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Enabling Delta Life

Manila Bay - Pasig River - Laguna de Bay watershed

Introduction to Decision Support System & Model Community Initiative

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To be told

- Timeline for the Decision Support System (DSS)
- Introduction to the (available) modeling framework of Manila Bay and Laguna de Bay
- Introduction to the Model Community of Practice (CoP) initiative

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Timeline for the Decision Support System

Period		Project/Program
2000-2003	LLDA	Sustainable Development of the Laguna de Bay Environment (SDLBE)
2003-2005	LLDA	Follow-up of the SDLBE
…	…	…
2013	PEMSEA	Total Pollutant Loading Study in the Laguna de Bay-Pasig River-Manila Bay Watershed (link)
2016-2018	MBCO/LLDA	Updating and Application of the Nutrient Reduction Modeling in the Laguna de Bay-Pasig River-Manila Bay Watershed
2017	Manila Water	Laguna East Bay water intake
2018-2020	NEDA	Manila Bay Sustainable Development Master Plan

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Sustainable Development of the Laguna de Bay Environment (SDLBE) 2000-2003

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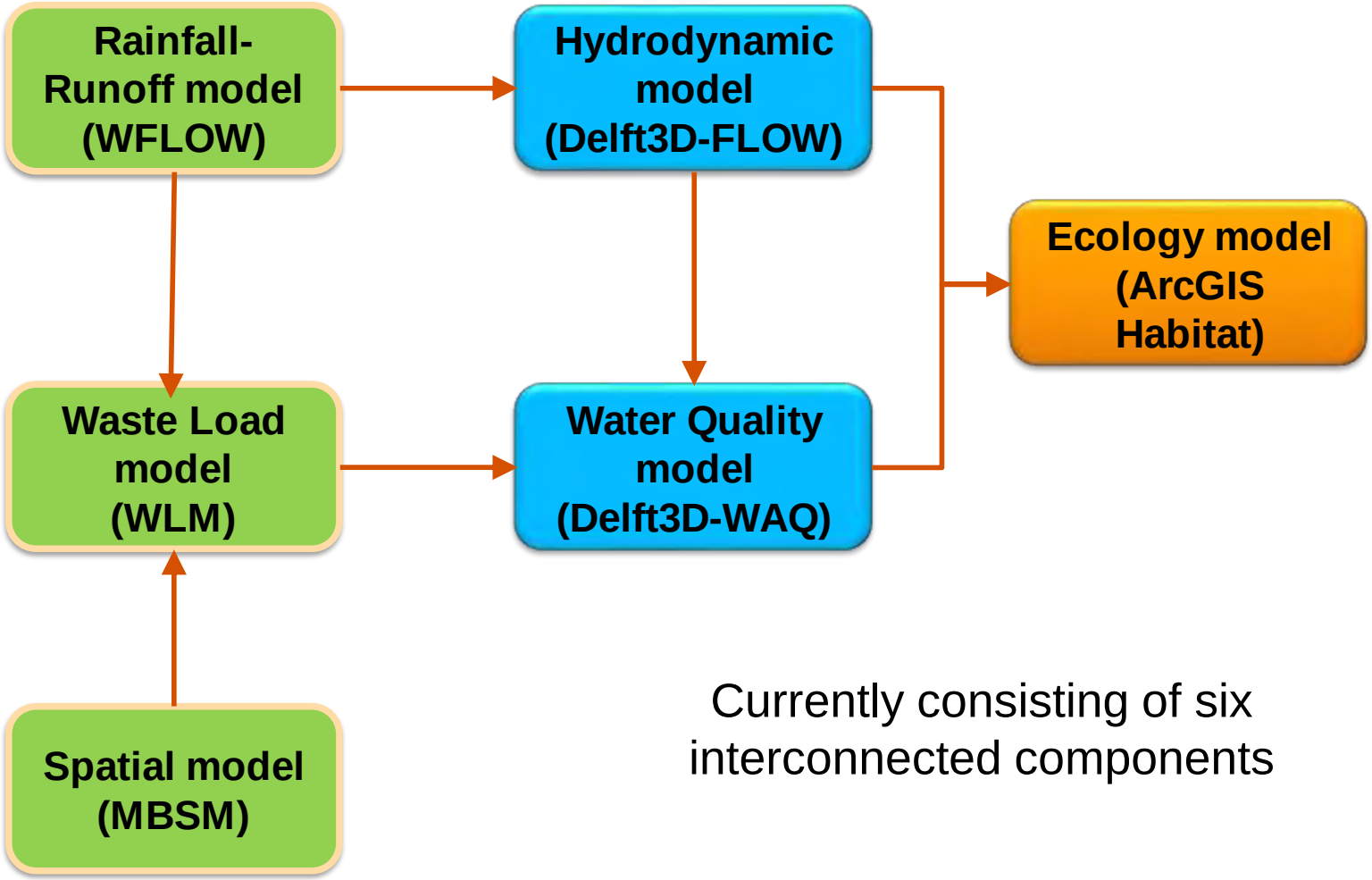
Decision Support System Manila Bay Area



Currently consisting of six interconnected components

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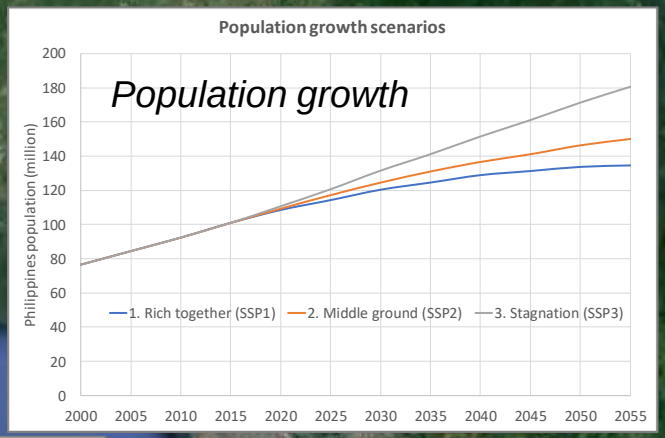
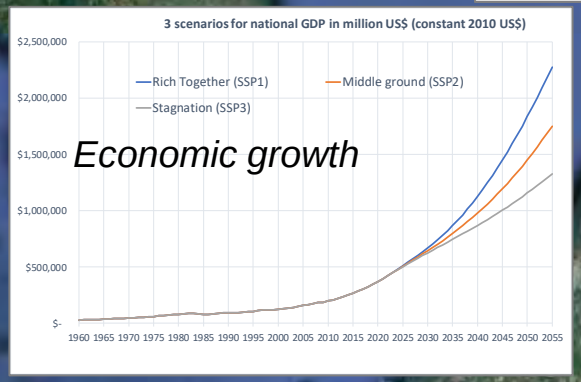
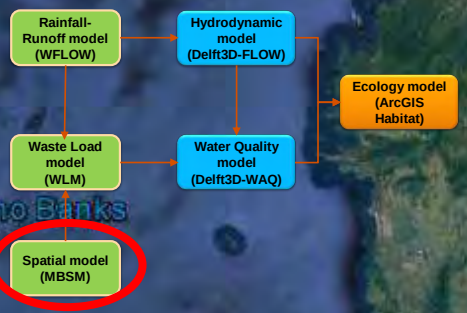
Modeling framework → Spatial Model (MBSM)

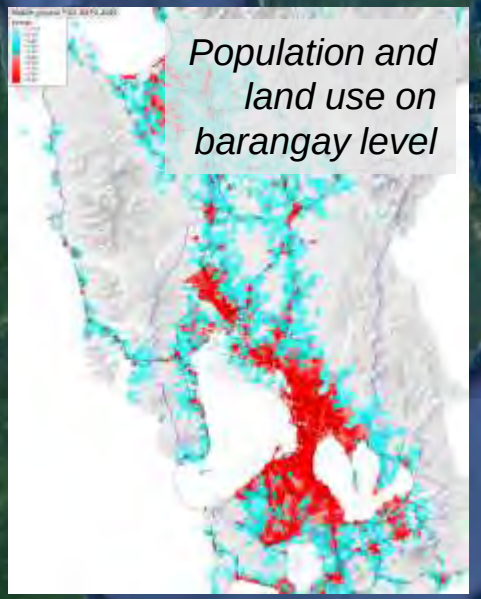
MODEL INPUT







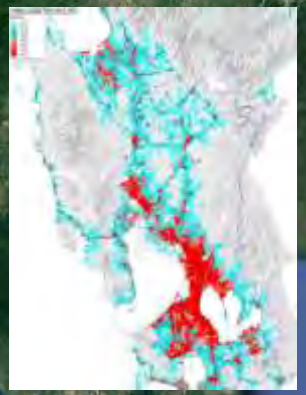
MODEL OUTPUT

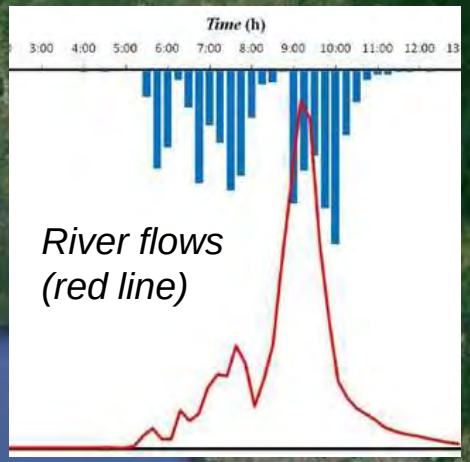


Time horizons:
2015
2022
2030
2040
2055

Modeling framework → Waste Load Model (WLM)

MODEL INPUT





Domestic

Land use

Industrial

Rainfall-Runoff model (WFLOW)
Hydrodynamic model (Delft3D-FLOW)
Ecology model (ArcGIS Habitat)
Waste Load model (WLM)
Water Quality model (Delft3D-WAQ)
Spatial model (MBSM)

MODEL OUTPUT

NO_3^-

NH_4^+

BOD

P

Silt & Clay

Bacteria

6 main catchments
Bataan,
Pampanga,
Bulacan, Manila
Laguna, Cavite

BOD pollution load – Reference Scenario

	Sewerage primary treatment	Sewerage secondary treatment	Sewerage tertiary treatment	Septic tank desludged	Septic tank non-desludged	No treatment
	2015					
Manila Water	14%	0	0%	41%	40%	5%
Maynilad	16%	0	0%	40%	39%	5%
Other	0%	0	0	15%	65%	20%
Reclamation	0%	0	100%	0%	0%	0%
	2022					
Manila Water	32%	0	0%	31%	32%	5%
Maynilad	47%	0	0%	24%	24%	5%
Other	0%	0	0	15%	65%	20%
Reclamation	0%	0	100%	0%	0%	0%
	2030					
Manila Water	0%	0	95%	5%	0%	0%
Maynilad	0%	0	100%	0%	0%	0%
Other	0%	0	0	15%	65%	20%
Reclamation	0%	0	100%	0%	0%	0%
	2040					
Manila Water	0%	0	99%	1%	0%	0%
Maynilad	0%	0	100%	0%	0%	0%
Other	0%	0	0	15%	65%	20%
Reclamation	0%	0	100%	0%	0%	0%

Percentage of population covered by treatment type per time horizon and per treatment area (data derived from Manila Water and Maynilad development plans)

Preliminary result.
Not for distribution.

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BOD pollution load – Reference Scenario

	Sewerage primary treatment	Sewerage secondary treatment	Sewerage tertiary treatment	Septic tank desludged	Septic tank non-desludged	No treatment
	2015					
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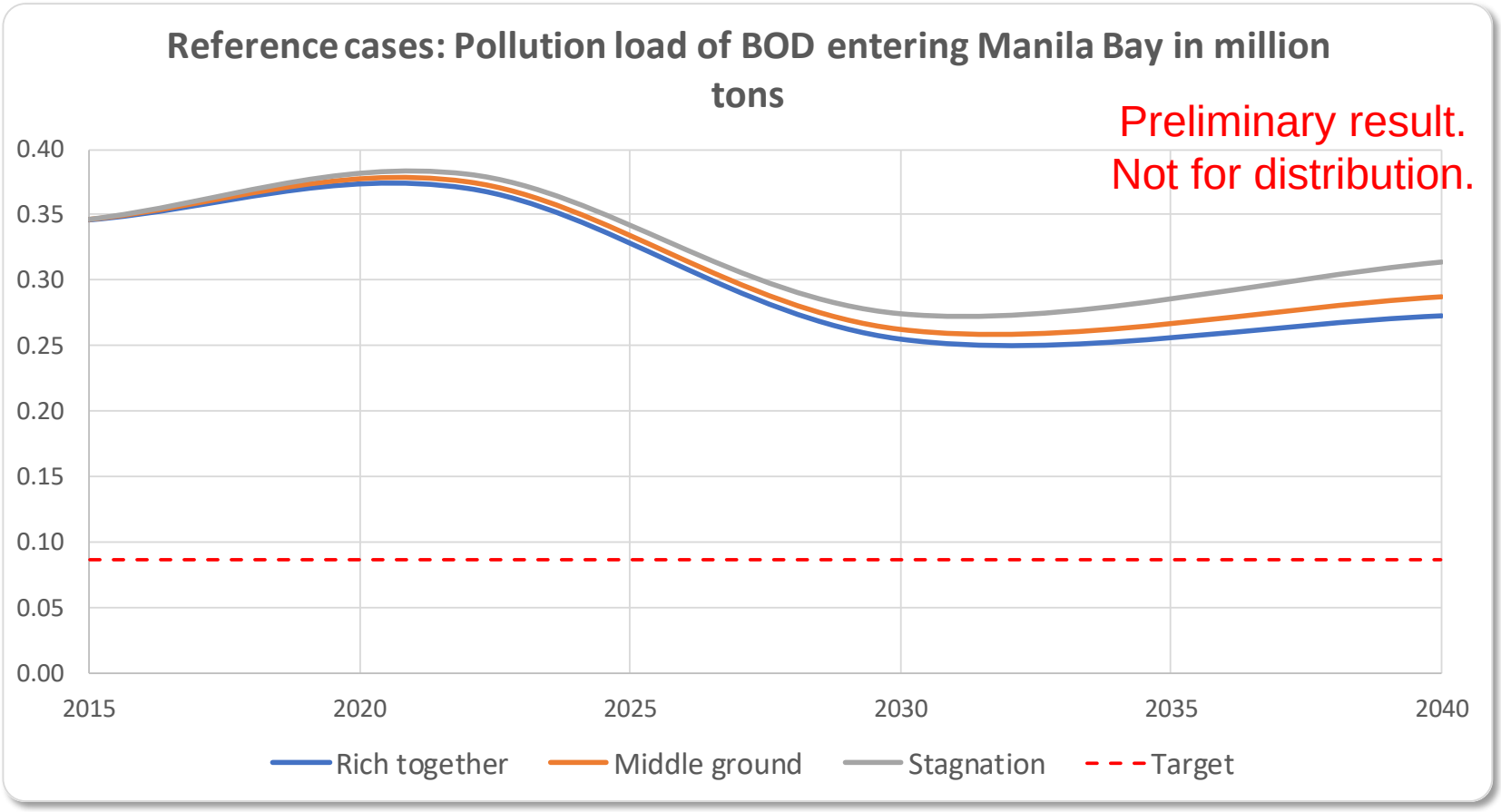
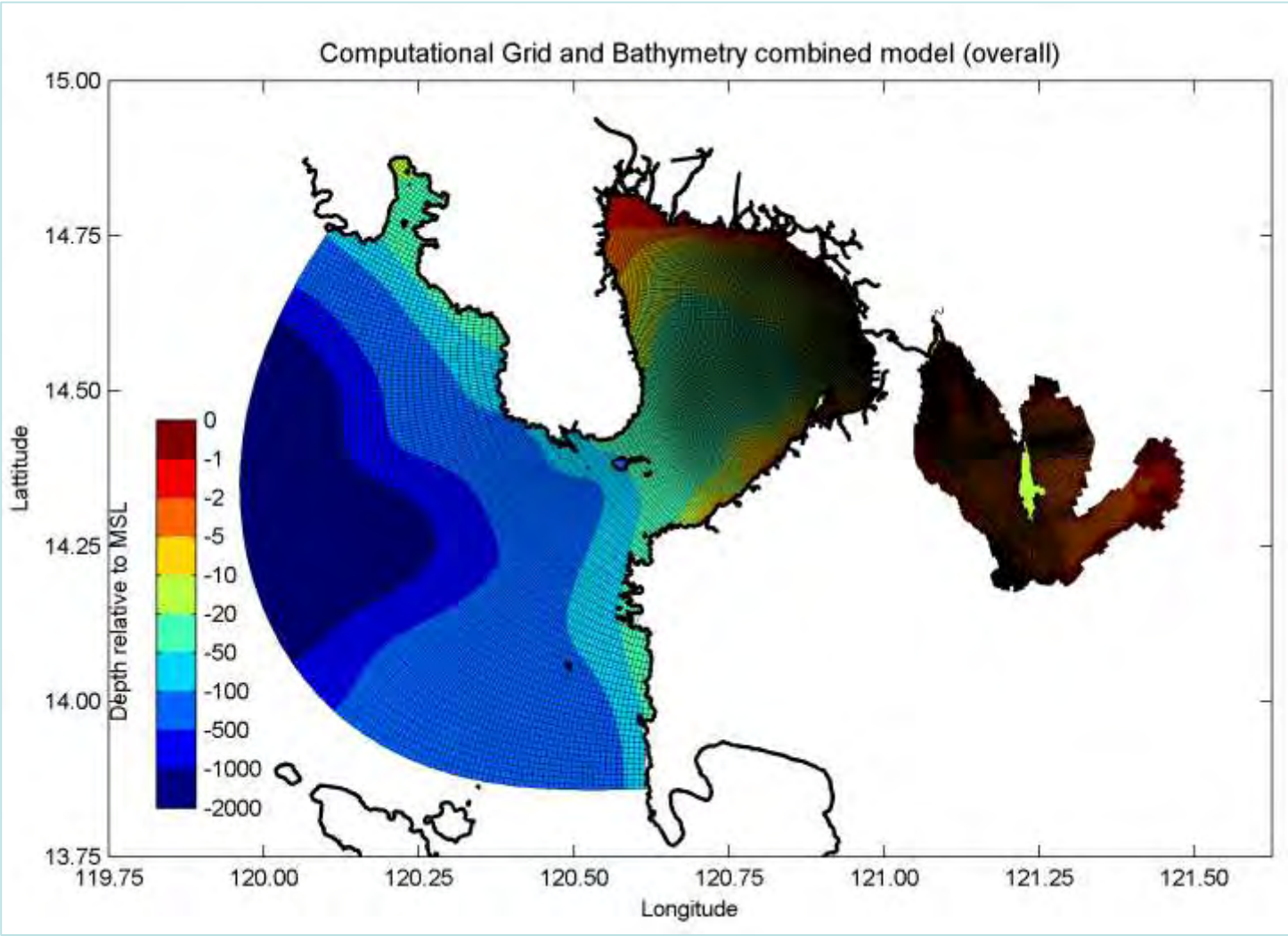
Maynilad						
Other						
Reclamat						
Manila W						
Maynilad						
Other						
Reclamat						
Manila W						
Maynilad						
Other						
Reclamat						
Manila W						
Maynilad						
Other						
Reclamat						

Percer
horizor
Maynil



Model grid → 3D Hydrodynamic & 3D Water Quality models

- Laguna de Bay and Manila Bay connected



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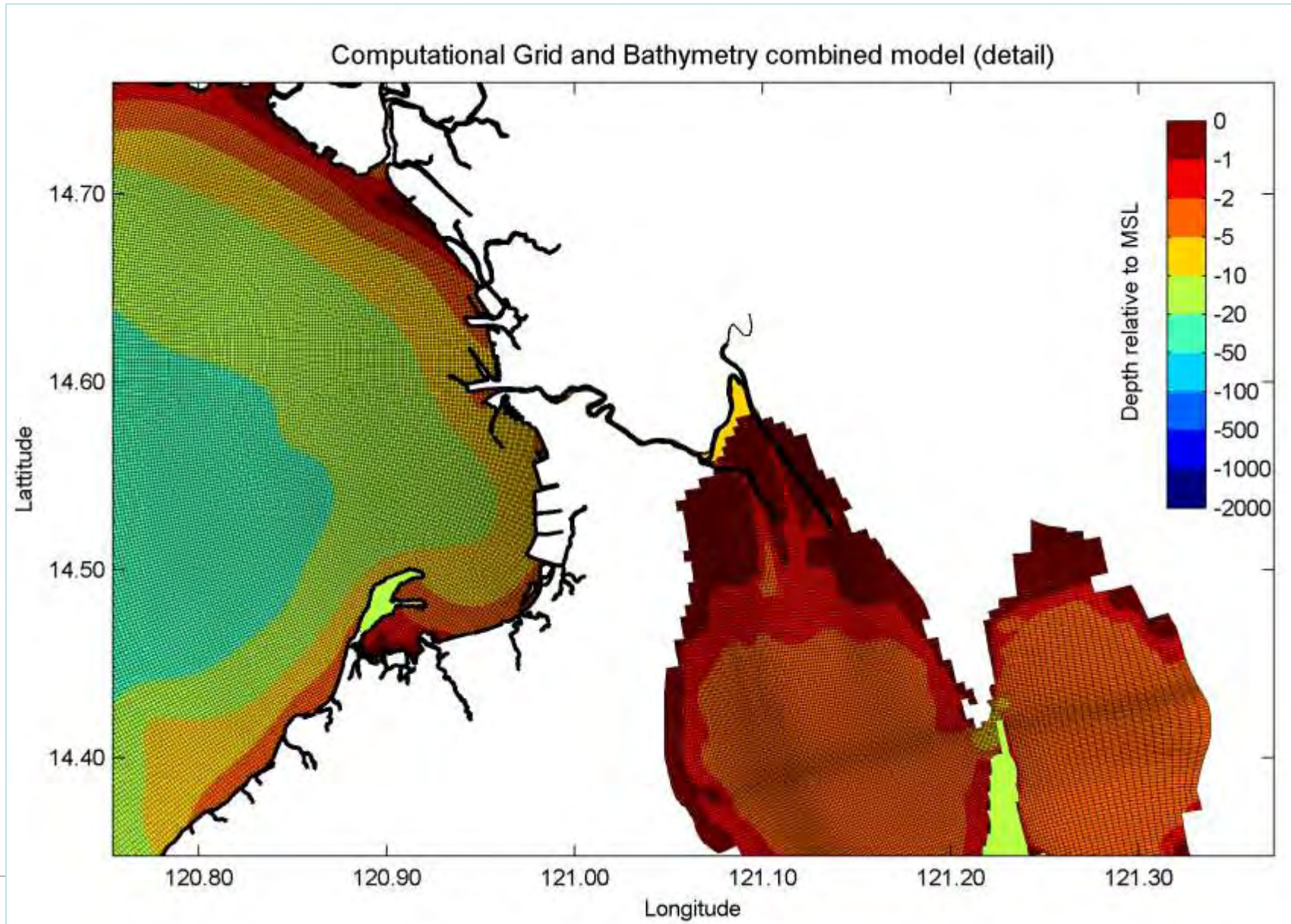
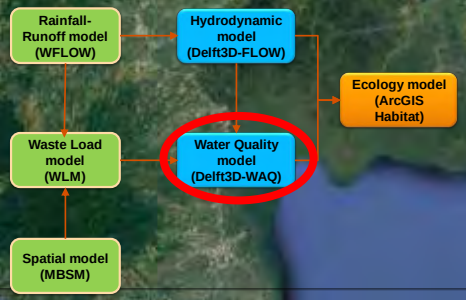
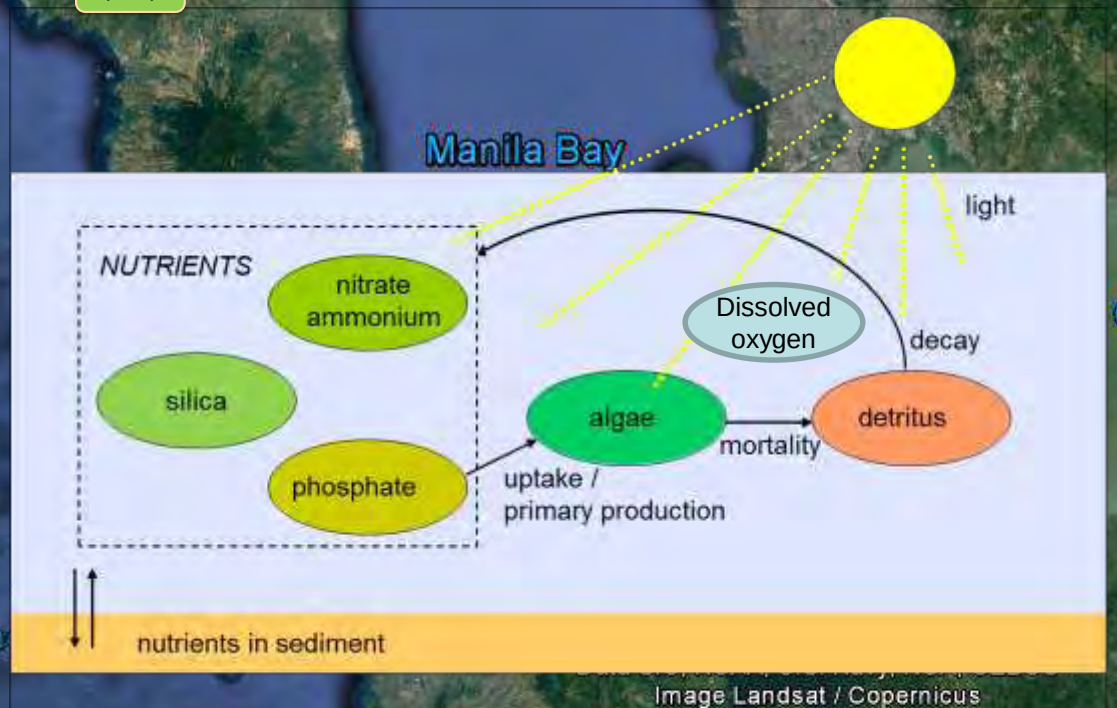
Model grid – Pasig connection



Modeling framework → 3D Water Quality model (Delft3D)

MODEL INPUT





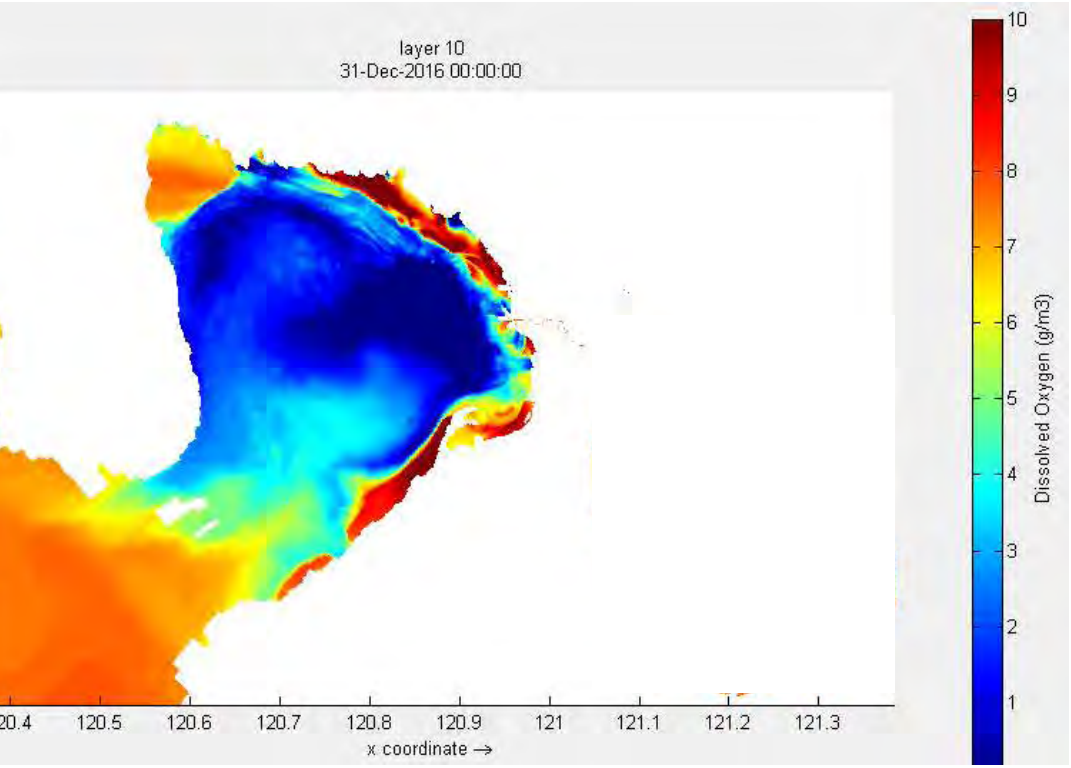
MODEL OUTPUT

1. Nutrient concentration (N, P, Si)
2. Dissolved Oxygen
3. Suspended sediment (turbidity)
4. Chlorophyll-*a*
5. BOD (Biological Oxygen Demand)
6. Pollutants (not included yet)

NB: And many derived variables and statistics.

Google earth

Water Quality Model Results:
Effect of Pollution load reduction on Dissolved Oxygen



Preliminary result.
Not for distribution.

100% Waste Load

(2015)

Dissolved oxygen concentration near the seabed

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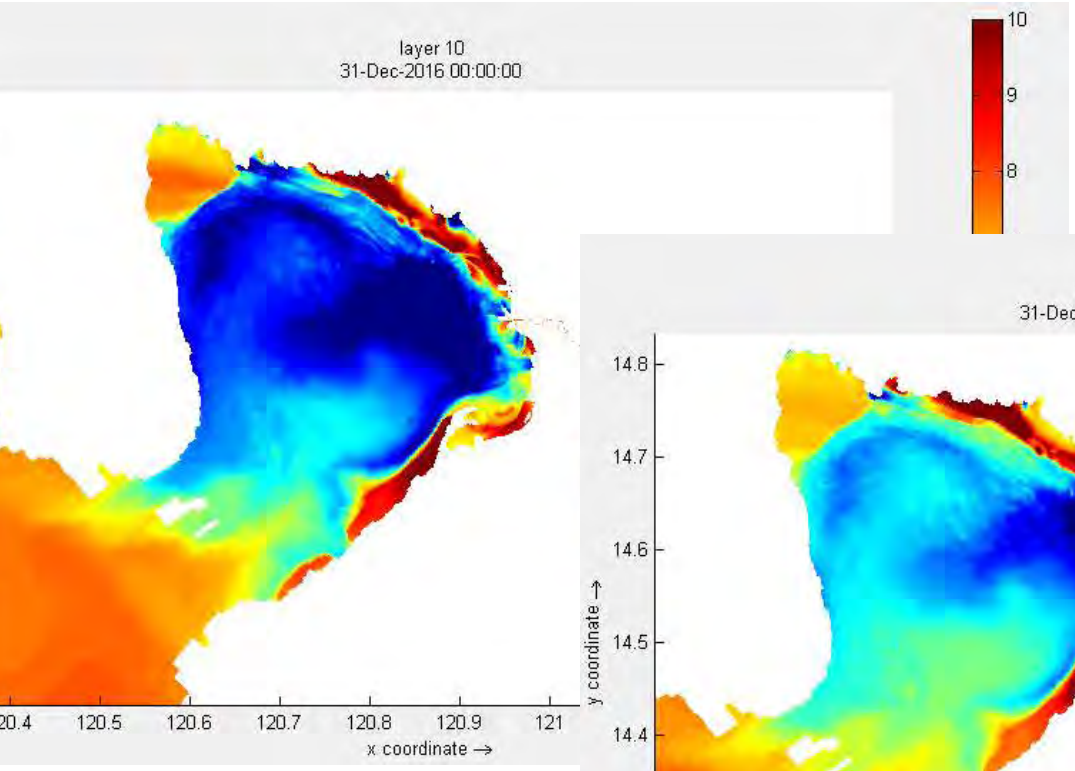
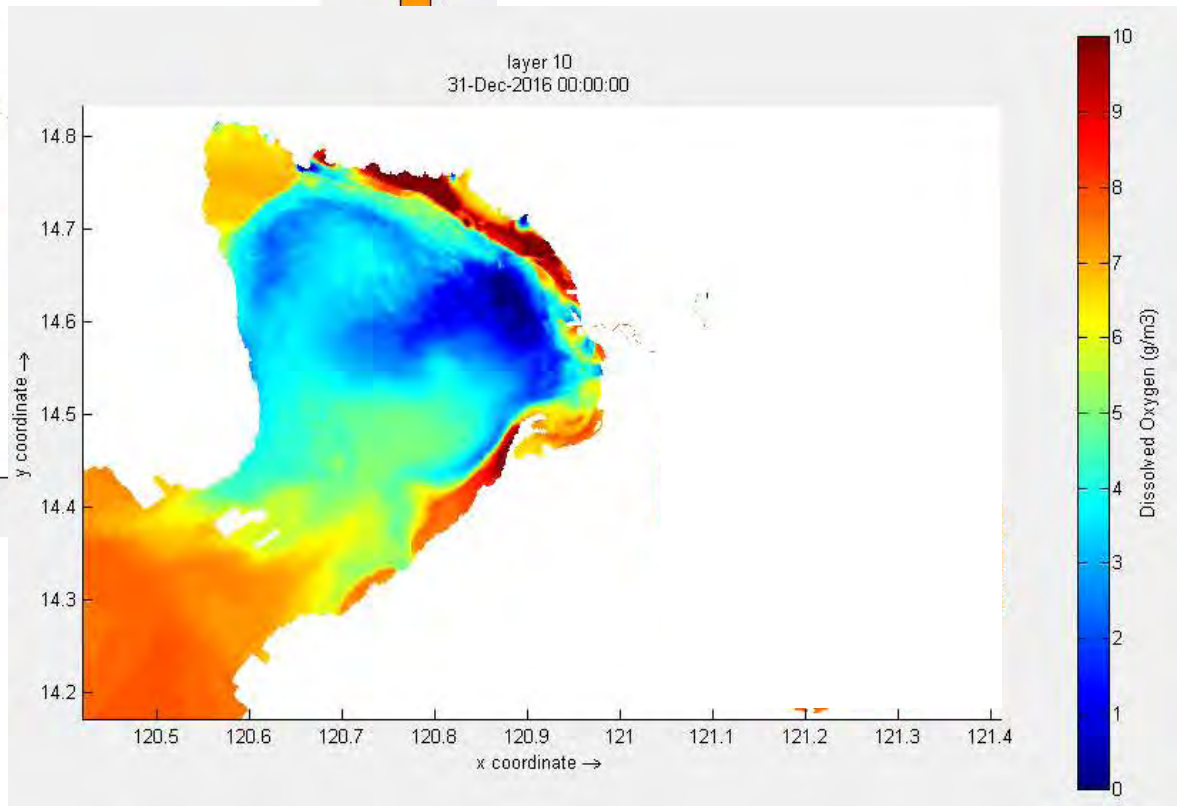
Water Quality Model Results:
Effect of Pollution load reduction on Dissolved Oxygen



100% Waste Load (2015)

Preliminary result.
Not for distribution.



50% Waste Load

Dissolved oxygen concentration near the seabed

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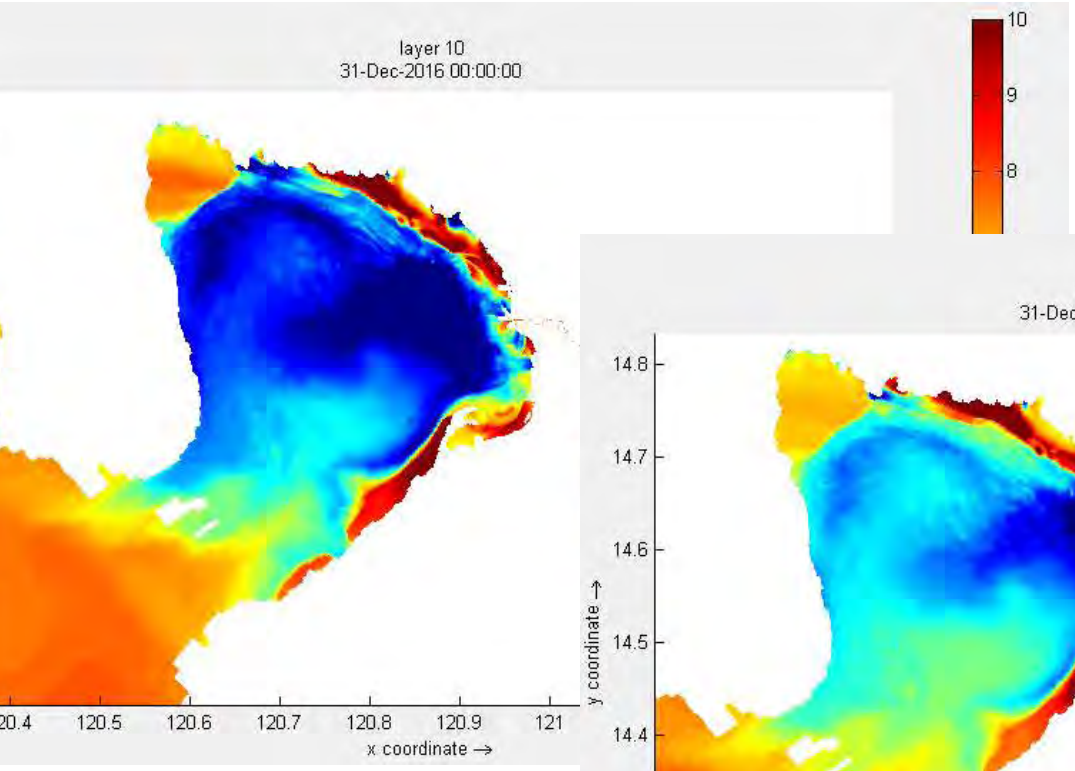
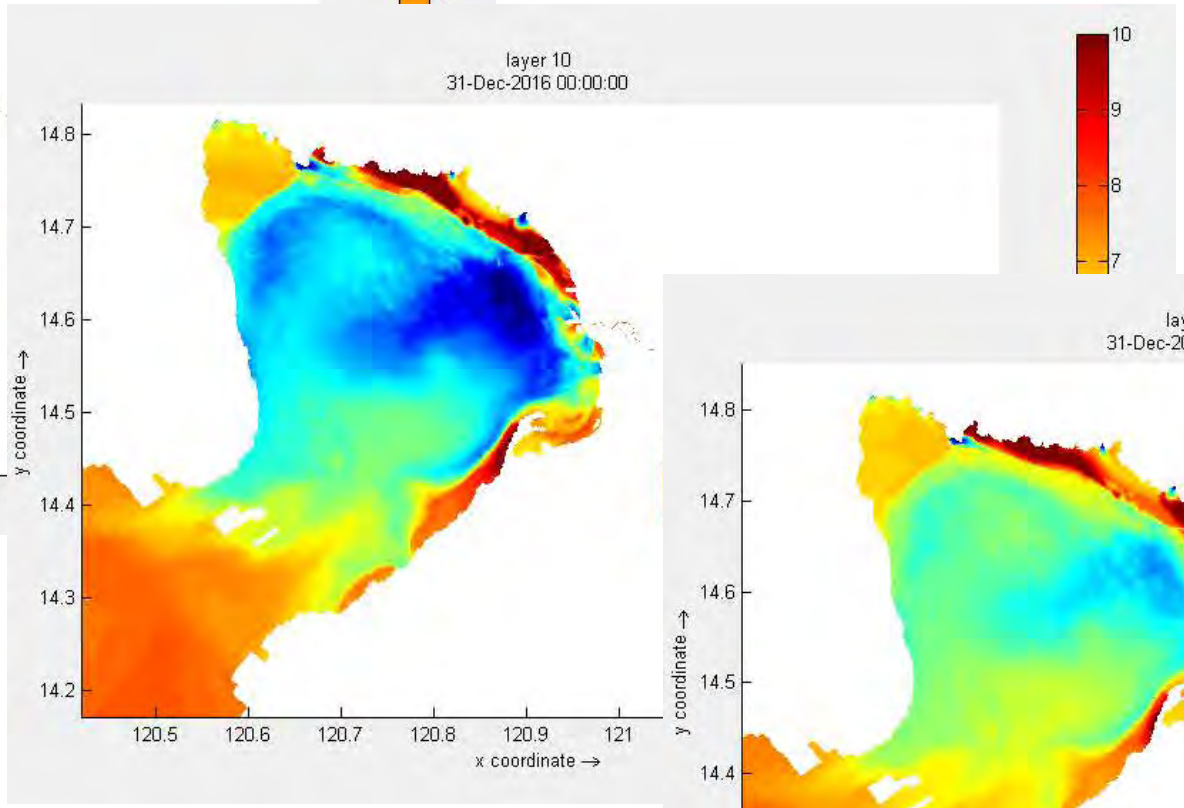
Water Quality Model Results:
Effect of Pollution load reduction on Dissolved Oxygen

Preliminary result.
Not for distribution.



100% Waste Load (2015)



50% Waste Load

25% Waste Load

Dissolved oxygen concentration near the seabed

MODEL COMMUNITY OF PRACTICE

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Model Community of Practice

Why a Model Community of Practice?

1. Wide range of topics for which expertise is usually not available in one organization
2. Wide range of topics requires a lot of input data from monitoring which is usually not available in one organization
3. Turnover of trained staff results in drain of expertise
4. Multiple models for the same topic may result in confusion and discussion if model results are not the same.
5. In general, investments are (too) large to be sustainably born by one organization.

A Model Community of Practice is a way to share expertise, pool knowledge transfer, combine investments, share maintenance, and optimize developments and monitoring efforts.

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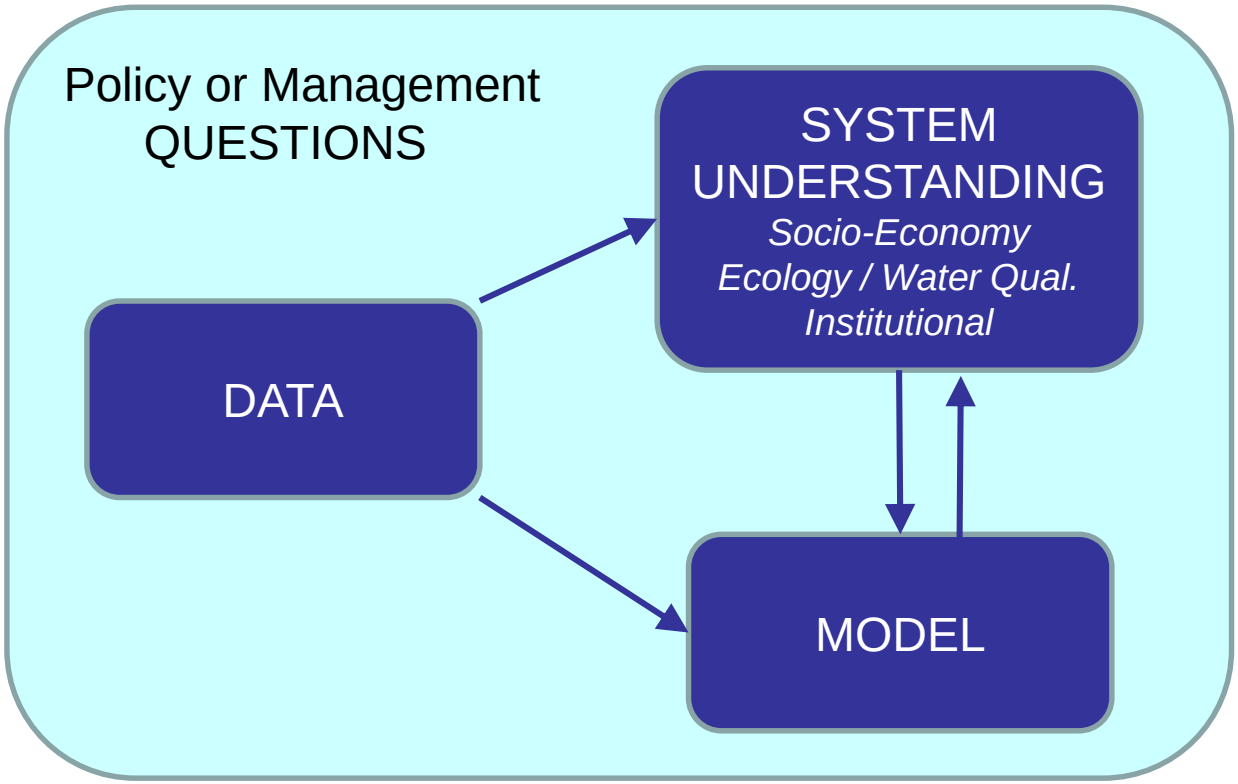
Model CoP covers more than Modeling



- Model application must be tailored to the Question(s) at hand.
- Model must be based on Understanding how the System works and reacts to measures and/or changes. (Also, model verifies system understanding.)
- System understanding must be based (primarily) on data analysis.
- Model must be fed by and calibrated/validated against suitable Data.

Organizations expressing interest

The modeling teams of the following organizations expressed interest in a Model CoP initiative:

- MBCO
- LLDA
- PRRC
- UP Marine Science Institute
- UP Los Banos
- UP National Engineering Center
- Manila Water
- Deltares
- …

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Next steps?

- Get interested organizations together to explore possibilities
- Get institutional support from management
- Draft CoP cooperation agreement
  - Identify and agree on common goal(s)
  - Find balance between commitment and flexibility
    - Voluntarily but not without obligation
  - Set-up supporting structure
    - People, Cooperation protocols, Computer infrastructure
  - Define activities and actions for the next year(s)
  - Arrange continuity

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Thank you! Salamat!

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