22e Entretiens du Centre Jacques Cartier - Lyon, France
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Invasive Species And Nutrient Cycling

Impacts of an Invasive Aquatic Plant on Nitrogen Dynamics in the Hudson River

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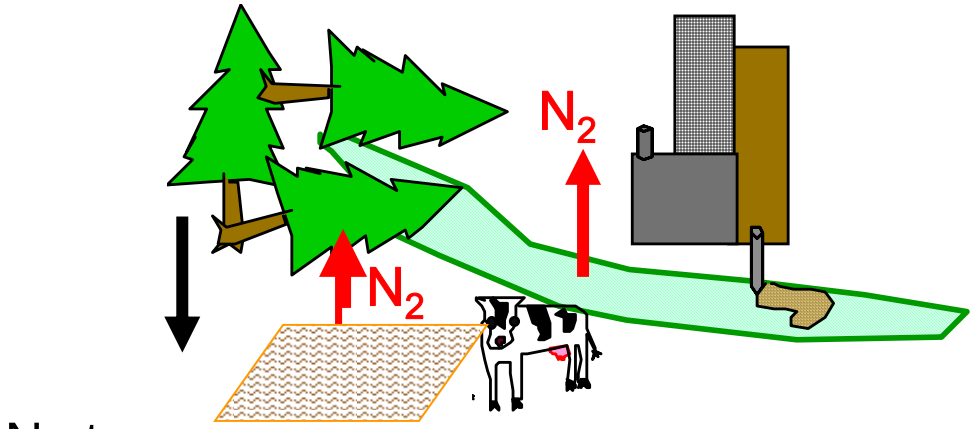
Background: Nitrogen (N) In Rivers

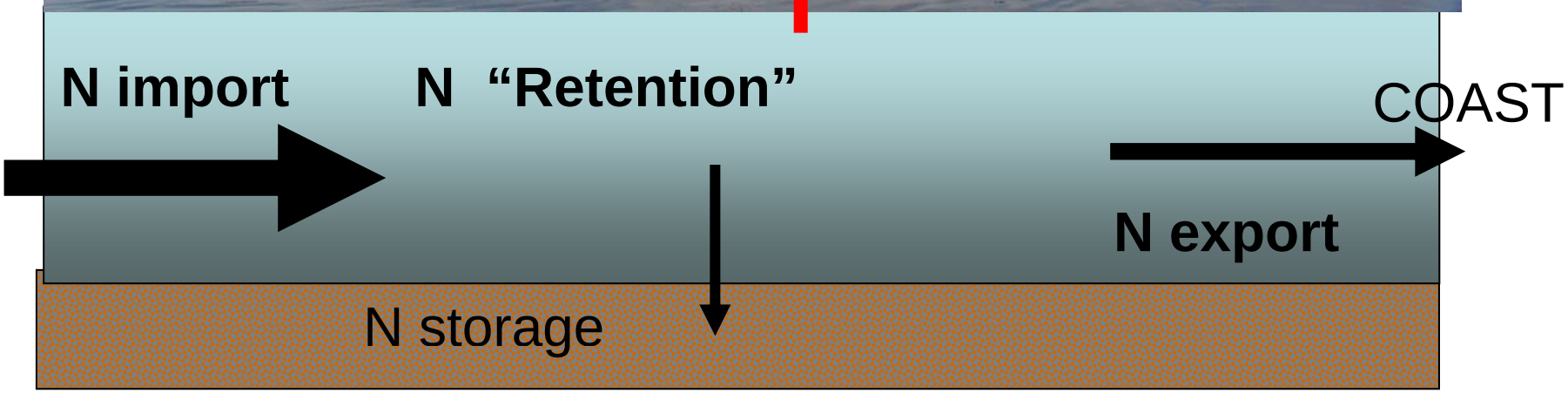
-Anthopogenic N load to rivers is large

-N 'retention' decreases impact of humans on coastal waters

-River networks play role in retention



Coastal Rivers Like Hudson Can Have An Important Role In N Retention



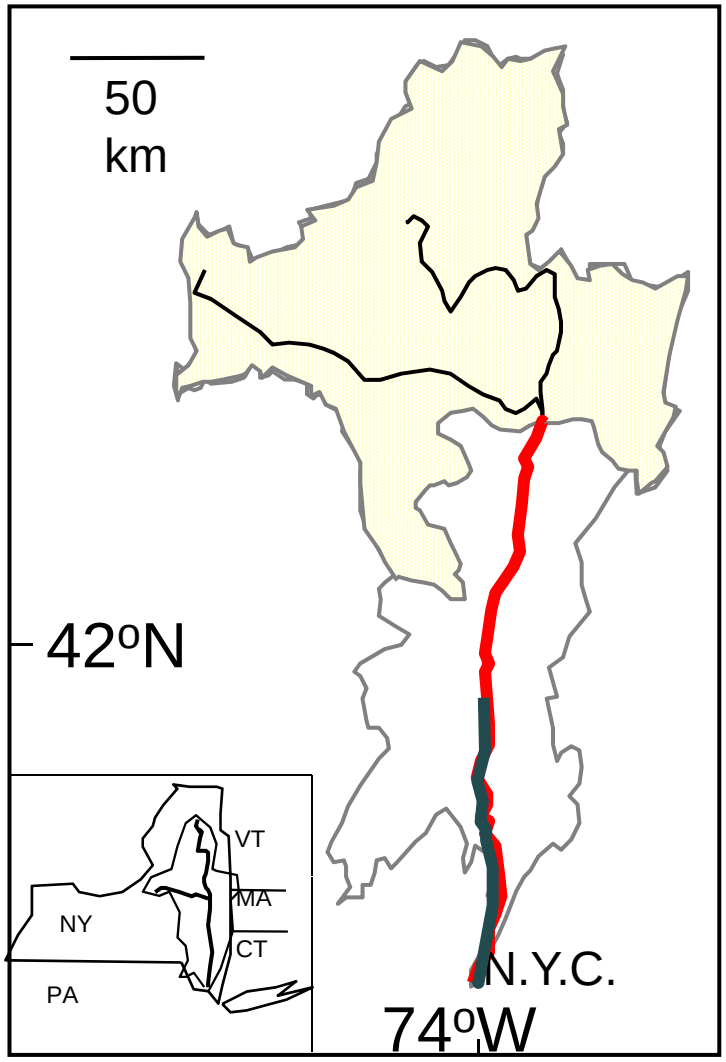
Background Hudson

-Moderate Size River

(WS = 35,000 km^2)

- Mixed Landuse

-150 km is both Tidal and Freshwater (TFW Hudson)



In TFW Hudson

-N retention accounts for ~25% of total load.

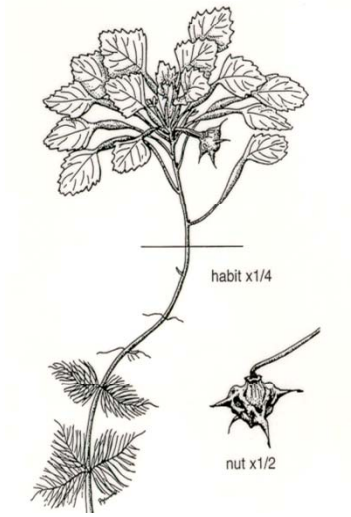
->50% of N retention occurs in 5% of area of river (biogeochemical Hot Spots)

Hot Spots Are Shallows Occupied By An Invasive Aquatic Plant

INVASIVE PLANT

Trapa, floating leaved species, forms dense cover

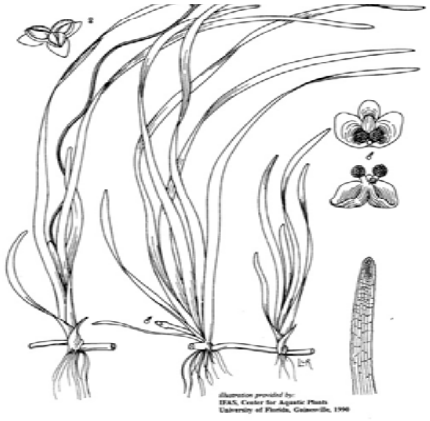
in 5% area of TFW Hudson



NATIVE PLANT

Vallisneria, SAV,

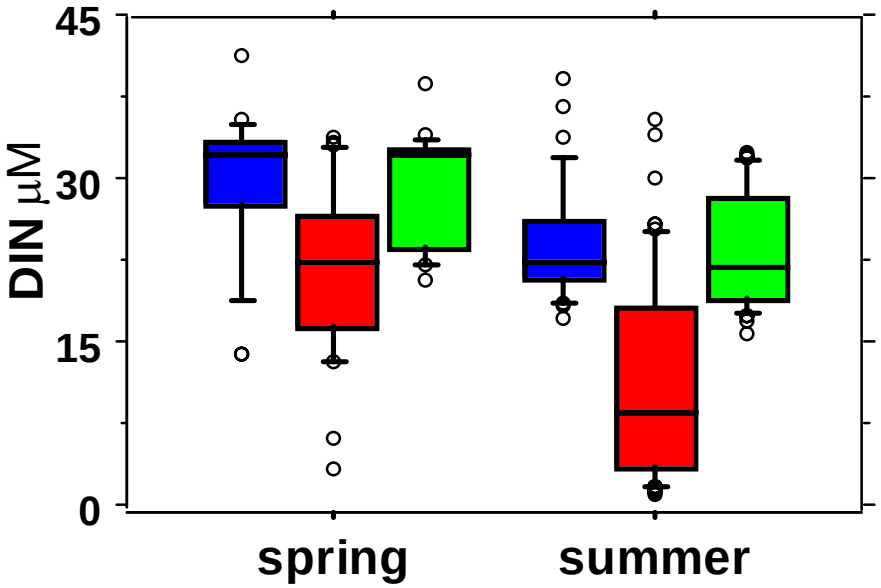
10% area of TFW Hudson



Aquatic Plants Occur In Large Distinct "Beds"

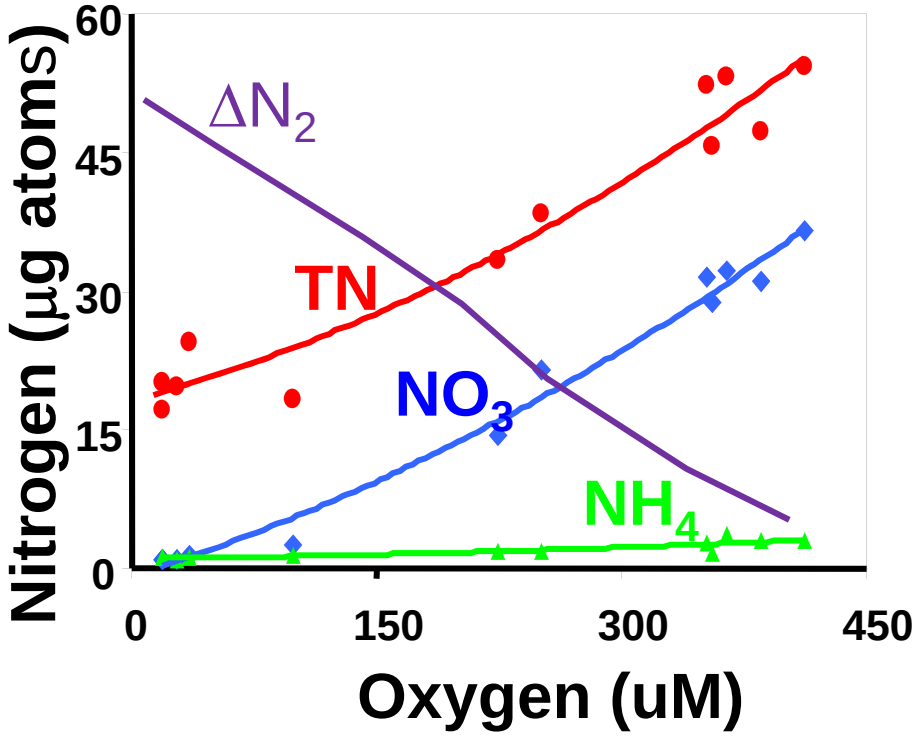
Impact Channel = ΔN x water exchange

So what happens to N In Plant Beds?

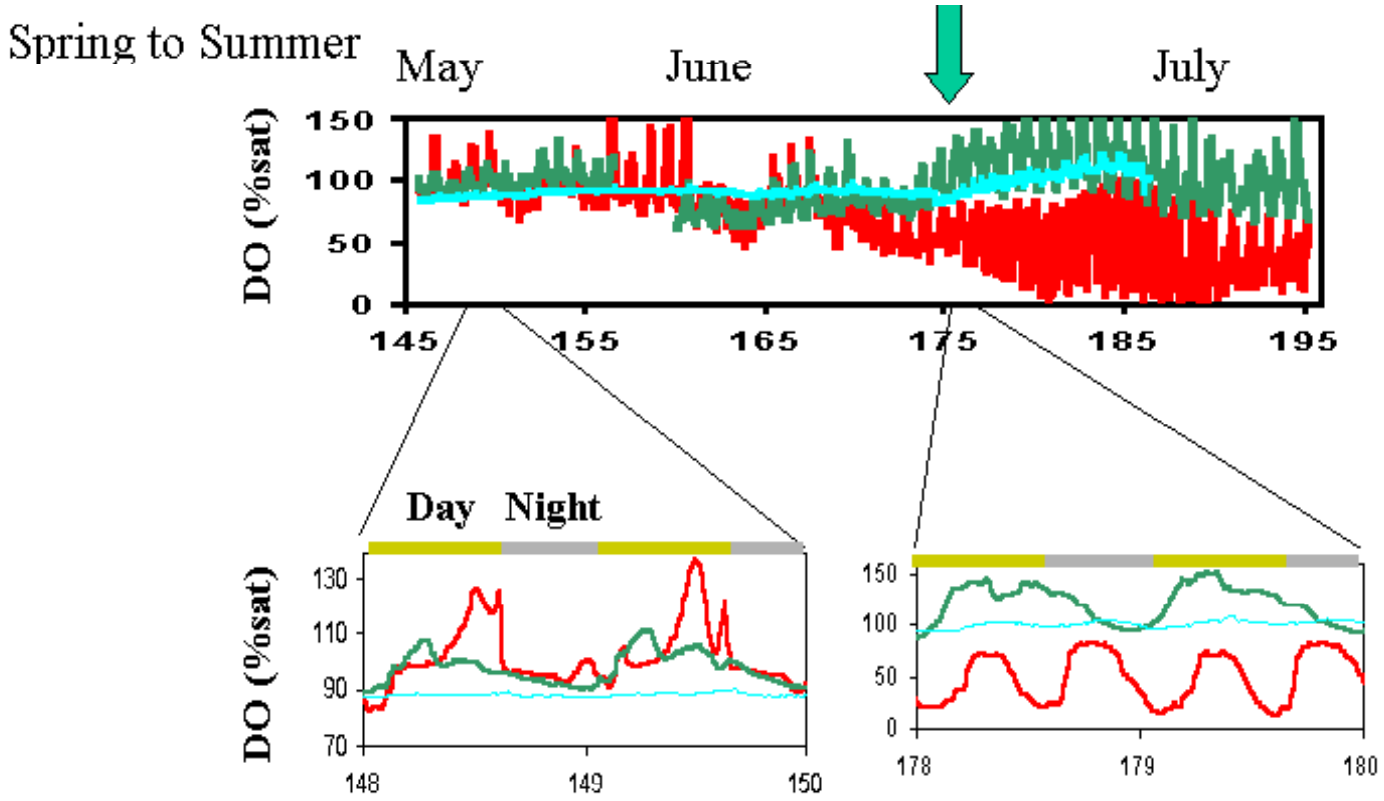


In Trapa beds but not Vallisneria beds N depleted.

DIN Depletion Related To Oxgyen Depletion and Fate of DIN is Denitrification *(N_2 Tall and Maranger)*



Daily N retention modeled from continuous oxygen and water exchange measurements



N removal In *Trapa* Beds ~4000 kg/day

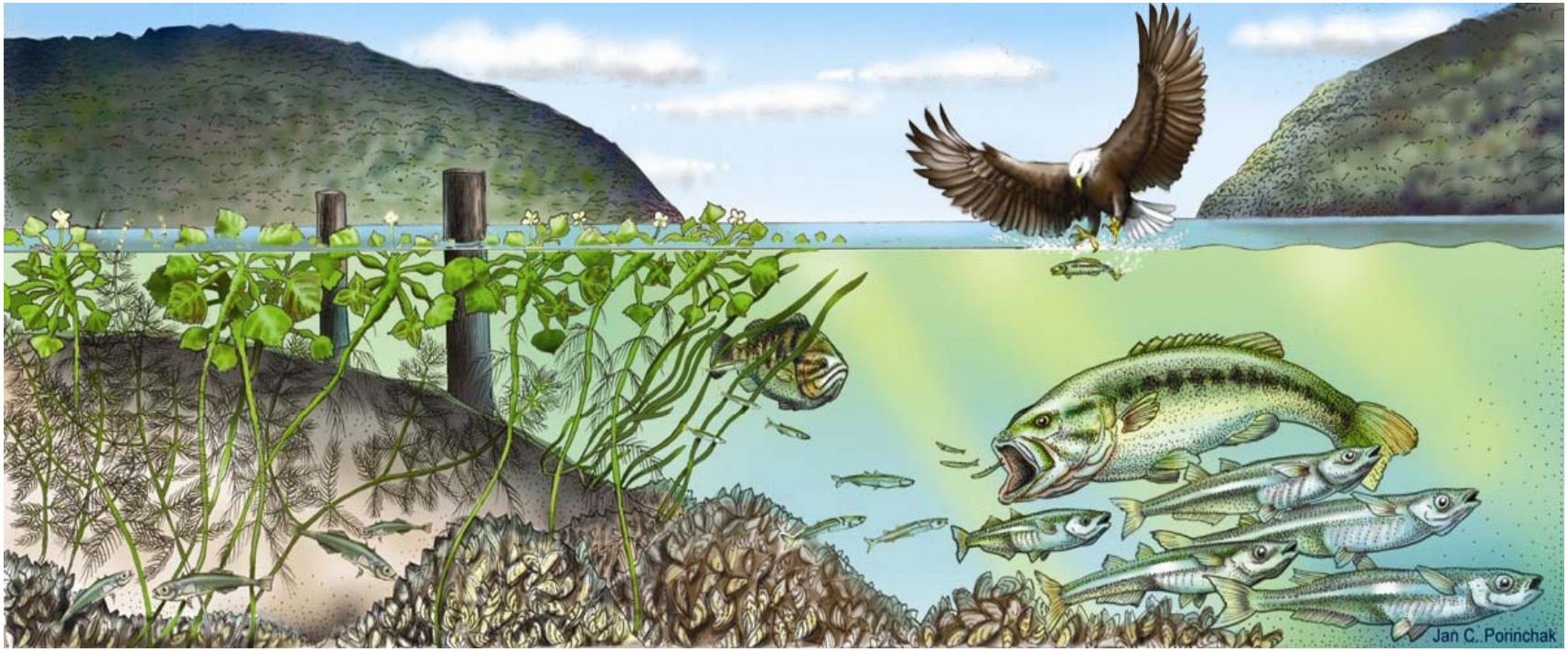
And occurs in only 5 km^2 of Trapa

How big is this?

1. Waste from 800,000 people
2. 1,000,000 fish at 0.5 kg/fish
4. 30% of N input to TFW Hudson from watershed
5. 80% of total N removal in river
6. retention from ~5000 km^2 of forest land

CONCLUSIONS

-Coastal Rivers Can Be Hot Spots of N processing
-Shallows occupied by plants may be very hot
-Species invasions can alter N processing



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