Supporting Information

Potential Cirsium pitcheri Habitat

Not Habitat for Cirsium pitcheri

Miller High Dunes

Ogden Dunes West

State Park Big Blowout

West Beach

Ogden Dunes East

BEACH	FOREDUNE	INTERDUNAL TROUGH	SECONDARY DUNES	FORESTED DUNES
Annual plants	Beachgrass and other colonizing species	Beachgrass Bunchgrass Annual and perennial herbs	Bunchgrasses Annual and perennial herbs Occasional shrubs	Trees Understory herbs

HIGH WIND EXPOSURE
Unstable sands
Low plant density
Early successional plant communities

LOWER WIND EXPOSURE
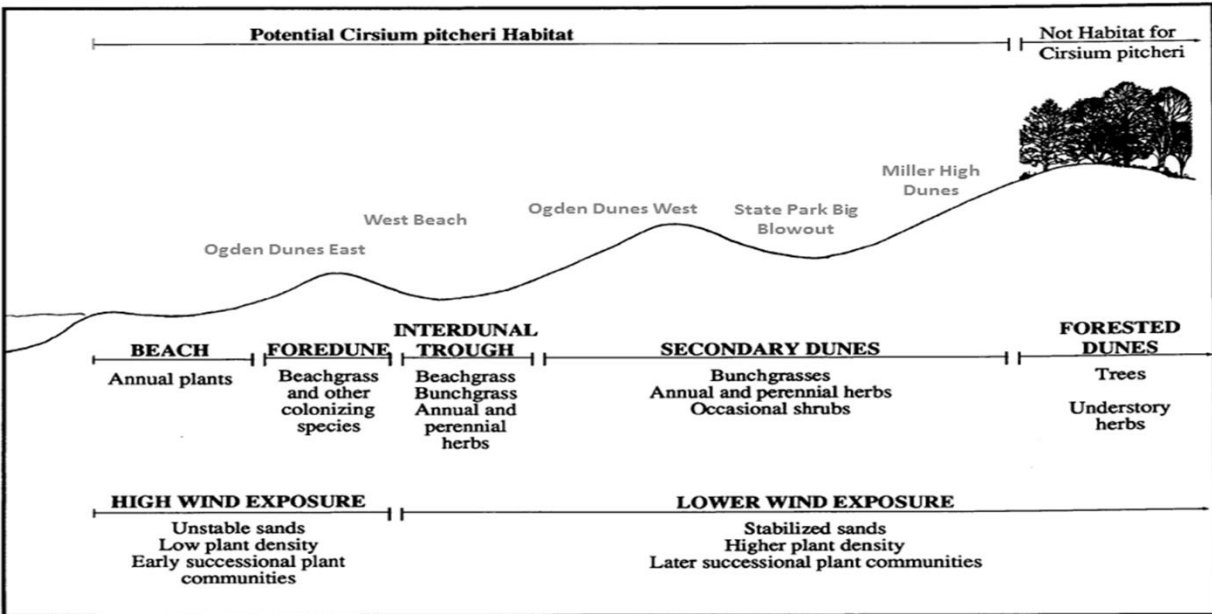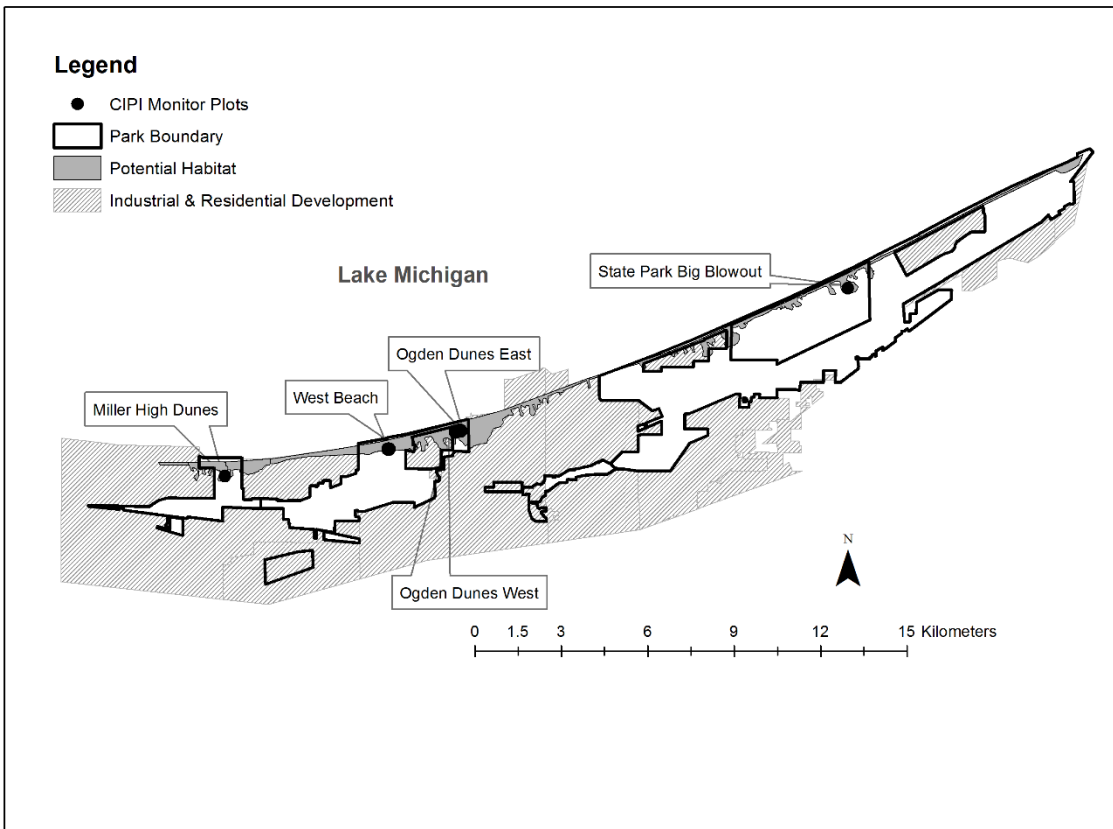Stabilized sands
Higher plant density
Later successional plant communities

Supporting Information 1. Structure of habitat surrounding Lake Michigan, the formation of dune communities, successional stage, and the relative position of five Indiana Dunes *Cirsium pitcheri* populations (Adapted from McEachern 1992).

Supporting Information 2. Stage classes and Moloney size class (mm) for each of the five Indiana Dunes *Cirsium pitcheri* populations.

Populations	Stage-Size Classes					
	S	J1	J2	J3	J4	A
Miller High Dunes	1st year	<3.7	3.8-5.6	5.7-10.0	>10.0	Flowering
Ogden Dune East	1st year	<4.4	4.5-7.2	7.3-12	>12.0	Flowering
Ogden Dunes West	1st year	<4.5	4.6-7.0	7.1-12.0	>12.0	Flowering
State Park Big Blowout	1st year	<4.3	4.4-5.5	5.6-9.0	>9.0	Flowering
West Beach	1st year	<4.0	4.1-7.0	7.1-15.0	>15.0	Flowering

Supporting Information 3: Study populations in reference to potential habitat and located along the southern tip of Lake Michigan in the Indian Dunes National Lakeshore and Indiana Dunes State Park near Porter, Indiana.

Supporting Information 4. Comparison of twelve possible parameter combinations of demographic stochasticity, environment stochasticity and correlations with mean squared error values, standard errors, confidence intervals and ranking.

Demographic Stochasticity	Environmental Stochasticity	Within Population Correlation	MEAN SQUARED ERROR	SE	95% LOWER	95% UPPER	Rank
YES	LOG	ALL	2629	832	997	4261	6,7
		FS	2576	862	886	4267	5
		FSK Uncorrelated *	2629	847	968	4290	6,7
	NORMAL	ALL	31237	29468	-26520	88995	12
		FS	1761	636	514	3008	3
		FSK Uncorrelated	1817	650	541	3093	4
NO	LOG	ALL	2722	862	1030	4413	9
		FS	2674	842	1023	4324	8
		FSK Uncorrelated	2789	864	1095	4483	10
	NORMAL	ALL	1704	602	522	2885	2
		FS	10603	9012	-7061	28269	11
		FSK Uncorrelated	1692	597	521	2863	1

*Chosen Model