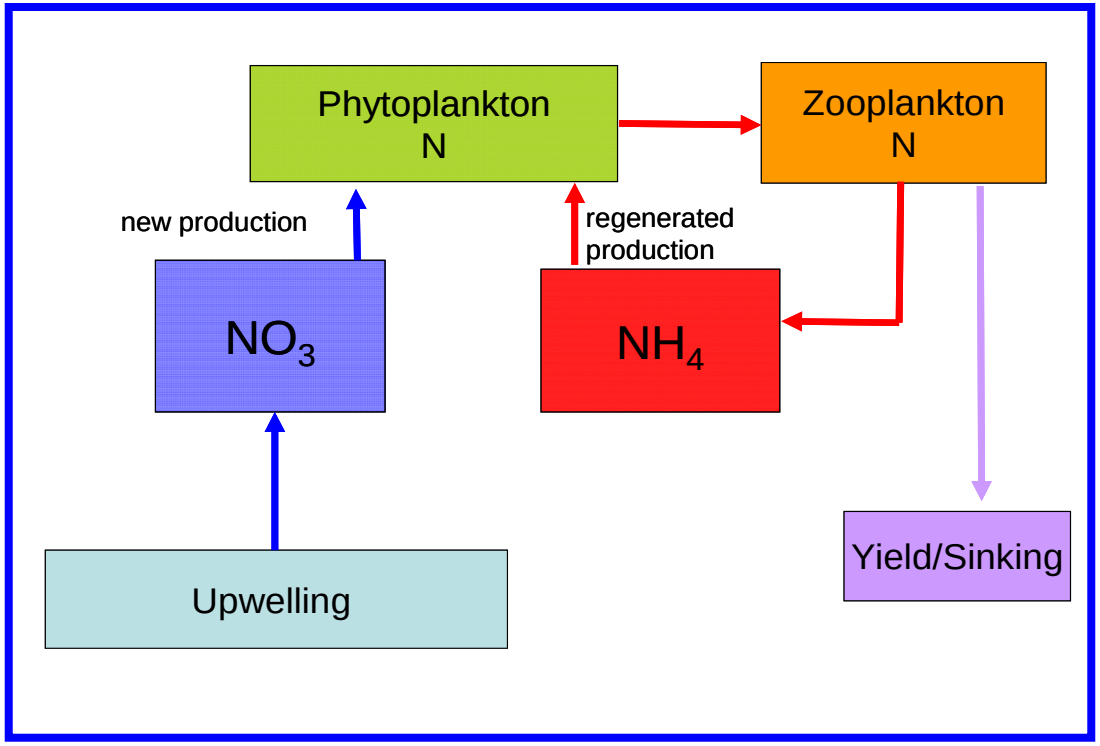
Lessons from the Ocean for the Estuary about DIN and productivity

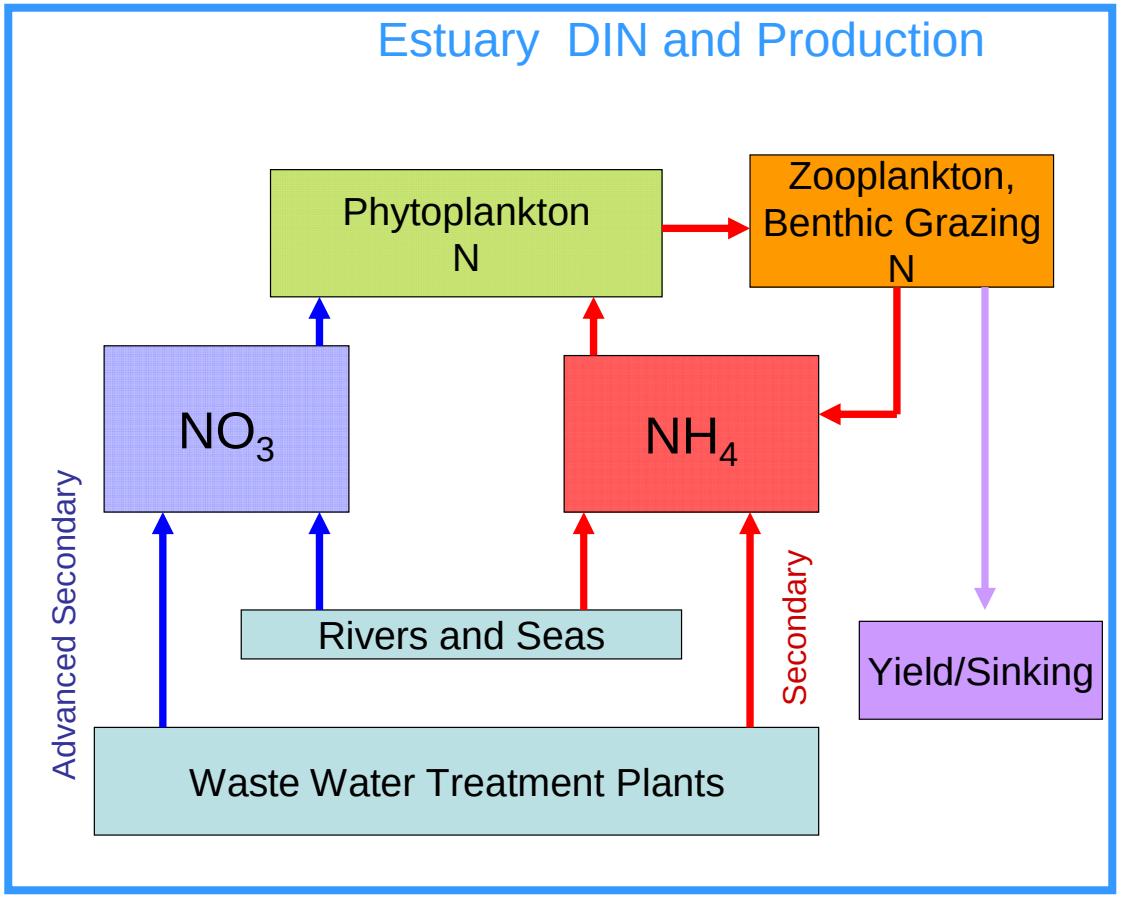
- In the oceans nitrate (NO_3) is supplied from deep water and is the major source of DIN for productivity, compared to the relatively low supply of ammonium (NH_4) from grazing.
- f = proportion of nitrate uptake = NO_3 uptake/(NO_3 plus NH_4 fixation).
- High f = high "new" productivity that sets the maximum yield from the system

Ocean DIN and Production



Simplified Estuarine N Cycle

- Multiple sources of NO_3 and NH_4 make it difficult to separate new and regenerated production in estuaries.
- f is still useful is assessing the proportion of NO_3 uptake in estuaries since high NO_3 uptake also correlates with bloom formation and high primary production (C fixation) in estuaries also.
- We will show that the uptake of NO_3 is the key to high productivity in the estuary also. This can be impacted by elevated NH_4 concentrations.



Suisun, Sacramento and San Joaquin have low f, low NO_3 uptake based productivity and low chlorophyll

	NO_3	NH_4	chl a	ρC	ρNO3	ρNH4	f
	µM	µM	µg/L	µg/l/h	µmol/l/h	µmol/l/h	
Central Bay	23.40	4.4	4.37	309	0.051	0.076	0.41
Suisun	38.80	5.1	2.36	90	0.015	0.042	0.26
Sacramento	25.20	13.4	2.09	53	0.013	0.048	0.21
San Joaquin	44.30	3.5	2.55	71	0.020	0.054	0.27

Mean initial data from 7 sets of enclosures show two productivity patterns; low f, low NO_3 uptake based production with low C uptake and chlorophyll vs higher f, NO_3 based production with high C uptake and chlorophyll