



Managing nitrogen loss from irrigated fields





Surface water influenced by ag runoff commonly exceeds the Federal drinking water standard of 10 PPM NO₃-N



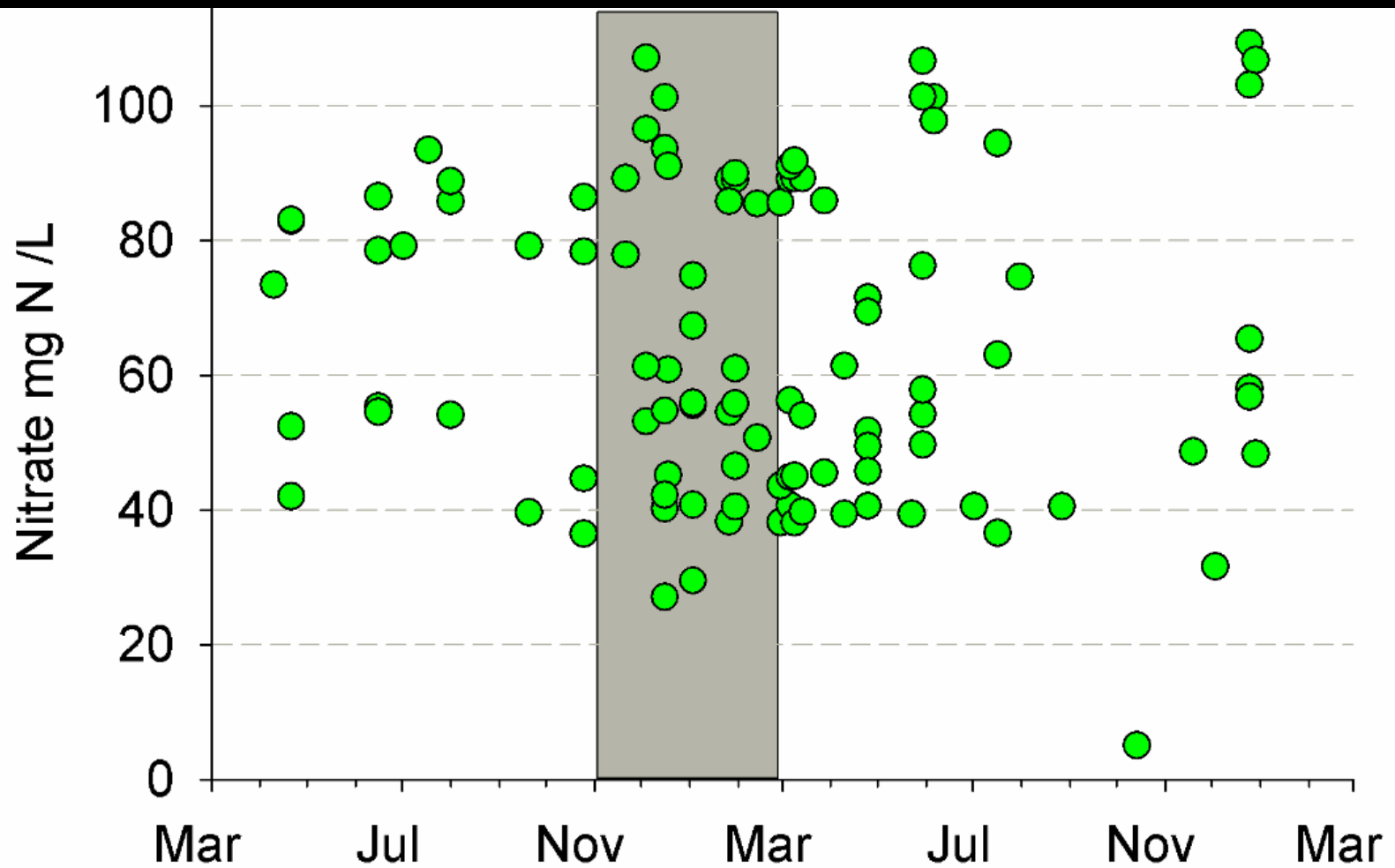
Ag runoff may be 'biostimulatory' at 2 PPM $\text{NO}_3\text{-N}$

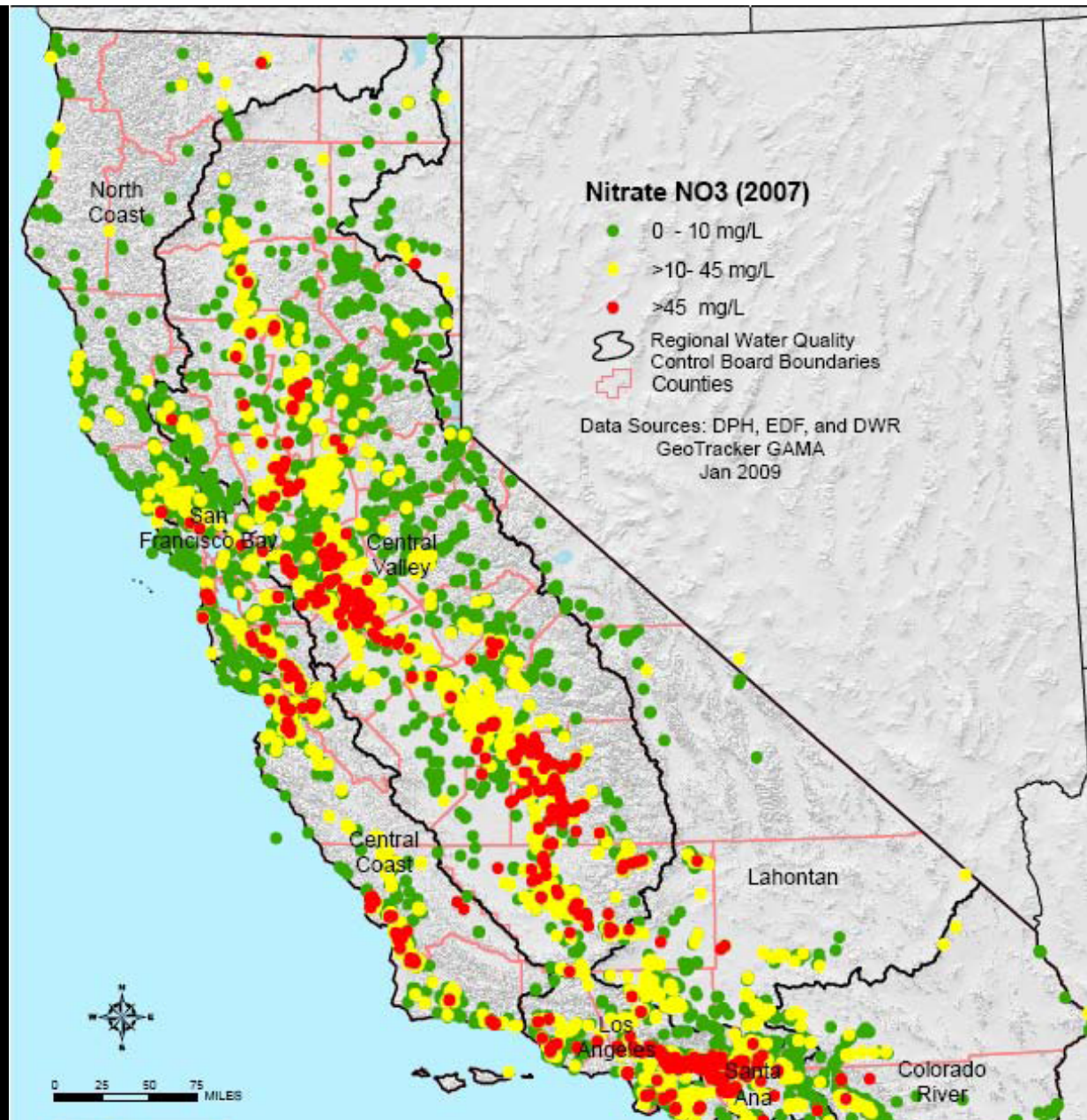


What about leachate moving toward groundwater ?

- Since soil water weighs only 20-30% of soil dry weight, $\text{NO}_3\text{-N}$ concentration in leachate is typically 3-5 times higher than in soil

2002-04 tile drain sampling in the Salinas Valley :





Nitrate contamination of groundwater an issue statewide



**So what do we do ?
Better irrigation management**





**So what do we do ?
Better fertilizer management**



**So what do we do ?
Grow 'trap crops'**



Some form of water treatment may be needed :



Conservation practices have environmental benefits, but have limited effect on $\text{NO}_3\text{-N}$ concentration

Plant-based treatment systems slow, logistically impractical

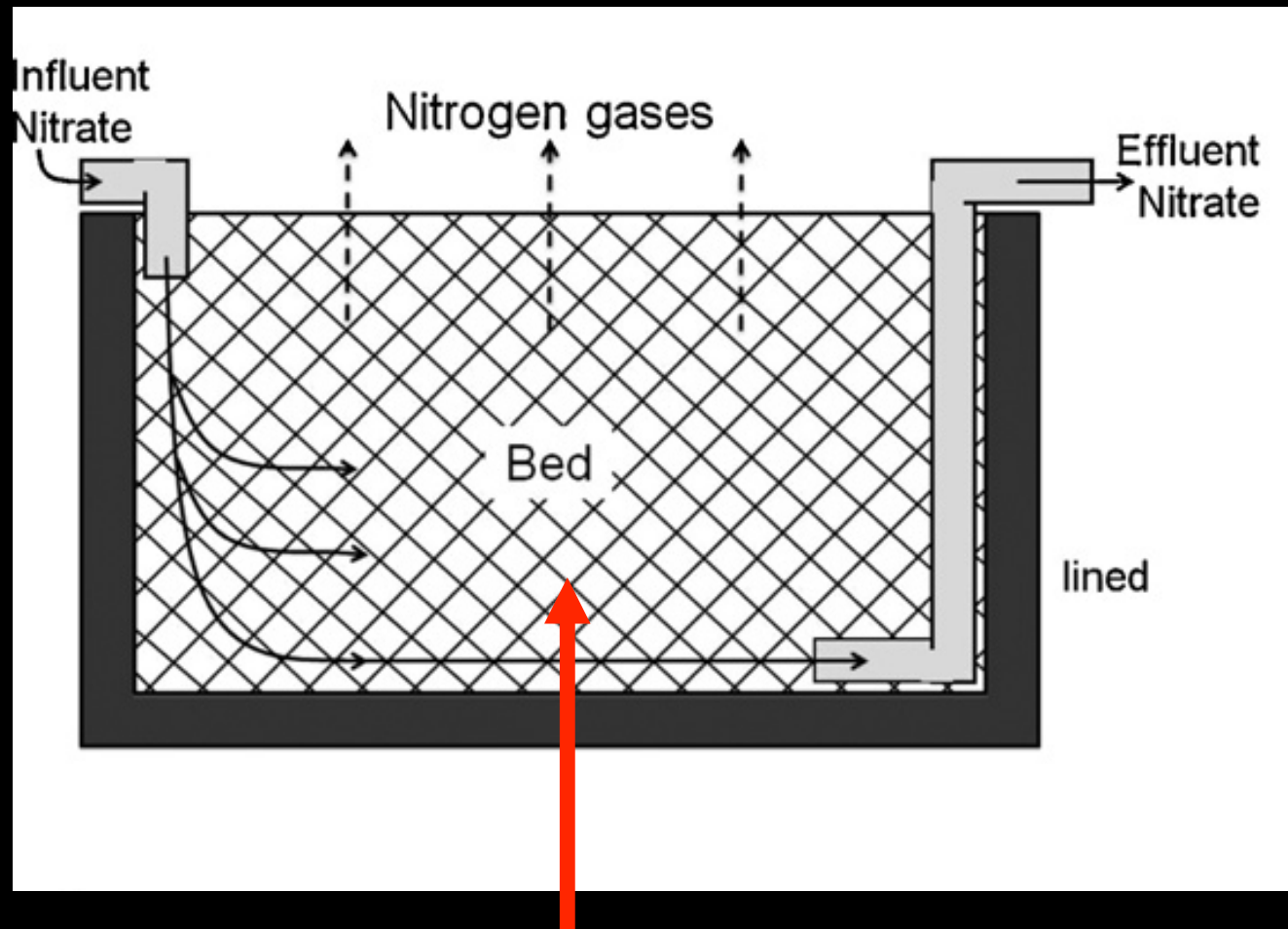


Managed wetlands combine plant N uptake with denitrification ...



Amount of labile carbon limits N removal (< 2,000 lb/acre/year)

‘Bioreactors’ can maximize denitrification :



Organic substrate to provide labile carbon

Salinas Valley bioreactors for treatment of tile drain effluent



2 bioreactors constructed in April, 2011



**Initial results suggest that annual denitrification
may exceed 8,000 lb N / acre ...**

