



LWCB  
Lake of the Woods  
Control Board

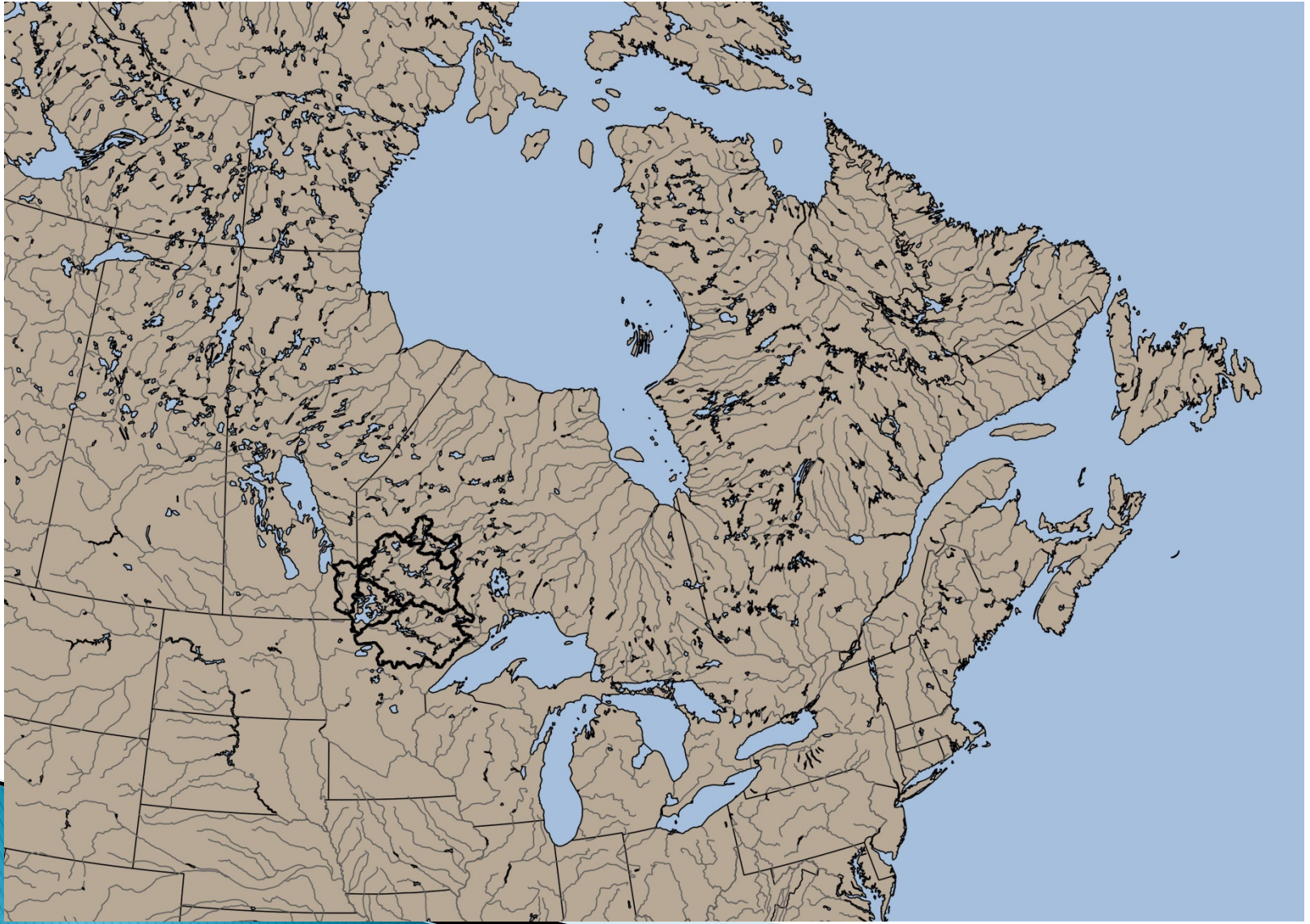
June 8, 2016  
HEPEX, Quebec City

James Bomhof  
jbomhof@lwcb.ca

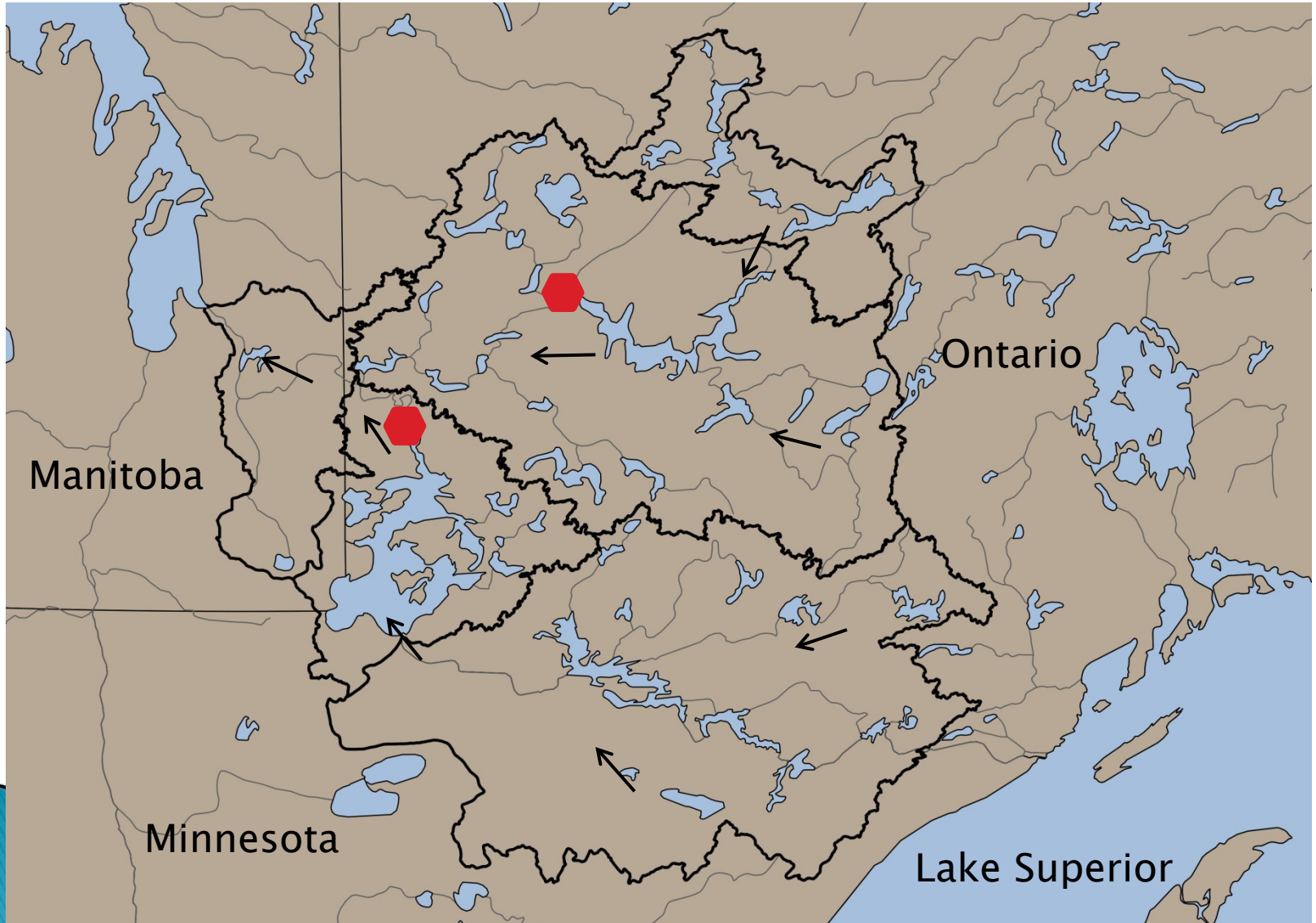


# Operational Flow Forecasting in the Winnipeg River Basin

# The Basin



# The Basin



# Lake of the Woods Control Board

- ▶ LWCB formed by Order-in-Council in 1919 upon requirement of 1925 Canada-USA treaty
- ▶ LWCB has jurisdiction to regulate all managed flows in Winnipeg River system in Ontario except those bordering USA



# Regulation

- ▶ Seasonal (4 month) regulation strategy created with community input and based on historical inflows

## First Nations

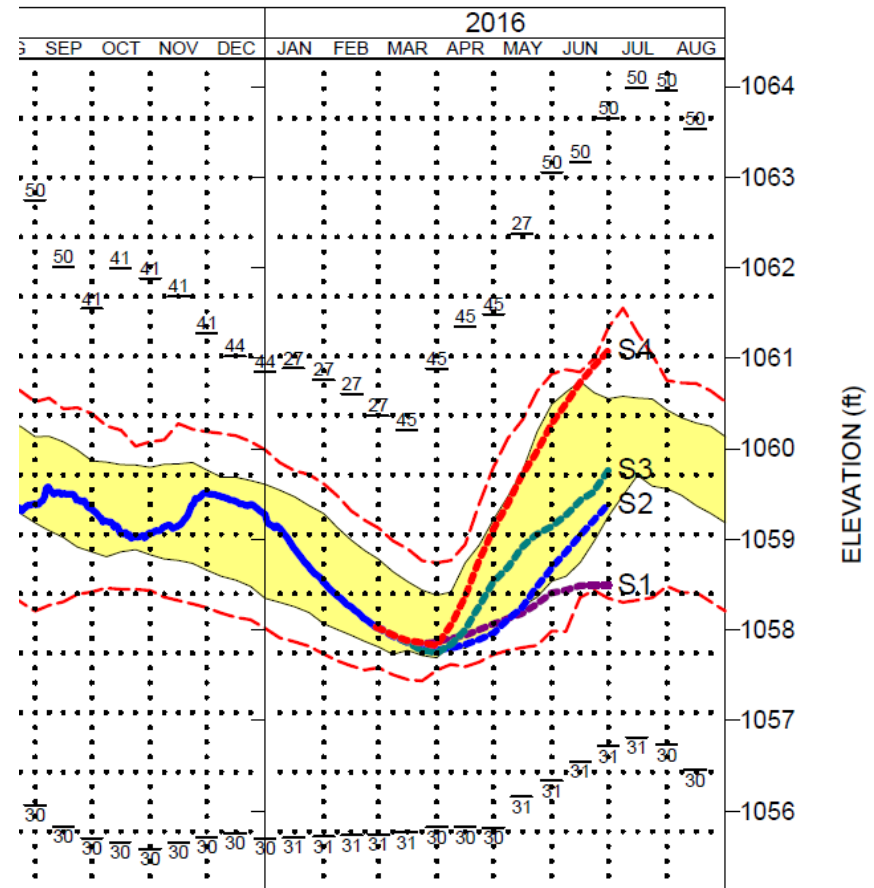
- Grand Treaty Council #3
- Grassy Narrows
- Mishkeegogamang

## Resource Agencies

- Soil and Water Conservation District
- OMNR

## Utilities

- City of Winnipeg (Drinking Water)
- H2O Power
- Manitoba Hydro
- Ontario Power Generation

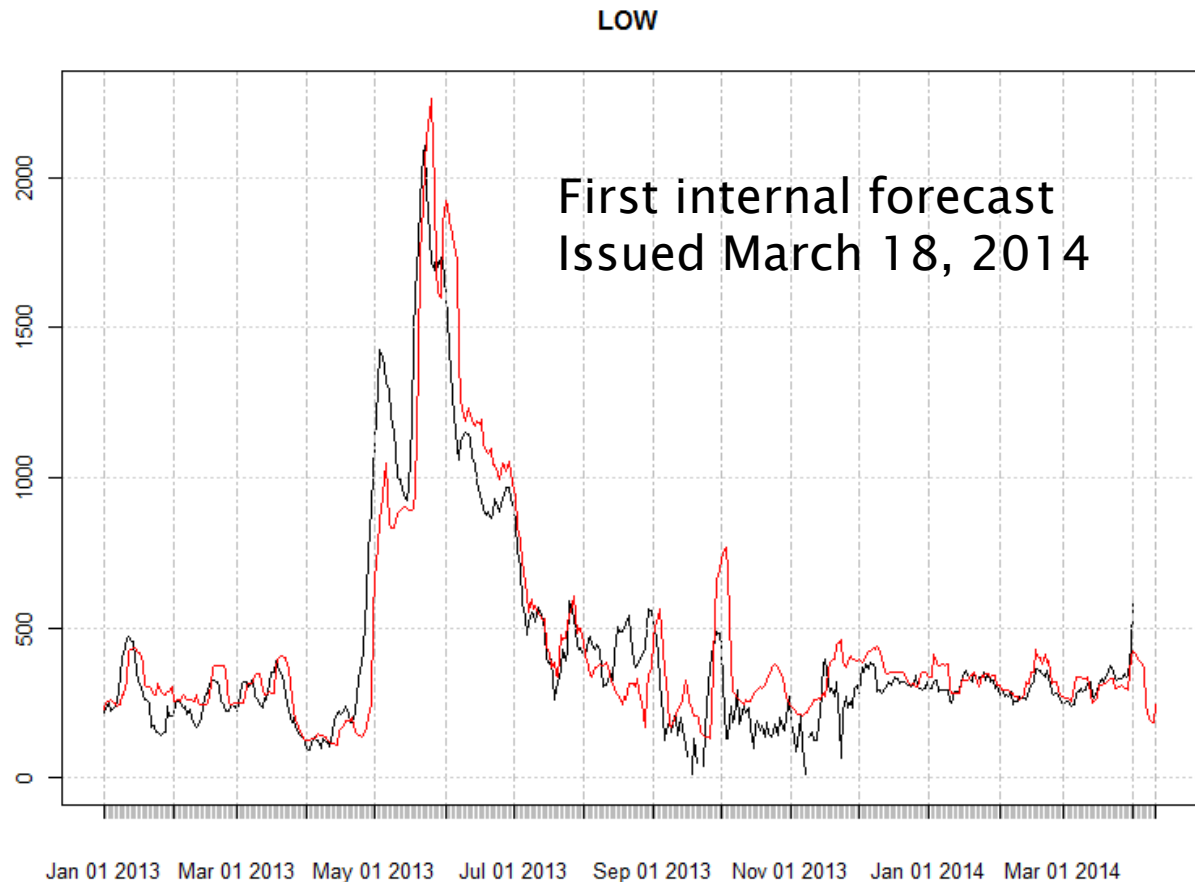
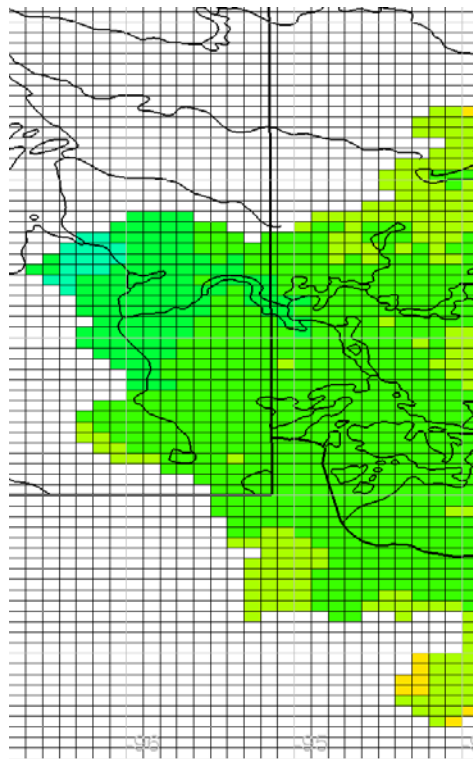


## Tourism/Recreation

- Ear Falls – Perrault Falls Outfitters Association
- North Western Ontario Tourism Association
- Pakwash Camp Owners Association
- Sioux Lookout Hudson Tourism Association
- Whiteshell Cottagers Association
- Lac Seul Advisory Committee
- LOW District Property Owners Association

# Regulation

## Need for medium-range hydrological forecasting



# Regulation

## Need for medium-range hydrological forecasting



### VIDEO | Rainy River water levels hit record high

Control board opens all dams on Lake of the Woods as communities deal with high water

CBC News | Posted: Jun 17, 2014 11:34 AM ET | Last Updated: Jun 18, 2014 6:41 AM ET



<http://www.mprnews.org/story/2014/06/23/flood-update-stillwater-bridge-closing-insurance-help>

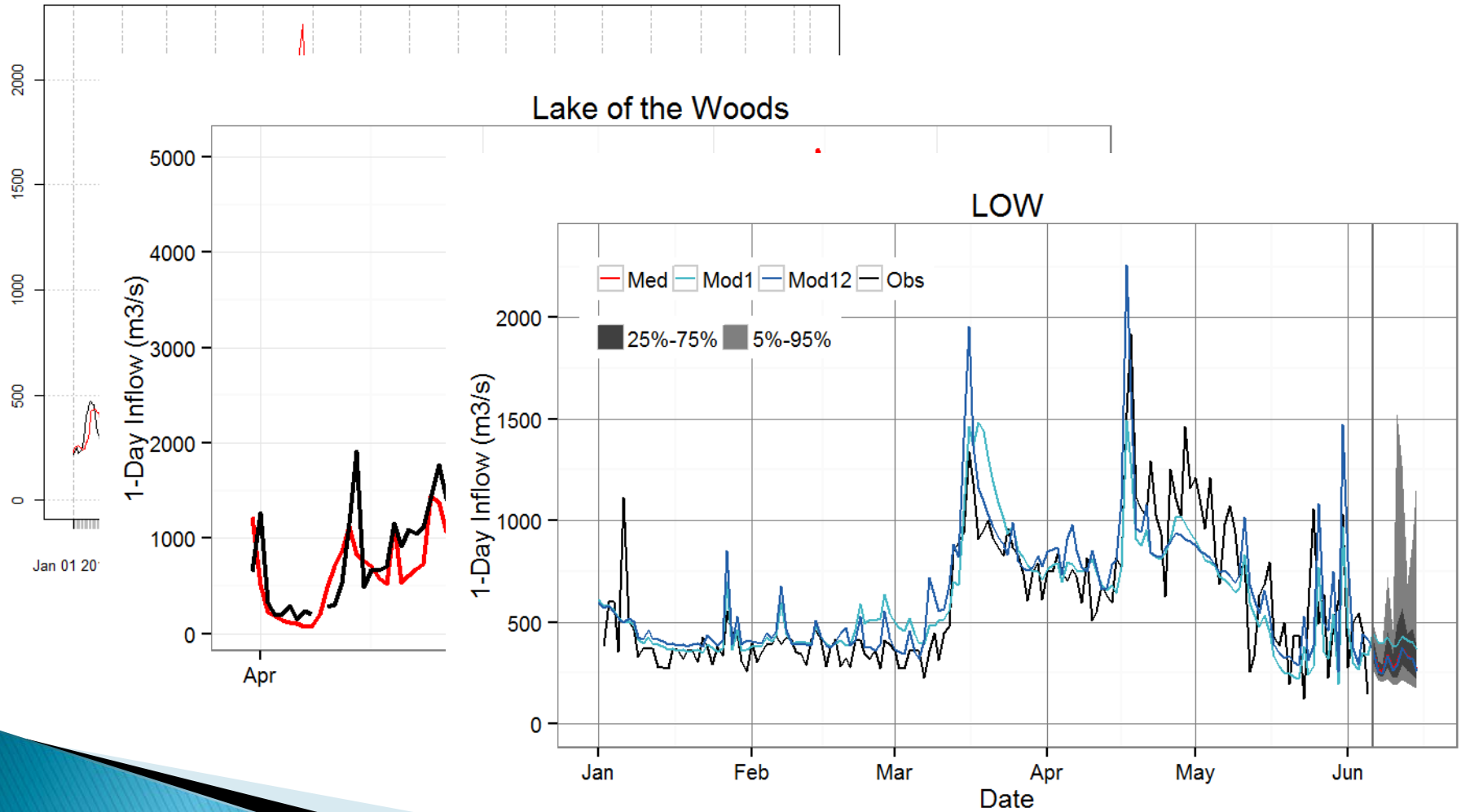
NEWS LOCAL

### Lake of the Woods Control Board alerts shorefront property owners to rising water levels

Miner and News  
Monday, June 2, 2014 11:20:04 EDT PM

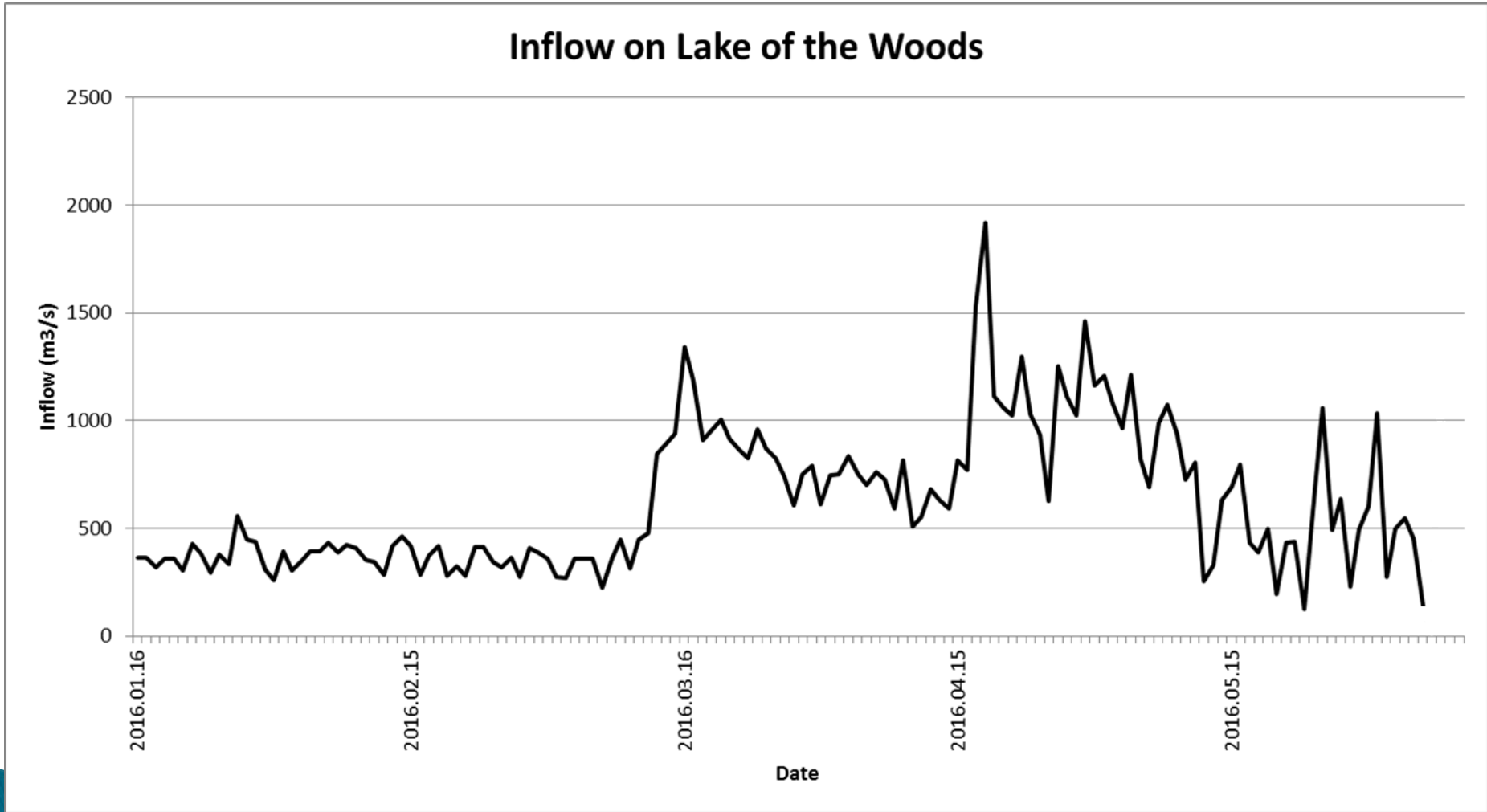
# Forecasting Evolution

LOW





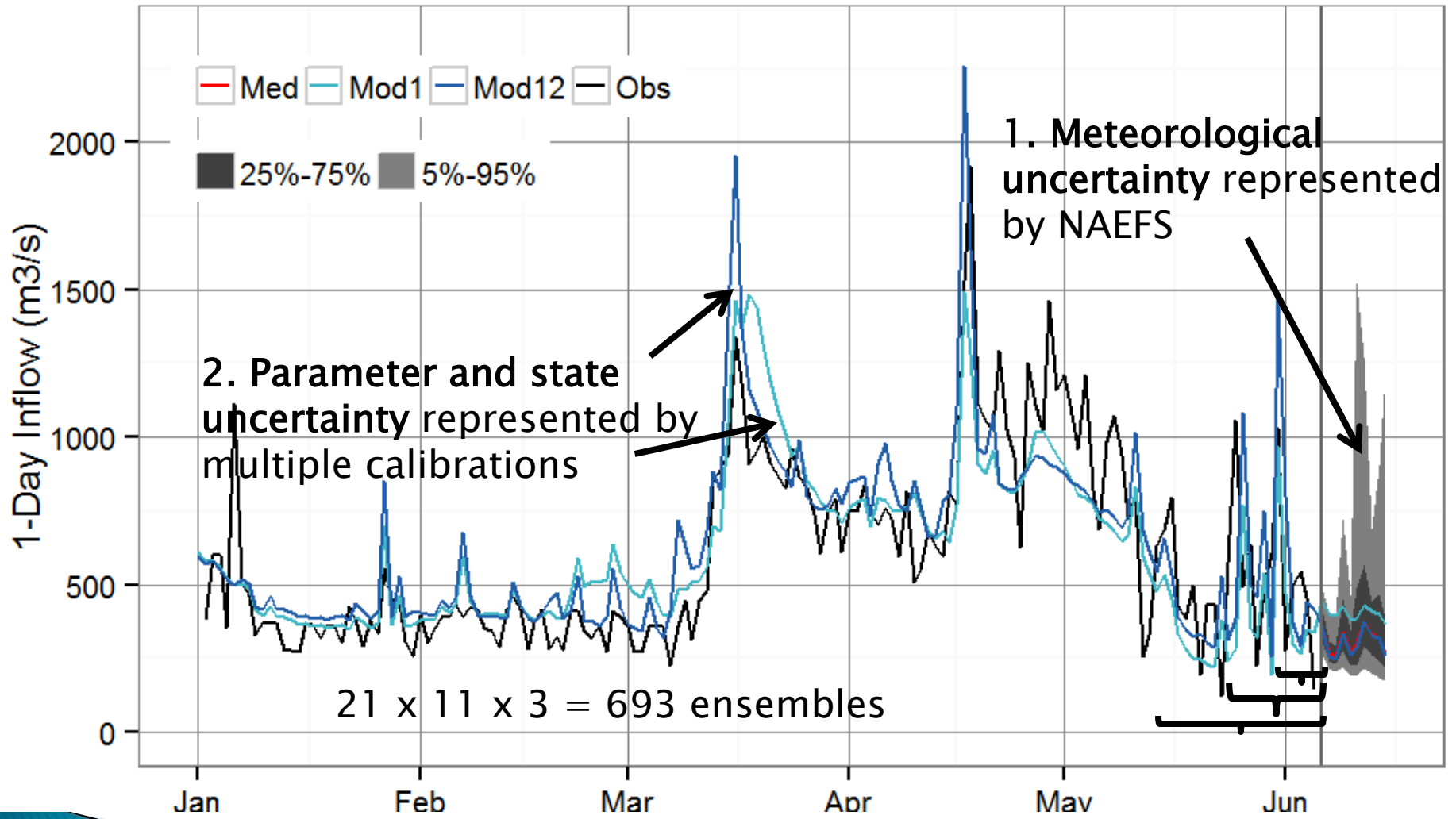
# Wind Setup



Printed: 2016.06.07 20:44:18

# Capturing Uncertainty

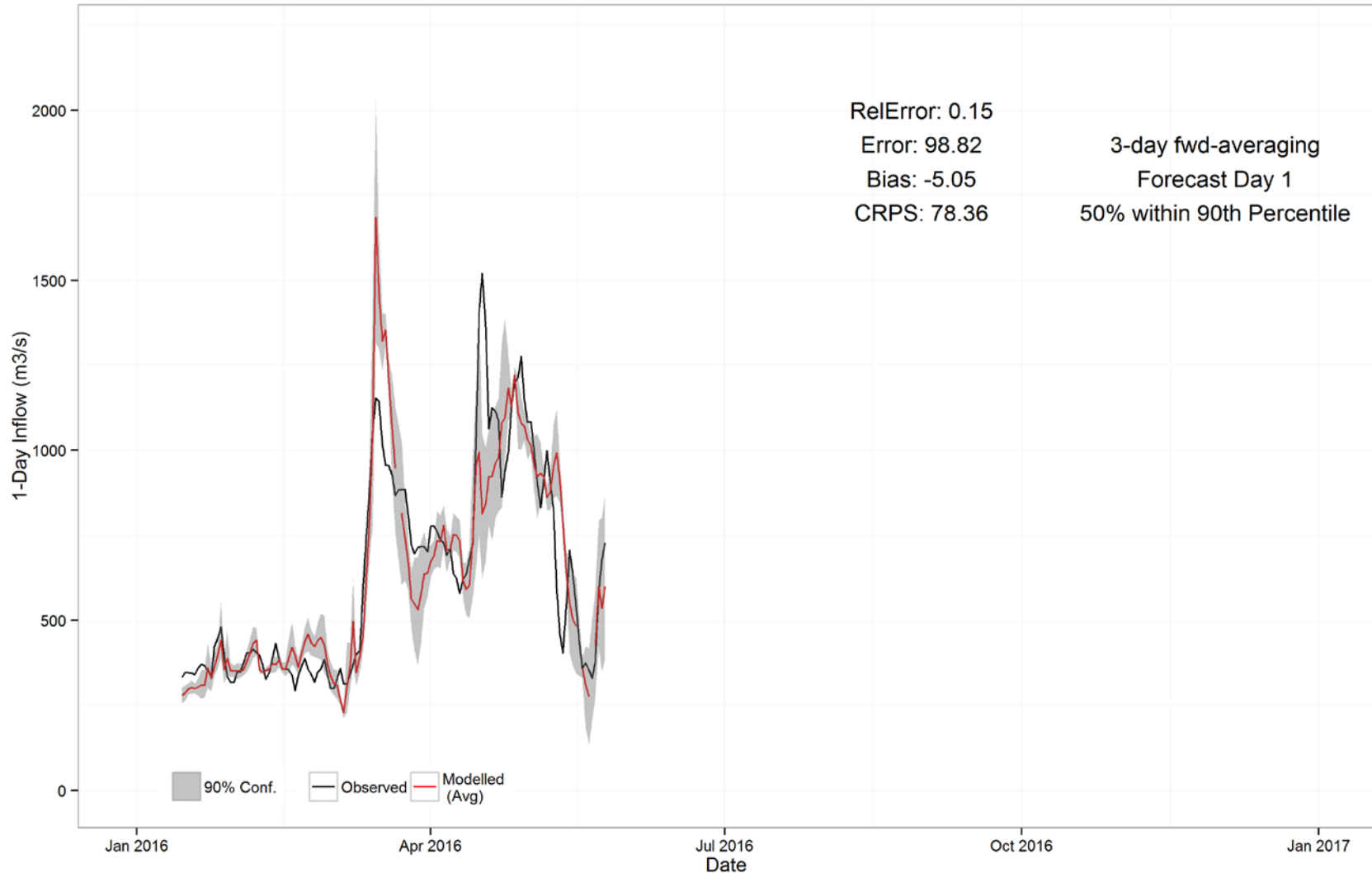
LOW



3. Observation uncertainty represented by a multi-window bias correction

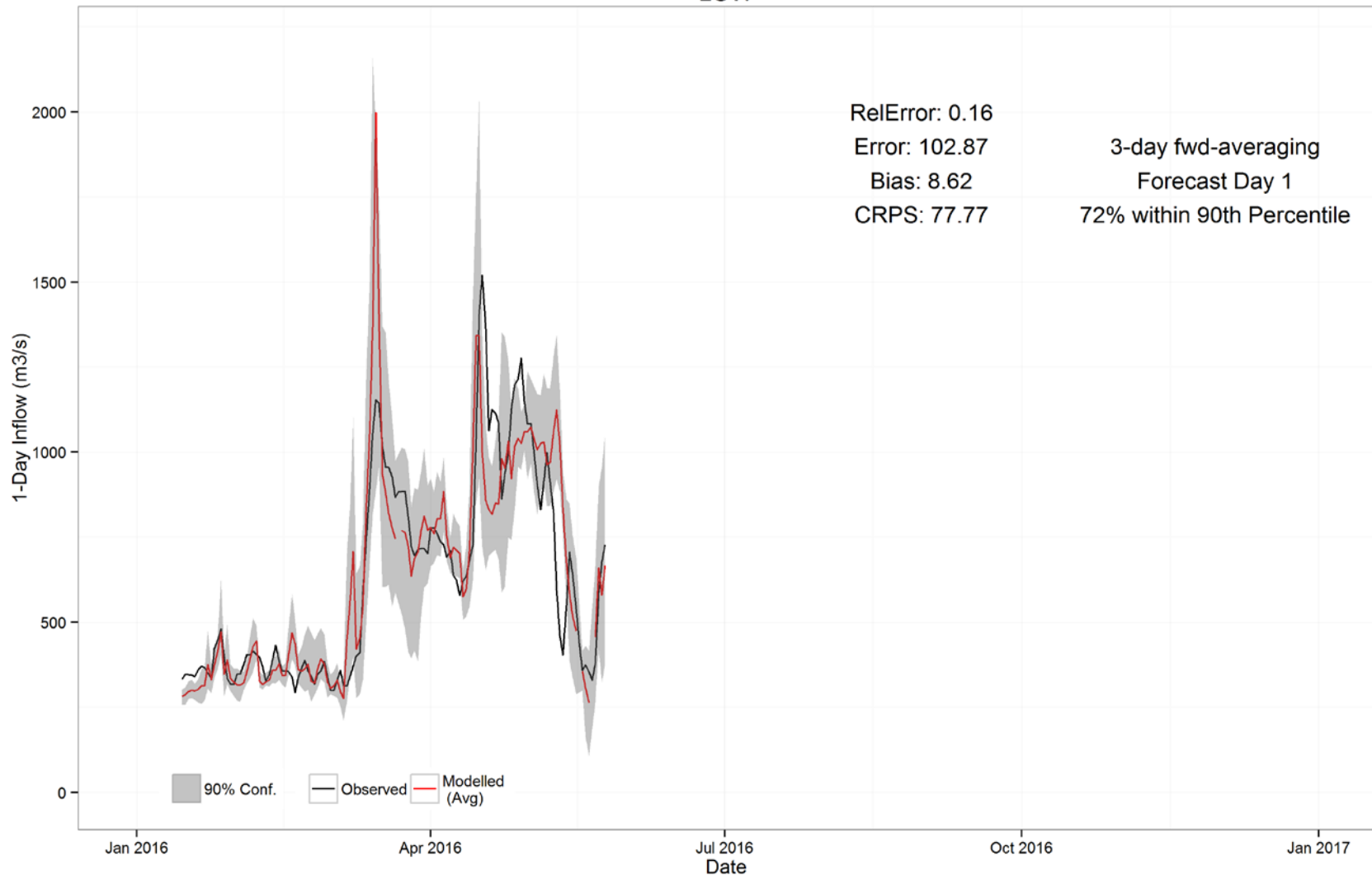
# 2016 Analysis (Single Model, Day1-3)

LOW



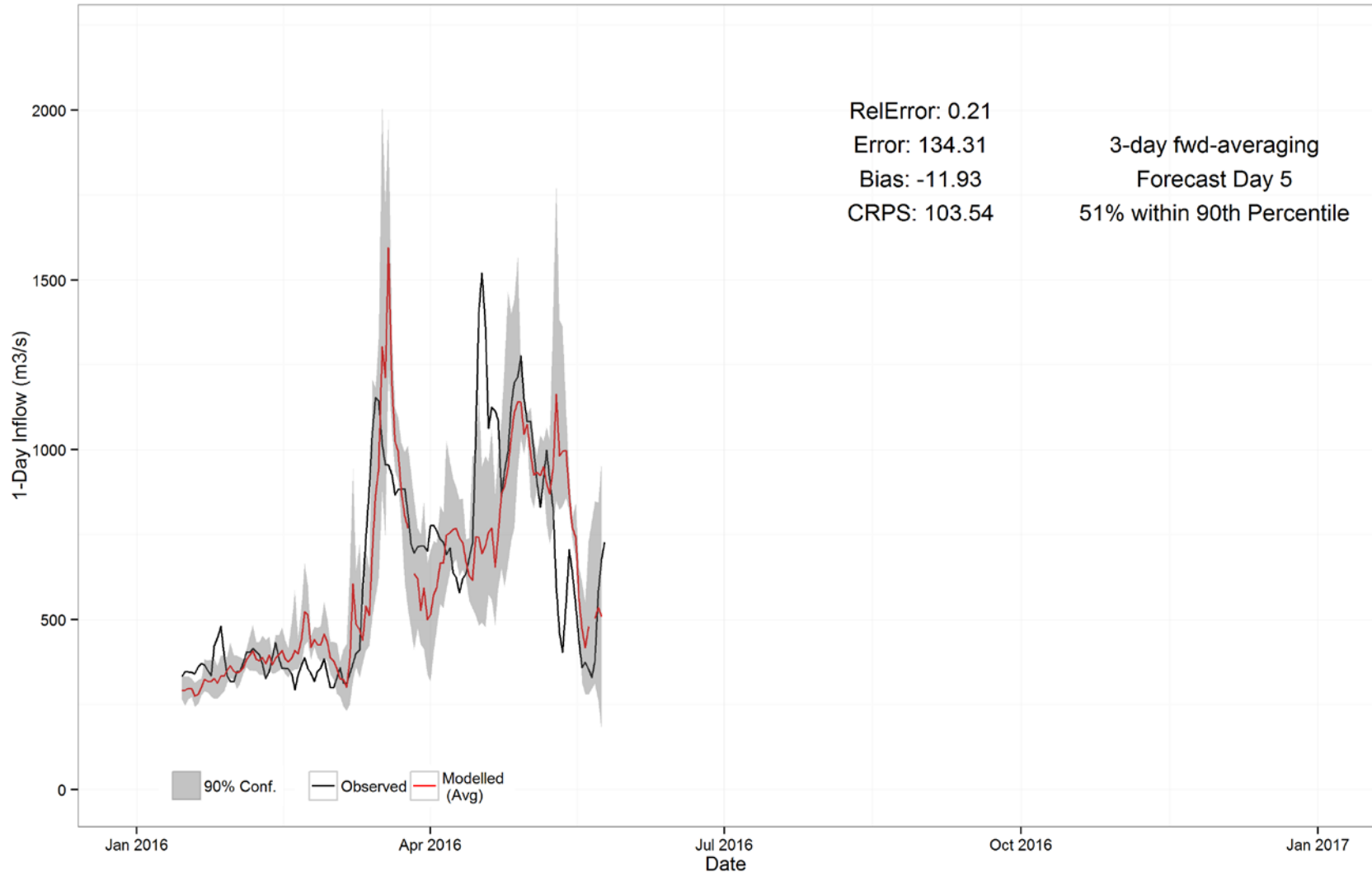
# 2016 Analysis (multi-calibration, Day 1-3)

LOW



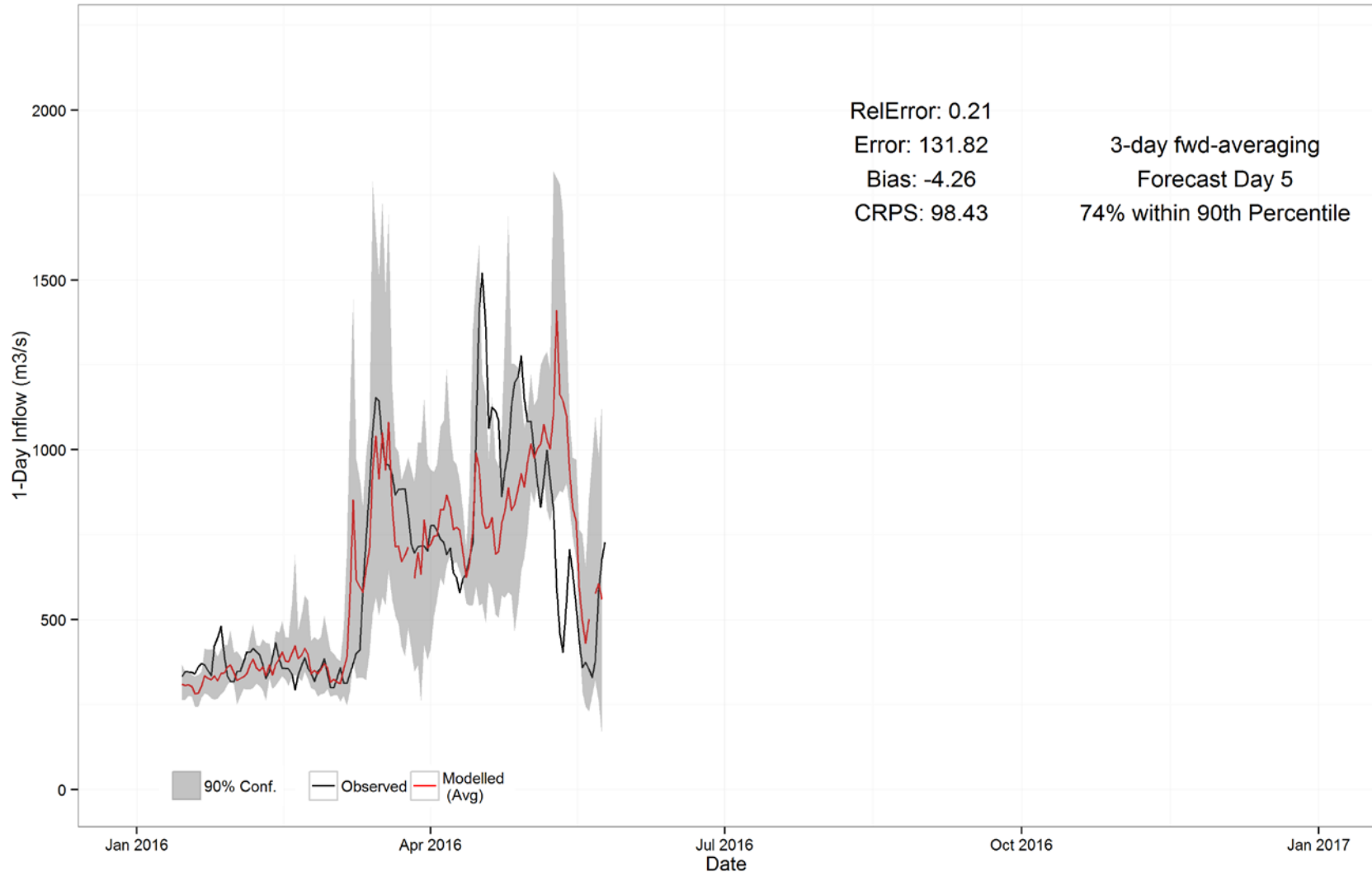
# 2016 Analysis (Single Model, Day 5-7)

LOW

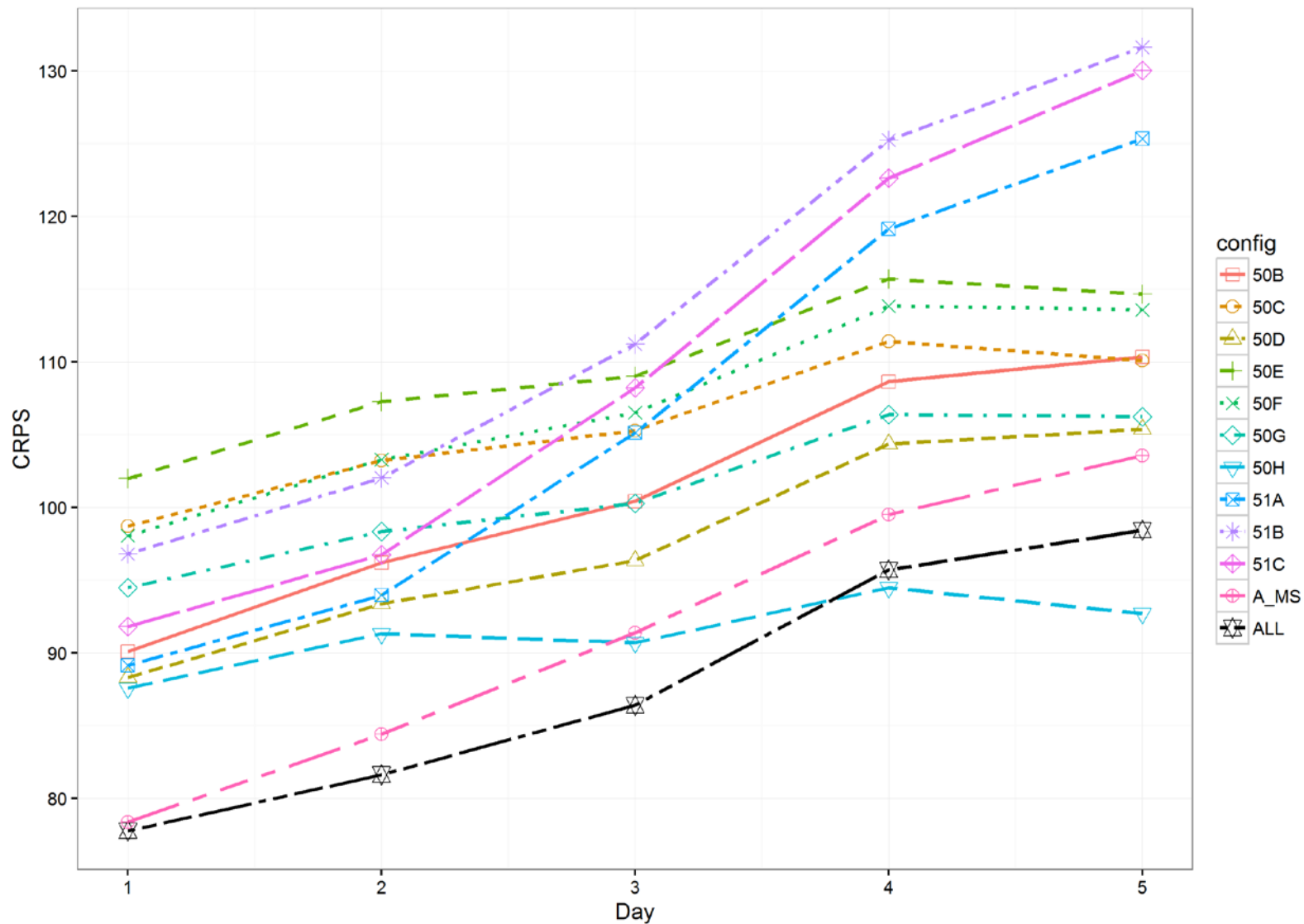


# 2016 Analysis (multi-calibration, Day 5-7)

LOW

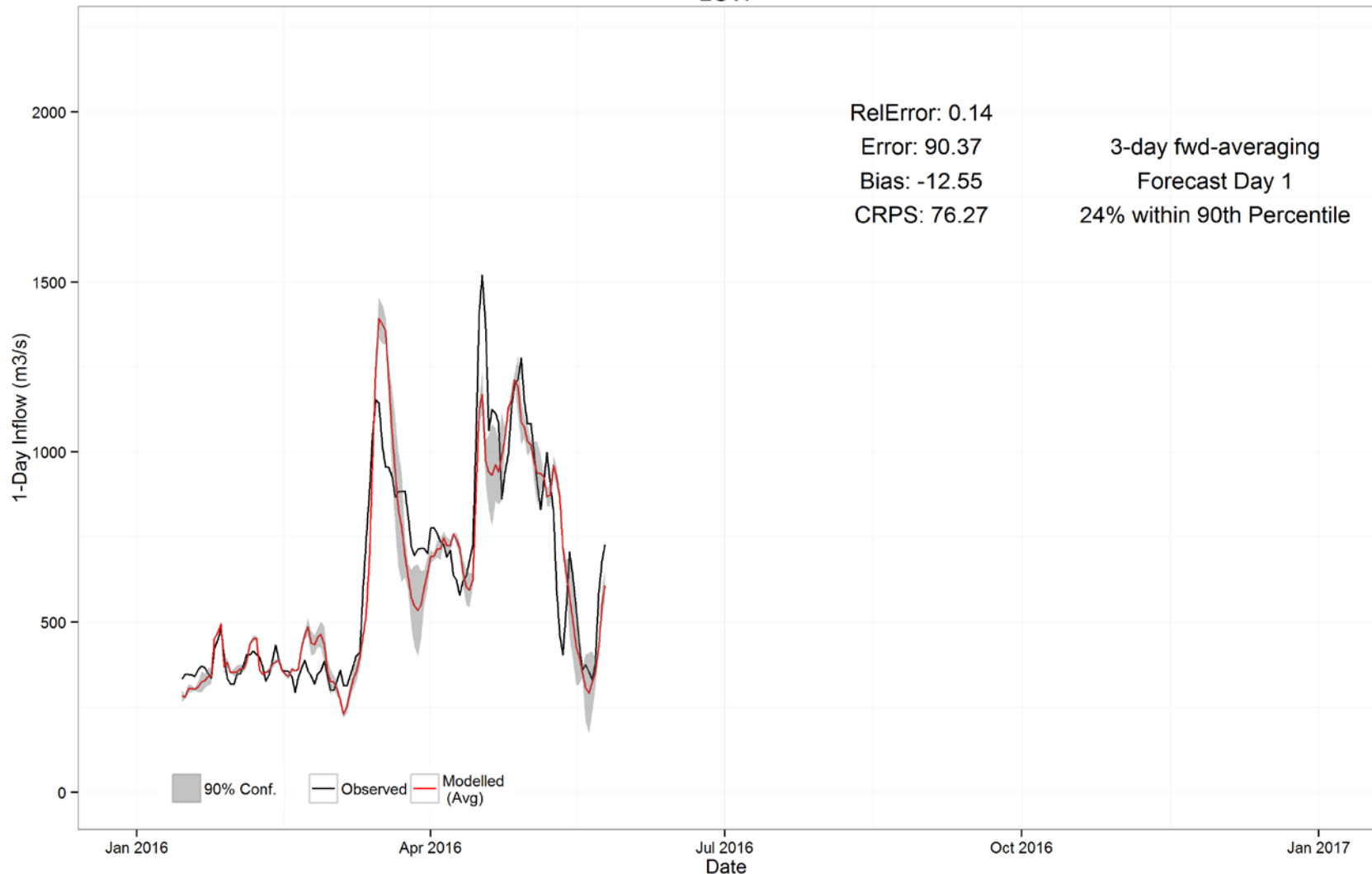


# 2016 Analysis



# 2016 Analysis – Perfect Met Forecast (Single Model, Day1–3)

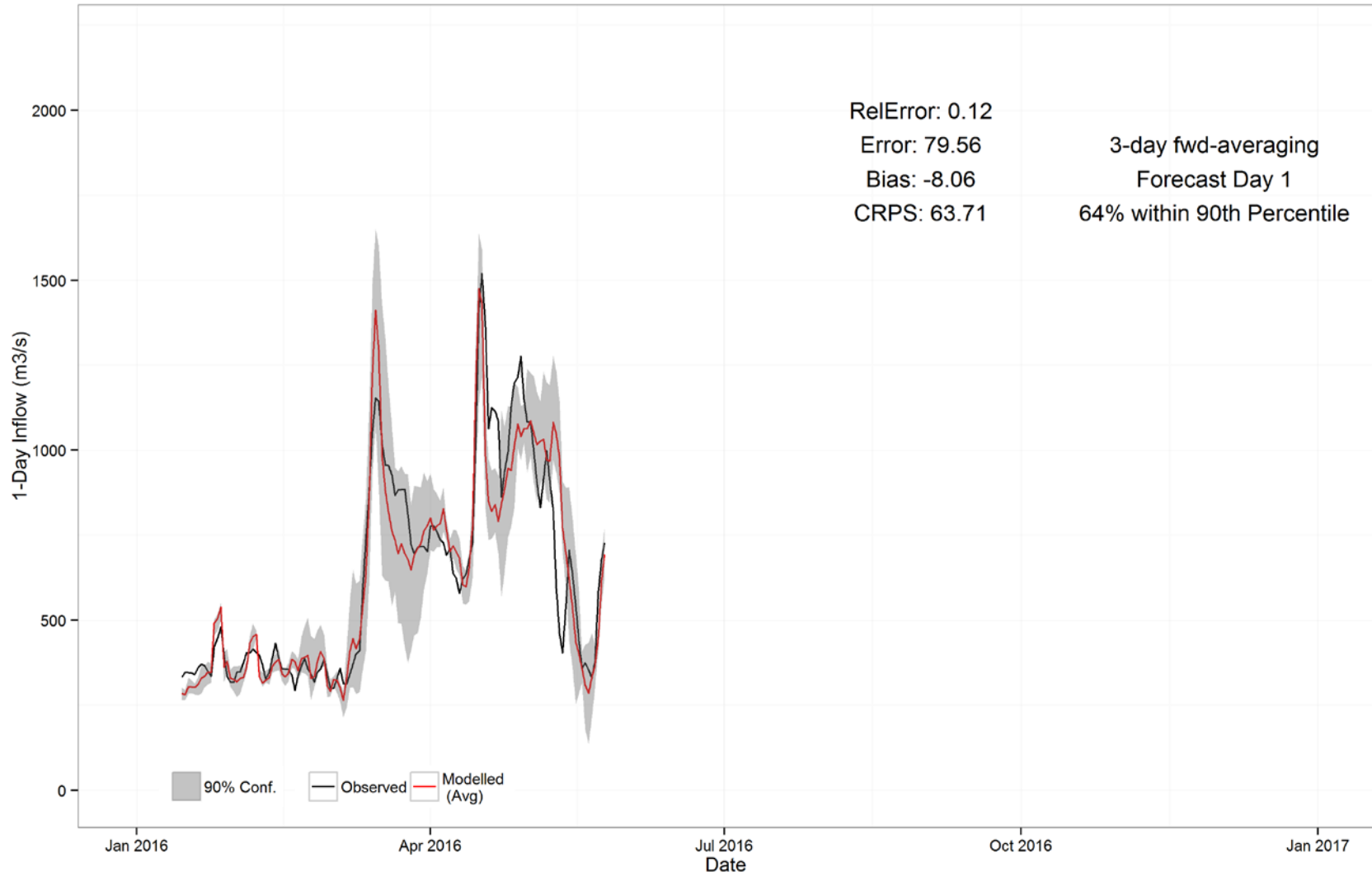
LOW



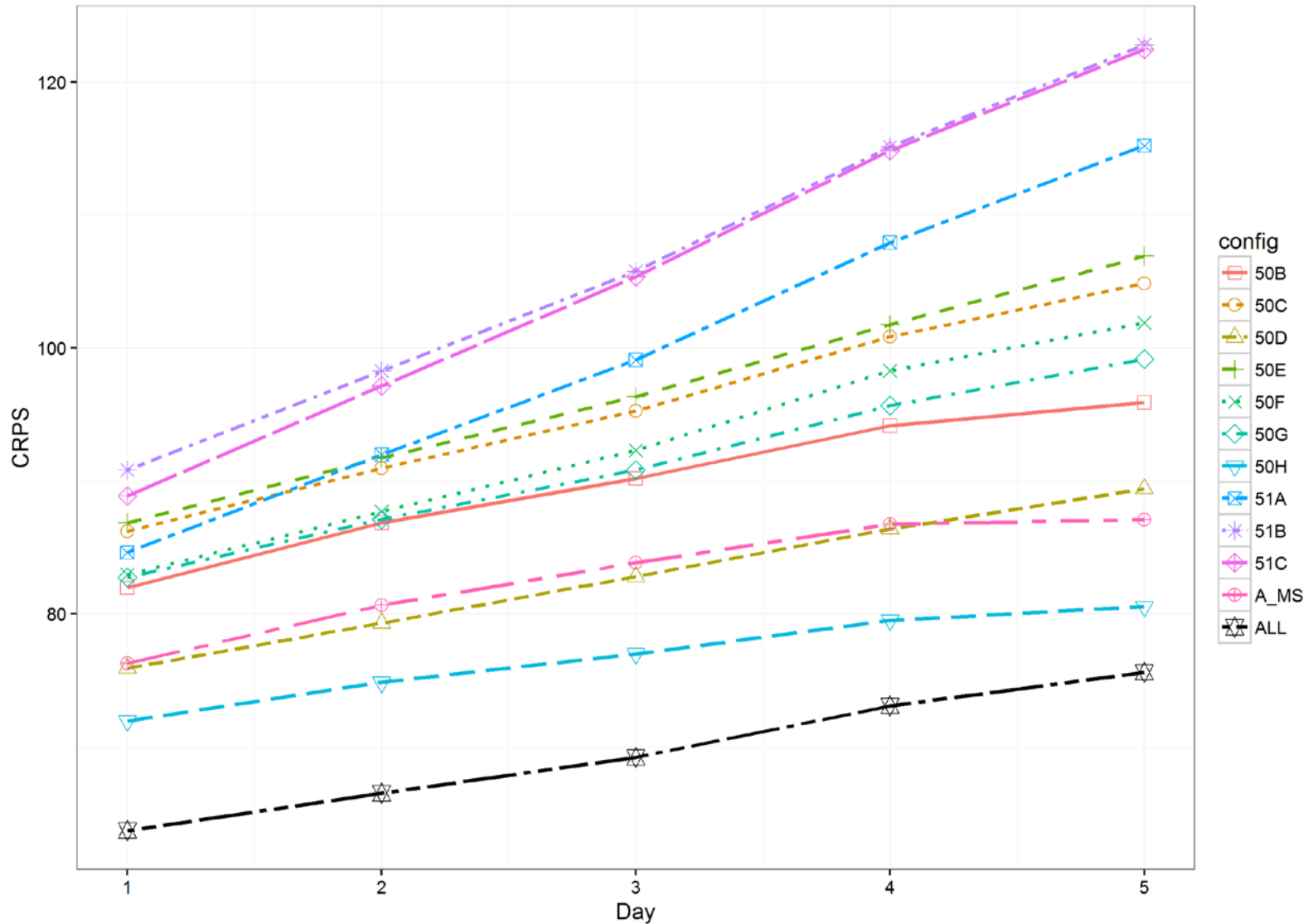


# 2016 Analysis – Perfect Met Forecast (multi-calibration, Day1–3)

LOW



# 2016 Analysis – Perfect Met Forecast



# Conclusions

- ▶ Multi-calibration approach mainly improves reliability and slightly increases skill
- ▶ Greater improvement demonstrated in perfect met forecast scenario – met forecast already encompasses some of the hydrological uncertainty
- ▶ Trends in error show model calibrations are not independent, better calibration technique and selection could improve results
- ▶ Data assimilation and/or further post-processing suggestion welcome!

# Thank you



## Questions or Suggestions?



**LWCB**

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[jbomhof@lwcb.ca](mailto:jbomhof@lwcb.ca)