

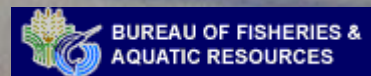


# **Planning and management of aquaculture parks for sustainable development of cage farms in the Philippines**

**[www.aqua-park.asia](http://www.aqua-park.asia)**

## **Estimation of carrying capacity**

AquaPark Mid-term meeting - interim results



# Carrying capacity

How much production is sustainable on the long term so that it does not over impact the environment or increase the risk of fish kills?

Depends on

- Level of production
- Food conversion rate
- Water exchange rate – flushing

# Carrying capacity factors

## Other nutrient inputs

- Rivers
- Agricultural run-off
- Livestock production

# Modelling carrying capacity

## 3 important aspects:

1. How severe is the impact – what is the maximum impact underneath cages?
2. How far to the boundary of the impact? (Allowable Zone of Effect)
3. How can husbandry practices be optimised to use the zone most productively?

## Objectives

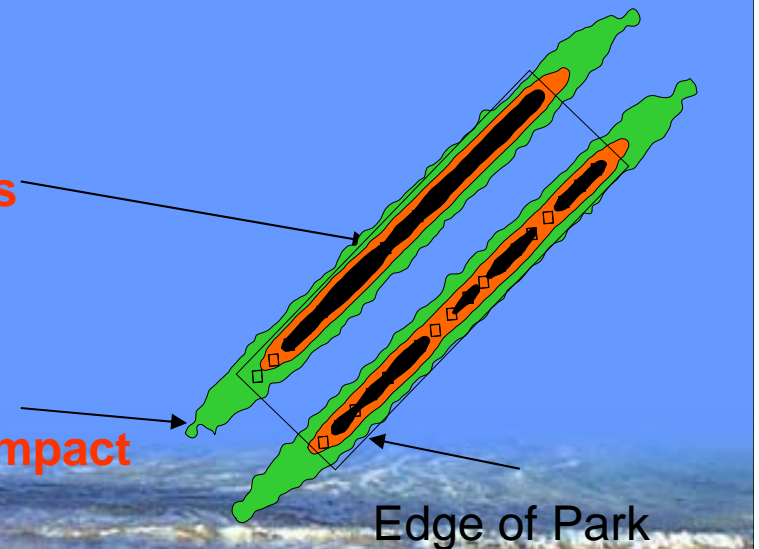
**Predict if impact is SEVERE underneath cages**

as shown by this deposition footprint

Zone colour

**Predict distance to boundary of MODERATE impact**

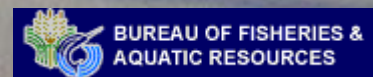
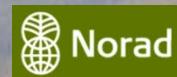
Zone colour







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# Model predictions - Panabo

Flux ( $\text{g m}^{-2}\text{d}^{-1}$ )

**TROPOMOD  
predicted flux  
(deposition) of waste  
feed and faeces for  
Panabo**

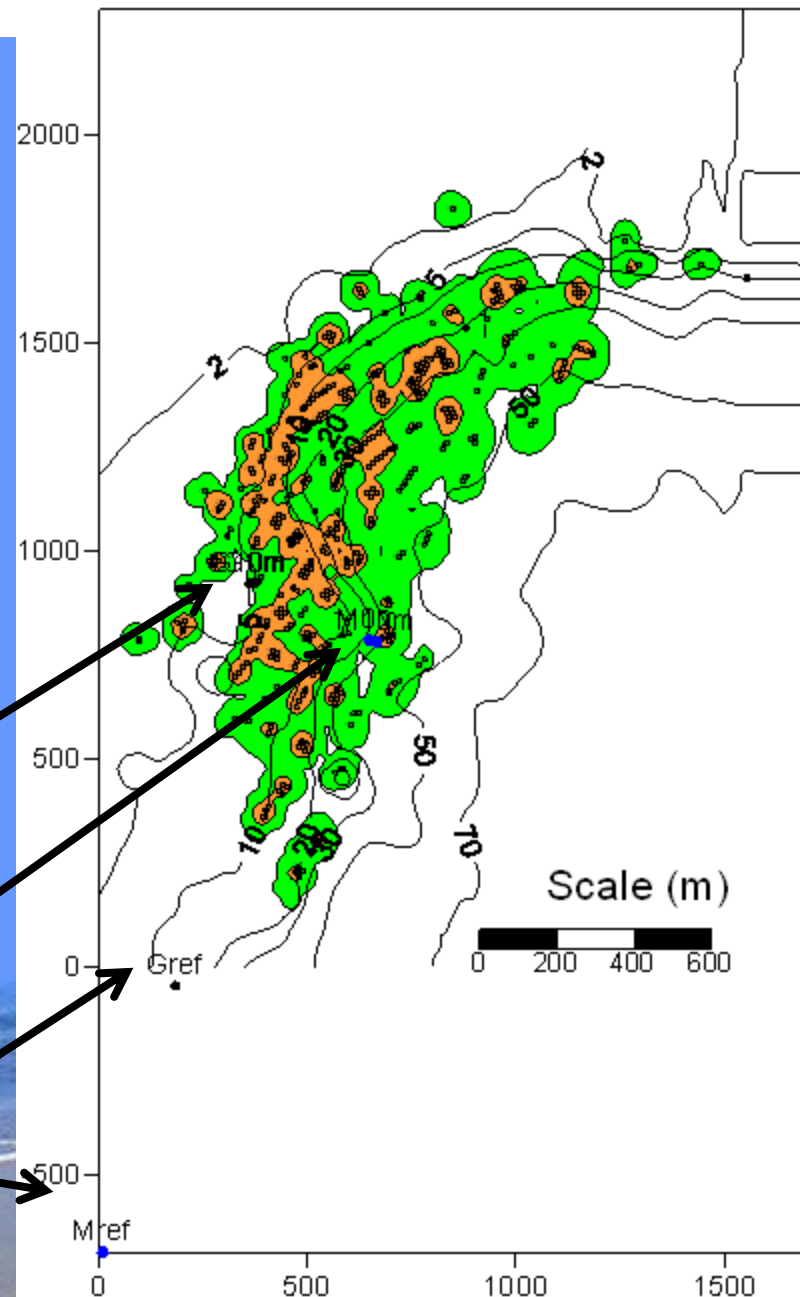
The colours show  
different amounts of  
flux

Sediment trap  
transects:

Grouper (traps  
are in 6 m  
depth)

Milkfish transect  
(traps are in 27  
m depth)

Reference traps



**Benthic  
Community**

150 Severe impact  
(no animals)

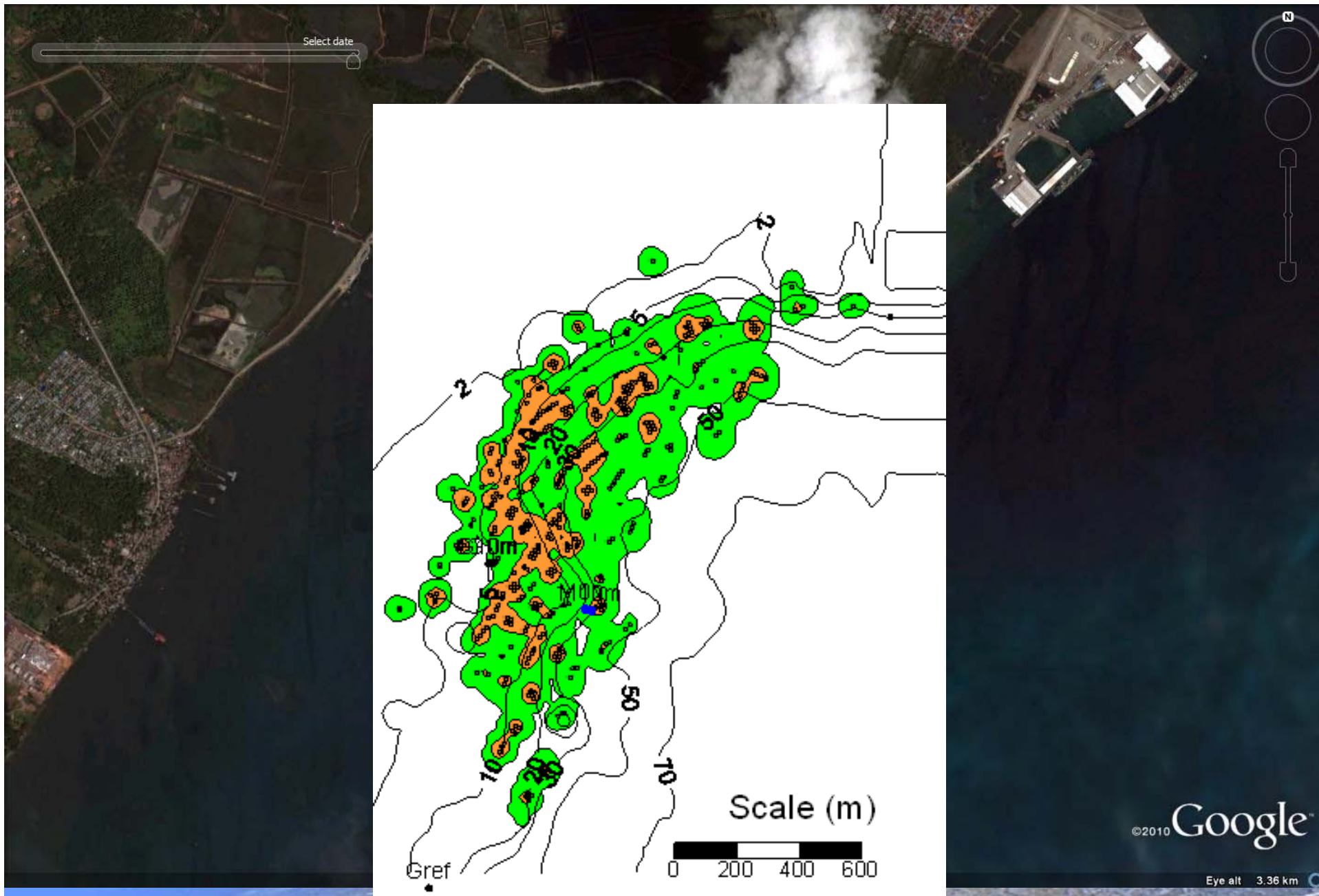
75 High impact

15 Moderate impact

1

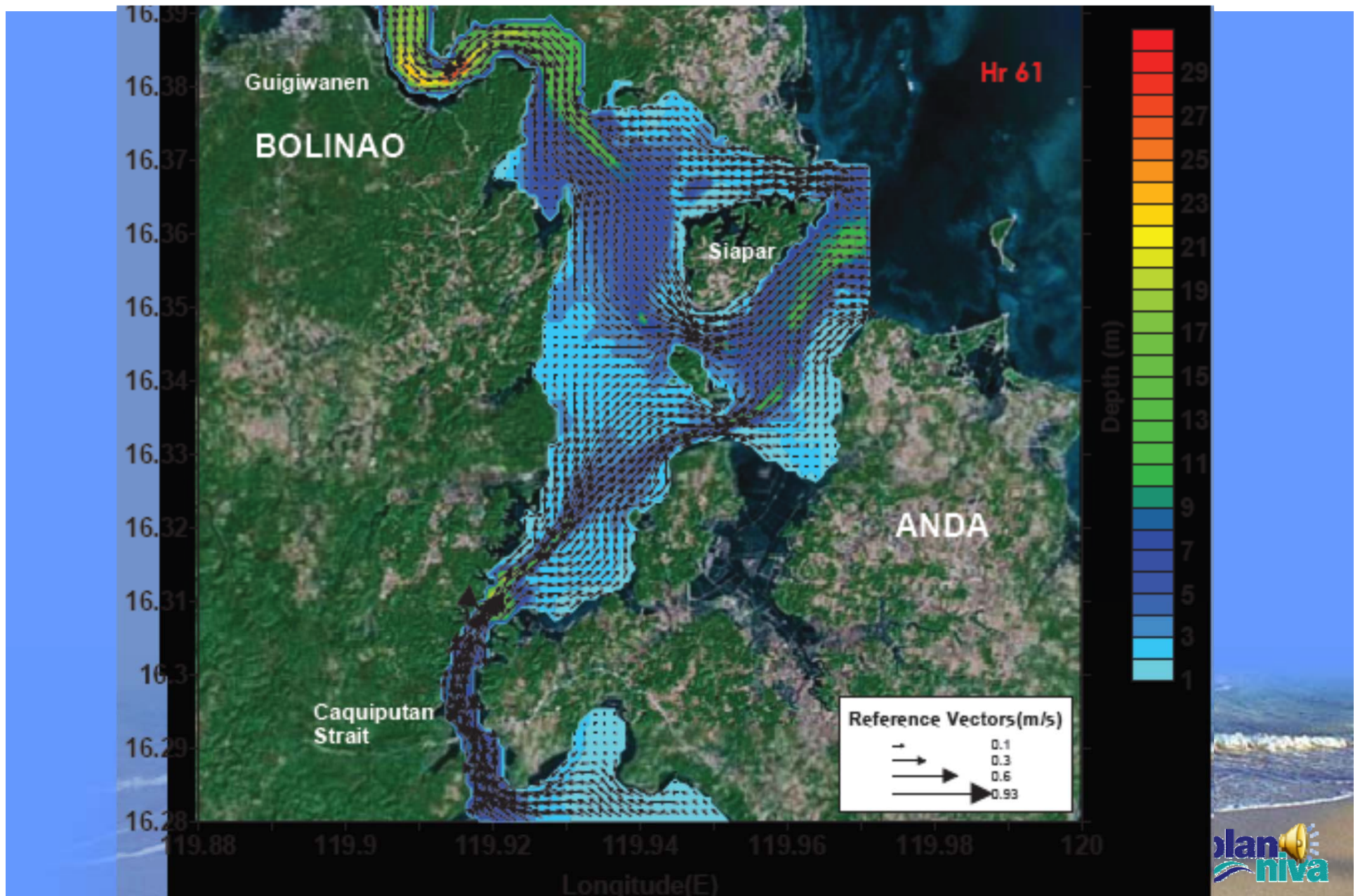
Higher flux and  
predicted impact  
in the inshore  
areas







# Modelling currents





# Nutrient build up in an aquaculture zone

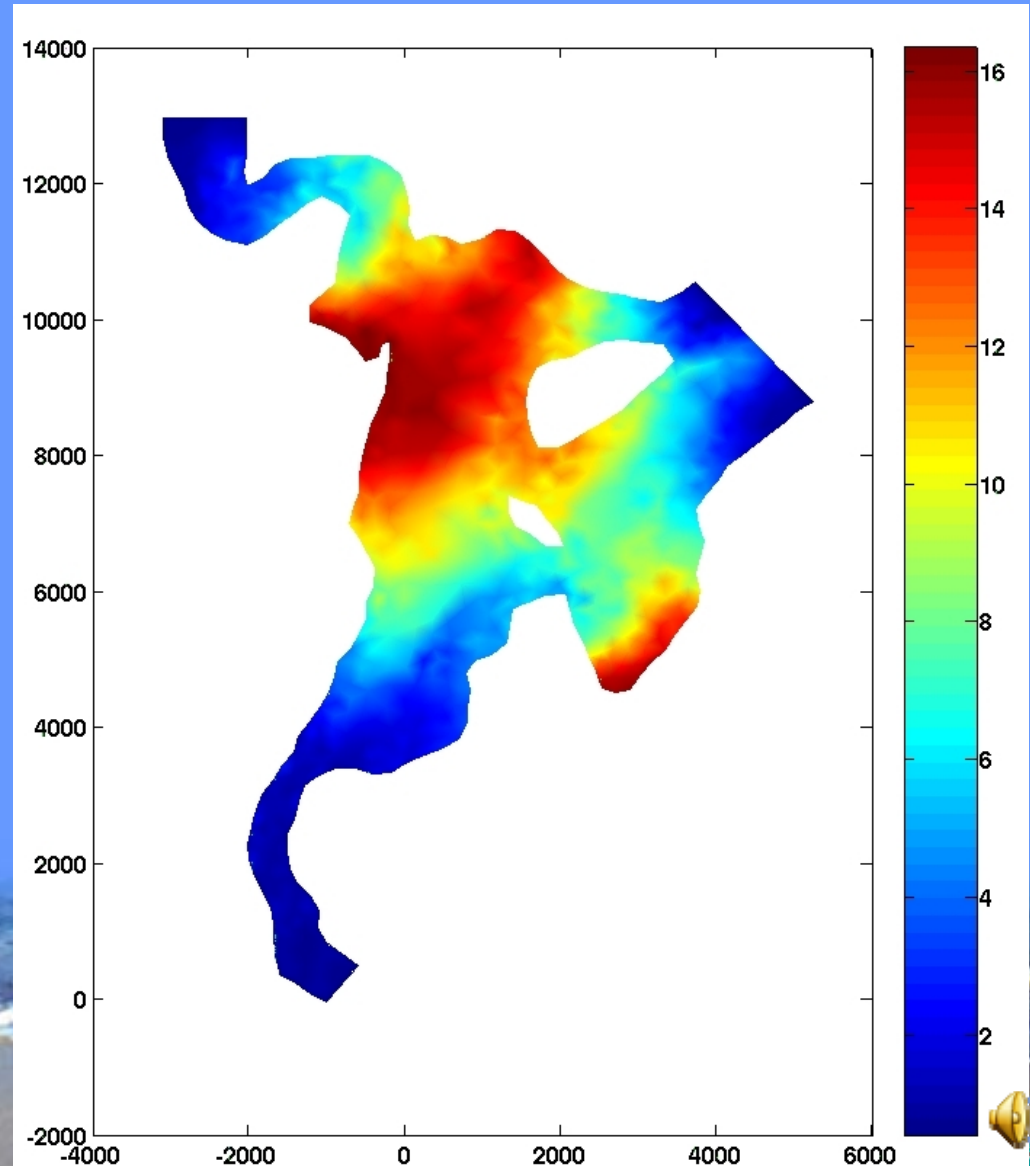
● High residence time, low flushing      ● Low residence time, high flushing

Residence time

Refreshment

Nutrient levels

Eutrophic

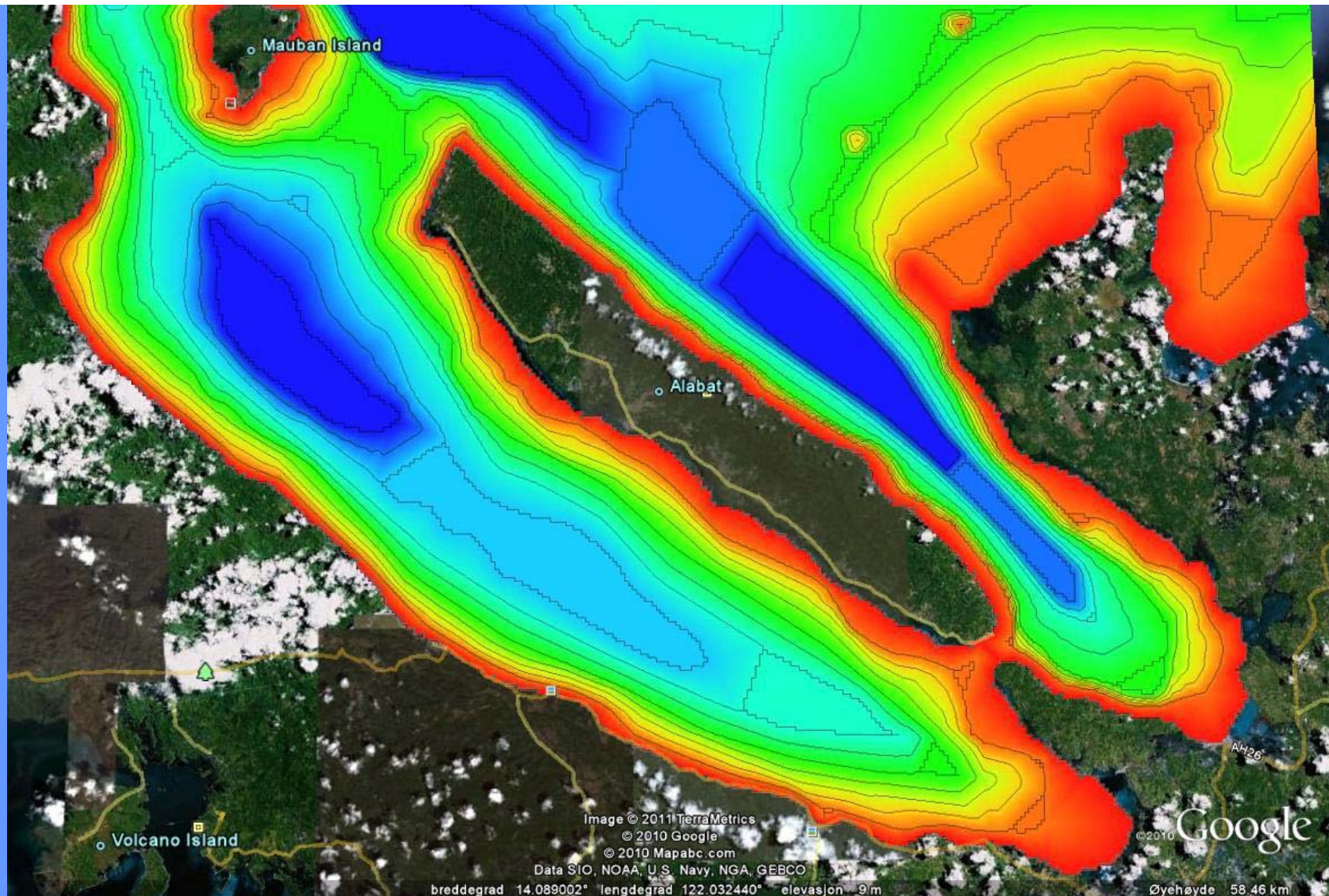


# Modelling currents

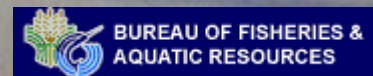
- Model of currents in Bolinao



# Bathymetry



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# Factors affecting carrying capacity

- Fish density

# Factors affecting carrying capacity

- Cage spacing

# Other factors

- Good site selection
- Water depth
- Extractive species