Ministry of Environment and Food of Denmark
The Danish Agricultural Agency

Putting satellite data to use – lessons learned by DAA

10 February 2022

Agenda

Basic payment monitoring in Denmark

- CbM practice in 2021/2022
- Using satellite data for a risk-based sampling
- Lessons learned
- Future plans regarding the Area monitoring system
- Ongoing challenges

CbM practice when monitoring Basic payment scheme in Denmark

- **Monitoring the activity requirement on parcels with monitorable crops (leaving out permanent crops etc.)**
- **Fully automated setup. All the way from**
  - **data leaving the agency after application deadline (June)**
  - **return of analyzed data from external supplier (once in july and daily in August, September and October)**
  - **calculating consequences for the farmer, has he met the activity requirement?)**
  - **displaying them as a traffic light in af web GIS (nudging farmers)**
  - **sending out hearings using our new app (end October)**
  - **Making payments to the farmer**

Using satellite data for a risk-based sampling

- We also use satellite data for assessing parcels that should be a part of the risk-based sampling
  - Farmers who are exempted from crop diversification and ecological focus area obligations
  - Farmers with a high bare soil index in September with regards to catch crops

Markers from external collaborators

Crop classification

Ploughing

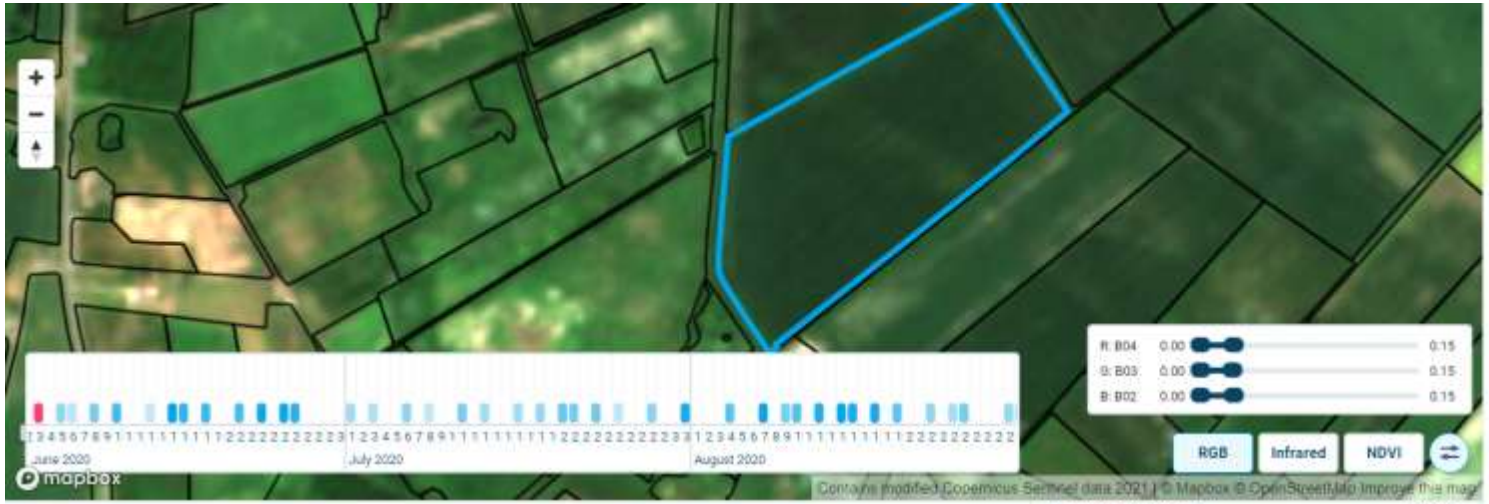
Harvest

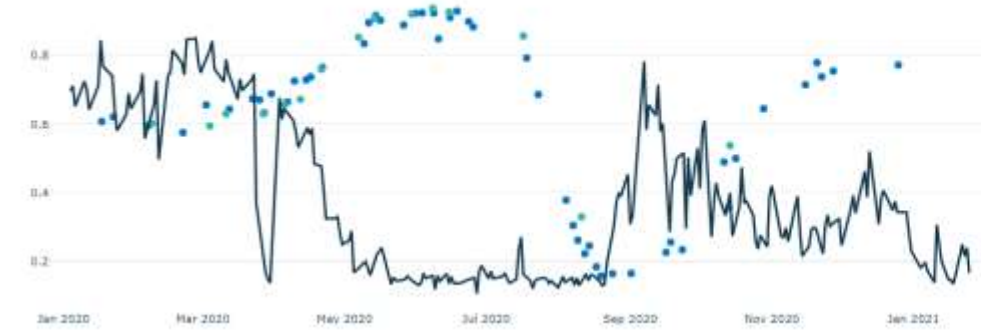
Mowing

Non-compliance classification

Web viewer for visualization of results

Very useful when doing internal QA on results from supplier, explaining why a parcel is green/red, audits and AMS QA





MARKNUMMER	9
MARKBLOKNU	651163-73
AfgKode	11
AfgNavn	Vinterhvede
cat_num	93
cat_name	Winter wheat
GodkArelMK	16.85
RS_GRP_NR	4
RS_GRP	winter crop
RS_CAT_NR1	4
RS_CAT1	winter crop
RS_prob1	0.86
RS_CAT_NR2	1
RS_CAT2	grassland
RS_prob2	0.08
RS_CAT_NR3	5
RS_CAT3	other annual crop
RS_prob3	0.05
prob_grass	0.08
prob_anual	0.92
date_s1	2020-08-01
date_s2	2020-07-23
Analysis	normal
strata	8-11
RS_exclude	0
num_pixels	1432
tile	32UPG

Timeline

May Jun Jul Aug Sep Oct

Crop classification

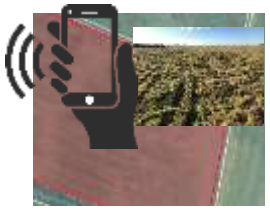
Continous ploughing, harvest and mowing detection

First traffic light on display

Non-compliance classification

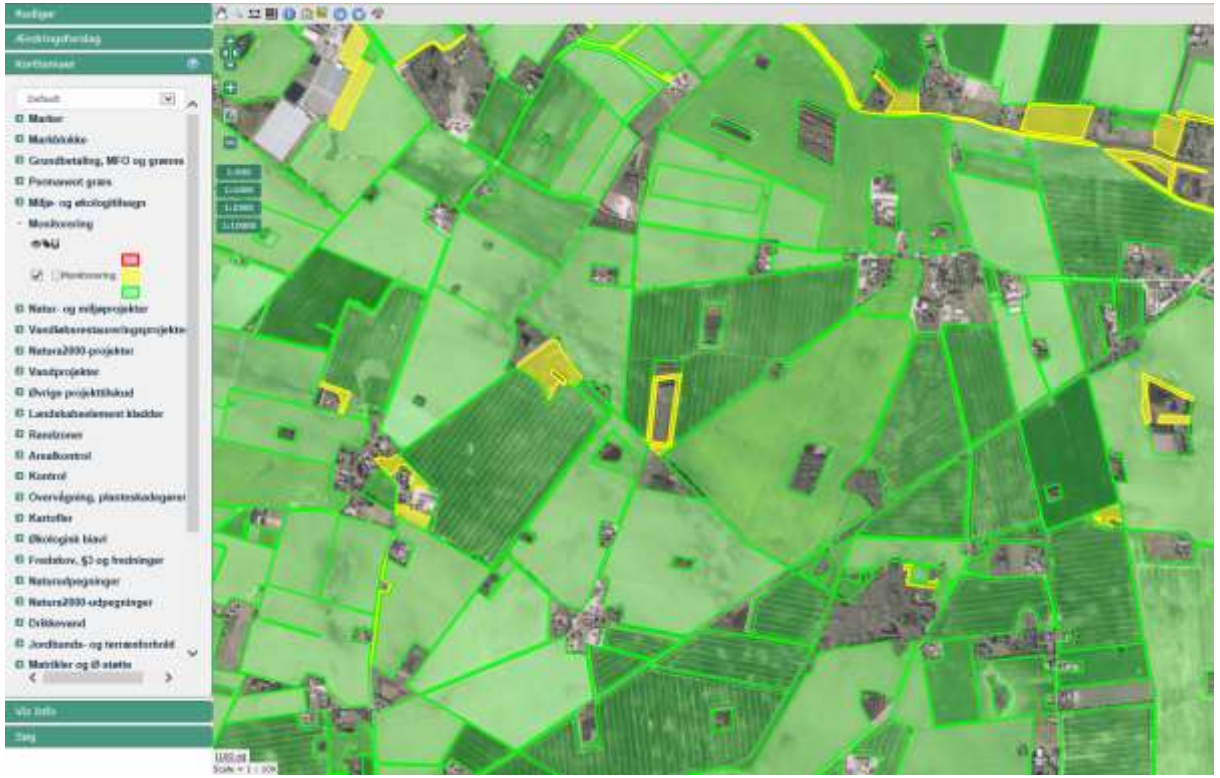
Parcels with high non-compliance probability turns

Deadline for sending geo-tagged images or withdrawal of application

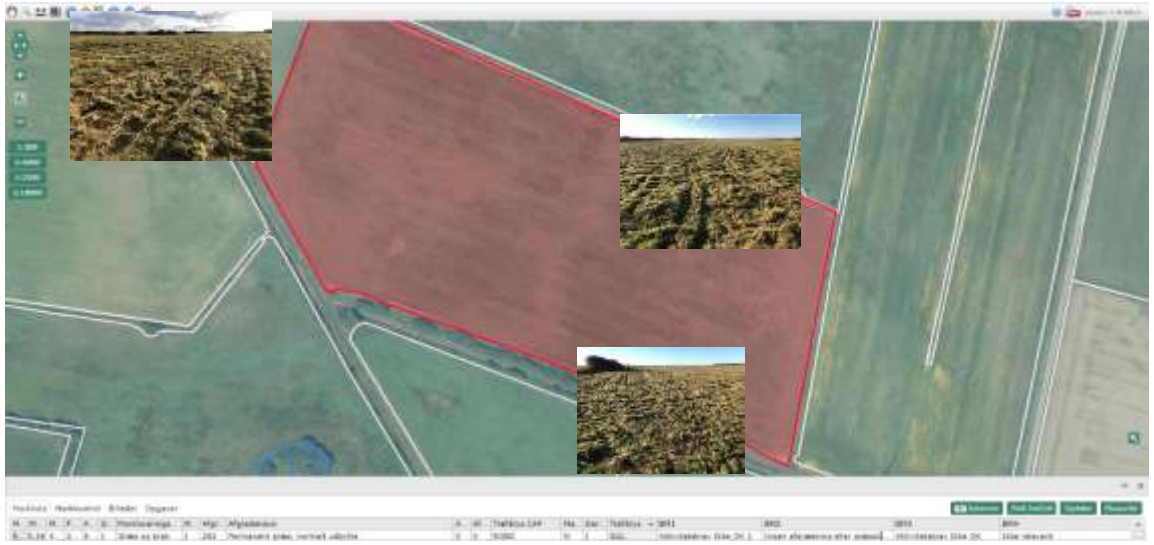


Field data for training, validation and quality assessment

Farmers trafic light and farmers pictures from hearing



2021	2020
500.000 parcels	507.000 parcels
473.000 parcels (94,7 %)	470.000 parcels (92,8%)
25.500parcels(5,1%)	36.000 parcels (7,1%)
900 parcels(0,2%)	650 parcels (0,1%)



CAP2020

AMS – makes monitoring mandatory

DAA is working to develop monitorable echoscemes so markers can be used for AMS – challenging

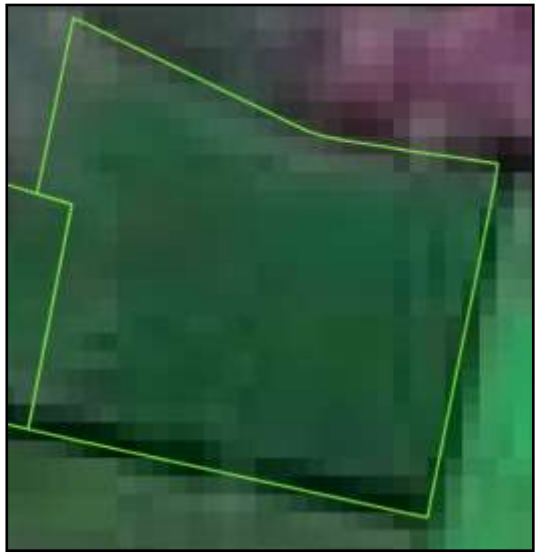
DAA will be using contractor also when implementing the new CAP (AMS)

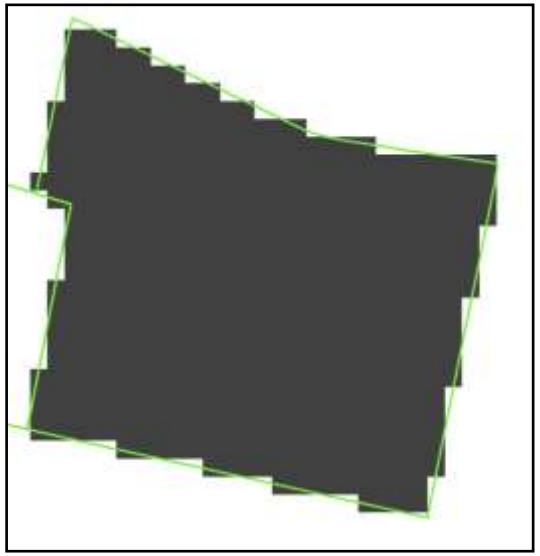
Beneficial to collaborate with knowledgeable and experienced partner. Both in terms of good quality results but also to discuss potential solutions

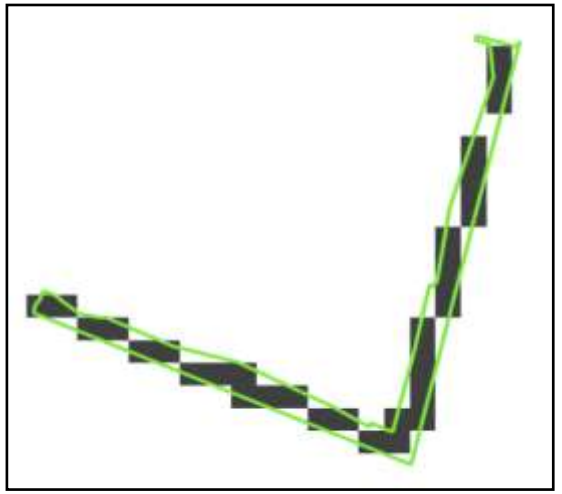
Concerns regarding georeferenced pictures and a massive back office load

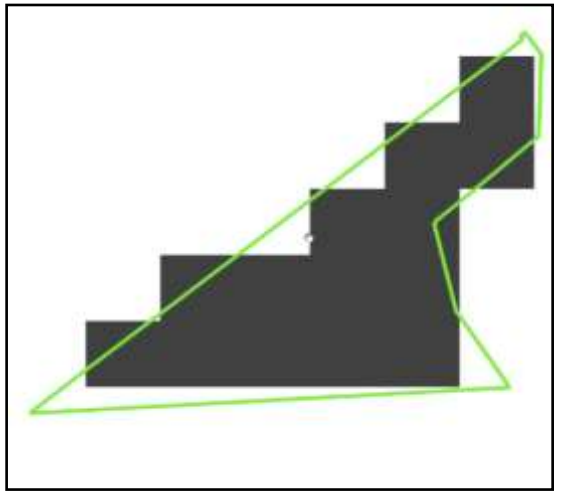
Ongoing challenges: Grassland and fallow

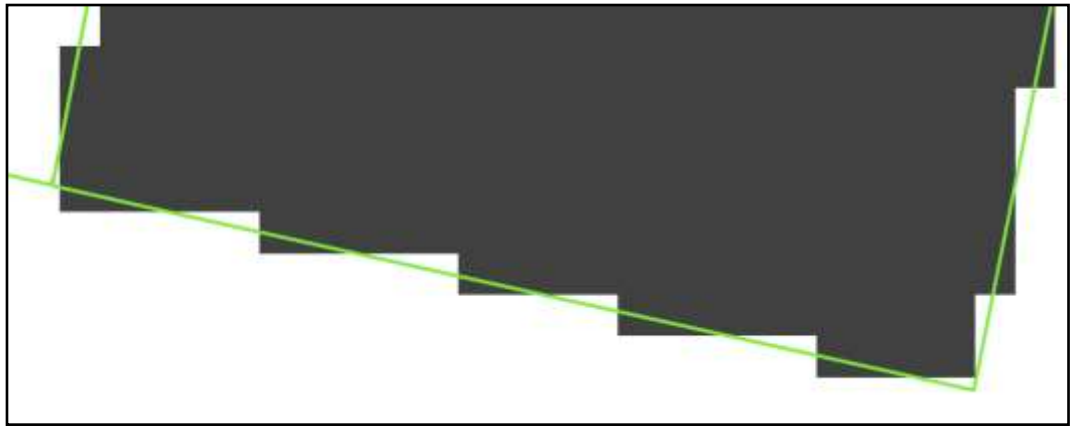
Ongoing challenges: Small parcels









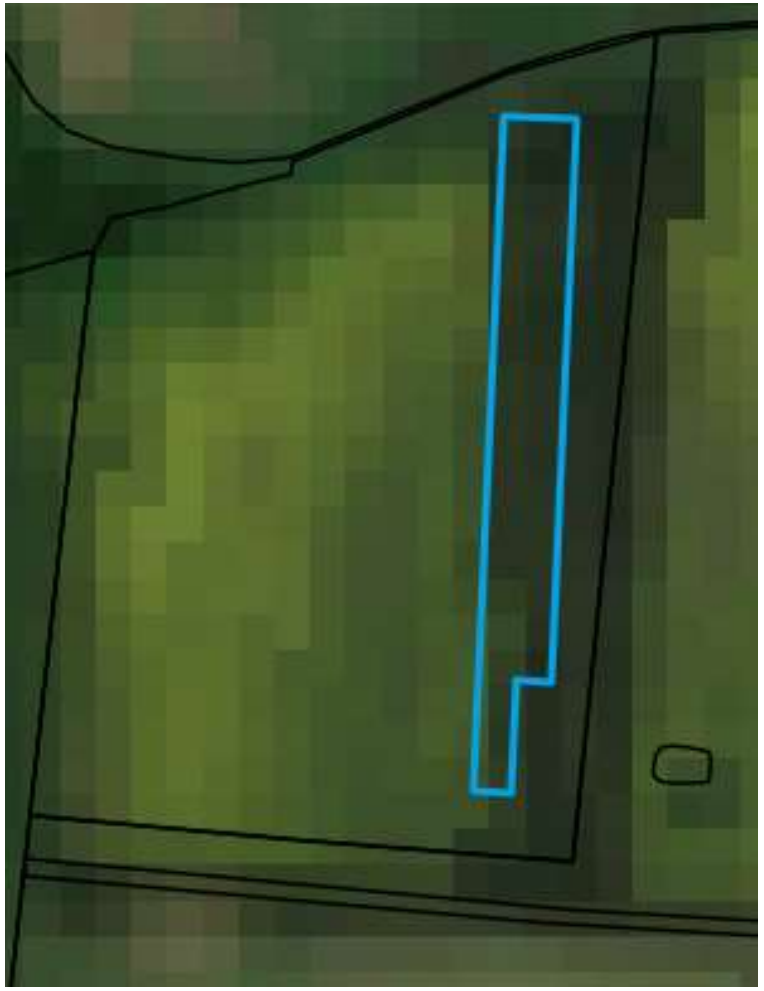


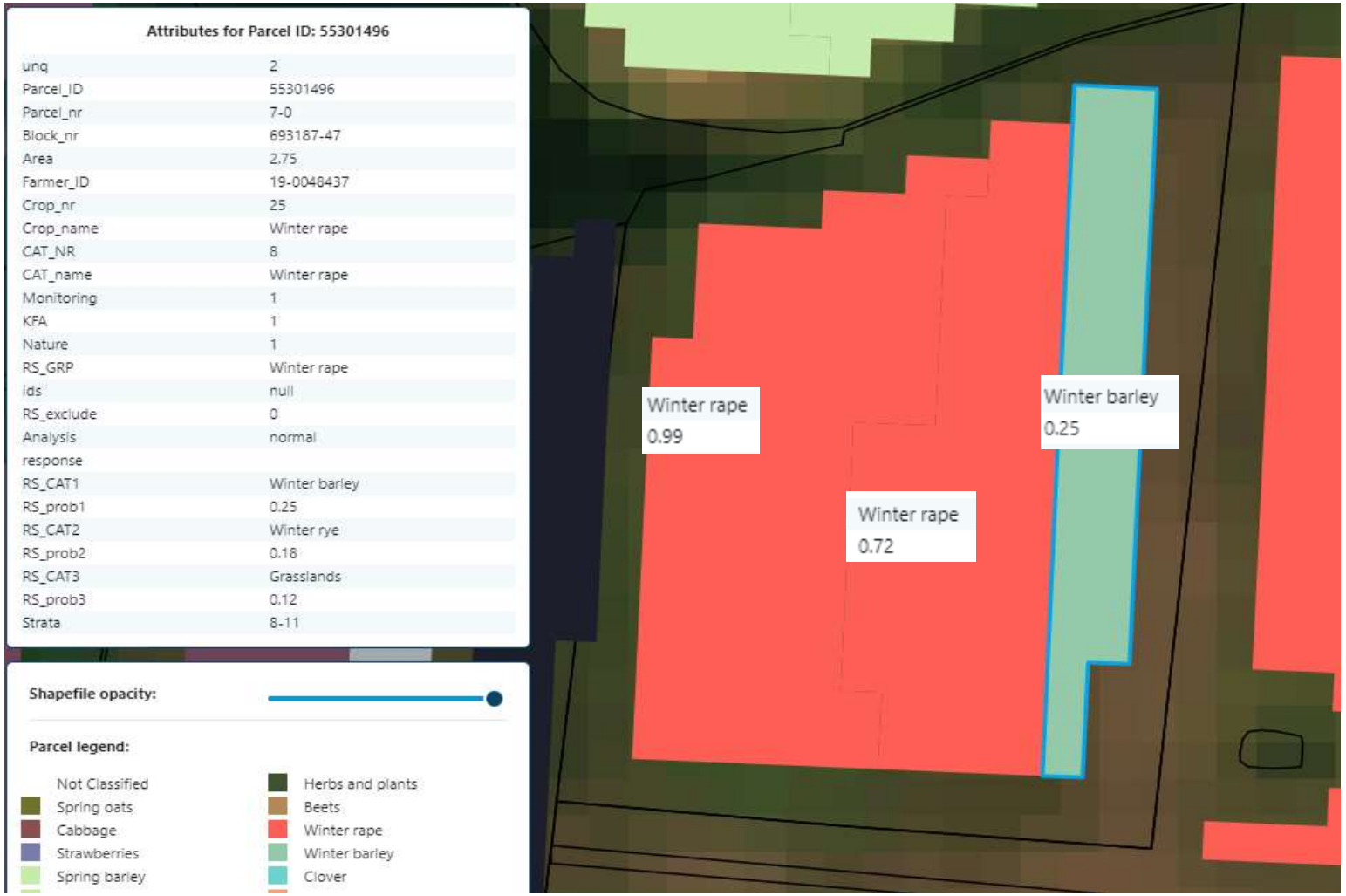
Ongoing challenges: Small crop classes – will we end up with a lot of georeferences pictures in the new AMS?

Table 13-1 Accuracy statistics for task 10 – rare crop classification.

	user's accuarcy	producer's accuarcy
Alfalfa	0.80	0.50
Beans	0.80	0.87
Beets	0.88	0.87
Browntop and creeping bent	1.00	0.67
Cabbage	0.64	0.49
Carrot	0.57	0.76
Celery	0.41	0.35
Chrysanthemum Garland, seeds	0.20	0.08
Clover	0.86	0.79
Cocksfoot seed	0.96	0.88
Flax	0.88	0.58
Giant pumpkin	0.34	0.46
Grasslands	0.96	0.95
Hemp	0.97	0.68
Herbs and plants	0.28	0.27
Kentucky bluegrass seed	0.94	0.91
Lettuce	0.59	0.68
Maize	0.86	0.95
Meadow fescue seed	0.93	0.90
Mix of cereals	0.44	0.47
Mix of oil species & cereals	0.37	0.40
Onion	0.80	0.62

Ongoing development: sub-parcel classification – potential problem when analyzing ineligible features on parcels in the future AMS





Questions?