

**Impacts of Dredging and Inlet Bypassing
on the Inter-tidal Ecology
of Pea Island National Wildlife Refuge**

*(12 Years of Sand Bypassed
from Oregon Inlet to Pea Island)*

Dennis Stewart
US Fish and Wildlife Service
and
Robert Dolan
University of Virginia



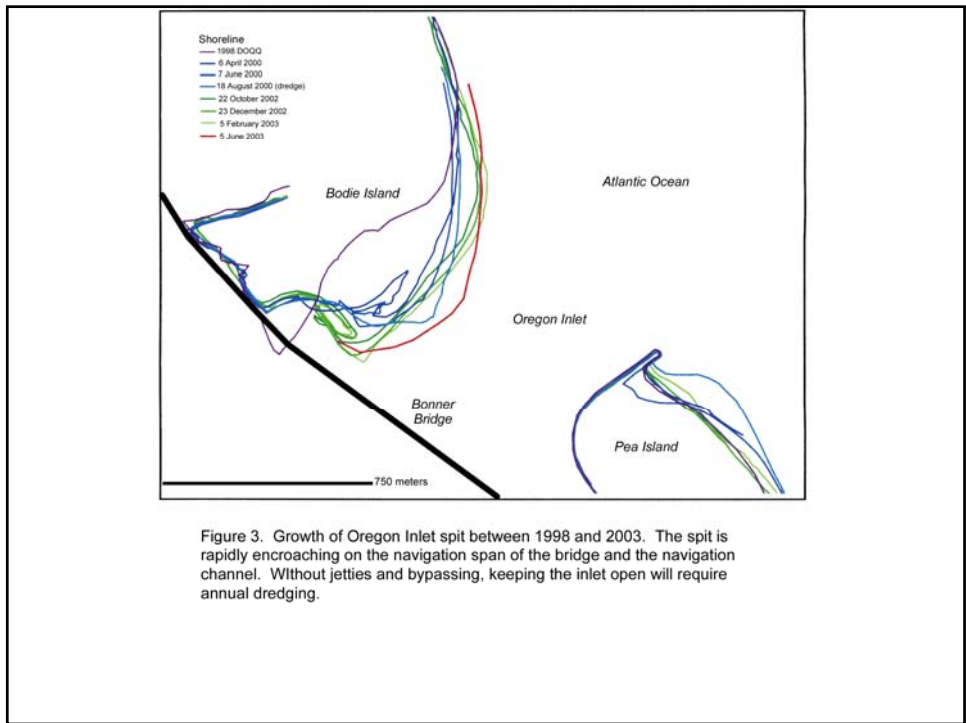
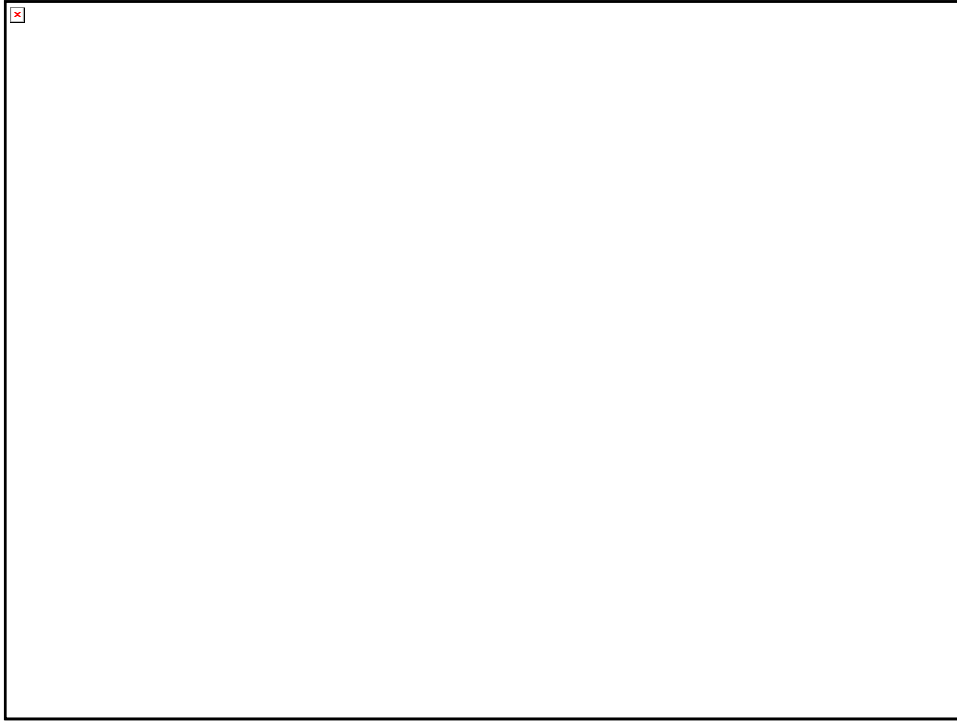


Figure 3. Growth of Oregon Inlet spit between 1998 and 2003. The spit is rapidly encroaching on the navigation span of the bridge and the navigation channel. Without jetties and bypassing, keeping the inlet open will require annual dredging.











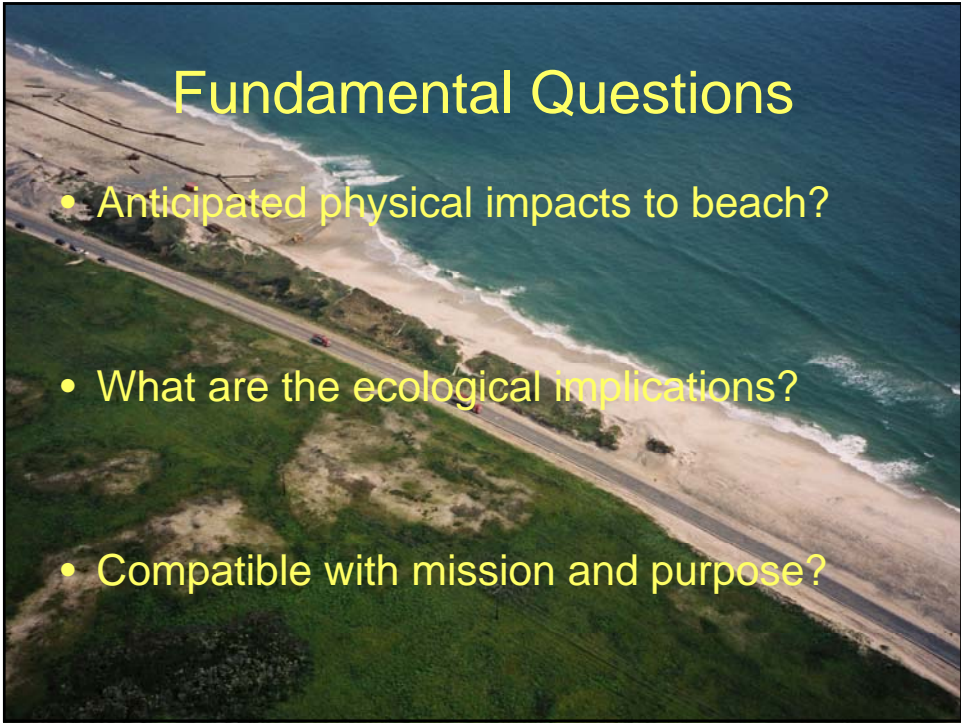
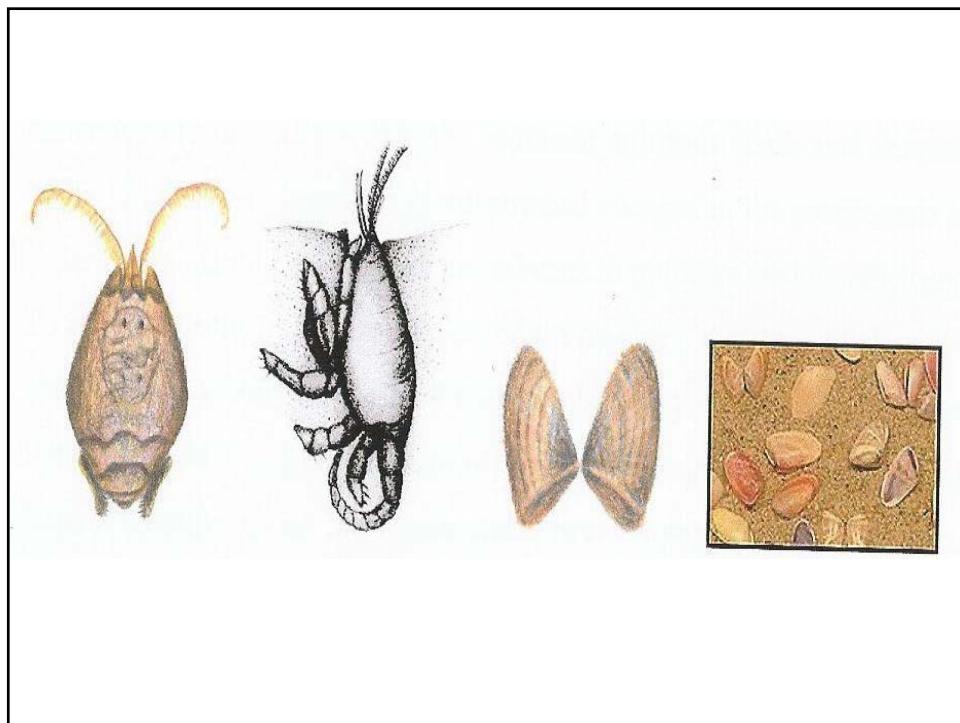
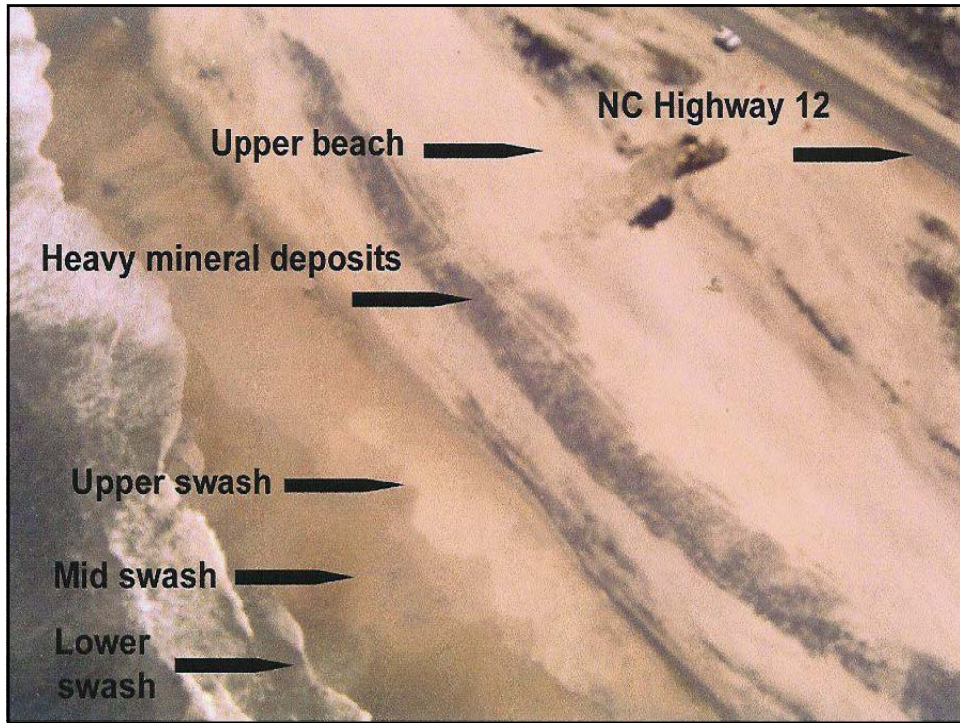






Table 1. Statistical Summary

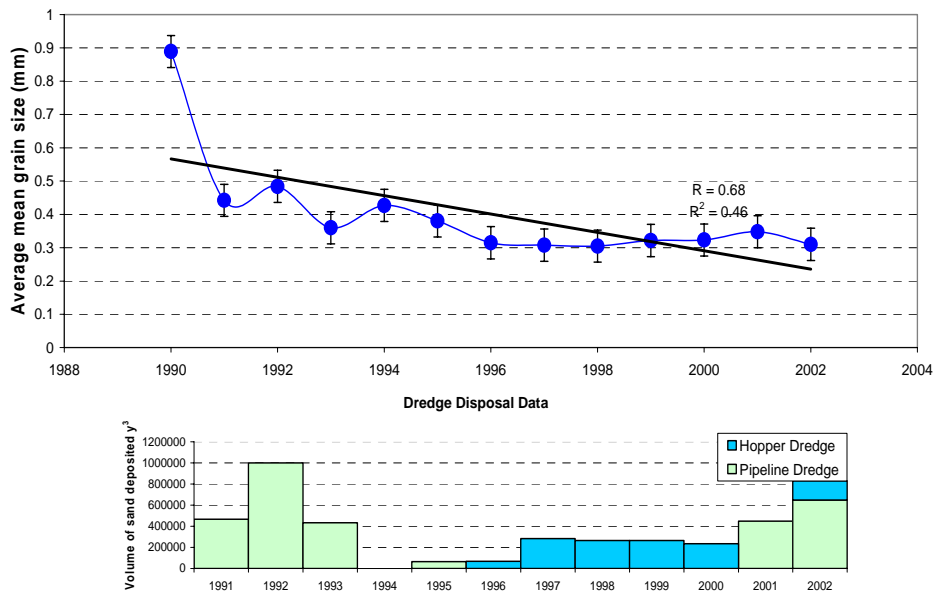
<u>Location</u>	<u>Sand Size</u>	<u>S.D.</u>	<u>Heavy Minerals</u>	<u>Percent Fine</u>
<u>Sand</u>	(In mm)		(Dark Minerals)	(<0.25mm)
Pea Island Swash zone	0.57mm	1.3	2.5%	32%
Oregon Inlet Spit	0.26mm	2.4	11%	50%
Ocean Bar	0.45mm	3.3	6%	33%
Oregon Inlet Channel	0.22mm	2.0	10%	60%



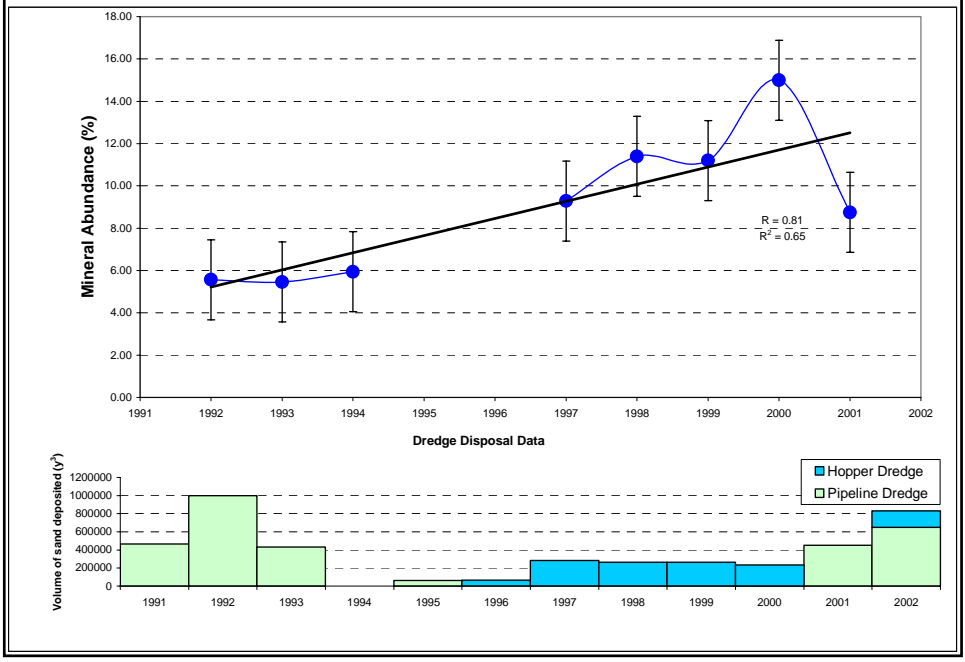
Significant Impacts

- 1. Burial (>4cm without wave runoff)
- 2. Finer grains & high % heavy mineral
- Degree of impact correlated with:
 - Frequency
 - Volume
 - Placement

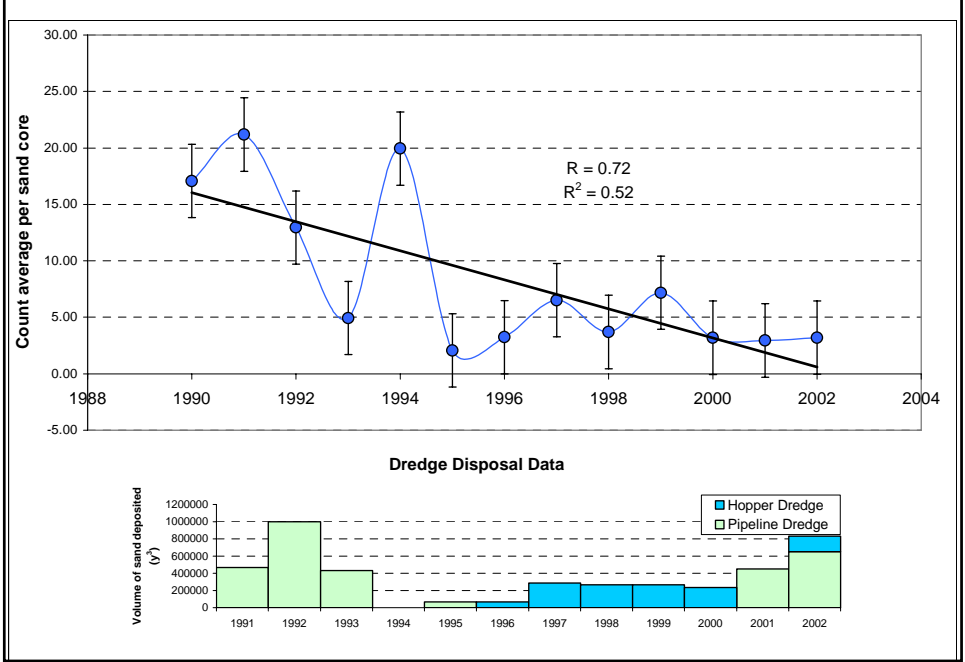
Trend in mean grain size from 1990-2002, mid swash zone, Pea Island, NC.



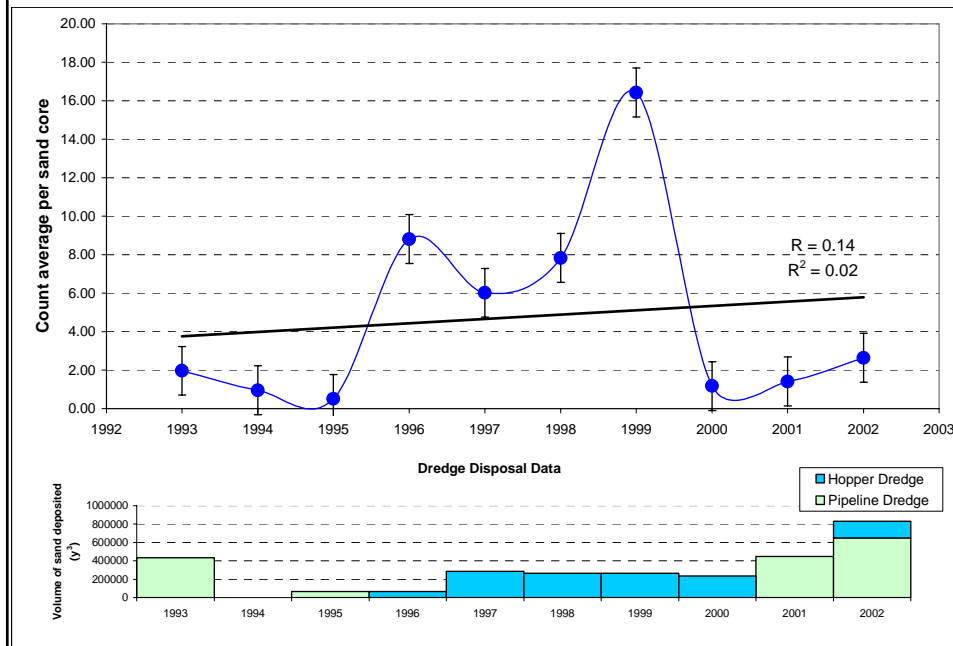
Trend in heavy mineral content of the Mid-Swash Zone 1992-2002



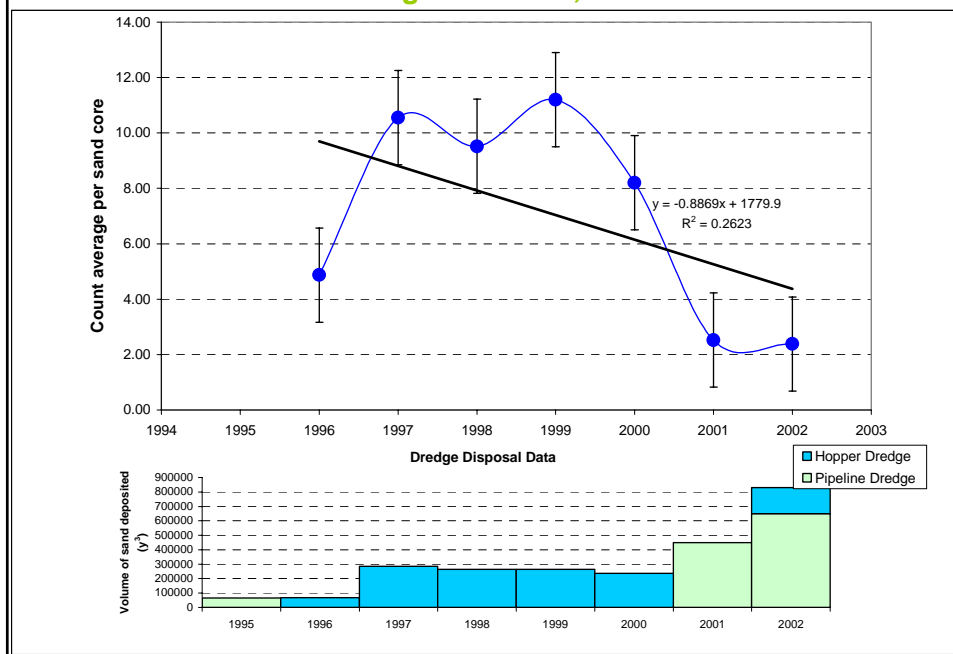
Trend of decline in Emerita counts taken from 1990-2002 along Pea Island, NC.



Trend of Donax counts taken from 1993 – 2002 along Pea Island.



Trend of Amphipod counts taken from 1996-2002 along Pea Island, NC.



CONCLUSIONS

- **NEW METHODS**
 - Node/Inter-node Disposal
 - Others?
- **REVISIT DREDGING MORATORIUM WINDOWS**
 - Least biological activity
 - Peak biological activity
- **MONITORING IS CRITICAL**
 - Data for adaptive management
 - Input for compatibility decision
- **MUST MAINTAIN SCIENTIFIC OBJECTIVITY**
 - Will involve some risks

