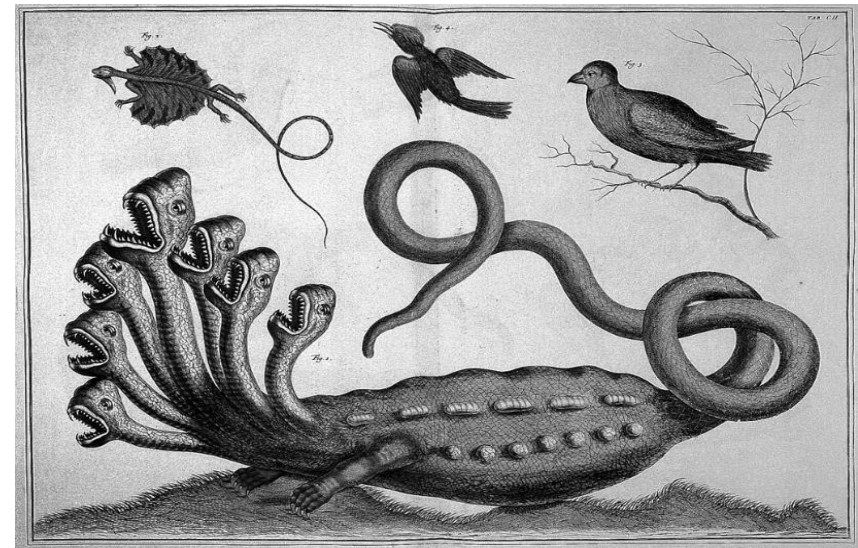




# Eradicating problematic alien species from dunes on the Wadden Islands, The Netherlands

Janneke van der Loop



# The Wadden Islands

- In the North sea
  - 405.2 km<sup>2</sup>
  - 24,504 residents
  - 1,3 million tourists each year!
- 
- Vlieland & Terschelling
  - Many dry dune grasslands and heath vegetation
  - Moist dune valleys



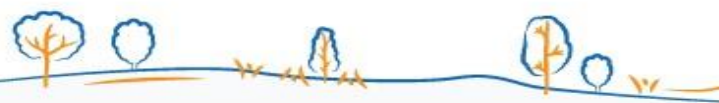
# Five problematic invasive species (groups)

- Vlieland

- Chokeberries (appelbes, *Aronia spec.*)
- Bamboo (Bamboe, *Pseudosasa / Sasa japonica*)
- Cotoneaster (dwergmispel, *contoneaster spec.*)
- Northern highbush blueberry (trosbosbes, *Vaccinium corymbosum*)
- Australian swamp stonecrop (watercrassula, *Crassula helmsii*)

- Terschelling

- Australian swamp stonecrop (watercrassula, *Crassula helmsii*)



# Natura 2000-area Dunes of Vlieland

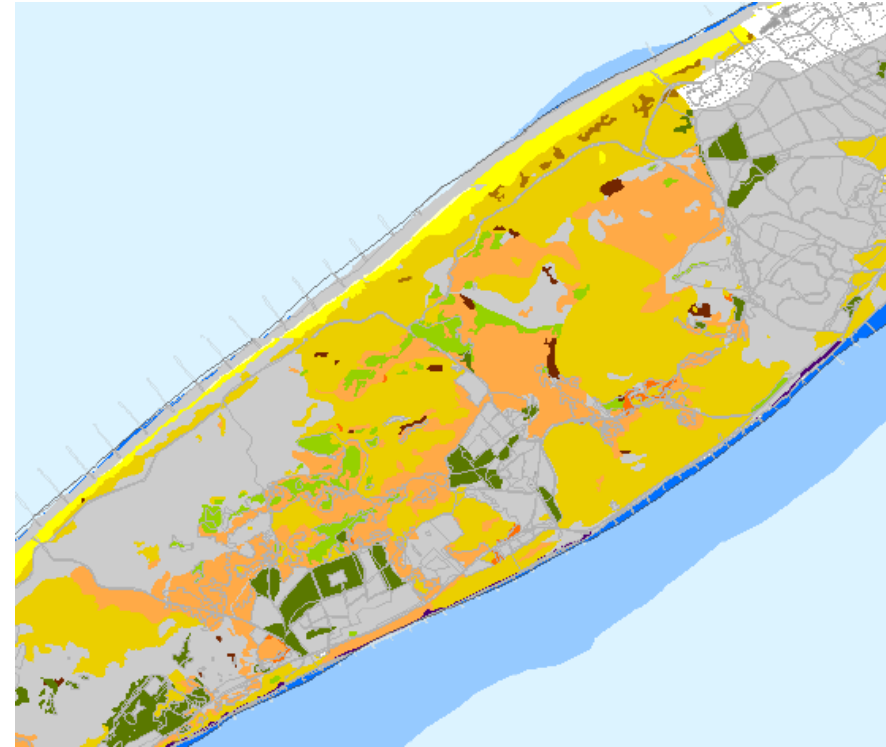
NDFP



Sovon



- Habitat and bird directive
- High nature values
- Relatively dry
- Only a few moist dune valleys
- Small infestations of *C. helmsii*

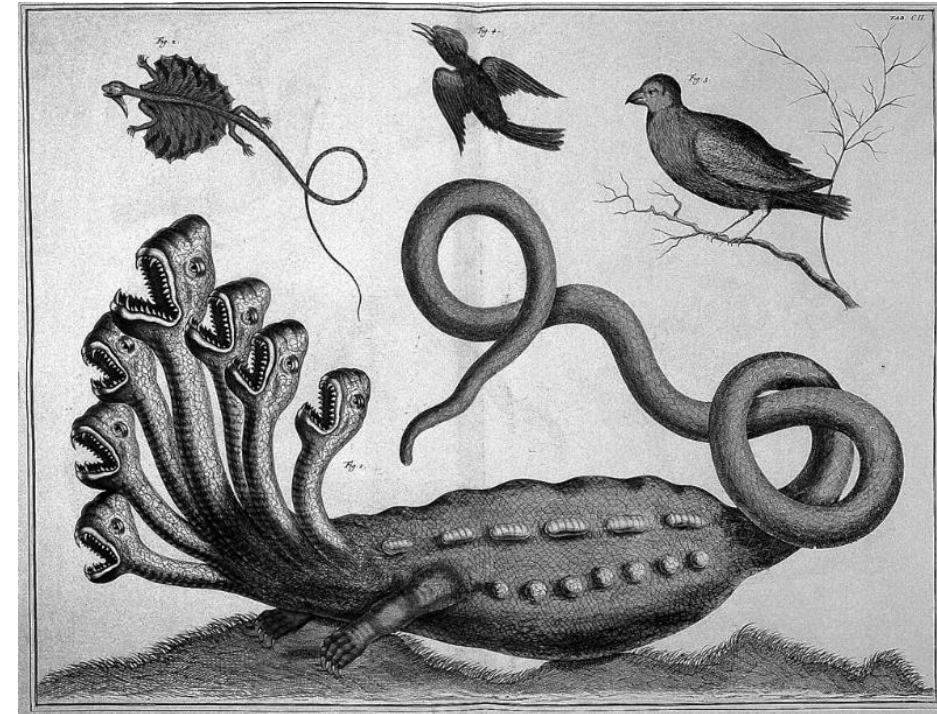


J. Meyer et al. 2017



# Tackling invasive species on Vlieland

- Species: *Aronia spec.*, *Pseudosasa / Sasa japonica*, *Contoneaster spec.*, *Vaccinium corymbosum* and *Crassula helmsii*)
- Risks: Outcompeting native species, spread, obstructing achievement of Natura 2000 goals
- Goal: Complete eradication
  - Completed for *Crassula helmsii*



A. Seba



# Tackling invasive species on Vlieland

- Species: *Aronia spec.*, *Pseudosasa / Sasa japonica*, *Contoneaster spec.*, *Vaccinium corymbosum*
- Measures:
  - Preparing a work plan in advance including a hygienic protocol
  - Excavation of all infestations by a mini excavator, manual digging to remove deeper rhizomes
  - Excavation within a radius of 2.5 meters from the plants to remove seeds and plant parts
  - Safe disposal of invasive plant material and soil
  - Monitoring to score effectiveness and aftercare if needed



# Tackling invasive species on Vlieland

- Species: *Aronia spec.*, *Pseudosasa / Sasa japonica*, *Contoneaster spec.*, *Vaccinium corymbosum*

	Size of infestation	Infested locations	Measure	Costs (€)
<b>Betreffende soort</b>				
<i>Aronia spec.</i>	5 m <sup>2</sup>	40	1.026,38	42,000
<i>Pseudosasa / Sasa japonica</i>	5 m <sup>2</sup>	6	1.046,38	6,250
<i>Contoneaster spec</i>	10 m <sup>2</sup>	35	1.226,38	43,000
<i>Vaccinium corymbosum</i>	5 m <sup>2</sup>	4	1.026,38	4,000



# Natura 2000-area Dunes of Terschelling

Wolverlei, M. Stevens



Flickr, H. Moorlag



- Habitat and bird directive
- High nature values
- Recent LIFE restoring project
- Many moist dune valleys
- > 4.5 Ha *C. helmsii* infested



J. Meyer et al. 2009



M. van de Loo





# Tackling invasive species on Terschelling

- Species: *Crassula helmsii*
- Risks: Outcompeting native species, spread, obstructing achievement of Natura 2000 goals
- Goal: Complete eradication
  - Ongoing since 2013, large scale eradication in 2018/2019



J. van der Loop



# Tackling invasive species on Terschelling

- Species: *Crassula helmsii*
- Measures:
  - Preparing a work plan in advance including a hygienic protocol
  - Excavation of all infestations by excavators, replenishment with clean sand
  - Excavation within a radius of 5 meters from the plants to remove seeds and plant parts
  - Safe disposal of invasive plant material and soil → storage in dry dunes
  - Monitoring to score effectiveness and lots of aftercare
- See: Van der Loop, J. M. M, van de Loo, M., de Vries, W., van Veenhuisen, L. S., van Kleef, H. H., & Leuven, R. S. E. W. (2022). Lessons learnt from large-scale eradication of Australian swamp stonecrop *Crassula helmsii* in a protected Natura 2000 site. *Management of Biological Invasions*, 13(1), 101



# Tackling invasive species on Terschelling



1. Draining waterbodies
2. Marking infested area
3. Setting work area
4. Excavating soils



# Tackling invasive species on Terschelling



- 5. Transportation
- 6. Inspecting the excavated area
- 7. Refilling the area with clean soil
- 8. Stimulating succession



**54,240 m<sup>3</sup> soil movement**

**4.5 Ha**

**4,000 m road plates**

**80,000 m<sup>3</sup> water drained**

**€1,55 million**

**2,750 m mitigation fence**

**1,100 m drainage**

**6 excavators**

# Tackling invasive species on Terschelling

- Successful elimination
- Strengths
  - Securing ecological values
  - Nature development back on track
  - Well developed strategy
  - The experience can be applied in other areas
- Weaknesses
  - Highly financial costs
  - Time consuming
  - Temporary high impact on ecosystem



J. van der Loop



# Tackling invasive species on Terschelling

- Next steps:
  - Eradication of new infestations
  - Application to other locations
  - But increasing resilience of vulnerable habitats as well
- Should we eradicate all?
  - Justification: when the infestation is isolated and natural values are in danger
  - When tackling entire infestation

From this



To this



# From traditional to innovative management



- LIFE Resilias prevents dominance of invasive alien species by strengthening the resilience of forest and nature

By: Preventing open niches and recovering from environmental changes

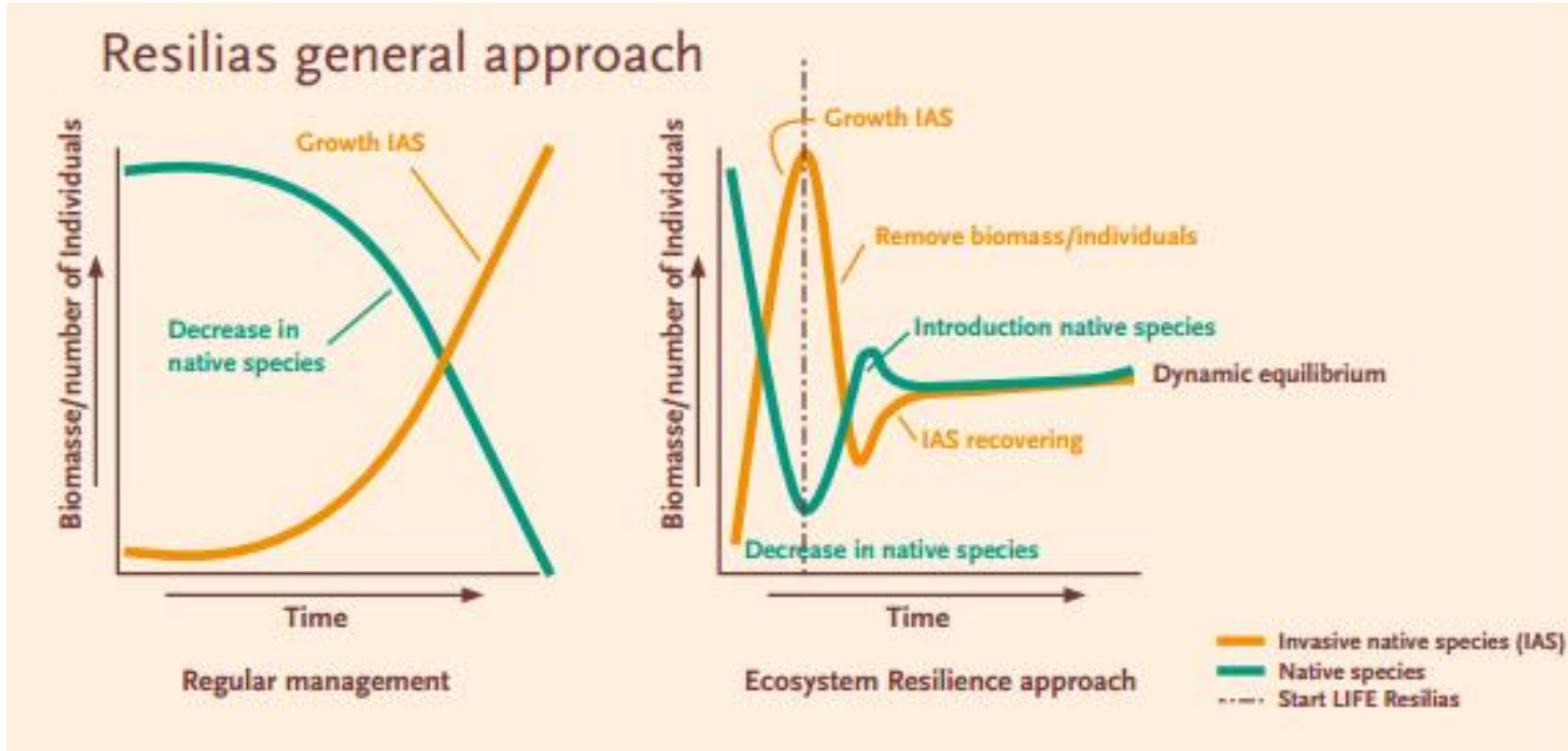


- Restoration of native species populations (competition, predators, herbivores, pathogens)
- Undo damage (eutrophication, acidification, vegetation structure, etc.)





# From traditional to innovative management



J. Van der Loop

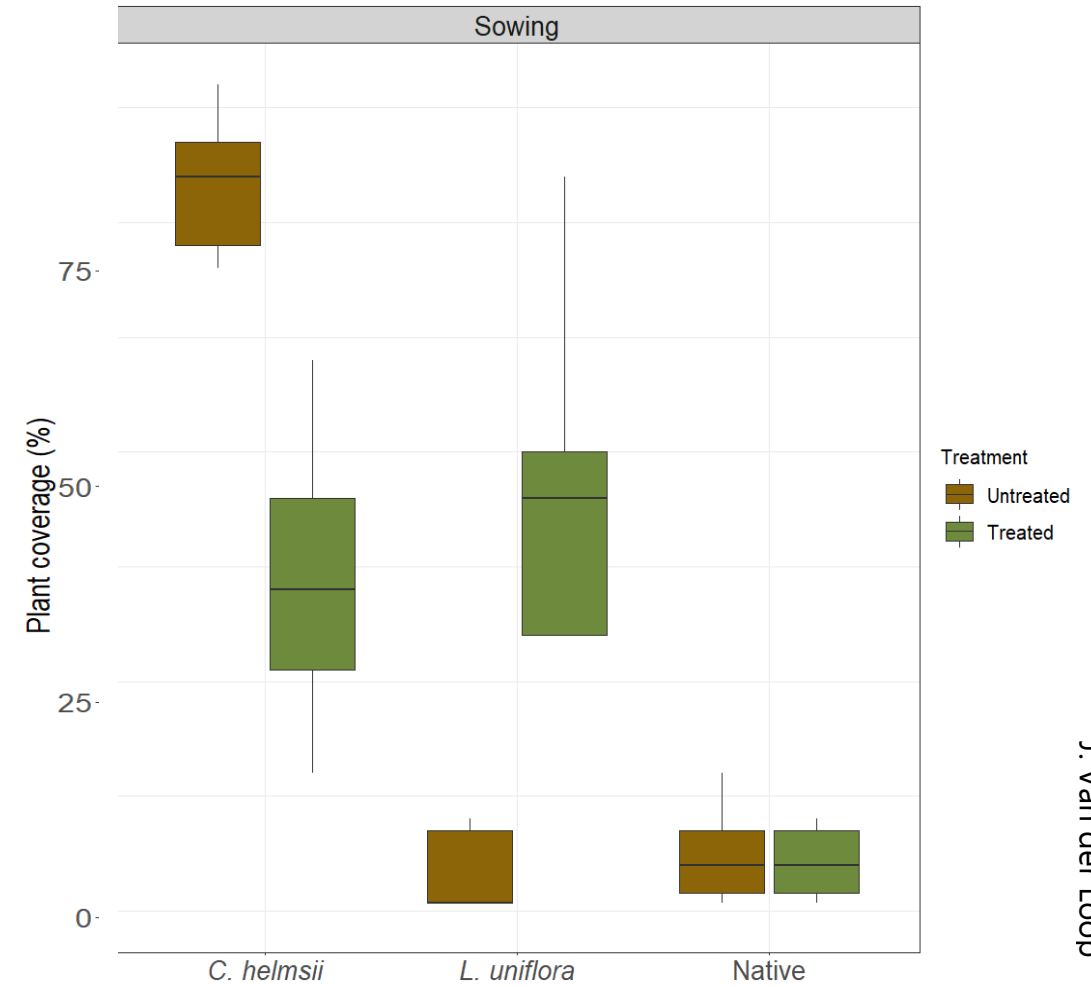
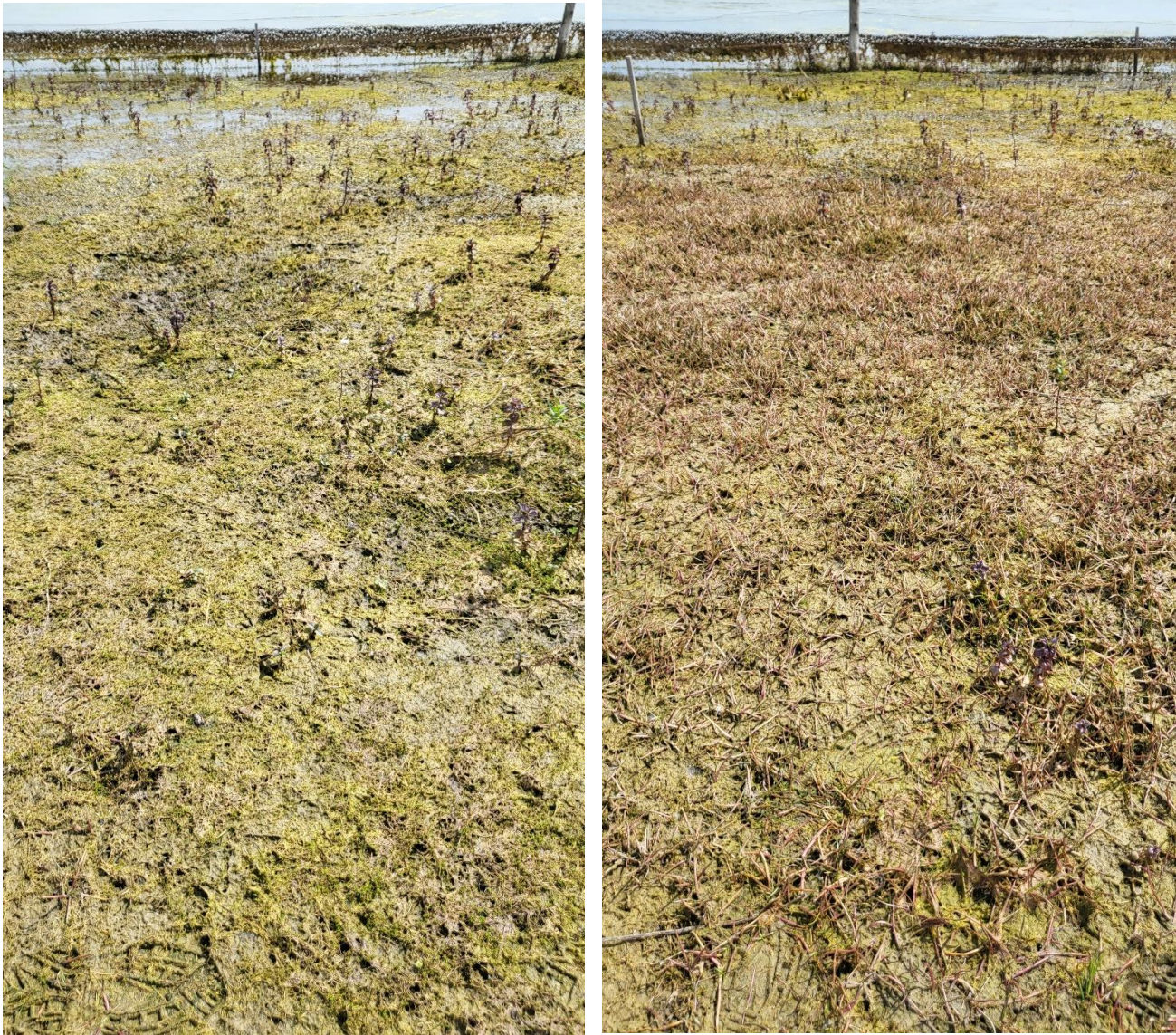


# From traditional to innovative management

- *Crassula helmsii*:
    - Three steps: 1. Breaking *C. helmsii*' dominance 2. Reduce eutrophication 3. Making the ecosystem resilient
    - By: Preventing open niches and recovering from environmental changes
1. i.e. excavation, foil, hot water
  2. Remove cattle, disconnect agricultural water, sod cutting
  3. introducing suitable vegetation from: seeds, plant parts, whole plants



# From traditional to innovative management



# From traditional to innovative management



- Proven to be suitable for Asian knotweeds, *prunus serotina* and *Lepomis gibbosus*
- Being tested for invasive crayfish, *Campylopus introflexus*, *robinia spec.* and many more
- See: [resilias.eu](https://www.resilias.eu)
- on 23 june the first LIFE Resilias Knowlegde day register for free via: <https://www.resilias.eu/nieuws/inschrijven-kennisdag/>



# Questions & Acknowledgements

Please meet me in person! Or via: [j.vanderloop@science.ru.nl](mailto:j.vanderloop@science.ru.nl)



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