



Great Lakes Fish Contaminants Laboratory Performance Study

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Abstract—Fish Consumption advisories and analysis of contaminants in fish are important tools for protection of human and ecological health. US EPA's Great Lakes National Program Office and Environment Canada have organized a three-phase interlaboratory comparison study of Great Lakes laboratories to determine the potential causes for within year variability in fish contaminant results reported by the various agencies implementing periodic monitoring programs.

Phase 1 of the Great Lakes Fish Contaminants Laboratory Performance Study built upon a previous survey conducted by the Michigan Department of Environmental Quality in 2003. Participating agencies were asked to complete an updated survey to identify differences between agencies in program description, program logistics and mechanics, quality control, data analysis, and interpretation of trends between agencies.

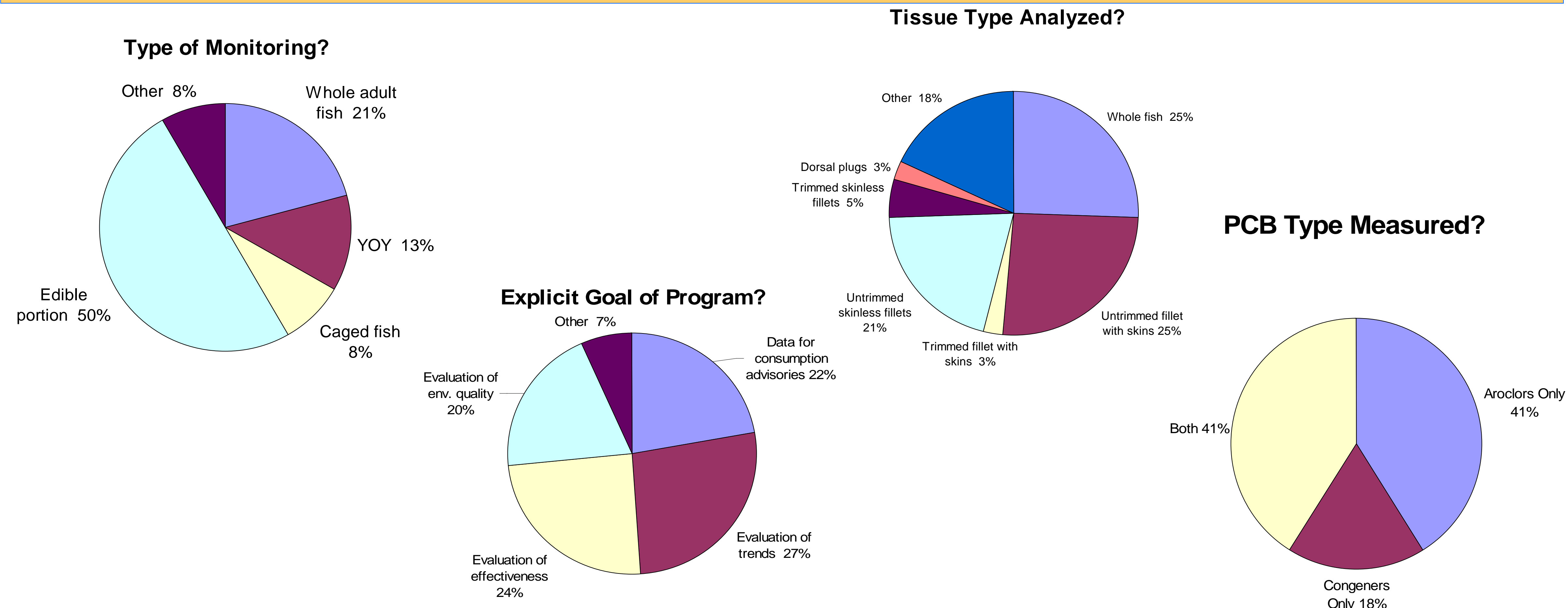
Phases 2 and 3 consisted of round robin analyses of known GCMS injectable PCB and organochlorine (OC) pesticide mixture standards and 3 homogenized fish tissue certified reference materials (CRM). Results are to be disseminated among participants and used in future planning for individual programs and the Great Lakes fish contaminant community as a whole.

Participating Programs & Laboratories—Each laboratory was assigned an ID number at random for Phases 2 & 3 of the Performance study. ID numbers ranged from ILCS2007001 to ILCS2007010.

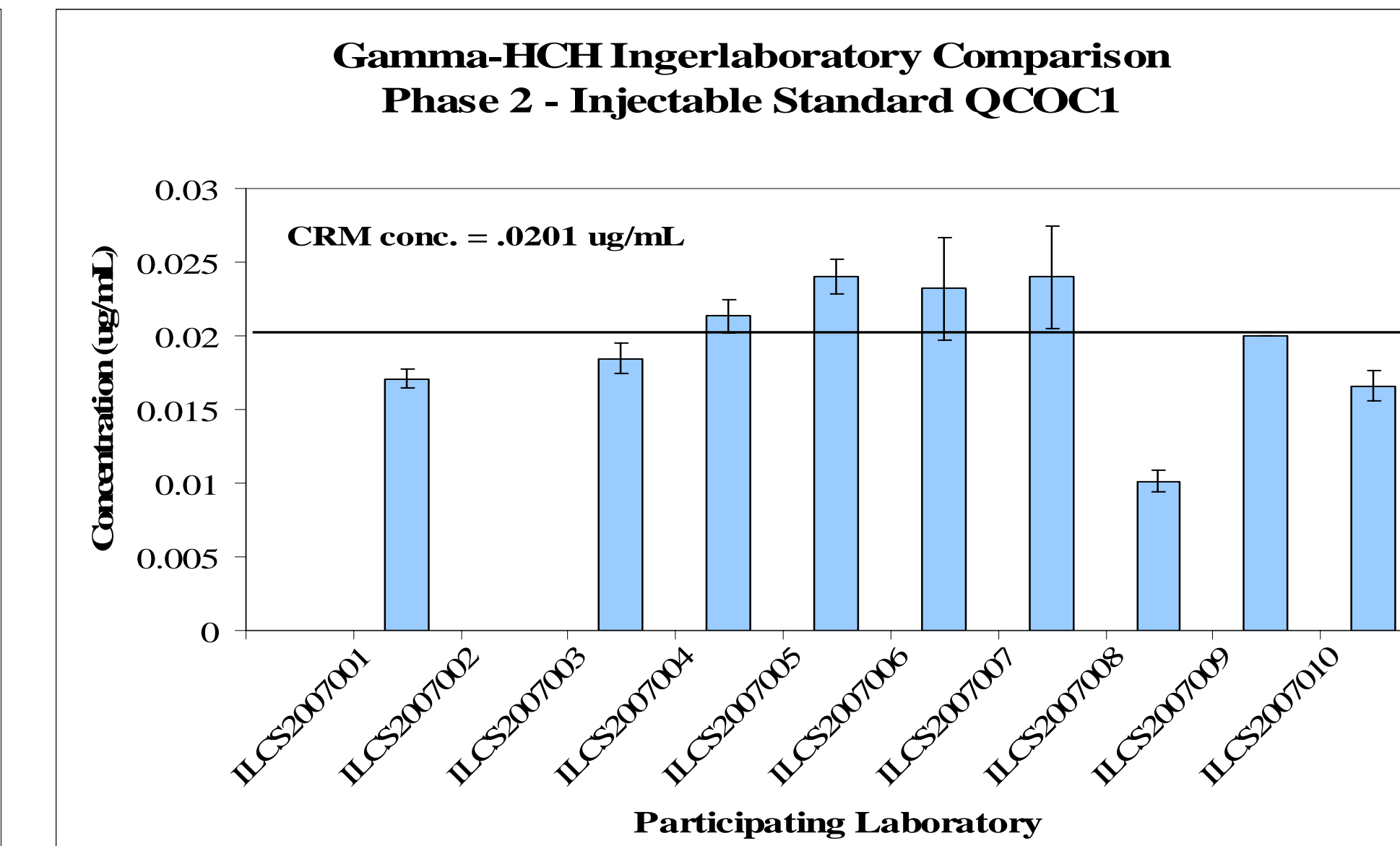
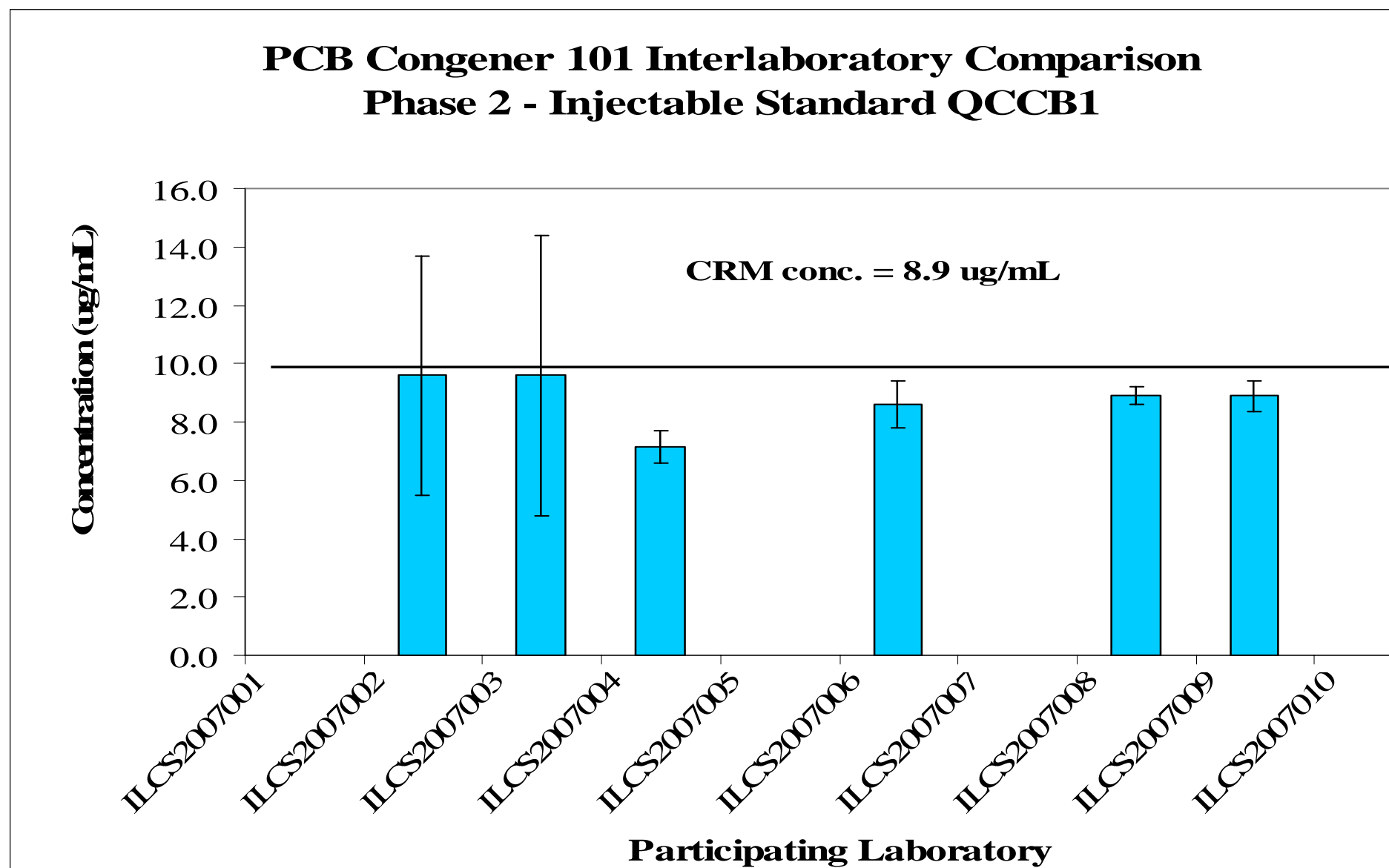
Environment Canada - ALS Laboratory Group
Great Lakes Indian Fishery and Wildlife Commission - Pace Analytical
Ontario Ministry of the Environment – OME Laboratory Services Branch
State of Illinois – Illinois Environmental Protection Agency
State of Indiana - Pace Analytical
State of Michigan – Michigan Department of Community Health
* Caged Fish Contaminant Monitoring Program
* Whole Fish Contaminant Monitoring Program
* Fillet Contaminant Monitoring Program

State of New York—NYS Department of Environmental Conservation
* Young of the Year Fish Contaminant Monitoring Program
* Lake Ontario Contaminant Trend Surveillance Program
State of Pennsylvania—Department of Environmental Protection
State of Wisconsin—Wisconsin State Lab of Hygiene
The Sault Saint Marie Tribe of the Chippewa Indians—ALS Laboratory
US EPA Great Lakes National Program Office—Clarkson University
* Open Water Trend Monitoring Program
* Sport Fish Fillet Monitoring Program

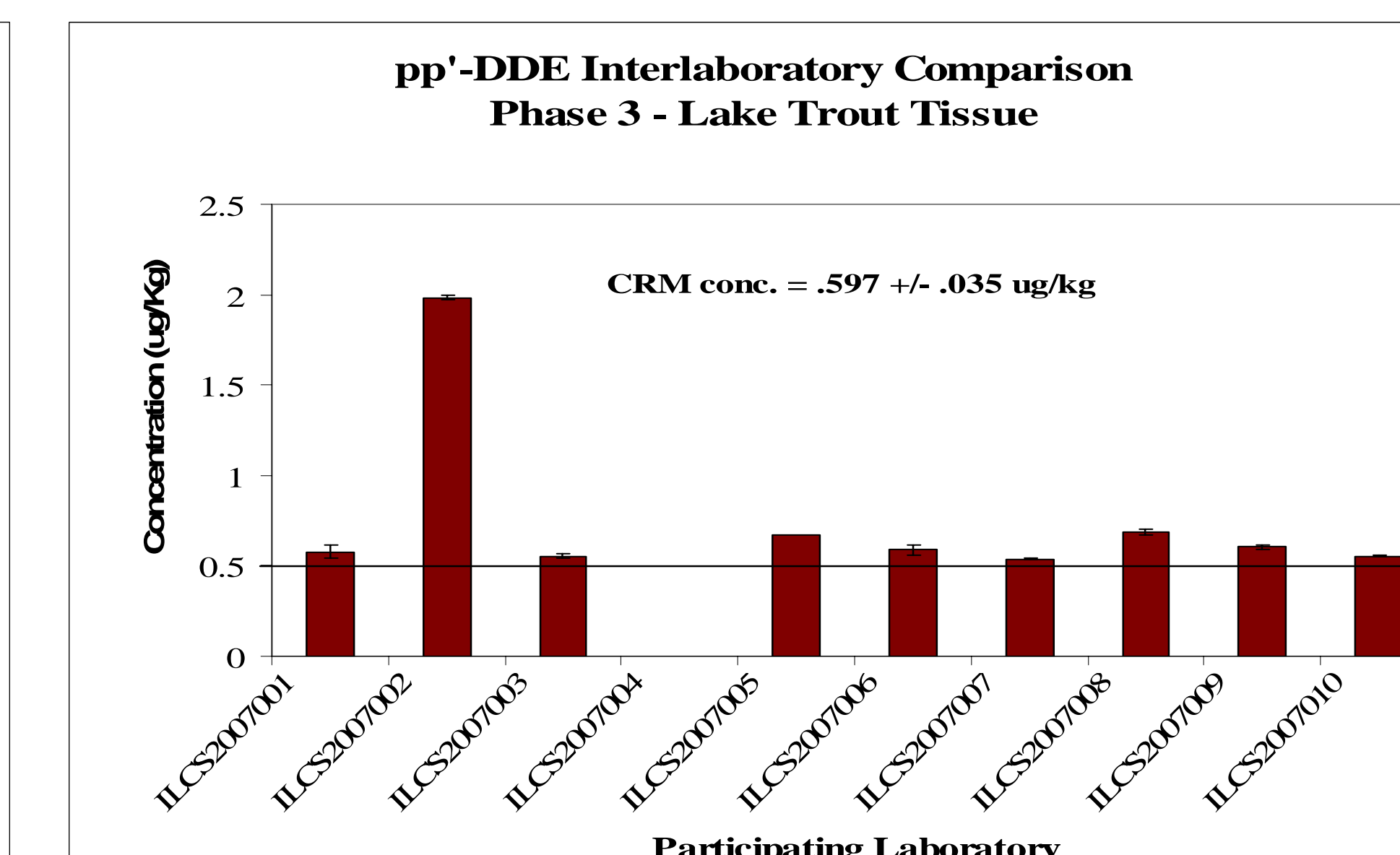
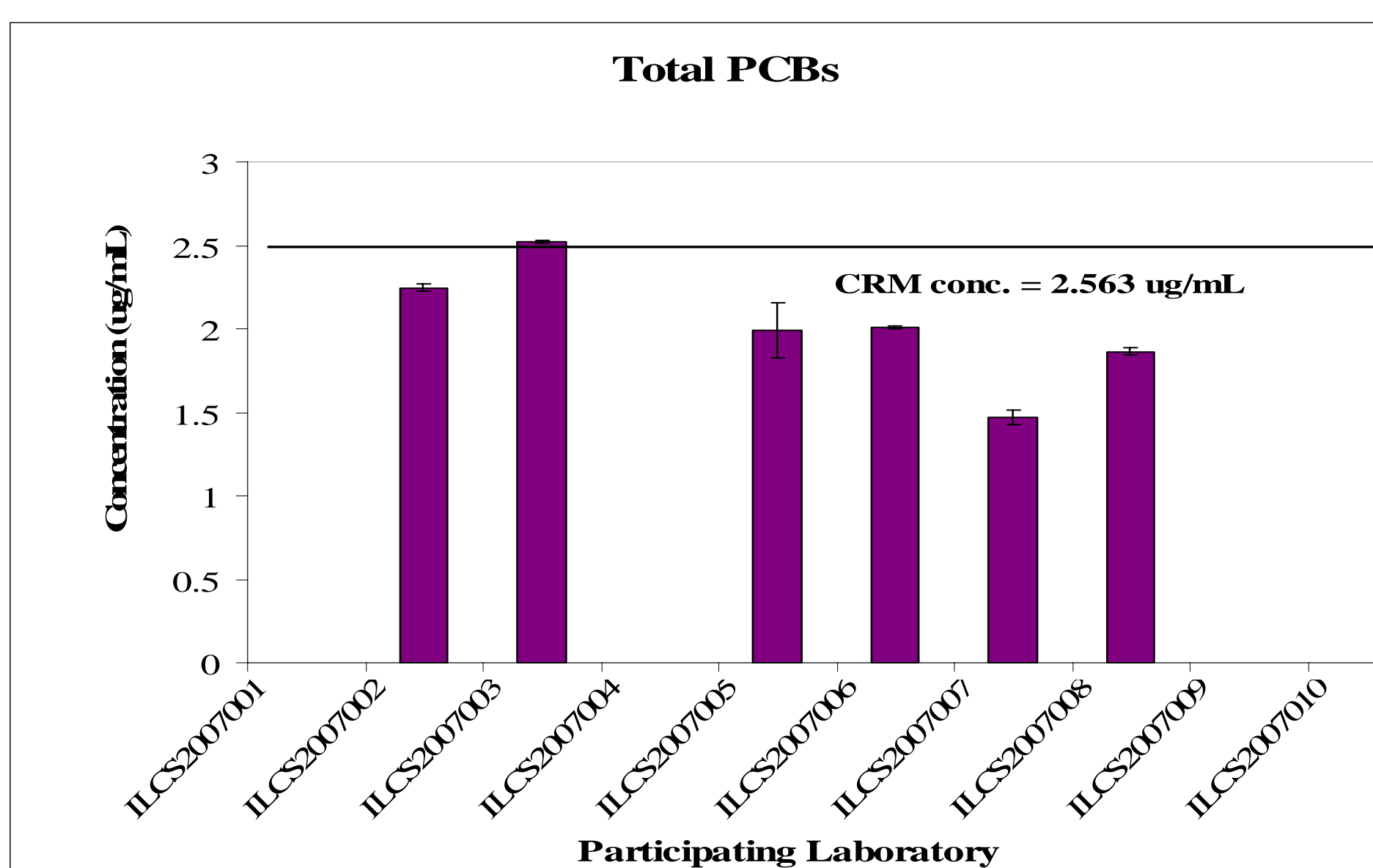
Phase 1 Results - Responses from participating agencies characterized program size, operations, longevity, and goals. A full report of survey responses, including a summary table and individual survey responses, can be found at: <http://www.epa.gov/glnpo/glindicators/fishtoxics/fishc>.



Phase 2 Analysis and Preliminary Results : Accustandard PCB Congener Mix #4
NWRI standard solution, EC-256



Phase 3 Analysis and Preliminary Results: Clement, R. E., Keith, L.H., & Siu, K.W. M. (1997). Reference Materials for Environmental Analysis. New York: CRC Press.



Discussion

This study involved the participation of 17 individual programs and 10 laboratories. Four of the programs outsource their analysis to two different commercial laboratories. Three agency participants operate multiple programs. One agency was only able to participate in Phase 1 of the study due to laboratory scheduling conflicts.

Each participating laboratory was asked to analyze two injectable standards for select known concentrations of PCB congeners (6) and OC pesticides (7) in Phase 2 that were purchased from commercial labs. Phase 3 involved the analysis of three different homogenized fish tissue samples for known concentrations of PCB congeners (9), Total PCBs, and OC pesticides (11) that was provided by Environment Canada.

- Lake Ontario lake trout – a naturally contaminated composite of about 65 kg, fresh water species
- Sockeye salmon – relatively uncontaminated and suitable for spiking. > 65 kg, freshwater / marine species
- Pacific herring – representative of a “clean” fish from off the far northern tip of Vancouver Island, > 65 kg, marine species

Preliminary results show good agreement between laboratory results and known values for the CRM for OC pesticide analysis for both the injectable standards and the fish tissue. With the exception of a few outliers, most of the injectable OC pesticides were within 30% agreement of the CRM and the lake trout tissue standards were between 40 and 80% of the CRM. Agreement is generally not as good for select PCB congeners for both the injectable standards and the homogenized lake trout tissue. It is important to note that seven of the 17 participating programs (five labs) analyze PCB arochlors only.

Conclusions

Additional statistical analysis is needed to properly identify differences in laboratory methods and capabilities. A final report, including the results of the statistical analysis and recommendations from participating laboratories regarding how the results should impact future efforts, will be prepared and disseminated. Results of this study may be used in future planning for individual fish contaminant monitoring programs and/or allow for collaboration between programs.