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**Meeting Minutes
Columbia River Comprehensive Impact Assessment
Weekly Management Meeting
June 18, 1996
Battelle's ETB Building, Columbia River Room, 1:00 - 5:00**

Attendees(*)/Distribution(#):

Michael Blanton, PNNL*#	Dick Gilbert, PNNL#	Roger Ovink, BHI#
Charlie Brandt, PNNL*#	Stuart Harris, CTUIR*#	Doug Palenshus, Ecology#
Amoret Bunn, Dames & Moore*#	RD Hildebrand, RL#	Ralph Patt, Oregon#
Sandra Cannon, PNNL*#	Dave Holland, Ecology*#	Stan Sobczyk, NPT#
Paul Danielson, NPT*#	A Knepp, BHI#	Bob Stewart, RL*#
Greg deBruler, HAB*#	Jay McConnaughey, WDFW#	Mike Thompson, RL#
Damon Delistraty, Ecology*#	Terri Miley, PNNL#	Steve Weiss, BHI*#
Kevin Clarke, RL#	Dick Moos, BHI#	JR Wilkinson, CTUIR#
Roger Dirkes, PNNL*#	Nancy Myers, BHI*#	Thomas W. Woods, YIN*#
Sue Finch, PNNL*#	Bruce Napier, PNNL#	Jerry Yokel, Ecology*#
Larry Gadbois, EPA#	Lino G. Niccoli, YIN*#	Admin Records-CRCIA#
Rose Gentry, Oregon*#		

Summary of Discussions:

Finalization of CRCIA Purpose and Team Purpose

Two versions of purpose statements were handed out to the team to begin discussions on the CRCIA purpose. Much discussion took place including the following highlights:

- Purpose and Objective should be combined into one section rather than split out separately.
- The sections CRCIA Management Team and Project Approach are not part of the purpose and were deleted.
- Need to specify areas of Hanford decision making to include waste management, environmental restoration, and remediation. It was noted that these are not organizational divisions.

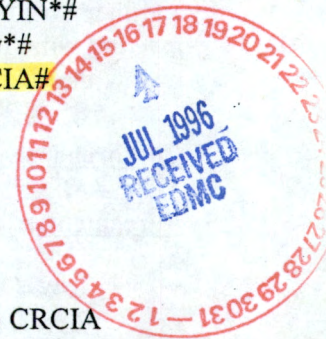
A finalized CRCIA purpose with team member signatures is attached to the minutes.

The CRCIA team purpose was not discussed.

EHQs Presentation

Charlie Brandt presented the information contained in the attached viewgraphs. The following identifies points that were emphasized and agreements that were reached.

- Results based on estimated concentrations will be flagged.
- Non-detect values are values that come from the lab. They are stated as non-detect values as they are lower than limits in the contract.
- There was much discussion on the conservatism of the screening assessment. It was qualified that it will be the worst case based on the data that's available.
- All means used to parameterize the exposure models will be documented.
- The question, "Why aren't small mouth bass included?" was asked. It wasn't picked as part of the tier 2 species. However, largescale sucker and mountain sucker have the same parameters so they could be combined. It was agreed to combine largescale sucker/mountain sucker and add small mouth bass.



- Agreement was reached to use groundwater data for organisms that drink close to shore and to use surface water data where organisms drink most of the time away from the river bank. Professional judgement will be used in making the distinction.

Proposal for Public Outreach Team

A "Proposal for the CRCIA Outreach Team" was handed out and discussed. The proposal was signed by CRCIA team members as presented. It was previously signed by outreach team members. A signed copy is attached to the minutes.

Items Not on the Agenda

A DSI from Dennis Dauble regarding Risk Assessment of Microbial Communities was handed out. The DSI was in response to issues raised at the 6/11/96 CRCIA team meeting.

The schedule for the comprehensive section was discussed. The need for additional meetings was identified and they will be scheduled for Monday afternoons. Also, an action was assigned to Sue Finch to schedule a meeting with Thomas Woods, Lino Niccoli, Bob Stewart, Amoret Bunn, Roger Dirkes, and Sue Finch to review the schedule and determine if the 9/17 completion date can be extended.

Comprehensive Chapter: None identified at this meeting.

Agreements:

- It was agreed to combine largescale sucker/mountain sucker and add small mouth bass.
- Agreement was reached to use groundwater data for organisms that drink close to shore and to use surface water data where organisms drink most of the time away from the river bank. Professional judgement will be used in making the distinction.

Action Items:

Action Description	Assigned To	Due Date
Schedule a meeting to review the schedule and determine if the 9/17 completion date for the comprehensive section can be extended.	Sue Finch	6/19/96

Attachments (file only - copies available upon request):

- 6/18/96 meeting agenda
- CRCIA Purpose dated 6/17/96
- CRCIA Purpose dated 6/18/96
- CRCIA Purpose with team signatures
- Viewgraphs presented by Charlie Brandt, first slide titled "Aquatic Exposure Model Overview"
- DSI from Dennis Dauble regarding Risk Assessment of Microbial Communities, dated 6/17/96
- Proposal for the CRCIA Outreach Team, signed by CRCIA team members

Prepared by SM Finch on 7/8/96

**Columbia River Comprehensive Impact Assessment
Purpose, Objectives, Project Approach
June 18, 1996**

Purpose and Objectives

The purpose of the Columbia River Comprehensive Impact Assessment (CRCIA) is to assess the effects of Hanford-derived materials and contaminants on the Columbia River environment, river-dependent life, and users of river resources.

For CRCIA to be comprehensive, representatives of the major community groups (non-DOE) on the CRCIA Team (~~see CRCIA Management Team description below~~) have agreed that the following objectives must be achieved if the results and conclusions are to be acceptable by all concerned:

- estimate, with useful certainty, river-related human health and ecological risks for the time period that Hanford materials and contaminants remain intrinsically hazardous
- evaluate the sustainability of the river ecosystem, the interrelated cultural quality of life, and the viability of socio-economic entities for the time period that Hanford materials and contaminants remain intrinsically hazardous
- provide results that are useful for decision making on Hanford waste management, environmental restoration, and remediation

Robert K. (Bob) Stewart, DOE

Rose Mentry, ODOE

Loy deBeaulieu HAD

Stewart H2

Confederated Tribes of The Umatilla Indian Reservation

Buy wheel for Dave (Holland) ECOLOGY LH

Paul Plummer Technical advisor of Nez Perce Tribe ERWM

John W. Young TECHNICAL ADVISOR OF THE YAKAMA NATION

Lawrence E. Gaddis, EPA

Proposal for the CRCIA Outreach Team

The Columbia River Comprehensive Impact Assessment (CRCIA) Outreach Team will be empowered and responsible for coordinating outreach activities on behalf of the CRCIA Project Team. The Outreach Team will strive to accurately reflect the views of the Project Team in any communication materials. Consensus from the Project Team will be sought prior to publication. The Outreach Team will be open to any of the organizations represented on the Project Team. The following are participants in and contacts for the Outreach Team:

Nancy Myers/Gail McClure	372-9059/373-5647	372-9115/376-1563 (fax)
Larry Gadbois	376-9884	376-2396 (fax)
Douglas Palenshus	736-3007	736-3030 (fax)
Rose Bennett	503-373-7400	503-373-7806 (fax)

Larry Gadbois 6-5-96
Larry Gadbois, EPA

Stuart G. Harris
Stuart G. HARRIS
JERRY YOKEL
Jerry Yokel for
Dane Holland
Thom J. Throck

Confederated Tribes of The
Wasilla Indian Reservation
6/18/1996

Douglas Palenshus 6/5/96
DOUGLAS PALENSHUS

Ecology
6/18/96
6/18/96

Rose Gentry 6-5-96
Rose Gentry, ODOE

Gail McClure
GAIL M-CLURE, DOE
6/5/96

Nancy B. Myers 6/18/96
NANCY B. MYERS

Greg de Bruin HAD
GREG DE BRUIN

ERWIN
Nepawa Tribe Technical Advisor

Robert K. (Bob) Stewart, DOE Project Mgr, CRCIA

AGENDA
Columbia River Comprehensive Impact Assessment
Weekly Project Management Team

Scheduled from 9:00 - 12:00 p.m., June 18, 1996
 Bechtel Building, 3350 George Washington Way, 2A01 Conference Room

Scheduled from 1:00 - 5:00, June 18, 1996
 Battelle's ETB Building, Columbia River Room

Morning Session

1. Content Development:
 - Section 1.6 - Habitat & Critical Uptake Locations Requirements
 - Section 1.7 - Ecosystem Relationships & Cultural Dependency Modeling Requirements
 - Section 1.8 - Dose-to Receptor Calculation Requirements
 - Section 1.9 - Dose Effects Requirements
 - Section 1.10 - Develop Climate, Geological & Political Scenario Requirements
 - Section 1.11 - Develop Tech B/L Requirements

2. Material to Hand Out for Review (Comments due to Lino on 6/25)
 - Section 1.5 - Review Hydrodynamics Requirements
 - Section 1.6 - Habitat & Critical Uptake Locations Requirements
 - Section 1.7 - Ecosystem Relationships & Cultural Dependency Modeling Requirements

NOTE: Section 1.6 and 1.7 will be faxed/ccmailed out on Wednesday or Thursday with comments due back on 6/25.

3. Comments from Team Members Due Today
 - Section 1.3 - Transport-to-River Requirements
 - Section 1.4 - Waste Entry to River Requirements

4. Material turned over for Editorial Review Today
 - Section 1.1 - Inventories & Sources Requirements
 - Section 1.2 - Containment Breach Requirements

NOTE: Very few comments were received from team members on these two sections.

Afternoon Session

1. 1:00 - Bob Stewart - Introduction
2. 1:15 - Thomas Woods - Finalization of CRCIA Purpose and Team Purpose
3. 3:15 - Charlie Brandt - EHQs Presentation
4. 4:15 - Rose Gentry - Proposal for Public Outreach Team
 - At the 4/23/96 meeting, a proposal for the Public Outreach Team was handed out and discussed. The proposal was briefly discussed at the 4/30/96 meeting. An updated proposal will be presented to the team for agreement at the 6/18/96 meeting.
5. 4:30 - Review of Upcoming Meetings

6/24/96 - Monday Afternoon - ETB Columbia River Room

1. "Polishing" of Comprehensive Text
 - Section 1.1 - Inventories & Sources Requirements
 - Section 1.2 - Containment Breach Requirements

6/25/96 - Morning - Bechtel Building, Room 2A01

1. Content Development:
 - Section 2.2 - Identification of River Impact "Drivers"
 - Section 2.3 - Analysis Architecture & Integration Requirements
 - Section 2.4 - Identification & Management of Uncertainty
2. Material to Hand Out for Review (Comments due to Lino on 7/2)
 - Section 1.8 - Dose-to Receptor Calculation Requirements
 - Section 1.9 - Dose Effects Requirements
 - Section 1.10 - Develop Climate, Geological & Political Scenario Requirements
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6/25/96 - Afternoon - ETB Columbia River Room

- Make-up session for Comprehensive Section

7/1/96 - Monday Afternoon - ETB Columbia River Room

1. "Polishing" of Comprehensive Text
 - Section 1.3 - Transport-to-River Requirements
 - Section 1.4 - Waste Entry to River Requirements

7/2/96 - Morning - Bechtel Building, Room 2A01

1. Content Development:
 - Section 2.1 - Required Impact Assessment Quality
 - Section 2.5 - Data Quality Requirements
 - Section 2.6 - Requirements for Development of New Analysis Methods
 - Section 2.7 - Development of Risk Assessment Methods
2. Material to Hand Out for Review (Comments due to Lino on 7/9)
 - Section 2.2 - Identification of River Impact "Drivers"
 - Section 2.3 - Analysis Architecture & Integration Requirements
 - Section 2.4 - Identification & Management of Uncertainty
3. Comments from Team Members Due Today
 - Section 1.8 - Dose-to Receptor Calculation Requirements
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4. Material turned over for Editorial Review
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7/2/96 - Afternoon - ETB Columbia River Room

- Make-up session for Comprehensive Section

Columbia River Comprehensive Impact Assessment

Purpose:

The purpose of the Columbia River Comprehensive Impact Assessment (CRCIA) is to assess the effects of Hanford-derived materials and contaminants on the Columbia River environment, River-dependent life, and users of River resources.

Objectives:

For CRCIA to be comprehensive, community members (non-DOE members) of the CRCIA Management Team (see CRCIA Management Team below) have agreed that the following objectives must be achieved:

- estimate, with useful certainty, river-related human health and ecological risks for the time period that Hanford materials and contaminants remain intrinsically hazardous,
- evaluate river-related risks to the sustainability of the river ecosystem, to cultural quality of life, and to socio-economic entities for the time period that Hanford materials and contaminants remain intrinsically hazardous,
- provide results that are useful for Hanford cleanup decision making.

CRCIA Management Team:

To address concerns about the scope and direction of CRCIA as well as enhance regulator, stakeholder, tribal, and public involvement, a CRCIA Management Team was formed in August 1995. This Team meets weekly and is comprised of representatives from the Department of Energy, the Environmental Protection Agency, the Washington State Department of Ecology, the Nez Perce Tribe, the Confederated Tribes of the Umatilla Reservation, the Yakama Indian Nation, the State of Oregon, and the Hanford Advisory Board.

Project Approach:

To address CRCIA objectives, the CRCIA Management Team has agreed to conduct CRCIA using a phased approach. The initial phase, which is required and described in Tri-Party Agreement milestones M-15-80 and M-15-80-T01, includes two components: 1) a screening assessment to evaluate the current impact to the river resulting from Hanford-derived contamination, and 2) a definition of "the essential work remaining to provide an acceptable comprehensive river impact assessment".

Additional phases of the CRCIA will be identified and decisions made regarding conduct of the additionally identified work based on submittal of information as required by Tri-Party Agreement

milestones M-15-80A, M-15-80B, and M-15-80B-T01.

Purpose and Scope of CRCIA Screening Assessment (CRCIA Initial Phase, Part I):

Purpose and Scope of CRCIA Requirements for a Comprehensive Assessment (CRCIA Initial Phase, Part II):

6/18/96

DRAFT

(Incorporates 6/17 Comments from Tom Woods into Bob Stewart's version)_

Columbia River Comprehensive Impact Assessment

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- evaluate the ~~river-related risks to~~ the sustainability of the river ecosystem, the cultural quality of life, and the ~~viability of~~ socio-economic entities for the time period that Hanford materials and contaminants remain intrinsically hazardous,
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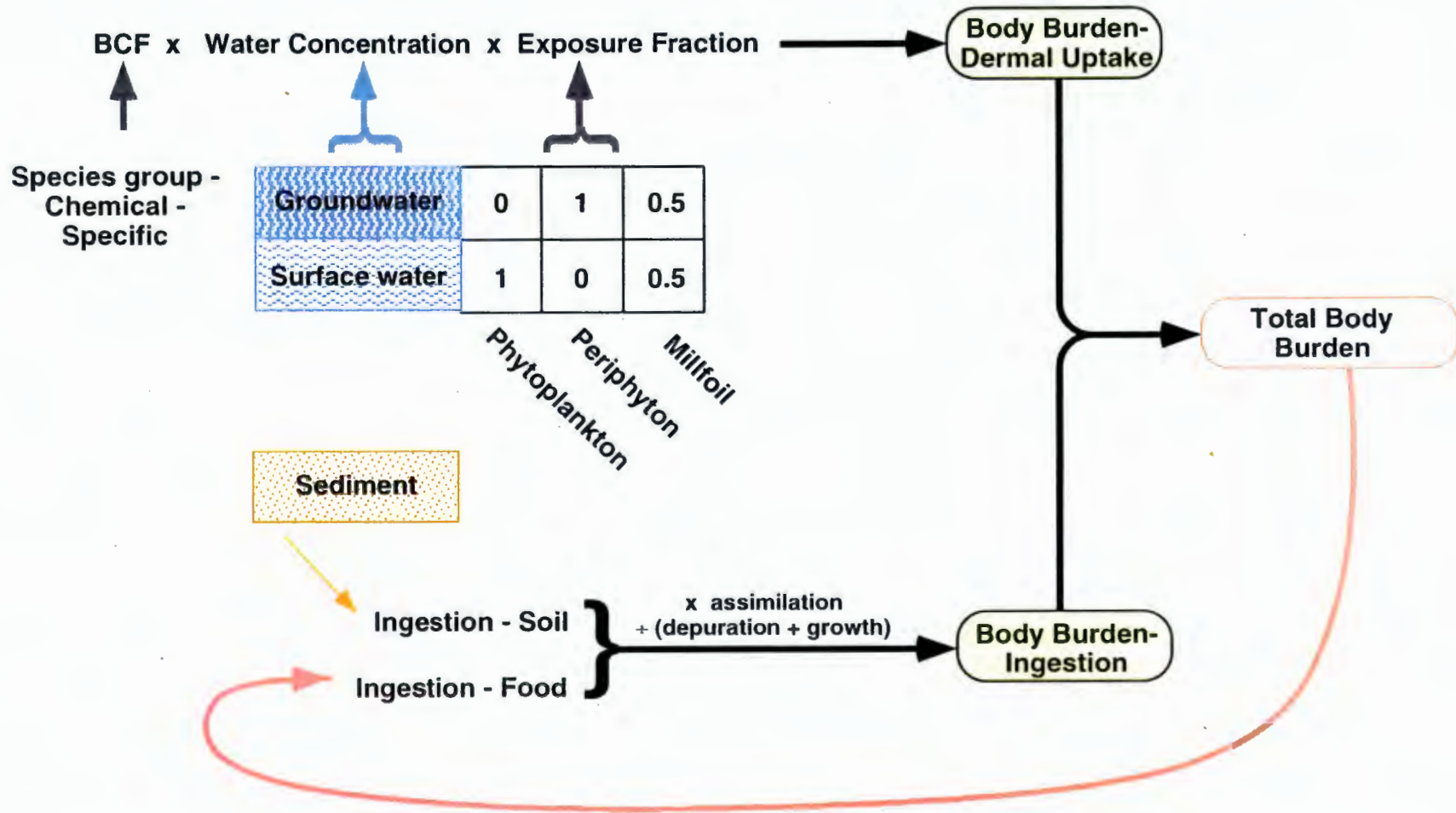
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Purpose and Scope of CRCIA Screening Assessment (CRCIA Initial Phase, Part I):

Purpose and Scope of CRCIA Requirements for a Comprehensive Assessment (CRCIA Initial Phase, Part II):

Aquatic Exposure Model Overview



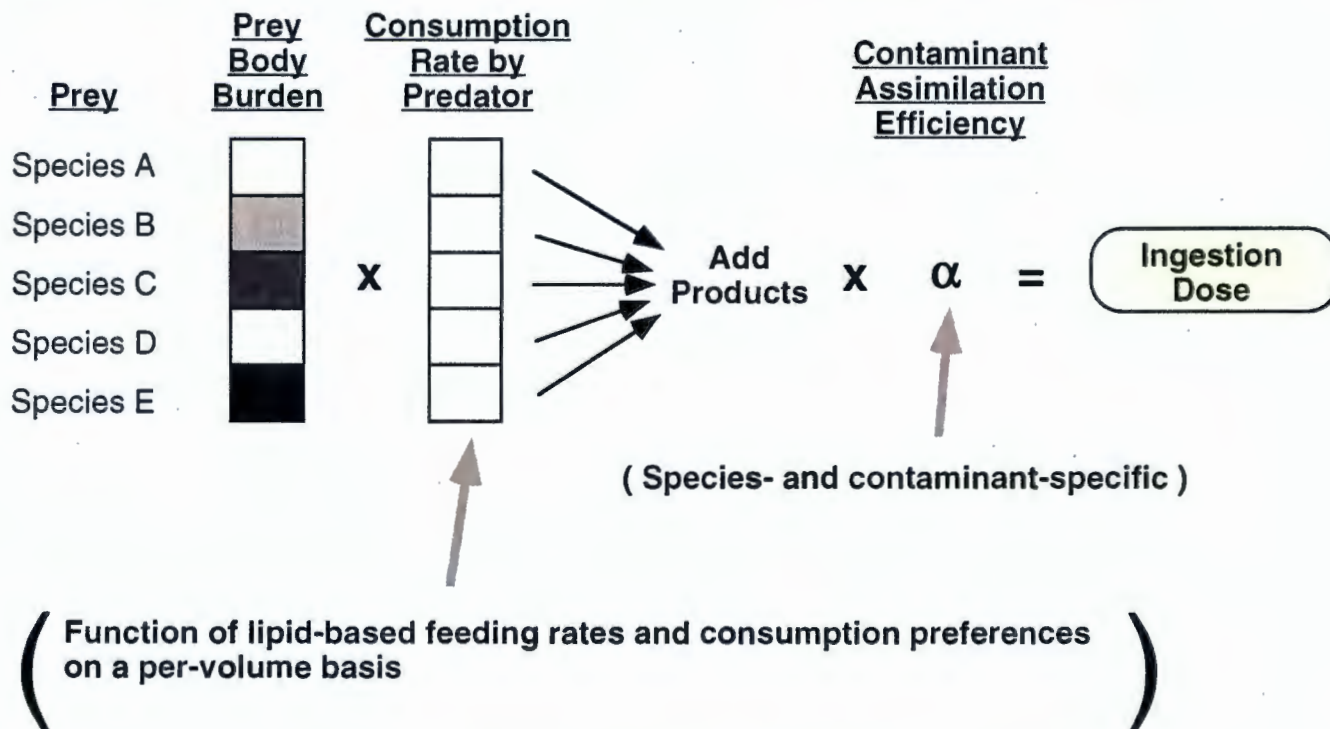
Aquatic Exposure Ingestion Formula

Ingestion

Exposure formula follows:

Thomann (1995) Steady-state model of biota sediment accumulation factor for metals in two marine bivalves. *Environ. Toxicol. Chem.* 14:1989-1998.

Thomann et al. (1992) An equilibrium model of organic chemical accumulation in aquatic food webs with sediment interaction. *Environ. Toxicol. Chem.* 11:615-629.

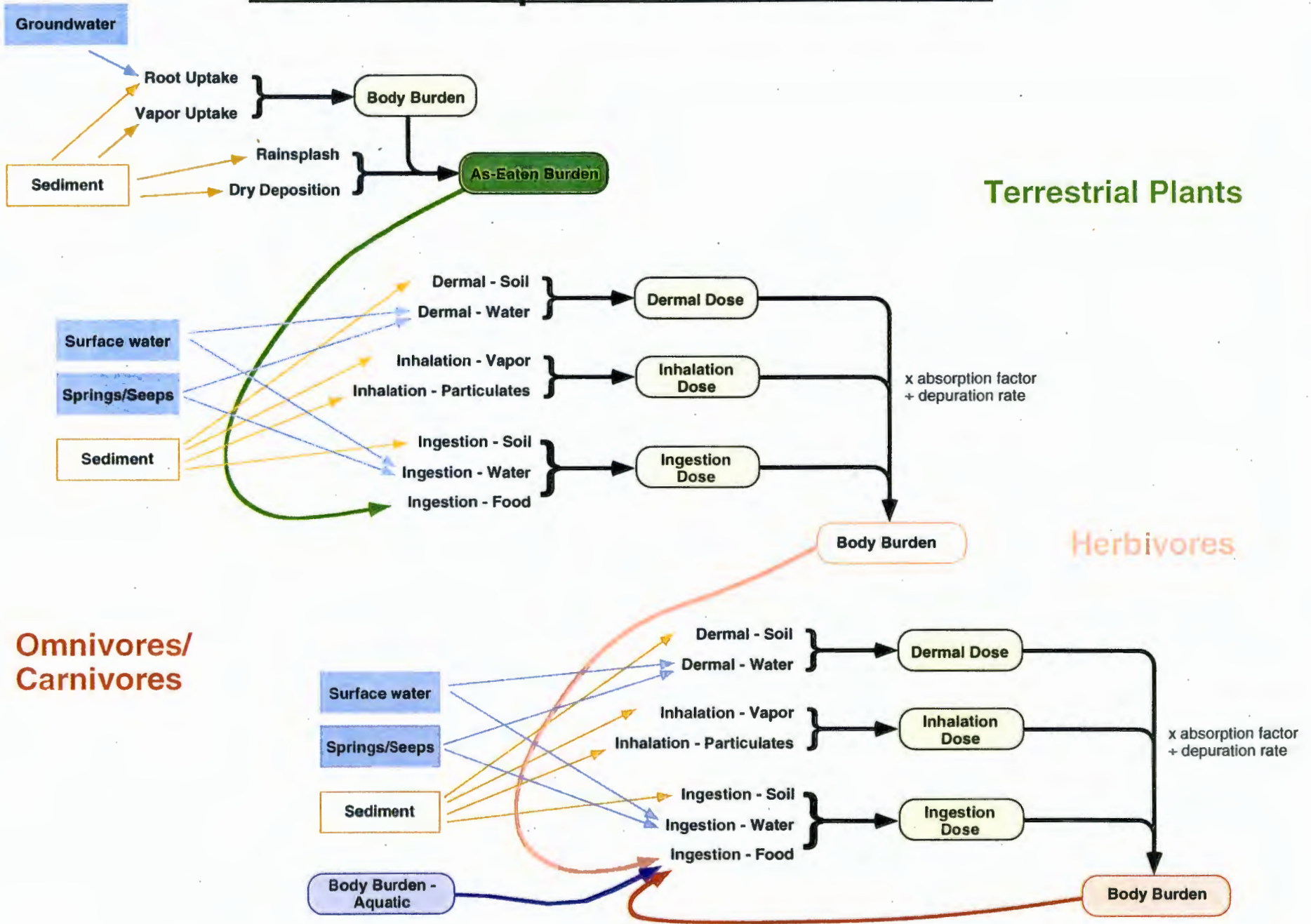


Consumption Matrix

	Foraging Preferences																								
	Sediment	Phyto-plankton	Peri-phyton	Water millioil	Crayfish	Mayfly	Columbia pebble-snail	clams	Bullfrog (tadpole)	mussets	Hyaliteia	Daphnia magna	Channel catfish	Large-scale sucker	Mountain sucker	Carp	Mountain whitefish	White sturgeon	Pacific lamprey (juve)	Salmon (larvae)	Salmon (eggs)	Salmon (adults)	Steelhead (adults)	Steelhead (eggs)	Steelhead (larvae)
	P _{1999,2001}	P ₁	P ₁	P ₁	P ₁	P ₁	P ₁	P ₁	P ₁	P ₁	P ₁	P ₁	P ₁	P ₁	P ₁	P ₁	P ₁	P ₁	P ₁	P ₁	P ₁	P ₁	P ₁	P ₁	P ₁
Phytoplankton	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Periphyton	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Water millioil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crayfish	0.4	0	0.4	0	0	0.1	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mayfly	0.2	0.2	0.4	0.1	0	0	0	0	0	0	0.05	0.05	0	0	0	0	0	0	0	0	0	0	0	0	0
Columbia pebblesnail	0.1	0	0.2	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
clams	0.4	0.5	0	0	0	0	0	0	0	0	0.05	0.05	0	0	0	0	0	0	0	0	0	0	0	0	0
Bullfrog (tadpole)	0.1	0	0.2	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
mussets	0.4	0.5	0	0	0	0	0	0	0	0	0.05	0.05	0	0	0	0	0	0	0	0	0	0	0	0	0
Hyaliteia	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Daphnia magna	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Channel catfish	0.38	0	0.38	0.1	0	0.14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Largescale sucker	0.38	0	0.38	0.1	0	0.14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mountain sucker	0.38	0	0.38	0.1	0	0.14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Carp	0.32	0	0.32	0.1	0	0.19	0.07	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mountain whitefish	0.1	0	0.1	0.07	0	0.05	0.05	0	0	0	0	0	0.005	0.005	0.005	0.005	0	0	0	0	0	0	0	0	0
White sturgeon	0.175	0	0.175	0	0.1	0.23	0	0	0	0	0	0	0.0725	0.0725	0.0725	0.072	0	0	0	0	0	0	0	0	0
Pacific lamprey (juvenile)	0.2	0	0.2	0	0	0	0	0	0	0	0.3	0.3	0	0	0	0	0	0	0	0	0	0	0	0	0
Salmon (larvae)	0.01	0	0.01	0	0	0.94	0	0	0	0	0.02	0.02	0	0	0	0	0	0	0	0	0	0	0	0	0
Salmon (eggs)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Salmon (adults)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Steelhead (adults)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Steelhead (eggs)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Steelhead (larvae)	0.01	0	0.01	0	0	0.94	0	0	0	0	0.02	0.02	0	0	0	0	0	0	0	0	0	0	0	0	0

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Terrestrial Exposure Model Overview



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Terrestrial Exposure Formulae Overview

Dermal

Exposure formulae follow:

EPA (1992) Dermal Exposure Assessment: Principles and Applications.

Inhalation

Exposure formulae follow:

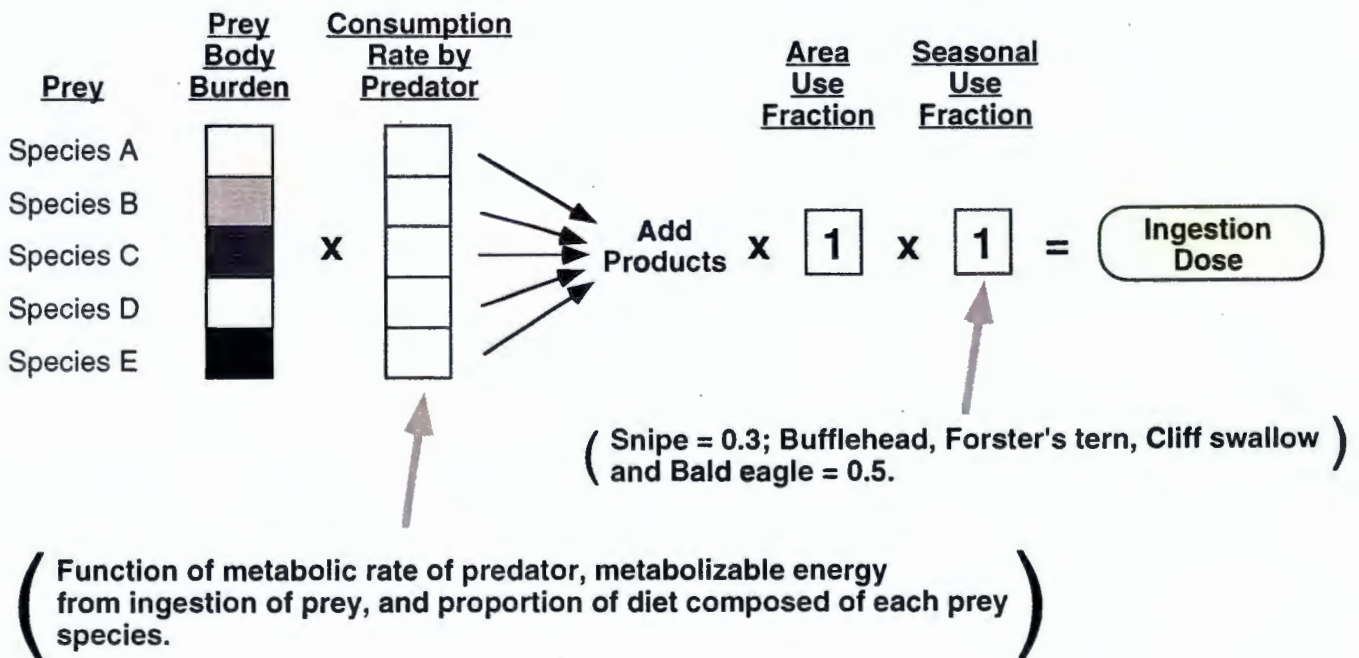
EPA (1991) Risk Assessment Guidance for Superfund: Volume 1 - Human Health Evaluation Manual (Part B, Development of Risk-based Preliminary Remediation Goals).

EPA (1993) Wildlife Exposure Factors Handbook, Volume 1.

Ingestion

Exposure formulae follow:

EPA (1993) Wildlife Exposure Factors Handbook, Volume 1.



Consumption Preferences

		Predation Fraction (by volume or wet weight basis)																																		
Species	P _{total}	Fungi	Black cottonwood	Dense sedge	Fern	Mulberry	Reed canarygrass	Rushes	Tule	Columbia yellowcress	Terrestrial arthropods	Lizards	Western garter snake	Muskrat	Beaver	Raccoon	Coyote	Weasel	Mule deer	Harvest mouse	Bullfrog - adult	American coot	Common snipe	Bufflehead	Canada Goose	Mallard	American white pelican	Forster's tern	California quail	Cliff swallow	Great blue heron	Bald eagle	Northern harrier			
		P ₁	P ₂	P ₃	P ₄	P ₅	P ₆	P ₇	P ₈	P ₉	P ₁₀	P ₁₁	P ₁₂	P ₁₃	P ₁₄	P ₁₅	P ₁₆	P ₁₇	P ₁₈	P ₁₉	P ₂₀	P ₂₁	P ₂₂	P ₂₃	P ₂₄	P ₂₅	P ₂₆	P ₂₇	P ₂₈	P ₂₉	P ₃₀	P ₃₁				
Fungi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Black cottonwood	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Dense sedge	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Fern	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Mulberry	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Reed canarygrass	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Rushes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Tule	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Columbia yellowcress	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Terrestrial arthropods	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Lizards (Uta)	0	0	0	0	0	0	0	0	0	0	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Western aquatic garter snake	0	0	0	0	0	0	0	0	0	0	0.1	0.2	0	0	0	0	0	0	0	0	0.23	0.02	0	0.05	0	0	0	0	0	0	0	0.05	0	0	0	
Muskrat	0	0	0.05	0	0	0	0.05	0.38	0.38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Beaver	0	0.8	0	0	0.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Raccoon	0	0	0.1	0	0.05	0	0.1	0.2	0	0.1	0	0.01	0.01	0	0	0	0	0	0	0	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0	0.02	0.02	0	0	0	0	
Coyote	0	0	0	0	0.02	0	0	0	0	0.05	0.01	0.01	0.01	0.01	0.01	0	0	0	0	0.02	0.28	0.02	0.02	0.02	0.04	0.03	0.05	0	0	0.02	0.02	0	0	0	0	
Weasel	0	0	0	0	0	0	0	0	0	0.01	0	0.01	0	0	0	0	0	0	0	0	0.02	0.05	0	0.01	0	0	0	0	0	0	0	0	0	0.05	0	0
Mule deer	0	0.2	0.1	0	0.3	0.1	0.1	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Harvest mouse	0	0	0.4	0	0	0.4	0.1	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Bullfrog - adult	0	0	0	0	0	0	0	0	0	0.25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
American coot	0	0	0	0	0	0	0	0.04	0.04	0.02	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Common snipe	0	0	0	0	0	0	0	0	0	0.05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Bufflehead	0	0	0	0	0	0	0	0.04	0.04	0.02	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Canada Goose	0	0	0.05	0	0	0.2	0.2	0.13	0.13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Mallard	0	0	0.05	0	0	0.05	0.1	0.18	0.18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
American white pelican	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Forster's tern	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
California quail	0	0	0.1	0	0	0.8	0.07	0	0	0.03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Cliff swallow	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Great blue heron	0	0	0	0	0	0	0	0	0	0.04	0	0.01	0	0	0	0	0	0	0	0	0.05	0.02	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bald eagle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0.2	0.08	0	0	0	0	0	0	0	0	0
Northern harrier	0	0	0	0	0	0	0	0	0	0	0	0	0	0.01	0	0	0	0	0	0	0.6	0	0.01	0.03	0	0.04	0	0.01	0.3	0	0	0	0	0	0	
American kestrel	0	0	0	0	0	0	0	0	0	0.01	0.2	0	0	0	0	0	0	0	0	0	0.33	0	0.03	0	0	0	0	0	0	0	0	0	0.46	0	0	0

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Consumption Preferences

		Predation Fraction (by volume or wet weight basis)																														
Species	P ₁	P ₂	P ₃	P ₄	P ₅	P ₆	P ₇	P ₈	P ₉	P ₁₀	P ₁₁	P ₁₂	P ₁₃	P ₁₄	P ₁₅	P ₁₆	P ₁₇	P ₁₈	P ₁₉	P ₂₀	P ₂₁	P ₂₂	P ₂₃	P ₂₄	P ₂₅	P ₂₆						
																											American kestrel	Phytoplankton	Periphyton	Water milfoil	Crayfish	Mayfly
Fungi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
Black cottonwood	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Dense sedge	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Fern	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Mulberry	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Reed canarygrass	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Rushes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Tule	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Columbia yellowcress	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Terrestrial arthropods	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Lizards (Uta)	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Western aquatic garter snake	0	0	0	0	0	0.15	0.1	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Muskrat	0	0	0.05	0.05	0.01	0	0.01	0.02	0	0	0	0	0	0	0	0	0.01	0	0	0	0	0	0	0	0	0	0	0				
Beaver	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Raccoon	0	0	0	0	0.2	0	0	0	0.01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Coyote	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.02	0.05	0.05	0	0	0	0	0	0	0.2	0	0				
Weasel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.05	0.1	0.1	0	0	0	0	0	0	0.05	0	0	0			
Mule deer	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
Harvest mouse	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
Bullfrog - adult	0	0	0	0	0	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
American coot	0	0	0.5	0.2	0.02	0.04	0	0.02	0.01	0.02	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
Common snipe	0	0	0	0	0	0.65	0.2	0	0	0	0	0	0	0	0	0	0.01	0.01	0.01	0	0	0.02	0.08	0	0	0	0	0	0	0.03		
Bufflehead	0	0	0.03	0.01	0.01	0.03	0.17	0.03	0	0	0	0	0	0	0	0	0	0	0	0	0	0.01	0	0	0	0	0	0	0	0.01		
Canada Goose	0	0	0.2	0.05	0	0.05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Mallard	0	0	0.25	0.1	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
American white pelican	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.05	0.05	0.15	0.4	0	0.1	0.13	0	0	0	0	0	0	0.13		
Forster's tern	0	0	0	0	0	0.3	0	0	0	0	0	0	0	0	0	0	0.05	0.05	0.1	0.2	0	0.1	0.1	0	0	0	0	0	0	0.1		
California quail	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Cliff swallow	0	0	0	0	0	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Great blue heron	0	0	0	0	0.08	0.04	0	0	0.01	0	0	0	0	0	0	0	0.05	0.05	0.1	0.05	0	0.1	0.1	0	0	0	0	0	0	0	0.1	
Bald eagle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.01	0.01	0.03	0.05	0	0	0	0	0	0	0.4	0.01	0	0	0	
Northern harrier	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
American kestrel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Use of Data

1. Maximum contaminant values in the abiotic media will be used in screening evaluation; geometric means and geometric standard deviations will be used in Monte Carlo simulations.
2. Reported values for non-detect data will be used in both screening and Monte Carlo analyses.
3. Missing sediment data will be estimated using k_d (where groundwater but not sediment data are available) or by extrapolating (where surface water data are absent) from upstream values. Extrapolation routine maintains surface water values downstream until next sampling station is reached. Where sediment are the only sampled medium in a segment, k_d will be used to estimate pore-water concentrations. Results based on estimated concentrations will be flagged.
4. Sediment values are assumed to represent soil values within the riparian zone, i.e., sediment data (or estimates) will be employed as source terms for terrestrial exposures.
5. Concentrations will be converted to consistent units (ppm) before use in the exposure model.
6. Species-specific averages will be used where available (e.g., body weights). Where species-specific data are unavailable, genus data will be substituted (e.g., BCFs). Where genus data are unavailable, 90th percentile data will be used for taxonomic group (e.g., soil-plant transfer factors). Where "standard" extrapolation methods (i.e., commonly-used, DOE, or EPA methods) are available, those will be employed (e.g., toxicological endpoint dose extrapolations among species). All means used to parameterize the exposure models will be documented.
7. Screening-level exposure estimates will be compared to toxicological endpoint dose (LOAELs and LC/LD₅₀s) by ratio method (estimated dose / toxicological endpoint dose) using additive effects where appropriate (metals, radiation, and organics as separate groups), and taking largest effect for non-additive effects. For locations/species where the ratio exceeds 0.1, the location/species is examined further under Monte Carlo.

DON'T SAY IT...WRITE IT!!!

17 June 1996

To: Charlie Brandt
From: Dennis Dauble
Subject: Risk Assessment of Microbial Communities

The subject of using Microtox testing results to assist in our evaluation of potential ecological risk to microbial communities was brought up during the CRCIA meeting of 11 June 1996. The purpose of this DSI is to 1) discuss the relevance of Microtox endpoints for use in ecotoxicological evaluations and 2) summarize some considerations related to use of bacteria for toxicological evaluations of contaminants.

Microtox

The Microtox test uses a photoluminescent marine bacterium to rapidly evaluate the relative toxicity of test solutions. Relative changes in bioluminescence are detected using a Microtox analyzer and a 15-min EC50 (effective concentration yielding a 50% response in the test system) values for each sample can be calculated (Hoffman et al., 1995). A major drawback is that this test does not provide a functional measure of the risk of a contaminant to the microbial ecology of the Hanford Reach of the Columbia River (or most other natural systems). More useful functional measures of toxicant effect would include microbial growth (eg., cell counts) and activity (eg., geochemical cycling rates, oxidation of organic matter). For this reason, I do not recommend using Microtox data as a surrogate for assessing impacts of Hanford-derived contaminants to the aquatic microbial community.

Microbial Toxicity

Bacteria are relatively insensitive to toxicants because they have relatively few specialized organs or metabolic processes (Pritchard and Bourquin 1985). Additionally, bacteria can become dormant and survive adverse conditions. Frequently, the effect of chemical exposure on bacteria is biostatic rather than biocidal; thus, recovery rates are typically quite high. The ubiquity of bacteria and the redundancy of metabolic processes within heterogeneous populations means that localized effects of a toxicant can be compensated in a relative short time. Thus, the potential for long-term effects of a toxicant on bacterial populations are quite low. Because of the lack of site-specific data on the composition and function of microbes in the Columbia River ecosystem, absence of relevant toxicological literature on the functional response of microbes to radionuclide and chemical contaminants, I do not recommend expanding the scope of the eco-risk assessment to include microbial response and related ecological impacts.

References

Hoffman, D.J., B.A. Rattner, G.A. Burton, Jr., and J Cairns, Jr. 1995. Handbook of Ecotoxicology. Lewis Publishers. Boca Raton.

Pritchard, P.H. And A.W. Bourquin. 1985. Microbial toxicity studies. In Fundamentals of Aquatic Toxicology. pp 177-220. G.M Rand and S.R. Petrocelli [eds]. Hemisphere Publishing Corporation. Washington.