

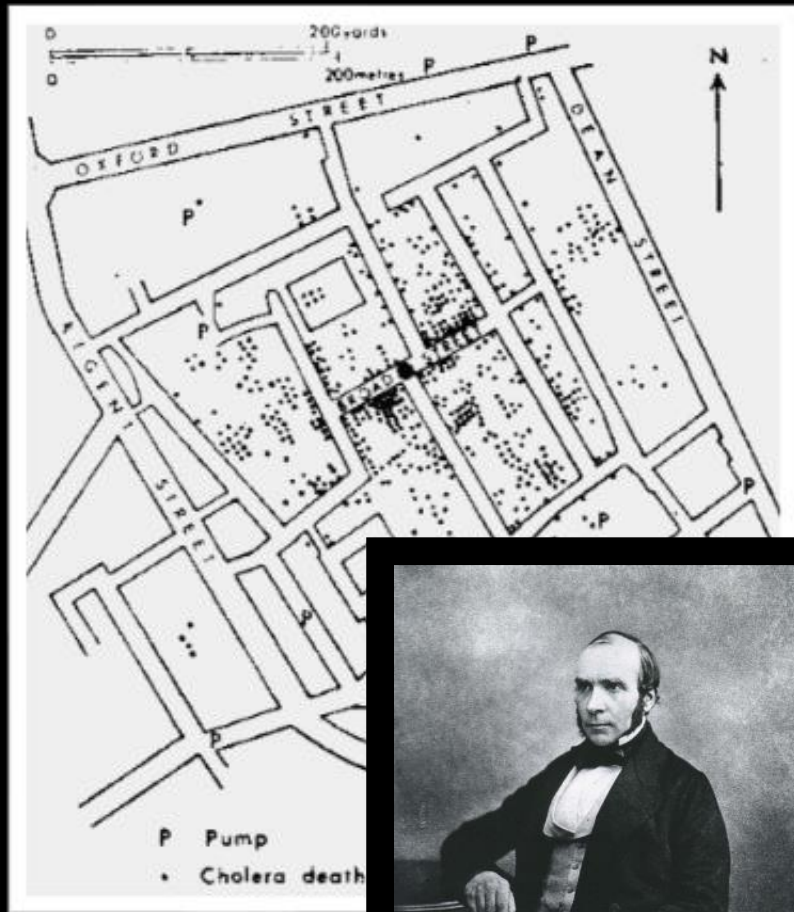
# A Spatial Perspective on GIS in Environmental Risk Analyses: How time is of the essence

EFSA 75<sup>th</sup> Advisory Forum meeting, 2020

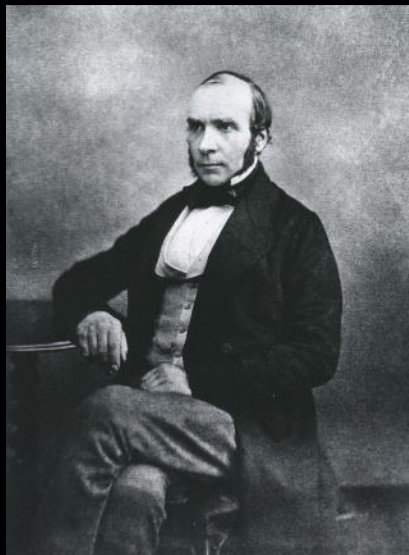
**Kyrre Kausrud**  
Norwegian Scientific Committee for Food and Environment  
[Kyrre.kausrud@vetinst.no](mailto:Kyrre.kausrud@vetinst.no)



# GIS and Risk Analysis: Integrated from the Start



1855



Information speed



Risk speed

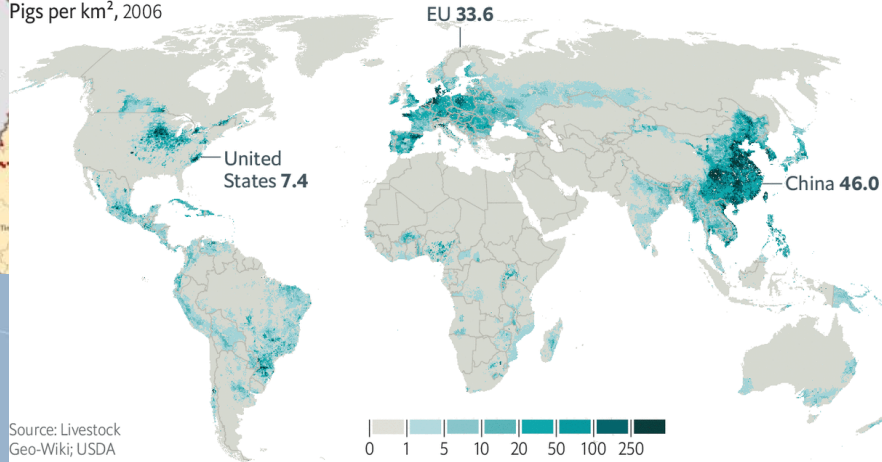


Snow, J. (1855). *On the mode of communication of cholera*. John Churchill.

# A Faster, Larger World

## Pigging out

Pigs per km<sup>2</sup>, 2006



The Economist



2020

European Food Safety Authority (EFSA), Miteva, A. et al. (2020). Epidemiological analyses of African swine fever in the European Union (November 2018 to October 2019). *EFSA Journal*, 18(1).

## Information speed

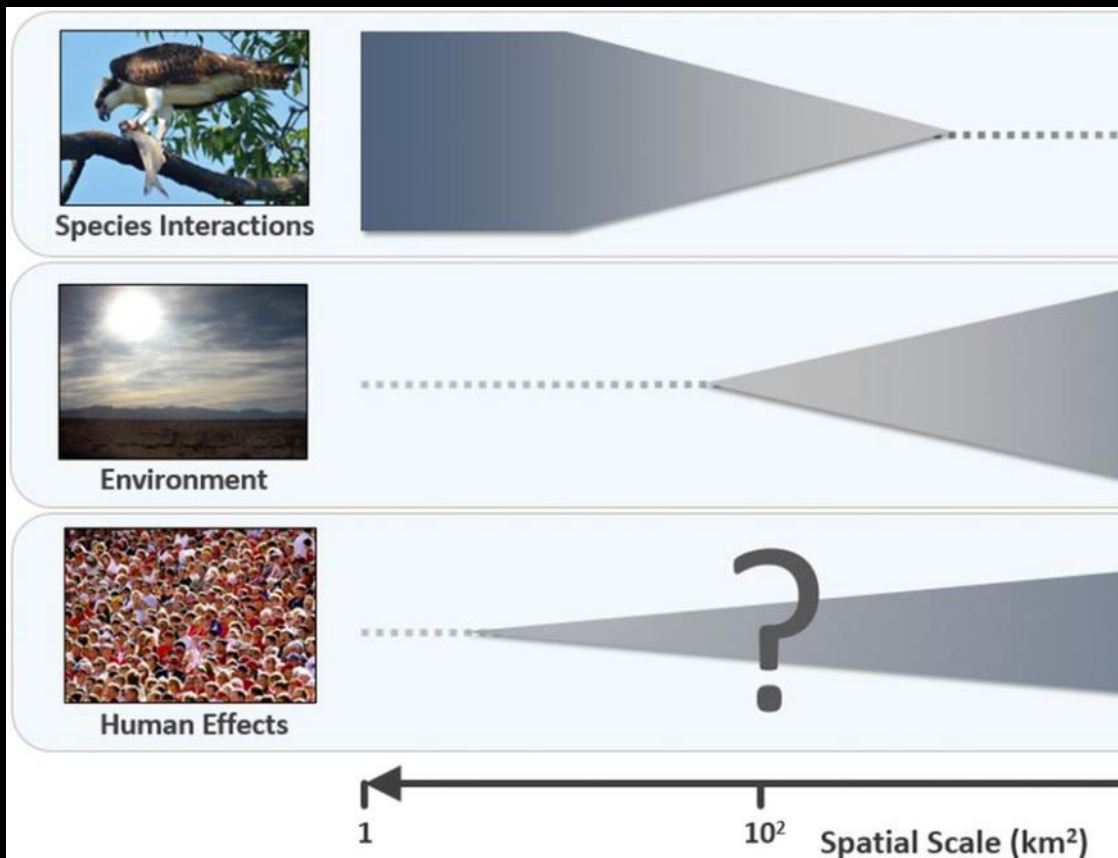


## Risk speed

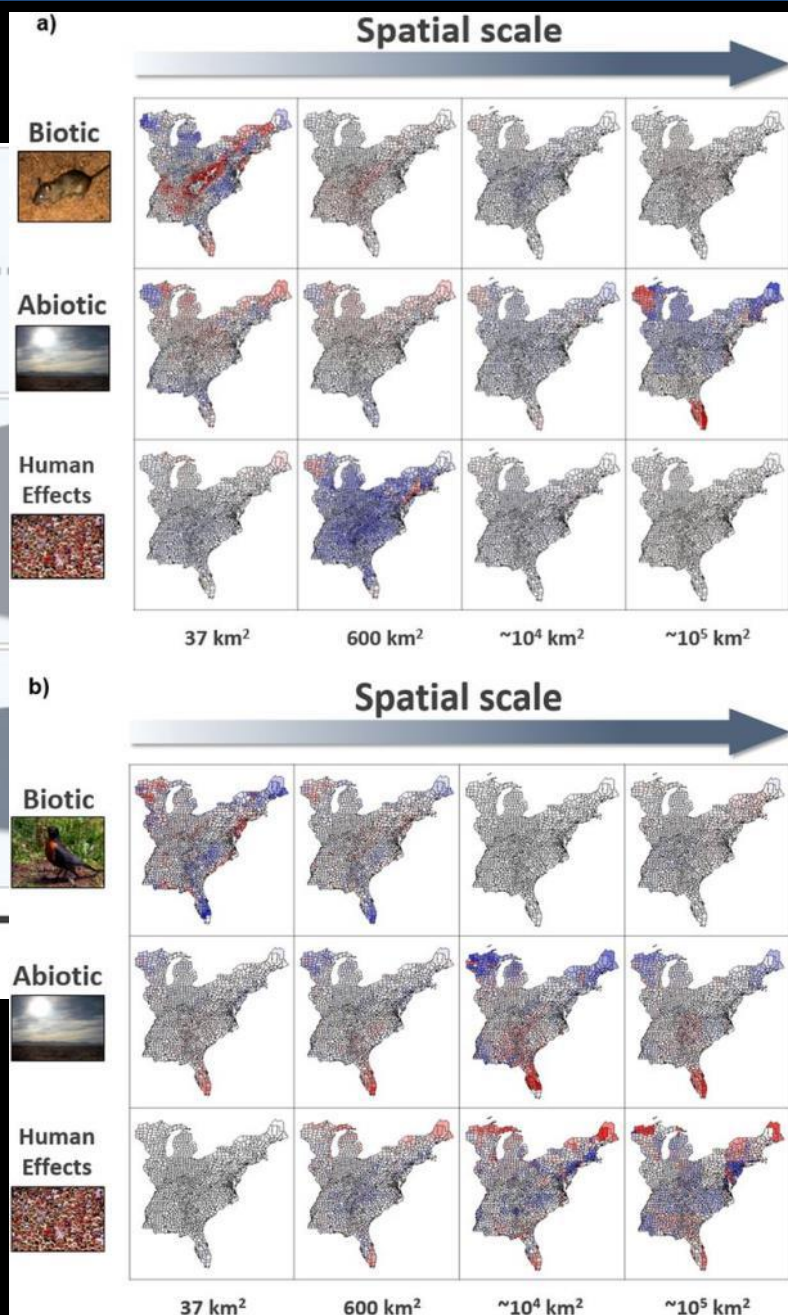


# Scale Dependency: Space

Chytridiomycosis, West Nile virus, and Lyme



Cohen, J. M. et.al. (2016). Spatial scale modulates the strength of ecological processes driving disease distributions. *Proceedings of the National Academy of Sciences*, 113(24), E3359-E3364.

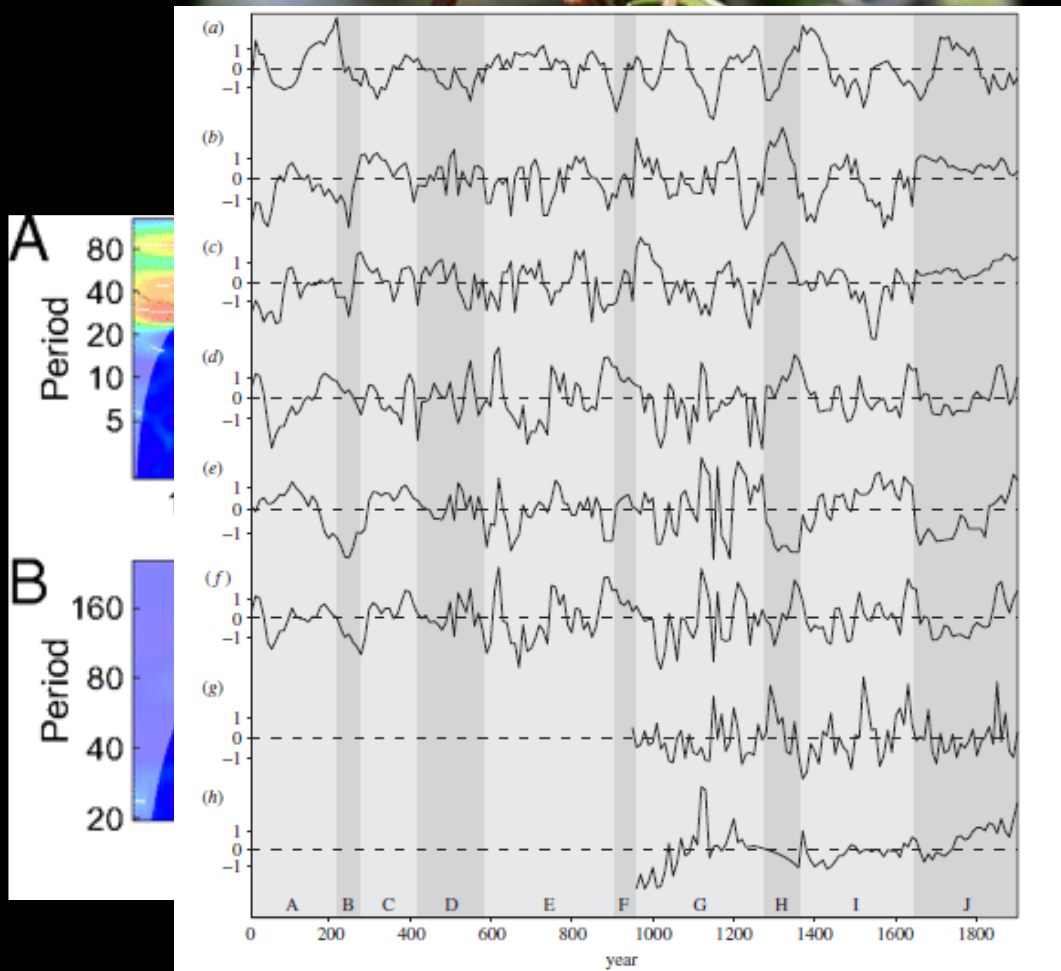


# Scale Dependency: Time

Millennia of locusts and wars



Tian, H., et.al. (2011). Reconstruction of a 1,910-y-long locust series reveals consistent associations with climate fluctuations in China. *Proceedings of the National Academy of Sciences*, 108(35), 14521-14526.



# Where to go and things to do:

## Developing concepts

### Conceptual framework

- Explicit spatial scales for effects
- Explicit time dimension in risk estimates
- Consider non-stationary processes

### Interdisciplinarity

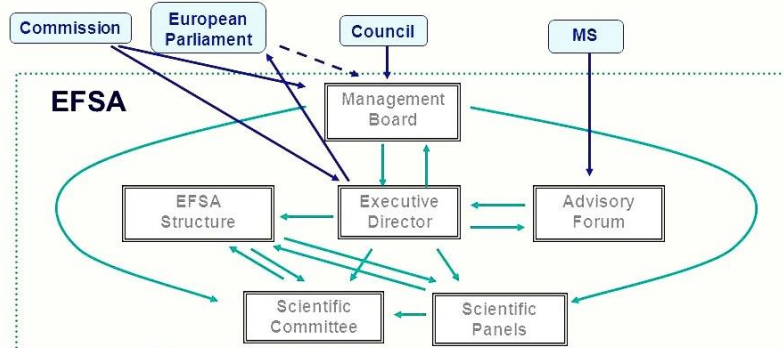
- Specialists and generalists
- Keeping it concrete: science and management

### Distributed knowledge

with less aggregation  
analysis at every level  
freeware

Explicit scales

### EFSA – Organisation and link with institutions and Member States

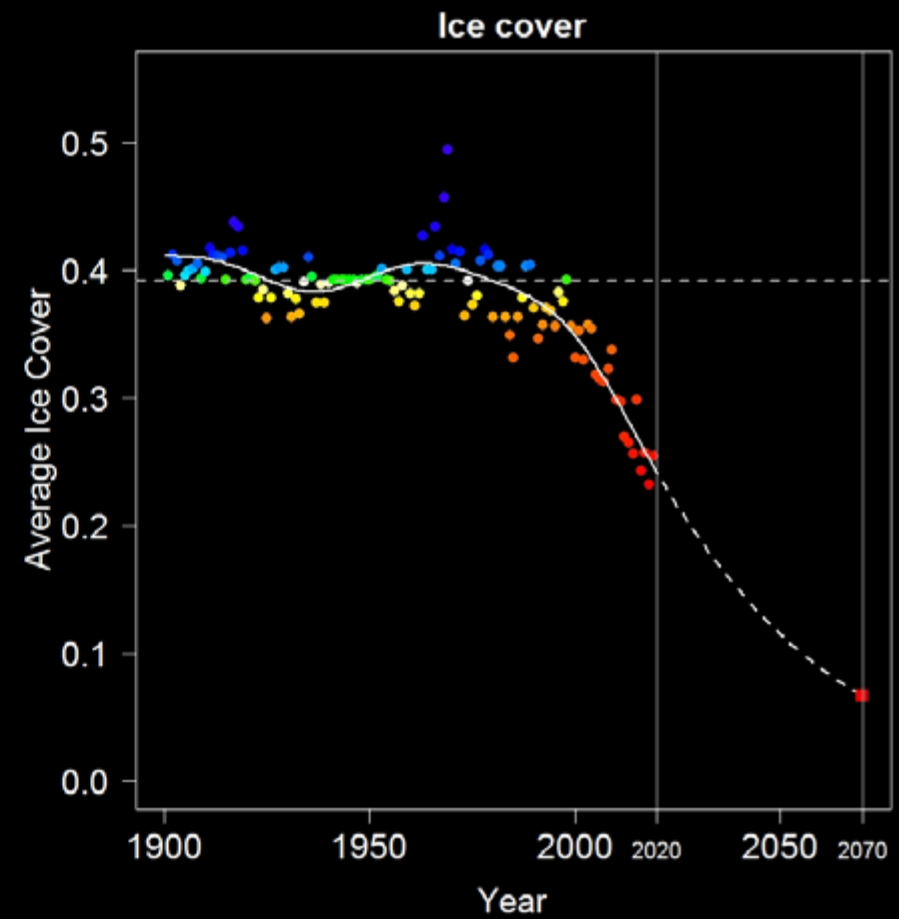
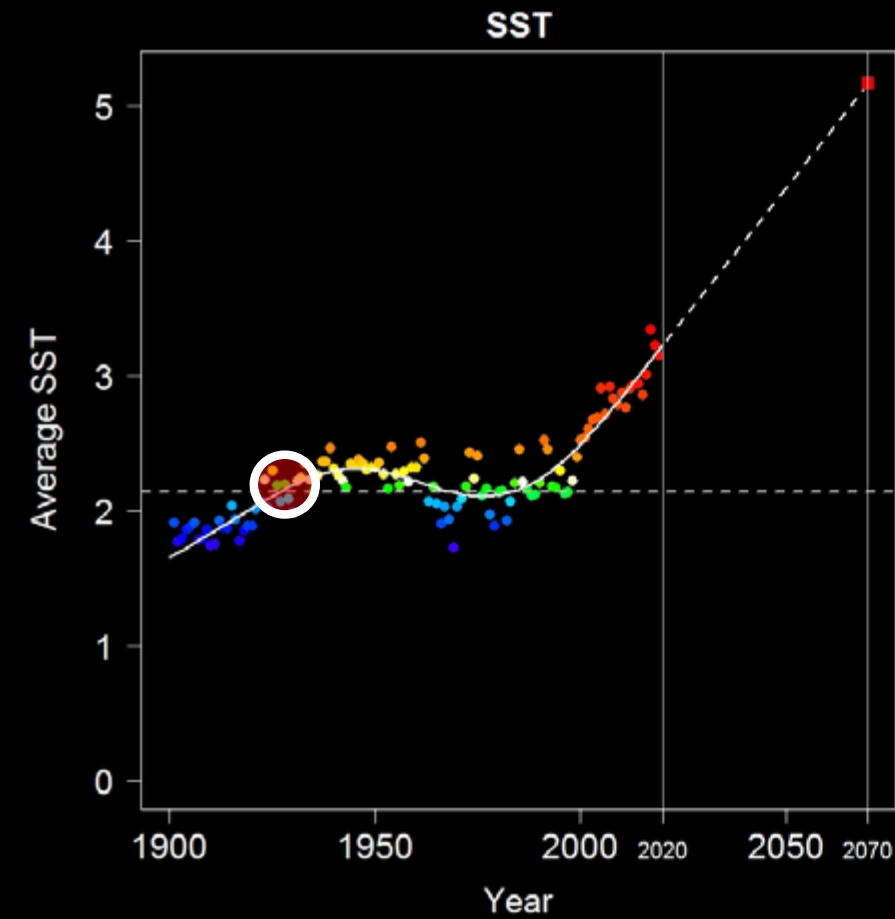


The only constant is change



# Examples from VKM: Pink Salmon

*Non-stationary environments cause changing processes and resources*



# Where to go and things to do:

*Distributed knowledge; two-way information flow and distributed competence*

## Distributed knowledge

- Data chains with less aggregation
- Awareness of analysis at every level
- Use of shared freeware

## Interdisciplinarity

- Specialists and generalists together
- Keeping it concrete: less jargon in science and management

## Conceptual framework

- Explicit spatial scales for effects
- The dimension in risk estimates
- Non-stationary processes

Data awareness

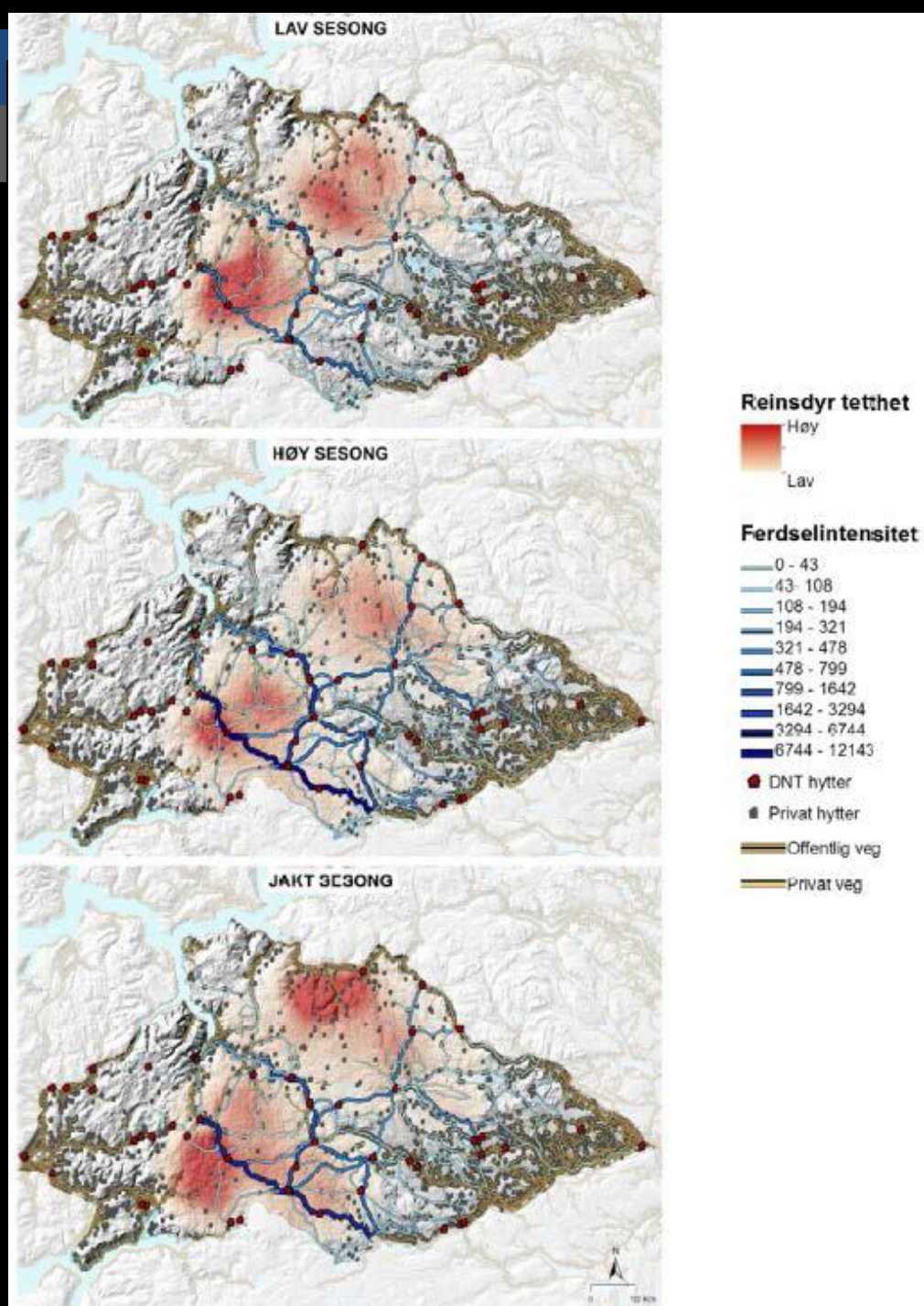
Multidirectional information





# Examples from VKM: CWD

## *Combining scales and sources*



VKM, Ytrehus, et.al. (2018) Factors that can contribute to spread of CWD – an update on the situation in Nordfjella, Norway. Opinion of the Panel on biological hazards. ISBN: 978-82-8259-316-8.

# Where to go and things to do:

*Concrete interdisciplinarity; combining specialists and generalists*

## Interdisciplinarity

- Specialists and generalists together
- Keeping it concrete: less jargon in both science and management

## Conceptual framework

- Explicit spatial scales for effects
- Explicit time dimension in risk
- Consider non-stationary processes

## Distributed knowledge

- Data chains with less aggregation
- Openness of analysis at every level
- Use of shared freeware

Cloaking complex ideas in  
common language



Explaining complex ideas in  
simple language

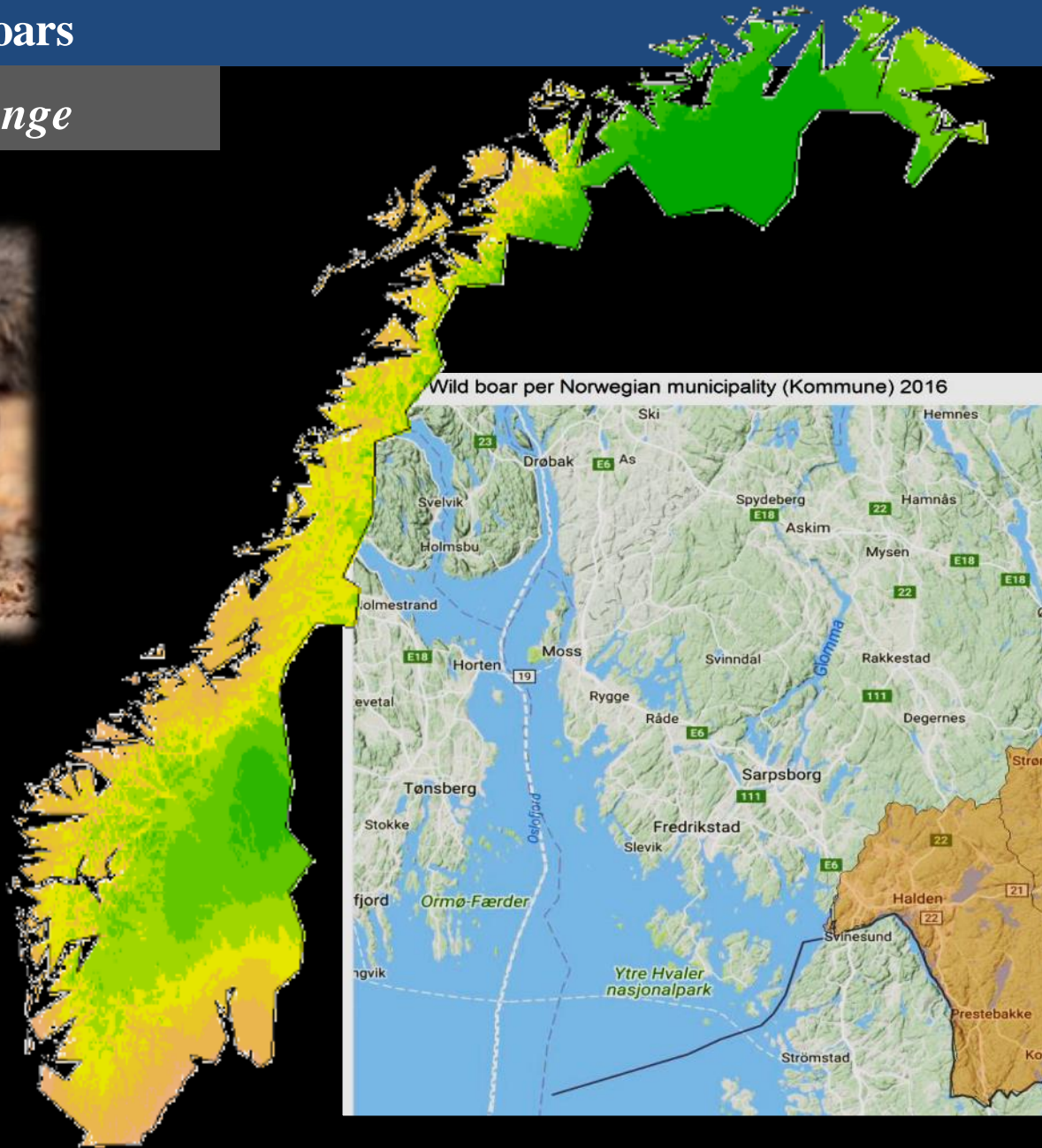


# Examples from VKM: Wild Boars

## Maps and potential invasive range

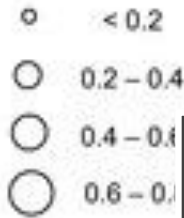


VKM, Skjerve et.al. (2018) Wild boar population growth and expansion - implications for biodiversity, food safety, and animal health in Norway. Opinion of the Norwegian Scientific Committee for Food and Environment. VKM report 2018:14, ISBN: 978-82-8259-311-3, ISSN: 2535-4019



# Thank You For Your Attention!

Correlation coefficients



## Interdisciplinarity

- Specialists and generalists together
- Keeping it concrete: less jargon in both science and management

## Conceptual framework

- Explicit spatial scales for effects
- Explicit time dimension in risk estimates
- Consider non-stationary processes

## Distributed knowledge

- Data chains with less aggregation
- Awareness of analysis at every level
- Use of shared freeware