# Habitat mapping of Ma-le'l Dunes coupling with UAV and NAIP imagery

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Friends of the DUNES
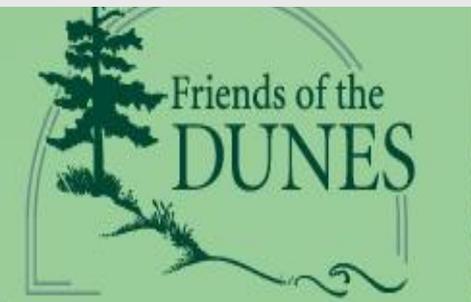
Background Info

- Data Collection

  - Mal-e'l Dunes

  - Kite Aerial Photography

  - UAV

- Agisoft Photoscan

    - Add Photos

    - Align Photos

    - Build Dense Point

    Cloud

    - Build Mesh

    - Build Orthomosaic
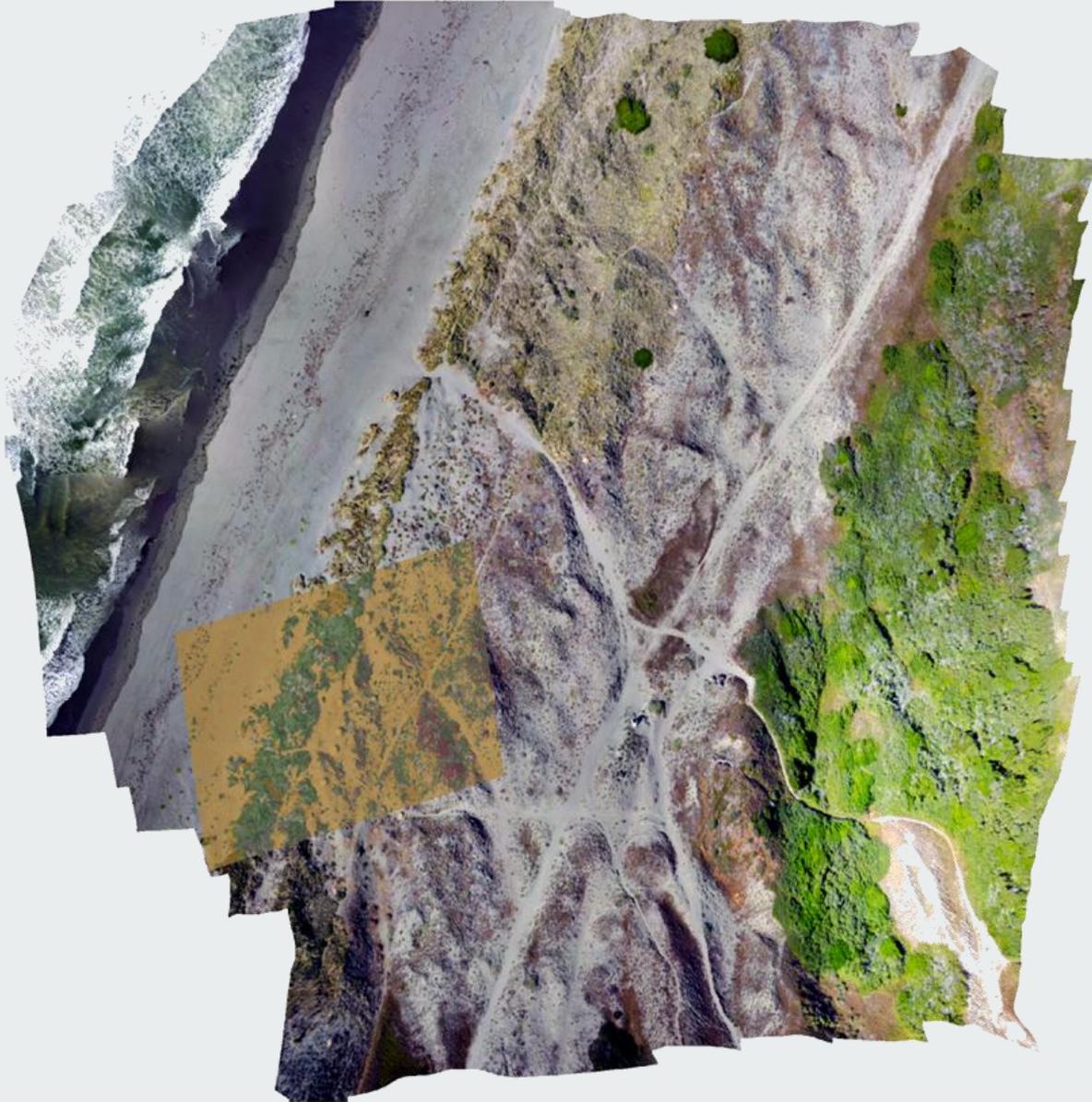
Objective

To determine which classification method was most accurate in identifying dune features when performed on a large, diverse area

Importance of Research

- Monitoring and managing vegetation over a large area
- Land management and restoration

Data Sources

- NAIP Images: 2012, 2014, 2016

- UAV Orthomosaic: 2017

Classification Methods

- Unsupervised

- Supervised

- Feature Extraction

Workflow Feature Extraction

Example Based Feature Extraction

- Scale Level: 55

- Merge Level: 60

- Classes

   -Sand

    -Beach grass

    -Shore Pine

    -Other vegetation

Results

Unsupervised Classification
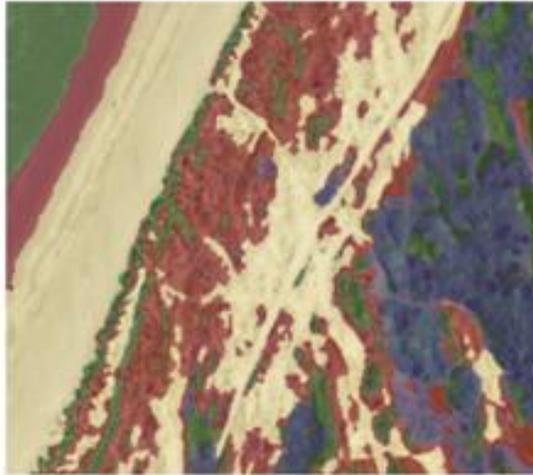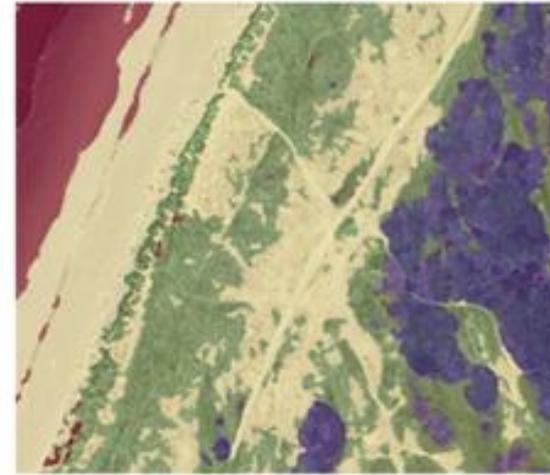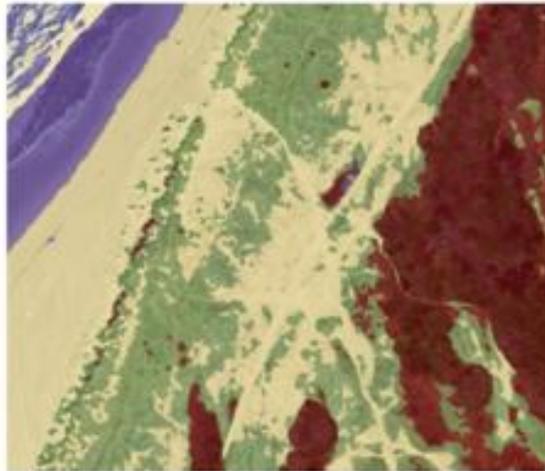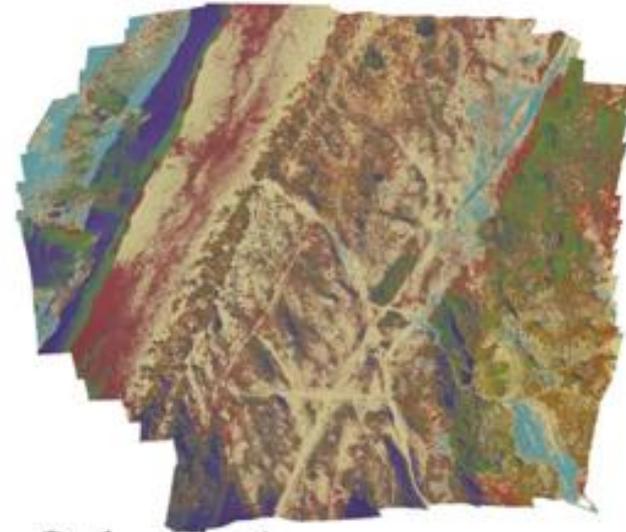
2012

2014

2016

Orthomosaic

European beachgrass · Other Vegetation · Unclassified

Shore pine · Sand · Ocean · 0 25 50 100 Meters · N

Supervised Classification

2012

2014

2016

Orthomosaic

■ European beachgrass	■ Other Vegetation	■ Unclassified		
■ Shore pine	■ Sand	■ Ocean	0 25 50 100 Meters	N
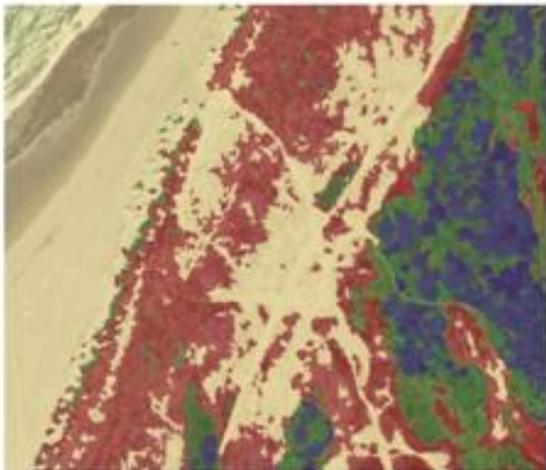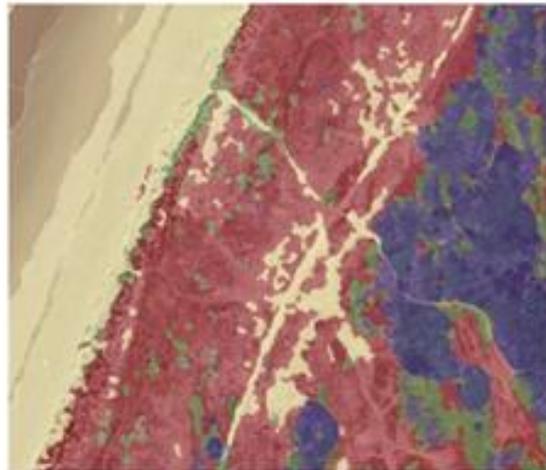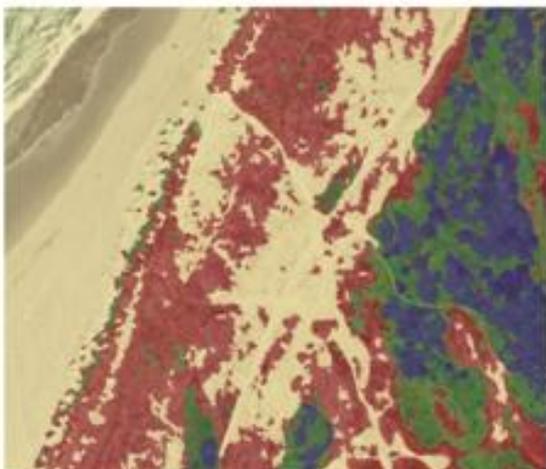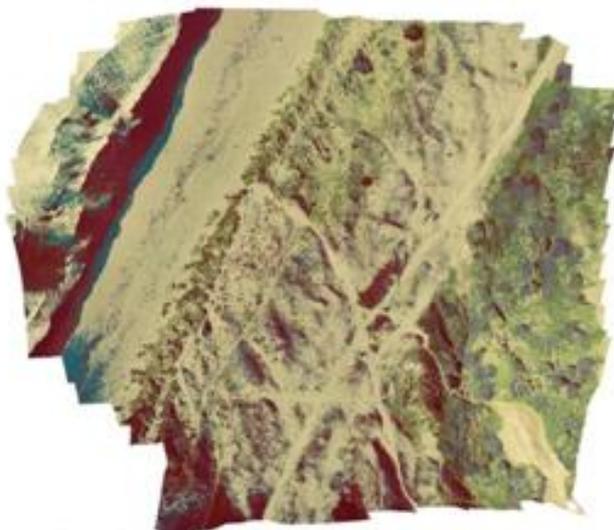
Feature Extraction

2012

2014

2016

Orthomosaic

Legend:
- European beachgrass
- Other Vegetation
- Unclassified
- Shore pine
- Sand
- Ocean

0 25 50 100 Meters

N
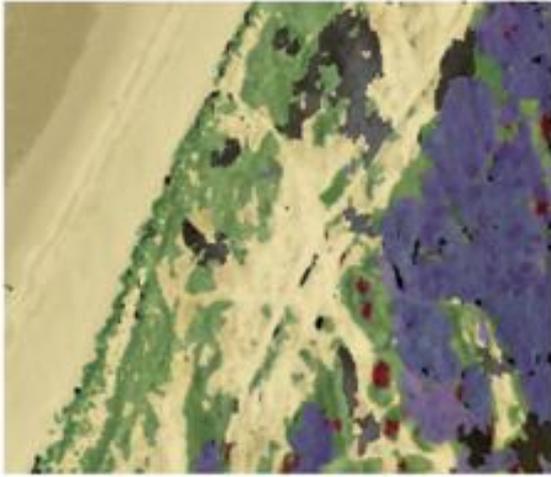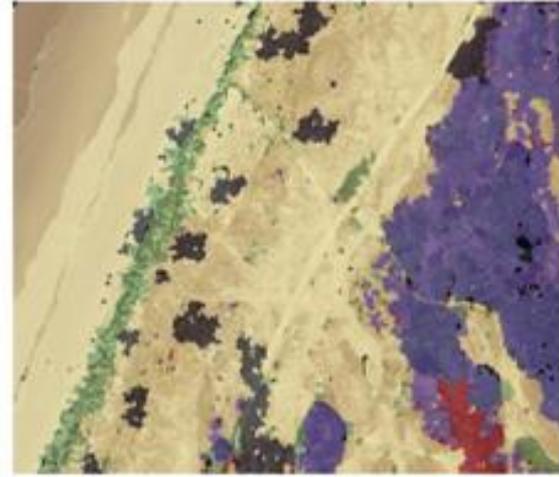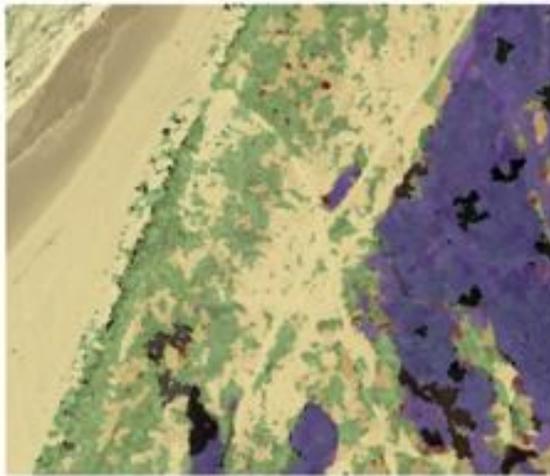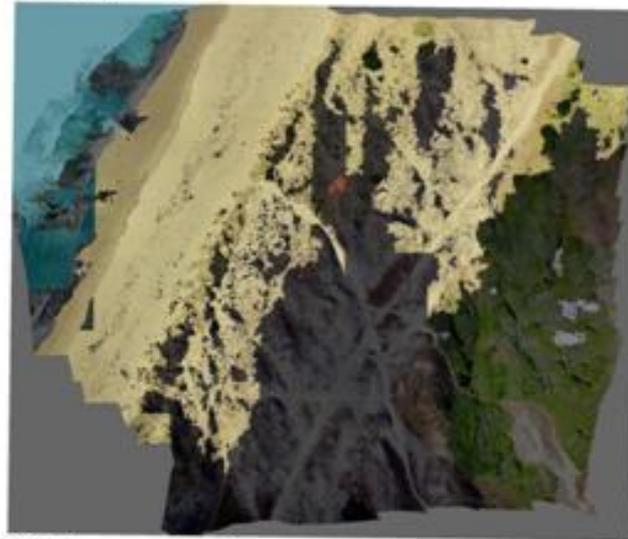
Comparison of overall accuracy of three classification methods: supervised, unsupervised and feature extraction

Year	Image	Classification Overall Accuracy (%)		
		Unsupervised	Supervised	Feature Extraction
2012	NAIP	82	90	64
2014	NAIP	62	80	40
2016	NAIP	60	86	46
2017	Orthomoasic	44	40	30

Land-use/cover transitional acreage from NAIP supervised classification of each sub period and the full period 2012-2016

Categories	Sand	Other vegetation	Shore pine	Beach grass	Total	% Accuracy	
						Producers	Users
2012 - 2014							
Sand	5.6594	2.8076	0.0042	0.1619	8.6331	98	66
Other vegetation	0.0843	4.6985	0.4586	1.1804	6.4218	59	73
Shore pine	0.0035	0.0430	2.9939	0.2330	3.2734	86	91
Beach grass	0.0057	0.3902	0.0166	0.0665	0.4789	4	14
2014 - 2016							
Sand	5.6357	0.0642	--	0.0205	5.7205	67	99
Other vegetation	2.6285	4.8645	0.0106	0.4053	7.9088	87	62
Shore pine	0.0042	0.0363	1.9534	1.4723	3.4661	98	56
Beach grass	0.1018	0.6306	0.0292	0.8772	1.6388	32	54
2012 - 2016							
Sand	7.4650	1.0356	--	0.0857	8.5864	89	87
Other vegetation	0.8836	4.1533	0.1399	1.2237	6.4005	74	65
Shore pine	--	0.0351	1.8525	1.3813	3.2690	93	57
Beach grass	0.0215	0.3716	0.0007	0.0845	0.4784	3	18

Discussion

- Supervised classification worked well in this study, contributing moderate agreement or accuracy of kappa analysis [60%].

- The orthomosaic image was at a resolution that was too high for the feature extraction to accurately assign the correct class.

- A high topographic variability of orthomosaic image, which produced numerous fragments resulting in lower accuracy for the classifications.

- The study can be expanded on furthered to support the detailed mapping of European beach grass, a predominant invasive species in the dune, using a high-resolution ortho imagery.

Acknowledgements