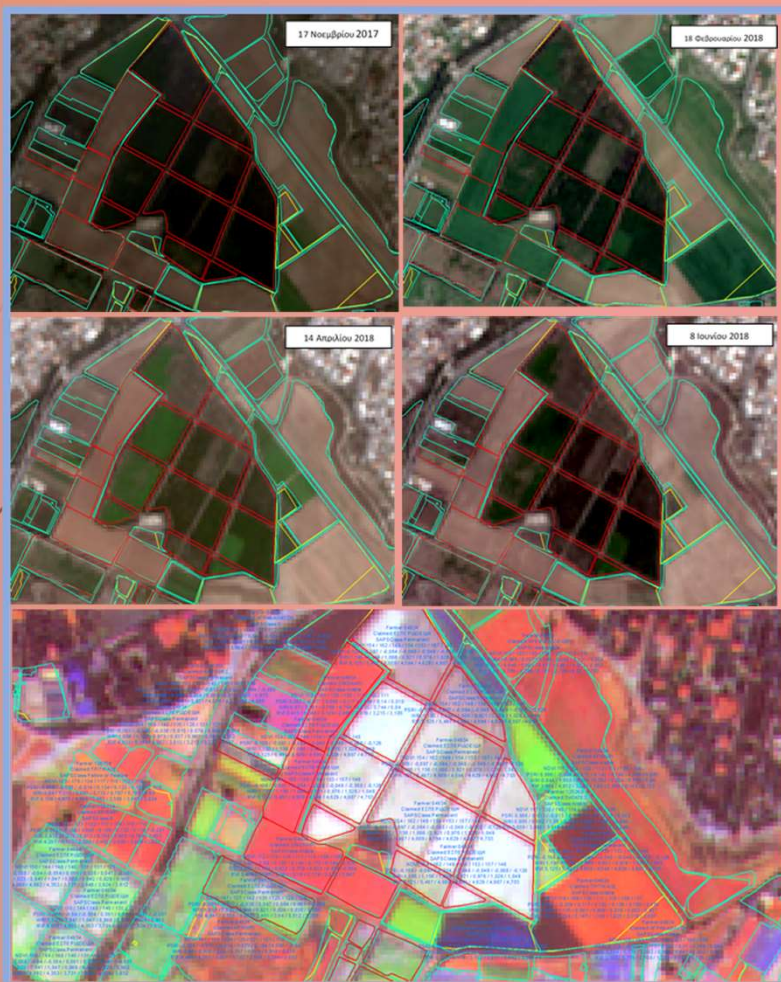




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CYPRUS AGRICULTURAL PAYMENTS
ORGANISATION (C.A.P.O.)



*pilot project for
the monitoring
implementation
in cyprus*

2019 IACS workshop, 10-11 April 2019, Valladolid, Spain

Kyriacos Alexandrou
Head of IT Department

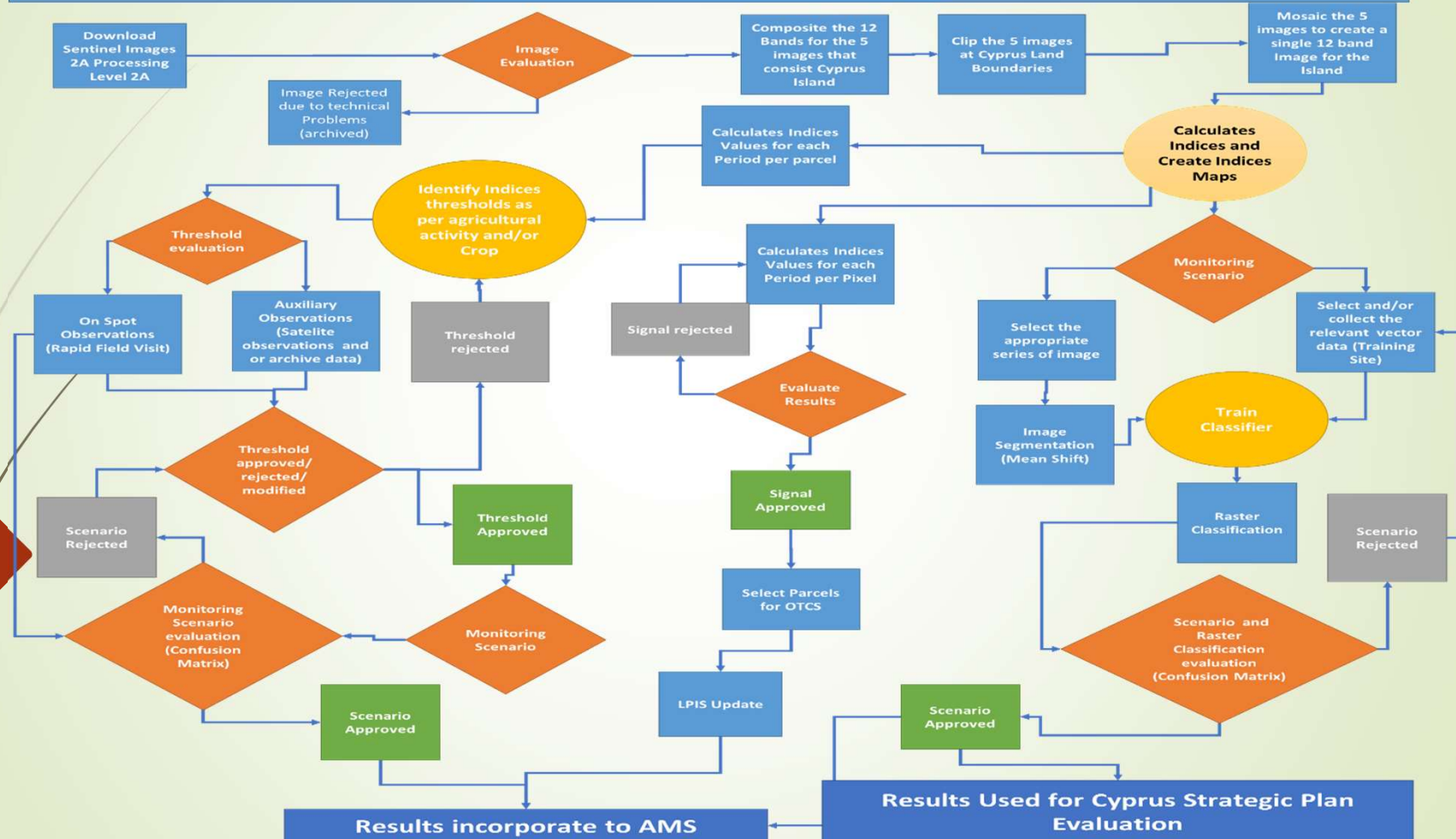


General Informations Volumetric's

➤ Cyprus Island Area	9251Km²
➤ LPIS No of Parcels	467000
➤ LPIS Area (aprox.)	175000Ha
➤ Claimed Parcels	334000
➤ Claimed Area for SAPS (aprox.)	140000 Ha
➤ No of Yearly Periods for Monitoring	30-36
➤ Number of Pixels (all Cyprus)	92.500.000
➤ Monitoring Period (1/9/2018-31/8/2019)	
➤ 18 Sentinel Images up to 25/3/2019	



CYPRUS MONITORING PROCEDURE DIAGRAM



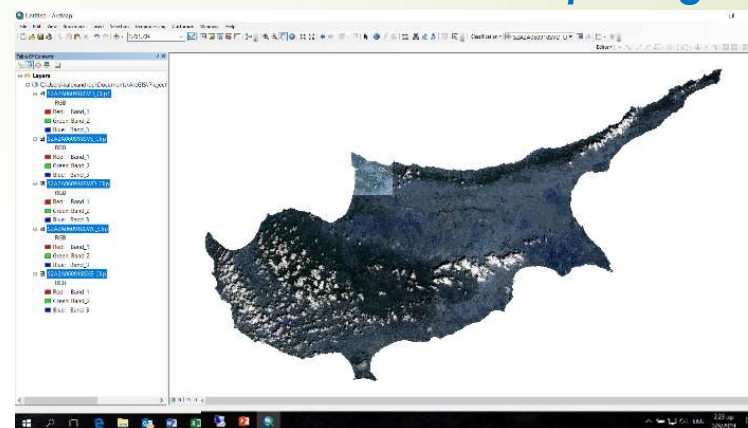
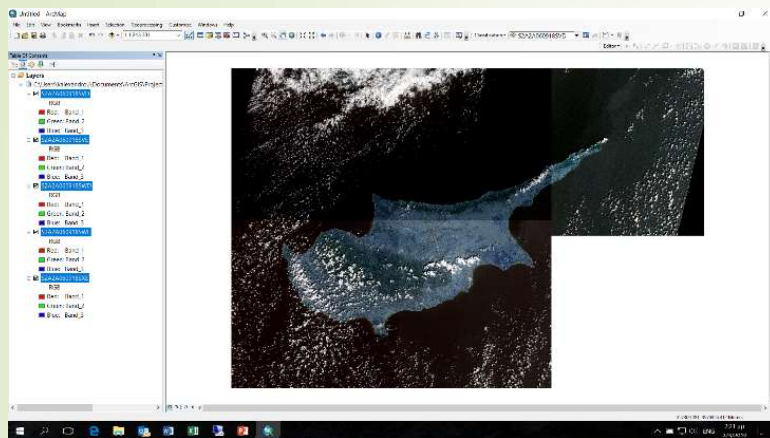
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Composite Images

Procedure to prepare Raster Data

Clip Images



Mosaic Images



Indices Layers





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Indices statistics per period

Layers

- BSI20190325
- NDBai20190325
- NDVI20190325
- NDVIRe20190325
- NPCI20190325
- PSRI20190325
- SAVI20190325
- TCB20190325
- WRI20190325

BSI20190325

OBJECTID *	OBJECTID 1 *	COUNT	AREA	MIN	MAX	RANGE	MEAN	STD	SUM
1	1	12	1200	0,071907	0,146811	0,075004	0,119087	0,025613	1,429038
2	2	28	2800	0,168186	0,301732	0,133546	0,2368	0,040086	6,630392
3	3	21	2100	0,128237	0,207173	0,078936	0,180079	0,021197	3,78165
4	4	49	4900	0,101422	0,161101	0,059679	0,12581	0,015177	6,164702
5	5	4	400	0,115652	0,127622	0,01197	0,120815	0,004604	0,483259
6	6	6	600	0,112136	0,162544	0,050408	0,136217	0,019353	0,817304
7	7	15	1500	0,219053	0,288216	0,069163	0,25037	0,020845	3,755556
8	8	27	2700	0,084342	0,167705	0,083363	0,135088	0,016552	3,647363
9	9	35	3500	0,139389	0,230879	0,091489	0,174027	0,019415	6,090951
10	10	27	2700	0,133072	0,226042	0,092971	0,177086	0,022858	4,78132
11	11	17	1700	0,179749	0,244965	0,065216	0,206996	0,015928	3,518935
12	12	81	8100	0,161505	0,298197	0,136692	0,228288	0,031699	18,491294
13	13	59	5900	0,125533	0,188564	0,063031	0,148586	0,010842	8,766551
14	14	33	3300	0,120829	0,191501	0,070672	0,138275	0,01696	4,563075
15	15	28	2800	0,151596	0,22387	0,072274	0,177419	0,018084	4,967726
16	16	58	5800	0,092751	0,189016	0,096225	0,153244	0,018666	8,888132
17	17	25	2500	0,13831	0,215001	0,076691	0,172952	0,018665	4,323797
18	18	6	600	0,119238	0,244531	0,125293	0,17481	0,051517	1,04886
19	19	38	3800	0,145737	0,220751	0,075014	0,17254	0,019487	6,566538
20	20	30	3000	0,151024	0,214439	0,063415	0,17044	0,013907	5,113186
21	21	31	3100	0,145686	0,230215	0,084529	0,169485	0,019247	5,254039
22	22	19	1900	0,137495	0,201643	0,064149	0,169026	0,016647	3,211502
23	23	11	1100	0,051592	0,206578	0,144986	0,151406	0,035965	1,665465
24	24	66	6600	0,041225	0,222669	0,181444	0,159273	0,036138	10,51205
25	25	681	68100	0,060861	0,298424	0,237563	0,18965	0,034296	129,151979
26	26	8	800	0,12772	0,173758	0,046037	0,151767	0,015302	1,214139
27	27	79	7900	0,01831	0,215052	0,196741	0,148467	0,037729	11,728908
28	28	11	1100	0,189381	0,244853	0,055472	0,217324	0,017951	2,390569
29	29	9	900	0,133556	0,179569	0,046013	0,154658	0,013903	1,391924
30	30	5	500	0,148846	0,199087	0,050241	0,166718	0,017736	0,833591
31	31	11	1100	0,122069	0,180988	0,058919	0,146783	0,019201	1,614614
32	32	4	400	0,159546	0,275943	0,116398	0,206751	0,045408	0,827005
33	33	9	900	0,123127	0,199466	0,076339	0,158585	0,029918	1,427263
34	34	25	2500	0,121812	0,146516	0,024704	0,136222	0,007606	3,405539
35	35	16	1600	0,094499	0,131933	0,037434	0,113469	0,010981	1,815497
36	36	103	10300	0,079564	0,248871	0,169307	0,174708	0,029058	17,99493
37	37	26	2600	0,119486	0,169487	0,050001	0,134307	0,012003	3,491973
38	38	45	4500	0,134496	0,180999	0,046504	0,158654	0,012718	7,139451
39	39	26	2600	0,092083	0,181809	0,089726	0,15022	0,019554	3,905719
40	40	48	4800	0,090599	0,136725	0,046026	0,101534	0,008134	4,87365
41	41	6	600	0,166357	0,226126	0,059769	0,194376	0,019536	1,166258
42	42	15	1500	0,148779	0,197981	0,049201	0,173017	0,013647	2,595251
43	43	54	5400	0,11927	0,158685	0,039415	0,133393	0,008758	7,203205
44	44	3	300	0,190747	0,228227	0,037479	0,215619	0,017588	0,646858
45	45	54	5400	0,10213	0,129315	0,027185	0,114078	0,007246	6,160088
46	46	44	4400	0,101436	0,14279	0,041355	0,113549	0,008168	4,996151

(0 out of 464268 Selected)

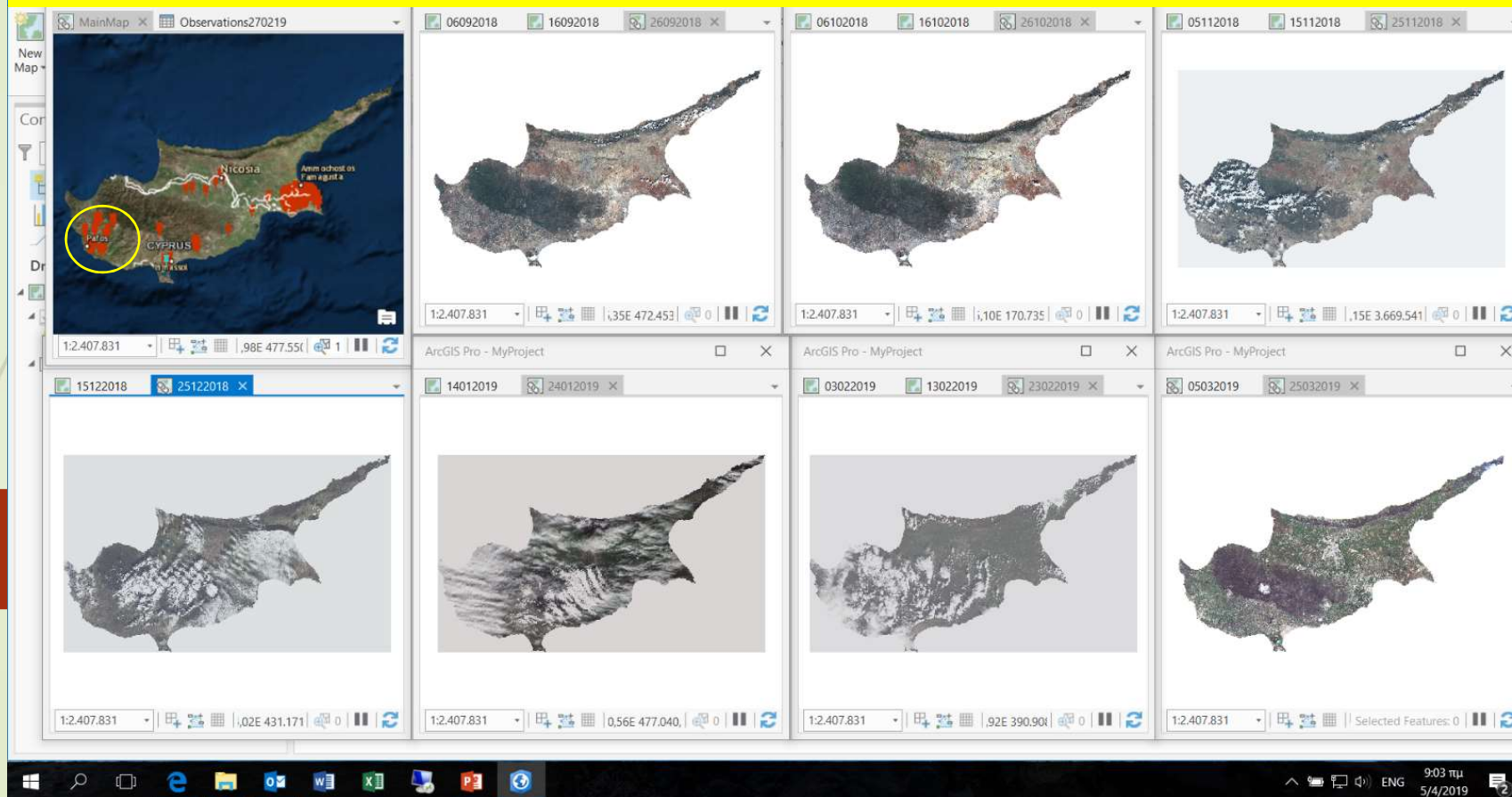
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System for monitoring and Evaluation of Indices Values

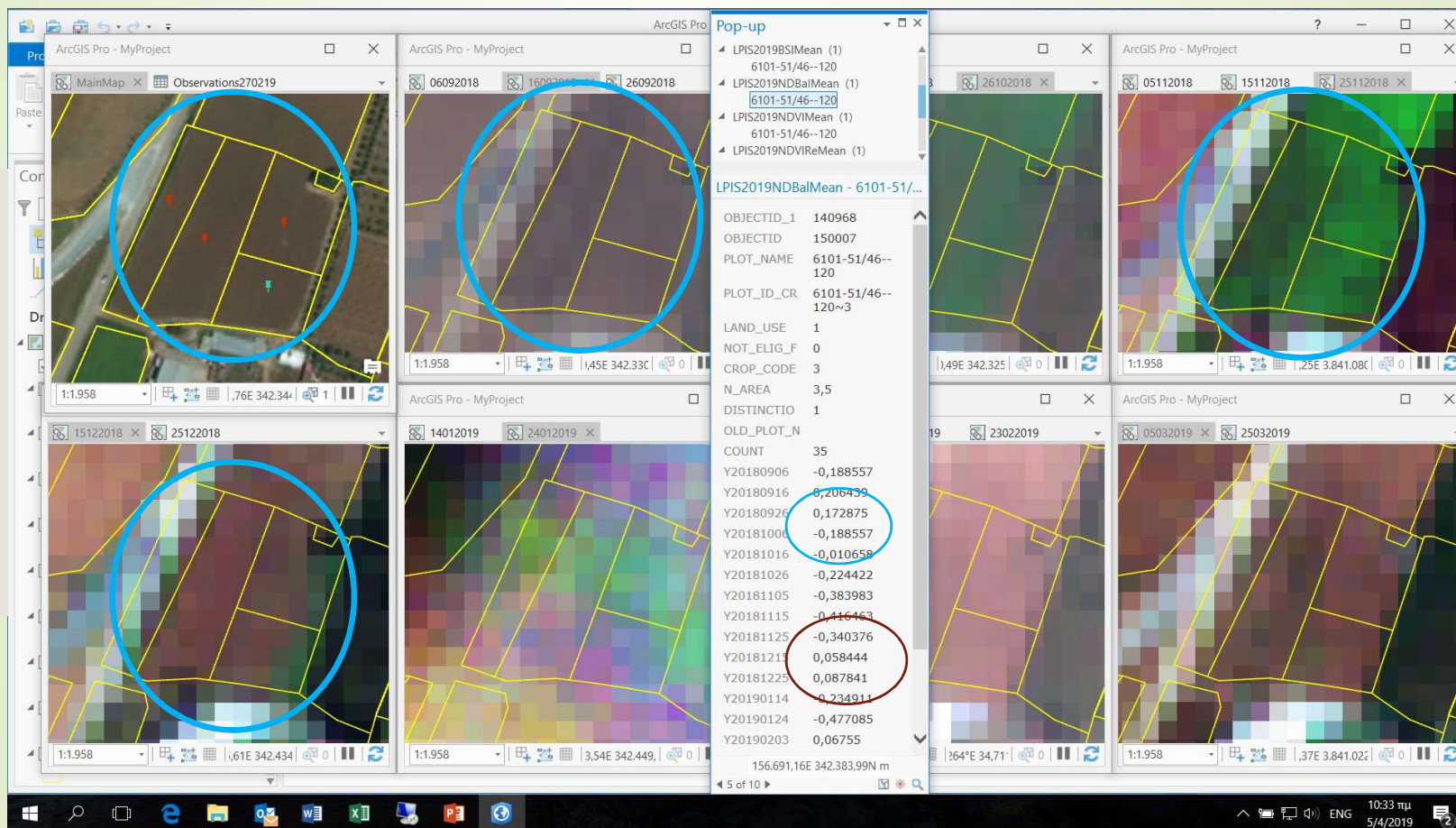


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System for monitoring and Evaluation of Indices Values

Typical
Pattern of
Winter
potato crop
(start in
October,
grow for 90
days finish
in
December

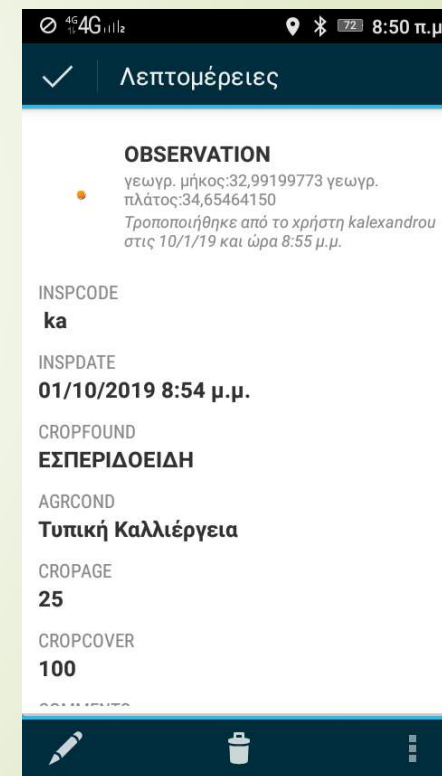
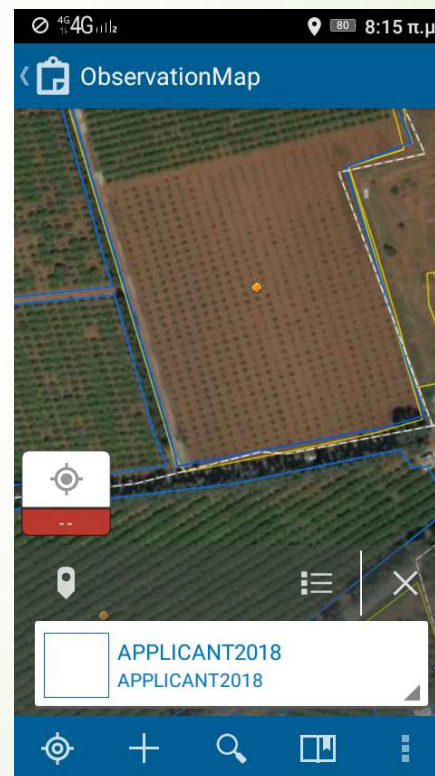
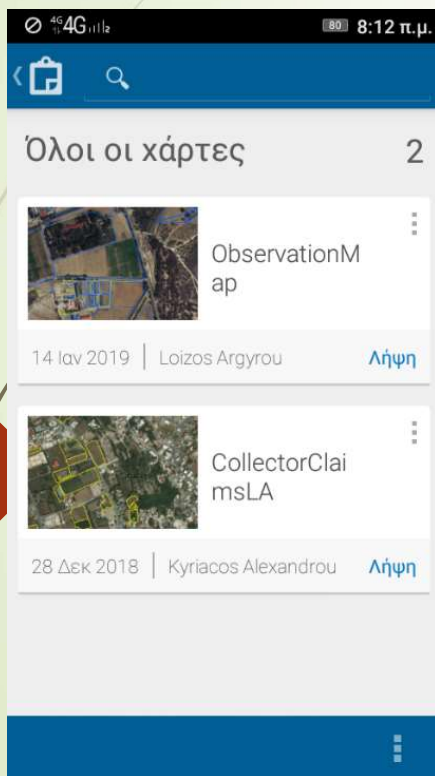




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Collect on Spot information through Rapid Field Visits



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Observed Indices Threshold

✓ **NDBal (Normalized Difference Bareness Index)**

(Identified that negative values show vegetation, change from positive to negative values or values closed to zero show ploughing soil and crop start. Changes from negative to positive values show crop finish. Low influence from cloud cover)

✓ **BSI (Bare Soil Index)**

(Identified that negative values during vegetation period indicate cloud cover or cloud shadow)

✓ **NDVI (Normalized Difference Vegetation Index)**

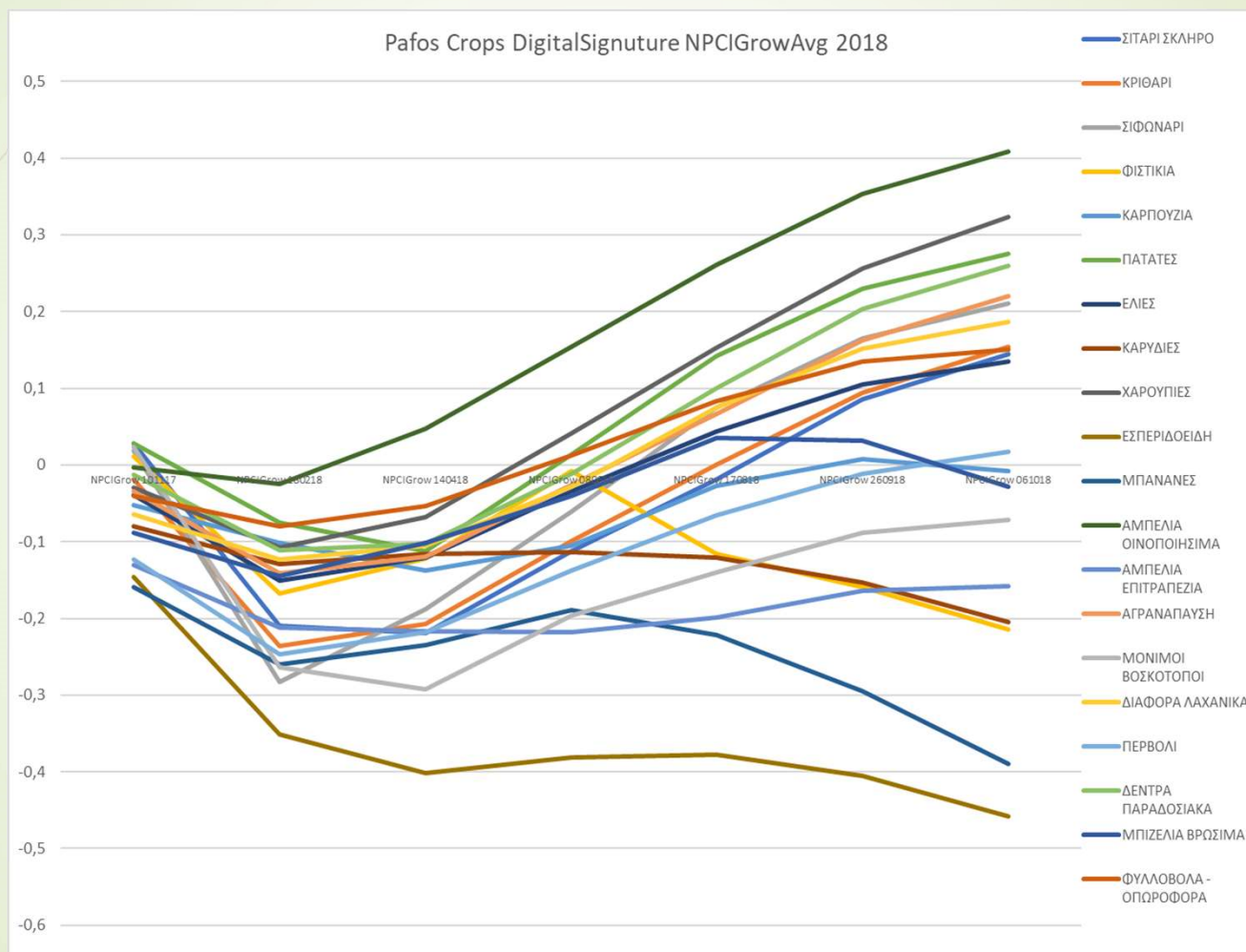
(Affected significantly from cloud cover. Corrected through interpolation of previous and next period values, Evaluation of total period NDVI and Max NDVI)

✓ **NPCI (Normalized Pigment Chlorophyll Ratio Index)**

(Identified that growing average values shows a significant crop distinction capacity)

✓ **PSRI (Plant Senescence Reflectance Index)**

(Identified that has the capability to distinguish bare soil from soil covered by plant residuals. Low influence from cloud cover)



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SAPS Eligibility Evaluation for LPIS Parcels

OBJECTID	NoVegetation Periods	Distinction	DistinctionEval	Distinction Control	Start Period	AvgNDVI	SumNDVI	MaxNDVI	PeriodOfMaxNDVI	Vegetation dates	CropExist Eval	SAPS Eligibility Evaluation	SAPS Eligibility Evaluation2
40	10	1	1	1	1	0,848143	13,157	0,959	14	44	1	3	3
41	1	2	2	1	1	0,481333	12,575	0,769	2	22	1	1	1
42	10	1	1	1	1	0,765	11,019	0,874	16	66	1	3	3
43	10	1	1	1	1	0,809143	9,949	0,915	14	44	1	3	3
44	8	1	1	1	1	0,476111	9,338	0,654	17	88	1	1	1
45	10	1	1	1	1	0,721857	11,212	0,867	17	77	1	3	3
46	9	1	1	1	1	0,769875	14,664	0,894	14	55	1	3	3
47	1	1	2	0	0	0,531563	15,086	0,758	12	132	1	1	1
48	7	1	1	1	1	0,6581	10,81	0,865	17	121	1	3	3
49	9	1	1	1	1	0,528625	9,645	0,758	14	55	1	3	3
50	4	1	3	0	4	0,416615	10,715	0,587	12	88	1	2	3
51	6	1	3	0	10	0,481727	8,149	0,788	17	77	1	2	3
52	11	1	1	1	11	0,475	7,749	0,745	17	66	1	3	3
53	7	2	1	1	0	0,4899	6,374	0,659	16	99	1	1	1
1	7	2	1	1	0	0,1475	2,673	0,305	10	33	0	2	4
2	12	2	1	0	9	0,2995	4,894	0,345	16	77	0	2	4
3	8	2	1	0	9	0,410667	7,683	0,605	17	88	1	2	3
4	8	3	1	0	10	0,443	8,573	0,775	14	44	1	2	3
5	7	3	1	0	9	0,4586	8,797	0,797	14	55	1	1	1
6	10	3	1	0	10	0,601571	8,289	0,798	16	66	1	1	1
7	7	1	1	1	5	0,453111	9,987	0,577	10	55	1	3	3
8	5	1	3	0	3	0,492417	8,471	0,789	17	154	1	2	3
9	11	1	1	1	11	0,427	9,255	0,621	17	66	1	3	3
10	4	1	3	0	5	0,514846	11,871	0,643	17	132	1	2	3
11	5	1	3	0	5	0,4315	6,674	0,589	12	77	1	2	3
12	11	2	1	0	11	0,249333	5,864	0,377	17	66	0	2	4
13	8	2	1	0	9	0,485333	8,53	0,701	14	55	1	2	3
14	8	1	1	1	9	0,462444	7,36	0,678	17	88	1	3	3
15	7	2	1	0	4	0,3198	5,671	0,53	17	143	1	2	3
16	9	2	1	0	11	0,309125	5,535	0,463	17	66	1	2	3
17	8	2	1	0	9	0,340222	8,386	0,509	15	66	1	2	3
18	7	1	1	1	7	0,5324	11,022	0,769	11	44	1	1	1
19	6	1	3	0	9	0,518	10,745	0,811	14	55	1	2	3
20	5	1	3	0	9	0,420583	10,225	0,699	14	55	1	2	3
21	4	1	3	0	9	0,4335	10,058	0,801	14	55	1	2	3
22	7	1	1	1	9	0,488	13,344	0,729	14	55	1	3	3
23	0	2	2	1	0	0,497882	10,763	0,695	12	132	1	3	3
24	7	3	1	0	9	0,2299	4,533	0,302	17	88	0	2	4
26	9	2	1	0	9	0,27925	4,874	0,419	15	66	0	2	4
27	8	2	1	0	9	0,293333	9,111	0,435	15	66	1	2	3
28	5	1	3	0	5	0,53925	10,332	0,748	17	132	1	2	3
29	10	0	1	0	10	0,551571	13,275	0,69	15	55	1	2	3
30	1	1	2	0	0	0,588375	13,843	0,856	14	154	1	1	1
31	9	1	1	1	10	0,553625	10,715	0,873	17	77	1	3	3
32	6	2	3	0	5	0,571455	11,596	0,704	6	11	1	1	1
33	9	1	1	1	10	0,66375	7,906	0,852	14	44	1	3	3
34	11	1	1	1	10	0,432667	8,034	0,745	17	77	1	3	3
35	10	1	1	1	10	0,776857	11,324	0,908	14	44	1	3	3
36	6	1	3	0	6	0,535091	9,508	0,64	14	88	1	2	3
37	9	1	1	1	9	0,518714	8,639	0,777	14	55	1	3	3
38	8	1	1	1	7	0,557444	8,719	0,756	14	77	1	3	3



SAPS Eligibility Evaluation for Declared Parcels up to 29/3/2019

Evaluation Category Code	Evaluation Category Description	LPIS Parcels	Farmer Declared Parcels	Category Percentage
0	Parcels Declared First Time		52	#DIV/0!
1	Parcels Less than 8 Pixels	96729	16445	16%
3	Eligible Parcels	340125	78747	77%
4	Not Eligible Parcels	30154	7175	7%
	Totals	467008	102419	22%

**Mostly Deciduous Trees
Vines and Potatoes
(very early evaluation)**



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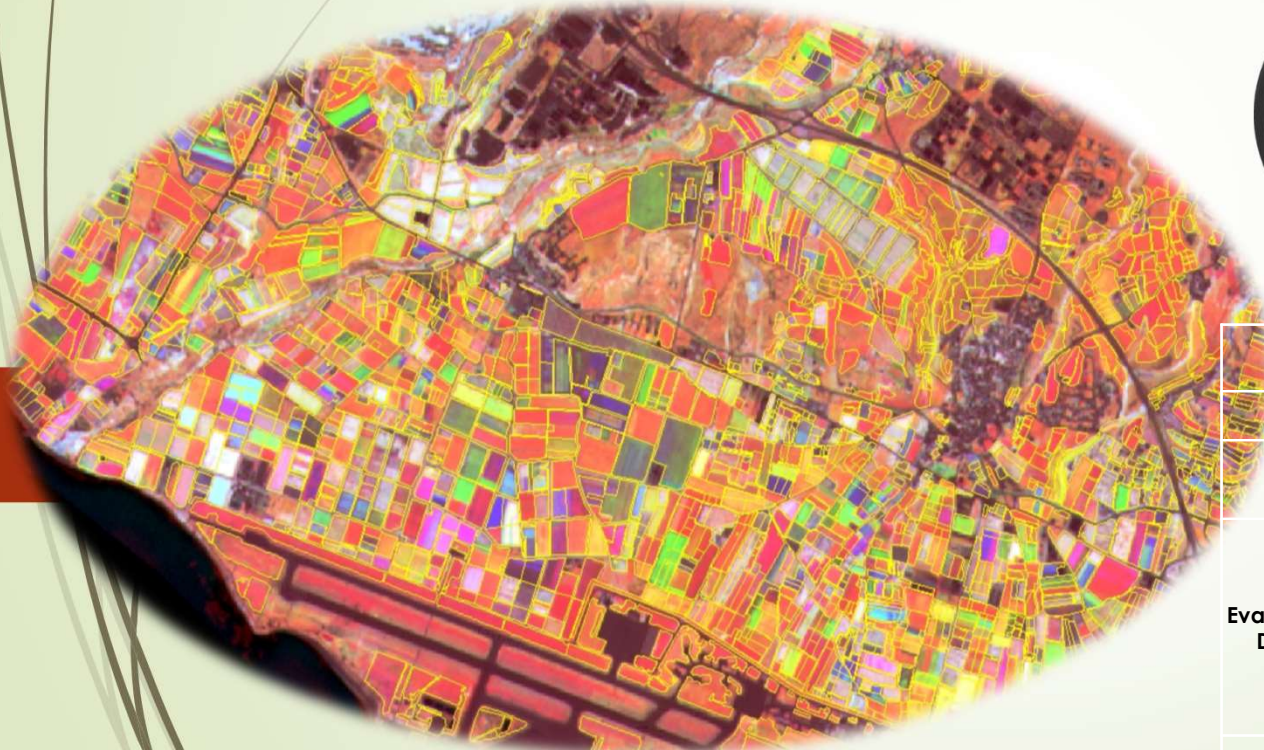


Pafos Pilot Project* – Evaluation of Classification procedures

*On process

Distinction Evaluation

Train Maximum Likelihood Classification



Confusion Matrix Pafos 2018 Distinction Classification

	Distinction / RS Distinction	LPIS Data			Total	Production Error
		Arable	Perma nent	Fallow or Pasture		
Evaluation Data	Arable	4378	1566	371	6315	69%
	Permanent	1312	3090	51	4453	69%
	Fallow or Pasture	3	9	1	13	8%
	Sum	5693	4665	423	10781	
Producer Error		77%	66%	0%		

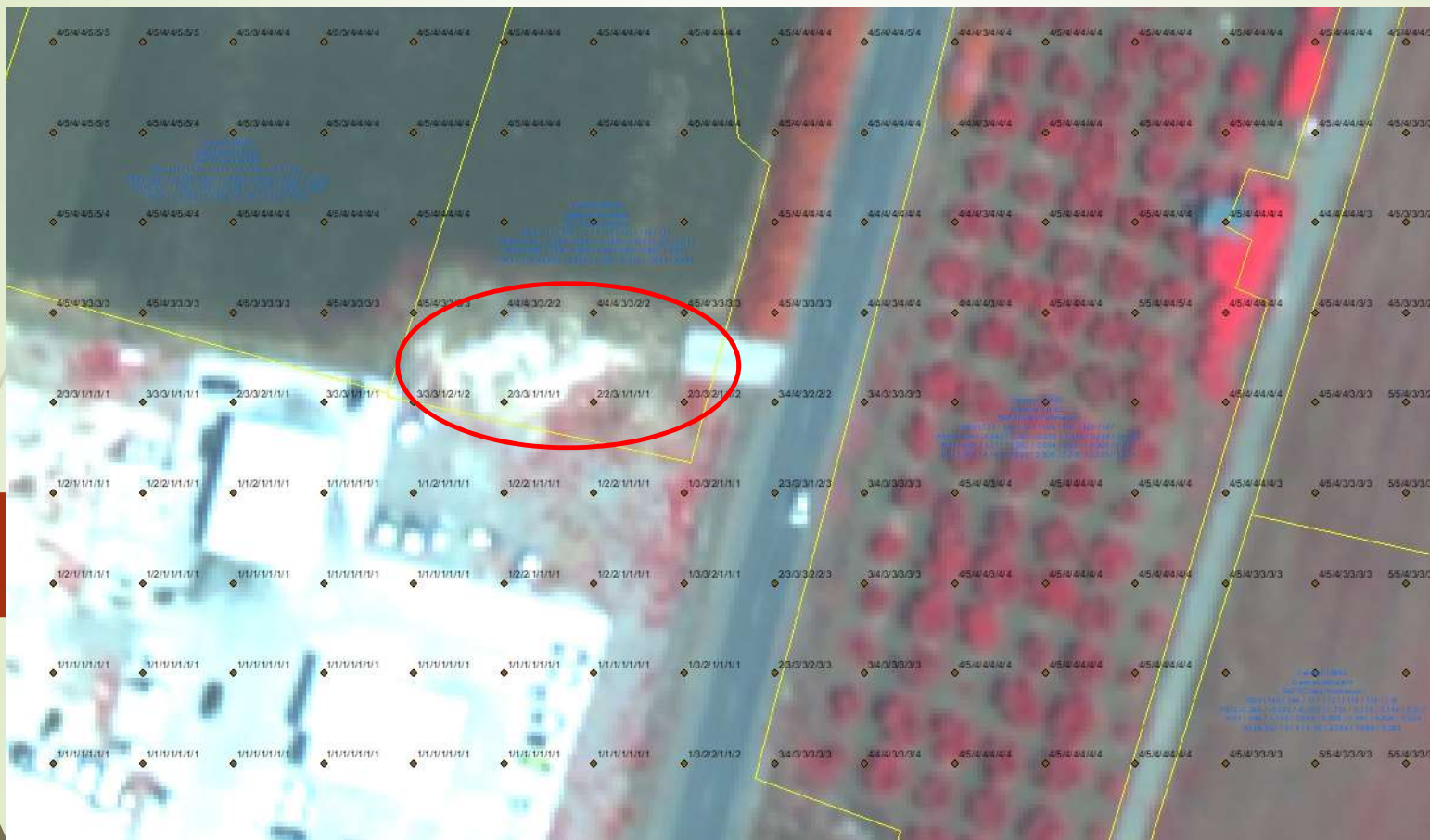
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Identification and positioning of not eligible features for LPIS Update



Monitoring
Vegetation
Control Index
could identify
ineligible LPIS
parcel features

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Thank you

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