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11th of June, 2024
Session 2 – Perspectives from end users

Early Warning System for protected grasslands

AGENCY FOR
NATURE & FORESTS



Vlaanderen
is natuur

Content

1. Protection of and enforcement on grasslands in Flanders
2. Developing an Early Warning System
3. Prosecution of illegal grassland modifications



Protection of and enforcement on grasslands in Flanders

Protected HPG

- "Historical Permanent Grasslands"
- **Long-term Use** often in use for hundreds of years, meaning they have experienced little to no disturbance from modern agricultural techniques.
- **Vegetation** rich vegetation with a great diversity of herbs and grass species.
- **Environment** often located in environments with ditches, trenches, ponds, microrelief, springs, or seepage areas (water management, soil erosion)

Protected HPG

- **Ecological Value** important habitat for various plant and animal species, including insects, small mammals, and birds.
- **Cultural and Landscape Value** cultural-historical value, contribution to the characteristic landscape of a region.
- **Protected** by Flemish Nature Decree
- **Enforcement priority**

Protected HPG



Destroyed grassland,
manure runoff to
protected areas

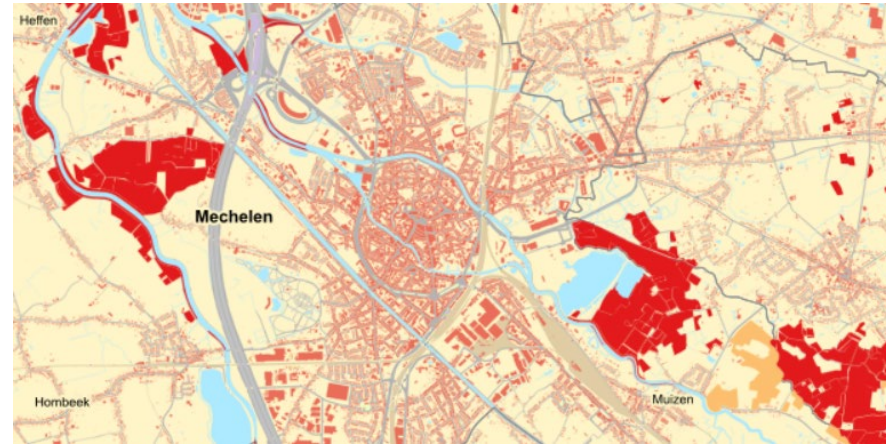
Protected HPG

Traditional enforcement

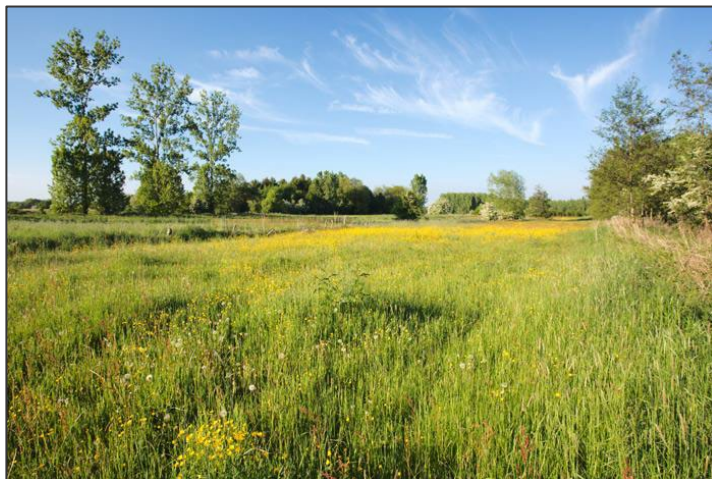
- complaints and active supervision
- comparing data



registration of crops by farmers/map of protected grasslands



Indicative
map for HPG



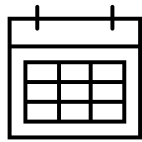
Protected HPG

Difficulties

- Dependency on chance discovery
- Targeted investigation impossible (too many data/small number of enforcers, data too late, incomplete and unreliable)



22500 farms



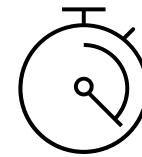
Data too late



Correct
registration?



Change in
microrelief not
registered



Time consuming



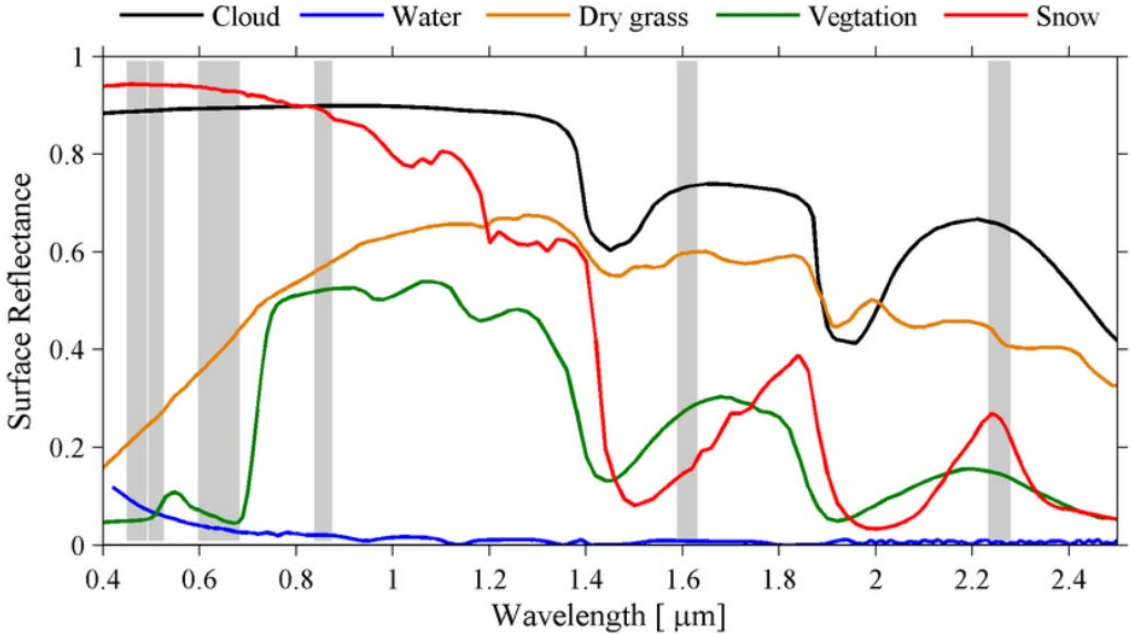
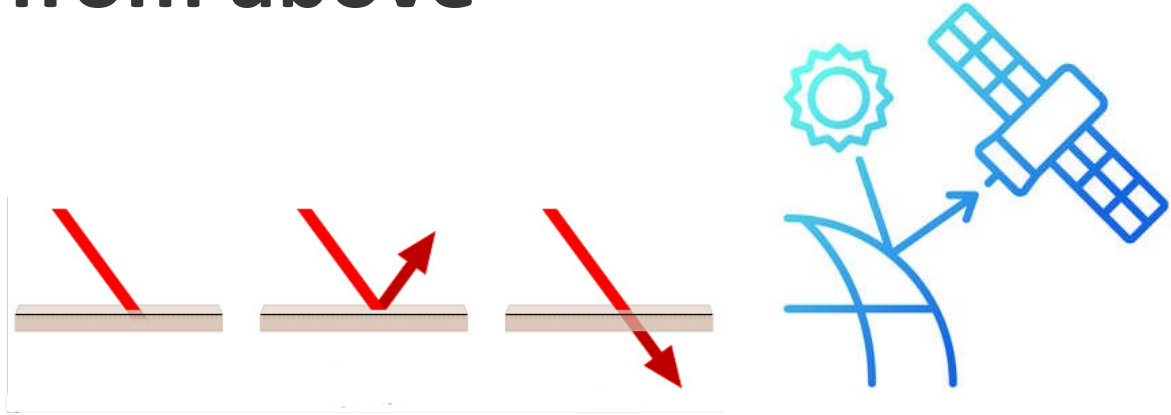
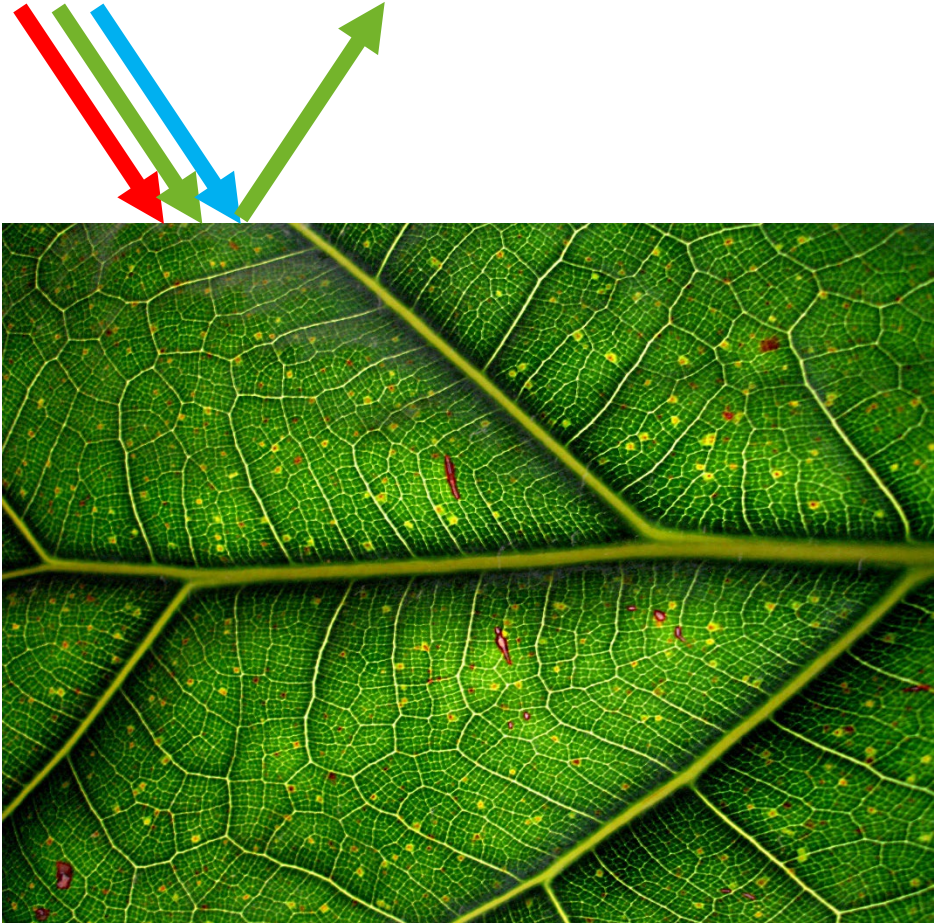
 vito



Shoot.be

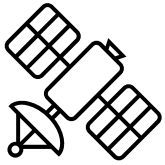
Developing an Early Warning System

Remote sensing: detection from above



Early Warning System: workflow

Imagery

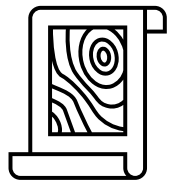


Sentinel 1 & 2

Spatial resolution: 10m

Temporal resolution:
daily (combined)

→ Time series



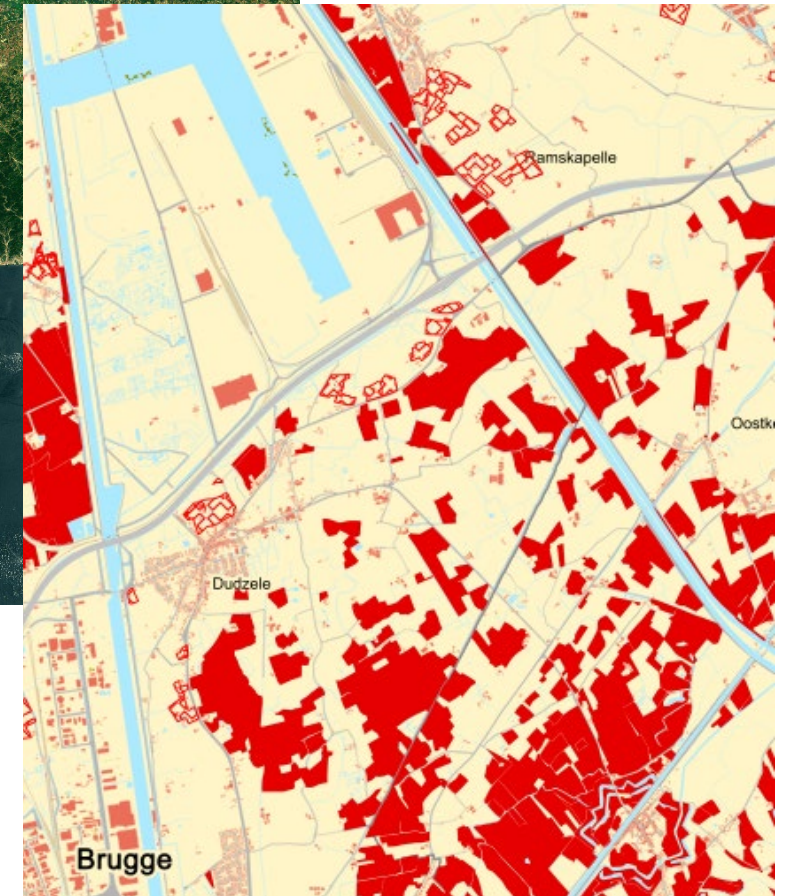
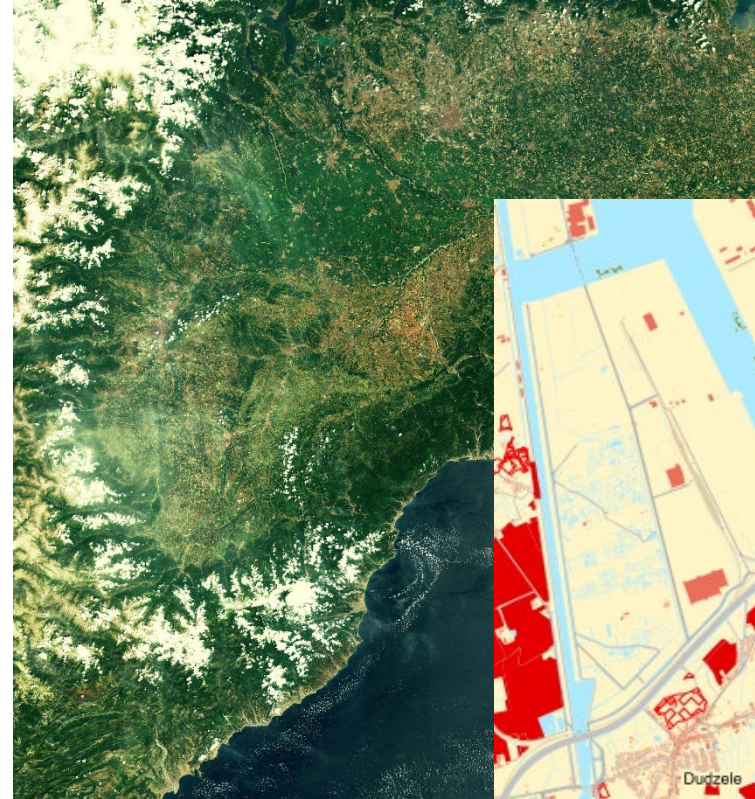
Informative map

for protected grasslands

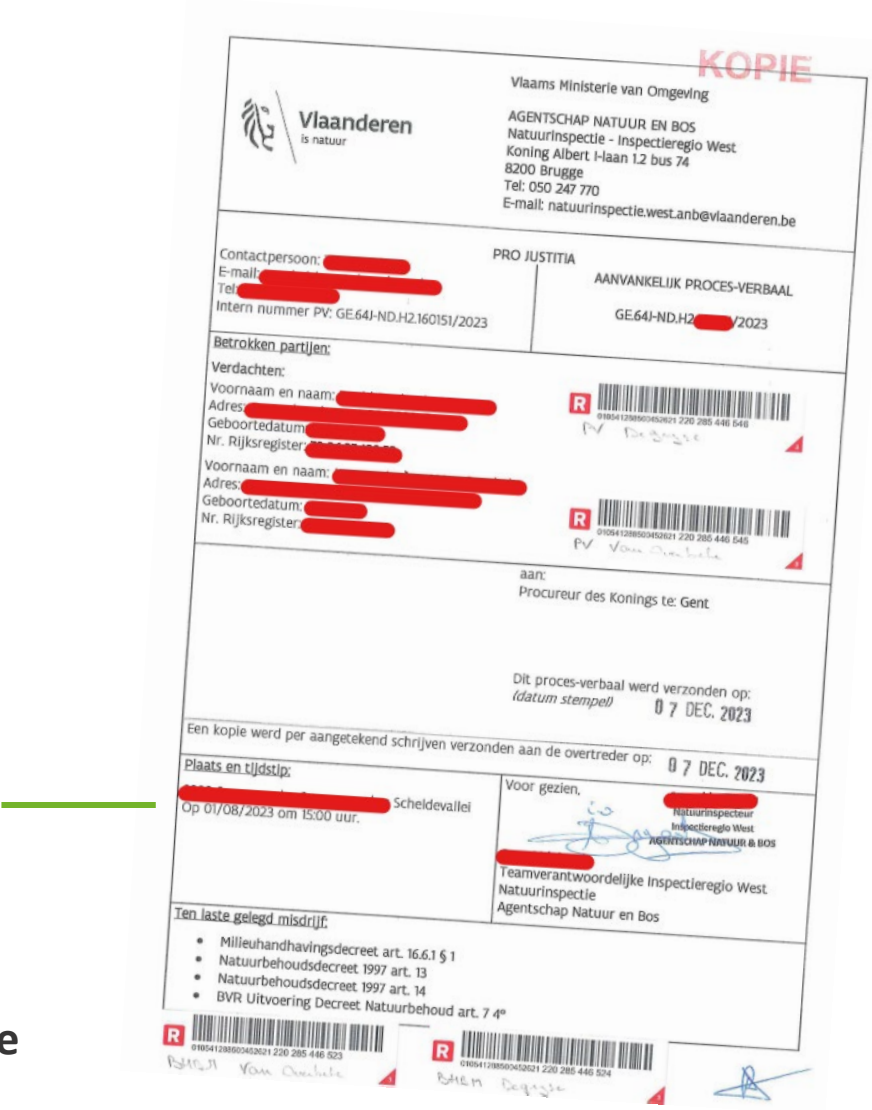
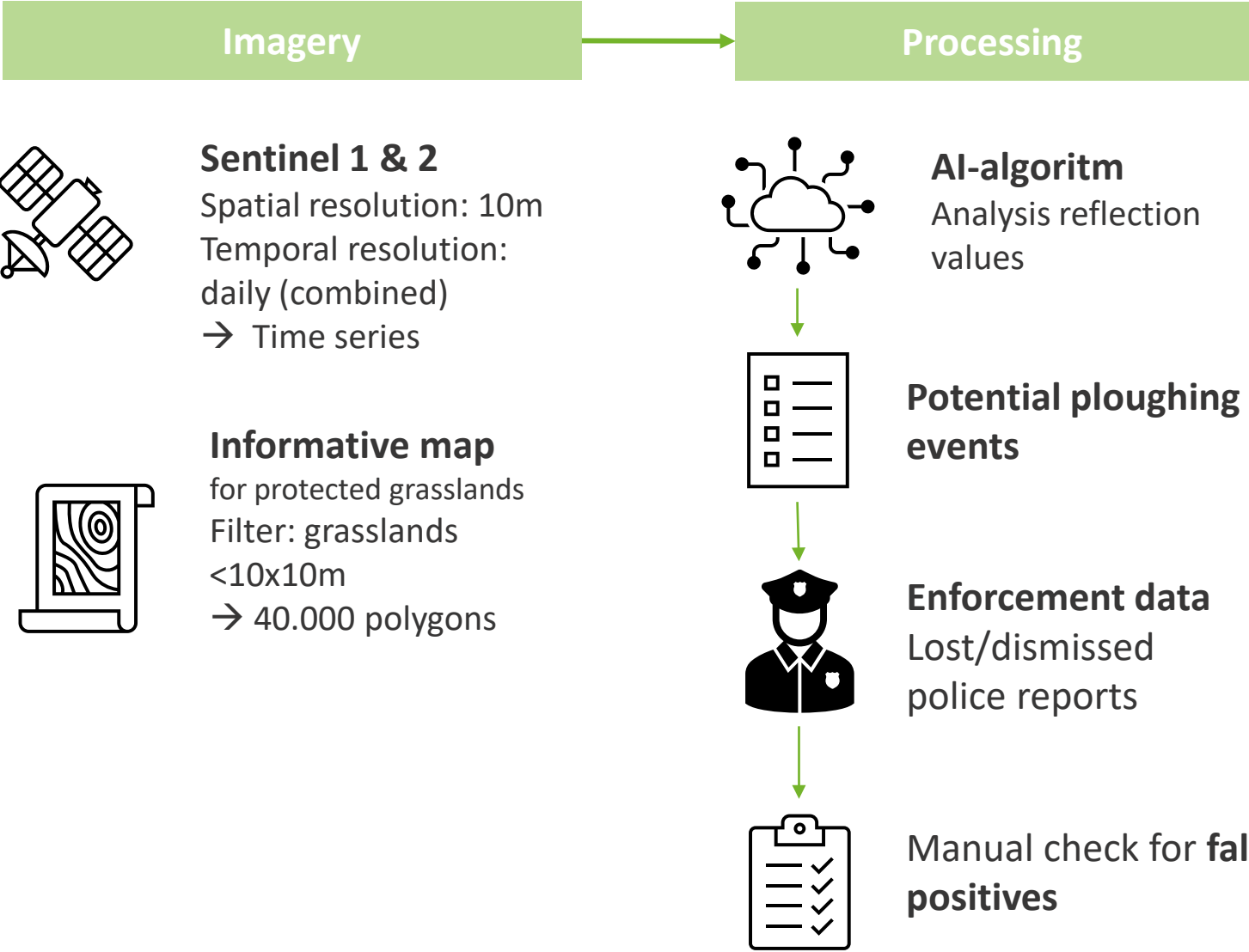
Filter: grasslands

<10x10m

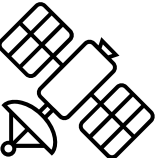
→ 40.000 polygons



Early Warning System: workflow



Early Warning System: workflow



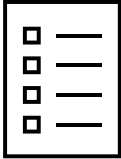
Sentinel 1 & 2
 Spatial resolution: 10m
 Temporal resolution: daily (combined)
 → Time series



Informative map
 for protected grasslands
 Filter: grasslands <10x10m
 → 40.000 polygons



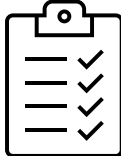
AI-algorithm
 Analysis reflection values



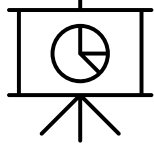
Potential ploughing events



Enforcement data
 Lost/dismitted police reports



Manual check for false positives



Deliverable: list



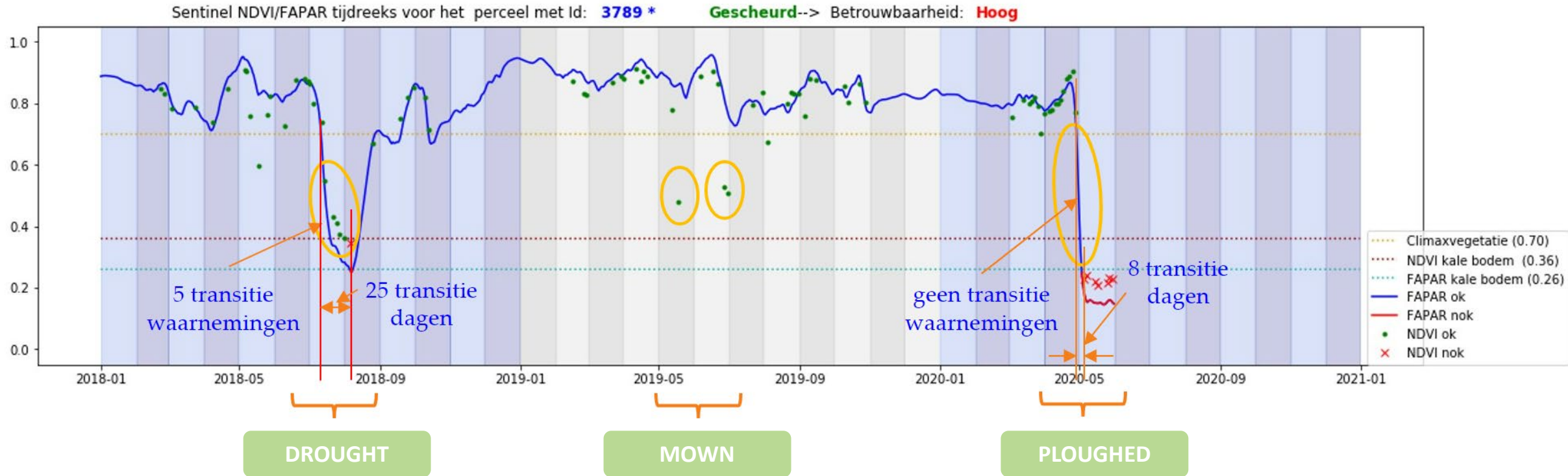
Digital check + field check & feedback by inspector

30/04/2023	48111 71363C1436/000000	Beijk in geopunt	Michael Sobkowiak	objecten aanwezig (2022-02-28)
30/04/2023	10784 4447280296/00A000	Beijk in geopunt	Philippe Van de Velde	landbouw (08/05/2023)-statuut: vergunning
30/04/2023	36162 24105C0477/008000	Beijk in geopunt	Steven Cumps	landbouw (08/05/2023)-statuut: vergunning
09/06/2023	40390 11332K0130/00E000	Beijk in geopunt		landbouwactiviteit (07/06/2023)
09/06/2023	10350 7104980366/00F000	Beijk in geopunt		landbouwactiviteit (07/06/2023)
09/06/2023	30557 72002D0025/00E000	Beijk in geopunt		vermoeden landbouw (07/06/2023)
09/06/2023	25191 44067A0277/00D000	Beijk in geopunt	Arne Maertens	vermoeden landbouw (07/06/2023)
09/06/2023	49171 24073H0031/00X000	Beijk in geopunt		landbouwactiviteit (07/06/2023)
31-06-2023	28235 45508B0523/00A000	Beijk in geopunt	tom Beirlaen	vermoeden landbouw(07072023)
31-06-2023	28239 45508B0520/00_000	Beijk in geopunt	tom Beirlaen	vermoeden landbouw(07072023)
31-06-2023	29099 71353E1052/00C000	Beijk in geopunt		vliegvel(07072023)
	103529 3104180610/00B000	Beijk in geopunt	Wannes Bogart	wannes: verlaeveld, andere percelen
31/07/2023	14152 33030C0100/000000	Beijk in geopunt	bram Vlaeminck	geploeg(0300/2023)
31/06/2023	1184 23322D0321/00C000	Beijk in geopunt	Bart Van Meerbeeck	Landbouwactiviteit(20230906)
31/08/2023	3082 23024D0026/00_000	Beijk in geopunt		Landbouwactiviteit (20210131)
31/08/2023	8104 42003C1154/00A000	Beijk in geopunt		werken sigmaplan? (2023/09/06)-statuut: vergunning
31/08/2023	8104 42003C1158/00_000	Beijk in geopunt		werken sigmaplan? (2023/09/06)-statuut: vergunning
31/08/2023	8104 42003C1157/00_000	Beijk in geopunt		werken sigmaplan? (2023/09/06)-statuut: vergunning
31/08/2023	8104 42003C1155/00A000	Beijk in geopunt		werken sigmaplan? (2023/09/06)-statuut: vergunning
31/08/2023	28596 8101700213/00A000	Beijk in geopunt		landbouw (31/03/2022) (2022-03-31)
31/08/2023	31147 72017A0046/00E000	Beijk in geopunt		landbouw (31/03/2022) (2022-03-31)
31/08/2023	38152 24122B0173/00P000	Beijk in geopunt		aanleg verlaeveld (20230906)
31/08/2023	46776 30025D0003/00A000	Beijk in geopunt		landbouw (2022-02-28)-statuut: EKBG
31/08/2023	51711 43016A0879/00_000	Beijk in geopunt		landbouw (20210331)-statuut: EKBG
31/08/2023	51711 43016A0874/00A000	Beijk in geopunt		landbouw (20210331)-statuut: EKBG
31/08/2023	53577 43016A0880/00_000	Beijk in geopunt		landbouw (2022-02-28)-statuut: EKBG

Algorithm: decision making process

FAPAR = Fraction of Absorbed Photosynthetically Active Radiation

NDVI = Normalized Difference Vegetation Index



Luchtbeeld
2019

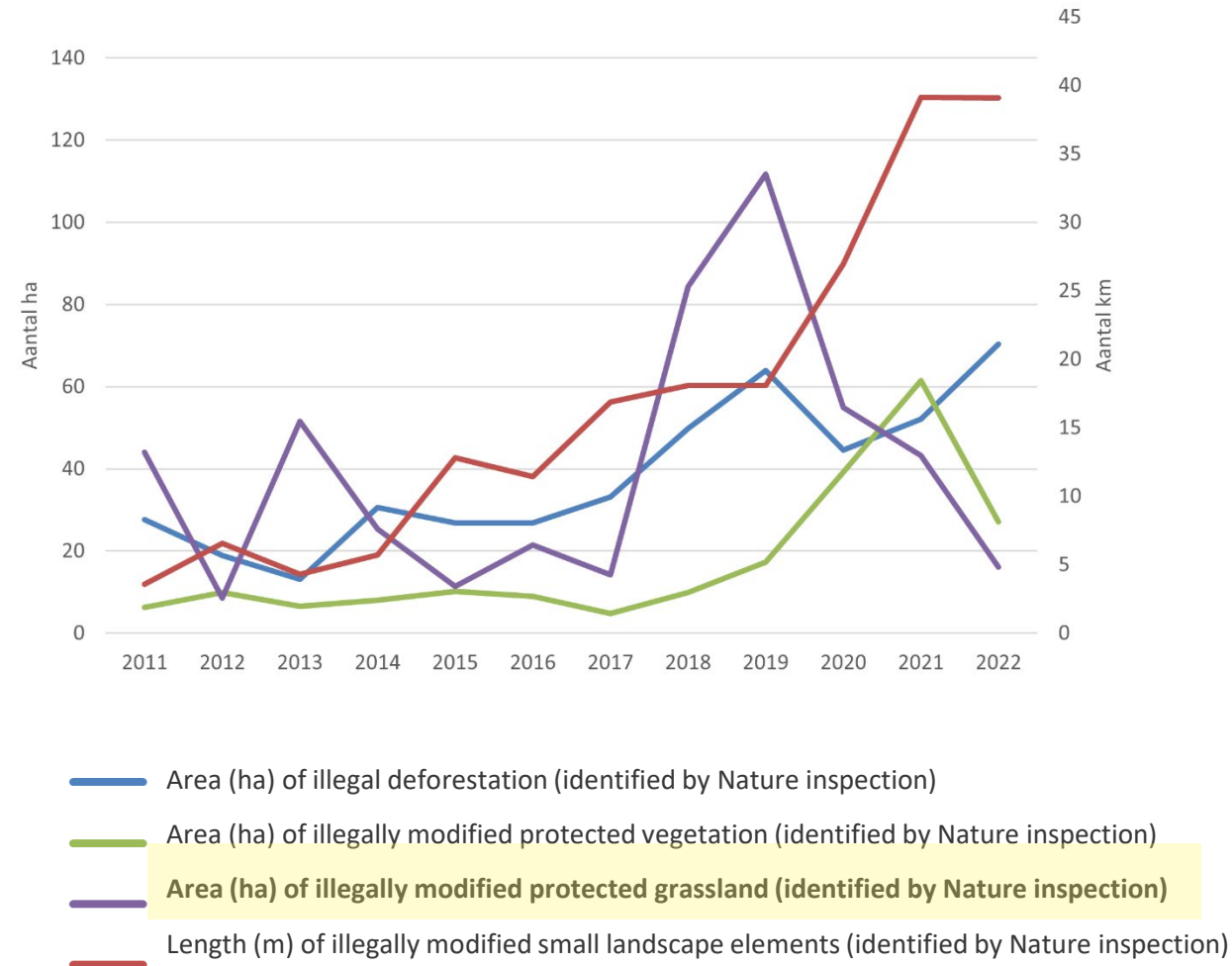


Sensinel-2
RGB



Early Warning System: next up & efficacy


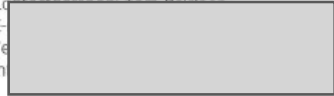



- Link algorithm to enforcement **database**
- Early Warning System for **small landscape elements**
- 635 checked parcels
 - +-90 parcels → police report
 - +-460 parcels → non-enforceable
 - Most common false positives: trappled horse prairies & droughts





Prosecution of illegal grassland modifications

Case File: horsetrack in protected ecological area

		Vlaams Ministerie van Omgeving AGENTSCHAP NATUUR EN BOS Natuurinspectie - Inspectieregio West Koning Albert I-laan 1.2 bus 74 8200 Brugge Tel: 050 247 770 E-mail: natuurinspectie.west.anb@vlaanderen.be	
Co E- Te In		PRO JUSTITIA 24	2409347 AANVANKELIJK PROCES-VERBAAL 
Betrokken partijen: Verdachten: Vd Ad Ge Ni 			
PRIORITAIR PV		aan: Procureur des Konings te: Gent	
Dit proces-verbaal werd verzonden op: <i>(datum stempel)</i>			
Een kopie werd per aangetekend schrijven verzonden aan de overtreder op:			
Plaats en tijdstip: Oudenaarde, graslanden nabij Bos 't Ename Op 15/12/2023 om 13:50 uur.		Voor gezien, Getekend door: Sven Vrielynck (Signature) Getekend op: 2024-02-02 11:45:42 +01:0 Reden: Ik keur dit document goed  Vlaamse overheid Sven Vrielynck Teamverantwoordelijke Inspectieregio West Natuurinspectie Agentschap Natuur en Bos	
Ten laste gelegd misdrijf: <ul style="list-style-type: none">Natuurbehoudsdecreet 1997 Art. 25 §3 2°			

Thank you!

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