

A quantitative and reproducible approach to evaluate trends in seagrass indicators

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Managing coastal waters

How do we use data?

The foundation of most management programs is a strong monitoring network

Monitoring provides information for decision-making based on apparent trends...

What are the changes in environmental condition over time?

Are these changes ‘good’ or ‘bad’ based on our management objectives?

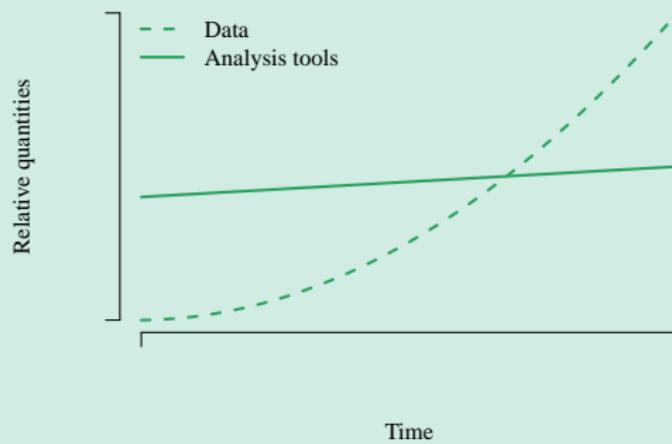
What may have caused these changes?

Managing coastal waters

How do we use data?

The good news: We are getting better at monitoring - standardized, automated, increased coverage, real-time/continuous

The bad news: Our ability to use these data for decision-making has not kept pace with availability!



Managing coastal waters

How do we use data?

We have the data but...

Challenge 1: We may not know how to use the information for decision-making

Challenge 2: We often lack appropriate tools to unambiguously and quantitatively characterize trends

Challenge 3: We may not have indicators to assess progress towards management goals

Managing coastal waters

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Challenge 3: We may not have indicators to assess progress towards management goals

These challenges are not impossible...

Solution: The use of open-science tools can facilitate data acquisition, collaboration, and communication!

Seagrasses and water quality

Making the most of data

Seagrasses have long been considered sentinels of water quality

Numerous ecosystem services - healthy seagrass, healthy estuary

The following example illustrates the use of open-science tools to *integrate*, *assess*, and *communicate* data for evaluating seagrass indicators

Seagrasses and water quality

Making the most of data

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The following example illustrates the use of open-science tools to *integrate*, *assess*, and *communicate* data for evaluating seagrass indicators

Open-science is *reproducible*, *transparent*, and *collaborative!*



Seagrasses and water quality

Making the most of data

The maximum depth of colonization is a useful indicator of water clarity - biologically-based and related to numerous response endpoints

Often used as a basis for establishing nutrient criteria

Seagrasses and water quality

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Problem 1: No consensus on the best way to measure depth of colonization

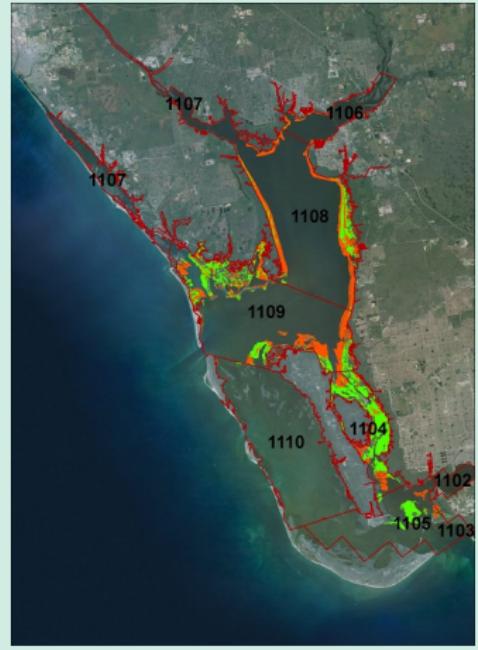
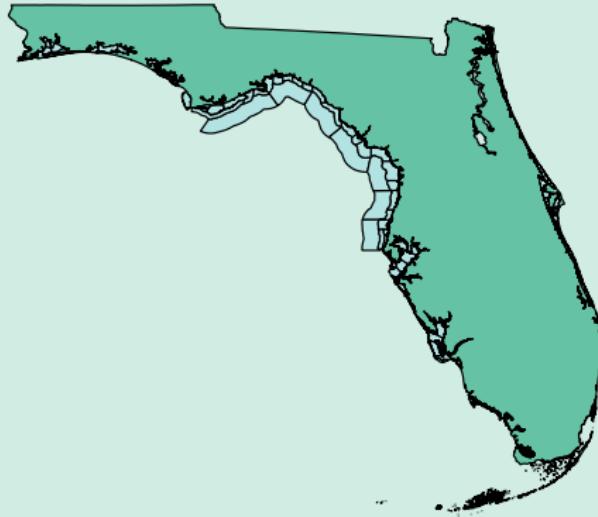
Problem 2: Plenty of data are available but standardized techniques have not been developed

Seagrasses and water quality

Making the most of data

Objective: Develop a reproducible and empirical method for estimating depth of colonization that leverages multiple data sources

Segment-based approach



Seagrass and water quality

Making the most of data

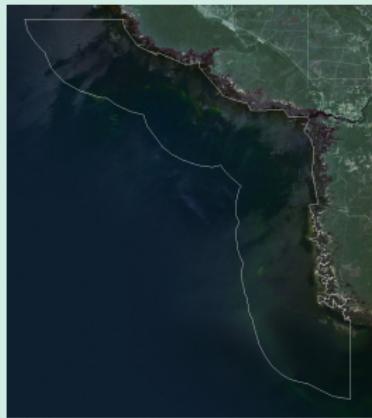
How can we estimate depth of colonization?

Seagrass and water quality

Making the most of data

How can we estimate depth of colonization?

Pick a segment

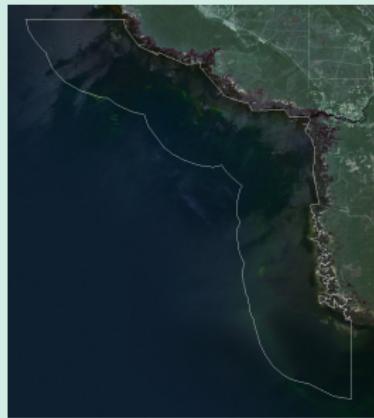


Seagrass and water quality

Making the most of data

How can we estimate depth of colonization?

Pick a segment



Get seagrass coverage

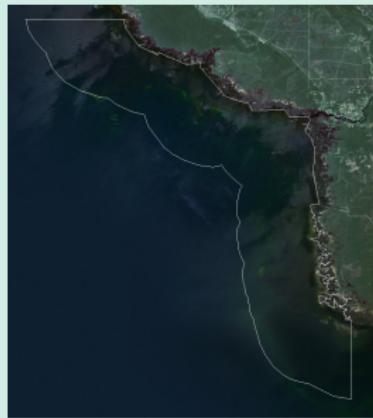


Seagrass and water quality

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How can we estimate depth of colonization?

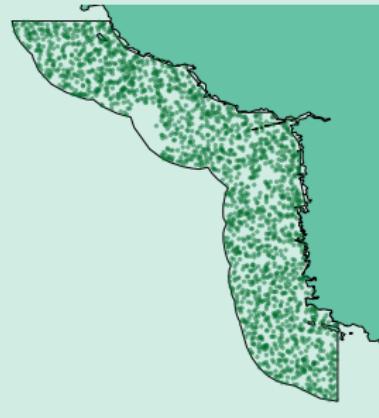
Pick a segment



Get seagrass coverage



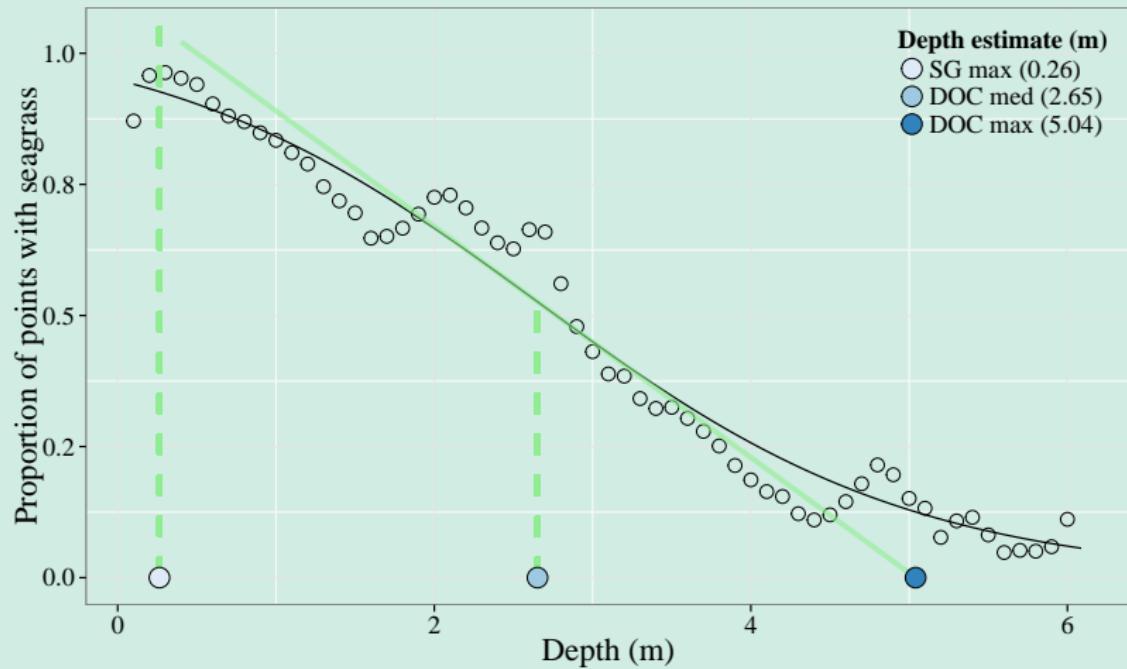
Get depth points



Seagrass and water quality

Making the most of data

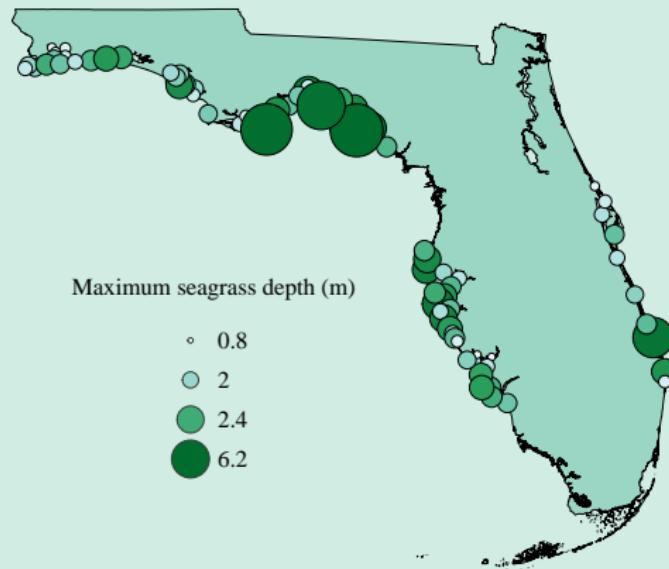
How can we estimate depth of colonization?



Seagrass and water quality

Making the most of data

We can get an estimate of seagrass depth of colonization for each segment in Florida [Hagy et al., in prep]



Case 2: Seagrass and water quality

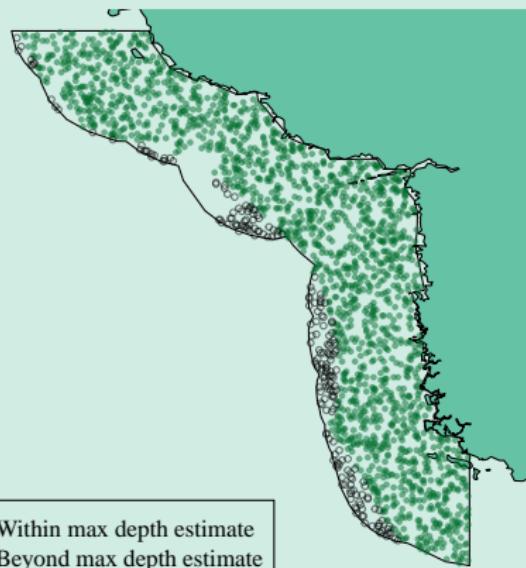
Making the most of existing data

This approach works if the segment is an appropriate spatial unit to characterize seagrass...

Case 2: Seagrass and water quality

Making the most of existing data

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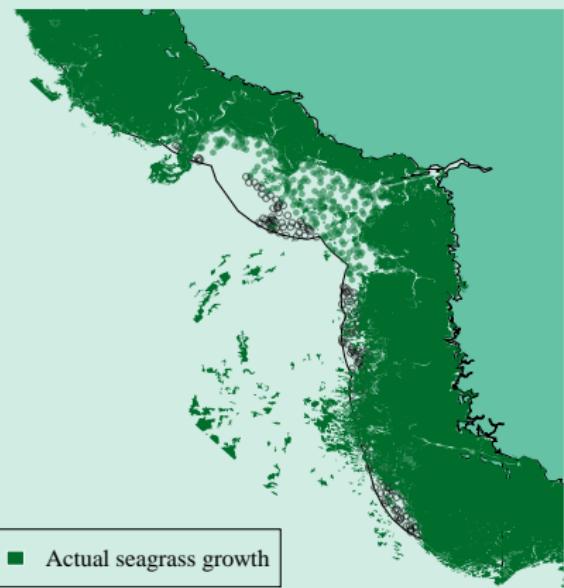
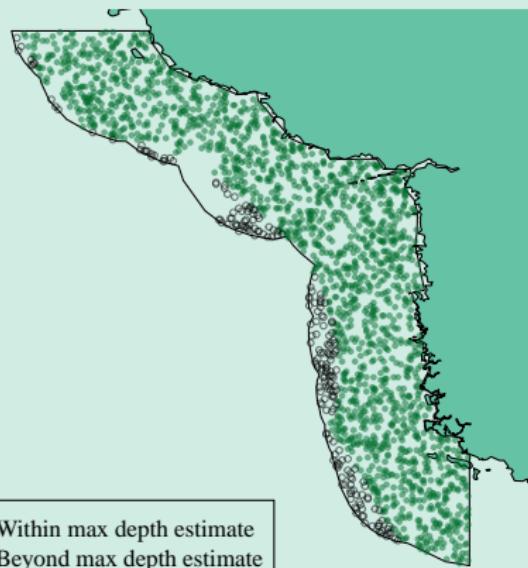


- Within max depth estimate
- Beyond max depth estimate

Case 2: Seagrass and water quality

Making the most of existing data

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Seagrass and water quality

Making the most of data

If segment is not appropriate, can we define a spatial boundary for estimating seagrass depth of colonization?

Case 2: Seagrass and water quality

Making the most of existing data

This can be repeated for a number of points until we get estimates that make sense

Seagrass and water quality

Making the most of data

Why go through all this trouble?

Indicators should be developed to address specific needs
Indicators should also capitalize on the available data
It's not really 'trouble' - the approach is reproducible

References I