



# Lifeline vulnerability at mass events

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## Background

Collaboration with MIUN on cross border security.

PhD thesis on **Adaptation of social vulnerability indicators to context**. Two articles on lifelines:

Holand, I. S. 2014. **The lifeline issue in social vulnerability indexing: A review of indicators and discussion on their application**. Accepted for publication in Natural Hazards Review.

Holand, I. S. & Rød, J. K. 2013. **Kartlegging av infrastruktursårbarhet** (Mapping of Infrastructure Vulnerability). In L. M. Bye, H. Lein & J. K. Rød, 2013, **Mot en farligere fremtid? Om klimaendringer, sårbarhet og tilpasning i Norge** (Towards a more dangerous future? Climate change, vulnerability and adaptation in Norway).



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## Lifeline vulnerability

### **Social vulnerability:**

The characteristics of a person or group and their situation that influence their capacity to anticipate, cope with, resist and recover from the impact of a natural hazard, we term social vulnerability (Wisner et al. 2004).

I find the concept **lifeline vulnerability** useful as a means to distinguish those aspects of social vulnerability to natural hazards that are influenced by lifeline failure from social vulnerability in general.



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## Lifelines

«networks which provide for the circulation of people, goods, services, and information upon which health, safety, comfort, and economic activity depend»

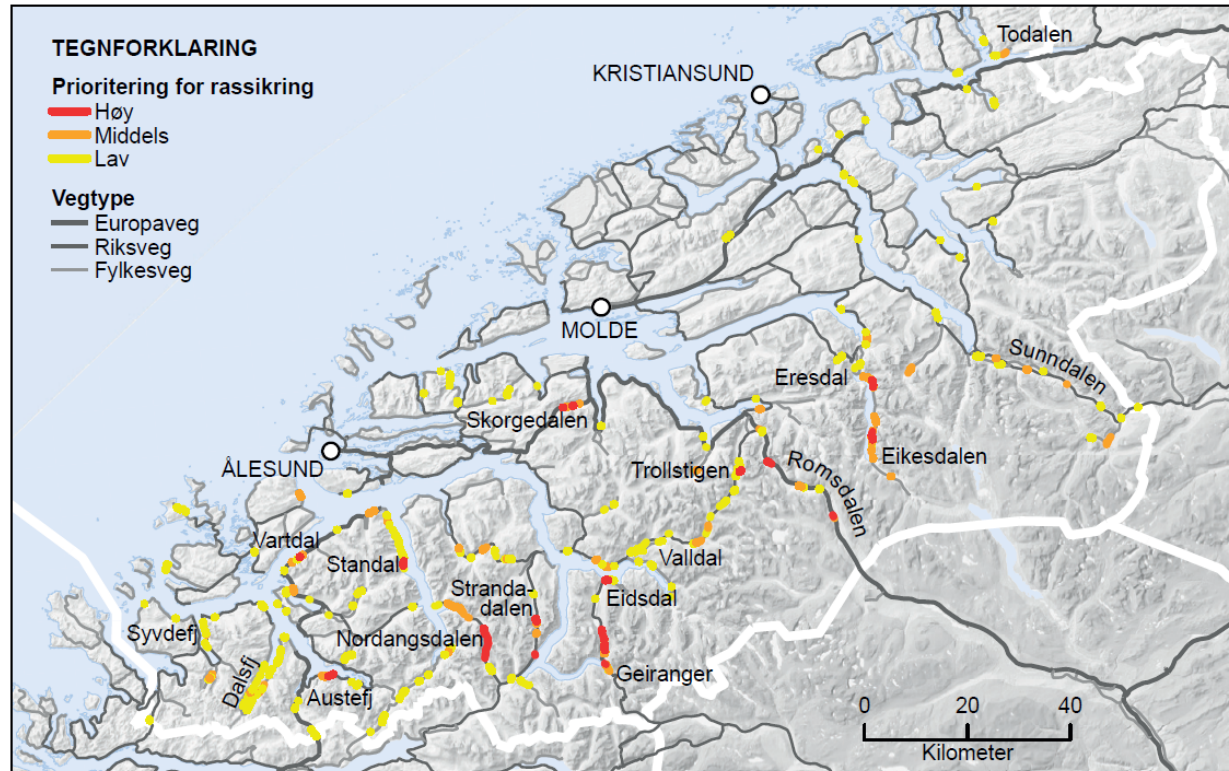
- water and sewer systems
- transportation facilities
- communication facilities
- electrical power facilities
- gas and liquid fuel lines

**Platt 1991**

**One of many elements that contributes to the vulnerability or resilience of people and places.**



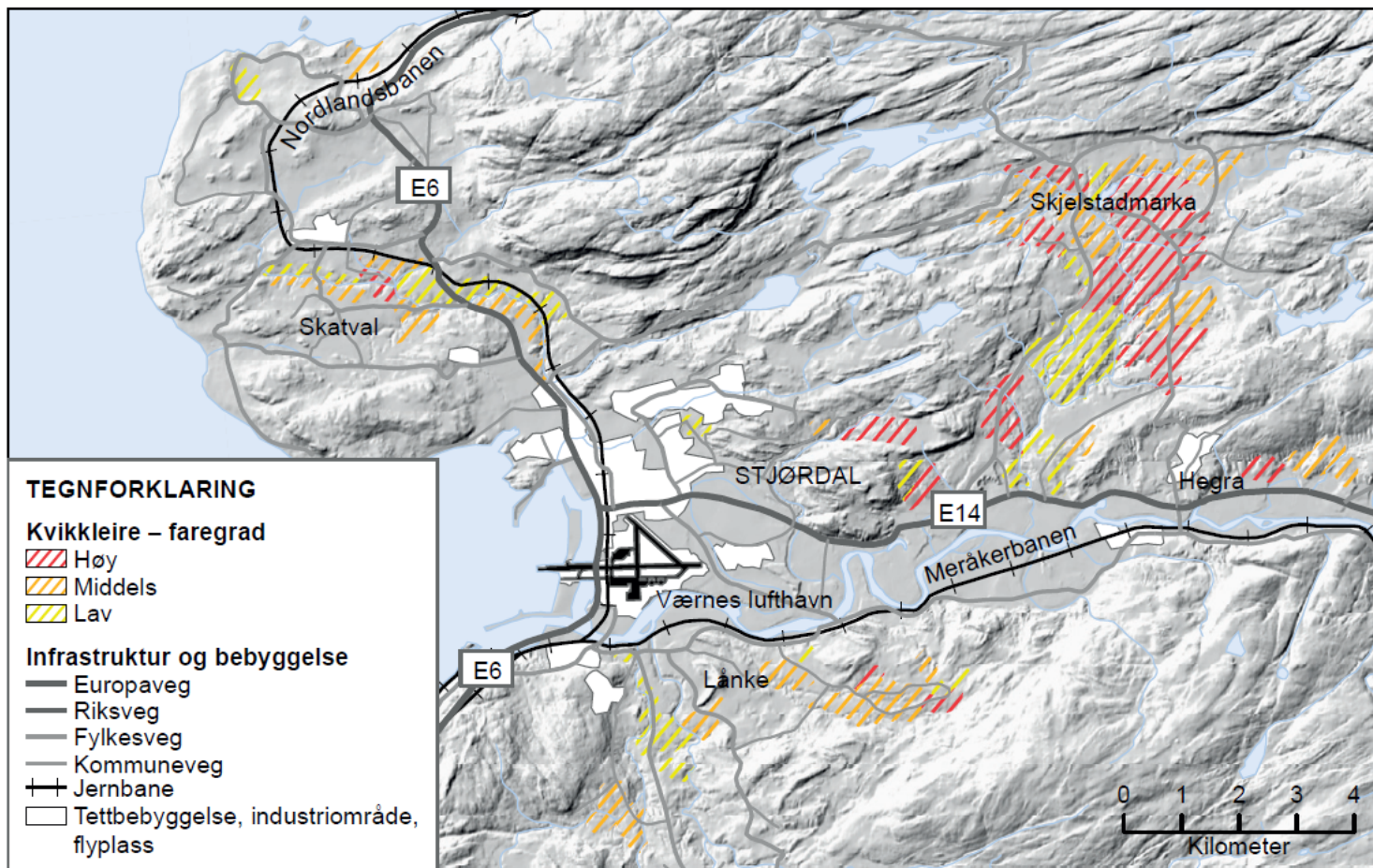
# Risk



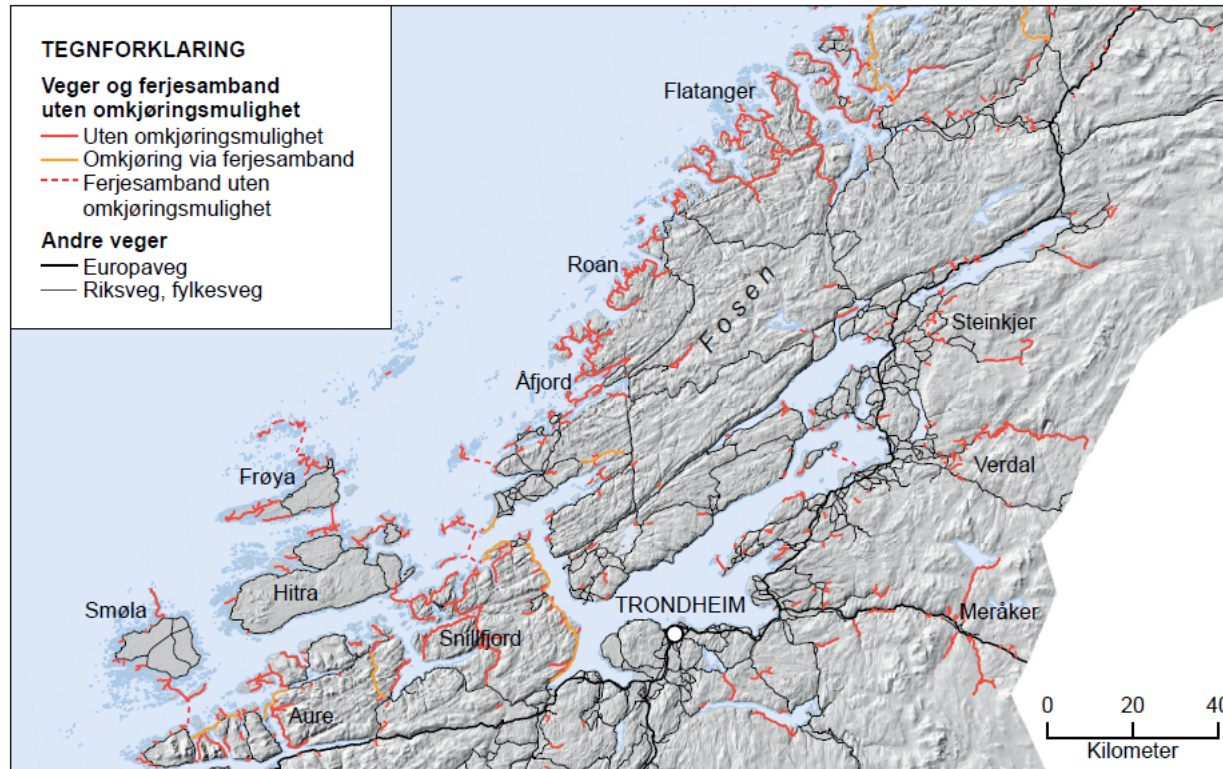
Focus on external threats and possible consequences

Likelihood x consequence





## Infrastructure vulnerability



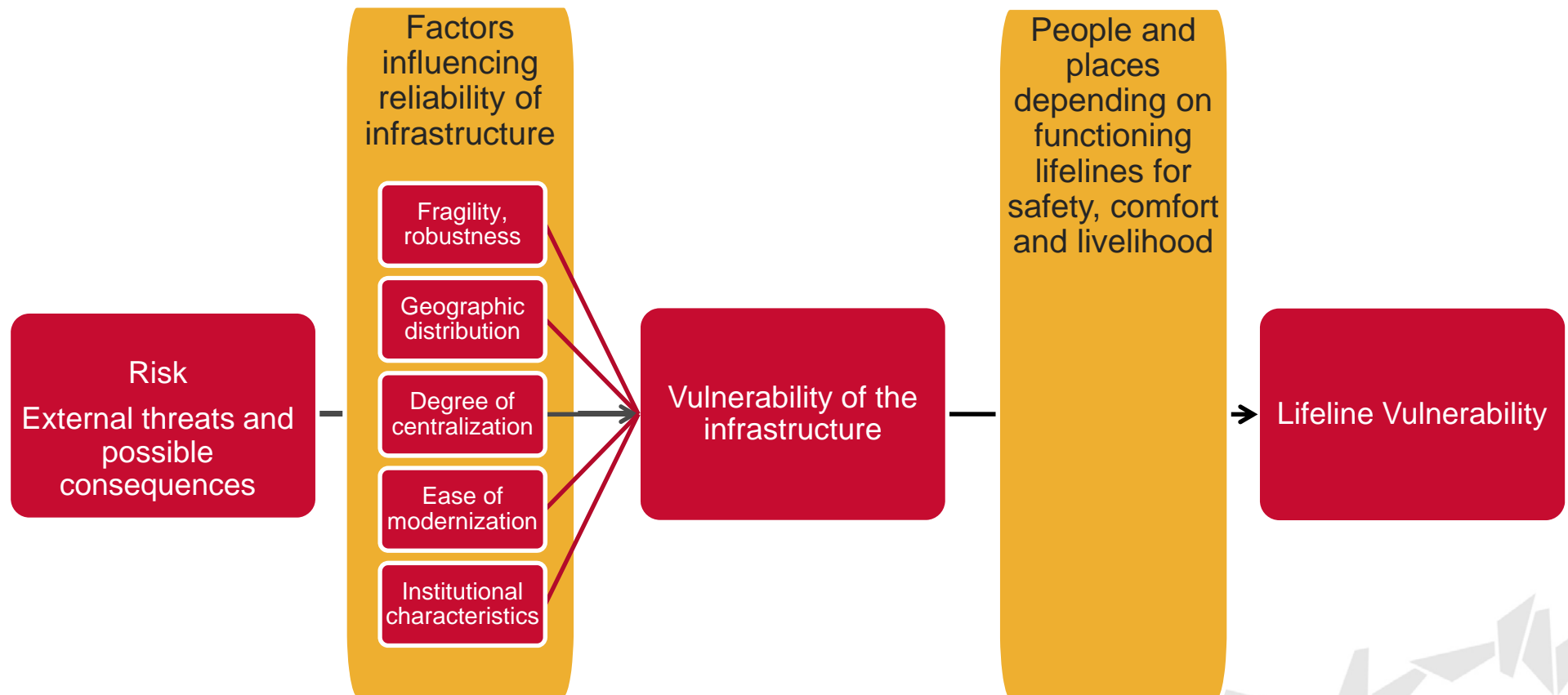
**Focus on factors that are internal to infrastructure systems**

**Vulnerability of the infrastructure**

**Infrastructure vulnerability = likelihood that infrastructure fails**

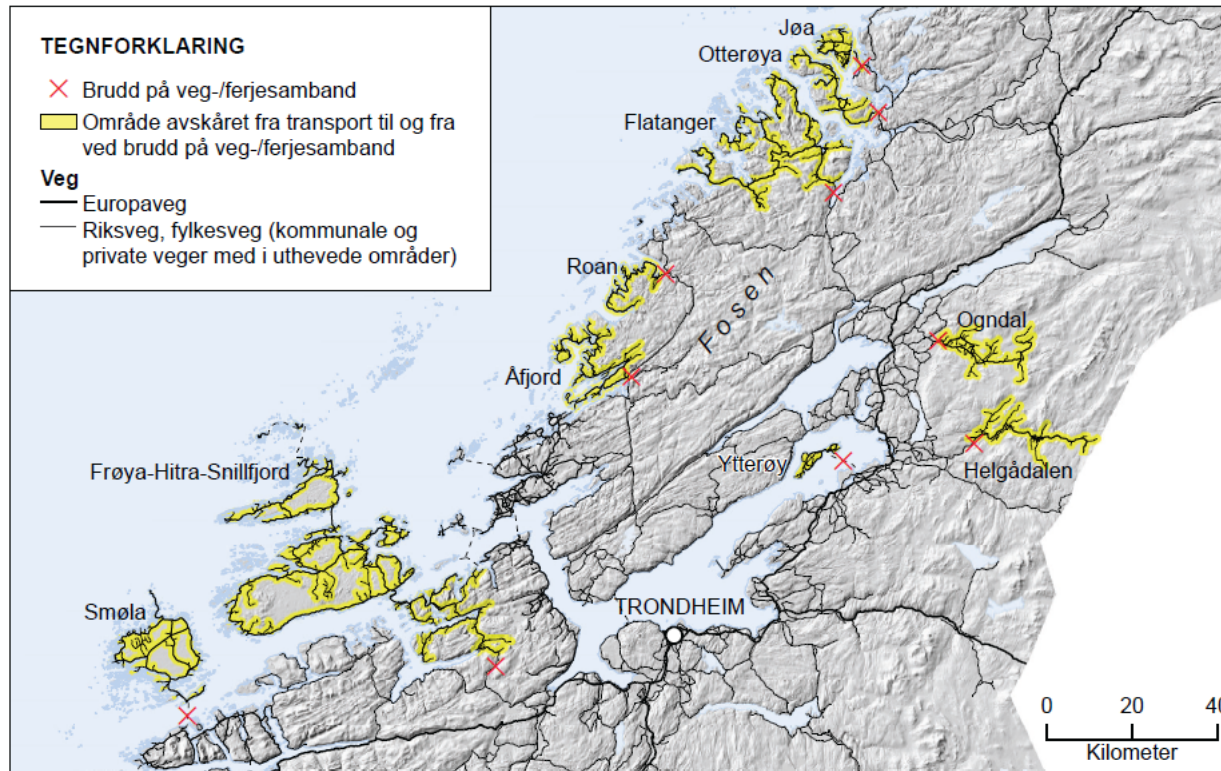
*Figur 5. Vegstrekninger i deler av Midt-Norge der det ikke er omkjøringsmuligheter (Data: Statens vegvesen og Statens kartverk).*







## Lifeline vulnerability



Reference to people and places who are vulnerable to lifeline failure

Lifeline vulnerability = dependency on circulation provided by infrastructure that may fail

Figur 8. Kart som viser de største sammenhengende områdene med stor sårbarhet for brudd på vegnettet. Områdene er avgrenset med utgangspunkt i at det er vegbrudd på mest ugunstige steder (markert med rødt kryss).



# Roan, June 13-24 2013

500 inh.

Municipal  
adm.

Tourism

Fish-  
farming

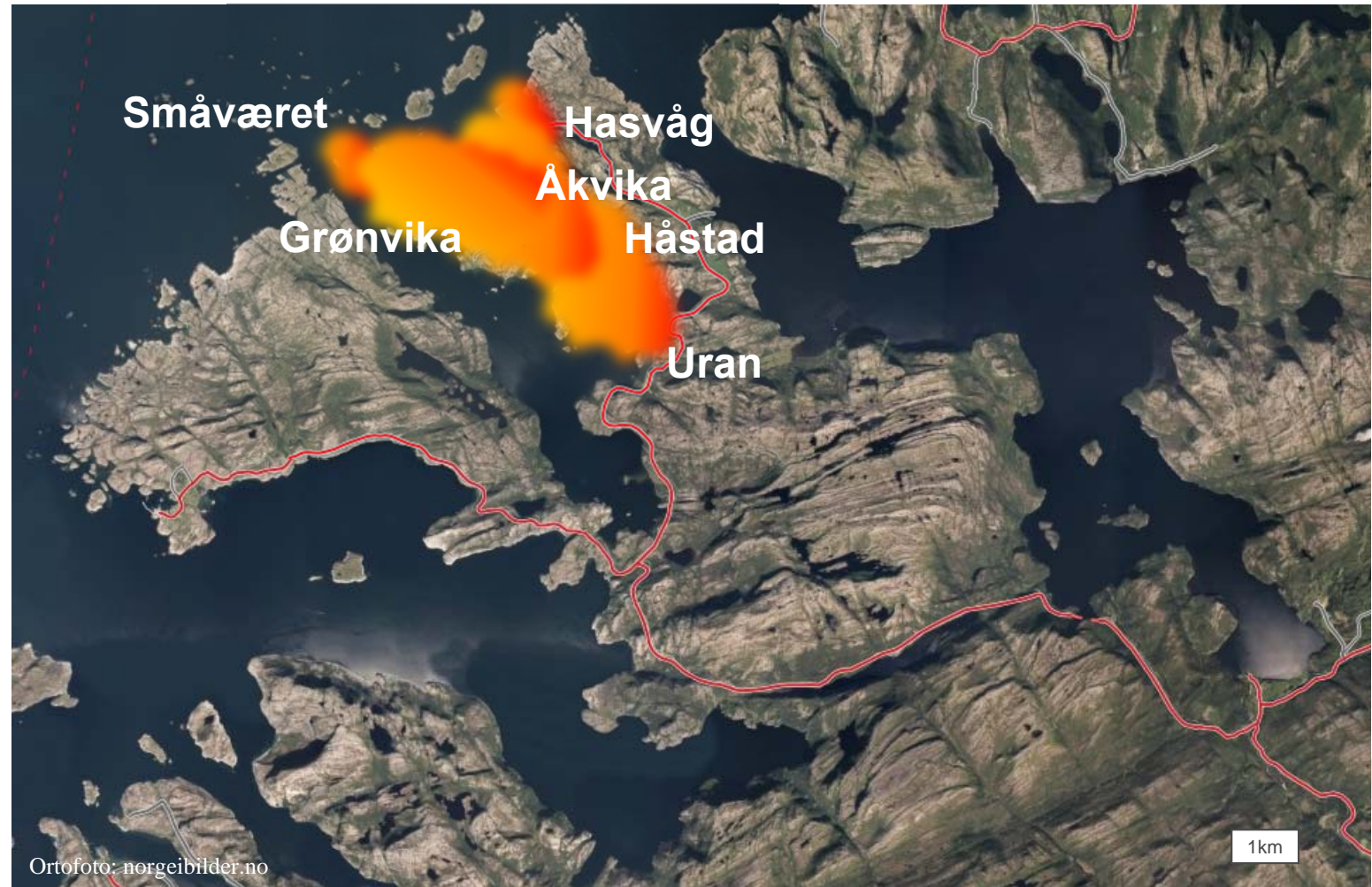
Farming

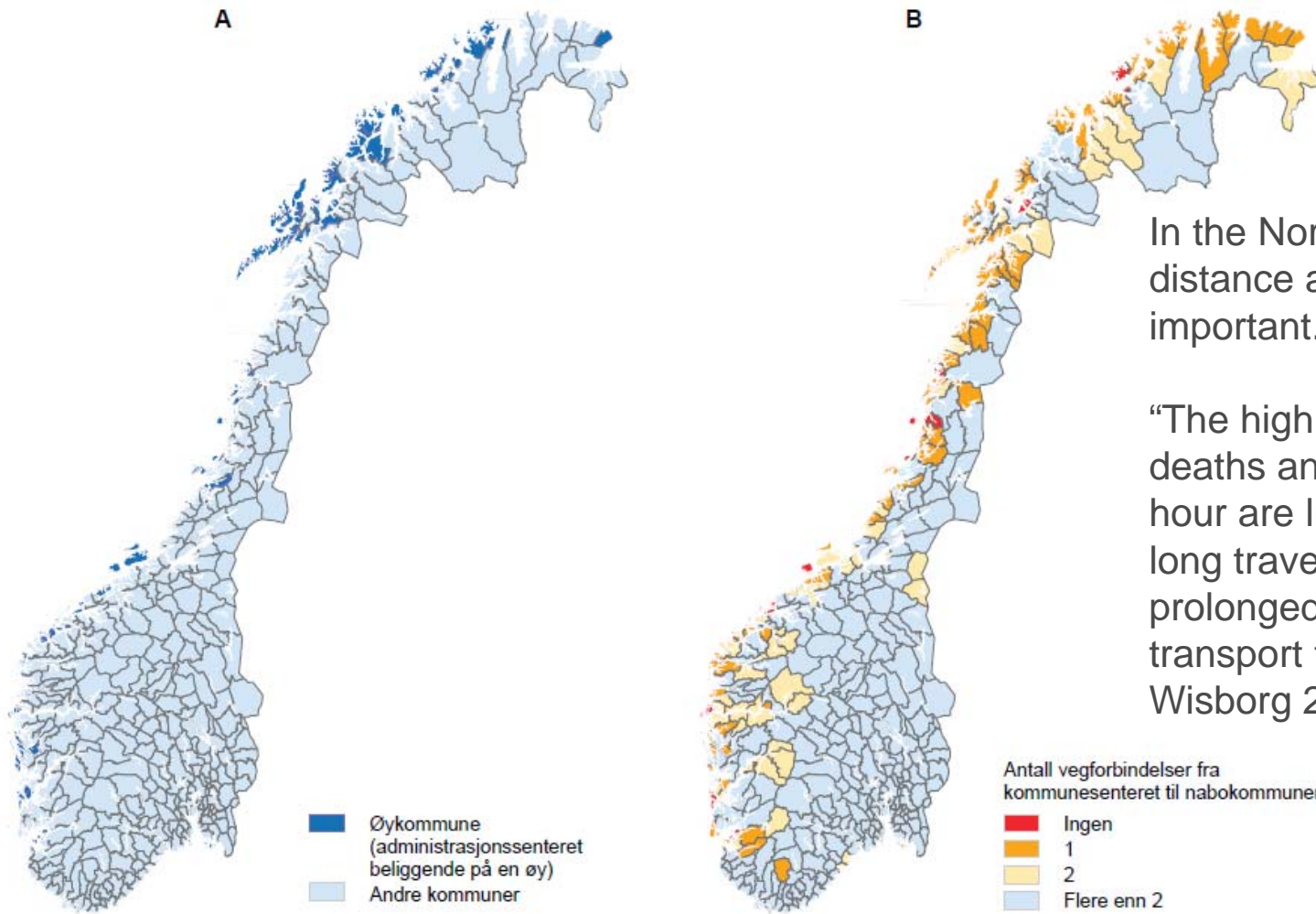


## Flatanger, January 27-28. 2014

Loss of 66 buildings

Evacuate before road cut off by fire





In the Norwegian context, distance and redundancy important.

“The high rate of prehospital deaths and deaths within one hour are likely the result from long travel distances and hence prolonged response and transport times” (Bakke & Wisborg 2011, p 1619).

Figur 7. Manglende redundans i vegnettet (Data: Statens kartverk)



## Lifeline vulnerability and mass events

### **Some issues:**

- **Access to safety, routes by which to evacuate, safe transportation**
- **Access to facilities e.g. medical assistance and other necessities such as water, food, toilets**
- **Access to information in case of an emergency**





Figur 9.16 Båten fylt til ripa. De frivilliges innsats reddet liv.

Foto: Svein Gustav Wilhelmsen

Ortofoto: norgebilder.no

## Usefulness of the *lifeline vulnerability* concept

**Lifeline vulnerability  $\neq$  Risk**

**Lifeline vulnerability  $\neq$  Infrastructure vulnerability**

**Aims focus on vulnerabilities associated with infrastructure failure: Who are dependent and who are not.**

**Develop methodology that can be used to identify populations that have high levels of vulnerability to infrastructure failure**

**→ Application in risk and vulnerability analyses**

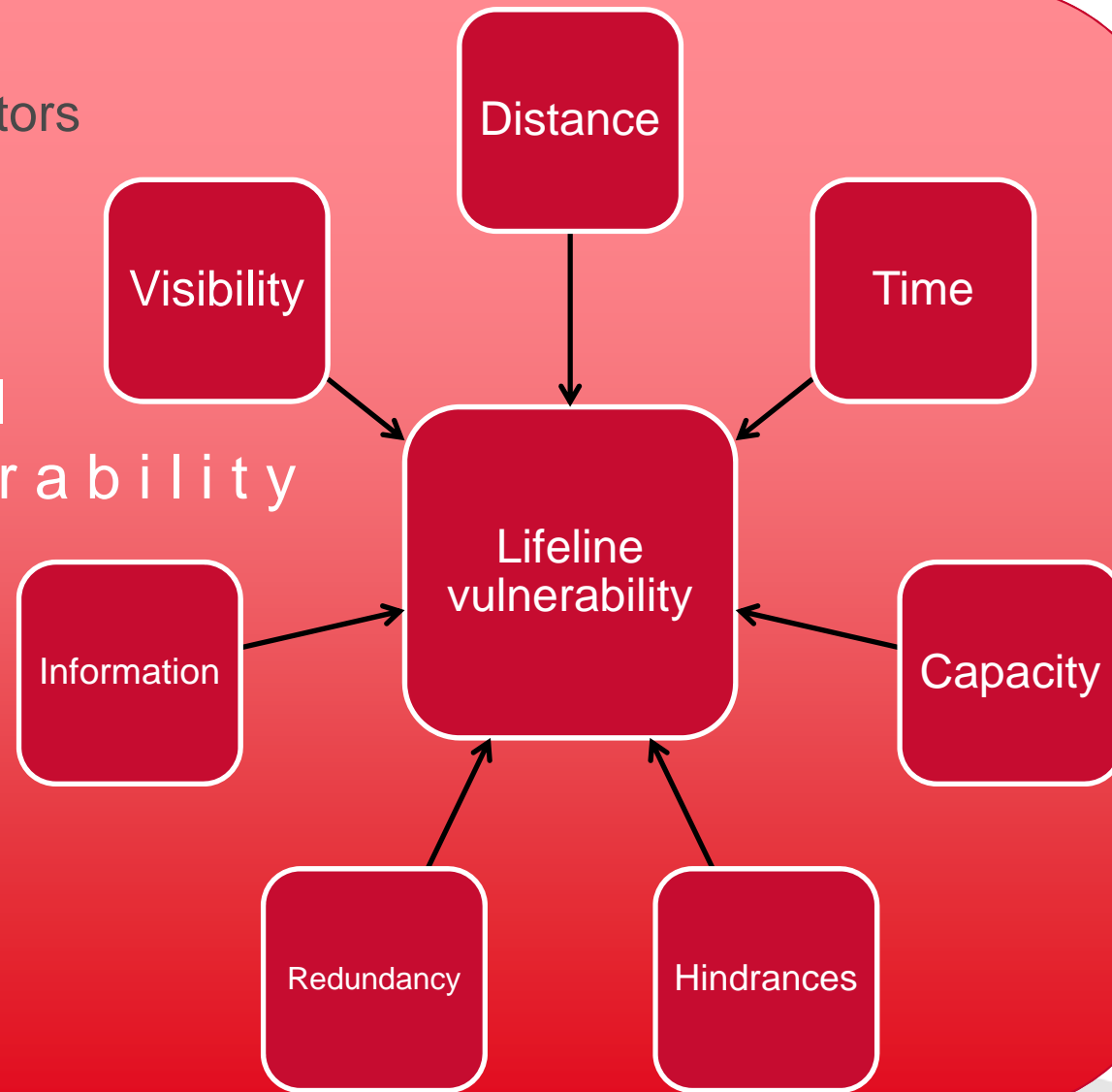
**→ Mitigation**

**Identify issues that otherwise remain unnoticed**



Influencing factors

Social  
Vulnerability







## References

Bakke, H. K. & Wisborg T. 2011. Rural High North: A High Rate of Fatal Injury and Prehospital Death. *World Journal of Surgery*, 35, 1615-1620.

Holand, I. S. & Rød, J. K. 2013. Kartlegging av infrastruktursårbarhet (Mapping of Infrastructure Vulnerability). In L. M. Bye, H. Lein & J. K. Rød, 2013, *Mot en farligere fremtid? Om klimaendringer, sårbarhet og tilpasning i Norge* (Towards a more dangerous future? Climate change, vulnerability and adaptation in Norway).

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Platt, R. H. (1991). Lifelines: An Emergency Management Priority for the United States in the 1990s. *Disasters*, 15, 172-176.

Wisner, B., Blaikie, P., Cannon, T., and Davis, I. (2004). *At risk: Natural hazards, people's vulnerability and disasters*, 2nd Ed., Routledge, New York.





**Thanks for listening**

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