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# Pharmaceuticals and Personal Care Products in the Lake Erie Watershed

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# Programs Measuring PPCPs

- Chemical Management Program
  - On going water monitoring both urban and rural sites (Thames R., Grand R. and Highland Creek)
- Environment Canada Connecting Channel Program:  
N.R. Upstream/downstream program, Wolfe Is
  - On going whole water monitoring at Fort Erie and Niagara on the Lake
- Great Lakes Sediment Assessment Program
  - Surveillance study of suspended sediment in the St. Clair/Detroit R. corridor





| Analyte                     | Use and Origin  |
|-----------------------------|---|
| Clofibrac Acid <sup>1</sup> | Metabolite of lipid regulator, clofibrate, etofyllin clofibrate, etofibrate |
| Ibuprofen <sup>1</sup>      | Analgesic/anti-inflammatory   |
| Gemfibrozil <sup>1</sup>    | Lipid regulator   |
| Fenoprofen <sup>1</sup>     | Analgesic/antiphlogistic  |
| Naproxen <sup>1</sup>       | Analgesic/anti-inflammatory   |
| Triclosan <sup>3</sup>      | Antimicrobial disinfectant  |
| Fenofibrate <sup>2</sup>    | Lipid regulator   |
| Ketoprofen <sup>1</sup>     | Analgesic/anti-inflammatory   |
| Diclofenac <sup>1</sup>     | Antiphlogistic  |
| Indomethacin <sup>2</sup>   | Antiphlogistic  |
| Bezafibrate <sup>2</sup>    | Lipid regulator   |

<sup>1</sup>Metcalf et al., 2003 Env. Tox. Chem. Vol. 22, No.12

<sup>2</sup>Ternes, 1998 Wat. Res. Vol. 32, No. 11

<sup>3</sup>Lee et al., Scientific Investigation Report 2004-5138, USGS and Dept. of Interior

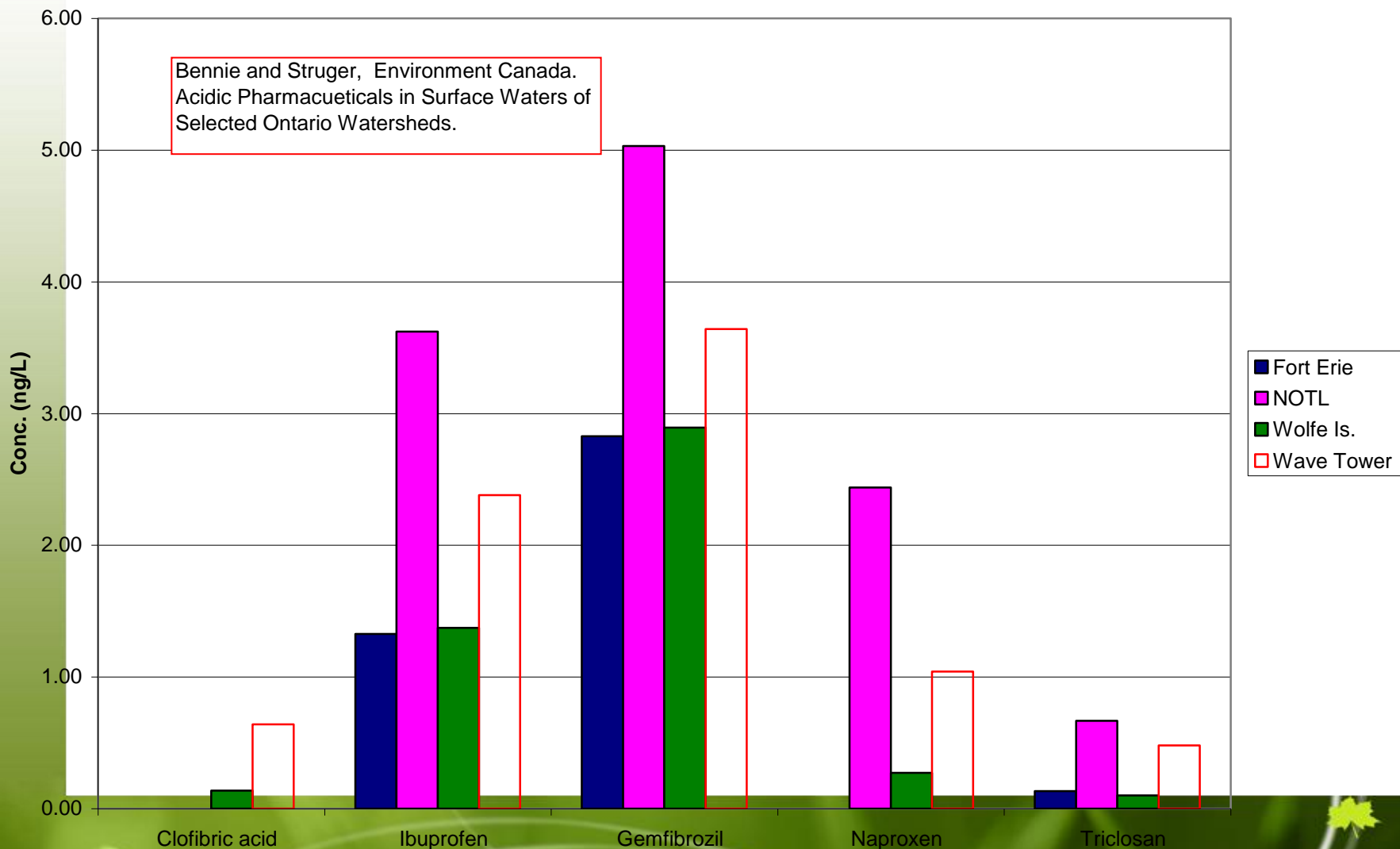


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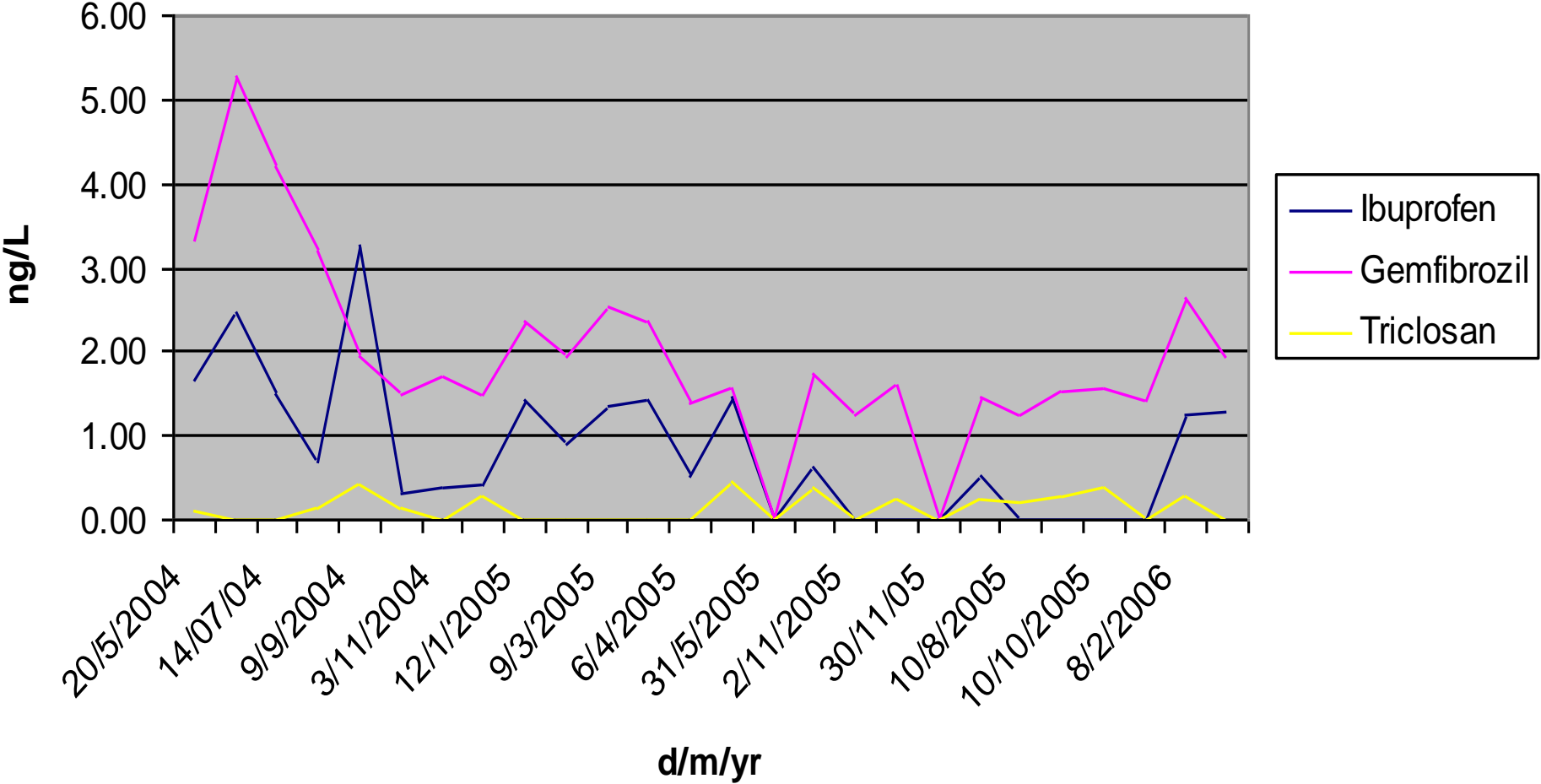
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### Mean Concentrations of Acid Pharmaceuticals

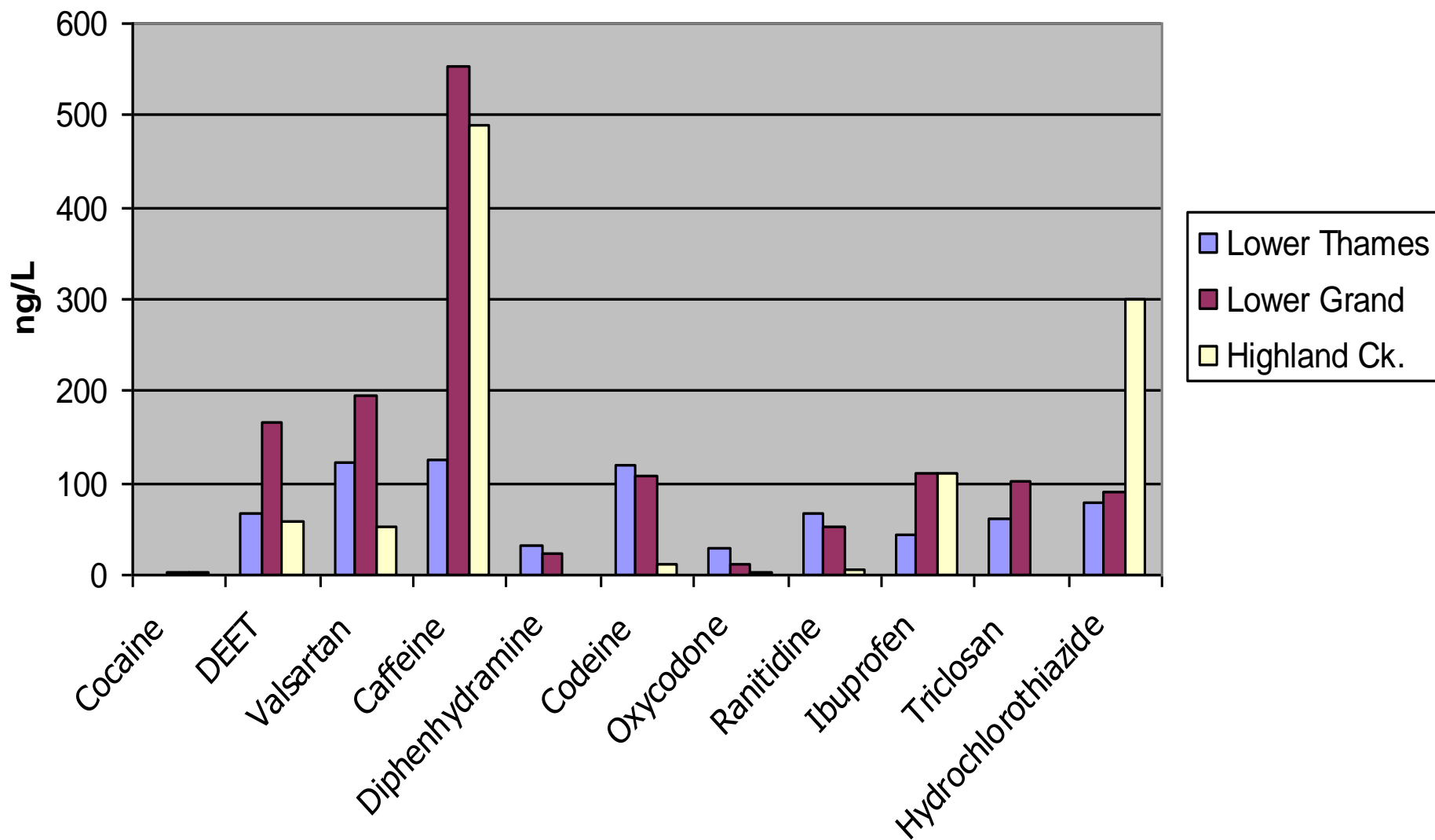


# PPCP in whole water at Fort Erie

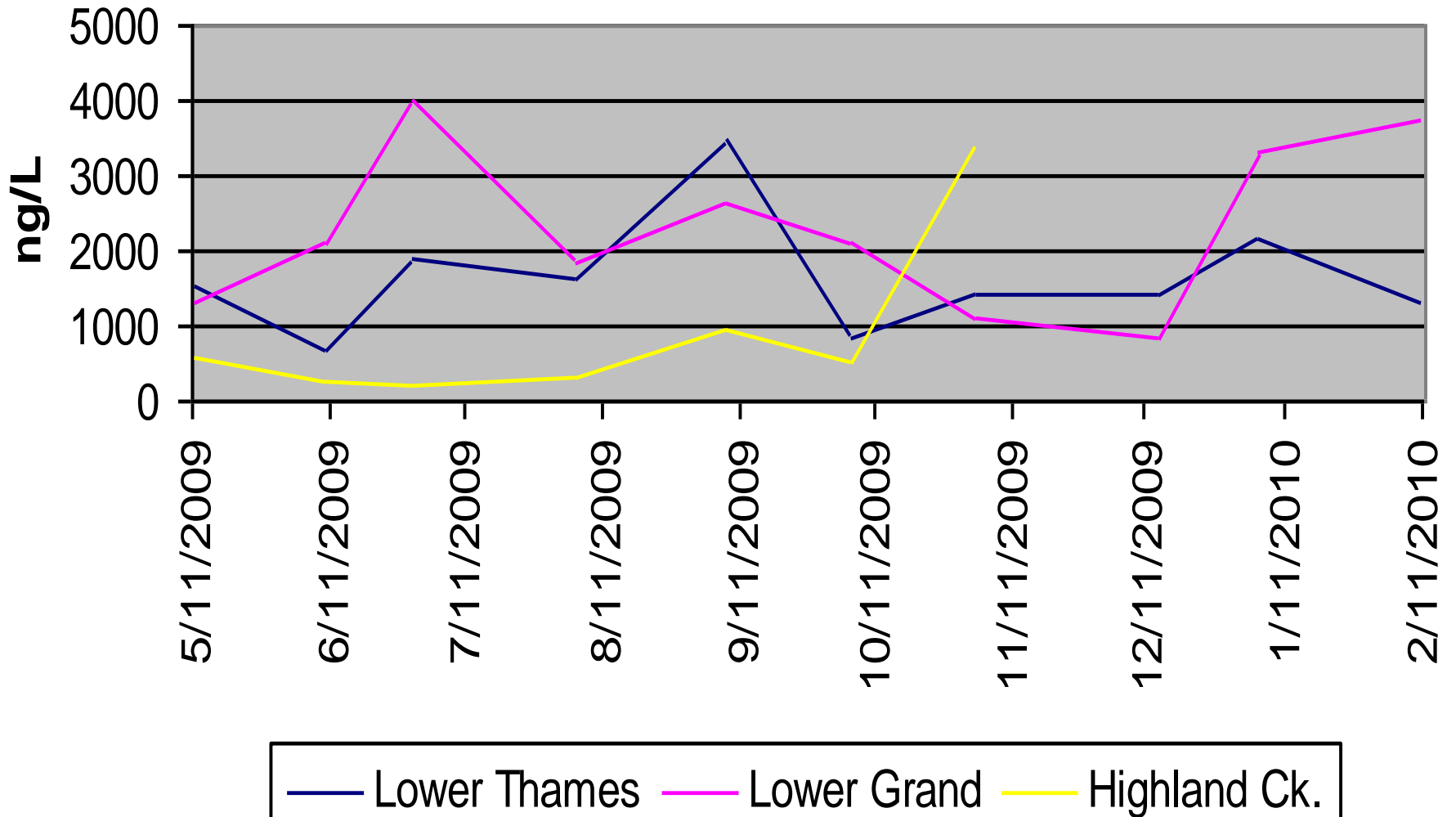




# PPCPs in Great Lake Watersheds



# Metformin





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# Cocktails

- 118 PPCP compounds analyzed for
- Average number of compounds found in mixtures:

Thames R.- 42 compounds- (52 compounds max)

Grand R.- 40 compounds

Highland Cr- 23 compounds







# Detroit River Suspended Sediment

- 118 analytes, only compounds detected: Metformin, Ciprofloxacin, Diltiazem, Norfluoxetine, Fluoxetine
- Levels detected at very low levels

## Exception

- Metformin ranged from <DL- 5980 ng/g
- Highest levels found at 1167 located above Sarnia in Lake Huron (n=2)





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# Summary – Acid Pharmaceuticals

- Present at low concentrations
- Spatial difference
- Ibuprofen, Naproxen and Triclosan follow similar concentration profiles
- Gemfibrozil has unique concentration profile
- Insufficient data to determine seasonal patterns

