EM Case Study Aquaculture

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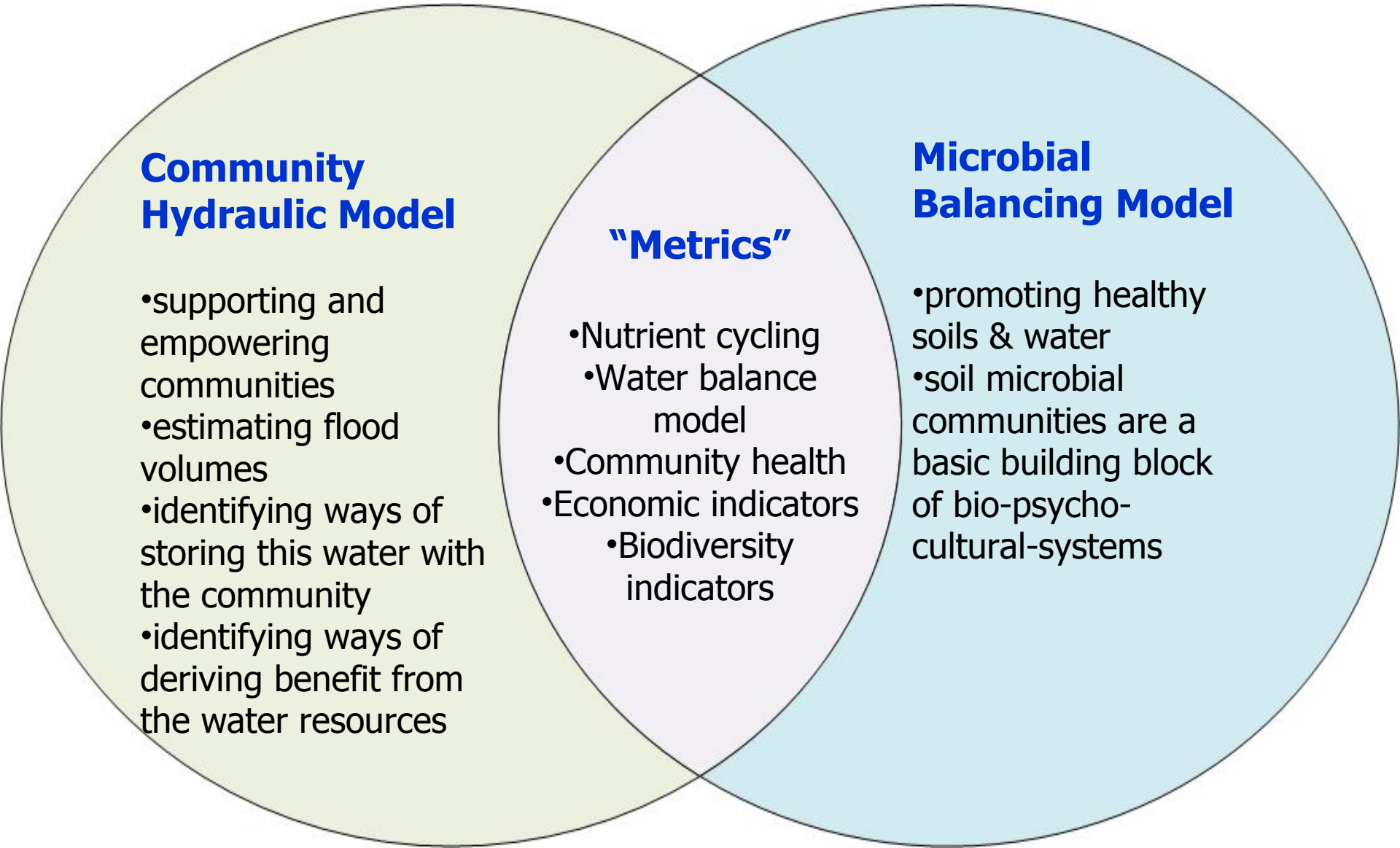
For Lifeworks Foundation


Community Hydraulic Model
•supporting and empowering communities
•estimating flood volumes
•identifying ways of storing this water with the community
•identifying ways of deriving benefit from the water resources
"Metrics"
•Nutrient cycling
•Water balance model
•Community health
•Economic indicators
•Biodiversity indicators
Microbial Balancing Model
•promoting healthy soils & water
•soil microbial communities are a basic building block of bio-psycho-cultural-systems

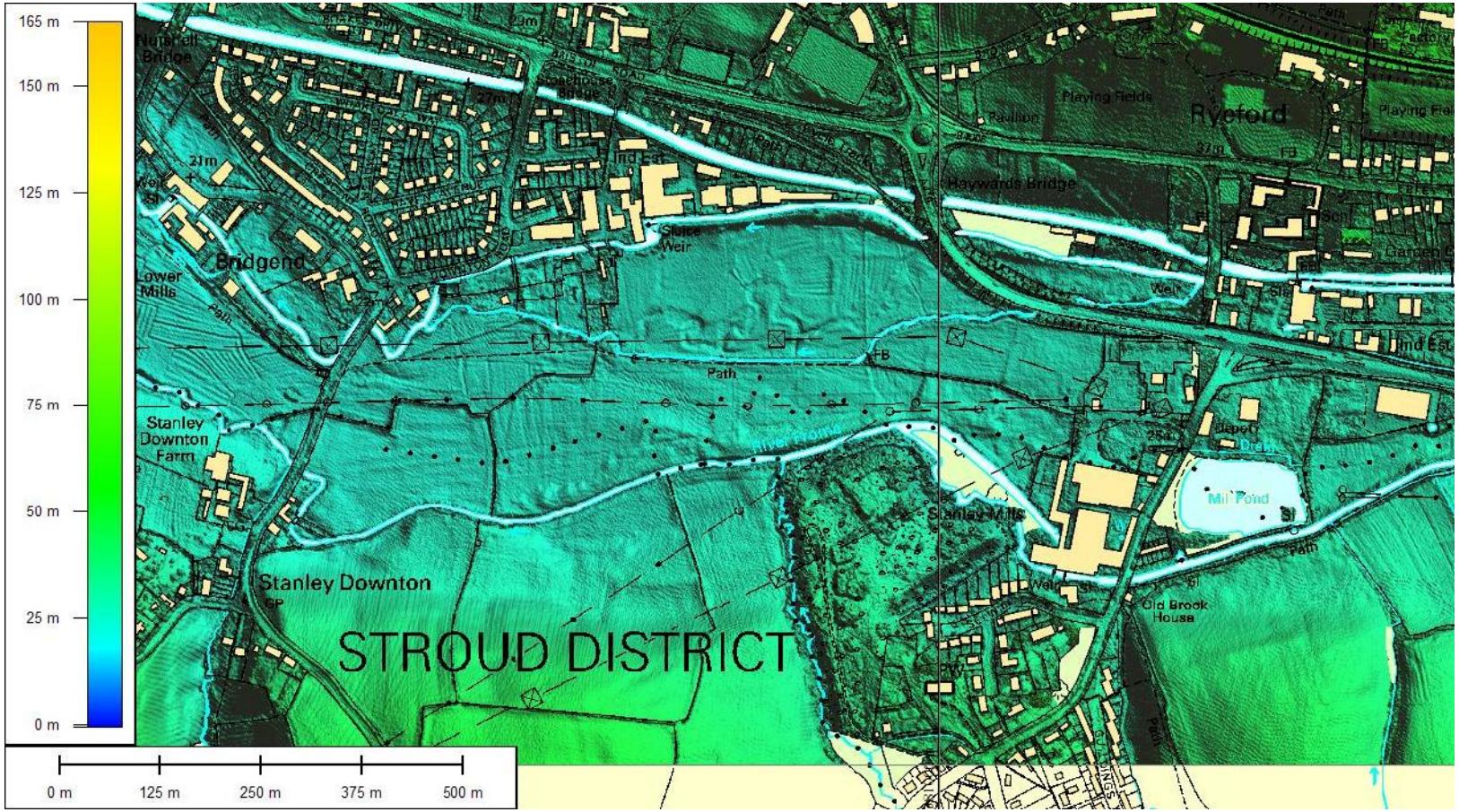
Animal manure & topsoil (nutrient) – river silts


FREEZER TIPS
NO. 1
20/09/09
FREEZER TIPS
NO. 2
20/09/09
FREEZER TIPS
NO 3-
20/09/09
FREEZER TIPS
NO. 4
20/8/09
FREEZER TIPS
NO. 5 L
20/8/09
FREEZER TIPS
NO-6
29/09/09

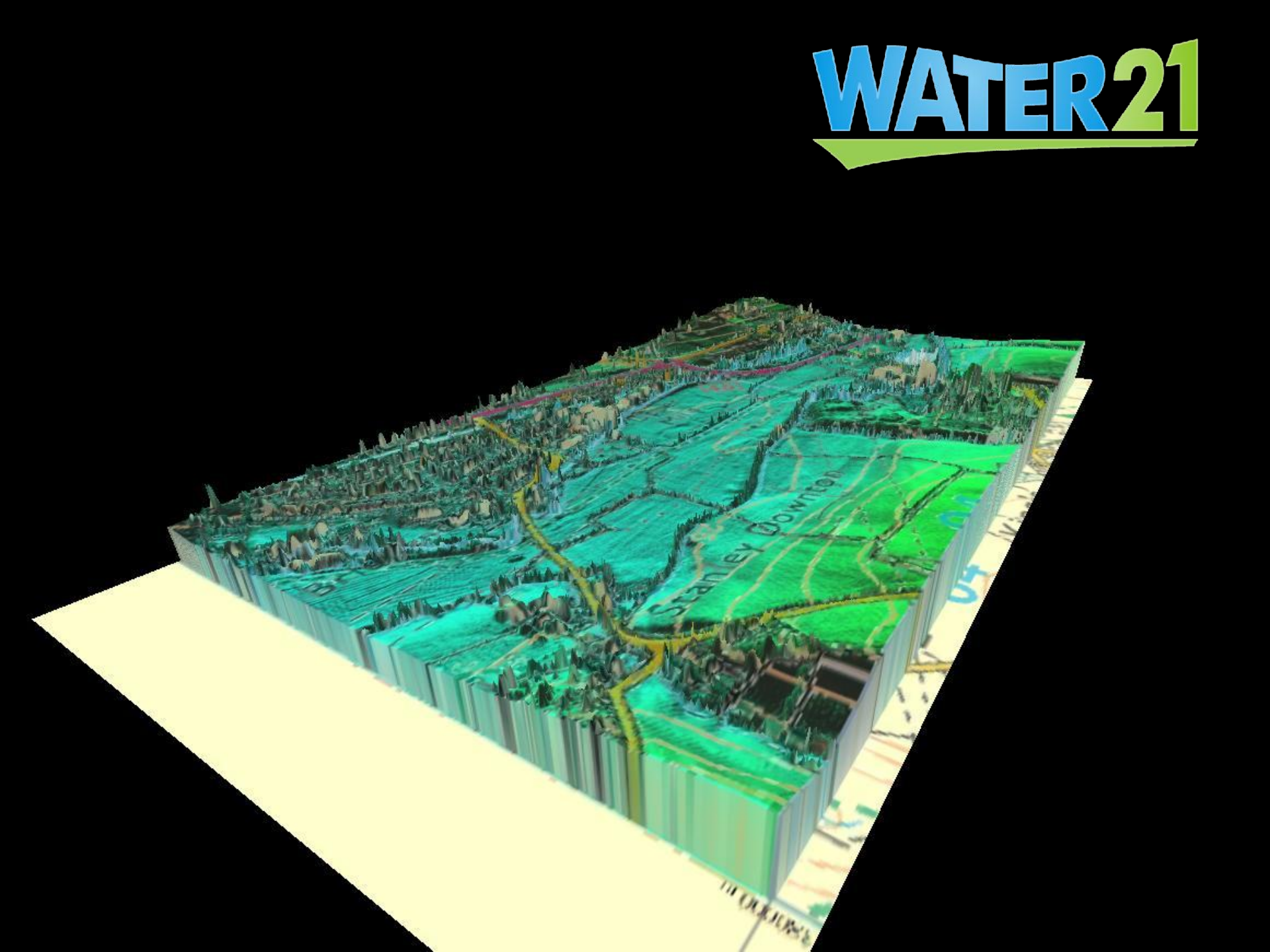
Nutrient cycling "Metrics"

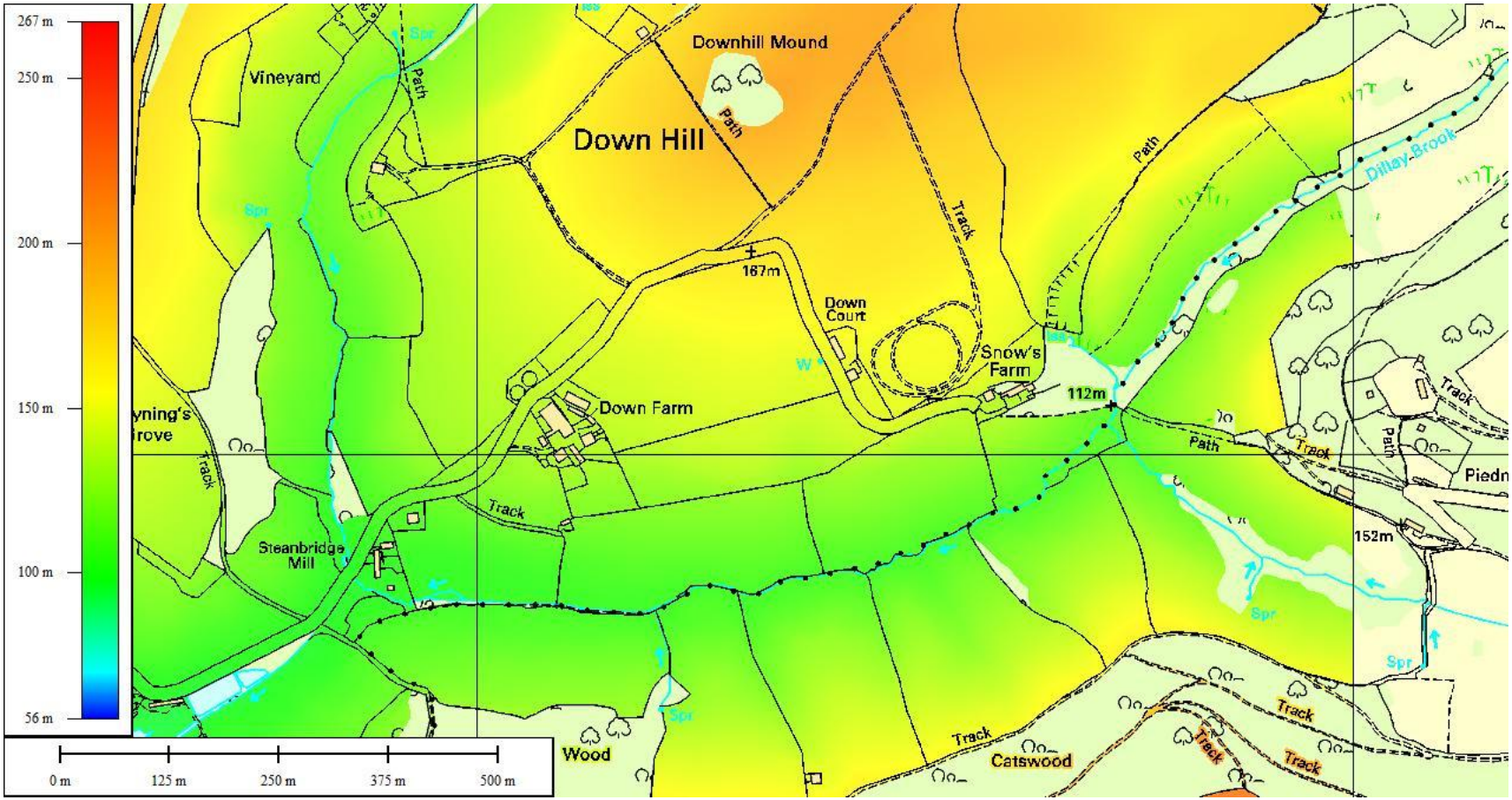
- Estimating the nutrient value of river silt
- What is the value of nutrient presently lost ?
- What is the environmental cost ?
- How can this material be recovered ?
- How can this be used ?

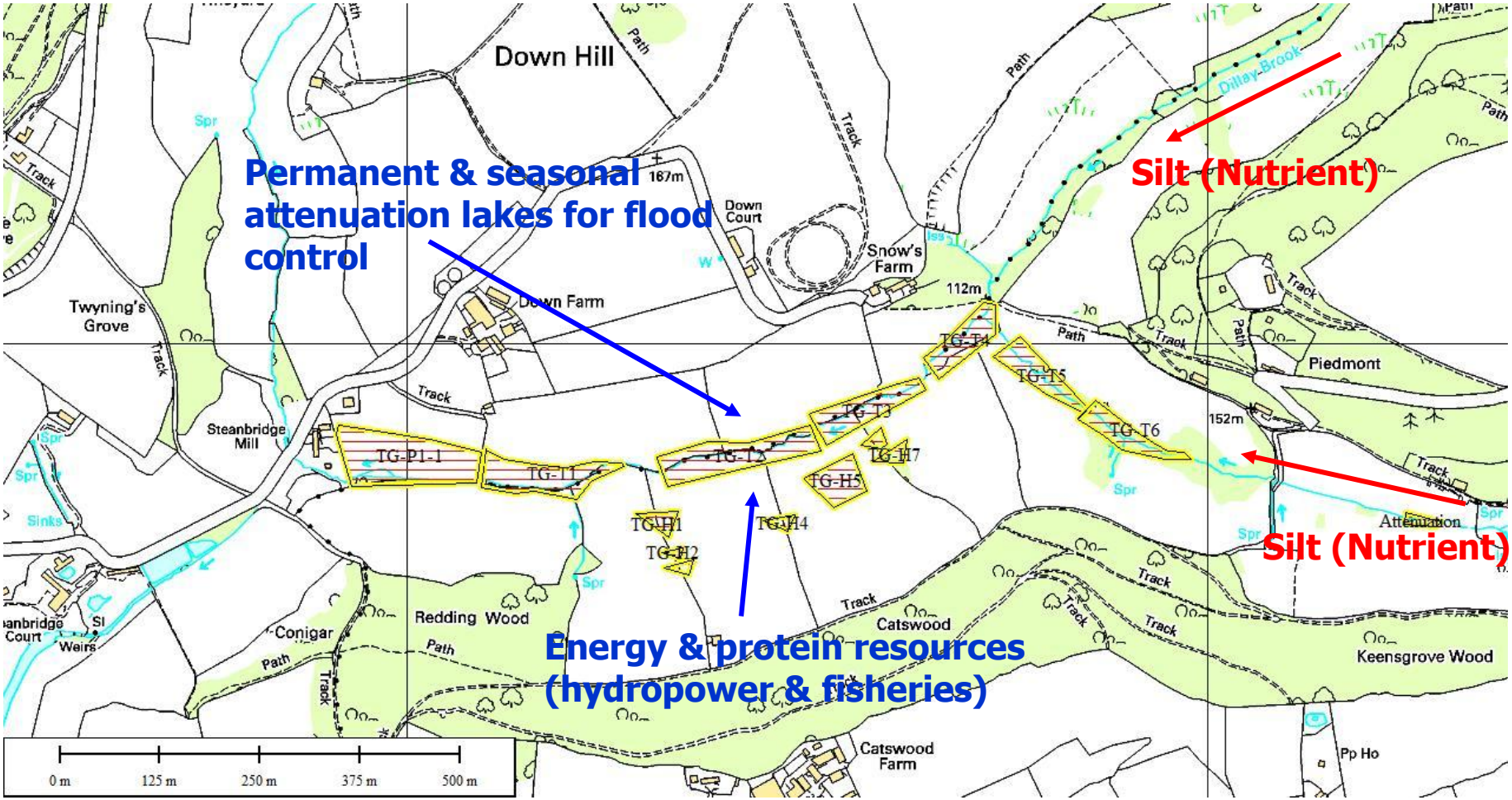
Developing a balanced catchment hydraulic model



Developing a balanced catchment nutrient model


WATER21
Stanley Downtown


267 m
250 m
200 m
150 m
100 m
56 m
0 m
125 m
250 m
375 m
500 m
Vineyard
Spr
Path
Downhill Mound
Down Hill
Path
Track
167m
Down Court
Snow's Farm
112m
Path
Dilley Brook
Down Farm
Track
Steanbridge Mill
Track
Track
Path
Track
Path
Piedn
152m
Spr
Spr
Spr
Wood
Track
Catswood
Track
Track
Track


Permanent & seasonal attenuation lakes for flood control
Silt (Nutrient)
Silt (Nutrient)
Energy & protein resources (hydropower & fisheries)
Down Hill
Twyning's Grove
Down Farm
Down Court
Snow's Farm
Steanbridge Mill
Piedmont
Redding Wood
Conigar
Catswood
Catswood Farm
Keensgrove Wood
Dilley Brook
Attenuation
TG-P1-1
TG-T1
TG-T2
TG-T3
TG-T4
TG-T5
TG-T6
TG-H1
TG-H2
TG-H4
TG-H5
TG-H7
0 m
125 m
250 m
375 m
500 m

10+ years experience of using EM Technology in Thailand

- 10 years ago, EM Tech was a hot alternative approach for Thai farmers
- Scientists → doubt
- Farmers → popular
- Main organizations: APNAN, Environmental Engineering Association of Thailand (EEAT)

Narong Farm, Thailand

- Mr. Lek has been using EM over 10 yrs
- He is satisfied with EM results and recommends to all farmers

- BUT: *"**There are some tricks to know**"*

Narong Farm, Thailand

- Aquaculture: *Pangasius* fish, exported as fish fillet world-wide
- 3 farms in Thailand + 48 hectare (120 acres) in Vietnam
- Turn over: $250K (2005), $350K (2006), and $500K (2007)

How can EM used for intensive aquaculture?

- EM seed culture from APNAN + fish pond water
    - + waste fish blood, + molasses
    - New symbiosis develops between EM & pond micro-organisms
    - Produces excellent food for fish fry
- New EM microbial culture used at Narong Farm
- New business supplying EM culture to other farms

How EM works for aquaculture

EM seed from APNAN + Pond Water (1:1)

↓

Zooplankton bloom

- *Paramecium*

- softer shell for juvenile fish to digest

= quicker fish growth

(& re-use of waste)

Mr Lek's suggestions for EM use in UK

1. EM works well now in SE Asia. The key points for attention are 'Suitable Microbes' and 'Suitable Conditions'
2. Use natural water, never tap water
3. Test 'what in your natural water' first
4. Test for 'smell of EM' after applying direct on a dead fish body for 12hrs. (To check for microbial efficacy)
5. EM works in any kinds of organic waste, except many chemical wastes.

Conclusion

1. EM Technology in Thailand is still popular
2. Farmers train at APNAN. Then modify the trained techniques to match their farms
3. Farmers produce their own EM mixtures & 'recipes' from EM seed culture / bokashi
4. Aquaculture & water resource management are an important part of a sustainable land & water management regime
5. EM has an important role

Kob Khun !

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