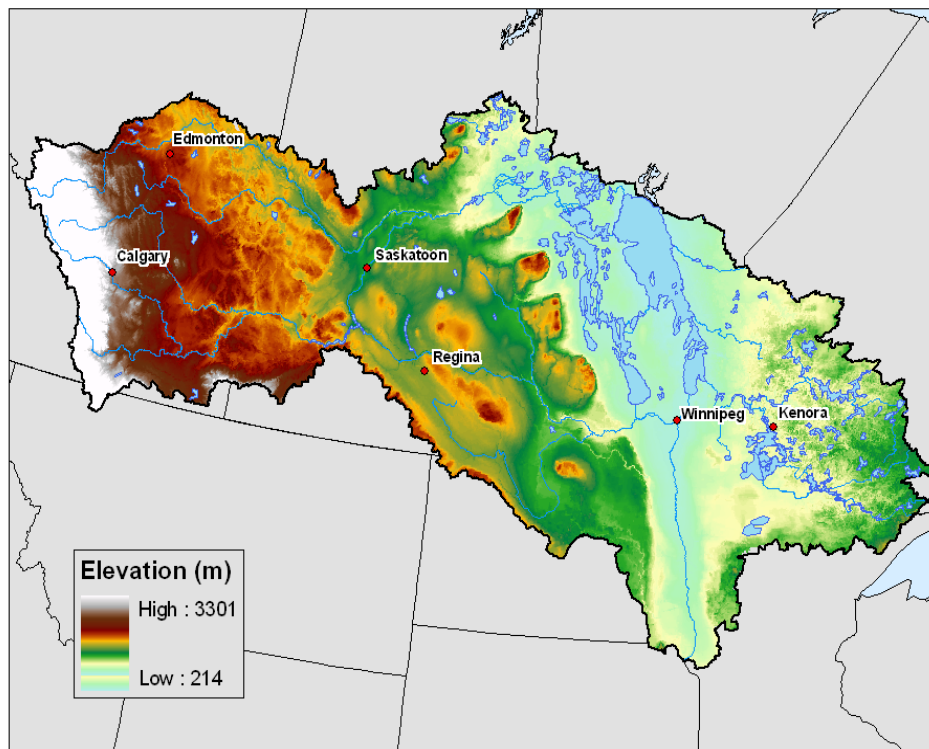


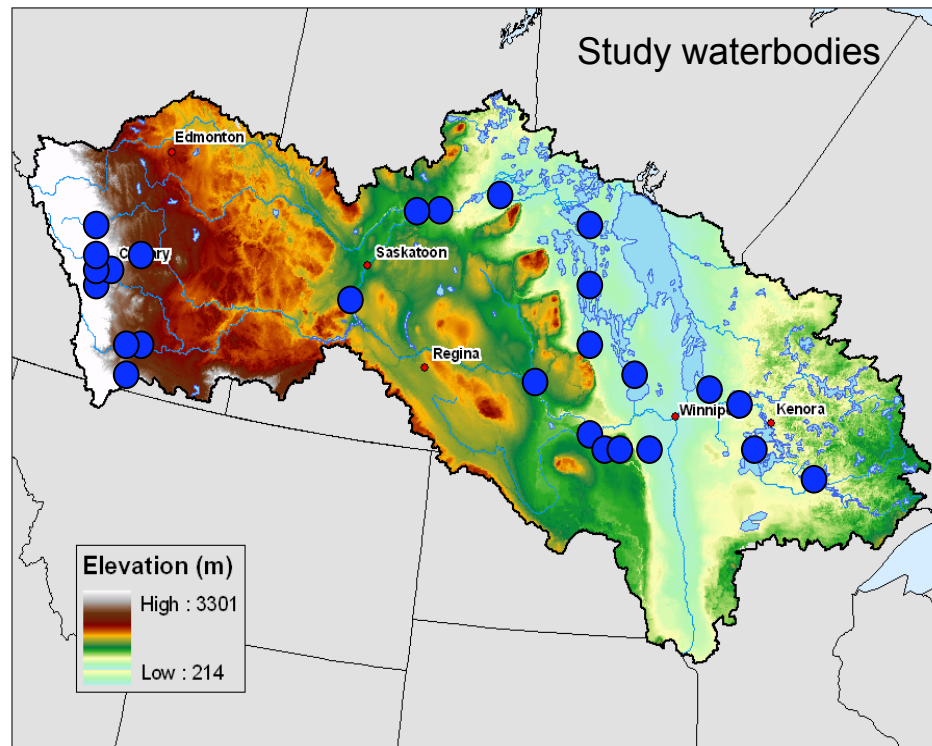
Nutrient Sequestration in Lakes and Reservoirs of the Lake Winnipeg Watershed



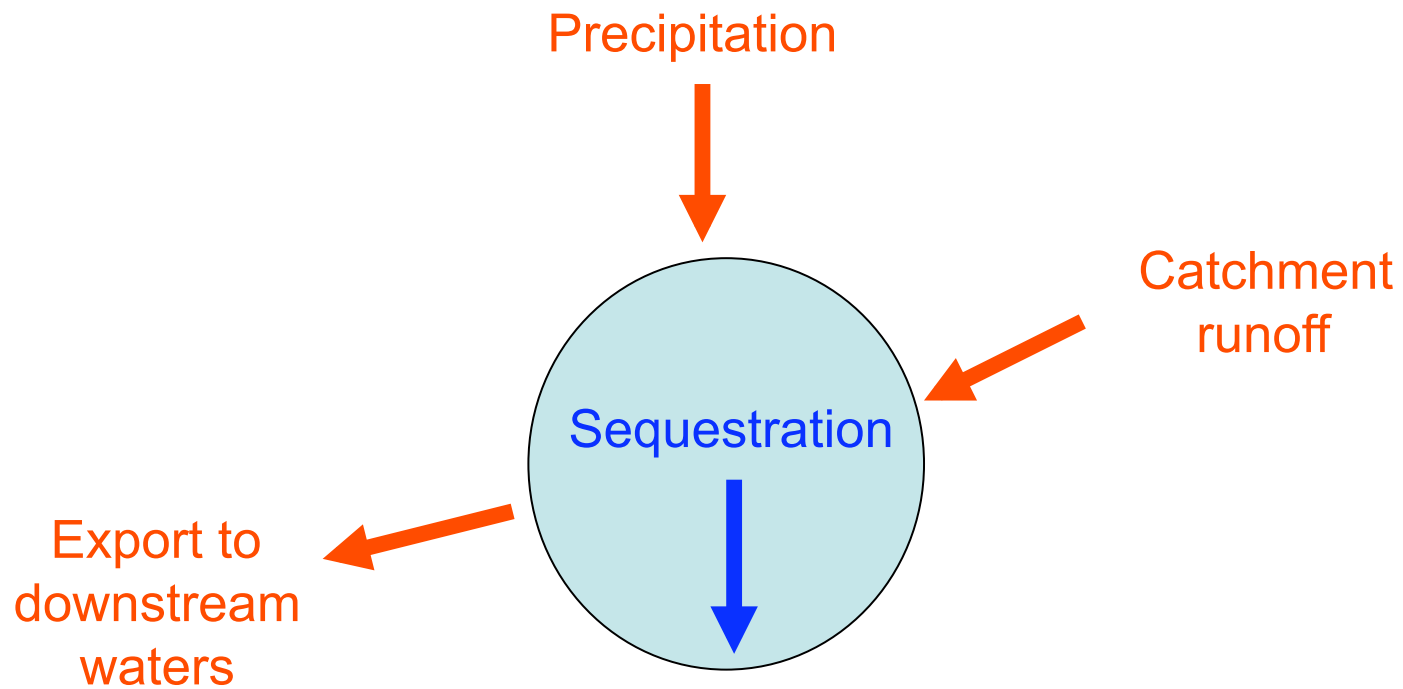
Brian R. Parker
Environment Canada

Study Objective

- Estimate the quantity of phosphorus and nitrogen sequestered, if any, in larger lakes and reservoirs in the greater Lake Winnipeg basin



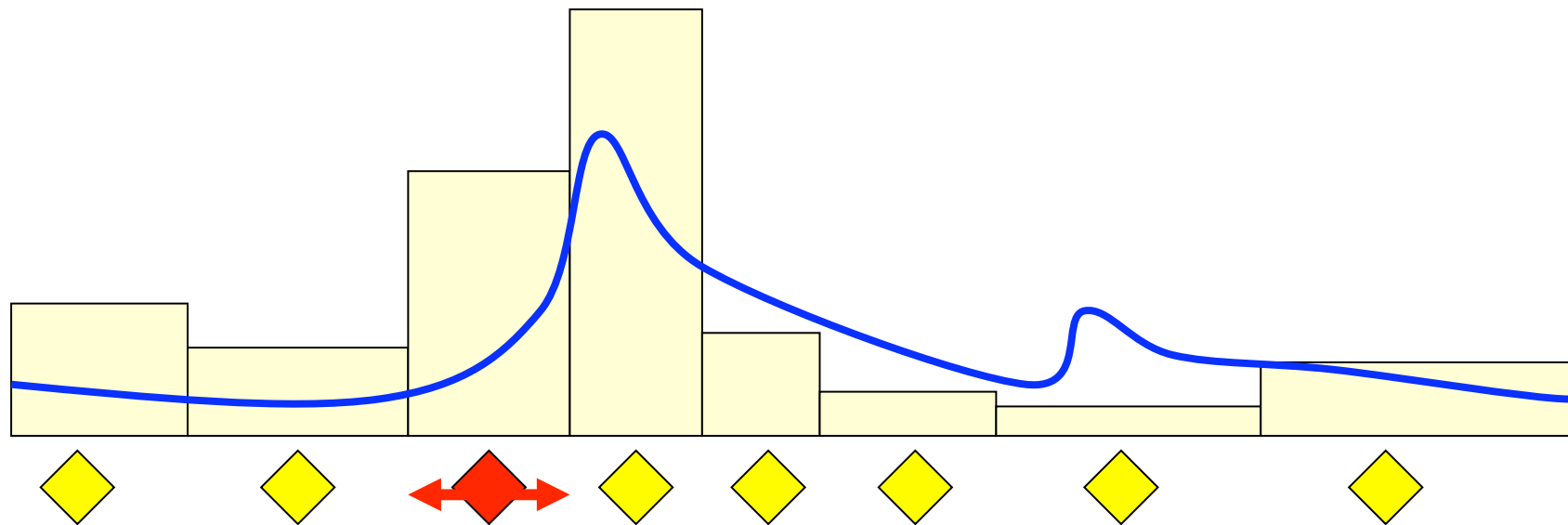
Hypothesis: Some portion of nutrients entering the Lake Winnipeg catchment is sequestered by upstream lakes and reservoirs and is unavailable for transport to Lake Winnipeg





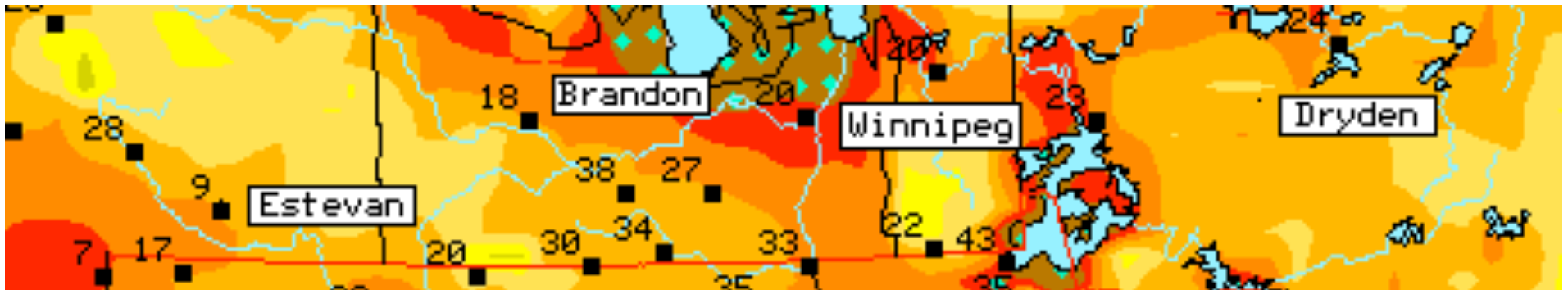
Methods

- Nutrient data from sites above and below lakes and reservoirs (nearest road bridge)
 - Bi-monthly grab samples May-July
 - Monthly grab samples August-April
- Flow data from WSC/Manitoba Hydro network
- Simple interpolation of nutrient data



Methods

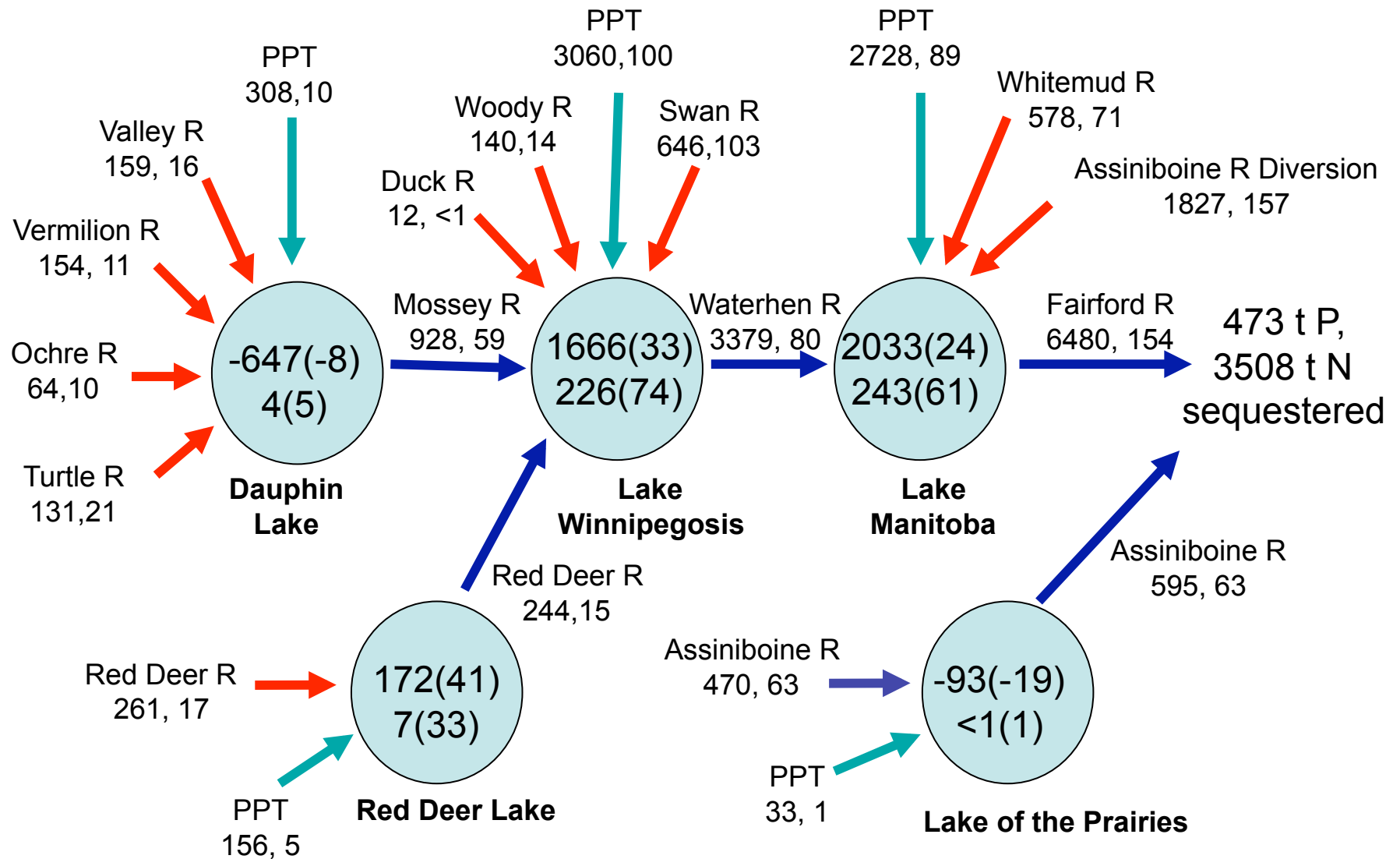
- Precipitation chemistry from Experimental Lakes Area (mean concentration 1970-2005)
- Precipitation volume from nearest MSC met site



- Sequestration =
(inflow mass + precipitation mass) – outflow mass

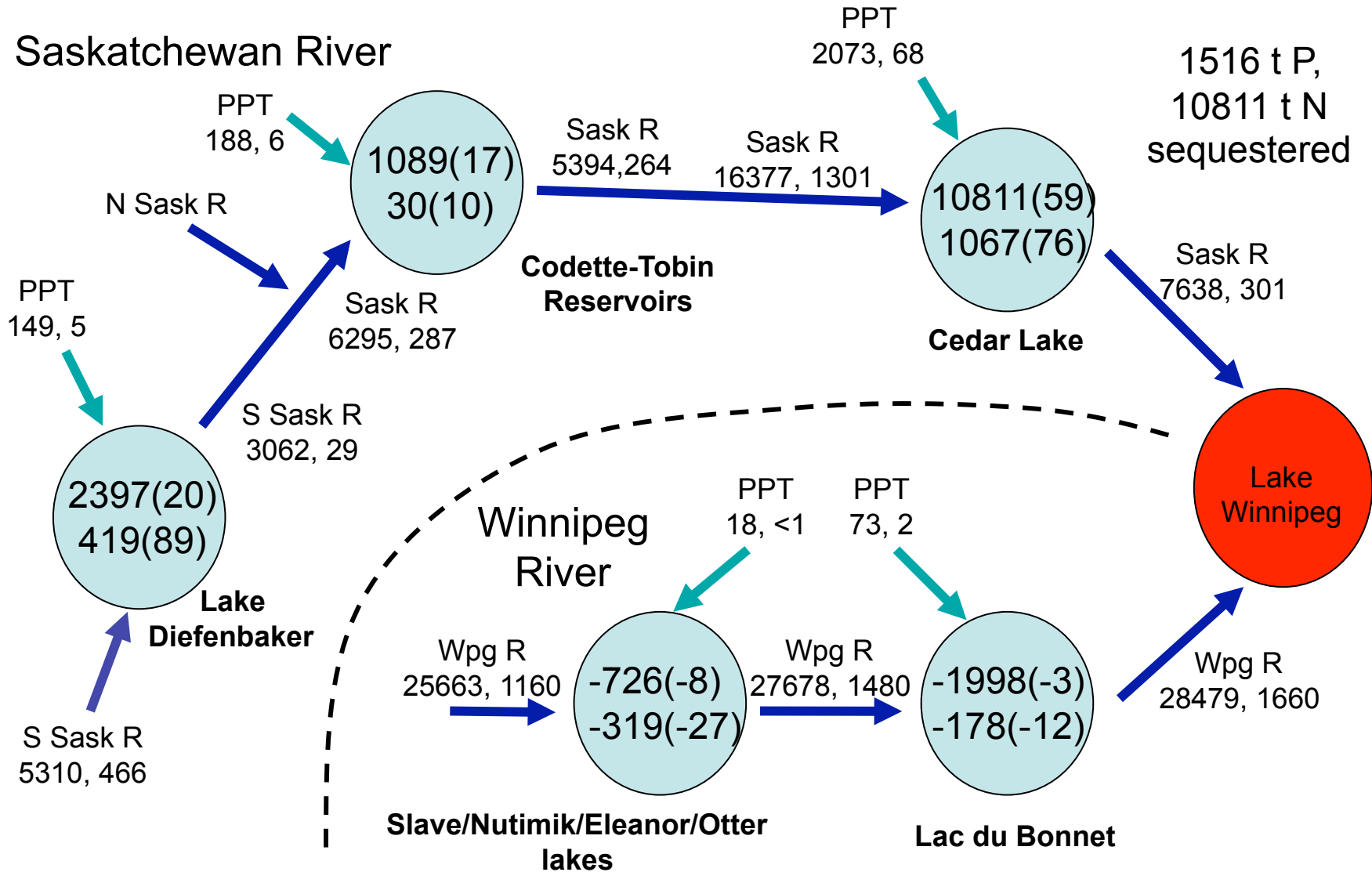
Results – Fairford, Assiniboine Systems

September 2008-September 2009 (tonnes N, P)



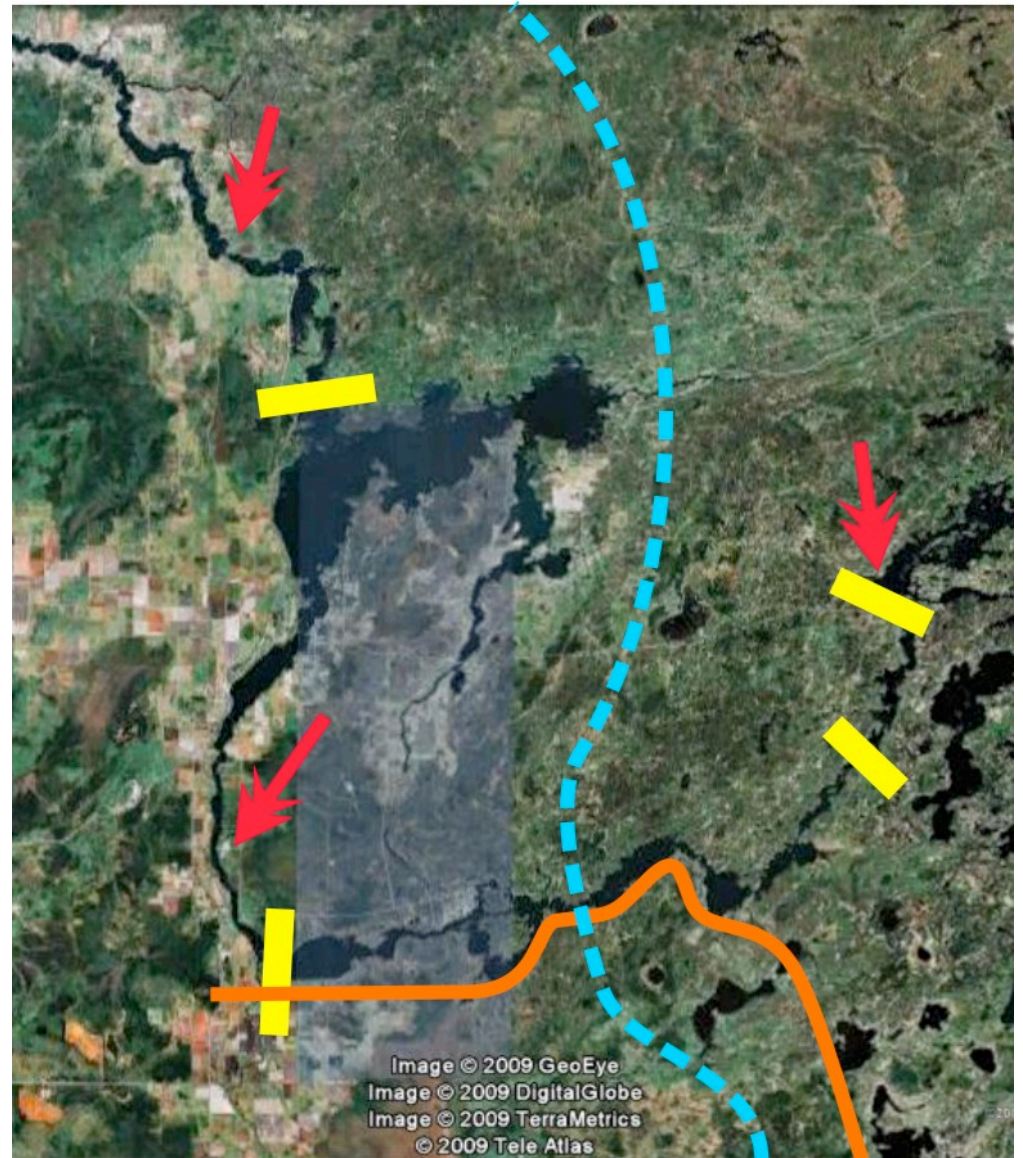
Results – Reservoir chains

September 2008 – September 2009 (tonnes N, P)

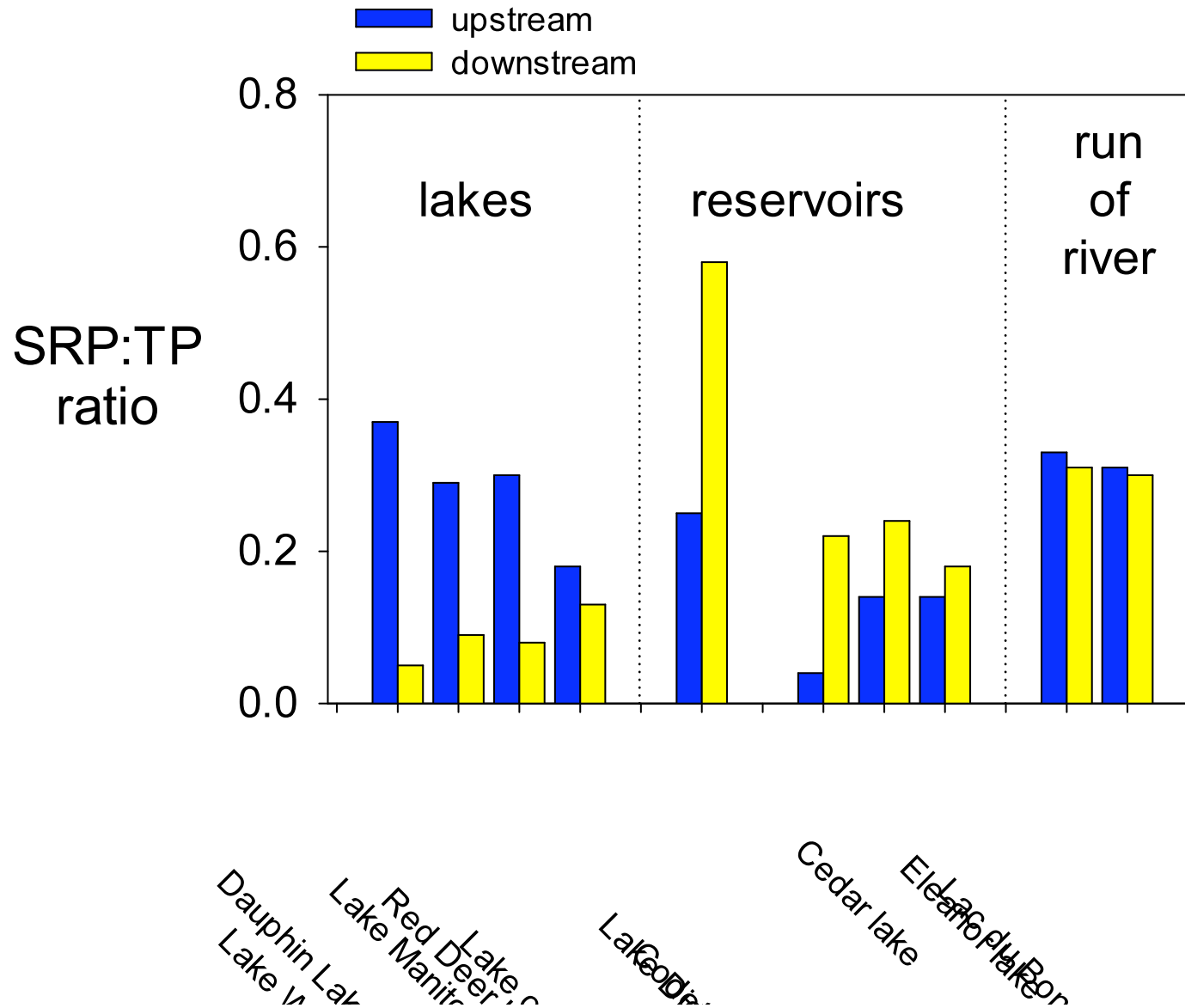


Winnipeg River

- A change in landscape
granite outcrops of
Canadian Shield to
tills/silts/clays
- Change in landscape use
'traditional use' to
cottage country to
agriculture
- Short water renewal times
<< 1 year



Lakes vs Reservoirs, SRP:Total P



Conclusions

- Substantial nutrient sequestration in the Fairford and Saskatchewan River systems
~15,000 tonnes N
~2,000 tonnes P in 2008-2009
- Winnipeg River reservoirs exhibit nutrient release changes in landscape and human activity
- Differences in retention patterns between different classes of waterbodies

Acknowledgements

- EC funding via Lake Winnipeg Basin Initiative
- WQMS Field staff – Bill Aitkin, Gordon Chamberlain, Bruce Holliday, Dallard Legault, Ben Shock, Jim Syrgiannis, Elise Watchorn, Lindsay Wazny
- NLET – Saskatoon, Burlington
- Province of Manitoba – water chemistry data from provincial sampling network
- Water Survey of Canada – hydrological data
- Manitoba Hydro – hydrological data
- Fisheries and Oceans Canada – ELA precipitation chemistry
- Meteorological Service of Canada – precipitation records