

2013 Mid-Atlantic Living Shorelines Summit

What we know and what we
need to know: the “Small”
and “Big” Picture

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Living Shorelines Attributed Services: Erosion Protection +

- Improve water quality and clarity
- Improve marine habitat & spawning areas
- Improve riparian habitat
- Create or maintain system-level connections
- Climate resilience
- Net wetland gain



Much of what we “know” are assumptions

- Based on natural tidal wetlands
- Based on created/ restored compensation wetlands
- Based on engineered structures
- Based on limited time scale
- Based on Local/ Small scale

LS marsh = created marsh = natural marsh

Primary Production

Erosion Control

Water Quality

Habitat

Data Limitations for Natural Marsh



LS marsh = natural marsh?

- Primary Production/ Vegetation establishment

Probably over time

- Have: Aboveground brackish/ salt
- Need: Belowground
Tidal Fresh



LS marsh = natural marsh?

- Erosion Control
 - Probably over time
 - Have: limited wave height/ energy data
 - Need: Wave energy /wave height reduction by species, community types, setting and storm



LS marsh = natural marsh?

- Water Quality

Maybe over longer time

- Have: Some sediment trapping
- Need: Denitrification

Nutrient uptake

Cycling data



LS marsh = natural marsh?

- Habitat

- Maybe over differing time scales

- Have: Some fish use, benthos

- Need: Comparative studies- LS trade-offs

- Fisheries

- Waterbirds

- Terrestrial species

- Corridors

- Longer Time monitoring



Scale Issues

Smaller Scale	Larger Scale
Site specific erosion control	Sediment budgets
Sediment trapping	Sediment availability
Primary Production	Non-vegetated and shallow water primary production
Denitrification	Water Quality Improvement/ Bay TMDL
Nutrient removal/ provision	Coastal eutrophication
Wetland creation	Cumulative Watershed restoration
Carbon sequestration	Climate change
Storm risk reduction	Coastal resilience/ wetland sustainability

Larger Scale

North Atlantic Comprehensive Coastal Study
(Sandy): Nature and Nature-Based

SAGE- Systems Approach to Geomorphic
Engineering: Grey-Green

TMDL: Sediment and Nutrient Load Reductions

Model

Credits

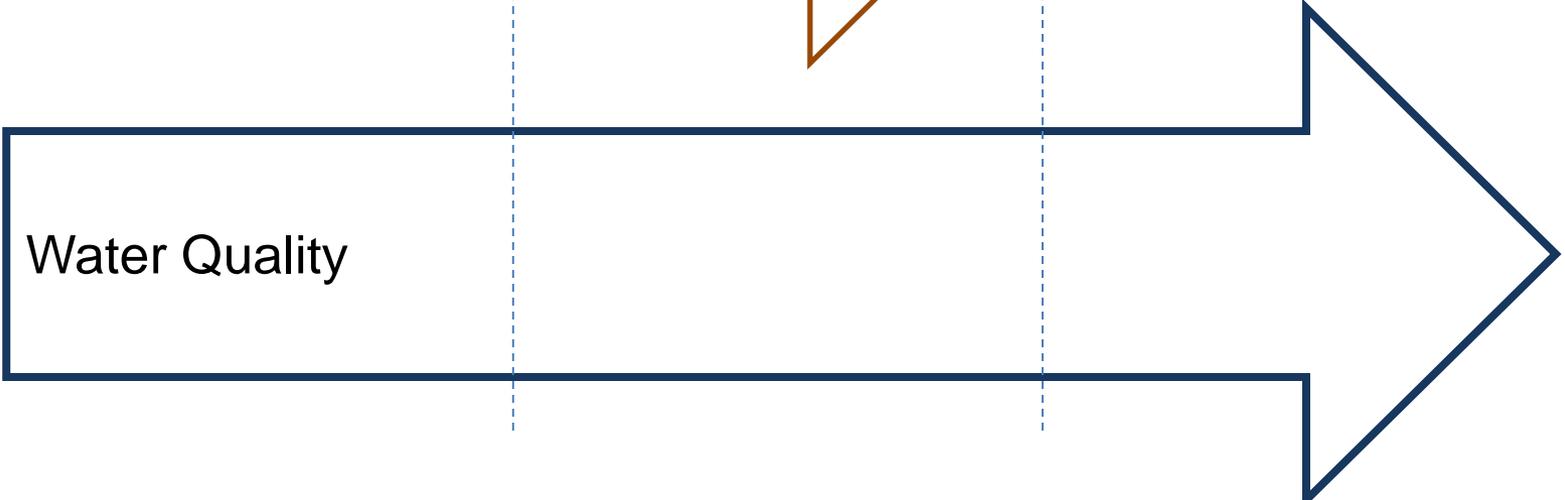
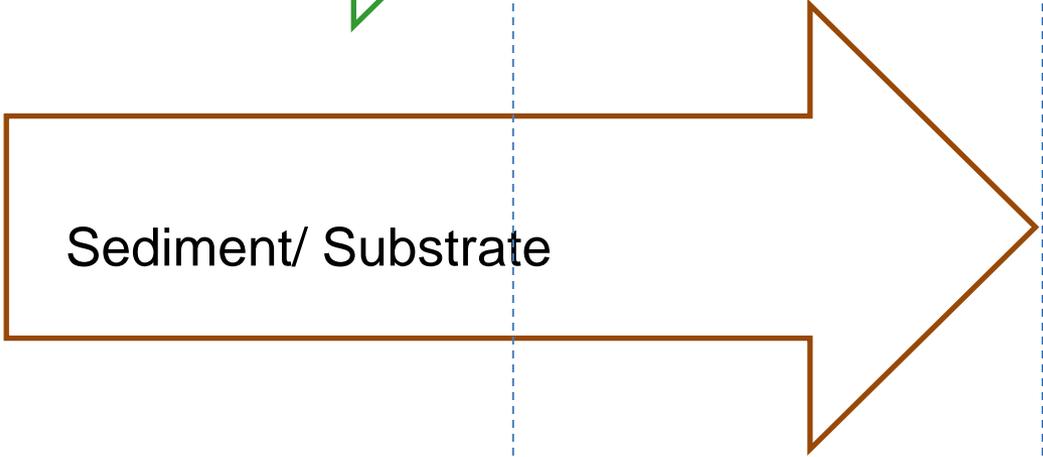
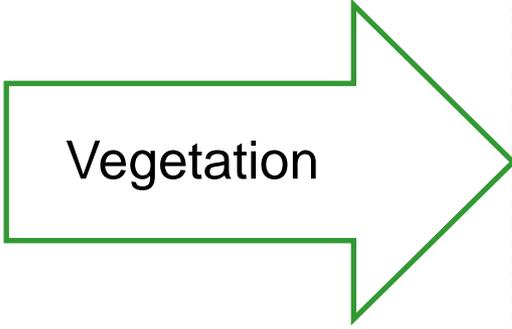
CRS – Community Rating System

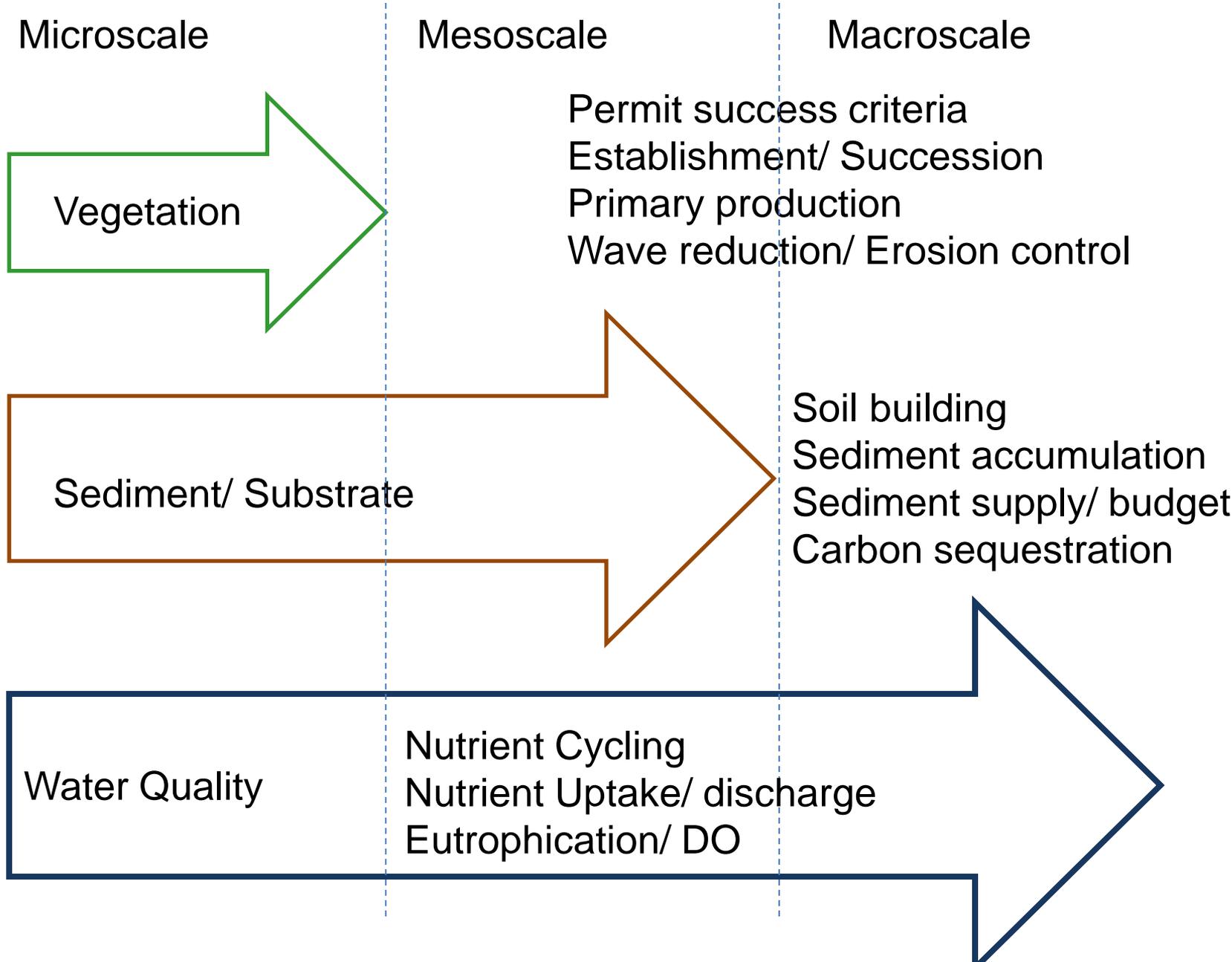
Green/ Blue ways: Corridors State Wildlife Plans

Microscale

Mesoscale

Macroscale





Microscale

Mesoscale

Macroscale

Vegetation

Permit success criteria
Establishment/ Succession
Primary production
Wave reduction/ Erosion control

Sediment/ Substrate

Soil building
Sediment accumulation
Sediment supply/ budget
Carbon sequestration

Water Quality

Nutrient Cycling
Nutrient Uptake/ discharge
Eutrophication/ DO

How to monitor to inform both Scales AND Regulatory and Ecosystems?

- **Small Scale:** Site specific for each LS type
 - Vegetation
 - Establishment/ Success Criteria
 - Erosion control
 - Primary production
 - Bank/ upland protection
 - LS with/without structures
 - Nutrient Uptake/ Denitrification
 - Sediment trapping
 - Faunal use
 - Forage, nursery, refuge

How to monitor to inform both Scales?

- **Larger scale**

- Assess and validate models – VIMS shoreline BMP, TNC Coastal Resilience 2.0
- Wetlands status and trends
 - Net gain- Regulatory
- Wetland sustainability
 - Sea level rise
- Sediment budget/ Littoral cells
 - Wetland and Beach
- Assess and validate risk reduction
 - Flood/ storm abatement
- Water quality services within the watershed
- Cumulative benefits of LS
- Habitat – corridors, secondary production, trophic effects

Solution to monitoring implementation?

- Include LS in state wetland monitoring programs/ State wetland implementation grants
- Require monitoring for large projects on public lands

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Thanks!

