BIOMAGNIFICATION FACTORS, TARGET FISH CONCENTRATIONS, AND HAZARD QUOTIENTS FOR BALD EAGLES IN THE LOWER COLUMBIA RIVER

Jeremy Buck, U.S. Fish and Wildlife Service, Oregon Fish and Wildlife Office, Portland, Oregon
Donald Tillitt, U.S. Geological Survey, Columbia Environmental Research Center, Columbia, Missouri

Abstract

The lower Columbia River is an important resource for fish and wildlife, and persistent contaminants entering the system are responsible for positive fishing landings at upper trophic levels.

Introduction

The lower Columbia River drains a large watershed, including portions of nine states and two countries, and supports high fish biomass. Bald eagles are ideal indicators to monitor accumulation and trends in contaminants because they are present year-round and 100% of their diet consists of prey captured downstream from the Columbia River.

Biological magnification factors (BMFs) for mercury (Hg), toxaphene, DDE, 2,3,7,8-TCDD, and 2,3,7,8-TCDF were calculated based on data collected from the Columbia River. These factors were compared to values calculated for bald eagles in a concurrent study in eastern Washington (Bi-State Study).

Data Analysis

Lower Columbia River Study Segments

<table>
<thead>
<tr>
<th>Location</th>
<th>Sampled Fish</th>
<th>Contaminant</th>
<th>Concentration (mg/kg)</th>
<th>TFC</th>
<th>BMF</th>
<th>HQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower Columbia River</td>
<td>Salmon</td>
<td>Mercury</td>
<td>0.05</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Toxaphene</td>
<td>0.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>DDE</td>
<td>0.05</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Results & Discussion

• BMFs were lower in bald eagles from the lower Columbia River compared to those from the Bi-State Study.

Conclusions

• BMFs can be used to evaluate contaminant concentrations at key endpoints and to guide regulatory decisions.

Acknowledgements

We would like to thank the following individuals for their contributions to this project: Gene Foster, BPA; Steve Lake, USDA; Jeff Gentry, and Lori Bogue, USDA; Don Raiser, and Charles Beckett, Fish and Wildlife.

References