



NOAA
CORAL REEF
CONSERVATION PROGRAM

Land-Based Sources of Pollution Implementation Plan

FY 2011 – FY 2015

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Executive Summary

The suite of problems facing coral reef ecosystems from land-based sources of pollution (LBSP) is broad and includes sediment, nutrients, and other pollutants from a variety of land-based activities that are transported in surface waters, runoff, groundwater seepage, and atmospheric deposition into coastal waters. The health of many U.S. coral reef ecosystems ultimately depends on effective management of land-based activities in adjacent coastal and upland regions.

Significantly strengthening and expanding the National Oceanic and Atmospheric Administration (NOAA) Coral Reef Conservation Program's (Coral Program) LBSP efforts came as a primary recommendation from the program realignment process in 2008, which resulted in the development of the Coral Program's National Goals and Objectives 2010-2015 document. The Coral Program engaged a community of experts to develop three goals to address the impacts of LBSP:

1. Reduce pollutant loading from watersheds to priority coral reef ecosystems.
2. Promote in-water management activities to restore priority coral reef ecosystems that have been adversely impacted by accumulated sediments, nutrients, and algae.
3. Build and sustain management capacity at the local level through local, state, regional, and federal coordination of financial, institutional, and human resources to reduce and prevent the impacts of LBSP on coral reef ecosystems.

This document outlines a plan for implementing the Coral Program's National Objectives for addressing LBSP and supporting identified local priorities related to this threat. The implementation plan identifies the particular expertise, tools, and support the Coral Program can provide to assure our partner jurisdictions have the capacity to successfully achieve management goals to reduce the impacts of LBSP to coral reef ecosystems and to effectively manage watersheds. Additionally, this implementation plan is intended to clearly articulate the Coral Program's niche in addressing LBSP, identify areas of collaboration, and ultimately help inform future LBSP funding decisions over the next five years (2011 - 2015). For the purposes of the LBSP Implementation Plan, NOAA's partnering jurisdictions include: American Samoa, the Commonwealth of the Northern Mariana Islands, Guam, Hawaii, Florida, Puerto Rico, and the U.S. Virgin Islands.

Analysis of Coral Program's historic investment in LBSP revealed that it can be categorized into six thematic areas.

1. Development and implementation of Local Action Strategies (LAS) to address LBSP.
2. Development of a watershed management plan (WMP) and/or conservation action plan (CAP).
3. Technical assistance and capacity building.
4. Implementation of demonstration projects and other management activities identified in WMPs and/or CAPs.
5. Monitoring and assessment.
6. Partner collaboration and coordination to leverage additional resources to address LBSP.

The six thematic areas directly correlate to the Coral Program’s National LBSP Objectives. These thematic areas of investment have concentrated on the development of WMPs/CAPs, implementation of BMPs (Best Management Practices) and other management activities identified in completed WMPs/CAPs, monitoring and assessment of sediment loads, external partnership development to leverage additional resources, and local capacity building.

The Coral Program’s in-depth knowledge and technical expertise of LBSP combined with the institutional capacity of contributing NOAA offices has positioned the program to provide technical assistance, guidance, monitoring and assessment, capacity building, multilateral coordination, and funding/implementation support to existing and emerging coastal resource and coral management programs, as well as nongovernmental organizations. Based on these roles, the Coral Program’s niche can be grouped into four areas: Partner Collaboration and Coordination, Technical Assistance, Monitoring and Assessment, and Capacity Building.

In order for the Coral Program to be effective in conserving coral reef ecosystems, the program should continue to narrow and sharpen its focus as recommended by the external review panel. The National Goals and Objectives, Jurisdictional Management Priorities, and the Land-Based Sources of Pollution Implementation Plan, coupled with the Coral Program’s technical capacity will enable the program to focus investment in the following four National LBSP Objectives over the next five years to more efficiently target LBSP efforts within each of the seven jurisdictions. These four National LBSP Objectives overlap with several of the jurisdiction’s priority LBSP objectives.

1. **Land-Based Sources of Pollution Impacts Objective 1.3:** Implement watershed management plans (WMPs) and relevant LAS within priority coral reef ecosystems and associated watersheds to improve water quality and enhance coral reef ecosystem resilience. Where needed, develop (or update) watershed management plans that incorporate coral reef protection measures.
2. **Land-Based Sources of Pollution Impacts Objective 3.2:** Build partnerships among local, state, federal, and non-governmental entities to identify, leverage, and apply financial and other resources to facilitate improved coastal and upland watershed management to protect coral reef ecosystems from impacts of land-based sources of pollution.
3. **Land-Based Sources of Pollution Impacts Objective 1.5:** Determine the efficacy of management activities through coordinated baseline and performance monitoring to assess progress and adapt management actions as needed.
4. **Land-Based Sources of Pollution Impacts Objective 3.1:** Ensure that coral reef jurisdictions have adequate resources and capacity to develop and implement management plans, assess water quality and coral reef ecosystem condition, enforce regulations and evaluate performance.

Detailed criteria to guide Coral Program’s support and involvement in addressing LBSP within the jurisdictional priority areas, is outlined in Section G of the plan. A “State of the Jurisdiction” is presented in Section G. It summarizes past accomplishments in addressing LBSP and highlights current jurisdictional needs that correspond to the four National LBSP Objectives.

Acronyms

AS	American Samoa
AS-DMWR	AS Department of Marine and Wildlife Resources
ARRA	American Recovery and Reinvestment Act
BMP	Best Management Practices
CAP	Conservation Action Plan
CELP	Coastal and Estuarine Land Conservation Program
CNMI	Commonwealth of the Northern Mariana Islands
CoRIS	Coral Reef Information System
CRCA	Coral Reef Conservation Act of 2000
Coral Program	Coral Reef Conservation Program
CRI	Coral Reef Initiative
CZM	Coastal Zone Management
CZMA	Coastal Zone Management Act
DEP	Division of Environmental Protection
DERM	Department of Environmental Resources Management
DNER	Department of Natural and Environmental Resources
DOC	Department of Commerce
EFH	Essential Fish Habitat
EPA	U.S. Environmental Protection Agency
ERM	Environmental Resources Management
FL-DEP	Florida Department of Environmental Protection
FY	Fiscal Year
HI-DAR	Hawaii Division of Aquatic Resources
JPA	Junta de Planificación (Puerto Rico Planning Board)
LAS	Local Action Strategy
LBSP	Land-Based Sources of Pollution
LIDAR	Light Detection and Ranging
MOU	Memorandum of Understanding
NCCOS	National Centers for Coastal Ocean Science
NFWF	National Fish and Wildlife Foundation
NGO	Nongovernmental Organization
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NOAA-PIRO	NOAA Pacific Islands Regional Office
NOS	National Ocean Service
NPS	Nonpoint Source
NRCS	Natural Resources Conservation Service
NSPECT	Nonpoint-Source Pollution and Erosion Comparison Tool
OAR	Oceanic and Atmospheric Research
OCRM	Office of Ocean and Coastal Resource Management
OGP	Oficina de Gerencia de Permisos
OHCRC	Office of Habitat Conservation Restoration Center

OMB	Office of Management and Budget
PLA	Participatory Learning and Action
PM	Performance Measure
PRCZMP	Puerto Rico Coastal Zone Management Program
PR-EQB	Puerto Rico Environmental Quality Board
RUSLE	Revised Universal Soil Loss Equation
SEA Team	Staff Evaluation and Assessment Team
STEER	St. Thomas East End Reserve
STXEMP	St. Croix East End Marine Park
TNC	The Nature Conservancy
WMP	Watershed Management Plan
USACE	United States Army Corps of Engineers
USCRTF	United States Coral Reef Task Force
USFWS	United States Fish and Wildlife Service
USDA	United States Department of Agriculture
USGS	United States Geological Survey
USNPS	United States National Park Service
USVI	United States Virgin Islands
USVI-CZMP	USVI Coastal Zone Management Program
USVI-DPNR	USVI Department of Planning and Natural Resources
UVI	University of the Virgin Islands

Introduction

The mission of the National Oceanic and Atmospheric Administration's (NOAA) Coral Reef Conservation Program (Coral Program) is to support effective management and sound science to preserve, sustain and restore valuable coral reef ecosystems for future generations. To implement this mission, the Coral Program developed 20-year goals and five-year objectives to address the top three recognized global threats to coral reef ecosystems: climate change impacts, fishing impacts, and impacts from land-based sources of pollution (LBSP). The Coral Program also facilitated the development of coral reef management priorities in each of the seven United States' state and territorial coral reef jurisdictions, in recognition of their unique management issues and needs. This document outlines a plan for implementing the Coral Program's Objectives addressing LBSP, and for supporting identified local priorities related to this threat to coral reef ecosystem health.

Land-based Sources of Pollution

It is now well accepted that many major coral reef ecosystem stressors originate from land-based sources, most notably, toxicants, sediments, and nutrients. The suite of problems facing coral reef ecosystems from LBSP is broad due to the variety of land-based activities that transport sediments, nutrients, and chemical contaminants via surface waters, runoff, groundwater seepage, and atmospheric deposition into coastal waters. The health of many U.S. coral reef ecosystems ultimately depends on effective management of land-based activities in adjacent coastal and upland regions. It is essential that federal, state, and territorial agencies, nonprofit organizations, local community groups, and stakeholders adopt a ridge to reef approach, coordinate their efforts, and definitively target their individual technical capabilities and resources in order to effectively conserve coral reef ecosystems.

Purpose Statement

The purpose of the Land-Based Sources of Pollution Implementation Plan is to clearly articulate the Coral Program's role and approach to addressing LBSP threats to U.S. coral reefs, identify areas of collaboration, and direct future LBSP funding decisions for the next five years (2011-2015). The plan expands upon the *Coral Reef Conservation Program Goals and Objectives 2010-2015* ([http://coralreef.noaa.gov/aboutCoral Program/strategy/currentgoals/](http://coralreef.noaa.gov/aboutCoral%20Program/strategy/currentgoals/)). It focuses on the seven domestic States and Territories including: American Samoa, the Commonwealth of the Northern Mariana Islands, Guam, Hawaii, Florida, Puerto Rico, and the U.S. Virgin Islands. The plan was developed primarily for Coral Program's Senior Management Council, and Staff Evaluation and Assessment Team to inform their funding decisions. It will also be useful for Coral Program's project managers, collaborating federal agencies, and partnering jurisdictions, as it outlines Coral Program's integrated role, capacity, and interest in providing support for managing LBSP.

A. Coral Program's National LBSP Goals & Objectives

Significantly strengthening and expanding Coral Program's LBSP efforts came as a primary recommendation from an external review panel. This directly led to a program realignment process in 2008; resulting in the development of the Coral Program's National Goals and Objectives 2010-2015 document. The following three goals and twelve objectives were developed by the Coral Program to address the impacts of LBSP.

1. Reduce pollutant loading from watersheds to priority coral reef ecosystems.
 - i. Identify and prioritize those coral reef ecosystems and associated watersheds, within each jurisdiction, that will benefit the most from implementing management conservation strategies to reduce LBSP.
 - ii. Identify and prioritize coastal and upland areas for preservation, protection, and restoration based on the coral reef ecosystems and associated watershed areas identified in Objective 1.1.
 - iii. Implement watershed management plans (WMPs) and relevant Local Action Strategies (LAS) within priority coral reef ecosystems and associated watersheds to improve water quality and enhance coral reef ecosystem resilience. Where needed, develop (or update) watershed management plans that incorporate coral reef protection measures
 - iv. Promote an integrated effort to fill strategic science gaps that directly inform management decisions related to planning and implementation activities in priority coral reef ecosystems and associated watersheds.
 - v. Determine the efficacy of management activities through coordinated baseline and performance monitoring to assess progress and adapt management actions as needed.
2. Promote in-water management activities to restore priority coral reef ecosystems that have been adversely impacted by accumulated sediments, nutrients, and algae.
 - i. Identify and prioritize coral reef ecosystems from those prioritized under Objective 1.1 where in-water management activities are needed to promote reef recovery.
 - ii. Develop, test, and apply existing or new management tools and technologies that demonstrate the ability to support and promote coral reef protection and recovery, including approaches to remove accumulated pollutants and/or macroalgae to restore healthy environmental and ecosystem conditions.
3. Build and sustain management capacity at the local level through local, state, regional, and federal coordination of financial, institutional, and human resources to reduce and prevent the impacts of LBSP on coral reef ecosystems.
 - i. Ensure that coral reef jurisdictions have adequate resources and capacity to develop and implement management plans, assess water quality and coral reef ecosystem condition, enforce regulations, and evaluate performance.
 - ii. Build partnerships among local, state, federal, and non-governmental entities to identify, leverage, and apply financial and other resources to facilitate improved coastal and upland watershed management to protect coral reef ecosystems from impacts of land-based sources of pollution.

- iii. Support or help develop intergovernmental mechanisms (appropriately designed for each jurisdiction) to promote effective local management actions and decisions.
- iv. Ensure that the necessary and consistent regulatory and programmatic framework exists and is enforced to implement watershed management strategies necessary to protect coral ecosystems.
- v. Increase public and political awareness and understanding of the ecological and socioeconomic impacts of land-based pollution on coral reef resources to promote better stewardship and informed decisions regarding activities in watersheds that may adversely impact coral reef ecosystems.

B. Coral Program's National LBSP Performance Measures

The Coral Program is supported with federal funding to carry-out the purposes of the Coral Reef Conservation Act of 2000 (CRCA), and is therefore held accountable to make wise investments to conserve coral reef ecosystems and meet program goals. Accountability is ensured through performance measures, which are used to track and communicate program performance within NOAA and beyond to the Department of Commerce (DOC), the Office of Management and Budget (OMB), and Congress. In 2008, the Coral Program's *Roadmap for the Future* identified the need for the development of a suite of performance measures and evaluation criteria to track progress toward reaching on-the-ground outcomes of the National Goals and Objectives. The proposed measures demonstrate the Coral Program's leadership by accepting responsibility, as the primary federally supported program responsible for the conservation of U.S. coral reefs, for outcomes relating to resource condition and not just outputs from activities conducted by the program. There are 18 proposed performance measures the Coral Program will report on that are directly related to the Goals and Objectives. Of the 18 measures, six assess the Coral Program's performance in addressing LBSP. The six LBSP performance measures include:

1. L1 PM1: Number of watersheds with completed and approved integrated WMPs. This performance measure aligns with National LBSP Objective 1.3.
2. L1 PM2: Number of projects completed from approved WMPs to reduce LBSP in priority coral reef areas. This performance measure aligns with National LBSP Objective 1.3.
3. L1 PM3: Stable or decreasing total suspended solids (metric tons/year) measured in target watersheds. This performance measure aligns with National LBSP Objective 1.5.
4. L2 PM1: Stable or improving coral demographics (recruitment, size frequency, mortality) in priority coral reef areas. This performance measure aligns with National LBSP Objective 1.5.
5. L2 PM2: Number of in-water restoration projects implemented in degraded coral reef ecosystems to reduce accumulated sediments, nutrients, and algae. This performance measure aligns with National LBSP Objective 1.3.
6. L3. PM1: Number of active partnerships established with local, state/territory, federal and/or non-governmental organizations with a common goal to reduce LBSP impacts in priority coral reefs areas. This performance measure aligns with National LBSP Objective 3.2.

C. LBSP Capabilities: NOAA's Coral Reef Conservation Program and Contributing Offices

NOAA's Coral Program was established in 2000 to help fulfill NOAA's responsibilities under the CRCA and Presidential Executive Order 13089 on Coral Reef Protection. The Coral Program is a partnership between the NOAA Line Offices that work on coral reef issues. The participating line offices include: the National Ocean Service (NOS), the National Marine Fisheries Service (NMFS), the Office of Oceanic and Atmospheric Research (OAR), and the National Environmental Satellite, Data and Information Service (NESDIS).

As a cross-cutting program, the Coral Program can tap expertise from a wide array of NOAA programs and offices to address the impacts of LBSP on coral reef ecosystems. These NOAA program offices include, but are not limited to, the NOS's Office of Ocean and Coastal Resource Management (OCRM), NOS's National Centers for Coastal Ocean Science (NCCOS), the NMFS's Office of Habitat Conservation's Restoration Center (RC), OAR's Atlantic Oceanographic and Meteorological Laboratory (AOML), and NESDIS. The following information highlights the technical expertise relevant to LBSP for each of the offices that the Coral Program coordinates with. This is not an exhaustive list and does not provide a description of all offices that are affiliated with the Coral Program. The subsequent offices are those that have worked directly with the Coral Program to reduce the impacts LBSP on coral reef ecosystems within the seven jurisdictions.

NOAA's Coral Reef Conservation Program

The primary objective of the Coral Program is to address strategic coral reef management needs in a targeted, cost-effective and efficient manner. To make the most of limited resources and to have the largest impact to reverse and/or reduce general declines in coral reef health, the Coral Program has narrowed the focus of its U.S. domestic program and shifted allocation of Coral Program resources to taking on-the-ground and in-the-water action. The Coral Program's in-depth knowledge and institutional capacity related to LBSP falls into three categories: 1) partner collaboration and coordination, 2) technical assistance, and 3) capacity building. The Coral Program plays an integral role in engaging federal and state agencies, nonprofit organizations, and jurisdictional partners to foster institutional partnerships, leverage financial resources and provide technical support to assist the jurisdictions to effectively address the impacts of LBSP. The Coral Program also provides technical assistance to the jurisdictions to develop watershed management plans, and identify and implement appropriate LBSP Best Management Practices (BMPs) and other types of management activities within the jurisdictions' priority areas. The 19 priority areas in the seven jurisdictions include:

- 1) Puerto Rico: Cabo Rojo, Culebra, Guánica Bay, and the Northeast Reserves.
- 2) USVI: St. Croix East End Marine Park (STXEEMP), St. Thomas East End Reserve (STEER), Fish Bay, and Coral Bay.
- 3) Florida; the entire Florida Reef Tract.
- 4) Hawai'i: Ka'anapali/Kahekili, Maui and Pelekane Bay/Puako-Anaeho'omalu Bay, Hawai'i Island.
- 5) Guam: Piti/Asan, Manell/Geuss, and a third in northern Guam to be determined.

- 6) CNMI: LaoLao Bay and Garapan on Saipan, and Talakahaya, Rota.
- 7) American Samoa: Faga'alu and Vatia.

The Coral Program also builds jurisdictional capacity through funding capacity assessments, LBSP management workshops, watershed management plan development training, and LBSP education and outreach.

NOS Ocean and Coastal Resource Management

The National Coastal Zone Management (CZM) Program in OCRM is a voluntary partnership between the Federal Government and U.S. coastal and Great Lake states and territories authorized by the Coastal Zone Management Act (CZMA) of 1972 to address national coastal issues. To meet the goals of the CZMA, the National CZM Program takes a comprehensive approach to coastal resource management by balancing the often competing and occasionally conflicting demands of coastal resource use, economic development, and conservation. One component of the OCRM CZM Program is the Coastal Nonpoint Pollution Control Program that encourages better coordination between state coastal zone managers and water quality experts to reduce polluted runoff in the coastal zone. This program is unique in that it establishes a set of management measures for states to use in controlling polluted runoff. The measures are designed to control runoff from six main sources: forestry, agriculture, urban areas, marinas, hydromodification (shoreline and stream channel modification), and wetlands and vegetated shorelines, or riparian areas. Congress appropriates 1:1 matching funds to help state coastal zone management programs implement their Coastal Nonpoint Pollution Control Programs under Section 310 (Technical Assistance) of the CZMA.

Another program within OCRM is the Coastal and Estuarine Land Conservation Program (CELCP) that is tasked with protecting coastal and estuarine lands considered important for their ecological, conservation, recreational, historical or aesthetic values. The program provides state and local governments with matching funds to purchase significant coastal and estuarine lands, or conservation easements on such lands, from willing sellers.

National Ocean Service: National Centers for Coastal Ocean Science

NCCOS's mission is to support achievement of NOAA's coastal missions by providing cutting-edge research, scientific information and tools that help balance ecological, social, and economic goals. NCCOS conducts research on and monitors the effects of coastal pollution nationwide to quantify benthic habitat type, fish and invertebrate abundance and type, assays of coral tissues, monitoring levels of sedimentation, nutrients, chemical contaminants and bioeffects, satellite imagery to create habitat maps, side scan sonar and light detection and ranging (LIDAR) to generate bathymetric maps, and remote sensing to measure turbidity and chlorophyll. These results provide federal agencies, state governments, local communities, coral reef managers, and stakeholders with the information and tools they need to establish baseline conditions, develop practices and policies that reduce LBSP, and assess the efficacy of those efforts on improving coral reef health.

National Marine Fisheries Service: Pacific Islands and Southeast Regional Offices

The NOAA NMFS is dedicated to the stewardship of living marine resources through science-based conservation and management, and the promotion of healthy ecosystems. NMFS is able to work with communities on fishery management issues, with the help of the six regional offices, including the Pacific Islands and Southeast Regional offices that have coral reefs within their jurisdiction. Healthy habitat is essential to the reproduction, growth, and diversity of harvested fish, and directly supports NOAA's priority to rebuild and sustain our nation's fisheries. Pursuant to the Essential Fish Habitat (EFH) provisions of the Magnuson-Stevens Fishery Conservation and Management Act, federal action agencies, which fund, permit, or carry out activities that may adversely impact EFH, are required to consult with regional NOAA Fisheries' Habitat Conservation Divisions regarding the potential effects of their actions on EFH. The Habitat Conservation Divisions provide recommendations for conserving the EFH, including recommendations to avoid and minimize LBSP. Additionally, the Protected Resources Divisions are responsible for the conservation, management, and protection of marine mammals and endangered and threatened species under the Marine Mammal Protection Act and Endangered Species Act. Under the Endangered Species Act, the Protected Resources Divisions develop recovery plans and provide Section 7 consultations for species listed as threatened or endangered, and may also include recommendations to avoid and minimize LBSP.

National Marine Fisheries Service: Restoration Center

The NOAA Restoration Center (RC) protects, restores, and promotes stewardship of coastal and marine habitat to support our nation's fisheries and preserve our coastal communities for future generations. The RC applies a novel, grass-roots approach to restoration designed to actively engage communities in on-the-ground restoration of local habitats. The program supports high priority habitat restoration, through direct investment of funds and technical expertise, as well as directly implementing on-the-ground restoration projects with support of resource specialists, project managers, engineers, and staff well versed in all aspects of selecting, implementing, and evaluating restoration projects. The RC's core strengths relate to the technical and administrative expertise that are required to run not only successful and sound on-the-ground restoration projects, but also the programs that support them behind the scenes. RC projects are funded both through direct appropriations to the program, as well as from other NOAA and external offices that use the program as their restoration implementation arm.

Office of Oceanic and Atmospheric Research: Atlantic Oceanographic & Meteorological Laboratory

The Atlantic Oceanographic & Meteorological Laboratory's Coastal Oceanography programs are engaged to better measure and understand the sources of degradation in coastal ecosystems, with a focus on tropical and subtropical ecosystems, particularly coral reefs. Activities include characterizing land-based sources of pollution, with emphasis on nutrients and microbial contaminants, and the impacts of climate change, restoration, and human activities on ecosystem function and resilience. The programs strive to advance detection and tracking of pollution sources through improved sensor development, observing strategies, and ecological modeling. This program has a number of active partnerships at the local, regional, national, and

international levels aimed to integrate ecosystem data into management decisions. One goal is to inform WMPs, conservation action plans (CAPs), and water restoration projects.

National Environmental Satellite, Data, and Information Service

The National Environmental Satellite, Data, and Information Service (NESDIS) is dedicated to providing timely access to global environmental data from satellites and other sources to promote, protect, and enhance the Nation's economy, security, environment, and quality of life. To fulfill its responsibilities, NESDIS acquires and manages the Nation's operational environmental satellites, operates the NOAA National Data Centers, provides data and information services including Earth system monitoring, performs official assessments of the environment, and conducts related research. Most NESDIS coral reef activities are at two of its centers: The National Oceanographic Data Center that houses the Coral Reef Information System (CoRIS) and the Center for Satellite Applications and Research that houses Coral Reef Watch. CoRIS is designed to be a single point of access to NOAA coral reef information and data products, especially those derived from NOAA's Coral Reef Conservation Program. This includes NOAA's data on LBSP. Coral Reef Watch's satellite data provide current reef environmental conditions to quickly identify areas at risk for coral bleaching, along with other threats to coral reefs.

D. Historic Coral Program Investment in LBSP

The Coral Program provides funding for coral reef conservation through four different financial mechanisms: 1) internal funding to NOAA project managers, 2) four external Coral Program competitive grant programs: domestic, international, Fishery Management Council, and State/Territory, 3) cooperative agreements with the nongovernmental organizations, and 4) through the National Fish and Wildlife Foundation (NFWF) which serves as a private-public fund. The Coral Program uses these four funding mechanisms to address the impacts of LBSP through targeting the reduction in pollutant loading, promoting in-water management activities to restore priority coral reef ecosystems, and developing and sustaining local management capacity through local, state, regional, and federal coordination. Historic program investment in LBSP can be categorized into six thematic areas:

1. Development and implementation of LAS to address LBSP. All seven jurisdictions have developed and implemented at least one LAS since 2004; however a few jurisdictions are implementing recently revised LASs.
2. Development of a WMP and/or CAP. Twelve of the nineteen priority areas within the Atlantic/Caribbean and Pacific basins either have a completed WMP/CAP or will have one completed with FY12 funding.
3. Technical assistance and capacity building. Types of technical assistance and capacity building include support for development and implementation of LAS addressing LBSP, development of a GIS data set that provides LBSP management tools for both the Pacific and Atlantic/Caribbean basins, coastal use assessments, publishing management guidebooks on the impacts of sediment and nutrient pollution on coral reefs, and workshops that provide local partners and managers with the necessary skills to address LBSP.

4. Implementation of demonstration projects and other management activities identified in WMPs and/or CAPs to directly reduce the impacts of LBSP on coral reef ecosystems. Funded projects include implementation of BMPs to reduce sediment loads, restoration activities and marine debris removal, and the implementation of a road stabilization project in Coral Bay funded through the American Recovery and Reinvestment Act (ARRA).
5. Monitoring and assessment. Funded in-water monitoring includes water quality, sediment, and chemical contaminant monitoring.
6. Partner collaboration and coordination to leverage additional resources to address LBSP. Funded partnership projects include the joint Coral Program/United States Department of Agriculture- Natural Resource Conservation Service (USDA-NRCS) Partnership Initiative for Guánica and Jobos Bay in Puerto Rico and the U.S. Coral Reef Task Force LAS.

All of the thematic areas directly correlate to four of Coral Program’s National LBSP Objectives that were developed in 2008. These thematic areas of investment have concentrated on the development of WMPs/CAPs, implementation of BMPs and other management activities identified in completed WMPs/CAPs, monitoring and assessment of sediment loads, external partnership development to leverage additional resources, and local capacity building. Below are the four National LBSP Objectives that Coral Program’s historic investment in LBSP directly corresponds to.

1. **Land-Based Sources of Pollution Impacts Objective 1.3:** Implement watershed management plans (WMPs) and relevant Local Action Strategies (LAS) within priority coral reef ecosystems and associated watersheds to improve water quality and enhance coral reef ecosystem resilience. Where needed, develop (or update) watershed management plans that incorporate coral reef protection measures.
2. **Land-Based Sources of Pollution Impacts Objective 3.2:** Build partnerships among local, state, federal, and non-governmental entities to identify, leverage, and apply financial and other resources to facilitate improved coastal and upland watershed management to protect coral reef ecosystems from impacts of land-based sources of pollution.
3. **Land-Based Sources of Pollution Impacts Objective 1.5:** Determine the efficacy of management activities through coordinated baseline and performance monitoring to assess progress and adapt management actions as needed.
4. **Land-Based Sources of Pollution Impacts Objective 3.1:** Ensure that coral reef jurisdictions have adequate resources and capacity to develop and implement management plans, assess water quality and coral reef ecosystem condition, enforce regulations and evaluate performance.

The table below reflects the amount of internal funding that the Coral Program has invested in LBSP from 2000 to 2010. The amounts listed below invested within each LBSP area cannot be summed together to calculate a total investment, as some of the internal project funding was awarded to multiple thematic areas. However, a comprehensive analysis of total financial investment of internal funds in LBSP over the past ten years was determined to be \$2,363,404. This figure only includes funds provided to NOAA project managers throughout the internal

spend plan process and does not include Coral Program investment in LBSP supported by our external program funding mechanisms (competitive grants, cooperative agreements, and the coral fund). The development and implementation of Local Action Strategies are executed through the Coral Program’s state and territorial grants program; thus past LAS funding is not captured in the table below.

Coral Program Internal Investment in LBSP from 2000-2010

Area of Investment	Corresponding National Objective	Amount
1. Development and Implementation of LAS	L1.3	N/A
2. Watershed Management Plan Development	L1.3	\$235,000
3. Technical Assistance / Capacity Building	L3.1	\$1,409,404
4. Demonstration Projects	L1.3 & L2.2	\$533,000
5. In-water Monitoring	L1.4 & L1.5	\$798,000
6. Coordination & Partnerships that leverage additional resources	L3.2	\$778,000

E. The Coral Reef Conservation Program’s Land-Based Sources of Pollution Niche

It is evident from Coral Program’s capabilities and investments in LBSP that the program and its matrix partners provide in-depth knowledge and technical expertise in specific LBSP areas. These are listed here and described in detail below:

1. Working collaboratively across NOAA’s offices and with external partners to identify, leverage, and apply financial and in-kind support to facilitate improved coastal and upland watershed management;
2. Providing technical assistance and guidance to the seven jurisdictions to effectively address the impacts of LBSP;
3. Conducting jurisdictional monitoring and assessment to identify the sources of LBSP and quantify the magnitude of LBSP within each priority site; and
4. Building local capacity to address and effectively manage LBSP impacts to coral reef ecosystems.

1. Partner Collaboration and Coordination

Land-based sources of pollution cross multiple jurisdictional boundaries and the authority and responsibility to address them falls to a multitude of governmental and jurisdictional levels. It is therefore necessary to build a framework that facilitates enhanced coordination, and promotes consistent and strengthened application and enforcement of laws and authorities intended to address LBSP. The Coral Program has been effective at collaborating and coordinating across multiple levels of government and should continue to build and focus on these efforts. Through the Coral Program’s activities and that of the U.S. Coral Reef Task Force, the program has developed strong relationships with the seven states and territories as well as other federal agencies whose actions may affect coral reef ecosystems. For the purposes of addressing the impacts of LBSP, the primary federal agencies of interest include: the USDA and its bureaus of NRCS, Rural Development, and the Agricultural Research Service; the U.S. Environmental Protection Agency (EPA); and the U.S. Department of Interior and its bureaus of the U.S. Fish



and Wildlife Service (USFWS), the National Park Service (NPS), the Office of Insular Affairs, the U.S. Geological Survey (USGS), and the U.S. Army Corps of Engineers (USACE). Additional federal agency partnerships that will be explored and further strengthened include the U.S. Department of Transportation and the U.S. Forest Service. The Coral Program is committed to working in partnership with federal, state and territorial agencies to strategically build upon and enhance on-going LBSP activities, and identify new opportunities to make demonstrable progress in decreasing the sources of and impacts from LBSP on coral reef ecosystems. Future efforts will continue to focus on improving partner coordination, as well as identifying and institutionalizing new sources of funding for cost-sharing LBSP activities.

2. Technical Assistance

An important component of watershed management and the Coral Program's efforts to protect coral reef ecosystems from LBSP has been the management and restoration of habitats that limit rates of erosion and quantities of transported sediment and other pollutants to adjacent coral reef ecosystems. The Coral Program has and continues to provide technical assistance to develop and implement Watershed Management Plans (WMP) and/or Conservation Action Plans (CAP) for each of the priority areas. The primary purpose of a WMP or CAP is to outline a comprehensive set of actions and an overall management strategy for improving and protecting the watershed from nonpoint and point sources of pollution derived from land use alterations, and residential, commercial and agricultural uses. A WMP/CAP is intended to identify a set of key recommendations, specific partners and next steps towards implementation. Twelve of the 19 priority areas within the seven jurisdictions have either completed a WMP/CAP or will have one completed with FY12 funding.

WMP/CAP recommendations typically include BMPs and/or management activities that target the reduction and movement of sediment, nutrients and contaminants within watersheds. Examples include revegetation and stabilization of degraded areas, stream-banks and dirt-roads/trails, storm water and waste water treatment practices, and better site design practices. Implementation of BMPs and management activities are essential to maintaining hydrologic functions including stream flow and ground water recharge to limit LBSP inputs and impacts to nearshore and coral reef ecosystems. The Coral Program and NOAA RC have supported the implementation of WMPs/CAPs by implementing BMPs and restoration projects within LAS and priority sites.

3. Monitoring and Assessment

Coastal ecosystems can be degraded by sediments, chemical pollutants, pathogens, and excess nutrients as pollutants are transported to coastal waters via rivers and streams, runoff, groundwater seepage, and atmospheric deposition. Each of the jurisdictions has experienced significant changes in their drainage basins due to land-use changes that have altered the character and volume of LBSP released to adjacent coral reef ecosystems. Through the work of NCCOS and support of state/territory partners, the Coral Program has monitored the effects of LBSP via: the use of surveys to quantify benthic habitat, fish and invertebrate abundance and type; assays of coral tissues monitoring levels of sedimentation, nutrients, and chemical contaminants; using satellite imagery to create habitat maps; conducting side scan sonar and

LIDAR to generate bathymetric maps; and employing remote sensing to measure turbidity and chlorophyll. Results from these studies provide coral reef managers with the information and tools needed to establish baseline conditions, develop practices and policies to reduce LBSP and improve coastal health, and measure the efficacy of those activities.

Monitoring and assessment of pollutant loading, implementing research applications that have direct management implications, and conducting the necessary performance monitoring are critical components to improving effectiveness in reducing pollutant loads, measuring progress, and incorporating adaptive management regimes. The application of Performance Measure L1 PM3 and L2 PM1 will measure and evaluate the program's performance in addressing LBSP. Performance Measure L1 PM3 targets the levels of total suspended solids within the priority sites. This metric will be used by the program to monitor the effectiveness of management activities within the jurisdictional priority areas. Performance Measure L2 PM1 will measure changes in coral demographics and will provide an indication about whether corals in and adjacent to affected priority watersheds are showing changes over time in response to Coral Program efforts to improve watershed management within priority areas.

4. Capacity Building

There are several other enabling factors that need to be considered and addressed for the Coral Program to be effective in addressing LBSP. Primarily, in many communities it is necessary to first build the local, state, and regional capacity to ensure that the jurisdictions have adequate resources and capacity to develop and implement management plans, monitor and assess LBSP and coral reef ecosystem condition, implement and maintain BMPs, and evaluate management activity performance. During the past 12 years, the Coral Program's expertise and technical skills have enabled the program to invest in local capacity building within the seven jurisdictions. The Coral Program's efforts have primarily focused on LBSP monitoring workshops, erosion and sediment control practices, WMP development training, stormwater management training, pollution prevention, site design, LBSP education and outreach, and providing funding at the local level to support project implementation. The LBSP trainings and WMP workshops have focused on increasing the technical capacity of coral reef managers to assess local watersheds and develop effective watershed management plans that support early implementation efforts. The Education and Outreach Working Group of the U.S. Coral Reef Task Force which is comprised of teachers, non-governmental organizations, federal agencies, and various branches of NOAA including the Coral Program has developed over 50 lesson plans and two full curricula for grades three to 12 in the Life Science and Earth Science subject areas. Six of these lesson plans focus on the impacts of LBSP on coral reef ecosystems. This educational curriculum will assist in fostering a sense of stewardship and passion amongst students to protect and preserve vulnerable coral reef ecosystems.

F. Future LBSP Direction

In order for the Coral Program to be effective in conserving coral reef ecosystems the program must narrow and sharpen its focus as recommended by the external review panel. This is especially critical given federal budget constraints, limited personnel resources, and the high cost of effectively managing LBSP. It is evident that the Coral Program and its partners have existing

capabilities and strengths that align with four of the 12 national LBSP objectives (see section A). The program will continue to build on these capabilities and strengths to implement these four national LBSP objectives over the next five years. These objectives are critical in effectively managing LBSP, are complementary, align with existing Coral Program activities and strengths or are logical progressions, align with jurisdictional LBSP priorities, are critical in assessing management effectiveness, and are achievable over a five year timeframe. The objectives and percentage of Coral Program investment in order of priority are:

1. **Land-Based Sources of Pollution Impacts Objective 1.3:** Implement watershed management plans (WMPs) and relevant Local Action Strategies (LAS) within priority coral reef ecosystems and associated watersheds to improve water quality and enhance coral reef ecosystem resilience. Where needed, develop (or update) watershed management plans that incorporate coral reef protection measures.
Funding allocation: ~70% of LBSP budget
2. **Land-Based Sources of Pollution Impacts Objective 3.2:** Build partnerships among local, state, federal, and non-governmental entities to identify, leverage, and apply financial and other resources to facilitate improved coastal and upland watershed management to protect coral reef ecosystems from impacts of land-based sources of pollution.
Funding allocation: ~5% of LBSP budget
3. **Land-Based Sources of Pollution Impacts Objective 1.5:** Determine the efficacy of management activities through coordinated baseline and performance monitoring to assess progress and adapt management actions as needed.
Funding allocation: ~20% of LBSP budget
4. **Land-Based Sources of Pollution Impacts Objective 3.1:** Ensure that coral reef jurisdictions have adequate resources and capacity to develop and implement management plans, assess water quality and coral reef ecosystem condition, enforce regulations and evaluate performance.
Funding allocation: ~5% of LBSP budget

The Coral Program's role in implementing each objective, and the eligibility criteria for receiving project funding are described in detail below.

LBSP Impacts Objective 1.3: Development and Implementation of WMPs/CAPS

The program will continue to provide technical support (internal and contractual) to the jurisdictions for developing WMPs and/or CAPs in Coral Program priority areas. By 2015, all 19 priority areas should have a completed WMP and/or CAP. The Coral Program's performance measure L1 PM1 will be applied to track developed WMPs/CAPs.

The following elements should be incorporated into a WMP:

- Addresses US EPA's nine elements of a watershed management plan to the greatest extent practicable. See <http://www.epa.gov/region9/water/nonpoint/9elements-WtrshdPlan-EpaHndbk.pdf> for a detailed list of the Nine Minimum Elements to be included in a watershed plan for impaired waters using incremental section 319 funds. The elements are: 1) Identifying causes and sources of pollution, 2) Estimating load

reductions expected for management measures, 3) Describing NPS (nonpoint source) management measures, 4) Estimating the amount of technical and financial assistance needed for implementation, 5) Information and education component, 6) Schedule, 7) Milestones, 8) Criteria for measuring effectiveness, and 9) Monitoring for evaluation.

- Prioritizes key recommended management actions to reduce the identified threats.
- Leverages support from federal and state agencies, nonprofit organizations, and jurisdictional partners to implement key projects.
- Where applicable, incorporates monitoring projects within jurisdictional priority areas that collect sediment load baseline data for the L1 PM3 Performance Measure.
- Identifies monitoring activities that assess the efficacy of management activities, i.e., BMPs and restoration activities.

For priority areas with a completed WMP and/or CAP, the Coral Program will provide technical assistance or funding to implement specific LBSP activities identified in the WMP/CAP. To qualify for Coral Program funds activities must meet some of the following criteria:

- Identified as a priority for implementation in a WMP or CAP
- Address a significant source of LBSP or provide an exemplary educational opportunity (e.g., demonstration project in a highly visible area)
- Demonstrate collaboration with other agencies and leveraging of resources (projects with matching funds will be prioritized)
- Can be replicated within other priority sites when similar LBSP sources and conditions exist
- Pollutant removal effectiveness is established or can be documented
- Coral Program contribution no greater than \$200,000 per year, per management activity.
- Projects that fall under the mandates of other federal agencies (e.g., US EPA sewage treatment plant upgrades, USDA NRCS farm bill activities) will not be eligible for Coral Program funding.
- Performance measure L1 PM2 should be applied to track implemented management activities and BMPs.

At least 70% of the LBSP budget will be allocated towards the development and implementation of WMP's/CAPs. The amount allocated for planning is expected to decrease and implementation will increase as more WMPs/CAPs are completed.

LBSP Impacts Objective 3.2: Partnership Building

Land-based pollution control measures can be expensive to implement and maintain. Therefore, it is essential that new sources of funding and new mechanisms to cost-share are identified and institutionalized. In order to efficiently and effectively address the threat of LBSP, it is essential that the Coral Program work in partnership with other entities that have regulatory authority and/or the particular expertise related to LBSP. The activities undertaken as part of this objective should be closely aligned with the areas identified and being funded under Objective 1.3. Management activities, such as the implementation of BMPs and demonstration projects within the jurisdictional priority areas, will not only have a greater impact on addressing LBSP but will also strengthen institutional capacity if coordinated with external partners. The Coral Program is

committed to engaging federal and state agencies, nonprofit organizations, communities, coral reef managers, and stakeholders to enhance current LBSP activities and identify new opportunities that will make demonstrable progress in decreasing the sources of and impacts from LBSP on coral reef ecosystems. The Coral Program's Performance Measure L3 PM1 should be applied to track the number of partnerships formed. A maximum of 5% of the LBSP budget will be allocated towards this objective. The following are examples of potential activities that are appropriate for Coral Program investment.

Potential activities:

- Maintain and establish new federal partnerships to address LBSP through the U.S. Coral Reef Task Force and/or the development of Memorandums of Understanding with external agencies.
- Coordinate with existing federal, state, and territory programs and private organizations to identify opportunities and support activities to purchase, preserve, protect, and restore coastal habitats in Coral Program priority areas. For example: Natural Resources Conservation Service Easements, the Coastal and Estuarine Land Conservation Program (CELCP), and the Trust for Public Lands (TPL).
- Facilitate new relationships with state and territorial agencies, e.g., water authorities, Department of Public Works, and health departments.
- Develop partnerships that leverage and increase resources available to address the impacts of LBSP (for example: incorporate the US EPA's nine elements of a WMP in developing WMPs for the remaining priority sites.)
- Coordinate with and provide technical assistance to support other agency efforts to implement watershed planning efforts in Coral Program priority areas, i.e., enforcement, TMDL, and agricultural conservation project implementation.

LBSP Impacts Objective 1.5: Determining Efficacy of Management Activities

Over the past 10 years, the Coral Program has invested heavily in the full suite of in-water monitoring to assess the impacts of LBSP on coral reef ecosystems. Since the program's inception, LBSP monitoring has run the gamut from assessing sediment loads to conducting chemical and biological characterizations for the jurisdictional priority areas. Coral Program will narrow its scope to three areas of baseline and performance monitoring in order to effectively assess the program's investment in LBSP. This narrowing aligns with the development of the National Goal and Objectives, defined program capabilities, jurisdictional needs, and finite financial resources. This streamlined list of monitoring activities will allow the Coral Program to more efficiently invest program dollars while simultaneously addressing jurisdictional needs. Data collected from monitoring projects will be made available to federal and state agencies, nonprofit organizations, coral reef managers, and stakeholders to empower informed decision-making that appropriately considers potential pollutant impacts to coral reef ecosystems. A maximum of 20% of the LBSP budget will be allocated towards this objective.

The priorities in order include:

- Monitoring projects within jurisdictional priority areas that collect baseline data for the L1 PM3 Performance Measure, i.e., projects that monitor sediment loads. These projects may also incorporate baseline assessments of pollutants present, along with biological

surveys and effects where appropriate. The need for baseline assessments will be determined on a case by case basis in consultation with local coral reef managers. This approach is recommended because while sediments can be a stressor on corals, the types of pollutants present and effects associated with those sediments can vary widely depending on activities present in the surrounding watershed.

- Monitoring projects that assess the efficacy of management activities recommended in WMPs and/or CAPs (e.g., BMPs and restoration activities implemented within jurisdictional priority areas that are funded by the Coral Program and external partners) and/or track the L1 PM3 Performance Measure. It will not be possible to quantitatively assess the performance of all management activities due to time and budgetary constraints. If the performance of an activity has been quantified under similar conditions, similar performance will be implied, rather than monitored. Monitoring will not be limited to in-water assessments and should include measurements of soil erosion rates using erosion pins where appropriate. Application of soil erosion models such as the Revised Universal Soil Loss Equation (RUSLE) or Nonpoint-Source Pollution and Erosion Comparison Tool (NSPECT) will also be considered. This monitoring data will supplement long-term coral reef monitoring at priority sites.
- Short term monitoring or research projects identified by the coral reef managers and the Coral Program that provide relevant information and data to identify in-water pollution hotspots and inform specific and known LBSP management decision-making processes.

LBSP Impacts Objective 3.1: Jurisdictional Resources & Capacity

The program will continue to focus on providing jurisdictional partners with the necessary skills to address LBSP in each of the seven jurisdictions. A maximum of 5% of the LBSP budget will be allocated towards this objective. The following are examples of activities that will be supported by the Coral Program to address LBSP.

Potential activities:

- WMP development workshops, LBSP trainings, development of best management practice manuals and educational material. These will be developed in close consultation with jurisdictional partners and address identified capacity needs.
- Coordinate with regional, state, and local agencies and provide technical assistance to foster greater community stewardship, local capacity, and promote project implementation to address the impacts of LBSP on coral reef ecosystems.
- The Coral Program will conduct capacity assessments for each jurisdiction to identify strategic approaches to building sustainable capacity for coral reef conservation. Results related to LBSP issues and capacity gaps will inform future Coral Program investments to increase capacity to address LBSP impacts on priority coral reefs. Results will also be relevant to other governmental and non-governmental organizations with similar mandates and goals.

G. Jurisdictional Coral Reef LBSP Management Priorities

This section incorporates the aforementioned information and recommendations within the context of the seven Coral Program partner jurisdictions. It is intended to further inform and focus the efforts of the Coral Program, our external partners, and coral reef managers to more effectively address the impacts of LBSP within each jurisdiction's priority sites by assessing the state of each jurisdiction and correlating Coral Program's National LBSP Objectives with the jurisdictional LBSP objectives.

In coordination with local coral reef managers, the Coral Program facilitated workshops to develop place-based, local coral reef management priorities for the seven U.S. state and territorial coral reef jurisdictions. This joint effort culminated in the development of priority-setting documents for each the jurisdictions. These priority-setting documents articulate a set of strategic coral reef management priorities that target the threats of LBSP, fishing, and climate change. The Coral Program also assisted the jurisdictions in identifying priority coral reef areas and associated watersheds. Coral reef managers in these jurisdictions identified and applied specific criteria to select the priority geographic areas. Some examples of applied criteria include:

1. Biological value: irreplaceability, uniqueness and abundance.
2. The degree of risk & threat: fishing, land-based sources of pollution, water quality, climate change, marine pollution, human impacts, and invasive species.
3. Management effectiveness and viability: existing management capacity and management plans, capacity (staff and infrastructure), existing LAS/management function, existing monitoring, community support/activity, and support (NGO and academic) and political will.
4. The ability to achieve priority goals and objectives from the workshop.

In total, the jurisdictions selected nineteen priority sites. These priority sites represent a ridge-to-reef approach to coral reef management; including both coral reef habitat and associated watershed areas. It should be noted that Florida did not identify specific priority areas and instead chose to emphasize the need for an integrated effort to address threats to coral reef ecosystem health along the entire Florida Reef Tract. The seven jurisdictional priority-setting documents can be found online at:

<http://coralreef.noaa.gov/aboutCoralProgram/strategy/reprioritization/managementpriorities/>.

State of the Jurisdiction

This section includes a jurisdictional synthesis of completed LBSP activities, current LBSP efforts, existing priority site needs, and a comparison of the four National LBSP Objectives aligned with corresponding jurisdictional LBSP priorities. It is not intended to be a complete inventory of all LBSP work funded and conducted in each jurisdiction as it does not include all LAS, prior competitive management grants, or standing cooperative agreement activities. Rather this assessment serves to provide a bigger picture of the state of progress to address LBSP in each priority site. It is intended to help inform and provide guidance to the Coral Program regarding potential areas for internal NOAA funding that align with both our National LBSP

Objectives of emphasis and the local management priorities. Types of activities and jurisdictional needs include but are not limited to: WMP/CAP development, implementation of BMPs and other types of management activities, identification of current project partners, in-water monitoring, and capacity building workshops. This information will help the Coral Program more effectively target the program's limited financial and technical resources in each of the seven jurisdictions.

Puerto Rico:

Puerto Rico has four priority sites: Cabo Rojo, Culebra, Guánica Bay, and the Northeast Reserves. These four sites were selected by a working group comprised of coral reef managers in Puerto Rico. Current project partners include: USDA-NRCS, Puerto Rico Department of Natural and Environmental Resources (DNER) including the Puerto Rico Coral Reef Initiative (CRI) and Puerto Rico Coastal Zone Management Program (PRCZMP), USFWS, Puerto Rico Environmental Quality Board (PR-EQB), Puerto Rico Planning Board (JPA), the U.S. EPA, and NFWF. The following is a summary of past and present LBSP activities at each of the jurisdiction's priority sites.

Cabo Rojo

- This priority site does not have a WMP.
- Currently there are no LBSP management activities being implemented within this priority area.

Culebra

- The development of a WMP was funded in FY12 and will be completed in FY13.
- Culebra was awarded funding in FY11 and FY12 to develop and implement BMPs to address sedimentation.

Guánica Bay

- A watershed management plan was completed in 2008. The WMP identified 12 management recommendations to reduce the impacts of LBSP.
- Current management activities include: discussions with federal and state agencies, the Puerto Rican government, coral reef managers, and local stakeholders to restore the lagoon to its natural state; extensive in-water monitoring; the conversion of sun to shade grown coffee in the upper watershed; and community outreach that focuses on educating the public on the importance of watershed management and the conservation of coral reef ecosystems.
- In FY12 Coral Program, USFWS, and DOJ awarded funding to NFWF to construct a treatment wetlands.
- Guánica Bay was selected as a U.S. Coral Reef Task Force Watershed Partnership Initiative site in 2009. Current federal agency partners include NOAA, USDA, USFWS, and US EPA.

Northeast Reserves

- This priority site does not have a WMP.

- At present, no LBSP management activities are being implemented within this priority area.

Jurisdictional Needs

The following list is a synthesis of jurisdictional needs identified by local field staff that pertains to the four National LBSP Objectives. This list does not encompass the entire suite of the jurisdiction’s LBSP related needs. Additionally, each of the needs listed indicate which specific facet of NOAA’s technical expertise can be employed to address the stated need and have been matched with the corresponding National LBSP Objective.

Technical Assistance

- Development of WMPs for Cabo Rojo and the Northeast Reserves. This activity aligns with National LBSP Objective 1.3.
- Implement restoration projects in the Guánica Bay (see the Guánica Bay Watershed Management Plan for identified actions). This activity aligns with National LBSP Objective 1.3.
- Stream bank stabilization in Guánica watershed. This activity aligns with National LBSP Objective 1.3.

Monitoring and Assessment

- Sedimentation and nutrient monitoring in Guánica. This activity aligns with National LBSP Objective 1.5.

Partner Coordination and Technical Assistance

- Facilitate the construction of a treatment wetland for Guánica funded in FY12. This activity aligns with National LBSP Objective 1.3 and National LBSP Objective 3.2.
- Promote and facilitate the application of agricultural conservation practices, i.e., conversion from sun to shade grown coffee. This activity aligns with National LBSP Objective 1.3 and National LBSP Objective 3.2.

The following table crosswalks the four National LBSP Objectives identified by the Coral Program as areas of focus that correspond with Puerto Rico’s Priority LBSP Objectives. Identifying how both these National LBSP Objectives and jurisdictional priorities correlate will increase efficiency and the ability to leverage available resources to address LBSP.

NOAA's National LBSP Objectives	LBSP Objectives from Puerto Rico’s Coral Reef Management Priorities
GOAL 1: Reduce pollutant loading from watersheds to priority coral reef ecosystems.	
<p>LBSP Impacts Objective 1.3: Implement watershed management plans and relevant LAS within priority coral reef ecosystems and associated watersheds to improve water quality and enhance coral reef ecosystem resilience. Where needed, develop (or update) watershed management plans that incorporate coral reef</p>	<p>Objective A1.1: Support the use of a watershed approach in the development and implementation of new and existing Municipal Ordinance Plans and Puerto Rico Land Use Plan.</p> <p>Objective A1.4: Ensure that planning activities are at watershed scale and loss of coastal</p>

<p>protection measures.</p>	<p>habitats (wetlands, seagrass) that serve as filters to maintain water quality is avoided and minimized</p> <p>Objective A2.1: Eliminate combined sewers where stormwater and wastewater systems are joined to reduce overflows and associated water quality impacts to water bodies (i.e., San Juan, Boqueron, Calle Calaf).</p> <p>Objective A2.2: Upgrade wastewater treatment plants to eliminate discharges to the sea unless plants become tertiary or other treatment options, such as treatment wetlands and other improvements to discharge quality, are completed.</p> <p>Objective A2.5: Implement sediment reduction practices and stormwater management plans that take a holistic watershed approach, considering the interaction between upland actions and their impacts on the marine environment, including seagrass and mangroves.</p> <p>Objective C2.3: Support the effective management of existing protected areas (such as natural reserves, state forests, national parks and wildlife refuges) within or adjacent to priority coastal areas, including the development and implementation of management plans.</p>
<p>LBSP Impacts Objective 1.5: Determine the efficacy of management activities through coordinated baseline and performance monitoring to assess progress and adapt management actions as needed.</p>	<p>Objective A2.4: Establish water quality monitoring stations in coral reef ecosystem areas and add water quality monitoring components to established coral monitoring sites around Puerto Rico. Establish standards in terms of what to monitor for and how to ensure comparability of data across locations. Use data regarding areas where water quality is an issue to enhance agency decision-making related to issuance of permits.</p>
<p>GOAL 3: Build and sustain management capacity at the local level through local, state, regional, and federal coordination of financial, institutional, and human resources to reduce and prevent the impacts from land-based sources of pollution on coral reef ecosystems.</p>	
<p>LBSP Impacts Objective 3.1: Ensure that coral reef jurisdictions have adequate resources and capacity to develop and implement management plans, assess water quality and</p>	<p>Objective A1.2: Develop stricter regulations and enhance enforcement capabilities for agricultural and development activities to ensure that best management practices that</p>

<p>coral reef ecosystem condition, enforce regulations and evaluate performance.</p>	<p>reduce sediment, nutrient, fecal coliform and pesticide transport be implemented and that erosion, including channel protection, be mitigated.</p> <p>Objective A3.5: Recruit enforcement personnel with a commitment to conservation and sustainable development of coastal and marine resources. Provide all law enforcement officials (rangers, lawyers, and judges) with educational opportunities to increase their effectiveness and efficiency at implementing conservation and resource management regulations.</p> <p>Objective C2.4: Increase the capacity of development permitting agencies (DNER, PR-EGB, JPA, OGP, USACE, and USEPA) to monitor development activity and ensure permit compliance.</p>
<p>LBSP Objective 3.2: Build partnerships among local, state, federal, and nongovernmental entities to identify, leverage and apply financial and other resources to facilitate improved coastal and upland watershed management to protect coral reef ecosystems from impacts of land-based sources of pollution.</p>	<p>Objective A1.3: Use existing incentive programs and strengthen partnerships with USDA and local Department of Agriculture, EPA, Public Health and PR-EQB to provide incentives and ensure compliance with regulations at the same time.</p>

United States Virgin Islands:

USVI has four priority areas: St. Croix East End Marine Park, St. Thomas East End Reserve, Fish Bay, and Coral Bay. These four sites were selected by a working group comprised of coral reef managers in the USVI. Current project partners include: The Nature Conservancy (TNC), the University of the Virgin Islands (UVINPS), USDA-NRCS, USVI Department of Planning and Natural Resources (USVI-DPNR) including the Coastal Zone Management Program (USVI-CZMP) and the Division of Environmental Protection (DEP), US EPA, and the USGS. The following is a summary of past and present LBSP activities at each of the jurisdiction’s priority sites.

Fish Bay, St. John

- A WMP was completed in 2001.
- A LAS for Fish Bay has been developed which identifies specific priority projects to implement the LBSP objectives from the USVI’s Coral Reef Management Priorities.
- In 2009, the ARRA funding was allocated to reduce sediment loading to coral reef habitats by implementing a variety of watershed management and stabilization techniques. Funding will improve roads and restore riparian habitats, and improve

watershed drainage and reduce the sediment load washing into nearshore habitats by approximately 130 tons per year.

Coral Bay, St. John

- A WMP was completed in 2008.
- With help from NOAA Coral Program, the Coral Bay Community Council was able to successfully compete for US EPA funding to support the contracting of a hydrologist who is overseeing the implementation of several activities from the management plan.
- In 2009 ARRA funding was allocated to reduce sediment loading to coral reef habitats by implementing a variety of watershed management and stabilization techniques. Funding will improve roads and restore riparian habitats, and improve watershed drainage and reduce the sediment load washing into nearshore habitats by approximately 130 tons per year.

St. Croix East End Marine Park (STXEEMP)

- A watershed management plan was completed in September 2011.
- In 2009 ARRA funding was allocated to reduce sediment loading to coral reef habitats by implementing a variety of watershed management and stabilization techniques. Funding will improve roads and restore riparian habitats, and improve watershed drainage and reduce the sediment load washing into nearshore habitats by approximately 130 tons per year.

St. Thomas East End Reserve (STEER)

- Watershed management projects are currently being developed. ARRA funding was provided to stabilize sediment. Project is being managed by NOAA's Restoration Center.
- FY11 funding was awarded to STEER for the development of a WMP, a coastal use assessment, and in-water contaminant assessment work to characterize sediment loads, nutrients, chemical contaminants, and bioeffects.

USVI (Jurisdiction)

- FY11 internal funding was awarded for development of a green construction training program for USVI that will provide construction workers with the technical skills and knowledge to implement appropriate construction methods to protect coral reef ecosystems.

Jurisdictional Needs

The following list is a synthesis of jurisdictional needs identified by local field staff that pertains to the four National LBSP Objectives. This list does not encompass the entire suite of the jurisdiction's LBSP related needs. Additionally, each of the needs listed indicate which specific facet of NOAA's technical expertise can be employed to address the stated need and have been matched with the corresponding National LBSP Objective.

Technical Assistance

- Implementation of recommended management activities identified in the WMPs for Coral Bay, Fish Bay, and the STXEEMP. This activity aligns with National LBSP Objective 1.3.
- An update to the Fish Bay WMP. This activity aligns with National LBSP Objective 1.3.
- An update to the Coral Bay WMP. This activity aligns with National LBSP Objective 1.3.

Partner Coordination and Technical Assistance

- Facilitate the implementation of storm water management projects in each of the four priority sites. This activity aligns with National LBSP Objective 3.2 and National LBSP Objective 1.3.
- Stream bed stabilization along the ephemeral guts in each of the four priority sites. This activity aligns with National LBSP Objective 3.2 and National LBSP Objective 1.3.

Partner Coordination, Technical Assistance, and Capacity Building

- A technical update and revision of the USVI Environmental Protection Handbook to include USVI-specific design standards and specifications and training for stormwater BMPs to more effectively address LBSP on coral reefs. The revised handbook would have territory-wide application for future development and redevelopment projects as well as provide key BMP performance information required for watershed planning efforts. This activity aligns with National LBSP Objective 3.1 and National LBSP Objective 3.2.

Monitoring and Assessment

- Sediment monitoring in each of the four priority sites. This activity aligns with National LBSP Objective 1.5.

The following table crosswalks the four National LBSP Objectives identified by the Coral Program as areas of focus that correspond with USVI’s Priority LBSP Objectives. Identifying how both these National LBSP Objectives and jurisdictional priorities correlate will increase efficiency and the ability to leverage available resources to address land-based sources of pollution.

NOAA's National LBSP Objectives	LBSP Objectives from USVI’s Coral Reef Management Priorities
GOAL 1: Reduce pollutant loading from watersheds to priority coral reef ecosystems.	
<p>LBSP Impacts Objective 1.3: Implement watershed management plans and relevant LAS within priority coral reef ecosystems and associated watersheds to improve water quality and enhance coral reef ecosystem resilience. Where needed, develop (or update) watershed management plans that incorporate coral reef protection measures.</p>	<p>Objective 1.1: Define and identify priority watersheds and develop management plans that reduce the effects of contaminants and poor water quality on reef resources.</p> <p>Objective 1.2: Develop and apply USVI specific best management practices and adaptive management plans as necessary throughout the territory (e.g., installation of</p>

	culverts, catch basins, vegetative buffers, etc.).
GOAL 3: Build and sustain management capacity at the local level through local, state, regional, and federal coordination of financial, institutional, and human resources to reduce and prevent the impacts from land-based sources of pollution on coral reef ecosystems.	
LBSP Impacts Objective 3.1: Ensure that coral reef jurisdictions have adequate resources and capacity to develop and implement management plans, assess water quality and coral reef ecosystem condition, enforce regulations and evaluate performance	Objective 3.1: Maintain sufficient law enforcement staff and enforce regulations on priority rules and regulations, such as development practices, permit conditions, MPA regulations and fisheries regulations. Objective 3.3: Provide cross training between science and management departments and enforcement officers to increase enforcement capacity and enable cross-enforcement of existing regulations.

Florida:

Florida has one priority region; the Florida Reef Tract. This priority region spans from the St. Lucie Inlet in Martin County to the Dry Tortugas in Monroe County. Coral reef managers in Florida determined that improved integration of efforts to address LBSP is needed across the entire Florida Reef Tract. Current project partners include: US EPA, USDA-NRCS, the Florida Department of Environmental Protection (FDEP), Florida International University, NOVA Southeastern University, Florida Keys National Marine Sanctuary, NPS in Biscayne, Everglades and Dry Tortugas National Parks, Palm Beach County’s Environmental Resources Management (ERM), Miami-Dade County’s Department of Environmental Resources Management (DERM), Broward County’s Environmental Protection Department, USFWS Key National Wildlife Refuge, Florida’s Fish and Wildlife Conservation Commission, John Pennekamp State Park, John U. Lloyd State Park, the St. Lucie Inlet State Park, the South Florida Water Management District, and NOAA Fisheries SE Regional Office. The following is a summary of past and present LBSP activities at each of the jurisdiction’s priority sites.

Florida Reef Tract

- A few WMPs have been developed by the South Florida Water Management District for SEFCRI region however they do not take into consideration the impacts of LBSP on coral reef ecosystems.
- Extensive water quality monitoring funded by US EPA has been conducted at 155 different sites in the Florida Keys. NOAA Coral Program provided two years of funding to initiate a pilot water quality monitoring at 22 sites in Martin, Palm Beach, Broward and Miami-Dade counties. There is no commitment for funding for this project beyond FY13.
- Two projects are currently being conducted to identify links between LBSP, coral reef resources, and the impact of LBSP on these resources. One project is specifically evaluating the chain of causality between LBSP, the responses of individual reef-building corals, and the health of coral reef communities. The other project is looking at

establishing indicator organisms as effective units for monitoring anthropogenic nutrient influence through cause-effect demonstrations in *Lyngbya* spp., the filamentous cyanobacteria. Outcomes will provide critical information to link the degradation of coral reefs with LBSP in southeast Florida and enable resource managers a way to evaluate the efficiency of land-based pollutant control measures.

- Educational materials are being developed to directly address the issue of the lack of public awareness regarding LBSP and its effect on coral reefs. The educational resources include a fertilizer and pesticide brochure and a watershed poster.

Jurisdictional Needs

The following list is a synthesis of jurisdictional needs identified by local field staff that pertains to the four National LBSP Objectives. This list does not encompass the entire suite of the jurisdiction's LBSP related needs. Additionally, each of the needs listed indicate which specific facet of NOAA's technical expertise can be employed to address the stated need and have been matched with the corresponding National LBSP Objective.

Technical Assistance

- Classification of the South East Florida Reef Tract into sub-watersheds units and a prioritization of these watersheds from a coral reef ecosystem perspective. This effort would include a synthesis of past watershed planning efforts and an update to existing plans to include inlet pollutant reduction measures i.e., actions to reduce nitrogen input as current plans focus on phosphorus. These syntheses would help identify priority areas for LBSP reduction projects. This activity aligns with National LBSP Objective 1.3.
- Further studies to understand the relative influence of pollutants from inlets, submerged groundwater discharge, and upwelling along the South East Florida Reef Tract within the prioritized sub-watershed units. This activity aligns with National LBSP Objective 1.5.
- Assess the efficacy of implemented management activities. Evaluate impacts of change in water quality on reef habitat. This activity aligns with National LBSP Objective 1.5.

Partner Coordination and Technical Assistance

- Support for pilot projects to evaluate new technologies that reduce LBSP on coral reefs i.e., the development of BMPs and replicable demonstration projects along the South East Florida Reef Tract. This activity aligns with National LBSP Objective 1.3 and National LBSP Objective 3.2.

The following table crosswalks the four National LBSP Objectives identified by the Coral Program as areas of focus that correspond with Florida's Priority LBSP Objectives. Identifying how both these National LBSP Objectives and jurisdictional priorities correlate will increase efficiency and the ability to leverage available resources to address land-based sources of pollution.

NOAA's National LBSP Objectives	LBSP Objectives from Florida's Coral Reef Management Priorities
GOAL 1: Reduce pollutant loading from watersheds to priority coral reef ecosystems.	
<p>LBSP Impacts Objective 1.3: Implement watershed management plans and relevant LAS within priority coral reef ecosystems and associated watersheds to improve water quality and enhance coral reef ecosystem resilience. Where needed, develop (or update) watershed management plans that incorporate coral reef protection measures.</p>	<p>Objective 1: Minimize the impacts of reduced water quality associated with controlled freshwater deliveries and coastal construction activities on coastal, estuarine and lagoonal habitats (i.e., seagrass, oyster, mangrove, hardbottom and coral reef communities). Irregularly timed, high volume releases of fresh water into the marine and estuarine coastal systems can carry excessive nutrient and pollutant loads and are detrimental to coastal habitats and biota.</p>
<p>LBSP Impacts Objective 1.5: Determine the efficacy of management activities through coordinated baseline and performance monitoring to assess progress and adapt management actions as needed.</p>	<p>Objective 3: Design and implement a long-term, spatially robust water-quality-monitoring program for the southeast Florida coastal waters in order to determine sources of pollution and prioritize reduction efforts, as well as indicate successes of current pollutant reduction efforts.</p> <p>Objective 2: Use monitoring data to assess effectiveness of abatement measures that can be easily and effectively communicated through outreach and education.</p>
GOAL 3: Build and sustain management capacity at the local level through local, state, regional, and federal coordination of financial, institutional, and human resources to reduce and prevent the impacts from land-based sources of pollution on coral reef ecosystems.	
<p>LBSP Impacts Objective 3.1: Ensure that coral reef jurisdictions have adequate resources and capacity to develop and implement management plans, assess water quality and coral reef ecosystem condition, enforce regulations and evaluate performance.</p>	<p>Objective 3: Design and implement a long-term, spatially robust water-quality-monitoring program for the southeast Florida coastal waters in order to determine sources of pollution and prioritize reduction efforts, as well as indicate successes of current pollutant reduction efforts.</p>

Hawai'i:

Hawai'i has two priority sites: Ka'anapali/Kahekili, Maui; and Pelekane Bay/Puako-Anaeho'omalu Bay, Hawai'i Island. These sites were selected by a working group of coral reef managers in Hawai'i. Current project partners include: US EPA, USGS, USDA-NRCS, USFWS, USACE, Hawai'i Division of Aquatic Resources (HI-DAR), Hawai'i State Department of Health, Hawai'i Coastal Zone Management Program, TNC, NFWF, and local community groups at each site. In addition there are four existing LBSP LAS watersheds (Maunalua Bay, Oahu; Honolulu Bay, Maui; Hanalei, Kaua'i; and Kawela – Kamalo, Moloka'i) where the LBSP LAS is

providing limited technical and financial support to complete on-going projects. Please refer to the LAS document for an overview of projects implemented since 2004. The following is a summary of past and present LBSP activities at each of the jurisdiction's priority sites.

Ka'anapali/Kahekili, Maui

- A WMP is being developed and will be completed by September 2012 with internal FY11 Coral Program funding.
- A CAP for Kahekili is being finalized through the TNC cooperative agreement. Planning will be led by TNC and HI-DAR.
- Ka'anapali was selected as a U.S. Coral Reef Task Force Watershed Partnership Initiative site in 2011. Current Federal agency partners include USDA-NRCS, NOAA, USACE, and US EPA. A watershed coordinator has been contracted thru the NFWF to lead this effort. The coordinator is co-managed by NOAA, DAR and NFWF.
- HI-DLNR and USACE led West Maui Watershed Project will be formalized in 2012. The project goal is to improve the overall health of coral reefs, nearshore waters and watersheds of the region. The project will 1) identify critical threats to reefs and watershed health, 2) evaluate solutions to these threats from ridge to reef, and 3) prioritize actions and implement restoration or remedial actions. The project area extends beyond the Coral Program priority site to Honolua Bay.
- An environmental forensic investigation into the causes of coral decline and mortality in the West Maui will be implemented in 2012 with internal FY12 Coral Program funding. The project will also include training for local managers in environmental forensic methods.
- A rain garden installation clinic will be conducted in 2012 with internal FY11 Coral Program funding.
- A project from the WMP will be implemented in 2012 thru the Hawaii coral management cooperative agreement (placeholder awaiting WMP completion).

Pelekane Bay/Puako-Anaeho'omalu Bay

- A CAP is under development and will be completed in 2012. The CAP is being co-led by TNC and HI-DAR.
- WMP's have been completed for Wai'ula'ula and Pelekane Bay.
- The Kohala Watershed Partnership received a NOAA coastal restoration grant, through the ARRA, to restore the Pelekane Bay watershed. The focus was on reducing land-based sediment input into the nearshore environment. Work is continuing in 2012 with support from the NFWF coral conservation fund.
- Coral reef and fish habitat monitoring is being conducted to assess the effectiveness of this Pelekane Bay watershed restoration project.
- Riparian fencing will be installed along Wai'ula'ula stream in 2012, thru the Hawaii coral management grant. This is a priority project from the Wai'ula'ula WMP.

Jurisdictional Needs

The following list is a synthesis of jurisdictional needs identified by local field staff that pertains to the four National LBSP Objectives. This list does not encompass the entire suite of the jurisdiction's LBSP related needs. Additionally, each of the needs listed indicate which specific

facet of NOAA’s technical expertise can be employed to address the stated need and have been matched with the corresponding National LBSP Objective.

Technical Assistance

- Implementation of WMP’s for Wai‘ula‘ula and Pelekane Bay. This activity aligns with National LBSP Objectives 1.3, 3.2, and 3.1.
- Completion and implementation of CAP’s in both priority areas. This activity aligns with National LBSP Objectives 1.3, 3.2, and 3.1.

Technical Assistance, Monitoring, Partner Coordination, and Capacity Building

- Development and implementation of the WMP in West Maui. This includes attaining adequate baseline information, filling data gaps, identifying pollution sources to inform planning, implementing plans, adequate capacity for planning and implementation, and monitoring to measure effectiveness of implementation. This activity aligns with National LBSP Objectives 1.3, 1.5, 3.2, and 3.1.

The following table crosswalks the four National LBSP Objectives identified by the Coral Program as areas of focus that correspond with Hawaii’s Priority LBSP Objectives. Identifying how both these National LBSP Objectives and jurisdictional priorities correlate will increase efficiency and the ability to leverage available resources to address land-based sources of pollution.

NOAA's National LBSP Objectives	LBSP Objectives from Hawai‘i’s Coral Reef Management Priorities
GOAL 1: Reduce pollutant loading from watersheds to priority coral reef ecosystems.	
LBSP Impacts Objective 1.3: Implement watershed management plans and relevant LAS within priority coral reef ecosystems and associated watersheds to improve water quality and enhance coral reef ecosystem resilience. Where needed, develop (or update) watershed management plans that incorporate coral reef protection measures.	GOAL 1: Coral reefs undamaged by pollution, invasive species, marine construction and marine debris. LBSP Objective 1: Reduce key anthropogenic threats to two priority nearshore coral reef sites by 2015 using ahupua‘a-based management.
GOAL 3: Build and sustain management capacity at the local level through local, state, regional, and federal coordination of financial, institutional, and human resources to reduce and prevent the impacts from land-based sources of pollution on coral reef ecosystems.	
LBSP Impacts Objective 3.2: Build partnerships among local, state, federal, and non-governmental entities to identify, leverage, and apply financial and other resources to facilitate improved coastal and upland watershed management to protect coral reef ecosystems from impacts of land-based sources of pollution.	GOAL 4: Increased public stewardship of coral reef ecosystems. LBSP Objective: Provide at least eight community organizations working at priority sites with technical support needed to implement coral reef management strategies that are consistent with ahupua‘a principles, and that enhance ecological resilience by 2020.

Guam:

Guam has three priority sites: Piti/Asan, Manell/Geuss, and a third in northern Guam to be determined. These priority sites were selected by a working group of coral reef managers in Guam. Current project partners include Guam Coastal Management Program, Guam EPA, Guam Department of Agriculture Division of Aquatic Wildlife Resources and Division of Forestry, USDA NRCS, USNPS, NOAA NMFS, TNC, and Guam Environmental Education Partners Incorporated. The following is a summary of past and present LBSP activities at each of the jurisdiction's priority sites.

Piti/Asan

- A CAP for Piti/Asan was completed and is currently being implemented. LSBP management activities include: development of an erosion potential GIS model to inform watershed planning, a forest restoration project, stream-bank stabilization and other BMPs, community based-stewardship projects, research to identify sediment threshold levels in coral, a rain-garden demonstration project at the Asan Mayor's Office, and enforcement patrols for arson and MPA violations. A better site design workshop and scoping for stormwater retrofit opportunities have been conducted.
- A draft WMP has been completed and will be finalized in 2012.
- A Rare Pride social marketing campaign has been completed in Guam's southern watersheds to protect Guam's coral reefs by preventing wildland fires lit by deer hunters. To build on this campaign, community planting projects, cleanups and education events are ongoing, while managers are working to increase enforcement to reduce wildland arson.
- Stream bank stabilization projects are being implemented by the Marianas Resource Conservation and Development Council
- In 2012 the Community Coral Reef Monitoring Program will assist community members monitor the changes in the coral reefs over time as the watershed restoration plans continue. Benthic habitat (in-situ and photoquads) and macroinvertebrates along with basic water quality (temp, pH, D.O., turbidity) will be monitored.

Mannell/Geus

- A CAP has been completed.
- A WMP is under development and will be completed in 2012
- A stream bank stabilization project, and a green belt/buffer strips project will be implemented in 2012 with internal Coral Program funding.
- Community planting projects, educational events and other volunteer activities for the site were coordinated in 2011 by a Micronesia Challenge "Young Champion" who also linked these activities to larger island and regional conservation targets for marine and terrestrial habitats. The new "Young Champion" will likely support similar efforts in 2012.

Guam (Jurisdiction)

- An erosion and sediment control certification program for contractors is planned in 2012.
- An inspector to conduct field assessments to minimize impacts of construction, land development and earthmoving projects will be hired in 2012. To complement the

inspector’s work, a project to share data and document site conditions prior to and during development will be field tested by government agencies with permitting and review responsibilities.

Jurisdictional Needs

The following list is a synthesis of jurisdictional needs identified by local field staff that pertains to the four National LBSP Objectives. This list does not encompass the entire suite of the jurisdiction’s LBSP related needs. Additionally, each of the needs listed indicate which specific facet of NOAA’s technical expertise can be employed to address the stated need and have been matched with the corresponding National LBSP Objective.

Technical Assistance

- Implementation of WMP’s and CAPs at both priority sites. This activity aligns with National LBSP Objectives 1.3, 3.2, and 3.1.
- Technical assistance and training for resource agency staff and contractors to increase awareness and implementation of stormwater management best management practices such as Low Impact Development. This activity aligns with National LBSP Objective 3.1.

Technical Assistance, Partner Coordination, and Capacity Building

- Technical assistance and increased staff capacity to review permit applications for construction and development projects associated with the Military Build-up, and to inspect compliance with permits. This activity aligns with National LBSP Objectives 1.3, 3.2, and 3.1.

The following table crosswalks the four National LBSP Objectives identified by the Coral Program as areas of focus that correspond with Guam’s Priority LBSP Objectives. Identifying how both these National LBSP Objectives and jurisdictional priorities correlate will increase efficiency and the ability to leverage available resources to address land-based sources of pollution.

NOAA's National LBSP Objectives	LBSP Objectives from Guam’s Coral Reef Management Priorities
GOAL 1: Reduce pollutant loading from watersheds to priority coral reef ecosystems.	
<p>LBSP Impacts Objective 1.3: Implement watershed management plans and relevant LAS within priority coral reef ecosystems and associated watersheds to improve water quality and enhance coral reef ecosystem resilience. Where needed, develop (or update) watershed management plans that incorporate coral reef protection measures.</p>	<p>Objective 1.1: Implement CAPs for priority watersheds by 2015 as a model approach to site-based planning and management. (The Piti CAP includes activities to manage land-based sources of pollution and recreational impacts to reefs, increase awareness of the impacts to reefs and fill gaps in knowledge through management-related research.)</p>

Commonwealth of the Northern Mariana Islands:

CNMI has three priority sites: LaoLao Bay and Garapan on Saipan, and Talakahaya, Rota. These three priority sites were selected by a working group of coral reef managers in CNMI. Current project partners include: CNMI Division of Environmental Quality, CNMI Coastal Resource Management Office, CNMI Division of Fish and Wildlife, TNC, NOAA NMFS, and NOAA NOS. The following is a summary of past and present LBSP activities at each of the jurisdiction's priority sites.

LaoLao Bay

- A CAP for LaoLao Bay has been developed and is currently being implemented. Of the 17 objectives in the 2009 CAP, 3 have been completed, 9 are in progress, 4 have not been started, and 1 is lacking sufficient information.
- Coastal restoration is being implemented through ARRA funding. Funds are being used to help restore coral reefs in LaoLao Bay by removing and addressing sources of upland sediment. The project includes road upgrades, drainage improvements, upland re-vegetation, water quality testing, and marine biological monitoring.
- Coral Program funds were used to install permeable parking in 2011, are funding a volunteer Tasi Watch program through a local NGO in 2012-13, and will fund additional parking improvements and dive access BMPs in 2012-13.
- In February 2012 an evaluation of progress on the CAP implementation was conducted by local agencies and their partners, and a 2012-13 work plan for CAP next steps or revisions is being developed by DEQ.
- A social marketing campaign to address littering and dumping was launched in March 2012 and will run for 6 months, at which time an evaluation will occur to determine the success of the campaign and whether to continue the campaign for an extended period.

Garapan

- This priority site does not have a WMP or CAP. A CAP will be developed in June 2012 utilizing existing stormwater engineering plans and designs.
- Municipal stormwater training for resource agency staff was conducted by the Center for Watershed Protection in 2010. This resulted in the identification of stormwater improvement strategies for Garapan.
- The Garapan Watershed Blue Starfish project is underway. It recognizes the Garapan business community for implementing stormwater management best practices. The project team is finalizing BMPs, qualifications, and materials with plans to launch the campaign by summer 2012.
- A rain garden demonstration project and installation clinic is scheduled for April 2012 at the Museum in Garapan which will be open for agency staff and the general public to participate.

Talakahaya

- Final CAP is pending adoption by resource agency directors.
- Implementation activities have begun in the watershed including re-vegetation and education and enforcement by seasonal field agents.

- A social marketing campaign to reduce lighting of wildland fires by deer hunters is planned for 2012 and 2013.
- A soil loss assessment to analyze the change in soil loss from re-vegetation efforts is planned for 2012-13.

CNMI (Jurisdiction)

- Long-term monitoring of coral reef condition is occurring at all three priority sites.

Jurisdictional Needs

The following list is a synthesis of jurisdictional needs identified by local field staff that pertains to the four National LBSP Objectives. This list does not encompass the entire suite of the jurisdiction’s LBSP related needs. Additionally, each of the needs listed indicate which specific facet of NOAA’s technical expertise can be employed to address the stated need and have been matched with the corresponding National LBSP Objective.

Technical Assistance, Partner Coordination, and Capacity Building

- Adequate resources to complete and implement CAPs. This activity aligns with National LBSP Objectives 1.3, 3.2, and 3.1.

Partner Coordination and Capacity Building

- Coordinate with other agencies to leverage hiring of enforcement officers to reduce burning at Talakahaya. This activity aligns with National LBSP Objectives 3.2 and 3.1.

The following table crosswalks the four National LBSP Objectives identified by the Coral Program as areas of focus that correspond with CNMI’s Priority LBSP Objectives. Identifying how both these National LBSP Objectives and jurisdictional priorities correlate will increase efficiency and the ability to leverage available resources to address land-based sources of pollution.

NOAA's National LBSP Objectives	LBSP Objectives from CNMI’s Coral Reef Management Priorities
GOAL 1: Reduce pollutant loading from watersheds to priority coral reef ecosystems.	
<p>LBSP Impacts Objective 1.3: Implement watershed management plans and relevant LAS within priority coral reef ecosystems and associated watersheds to improve water quality and enhance coral reef ecosystem resilience. Where needed, develop (or update) watershed management plans that incorporate coral reef protection measures.</p>	<p>Objective 1.1: Implement LaoLao CAP as a model approach to site-based planning and management by 2013 (end of ARRA road improvement project in LaoLao Bay)</p> <p>Objective 1.2: Develop and begin implementing a CAP or comprehensive watershed management plan in Garapan (defined as American Memorial Park to Garapan Fishing Base) by 2015 to improve water quality and condition of adjacent coral reefs.</p> <p>Objective 1.3: Develop and begin to implement a CAP or comprehensive watershed</p>

	management plan for a key watershed in Rota to improve water quality and condition of adjacent coral reefs.
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American Samoa:

American Samoa has two priority sites: Faga’alu and Vatia; and one existing LAS Site: Nu’uli. These two priority sites were selected by a working group of coral reef managers in American Samoa. Current project partners include: American Samoa (AS) Department of Commerce - Coastal Management Program, AS EPA, AS Department of Marine and Wildlife Resources, AS Community College-Land Grant Office, USDA-NRCS, the NOAA Pacific Islands Regional Office (PIRO), Fagatele Bay National Marine Sanctuary, National Park of American Samoa, and Le Tausagi. Faga’alu was recently selected as the next site for the US Coral Reef Task Force watershed initiative. The following is a summary of past and present LBSP activities at each of the jurisdiction’s priority sites.

Faga’alu

- A Participatory Learning and Action (PLA) process and CAP were completed in 2011. The two approaches were integrated with the CAP building on the PLA. The PLA was led by NOAA PIRO and CAP by TNC in partnership with the LBSP LAS.
- A watershed modeling project, which includes measuring water parameters, a reconnaissance level watershed assessment, and quantifying sediment and nutrient loading, is being conducted in 2012
- A turbidity study examining the sources and impacts of sediments and identifying solutions was conducted in 2011 by Steven Curtis (a NOAA summer intern)
- A study of the Sediment flux dynamics in the Faga'alu Reefs is underway by Alex Messina (MS graduate student from Univ. of San Diego)
- NOAA CRED is conducting research into the flow dynamics and sedimentation effects on corals
- An American Samoa Watershed Protection Plan has been completed (this is not a WMP).
- The LBSP LAS group has an ongoing outreach and education campaign with participation from the only elementary school in the village.
- A watershed assessment and training will be conducted in 2012 by Horsley Witten Group and the Center for Watershed Protection. They will also develop an implementation strategy to supplement the Faga’alu watershed management plan, including detailed design, cost estimates, and/or implementation planning for one or more projects.

Vatia

- This priority site does not have a WMP or a CAP but does have an MPA, Wetland, and Non-point source program. A community workshop is planned in 2012 to integrate these various programs into one overarching plan (thru PIMPAC).
- No LBSP management activities are currently being implemented within this priority area.
- An American Samoa Watershed Protection Plan has been completed (this is not a WMP).

American Samoa (Jurisdiction)

- A state-wide LBSP LAS was revised in 2010, which includes some activities in the priority sites.

Jurisdictional Needs

The following list is a synthesis of jurisdictional needs identified by local field staff that pertains to the four aforementioned National LBSP Objectives. This list does not encompass the entire suite of the jurisdiction’s LBSP related needs. Additionally, each of the needs listed indicate which specific facet of NOAA’s technical expertise can be employed to address the stated need and have been matched with the corresponding National LBSP Objective.

Technical Assistance

- Implementation of CAPs and WMPs in Faga’alu. This activity aligns with National LBSP Objective 1.3.

Technical Assistance and Partner Coordination

- Implement management activities that address sediment runoff, nutrient and bacterial loading due to piggeries and septic systems. This activity aligns with National LBSP Objective 1.3, and 3.2.

Monitoring and Assessment

- Monitoring sediment loads and nutrient levels from piggeries and septic systems. This activity aligns with National LBSP Objective 1.5.

Partner Coordination and Capacity Building

- Education and outreach to increase LBSP awareness within communities. This activity aligns with National LBSP Objective 3.2 and 3.1.

Capacity Building

- Technical assistance and training to build local capacity to manage LBSP. This activity aligns with National LBSP Objective 1.3, and 3.1.

The following table crosswalks the four National LBSP Objectives identified by the Coral Program as areas of focus that correspond with American Samoa’s Priority LBSP Objectives. Identifying how both these National LBSP Objectives and jurisdictional priorities correlate will increase efficiency and the ability to leverage available resources to address land-based sources of pollution.

NOAA's National LBSP Objectives	LBSP Objectives from America Samoa’s Coral Reef Management Priorities
GOAL 1: Reduce pollutant loading from watersheds to priority coral reef ecosystems.	
LBSP Impacts Objective 1.3: Implement watershed management plans and relevant LAS within priority coral reef ecosystems and associated watersheds to improve water quality	Objective 2.2: Reduce runoff and resulting sedimentation loads to surface water and reef systems by developing and implementing best management practices.

and enhance coral reef ecosystem resilience. Where needed, develop (or update) watershed management plans that incorporate coral reef protection measures.	Objective 2.3: Reduce nutrient and bacterial loading to surface and groundwater.
LBSP Impacts Objective 1.5: Determine the efficacy of management activities through coordinated baseline and performance monitoring to assess progress and adapt management actions as needed.	Objective 2.3: Reduce nutrient and bacterial loading to surface and groundwater.

G. Conclusion

This document outlines a strategic plan for implementing the Coral Program National Goals and Objectives for addressing LBSP and supporting jurisdictional LBSP priorities. Over the next five years (2011 -2015), the Coral Program will focus on implementing four of the twelve national LBSP national objectives: 1.3 Implementing and developing WMPs/CAPs, 3.2 Partnership building, 1.5 Determining the efficacy of management activities, and 3.1 Jurisdictional resources and capacity. The Coral Program LBSP funds will be distributed between these four objectives: 70%, 5%, 20%, and 5% respectively. The Coral Program’s effectiveness at addressing LBSP in each of the seven jurisdictions will be tracked annually with the LBSP performance measures.

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