

Preliminary "back of envelope" numbers as of March 22, 2012			
parameter	units	quantity	comments
Tons of artificial fertilizers applied globally for agriculture and landscape	metric tons per year	55,000,000	
Nitrate fraction of artificial fertilizer	%	60%	
Fraction of nitrogen from artificial fertilizers reaching the ocean	%	25%	50% too high, how about 25%?
Tons of nitrogen applied globally (rounded)	-N tons/yr	2,400,000	
Add nitrogen from combustion of fossil fuels	-N tons/yr	20,000,000	Currently, some 20 million metric tons of fixed N per year are released globally from fossil fuel combustion by automobiles, factories, and power plants. However, this represents only one-fourth of the amount of N used in inorganic N fertilizer and perhaps one-seventh of the total amount of N fixed globally through human activity, including the manufacture of inorganic fertilizers and the planting of N-fixing crops such as soybeans and other legumes. Nonetheless, N from fossil fuel combustion may contribute substantially to the nonpoint-source pollution of surface waters. http://www.esa.org/science/resources/issues/TextIssues/issue1.php
Typical nitrogen in secondary treated human wastewater	-N mg/L	20	
Typical wastewater volume for above concentration	m ³ /day/person	0.4	
Number of people	each	9,000,000,000	
Fraction of nitrogen from wastewater reaching the ocean	%	25%	50% too high, how about 25%?
Tons of nitrogen fertilizer reaching ocean from human wastes (rounded)	-N tons/yr	6,200,000	
Ratio of livestock nitrogen to human nitrogen reaching oceans	fraction	0.5	Less livestock than humans
Tons of nitrogen fertilizer reaching ocean from livestock wastes (rounded)	-N tons/yr	3,100,000	
Total of human derived nitrogen reaching the ocean (rounded)	-N tons/yr	31,700,000	
Dry tons of macro-algae per ton of nitrogen based on algal composition	dry ton algae/ton of -N	33	5% is too high, should be 3%
Fraction of nitrogen reaching the ocean removed by the marine agronomy macroalgae	%	70%	This is a global number guess at how good we can do at removing the "problem" nutrients. I suspect we do not want to propose removing more than 100% of the human-activity nitrogen.
Single pass macro-algae production from terrestrial fertile runoff, rounded	dry ton algae/year	730,000,000	Food harvests appear to reported in wet tons. Seaweed harvests appear to be reported in desiccated dry tons.
Ratio of wet tons to dry tons	ratio	3	Adjustment factor is calculated in the "food & people" tab.
Single pass macro-algae production from terrestrial fertilizer runoff, rounded	wet ton algae/year	1,900,000,000	
Fraction of doubled food production	%	31%	
We need to add in the extra fish production from a seaweed-fish-seaweed-fish nutrient loop. Any thoughts on the numbers and calculations for that?			
Macroalgae production per area for the relatively nutrient rich situation	dry tons/ha/yr	30	
Area of macroalgae production	hectares	2.4E+07	
Area of macroalgae production	km ²	243,333	
Fraction of ocean area	%	0.07%	
Fraction of seasonal dead zone area	%	122%	
Total seasonal dead zone area	km ²	200,000	Wikipedia, March 2012 indicates 405 dead zones, largest 70,000 km ² , smallest 1 km ² . Maybe total is 3x the largest?