

DISEASES IN SEA TURTLES

Thierry M. Work

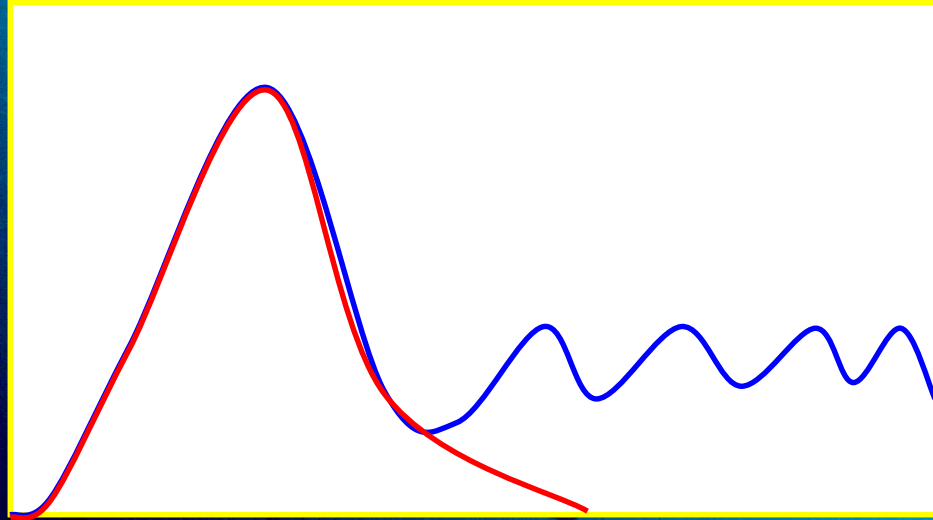
US Geological Survey

National Wildlife Health Center

Honolulu Field Station



Prevalence



Time

Probability
of detection



Marine Mammals



Seabirds



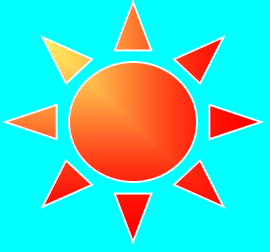
Sea turtles



Fish

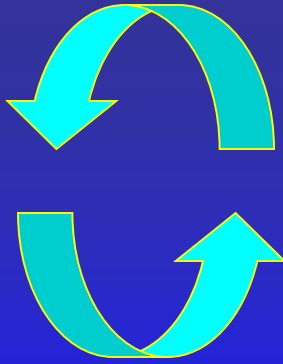
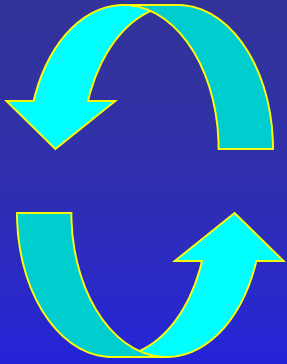


Invertebrates



Pelagic

Near shore

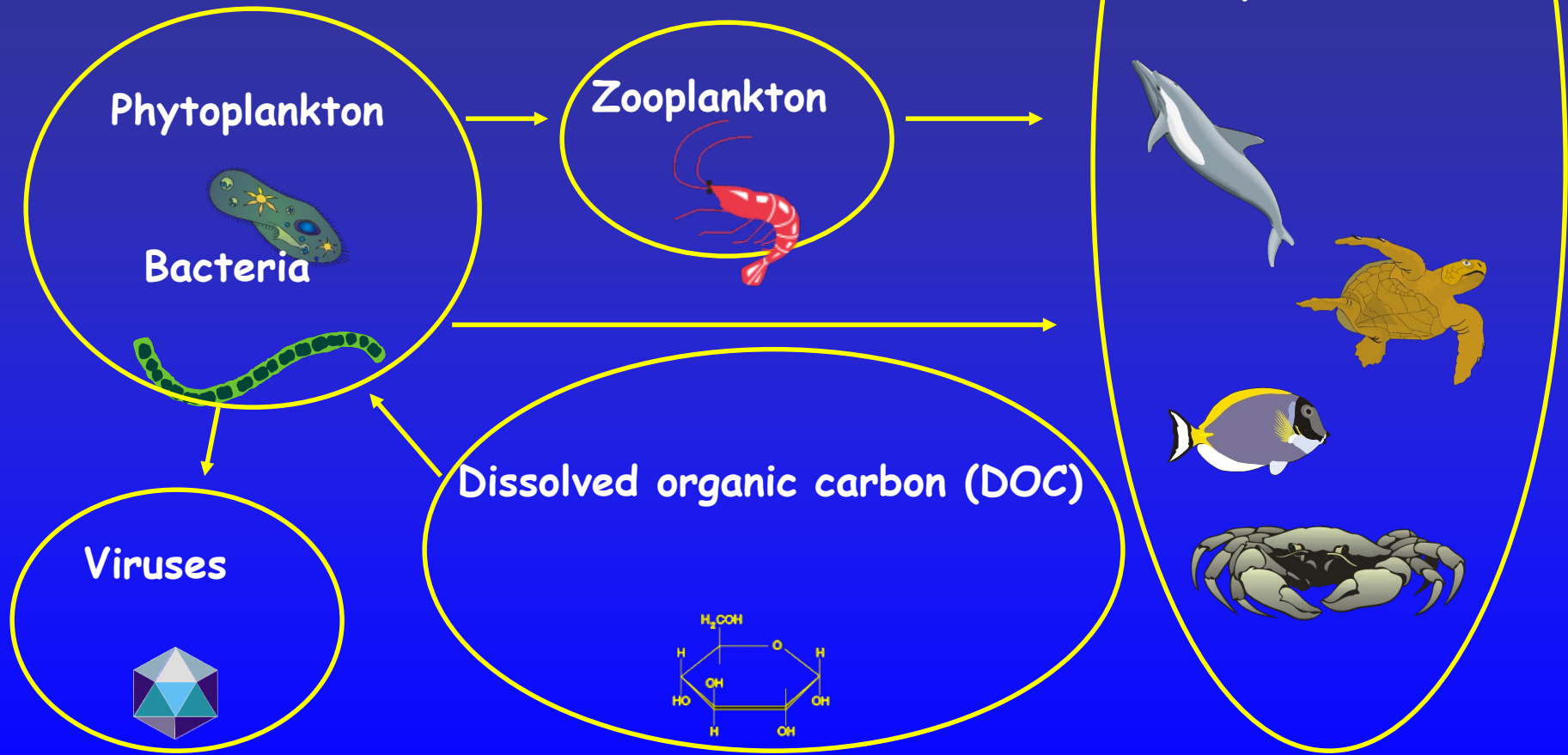
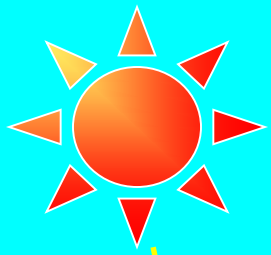


OCEAN

ISLAND



Nutrient cycle



Phytoplankton

Zooplankton

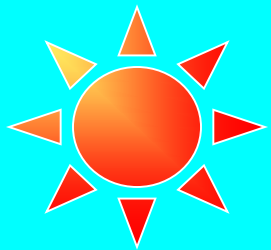
Meroplankton

Bacteria

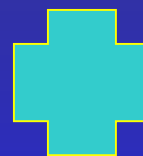
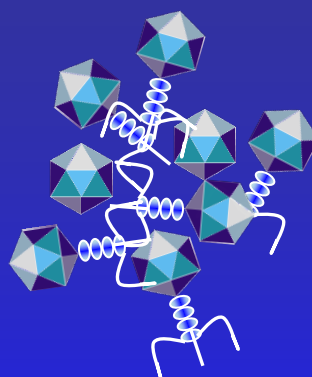
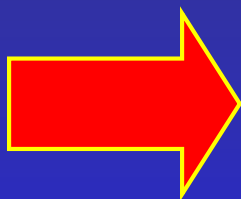
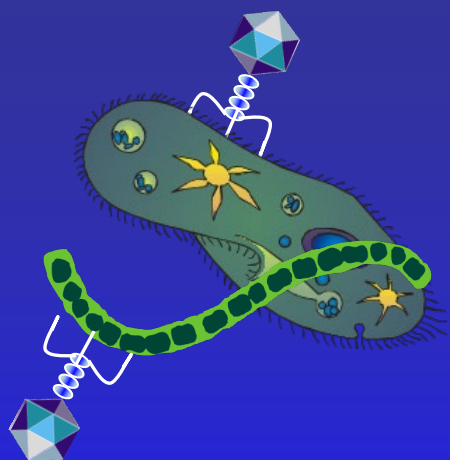
Dissolved organic carbon (DOC)

Viruses

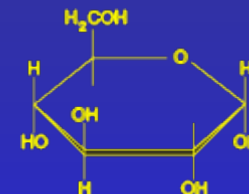




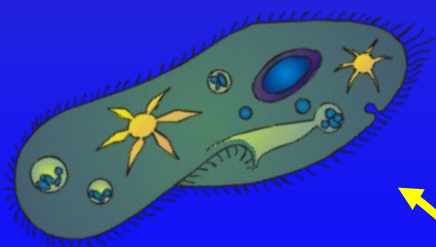
Carbon cycle



DOC

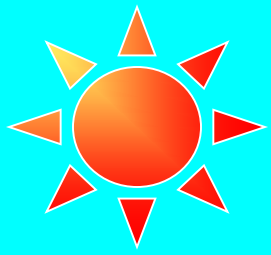


Lysis-150 gT/yr

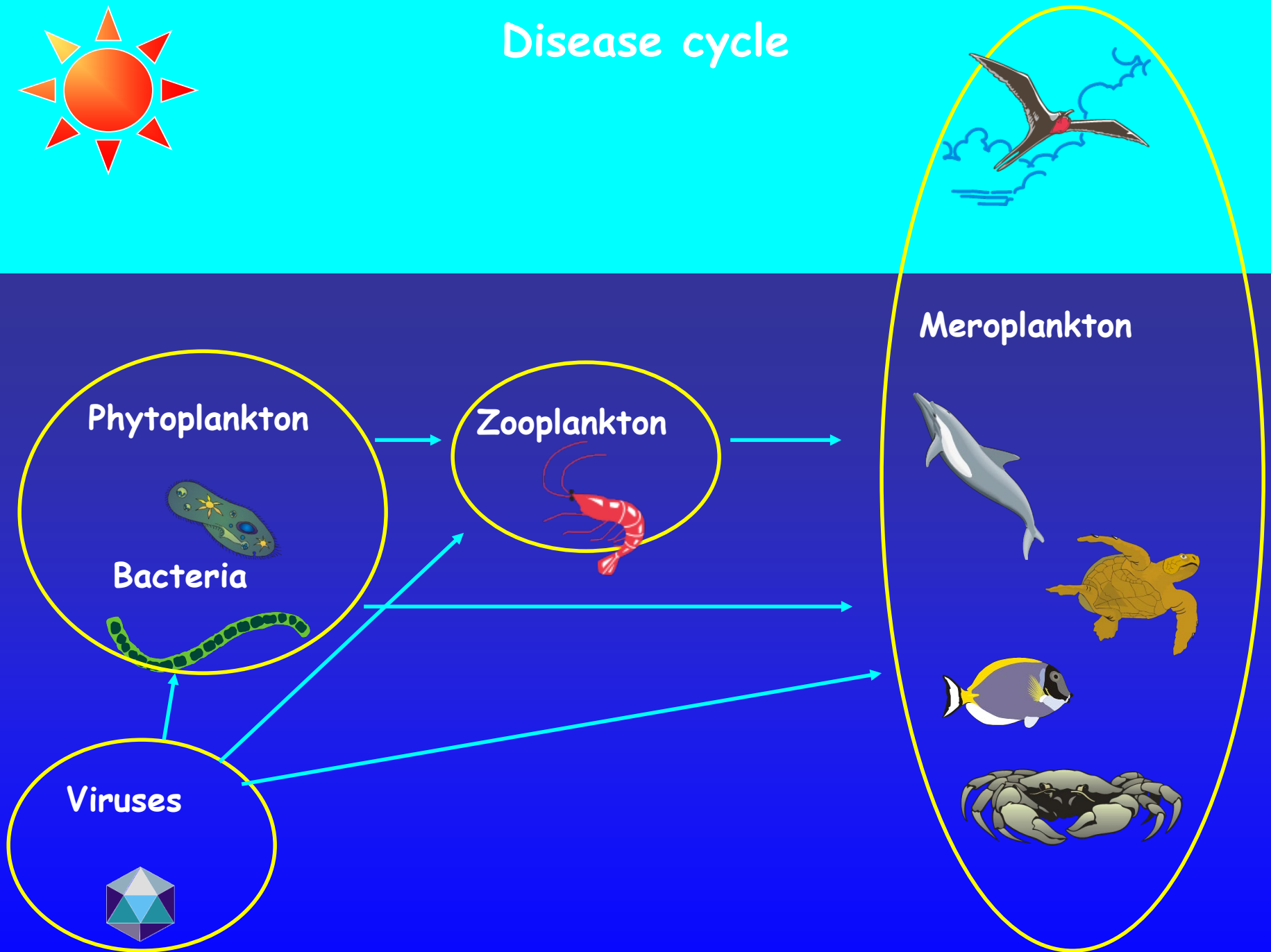


Detritus-3 gT/yr



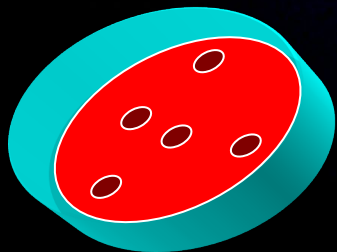
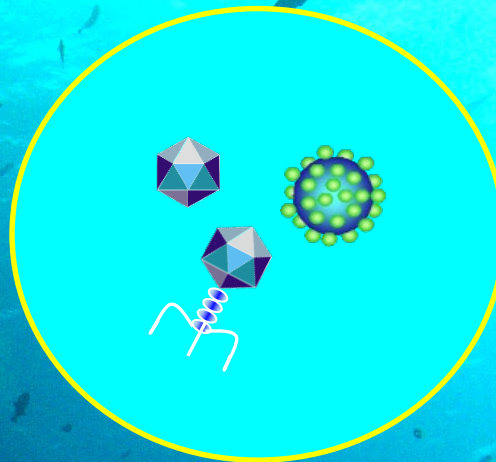
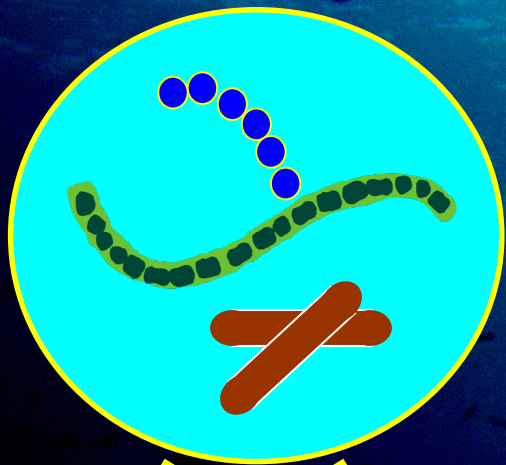


Disease cycle



Bacteria

Viruses



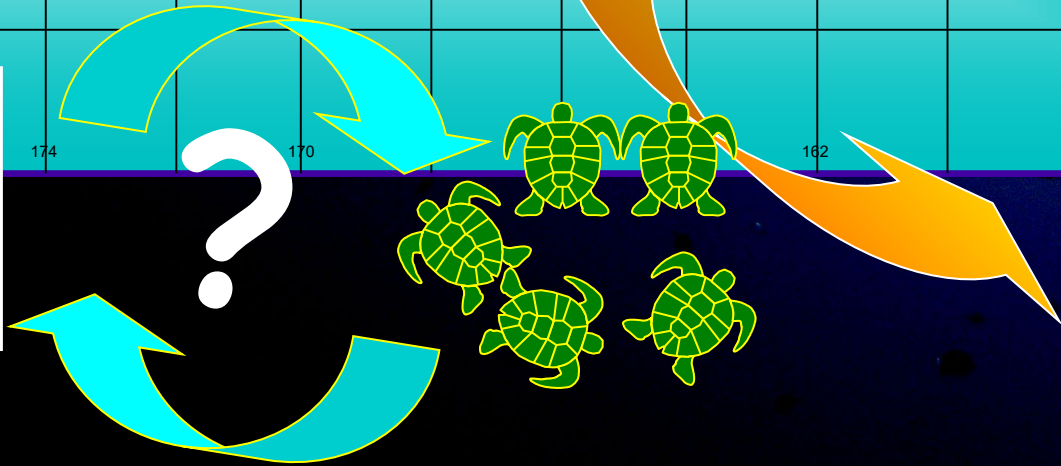
50% not cultivable



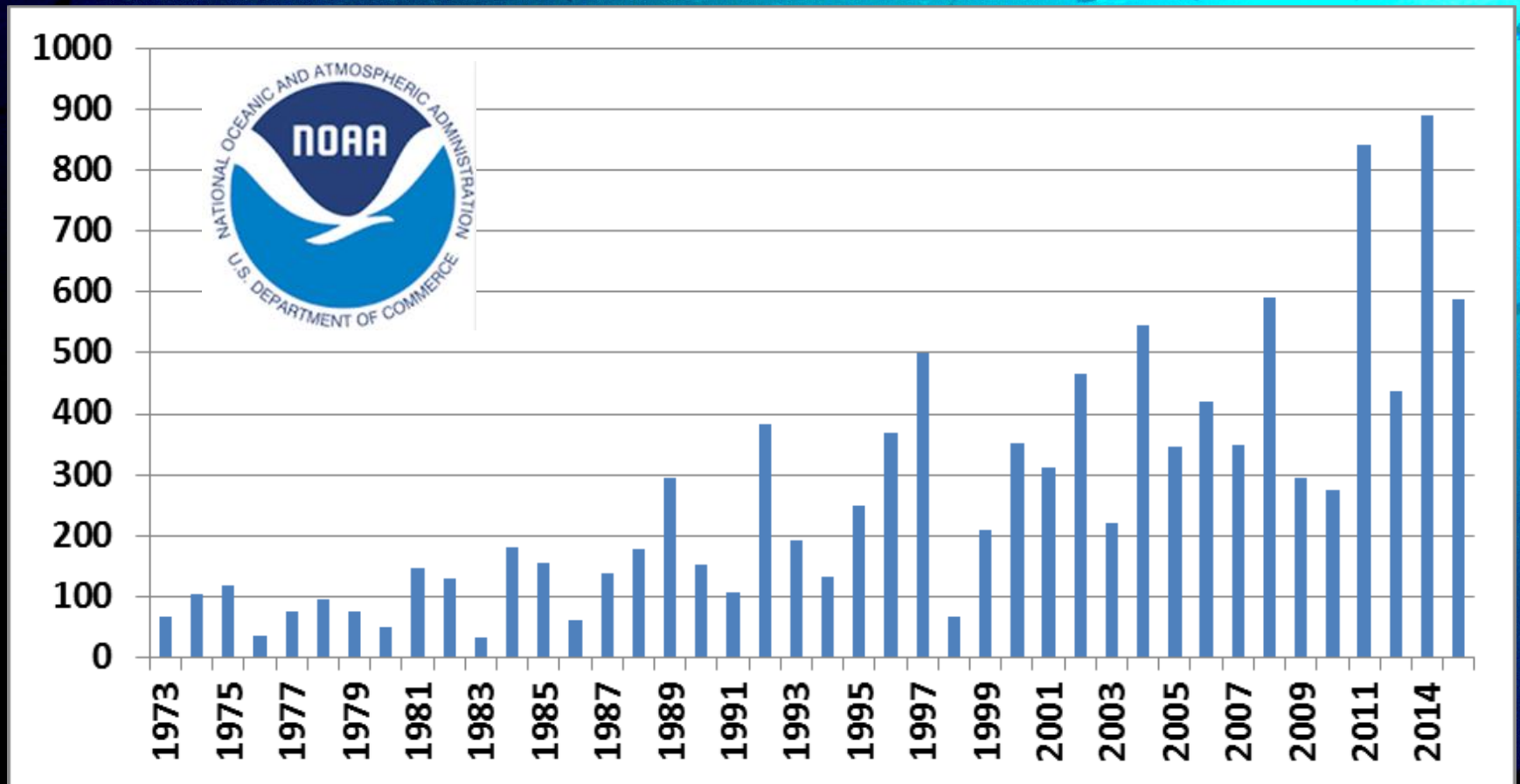
DISEASES OF SEA TURTLES IN HAWAII



Green turtles in Hawaii

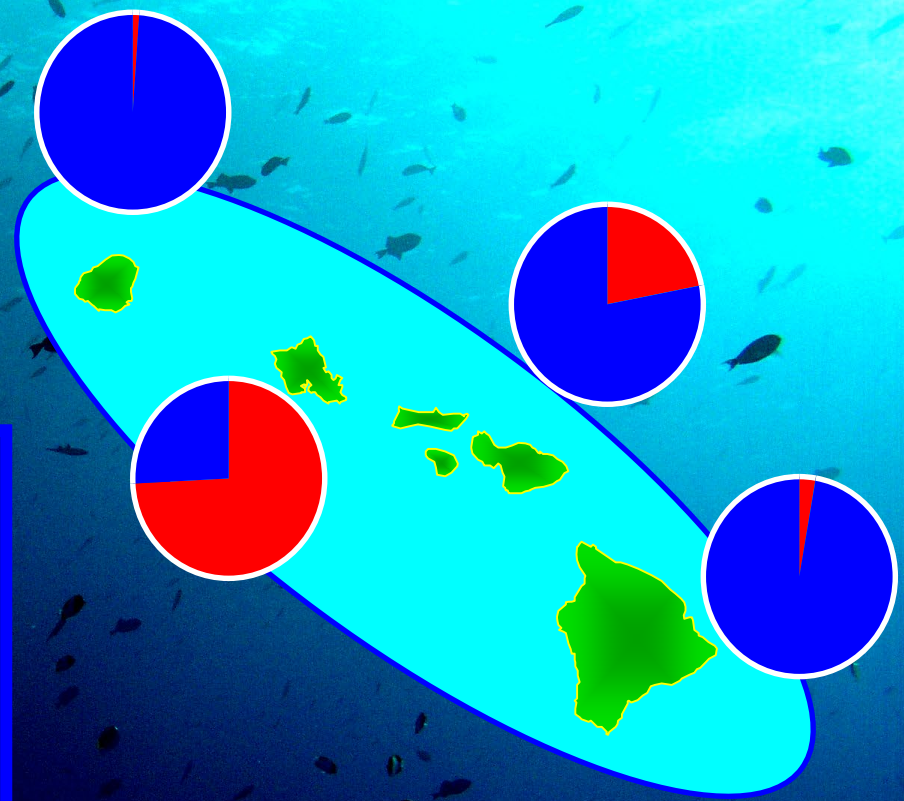
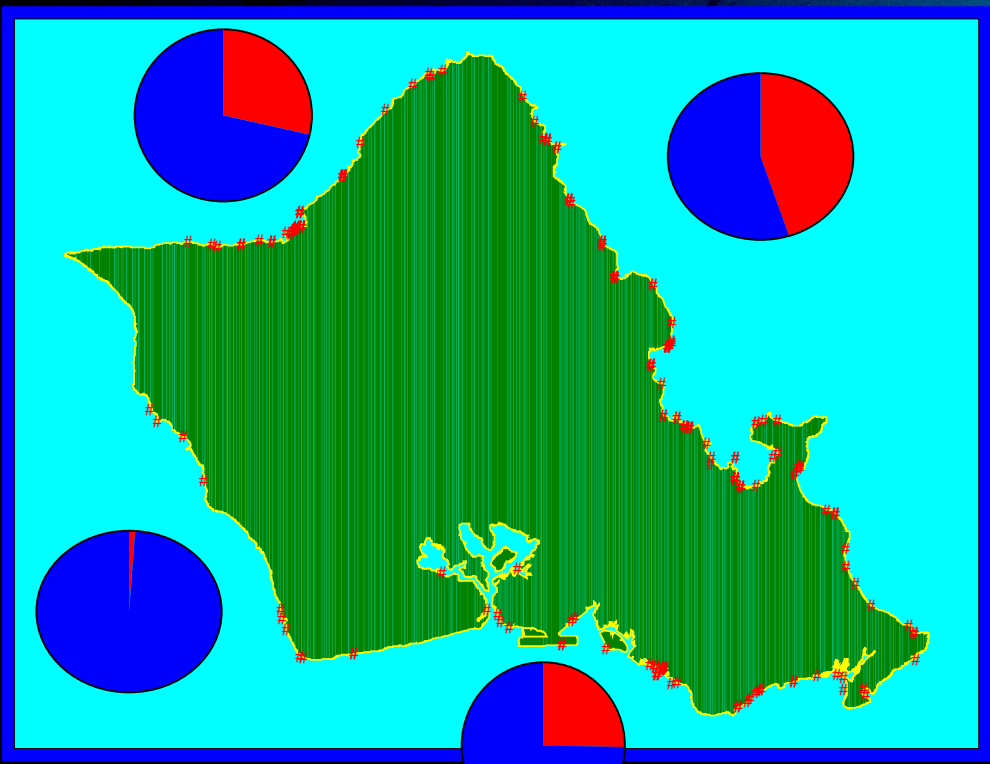


Nesting turtles at FFS

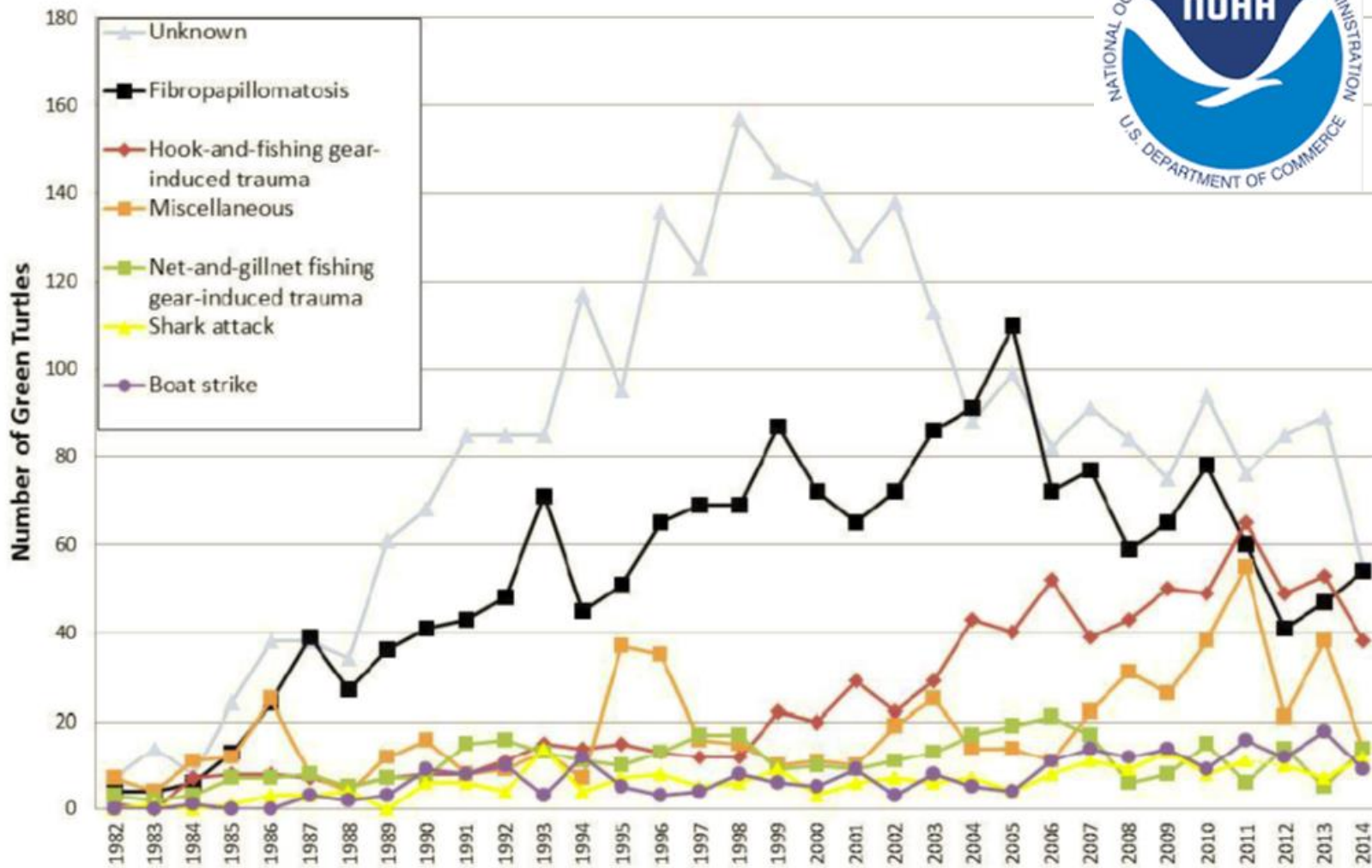


WHERE DO THEY STRAND?

■ Strandings

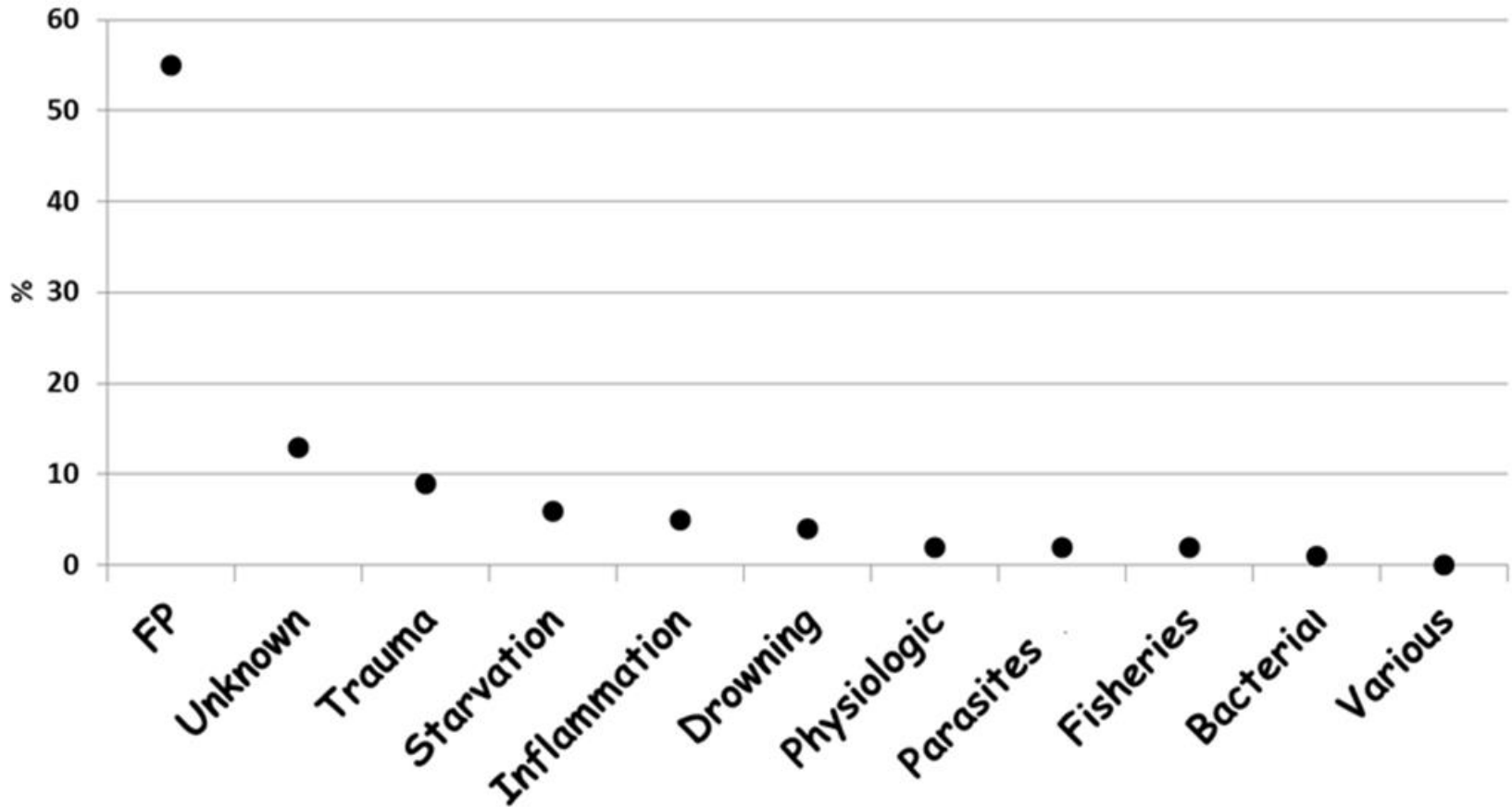


1982-2014 All Hawaiian Green Turtle Stranding Events (n=6723)



Green turtles N=1018

Necropsy findings











Marine turtle fibropapillomatosis

© U. Keuper-Bennett



© U. Keuper-Bennett



© U. Keuper-Bennett



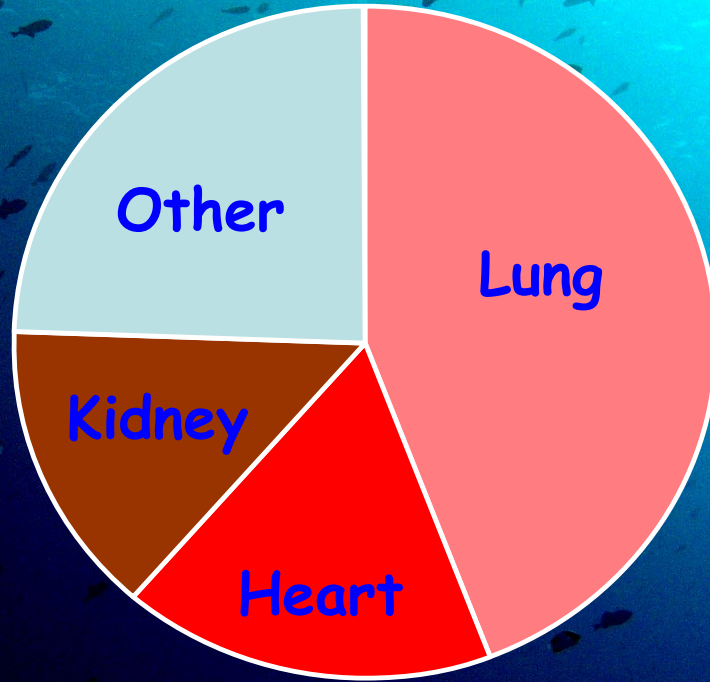
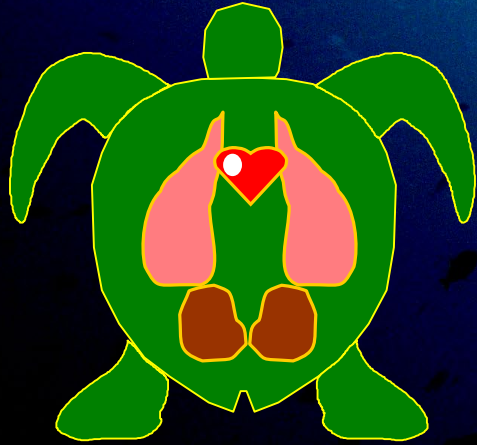


- Green
- Loggerhead
- Olive ridley

Marine turtle fibropapillomatosis



INTERNAL TUMORS



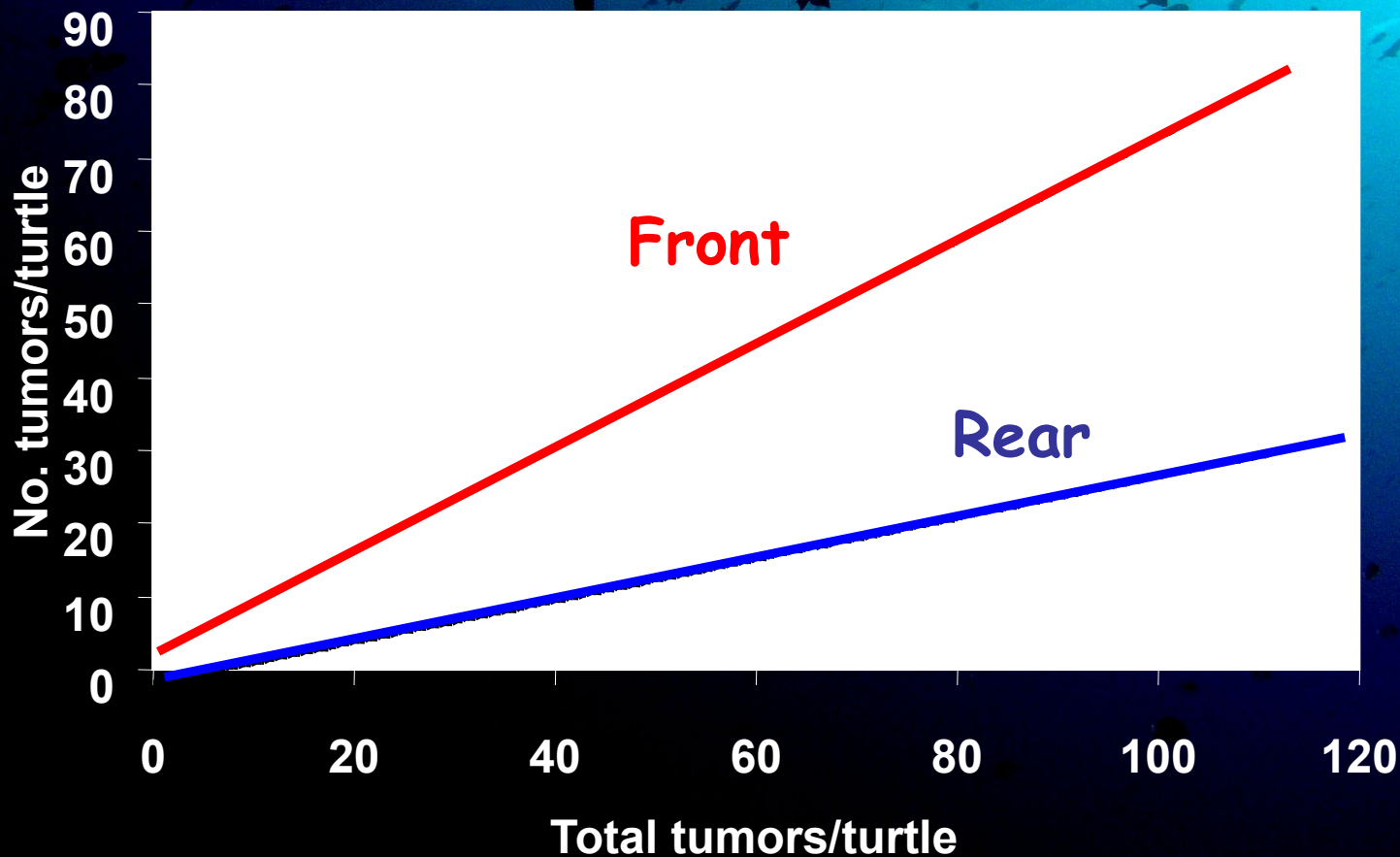
TUMOR LOCATIONS (External)

11% Seams/scutes

92% eyes

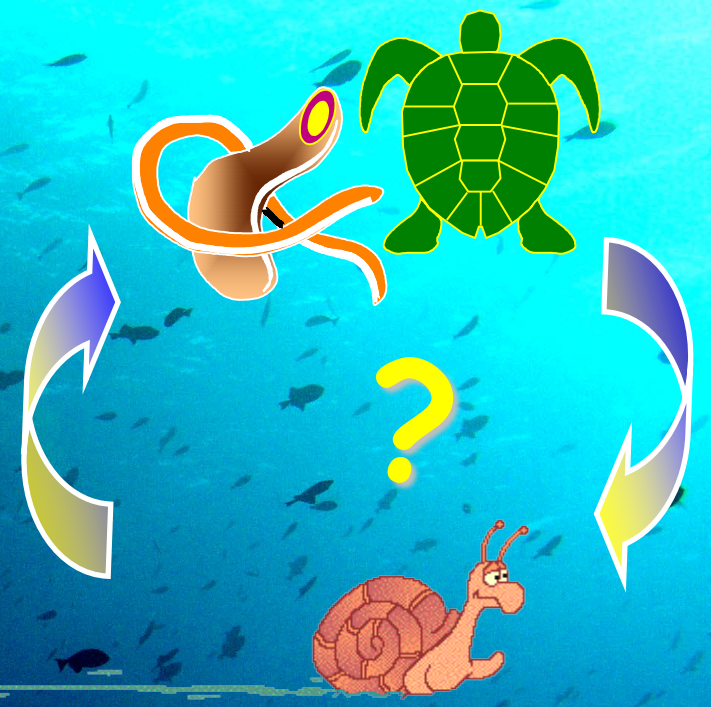
80% Mouth

(41% Glottis-Hawaii)

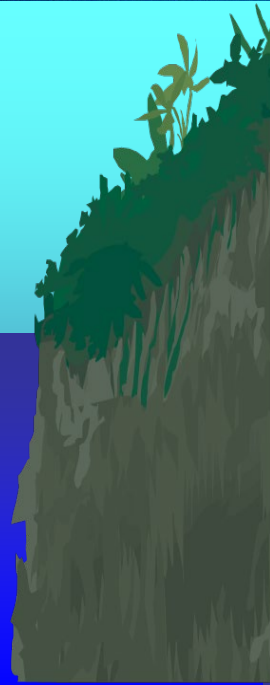
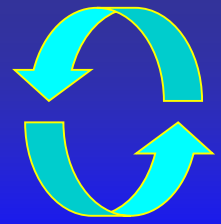
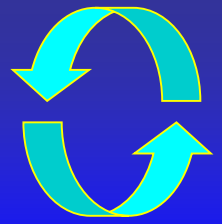




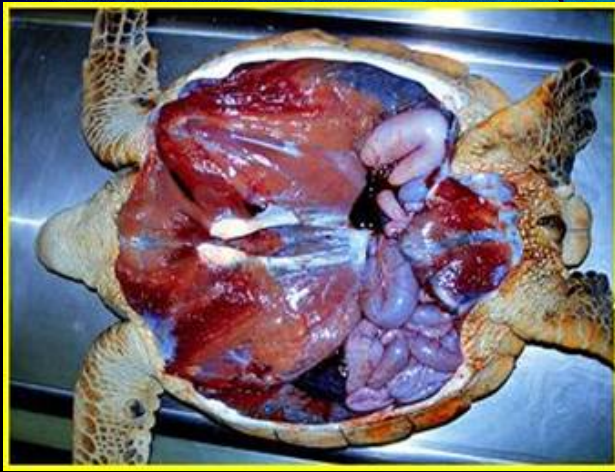
Vascular trematode



Prevalence



QUANTIFYING SEVERITY OF INFECTION



SPLEEN



Type I



Type II



Worm species

Hapalotrema dorsospori

Hapalotrema postorchis

Laeredius laeredi

Caretacolla hawaiiensis

Egg Type

I

I

I

II

Marine turtle FP immunology



White cell counts



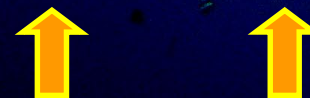
Cell mediated immunity



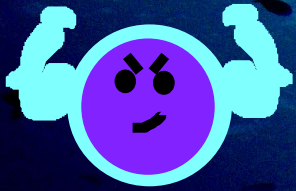
Humoral immunity



Bacterial infection

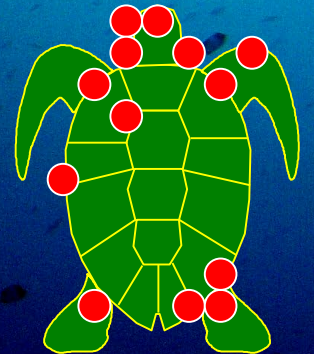
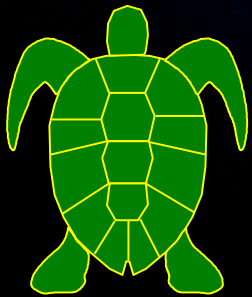


Immune system



FP immunology

Vibrio

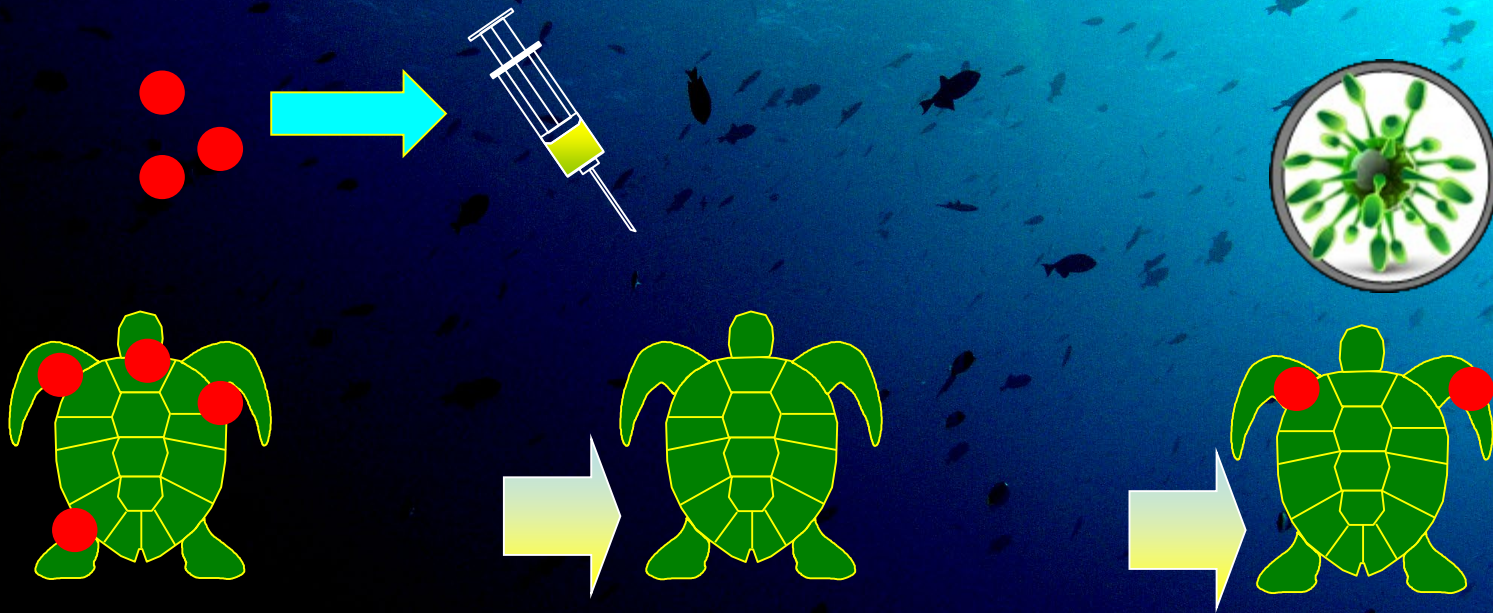


Time

Opportunism

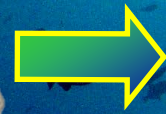
Marine turtle FP transmissible

Herbst et al., 1995, 1996

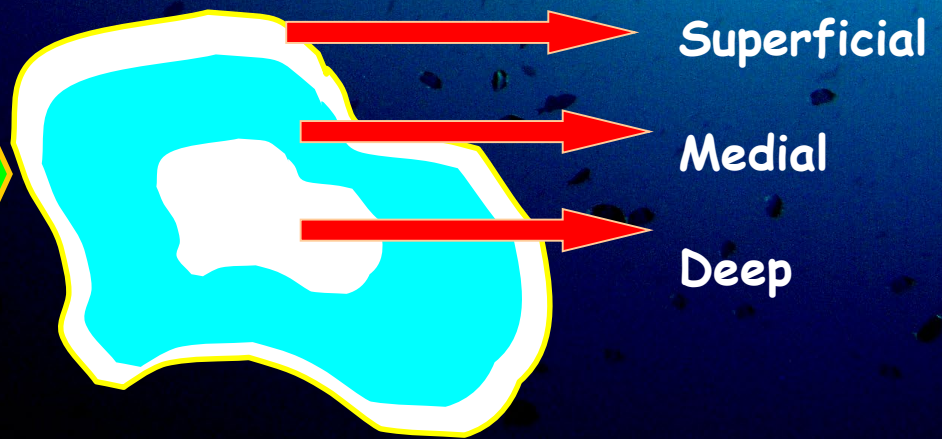
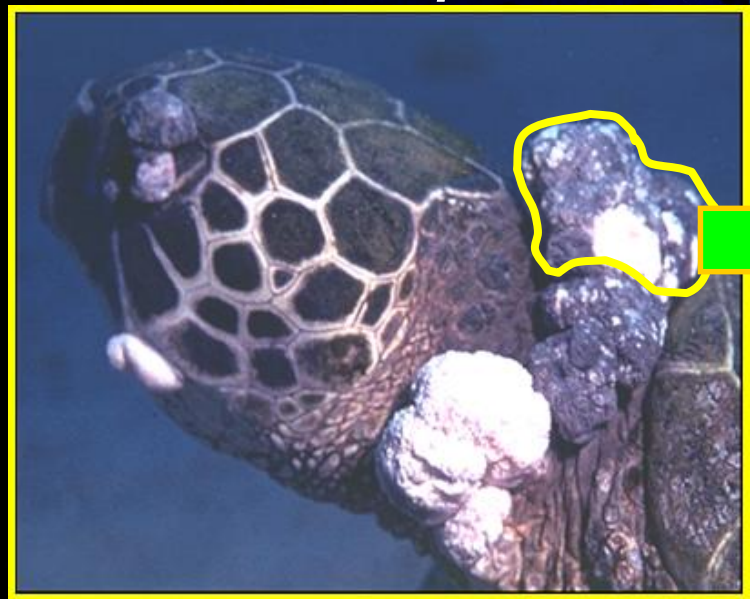
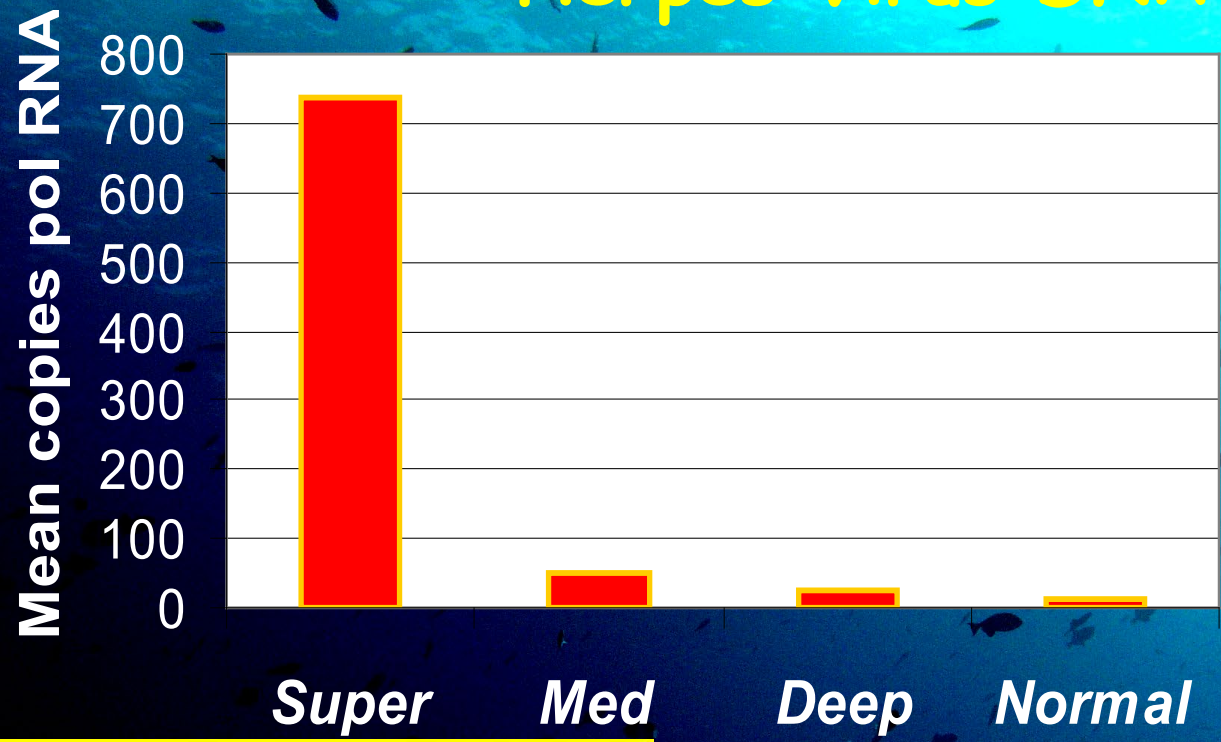




Molecular biology

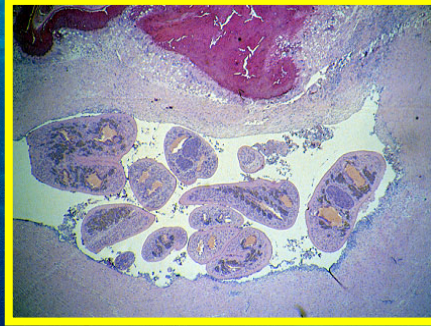


Herpes Virus DNA





Amphipod



Blood Fluke

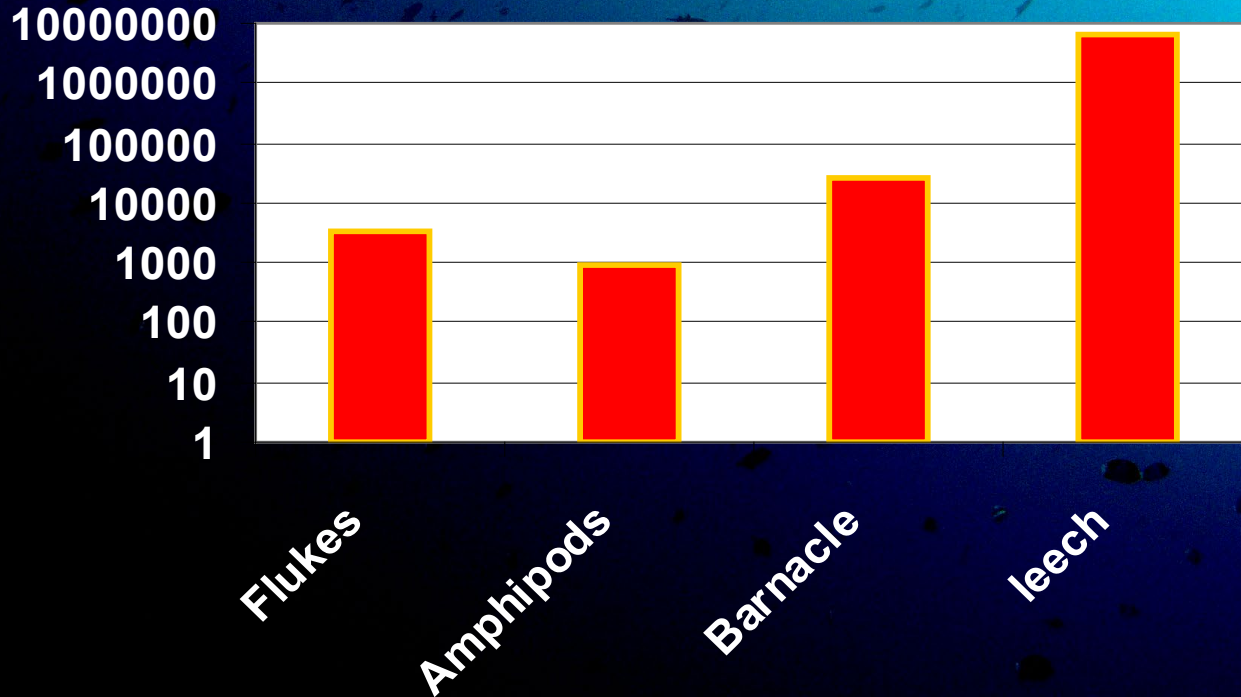


Barnacle

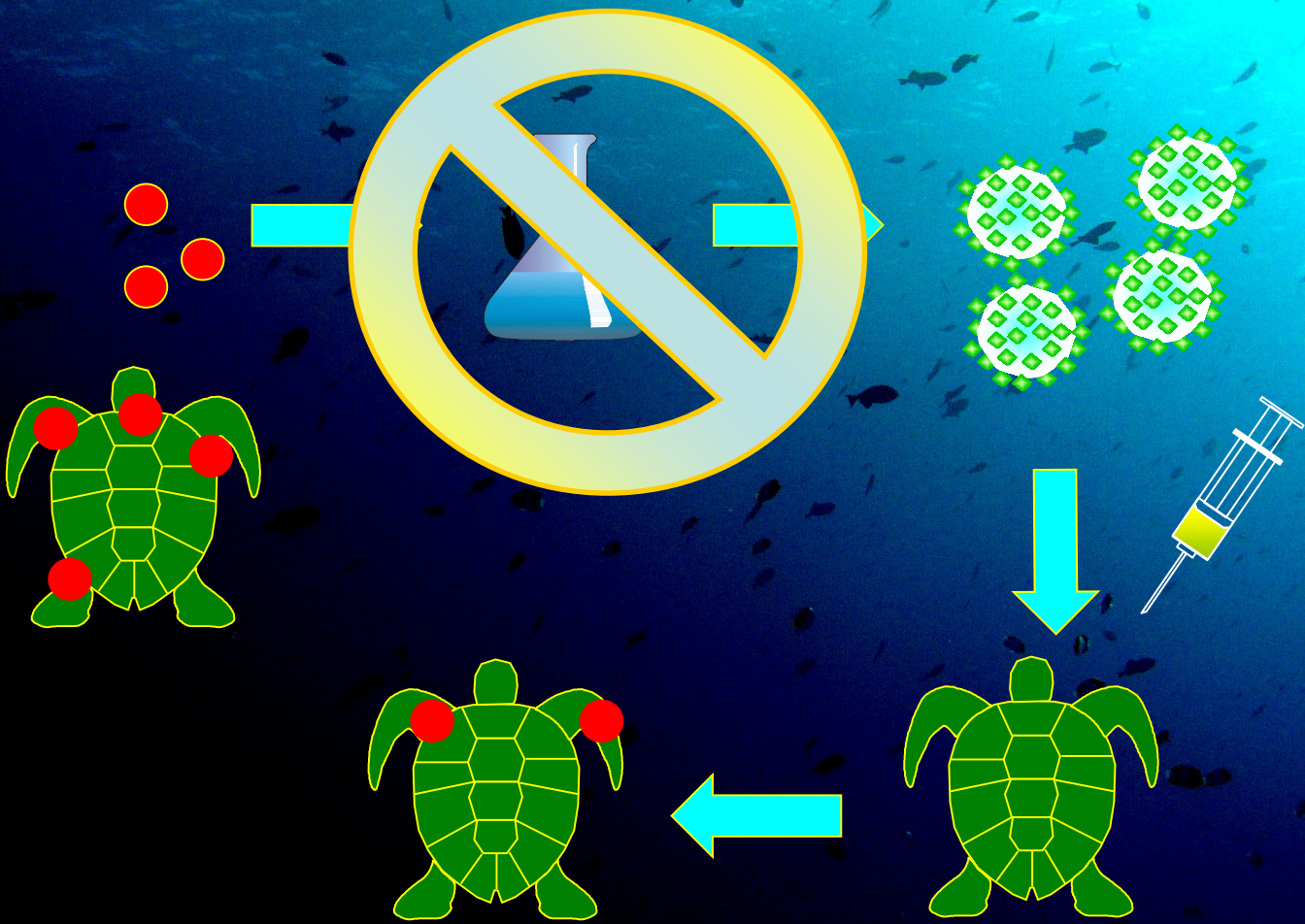


Leeches

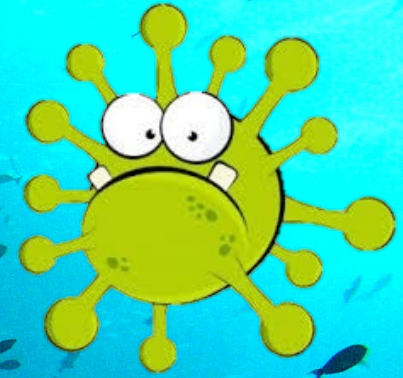
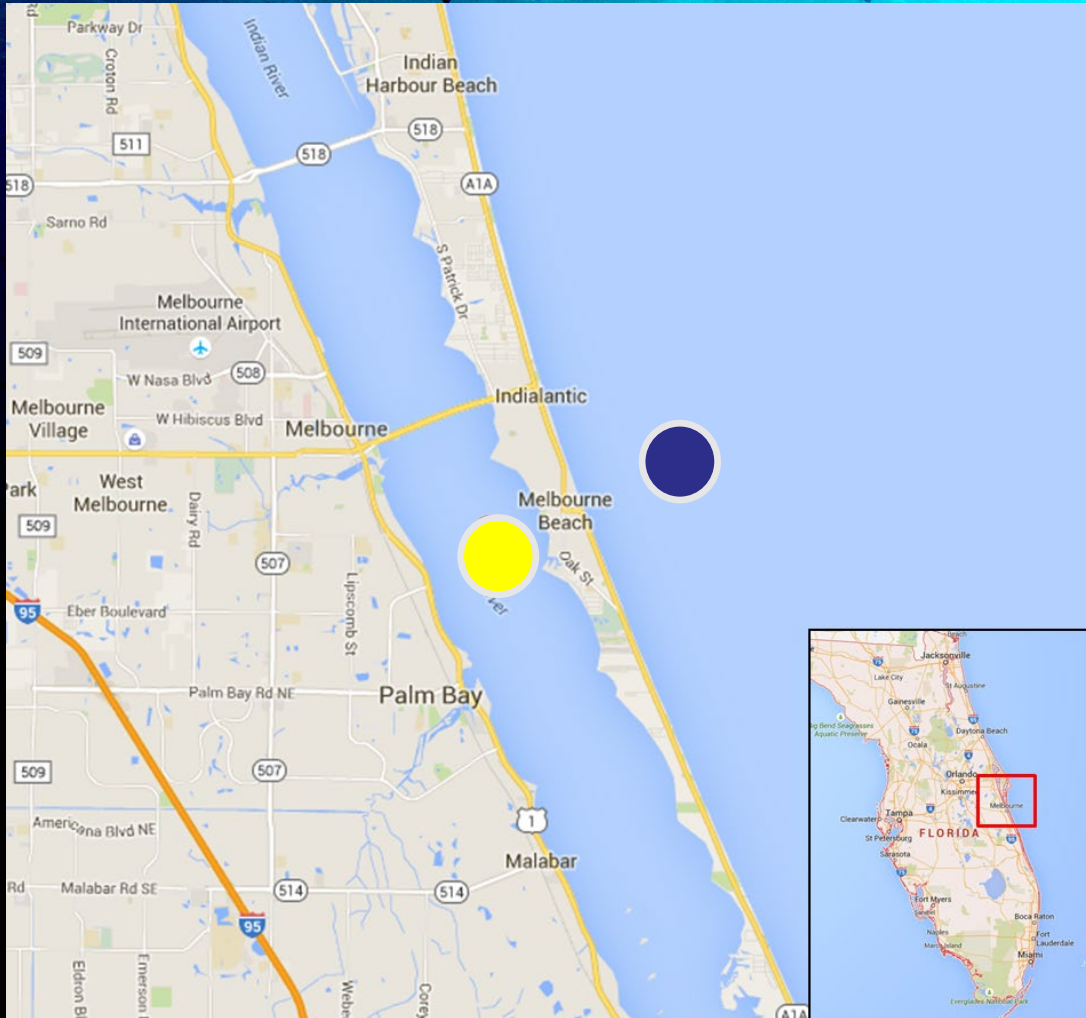
Mean DNA pol copies/organism



Not possible now



Turtles get virus after recruitment



Variants

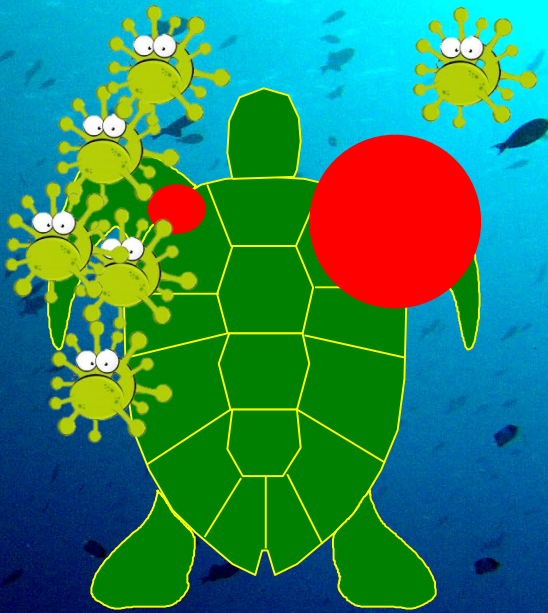
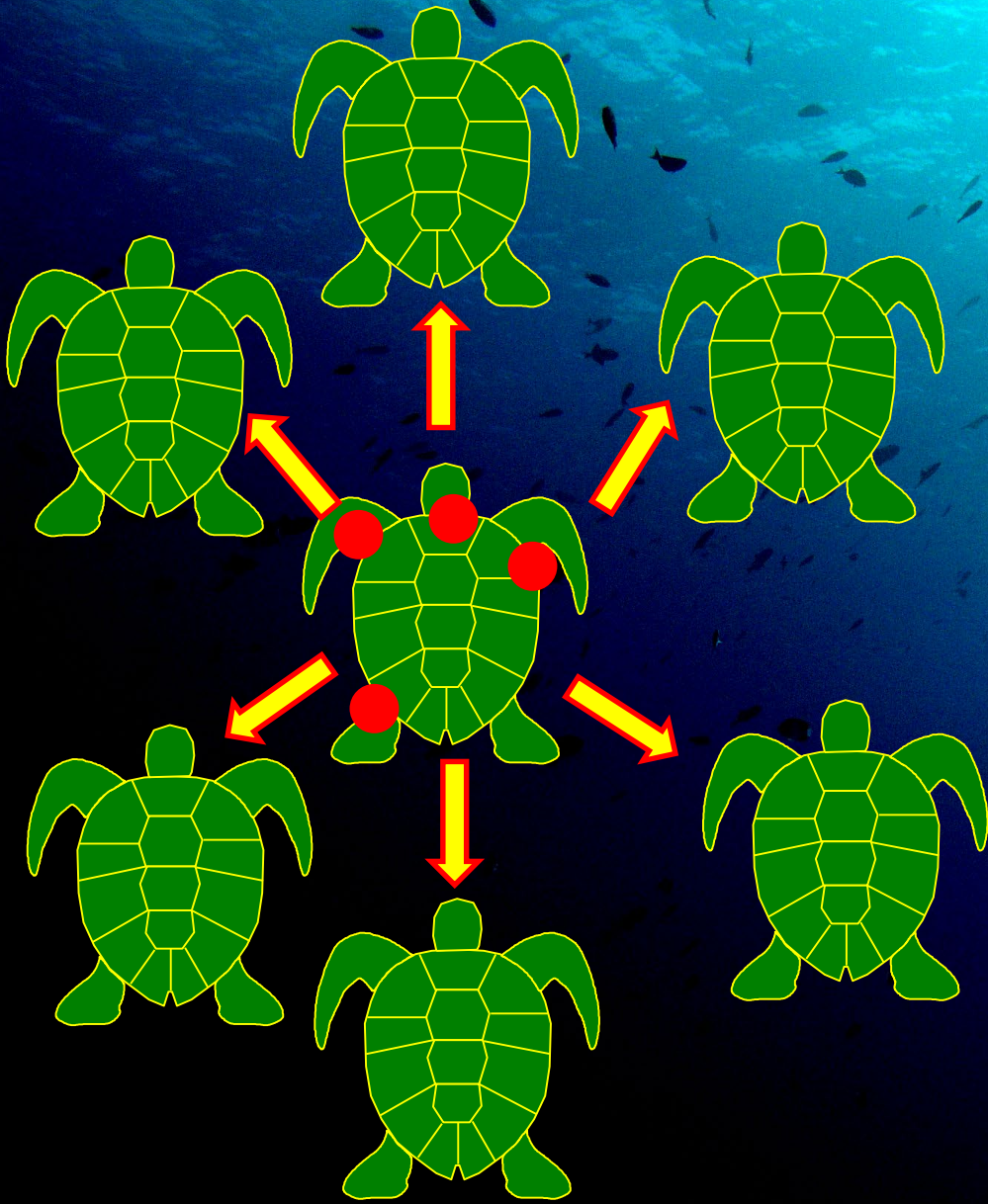
A



B



*Smaller
tumors more
virus*



Superspreaders

KNOWLEDGE



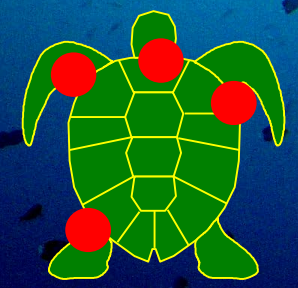
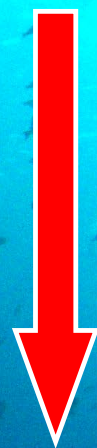
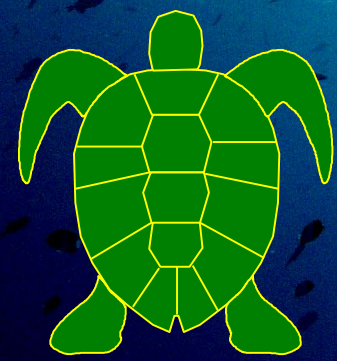
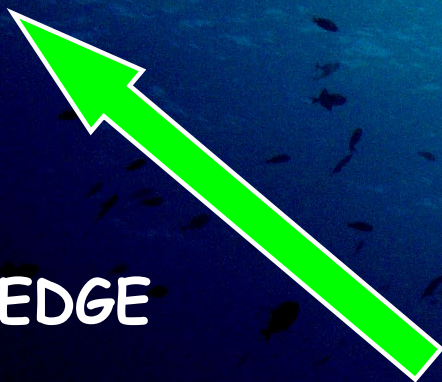
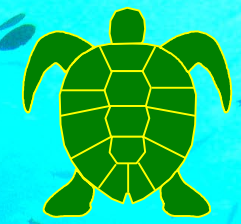
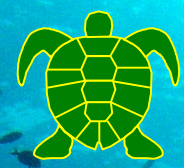
Little



Moderate



Large



Prevalence FP Molokai

Percent FP stranding statewide

