

Methods to Minimize Dredging Impacts on Sea Turtles

DENA DICKERSON

ERDC, Environmental Lab

U.S. Army Corps of Engineers

Vicksburg, Mississippi



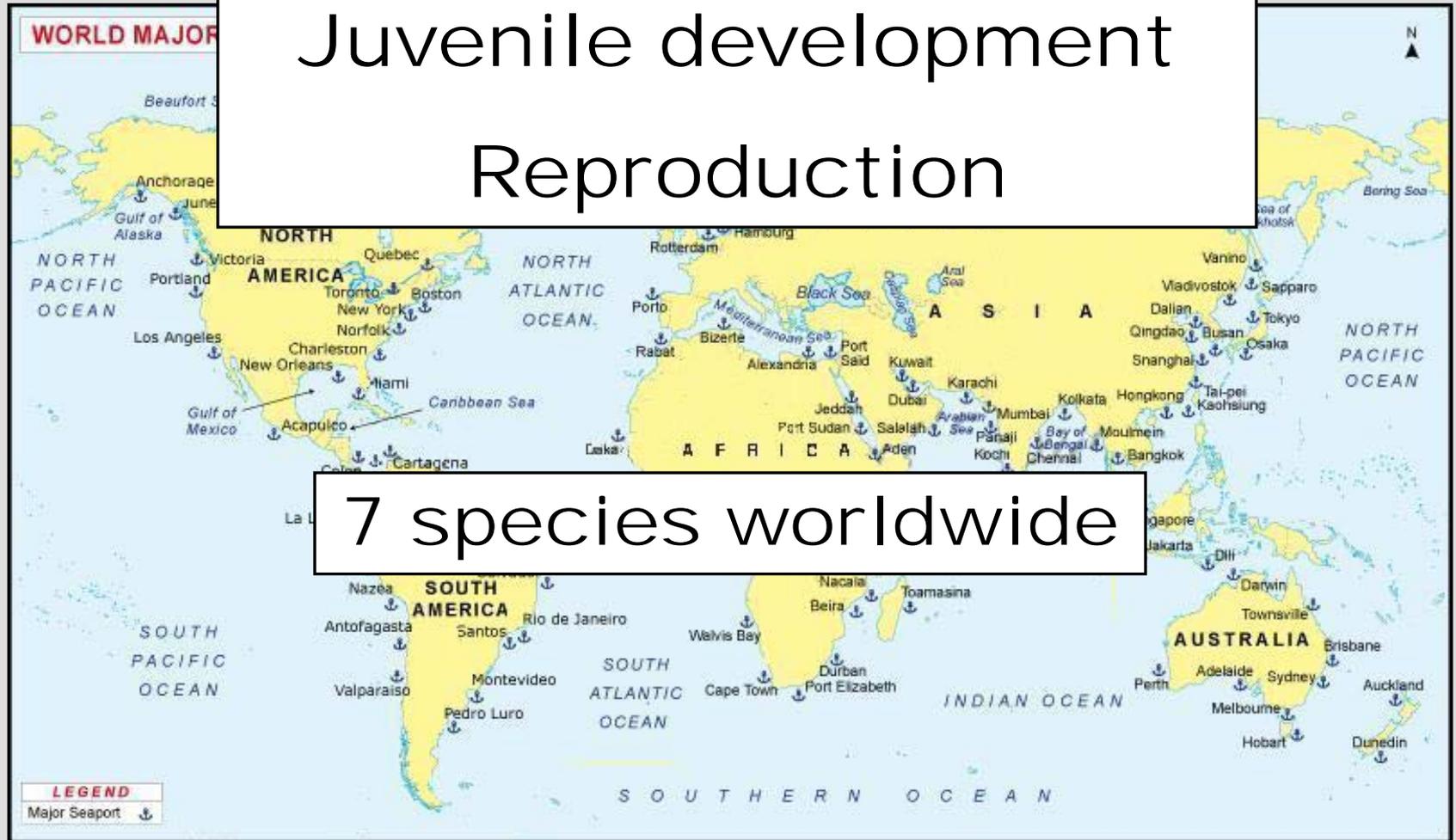
Coastal Sea Turtle Habitat

Feeding

Juvenile development

Reproduction

7 species worldwide



Southeastern US Sea Turtles



Kemp's ridley



Loggerhead



Green



Leatherback



Hawksbill



Olive ridley

Dredging Impacts to Sea Turtles

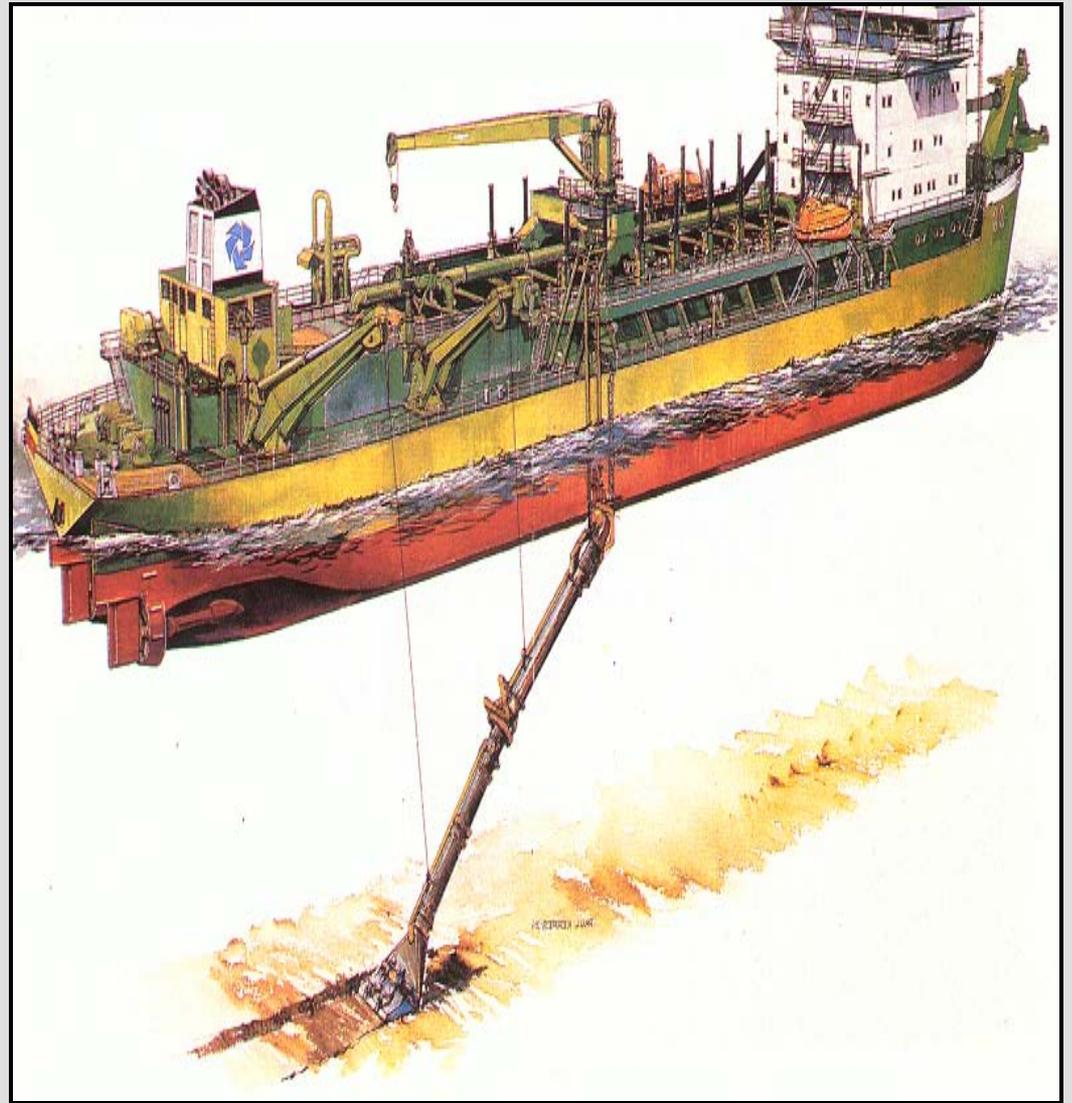


On Shore Impacts



In Water Impacts

- **Entrain adults, subadults, juveniles**
- **Disrupt nesting activities**
- **Destroy nests and nesting habitat**



Hopper Trailing Suction

693 Documented Sea Turtles

Takes by Dredges

(1980-2011) (31.5-yrs)

3 Sea Turtle Species

(61 Unknown)

471

Loggerhead



87

Green

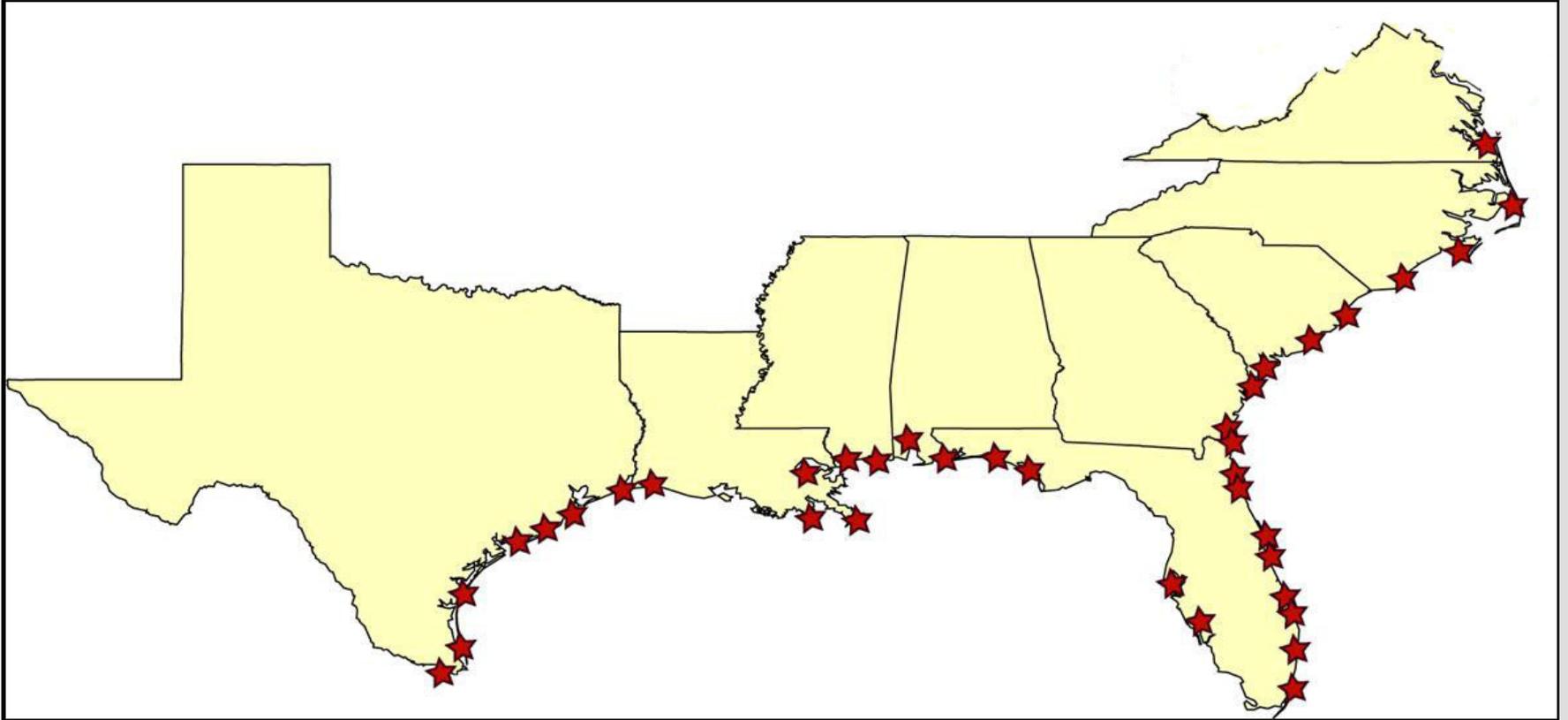


74

Kemp's ridley



Southeastern US



77+ sites monitored

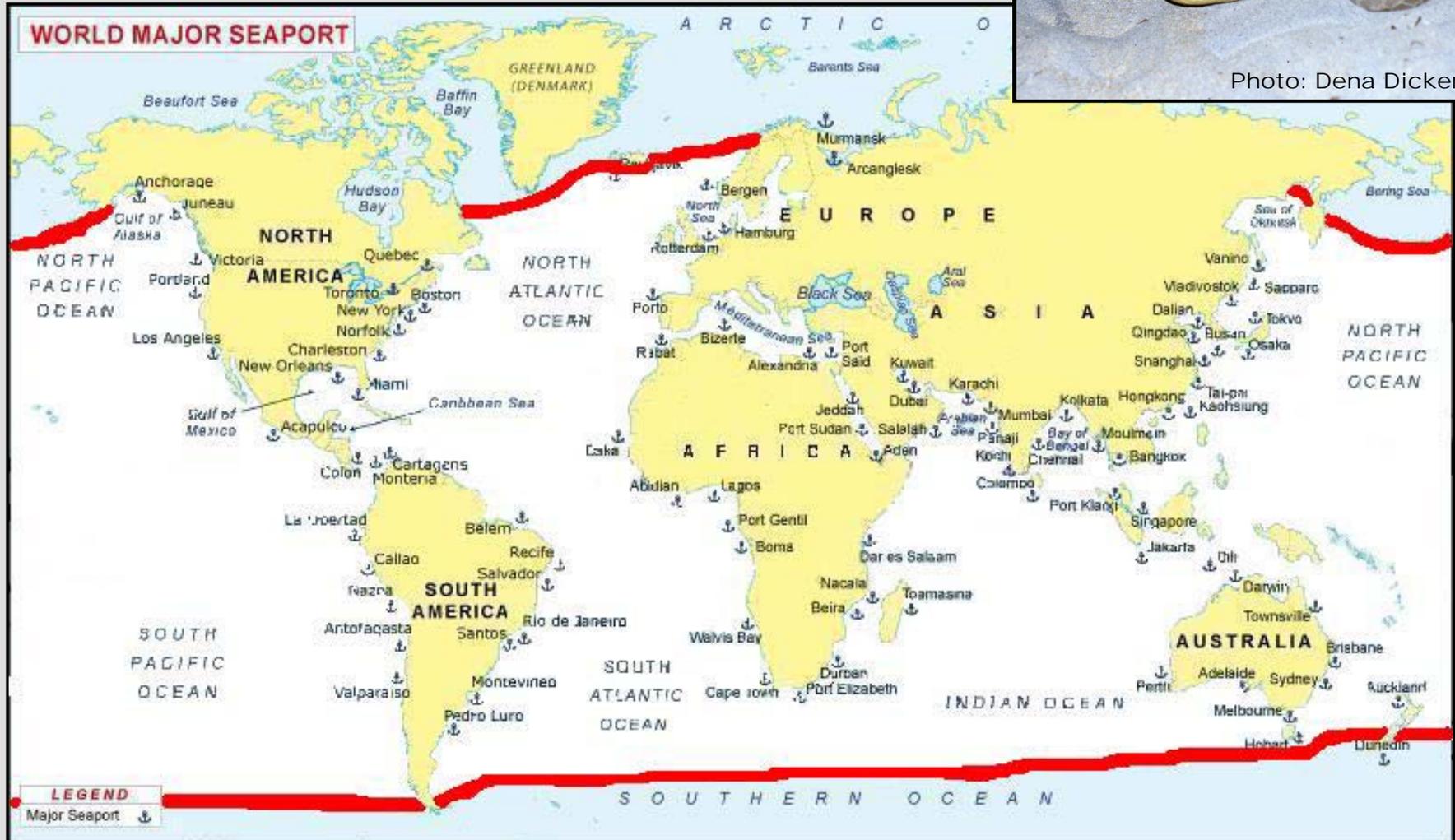
44 sites with turtle takes

Loggerhead *Caretta caretta*

US - Threatened
World - Endangered



Photo: Dena Dickerson

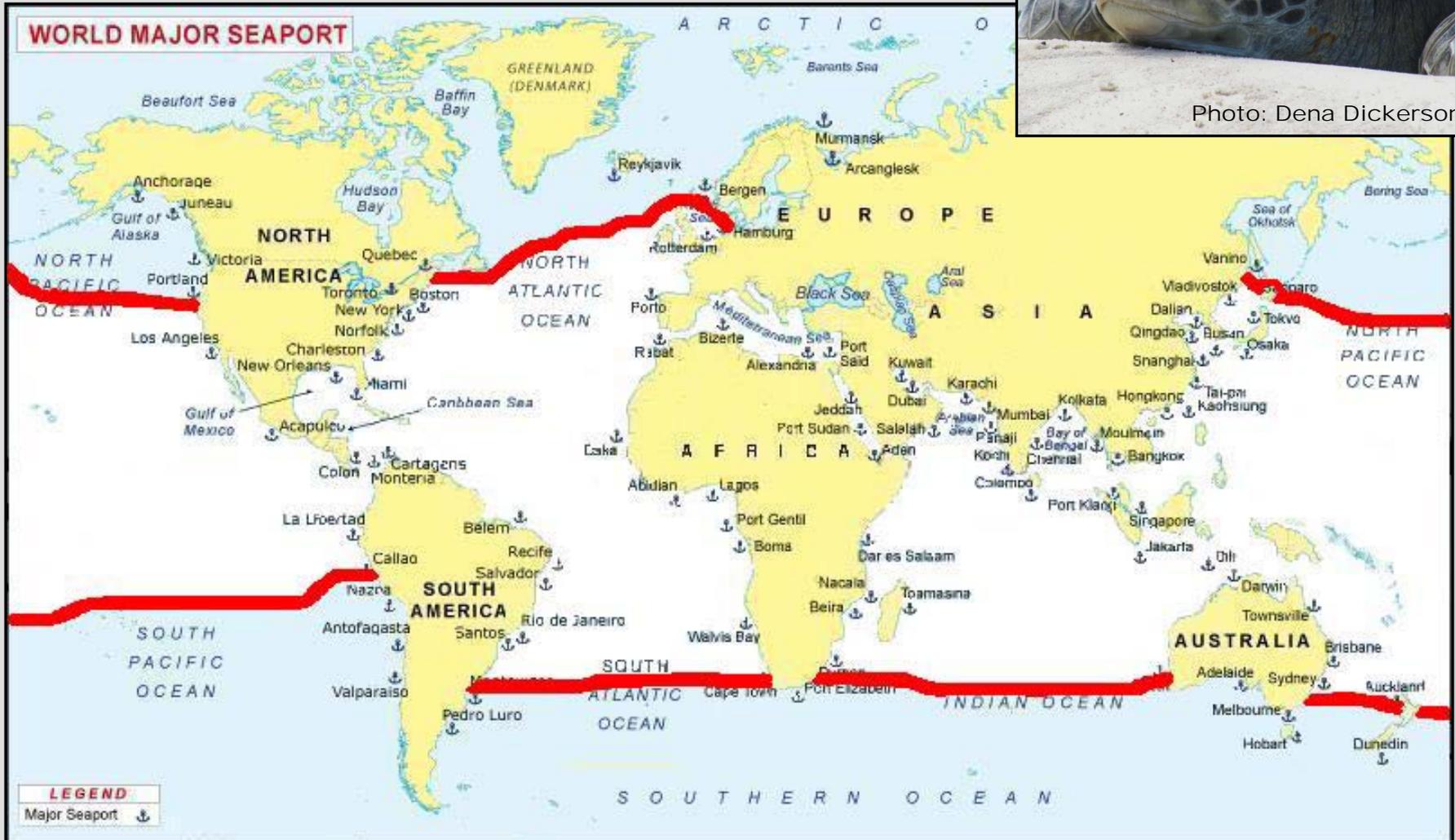


Green *Chelonia mydas*

*US - Threatened/
Endangered
World - Endangered*



Photo: Dena Dickerson



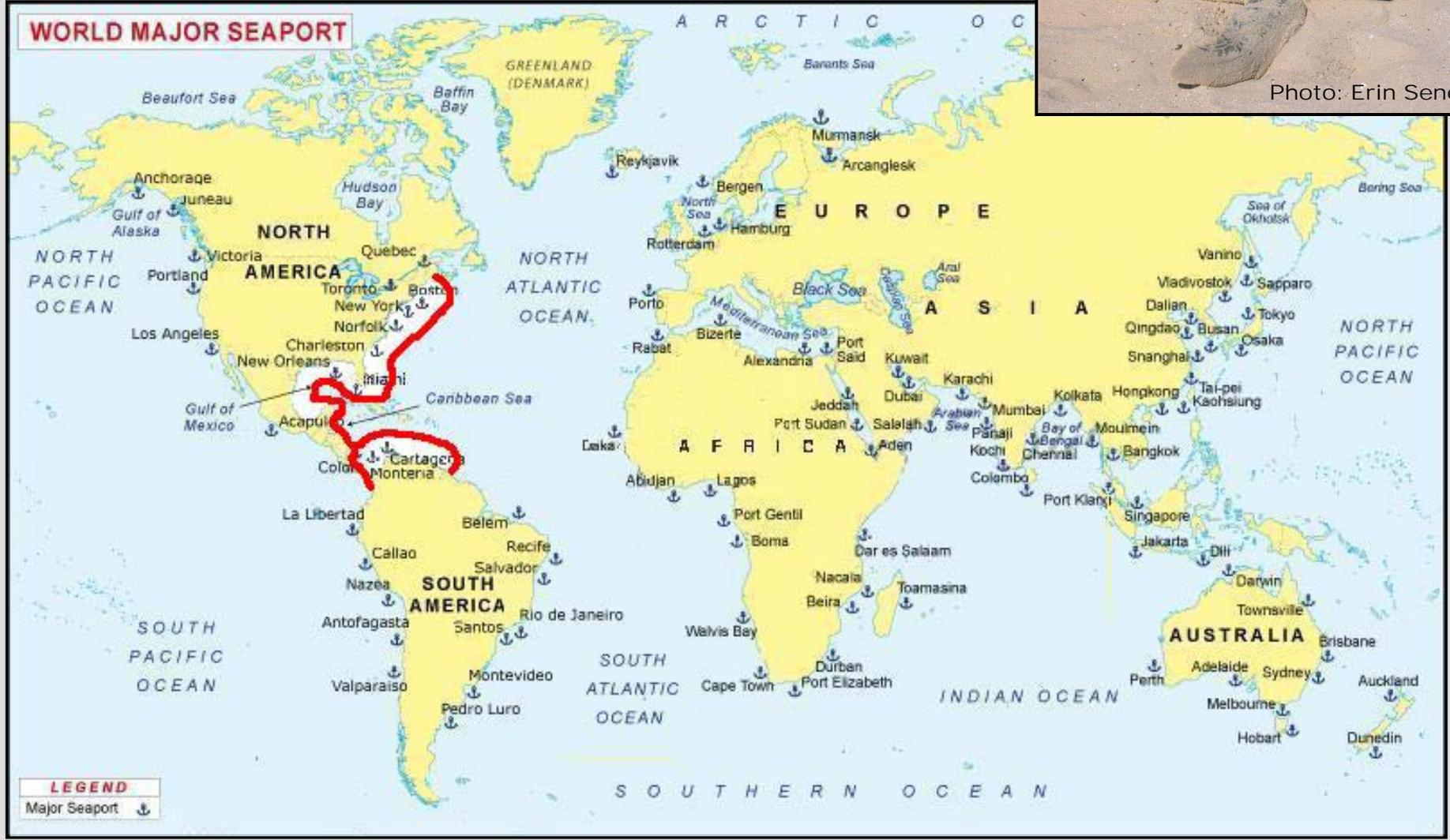
Kemp's ridley

Lepidochelys kempii

US - Endangered
World - Critically Endangered



Photo: Erin Seney



Olive ridley

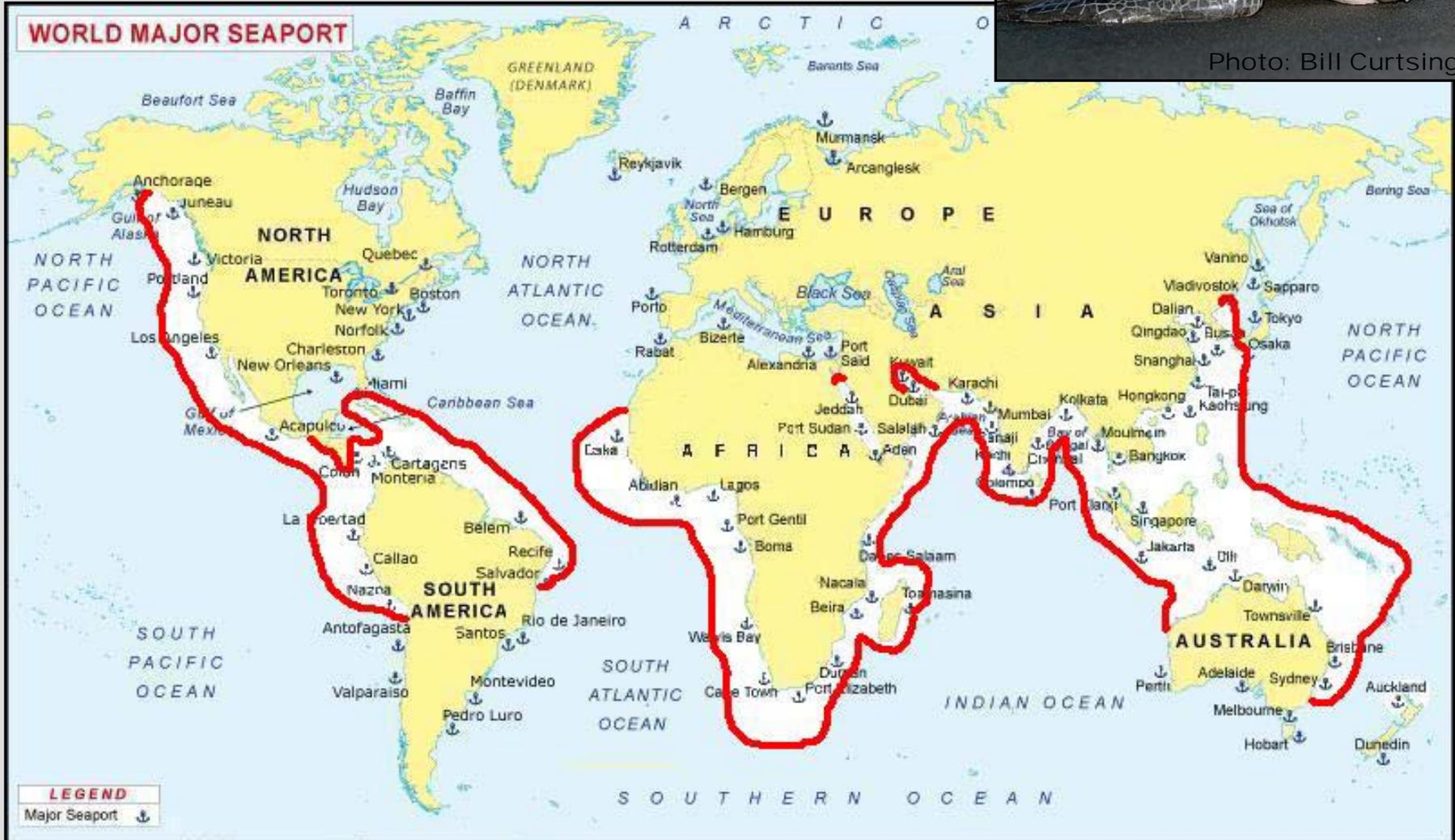
Lepidochelys olivacea

*US - Threatened /
Endangered*

World - Vulnerable



Photo: Bill Curtsinger



Olive ridley – Arribada (Mass nesting)

Mexico



India



Hawksbill

Eretmochelys imbricata

US - Endangered
World - Critically Endangered

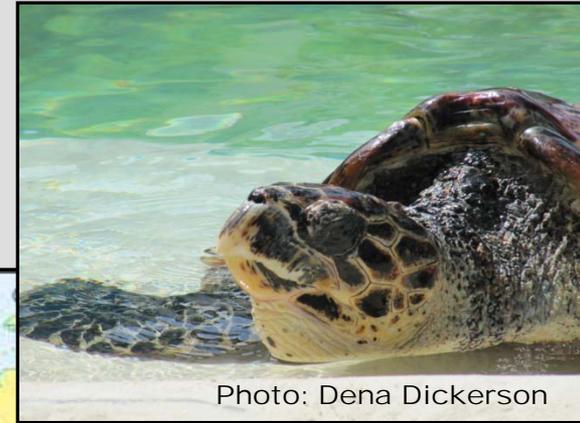


Photo: Dena Dickerson



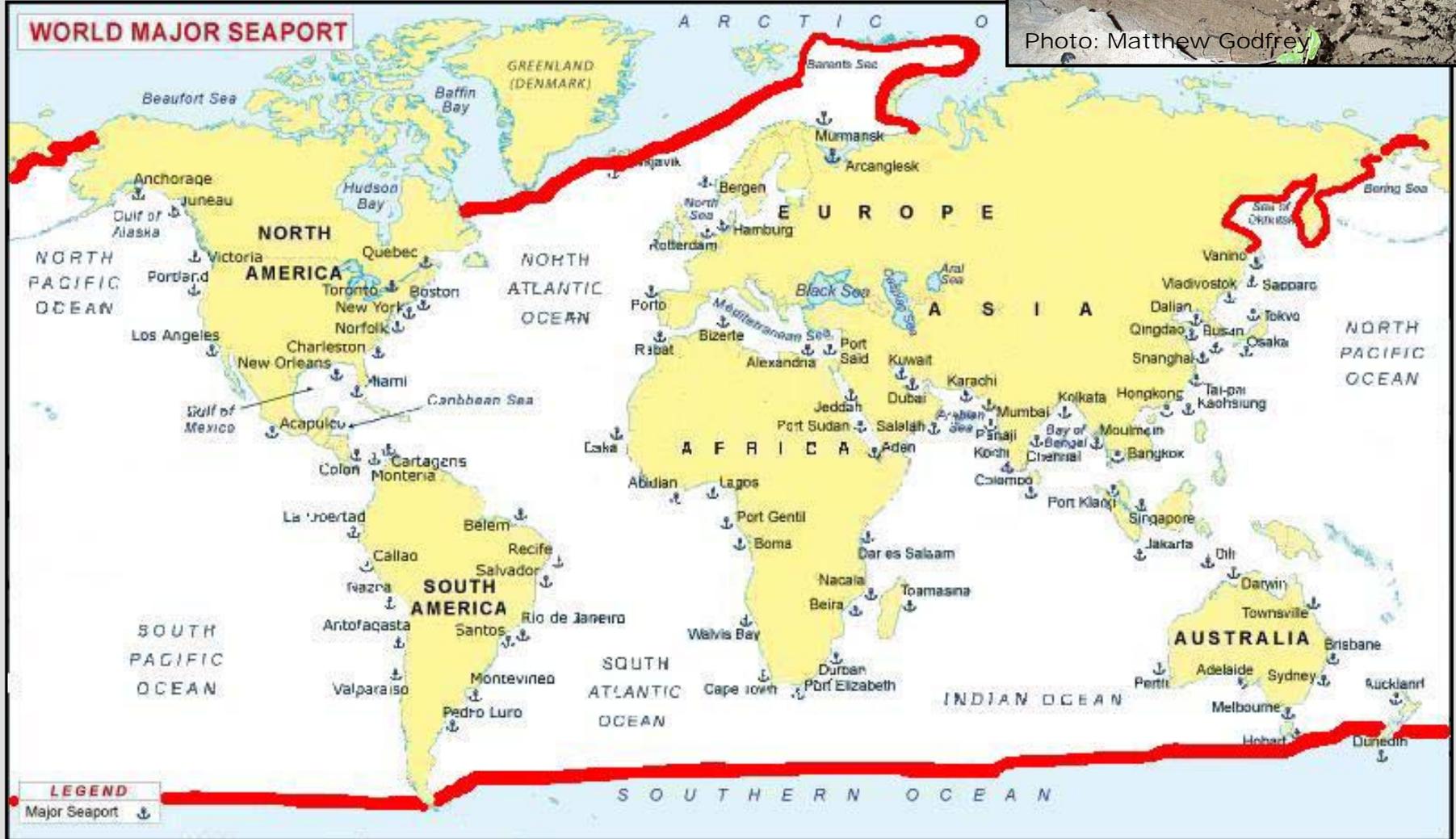
Leatherback

Dermochelys coriacea

US - Endangered
World - Critically Endangered



Photo: Matthew Godfrey



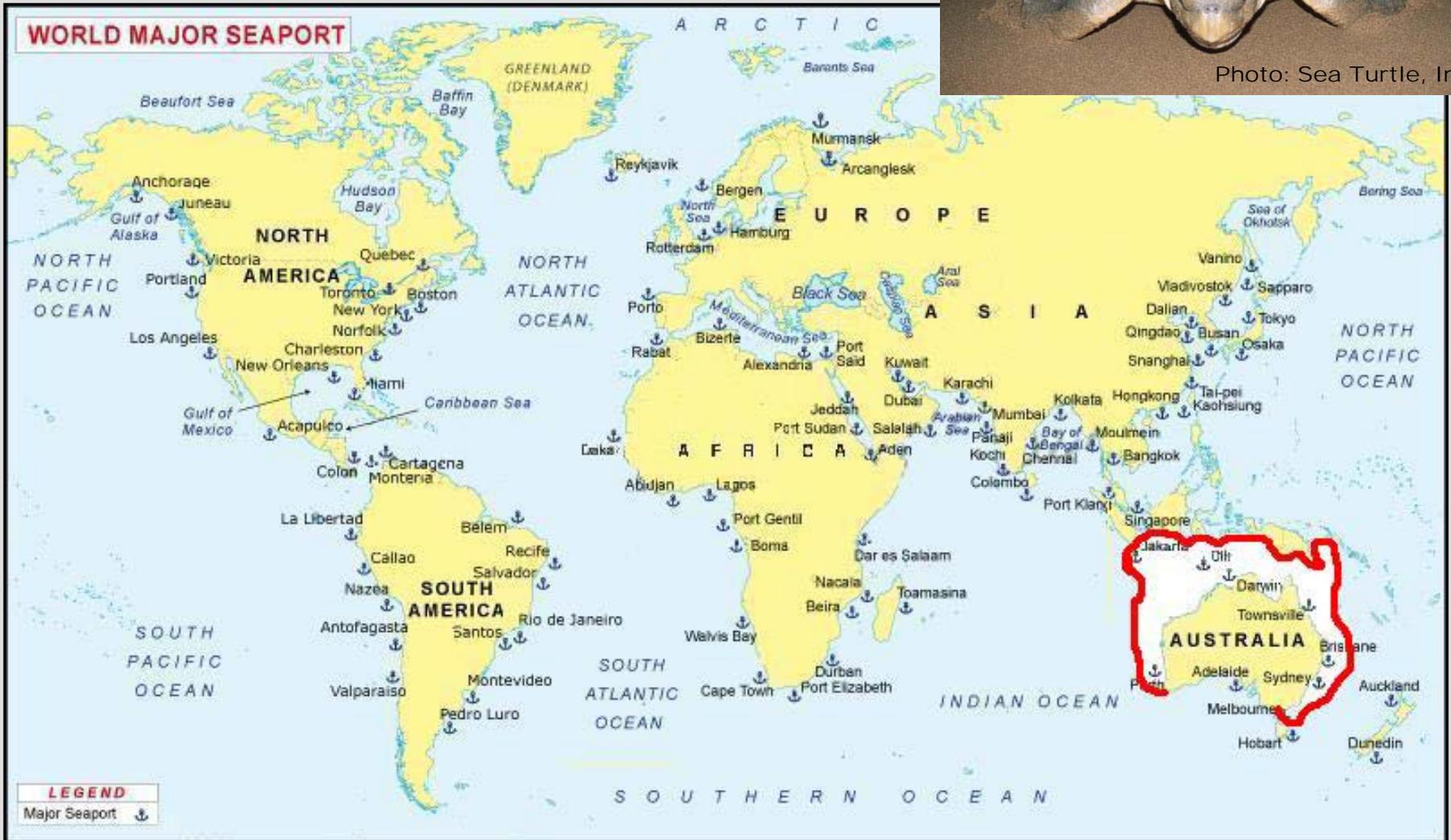
Flatback

Natator depressus

*World - Data
Deficient*



Photo: Sea Turtle, Inc

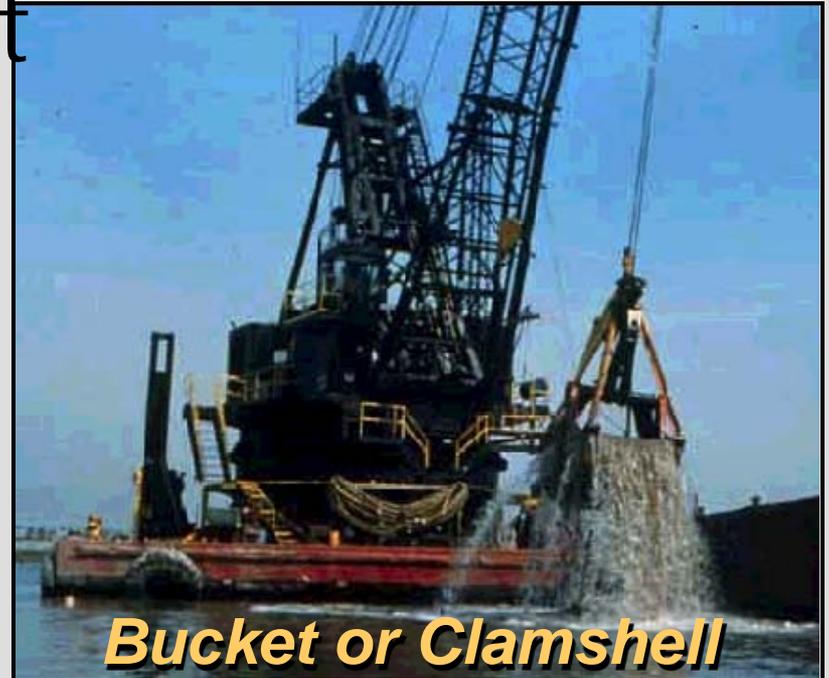


Risk Assessment Factors for Potential Dredging Impacts

1. Dredging Project
2. Biological Data
3. Entrainment Data
4. Protection Methods

1. Dredging Project

- *Location*
- *Timing*
- *Duration*
- *Dredge type*
- *Dredge operations*



Bucket or Clamshell



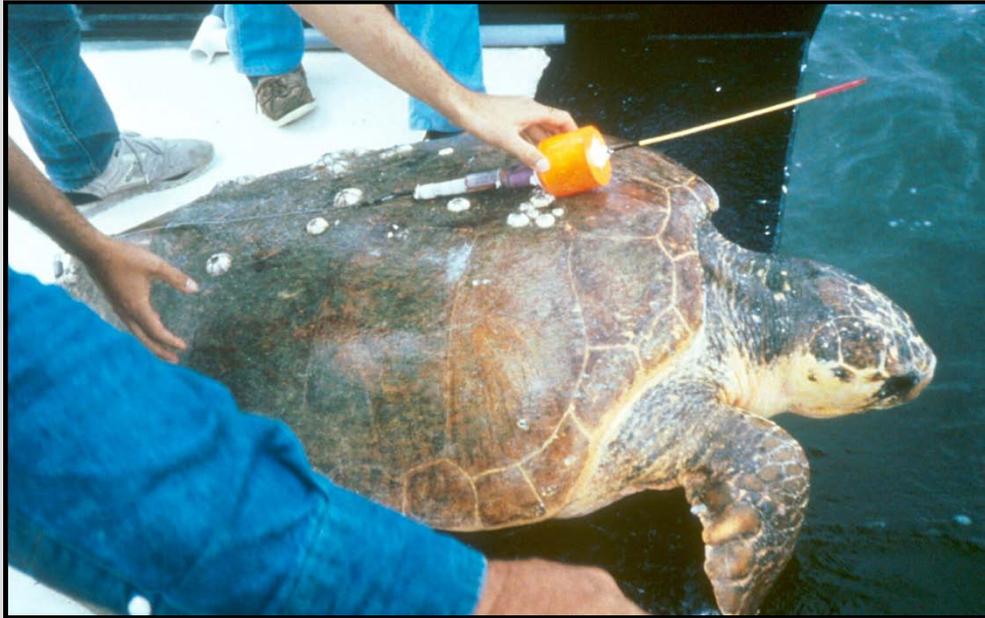
Cutter-suction Pipeline



Trailing-suction Hopper

2. Biological Data

- *Species occurrence and behavior*
- *Habitat utilization at dredging site*



3. Entrainment Data

Data collection

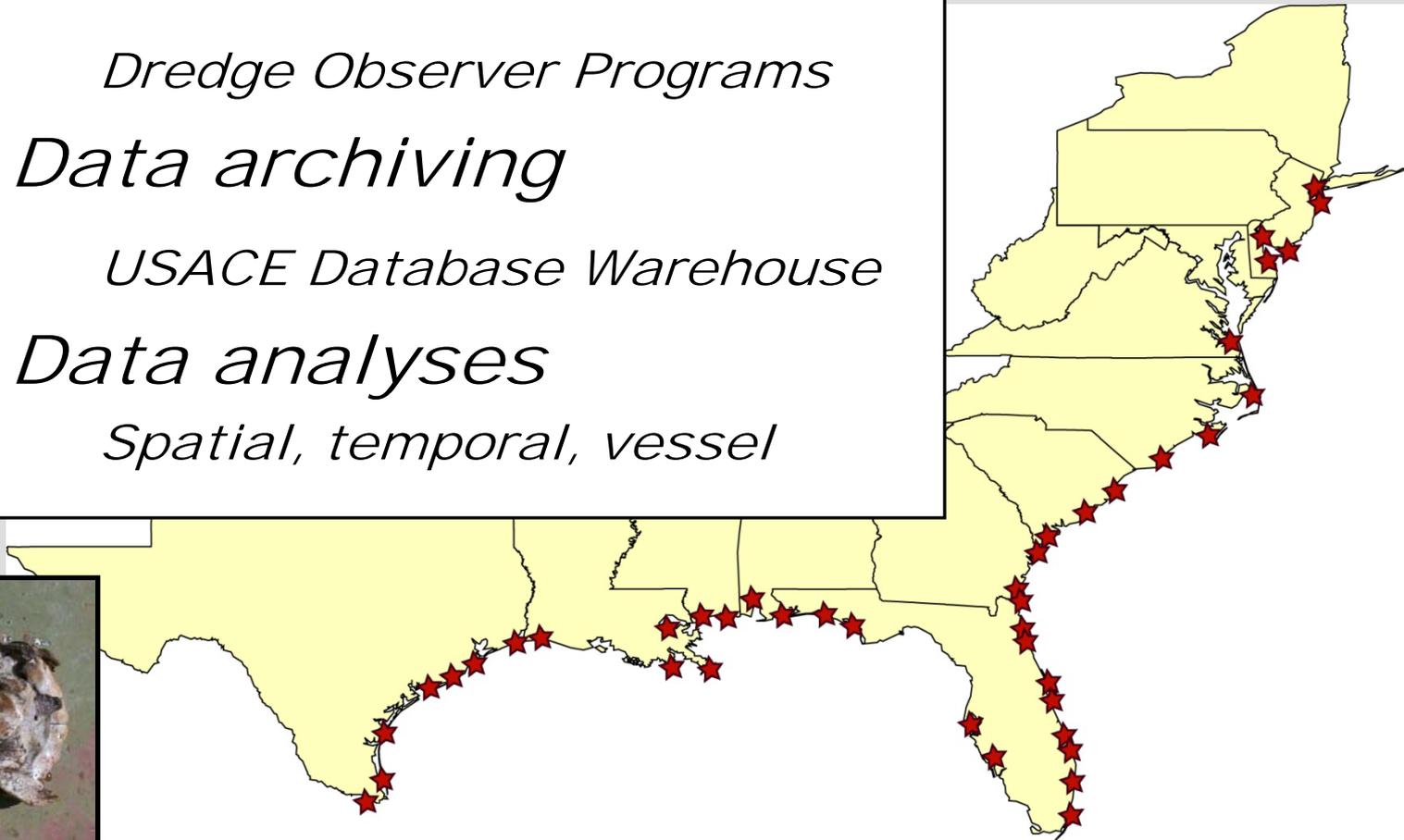
Dredge Observer Programs

Data archiving

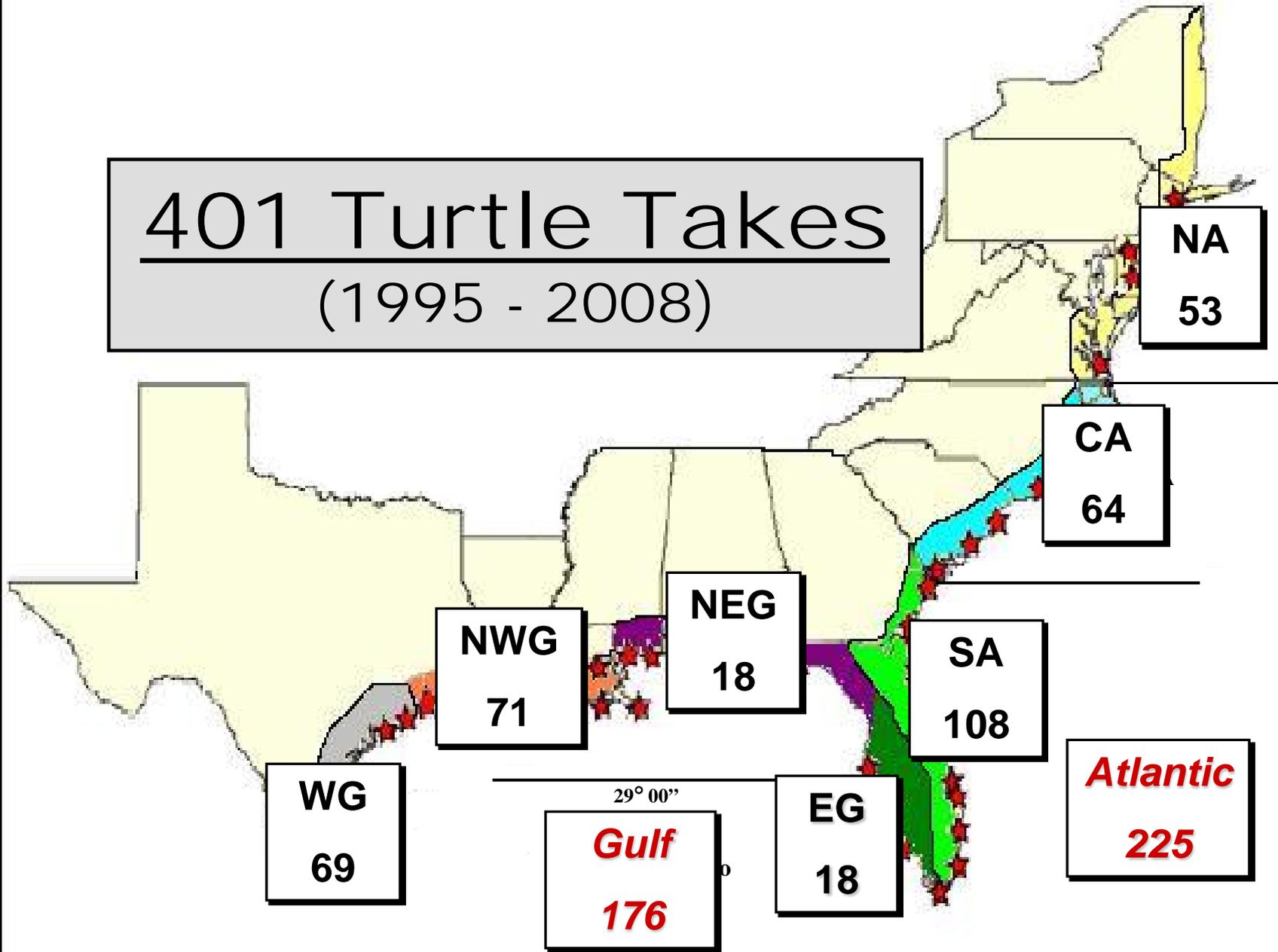
USACE Database Warehouse

Data analyses

Spatial, temporal, vessel

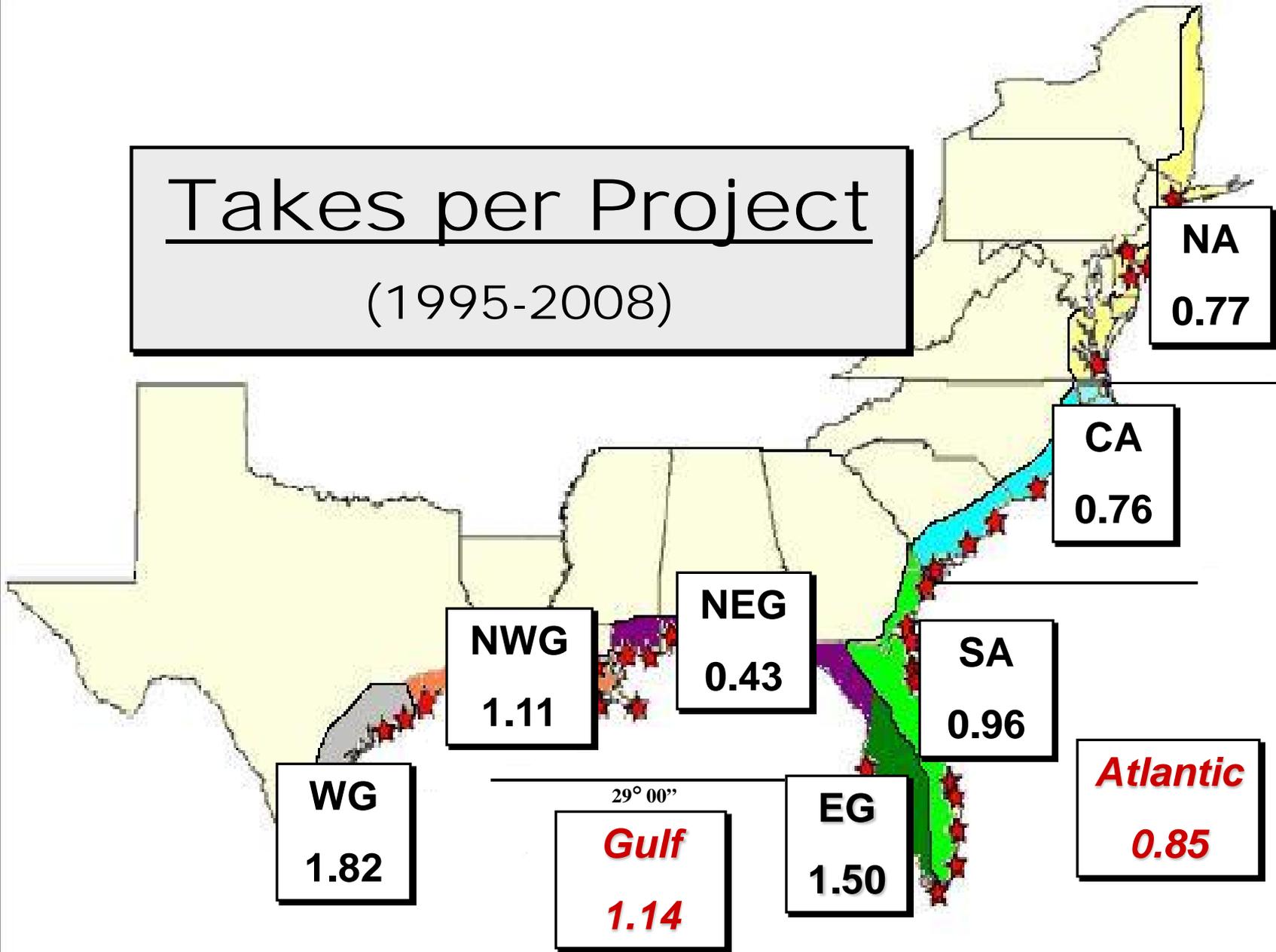


401 Turtle Takes (1995 - 2008)



Takes per Project

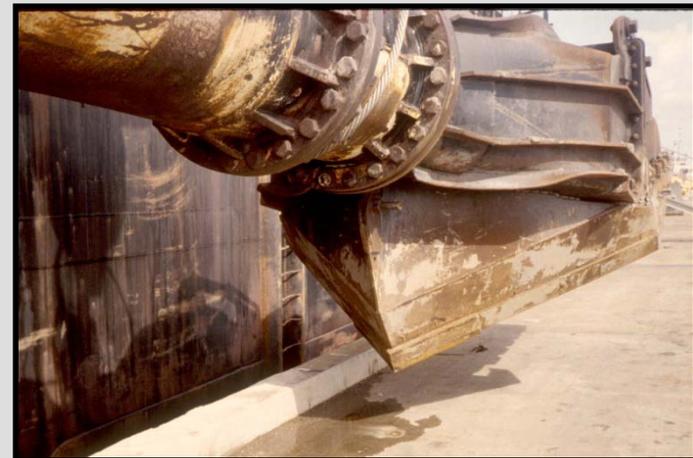
(1995-2008)



4. Protection Methods

a. Availability

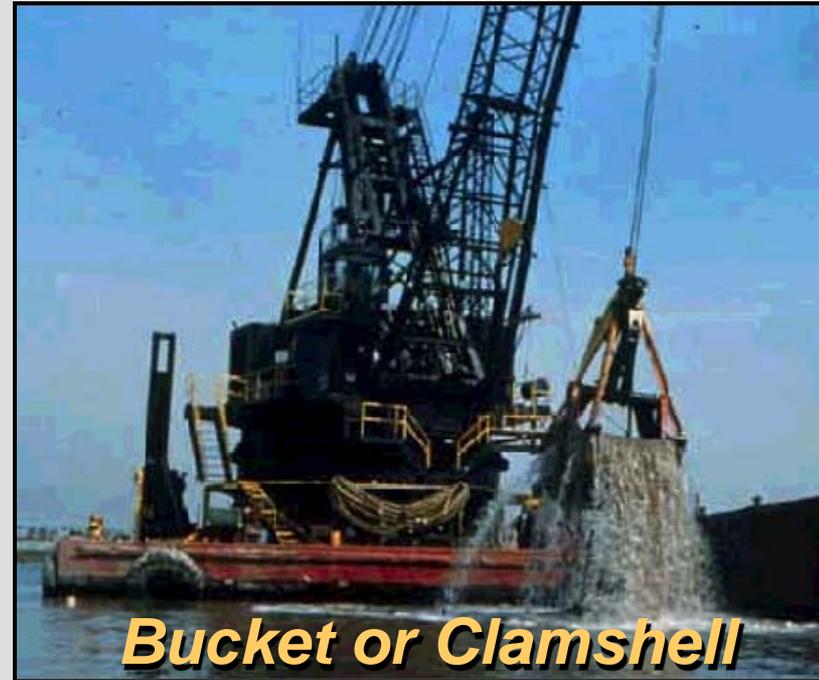
b. Effectiveness



Available Protection Methods

(Implemented 1992)

Minimize hopper use



Available Protection Methods

(Implemented 1992)

Environmental Window



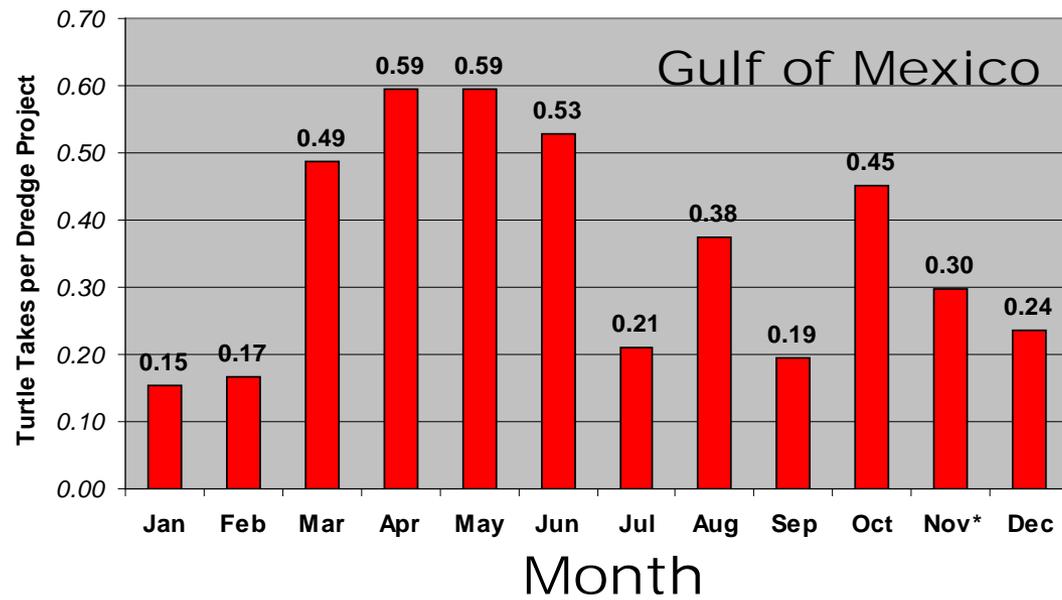
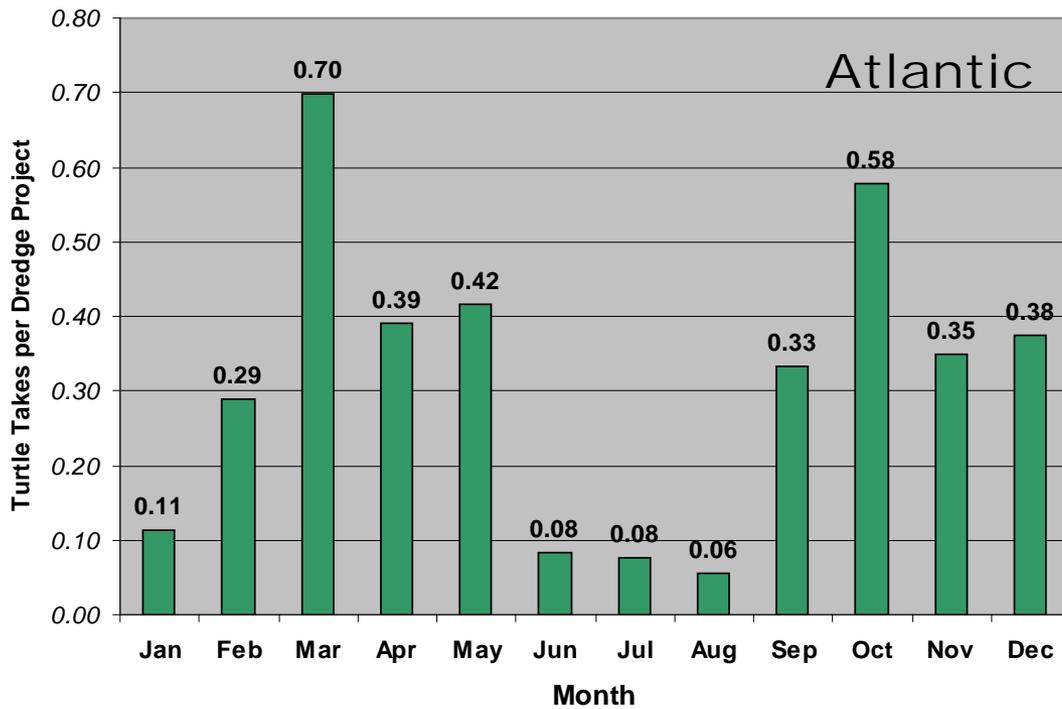
Based on Water Temp. & Nesting Timeline

Hatching

Nesting

JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

Takes per Project

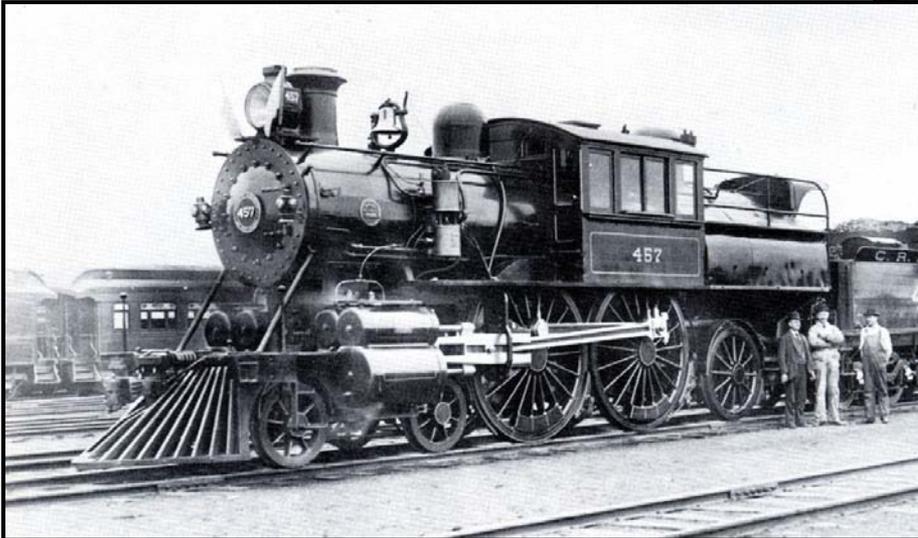


Available Protection Methods

(Implemented 1992)

Draghead turtle deflector

Reduce pumps in water column



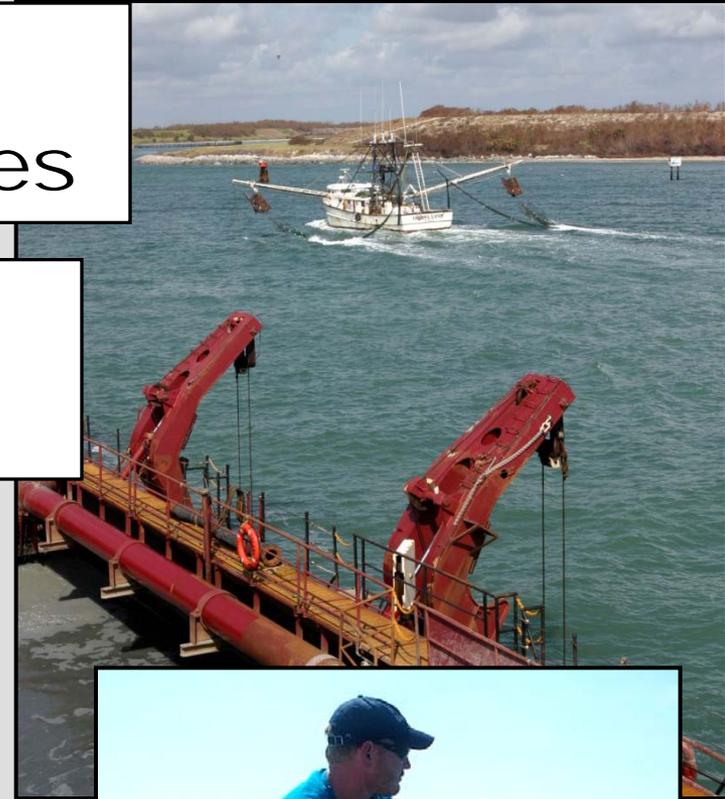
Available Protection Methods

(Implemented 1992)

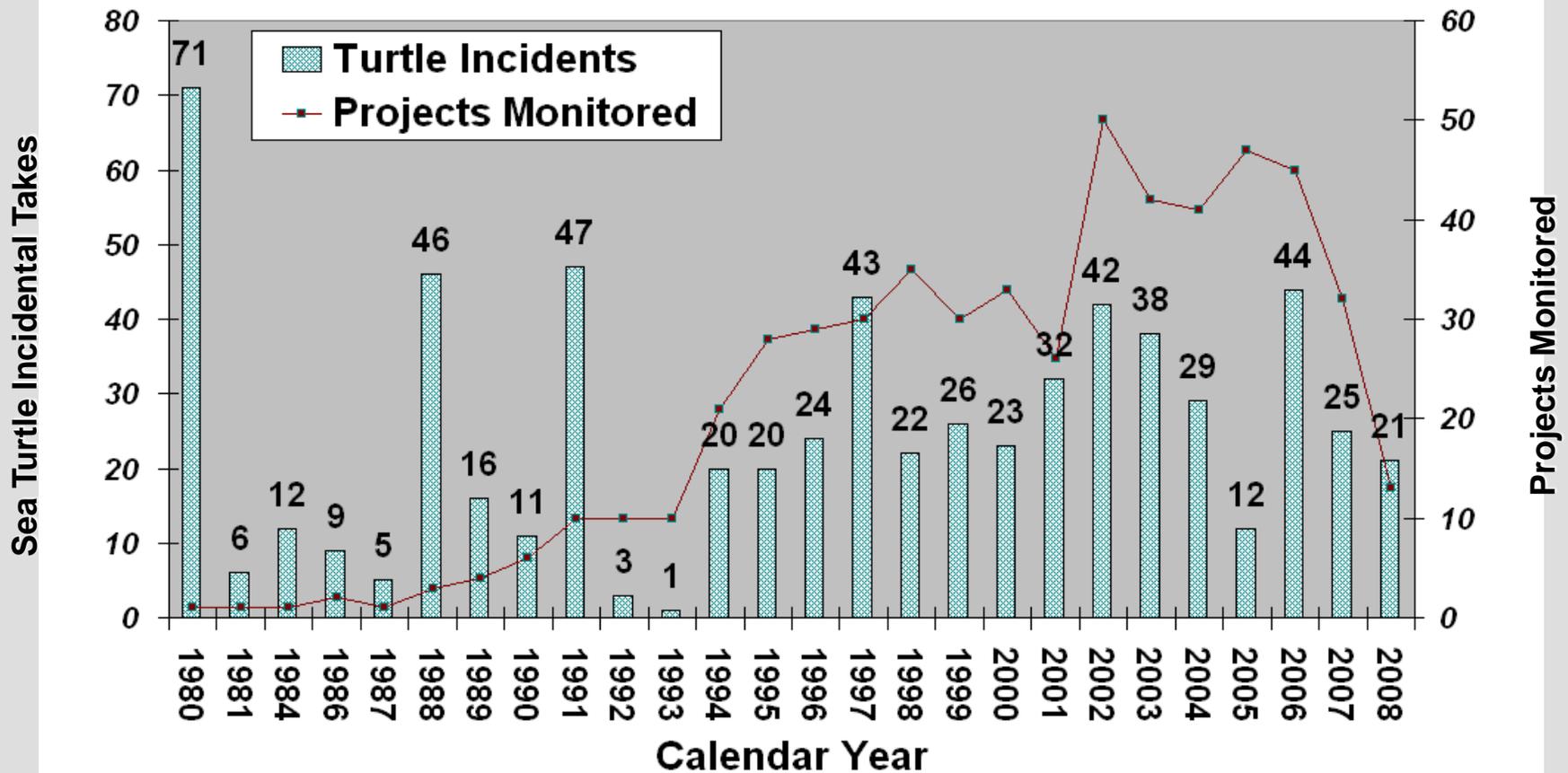
Capture and relocate turtles

(Implemented 2008)

Non-capture Trawling

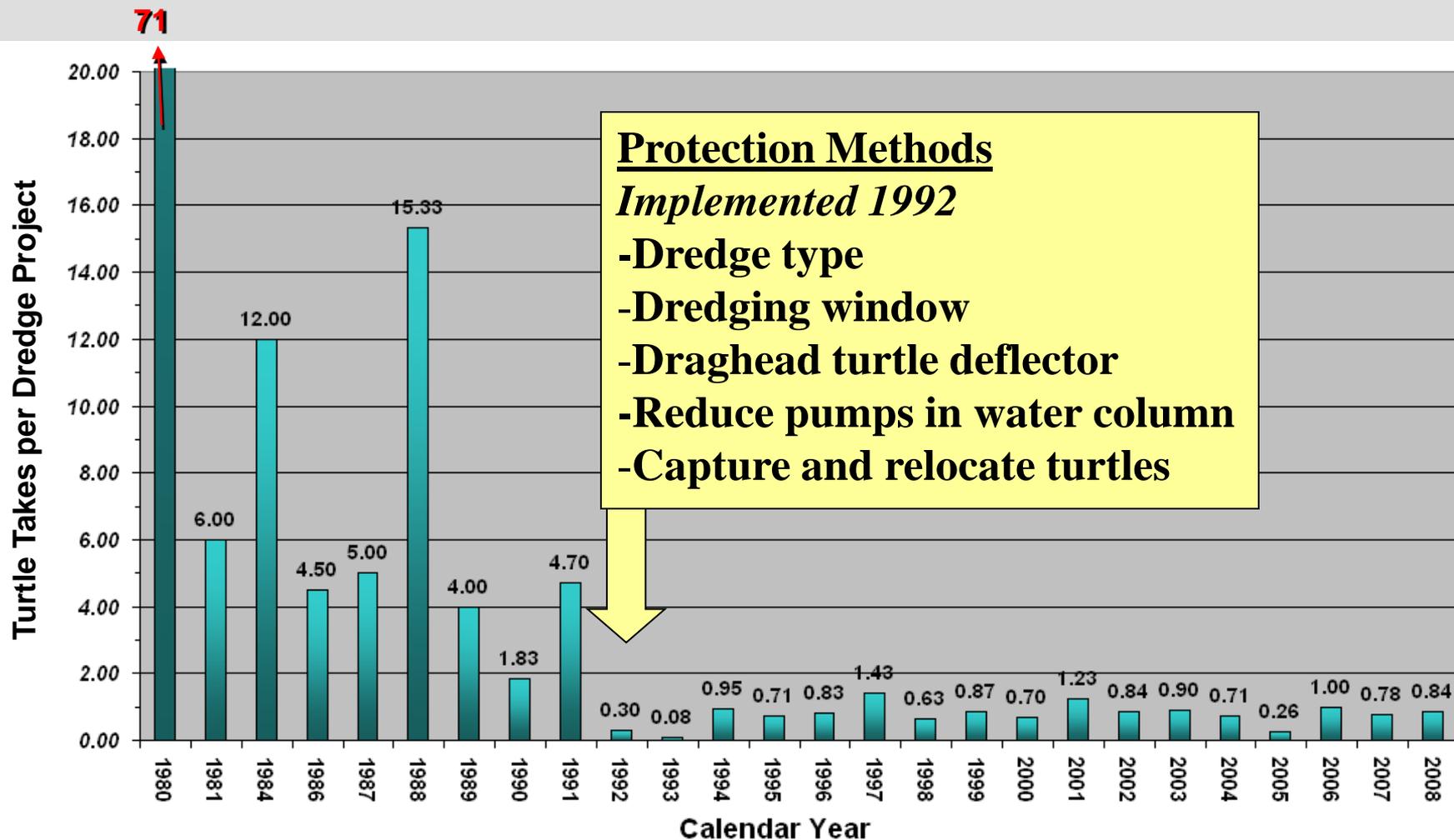


Effectiveness of Protection Methods (Annual Turtle Takes)



Effectiveness of Protection Methods

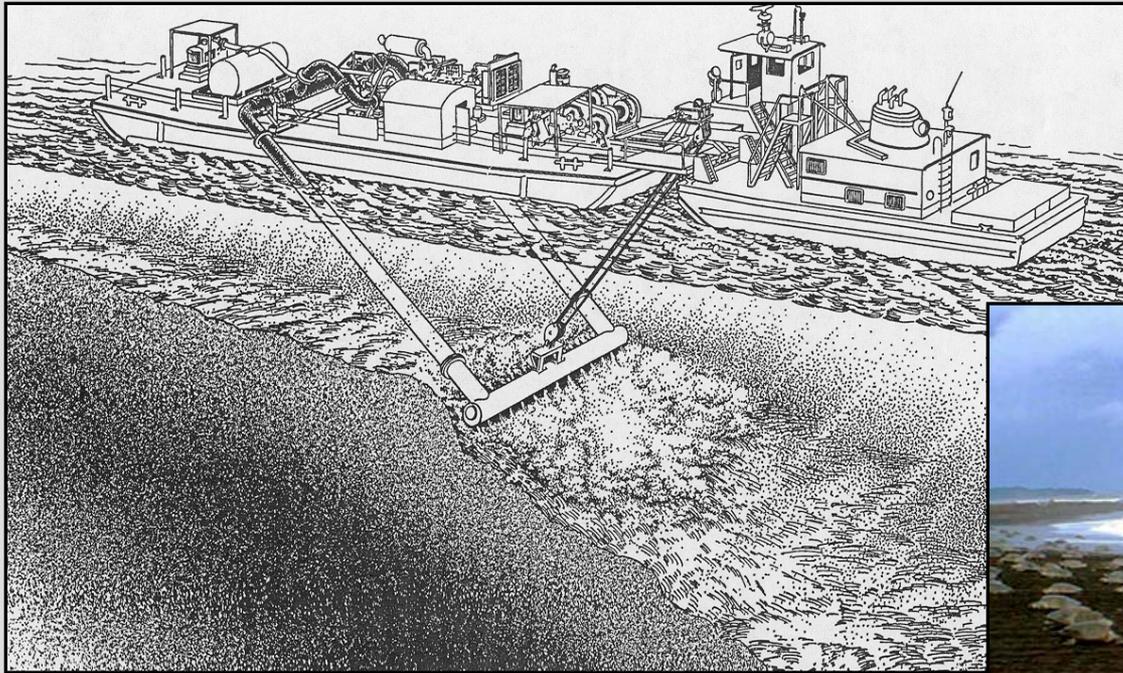
(Annual Turtle Takes per Project)



Newly Available Protection Methods

Implemented 2008 – Dhamra, India

Water-injection to move turtles



Newly Available Protection Methods

To be Implemented - USA

“Turtle friendly” bed-leveler

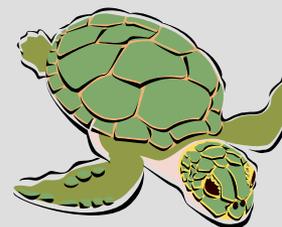


UNavailable Protection Tools

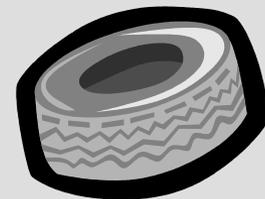
Acoustic Dispersal



Acoustic Detection



or



=

?



WORLD MAJOR SEAPORT



Global
Dredging
Impacts on
Sea Turtles??