

Humboldt Bay Primary Producers

What happens to marsh net primary productivity when
Spartina densiflora is removed?

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Outline

- Functions of primary producers
- Net primary productivity (NPP)
- Plant/algal form & NPP
- Measuring NPP
- Rogers (1981): NPP comparison
- NPP & the community perspective

Functions of Primary Producers

- Trophic support
- Sediment stabilization
- Sediment oxygenation
- Nursery
- Refuge

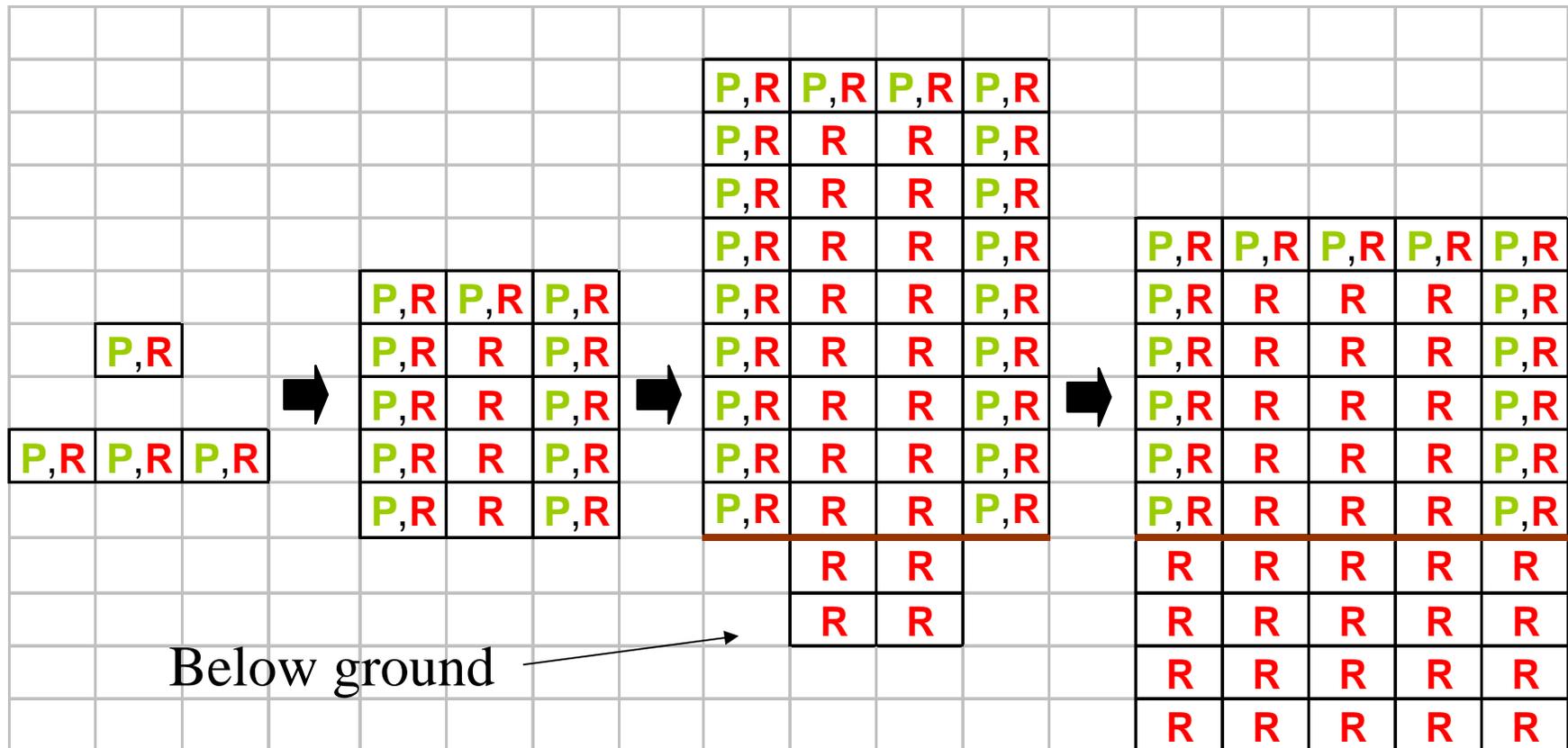


What is NPP?

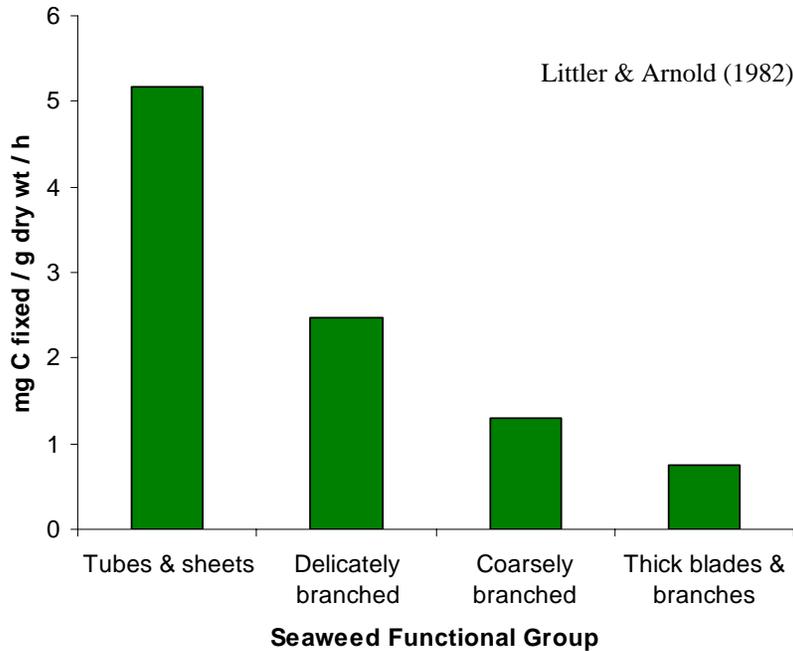
- Net primary productivity = gross photosynthesis – respiration
- NPP units: Mass / area / time (a rate)
- NPP is not *production*, or *standing stock*; units for these are: Mass / area

Plant/algal form & NPP

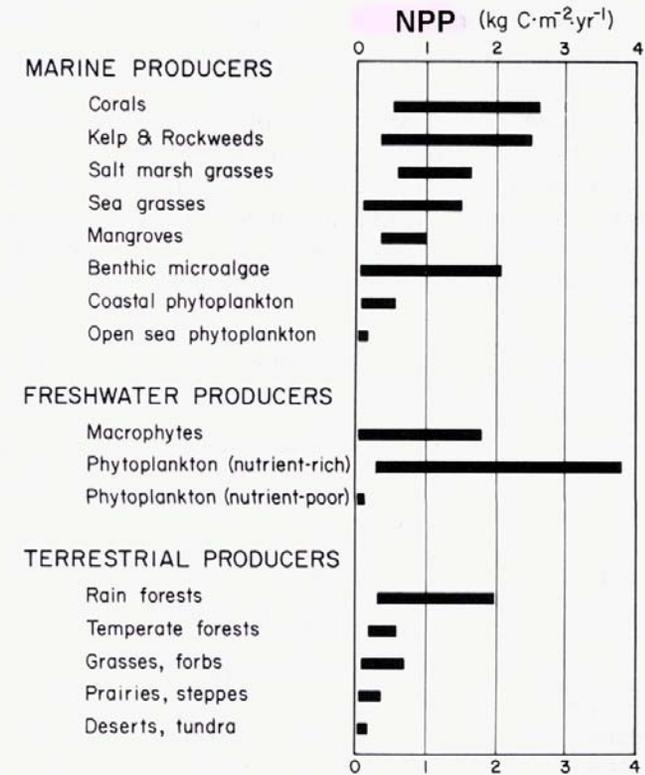
Algal unicells & filaments > seaweeds > *Spartina* > *Salicornia*, *Distichlis* ?



Net photosynthesis as affected by only the intrinsic property of thallus morphology



NPP due to intrinsic & extrinsic factors

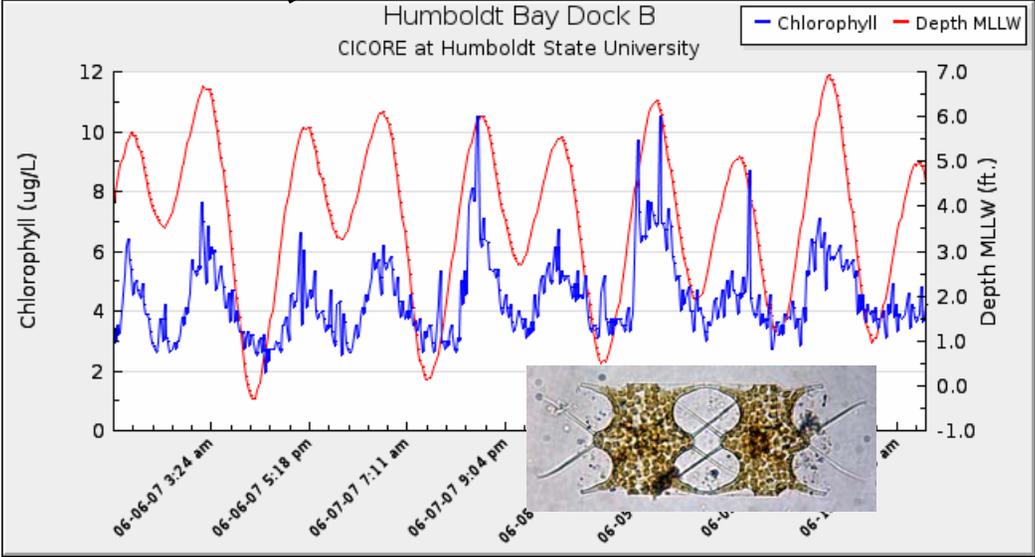
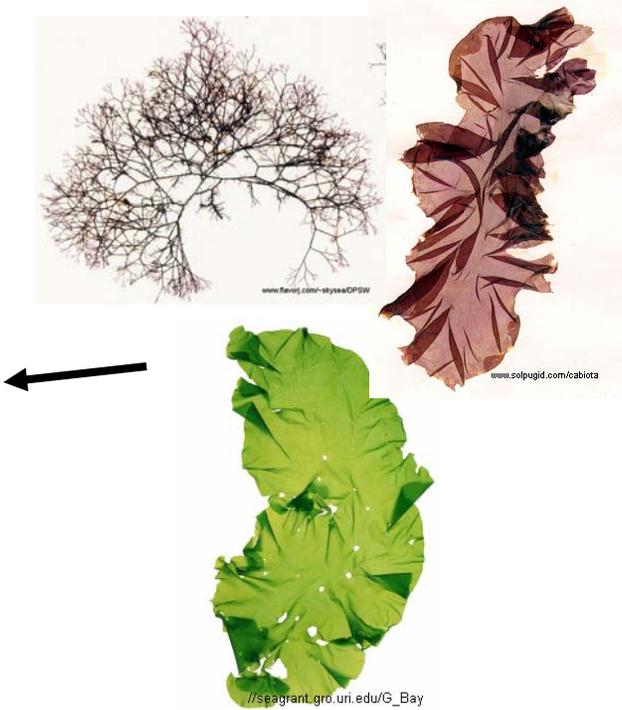


Valiela (1995)

A big thallus/plant does not necessarily = big NPP!

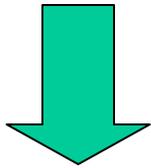
Other Contributors

Watershed
detritus



Measuring NPP: Difficult!

$NPP = \text{gross photosynthesis} - \text{respiration}$



- New above ground biomass
- New below ground biomass
- Grazing loss
- Breakage loss
- Exudate loss

John Rogers (1981) – Partial NPP Estimate

Spartina densiflora



Salicornia virginica



Distichlis spicata



G dry wt m⁻² yr⁻¹: 774 - 2,544

699-1019*

196 – 340*

P,R	P,R	P,R	P,R						
P,R	R	R	P,R						
P,R	R	R	P,R						
P,R	R	R	P,R		P,R	P,R	P,R	P,R	P,R
P,R	R	R	P,R		P,R	R	R	R	P,R
P,R	R	R	P,R	➔	P,R	R	R	R	P,R
P,R	R	R	P,R		P,R	R	R	R	P,R
P,R	R	R	P,R		P,R	R	R	R	P,R
	R	R			R	R	R	R	R
	R	R			R	R	R	R	R
					R	R	R	R	R
					R	R	R	R	R

The Necessary Perspective: Community NPP

1.0m²

1.0m²

NPP w/ <i>S. densiflora</i> =		NPP w/o <i>S. densiflora</i> =
<i>S. densiflora</i> +		<i>Salicornia</i> +
Other vascular plants +		<i>Distichlis</i> +
Algae		Other vascular plants +
		Algae



Similar NPP, different food web?