CREIOS Mapping & Monitoring

Water Quality | Land Based Sources of Pollution

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LAND BASED SOURCES of POLLUTION *(source: NOAA CRCP)*

Pollution from land-based sources such as development and construction activities, sewage treatment, agriculture, storm water, chemical and oil spills etc.

Tanker traffic and lightering off Hawai'i

Coastal development in Tumon Bay, Guam

Points of Intersection

Water Quality | Land Based Sources of Pollution

CORE CAPABILITIES & REQUIREMENTS

Monitoring and Assessment: Chemical, Nutrient, and Pathogen Contamination, Bioavailability, Ecotoxicology, Biological Effects, Disease

Ocean Remote Sensing: Temperature, Ocean Color, Turbidity, Currents, Waves, Rainfall, Frontal Boundaries, Climatological Anomalies

Watershed Modeling and Assessment: Source, Fate, and Transport; Management Impacts, watershed management strategies

Review, Mitigation and Restoration: Essential Fish Habitat, Clean Water Act, Executive Order 13089, Ship Groundings, Habitat Equivalency

NOAA Capabilities

National Status & Trends Program (NS&T)

PROGRAM OVERVIEW

- 280 sites nationwide monitored annually for 120 contaminants
- Nation's longest running coastal contaminant monitoring program
- Comprehensive assessments of environmental contamination, toxicity, & biological community condition in coastal, estuarine, and coral reef ecosystems

Map depicting NS&T monitoring and assessment locations. Orange denotes annual "Mussel Watch" contaminant monitoring, and Yellow denotes biological effects assessment sites

NOAA Capabilities

National Status & Trends Program (NS&T)

ANALYTICAL STANDARDS

- Heavy Metals
- Organics (PCBs, PAHs, DDT)
- Antifouling Agents
- Flame Retardants
- Energetic Compounds
- Radioactive Compounds
- Contemporary Pesticides
- *Clostridium prefringens* (pathogens)
- Shellfish pathologies
- Nutrients

  (nitrate, nitrite, ammonia, urea, total nitrogen, orthophosphate, total phosphorus, silica)

NS&T scientists assess contamination associated with military activities in Vieques Puerto Rico

NOAA Capabilities

National Status & Trends Program (NS&T)

CASE STUDY

Conservation Effectiveness Assessment Project

(NOAA | USDA | Puerto Rico)

Goal is to evaluate the effectiveness of Best Management Practices (BMPs) in an agricultural watershed, and to construct quantitative models for use by coastal managers

Partners are integrating sediment and water contamination (nutrients and agro-chemicals) with biological indicators of coral reef ecosystem health to determine impacts

NS&T scientists collaborate with NOAA CRCP, USDA, and Puerto Rico to evaluate watershed management BMPs

NOAA Capabilities

Coastal Change Analysis Program (C-CAP)

NOS | CSC | Pacific Services Center

- Impervious surface data for MHI and Guam (American Samoa available spring 2009)
- Land cover change data and maps for MHI (Guam available summer 2009)
- Decision support tools for prioritizing conservation areas and modeling nonpoint source pollution and erosion

  www.csc.noaa.gov/digitalcoast

High-resolution impervious surface data of Andersen Air Force Base on Guam

High-resolution land cover data illustrating coastal development, pineapple cultivation, and Kapalua Golf Resort on Maui

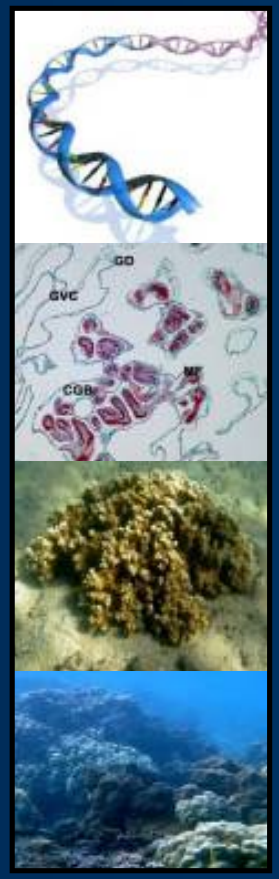
CRCP Local Action Strategies

CASE STUDY

Developing tools for assessing land-based pollutant impacts in corals (Hawai'i)

(NOAA | HIMB | State of Hawai'i)

Goal is to assess pollution impacts using an array of indicators ranging from molecular expressions of compromise to population-level effects observed through traditional monitoring techniques



Time scales of pollution impacts, ranging from minutes to years

CASE STUDY

Impacts to Fringing Reefs in Molokai, Hawai'i

NOAA Capabilities

CRED – Coral Disease Program

CORAL DISEASE AS AN INDICATOR of LBSP

"Nothing within any of our experiences prepared us for the increase we've seen in coral disease. We saw a 300% increase in the number of stations afflicted."
(Dr. Jim Porter, CBS News 2002; EPA Coral Reef Monitoring Program)

"Sedimentation, pollution and nutrient enrichment are associated with elevated severity of coral diseases"
(Bruno *et al*., 2003; Francini-Filho 2008)

NOAA Capabilities

CRED – Coral Disease Program

GOALS & OBJECTIVES

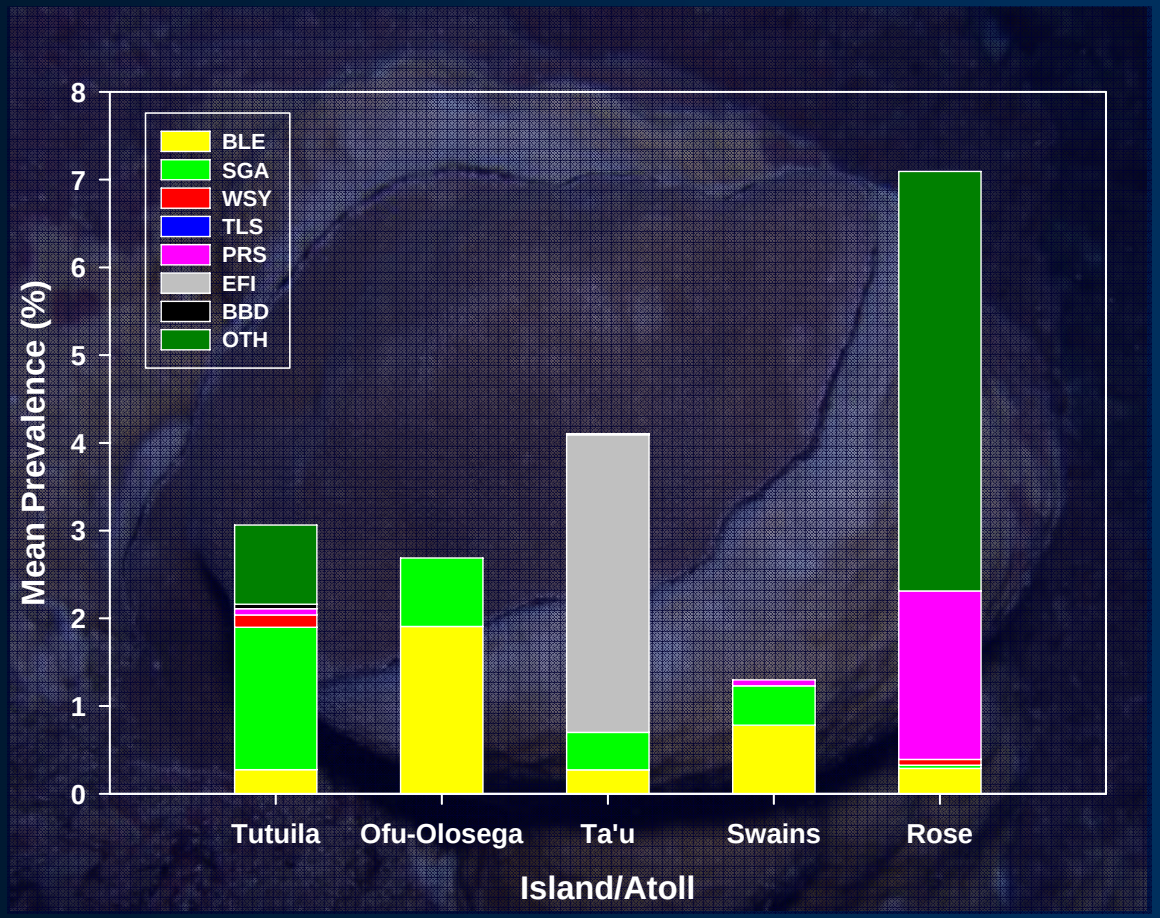
- Assess and monitor the abundance and distribution coral of disease across the US-affiliated Pacific territories
- Evaluate the spatio-temporal patterns of disease prevalence
- Assess potential linkages with natural and anthropogenic impacts
- Contribute to development of standardized nomenclature; facilitate field identification and reporting
- Build capacity and partnerships

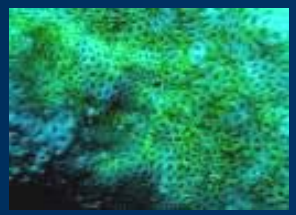
NOAA Capabilities

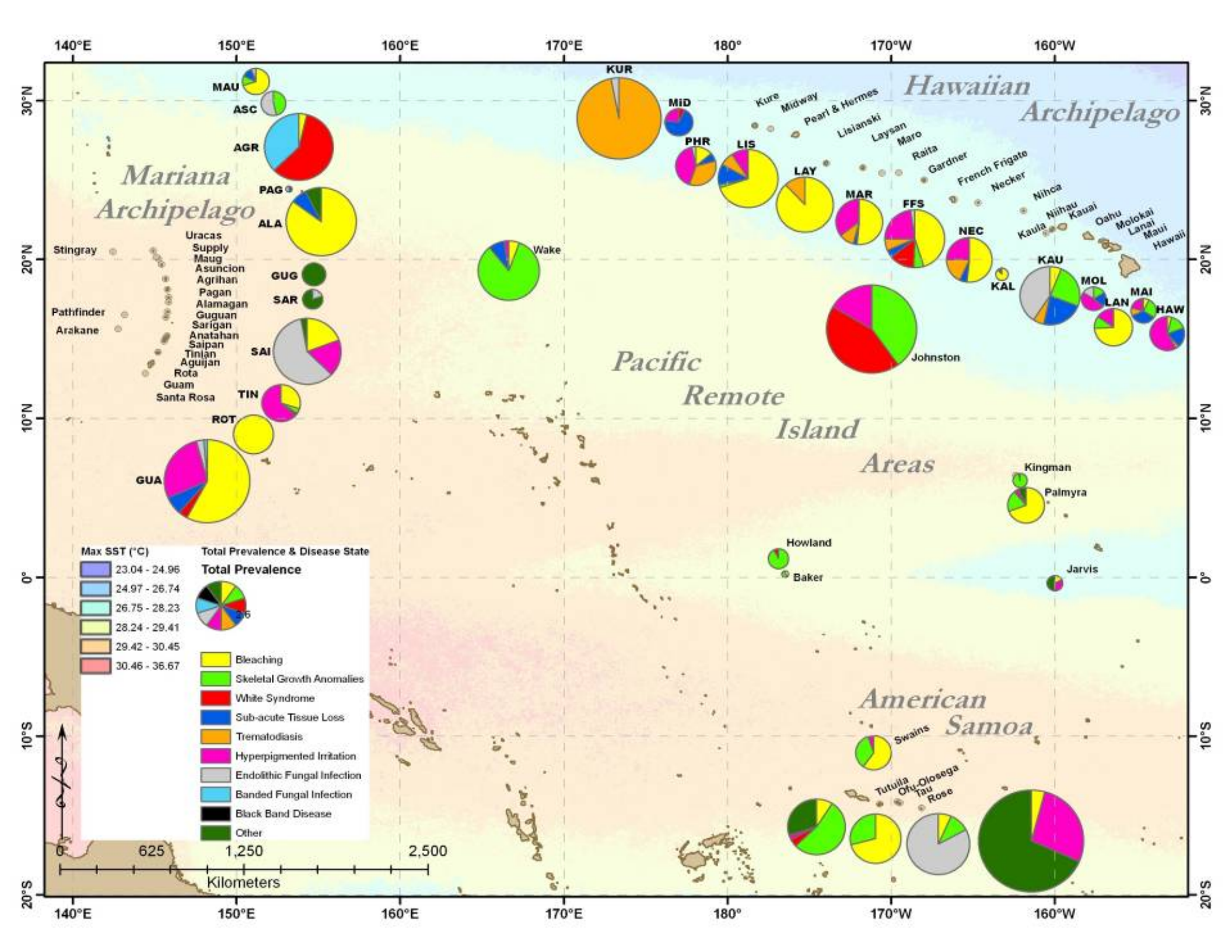
CRED – Coral Disease Program

CASE STUDY

Disease Prevalence in the Pacific Basin: American Samoa *(NOAA | Territory of American Samoa)*






140°E
150°E
160°E
170°E
180°
170°W
160°W
30°N
20°N
10°N
0°
10°S
20°S
Mariana Archipelago
Hawaiian Archipelago
Pacific Remote Island Areas
American Samoa
MAU
ASC
AGR
PAG
ALA
GUG
SAR
SAI
TIN
ROT
GUA
Uracas
Supply
Maug
Asuncion
Agrihan
Pagan
Alamagan
Guguan
Sarigan
Anatahan
Saipan
Tinian
Aguijan
Rota
Guam
Santa Rosa
Stingray
Pathfinder
Arakane
KUR
MID
PHR
LIS
LAY
MAR
FFS
NEC
KAL
KAU
MOL
MAI
LAN
HAW
Kure
Midway
Pearl & Hermes
Lisianski
Laysan
Maro
Raita
Gardner
French Frigate
Necker
Nihoa
Kaula
Niihau
Kauai
Oahu
Molokai
Lanai
Maui
Hawaii
Wake
Johnston
Kingman
Palmyra
Howland
Baker
Jarvis
Swains
Tutuila
Ofu-Olosega
Tau
Rose
Max SST (°C)
23.04 - 24.96
24.97 - 26.74
26.75 - 28.23
28.24 - 29.41
29.42 - 30.45
30.46 - 36.67
Total Prevalence & Disease State
Total Prevalence
Bleaching
Skeletal Growth Anomalies
White Syndrome
Sub-acute Tissue Loss
Trematodiasis
Hyperpigmented Irritation
Endolithic Fungal Infection
Banded Fungal Infection
Black Band Disease
Other
0
625
1,250
2,500
Kilometers