

# A dynamic data-driven decision support for aquaculture farm closure

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# Background-TSQAP

## Moulting Bay

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### Summary

Search:

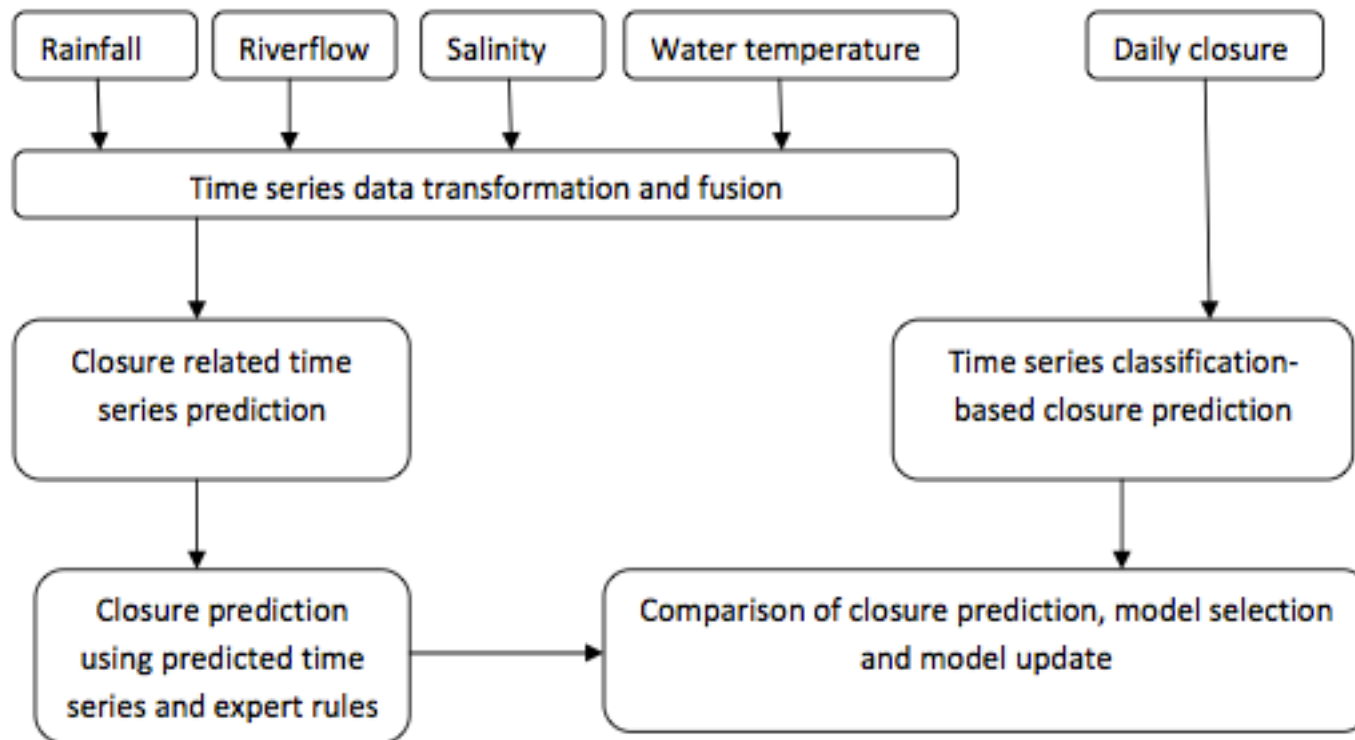
Area	Zone	Domestic	General	EU	Japan	Actions
Moulting Bay	1	Closed	Closed	Closed	Closed	✓ ✗ ⚠
Moulting Bay	2	Closed	Closed	Closed	Closed	✓ ✗ ⚠
Moulting Bay	GB1	Closed	Closed	Closed	Closed	✓ ✗ ⚠
Moulting Bay	4	Closed	Closed	Closed	Closed	✓ ✗ ⚠
Moulting Bay	5	Closed	Closed	Closed	Closed	✓ ✗ ⚠
Moulting Bay	6A	Closed	Closed	Closed	Closed	✓ ✗ ⚠
Moulting Bay	GB2	Closed	Closed	Closed	Closed	✓ ✗ ⚠

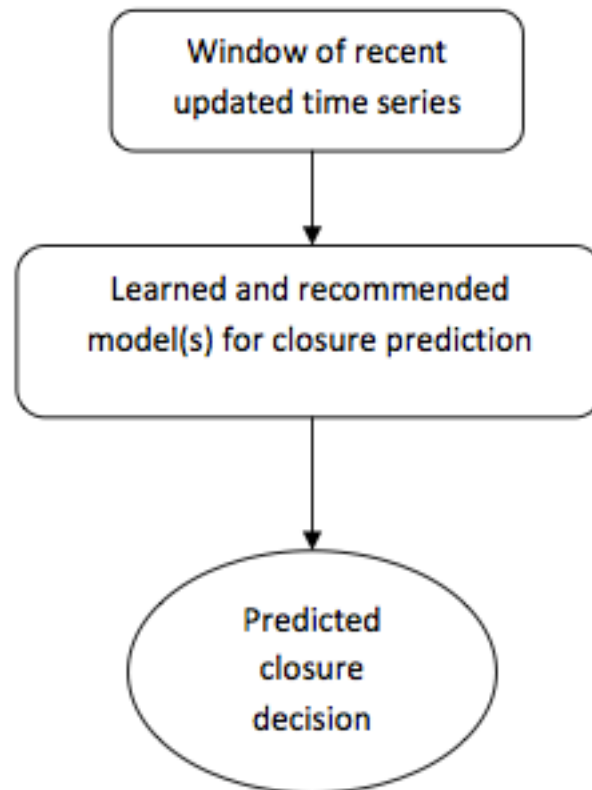
# Importance of closure as decision support

1. DHHS-public health
2. Shellfish farms-management

# Closure decisions (Open/Close)

1. Now-casting
2. Forecasting/prediction: 1 to n days ahead
  - Time series classification
  - Predicting relevant environmental variables/time series and then applying TSQAP rules on the predicted value as simple classifier





# Time series classification

Date	Rainfall	River flow	...	Status
01-01-2012	1	0.5		Open
02-01-2012	20	1		Open
03-01-2012	10	8		Close
...	...	...	...	...
...	...	...	...	...
...	...	...	...	...
01-02-2013	2	2	...	Open

# Time series prediction

Date	Rainfall	River flow	...	Status
01-01-2012	1	0.5		Open
02-01-2012	20	1		Open
03-01-2012	10	8		Close
...	...	...	...	...
...	...	...	...	...
...	...	...	...	...
01-02-2013	2	2	...	Open

The table illustrates a time series prediction scenario. A dashed box highlights the first two rows (01-01-2012 and 02-01-2012), indicating the input data used for prediction. An arrow points from the 'River flow' value of 8 on 03-01-2012 to the 'Close' status, suggesting a prediction or a specific event triggered by the data.



# Tasks/issues in time series prediction

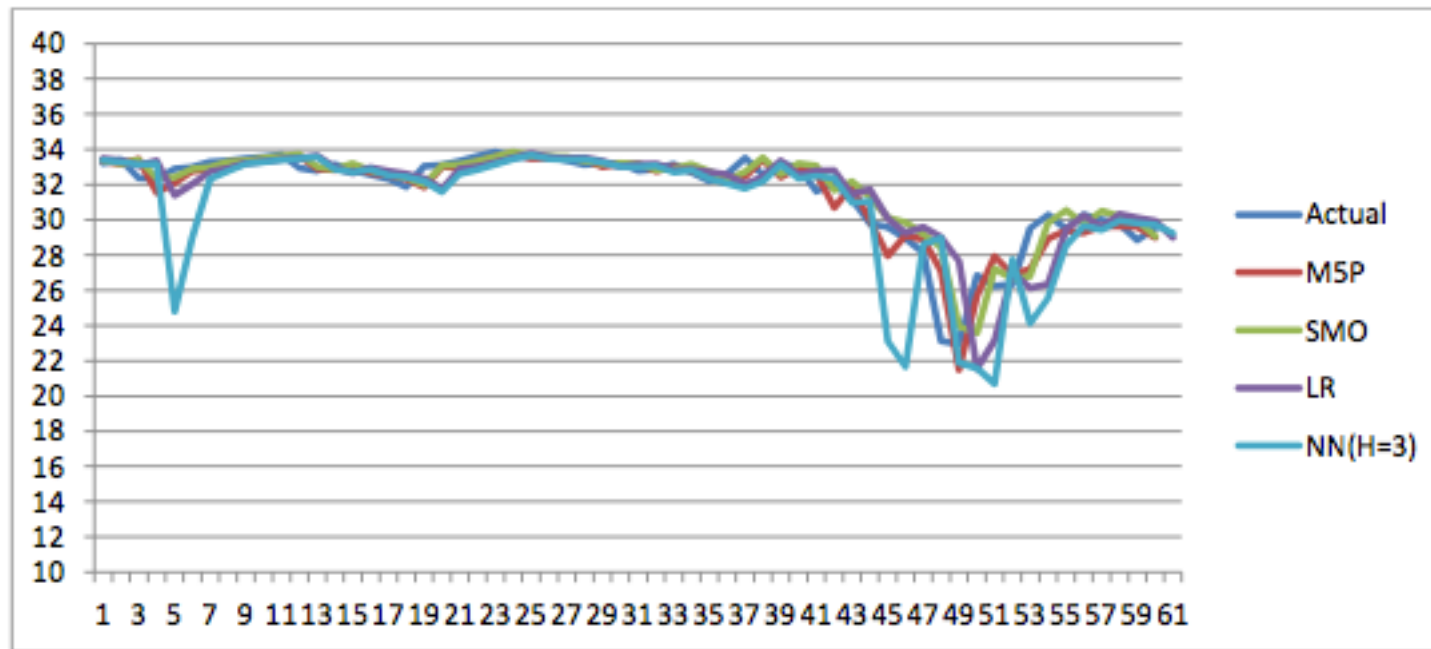
1. River flow/stream flow-Hydrology: Geology, other factors
2. Salinity: Poor quality data, needs more variables (water temperature)
3. Modelling for individual locations
  - Lag days
  - Input variables
4. Many rules...

# Time series prediction model for salinity

Test case: 1/07/2012 to 31/08/2013.

Technique	Lag days(River flow-Rainfall-Water temperature-Salinity)	MSE
M5P	1-1-1-3	0.361
SMOReg	1-1-3-1	0.365
LR	1-2-2-1	0.375
NN (Hidden layer=3)	2-1-1-1	0.395

# Prediction result



# Using expert rules on prediction

Salinity < 30 PSU

	Closed	Opened
Closed	14	7
Opened	3	36

# Time series classification

	Closed	Opened
Closed	17	4
Opened	8	31

## Ongoing and future work

1. Data-driven models are implemented
2. Visualization of closure status is being implemented
3. Relocating models to other locations

# Thank you

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