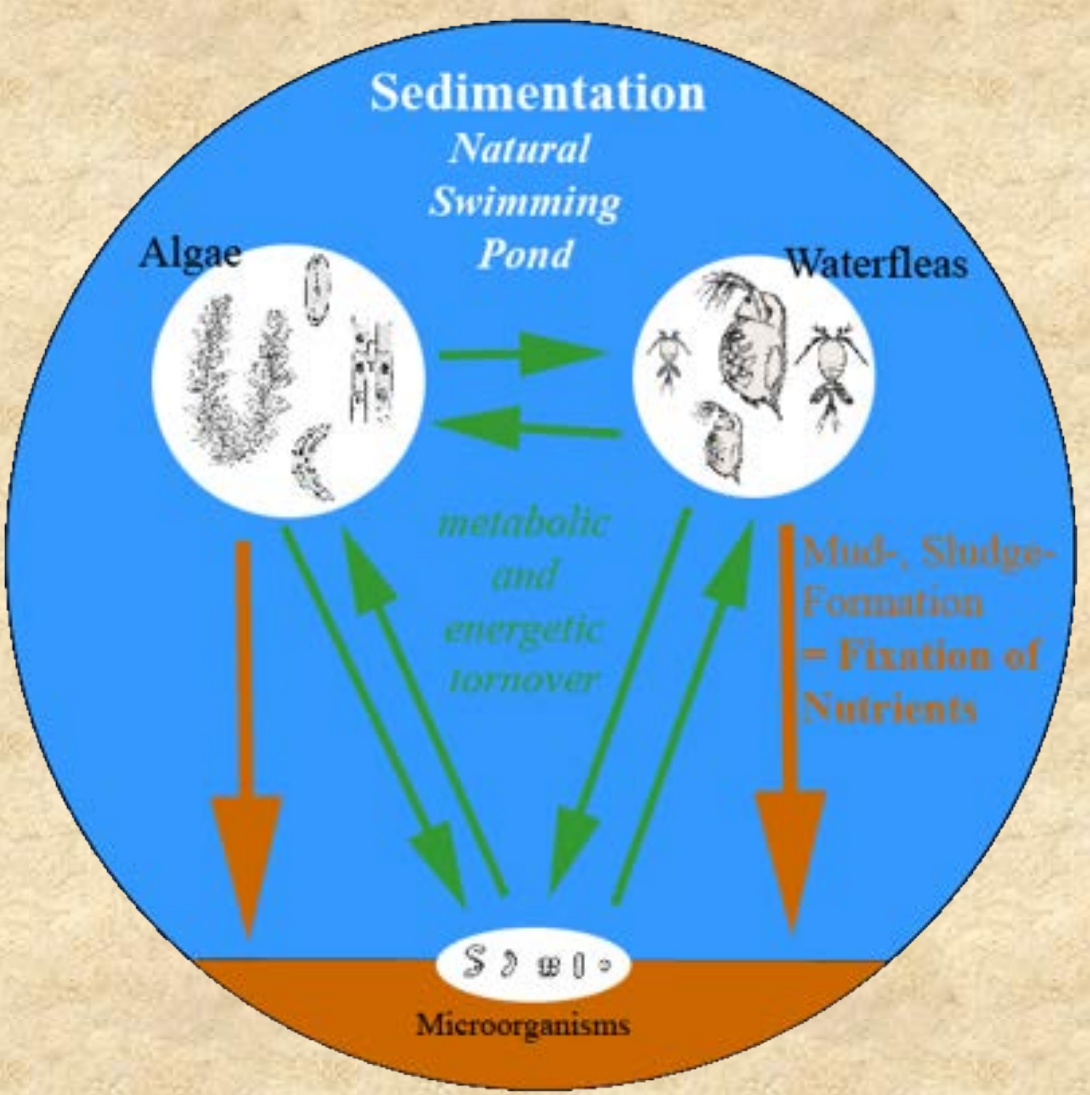

Sedimentation
Natural
Swimming
Pond
Algae
Waterfleas
metabolic
and
energetic
turnover
Mud-, Sludge-
Formation
= Fixation of
Nutrients
Microorganisms

Concerning Natural Swimming Ponds (NSPonds) calculations are reasonable if the pond is a perfect habitat for zooplancton (e. g. large Daphnia species), as these animals are by far the most important filtering organisms for suspended algae, especially at lower meso- and oligotrophic levels.

i. e.

-) stagnant water (no permanent current, no filters)

-) there ist enough habitat space for waterfleas (rich in structure)

-) no toxic substances (algal agents, nitrite etc.)

Concerning Natural Swimming Ponds (NSPonds) calculations are reasonable if every organic component in direct contact with the waterbody is

green or

greyish or

brownish and

permanent NOT black and smelly!

Nutrients (especially phosphor) are more or less stable in oxidized condition (green/living; sediment: grey, brown).

They get soluble to water at anoxic condition (black, smelly).

Clay may be an appropriate boundary between anoxic and oxidized milieu (plant substrate – water).

Gravel is not an appropriate boundary between anoxic and oxidized milieu, gravel is not an appropriate substrate for NSPonds

Gravel may destroy the separating effect of clay.

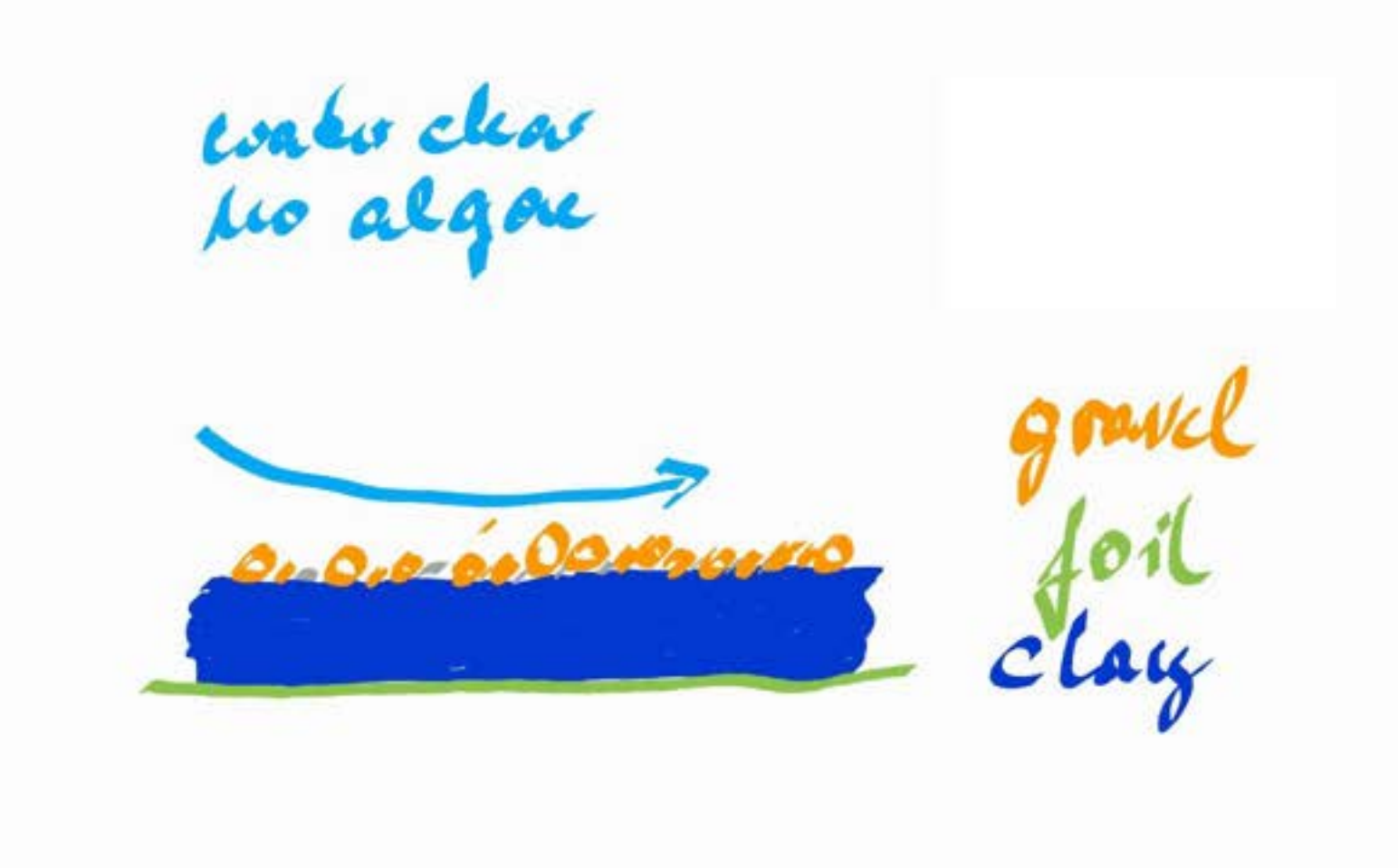

water - clear
no algae
gravel
foil


water - clear
no algae
gravel
foil


water - clear
no algae
gravel
foil


water turbid or
stringy algae
phosphor
anaerobic
gravel
foil


water turbid or
stringy algae
phosphor
anaerobic
gravel
foil
clay

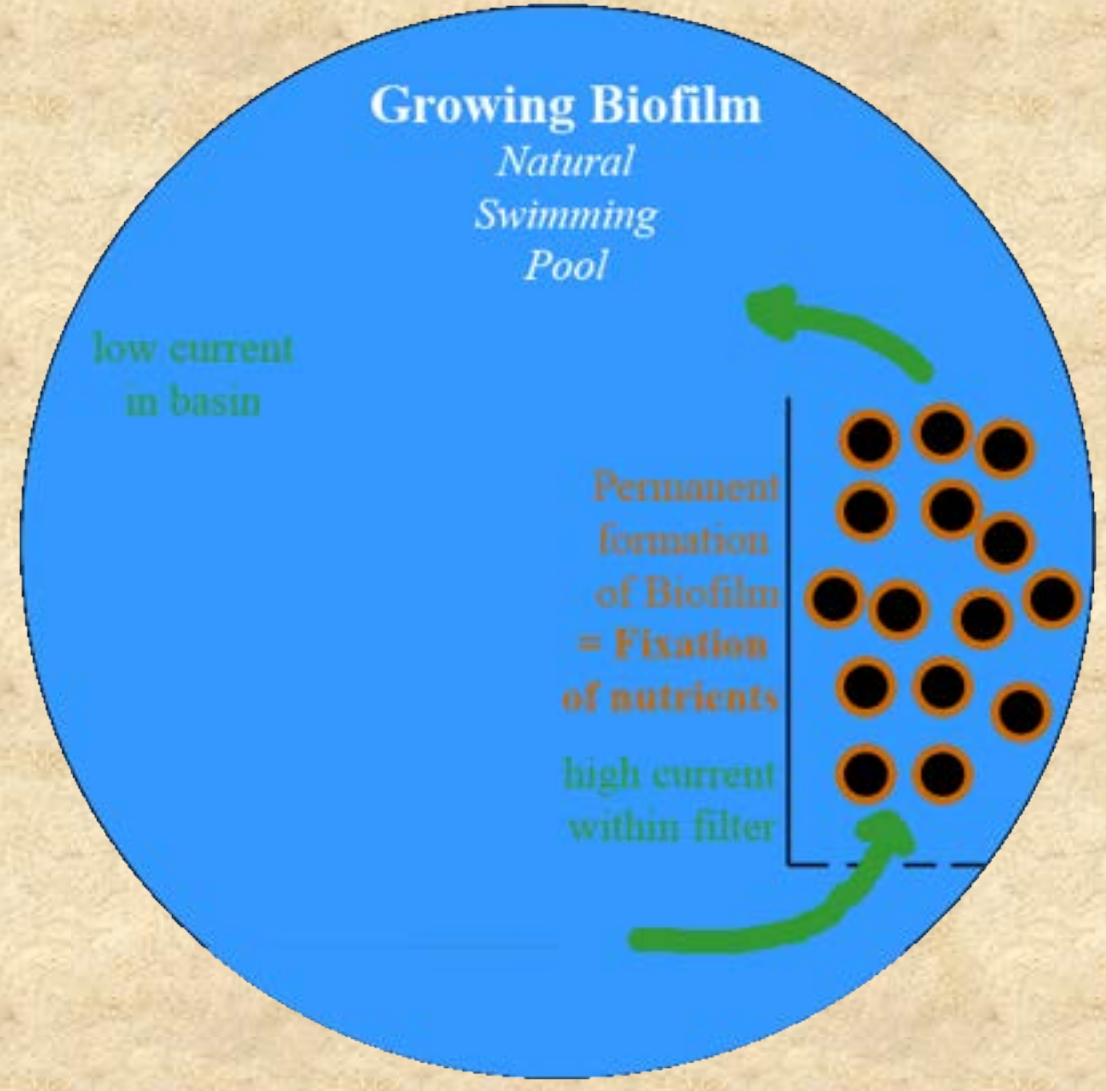

water clear
no algae
gravel
foil
clay

Summary NSPonds

Exact calculations are more or less meaningless if you plan:

-) to filter your pond,
-) to set permanent current within the pond,
-) to use open organic substrates,
-) to use gravel als substrates,
-) to use toxins
-) to set too little amount of submerged waterplants (additional phosphor-binding capacity, structure for Daphnia)
-) to use no nitrogen-fertilizer

Anything else aside calculation is possible -
but a matter of trial and error, unfortunately for every single project.
Calculation is not a 100 %-guarantee for success, it just improves the chance to success in the sense of customer satisfaction.


Growing Biofilm
Natural
Swimming
Pool
low current
in basin
Permanent
formation
of Biofilm
= Fixation
of nutrients
high current
within filter

Concerning Natural Swimming Pools (NSPools) calculations are reasonable if the pool consits of

-) a body of water with appropriate waterquality

-) a filter/reactor with permanent and evenly perfusion

-) and nothing more!

Anything else is possible -

but a matter of trial and error, unfortunately for every single project.

Concerning Natural Swimming Pools (NSPools) calculations are NOT reasonable/necessary if

-) you/customer accepts stringalgae, larger amounts of biofilm (algae, blue-green algae) and turbidity within the area of usage of the pool

-) you plan any amount of open organic matter (e. g. plant substrate) within the system

-) you plan larger amounts of gravel (except filter) within the system

>>The best filtersystem can‘t cope with nutrients, that will not pass the filter<<

-) you plan to build a filter, that is not cleanable

-) you/your customer will not take car for some simple parameters concerning pool- and refillwater (hardness, content of nitrogen etc.)

Question: Correct clay substrate with or without plants within NPool??

Question: Correct clay substrate with or without plants within NPool??

Answer from the practical perspective: Some colleagues in Austria tried, they stopped the experiment

Some general considerations to calculations in biology

-) in contrast e. g. to physics or chemistry - biology is not an exact science
-) never expect 100 %
-) never expect 0

But: Efficient approximation (via calculation) even within an amount of some percent can decide if your water perfectly clear or horrible turbid

Some general considerations to calculations in biology

Concerning NP-filters
NP-filters are biologically working competitors to the usable area of the pool

-) they will not absorbe 100 % of accumulating nutrients, but they will do the best if you give them the opportunity

1/99 50/50 99/1