What I learned while creating the Critical Dune Tool:

Opportunities for improving critical dune policy and management

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Project Goals

- Build a *spatial decision support tool* within Michigan MIV

➢ Science

Provide a more comprehensive picture of the landscape

➢ Technology

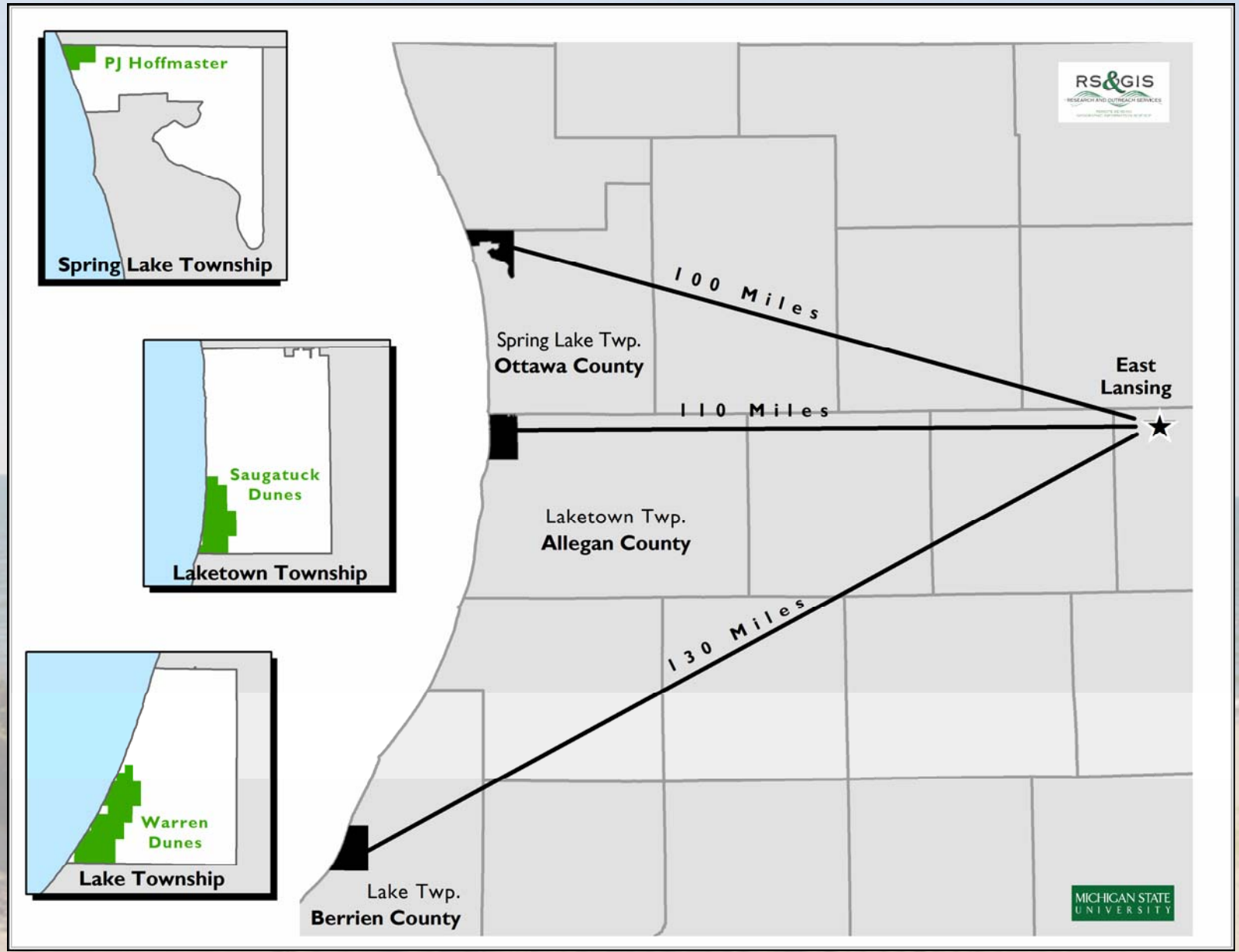
Improve process & Increase efficiency

✓ Research Question:

Can the MDEQ provide staff with a tool that enables them to exhaust fewer resources in the field, while providing them with more site information?

Implications for the MDEQ

- Quickly and efficiently gather information needed during the permit process
- Provide additional site knowledge to the agent
- GIS can act as a permanent database of site-specific measures and applicant information



Map of the Three Field Sites selected by the Project Team

Critical Dune Tool Design

Reviewed…

the application and site inspection form

Solicited…

feedback from MDEQ agents

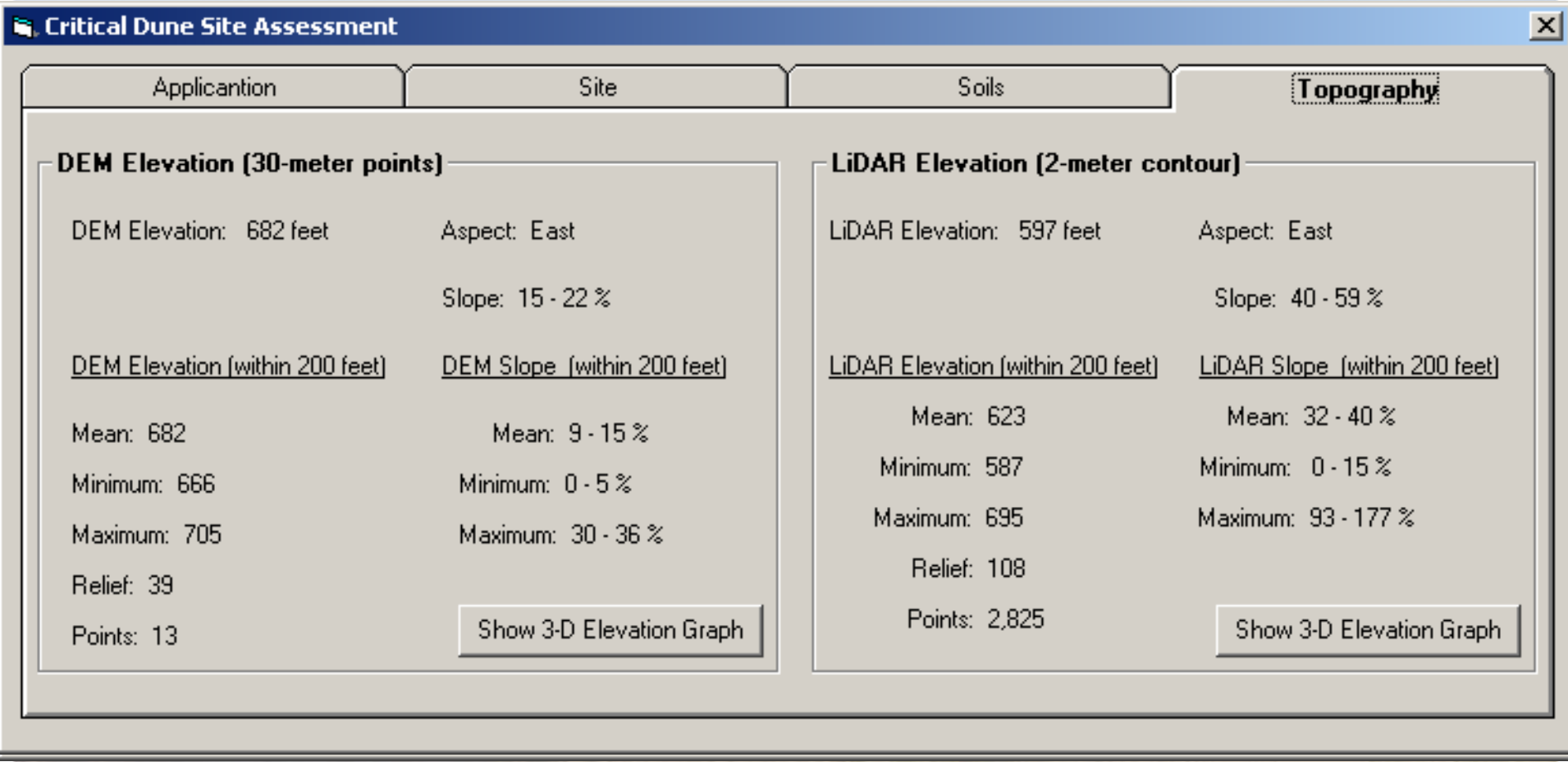
Evaluated…

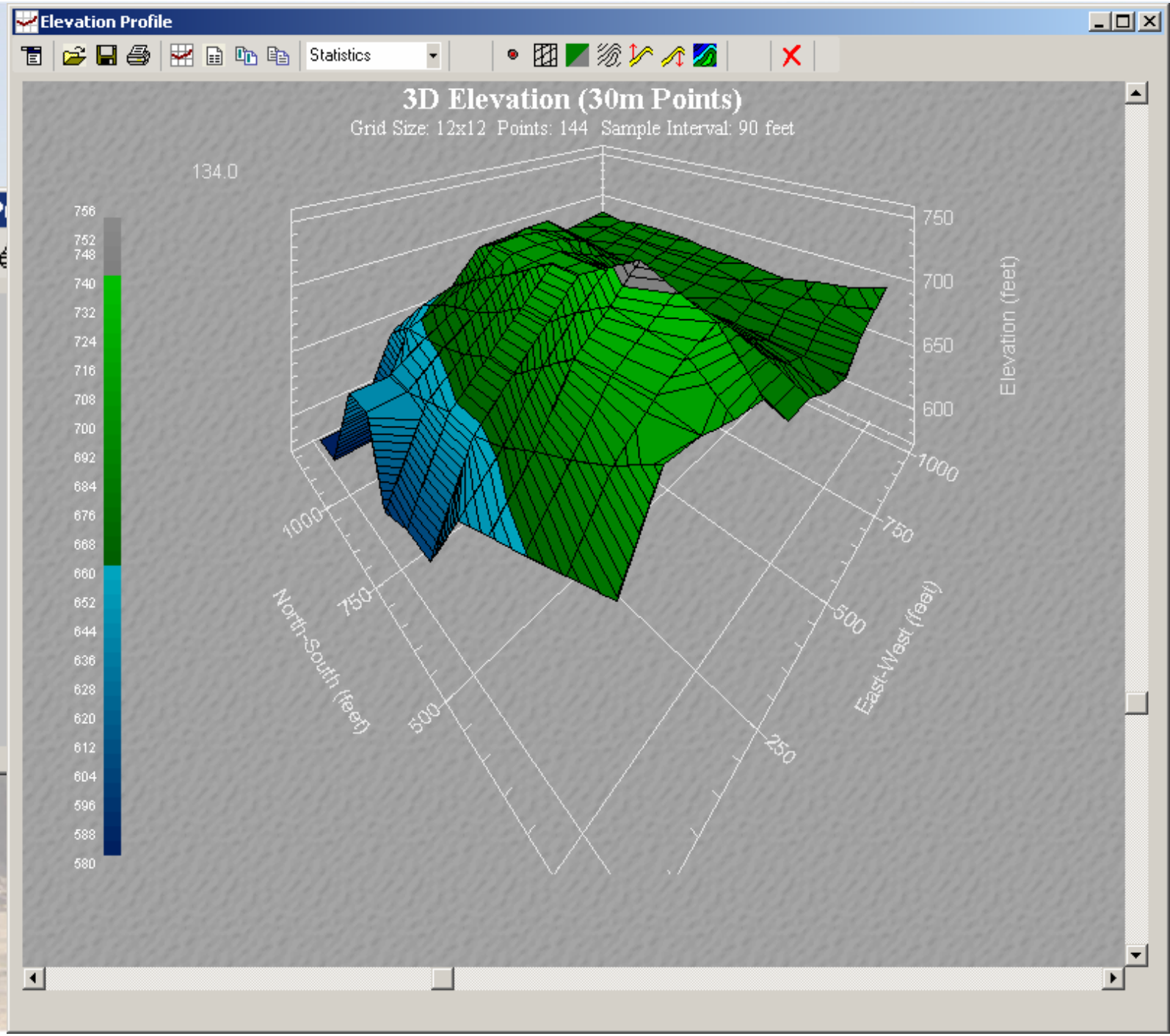
digital data sources/quality

Designed

the tool to mimic this information w/additional information about the site

Critical Dune Tool Design




Elevation Profile
Statistics
3D Elevation (30m Points)
Grid Size: 12x12 Points: 144 Sample Interval: 90 feet
134.0
756
752
748
740
732
724
716
708
700
692
684
676
668
660
652
644
636
628
620
612
604
596
588
580
750
700
650
600
Elevation (feet)
1000
750
500
250
North-South (feet)
1000
750
500
East-West (feet)

Critical Dune Tool Design

- Collectively called the *Critical Dune Site Assessment*

- Information provided for and by the user appears in a **report** and in a user **database**

Digital Data

- Elevation & Terrain Derivatives
  LIDAR (2m) vs. NED (30m)
- Land use/ land cover
  2002 (sub-acre) vs. 1978 (2.5 acre)
- Soils
  SSURGO (5 acres) vs. STATSGO(1544 acres)
- Parcels w/PIN
  for locating and tracking

	Field Site 1	Field Site 2	Field Site 3
Location	Lake Township, Berrien County	Laketown Township, Allegan County	Spring Lake Township, Ottawa County
Elevation Data	LIDAR 2-meter, NED 30-meter	NED 30-meter	NED 30-meter
Lu/Lc Data	1978, 2002 (shoreline)	1978, 2002 (shoreline)	1978, 2002 (shoreline)
Soils Data	SSURGO	STATSGO	STATSGO
Additional Data	Parcels w/PIN	Parcels w/PIN	NA
Overall Data Quality	High	Medium	Low

Field Data Collection

- Trimble Pro XRS GPS Unit
- Compass, w/built in slope indicator
- Soil Auger
- Observation

	Sand OTB	Ctrl. Hardwood	Sgl. Family	Beaches & Riverbanks	
Sand OTB	15	7	0	0	22
Ctrl. Hardwood	4	13	0	0	17
Sgl. Family	0	2	5	0	7
Beaches & Riverbanks	0	1	0	0	1
	19	23	5	0	47
Producer Accuracy	78.95%	56.52%	100.00%	0.00%	
User Accuracy	68.18%	76.47%	71.43%	0.00%	
Overall Accuracy	**70.21%**				

Data	Source	County	RMSE	MAE	MAX	MIN
Elevation	**LIDAR**	Berrien	**1.658**	**1.182**	5.430	0.027
Elevation	**NED**	Allegan	**17.913**	**15.092**	36.750	-0.354
Slope	**LIDAR**	Berrien	**14.907**	**9.87**	44	1
Slope	**NED**	Allegan	**27.80**	**21.61**	-67.00	0.00

Conclusions…

- While not yet omitting fieldwork, there is potential for the use of this tool in policy management
  - High resolution data sets are a necessity if the tool is to be used
  - Parcels w/PIN are critical for locating/tracking sites

So, what did I learn?

- There are some steep, yet stable slopes out there
- There is little accountability when it comes to CZM:
  - Not one state employs a database on coastal statistics or resources affected by permits or policies (Bernd-Cohen and Gordon 1999)
  - In Michigan, relatively few sites ever receive follow-up visits

Research shows that Michigan is not alone…

- ALL coastal mangers are overburdened with IMPLEMENTATION…

  -the focus is on the current decision processes, not monitoring and evaluating past actions.

- In order for a coastal program to change or improve, program managers must have the time and resources available to evaluate the state of coastal resources

(Bernd-Cohen and Gordon 1999; Hershman et al. 1999)

Thank you all for attention….

And a special thanks to all who helped make this project a success, including Matt Warner (MDEQ), Justin Booth (MSU RS&GIS), and Jeff Schlueter (field assistant).