

# What Type of Remote Sensing Imagery Is Right for Me?

## Relating Benthic Cover Data Resolution to Management Needs

### Sediment Profiling Imagery

In situ photograph that penetrates the seafloor and captures a vertical slice of the bottom (15 x 25 cm) in shallow to deep waters (<1 meter to 4,000 meters)



#### How can I use these data?

- Ground-truthing of remote sensing data
- Habitat and species inventory
- Sediment and habitat quality assessments
- Dredged material monitoring and impact assessments
- Mapping in turbid waters

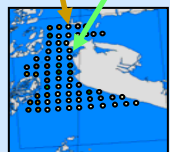
#### What will I see?

Features at or below the sediment surface:

- Biological features (shellfish, seagrass)
- Geophysical features (sediments, layering)
- Anthropogenic debris and subsurface methane pockets

#### Limitations

- Difficult to relate small sample footprint to entire habitat
- Interpolated maps may under- or overestimate the resource or miss valuable information



### Airborne Digital Imagery

Panchromatic (1-band), multispectral (2 to 7 bands) and hyperspectral (8 or more bands) imagery with pixel sizes 0.25 to 3 meters\* (variable depending on mission requirements)



\*Resolution for some airborne digital sensors—for example, AVIRIS hyperspectral sensor ER-1—may be up to 20 meters.

#### How can I use these data?

- Resource inventory
- Damage assessment and mitigation
- Permitting, monitoring, and leasing
- Guiding in situ studies

#### What will I see?

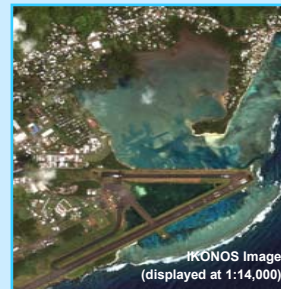
- Areal extent of resources, including seagrass beds and patches, coral reefs, individual corals, and oyster reefs
- Basic sediment types

#### Limitations

- Depth penetration limited by water clarity
- Not suitable for identifying species or resource health (stress, disease)

### High-Resolution Satellite Imagery

Panchromatic (1-band), multispectral (2 to 7 bands), and hyperspectral (8 or more bands) imagery with pixel sizes 0.7 to 10 meters



#### How can I use these data?

- Resource inventory
- Monitoring
- Guiding in situ studies

#### What will I see?

- Areal extent of resources, including seagrass beds and patches, coral reefs, and individual corals
- Basic sediment types

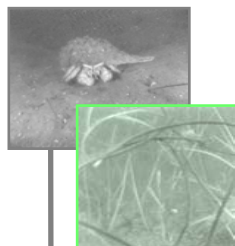
#### Limitations

- Depth penetration limited by water clarity
- Not suitable for identifying species or assessing resource health
- Cannot control for clouds
- Imagery may not have been acquired during conditions optimal for benthic mapping (tidal stage, sun angle)



### Underwater Videography

In situ video stream of the seafloor surface that provides continuous, direct view of about 1 meter of the seafloor



#### How can I use these data?

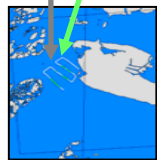
- Validation and assessment of remotely sensed data
- Assessment of health or status of some resources using long-term monitoring
- Habitat inventory and mapping
- Damage assessments and mitigation
- Mapping in turbid waters

#### What will I see?

- Seagrass, macro algae, shellfish beds, corals
- Species and health
- Sediment types (sand, gravel) and substrate (shell hash, detrital mats)

#### Limitations

- Difficult to relate small sample footprint to entire habitat
- Interpolated maps may under- or overestimate the resource or miss valuable information
- Interpretation is labor-intensive



### Analog Aerial Photography

Panchromatic (1-band) or multispectral (3-band) with pixel sizes 1 foot to 3 meters (variable depending on mission requirements)



#### How can I use these data?

- Resource inventory
- Damage assessment and mitigation
- Permitting, monitoring, and leasing
- Guiding in situ studies
- Depth evaluations (stereo)

#### What will I see?

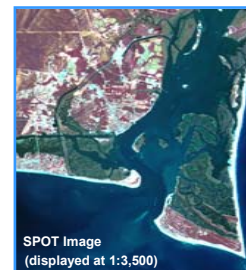
- Areal extent of resources, including seagrass beds and patches, coral reefs, and individual corals
- Basic sediment types

#### Limitations

- Film format
- Depth penetration limited by water clarity
- Not suitable for identifying individual species or assessing resource health

### Mid-Resolution Satellite Imagery

Panchromatic\*\* (1-band), multispectral (2 to 7 bands), and hyperspectral (8 or more bands) imagery with pixel sizes 10 to 30 meters



#### How can I use these data?

- Hypothesis formulations
- Identification of potential resources for detailed mapping
- Generalized mapping of a resource

#### What will I see?

- Location of resources such as seagrass beds and coral reefs
- Land and water interface
- Relationships to major terrestrial features

#### Limitations

- Imagery may not have been acquired during conditions optimal for benthic mapping (tidal stage, sun angle)
- Cannot control for clouds
- Larger pixel size may over- or underestimate aerial extent of resource
- Small features will not be detected
- Panchromatic imagery has limited benthic mapping applications\*\*

\*\*Panchromatic imagery acquired from high resolution satellites has pixel sizes as small as 0.7 meters. However, panchromatic imagery has limited benthic mapping applications because it has a limited blue band and is calibrated to the near infra red band.