sites have not had chemical analysis, mostly since the land uses changes in the agricultural district have taken place, which creates a gap in needed information for watershed management since nutrients are a priority stressor.



Water quality monitoring has also taken place at Kahekili Beach Park at various seep locations, but are not included here since the data is collected under a special project and is not included in the integrated report.



Figure 10: Potential urban water quality monitoring sites seen in green (plus Honokowai Beach Park channel- not shown)

### Urban Water Quality Monitoring Project

Led by a UH team including Dr. Roger Babcock and Kim Falinski and funded by NFWF, an assessment of select storm water conduits in urban areas will be sampled and evaluated across water quality parameters. This project is intended to allow insight into which pollutants are concentrated in which land use (i.e. golf courses, residential, high density urban/residential). Land owners and the County of Maui have been approached about granting access and permissions.

### Future Water Quality Monitoring Efforts

A coalition of Maui Nui watershed/community groups, called Hui O Wai Ola, is committed to starting a coastal water-quality monitoring program. The aim of the program is to augment the coastal monitoring conducted by the Department of Health Clean Water Branch (CWB). The CWB program is limited in spatial extent, sampling frequency and variables by staff availability and funding. The intent is that quality-assured, community based monitoring can help fill the need for reliable data, which will improve our ability to assess coastal water-quality conditions and detect trends. Producing reliable water-quality data will require that the community team members are well-trained and operate under a comprehensive QA project plan (QAPP), and that some analyses are run by a certified analytical laboratory.

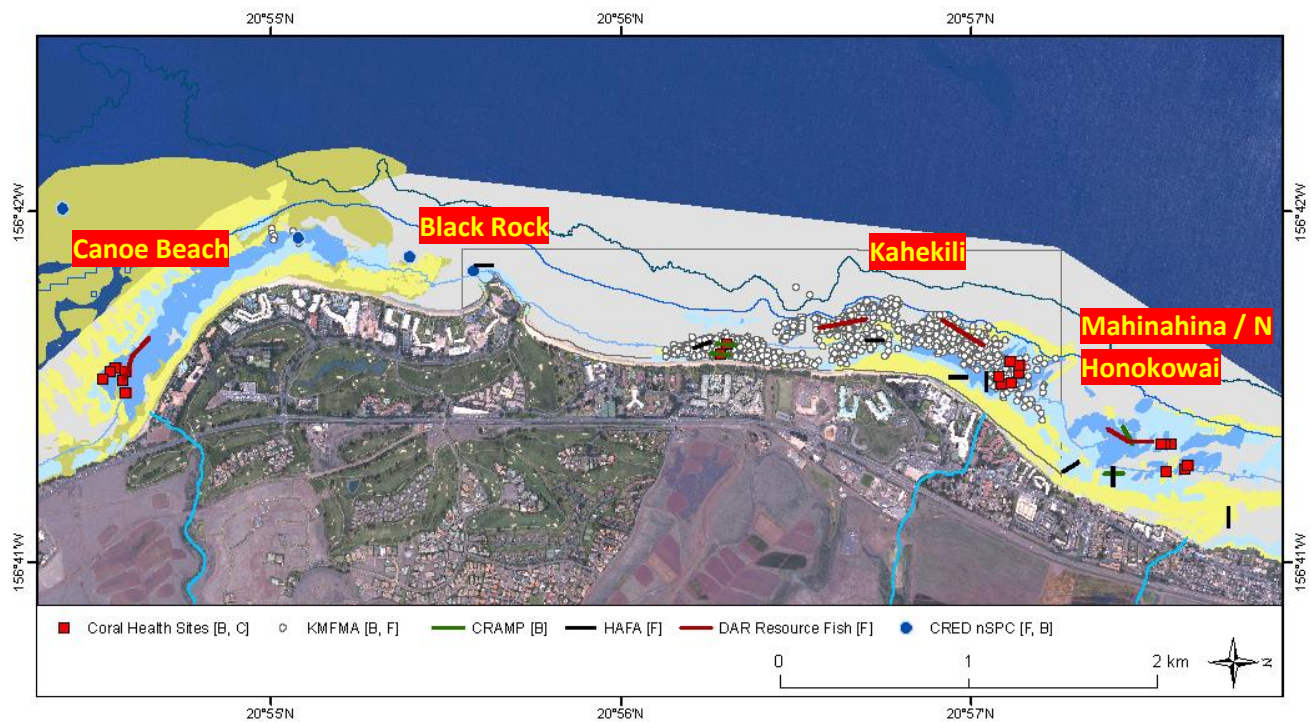


The Nature Conservancy, the Maui Nui Marine Resource Council, the NOAA Hawaiian Islands Humpback Whale National Marine Sanctuary, West Maui Ridge to Reef Initiative and UH-Maui College are helping to develop the program with guidance from DOH and EPA.

### C. Coral Health Monitoring

In 2014, NOAA and DAR partners worked with R2R to compile a summary of all monitoring efforts in the priority watersheds to date (Wahikuli- Honokōwai Reef Condition Report August 2014, available at [www.westmauir2r.com](http://www.westmauir2r.com)). This was very helpful in identifying where more monitoring is needed, and where there is enough data to reliably draw conclusions. It should be noted that there is considerable variability in characteristics and condition of the reefs and hard bottom habitats, as well as in the type and quality of biological survey data available in these two watersheds. The addition of three “Coral Health” sites out from the stream mouths is a step towards filling in missing locations, but as monitoring has just begun, it is premature to suggest trends for coral health in these areas.

Figure 11: Coral reef survey locations inside the priority watersheds



### Survey programs

There are four main survey programs currently ongoing in the priority area.






- ‘CRAMP’ (Hawaii Coral Reef Assessment and Monitoring Program; <http://cramp.wcc.hawaii.edu>)
- DAR Fish Resource Surveys
- KHFMA surveys of fish and photo transects
- Coral Health sites locates outside of stream mouths to capture/track watershed effects

The following is a highly subjective figure to show at a glance, the status of reef areas in Wahikuli and Honokōwai. While the report divides the area into four parts, Black Rock (Puu Ke`kaa) is not included in the below diagram because it does not have any coral cover.

Figure 12: Coral Reef Condition Status Trends Schematic

SECTION	Fish Biomass	Key Herbivore	Fish Richness	Coral Cover	Crustose Coralline Algae [CCA]	Macroalgal Cover
Canoe Beach	→	→				
Kahekili HFMA	→	↑	→	→	↑	↓
N. Honokōwai	→	→				

**Legend:**

	Arrows indicate direction of trend
	Insufficient data to draw conclusions about status or trends
	<b>Condition is good</b> as compared to other Maui reefs
	<b>Condition is average</b> as compared to other Maui reefs
	<b>Condition is poor</b> as compared to other Maui reefs

It is clear from the two preceding figures that Kahekili has the most data, so is the only place where reliable conclusions can be drawn. There is cautious optimism that the Kahekili HFMA which has now been established for five years is beginning to show positive signs of system improvements. As more data is collected from across all sites, it will be possible to do a more formal assessment. Please see the full report from Feb.2014 for more details.

**D. USCRTF Metrics Committee Draft Recommendations**

Through a collaborative process between members of the US Coral Reef Task Force over the past couple of years, priority measurements and indicators were identified that assess important aspects of a coral reef community, water quality, and sediment quality – all factors that should be considered when evaluating the success of efforts completed in watersheds to reduce land-based sources of pollution from draining into coral reef areas. The concept is that these measures will be collected across all three of the priority watershed sites, allowing areas to be compared and help to ensure the most critical

information is collected. The table below lists the draft metrics selected for biological criteria. As this is still in draft form, some metrics may change in the final document.

**Table 6: Priority process and outcome indicators of the coral reef communities, sediment quality and water quality for the Watershed Partnership Initiative of the US Coral Reef Task Force (draft, Feb.2015)**

Indicator	Type of Indicator	Unit of Measurement	Preferred Method
<b>Coral Community Indicators</b>			
Benthic Cover	Outcome	Percentage of occurrences of biotic and abiotic elements occupying the benthos	NOAA NCRMP*
Coral Recruitment	Outcome	Density of juvenile corals (<5 cm) per m <sup>2</sup>	NOAA NCRMP
Coral Colony Size Structure	Outcome	Coral colony size frequency distribution for all coral species in a defined area	NOAA NCRMP
Coral Taxonomic Richness	Outcome	Number of species occurring in a defined area	NOAA NCRMP
Herbivorous Fish Biomass	Process	Total weight of herbivorous fish in g/m <sup>2</sup>	NOAA NCRMP
<b>Sediment Quality Indicators</b>			
Sediment Constituent Accumulation	Process		USGS
Sediment Chemistry			
Sediment Toxicity	Process		EPA NCCA†
<b>Water Quality Indicators</b>			
Total Nitrogen	Process	mg/L N	EPA NCCA
Total Phosphorus	Process	mg/L P	EPA NCCA
Chlorophyll a	Process	µg/L	EPA NCCA
Dissolved Oxygen	Process	mg/L DO	EPA NCCA
Light Attenuation	Process	%	EPA NCCA
Turbidity	Process	NTU	EPA NCCA

\*NOAA National Coral Reef Monitoring Program; † EPA National Coastal Condition Assessment

Once water quality monitoring is funded and established in West Maui, we are mostly on track for monitoring the ecological parameters identified as most important for evaluating changes over time.

In addition to recommendation for tracking ecological indicators, a Programmatic Checklist (see appendix) was also developed. The checklist is intended to help watershed coordinators assess the status of the institutional and stakeholder support for the watershed partnership sites, and determine whether agency resources and support are adequate for the successful implementation of a ridge to reef watershed management plan. This will be completed for West Maui annually, prior to the fall 2015 Task Force Meeting, and each year thereafter.

## Chapter 4: Research Projects in Wahikuli-Honokōwai

The following is a list of the known ongoing research efforts in the priority watersheds. Researchers were convened in March 2014 with NFWF support to increase communication between PIs thereby improving synergies and outcomes.

Table 7: Current Known Research Projects in Wahikuli- Honokōwai

Principal Investigator	Affiliation	Project Title	Timeframe
<b>Bob Richmond</b>	UH	Biomarker expression in corals from West Maui	2013- 2015
<b>Cheryl Woodley/ Craig Downs</b>	NOAA / HEL	Environmental Investigation into Impacts of LBSP on Coral Health in West Maui, Hawaii	Sept 2012-15
<b>Darla White/Ivor Williams</b>	DAR/NOAA	Collaborative Monitoring of Kahekili Herbivore Fisheries Management Area	Jan.2008- Dec.2014
<b>Craig Nelson</b>	UH	Setting Nutrient Thresholds Using Coral Gene Expression	May 2012- Nov.2014
<b>Mark Howland</b>	WHALE	Identifying and Preserving the Resilience of West Maui Coral Reefs	Mar.2014- Oct.2014
<b>Craig Glenn</b>	UH	Quantifying Transport and Differentiation of Land-Use Impacts of Groundwater Nutrient Coastal Zones of Maui	2014-2016
<b>Peter Swarenski</b>	USGS	Examining marine controls on focused submarine groundwater discharge off west Maui, Hawaii	Summer 2013- findings pending
<b>Curt Storlazzi</b>	FAST/USGS	Maui Nui numerical circulation modeling	summer 2013- FY2016
<b>Curt Storlazzi</b>	FAST/USGS	Geochemical Records of Land-Based Pollution and Climate Change at Kahekili	summer 2013- FY2016
<b>Bernardo Vargas</b>	NOAA	Determining the efficacy of watershed management activities in the Wahikuli and Honokōwai watersheds, West Maui	Summer 2014- 2016
<b>Watson Okubo</b>	DOH	State of Hawaii Department of Health (DOH) West Maui Water Quality Sampling (NCCA 2010-2011, Lahaina Seep 2012-2014)	2010-2014
<b>Curt Storlazzi</b>	FAST/USGS	Maui Nui Reef Geology and Oceanography GIS	FY2015
<b>Curt Storlazzi</b>	FAST/USGS	West Maui High-Resolution Benthic Habitat Mapping	Summer 2012- FY2015
<b>John Rooney</b>	NOAA	Benthic habitat mapping the West Maui coral reef ecosystem	June 2013- Feb.2016

<b>Kirsten Oleson</b>	UH	Ecosystem service mapping, modeling, and valuation decision support tool	Jan.2015-2016
<b>Thomas Smith</b>	USACE	The West Maui RSM effort extends from Kaanapali through Honolua Bay	Nov.2013-2014
<b>Michael Fox</b>	Scripps, UCSD	Effects of wastewater effluent on coral physiology and competitive interactions with algae	2014-2016
<b>Samantha Clements</b>	Scripps, UCSD	Foraging ecology and functional diversity of surgeon fishes in Maui, Hawaii	Aug.2011-2015
<b>Tom Oliver</b>	UH	Setting Nutrient Thresholds to Coral Reef Health (HI, AS)	Oct.2014-Sept.2015
<b>Roger Babcock/Kim Falinski</b>	UH	Nutrient and Sediment Contributions from Urban Storm Water	Jan.2015- June 2016
<b>Victoria Keener</b>	Pacific RISA	Climate change and groundwater recharge on Maui	
<b>Levi Lewis</b>	Scripps, UCSD	Effects of herbivory and environmental context on succession and CaCO <sub>3</sub> accretion in shallow reef environments	Aug 2011-2015
<b>Levi Lewis</b>	Scripps, UCSD	Effects of herbivore (urchin) identity and diversity on benthic coral reef communities	Aug 2011-2015

## A. Data Gaps

At this point in time, the following are understood to be the most significant data gaps in Wahikuli and Honokōwai affecting watershed management for the reasons stated:

- Watershed Sediment sources-specific locations and amount/load: needed to help prioritize implementation to address largest and/or more ‘treatable’ sources of sediment.
- Stream flow information: when coupled with sediment and/or stream water quality data allows relative watershed/sub-watershed contributions (pollution loading) to be identified. Implementation can be prioritized accordingly.
- Baseline coastal and stream water quality data: allows better problem identification, targeting of implementation and something to measure progress (related to implementation) over time
- Toxins associated with sediment and geographic variability: determine if this is a contributor to coral decline and where.
- Presence of substances of emerging concern and effect on reef health: determine if this is a contributor to coral decline and where.



## Chapter 5: Outreach & Community Engagement

Outreach and community engagement was achieved through several mechanisms, and is a key component of overall implementation success as the community and local leadership are kept aware of our goals, progress and their prospective role in keeping our resources healthy.

### A. Social marketing as an approach to changing behavior: the West Maui Kumuwai Campaign



Social marketing is the systematic application of social science and commercial marketing techniques to achieve specific behavioral changes for social, political and environmental good. Essentially, the same marketing tactics (e.g. peer pressure, social norms) used to sell products can be used to persuade such behaviors as fastening your seat belt, or using native plants in your backyard.

To reduce polluted runoff entering near-shore waters in West Maui that may lead to coral decline, the West Maui Kumuwai Social Marketing Campaign has been developed to persuade area residents to play a crucial role in ensuring the health of their ahupua'a, or watershed. Activation points are focused on lawn care practices, including: fertilizer, pesticide, water use, planting with *pono*, and installing a rain garden, with additional opportunities for those with whom those actions are not applicable, including: disposing of pet waste, car wash practices, and volunteering in the community. Through specific social marketing approaches, the campaign strategy is designed to generate not just individual actions in the short term, but a behavior change path that leads to greater, more complex and systemic actions and commitments (from individuals and the larger community) to sustainably manage West Maui reefs for the long term.

At its current phase, organizers from the eleven groups that make up the campaign team would like to focus on further activating the target audience to take individual action, and measure those results over the next year. A part-time campaign manager (Liz Foote) has been -contracted\_ with grant funds (through Aug.2015) to move the group's objectives forward.

#### Tactics Employed

Several approaches or tactics were developed for the West Maui Kumuwai (WMK) campaign with the support of SeaWeb Asia Pacific from Sept. 2012 to March 2014. These are each developed to different degrees, but all still largely in the pilot stages of determining if these techniques will be the most effective in changing the desired behaviors.

Pledges: Studies have shown that social norms can be quite powerful in behavior change campaigns. Pledges serve as a means for the community to make a public statement about a behavior they will adopt to reduce their personal polluted runoff. Pledges are collected at public events, following presentations, after beach clean ups, at watershed workshops and as the opportunity arises. Pledges



Figure 13: Volunteer pledges to plant native plants

are posted on the website, and on the Facebook page.



Figure 14: Volunteers weed Honokōwai Valley with Maui Cultural Lands in a joint event

Community events: WMK has partnered with numerous nonprofits and local agencies working to protect the watershed by promoting their events, and co-hosting activities such as planting days. The aim is to showcase the many opportunities on West Maui to “lend a hand,” which is one of the campaign asks, and to demonstrate that a cumulative effort is taking place to improve the health of the West Maui Watershed. These events are also used as a means to attract volunteers to maintain the four areas where the R2R has installed projects on public land.

Ocean friendly landscapers: to allow homeowners who do not do their own landscaping to participate, this tactic was developed. Pledged Landscapers are asked to commit to at least 10 of 14 ocean friendly practices, involve homeowners by leaving them a letter of what they have pledged to, and a promise to engage with WMK to help identify unforeseen challenges, or seek feedback on how WMK can improve its program. To give landscapers favorable exposure for their commitment, a suite of promotion items include: company name on the WMK Web site, a digital “Ocean Friendly Landscaper” badge for their Web site, WMK stickers for their work trucks and for their clients, and an invitation to participate in events.



Figure 15: Ace Hardware shelf featuring ocean preferred labeled products

Ocean Preferred Products: To eliminate the consumer’s mind-numbing task of choosing which fertilizer and pesticide products are less harmful to marine resources, the branded point-of-purchase program called, “Ocean Preferred” was developed. Through a partnership with Ace Lahaina, staff label approved fertilizer and pesticide products with Ocean Preferred stickers and place marketing collateral, such as large shelf talkers, an end cap display and a WMK video in aisles that sell such products.

### Community stories:

Based on recent examples of community volunteerism and contributions to Kumuwai goals, stories were captured and shared about local people. The stories have multiple behavior change components: they encourage others to take action by modeling the desired behavior (social norms), they communicate to the audience that WMK actions are supported and should be investigated, and they create meaningful dialogue by allowing audiences to explore their own role in watershed health. This requires contacting, interviewing, photography, writing and editing stories that were then shared through various media.

**Media coverage:** Stories covering West Maui Kumuwai run with regularity in the local paper. WMK has built strong partnerships with media outlets to promote programs and co-hosted events. Earned media additionally provides third-party validation of the campaign message, and helps direct residents to the WMK Web site.



**1 USE FERTILIZER WISELY**

- **Test your soil** to find out if you need fertilizer in the first place.
- **Choose organic or slow-release products**, the latter keeps nutrients in your yard by releasing them gradually over time.
- **Follow the fertilizer label** to make sure you are applying the appropriate amount; excess fertilizer can actually harm your plants.
- **Keep fertilizer off paved surfaces**, to prevent it from being washed into storm drains or waterways.

**5 PLANT POND**

- **Plant native or non-invasive species** that will thrive in your yard's natural conditions. Consider factors like water availability, sun exposure, and soil type.
- **Use mulch**, such as compost, which retains moisture around plants, adds nutrients, and prevents weed growth.

**2 HANDLE PESKY PESTS RIGHT**

- **Keep a close eye on your plants** to spot any problems early on.
- **Try non-toxic methods first**, like washing pests off with water or using a home-made insecticide, made with one teaspoon of liquid soap and one quart of water.
- **Choose chemical-free pesticides** with natural ingredients, such as neem or pyrethrum.
- **Spot treat affected plants** and avoid blanket applications.

**6 INSTALL A RAIN GARDEN**

- **Capture runoff and naturally filter out pollutants** before they reach the ocean with this sunken landscape of plants, soil, and mulch. Rain gardens can also help protect your property from flooding and erosion.

**3 PICK UP AFTER YOUR POOCH**

- **Pick up pet waste and put it in the garbage bin** before water washes it away. Pet waste contains bacteria, viruses, and parasites that are unhealthy for humans and marine life alike.

**7 CAR WASH LIKE A GREENIE**

- **Take your car to a car wash**, where filters and drains lead to the sewer system, or **wash it on your lawn**, where grass and gravel can help absorb water and filter out pollutants.
- **Avoid washing it on paved surfaces**, where dirty water will likely end up in a storm drain – and go straight into the ocean.

**4 WATER SMART OUTDOORS**

- **Use a drip irrigation system**, which delivers water directly to your plants and allows you to control how much water is distributed.
- **Make sure your sprinklers are only watering things that grow**
- **Water before 10am** to reduce water loss from evaporation.
- **Water less often**, but for longer periods to promote root growth.

**8 LEND A HAND**

- **Pitch in on community projects** with local organizations such as Division of Aquatic Resources Maui, Coral Reef Alliance, Hawaiian Islands Humpback Whale National Sanctuary, Maui Cultural Lands, Maui Nui Marine Resource Council, Save Honolua Coalition, Surfrider Foundation - Maui, West Maui Ridge to Reef Initiative, West Maui Mountain Watershed Partnership, and more. Go to our Web site to find more details.



Take the Pledge to reduce polluted runoff at  
**WESTMAUIKUMUWAI.ORG**

Figure 16: Behavioral "asks" targeted through the Kumuwai campaign





Figure 17: Print ad ran in local papers in 2014

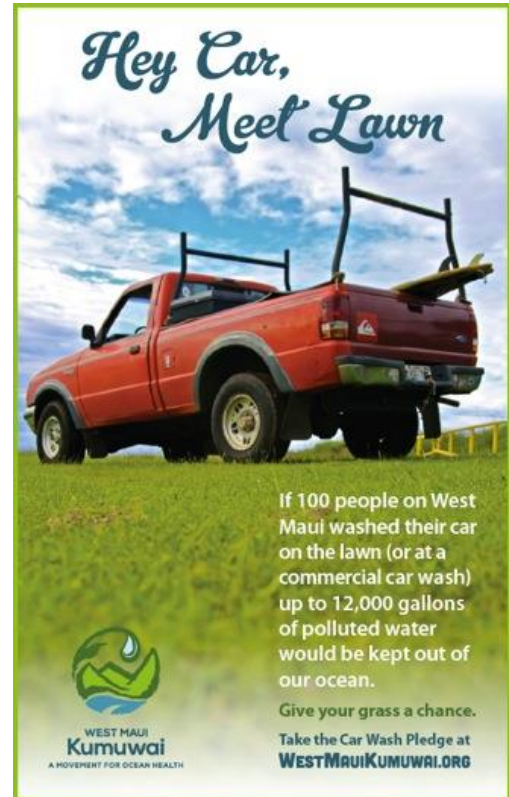


Figure 18: Example of a print ad ran in local papers

Figure 19: Bumper stickers are given to community members who take the pledge to a pollution reduction action



While the Kumuwai campaign has good traction and progress to date, sustained support is needed to move these tactics through the pilot phase and into their final form. It is likely take a couple more years for this campaign to be sustained by other partners in the community. As such, this effort should be considered off to a good start, not a completed endeavor.

## B. Community Events and Engagement

West Maui Ridge to Reef/West Maui Kumuwai participates in an average of 23 events/functions per year. This ranges from invitational speaking engagements for a target audience such as civic groups, university class or stakeholder groups, to engaging with the public through outreach stations at community events or meetings. Partner groups have been critical in multiplying the effectiveness of community events or meetings. Partner groups have been critical in multiplying the effectiveness of community engagement by highlighting cross-over in objectives and sharing resources.

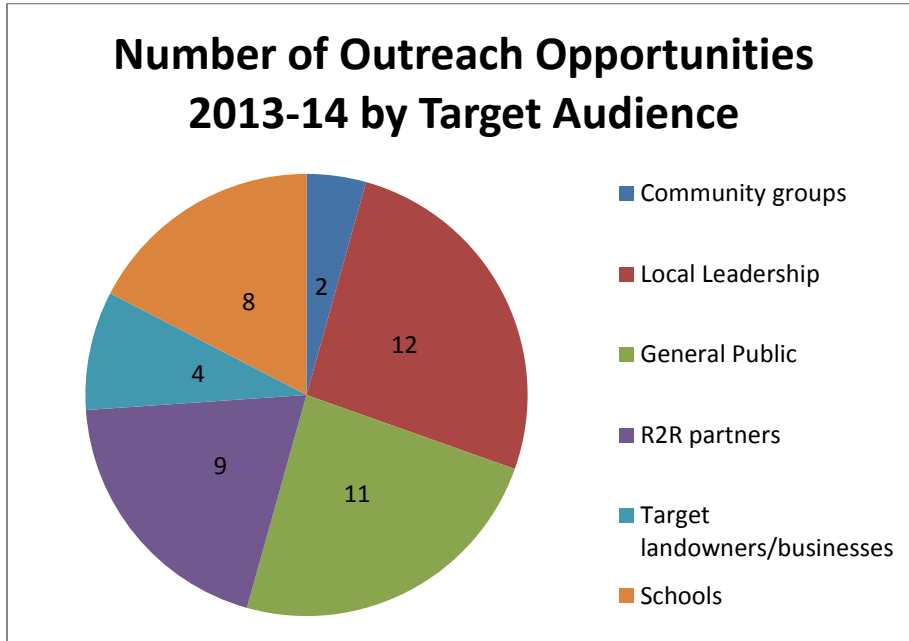
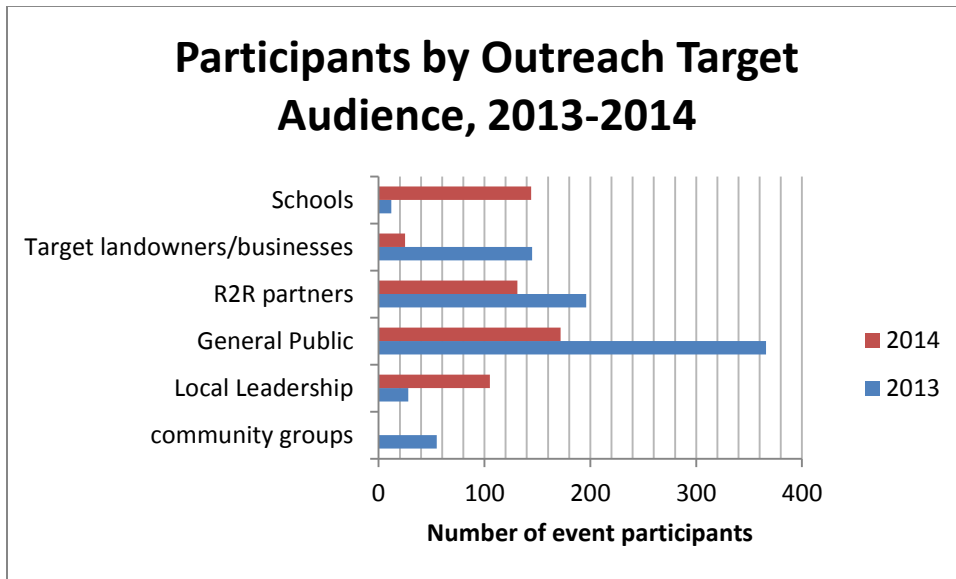


Figure 20: Outreach Activities by Target Audience

The number of outreach opportunities with an active R2R presence in 2013 was 24, and 22 for 2014. These mostly involve a presentation being given about the R2R and related projects. In some instances, in addition to a presentation, reef tours were given with R2R partners or an outreach booth activity was involved. The figure above demonstrates that the majority of events (~3/4) are directed to target audiences, while the balance were oriented towards the public.



Figure 21: Community Engaged/reached through general outreach



While the total numbers of outreach events are comparable in 2013 and 2014, the break-down of participants and event types vary for a number of reasons. Firstly, at the beginning of the Initiative, there was a lot of emphasis on generally getting the word out about the R2R. As the project needs developed, outreach became more targeted. This was greatly facilitated by projects led by our partner organization CORAL, whose focus through two separate grants allowed concentrated attention on local decision makers and teachers interested in bringing watershed education to their classrooms. The estimated volunteer hours for R2R projects for 2013-14 are 1300 hours.



Figure 22: Landscape managers meet to discuss the reef friendly landscaping project



In addition to the events, additional people were reached through the media. From 2013-14 there were ~25 articles in the two local papers (circulation ~18,000 and 12,500), one radio interview, one local and one statewide television show, and a local TV PSA. In addition, social media is widely employed through WMK and partner groups.

Figure 23 (left): 50 volunteers plant ~1000 native plants to stabilize the slope in Wahikuli



Through the CORAL led, NOAA funded Decision Makers grant in 2014, experiential learning opportunities were made possible such as with the mayor of Maui County as pictured. One on one time to share ideas and discuss issues with local leaders was invaluable for furthering goals and raising awareness.

**Figure 24: Mayor Alan Arakawa (in blue) and staff pose with community volunteers and partner organizations during a reef tour and education session**



**Figure 25: Community members and regular volunteers don party hats at annual KHfMA Birthday Bash/R2R Celebration**

This annual event pictured above generally draws over 100 people and is unique in that it brings the Mauka and Makai organizations together under one tent and one goal, while also raising awareness for the Herbivore Fisheries Management Area.

## Chapter 6: Organizational Updates

Membership in the organizational bodies that make up the R2R and USCRTF teams have remained largely steady. Updated participation lists are included below.

### A. Funding and Agency Support Team (FAST)

The Funding and Agency Support Team meets monthly, and provides direction, oversight and funding for meeting the goals of the Initiative. Athline Clark of USACE will be leaving the agency at the end of March 2015.

Table 8: Members and affiliations in the FAST

Contact	Affiliation	Contact	Affiliation
Lenore Ohye	DLNR/CWRM	Kristin Gilroy	IWR/USACE
Hal Cardwell	IWR/USACE	Michelle Haynes	IWR/USACE
Adam Reed	NRCS	Jennie Dean	NFWF
Emma Anders	DLNR/DAR	Michelle Pico	NFWF
Leah Laramie	DLNR/DOFAW	Paulo Marin	NOAA
Greg Takeshima	DOH	Anne Rosinski	NOAA/DAR
Hudson Slay	EPA	Athline Clark	USACE
Jennifer Higashino	FWS	Curt Storlazzi	USGS
Cami Kloster	Group 70	Steve Anthony	USGS
Derek Gardels	IWR/USACE	Tova Callender	WM Coordinator

### B. R2R Working Group

The working group meets every second month to review progress and provide guidance on how to ground the planning and implementation process in the local context. In addition, members work with the watershed coordinator outside of meetings to further projects and advise on an issue-specific basis.

Table 9: R2R Working Group Members and Affiliations

Working Group Participant	Affiliation
Russell Sparks (chair)	DLNR-Department of Aquatic Resources
Chris Brosius	West Maui Mountain Watershed Partnership, Coordinator
Ekolu Lindsey	Maui Cultural Lands, President
Wayne Hedani	Kaanapali Operators Association, Director
John Smith	County of Maui, Engineering Division, Department of Public Works
Liz Foote	Project SEA Link
Wesley Nohara	West Maui Soil & Water Conservation District (WMSWCD)
Pomaika`i Kaniaupio-Crozier	Maui Land & Pineapple Co. Inc.
Rob Parsons	Maui County, Environmental Coordinator to the Mayor

Felimon Sadang	Aha Moku Council, Kaanapali Moku
Tova Callender (facilitator)	West Maui Watershed & Coastal Management Coordinator

### C. R2R Hui

The Hui is a loose collection of organizations and individuals whose efforts and outputs support the goals of the R2R.

**Table 10: R2R Hui Organizations and Role in Supporting R2R Goals**

Affiliation	Level of Engagement
Harold K.L. Castle Foundation	Funding coordination and partner projects
The Nature Conservancy	Water quality monitoring hui, CAP, partner in meetings
Maui Nui Marine Resource Council	Coral reef recovery plan for Kahekili, WMK, events, water quality planning
Surfrider Foundation, Maui Chapter	Pohaku Beach rain gardens, cleanups
CORAL Reef Alliance	Rain garden at Westin, guidance manuals
Save Honolulu Bay Coalition	WMK, water quality watchdog, cleanups
Malama Maui Nui	Plantings and maintenance support, clean ups, WMK
Maui Hotel and Lodging Assoc.	Provided venue for outreach to engineers
Sustainable Living Institute of Maui (SLIM)	Classes developed to align with goals
Napili Beach and Bay Foundation	Coordination on outreach, implementation projects, partner on trainings
University of Hawaii, Maui College and Manoa	Outreach platform, water quality monitoring support, research
Kaanapali Makai Watch	Source of volunteers, outreach and event partners
CAP team	Conservation plan for the coastal areas of Wahikuli- Honokōwai
Hui o Wai Ola	Establishing community based water quality monitoring program

### D. United States Coral Reef Task Force (USCRTF) Watershed Working Group

The working group consists of staff from member agencies and jurisdictions, NFWF, and the watershed coordinators from the three priority watershed areas. They meet monthly to implement Resolution 28:1, support priority watersheds, federal partnerships, and develop metrics to measure success of LBSP reduction projects in the priority watersheds. In addition, topic specific sub-committees meet monthly.

**Table 11: USCRTF Working Group Representatives and Affiliations**

Partner	Name
<b>Federal Agency Members</b>	
EPA HQ	Ken Potts

EPA Region 9	John Mccarroll
EPA Region 9	Wendy Wiltse
EPA Region 9	Hudson Slay
EPA ORD	Patricia Bradley
EPA Region 2	Charles "Buddy" Lobue
USACE	Athline Clark
ASA-CW	Gib Owen
USACE	Cindy Barger
USDA NRCS	Craig Goodwin
USDA NRCS Pacific Islands Area	Jeffrey Wheaton
USDA Forest Service	
DOI	Liza Johnson
DOI	Karen Koltes
DOI	Cheryl Fossani
DOI USFWS-Southeast	Silmarie Padron
DOI USFWS-Honolulu	Dan Polhemus
DOI USFWS-Honolulu	Tony Montgomery
DOI-USGS-Santa Cruz/Pacific Isl	Curt Storlazzi
DOI-USGS-S Atlantic/Caribbean	Ilsa Kuffner
NASA	Sherry Palacios
NASA	Juan Torres
NASA	Liane Guild
NOAA CRCP	Rob Ferguson
NOAA CRCP	Shannon Simpson
NOAA CRCP	Susie Holst
NOAA NCCOS	Dave Whitall
NOAA CRCP	Antares Ramos
NOAA CRCP	Eileen Alicea
NOAA CRCP – Honolulu	Paulo Maurin
NOAA CRCP	Dana Okano
NOAA CRCP/STAR	Alan Strong
Jurisdiction Partners	
AIC Secretariat	Carey Morishige
American Samoa	Ruth Matagi-Tofiga
American Samoa	Kristine Bucchianeri
American Samoa	Alex Messina



American Samoa	Christianera Tuitele
CNMI	Fran Castro
Florida	Katharine Tzadik
Guam	Lorilee Crisostomo
Guam	Jason Biggs
Hawaii	Emma Anders
Puerto Rico	Damaris Delgado
US Virgin Island	Leslie Henderson
West Maui Watershed Coordinator	Tova Callender
Guánica Watershed Coordinator	Roberto Viqueira
Faga'alu Watershed Coordinator	Meagan Curtis
Non-member NGO Partners	
NFWF	Michelle Pico
NFWF	Jennie Dean
Ridge to Reefs	Paul Sturm

## Appendix

### USCRTF Watershed Partnership Programmatic checklist

#### INTRODUCTION

In 2012, the U.S. Coral Reef Task Force (USCRTF) developed a Watershed Partnership Initiative (Resolution 28.1) to focus the capabilities and capacities of the USCRTF agencies and the U.S. coral reef jurisdictions to reduce Land-based Sources of Pollution (LBSP) from entering into coastal coral reef areas. The intent of this initiative is to facilitate and enhance coordination, partnerships, and contributions of agency resources and expertise to implement geographically specific and integrated activities to reduce pollutant loads to coral reef ecosystems, while also promoting consistent and strengthened application and enforcement of laws and authorities intended to address LBSP. This Checklist is for watershed coordinators and is intended to help them assess the status of the institutional and stakeholder support for the watershed partnership sites, and determine whether agency resources and support are adequate for the successful implementation of a ridge to reef watershed management plan. This tool was developed to be broadly applicable and can be used for priority sites identified by the USCRTF as well as any other watershed in the U.S. coral reef jurisdictions.

#### INSTRUCTIONS

Watershed coordinators: On an annual basis, complete each of the questions below. By annually completing this checklist coordinators can monitor progress, and will be able to better identify the needs and areas of focus for continued implementation of their watershed's plan.

#### CHECKLIST EVALUATION QUESTIONS

<b>1) Does the watershed have the commitment of at least two partner Federal agencies (at HQ and local levels) and a lead local jurisdiction agency? Who?</b>	<b>YES</b>	<b>NO</b>
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Please specify

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<b>2) Does the watershed have a full time coordinator?</b>	<b>YES</b>	<b>NO</b>
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If yes, provide name and how long current funds will cover their salary

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**3) Does the watershed have a finalized watershed management plan (WMP)? Does the WMP fully address EPA's Nine Minimum Elements of a Watershed Management Plan\* for Restoring Impaired Waters using Section 319 funds?**

**YES NO**

**\*<http://www.epa.gov/region9/water/nonpoint/9elements-WtrshdPlan-EpaHndbk.pdf>**

If yes, please provide copy of plan and describe whether it addresses the EPA elements.

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**4) Do/Did stakeholders have the opportunity to provide input to development of the WMP? If so, what are the mechanisms for collecting this input? Was a structured decision-making process used, were public meetings held, and were prioritized objectives developed?**

**YES NO**

Please specify

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**5) Has the WMP undergone a process to be institutionalized as an official policy to be implemented by the jurisdictional government and all other appropriate stakeholders?**

**YES NO**

What Tier does it achieve (\*see language on Institutionalizing WMPs on page 6)?

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**6) Does the watershed have an implementation agreement in place based on the WMP and adequate resources to accomplish the plan's goals and objectives? Are roles and responsibilities specified in the agreement?**

**YES NO**

If yes, please provide copy of agreement

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**7a) Do there appear to be problems with runoff from construction sites within the watershed?** YES NO

Please rate using guidelines below:

- High – No perceived run off issues from construction sites
- Medium – Sporadic perceived run off issues from construction sites
- Low – Wide-spread perceived run off issues from construction sites.

**7b) Is the appropriate NPDES general permit for erosion and sediment control at construction sites active in the watershed? Are appropriate local permits in place and do they cover sites of less than 1 acre?** YES NO

If yes, please rate the effectiveness of this program using rating guidelines below – work with local officials as applicable.

- High – No perceived run off issues from construction sites
- Medium – Sporadic perceived run off issues from construction sites
- Low – Wide-spread perceived run off issues from construction sites.

In addition, provide any additional information on the permit(s) and provide information about their adequacy and/or effectiveness in this watershed.

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**8) Are enforcement actions taken at sites with known issues?** YES NO

Please describe the level of compliance for permitted sites in the watershed.

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**9) If applicable, is the appropriate NPDES MS-4 stormwater program active in the watershed?** YES NO

If yes, please provide the status of the MS-4 program in the municipality(ies), and rate low to high the effectiveness of this program – work with local officials as applicable. Explain your rating.

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**10) Is there centralized wastewater collection and treatment in the watershed? YES NO**

If so, what level of treatment is achieved? (check one)

\_\_\_\_\_ **Primary treatment** consists primarily of physical processes (settling or skimming) that remove a significant percentage of the organic and inorganic solids from wastewater.

\_\_\_\_\_ **Secondary treatment** depends on biological action to remove fine suspended solids, dispersed solids, and dissolved organics by volatilization, biodegradation, and incorporation into sludge. In addition, secondary treatment satisfies much of the oxygen demand of the pollutant(s).

\_\_\_\_\_ **Tertiary (advanced) treatment** uses a variety of biological, physical, and chemical treatment approaches to reduce nutrients, organics, and pathogens.

What percentage of properties are connected to the centralized wastewater collection and treatment system? What percentage of properties have onsite wastewater systems? Work with local officials as applicable.

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**11) Are agricultural BMPs for erosion control, pathogens and pharmaceuticals, and pest and nutrient management being implemented in the watershed? YES NO**

If so, what percentage of agricultural operations implement BMPs and how successful (low to high) are they at reducing LBSP? Work with an NRCS representative and your local soil and water conservation districts.

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**12) How many of the recommended implementation actions from the WMP have been funded? How many are completed?**

Please provide a list of recommendations funded and completed.

**13) How many partners are contributing funds? In-kind services? Leveraging funds?**

Please provide a list of partners and their contributions. (spreadsheet)

**14) Is an ecological monitoring program underway to collect baseline and long term data, including key water quality, fish and coral metrics? YES NO**



If so, please provide information about the monitoring program including key metrics/indicators for the watershed.

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15) Is there an adaptive management or watershed plan evaluation process to learn and modify implementation approach? YES NO

If yes, please explain.

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## SUPPORTING INFORMATION

### \* Institutionalizing Watershed Management Plans (see question 5)

How to measure success: we suggest several different levels, similar to the LEED certification process. The lead jurisdiction agency would manage this process (not the federal agencies).

Platinum: Jurisdiction has passed the watershed management plan through a state/territory legislative process and it has been ratified as official jurisdiction policy. Local governments (counties, municipalities, cities) have also passed the watershed management plan through a legislative process have ratified as official government policy.

Gold: Either the state/territory or the local governments have passed the watershed management plan through a legislative process. The other government level has endorsed the watershed management plan, with signatures from all the relevant government agency heads.

Silver: Both the jurisdiction and local governments have endorsed the watershed management plan, with signatures from all the relevant government agency heads. The watershed management plan has not been made official government policy.

Bronze: Either the state/territory or the local governments have endorsed the watershed management plan, with signatures from all the relevant government agency heads. The other government level has not endorsed the watershed management plan.

Tin: The watershed has a formal watershed management plan. However, the watershed management plan has not been endorsed or ratified through a legislative process.

Failure: A watershed management plan has not been developed for the watershed.