



Columbia Environmental Research Center

## Publication Brief

# Fish Health and Contaminant Assessment in the Yukon River Basin, Alaska

The Large River Monitoring Network (LRMN) of the USGS Biomonitoring of Environmental Status and Trends (BEST) Program measures environmental contaminants and evaluates physiological, morphological and histological responses of contaminant exposure in fish from large U.S. river basins. The Yukon River Basin (YRB) was fourth in a series of large river basins sampled in the BEST program.

Fish were collected at 10 stations in the U.S. portion of the YRB in 2002. Sampling sites were located on the Yukon, Porcupine, Ray, Tanana, Tolovana, and Innoko Rivers.

Tissue and blood samples from northern pike (*Esox lucius*), longnose sucker (*Catostomus catostomus*) and burbot (*Lota lota*) were collected to evaluate fish health. Composite whole-body fish samples were analyzed for organochlorine residues, elemental contaminants, and dioxin-like activity.

Overall fish health was generally good and the concentrations of most chemical contaminants were low in the YRB compared to other LRMN basins, including the Mississippi, Rio Grande and Columbia.

Concentrations of organochlorine pesticides, total PCBs, and dioxin-like activity were low in all samples. Mercury and selenium were the only elemental contaminants to exceed wildlife guidelines or thresholds, and both had been identified as contaminants of concern in previous studies in the YRB.

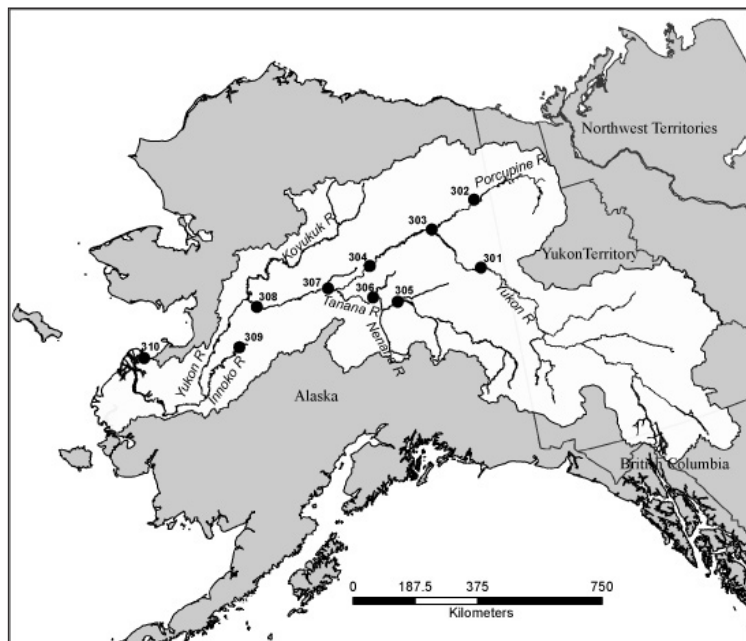
Concentrations of mercury exceeded 0.1  $\mu\text{g/g}$  wet weight (ww) in at least one species from every YRB station. Mercury concentrations were

>0.3  $\mu\text{g/g}$  ww in one or more northern pike and burbot samples from Stations 304, 305 and 308.

Concentrations of selenium (>0.85  $\mu\text{g/g}$  ww) in burbot from Station 305 also exceeded wildlife guidelines.

Fish health and reproductive biomarkers did not indicate widespread responses to contaminants, but individual fish from sites throughout the basin expressed isolated responses. Multiple male fish collected from Stations 301, 305, 308 and 309 had concentrations of vitellogenin >0.01 mg/mL, which may indicate exposure to estrogenic compounds. Other reproductive biomarkers (steroid hormones, gonadal histology) and fish health indicators (somatic indices, macrophage aggregate parameters) were normal in YRB fish.

Based on the results of this YRB study a risk analysis is being conducted to identify contaminants that may be harmful to piscivorous wildlife in the YRB.



Map of the Yukon River Basin showing sampling stations.

### USGS Scientific Investigations Report 2004-5285.

Hinck, J.E.; Bartish, T.M.; Denslow, V.S.; Gross, T.S.; Myers, M.S.; Anderson, P.J.; Orazio, C.E.; Tillitt, D.E. 2004.

Biomonitoring of Environmental Status and Trends (BEST) Program: Environmental Contaminants and their Effects on Fish in the Yukon River Basin  
USGS, Columbia Environmental Research Center, Columbia, MO

This report is available online at:  
<http://www.cerc.usgs.gov/pubs/center/pdfDocs/BEST-YukonRiver.pdf>

Contaminant and fish health data for all LRMN studies are available online at: <http://www.cerc.usgs.gov/data/best/lrmn/>

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