Establishing a Global Science and Data Network for Coastal Blue Carbon (SBC)

USGS Headquarters - Western Region
Menlo Park, California
12-14 January 2016

Why a Global Science and Data Network for Coastal Blue Carbon?

Science:

-Leadership to define and raise the caliber of blue C science

-Access to global high quality data and research

-Improve basic & applied science on C & GHG cycling in coasts

-Access to science users to understand needs

Policy:

-Generate large scale accounting of C emissions and sequestration

-Need data to support Blue C inclusion in policy and regulation

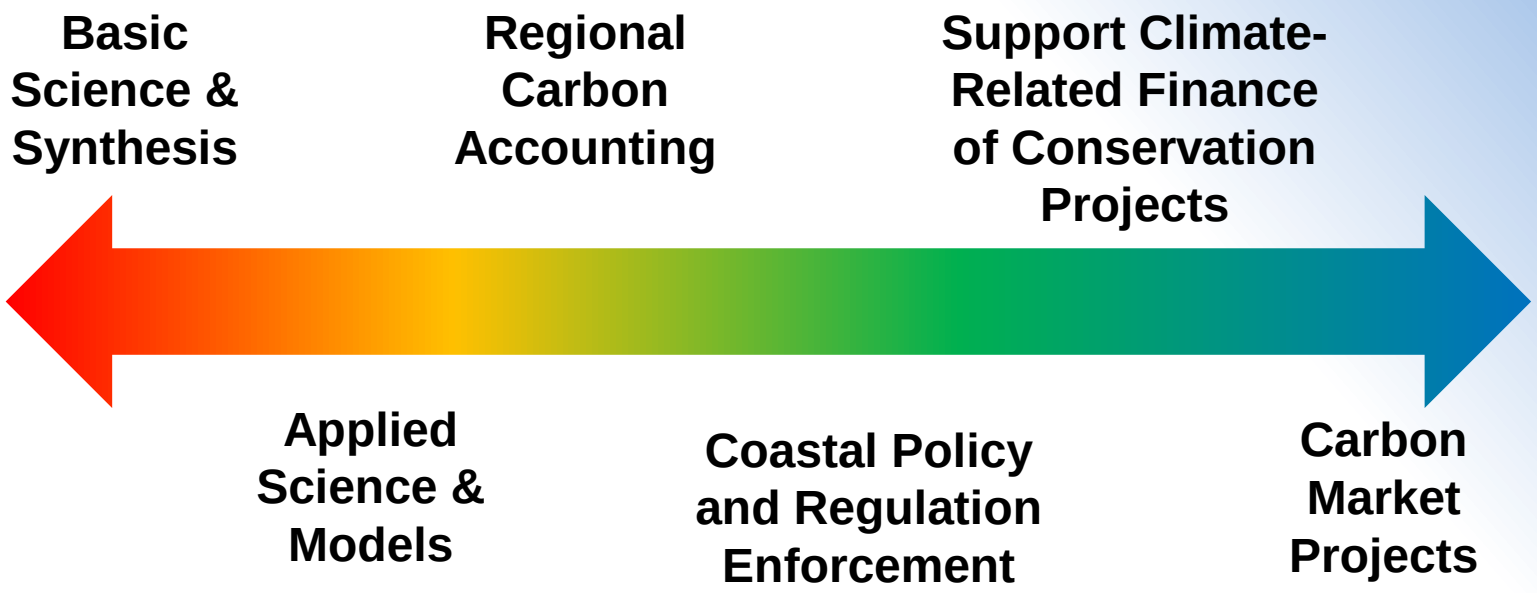
-Need to access topic experts

Conservation Projects:

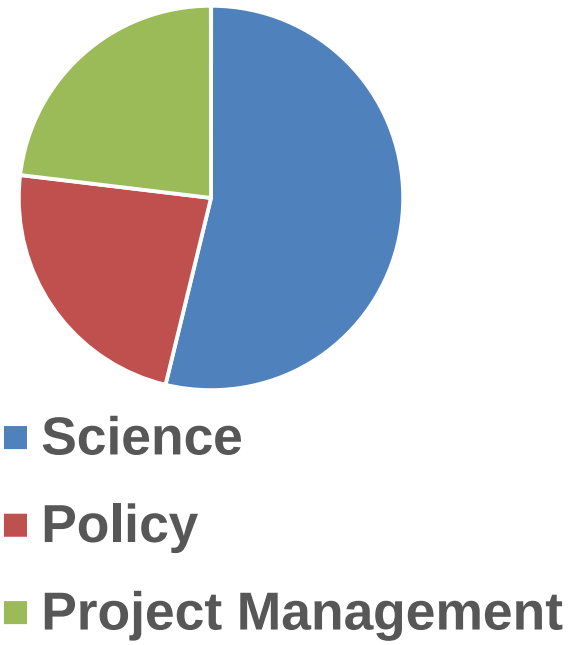
-Quantify current and future carbon in project areas

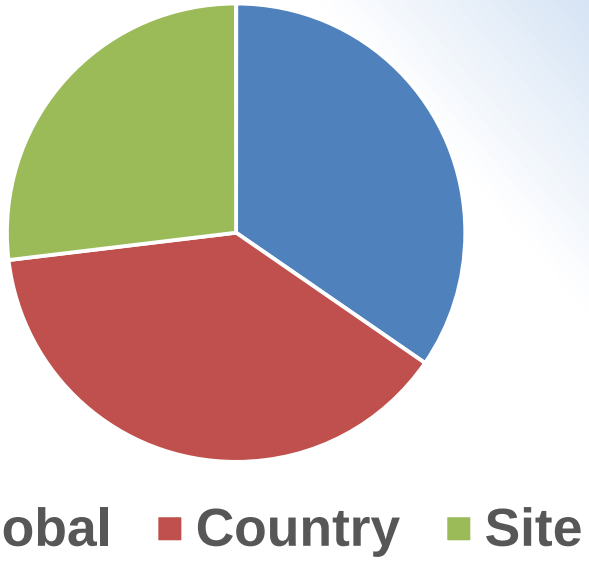
-Need to access topic experts

Broad Spectrum of Users and Needs



Workshop – 12-14 January 2016

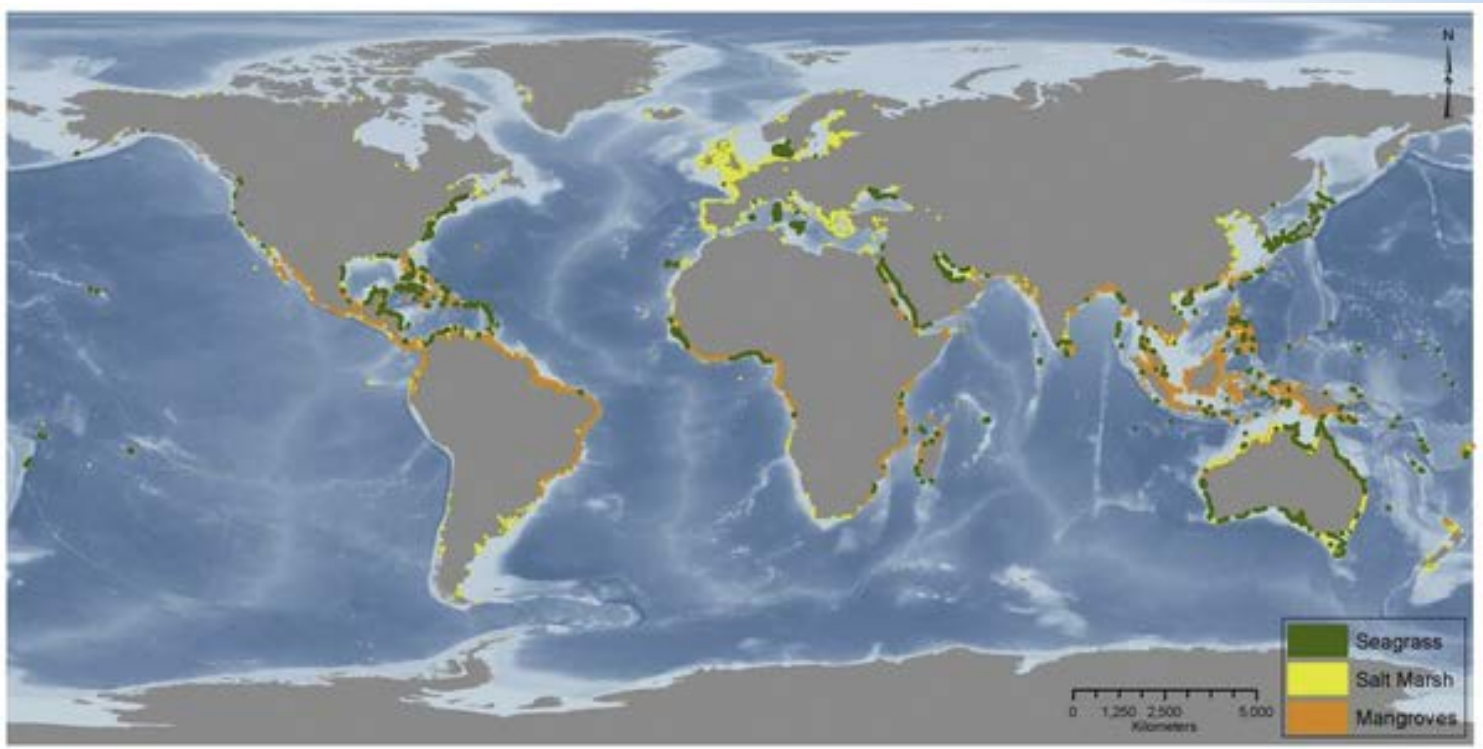




Motivation for Global Science and Data Network for Coastal Blue Carbon

Across spectrum need for:

a. Confidence in accurate and accessible blue carbon data
b. Global data coverage
c. An inclusive network of stakeholders
d. Leadership and definition of the field of blue carbon science



Vision for SBC Network and Database

Goal: Establish a Global Science and Data Network for Coastal Blue Carbon (SBC), to support carbon and GHG cycle science in coastal ecosystems.

- Improve science on carbon and GHG cycling in vegetated coastal ecosystems
  - Basic science
  - Applied science that addresses policy
- Identify priority research gaps
- Provide a quality-assured coastal carbon and GHG database
- Build global capacity to collect and interpret high quality coastal carbon data

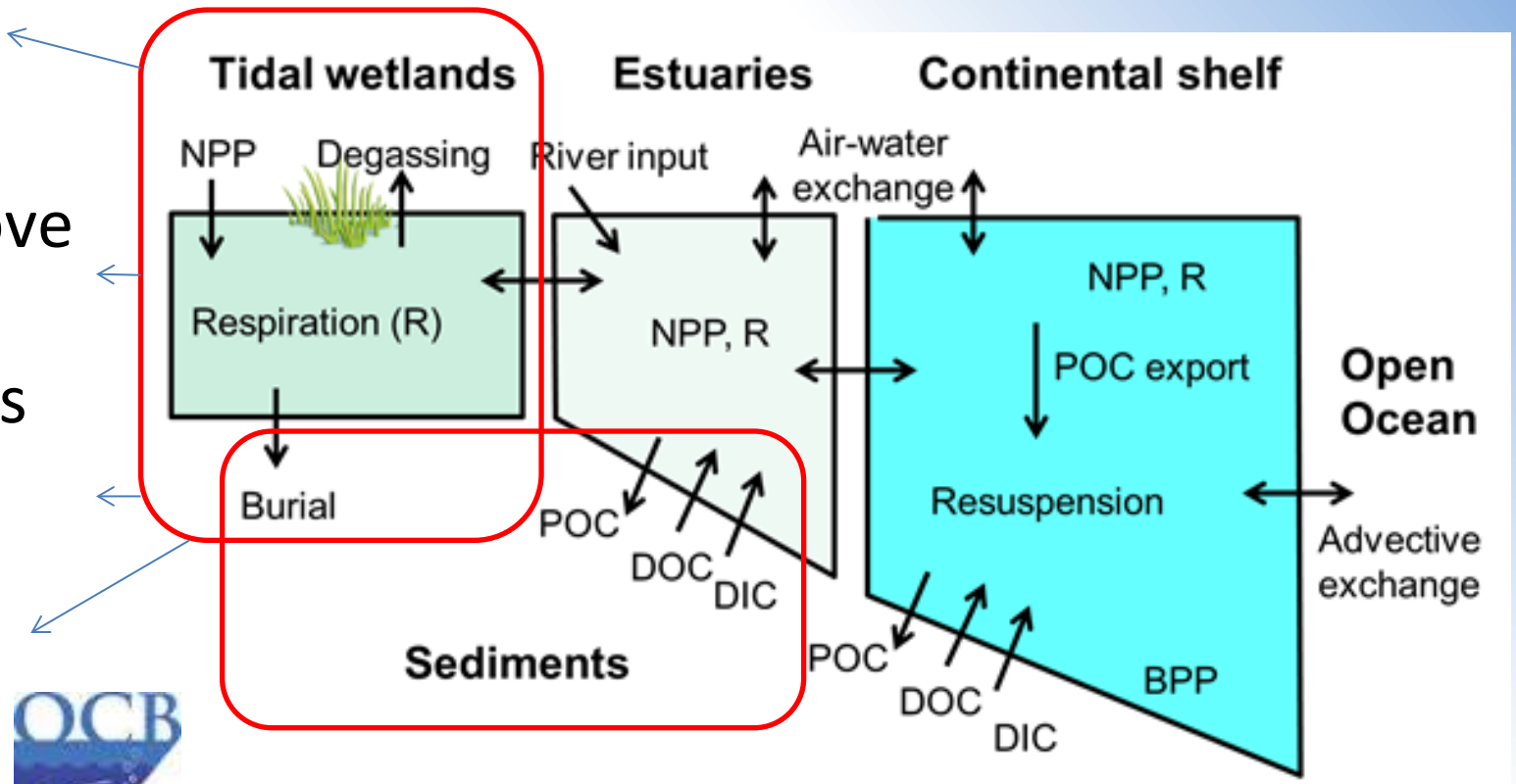
Why focus on Blue Carbon Habitats “only”?

Marsh

Mangrove

Seagrass

Other



subset of habitats in Coastal CARbon Synthesis

Carbon and GHG Fluxes and Processes in Blue Carbon Habitats

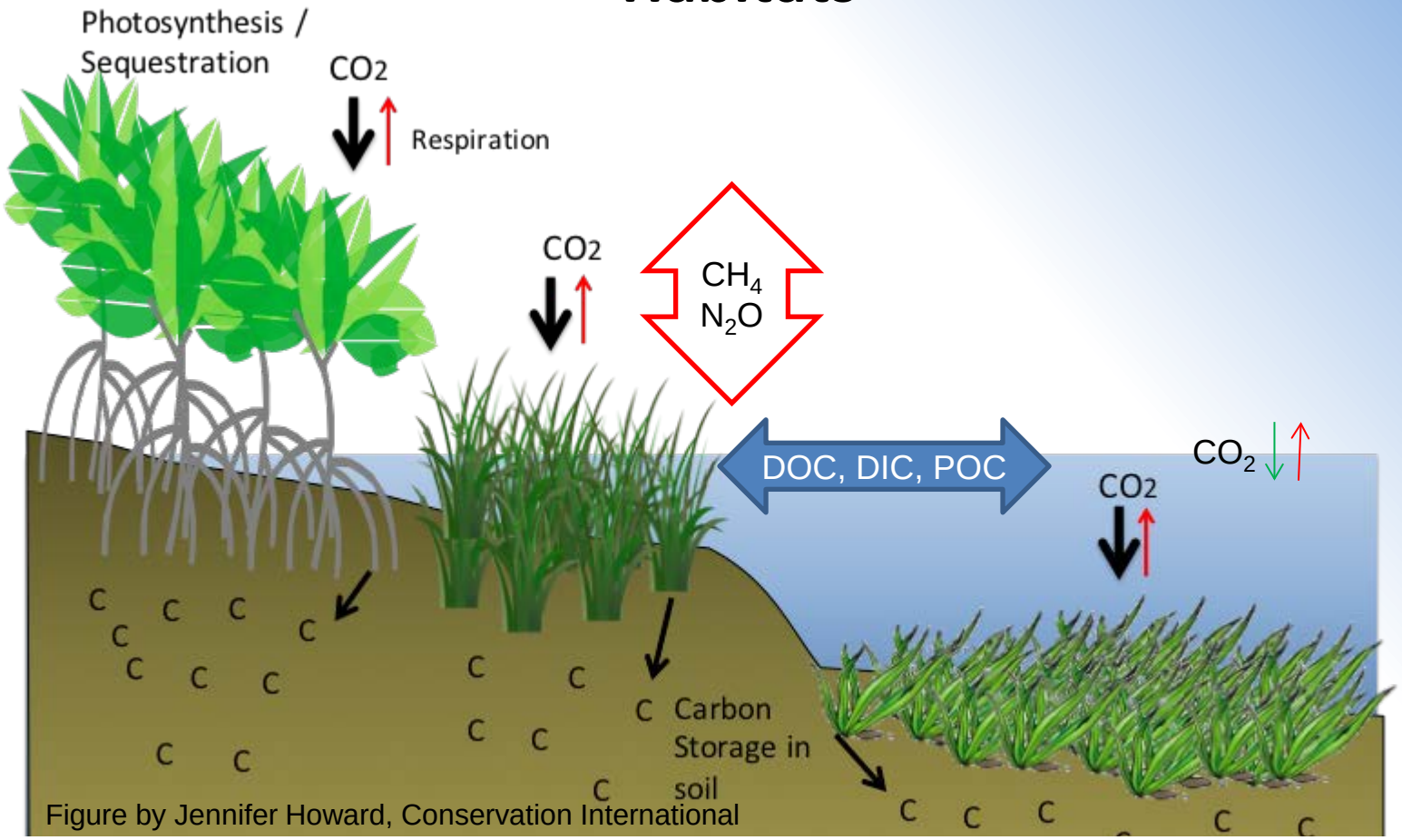


Figure by Jennifer Howard, Conservation International

- Atmospheric Flux (Eddy Covariance, Chambers)
- Hydrologic (Lateral) Flux (dissolved and particulate, inorganic and organic)
- Vegetation Pools (Species, Mapping, Biomass above and belowground)
- Soil Pools (Depth, Accretion/Erosion/Oxidation, Carbon density, Provenance)

Management and Policy Needs

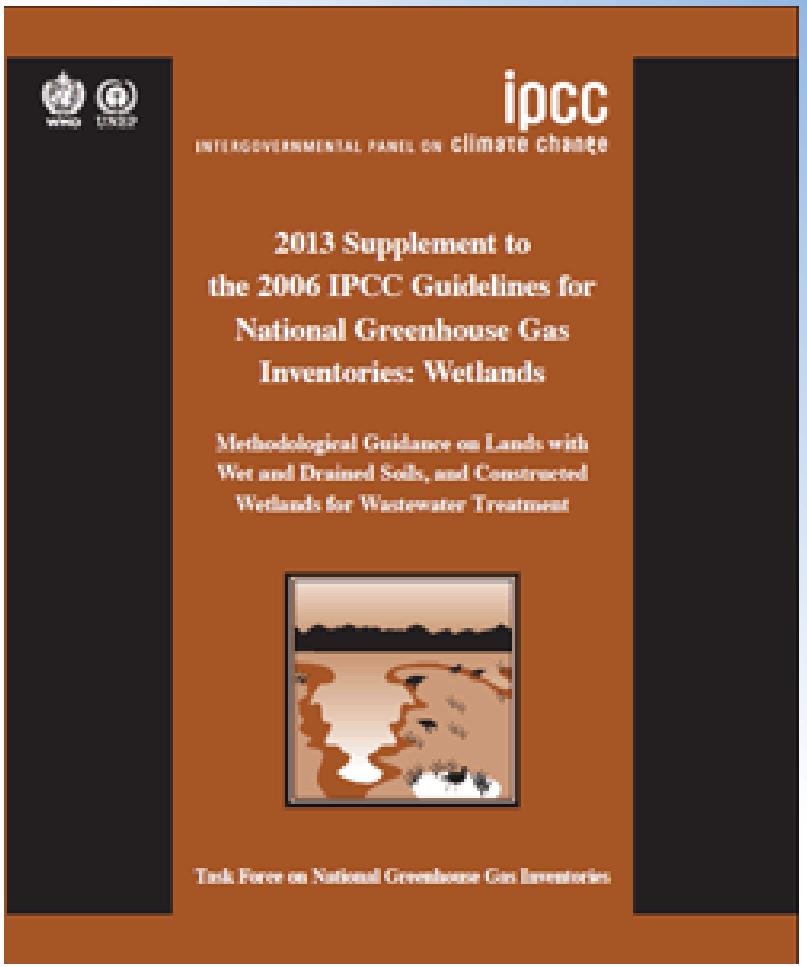
Priority Agenda

Enhancing the Climate Resilience *of* America's Natural Resources

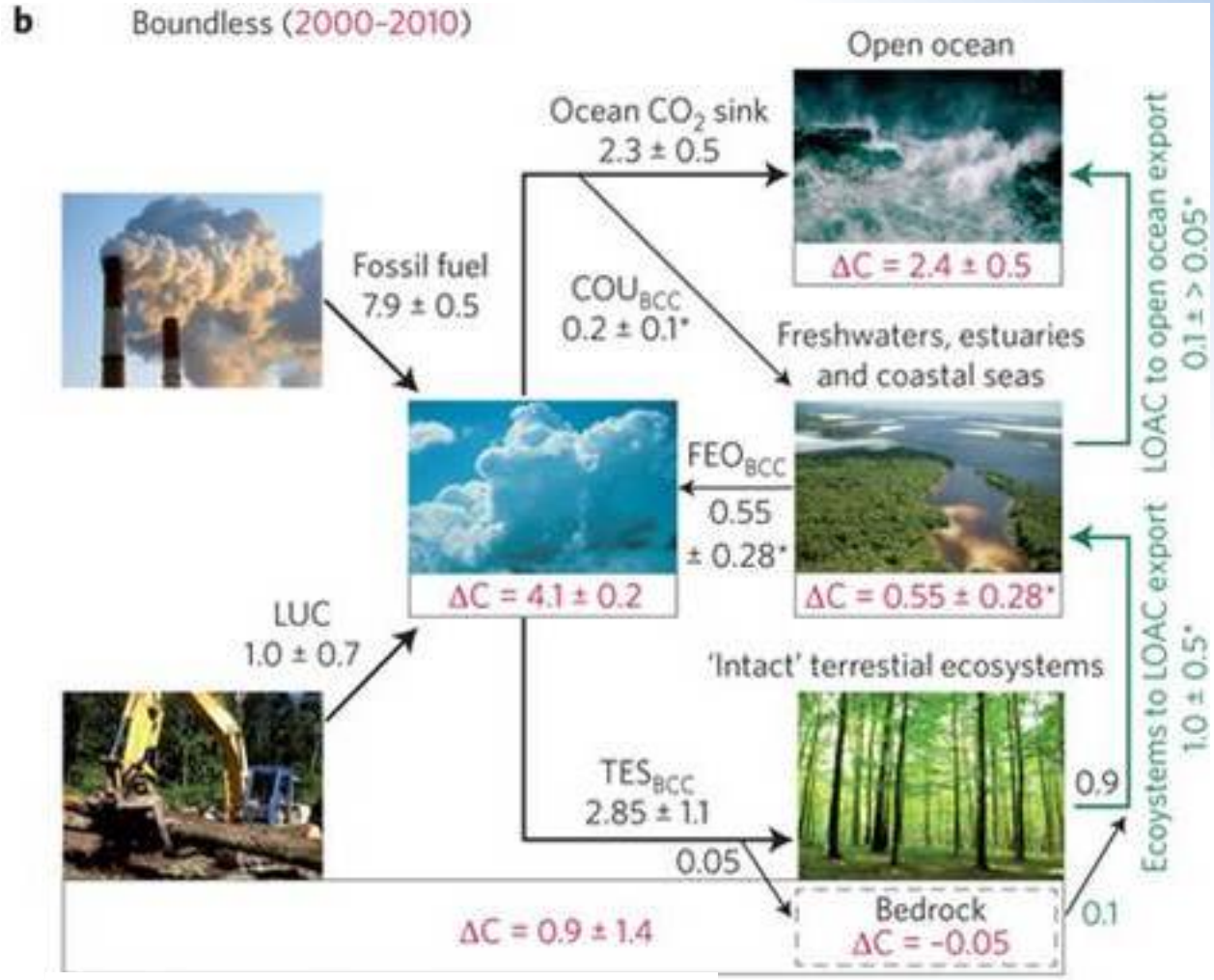
COUNCIL ON CLIMATE PREPAREDNESS AND RESILIENCE

VCS | VERIFIED CARBON STANDARD

A Global Benchmark for Carbon



Critical Need to fill the Coastal C Knowledge Gap



Regnier et al 2013 Nature Geosciences

Proposed network and database: Principles

- Provide scientific leadership
- Global coverage
- Inclusive and open
- Bi-directional communication between data providers and users
- Flexible
- Future thinking
- Scientifically rigorous and credible

Critical elements of the SBC network

- Community-driven
- Policy relevant but science focused
- Credible, reliable & traceable dataset
- Sustainable (funding, staff, ongoing participation and community engagement)
- Facilitate collaboration with other networks
- Training & outreach

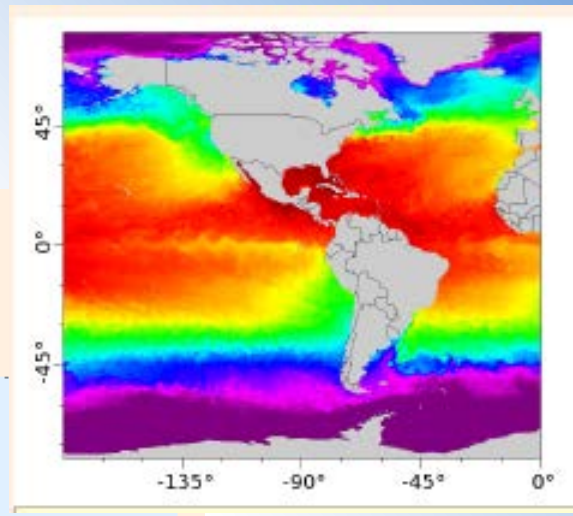
Seagrasses

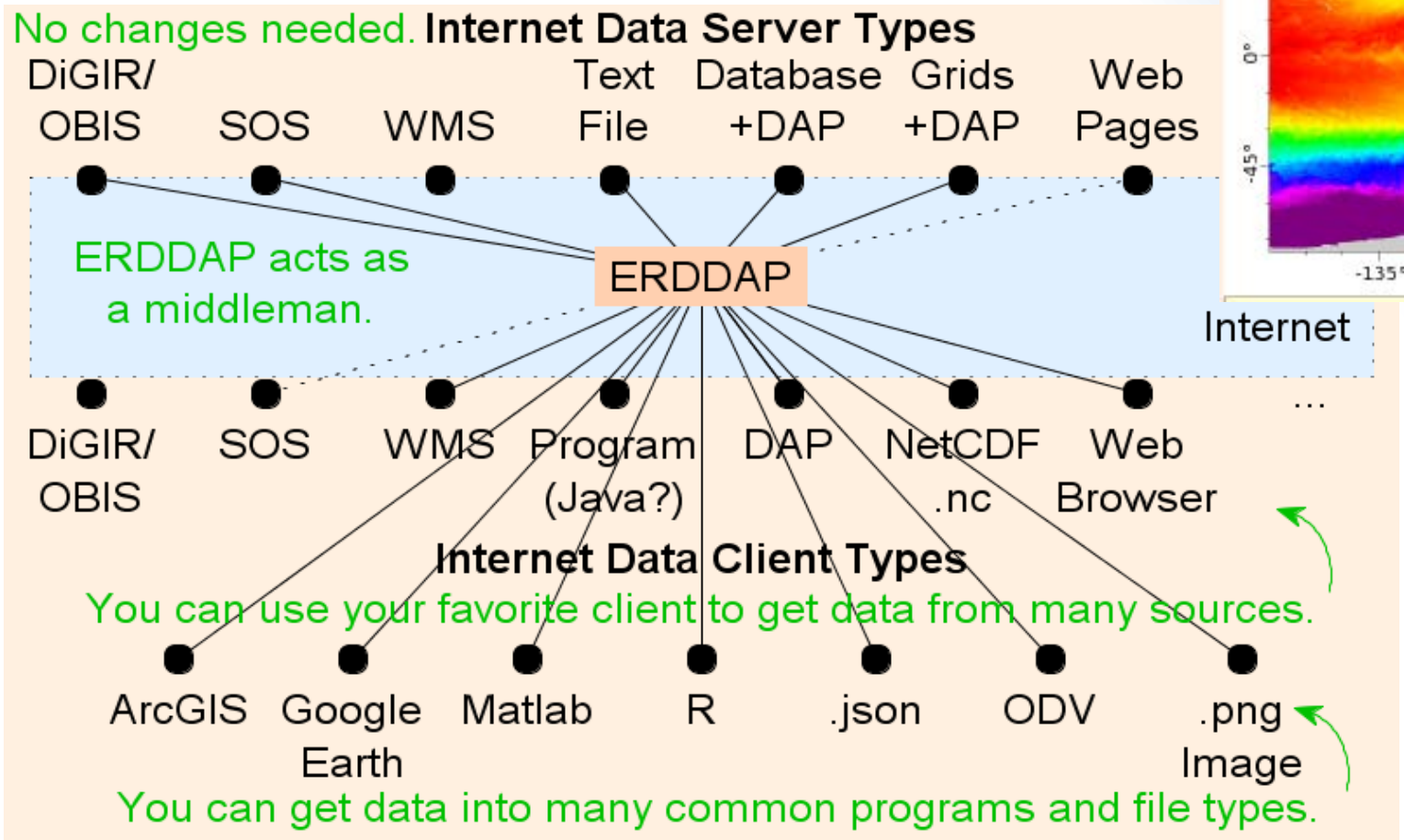
		Parameter	Level of information needed for a particular parameter		
			Minimum	Optimal	Ideal
Basic ecosystem descriptors ***Carbon stock descriptors - there will be multiple data points per sample site location because of measurements being taken from multiple slices from within any given core sample***					
	Above Ground Stock				
Extent to which this parameter is important t measure	Minimum	**Mass**	total Dry Weight (DW)	DW per components (leaves, flowers, fruits)	previous, dated, estimates of mass
	Minimum	**Organic matter /Carbon**	Loss on ignition (wt%)	Direct determination of organic carbon content specify whether or not epiphytes were removed	Direct determination of organic carbon content by component
	Optimum	**Nitrogen (N)**	N content, unit	N and/or P content per component	previous, dated estimates
	Optimum	**Phosphorous (P)**	P content, unit	N and/or P content per component	previous, dated estimates
	Optimum	**Inorganic matter/carbon**	indirect determination of IMC (eg. 1-Loss on ignition (wt%)	determination of inorganic carbon content	
	Optimum	**Epiphyte load**	mass of epiphyte per mass of seagrass leaf	LOI of epiphyte material	Measurement of Corg of epiphyte material
	Below Ground Stock				
Extent to which this parameter is important t measure	***Sedimentary pool***				
	Minimum	**Core location**	lat/long		
	Minimum	**Core depth**	depth (cm)	basic core description	
	Minimum	**Core diameter**	diameter (cm)		
	Minimum	**Slice depth**	top, mid and bottom-depth of sample slice (cm)		
	Minimum	**Slice thickness**	Thickness (cm)		
	Minimum	**Vegetation**	Presence/absence (y/n)		
	Minimum	**Org Carbon (C)**	OM content and specify unit by LOI	Direct determination of organic carbon content	
	Minimum	**Bulk density**	dry bulk density (g/cm3), volume & mass dry	porocity, volume & mass wet	
	Optimum	**Nitrogen (N)**	determined as a fraction of DW		
	Optimum	**Phosphorus (P)**	determined as a fraction of DW		
	Optimum	**Inorganic Carbon**	indirect determination of IMC (eg. 1-Loss on ignition (wt%)	determination of inorganic carbon content	

ERDDAP as a user-friendly and cost-effective solution to build a network of data stores, link to existing datasets, and serve data through customizable queries

- **Leverages substantial, long-term investment in tool development**

Bob Simons, NOAA





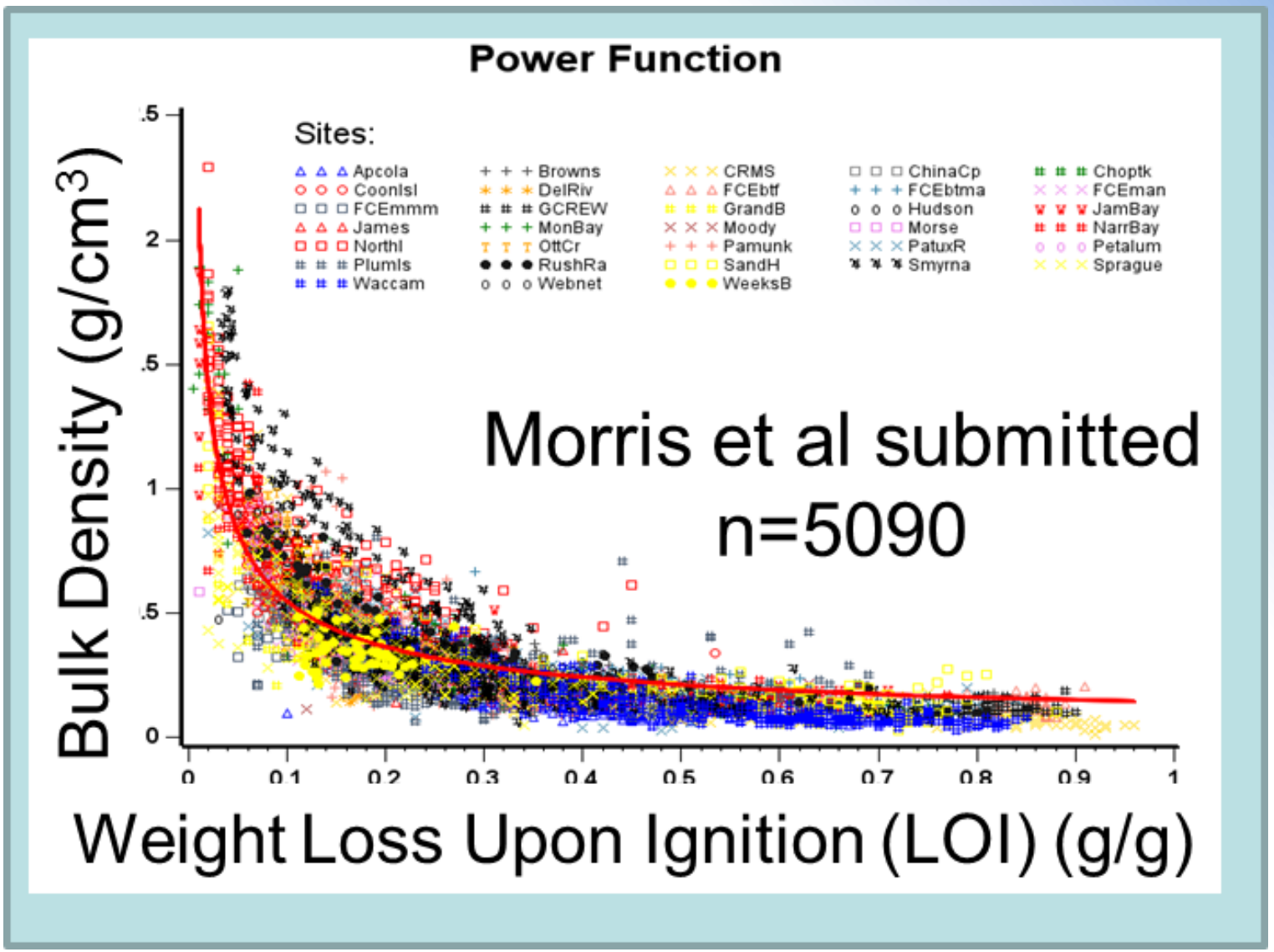
Data use policy

- Creative Commons
- Follow government requirements
- Multiple tiers of data (freely download vs. restricted data)
- DOI for data products

Resources required

- Full-time personnel to develop and maintain the database, network and website.
- Support for network activities (workshops, meetings)
- Funds for synthesis activities (postdocs)
- Data storage

The power of data sharing and synthesis (an example)



Improved Research Outcomes
What can we do together?

- Promote consistent and improved data analysis and collection techniques
- Detect change in blue carbon stocks and fluxes
- Improve holistic understanding of
  - coastal carbon cycle processes
  - contribution to large scale budgets
  - spatial and temporal variability
- Validate models
  - Empirical, process, neural network, etc.
  - Forecasting
  - Variability

The Network will enable critical synthesis activities

- Emissions accounting for wetlands in National GHG Inventories
- Substantial data increase for SOCCR
- Updates to IPCC emission factors
- Global & regional C budgets and models
- National, state and local level guidance on restoration and conservation activities (e.g. Massachusetts Wetland C Calculator; Nature Conservancy Emissions Calculator for Indonesian mangrove loss)
- Widespread, ongoing validation data for remote sensing and models
- Simple and visible way to make government data publically available
- Value added to existing and future data collections as well as existing databases (ISCN, Ameriflux, CSIRO, USAID Central American data hub, SSURGO, LandCarbon, CDIAC, etc.)

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Thank you!