

COLLABORATIVE RESEARCH SURVEY ON MARINE FISHERIES RESOURCES AND ENVIRONMENT IN THE GULF OF THAILAND 2018

Preliminary assessing the impacts of fishing
on aquatic animal assemblages
in the Gulf of Thailand
using the abundance – biomass curve

Presented by

Tuantong Jutagate, Ubon Ratchathani University

Sontaya Koolkalya, Rambhai Barni Rajabhat University

Sukchai Arnupapboon, SEAFDEC/TD

Thanitha Darbanandana, Kasetsart University



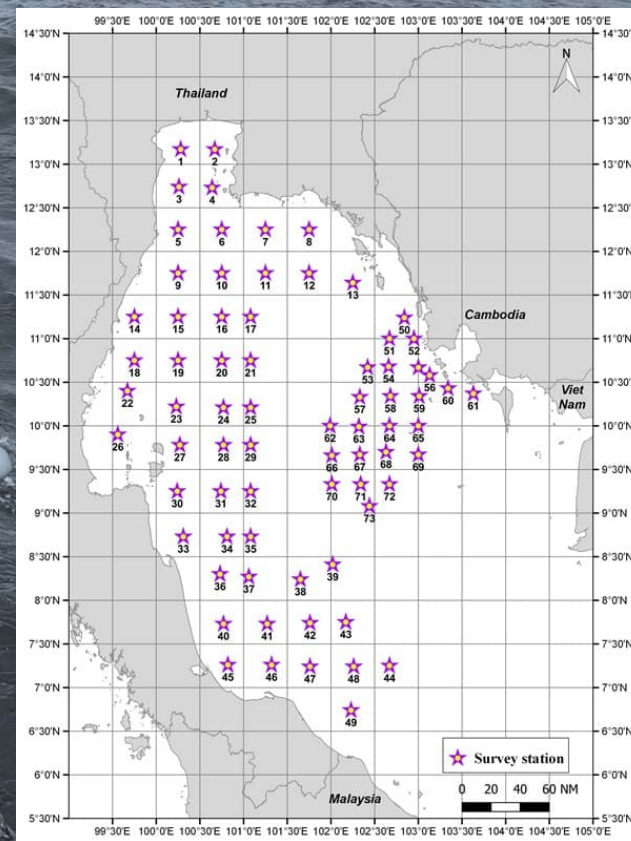
Supported by Southeast Asian Fisheries Development Center
Training Department, Samut Prakan, Thailand

Introduction

- Heavy fishing is among the major threats to the integrity of the marine ecosystems.
- The most direct effect is reduction in abundance of fishery targeted species, habitat destruction and changes in community structures.
- The measurement of structure of fish communities is used for interpreting the effects of fishing to the resources.
- The simple measurement of structure of fish communities is comparison of abundance/biomass to examine the level of disturbance by fishing

Materials and Methods – *Source of data*

- M.V. SEAFDEC-II cruise survey was conducted between August and October 2018 in the Gulf of Thailand
- Seventy one (71) bottom trawl operations, i.e. stations, were conducted.
- Total number of marine animal species was 335, with the total weight of 2,898.3 kg of 216,357 individuals
- There were 250 fish species, 19 shrimp species, 24 cephalopod species, 22 crab species and others.
- The obtained data was used as inputs for comparison of abundance/biomass



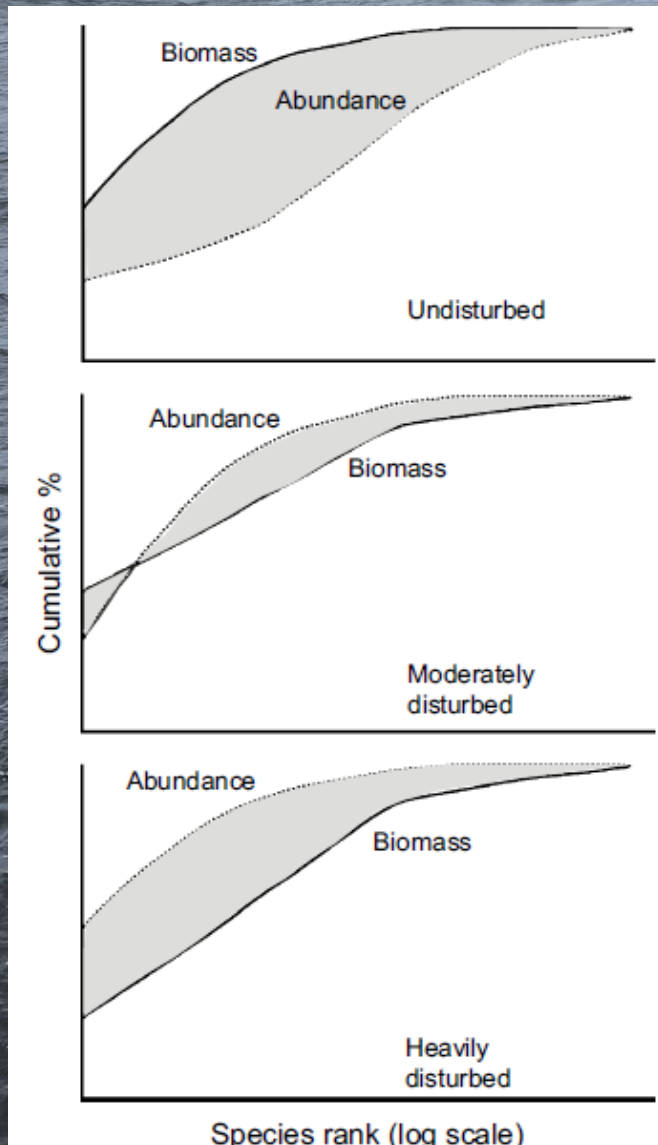
Materials and Methods – *ABC*

- The abundance/biomass comparison (ABC) method (Warwick, 1986) was applied to evaluate the status of the community in each station
- The disturbance level of the community was evaluated both by the ABC curve and *W*-statistic value, in which

$$W = \sum_{i=1}^S \frac{(B_i - A_i)}{[50(S - 1)]}$$

where *S* is the number of species, A_i is abundance value of the each of species rank *i*, and B_i is biomass value of each species rank, *i*.

Materials and Methods – *ABC (cont.)*



- Undisturbed or less disturbed, W-statistic value is positive (+)

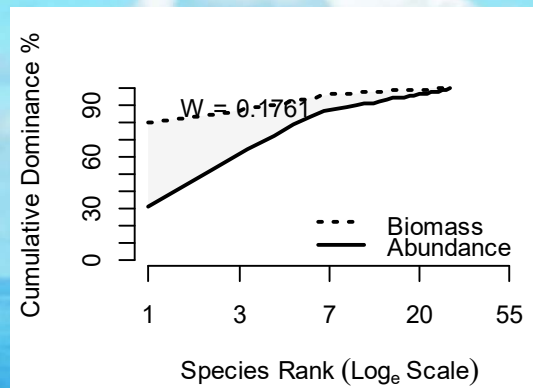
- Moderately disturbed, W-statistic value closes to zero (0)

- Heavily disturbed, W-static value is negative (-)

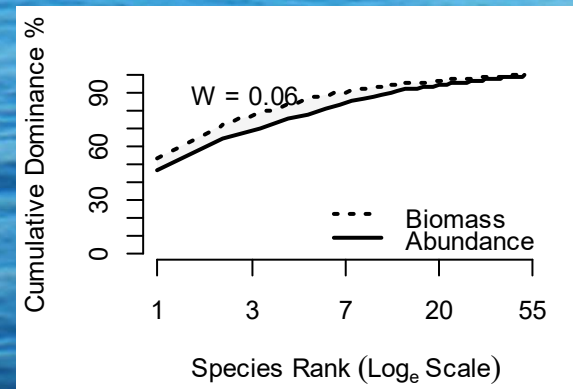
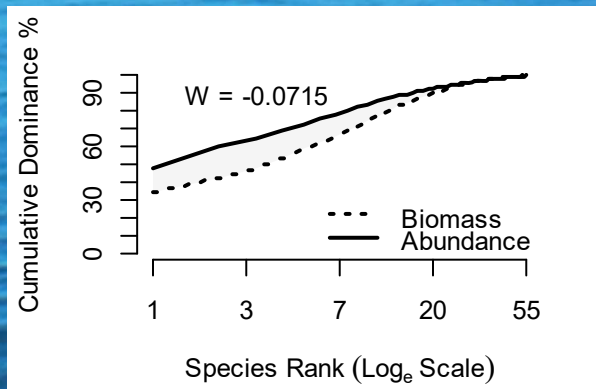
(Yamane et al., 2005)

Results

- Only 1 stations showed in the less disturbed condition

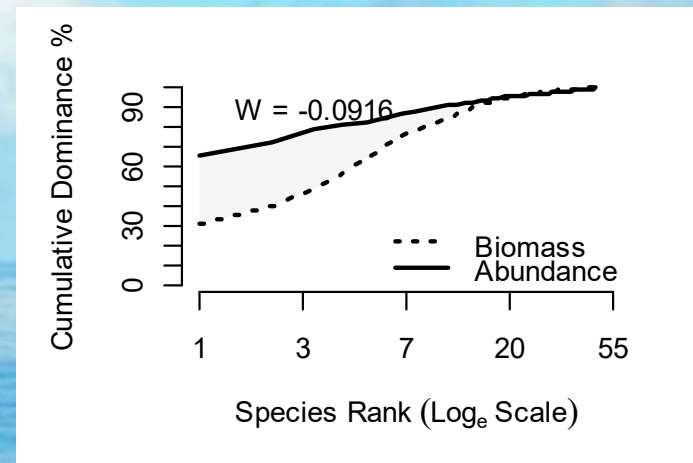
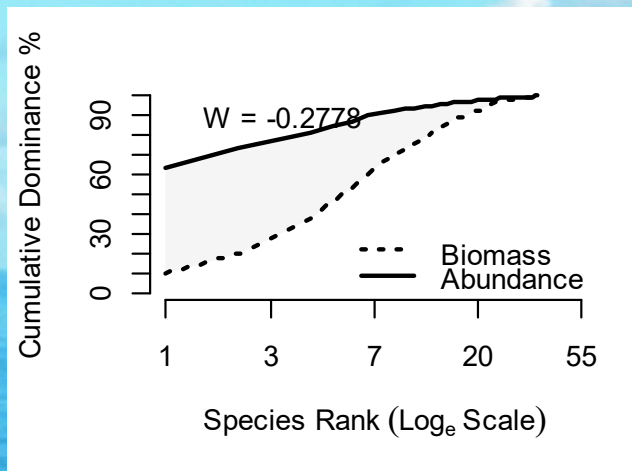


- Eighteen (18) stations were in the moderately disturbed condition (W-statistic ranged between -0.0715 and 0.06)



Results

- Fifty-two (52) stations were in the highly disturbed condition (W -statistic ranged between -0.2778 and -0.0916)



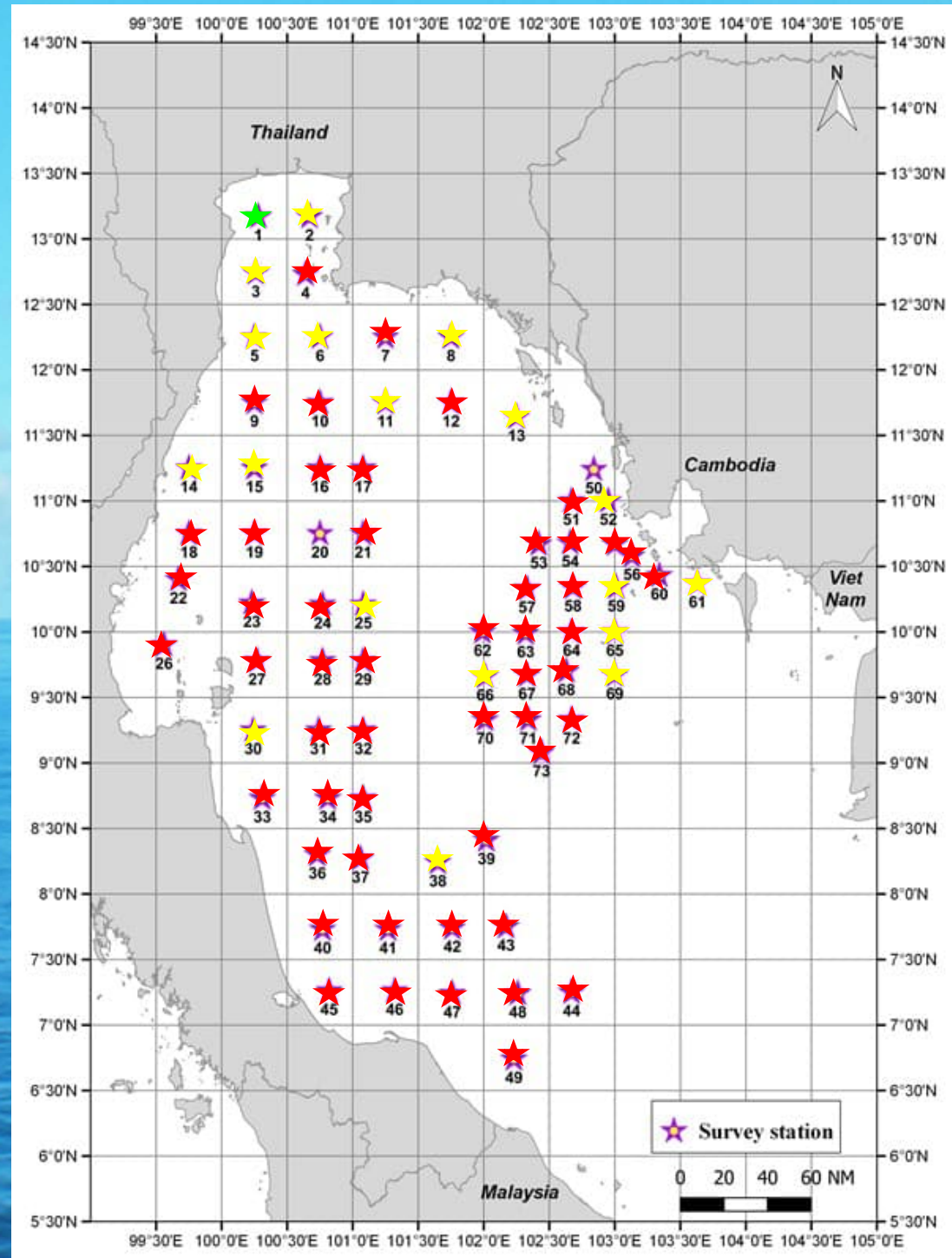
- No clear patterns of the disturbed gradient, i.e. from coastal- to coastal- areas and *vice versa* .
- Interestingly, many stations in the inner area of the Gulf of Thailand showed moderately disturbed condition, similar to the obtained results from Cambodian water (*See next slide*)

Results

- ★ Undisturbed or less disturbed conditions
- ★ Moderately disturbed condition
- ★ Heavily disturbed condition

- **Note:**

- 1. The survey did not be operated in Stations 20 and 50
- 2. Raw data of the study can be provided upon request





References

Warwick R. M. 1986. A new method for detecting pollution effects on marine macrobenthic communities. *Marine Biology*, 92: 557-562.

Yamane D., Field J.G. and Leslie R. W. 2005. Exploring the effects of fishing on fish assemblages using Abundance Biomass Comparison (ABC) curves. *ICES Journal of Marine Science*, 62: 374e379