

# **Plastic in Oceans and the effect on sea turtles**



# Background

## Plastic in the oceans

- *“Plastic litter is a very small proportion of the all litter and causes no harm to the environment except as an eyesore”*
- 60-80% of the marine litter
- Higher deposit then production rate
- Very slow biodegraded
- Can inhibit gas exchange on the sea bottom
- In 2005 plastic cause 269 boat accidents and 15 death in the USA

# Background

## Affects on marine fauna

- Ghost-net continues to fish and destroying resources. By-catch kills millions every year
- Ingestion by 44% seabirds, 14 fish and 26 cetacean species. Total 267 species
- Plastic is used as a substrate and as it moves around in the ocean it's spreading invasive species.
- Destroying nursing habitats



# Introduction

## Leatherback turtles

(*Dermochelys coriacea*)

- The biggest sea turtle and it's mainly feeding on jellyfish
- Threat against the population:
  - Caught in fishing gear
  - Collision with boat propellers
  - Development on nesting beaches
  - Ingestion of plastic



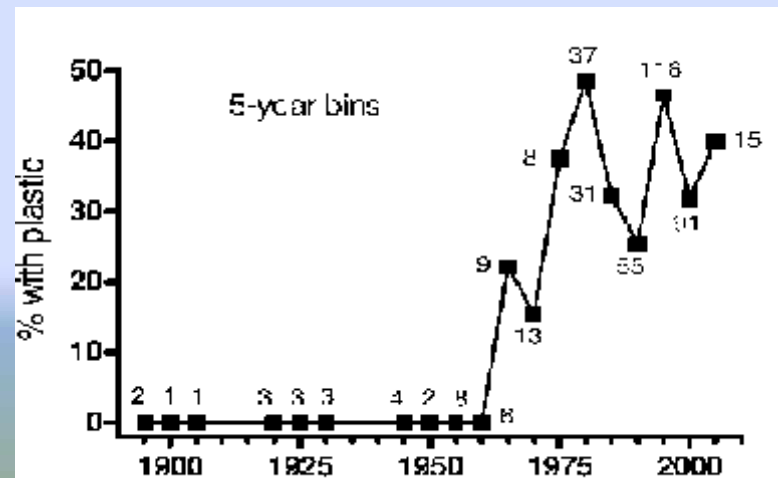
- A review looking at report from 1885-2007

– N. Mrosovsky et al., 2009, Leatherback turtles: The menace of plastic, Marine Pollution Bulletin 58; 287-289

# Results

## *Leatherback turtle (Dermochelys coriacea)*

- 33,8% had ingested plastic
- In 8,7% plastic was obstructing the gut and was the cause of death
- Rapid increase in late 1960s to 1980s and remained common after that.



# Discussion

## *Leatherback turtle (Dermochelys coriacea)*

- Problem more serious than it appears
- Impact on health and reproduction
- Eat 50 or more large jellyfish per day
- Top-down effect
- Showed a higher ingestion of plastic when jellyfish is scarce.



# Introduction

## Green turtles

(*Chelonia mydas*)

- Primarily herbivorous but will also eat animal matter
- Juvenile green turtle are carnivorous
- In 1994 the carcasses from 43 juvenile green turtles was studied in Florida
  - K. A. Bjorndal et al., 1994, Ingestion of Marine Debris by Juvenile Sea turtles in Coastal Florida Habitats, Marine Pollution Bulletin 28; 154-158
- In 2001, 38 stranded juvenile green turtles were studied in Brazil
  - L. Bugoni et al., 2001, Marine Debris and Human Impacts on Sea Turtles in Southern Brazil, Marine Pollution Bulletin 42; 1330-1334

# Results

## *Green turtle (Chelonia mydas)*

- 1994; 56% of the green turtles had ingested plastic. 42% of males and 83% of the female
- Plastic was cause of death in 2, 4,6% of the animals
- 2001; 60,5% of the turtles had ingested plastic. In 4 cases, 10,5% plastic was the cause of death

| Anthropogenic debris | Occurrence n (%) |
|----------------------|------------------|
| Plastic bags         | 16 (50.0)        |
| Plastic ropes        | 15 (39.5)        |
| Cloth                | 6 (15.8)         |
| Hard plastic pieces  | 4 (10.5)         |
| Styrofoam            | 3 (7.9)          |
| Oil                  | 1 (2.6)          |
| Paper                | 1 (2.6)          |
| Other ropes          | 1 (2.6)          |

# Discussion

## *Green turtle (Chelonia mydas)*

- Small quantities of plastic can kill green turtles
- Reduced growth rates, longer development, decreased energy reserves lead to decreased survival and reproduction
- Hard to determine cause of death. 7-13% of turtles that died due to interactions with fishery is stranded on beaches

# References

- Plastic:
  - C. J. Moore, 2008, Synthetic polymers in the marine environment: A rapidly increasing, long-term threat, Environmental Research 108; 131-139
- Leatherback turtles:
  - N. Mrosovsky et al., 2009, Leatherback turtles: The menace of plastic, Marine Pollution Bulletin 58; 287-289
- Green turtles:
  - K. A. Bjorndal et al., 1994, Ingestion of Marine Debris by Juvenile Sea turtles in Coastal Florida Habitats, Marine Pollution Bulletin 28; 154-158
  - L. Bugoni et al., 2001, Marine Debris and Human Impacts on Sea Turtles in Southern Brazil, Marine Pollution Bulletin 42; 1330-1334

Questions?