

IAS and conservation status in coastal dunes: perspectives from the Belgian Natura 2000 monitoring

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N2K Monitoring strategy Flanders

- ▶ Article 17 reporting every 6 years on the conservation status of habitats: at least 75% of the habitat area in Favourable CS
 - area, range: habitat mapping
 - habitat quality: monitoring scheme with permanent plots
 - pressures and threats, future prospects
- ▶ Random stratified sampling on the habitatmap of Flanders
Sample size: 100/habitatsubtype: confidence 10%, power 80%
dune habitats: 500 relevés every 6year
- ▶ Rare habitats (<10ha) are monitored entirely
- ▶ Dunes: a proportion of the sampling sites are inherited from PINK monitoring

2110 Embryonic shifting dunes

- Occurs on sand ripples and floodmarks on the beach and most seaward fringes at the foot of the dunes
- Represent the first stages of dune formation
- annual plants like *Cakile maritima*, *Salsola kali* subsp. *kali*, *Beta vulgaris* subsp. *maritima*, *Atriplex littoralis*, and perennial species such *Honkenya peploides*, *Leymus arenarius*, *Elymus farctus*
- Area: 27ha



2120 Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes)

- Mobile dunes forming the seaward dune belt
- vegetation belonging to the *Ammophilion arenariae*: *Ammophila arenaria*, *Festuca arenaria*, *Cerastium diffusum*, *Eryngium maritimum*, *Euphorbia paralias*, *Calystegia soldanella*, ...
- Area: about 470-480 ha and declining because of fixation



2130 Fixed coastal dunes with herbaceous vegetation (grey dunes)

- Fixed dunes, stabilised and colonised by more or less closed perennial grasslands + lichen and bryophyte communities (moss dunes)
- Comprises a broad set of vegetation types differing in moisture and base content, degree of exposition, and management type
- 720-790ha



2150 Atlantic decalcified fixed dunes (Calluno-Ulicetae)



- Decalcified fixed dunes with a dry heathland vegetation (*Calluna vulgaris*, *Danthonia decumbens*, *Carex trinervis*, *Rumex acetosella*, *Nardus stricta*, *Potentilla erecta*, *Carex arenaria*, *Festuca ovina*, ...)
- Due to (historical) nutrient addition current distribution limited to one location of 0.1ha

2160 Dunes with Hippophae rhamnoides

- Sea-buckthorn scrubland formations in both dry and humid dune depressions.
- Pioneer stages of sea-buckthorn colonization in open fixed dunes to more or less closed species rich scrubland: *Crataegus monogyna*, *Ligustrum vulgare*, *Rhamnus cathartica*, *Rosa* spp., *Prunus spinosa*, ...
- 660 – 675 ha



2170 Dunes with *Salix repens* ssp. *argentea* (*Salicion arenariae*)

- Dwarf scrub communities (*Salicion arenariae*), colonising wet and moist dune slacks.
- forms mosaics with other dune slack vegetation containing *Salix arenaria*, as well as mosaics with dune grasslands.
- This habitat is easily invaded by *Hippophae rhamnoides* and *Ligustrum vulgare*.
- 77 ha

2180 Wooded dunes of the Atlantic, Continental and Boreal region

- Natural or long-established semi-natural forests with a well developed woodland structure and an assemblage of characteristic woodland species.
- Pioneer stages are open forests with *Betula* spp. and *Crataegus monogyna*, mixed forests with *Fraxinus excelsior*, *Quercus robur*, *Ulmus minor* and *Acer pseudoplatanus* or, in wet dune slacks, pioneer forests with *Salix alba*
- 240-250 ha



2190 Humid dune slacks

- Occur in humid depressions of dunal systems. Humid dune-slacks are very species rich and specialised habitats strongly depending on ground water tables.
- Encompasses all wet to moist dune-slack formations such as pools with *Chara* spp., freshwater aquatic communities, dune-slack pioneer swards, calcareous fens, humid grasslands and rushbeds, reedbeds and tall-sedge communities
- Area 56-62 ha



What do we need to measure?

Information needs

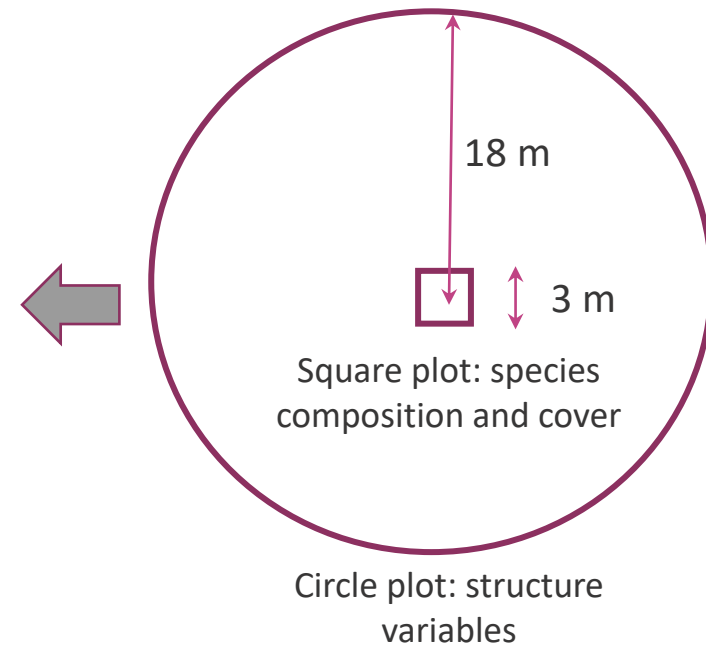
% of
habitattype X
in favourable
condition ?

e.g. IAS,
trembling,
eutrofication,
...

*Indicators for
habitat quality*



*Measurement
variables*



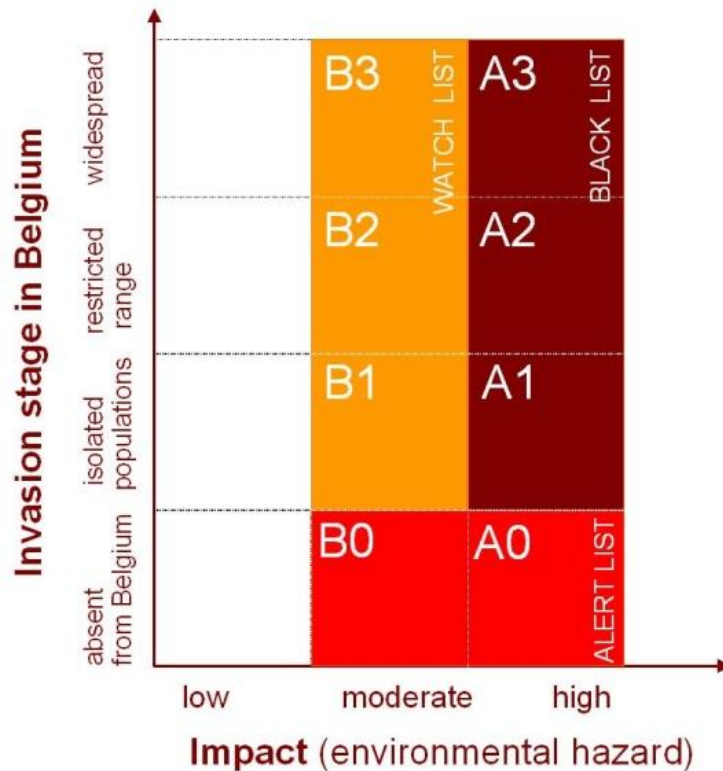
Indicators for habitat quality

► E.g. evaluation matrix for 2160 *Hippophae rhamnoides* dunes

Vegetation		
Indicator	Description	Threshold for favourable CS
Key species	<i>Hippophae rhamnoides</i> , <i>Lithospermum officinale</i> , <i>Stellaria pallida</i> , <i>Fallopia convolvulus</i> , <i>Fallopia dumetorum</i> , <i>Ribes rubrum</i> , <i>Ligustrum vulgare</i> , <i>Rosa canina</i> s.l., <i>Rosa rubiginosa</i> , <i>Rosa tomentosa</i> , <i>Rosa pseudoscabriuscula</i> , <i>Rosa sherardii</i> , <i>Rhamnus cathartica</i> , <i>Crataegus monogyna</i>	>= 5 species at least frequent
Structure		
Horizontal structure	Open patches, pioneer stage, developmental stage, climax stage and degeneration	all developmental stages of <i>H. rhamnoides</i> are present
Disturbances		
Tree encroachment	Cover of All tree species, regardless of their age	<= 10%
Invasive alien species	<i>Mahonia aquifolium</i> , <i>Prunus serotina</i> , <i>Cotoneaster</i> sp., <i>Ailanthus altissima</i> , ...	At most occasional
Other alien species	<i>Symphoricarpos albus</i> , <i>Ribes alpinum</i> , <i>Ribes odoratum</i> , <i>Ribes sanguineum</i> , <i>Ribes spicatum</i> , <i>Lycium barbarum</i> , <i>Tamarix</i> spp., <i>Fallopia auberti</i> , <i>Eleaagnus</i> sp., ...	<= 10%
Spatial configuration		Dune habitatclusters of at least 50 ha containing at least 5 ha of 2160 habitat

IAS in CS-criteria: general rules of thumb

- ▶ IAS species list = A-categories from Harmonia db (Belgian Forum on IS, ias.biodiversity.be)
- ▶ 30 vascular plants, 0 bryophytes
- ▶ Thresholds for favourable CS = ABSENT!



IAS & OAS criteria for dune habitats

Habitat	IAS	Treshold	OAS	Treshold
2110	none	/	none	/
2120	/		Corispermum leptopterum, Senecio inaequidens, Conyza canadensis	<= 10% cover
2130_hd	Rosa rugosa,...	absent	Conyza canadensis, Gaillardia x grandiflora, Iberis umbellata, Oenothera sp.,	<= 10% cover
2130_had, 2150	Rosa rugosa,...	absent		
	Campylopus introflexus,...	<= 10% cover		
2160, 2170	Mahonia aquifolium, Prunus serotina, Cotoneaster sp., Ailanthus altissima, ...	At most occasional	Symphoricarpos albus, Ribes alpinum, Ribes odoratum, Ribes sanguineum, Ribes spicatum, Lycium barbarum, Tamarix spp., Fallopia auberti, Eleaegnus sp., ...	<= 10% cover
2180	Alnus incana, Populus trichocarpa, Populus balsamifera, Ailanthus altissima, Prunus serotina, Mahonia aquifolium, ...	absent	Populus x canadensis, Populus alba, Populus canescens, Claytonia perfoliata, Pentaglottis sempervirens, ...	<= 30%
2190	Crassula helmsii, ...	absent		

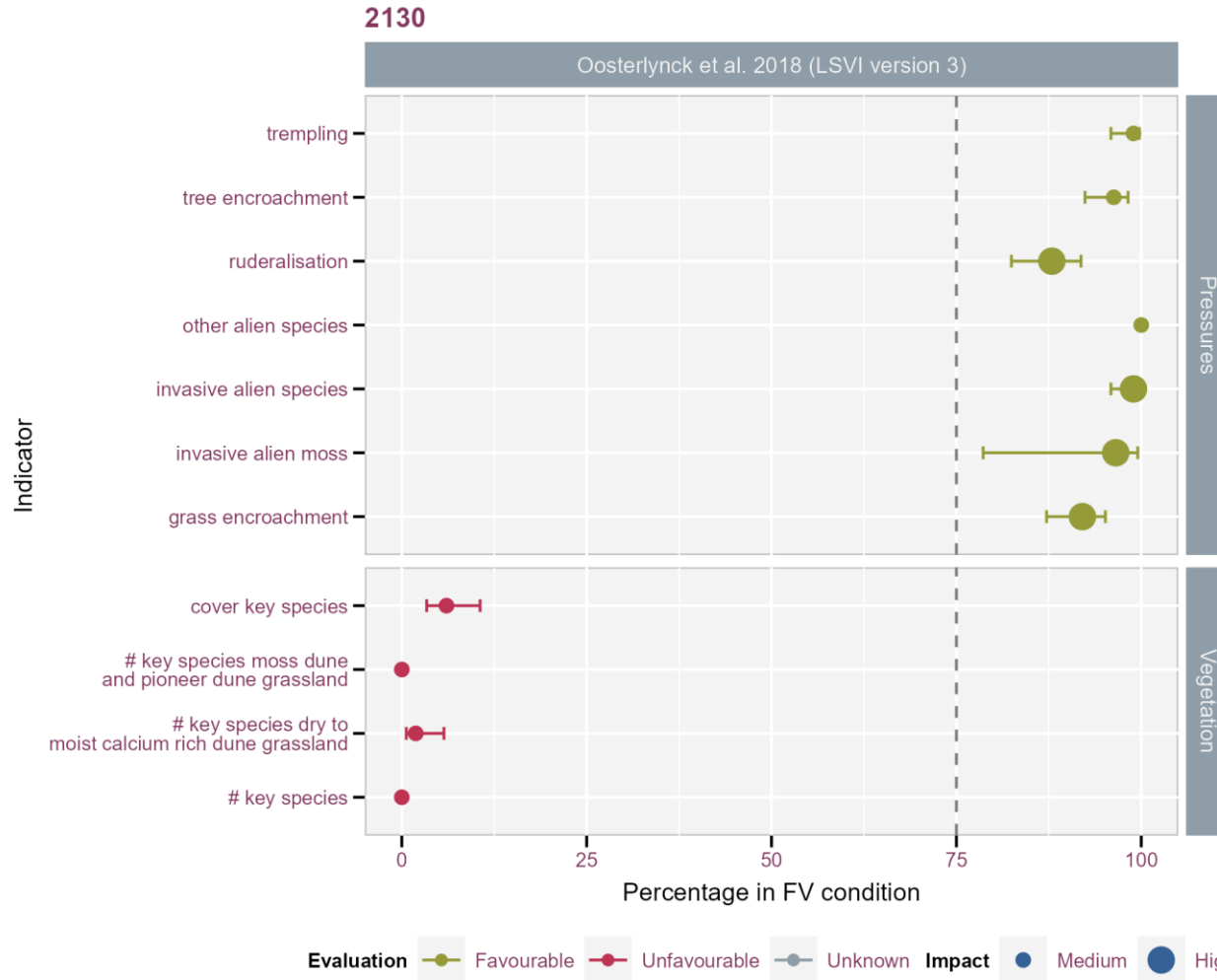
Reporting cycle 2019

► Relevé data from PINK (Permanent Inventory Nature Reserves along the Coast, Provoost et al.) and N2000 monitoring.

Type	Name	Area (ha)	PINK Relevés	N2K Relevés	Remarks
2110	Embryonic shifting dunes		0	0	Entire surface surveyed
2120	Shifting Dunes		0	69	No data
2130	Grey dunes		420	83	
2150	Calluno-Ulicetum		0	0	Entire surface survey
2160	Dunes with Hippophae rhamnoides		42	54	
2170	Dunes with Salix repens		42	31	
2180	Wooded dunes		0	27	
2190	Humid dune slacks		154	50	
Total			658	314	

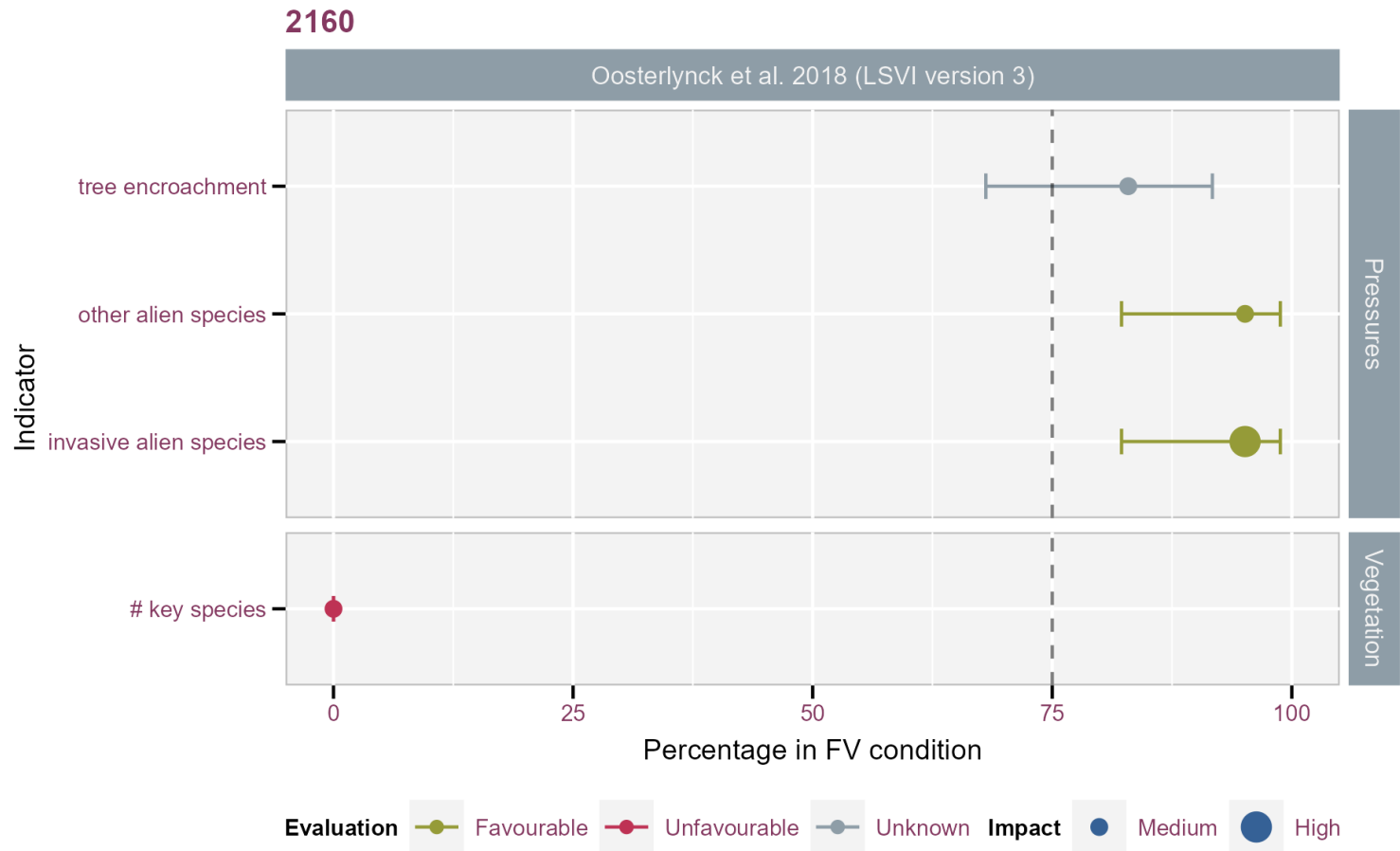
Results from the 2019 reporting cycle:

Grey dunes



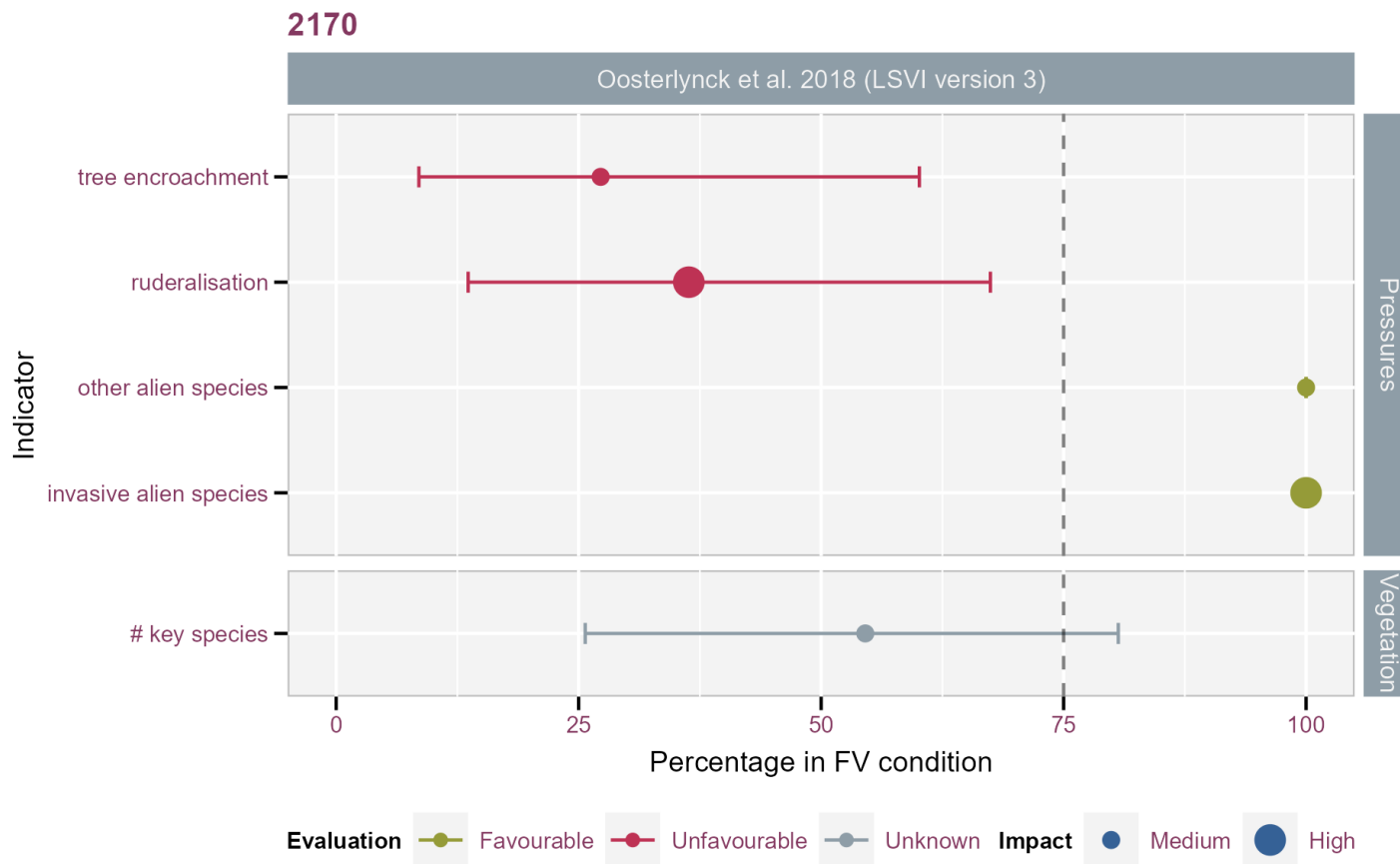
Results from the 2019 reporting cycle:

Dunes with *Hippophae rhamnoides*



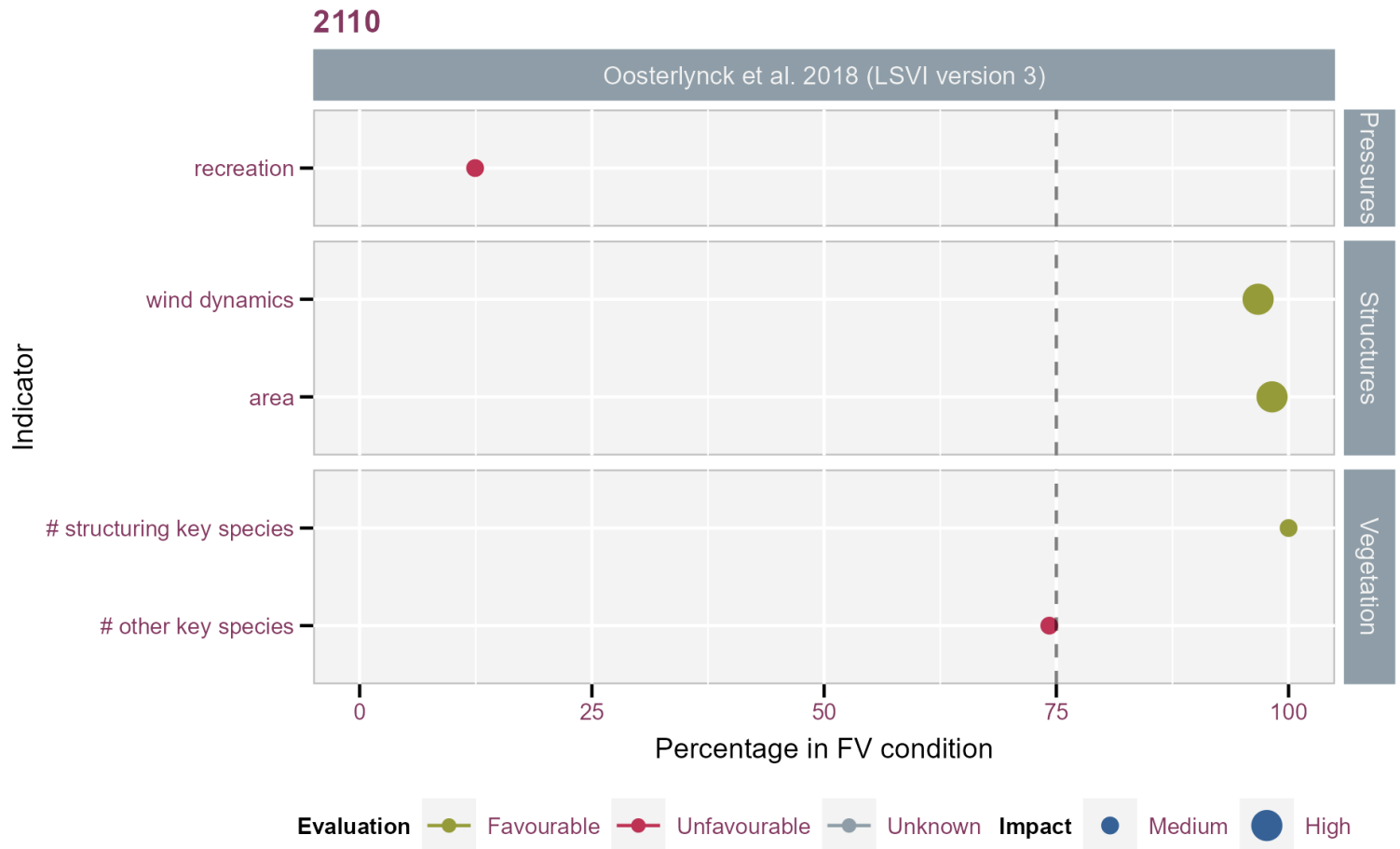
Results from the 2019 reporting cycle:

dunes with *Salix repens*



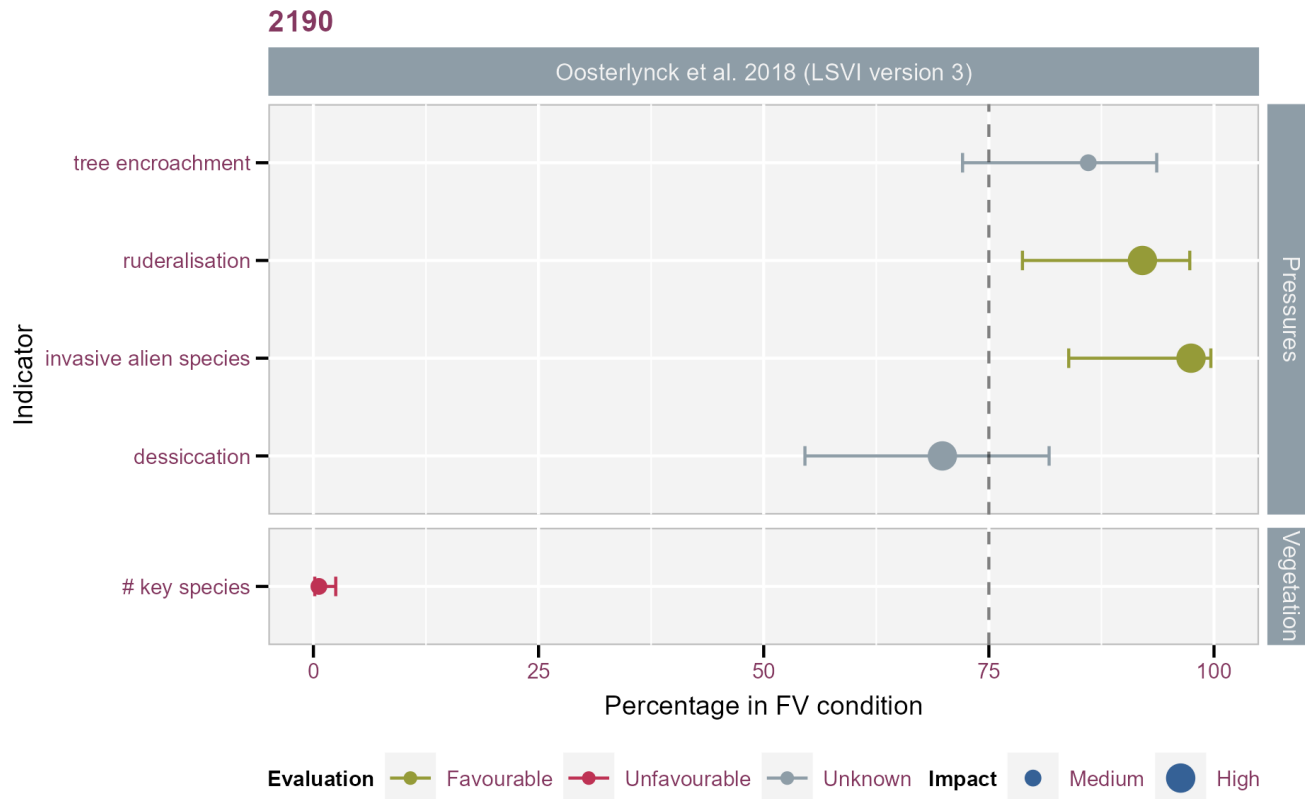
Results from the 2019 reporting cycle:

Embryonic shifting dunes



Results from the 2019 reporting cycle:

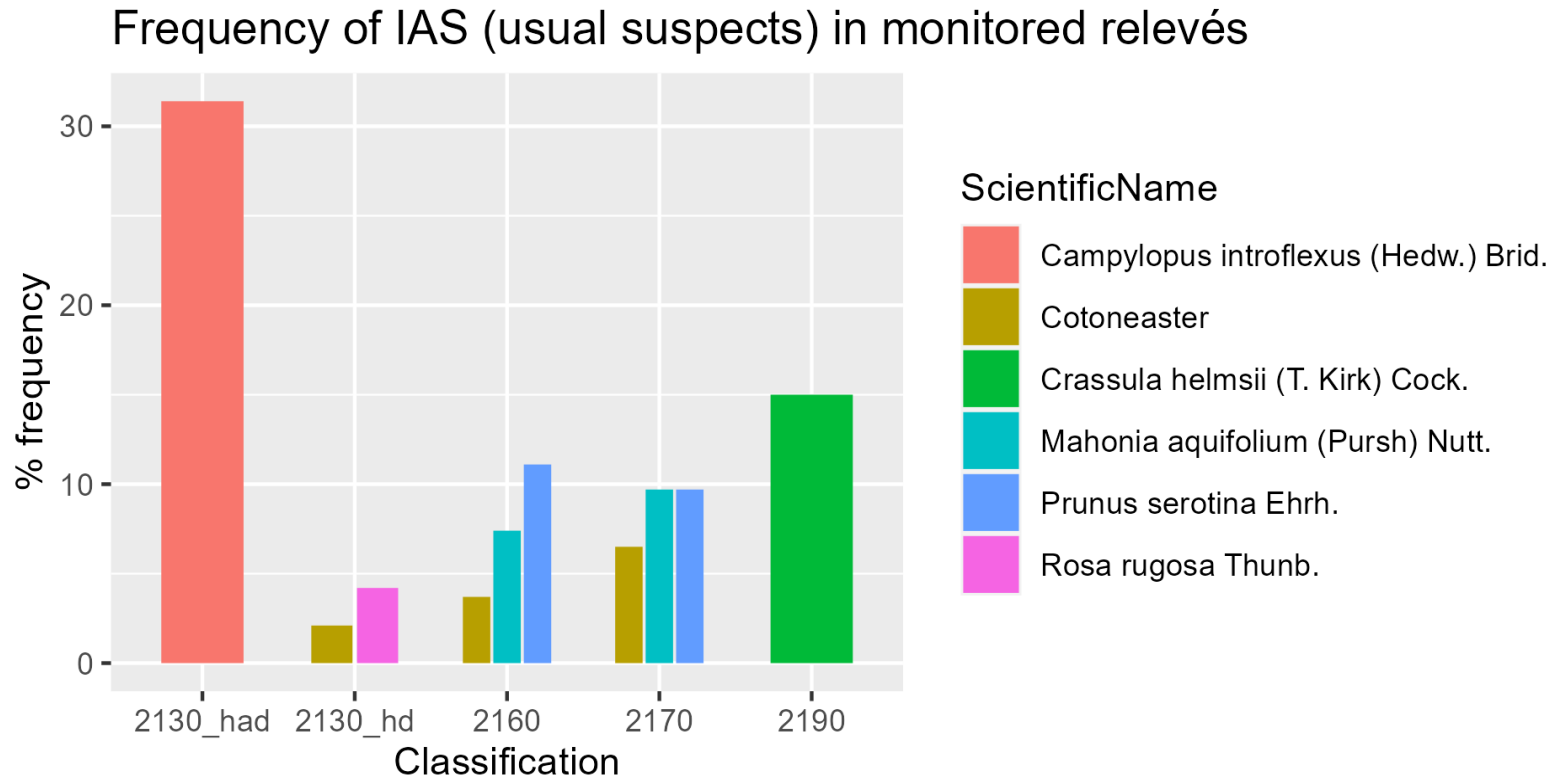
Humid dune slacks



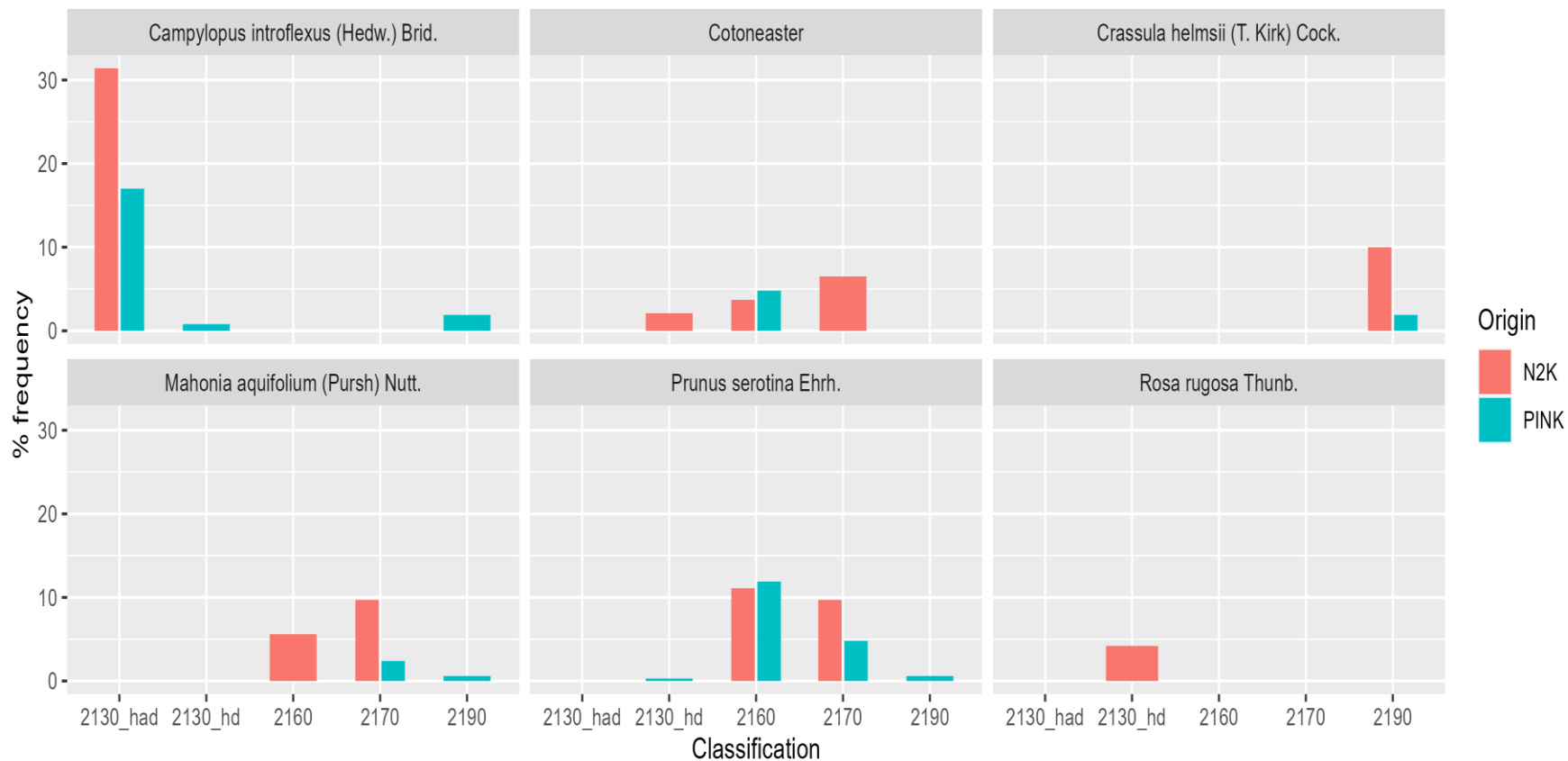
Some considerations on the role of IAS in the Art 17 reporting in Belgium

- ▶ The rather positive evaluation is not in line with the current pressure/problem associated with IAS in dune habitats.
Example: 10-20% of the plots are colonised by IAS in the case of 2190
- ▶ Mapping effect: IAS dominated vegetation is excluded from habitat definition, and therefore their impact may currently be underestimated
- ▶ IAS lists at least need to be in line with EU regulation lists
- ▶ ...

Exploration of raw relevé data N2K

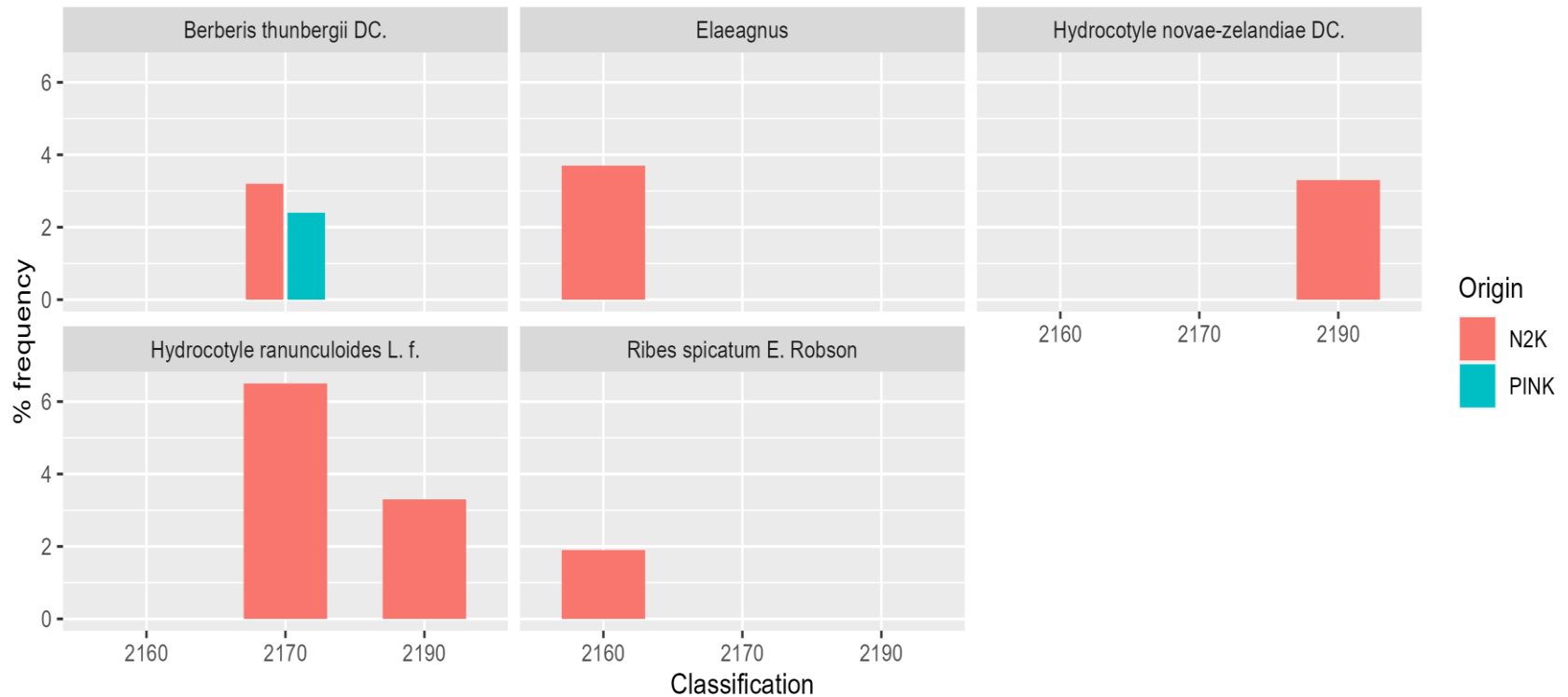


frequency of IAS “usual suspect” in relevés from PINK(1997-2017) and N2K (2018-2021)



frequency of IAS “new suspects” in relevés from PINK(1997-2017) and N2K (2018-2021)

Frequency of IAS (new-suspects) in monitored relevés in time (PINK 1997-2017 vs N2K 2018-2021)



frequency of non-IAS in relevés from PINK(1997-2017) and N2K (2018-2021)

Frequency of non-IAS in monitored relevés in time (PINK 1997-2017 vs N2K 2018-2021)

