NSW MODELLING AND MONITORING HUB

NSW WATER MODELLING SURVEY SUMMARY RESULTS

Report no: MHL2686
March 2019

What is the NSW modelling and monitoring hub (MaMH)?

- www.mamh.nsw.gov.au/
- The MaMH is a knowledge network established to coordinate and aid information sharing across government agencies, state owned corporations and local government in relation to water modelling and monitoring.

Why did the MaMH conduct a survey of water modelling in NSW Government?

- Provide a state-wide snapshot of water modelling assets, knowledge and capabilities spread across multiple government agencies in NSW.
- Inform of the present-day use of water models[1] and water modelling expertise across NSW Government.
- Identify opportunities and hurdles to improving the management, sharing and collaboration of water modelling assets and capabilities across NSW Government.

What is the MaMH working to achieve?

- More efficient water related services.
- Improved operations, planning and management of water assets.
- Strategic and coordinated investment in water modelling

[1] *In this survey a water model is defined as an application, instance or use of a water modelling program (or software) for a specific location, modelling task and/or objective/s.*

RESPONSE RATE

27%

41 OF 150 TOTAL INVITED ORGANISATIONS

WATER MODELS IDENTIFIED

1100 - 2400

WATER MODELS IDENTIFIED ACROSS 41 NSW GOVERNMENT AGENCIES

WATER MODELS UPDATED IN LAST 5 YEARS:

50%

WATER MODELS WITH METADATA AVAILABLE TO SHARE:

36%

Respondents:
- Local Government
- DoI Water
- WaterNSW
- State Agencies
- Commonwealth Agencies
- Irrigation Corps
- Local Land Services
- Water Utilities
- OEH
- MHL
- Sydney Water
- Power Utilities

NSW GOVERNMENT COLLABORATIVE TOOLS

79%

OF RESPONDANTS SAID 'YES' THERE IS A BENEFIT TO ADOPTING THE TOOLS

OBSTACLES TO SHARING WATER MODEL METADATA:

Resourcing

Funding

Metadata systems

Sensitivities

Complexities

PURPOSES FOR USING WATER MODELS ARE DIVERSE

WATER MODELLING EXPERTISE VARIES SUBSTANTIALY ACROSS NSW GOVERNMENT AGENCIES
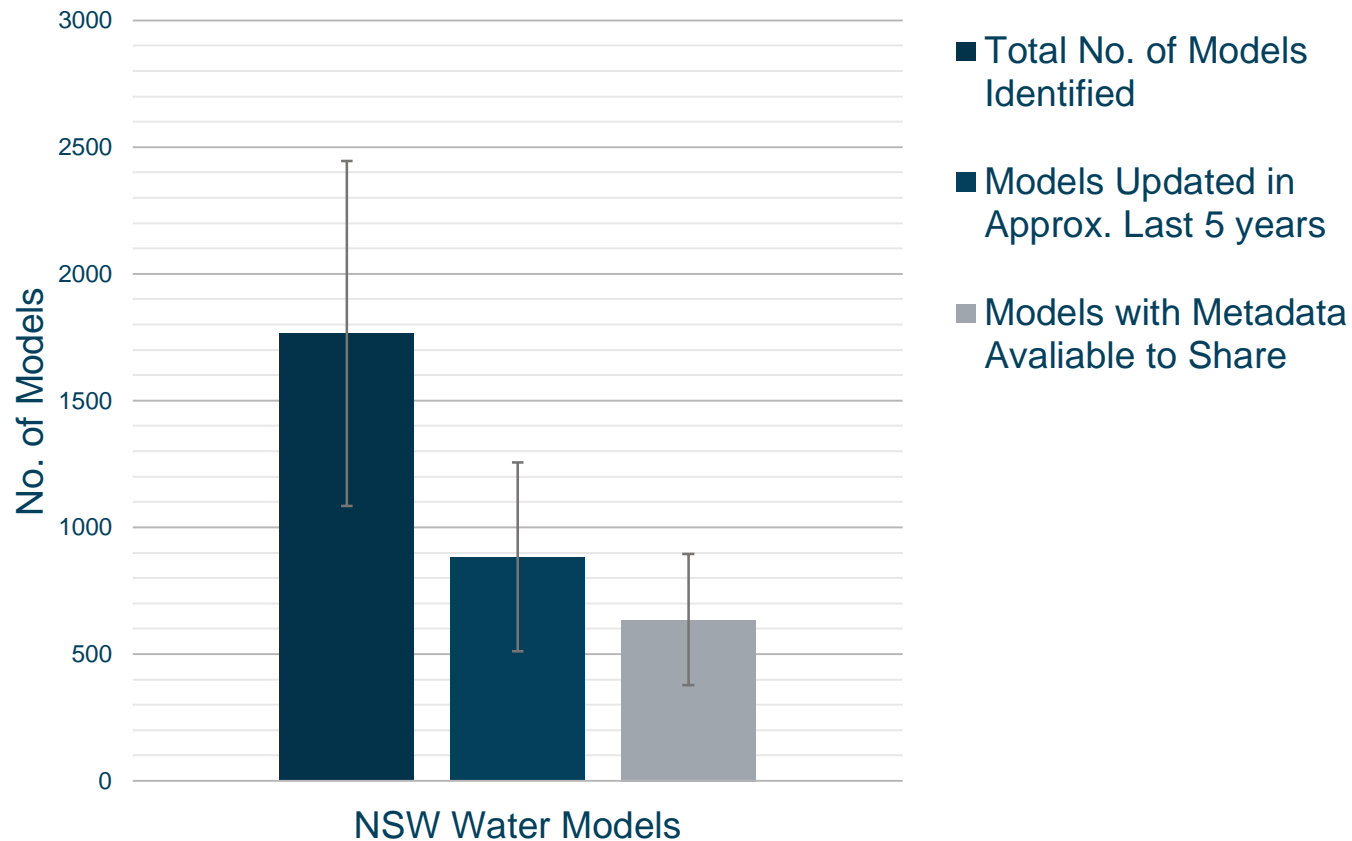
NUMBER OF WATER MODELS IDENTIFIED

Total number of water models identified:

~1700 (1080 – 2450)

- Approximately 50% updated in last 5 years.

- Approximately 36% with metadata available to share.

a) Percentage of Total Models Identified
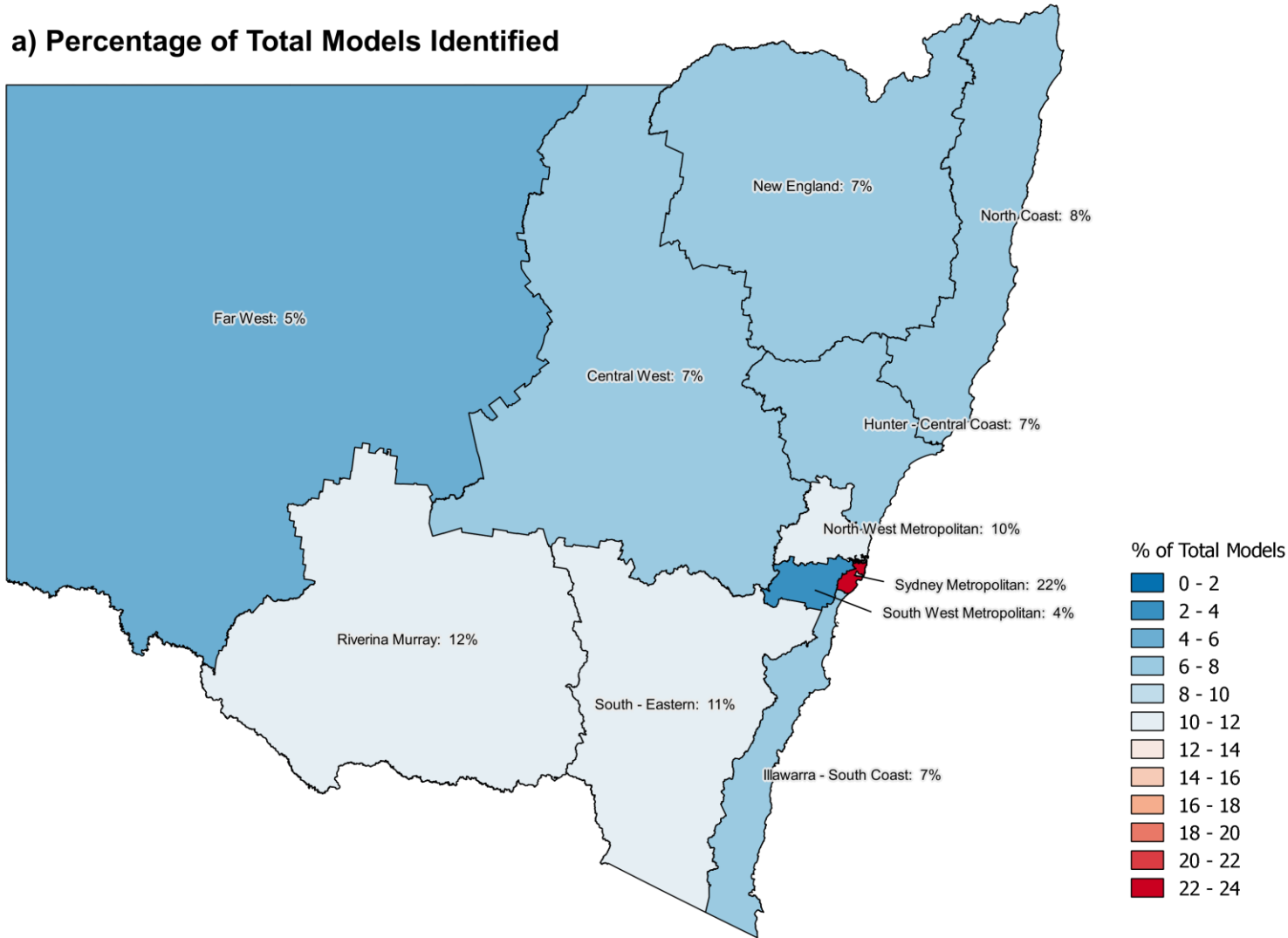
Regions where water modelling was undertaken by survey respondents:

Sydney Metropolitan: 22%
Riverina Murray: 12%
South-Eastern: 11%
North West Metropolitan: 10%
North Coast: 8%
Hunter – Central Coast: 7%
Illawarra – South Coast: 7%
Central West: 7%
New England: 7%
Far West: 5%
South West Metropolitan: 4%
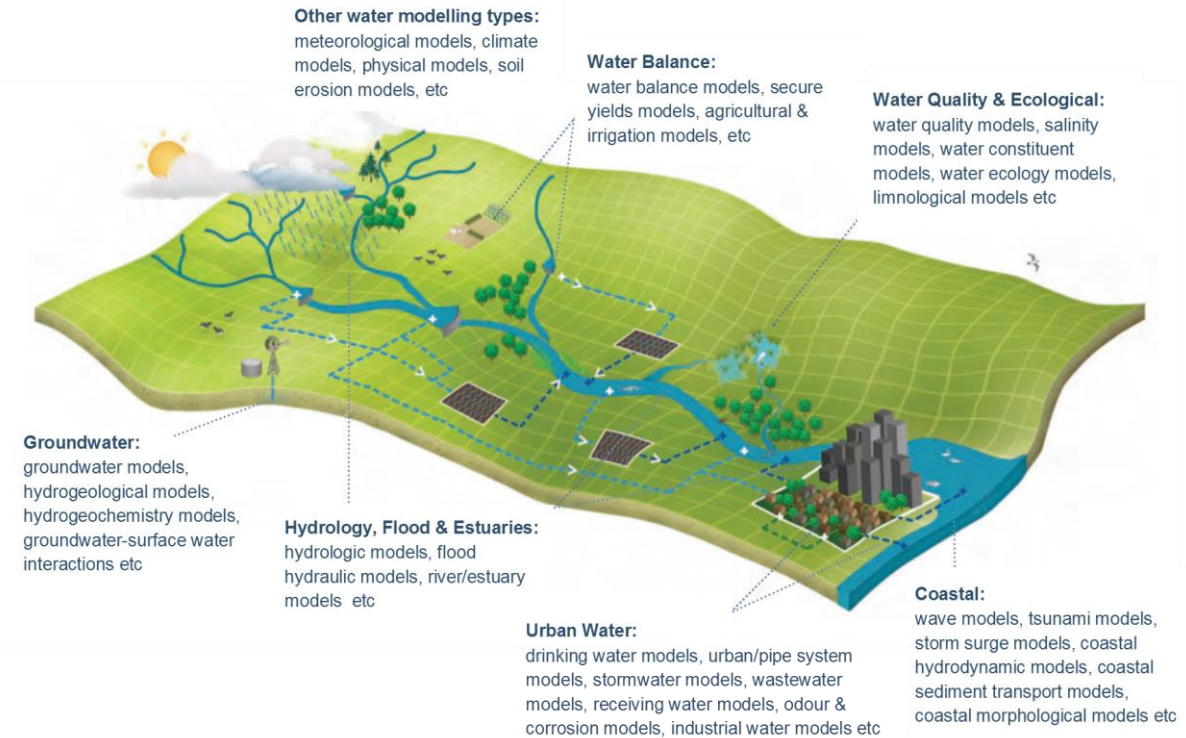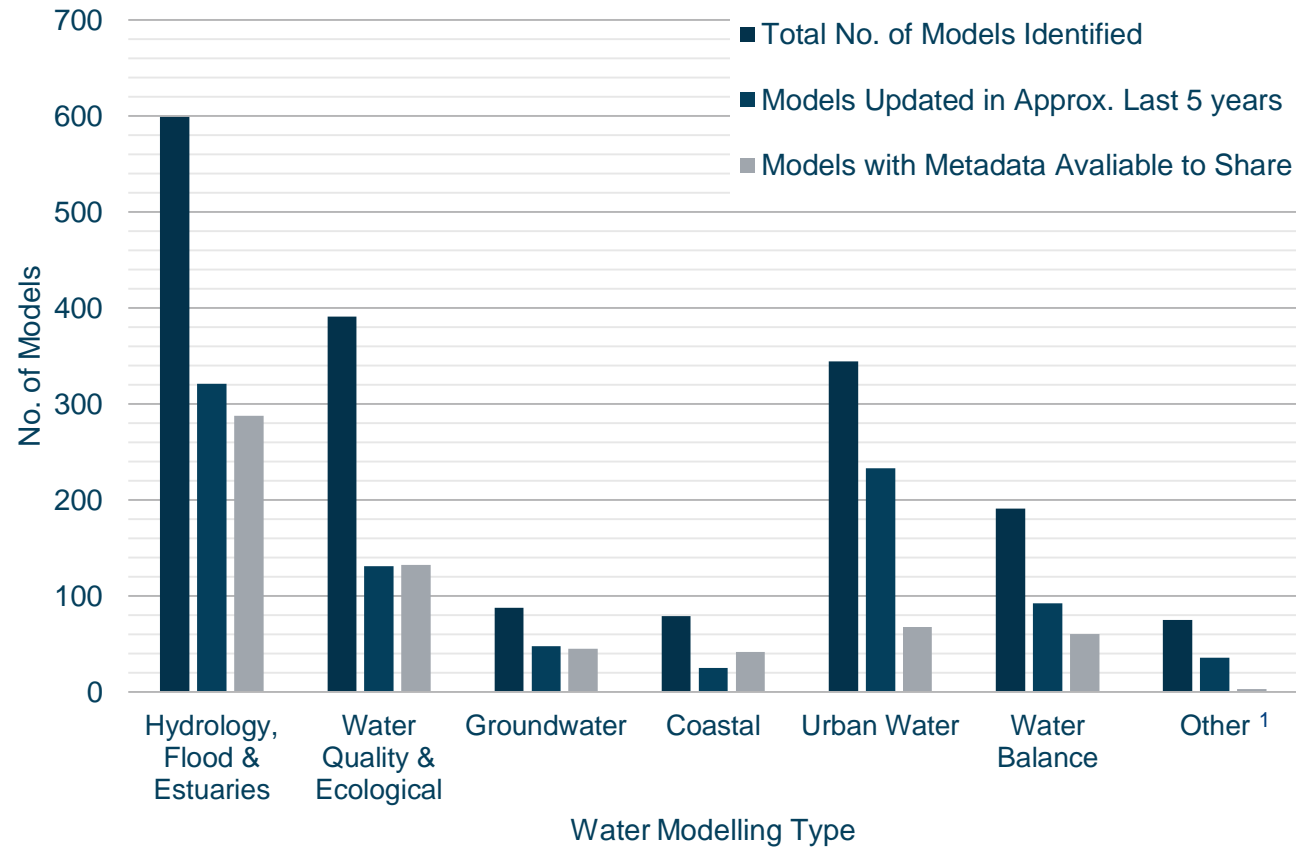
Various types of water modelling undertaken in NSW Government. Figure adapted from:
eWater, 2018. https://ewater.org.au/products/ewater-source/

[1] Although physical modelling is an important tool for water modelling it has not been included in the survey results.

Percentage Breakdown of Key Purposes of Water Modelling in NSW Government

- Stormwater Management
- Water Supply Systems
- Drinking Water
- Flood Risk Management
- Lakes and Estuaries…
- Receiving Water Management
- Basin Planning
- Reservoir Management
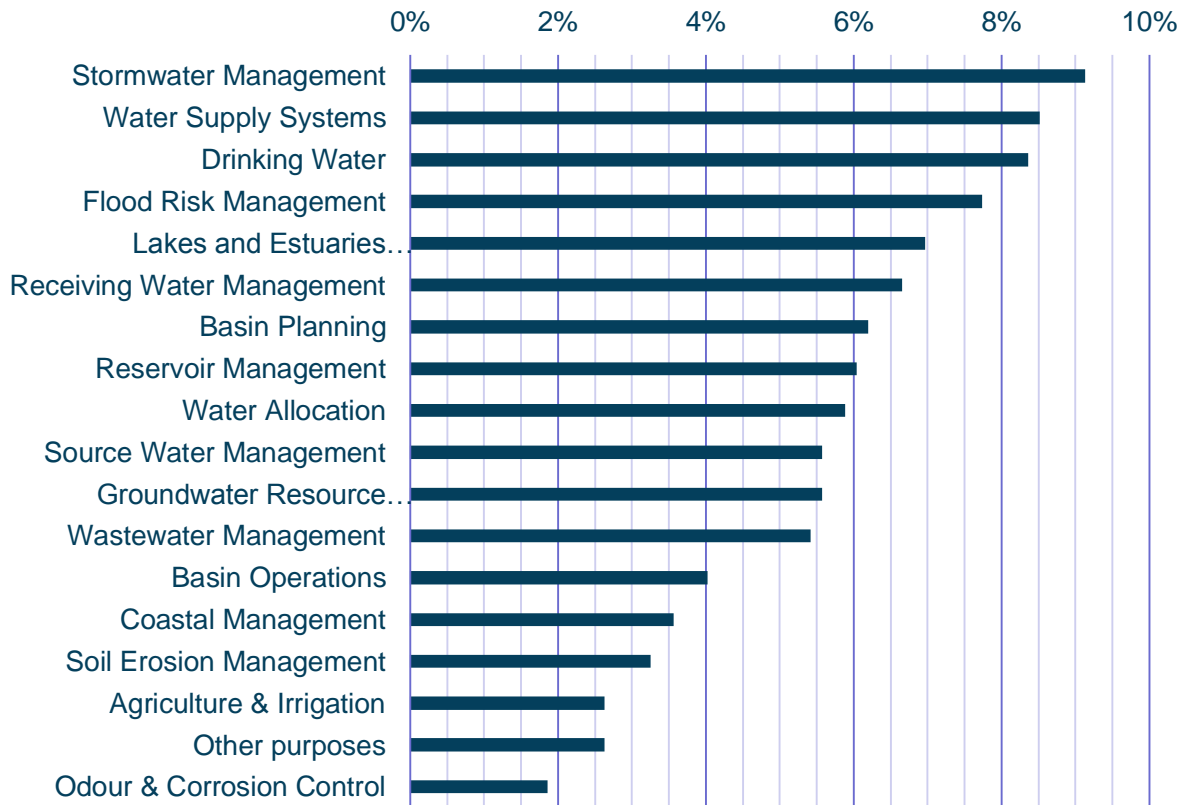- Water Allocation
- Source Water Management
- Groundwater Resource…
- Wastewater Management
- Basin Operations
- Coastal Management
- Soil Erosion Management
- Agriculture & Irrigation
- Other purposes
- Odour & Corrosion Control

The multi-faceted roles and purposes of water modelling in supporting decision-making in NSW Government.
Figure adapted from:
eWater, 2018. https://ewater.org.au/products/ewater-source/

COMMON PROGRAMS USED FOR WATER MODELLING

| Water Modelling Type	Key Programs
Hydrology, Flood and Estuary	TUFLOW, MIKE HYDRO, MIKE FLOOD, DRAINS, XPRAFTS, eWater Source, HEC-RAS, RMA2/10
Water Quality & Ecological	MUSIC, eWater Source, RMA11
Groundwater	MODFLOW, eWater Source, Bespoke Programs
Coastal	MIKE21, WW3, S-Beach, X-Beach, Bespoke Programs
Urban Water	TUFLOW, MIKE URBAN, DRAINS, MUSIC, XPSTORM, InfoWorks
Water Balance	eWater SOURCE, IQQM, WATHNET, Bespoke Programs

KEY CUSTODIANS OF WATER MODELS BY TYPE

| Water Modelling Type	Key Model Custodians
Hydrology, Flood & Estuaries	Local Government (Metropolitan & Regional), DoI Lands & Water, OEH, MHL, WaterNSW, Other State & Commonwealth Agencies
Water Quality & Ecological	Local Government (Metropolitan), MHL, Sydney Water, DoI Lands & Water,
Groundwater	DoI Lands & Water, Local Government (Regional)
Coastal	Local Government (Metropolitan), OEH, MHL
Urban Water	Sydney Water, OEH, Water Utilities, Local Government (Metropolitan)
Water Balance	DoI Lands & Water, WaterNSW
Other	OEH (Climate Modelling)

WATER MODELLING CAPABILITIES AND EXPERIENCE - OVERALL CAPABILITY RATING BY TYPE

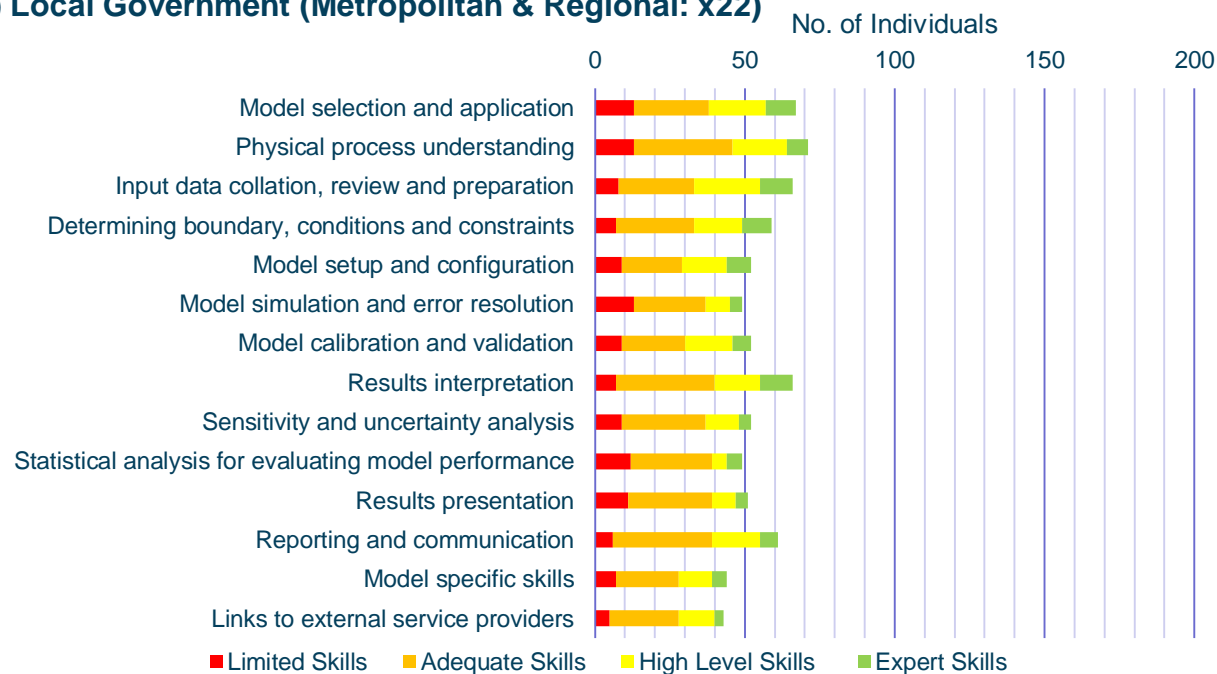a) Local Government (Metropolitan & Regional x24)
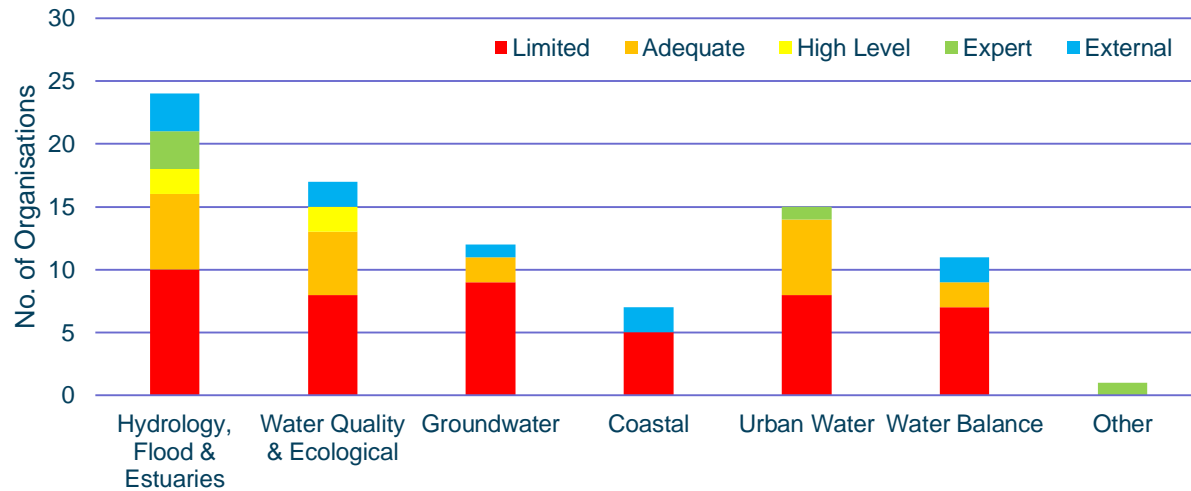
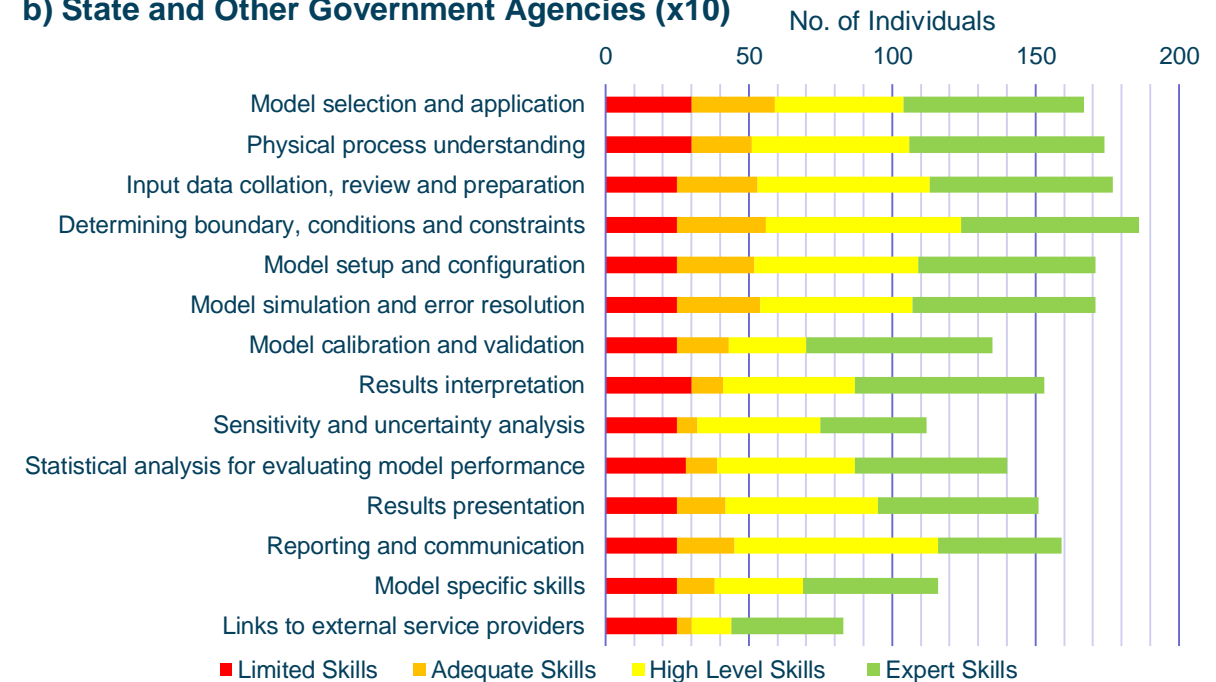b) State Government & Other Agencies (x13)
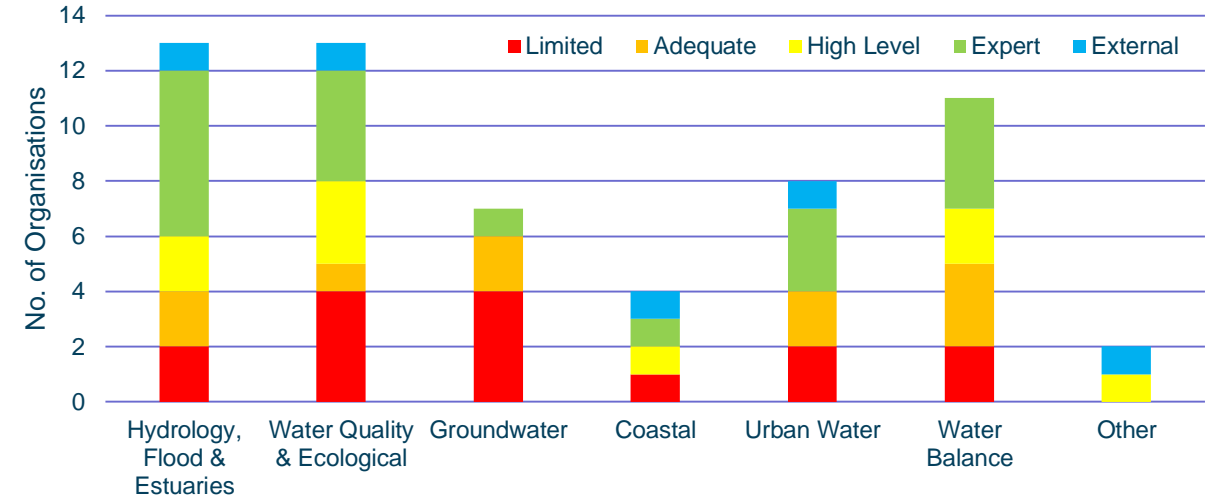
WATER MODELLING CAPABILITIES AND EXPERIENCE - SKILLS BREAKDOWN

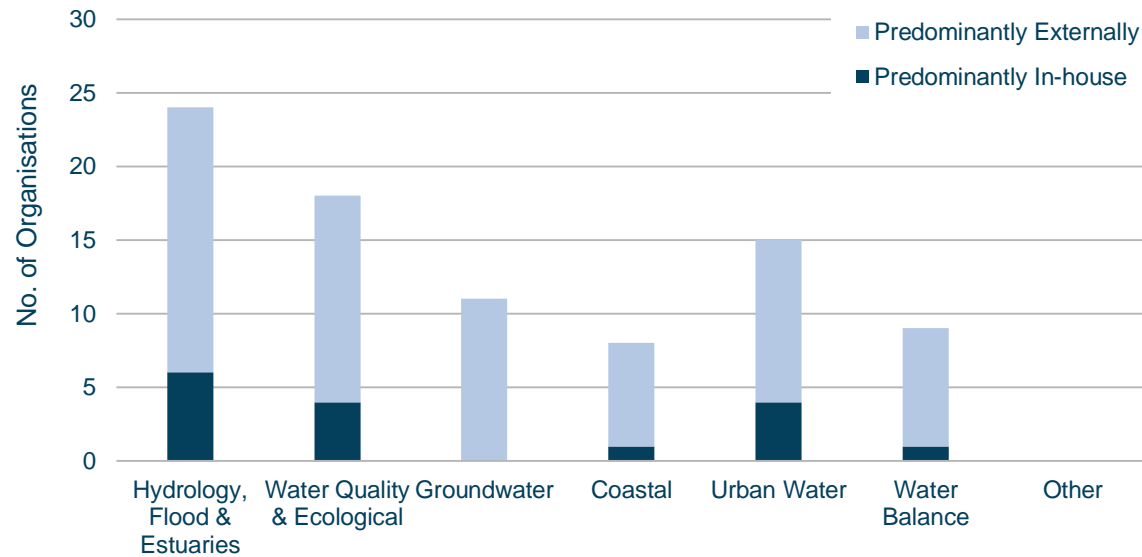a) Local Government (Metropolitan & Regional: x22)

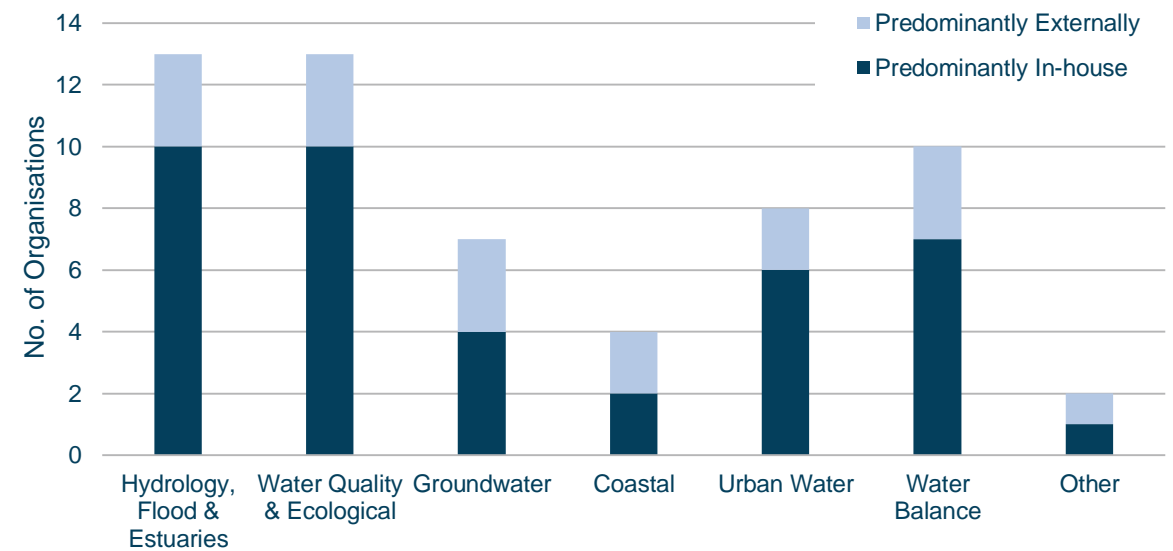b) State and Other Government Agencies (x10)

WATER MODELLING CAPABILITIES AND EXPERIENCE - EXTERNAL VS IN-HOUSE

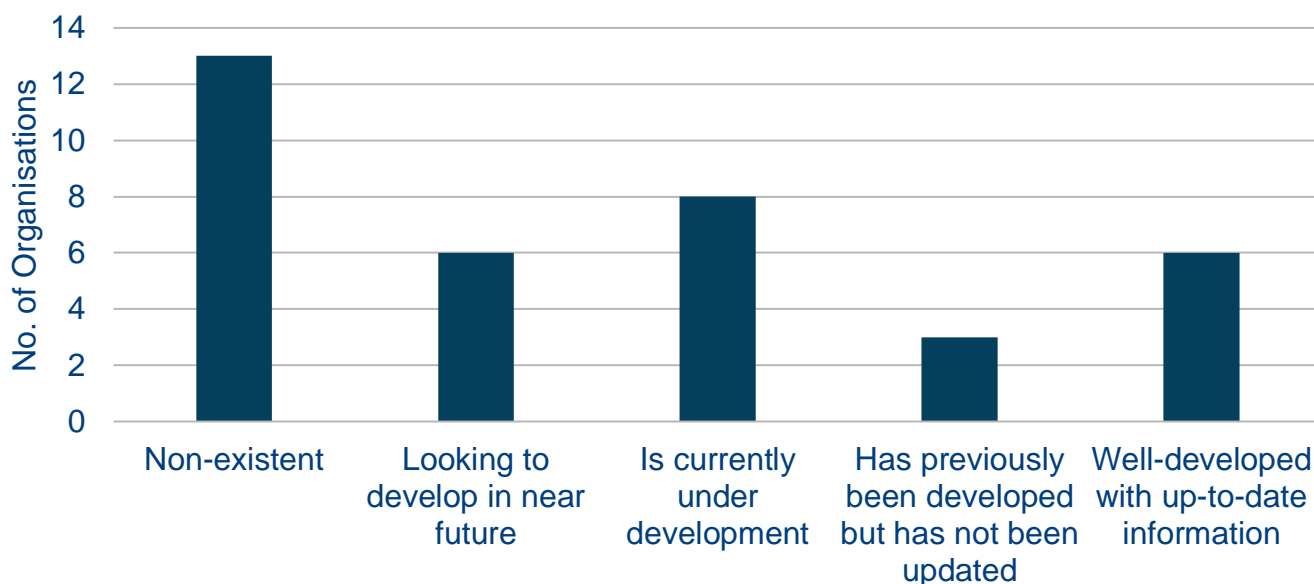**a) Local Government (Metropolitan & Regional: x24)**

b) State and Other Government Agencies (x12)

MANAGEMENT OF WATER MODELLING METADATA

Current status of management system for documenting water modelling metadata

Chart — No. of Organisations vs. status:
- Non-existent: 13
- Looking to develop in near future: 6
- Is currently under development: 8
- Has previously been developed but has not been updated: 3
- Well-developed with up-to-date information: 6

73% of respondents noted having management systems for water modelling metadata that are not yet fully developed, not up-to-date or non-existent.

Suggestions to better update and manage water modelling metadata:

- Provision of a federated inventory and common standards across agencies

- GIS integration

- Automated linking of model components (inputs, outputs, configuration and software version)

- Shared web-portal design

- Qualified/experienced staffing and resources to manage metadata

Are you aware of NSW Government collaborative tools for metadata sharing?

No. of Respondents (Yes: ~17, No: ~21)

Do you see a benefit with using these NSW Government collaborative tools?

79% of respondents

No. of Respondents (Yes: ~30, No: ~8)
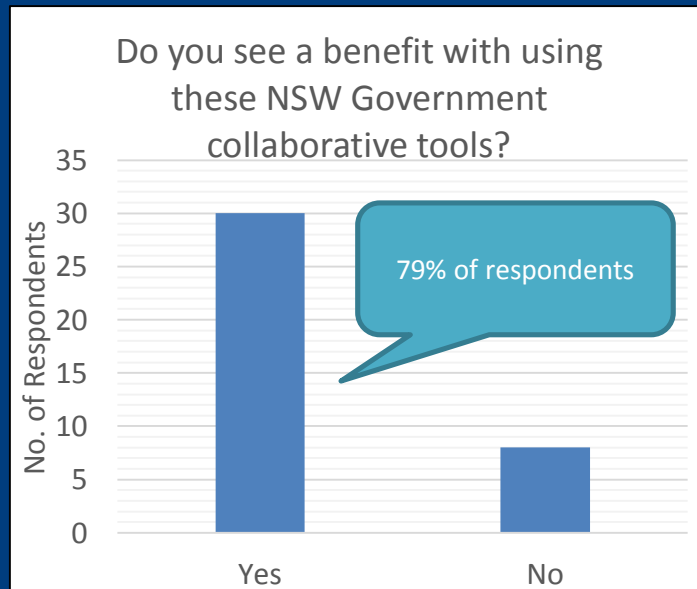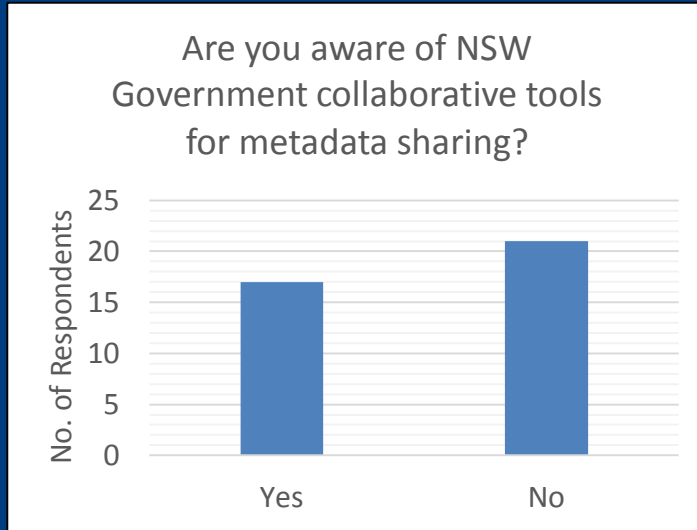
Top ranked obstacles to use of collaborative tools:
- Lack of Resourcing
- Lack of Funding

Other barriers to sharing water modelling metadata
- Management systems for water modelling metadata not yet fully developed, not up-to-date or non-existent.
- 33% of respondents raised concerns over sensitivities to sharing metadata related to licensing, IP protections, metadata quality & confidentiality.
- The findings also highlight the need for leadership in overcoming obstacles and facilitating collaboration and sharing.

Findings noted additional complexities to the sharing of water models themselves.

IT INFRASTRUCTURE TO SUPPORT WATER MODELLING

Satisfaction with current IT infrastructure to support water modelling requirements
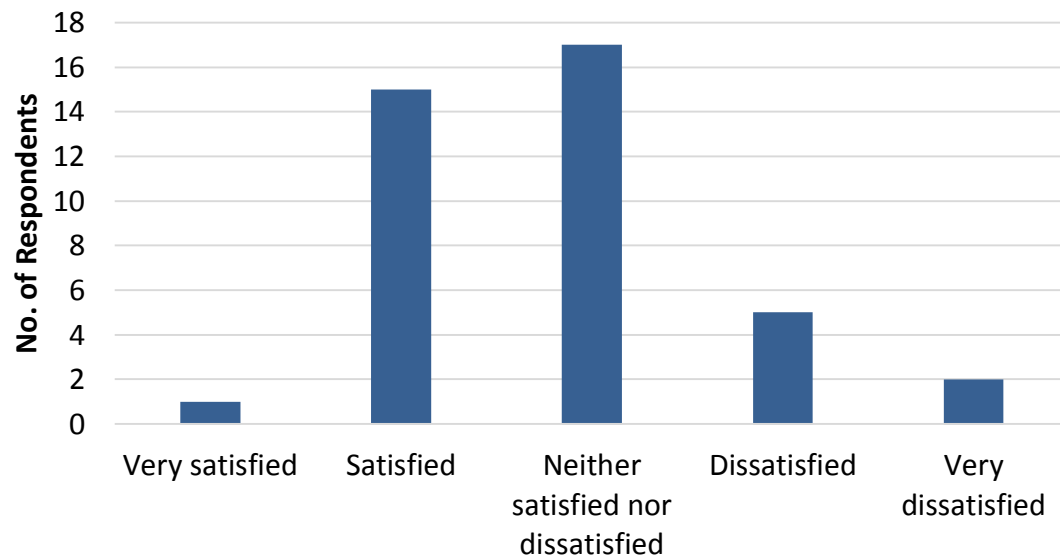
Suggestions to further improve IT infrastructure to better support water modelling requirements:

- Provision of shared high-speed computers dedicated to modelling purposes across government

- Provision of cloud computing and storage infrastructure dedicated to modelling purposes

- Modelling platform integration of water models and supporting datasets

- Sharing arrangements for modelling IT resources across government agencies

- Additional staffing resources to develop and maintain IT infrastructure support water modelling

MaMH's strategic conclusions from the survey results:

Water model assets are numerous, widespread and support a wide range of decision making purposes in NSW Government. There are opportunities for improved collaboration and management of water modelling resources across Government.

Water modelling expertise varies across NSW Government. Collaboration efforts should address indifferences between Local and State Government expertise.

There are obstacles and complexities involved in sharing water modelling metadata that would benefit from case studies piloting a sharing framework.

There is a close dependency between water modelling and monitoring with opportunities to better inform water management decision making.

The MaMH's 2019/20 recommendations include:

Develop water modelling and monitoring metadata guidelines and tools to enable a consistent approach for sharing information.

Case studies to pilot data sharing through Data.NSW, and a framework that facilitates the management and sharing of water model metadata.

Develop business cases to enable water information collaboration to quantify resources, costs and potential benefits.