

Breakout Session #1

Terrestrial Inputs Group

What do we know?

We have developed **first complete C budgets** for the coastal regions, **including estimates of lateral fluxes of C** from the terrestrial landscape to coastal waters.

- **Multiple modeling approaches** are complimentary and provide insights: NEWS, DLEM, SPARROW, LOADEST.
 - Re-expressing output from these models to common geographic watershed areas is underway.
 - Estimates are available for all forms of C for all regions. Forthcoming AK estimates from DLEM and from LandCarbon program may be of interest.
- **Knowledge of dominant controlling processes**; e.g., land use and climate.

What don't we know?

- **Attribution:** How tease apart the roles of climate, land use, atmospheric deposition, and other drivers of C fluxes (in land, water)?
- **Source apportionment:** What are the sources and quality of carbon loadings to coastal waters anyway? Quality matters.
- **C cycling in “hotspots”.** How much carbon is generated in the landscape, anyway?
 - e.g., disproportionate role of tidal wetlands vs upland wetlands, and how they are represented in the terrestrial models.
- **Multi-element interactions.** How best to represent multiple element cycles working together (e.g., Q-C-N-P)?
 - e.g., LandCarbon integrated model results of N&P drivers from terrestrial lands → “new” C in estuaries.

What changes will most impact flux predictions

- Understanding of **streamflow discharge** at the coastal margins.
 - Most gaging stations are upstream of tidal influence; some areas not well characterized; scaling required to estimate Q delivery downstream.
 - Role for new direct measurements of Q (and C) in rivers where they enter coastal zone; role of remote sensing of Q, etc.
- Understanding of **C concentration and quality** at the coastal margins.
 - Quality and reactivity of carbon? Degassing of C in rivers and estuaries? Loss of carbon to methane production? Hotspots?
 - Density of spatio-temporal measurements of C in water quality sample: monitoring is decreasing not increasing.

High priorities for predictions?

- Further understanding of mechanisms
 - Process studies where hydro-bio-geo measurements are well integrated; representative of multiple ecosystems
- Toward integrated modeling: coupling of models (transport, biogeochemistry, multi-element, multi-scale, etc.)
- Better integration of remotely sensed data into our models
 - Use of existing and forthcoming RS data
 - Developing new algorithms to use in catchment / terrestrial models
 - Developing modelling frameworks to directly assimilate the RS data