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STORM WATER PROGRAM EFFECTIVENESS ASSESSMENT PLAN

Storm Water Management Plan for Department of the Navy

Navy Region Hawaii, Oahu, Hawaii

NPDES Permit No. HI S000257

Prepared by:

Navy Region Hawaii

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Table of Contents

1 Introduction 1
1.1 Strategy 1
1.2 Assessment Measures 3
1.3 Measurable Goals 5
1.4 Program Assessment and Reporting 5
1.5 Document Organization 5
2 Public Education and Outreach 6
3 Illicit Discharge Detection and Elimination 7
4 Construction Site Runoff Control 9
5 Post-Construction Management in New Development and Redevelopment 11
6 Pollution Prevention and Good Housekeeping 13
7 Industrial and Commercial Discharge Management 16
8 Monitoring 18

Figures

Figure 1: Outcome Levels 2

Tables

Table 1: Assessment Methods for Different Outcome Levels 4

List of Acronyms and Abbreviations

BMP	Best Management Practice
CASQA	California Storm Water Quality Association
DOE	Department of Education
DOH	State of Hawaii Department of Health
GIS	Geographic Information System
MEP	Maximum Extent Practicable
MS4	Municipal Separate Storm Sewer System
NAVFAC	Naval Facilities Engineering Command
NEX	Navy Exchange
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NRH	Navy Region Hawaii
O&M	Operation and Maintenance
SWMP	Storm Water Management Plan
SWPCP	Storm Water Pollution Control Plan
TMDL	Total Maximum Daily Load
WLA	Waste Load Allocation

1 Introduction

As of the effective date, March 23, 2015, the Department of the Navy, Navy Region Hawaii is required to comply with the conditions of the National Pollutant Discharge Elimination System (NPDES) Small Municipal Separate Storm Sewer System (MS4) and Navy Industrial Facilities Permit No. HI S000257 (referred to hereinafter as the "Permit"). The Permit includes authorized storm water and specified non-storm water discharges into waters in and around Oahu, Hawaii (Pearl Harbor, Halawa Stream, Kaiapo Canal, Kaukonahua Stream, Kumumauu Canal, Mailiili Stream, Mamala Bay, Manuwai Canal, Poamoho Stream, Transportation Canal, Ulehawa Stream, Unnamed Tributary of Waikele Stream, and Unnamed Gulches in Wahiawa, Waikakalaua, and Waiawa Streams). Per the Permit, Part G.2.b.vi, Navy Region Hawaii is required to provide a Program Effectiveness Assessment Plan. The Permit states:

> *Reporting Requirements, Part G.2.b.vi:*
>
> *"Program Effectiveness Reporting - Within one (1) year of the effective date of the permit, the Permittee shall submit to DOH a written strategy for determining the effectiveness of its SWMP. The strategy shall include water quality monitoring efforts as well as program implementation information and other indicators. The Permittee shall include an assessment of program effectiveness and identification of water quality improvements or degradation beginning with the 2nd Annual Report."*

For the purpose of this Program Effectiveness Plan, the term "Base" is inclusive of all areas covered by the Permit. This includes Joint Base Pearl Harbor Hickam (JBPHH) and other specified Navy industrial areas and facilities. This plan presents the strategy for:

(1) measuring progress of permit compliance and implementation of Best Management Practices (BMPs);
(2) tracking program component effectiveness over the permit period; and
(3) setting the frame work to be able to link program implementation with environmental improvements over time.

1.1 Strategy

This plan has been developed to incorporate elements of the California Storm Water Quality Association (CASQA) approach to program effectiveness as detailed in their 2007 manual. The approach is based on expected outcomes that result from implementing the various components of the storm water management program. The outcomes are characterized into six Outcome Levels as shown on Figure 1, which has been adapted from CASQA. The pyramid structure illustrates the progression from implementing activities to protecting water quality. The Outcome Levels help categorize and define the desired results or goals of programs and control measures.

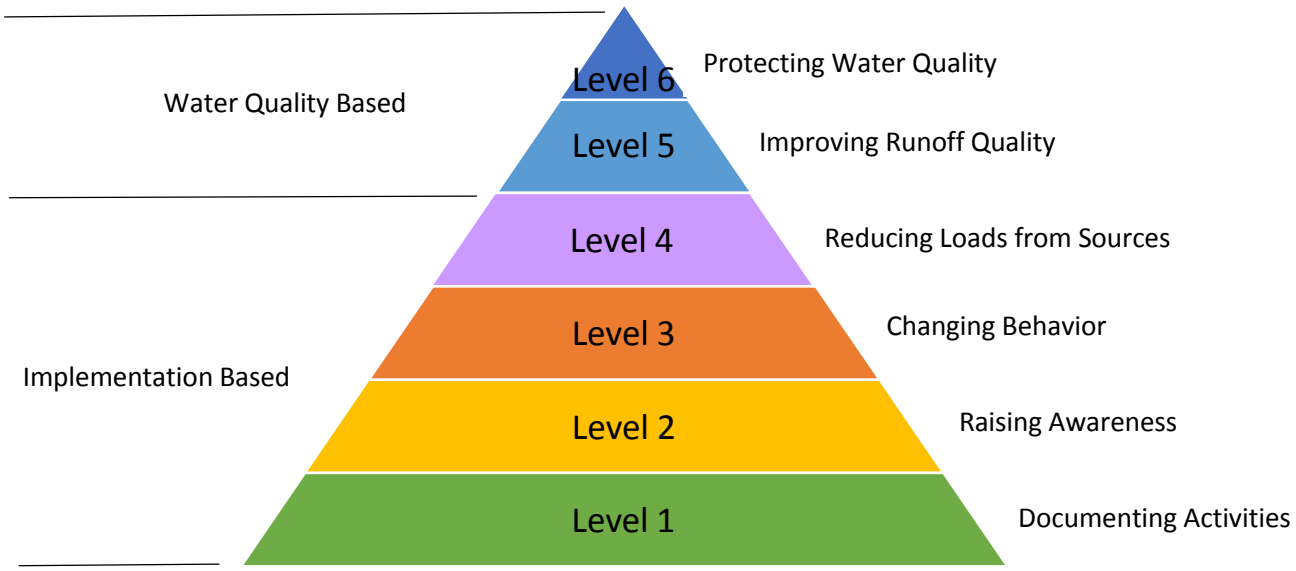

Figure 1: Outcome Levels

The Outcome Levels are defined as follows:

Level 1 – Documenting Activities

Many program activities are directly established as permit requirements and can be tracked by simply documenting activities. Level 1 outcomes may take the form of a confirmation of task completion (yes/no answers) or direct tabulation of efforts (such as the number of inspections completed or plans reviewed). Level 1 outcomes can also include documenting progress towards measurable goals by confirming whether they have been met or not. Level 1 outcomes reflect program implementation and permit compliance and are assumed to be beneficial to water quality but are not indicators of the direct impact of program implementation on environmental conditions.

Level 2 – Raising Awareness

Level 2 outcomes reflect how well the program is able to increase the level of knowledge and awareness and change attitudes of target audiences including tenant commands, civilian workers, residents, commercial and industrial businesses, contractors, and designers. Measuring these outcomes is done through various methods including surveys and training quizzes, and may be inferred through observations of community involvement such as the number of visits to the Navy Region Hawaii environmental website, and other partner websites. Similar to Level 1 outcomes, Level 2 outcomes are assumed to be beneficial to water quality but are not indicators of the direct impact of program implementation on environmental conditions.

Level 3 – Changing Behavior

The goal of raising knowledge and awareness (in Level 2 outcomes) is to effect behavior change that results in the implementation of recommended BMPs. Level 3 outcomes indicate how effective program components are in motivating behavior change and BMP implementation among target audiences. These changes can be tracked using surveys; site visits and inspections

to observe BMP implementation at sites such as construction sites or industrial facilities; and tabulating changes in program involvement.

Level 4 – Reducing Pollutant Loads from Sources

Many BMPs are intended to reduce the amount of pollutants that have the potential to discharge into the MS4. Level 4 outcomes provide program managers with feedback/ data regarding reductions in pollutant loads as a result of the implementation or enhancement of a BMP. These outcomes can include information such as the amount of debris collected during street sweeping, the amount of trash collected during volunteer cleanups, and by examining photos of the debris present in drainage ways and detention basins. The data are compared to baseline estimates to provide feedback on the effectiveness of BMPs and control strategies.

Level 5 – Improving Runoff Quality

The primary goal of the Storm Water Management Plan (SWMP) is to reduce pollutants to the MS4 to the maximum extent practicable (MEP) and to ensure that discharges do not cause or contribute to exceedances of water quality standards in receiving waters. Level 5 outcomes may be the most direct measure of program effectiveness as it relates to improving the quality of storm water runoff. Level 5 outcomes may be measured as reductions in one or more specific pollutants and may reflect effectiveness of BMP implementation at the above outcome levels.

Level 6 – Protecting Receiving Water Quality

The ultimate objective of any NPDES SWMP is to protect receiving water quality. These outcomes are the most challenging to document and are many times affected by more than the quality of storm water discharges, including sanitary sewer overflows, rising groundwater, agricultural runoff, and other non-point source pollutants. Additionally, receiving water quality is dependent upon partnerships with other agencies, land owners and stakeholders, and the general public. Assessment methods include compliance with water quality standards, Total Maximum Daily Load (TMDL) programs, biological assessments, and other monitoring assessments. It may take years to establish a reliable data set and even longer periods of time to allow the cumulative impacts of multiple program elements to take effect.

1.2 Assessment Measures

In each outcome level, several methods are available to determine if outcomes are being achieved. These methods include:

- confirming that permit requirements have been met;
- tabulating specific activities and load reduction;
- surveying employees and residents;
- inspecting construction sites and post-construction BMPs; and
- monitoring runoff and receiving waters.

A summary of the assessment methods and their application to each outcome level are listed in Table 1, below.

Table 1: Assessment Methods for Different Outcome Levels

	Outcome Level					
Assessment Method	**Level 1 Documenting Activities**	**Level 2 Raising Awareness**	**Level 3 Changing Behavior**	**Level 4 Reducing Loads from Sources**	**Level 5 Improving Runoff Quality**	**Level 6 Protecting Receiving Water Quality**
Confirmation	X					
Tabulation	X	X	X	X		
Survey		X	X			
Inspection	X	X	X	X		
Monitoring				X	X	X

Notes: Table has been adapted from CASQA Municipal Stormwater Program Effectiveness Assessment Guidance, 2007.

The various data collected will be tracked and compared from year to year in order to meet goals or as a way to view trends and help guide the program for subsequent years. The data will be tracked using program databases and the Navy's Geographic Information System (GIS), which contains an inventory of MS4 features and other related data. Updating the GIS and data tracking will be an ongoing process that is integral to allow for effective monitoring and preventative storm water quality measures.

1.3 Measurable Goals

As required by the Permit, Navy Region Hawaii has developed specific measurable goals or milestones related to each program component. The measurable goals are based on past experiences, previous trends or results of previous surveys, or based on compliance with the Permit. Measurable goals have been incorporated into this approach as data assessment measures and are used to assist tracking program effectiveness.

1.4 Program Assessment and Reporting

Overall Program Assessment will be incorporated into the Annual Report required by the Permit. Most program assessment will be conducted at the implementation level (Outcome Levels 1 to 4). Water quality assessments (Outcome Levels 5 and 6) are conducted as part of Navy Region Hawaii's ongoing Annual Monitoring program.

1.5 Document Organization

The following chapters describe the outcomes that Navy Region Hawaii aims to achieve during this Permit term and the data collected that will be used to assess each of the following programs:

- Public Education and Outreach;
- Illicit Discharge Detection and Elimination;
- Construction Site Runoff Control;
- Post Construction Storm Water Management in New Development and Redevelopment;
- Pollution Prevention and Good Housekeeping; and
- Industrial and Commercial Discharge Management.

Each section will present outcome objectives and assessments measures as follows:

- Outcome Objectives: lists the desired outcomes that each program will strive to achieve during the permit term. The outcomes are categorized by the Outcome Levels.
- Assessment Measures: lists the data that will be used to assess each desired outcome. The measures are categorized by assessment method (i.e., confirmation, tabulation, etc.) and may directly or indirectly measure progress towards the desired outcome.

2 Public Education and Outreach

Assessing the Public Education and Outreach is an iterative process that relies on a variety of methods. The target audiences include tenant commands; civilian personnel; residents; industrial and commercial businesses; construction operators; and schools, including staff, students, and contractors. The desired outcomes are to raise awareness and effect behavior change through a variety of methods including distributing educational materials, conducting media campaigns, holding workshops, forming partnerships with other agencies and groups, and participating in special events. This program will be assessed to Outcome Levels 1 through 3.

Outcome Level	Outcome Objectives and Data Assessment
1 2	*Objective:* Increase public support, interest, knowledge, and awareness of Storm Water Management Program. *Assessment Measures:* <u>Confirmation:</u> o Distribute brochures/pamphlets to new arrivals (e.g., residents and commercial/industrial workers) in orientation materials. o Provide storm water pollution prevention information to Base staff, contractors, and industrial and commercial businesses during environmental training classes. o Implement outreach through community newsletters and the Base website. o Stencil storm drains, with priority given to industrial and commercial areas, and areas with pedestrian traffic. <u>Tabulation:</u> o Number of brochures/pamphlets distributed to new arrivals. o Number of training classes and number attendees. o Number of volunteer hours. o Number of storm drains stenciled. o Annual survey. o Number of public informational/training meetings.
1 2 3	*Objective*: Increase public participation in special events. *Assessment Measure:* <u>Tabulation:</u> o Number of events. o Number of volunteers. o Number of volunteer hours. o Number of participants in special events each year.

3 Illicit Discharge Detection and Elimination

The goal of Navy Region Hawaii's Illicit Discharge Detection and Elimination Program is to eliminate improper discharge activities. This will be accomplished through maintenance of up-to-date records and maps of the storm drain system; training and implementation of Navy instructions prohibiting illicit storm water discharges; advertising and providing locations for turn-in of household waste materials; continuing the review and approval process for new storm drain connections; responding to complaints; inspection of facilities and the storm drain system; and maintaining spill prevention and response programs for wastewater and subsurface oil. This program will be assessed primarily at Outcome Levels 1 through 3.

Outcome Level	Outcome Objectives and Data Assessment
1 2 3	*Objective:* Encourage and facilitate public involvement in identifying and reporting illicit discharge. *Assessment Measures:* <u>Confirmation:</u> o Maintain base hotline and respond to complaints. <u>Tabulation:</u> o Number of complaints.
1 2 3	*Objective:* Decrease the number of improper discharge activities. *Assessment Measure:* <u>Confirmation:</u> o Maintain base hotline and respond to complaints. o Advertise and provide locations for turn-in of household waste materials. o Inspection of facilities and the storm drain system. <u>Tabulation:</u> o Number of complaints. o Number of illicit discharge investigations. o Number of follow-up visits. o Number of corrective actions completed including distribution of educational materials. o Number of spills. <u>Inspection:</u> o Photo documentation of identified problem areas.

1 2	*Objective:* Continue to maintain an educated Base staff regarding illicit discharge detection and elimination. *Assessment Measure:* <u>Confirmation:</u> o Provide training to Base staff including industrial and commercial workers on Environmental Standard Operating Procedures and Spill Prevention and Response. <u>Inspection:</u> o Results of in-house audits. o Results of annual Storm Water Pollution Control Plan (SWPCP) inspections.
1	*Objective:* Continue review of new storm drain connections by Naval Facilities Engineering Command (NAVFAC) Hawaii and approval by Navy Region Hawaii. *Assessment Measure:* <u>Confirmation:</u> o Maintain up-to-date map of storm water system components in GIS. <u>Tabulation:</u> o Number of new drain connection agreements approved each year, as required.

4 Construction Site Runoff Control

The Construction Site Runoff Control Program focuses on storm water discharges from construction projects that drain to drainage facilities and natural drainage ways that Navy Region Hawaii has ownership and responsibility for. Construction projects on Base include smaller projects completed by Facilities Maintenance, larger projects completed by NAVFAC, and other projects by the Department of Education (DOE), Navy Exchange (NEX), Army and Air Force Exchange Service, and Housing Public Private Venture contractors.

Navy Region Hawaii tracks the implementation of BMPs to minimize polluted runoff through design drawing review and completing inspections of active construction sites. The Construction Site Runoff Control Program will be assessed at Outcome Levels 1 through 3.

Outcome Level	Outcome Objectives and Data Assessment
1	*Objective:* Continue to maintain an effective plan review program to ensure proper permits are obtained and followed. *Assessment Measures:* <u>Confirmation:</u> o BMP Checklist for Construction Site Plan Approval is completed. o Construction sites of one or more acres will submit a notice of intent (NOI) for coverage under DOH's general permit for construction activities or an individual NPDES permit application. o Plan review will ensure new developments meet Federal and State regulations, NPDES permit conditions, and building and landscape design criteria.
1	*Objective:* Continue to maintain an effective construction site inspection program. *Assessment Measure:* <u>Confirmation:</u> o Construction sites inspected in accordance with established frequencies. o Scheduled follow-up inspections are conducted. o Construction Site BMP Checklists are completed for all inspections. o Appropriate enforcement actions are taken when warranted.

1 2	*Objective:* Continue to maintain an educated and trained staff. *Assessment Measure:* <u>Confirmation:</u> o Provide training for employees responsible for plan review. o Provide training for employees responsible for construction site inspections.
1 2 3	*Objective:* Increase contractor effectiveness. *Assessment Measure:* <u>Tabulation:</u> o Number of written notices issued. o Number of stop work orders issued. o Number of contract enforcement provisions applied. o Number of DOH referrals. o Number of repeat violations. o Response time for corrective actions.
1	*Objective:* Continue to maintain inventory of construction sites. *Assessment Measure:* <u>Confirmation:</u> o All approved projects added to database. o Inspection data recorded.
1	*Objective:* Continue review and approval of new storm drain connections by Navy Region Hawaii. *Assessment Measure:* <u>Confirmation:</u> o Maintain up-to-date map of storm water system components in GIS. <u>Tabulation:</u> o Number of new drain connection agreements approved each year, as required

5 Post-Construction Management in New Development and Redevelopment

Post-construction storm water discharges can impact receiving waters by increasing the type and quantity of pollutants in storm water, and by increasing the overall quantity of storm water delivered to the receiving water body during storms. The objective of post-construction runoff controls is to improve storm water quality by installing and maintaining post-construction BMPs, both structural and non-structural, in applicable development and redevelopment projects that have the potential to discharge pollutants into the MS4.

The Post-Construction Management Program includes inspection and operation and maintenance of post-construction BMPs, which also includes routine training and outreach for staff. The Post-Construction Management Program will be assessed at Outcome Levels 1 through 3.

Outcome Level	Outcome Objectives and Data Assessment
1	*Objective:* Continue to maintain an effective plan review program to ensure post-construction runoff controls are incorporated into new development and redevelopment projects. *Assessment Measures:* <u>Confirmation:</u> o BMP Checklist for Construction Site Plan Approval is completed. o Plan review will ensure new developments meet Federal and State regulations and NPDES permit conditions.
1 2	*Objective:* Continue to maintain an effective post-construction BMP inspection and maintenance program. *Assessment Measure:* <u>Confirmation:</u> o Post-construction BMPs inspected for operation and maintenance (O&M) in accordance with established frequencies. o Scheduled follow-up O&M inspections are conducted. o Permanent BMP Inspection Reports are completed for all inspections. o O&M completed in accordance with established frequencies. o Asset management system is kept up to date to track the frequency of inspections and maintenance of post-construction BMPs. <u>Tabulation:</u> o Number of post-construction BMP O&M inspections. o Number of follow-up O&M inspections.

1 2	*Objective:* Continue to maintain an educated and trained staff. *Assessment Measure:* <u>Confirmation:</u> o Provide training for employees responsible for plan review. o Provide training for employees responsible for post-construction BMP O&M inspections.
1 2 3	*Objective:* Increase awareness of post-construction facility responsibilities. *Assessment Measure:* <u>Confirmation:</u> o Education/outreach to facilities with post-construction BMPs. <u>Tabulation/Inspection:</u> o Number of O&M inspections with missing or incomplete inspection and maintenance logs. o Number of inspections with corrective actions required. o Number of O&M inspections requiring follow-up inspections.

6 Pollution Prevention and Good Housekeeping

The objective of the Pollution Prevention/Good Housekeeping Program is to reduce the amount of pollutants entering receiving bodies of water through both education and proper procedures. It requires examination and subsequent alternation of actions to help ensure a reduction in the type of pollution that:

(1) collects on streets, parking lots, open spaces, and storage and vehicle maintenance areas and is discharged into local waterways; and
(2) results from actions such as environmentally damaging land development and flood management practices or poor maintenance of storm drain systems.

The program is assessed at Outcome Levels 1 through 4.

Outcome Level	Outcome Objectives and Data Assessment
1 2	*Objective:* Continue to maintain an educated and trained staff. *Assessment Measures:* <u>Confirmation:</u> o Inspect industrial facilities included in the Permit annually. o Inspect commercial facilities according to the priority schedule developed. o Train maintenance personnel annually and have new maintenance employees trained as part of the orientation program.
1 4	*Objective:* Decrease potential for storm water impact from street debris. *Assessment Measures:* <u>Confirmation:</u> o Complete street sweeping. o Conduct cleaning and debris removal from drainage structures. o Stencil storm drains, with priority given to industrial and commercial areas, and areas with pedestrian traffic. <u>Tabulation:</u> o Number of storm drains stenciled o Number of curb miles swept. o Volume of trash collected.
1 2 4	*Objective:* Decrease potential for storm water impact from chemical applications. *Assessment Measures:* <u>Confirmation:</u> o Develop an Authorized Use List of chemicals used.

	o Monitor fertilizer and pesticide application in application logs and reduce usage where feasible. o Periodically collect and dispose of unused pesticides, herbicides, and fertilizers according to manufacturers' instruction. o Conduct annual training for personnel on proper maintenance activities. o Conduct annual training for personnel and contractors applying pesticides, herbicides or fertilizers. <u>Tabulation:</u> o Volume of excess/unused chemicals collected for disposal. o Number of facilities inspected annually. o Number of training sessions, and/or number of attendees to training sessions.
1 3 4	*Objective:* Improve implementation of temporary or permanent BMPs to reduce pollutants to the MS4 *Assessment Measure:* <u>Confirmation:</u> Develop, implement, and maintain up-to-date site-specific BMPs and SWPCPs developed and implemented, as needed. <u>Inspections:</u> o Number of facilities inspected annually.
1 4	*Objective:* Improve condition and utility of storm water system through inspection and maintenance program. *Assessment Measure:* <u>Confirmation:</u> o Conduct cleaning and debris removal from storm drainage structures, at least once during the term of the permit. <u>Tabulation:</u> o Number of inlets/catch basins cleaned or maintained. o Number of inlets/catch basins inspected. o Number of inspections resulting in recommendations of additional maintenance. o Volume of debris removed.
1	*Objective:* Continue to maintain an updated inventory of the MS4. *Assessment Measure:* <u>Confirmation:</u> o Maintain an up-to-date map of storm water system components in GIS.

1 4	*Objective:* Reduce discharge of pollutants to the MS4 by Retrofitting Structural BMPs. *Assessment Measure:* <u>Confirmation:</u> o Develop and implement an Action Plan for Retrofitting Structural BMPs. <u>Tabulation:</u> o See Action Plan for Retrofitting Structural BMPs.
1 2 4	*Objective:* Reduce discharge of trash into and out of the MS4. *Assessment Measure:* <u>Confirmation:</u> o Develop and implement a Trash Reduction Plan <u>Tabulation:</u> o See Trash Reduction Plan
1 4	*Objective:* Reduce effects of erosion on storm water quality. *Assessment Measure:* <u>Confirmation:</u> o Develop and implement an Erosion Control BMPs Program Plan. <u>Tabulation:</u> o See Erosion Control BMPs Program Plan

7 Industrial and Commercial Discharge Management

The Industrial and Commercial Activities Discharge Management Program addresses environmental compliance at industrial and commercial facilities within the Base. The program focuses on documenting the inspection efforts, raising awareness among private commercial and industrial facility personnel, and increasing use of BMPs by these personnel. This program is assessed at Outcome Levels 1 through 3.

Outcome Level	Outcome Objectives and Data Assessment
1 2 3	*Objective:* Increase use of BMPs among industrial and commercial facilities to reduce possible spills, illegal connections and illicit discharges. *Assessment Measures:* <u>Confirmation:</u> o Inspect industrial facilities included in the Permit semi-annually. o Inspect commercial facilities at least once every five years. o Require a permit or written equivalent approval for drainage connections and discharge of surface runoff into the MS4. o Provide all facilities educational/BMP handouts or other outreach materials. o Deficiencies corrected by facilities issued a non-compliance notice. o Conduct annual training for inspectors (to identify deficiencies, assess potential impacts to receiving waters, and evaluate the appropriateness and effectiveness of deployed BMPs). <u>Tabulation/Inspection:</u> o Number of inspections conducted. o Number of revisits completed. o Number of deficiencies issued. o Number of corrective actions completed including distribution of educational materials. o Number of contract enforcement provisions applied. o Number of inspector training sessions, and/or number of attendees to inspector training sessions.
1 2 4	*Objective:* Improve implementation of temporary or permanent BMPs at industrial and commercial facilities to reduce pollutants to the MS4 *Assessment Measure:* <u>Confirmation:</u> o Develop, implement, and maintain up-to-date site-specific BMPs and SWPCPs developed and implemented, as needed. o Require a permit or written equivalent approval for drainage connections and discharge of surface runoff into the MS4.

	o Conduct annual training for inspectors (to identify deficiencies, assess potential impacts to receiving waters, and evaluate the appropriateness and effectiveness of deployed BMPs). Inspections: o Number of facilities implementing temporary or permanent BMPs. o Number of inspector training sessions, and/or number of attendees to inspector training sessions.
1 2	*Objective:* Improve monitoring and tracking of industrial and commercial discharge management. *Assessment Measure:* Confirmation: o Maintain up-to-date inventory/database of industrial facilities and activities. o Maintain up-to-date inventory/database of commercial facilities and activities, sorted by priority area. o Require a permit or written equivalent approval for drainage connections and discharge of surface runoff into the MS4. o Develop and maintain database of permits/written approvals for drainage connections and discharge of surface runoff into the MS4.

8 Monitoring

Navy Region Hawaii conducts storm water monitoring at industrial facilities annually. The results of the monitoring are summarized in the Annual Monitoring Report submitted to DOH. Analytical results are also submitted to DOH through facility specific Discharge Monitoring Reports, which are submitted after each sampling event. As data are collected over time, the results can be used to evaluate long-term trends in pollutant reductions and assist in determining the effectiveness of the various programs in the SWMP. Navy Region Hawaii may also utilize water quality monitoring analysis results conducted by other agencies such as the City and County of Honolulu, the United State Geological Survey, and DOH to provide a comparison between discharges from the MS4 and water quality in receiving waters. The water quality monitoring results from sampling the MS4 will be used to compare relative contributions and progress towards improving water quality. The monitoring program provides data assessment measures to assess the program at Levels 1 and 4 through 6, and sets the framework for an integrated assessment between all Outcome Levels.

Waste load allocations (WLA) have been developed for discharge from the MS4 into the North Fork of Kaukanohua Stream. Monitoring for WLAs began in 2015 and will continue annually in accordance with the Permit. Monitoring results will be documented in a WLA Completion Report to demonstrate compliance with Permit required WLAs.