

Mapping Terrapin Populations and Their Habitat



STAC Workshop 16/17 April 2013
Randy Chambers, College of William and Mary



Habitat: coastal bays, lagoons, marshes, creeks

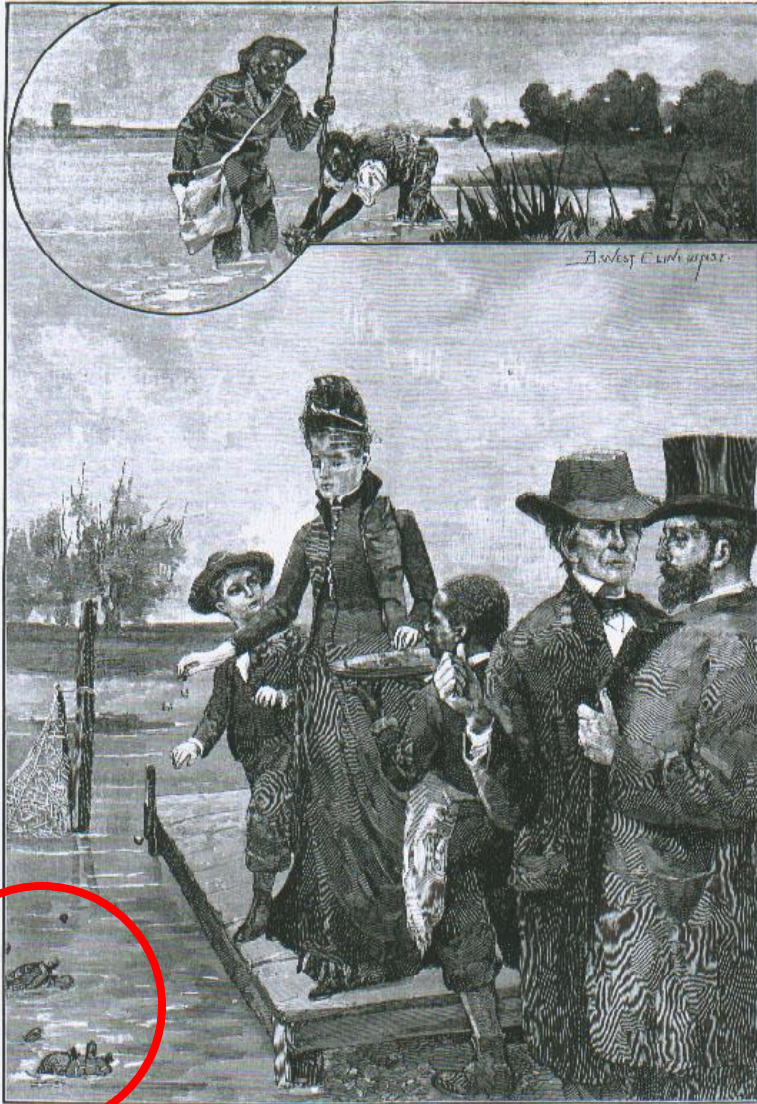
Diet: Snails, crabs, worms, barnacles, other inverts, fish

Life cycle: Swim in creeks, feed in marshes/seagrass beds, brumate in sub-tidal muds, nest on open beaches/uplands





Source: Bryan Watts, CCB



SEEKING AND CATCHING "TERRAPIN ON A MARYLAND FARM"—Drawn by R. W. COCHRAN.—[See Page 110.]

Catching terrapin on a Maryland farm --Harper's Weekly

Choicest of all turtle meat is furnished by the terrapin, which inhabits salt-marshes along the East Coast. But this holds good only for the female of the species—the males being unacceptably tough—and to those weighing not much more than 3 pounds.

➤ To cook, place in a pan of cold water:

A 7-inch turtle

Bring water slowly to a boil and parblanch at least 10 minutes. Drain. Plunge into cold water and leave until cool enough to handle. Scrub well. Place the turtle in rapidly boiling water and add:

(A Bouquet Garni, 572)

(An onion stuck with cloves)

(3 stalks celery)

➤ Reduce the heat at once and simmer 35 to 45 minutes or until the claws can be removed by pulling. Drain, reserving the stock. Allow the turtle to cool on its back in order to trap the juices as it cools. When cool, pry the flat plastron free from the curved carapace—easier said than done. Near the head you will find the liver. ➤ Free it carefully from the gall. Discard the gall. Slice the liver thin and reserve it, as well as the eggs, if any. You may or may not want to reserve the small intestines, which may be chopped and added to the meat or sauce. Remove the meat from both the carapace and the skinned legs. When ready to serve, you may toss the meat, including the ground liver and intestines, in:

6 tablespoons hot melted butter

Garnish with:

Parsley

Serve with:

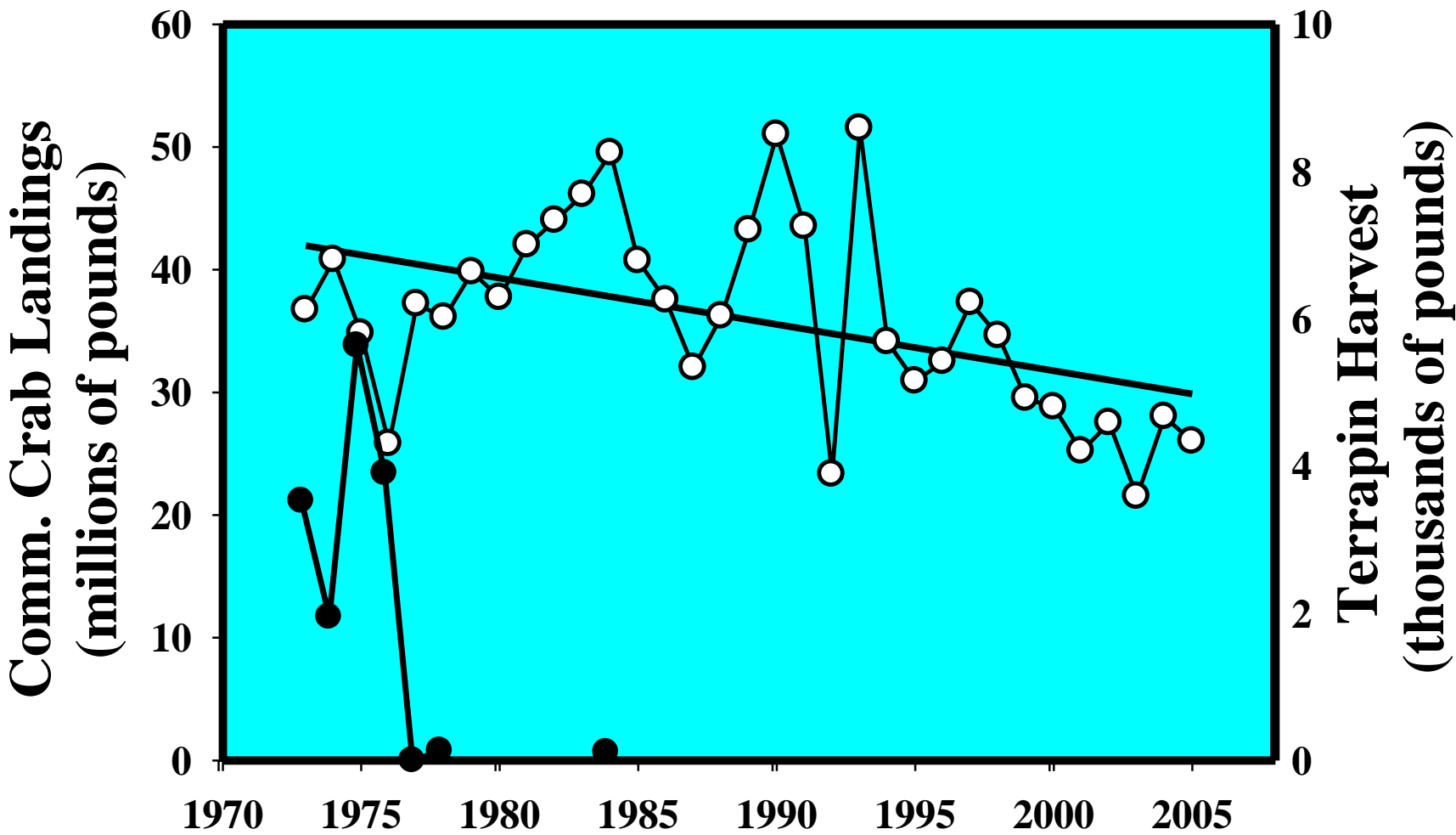
Sherry, as a drink

joy
OF
COOKING

A nearby turtle dealer's shop in Qing Ping market, Guangzhou, China. Photograph taken March 02, 2006.

© Peter Paul van Dijk, Conservation International







© Willem Roosenburg

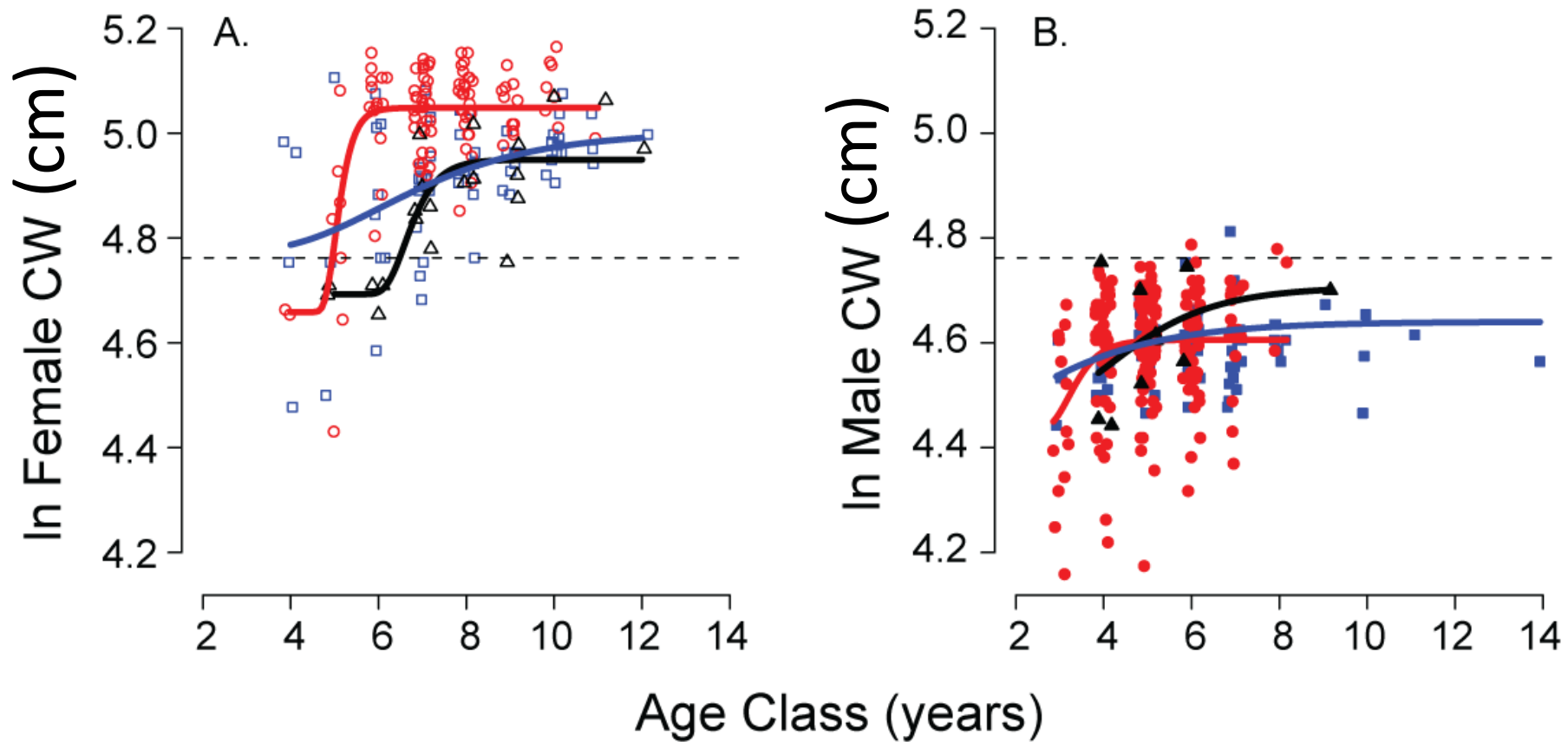








- Current ChesBay
- Historic ChesBay
- Long Island Sound



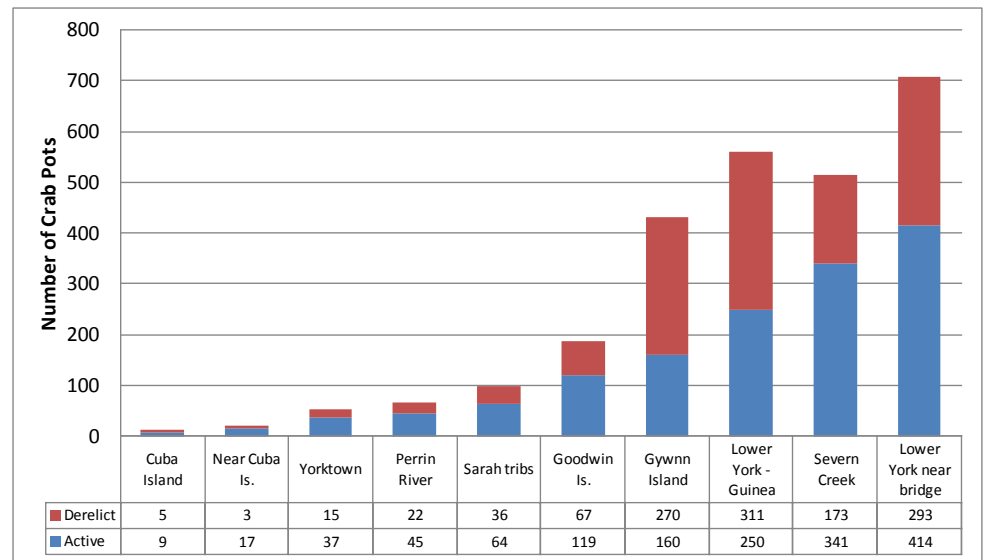
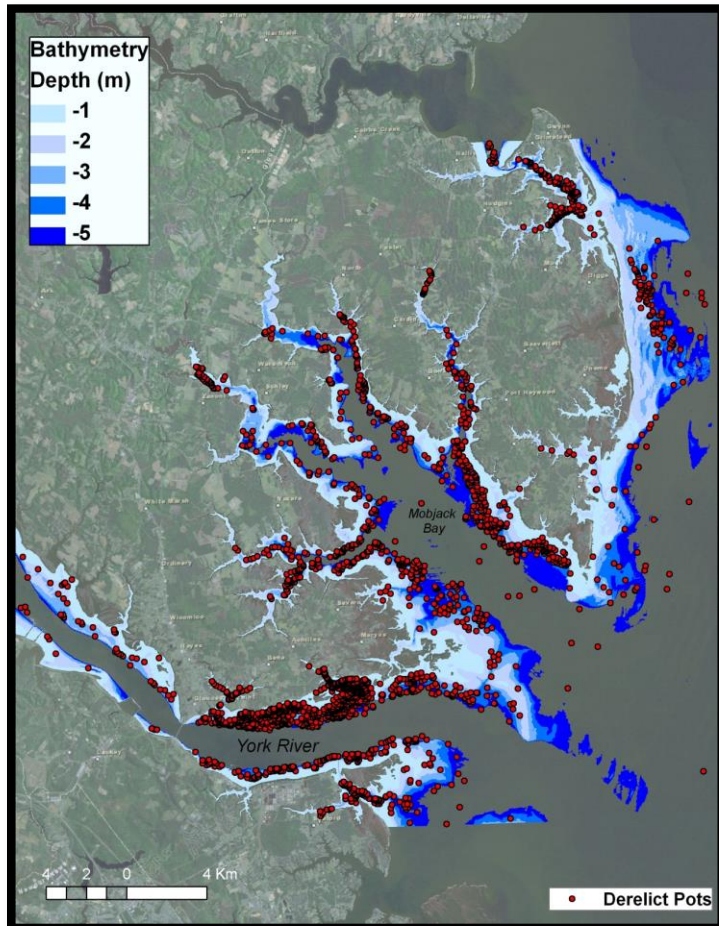
Grosse et al. 2009



USFWS photo

The scope of the derelict crab pot issue

- Within the pilot study area 2872 derelict pots were removed during 2 winters
 - Of these, 22% were within shallow waters (≤ 2 m) where terrapins typically reside
- The amount of derelict pots generally corresponds to the number of active pots in a given area



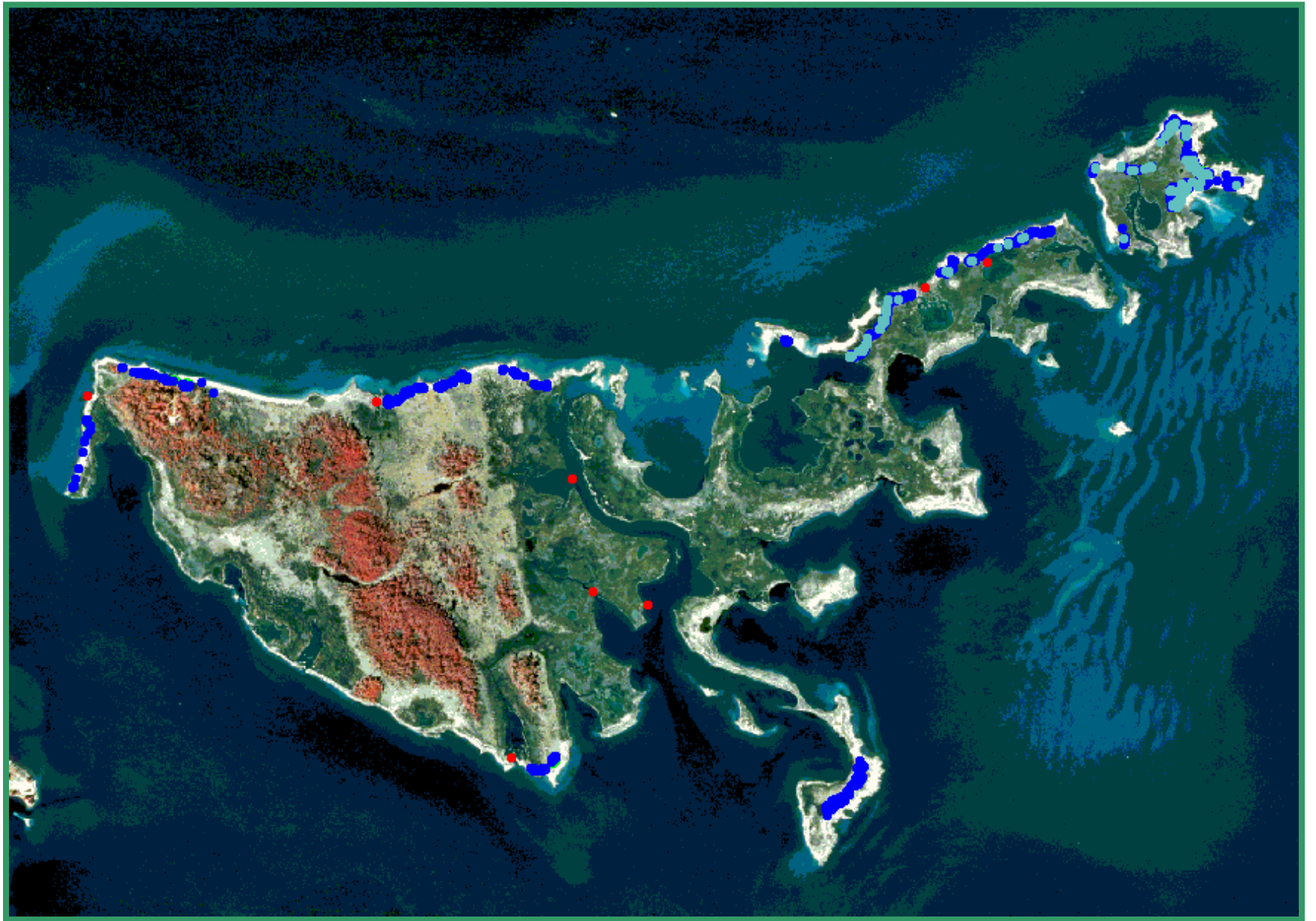


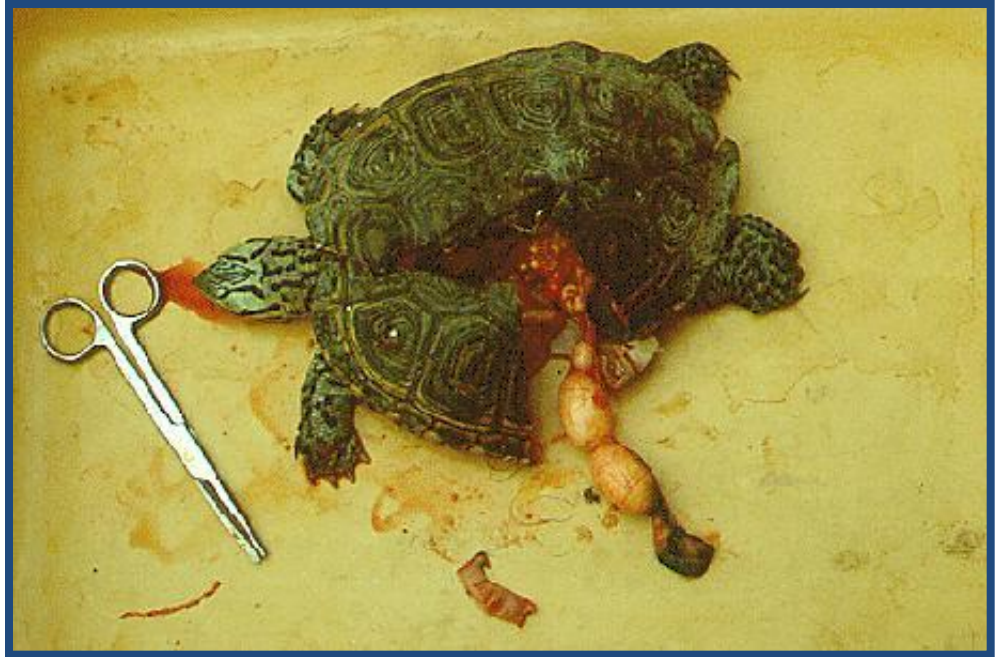




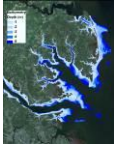






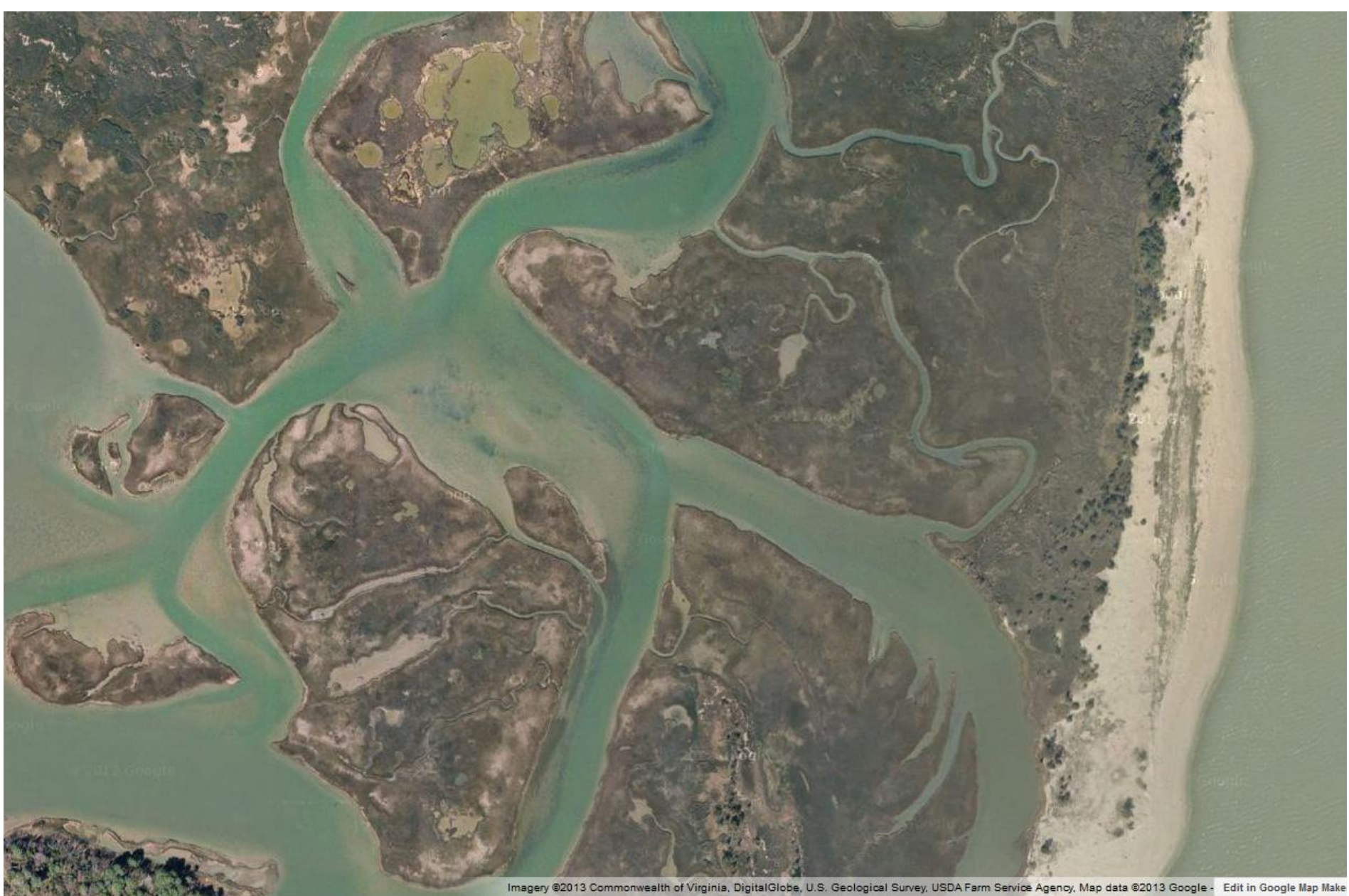
Goodwin Islands, mouth of York River





TERRAPIN HABITAT SUITABILITY

| Variable | Rationale | Metrics | Source |
|----------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|--------------------------------------------|-------------------------------------------|
| Bathymetry  | Primary critical habitats occur in shallow waters | Waters \leq 2m depth | NOAA - National Ocean Service |
| Tidal Marsh  | Essential habitat: meso-polyhaline distribution | Presence of extensive or embayed marshes | Shoreline Inventory (CCRM-VIMS) |
| Nesting Beach  | Nesting success influenced by nest site suitability | Presence of subaerial unconsolidated sands | Shoreline Inventory (CCRM-VIMS) |
| Riparian land-use  | Access to high marsh, land-water connectivity diminished | Forested land use within 10m of the shore | Southeast Gap Analysis Land Cover Dataset |
| SAV  | Supplementary feeding habitats | Presence/area of seagrasses | 10-yr composite of annual VIMS SAV survey |







Bellfield Rd

Bellfield Rd

Bellfield Rd

Bellfield Rd

Colonial National Historic Pkwy

Colonial National Historic Pkwy

Colonial National Historic Pkwy

Helm Rd

Indian Field Creek

Kiskiak Cir

Mason

Mason Row

Kiskiak Cir

200 ft
100 m

Imagery ©2013 Commonwealth of Virginia, DigitalGlobe, U.S. Geological Survey, USDA Farm Service Agency, Map data ©2013 G



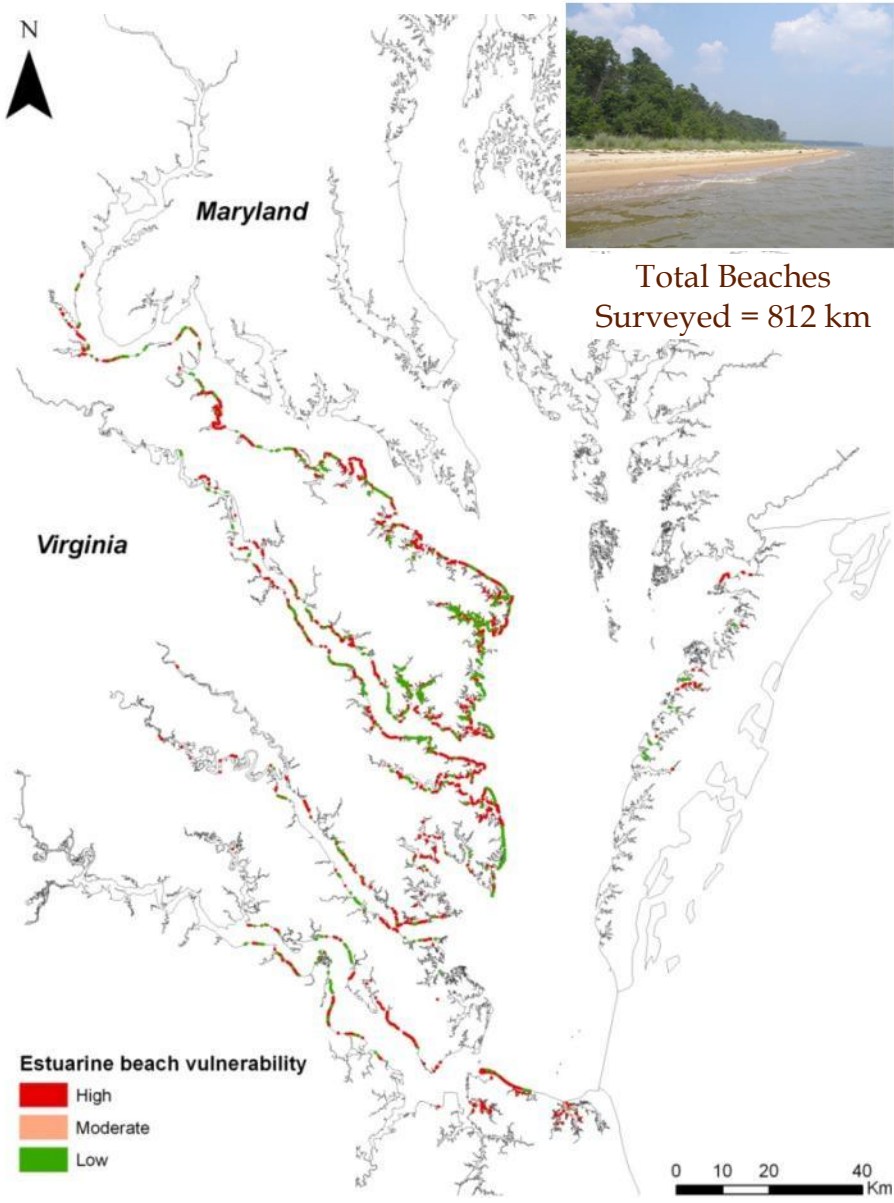
Modeling ecological integrity for terps: habitat reqs and stressors

Strengths: Landscape-level, GIS-based approach provides broad-brush

Weaknesses: Proxies for habitat and stressors difficult to model

Scale for use: Variable, owing to variable life-history reqs for terps, by age and sex

Estuarine Beaches - SLR & shoreline development



The majority of estuarine beach habitat occurs in poly-mesohaline reaches

88.2% (716 km)

Of existing beaches, **~ 85%** are at high-moderate risk from sea level rise

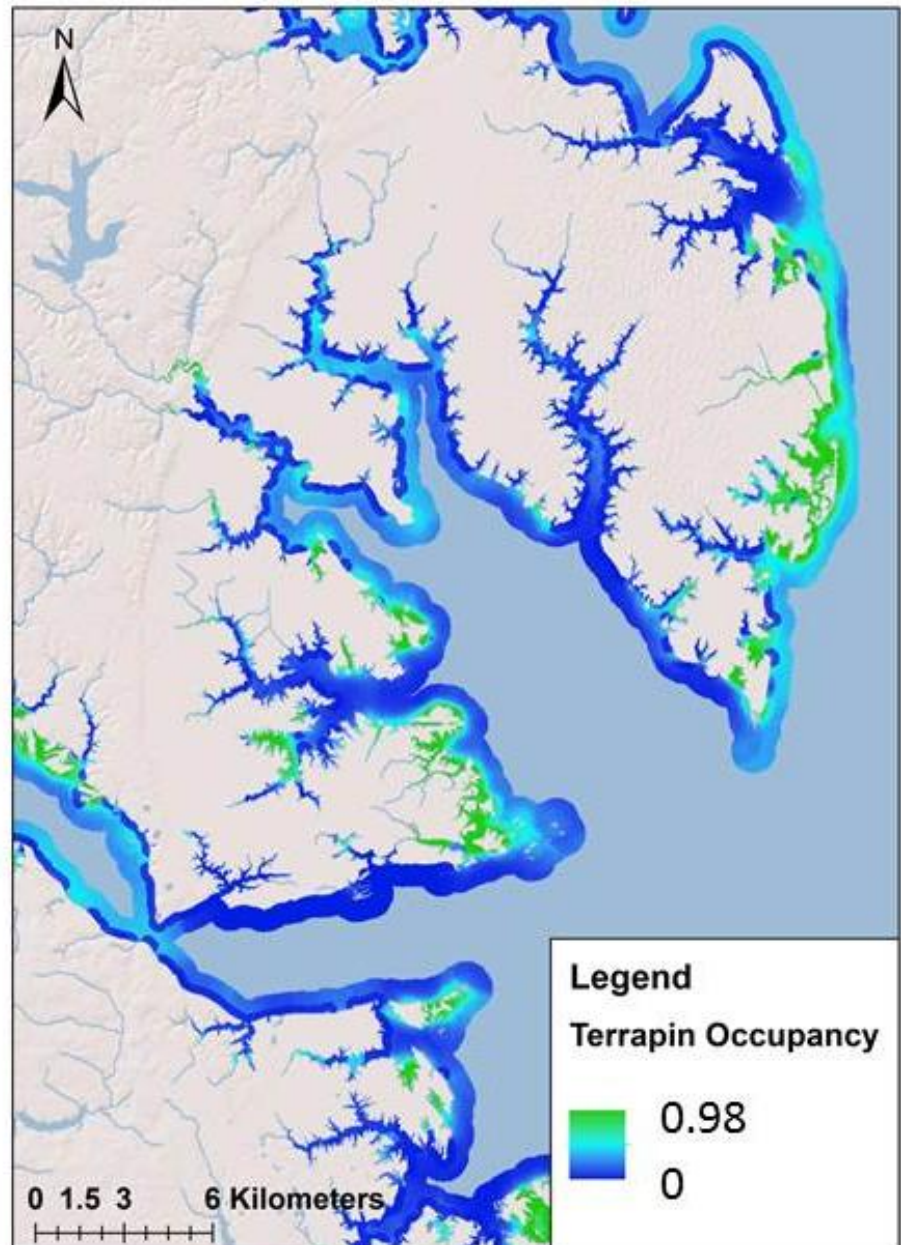


High Risk Beach



Low Risk Beach

Data sources: Shoreline Inventories (VIMS-CCRM), VIMS Shoreline Studies Survey (S. Hardaway)



Terrapin occupancy was positively related to:

1) proportion of marsh in the intertidal zone (500-m scale);

and negatively related to:

2) derelict crab pot density in open water (1-km scale);

3) proportion of agriculture in adjacent uplands (1-km scale), and;

4) presence of shoreline hardening along the coast (270-m scale).

These preliminary results of a landscape-seascape connectivity model demonstrate the utility of the multi-stage life-history approach that incorporates habitat connectivity and human stressor components.

Does ID and maintenance of terp habitat provide other ecosystem services/values?

1. Not all coastal habitat is terp habitat, nor was it.
2. Occurrence of expansive tidal marsh with adjacent open water and nearby nesting beach does not imply, e.g., good water quality.
3. But...maintenance of terrapin habitat would imply integration of “desirable” seascape elements that are more closely associated with ecosystem services.

Is terrapin coastal habitat a good surrogate for other fauna or water quality services?

1. The presence of terps suggests local conditions (~2 km) are good for terps and for other fauna that use intertidal wetland habitat.
2. But...because terps are long-lived, a negative, population-level response to declining conditions and positive response to improving conditions may be slow to emerge.
3. No meta-population analyses have been completed demonstrating the occurrence of population sinks and sources across the estuarine seascape.



Issues and Trends Impacting Terrapin Populations:

- 1) Loss of male and juvenile female terps in commercial-style crab pots.
- 2) Shoreline armoring and other modifications limiting female access to upland nesting sites vs. shoreline creation via dredge islands.
- 3) Ongoing development of upland nesting sites; increase in impact of synanthropic predators like raccoons and crows.
- 4) Conversion of oligo- and meso-haline tidal marsh habitat dominated by *Spartina* to habitats dominated by *Phragmites*.
- 5) Coastal development and SLR may decrease habitat connectivity among marsh, open water, and suitable nesting beach.

