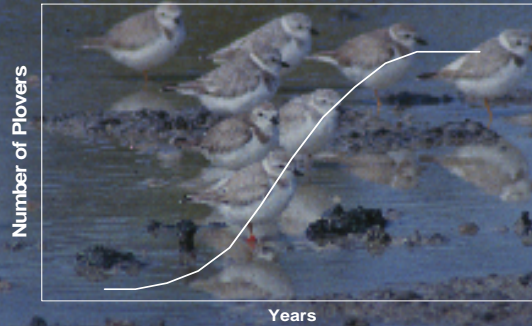


PIPING PLOVER POPULATION REGULATION ON A REBUILT BARRIER ISLAND



Jim Fraser, Jon Cohen, Larry Houghton

T & E Conservation

- Increase numbers
 - Is population regulated?
 - If so, how?
 - What determines equilibrium density?

Plover Ecology

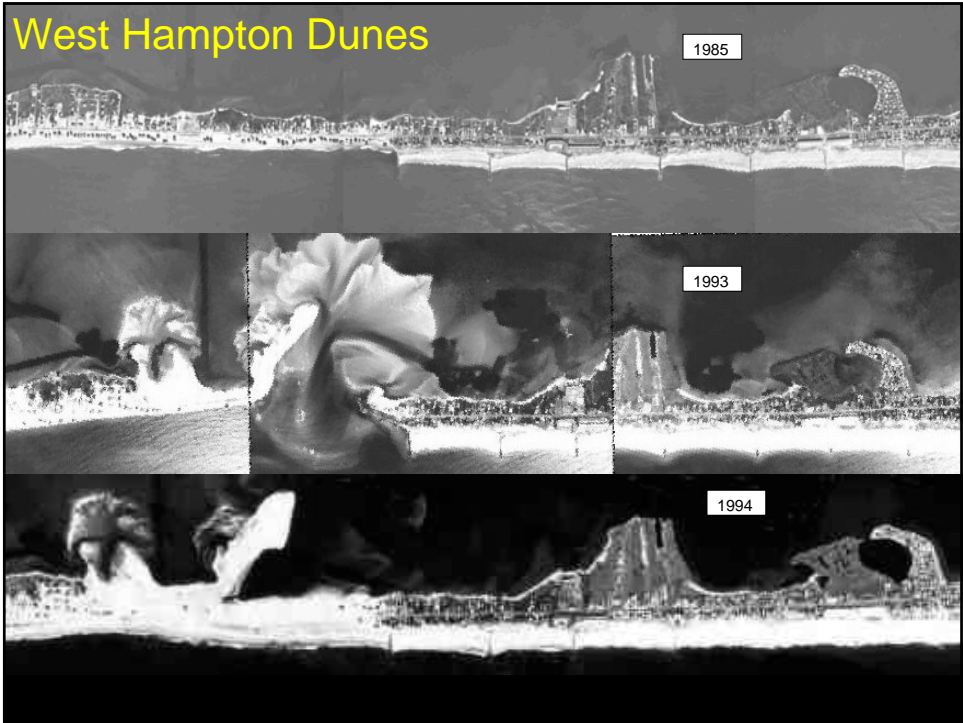




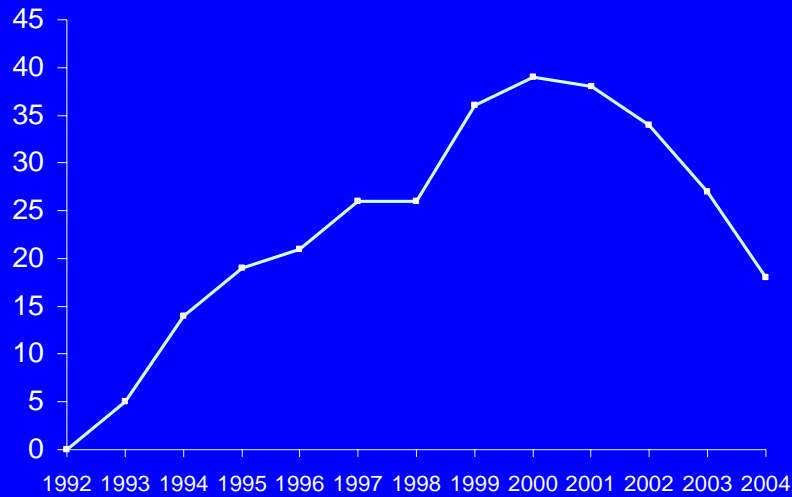
Atlantic Coast Plover Population

- Slowly increasing since listed in 1986
- U.S. reproduction 1992-2001 = 1.34 fledglings/pair

West Hampton Dunes



Number of Plover Pairs



Study Goals



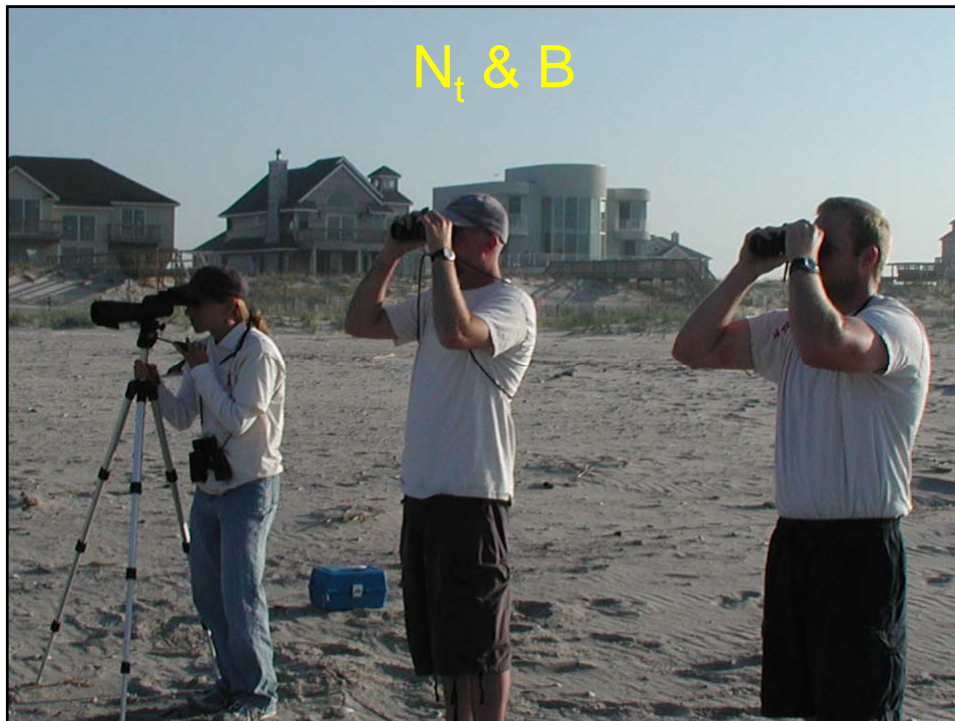
- Piping Plovers at West Hampton Dunes N.Y.
 - Is population regulated?
 - If so, how?
 - What determines equilibrium density?

Methods



Variables Leading to
Population Changes:

$$N_{\text{year}_{t+1}} = N_{\text{year}_t} + [B - D] + [I - E]$$

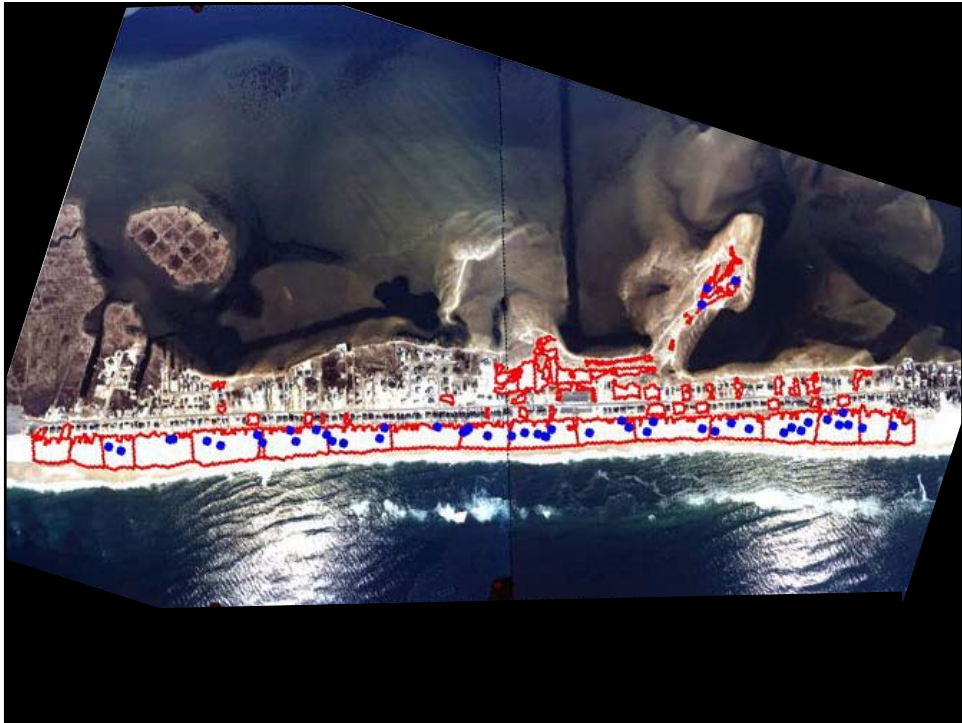


D = Mortality Rates = 1-S

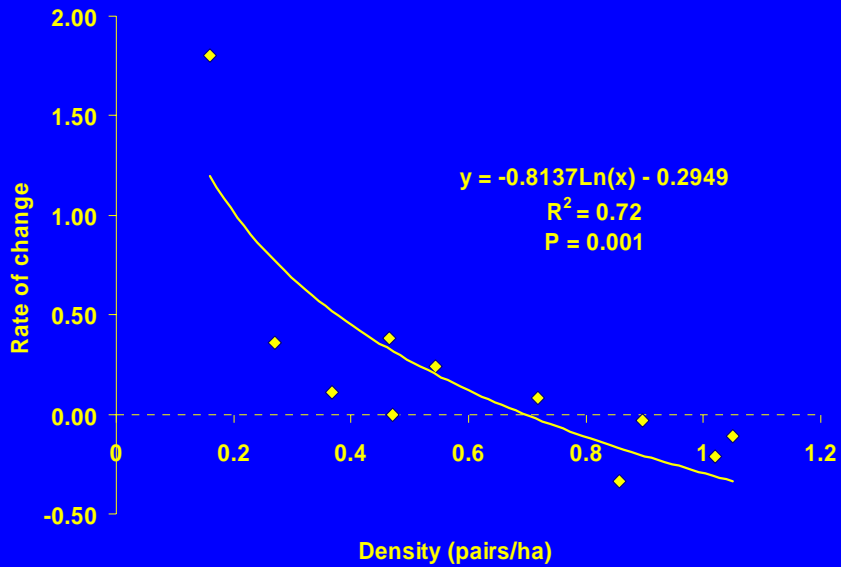
	Adult S	Juv S
Loefering 1992	0.71	0.41
Melvin and Gibbs 1995	0.74	0.48
Larson et al. 2000	0.74	0.32
This Study (assumed)	0.74	0.48

I/E = Observed N – Expected N



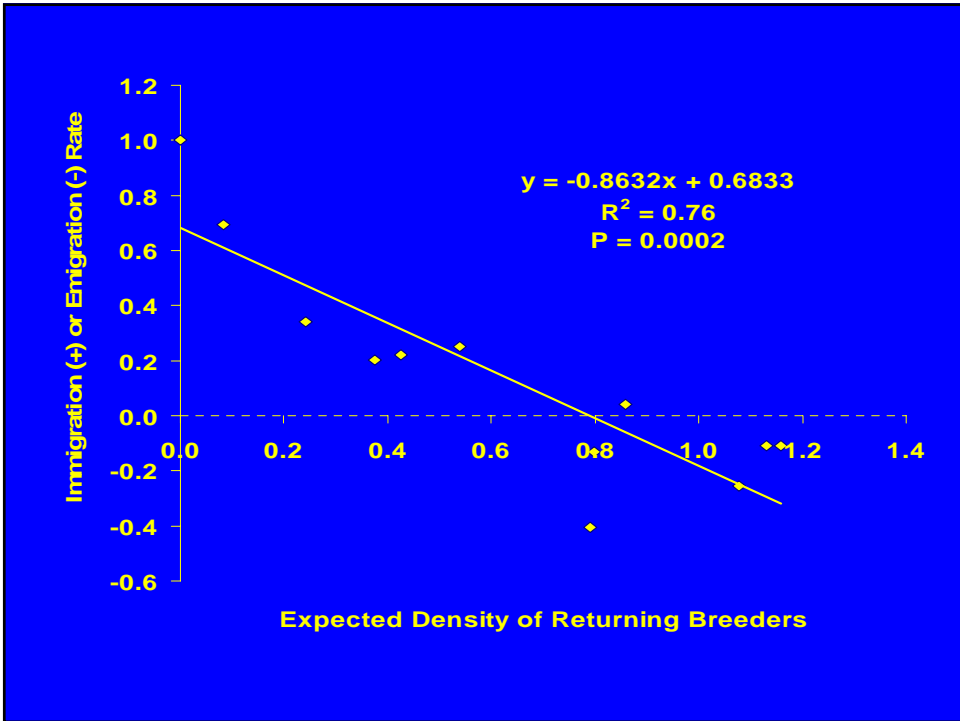
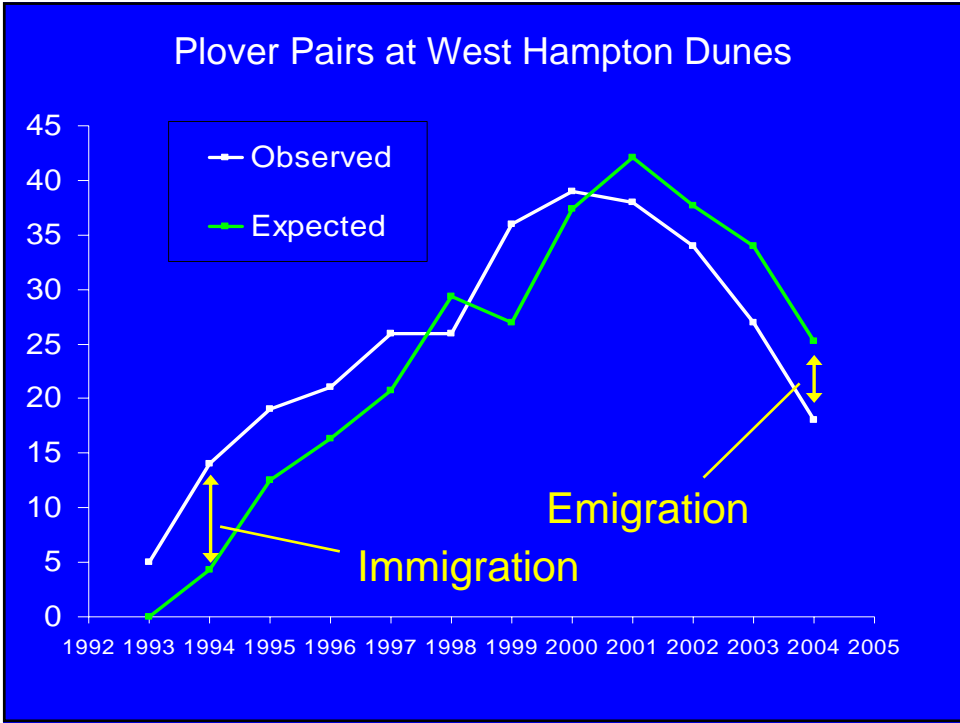


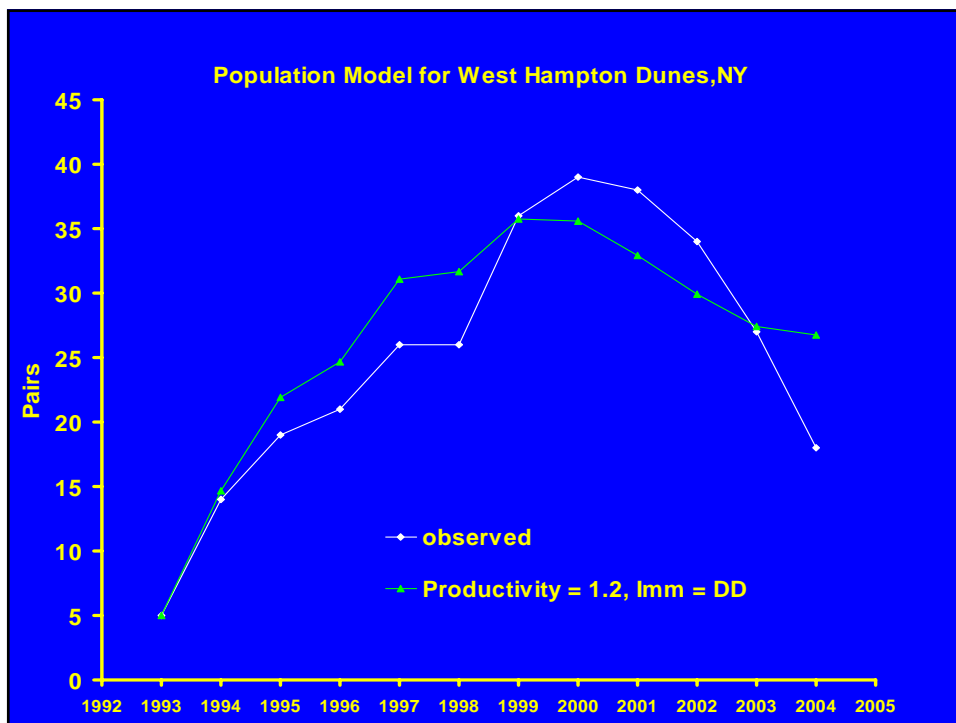
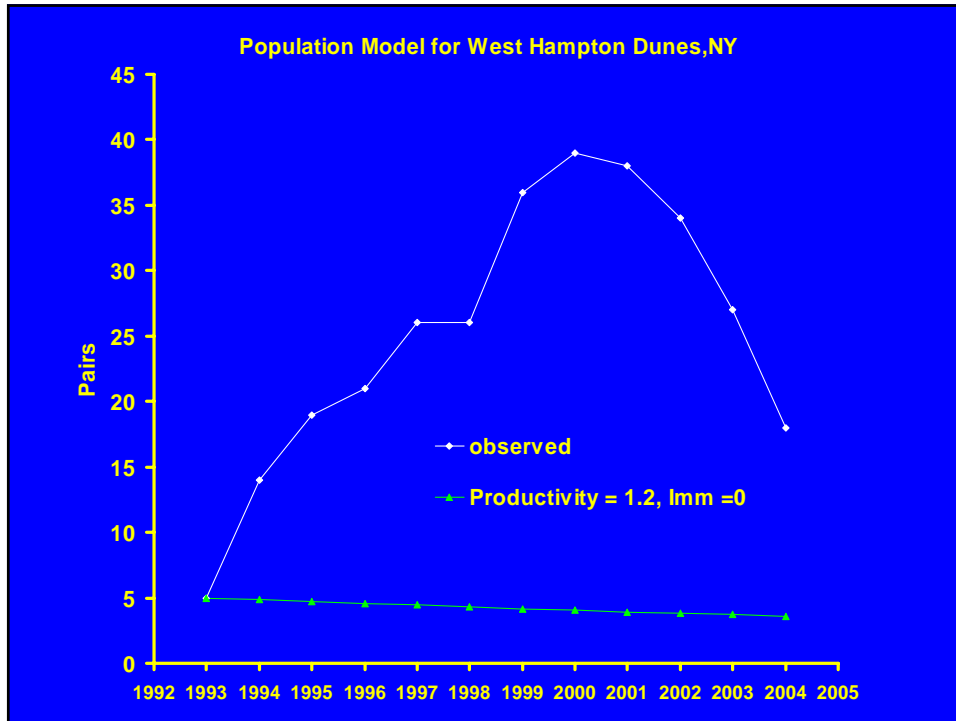
Density Dependent Population Changes



Correlation With Density

	r	P
Fledglings/pair	0.02	0.9
Chick Survival	0.1	0.8
Nest Survival, Other Vital Rates		>0.5
Adult/Fledgling Survival		?

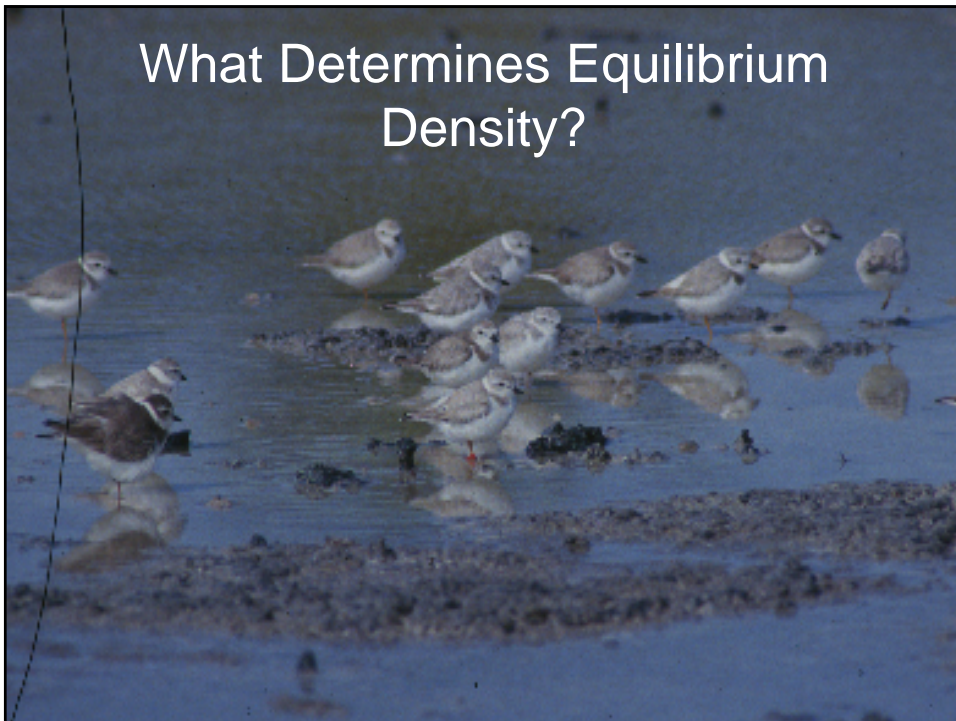




Emigration from WHD

Year	Nesting habitat (ha)	% birds resighted	% resights breeding
2000	43.3	-	-
2001	36.3	-	-
2002	33.3	22/26 = 85%	19/22 = 86%
2003	31.5	22/28 = 79%	14/22 = 64%
2004	32.0	18/25 = 72%	15/18 = 83%

What Determines Equilibrium Density?



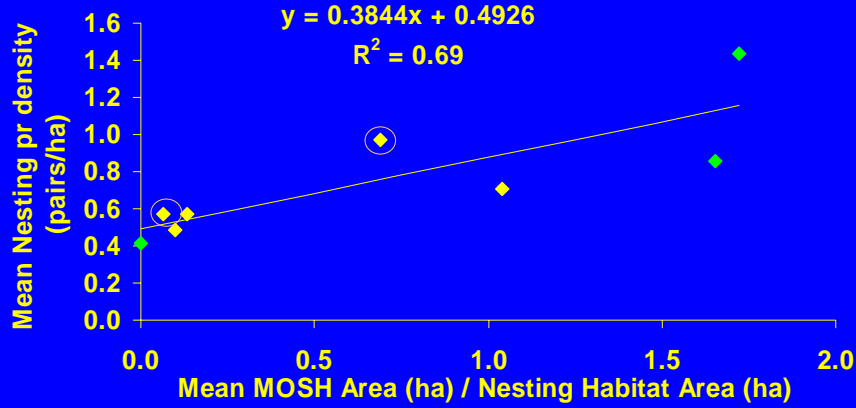
Moist-Sediment Habitat (MOSH)

- Low-wave energy (mudflats, sandflats, ephemeral pools)
- Previous studies
 - Predicts presence of breeding plovers
 - More food
 - Higher chick foraging rates
 - Faster chick growth (small sample)
 - Higher chick survival (sometimes)

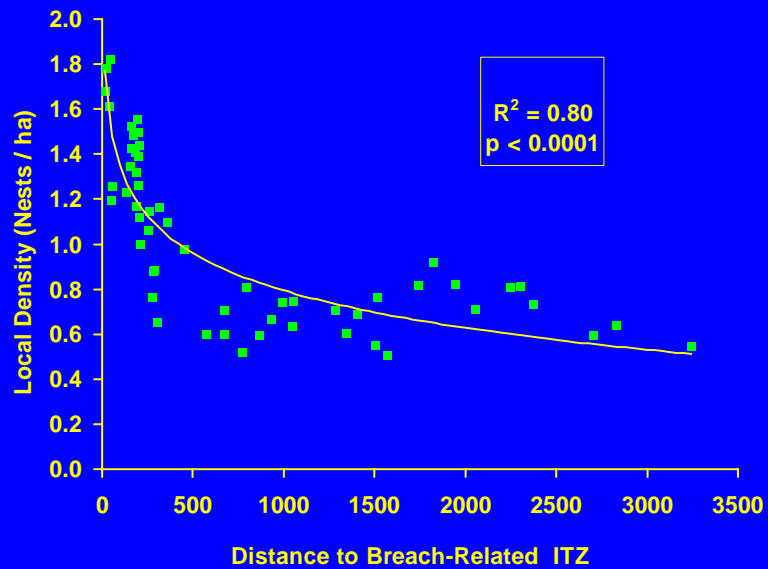
Average Density 2001-2004

Area	Pairs/ha
WHD	0.87 ± 0.11
Adjacent Area	0.53 ± 0.07

Piping Plover Density, NY and Monomoy, MA 2001-2003



Piping Plover Density, West Hampton Dunes, N.Y. 2001



Main Points

- Population regulated by immigration and emigration (Might be different if nearby populations were at equilibrium density)
- Habitat quality (food supply) determines density within a given area of nesting habitat
- Territorial behavior limits density

Conservation Implications:
Can increase local density



Regionally, reproduction must be $>$
1.3 Chicks/pair



Thanks to:



**New York District,
U.S. Army Corps of Engineers**



Thanks to:

- National Park Service
- New York DEC
- U. S. Fish and Wildlife Service
- U.S.G.S. Biological Resources Division
- New York State Parks
- New York County Parks
- The Nature Conservancy
- Town of Southampton, NY
- Village of West Hampton Dunes
- Village of Westhampton Beach, NY

