

Ecological Research at Shell Key Preserve

Pinellas County Dept. of Env. Mgmt.
Environmental Lands Division
Research Section

1 Feb 2007

Background

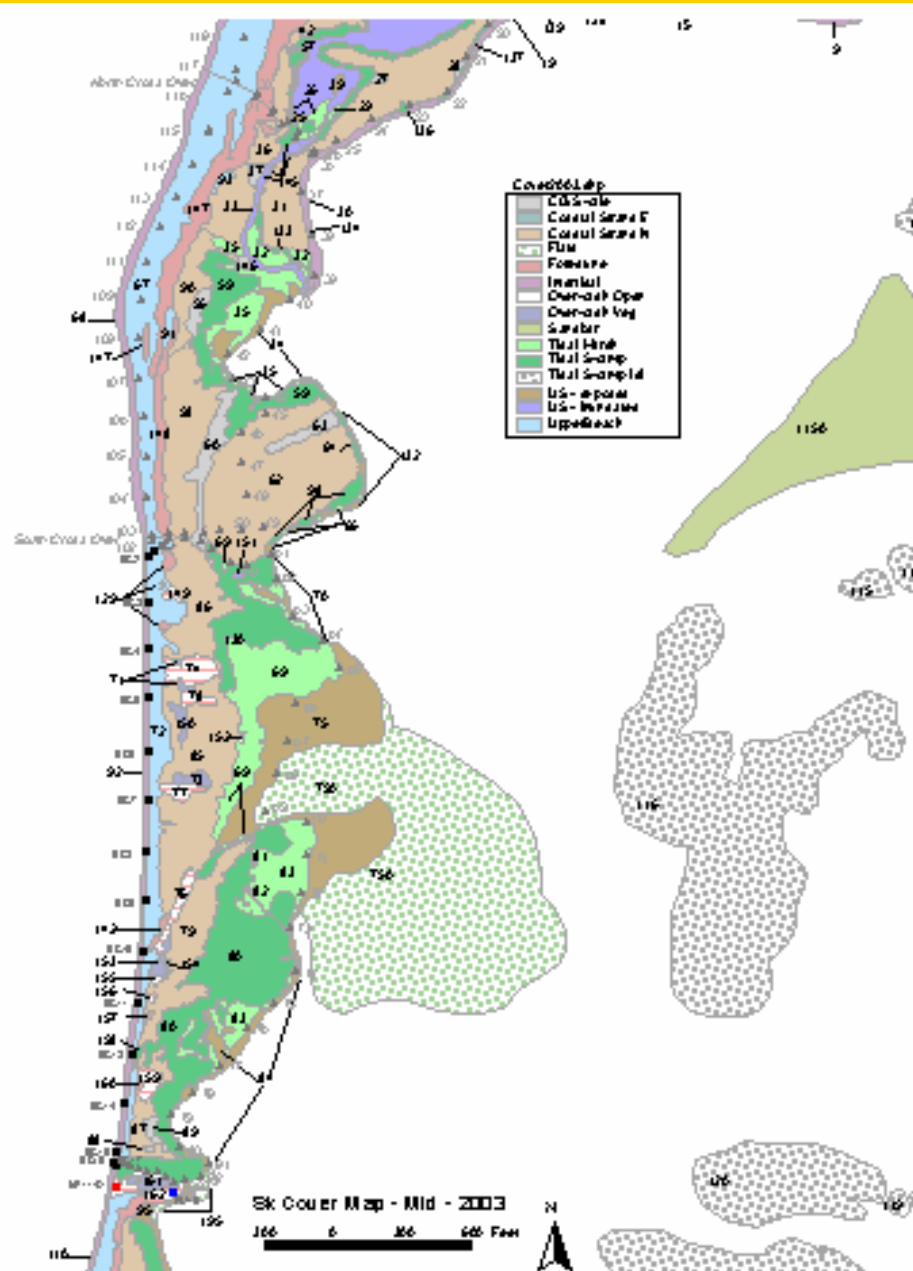
- Shell Key Preserve established 2000
- Managed by Pinellas County Department of Environmental Management
- Management Plan
 - Resource Management Component
 - Public Use Component

Major Research Efforts

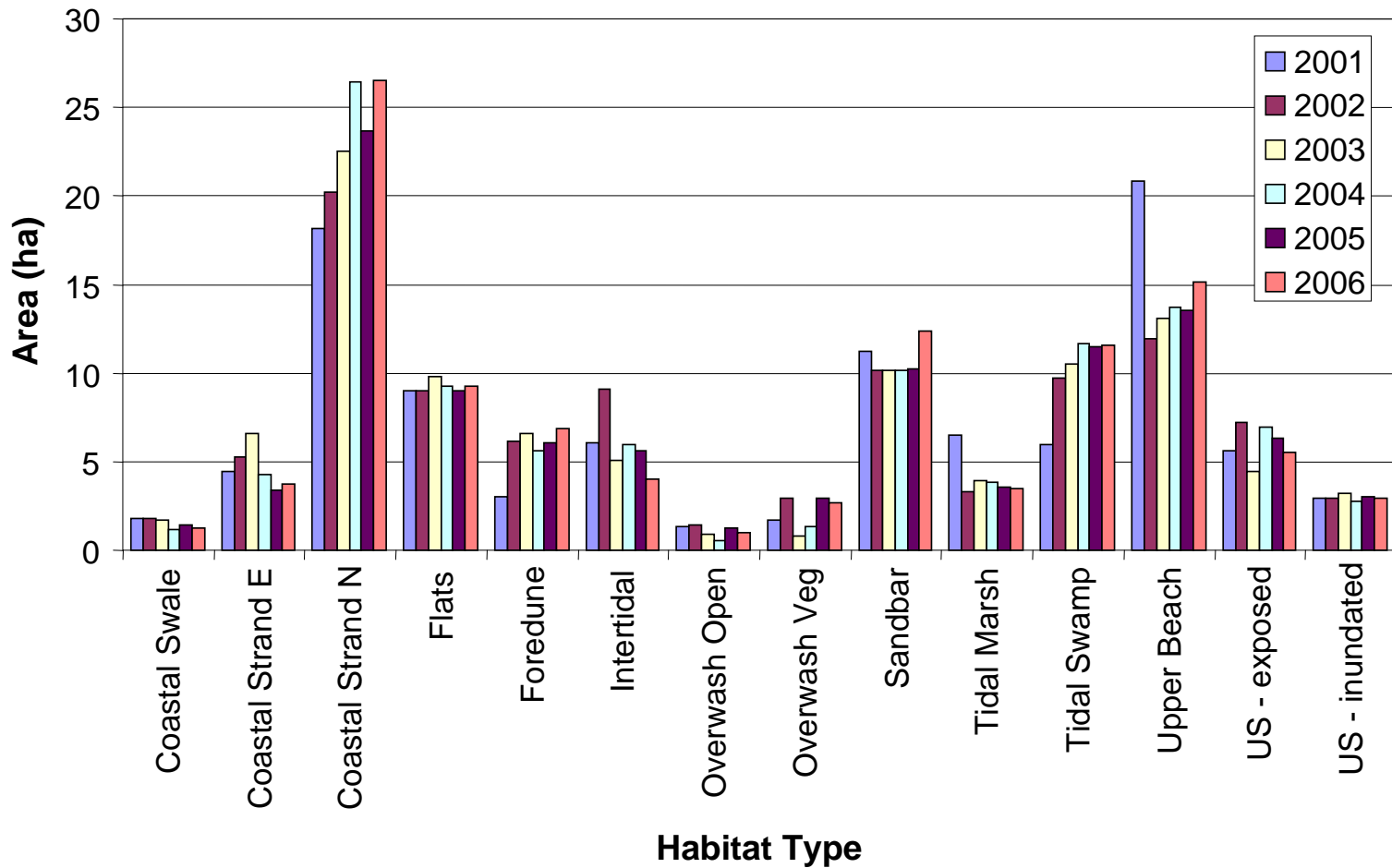
- Delineate and map habitats
- Survey fall-winter bird utilization
- Monitor breeding shorebirds







Habitat Area Over Time



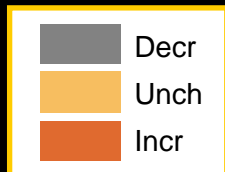
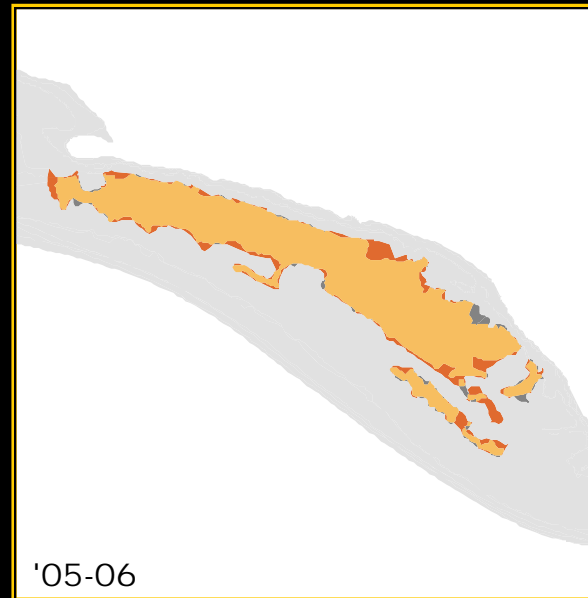
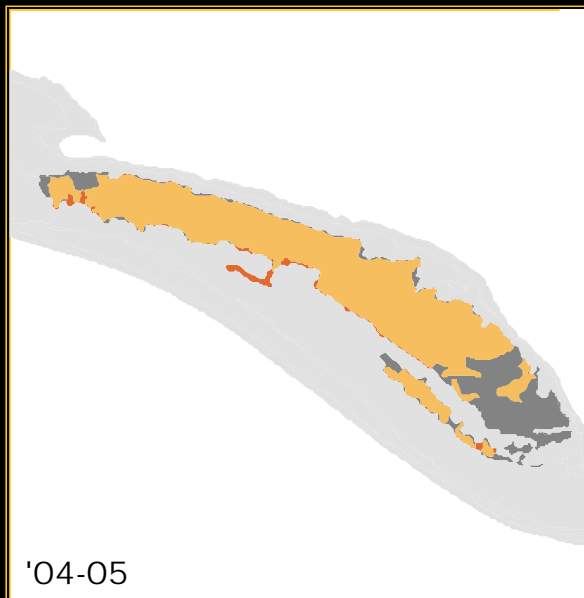
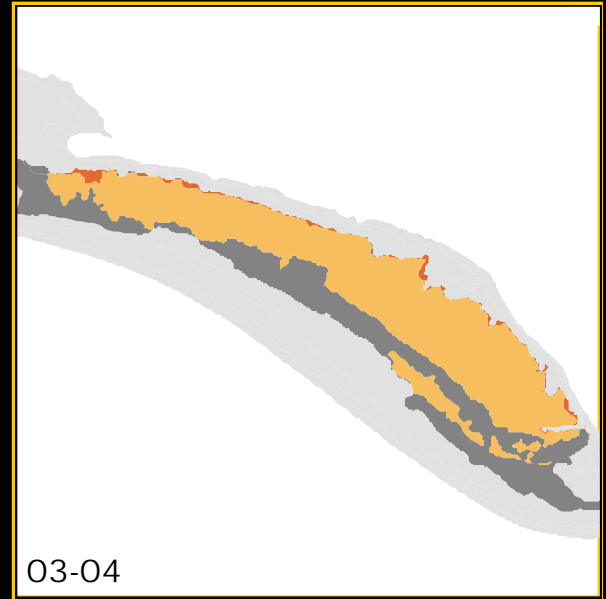
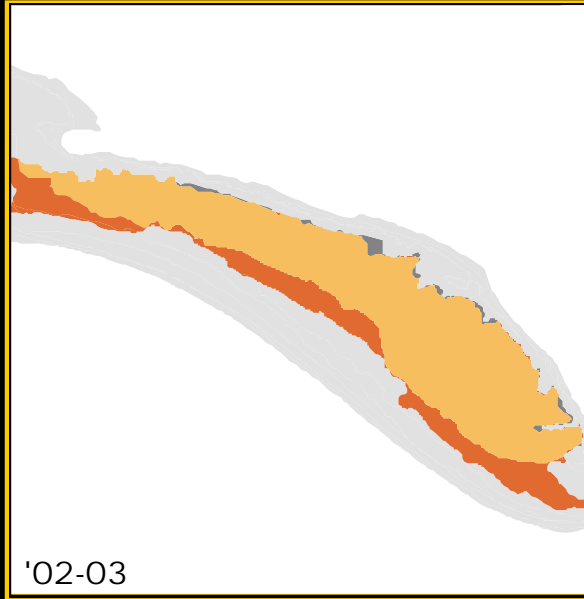
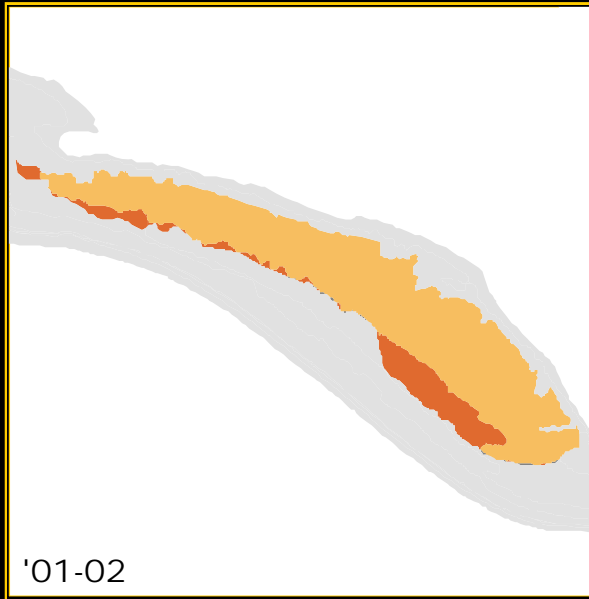
Habitat Transitions

Average Percent Change	To:														
From:	Coastal Swale	Coastal Strand E	Coastal Strand N	Flats	Foredune	Intertidal	Overwash Open	Overwash Veg	Sandbar	Tidal Marsh	Tidal Swamp	Upper Beach	US - exposed	US - inundated	Unclassified
Coastal Swale	79.8	0.0	16.7	0.0	0.1	0.0	0.0	0.4	0.0	0.5	2.3	0.1	0.0	0.1	0.0
Coastal Strand E	0.0	86.2	12.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0	0.0	0.0
Coastal Strand N	0.6	2.6	89.9	0.0	1.8	0.2	0.8	1.6	0.0	0.1	1.6	0.8	0.0	0.0	0.0
Flats	0.0	0.0	0.0	92.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	3.6	0.0	4.3
Foredune	0.0	0.0	7.4	0.0	82.9	0.3	0.2	1.3	0.0	0.0	0.1	7.8	0.0	0.0	0.0
Intertidal	0.0	0.0	0.9	0.0	0.0	48.8	0.1	0.0	0.0	0.3	0.7	27.4	0.1	0.0	21.6
Overwash Open	0.0	0.1	12.0	0.0	1.4	0.1	41.9	25.8	0.0	0.5	0.7	17.5	0.0	0.0	0.0
Overwash Veg	0.0	0.0	30.1	0.0	2.0	0.0	4.3	53.9	0.0	1.9	2.5	5.1	0.2	0.0	0.0
Sandbar	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	95.6	0.0	0.0	0.0	0.0	0.0	4.2
Tidal Marsh	0.1	0.0	0.7	0.0	0.0	0.2	0.0	0.0	0.0	74.6	21.3	0.1	2.5	0.5	0.1
Tidal Swamp	0.3	0.6	3.8	0.0	0.0	0.0	0.0	0.1	0.0	0.7	93.4	0.0	0.5	0.4	0.1
Upper Beach	0.1	0.2	8.1	0.0	8.4	6.4	1.7	2.7	0.0	0.0	0.2	71.3	0.0	0.0	1.0
US - exposed	0.0	0.0	0.2	6.4	0.0	0.1	0.1	0.9	0.0	6.7	1.5	0.0	77.0	1.3	5.8
US - inundated	0.0	0.0	0.1	0.0	0.0	0.5	0.0	0.0	0.0	1.3	2.6	0.0	0.5	95.0	0.0
Unclassified	0.1	0.0	0.0	9.3	0.0	45.2	0.0	0.0	11.5	0.9	0.1	10.5	22.4	0.0	0.0

Controlling Exotics

Average Percent Change	To:		From:												
	Coastal Swale	Coastal Strand E	Coastal Strand N	Flats	Foredune	Intertidal	Overwash Open	Overwash Veg	Sandbar	Tidal Marsh	Tidal Swamp	Upper Beach	US - exposed	US - inundated	Unclassified
Coastal Swale	79.8	0.0	16.7	0.0	0.1	0.0	0.0	0.4	0.0	0.5	2.3	0.1	0.0	0.1	0.0
Coastal Strand E	0.0	86.2	12.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0	0.0	0.0
Coastal Strand N	0.6	2.6	89.9	0.0	1.8	0.2	0.8	1.6	0.0	0.1	1.6	0.8	0.0	0.0	0.0
Flats	0.0	0.0	0.0	92.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	3.6	0.0	4.3
Foredune	0.0	0.0	7.4	0.0	82.9	0.3	0.2	1.3	0.0	0.0	0.1	7.8	0.0	0.0	0.0
Intertidal	0.0	0.0	0.9	0.0	0.0	48.8	0.1	0.0	0.0	0.3	0.7	27.4	0.1	0.0	21.6
Overwash Open	0.0	0.1	12.0	0.0	1.4	0.1	41.9	25.8	0.0	0.5	0.7	17.5	0.0	0.0	0.0
Overwash Veg	0.0	0.0	30.1	0.0	2.0	0.0	4.3	53.9	0.0	1.9	2.5	5.1	0.2	0.0	0.0
Sandbar	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	95.6	0.0	0.0	0.0	0.0	0.0	4.2
Tidal Marsh	0.1	0.0	0.7	0.0	0.0	0.2	0.0	0.0	0.0	74.6	21.3	0.1	2.5	0.5	0.1
Tidal Swamp	0.3	0.6	3.8	0.0	0.0	0.0	0.0	0.1	0.0	0.7	93.4	0.0	0.5	0.4	0.1
Upper Beach	0.1	0.2	8.1	0.0	8.4	6.4	1.7	2.7	0.0	0.0	0.2	71.3	0.0	0.0	1.0
US - exposed	0.0	0.0	0.2	6.4	0.0	0.1	0.1	0.9	0.0	6.7	1.5	0.0	77.0	1.3	5.8
US - inundated	0.0	0.0	0.1	0.0	0.0	0.5	0.0	0.0	0.0	1.3	2.6	0.0	0.5	95.0	0.0
Unclassified	0.1	0.0	0.0	9.3	0.0	45.2	0.0	0.0	11.5	0.9	0.1	10.5	22.4	0.0	0.0

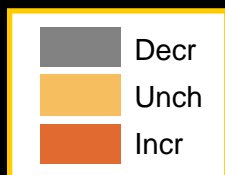
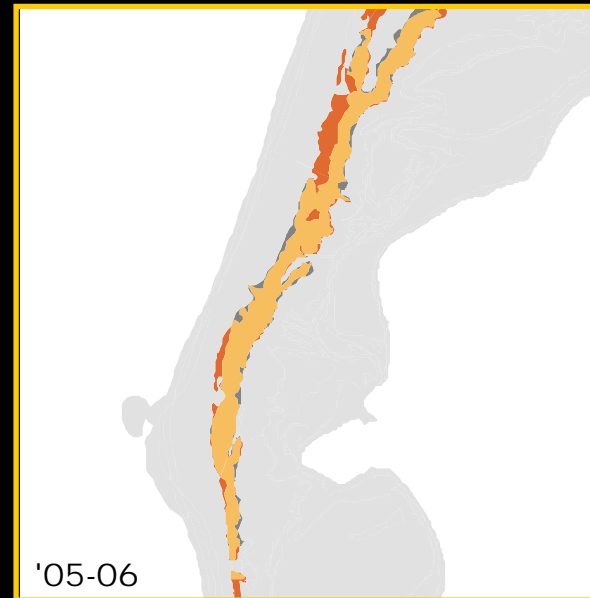
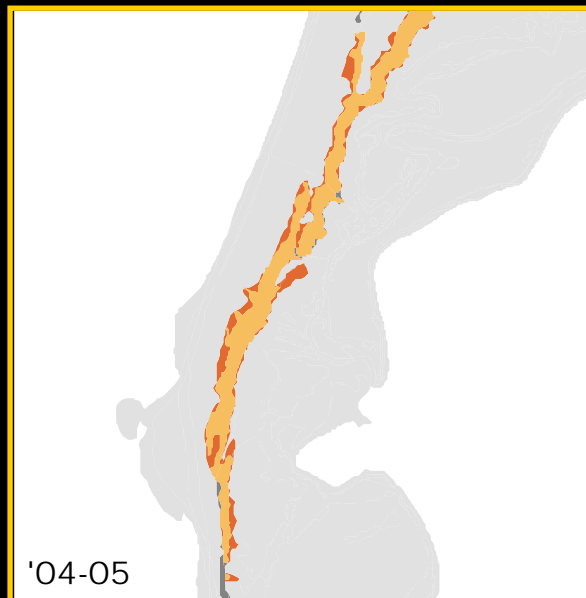
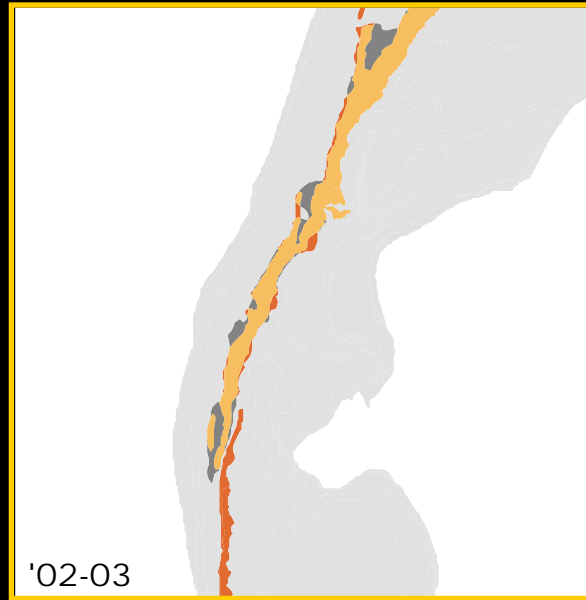
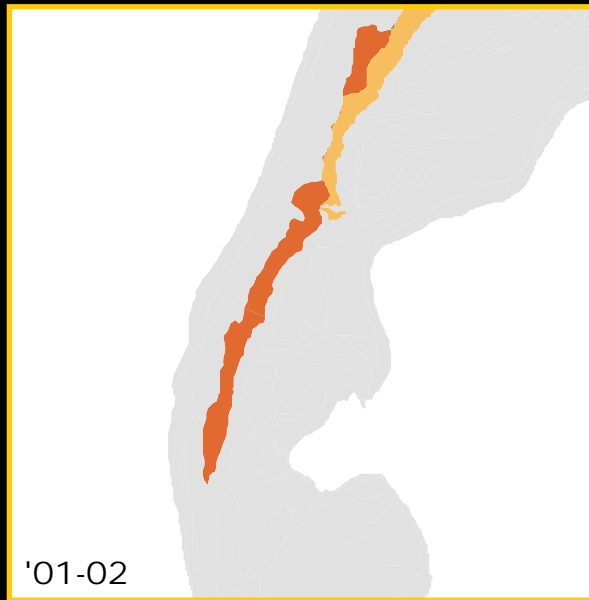
Controlling Exotics



Dune Formation

Average Percent Change	To: From:	To:														
		Coastal Swale	Coastal Strand E	Coastal Strand N	Flats	Foredune	Intertidal	Overwash Open	Overwash Veg	Sandbar	Tidal Marsh	Tidal Swamp	Upper Beach	US - exposed	US - inundated	Unclassified
Coastal Swale		79.8	0.0	16.7	0.0	0.1	0.0	0.0	0.4	0.0	0.5	2.3	0.1	0.0	0.1	0.0
Coastal Strand E		0.0	86.2	12.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0	0.0	0.0
Coastal Strand N		0.6	2.6	89.9	0.0	1.8	0.2	0.8	1.6	0.0	0.1	1.6	0.8	0.0	0.0	0.0
Flats		0.0	0.0	0.0	92.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	3.6	0.0	4.3
Foredune		0.0	0.0	7.4	0.0	82.9	0.3	0.2	1.3	0.0	0.0	0.1	7.8	0.0	0.0	0.0
Intertidal		0.0	0.0	0.9	0.0	0.0	48.8	0.1	0.0	0.0	0.3	0.7	27.4	0.1	0.0	21.6
Overwash Open		0.0	0.1	12.0	0.0	1.4	0.1	41.9	25.8	0.0	0.5	0.7	17.5	0.0	0.0	0.0
Overwash Veg		0.0	0.0	30.1	0.0	2.0	0.0	4.3	53.9	0.0	1.9	2.5	5.1	0.2	0.0	0.0
Sandbar		0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	95.6	0.0	0.0	0.0	0.0	0.0	4.2
Tidal Marsh		0.1	0.0	0.7	0.0	0.0	0.2	0.0	0.0	0.0	74.6	21.3	0.1	2.5	0.5	0.1
Tidal Swamp		0.3	0.6	3.8	0.0	0.0	0.0	0.0	0.1	0.0	0.7	93.4	0.0	0.5	0.4	0.1
Upper Beach		0.1	0.2	8.1	0.0	8.4	6.4	1.7	2.7	0.0	0.0	0.2	71.3	0.0	0.0	1.0
US - exposed		0.0	0.0	0.2	6.4	0.0	0.1	0.1	0.9	0.0	6.7	1.5	0.0	77.0	1.3	5.8
US - inundated		0.0	0.0	0.1	0.0	0.0	0.5	0.0	0.0	0.0	1.3	2.6	0.0	0.5	95.0	0.0
Unclassified		0.1	0.0	0.0	9.3	0.0	45.2	0.0	0.0	11.5	0.9	0.1	10.5	22.4	0.0	0.0

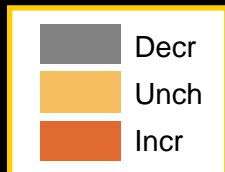
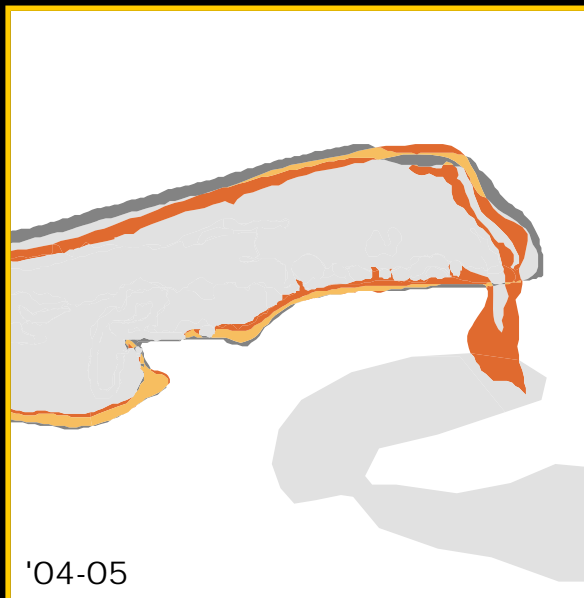
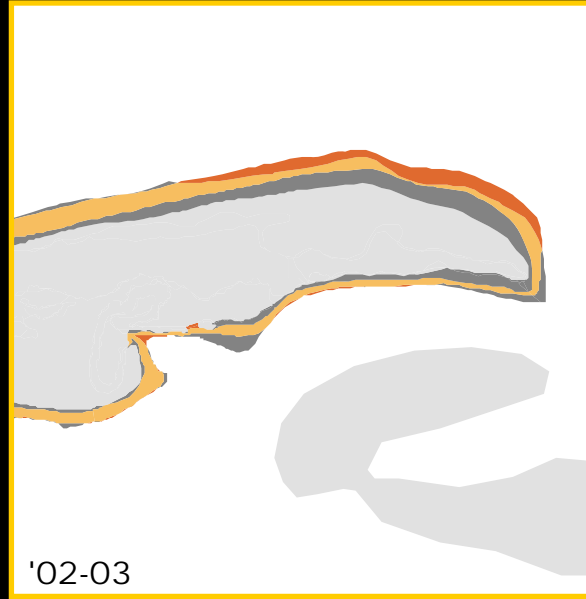
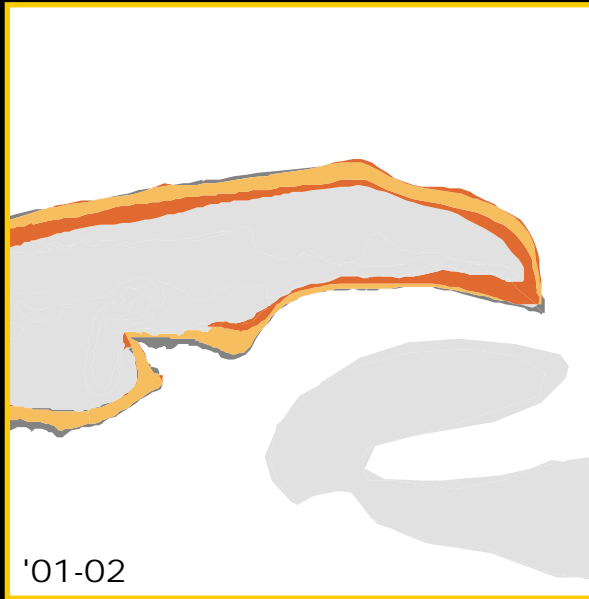
Dune Formation



Changing Intertidal

Average Percent Change	To:														
From:	Coastal Swale	Coastal Strand E	Coastal Strand N	Flats	Foredune	Intertidal	Overwash Open	Overwash Veg	Sandbar	Tidal Marsh	Tidal Swamp	Upper Beach	US - exposed	US - inundated	Unclassified
Coastal Swale	79.8	0.0	16.7	0.0	0.1	0.0	0.0	0.4	0.0	0.5	2.3	0.1	0.0	0.1	0.0
Coastal Strand E	0.0	86.2	12.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0	0.0	0.0
Coastal Strand N	0.6	2.6	89.9	0.0	1.8	0.2	0.8	1.6	0.0	0.1	1.6	0.8	0.0	0.0	0.0
Flats	0.0	0.0	0.0	92.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	3.6	0.0	4.3
Foredune	0.0	0.0	7.4	0.0	82.9	0.3	0.2	1.3	0.0	0.0	0.1	7.8	0.0	0.0	0.0
Intertidal	0.0	0.0	0.9	0.0	0.0	48.8	0.1	0.0	0.0	0.3	0.7	27.4	0.1	0.0	21.6
Overwash Open	0.0	0.1	12.0	0.0	1.4	0.1	41.9	25.8	0.0	0.5	0.7	17.5	0.0	0.0	0.0
Overwash Veg	0.0	0.0	30.1	0.0	2.0	0.0	4.3	53.9	0.0	1.9	2.5	5.1	0.2	0.0	0.0
Sandbar	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	95.6	0.0	0.0	0.0	0.0	0.0	4.2
Tidal Marsh	0.1	0.0	0.7	0.0	0.0	0.2	0.0	0.0	0.0	74.6	21.3	0.1	2.5	0.5	0.1
Tidal Swamp	0.3	0.6	3.8	0.0	0.0	0.0	0.0	0.1	0.0	0.7	93.4	0.0	0.5	0.4	0.1
Upper Beach	0.1	0.2	8.1	0.0	8.4	6.4	1.7	2.7	0.0	0.0	0.2	71.3	0.0	0.0	1.0
US - exposed	0.0	0.0	0.2	6.4	0.0	0.1	0.1	0.9	0.0	6.7	1.5	0.0	77.0	1.3	5.8
US - inundated	0.0	0.0	0.1	0.0	0.0	0.5	0.0	0.0	0.0	1.3	2.6	0.0	0.5	95.0	0.0
Unclassified	0.1	0.0	0.0	9.3	0.0	45.2	0.0	0.0	11.5	0.9	0.1	10.5	22.4	0.0	0.0

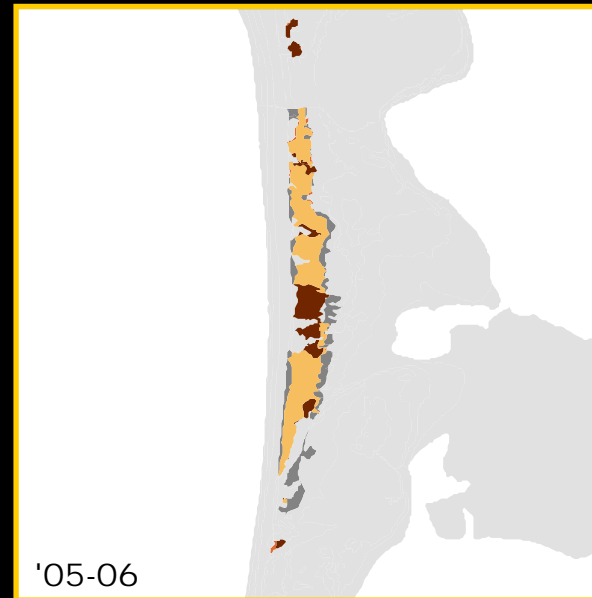
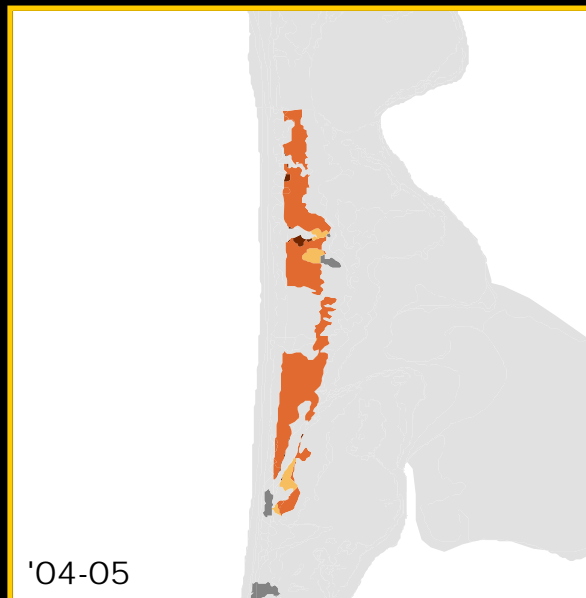
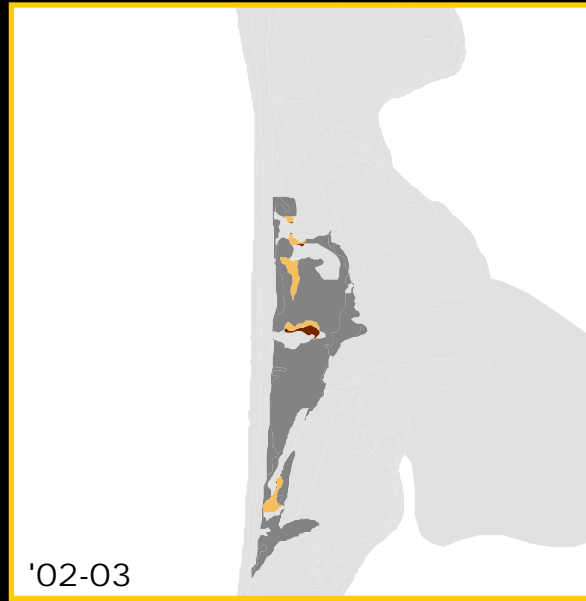
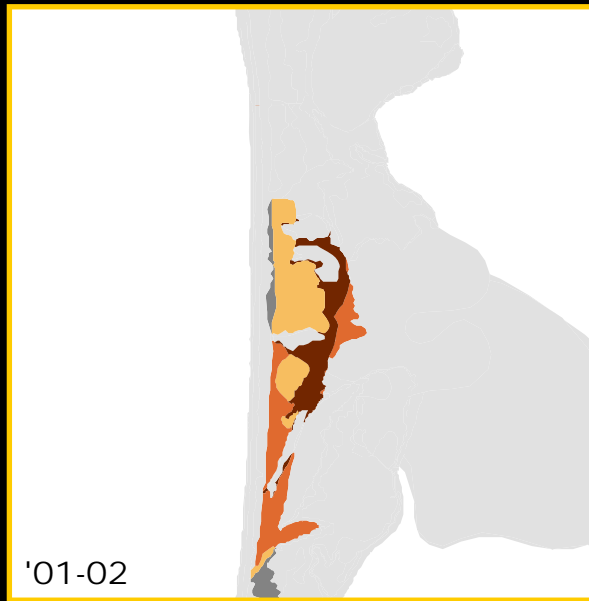
Changing Intertidal



Succession

Average Percent Change	To:														
From:	Coastal Swale	Coastal Strand E	Coastal Strand N	Flats	Foredune	Intertidal	Overwash Open	Overwash Veg	Sandbar	Tidal Marsh	Tidal Swamp	Upper Beach	US - exposed	US - inundated	Unclassified
Coastal Swale	79.8	0.0	16.7	0.0	0.1	0.0	0.0	0.4	0.0	0.5	2.3	0.1	0.0	0.1	0.0
Coastal Strand E	0.0	86.2	12.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0	0.0	0.0
Coastal Strand N	0.6	2.6	89.9	0.0	1.8	0.2	0.8	1.6	0.0	0.1	1.6	0.8	0.0	0.0	0.0
Flats	0.0	0.0	0.0	92.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	3.6	0.0	4.3
Foredune	0.0	0.0	7.4	0.0	82.9	0.3	0.2	1.3	0.0	0.0	0.1	7.8	0.0	0.0	0.0
Intertidal	0.0	0.0	0.9	0.0	0.0	48.8	0.1	0.0	0.0	0.3	0.7	27.4	0.1	0.0	21.6
Overwash Open	0.0	0.1	12.0	0.0	1.4	0.1	41.9	25.8	0.0	0.5	0.7	17.5	0.0	0.0	0.0
Overwash Veg	0.0	0.0	30.1	0.0	2.0	0.0	4.3	53.9	0.0	1.9	2.5	5.1	0.2	0.0	0.0
Sandbar	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	95.6	0.0	0.0	0.0	0.0	0.0	4.2
Tidal Marsh	0.1	0.0	0.7	0.0	0.0	0.2	0.0	0.0	0.0	74.6	21.3	0.1	2.5	0.5	0.1
Tidal Swamp	0.3	0.6	3.8	0.0	0.0	0.0	0.0	0.1	0.0	0.7	93.4	0.0	0.5	0.4	0.1
Upper Beach	0.1	0.2	8.1	0.0	8.4	6.4	1.7	2.7	0.0	0.0	0.2	71.3	0.0	0.0	1.0
US - exposed	0.0	0.0	0.2	6.4	0.0	0.1	0.1	0.9	0.0	6.7	1.5	0.0	77.0	1.3	5.8
US - inundated	0.0	0.0	0.1	0.0	0.0	0.5	0.0	0.0	0.0	1.3	2.6	0.0	0.5	95.0	0.0
Unclassified	0.1	0.0	0.0	9.3	0.0	45.2	0.0	0.0	11.5	0.9	0.1	10.5	22.4	0.0	0.0

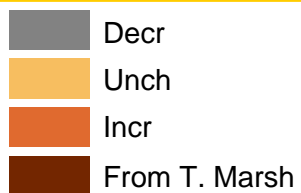
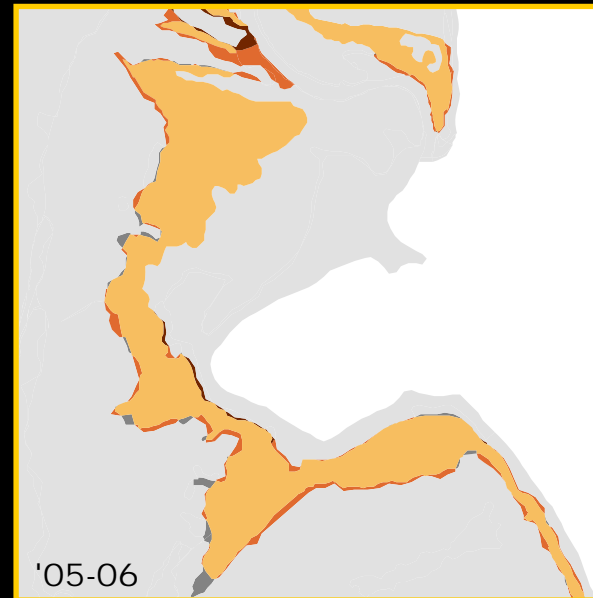
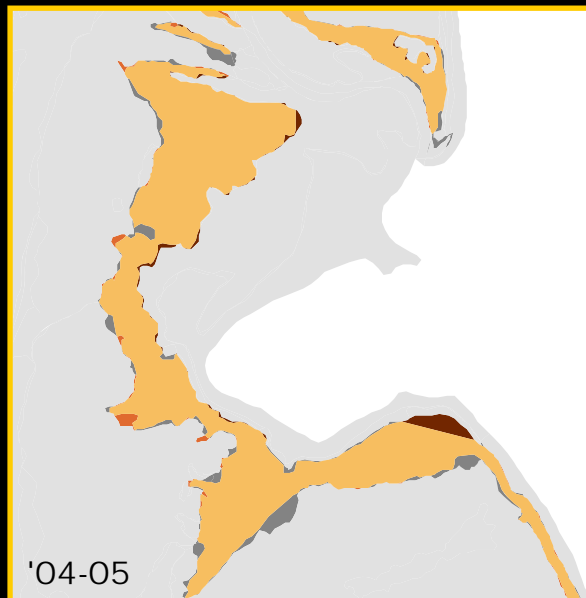
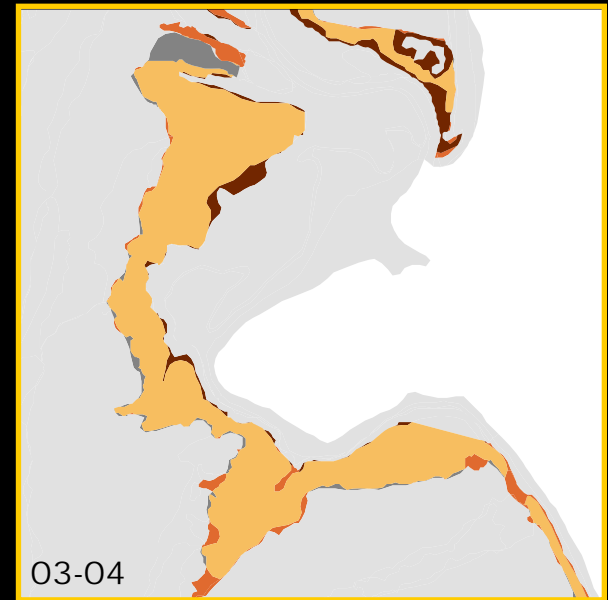
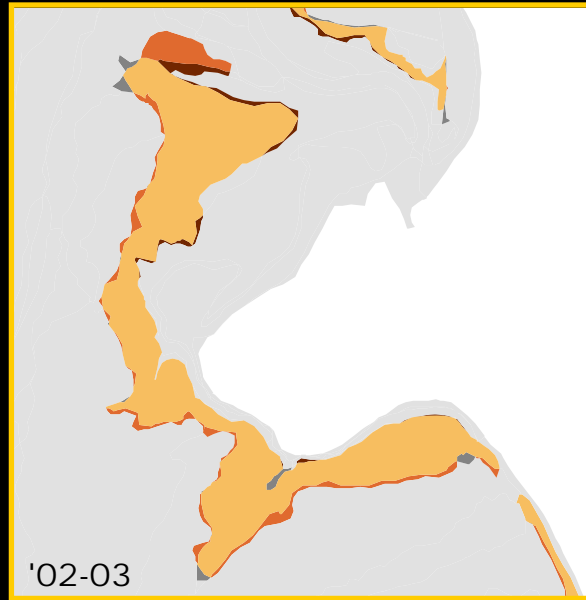
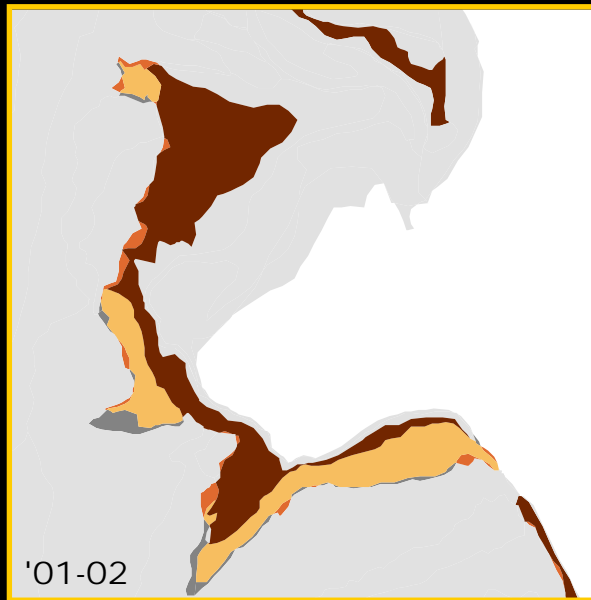
Succession - Overwash Veg



Tidal Swamp Encroachment

Average Percent Change	To:		From:												
	Coastal Swale	Coastal Strand E	Coastal Strand N	Flats	Foredune	Intertidal	Overwash Open	Overwash Veg	Sandbar	Tidal Marsh	Tidal Swamp	Upper Beach	US - exposed	US - inundated	Unclassified
Coastal Swale	79.8	0.0	16.7	0.0	0.1	0.0	0.0	0.4	0.0	0.5	2.3	0.1	0.0	0.1	0.0
Coastal Strand E	0.0	86.2	12.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0	0.0	0.0
Coastal Strand N	0.6	2.6	89.9	0.0	1.8	0.2	0.8	1.6	0.0	0.1	1.6	0.8	0.0	0.0	0.0
Flats	0.0	0.0	0.0	92.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	3.6	0.0	4.3
Foredune	0.0	0.0	7.4	0.0	82.9	0.3	0.2	1.3	0.0	0.0	0.1	7.8	0.0	0.0	0.0
Intertidal	0.0	0.0	0.9	0.0	0.0	48.8	0.1	0.0	0.0	0.3	0.7	27.4	0.1	0.0	21.6
Overwash Open	0.0	0.1	12.0	0.0	1.4	0.1	41.9	25.8	0.0	0.5	0.7	17.5	0.0	0.0	0.0
Overwash Veg	0.0	0.0	30.1	0.0	2.0	0.0	4.3	53.9	0.0	1.9	2.5	5.1	0.2	0.0	0.0
Sandbar	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	95.6	0.0	0.0	0.0	0.0	0.0	4.2
Tidal Marsh	0.1	0.0	0.7	0.0	0.0	0.2	0.0	0.0	0.0	74.6	21.3	0.1	2.5	0.5	0.1
Tidal Swamp	0.3	0.6	3.8	0.0	0.0	0.0	0.0	0.1	0.0	0.7	93.4	0.0	0.5	0.4	0.1
Upper Beach	0.1	0.2	8.1	0.0	8.4	6.4	1.7	2.7	0.0	0.0	0.2	71.3	0.0	0.0	1.0
US - exposed	0.0	0.0	0.2	6.4	0.0	0.1	0.1	0.9	0.0	6.7	1.5	0.0	77.0	1.3	5.8
US - inundated	0.0	0.0	0.1	0.0	0.0	0.5	0.0	0.0	0.0	1.3	2.6	0.0	0.5	95.0	0.0
Unclassified	0.1	0.0	0.0	9.3	0.0	45.2	0.0	0.0	11.5	0.9	0.1	10.5	22.4	0.0	0.0

Tidal Swamp Encroachment





2001

2005



PhotoPoint 8E



2001

2005



PhotoPoint 57E



2001

2005



PhotoPoint 6S

Hurricane Dennis

July 7, 2005

11 AM EDT Thursday

NWS TPC/National Hurricane Center

Advisory 12

Current Center Location 18.0 N 75.6 W

Max Sustained Wind 105 mph

Current Movement NW at 13 mph

● Current Center Location

● Forecast Center Positions

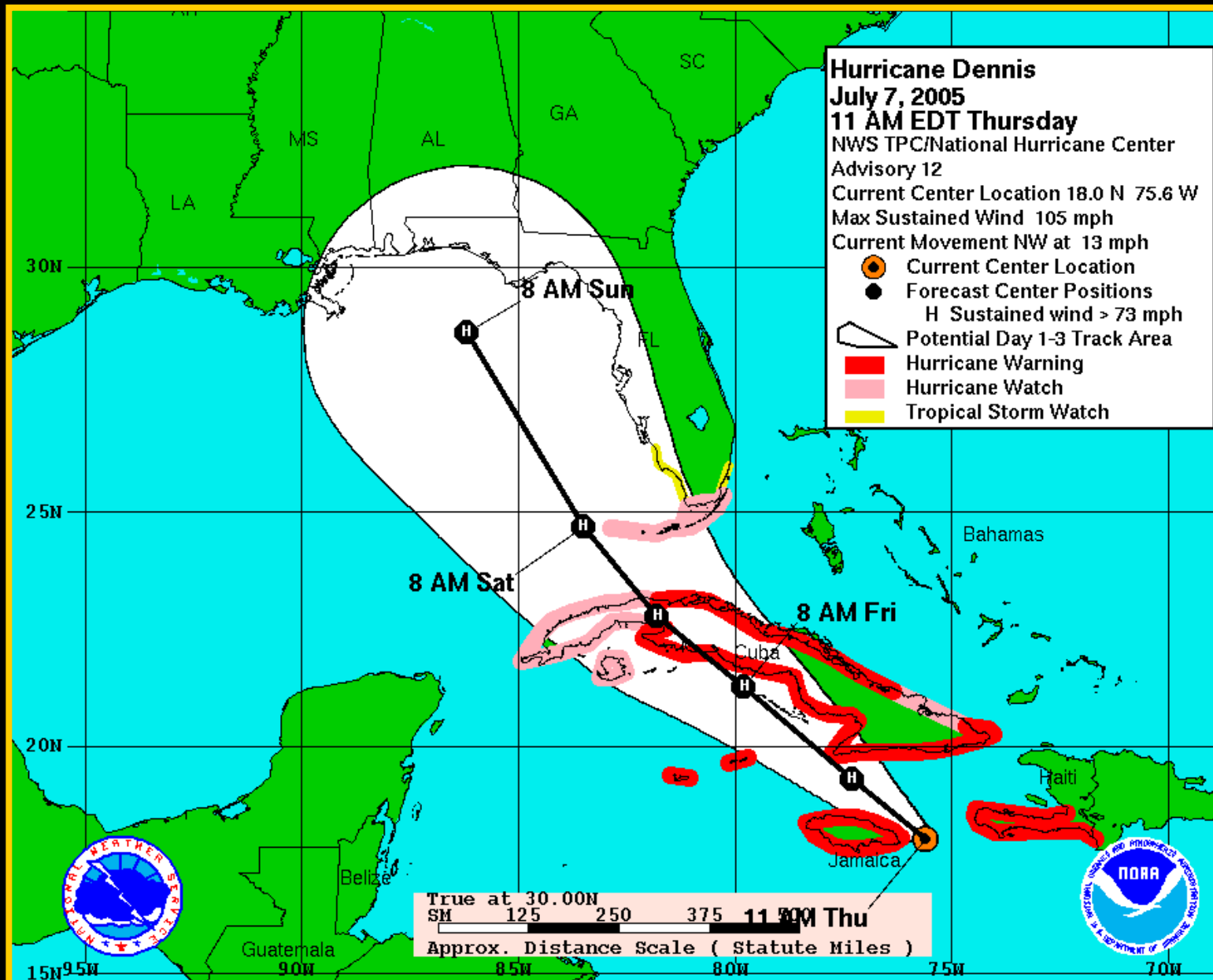
H Sustained wind > 73 mph

△ Potential Day 1-3 Track Area

■ Hurricane Warning

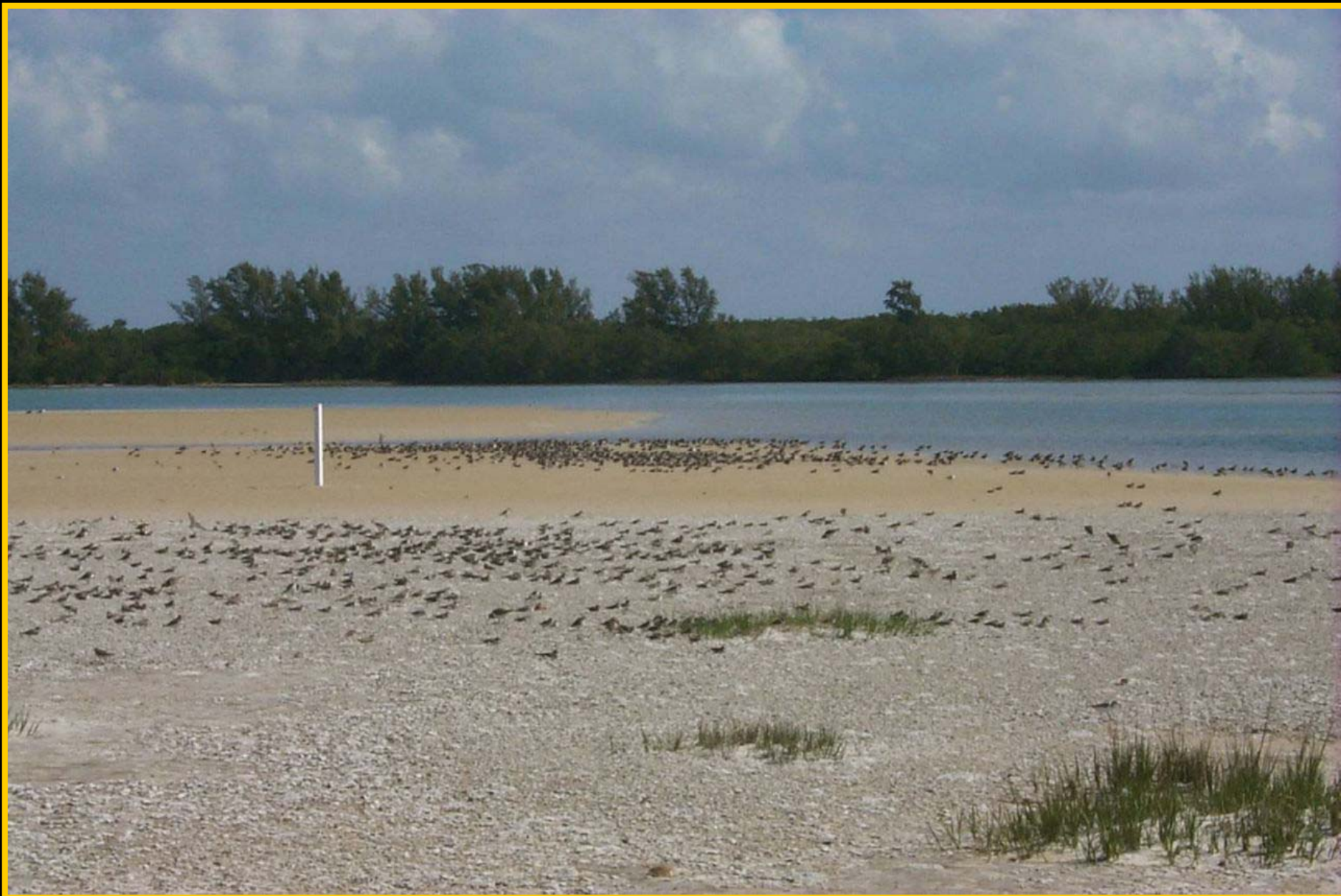
■ Hurricane Watch

■ Tropical Storm Watch





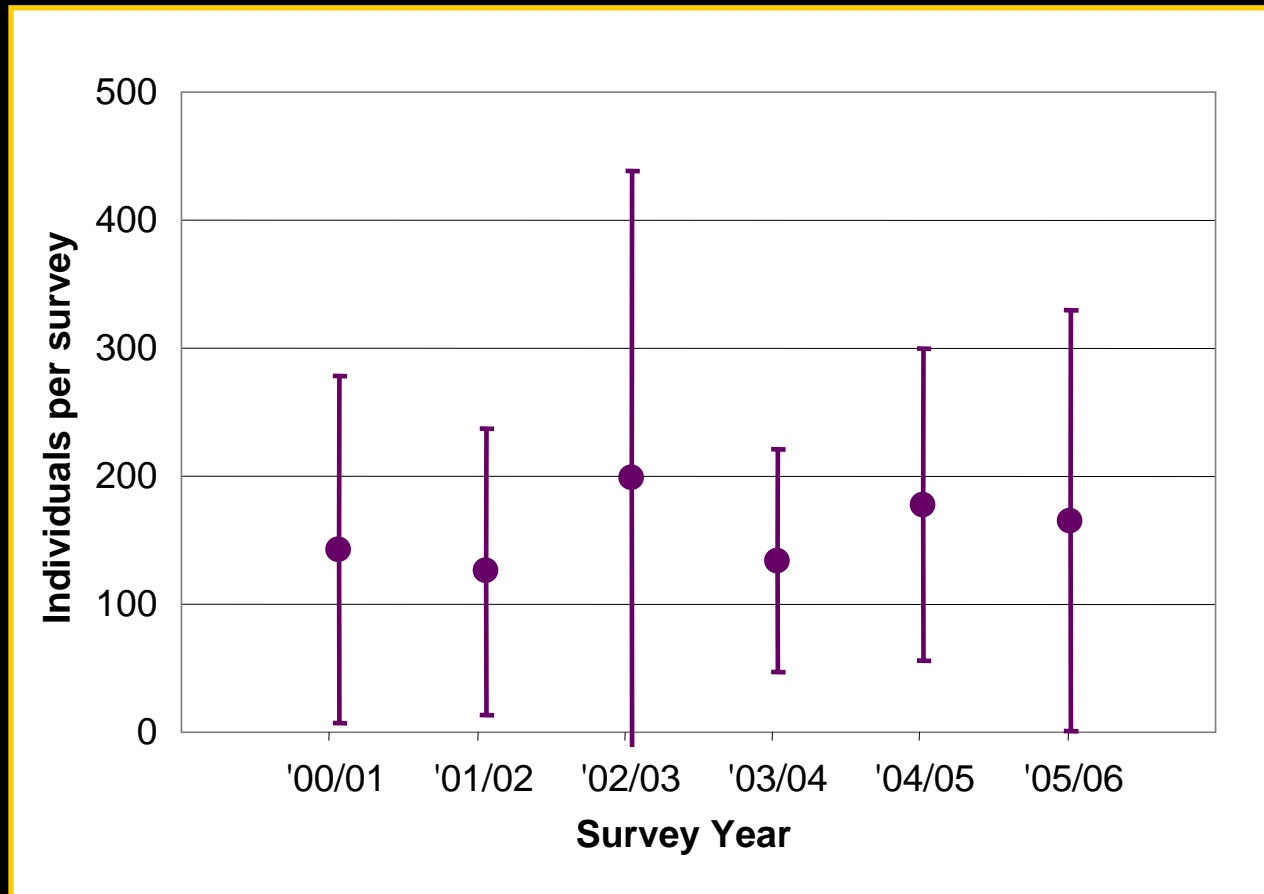




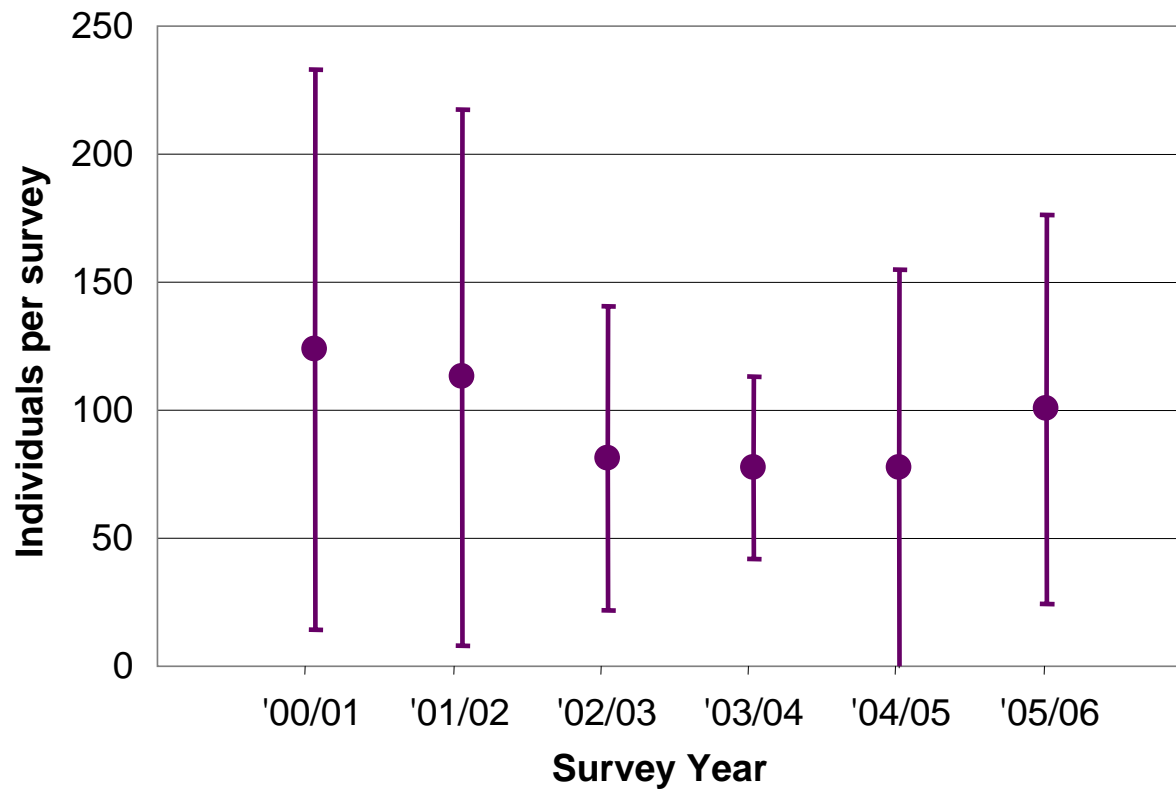
Fall - Winter Bird Counts

Year	Hours	Individuals	Species
2000	83	29,318	84
2001	73	32,421	82
2002	87	32,936	92
2003	42	18,158	76
2004	60	15,189	90
2005	50	15,600	79

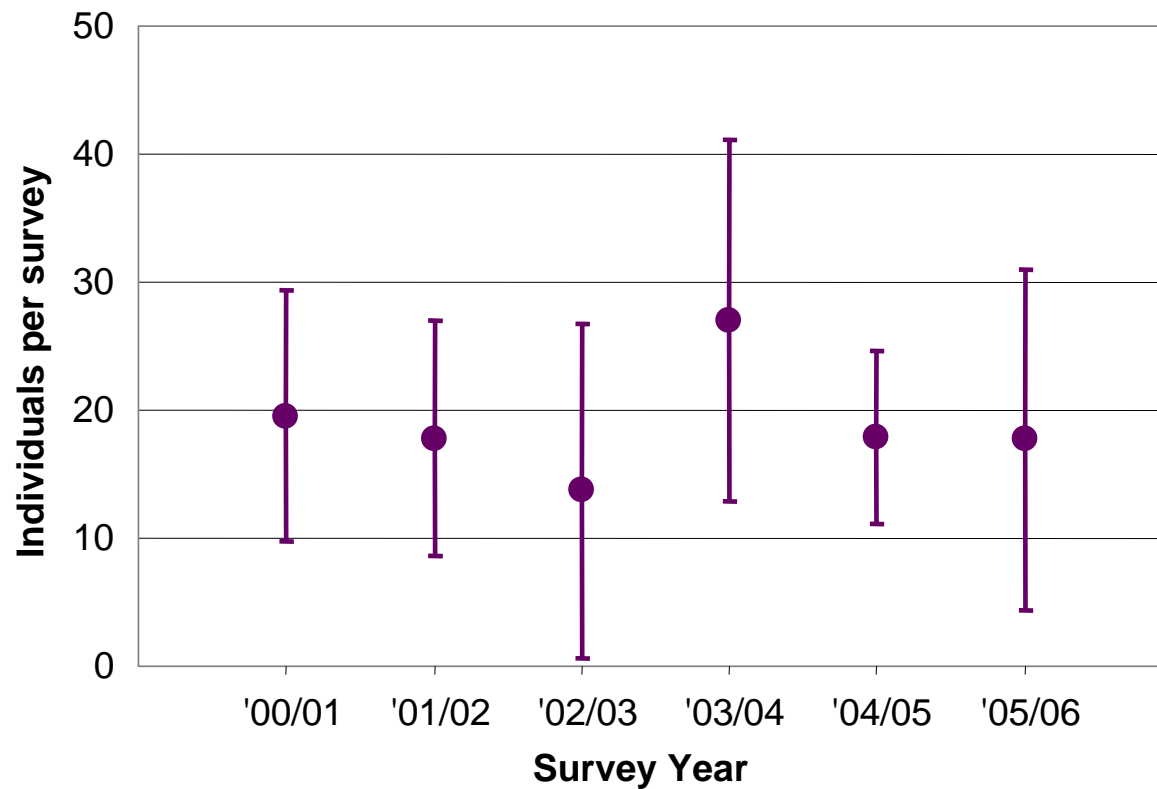
Sanderling



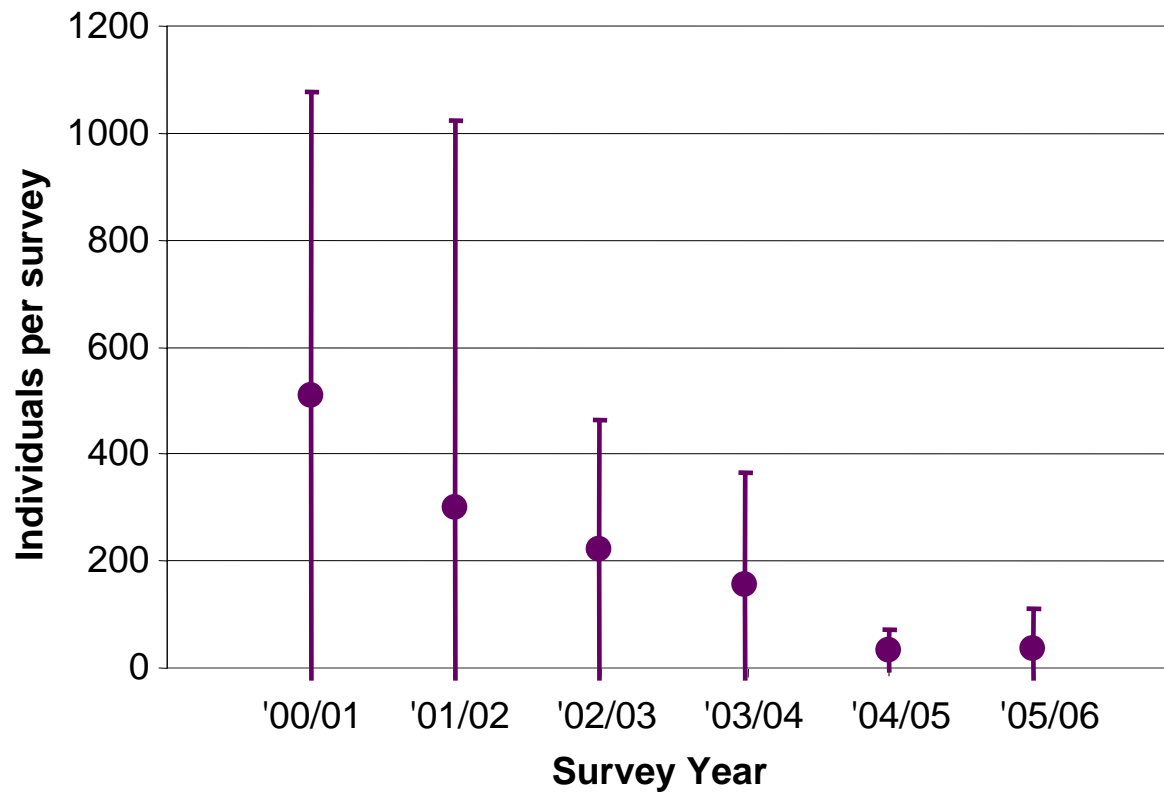
Semipalmated Plover



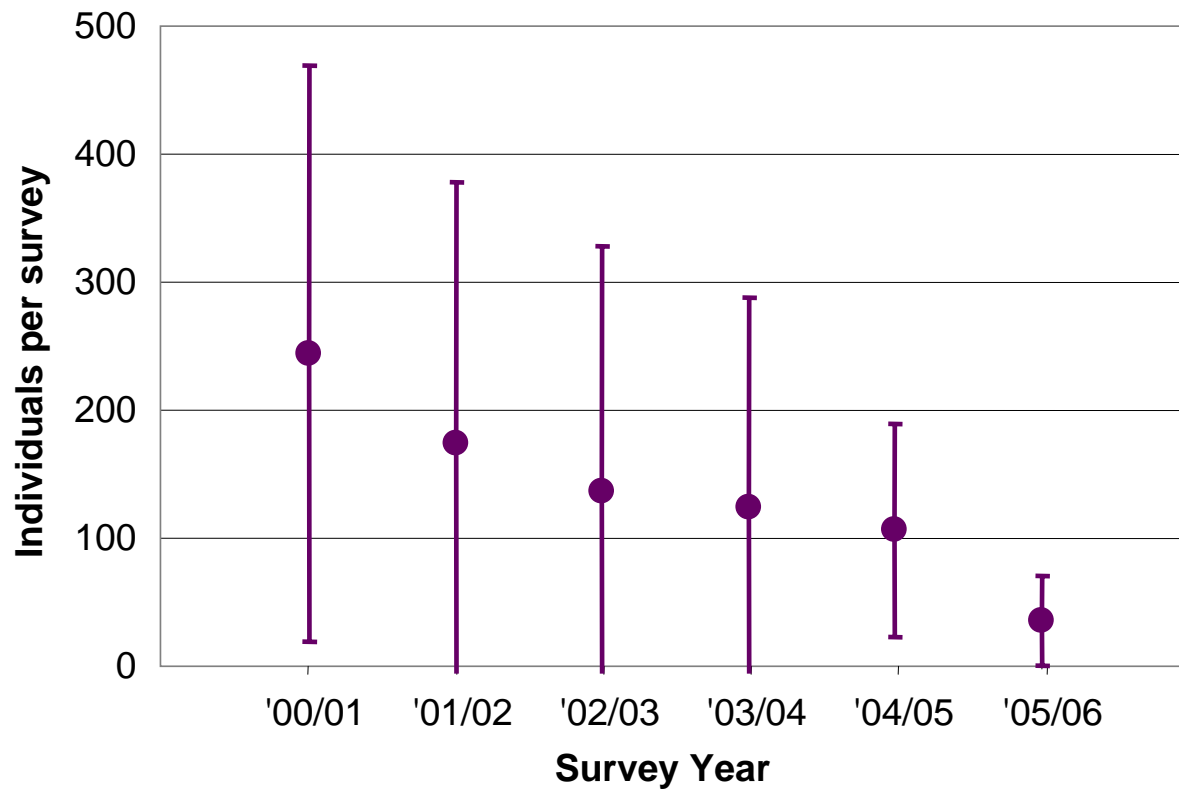
Piping Plover



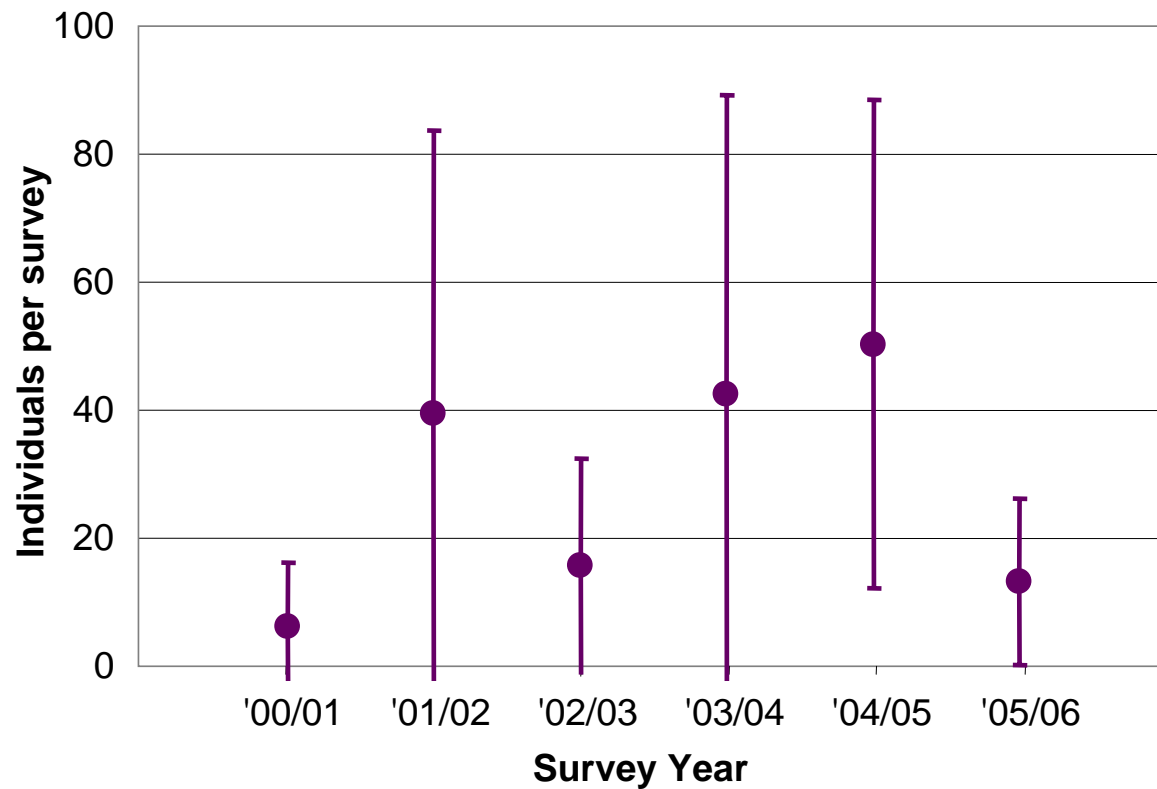
Red Knot



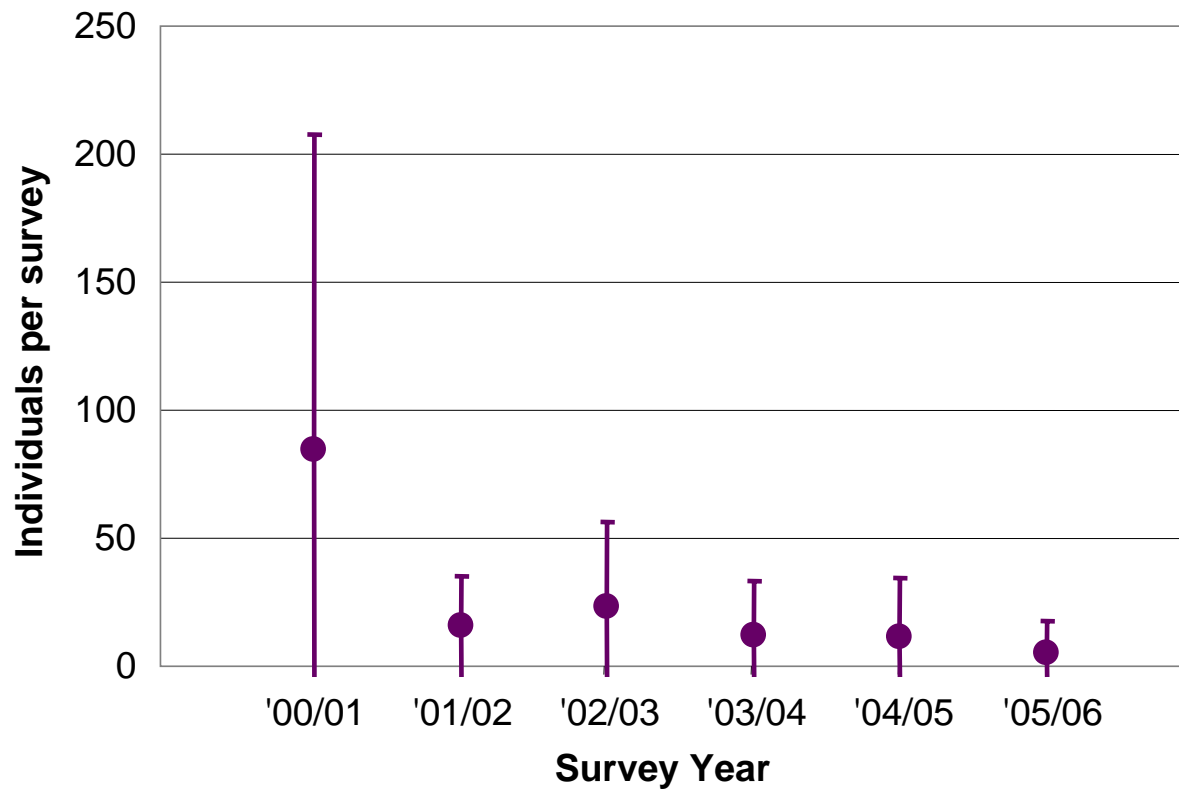
Willet



American White Pelican



Marbled Godwit



Banded Piping Plover



Photo courtesy of Stewart Boots

Banded Red Knot



Photo courtesy of Nigel Clark

Sightings

69 banded Piping Plovers have been reported since 2001, with 15 positive identifications (multiple sightings for many individuals)

19 banded Red Knots have been reported since 2005, with one individual seen 5 times





Black Skimmer



Year	Pairs	Chicks	Fledged
2000	45 (3)	0	0
2001	101 (4)	12	2
2002	190 (2)	189	128
2003	361 (1)	246	165
2004	265 (3)	1	0
2005	155 (1)	0	0
2006	450 (1)	284	235

Least Tern



Year	Pairs	Chicks	Fledged
2000	10 (1)	6	4
2001	71 (4)	0	0
2002	71 (3)	4	2
2003	94 (2)	10	2
2004	62 (3)	0	0
2005	22 (1)	0	0
2006	102 (3)	7	4

American Oystercatcher



Year	Pairs	Chicks	Fledged
2000	13	2	2
2001	15	5	3
2002	8	6	3
2003	9	5	4
2004	8	5	5
2005	5	1	1
2006	5	6	6







WELCOME TO SHELL KEY PRESERVE

WHILE ON THE ISLAND:

- ALL PLANTS AND ANIMALS ARE PROTECTED
- PETS MUST BE UNDER CONTROL AT ALL TIMES
- DO NOT ENTER BIRD PRESERVATION AREA
- TAKE YOUR TRASH WITH YOU
- CAMPING IS PERMITTED IN DESIGNATED AREAS ONLY
- PERMITS REQUIRED FOR GROUPS OF 50 OR MORE

****NOTICE** APRIL 15TH - JUNE 15TH
ENTIRE ISLAND CLOSED TO PETS**

THE FOLLOWING ARE PROHIBITED

- OPEN ALCOHOLIC BEVERAGES
- FIREARMS AND FIREWORKS
- EXCESSIVE NOISE
- REMOVAL OF SIGNS
- NUDITY

Pinellas County Ordinance #02-6



PLEASE HELP MANAGE THIS ISLAND FOR
YOUR ENJOYMENT AND PROTECTION OF
ITS NATURAL RESOURCES

FOR QUESTIONS OR PERMITS
727-453-6900

TO REPORT RULE VIOLATIONS
727-582-6200



Documented Intrusions

