

Omgaan met onzekerheid bij besluiten over significante effecten op Natura 2000 gebieden

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Causes of uncertainty

- System complexity
- System variability
- Knowledge of cause-effect relations
- Goal setting

1. Ecological systems are variable

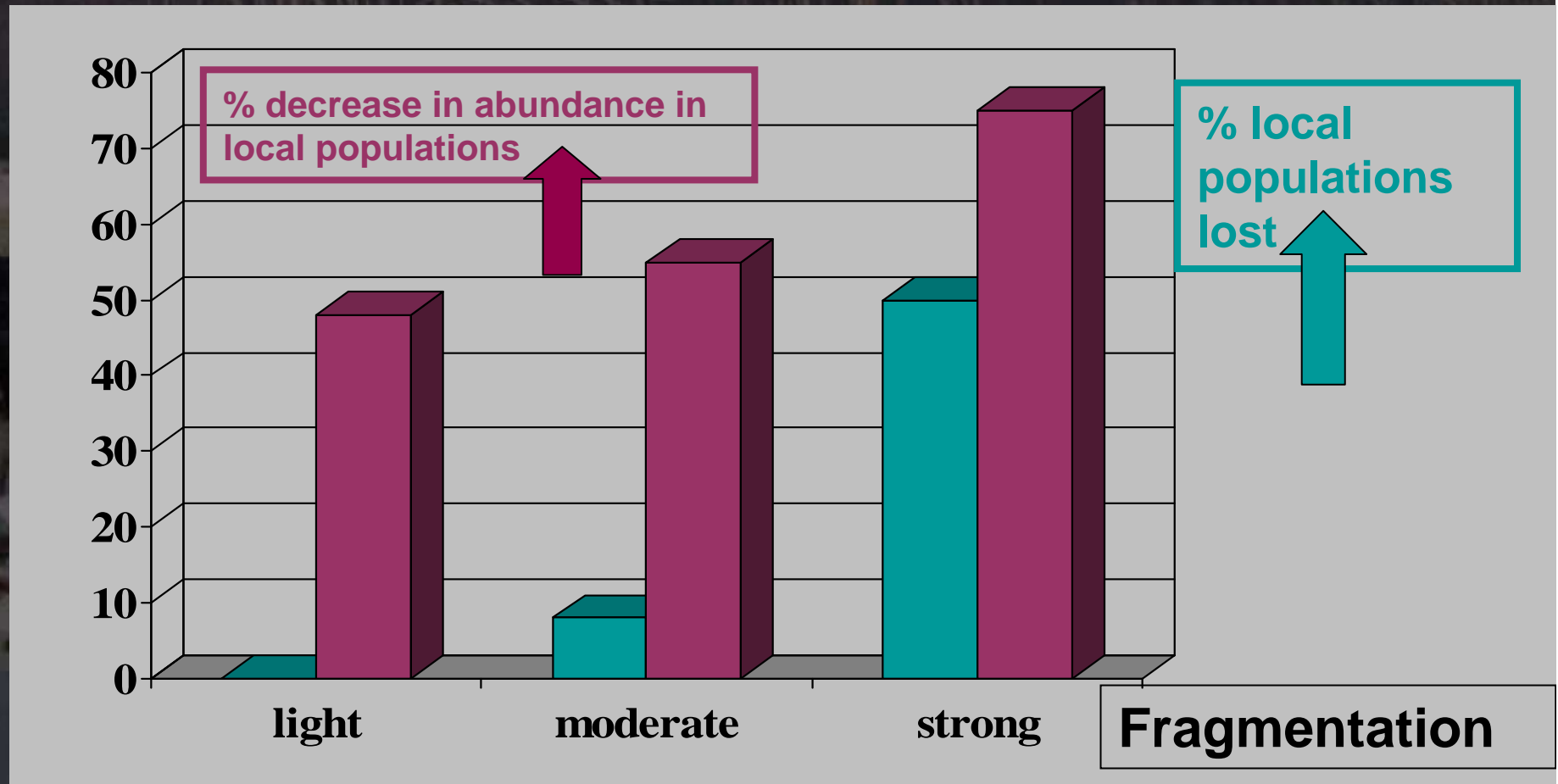


Weather extremes have
stronger impacts in more
fragmented regions



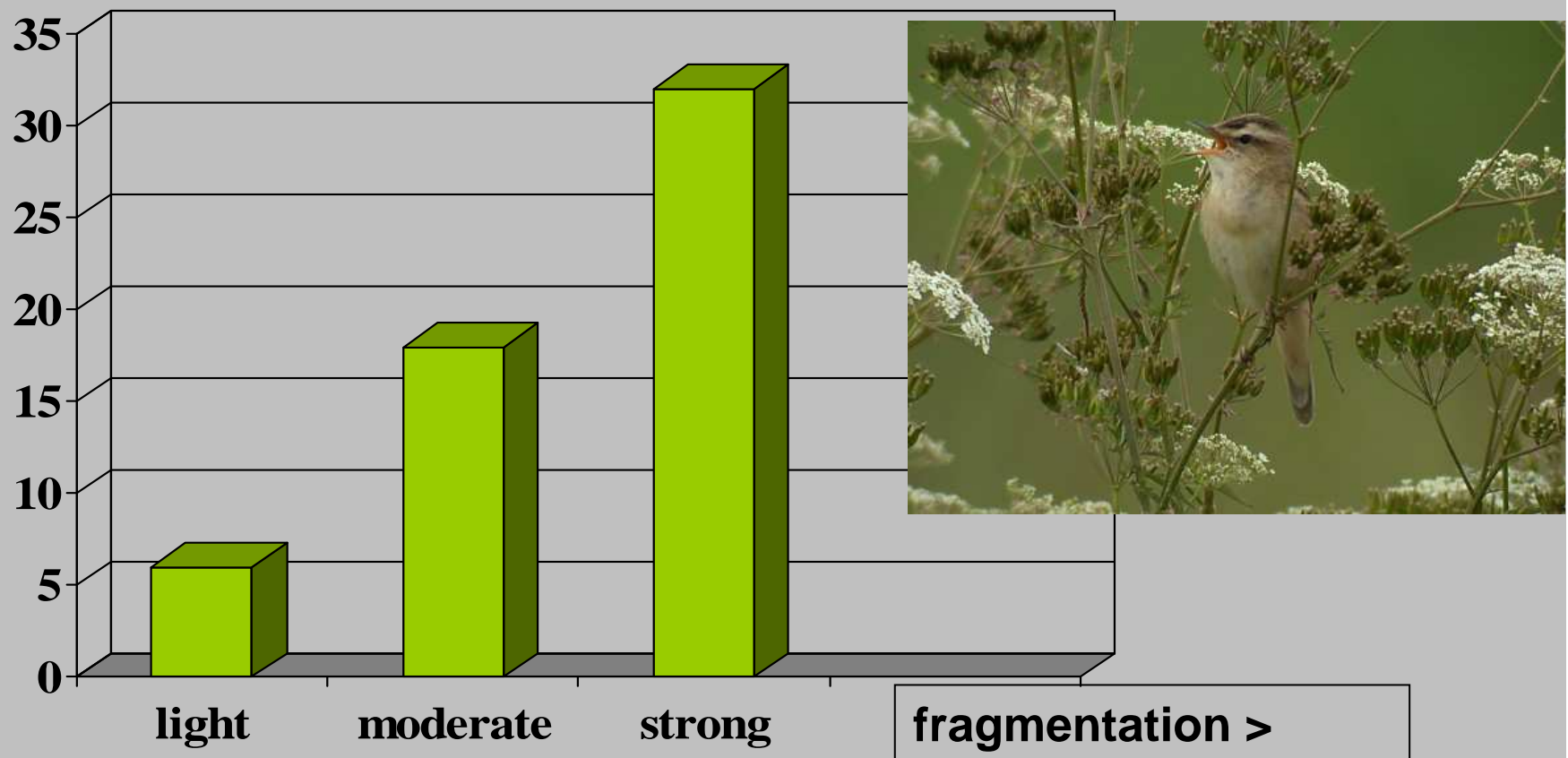
Acrocephalus schoenobaenus
Sedge warbler

Habitat fragmentation aggravates effect of Sahel droughts in local Sedge warbler populations

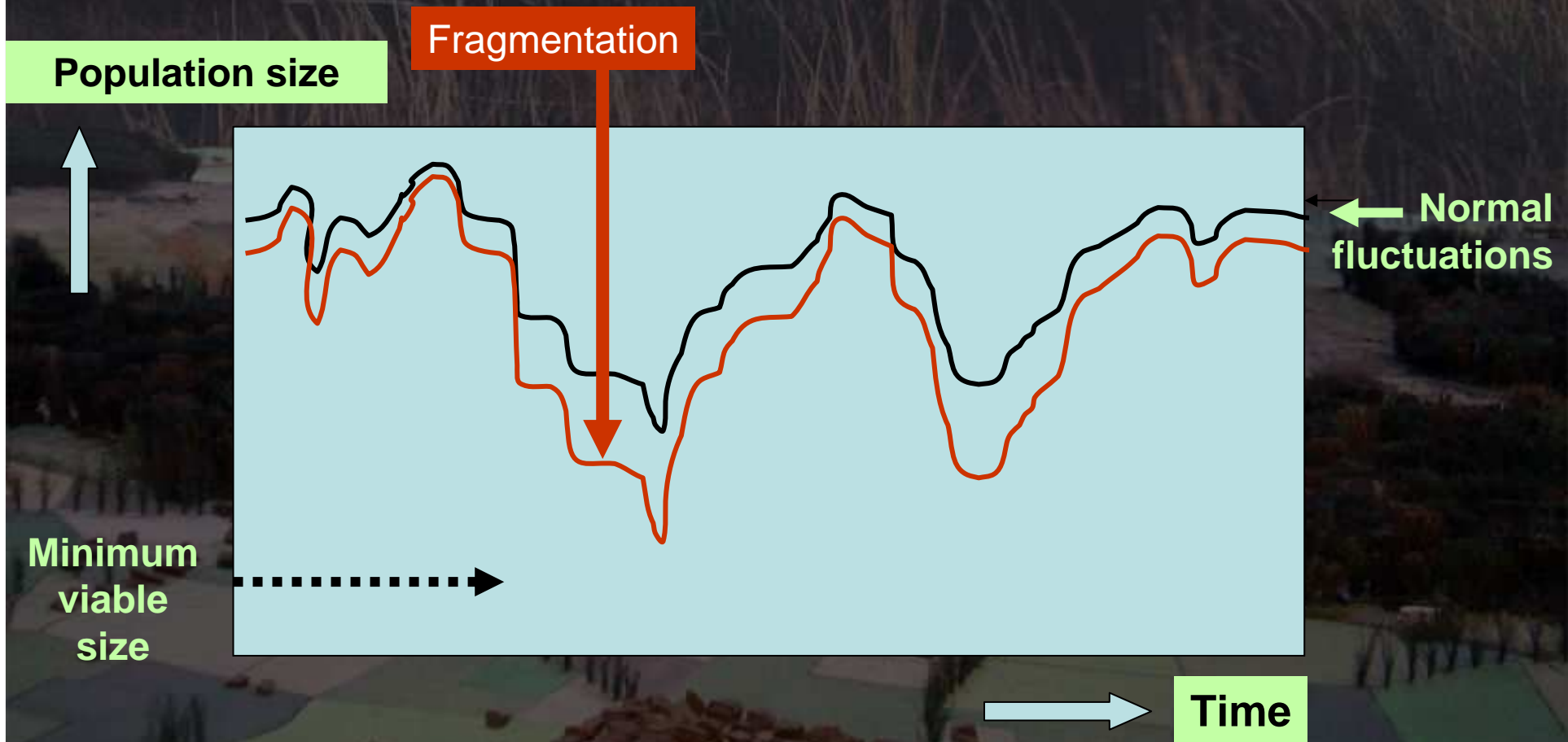


Sedge warbler recovery time increases with fragmentation

Years until recovery



Fragmentation weakens resilience of population, although still above threshold



Categories of uncertainty

- Complex interaction between natural fluctuations and effect of local activity

2. Significant effect depends on conservation goal

Conservation Goal	Significant effect?
Average number constant	yes
Persistence ($>$ critical threshold)	no
Future perspectives (climate change)	Yes?

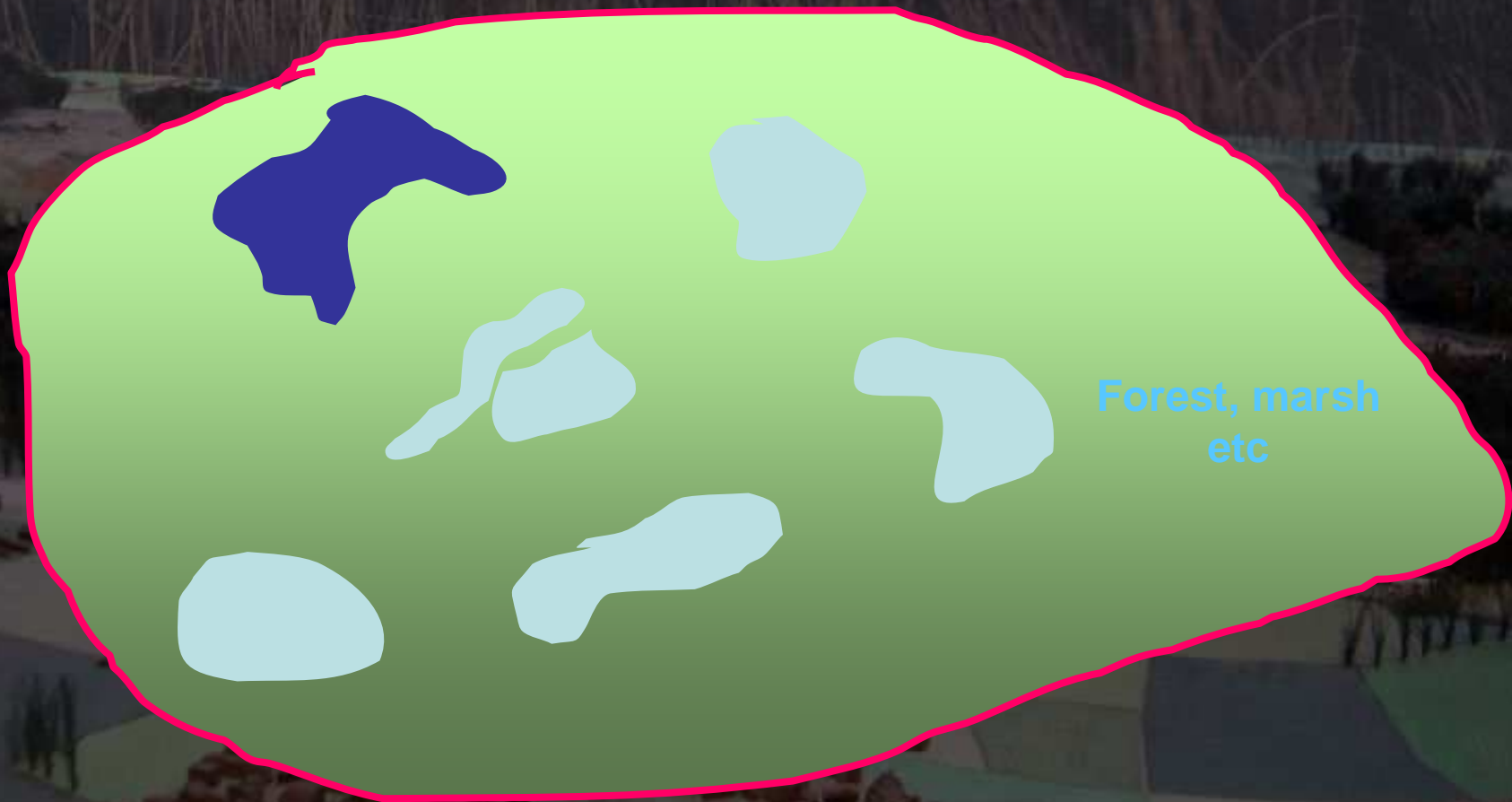
Categories of uncertainty

- Complex interaction between natural fluctuations and effect of local activity
- Uncertainty in goal setting

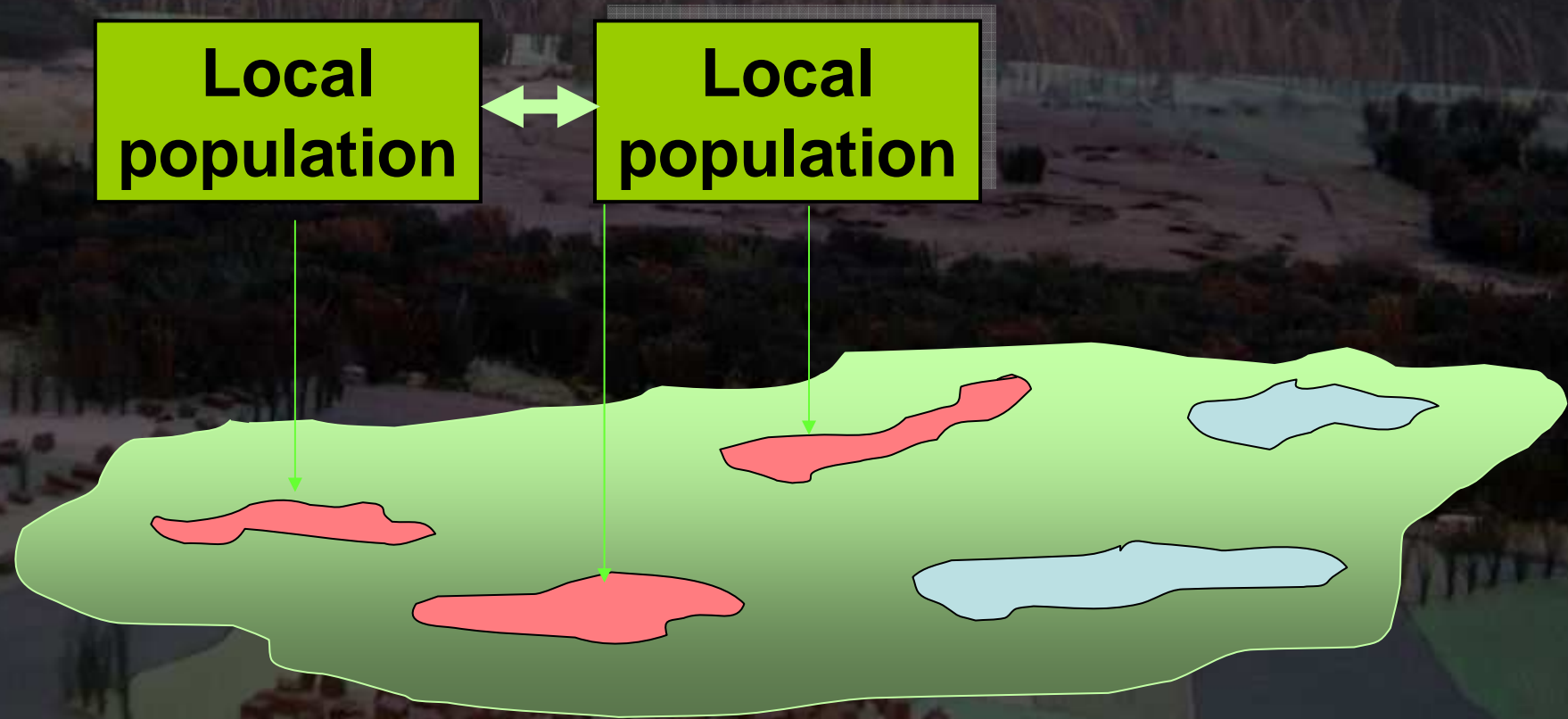
Comments:

- Average number of population in Natura 2000 site often unknown
- Monitoring: importance of long time series!

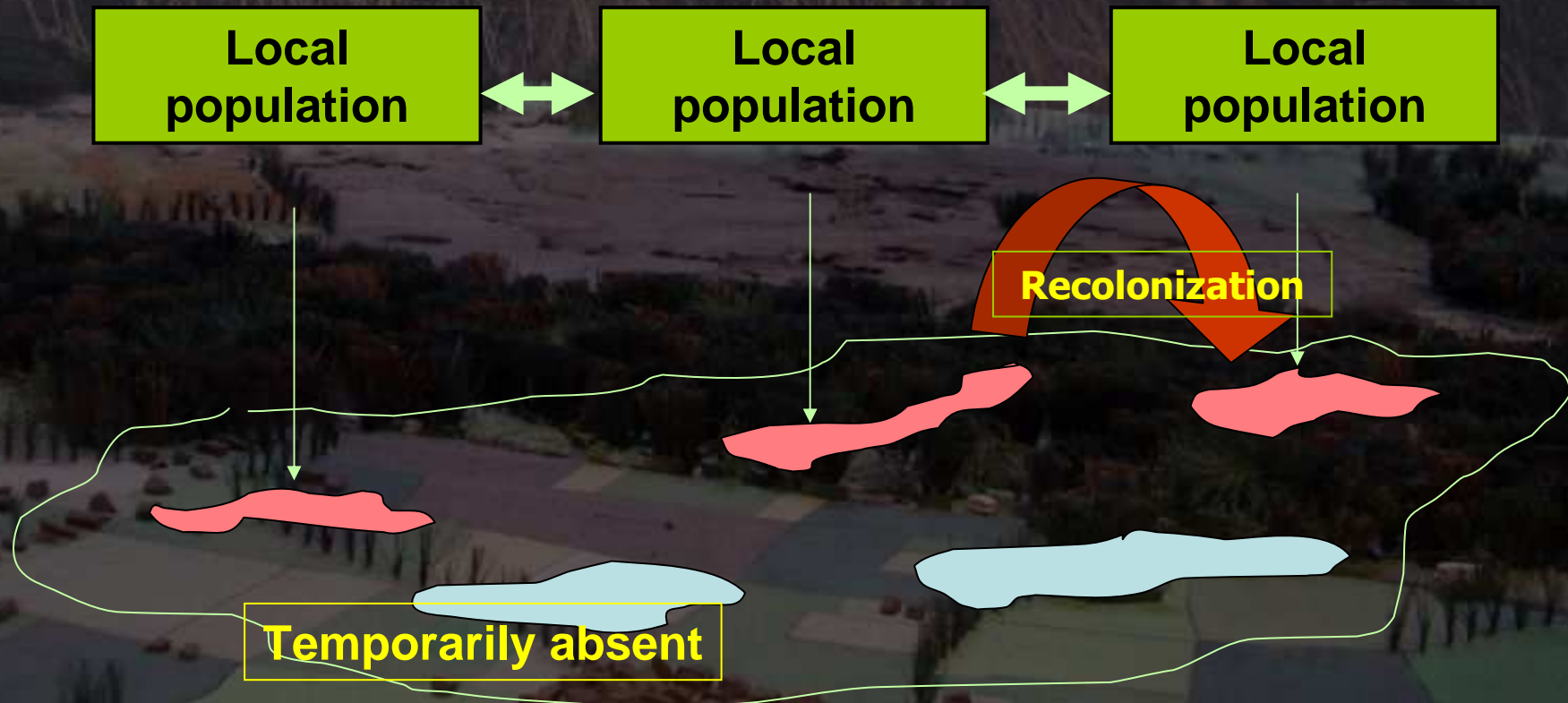
3. Spatial context: Natura 2000 site is often part of ecosystem network



Metapopulation: local occurrence depends on whole network



Metapopulation: local occurrence depends on whole network

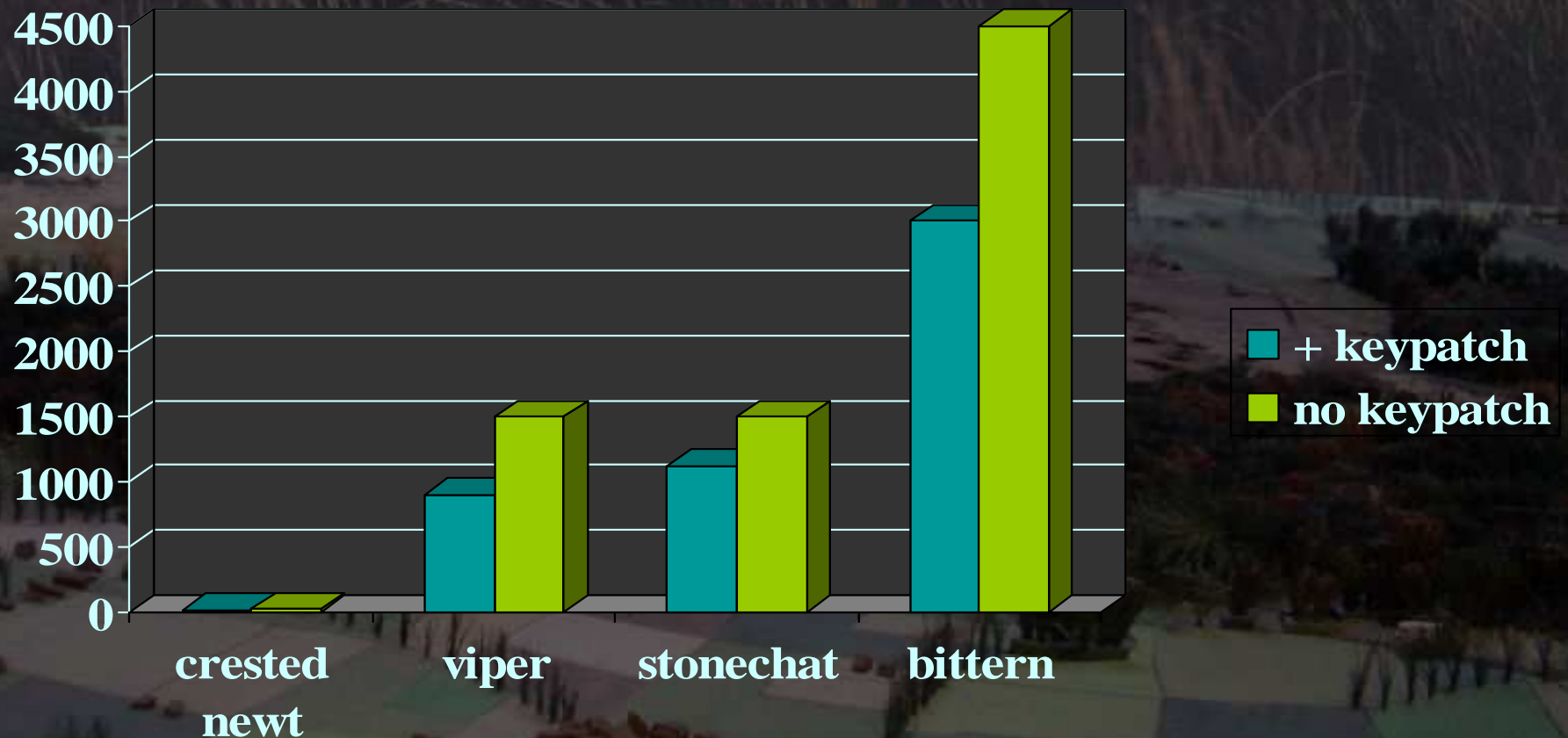


Occurrence of species in Natura 2000 site: dependent on network

Dispersal distance 5 km



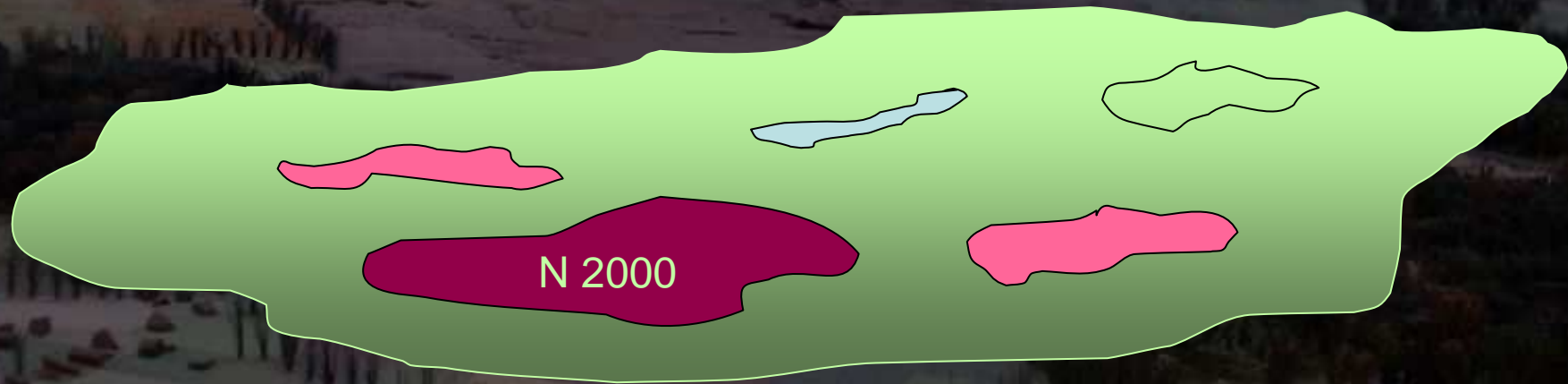
Minimum network area for metapopulation persistence (ha)



Verboom et al. 2001

Destruction of unprotected part of network might turn N 2000 conservation status to unfavourable

Dispersal distance 5 km

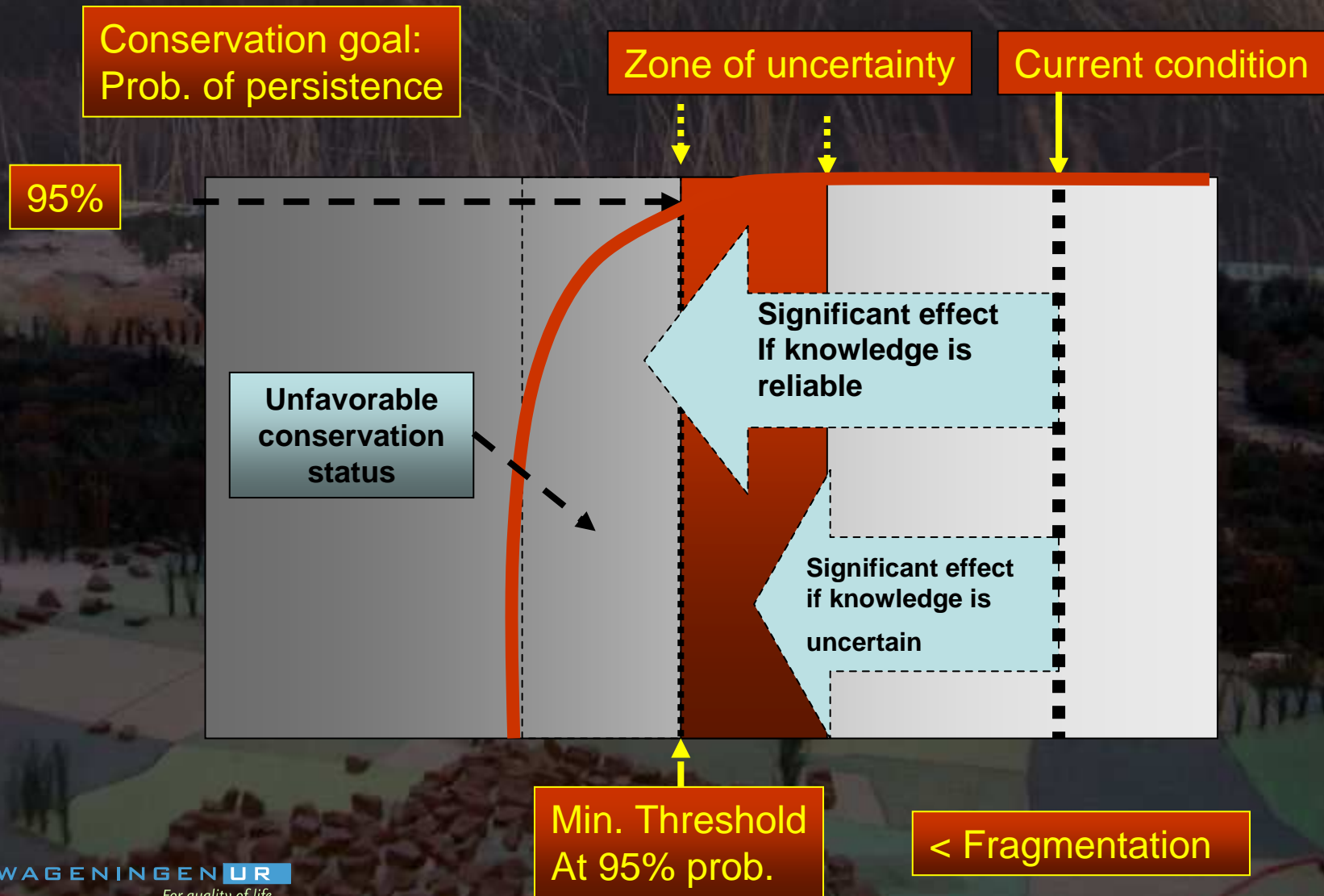


Categories of uncertainty

- Complex interaction between natural fluctuations and effect of local activity
- Variable choices in goal setting
- Activity may affect N 2000 site far away

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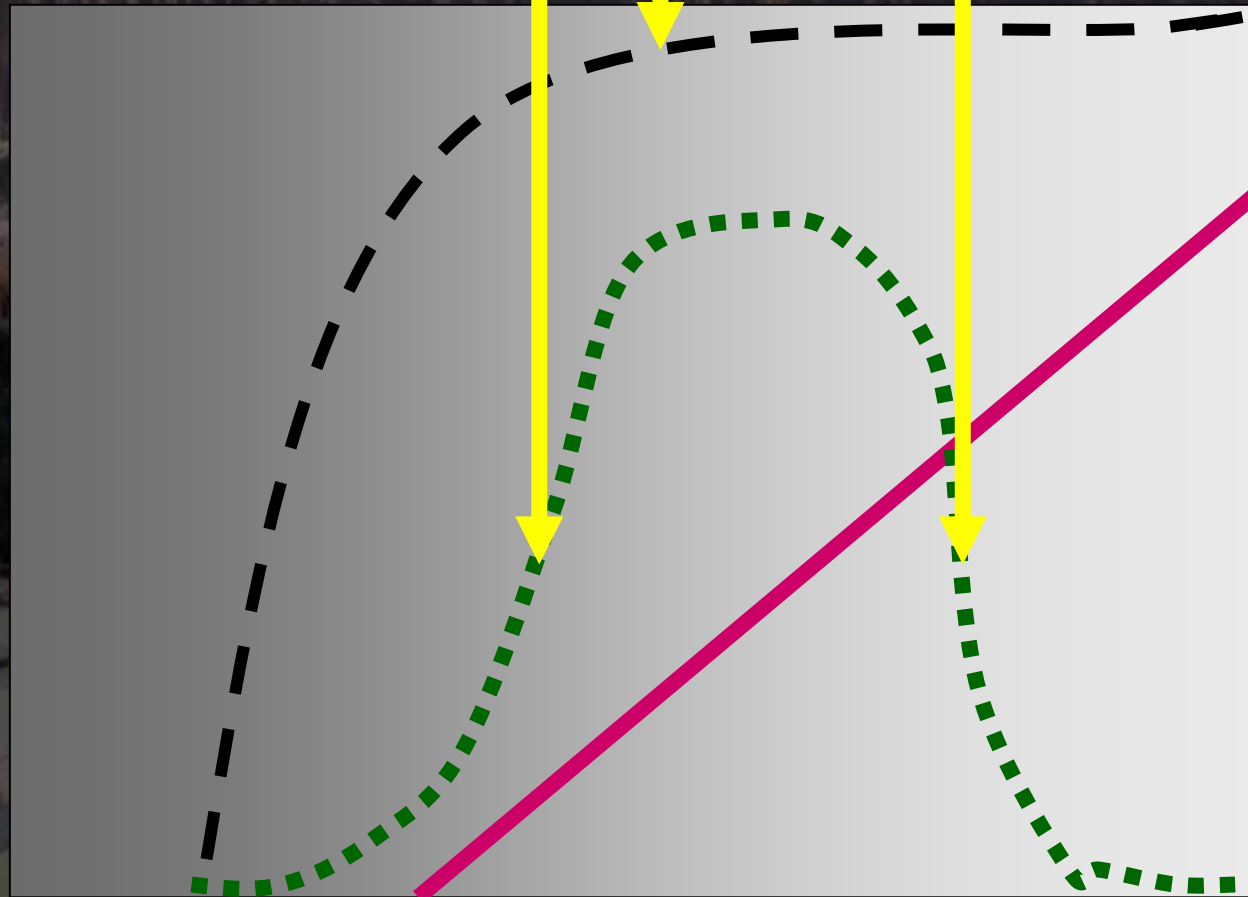
4. Uncertainty in cause-effect relationship



Cause/effect curve?

Probab. that conservation objective is achieved

Critical thresholds



Environmental variable

Categories of uncertainty

- Complex interaction between natural fluctuations and effect of local activity
- Variable choices in goal setting
- Activity may affect N 2000 site far away
- Uncertainty in cause/effect relationship

However:

- Interpretation of effect in terms of significant only in context of conservation status
- Local and/or national level?

Risk on significant effect?

	No significant change predicted	Significant change predicted
Local status unfavourable	yes	yes
Local status favourable	no	may be
National status unfavourable	may be	yes
National status favourable	no	may be

Categories of uncertainty

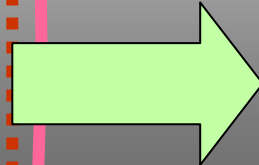
- Complex interaction between natural fluctuations and effect of local activity
- Variable choices in goal setting (scales!)
- Activity may affect N 2000 site far away
- Uncertainty in cause/effect relationship

5. Uncertainty due to multiple stress:

Conservation goal:
Prob. of persistence

95%

Extra
stress
factor

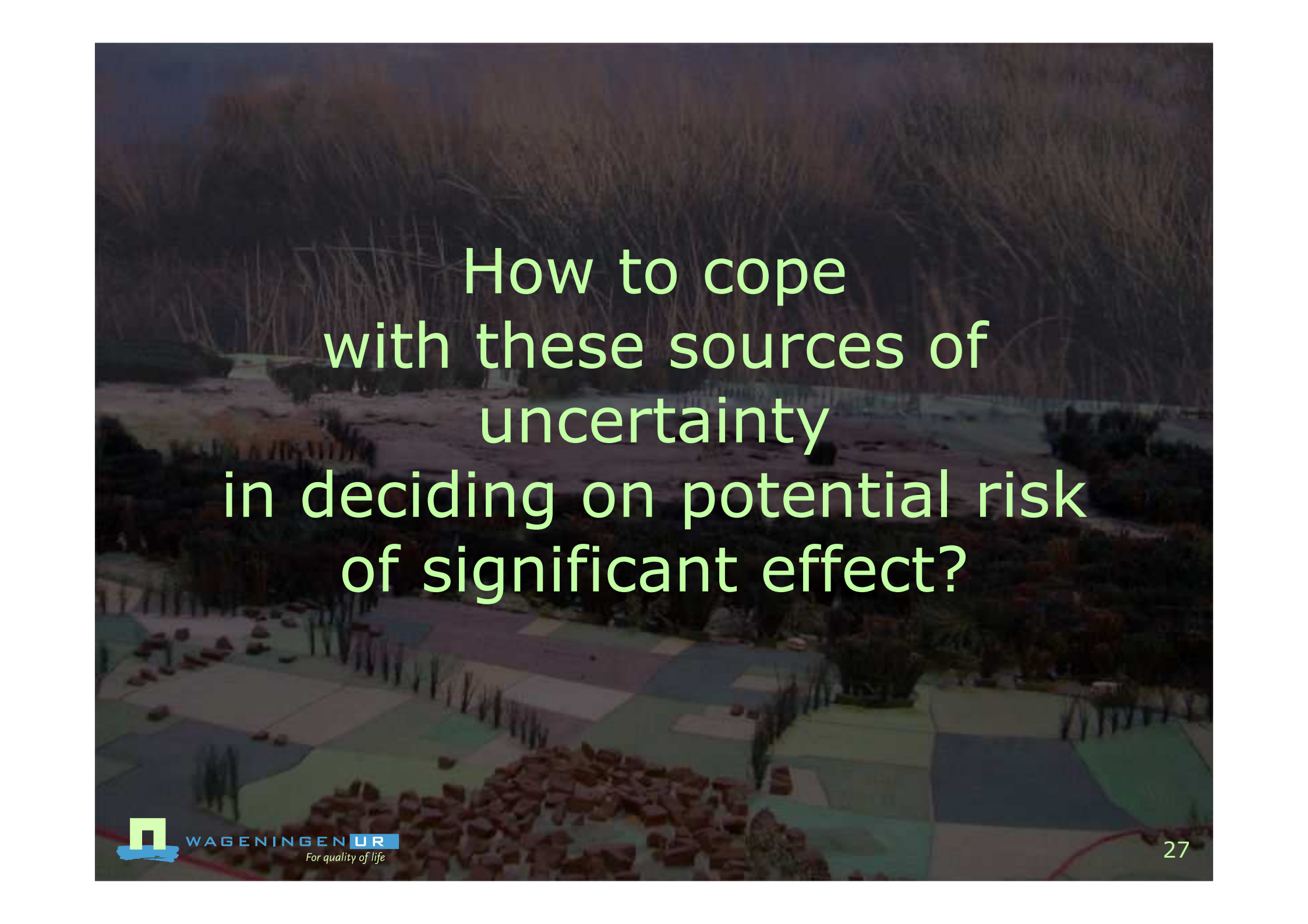


Min. Threshold
At 95% prob.

Key condition >

5 categories of uncertainty

1. Complex interaction between natural fluctuations and effect of local activity
2. Variable choices in goal setting (scales!)
3. Activity may affect N 2000 site far away
4. Uncertainty in cause/effect relationship
5. Complex interaction with factors not affected by activity



How to cope
with these sources of
uncertainty
in deciding on potential risk
of significant effect?

How to cope with uncertainty?

- Precautionary principle
- Actual conservation status
- Autonomous trends in area
- Are site specific data available?
- Prob. that activity will affect key conditions
- Prob. that change in key conditions will affect conservation status

Use adequate wording

- “Significant risk on structural (enduring) change in conditions pushing conservation status below critical threshold”

1. No data

If no data
on current conservation
status or
on site conditions
are available

Can
significant
risk be
excluded?

Yes	No
	X

2. Conservation status

If current conservation status (including conditions) unfavourable

Can significant risk be excluded?

Yes	No
	X

3. Autonomous development

**Autonomous development
might cause
unfavourable
conservation status**

**Can
significant
risk be
excluded?**

Yes	No
	X

4. Cause and effect chain (1)

**Determine how activity changes key conditions.
If not possible:**

**Determine if change in condition leads to significant change in conservation goal
If not possible:**

Can significant risk be excluded?

Yes	No
	X

4. Cause and effect chain (2)

**Determine if change in condition pushes system beyond critical threshold.
If yes:**

Significant risk likely

Yes	No
X	

Elaboration of cause/effect chain

decision	Step in diagnosis	Significant risk
1. Cause and effect chain inadequately known		1. Significant risk can not be excluded

Elaboration of cause/effect chain


decision	Step in diagnosis	Significant risk
2. Adequate, but very uncertain	2. Upgrade threshold level.	See next

Elaboration of cause/effect chain

decision	Step in diagnosis	Significant risk?
3. No effect beyond threshold, but potential synergy with other factors	Determine if multistress effects cause change below threshold	3. If yes, significant risk can not be excluded

Elaboration of cause/effect chain

decision	Step in diagnosis	Significant risk?
4. No effect on condition, but resilience probably affected	Determine loss of resilience	4. If yes, significant risk can not be excluded



Hoe bent u omgegaan met
deze vormen van
onzekerheid?