



Draft White Paper - Are Contaminants Impacting Chinook?

Jenee Colton - December 13, 2017

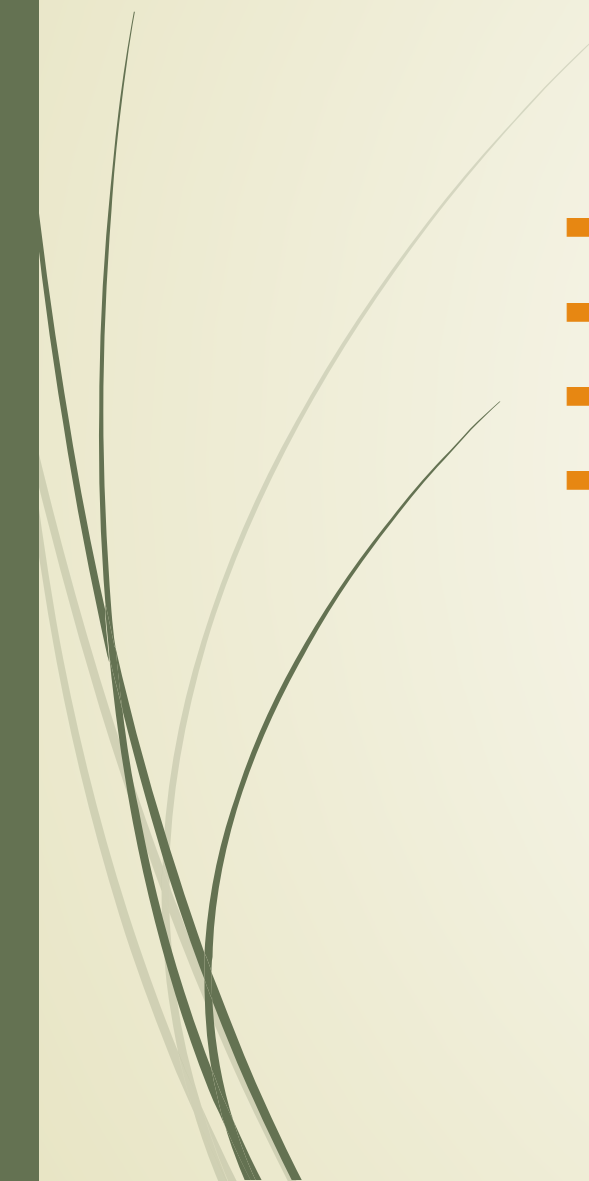


Overview

- ▶ Intent of the paper is be part of the addendum to the Strategic Assessment—the technical basis for which policy actions are based on
- ▶ Thank you reviewers
- ▶ First full draft provided
- ▶ Conclusion and Recommendations added
- ▶ Want approval of final paper in February
- ▶ *Comments are due by Jan ?*



Minor Comments

- ▶ Added info on East Waterway cleanup plan
 - ▶ Editorial changes for clarity
 - ▶ Updated and edited prespawn mortality and stormwater toxicity research
 - ▶ Footnotes to explain terms and concepts (why is BIBI not used in this paper?)
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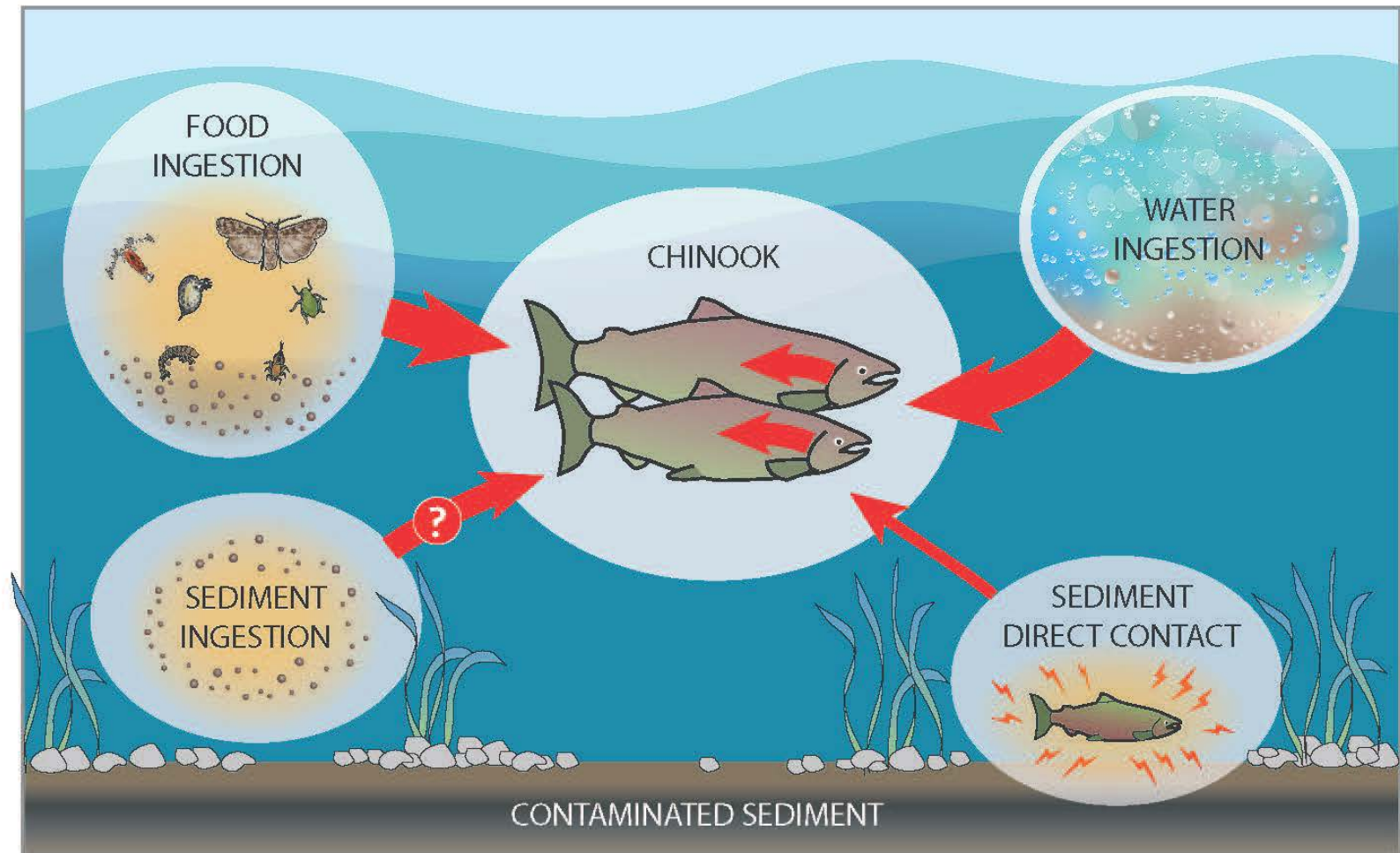


Major Comments

- ▶ Added text on emerging contaminants as a data gap
- ▶ Added additional data sources (fish tissue and water data)
- ▶ Added a comparison of PCB Chinook thresholds from the Superfund risk assessments and NOAA.
- ▶ Revised Uncertainty Section

To be addressed

Refined food ingestion part of ingestion pathway graphic





To Be Addressed

- ▶ Change “Chinook” to “Chinook Salmon”
- ▶ News for the Our Green Duwamish program
- ▶ Adding a few more citations to text (not data)



Conclusion



- Generally, water and sediment contaminant concentrations ↑ with distance downstream.
- Generally, tributaries with evidence of highest sediment contamination are the most urbanized (Springbrook and Mill Creek in Kent).
- Duwamish Estuary Chinook are more contaminated than other Puget Sound waterbodies;
- Duwamish Estuary juvenile Chinook may experience adverse effects from contaminants;



Conclusion (cont.)

- ▶ No information on potential impacts of CECs on salmon are available for WRIA 9.
- ▶ SAR rates are substantially lower in contaminated estuaries compared to non-contaminated ones
- ▶ Biomarkers, demonstrating contaminant exposure, have been observed in LDW Chinook.
- ▶ Benthic invertebrates in some LDR areas experience adverse effects. Therefore, could ↓ food for juvenile Chinook and/or shift diets.




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 - ▶ Specific Contaminants
 - ▶ Focus on those known to be elevated and have some effects data (PCBs, PAHs)
 - ▶ Opportunistically explore CECs, such as pharmaceuticals, in water and Chinook to build a chemistry database.
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- ▶ Tease out cause(s) of lower SAR in Duwamish

Duwamish Estuary	Chinook specific assessment?	Risk Level	Uncertainty	Notes
Water	No – Aquatic Life	Low	High	Low data volume; not evaluated with updated Chinook-specific thresholds
Sediments – Direct Exposure	None completed	Low	High	Lack of exposure data; unknown and indirect effect on Chinook
Sediments and Benthic Invertebrates	No – Indirect exposure via prey	High (for 4% of LDW); Moderate (for 18 % of LDW); Low in other areas	High	Large volume, indirect and unquantified effect on Chinook; multiple lines of evidence;
Tissue/Food/Biomarkers	Yes	Moderate (PCBs)	High	Small data volume and highly uncertain effect thresholds.
SAR (return rates)	Yes	High	High	Contaminants as cause for low SAR unconfirmed. Need further analysis and other lines of evidence.
Low to Mid-Green				
Water	No – aquatic life	Low	Moderate	Small data volume; Black River levels highest for PCBs and PAHs
Sediments – Direct Effect	No	Low	High	Lack of exposure data; unknown and indirect effect on Chinook
Sediments and benthic invertebrates	No – Indirect effect on prey	Low in mainstem and most tributaries; moderate in Springbrook and Mill (Kent) creeks.	High in mainstem; Moderate in tributaries.	Indirect and unquantified effect on Chinook; Low sample density in mainstem; >10 per creek.
Upper Green				
Water	No – aquatic life	Low	High	Small data volume; not evaluated with Chinook-specific thresholds