DISTRIBUTION MODELS
WIDE RANGE OF AUDIENCES

Gap filling	Epidemiologists, Planners, PH, Public
Identifying risk	Epidemiologists, Planners, PH, Public
Identifying drivers	Epidemiologists
Targeting	
Surveillance	Resource Planners, Epidemiologists
Intervention	Control technicians, Resource Planners,
Preparedness	Agencies, Strategic Planners
Projections	Planners, PH
Advocacy and Translation	Funding Bodies, Public, PH, Planners

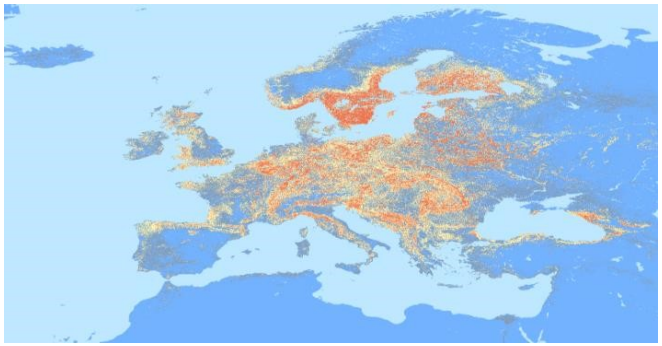
A KICK UP THE ….

Provide users with what they want.

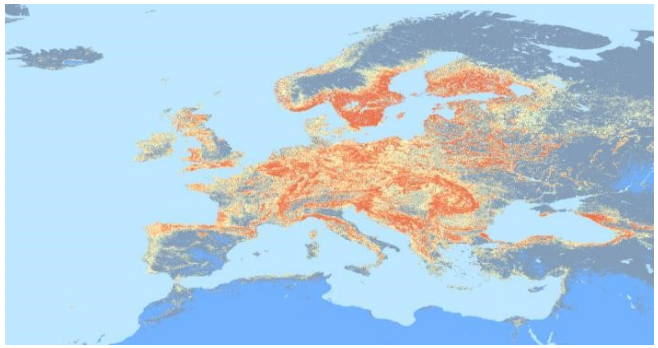
We may need some encouragement

PRODUCE WHAT THE PH SYSTEM ACTUALLY WANTS

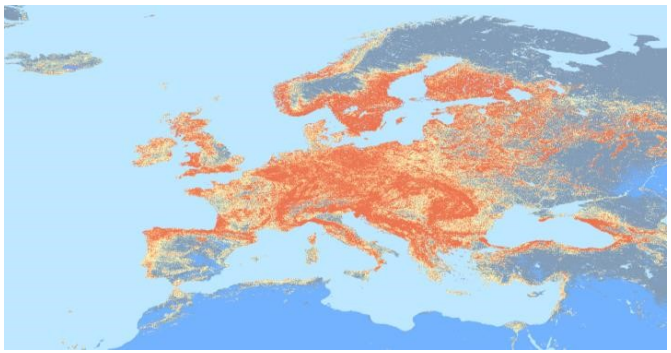
Mean - SE



Mean



Mean +SE



Ixodes Probability

Best Case ---------- > Worst Case

Better generic conversion of vector risk to disease risk and Public Health Impact

Inform the medical profession better so can recognise emerging diseases;

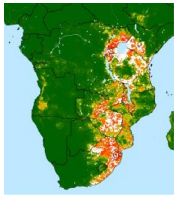
simplify the metrics used

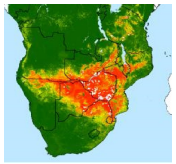
don't go for detail when summary is enough

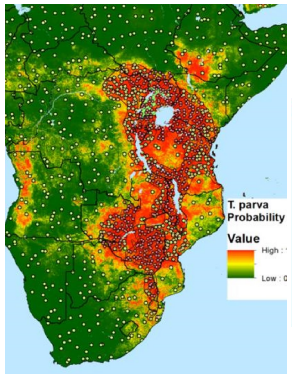
provide take home message in lay terms

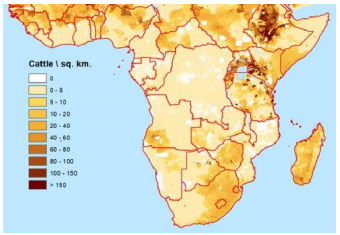
Improve methods to use trade/movement data to quantify risk of introduction, rather than focussing on suitability and establishment

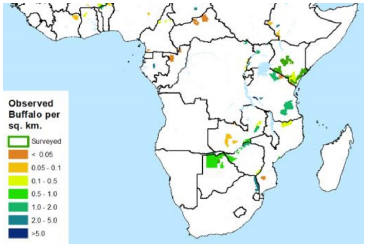
USING THE MODELS,
MAY NEED COMBINE A LOT OF DATA TO DERIVE IMPACT

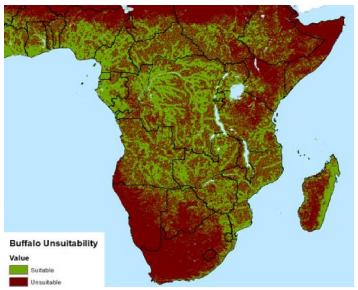


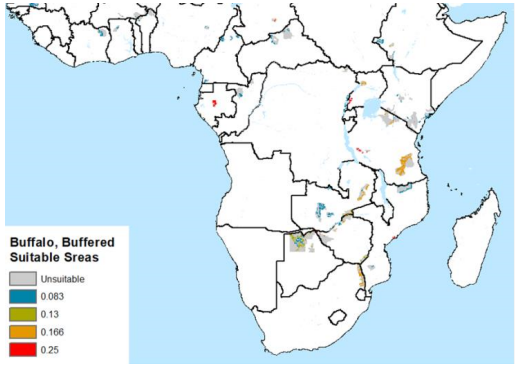


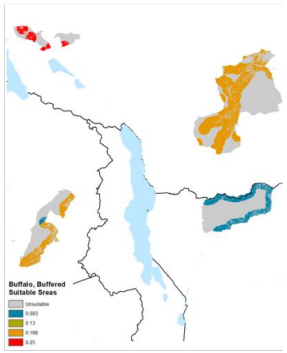












Three set of estimates for all cattle at risk

Disease and *R. appendiculatus*: 45.3m
Disease and *R. zambeziensis*: 11.6m
Disease and Both Ticks: 51.5m

Estimate risk near Buffalo (Disease and Tick and buffered Buffalo)

Max number (PA=.25, Cattle > 1/sq.km): 3.2m

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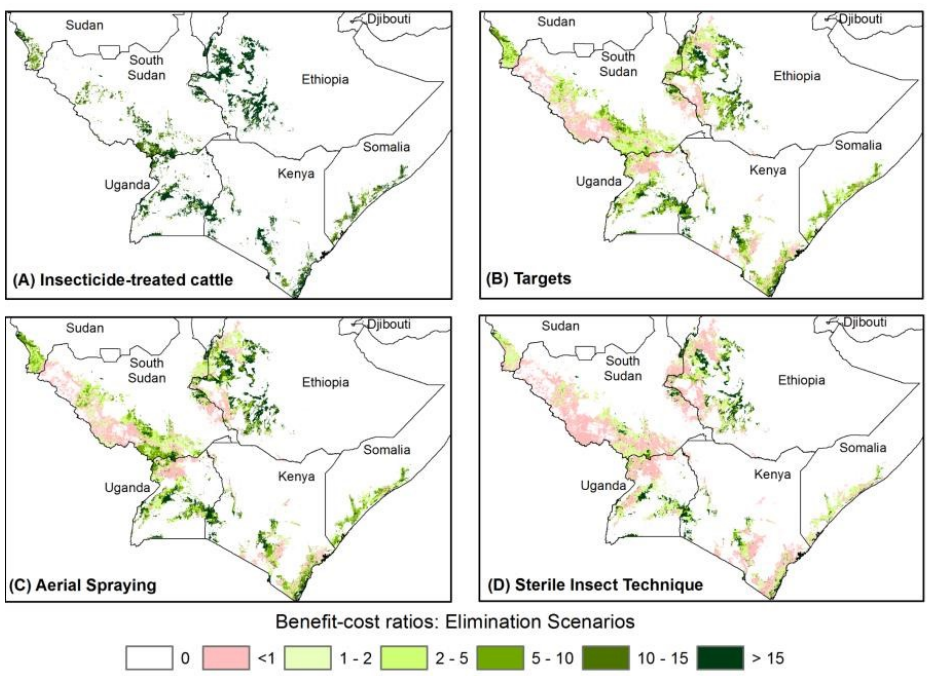
USING THE MODELS

Doesn't end with models

Audience may not have skills to produce derivatives

Using the outcomes essential to achieving impacts

- Economics, Cost Benefits
- Disease Impacts (people)



Modellers probably can't (won't) produce some of the derivatives required so model data should be released

Some training needed for Users in what is possible to model – and what is not (expectation management!)

ADDING TO THE MODELS

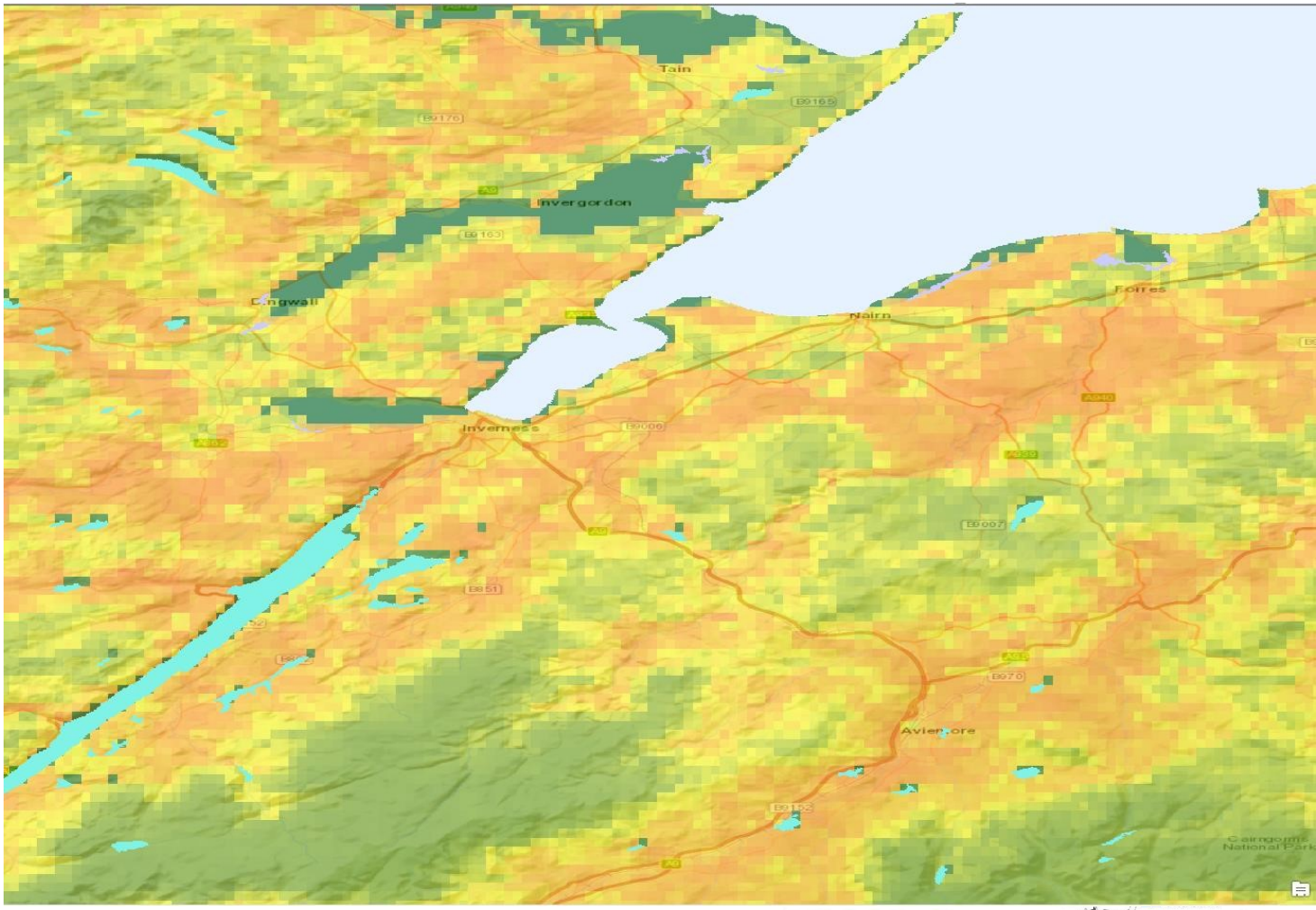
Ticks

Here is the basic ‘model’

Green means unlikely

Yellow means maybe

Orange means most probably



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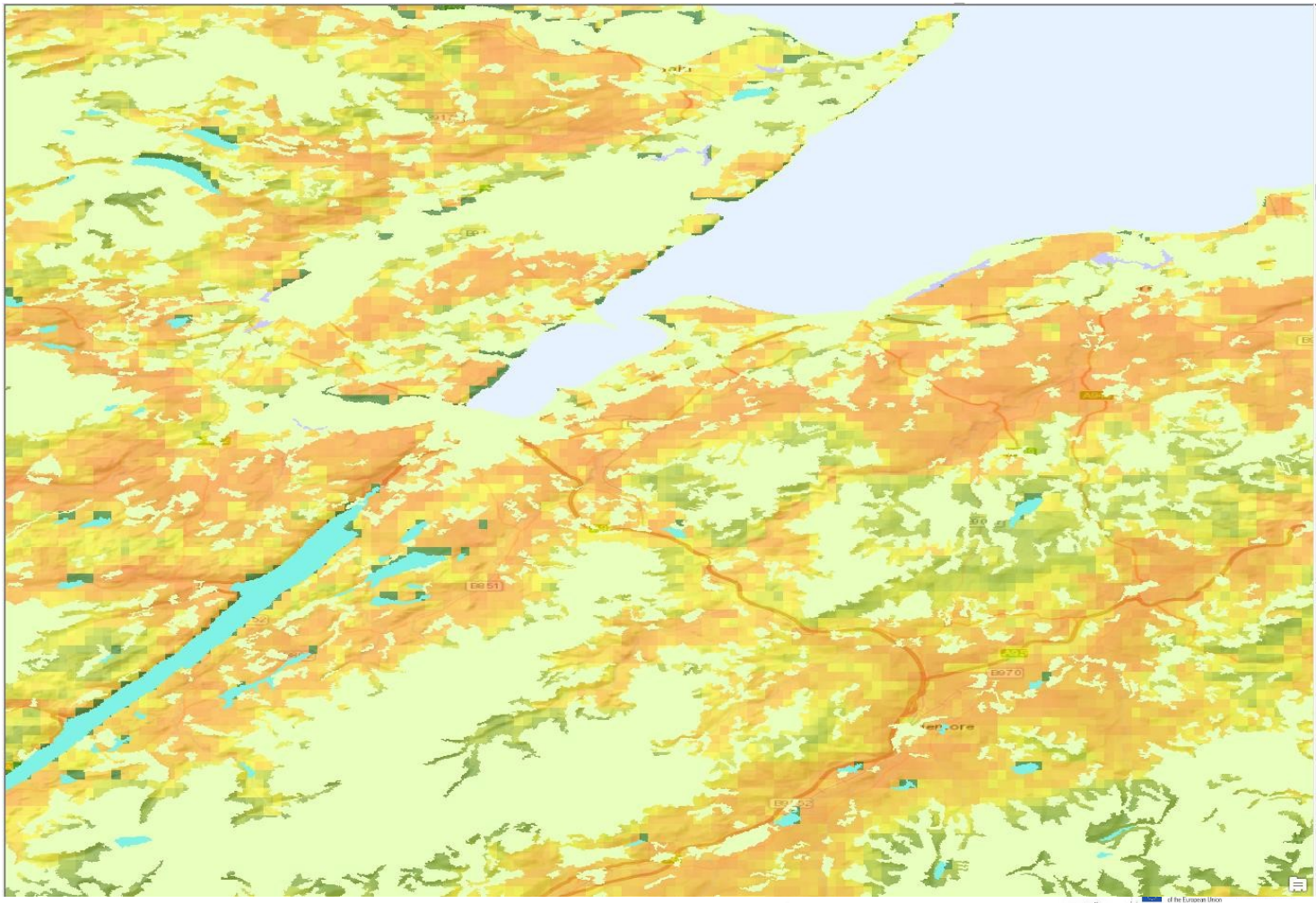
ADDING TO THE MODELS

We can then refine these estimates by using what we know of tick preferences:

They do well in certain habitats like woodlands, heathland, etc,

They don't like many other habitats like crops, built up areas, wetlands, bogs, kempt gardens etc

Pleasingly, the model picks up many of these low probability areas already



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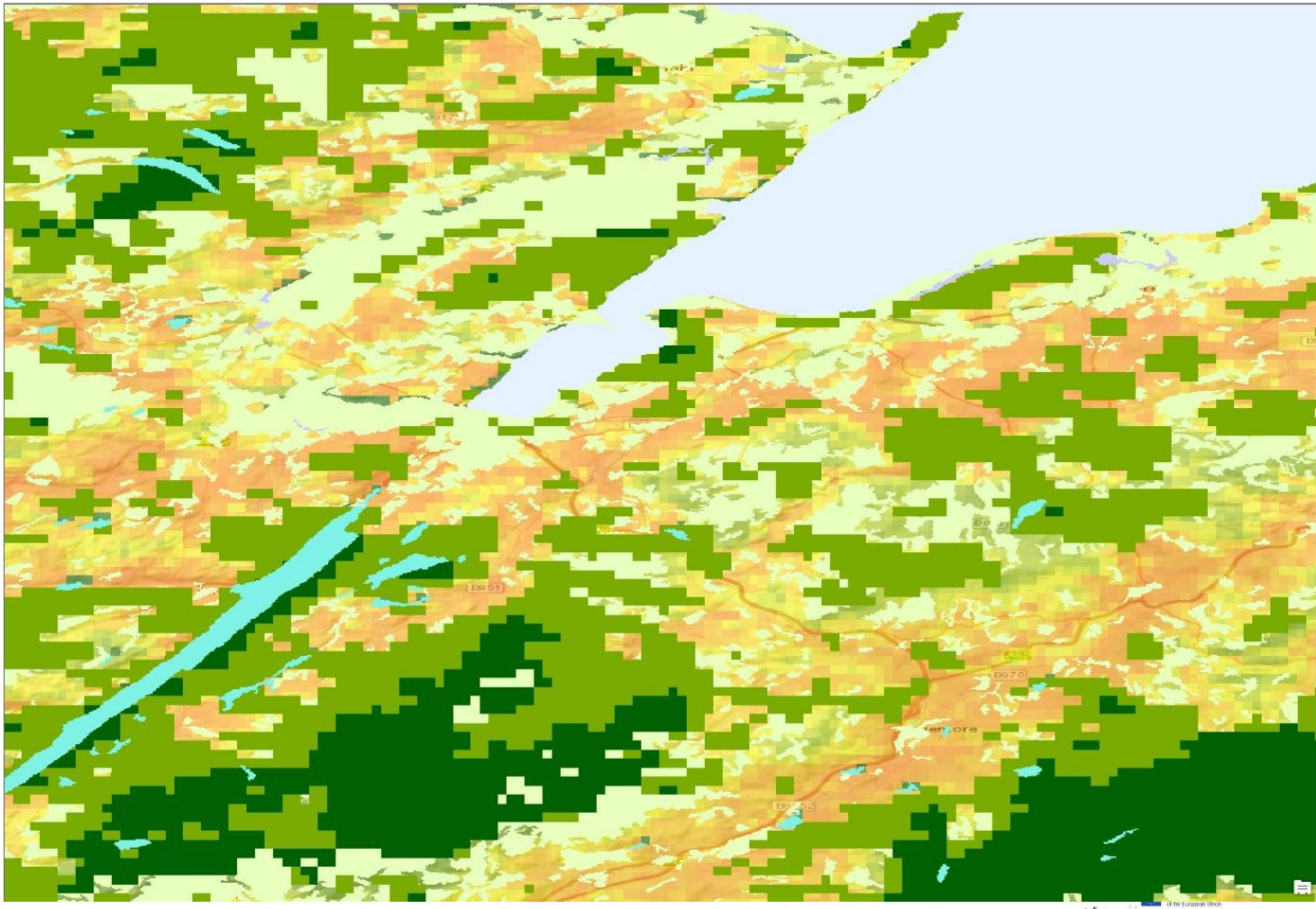
ADDING TO THE MODELS

We can then refine these estimates by using what we know of tick preferences:

They do well in certain habitats like woodlands, heathland, etc, especially if there are a lot of deer in the area

But only when the temperature rises above 7C, do the ticks become active

Here are the more ‘active’ areas in March



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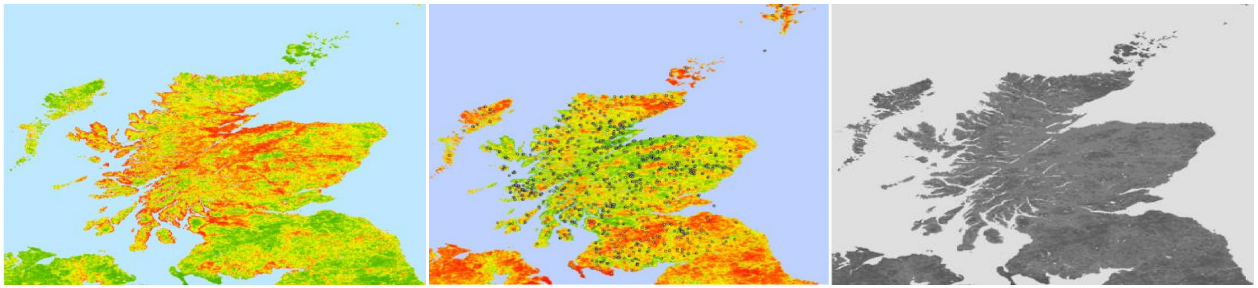
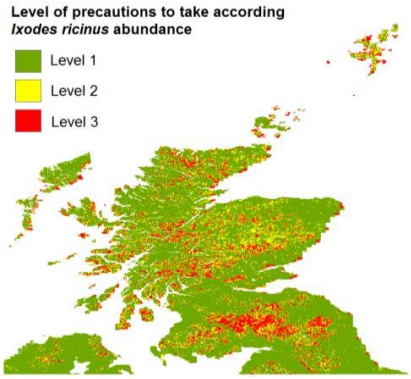
USING THE MODELS
ADJUST LEGENDS TO DESCRIBE MITIGATION

What are the most appropriate format to display risk maps: these are all the same map



IF we bother to ask, we find out that risk maps as abundance not acceptable

So re-label legends to reflect mitigation measures:



e.g.

Minimal protection needed

Be aware, footwear and trousers

Protective clothing, regular checking

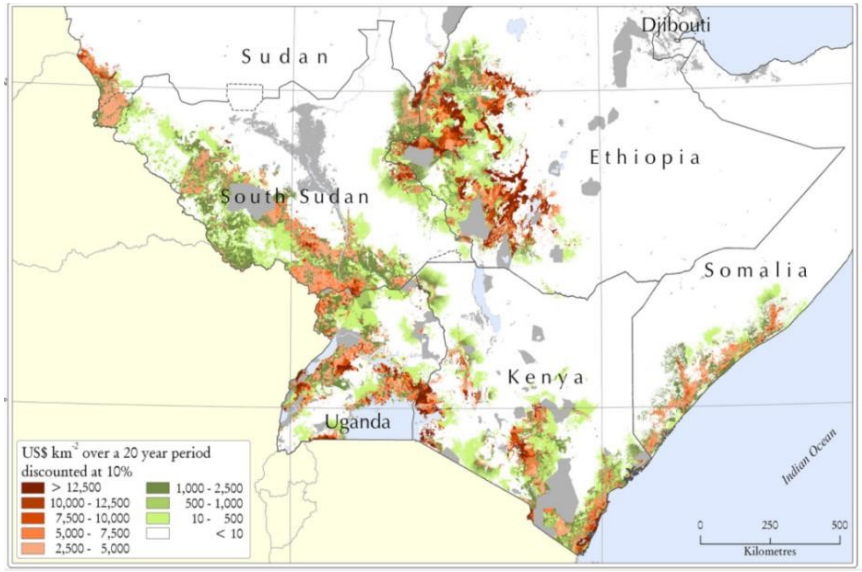
JOINING THE REAL WORLD
USING MODELS TO PROVIDE JUSTIFICATION

To encourage policy to prioritise vectors:

Cost Surveillance and Control

Control of tsetse can produce benefits in excess of 10,000$/km

So can calculate cost benefit ratios of different control methods



Cost "Public Good"

Making people aware of Lyme risk just in Scotland estimated to save 5-10m€/year. 60-70m€ for EU. THEN refine the models to be more useful

GETTING THE DATA OUT THERE

Institutional websites (ECDC)

Open archives

Data papers

Apps

Journals? – Not big enough audience unless max impact, not to right audience not cost effective in terms of effort.

Too much reliance on journals – Easy for bureaucrats to rank for funding BUT means authors don't have to make their results usable, so less useful.

JOINING THE REAL WORLD
CAN ANYONE SEE WHATS WRONG WITH THIS?

Dengue

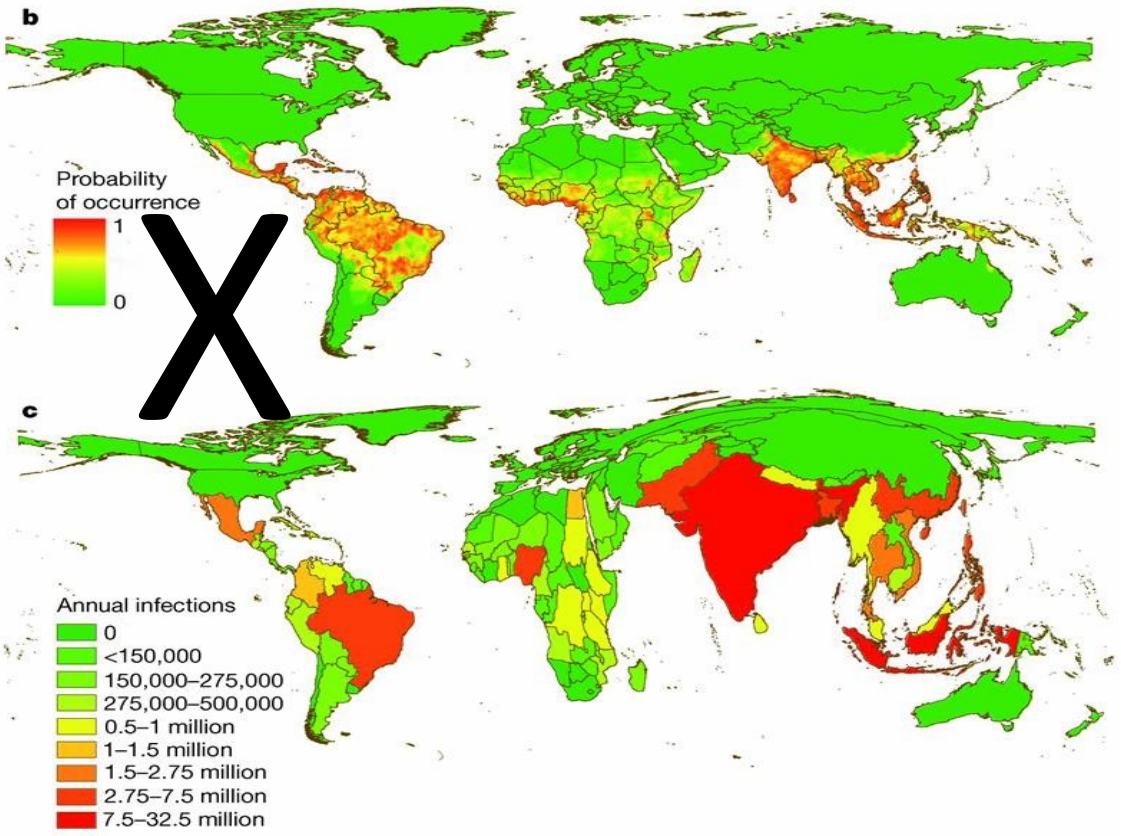
Probability of presence

X

People

=

Annual infections



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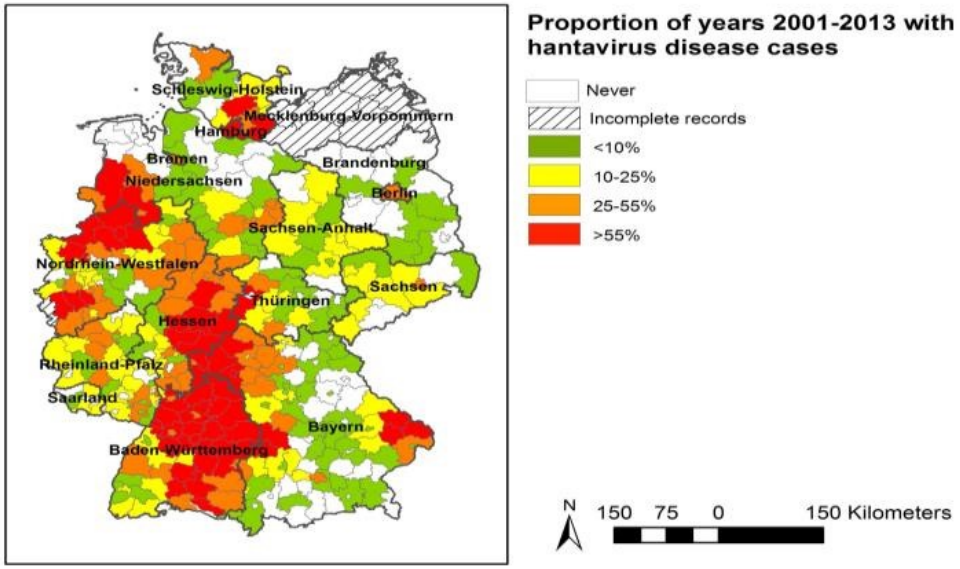
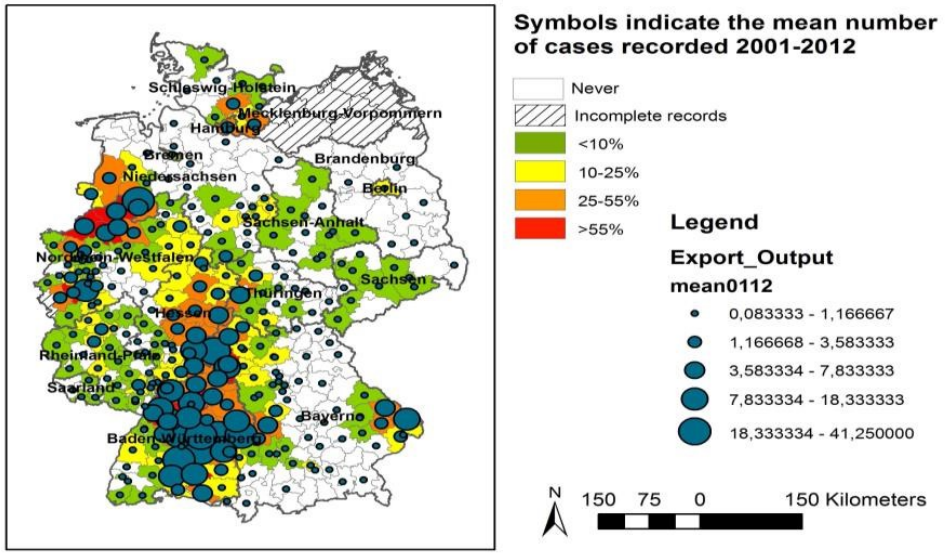
OR THIS?





Do the maps help or spread fear?

JOINING THE REAL WORLD
DON'T JUST ASK, LISTEN & LEARN

Risk appraisal: integrating risk perception findings in risk models – and vice versa

Findings Risk Perception Study

Looking at various risk factors participants of the rural and occupational groups were more aware about various risk factors than participants in the urban group."

"Over all focus groups, many participants felt unsafe due to a general lack of knowledge about the disease. One frequent question which came up during the discussions was what a bank vole looks like."

"In the urban group participants suggested a kind of traffic light system instead of a standardized warning signs, situation."

Comments from Modelers

This could lead to a different way to present risk analysis (more information is needed for urban people)."

I think if I need to produce some material for people, I would need to add some pictures of bank voles. With the warning that you can still have risk even if you don't see it.

We could consider all the risk not just presence: >0.5 "high risk" (red), those between 0.1-0.5 medium risk (yellow) and those <0.1 low risk (green). [the threshold of 0.5 is often used for risk classification]

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MODELLERS AND THE PUBLIC ARE DIFFERENT WE NEED TO TRANSLATE

We scientists are not persuading the planners (falling resources); We tend to cry wolf;
We are not persuading the public who could pressurise the planners – (incomprehensible)

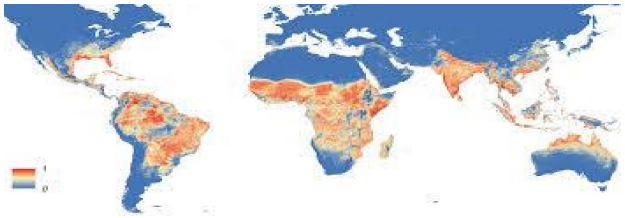
Some common examples leading to misunderstanding:

Term	Modeller/GIS/Scientist
Layer	A map of some variable
Overlay	A way to combine information
Vector	Mosquito
Legend	Key to a map
Statistics	How we prove stuff
Stakeholder	Interested party

Normal person
A chicken
Probably obscene
Arrow
Thor (or Bob Marley)
Waist size – or just plain lies
Vampire killer

JOINING THE REAL WORLD
WE ARE THE WEIRD ONES

These are all MODELS
Which is the one most people will most easily figure out?



$$
\begin{aligned}
\frac{dS}{dt} &= \mu(N-S) - \beta\frac{SI}{N} - \nu S \\
\frac{dE}{dt} &= \beta\frac{SI}{N} - (\mu+\sigma)E \\
\frac{dI}{dt} &= \sigma E - (\mu+\gamma)I \\
\frac{dR}{dt} &= \gamma I - \mu R + \nu S \\
N &= S + E + I + R
\end{aligned}
$$

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