GUAM'S COASTAL & WADEABLE STREAM ASSESSMENTS

Monitoring Program
EMAS Division
Guam EPA

Key Environmental Issues

- Habitat Destruction and Alteration
- Sedimentation related Issues
- Toxic Contamination
- Eutrophication on Reefs

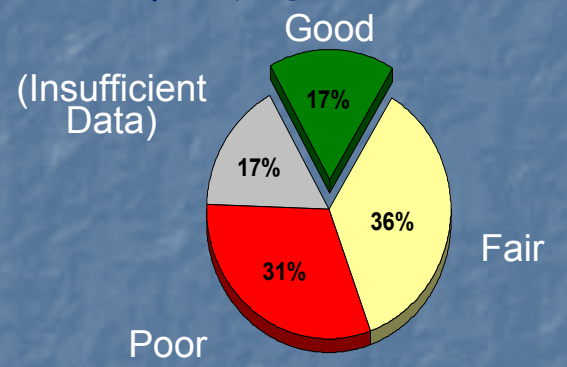
Key Questions

- What size (in percent or miles) of all waters in Guam meet their designated uses?
- For assessed waters that are not meeting their designated uses, what size is affected by stressors?

Why EMAP?

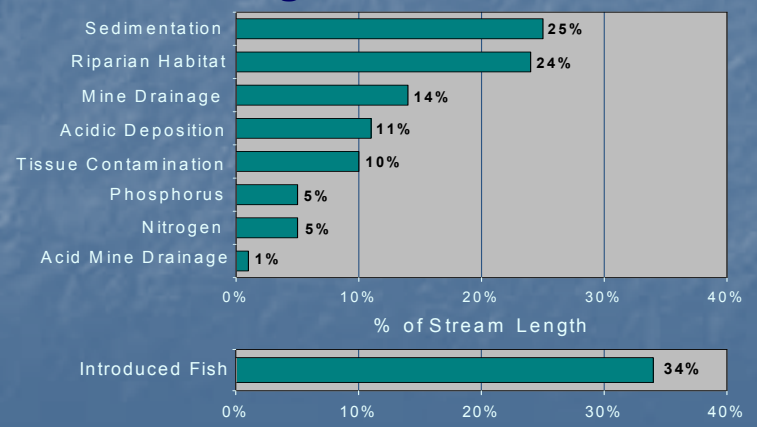
- Probability Design Advantage
  - Sites are statistically representative of the entire resource population
  - Results can be extrapolated to entire population
  - Allows Guam to be included in the national assessment
  - Expandability to a regional scale

Fish IBI Results



Proportion of Stream Length

Ranking of Potential Stressors



(Example from EMAP in Mid-Atlantic)

Guam Coastal Assessment (GCA)

50 Stations Islandwide

0 TO -60ft
Depth

Estuaries and Near Shore
w/
Special Sample Area:
APRA HARBOR

Phaethon lepturus

(WHITE-TAILED TROPIC BIRD)

R/V UTAK

GCA Parameters
Water Column Profile

3 Depths Collection*:*

- Bacteria (enterococci)
- Chlorophyll a
- Ammonia-nitrogen
- Nitrite nitrogen
- Nitrate+nitrite Nitrogen
- Orthophosphorus
- Total Suspended Solids

3 Depths *in situ:*

- Depth
- Temperature
- Transparency/Clarity
- pH
- Salinity
- Conductivity
- Dissolved Oxygen
- Turbidity (NTU)

Data Sonde & PAR combo

Horizontal Water Sampler

GCA Parameters Biological Resources

Benthic Community & Habitat Description - SCUBA

- Sediment collection:
  - Infaunal Composition & Abundance
  - Granulometry (UH Infaunal Lab)
  - Total Organic Carbon
  - Habitat Substrate type
- Habitat Aquatic Vegetation & Macroalgal Abundance
- Habitat Invertebrate Composition & Abundance
- Degree of Wave Impact
- Anthropogenic Debris Identification
- Threatened/Endangered Species Identification

Fish Community Visual Assessment - SCUBA

- Composition
- Abundance

Used for:

- Biomass Estimate
  - (Standing Stock)

Done with the assistance of the DAWR Fisheries Section

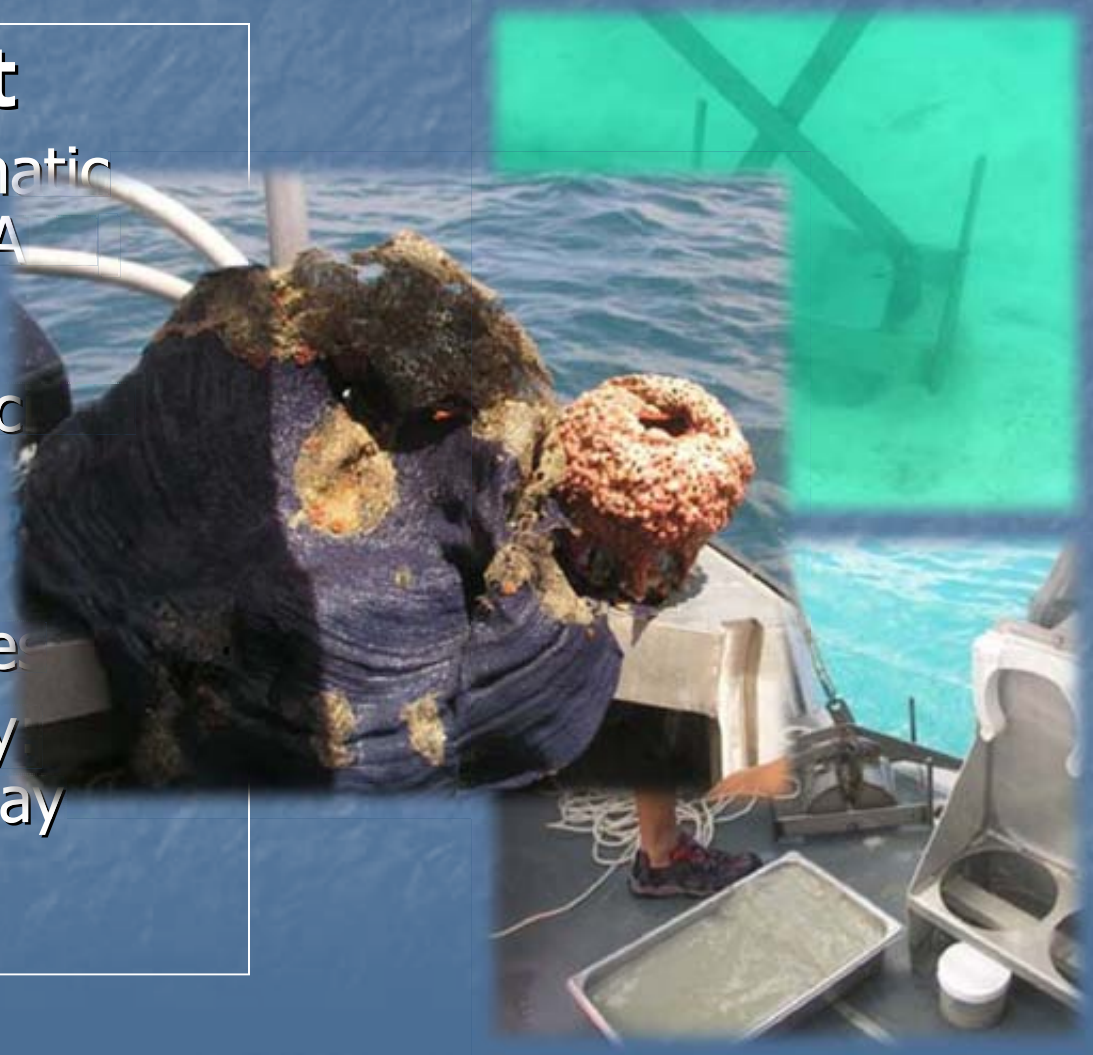
1m Square Quadrat

25m Transect

GCA Parameters Contaminants: Sediment

Sediment

- Polynuclear Aromatic Hydrocarbons (PA
- PCB congeners
- Chlorinated Pestic other than DDT
- Inorganics
- DDT & Metabolite
- Sediment Toxicity Amphipod Bioassay



Nematonereis unicornis

Capitella capitata

Sipuncula

Branchiostoma sp

Total Invertebrates	14,051
Invertebrate Taxa	163
Total Polychaetes	8,582
Polychaete Taxa	141

GCA Parameters Contaminants: Tissue

Actinopyga mauritiana

Holothuria atra

Holothurian Tissue

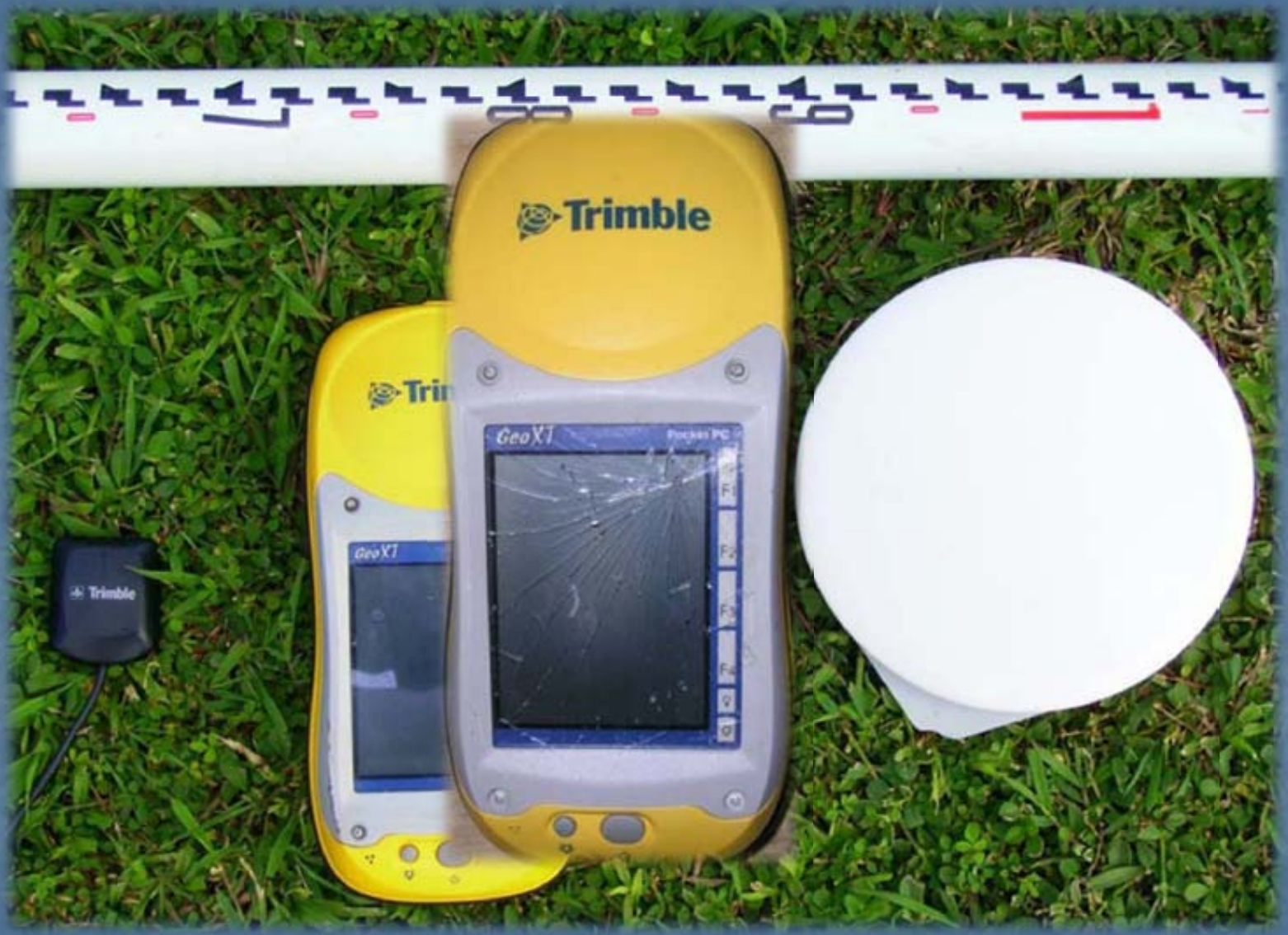
- Polynuclear Aromatic Hydrocarbons (PAHs)
- PCB congeners
- Chlorinated Pesticides other than DDT
- Inorganics
- DDT & Metabolites
- Tissue % Lipid Determination

Guam Wadeable Steam Assessment (GWSA)

38 Stations w/in Southern Watersheds

119 Rivers & Streams

FRESHWATER ONLY


Trimble
GeoXT
Pocket PC
Trimble

Site Location & Verification

Reach 150m
Ten 15m segments

GWSA Parameters Water

Guam EPA Laboratory

- Temperature
- pH
- Conductivity
- Dissolved Oxygen
- Turbidity (NTU)
- Chlorophyll
- True Color
- Total Suspended Solids
- Total Dissovled Solids
- Bacteria (E. coli)
- Total Dissovled Nitrogen
- Ammonia-nitrogen
- Nitrite nitrogen
- Nitrate+nitrite Nitrogen
- Total Dissolved Phosphorus
- Orthophosphorus

USEPA Region 9 Laboratory

- NH3, Ammonium
- Silica, dissolved
- Acid Neutralizing Capacity-Alkalinity (ANC)
- Total Inorganic Carbon
- Total Organic Carbon
- Total Aluminum (Dissolved)
- Aluminum (monomeric & organic monomeric)
- Major Anions (Chloride/Nitrate/Sulfate)
- Major Cations (Calcium/Magnesium/Potassium/Sodium)

Biological Stream Assessments

GWSA Parameters Tissue

- PCB Congeners (EPA 8082)
- Organochloride Pesticides (EPA 8081)
- Inorganics (EPA 7010 for Ar, Pb, Hg, & Se)
- Inorganics (EPA 6010)
  - (Al, Cd, Cr, Cu, Fe, Ni, Sn, Zn)
- Tissue Chemistry (% Lipid Determination)
- Organophosphate Pesticides
- Tributyltin

10
11
12

1
4
5
6
7
METRIC
10
12
13
14
15

27
28
29

Ricknet

METRIC

Periphyton and Benthic Macro Invert Sampling

Physical Habitat Characterization

Stream Bank Angle

Stream Discharge

Canopy Density

Woody Debris ID

Measuring Undercut

Stream Heading/Slope

Forms Forms Forms

Current Status

GCA '04

- Sampling Completed
- Data Validation Ongoing
- Data Evaluation

GWSA '06

- Sampling Ongoing

  15 stations remaining

Next Year should start

- Data Validation
- Data Evaluation

GCA '10

- Sampling NearShore Reef Flats Only
- Still Deciding If Regional for CNMI and Guam
- Funding from USEPA