



SCIENCE AND
EDUCATION **FOR**
SUSTAINABLE
LIFE



Stream food webs from source to sea

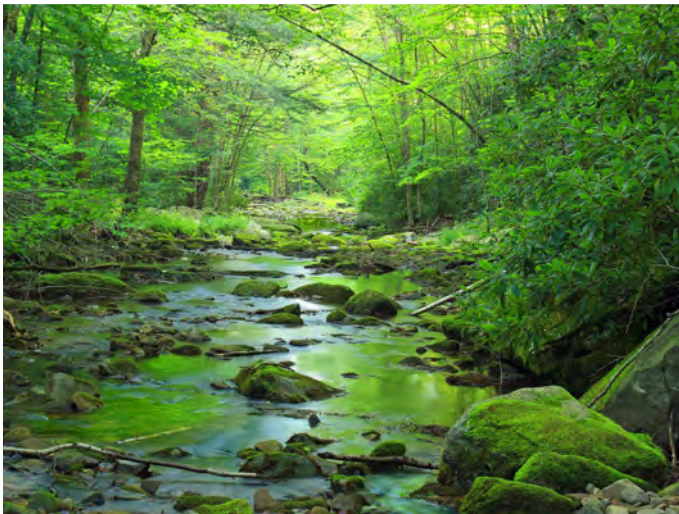
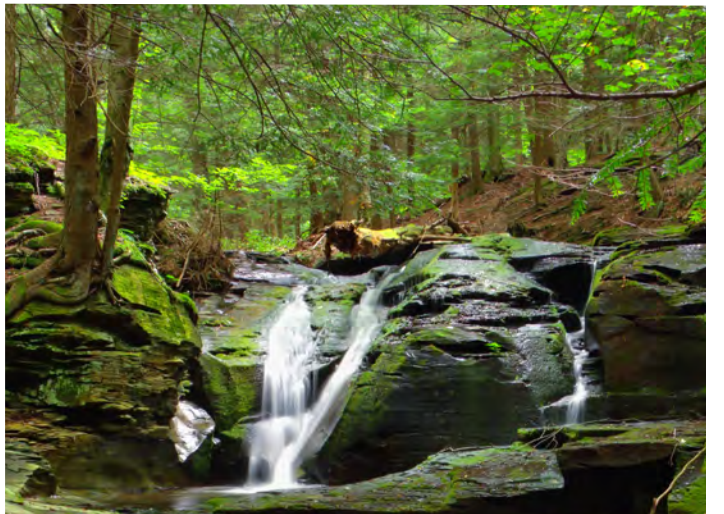
Från skogsbäck till å till älv

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Swedish University of Agricultural Sciences, Uppsala

Miljöanalys program: Sjöar och vattendrag
Brendan.mckie@slu.se







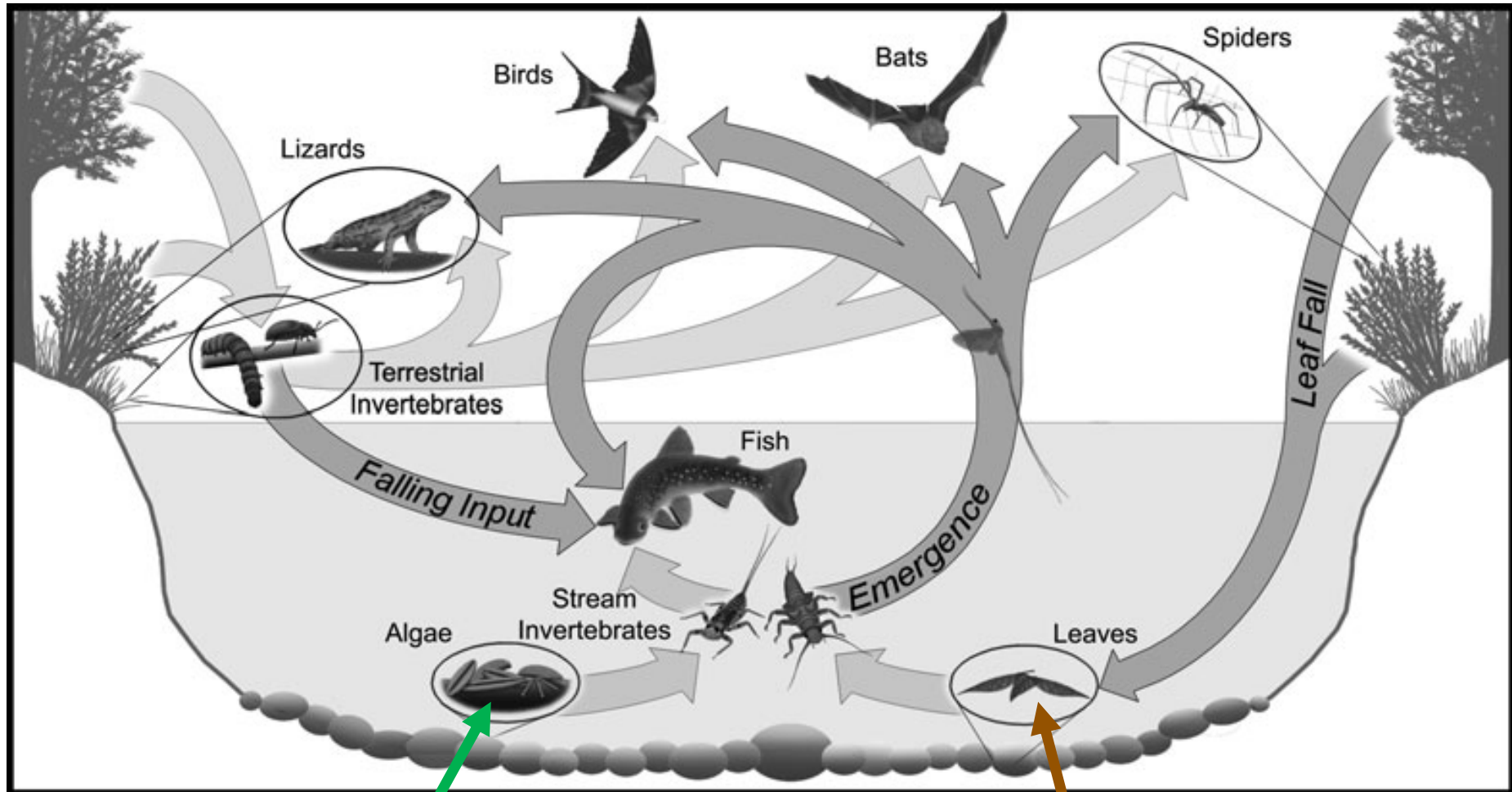






“Tangled webs”

Ekologisk konnektivitet emellan land och vatten

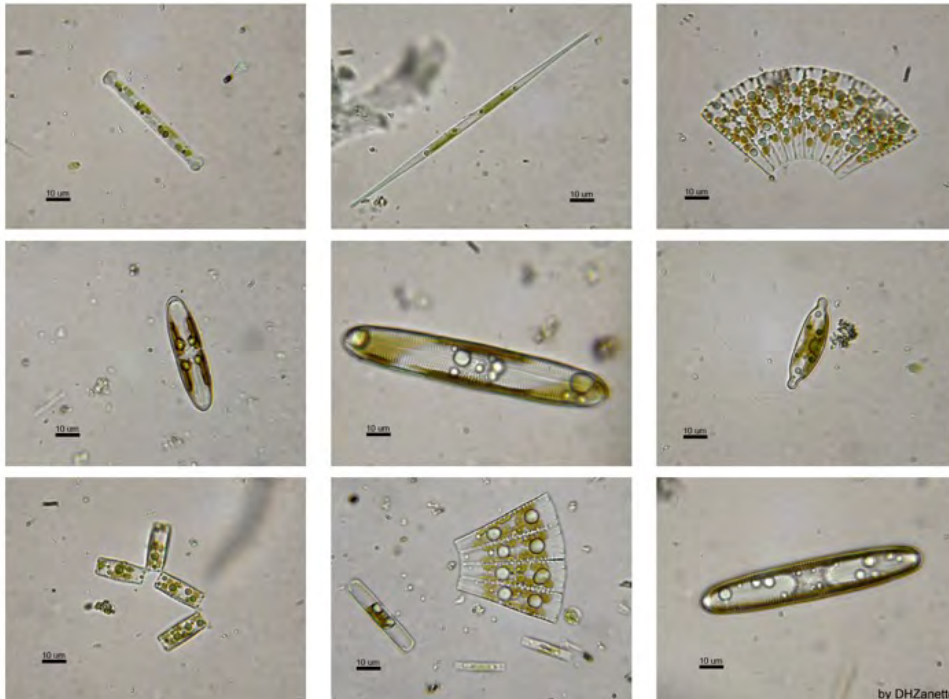


“Det gröna näringsvävet”

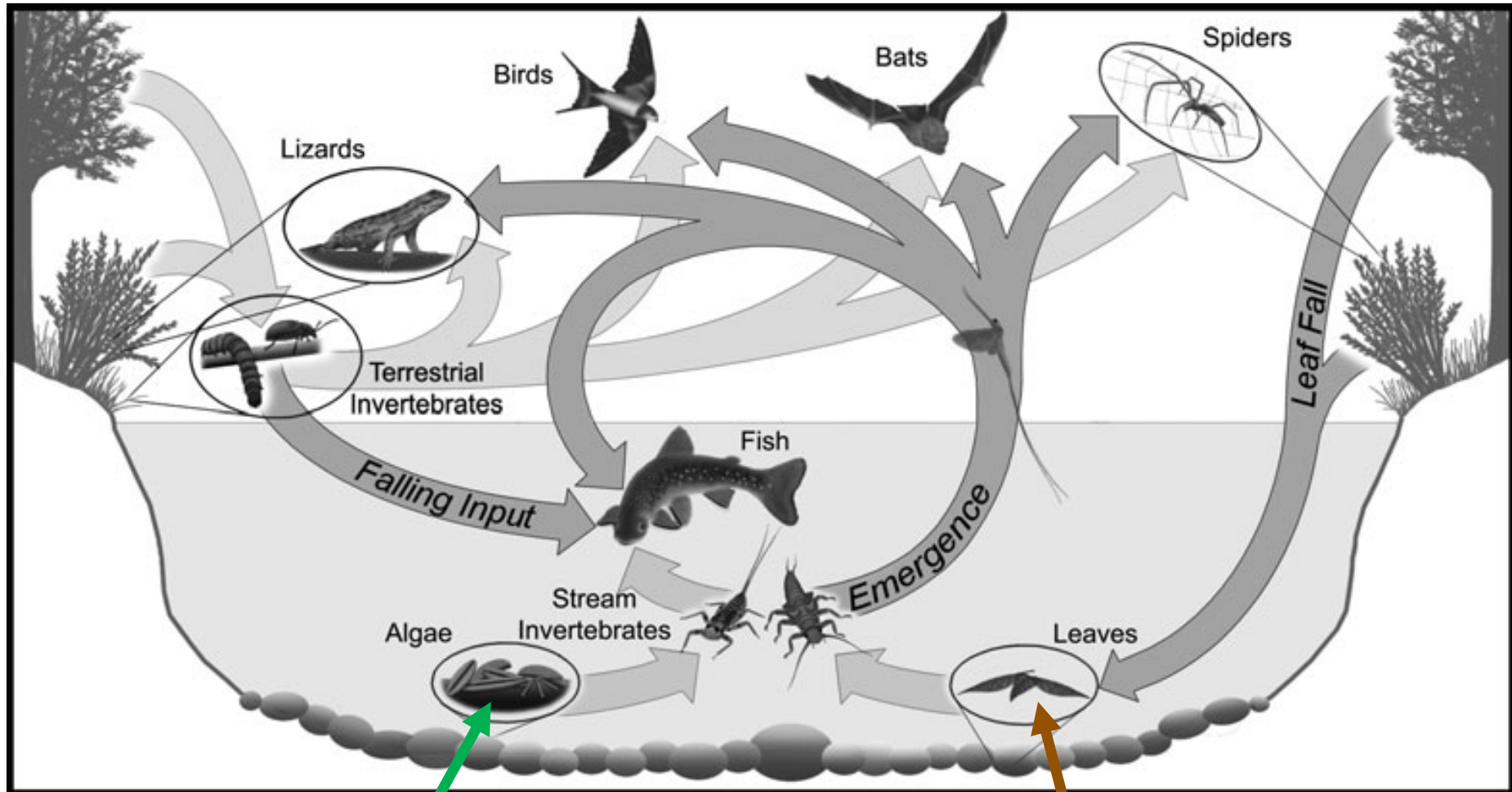
“Det bruna näringsvävet”

Algal biofilms /algbiofilmer:

- Snabbt tillväxt
- Närsalts upptag
- Det gröna näringsvävet



Ekologisk konnektivitet emellan land och vatten

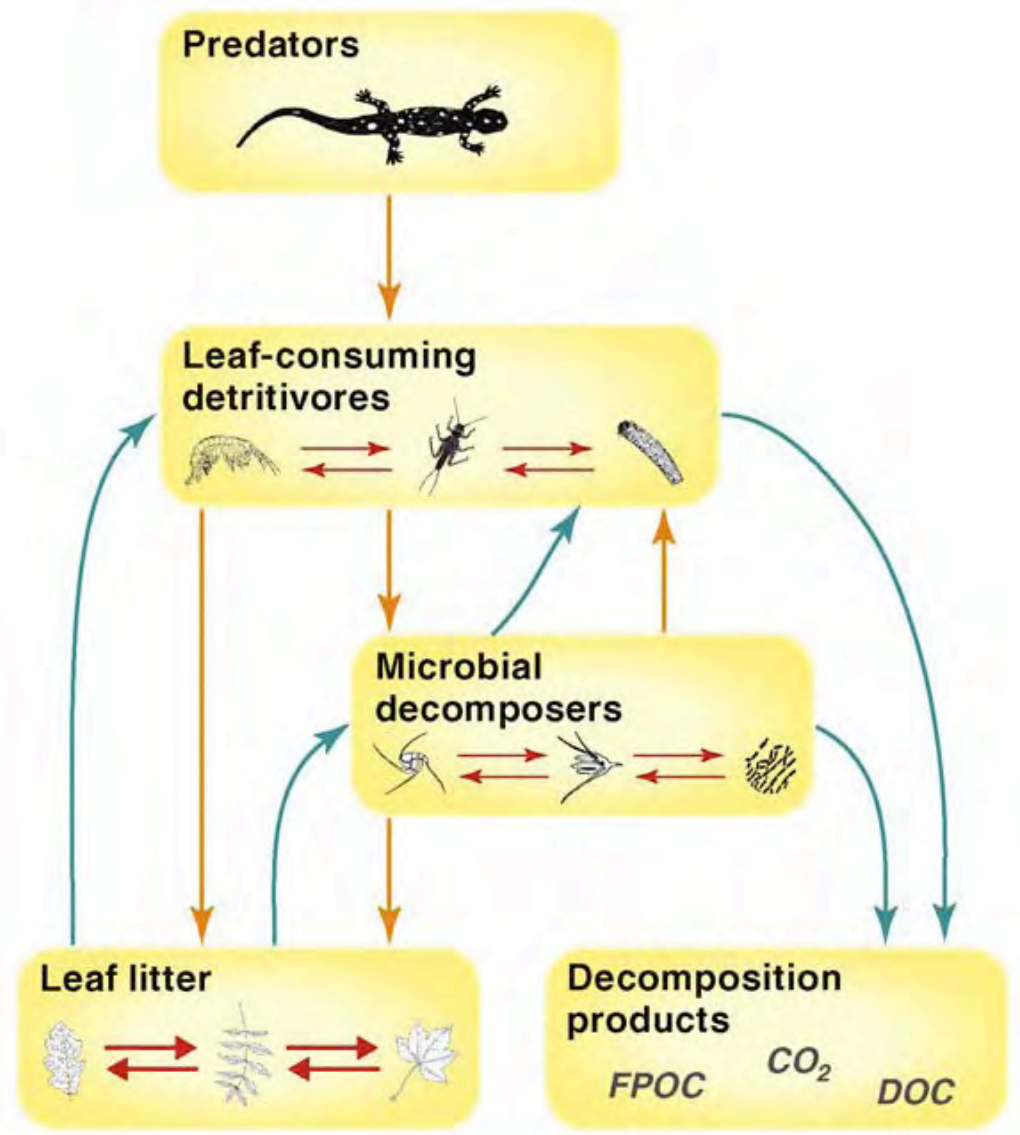


“Det gröna näringsvävet”

“Det bruna näringsvävet”

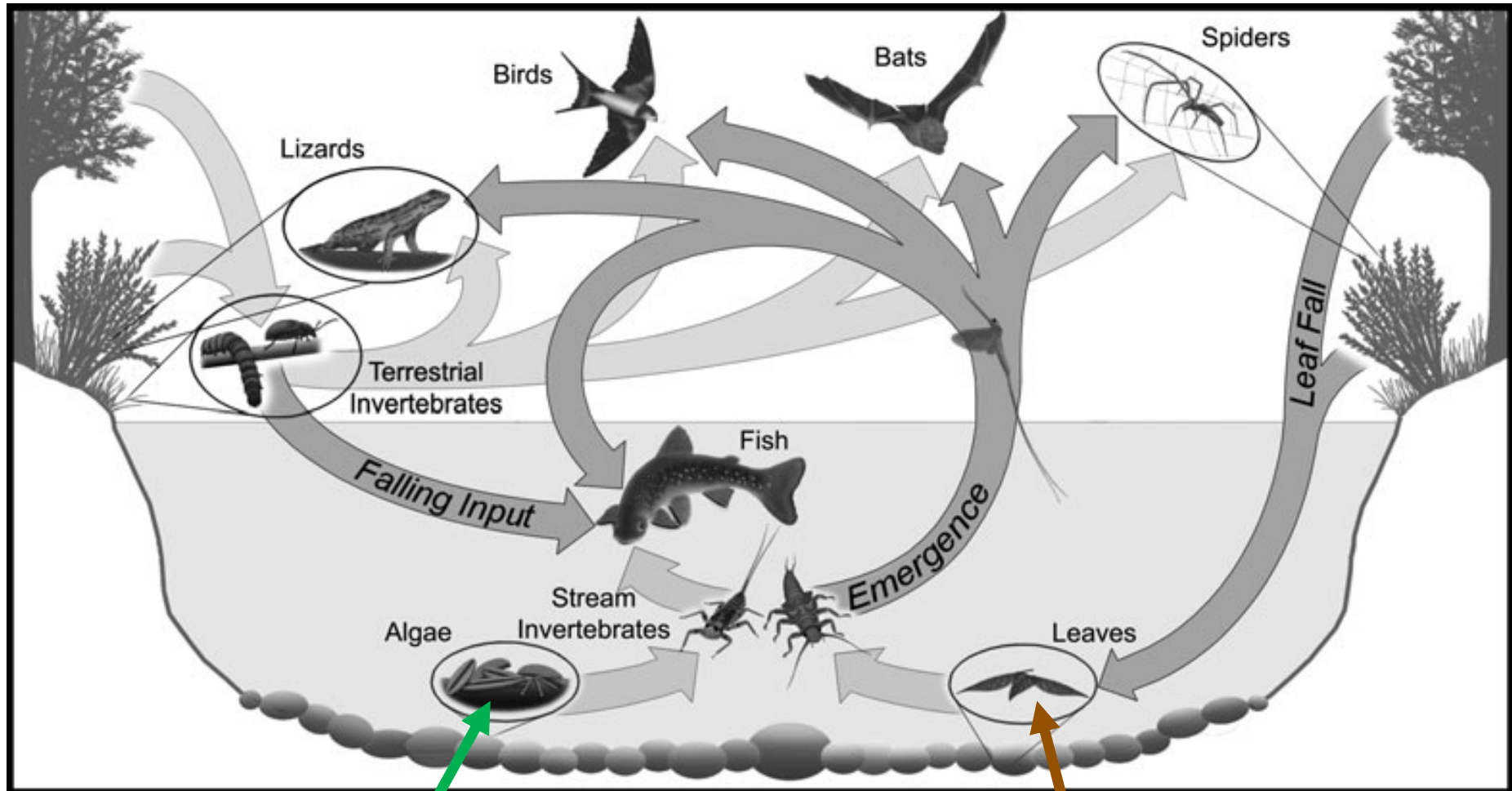
Microbes & Detritus / Mikrober och lövnedbrytning

- Närsalts upptag
- Nedbrytning: detritus, toxiner mm
- Det bruna näringsvävet



Gessner et al, TREE (2010)

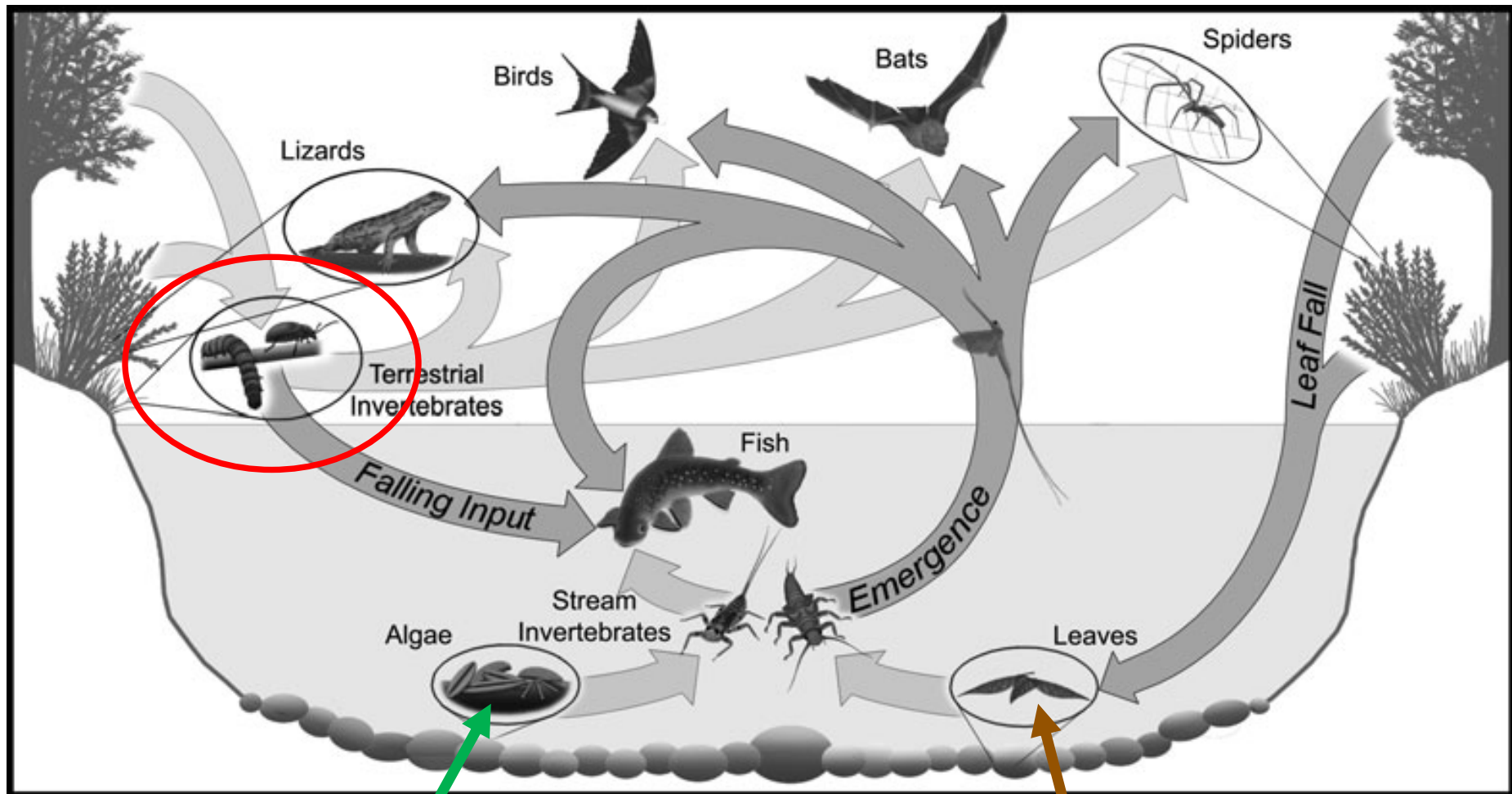
Ekologisk konnektivitet emellan land och vatten



“Det gröna näringsvävet”

“Det bruna näringsvävet”

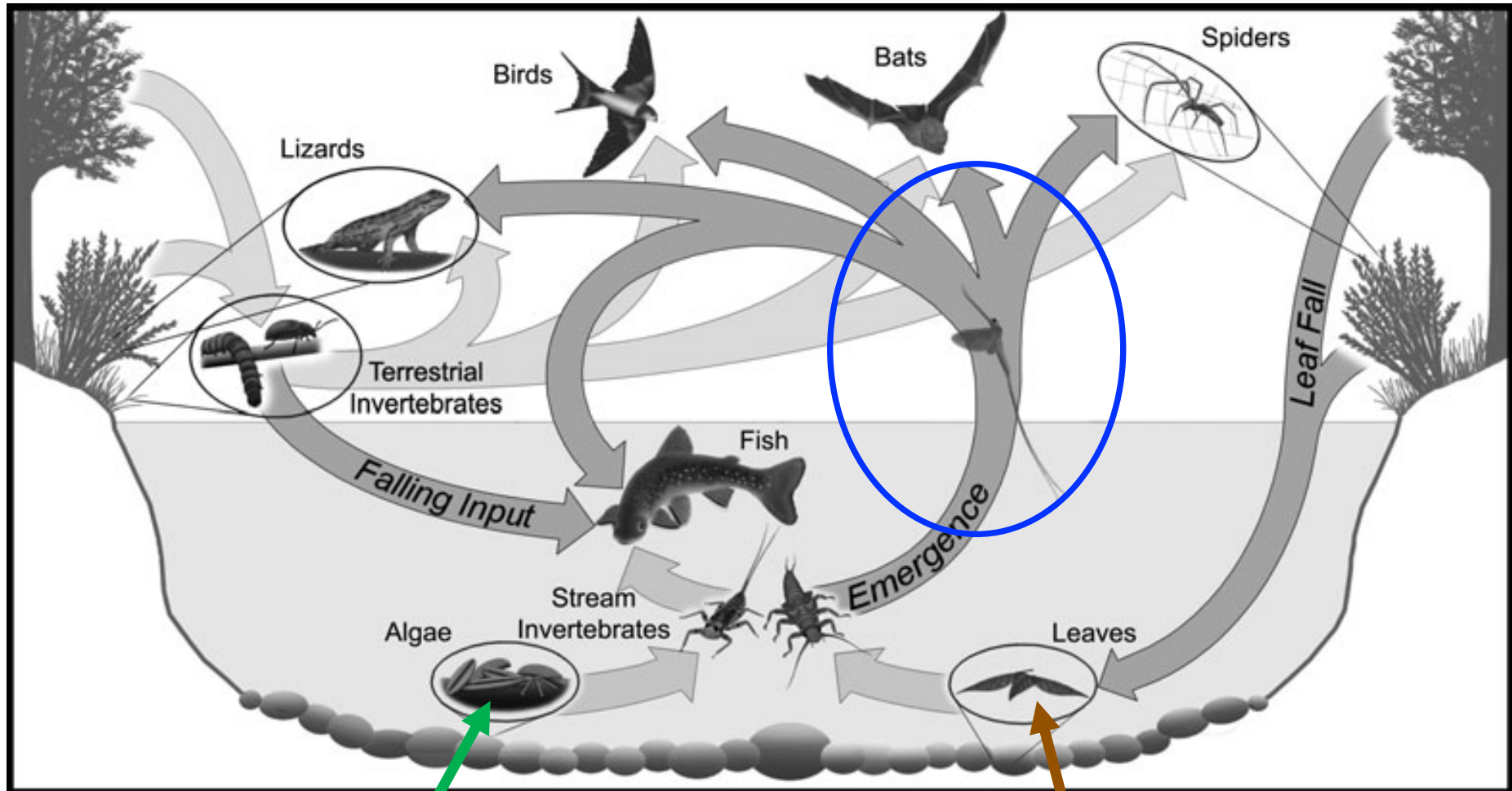
Ekologisk konnektivitet emellan land och vatten



“Det gröna näringsvävet”

“Det bruna näringsvävet”

Ekologisk konnektivitet emellan land och vatten

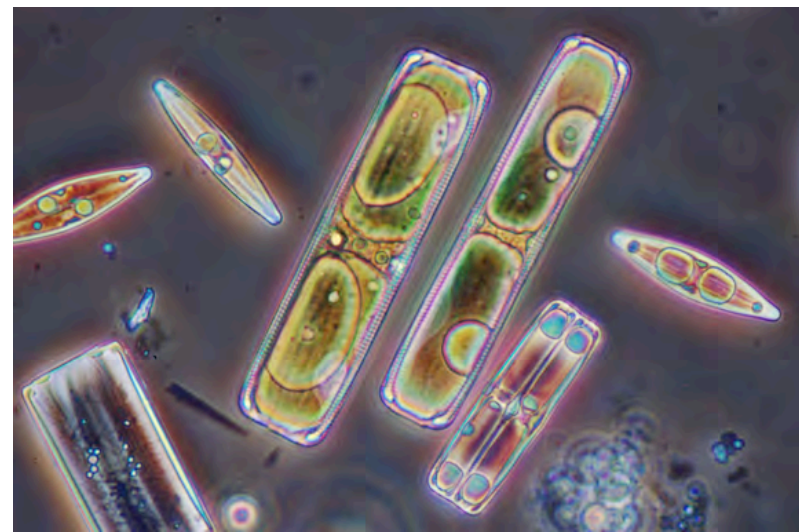


“Det gröna näringsvävet”

“Det bruna näringsvävet”



Polyunsaturated Fatty Acids / Fleromättad fettsyror

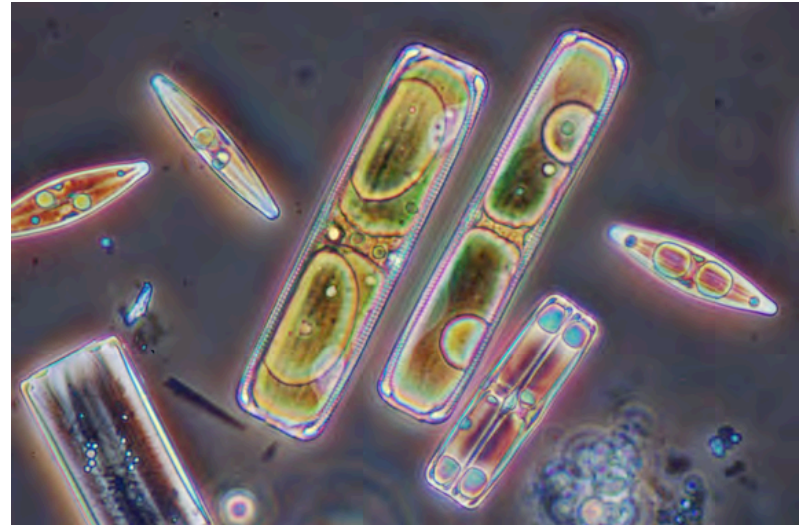


- E.g. Omega 3 fatty acids
- Essential for metabolism and development
- Highest quality fatty acids synthesised in aquatic environments ...
- ... by algae

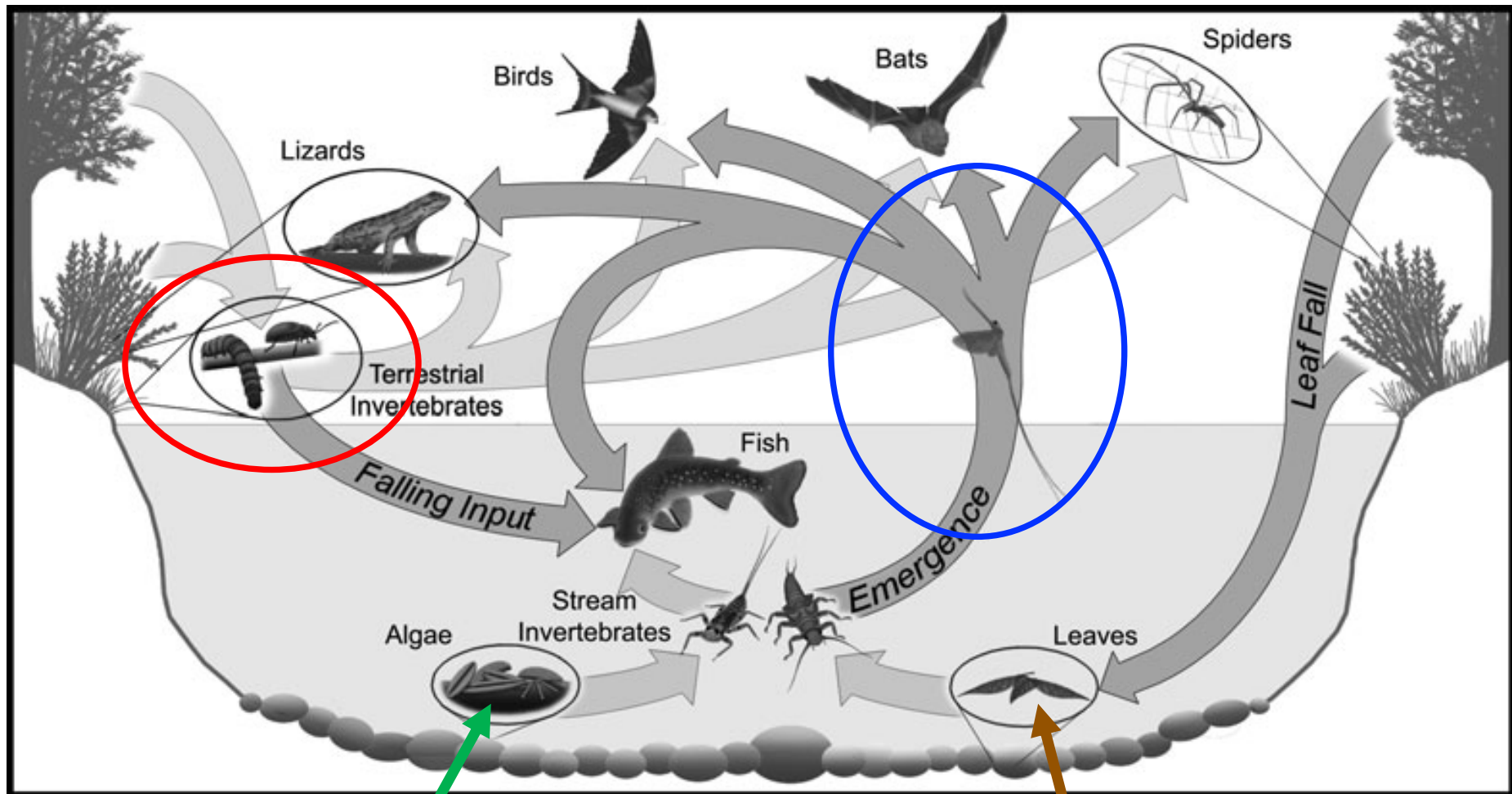




Omega 3-fettsyror
produceras av kiselalger!



Ekologisk konnektivitet emellan land och vatten

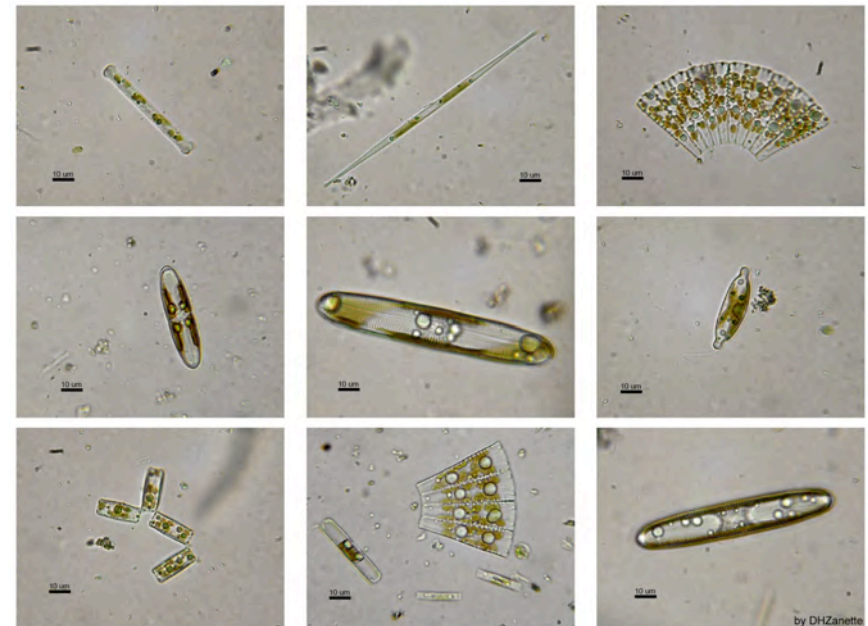
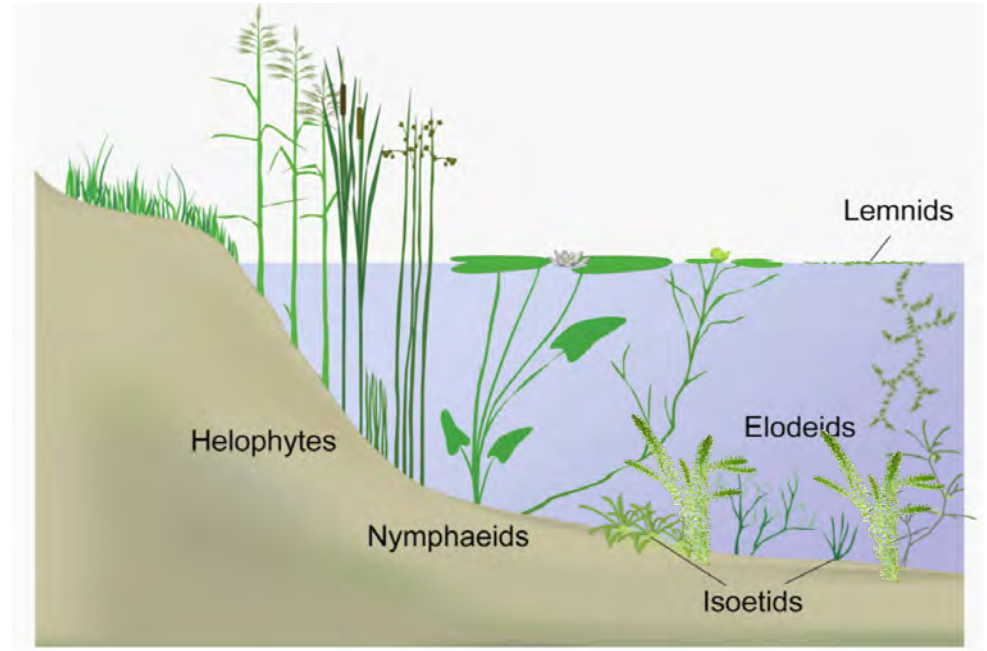
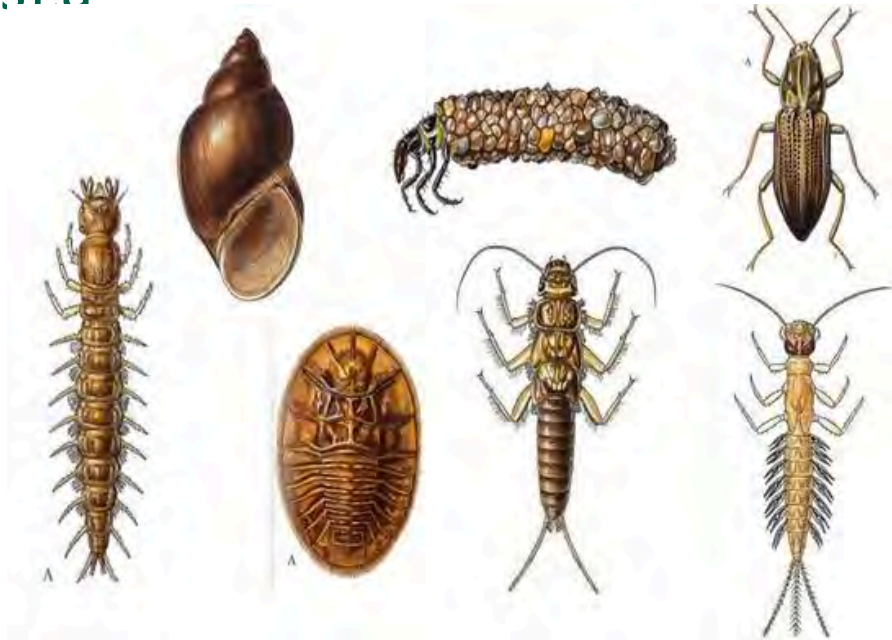


“Det gröna näringsvävet”

“Det bruna näringsvävet”

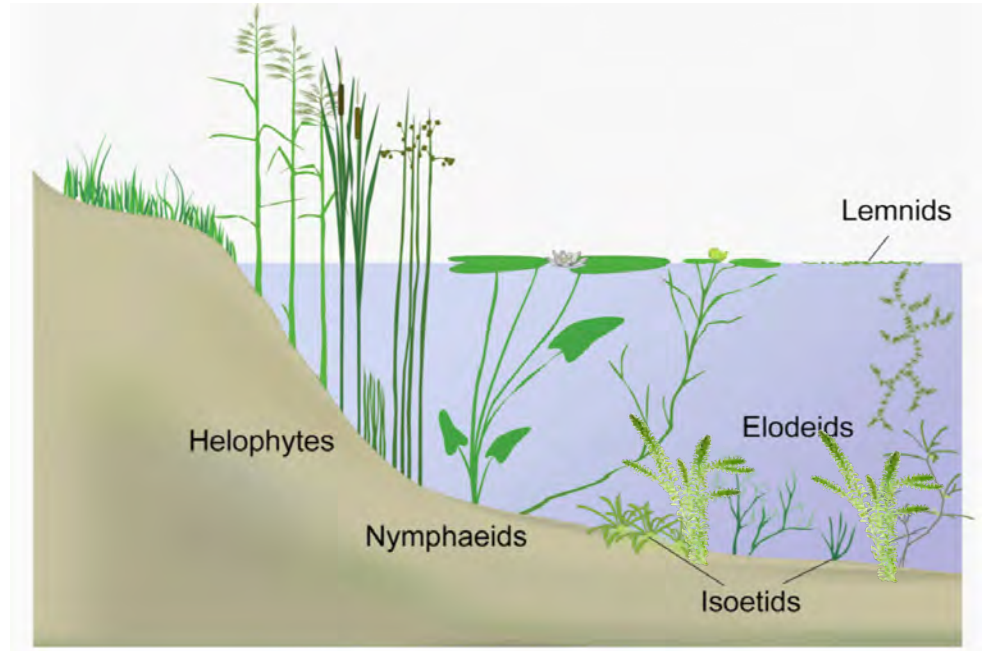
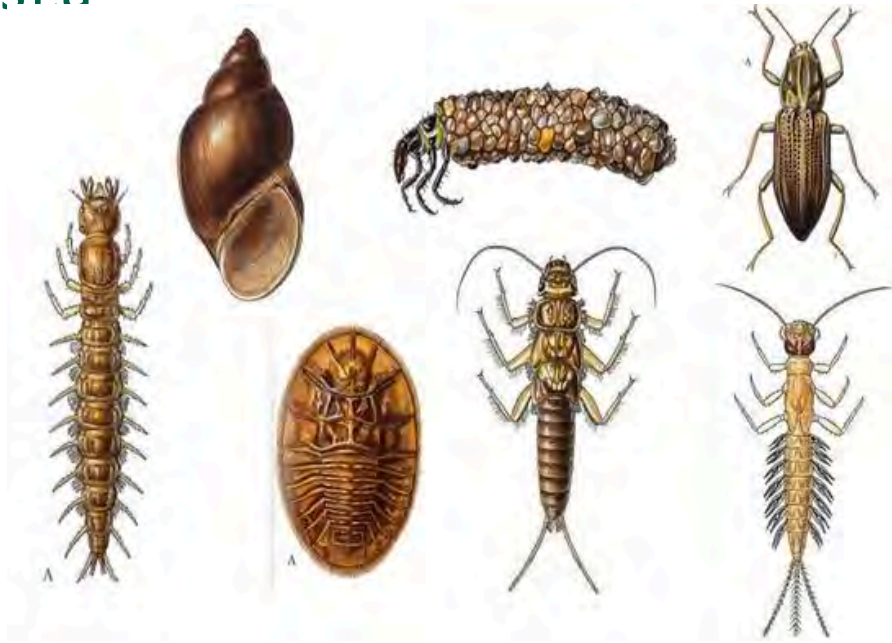


Vattendrag: biologiska mångfald är oproportionerligt hög

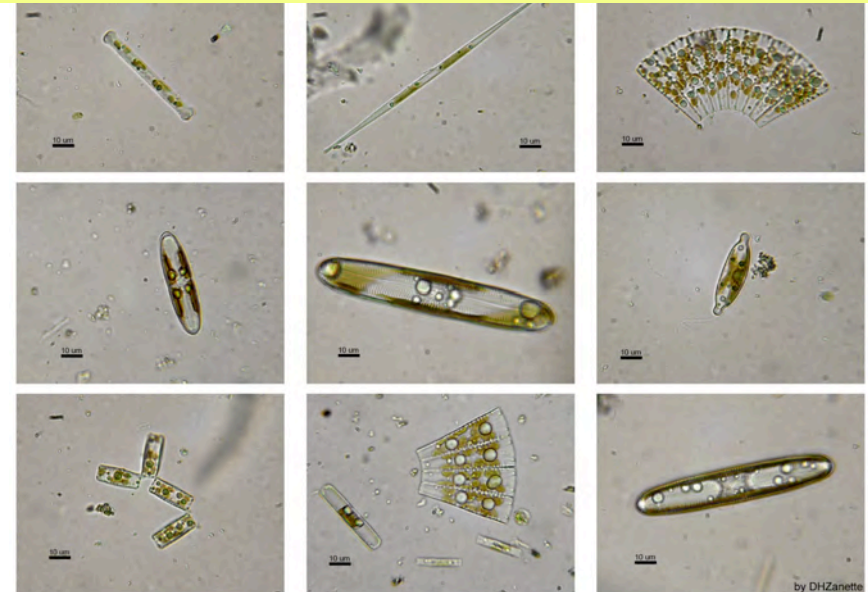




Vattendrag: biologiska mångfald är oproportionerligt hög



Freshwaters < 1% Earth's surface, but host >25% of vertebrates



by DHZanette

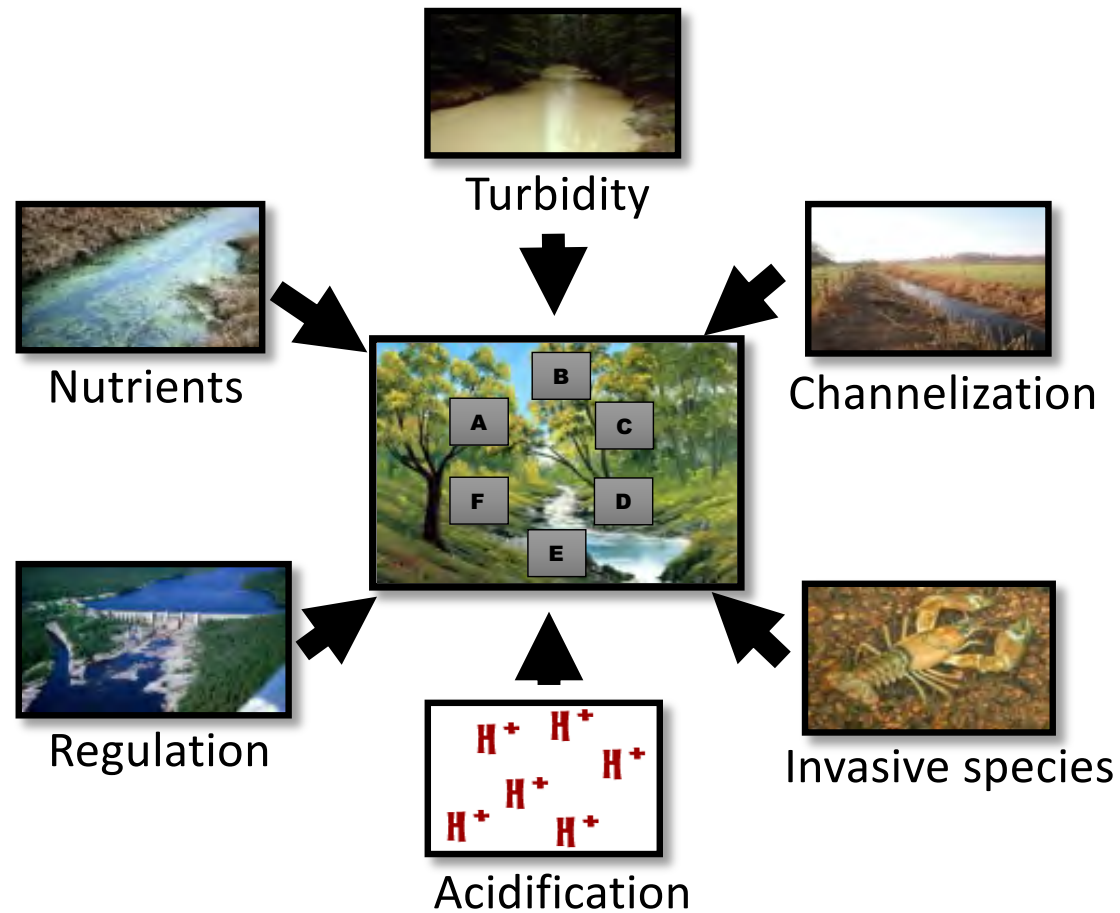
Ekosystem tjänster: mer än bara vatten!



Centrala för det ekonomiska och kulturella livet i samhällen



Bäckar och floder är hårt påverkade



Sötvattens biologiska mångfald: minskar snabbast av alla?



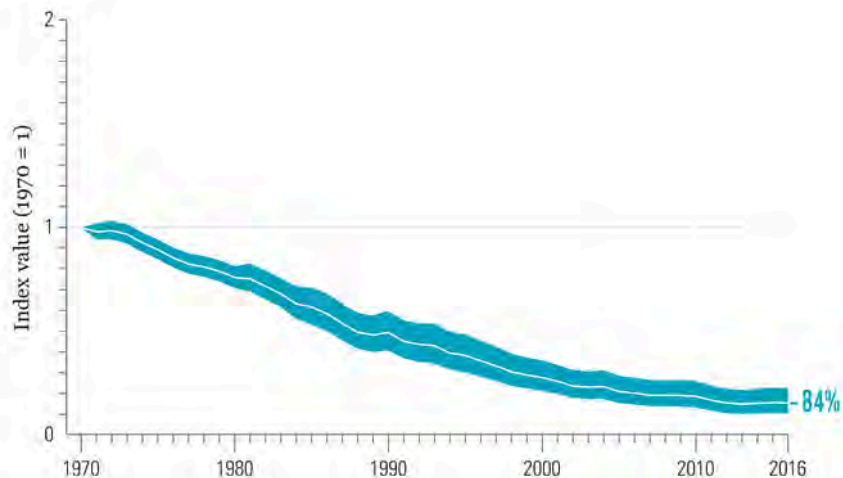
WWF

Sep 22, 2020 · 7 min read · Listen



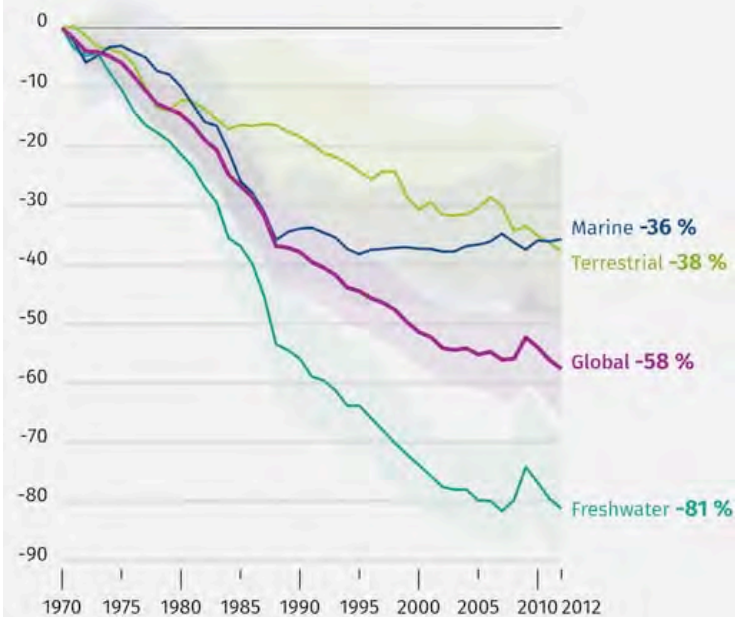
Freshwater biodiversity is crashing: Time for an emergency turn-around strategy.

By Dean Muruven, WWF Global Freshwater Policy Lead



The Living Planet Index (LPI) measures biodiversity by collecting data and tracking trends in abundance of a large number of populations of vertebrate species (amphibians, mammals, birds, fish and reptiles).

Average decline in abundance of populations by type of habitat (% compared to 1970)



© FNISP - Sciences Po, Atelier de cartographie, 2018



Från bäck till å till älv (och därefter hav)

SLU

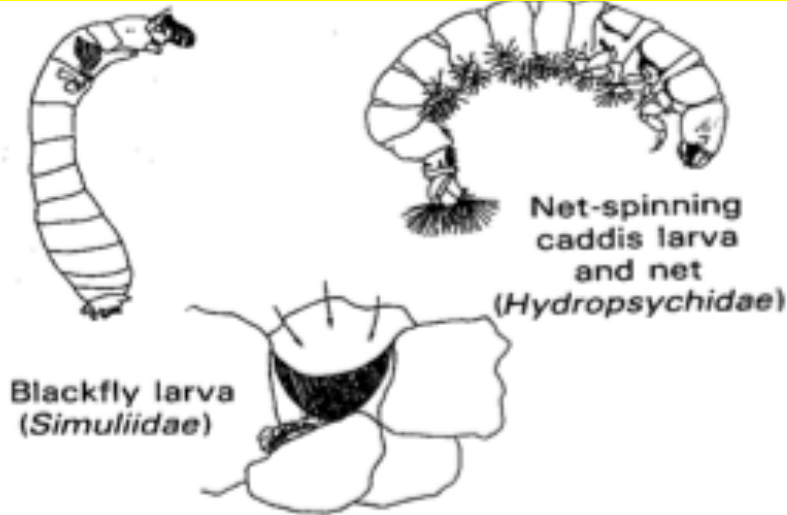


- How it *should* be:
The River
Continuum Concept
- How it often is today:
The river continuum
interrupted!

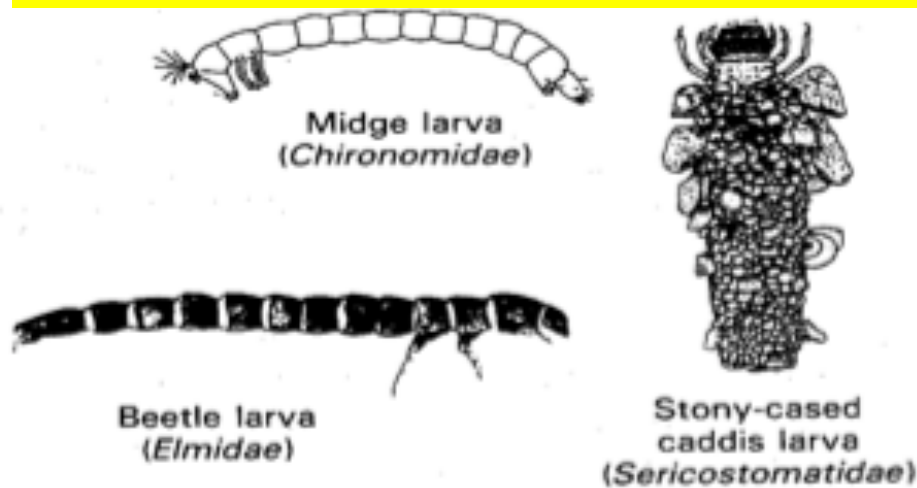


Evertebrater: funktionella grupper

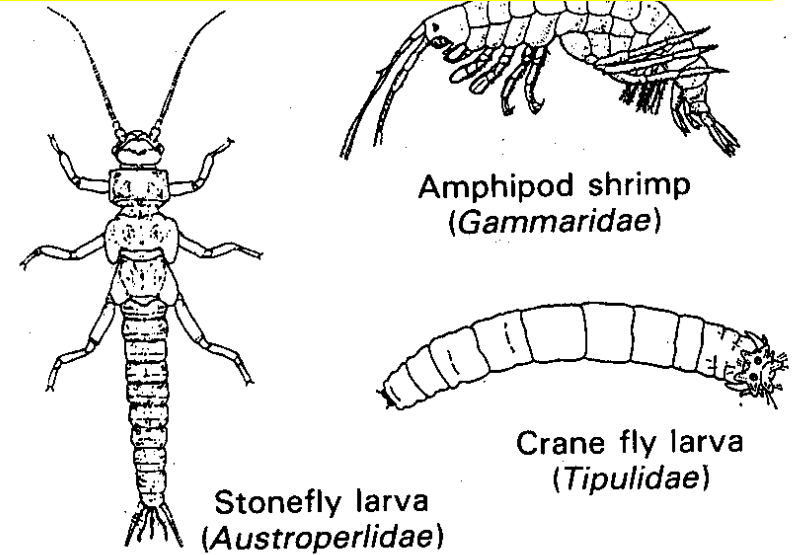
Particle collectors: Filterers / filtrarare



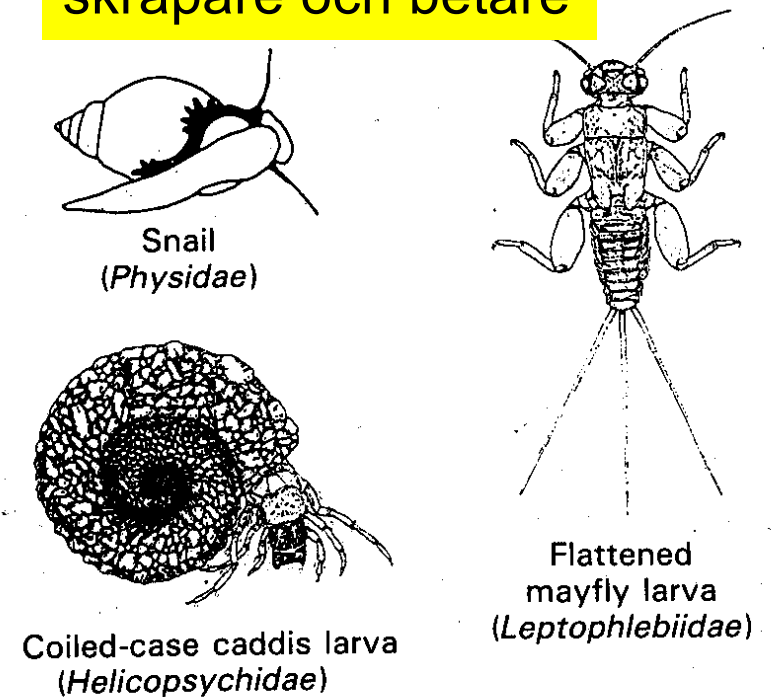
Particle collectors: Gatherers / samlare



Leaf shredders/ sönderdelare



Algal scrapers / skrapare och betare



Evertebrater: funktionella grupper

Leaf shredders/ sönderdelare

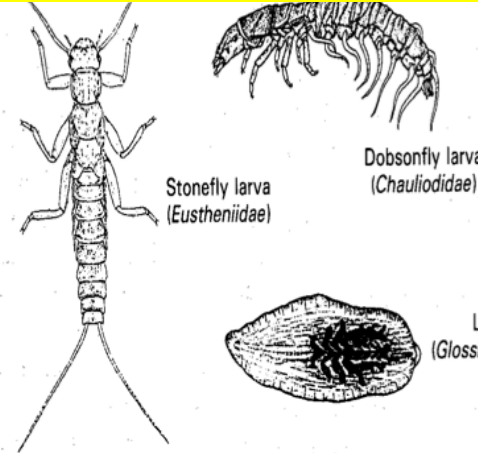
Particle collectors: Filterers / filtrarare



Blackfly larva
(*Simuliidae*)

Flatworm
(*Planariidae*)

Predators/ rovdjur



Stonefly larva
(*Eustheniidae*)

Dobsonfly larva
(*Chaulioididae*)



Amphipod shrimp
(*Gammaridae*)



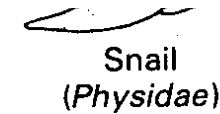
Crane fly larva
(*Tipulidae*)

Leafy larva
(*Properlidae*)

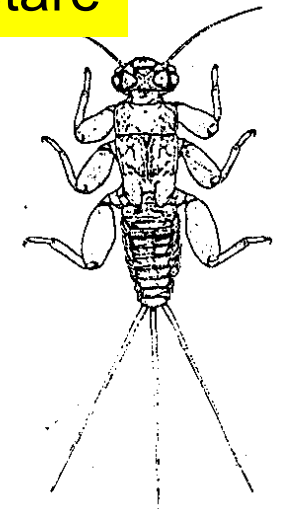
Scrapers / skrapare och betare



Leech
(*Glossiphoniidae*)



Snail
(*Physidae*)

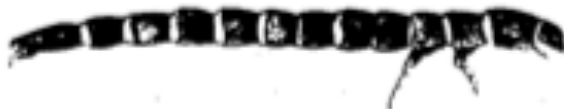


Flattened mayfly larva
(*Leptophlebiidae*)

Particle collectors: Gattling



Midge larva
(*Chironomidae*)



Beetle larva
(*Elmidae*)



Stony-cased caddis larva
(*Sericostomatidae*)



Coiled-case caddis larva
(*Helicopsychoidea*)



The River Continuum Concept

- Biologisk mångfald och ekosystems funktion varierar på ett systematiskt sätt från bäck till å till älv



(Vannote et al, 1980)



The River Continuum Concept





The River Continuum Concept





The River Continuum Concept



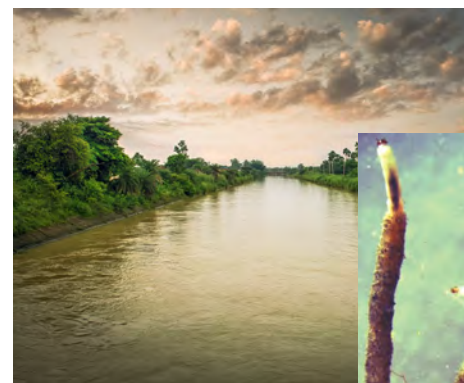


The River Continuum Concept



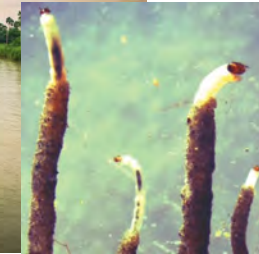
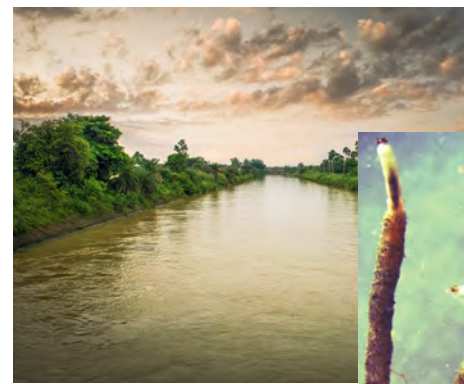
The River Continuum Concept - Interrupted!

- Antropogenska påverkan förändrar kontektivitetet





The River Continuum Concept - Interrupted!



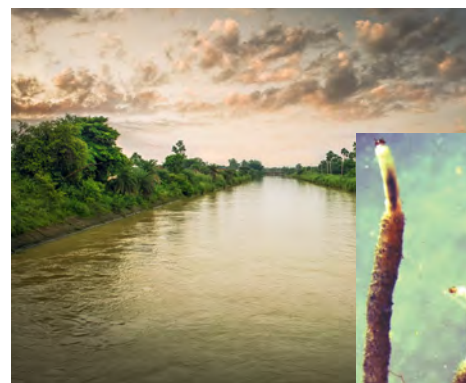


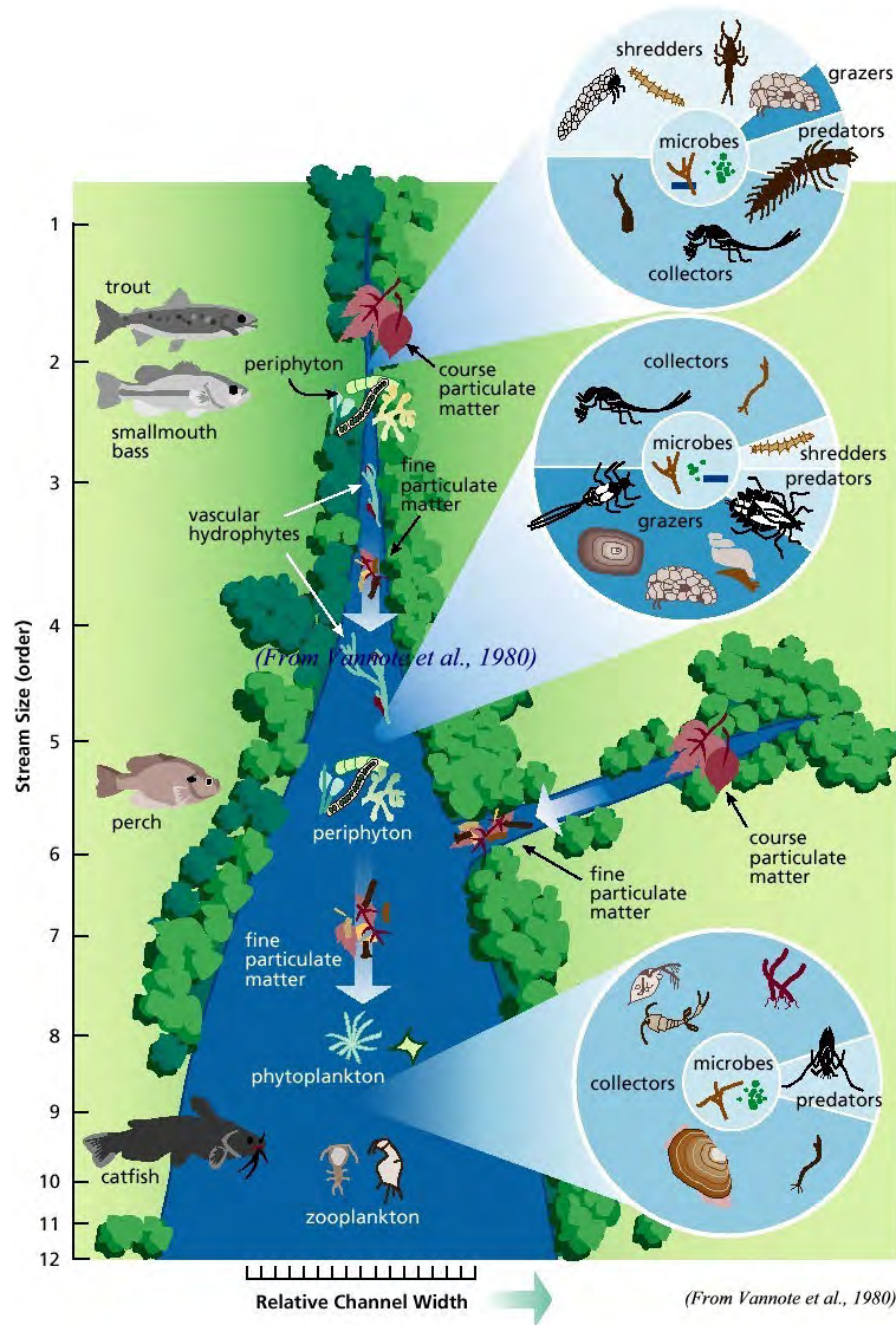
The River Continuum Concept - Interrupted!





The River Continuum Concept - Interrupted!





River Continuum Concept: Adding Complexity



Thanks for your attention!

Brendan.mckie@slu.se

www.riparianbuffers.com



(Lake Vättern, Sweden)