

Hyperspectral **Remote Sensing Applications to** the Study of **Native Prairie** Vegetation John P. Tandarich, William J. Sluis, Chris J. Johannsen, Larry Biehl and Paul Carter

Figure 1. The Electromagnetic Spectrum



Figure 2. Plant Canopy Reflectance



Figure 3. Hyperspectral Study Sites

Reference Sites
Drummond Area
Blodgett Road West
Grant Creek
Restoration Site
Blodgett Road



Table 1. G	Grassland	soils of	the Dol	lomite	Straths
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		Soil Drain	age Class		
Bedrock Depth	Poor		Well		
(cm) and Depth	Soil	Particle Size	e Class (clay	0⁄0)	
Classes	<35	>35	<35	>35	
< 25	Romeo		Marblehead		
Very Shallow					
25 - 50	Joliet		Channahon	Edmund	
Shallow					
51 - 101	Faxon	Millsdale†	Rockton,		
Moderately			Ripon		
Deep					
102 - 152	Drummer,	Peoton e §	Plattville,		
Deep	Selma§		Ashdale		/
> 152	Drummer,	Peotone†	Jasper,		
Very Deep	Selma		Proctor	//	

† Includes soils with mollic epipedons to bedrock depth.
 § Bedrock substratum phase.

Table 2. Twinspan Dolomite Strath Grassland PlantCommunities.

No.	Soil Depth	Dominant Vegetation	Moisture	
1	Very shallow	Upland annuals	Dry	
2	Very shallow	Upland perennials	Dry	
3	Shallow	Wetland perennials	Wet	
4	Shallow	Upland perennials	Dry mesic	
5	Moderately deep	Upland-wetland	Wet mesic to	
		perennials	wet	
6	Moderately deep	Wetland	Wet	

Table 3. Midewin Region Edaphic Analogues	
Soil Series or Phase	TWINSPAN (TC) Community
Channahon	4
Drummer, bedrock substratum	3
Faxon	6
Joliet	3
Marblehead	2
Millsdale	3
Millsdale, deep	3
Peotone	3
Peotone, bedrock substratum	3
Plattville	4
Romeo	3
Rockton	4
Selma, bedrock substratum	5

Figure 4. Image Locations





Figure 6. Grant Creek Prairie State Nature Preserve

• Data Point

N



GC120 GC11 GC116 GC115 GC113 GC114 GC111 GC106 10101 GR GC104 GC103 GC102 GC101 GC098 GC096 GC094 GC089 GC092 GC093 GC090 GCO GC084 GC087 GC085 GC083 GCOS GC079 GC080 GC078 GC075 GC077 GC07 GC067 GC063 GC062 GC056 GC053 GC051 C04 GC046 GC044 GC041 GC026 GC023 GC022 GC019 GC01 GC016 GC014 GC013 GC011 GCOOS GC01 6GC008 GC007 GC003 GC002

Figure 7. Grant Creek Twinspan Communities



Figure 8. Grant Creek MultiSpec Clustering



Figure 9. Grant Creek: Spectrally Derived and Field Verified Plant Assemblages





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Palette



Table 4. Grant Creek: Spectrally-derived and field verifiedplant assemblages

No.	Name
1	Poa, dense grasses
2	Andropogon spoparius
3	Sedges (dense Helianthus grossesseratus)
4	Sedges, Calamagrostis Canadensis, standing water
5	Poa, Solidago altissima
6	Sedges, Calamagrostis Canadensis, no standing water
7	Sedges (sparse Helianthus grossesseratus)
8	Sparse grass (dense Helianthus grossesseratus)

Figure 10. Grant Creek: Ground Reference Photographs of Three of the Eight Spectrally-Derived Assemblages



Community 2: Andropogon scoparius



Community 3: Sedges, dense H. grossesseratus



Community 4: Sedges (C. canadensis), standing water M004 M001 M008 M006 M003 M007 M005 M008 M000 M007 M009

M011M010 M013 M012 M014

M016 M017 M020M019 M022 M021 M025 M027 M028

MO29 MO31 MO30 MO32 MO37 MO35 MO36 MO38 MO40

M045 M044

M229 M228 M227 M223 M225M226 M222 M224 M221

M220 M219 M218 M216 M218 M216 M217 M205 M206 M207 M207 M207 M207 M207 M207

M303 M302 M307 M312 M310 M308 M314 M318 M313 M315 M316 M319 M322 M320 M324 M323 M321

M325

M326 M327 M330 M328 M331 M329 M332 M333 M334 M335 M336

M337

Figure 11. Drummond Prairie Sites

Drummond Thirty Cluster Mask

08^{M006} M004^{M001} M003^{M007} M005 M009

M011M010 M013 M012

M014

M016 M020M019 M022 M021 M026 M024^{M023} M027 M028

MO29 MO31 MO30 MO32 MO37 MO35 MO36 MO38 MO40

MO45 MO44

Data Points

1

2

3456789

10

- Very Shallow Annual Dry (1)
 Very Shallow Perennial Dry (2)
 Shallow Wet (3)
 Mesic Prairie (4)
- Wet-Mesic Prairie (5) Clusters

M2 M223 M225M226 M224 M222 M22 M220 M214 M216 M215 MO15 M217 M201 M202 M203 M301 [•]M303 M302 M30 M309 M312 M308 M310 M318 M317 M313 M315 M316 M319 M322 M320 M324 M323 M321 M325 M326 M327 M330 M328 M331 M329 M332 • M333 M334 • M335

 Δ_{N}

M210

M209 M208 Figure 12. Drummond: MultiSpec Pixel Clustering

50 0 50 100 Meters

•M336



Figure 13. Drummond: chs. 25, 4, 73