



Photo: K. B. Westergaard

# The status of Arctic alien species, and what can be done

Research findings, preventive  
measures, and citizen science

Dr. Kristine Bakke Westergaard





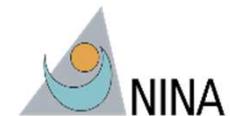
Photos: K.B. Westergaard



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## Dandelions in Barentsburg



# Alaskan/Nootka lupine in Iceland



**The war on the lupine plant  
continues around Iceland**

Photos: K.B. Westergaard

Red King / Kamchatka crab



Photo: Erling Svensen/Ocean Photo. CC BY 4.0

# What's the issue with alien species?

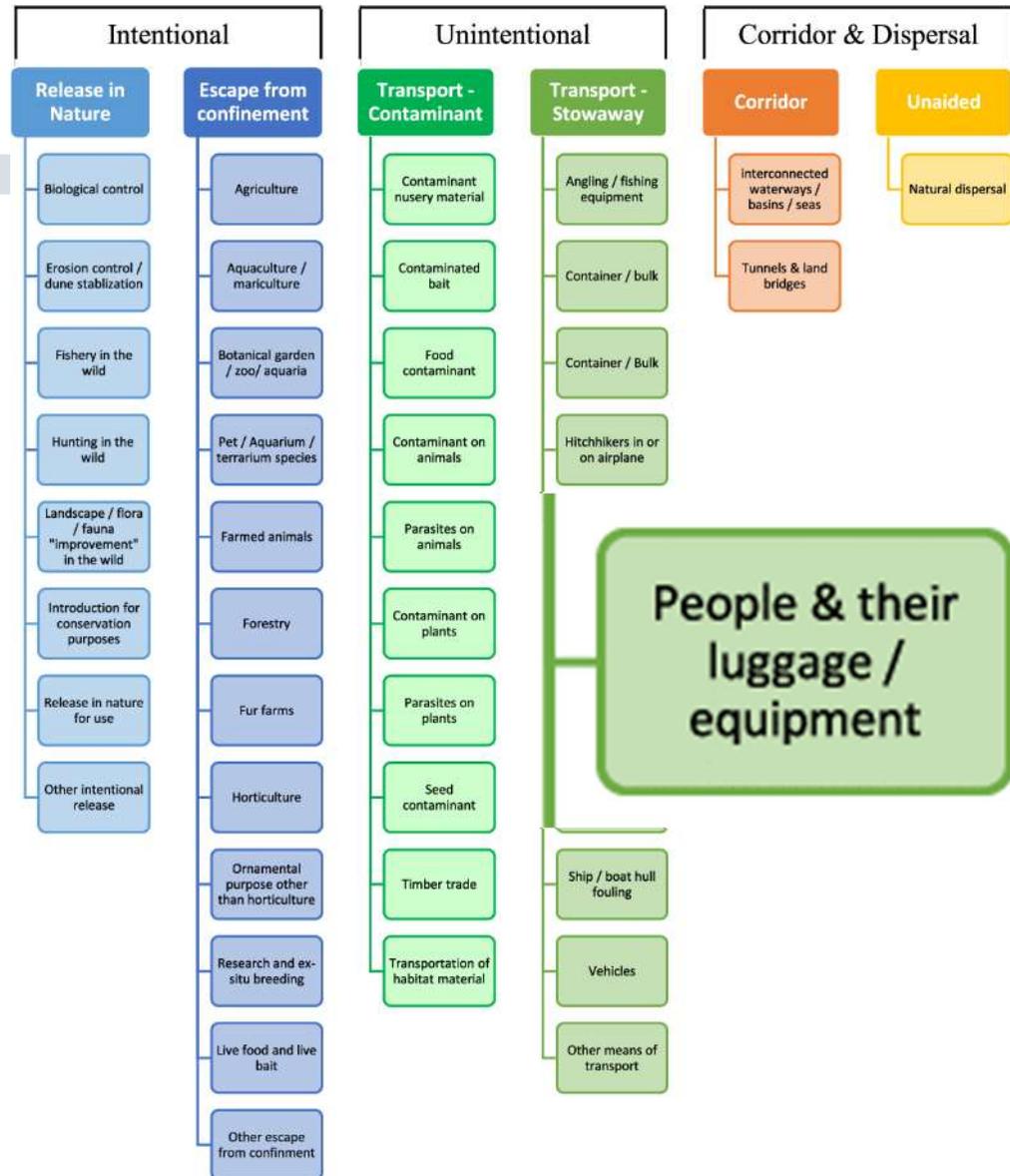
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International Union for Conservation of Nature (IUCN):

- An alien species is an organism that is introduced by humans, either intentionally or accidentally, into places outside its natural range; if this species becomes problematic, it is termed an invasive alien species.
- Negative impact on native biodiversity, ecosystem services or human well-being.
- Invasive alien species are a big cause of biodiversity loss and species extinctions
- Invasive alien species are compounded by climate change. Climate change facilitates the spread and establishment of many alien species and creates new opportunities for them to become invasive.

# Introduction pathways

- A unified system to categorise introduction pathways of alien species according to the Convention on Biological Diversity (CBD)



# Alien species in the Arctic



- Relatively low number of established alien species
  - Relatively limited human activity
  - Cold climate as an effective filter
  - Vulnerable environment, highly specialized species
- } Changing processes

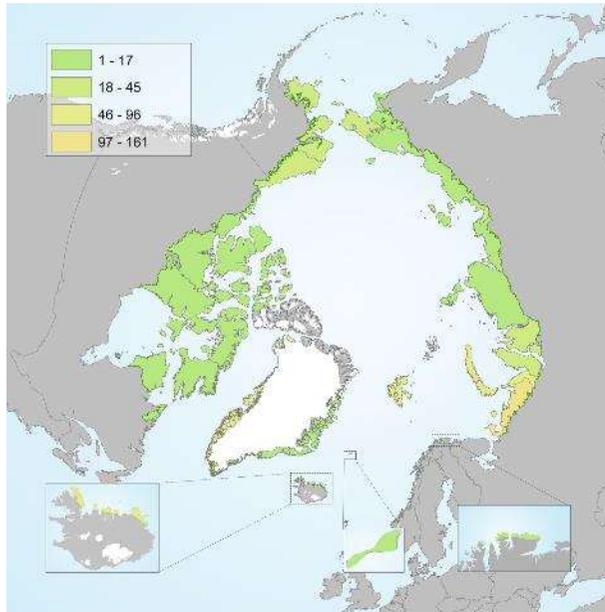
## "The aliens to watch": how the humble earthworm is altering the Arctic

After hitching a ride with humans, the species has colonised entire areas and may be making the soil too fertile, say scientists

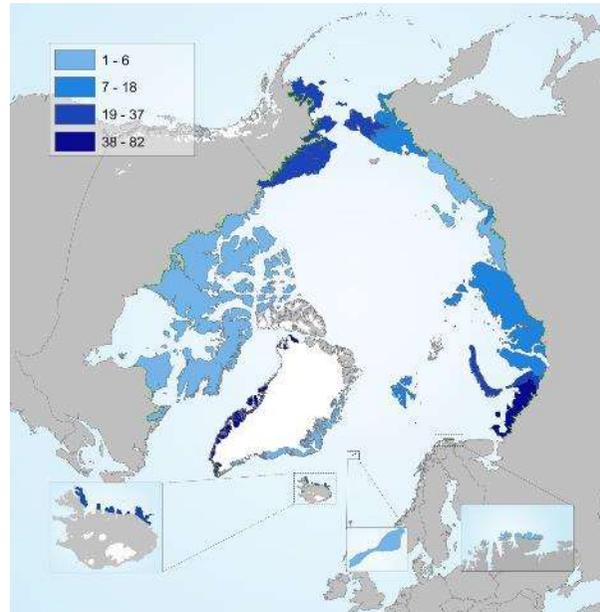


▲ Earthworms could have the same effect on Arctic plant productivity as a 3C rise in temperature, say researchers. Blackburne, Ben Stockell/PA

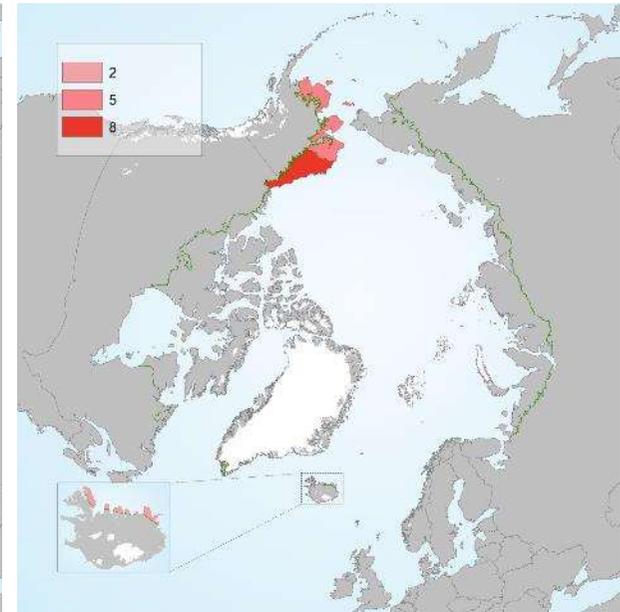
# Alien plant richness in Arctic regions



Total alien species (298)



Naturalized species



Invasive species (11)

More alien species are present  
but not yet recorded.



North Atlantic  
islands

# SVALBARD



Longyearbyen

**73 156** tourist arrivals 2018<sup>1</sup>

**2 500** permanent residents

**15% ↑** in foreign guests

**16% ↓** in domestic guests<sup>1</sup>

**54% increase** in  
cruise passengers<sup>1</sup>



onshore locations visited - **180**<sup>1</sup>

Ny-Ålesund

Pyramiden

Barentsburg



**36** alien vascular plant species<sup>2</sup>



**15** alien invertebrate species<sup>3</sup>



Aphids found on imported pot plants in  
**2018**<sup>4</sup>



2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018

1) Office of the Governor of Svalbard. 2) Elven & Westergaard, 2018. 3) Coulson, 2015. 4) Wiczorek & Chlund, 2019.

# Unintentional introductions of alien species

Svalbard Environmental Act regulates import of alien species

- ▶ reduced risk of intentional introductions



## Biosecurity measures

- ▶ Brush, Hoover, wash
- ▶ Disinfect



## Humans introduce viable seeds to the Arctic on footwear

- ▶ Sampled footwear of 259 travelers
- ▶ 1019 seeds, 26% germinated under Svalbard conditions

Ware et al. 2012. Biological Invasions.

# Alien vascular plants in Svalbard



We only found alien plant species in the settlements, not in areas associated with bird cliffs



Photo: K. B. Westergaard

# Alien vascular plants in Svalbard

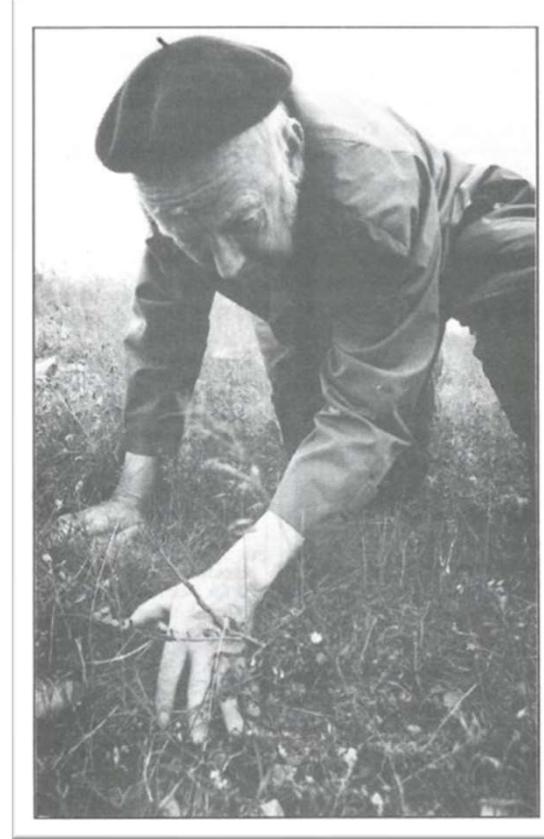
- Disturbance is the key to plant invasions in cold environments
- Grow around the settlements
- «Old sins» of animal husbandry and «beautification projects»



# A greener Longyearbyen



1982 -> grass seeding



1990s -> large scale seeding and dwarf birch planting

# The beautification project of Pyramiden



Photo: K. B. Westergaard

# A GREENING BARENTSBURG SUMMER 2019

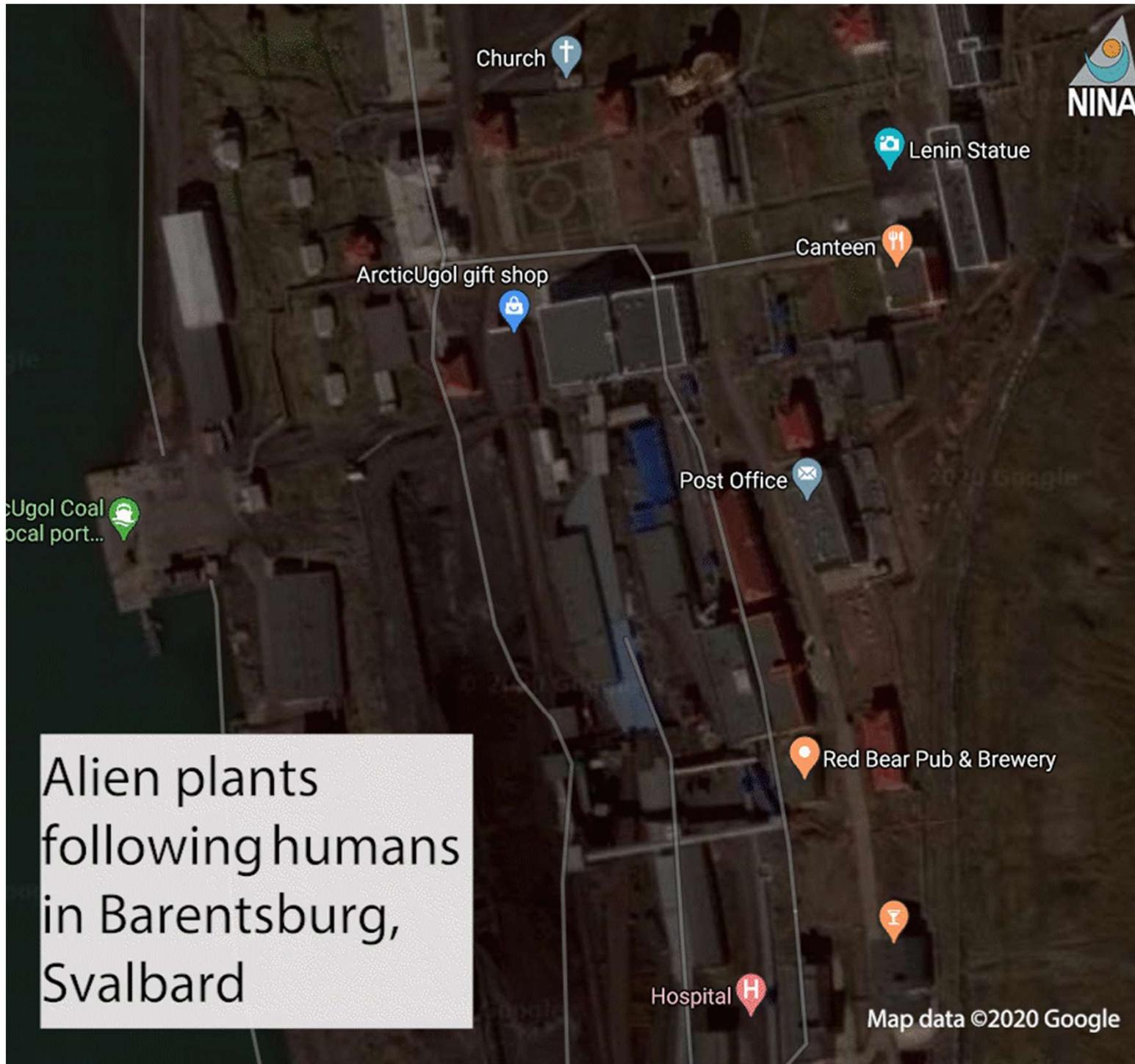
New dog yard

Farm waste site

Old farm buildings



Photos: K.B. Westergaard



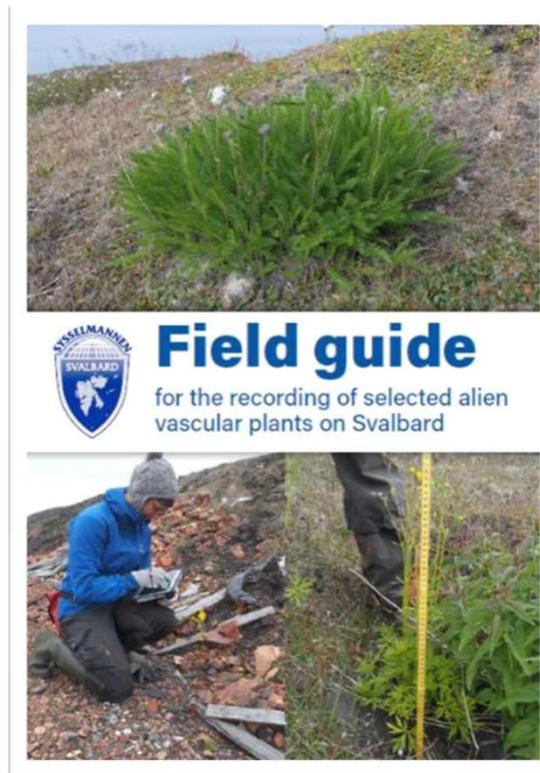
Alien plants following humans in Barentsburg, Svalbard

# Alien species list & Action plan

- Knowledgebased management
  - ▶ Ecological risk assessment of each alien species
  - ▶ Governor of Svalbard; Action plan against harmful alien species in Svalbard



# Encourage citizen scientists!



LOW RISK

## Winter cress *(Barbarea vulgaris)*

**Species recognition**

- **Height:** The stalks can grow to 30 - 60 cm high.
- **Flowers:** Winter cress has yellow flowers situated in a wide top and has a sweet scent. It flowers early from spring until August.
- **Leaves:** The species forms rosettes comprising dark green, glossy pinnated leaves with a large, oval lobe at the end. The base of the leaf wraps around the stalk.
- **Growth form:** Winter cress on Svalbard are perennial, erect individual plants.

**Description:** Winter cress is a perennial herb in the crucifer family. Winter cress is often spread through seeds and a single plant can produce 1,000 - 10,000 seeds each year. In addition, it can spread through parts of the root system where there are buds for further growth on the main root and the adventitious roots. The roots extend deep into the soil.

**Habitat:** Winter cress is found in coastal areas and the interior of the island. It is often found in wet areas and may prevent scurvy.

**Assessment of risk and there is no known impact on native species.**

**May be confused with:** winter cress and wild radish.



Winter cress (*Barbarea vulgaris*) in flower in Svalbard.  
Photo: Kristine Bakke Westergaard

# Early detection – rapid response

“An ounce of prevention is worth a pound of cure”

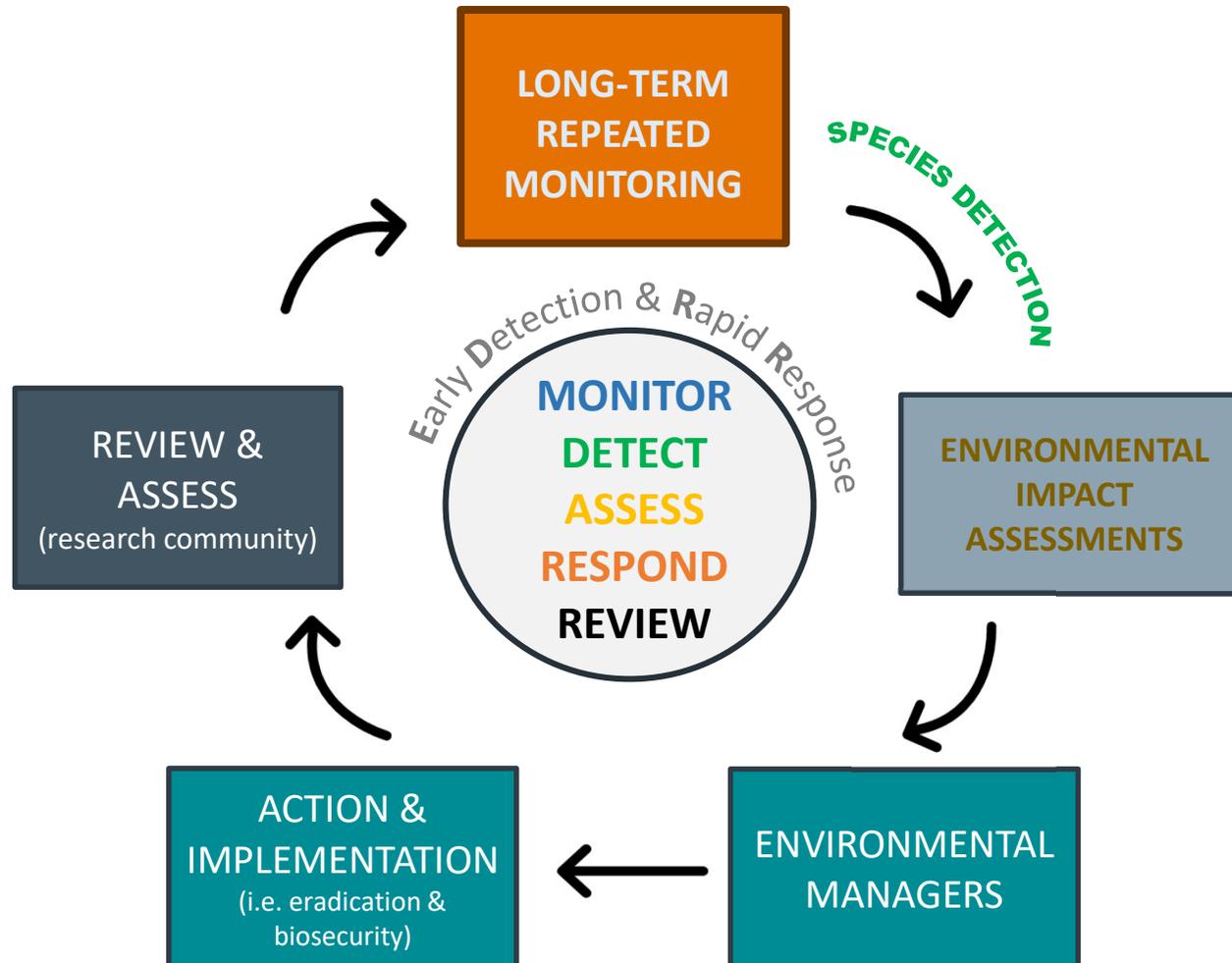




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Purple saxifrage on Traill Island, NE Greenland National park

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