PHASE 2 REPORT
FURTHER SITE CHARACTERIZATION AND ANALYSIS

VOLUME 2E - REVISED BASELINE ECOLOGICAL RISK ASSESSMENT
HUDSON RIVER PCBs REASSESSMENT RI/FS

NOVEMBER 2000

For

U.S. Environmental Protection Agency
Region 2
and
U.S. Army Corps of Engineers
Kansas City District

Book 2 of 2
Tables, Figures and Plates

TAMS Consultants, Inc.
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PHASE 2 REPORT
FURTHER SITE CHARACTERIZATION AND ANALYSIS
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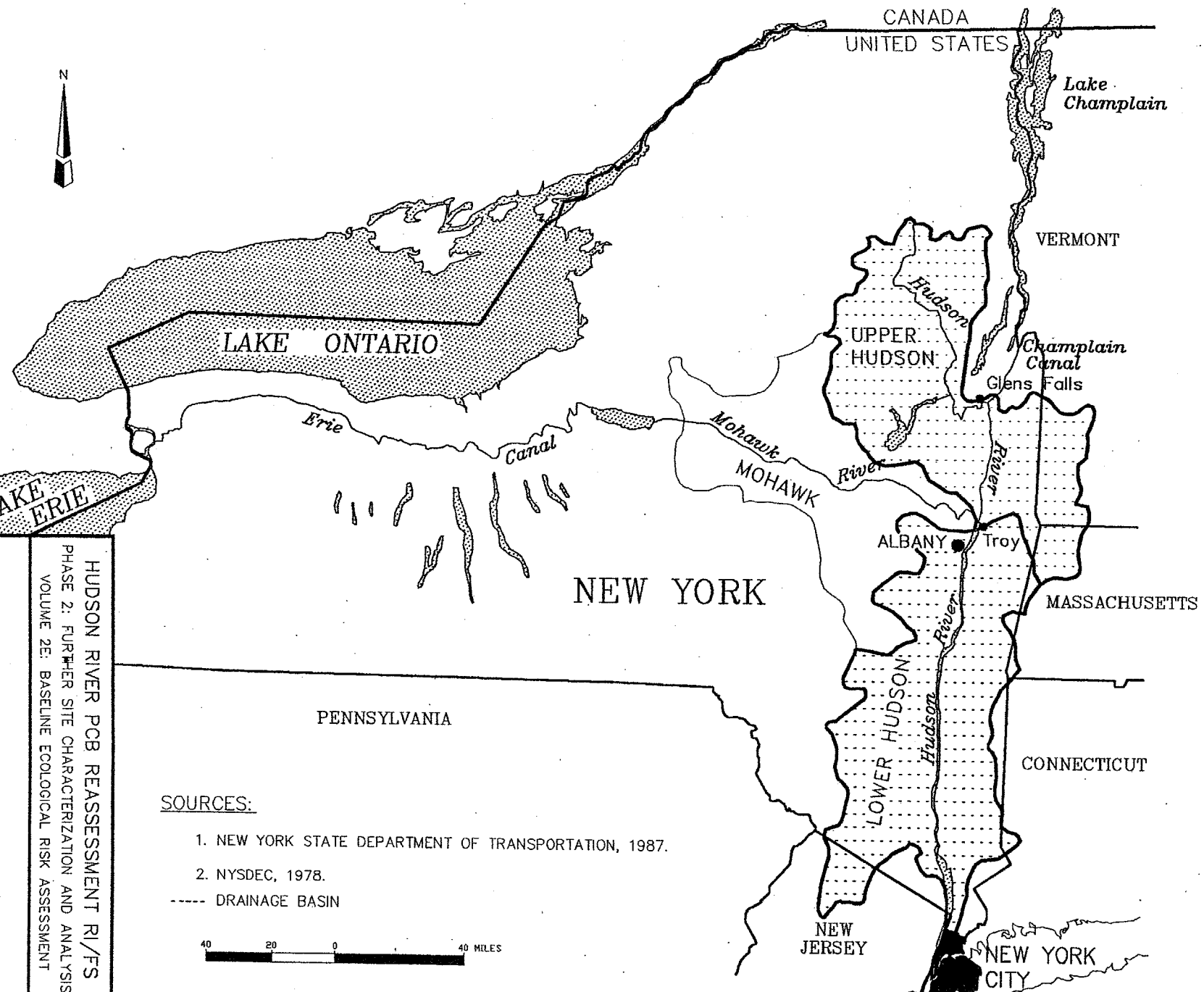

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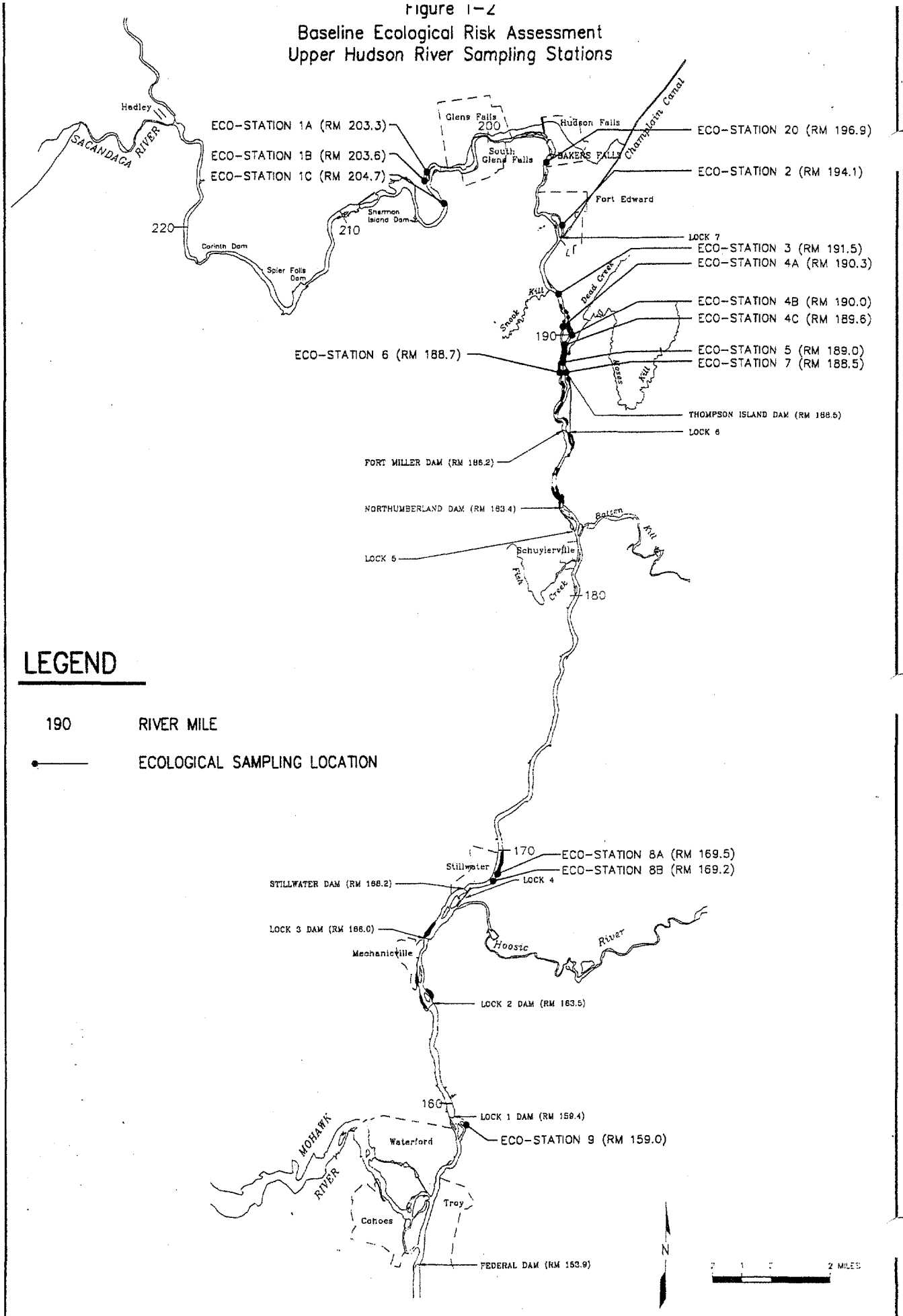
HUDSON RIVER PCB REASSESSMENT RI/FS
PHASE 2: FURTHER SITE CHARACTERIZATION AND ANALYSIS
VOLUME 2E: BASELINE ECOLOGICAL RISK ASSESSMENT

HUDSON RIVER DRAINAGE BASIN AND SITE LOCATION MAP

TAMS/MCA

FIGURE 1-1

Figure 1-2
Baseline Ecological Risk Assessment
Upper Hudson River Sampling Stations



SOURCE: Reassessment Database

TAMS / MCA

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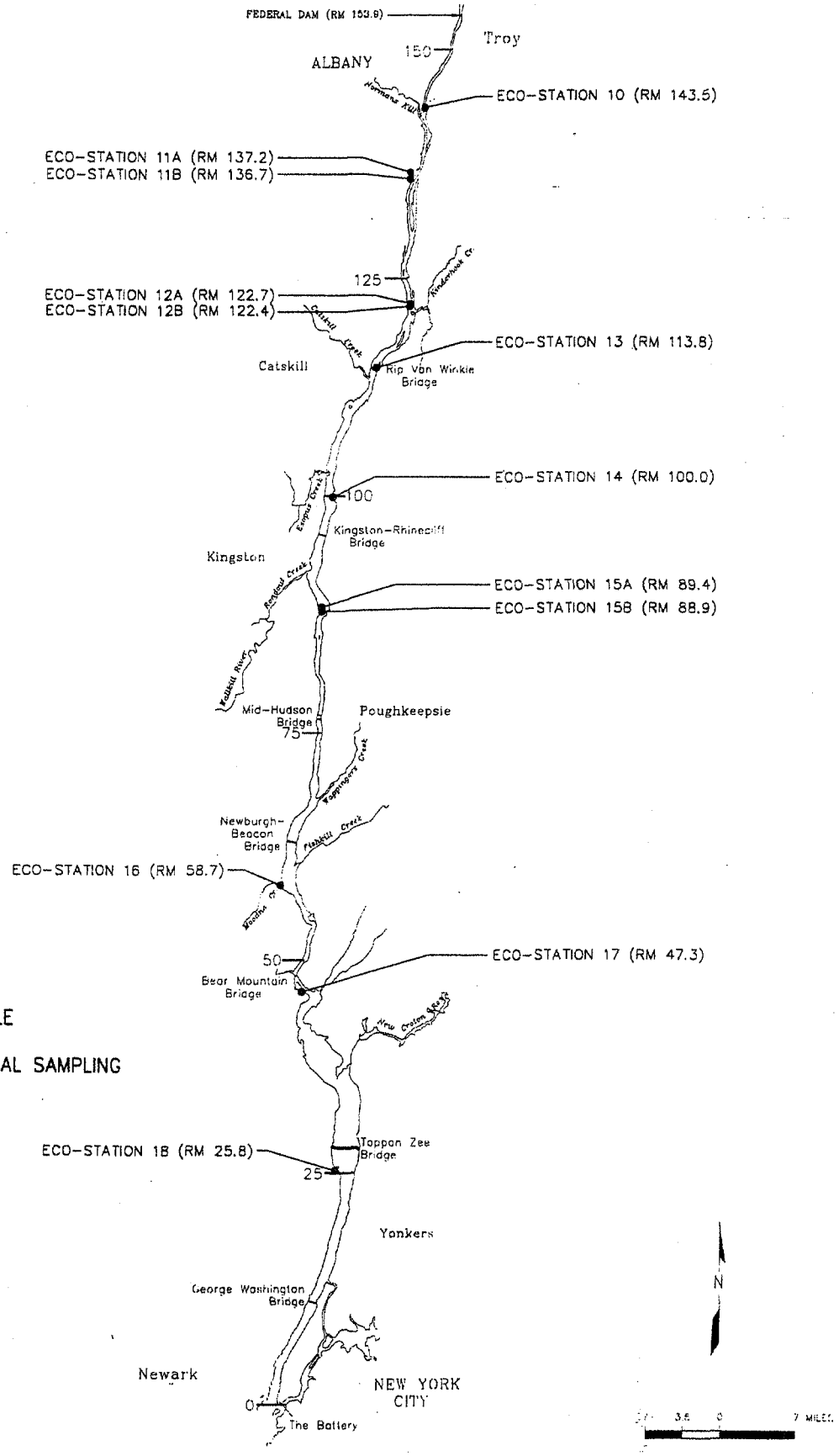
Figure 1-3
Baseline Ecological Risk Assessment
Lower Hudson River Sampling Stations



LEGEND

190 RIVER MILE

ECOLOGICAL SAMPLING LOCATION

SOURCE: Reassessment Database

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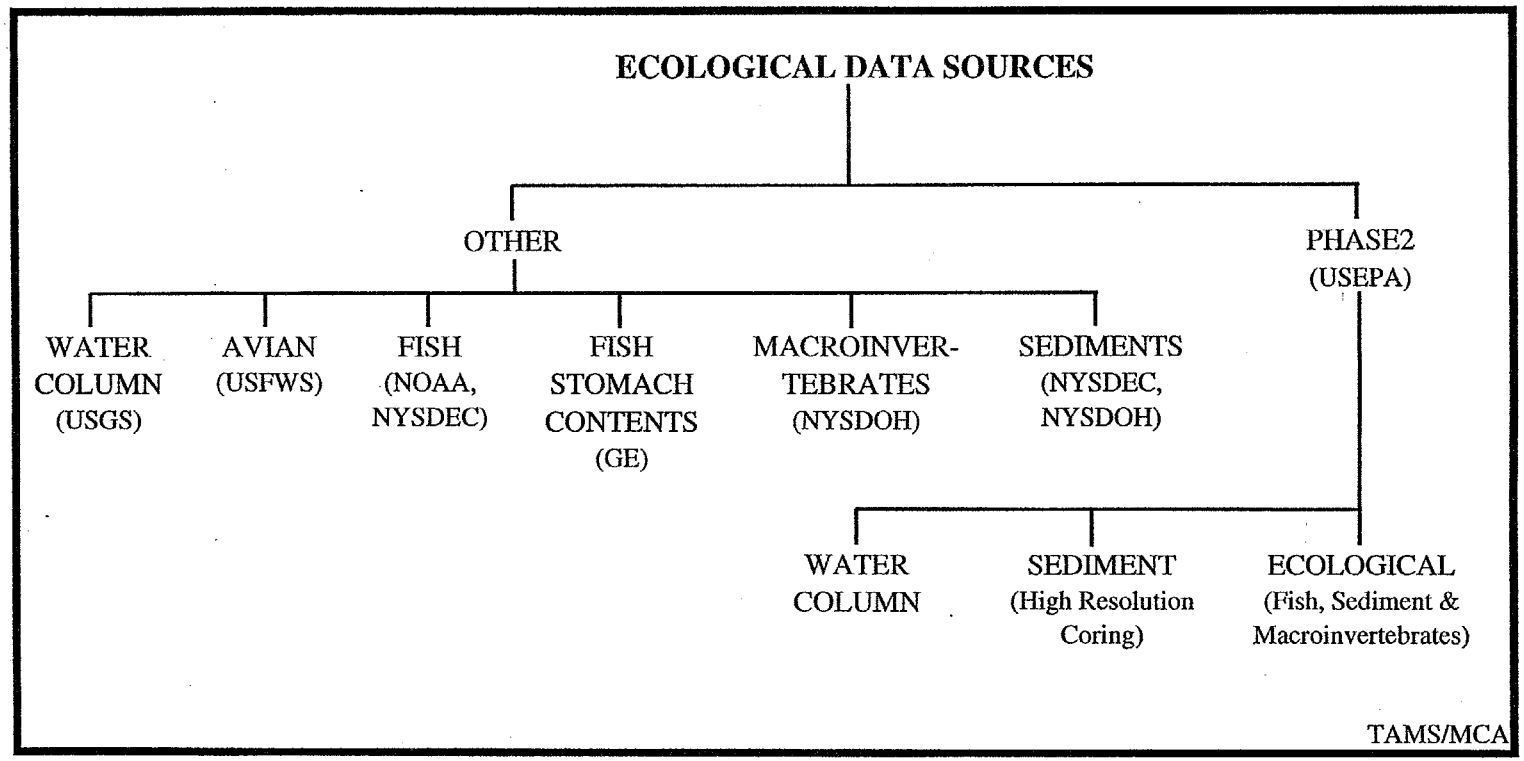

Figure 1-4
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Figure 1-5
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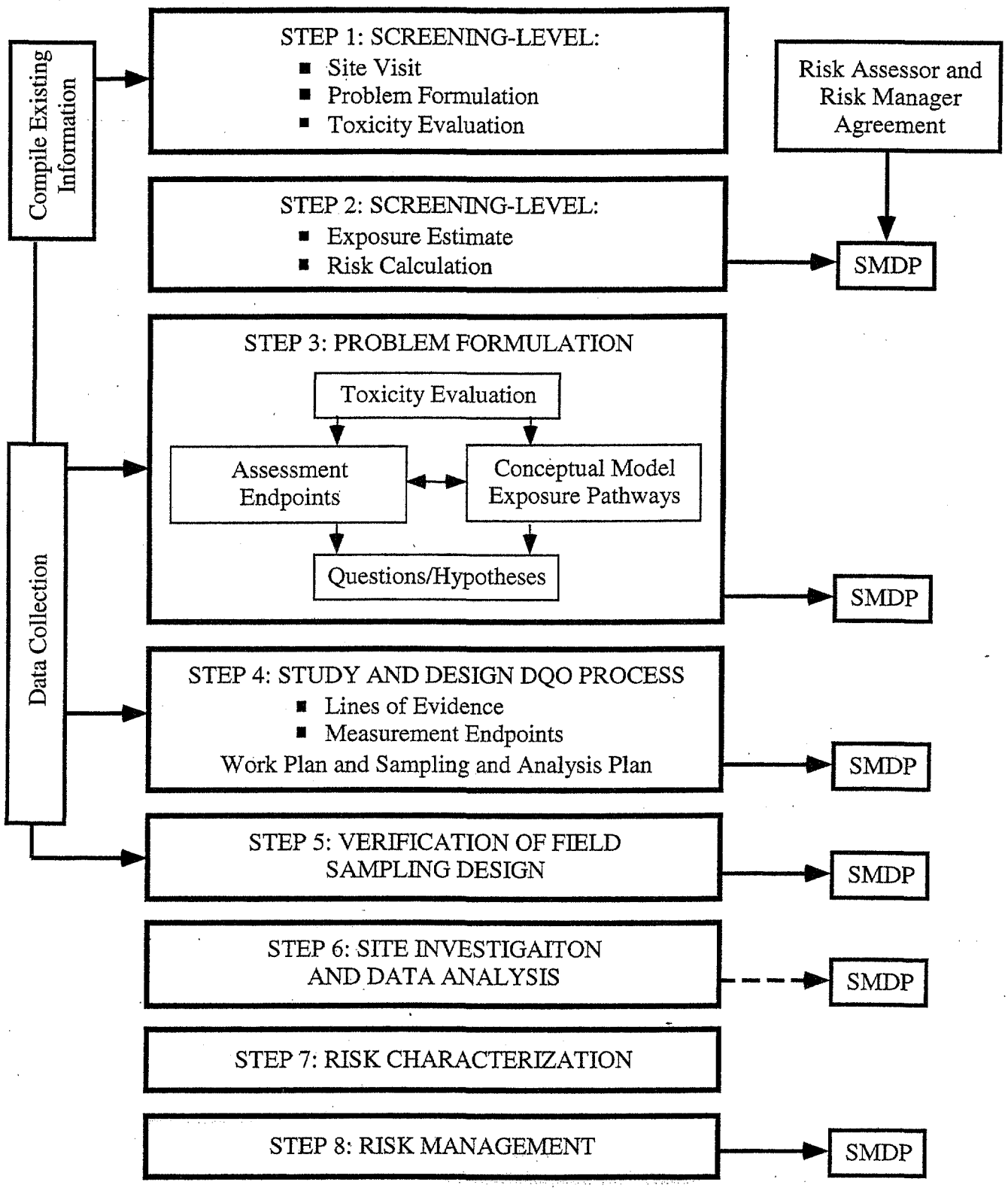

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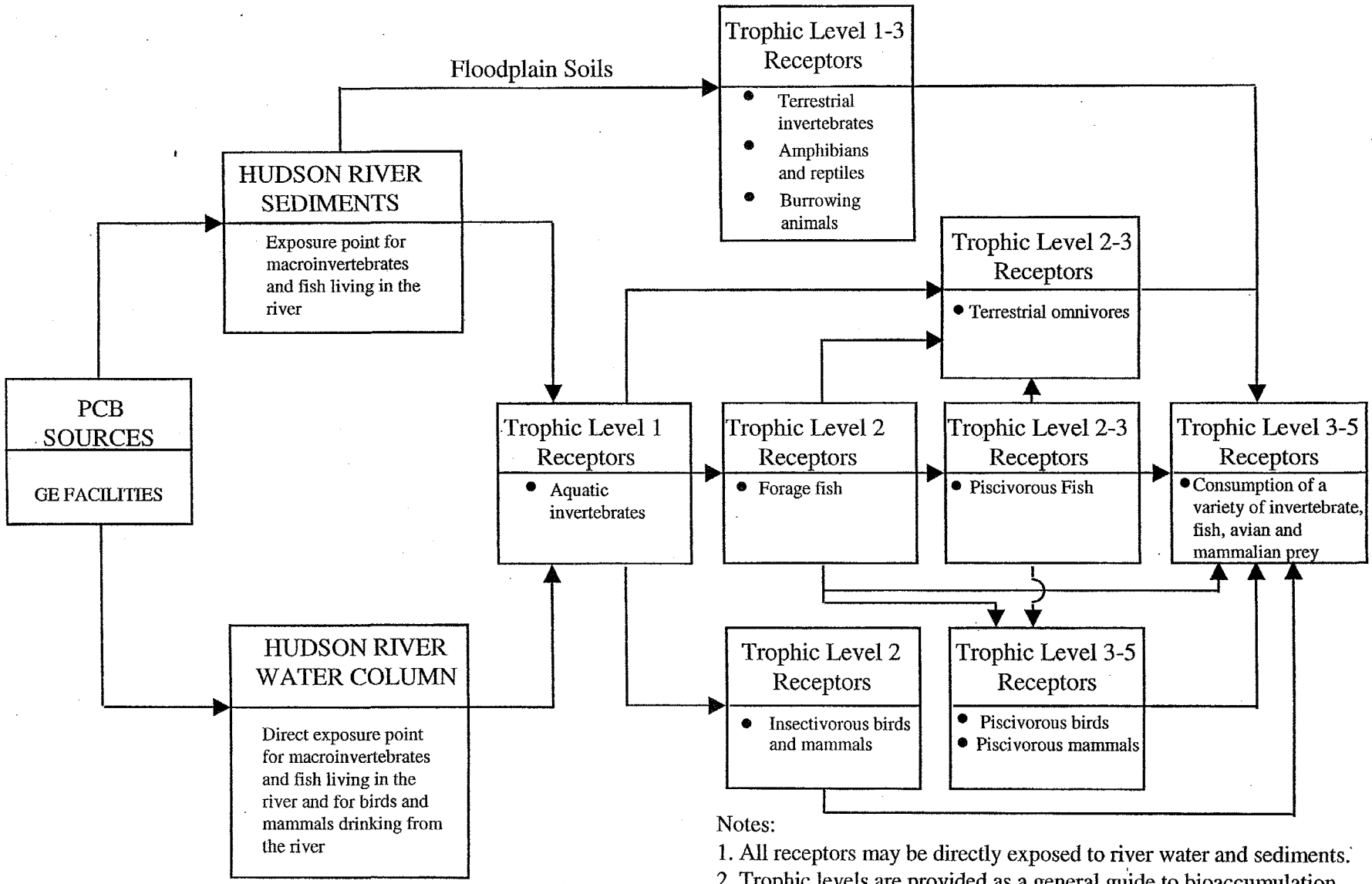
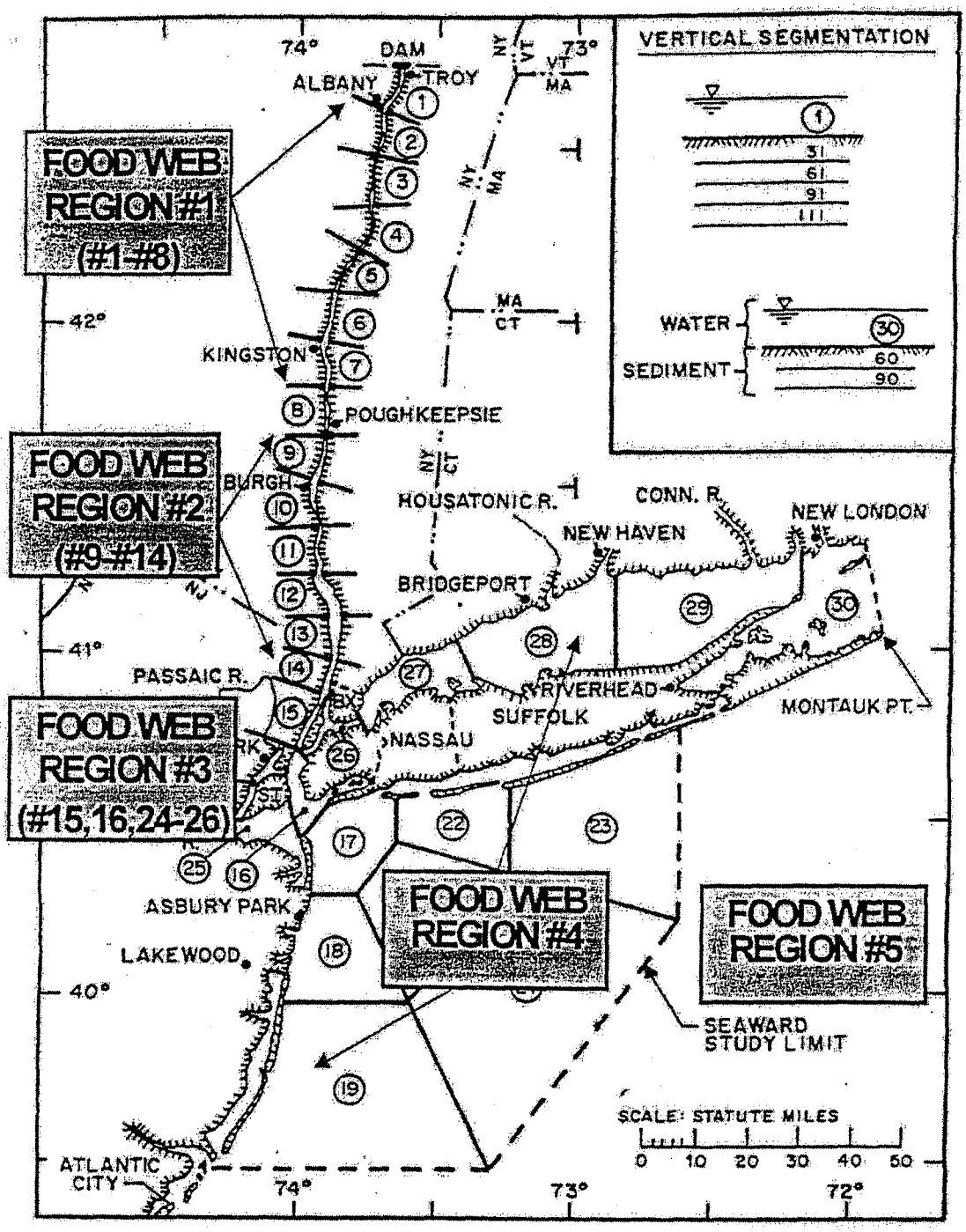
Hudson River PCB Reassessment
Conceptual Model Diagram Including Floodplain Soils



Notes:
1. All receptors may be directly exposed to river water and sediments.
2. Trophic levels are provided as a general guide to bioaccumulation potential, but vary according to species and food availability



Source: Farley et al., 1999

Note: Model segment numbers 1-30 pertain to the Fate and transport model. Model segments are combined into five food web regions for the bioaccumulation model calculations

Figure 3-1
Revised Segments and Regions of the Farley Model for PCBs in Hudson River Estuary and Surrounding Waters

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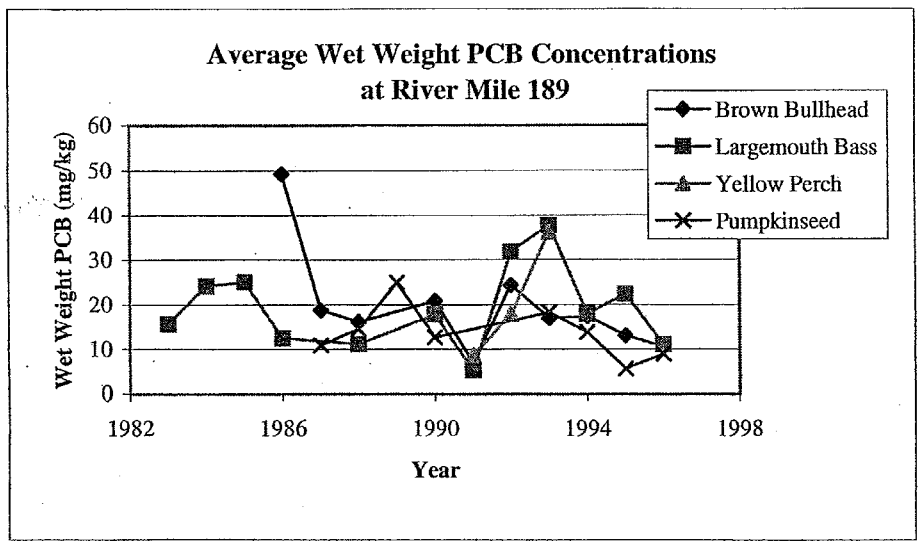
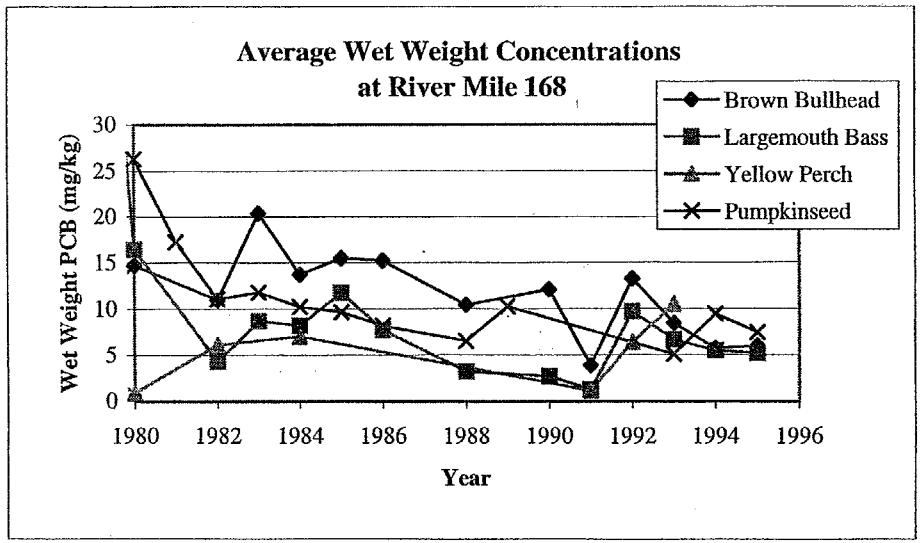
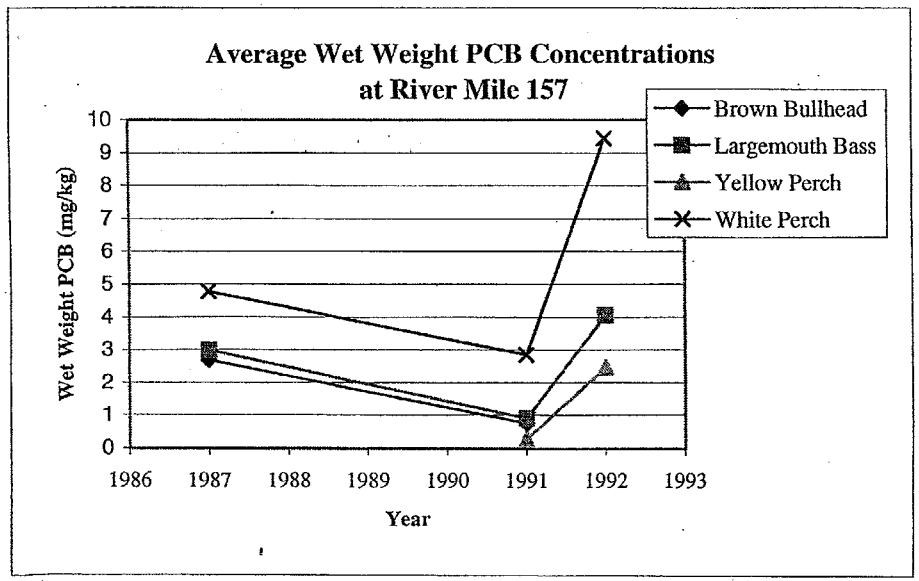
FIGURE 3-2: AVERAGE WET WEIGHT PCB CONCENTRATIONS IN SELECTED FISH SPECIES BASED ON NYSDEC DATA







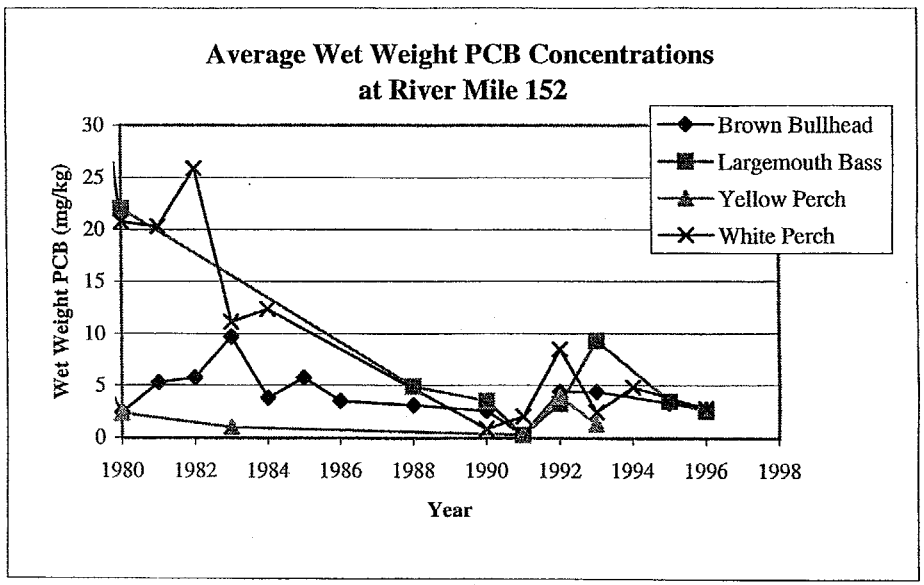


FIGURE 3-3: AVERAGE LIPID-NORMALIZED PCB CONCENTRATIONS IN SELECTED FISH SPECIES BASED ON NYSDEC DATA

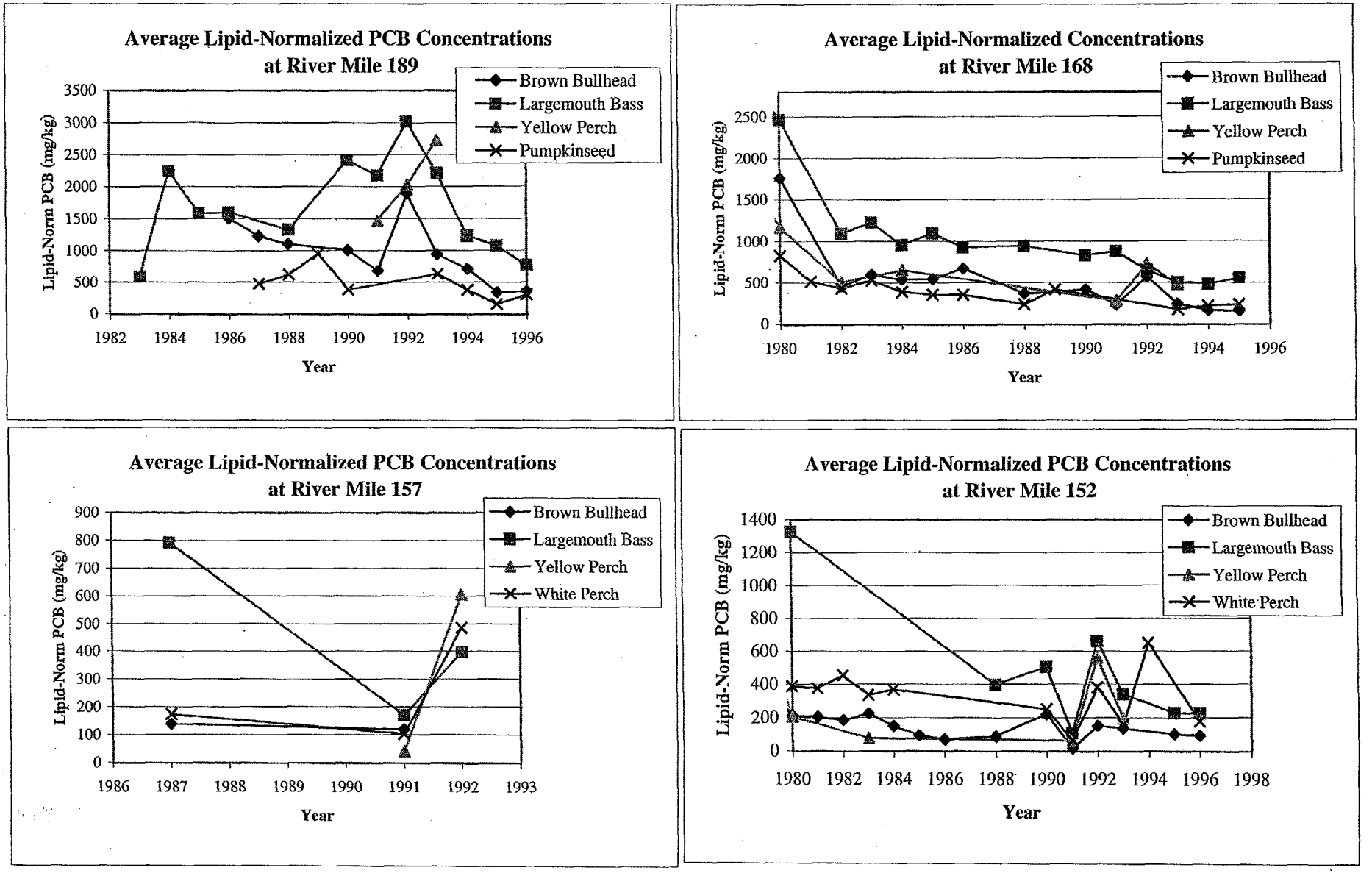


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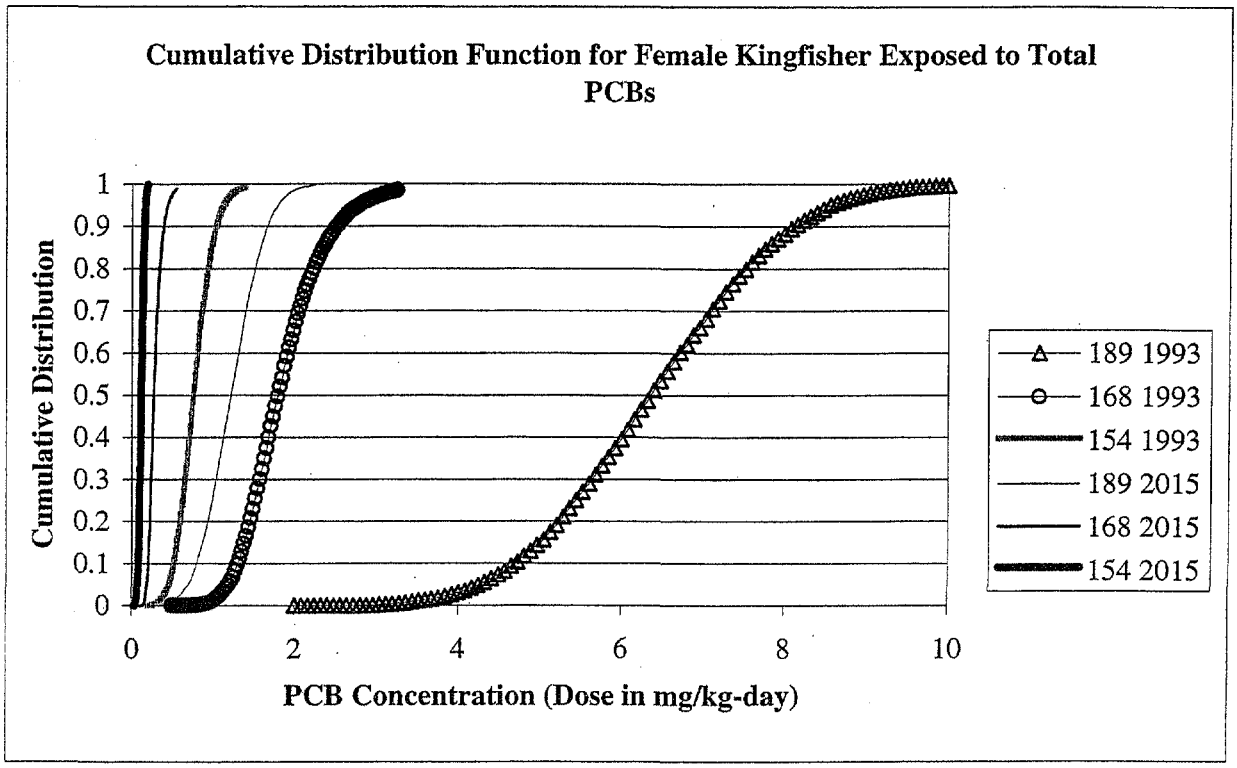
Figure 3-4: Cumulative Distribution Functions of Exposure for Kingfisher and Eagle



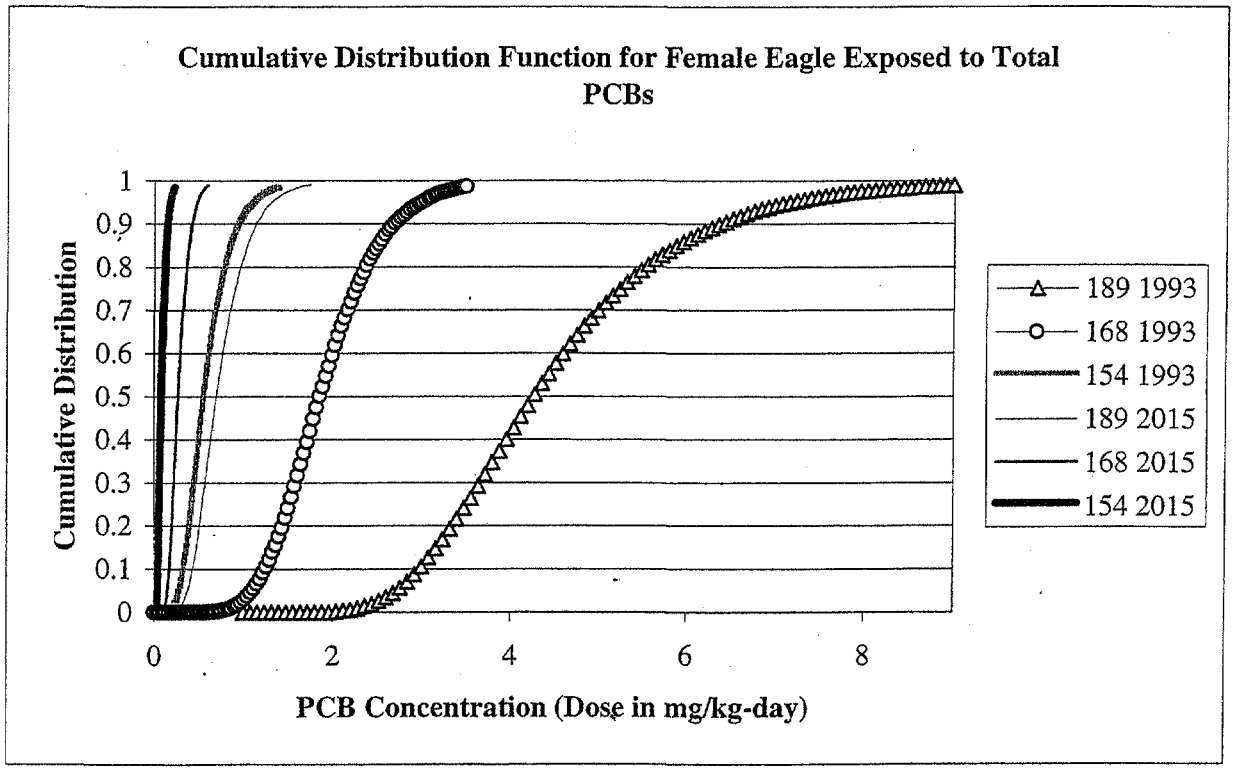
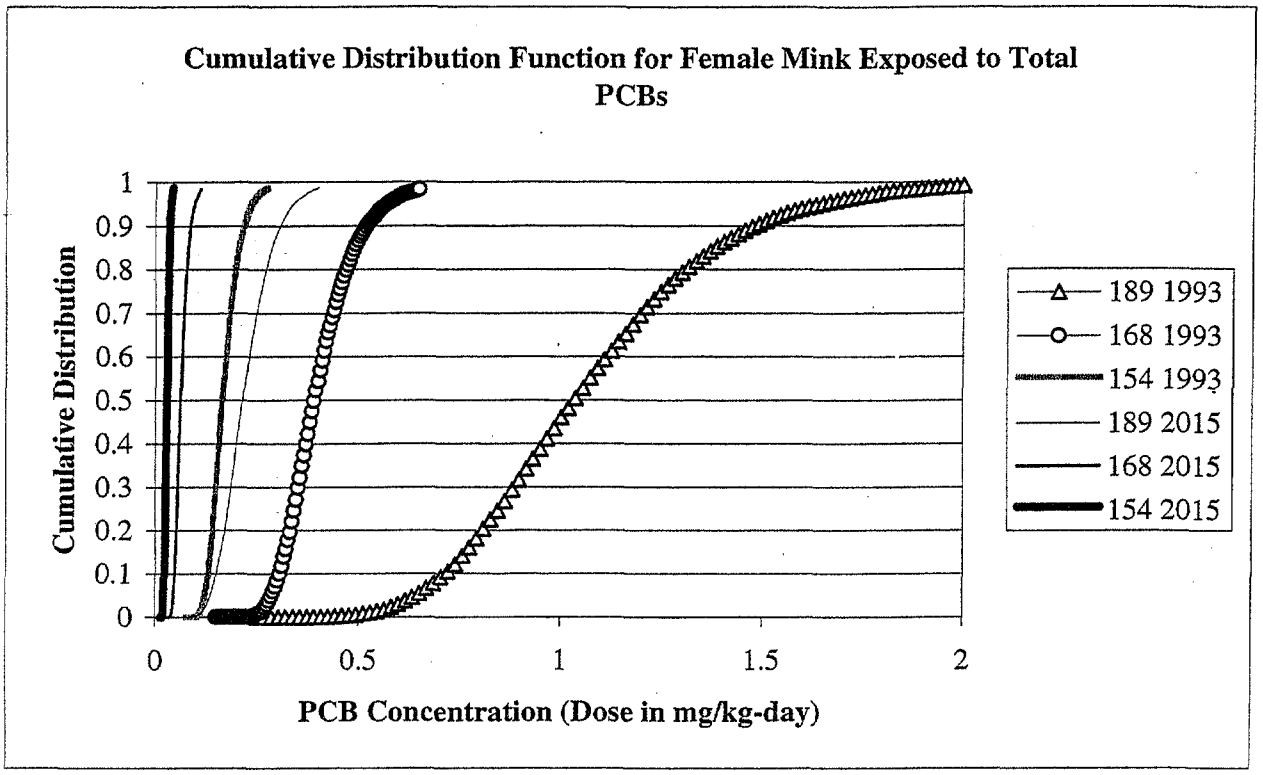
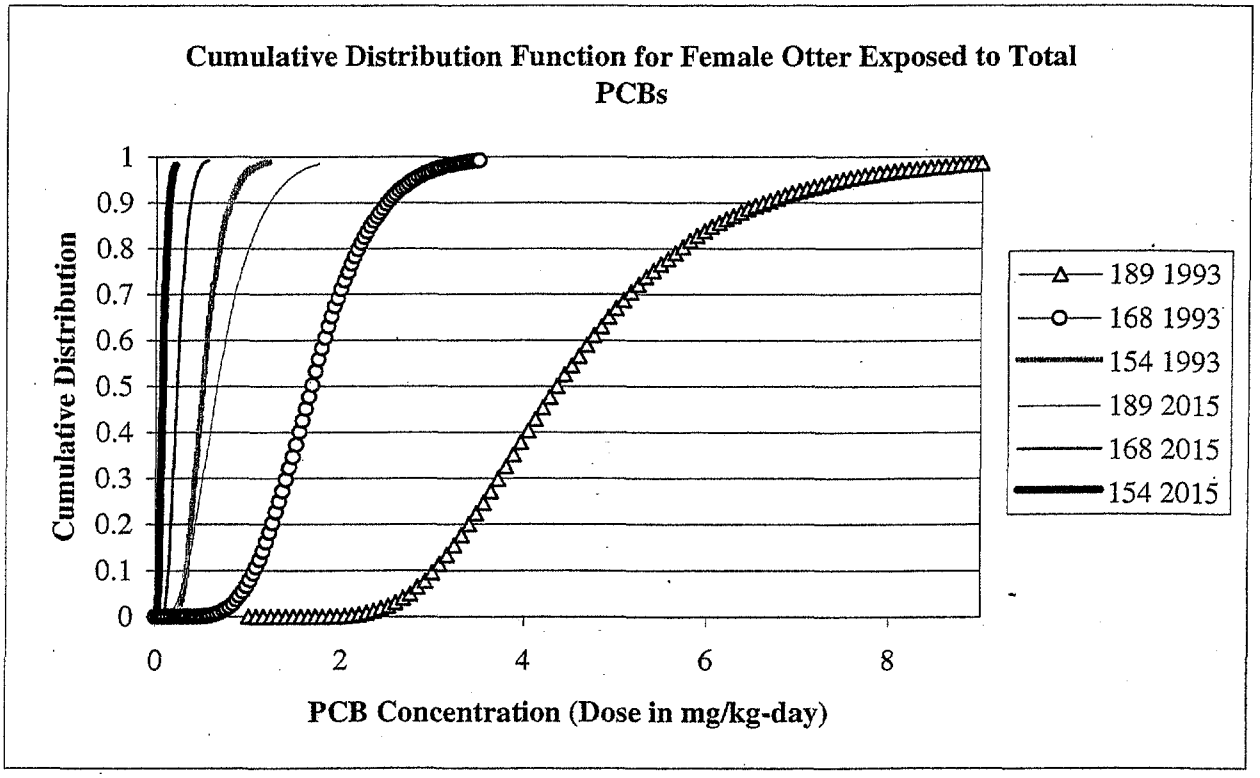
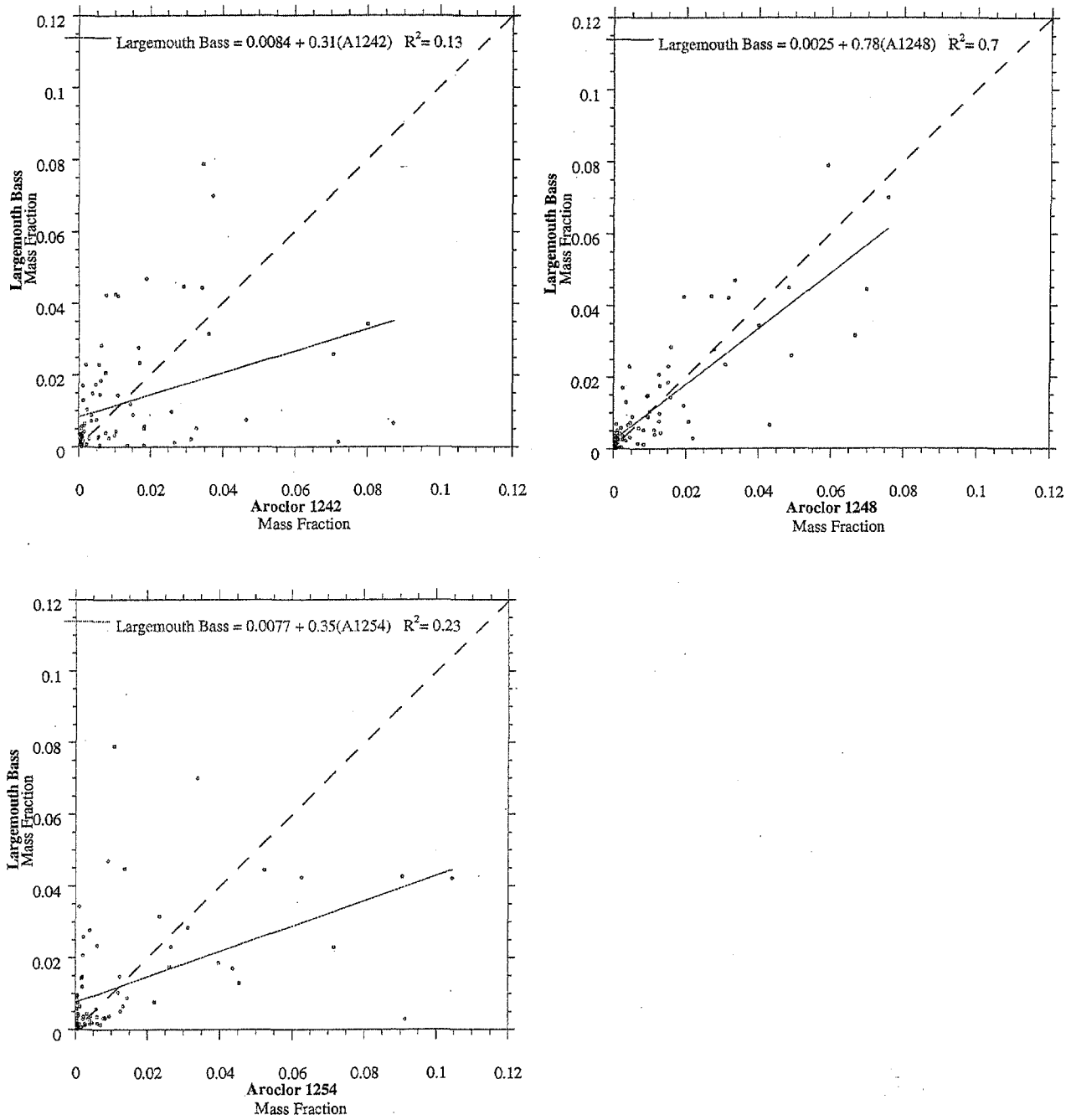


Figure 3-5: Cumulative Distribution Functions of Exposure for Mink and Otter





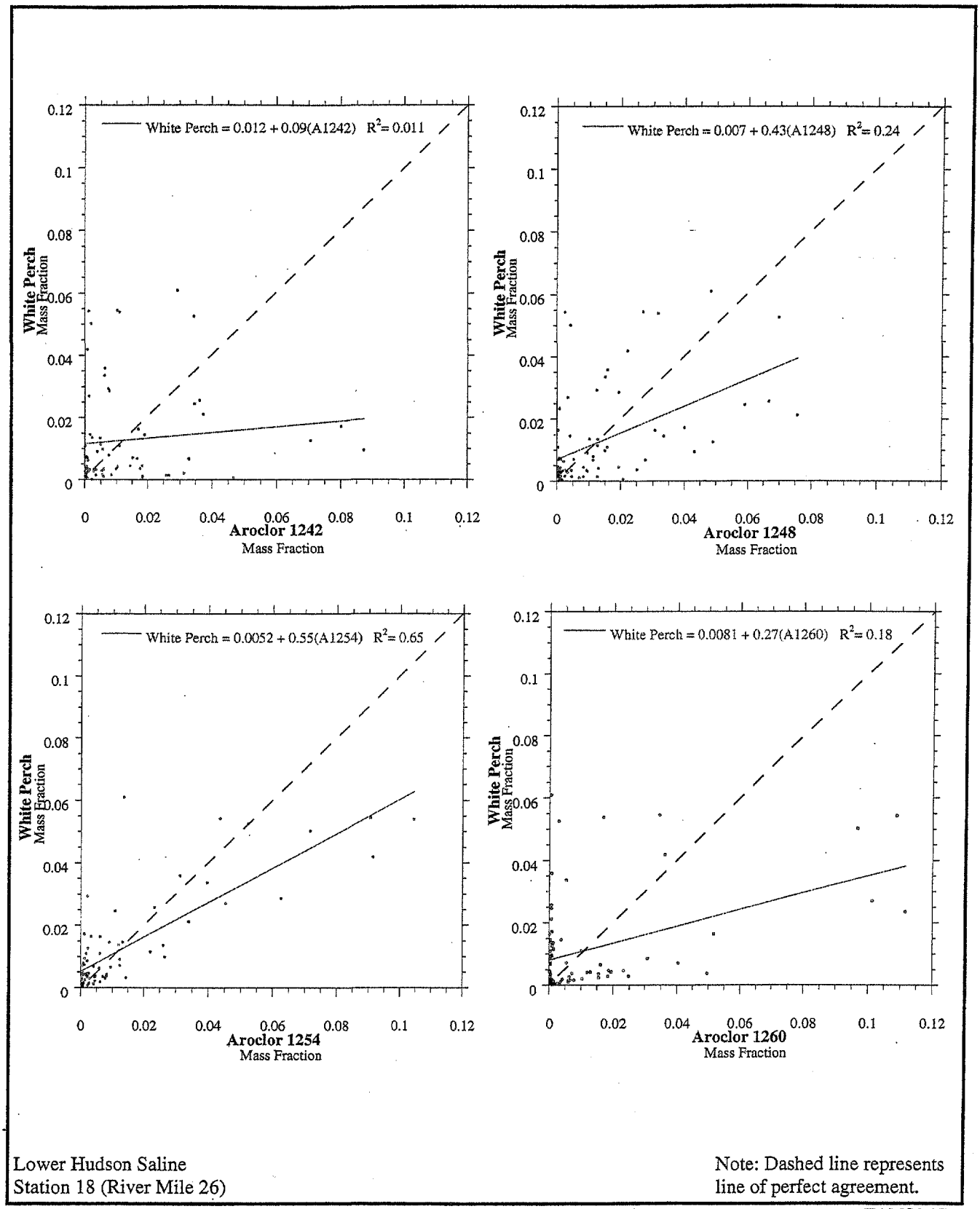


Upper Hudson
Station 4 (River Mile 190)

Note: Dashed line represents line of perfect agreement.

TAMS/MCA

Figure 3-6
Comparison of Congener Mass Fraction Between a Large Mouth Bass Sample from RM 190 and Several Aroclor Standards

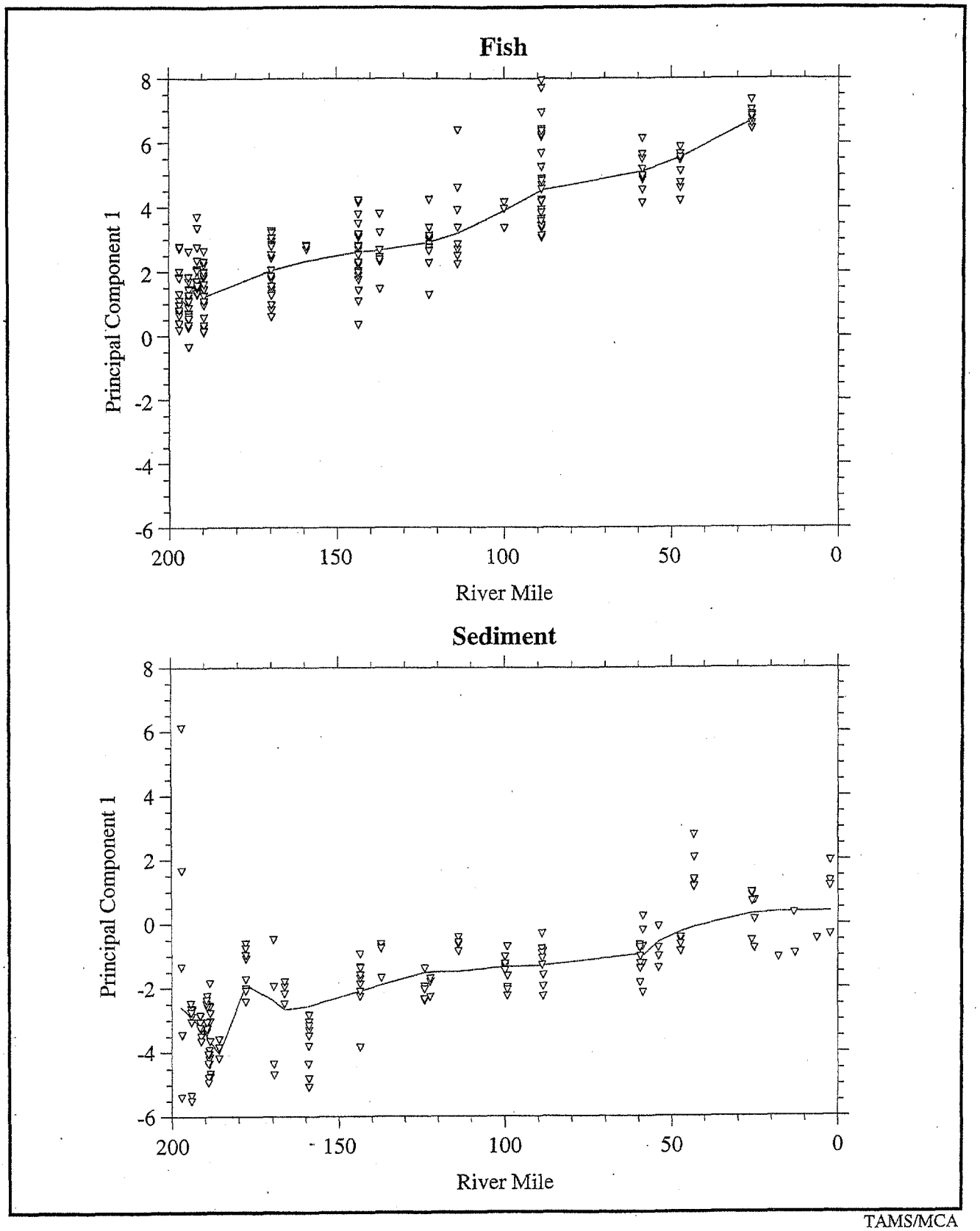


Lower Hudson Saline
Station 18 (River Mile 26)

Note: Dashed line represents line of perfect agreement.

TAMS/MCA

Figure 3-7
Comparisons of Congener Mass Fraction Between a White Perch Sample from RM 26 and Several Aroclor Standards



TAMS/MCA

Figure 3-8
Variation of Principal Component 1 with River Mile in Fish and Sediment

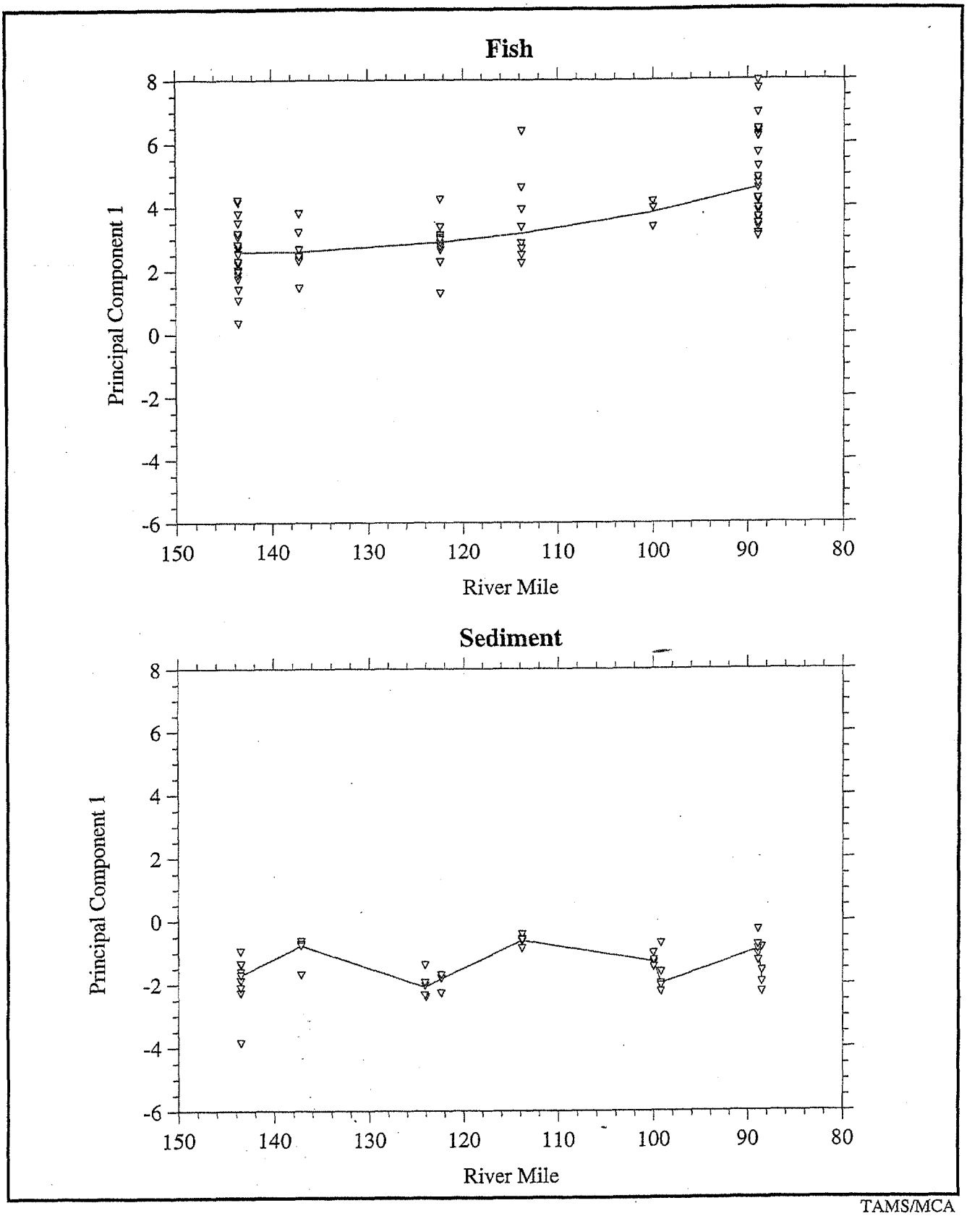


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Figure 3-9
Variation of Principal Component 1 with River Mile in Fish and Sediment River Miles 150 to 80

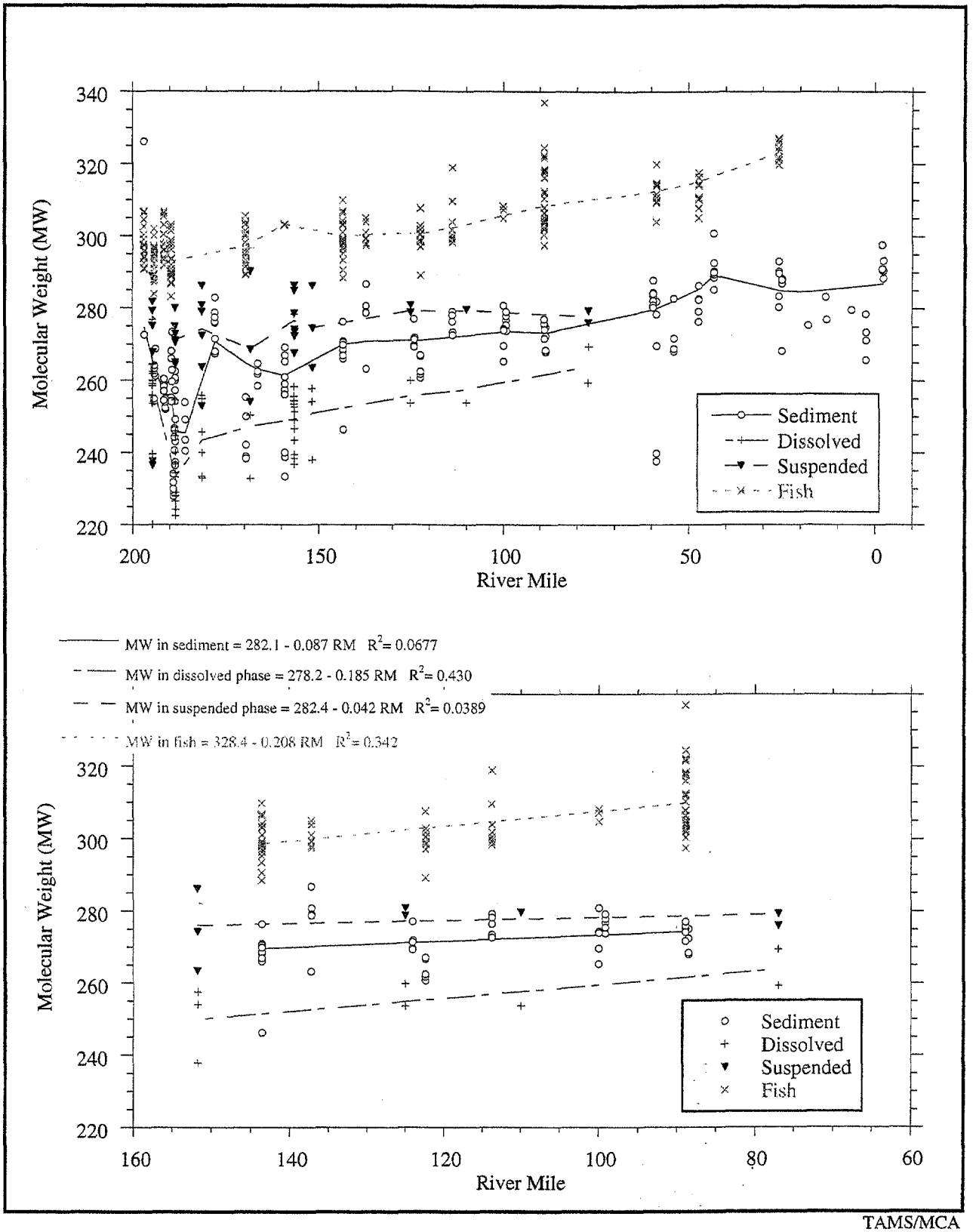

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Figure 3-10
Relationship Between Molecular Weight and River Mile for 1993 Hudson River Samples

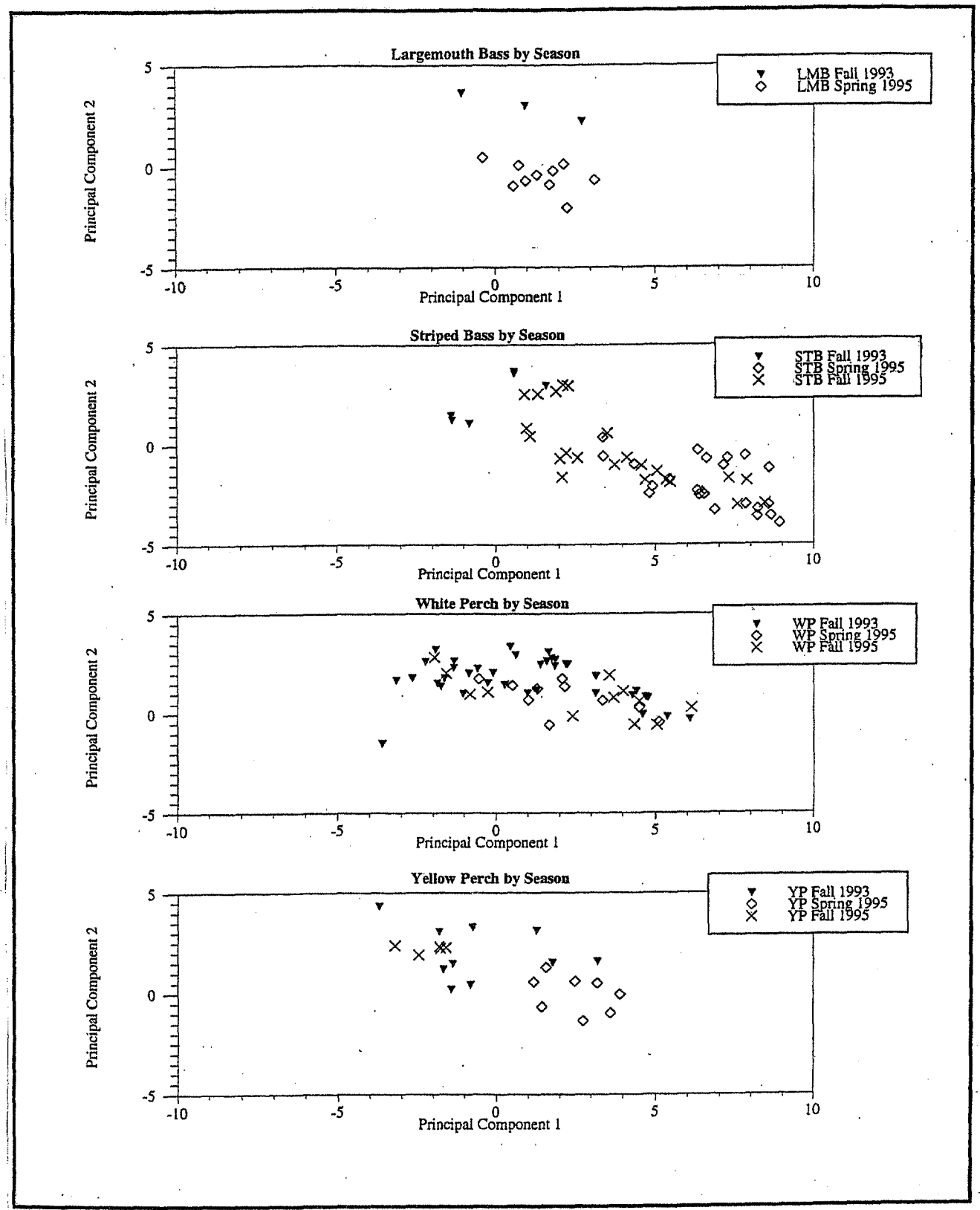

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Figure 3-11
Principal Component Results for 1993 and 1995
Fish Samples by Life Stage
(Based on 29 Congeners)

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SCANNING TRACKING SHEET

DOC ID # 67420

DOC TITLE/SUBJECT:

HUDSON RIVER PCBS UPDATE #5
FIGURE 3-12
COMPARISON OF CONGENER MASS FRACTION IN HUDSON RIVER FISH AND SEVERAL AROCLOR STANDARDS: LINEAR SCALE (Page: 306235)

THIS DOCUMENT IS OVERSIZED AND CAN BE LOCATED IN THE ADMINISTRATIVE RECORD FILE AT THE

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EPA REGION II
SCANNING TRACKING SHEET

DOC ID # 67420

DOC TITLE/SUBJECT:

HUDSON RIVER PCBS UPDATE #5
FIGURE 3-13
COMPARISON OF CONGENER MASS FRACTION IN HUDSON RIVER FISH AND SEVERAL AROCLOR STANDARDS: SEMILOGARITHMIC SCALE (Page: 306236)

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NEW YORK, NY 10007

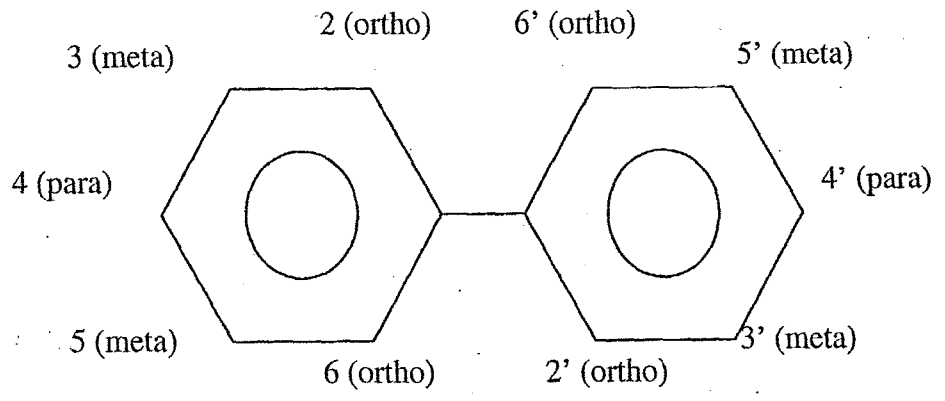
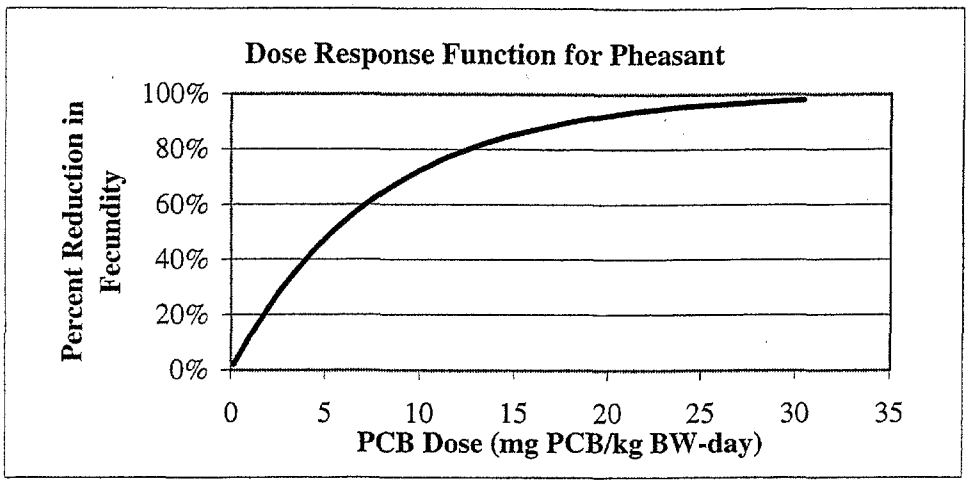
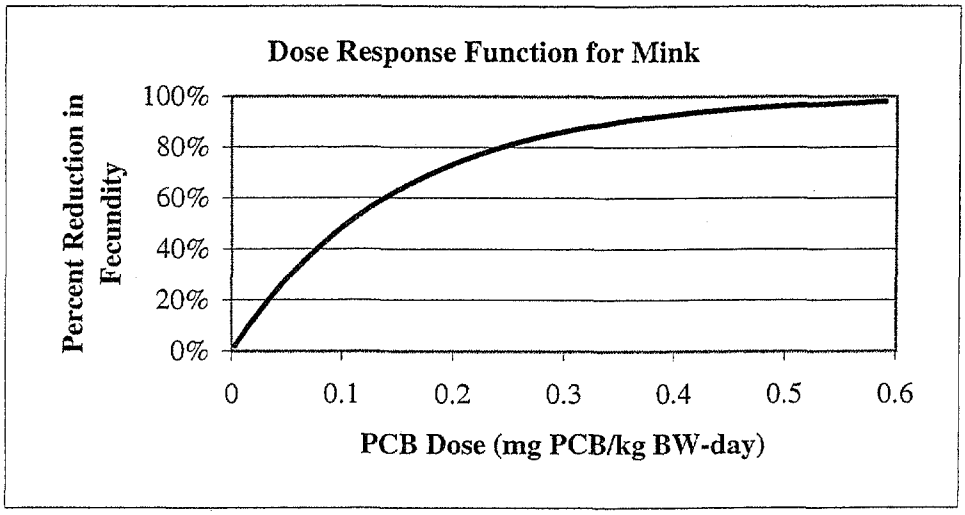


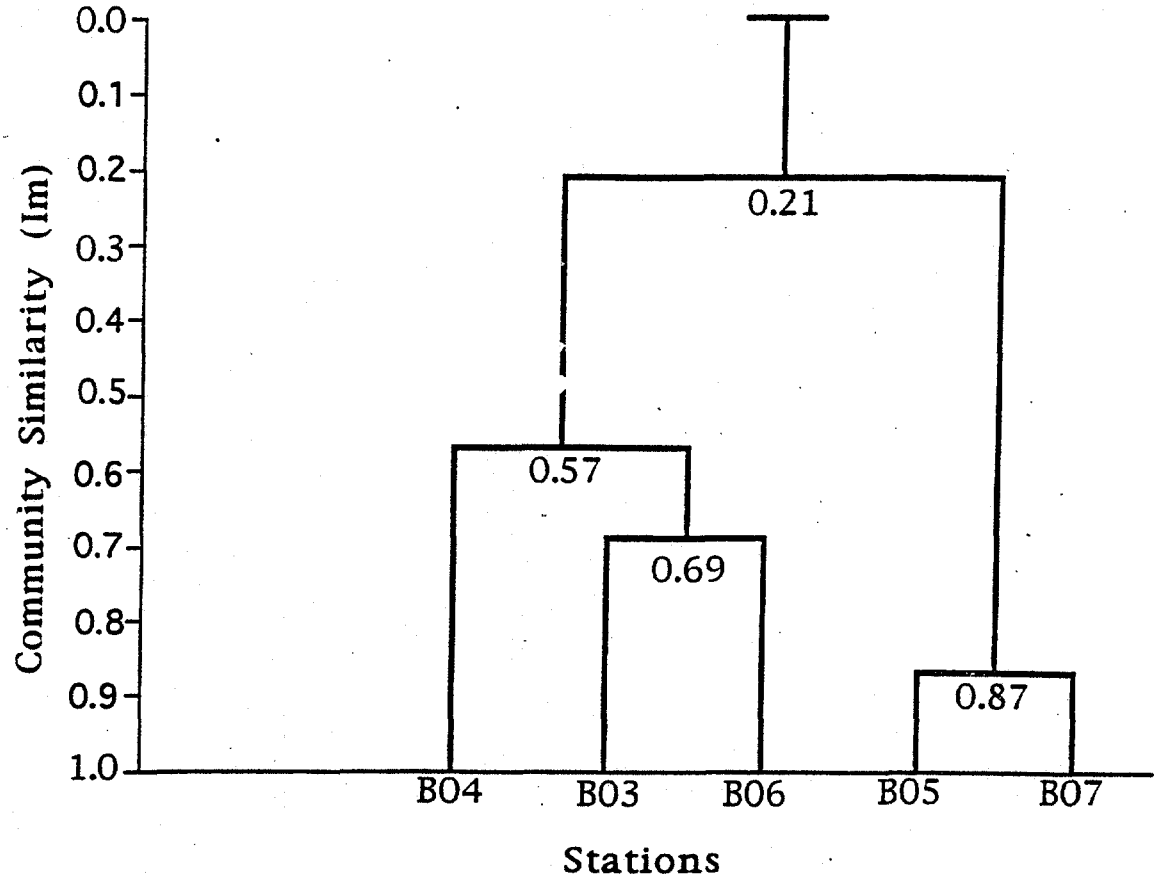
Figure 4-1: Shape of Biphenyl and Substitution Sites

TAMS/MCA

FIGURE 4-2: Dose Response Functions for Pheasant and Mink



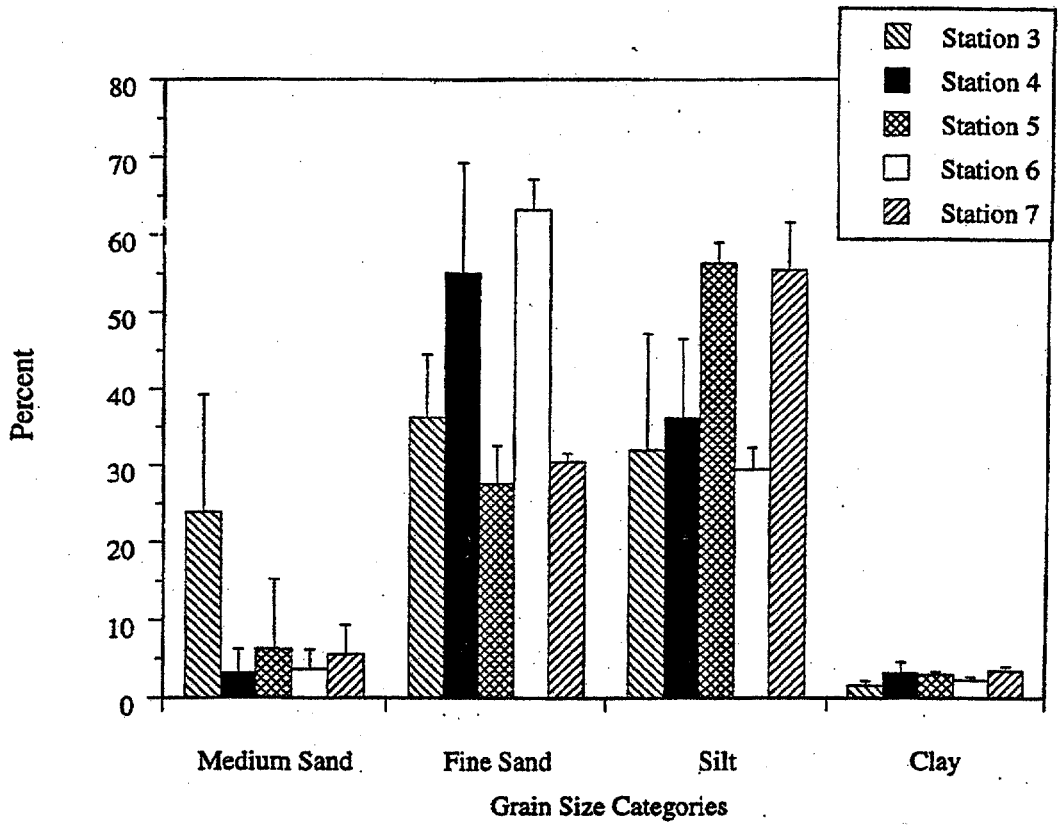




Note: The dendrogram is based on Morista's Index (I_m) of community similarity and the computed fusion value of each junction is given.

TAMS/MCA

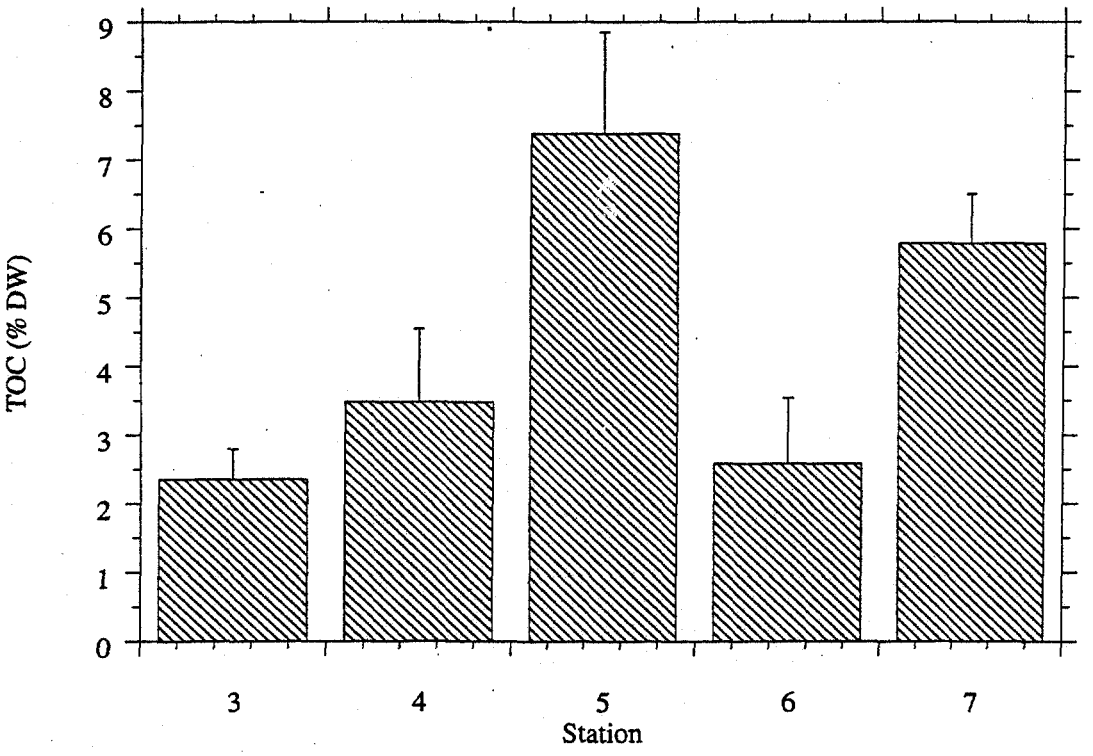
Figure 5-1
Complete Linkage Clustering - TI Pool



Note: Error bars represent one standard deviation.

TAMS/MCA

Figure 5-2
Relative Percent Grain Size Classes - TI Pool



Note: Error bars represent one standard deviation.

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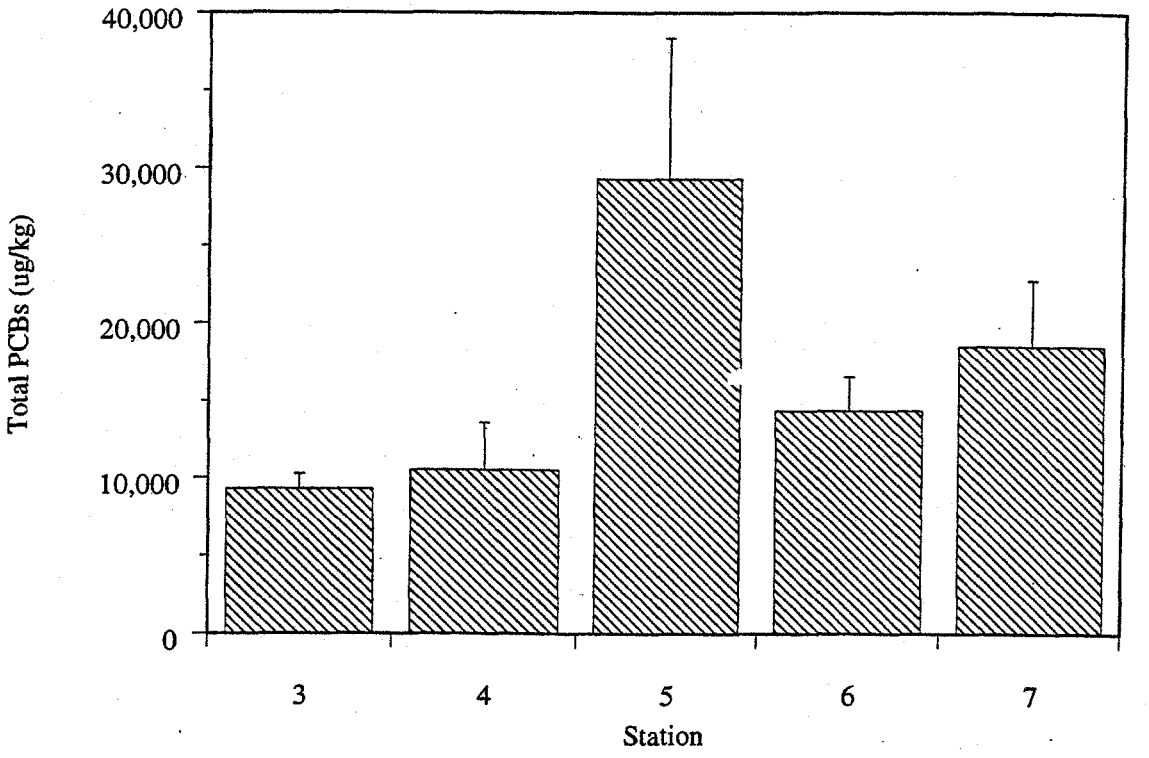
Figure 5-3
Mean Sediment TOC - TI Pool



Note: Error bars represent one standard deviation.

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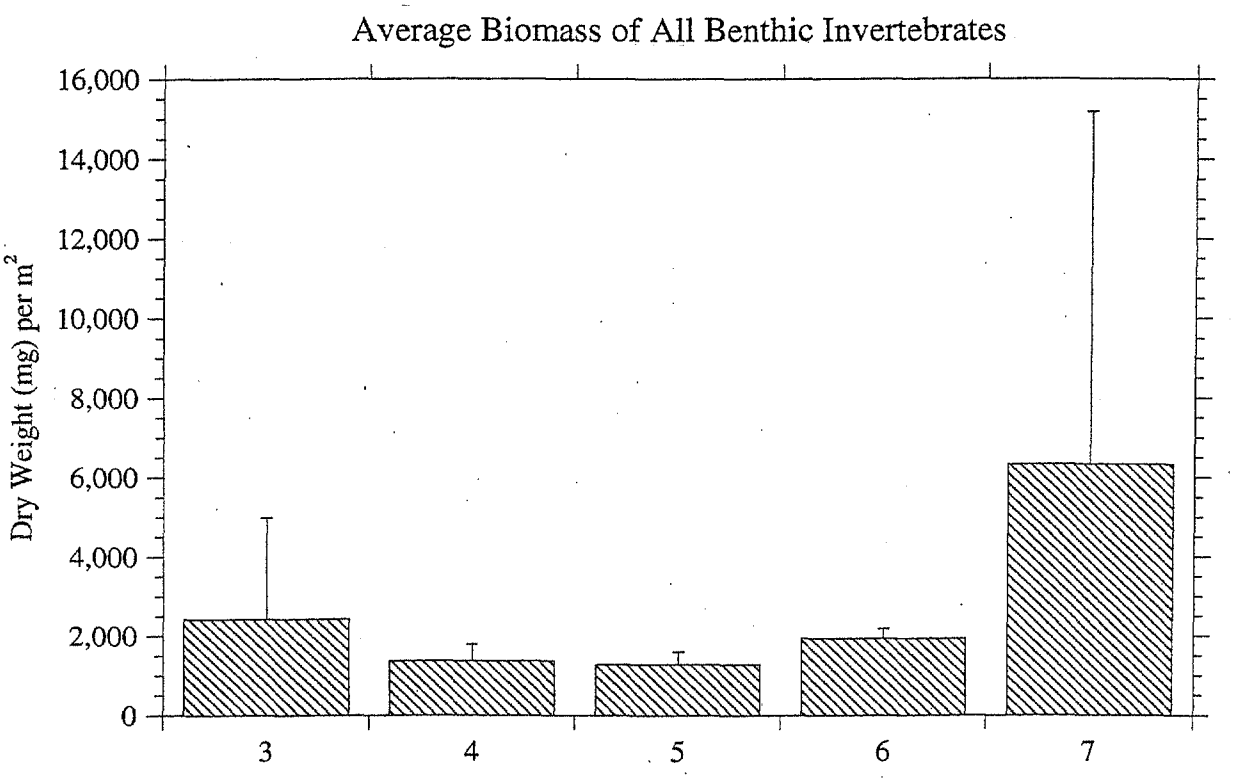
Figure 5-4
Mean Total PCB Concentration in Sediment - TI Pool



Note: Error bars represent one standard deviation.

TAMS/MCA

Figure 5-5
Biomass of Benthic Invertebrates - TI Pool

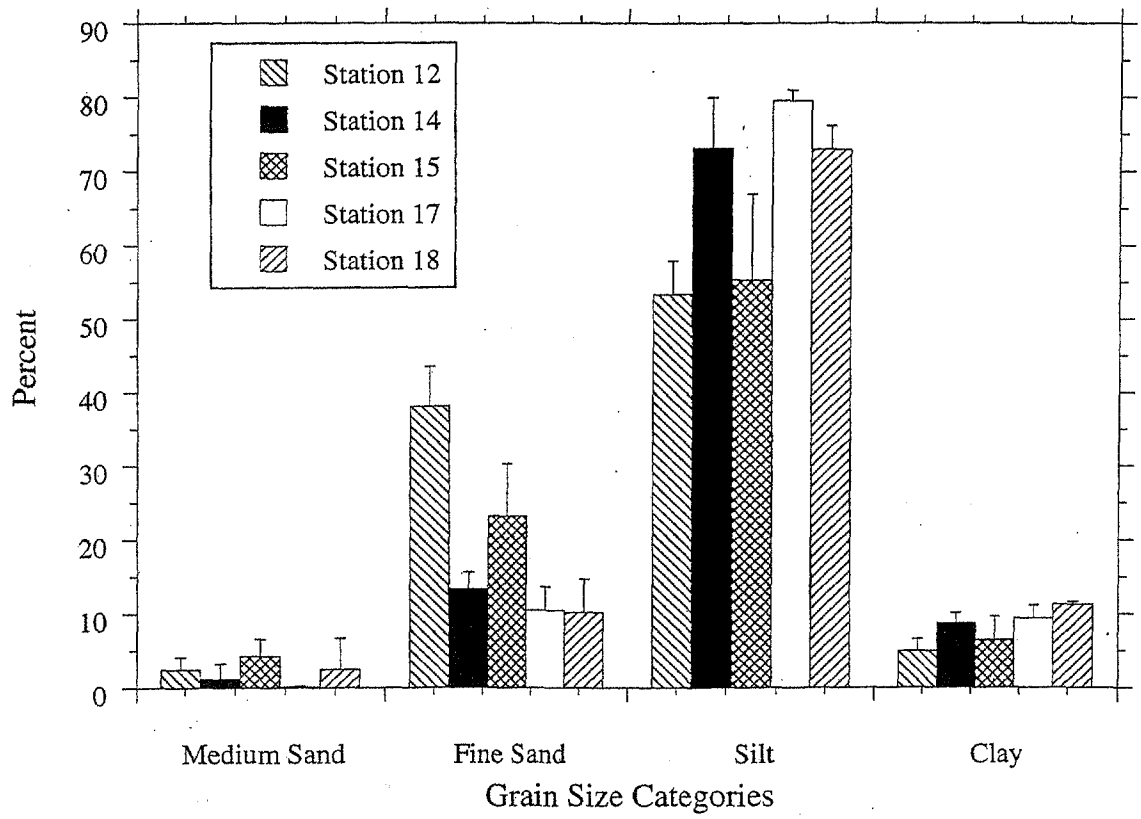


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Figure 5-6
Relative Percent Grain Size Classes - Lower Hudson River

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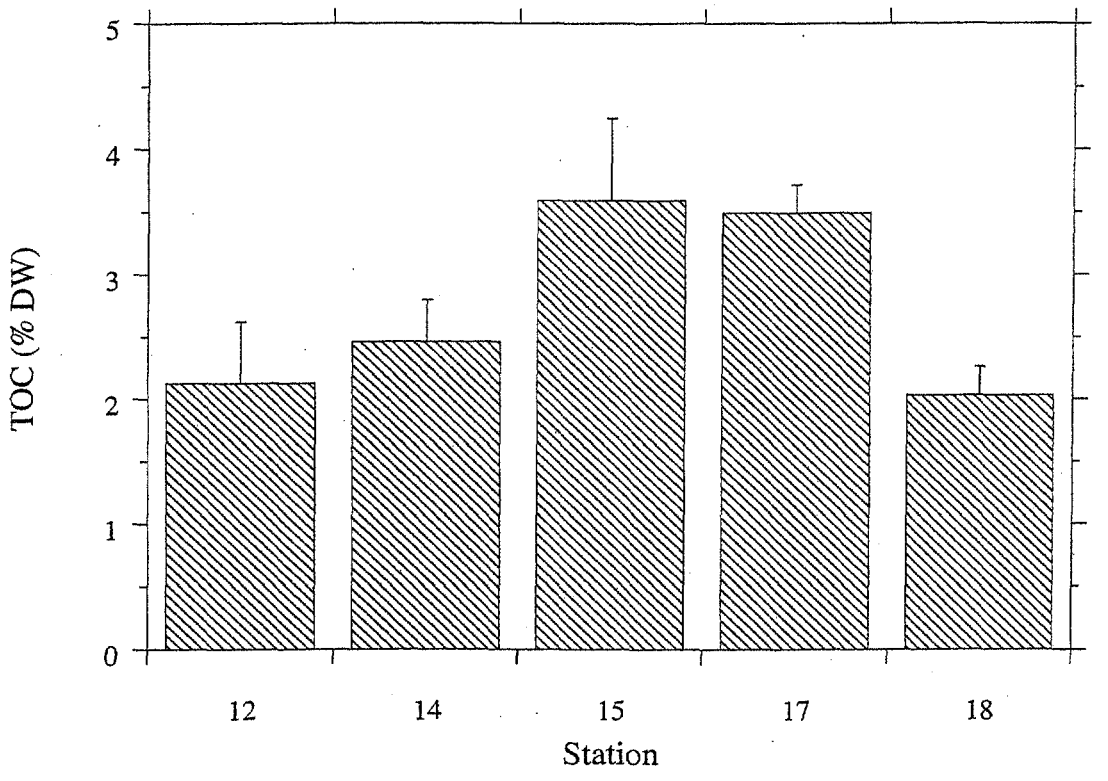
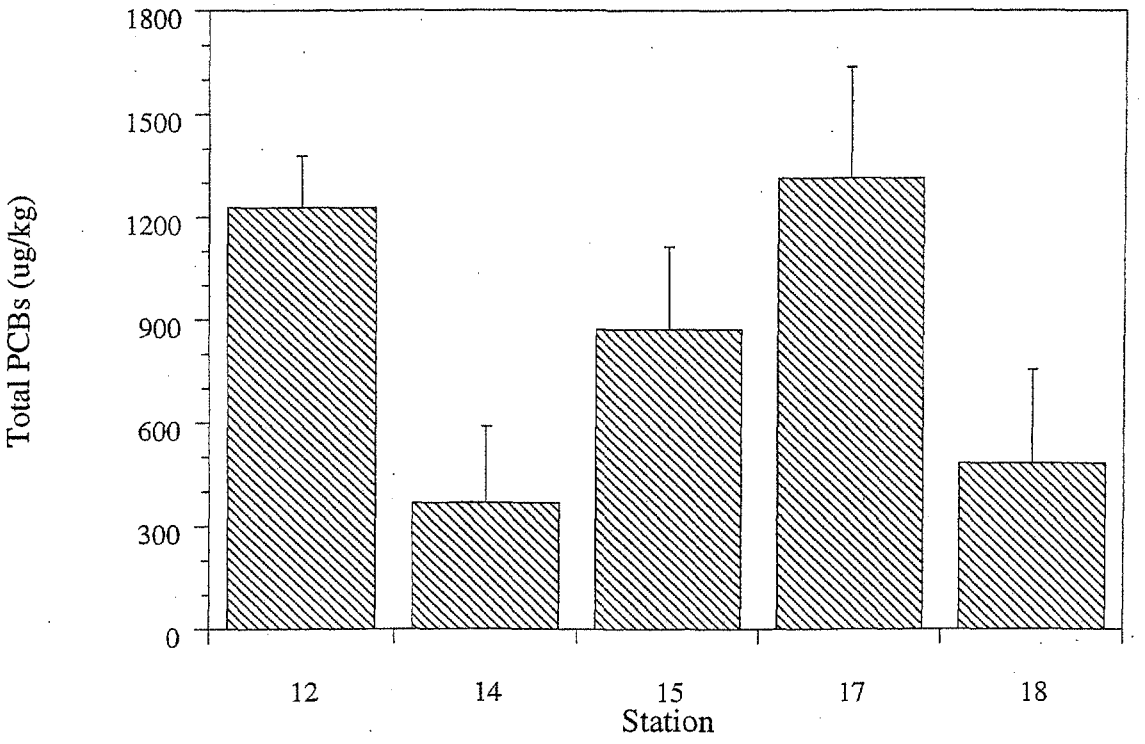


TAMS/MCA

Figure 5-7
Mean Sediment TOC - Lower Hudson River

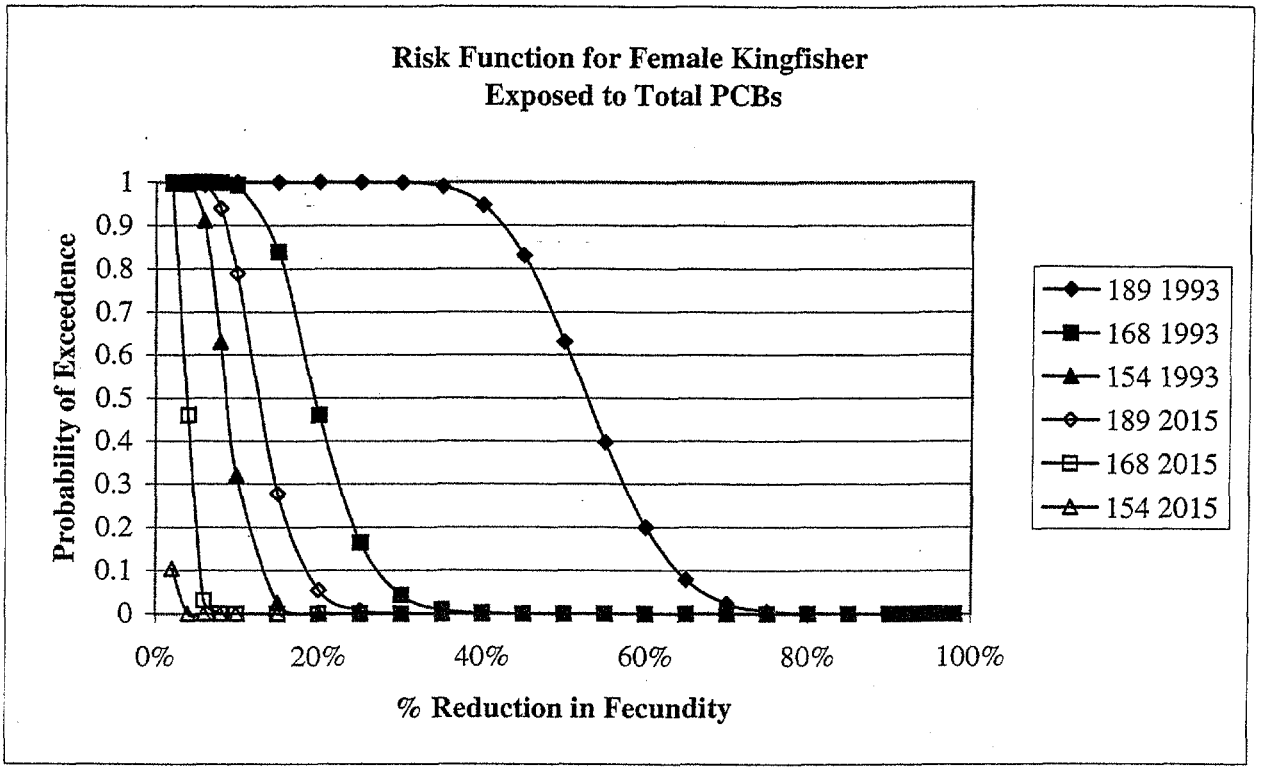


Note: Error bars represent one standard deviation.

TAMS/MCA

Figure 5-8
Mean Total PCB Concentration in Sediment - Lower Hudson River

Figure 5-9: Cumulative Risk Functions for the Belted Kingfisher and Bald Eagle



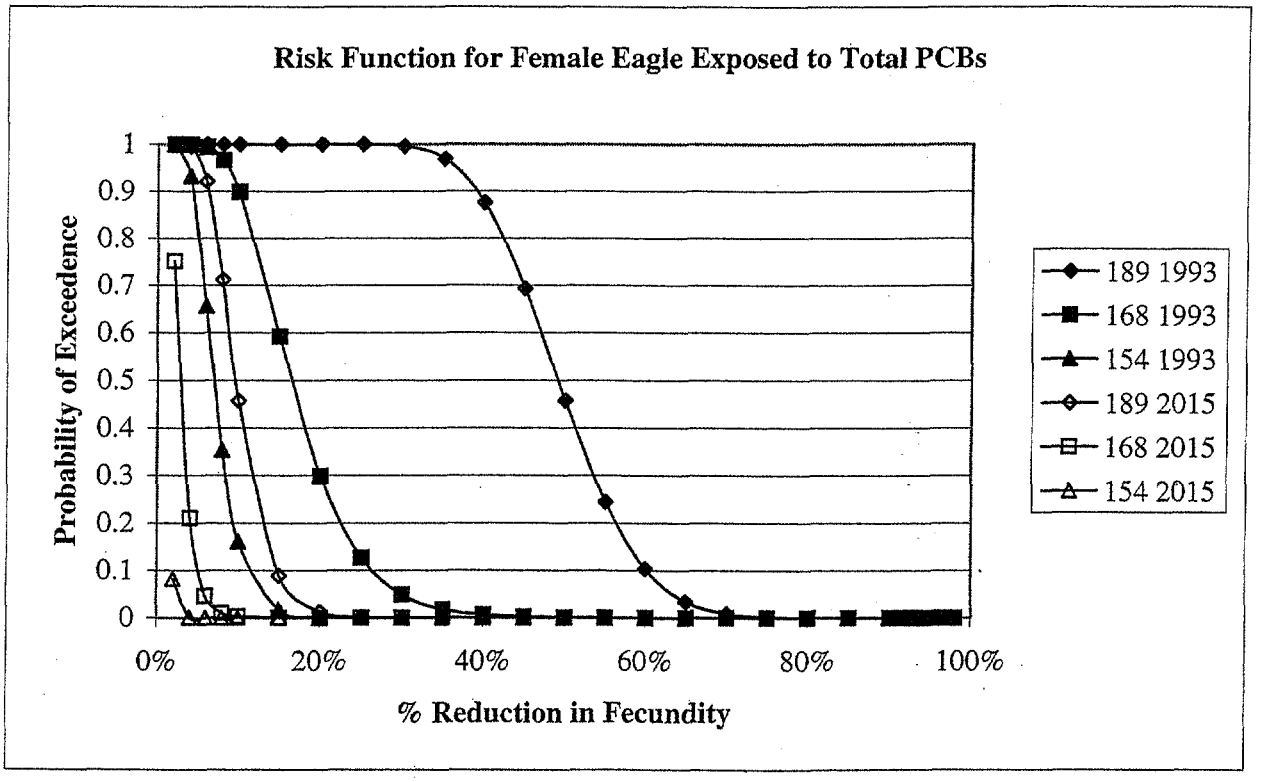
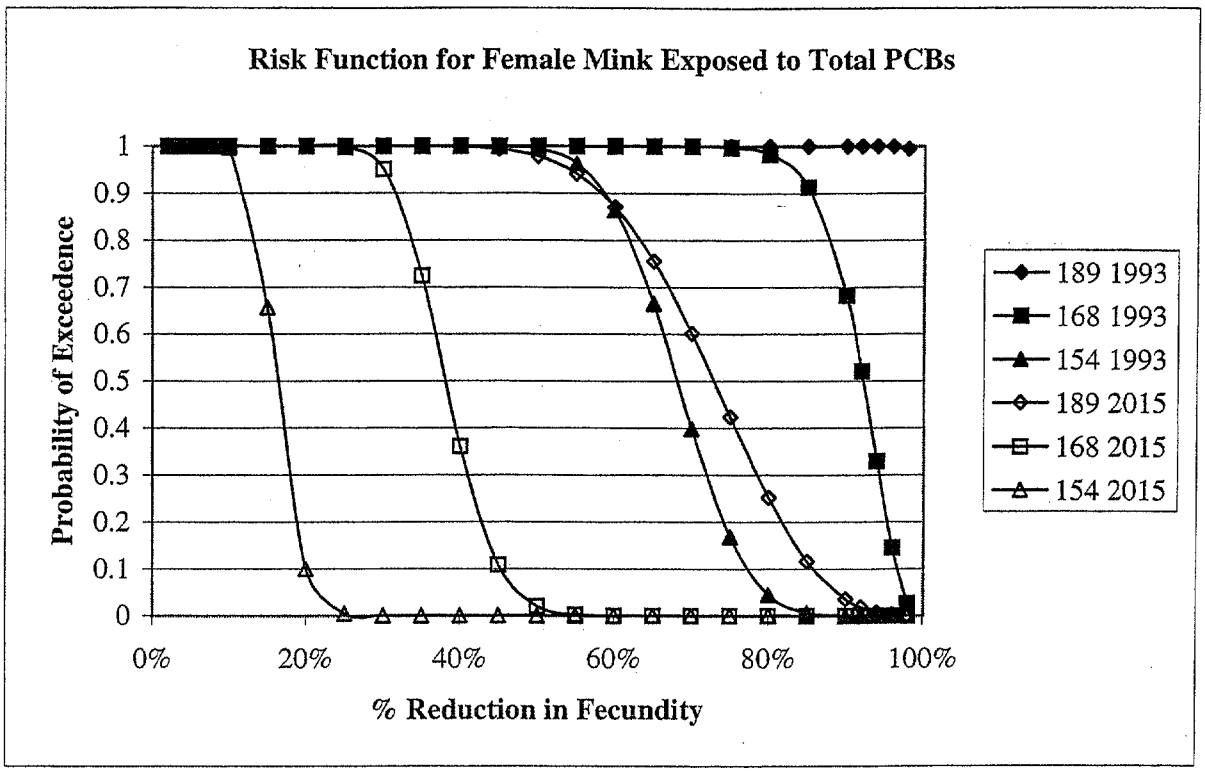


Figure 5-10: Cumulative Risk Functions for Mink and River Otter



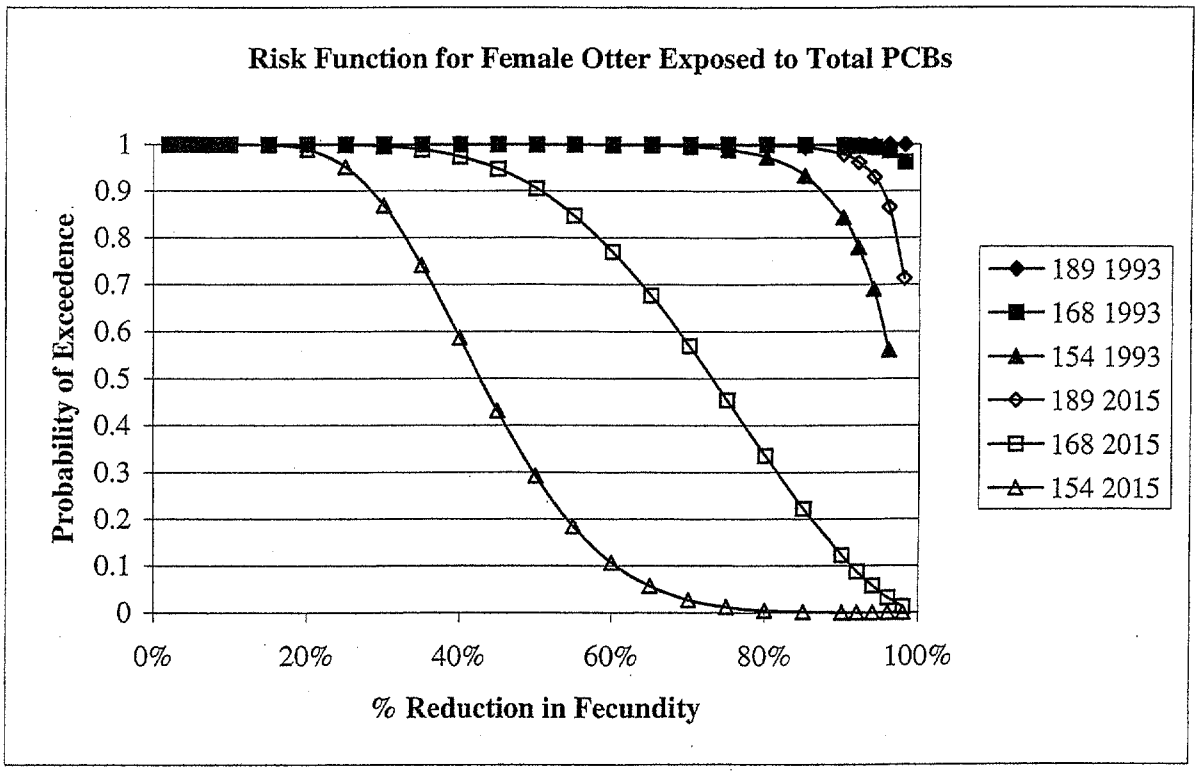
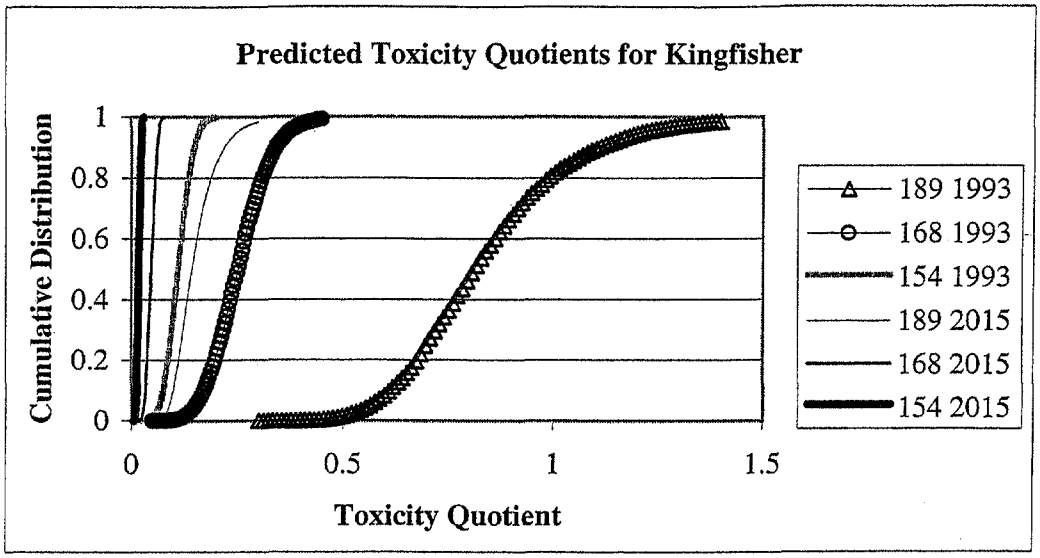
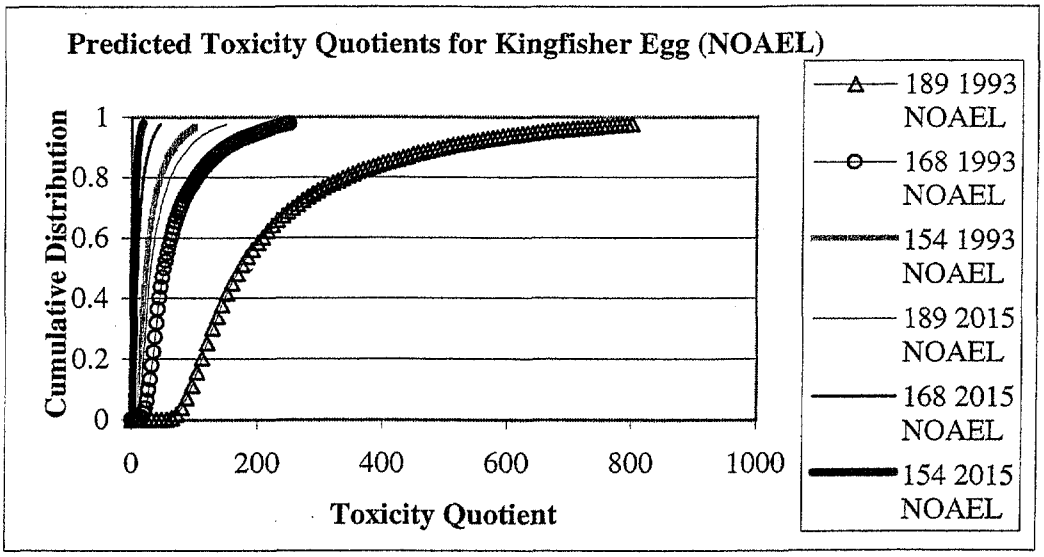


FIGURE 6-1: Predicted Toxicity Quotients from Uncertainty Analysis for Kingfisher and Kingfisher Egg





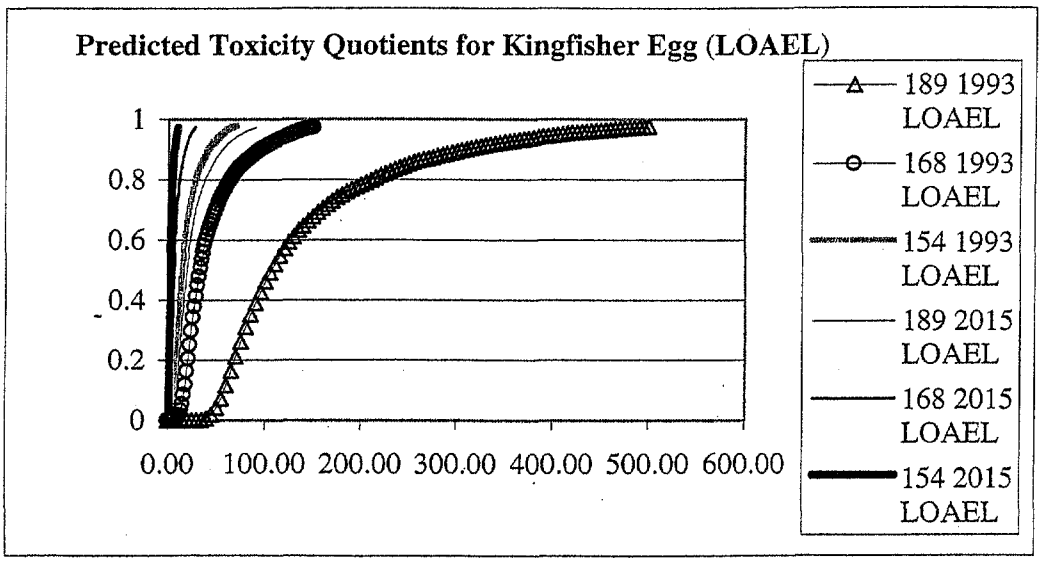
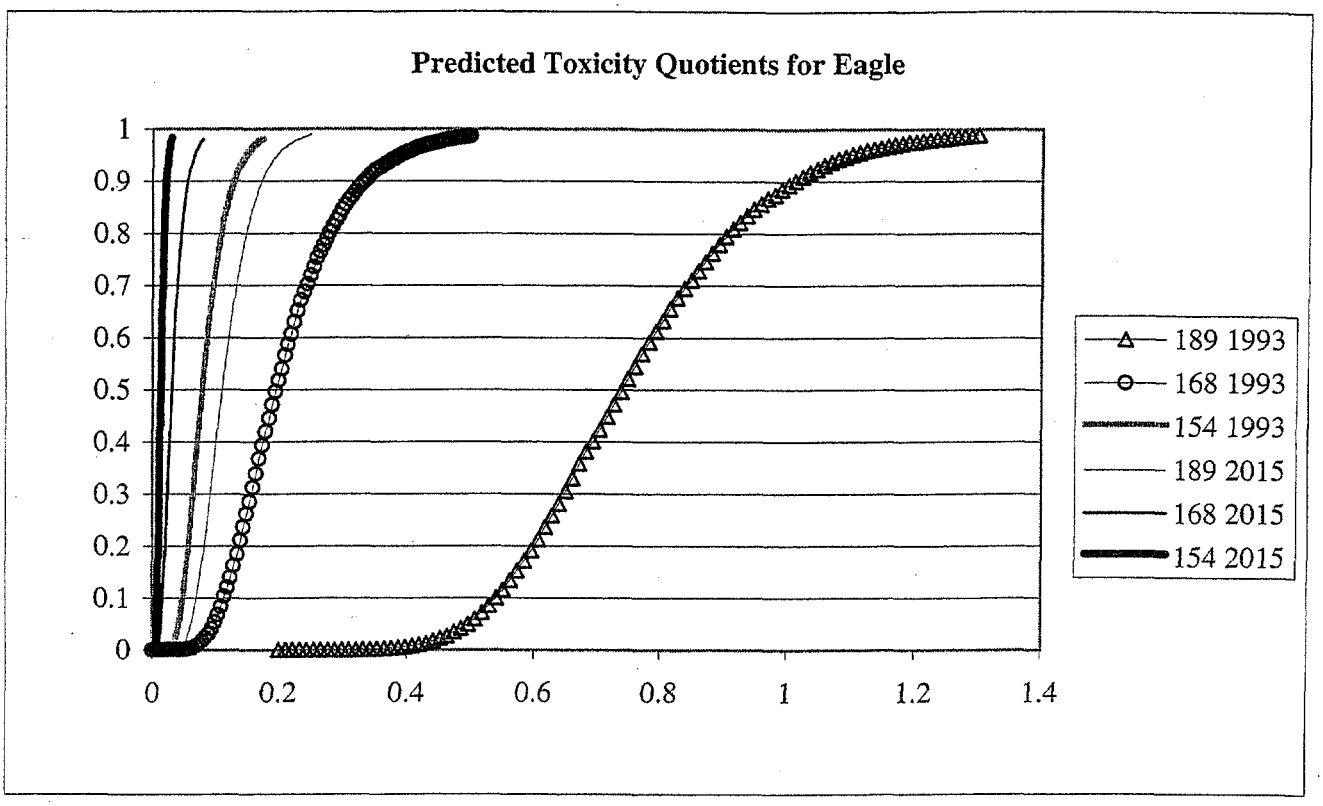


FIGURE 6-2: Predicted Toxicity Quotients from Uncertainty Analysis for Eagle and Eagle Egg



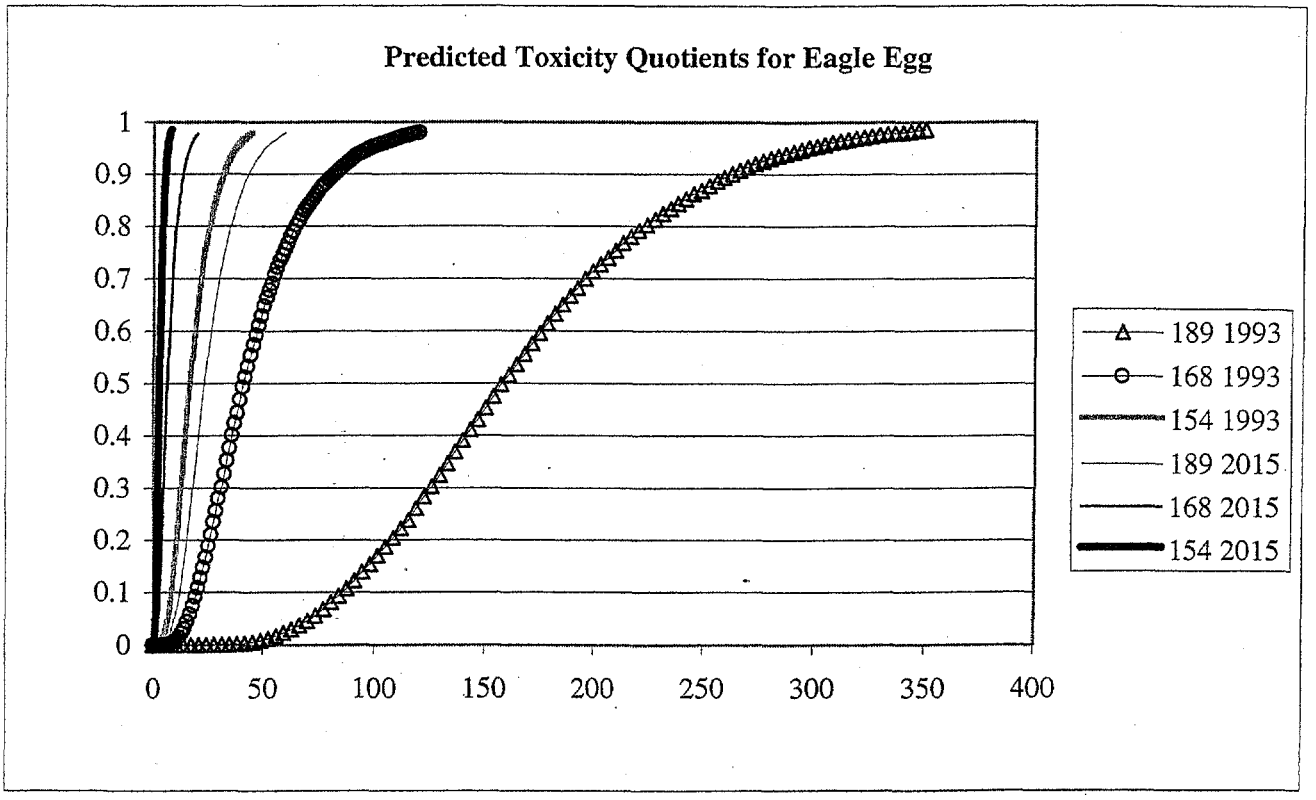
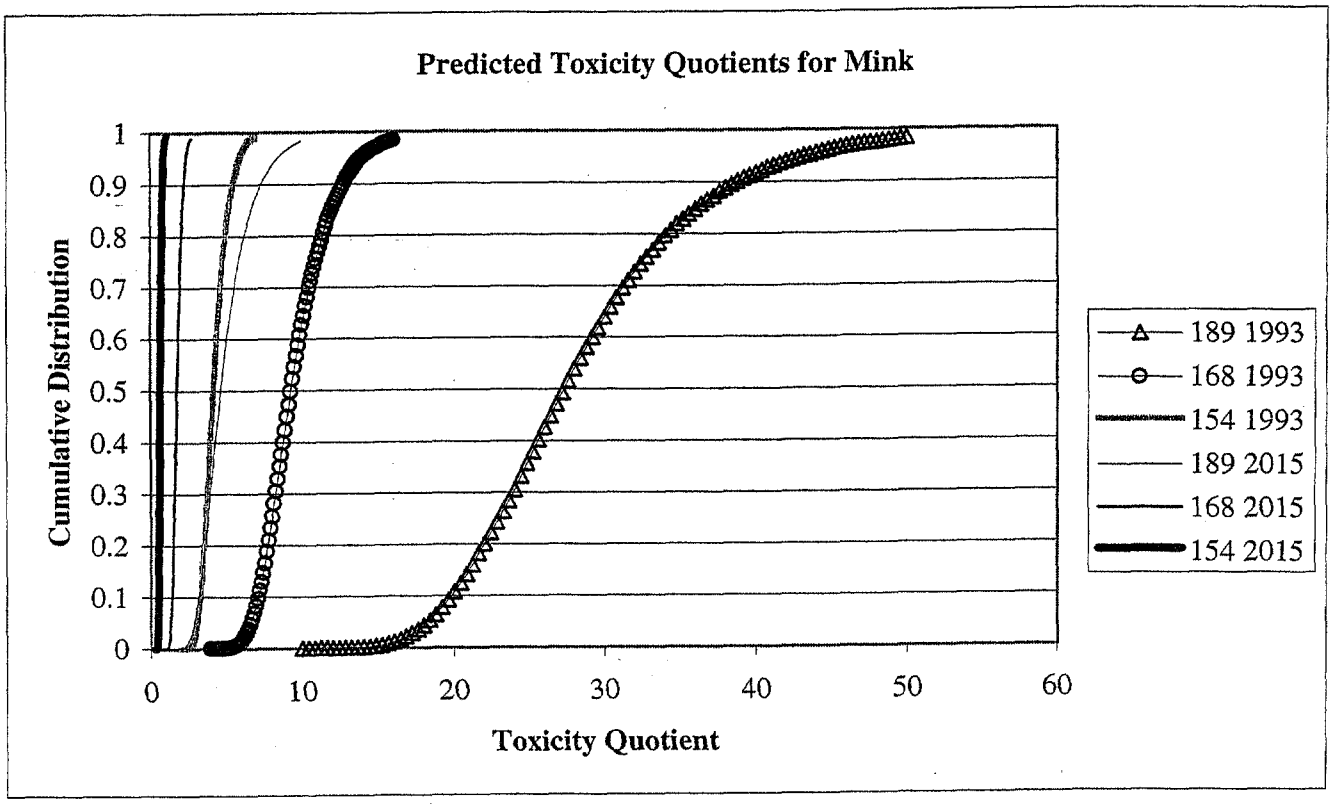


FIGURE 6-3: Predicted Toxicity Quotients from Uncertainty Analysis for Mink and Otter



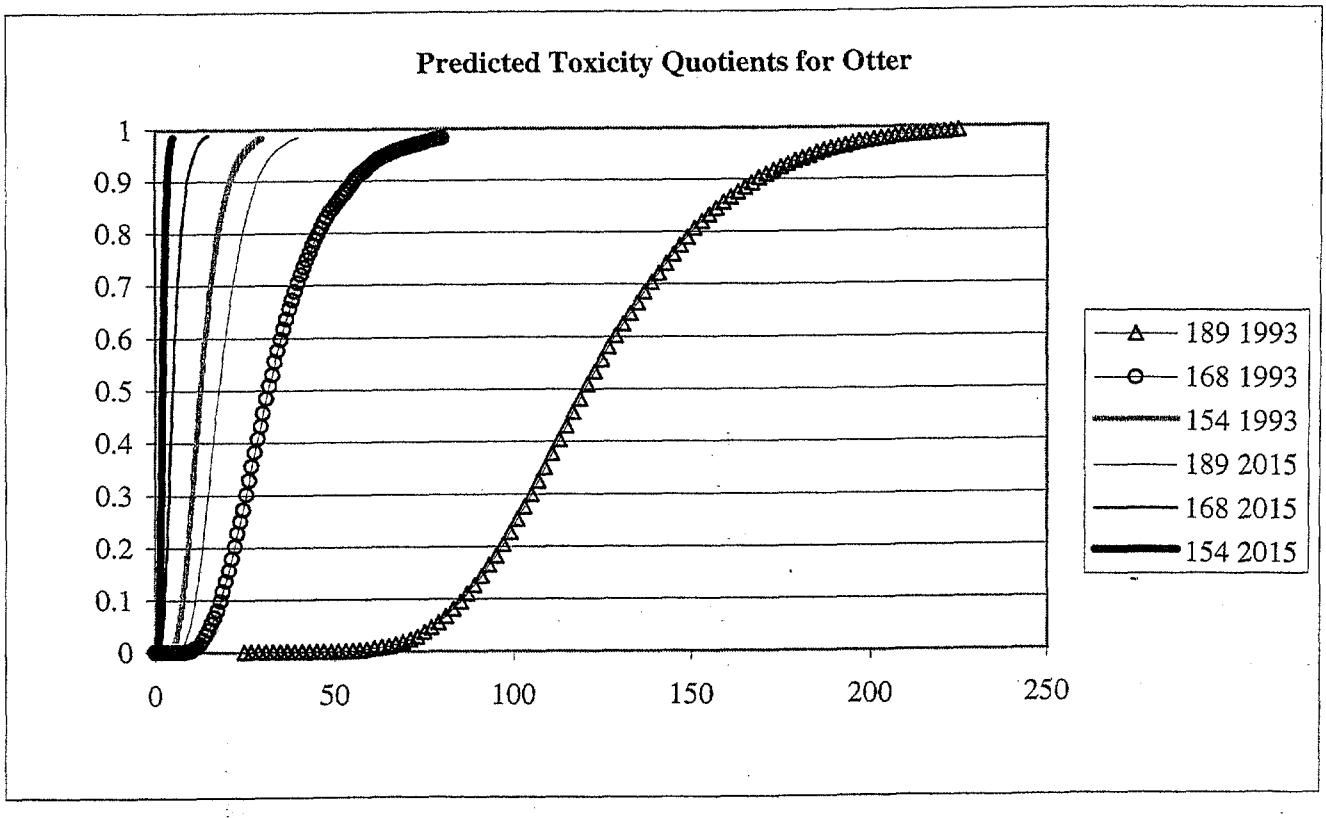


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Table 1-1
Average Fish Tissue Concentrations from 1998 NYSDEC Sampling in the Upper Hudson River, Reported as mg/kg Wet Weight and Converted to a Consistent Estimator of Tri+ PCBs

Species	Thompson Island Pool RM 188 - 193	Stillwater Reach RM 168 – 176	Waterford Reach RM 155 – 157	Below Federal Dam RM 142 – 153.2
Brown Bullhead	11.2	8.25	2.98	1.85
Carp	28.64	41.25	18.92	11.01
Largemouth Bass	16.06	6.92	3.27	9.7
Pumpkinseed	8.64	4.77		4.5
Yellow Perch	7.59	1.62		1.16

Table 1-2
Average Fish Tissue Concentrations from 1998 NYSDEC Sampling in the Upper Hudson River, Reported as mg/kg-Lipid and Converted to a Consistent Estimator of Tri+ PCBs

Species	Thompson Island Pool RM 188 - 193	Stillwater Reach RM 168 – 176	Waterford Reach RM 155 – 157	Below Federal Dam RM 142 – 153.2
Brown Bullhead	304	230	104	36
Carp	243	312	197	81
Largemouth Bass	1128	436	230	289
Pumpkinseed	253	125		134
Yellow Perch	365	96		90

Table 1-3. Half-Life Comparison of Data Lipid-Based Annual Average PCB Concentrations in Fish

		Thompson Island Pool (RM 189)			Stillwater Reach (RM 168–176)		
		1985–99	1985-91	1995-99	1985–99	1985-91	1995-99
Brown Bullhead	Data - Consistent Tri+	5.57 (1986-99)	3.06 (1986-91)	50.00	6.97	3.61	Increasing
	Data - NYSDEC Sum	8.15 (1986-98)	4.65 (1986-91)	Increasing (1995-98)	8.51 (1985-98)	4.28	Increasing (1995-98)
	Data - NYSDEC 1254	5.41 (1986-98)	3.30 (1986-91)	14.48 (1995-98)	7.47 (1985-98)	3.57	Increasing (1995-98)
	Model	5.22	4.42	7.27	9.83	10.69	6.06
Largemouth Bass	Data - Consistent Tri+	12.78	Increasing	Increasing	9.19	6.10	41.95
	Data - NYSDEC Sum	46.97 (1985-98)	Increasing	Increasing (1995-98)	15.90 (1985-98)	17.53	20.44 (1995-98)
	Data - NYSDEC 1254	21.26 (1985-98)	294.01	Increasing (1995-98)	9.81 (1985-98)	11.99	10.56 (1995-98)
	Model	7.35	5.05	4.10	9.65	9.10	7.18
Pumpkinseed	Data - Consistent Tri+	5.91 (1987-98)	Increasing (1987-91)	Increasing (1995-98)	7.96 (1985-98)	7.43	2.66 (1995-98)
	Data - NYSDEC Sum	15.04 (1987-98)	Increasing (1987-91)	Increasing (1995-98)	25.61 (1985-98)	18.46	3.37 (1995-98)
	Data - NYSDEC 1254	9.87 (1987-98)	Increasing (1987-91)	Increasing (1995-98)	12.63 (1985-98)	15.77	2.83 (1995-98)
	Model	8.10	7.44	4.33	9.62	11.40	7.21
Yellow Perch	Data - Consistent Tri+						Increasing
	Data - NYSDEC Sum				5.78 (1984-98)		Increasing (1995-98)
	Data - NYSDEC 1254				5.10 (1984-98)		
	Model	7.16	5.74	4.36	9.82	9.80	7.00

Notes:
Consistent Tri+: NYSDEC data converted to consistent Tri+ basis (see RBMR) plus NEA congener data.
NYSDEC Sum: Uncorrected sum of lipid-based PCBs reported by NYSDEC, including provisional 1999 results
NYSDEC 1254: Uncorrected Aroclor 1254 quantitations reported by NYSDEC.
Model: Output of HUDTOX/FISHRAND models on lipid basis; forecasts represent simulation with constant load upstream boundary.
Annualized arithmetic means computed from 25th, 50th, and 95th percentile estimates.

TABLE 2-1
HUDSON RIVER FISHES

Common Name	Scientific Name	Predominant Habitat
Anchovies - Family Engraulidae		
Bay anchovy	*Anchoa mitchilli*	Saltwater
Striped anchovy	*Anchoa hepsetus*	Saltwater
Basses (Sea) - Family Serranidae		
Black sea bass	***Centropristis** striata*	Saltwater
Basses (Temperate) - Family Percichthyidae or Moronidae		
Striped bass	*Morone saxatilis*	Anadromous
White bass	*Morone chrysops*	Freshwater
White perch	*Morone americana*	Freshwater/brackish
Bluefishes - Family Pomatomidae		
Bluefish	*Pomatomus saltatrix*	Saltwater
Bowfins - Family Amiidae		
Bowfin	*Amia calva*	Freshwater
Butterfishes - Family Stromateidae		
Butterfish	*Peprilus triacanthus*	Saltwater
Catfishes - Family Ictaluridae		
Brown bullhead	*Ictalurus nebulosus*	Freshwater
Channel catfish	*Ictalurus punctatus*	Freshwater
Margined madtom	*Noturus insignis*	Freshwater
Stonecat	*Noturus flavus*	Freshwater
Tadpole madtom	*Noturus gyrinus*	Freshwater
White catfish	*Ictalurus catus*	Freshwater
Yellow bullhead	*Ictalurus natalis*	Freshwater
Codfishes - Family Gadidae		
Atlantic tomcod	*Microgadus tomcod*	Anadromous
Fourbeard rockling	*Enchelyopus cimbrius*	Saltwater
Red hake	*Urophycis chuss*	Saltwater
Silver hake	*Merluccius bilinearis*	Saltwate
Drums - Family Sciaenidae		
Atlantic croaker	*Micropogonias undulatus*	Saltwater
Spot	*Leiostomus xanthurus*	Saltwater
Weakfish	*Cynoscion regalis*	Saltwater
Eels (Freshwater) - Family Anguillidae		
American eel	*Anguilla rostrata*	Catadromous
Flounders (Lefteye) - Family Bothidae		
Smallmouth flounder	*Etropus microstomus*	Saltwater
Summer flounder	*Paralichthys dentatus*	Saltwater
Weakfish	*Cynoscion regalis*	Saltwater
Flounders (Righteye) - Family Pleuronectidae		
Winter flounder	*Pleuronectes americanus*	Saltwater
Gars - Family Lepisosteidae		
Longnose gar	*Lepisosteus osseus*	Saltwater
Gobies - Family Gobiidae		
Naked Goby	*Gobiosoma bosc*	Saltwater
Herrings - Family Clupeidae		
Alewife	*Alosa pseudoharengus*	Anadromous
American shad	*Alosa sapidissima*	Anadromous
Atlantic menhaden	*Brevoortia tyrannus*	Anadromous
Blueback herring	*Alosa aestavalis*	Anadromous
Gizzard shad	*Dorosoma cepedianum*	Freshwater
Hickory shad	*Alosa mediocris*	Anadromous
Jacks - Family Carangidae		
Crevalle jack	*Caranx hippos*	Saltwater
Killifishes- Family Cyprinodontidae		

TABLE 2-1
HUDSON RIVER FISHES

Common Name	Scientific Name	Predominant Habitat
Banded killifish	*Fundulus diaphanus*	Freshwater/brackish
Mummichog	*Fundulus heteroclitus*	Freshwater/brackish
Sheepshead minnow	*Cyprinodon variegatus*	Saltwater
Striped killifish	*Fundulus majalis*	Freshwater
Lampreys - Family Petromyzontidae		
American brook lamprey	*Lampetra appendix*	Freshwater
Sea lamprey	*Petromyzon marinus*	Anandromous
Lizardfishes - Family Synodontidae		
Inshore lizardfish	*Synodus foetens*	Saltwater
Mackerels - Family Scombridae		
Atlantic mackerel	*Scomber scombrus*	Saltwater
Minnows - Family Cyprinidae		
Blacknose dace	*Rhinichthys atratulus*	Freshwater
Bluntnose minnow	*Pimephales notatus*	Freshwater
Bridle shiner	*Notropis bifrenatus*	Freshwater
Central stoneroller	*Campostoma anomalum*	Freshwater
Comely shiner	*Notropis amoenus*	Freshwater
Common carp	*Cyprinus carpio*	Freshwater
Common shiner	*Notropis cornutus*	Freshwater
Creek chub	*Semotilus atromaculatus*	Freshwater
Cutlips minnow	*Exoglossum maxillingua*	Freshwater
Emerald shiner	*Notropis atherinoides*	Freshwater
Fallfish	*Semotilus corporalis*	Freshwater
Fathead minnow	*Pimephales promelas*	Freshwater
Golden shiner	*Notemigonus crysoleucas*	Freshwater
Goldfish	*Carassius auratus*	Freshwater
Hornyhead chub	*Nocomis biguttatus*	Freshwater
Longnose dace	*Rhinichthys cataractae*	Freshwater
Northern redbelly dace	*Rhinichthys atratulus*	Freshwater
Pearl dace	*Margariscus margarita*	Freshwater
Roseyface shiner	*Notropis rubellus*	Freshwater
Satinfin shiner	*Notropis analostanus*	Freshwater
Silvery minnow	*Hybognathus regius*	Freshwater
Spotfin shiner	*Notropis spilopterus*	Freshwater
Spottail shiner	*Notropis hudsonius*	Freshwater
Mudminnows - Family Umbridae		
Central mudminnow	*Umbra limi*	Freshwater
Eastern mudminnow	*Umbra pygmaea*	Freshwater
Mullets - Family Mugilidae		
Striped mullet	*Mugil cephalus*	Saltwater
Needlefishes - Family Belonidae		
Atlantic needlefish	*Strongylura marina*	Saltwater
Perches - Family Percidae		
Fantail darter	*Etheostoma flabellare*	Freshwater
Greenside darter	*Etheostoma blennioides*	Freshwater
Log perch	*Percina caprodes*	Freshwater
Tessellated darter	*Etheostoma olmstedi*	Freshwater
Walleye	*Stizostedion v. vitreum*	Freshwater
Yellow perch	*Perca flavescens*	Freshwater
Pikes - Family Esocidae		
Chain pickerel	*Esox niger*	Freshwater
Northern pike	*Esox lucius*	Freshwater
Redfin pickerel	*Esox a. americanus*	Freshwater
Tiger muskellunge	*Northern pike X muskellunge*	Freshwater
Pipefishes - Family Sygnathidae		

TABLE 2-1
HUDSON RIVER FISHES

Common Name	Scientific Name	Predominant Habitat
Lined seahorse	*Hippocampus erectus*	Saltwater
Northern pipefish	*Syngnathus fuscus*	Saltwater
Porgies - Family Sparidae		
Scup	*Stenotomus chrysops*	Saltwater
Puffers - Family Tetraodontidae		
Northern puffer	*Sphoeroides maculatus*	Saltwater
Sculpins - Family Cottidae		
Grubby	*Myoxocephalus aenaeus*	Freshwater
Longhorn sculpin	*Myoxocephalus octodecemspinosus*	Freshwater
Slimy sculpin	*Cottus cognatus*	Freshwater
Searobins - Family Triglidae		
Northern searobin	*Prionotus carolinus*	Saltwater
Striped searobin	*Prionotus evolans*	Saltwater
Silversides - Family Atherinidae		
Atlantic silverside	*Menidia menidia*	Saltwater
Brook silverside	*Labidesthes sicculus*	Freshwater
Smelts - Family Osmeridae		
Rainbow smelt	*Osmerus mordax*	Anadromous
Soles - Family Soleidae		
Hogchoker	*Trinectes maculatus*	Saltwater
Stickelbacks - Family Gasterosteidae		
Brook stickleback	*Culaea inconstans*	Freshwater
Fourspine stickleback	*Apeltes quadracus*	Freshwater
Threespine stickleback	*Gasterosteus aculeatus*	Freshwater
Sturgeons - Family Acipenseridae		
Atlantic sturgeon	*Acipenser oxyrhynchus*	Freshwater
Shortnose sturgeon	*Acipenser breviostrum*	Freshwater
Suckers - Family Castostomidae		
Creek chubsucker	*Erimyzon oblongus*	Freshwater
Longnose sucker	*Catostomus catostomus*	Freshwater
Northern hogsucker	*Hypentelium nigricans*	Freshwater
Shorthead redhorse	*Moxostoma macrolepidotum*	Freshwater
White sucker	*Catastomus commersoni*	Freshwater
Sunfishes - Family Centrarchidae		
Black crappie	*Pomoxis nigromaculatus*	Freshwater
Bluegill	*Lepomis macrochirus*	Freshwater
Bluespotted sunfish	*Enneacanthus gloriosus*	Freshwater
Green sunfish	*Lepomis cyanellus*	Freshwater
Largemouth bass	*Micropterus salmoides*	Freshwater
Pumpkinseed	*Lepomis gibbosus*	Freshwater
Redbreast sunfish	*Lepomis auritus*	Freshwater
Rock bass	*Ambloplites rupestris*	Freshwater
Smallmouth bass	*Micropterus dolomieui*	Freshwater
Warmouth	*Lepomis gulosis*	Freshwater
White crappie	*Pomoxis annularis*	Freshwater
Trouts - Family Salmonidae		
Atlantic salmon	*Salmo salar*	Anandromous
Brook trout	*Salvelinus fontinalis*	Freshwater
Brown trout	*Salmo trutta*	Freshwater
Lake whitefish	*Coregonus clupeaformis*	Freshwater
Rainbow trout	*Oncorhynchus mykiss (formerly Salmo gairdneri)*	Freshwater
Round whitefish	*Prosopium cylindraceum*	Freshwater
Trout-perches - Family Percopsidae		

TABLE 2-1
HUDSON RIVER FISHES

Common Name	Scientific Name	Predominant Habitat
Trout-perch	*Percopsis omiscomaycus*	Freshwater
Wrasses - Family Labridae		
Cunner	*Tautogolabrus adspersus*	Saltwater
Tautog	*Tautoga onitis*	Saltwater
Notes: Fish are not found exclusively in predominant habitats. Source: Haynes and Frisch, 1993 and NYSDEC, 1989.		

TABLE 2-2

TYPICAL FISH AGGREGATIONS IN THE UPPER HUDSON RIVER ESTUARY (RM 101-153)

Widespread species American eel Blueback herring Alewife American shad Common carp Spottail shiner White perch Striped bass Pumpkinseed	**Shore area** Banded killifish Golden shiner Emerald shiner Gizzard shad Bay anchovy Bluegill Smallmouth bass Yellow perch
Rock pile White catfish Smallmouth bass Largemouth bass Rock bass Redbreast sunfish	**Tailwater** White sucker Golden shiner White catfish Largemouth bass Walleye
Vegetated backwater Brown bullhead Yellow perch Goldfish Golden shiner Banded killifish Largemouth bass White catfish White sucker Gizzard shad Northern pike Emerald shiner Rock bass Redbreast sunfish Bluegill Smallmouth bass	**Major tributaries** White sucker Smallmouth bass Redbreast sunfish Yellow perch Largemouth bass Goldfish Golden shiner Rock bass Bluegill Black crappie
Offshore shoals and channel Tessellated darter White catfish Brown bullhead	Hogchoker Shortnose sturgeon White sucker

Notes: Species are listed in order of abundance, excluding widespread species.
Source: NYSDEC, 1989.

TABLE 2-3

AMPHIBIANS POTENTIALLY FOUND ALONG THE HUDSON RIVER

Common Name	Scientific Name
Order Caudauta - Salamanders	
Allegheny Dusky Salamander	*Desmognathus ochrophaeus*
Blue-spotted Salamander*	*Ambystoma laterale*
Common Mudpuppy	*Necturus maculosus*
Four-toed Salamander	*Hemidactylium scutatum*
Jefferson Salamander	*Ambystoma jeffersonianum*
Marbled Salamander	*Ambystoma opacum*
Northern Dusky Salamander*	*Desmognathus fuscus*
Northern Spring Salamander	*Gyrinophilus p. porphyriticus*
Northern Redback Salamander*	*Plethodon c. cinereus*
Northern Slimy Salamander	*Plethodon glutinosus*
Northern Two-lined Salamander	*Eurycea bislineata*
Northern Red Salamander	*Pseudotriton r. ruber*
Red-spotted or Eastern Newt*	*Notophthalmus v. viridescens*
Spotted Salamander*	*Ambystoma maculatum*
Order Anura - Toads and Frogs	
Toads	
Eastern American Toad*	*Bufo a. americanus*
Eastern Spadefoot	*Scaphiopus holbrookii*
Fowler's Toad	*Bufo fowleri*
Woodhouse's Toad*	*Bufo woodhousii*
Family Ranida- True Frogs	
Bullfrog*	*Rana catesbeiana*
Gray Treefrog*	*Hyla versicolor*
Green Frog*	*Rana clamitans melanota*
Northern Spring Peeper*	*Pseudacris c. crucifer*
Northern Cricket Frog	*Acris c. crepitans*
Northern Leopard Frog*	*Rana pipiens*
Pickerel Frog*	*Rana palustris*
Wood Frog	*Rana sylvatica*
Note: * Sighted at Saratoga National Historic Park. Sources: New York State Amphibian and Reptile Atlas 1990-1998 (NYSDEC, 1999) and SNHP (2000).	

TABLE 2-4

REPTILES POTENTIALLY FOUND ALONG THE HUDSON RIVER

Common Name	Scientific Name
Turtles - Order Testudines	
Blanding's Turtle	*Emydoidea blandingii*
Bog turtle	*Clemmys muhlenbergi*
Common snapping turtle*	*Chelydra serpentina*
Diamondback terrapin	*Malaclemys terrapin*
Eastern box turtle*	*Terrapene carolina*
Map turtle	*Graptemys geographica*
Painted turtle*	*Chrysemys picta*
Red-eared Slider	*Trachemys scripta elegans*
Spotted turtle	*Clemmys guttata*
Stinkpot/ common musk turtle	*Sternotherus odoratus*
Wood turtle*	*Clemmys insculpta*
Order Squamata - Lizards and Snakes	
Suborder Lacertilla - Lizards	
Five-lined Skink	*Eumeces fasciatus*
Northern Coal Skink	*Eumeces a. anthracinus*
Northern Fence Lizard	*Sceloporus undulatus hyacinthinus*
Suborder Serpente- Snakes	
Northern Water Snake*	*Nerodia s. sipedon*
Northern Redbelly Snake*	*Storeria o. occipitomaculata*
Common Garter Snake*	*Thamnophis sirtalis*
Eastern Ribbon Snake*	*Thamnophis sauritus*
Eastern Hognose Snake	*Heterodon platirhinos*
Northern Ringneck Snake	*Diadophis punctatus edwardsii*
Eastern Worm Snake	*Carphophis a. amoenus*
Northern Black Racer	*Coluber c. constrictor*
Smooth Green Snake	*Liochlorophis vernalis*
Black Rat Snake	*Elaphe o. obsoleta*
Eastern Milk Snake*	*Lampropeltis t. triangulum*
Northern Copperhead	*Agkistrodon contortrix mokasen*
Timber Rattlesnake	*Crotalus horridus*
Northern Brown Snake*	*Storeria d. dekayi*
Note: * Sighted at Saratoga National Historic Park. Sources: New York State Amphibian and Reptile Atlas 1990-1998 (NYSDEC, 1999) and SNHP (2000).	

TABLE 2-5

BREEDING BIRDS OF THE HUDSON RIVER

Common Name	*Scientific Name*
Acadian Flycatcher*	*Empidonax virescens*
Alder Flycatcher*	*Empidonax alnorum*
American Bittern*	*Botaurus lentiginosus*
American Robin*	*Turdus migratorius*
American Kestrel*	*Falco sparverius*
American Goldfinch*	*Carduelis tristis*
American Coot* °	*Fulica americana*
American Black Duck*	*Anas rubripes*
American Crow*	*Corvus brachyrhynchos*
American Redstart*	*Setophaga ruticilla*
American Woodcock*	*Scolopax minor*
Bank Swallow*	*Riparia riparia*
Barn Swallow*	*Hirundo rustica*
Barred Owl	*Strix varia*
Belted Kingfisher*	*Ceryle alcyon*
Black-and-white Warbler*	*Mniotilta varia*
Black-billed Cuckoo*	*Coccyzus erythropthalmus*
Black-capped Chickadee*	*Parus atricapillus*
Black-crowned Night-Heron*	*Nycticorax nycticorax*
Black-throated Blue Warbler*	*Dendroica caerulescens*
Black-throated Green Warbler*	*Dendroica virens*
Blackburnian Warbler*	*Dendroica fusca*
Blue Jay*	*Cyanocitta cristata*
Blue-gray Gnatcatcher*	*Polioptila caerulea*
Blue-winged Teal*	*Anas discors*
Blue-winged Warbler*	*Vermivora pinus*
Blue-winged & Golden-winged Warbler Hybrids	*Vermivora pinus & Vermivora chrysoptera*
Bobolink*	*Dolichonyx oryzivorus*
Broad-winged Hawk*	*Buteo platypterus*
Brown Thrasher*	*Toxostoma rufum*
Brown Creeper*	*Certhia americana*
Brown-headed Cowbird*	*Molothrus ater*
Canada Warbler*	*Wilsonia canadensis*
Canada Goose*	*Branta canadensis*
Carolina Wren*	*Thryothorus ludovicianus*
Cattle Egret°	*Bubulcus ibis*
Cedar Waxwing*	*Bombycilla cedrorum*
Cerulean Warbler	*Dendroica cerulea*
Chestnut-sided Warbler*	*Dendroica pensylvanica*
Chimney Swift*	*Chaetura pelagica*
Chipping Sparrow*	*Spizella passerina*
Clapper Rail°	*Rallus longirostris*
Cliff Swallow	*Hirundo pyrrhonota*
Common Grackle*	*Quiscalus quiscula*
Common Moorhen	*Gallinule chlorous*
Common Nighthawk	*Chordeiles minor*
Common Barn-Owl	*Tyto alba*
Common Yellowthroat	*Geothlypis trichas*

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TABLE 2-5

BREEDING BIRDS OF THE HUDSON RIVER

Common Name	*Scientific Name*
Common Merganser*	*Mergus merganser*
Common Snipe*	*Gallinago gallinago*
Cooper's Hawk*	*Accipiter cooperii*
Dark-eyed Junco	*Junco hyemalis*
Double-crested Cormorant	*Phalacrocorax auritus*
Downy Woodpecker*	*Picoides pubescens*
Eastern Meadowlark	*Sturnella magna*
Eastern Phoebe*	*Sayornis phoebe*
Eastern Wood-Pewee*	*Contopus virens*
Eastern Kingbird*	*Tyrannus tyrannus*
Eastern Bluebird*	*Sialia sialis*
Eastern Screech-Owl*	*Otus asio*
European Starling*	*Sturnus vulgaris*
Field Sparrow*	*Spizella pusilla*
Fish Crow*	*Corvis ossifragus*
Gadwall*	*Anas strepera*
Glossy Ibis	*Plegadis falcinellus**
Golden-crowned Kinglet*	*Regulus satrapa*
Golden-winged Warbler*	*Vermivora chrysoptera*
Grasshopper Sparrow*	*Ammodramus savannarum*
Gray Catbird*	*Dumetella carolinensis*
Great Horned Owl	*Bubo virginianus*
Great Egret°	*Casmerodius albus*
Great Blue Heron*	*Ardea herodias*
Great Crested Flycatcher*	*Myiarchus crinitus*
Great Black-backed Gull*	*Larus marinus*
Green-backed Heron*	*Butorides striatus*
Green-winged Teal*	*Arias crecca*
Hairy Woodpecker*	*Picoides villosus*
Henslow's Sparrow*	*Ammodramus henslowii*
Hermit Thrush*	*Catharus guttatus*
Herring Gull*°	*Larus argentatus*
Hooded Merganser*	*Lophodytes cucullatus*
Hooded Warbler	*Wilsonia citrina*
Horned Lark*	*Eremophila alpestris*
House Sparrow*	*Passer domesticus*
House Finch*	*Carpodacus mexicanus*
House Wren*	*Troglodytes aedon*
Indigo Bunting*	*Passerina cyanea*
Kentucky Warbler	*Oporornis formosus*
Killdeer*	*Charadrius vociferus*
King Rail	*Rallus elegans*
Laughing Gull°	*Larus atricilla*
Least Bittern	*Ixobrychus exilis*
Least Flycatcher*	*Empidonax minimus*
Loggerhead Shrike	*Lanius ludovicianus*
Long-earned Owl*	*Asio otus*
Louisiana Waterthrush*	*Seiurus motacilla*
Magnolia Warbler*	*Dendroica magnolia*
Mallard x American Black Duck	*Anas platyrhynchos x rubripes*
Mallard *	*Anas platyrhynchos*

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TABLE 2-5

BREEDING BIRDS OF THE HUDSON RIVER

Common Name	*Scientific Name*
Marsh Wren	*Cistothorus palustris*
Mourning Dove*	*Zenaida macroura*
Mute Swan	*Cygnus olor*
Nashville Warbler*	*Vermivora ruficapilla*
Northern Bobwhite	*Colinus virginianus*
Northern Rough-winged Swallow*	*Stelgidopteryx serripennis*
Northern Saw-whet Owl	*Aegolius acadicus*
Northern Oriole	*Icterus galbula*
Northern Pintail	*Anas acuta*
Northern Waterthrush*	*Seiurus noveboracensis*
Northern Goshawk*	*Accipiter gentilis*
Northern Flicker*	*Colaptes auratus*
Northern Mockingbird*	*Mimus polyglottos*
Northern Harrier*	*Circus cyaneus*
Northern Cardinal*	*Cardinalis cardinalis*
Orchard Oriole	*Icterus spurius*
Osprey*	*Pandion haliaetus*
Ovenbird*	*Seiurus aurocapillus*
Pied-billed Grebe*	*Podilymbus podiceps*
Pileated Woodpecker*	*Dryocopus pileatus*
Pine Warbler	*Dendroica pinus*
Prairie Warbler*	*Dendroica discolor*
Purple Martin*	*Progne subis*
Purple Finch*	*Carpodacus purpureus*
Red-bellied Woodpecker*	*Melanerpes carolinus*
Red-breasted Merganser*	*Mergus serrator*
Red-breasted Nuthatch*	*Sitta canadensis*
Red-eyed Vireo*	*Vireo olivaceus*
Red-headed Woodpecker	*Melanerpes erythrocephalus*
Red-shouldered Hawk*	*Buteo lineatus*
Red-tailed Hawk*	*Buteo jamaicensis*
Red-winged Blackbird*	*Agelaius phoeniceus*
Ring-necked Pheasant*	*Phasianus colchicus*
Rock Dove*	*Columba livia*
Rose-breasted Grosbeak*	*Pheucticus ludovicianus*
Ruby-throated Hummingbird*	*Archilochus colubris*
Ruddy Duck*	*Oxyura jamaicensis*
Ruffed Grouse*	*Bonasa umbellus*
Rufous-sided Towhee*	*Pipilo erythrophthalmus*
Savannah Sparrow*	*Passerculus sandwichensis*
Scarlet Tanager*	*Piranga olivacea*
Sharp-shinned Hawk*	*Accipiter striatus*
Snowy Egret°	*Egretta thula*
Solitary Vireo	*Vireo solitarius*
Song Sparrow*	*Melospiza melodia*
Sora	*Porzana carolina*
Spotted Sandpiper*	*Actitis macularia*
Swamp Sparrow*	*Melospiza georgiana*
Tree Swallow*	*Tachycineta bicolor*
Tufted Titmouse*	*Parus bicolor*
Turkey Vulture*	*Cathartes aura*

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TABLE 2-5

BREEDING BIRDS OF THE HUDSON RIVER

Common Name	*Scientific Name*
Upland Sandpiper*	*Bartramia longicauda*
Veery *	*Catharus fuscescens*
Vesper Sparrow	*Pooecetes gramineus*
Virginia Rail*	*Rallus limicola*
Warbling Vireo*	*Vireo gilvus*
Western Meadowlark	*Sturnella neglecta*
Whip-poor-will*	*Caprimulgus vociferus*
White-breasted Nuthatch	*Sitta carolinensis*
White-eyed Vireo	*Vireo griseus*
White-throated Sparrow*	*Zonotrichia albicollis*
Wild Turkey*	*Meleagris gallopavo*
Willow Flycatcher	*Empiddonax traillii*
Winter Wren	*Troglodytes troglodytes*
Wood Duck	*Aix sponsa*
Wood Thrush	*Hylocichla mustelina*
Worm-eating Warbler	*Helmitheros vermivorus*
Yellow Warbler*	*Dendroica petechia*
Yellow-bellied Sapsucker*	*Sphyrapicus varius*
Yellow-billed Cuckoo	*Coccyzus americanus*
Yellow-breasted Chat	*Icteria virens*
Yellow-crowned Night-Heron°	*Nycticorax violaceus*
Yellow-rumped Warbler*	*Dendroica coronata*
Yellow-throated Vireo*	*Vireo flavifrons*

Notes: * Sighted at Saratoga National Park (SNP, 2000)
° coastal breeding birds
This list does not reflect all birds using the Hudson River. It includes only birds listed as breeding along the Hudson River in Andrle, R.F. and J.R. Carroll (Editors). 1988. The Atlas of Breeding Birds in New York State. Cornell University Press. Ithaca, New York. 551 pp.

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TABLE 2-6

MAMMALS POTENTIALLY FOUND ALONG THE HUDSON RIVER

Common Name	*Scientific Name*
Order Artiodacyla - Even-toed Ungulates	
Family Cervidae - Cervids	
Whitetail deer*	*Odocoileus virginianus*
Order Carnivora	
Family Canidae - Canids	
Coyote*	*Canis latrans*
Gray fox*	*Urocyon cinereoargenteus*
Red fox*	*Vulpes vulpes*
Family Felidae- Cats	
Bobcat	*Lynx rufus*
Family Mustelidae - Weasels	
Common striped skunk*	*Mephitis mephitis*
Ermine*	*Martes erminea*
Fisher	*Martes pennanti*
Least weasel	*Martes nivalis*
Longtail weasel*	*Mustela frenata*
Marten	*Martes americana*
Mink*	*Mustela vison*
River otter	*Lutra canadensis*
Family Procyonidae- Raccoons	
Raccoon*	*Procyon lotor*
Family Ursidae - Bears	
Black bear*	*Ursus americanus*
Order Chiroptera - Bats	
Family Vespertilionidae - Vespertilionid Bats	
Big brown bat*	*Eptesicus fuscus*
Eastern pipistrelle*	*Pipistrellus subflavus*
Eastern small-footed myotis	*Myotis leibii*
Evening bat	*Nycticeius humeralis*
Hoary bat	*Lasiurus cinereus*
Indiana Myotis	*Myotis sodalis*
Little brown bat*	*Myotis lucifugus*
Keen's Myotis*	*Myotis keenii or M. septentrionalis*
Red bat*	*Lasiurus borealis*
Silver-haired bat	*Lasionycteris noctivagans*
Order Insectivora- Insectivores	
Family Soricidae - Shrews	
Least shrew	*Cryptotis parva*
Masked shrew*	*Sorex cinereus*
Northern short-tailed shrew*	*Blarina brevicauda*
Pygmy shrew	*Sorex hoyi*
Rock shrew	*Sorex dispar*
Smokey shrew*	*Sorex fumeus*
Water shrew	*Sorex palustris*
Family Talpidae - Moles	
Eastern mole*	*Scalopus aquaticus*
Hairy-tailed mole*	*Parascalops breweri*
Star-nosed mole*	*Condylura cristata*

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TABLE 2-6

MAMMALS POTENTIALLY FOUND ALONG THE HUDSON RIVER

Common Name	*Scientific Name*
Order Lagomorpha	
Family Leporidae - Hares and Rabbits	
Black-tailed jackrabbit	*Lepus californicus*
Cottontail*	*Sylvilagus floridanus*
European rabbit	*Orytolagus cuniculus*
New England cottontial	*Sylvilagus transitionalis*
Snowshoe hare*	*Lepus americanus*
Order Marsupialia - Marsupials	
Family Didelphidae – Oppossums	
Virginia opposum*	*Didelphis virginiana*
Order Rodentia - Rodents	
Family Castoridae - Beavers	
Beaver*	*Castor canadensis*
Family Cricetidae - Cricetids	
Deer mouse	*Peromyscus maniculatus*
Meadow vole*	*Microtus pennsylvanicus*
Muskrat*	*Ondatra zibethicus*
Pine vole	*Microtus pientorum*
Rock or yellow nose vole	*Microtus chrotorrhinus*
Southern bog lemming*	*Synaptomys cooperi*
Southern red-backed vole	*Clethrionomys gappeeri*
White-footed mouse*	*Peromyscus leucopus*
Family Erethizontidae - New World Porcupine	
Porcupine*	*Erethizon dorsatum*
Family Muridae - Murids	
Norway rat*	*Rattus norvegicus*
Black rat	*Rattus rattus*
House mouse*	*Mus musculus*
Eastern woodrat	*Neotoma magister*
Family Myocastoridae - Myocastorids	
Nutria	*Myocastor coypus*
Family Sciuridae - Squirrels	
Chipmunk*	*Tamias striatus*
Eastern gray squirrel	*Sciurus carolinensis*
Fox squirrel	*Sciurus niger*
Northern flying squirrel	*Glaucomys sabrinus*
Red squirrel*	*Tamiasciurus hudsonicus*
Southern flying squirrel*	*Glaucomys volans*
Woodchuck*	*Marmota monax*
Family Zapodidae - Jumping Mice	
Meadow jumping mouse*	*Zapus hudsonius*
Woodland jumping mouse*	*Napaeozapus insignis*
Notes: * Sighted at Saratoga National Park Sources: NYSDOS, 1990; NYSM, 1999; and SNP, 2000.	

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TABLE 2-7

NYS RARE AND LISTED SPECIES AND HABITATS OCCURRING IN THE VICINITY OF THE HUDSON RIVER

Common Name	Scientific Name	NYS Status	State Rank	Precision Value
Plants - known occurrences (i.e., precision value S)				
American waterwort	*Elantine americana*	Endangered	S1	S
Bicknell's sedge	*Carex bicknelli*	Rare	S2/S3	S
Blunt-lobe grape fern*	*Botrychium oneidense*	Endangered	S1/S3	S
Carey's smartweed	*Polygonum careyi*	Unprotected	S2	S
Clustered sedge	*Carex cumulata*	Rare	S2S3	S
Corn-salad	*Valerianella umbilicata*	Unprotected	SH	S
Davis' sedge	*Carex davisii*	Rare	S1	S
Estuary beggar-ticks	*Bidens bidentoides*	Threatened	S3	S
False hop sedge	*Carex lupiformes*	Rare	S3	S
Fissidens (non-vascular)	*Fissidens Fontanus*	Unprotected	S3?	S
Frank sedge	*Carex frankii*	Unprotected	S1	S
Glaucous sedge	*Carex Flaccosperma var. glaucodea*	Rare	S1	S
Golden club	*Orontium aquaticum*	Unprotected	S2	S
Golden seal	*Hydrastis canadensis*	Threatened	S2	S
Gypsy-wort	*Lycopus rubellus*	Unprotected	S1	S
Heartleaf plantain	*Plantago cordata*	Threatened	S3	S
Illinois pinweed	*Lechea racemulosa*	Rare	S3	S
Liliaeopsis	*Lilaeopsis chinensis*	Unprotected	S2	S
Lined sedge	*Carex striatula*	Unprotected	S1	S
Long's bittercress	*Cardamine longii*	Unprotected	S2	S
Marsh straw sedge	*Carex hormathodes*	Rare	S2/S3	S
Midland sedge	*Carex mesocorea*	Unprotected	S1	S

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TABLE 2-7

NYS RARE AND LISTED SPECIES AND HABITATS OCCURRING IN THE VICINITY OF THE HUDSON RIVER

Common Name	Scientific Name	NYS Status	State Rank	Precision Value
Mock-pennyroyal	*Hedeoma hispidum*	Rare	S2/S3	S
Narrow-leaved sedge	*Carex amphibola var. amphibola*	Unprotected	S1	S
Saltmarsh aster	*Aster subulatus*	Threatened	S2	
Saltmarsh bulrush	*Scirpus novae-angliae*	Endangered	S1	S
Schweinitz's flatsedge	*Cyperus schweinitizii*	Rare	S3	S
Slender crabgrass	*Digitaria filiformis*	Threatened	S2	S
Small-flowered crowfoot	*Ranunculus micranthus*	Unprotected	S2	S
Smooth bur-marigold	*Bidens laevis*	Rare	S2	S
Southern yellow flax	*Linum medium var. texanum*	Threatened	S2	S
Southern dodder	*Cuscata obtusiflora car. glandulosa*	Unprotected	S1	S
Spongy arrowhead	*Sagittaria calycina var. spongiosa*	Rare	S2	S
Starwort	*Callitriche terrestris*	Unprotected	S2S3	S
Swamp lousewort	*Pedicularis lanceolata*	Rare	S2	S
Swamp cottonwood	*Populus heterophylla*	Threatened	S2	S
Taxiphyllum (non-vascular)	*Taxiphyllum taxirameum*	Unprotected	S1	S
Violet wood-sorrel	*Oxalis violacea*	Unprotected	S1S2	S
Violet lespedeza	*Lespedeza violacea*	Rare	S3	S
Water pigmyweed	*Crassula aquatica*	Endangered	S1	S
Weak stellate sedge	*Carex seorsa*	Rare	S2	S
Invertebrates				
American rubyspot dragonfly	*Hetaerina americana*	Unprotected	S2/S3	S
Arrowhead spiketail dragonfly	*Cordulegaster obliqua*	Unprotected	S2S3	S

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TABLE 2-7

NYS RARE AND LISTED SPECIES AND HABITATS OCCURRING IN THE VICINITY OF THE HUDSON RIVER

Common Name	Scientific Name	NYS Status	State Rank	Precision Value
Gray petaltail dragonfly	*Tachopteryx thoreyi*	Unprotected	S2	S
Spatterdock darner	*Aeshna mutata*	Unprotected	S2	
Tawny emperor butterfly	*Asterocampa clyton*	Unprotected	S3	S
Riverine clubtail	*Stylurus amnicola*	Unprotected	SH	M
Fish				
Shortnose sturgeon	*Acipenser brevirostrum*	Endangered	S1	S
Bluespotted sunfish	*Enneacanthus gloriosus*	Unprotected	S2	M
Reptiles				
Bog turtle	*Clemmys muhlenbergii*	Endangered	S2	M
Blanding's turtle	*Emydoidea blandingii*	Threatened	S2	M
Fence lizard	*Sceloporus undulatus*	Unprotected	S1	S
Timber rattlesnake	*Crotalus horridus*	Threatened	S3	M
Birds				
Peregrine falcon	*Falco peregrinus*	Endangered	S2	S
Bald eagle*	*Haliaeetus Leucocephalus*	Endangered	S1B, S1N	S
Least bittern	*Ixobrychus Exilis*	Threatened	S3B, S1N	
King rail	*Rallus elegans*	Protected	S1	M
Barn Owl	*Tyto alba*	Protected-Special Concern	S3	M
Short-eared owl*	*Asio flammeus*	Protected-Special Concern	S2	S
Osprey	*Pandion halietus*	Threatened	S4	M
Mammals				
Eastern woodrat	*Neotoma magister*	Endangered	SH	M

TABLE 2-7

NYS RARE AND LISTED SPECIES AND HABITATS OCCURRING IN THE VICINITY OF THE HUDSON RIVER

Common Name	Scientific Name	NYS Status	State Rank	Precision Value
Communities				
17 Freshwater Intertidal Mudflats Communities				S
21 Freshwater Tidal Marsh Communities				S
9 Freshwater Tidal Swamp Communities				S
6 Freshwater Intertidal Shore Communties				S
7 Brackish Intertidal Mudflats Communities				S
7 Brackish Tidal Marsh Communities				S
1 Brackish Subtidal Aquatic Bed Community				S
1 Calcareous Cliff Community				S
Areas of Concern				
16 Anadromous Fish Concentration Areas				S
12 Waterfowl Concentration Areas				S
3 Raptor Concentration Areas*				S
1 Warm Water Fish Concentration Area				S

Notes:
* Indicates sighted in the Upper Hudson River (above Federal Dam).
State Rank:
S1 = Typically 5 or fewer occurrences, very few remaining individuals, acres or miles of stream in NYS
S2 = Typically 6 to 20 occurrences, very few remaining individuals, acres or miles of stream in NYS
S3 = Typically 21 to 100 occurrences, limited acreage or miles of stream in NYS
S4 = Apparently secure in NYS
S5 = Demostrably secure in NYS
Precision Rank:
A precision value of "S" or a blank indicates that a species is known to be found along the Hudson River.
A precision value of "M" indicates that a species may occur along the Hudson River in an appropriate habitat.
Source: NYSDEC, July 27, 2000.

TABLE 2-8

HUDSON RIVER SIGNIFICANT HABITATS

Freshwater Habitats
Normans Kill Papascanee Marsh and Creek Shad and Schermerhorn Island Schodack and Houghtaling Islands and Schodack Creek Coeymans Creek Hannacroix Creek Mill Creek Wetlands Stuyvesant Marshes* Coxsackie Creek Coxsackie Island Backwater Stockport Creek and Flats Vosburgh Swamp and Middle Ground Flats Roger's Island Catskill Creek Ramshorn Marsh Inbocht Bay and Duck Cove Roeliff-Jansen Kill Smith's Landing Cementon* Germantown/Clermont Flats Esopus Estuary North and South Tivoli Bays Mudder Kill* The Flats Roundout Creek Kingston Deepwater Habitat Vanderburgh Cove and Shallows Esopus Meadows Poughkeepsie Deepwater Habitat Crum Elbow Marsh*
Brackish Water Habitats
Wappinger Creek Fishkill Creek Moodna Creek Hudson River Miles 44-56 Constitution Marsh Iona Island Marsh Camp Smith Marsh and Annsville Creek*
Salt Water Habitats
Haverstraw Bay Croton River and Bay Piermont Marsh
Notes: * Indicates an area that is recognized by the NYS Natural Heritage Program as containing rare/important species or communities, but is not a designated Significant Habitat. Source: NYSDOS, 1990.

TAMS/MCA

TABLE 2-9

HUDSON RIVER SIGNIFICANT HABITAT SPECIES AND RESOURCES

Site Name	County	Community Types	Rare Species	Valuable Resources
Freshwater Habitats				
Normans Kill	Albany	Freshwater creek with shallows associated with creek mouth.	None identified.	Spawning area for anadromous fish species including alewife, white perch, and blueback herring. Large resident smallmouth bass populations.
Shad and Schermerhorn Island	Albany	Largely comprised of shallows and mudflats with lesser amounts of lower marsh, upper marsh and freshwater creek.	Heart leaf plantain and estuary beggar ticks.	Large feeding areas for herons and other wading birds, furbearers, deer and other upland game, limited waterfowl usage, important spawning and nursery grounds for American shad, blueback herring, alewife, white perch, striped bass, and resident fish species.
Papascanee Marsh and Creek	Renssalear	Mainly upper marsh with lesser amounts of shallows, mudflats, lower marsh, and freshwater creek.	Least bittern nesting area; map turtles.	Waterfowl use during migrations. Breeding birds incl. green-backed heron, Virginia rail, several duck species, marsh wren, swamp swallow, and others. Spawning and nursery grounds for American shad, blueback herring, alewife, white catfish, black bass, white perch and other fish.
Schodack and Houghtaling Islands and Schodack Creek	Renssalear, Columbia, Greene	Predominantly shallows, mudflats, and sandy beach with lesser amounts of lower marsh and upper marsh.	Osprey roosting and feeding; possible use by shortnose sturgeon; heart leaf plantain.	Waterfowl use during migrations and limited nesting activity, nesting by other bird species. Furbearers present. Schodack Creek provides important spawning and nursery grounds for American Shad, white perch, alewife, and blueback herring, black bass and other species. Northmost concentration of shad spawning on the Hudson.

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TABLE 2-9

HUDSON RIVER SIGNIFICANT HABITAT SPECIES AND RESOURCES

Site Name	County	Community Types	Rare Species	Valuable Resources
Coeymans Creek	Albany	Predominantly shallows with smaller amounts of mudflats, lower marsh, and swamp forest.	None.	Important spawning area for anadromous fish including alewife, blueback herring, white perch, and American Shad. Limited waterfowl during migrations.
Hannacroix Creek	Albany, Greene	Predominantly freshwater creek with shallows, mudflats, lower marsh, upper marsh and swamp forest.	None identified.	Important spawning area for alewife, blueback herring, white perch, American Shad, and other fish. Resting and feeding area for migratory waterfowl. Feeding area for herons, various birds, and furbearers.
Mill Creek Wetlands	Columbia	Swamp forest with some shallows, mudflats, sandy beach, lower marsh, and upper marsh.	Estuary beggar ticks.	Limited waterfowl use during migrations. Populations of breeding birds include green-backed herons, various ducks, and many passerines.
Stuyvesant Marshes*	Columbia	Roughly equal amounts of shallows, mudflats, sandy mudflats, sandy beach, rocky shore, lower marsh, and upper marsh.	Heart leaf plantain, kidney leaf mud plantain.	Limited use by migrating waterfowl, probable heavy use by various nesting bird species.
Coxsackie Creek	Greene	Principally freshwater creek with some shallows, mudflats, sandy beach, lower marsh, upper marsh, and freshwater creek.	Estuary beggar ticks.	Spawning habitat for alewife, blueback herring, white perch, and American shad. Feeding grounds for herons and other wading birds. Small mammal and furbearer foraging.

TABLE 2-9

HUDSON RIVER SIGNIFICANT HABITAT SPECIES AND RESOURCES

Site Name	County	Community Types	Rare Species	Valuable Resources
Coxsackie Island Backwater	Greene	Shallows with peripheral mud and sand flats, rocky shore, lower marsh, and upper marsh.	Heart leaf plantain, kidney leaf mud plantain.	Important spawning and nursery ground for resident fish including brown bullhead, largemouth bass, yellow perch, and redfin pickerel. Also feeding grounds for anadromous fish and wintering areas for largemouth bass.
Stockport Creek and Flats	Columbia	Shallows and mudflats with substantial areas of lower marsh, upper marsh, and woody swamp. Three miles of tidal and freshwater creek. Some deepwater and sandy beach associated with navigation channel and islands.	Heart leaf plantain, estuary beggar ticks, golden club; map turtle.	Very important spawning/nursery grounds for anadromous and freshwater fish including alewife, blueback herring, smelt, American shad, striped bass, and smallmouth bass. Very important feeding and resting habitat for migrating and overwintering waterfowl. Use by wading, shore, and passerine birds for feeding and breeding. Bank swallows nest in the vertical sand banks. Extensive stands of wild rice.
Vosburgh Swamp and Middle Ground Flats	Greene	Largely comprised of creek, deepwater, shallows, and mudflats with lesser amounts of sandy beach, lower marsh, upper marsh, and freshwater swamp.	Possible least bittern and mud turtle; heart leaf plantain, sublate arrowhead, estuary beggar ticks.	Important feeding and resting grounds for migrating waterfowl and wintering waterfowl (when open water is available). Extensive nesting area for ducks, green-backed herons, and other birds. Colony of bank swallows. Heavy use of shallows for American shad spawning and extensive spawning, nursery and feeding areas for striped bass, alewife, blueback herring and resident fish species.
Roger's Island	Columbia	Comprised of roughly equal amounts of shallows and mudflats with some sandy beach, lower marsh, upper marsh, and swamp forest.	Estuary beggar-ticks, goldenclub.	Extensive waterfowl use during migrations and overwintering, nesting sites for many birds, extensive spawning areas for anadromous fish including the American shad.

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TABLE 2-9

HUDSON RIVER SIGNIFICANT HABITAT SPECIES AND RESOURCES

Site Name	County	Community Types	Rare Species	Valuable Resources
Catskill Creek	Greene	Predominantly creek with small amounts of shallows, mudflats, and lower marsh.	Wood turtle, probably in association with buffer area.	Important spawning and nursery grounds for anadromous and resident fishes including American shad, alewife, blueback herring, white perch, smallmouth and largemouth bass.
Ramshorn Marsh	Greene	Largely shallows, mudflats, lower marsh, upper marsh, and swamp forest with lesser amounts of sandy beach and rocky shore.	Least bittern nesting; estuary beggar-ticks, and heart leaf plantain.	Waterfowl use during migrations and overwintering, important heron feeding grounds, furbearer habitat, spawning and nursery grounds for American shad and black bass.
Inbocht Bay and Duck Cove	Greene	Principally shallows and mudflats with some lower marsh.	Estuary beggar-ticks.	Very extensive waterfowl concentrations during spring and fall migrations, some waterfowl overwintering, large muskrat and snapping turtle populations.
Roeliff-Jansen Kill	Columbia	Predominantly freshwater creek with limited shallows, mudflats, and lower marsh.	None identified.	Extensive use as a spawning/nursery ground for anadromous fish including American shad, blueback herring, white perch, and striped bass. Resident brown trout in upper reaches.
Smith's Landing Cementon*	Greene, Ulster	Limited mudflats, lower marsh, and upper marsh.	Heart leaf plantain, kidney leaf mud-plantain.	None identified.
Germantown/Clermont Flats	Columbia	Deepwater, shallows, mudflats, and limited lower marsh.	None identified.	Extremely important American shad spawning area, nursery areas for shad, striped bass, white perch, and resident fish. Extensive waterfowl feeding grounds during spring and fall migration periods. Some waterfowl overwintering.

TABLE 2-9

HUDSON RIVER SIGNIFICANT HABITAT SPECIES AND RESOURCES

Site Name	County	Community Types	Rare Species	Valuable Resources
Esopus Estuary	Ulster, Dutchess	Comprised of freshwater creek, deepwater, shallows, mudflats, lower marsh, upper marsh, and a small amount of tidal swamp.	Shortnose sturgeon spawning and wintering area in deepwater; migrating osprey feeding grounds; heart leaf plantain, goldenclub.	Important spawning and nursery grounds for striped bass, white perch, American shad, alewife, blueback herring, rainbow smelt, and resident fish. Feeding and resting grounds for migrating waterfowl.
North and South Tivoli Bays	Dutchess	Comprised of shallows, lower marsh, and upper marsh, followed by tidal swamp forest, rocky shore and creeks.	Migrating osprey feeding and resting, least bittern nesting, king rail; map turtles; heart leaf plantain, estuary beggar-ticks, goldenclub and other rare plants.	Feeding, spawning and/or nursery areas for striped bass, alewife, blueback herring, largemouth and smallmouth bass, and other fishes. Large snapping turtle population. Extensive waterfowl use for feeding and resting during migrations. Many breeding birds. Furbearer habitat.
Mudder Kill*	Dutchess	Equal amounts of mudflats, lower marsh, upper marsh, and tidal swamp forest.	Goldenclub, hirsute sedge, Davis sedge, heavy sedge, kidney leaf mud-plantain, and spongy arrowhead.	None known.
The Flats	Ulster, Dutchess	Comprised entirely of shallows.	Potential shortnose sturgeon feeding and resting area.	Primary spawning grounds for American shad and spawning and nursery area for striped bass, white perch, and resident fishes. Feeding area during migration periods for diving ducks and resting areas for all duck species.

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TABLE 2-9

HUDSON RIVER SIGNIFICANT HABITAT SPECIES AND RESOURCES

Site Name	County	Community Types	Rare Species	Valuable Resources
Roundout Creek	Ulster	Predominantly creek with shallows, mudflats, rocky shore, lower marsh, and limited amounts of upper marsh in association with the creek mouth.	Osprey during migration; heart leaf plantain.	Important spawning area for anadromous fish including alewife, rainbow smelt, blueback herring, white perch, tomcod, striped bass, and American shad. Important for resident fish such as brown bullhead, yellow perch, sunfish, and black basses. Limited use by migrating waterfowl for resting and feeding, extensive feeding on mudflats by herons and other wading birds.
Kingston Deepwater Habitat	Dutchess, Ulster	Deepwater.	Shortnose sturgeon wintering area and possible spawning grounds.	Atlantic sturgeon wintering area, the northern extent of many marine fishes in the Hudson.
Vanderburgh Cove and Shallows	Dutchess	Largely shallows with smaller amounts of mudflats, lower marsh, upper marsh, tidal swamp, and freshwater creek.	Possible shortnose sturgeon feeding grounds, osprey feeding ground during migration, sharp-winged monkey flower.	Extensive waterfowl feeding and resting grounds during spring and fall migrations. Important spawning, nursery, and feeding grounds for anadromous fish (striped bass, American shad, white perch, rainbow smelt, alewife, blueback herring) and resident fish (largemouth bass, yellow perch, brown bullhead).
Esopus Meadows	Ulster	Shallows.	Important feeding area for shortnose sturgeon, especially in spring.	Spawning, nursery, and feeding grounds for anadromous fish (e.g., striped bass, American shad, and white perch) and resident fish (e.g., largemouth bass, yellow perch, brown bullhead, and shiners).
Poughkeepsie Deepwater Habitat	Dutchess, Ulster	Deepwater.	Shortnose sturgeon wintering area and possible nursery grounds.	Estuarine and marine fish including bay anchovies, silversides, bluefish, weakfish, and hogchokers.

TABLE 2-9

HUDSON RIVER SIGNIFICANT HABITAT SPECIES AND RESOURCES

Site Name	County	Community Types	Rare Species	Valuable Resources
Crum Elbow Marsh*	Dutchess	Small amount of shallows, lower marsh, upper marsh, and tidal swamp forest.	Map turtle population.	Waterfowl migration, value limited by size of the marsh.
Brackish Water Habitats				
Wappinger Creek	Dutchess	Predominantly creek with smaller amounts of shallows, mudflats, lower marsh, and upper marsh.	Osprey feeding during spring migrations. Grassleaf arrowhead, subulate arrowhead, kidney leaf mud plaintain and Maryland bur-marigold.	Important spawning areas for anadromous fish including alewife, blueback herring, white perch, tomcod, and striped bass. Resident fish include largemouth bass, bluegill, brown bullhead, and red-breasted sunfish. Productive area for herons, waterfowl, and turtles.
Fishkill Creek	Dutchess	Mostly shallows and wooded upland with smaller amounts of mudflats, lower marsh, and upper marsh.	Important feeding site for migrating osprey and a potential osprey nesting site. Least bittern breeding. Estuary beggar-ticks, subulate arrowhead, kidney leaf mud- plantain.	Important spawning areas for anadromous fish including alewife, blueback herring, white perch, tomcod, and striped bass. Resident fish include largemouth bass, bluegill, brown bullhead, and red-breasted sunfish. Also blue claw crabs, herons and turtles.
Moodna Creek	Orange	Predominantly freshwater creek with shallows, mudflats, lower marsh, and upper marsh associated with the creek mouth.	Major feeding and resting ground for bald eagles and osprey. Limited summer feeding ground for bald eagles. Least bittern breeding area.	Important spawning areas for anadromous fish including alewife, blueback herring, smelt, white perch, tomcod, and striped bass. Resident fish include largemouth bass, bluegill, brown bullhead, and pumpkinseed. Also many herons, snapping turtles, raccoons, and muskrats.

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TABLE 2-9

HUDSON RIVER SIGNIFICANT HABITAT SPECIES AND RESOURCES

Site Name	County	Community Types	Rare Species	Valuable Resources
Hudson River Miles 44-56	Orange, Rockland, Putnam, Westchester	Deepwater, shallows, and forested uplands.	Bald eagle winter feeding grounds. Possible nursery area for shortnose sturgeon.	The major spawning area along the Hudson for striped bass and white perch (about 50% of northeast striped bass stocks come from the Hudson). Narrow migration corridor for all anadromous fish spawning upriver. Marine species (e.g., bluefish, bay anchovy) live here during periods of low freshwater flow (generally July through February).
Constitution Marsh	Putnam	Approximately equal amounts of shallows, mudflats, lower marsh, and upper marsh.	Least bittern nesting site. Osprey use during migrations.	Very important nesting habitat for a variety of bird species including green-backed heron, various waterfowl, and passerine birds. Important feeding grounds for herons and other wetland and shore birds. Significant spawning and feeding grounds for anadromous and resident fish. Muskrat population.
Iona Island Marsh	Rockland	Mainly upper marsh, followed by shallows and flats, with lesser amounts of woody tidal swamp and non-tidal freshwater marsh.	Least bittern nesting, adjacent bald eagle winter roosting. Walking fern and prickly pear cactus.	Extensive breeding for many birds. Muskrat and possibly other furbearers, amphibians, snapping turtle, and blue claw crab. Heron and shorebird feeding. Spawning and/or nursery for anadromous and resident fish.
Camp Smith Marsh and Annsville Creek*	Westchester	Largely shallows and creek with smaller amounts of mudflats and upper marsh.	Spongy arrowhead.	None identified.
Salt Water Habitats				

TABLE 2-9

HUDSON RIVER SIGNIFICANT HABITAT SPECIES AND RESOURCES

Site Name	County	Community Types	Rare Species	Valuable Resources
Haverstraw Bay	Rockland, Westchester	Deepwater and shallows.	Shortnose sturgeon wintering area.	Extensive nursery for anadromous fish species. Nursery and feeding ground for marine species. Spawning and wintering grounds for Atlantic sturgeon. Waterfowl feeding and resting during migration.
Croton River and Bay	Westchester	Mostly shallows with lesser amounts of mudflats and brackish upper marsh.	Possible osprey feeding grounds during spring and fall migrations.	Productive nursery, foraging and resting area for anadromous and resident fish.
Piermont Marsh	Rockland	Predominantly shallows and brackish upper marsh with a broad transition area of mudflats.	Least bittern and sedgewren nesting. Diamondback turtle use. Osprey feeding during migration.	Extensive use of mudflats by herons and egrets. Large numbers of resident and breeding birds, blue claw crabs, resident fish, and lesser numbers of furbearers. Waterfowl, wading bird, and shorebird feeding during migration.

Notes: * Indicates areas recognized by the NYS Natural Heritage Program as containing rare/important species or communities, but not designated as significant habitats.
Source: NYSDOS and the Nature Conservancy, 1990.

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TABLE 2-10

ASSESSMENT AND MEASUREMENT ENDPOINTS

Assessment Endpoint	Representative Receptor	Measures	
		Exposure	Effect
Benthic community structure as food source for local fish and wildlife.	· Benthic macroinvertebrate community	· Ecological community indices (diversity, evenness, dominance) · PCB levels in sediments and water column	· Differences in benthic community indices · Exceedance of ambient water quality criteria (AWQC) and sediment guidelines
Survival, growth, and reproduction of local forage fish populations.	· Spottail shiner · Pumpkinseed	· Measured PCB body burdens · Modeled PCB body burdens · PCB concentrations in sediments and water column	· Estimated exceedance of TRVs[1] · Exceedance of AWQC and sediment guidelines · Field observations
Survival, growth, and reproduction of local piscivorous/semi-piscivorous fish populations.	· Yellow perch · White perch · Largemouth bass · Striped bass	· Measured PCB body burdens · Modeled PCB body burdens · PCB concentrations in sediments and water column	· Estimated exceedance of TRVs · Exceedance of AWQC and sediment guidelines · Field observations
Survival, growth, and reproduction of local omnivorous fish populations.	· Brown bullhead	· Measured PCB body burdens · Modeled PCB body burdens · PCB concentrations in sediments and water column	· Estimated exceedance of TRVs · Exceedance of AWQC and sediment guidelines · Field observations
Protection (i.e., survival and reproduction) of insectivorous birds and mammals.	· Tree swallow · Little brown bat	· Measured PCB concentrations in prey items (aquatic insects/benthic invertebrates) · Modeled PCB concentrations in prey items (aquatic insects) · PCB concentrations in the water column	· Estimated exceedance of TRVs · Exceedance of AWQC for the protection of wildlife · Field observations
Protection (i.e., survival and reproduction) of waterfowl.	· Mallard	· Measured PCB concentrations in prey (invertebrates, macrophytes) · Modeled PCB concentrations in prey (invertebrates, macrophytes) · PCB concentrations in the water column	· Estimated exceedance of TRVs · Exceedance of AWQC for the protection of wildlife · Field observations
Protection of piscivorous/semi-piscivorous birds and mammals.	· Belted kingfisher · Great blue heron · Mink · River Otter	· Measured PCB concentrations in prey (forage fish, invertebrates) · Modeled PCB concentrations in prey (forage fish, invertebrates) · PCB concentrations in sediments and water column	· Estimated exceedance of TRVs · Exceedance of AWQC for the protection of wildlife · Field observations
Protection of omnivorous mammals.	· Raccoon	· Measured PCB concentrations in prey items (fish, invertebrates) · PCB concentrations in the water column	· Estimated exceedance of TRVs · Exceedance of AWQC for the protection of wildlife · Field observations

Notes: 1: Individual-level effects are considered to occur when the TQ is greater to or equal to one.Receptor species are surrogates, representative of a wide range of species likely to use the Hudson River as habitat or foraging source.

TABLE 2-11

HUDSON RIVER RECEPTOR SPECIES

Receptor Species	Habitat/Feeding Characteristics	Similar Feeding Groups (general comparison)	
Benthic Invertebrate Community	Benthic Macroinvertebrates- Planktivorous, Deposit-feeders, Omnivorous		
Spottail Shiner Pumpkinseed	Nektonic Forage Fish - Planktivorous, Insectivorous, Omnivorous	Fish Sunfishes Minnows Killifish River Herring	Amphibians Medium-sized Ranids (True Frogs)
Yellow Perch White Perch Largemouth Bass Striped Bass	Nektonic Fishes- Piscivorous	Basses Bluefish Weakfish	
Brown Bullhead Shortnose Sturgeon	Aquatic Feeders - Omnivorous, Scavengers, Detritivores	Fish Catfish Sturgeon Flatfishes Eels	Amphibians Salamanders Newts Larger Ranids Reptiles Turtles
Tree Swallow	Perching Birds of Wetlands- Insectivorous	Thrushes Wrens Sparrows	Flycatchers Jays Blackbirds
Mallard	Swimming Birds - Aquatic Herbivorous/Insectivorous	Birds Ducks Geese Swans Coots	Mammals Muskrat
Great Blue Heron	Wading Birds - Piscivorous	Shorebirds Herons, egrets, and bitterns Cormorants Mergansers Rails	
Belted Kingfisher	Wide-ranging River Birds - Piscivorous	Gulls Kingfishers	
Bald Eagle	Raptors (Birds of Prey) - Piscivorous/Carnivorous/ Scavengers	Eagles Hawks Falcons Osprey	
Little Brown Bat	Flying Mammals -Insectivorous	Bats	
Mink	Semi-piscivorous/Carnivorous Mammals	Other mustelids	
River Otter	Piscivorous mammals	Harbor Seal	
Raccoon	Facultative Wetland Mammals - Omnivorous	Foxes Dogs Cats	
Notes: Habitat/feeding characteristics are generalized and may not apply to all individuals of a group or species.			

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TABLE 3-1
AVERAGE PROPORTION OF FISH-BASED TEQ CONGENERS USING EPA 1993 DATASET AND USFWS 1995 DATASET

	BZ#77	**BZ#81**	**BZ#105**	BZ#114	**BZ#118**	BZ#123	**BZ#126**	BZ#156	BZ#157	BZ#167	BZ#169	BZ#189
Upper River Mean	**0.28**		**0.06**	0.01	**0.11**	0.00	**0.52**	0.01	0.00	0.00	0.01	0.00
Lower River Mean	**0.05**		**0.02**	0.00	**0.05**	0.00	**0.85**	0.00	0.00	0.00	0.01	0.00
Whole River Mean	**0.15**		**0.03**	0.00	**0.07**	0.00	**0.71**	0.01	0.00	0.00	0.01	0.00
Egg Mean	**0.32**	**0.11**	**0.04**	0.01	**0.07**	0.03	**0.40**	0.01	0.00	0.00	0.00	0.00
Chick Mean	**0.38**	**0.13**	**0.04**	0.01	**0.08**	0.03	**0.33**	0.01	0.00	0.00	0.00	0.00
Odonate Mean	**0.34**	**0.05**	**0.03**	0.00	**0.05**	0.01	**0.49**	0.01	0.00	0.00	0.00	0.00
Insect Mean	**0.34**	**0.11**	**0.04**	0.01	**0.05**	0.02	**0.42**	0.00	0.00	0.00	0.00	0.00

Source: Hudson River Database Release 5.0

TABLE 3-2: FRACTION OF TRI+ CHLORINATED CONGENERS EXPRESSED AS TOXIC EQUIVALENCIES (TEQ)

	Fish	Avian	Mammal
<<<<<<< ---- Whole Water Concentrations ---- >>>>>>>			
Upper River	4.43E-06	8.92E-04	4.73E-04
Lower River	4.72E-07	8.83E-05	5.49E-05
Whole River	4.03E-06	8.10E-04	4.31E-04
<<<<<<< ---- Fish Concentrations ---- >>>>>>>			
Upper River	1.22E-06	2.36E-04	1.78E-05
Lower River	1.20E-06	1.02E-04	2.19E-05
Whole River	1.21E-06	1.58E-04	2.02E-05
<<<<<<< ---- Sediment Concentrations ---- >>>>>>>			
Upper River	5.75E-06	2.10E-03	3.86E-05
Lower River	7.86E-06	2.05E-03	8.33E-05
Whole River	6.83E-06	2.08E-03	6.15E-05
<<<<<<< ---- Dissolved Water Concentrations ---- >>>>>>>			
Upper River	1.49E-06	4.27E-05	2.80E-04
Lower River	5.10E-07	4.50E-05	8.45E-05
Whole River	1.39E-06	4.30E-05	2.60E-04
<<<<<<< ---- Benthic Invertebrate Concentrations ---- >>>>>>>			
Upper River	1.06E-07	1.88E-05	1.55E-06
Lower River	1.05E-07	3.96E-06	2.07E-06
Whole River	1.06E-07	1.52E-05	1.67E-06

Factors obtained by multiplying media-specific TEF in Table 4-2 by individual congener concentrations for each sample, averaging across location and summing

Source: Hudson River Database Release 5.0

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Table 3-3 Summary of Conversion for the Di through Hexa Homologues

Homologue	Period	Mean Mass Percent of Tri+ Using TID Data	Mean +2 Standard Errors	Mean -2 Standard Errors	Mean Mass Percent Ratio Waterford/TID	Corrected TID Mass Percent	Mass Percent of Tri+ at Waterford
Calibration Period							
Di-Hexa	1987-1990		Repeat the 1991 Distribution				
Di	High Flow 1991-1995	32.17	36.28	28.07	1.04	33.37	33.37
Di	Low Flow 1991-1995	48.40	53.02	43.78	0.52	25.41	25.41
Di	High Flow 1996-1998	70.64	76.69	64.60	1.04	73.27	73.27
Di	Low Flow 1996-1998	96.46	102.16	90.76	0.52	50.64	50.64
Tri-Hexa	Fall-winter 1991-1998		GE TID Data		Same as below by homologue.	Varies	Varies
Tri-Hexa	Spring 1991-1998		GE TID Data		"	Varies	Varies
Tri-Hexa	Summer 1991-1998		GE TID Data		"	Varies	Varies
Forecast Period							
Di	High Flow 1999+	70.64	76.69	64.60	1.04	73.27	73.27
Di	Low Flow 1999+	96.46	102.16	90.76	0.52	50.64	50.64
Tri	Fall-winter 1999+	47.21	48.82	45.60	0.98	46.11	44.97
Tri	Spring 1999+	45.90	47.71	44.09	0.98	44.83	44.06
Tri	Summer 1999+	54.30	55.12	53.48	0.91	49.18	48.08
Tetra	Fall-winter 1999+	29.66	30.51	28.81	0.97	28.76	28.05
Tetra	Spring 1999+	34.41	35.55	33.26	0.97	33.36	32.79
Tetra	Summer 1999+	30.12	30.55	29.69	1.09	32.81	32.08
Penta	Fall-winter 1999+	18.10	19.22	16.98	1.19	21.49	20.96
Penta	Spring 1999+	15.65	16.88	14.41	1.19	18.58	18.26
Penta	Summer 1999+	12.95	13.54	12.37	1.28	16.64	16.27
Hexa	Fall-winter 1999+	5.00	5.58	4.42	1.23	6.15	6.00
Hexa	Spring 1999+	4.04	4.61	3.48	1.23	4.97	4.89
Hexa	Summer 1999+	2.62	2.82	2.41	1.39	3.64	3.56
Tri-Hexa	Fall-winter 1999+	99.97				102.50	99.97
Tri-Hexa	Spring 1999+	100.00				101.74	100.00
Tri-Hexa	Summer 1999+	99.99				102.26	99.99

Table 3-3a
HUDTOX Annual Tri+ PCB Loads to the Lower Hudson River

Year	Jan-00	Sep-00	September/ January
1993	410	411	1.00
1994	337	333	0.99
1995	220	218	0.99
1996	350	351	1.00
1997	260	256	0.99
1998	145	336	*
1999	141	155	1.10
2000	201	205	1.02
2001	240	236	0.98
2002	134	138	1.04
2003	127	130	1.02
2004	89	95	1.07
2005	105	110	1.05
2006	126	129	1.03
2007	129	131	1.01
2008	63	71	1.12
2009	58	66	1.14
2010	130	130	1.00
2011	101	105	1.04
2012	98	102	1.04
2013	100	104	1.04
2014	78	83	1.06
2015	75	79	1.05
2016	44	51	1.16
2017	43	51	1.18
2018	58	64	1.11

* The 1994 concentrations will be subsituted for the 1998 values because loading in this year is similar. Using the load ratio (2.3) results in concentrations that are greater than the 1993 concentrations, a time of higher sustained loading.

Table 3-4
Ratio of Striped Bass to Largemouth Bass Concentrations

RM 152

Year	STB Tri + ppm	LMB Tri+ ppm	WP Tri+ ppm	STB/LMB	STB/WP
1990	9.02	3.53	0.84	2.56	10.68
1991	NA	NA	NA		
1992	15.32	3.24	8.64	4.73	1.77
1993	10.92	9.34	5.45	1.17	2
1995	NA	NA	NA		
1994	5.61	NA	4.81		1.16
1996	4.28	2.51	2.78	1.71	1.54
			Average --->>>	2.54	3.43

RM 152 Monthly Averages

	LMB	Striped Bass			STB/LMB		
Year	June	June-Aug	June-July	June Only	June-Aug	June-July	June Only
1990	3.53	9.02	9.39	4.95	3.55	3.70	1.95
1992	3.24	15.32	15.32	15.32	6.03	6.03	6.03
1993	9.34	11.38	11.38	11.37	4.48	4.48	4.47
1996	2.51	4.28	4.28	2.78	1.69	1.69	1.09
				Average	2.55	2.58	2.58

RM 113

Year	LMB Tri+ ppm	WP Tri+ ppm	STB Tri+ ppm	STB/LMB	STB/WP
1988	7.71	NA	6.31	0.82	
1989	NA	NA	NA		
1990	7.84	NA	4.64	0.59	
1991	NA	NA	NA		
1992	8.28	NA	2.94	0.35	
1993	4.45	3.25	3.27	0.74	1.01
1994	6.26	1.04	2.3	0.37	2.21
1995	3.27	1.86	1.11	0.34	0.6
1996	3.73	4.94	1.66	0.45	0.34
			Average --->>>	0.52	1.04

Note:

STB : Striped Bass; WP: White Perch; LMB: Large Mouth Bass.
NA: Data is not available.

TABLE 3-5: WHOLE WATER CONCENTRATIONS BASED ON USEPA PHASE 2 DATASET

Hudson River	Tri+ PCB		Avian Based TEF		Mammalian Based TEF	
Location	Average Conc. in Water mg/L	95% UCL Conc. In Water mg/L	Average Conc. in Water mg/L	95% UCL Conc. In Water mg/L	Average Conc. in Water mg/L	95% UCL Conc. In Water mg/L
Upper River						
Thompson Island Pool (189)	7.36E-05	2.33E-04	6.01E-07	1.90E-06	4.66E-07	1.47E-06
Stillwater (168)	1.31E-04	4.15E-04	1.07E-06	3.39E-06	8.27E-07	2.62E-06
Federal Dam (154)	9.14E-05	1.96E-04	7.46E-07	1.60E-06	5.78E-07	1.24E-06
Lower River						
143.5	7.07E-05	7.70E-04	6.01E-08	6.55E-07	4.62E-08	5.03E-07
137.2	7.07E-05	7.70E-04	6.01E-08	6.55E-07	4.62E-08	5.03E-07
122.4	3.24E-05	4.15E-04	2.75E-08	3.53E-07	2.11E-08	2.71E-07
113.8	3.24E-05	4.15E-04	2.75E-08	3.53E-07	2.11E-08	2.71E-07
100	3.24E-05	4.15E-04	2.75E-08	3.53E-07	2.11E-08	2.71E-07
88.9	2.13E-05	9.48E-05	1.81E-08	8.06E-08	1.39E-08	6.19E-08
58.7	2.13E-05	9.48E-05	1.81E-08	8.06E-08	1.39E-08	6.19E-08
47.3	2.13E-05	9.48E-05	1.81E-08	8.06E-08	1.39E-08	6.19E-08
25.8	2.13E-05	9.48E-05	1.81E-08	8.06E-08	1.39E-08	6.19E-08

Notes:

Source: Hudson River Database Release 5.0

Water concentrations estimated from Phase 2 dataset -- data averaged across appropriate lower river water column sampling locations

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TABLE 3-6: DRY WEIGHT SEDIMENT CONCENTRATIONS BASED ON USEPA PHASE 2 DATASET

	Tri+ PCB		Avian Based TEF		Mammalian Based TEF	
Location	Average Sediment Conc. mg/Kg	95% UCL Sediment Conc. mg/Kg	Average Sediment Conc. mg/Kg	95% UCL Sediment Conc. mg/Kg	Average Sediment Conc. mg/Kg	95% UCL Sediment Conc. mg/Kg
Upper River						
Thompson Island Pool (189)	11.879	17.381	3.30E-02	4.83E-02	9.24E-03	1.35E-02
Stillwater (168)	31.030	54.170	8.62E-02	1.50E-01	2.41E-02	4.21E-02
Federal Dam (154)	2.793	4.684	7.76E-03	1.30E-02	2.17E-03	3.64E-03
Lower River						
143.5	0.860	0.942	1.88E-03	2.06E-03	2.12E-04	2.32E-04
137.2	1.519	3.069	3.32E-03	6.71E-03	3.74E-04	7.56E-04
122.4	0.963	1.069	2.10E-03	2.34E-03	2.37E-04	2.63E-04
113.8	1.009	1.667	2.21E-03	3.64E-03	2.48E-04	4.11E-04
100	0.399	8.613	8.72E-04	1.88E-02	9.82E-05	2.12E-03
88.9	0.781	2.284	1.71E-03	4.99E-03	1.92E-04	5.62E-04
58.7	0.252	2.794	5.51E-04	6.11E-03	6.20E-05	6.88E-04
47.3	1.537	6.000	3.36E-03	1.31E-02	3.79E-04	1.48E-03
25.8	0.578	1.563	1.26E-03	3.42E-03	1.42E-04	3.85E-04

Source: Hudson River Database Release 5.0

TABLE 3-7: SUMMARY OF TRI+ WHOLE WATER CONCENTRATIONS FROM THE HUDTOX (UPPER RIVER) AND FARLEY (LOWER RIVER) MODELS AND TEQ-BASED PREDICTIONS FOR 1993 - 2018

	Mean Total PCB Results							Average Avian TEF							Average Mammalian TEF						
Year	189 Whole Water Conc mg/l	168 Whole Water Conc mg/l	154 Whole Water Conc mg/l	152 Whole Water Conc mg/l	113 Whole Water Conc mg/l	90 Whole Water Conc mg/l	50 Whole Water Conc mg/l	189 Whole Water Conc mg/l	168 Whole Water Conc mg/l	154 Whole Water Conc mg/l	152 Whole Water Conc mg/l	113 Whole Water Conc mg/l	90 Whole Water Conc mg/l	50 Whole Water Conc mg/l	189 Whole Water Conc mg/l	168 Whole Water Conc mg/l	154 Whole Water Conc mg/l	152 Whole Water Conc mg/l	113 Whole Water Conc mg/l	90 Whole Water Conc mg/l	50 Whole Water Conc mg/l
1993	1.5E-04	8.2E-05	4.9E-05	4.4E-05	3.0E-05	2.3E-05	1.8E-05	1.2E-06	6.7E-07	4.0E-07	3.8E-08	2.6E-08	2.0E-08	1.6E-08	9.2E-07	5.2E-07	3.1E-07	2.9E-08	2.0E-08	1.5E-08	1.2E-08
1994	1.3E-04	6.7E-05	4.2E-05	4.0E-05	2.6E-05	2.0E-05	1.6E-05	1.0E-06	5.5E-07	3.4E-07	3.4E-08	2.2E-08	1.7E-08	1.4E-08	8.1E-07	4.3E-07	2.6E-07	2.6E-08	1.7E-08	1.3E-08	1.0E-08
1995	1.7E-04	7.9E-05	4.1E-05	1.6E-05	1.6E-05	1.6E-05	1.4E-05	1.4E-06	6.4E-07	3.3E-07	1.4E-08	1.4E-08	1.4E-08	1.2E-08	1.0E-06	5.0E-07	2.6E-07	1.0E-08	1.1E-08	1.0E-08	8.9E-09
1996	7.9E-05	4.3E-05	2.6E-05	4.7E-05	2.6E-05	1.8E-05	1.3E-05	6.5E-07	3.5E-07	2.1E-07	4.0E-08	2.2E-08	1.5E-08	1.1E-08	5.0E-07	2.7E-07	1.6E-07	3.1E-08	1.7E-08	1.2E-08	8.8E-09
1997	9.4E-05	4.7E-05	2.9E-05	3.0E-05	2.1E-05	1.6E-05	1.2E-05	7.6E-07	3.9E-07	2.3E-07	2.6E-08	1.8E-08	1.3E-08	1.0E-08	5.9E-07	3.0E-07	1.8E-07	2.0E-08	1.4E-08	1.0E-08	8.0E-09
1998	8.2E-05	4.7E-05	2.8E-05	4.2E-05	3.6E-05	3.1E-05	2.5E-05	6.7E-07	3.8E-07	2.3E-07	3.6E-08	3.0E-08	2.6E-08	2.2E-08	5.2E-07	3.0E-07	1.8E-07	2.8E-08	2.3E-08	2.0E-08	1.7E-08
1999	1.2E-04	5.0E-05	2.6E-05	1.7E-05	1.4E-05	1.3E-05	1.1E-05	9.6E-07	4.1E-07	2.2E-07	1.5E-08	1.2E-08	1.1E-08	9.1E-09	7.4E-07	3.2E-07	1.7E-07	1.1E-08	9.2E-09	8.3E-09	7.0E-09
2000	6.5E-05	3.2E-05	1.9E-05	2.6E-05	1.6E-05	1.2E-05	9.2E-06	5.3E-07	2.6E-07	1.6E-07	2.2E-08	1.3E-08	9.8E-09	7.8E-09	4.1E-07	2.0E-07	1.2E-07	1.7E-08	1.0E-08	7.6E-09	6.0E-09
2001	6.9E-05	3.3E-05	1.9E-05	2.8E-05	1.7E-05	1.1E-05	8.6E-06	5.6E-07	2.7E-07	1.6E-07	2.4E-08	1.4E-08	9.7E-09	7.3E-09	4.4E-07	2.1E-07	1.2E-07	1.8E-08	1.1E-08	7.4E-09	5.6E-09
2002	7.4E-05	3.1E-05	1.8E-05	1.7E-05	1.3E-05	1.1E-05	8.3E-06	6.0E-07	2.5E-07	1.5E-07	1.5E-08	1.1E-08	9.0E-09	7.1E-09	4.7E-07	1.9E-07	1.1E-07	1.1E-08	8.6E-09	6.9E-09	5.4E-09
2003	6.3E-05	2.8E-05	1.6E-05	1.9E-05	1.3E-05	9.9E-06	7.7E-06	5.2E-07	2.3E-07	1.3E-07	1.6E-08	1.1E-08	8.5E-09	6.5E-09	4.0E-07	1.8E-07	9.9E-08	1.2E-08	8.5E-09	6.5E-09	5.0E-09
2004	9.1E-05	3.5E-05	1.8E-05	1.1E-05	9.2E-06	8.4E-06	7.0E-06	7.4E-07	2.8E-07	1.5E-07	9.2E-09	7.8E-09	7.1E-09	5.9E-09	5.7E-07	2.2E-07	1.1E-07	7.1E-09	6.0E-09	5.5E-09	4.6E-09
2005	6.3E-05	2.7E-05	1.4E-05	1.5E-05	9.6E-06	7.6E-06	6.3E-06	5.2E-07	2.2E-07	1.2E-07	1.3E-08	8.2E-09	6.5E-09	5.3E-09	4.0E-07	1.7E-07	9.1E-08	9.9E-09	6.3E-09	5.0E-09	4.1E-09
2006	5.4E-05	2.1E-05	1.2E-05	1.9E-05	1.1E-05	7.7E-06	6.0E-06	4.4E-07	1.7E-07	1.0E-07	1.6E-08	9.4E-09	6.5E-09	5.1E-09	3.4E-07	1.3E-07	7.8E-08	1.3E-08	7.2E-09	5.0E-09	3.9E-09
2007	5.5E-05	2.3E-05	1.3E-05	2.0E-05	1.1E-05	7.5E-06	5.6E-06	4.5E-07	1.9E-07	1.0E-07	1.7E-08	9.5E-09	6.3E-09	4.8E-09	3.5E-07	1.5E-07	7.9E-08	1.3E-08	7.3E-09	4.9E-09	3.7E-09
2008	7.9E-05	2.6E-05	1.2E-05	8.9E-06	7.8E-06	6.8E-06	5.6E-06	6.4E-07	2.1E-07	9.9E-08	7.5E-09	6.6E-09	5.8E-09	4.8E-09	5.0E-07	1.6E-07	7.7E-08	5.8E-09	5.1E-09	4.5E-09	3.7E-09
2009	6.6E-05	2.6E-05	1.3E-05	9.7E-06	7.4E-06	6.4E-06	5.3E-06	5.4E-07	2.1E-07	1.1E-07	8.2E-09	6.3E-09	5.4E-09	4.5E-09	4.2E-07	1.6E-07	8.2E-08	6.3E-09	4.8E-09	4.1E-09	3.4E-09
2010	5.2E-05	2.0E-05	1.1E-05	1.5E-05	8.8E-06	6.1E-06	4.7E-06	4.3E-07	1.6E-07	8.7E-08	1.3E-08	7.5E-09	5.2E-09	4.0E-09	3.3E-07	1.3E-07	6.8E-08	9.9E-09	5.7E-09	4.0E-09	3.0E-09
2011	4.9E-05	1.9E-05	1.0E-05	1.6E-05	9.5E-06	6.4E-06	4.7E-06	4.0E-07	1.6E-07	8.2E-08	1.3E-08	8.0E-09	5.4E-09	4.0E-09	3.1E-07	1.2E-07	6.4E-08	1.0E-08	6.2E-09	4.2E-09	3.1E-09
2012	6.0E-05	2.0E-05	9.1E-06	1.1E-05	8.0E-06	6.1E-06	4.6E-06	4.9E-07	1.7E-07	7.4E-08	9.3E-09	6.8E-09	5.2E-09	4.0E-09	3.8E-07	1.3E-07	5.7E-08	7.1E-09	5.2E-09	4.0E-09	3.0E-09
2013	4.5E-05	1.6E-05	8.5E-06	1.4E-05	9.0E-06	6.3E-06	4.6E-06	3.7E-07	1.3E-07	6.9E-08	1.2E-08	7.6E-09	5.3E-09	3.9E-09	2.9E-07	1.0E-07	5.4E-08	9.3E-09	5.9E-09	4.1E-09	3.0E-09
2014	4.1E-05	1.5E-05	8.0E-06	1.1E-05	8.0E-06	6.0E-06	4.6E-06	3.3E-07	1.2E-07	6.5E-08	9.8E-09	6.8E-09	5.1E-09	3.9E-09	2.6E-07	9.7E-08	5.0E-08	7.5E-09	5.2E-09	3.9E-09	3.0E-09
2015	4.0E-05	1.5E-05	7.6E-06	1.1E-05	7.5E-06	5.7E-06	4.4E-06	3.2E-07	1.2E-07	6.2E-08	9.3E-09	6.3E-09	4.8E-09	3.7E-09	2.5E-07	9.3E-08	4.8E-08	7.1E-09	4.9E-09	3.7E-09	2.8E-09
2016	6.0E-05	1.9E-05	8.2E-06	6.3E-06	5.8E-06	5.3E-06	4.4E-06	4.9E-07	1.5E-07	6.7E-08	5.3E-09	4.9E-09	4.5E-09	3.7E-09	3.8E-07	1.2E-07	5.2E-08	4.1E-09	3.8E-09	3.5E-09	2.8E-09
2017	6.2E-05	2.0E-05	9.3E-06	6.0E-06	5.2E-06	4.8E-06	4.1E-06	5.0E-07	1.6E-07	7.6E-08	5.1E-09	4.4E-09	4.1E-09	3.5E-09	3.9E-07	1.3E-07	5.9E-08	3.9E-09	3.4E-09	3.2E-09	2.7E-09
2018	5.3E-05	1.8E-05	8.5E-06	8.5E-06	6.0E-06	4.8E-06	3.8E-06	4.3E-07	1.5E-07	7.0E-08	7.2E-09	5.1E-09	4.1E-09	3.3E-09	3.4E-07	1.1E-07	5.4E-08	5.5E-09	3.9E-09	3.1E-09	2.5E-09

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TABLE 3-8: SUMMARY OF TRI+ SEDIMENT CONCENTRATIONS FROM THE HUDTOX (UPPER RIVER) AND FARLEY (LOWER RIVER) MODELS AND TEQ-BASED PREDICTIONS FOR 1993 - 2018

	Mean Total PCB Results							Average Avian TEF							Average Mammalian TEF						
Year	189 Total Sed Conc mg/kg	168 Total Sed Conc mg/kg	154 Total Sed Conc mg/kg	152 Total Sed Conc mg/kg	113 Total Sed Conc mg/kg	90 Total Sed Conc mg/kg	50 Total Sed Conc mg/kg	189 Total Sed Conc mg/kg	168 Total Sed Conc mg/kg	154 Total Sed Conc mg/kg	152 Total Sed Conc mg/kg	113 Total Sed Conc mg/kg	90 Total Sed Conc mg/kg	50 Total Sed Conc mg/kg	189 Total Sed Conc mg/kg	168 Total Sed Conc mg/kg	154 Total Sed Conc mg/kg	152 Total Sed Conc mg/kg	113 Total Sed Conc mg/kg	90 Total Sed Conc mg/kg	50 Total Sed Conc mg/kg
1993	3.4E+01	9.1E+00	2.1E+00	9.7E-01	7.6E-01	6.1E-01	4.5E-01	9.4E-02	2.5E-02	5.7E-03	8.2E-04	6.5E-04	5.2E-04	3.8E-04	2.6E-02	7.0E-03	1.6E-03	6.3E-04	5.0E-04	4.0E-04	2.9E-04
1994	3.1E+01	8.2E+00	1.9E+00	8.7E-01	7.1E-01	5.7E-01	4.2E-01	8.7E-02	2.3E-02	5.2E-03	7.4E-04	6.1E-04	4.9E-04	3.6E-04	2.4E-02	6.4E-03	1.5E-03	5.7E-04	4.6E-04	3.7E-04	2.7E-04
1995	2.9E+01	7.5E+00	1.8E+00	8.0E-01	6.7E-01	2.2E+00	4.0E-01	8.0E-02	2.1E-02	4.9E-03	6.8E-04	5.7E-04	1.8E-03	3.4E-04	2.2E-02	5.8E-03	1.4E-03	5.2E-04	4.4E-04	1.4E-03	2.6E-04
1996	2.6E+01	6.3E+00	1.6E+00	8.1E-01	6.5E-01	2.2E+00	3.9E-01	7.2E-02	1.8E-02	4.4E-03	6.9E-04	5.5E-04	1.9E-03	3.3E-04	2.0E-02	4.9E-03	1.2E-03	5.3E-04	4.3E-04	1.4E-03	2.5E-04
1997	2.4E+01	5.2E+00	1.4E+00	7.8E-01	6.2E-01	5.0E-01	3.7E-01	6.6E-02	1.5E-02	3.9E-03	6.6E-04	5.3E-04	4.2E-04	3.1E-04	1.8E-02	4.1E-03	1.1E-03	5.1E-04	4.1E-04	3.2E-04	2.4E-04
1998	2.2E+01	4.9E+00	1.4E+00	1.7E+00	1.4E+00	1.1E+00	8.2E-01	6.0E-02	1.4E-02	3.8E-03	1.4E-03	1.2E-03	9.5E-04	7.0E-04	1.7E-02	3.8E-03	1.1E-03	1.1E-03	9.1E-04	7.3E-04	5.4E-04
1999	2.1E+01	4.6E+00	1.3E+00	7.5E-01	6.3E-01	5.1E-01	3.8E-01	5.8E-02	1.3E-02	3.6E-03	6.4E-04	5.3E-04	4.3E-04	3.2E-04	1.6E-02	3.6E-03	1.0E-03	4.9E-04	4.1E-04	3.3E-04	2.5E-04
2000	1.9E+01	4.1E+00	1.2E+00	6.8E-01	5.6E-01	4.5E-01	3.3E-01	5.3E-02	1.1E-02	3.3E-03	5.8E-04	4.7E-04	3.8E-04	2.8E-04	1.5E-02	3.2E-03	9.2E-04	4.4E-04	3.6E-04	2.9E-04	2.2E-04
2001	1.7E+01	3.4E+00	1.0E+00	6.6E-01	5.3E-01	4.2E-01	3.1E-01	4.7E-02	9.4E-03	2.9E-03	5.6E-04	4.5E-04	3.6E-04	2.6E-04	1.3E-02	2.6E-03	8.1E-04	4.3E-04	3.4E-04	2.7E-04	2.0E-04
2002	1.5E+01	2.9E+00	9.3E-01	6.7E-01	5.4E-01	4.3E-01	3.2E-01	4.3E-02	8.0E-03	2.6E-03	5.7E-04	4.6E-04	3.7E-04	2.7E-04	1.2E-02	2.2E-03	7.2E-04	4.4E-04	3.5E-04	2.8E-04	2.1E-04
2003	1.4E+01	2.5E+00	8.4E-01	6.3E-01	5.2E-01	4.1E-01	3.0E-01	4.0E-02	7.0E-03	2.3E-03	5.4E-04	4.4E-04	3.5E-04	2.6E-04	1.1E-02	2.0E-03	6.6E-04	4.1E-04	3.4E-04	2.7E-04	2.0E-04
2004	1.3E+01	2.5E+00	7.9E-01	6.3E-01	5.2E-01	4.1E-01	3.1E-01	3.7E-02	6.8E-03	2.2E-03	5.3E-04	4.4E-04	3.5E-04	2.6E-04	1.0E-02	1.9E-03	6.2E-04	4.1E-04	3.4E-04	2.7E-04	2.0E-04
2005	1.2E+01	2.4E+00	7.5E-01	6.0E-01	4.9E-01	3.9E-01	2.9E-01	3.4E-02	6.5E-03	2.1E-03	5.1E-04	4.2E-04	3.3E-04	2.5E-04	9.5E-03	1.8E-03	5.8E-04	3.9E-04	3.2E-04	2.6E-04	1.9E-04
2006	1.1E+01	2.1E+00	6.8E-01	5.8E-01	4.7E-01	3.7E-01	2.7E-01	3.2E-02	5.9E-03	1.9E-03	4.9E-04	4.0E-04	3.1E-04	2.3E-04	8.9E-03	1.6E-03	5.3E-04	3.8E-04	3.1E-04	2.4E-04	1.8E-04
2007	1.0E+01	1.9E+00	6.2E-01	5.6E-01	4.5E-01	3.5E-01	2.6E-01	2.9E-02	5.4E-03	1.7E-03	4.7E-04	3.8E-04	3.0E-04	2.2E-04	8.2E-03	1.5E-03	4.8E-04	3.6E-04	3.0E-04	2.3E-04	1.7E-04
2008	9.6E+00	1.8E+00	5.8E-01	5.9E-01	4.9E-01	3.8E-01	2.8E-01	2.7E-02	5.1E-03	1.6E-03	5.0E-04	4.1E-04	3.2E-04	2.4E-04	7.5E-03	1.4E-03	4.5E-04	3.9E-04	3.2E-04	2.5E-04	1.8E-04
2009	9.1E+00	1.8E+00	5.4E-01	5.8E-01	4.8E-01	3.8E-01	2.8E-01	2.5E-02	5.0E-03	1.5E-03	4.9E-04	4.1E-04	3.2E-04	2.4E-04	7.1E-03	1.4E-03	4.2E-04	3.8E-04	3.1E-04	2.4E-04	1.8E-04
2010	8.4E+00	1.7E+00	4.8E-01	5.0E-01	4.1E-01	3.2E-01	2.4E-01	2.3E-02	4.6E-03	1.3E-03	4.3E-04	3.5E-04	2.7E-04	2.0E-04	6.6E-03	1.3E-03	3.8E-04	3.3E-04	2.7E-04	2.1E-04	1.6E-04
2011	7.6E+00	1.5E+00	4.4E-01	5.1E-01	4.2E-01	3.2E-01	2.4E-01	2.1E-02	4.1E-03	1.2E-03	4.3E-04	3.5E-04	2.7E-04	2.0E-04	5.9E-03	1.1E-03	3.4E-04	3.3E-04	2.7E-04	2.1E-04	1.6E-04
2012	6.9E+00	1.4E+00	3.9E-01	5.0E-01	4.1E-01	3.2E-01	2.3E-01	1.9E-02	3.9E-03	1.1E-03	4.2E-04	3.5E-04	2.7E-04	2.0E-04	5.4E-03	1.1E-03	3.1E-04	3.3E-04	2.7E-04	2.1E-04	1.5E-04
2013	7.1E+00	1.5E+00	3.5E-01	4.9E-01	4.0E-01	3.1E-01	2.3E-01	2.0E-02	4.1E-03	9.6E-04	4.2E-04	3.4E-04	2.6E-04	1.9E-04	5.5E-03	1.2E-03	2.7E-04	3.2E-04	2.6E-04	2.0E-04	1.5E-04
2014	7.2E+00	1.4E+00	3.2E-01	4.8E-01	4.0E-01	3.1E-01	2.3E-01	2.0E-02	3.8E-03	8.9E-04	4.1E-04	3.4E-04	2.6E-04	1.9E-04	5.6E-03	1.1E-03	2.5E-04	3.2E-04	2.6E-04	2.0E-04	1.5E-04
2015	6.9E+00	1.3E+00	3.0E-01	4.7E-01	3.9E-01	3.0E-01	2.2E-01	1.9E-02	3.6E-03	8.4E-04	4.0E-04	3.3E-04	2.5E-04	1.9E-04	5.4E-03	1.0E-03	2.4E-04	3.0E-04	2.5E-04	1.9E-04	1.4E-04
2016	6.5E+00	1.3E+00	3.0E-01	5.0E-01	4.1E-01	3.2E-01	2.4E-01	1.8E-02	3.5E-03	8.2E-04	4.2E-04	3.5E-04	2.7E-04	2.0E-04	5.1E-03	9.8E-04	2.3E-04	3.2E-04	2.7E-04	2.1E-04	1.5E-04
2017	6.2E+00	1.3E+00	3.0E-01	4.9E-01	4.1E-01	3.2E-01	2.3E-01	1.7E-02	3.5E-03	8.3E-04	4.2E-04	3.5E-04	2.7E-04	2.0E-04	4.8E-03	9.9E-04	2.3E-04	3.2E-04	2.7E-04	2.1E-04	1.5E-04
2018	5.7E+00	1.2E+00	2.9E-01	4.5E-01	3.8E-01	2.9E-01	2.1E-01	1.6E-02	3.4E-03	8.1E-04	3.8E-04	3.2E-04	2.5E-04	1.8E-04	4.4E-03	9.6E-04	2.3E-04	3.0E-04	2.5E-04	1.9E-04	1.4E-04

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TABLE 3-9: SUMMARY OF ORGANIC CARBON NORMALIZED TRI+ SEDIMENT CONCENTRATIONS FROM THE HUDTOX (UPPER RIVER) AND FARLEY (LOWER RIVER) MODEL PREDICTIONS FOR 1993-2018

Location	Tri+ PCB Sediment Conc. mg/Kg	Tri+ PCB Sediment Conc. mg/Kg
Upper River		
Thompson Island Pool (189)	236.014	300.713
Stillwater (168)	821.993	1434.980
Federal Dam (154)	178.124	298.730
Lower River		
143.5	27.458	27.701
137.2	54.091	110.609
122.4	46.341	50.253
113.8	30.765	51.102
100	17.300	337.746
88.9	22.066	63.617
58.7	21.844	185.519
47.3	44.585	169.599
25.8	28.252	75.507

Source: Hudson River Database Release 5.0

Year	Mean Total PCB Results: 189 Total Sed Conc mg/kg	168 Total Sed Conc mg/kg	154 Total Sed Conc mg/kg	Mean Tri+ PCB Results: 152 Total Sed Conc mg/kg	113 Total Sed Conc mg/kg	90 Total Sed Conc mg/kg	50 Total Sed Conc mg/kg
1993	2716.80	426.90	272.01	38.81	30.40	24.47	18.03
1994	2450.66	391.28	248.32	34.88	28.47	22.96	16.85
1995	2320.79	369.35	232.40	31.98	26.82	86.50	16.09
1996	2082.41	318.21	212.28	32.51	26.07	87.49	15.53
1997	1856.68	268.01	189.37	31.02	24.83	19.85	14.60
1998	1092.05	295.45	171.82	67.42	55.55	44.64	32.89
1999	1042.74	281.68	163.44	30.01	25.08	20.30	15.03
2000	954.51	249.20	148.42	27.16	22.28	17.92	13.31
2001	843.59	205.34	129.95	26.43	21.10	16.71	12.37
2002	777.00	175.32	116.15	26.77	21.71	17.19	12.67
2003	715.94	153.38	105.29	25.20	20.72	16.42	12.09
2004	661.03	148.89	99.23	25.02	20.78	16.54	12.21
2005	615.86	142.87	93.74	23.90	19.76	15.71	11.64
2006	575.97	128.06	85.37	23.04	18.78	14.80	10.97
2007	526.41	116.88	77.85	22.26	18.10	14.17	10.49
2008	481.74	110.74	72.85	23.71	19.50	15.26	11.28
2009	457.87	109.12	67.57	23.12	19.15	15.00	11.10
2010	423.24	100.43	60.46	20.12	16.48	12.85	9.51
2011	382.05	89.36	54.37	20.46	16.68	12.92	9.54
2012	345.69	84.60	49.31	19.96	16.40	12.67	9.33
2013	355.10	90.39	43.33	19.67	16.12	12.43	9.14
2014	362.03	83.35	40.06	19.38	15.99	12.33	9.06
2015	346.34	77.67	37.96	18.63	15.46	11.93	8.77
2016	327.71	76.46	36.98	19.87	16.55	12.78	9.41
2017	309.78	77.33	37.20	19.76	16.43	12.69	9.36
2018	285.61	74.57	36.36	18.09	15.10	11.61	8.58

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TABLE 3-10: BENTHIC INVERTEBRATE CONCENTRATIONS BASED ON USEPA PHASE 2 DATASET

	Tri+ PCB		Avian Based TEF		Mammalian Based TEF	
Location	Average Benthic Invert Conc mg/Kg	95% UCL Benthic Conc mg/Kg	Average Benthic Invert Conc mg/Kg	95% UCL Benthic Conc mg/Kg	Average Benthic Invert Conc mg/Kg	95% UCL Benthic Conc mg/Kg
Upper River						
Thompson Island Pool (189)	14.138	22.210	7.53E-04	1.18E-03	4.20E-04	6.59E-04
Stillwater (168)	26.377	45.912	1.41E-03	2.45E-03	7.83E-04	1.36E-03
Federal Dam (154)	6.286	10.942	3.35E-04	5.83E-04	1.87E-04	3.25E-04
Lower River						
143.5	0.876	1.524	1.21E-04	2.11E-04	9.45E-05	1.64E-04
137.2	1.725	3.002	2.39E-04	4.16E-04	1.86E-04	3.24E-04
122.4	0.804	2.021	1.11E-04	2.80E-04	8.68E-05	2.18E-04
113.8	0.691	1.203	9.57E-05	1.67E-04	7.45E-05	1.30E-04
100	0.380	2.598	5.27E-05	3.60E-04	4.10E-05	2.80E-04
88.9	0.191	0.339	2.64E-05	4.69E-05	2.06E-05	3.65E-05
58.7	0.491	0.854	6.80E-05	1.18E-04	5.29E-05	9.21E-05
47.3	0.666	4.891	9.23E-05	6.78E-04	7.19E-05	5.28E-04
25.8	0.197	0.335	2.73E-05	4.64E-05	2.13E-05	3.61E-05

Source: Hudson River Database Release 5.0

TABLE 3-11: SUMMARY OF TRI+ BENTHIC INVERTEBRATE CONCENTRATIONS FROM THE FISHRAND MODEL AND TEQ-BASED PREDICTIONS FOR 1993 - 2018

	Mean Tri+ PCB Results			Average Avian TEF			Average Mammalian TEF			Tri+ Average PCB Results				Average Avian TEF				Average Mammalian TEF			
Year	189 Total Benthic Conc mg/kg	168 Total Benthic Conc mg/kg	154 Total Benthic Conc mg/kg	189 Total Benthic Conc mg/kg	168 Total Benthic Conc mg/kg	154 Total Benthic Conc mg/kg	189 Total Benthic Conc mg/kg	168 Total Benthic Conc mg/kg	154 Total Benthic Conc mg/kg	152 Total Benthic Conc mg/kg	113 Total Benthic Conc mg/kg	90 Total Benthic Conc mg/kg	50 Total Benthic Conc mg/kg	152 Total Benthic Conc mg/kg	113 Total Benthic Conc mg/kg	90 Total Benthic Conc mg/kg	50 Total Benthic Conc mg/kg	152 Total Benthic Conc mg/kg	113 Total Benthic Conc mg/kg	90 Total Benthic Conc mg/kg	50 Total Benthic Conc mg/kg
1993	1.4E+01	8.6E+00	4.2E+00	7.6E-04	4.6E-04	2.3E-04	4.2E-04	2.5E-04	1.3E-04	1.8E+00	1.4E+00	1.1E+00	8.3E-01	2.4E-04	1.9E-04	1.6E-04	1.2E-04	1.9E-04	1.5E-04	1.2E-04	9.0E-05
1994	1.3E+01	7.9E+00	4.0E+00	6.9E-04	4.2E-04	2.1E-04	3.8E-04	2.3E-04	1.2E-04	1.6E+00	1.3E+00	1.1E+00	7.7E-01	2.2E-04	1.8E-04	1.5E-04	1.1E-04	1.7E-04	1.4E-04	1.1E-04	8.3E-05
1995	1.1E+01	7.2E+00	3.6E+00	6.1E-04	3.8E-04	1.9E-04	3.4E-04	2.1E-04	1.1E-04	1.5E+00	1.2E+00	1.0E+00	7.3E-01	2.1E-04	1.7E-04	1.4E-04	1.0E-04	1.6E-04	1.3E-04	1.1E-04	7.9E-05
1996	9.6E+00	6.5E+00	3.2E+00	5.1E-04	3.4E-04	1.7E-04	2.8E-04	1.9E-04	9.5E-05	1.5E+00	1.2E+00	9.6E-01	7.2E-01	2.1E-04	1.7E-04	1.3E-04	9.9E-05	1.6E-04	1.3E-04	1.0E-04	7.7E-05
1997	8.4E+00	6.0E+00	3.0E+00	4.5E-04	3.2E-04	1.6E-04	2.5E-04	1.8E-04	8.9E-05	1.4E+00	1.1E+00	9.1E-01	6.8E-01	1.9E-04	1.6E-04	1.3E-04	9.4E-05	1.5E-04	1.2E-04	9.9E-05	7.3E-05
1998	7.8E+00	5.6E+00	2.9E+00	4.1E-04	3.0E-04	1.5E-04	2.3E-04	1.7E-04	8.5E-05	3.2E+00	2.6E+00	2.0E+00	1.5E+00	4.4E-04	3.6E-04	2.8E-04	2.1E-04	3.4E-04	2.8E-04	2.2E-04	1.6E-04
1999	7.3E+00	5.2E+00	2.7E+00	3.9E-04	2.8E-04	1.4E-04	2.2E-04	1.6E-04	8.0E-05	1.4E+00	1.2E+00	9.4E-01	7.0E-01	2.0E-04	1.7E-04	1.3E-04	9.7E-05	1.5E-04	1.3E-04	1.0E-04	7.5E-05
2000	6.3E+00	4.7E+00	2.4E+00	3.3E-04	2.5E-04	1.3E-04	1.9E-04	1.4E-04	7.2E-05	1.3E+00	1.1E+00	8.4E-01	6.3E-01	1.8E-04	1.5E-04	1.2E-04	8.7E-05	1.4E-04	1.1E-04	9.1E-05	6.8E-05
2001	5.2E+00	4.2E+00	2.1E+00	2.8E-04	2.3E-04	1.1E-04	1.6E-04	1.3E-04	6.3E-05	1.2E+00	1.0E+00	7.9E-01	5.9E-01	1.7E-04	1.4E-04	1.1E-04	8.1E-05	1.3E-04	1.1E-04	8.5E-05	6.3E-05
2002	4.5E+00	3.9E+00	1.9E+00	2.4E-04	2.1E-04	1.0E-04	1.3E-04	1.2E-04	5.7E-05	1.3E+00	1.0E+00	8.1E-01	6.1E-01	1.7E-04	1.4E-04	1.1E-04	8.4E-05	1.4E-04	1.1E-04	8.8E-05	6.5E-05
2003	4.1E+00	3.6E+00	1.8E+00	2.2E-04	1.9E-04	9.4E-05	1.2E-04	1.1E-04	5.3E-05	1.2E+00	9.7E-01	7.8E-01	5.8E-01	1.6E-04	1.3E-04	1.1E-04	8.0E-05	1.3E-04	1.0E-04	8.5E-05	6.2E-05
2004	4.0E+00	3.4E+00	1.7E+00	2.1E-04	1.8E-04	8.8E-05	1.2E-04	1.0E-04	4.9E-05	1.2E+00	9.7E-01	7.8E-01	5.8E-01	1.7E-04	1.4E-04	1.1E-04	8.0E-05	1.3E-04	1.1E-04	8.4E-05	6.2E-05
2005	3.7E+00	3.1E+00	1.6E+00	2.0E-04	1.7E-04	8.3E-05	1.1E-04	9.3E-05	4.6E-05	1.2E+00	9.5E-01	7.4E-01	5.5E-01	1.6E-04	1.3E-04	1.0E-04	7.6E-05	1.2E-04	1.0E-04	8.0E-05	5.9E-05
2006	3.3E+00	2.9E+00	1.4E+00	1.8E-04	1.5E-04	7.5E-05	9.9E-05	8.6E-05	4.2E-05	1.1E+00	9.0E-01	6.9E-01	5.1E-01	1.5E-04	1.2E-04	9.5E-05	7.1E-05	1.2E-04	9.7E-05	7.4E-05	5.5E-05
2007	3.1E+00	2.6E+00	1.3E+00	1.7E-04	1.4E-04	7.0E-05	9.2E-05	7.8E-05	3.9E-05	1.0E+00	8.7E-01	6.6E-01	4.9E-01	1.5E-04	1.2E-04	9.2E-05	6.8E-05	1.1E-04	9.4E-05	7.1E-05	5.3E-05
2008	3.0E+00	2.5E+00	1.2E+00	1.6E-04	1.3E-04	6.5E-05	8.9E-05	7.3E-05	3.6E-05	1.1E+00	9.3E-01	7.1E-01	5.3E-01	1.6E-04	1.3E-04	9.8E-05	7.3E-05	1.2E-04	1.0E-04	7.7E-05	5.7E-05
2009	2.9E+00	2.3E+00	1.1E+00	1.5E-04	1.2E-04	5.9E-05	8.5E-05	6.9E-05	3.3E-05	1.1E+00	9.1E-01	7.0E-01	5.2E-01	1.5E-04	1.3E-04	9.8E-05	7.2E-05	1.2E-04	9.8E-05	7.6E-05	5.6E-05
2010	2.6E+00	2.1E+00	1.0E+00	1.4E-04	1.1E-04	5.3E-05	7.7E-05	6.3E-05	3.0E-05	9.7E-01	7.9E-01	6.1E-01	4.5E-01	1.3E-04	1.1E-04	8.5E-05	6.3E-05	1.0E-04	8.5E-05	6.6E-05	4.9E-05
2011	2.4E+00	1.9E+00	9.0E-01	1.3E-04	1.0E-04	4.8E-05	7.1E-05	5.6E-05	2.7E-05	9.5E-01	8.1E-01	6.1E-01	4.6E-01	1.3E-04	1.1E-04	8.4E-05	6.4E-05	1.0E-04	8.7E-05	6.6E-05	4.9E-05
2012	2.4E+00	1.8E+00	8.0E-01	1.3E-04	9.8E-05	4.3E-05	7.1E-05	5.4E-05	2.4E-05	9.3E-01	7.9E-01	6.0E-01	4.5E-01	1.3E-04	1.1E-04	8.3E-05	6.2E-05	1.0E-04	8.5E-05	6.4E-05	4.9E-05
2013	2.4E+00	1.9E+00	7.2E-01	1.3E-04	1.0E-04	3.9E-05	7.0E-05	5.6E-05	2.1E-05	9.2E-01	7.8E-01	5.8E-01	4.4E-01	1.3E-04	1.1E-04	8.0E-05	6.1E-05	9.9E-05	8.4E-05	6.3E-05	4.7E-05
2014	2.2E+00	1.9E+00	6.7E-01	1.2E-04	9.9E-05	3.6E-05	6.5E-05	5.5E-05	2.0E-05	9.2E-01	7.7E-01	5.8E-01	4.3E-01	1.3E-04	1.1E-04	8.0E-05	6.0E-05	1.0E-04	8.3E-05	6.2E-05	4.7E-05
2015	2.1E+00	1.8E+00	6.5E-01	1.1E-04	9.4E-05	3.4E-05	6.2E-05	5.3E-05	1.9E-05	8.9E-01	7.4E-01	5.6E-01	4.2E-01	1.2E-04	1.0E-04	7.8E-05	5.8E-05	9.6E-05	7.9E-05	6.0E-05	4.5E-05
2016	2.1E+00	1.7E+00	6.5E-01	1.1E-04	8.9E-05	3.5E-05	6.2E-05	5.0E-05	1.9E-05	9.9E-01	7.9E-01	6.0E-01	4.5E-01	1.4E-04	1.1E-04	8.4E-05	6.3E-05	1.1E-04	8.5E-05	6.5E-05	4.9E-05
2017	2.1E+00	1.6E+00	6.3E-01	1.1E-04	8.3E-05	3.4E-05	6.2E-05	4.6E-05	1.9E-05	9.9E-01	8.0E-01	6.1E-01	4.5E-01	1.4E-04	1.1E-04	8.4E-05	6.2E-05	1.1E-04	8.6E-05	6.6E-05	4.9E-05
2018	2.0E+00	1.5E+00	6.3E-01	1.1E-04	8.0E-05	3.4E-05	6.1E-05	4.4E-05	1.9E-05	9.1E-01	7.5E-01	5.6E-01	4.2E-01	1.3E-04	1.0E-04	7.8E-05	5.8E-05	9.9E-05	8.1E-05	6.1E-05	4.5E-05

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TABLE 3-12: FORAGE FISH CONCENTRATIONS BASED ON USEPA PHASE 2 DATASET

	Tri+ PCB		Avian Based TEF		Mammalian Based TEF	
Location	Average Conc mg/Kg	95% UCL Conc mg/Kg	Average Conc mg/Kg	95% UCL Conc mg/Kg	Average Conc mg/Kg	95% UCL Conc mg/Kg
Upper River						
Thompson Island Pool (189)	20.919	42.716	5.37E-03	1.10E-02	8.97E-04	1.83E-03
Stillwater (168)	7.062	10.099	1.81E-03	2.59E-03	3.03E-04	4.33E-04
Federal Dam (154)	1.657	2.405	4.25E-04	6.17E-04	7.11E-05	1.03E-04
Lower River						
143.5	1.927	2.314	3.66E-04	4.39E-04	2.25E-04	2.70E-04
137.2	3.898	8.453	7.40E-04	1.60E-03	4.55E-04	9.86E-04
122.4	1.488	2.407	2.82E-04	4.57E-04	1.74E-04	2.81E-04
113.8	1.560	1.618	2.96E-04	3.07E-04	1.82E-04	1.89E-04
100	0.676	1.167	1.28E-04	2.21E-04	7.89E-05	1.36E-04
88.9	1.345	1.845	2.55E-04	3.50E-04	1.57E-04	2.15E-04
58.7	1.465	1.661	2.78E-04	3.15E-04	1.71E-04	1.94E-04
47.3	1.304	1.728	2.47E-04	3.28E-04	1.52E-04	2.02E-04
25.8	0.981	1.179	1.86E-04	2.24E-04	1.14E-04	1.38E-04

Source: Hudson River Database Release 5.0

TABLE 3-13: OBSERVED CONCENTRATIONS IN PPM FOR FISH SPECIES FOR RIVER MILES 113, 152, 168 AND 189 FROM NYSDEC DATASET

	WET WEIGHT CONCENTRATIONS														
	Largemouth Bass 113			Largemouth Bass 168			Brown Bullhead 168			Largemouth Bass 189			Brown Bullhead 189		
	Average	95% UCL	Maximum	Average	95% UCL	Maximum	Average	95% UCL	Maximum	Average	95% UCL	Maximum	Average	95% UCL	Maximum
1993	11.12	*	34.36	16.79	21.63	38.12	12.75	20.03	26.00	94.49	182.86	345.84	25.52	49.75	42.28
1994	15.66	36.04	52.09	13.68	27.41	31.79	8.59	20.00	27.08	45.07	68.02	96.35	26.28	34.44	103.77
1995	8.17	10.72	29.76	13.11	18.07	28.67	9.01	11.53	19.17	56.13	93.61	128.03	19.69	26.06	27.05
1996	9.32	16.09	26.70							27.90	37.34	56.96	16.13	*	18.81

	LIPID NORMALIZED CONCENTRATIONS														
	Largemouth Bass 113			Largemouth Bass 168			Brown Bullhead 168			Largemouth Bass 189			Brown Bullhead 189		
	Average	95% UCL	Maximum	Average	95% UCL	Maximum	Average	95% UCL	Maximum	Average	95% UCL	Maximum	Average	95% UCL	Maximum
1993	129.94	269.40	225.31	504.50	589.56	790.13	244.29	*	377.87	2215.67	3374.69	4993.02	942.50	1583.04	1783.53
1994	150.43	225.71	435.87	480.44	892.00	1115.37	165.28	344.97	763.25	1237.36	1558.14	2569.30	718.47	1006.55	3088.33
1995	143.41	174.17	226.37	557.58	658.90	978.39	161.85	194.03	489.69	1077.61	1661.12	1822.26	341.76	421.82	612.17
1996	115.88	161.28	237.33							779.19	990.00	1411.89	356.67	*	410.64

	WET WEIGHT CONCENTRATIONS														
	White Perch 113			White Perch 152			Yellow Perch 113			Yellow Perch 168			Yellow Perch 189		
	Average	95% UCL	Maximum	Average	95% UCL	Maximum	Average	95% UCL	Maximum	Average	95% UCL	Maximum	Average	95% UCL	Maximum
1993	2.54	5.37	5.60	2.42	4.97	3.69	1.06	1.26	3.25	10.53	*	21.21	36.25	66.22	131.33
1994	1.04	1.73	2.23	4.81	9.34	8.67	0.51	0.66	0.80						
1995															
1996	4.94	*	8.84	2.78	5.40	8.14									

	LIPID NORMALIZED CONCENTRATIONS														
	White Perch 113			White Perch 152			Yellow Perch 113			Yellow Perch 168			Yellow Perch 189		
	Average	95% UCL	Maximum	Average	95% UCL	Maximum	Average	95% UCL	Maximum	Average	95% UCL	Maximum	Average	95% UCL	Maximum
1993	119.96	174.09	215.41	106.16	121.40	160.87	108.84	132.50	427.33	478.90	*	708.98	2724.70	3980.41	13539.37
1994	110.50	161.09	192.59	308.69	376.11	651.61	52.32	69.06	71.97						
1995															
1996	150.33	389.55	346.93	92.13	105.80	175.91									

* Indicates that the calculated UCL exceeds the maximum due to small sample size.

Source: Hudson River Database Release 5.0

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TABLE 3-14
OBSERVED STRIPED BASS CONCENTRATIONS FROM NYSDEC FOR THE HUDSON RIVER

River Mile	Year	Average Wet Weight (mg/Kg)	95%UCL (mg/Kg)	Average Lipid Normalized (mg PCB /Kg Lipid)	95% UCL (mg PCB /Kg Lipid)
12	1993	1.33	2.13	25.09	38.48
27	1993	2.55	4.09	46.12	69.02
33	1993	4.25	8.46	54.81	96.75
40	1993	1.61	2.03	32.28	43.61
74	1993	3.15	4.90	75.92	135.09
112	1993	3.74	5.63	121.90	204.94
152	1993	12.38	17.67	306.41	533.77
26	1994	1.65	2.56	36.28	53.31
37	1994	1.95	3.03	46.46	84.32
40	1994	1.78	2.91	40.01	58.23
74	1994	2.54	4.22	49.58	75.02
112	1994	3.05	8.35	132.69	476.15
152	1994	6.40	9.79	254.45	338.72
27	1995	1.99	2.86	53.47	90.59
36	1995	1.30	1.70	26.03	35.97
59	1995	2.26	2.83	165.82	250.65
76	1995	1.72	2.05	29.85	35.79
113	1995	1.69	2.68	35.14	58.11
152	1995	6.51	8.42	174.47	235.65
12	1996	1.26	1.87	35.97	52.95
29	1996	1.92	2.74	44.94	58.94
40	1996	1.69	2.31	47.40	71.61
74	1996	1.81	2.49	46.47	68.76
112	1996	1.90	3.11	86.86	186.24
152	1996	4.89	11.26	216.03	531.63

TABLE 3-15: LARGEMOUTH BASS PREDICTED TRI+ CONCENTRATIONS FOR 1993 - 2018

	Thompson Island Pool			River Mile 168			River Mile 154		
Year	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)
1993	21.56	34.80	99.23	10.69	12.45	16.22	4.23	4.96	6.38
1994	15.58	24.79	61.55	9.67	11.22	14.58	3.83	4.61	5.88
1995	18.94	29.99	62.22	8.85	10.30	13.34	3.54	4.23	5.41
1996	11.49	18.06	42.66	6.75	7.82	10.31	2.85	3.37	4.34
1997	11.57	18.34	38.00	6.28	7.03	9.25	2.63	3.29	4.35
1998	9.37	14.48	32.07	5.81	7.03	9.07	2.58	3.22	4.21
1999	8.83	13.72	33.73	5.91	6.78	8.75	2.62	3.12	4.00
2000	6.90	10.97	27.78	4.70	5.39	6.99	2.27	2.60	3.34
2001	6.22	9.68	23.21	4.14	4.77	6.12	1.99	2.41	3.07
2002	6.11	9.45	23.12	3.58	4.11	5.29	1.80	2.14	2.75
2003	5.68	8.61	19.75	3.33	3.90	5.05	1.65	2.00	2.56
2004	7.56	11.60	26.45	3.43	4.03	5.18	1.63	2.00	2.55
2005	6.28	9.64	24.14	3.12	3.54	4.57	1.51	1.77	2.26
2006	5.08	7.66	18.78	2.78	3.11	4.04	1.36	1.60	2.06
2007	6.12	9.36	22.08	2.70	3.04	3.94	1.28	1.53	1.98
2008	6.24	9.59	21.39	2.61	3.07	3.92	1.20	1.43	1.82
2009	6.17	9.46	21.70	2.54	2.94	3.76	1.12	1.37	1.74
2010	5.75	8.81	21.64	2.21	2.52	3.25	1.01	1.20	1.52
2011	4.72	7.12	15.96	2.07	2.38	3.08	0.91	1.11	1.43
2012	4.36	6.76	17.48	2.06	2.41	3.10	0.84	0.96	1.23
2013	3.75	5.65	13.72	1.94	2.23	2.88	0.71	0.89	1.14
2014	4.00	6.26	15.15	1.85	2.07	2.68	0.70	0.84	1.07
2015	3.79	5.87	13.27	1.77	1.99	2.58	0.67	0.81	1.03
2016	4.78	7.02	14.25	1.79	2.16	2.78	0.66	0.83	1.06
2017	4.89	7.57	17.34	1.85	2.17	2.77	0.67	0.84	1.08
2018	4.54	6.88	16.33	1.81	2.10	2.70	0.69	0.84	1.07

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TABLE 3-15: LARGEMOUTH BASS PREDICTED TRI+ CONCENTRATIONS FOR 1993 - 2018

	River Mile 152			River Mile 113			River Mile 90			River Mile 50		
Year	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)
1993	11.32	14.38	21.64	7.52	9.62	14.44	1.84	2.24	3.06	1.76	2.11	2.87
1994	7.95	10.26	15.26	6.47	8.27	12.48	1.67	2.01	2.75	1.56	1.86	2.54
1995	7.04	8.84	13.40	5.84	7.39	11.15	1.51	1.82	2.51	1.40	1.68	2.28
1996	8.28	10.63	15.86	5.42	6.97	10.44	1.38	1.67	2.31	1.28	1.54	2.09
1997	7.51	9.50	14.24	5.18	6.61	9.94	1.27	1.54	2.11	1.16	1.40	1.89
1998	14.00	17.49	26.87	10.94	14.12	21.26	2.78	3.33	4.58	2.52	3.01	4.11
1999	5.58	7.20	10.77	4.37	5.63	8.53	1.18	1.43	1.96	1.08	1.31	1.79
2000	4.87	6.24	9.42	3.64	4.72	7.17	0.98	1.19	1.66	0.91	1.11	1.51
2001	5.25	6.84	10.16	3.58	4.62	6.99	0.89	1.09	1.52	0.81	1.00	1.36
2002	5.25	6.60	10.01	3.74	4.82	7.32	0.92	1.12	1.56	0.82	1.00	1.37
2003	4.44	5.79	8.73	3.39	4.37	6.67	0.86	1.05	1.46	0.76	0.94	1.29
2004	3.83	4.88	7.48	3.16	4.05	6.21	0.84	1.02	1.42	0.75	0.92	1.26
2005	3.53	4.58	6.97	2.82	3.67	5.60	0.76	0.93	1.29	0.69	0.84	1.16
2006	3.93	5.04	7.70	2.72	3.53	5.37	0.69	0.85	1.20	0.62	0.77	1.06
2007	3.53	4.58	6.89	2.64	3.41	5.17	0.66	0.81	1.14	0.59	0.72	1.00
2008	3.72	4.72	7.19	2.84	3.64	5.56	0.71	0.87	1.22	0.62	0.76	1.06
2009	3.20	4.15	6.35	2.61	3.37	5.17	0.68	0.83	1.17	0.60	0.74	1.02
2010	3.00	3.85	5.82	2.19	2.84	4.33	0.56	0.70	0.98	0.50	0.62	0.86
2011	3.39	4.44	6.72	2.39	3.11	4.73	0.57	0.71	1.01	0.50	0.62	0.86
2012	3.10	3.99	6.04	2.36	3.05	4.66	0.58	0.71	0.99	0.50	0.61	0.85
2013	3.33	4.36	6.57	2.43	3.16	4.82	0.60	0.73	1.02	0.51	0.62	0.86
2014	3.12	4.03	6.15	2.35	3.05	4.65	0.57	0.70	0.98	0.49	0.60	0.83
2015	2.85	3.69	5.64	2.21	2.88	4.39	0.55	0.68	0.95	0.47	0.58	0.81
2016	2.97	3.73	5.75	2.31	2.96	4.53	0.58	0.71	1.00	0.50	0.62	0.86
2017	2.68	3.42	5.24	2.15	2.78	4.24	0.56	0.69	0.96	0.50	0.61	0.85
2018	2.41	3.14	4.78	1.90	2.48	3.80	0.49	0.61	0.86	0.44	0.54	0.76

TABLE 3-16: BROWN BULLHEAD PREDICTED TRI+ CONCENTRATIONS FOR 1993 - 2018

	Thompson Island Pool			River Mile 168			River Mile 154		
Year	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)
1993	13.53	17.09	26.86	11.02	12.91	20.87	3.59	4.21	6.76
1994	15.07	23.90	13.65	10.04	11.77	18.95	3.36	3.92	6.29
1995	14.40	22.65	14.43	8.78	10.30	16.63	3.05	3.57	5.74
1996	12.07	19.06	9.42	7.23	8.48	13.78	2.66	3.11	5.05
1997	11.21	18.34	8.47	5.64	6.80	11.77	2.30	2.75	4.71
1998	7.70	9.93	15.59	5.38	6.46	11.16	2.23	2.67	4.59
1999	7.63	9.79	15.74	5.68	6.66	10.74	2.31	2.70	4.34
2000	6.73	8.60	13.70	4.77	5.59	9.07	2.04	2.39	3.85
2001	6.08	7.82	12.40	4.04	4.74	7.66	1.81	2.13	3.42
2002	5.63	7.21	11.55	3.49	4.10	6.61	1.62	1.91	3.07
2003	5.29	6.78	10.59	3.32	3.88	6.23	1.53	1.79	2.87
2004	5.20	6.61	10.50	3.20	3.74	6.01	1.45	1.69	2.71
2005	4.75	6.03	9.47	2.92	3.42	5.51	1.33	1.55	2.50
2006	4.33	5.52	8.62	2.65	3.11	5.00	1.21	1.42	2.28
2007	4.11	5.22	8.12	2.50	2.92	4.68	1.13	1.32	2.12
2008	3.94	5.01	7.78	2.43	2.84	4.55	1.05	1.23	1.97
2009	3.77	4.76	7.33	2.29	2.68	4.31	0.95	1.12	1.79
2010	3.43	4.31	6.61	2.05	2.40	3.86	0.86	1.00	1.61
2011	3.04	3.87	5.99	1.92	2.24	3.63	0.78	0.91	1.46
2012	2.87	3.65	5.78	1.95	2.28	3.68	0.68	0.80	1.28
2013	2.86	3.64	5.54	1.88	2.21	3.55	0.63	0.73	1.17
2014	2.83	3.61	5.59	1.75	2.05	3.29	0.59	0.69	1.10
2015	2.71	3.45	5.32	1.69	1.98	3.19	0.57	0.67	1.06
2016	2.75	3.49	5.42	1.71	2.00	3.21	0.57	0.67	1.06
2017	2.65	3.35	5.22	1.68	1.96	3.14	0.56	0.66	1.05
2018	2.53	3.18	4.89	1.68	1.96	3.13	0.56	0.66	1.05

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TABLE 3-16: BROWN BULLHEAD PREDICTED TRI+ CONCENTRATIONS FOR 1993 - 2018

	River Mile 152			River Mile 113			River Mile 90			River Mile 50		
Year	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)
1993	2.34	3.34	5.49	1.79	2.56	4.29	1.43	2.06	3.45	1.11	1.58	2.60
1994	2.02	2.91	4.85	1.64	2.36	3.96	1.33	1.91	3.21	1.02	1.46	2.41
1995	1.88	2.71	4.52	1.53	2.21	3.71	1.25	1.81	3.04	0.96	1.37	2.29
1996	1.94	2.78	4.62	1.49	2.15	3.61	1.20	1.73	2.91	0.92	1.31	2.19
1997	1.81	2.59	4.31	1.41	2.04	3.40	1.12	1.62	2.73	0.85	1.22	2.05
1998	3.91	5.63	9.39	3.10	4.52	7.58	2.51	3.63	6.10	1.93	2.74	4.57
1999	1.68	2.43	4.08	1.38	2.00	3.36	1.12	1.63	2.75	0.86	1.24	2.07
2000	1.51	2.20	3.70	1.22	1.78	2.98	0.99	1.44	2.41	0.76	1.09	1.82
2001	1.48	2.14	3.56	1.16	1.69	2.82	0.92	1.34	2.24	0.70	1.01	1.68
2002	1.49	2.16	3.62	1.19	1.73	2.90	0.94	1.37	2.29	0.71	1.03	1.72
2003	1.38	2.01	3.37	1.12	1.64	2.75	0.89	1.30	2.19	0.68	0.98	1.63
2004	1.34	1.95	3.29	1.11	1.63	2.74	0.89	1.31	2.20	0.68	0.98	1.64
2005	1.28	1.88	3.15	1.05	1.54	2.59	0.84	1.23	2.08	0.64	0.93	1.56
2006	1.26	1.83	3.06	1.01	1.47	2.47	0.79	1.16	1.95	0.60	0.88	1.47
2007	1.19	1.74	2.92	0.97	1.41	2.37	0.76	1.11	1.86	0.57	0.84	1.40
2008	1.27	1.85	3.11	1.04	1.51	2.55	0.81	1.19	2.00	0.62	0.90	1.50
2009	1.23	1.79	3.02	1.01	1.48	2.49	0.80	1.17	1.96	0.61	0.88	1.47
2010	1.06	1.57	2.65	0.87	1.28	2.15	0.68	1.00	1.68	0.52	0.75	1.26
2011	1.10	1.61	2.71	0.89	1.30	2.18	0.69	1.01	1.69	0.52	0.76	1.26
2012	1.08	1.58	2.65	0.88	1.28	2.16	0.68	0.99	1.67	0.51	0.74	1.24
2013	1.07	1.56	2.62	0.86	1.26	2.12	0.67	0.97	1.64	0.50	0.73	1.21
2014	1.05	1.53	2.57	0.86	1.25	2.10	0.66	0.97	1.62	0.50	0.72	1.20
2015	1.00	1.45	2.45	0.82	1.20	2.02	0.64	0.93	1.57	0.48	0.70	1.16
2016	1.04	1.53	2.59	0.87	1.28	2.16	0.68	1.00	1.67	0.51	0.75	1.25
2017	1.03	1.52	2.55	0.86	1.26	2.13	0.67	0.98	1.66	0.51	0.74	1.24
2018	0.95	1.39	2.36	0.79	1.16	1.97	0.61	0.90	1.53	0.47	0.68	1.14

TABLE 3-17: WHITE PERCH PREDICTED TRI+ CONCENTRATIONS FOR 1993 - 2018 FOR 1993 - 2018

	Thompson Island Pool			River Mile 168			River Mile 154		
Year	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)
1993	NA	NA	NA	NA	NA	NA	2.55	3.16	6.90
1994	NA	NA	NA	NA	NA	NA	2.53	3.14	6.87
1995	NA	NA	NA	NA	NA	NA	2.29	2.86	6.33
1996	NA	NA	NA	NA	NA	NA	2.13	2.66	5.88
1997	NA	NA	NA	NA	NA	NA	1.93	2.42	5.38
1998	NA	NA	NA	NA	NA	NA	1.45	1.90	4.31
1999	NA	NA	NA	NA	NA	NA	1.46	1.82	4.04
2000	NA	NA	NA	NA	NA	NA	1.28	1.60	3.58
2001	NA	NA	NA	NA	NA	NA	1.15	1.43	3.19
2002	NA	NA	NA	NA	NA	NA	1.02	1.28	2.86
2003	NA	NA	NA	NA	NA	NA	0.96	1.20	2.66
2004	NA	NA	NA	NA	NA	NA	0.92	1.14	2.52
2005	NA	NA	NA	NA	NA	NA	0.84	1.05	2.33
2006	NA	NA	NA	NA	NA	NA	0.76	0.95	2.12
2007	NA	NA	NA	NA	NA	NA	0.72	0.89	1.97
2008	NA	NA	NA	NA	NA	NA	0.66	0.83	1.83
2009	NA	NA	NA	NA	NA	NA	0.60	0.76	1.67
2010	NA	NA	NA	NA	NA	NA	0.54	0.68	1.50
2011	NA	NA	NA	NA	NA	NA	0.50	0.62	1.36
2012	NA	NA	NA	NA	NA	NA	0.43	0.54	1.20
2013	NA	NA	NA	NA	NA	NA	0.40	0.49	1.09
2014	NA	NA	NA	NA	NA	NA	0.38	0.47	1.03
2015	NA	NA	NA	NA	NA	NA	0.36	0.45	0.99
2016	NA	NA	NA	NA	NA	NA	0.36	0.45	0.99
2017	NA	NA	NA	NA	NA	NA	0.36	0.45	0.98
2018	NA	NA	NA	NA	NA	NA	0.36	0.45	0.98

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TABLE 3-17: WHITE PERCH PREDICTED TRI+ CONCENTRATIONS FOR 1993 - 2018
FOR 1993 - 2018

	River Mile 152			River Mile 113			River Mile 90			River Mile 50		
Year	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)
1993	2.70	2.87	3.31	2.09	2.22	2.56	1.65	1.76	2.04	1.32	1.40	1.58
1994	2.29	2.44	2.85	1.88	2.01	2.34	1.52	1.62	1.89	1.21	1.28	1.45
1995	2.14	2.30	2.67	1.74	1.86	2.19	1.42	1.52	1.79	1.13	1.19	1.37
1996	2.33	2.46	2.78	1.70	1.81	2.11	1.36	1.45	1.70	1.07	1.13	1.30
1997	2.07	2.21	2.57	1.60	1.71	2.01	1.26	1.35	1.59	0.99	1.05	1.21
1998	4.30	4.64	5.56	3.56	3.78	4.43	2.80	3.01	3.60	2.20	2.35	2.74
1999	1.90	2.03	2.40	1.53	1.65	1.96	1.25	1.35	1.60	0.99	1.05	1.22
2000	1.69	1.81	2.15	1.33	1.43	1.73	1.09	1.17	1.40	0.86	0.92	1.07
2001	1.69	1.79	2.08	1.27	1.37	1.64	1.01	1.08	1.30	0.79	0.84	0.99
2002	1.71	1.82	2.13	1.32	1.42	1.69	1.04	1.11	1.33	0.80	0.86	1.01
2003	1.55	1.66	1.96	1.24	1.33	1.59	0.98	1.06	1.27	0.76	0.81	0.96
2004	1.45	1.57	1.90	1.21	1.31	1.58	0.98	1.06	1.27	0.76	0.82	0.96
2005	1.38	1.50	1.82	1.13	1.22	1.49	0.92	0.99	1.20	0.72	0.77	0.91
2006	1.40	1.49	1.78	1.08	1.17	1.42	0.85	0.93	1.12	0.67	0.72	0.85
2007	1.32	1.42	1.68	1.03	1.12	1.36	0.81	0.88	1.07	0.63	0.68	0.81
2008	1.38	1.49	1.81	1.12	1.22	1.47	0.88	0.95	1.15	0.68	0.73	0.87
2009	1.31	1.42	1.72	1.08	1.17	1.42	0.86	0.93	1.13	0.67	0.71	0.85
2010	1.17	1.26	1.53	0.93	1.01	1.23	0.73	0.79	0.97	0.56	0.61	0.73
2011	1.23	1.32	1.57	0.95	1.03	1.26	0.73	0.80	0.98	0.57	0.61	0.73
2012	1.18	1.28	1.54	0.95	1.03	1.24	0.73	0.79	0.96	0.56	0.60	0.72
2013	1.20	1.29	1.53	0.94	1.01	1.22	0.72	0.78	0.94	0.55	0.59	0.70
2014	1.16	1.24	1.49	0.92	1.00	1.21	0.71	0.77	0.93	0.54	0.58	0.70
2015	1.08	1.17	1.41	0.88	0.95	1.16	0.68	0.74	0.90	0.52	0.56	0.67
2016	1.13	1.23	1.49	0.94	1.02	1.24	0.73	0.79	0.96	0.56	0.60	0.72
2017	1.11	1.21	1.48	0.91	1.00	1.22	0.72	0.78	0.95	0.55	0.60	0.72
2018	1.03	1.12	1.37	0.84	0.92	1.14	0.66	0.72	0.89	0.51	0.55	0.67

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TABLE 3-18: YELLOW PERCH PREDICTED TRI+ CONCENTRATIONS FOR 1993 - 2018

	Thompson Island Pool			River Mile 168			River Mile 154		
Year	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)
1993	12.65	15.93	26.35	2.51	3.55	7.73	0.88	1.22	2.53
1994	9.10	11.60	20.01	2.35	3.18	7.06	0.84	1.21	2.45
1995	9.62	12.14	19.56	2.01	2.89	6.13	0.74	1.05	2.15
1996	6.28	8.01	13.92	1.58	2.27	4.94	0.61	0.87	1.83
1997	5.64	7.09	11.49	1.54	2.08	4.69	0.58	0.88	1.88
1998	4.98	6.37	10.73	1.45	1.93	4.27	0.58	0.85	1.79
1999	4.68	5.98	10.32	1.39	1.90	4.11	0.57	0.82	1.73
2000	3.80	4.83	8.38	1.12	1.49	3.30	0.50	0.68	1.46
2001	3.19	4.07	7.08	0.97	1.32	2.88	0.43	0.62	1.34
2002	3.31	4.20	7.17	0.83	1.13	2.48	0.39	0.56	1.20
2003	2.89	3.67	6.25	0.78	1.09	2.33	0.37	0.52	1.10
2004	3.94	5.05	8.74	0.80	1.09	2.35	0.36	0.51	1.07
2005	3.20	4.03	6.72	0.72	0.97	2.11	0.33	0.46	0.97
2006	2.63	3.32	5.56	0.65	0.86	1.87	0.30	0.42	0.89
2007	3.16	4.01	6.68	0.63	0.85	1.79	0.28	0.40	0.83
2008	3.17	4.01	6.68	0.60	0.83	1.79	0.26	0.37	0.78
2009	3.22	4.03	6.64	0.59	0.79	1.70	0.24	0.35	0.72
2010	2.96	3.72	6.19	0.51	0.69	1.49	0.21	0.30	0.64
2011	2.25	2.82	4.58	0.48	0.66	1.38	0.20	0.28	0.59
2012	2.19	2.77	4.58	0.47	0.66	1.42	0.18	0.24	0.52
2013	1.86	2.34	3.86	0.46	0.61	1.35	0.15	0.23	0.46
2014	2.10	2.66	4.38	0.43	0.57	1.24	0.15	0.21	0.44
2015	1.96	2.46	4.04	0.41	0.55	1.19	0.14	0.20	0.42
2016	2.44	3.09	5.14	0.42	0.58	1.26	0.14	0.21	0.42
2017	2.51	3.16	5.24	0.43	0.58	1.24	0.14	0.21	0.42
2018	2.37	3.00	4.99	0.41	0.57	1.22	0.15	0.21	0.42

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TABLE 3-18: YELLOW PERCH PREDICTED TRI+ CONCENTRATIONS FOR 1993 - 2018

	River Mile 152			River Mile 113			River Mile 90			River Mile 50		
Year	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)
1993	0.85	0.99	1.29	0.65	0.76	0.98	0.51	0.60	0.78	0.41	0.48	0.61
1994	0.70	0.84	1.09	0.58	0.69	0.89	0.47	0.55	0.72	0.37	0.44	0.56
1995	0.67	0.79	1.04	0.54	0.64	0.83	0.44	0.52	0.68	0.35	0.41	0.53
1996	0.70	0.83	1.06	0.52	0.62	0.81	0.42	0.49	0.65	0.33	0.39	0.50
1997	0.65	0.77	0.99	0.49	0.59	0.77	0.39	0.46	0.61	0.30	0.36	0.47
1998	1.35	1.64	2.13	1.08	1.29	1.69	0.86	1.04	1.36	0.68	0.80	1.05
1999	0.58	0.70	0.91	0.47	0.57	0.75	0.39	0.46	0.61	0.30	0.36	0.47
2000	0.51	0.61	0.80	0.41	0.49	0.65	0.34	0.40	0.53	0.26	0.31	0.41
2001	0.51	0.61	0.80	0.39	0.47	0.62	0.31	0.38	0.49	0.24	0.29	0.38
2002	0.52	0.62	0.81	0.41	0.49	0.64	0.32	0.38	0.51	0.25	0.29	0.39
2003	0.47	0.56	0.74	0.38	0.46	0.61	0.30	0.36	0.48	0.23	0.28	0.37
2004	0.45	0.54	0.72	0.37	0.45	0.60	0.30	0.36	0.48	0.24	0.28	0.37
2005	0.42	0.51	0.68	0.35	0.42	0.56	0.28	0.34	0.45	0.22	0.26	0.35
2006	0.43	0.52	0.68	0.33	0.40	0.54	0.26	0.32	0.43	0.21	0.25	0.33
2007	0.40	0.48	0.63	0.32	0.38	0.51	0.25	0.30	0.41	0.20	0.24	0.31
2008	0.43	0.51	0.68	0.34	0.42	0.56	0.27	0.33	0.44	0.21	0.25	0.33
2009	0.40	0.48	0.65	0.33	0.40	0.54	0.26	0.32	0.43	0.21	0.25	0.33
2010	0.35	0.42	0.57	0.28	0.34	0.46	0.22	0.27	0.36	0.17	0.21	0.28
2011	0.38	0.45	0.59	0.29	0.35	0.47	0.23	0.27	0.37	0.18	0.21	0.28
2012	0.36	0.43	0.58	0.29	0.35	0.47	0.22	0.27	0.36	0.17	0.21	0.27
2013	0.37	0.44	0.58	0.29	0.35	0.46	0.22	0.27	0.36	0.17	0.20	0.27
2014	0.35	0.43	0.56	0.28	0.34	0.46	0.22	0.26	0.35	0.17	0.20	0.27
2015	0.33	0.40	0.53	0.27	0.33	0.44	0.21	0.26	0.34	0.16	0.19	0.26
2016	0.35	0.42	0.56	0.29	0.35	0.47	0.22	0.27	0.36	0.17	0.21	0.28
2017	0.34	0.41	0.55	0.28	0.34	0.46	0.22	0.27	0.36	0.17	0.21	0.27
2018	0.31	0.38	0.50	0.26	0.31	0.42	0.20	0.24	0.33	0.16	0.19	0.25

TABLE 3-19: STRIPED BASS PREDICTED TRI+ CONCENTRATIONS FOR 1993 - 2018

	River Mile 152			River Mile 113		
Year	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)
1993	28.66	36.41	54.77	3.90	4.98	7.48
1994	20.43	26.37	39.23	3.40	4.35	6.57
1995	18.03	22.65	34.33	3.06	3.88	5.85
1996	20.95	26.88	40.12	2.81	3.61	5.41
1997	19.34	24.47	36.70	2.73	3.49	5.24
1998	15.36	19.19	29.49	2.46	3.17	4.78
1999	12.85	16.58	24.80	2.06	2.65	4.02
2000	12.15	15.55	23.50	1.86	2.41	3.66
2001	13.57	17.67	26.26	1.89	2.44	3.69
2002	12.87	16.19	24.54	1.88	2.42	3.68
2003	11.02	14.37	21.69	1.72	2.22	3.39
2004	9.12	11.61	17.80	1.54	1.97	3.02
2005	8.50	11.04	16.80	1.39	1.81	2.76
2006	9.72	12.45	19.03	1.38	1.79	2.72
2007	8.85	11.49	17.26	1.35	1.75	2.65
2008	8.43	10.69	16.27	1.32	1.69	2.58
2009	7.14	9.25	14.16	1.19	1.54	2.36
2010	7.59	9.74	14.73	1.14	1.47	2.24
2011	8.33	10.89	16.50	1.20	1.56	2.38
2012	7.58	9.75	14.75	1.18	1.53	2.33
2013	8.11	10.62	15.99	1.21	1.58	2.40
2014	7.47	9.66	14.72	1.15	1.49	2.28
2015	6.87	8.92	13.60	1.09	1.42	2.17
2016	6.51	8.17	12.62	1.03	1.33	2.03
2017	5.77	7.36	11.27	0.95	1.22	1.87
2018	5.50	7.16	10.92	0.89	1.16	1.78

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TABLE 3-20a: OBSERVED AVIAN TOTAL PCB CONCENTRATIONS

1994 USFWS Tree Swallow Concentrations in mg/kg				
	Lock 9	Remnant 4	SA13	Saratoga NHP
Eggs	0.9	6.6	29.6	18.5
	2.6	22.9	77.3	2.4
	5.7	12.9	17.6	15.7
	16	4.6	44	13
EGG AVERAGE	6.28	11.7	42.1	12.4
Nestlings	0.51	31.1	54.8	9.8
	0.244	27.1	56.8	0.7
NESTLING AVERAGE	0.377	29.1	55.8	5.3

1997-1999 USFWS Tree Swallow Concentrations in ng/g						
	WI (Ref. Station)	Remnant 4	SA13	Saratoga NHP	Ravena (Alb.Co.)	Lower Hudson
Nestlings	42	7600	8500	6400	2300	750
	56	7600	12000	4500	1800	890
		7800	9600	9100		160
		8500	9700	7300		160
						290
						330
						170
						450
NESTLING AVERAGE	49	7875	9950	6825	2050	400
Adults		9700	16000	2300		
		8000.0	11000	5400		
		7500	5400	3600		
ADULT AVERAGE		8400	10800	3767		

1997-1999 USFWS Great Blue Heron Concentrations in ng/g		
	Castleton Island (Lower River)	Saratoga NHP
Nestling Brains	560	1000
	35	
	140	
	60	
	150	
NESTLING BRAIN AVE.	189	1000

1997-1999 USFWS Eagle Blood Concentrations in ng/g			
Bald Eagle Blood	Serum Lower River	Whole Blood Lower River	Serum Lock 1
Minimum	471	214	
Maximum	14240	755	
Average	2288	440	1009
Number of Samples	13	5	1

Source: 1994 data from USFWS, 1997; 1997- 1999 data from USGS 2000a and 2000c.

TABLE 3-20b: OBSERVED MAMMALIAN TOTAL PCB CONCENTRATIONS

Species and Statistic	1983 - 1986 mg/kg wet weight (Foley *et al.*, 1988) Upper Hudson Valley	Lower Hudson Valley	Hudson Valley (unspecified)
Mink liver - average	0.6	0.7	
Mink liver - minimum	0.1	0.1	
Mink liver - maximum	1.7	3.4	
Otter liver - average			2.3
Otter liver - minimum			0.7
Otter liver - maximum			7.3

TABLE 3-21
EXPOSURE PARAMETERS FOR THE TREE SWALLOW (*Tachycineta bicolor*)

	Exposure Parameters		Range Reported for Species
Common Name	Tree Swallow		-
Genus	*Tachycineta*		-
Species	*bicolor*		-
Sex (M/F)	Female	Male	-
Age (Adult/Juv.)	Adult, Breeding		-
Male/Female Body Weight (kg) [1]	0.0210	0.0206	0.017-0.0255 (M and F)
Total Daily Dietary Ingestion (kg/day wet wt.) [2]	0.018	0.018	0.016-0.020
Total Daily Dietary Ingestion (kg/day dry wt.) [3]	0.005		No Contact with Sediments
General Dietary Characterization	Insectivore		-
Percent Diet Composition (% wet wt.) [4]			
Fish (Total Component)	0%		0%
Aquatic Invertebrates (Total Component) [5]	100%		95.0% - 100.0%
Non-river Related Diet Sources	0%		0%
Water Consumption Rate (L/day) [6]	0.0044		0.0038-0.0050
Percent Incidental Sediment Ingestion in Diet [7]	0%		No Contact with Sediments
Foraging Territory (km) [8]	0.1		0.1-0.2
Behavioral Modification Factors in the Exposure Assessment [9]			
Temporal Migration CorrectionFactor (1-%Annual Temporal Displaceme	1		-
Temporal Hibernation/Asetivation Correction Factor (1-%Temporal Hib/	1		-
Habitat Use Factor (Temporal use factor %)	1		Feeds over open water habitats
Temporal Reproductive Period (Mating/Gestation/Birth) [10, 11]	April - June		April - June

Notes: [1] Secord and McCarty (1997), Robertson *et al.* (1992); [2] Estimated from Nagy (1987) and USEPA (1993b); [3] No contact with sediments; [4] Secord and McCarty (1997), McCarty and Winkler (1999) [5] Emergent forms of insects with partial aquatic life histories; [6] Calder and Braun (1983 In USEPA, 1993b); [7] Robertson *et al.* (1992); [8] McCarty and Winkler (1999); [9] Robertson *et al.* (1992), see text for rationale; [10] Bull (1998), Andrle and Carroll(1988).

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TABLE 3-22
EXPOSURE PARAMETERS FOR THE MALLARD (*Anas platyrhynchos*)

	Exposure Parameters		Range Reported for Species
Common Name	Mallard		-
Genus	*Anas*		-
Species	*platyrhychos*		-
Sex (M/F)	Female	Male	-
Age (Adult/Juv.)	Adult, Breeding		-
Male/Female Body Weight (kg) [1]	1.06	1.24	1.01 - 1.11 F/M 1.21 - 1.27
Total Daily Dietary Ingestion (kg/day wet wt.) [2]	0.292	0.322	0.270-0.279 F/0.317-0.326 M
Total Daily Dietary Ingestion (kg/day dry wt.) [3]	0.061	0.067	0.058-0.063 F/ 0.066-0.068 M
General Dietary Characterization	Opportunistic Omnivore		-
Percent Diet Composition (% wet wt.) [4]			
Fish (Total Component)	0%		0%
Aquatic Invertebrates (Total Component)	50%		10 - 100%
Aquatic Vegetation/Seeds	50%		8 - 90 %
Water Consumption Rate (L/day) [5]	0.061	0.068	0.059-0.063 F/ 0.067 - 0.069 M
Percent Incidental Sediment Ingestion in Diet [6]	2%		2.00%
Foraging Territory (hectare) [7]	540.0	620.0	40.0-1440.0
Behavioral Modification Factors in the Exposure Assessment [8]			
Temporal Migration CorrectionFactor (1-%Annual Temporal Displaceme	1		Resident
Temporal Hibernation/Asetivation Correction Factor (1-%Temporal Hib/	1		Active Year Round
Habitat Use Factor (Temporal use factor %)	1		Riparian habitats preferred
Temporal Reproductive Period (Mating/Gestation/Birth)[9,10]	February -May		February -May

[1] Dunning (1993), USEPA (1993b); [2] Estimated from Nagy (1987) and USEPA (1993b); [3] Estimated from USEPA (1993b);
[4] Average of diet study summaries presented in USEPA (1993b); [5] Calder and Braun (1983 In USEPA, 1993b); [6] Beyer *et al*. (1994);
[7] Kirby *et al*. (1985 In USEPA, 1993b); [8] Bull (1998), USEPA (1993b); [9,10] Bull (1998), Andrle and Carroll (1988).

TABLE 3-23
EXPOSURE PARAMETERS FOR BELTED KINGFISHER (*Ceryle alcyon*)

	Exposure Parameters		Range Reported for Species
Common Name	Belted Kingfisher		-
Genus	*Ceryle*		-
Species	*alcyon*		-
Sex (M/F)	Female	Male	-
Age (Adult/Juv.)	Adult, Breeding		-
Male/Female Body Weight (kg) [1]	0.147	0.147	0.136-0.158 M and F
Total Daily Dietary Ingestion (kg/day wet wt.) [2]	0.058	0.058	0.055-0.060 M and F
Total Daily Dietary Ingestion (kg/day dry wt.) [3]	0.017	0.017	-
General Dietary Characterization	Opportunistic Piscivore		-
Percent Diet Composition (% wet wt.) [4]			
Fish (Total Component)	78%		46% - 100%
Aquatic Invertebrates (Total Component)	22%		5% - 41%
Non-river Related Diet Sources	0%		0-4.3%
Water Consumption Rate (L/day) [5]	0.016		0.015-0.017
Percent Incidental Sediment Ingestion in Diet [6]	1%		nests in banks, grooming
Foraging Territory (km) [7]	0.70		0.389-1.03
Behavioral Modification Factors in the Exposure Assessment [8]			
Temporal Migration CorrectionFactor (1-%Annual TemporalDisplacement)	1		Resident
Temporal Hibernation/Asetivation Correction Factor (1-%Temporal Hib/Aset.)	1		Active Year Round
Habitat Use Factor (Temporal use factor %)	1		Riparian habitats preferred
Temporal Reproductive Period (Mating/Gestation/Hatching)[9,10]	April - June		April - June

[1] Brooks and Davis (1987), Poole (1938); [2] Estimated from Nagy (1987) and USEPA (1993b); [3] No contact with sediments; [4] Gould unpublished data [1] In USEPA, 1993b), Davis (1982); [5] Calder and Braun (1983 In USEPA 1993b); [6] Best Professional Judgment based on Davis (1982); [7] Davis (1982); [8] Bull (1998), USEPA (1993b); [9, 10] Bull (1998), Andrle and Carroll (1988).

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TABLE 3-24
EXPOSURE PARAMETERS FOR GREAT BLUE HERON (*Ardea herodias*)

	Exposure Parameters		Range Reported for Species
Common Name	Great Blue Heron		-
Genus	*Ardea*		-
Species	*herodias*		-
Sex (M/F)	Female	Male	-
Age (Adult/Juvenile)	Adult, Breeding		-
Male/Female Body Weight (kg) [1]	2.20	2.58	1.87-2.54 F/ 2.28-2.88 M
Total Daily Dietary Ingestion (kg/day wet wt.) [2]	0.352	0.390	0.284-0.431 F/ 0.331-0.455 M
Total Daily Dietary Ingestion (kg/day dry wt.) [3]	0.097	0.108	
General Dietary Characterization	Opportunistic Piscivore		-
Percent Diet Composition (% wet wt.) [4]			
Fish (Total Component)	98%		72-98%
Aquatic Invertebrates (Total Component)	1%		1-18%
Non-river Related Diet Sources	1%		0-4.3%
Water Consumption Rate (L/day) [5]	0.100	0.111	0.089-0.110 F/ 0.102-0.119 M
Percent Incidental Sediment Ingestion in Diet [6]	2%		-
Foraging Territory (km) [7]	0.98		0.6-1.37
Behavioral Modification Factors in the Exposure Assessment [8]			
Temporal Migration CorrectionFactor (1-%Annual Temporal Displacement)	1		Resident
Temporal Hibernation/Asetivation Correction Factor (1-%Temporal Hib/Aset.)	1		Active Year Round
Habitat Use Factor (Temporal use factor %)	1		Riparian habitats preferred
Temporal Reproductive Period (Mating/Gestation/Birth)[9,10]	March - June		March -June

Notes: [1] Dunning (1993) ; [2] Estimated from Nagy (1987) and USEPA (1993b); [4] Alexander (1977 In USEPA, 1993b), Cotaam and Uhler (1945); [5] Calder and Braun (1983 In USEPA, 1993b); [6] Best Professional Judgement based on Eckert and Karalus (1988); 7 Peifer (1979 In USEPA 1993b); [8] USEPA (1993b) [9,10] Hull (1998) and Andrle and Carroll (1988).

TABLE 3-25
EXPOSURE PARAMETERS FOR BALD EAGLE (*Haliaeetus leucocephalus*)

	Exposure Parameters		Range Reported for Species
Common Name	Bald Eagle		-
Genus	*Haliaeetus*		-
Species	*leucocephalus*		-
Sex (M/F)	Female	Male	-
Age (Adult/Juvenile)	Adult, Breeding		-
Male/Female Body Weight (kg) [1]	5.10	3.20	4.5-5.6 F/M 3.0-3.4
Total Daily Dietary Ingestion (kg/day wet wt.) [2]	0.65	0.46	0.60-0.69 F/0.46-0.49 M
Total Daily Dietary Ingestion (kg/day dry wt.) [3]	-	-	-
General Dietary Characterization [4]	Opportunistic Piscivore		-
Percent Diet Composition (% wet wt.) [4]			
Fish (Total Component)	100%		70-100%
Aquatic Invertebrates (Total Component)	0%		0-18%
Non-river Related Diet Sources	0%		0-4.3%
Water Consumption Rate (L/day) [5]	0.175	0.129	0.162-0.187 F/0.123-0.134 M
Percent Incidental Sediment Ingestion in Diet [6]	0%		0.00%
Foraging Territory (km) [7]	5.0		3.0-7.0 Km
Behavioral Modification Factors in the Exposure Assessment [8]			
Temporal Migration CorrectionFactor (1-%Annual Temporal Displacement)	1		Resident
Temporal Hibernation/Asetivation Correction Factor (1-%Temporal Hib/Aset.)	1		Active Year Round
Habitat Use Factor (Temporal use factor %)	1		Riparian habitats preferred
Temporal Reproductive Period (Mating/Gestation/Birth)[9,10]	February - May		February - May

[1] Bopp (1999a), USEPA (1993b), Dunning (1993); [2], [3] Estimated from Nagy (1987) and USEPA (1993b);
[4] Nye (1999b), Bull (1998), USEPA (1993b), Nye and Suring (1978); [5] Caluder and Braun (1983 In USEPA 1993b);
[6] Best Professional Judgement - USEPA (1993b);
[7] Craig *et al.* (1988 In USEPA, 1993b); [8] Nye (1999a), USEPA (1993b); [9 10] Nye (1999b), Andrle and Carroll (1988).

TABLE 3-26: BIOMAGNIFICATION FACTORS FISH TO BIRD EGG FROM SCIENTIFIC LITERATURE

Bird species	Fish species	COC	Mean BMF	Range	Location	Citation, Comments
TOTAL PCB STUDIES						
Double-crested cormorant (*Phalacrocorax auritus*)	Yellow perch (*Perca flavescens*)	Total PCBs	53		Lake Huron	Weseloh et al. (1983)
Herring gull (*Larus argentatus*)	Smelt (*Osmerus mordax*) and alewives (*Alosa pseudoharengus*)	Total PCBs	50	SD = 10	Lake Ontario	Norstrom et al. (1978) as cited in Weseloh et al. (1983)
Herring gull (*Larus argentatus*)	Alewife (*Alosa pseudoharengus*)	Total PCB	32	SD = 7.3	Lake Ontario	Braune and Norstrom (1989)
Bald eagle (*Haliaeetus leucocephalus*)	Various	Total PCBs	28	NA	Au Sable, Manistee, and Muskegon Rivers of lower Michigan	Giesy et al. (1995)
Great blue heron (*Ardea herodias*)	Various, collected from active nests or stomachs of collected chicks	Aroclor 1260	8.04	0.3, 44.0	K25, Oak Ridge Reservation, Tennessee, USA	Halbrook et al. (1999) Calculated from means presented in article.
TOXIC EQUIVALENCY (TEQ) STUDIES						
Bald eagle (*Haliaeetus leucocephalus*)	Forage fish	TCDD-eq	200	NA	Thunder Bay, Lake Huron	in: USEPA (1994), P. C-249
Bald eagle (*Haliaeetus leucocephalus*)	Alewife (*Alosa pseudoharengus*)	TCDD-eq	97	19, 97	Thunder Bay, Lake Huron	Kubiak and Best (1993)
Bald eagle (*Haliaeetus leucocephalus*)	Northern Pike (*Esox lucius*)	TCDD-eq	19	NA	Great Lakes	Kubiak and Best (1993); called "consensus BMF" in Bowerman et al. (1995)
Fish-eating colonial waterbirds	Great Lakes fishes	PCDD, PCDF	21	NA	Great Lakes	Giesy et al. (1994) as cited in Bowerman et al. (1995)
Double-crested cormorant (*Phalacrocorax auritus*)	Forage fish	TCDD-eq	31.3	11.7, 56.8	Great Lakes	Jones et al. (1993); Jones et al. (1994)
Herring gull (*Larus argentatus*)	Alewife (*Alosa pseudoharengus*)	TCDD	21	SD = 4.8	Lake Ontario	Braune and Norstrom (1989)
Forster's tern (*Sterna forsteri*)	Great Lakes spottail shiner (*Notropis hudsonius*)	3,3',4,4',5,5'-HeCB (PCB 169)	176	137, 263	Great Lakes	Kubiak et al. (1989)
Forster's tern (*Sterna forsteri*)	Great Lakes spottail shiner (*Notropis hudsonius*)	3,3',4,4'5-PeCB (PCB 126)	64	9, 151	Great Lakes	Kubiak et al. (1989)
Forster's tern (*Sterna forsteri*)	Great Lakes spottail shiner (*Notropis hudsonius*)	2,3,7,8-TCDD	37	11, 79	Great Lakes	Kubiak et al. (1989)
Forster's tern (*Sterna forsteri*)	Great Lakes spottail shiner (*Notropis hudsonius*)	3,3',4,4'-TeCB (PCB 77)	0.17	0.02, 0.66	Great Lakes	Kubiak et al. (1989)
Forster's tern (*Sterna forsteri*)	Great Lakes spottail shiner (*Notropis hudsonius*)	2,3,7,8-TCDF	"negligible"	NA	Great Lakes	Kubiak et al. (1989)

Notes:
"NA" - data not available to estimate a range or uncertainty about the mean

TABLE 3-26a: RATIO OF EGG AND CHICK TO INSECT AND ODONATA FROM HUDSON RIVER USFWS DATA

Tri+ PCBs

	<<<----- TREE SWALLOW ----->>>		<<-- MALLARD-->>	
Location	Ratio of Egg to Insects	Ratio of Egg to Odonata	Ratio of Duck Egg to Insects	Ratio of Duck Egg to Odonates
RM 195	0.4	5.5		
RM 195	1.3	19.4		
RM 195	0.7	10.9		
RM 195	1.3	19.6		
RM 195	1.4	21.3		
RM 193	4.5	50.4		
RM 193	11.7	131.3		
RM 193	2.7	29.9		
RM 193	2.1	23.8		
RM 193	2.3	26.1		
RM 193	1.4	15.3		
RM 190			3.7	14.5
AVERAGE	2.7	32.1	3.7	14.5
STDEV	3.2	34.9		
MIN	0.4	5.5		
MAX	11.7	131.3		

TEQ

	<<<----- TREE SWALLOW ----->>>			MALLARD
Location	Ratio of Egg to Insects	Ratio of Egg to Odonata	Ratio of Chick to Odonata	Ratio of Duck Egg to Adult
RM 195	2.4	8.8	4.6	
RM 195			9.3	
RM 195			18.9	
RM 195	2.2	8.1	3.2	
RM 195			6.8	
RM 195			18.2	
RM 193	4.2	13.8	17.2	
RM 193			5.7	
RM 193			14.5	
RM 193	2.4	7.8	17.7	
RM 193			6.3	
RM 193			10.1	
RM 193			21.8	
RM 190				7.1
RM 173	13.6	9.1	3.5	
RM 173	5.9	3.9	3.4	
RM 173	20.2	13.5	3.6	
AVERAGE	7.3	9.3	10.3	7.1
STDEV	7.0	3.5	6.6	
MIN	2.2	3.9	3.2	7.1
MAX	20.2	13.8	21.8	7.1

Source: USFWS data in Hudson River Database Release 5.0 (USEPA, 2000e)

TABLE 3-27: SUMMARY OF $ADD_{Expected}$ AND EGG CONCENTRATIONS FOR FEMALE TREE SWALLOW BASED ON 1993 DATA USING SUM OF TRI+ CONGENERS

Location	Drinking Water Expected	Benthic Invertebrate Expected	Total Average Daily $Dose_{Expected}$ (mg/Kg/day)	Total Average Predicted Egg Conc (mg/Kg)
Upper River				
Thompson Island Pool (189)	1.54E-05	1.09E+01	1.09E+01	2.54E+01
Stillwater (168)	2.74E-05	1.91E+01	1.91E+01	4.45E+01
Federal Dam (154)	1.92E-05	4.54E+00	4.54E+00	1.06E+01
Lower River				
143.5	1.48E-05	6.33E-01	6.33E-01	1.48E+00
137.2	1.48E-05	1.25E+00	1.25E+00	2.91E+00
122.4	6.79E-06	6.89E-01	6.89E-01	1.61E+00
113.8	6.79E-06	7.09E-01	7.09E-01	1.65E+00
100	6.79E-06	3.26E-01	3.26E-01	7.60E-01
88.9	4.47E-06	1.63E-01	1.63E-01	3.81E-01
58.7	4.47E-06	5.03E-01	5.03E-01	1.17E+00
47.3	4.47E-06	5.71E-01	5.71E-01	1.33E+00
25.8	4.47E-06	1.69E-01	1.69E-01	3.95E-01

TABLE 3-28: SUMMARY OF $ADD_{95\%UCL}$ AND EGG CONCENTRATIONS FOR FEMALE TREE SWALLOW BASED ON 1993 DATA USING SUM OF TRI+ CONGENERS

Location	Drinking Water 95% UCL	Benthic Invertebrate 95% UCL	Total Average Daily $Dose_{95\%UCL}$ (mg/Kg/day)	95% UCL Predicted Egg Conc (mg/Kg)
Upper River				
Thompson Island Pool (189)	4.88E-05	1.90E+01	1.90E+01	4.44E+01
Stillwater (168)	8.69E-05	8.93E+01	8.93E+01	2.08E+02
Federal Dam (154)	4.11E-05	7.72E+00	7.72E+00	1.80E+01
Lower River				
143.5	1.61E-04	1.55E+00	1.55E+00	3.62E+00
137.2	1.61E-04	5.06E+00	5.06E+00	1.18E+01
122.4	8.70E-05	1.73E+00	1.73E+00	4.04E+00
113.8	8.70E-05	2.75E+00	2.75E+00	6.41E+00
100	8.70E-05	2.23E+00	2.23E+00	5.20E+00
88.9	1.99E-05	2.90E-01	2.90E-01	6.77E-01
58.7	1.99E-05	4.60E+00	4.60E+00	1.07E+01
47.3	1.99E-05	4.19E+00	4.19E+00	9.78E+00
25.8	1.99E-05	2.87E-01	2.87E-01	6.69E-01

TABLE 3-29: SUMMARY OF UPPER RIVER $ADD_{Expected}$ AND EGG CONCENTRATIONS FOR FEMALE SWALLOW BASED ON TRI+ CONGENERS FOR PERIOD 1993 - 2018

Year	Total Average Dietary Dose (mg/Kg/day)			Average Egg Concentration (mg/Kg)		
	189	168	154	189	168	154
1993	7.33E+00	1.22E+01	3.64E+00	1.71E+01	2.85E+01	8.50E+00
1994	6.77E+00	1.11E+01	3.39E+00	1.58E+01	2.58E+01	7.91E+00
1995	6.14E+00	9.77E+00	3.10E+00	1.43E+01	2.28E+01	7.23E+00
1996	5.54E+00	8.20E+00	2.75E+00	1.29E+01	1.91E+01	6.43E+00
1997	5.16E+00	7.21E+00	2.57E+00	1.20E+01	1.68E+01	6.01E+00
1998	4.80E+00	6.67E+00	2.46E+00	1.12E+01	1.56E+01	5.74E+00
1999	4.49E+00	6.21E+00	2.32E+00	1.05E+01	1.45E+01	5.42E+00
2000	4.04E+00	5.37E+00	2.07E+00	9.43E+00	1.25E+01	4.84E+00
2001	3.63E+00	4.50E+00	1.83E+00	8.47E+00	1.05E+01	4.27E+00
2002	3.36E+00	3.86E+00	1.64E+00	7.85E+00	9.00E+00	3.84E+00
2003	3.10E+00	3.53E+00	1.52E+00	7.22E+00	8.24E+00	3.55E+00
2004	2.87E+00	3.39E+00	1.42E+00	6.71E+00	7.91E+00	3.32E+00
2005	2.68E+00	3.17E+00	1.33E+00	6.26E+00	7.39E+00	3.10E+00
2006	2.47E+00	2.87E+00	1.21E+00	5.77E+00	6.70E+00	2.83E+00
2007	2.27E+00	2.66E+00	1.12E+00	5.29E+00	6.21E+00	2.61E+00
2008	2.12E+00	2.56E+00	1.04E+00	4.94E+00	5.98E+00	2.43E+00
2009	1.98E+00	2.45E+00	9.53E-01	4.63E+00	5.71E+00	2.22E+00
2010	1.81E+00	2.23E+00	8.54E-01	4.23E+00	5.21E+00	1.99E+00
2011	1.63E+00	2.05E+00	7.71E-01	3.81E+00	4.78E+00	1.80E+00
2012	1.57E+00	2.04E+00	6.89E-01	3.66E+00	4.76E+00	1.61E+00
2013	1.61E+00	2.03E+00	6.21E-01	3.76E+00	4.74E+00	1.45E+00
2014	1.59E+00	1.88E+00	5.74E-01	3.71E+00	4.40E+00	1.34E+00
2015	1.52E+00	1.80E+00	5.55E-01	3.54E+00	4.20E+00	1.30E+00
2016	1.44E+00	1.80E+00	5.55E-01	3.35E+00	4.19E+00	1.30E+00
2017	1.34E+00	1.78E+00	5.44E-01	3.13E+00	4.15E+00	1.27E+00
2018	1.29E+00	1.75E+00	5.42E-01	3.00E+00	4.09E+00	1.27E+00

TABLE 3-30: SUMMARY OF LOWER RIVER $ADD_{Expected}$ AND EGG CONCENTRATIONS FOR FEMALE SWALLOW BASED ON TRI+ CONGENERS FOR PERIOD 1993 - 2018

Year	Average Dietary Dose (mg/Kg/day)				Average Egg Concentration (mg/Kg)			
	152	113	90	50	152	113	90	50
1993	1.51E+00	1.20E+00	9.73E-01	7.15E-01	3.52E+00	2.80E+00	2.27E+00	1.67E+00
1994	1.33E+00	1.10E+00	9.09E-01	6.61E-01	3.11E+00	2.58E+00	2.12E+00	1.54E+00
1995	1.29E+00	1.06E+00	8.55E-01	6.30E-01	3.02E+00	2.48E+00	1.99E+00	1.47E+00
1996	1.29E+00	1.03E+00	8.24E-01	6.13E-01	3.02E+00	2.41E+00	1.92E+00	1.43E+00
1997	1.20E+00	9.74E-01	7.84E-01	5.83E-01	2.80E+00	2.27E+00	1.83E+00	1.36E+00
1998	2.70E+00	2.22E+00	1.75E+00	1.29E+00	6.30E+00	5.19E+00	4.09E+00	3.02E+00
1999	1.22E+00	1.03E+00	8.06E-01	5.99E-01	2.85E+00	2.40E+00	1.88E+00	1.40E+00
2000	1.13E+00	9.10E-01	7.24E-01	5.37E-01	2.65E+00	2.12E+00	1.69E+00	1.25E+00
2001	1.07E+00	8.66E-01	6.78E-01	5.02E-01	2.50E+00	2.02E+00	1.58E+00	1.17E+00
2002	1.08E+00	8.80E-01	6.96E-01	5.19E-01	2.51E+00	2.05E+00	1.62E+00	1.21E+00
2003	1.00E+00	8.29E-01	6.72E-01	4.95E-01	2.33E+00	1.93E+00	1.57E+00	1.15E+00
2004	1.03E+00	8.35E-01	6.65E-01	4.93E-01	2.40E+00	1.95E+00	1.55E+00	1.15E+00
2005	9.87E-01	8.17E-01	6.33E-01	4.69E-01	2.30E+00	1.91E+00	1.48E+00	1.09E+00
2006	9.24E-01	7.73E-01	5.90E-01	4.37E-01	2.16E+00	1.80E+00	1.38E+00	1.02E+00
2007	8.99E-01	7.46E-01	5.66E-01	4.19E-01	2.10E+00	1.74E+00	1.32E+00	9.77E-01
2008	9.61E-01	7.96E-01	6.09E-01	4.51E-01	2.24E+00	1.86E+00	1.42E+00	1.05E+00
2009	9.54E-01	7.82E-01	6.04E-01	4.48E-01	2.23E+00	1.83E+00	1.41E+00	1.05E+00
2010	8.27E-01	6.76E-01	5.23E-01	3.87E-01	1.93E+00	1.58E+00	1.22E+00	9.04E-01
2011	8.18E-01	6.91E-01	5.21E-01	3.93E-01	1.91E+00	1.61E+00	1.22E+00	9.17E-01
2012	8.01E-01	6.79E-01	5.11E-01	3.86E-01	1.87E+00	1.58E+00	1.19E+00	9.00E-01
2013	7.87E-01	6.67E-01	4.97E-01	3.76E-01	1.84E+00	1.56E+00	1.16E+00	8.77E-01
2014	7.91E-01	6.61E-01	4.93E-01	3.72E-01	1.85E+00	1.54E+00	1.15E+00	8.69E-01
2015	7.62E-01	6.31E-01	4.80E-01	3.60E-01	1.78E+00	1.47E+00	1.12E+00	8.41E-01
2016	8.47E-01	6.76E-01	5.17E-01	3.89E-01	1.98E+00	1.58E+00	1.21E+00	9.08E-01
2017	8.53E-01	6.83E-01	5.21E-01	3.86E-01	1.99E+00	1.59E+00	1.22E+00	9.02E-01
2018	7.84E-01	6.41E-01	4.81E-01	3.56E-01	1.83E+00	1.50E+00	1.12E+00	8.30E-01

TABLE 3-31: SUMMARY OF $ADD_{Expected}$ AND EGG CONCENTRATIONS FOR FEMALE MALLARD BASED ON 1993 DATA USING SUM OF TRI+ CONGENERS

Location	Drinking Water Expected	Macrophyte Expected	Benthic Invertebrate Expected	Sediment Expected	Total Average Daily $Dose_{Expected}$ (mg/Kg/day)	Total Average Concentration in Eggs (mg/Kg)
Upper River						
Thompson Island Pool (189)	4.24E-06	1.49E-01	1.95E+00	1.37E-02	2.11E+00	4.24E+01
Stillwater (168)	7.53E-06	2.41E-01	3.63E+00	3.57E-02	3.91E+00	7.91E+01
Federal Dam (154)	5.26E-06	2.35E-01	8.66E-01	3.21E-03	1.10E+00	1.89E+01
Lower River						
143.5	4.07E-06	1.33E-01	1.21E-01	9.90E-04	2.55E-01	2.63E+00
137.2	4.07E-06	1.33E-01	2.38E-01	1.75E-03	3.73E-01	5.17E+00
122.4	1.86E-06	7.92E-02	1.11E-01	1.11E-03	1.91E-01	2.41E+00
113.8	1.86E-06	7.92E-02	9.52E-02	1.16E-03	1.75E-01	2.07E+00
100	1.86E-06	7.92E-02	5.23E-02	4.59E-04	1.32E-01	1.14E+00
88.9	1.23E-06	5.79E-02	2.63E-02	8.98E-04	8.51E-02	5.72E-01
58.7	1.23E-06	5.79E-02	6.76E-02	2.90E-04	1.26E-01	1.47E+00
47.3	1.23E-06	5.79E-02	9.18E-02	1.77E-03	1.52E-01	2.00E+00
25.8	1.23E-06	5.79E-02	2.72E-02	6.66E-04	8.58E-02	5.92E-01

TABLE 3-32: SUMMARY OF $ADD_{95\%UCL}$ AND EGG CONCENTRATIONS FOR FEMALE MALLARD BASED ON 1993 DATA USING SUM OF TRI+ CONGENERS

Location	Drinking Water 95% UCL	Macrophyte 95% UCL	Benthic Invertebrate 95% UCL	Sediment 95% UCL	Total Upper Bound Daily $Dose_{95\%UCL}$ (mg/Kg/day)	Total Concentration in Eggs (95% UCL) (mg/Kg)
Upper River						
Thompson Island Pool (189)	1.34E-05	5.88E-01	3.06E+00	2.00E-02	3.67E+00	6.66E+01
Stillwater (168)	2.39E-05	6.45E-01	6.32E+00	6.23E-02	7.03E+00	1.38E+02
Federal Dam (154)	1.13E-05	4.87E-01	1.51E+00	5.39E-03	2.00E+00	3.28E+01
Lower River						
143.5	4.43E-05	3.99E-01	2.10E-01	1.08E-03	6.10E-01	4.57E+00
137.2	4.43E-05	3.99E-01	4.14E-01	3.53E-03	8.16E-01	9.01E+00
122.4	2.39E-05	1.22E+00	2.78E-01	1.23E-03	1.50E+00	6.06E+00
113.8	2.39E-05	1.22E+00	1.66E-01	1.92E-03	1.39E+00	3.61E+00
100	2.39E-05	1.22E+00	3.58E-01	9.91E-03	1.59E+00	7.79E+00
88.9	5.46E-06	1.13E+00	4.67E-02	2.63E-03	1.17E+00	1.02E+00
58.7	5.46E-06	1.13E+00	1.18E-01	3.22E-03	1.25E+00	2.56E+00
47.3	5.46E-06	1.13E+00	6.74E-01	6.91E-03	1.81E+00	1.47E+01
25.8	5.46E-06	1.13E+00	4.61E-02	1.80E-03	1.17E+00	1.00E+00

TABLE 3-33: SUMMARY OF UPPER RIVER $ADD_{Expected}$ AND EGG CONCENTRATIONS FOR FEMALE MALLARD BASED ON TRI+ CONGENERS FOR PERIOD 1993 - 2018

	Average Dietary Dose (mg/Kg/day)			Average Egg Concentration (mg/Kg)		
Year	189	168	154	189	168	154
1993	1.08E+01	2.36E+00	8.00E-01	2.57E+01	4.28E+01	1.27E+01
1994	8.31E+00	2.15E+00	7.38E-01	2.37E+01	3.87E+01	1.19E+01
1995	8.11E+00	1.85E+00	6.49E-01	2.15E+01	3.42E+01	1.09E+01
1996	4.47E+00	1.52E+00	5.56E-01	1.94E+01	2.87E+01	9.64E+00
1997	4.31E+00	1.37E+00	5.32E-01	1.81E+01	2.52E+01	9.01E+00
1998	6.26E+00	1.32E+00	5.46E-01	1.68E+01	2.33E+01	8.60E+00
1999	5.48E+00	1.22E+00	5.00E-01	1.57E+01	2.18E+01	8.13E+00
2000	3.73E+00	1.03E+00	4.23E-01	1.41E+01	1.88E+01	7.26E+00
2001	3.05E+00	8.38E-01	3.56E-01	1.27E+01	1.57E+01	6.41E+00
2002	3.73E+00	7.42E-01	3.29E-01	1.18E+01	1.35E+01	5.75E+00
2003	4.58E+00	7.10E-01	3.27E-01	1.08E+01	1.24E+01	5.32E+00
2004	5.54E+00	6.87E-01	2.99E-01	1.01E+01	1.19E+01	4.97E+00
2005	3.74E+00	6.37E-01	2.79E-01	9.39E+00	1.11E+01	4.65E+00
2006	3.59E+00	5.61E-01	2.46E-01	8.65E+00	1.00E+01	4.25E+00
2007	3.51E+00	5.27E-01	2.29E-01	7.93E+00	9.32E+00	3.92E+00
2008	5.05E+00	5.22E-01	2.19E-01	7.41E+00	8.96E+00	3.65E+00
2009	5.13E+00	5.23E-01	2.12E-01	6.94E+00	8.57E+00	3.34E+00
2010	3.22E+00	4.48E-01	1.76E-01	6.34E+00	7.81E+00	2.99E+00
2011	3.18E+00	4.10E-01	1.64E-01	5.71E+00	7.16E+00	2.70E+00
2012	2.43E+00	4.14E-01	1.53E-01	5.49E+00	7.14E+00	2.41E+00
2013	2.00E+00	3.92E-01	1.31E-01	5.64E+00	7.10E+00	2.17E+00
2014	2.48E+00	3.88E-01	1.31E-01	5.57E+00	6.59E+00	2.01E+00
2015	2.44E+00	3.73E-01	1.27E-01	5.31E+00	6.31E+00	1.94E+00
2016	3.73E+00	3.75E-01	1.27E-01	5.03E+00	6.29E+00	1.94E+00
2017	3.98E+00	3.76E-01	1.29E-01	4.69E+00	6.23E+00	1.90E+00
2018	4.09E+00	3.73E-01	1.30E-01	4.50E+00	6.14E+00	1.90E+00

TABLE 3-34: SUMMARY OF $ADD_{Expected}$ AND EGG CONCENTRATIONS FOR FEMALE MALLARD BASED ON TRI+ CONGENERS FOR PERIOD 1993 - 2018

	Average Dietary Dose (mg/Kg/day)				Average Egg Concentration (mg/Kg)			
Year	152	113	90	50	152	113	90	50
1993	5.71E-01	4.56E-01	3.69E-01	3.32E-01	5.28E+00	4.19E+00	3.40E+00	2.50E+00
1994	4.93E-01	4.07E-01	3.32E-01	2.93E-01	4.67E+00	3.87E+00	3.18E+00	2.31E+00
1995	4.17E-01	3.44E-01	2.92E-01	2.66E-01	4.53E+00	3.72E+00	2.99E+00	2.20E+00
1996	5.21E-01	3.59E-01	2.83E-01	2.47E-01	4.52E+00	3.62E+00	2.88E+00	2.15E+00
1997	4.31E-01	3.28E-01	2.59E-01	2.25E-01	4.21E+00	3.41E+00	2.74E+00	2.04E+00
1998	8.19E-01	6.63E-01	5.46E-01	4.82E-01	9.45E+00	7.78E+00	6.14E+00	4.53E+00
1999	3.45E-01	2.84E-01	2.37E-01	2.14E-01	4.27E+00	3.60E+00	2.82E+00	2.10E+00
2000	3.44E-01	2.56E-01	2.08E-01	1.83E-01	3.97E+00	3.18E+00	2.53E+00	1.88E+00
2001	3.50E-01	2.52E-01	1.94E-01	1.66E-01	3.74E+00	3.03E+00	2.37E+00	1.76E+00
2002	3.21E-01	2.48E-01	1.97E-01	1.69E-01	3.77E+00	3.08E+00	2.44E+00	1.82E+00
2003	2.81E-01	2.31E-01	1.87E-01	1.58E-01	3.50E+00	2.90E+00	2.35E+00	1.73E+00
2004	2.60E-01	2.11E-01	1.77E-01	1.55E-01	3.60E+00	2.92E+00	2.33E+00	1.73E+00
2005	2.52E-01	2.03E-01	1.64E-01	1.43E-01	3.45E+00	2.86E+00	2.21E+00	1.64E+00
2006	2.49E-01	1.97E-01	1.54E-01	1.31E-01	3.23E+00	2.70E+00	2.06E+00	1.53E+00
2007	2.28E-01	1.89E-01	1.47E-01	1.24E-01	3.15E+00	2.61E+00	1.98E+00	1.47E+00
2008	2.40E-01	1.95E-01	1.55E-01	1.32E-01	3.36E+00	2.79E+00	2.13E+00	1.58E+00
2009	2.16E-01	1.84E-01	1.49E-01	1.28E-01	3.34E+00	2.74E+00	2.11E+00	1.57E+00
2010	2.14E-01	1.67E-01	1.29E-01	1.09E-01	2.90E+00	2.37E+00	1.83E+00	1.36E+00
2011	2.03E-01	1.71E-01	1.31E-01	1.10E-01	2.86E+00	2.42E+00	1.82E+00	1.38E+00
2012	2.08E-01	1.71E-01	1.30E-01	1.08E-01	2.80E+00	2.38E+00	1.79E+00	1.35E+00
2013	2.27E-01	1.73E-01	1.28E-01	1.06E-01	2.75E+00	2.33E+00	1.74E+00	1.31E+00
2014	2.07E-01	1.67E-01	1.27E-01	1.06E-01	2.77E+00	2.31E+00	1.73E+00	1.30E+00
2015	1.98E-01	1.59E-01	1.22E-01	1.02E-01	2.67E+00	2.21E+00	1.68E+00	1.26E+00
2016	1.95E-01	1.58E-01	1.28E-01	1.09E-01	2.96E+00	2.37E+00	1.81E+00	1.36E+00
2017	1.93E-01	1.54E-01	1.25E-01	1.07E-01	2.98E+00	2.39E+00	1.82E+00	1.35E+00
2018	1.90E-01	1.48E-01	1.15E-01	9.76E-02	2.74E+00	2.24E+00	1.69E+00	1.25E+00

TABLE 3-35: SUMMARY UPPER RIVER OF $ADD_{Expected}$ AND EGG CONCENTRATIONS FOR FEMALE BELTED KINGFISHER BASED ON 1993 DATA USING SUM OF TRI+ CONGENERS

Location	Drinking Water Expected	Forage Fish Expected	Benthic Invertebrate Expected	Sediment Expected	Total Average Daily $Dose_{Expected}$ (mg/Kg/day)	Total Average Concentration in Eggs (mg/Kg)
Upper River						
Thompson Island Pool (189)	8.01E-06	6.37E+00	1.14E+00	1.35E-02	7.53E+00	5.71E+02
Stillwater (168)	1.42E-05	2.15E+00	2.00E+00	3.53E-02	4.18E+00	3.15E+02
Federal Dam (154)	9.95E-06	5.05E-01	4.76E-01	3.17E-03	9.84E-01	7.46E+01
Lower River						
143.5	7.70E-06	5.87E-01	6.63E-02	9.78E-04	6.54E-01	4.97E+01
137.2	7.70E-06	1.19E+00	1.31E-01	1.73E-03	1.32E+00	1.00E+02
122.4	3.53E-06	4.53E-01	7.22E-02	1.09E-03	5.27E-01	4.00E+01
113.8	3.53E-06	4.75E-01	7.43E-02	1.15E-03	5.51E-01	4.18E+01
100	3.53E-06	2.06E-01	3.41E-02	4.53E-04	2.41E-01	1.83E+01
88.9	2.32E-06	4.10E-01	1.71E-02	8.87E-04	4.28E-01	3.25E+01
58.7	2.32E-06	4.47E-01	5.27E-02	2.86E-04	5.00E-01	3.80E+01
47.3	2.32E-06	3.97E-01	5.99E-02	1.75E-03	4.59E-01	3.48E+01
25.8	2.32E-06	2.99E-01	1.77E-02	6.57E-04	3.17E-01	2.41E+01

TABLE 3-36: SUMMARY OF $ADD_{95\%UCL}$ AND EGG CONCENTRATIONS FOR FEMALE BELTED KINGFISHER BASED ON 1993 DATA USING SUM OF TRI+ CONGENERS

Location	Drinking Water 95% UCL	Fish 95% UCL	Benthic Invertebrate 95% UCL	Sediment 95% UCL	Total Upper Bound Daily $Dose_{95\%UCL}$ (mg/Kg/day)	Total Concentration in Eggs (95 % UCL) (mg/Kg)
Upper River						
Thompson Island Pool (189)	2.54E-05	1.30E+01	2.00E+00	1.98E-02	1.50E+01	1.14E+03
Stillwater (168)	4.52E-05	3.08E+00	9.36E+00	6.16E-02	1.25E+01	9.45E+02
Federal Dam (154)	2.13E-05	7.33E-01	8.09E-01	5.32E-03	1.55E+00	1.17E+02
Lower River						
143.5	8.39E-05	7.05E-01	1.63E-01	1.07E-03	8.69E-01	6.60E+01
137.2	8.39E-05	2.58E+00	5.30E-01	3.49E-03	3.11E+00	2.36E+02
122.4	4.52E-05	7.33E-01	1.82E-01	1.22E-03	9.16E-01	6.96E+01
113.8	4.52E-05	4.93E-01	2.88E-01	1.89E-03	7.83E-01	5.94E+01
100	4.52E-05	3.56E-01	2.33E-01	9.79E-03	5.99E-01	4.48E+01
88.9	1.03E-05	5.62E-01	3.04E-02	2.60E-03	5.95E-01	4.50E+01
58.7	1.03E-05	5.06E-01	4.83E-01	3.17E-03	9.92E-01	7.52E+01
47.3	1.03E-05	5.27E-01	4.39E-01	6.82E-03	9.73E-01	7.35E+01
25.8	1.03E-05	3.59E-01	3.01E-02	1.78E-03	3.91E-01	2.96E+01

TABLE 3-37: SUMMARY OF UPPER RIVER $ADD_{Expected}$ AND EGG CONCENTRATIONS FOR FEMALE BELTED KINGFISHER BASED ON TRI+ CONGENERS FOR PERIOD 1993 - 2018

	Average Dietary Dose (mg/Kg/day)			Average Egg Concentration (mg/Kg)		
Year	189	168	154	189	168	154
1993	5.30E+00	2.18E+00	7.16E-01	3.93E+02	1.63E+02	5.38E+01
1994	4.80E+00	2.02E+00	6.53E-01	3.55E+02	1.51E+02	4.91E+01
1995	4.39E+00	1.74E+00	5.89E-01	3.25E+02	1.30E+02	4.42E+01
1996	3.17E+00	1.44E+00	5.16E-01	2.33E+02	1.07E+02	3.88E+01
1997	2.51E+00	1.25E+00	4.61E-01	1.83E+02	9.36E+01	3.46E+01
1998	2.86E+00	1.23E+00	4.92E-01	2.11E+02	9.19E+01	3.70E+01
1999	2.55E+00	1.14E+00	4.46E-01	1.88E+02	8.53E+01	3.36E+01
2000	1.96E+00	9.64E-01	3.93E-01	1.44E+02	7.20E+01	2.95E+01
2001	1.67E+00	8.03E-01	3.38E-01	1.22E+02	6.00E+01	2.54E+01
2002	1.82E+00	7.08E-01	3.13E-01	1.34E+02	5.30E+01	2.35E+01
2003	1.87E+00	6.47E-01	2.86E-01	1.38E+02	4.84E+01	2.15E+01
2004	2.18E+00	6.38E-01	2.72E-01	1.62E+02	4.78E+01	2.04E+01
2005	1.76E+00	5.86E-01	2.53E-01	1.30E+02	4.39E+01	1.90E+01
2006	1.53E+00	5.27E-01	2.32E-01	1.13E+02	3.94E+01	1.74E+01
2007	1.49E+00	4.99E-01	2.12E-01	1.10E+02	3.74E+01	1.59E+01
2008	1.73E+00	4.78E-01	1.99E-01	1.28E+02	3.58E+01	1.50E+01
2009	1.85E+00	4.71E-01	1.86E-01	1.38E+02	3.53E+01	1.40E+01
2010	1.31E+00	4.15E-01	1.65E-01	9.67E+01	3.11E+01	1.24E+01
2011	1.24E+00	3.82E-01	1.46E-01	9.18E+01	2.86E+01	1.10E+01
2012	1.14E+00	3.81E-01	1.34E-01	8.47E+01	2.86E+01	1.01E+01
2013	1.06E+00	3.72E-01	1.20E-01	7.88E+01	2.79E+01	9.00E+00
2014	1.07E+00	3.48E-01	1.14E-01	7.88E+01	2.60E+01	8.55E+00
2015	1.04E+00	3.33E-01	1.10E-01	7.67E+01	2.49E+01	8.25E+00
2016	1.32E+00	3.38E-01	1.11E-01	9.85E+01	2.53E+01	8.34E+00
2017	1.31E+00	3.40E-01	1.08E-01	9.75E+01	2.55E+01	8.14E+00
2018	1.38E+00	3.32E-01	1.11E-01	1.03E+02	2.49E+01	8.38E+00

TABLE 3-38: SUMMARY OF LOWER RIVER $ADD_{Expected}$ AND EGG CONCENTRATIONS FOR FEMALE BELTED KINGFISHER BASED ON TRI+ CONGENERS FOR PERIOD 1993 - 2018

	Average Dietary Dose (mg/Kg/day)				Average Egg Concentration (mg/Kg)			
Year	152	113	90	50	152	113	90	50
1993	6.70E-01	4.70E-01	3.77E-01	3.35E-01	5.06E+01	3.55E+01	2.85E+01	2.54E+01
1994	5.16E-01	4.23E-01	3.41E-01	2.99E-01	3.89E+01	3.19E+01	2.57E+01	2.26E+01
1995	4.70E-01	3.63E-01	3.12E-01	2.70E-01	3.55E+01	2.74E+01	2.31E+01	2.04E+01
1996	5.46E-01	3.73E-01	2.97E-01	2.54E-01	4.13E+01	2.82E+01	2.19E+01	1.92E+01
1997	4.66E-01	3.44E-01	2.68E-01	2.31E-01	3.52E+01	2.60E+01	2.03E+01	1.75E+01
1998	8.72E-01	7.00E-01	5.86E-01	5.07E-01	6.58E+01	5.28E+01	4.42E+01	3.83E+01
1999	3.76E-01	3.05E-01	2.51E-01	2.21E-01	2.84E+01	2.30E+01	1.89E+01	1.67E+01
2000	3.42E-01	2.63E-01	2.17E-01	1.89E-01	2.58E+01	1.98E+01	1.63E+01	1.43E+01
2001	3.52E-01	2.59E-01	2.00E-01	1.71E-01	2.66E+01	1.96E+01	1.51E+01	1.29E+01
2002	3.36E-01	2.65E-01	2.05E-01	1.74E-01	2.53E+01	2.00E+01	1.55E+01	1.31E+01
2003	3.08E-01	2.42E-01	1.93E-01	1.63E-01	2.32E+01	1.82E+01	1.46E+01	1.23E+01
2004	2.72E-01	2.26E-01	1.87E-01	1.60E-01	2.05E+01	1.70E+01	1.41E+01	1.21E+01
2005	2.62E-01	2.13E-01	1.73E-01	1.48E-01	1.98E+01	1.61E+01	1.30E+01	1.12E+01
2006	2.83E-01	2.08E-01	1.60E-01	1.36E-01	2.13E+01	1.57E+01	1.21E+01	1.02E+01
2007	2.44E-01	1.99E-01	1.53E-01	1.28E-01	1.84E+01	1.50E+01	1.15E+01	9.68E+00
2008	2.54E-01	2.09E-01	1.64E-01	1.37E-01	1.91E+01	1.57E+01	1.23E+01	1.03E+01
2009	2.41E-01	1.98E-01	1.58E-01	1.33E-01	1.82E+01	1.49E+01	1.19E+01	1.00E+01
2010	2.24E-01	1.72E-01	1.33E-01	1.13E-01	1.69E+01	1.29E+01	1.00E+01	8.49E+00
2011	2.40E-01	1.82E-01	1.36E-01	1.13E-01	1.81E+01	1.37E+01	1.03E+01	8.55E+00
2012	2.28E-01	1.79E-01	1.36E-01	1.13E-01	1.72E+01	1.35E+01	1.02E+01	8.49E+00
2013	2.38E-01	1.81E-01	1.35E-01	1.11E-01	1.80E+01	1.36E+01	1.02E+01	8.37E+00
2014	2.30E-01	1.77E-01	1.33E-01	1.09E-01	1.74E+01	1.33E+01	9.98E+00	8.23E+00
2015	2.08E-01	1.66E-01	1.28E-01	1.06E-01	1.57E+01	1.25E+01	9.62E+00	7.96E+00
2016	2.07E-01	1.70E-01	1.35E-01	1.13E-01	1.56E+01	1.28E+01	1.02E+01	8.51E+00
2017	2.04E-01	1.65E-01	1.32E-01	1.11E-01	1.54E+01	1.25E+01	9.93E+00	8.34E+00
2018	1.92E-01	1.53E-01	1.21E-01	1.01E-01	1.44E+01	1.15E+01	9.08E+00	7.64E+00

TABLE 3-39: SUMMARY OF UPPER RIVER $ADD_{Expected}$ AND EGG CONCENTRATIONS FOR FEMALE GREAT BLUE HERON BASED ON 1993 DATA USING SUM OF TRI+ CONGENERS

Location	Drinking Water Expected	Forage Fish Expected	Benthic Invertebrate Expected	Sediment Expected	Total Average Daily $Dose_{Expected}$ (mg/Kg/day)	Total Concentration in Eggs (mg/Kg)
Upper River						
Thompson Island Pool (189)	3.34E-06	3.24E+00	2.01E-02	1.05E-02	3.27E+00	1.67E+02
Stillwater (168)	5.93E-06	1.09E+00	3.52E-02	2.74E-02	1.16E+00	5.65E+01
Federal Dam (154)	4.15E-06	2.57E-01	8.38E-03	2.47E-03	2.68E-01	1.33E+01
Lower River						
143.5	3.21E-06	2.99E-01	1.17E-03	7.60E-04	3.01E-01	1.54E+01
137.2	3.21E-06	6.04E-01	2.30E-03	1.34E-03	6.08E-01	3.12E+01
122.4	1.47E-06	2.31E-01	1.27E-03	8.50E-04	2.33E-01	1.19E+01
113.8	1.47E-06	2.42E-01	1.31E-03	8.91E-04	2.44E-01	1.25E+01
100	1.47E-06	1.05E-01	6.01E-04	3.52E-04	1.06E-01	5.41E+00
88.9	9.68E-07	2.08E-01	3.01E-04	6.90E-04	2.09E-01	1.08E+01
58.7	9.68E-07	2.27E-01	9.28E-04	2.23E-04	2.28E-01	1.17E+01
47.3	9.68E-07	2.02E-01	1.05E-03	1.36E-03	2.05E-01	1.04E+01
25.8	9.68E-07	1.52E-01	3.12E-04	5.11E-04	1.53E-01	7.85E+00

TABLE 3-40: SUMMARY OF $ADD_{95\%UCL}$ AND EGG CONCENTRATIONS FOR FEMALE GREAT BLUE HERON BASED ON 1993 DATA USING SUM OF TRI+ CONGENERS

Location	Drinking Water 95% UCL	Fish 95% UCL	Benthic Invertebrate 95% UCL	Total Average Daily $Dose_{95\%UCL}$ (mg/Kg/day)	Total Concentration in Eggs (mg/Kg)
Upper River					
Thompson Island Pool (189)	1.06E-05	6.62E+00	3.51E-02	6.67E+00	3.42E+02
Stillwater (168)	1.88E-05	1.56E+00	1.65E-01	1.78E+00	8.08E+01
Federal Dam (154)	8.90E-06	3.73E-01	1.42E-02	3.91E-01	1.92E+01
Lower River					
143.5	3.50E-05	3.59E-01	2.86E-03	3.62E-01	1.85E+01
137.2	3.50E-05	1.31E+00	9.33E-03	1.32E+00	6.76E+01
122.4	1.88E-05	3.73E-01	3.20E-03	3.77E-01	1.93E+01
113.8	1.88E-05	2.51E-01	5.07E-03	2.57E-01	1.29E+01
100	1.88E-05	1.81E-01	4.11E-03	1.93E-01	9.33E+00
88.9	4.30E-06	2.86E-01	5.36E-04	2.88E-01	1.48E+01
58.7	4.30E-06	2.57E-01	8.49E-03	2.68E-01	1.33E+01
47.3	4.30E-06	2.68E-01	7.73E-03	2.81E-01	1.38E+01
25.8	4.30E-06	1.83E-01	5.29E-04	1.85E-01	9.43E+00

TABLE 3-41: SUMMARY OF UPPER RIVER $ADD_{Expected}$ AND EGG CONCENTRATIONS FOR FEMALE GREAT BLUE HERON BASED ON TRI+ CONGENERS FOR PERIOD 1993 - 2018

	Average Dietary Dose (mg/Kg/day)			Average Egg Concentration (mg/Kg)		
Year	189	168	154	189	168	154
1993	2.28E+00	4.72E-01	1.74E-01	1.16E+02	2.28E+01	8.55E+00
1994	2.06E+00	4.51E-01	1.55E-01	1.04E+02	2.19E+01	7.61E+00
1995	1.88E+00	3.76E-01	1.38E-01	9.54E+01	1.82E+01	6.74E+00
1996	1.30E+00	3.01E-01	1.19E-01	6.52E+01	1.45E+01	5.80E+00
1997	9.82E-01	2.60E-01	1.00E-01	4.92E+01	1.25E+01	4.86E+00
1998	1.18E+00	2.76E-01	1.22E-01	5.96E+01	1.34E+01	6.02E+00
1999	1.04E+00	2.55E-01	1.06E-01	5.26E+01	1.23E+01	5.19E+00
2000	7.69E-01	2.09E-01	9.18E-02	3.85E+01	1.01E+01	4.49E+00
2001	6.44E-01	1.73E-01	7.63E-02	3.21E+01	8.35E+00	3.72E+00
2002	7.38E-01	1.58E-01	7.35E-02	3.71E+01	7.67E+00	3.59E+00
2003	7.75E-01	1.44E-01	6.62E-02	3.90E+01	7.00E+00	3.24E+00
2004	9.45E-01	1.47E-01	6.42E-02	4.79E+01	7.17E+00	3.14E+00
2005	7.43E-01	1.32E-01	5.92E-02	3.75E+01	6.43E+00	2.90E+00
2006	6.38E-01	1.18E-01	5.45E-02	3.22E+01	5.72E+00	2.67E+00
2007	6.29E-01	1.15E-01	4.93E-02	3.18E+01	5.58E+00	2.41E+00
2008	7.58E-01	1.09E-01	4.70E-02	3.85E+01	5.30E+00	2.30E+00
2009	8.26E-01	1.11E-01	4.50E-02	4.20E+01	5.44E+00	2.21E+00
2010	5.61E-01	9.44E-02	3.96E-02	2.84E+01	4.59E+00	1.94E+00
2011	5.37E-01	8.71E-02	3.42E-02	2.72E+01	4.24E+00	1.67E+00
2012	4.92E-01	8.72E-02	3.24E-02	2.49E+01	4.24E+00	1.59E+00
2013	4.50E-01	8.33E-02	2.86E-02	2.28E+01	4.04E+00	1.40E+00
2014	4.52E-01	7.84E-02	2.79E-02	2.28E+01	3.81E+00	1.37E+00
2015	4.41E-01	7.51E-02	2.69E-02	2.23E+01	3.65E+00	1.32E+00
2016	5.91E-01	7.82E-02	2.75E-02	3.00E+01	3.81E+00	1.35E+00
2017	5.89E-01	8.01E-02	2.67E-02	3.00E+01	3.91E+00	1.31E+00
2018	6.30E-01	7.72E-02	2.84E-02	3.22E+01	3.76E+00	1.40E+00

TABLE 3-42: SUMMARY OF LOWER RIVER $ADD_{Expected}$ AND EGG CONCENTRATIONS FOR FEMALE GREAT BLUE HERON BASED ON TRI+ CONGENERS FOR PERIOD 1993 - 2018

	Average Dietary Dose (mg/Kg/day)				Average Egg Concentration (mg/Kg)			
Year	152	113	90	50	152	113	90	50
1993	2.62E-01	1.76E-01	1.41E-01	1.33E-01	5.00E+01	3.36E+01	2.69E+01	2.55E+01
1994	1.92E-01	1.57E-01	1.25E-01	1.17E-01	3.67E+01	3.00E+01	2.39E+01	2.24E+01
1995	1.71E-01	1.28E-01	1.12E-01	1.05E-01	3.27E+01	2.45E+01	2.11E+01	2.00E+01
1996	2.10E-01	1.35E-01	1.06E-01	9.69E-02	4.01E+01	2.58E+01	1.99E+01	1.85E+01
1997	1.74E-01	1.24E-01	9.51E-02	8.71E-02	3.32E+01	2.36E+01	1.81E+01	1.66E+01
1998	3.01E-01	2.39E-01	2.06E-01	1.90E-01	5.73E+01	4.55E+01	3.92E+01	3.63E+01
1999	1.27E-01	1.01E-01	8.49E-02	8.07E-02	2.41E+01	1.91E+01	1.62E+01	1.54E+01
2000	1.14E-01	8.55E-02	7.19E-02	6.79E-02	2.17E+01	1.63E+01	1.37E+01	1.30E+01
2001	1.23E-01	8.60E-02	6.57E-02	6.07E-02	2.34E+01	1.64E+01	1.25E+01	1.16E+01
2002	1.14E-01	8.82E-02	6.74E-02	6.08E-02	2.17E+01	1.68E+01	1.28E+01	1.16E+01
2003	1.03E-01	7.91E-02	6.27E-02	5.69E-02	1.97E+01	1.51E+01	1.19E+01	1.09E+01
2004	8.38E-02	7.07E-02	6.00E-02	5.52E-02	1.60E+01	1.35E+01	1.14E+01	1.05E+01
2005	8.09E-02	6.49E-02	5.44E-02	5.05E-02	1.54E+01	1.24E+01	1.04E+01	9.63E+00
2006	9.49E-02	6.49E-02	5.02E-02	4.59E-02	1.81E+01	1.24E+01	9.55E+00	8.76E+00
2007	7.61E-02	6.15E-02	4.75E-02	4.31E-02	1.45E+01	1.17E+01	9.05E+00	8.21E+00
2008	7.79E-02	6.39E-02	5.09E-02	4.57E-02	1.48E+01	1.22E+01	9.68E+00	8.70E+00
2009	7.19E-02	5.91E-02	4.83E-02	4.39E-02	1.37E+01	1.12E+01	9.18E+00	8.36E+00
2010	6.99E-02	5.13E-02	3.99E-02	3.67E-02	1.33E+01	9.77E+00	7.59E+00	6.99E+00
2011	7.86E-02	5.60E-02	4.15E-02	3.68E-02	1.50E+01	1.07E+01	7.89E+00	7.02E+00
2012	7.35E-02	5.52E-02	4.20E-02	3.68E-02	1.40E+01	1.05E+01	7.99E+00	7.01E+00
2013	7.95E-02	5.65E-02	4.21E-02	3.65E-02	1.51E+01	1.08E+01	8.02E+00	6.96E+00
2014	7.53E-02	5.48E-02	4.12E-02	3.57E-02	1.43E+01	1.04E+01	7.84E+00	6.81E+00
2015	6.52E-02	5.09E-02	3.95E-02	3.46E-02	1.24E+01	9.68E+00	7.51E+00	6.59E+00
2016	6.01E-02	5.05E-02	4.12E-02	3.67E-02	1.14E+01	9.61E+00	7.85E+00	7.00E+00
2017	5.83E-02	4.77E-02	3.94E-02	3.58E-02	1.11E+01	9.07E+00	7.49E+00	6.81E+00
2018	5.58E-02	4.37E-02	3.57E-02	3.26E-02	1.06E+01	8.31E+00	6.78E+00	6.21E+00

TABLE 3-43: SUMMARY OF $ADD_{Expected}$ AND EGG CONCENTRATIONS FOR FEMALE EAGLE BASED ON 1993 DATA USING SUM OF TRI+ CONGENERS

Location	Drinking Water Expected	Piscivorous Fish Expected	Total Average Daily $Dose_{Expected}$ (mg/Kg/day)	Total Concentration in Eggs (mg/Kg)
Upper River				
Thompson Island Pool (189)	2.53E-06	1.20E+01	1.20E+01	2.65E+03
Stillwater (168)	4.49E-06	2.14E+00	2.14E+00	4.70E+02
Federal Dam (154)	3.14E-06	1.55E+00	1.55E+00	3.41E+02
Lower River				
143.5	2.43E-06	1.55E+00	1.55E+00	3.41E+02
137.2	2.43E-06	5.86E+00	5.86E+00	1.29E+03
122.4	1.11E-06	1.36E+00	1.36E+00	3.00E+02
113.8	1.11E-06	1.23E+00	1.23E+00	2.71E+02
100	1.11E-06	1.42E+00	1.42E+00	3.11E+02
88.9	7.32E-07	9.13E-01	9.13E-01	2.01E+02
58.7	7.32E-07	1.06E+00	1.06E+00	2.33E+02
47.3	7.32E-07	1.21E+00	1.21E+00	2.67E+02
25.8	7.32E-07	8.58E-01	8.58E-01	1.88E+02

TABLE 3-44: SUMMARY OF $ADD_{95\%UCL}$ AND EGG CONCENTRATIONS FOR FEMALE EAGLE BASED ON 1993 DATA USING SUM OF TRI+ CONGENERS

Location	Drinking Water 95% UCL	Piscivorous Fish 95% UCL	Total Upper Bound Daily $Dose_{95\%UCL}$ (mg/Kg/day)	Total Concentration in Eggs (95% UCL) (mg/Kg)
Upper River				
Thompson Island Pool (189)	8.00E-06	2.33E+01	2.33E+01	5.12E+03
Stillwater (168)	1.42E-05	2.76E+00	2.76E+00	6.06E+02
Federal Dam (154)	6.73E-06	2.79E+00	2.79E+00	6.13E+02
Lower River				
143.5	2.64E-05	2.79E+00	2.79E+00	6.13E+02
137.2	2.64E-05	1.39E+01	1.39E+01	3.06E+03
122.4	1.42E-05	1.88E+00	1.88E+00	4.12E+02
113.8	1.42E-05	1.73E+00	1.73E+00	3.79E+02
100	1.42E-05	4.38E+00	4.38E+00	9.62E+02
88.9	3.25E-06	1.74E+00	1.74E+00	3.81E+02
58.7	3.25E-06	1.57E+00	1.57E+00	3.45E+02
47.3	3.25E-06	3.27E+00	3.27E+00	7.18E+02
25.8	3.25E-06	1.70E+00	1.70E+00	3.74E+02

TABLE 3-45: SUMMARY OF UPPER RIVER $ADD_{Expected}$ AND EGG CONCENTRATIONS FOR FEMALE EAGLE BASED ON TRI+ CONGENERS FOR PERIOD 1993 - 2018

	Average Dietary Dose (mg/Kg/day)			Average Egg Concentration (mg/Kg)		
Year	189	168	154	189	168	154
1993	5.50E+00	1.61E+00	6.42E-01	1.21E+03	3.54E+02	1.41E+02
1994	3.75E+00	1.45E+00	5.98E-01	8.24E+02	3.19E+02	1.31E+02
1995	4.34E+00	1.33E+00	5.48E-01	9.54E+02	2.93E+02	1.20E+02
1996	2.69E+00	1.01E+00	4.36E-01	5.91E+02	2.23E+02	9.57E+01
1997	2.66E+00	9.09E-01	4.29E-01	5.84E+02	2.00E+02	9.43E+01
1998	2.12E+00	9.12E-01	4.20E-01	4.65E+02	2.00E+02	9.22E+01
1999	2.06E+00	8.77E-01	4.04E-01	4.53E+02	1.93E+02	8.87E+01
2000	1.67E+00	6.96E-01	3.36E-01	3.66E+02	1.53E+02	7.39E+01
2001	1.45E+00	6.16E-01	3.12E-01	3.18E+02	1.35E+02	6.85E+01
2002	1.42E+00	5.31E-01	2.78E-01	3.11E+02	1.17E+02	6.10E+01
2003	1.26E+00	5.05E-01	2.59E-01	2.78E+02	1.11E+02	5.69E+01
2004	1.71E+00	5.21E-01	2.59E-01	3.75E+02	1.14E+02	5.69E+01
2005	1.45E+00	4.58E-01	2.29E-01	3.19E+02	1.01E+02	5.02E+01
2006	1.14E+00	4.02E-01	2.07E-01	2.51E+02	8.82E+01	4.54E+01
2007	1.39E+00	3.92E-01	1.99E-01	3.05E+02	8.62E+01	4.37E+01
2008	1.40E+00	3.97E-01	1.86E-01	3.08E+02	8.71E+01	4.08E+01
2009	1.39E+00	3.80E-01	1.77E-01	3.06E+02	8.35E+01	3.90E+01
2010	1.32E+00	3.26E-01	1.55E-01	2.90E+02	7.16E+01	3.41E+01
2011	1.04E+00	3.08E-01	1.44E-01	2.28E+02	6.77E+01	3.17E+01
2012	1.03E+00	3.12E-01	1.24E-01	2.26E+02	6.85E+01	2.73E+01
2013	8.41E-01	2.88E-01	1.15E-01	1.85E+02	6.34E+01	2.54E+01
2014	9.38E-01	2.68E-01	1.09E-01	2.06E+02	5.88E+01	2.40E+01
2015	8.62E-01	2.57E-01	1.05E-01	1.89E+02	5.66E+01	2.31E+01
2016	9.97E-01	2.81E-01	1.07E-01	2.19E+02	6.16E+01	2.36E+01
2017	1.12E+00	2.81E-01	1.10E-01	2.45E+02	6.16E+01	2.41E+01
2018	1.02E+00	2.71E-01	1.09E-01	2.24E+02	5.96E+01	2.40E+01

TABLE 3-46: SUMMARY OF LOWER RIVER $ADD_{Expected}$ AND EGG CONCENTRATIONS FOR FEMALE EAGLE BASED ON TRI+ CONGENERS FOR PERIOD 1993 - 2018

	Average Dietary Dose (mg/Kg/day)				Average Egg Concentration (mg/Kg)			
Year	152	113	90	50	152	113	90	50
1993	1.90E+00	1.27E+00	2.92E-01	2.75E-01	4.18E+02	2.80E+02	6.42E+01	6.05E+01
1994	1.36E+00	1.10E+00	2.62E-01	2.43E-01	2.99E+02	2.41E+02	5.75E+01	5.33E+01
1995	1.17E+00	9.78E-01	2.37E-01	2.19E-01	2.57E+02	2.15E+02	5.20E+01	4.82E+01
1996	1.41E+00	9.23E-01	2.18E-01	2.01E-01	3.09E+02	2.03E+02	4.80E+01	4.41E+01
1997	1.26E+00	8.76E-01	2.01E-01	1.82E-01	2.76E+02	1.92E+02	4.41E+01	4.00E+01
1998	2.32E+00	1.87E+00	4.34E-01	3.92E-01	5.09E+02	4.11E+02	9.53E+01	8.62E+01
1999	9.54E-01	7.47E-01	1.86E-01	1.70E-01	2.10E+02	1.64E+02	4.09E+01	3.74E+01
2000	8.27E-01	6.28E-01	1.56E-01	1.44E-01	1.82E+02	1.38E+02	3.43E+01	3.17E+01
2001	9.07E-01	6.13E-01	1.43E-01	1.30E-01	1.99E+02	1.35E+02	3.14E+01	2.86E+01
2002	8.73E-01	6.39E-01	1.46E-01	1.31E-01	1.92E+02	1.40E+02	3.22E+01	2.87E+01
2003	7.69E-01	5.80E-01	1.37E-01	1.22E-01	1.69E+02	1.27E+02	3.02E+01	2.69E+01
2004	6.48E-01	5.37E-01	1.33E-01	1.20E-01	1.42E+02	1.18E+02	2.92E+01	2.63E+01
2005	6.09E-01	4.88E-01	1.21E-01	1.10E-01	1.34E+02	1.07E+02	2.66E+01	2.41E+01
2006	6.69E-01	4.70E-01	1.12E-01	1.00E-01	1.47E+02	1.03E+02	2.46E+01	2.21E+01
2007	6.08E-01	4.53E-01	1.06E-01	9.43E-02	1.34E+02	9.96E+01	2.34E+01	2.07E+01
2008	6.26E-01	4.83E-01	1.14E-01	1.00E-01	1.38E+02	1.06E+02	2.50E+01	2.20E+01
2009	5.51E-01	4.47E-01	1.09E-01	9.64E-02	1.21E+02	9.83E+01	2.40E+01	2.12E+01
2010	5.11E-01	3.77E-01	9.12E-02	8.09E-02	1.12E+02	8.28E+01	2.00E+01	1.78E+01
2011	5.90E-01	4.14E-01	9.33E-02	8.10E-02	1.30E+02	9.08E+01	2.05E+01	1.78E+01
2012	5.29E-01	4.06E-01	9.28E-02	7.95E-02	1.16E+02	8.91E+01	2.04E+01	1.75E+01
2013	5.80E-01	4.20E-01	9.57E-02	8.16E-02	1.27E+02	9.24E+01	2.10E+01	1.79E+01
2014	5.36E-01	4.05E-01	9.19E-02	7.84E-02	1.18E+02	8.90E+01	2.02E+01	1.72E+01
2015	4.91E-01	3.83E-01	8.85E-02	7.57E-02	1.08E+02	8.41E+01	1.94E+01	1.66E+01
2016	4.94E-01	3.93E-01	9.32E-02	8.09E-02	1.09E+02	8.63E+01	2.05E+01	1.78E+01
2017	4.54E-01	3.69E-01	9.01E-02	7.99E-02	9.97E+01	8.11E+01	1.98E+01	1.76E+01
2018	4.17E-01	3.30E-01	8.04E-02	7.11E-02	9.16E+01	7.25E+01	1.77E+01	1.56E+01

TABLE 3-47: SUMMARY OF $ADD_{Expected}$ AND EGG CONCENTRATIONS FOR FEMALE TREE SWALLOW BASED ON 1993 DATA ON TEQ BASIS

Location	Drinking Water Expected	Benthic Invertebrate Expected	Total Average Daily $Dose_{Expected}$ (mg/Kg/day)	Total Average Predicted Egg Conc (mg/Kg)
Upper River				
Thompson Island Pool (189)	1.26E-07	0.00	5.80E-04	4.74E-03
Stillwater (168)	2.24E-07	0.00	1.02E-03	8.29E-03
Federal Dam (154)	1.56E-07	0.00	2.42E-04	1.98E-03
Lower River				
143.5	1.21E-07	0.00	3.38E-05	2.75E-04
137.2	1.21E-07	0.00	6.65E-05	5.42E-04
122.4	5.54E-08	0.00	3.68E-05	3.00E-04
113.8	5.54E-08	0.00	3.78E-05	3.08E-04
100	5.54E-08	0.00	1.74E-05	1.42E-04
88.9	3.65E-08	0.00	8.74E-06	7.11E-05
58.7	3.65E-08	0.00	2.68E-05	2.19E-04
47.3	3.65E-08	0.00	3.05E-05	2.49E-04
25.8	3.65E-08	0.00	9.05E-06	7.36E-05

TABLE 3-48: SUMMARY OF $ADD_{95\%UCL}$ AND EGG CONCENTRATIONS FOR FEMALE TREE SWALLOW BASED ON 1993 DATA ON TEQ BASIS

Location	Drinking Water 95% UCL	Benthic Invertebrate 95% UCL	Total Average Daily $Dose_{95\%UCL}$ (mg/Kg/day)	95% UCL Predicted Egg Conc (mg/Kg)
Upper River				
Thompson Island Pool (189)	3.99E-07	0.00	1.01E-03	8.28E-03
Stillwater (168)	7.10E-07	0.00	4.76E-03	3.88E-02
Federal Dam (154)	3.35E-07	0.00	4.12E-04	3.36E-03
Lower River				
143.5	1.32E-06	0.00	8.40E-05	6.75E-04
137.2	1.32E-06	0.00	2.71E-04	2.20E-03
122.4	7.10E-07	0.00	9.30E-05	7.54E-04
113.8	7.10E-07	0.00	1.47E-04	1.20E-03
100	7.10E-07	0.00	1.19E-04	9.69E-04
88.9	1.62E-07	0.00	1.56E-05	1.26E-04
58.7	1.62E-07	0.00	2.45E-04	2.00E-03
47.3	1.62E-07	0.00	2.24E-04	1.82E-03
25.8	1.62E-07	0.00	1.54E-05	1.25E-04

TABLE 3-49: SUMMARY OF UPPER RIVER $ADD_{Expected}$ AND EGG CONCENTRATIONS FOR FEMALE TREE SWALLOW FOR THE PERIOD 1993 - 2018 ON TEQ BASIS

Year	Total Average Dietary Dose (mg/Kg/day)			Average Egg Concentration (mg/Kg)		
	189	168	154	189	168	154
1993	3.91E-04	6.51E-04	1.94E-04	3.19E-03	5.32E-03	1.58E-03
1994.00	3.61E-04	5.89E-04	0.00	0.00	4.81E-03	1.47E-03
1995.00	3.27E-04	5.21E-04	0.00	0.00	4.25E-03	1.35E-03
1996.00	2.95E-04	4.37E-04	0.00	0.00	3.57E-03	1.20E-03
1997.00	2.75E-04	3.84E-04	0.00	0.00	3.13E-03	1.12E-03
1998.00	2.56E-04	3.55E-04	0.00	0.00	2.90E-03	1.07E-03
1999.00	2.39E-04	3.31E-04	0.00	0.00	2.70E-03	1.01E-03
2000.00	2.15E-04	2.86E-04	0.00	0.00	2.34E-03	9.02E-04
2001.00	1.94E-04	2.40E-04	0.00	0.00	1.96E-03	7.97E-04
2002.00	1.79E-04	2.06E-04	0.00	0.00	1.68E-03	7.15E-04
2003.00	1.65E-04	1.88E-04	0.00	0.00	1.54E-03	6.61E-04
2004.00	1.53E-04	1.81E-04	0.00	0.00	1.47E-03	6.18E-04
2005.00	1.43E-04	1.69E-04	0.00	0.00	1.38E-03	5.78E-04
2006.00	1.32E-04	1.53E-04	0.00	0.00	1.25E-03	5.28E-04
2007.00	1.21E-04	1.42E-04	0.00	0.00	1.16E-03	4.88E-04
2008.00	1.13E-04	1.36E-04	0.00	0.00	1.11E-03	4.54E-04
2009.00	1.06E-04	1.31E-04	0.00	0.00	1.07E-03	4.15E-04
2010.00	9.66E-05	1.19E-04	0.00	0.00	9.71E-04	3.71E-04
2011.00	8.70E-05	1.09E-04	0.00	0.00	8.90E-04	3.35E-04
2012.00	8.37E-05	1.09E-04	0.00	0.00	8.88E-04	3.00E-04
2013.00	8.59E-05	1.08E-04	0.00	0.00	8.83E-04	2.70E-04
2014.00	8.48E-05	1.00E-04	0.00	0.00	8.20E-04	2.50E-04
2015.00	8.09E-05	9.60E-05	0.00	0.00	7.84E-04	2.41E-04
2016.00	7.67E-05	9.57E-05	0.00	0.00	7.81E-04	2.42E-04
2017.00	7.15E-05	9.48E-05	0.00	0.00	7.74E-04	2.37E-04
2018.00	6.86E-05	9.35E-05	0.00	0.00	7.63E-04	2.36E-04

TABLE 3-50: SUMMARY OF LOWER RIVER $ADD_{Expected}$ AND EGG CONCENTRATIONS FOR FEMALE TREE SWALLOW FOR THE PERIOD 1993 - 2018 ON TEQ BASIS

Year	Total Average Dietary Dose (mg/Kg/day)				Average Egg Concentration (mg/Kg)			
	152	113	90	50	152	113	90	50
1993	2.09E-04	1.66E-04	1.35E-04	9.91E-05	1.71E-03	1.36E-03	1.10E-03	8.09E-04
1994	1.85E-04	1.53E-04	1.26E-04	9.15E-05	1.51E-03	1.25E-03	1.03E-03	7.48E-04
1995	1.79E-04	1.47E-04	1.18E-04	8.73E-05	1.46E-03	1.20E-03	9.67E-04	7.13E-04
1996	1.79E-04	1.43E-04	1.14E-04	8.50E-05	1.46E-03	1.17E-03	9.33E-04	6.94E-04
1997	1.67E-04	1.35E-04	1.09E-04	8.07E-05	1.36E-03	1.10E-03	8.87E-04	6.59E-04
1998	3.74E-04	3.08E-04	2.43E-04	1.79E-04	3.06E-03	2.52E-03	1.98E-03	1.46E-03
1999	1.69E-04	1.42E-04	1.12E-04	8.30E-05	1.38E-03	1.16E-03	9.12E-04	6.78E-04
2000	1.57E-04	1.26E-04	1.00E-04	7.44E-05	1.28E-03	1.03E-03	8.19E-04	6.07E-04
2001	1.48E-04	1.20E-04	9.39E-05	6.95E-05	1.21E-03	9.80E-04	7.67E-04	5.68E-04
2002	1.49E-04	1.22E-04	9.65E-05	7.20E-05	1.22E-03	9.96E-04	7.88E-04	5.88E-04
2003	1.39E-04	1.15E-04	9.32E-05	6.86E-05	1.13E-03	9.38E-04	7.61E-04	5.60E-04
2004	1.42E-04	1.16E-04	9.22E-05	6.84E-05	1.16E-03	9.45E-04	7.53E-04	5.58E-04
2005	1.37E-04	1.13E-04	8.77E-05	6.50E-05	1.12E-03	9.25E-04	7.16E-04	5.31E-04
2006	1.28E-04	1.07E-04	8.17E-05	6.05E-05	1.05E-03	8.74E-04	6.68E-04	4.94E-04
2007	1.25E-04	1.03E-04	7.85E-05	5.80E-05	1.02E-03	8.45E-04	6.41E-04	4.74E-04
2008	1.33E-04	1.10E-04	8.43E-05	6.25E-05	1.09E-03	9.01E-04	6.89E-04	5.11E-04
2009	1.32E-04	1.08E-04	8.37E-05	6.21E-05	1.08E-03	8.86E-04	6.83E-04	5.07E-04
2010	1.15E-04	9.37E-05	7.25E-05	5.37E-05	9.36E-04	7.65E-04	5.92E-04	4.38E-04
2011	1.13E-04	9.58E-05	7.22E-05	5.45E-05	9.26E-04	7.83E-04	5.90E-04	4.45E-04
2012	1.11E-04	9.41E-05	7.08E-05	5.35E-05	9.06E-04	7.68E-04	5.78E-04	4.37E-04
2013	1.09E-04	9.24E-05	6.89E-05	5.21E-05	8.90E-04	7.54E-04	5.63E-04	4.25E-04
2014	1.10E-04	9.16E-05	6.84E-05	5.16E-05	8.95E-04	7.48E-04	5.58E-04	4.22E-04
2015	1.06E-04	8.75E-05	6.65E-05	4.99E-05	8.62E-04	7.15E-04	5.43E-04	4.08E-04
2016	1.17E-04	9.37E-05	7.17E-05	5.39E-05	9.58E-04	7.65E-04	5.85E-04	4.40E-04
2017	1.18E-04	9.47E-05	7.22E-05	5.36E-05	9.65E-04	7.73E-04	5.90E-04	4.37E-04
2018	1.09E-04	8.89E-05	6.67E-05	4.93E-05	8.87E-04	7.26E-04	5.45E-04	4.03E-04

TABLE 3-51: SUMMARY OF $ADD_{Expected}$ AND EGG CONCENTRATIONS FOR FEMALE MALLARD BASED ON 1993 DATA ON A TEQ BASIS

Location	Drinking Water Expected	Macrophyte Expected	Benthic Invertebrate Expected	Sediment Expected	Total Average Daily $Dose_{Expected}$ (mg/Kg/day)	Total Average Concentration in Eggs (mg/Kg)
Upper River						
Thompson Island Pool (189)	3.46E-08	1.16E-03	1.04E-04	3.80E-05	1.31E-03	2.11E-02
Stillwater (168)	6.14E-08	1.89E-03	1.94E-04	9.92E-05	2.18E-03	3.93E-02
Federal Dam (154)	4.29E-08	1.84E-03	4.61E-05	8.93E-06	1.89E-03	9.38E-03
Lower River						
143.5	3.32E-08	1.09E-04	1.67E-05	2.75E-06	1.28E-04	3.40E-03
137.2	3.32E-08	1.09E-04	3.29E-05	4.86E-06	1.47E-04	6.69E-03
122.4	1.52E-08	6.46E-05	1.53E-05	3.08E-06	8.30E-05	3.12E-03
113.8	1.52E-08	6.46E-05	1.32E-05	3.23E-06	8.10E-05	2.68E-03
100	1.52E-08	6.46E-05	7.25E-06	1.27E-06	7.31E-05	1.47E-03
88.9	1.00E-08	4.73E-05	3.64E-06	2.50E-06	5.34E-05	7.40E-04
58.7	1.00E-08	4.73E-05	9.36E-06	8.05E-07	5.75E-05	1.90E-03
47.3	1.00E-08	4.73E-05	1.27E-05	4.91E-06	6.49E-05	2.59E-03
25.8	1.00E-08	4.73E-05	3.77E-06	1.85E-06	5.29E-05	7.66E-04

TABLE 3-52: SUMMARY OF $ADD_{95\%UCL}$ AND EGG CONCENTRATIONS FOR FEMALE MALLARD BASED ON 1993 DATA ON A TEQ BASIS

Location	Drinking Water 95% UCL	Macrophyte 95% UCL	Benthic Invertebrate 95% UCL	Sediment 95% UCL	Total Upper Bound Daily $Dose_{95\%UCL}$ (mg/Kg/day)	Total Concentration in Eggs (95% UCL) (mg/Kg)
Upper River						
Thompson Island Pool (189)	1.09E-07	4.61E-03	1.63E-04	5.56E-05	4.83E-03	3.31E-02
Stillwater (168)	1.95E-07	5.05E-03	3.37E-04	1.73E-04	5.56E-03	6.85E-02
Federal Dam (154)	9.21E-08	3.82E-03	8.03E-05	1.50E-05	3.91E-03	1.63E-02
Lower River						
143.5	3.62E-07	3.26E-04	2.91E-05	3.01E-06	3.58E-04	5.91E-03
137.2	3.62E-07	3.26E-04	5.73E-05	9.81E-06	3.93E-04	1.16E-02
122.4	1.95E-07	9.95E-04	3.86E-05	3.42E-06	1.04E-03	7.84E-03
113.8	1.95E-07	9.95E-04	2.30E-05	5.33E-06	1.02E-03	4.67E-03
100	1.95E-07	9.95E-04	4.96E-05	2.75E-05	1.07E-03	1.01E-02
88.9	4.45E-08	9.19E-04	6.47E-06	7.30E-06	9.32E-04	1.31E-03
58.7	4.45E-08	9.19E-04	1.63E-05	8.93E-06	9.44E-04	3.31E-03
47.3	4.45E-08	9.19E-04	9.34E-05	1.92E-05	1.03E-03	1.90E-02
25.8	4.45E-08	9.19E-04	6.39E-06	5.00E-06	9.30E-04	1.30E-03

TABLE 3-53: SUMMARY OF UPPER RIVER $ADD_{Expected}$ AND EGG CONCENTRATIONS FOR FEMALE MALLARD ON A TEQ BASIS FOR PERIOD 1993 - 2018

	Average Dietary Dose (mg/Kg/day)			Average Egg Concentration (mg/Kg)		
Year	189	168	154	189	168	154
1993	9.23E-04	1.64E-04	5.44E-05	1.28E-02	2.13E-02	6.34E-03
1994	7.21E-04	1.49E-04	5.01E-05	1.18E-02	1.92E-02	5.90E-03
1995	7.00E-04	1.29E-04	4.39E-05	1.07E-02	1.70E-02	5.40E-03
1996	4.08E-04	1.06E-04	3.74E-05	9.64E-03	1.43E-02	4.79E-03
1997	3.90E-04	9.45E-05	3.57E-05	8.98E-03	1.25E-02	4.48E-03
1998	5.39E-04	9.17E-05	3.72E-05	8.36E-03	1.16E-02	4.28E-03
1999	4.76E-04	8.50E-05	3.39E-05	7.82E-03	1.08E-02	4.04E-03
2000	3.35E-04	7.17E-05	2.85E-05	7.03E-03	9.35E-03	3.61E-03
2001	2.76E-04	5.81E-05	2.38E-05	6.32E-03	7.83E-03	3.19E-03
2002	3.27E-04	5.16E-05	2.20E-05	5.85E-03	6.71E-03	2.86E-03
2003	3.91E-04	4.93E-05	2.21E-05	5.39E-03	6.15E-03	2.65E-03
2004	4.63E-04	4.79E-05	2.02E-05	5.00E-03	5.90E-03	2.47E-03
2005	3.20E-04	4.45E-05	1.88E-05	4.67E-03	5.51E-03	2.31E-03
2006	3.07E-04	3.89E-05	1.65E-05	4.30E-03	4.99E-03	2.11E-03
2007	2.98E-04	3.66E-05	1.54E-05	3.94E-03	4.64E-03	1.95E-03
2008	4.17E-04	3.63E-05	1.48E-05	3.69E-03	4.46E-03	1.81E-03
2009	4.22E-04	3.67E-05	1.45E-05	3.45E-03	4.26E-03	1.66E-03
2010	2.71E-04	3.12E-05	1.18E-05	3.15E-03	3.89E-03	1.49E-03
2011	2.66E-04	2.85E-05	1.11E-05	2.84E-03	3.56E-03	1.34E-03
2012	2.06E-04	2.86E-05	1.04E-05	2.73E-03	3.55E-03	1.20E-03
2013	1.72E-04	2.72E-05	8.81E-06	2.80E-03	3.53E-03	1.08E-03
2014	2.10E-04	2.71E-05	8.94E-06	2.77E-03	3.28E-03	9.98E-04
2015	2.07E-04	2.60E-05	8.62E-06	2.64E-03	3.14E-03	9.66E-04
2016	3.07E-04	2.61E-05	8.62E-06	2.50E-03	3.13E-03	9.66E-04
2017	3.26E-04	2.63E-05	8.83E-06	2.33E-03	3.10E-03	9.47E-04
2018	3.33E-04	2.60E-05	8.87E-06	2.24E-03	3.05E-03	9.44E-04

TABLE 3-54: SUMMARY OF LOWER RIVER $ADD_{Expected}$ AND EGG CONCENTRATIONS FOR FEMALE MALLARD ON A TEQ BASIS FOR PERIOD 1993 - 2018

	Average Dietary Dose (mg/Kg/day)				Average Egg Concentration (mg/Kg)			
Year	152	113	90	50	152	113	90	50
1993	2.28E-04	1.82E-04	1.50E-04	2.23E-04	6.83E-03	5.42E-03	4.40E-03	3.24E-03
1994	1.94E-04	1.60E-04	1.31E-04	1.91E-04	6.03E-03	5.00E-03	4.11E-03	2.99E-03
1995	1.53E-04	1.26E-04	1.18E-04	1.46E-04	5.86E-03	4.82E-03	3.87E-03	2.85E-03
1996	2.14E-04	1.37E-04	1.08E-04	2.12E-04	5.85E-03	4.68E-03	3.73E-03	2.78E-03
1997	1.67E-04	1.23E-04	9.52E-05	1.63E-04	5.44E-03	4.41E-03	3.55E-03	2.64E-03
1998	2.88E-04	2.31E-04	2.01E-04	2.72E-04	1.22E-02	1.01E-02	7.94E-03	5.85E-03
1999	1.15E-04	9.33E-05	8.77E-05	1.08E-04	5.53E-03	4.65E-03	3.65E-03	2.71E-03
2000	1.21E-04	8.54E-05	7.33E-05	1.14E-04	5.13E-03	4.12E-03	3.28E-03	2.43E-03
2001	1.29E-04	8.61E-05	6.59E-05	1.24E-04	4.84E-03	3.92E-03	3.07E-03	2.27E-03
2002	1.11E-04	8.29E-05	6.62E-05	1.05E-04	4.87E-03	3.98E-03	3.15E-03	2.35E-03
2003	9.34E-05	7.62E-05	6.16E-05	8.70E-05	4.52E-03	3.75E-03	3.04E-03	2.24E-03
2004	7.89E-05	6.41E-05	5.96E-05	7.06E-05	4.65E-03	3.78E-03	3.01E-03	2.23E-03
2005	7.73E-05	6.05E-05	5.41E-05	6.93E-05	4.47E-03	3.70E-03	2.86E-03	2.12E-03
2006	7.98E-05	6.02E-05	4.93E-05	7.30E-05	4.18E-03	3.50E-03	2.67E-03	1.98E-03
2007	6.97E-05	5.72E-05	4.62E-05	6.22E-05	4.07E-03	3.38E-03	2.56E-03	1.90E-03
2008	7.18E-05	5.73E-05	4.87E-05	6.37E-05	4.35E-03	3.60E-03	2.76E-03	2.04E-03
2009	5.83E-05	5.18E-05	4.68E-05	4.94E-05	4.32E-03	3.54E-03	2.73E-03	2.03E-03
2010	6.66E-05	4.93E-05	3.94E-05	5.99E-05	3.75E-03	3.06E-03	2.37E-03	1.75E-03
2011	6.06E-05	5.11E-05	3.96E-05	5.39E-05	3.70E-03	3.13E-03	2.36E-03	1.78E-03
2012	6.50E-05	5.18E-05	3.89E-05	5.89E-05	3.62E-03	3.07E-03	2.31E-03	1.75E-03
2013	7.71E-05	5.38E-05	3.83E-05	7.20E-05	3.56E-03	3.02E-03	2.25E-03	1.70E-03
2014	6.46E-05	5.09E-05	3.83E-05	5.84E-05	3.58E-03	2.99E-03	2.23E-03	1.69E-03
2015	6.16E-05	4.79E-05	3.71E-05	5.56E-05	3.45E-03	2.86E-03	2.17E-03	1.63E-03
2016	5.40E-05	4.43E-05	3.93E-05	4.60E-05	3.83E-03	3.06E-03	2.34E-03	1.76E-03
2017	5.22E-05	4.13E-05	3.85E-05	4.39E-05	3.86E-03	3.09E-03	2.36E-03	1.75E-03
2018	5.53E-05	4.07E-05	3.47E-05	4.82E-05	3.55E-03	2.90E-03	2.18E-03	1.61E-03

TABLE 3-55: SUMMARY OF $ADD_{Expected}$ AND EGG CONCENTRATIONS FOR FEMALE BELTED KINGFISHER BASED ON 1993 DATA ON TEQ BASIS

Location	Drinking Water Expected	Forage Fish Expected	Benthic Invertebrate Expected	Sediment Expected	Total Average Daily $Dose_{Expected}$ (mg/Kg/day)	Total Concentration in Eggs (mg/Kg)
Upper River						
Thompson Island Pool (189)	6.54E-08	1.64E-03	5.82E-05	3.75E-05	1.73E-03	8.16E-02
Stillwater (168)	1.16E-07	5.52E-04	1.02E-04	9.79E-05	7.52E-04	3.15E-02
Federal Dam (154)	8.12E-08	1.30E-04	2.43E-05	8.82E-06	1.63E-04	7.41E-03
Lower River						
143.5	6.28E-08	1.51E-04	3.38E-06	2.72E-06	1.57E-04	7.42E-03
137.2	6.28E-08	3.05E-04	6.66E-06	4.79E-06	3.16E-04	1.50E-02
122.4	2.88E-08	1.16E-04	3.68E-06	3.04E-06	1.23E-04	5.78E-03
113.8	2.88E-08	1.22E-04	3.79E-06	3.18E-06	1.29E-04	6.06E-03
100	2.88E-08	5.29E-05	1.74E-06	1.26E-06	5.59E-05	2.63E-03
88.9	1.90E-08	1.05E-04	8.73E-07	2.46E-06	1.09E-04	5.11E-03
58.7	1.90E-08	1.15E-04	2.69E-06	7.95E-07	1.18E-04	5.65E-03
47.3	1.90E-08	1.02E-04	3.05E-06	4.85E-06	1.10E-04	5.06E-03
25.8	1.90E-08	7.67E-05	9.03E-07	1.83E-06	7.94E-05	3.74E-03

TABLE 3-56: SUMMARY OF $ADD_{95\%UCL}$ AND EGG CONCENTRATIONS FOR FEMALE BELTED KINGFISHER BASED ON 1993 DATA ON TEQ BASIS

Location	Drinking Water 95% UCL	Fish 95% UCL	Benthic Invertebrate 95% UCL	Sediment 95% UCL	Total Upper Bound Daily $Dose_{95\%UCL}$ (mg/Kg/day)	Total Concentration in Eggs (95 % UCL) (mg/Kg)
Upper River						
Thompson Island Pool (189)	2.07E-07	3.34E-03	1.02E-04	5.49E-05	3.50E-03	1.66E-01
Stillwater (168)	3.69E-07	7.90E-04	4.77E-04	1.71E-04	1.44E-03	6.10E-02
Federal Dam (154)	1.74E-07	1.88E-04	4.12E-05	1.48E-05	2.44E-04	1.10E-02
Lower River						
143.5	6.84E-07	1.81E-04	8.29E-06	2.97E-06	1.93E-04	9.11E-03
137.2	6.84E-07	6.61E-04	2.70E-05	9.69E-06	6.98E-04	3.31E-02
122.4	3.69E-07	1.88E-04	9.26E-06	3.38E-06	2.01E-04	9.51E-03
113.8	3.69E-07	1.27E-04	1.47E-05	5.26E-06	1.47E-04	6.80E-03
100	3.69E-07	9.12E-05	1.19E-05	2.72E-05	1.31E-04	4.97E-03
88.9	8.42E-08	1.44E-04	1.55E-06	7.21E-06	1.53E-04	7.02E-03
58.7	8.42E-08	1.30E-04	2.46E-05	8.82E-06	1.63E-04	7.44E-03
47.3	8.42E-08	1.35E-04	2.24E-05	1.89E-05	1.77E-04	7.59E-03
25.8	8.42E-08	9.22E-05	1.53E-06	4.93E-06	9.87E-05	4.51E-03

TABLE 3-57: SUMMARY OF UPPER RIVER $ADD_{Expected}$ AND EGG CONCENTRATIONS FOR FEMALE BELTED KINGFISHER FOR THE PERIOD 1993 - 2018 ON TEQ BASIS

	Average Dietary Dose (mg/Kg/day)			Average Egg Concentration (mg/Kg)		
Year	189	168	154	189	168	154
1993	1.54E-03	3.87E-04	1.26E-04	5.63E-02	1.39E-02	4.96E-03
1994	1.40E-03	3.62E-04	1.13E-04	5.07E-02	1.31E-02	4.45E-03
1995	1.28E-03	3.12E-04	1.02E-04	4.65E-02	1.11E-02	3.97E-03
1996	9.51E-04	2.55E-04	8.88E-05	3.21E-02	8.92E-03	3.44E-03
1997	7.67E-04	2.18E-04	7.66E-05	2.45E-02	7.73E-03	2.95E-03
1998	8.47E-04	2.20E-04	8.70E-05	2.93E-02	8.02E-03	3.46E-03
1999	7.66E-04	2.05E-04	7.75E-05	2.59E-02	7.41E-03	3.04E-03
2000	6.06E-04	1.72E-04	6.80E-05	1.91E-02	6.13E-03	2.65E-03
2001	5.18E-04	1.43E-04	5.75E-05	1.60E-02	5.08E-03	2.22E-03
2002	5.50E-04	1.27E-04	5.41E-05	1.83E-02	4.60E-03	2.11E-03
2003	5.54E-04	1.15E-04	4.90E-05	1.92E-02	4.20E-03	1.91E-03
2004	6.28E-04	1.15E-04	4.70E-05	2.33E-02	4.25E-03	1.84E-03
2005	5.16E-04	1.06E-04	4.36E-05	1.83E-02	3.84E-03	1.70E-03
2006	4.54E-04	9.44E-05	4.01E-05	1.58E-02	3.43E-03	1.57E-03
2007	4.37E-04	8.99E-05	3.64E-05	1.55E-02	3.31E-03	1.42E-03
2008	4.93E-04	8.56E-05	3.44E-05	1.87E-02	3.15E-03	1.35E-03
2009	5.22E-04	8.60E-05	3.26E-05	2.03E-02	3.19E-03	1.28E-03
2010	3.80E-04	7.49E-05	2.88E-05	1.38E-02	2.73E-03	1.13E-03
2011	3.58E-04	6.85E-05	2.53E-05	1.32E-02	2.52E-03	9.86E-04
2012	3.27E-04	6.77E-05	2.35E-05	1.21E-02	2.52E-03	9.25E-04
2013	3.09E-04	6.67E-05	2.08E-05	1.11E-02	2.42E-03	8.18E-04
2014	3.11E-04	6.24E-05	2.00E-05	1.12E-02	2.28E-03	7.93E-04
2015	3.02E-04	5.94E-05	1.92E-05	1.09E-02	2.18E-03	7.64E-04
2016	3.73E-04	6.06E-05	1.94E-05	1.45E-02	2.25E-03	7.80E-04
2017	3.68E-04	6.17E-05	1.90E-05	1.45E-02	2.30E-03	7.57E-04
2018	3.84E-04	5.96E-05	1.98E-05	1.55E-02	2.22E-03	8.00E-04

TABLE 3-58: SUMMARY OF LOWER RIVER $ADD_{Expected}$ AND EGG CONCENTRATIONS FOR FEMALE BELTED KINGFISHER FOR THE PERIOD 1993 - 2018 ON TEQ BASIS

	Average Dietary Dose (mg/Kg/day)				Average Egg Concentration (mg/Kg)			
Year	152	113	90	50	152	113	90	50
1993	1.21E-04	8.40E-05	6.74E-05	6.05E-05	5.65E-03	3.92E-03	3.14E-03	2.84E-03
1994	9.21E-05	7.55E-05	6.07E-05	5.38E-05	4.29E-03	3.52E-03	2.83E-03	2.52E-03
1995	8.36E-05	6.42E-05	5.97E-05	4.86E-05	3.90E-03	2.98E-03	2.52E-03	2.27E-03
1996	9.80E-05	6.64E-05	5.71E-05	4.55E-05	4.59E-03	3.09E-03	2.40E-03	2.13E-03
1997	8.32E-05	6.10E-05	4.75E-05	4.14E-05	3.88E-03	2.84E-03	2.21E-03	1.93E-03
1998	1.54E-04	1.23E-04	1.04E-04	9.07E-05	7.13E-03	5.71E-03	4.81E-03	4.23E-03
1999	6.60E-05	5.33E-05	4.41E-05	3.92E-05	3.06E-03	2.46E-03	2.04E-03	1.83E-03
2000	5.98E-05	4.59E-05	3.79E-05	3.35E-05	2.77E-03	2.12E-03	1.75E-03	1.56E-03
2001	6.22E-05	4.54E-05	3.49E-05	3.03E-05	2.89E-03	2.10E-03	1.61E-03	1.41E-03
2002	5.90E-05	4.64E-05	3.59E-05	3.06E-05	2.73E-03	2.15E-03	1.66E-03	1.42E-03
2003	5.40E-05	4.23E-05	3.37E-05	2.88E-05	2.50E-03	1.95E-03	1.56E-03	1.34E-03
2004	4.71E-05	3.93E-05	3.26E-05	2.82E-05	2.17E-03	1.81E-03	1.51E-03	1.31E-03
2005	4.54E-05	3.68E-05	3.01E-05	2.60E-05	2.09E-03	1.69E-03	1.38E-03	1.21E-03
2006	4.96E-05	3.61E-05	2.78E-05	2.39E-05	2.30E-03	1.66E-03	1.28E-03	1.10E-03
2007	4.23E-05	3.44E-05	2.65E-05	2.25E-05	1.95E-03	1.59E-03	1.22E-03	1.04E-03
2008	4.39E-05	3.61E-05	2.84E-05	2.40E-05	2.02E-03	1.66E-03	1.31E-03	1.11E-03
2009	4.15E-05	3.41E-05	2.73E-05	2.33E-05	1.91E-03	1.57E-03	1.26E-03	1.08E-03
2010	3.88E-05	2.96E-05	2.30E-05	1.96E-05	1.79E-03	1.36E-03	1.05E-03	9.08E-04
2011	4.19E-05	3.15E-05	2.35E-05	1.98E-05	1.94E-03	1.45E-03	1.08E-03	9.14E-04
2012	3.98E-05	3.10E-05	2.36E-05	1.97E-05	1.83E-03	1.43E-03	1.08E-03	9.09E-04
2013	4.18E-05	3.13E-05	2.34E-05	1.94E-05	1.93E-03	1.44E-03	1.08E-03	8.97E-04
2014	4.02E-05	3.06E-05	2.30E-05	1.91E-05	1.86E-03	1.41E-03	1.06E-03	8.81E-04
2015	3.60E-05	2.87E-05	2.21E-05	1.84E-05	1.66E-03	1.32E-03	1.02E-03	8.53E-04
2016	3.54E-05	2.93E-05	2.34E-05	1.97E-05	1.63E-03	1.34E-03	1.07E-03	9.10E-04
2017	3.49E-05	2.83E-05	2.27E-05	1.93E-05	1.60E-03	1.30E-03	1.04E-03	8.91E-04
2018	3.29E-05	2.62E-05	2.07E-05	1.76E-05	1.51E-03	1.20E-03	9.52E-04	8.15E-04

TABLE 3-59: SUMMARY OF $ADD_{Expected}$ AND EGG CONCENTRATIONS FOR FEMALE GREAT BLUE HERON BASED ON 1993 DATA ON TEQ BASIS

Location	Drinking Water Expected	Forage Fish Expected	Benthic Invertebrate Expected	Sediment Expected	Total Average Daily $Dose_{Expected}$ (mg/Kg/day)	Total Concentration in Eggs (mg/Kg)
Upper River						
Thompson Island Pool (189)	2.73E-08	8.32E-04	1.07E-06	2.91E-05	8.62E-04	1.02E-01
Stillwater (168)	4.84E-08	2.81E-04	1.87E-06	7.61E-05	3.59E-04	3.44E-02
Federal Dam (154)	3.39E-08	6.59E-05	4.46E-07	6.85E-06	7.32E-05	8.08E-03
Lower River						
143.5	2.62E-08	7.66E-05	6.22E-08	2.11E-06	7.88E-05	9.40E-03
137.2	2.62E-08	1.55E-04	1.22E-07	3.73E-06	1.59E-04	1.90E-02
122.4	1.20E-08	5.92E-05	6.77E-08	2.36E-06	6.16E-05	7.25E-03
113.8	1.20E-08	6.20E-05	6.97E-08	2.48E-06	6.46E-05	7.61E-03
100	1.20E-08	2.69E-05	3.20E-08	9.79E-07	2.79E-05	3.30E-03
88.9	7.90E-09	5.35E-05	1.61E-08	1.92E-06	5.54E-05	6.56E-03
58.7	0	5.83E-05	4.95E-08	6.18E-07	5.90E-05	7.15E-03
47.3	0	5.19E-05	5.61E-08	3.77E-06	5.57E-05	6.36E-03
25.8	0	3.90E-05	1.66E-08	1.42E-06	4.05E-05	4.78E-03

TABLE 3-60: SUMMARY OF $ADD_{95\%UCL}$ AND EGG CONCENTRATIONS FOR FEMALE GREAT BLUE HERON BASED ON 1993 DATA ON TEQ BASIS

Location	Drinking Water 95% UCL	Forage Fish 95% UCL	Benthic Invertebrate 95% UCL	Sediment 95% UCL	Total Average Daily $Dose_{95\%UCL}$ (mg/Kg/day)	Total Concentration in Eggs (mg/Kg)
Upper River						
Thompson Island Pool (189)	8.63E-08	1.70E-03	1.87E-06	4.26E-05	1.74E-03	2.08E-01
Stillwater (168)	1.54E-07	4.02E-04	8.77E-06	1.33E-04	5.43E-04	4.92E-02
Federal Dam (154)	7.26E-08	9.57E-05	7.59E-07	1.15E-05	1.08E-04	1.17E-02
Lower River						
143.5	2.85E-07	9.20E-05	1.53E-07	2.31E-06	9.48E-05	1.13E-02
137.2	2.85E-07	3.36E-04	4.97E-07	7.53E-06	3.45E-04	4.12E-02
122.4	1.54E-07	9.57E-05	1.70E-07	2.62E-06	9.87E-05	1.17E-02
113.8	1.54E-07	6.44E-05	2.70E-07	4.09E-06	6.89E-05	7.89E-03
100	1.54E-07	4.64E-05	2.19E-07	2.11E-05	6.79E-05	5.69E-03
88.9	3.51E-08	7.34E-05	2.85E-08	5.60E-06	7.90E-05	8.99E-03
58.7	0	6.61E-05	4.53E-07	6.86E-06	7.34E-05	8.10E-03
47.3	0	6.87E-05	4.12E-07	1.47E-05	8.39E-05	8.43E-03
25.8	0	4.69E-05	2.82E-08	3.84E-06	5.08E-05	5.75E-03

TABLE 3-61: SUMMARY OF UPPER RIVER $ADD_{Expected}$ AND EGG CONCENTRATIONS FOR FEMALE GREAT BLUE HERON FOR THE PERIOD 1993 - 2018 ON TEQ BASIS

	Average Dietary Dose (mg/Kg/day)			Average Egg Concentration (mg/Kg)		
Year	189	168	154	189	168	154
1993	0.0	0.0	4.79E-05	7.04E-02	1.39E-02	5.21E-03
1994	0.0	0.0	4.28E-05	6.34E-02	1.33E-02	4.64E-03
1995	0.0	0.0	3.82E-05	5.81E-02	1.11E-02	4.11E-03
1996	0.0	0.0	0	3.98E-02	8.82E-03	3.53E-03
1997	0.0	0.0	0	3.00E-02	7.61E-03	2.96E-03
1998	0.0	0.0	0	0.0	8.16E-03	3.67E-03
1999	0.0	0.0	0	3.20E-02	7.53E-03	3.16E-03
2000	0.0	0.0	0	2.34E-02	6.14E-03	2.74E-03
2001	0.0	0.0	0	0.0	5.09E-03	2.27E-03
2002	0.0	0.0	0	0.0	4.68E-03	2.19E-03
2003	0.0	0.0	0	0.0	4.27E-03	1.97E-03
2004	0.0	0.0	0	0.0	4.37E-03	1.92E-03
2005	0.0	0.0	0	0.0	3.92E-03	1.76E-03
2006	0.0	0.0	0.0	0.0	3.49E-03	1.63E-03
2007	**0.0**	**0.0**	0.0	0.0	3.40E-03	1.47E-03
2008	**0.0**	**0.0**	0.0	0.0	3.23E-03	1.40E-03
2009	**0.0**	**0.0**	0.0	0.0	3.31E-03	1.34E-03
2010	**0.0**	**0.0**	0.0	0.0	2.80E-03	1.18E-03
2011	**0.0**	**0.0**	0.0	0.0	2.58E-03	1.02E-03
2012	**0.0**	**0.0**	0.0	0.0	2.59E-03	9.69E-04
2013	**0.0**	**0.0**	0.0	0.0	2.46E-03	8.53E-04
2014	**0.0**	**0.0**	0.0	0.0	2.32E-03	8.36E-04
2015	**0.0**	**0.0**	0.0	0.0	2.22E-03	8.05E-04
2016	**0.0**	**0.0**	0.0	0.0	2.32E-03	8.25E-04
2017	**0.0**	**0.0**	0.0	0.0	2.38E-03	8.00E-04
2018	**0.0**	**0.0**	0.0	0.0	2.29E-03	8.55E-04

TABLE 3-62: SUMMARY OF LOWER RIVER $ADD_{Expected}$ AND EGG CONCENTRATIONS FOR FEMALE GREAT BLUE HERON FOR THE PERIOD 1993 - 2018 ON TEQ BASIS

	Average Dietary Dose (mg/Kg/day)				Average Egg Concentration (mg/Kg)			
Year	152	113	90	50	152	113	90	50
1993	3.10E-05	2.12E-05	1.70E-05	1.59E-05	3.69E-03	2.48E-03	1.99E-03	1.88E-03
1994	2.29E-05	1.89E-05	1.51E-05	1.41E-05	2.71E-03	2.21E-03	1.77E-03	1.66E-03
1995	2.04E-05	1.56E-05	1.46E-05	1.26E-05	2.41E-03	1.81E-03	1.56E-03	1.48E-03
1996	2.49E-05	1.64E-05	1.39E-05	1.17E-05	2.97E-03	1.91E-03	1.47E-03	1.37E-03
1997	2.07E-05	1.50E-05	1.16E-05	1.05E-05	2.45E-03	1.74E-03	1.34E-03	1.23E-03
1998	3.61E-05	2.91E-05	2.50E-05	2.29E-05	4.24E-03	3.36E-03	2.90E-03	2.68E-03
1999	1.52E-05	1.23E-05	1.04E-05	9.77E-06	1.78E-03	1.42E-03	1.20E-03	1.14E-03
2000	1.37E-05	1.05E-05	8.83E-06	8.25E-06	1.60E-03	1.20E-03	1.01E-03	9.58E-04
2001	1.47E-05	1.05E-05	8.08E-06	7.38E-06	1.73E-03	1.21E-03	9.25E-04	8.55E-04
2002	1.37E-05	1.08E-05	8.29E-06	7.41E-06	1.60E-03	1.24E-03	9.49E-04	8.58E-04
2003	1.24E-05	9.73E-06	7.72E-06	6.94E-06	1.46E-03	1.11E-03	8.83E-04	8.03E-04
2004	1.02E-05	8.76E-06	7.41E-06	6.75E-06	1.18E-03	9.95E-04	8.44E-04	7.78E-04
2005	9.79E-06	8.07E-06	6.75E-06	6.18E-06	1.14E-03	9.13E-04	7.66E-04	7.11E-04
2006	1.14E-05	8.04E-06	6.23E-06	5.63E-06	1.34E-03	9.13E-04	7.06E-04	6.47E-04
2007	9.20E-06	7.63E-06	5.91E-06	5.29E-06	1.07E-03	8.65E-04	6.69E-04	6.07E-04
2008	9.44E-06	7.95E-06	6.33E-06	5.61E-06	1.10E-03	8.99E-04	7.15E-04	6.43E-04
2009	8.72E-06	7.38E-06	6.02E-06	5.40E-06	1.01E-03	8.30E-04	6.79E-04	6.18E-04
2010	8.44E-06	6.41E-06	4.99E-06	4.53E-06	9.83E-04	7.22E-04	5.61E-04	5.17E-04
2011	9.45E-06	6.95E-06	5.18E-06	4.54E-06	1.11E-03	7.88E-04	5.83E-04	5.19E-04
2012	8.85E-06	6.84E-06	5.23E-06	4.53E-06	1.03E-03	7.76E-04	5.91E-04	5.18E-04
2013	9.54E-06	6.99E-06	5.24E-06	4.50E-06	1.12E-03	7.95E-04	5.93E-04	5.15E-04
2014	9.05E-06	6.79E-06	5.12E-06	4.40E-06	1.06E-03	7.71E-04	5.79E-04	5.03E-04
2015	7.87E-06	6.32E-06	4.91E-06	4.26E-06	9.17E-04	7.15E-04	5.55E-04	4.87E-04
2016	7.30E-06	6.32E-06	5.14E-06	4.53E-06	8.44E-04	7.10E-04	5.80E-04	5.17E-04
2017	7.10E-06	5.99E-06	4.93E-06	4.42E-06	8.19E-04	6.70E-04	5.53E-04	5.03E-04
2018	6.77E-06	5.49E-06	4.47E-06	4.03E-06	7.84E-04	6.14E-04	5.01E-04	4.59E-04

TABLE 3-63: SUMMARY OF $ADD_{Expected}$ AND EGG CONCENTRATIONS FOR FEMALE EAGLE BASED ON 1993 DATA ON TEQ BASIS

Location	Drinking Water Expected	Piscivorous Fish Expected	Total Average Daily $Dose_{Expected}$ (mg/Kg/day)	Average Concentration in Eggs (mg/Kg)
Upper River				
Thompson Island Pool (189)	2.06E-08	3.09E-03	3.09E-03	4.61E-01
Stillwater (168)	3.66E-08	5.49E-04	5.49E-04	8.19E-02
Federal Dam (154)	2.56E-08	3.98E-04	3.99E-04	5.94E-02
Lower River				
143.5	1.98E-08	3.98E-04	3.98E-04	5.94E-02
137.2	1.98E-08	1.50E-03	1.50E-03	2.24E-01
122.4	9.07E-09	3.50E-04	3.50E-04	5.22E-02
113.8	9.07E-09	3.17E-04	3.17E-04	4.72E-02
100	9.07E-09	3.64E-04	3.64E-04	5.42E-02
88.9	5.98E-09	2.34E-04	2.34E-04	3.49E-02
58.7	5.98E-09	2.72E-04	2.72E-04	4.06E-02
47.3	5.98E-09	3.12E-04	3.12E-04	4.65E-02
25.8	5.98E-09	2.20E-04	2.20E-04	3.28E-02

TABLE 3-64: SUMMARY OF $ADD_{95\%UCL}$ AND EGG CONCENTRATIONS FOR FEMALE EAGLE BASED ON 1993 DATA ON TEQ BASIS

Location	Drinking Water 95% UCL	Piscivorous Fish 95% UCL	Total Upper Bound Daily $Dose_{95\%UCL}$ (mg/Kg/day)	Upper Bound Concentration in Eggs (95% UCL) (mg/Kg)
Upper River				
Thompson Island Pool (189)	6.53E-08	5.98E-03	5.98E-03	8.92E-01
Stillwater (168)	1.16E-07	7.07E-04	7.08E-04	1.05E-01
Federal Dam (154)	5.49E-08	7.16E-04	7.16E-04	1.07E-01
Lower River				
143.5	2.16E-07	7.16E-04	7.16E-04	1.07E-01
137.2	2.16E-07	3.58E-03	3.58E-03	5.33E-01
122.4	1.16E-07	4.81E-04	4.82E-04	7.18E-02
113.8	1.16E-07	4.43E-04	4.43E-04	6.60E-02
100	1.16E-07	1.12E-03	1.12E-03	1.68E-01
88.9	2.65E-08	4.46E-04	4.46E-04	6.64E-02
58.7	2.65E-08	4.03E-04	4.03E-04	6.01E-02
47.3	2.65E-08	8.39E-04	8.39E-04	1.25E-01
25.8	2.65E-08	4.37E-04	4.37E-04	6.52E-02

TABLE 3-65: SUMMARY OF UPPER RIVER $ADD_{Expected}$ AND EGG CONCENTRATIONS FOR FEMALE EAGLE FOR THE PERIOD 1993 - 2018 ON TEQ BASIS

	Average Dietary Dose (mg/Kg/day)			Average Egg Concentration (mg/Kg)		
Year	189	168	154	189	168	154
1993	1.41E-03	4.14E-04	1.65E-04	2.10E-01	6.17E-02	2.46E-02
1994	9.63E-04	3.73E-04	1.53E-04	1.44E-01	5.56E-02	2.29E-02
1995	1.11E-03	3.42E-04	1.41E-04	1.66E-01	5.10E-02	2.10E-02
1996	6.91E-04	2.60E-04	1.12E-04	1.03E-01	3.88E-02	1.67E-02
1997	6.82E-04	2.33E-04	1.10E-04	1.02E-01	3.48E-02	1.64E-02
1998	5.43E-04	2.34E-04	1.08E-04	8.10E-02	3.49E-02	1.61E-02
1999	5.29E-04	2.25E-04	1.04E-04	7.88E-02	3.36E-02	1.55E-02
2000	4.28E-04	1.79E-04	8.63E-05	6.38E-02	2.66E-02	1.29E-02
2001	3.71E-04	1.58E-04	8.01E-05	5.53E-02	2.36E-02	1.19E-02
2002	3.63E-04	1.36E-04	7.13E-05	5.42E-02	2.03E-02	1.06E-02
2003	3.24E-04	1.30E-04	6.65E-05	4.84E-02	1.93E-02	9.91E-03
2004	4.38E-04	1.34E-04	6.65E-05	6.53E-02	1.99E-02	9.91E-03
2005	3.72E-04	1.17E-04	5.87E-05	5.55E-02	1.75E-02	8.75E-03
2006	2.93E-04	1.03E-04	5.31E-05	4.37E-02	1.54E-02	7.91E-03
2007	3.56E-04	1.01E-04	5.11E-05	5.31E-02	1.50E-02	7.61E-03
2008	3.60E-04	1.02E-04	4.76E-05	5.37E-02	1.52E-02	7.10E-03
2009	3.57E-04	9.75E-05	4.55E-05	5.33E-02	1.45E-02	6.78E-03
2010	3.39E-04	8.37E-05	3.98E-05	5.05E-02	1.25E-02	5.93E-03
2011	2.67E-04	7.91E-05	3.70E-05	3.97E-02	1.18E-02	5.52E-03
2012	2.64E-04	8.00E-05	3.19E-05	3.93E-02	1.19E-02	4.76E-03
2013	2.16E-04	7.40E-05	2.96E-05	3.22E-02	1.10E-02	4.42E-03
2014	2.41E-04	6.87E-05	2.80E-05	3.59E-02	1.02E-02	4.18E-03
2015	2.21E-04	6.61E-05	2.69E-05	3.30E-02	9.85E-03	4.02E-03
2016	2.56E-04	7.20E-05	2.76E-05	3.81E-02	1.07E-02	4.11E-03
2017	2.87E-04	7.20E-05	2.82E-05	4.27E-02	1.07E-02	4.20E-03
2018	2.61E-04	6.96E-05	2.80E-05	3.90E-02	1.04E-02	4.17E-03

TABLE 3-66: SUMMARY OF LOWER RIVER $ADD_{Expected}$ AND EGG CONCENTRATIONS FOR FEMALE EAGLE FOR THE PERIOD 1993 - 2018 ON TEQ BASIS

	Average Dietary Dose (mg/Kg/day)				Average Egg Concentration (mg/Kg)			
Year	152	113	90	50	152	113	90	50
1993	3.61E-04	2.42E-04	5.54E-05	5.22E-05	5.39E-02	3.60E-02	8.26E-03	7.79E-03
1994	2.58E-04	2.08E-04	4.97E-05	4.61E-05	3.84E-02	3.10E-02	7.41E-03	6.87E-03
1995	2.22E-04	1.86E-04	4.49E-05	4.16E-05	3.31E-02	2.77E-02	6.70E-03	6.20E-03
1996	2.67E-04	1.75E-04	4.14E-05	3.81E-05	3.98E-02	2.61E-02	6.18E-03	5.67E-03
1997	2.38E-04	1.66E-04	3.80E-05	3.45E-05	3.55E-02	2.48E-02	5.67E-03	5.15E-03
1998	4.40E-04	3.55E-04	8.23E-05	7.44E-05	6.55E-02	5.30E-02	1.23E-02	1.11E-02
1999	1.81E-04	1.42E-04	3.53E-05	3.23E-05	2.70E-02	2.11E-02	5.27E-03	4.82E-03
2000	1.57E-04	1.19E-04	2.96E-05	2.74E-05	2.34E-02	1.78E-02	4.41E-03	4.08E-03
2001	1.72E-04	1.16E-04	2.71E-05	2.47E-05	2.56E-02	1.73E-02	4.04E-03	3.68E-03
2002	1.66E-04	1.21E-04	2.78E-05	2.48E-05	2.47E-02	1.81E-02	4.14E-03	3.69E-03
2003	1.46E-04	1.10E-04	2.60E-05	2.32E-05	2.17E-02	1.64E-02	3.88E-03	3.46E-03
2004	1.23E-04	1.02E-04	2.53E-05	2.27E-05	1.83E-02	1.52E-02	3.77E-03	3.38E-03
2005	1.16E-04	9.26E-05	2.30E-05	2.08E-05	1.72E-02	1.38E-02	3.43E-03	3.10E-03
2006	1.27E-04	8.91E-05	2.12E-05	1.90E-05	1.89E-02	1.33E-02	3.17E-03	2.84E-03
2007	1.15E-04	8.60E-05	2.02E-05	1.79E-05	1.72E-02	1.28E-02	3.01E-03	2.67E-03
2008	1.19E-04	9.16E-05	2.16E-05	1.90E-05	1.77E-02	1.37E-02	3.22E-03	2.83E-03
2009	1.05E-04	8.49E-05	2.07E-05	1.83E-05	1.56E-02	1.27E-02	3.08E-03	2.73E-03
2010	9.69E-05	7.15E-05	1.73E-05	1.54E-05	1.44E-02	1.07E-02	2.58E-03	2.29E-03
2011	1.12E-04	7.84E-05	1.77E-05	1.54E-05	1.67E-02	1.17E-02	2.64E-03	2.29E-03
2012	1.00E-04	7.69E-05	1.76E-05	1.51E-05	1.50E-02	1.15E-02	2.63E-03	2.25E-03
2013	1.10E-04	7.98E-05	1.82E-05	1.55E-05	1.64E-02	1.19E-02	2.71E-03	2.31E-03
2014	1.02E-04	7.68E-05	1.74E-05	1.49E-05	1.52E-02	1.15E-02	2.60E-03	2.22E-03
2015	9.32E-05	7.27E-05	1.68E-05	1.44E-05	1.39E-02	1.08E-02	2.50E-03	2.14E-03
2016	9.38E-05	7.45E-05	1.77E-05	1.54E-05	1.40E-02	1.11E-02	2.64E-03	2.29E-03
2017	8.61E-05	7.00E-05	1.71E-05	1.52E-05	1.28E-02	1.04E-02	2.55E-03	2.26E-03
2018	7.91E-05	6.26E-05	1.52E-05	1.35E-05	1.18E-02	9.34E-03	2.27E-03	2.01E-03

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TABLE 3-67
EXPOSURE PARAMETERS FOR LITTLE BROWN BAT (*Myotis lucifugus*)

	Exposure Parameters		Proximal Range Reported for Species
Common Name	Little Brown Bat		-
Genus	*Myotis*		-
Species	*lucifugus*		-
Sex (M/F)	Female	Male	-
Age (Adult/Juv.)	Adult, Breeding		-
Male/Female Body Weight (kg) [1]	0.0071	0.0069	0.0042-0.0094 /0.0055-0.0077
Total Daily Dietary Ingestion (kg/day wet wt.) [2]	0.0025	0.0025	0.0025-0.0037 F/ No Male Data
Total Daily Dietary Ingestion (kg/day dry wt.) [3]	-	-	-
General Dietary Characterization [4]	Insectivore		-
Percent Diet Composition (% wet wt.) [4]			
Fish (Total Component)	0%		0%
Aquatic Invertebrates (Total Component)	100%		87.0 % - 100.0%
Non-river Related Diet Sources	0%		0 % - 13.0 %
Water Consumption Rate (L/day) [5]	0.0011	0.0011	Based upon 0.007 Kg
Percent Incidental Sediment Ingestion in Diet [6]	0%	0%	0%
Home Range (km) [7]	0.1	>0.1	0.1 - >0.1
Behavioral Modification Factors in the Exposure Assessment [8]			
Temporal Migration CorrectionFactor (1-%Annual Temporal Displacement)	1		Resident
Temporal Hibernation/Asetivation Correction Factor (1-%Temporal Hib/Aset.)	1		See text
Habitat Use Factor (Temporal use factor %)	1		Feeds over waterbody
Temporal Reproductive Period (Mating/Gestation/Birth)[9, 10]	April to July	-	April to July

[1] Bopp (1999a); [2] Fenton and Barclay (1980); [3] Dry weight basis of ingestion not required;
[4] Anthony and Kunz (1977), Belwood and Fenton (1976), Buchler (1976); [5] Calder and Braun (1983 In USEPA, 1993b); [6] No contact with sediments;
[7] Bulcher (1976); [8] Davis and Hitchcock (1965); [9, 10] Belwood and Fenton (1976), Wimbatt (1945).

TABLE 3-68
EXPOSURE PARAMETERS FOR RACCOON (*Proycon lotor*)

	Exposure Parameters		Proximal Range Reported for Species
Common Name	Raccoon		-
Genus	*Procyon*		-
Species	*lotor*		-
Sex (M/F)	Female	Male	-
Age (Adult/Juv.)	Adult, Breeding		-
Male/Female Body Weight (kg) [1]	6.4	7.6	5.6-7.1 F/7.0-8.3 M
Total Daily Dietary Ingestion (kg/day wet wt.) [2]	0.99	1.20	0.866-1.1 F/1.1-1.30 M
Total Daily Dietary Ingestion (kg/day dry wt.) [3]	0.316	0.364	0.283-0.344 F/0.340-0.391 M
General Dietary Characterization [4]	Opportunistic Omnivore		-
Percent Diet Composition (% wet wt.) [4]			
Fish (Total Component)	3.0%		0-3%
Aquatic Invertebrates (Total Component)	37.0%		1.4-37.0%
Non-river Related Diet Sources	60.0%		0-100 %
Water Consumption Rate (L/day) [5]	0.526	0.614	0.467-0.578 F/0.571-0.665 M
Percent Incidental Sediment Ingestion in Diet [6]	9.4%	9.4%	9.40%
Home Range (hectare) [7]	48.0	48.0	5.3-376 F/18.2-814 M
Behavioral Modification Factors in the Exposure Assessment [8]			
Temporal Migration CorrectionFactor (1-%Annual TemporalDisplacement)	1		Resident
Temporal Hibernation/Asetivation Correction Factor (1-%Temporal Hib/Aset.)	1		Active Year Round
Habitat Use Factor (Temporal use factor %)	1		Riparian habitats preferred
Temporal Reproductive Period (Mating/Gestation/Birth)[9, 10]	January to May	-	January to May

[1] Bopp (1999a), Sanderson (1984), USEPA (1993b); [2], [3] Estimated from NFMR and ME in USEPA (1993b) and Nagy (1987);
[4] Tabatabai and Kennedy (1988), Newell *et al*. (1987), Llewellyn and Uhler (1952), Hamilton (1951); [5] Calder and Braun (1983 In USEPA, 1993b);
[6] Beyer *et al*. (1994); [7] Urban (1970), Stuewer (1943); [8] USEPA (1993b), Hamilton (1951); [9 10] USEPA (1993b), Stuewer (1943).

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TABLE 3-69
EXPOSURE PARAMETERS FOR MINK (*Mustela vison*)

	Exposure Parameters		Proximal Range Reported for Species
Common Name	Mink		-
Genus	*Mustela*		-
Species	*vision*		-
Sex (M/F)	Female	Male	-
Age (Adult/Juv.)	Adult, Breeding		-
Male/Female Body Weight (kg) [1]	0.83	1.02	0.550-1.101 F/0.681-1.362 M
Total Daily Dietary Ingestion (kg/day wet wt.) [2]	0.132	0.132	0.145 F/ 0.119 M
Total Daily Dietary Ingestion (kg/day dry wt.) [3]	0.059	0.069	0.042-1.013 F/0.050-0.089 M
General Dietary Characterization [4]	Opportunistic Piscivore/Carnivore		-
Percent Diet Composition (% wet wt.) [4]			
Fish (Total Component)	34.0%		18.8-34.0%
Aquatic Invertebrates (Total Component)	16.5%		13.9-16.5%
Non-river Related Diet Sources	49.5%		49.5 % - 67.0 %
Water Consumption Rate (L/day) [5]	0.084	0.101	0.052-0.107 F/0.070-0.131 M
Percent Incidental Sediment Ingestion in Diet [6]	1.0%		1.0%
Home Range (km) [7]	1.9	3.4	1.0-2.8 km F/1.8-5.0 km M
Behavioral Modification Factors in the Exposure Assessment [8]			
Temporal Migration CorrectionFactor (1-%Annual TemporalDisplacement)	1		Resident
Temporal Hibernation/Asetivation Correction Factor (1-%Temporal Hib/Aset.)	1		Active Year Round
Habitat Use Factor (Temporal use factor %)	1		Riparian habitats preferred
Temporal Reproductive Period (Mating/Gestation/Birth)[8]	March to June		March to June

[1] Mitchell (1961); J. Bopp (1999a), [2] Bleavins and Aulerich (1981); [3] Estimated from Nagy (1987) and USEPA (1993b); [4] Hamilton (1951), Hamilton (1940), Hamilton (1936); [5] Calder and Braun (1983 In USEPA, 1993b); [6] Best Professional Judgement - based upon observations in Hamilton (1940); [7] Gerell (1970), Mitchell (1961); [8] Allen (1986).

TABLE 3-70
EXPOSURE PARAMETERS FOR RIVER OTTER (*Lutra canadensis*)

	Exposure Parameters		Proximal Range Reported for Species
Common Name	River Otter		-
Genus	*Lutra*		-
Species	*canadensis*		-
Sex (M/F)	Female	Male	-
Age (Adult/Juv.)	Adult, Breeding		-
Male/Female Body Weight (kg) [1]	7.32	10.9	6.73-7.90 F/9.20-12.7 M
Total Daily Dietary Ingestion (kg/day wet wt.) [2]	0.900	0.900	0.7-1.1
Total Daily Dietary Ingestion (kg/day dry wt.) [3]	0.353	0.491	0.329-0.376 F/0.425-0.555 M
General Dietary Characterization [4]	Opportunistic Piscivore		-
Percent Diet Composition (% wet wt.) [4]			
Fish (Total Component)	100%		70-100%
Aquatic Invertebrates (Total Component)	0.0%		5-15%
Non-river Related Diet Sources	0.0%		0-25%
Water Consumption Rate (L/day) [5]	0.594	0.853	0.551-0.636 F/0.730-0.975 M
Percent Incidental Sediment Ingestion in Diet [6]	1.0%		1.0%
Home Range (km) [7]	10.0		1.5-22.3 Km
Behavioral Modification Factors in the Exposure Assessment [8]			
Temporal Migration CorrectionFactor (1-%Annual TemporalDisplacement)	1		Resident
Temporal Hibernation/Asetivation Correction Factor (1-%Temporal Hib/Aset.)	1		Active Year Round
Habitat Use Factor (Temporal use factor %)	1		Riparian habitats preferred
Temporal Reproductive Period (Mating/Gestation/Birth)[9]	March to March [10]		March to March

[1] Spinola *et al.*, (undated), Bopp (1999a), USEPA (1993b); [2], [3] Harris (1968 In USEPA, 1993b), Penrod (1999);
[4] Spinola (1999), Newell *et al*. (1987), Hamilton (1961); [5] Calder and Braun (1983In USEPA, 1993b); [6] Best Professional Judgement - based upon Liers (1951 In USEPA, 1993b); [7] Spinola *et al*. (undated); [8] USEPA (1993b); [9] Hamilton and Eadie (1964);
10 Period between mating and birth extends for one full year due to delayed implantation of zygote.

TABLE 3-71: SUMMARY OF $ADD_{Expected}$ FOR FEMALE BAT USING 1993 DATA BASED ON TRI+ CONGENERS

Location	Drinking Water Expected	Benthic Invertebrate Expected	Total Average Daily $Dose_{Expected}$ (mg/Kg/day)
Upper River			
Thompson Island Pool (189)	1.14E-05	4.47E+00	4.47E+00
Stillwater (168)	2.03E-05	7.83E+00	7.83E+00
Federal Dam (154)	1.42E-05	1.87E+00	1.87E+00
Lower River			
143.5	1.10E-05	2.60E-01	2.60E-01
137.2	1.10E-05	5.12E-01	5.12E-01
122.4	5.02E-06	2.83E-01	2.83E-01
113.8	5.02E-06	2.91E-01	2.91E-01
100	5.02E-06	1.34E-01	1.34E-01
88.9	3.31E-06	6.71E-02	6.71E-02
58.7	3.31E-06	2.07E-01	2.07E-01
47.3	3.31E-06	2.35E-01	2.35E-01
25.8	3.31E-06	6.95E-02	6.95E-02

TABLE 3-72: SUMMARY OF $ADD_{95\%UCL}$ FOR FEMALE BAT USING 1993 DATA BASED ON TRI+ CONGENERS

Location	Drinking Water 95% UCL	Benthic Invertebrate 95% UCL	Total Upper Bound Daily $Dose_{95\%UCL}$ (mg/Kg/day)
Upper River			
Thompson Island Pool (189)	3.61E-05	7.82E+00	7.82E+00
Stillwater (168)	6.43E-05	3.67E+01	3.67E+01
Federal Dam (154)	3.04E-05	3.17E+00	3.17E+00
Lower River			
143.5	1.19E-04	6.38E-01	6.38E-01
137.2	1.19E-04	2.08E+00	2.08E+00
122.4	6.43E-05	7.12E-01	7.12E-01
113.8	6.43E-05	1.13E+00	1.13E+00
100	6.43E-05	9.15E-01	9.15E-01
88.9	1.47E-05	1.19E-01	1.19E-01
58.7	1.47E-05	1.89E+00	1.89E+00
47.3	1.47E-05	1.72E+00	1.72E+00
25.8	1.47E-05	1.18E-01	1.18E-01

TABLE 3-73: SUMMARY OF UPPER RIVER $ADD_{Expected}$ FOR FEMALE BAT BASED ON TRI+ PREDICTIONS FOR THE PERIOD 1993 - 2018

	Total Average Dietary Dose (mg/Kg/day)		
Year	189	168	154
1993	3.01E+00	5.02E+00	1.50E+00
1994	2.78E+00	4.54E+00	1.39E+00
1995	2.52E+00	4.01E+00	1.27E+00
1996	2.28E+00	3.37E+00	1.13E+00
1997	2.12E+00	2.96E+00	1.06E+00
1998	1.97E+00	2.74E+00	1.01E+00
1999	1.84E+00	2.55E+00	9.54E-01
2000	1.66E+00	2.21E+00	8.52E-01
2001	1.49E+00	1.85E+00	7.52E-01
2002	1.38E+00	1.58E+00	6.75E-01
2003	1.27E+00	1.45E+00	6.25E-01
2004	1.18E+00	1.39E+00	5.84E-01
2005	1.10E+00	1.30E+00	5.46E-01
2006	1.02E+00	1.18E+00	4.99E-01
2007	9.30E-01	1.09E+00	4.60E-01
2008	8.70E-01	1.05E+00	4.28E-01
2009	8.14E-01	1.01E+00	3.91E-01
2010	7.44E-01	9.17E-01	3.51E-01
2011	6.70E-01	8.41E-01	3.17E-01
2012	6.45E-01	8.38E-01	2.83E-01
2013	6.62E-01	8.34E-01	2.55E-01
2014	6.54E-01	7.74E-01	2.36E-01
2015	6.23E-01	7.40E-01	2.28E-01
2016	5.90E-01	7.38E-01	2.28E-01
2017	5.50E-01	7.31E-01	2.24E-01
2018	5.28E-01	7.21E-01	2.23E-01

TABLE 3-74: SUMMARY OF LOWER RIVER $ADD_{Expected}$ FOR FEMALE BAT BASED ON TRI+ PREDICTIONS FOR THE PERIOD 1993 - 2018

	Total Average Dietary Dose (mg/Kg/day)			
Year	152	113	90	50
1993	6.20E-01	4.92E-01	4.00E-01	2.94E-01
1994	5.48E-01	4.54E-01	3.73E-01	2.71E-01
1995	5.32E-01	4.37E-01	3.51E-01	2.59E-01
1996	5.31E-01	4.25E-01	3.38E-01	2.52E-01
1997	4.94E-01	4.00E-01	3.22E-01	2.39E-01
1998	1.11E+00	9.13E-01	7.20E-01	5.31E-01
1999	5.02E-01	4.22E-01	3.31E-01	2.46E-01
2000	4.66E-01	3.74E-01	2.97E-01	2.20E-01
2001	4.39E-01	3.56E-01	2.78E-01	2.06E-01
2002	4.42E-01	3.61E-01	2.86E-01	2.13E-01
2003	4.11E-01	3.41E-01	2.76E-01	2.03E-01
2004	4.22E-01	3.43E-01	2.73E-01	2.03E-01
2005	4.05E-01	3.36E-01	2.60E-01	1.93E-01
2006	3.80E-01	3.17E-01	2.42E-01	1.79E-01
2007	3.69E-01	3.07E-01	2.33E-01	1.72E-01
2008	3.95E-01	3.27E-01	2.50E-01	1.85E-01
2009	3.92E-01	3.21E-01	2.48E-01	1.84E-01
2010	3.40E-01	2.78E-01	2.15E-01	1.59E-01
2011	3.36E-01	2.84E-01	2.14E-01	1.61E-01
2012	3.29E-01	2.79E-01	2.10E-01	1.59E-01
2013	3.23E-01	2.74E-01	2.04E-01	1.54E-01
2014	3.25E-01	2.71E-01	2.03E-01	1.53E-01
2015	3.13E-01	2.59E-01	1.97E-01	1.48E-01
2016	3.48E-01	2.78E-01	2.12E-01	1.60E-01
2017	3.50E-01	2.81E-01	2.14E-01	1.59E-01
2018	3.22E-01	2.63E-01	1.98E-01	1.46E-01

TABLE 3-75: SUMMARY OF $ADD_{Expected}$ FOR FEMALE RACCOON USING 1993 DATA BASED ON TRI+ CONGENERS

Location	Drinking Water Expected	Forage Fish Expected	Benthic Invertebrate Expected	Sediment Expected	Total Average Daily $Dose_{Expected}$ (mg/Kg/day)
Upper River					
Thompson Island Pool (189)	6.05E-06	9.38E-02	7.27E-01	5.51E-02	8.76E-01
Stillwater (168)	1.08E-05	1.26E-02	1.27E+00	1.44E-01	1.43E+00
Federal Dam (154)	7.51E-06	7.69E-03	3.03E-01	1.30E-02	3.24E-01
Lower River					
143.5	5.81E-06	8.92E-03	4.22E-02	3.99E-03	5.52E-02
137.2	5.81E-06	1.79E-02	8.32E-02	7.05E-03	1.08E-01
122.4	2.66E-06	6.82E-03	4.60E-02	4.47E-03	5.73E-02
113.8	2.66E-06	7.24E-03	4.73E-02	4.68E-03	5.92E-02
100	2.66E-06	3.11E-03	2.18E-02	1.85E-03	2.67E-02
88.9	1.75E-06	6.18E-03	1.09E-02	3.62E-03	2.07E-02
58.7	1.75E-06	6.79E-03	3.36E-02	1.17E-03	4.16E-02
47.3	1.75E-06	6.03E-03	3.81E-02	7.14E-03	5.13E-02
25.8	1.75E-06	4.55E-03	1.13E-02	2.68E-03	1.85E-02

TABLE 3-76: SUMMARY OF $ADD_{95\%UCL}$ FOR FEMALE RACCOON USING 1993 DATA BASED ON TRI+ CONGENERS

Location	Drinking Water 95% UCL	Fish 95% UCL	Benthic Invertebrate 95% UCL	Sediment 95% UCL	Total Average Daily $Dose_{95\%UCL}$ (mg/Kg/day)
Upper River					
Thompson Island Pool (189)	1.92E-05	1.43E-01	1.27E+00	8.07E-02	1.50E+00
Stillwater (168)	3.41E-05	2.32E-02	5.96E+00	2.51E-01	6.24E+00
Federal Dam (154)	1.61E-05	1.10E-02	5.15E-01	2.17E-02	5.48E-01
Lower River					
143.5	6.33E-05	1.06E-02	1.04E-01	4.37E-03	1.19E-01
137.2	6.33E-05	3.80E-02	3.38E-01	1.42E-02	3.90E-01
122.4	3.41E-05	1.07E-02	1.16E-01	4.96E-03	1.31E-01
113.8	3.41E-05	7.51E-03	1.83E-01	7.74E-03	1.99E-01
100	3.41E-05	5.28E-03	1.49E-01	4.00E-02	1.94E-01
88.9	7.79E-06	8.11E-03	1.94E-02	1.06E-02	3.81E-02
58.7	7.79E-06	7.65E-03	3.07E-01	1.30E-02	3.28E-01
47.3	7.79E-06	7.94E-03	2.80E-01	2.78E-02	3.16E-01
25.8	7.79E-06	5.45E-03	1.92E-02	7.25E-03	3.19E-02

TABLE 3-77: SUMMARY OF UPPER RIVER $ADD_{Expected}$ FOR FEMALE RACCOON BASED ON TRI+ PREDICTIONS FOR THE PERIOD 1993 - 2018

	Total Average Dietary Dose (mg/Kg/day)		
Year	189	168	154
1993	7.14E-01	8.71E-01	2.58E-01
1994	6.58E-01	7.89E-01	2.40E-01
1995	5.99E-01	6.98E-01	2.19E-01
1996	5.28E-01	5.85E-01	1.95E-01
1997	4.82E-01	5.13E-01	1.81E-01
1998	4.56E-01	4.76E-01	1.74E-01
1999	4.27E-01	4.44E-01	1.64E-01
2000	3.80E-01	3.84E-01	1.47E-01
2001	3.39E-01	3.21E-01	1.29E-01
2002	3.18E-01	2.75E-01	1.16E-01
2003	2.96E-01	2.52E-01	1.07E-01
2004	2.81E-01	2.42E-01	1.00E-01
2005	2.58E-01	2.26E-01	9.39E-02
2006	2.37E-01	2.05E-01	8.58E-02
2007	2.18E-01	1.90E-01	7.91E-02
2008	2.08E-01	1.83E-01	7.36E-02
2009	1.99E-01	1.75E-01	6.74E-02
2010	1.77E-01	1.59E-01	6.04E-02
2011	1.60E-01	1.46E-01	5.45E-02
2012	1.51E-01	1.45E-01	4.88E-02
2013	1.54E-01	1.45E-01	4.39E-02
2014	1.53E-01	1.34E-01	4.06E-02
2015	1.46E-01	1.28E-01	3.92E-02
2016	1.44E-01	1.28E-01	3.92E-02
2017	1.35E-01	1.27E-01	3.85E-02
2018	1.31E-01	1.25E-01	3.84E-02

TABLE 3-78: SUMMARY OF LOWER RIVER $ADD_{Expected}$ FOR FEMALE RACCOON BASED ON TRI+ PREDICTIONS FOR THE PERIOD 1993 - 2018

	Average Dietary Dose (mg/Kg/day)			
Year	152	113	90	50
1993	1.13E-01	8.87E-02	7.20E-02	5.38E-02
1994	9.87E-02	8.17E-02	6.71E-02	4.95E-02
1995	9.52E-02	7.79E-02	7.04E-02	4.70E-02
1996	9.63E-02	7.61E-02	6.82E-02	4.56E-02
1997	8.90E-02	7.16E-02	5.75E-02	4.32E-02
1998	1.97E-01	1.62E-01	1.28E-01	9.58E-02
1999	8.87E-02	7.45E-02	5.87E-02	4.41E-02
2000	8.22E-02	6.59E-02	5.25E-02	3.94E-02
2001	7.81E-02	6.28E-02	4.91E-02	3.67E-02
2002	7.84E-02	6.39E-02	5.05E-02	3.79E-02
2003	7.27E-02	6.01E-02	4.86E-02	3.61E-02
2004	7.40E-02	6.02E-02	4.81E-02	3.60E-02
2005	7.10E-02	5.88E-02	4.57E-02	3.41E-02
2006	6.72E-02	5.57E-02	4.26E-02	3.18E-02
2007	6.49E-02	5.37E-02	4.09E-02	3.04E-02
2008	6.92E-02	5.73E-02	4.39E-02	3.28E-02
2009	6.85E-02	5.62E-02	4.35E-02	3.25E-02
2010	5.96E-02	4.86E-02	3.76E-02	2.81E-02
2011	5.93E-02	4.98E-02	3.75E-02	2.84E-02
2012	5.79E-02	4.89E-02	3.68E-02	2.79E-02
2013	5.71E-02	4.80E-02	3.59E-02	2.72E-02
2014	5.73E-02	4.76E-02	3.56E-02	2.70E-02
2015	5.49E-02	4.55E-02	3.46E-02	2.61E-02
2016	6.06E-02	4.86E-02	3.72E-02	2.82E-02
2017	6.10E-02	4.89E-02	3.74E-02	2.79E-02
2018	5.61E-02	4.59E-02	3.45E-02	2.57E-02

TABLE 3-79: SUMMARY OF $ADD_{Expected}$ FOR FEMALE MINK USING 1993 DATA BASED ON TRI+ CONGENERS

Location	Drinking Water Expected	Forage Fish Expected	Benthic Invertebrate Expected	Sediment Expected	Total Average Daily $Dose_{Expected}$ (mg/Kg/day)
Upper River					
Thompson Island Pool (189)	7.45E-06	1.09E+00	3.33E-01	8.44E-03	1.43E+00
Stillwater (168)	1.32E-05	1.46E-01	5.83E-01	2.21E-02	7.52E-01
Federal Dam (154)	9.25E-06	8.96E-02	1.39E-01	1.99E-03	2.31E-01
Lower River					
143.5	7.16E-06	1.04E-01	1.94E-02	6.12E-04	1.24E-01
137.2	7.16E-06	2.09E-01	3.81E-02	1.08E-03	2.48E-01
122.4	3.28E-06	7.94E-02	2.11E-02	6.84E-04	1.01E-01
113.8	3.28E-06	8.43E-02	2.17E-02	7.17E-04	1.07E-01
100	3.28E-06	3.63E-02	9.97E-03	2.84E-04	4.65E-02
88.9	2.16E-06	7.20E-02	5.00E-03	5.55E-04	7.75E-02
58.7	2.16E-06	7.91E-02	1.54E-02	1.79E-04	9.47E-02
47.3	2.16E-06	7.03E-02	1.75E-02	1.09E-03	8.89E-02
25.8	2.16E-06	5.30E-02	5.18E-03	4.11E-04	5.86E-02

TABLE 3-80: SUMMARY OF $ADD_{95\%UCL}$ FOR FEMALE MINK USING 1993 DATA BASED ON TRI+ CONGENERS

Location	Drinking Water 95% UCL	Forage Fish 95% UCL	Benthic Invertebrate 95% UCL	Sediment 95% UCL	Total Upper Bound Daily $Dose_{95\%UCL}$ (mg/Kg/day)
Upper River					
Thompson Island Pool (189)	2.36E-05	1.67E+00	5.83E-01	1.24E-02	2.26E+00
Stillwater (168)	4.20E-05	2.70E-01	2.73E+00	3.85E-02	3.04E+00
Federal Dam (154)	1.98E-05	1.29E-01	2.36E-01	3.33E-03	3.68E-01
Lower River					
143.5	7.80E-05	1.23E-01	4.75E-02	6.69E-04	1.71E-01
137.2	7.80E-05	4.42E-01	1.55E-01	2.18E-03	6.00E-01
122.4	4.20E-05	1.25E-01	5.30E-02	7.60E-04	1.79E-01
113.8	4.20E-05	8.75E-02	8.41E-02	1.19E-03	1.73E-01
100	4.20E-05	6.15E-02	6.82E-02	6.12E-03	1.36E-01
88.9	9.59E-06	9.46E-02	8.89E-03	1.62E-03	1.05E-01
58.7	9.59E-06	8.91E-02	1.41E-01	1.99E-03	2.32E-01
47.3	9.59E-06	9.25E-02	1.28E-01	4.26E-03	2.25E-01
25.8	9.59E-06	6.35E-02	8.78E-03	1.11E-03	7.34E-02

TABLE 3-81: SUMMARY OF UPPER RIVER $ADD_{Expected}$ FOR FEMALE MINK BASED ON TRI+ PREDICTIONS FOR THE PERIOD 1993 - 2018

	Average Dietary Dose (mg/Kg/day)		
Year	189	168	154
1993	1.03E+00	5.34E-01	1.71E-01
1994	9.33E-01	4.92E-01	1.57E-01
1995	8.53E-01	4.27E-01	1.42E-01
1996	6.29E-01	3.53E-01	1.25E-01
1997	5.07E-01	3.09E-01	1.13E-01
1998	5.65E-01	2.98E-01	1.17E-01
1999	5.08E-01	2.77E-01	1.07E-01
2000	3.97E-01	2.36E-01	9.47E-02
2001	3.40E-01	1.96E-01	8.19E-02
2002	3.64E-01	1.72E-01	7.53E-02
2003	3.69E-01	1.57E-01	6.90E-02
2004	4.21E-01	1.54E-01	6.53E-02
2005	3.44E-01	1.42E-01	6.08E-02
2006	3.01E-01	1.28E-01	5.57E-02
2007	2.91E-01	1.21E-01	5.10E-02
2008	3.32E-01	1.16E-01	4.79E-02
2009	3.51E-01	1.13E-01	4.45E-02
2010	2.53E-01	1.01E-01	3.96E-02
2011	2.39E-01	9.23E-02	3.52E-02
2012	2.21E-01	9.22E-02	3.21E-02
2013	2.08E-01	9.05E-02	2.87E-02
2014	2.08E-01	8.44E-02	2.71E-02
2015	2.02E-01	8.07E-02	2.61E-02
2016	2.52E-01	8.16E-02	2.64E-02
2017	2.48E-01	8.18E-02	2.57E-02
2018	2.61E-01	8.00E-02	2.63E-02

TABLE 3-82: SUMMARY OF LOWER RIVER $ADD_{Expected}$ FOR FEMALE MINK BASED ON TRI+ PREDICTIONS FOR THE PERIOD 1993 - 2018

	Average Dietary Dose (mg/Kg/day)			
Year	152	113	90	50
1993	1.37E-01	9.78E-02	7.87E-02	6.81E-02
1994	1.08E-01	8.83E-02	7.14E-02	6.09E-02
1995	9.90E-02	7.72E-02	6.56E-02	5.56E-02
1996	1.13E-01	7.87E-02	6.26E-02	5.24E-02
1997	9.72E-02	7.27E-02	5.70E-02	4.81E-02
1998	1.87E-01	1.51E-01	1.25E-01	1.06E-01
1999	8.14E-02	6.64E-02	5.42E-02	4.63E-02
2000	7.43E-02	5.76E-02	4.72E-02	4.00E-02
2001	7.54E-02	5.64E-02	4.36E-02	3.64E-02
2002	7.26E-02	5.76E-02	4.48E-02	3.70E-02
2003	6.66E-02	5.29E-02	4.24E-02	3.49E-02
2004	6.06E-02	5.02E-02	4.13E-02	3.43E-02
2005	5.84E-02	4.76E-02	3.83E-02	3.19E-02
2006	6.13E-02	4.63E-02	3.55E-02	2.93E-02
2007	5.40E-02	4.43E-02	3.39E-02	2.78E-02
2008	5.66E-02	4.66E-02	3.64E-02	2.97E-02
2009	5.43E-02	4.45E-02	3.53E-02	2.90E-02
2010	4.97E-02	3.86E-02	2.99E-02	2.46E-02
2011	5.24E-02	4.07E-02	3.04E-02	2.49E-02
2012	5.01E-02	4.00E-02	3.03E-02	2.46E-02
2013	5.17E-02	4.01E-02	2.99E-02	2.42E-02
2014	5.04E-02	3.93E-02	2.94E-02	2.38E-02
2015	4.60E-02	3.71E-02	2.84E-02	2.31E-02
2016	4.69E-02	3.83E-02	3.02E-02	2.47E-02
2017	4.64E-02	3.76E-02	2.97E-02	2.43E-02
2018	4.34E-02	3.49E-02	2.72E-02	2.22E-02

TABLE 3-83: SUMMARY OF $ADD_{Expected}$ FOR FEMALE OTTER USING 1993 DATA BASED ON TRI+ CONGENERS

Location	Drinking Water Expected	Piscivorous Fish Expected	Sediment Expected	Total Average Daily $Dose_{Expected}$ (mg/Kg/day)
Upper River				
Thompson Island Pool (189)	5.97E-06	1.16E+01	5.73E-03	1.16E+01
Stillwater (168)	1.06E-05	2.06E+00	1.50E-02	2.08E+00
Federal Dam (154)	7.42E-06	1.50E+00	1.35E-03	1.50E+00
Lower River				
143.5	5.74E-06	1.50E+00	4.15E-04	1.50E+00
137.2	5.74E-06	5.65E+00	7.32E-04	5.65E+00
122.4	2.63E-06	1.32E+00	4.64E-04	1.32E+00
113.8	2.63E-06	1.19E+00	4.87E-04	1.19E+00
100	2.63E-06	1.37E+00	1.92E-04	1.37E+00
88.9	1.73E-06	8.81E-01	3.76E-04	8.81E-01
58.7	1.73E-06	1.02E+00	1.21E-04	1.02E+00
47.3	1.73E-06	1.17E+00	7.41E-04	1.17E+00
25.8	1.73E-06	8.27E-01	2.79E-04	8.28E-01

TABLE 3-84: SUMMARY OF $ADD_{95\%UCL}$ FOR FEMALE OTTER USING 1993 DATA BASED ON TRI+ CONGENERS

Location	Drinking Water 95% UCL	Piscivorous Fish 95% UCL	Sediment 95% UCL	Total Average Daily $Dose_{95\%UCL}$ (mg/Kg/day)
Upper River				
Thompson's Island Pool (189)	1.89E-05	2.25E+01	8.38E-03	2.25E+01
Stillwater (168)	3.37E-05	2.66E+00	2.61E-02	2.69E+00
Federal Dam (154)	1.59E-05	2.69E+00	2.26E-03	2.69E+00
Lower River				
143.5	6.25E-05	2.69E+00	4.54E-04	2.69E+00
137.2	6.25E-05	1.34E+01	1.48E-03	1.34E+01
122.4	3.37E-05	1.81E+00	5.16E-04	1.81E+00
113.8	3.37E-05	1.67E+00	8.04E-04	1.67E+00
100	3.37E-05	4.22E+00	4.15E-03	4.23E+00
88.9	7.69E-06	1.68E+00	1.10E-03	1.68E+00
58.7	7.69E-06	1.52E+00	1.35E-03	1.52E+00
47.3	7.69E-06	3.15E+00	2.89E-03	3.16E+00
25.8	7.69E-06	1.64E+00	7.54E-04	1.64E+00

TABLE 3-85: SUMMARY OF UPPER RIVER $ADD_{Expected}$ FOR FEMALE OTTER BASED ON TRI+ PREDICTIONS FOR THE PERIOD 1993 - 2018

	Total Average Dietary Dose (mg/Kg/day)		
Year	189	168	154
1993	5.32E+00	1.56E+00	6.21E-01
1994	3.64E+00	1.41E+00	5.77E-01
1995	4.20E+00	1.29E+00	5.30E-01
1996	2.61E+00	9.81E-01	4.21E-01
1997	2.57E+00	8.79E-01	4.15E-01
1998	2.05E+00	8.82E-01	4.05E-01
1999	2.00E+00	8.48E-01	3.90E-01
2000	1.62E+00	6.74E-01	3.25E-01
2001	1.40E+00	5.96E-01	3.01E-01
2002	1.37E+00	5.14E-01	2.68E-01
2003	1.23E+00	4.88E-01	2.50E-01
2004	1.65E+00	5.04E-01	2.50E-01
2005	1.41E+00	4.43E-01	2.21E-01
2006	1.11E+00	3.88E-01	2.00E-01
2007	1.34E+00	3.79E-01	1.92E-01
2008	1.36E+00	3.83E-01	1.79E-01
2009	1.35E+00	3.68E-01	1.71E-01
2010	1.28E+00	3.15E-01	1.50E-01
2011	1.01E+00	2.98E-01	1.39E-01
2012	9.95E-01	3.01E-01	1.20E-01
2013	8.15E-01	2.79E-01	1.12E-01
2014	9.08E-01	2.59E-01	1.05E-01
2015	8.35E-01	2.49E-01	1.01E-01
2016	9.65E-01	2.71E-01	1.04E-01
2017	1.08E+00	2.71E-01	1.06E-01
2018	9.85E-01	2.62E-01	1.05E-01

TABLE 3-86: SUMMARY OF LOWER RIVER $ADD_{Expected}$ FOR FEMALE OTTER BASED ON TRI+ PREDICTIONS FOR THE PERIOD 1993 - 2018

	Average Dietary Dose (mg/Kg/day)			
Year	152	113	90	50
1993	1.84E+00	1.23E+00	2.82E-01	2.66E-01
1994	1.31E+00	1.06E+00	2.53E-01	2.34E-01
1995	1.13E+00	9.44E-01	2.30E-01	2.12E-01
1996	1.36E+00	8.91E-01	2.12E-01	1.94E-01
1997	1.21E+00	8.45E-01	1.94E-01	1.76E-01
1998	2.24E+00	1.81E+00	4.19E-01	3.79E-01
1999	9.21E-01	7.21E-01	1.80E-01	1.64E-01
2000	7.98E-01	6.06E-01	1.51E-01	1.39E-01
2001	8.75E-01	5.92E-01	1.38E-01	1.26E-01
2002	8.43E-01	6.17E-01	1.41E-01	1.26E-01
2003	7.42E-01	5.60E-01	1.33E-01	1.18E-01
2004	6.25E-01	5.19E-01	1.29E-01	1.15E-01
2005	5.88E-01	4.71E-01	1.17E-01	1.06E-01
2006	6.46E-01	4.53E-01	1.08E-01	9.70E-02
2007	5.87E-01	4.38E-01	1.03E-01	9.11E-02
2008	6.04E-01	4.66E-01	1.10E-01	9.66E-02
2009	5.32E-01	4.32E-01	1.05E-01	9.31E-02
2010	4.93E-01	3.64E-01	8.81E-02	7.82E-02
2011	5.69E-01	3.99E-01	9.02E-02	7.82E-02
2012	5.11E-01	3.91E-01	8.97E-02	7.68E-02
2013	5.60E-01	4.06E-01	9.25E-02	7.88E-02
2014	5.17E-01	3.91E-01	8.88E-02	7.58E-02
2015	4.74E-01	3.70E-01	8.55E-02	7.31E-02
2016	4.77E-01	3.79E-01	9.01E-02	7.82E-02
2017	4.38E-01	3.56E-01	8.71E-02	7.72E-02
2018	4.03E-01	3.19E-01	7.77E-02	6.86E-02

TABLE 3-87: SUMMARY OF $ADD_{Expected}$ FOR FEMALE BAT USING 1993 DATA ON A TEQ BASIS

Location	Drinking Water Expected	Benthic Invertebrate Expected	Total Average Daily $Dose_{Expected}$ (mg/Kg/day)
Upper River			
Thompson Island Pool (189)	7.21E-08	1.33E-04	1.33E-04
Stillwater (168)	1.28E-07	2.32E-04	2.32E-04
Federal Dam (154)	8.96E-08	5.54E-05	5.54E-05
Lower River			
143.5	6.93E-08	7.71E-06	7.78E-06
137.2	6.93E-08	1.52E-05	1.53E-05
122.4	3.18E-08	8.40E-06	8.43E-06
113.8	3.18E-08	8.64E-06	8.67E-06
100	3.18E-08	3.97E-06	4.00E-06
88.9	2.09E-08	1.99E-06	2.01E-06
58.7	2.09E-08	6.13E-06	6.15E-06
47.3	2.09E-08	6.96E-06	6.98E-06
25.8	2.09E-08	2.06E-06	2.08E-06

TABLE 3-88: SUMMARY OF $ADD_{95\%UCL}$ FOR FEMALE BAT USING 1993 DATA ON A TEQ BASIS

Location	Drinking Water 95% UCL	Benthic Invertebrate 95% UCL	Total Upper Bound Daily $Dose_{95\%UCL}$ (mg/Kg/day)
Upper River			
Thompson Island Pool (189)	2.28E-07	2.32E-04	2.32E-04
Stillwater (168)	4.07E-07	1.09E-03	1.09E-03
Federal Dam (154)	1.92E-07	9.41E-05	9.43E-05
Lower River			
143.5	7.55E-07	1.89E-05	1.97E-05
137.2	7.55E-07	6.17E-05	6.24E-05
122.4	4.07E-07	2.11E-05	2.15E-05
113.8	4.07E-07	3.35E-05	3.39E-05
100	4.07E-07	2.71E-05	2.76E-05
88.9	9.29E-08	3.54E-06	3.63E-06
58.7	9.29E-08	5.61E-05	5.62E-05
47.3	9.29E-08	5.11E-05	5.12E-05
25.8	9.29E-08	3.50E-06	3.59E-06

TABLE 3-89: SUMMARY OF UPPER RIVER $ADD_{Expected}$ FOR FEMALE BAT ON A TEQ BASIS FOR THE PERIOD 1993 - 2018

	Total Average Dietary Dose (mg/Kg/day)		
Year	189	168	154
1993	8.95E-05	1.49E-04	4.44E-05
1994	8.26E-05	1.35E-04	4.14E-05
1995	7.50E-05	1.19E-04	3.78E-05
1996	6.76E-05	1.00E-04	3.36E-05
1997	6.30E-05	8.79E-05	3.14E-05
1998	5.86E-05	8.13E-05	3.00E-05
1999	5.49E-05	7.58E-05	2.83E-05
2000	4.93E-05	6.56E-05	2.53E-05
2001	4.43E-05	5.48E-05	2.23E-05
2002	4.11E-05	4.70E-05	2.01E-05
2003	3.78E-05	4.31E-05	1.85E-05
2004	3.51E-05	4.14E-05	1.73E-05
2005	3.27E-05	3.86E-05	1.62E-05
2006	3.02E-05	3.50E-05	1.48E-05
2007	2.77E-05	3.25E-05	1.37E-05
2008	2.59E-05	3.12E-05	1.27E-05
2009	2.42E-05	2.99E-05	1.16E-05
2010	2.21E-05	2.72E-05	1.04E-05
2011	1.99E-05	2.50E-05	9.41E-06
2012	1.92E-05	2.49E-05	8.41E-06
2013	1.97E-05	2.48E-05	7.57E-06
2014	1.94E-05	2.30E-05	7.00E-06
2015	1.85E-05	2.20E-05	6.77E-06
2016	1.76E-05	2.19E-05	6.77E-06
2017	1.64E-05	2.17E-05	6.64E-06
2018	1.57E-05	2.14E-05	6.62E-06

TABLE 3-90: SUMMARY OF LOWER RIVER $ADD_{Expected}$ FOR FEMALE BAT ON A TEQ BASIS FOR THE PERIOD 1993 - 2018

	Total Average Dietary Dose (mg/Kg/day)			
Year	152	113	90	50
1993	6.69E-05	5.31E-05	4.31E-05	3.17E-05
1994	5.91E-05	4.90E-05	4.03E-05	2.93E-05
1995	5.73E-05	4.71E-05	3.79E-05	2.79E-05
1996	5.73E-05	4.58E-05	3.65E-05	2.72E-05
1997	5.33E-05	4.32E-05	3.48E-05	2.58E-05
1998	1.20E-04	9.85E-05	7.77E-05	5.73E-05
1999	5.41E-05	4.55E-05	3.57E-05	2.65E-05
2000	5.02E-05	4.03E-05	3.21E-05	2.38E-05
2001	4.74E-05	3.84E-05	3.00E-05	2.22E-05
2002	4.77E-05	3.90E-05	3.09E-05	2.30E-05
2003	4.43E-05	3.67E-05	2.98E-05	2.19E-05
2004	4.55E-05	3.70E-05	2.95E-05	2.19E-05
2005	4.37E-05	3.62E-05	2.80E-05	2.08E-05
2006	4.09E-05	3.42E-05	2.61E-05	1.94E-05
2007	3.98E-05	3.31E-05	2.51E-05	1.86E-05
2008	4.26E-05	3.53E-05	2.70E-05	2.00E-05
2009	4.23E-05	3.47E-05	2.68E-05	1.99E-05
2010	3.67E-05	3.00E-05	2.32E-05	1.72E-05
2011	3.63E-05	3.06E-05	2.31E-05	1.74E-05
2012	3.55E-05	3.01E-05	2.26E-05	1.71E-05
2013	3.49E-05	2.95E-05	2.20E-05	1.67E-05
2014	3.51E-05	2.93E-05	2.19E-05	1.65E-05
2015	3.38E-05	2.80E-05	2.13E-05	1.60E-05
2016	3.75E-05	3.00E-05	2.29E-05	1.72E-05
2017	3.78E-05	3.03E-05	2.31E-05	1.71E-05
2018	3.47E-05	2.84E-05	2.13E-05	1.58E-05

TABLE 3-91: SUMMARY OF $ADD_{Expected}$ FOR FEMALE RACCOON USING 1993 DATA ON A TEQ BASIS

Location	Drinking Water Expected	Forage Fish Expected	Benthic Invertebrate Expected	Sediment Expected	Total Average Daily $Dose_{Expected}$ (mg/Kg/day)
Upper River					
Thompson Island Pool (189)	3.83E-08	1.87E-11	2.16E-05	4.29E-05	6.45E-05
Stillwater (168)	6.80E-08	1.63E-11	3.78E-05	1.12E-04	1.50E-04
Federal Dam (154)	4.75E-08	2.34E-11	9.00E-06	1.01E-05	1.91E-05
Lower River					
143.5	3.68E-08	1.47E-11	1.25E-06	3.11E-06	4.40E-06
137.2	3.68E-08	1.26E-11	2.47E-06	5.48E-06	7.99E-06
122.4	1.68E-08	1.80E-11	1.37E-06	3.47E-06	4.86E-06
113.8	1.68E-08	1.26E-11	1.40E-06	3.64E-06	5.06E-06
100	1.68E-08	1.07E-11	6.45E-07	1.44E-06	2.10E-06
88.9	1.11E-08	1.10E-11	3.24E-07	2.82E-06	3.15E-06
58.7	1.11E-08	1.57E-11	9.97E-07	9.09E-07	1.92E-06
47.3	1.11E-08	1.31E-11	1.13E-06	5.55E-06	6.69E-06
25.8	1.11E-08	1.04E-11	3.35E-07	2.09E-06	2.43E-06

TABLE 3-92: SUMMARY OF $ADD_{95\%UCL}$ FOR FEMALE RACCOON USING 1993 DATA ON A TEQ BASIS

Location	Drinking Water 95% UCL	Fish 95% UCL	Benthic Invertebrate 95% UCL	Sediment 95% UCL	Total Average Daily $Dose_{95\%UCL}$ (mg/Kg/day)
Upper River					
Thompson Island Pool (189)	1.21E-07	9.42E-12	3.77E-05	6.27E-05	1.01E-04
Stillwater (168)	2.16E-07	9.33E-12	1.77E-04	1.96E-04	3.73E-04
Federal Dam (154)	1.02E-07	1.00E-11	1.53E-05	1.69E-05	3.23E-05
Lower River					
143.5	4.01E-07	6.09E-12	3.08E-06	3.40E-06	6.88E-06
137.2	4.01E-07	5.60E-12	1.00E-05	1.11E-05	2.15E-05
122.4	2.16E-07	6.88E-12	3.43E-06	3.86E-06	7.51E-06
113.8	2.16E-07	5.35E-12	5.44E-06	6.02E-06	1.17E-05
100	2.16E-07	4.24E-12	4.41E-06	3.11E-05	3.57E-05
88.9	4.93E-08	4.65E-12	5.75E-07	8.24E-06	8.87E-06
58.7	4.93E-08	5.19E-12	9.12E-06	1.01E-05	1.93E-05
47.3	4.93E-08	5.17E-12	8.31E-06	2.17E-05	3.00E-05
25.8	4.93E-08	3.94E-12	5.68E-07	5.64E-06	6.26E-06

TABLE 3-93: SUMMARY OF UPPER RIVER $ADD_{Expected}$ FOR FEMALE RACCOON ON A TEQ BASIS FOR THE PERIOD 1993 - 2018

	Total Average Dietary Dose (mg/Kg/day)		
Year	189	168	154
1993	1.40E-04	5.75E-05	1.49E-05
1994	1.29E-04	5.20E-05	1.37E-05
1995	1.19E-04	4.69E-05	1.27E-05
1996	1.06E-04	3.95E-05	1.13E-05
1997	9.67E-05	3.35E-05	1.03E-05
1998	8.96E-05	3.12E-05	1.00E-05
1999	8.52E-05	2.94E-05	9.47E-06
2000	7.76E-05	0.0	0.0
2001	6.87E-05	2.14E-05	7.48E-06
2002	6.35E-05	1.83E-05	6.71E-06
2003	5.86E-05	1.63E-05	6.14E-06
2004	5.45E-05	1.58E-05	5.77E-06
2005	5.06E-05	1.50E-05	5.42E-06
2006	4.71E-05	1.35E-05	4.94E-06
2007	4.32E-05	1.24E-05	4.54E-06
2008	3.98E-05	1.18E-05	4.23E-06
2009	3.79E-05	1.15E-05	3.90E-06
2010	3.48E-05	1.05E-05	3.49E-06
2011	3.14E-05	9.49E-06	3.14E-06
2012	2.86E-05	9.20E-06	2.83E-06
2013	2.93E-05	9.51E-06	2.52E-06
2014	2.98E-05	8.80E-06	2.33E-06
2015	2.85E-05	8.30E-06	2.23E-06
2016	2.72E-05	8.22E-06	2.21E-06
2017	2.57E-05	8.24E-06	2.19E-06
2018	2.39E-05	8.02E-06	2.16E-06

TABLE 3-94: SUMMARY OF LOWER RIVER $ADD_{Expected}$ FOR FEMALE RACCOON ON A TEQ BASIS FOR THE PERIOD 1993 - 2018

	Total Average Dietary Dose (mg/Kg/day)			
Year	152	113	90	50
1993	1.47E-05	1.15E-05	9.35E-06	6.98E-06
1994	1.29E-05	1.07E-05	8.72E-06	6.44E-06
1995	1.23E-05	1.01E-05	1.31E-05	6.12E-06
1996	1.25E-05	9.89E-06	1.29E-05	5.93E-06
1997	1.16E-05	9.32E-06	7.48E-06	5.60E-06
1998	2.56E-05	2.10E-05	1.67E-05	1.25E-05
1999	1.15E-05	9.65E-06	7.63E-06	5.73E-06
2000	1.06E-05	8.54E-06	6.82E-06	5.11E-06
2001	1.01E-05	8.13E-06	6.37E-06	4.76E-06
2002	1.02E-05	8.29E-06	6.55E-06	4.91E-06
2003	9.47E-06	7.81E-06	6.30E-06	4.68E-06
2004	9.58E-06	7.83E-06	6.25E-06	4.67E-06
2005	9.20E-06	7.61E-06	5.94E-06	4.43E-06
2006	8.73E-06	7.21E-06	5.54E-06	4.13E-06
2007	8.42E-06	6.96E-06	5.32E-06	3.96E-06
2008	8.99E-06	7.43E-06	5.72E-06	4.26E-06
2009	8.87E-06	7.29E-06	5.65E-06	4.22E-06
2010	7.73E-06	6.30E-06	4.88E-06	3.64E-06
2011	7.71E-06	6.44E-06	4.88E-06	3.68E-06
2012	7.53E-06	6.32E-06	4.78E-06	3.61E-06
2013	7.43E-06	6.22E-06	4.67E-06	3.53E-06
2014	7.42E-06	6.16E-06	4.63E-06	3.49E-06
2015	7.12E-06	5.89E-06	4.50E-06	3.38E-06
2016	7.81E-06	6.30E-06	4.84E-06	3.64E-06
2017	7.84E-06	6.33E-06	4.85E-06	3.62E-06
2018	7.21E-06	5.91E-06	4.47E-06	3.33E-06

TABLE 3-95: SUMMARY OF $ADD_{Expected}$ FOR FEMALE MINK USING 1993 DATA ON A TEQ BASIS

Location	Drinking Water Expected	Forage Fish Expected	Benthic Invertebrate Expected	Sediment Expected	Total Average Daily $Dose_{Expected}$ (mg/Kg/day)
Upper River					
Thompson Island Pool (189)	4.7E-08	4.7E-05	9.9E-06	6.6E-06	6.3E-05
Stillwater (168)	8.4E-08	6.3E-06	1.7E-05	1.7E-05	4.1E-05
Federal Dam (154)	5.9E-08	3.8E-06	4.1E-06	1.5E-06	9.6E-06
Lower River					
143.5	4.5E-08	4.5E-06	5.7E-07	4.8E-07	5.6E-06
137.2	4.5E-08	8.9E-06	1.1E-06	8.4E-07	1.1E-05
122.4	2.1E-08	3.4E-06	6.3E-07	5.3E-07	4.6E-06
113.8	2.1E-08	3.6E-06	6.4E-07	5.6E-07	4.8E-06
100	2.1E-08	1.6E-06	3.0E-07	2.2E-07	2.1E-06
88.9	1.4E-08	3.1E-06	1.5E-07	4.3E-07	3.7E-06
58.7	1.4E-08	3.4E-06	4.6E-07	1.4E-07	4.0E-06
47.3	1.4E-08	3.0E-06	5.2E-07	8.5E-07	4.4E-06
25.8	1.4E-08	2.3E-06	1.5E-07	3.2E-07	2.8E-06

TABLE 3-96: SUMMARY OF $ADD_{95\%UCL}$ FOR FEMALE MINK USING 1993 DATA ON A TEQ BASIS

Location	Drinking Water 95% UCL	Forage Fish 95% UCL	Benthic Invertebrate 95% UCL	Sediment 95% UCL	Total Upper Bound Daily $Dose_{95\%UCL}$ (mg/Kg/day)
Upper River					
Thompson Island Pool (189)	1.5E-07	7.2E-05	1.7E-05	9.6E-06	9.9E-05
Stillwater (168)	2.7E-07	1.2E-05	8.1E-05	3.0E-05	1.2E-04
Federal Dam (154)	1.3E-07	5.5E-06	7.0E-06	2.6E-06	1.5E-05
Lower River					
143.5	4.9E-07	5.3E-06	1.4E-06	5.2E-07	7.7E-06
137.2	4.9E-07	1.9E-05	4.6E-06	1.7E-06	2.6E-05
122.4	2.7E-07	5.4E-06	1.6E-06	5.9E-07	7.8E-06
113.8	2.7E-07	3.8E-06	2.5E-06	9.2E-07	7.4E-06
100	2.7E-07	2.6E-06	2.0E-06	4.8E-06	9.7E-06
88.9	6.1E-08	4.1E-06	2.6E-07	1.3E-06	5.6E-06
58.7	6.1E-08	3.8E-06	4.2E-06	1.5E-06	9.6E-06
47.3	6.1E-08	4.0E-06	3.8E-06	3.3E-06	1.1E-05
25.8	6.1E-08	2.7E-06	2.6E-07	8.6E-07	3.9E-06

TABLE 3-97: SUMMARY OF UPPER RIVER $ADD_{Expected}$ FOR FEMALE MINK ON A TEQ BASIS FOR THE PERIOD 1993 - 2018

	Average Dietary Dose (mg/Kg/day)		
Year	189	168	154
1993	5.90E-05	2.28E-05	6.96E-06
1994	5.37E-05	2.09E-05	6.36E-06
1995	4.93E-05	1.83E-05	5.78E-06
1996	3.83E-05	1.52E-05	5.08E-06
1997	3.20E-05	1.31E-05	4.54E-06
1998	3.37E-05	1.27E-05	4.76E-06
1999	3.09E-05	1.18E-05	4.36E-06
2000	2.54E-05	1.01E-05	3.85E-06
2001	2.19E-05	8.40E-06	3.33E-06
2002	2.24E-05	7.35E-06	3.06E-06
2003	2.21E-05	6.66E-06	2.80E-06
2004	2.39E-05	6.54E-06	2.65E-06
2005	2.01E-05	6.06E-06	2.47E-06
2006	1.80E-05	5.45E-06	2.26E-06
2007	1.71E-05	5.12E-06	2.07E-06
2008	1.84E-05	4.89E-06	1.94E-06
2009	1.91E-05	4.81E-06	1.81E-06
2010	1.46E-05	4.29E-06	1.61E-06
2011	1.36E-05	3.91E-06	1.43E-06
2012	1.25E-05	3.87E-06	1.31E-06
2013	1.20E-05	3.85E-06	1.17E-06
2014	1.21E-05	3.59E-06	1.10E-06
2015	1.17E-05	3.41E-06	1.06E-06
2016	1.37E-05	3.44E-06	1.07E-06
2017	1.34E-05	3.47E-06	1.05E-06
2018	1.37E-05	3.38E-06	1.07E-06

TABLE 3-98: SUMMARY OF LOWER RIVER $ADD_{Expected}$ FOR FEMALE MINK ON A TEQ BASIS FOR THE PERIOD 1993 - 2018

	Average Dietary Dose (mg/Kg/day)			
Year	152	113	90	50
1993	1.60E-05	1.14E-05	9.15E-06	7.93E-06
1994	1.25E-05	1.03E-05	8.30E-06	7.09E-06
1995	1.15E-05	8.97E-06	8.25E-06	6.47E-06
1996	1.31E-05	9.16E-06	7.92E-06	6.10E-06
1997	1.13E-05	8.46E-06	6.63E-06	5.59E-06
1998	2.18E-05	1.76E-05	1.46E-05	1.23E-05
1999	9.46E-06	7.71E-06	6.30E-06	5.39E-06
2000	8.62E-06	6.69E-06	5.48E-06	4.65E-06
2001	8.76E-06	6.55E-06	5.07E-06	4.24E-06
2002	8.43E-06	6.69E-06	5.20E-06	4.30E-06
2003	7.74E-06	6.15E-06	4.92E-06	4.06E-06
2004	7.04E-06	5.83E-06	4.79E-06	3.99E-06
2005	6.78E-06	5.53E-06	4.45E-06	3.71E-06
2006	7.12E-06	5.37E-06	4.13E-06	3.41E-06
2007	6.28E-06	5.14E-06	3.94E-06	3.23E-06
2008	6.57E-06	5.41E-06	4.22E-06	3.45E-06
2009	6.30E-06	5.17E-06	4.10E-06	3.37E-06
2010	5.77E-06	4.48E-06	3.47E-06	2.86E-06
2011	6.09E-06	4.72E-06	3.53E-06	2.89E-06
2012	5.82E-06	4.64E-06	3.52E-06	2.86E-06
2013	6.01E-06	4.65E-06	3.47E-06	2.81E-06
2014	5.85E-06	4.56E-06	3.42E-06	2.77E-06
2015	5.34E-06	4.30E-06	3.30E-06	2.68E-06
2016	5.43E-06	4.45E-06	3.51E-06	2.87E-06
2017	5.38E-06	4.36E-06	3.44E-06	2.82E-06
2018	5.03E-06	4.04E-06	3.15E-06	2.58E-06

TABLE 3-99: SUMMARY OF $ADD_{Expected}$ FOR FEMALE OTTER USING 1993 DATA ON A TEQ BASIS

Location	Drinking Water Expected	Piscivorous Fish Expected	Sediment Expected	Total Average Daily $Dose_{Expected}$ (mg/Kg/day)
Upper River				
Thompson's Island Pool (189)	3.78E-08	4.98E-04	4.46E-06	5.03E-04
Stillwater (168)	6.71E-08	8.86E-05	1.16E-05	1.00E-04
Federal Dam (154)	4.69E-08	6.43E-05	1.05E-06	6.54E-05
Lower River				
143.5	3.63E-08	6.43E-05	3.23E-07	6.46E-05
137.2	3.63E-08	2.42E-04	5.70E-07	2.43E-04
122.4	1.66E-08	5.65E-05	3.61E-07	5.69E-05
113.8	1.66E-08	5.11E-05	3.78E-07	5.15E-05
100	1.66E-08	5.87E-05	1.50E-07	5.88E-05
88.9	1.10E-08	3.78E-05	2.93E-07	3.81E-05
58.7	1.10E-08	4.39E-05	9.45E-08	4.40E-05
47.3	1.10E-08	5.03E-05	5.77E-07	5.08E-05
25.8	1.10E-08	3.55E-05	2.17E-07	3.57E-05

TABLE 3-100: SUMMARY OF $ADD_{95\%UCL}$ FOR FEMALE OTTER USING 1993 DATA ON A TEQ BASIS

Location	Drinking Water 95% UCL	Piscivorous Fish 95% UCL	Sediment 95% UCL	Total Average Daily $Dosage_{95\%UCL}$ (mg/Kg/day)
Upper River				
Thompson's Island Pool (189)	1.20E-07	9.65E-04	6.52E-06	9.71E-04
Stillwater (168)	2.13E-07	1.14E-04	2.03E-05	1.35E-04
Federal Dam (154)	1.01E-07	1.15E-04	1.76E-06	1.17E-04
Lower River				
143.5	3.95E-07	1.15E-04	3.53E-07	1.16E-04
137.2	3.95E-07	5.77E-04	1.15E-06	5.78E-04
122.4	2.13E-07	7.76E-05	4.01E-07	7.83E-05
113.8	2.13E-07	7.14E-05	6.25E-07	7.23E-05
100	2.13E-07	1.81E-04	3.23E-06	1.85E-04
88.9	4.87E-08	7.19E-05	8.57E-07	7.28E-05
58.7	4.87E-08	6.51E-05	1.05E-06	6.61E-05
47.3	4.87E-08	1.35E-04	2.25E-06	1.38E-04
25.8	4.87E-08	7.05E-05	5.86E-07	7.12E-05

TABLE 3-101: SUMMARY OF UPPER RIVER $ADD_{Expected}$ FOR FEMALE OTTER ON A TEQ BASIS FOR THE PERIOD 1993 - 2018

	Total Average Dietary Dose (mg/Kg/day)		
Year	189	168	154
1993	2.40E-04	7.02E-05	2.74E-05
1994	1.67E-04	6.32E-05	2.55E-05
1995	1.91E-04	5.80E-05	2.34E-05
1996	1.21E-04	4.43E-05	1.86E-05
1997	1.19E-04	3.96E-05	1.83E-05
1998	9.58E-05	3.96E-05	1.79E-05
1999	9.31E-05	3.81E-05	1.72E-05
2000	7.62E-05	3.04E-05	1.44E-05
2001	6.62E-05	2.68E-05	1.33E-05
2002	6.44E-05	2.31E-05	1.18E-05
2003	5.77E-05	2.19E-05	1.10E-05
2004	7.56E-05	2.25E-05	1.10E-05
2005	6.47E-05	1.98E-05	9.75E-06
2006	5.16E-05	1.74E-05	8.82E-06
2007	6.14E-05	1.70E-05	8.48E-06
2008	6.17E-05	1.71E-05	7.90E-06
2009	6.11E-05	1.64E-05	7.55E-06
2010	5.78E-05	1.41E-05	6.60E-06
2011	4.59E-05	1.33E-05	6.14E-06
2012	4.52E-05	1.34E-05	5.30E-06
2013	3.75E-05	1.25E-05	4.91E-06
2014	4.15E-05	1.16E-05	4.64E-06
2015	3.83E-05	1.11E-05	4.46E-06
2016	4.37E-05	1.21E-05	4.56E-06
2017	4.86E-05	1.21E-05	4.66E-06
2018	4.43E-05	1.17E-05	4.63E-06

TABLE 3-102: SUMMARY OF LOWER RIVER $ADD_{Expected}$ FOR FEMALE OTTER ON A TEQ BASIS FOR THE PERIOD 1993 - 2018

	Total Average Dietary Dose (mg/Kg/day)			
Year	152	113	90	50
1993	2.15E-04	1.44E-04	3.31E-05	3.11E-05
1994	1.53E-04	1.24E-04	2.97E-05	2.75E-05
1995	1.32E-04	1.10E-04	2.73E-05	2.48E-05
1996	1.59E-04	1.04E-04	2.53E-05	2.27E-05
1997	1.42E-04	9.88E-05	2.27E-05	2.06E-05
1998	2.61E-04	2.11E-04	4.92E-05	4.44E-05
1999	1.08E-04	8.43E-05	2.11E-05	1.93E-05
2000	9.33E-05	7.08E-05	1.77E-05	1.63E-05
2001	1.02E-04	6.92E-05	1.62E-05	1.47E-05
2002	9.85E-05	7.21E-05	1.66E-05	1.48E-05
2003	8.67E-05	6.55E-05	1.56E-05	1.39E-05
2004	7.31E-05	6.07E-05	1.51E-05	1.35E-05
2005	6.88E-05	5.51E-05	1.38E-05	1.24E-05
2006	7.55E-05	5.30E-05	1.27E-05	1.14E-05
2007	6.87E-05	5.12E-05	1.21E-05	1.07E-05
2008	7.07E-05	5.45E-05	1.29E-05	1.13E-05
2009	6.23E-05	5.05E-05	1.24E-05	1.09E-05
2010	5.76E-05	4.26E-05	1.04E-05	9.19E-06
2011	6.66E-05	4.67E-05	1.06E-05	9.19E-06
2012	5.97E-05	4.58E-05	1.06E-05	9.02E-06
2013	6.54E-05	4.74E-05	1.09E-05	9.25E-06
2014	6.05E-05	4.57E-05	1.04E-05	8.90E-06
2015	5.54E-05	4.32E-05	1.01E-05	8.59E-06
2016	5.58E-05	4.44E-05	1.06E-05	9.18E-06
2017	5.13E-05	4.17E-05	1.02E-05	9.07E-06
2018	4.71E-05	3.73E-05	9.14E-06	8.07E-06

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Table 3-103: Summary of Distributions and Distribution Parameters

Input Variable	Units	Distribution Type	Parameters[1] for Kingfisher	Parameters[1] for Kingfisher Egg	Parameters[1] for Eagle	Parameters[1] for Eagle Egg	Parameters[1] for Mink	Parameters[1] for Otter
Piscivorous fish concentration at 189 in 1993	mg/kg wet weight	Lognormal			45.62 (10.65)	45.62 (10.65)		45.62 (10.65)
Piscivorous fish concentration at 168 in 1993	mg/kg wet weight	Lognormal			12.82 (5.50)	12.82 (5.50)		12.82 (5.50)
Piscivorous fish concentration at 154 in 1993	mg/kg wet weight	Lognormal			5.11 (1.98)	5.11 (1.98)		5.11 (1.98)
Piscivorous fish concentration at 189 in 2015	mg/kg wet weight	Lognormal			7.07 (2.50)	7.07 (2.50)		7.07 (2.50)
Piscivorous fish concentration at 168 in 2015	mg/kg wet weight	Lognormal			2.04 (1.01)	2.04 (1.01)		2.04 (1.01)
Piscivorous fish concentration at 154 in 2015	mg/kg wet weight	Lognormal			0.83 (0.33)	0.83 (0.33)		0.83 (0.33)
Forage fish concentration at 189 in 1993	mg/kg wet weight	Lognormal	14.77 (4.85)	14.77 (4.85)			14.77 (4.85)	
Forage fish concentration at 168 in 1993	mg/kg wet weight	Lognormal	3.00 (1.34)	3.00 (1.34)			3.00 (1.34)	
Forage fish concentration at 154 in 1993	mg/kg wet weight	Lognormal	1.13 (0.45)	1.13 (0.45)			1.13 (0.45)	
Forage fish concentration at 189 in 2015	mg/kg wet weight	Lognormal	2.85 (1.22)	2.85 (1.22)			2.85 (1.22)	
Forage fish concentration at 168 in 2015	mg/kg wet weight	Lognormal	0.48 (0.14)	0.48 (0.14)			0.48 (0.14)	
Forage fish concentration at 154 in 2015	mg/kg wet weight	Lognormal	0.17 (0.06)	0.17 (0.06)			0.17 (0.06)	
Benthic invertebrate concentration at 189 in 1993	mg/kg wet weight	Triangular	15.17 (13.65-16.68)	15.17 (13.65-16.68)	NA		15.17 (13.65-16.68)	15.17 (13.65-16.68)
Benthic invertebrate concentration at 168 in 1993	mg/kg wet weight	Triangular	9.30 (9.03-9.94)		NA		9.30 (9.03-9.94)	9.30 (9.03-9.94)
Benthic invertebrate concentration at 154 in 1993	mg/kg wet weight	Triangular	4.52 (4.07-4.97)		NA		4.52 (4.07-4.97)	4.52 (4.07-4.97)
Benthic invertebrate concentration at 189 in 2015	mg/kg wet weight	Triangular	2.24 (2.01-2.46)		NA		2.24 (2.01-2.46)	2.24 (2.01-2.46)
Benthic invertebrate concentration at 168 in 2015	mg/kg wet weight	Triangular	1.87 (1.68-2.06)		NA		1.87 (1.68-2.06)	1.87 (1.68-2.06)
Benthic invertebrate concentration at 154 in 2015	mg/kg wet weight	Triangular	0.69 (0.62-0.76)		NA		0.69 (0.62-0.76)	0.69 (0.62-0.76)
Body weight	kg	Triangular	0.147 (0.136-0.158)		5.1 (4.5-5.6)		0.827 (0.550-1.101)	7.32 (6.73-7.90)
Ingestion rate	g/day	Triangular	0.058 (0.055-0.060)		0.642 (0.585-0.690)		0.132 (0.119-0.145)	0.9 (0.7-1.1)
Percentage of diet consisting of fish	fraction	Triangular	0.75 (0.46-1.00)		0.9 (0.8 - 1.0)		0.30 (0.19-0.37)	0.88 (0.70-1.00)
Percentage of diet consisting of invertebrates	fraction	Triangular	1- % fish		0		0.16 (0.13-0.18)	1-% fish
Water intake rate	L/day	Triangular	0.016 (0.015-0.017)		0.175 (0.162-0.187)		0.08 (0.05-0.10)	0.59 (0.55-0.64)
Biomagnification factor				28 (8.0 - 60)		28 (8.0 - 60)		

Notes:

1 - Parameters for lognormal distribution are specified as mean (standard deviation).
Parameters for triangular distribution are specified as mode (min, max).

TABLE 4-1
COMMON EFFECTS OF PCB EXPOSURE IN ANIMALS

Hepatotoxicity
Hepatomegaly; bile duct hyperplasia, proliferation of smooth ER
Focal necrosis; fatty degeneration
Induction of microsomal enzymes; implications for hormone imbalances, pancreas and reproductive effects
Depletion of fat soluble vitamins (predominantly vitamin A)
Porphyria

Immunotoxicity
Atrophy of lymphoid tissues
Reduction in circulating leukocytes and lymphocytes
Suppressed antibody responses
Enhanced susceptibility to viruses
Suppression of natural killer cells

Neurotoxicity
Impaired behavioral responses
Alterations in catecholamine levels
Depressed spontaneous motor activity
Developmental deficits
Numbness in extremities

Reproduction
Increased abortion; low birth weights
Decreased survival and mating success
Increased length of estrus
Embryo and fetal mortality
Gross teratogenic effects
Biochemical, neurological, and functional changes following *in utero* exposure (mammals)
Decreased libido, decreased sperm numbers and motility

Gastrointestinal
Gastric hyperplasia
Ulceration and necrosis

Respiratory
Chronic bronchitis
Decreased vital capacity

Dermal Toxicity
Chloracne
Hyperplasia and hyperkeratosis of epithelium
Edema

Mutagenic Effects
Commercial mixtures are weakly mutagenic

Carcinogenic Effects
Preneoplastic changes
Neoplastic changes
Promotion considered main contribution
Attenuation of other carcinogens under certain conditions

Source: Hansen, L. G.. 1987. Environmental Toxicology of Polychlorinated Biphenyls in Environmental Toxin Series 1. eds. Safe, S. and Hutzinger, O., p. 32.

TABLE 4-2
WORLD-HEALTH ORGANIZATION FOR TOXIC EQUIVALENCY FACTORS (TEFs) FOR HUMANS, MAMMALS, FISH, AND BIRDS

Congener	Toxic Equivalency Factor		
	Humans/Mammals	Fish	Birds
Non-*ortho* PCBs			
3,4,4',5-TetraCB (81)	0.0001	0.0005	0.1
3,3',4,4'-TetraCB (77)	0.0001	0.0001	0.05
3,3',4,4',5-PentaCB (126)	0.1	0.005	0.1
3,3',4,4',5,5'-HexaCB (169)	0.01	0.00005	0.001
Mono-*ortho* PCBs			
2,3,3',4,4'-PentaCB (105)	0.0001	<0.000005	0.0001
2,3,4,4',5-PentaCB (114)	0.0005	<0.000005	0.0001
2,3',4,4',5-PentaCB (118)	0.0001	<0.000005	0.00001
2',3,4,4',5-PentaCB (123)	0.0001	<0.000005	0.00001
2,3,3',4,4',5-HexaCB (156)	0.0005	<0.000005	0.0001
2,3,3',4,4',5'-HexaCB (157)	0.0005	<0.000005	0.0001
2,3',4,4',5,5'-HexaCB (167)	0.00001	<0.000005	0.00001
2,3,3',4,4',5,5'-HeptaCB (189	0.0001	<0.000005	0.00001

Notes: CB = chlorinated biphenyls

Reference: van den Berg, et al. (1998). Toxic Equivalency Factors (TEFs) for PCBs PCDDs, PCDFs for Humans and Wildlife. Environmental Health Perspectives, 106:12, 775-791.

TABLE 4-3
SELECTED SEDIMENT SCREENING GUIDELINES: PCBs

	Total PCBs	Aroclor 1254	Aroclor 1248	Aroclor 1016	Aroclor 1260
Hudson River Sediment Effect Concentrations ***(mg/kg, or ppm)***					
(NOAA, 1999a)					
(Estuarine, freshwater, and saltwater)					
Threshold Effect Concentration	0.04				
Mid-range Effect Concentration	0.4				
Extreme Effect Concentration	1.7				
NYSDEC (1998) (Freshwater) ***(mg/kg organic carbon)***					
Benthic Aquatic Life Acute Toxicity	2760.8				
Benthic Aquatic Life Chronic Toxicity	19.3				
Wildife Bioaccumulation	1.4				
NYSDEC (1998) (Saltwater) ***(mg/kg organic carbon)***					
Benthic Aquatic Life Acute Toxicity	13803.3				
Benthic Aquatic Life Chronic Toxicity	41.4				
Wildlife Bioaccumulation	1.4				
Ontario Ministry of the Environment Sediment Guidelines (Freshwater)					
(Persaud et al., 1993)					
No Effect Level ***(mg/kg)***	0.01				
Lowest Effect Level ***(mg/kg)***	0.07	0.06	0.03	0.007	0.005
Severe Effect Level ***(mg/kg organic carbon)***	530	34	150	53	24
Long et al. (1995) Sediment Guidelines ***(ug/kg)***					
(Marine and Estuarine)					
Effects-Range-Low	22.7				
Effects-Range-Median	180				
Ingersoll et al. (1996) Sediment Guidelines ***(ug/kg, or ppb)***					
(Freshwater)					
(Derived from 28-day Hyalella azteca *data)*					
Effects-Range-Low	50				
Effects-Range-Median	730				
Threshold Effect Level	32				
Probable Effect Level	240				
No Effect Concentration	190				
				Aroclor 1242	
Washington State Dep't of Ecology 1997 Sediment Guidelines					
(Freshwater) ***(ug/kg, or ppb)*** [1]					
Apparent Effects Threshold (Microtox)	21	7.3			
Apparent Effects Threshold (*Hyalella azteca*)	820	350		100	
Probable Apparent Effects Threshold (Microtox)	21	7.3	21		
Probable Apparent Effects Threshold (*Hyalella azteca*)	450	240		100	
Lowest Apparent Effects Threshold (between Microtox and *H. azteca*)	21	7.3	21		
Jones et al. (1997) ***(ug/kg, or ppb)***					
EqP-derived; recommended TOC adjustment					
Secondary Chronic Value		810	1000		450000

Note: All values are dry weight unless noted.

Please note that for Washington state values, the Aroclor 1016 column becomes Aroclor 1242. This applies only to this one set of values.

[1] Some values also available in mg/kg organic carbon

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TABLE 4-4
TOXICITY ENDPOINTS FOR BENTHIC INVERTEBRATES
EFFECTIVE CONCENTRATIONS OF TOTAL PCBs, AROCLORS, AND DIOXIN TOXIC EQUIVALENTS (TEQs)

SPECIES	EXPOSURE MEDIA	PCB TYPE	EXPOSURE DURATION	EFFECT LEVEL	EFFECT CONC, WHOLE BODY CONC. (mg/kg wet wt)	EFFECT ENDPOINT	REFERENCE
Amphipod (*Gammarus pseudolimnaeus*)	Water	Aroclor 1248	2 months	LD_{50}	552	Mortality	Nebeker and Puglisi (1974)
Amphipod (*Hyalella azteca*)	Water	PCB 52	> or = 10 weeks	LD_{100}	180	Mortality	Borgmann et al. (1990)
Amphipod (*Hyalella azteca*)	Water	Aroclor 1242	> or = 10 weeks	LD_{100}	100	Mortality	Borgmann et al. (1990)
Amphipod (*Gammarus pseudolimnaeus*)	Water	Aroclor 1242	2 months	LD_{50}	316	Mortality	Nebeker and Puglisi (1974)
Cladoceran (*Daphnia magna*)	Model ecosystem	2,3,7,8-TCDD	33 days	EL (no effect)	1570	Mortality	Isensee and Jones (1975)
Amphipod (*Gammarus pseudolimnaeus*)	Water	Aroclor 1248	2 months	LOAEL	552	Reproduction reduced by at least 50%	Nebeker and Puglisi (1974)
Snail (*Physa* spp.)	Water	2,3,7,8-TCDD	33 days	EL (no effect)	502	Mortality	Isensee and Jones (1975) Isensee (1978)
Amphipod (*Gammarus pseudolimnaeus*)	Water	Aroclor 1242	2 months	EL (effect)	316	No reproduction	Nebeker and Puglisi (1974)
Oligochaete (*Lumbriculus variegatus*)	Algae (Food)	PCB 153	35 days	LOAEL	126	Mortality	Fisher et al. (1998)
Oligochaete (*Lumbriculus variegatus*)	Algae (Food)	PCB 153	35 days	LOAEL	126	Weight loss	Fisher et al. (1998)
Oligochaete (*Lumbriculus variegatus*)	Algae (Food)	PCB 15	35 days	LOAEL	119	Mortality	Fisher et al. (1998)
Oligochaete (*Lumbriculus variegatus*)	Algae (Food)	PCB 15	35 days	LOAEL	119	Weight loss	Fisher et al. (1998)
Oligochaete (*Lumbriculus variegatus*)	Algae (Food)	PCB 47	35 days	LOAEL	113	Mortality	Fisher et al. (1998)
Oligochaete (*Lumbriculus variegatus*)	Algae (Food)	PCB 47	35 days	LOAEL	113	Weight loss	Fisher et al. (1998)
Grass shrimp (*Palaemonetes pugio*)	Water	Aroclor 1254	7 days	LOAEL	65	Mortality (60%)	Nimmo et al. (1974)
Oligochaete (*Lumbriculus variegatus*)	Algae (Food)	PCB 1	35 days	LOAEL	64	Mortality	Fisher et al. (1998)
Oligochaete (*Lumbriculus variegatus*)	Algae (Food)	PCB 1	35 days	LOAEL	64	Weight loss	Fisher et al. (1998)
Grass shrimp (*Palaemonetes pugio*)	Water	Aroclor 1254	16 days	LOAEL	27	Mortality (45%)	Nimmo et al. (1974)
Amphipod (*Gammarus pseudolimnaeus*)	Water	Aroclor 1248	2 months	NOAEL	127	Reproduction	Nebeker and Puglisi (1974)
Amphipod (*Gammarus pseudolimnaeus*)	Water	Aroclor 1242	2 months	NOAEL	76	Reproduction	Nebeker and Puglisi (1974)
Oligochaete (*Lumbriculus variegatus*)	Algae (Food)	PCB 153	35 days	NOAEL	65	Mortality	Fisher et al. (1998)
Oligochaete (*Lumbriculus variegatus*)	Algae (Food)	PCB 153	35 days	NOAEL	65	Weight loss	Fisher et al. (1998)
Oligochaete (*Lumbriculus variegatus*)	Algae (Food)	PCB 15	35 days	NOAEL	63.1	Mortality	Fisher et al. (1998)

TABLE 4-4
TOXICITY ENDPOINTS FOR BENTHIC INVERTEBRATES
EFFECTIVE CONCENTRATIONS OF TOTAL PCBs, AROCLORS, AND DIOXIN TOXIC EQUIVALENTS (TEQs)

SPECIES	EXPOSURE MEDIA	PCB TYPE	EXPOSURE DURATION	EFFECT LEVEL	EFFECT CONC, WHOLE BODY CONC. (mg/kg wet wt)	EFFECT ENDPOINT	REFERENCE
Oligochaete (*Lumbriculus variegatus*)	Algae (Food)	PCB 15	35 days	NOAEL	63.1	Weight loss	Fisher et al. (1998)
Amphipod (*Hyalella azteca*)	Water	PCB 52	> or = 10 weeks	NOAEL	54	Mortality	Borgmann et al. (1990)
Oligochaete (*Lumbriculus variegatus*)	Algae (Food)	PCB 47	35 days	NOAEL	49.3	Mortality	Fisher et al. (1998)
Oligochaete (*Lumbriculus variegatus*)	Algae (Food)	PCB 47	35 days	NOAEL	49.3	Weight loss	Fisher et al. (1998)
Oligochaete (*Lumbriculus variegatus*)	Algae (Food)	PCB 1	35 days	NOAEL	33.2	Mortality	Fisher et al. (1998)
Oligochaete (*Lumbriculus variegatus*)	Algae (Food)	PCB 1	35 days	NOAEL	33.2	Weight loss	Fisher et al. (1998)
Amphipod (*Hyalella azteca*)	Water	Aroclor 1242	> or = 10 weeks	NOAEL	30	Mortality	Borgmann et al. (1990)
Grass shrimp (*Palaemonetes pugio*)	Water	Aroclor 1254	16 days	NOAEL	18	Mortality	Nimmo et al. (1974)
Grass shrimp (*Palaemonetes pugio*)	Water	Aroclor 1255	7 days	NOAEL	5.4	Mortality	Nimmo et al. (1974)

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TABLE 4-5
TOXICITY ENDPOINTS FOR FISH - LABORATORY STUDIES
EFFECTIVE CONCENTRATIONS OF TOTAL PCBs AND AROCLORS

SPECIES	EXPOSURE MEDIA	PCB TYPE	EXPOSURE DURATION	EFFECT LEVEL	EFFECT CONCENTRATION WHOLE BODY CONCENTRATION mg/kg wet wt.	EFFECT ENDPOINT	REFERENCE
Laboratory studies							
Lake trout (*Salvelinus namaycush*)	Water	PCB-153	15 days	LD100	7.6	Fry mortality	Broyles and Noveck, 1979
Chinook salmon (Oncorhnchus tshawytscha)	Water	PCB-153	15 days	LD100	3.6	Fry mortality	Broyles and Noveck, 1979
Adult Fathead Minnow (*Pimephales promelas*)	Water	Aroclor 1254	9 months	LOAEL	999	Adult mortality	Nebeker et al., 1974
Adult Fathead Minnow (*Pimephales promelas*)	Water	Aroclor 1254	9 months	LOAEL	429	Spawning	Nebeker et al., 1974
Brook trout fry (*Salvelinus fontinalis*)	Water	Aroclor 1254	118 days	LOAEL	125	Fry mortality	Mauck et al., 1978
Brook trout (*Salvelinus fontinalis*)	Water	Aroclor 1254	21 days	EL-effect	32.8 in muscle	Egg hatchabilty	Freeman and Idler, 1975
Brook trout fry (*Salvelinus fontinalis*)	Water	Aroclor 1254	21 days	EL-effect	77.9 in eggs	Egg hatchability	Freeman and Idler, 1975
Junvenile Spot (*Leiostomus xanthurus*)	Water	Aroclor 1254	20 days	LOAEL	46	Adult mortality	Hansen et al., 1971
Adult pinfish (*Lagodon rhomboides*)	Water	Aroclor 1016	42 days	LOAEL	42	Adult mortality	Hansen et al., 1974a
Adult Minnow (*Phoxinus phoxinus*)	Diet	Clophen A50	40 days; studied for 300 days	LOAEL	15	Hatching time; fry survival	Bengtsson, B., 1980
Killifish (*Fundulus heteroclitus*)	Single intraperitoneal injection into adults	PCB mixture	Single injection, 40 d of observation	LOAEL	19 (nominal dose)	Adult female mortality	Black et al., 1998a
Sheepshead minnow (*Cyprinodon variegatus*)	Water	Aroclor 1254	28 days	LOAEL	9.3	Fry mortality	Hansen et al., 1974b
Lake trout (*Salvelinus namaycush*)	Water	Aroclor 1254	48 days	EL-effect	4.5	Fry mortality	Mac and Seelye, 1981
Killifish (*Fundulus heteroclitus*)	Single intraperitoneal injection into adults	PCB mixture	Single injection, 40 days of observation	LOAEL	3.8 (nominal dose)	Egg production and food consumption	Black et al., 1998a
Lake trout (*Salvelinus namaycush*)	Water and food	Aroclor 1254	176 days	LOAEL	1.53	Fry mortality	Berlin et al., 1981
Adult Fathead Minnow (*Pimephales promelas*)	Water	Aroclor 1242	9 months	NOAEL	436	Adult mortality	Nebeker et al., 1974
Adult Fathead Minnow (*Pimephales promelas*)	Water	Aroclor 1254	9 months	NOAEL	429	Egg hatchability	Nebeker et al., 1974
Stickleback (*Gasterosteus aculeatus*)		Clophen A50	3.5 months	NOAEL	289	Spawning success and number of eggs laid per female	Holm et al., 1993
Adult pinfish (*Lagodon rhomboides*)	Water	Aroclor 1016	42 days	NOAEL	170	Adult mortality	Hansen et al., 1974a
Adult Fathead Minnow (*Pimephales promelas*)	Water	Aroclor 1254	9 months	NOAEL	105	Spawning	Nebeker et al., 1974

TABLE 4-5
TOXICITY ENDPOINTS FOR FISH - LABORATORY STUDIES
EFFECTIVE CONCENTRATIONS OF TOTAL PCBs AND AROCLORS

SPECIES	EXPOSURE MEDIA	PCB TYPE	EXPOSURE DURATION	EFFECT LEVEL	EFFECT CONCENTRATION WHOLE BODY CONCENTRATION mg/kg wet wt.	EFFECT ENDPOINT	REFERENCE
Brook trout fry (*Salvelinus fontinalis*)	Water	Aroclor 1254	118 days	NOAEL	71	Fry mortality	Mauck et al., 1978
Juvenile Spot (*Leiostomus xanthurus*)	Water	Aroclor 1254	Lab Stu	NOAEL	27	Adult mortality	Hansen et al., 1971
Killifish (*Fundulus heteroclitus*)	Single intraperitoneal injection into adults	PCB mixture	Single injection, 40 days of observation	NOAEL	3.8 (nominal dose)	Adult female mortality	Black et al., 1998a
Sheepshead minnow (*Cyprinodon variegatus*)	Water	Aroclor 1254	28 days	NOAEL	1.9	Fry mortality	Hansen et al., 1974b
Adult Minnow (*Phoxinus phoxinus*)	Diet	Clophen A50	40 days; studied for 300 days	NOAEL	1.6	Hatching time; fry survival	Bengtsson, B., 1980
Killifish (*Fundulus heteroclitus*)	Single intraperitoneal injection into adults	PCB mixture	Single injection, 40 days of observation	NOAEL	0.76 (nominal dose)	Egg production and food consumption	Black et al., 1998a

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TABLE 4-6
TOXICITY ENDPOINTS FOR FISH - FIELD STUDIES
EFFECTIVE CONCENTRATIONS OF TOTAL PCBs AND AROCLORS

SPECIES	FIELD COMPONENT	CONTAMINANT TYPE	EFFECT LEVEL	EFFECT CONCENTRATION mg/kg wet wt (or as noted below)	EFFECT ENDPOINT	REFERENCE
Field studies						
Arctic charr (*Salvelinus alpinus*)	Adult fish and eggs collected from Lake Geneva	PCBs DDT	EL-effect	10 to 78 mg/kg lipid in eggs	Embryomortality	Monod, 1985
Winter flounder (*Pseudopleuronectes americanus*)	Adult and eggs collected from New Bedford Harbor	PCBs	EL-effect	39.6 mg/kg dry wt in eggs	Growth rate of larvae	Black et al., 1988b
Killifish (*Fundulus heteroclitus*)	Fish collected from New Bedford Harbor	PCBs	LOAEL	29.2 mg/kg dry wt in liver	Embryo and larval survival	Black et al., 1998b
Killifish (*Fundulus heteroclitus*)	Fish collected from New Bedford Harbor	PCBs	LOAEL	20.8 mg/kg dry wt in liver	Adult female mortality	Black et al., 1998b
English sole (*Parophrys vetulus*)	Fish collected from Puget Sound	PCBs, PAHs	EL-effect	Approx. 10 mg/kg in liver	Increased fecundity	Johnson et al., 1997
Fathead minnow (*Pimephales promelas*)	Fish exposed to in lab to contaminated sediment collected from Sheboygen Harbor, Wis.	PCBs	LOAEL	13.7 in whole body	Fecundity and frequency of reproduction	USACE , 1988
Striped bass (*Morone saxatilis*)	Eggs from hatcheries. Larvae fed naturally contaminated food.	PCBs, HCB, pesticides	EL-effect	0.1 to 10 in eggs	Larval mortality	Westin et al., 1985
Chinook salmon (*Oncorhynchus tshawytscha*)	Adult fish and eggs collected from Lake Michigan	PCBs, pesticides	Correlation	2.8 to 9.9 A-1254 in eggs	Hatching success	Giesy et al., 1986
Chinook salmon (*Oncorhynchus tshawytscha*)	Adult fish and eggs collected from Lake Michigan	PCBs	Correlation	2.75 to 5.75 in eggs	Hatching success	Ankley et al., 1991
Lake trout (Salvelinus namaycush)	Adult fish and eggs collected from Lake Michigan	PCBs	Correlation	0.37 to 4.5 in eggs	Hatching success	Mac and Schwartz, 1992
Redbreast sunfish (*Lepomis auritus*)	Fish from an East Tennessee stream	PCBs, PAHs, metals, chlorine	LOAEL	0.4	Growth	Adams et al., 1989, 1990, 1992
Rainbow trout (*Salmo gairdneri*)	Adult fish and eggs hatchery	PCBs, DDT	EL-effect	2.7 in eggs	Embryomortality	Hogan and Braun, 1975
English sole (*Parophrys vetulus*)	Adults and eggs collected from Puget Sound	PCBs	LOAEL	2.56 in liver	Production of normal larvae	Casillas et al., 1991
Lake trout (*Salvelinus namaycush*)	Adult fish and eggs collected from Great Lakes	PCBs	Correlation	0.25 to 7.77 in eggs	Egg mortality and percent of normal fry hatching	Mac et al., 1993
Chinook salmon (*Oncorhynchus tshawytscha*)	Adult fish and eggs collected from Lake Michigan	PCBs, pesticides	Correlation	0.322 to 2.6 A-1260 in eggs	Hatching success	Giesy et al., 1986
Starry flounder (*Platichthys stellatus*)	Adult fish and eggs collected from area of San Francisco Bay	PCBs, HCB, Pthalates	EL-effect	about 50 to 200 in eggs	Hatching success	Spies and Rice, 1988
Baltic herring (*Clupea harengus*)	Adult fish and eggs collected from Baltic Sea	PCBs, pesticides	EL-effect	> 0.120 in ovaries	Hatching success	Hansen et el., 1985
Baltic flounder (*Platichthys flesus*)	Adult fish and eggs collected from Baltic Sea	PCBs, pesticides, metals	EL-effect	> 0.120 in ovaries	Hatching success	von Westernhagen et al., 1981
Killifish (*Fundulus heteroclitus*)	Fish collected from New Bedford Harbor	PCBs	NOAEL	9.5 mg/kg dry wt in liver	Embryo and larval mortality	Black et al., 1998b

TABLE 4-6
TOXICITY ENDPOINTS FOR FISH - FIELD STUDIES
EFFECTIVE CONCENTRATIONS OF TOTAL PCBs AND AROCLORS

SPECIES	FIELD COMPONENT	CONTAMINANT TYPE	EFFECT LEVEL	EFFECT CONCENTRATION mg/kg wet wt (or as noted below)	EFFECT ENDPOINT	REFERENCE
Field studies						
Fathead minnow (*Pimephales promelas*)	Fish exposed to in lab to contaminated sediment collected from Sheboygen Harbor, Wis.	PCBs	NOAEL	5.25 whole body	Fecundity and frequency of reproduction	USACE , 1988
Striped bass (*Morone saxatilis*)	Eggs from Hudson River fish. Larvae fed naturally contaminated food	PCBs	EL-no effect	3.1 in post yolk sac larvae	Larval mortality	Westin et al., 1983
Winter flounder (*Pseudopleuronectes americanus*)	Adult and eggs collected from New Bedford Harbor	PCBs	EL-no effect	1.08 mg/kg dry wt in eggs	Growth rate of larvae	Black et al., 1988b
English sole (*Parophrys vetulus*)	Adults and eggs collected from Puget Sound	PCBs	NOAEL	0.09 in liver	Production of normal larvae	Casillas et al., 1991
Redbreast sunfish (*Lepomis auritus*)	Fish from an East Tennessee stream	PCBs, PAHs, metals, chlorine	EL-no effect	0.5	Fecundity	Adams et al., 1989, 1990, 1992
Redbreast sunfish (*Lepomis auritus*)	Fish from an East Tennessee stream	PCBs, PAHs, metals, chlorine	NOAEL	0.3	Growth	Adams et al., 1989, 1990, 1992
Killifish (*Fundulus heteroclitus*)	Fish collected from New Bedford Harbor	PCBs	NOAEL	0.461 mg/kg dry wt in liver	Adult female mortality	Black et al., 1998b
Arctic charr (*Salvelinus alpinus*)	Adult fish and eggs collected from Lake Geneva	PCBs DDT	EL- no effect	0.1 to 0.31 in eggs	Embryomortality	Monod, 1985

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TABLE 4-7
TOXICITY ENDPOINTS FOR FISH - LABORATORY STUDIES
EFFECTIVE CONCENTRATIONS OF DIOXIN TOXIC EQUIVALENTS (TEQs)

SPECIES	EXPOSURE MEDIA	EFFECT LEVEL	TISSUE	CONTAMINANT TYPE	EFFECT CONC. (ug/kg ww)	LIPID CONTENT OF EGG (kg lipid/kg ww egg)	TEF	EFFECT CONC. DIOXIN EQUIVALENTS (ug TEQ/kg lipid)	EFFECT ENDPOINT	REFERENCE
Laboratory studies										
Chinook salmon (*Oncorhynchus tshawytscha*)	Water	LD100	Sac fry	2,4,5,2',4',5'-HCB	7600	Not reported	Not Available	Not Available	Early life stage mortality	Broyles and Noveck, 1979
Lake trout (*Salvelinus namaycush*)	Water	LD100	Sac fry	2,4,5,2',4',5'-HCB	3600	Not reported	Not Available	Not Available	Early life stage mortality	Broyles and Noveck, 1979
Fathead minnow (*Pimephales promelas*)	Water	LD100	Larvae	2,3,7,8-TCDD	163	Not reported for larvae	1		Early life stage mortality	Olivieri and Cooper, 1997
Brook trout (*Salvelinus fontinalis*)	Water	LD100	Egg	2,3,7,8-TCDD	0.324	0.068	1	4.8	Early life stage mortality	Walker and Peterson, 1994
Fathead minnow (*Pimephales promelas*)	Water	LD50	Embryo	2,3,7,8-TCDD	25.7	0.024	1	1071	Early life stage mortality	Olivieri and Cooper, 1997 [b]
Zebrafish (*Danio danio*)	Water	LD50	Egg	2,3,7,8-TCDD	2.61	0.017	1	154	Early life stage mortality	Elonen et al., 1998
Yellow perch (*Perca flavescens*)	Injection	LD50	Juvenile	2,3,7,8-TCDD	3	0.02	1	150	Mortality	Spitsbergen et al., 1988
Zebrafish (*Danio danio*)	Water	LD50	Egg	2,3,7,8-TCDD	2.5	0.017	1	147	Early life stage mortality	Henry et al., 1997
White sucker (*Catastomus commersoni*)	Water	LD50	Egg	2,3,7,8-TCDD	1.89	0.025	1	76	Early life stage mortality	Elonen et al., 1998
Northern pike (*Esox lucius*)	Water	LD50	Egg	2,3,7,8-TCDD	2.46	0.042	1	59	Early life stage mortality	Elonen et al., 1998
Medaka (*Oryzias latipes*)	Water	LD50	Egg	2,3,7,8-TCDD	1.11	0.029	1	38	Early life stage mortality	Elonen et al., 1998
Fathead minnow (*Pimephales promelas*)	Water	LD50	Egg	2,3,7,8-TCDD	0.539	0.024	1	22	Early life stage mortality	Elonen et al., 1998
Lake herring (*Coregonus artedii*)	Water	LD50	Egg	2,3,7,8-TCDD	0.902	0.066	1	14	Early life stage mortality	Elonen et al., 1998
Channel catfish (*Ictalurus punctatus*)	Water	LD50	Egg	2,3,7,8-TCDD	0.644	0.048	1	13	Early life stage mortality	Elonen et al., 1998
Rainbow trout (*Salmo gairderi*) - Erwin strain	Water	LD50	Egg	2,3,7,8-TCDD	0.439	0.087	1	5.0	Early life stage mortality	Walker et al., 1992
Rainbow trout (*Salmo gairderi*) - Erwin strain	Injection	LD50	Egg	2,3,7,8-TCDD	0.421	0.087	1	4.8	Early life stage mortality	Walker et al., 1992
Rainbow trout (*Salmo gairderi*) - Erwin strain	Egg injection	LD50	Egg	2,3,7,8-TCDD	0.409	0.087	1	4.7	Early life stage mortality	Zabel & Peterson, 1996
Rainbow trout (*Salmo gairderi*)	Egg injection	LD50	Egg	2,3,7,8-TCDD	0.374	0.087	1	4.3	Early life stage mortality	Walker and Peterson, 1991
Rainbow trout (*Salmo gairderi*)	Egg injection	LD50	Egg	PCB 126	74	0.087	0.005	4.3	Early life stage mortality	Walker and Peterson, 1991
Brook trout (*Salvenius fontinalis*)	Water	LD50	Egg	2,3,7,8-TCDD	0.200	0.068	1	2.9	Early life stage mortality	Walker and Peterson, 1994
Rainbow Trout (*Salmo gairdneri*) - Erwin strain	Egg injection	LD50	Egg	2,3,7,8-TCDD	0.242	0.087	1	2.8	Early life stage mortality	Zabel & Peterson, 1996
Brook trout (*Salvelinus fontinalis*)		LD50	Egg	2,3,7,8-TCDD	0.127	0.068	1	1.9	Early life stage mortality	Johnson et al., 1998
Lake trout (*Salvelinus namaycush*)	Water	LD50	Egg	PCB 126	29	0.08	0.005	1.8	Early life stage mortality	Zabel et al., 1995
Fathead minnow (Pimephales promelas)	Water	LD50	Embryo	2,3,7,8-TCDD	0.026	0.024	1	1.1	Early life stage mortality	Olivieri and Cooper, 1997
Lake trout (*Salvelinus namaycush*)	Water	LD50	Egg	2,3,7,8-TCDD	0.085	0.08	1	1.1	Early life stage mortality	Zabel et al., 1995
Lake trout (*Salvelinus namaycush*)	Water	LD50	Egg	2,3,7,8-TCDD	0.065	0.08	1	0.8	Early life stage mortality	Walker et al., 1992
Lake trout (*Salvelinus namaycush*)	Injection	LD50	Egg	2,3,7,8-TCDD	0.047	0.08	1	0.6	Early life stage mortality	Walker et al., 1992
Lake trout (*Salvelinus namaycush*)	Water	LD50	Egg	2,3,7,8-TCDD	0.042-0.072	0.08	1	0.5-0.9	Early life stage mortality	Guiney et al., 1996
Fathead minnow (Pimephales promelas)	Water	LD50	Larvae	2,3,7,8-TCDD	70.9	Not reported for larvae	1		Early life stage mortality	Olivieri and Cooper, 1997

TABLE 4-7
TOXICITY ENDPOINTS FOR FISH - LABORATORY STUDIES
EFFECTIVE CONCENTRATIONS OF DIOXIN TOXIC EQUIVALENTS (TEQs)

SPECIES	EXPOSURE MEDIA	EFFECT LEVEL	TISSUE	CONTAMINANT TYPE	EFFECT CONC. (ug/kg ww)	LIPID CONTENT OF EGG (kg lipid/kg ww egg)	TEF	EFFECT CONC. DIOXIN EQUIVALENTS (ug TEQ/kg lipid)	EFFECT ENDPOINT	REFERENCE
Yellow perch (*Perca flavescens*)	Injection	LOAEL	Juvenile	2,3,7,8-TCDD	5	0.02	1	250	Growth in juveniles	Spitsbergen et al., 1988
Zebrafish (*Danio danio*)	Water	LOAEL	Egg	2,3,7,8-TCDD	2	0.017	1	118	Early life stage mortality	Elonen et al., 1998
Fathead minnow (*Pimephales promelas*)	Water	LOAEL	Embryo	2,3,7,8-TCDD	2.46	0.024	1	103	Early life stage mortality	Olivieri and Cooper, 1997
White sucker (*Catastomus commersoni*)	Water	LOAEL	Egg	2,3,7,8-TCDD	1.22	0.025	1	49	Early life stage mortality	Elonen et al., 1998
Northern pike (*Esox lucius*)	Water	LOAEL	Egg	2,3,7,8-TCDD	1.8	0.042	1	43	Early life stage mortality	Elonen et al., 1998
Medaka (*Oryzias latipes*)	Water	LOAEL	Egg	2,3,7,8-TCDD	0.949	0.029	1	33	Early life stage mortality	Elonen et al., 1998
Fathead minnow (*Pimephales promelas*)	Water	LOAEL	Egg	2,3,7,8-TCDD	0.435	0.024	1	18	Early life stage mortality	Elonen et al., 1998
Channel catfish (*Ictalurus punctatus*)	Water	LOAEL	Egg	2,3,7,8-TCDD	0.855	0.048	1	18	Early life stage mortality	Elonen et al., 1998
Lake herring (*Coregonus artedii*)	Water	LOAEL	Egg	2,3,7,8-TCDD	0.27	0.066	1	4.1	Early life stage mortality	Elonen et al., 1998
Rainbow trout (*Salmo gairderi*)	Injection	LOAEL	Egg	2,3,7,8-TCDD	0.291	0.087	1	3.3	Early life stage mortality	Walker et al., 1992
Rainbow trout (*Salmo gairderi*)	Water	LOAEL	Egg	2,3,7,8-TCDD	0.279	0.087	1	3.2	Early life stage mortality	Walker et al., 1992
Brook trout (*Salvelinus fontinalis*)	Water	LOAEL	Egg	2,3,7,8-TCDD	0.185	0.068	1	2.7	Early life stage mortality	Walker and Peterson, 1994
Lake trout (*Salvelinus namaycush*)	Egg injection	LD50	Egg	TEQs from fish extract	0.103	0.08	1	1.3	Early life stage mortality	Tillitt and Wright, 1997
Lake trout (*Salvelinus namaycush*)	Egg injection	LD50	Egg	2,3,7,8-TCDD	0.081	0.08	1	1.0	Early life stage mortality	Tillitt and Wright, 1997
Lake trout (*Salvelinus namaycush*)	Injection	LOAEL	Egg	2,3,7,8-TCDD	0.058	0.08	1	0.7	Early life stage mortality	Walker et al., 1992
Lake trout (*Salvelinus namaycush*)	Injection	LOAEL	Egg	2,3,7,8-TCDD	0.055	0.08	1	0.7	Early life stage mortality	Walker et al., 1994
Lake trout (*Salvelinus namaycush*)	Water	LOAEL	Egg	2,3,7,8-TCDD	0.055	0.08	1	0.7	Early life stage mortality	Walker et al., 1992
Lake trout (*Salvelinus namaycush*)	Maternal transfer	LOAEL	Egg	2,3,7,8-TCDD	0.05	0.08	1	0.6	Early life stage mortality	Walker et al., 1994
Lake trout (*Salvelinus namaycush*)	Water	LOAEL	Egg	2,3,7,8-TCDD	0.04	0.08	1	0.5	Early life stage mortality	Walker et al., 1994
Fathead minnow (*Pimephales promelas*)	Water	LOAEL	Larvae	2,3,7,8-TCDD	20	Not reported for larvae	1		Early life stage mortality	Olivieri and Cooper, 1997
Yellow perch (*Perca flavescens*)	Injection	NOAEL	Juvenile	2,3,7,8-TCDD	1	0.02	1	50	Growth in juveniles	Spitsbergen et al., 1988
White sucker (*Catastomus commersoni*)	Water	NOAEL	Egg	2,3,7,8-TCDD	0.848	0.025	1	34	Early life stage mortality	Elonen et al., 1998
Northern pike (*Esox lucius*)	Water	NOAEL	Egg	2,3,7,8-TCDD	1.19	0.042	1	28	Early life stage mortality	Elonen et al., 1998
Zebrafish (*Danio danio*)	Water	NOAEL	Egg	2,3,7,8-TCDD	0.424	0.017	1	25	Early life stage mortality	Elonen et al., 1998
Medaka (*Oryzias latipes*)	Water	NOAEL	Egg	2,3,7,8-TCDD	0.455	0.029	1	16	Early life stage mortality	Elonen et al., 1998
Fathead minnow (*Pimephales promelas*)	Water	NOAEL	Egg	2,3,7,8-TCDD	0.235	0.024	1	9.8	Early life stage mortality	Elonen et al., 1998
Channel catfish (*Ictalurus punctatus*)	Water	NOAEL	Egg	2,3,7,8-TCDD	0.385	0.048	1	8.0	Early life stage mortality	Elonen et al., 1998
Fathead minnow (*Pimephales promelas*)	Water	NOAEL	Embryo	2,3,7,8-TCDD	0.13	0.024	1	5.4	Early life stage mortality	Olivieri and Cooper, 1997
Lake herring (*Coregonus artedii*)	Water	NOAEL	Egg	2,3,7,8-TCDD	0.175	0.066	1	2.7	Early life stage mortality	Elonen et al., 1998
Rainbow trout (*Salmo gairderi*)	Injection	NOAEL	Egg	2,3,7,8-TCDD	0.291	0.087	1	3.3	Early life stage mortality	Walker et al., 1992
Brook trout (*Salvenius fontinalis*)	Water	NOAEL	Egg	2,3,7,8-TCDD	0.135	0.068	1	2.0	Early life stage mortality	Walker and Peterson, 1994

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TABLE 4-7
TOXICITY ENDPOINTS FOR FISH - LABORATORY STUDIES
EFFECTIVE CONCENTRATIONS OF DIOXIN TOXIC EQUIVALENTS (TEQs)

SPECIES	EXPOSURE MEDIA	EFFECT LEVEL	TISSUE	CONTAMINANT TYPE	EFFECT CONC. (ug/kg ww)	LIPID CONTENT OF EGG (kg lipid/kg ww egg)	TEF	EFFECT CONC. DIOXIN EQUIVALENTS (ug TEQ/kg lipid)	EFFECT ENDPOINT	REFERENCE
Lake trout (*Salvelinus namaycush*)	Injection	NOAEL	Egg	2,3,7,8-TCDD	0.044	0.08	1	0.55	Early life stage mortality	Walker et al., 1992
Lake trout (*Salvelinus namaycush*)	Injection	NOAEL	Egg	2,3,7,8-TCDD	0.044	0.08	1	0.55	Early life stage mortality	Walker et al., 1994
Lake trout (*Salvelinus namaycush*)	Water	NOAEL	Egg	2,3,7,8-TCDD	0.034	0.08	1	0.43	Early life stage mortality	Walker et al., 1992
Lake trout (*Salvelinus namaycush*)	Water	NOAEL	Egg	2,3,7,8-TCDD	0.034	0.08	1	0.43	Early life stage mortality	Walker et al., 1994
Lake trout (*Salvelinus namaycush*)	Water	NOAEL	Egg	2,3,7,8-TCDD	0.03-0.045	0.08	1	0.4-0.6	Early life stage mortality	Guiney et al., 1996
Lake trout (*Salvelinus namaycush*)	Maternal transfer	NOAEL	Egg	2,3,7,8-TCDD	0.023	0.08	1	0.29	Early life stage mortality	Walker et al., 1994
Fathead minnow (*Pimephales promelas*)	Water	NOAEL	Larvae	2,3,7,8-TCDD	3.59	Not reported for larvae	1		Early life stage mortality	Olivieri and Cooper, 1997

Notes:
Fathead minnow embryo is assumed to have same lipid content as reported for eggs (Elonen et al., 1998)

TABLE 4-8
TOXICITY ENDPOINTS FOR FISH - FIELD STUDIES
EFFECTIVE CONCENTRATIONS OF DIOXIN TOXIC EQUIVALENTS (TEQs)

SPECIES	EXPOSURE MEDIA	EFFECT LEVEL	TISSUE	CONTAMINANT TYPE	EFFECT CONC. (ug/kg ww, unless noted differently below)	LIPID CONTENT OF EGG (g lipid/gww egg)	TEF	EFFECT CONC. DIOXIN EQUIVALENTS (ng TEQ/kg lipid)	EFFECT ENDPOINT	REFERENCE
Rainbow trout - Lake Superior (*Salmo gairdneri*)	Egg injection of extract from field-collected fish	LD50	Eggs	TEQs	1.43	0.087	1	16.4	Embryomortality	Wright and Tillitt , 1999
Rainbow trout - Arlee strain (*Salmo gairdneri*)	Egg injection of extract from field-collected fish	LD50	Eggs	TEQs	0.514	0.087	1	5.9	Embryomortality	Wright and Tillitt , 1999
Rainbow trout - Erwin strain (*Salmo gairdneri*)	Egg injection of extract from field-collected fish	LD50	Eggs	TEQs	0.206	0.087	1	2.4	Embryomortality	Wright and Tillitt , 1999
Killifish (*Fundulus heteroclitus*)	Fish collected from New Bedford Harbor	LOAEL	Liver	TEQs	1.56 ug/kg dry et	Not available	1	Not available	Embryo and larval survival	Black et al., 1998
Killifish (*Fundulus heteroclitus*)	Fish collected from New Bedford Harbor	LOAEL	Liver	TEQs	0.543 ug/kg dry wt	Not available	1	Not available	Adult female mortality	Black et al., 1998
Killifish (*Fundulus heteroclitus*)	Fish collected from New Bedford Harbor	NOAEL	Liver	TEQs	0.132 ug/kg dry wt	Not available	1	Not available	Embryo and larval survival	Black et al., 1998
Lake trout (*Salvelinus namaycush*)	Fish collected from Lake Ontario	EL-no effect	Eggs	TEQs	0.011	0.08	1	0.1	Early life stage mortality	Guiney et al., 1996
Killifish (*Fundulus heteroclitus*)	Fish collected from New Bedford Harbor	NOAEL	Liver	TEQs	0.00572 ug/kg dry wt	Not available	1	Not available	Adult female mortality	Black et al., 1998

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TABLE 4-9
TOXICITY ENDPOINTS FOR BIRDS - LABORATORY STUDIES
EFFECTIVE DIETARY DOSES OF TOTAL PCBs AND AROCLORS

SPECIES	EXPOSURE MEDIA	EXPOSURE DURATION	EFFECT LEVEL	PCB TYPE	EFFECTIVE DOSE (mg/kg/day)	EFFECTIVE FOOD CONC. (mg/kg)	EFFECT ENDPOINT	REFERENCE
Laboratory studies								
Mallard (*Anas platrhynchos*)		5 day	LD50	Aroclor 1254	853	8122	Mortality	Hill et al., 1975
Japanese quail (*Coturnix coturnix*)		5 day	LD50	Aroclor 1254	759	6737	Mortality	Hill et al., 1975
Japanese quail (*Coturnix coturnix*)	diet	5 day	LD50	Aroclor 1232	>563	>5000	Mortality	Heath et al. 1972
Japanese quail (*Coturnix coturnix*)	diet	5 day	LD50	Aroclor 1242	>563	>5000	Mortality	Heath et al. 1972
Japanese quail (*Coturnix coturnix*)	diet	5 day	LD50	Aroclor 1248	546	4845	Mortality	Heath et al. 1972
Mallard (Anas platrhynchos)	diet	5 day	LD50	Aroclor 1242	876	3180	Mortality	Heath et al. 1972
Japanese quail (*Coturnix coturnix*)	diet	5 day	LD50	Aroclor 1254	327	2900	Mortality	Heath et al. 1972
Mallard (Anas platrhynchos)	diet	5 day	LD50	Aroclor 1262	829	3010	Mortality	Heath et al. 1972
Mallard (Anas platrhynchos)	diet	5 day	LD50	Aroclor 1248	770	2795	Mortality	Heath et al. 1972
Mallard (Anas platrhynchos)	diet	5 day	LD50	Aroclor 1254	744	2700	Mortality	Heath et al. 1972
Northern bobwhite (*Colinus virginianus*)	diet	5 day	LD50	Aroclor 1232	279	3000	Mortality	Heath et al. 1972
Japanese quail (*Coturnix coturnix*)	diet	5 day	LD50	Aroclor 1260	246	2185	Mortality	Heath et al. 1972
Mallard (*Anas platrhynchos*)	diet	5 day	LD50	Aroclor 1260	211	1975	Mortality	Heath et al. 1972
Northern bobwhite (*Colinus virginianus*)	diet	5 day	LD50	Aroclor 1242	195	2100	Mortality	Heath et al. 1972
Ring-necked pheasant (*Phasianus colchicus*)	diet	5 day	LD50	Aroclor 1232	176	3150	Mortality	Heath et al. 1972
Northern bobwhite (*Colinus virginianus*)	diet	5 day	LD50	Aroclor 1254	141	1516	Mortality	Hill et al., 1975
Ring-necked pheasant (*Phasianus colchicus*)	diet	5 day	LD50	Aroclor 1242	116	2080	Mortality	Heath et al. 1972
Northern bobwhite (*Colinus virginianus*)	diet	5 day	LD50	Aroclor 1248	109	1175	Mortality	Heath et al. 1972
Northern bobwhite (*Colinus virginianus*)	diet	5 day	LD50	Aroclor 1262	81	870	Mortality	Heath et al. 1972
Ring-necked pheasant (*Phasianus colchicus*)	diet	5 day	LD50	Aroclor 1248	73	1310	Mortality	Heath et al. 1972
Ring-necked pheasant (*Phasianus colchicus*)	diet	5 day	LD50	Aroclor 1260	71	1260	Mortality	Heath et al. 1972
Ring-necked pheasant (*Phasianus colchicus*)	diet	5 day	LD50	Aroclor 1262	69	1235	Mortality	Heath et al. 1972
Northern bobwhite (*Colinus virginianus*)	diet	5 day	LD50	Aroclor 1260	69	745	Mortality	Heath et al. 1972
Ring-necked pheasant (*Phasianus colchicus*)	diet	5 day	LD50	Aroclor 1254	61	1090	Mortality	Heath et al. 1972
Northern bobwhite (*Colinus virginianus*)	diet	5 day	LD50	Aroclor 1[illegible]	56	605	Mortality	Heath et al. 1972

TABLE 4-9
TOXICITY ENDPOINTS FOR BIRDS - LABORATORY STUDIES
EFFECTIVE DIETARY DOSES OF TOTAL PCBs AND AROCLORS

SPECIES	EXPOSURE MEDIA	EXPOSURE DURATION	EFFECT LEVEL	PCB TYPE	EFFECTIVE DOSE (mg/kg/day)	EFFECTIVE FOOD CONC. (mg/kg)	EFFECT ENDPOINT	REFERENCE
Laboratory studies								
Common grackle (*Quiscalus quiscula*)	Diet	8 days	EL-effect	Aroclor 1254	Not available	1,500	Mortality	Stickel et al., 1984
Brown-headed cowbird (*Molothrus ater*)	Diet	7 days	EL-effect	Aroclor 1254	333	1500	Mortality	Stickel et al., 1984
Red-winged blackbird (*Agelaius phoeniceus*)	Diet	6 days	EL-effect	Aroclor 1254	321	1500	Mortality	Stickel et al., 1984
Japanese quail (*Coturnix coturnix*)	Oral by syringe	7 days	LOAEL	Aroclor 1260	100	888	Weight loss	Vos et al., 1971
Mallard (*Anas platrhynchos*)	Diet	12 weeks	EL-effect	Aroclor1242	41	150	Decreased weight gain in hens, eggshell thinning	Haseltine and Prouty, 1980
Domestic chicken (*Gallus domesticus*)	Drinking water	6 weeks	EL-effect	Aroclor 1254	3.5	50	Hatching success	Tumasonis et al., 1973
Ring-necked pheasant (*Phasianus colchicus*)	Diet, in gelatin capsules	Once per week for 16 weeks	LOAEL	Aroclor 1254	7.1	50 mg/capsule	Egg production	Dahlgren et al., 1972
Ring-necked pheasant (*Phasianus colchicus*)	Diet	Not available	LOAEL	Aroclor 1254	2.9	50	Female fertility	Roberts et al., 1978
Domestic chicken (*Gallus domesticus*)	Diet	9 weeks	LOAEL	Aroclor 1242	1.4	20	Egg production, hatching success, chick growth	Lillie et al., 1974
Domestic chicken (*Gallus domesticus*)	Diet	9 weeks	LOAEL	Aroclor 1248	1.4	20	Egg production, hatching success, chick growth	Lillie et al., 1974
Domestic chicken (*Gallus domesticus*)	Diet	9 weeks	LOAEL	Aroclor 1254	1.4	20	Egg production, hatching success, chick growth	Lillie et al., 1974
Domestic chicken (*Gallus domesticus*)	Diet	9 weeks	LOAEL	Aroclor1242	1.4	20	Hatching success	Cecil et al., 1974
Domestic chicken (*Gallus domesticus*)	Diet	9 weeks	LOAEL	Aroclor 1254	1.4	20	Hatching success	Cecil et al., 1974
Domestic chicken (*Gallus domesticus*)	Diet	9 weeks	LOAEL	Aroclor1248	1.4	20	Hatching success	Cecil et al., 1974
Ringed turtle dove (*Streptopelia risoria*)	Diet	3 months	EL-effect	Aroclor 1254	1.1	10	Hatching success	Peakall et al, 1972
Ringed turtle dove (*Streptopelia risoria*)	Diet		LOAEL	Aroclor 1254	1.1	10	Hatching success	Peakall and Peakall, 1973
Domestic chicken (*Gallus domesticus*)	Diet	6 weeks	LOAEL	Aroclor 1242	0.7	10	Hatching success	Britton and Huston, 1973
Domestic chicken (*Gallus domesticus*)	Diet	8 weeks	LOAEL	Aroclor 1242	0.7	10	Hatching success	Lillie et al., 1975
Domestic chicken (*Gallus domesticus*)	Diet	8 weeks	LOAEL	Aroclor 1248	0.7	10	Hatching success	Lillie et al., 1975
Domestic chicken (*Gallus domesticus*)	Diet	8 weeks	LOAEL	Aroclor 1248	0.7	10	Hatching success	Scott, 1977
Domestic chicken (*Gallus domesticus*)	Diet		LOAEL	Aroclor 1254	0.3	5	Fertility and egg production	Platonow and Reinhart, 1973
Mallard (Anas platrhynchos)	Oral by gavage	5 weeks	NOAEL	Aroclor 1254	143	Not available	Growth in adults	Fowles et al. 1997
Mallard (Anas platrhynchos)	Diet	12 weeks	EL-no effect	Aroclor1242	41	150	Reproduction success, hatching success, survival and growth of chicks	Haseltine and Prouty, 1980
Northern bobwhite (*Colinus virginianus*)	Diet	2 years	EL-no effect	Aroclor 1254	4.7	50	Egg production, hatching sucfess and survival of chicks	Heath et al., 1972

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TABLE 4-9
TOXICITY ENDPOINTS FOR BIRDS - LABORATORY STUDIES
EFFECTIVE DIETARY DOSES OF TOTAL PCBs AND AROCLORS

SPECIES	EXPOSURE MEDIA	EXPOSURE DURATION	EFFECT LEVEL	PCB TYPE	EFFECTIVE DOSE (mg/kg/day)	EFFECTIVE FOOD CONC. (mg/kg)	EFFECT ENDPOINT	REFERENCE
Laboratory studies								
Mallard (Anas platrhynchos)	Diet	4 months	EL-no effect	Aroclor 1254	11	39	Egg production	Riseborough and Anderson, 1975
Mallard (Anas platrhynchos)	Diet	Approx. 1 month	EL-no effect	Aroclor 1254	7	25	Reproduction success	Custer and Heinz, 1980
Mallard (Anas platrhynchos)	Diet	2 years	EL-no effect	Aroclor 1254	7	25	Egg production, hatching sucfess and survival of chicks	Heath et al., 1972
Japanese quail (*Coturnix coturnix*)	Diet	Not reported	NOAEL	Aroclor1248	2.3	20	Hatching success	Scott, 1977
Domestic chicken (*Gallus domesticus*)	Diet	8 weeks	NOAEL	Aroclor 1254	1.4	20	Egg production	Lillie et al., 1975
Domestic chicken (*Gallus domesticus*)	Diet	9 weeks	EL-no effect	Aroclor1221	1.4	20	Hatching success	Cecil et al., 1974
Domestic chicken (*Gallus domesticus*)	Diet	9 weeks	EL-no effect	Aroclor1232	1.4	20	Hatching success	Cecil et al., 1974
Domestic chicken (*Gallus domesticus*)	Diet	9 weeks	EL-no effect	Aroclor1268	1.4	20	Hatching success	Cecil et al., 1974
Domestic chicken (*Gallus domesticus*)	Diet	9 weeks	EL-no effect	Aroclor 5442	1.4	20	Hatching success	Cecil et al., 1974
Ring-necked pheasant (*Phasianus colchicus*)	Diet, in gelatin capsules	Once per week for 16 weeks	NOAEL	Aroclor 1254	1.8	12.5 mg/capsule	Egg production	Dahlgren et al., 1972
Screech owl (*Otus asio*)	Diet	> 8 weeks	EL-no effect	Aroclor1248	0.4	3	Egg prdoduction, hatching success, fledging success	McLane and Hughes, 1980
Domestic chicken (*Gallus domesticus*)	Diet	6 weeks	NOAEL	Aroclor1242	0.3	5	Hatching success	Britton and Huston, 1973
Domestic chicken (*Gallus domesticus*)	Diet	8 weeks	NOAEL	Aroclor 1242	0.3	5	Hatching success	Lillie et al., 1975
Domestic chicken (*Gallus domesticus*)	Diet	8 weeks	NOAEL	Aroclor1248	0.3	5	Hatching success	Lillie et al., 1975
Domestic chicken (*Gallus domesticus*)	Diet	9 weeks	NOAEL	Aroclor 1242	0.1	2	Egg production, hatching success, chick growth	Lillie et al., 1974
Domestic chicken (*Gallus domesticus*)	Diet	9 weeks	NOAEL	Aroclor 1248	0.1	2	Egg production, hatching success, chick growth	Lillie et al., 1974
Domestic chicken (*Gallus domesticus*)	Diet	9 weeks	NOAEL	Aroclor 1254	0.1	2	Egg production, hatching success, chick growth	Lillie et al., 1974
Domestic chicken (*Gallus domesticus*)	Diet	9 weeks	NOAEL	Aroclor1242	0.1	2	Hatching success	Cecil et al., 1974
Domestic chicken (*Gallus domesticus*)	Diet	9 weeks	NOAEL	Aroclor1248	0.1	2	Hatching success	Cecil et al., 1974
Domestic chicken (*Gallus domesticus*)	Diet	9 weeks	NOAEL	Aroclor 1254	0.1	2	Hatching success	Cecil et al., 1974
Domestic chicken (*Gallus domesticus*)	Diet	8 weeks	NOAEL	Aroclor1248	0.1	1	Hatching success	Scott, 1977

TABLE 4-10
TOXICITY ENDPOINTS FOR BIRDS - FIELD STUDIES
EFFECTIVE DIETARY DOSES OF TOTAL PCBs AND AROCLORS

SPECIES	FIELD COMPONENT	EFFECT LEVEL	CONTAMINANT TYPE	EFFECTIVE DOSE (mg/kg/day)	EFFECTIVE FOOD CONC. (mg/kg)	EFFECT ENDPOINT	REFERENCE
Field studies							
Forster's tern (*Sterna forsteri*)	Green Bay, Michigan	LOAEL	PCBs	0.176 (estimated)	Not provided	Wasting syndrome	Harris et al., 1993
Tree swallow (*Tachycineta bicolor*)	Populations in Fox River and Green Bay, Michigan	NOAEL	PCBs, DDE	0.55	up to 0.61	Clutch and egg success	Custer et al., 1998
Tree swallow (*Tachycineta bicolor*)	Populations along Hudson River	NOAEL	PCBs	16.1	up to 17.9	Growth, mortality, reproduction	US EPA Phase 2 Database (2000e)

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TABLE 4-11
TOXICITY ENDPOINTS FOR BIRDS - LABORATORY STUDIES
EFFECTIVE DIETARY DOSES OF DIOXIN TOXIC EQUIVALENTS (TEQs)

SPECIES	EXPOSURE MEDIA	EXPOSURE DURATION	EFFECT LEVEL	CONTAMINANT TYPE	EFFECTIVE DOSE (ug/kg/day)	TEF	EFFECTIVE DOSE DIOXIN EQUIVALENTS (ug/kg/day)	EFFECT ENDPOINT	REFERENCE
Ringed turtle dove (*Streptopelia risoria*)	Oral	Singe dose	LD_{50}	2,3,7,8-TCDD	> 810	1	> 810	Mortality	Hudson et al., 1984
Mallard (*Anas platyrhynchos*)	Oral	Single dose		2,3,7,8-TCDD	> 108	1	> 108	Mortality	Hudson et al., 1984
Domestic chicken (*Gallus domesticus*)	Oral	21 days	LD_{100}	2,3,7,8-TCDD	25 - 50	1	25 - 50	Mortality	Greig et al., 1973
Ring-necked pheasant (*Phasianus colchicus*)	Intraperitoneal	Single dose	LD_{75}	2,3,7,8-TCDD	25	1	25	Mortality	Nosek et al., 1992
Northern bobwhite (*Colinus virginianus*)	Oral	Single dose	LD_{50}	2,3,7,8-TCDD	15	1	15	Mortality	Hudson et al., 1984
Ringed turtle dove (*Streptopelia risoria*)	Intraperitoneal	Single dose	EL-effect	PCB 77	40,000	0.05	2000	Embryomortality	Spear et al., 1988
American kestrel (*Falco sparverius*)	Oral	10 days	LOAEL	PCB 126	250	0.1	25	Bone growth	Hoffman et al. 1996
Domestic chicken (*Gallus domesticus*)	Oral	21 days	LOAEL	2,3,7,8-TCDD	1.0	1	1.0	Mortality	Schwetz et al., 1973
Ring-necked pheasant (*Phasianus colchicus*)	Intraperitoneal	10 weeks	LOAEL	2,3,7,8-TCDD	0.14	1	0.14	Fertility, embryo mortality	Nosek et al., 1992
American kestrel (*Falco sparverius*)	Oral	10 days	NOAEL	PCB 126	50	0.1	5	Bone growth	Hoffman et al. 1996
Domestic chicken (*Gallus domesticus*)	Oral	21 days	NOAEL	2,3,7,8-TCDD	0.1	1	0.1	Mortality	Schwetz et al., 1973
Ring-necked pheasant (*Phasianus colchicus*)	Intraperitoneal	10 weeks	NOAEL	2,3,7,8-TCDD	0.014	1	0.014	Fertility, embryo mortality	Nosek et al., 1992

TABLE 4-12
TOXICITY ENDPOINTS FOR BIRDS - FIELD STUDIES
EFFECTIVE DIETARY DOSES OF DIOXIN TOXIC EQUIVALENTS (TEQs)

SPECIES	FIELD COMPONENT	EFFECT LEVEL	CONTAMINANT TYPE	EFFECTIVE DOSE DIOXIN EQUIVALENTS (ug/kg/day)	EFFECTIVE FOOD CONC. (ug/kg)	EFFECT ENDPOINT	REFERENCE
Field studies							
Tree swallow (*Tachycineta bicolor*)	Populations along Hudson River studied	EL-no effect	TEQs	4.9	up to 5.41	Growth, mortality, reproduction	US EPA Phase 2 Database, 2000e
Tree swallow (*Tachycineta bicolor*)	Populations in Fox River and Green Bay, Lake Michigan,	EL-no effect	TEQs, DDE	0.08	up to 0.091	Clutch and egg success	Custer et al., 1998

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TABLE 4-13
TOXICITY ENDPOINTS FOR BIRD EGGS - LABORATORY STUDIES
EFFECTIVE CONCENTRATIONS OF TOTAL PCBs AND AROCLORS

SPECIES	EXPOSURE MEDIA	EXPOSURE DURATION	EFFECT LEVEL	PCB TYPE	EFFECTIVE EGG CONC. (mg/kg egg)	EFFECT ENDPOINT	REFERENCE
Laboratory studies							
Ringed turtle dove (*Streptopelia risoria*)	Oral	Continual through two generations	EL-effect	Aroclor 1254	50	Hatching and fledging success	As reported in Peakall et al., 1972
Ringed turtle dove (*Streptopelia risoria*)	Oral	Continual through two generations	EL-effect	Aroclor 1254	16	Hatching and fledging success	Peakall and Peakall, 1973
Domestic chicken (*Gallus domesticus*)	Drinking water	6 weeks	EL-effect	Aroclor 1254	> 10-15 ppm in yolk	Deformities	Tumasonis et al., 1973
Domestic chicken (*Gallus domesticus*)	Egg injection		LOAEL	Aroclor 1260	10	Growth rate of chicks	Carlson and Duby, 1973
Domestic chicken (*Gallus domesticus*)	Egg injection		LOAEL	Aroclor 1254	6.7	Growth and mortality of embryos	Gould et al., 1997
Domestic chicken (*Gallus domesticus*)	Egg injection		LOAEL	Aroclor 1242	5	Hatching success	Carlson and Duby, 1973
Domestic chicken (*Gallus domesticus*)	Egg injection		LOAEL	Aroclor 1254	5	Hatching success	Carlson and Duby, 1973
Domestic chicken (*Gallus domesticus*)	Egg injection		LOAEL	Aroclor 1242	5	Growth rate of chicks	Carlson and Duby, 1973
Domestic chicken (*Gallus domesticus*)			LOAEL		5	Egg production and hatching success	Platanow and Reinhart, 1973
Domestic chicken (*Gallus domesticus*)	Diet	6 weeks	LOAEL	Aroclor 1242	3.7	Hatching success	Britton and Huston, 1973
Domestic chicken (*Gallus domesticus*)	Diet	4 weeks	LOAEL	Aroclor 1248	2.21	Hatching success	Scott, 1977
Mallard (*Anas platyrhynchos*)	Oral to adult	12 weeks	EL-no effect	Aroclor 1260	105	Hatching success, growth rate of chicks	Haseltine and Prouty, 1980
Domestic chicken (*Gallus domesticus*)	Egg injection		NOAEL	Aroclor 1260	10	Hatching success	Carlson and Duby, 1973
Screech owl (*Otus asio*)	Diet of hens	> 8 weeks	NOAEL	Aroclor 1248	7.1	Egg production, hatching success, and fledging success	McLane and Hughes, 1980
Domestic chicken (*Gallus domesticus*)	Egg injection		NOAEL	Aroclor 1260	5	Growth rate of chicks	Carlson and Duby, 1973
Domestic chicken (*Gallus domesticus*)	Egg injection		NOAEL	Aroclor 1242	2.5	Hatching success	Carlson and Duby, 1973
Domestic chicken (*Gallus domesticus*)	Egg injection		NOAEL	Aroclor 1254	2.5	Hatching success	Carlson and Duby, 1973
Domestic chicken (*Gallus domesticus*)	Egg injection		NOAEL	Aroclor 1242	2.5	Growth rate of chicks	Carlson and Duby, 1973
Domestic chicken (*Gallus domesticus*)	Diet	6 weeks	NOAEL	Aroclor 1242	1.7	Hatching success	Britton and Huston, 1973
Domestic chicken (*Gallus domesticus*)	Egg injection		NOAEL	Aroclor 1254	0.67	Growth and mortality of embryos	Gould et al., 1997
Domestic chicken (*Gallus domesticus*)	Diet	4 weeks	NOAEL	Aroclor 1248	0.33	Hatching success	Scott, 1977

TABLE 4-14
TOXICITY ENDPOINTS FOR BIRD EGGS - FIELD STUDIES
EFFECTIVE CONCENTRATIONS OF TOTAL PCBs AND AROCLORS

SPECIES	EFFECT LEVEL	CONTAMINANT TYPE	EFFECTIVE EGG CONC. (mg/kg egg)	EFFECT ENDPOINT	REFERENCE
Field studies					
Bald eagle (*Haliaeetus leucocephalus*)	EL-Effect	PCBs, Pesticides	45	Reproductive success	Clark et al., 1988
Double-crested cormorant (*Phalocrocorax auritus*)	EL-Effect	PCBs, Pesticides, Hg	23.8	Hatching success and fledging success	Weseloh et al., 1983
Caspian tern (*Hydropogne caspia*)	EL-Effect	PCBs, Pesticides	4.2 - 18	Increased rate of embryo deformities	Yamashita et al., 1993
Forster's tern (*Sterna forsteri*)	LOAEL	PCBs, Pesticides, Dioxins, Furans	22.2	Hatching success, Growth	Kubiak et al., 1989 Hoffman et al., 1987
Common tern (*Sterna hirundo*)	LOAEL	PCBs, Pesticides, Hg	7.6	Hatching success	Hoffman et al., 1993
Bald eagle (*Haliaeetus leucocephalus*)	LOAEL	PCBs, Pesticides, Hg	8.7	10 % reduction in reproductive success	Wiemeyer et al., 1984, 1993
Common tern (*Sterna hirundo*)	LOAEL	PCBs, Pesticides, Hg	7.6	Hatching success	Becker et al., 1993
Black-crowned night heron (*Nycticorax nycticorax*)	EL-effect	PCBs, Pesticides	4.1	Growth	Hoffman et al., 1986
Double-crested cormorant (*Phalocrocorax auritus*)	Correlation	PCBs	0.05-14.8	Egg Mortality	Tillitt et alk. 1992
Bald eagle (*Haliaeetus leucocephalus*)	EL- No Effect	PCBs, TEQs, Pesticides	33.2 - 64 in yolk sac	Hatching success	Elliott et al., 1996
Tree swallow (*Tachycineta bicolor*)	NOAEL	PCBs	26.7	Reproductive output	Secord and McCarty, 1997, McCarty and Secord, 1999, U.S. EPA Phase 2 Database Release 4.1b, 1998
Bald eagle (*Haliaeetus leucocephalus*)	EL- No Effect	PCBs, DDE, pesticides	26.4	Reproductive output	Donaldson et al., 1999
Red-breasted merganser (*Mergus serrator*)	EL-No effect	PCBs, pesticides	19.3	Hatching success, duckling production	Heinz et al. 1983
Forster's tern (Sterna forsteri)	NOAEL	PCBs	7.3	Hatching success, fledging success	Harris et al., 1993
Common tern (*Sterna hirundo*)	NOAEL	PCBs, Pesticides, Hg	6.3	Hatching success	Becker et al., 1993
Bald eagle (*Haliaeetus leucocephalus*)	NOAEL	PCBs, Pesticides, Hg	5.5	Reproductive success	Wiemeyer et al., 1984, 1993
Common tern (*Sterna hirundo*)	NOAEL	PCBs, Pesticides, Hg	4.7	Hatching success	Hoffman et al., 1993
Forster's tern (Sterna forsteri)	NOAEL	PCBs, Pesticides, Dioxins, Furans	4.5	Hatching success, growth	Kubiak et al., 1989 Hoffman et al., 1987
Tree swallow (*Tachycineta bicolor*)	NOAEL	PCBs, DDE	3.24 in eggs and pippers	Clutch success, egg success	Custer et al., 1998
Great blue heron (*Ardea herodias*)	EL-No effect	PCBs, Hg, metals	2.01	Reproductive success	Halbrook et al., 1999

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TABLE 4-15
TOXICITY ENDPOINTS FOR BIRD EGGS - LABORATORY STUDIES
EFFECTIVE CONCENTRATIONS OF DIOXIN TOXIC EQUIVALENTS (TEQs)

SPECIES	EXPOSURE MEDIA	EXPOSURE DURATION	EFFECT LEVEL	CONTAMINANT TYPE	EFFECTIVE EGG CONC. (ug/kg egg)	TEF	EFFECTIVE EGG CONC. DIOXIN EQUIVALENTS (ug TEQ/kg egg)	EFFECT ENDPOINT	REFERENCE
Laboratory studies									
Ring-necked pheasant (*Phasianus colchicus*)	Egg injection	Embryonic day 4 through hatch	LD100	PCB 77	1000	0.05	50	Embryo mortality	Brunstrom and Reutergardh, 1986
Domestic turkey (*Meleagris gallopavo*)	Egg injection	24 days	LD100	PCB 126	60	0.1	6	Embryo mortality	Brunstrom, 1989
American kestrel (*Falco sparverius*)	Egg injection	18 days	LD50	PCB 77	316	0.05	16	Embryo mortality	Hoffman et al., 1998
Double-crested cormorant (*Phalacrocorax auritus*)	Egg injection	21 days	LD50	PCB 126	158	0.1	16	Embryo mortality	Powell et al., 1997
Common tern (*Sterna hirundo*)	Egg injection	18 days	LD50	PCB 126	104	0.1	10	Embryo mortality	Hoffman et al., 1998
American kestrel (*Falco sparverius*)	Egg injection	20 days	LD50	PCB 126	65	0.1	7	Embryo mortality	Hoffman et al., 1998
Ring-necked pheasant (*Phasianus colchicus*)	Egg injection	28 days	LD50	2,3,7,8-TCDD	1.35	1	1	Embryo mortality	Nosek et al., 1993
Domestic chicken (*Gallus domesticus*)	Egg injection	18 days	LD50	PCB 105	5592	0.0001	1	Embryo mortality	Powell et al., 1996b
Domestic chicken (*Gallus domesticus*)	Egg injection	18 days	LD50	PCB 77	8.8	0.05	0.4	Embryo mortality	Powell et al., 1996b
Domestic chicken (*Gallus domesticus*)	Egg injection	24 days	LD50	PCB 126	2.3	0.1	0.2	Embryo mortality	Powell et al., 1996a
Domestic chicken (*Gallus domesticus*)	Egg injection	24 days	LD50	2,3,7,8-TCDD	0.15	1	0.2	Embryo mortality	Powell et al., 1996a
Domestic chicken (*Gallus domesticus*)	Egg injection	20 days	LD50	PCB 77	2.6	0.05	0.1	Embryo mortality	Hoffman et al., 1998
Domestic chicken (*Gallus domesticus*)	Egg injection	18 days	LD50	PCB 126	0.4	0.1	0.04	Embryo mortality	Hoffman et al., 1998
Domestic chicken (*Gallus domesticus*)	Egg injection	18 days	LD50	PCB 126	0.6	0.1	0.1	Embryo mortality	Powell et al., 1996b
Swedish duck (*Anas platyrhynchos*)	Egg injection	24 days	LOAEL	PCB 77	5000	0.05	250	Embryo mortality	Brunstrom, 1988
Domestic goose (*Anser anser*)	Egg injection	24 days	LOAEL	PCB 77	1000	0.05	50	Embryo mortality	Brunstrom, 1988
Herring gull (*Laurus argentatus*)	Egg injection	24 days	EL-no effect	PCB 77	1000	0.05	50	Embryo mortality	Brunstrom, 1988
Double-crested cormorant (*Phalacrocorax auritus*)	Egg injection	21 days	LOAEL	PCB 126	400	0.1	40	Embryo mortality	Powell et al., 1997
American kestrel (*Falco sparverius*)	Egg injection	20 days	LOAEL	PCB 126	233	0.1	23	Embryo mortality	Hoffman et al., 1998
American kestrel (*Falco sparverius*)	Egg injection	20 days	LOAEL	PCB 77	100	0.05	5	Embryo mortality	Hoffman et al., 1998
Common tern (*Sterna hirundo*)	Egg injection	18 days	LOAEL	PCB 126	44	0.1	4	Embryo mortality	Hoffman et al., 1998
Double-crested cormorant (*Phalacrocorax auritus*)	Egg injection	21 days	LOAEL	2,3,7,8-TCDD	4	1	4	Embryo mortality	Powell et al., 1997
Ring-necked pheasant (*Phasianus colchicus*)	Egg injection	21 days	LOAEL	2,3,7,8-TCDD	1	1	1	Embryo mortality	Nosek et al. 1993
Domestic chicken (*Gallus domesticus*)	Egg injection	18 days	LOAEL	PCB 105	8100	0.0001	1	Embryo mortality	Powell et al., 1996b

TABLE 4-15
TOXICITY ENDPOINTS FOR BIRD EGGS - LABORATORY STUDIES
EFFECTIVE CONCENTRATIONS OF DIOXIN TOXIC EQUIVALENTS (TEQs)

SPECIES	EXPOSURE MEDIA	EXPOSURE DURATION	EFFECT LEVEL	CONTAMINANT TYPE	EFFECTIVE EGG CONC. (ug/kg egg)	TEF	EFFECTIVE EGG CONC. DIOXIN EQUIVALENTS (ug TEQ/kg egg)	EFFECT ENDPOINT	REFERENCE
Domestic turkey (*Meleagris gallopavo*)	Egg injection	24 days	LOAEL	PCB 126	20	0.1	2	Embryo mortality	Brunstrom, 1989
Domestic chicken (*Gallus domesticus*)	Egg injection	18 days	LOAEL	PCB 77	9	0.05	0.5	Embryo mortality	Powell et al., 1996b
Domestic chicken (*Gallus domesticus*)	Egg injection	18 days	LOAEL	PCB 77	6	0.05	0.3	Embryo mortality	Hoffman et al., 1998
Domestic chicken (*Gallus domesticus*)	Egg injection	Approx. 18 days	LOAEL	PCB 77	4	0.05	0.2	Hatchability	Brunstrom, 1988
Domestic chicken (*Gallus domesticus*)	Egg injection	18 days	LOAEL	PCB 77	5	0.05	0.3	Embryo mortality	Brunstron, 1988
Domestic chicken (*Gallus domesticus*)	Egg injection	24 days	LOAEL	2,3,7,8-TCDD	0.16	1	0.2	Embryo mortality	Powell et al., 1996a
Rock dove (*Columba livia*)	Egg injection	Embryonic day 3 through hatch	EL-Effect	2,3,7,8-TCDD	1	1	1.0	Hatchability	Janz and Bellward, 1996
Domestic chicken (*Gallus domesticus*)	Egg injection	18 days	LOAEL	PCB 126	0.9	0.1	0.09	Embryo mortality	Powell et al., 1996b
Domestic chicken (*Gallus domesticus*)	Egg injection	18 days	LOAEL	PCB 126	0.5	0.1	0.05	Embryo mortality	Hoffman et al., 1998
Domestic chicken (*Gallus domesticus*)	Egg injection	24 days	LOAEL	PCB 126	0.2	0.1	0.02	Embryo mortality	Powell et al., 1996a
Common goldeneye (*Bucephala clangula*)	Egg injection	Embryonic day 5 through hatch	EL-No effect	PCB 77	1000	0.05	50	Embryo mortality	Brunstrom and Reutergardh, 1986
Common black-headed gull (*Larus ridibundus*)	Egg injection	Embryonic day 4 through hatch	EL-No effect	PCB 77	1000	0.05	50	Embryo mortality	Brunstrom and Reutergardh, 1986
Common eider (*Somateria mollissima*)	Egg injection	Embryonic day 5 through hatch	EL-no effect	PCB 77	1000	0.05	50	Embryo mortality	Brunstrom et al. 1990
Double-crested cormorant (*Phalacrocorax auritus*)	Egg injection	21 days	NOAEL	PCB 126	200	0.1	20	Embryo mortality	Powell et al., 1997
Common eider (*Somateria mollissima*)	Egg injection	Embryonic day 5 through hatch	EL-no effect	PCB 126	100	0.1	10	Embryo mortality	Brunstrom et al. 1990
Ring-necked pheasant (*Phasianus colchicus*)	Egg injection	Embryonic day 4 through hatch	NOAEL	PCB 77	100	0.05	5	Embryo mortality	Brunstrom and Reutergardh, 1986
Mallard (*Anas platyrhynchos*)	Egg injection	Embryonic day 5 through hatch	EL-No effect	PCB 77	100	0.05	5	Embryo mortality	Brunstrom and Reutergardh, 1986
Great blue heron (*Ardea herodias*)	Egg injection	Embryonic Day 9 through hatch	EL-No effect	2,3,7,8-TCDD	2	1	2	Growth rate of chicks	Janz and Bellward, 1996
American kestrel (*Falco sparverius*)	Egg injection	20 days	NOAEL	PCB 126	23	0.1	2	Embryo mortality	Hoffman et al., 1998
Double-crested cormorant (*Phalacrocorax auritus*)	Egg injection	21 days	NOAEL	2,3,7,8-TCDD	1	1	1	Embryo mortality	Powell et al., 1997
Domestic chicken (*Gallus domesticus*)	Egg injection	18 days	NOAEL	PCB 105	2700	0.0001	0.3	Embryo mortality	Powell et al., 1996b
Domestic chicken (*Gallus domesticus*)	Egg injection	18 days	NOAEL	PCB 77	3	0.05	0.2	Embryo mortality	Powell et al., 1996b
Ring-necked pheasant (*Phasianus colchicus*)	Egg injection	28 days	NOAEL	2,3,7,8-TCDD	0.1	1	0.1	Embryo mortality	Nosek et al., 1993
Domestic chicken (*Gallus domesticus*)	Egg injection	24 days	NOAEL	2,3,7,8-TCDD	0.08	1	0.1	Embryo mortality	Powell et al., 1996a
Domestic chicken (*Gallus domesticus*)	Egg injection	18 days	NOAEL	PCB 77	1.2	0.05	0.1	Embryo mortality	Hoffman et al., 1998
Domestic chicken (*Gallus domesticus*)	Egg injection	Embryonic day 4 through hatch	EL-No effect	2,3,7,8-TCDD	0.1	1	0.1	Hatchability	Janz and Bellward, 1996

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TABLE 4-15
TOXICITY ENDPOINTS FOR BIRD EGGS - LABORATORY STUDIES
EFFECTIVE CONCENTRATIONS OF DIOXIN TOXIC EQUIVALENTS (TEQs)

SPECIES	EXPOSURE MEDIA	EXPOSURE DURATION	EFFECT LEVEL	CONTAMINANT TYPE	EFFECTIVE EGG CONC. (ug/kg egg)	TEF	EFFECTIVE EGG CONC. DIOXIN EQUIVALENTS (ug TEQ/kg egg)	EFFECT ENDPOINT	REFERENCE
Domestic chicken (*Gallus domesticus*)	Egg injection	18 days	NOAEL	PCB 126	0.3	0.1	0.03	Embryo mortality	Hoffman et al., 1998
Domestic chicken (*Gallus domesticus*)	Egg injection	18 days	NOAEL	PCB 126	0.3	0.1	0.03	Embryo mortality	Powell et al., 1996b
Domestic chicken (*Gallus domesticus*)	Egg injection	24 days	NOAEL	PCB 126	0.1	0.1	0.01	Embryo mortality	Powell et al., 1996a

TABLE 4-16
TOXICITY ENDPOINTS FOR BIRD EGGS - FIELD STUDIES
EFFECTIVE CONCENTRATIONS OF DIOXIN TOXIC EQUIVALENTS (TEQs)

SPECIES	EFFECT LEVEL	CONTAMINANT TYPE	EFFECTIVE EGG CONC. DIOXIN EQUIVALENTS (ug TEQ/kg egg)	EFFECT ENDPOINT	REFERENCE
Field studies					
Osprey (*Pandion haliaeetus*)	EL-Effect level	TCDD	29 - 162	Growth rate of chicks	Woodford, et al., 1998
Eastern bluebird (*Siala sialis*)	LOAEL	TCDD	10	Reproductive behavior	Thiel et al., 1988
Bald eagle (*Haliaeetus leucocephalus*)	EL-Effect level	TEQs, DDE	0.51-1.2	Reproductive success	Clark et al., 1998
Great blue heron (*Ardea herodias*)	LOAEL	TEQs	0.5	Growth rate	Sanderson et al., 1994
Great blue heron (*Ardea herodias*)	EL-Effect level	TEQs, pesticides	0.5	Growth rate	Hart et al., 1991
Double-crested cormorant (*Phalacrocorax auritus*)	EL-effect level	TEQ	0.035 - 0.344	Egg mortality	Tillitt et al., 1992
Great blue heron (*Ardea herodias*)	EL-Effect level	TEQs, pesticides	0.23	Reproductive success	Elliott et al., 1989
Forster's tern (*Sterna forsteri*)	EL-Effect	TEQs, pesticides	2.20	Hatching success, growth rate of chicks	Kubiak et al., 1989
Forster's tern (*Sterna forsteri*)	LOAEL	TEQs	1.06	Hatching success	Harris et al., 1993
Forster's tern (*Sterna forsteri*)	EL-Effect level	TEQ	0.21	Hatching success	Tillitt et al., 1993
Wood duck (*Aix sponsa*)	LOAEL	TEQs, pesticides	0.02	Nest success, hatching success, duckling production	White and Seginak, 1994; White and Hoffman, 1995
Caspian tern (*Hydroprogne caspia*)	Correlation	TEQs	0.25-0.4 (approx.)	Rate of deformities in dead chicks	Ludwig et al., 1996
Double-crested cormorant (*Phalacrocorax auritus*)	Correlation	TEQs	0.2-0.5 (approx.)	Rate of deformities in dead chicks	Ludwig et al., 1996
Double-crested cormorant (Phalacrocorax auritus)	Correlation	TEQs	0.035-0.344	Egg mortality	Tillitt et al., 1992
Tree swallow (*Tachycineta bicolor*)	NOAEL	TEQs	13	Reproductive success	US EPA Phase 2 Database (2000e)
Great blue heron (*Ardea herodias*)	NOAEL	TCDD	2	Growth of chicks	Janz and Bellward, 1996
Herring gull (*Larus argentatus*)	NOAEL	TEQs	1-2	Hatching success	Ludwig et al., 1993
Eastern bluebird (*Siala sialis*)	NOAEL	TCDD	1	Reproductive behavior	Thiel et al., 1988
Caspian tern (*Sterna caspia*)	NOAEL	TEQs	0.75	Hatching success	Ludwig et al., 1993
Forster's tern (*Sterna forsteri*)	NOAEL	TEQs	0.61	Hatching success	Harris et al., 1993
Tree swallow (*Tachycineta bicolor*)	EL-No effect	TEQs	0.589 in pippers	Reproductive success	Custer et al., 1998
Great blue heron (*Ardea herodias*)	NOAEL	TEQs	0.3	Reduced body weight	Sanderson et al., 1994
Great blue heron (*Ardea herodias*)	NOAEL	TEQs	0.24	Growth rate	Hart et al., 1991
Bald eagle (*Haliaeetus leucocephalus*)	EL-no effect	TEQs	0.21	Hatching success	Elliott et al., 1996
Forster's tern (*Sterna forsteri*)	EL-no effect	TEQs, pesticides	0.2	Hatchabilty, growth rate of chicks	Kubiak et al., 1989
Great blue heron (*Ardea herodias*)	EL-No effect	TEQs, pesticides	0.079	Reproductive success	Elliott et al., 1989
Osprey (*Pandion haliaeetus*)	EL-no effect	TCDD, TEQs	ND - 23.8	Growth rate of chicks	Woodford et al., 1998
Osprey (*Pandion haliaeetus*)	EL-no effect	TEQs	0.136	Embryo survival	Woodford et al., 1998
Foster's tern (*Sterna forsteri*)	EL-no effect	TEQs	0.023	Hatching success	Tillitt et al., 1993
Wood duck (*Aix sponsa*)	NOAEL	TEQs, pesticides	0.005	Nest success, hatching success, duckling production	White and Seginak, 1994; White and Hoffman, 1995

TABLE 4-17
TOXICITY ENDPOINTS FOR OTHER MAMMALS - LABORATORY STUDIES
EFFECTIVE DIETARY DOSES OF TOTAL PCBs AND AROCLORS

SPECIES	EXPOSURE MEDIA	EXPOSURE DURATION	EFFECT LEVEL	PCB TYPE	EFFECTIVE DOSE (mg/kg/day)	FOOD INGESTION RATE (kg/kg/day)	EFFECTIVE FOOD CONC. (mg/kg)	EFFECT ENDPOINT	REFERENCE
Laboratory studies*									
Osborne-Mendel Rat	Oral-gavage	2.5 wk, 2 d per week	LD_{50}	Aroclor 1254	1530	0.099		Mortality	Garthoff et al., 1981
Osborne-Mendel Rat	Oral-gavage	2.5 wk, 2 d per week	LD_{50}	Aroclor 1254	1530	0.099		Mortality	Garthoff et al., 1981
Wistar Rat	Diet	From mating to weaning of pups	LD_{50}	Aroclor 1254	22	0	269	2 day postnatal mortality of offspring	Overmann et al., 1987
Juvenile Male Rat	Single intraperitoneal injection	Observed after 14 days	LOAEL	Aroclor 1248	2000			Growth rate of juveniles	Harris et al., 1993
Juvenile Male Rat	Single intraperitoneal injection	Observed after 14 days	LOAEL	Aroclor 1232	2000			Growth rate of juveniles	Harris et al., 1993
Sherman Rat	Diet	8 months	LOAEL	Aroclor 1260	72.4	0.08		Mortality	Kimbrough et al., 1972
Raccoon (*Procyon lotor*)	Diet	8 days	EL-effect	Arochor 1254	50			Decreased weight gain	Montz et al., 1982
Osborne-Mendel Rat	Diet	During pregnancy and lactation	LOAEL	Not reported	49.471	0.080	500	Reduced litter size	Collins & Capen, 1980
Balb/c Mouse	Oral	6 months	LOAEL	Aroclor 1254	48.75	0.18		Mortality	Koller et al., 1977
Adult Female Rat	Oral	Day 1,3,5,7 and 9 of lactation	LOAEL	Aroclor 1254	32	0.08		Reduced growth rate of offspring	Sager & Girard, 1994
Wistar Rat	Oral-gavage	1 month	LOAEL	Aroclor 1254	30	0.08		Decreased litter size, survival of weanlings	Brezner et al., 1984
White-footed Mouse (*Peromyscus leucopus*)	Diet	12 weeks	EL-effect	Aroclor 1254	17		10	Reduced growth rate reproduction in second generation	Linzey, 1988
Wistar Rat	Diet	42 days	LOAEL	Aroclor 1254	13.5	0.08		Neonatal death	Overmann, 1987
Mouse	Diet	108 days	LOAEL	Aroclor 1254	12.5	0.18		Decreased conception	Welsch, 1985
Rabbit	Oral-gavage	28 days	LOAEL	Aroclor 1254	12.5	0.034		Fetal death	Villeneuve et al., 1971
Pig	Diet	91 days	LOAEL	Aroclor 1242	9.2			Decreased weight gain	Hansen et al., 1976 (ATSDR)
New Zealand White Rabbit	Diet	> 4 weeks	LOAEL	Aroclor 1248	8.9	0.0	250	Reduced growth rate in offspring	Thomas and Hinsdill, 1980
Osborne-Mendel Rat	Diet	During pregnancy and lactation	LOAEL	Not reported	4.947	0.080	50	Reduced growth rate of offspring	Collins & Capen, 1980
Rhesus Monkey (*Macaca mulatta*)	Diet	2 months	LOAEL	Aroclor 1248	4.3	0.2		Decreased conception	Allen et al., 1974
Rhesus Monkey (*Macaca mulatta*)	Diet	2 months	LOAEL	Aroclor 1248	4.3	0.2		Abortion	Allen et al., 1974
Fischer Rat	Diet	105 weeks	LOAEL	Aroclor 1254	2.5	0.08		Decreased survival	NCI, 1978
Guinea Pig	Oral-gavage	Gestational day 18-60	LOAEL	Clophen A50	2.5			Fetal death	Lundkvist, 1990
Sherman Rat	Diet	Multigenerational	LOAEL	Aroclor 1254	1.5	0.08	20	Decreased litter size	Linder et al., 1974
Swine	Diet	Throughout gestation	EL-effect	Aroclor 1242	Not available		20	Decreased litter size	Hansen et al., 1975
Wistar Rat	Diet	52 weeks	LOAEL	Aroclor 1254	1	0.08		Decreased growth rate	Phillips et al., 1972 (ATSDR)
Oldfield Mouse (*Peromyscus polionotus*)	Diet	12 months	EL-effect	Aroclor 1254	[illegible]	0.01	5	Decreased offspring born per mated pair, birth weight, % survival of offspring to weaning	McCoy et al., 1995
Rhesus Monkey (*Macaca mulatta*)	Diet	38 weeks	LOAEL	Aroclor 1254	0.2	0.2		No conception, abortion	Arnold et al., 1990
Rhesus Monkey (*Macaca mulatta*)	Diet	7 months	LOAEL	Aroclor 1248	[illegible]	0.2		Decreased conception	Barsotti et al., 1976
Wistar Rat	Diet	From mating to weaning of pups	LOAEL	Aroclor 1254	[illegible]	0.08	2.5	Reduced growth rate in offspring	Overmann et al., 1987
Rhesus Monkey (*Macaca mulatta*)	Diet	2 months	LOAEL	Aroclor 1242	0.12	0.2		No weight gain	Becker et al., 1979
Rhesus Monkey (*Macaca mulatta*)	Diet	1.5 years	LOAEL	Aroclor 1248	0.12	0.2	5	Reduced birth weight	Allen and Barsotti, 1976
Rhesus Monkey (*Macaca mulatta*)	Diet	18 months	LOAEL	Aroclor 1248	0.1	0.2		Infant mortality	Allen et al., 1980
Cynomolgus Monkey	Diet	238 days	LOAEL	Aroclor 1254	0.1			100% fetal death	Truelove et al., 1982
Rhesus Monkey (*Macaca mulatta*)	Diet	18.2	LOAEL	Aroclor 1248	0.08	0.2		Decreased birth weight	Levin et al., 1988
Rhesus Monkey (*Macaca mulatta*)	Diet	> 8 months	LOAEL	Aroclor 1016	0.04	0.2	1	Reduced birth weight	Barsotti and Van Miller, 1984
Juvenile Male Rat	Single intraperitoneal injection	Observed after 14 days	NOAEL	Aroclor 1248	480			Growth rate of juveniles	Harris et al., 1993
Juvenile Male Rat	Single intraperitoneal injection	Observed after 14 days	NOAEL	Aroclor 1232	480			Growth rate of juveniles	Harris et al., 1993
Wistar Rat	Diet	52 weeks	NOAEL	Aroclor 1254	10	0.08		Decreased growth rate	Phillips et al., 1972 (ATSDR)
Rabbit	Oral-gavage	28 days	NOAEL	Aroclor 1254	10	0.034		Fetal death	Villeneuve et al., 1971
Adult Female Rat	Oral	Day 1,3,5,7 and 9 of lactation	NOAEL	Aroclor 1254	8	0.099		Growth rate of offspring	Sager & Girard, 1994
Cottontail Rabbit (*Sylvilagus floridanus*)		12 weeks	EL-no effect	Aroclor 1254	Not reported		10	Growth rate and rate of conception	Zepp and Kirkpatrick, 1976
New Zealand White Rabbit	Diet	> 4 weeks	NOAEL	Aroclor 1248	3.6	0.034	100	Reduced growth rate in offspring	Thomas and Hinsdill, 1980

TABLE 4-17
TOXICITY ENDPOINTS FOR OTHER MAMMALS - LABORATORY STUDIES
EFFECTIVE DIETARY DOSES OF TOTAL PCBs AND AROCLORS

SPECIES	EXPOSURE MEDIA	EXPOSURE DURATION	EFFECT LEVEL	PCB TYPE	EFFECTIVE DOSE (mg/kg/day)	FOOD INGESTION RATE (kg/kg/day)	EFFECTIVE *FOOD CONC.* (mg/kg)	*EFFECT ENDPOINT*	*REFERENCE*
Sherman Rat	Diet	Multigenerational	NOAEL	Aroclor 1254	0.32	0.08	5	Decreased litter size	Linder et al., 1974
Osborne-Mendel Rat	Diet	During pregnancy and lactation	NOAEL	Aroclor 1254	0.059	0.08	50	Reduced litter size	Collins & Capen, 1980
Rhesus Monkey (*Macaca mulatta*)	Diet	> 8 months	NOAEL	Aroclor 1016	0.01	0.2	0.25	Reduced birth weight	Barsotti and Van Miller, 1984
Wistar Rat	Diet	From mating to weaning of pups	NOAEL	Aroclor 1254	0.0016	0.08	0.02	Reduced growth rate in offspring	Overmann et al., 1987

Notes:

[a]No relevant field studies were found.

Dose to rhesus monkey calculated using food ingestion rate of 0.2 kg/day and body weight of 5 kg (Sample et al., 1996)

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TABLE 4-18
TOXICITY ENDPOINTS FOR OTHER MAMMALS - LABORATORY STUDIES
EFFECTIVE DIETARY DOSES OF DIOXIN TOXIC EQUIVALENTS (TEQs)

SPECIES	EXPOSURE MEDIA	EXPOSURE DURATION	EFFECT LEVEL	CONTAMINANT TYPE	EFFECTIVE DOSE DIOXIN EQUIVALENTS (ug TEQ/kg/day)*	EFFECT ENDPOINT	REFERENCE
Laboratory studies							
Hamster	Oral	Single dose	LD_{50}	2,3,7,8-TCDD	1,160 - 5,050	Mortality	Kociba and Schwetz, 1982
Mouse	Oral	Single dose	LD_{50}	2,3,7,8-TCDD	114 -284	Mortality	Kociba and Schwetz, 1982
Dog	Oral	Single dose	LD_{50}	2,3,7,8-TCDD	about 100 - 200	Mortality	Kociba and Schwetz, 1982
Rabbit	Oral	Single dose	LD_{50}	2,3,7,8-TCDD	115	Mortality	Schwetz et al., 1973
Rhesus monkey (*Macaca mulatta*)	Oral	Single dose	LD_{50}	2,3,7,8-TCDD	approx. 70	Mortality	Kociba and Schwetz, 1982
Rat	Oral	Single dose	LD_{50}	2,3,7,8-TCDD	22 - 45	Mortality	Schwetz et al., 1973
Guinea pig	Oral	Single dose	LD_{52}	2,3,7,8-TCDD	0.6 - 2.1	Mortality	Schwetz et al., 1973
Rat		Gestation days 6 to 15	LOAEL	2,3,7,8-TCDD	0.25	Litter size, pup weight	Khera and Ruddick, 1973
Rat		2 years	LOAEL	2,3,7,8-TCDD	0.1	Female mortality	Kociba et al., 1978
Rat		3 generations	LOAEL	2,3,7,8-TCDD	0.01	Reproductive capacity	Murray et al.,1979
Rhesus monkey (*Macaca mulatta*)		7 months	LOAEL	2,3,7,8-TCDD	0.0021	Number of births	Allen et al., 1979
Rhesus monkey (*Macaca mulatta*)		7 - 48 months, maternal	LOAEL	2,3,7,8-TCDD	0.00059	Reproductive	Bowman et al., 1989b
Rat		Gestation days 6 to 15	NOAEL	2,3,7,8-TCDD	0.125	Litter size, pup weight	Khera and Ruddick, 1973
Rat		2 years	NOAEL	2,3,7,8-TCDD	0.01	Female mortality	Kociba et al., 1978
Rat		3 generations	NOAEL	2,3,7,8-TCDD	0.001	Reproductive capacity	Murray et al. 1979
Rhesus monkey (*Macaca mulatta*)		7 to 48 months, maternal	NOAEL	2,3,7,8-TCDD	0.00012	Reproductive	Bowman et al., 1989

TABLE 4-19
TOXICITY ENDPOINTS FOR MINK - LABORATORY STUDIES
EFFECTIVE DIETARY DOSES OF TOTAL PCBs AND AROCLORS

SPECIES	EXPOSURE MEDIA	EXPOSURE DURATION	EFFECT LEVEL	PCB TYPE	EFFECTIVE DOSE (mg/kg/day)	EFFECTIVE FOOD CONC. (mg/kg)	EFFECT ENDPOINT	REFERENCE
Laboratory studies								
Mink (*Mustela vision*)	Diet	4 weeks	LD50	Aroclor 1254	11.5	84	Adult mortality	Hornshaw (1984), as cited in Aulerich et al. (1986)
Mink (*Mustela vision*)	Diet	4 weeks	LD50	Aroclor 1254	10.8	79	Adult mortality	Aulerich et al. (1986)
Mink (*Mustela vision*)	Diet	4 weeks	LD50	Aroclor 1254	6.4	47	Adult mortality	Hornshaw et al. (1986)
Mink (*Mustela vision*)	Diet	4 weeks	LD50	Aroclor 1254 (weathered)	6.4	47	Adult mortality	Aulerich et al. (1986)
Mink (*Mustela vision*)	Diet	9 months	LD50	Aroclor 1254	0.9	6.6	Mortality	Ringer et al. (1981)
Mink (*Mustela vision*)	Diet	8 months	EL-effect	Aroclor 1016	2.7	20	Reduced birth weight and growth rate of kits	Bleavins et al., 1980
Mink (*Mustela vision*)	Diet	8 months	EL-effect	Aroclor 1016	2.7	20	Adult mortality	Bleavins et al., 1980
Mink (*Mustela vision*)	Diet	4 weeks	LOAEL	Aroclor 1254	1.4	10	Reduced weight gain in juveniles	Hornshaw et al. (1986)
Mink (*Mustela vision*)	Diet	8 months	LOAEL	Aroclor 1242	1.4	10	Adult mortality	Bleavins et al., 1980
Mink (*Mustela vision*)	Diet	3 months	EL-effect	Clophen A-50	2	Not reported	Decreased number of kits born alive	Kihlstom et al., 1992
Mink (*Mustela vision*)	Diet	3 months	EL-effect	Aroclor 1254	2	Not reported	Decreased number of kits born alive	Kihlstom et al., 1992
Mink (*Mustela vision*)	Diet	8 months	LOAEL	Aroclor 1242	0.7	5	Reduced reproduction	Bleavins et al., 1980
Mink (*Mustela vision*)	Diet	4 months	LOAEL	Aroclor 1254	0.8	5	Decreased number of kits born alive	Aulerich and Ringer (1977)
Mink (*Mustela vision*)	Diet	105 days	LOAEL	Aroclor 1254 (weathered)	0.5	3.57	Adult mortality	Platonow & Karstad (1973)
Mink (*Mustela vision*)	Diet	66 days	LOAEL	Not reported	0.5	3.3	Decreased number of kits born alive	Jensen et al. (1977)
Mink (*Mustela vision*)	Diet	4 months	EL-effect	Aroclor 1254	0.3	2.5	Decreased number of kits born alive	Aulerich et al. (1985)
Mink (*Mustela vision*)	Diet	9 months	EL-effect	Aroclor 1254	0.3	2	Reduced number of kits born alive	Aulerich and Ringer (1977)
Mink (*Mustela vision*)	Diet	6 months	EL-effect	Aroclor 1254	0.1	1	Reduced growth rates of kits	Wren et al., 1987
Mink (*Mustela vision*)	Diet	160 days	LOAEL	Aroclor 1254 (weathered)	0.09	0.64	Reduced number of kits born alive	Platonow & Karstad (1973)
Mink (*Mustela vision*)	Diet	8 months	NOAEL	Aroclor 1242	0.9	5	Adult mortality	Bleavins et al., 1980
Mink (*Mustela vision*)	Diet	4 months	NOAEL	Aroclor 1254	0.2	1	Decreased number of kits born alive	Aulerich & Ringer (1977)

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TABLE 4-20
TOXICITY ENDPOINTS FOR MINK - FIELD STUDIES
EFFECTIVE DIETARY DOSES OF TOTAL PCBs AND AROCLORS

SPECIES	FIELD COMPONENT	STUDY DURATION	EFFECT LEVEL	CONTAMINANT TYPE	EFFECTIVE DOSE (mg/kg/day)	EFFECTIVE FOOD CONC. (mg/kg)	EFFECT ENDPOINT	REFERENCE
Field studies								
Mink (*Mustela vision*)	Fed contaminated Great Lakes fish	290 days	LD100	PCBs as Aroclor 1254	0.14	0.66	Kit survival	Hornshaw et al., 1983
Mink (*Mustela vision*)	Fed contaminated carp from Saginaw Bay, MI	Mink were fed prior to and throughout the reproductive period	LOAEL	PCBs, TEQs, others	0.13	N/A	Reproductive success, growth/survival of kits	Heaton et al. (1995)
Mink (*Mustela vision*)	Fed contaminated carp from Saginaw Bay, MI	Mink fed prior to breeding and over two generations	LOAEL	PCBs, pesticides	0.08	0.5	Kit survival	Restum et al., 1998
Mink (*Mustela vision*)	Fed contaminated carp from Saginaw Bay, MI	Mink fed prior to breeding and over two generations	LOAEL	PCBs, pesticides	0.04	0.25	Reduced growth rate of kits	Restum et al., 1998
Mink (*Mustela vision*)	Fed contaminated carp from Saginaw Bay, MI	Mink fed prior to breeding and over two generations	NOAEL	PCBs, pesticides	0.04	0.25	Kit survival	Restum et al., 1998
Mink (*Mustela vision*)	Fed contaminated Great Lakes fish	290 days	NOAEL	PCBs	0.01	0.66	Kit survival	Hornshaw et al., 1983
Mink (*Mustela vision*)	Fed contaminated carp from Saginaw Bay, MI	Mink were fed prior to and throughout the reproductive period	NOAEL	PCBs, TEQs, others	0.004	N/A	Reproductive success, growth/survival of offspring	Heaton et al. (1995)

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TOXICITY ENDPOINTS FO[illegible]NK - LABORATORY STUDIES
EFFECTIVE DIETARY DOSES OF DIOXIN TOXIC EQUIVALENTS (TEQs)

SPECIES	EXPOSURE MEDIA	STUDY DURATION	EFFECT LEVEL	CONTAMINANT TYPE	EFFECTIVE DOSE (ug/kg/day)	TEF	EFFECTIVE DOSE DIOXIN EQUIVALENTS (ug TEQ/kg/day)	EFFECT ENDPOINT	REFERENCE
Laboratory studies									
Mink males (*Mustela vison*)	Oral	Single dose	LD_{51}	2,3,7,8-TCDD	4.2		4.2	Mortality	Hochstein et al., 1988
Mink (*Mustela vison*)	Oral	12.5 weeks	LD50	PCB 169	10	0.01	0.10	Mortality	Aulerich et al., 1985
Newborn mink kits (*Mustela vison*)	Intraperitoneal	12 days	LD62	2,3,7,8-TCDD	0.01		0.01	Mortality	Aulerich et al., 1988

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TABLE 4-22
TOXICITY ENDPOINTS FOR MINK - FIELD STUDIES
EFFECTIVE DIETARY DOSES OF DIOXIN TOXIC EQUIVALENTS (TEQs)

SPECIES	FIELD COMPONENT	STUDY DURATION	EFFECT LEVEL	CONTAMINANT TYPE	EFFECTIVE FOOD CONC. (ug/kg)	EFFECTIVE DOSE DIOXIN EQUIVALENTS (ug TEQ/kg/day)	EFFECT ENDPOINT	REFERENCE
Field studies								
Mink (*Mustela vision*)	Fed contaminated carp from Saginaw Bay, MI	Fed prior to and throughout breeding period	LOAEL	TEQs, pesticides	0.0194	0.0036	Growth rate of kits	Heaton et al. (1995)
Mink (*Mustela vision*)	Fed contaminated carp from Saginaw Bay, MI	Fed prior to and throughout breeding period	LOAEL	TEQs (chemically derived)	0.0126	0.00224	Growth and survival rate of kits	Tillitt et al., 1996
Mink (*Mustela vision*)	Fed contaminated carp from Saginaw Bay, MI	Fed prior to and throughout breeding period	LOAEL	TEQs (bioassay derived)	0.0194	0.00344	Growth and survival rate of kits	Tillitt et al., 1996
Mink (*Mustela vision*)	Fed contaminated carp from Saginaw Bay, MI	Fed prior to and throughout breeding period	NOAEL	TEQs (bioassay derived)	0.001	0.00027	Growth and survival rate of kits	Tillitt et al., 1996
Mink (*Mustela vision*)	Fed contaminated carp from Saginaw Bay, MI	Fed prior to and throughout breeding period	NOAEL	TEQs, pesticides	0.001	0.00025	Growth rate of kits	Heaton et al. (1995)
Mink (*Mustela vision*)	Fed contaminated carp from Saginaw Bay, MI	Fed prior to and throughout breeding period	NOAEL	TEQs (chemically derived)	0.0003	0.00008	Growth and survival rate of kits	Tillitt et al., 1996

TABLE 4-23
TAXONOMY OF STUDIED ORGANISMS

Phylum	*Class*	*Subclass*	*Order*	*Family*	*Genus*	*Species*	*Common name*
Chordata	Mammalia		Carnivora	Mustelidae	*Lutra*	*canadensis*	River Otter
Chordata	Mammalia		Carnivora	Mustelidae	*Mustela*	*vision*	Mink
Chordata	Mammalia		Carnivora	Procyonidae	*Procyon*	*lotor*	Raccoon
Chordata	Mammalia		Chiroptera	Vespertilionidae	*Myotis*	*lucifugus*	Little Brown Bat
Chordata	Mammalia		Lagomorphus	Leporidae	*[Sylvilagus]*	*[transitionalis]*	Rabbit [Eastern Cottontail]
Chordata	Mammalia		Rodentia	Muridae	*[Peromyscus]*	*[polionotus]*	Mouse [Oldfield Mouse]
Chordata	Mammalia		Rodentia	Muridae	*[Rattus]*	*[rattus]*	Rat
							Birds
Chordata	Aves		Anseriformes	Anatidae	*Aix*	*sponsa*	Wood Duck
Chordata	Aves		Anseriformes	Anatidae	*Anas*	*platyrhynchos*	Mallard Duck
Chordata	Aves		Anseriformes	Anatidae	*Anser*	*anser*	Domestic Goose
Chordata	Aves		Anseriformes	Anatidae	*Bucephala*	*clangula*	Common Goldeneye
Chordata	Aves		Anseriformes	Anatidae	*Mergus*	*serrator*	Red-Breasted Merganser
Chordata	Aves		Anseriformes	Anatidae	*Somateria*	*mollissima*	Common Eider
Chordata	Aves		Charadriiformes	Laridae	*Larus*	*argentus*	Herring Gull
Chordata	Aves		Charadriiformes	Laridae	*Larus*	*ridibundus*	Black-Headed Gull
Chordata	Aves		Charadriiformes	Laridae	*Hydropogne*	*caspia*	Caspian Tern
Chordata	Aves		Charadriiformes	Laridae	*Sterna*	*hirundo*	Common Tern
Chordata	Aves		Charadriiformes	Laridae	*Sterna*	*forsteri*	Forster's Tern
Chordata	Aves		Ciconiiformes	Ardeidae	*Ardea*	*herodias*	Great Blue Heron
Chordata	Aves		Ciconiiformes	Ardeidae	*Nycticorax*	*nycticorax*	Black-crowned Night Heron
Chordata	Aves		Columbiformes	Columbidae	*Columbia*	*livia*	Rock Dove (Common Pigeon)
Chordata	Aves		Columbiformes	Columbidae	*Streptopelia*	*risoria*	Ringed Turtle Dove
Chordata	Aves		Coraciiformes	Alcedinidae	*Ceryle*	*alcyon*	Belted Kingfisher
Chordata	Aves		Falconiiformes	Accipitridae	*Haliaeetus*	*leucocephalus*	Bald Eagle
Chordata	Aves		Falconiiformes	Falconidae	*Falco*	*sparvenius*	American Kestrel
Chordata	Aves		Falconiiformes	Pandionidae	*Pandion*	*haliaeetus*	Osprey
Chordata	Aves		Galliformes	Phasianidae	*Colinus*	*virginianus*	Northern Bobwhite
Chordata	Aves		Galliformes	Phasianidae	*Coturnix*	*coturnix*	Japanese Quail
Chordata	Aves		Galliformes	Phasianidae	*Gallus*	*domesticus*	Domestic Chicken
Chordata	Aves		Galliformes	Phasianidae	*Meleagris*	*gallopavo*	Domestic Turkey
Chordata	Aves		Galliformes	Phasianidae	*Phasianus*	*colchicus*	Ring-Necked Pheasant
Chordata	Aves		Passeriformes	Hirundinidae	*Tachycineta*	*bicolor*	Tree Swallow
Chordata	Aves		Passeriformes	Icteridae	*Agelaius*	*phoeniceus*	Red-Winged Blackbird
Chordata	Aves		Passeriformes	Icteridae	*Molothrus*	*ater*	Brown-Headed Cowbird
Chordata	Aves		Passeriformes	Icteridae	*Quiscalus*	*quiscula*	Common Grackle
Chordata	Aves		Passeriformes	Sturnidae	*Sturnus*	*vulgaris*	European Starling
Chordata	Aves		Passeriformes	Turdidae	*Siala*	*sialis*	Eastern Bluebird
Chordata	Aves		Pelecaniformes	Phalacrocoracidae	*Phalacrocorax*	*auritus*	Double-Crested Cormorant
Chordata	Aves		Strigiformes	Strigidae	*Otus*	*asio*	Screech Owl
							Fish
Chordata	Pisces	Actinopterygii	Acipenseriformes	Acipenseridae	*Acipenser*	*brevirostrum*	Shortnose Sturgeon
Chordata	Pisces	Actinopterygii	Beloniformes	Adrianichthydiae	*Oryzias*	*latipes*	Medaka
Chordata	Pisces	Actinopterygii	Clupeiformes	Clupeidae	*Clupea*	*harengus*	Baltic Herring
Chordata	Pisces	Actinopterygii	Cypriniformes	Catostomidae	*Catastomus*	*commersoni*	White Sucker
Chordata	Pisces	Actinopterygii	Cypriniformes	Cyprinidae	*Danio*	*danio*	Zebrafish

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TABLE 4-23
TAXONOMY OF STUDIED ORGANISMS

Phylum	*Class*	*Subclass*	*Order*	*Family*	*Genus*	*Species*	*Common name*
Chordata	Pisces	Actinopterygii	Cypriniformes	Cyprinidae	*Notropis*	*hudsonius*	Spottail Shiner
Chordata	Pisces	Actinopterygii	Cypriniformes	Cyprinidae	*Phoxinus*	*phoxinus*	Minnow
Chordata	Pisces	Actinopterygii	Cypriniformes	Cyprinidae	*Pimephalus*	*promelas*	Fathead Minnow
Chordata	Pisces	Actinopterygii	Cypriniformes	Cyprinidae	*Cyprinodon*	*variegatus*	Sheepshead Minnow
Chordata	Pisces	Actinopterygii	Cypriniformes	Cyprinodontidae	*Fundulus*	*heteroclitus*	Killifish
Chordata	Pisces	Actinopterygii	Gasterosteiformes	Gasterosteidae	*Gastrosteus*	*aculeatus*	Stickleback
Chordata	Pisces	Actinopterygii	Perciformes	Centrarchidae	*Lepomis*	*gibbosus*	Pumpkinseed
Chordata	Pisces	Actinopterygii	Perciformes	Centrarchidae	*Lepomis*	*auritus*	Redbreast Sunfish
Chordata	Pisces	Actinopterygii	Perciformes	Centrarchidae	*Micropterus*	*salmoides*	Largemouth Bass
Chordata	Pisces	Actinopterygii	Perciformes	Moronidae	*Morone*	*americana*	White Perch
Chordata	Pisces	Actinopterygii	Perciformes	Moronidae	*Morone*	*saxatilis*	Striped Bass
Chordata	Pisces	Actinopterygii	Perciformes	Percidae	*Perca*	*flavescens*	Yellow Perch
Chordata	Pisces	Actinopterygii	Perciformes	Sciaenidae	*Leiostomus*	*xanthurus*	Spot
Chordata	Pisces	Actinopterygii	Perciformes	Sparidae	*Lagodon*	*rhomboides*	Pinfish
Chordata	Pisces	Actinopterygii	Pleuronectiformes	Pleuronectidae	*Parophrys*	*vetulus*	English Sole
Chordata	Pisces	Actinopterygii	Pleuronectiformes	Pleuronectidae	*Platichthys*	*flesus*	Baltic Flounder
Chordata	Pisces	Actinopterygii	Pleuronectiformes	Pleuronectidae	*Platichthys*	*stellatus*	Starry Flounder
Chordata	Pisces	Actinopterygii	Pleuronectiformes	Pleuronectidae	*Pseudopleuronectes*	*americanus*	Winter Flounder
Chordata	Pisces	Actinopterygii	Salmoniformes	Esocidae	*Esox*	*lucius*	Northern Pike
Chordata	Pisces	Actinopterygii	Salmoniformes	Salmonidae	*Coregonus*	*artedii*	Lake Herring
Chordata	Pisces	Actinopterygii	Salmoniformes	Salmonidae	*Oncorhynchus*	*tshawytscha*	Chinook Salmon
Chordata	Pisces	Actinopterygii	Salmoniformes	Salmonidae	*Salmo*	*gairdneri*	Rainbow Trout
Chordata	Pisces	Actinopterygii	Salmoniformes	Salmonidae	*Salvelinus*	*alpinus*	Arctic Charr
Chordata	Pisces	Actinopterygii	Salmoniformes	Salmonidae	*Salvelinus*	*fontinalis*	Brook Trout
Chordata	Pisces	Actinopterygii	Salmoniformes	Salmonidae	*Salvelinus*	*namaycush*	Lake Trout
Chordata	Pisces	Actinopterygii	Siluriformes	Ictaluridae	*Ictalurus*	*nebulosus*	Brown Bullhead
Chordata	Pisces	Actinopterygii	Siluriformes	Ictaluridae	*Ictalurus*	*punctatus*	Channel Catfish

TABLE 4-24
STANDARD ANIMAL BODY WEIGHTS AND FOOD INTAKE RATES

Animal	*Body Weight (kg)*	*Food Ing. Rate (g/d)*	*Food Ingestion Rate (kg/d)*	*Food factor (kg/kg body wt/d)*
MAMMALS				
Mink	1		0.137	0.137
Mouse	0.03		0.0055	0.180
	0.028			
Mean Mouse	0.029			
Mouse, Oldfield	0.014	1.9	0.0019	
Rabbit	3.8		0.135	0.034
Rhesus Monkey	5		0.2	0.040
Rat	0.35		0.028	0.080
	0.435			
	0.303			
	0.273		0.0375	0.137
	0.365			
	0.26			
Mean Rat	0.331		0.03275	0.099
BIRDS				
Blackbird, Red-Winged	0.064		0.0137	0.214
Chicken, Domestic--adult	1.6		0.11	0.069
	1.5		0.106	0.071
Mean Chicken, Domestic--adult	1.55		0.108	0.070
Chickens, Domestic--chick	0.121		0.0126	0.104
	0.534		0.044	0.082
Mean Chicken, Domestic--chick	0.3275		0.0283	0.086
Cowbird, Brown-headed	0.049		0.01087	0.222
Dove, Ringed	0.155		0.017	0.110
Duck, Mallard--adult	1		0.1	0.100
	1.153		0.11	0.095
	1.15	115	0.115	0.100
	1		0.128	0.128
	1.17		0.121	0.103
Duck, Mallard --				
Hudson ERA selected values	1.06		0.292	0.275
Duck, Mallard--duckling	0.782	78.2	0.0782	0.100
Kestrel, American	0.13		0.01	0.077
Owl, Screech	0.181	25	0.025	0.138
Pheasant, Ring-necked	1		0.0582	0.058
Quail, Japanese	0.15		0.0169	0.113
Quail, Japanese--3 months	0.072			

Note: All values are from Toxicological Benchmarks for Wildlife:1996 Revision (USEPA, 1996) unless otherwise

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TABLE 4-25a
TOXICITY REFERENCE VALUES FOR FISH
DIETARY DOSES AND EGG CONCENTRATIONS OF TOTAL PCBs AND DIOXIN TOXIC EQUIVALENTS (TEQs)

WITHOUT UNCERTAINTY FACTORS

TRVs		Pumpkinseed (*Lepomis gibbosus*)	Spottail Shiner (*Notropis hudsonius*)	Brown Bullhead (*Ictalurus nebulosus*)	Yellow Perch (*Perca flavescens*)	White Perch (*Morone americana*)	Largemouth Bass (*Micropterus salmoides*)	Striped Bass (*Morone saxatilus*)	References
Tissue Concentration									
Lab-based TRVs for PCBs (mg/kg wet wt.)	LOAEL	***9.3***	9.3	***9.3***	***9.3***	***9.3***	***9.3***	***9.3***	Hansen et al. (1974b, sheepshead minnow)
(from Table 4-5)	NOAEL	***1.9***	1.9	***1.9***	***1.9***	1.9	***1.9***	1.9	
Field-based TRVs for PCBs (mg/kg wet wt.)	LOAEL	0.4	***13.7***	13.7	13.7	NA	0.4	NA	(1983, striped bass). Spottail shiner: USACE (1988, fathead
(from Table 4-6)	NOAEL	0.3	***5.25***	5.25	5.25	***3.1***	0.3	***3.1***	Pumpkinseed and Largemouth bass: Adams et al. (1989, 1990, 1992, sunfish). All others: USACE (1988, fathead minnow)
Egg Concentration									
Lab-based TRV for TEQs (ug/kg lipid) from salmonids	LOAEL	0.6	ND	ND	0.6	0.6	0.6	0.6	Walker et al. (1994, lake trout)
(from Table 4-7)	NOAEL	0.29	ND	ND	0.29	0.29	0.29	0.29	
Lab-based TRV for TEQs (ug/kg lipid) from non-salmonids	LOAEL	***18***	***18***	***18***	***18***	***18***	***18***	***18***	Spottail shiner: Elonen et al. (1998, fathead minnow)
(from Table 4-7)	NOAEL	***8***	***9.8***	***8***	***8***	***8***	***8***	***8***	All others: Elonen et al. (1998, catfish)
Field-based TRVs for TEQs (ug/kg lipid)	LOAEL	NA	NA	NA	NA	NA	NA	NA	Guiney et al. (1996, lake trout)
(from Table 4-8)	NOAEL	0.1	0.1	0.1	0.1	0.1	0.1	0.1	

Note:
Units differ for PCBs and TEQ.
NA = Not available
ND= Not developed
TRVs selected for use in the risk assessment are ***BOLDED and ITALICIZED***.

TABLE 4-25b
TOXICITY REFERENCE VALUES FOR FISH
DIETARY DOSES AND EGG CONCENTRATIONS OF TOTAL PCBs AND DIOXIN TOXIC EQUIVALENTS (TEQs)

WITH UNCERTAINTY FACTORS

TRVs		Pumpkinseed (*Lepomis gibbosus*)	Spottail Shiner (*Notropis hudsonius*)	Brown Bullhead (*Ictalurus nebulosus*)	Yellow Perch (*Perca flavescens*)	White Perch (*Morone americana*)	Largemouth Bass (*Micropterus salmoides*)	Striped Bass (*Morone saxatilus*)	References
Tissue Concentration									
Lab-based TRVs for PCBs (mg/kg wet wt.)	LOAEL	0.93	9.3	0.93	0.93	0.93	0.93	0.93	Hansen et al. (1974, sheepshead minnow)
(from Table 4-5)	NOAEL	0.19	1.9	0.19	0.19	0.19	0.19	0.19	
Field-based TRVs for PCBs (mg/kg wet wt.)	LOAEL	0.4	13.7	1.37	1.37	NA	0.4	NA	(1983, striped bass). Spottail shiner: USACE (1988, fathead
(from Table 4-6)	NOAEL	0.3	5.25	0.525	0.525	3.1	0.3	3.1	Pumpkinseed and Largemouth bass: Adams et al. (1989, 1990, 1992, sunfish). All others: USACE (1988, fathead minnow)
Egg Concentration									
Lab-based TRV for TEQs (ug/kg lipid) from salmonids	LOAEL	0.6	ND	ND	0.6	0.6	0.6	0.6	Walker et al. (1994, lake trout)
(from Table 4-7)	NOAEL	0.29	ND	ND	0.29	0.29	0.29	0.29	
Lab-based TRV for TEQs (ug/kg lipid) from non-salmonids	LOAEL	1.8	18	18	1.8	1.8	1.8	1.8	Spottal shiner: Elonen et al. (1998, fathead minnow)
(from Table 4-7)	NOAEL	0.8	9.8	8	0.8	0.8	0.8	0.8	All others: Elonen et al. (1998, catfish)
Field-based TRVs for TEQs (ug/kg lipid)	LOAEL	NA	NA	NA	NA	NA	NA	NA	Guiney et al. (1996, lake trout)
(from Table 4-8)	NOAEL	0.1	0.1	0.1	0.1	0.1	0.1	0.1	

Note:
Units differ for PCBs and TEQ.
NA = Not available
ND=Not developed

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TABLE 4-26a
TOXICITY REFERENCE VALUES FOR BIRDS
DIETARY DOSES AND EGG CONCENTRATIONS OF TOTAL PCBs AND DIOXIN TOXIC EQUIVALENTS (TEQs)

WITHOUT UNCERTAINTY FACTORS

TRVs		Tree Swallow (*Tachycineta bicolor*)	Mallard Duck (*Anas platyrhychos*)	Belted Kingfisher (*Ceryle alcyon*)	Great Blue Heron (*Ardea herodias*)	Bald Eagle (*Haliaeetus leucocephalus*)	References
Dietary Dose							
Lab-based TRVs for PCBs (mg/kg/day)	LOAEL	7.1	***41***	***7.1***	***7.1***	***7.1***	Mallard: Haseltine and Prouty (1980, mallard)
(from Table 4-9)	NOAEL	1.8	***4.1***	***1.8***	***1.8***	***1.8***	All others: Dahlgren et al. (1972, pheasant)
Field-based TRVs for PCBs (mg/kd/day)	LOAEL	NA	NA	NA	NA	NA	Tree Swallow: US EPA Phase 2 Database (2000e, tree swallow)
(from Table 4-10)	NOAEL	***16.1***	NA	NA	NA	NA	
Lab-based TRVs for TEQs (ug/kg/day)	LOAEL	0.014	***0.014***	***0.014***	***0.014***	***0.014***	Nosek et al. (1992, pheasant)
(from Table 4-11)	NOAEL	0.0014	***0.0014***	***0.0014***	***0.0014***	***0.0014***	
Field-based TRVs for TEQs (ug/kg/day)	LOAEL	NA	NA	NA	NA	NA	US EPA Phase 2 Database (2000e, tree swallow)
(from Table 4-12)	NOAEL	***4.9***	NA	NA	NA	NA	
Egg Concentration							
Lab-based TRVs for PCBs (mg/kg egg)	LOAEL	16	NA	16	16	16	Mallard: Haselitne and Prouty (1980, mallard).
(from Table 4-13)	NOAEL	1.6	***105***	1.6	1.6	1.6	All others: Peakall and Peakall (1973, ring dove).
Field-based TRVs for PCBs (mg/kg egg)	LOAEL	NA	NA	***7.6***	***7.6***	***8.7***	Tree Swallow: US EPA Phase 2 Database (2000e, tree swallow)
(from Table 4-14	NOAEL	***26.7***	19.3	***4.7***	***2.01***	***5.5***	Mallard: Heinz et al. (1983, red-breasted merganser). Kingfisher: Hoffman et al. (1993, common tern). Great blue heron: NOAEL from Halbrook et al. (1999, great blue heron), LOAEL from Hoffman et al. (1993, common tern) Bald eagle: Wiemeyer (1984, 1993, bald eagle).
Lab-based TRVs for TEQs (ug/kg egg)	LOAEL	4	NA	***4***	NA	***5***	Mallard: Brunstrom and Reutergardh (1986, mallard). Great Blue Heron: Janz and Bellward (1996, blue heron).
(from Table 4-15)	NOAEL	1	***5***	***1***	2	2	Eagle: Hoffman et al. (1998, kestrel). Others: Powell et al. (1997, cormorant)
Field-based TRVs for TEQs (ug/kg egg)	LOAEL	NA	0.02	1.06	***0.5***	NA	Tree Swallow: US EPA Phase 2 Database (2000e, tree swallow) Mallard: White and Segniak (1994) and White and Hoffman (1995), both wood duck.
(from Table 4-16)	NOAEL	***13***	0.005	0.61	***0.3***	***0.21***	Kingfisher: Harris et al. (1993, Forster's tern). Great blue heron: Hart et al (1991) and Sanderson et al. (1994), both great blue herons. Bald eagle: Elliott et al. (1996, bald eagle).

Note: Units differ for PCBs and TEQ.

NA = Not Available

TRVs selected for use in the risk assessment are ***BOLDED and ITALICIZED***

TABLE 4-26b
TOXICITY REFERENCE VALUES FOR BIRDS
DIETARY DOSES AND EGG CONCENTRATIONS OF TOTAL PCBs AND DIOXIN TOXIC EQUIVALENTS (TEQs)

WITH UNCERTAINTY FACTORS

TRVs		Tree Swallow (*Tachycineta bicolor*)	Mallard Duck (*Anas platyrhychos*)	Belted Kingfisher (*Ceryle alcyon*)	Great Blue Heron (*Ardea herodias*)	Bald Eagle (*Haliaeetus leucocephalus*)	References
Dietary Dose							
Lab-based TRVs for PCBs (mg/kg/day)	LOAEL	7.1	41	7.1	7.1	7.1	Mallard: Haseltine and Prouty (1980, mallard)
(from Table 4-9)	NOAEL	1.8	4.1	1.8	1.8	1.8	All others: Dahlgren et al. (1972, pheasant)
Field-based TRVs for PCBs (mg/kd/day)	LOAEL	NA	NA	NA	NA	NA	Tree Swallow: US EPA Phase 2 Database (2000e, tree swallow)
(from Table 4-10)	NOAEL	16.1	NA	NA	NA	NA	
Lab-based TRVs for TEQs (ug/kg/day)	LOAEL	0.014	0.014	0.014	0.014	0.014	Nosek et al. (1992, pheasant)
(from Table 4-11)	NOAEL	0.0014	0.0014	0.0014	0.0014	0.0014	
Field-based TRVs for TEQs (ug/kg/day)	LOAEL	NA	NA	NA	NA	NA	US EPA Phase 2 Database (2000e, tree swallow)
(from Table 4-12)	NOAEL	4.9	NA	NA	NA	NA	
Egg Concentration							
Lab-based TRVs for PCBs (mg/kg egg)	LOAEL	1.6	NA	1.6	1.6	1.6	Mallard: Haseltine and Prouty (1980, mallard).
(from Table 4-13)	NOAEL	0.16	105	0.16	0.16	0.16	All others: Peakall and Peakall (1973, ring dove).
Field-based TRVs for PCBs (mg/kg egg)	LOAEL	NA	NA	0.76	7.6	8.7	Tree Swallow: US EPA Phase 2 Database (2000e, tree swallow)
(from Table 4-14)	NOAEL	26.7	19.3	0.47	2.01	5.5	Mallard: Heinz et al. (1983, red-breasted merganser). Kingfisher: Hoffman et al. (1993, common tern). Great blue heron: Halbrook et al. (1999, great blue heron). Bald eagle: Wiemeyer (1984, 1993, bald eagle).
Lab-based TRVs for TEQs (ug/kg egg)	LOAEL	0.4	NA	0.4	NA	0.5	Mallard: Brunstrom and Reutergardh (1986, mallard). Great Blue Heron: Janz and Bellward (1996, blue heron).
(from Table 4-15)	NOAEL	0.1	5	0.1	2	0.2	Eagle: Hoffman et al. (1998, kestral). Others: Powell et al. (1997, cormorant)
Field-based TRVs for TEQs (ug/kg egg)	LOAEL	NA	0.02	0.106	0.5	NA	Tree Swallow: US EPA Phase 2 Database (2000e, tree swallow). Mallard: White and Segniak (1994) and White and Hoffman (1995), both mallard.
(from Table 4-16)	NOAEL	13	0.005	0.061	0.3	0.21	Kingfisher: Harris et al. (1993, Foster's tern). Great blue heron: Hart et al (1991) and Sanderson et al. (1994), both great blue herons. Eagle: Elliott et al. (1996, bald eagle).

Note: Units differ for PCBs and TEQ.
NA = Not Available

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TABLE 4-27a
TOXICITY REFERENCE VALUES FOR MAMMALS
DIETARY DOSES OF TOTAL PCBs AND DIOXIN TOXIC EQUIVALENTS (TEQs)

WITHOUT UNCERTAINTY FACTORS

TRVs		Little Brown Bat (*Myotis lucifugus*)	Raccoon (*Procyon lotor*)	Mink (*Mustela vison*)	Otter (*Lutra canadensis*)	References
Lab-based TRVs for PCBs (mg/kg/day)	LOAEL	***1.5***	***1.5***	0.3	0.3	Mink and otter: Aulerich and Ringer (1977, mink)
	NOAEL	***0.32***	***0.32***	0.03	0.03	Raccoon and bat: Linder et al. (1984, rat)
Field-based TRVs for PCBs (mg/kg/day)	LOAEL	NA	NA	***0.04***	***0.04***	Restum et al. (1998, mink)
	NOAEL	NA	NA	***0.004***	***0.004***	
Lab-based TRVs for TEQs (ug/kg/day)	LOAEL	***0.01***	***0.01***	0.01	0.01	Murray et al. (1979, rat)
	NOAEL	***0.001***	***0.001***	0.001	0.001	
Field-based TRVs for TEQs (ug/kg/day)	LOAEL	NA	NA	***0.00224***	***0.00224***	Tillitt et al. (1996, mink)
	NOAEL	NA	NA	***0.00008***	***0.00008***	

Note: Units differ for PCBs and TEQ.
NA = Not Available
TRVs selected for use in the risk assessment are ***BOLDED and ITALICIZED***.

TABLE 4-27b
TOXICITY REFERENCE VALUES FOR MAMMALS
DIETARY DOSES OF TOTAL PCBs AND DIOXIN TOXIC EQUIVALENTS (TEQs)

WITH UNCERTAINTY FACTORS

TRVs		Little Brown Bat (*Myotis lucifugus*)	Raccoon (*Procyon lotor*)	Mink (*Mustela vison*)	Otter (*Lutra canadensis*)	References
Lab-based TRVs for PCBs (mg/kg/day)	LOAEL	0.15	0.15	0.3	0.3	Mink and otter: Aulerich and Ringer (1977)
	NOAEL	0.032	0.032	0.03	0.03	Raccoon and bat: Linder et al. (1984)
Field-based TRVs for PCBs (mg/kg/day)	LOAEL	NA	NA	0.04	0.04	Restum et al. (1998)
	NOAEL	NA	NA	0.004	0.004	
Lab-based TRVs for TEQs (ug/kg/day)	LOAEL	0.001	0.001	0.001	0.001	Murray et al. (1979)
	NOAEL	0.0001	0.0001	0.0001	0.0001	
Field-based TRVs for TEQs (ug/kg/day)	LOAEL	NA	NA	0.00224	0.00224	Tillitt et al. (1996)
	NOAEL	NA	NA	0.00008	0.00008	

Note: Units differ for PCBs and TEQ.
NA = Not Available

TABLE 5-1
BENTHIC INVERTEBRATES COLLECTED AT TI POOL STATIONS

Taxa in Rank Order	Common Name	Mean % of Total Ind. Collected
Caecidotea racovitzai	Isopod (sowbug)	34.6
Chironomidae[1]	Midges	~30.2
Oligochaeta	Aquatic worms	14.3
Gammarus fasciatus	Amphipod	10.3
Pisidium sp.	Pill Clam	5.0
Canthocamptes sp.	Harpacticoid copepod	1.5
Nematoda	Nematods (worms)	1.1
Phylocentropus sp.	Caddis fly larvae	<1.0
Dubiraphia sp.	Beetle larvae	<1.0
Menetus sp.	Caddis fly larvae	<1.0
Valvata sp.	Snail	<1.0
Sialis sp.	Alderfly larvae	<1.0
Oecetis sp.	Caddisfly larvae	<1.0
Probezzia sp.	Biting midges	<1.0
Enallagma sp.	Damselfly nymph	<1.0
Chydoridae	Water fleas (Cladoceran)	<1.0
Acariformes	Mites	<1.0
Amnicola sp.	Snail	<1.0
Mystacides sp.	Caddisfly larvae	<1.0
Diaphanosoma sp.	Water fleas (Cladoceran)	<1.0
Ceratopogonidae	Biting midges	<1.0
Helobdella fusca	Leech	<1.0
Arthropoda	Arthropods	<1.0
Eukiefferiella sp.	Biting Midges	<1.0

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TABLE 5-1
BENTHIC INVERTEBRATES COLLECTED AT TI POOL STATIONS

Taxa in Rank Order	Common Name	Mean % of Total Ind. Collected
Turbellaria	Flatworms	<1.0
Dugesia tigrina	Flatworm	<1.0
Bithynia tentaculata	Snail	<1.0
Trichoptera	Caddisfly larvae	<1.0
Chydorus sp.	Water fleas (Cladoceran)	<1.0
Caenis sp.	Mayfly nymph	<1.0
Physa sp.	Snail	<1.0
Helobdella sp.	Leech	<1.0
Mesocyclops sp.	Cyclopoid copepods	<1.0
Orthotrichia sp.	Caddis fly larvae	<1.0
Aeschnidae	Dragonfly nymph	<1.0
Hexagenia sp.	Mayfly nymph	<1.0
Hirudinea	Leeches	<1.0
Neureclipsis sp.	Caddisfly larvae	<1.0
Culicoides sp.	Mosquito larvae	<1.0
Corixidae	Water boatman	<1.0
Neoperla sp.	Stonefly nymph	<1.0
Caenidae	Mayfly nymph	<1.0
Donacia sp.	Beetle	<1.0
Hemiptera	True bugs	<1.0
Molanna sp.	Caddisfly larvae	<1.0
Copepoda	Copepods	<1.0
Insecta	Insects	<1.0
Baetidae	Mayfly nymph	<1.0
Macronychus sp.	Riffle beetle	<1.0
Tipulidae	Cranefly larvae	<1.0

TABLE 5-1
BENTHIC INVERTEBRATES COLLECTED AT TI POOL STATIONS

Taxa in Rank Order	Common Name	Mean % of Total Ind. Collected
Cymatia sp.	Water boatman	<1.0
Notonecta sp.	Water boatman	<1.0
Talitridae	Amphipod	<1.0
Baetis sp.	Mayfly nymph	<1.0
Dromogomphus sp.	Dragonfly nymph	<1.0
Oxyethira sp.	Caddis fly larvae	<1.0
Diptera	Flies and midges	<1.0
Atherix sp.	Snipe fly	<1.0
Tabanidae	Horsefly larvae	<1.0
Elliptio sp.	Eastern elliptio mussel	<1.0

Notes: Taxa are listed in order of absolute abundance.
Mean Percent of individuals is based on the mean of Stations 3 to 7.
[1] Chironomidae were primarily composed of Chironominae, *Proclaudius* sp., *Tanytarsus* sp., *Dicrotendipes* sp., *Polypedilum* sp., *Clinotanypus* sp., *Tribelos jucundus*, and Tanypodinae.

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TABLE 5-2
RELATIVE ABUNDANCE OF FIVE DOMINANT TAXANOMIC GROUPS AT TI POOL STATIONS

Group/Taxa	Station 3 Abundance		Station 4 Abundance		Station 5 Abundance		Station 6 Abundance		Station 7 Abundance	
	ind/m^2	Percent	ind/m^2	Percent	ind/m^2	Percent	ind/m^2	Percent	ind/m^2	Percent
Total Dominant Isopoda	**653**	**5.6%**	**3245**	**24.6%**	**14256**	**50.9%**	**2347**	**15.2%**	**7286**	**60.9%**
Caecidotea racovitzai										
Total Dominant Chironomids	**3775**	**32.3%**	**3959**	**30.1%**	**7619**	**27.2%**	**3277**	**21.3%**	**1561**	**13.0%**
Unidentified Chironomidae	1398	12.0%	122	0.9%	2232	8.0%	293	1.9%	398	3.3%
Unidentified Chironominae	510	4.4%	1490	11.3%	374	1.3%	1378	8.9%	41	0.3%
Procladius sp.	479	4.1%	204	1.5%	1474	5.3%	128	0.8%	296	2.5%
Tanytarsus sp.	255	2.2%	0	0.0%	1409	5.0%	26	0.2%	0	0.0%
Dicrotendipes sp.	479	4.1%	337	2.6%	560	2.0%	38	0.2%	204	1.7%
Polypedilum sp.	82	0.7%	102	0.8%	396	1.4%	281	1.8%	224	1.9%
Clinotanypus sp.	51	0.4%	133	1.0%	200	0.7%	332	2.2%	194	1.6%
Tribelos jucundus	0	0.0%	867	6.6%	0	0.0%	0	0.0%	0	0.0%
Unidentified Tanypodinae	112	1.0%	571	4.3%	131	0.5%	38	0.2%	0	0.0%
Tribelos sp.	214	1.8%	51	0.4%	194	0.7%	128	0.8%	204	1.7%
Chironomus sp.	41	0.3%	41	0.3%	650	2.3%	0	0.0%	0	0.0%
Cricotopus trifascia	102	0.9%	41	0.3%	0	0.0%	306	2.0%	0	0.0%
Unidentified Orthocladiinae	51	0.4%	0	0.0%	0	0.0%	332	2.2%	0	0.0%
Total Dominant Oligochaeta	**2918**	**25.0%**	**2245**	**17.0%**	**2681**	**9.6%**	**3584**	**23.3%**	**71**	**0.6%**
Unidentified Oligochaeta										
Total Dominant Amphipoda	**1030**	**8.8%**	**1102**	**8.4%**	**682**	**2.4%**	**3176**	**20.6%**	**2296**	**19.2%**
Gammarus fasciatus										
Total Dominant Pelecypoda	**1245**	**10.6%**	**1581**	**12.0%**	**49**	**0.2%**	**1097**	**7.1%**	**0**	**0.0%**
Pisidium sp.										
Subtotals	**9621**	**82.3%**	**12132**	**92.1%**	**25287**	**90.4%**	**13482**	**87.5%**	**11214**	**93.7%**
Total Abundance (all taxa)	**11691**		**13172**		**27983**		**15407**		**11968**	

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TABLE 5-3
SUMMARY OF INFAUNA AND TOTAL BENTHOS INDICES – TI POOL

Station	Simpson Diversity D_s		Simpson Dominance I		Eveness Distribution		Species Richness		Abundance No. Ind./Sq M	
	Infauna	Total Benthos	Infauna	Total Benthos	Infauna	Total Benthos	Infauna	Total Benthos	Infauna	Total Benthos
3	0.84	0.87	0.16	0.13	0.88	0.90	25	27	10,008	11,691
4	0.79	0.83	0.21	0.17	0.84	0.87	19	21	8,825	13,172
5	0.81	0.69	0.19	0.31	0.87	0.73	17	19	13,044	27,983
6	0.78	0.84	0.22	0.16	0.82	0.88	22	24	9,884	15,407
7	0.84	0.57	0.16	0.43	0.95	0.61	12	14	2,387	11,968
TI Pool Grand Mean	0.81	0.76	0.19	0.24	0.87	0.80	19	21	8,830	16,044

Notes: Total benthos equals the sum of infaunal and epibenthic macroinvertebrates

TABLE 5-4
RELATIVE PERCENT ABUNDANCE OF MACROINVERTEBRATES - LOWER HUDSON RIVER

Stockport Flats - Station 12		Tivoli Bays - Station 14		Esopus Meadows-Station 1		Iona Island - Station 17		Piermont Marsh - Station 18	
Species/Group	**%**	**Species/Group**	**%**	**Species/Group**	**%**	**Species/Group**	**%**	**Species/Group**	**%**
Oligochaeta	42.4%	Chironominae Indet.	36.1%	Oligochaeta	22.0%	*Hobsonia florida*	36.1%	Oligochaeta	18.4%
Chironominae Indet.	12.9%	*Dicrotendipes sp.*	10.5%	Chydoridae	17.3%	Oligochaeta	32.8%	*Cyathura polita*	16.5%
Chironomidae Indet.	10.3%	*Procladius sp.*	10.2%	*Coelotanypus sp.*	14.0%	*Gammarus fasciatus*	11.3%	*Hobsonia florida*	14.2%
Procladius sp.	8.0%	*Polypedilum sp.*	9.0%	Nematoda	7.3%	*Clinotanypus sp.*	6.3%	*Hydrobia minuta*	11.5%
Polypedilum sp.	7.1%	*Clinotanypus sp.*	6.4%	*Clinotanypus sp.*	6.0%	Nemotoda	3.3%	Isopoda	10.8%
Pisidium sp.	2.9%	Oligochaeta	4.1%	*Polypedilum sp.*	5.3%	*Cyathura polita*	2.0%	*Clinotanypus sp.*	10.0%
Tribelos sp.	2.9%	*Gammarus fasciatus*	2.6%	Acariformes	4.0%	*Coelotanypus sp.*	2.0%	*Gammarus fasciatus*	9.7%
Cryptotendipes sp.	2.9%	*Pisidium sp.*	2.3%	*Dicrotendipes sp.*	4.0%	*Procladius sp.*	1.7%	Ostracoda	4.5%
Tanytarsus sp.	2.3%	Chironomidae Indet.	2.3%	*Cladotanytarsus sp.*	3.3%	Pelecypoda	1.3%	*Neanthes succinea*	1.3%
Chironomus sp.	1.9%	*Amnicola limosa*	1.9%	*Amnicola sp.*	3.3%	*Neanthes succinea*	1.0%	Pelecypoda	1.3%
Gammarus fasciatus	1.0%	*Cladotanytarsus sp.*	1.5%	*Synorthocladius sp.*	2.7%	Bryozoa	0.7%	*Procladius sp.*	1.0%
Acariformes	0.6%	*Orthotrichia sp.*	1.1%	*Pisidium sp.*	2.7%	*Balanus improvisus*	0.7%	*Rhithropanopeus harrisii*	0.5%
Tanypodinae Indet.	0.6%	Nematoda	1.1%	*Tribelos sp.*	2.0%	Isopoda	0.3%	*Coelotanypus sp.*	0.3%
Clinotanypus sp.	0.6%	Gastropoda	1.1%	Cyclopoida	1.3%	Orthocladiinae	0.3%		
Coleoptera	0.3%	*Cricotopus bicinctus*	1.1%	*Gammarus fasciatus*	1.3%	*Dicrotendipes sp.*	0.3%		
Bithynia tentaculata	0.3%	*Tanytarsus sp.*	1.1%	Hydroptilidae	1.3%				
Valvata sp.	0.3%	*Triaenodes sp.*	0.8%	*Cyathura polita*	0.7%				
Nematoda	0.3%	Orthocladiinae Indet.	0.8%	*Hydroptila sp.*	0.7%				
Cyathura polita	0.3%	*Chironomus sp.*	0.8%	*Chironomus sp.*	0.7%				
Ostracoda	0.3%	Acariformes	0.4%						
Leptoceridae	0.3%	*Dugesia tigrina*	0.4%						
Ceratopognidae	0.3%	*Diaphanosoma sp.*	0.4%						
Hemiptera	0.3%	*Hydroptila sp.*	0.4%						
Nilothauma sp.	0.3%	*Probezzia sp.*	0.4%						
Cryptochironomus sp.	0.3%	*Bithynia tentaculata*	0.4%						
		Tanypodinae Indet.	0.4%						
		Synorthocladius sp.	0.4%						
		Tribelos sp.	0.4%						
		Djalmabatista sp.	0.4%						
		Labrundinia sp.	0.4%						
		Coelotanypus sp.	0.4%						
		Synorthocladius sp.	0.4%						
		Cryptotendipes sp.	0.4%						

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TABLE 5-5
SUMMARY OF DIVERSITY INDICES AND ABUNDANCE DATA – LOWER HUDSON RIVER

Station	D_s	I	D_{max}	E_s	Species Richness	Abundance ind/m^2	Biomass mg/m^2
Station 12 Stockport Flats	0.70	0.30	0.92	0.76	14	5,289	63
Station 14 Tivoli Bays	0.82	0.18	0.95	0.86	16	4,524	126
Station 15 Esopus Meadows	0.86	0.14	0.93	0.93	11	2,551	65
Station 17 Iona Island	0.71	0.29	0.90	0.79	9	5,136	365
Station 18 Piermont Pier	0.84	0.16	0.90	0.93	9	6,480	291
Grand Mean	0.79	0.21	0.92	0.85	12	4,796	182

TABLE 5-6: RATIO OF OBSERVED SEDIMENT CONCENTRATIONS TO GUIDELINES

Location	TEC 0.04 mg/kg dry weight		MEC 0.4 mg/kg dry weight		EEC 1.7 mg/kg dry weight		NYSDEC Benthic Chronic 19.3 (FW) or 41.4 (SW) mg/kg OC		NYSDEC Wildlife 1.4 mg/kg OC	
	Average Sediment	95% UCL Sediment	Average Sediment	95% UCL Sediment	Average Sediment	95% UCL Sediment	Average Sediment	95% UCL Sediment	Average Sediment	95% UCL Sediment
Upper River										
Thompson Island Pool (189)	**297**	**435**	**30**	**43**	**7.0**	**10.2**	**12**	**16**	**169**	**215**
Stillwater (168)	**776**	**1354**	**78**	**135**	**18**	**32**	**43**	**74**	**587**	**1025**
Federal Dam (154)	**70**	**117**	**7.0**	**12**	**1.6**	**2.8**	**9.2**	**15**	**127**	**213**
Lower River										
143.5	**22**	**24**	**2.2**	**2.4**	0.5	0.6	**1.4**	**1.4**	**20**	**20**
137.2	**38**	**77**	**3.8**	**7.7**	0.9	**1.8**	**2.8**	**5.7**	**39**	**79**
122.4	**24**	**27**	**2.4**	**2.7**	0.6	0.6	**2.4**	**2.6**	**33**	**36**	
113.8	**25**	**.2**	**2.5**	**4.2**	0.6	**1.0**	**1.6**	**2.6**	**22**	**37**
100	**10**	**215**	**1.0**	**2?**	0.2	**5.1**	0.9	**17**	**12**	**241**
88.9	**20**	**57**	**2.0**	**5.7**	0.5	**1.3**	**1.1**	**3.3**	**16**	**45**
58.7	**6.3**	**70**	0.6	**7.0**	0.1	**1.6**	0.5	**4.5**	**16**	**133**
47.3	**38**	**150**	**3.8**	**15**	0.9	**3.5**	**1.1**	**4.1**	**32**	**121**
25.8	**14**	**39**	**1.4**	**3.9**	0.3	0.9	0.7	**1.8**	**20**	**54**

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TABLE 5-6: RATIO OF OBSERVED SEDIMENT CONCENTRATIONS TO GUIDELINES

Location	Persaud LEL 0.07 mg/kg dry weight		Persaud SEL 530 mg/kg OC		Washington State PAET 1242 100 ppb		Washington State PAET Microtox		Washington State AET Microtox OC	
	Average Sediment	95% UCL Sediment	Average Sediment	95% UCL Sediment	Average Sediment	95% UCL Sediment	Average Sediment	95% UCL Sediment	Average Sediment	95% UCL Sediment
Upper River										
Thompson Island Pool (189)	**170**	**248**	0.4	0.6	**119**	**174**	**566**	**828**	**91**	**116**
Stillwater (168)	**443**	**774**	**1.6**	**2.7**	**310**	**542**	**1478**	**2580**	**316**	**552**
Federal Dam (154)	**40**	**67**	0.3	0.6	**28**	**47**	**133**	**223**	**69**	**115**
Lower River										
143.5	**12**	**13**	0.1	0.1	**8.6**	**9.4**	**41**	**45**	**11**	**11**
137.2	**22**	**44**	0.1	0.2	**15**	**31**	**72**	**146**	**21**	**43**
122.4	**14**	**15**	0.1	0.1	**10**	**11**	**46**	**51**	**18**	**19**
113.8	**14**	**24**	0.1	0.1	**10**	**17**	**48**	**79**	**12**	**20**
100	**6**	**123**	0.0	0.6	**4.0**	**86**	**19**	**410**	**6.7**	**130**
88.9	**11**	**33**	0.0	0.1	**7.8**	**23**	**37**	**109**	**8.5**	**24**
58.7	**4**	**40**	0.0	0.4	**2.5**	**28**	**12**	**133**	**8.4**	**71**
47.3	**22**	**86**	0.1	0.3	**15**	**60**	**73**	**286**	**17**	**65**
25.8	**8**	**22**	0.1	0.1	**5.8**	**16**	**28**	**74**	**11**	**29**

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TABLE 5-7: RATIO OF PREDICTED SEDIMENT CONCENTRATIONS TO SEDIMENT GUIDELINES

	Mean PCB Results							*Mean PCB Results*							*Mean PCB Results*						
Year	189 Total Sed Conc	168 Total Sed Conc	154 Total Sed Conc	152 Total Sed Conc	113 Total Sed Conc	90 Total Sed Conc	50 Total Sed Conc	189 Total Sed Conc	168 Total Sed Conc	154 Total Sed Conc	152 Total Sed Conc	113 Total Sed Conc	90 Total Sed Conc	50 Total Sed Conc	189 Total Sed Conc	168 Total Sed Conc	154 Total Sed Conc	152 Total Sed Conc	113 Total Sed Conc	90 Total Sed Conc	50 Total Sed Conc
	NYSDEC Benthic Chronic 19.3 (FW) or 41.4 (SW) mg/Kg OC							NYSDEC Wildlife 1.4 mg/Kg OC							Persaud LEL 0.07 mg/Kg dry weight						
1993	141	22	14	2.0	1.6	1.3	0.9	1941	305	194	28	22	17	13	484	129	29	14	11	9	6.4
1994	127	20	13	1.8	1.5	1.2	0.9	1750	279	177	25	20	16	12	448	117	27	12	10	8	6.0
1995	120	19	12	1.7	1.4	4.5	0.8	1658	264	166	23	19	62	11	412	107	25	11	10	31	5.7
1996	108	16	11	1.7	1.4	4.5	0.8	1487	227	152	23	19	62	11	370	90	23	12	9.3	31	5.5
1997	96	14	9.8	1.6	1.3	1.0	0.8	1326	191	135	22	18	14	10	337	75	20	11	8.9	7.1	5.2
1998	57	15	8.9	3.5	2.9	2.3	1.7	780	211	123	48	40	32	23	311	70	20	24	20	16	12
1999	54	15	8.5	1.6	1.3	1.1	0.8	745	201	117	21	18	14	11	297	66	19	11	9.0	7.2	5.4
2000	49	13	7.7	1.4	1.2	0.9	0.7	682	178	106	19	16	13	10	272	59	17	9.7	8.0	6.4	4.8
2001	44	11	6.7	1.4	1.1	0.9	0.6	603	147	93	19	15	12	9	240	48	15	9.4	7.5	6.0	4.4
2002	40	9.1	6.0	1.4	1.1	0.9	0.7	555	125	83	19	16	12	9	221	41	13	9.6	7.8	6.1	4.5
2003	37	7.9	5.5	1.3	1.1	0.9	0.6	511	110	75	18	15	12	9	204	36	12	9.0	7.4	5.9	4.3
2004	34	7.7	5.1	1.3	1.1	0.9	0.6	472	106	71	18	15	12	9	188	35	11	8.9	7.4	5.9	4.4
2005	32	7.4	4.9	1.2	1.0	0.8	0.6	440	102	67	17	14	11	8	175	34	11	8.5	7.1	5.6	4.2
2006	30	6.6	4.4	1.2	1.0	0.8	0.6	411	91	61	16	13	11	8	164	30	10	8.2	6.7	5.3	3.9
2007	27	6.1	4.0	1.2	0.9	0.7	0.5	376	83	56	16	13	10	7	150	28	8.9	7.9	6.5	5.1	3.7
2008	25	5.7	3.8	1.2	1.0	0.8	0.6	344	79	52	17	14	11	8	137	26	8.3	8.5	7.0	5.4	4.0
2009	24	5.7	3.5	1.2	1.0	0.8	0.6	327	78	48	17	14	11	8	130	26	7.7	8.3	6.8	5.4	4.0
2010	22	5.2	3.1	1.0	0.9	0.7	0.5	302	72	43	14	12	9	7	120	24	6.9	7.2	5.9	4.6	3.4
2011	20	4.6	2.8	1.1	0.9	0.7	0.5	273	64	39	15	12	9	7	109	21	6.2	7.3	6.0	4.6	3.4
2012	18	4.4	2.6	1.0	0.8	0.7	0.5	247	60	35	14	12	9	7	98	20	5.6	7.1	5.9	4.5	3.3
2013	18	4.7	2.2	1.0	0.8	0.6	0.5	254	65	31	14	12	9	7	101	21	5.0	7.0	5.8	4.4	3.3
2014	19	4.3	2.1	1.0	0.8	0.6	0.5	259	60	29	14	11	9	6	103	20	4.6	6.9	5.7	4.4	3.2
2015	18	4.0	2.0	1.0	0.8	0.6	0.5	247	55	27	13	11	9	6	99	18	4.3	6.7	5.5	4.3	3.1
2016	17	4.0	1.9	1.0	0.9	0.7	0.5	234	55	26	14	12	9	7	93	18	4.2	7.1	5.9	4.6	3.4
2017	16	4.0	1.9	1.0	0.9	0.7	0.5	221	55	27	14	12	9	7	88	18	4.2	7.1	5.9	4.5	3.3
2018	15	3.9	1.9	0.9	0.8	0.6	0.4	204	53	26	13	11	8	6	81	18	4.2	6.5	5.4	4.1	3.1

TABLE 5-7: RATIO OF PREDICTED SEDIMENT CONCENTRATIONS TO SEDIMENT GUIDELINES

	Mean PCB Results							Mean PCB Results							Mean PCB Results						
Year	189 Total Sed Conc	168 Total Sed Conc	154 Total Sed Conc	152 Total Sed Conc	113 Total Sed Conc	90 Total Sed Conc	50 Total Sed Conc	189 Total Sed Conc	168 Total Sed Conc	154 Total Sed Conc	152 Total Sed Conc	113 Total Sed Conc	90 Total Sed Conc	50 Total Sed Conc	189 Total Sed Conc	168 Total Sed Conc	154 Total Sed Conc	152 Total Sed Conc	113 Total Sed Conc	90 Total Sed Conc	50 Total Sed Conc
	TEC: 0.04 mg/kg dry weight							MEC: 0.4 mg/kg dry weight							EEC: 1.7 mg/kg dry weight						
1993	847	226	51	24	19	15	11	85	23	5	2	2	2	1	20	5	1	0.6	0.4	0.4	0.3
1994	784	204	47	22	18	14	11	78	20	5	2	2	1	1	18	5	1	0.5	0.4	0.3	0.2
1995	722	187	44	20	17	54	10	72	19	4	2	2	5	1	17	4	1	0.5	0.4	1.3	0.2
1996	647	158	40	20	16	55	10	65	16	4	2	2	5	1.0	15	4	0.9	0.5	0.4	1.3	0.2
1997	590	131	35	19	16	12	9	59	13	3	2	2	1	0.9	14	3	0.8	0.5	0.4	0.3	0.2
1998	544	122	34	42	35	28	21	54	12	3	4	3	3	2	13	3	0.8	1.0	0.8	0.7	0.5
1999	519	116	33	19	16	13	9	52	12	3	2	2	1	0.9	12	3	0.8	0.4	0.4	0.3	0.2
2000	475	103	30	17	14	11	8	48	10	3	2	1	1	0.8	11	2	0.7	0.4	0.3	0.3	0.2
2001	420	85	26	17	13	10	8	42	8	3	2	1	1	0.8	10	2	0.6	0.4	0.3	0.2	0.2
2002	387	72	23	17	14	11	8	39	7	2	2	1	1	0.8	9	2	0.5	0.4	0.3	0.3	0.2
2003	356	63	21	16	13	10	8	36	6	2	2	1	1	0.8	8	1	0.5	0.4	0.3	0.2	0.2
2004	329	61	20	16	13	10	8	33	6	2	2	1	1	0.8	8	1	0.5	0.4	0.3	0.2	0.2
2005	307	59	19	15	12	10	7	31	6	2	1	1	1.0	0.7	7	1	0.4	0.4	0.3	0.2	0.2
2006	287	53	17	14	12	9	7	29	5	2	1	1	0.9	0.7	7	1	0.4	0.3	0.3	0.2	0.2
2007	262	48	16	14	11	9	7	26	5	2	1	1	0.9	0.7	6	1	0.4	0.3	0.3	0.2	0.2
2008	240	46	15	15	12	10	7	24	5	1	1	1	1.0	0.7	6	1	0.3	0.3	0.3	0.2	0.2
2009	228	45	14	14	12	9	7	23	4	1	1	1	0.9	0.7	5	1	0.3	0.3	0.3	0.2	0.2
2010	211	41	12	13	10	8	6	21	4	1	1	1	0.8	0.6	5	1.0	0.3	0.3	0.2	0.2	0.1
2011	190	37	11	13	10	8	6	19	4	1	1	1	0.8	0.6	4	0.9	0.3	0.3	0.2	0.2	0.1
2012	172	35	10	12	10	8	6	17	3	1.0	1	1	0.8	0.6	4	0.8	0.2	0.3	0.2	0.2	0.1
2013	177	37	9	12	10	8	6	18	4	0.9	1	1	0.8	0.6	4	0.9	0.2	0.3	0.2	0.2	0.1
2014	180	34	8	12	10	8	6	18	3	0.8	1	1.0	0.8	0.6	4	0.8	0.2	0.3	0.2	0.2	0.1
2015	172	32	8	12	10	7	5	17	3	0.8	1	1	0.7	0.5	4	0.8	0.2	0.3	0.2	0.2	0.1
2016	163	32	7	12	10	8	6	16	3	0.7	1	1	0.8	0.6	4	0.7	0.2	0.3	0.2	0.2	0.1
2017	154	32	7	12	10	8	6	15	3	0.7	1	1	0.8	0.6	4	0.8	0.2	0.3	0.2	0.2	0.1
2018	142	31	7	11	9	7	5	14	3	0.7	1	0.9	0.7	0.5	3	0.7	0.2	0.3	0.2	0.2	0.1

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TABLE 5-7: RATIO OF PREDICTED SEDIMENT CONCENTRATIONS TO SEDIMENT GUIDELINES

	Mean PCB Results							Mean PCB Results							Mean PCB Results						
Year	189 Total Sed Conc	168 Total Sed Conc	154 Total Sed Conc	152 Total Sed Conc	113 Total Sed Conc	90 Total Sed Conc	50 Total Sed Conc	189 Total Sed Conc	168 Total Sed Conc	154 Total Sed Conc	152 Total Sed Conc	113 Total Sed Conc	90 Total Sed Conc	50 Total Sed Conc	189 Total Sed Conc	168 Total Sed Conc	154 Total Sed Conc	152 Total Sed Conc	113 Total Sed Conc	90 Total Sed Conc	50 Total Sed Conc
	Persaud SEL 530 mg/Kg OC							Washington State PAET *Hyalella Azteca* Aroclor 1242 0.1 mg/Kg dw							Washington PAET Microtox 0.021 mg/Kg dry weight						
1993	**5.1**	0.8	0.5	0.07	0.06	0.05	0.03	**339**	**91**	**21**	**10**	**8**	**6**	**5**	**1614**	**431**	**98**	**46**	**36**	**29**	**21**
1994	**4.6**	0.7	0.5	0.07	0.05	0.04	0.03	**313**	**82**	**19**	**9**	**7**	**6**	**4**	**1492**	**389**	**90**	**42**	**34**	**27**	**20**
1995	**4.4**	0.7	0.4	0.06	0.05	0.16	0.03	**289**	**75**	**18**	**8**	**7**	**22**	**4**	**1374**	**356**	**85**	**38**	**32**	**103**	**19**
1996	**3.9**	0.6	0.4	0.06	0.05	0.17	0.03	**259**	**63**	**16**	**8**	**7**	**22**	**4**	**1232**	**301**	**75**	**39**	**31**	**104**	**18**
1997	**3.5**	0.5	0.4	0.06	0.05	0.04	0.03	**236**	**52**	**14**	**8**	**6**	**5**	**4**	**1124**	**249**	**67**	**37**	**30**	**24**	**17**
1998	**2.1**	0.6	0.3	0.13	0.10	0.08	0.06	**218**	**49**	**14**	**17**	**14**	**11**	**8**	**1036**	**232**	**65**	**80**	**66**	**53**	**39**
1999	**2.0**	0.5	0.3	0.06	0.05	0.04	0.03	**208**	**46**	**13**	**8**	**6**	**5**	**4**	**989**	**221**	**62**	**36**	**30**	**24**	**18**
2000	**1.8**	0.5	0.3	0.05	0.04	0.03	0.03	**190**	**41**	**12**	**7**	**6**	**4**	**3**	**905**	**196**	**57**	**32**	**27**	**21**	**16**
2001	**1.6**	0.4	0.2	0.05	0.04	0.03	0.02	**168**	**34**	**10**	**7**	**5**	**4**	**3**	**800**	**161**	**50**	**31**	**25**	**20**	**15**
2002	**1.5**	0.3	0.2	0.05	0.04	0.03	0.02	**155**	**29**	**9**	**7**	**5**	**4**	**3**	**737**	**138**	**44**	**32**	**26**	**20**	**15**
2003	**1.4**	0.3	0.2	0.05	0.04	0.03	0.02	**143**	**25**	**8**	**6**	**5**	**4**	**3**	**679**	**121**	**40**	**30**	**25**	**20**	**14**
2004	**1.2**	0.3	0.2	0.05	0.04	0.03	0.02	**132**	**25**	**8**	**6**	**5**	**4**	**3**	**627**	**117**	**38**	**30**	**25**	**20**	**15**
2005	**1.2**	0.3	0.2	0.05	0.04	0.03	0.02	**123**	**24**	**7**	**6**	**5**	**4**	**3**	**584**	**112**	**36**	**28**	**24**	**19**	**14**
2006	**1.1**	0.2	0.2	0.04	0.04	0.03	0.02	**115**	**21**	**7**	**6**	**5**	**4**	**3**	**546**	**101**	**33**	**27**	**22**	**18**	**13**
2007	1.0	0.2	0.1	0.04	0.03	0.03	0.02	**105**	**19**	**6**	**6**	**5**	**4**	**3**	**499**	**92**	**30**	**26**	**22**	**17**	**12**
2008	0.9	0.2	0.1	0.04	0.04	0.03	0.02	**9[illegible]**	**18**	**6**	**6**	**5**	**4**	**3**	**457**	**87**	**28**	**28**	**23**	**18**	**13**
2009	0.9	0.2	0.1	0.04	0.04	0.03	.02	**[illegible]1**	**18**	**5**	**6**	**5**	**4**	**3**	**434**	**86**	**26**	**28**	**23**	**18**	**13**
2010	0.8	0.2	0.1	0.04	0.03	0.02	0.02	**84**	**17**	**5**	**5**	**4**	**3**	**2**	**401**	**79**	**23**	**24**	**20**	**15**	**11**
2011	0.7	0.2	0.1	0.04	0.03	0.02	0.02	**76**	**15**	**4**	**5**	**4**	**3**	**2**	**362**	**70**	**21**	**24**	**20**	**15**	**11**
2012	0.7	0.2	0.1	0.04	0.03	0.02	0.02	**69**	**14**	**4**	**5**	**4**	**3**	**2**	**328**	**66**	**19**	**24**	**20**	**15**	**11**
2013	0.7	0.2	0.1	0.04	0.03	0.02	0.02	**71**	**15**	**3**	**5**	**4**	**3**	**2**	**337**	**71**	**17**	**23**	**19**	**15**	**11**
2014	0.7	0.2	0.1	0.04	0.03	0.02	0.02	**72**	**14**	**3**	**5**	**4**	**3**	**2**	**344**	**65**	**15**	**23**	**19**	**15**	**11**
2015	0.7	0.1	0.1	0.04	0.03	0.02	0.02	**69**	**13**	**3**	**5**	**4**	**3**	**2**	**328**	**61**	**14**	**22**	**18**	**14**	**10**
2016	0.6	0.1	0.1	0.04	0.03	0.02	0.02	**65**	**13**	**3**	**5**	**4**	**3**	**2**	**311**	**60**	**14**	**24**	**20**	**15**	**11**
2017	0.6	0.1	0.1	0.04	0.03	0.02	0.02	**62**	**13**	**3**	**5**	**4**	**3**	**2**	**294**	**61**	**14**	**24**	**20**	**15**	**11**
2018	0.5	0.1	0.1	0.03	0.03	0.02	0.02	**57**	**12**	**3**	**5**	**4**	**3**	**2**	**271**	**59**	**14**	**22**	**18**	**14**	**10**

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TABLE 5-8: RATIO OF MEASURED WHOLE WATER CONCENTRATIONS TO BENCHMARKS

Hudson River	USEPA/NYSDEC - Benthic Aquatic Life 0.014 ug/L freshwater and 0.03 ug/L saltwater		USEPA/NYSDEC Wildlife Bioaccumulation 1.2E-04 µg/L	
Location	Average Conc. in Water	95% UCL Conc. In Water	Average Conc. in Water	95% UCL Conc. In Water
Upper River				
Thompson Island Pool (189)	**5.3**	**17**	**613**	**1942**
Stillwater (168)	**9.3**	**30**	**1090**	**3458**
Federal Dam (154)	**6.5**	**14**	**762**	**1634**
Lower River				
143.5	**5.1**	**55**	**589**	**6420**
137.2	**5.1**	**55**	**589**	**6420**
122.4	**2.3**	**30**	**270**	**3460**
113.8	**2.3**	**30**	**270**	**3460**
100	**2.3**	**30**	**270**	**3460**
88.9	**1.5**	**6.8**	**178**	**790**
58.7	0.7	**3.2**	**178**	**790**
47.3	0.7	**3.2**	**178**	**790**
25.8	0.7	**3.2**	**178**	**790**

Note: Water concentrations estimated from Phase 2 dataset -- data averaged across appropriate lower river water column sampling locations.
Source: Hudson River Database Release 5.0

TABLE 5-9: RATIO OF PREDICTED WHOLE WATER CONCENTRATIONS TO CRITERIA AND BENCHMARKS

	Mean Total PCB Results							Mean Total PCB Results						
Year	189 Whole Water Conc	168 Whole Water Conc	154 Whole Water Conc	152 Whole Water Conc	113 Whole Water Conc	90 Whole Water Conc	50 Whole Water Conc	189 Whole Water Conc	168 Whole Water Conc	154 Whole Water Conc	152 Whole Water Conc	113 Whole Water Conc	90 Whole Water Conc	50 Whole Water Conc
	USEPA/NYSDEC - Benthic Aquatic Life 0.014 ug/L FW 0.03 ug/L SW							USEPA/NYSDEC - Wildlife Bioaccumulation 1.2E-04 ug/l						
1993	10.4	5.8	3.5	3.2	2.2	1.7	0.6	121	68	41	37	25	19	15
1994	9.1	4.8	3.0	2.8	1.8	1.4	0.5	106	56	35	33	21	17	13
1995	11.8	5.6	2.9	1.1	1.2	1.1	0.5	138	66	34	13	14	13	11
1996	5.7	3.1	1.9	3.4	1.9	1.3	0.4	66	36	22	40	22	15	11
1997	6.7	3.4	2.1	2.2	1.5	1.1	0.4	78	39	24	25	17	13	10
1998	5.8	3.3	2.0	3.0	2.6	2.2	0.8	68	39	24	35	30	26	21
1999	8.4	3.6	1.9	1.2	1.0	0.9	0.4	98	42	22	14	12	11	8.9
2000	4.7	2.3	1.4	1.9	1.1	0.8	0.3	54	27	16	22	13	9.6	7.7
2001	4.9	2.3	1.4	2.0	1.2	0.8	0.3	57	27	16	23	14	9.5	7.2
2002	5.3	2.2	1.3	1.2	0.9	0.8	0.3	62	26	15	14	11	8.8	6.9
2003	4.5	2.0	1.1	1.4	0.9	0.7	0.3	53	23	13	16	11	8.3	6.4
2004	6.5	2.5	1.3	0.8	0.7	0.6	0.2	76	29	15	9.0	7.7	7.0	5.8
2005	4.5	1.9	1.0	1.1	0.7	0.5	0.2	53	22	12	13	8.0	6.4	5.2
2006	3.8	1.5	0.9	1.4	0.8	0.5	0.2	45	18	10	16	9.2	6.4	5.0
2007	4.0	1.7	0.9	1.4	0.8	0.5	0.2	46	19	10	16	9.3	6.2	4.7
2008	5.6	1.9	0.9	0.6	0.6	0.5	0.2	66	22	10	7.4	6.5	5.7	4.7
2009	4.7	1.9	0.9	0.7	0.5	0.5	0.2	55	22	11	8.1	6.2	5.3	4.4
2010	3.7	1.4	0.8	1.1	0.6	0.4	0.2	44	16	8.9	13	7.3	5.1	3.9
2011	3.5	1.4	0.7	1.1	0.7	0.5	0.2	41	16	8.4	13	7.9	5.3	3.9
2012	4.3	1.5	0.6	0.8	0.6	0.4	0.2	50	17	7.6	9.1	6.6	5.1	3.9
2013	3.2	1.2	0.6	1.0	0.6	0.4	0.2	38	14	7.1	12	7.5	5.2	3.9
2014	2.9	1.1	0.6	0.8	0.6	0.4	0.2	34	13	6.6	9.6	6.6	5.0	3.8
2015	2.8	1.0	0.5	0.8	0.5	0.4	0.1	33	12	6.4	9.1	6.2	4.7	3.6
2016	4.3	1.3	0.6	0.4	0.4	0.4	0.1	50	16	6.8	5.2	4.8	4.4	3.6
2017	4.4	1.4	0.7	0.4	0.4	0.3	0.1	51	17	7.7	5.0	4.3	4.0	3.4
2018	3.8	1.3	0.6	0.6	0.4	0.3	0.1	44	15	7.1	7.1	5.0	4.0	3.2

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TABLE 5-10: RATIO OF MEASURED FORAGE FISH CONCENTRATIONS TO TOXICITY BENCHMARKS

Location	Pumpkinseed lab-based NOAEL		Pumpkinseed lab-based LOAEL		Spottail shiner lab-based NOAEL		Spottail shiner lab-based LOAEL	
	Average Forage Fish Conc mg/Kg	95% UCL Forage Fish Conc mg/Kg	Average Forage Fish Conc mg/Kg	95% UCL Forage Fish Conc mg/Kg	Average Forage Fish Conc mg/Kg	95% UCL Forage Fish Conc mg/Kg	Average Forage Fish Conc mg/Kg	95% UCL Forage Fish Conc mg/Kg
Upper River								
Thompson Island Pool (189)	**11**	**22**	**2.2**	**4.6**	**4.0**	**8.1**	**1.5**	**3.1**
Stillwater (168)	**3.7**	**5.3**	0.8	**1.1**	**1.3**	**1.9**	0.5	0.7
Federal Dam (154)	0.9	**1.3**	0.2	0.3	0.3	0.5	0.1	0.2
Lower River								
143.5	**1.0**	**1.2**	0.2	0.2	0.4	0.4	0.1	0.2
137.2	**2.1**	**4.4**	0.4	0.9	0.7	**1.6**	0.3	0.6
122.4	0.8	**1.3**	0.2	0.3	0.3	0.5	0.1	0.2
113.8	0.8	0.9	0.2	0.2	0.3	0.3	0.1	0.1
100	0.4	0.6	0.1	0.1	0.1	0.2	0.0	0.1
88.9	0.7	**1.0**	0.1	0.2	0.3	0.4	0.1	0.1
58.7	0.8	0.9	0.2	0.2	0.3	0.3	0.1	0.1
47.3	0.7	0.9	0.1	0.2	0.2	0.3	0.1	0.1
25.8	0.5	0.6	0.1	0.1	0.2	0.2	0.1	0.1

Source: Hudson River Database Release 5.0

TABLE 5-11a: RATIO OF PREDICTED PUMPKINSEED CONCENTRATIONS TO LABORATORY-BASED NOAEL FOR TRI+ PCBS - UPPER RIVER

	River Mile 189			River Mile 168			River Mile 154		
Year	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)
1993	**5.8**	**7.1**	**11**	**2.8**	**3.6**	**6.3**	**1.0**	**1.3**	**2.3**
1994	**4.9**	**6.1**	**9.5**	**2.5**	**3.1**	**5.4**	0.9	**1.2**	**2.0**
1995	**4.9**	**6.1**	**8.8**	**2.2**	**2.8**	**4.9**	0.9	**1.1**	**1.8**
1996	**3.2**	**4.1**	**6.2**	**1.8**	**2.3**	**4.0**	0.7	0.9	**1.5**
1997	**2.7**	**3.3**	**4.6**	**1.6**	**1.9**	**3.6**	0.6	0.8	**1.4**
1998	**2.7**	**3.4**	**5.6**	**1.6**	**2.0**	**3.4**	0.7	0.9	**1.5**
1999	**2.3**	**2.9**	**4.6**	**1.5**	**1.8**	**3.2**	0.6	0.8	**1.3**
2000	**1.7**	**2.1**	**3.3**	**1.2**	**1.6**	**2.7**	0.5	0.7	**1.2**
2001	**1.5**	**1.8**	**2.8**	**1.0**	**1.3**	**2.2**	0.5	0.6	**1.0**
2002	**1.6**	**2.0**	**3.2**	0.9	**1.1**	**2.0**	0.4	0.5	0.9
2003	**1.6**	**2.0**	**3.0**	0.9	**1.1**	**1.8**	0.4	0.5	0.9
2004	**2.1**	**2.6**	**4.2**	0.9	**1.1**	**1.8**	0.4	0.5	0.8
2005	**1.6**	**2.0**	**3.0**	0.8	**1.0**	**1.7**	0.4	0.4	0.8
2006	**1.3**	**1.6**	**2.5**	0.7	0.9	**1.5**	0.3	0.4	0.7
2007	**1.6**	**2.0**	**3.1**	0.7	0.9	**1.4**	0.3	0.4	0.7
2008	**1.7**	**2.1**	**3.2**	0.6	0.8	**1.4**	0.3	0.4	0.6
2009	**1.9**	**2.4**	**3.7**	0.6	0.8	**1.4**	0.3	0.3	0.6
2010	**1.5**	**1.8**	**2.9**	0.5	0.7	**1.2**	0.2	0.3	0.5
2011	**1.2**	**1.5**	**2.3**	0.5	0.6	**1.1**	0.2	0.3	0.5
2012	**1.1**	**1.4**	**2.1**	0.5	0.6	**1.1**	0.2	0.2	0.4
2013	**1.0**	**1.2**	**1.8**	0.5	0.6	**1.1**	0.2	0.2	0.4
2014	**1.0**	**1.3**	**2.0**	0.5	0.6	**1.0**	0.2	0.2	0.4
2015	**1.0**	**1.3**	**2.0**	0.5	0.6	**1.0**	0.2	0.2	0.4
2016	**1.3**	**1.6**	**2.5**	0.5	0.6	**1.0**	0.2	0.2	0.3
2017	**1.3**	**1.7**	**2.6**	0.5	0.6	**1.0**	0.2	0.2	0.4
2018	**1.4**	**1.7**	**2.7**	0.5	0.6	**1.0**	0.2	0.2	0.4

Bold values indicate exceedances

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TABLE 5-11b: RATIO OF PREDICTED PUMPKINSEED CONCENTRATIONS TO LABORATORY-BASED NOAEL FOR TRI+ PCBS - LOWER RIVER

	River Mile 152			River Mile 113			River Mile 90			River Mile 50		
Year	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)
1993	0.6	0.8	**1.3**	0.4	0.6	0.9	0.3	0.4	0.7	0.3	0.4	0.7
1994	0.4	0.6	1.0	0.4	0.5	0.8	0.3	0.4	0.6	0.3	0.4	0.6
1995	0.4	0.5	0.9	0.3	0.4	0.7	0.2	0.3	0.6	0.2	0.3	0.5
1996	0.5	0.7	**1.1**	0.3	0.4	0.7	0.2	0.3	0.5	0.2	0.3	0.5
1997	0.4	0.5	0.9	0.3	0.4	0.6	0.2	0.3	0.5	0.2	0.3	0.4
1998	0.6	0.9	**1.6**	0.5	0.7	**1.2**	0.4	0.6	**1.1**	0.4	0.6	1.0
1999	0.3	0.4	0.7	0.2	0.3	0.5	0.2	0.3	0.4	0.2	0.3	0.4
2000	0.3	0.4	0.6	0.2	0.3	0.5	0.2	0.2	0.4	0.1	0.2	0.4
2001	0.3	0.4	0.6	0.2	0.3	0.4	0.1	0.2	0.3	0.1	0.2	0.3
2002	0.2	0.4	0.6	0.2	0.3	0.5	0.1	0.2	0.4	0.1	0.2	0.3
2003	0.2	0.3	0.5	0.2	0.2	0.4	0.1	0.2	0.3	0.1	0.2	0.3
2004	0.2	0.3	0.4	0.1	0.2	0.4	0.1	0.2	0.3	0.1	0.2	0.3
2005	0.2	0.3	0.4	0.1	0.2	0.3	0.1	0.2	0.3	0.1	0.2	0.3
2006	0.2	0.3	0.5	0.1	0.2	0.3	0.1	0.2	0.3	0.1	0.1	0.2
2007	0.2	0.2	0.4	0.1	0.2	0.3	0.1	0.1	0.2	0.1	0.1	0.2
2008	0.2	0.2	0.4	0.1	0.2	0.3	0.1	0.2	0.3	0.1	0.1	0.2
2009	0.2	0.2	0.4	0.1	0.2	0.3	0.1	0.1	0.3	0.1	0.1	0.2
2010	0.2	0.2	0.4	0.1	0.2	0.3	0.1	0.1	0.2	0.1	0.1	0.2
2011	0.2	0.2	0.4	0.1	0.2	0.3	0.1	0.1	0.2	0.1	0.1	0.2
2012	0.2	0.2	0.4	0.1	0.2	0.3	0.1	0.1	0.2	0.1	0.1	0.2
2013	0.2	0.2	0.4	0.1	0.2	0.3	0.1	0.1	0.2	0.1	0.1	0.2
2014	0.2	0.2	0.4	0.1	0.2	0.3	0.1	0.1	0.2	0.1	0.1	0.2
2015	0.1	0.2	0.3	0.1	0.2	0.3	0.1	0.1	0.2	0.1	0.1	0.2
2016	0.1	0.2	0.3	0.1	0.2	0.3	0.1	0.1	0.2	0.1	0.1	0.2
2017	0.1	0.2	0.3	0.1	0.1	0.3	0.1	0.1	0.2	0.1	0.1	0.2
2018	0.1	0.2	0.3	0.1	0.1	0.2	0.1	0.1	0.2	0.1	0.1	0.2

Bold values indicate exceedances

TABLE 5-12a: RATIO OF PREDICTED PUMPKINSEED CONCENTRATIONS TO LABORATORY-BASED LOAEL FOR TRI+ PCBS - UPPER RIVER

	River Mile 189			River Mile 168			River Mile 154		
Year	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)
1993	**1.2**	**1.4**	**2.3**	0.6	0.7	**1.3**	0.2	0.3	0.5
1994	**1.0**	**1.3**	**1.9**	0.5	0.6	**1.1**	0.2	0.2	0.4
1995	**1.0**	**1.2**	**1.8**	0.5	0.6	**1.0**	0.2	0.2	0.4
1996	0.7	0.8	**1.3**	0.4	0.5	0.8	0.1	0.2	0.3
1997	0.5	0.7	0.9	0.3	0.4	0.7	0.1	0.2	0.3
1998	0.5	0.7	**1.1**	0.3	0.4	0.7	0.1	0.2	0.3
1999	0.5	0.6	0.9	0.3	0.4	0.6	0.1	0.2	0.3
2000	0.4	0.4	0.7	0.3	0.3	0.6	0.1	0.1	0.2
2001	0.3	0.4	0.6	0.2	0.3	0.4	0.1	0.1	0.2
2002	0.3	0.4	0.7	0.2	0.2	0.4	0.1	0.1	0.2
2003	0.3	0.4	0.6	0.2	0.2	0.4	0.1	0.1	0.2
2004	0.4	0.5	0.9	0.2	0.2	0.4	0.1	0.1	0.2
2005	0.3	0.4	0.6	0.2	0.2	0.3	0.1	0.1	0.2
2006	0.3	0.3	0.5	0.1	0.2	0.3	0.1	0.1	0.1
2007	0.3	0.4	0.6	0.1	0.2	0.3	0.1	0.1	0.1
2008	0.3	0.4	0.7	0.1	0.2	0.3	0.1	0.1	0.1
2009	0.4	0.5	0.8	0.1	0.2	0.3	0.1	0.1	0.1
2010	0.3	0.4	0.6	0.1	0.1	0.2	0.0	0.1	0.1
2011	0.3	0.3	0.5	0.1	0.1	0.2	0.0	0.1	0.1
2012	0.2	0.3	0.4	0.1	0.1	0.2	0.0	0.1	0.1
2013	0.2	0.3	0.4	0.1	0.1	0.2	0.0	0.0	0.1
2014	0.2	0.3	0.4	0.1	0.1	0.2	0.0	0.0	0.1
2015	0.2	0.3	0.4	0.1	0.1	0.2	0.0	0.0	0.1
2016	0.3	0.3	0.5	0.1	0.1	0.2	0.0	0.0	0.1
2017	0.3	0.3	0.5	0.1	0.1	0.2	0.0	0.0	0.1
2018	0.3	0.3	0.6	0.1	0.1	0.2	0.0	0.0	0.1

Bold values indicate exceedances

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TABLE 5-12b: RATIO OF PREDICTED PUMPKINSEED CONCENTRATIONS TO LABORATORY-BASED LOAEL FOR TRI+ PCBS - LOWER RIVER

	River Mile 152			River Mile 113			River Mile 90			River Mile 50		
Year	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)
1993	0.1	0.2	0.3	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1
1994	0.1	0.1	0.2	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1
1995	0.1	0.1	0.2	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.1	0.1
1996	0.1	0.1	0.2	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.1	0.1
1997	0.1	0.1	0.2	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.1	0.1
1998	0.1	0.2	0.3	0.1	0.2	0.3	0.1	0.1	0.2	0.1	0.1	0.2
1999	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.1	0.1	0.0	0.1	0.1
2000	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.1
2001	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.1
2002	0.0	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.1
2003	0.0	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.1
2004	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.1
2005	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.1
2006	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0
2007	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0
2008	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0
2009	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0
2010	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
2011	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
2012	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
2013	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
2014	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
2015	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
2016	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
2017	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
2018	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Bold values indicate exceedances

TABLE 5-13a: RATIO OF PREDICTED SPOTTAIL SHINER CONCENTRATIONS TO FIELD-DERIVED NOAEL FOR TRI+ PCBS - UPPER RIVER

	River Mile 189			River Mile 168			River Mile 154		
Year	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)
1993	**2.1**	**2.6**	**4.2**	0.3	0.4	**1.2**	0.1	0.2	0.4
1994	**2.0**	**2.4**	**3.7**	0.2	0.4	**1.1**	0.09	0.1	0.4
1995	**1.8**	**2.2**	**3.2**	0.2	0.3	**1.0**	0.08	0.1	0.4
1996	**1.3**	**1.5**	**2.3**	0.2	0.3	0.7	0.07	0.1	0.3
1997	**1.0**	**1.1**	**1.6**	0.2	0.2	0.7	0.06	0.09	0.3
1998	**1.1**	**1.4**	**2.2**	0.2	0.3	0.6	0.07	0.1	0.3
1999	**1.0**	**1.2**	**1.9**	0.1	0.2	0.7	0.06	0.1	0.3
2000	0.7	0.9	**1.4**	0.1	0.2	0.5	0.05	0.09	0.2
2001	0.6	0.7	**1.1**	0.1	0.2	0.4	0.04	0.07	0.2
2002	0.7	0.9	**1.3**	0.09	0.1	0.4	0.04	0.07	0.2
2003	0.8	0.9	**1.3**	0.08	0.1	0.4	0.04	0.06	0.2
2004	0.9	**1.1**	**1.7**	0.08	0.1	0.4	0.04	0.06	0.2
2005	0.7	0.9	**1.3**	0.07	0.1	0.3	0.03	0.06	0.2
2006	0.6	0.7	**1.1**	0.06	0.1	0.3	0.03	0.05	0.1
2007	0.6	0.7	**1.1**	0.06	0.1	0.3	0.03	0.05	0.1
2008	0.8	0.9	**1.3**	0.06	0.1	0.3	0.03	0.04	0.1
2009	0.8	**1.0**	**1.5**	0.06	0.1	0.3	0.03	0.04	0.1
2010	0.5	0.6	**1.0**	0.05	0.09	0.2	0.02	0.04	0.1
2011	0.5	0.6	**1.0**	0.05	0.08	0.2	0.02	0.03	0.09
2012	0.5	0.6	0.8	0.05	0.08	0.2	0.02	0.03	0.08
2013	0.4	0.5	0.8	0.05	0.08	0.2	0.02	0.03	0.07
2014	0.4	0.5	0.8	0.04	0.07	0.2	0.02	0.03	0.07
2015	0.4	0.5	0.8	0.04	0.07	0.2	0.02	0.03	0.07
2016	0.6	0.7	**1.0**	0.04	0.07	0.2	0.02	0.03	0.07
2017	0.6	0.7	**1.1**	0.04	0.07	0.2	0.02	0.03	0.07
2018	0.6	0.7	**1.2**	0.05	0.07	0.2	0.02	0.03	0.07

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TABLE 5-13b: RATIO OF PREDICTED SPOTTAIL SHINER CONCENTRATIONS TO FIELD-DERIVED NOAEL FOR TRI+ PCBS - LOWER RIVER

	River Mile 152			River Mile 113			River Mile 90			River Mile 50		
Year	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)
1993	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.1
1994	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.1
1995	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.1
1996	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.1
1997	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0
1998	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
1999	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
2000	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2001	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2002	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2003	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2004	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2005	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2006	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2007	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2008	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2009	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2010	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2011	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2012	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2013	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2014	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2015	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2016	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2017	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2018	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TABLE 5-14a: RATIO OF PREDICTED SPOTTAIL SHINER CONCENTRATIONS TO FIELD-DERIVED LOAEL FOR TRI+ PCBS - UPPER RIVER

	River Mile 189			River Mile 168			River Mile 154		
Year	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)
1993	0.8	**1.0**	**1.6**	0.1	0.2	0.5	0.04	0.06	0.2
1994	0.8	0.9	**1.4**	0.1	0.2	0.4	0.03	0.06	0.2
1995	0.7	0.8	**1.2**	0.08	0.1	0.4	0.03	0.05	0.1
1996	0.5	0.6	0.9	0.07	0.1	0.3	0.03	0.04	0.1
1997	0.4	0.4	0.6	0.06	0.1	0.3	0.02	0.04	0.1
1998	0.4	0.5	0.9	0.06	0.1	0.2	0.03	0.05	0.1
1999	0.4	0.5	0.7	0.05	0.09	0.3	0.02	0.04	0.1
2000	0.3	0.3	0.5	0.04	0.08	0.2	0.02	0.03	0.09
2001	0.2	0.3	0.4	0.04	0.06	0.2	0.02	0.03	0.08
2002	0.3	0.3	0.5	0.03	0.06	0.2	0.02	0.03	0.07
2003	0.3	0.3	0.5	0.03	0.05	0.1	0.02	0.02	0.07
2004	0.3	0.4	0.7	0.03	0.05	0.1	0.01	0.02	0.07
2005	0.3	0.3	0.5	0.03	0.05	0.1	0.01	0.02	0.06
2006	0.2	0.3	0.4	0.02	0.04	0.1	0.01	0.02	0.05
2007	0.2	0.3	0.4	0.02	0.04	0.1	0.01	0.02	0.05
2008	0.3	0.3	0.5	0.02	0.04	0.1	0.01	0.02	0.05
2009	0.3	0.4	0.6	0.02	0.04	0.1	0.01	0.02	0.05
2010	0.2	0.2	0.4	0.02	0.03	0.09	0.01	0.01	0.04
2011	0.2	0.2	0.4	0.02	0.03	0.09	0.01	0.01	0.04
2012	0.2	0.2	0.3	0.02	0.03	0.09	0.01	0.01	0.03
2013	0.2	0.2	0.3	0.02	0.03	0.08	0.01	0.01	0.03
2014	0.2	0.2	0.3	0.02	0.03	0.07	0.01	0.01	0.03
2015	0.2	0.2	0.3	0.02	0.03	0.07	0.01	0.01	0.03
2016	0.2	0.3	0.4	0.02	0.03	0.08	0.01	0.01	0.03
2017	0.2	0.3	0.4	0.02	0.03	0.08	0.01	0.01	0.03
2018	0.2	0.3	0.4	0.02	0.03	0.07	0.01	0.01	0.03

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TABLE 5-14b: RATIO OF PREDICTED SPOTTAIL SHINER CONCENTRATIONS TO FIELD-DERIVED LOAEL FOR TRI+ PCBS - LOWER RIVER

	River Mile 152			River Mile 113			River Mile 90			River Mile 50		
Year	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)
1993	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1994	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1995	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1996	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1997	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1998	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2001	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2002	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2003	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2004	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2005	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2006	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2007	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2008	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2009	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2010	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2011	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2012	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2013	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2014	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2015	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2016	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2017	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2018	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TABLE 5-15a: RATIO OF PREDICTED PUMPKINSEED CONCENTRATIONS TO LABORATORY-DERIVED NOAEL ON A TEQ BASIS -UPPER RIVER

	River Mile 189			River Mile 168			River Mile 154		
Year	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)
1993	0.10	0.1	0.2	0.05	0.07	0.1	0.02	0.03	0.05
1994	0.09	0.1	0.2	0.05	0.06	0.1	0.02	0.02	0.04
1995	0.09	0.1	0.2	0.04	0.06	0.1	0.02	0.02	0.04
1996	0.06	0.07	0.1	0.03	0.04	0.08	0.01	0.02	0.03
1997	0.05	0.06	0.09	0.03	0.04	0.07	0.01	0.02	0.03
1998	0.05	0.06	0.1	0.03	0.04	0.07	0.01	0.02	0.03
1999	0.04	0.05	0.09	0.03	0.04	0.06	0.01	0.02	0.03
2000	0.03	0.04	0.07	0.02	0.03	0.06	0.01	0.01	0.02
2001	0.03	0.03	0.05	0.02	0.02	0.05	0.009	0.01	0.02
2002	0.03	0.04	0.06	0.02	0.02	0.04	0.008	0.01	0.02
2003	0.03	0.04	0.06	0.02	0.02	0.04	0.008	0.01	0.02
2004	0.04	0.05	0.08	0.02	0.02	0.04	0.008	0.01	0.02
2005	0.03	0.04	0.06	0.01	0.02	0.03	0.007	0.009	0.02
2006	0.02	0.03	0.05	0.01	0.02	0.03	0.006	0.008	0.01
2007	0.03	0.04	0.06	0.01	0.02	0.03	0.006	0.008	0.01
2008	0.03	0.04	0.06	0.01	0.02	0.03	0.005	0.007	0.01
2009	0.03	0.04	0.07	0.01	0.02	0.03	0.005	0.007	0.01
2010	0.03	0.03	0.06	0.01	0.01	0.02	0.005	0.006	0.01
2011	0.02	0.03	0.05	0.01	0.01	0.02	0.004	0.006	0.01
2012	0.020	0.03	0.04	0.01	0.01	0.02	0.004	0.005	0.008
2013	0.018	0.02	0.04	0.009	0.01	0.02	0.003	0.004	0.008
2014	0.019	0.02	0.04	0.009	0.01	0.02	0.003	0.004	0.008
2015	0.018	0.02	0.04	0.009	0.01	0.02	0.003	0.004	0.007
2016	0.02	0.03	0.05	0.009	0.01	0.02	0.003	0.004	0.007
2017	0.02	0.03	0.05	0.009	0.01	0.02	0.003	0.004	0.007
2018	0.02	0.03	0.05	0.009	0.01	0.02	0.003	0.004	0.007

Bold values indicate exceedances

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TABLE 5-15b: RATIO OF PREDICTED PUMPKINSEED CONCENTRATIONS TO LABORATORY-DERIVED NOAEL ON A TEQ BASIS - LOWER RIVER

	River Mile 152			River Mile 113			River Mile 90			River Mile 50		
Year	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)
1993	0.03	0.04	0.07	0.02	0.03	0.05	0.02	0.02	0.04	0.02	0.02	0.04
1994	0.02	0.03	0.05	0.02	0.03	0.04	0.01	0.02	0.04	0.01	0.02	0.03
1995	0.02	0.03	0.05	0.01	0.02	0.04	0.01	0.02	0.03	0.01	0.02	0.03
1996	0.03	0.04	0.06	0.02	0.02	0.04	0.01	0.02	0.03	0.01	0.02	0.03
1997	0.02	0.03	0.05	0.01	0.02	0.03	0.01	0.02	0.03	0.01	0.01	0.02
1998	0.03	0.05	0.08	0.03	0.04	0.07	0.02	0.03	0.06	0.02	0.03	0.05
1999	0.01	0.02	0.04	0.01	0.02	0.03	0.01	0.01	0.02	0.01	0.01	0.02
2000	0.01	0.02	0.03	0.01	0.01	0.02	0.01	0.01	0.02	0.01	0.01	0.02
2001	0.01	0.02	0.04	0.01	0.01	0.02	0.01	0.01	0.02	0.01	0.01	0.02
2002	0.01	0.02	0.03	0.01	0.01	0.02	0.01	0.01	0.02	0.01	0.01	0.02
2003	0.01	0.02	0.03	0.01	0.01	0.02	0.01	0.01	0.02	0.01	0.01	0.02
2004	0.01	0.01	0.02	0.01	0.01	0.02	0.01	0.01	0.02	0.01	0.01	0.02
2005	0.01	0.01	0.02	0.01	0.01	0.02	0.01	0.01	0.02	0.01	0.01	0.01
2006	0.01	0.02	0.03	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01
2007	0.01	0.01	0.02	0.01	0.01	0.02	0.01	0.01	0.01	0.00	0.01	0.01
2008	0.01	0.01	0.02	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01
2009	0.01	0.01	0.02	0.01	0.01	0.02	0.01	0.01	0.01	0.00	0.01	0.01
2010	0.01	0.01	0.02	0.01	0.01	0.02	0.00	0.01	0.01	0.00	0.01	0.01
2011	0.01	0.01	0.02	0.01	0.01	0.02	0.00	0.01	0.01	0.00	0.01	0.01
2012	0.01	0.01	0.02	0.01	0.01	0.02	0.00	0.01	0.01	0.00	0.01	0.01
2013	0.01	0.01	0.02	0.01	0.01	0.02	0.00	0.01	0.01	0.00	0.01	0.01
2014	0.01	0.01	0.02	0.01	0.01	0.02	0.00	0.01	0.01	0.00	0.01	0.01
2015	0.01	0.01	0.02	0.01	0.01	0.01	0.00	0.01	0.01	0.00	0.01	0.01
2016	0.01	0.01	0.02	0.01	0.01	0.01	0.00	0.01	0.01	0.00	0.01	0.01
2017	0.01	0.01	0.02	0.01	0.01	0.01	0.00	0.01	0.01	0.00	0.01	0.01
2018	0.01	0.01	0.02	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01	0.01

Bold values indicate exceedances

TABLE 5-16a: RATIO OF PREDICTED SPOTTAIL SHINER CONCENTRATIONS TO LABORATORY-DERIVED NOAEL ON A TEQ BASIS -UPPER RIVER

	River Mile 189			River Mile 168			River Mile 154		
Year	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)
1993	0.2	0.2	0.5	0.05	0.08	0.23	0.02	0.03	0.08
1994	0.2	0.2	0.4	0.05	0.08	0.21	0.02	0.03	0.07
1995	0.2	0.2	0.3	0.04	0.06	0.19	0.02	0.02	0.07
1996	0.1	0.1	0.2	0.03	0.05	0.15	0.01	0.02	0.06
1997	0.08	0.1	0.2	0.03	0.04	0.13	0.01	0.02	0.05
1998	0.09	0.1	0.2	0.03	0.05	0.13	0.01	0.02	0.05
1999	0.08	0.1	0.2	0.03	0.04	0.12	0.01	0.02	0.05
2000	0.06	0.08	0.1	0.02	0.04	0.10	0.01	0.02	0.04
2001	0.05	0.06	0.1	0.02	0.03	0.09	0.008	0.01	0.04
2002	0.06	0.07	0.1	0.02	0.03	0.07	0.008	0.01	0.03
2003	0.06	0.08	0.1	0.02	0.03	0.07	0.008	0.01	0.03
2004	0.07	0.1	0.2	0.02	0.02	0.07	0.007	0.01	0.03
2005	0.06	0.08	0.1	0.01	0.02	0.06	0.006	0.01	0.03
2006	0.05	0.07	0.1	0.01	0.02	0.06	0.006	0.009	0.03
2007	0.05	0.06	0.1	0.01	0.02	0.06	0.005	0.009	0.02
2008	0.06	0.08	0.1	0.01	0.02	0.05	0.005	0.008	0.02
2009	0.06	0.08	0.2	0.01	0.02	0.05	0.005	0.008	0.02
2010	0.04	0.06	0.1	0.01	0.02	0.05	0.004	0.007	0.02
2011	0.04	0.05	0.1	0.009	0.01	0.04	0.004	0.006	0.02
2012	0.04	0.05	0.09	0.009	0.01	0.04	0.004	0.006	0.02
2013	0.04	0.05	0.09	0.009	0.01	0.04	0.003	0.005	0.01
2014	0.04	0.05	0.09	0.009	0.01	0.04	0.003	0.005	0.01
2015	0.03	0.04	0.09	0.008	0.01	0.04	0.003	0.005	0.01
2016	0.05	0.06	0.1	0.008	0.01	0.04	0.003	0.005	0.01
2017	0.05	0.06	0.1	0.009	0.01	0.04	0.003	0.005	0.01
2018	0.05	0.06	0.1	0.01	0.01	0.04	0.003	0.005	0.01

Bold values indicate exceedances

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TABLE 5-16b: RATIO OF PREDICTED SPOTTAIL SHINER CONCENTRATIONS TO LABORATORY-DERIVED NOAEL ON A TEQ BASIS - LOWER RIVER

	River Mile 152			River Mile 113			River Mile 90			River Mile 50		
Year	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)
1993	3.E-02	4.E-02	7.E-02	2.E-02	3.E-02	5.E-02	2.E-02	2.E-02	4.E-02	2.E-02	2.E-02	4.E-02
1994	3.E-02	4.E-02	6.E-02	2.E-02	3.E-02	5.E-02	2.E-02	2.E-02	4.E-02	2.E-02	2.E-02	4.E-02
1995	2.E-02	3.E-02	5.E-02	2.E-02	2.E-02	4.E-02	1.E-02	2.E-02	3.E-02	1.E-02	2.E-02	3.E-02
1996	3.E-02	4.E-02	7.E-02	2.E-02	2.E-02	4.E-02	1.E-02	2.E-02	3.E-02	1.E-02	2.E-02	3.E-02
1997	2.E-02	3.E-02	5.E-02	2.E-02	2.E-02	4.E-02	1.E-02	2.E-02	3.E-02	1.E-02	1.E-02	3.E-02
1998	4.E-02	5.E-02	9.E-02	3.E-02	4.E-02	7.E-02	3.E-02	3.E-02	6.E-02	2.E-02	3.E-02	6.E-02
1999	1.E-02	2.E-02	4.E-02	1.E-02	2.E-02	3.E-02	1.E-02	1.E-02	3.E-02	1.E-02	1.E-02	2.E-02
2000	2.E-02	2.E-02	4.E-02	1.E-02	2.E-02	3.E-02	9.E-03	1.E-02	2.E-02	9.E-03	1.E-02	2.E-02
2001	2.E-02	2.E-02	4.E-02	1.E-02	2.E-02	3.E-02	9.E-03	1.E-02	2.E-02	8.E-03	1.E-02	2.E-02
2002	1.E-02	2.E-02	3.E-02	1.E-02	1.E-02	3.E-02	9.E-03	1.E-02	2.E-02	8.E-03	1.E-02	2.E-02
2003	1.E-02	2.E-02	3.E-02	1.E-02	1.E-02	2.E-02	8.E-03	1.E-02	2.E-02	7.E-03	1.E-02	2.E-02
2004	1.E-02	1.E-02	3.E-02	9.E-03	1.E-02	2.E-02	7.E-03	1.E-02	2.E-02	7.E-03	9.E-03	2.E-02
2005	1.E-02	1.E-02	2.E-02	8.E-03	1.E-02	2.E-02	7.E-03	9.E-03	2.E-02	6.E-03	8.E-03	2.E-02
2006	1.E-02	2.E-02	3.E-02	8.E-03	1.E-02	2.E-02	6.E-03	9.E-03	2.E-02	6.E-03	8.E-03	1.E-02
2007	1.E-02	1.E-02	2.E-02	8.E-03	1.E-02	2.E-02	6.E-03	8.E-03	1.E-02	6.E-03	8.E-03	1.E-02
2008	9.E-03	1.E-02	2.E-02	8.E-03	1.E-02	2.E-02	6.E-03	9.E-03	2.E-02	6.E-03	8.E-03	1.E-02
2009	8.E-03	1.E-02	2.E-02	7.E-03	1.E-02	2.E-02	6.E-03	8.E-03	1.E-02	6.E-03	8.E-03	1.E-02
2010	9.E-03	1.E-02	2.E-02	6.E-03	9.E-03	2.E-02	5.E-03	7.E-03	1.E-02	5.E-03	6.E-03	1.E-02
2011	9.E-03	1.E-02	2.E-02	7.E-03	9.E-03	2.E-02	5.E-03	7.E-03	1.E-02	5.E-03	6.E-03	1.E-02
2012	9.E-03	1.E-02	2.E-02	7.E-03	1.E-02	2.E-02	5.E-03	7.E-03	1.E-02	5.E-03	6.E-03	1.E-02
2013	9.E-03	1.E-02	2.E-02	7.E-03	9.E-03	2.E-02	5.E-03	7.E-03	1.E-02	5.E-03	6.E-03	1.E-02
2014	9.E-03	1.E-02	2.E-02	7.E-03	9.E-03	2.E-02	5.E-03	7.E-03	1.E-02	5.E-03	6.E-03	1.E-02
2015	8.E-03	1.E-02	2.E-02	6.E-03	9.E-03	2.E-02	5.E-03	7.E-03	1.E-02	5.E-03	6.E-03	1.E-02
2016	7.E-03	9.E-03	2.E-02	6.E-03	8.E-03	2.E-02	5.E-03	7.E-03	1.E-02	5.E-03	6.E-03	1.E-02
2017	7.E-03	9.E-03	2.E-02	6.E-03	8.E-03	1.E-02	5.E-03	7.E-03	1.E-02	5.E-03	6.E-03	1.E-02
2018	7.E-03	9.E-03	2.E-02	5.E-03	7.E-03	1.E-02	4.E-03	6.E-03	1.E-02	4.E-03	6.E-03	1.E-02

Bold values indicate exceedances

TABLE 5-17a: RATIO OF PREDICTED BROWN BULLHEAD CONCENTRATIONS TO LABORATORY-DERIVED NOAEL FOR TRI+ PCBS - UPPER RIVER

	River Mile 189			River Mile 168			River Mile 154		
Year	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)
1993	**7.1**	**9.0**	**14**	**5.8**	**6.8**	**11**	**1.9**	**2.2**	**3.6**
1994	**7.9**	**13**	**7.2**	**5.3**	**6.2**	**10**	**1.8**	**2.1**	**3.3**
1995	**7.6**	**12**	**7.6**	**4.6**	**5.4**	**8.8**	**1.6**	**1.9**	**3.0**
1996	**6.4**	**10**	**5.0**	**3.8**	**4.5**	**7.3**	**1.4**	**1.6**	**2.7**
1997	**5.9**	**9.7**	**4.5**	**3.0**	**3.6**	**6.2**	**1.2**	**1.4**	**2.5**
1998	**4.1**	**5.2**	**8.2**	**2.8**	**3.4**	**5.9**	**1.2**	**1.4**	**2.4**
1999	**4.0**	**5.2**	**8.3**	**3.0**	**3.5**	**5.7**	**1.2**	**1.4**	**2.3**
2000	**3.5**	**4.5**	**7.2**	**2.5**	**2.9**	**4.8**	**1.1**	**1.3**	**2.0**
2001	**3.2**	**4.1**	**6.5**	**2.1**	**2.5**	**4.0**	**1.0**	**1.1**	**1.8**
2002	**3.0**	**3.8**	**6.1**	**1.8**	**2.2**	**3.5**	0.9	**1.0**	**1.6**
2003	**2.8**	**3.6**	**5.6**	**1.7**	**2.0**	**3.3**	0.8	0.9	**1.5**
2004	**2.7**	**3.5**	**5.5**	**1.7**	**2.0**	**3.2**	0.8	0.9	**1.4**
2005	**2.5**	**3.2**	**5.0**	**1.5**	**1.8**	**2.9**	0.7	0.8	**1.3**
2006	**2.3**	**2.9**	**4.5**	**1.4**	**1.6**	**2.6**	0.6	0.7	**1.2**
2007	**2.2**	**2.7**	**4.3**	**1.3**	**1.5**	**2.5**	0.6	0.7	**1.1**
2008	**2.1**	**2.6**	**4.1**	**1.3**	**1.5**	**2.4**	0.6	0.6	**1.0**
2009	**2.0**	**2.5**	**3.9**	**1.2**	**1.4**	**2.3**	0.5	0.6	0.9
2010	**1.8**	**2.3**	**3.5**	**1.1**	**1.3**	**2.0**	0.5	0.5	0.8
2011	**1.6**	**2.0**	**3.2**	**1.0**	**1.2**	**1.9**	0.4	0.5	0.8
2012	**1.5**	**1.9**	**3.0**	**1.0**	**1.2**	**1.9**	0.4	0.4	0.7
2013	**1.5**	**1.9**	**2.9**	**1.0**	**1.2**	**1.9**	0.3	0.4	0.6
2014	**1.5**	**1.9**	**2.9**	0.9	**1.1**	**1.7**	0.3	0.4	0.6
2015	**1.4**	**1.8**	**2.8**	0.9	**1.0**	**1.7**	0.3	0.4	0.6
2016	**1.4**	**1.8**	**2.9**	0.9	**1.1**	**1.7**	0.3	0.4	0.6
2017	**1.4**	**1.8**	**2.7**	0.9	**1.0**	**1.7**	0.3	0.3	0.6
2018	**1.3**	**1.7**	**2.6**	0.9	**1.0**	**1.6**	0.3	0.3	0.6

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TABLE 5-17b: RATIO OF PREDICTED BROWN BULLHEAD CONCENTRATIONS TO LABORATORY-DERIVED NOAEL FOR TRI+ PCBS -LOWER RIVER

	River Mile 152			River Mile 113			River Mile 90			River Mile 50		
Year	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)
1993	**1.2**	**1.8**	**2.9**	0.9	**1.3**	**2.3**	0.8	**1.1**	**1.8**	0.6	0.8	**1.4**
1994	**1.1**	**1.5**	**2.6**	0.9	**1.2**	**2.1**	0.7	**1.0**	**1.7**	0.5	0.8	**1.3**
1995	1.0	**1.4**	**2.4**	0.8	**1.2**	**2.0**	0.7	1.0	**1.6**	0.5	0.7	**1.2**
1996	**1.0**	**1.5**	**2.4**	0.8	**1.1**	**1.9**	0.6	0.9	**1.5**	0.5	0.7	**1.2**
1997	1.0	**1.4**	**2.3**	0.7	**1.1**	**1.8**	0.6	0.9	**1.4**	0.4	0.6	**1.1**
1998	**2.1**	**3.0**	**4.9**	**1.6**	**2.4**	**4.0**	**1.3**	**1.9**	**3.2**	**1.0**	**1.4**	**2.4**
1999	0.9	**1.3**	**2.1**	0.7	**1.1**	**1.8**	0.6	0.9	**1.4**	0.5	0.7	**1.1**
2000	0.8	**1.2**	**1.9**	0.6	0.9	**1.6**	0.5	0.8	**1.3**	0.4	0.6	1.0
2001	0.8	**1.1**	**1.9**	0.6	0.9	**1.5**	0.5	0.7	**1.2**	0.4	0.5	0.9
2002	0.8	**1.1**	**1.9**	0.6	0.9	**1.5**	0.5	0.7	**1.2**	0.4	0.5	0.9
2003	0.7	**1.1**	**1.8**	0.6	0.9	**1.4**	0.5	0.7	**1.2**	0.4	0.5	0.9
2004	0.7	**1.0**	**1.7**	0.6	0.9	**1.4**	0.5	0.7	**1.2**	0.4	0.5	0.9
2005	0.7	1.0	**1.7**	0.6	0.8	**1.4**	0.4	0.6	**1.1**	0.3	0.5	0.8
2006	0.7	1.0	**1.6**	0.5	0.8	**1.3**	0.4	0.6	**1.0**	0.3	0.5	0.8
2007	0.6	0.9	**1.5**	0.5	0.7	**1.2**	0.4	0.6	1.0	0.3	0.4	0.7
2008	0.7	1.0	**1.6**	0.5	0.8	**1.3**	0.4	0.6	**1.1**	0.3	0.5	0.8
2009	0.6	0.9	**1.6**	0.5	0.8	**1.3**	0.4	0.6	**1.0**	0.3	0.5	0.8
2010	0.6	0.8	**1.4**	0.5	0.7	**1.1**	0.4	0.5	0.9	0.3	0.4	0.7
2011	0.6	0.8	**1.4**	0.5	0.7	**1.1**	0.4	0.5	0.9	0.3	0.4	0.7
2012	0.6	0.8	**1.4**	0.5	0.7	**1.1**	0.4	0.5	0.9	0.3	0.4	0.7
2013	0.6	0.8	**1.4**	0.5	0.7	**1.1**	0.4	0.5	0.9	0.3	0.4	0.6
2014	0.6	0.8	**1.4**	0.5	0.7	**1.1**	0.3	0.5	0.9	0.3	0.4	0.6
2015	0.5	0.8	**1.3**	0.4	0.6	**1.1**	0.3	0.5	0.8	0.3	0.4	0.6
2016	0.5	0.8	**1.4**	0.5	0.7	**1.1**	0.4	0.5	0.9	0.3	0.4	0.7
2017	0.5	0.8	**1.3**	0.5	0.7	**1.1**	0.4	0.5	0.9	0.3	0.4	0.7
2018	0.5	0.7	**1.2**	0.4	0.6	**1.0**	0.3	0.5	0.8	0.2	0.4	0.6

Bold values indicate exceedances

TABLE 5-18a: RATIO OF PREDICTED BROWN BULLHEAD CONCENTRATIONS TO LABORATORY-DERIVED LOAEL FOR TRI+ PCBS - UPPER RIVER

	River Mile 189			River Mile 168			River Mile 154		
Year	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)
1993	**1.5**	**1.8**	**2.9**	**1.2**	**1.4**	**2.2**	0.4	0.5	0.7
1994	**1.6**	**2.6**	**1.5**	**1.1**	**1.3**	**2.0**	0.4	0.4	0.7
1995	**1.5**	**2.4**	**1.6**	0.9	**1.1**	**1.8**	0.3	0.4	0.6
1996	**1.3**	**2.0**	**1.0**	0.8	0.9	**1.5**	0.3	0.3	0.5
1997	**1.2**	**2.0**	**0.9**	0.6	0.7	**1.3**	0.2	0.3	0.5
1998	0.8	**1.1**	**1.7**	0.6	0.7	**1.2**	0.2	0.3	0.5
1999	0.8	**1.1**	**1.7**	0.6	0.7	**1.2**	0.2	0.3	0.5
2000	0.7	0.9	**1.5**	0.5	0.6	**1.0**	0.2	0.3	0.4
2001	0.7	0.8	**1.3**	0.4	0.5	0.8	0.2	0.2	0.4
2002	0.6	0.8	**1.2**	0.4	0.4	0.7	0.2	0.2	0.3
2003	0.6	0.7	**1.1**	0.4	0.4	0.7	0.2	0.2	0.3
2004	0.6	0.7	**1.1**	0.3	0.4	0.6	0.2	0.2	0.3
2005	0.5	0.6	**1.0**	0.3	0.4	0.6	0.1	0.2	0.3
2006	0.5	0.6	0.9	0.3	0.3	0.5	0.1	0.2	0.2
2007	0.4	0.6	0.9	0.3	0.3	0.5	0.1	0.1	0.2
2008	0.4	0.5	0.8	0.3	0.3	0.5	0.1	0.1	0.2
2009	0.4	0.5	0.8	0.2	0.3	0.5	0.1	0.1	0.2
2010	0.4	0.5	0.7	0.2	0.3	0.4	0.09	0.1	0.2
2011	0.3	0.4	0.6	0.2	0.2	0.4	0.08	0.1	0.2
2012	0.3	0.4	0.6	0.2	0.2	0.4	0.07	0.09	0.1
2013	0.3	0.4	0.6	0.2	0.2	0.4	0.07	0.08	0.1
2014	0.3	0.4	0.6	0.2	0.2	0.4	0.06	0.07	0.1
2015	0.3	0.4	0.6	0.2	0.2	0.3	0.06	0.07	0.1
2016	0.3	0.4	0.6	0.2	0.2	0.3	0.06	0.07	0.1
2017	0.3	0.4	0.6	0.2	0.2	0.3	0.06	0.07	0.1
2018	0.3	0.3	0.5	0.2	0.2	0.3	0.06	0.07	0.1

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TABLE 5-18b: RATIO OF PREDICTED BROWN BULLHEAD CONCENTRATIONS TO LABORATORY-DERIVED LOAEL FOR TRI+ PCBS - LOWER RIVER

	River Mile 152			River Mile 113			River Mile 90			River Mile 50		
Year	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)
1993	0.3	0.4	0.6	0.2	0.3	0.5	0.2	0.2	0.4	0.1	0.2	0.3
1994	0.2	0.3	0.5	0.2	0.3	0.4	0.1	0.2	0.3	0.1	0.2	0.3
1995	0.2	0.3	0.5	0.2	0.2	0.4	0.1	0.2	0.3	0.1	0.1	0.2
1996	0.2	0.3	0.5	0.2	0.2	0.4	0.1	0.2	0.3	0.1	0.1	0.2
1997	0.2	0.3	0.5	0.2	0.2	0.4	0.1	0.2	0.3	0.1	0.1	0.2
1998	0.4	0.6	**1.0**	0.3	0.5	0.8	0.3	0.4	0.7	0.2	0.3	0.5
1999	0.2	0.3	0.4	0.1	0.2	0.4	0.1	0.2	0.3	0.1	0.1	0.2
2000	0.2	0.2	0.4	0.1	0.2	0.3	0.1	0.2	0.3	0.1	0.1	0.2
2001	0.2	0.2	0.4	0.1	0.2	0.3	0.1	0.1	0.2	0.1	0.1	0.2
2002	0.2	0.2	0.4	0.1	0.2	0.3	0.1	0.1	0.2	0.1	0.1	0.2
2003	0.1	0.2	0.4	0.1	0.2	0.3	0.1	0.1	0.2	0.1	0.1	0.2
2004	0.1	0.2	0.4	0.1	0.2	0.3	0.1	0.1	0.2	0.1	0.1	0.2
2005	0.1	0.2	0.3	0.1	0.2	0.3	0.1	0.1	0.2	0.1	0.1	0.2
2006	0.1	0.2	0.3	0.1	0.2	0.3	0.1	0.1	0.2	0.1	0.1	0.2
2007	0.1	0.2	0.3	0.1	0.2	0.3	0.1	0.1	0.2	0.1	0.1	0.2
2008	0.1	0.2	0.3	0.1	0.2	0.3	0.1	0.1	0.2	0.1	0.1	0.2
2009	0.1	0.2	0.3	0.1	0.2	0.3	0.1	0.1	0.2	0.1	0.1	0.2
2010	0.1	0.2	0.3	0.1	0.1	0.2	0.1	0.1	0.2	0.1	0.1	0.1
2011	0.1	0.2	0.3	0.1	0.1	0.2	0.1	0.1	0.2	0.1	0.1	0.1
2012	0.1	0.2	0.3	0.1	0.1	0.2	0.1	0.1	0.2	0.1	0.1	0.1
2013	0.1	0.2	0.3	0.1	0.1	0.2	0.1	0.1	0.2	0.1	0.1	0.1
2014	0.1	0.2	0.3	0.1	0.1	0.2	0.1	0.1	0.2	0.1	0.1	0.1
2015	0.1	0.2	0.3	0.1	0.1	0.2	0.1	0.1	0.2	0.1	0.1	0.1
2016	0.1	0.2	0.3	0.1	0.1	0.2	0.1	0.1	0.2	0.1	0.1	0.1
2017	0.1	0.2	0.3	0.1	0.1	0.2	0.1	0.1	0.2	0.1	0.1	0.1
2018	0.1	0.1	0.3	0.1	0.1	0.2	0.1	0.1	0.2	0.1	0.1	0.1

Bold values indicate exceedances

TABLE 5-19a: RATIO OF PREDICTED BROWN BULLHEAD CONCENTRATIONS TO LABORATORY-DERIVED NOAEL ON A TEQ BASIS -UPPER RIVER

	River Mile 189			River Mile 168			River Mile 154		
Year	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)
1993	0.2	0.2	0.4	0.1	0.2	0.3	0.04	0.05	0.1
1994	0.1	0.2	0.3	0.1	0.1	0.3	0.04	0.05	0.09
1995	0.1	0.2	0.3	0.1	0.1	0.2	0.04	0.04	0.08
1996	0.1	0.1	0.3	0.09	0.1	0.2	0.03	0.04	0.07
1997	0.1	0.1	0.3	0.07	0.08	0.2	0.03	0.03	0.06
1998	0.09	0.1	0.2	0.07	0.08	0.2	0.03	0.03	0.06
1999	0.09	0.1	0.2	0.07	0.08	0.2	0.03	0.03	0.06
2000	0.08	0.1	0.2	0.06	0.07	0.1	0.03	0.03	0.05
2001	0.07	0.09	0.2	0.05	0.06	0.1	0.02	0.03	0.05
2002	0.07	0.09	0.2	0.04	0.05	0.09	0.02	0.02	0.04
2003	0.06	0.08	0.1	0.04	0.05	0.09	0.02	0.02	0.04
2004	0.06	0.08	0.1	0.04	0.05	0.09	0.02	0.02	0.04
2005	0.06	0.07	0.1	0.04	0.04	0.08	0.02	0.02	0.04
2006	0.05	0.07	0.1	0.03	0.04	0.07	0.01	0.02	0.03
2007	0.05	0.06	0.1	0.03	0.04	0.07	0.01	0.02	0.03
2008	0.05	0.06	0.1	0.03	0.04	0.07	0.01	0.02	0.03
2009	0.04	0.06	0.1	0.03	0.03	0.06	0.01	0.01	0.03
2010	0.04	0.05	0.09	0.03	0.03	0.05	0.01	0.01	0.02
2011	0.04	0.05	0.08	0.02	0.03	0.05	0.01	0.01	0.02
2012	0.03	0.04	0.08	0.02	0.03	0.05	0.008	0.01	0.02
2013	0.03	0.04	0.08	0.02	0.03	0.05	0.008	0.009	0.02
2014	0.03	0.04	0.08	0.02	0.03	0.05	0.007	0.009	0.02
2015	0.03	0.04	0.07	0.02	0.02	0.05	0.007	0.008	0.02
2016	0.03	0.04	0.08	0.02	0.03	0.05	0.007	0.008	0.02
2017	0.03	0.04	0.07	0.02	0.02	0.04	0.007	0.008	0.01
2018	0.03	0.04	0.07	0.02	0.02	0.04	0.007	0.008	0.01

Bold values indicate exceedances

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TABLE 5-19b: RATIO OF PREDICTED BROWN BULLHEAD CONCENTRATIONS TO LABORATORY-DERIVED NOAEL ON A TEQ BASIS - LOWER RIVER

	River Mile 152			River Mile 113			River Mile 90			River Mile 50		
Year	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)
1993	0.04	0.05	0.09	0.03	0.04	0.07	0.02	0.03	0.06	0.02	0.02	0.04
1994	0.03	0.05	0.08	0.02	0.04	0.06	0.02	0.03	0.05	0.02	0.02	0.04
1995	0.03	0.04	0.07	0.02	0.04	0.06	0.02	0.03	0.05	0.01	0.02	0.04
1996	0.03	0.04	0.08	0.02	0.03	0.06	0.02	0.03	0.05	0.01	0.02	0.04
1997	0.03	0.04	0.07	0.02	0.03	0.06	0.02	0.03	0.04	0.01	0.02	0.03
1998	0.06	0.09	0.15	0.05	0.07	0.12	0.04	0.06	0.10	0.03	0.04	0.07
1999	0.03	0.04	0.07	0.02	0.03	0.06	0.02	0.03	0.04	0.01	0.02	0.03
2000	0.02	0.03	0.06	0.02	0.03	0.05	0.01	0.02	0.04	0.01	0.02	0.03
2001	0.02	0.03	0.06	0.02	0.03	0.05	0.01	0.02	0.04	0.01	0.02	0.03
2002	0.02	0.03	0.06	0.02	0.03	0.05	0.01	0.02	0.04	0.01	0.02	0.03
2003	0.02	0.03	0.06	0.02	0.03	0.05	0.01	0.02	0.04	0.01	0.02	0.03
2004	0.02	0.03	0.05	0.02	0.03	0.04	0.01	0.02	0.04	0.01	0.02	0.03
2005	0.02	0.03	0.05	0.02	0.02	0.04	0.01	0.02	0.03	0.01	0.01	0.03
2006	0.02	0.03	0.05	0.02	0.02	0.04	0.01	0.02	0.03	0.01	0.01	0.02
2007	0.02	0.03	0.05	0.01	0.02	0.04	0.01	0.02	0.03	0.01	0.01	0.02
2008	0.02	0.03	0.05	0.02	0.02	0.04	0.01	0.02	0.03	0.01	0.01	0.02
2009	0.02	0.03	0.05	0.02	0.02	0.04	0.01	0.02	0.03	0.01	0.01	0.02
2010	0.02	0.02	0.04	0.01	0.02	0.04	0.01	0.02	0.03	0.01	0.01	0.02
2011	0.02	0.03	0.04	0.01	0.02	0.04	0.01	0.02	0.03	0.01	0.01	0.02
2012	0.02	0.02	0.04	0.01	0.02	0.04	0.01	0.02	0.03	0.01	0.01	0.02
2013	0.02	0.02	0.04	0.01	0.02	0.03	0.01	0.02	0.03	0.01	0.01	0.02
2014	0.02	0.02	0.04	0.01	0.02	0.03	0.01	0.02	0.03	0.01	0.01	0.02
2015	0.02	0.02	0.04	0.01	0.02	0.03	0.01	0.01	0.03	0.01	0.01	0.02
2016	0.02	0.02	0.04	0.01	0.02	0.04	0.01	0.02	0.03	0.01	0.01	0.02
2017	0.02	0.02	0.04	0.01	0.02	0.03	0.01	0.02	0.03	0.01	0.01	0.02
2018	0.01	0.02	0.04	0.01	0.02	0.03	0.01	0.02	0.03	0.01	0.01	0.02

Bold values indicate exceedances

TABLE 5-20: RATIO OF OBSERVED LARGEMOUTH BASS AND BROWN BULLHEAD CONCENTRATIONS TO TOXICITY BENCHMARKS USING NYSDEC DATASET

	RATIO OF WET WEIGHT CONCENTRATION TO NOAEL														
	Largemouth Bass 113			Largemouth Bass 168			Brown Bullhead 168			Largemouth Bass 189			Brown Bullhead 189		
	Average	95% UCL	Maximum	Average	95% UCL	Maximum	Average	95% UCL	Maximum	Average	95% UCL	Maximum	Average	95% UCL	Maximum
1993	5.9	*	18	8.8	11	20	6.7	11	14	50	96	182	13	26	22
1994	8.2	19	27	7.2	14	17	4.5	11	14	24	36	51	14	18	55
1995	4.3	5.6	16	6.9	10	15	4.7	6.1	10	30	49	67	10	14	14
1996	4.9	8.5	14							15	20	30	8.5	*	10
1998				3.6			4.3			8.5			5.9		

	RATIO OF WET WEIGHT CONCENTRATION TO LOAEL														
	Largemouth Bass 113			Largemouth Bass 168			Brown Bullhead 168			Largemouth Bass 189			Brown Bullhead 189		
	Average	95% UCL	Maximum	Average	95% UCL	Maximum	Average	95% UCL	Maximum	Average	95% UCL	Maximum	Average	95% UCL	Maximum
1993	1.2	*	3.7	1.8	2.3	4.1	1.4	2.2	2.8	10	20	37	2.7	5.3	4.5
1994	1.7	3.9	5.6	1.5	2.9	3.4	0.9	2.2	2.9	4.8	7.3	10	2.8	3.7	11
1995	0.9	1.2	3.2	1.4	1.9	3.1	1.0	1.2	2.1	6.0	10	14	2.1	2.8	2.9
1996	1.0	1.7	2.9							3.0	4.0	6.1	1.7	*	2.0
1998				0.7			0.9			1.7			1.2		

	RATIO OF LIPID NORMALIZED CONCENTRATIONS: TEQ BASIS TO NOAEL														
	Largemouth Bass 113			Largemouth Bass 168			Brown Bullhead 168			Largemouth Bass 189			Brown Bullhead 189		
	Average	95% UCL	Maximum	Average	95% UCL	Maximum	Average	95% UCL	Maximum	Average	95% UCL	Maximum	Average	95% UCL	Maximum
1993	0.09	0.2	0.2	0.3	0.4	0.5	0.2	*	0.3	1.5	2.3	3.4	0.6	1.1	1.2
1994	0.1	0.2	0.3	0.3	0.6	0.8	0.1	0.2	0.5	0.8	1.1	1.8	0.5	0.7	2.1
1995	0.1	0.1	0.2	0.4	0.4	0.7	0.1	0.1	0.3	0.7	1.1	1.2	0.2	0.3	0.4
1996	0.08	0.1	0.2							0.5	0.7	1.0	0.2	*	0.3
1998				0.1			0.03			0.1			0.04		

	RATIO OF LIPID NORMALIZED CONCENTRATIONS: TEQ BASIS TO LOAEL														
	Largemouth Bass 113			Largemouth Bass 168			Brown Bullhead 168			Largemouth Bass 189			Brown Bullhead 189		
	Average	95% UCL	Maximum	Average	95% UCL	Maximum	Average	95% UCL	Maximum	Average	95% UCL	Maximum	Average	95% UCL	Maximum
1993	0.04	0.08	0.07	0.2	0.2	0.2	0.07	*	0.1	0.7	1.0	1.5	0.3	0.5	0.5
1994	0.05	0.07	0.1	0.1	0.3	0.3	0.05	0.1	0.2	0.4	0.5	0.8	0.2	0.3	0.9
1995	0.04	0.05	0.07	0.2	0.2	0.3	0.05	0.06	0.1	0.3	0.5	0.6	0.1	0.1	0.2
1996	0.04	0.05	0.07							0.2	0.3	0.4	0.1	*	0.1
1998				0.02			0.01			0.1			0.02		

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TABLE 5-21: RATIO OF OBSERVED WHITE PERCH AND YELLOW PERCH CONCENTRATIONS TO TOXICITY BENCHMARKS USING NYSDEC DATASET

	RATIO OF WET WEIGHT CONCENTRATION TO NOAEL														
	White Perch 113			White Perch 152			Yellow Perch 113			Yellow Perch 168			Yellow Perch 189		
	Average	95% UCL	Maximum	Average	95% UCL	Maximum	Average	95% UCL	Maximum	Average	95% UCL	Maximum	Average	95% UCL	Maximum
1993	0.8	**1.7**	**1.8**	0.8	**1.6**	**1.2**	0.6	**0.7**	**1.7**	**5.5**	*	**11**	**19**	**35**	**69**
1994	0.3	0.6	0.7	**1.6**	**3.0**	**2.8**	0.3	0.3	0.4						
1995															
1996	**1.6**	*	**2.9**	0.9	**1.7**	**2.6**									

	RATIO OF WET WEIGHT CONCENTRATION TO LOAEL														
	White Perch 113			White Perch 152			Yellow Perch 113			Yellow Perch 168			Yellow Perch 189		
	Average	95% UCL	Maximum	Average	95% UCL	Maximum	Average	95% UCL	Maximum	Average	95% UCL	Maximum	Average	95% UCL	Maximum
1993	0.3	0.6	0.6	0.3	0.5	0.4	0.1	0.1	0.3	**1.1**	*	**2.3**	**3.9**	**7.1**	**14**
1994	0.1	0.2	0.2	0.5	1.0	0.9	0.1	0.1	0.1						
1995															
1996	0.5	*	**1.0**	0.3	0.6										

	RATIO OF LIPID NORMALIZED CONCENTRATIONS: TEQ BASIS TO NOAEL														
	White Perch 113			White Perch 152			Yellow Perch 113			Yellow Perch 168			Yellow Perch 189		
	Average	95% UCL	Maximum	Average	95% UCL	Maximum	Average	95% UCL	Maximum	Average	95% UCL	Maximum	Average	95% UCL	Maximum
1993	0.08	0.1	0.1	0.07	0.08	0.1	0.07	0.09	0.3	0.3	*	0.5	**1.9**	**2.7**	**9.2**
1994	0.08	0.1	0.1	0.2	0.3	0.4	0.04	0.05	0.05						
1995															
1996	0.1	0.3	0.2	0.1	0.07	0.1									

	RATIO OF LIPID NORMALIZED CONCENTRATIONS: TEQ BASIS TO LOAEL														
	White Perch 113			White Perch 152			Yellow Perch 113			Yellow Perch 168			Yellow Perch 189		
	Average	95% UCL	Maximum	Average	95% UCL	Maximum	Average	95% UCL	Maximum	Average	95% UCL	Maximum	Average	95% UCL	Maximum
1993	0.04	0.05	0.07	0.03	0.04	0.05	0.03	0.04	0.1	0.1	*	0.2	0.8	**1.2**	**4.1**
1994	0.03	0.05	0.06	0.09	0.1	0.2	0.02	0.02	0.02						
1995															
1996	0.05	0.1	0.1	0.03	0.03	0.05									

TABLE 5-22: RATIO OF PREDICTED WHITE PERCH CONCENTRATIONS TO FIELD-BASED NOAEL FOR TRI+ PCBS

	River Mile 154			River Mile 152			River Mile 113			River Mile 90			River Mile 50		
Year	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)
1993	0.8	**1.0**	**2.2**	0.9	0.9	**1.1**	0.7	0.7	0.8	0.5	0.6	0.7	0.4	0.5	0.5
1994	0.8	**1.0**	**2.2**	0.7	0.8	0.9	0.6	0.6	0.8	0.5	0.5	0.6	0.4	0.4	0.5
1995	0.7	0.9	**2.0**	0.7	0.7	0.9	0.6	0.6	0.7	0.5	0.5	0.6	0.4	0.4	0.4
1996	0.7	0.9	**1.9**	0.8	0.8	0.9	0.5	0.6	0.7	0.4	0.5	0.5	0.3	0.4	0.4
1997	0.6	0.8	1.7	0.7	0.7	0.8	0.5	0.6	0.6	0.4	0.4	0.5	0.3	0.3	0.4
1998	0.5	0.6	**1.4**	**1.4**	**1.5**	**1.8**	**1.1**	**1.2**	**1.4**	0.9	0.97	**1.2**	0.7	0.8	0.9
1999	0.5	0.6	**1.3**	0.6	0.7	0.8	0.5	0.5	0.6	0.4	0.4	0.5	0.3	0.3	0.4
2000	0.4	0.5	**1.2**	0.5	0.6	0.7	0.4	0.5	0.6	0.4	0.4	0.5	0.3	0.3	0.3
2001	0.4	0.5	**1.0**	0.5	0.6	0.7	0.4	0.4	0.5	0.3	0.3	0.4	0.3	0.3	0.3
2002	0.3	0.4	0.9	0.6	0.6	0.7	0.4	0.5	0.5	0.3	0.4	0.4	0.3	0.3	0.3
2003	0.3	0.4	0.9	0.5	0.5	0.6	0.4	0.4	0.5	0.3	0.3	0.4	0.2	0.3	0.3
2004	0.3	0.4	0.8	0.5	0.5	0.6	0.4	0.4	0.5	0.3	0.3	0.4	0.2	0.3	0.3
2005	0.3	0.3	0.8	0.4	0.5	0.6	0.4	0.4	0.5	0.3	0.3	0.4	0.2	0.2	0.3
2006	0.2	0.3	0.7	0.5	0.5	0.6	0.3	0.4	0.5	0.3	0.3	0.4	0.2	0.2	0.3
2007	0.2	0.3	0.6	0.4	0.5	0.5	0.3	0.4	0.4	0.3	0.3	0.3	0.2	0.2	0.3
2008	0.2	0.3	0.6	0.4	0.5	0.6	0.4	0.4	0.5	0.3	0.3	0.4	0.2	0.2	0.3
2009	0.2	0.2	0.5	0.4	0.5	0.6	0.3	0.4	0.5	0.3	0.3	0.4	0.2	0.2	0.3
2010	0.2	0.2	0.5	0.4	0.4	0.5	0.3	0.3	0.4	0.2	0.3	0.3	0.2	0.2	0.2
2011	0.2	0.2	0.4	0.4	0.4	0.5	0.3	0.3	0.4	0.2	0.3	0.3	0.2	0.2	0.2
2012	0.1	0.2	0.4	0.4	0.4	0.5	0.3	0.3	0.4	0.2	0.3	0.3	0.2	0.2	0.2
2013	0.1	0.2	0.4	0.4	0.4	0.5	0.3	0.3	0.4	0.2	0.3	0.3	0.2	0.2	0.2
2014	0.1	0.2	0.3	0.4	0.4	0.5	0.3	0.3	0.4	0.2	0.2	0.3	0.2	0.2	0.2
2015	0.1	0.1	0.3	0.3	0.4	0.5	0.3	0.3	0.4	0.2	0.2	0.3	0.2	0.2	0.2
2016	0.1	0.1	0.3	0.4	0.4	0.5	0.3	0.3	0.4	0.2	0.3	0.3	0.2	0.2	0.2
2017	0.1	0.1	0.3	0.4	0.4	0.5	0.3	0.3	0.4	0.2	0.3	0.3	0.2	0.2	0.2
2018	0.1	0.1	0.3	0.3	0.4	0.4	0.3	0.3	0.4	0.2	0.2	0.3	0.2	0.2	0.2

Bold values indicate exceedances

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TABLE 5-23: RATIO OF PREDICTED WHITE PERCH CONCENTRATIONS TO LABORATORY-DERIVED LOAEL FOR TRI+ PCBS

	River Mile 154			River Mile 152			River Mile 113			River Mile 90			River Mile 50		
Year	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)
1993	0.3	0.3	0.7	0.3	0.3	0.4	0.2	0.2	0.3	0.2	0.2	0.2	0.1	0.2	0.2
1994	0.3	0.3	0.7	0.2	0.3	0.3	0.2	0.2	0.3	0.2	0.2	0.2	0.1	0.1	0.2
1995	0.2	0.3	0.7	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1
1996	0.2	0.3	0.6	0.3	0.3	0.3	0.2	0.2	0.2	0.1	0.2	0.2	0.1	0.1	0.1
1997	0.2	0.3	0.6	0.2	0.2	0.3	0.2	0.2	0.2	0.1	0.1	0.2	0.1	0.1	0.1
1998	0.2	0.2	0.5	0.5	0.5	0.6	0.4	0.4	0.5	0.3	0.3	0.4	0.2	0.3	0.3
1999	0.2	0.2	0.4	0.2	0.2	0.3	0.2	0.2	0.2	0.1	0.1	0.2	0.1	0.1	0.1
2000	0.1	0.2	0.4	0.2	0.2	0.2	0.1	0.2	0.2	0.1	0.1	0.2	0.1	0.1	0.1
2001	0.1	0.2	0.3	0.2	0.2	0.2	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1
2002	0.1	0.1	0.3	0.2	0.2	0.2	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1
2003	0.1	0.1	0.3	0.2	0.2	0.2	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1
2004	0.1	0.1	0.3	0.2	0.2	0.2	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1
2005	0.1	0.1	0.3	0.1	0.2	0.2	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1
2006	0.1	0.1	0.2	0.2	0.2	0.2	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1
2007	0.1	0.1	0.2	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
2008	0.1	0.1	0.2	0.1	0.2	0.2	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1
2009	0.1	0.1	0.2	0.1	0.2	0.2	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1
2010	0.1	0.1	0.2	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
2011	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
2012	0.0	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
2013	0.0	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
2014	0.0	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
2015	0.0	0.0	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
2016	0.0	0.0	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
2017	0.0	0.0	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
2018	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1

Bold values indicate exceedances

TABLE 5-24a: RATIO OF PREDICTED YELLOW PERCH CONCENTRATIONS TO LABORATORY-DERIVED NOAEL FOR TRI+ PCBS - UPPER RIVER

	River Mile 189			River Mile 168			River Mile 154		
Year	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)
1993	**6.7**	**8.4**	**14**	**1.3**	**1.9**	**4.1**	0.5	0.6	**1.3**
1994	**4.8**	**6.1**	**11**	**1.2**	**1.7**	**3.7**	0.4	0.6	**1.3**
1995	**5.1**	**6.4**	**10**	**1.1**	**1.5**	**3.2**	0.4	0.6	**1.1**
1996	**3.3**	**4.2**	**7.3**	0.8	**1.2**	**2.6**	0.3	0.5	**1.0**
1997	**3.0**	**3.7**	**6.0**	0.8	**1.1**	**2.5**	0.3	0.5	**1.0**
1998	**2.6**	**3.4**	**5.6**	0.8	**1.0**	**2.2**	0.3	0.4	0.9
1999	**2.5**	**3.1**	**5.4**	0.7	**1.0**	**2.2**	0.3	0.4	0.9
2000	**2.0**	**2.5**	**4.4**	0.6	0.8	**1.7**	0.3	0.4	0.8
2001	**1.7**	**2.1**	**3.7**	0.5	0.7	**1.5**	0.2	0.3	0.7
2002	**1.7**	**2.2**	**3.8**	0.4	0.6	**1.3**	0.2	0.3	0.6
2003	**1.5**	**1.9**	**3.3**	0.4	0.6	**1.2**	0.2	0.3	0.6
2004	**2.1**	**2.7**	**4.6**	0.4	0.6	**1.2**	0.2	0.3	0.6
2005	**1.7**	**2.1**	**3.5**	0.4	0.5	**1.1**	0.2	0.2	0.5
2006	**1.4**	**1.7**	**2.9**	0.3	0.5	**1.0**	0.2	0.2	0.5
2007	**1.7**	**2.1**	**3.5**	0.3	0.4	0.9	0.1	0.2	0.4
2008	**1.7**	**2.1**	**3.5**	0.3	0.4	0.9	0.1	0.2	0.4
2009	**1.7**	**2.1**	**3.5**	0.3	0.4	0.9	0.1	0.2	0.4
2010	**1.6**	**2.0**	**3.3**	0.3	0.4	0.8	0.1	0.2	0.3
2011	**1.2**	**1.5**	**2.4**	0.3	0.3	0.7	0.1	0.1	0.3
2012	**1.2**	**1.5**	**2.4**	0.2	0.3	0.7	0.09	0.1	0.3
2013	**1.0**	**1.2**	**2.0**	0.2	0.3	0.7	0.08	0.1	0.2
2014	**1.1**	**1.4**	**2.3**	0.2	0.3	0.7	0.08	0.1	0.2
2015	**1.0**	**1.3**	**2.1**	0.2	0.3	0.6	0.08	0.1	0.2
2016	**1.3**	**1.6**	**2.7**	0.2	0.3	0.7	0.08	0.1	0.2
2017	**1.3**	**1.7**	**2.8**	0.2	0.3	0.7	0.08	0.1	0.2
2018	**1.2**	**1.6**	**2.6**	0.2	0.3	0.6	0.08	0.1	0.2

Bold values indicate exceedances

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TABLE 5-24b: RATIO OF PREDICTED YELLOW PERCH CONCENTRATIONS TO LABORATORY-DERIVED NOAEL FOR TRI+ PCBS - LOWER RIVER

	River Mile 152			River Mile 113			River Mile 90			River Mile 50		
Year	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)
1993	0.4	0.5	0.7	0.3	0.4	0.5	0.3	0.3	0.4	0.2	0.3	0.3
1994	0.4	0.4	0.6	0.3	0.4	0.5	0.2	0.3	0.4	0.2	0.2	0.3
1995	0.4	0.4	0.5	0.3	0.3	0.4	0.2	0.3	0.4	0.2	0.2	0.3
1996	0.4	0.4	0.6	0.3	0.3	0.4	0.2	0.3	0.3	0.2	0.2	0.3
1997	0.3	0.4	0.5	0.3	0.3	0.4	0.2	0.2	0.3	0.2	0.2	0.2
1998	0.7	0.9	**1.1**	0.6	0.7	0.9	0.5	0.5	0.7	0.4	0.4	0.6
1999	0.3	0.4	0.5	0.2	0.3	0.4	0.2	0.2	0.3	0.2	0.2	0.2
2000	0.3	0.3	0.4	0.2	0.3	0.3	0.2	0.2	0.3	0.1	0.2	0.2
2001	0.3	0.3	0.4	0.2	0.2	0.3	0.2	0.2	0.3	0.1	0.2	0.2
2002	0.3	0.3	0.4	0.2	0.3	0.3	0.2	0.2	0.3	0.1	0.2	0.2
2003	0.2	0.3	0.4	0.2	0.2	0.3	0.2	0.2	0.3	0.1	0.1	0.2
2004	0.2	0.3	0.4	0.2	0.2	0.3	0.2	0.2	0.3	0.1	0.1	0.2
2005	0.2	0.3	0.4	0.2	0.2	0.3	0.1	0.2	0.2	0.1	0.1	0.2
2006	0.2	0.3	0.4	0.2	0.2	0.3	0.1	0.2	0.2	0.1	0.1	0.2
2007	0.2	0.3	0.3	0.2	0.2	0.3	0.1	0.2	0.2	0.1	0.1	0.2
2008	0.2	0.3	0.4	0.2	0.2	0.3	0.1	0.2	0.2	0.1	0.1	0.2
2009	0.2	0.3	0.3	0.2	0.2	0.3	0.1	0.2	0.2	0.1	0.1	0.2
2010	0.2	0.2	0.3	0.1	0.2	0.2	0.1	0.1	0.2	0.1	0.1	0.1
2011	0.2	0.2	0.3	0.2	0.2	0.2	0.1	0.1	0.2	0.1	0.1	0.1
2012	0.2	0.2	0.3	0.2	0.2	0.2	0.1	0.1	0.2	0.1	0.1	0.1
2013	0.2	0.2	0.3	0.2	0.2	0.2	0.1	0.1	0.2	0.1	0.1	0.1
2014	0.2	0.2	0.3	0.1	0.2	0.2	0.1	0.1	0.2	0.1	0.1	0.1
2015	0.2	0.2	0.3	0.1	0.2	0.2	0.1	0.1	0.2	0.1	0.1	0.1
2016	0.2	0.2	0.3	0.2	0.2	0.2	0.1	0.1	0.2	0.1	0.1	0.1
2017	0.2	0.2	0.3	0.1	0.2	0.2	0.1	0.1	0.2	0.1	0.1	0.1
2018	0.2	0.2	0.3	0.1	0.2	0.2	0.1	0.1	0.2	0.1	0.1	0.1

Bold values indicate exceedances

TABLE 5-25a: RATIO OF PREDICTED YELLOW PERCH CONCENTRATIONS TO LABORATORY-DERIVED LOAEL FOR TRI+ PCBS - UPPER RIVER

	River Mile 189			River Mile 168			River Mile 154		
Year	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)
1993	**1.4**	**1.7**	**2.8**	0.3	0.4	0.8	0.09	0.1	0.3
1994	**1.0**	**1.2**	**2.2**	0.3	0.3	0.8	0.09	0.1	0.3
1995	**1.0**	**1.3**	**2.1**	0.2	0.3	0.7	0.08	0.1	0.2
1996	0.7	0.9	**1.5**	0.2	0.2	0.5	0.07	0.09	0.2
1997	0.6	0.8	**1.2**	0.2	0.2	0.5	0.06	0.09	0.2
1998	0.5	0.7	**1.2**	0.2	0.2	0.5	0.06	0.09	0.2
1999	0.5	0.6	**1.1**	0.1	0.2	0.4	0.06	0.09	0.2
2000	0.4	0.5	0.9	0.1	0.2	0.4	0.05	0.07	0.2
2001	0.3	0.4	0.8	0.1	0.1	0.3	0.05	0.07	0.1
2002	0.4	0.5	0.8	0.09	0.1	0.3	0.04	0.06	0.1
2003	0.3	0.4	0.7	0.08	0.1	0.3	0.04	0.06	0.1
2004	0.4	0.5	0.9	0.09	0.1	0.3	0.04	0.06	0.1
2005	0.3	0.4	0.7	0.08	0.1	0.2	0.04	0.05	0.1
2006	0.3	0.4	0.6	0.07	0.09	0.2	0.03	0.04	0.1
2007	0.3	0.4	0.7	0.07	0.09	0.2	0.03	0.04	0.09
2008	0.3	0.4	0.7	0.06	0.09	0.2	0.03	0.04	0.08
2009	0.3	0.4	0.7	0.06	0.08	0.2	0.03	0.04	0.08
2010	0.3	0.4	0.7	0.05	0.07	0.2	0.02	0.03	0.07
2011	0.2	0.3	0.5	0.05	0.07	0.1	0.02	0.03	0.06
2012	0.2	0.3	0.5	0.05	0.07	0.2	0.02	0.03	0.06
2013	0.2	0.3	0.4	0.05	0.07	0.1	0.02	0.02	0.05
2014	0.2	0.3	0.5	0.05	0.06	0.1	0.02	0.02	0.05
2015	0.2	0.3	0.4	0.04	0.06	0.1	0.02	0.02	0.05
2016	0.3	0.3	0.6	0.05	0.06	0.1	0.02	0.02	0.04
2017	0.3	0.3	0.6	0.05	0.06	0.1	0.02	0.02	0.05
2018	0.3	0.3	0.5	0.04	0.06	0.1	0.02	0.02	0.05

Bold values indicate exceedances

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TABLE 5-25b: RATIO OF PREDICTED YELLOW PERCH CONCENTRATIONS TO LABORATORY-DERIVED LOAEL FOR TRI+ PCBS - LOWER RIVER

	River Mile 152			River Mile 113			River Mile 90			River Mile 50		
Year	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)
1993	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1
1994	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.1
1995	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.1
1996	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.1
1997	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.1
1998	0.1	0.2	0.2	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1
1999	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.1
2000	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.0
2001	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.0
2002	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.0
2003	0.1	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0
2004	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0
2005	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
2006	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
2007	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
2008	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
2009	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
2010	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2011	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
2012	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
2013	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2014	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2015	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2016	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
2017	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2018	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Bold values

TABLE 5-26: RATIO OF PREDICTED WHITE PERCH CONCENTRATIONS TO LABORATORY-DERIVED NOAEL ON A TEQ BASIS

	River Mile 154			River Mile 152			River Mile 113			River Mile 90			River Mile 50		
Year	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)
1993	0.02	0.03	0.08	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.1
1994	0.02	0.03	0.08	0.0	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.1
1995	0.02	0.03	0.08	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.1
1996	0.02	0.03	0.07	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.1
1997	0.02	0.03	0.07	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0
1998	0.01	0.02	0.05	0.1	0.1	0.2	0.1	0.1	0.2	0.1	0.1	0.1	0.0	0.1	0.1
1999	0.01	0.02	0.05	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0
2000	0.01	0.02	0.04	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0
2001	0.01	0.01	0.04	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0
2002	0.01	0.01	0.03	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0
2003	0.009	0.01	0.03	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
2004	0.009	0.01	0.03	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
2005	0.008	0.01	0.03	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
2006	0.007	0.01	0.03	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
2007	0.007	0.009	0.02	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
2008	0.006	0.009	0.02	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
2009	0.006	0.008	0.02	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
2010	0.005	0.007	0.02	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2011	0.005	0.006	0.02	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2012	0.004	0.006	0.01	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2013	0.004	0.005	0.01	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2014	0.004	0.005	0.01	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2015	0.003	0.005	0.01	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2016	0.003	0.005	0.01	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2017	0.003	0.005	0.01	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2018	0.003	0.005	0.01	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Bold values indicate exceedances

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TABLE 5-27a: RATIO OF PREDICTED YELLOW PERCH CONCENTRATIONS TO LABORATORY-DERIVED NOAEL ON A TEQ BASIS - UPPER RIVER

	River Mile 189			River Mile 168			River Mile 154		
Year	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)
1993	0.2	0.3	0.6	0.1	0.2	0.4	0.04	0.06	0.1
1994	0.2	0.2	0.4	0.1	0.2	0.3	0.04	0.06	0.1
1995	0.2	0.2	0.4	0.1	0.1	0.3	0.04	0.05	0.1
1996	0.1	0.1	0.3	0.08	0.1	0.2	0.03	0.04	0.09
1997	0.1	0.1	0.2	0.08	0.1	0.2	0.03	0.04	0.09
1998	0.09	0.1	0.2	0.07	0.09	0.2	0.03	0.04	0.09
1999	0.08	0.1	0.2	0.07	0.09	0.2	0.03	0.04	0.08
2000	0.07	0.09	0.2	0.05	0.07	0.2	0.02	0.03	0.07
2001	0.06	0.07	0.2	0.05	0.06	0.1	0.02	0.03	0.07
2002	0.06	0.08	0.2	0.04	0.05	0.1	0.02	0.03	0.06
2003	0.05	0.07	0.1	0.04	0.05	0.1	0.02	0.03	0.05
2004	0.07	0.09	0.2	0.04	0.05	0.1	0.02	0.02	0.05
2005	0.05	0.07	0.1	0.03	0.05	0.1	0.02	0.02	0.05
2006	0.05	0.06	0.1	0.03	0.04	0.09	0.01	0.02	0.04
2007	0.05	0.07	0.1	0.03	0.04	0.09	0.01	0.02	0.04
2008	0.05	0.07	0.1	0.03	0.04	0.09	0.01	0.02	0.04
2009	0.06	0.07	0.1	0.03	0.04	0.08	0.01	0.02	0.03
2010	0.05	0.07	0.1	0.02	0.03	0.07	0.01	0.01	0.03
2011	0.04	0.05	0.1	0.02	0.03	0.07	0.01	0.01	0.03
2012	0.04	0.05	0.1	0.02	0.03	0.07	0.009	0.01	0.03
2013	0.03	0.04	0.08	0.02	0.03	0.07	0.008	0.01	0.02
2014	0.04	0.05	0.09	0.02	0.03	0.06	0.007	0.01	0.02
2015	0.03	0.04	0.09	0.02	0.03	0.06	0.007	0.01	0.02
2016	0.04	0.06	0.1	0.02	0.03	0.06	0.007	0.01	0.02
2017	0.04	0.06	0.1	0.02	0.03	0.06	0.007	0.01	0.02
2018	0.04	0.05	0.1	0.02	0.03	0.06	0.007	0.01	0.02

Bold values indicate exceedances

TABLE 5-27b: RATIO OF PREDICTED YELLOW PERCH CONCENTRATIONS TO LABORATORY-DERIVED NOAEL ON A TEQ BASIS -LOWER RIVER

	River Mile 152			River Mile 113			River Mile 90			River Mile 50		
Year	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)
1993	0.06	0.07	0.12	0.04	0.05	0.09	0.03	0.04	0.07	0.03	0.03	0.06
1994	0.05	0.06	0.10	0.04	0.05	0.08	0.03	0.04	0.07	0.02	0.03	0.05
1995	0.04	0.05	0.10	0.04	0.04	0.08	0.03	0.04	0.06	0.02	0.03	0.05
1996	0.05	0.06	0.10	0.03	0.04	0.07	0.03	0.03	0.06	0.02	0.03	0.05
1997	0.04	0.05	0.09	0.03	0.04	0.07	0.03	0.03	0.06	0.02	0.02	0.04
1998	0.09	0.11	0.20	0.07	0.09	0.16	0.06	0.07	0.13	0.04	0.05	0.10
1999	0.04	0.05	0.08	0.03	0.04	0.07	0.03	0.03	0.06	0.02	0.02	0.04
2000	0.03	0.04	0.07	0.03	0.03	0.06	0.02	0.03	0.05	0.02	0.02	0.04
2001	0.03	0.04	0.07	0.03	0.03	0.06	0.02	0.03	0.05	0.02	0.02	0.04
2002	0.03	0.04	0.08	0.03	0.03	0.06	0.02	0.03	0.05	0.02	0.02	0.04
2003	0.03	0.04	0.07	0.03	0.03	0.06	0.02	0.02	0.04	0.02	0.02	0.03
2004	0.03	0.04	0.07	0.03	0.03	0.05	0.02	0.02	0.04	0.02	0.02	0.03
2005	0.03	0.03	0.06	0.02	0.03	0.05	0.02	0.02	0.04	0.01	0.02	0.03
2006	0.03	0.04	0.06	0.02	0.03	0.05	0.02	0.02	0.04	0.01	0.02	0.03
2007	0.03	0.03	0.06	0.02	0.03	0.05	0.02	0.02	0.04	0.01	0.02	0.03
2008	0.03	0.04	0.06	0.02	0.03	0.05	0.02	0.02	0.04	0.01	0.02	0.03
2009	0.03	0.03	0.06	0.02	0.03	0.05	0.02	0.02	0.04	0.01	0.02	0.03
2010	0.02	0.03	0.05	0.02	0.02	0.04	0.02	0.02	0.03	0.01	0.01	0.03
2011	0.03	0.03	0.06	0.02	0.02	0.04	0.02	0.02	0.03	0.01	0.01	0.03
2012	0.02	0.03	0.05	0.02	0.02	0.04	0.01	0.02	0.03	0.01	0.01	0.03
2013	0.02	0.03	0.05	0.02	0.02	0.04	0.01	0.02	0.03	0.01	0.01	0.02
2014	0.02	0.03	0.05	0.02	0.02	0.04	0.01	0.02	0.03	0.01	0.01	0.02
2015	0.02	0.03	0.05	0.02	0.02	0.04	0.01	0.02	0.03	0.01	0.01	0.02
2016	0.02	0.03	0.05	0.02	0.02	0.04	0.02	0.02	0.03	0.01	0.01	0.03
2017	0.02	0.03	0.05	0.02	0.02	0.04	0.01	0.02	0.03	0.01	0.01	0.03
2018	0.02	0.03	0.05	0.02	0.02	0.04	0.01	0.02	0.03	0.01	0.01	0.02

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TABLE 5-28a: RATIO OF PREDICTED LARGEMOUTH BASS CONCENTRATIONS TO LABORATORY-DERIVED NOAEL FOR TRI+ PCBS - UPPER RIVER

	River Mile 189			River Mile 168			River Mile 154		
Year	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)
1993	**11**	**18**	**52**	**5.6**	**6.6**	**8.5**	**2.2**	**2.6**	**3.4**
1994	**8.2**	**13**	**32**	**5.1**	**5.9**	**7.7**	**2.0**	**2.4**	**3.1**
1995	**10**	**16**	**33**	**4.7**	**5.4**	**7.0**	**1.9**	**2.2**	**2.8**
1996	**6.0**	**9.5**	**22**	**3.6**	**4.1**	**5.4**	**1.5**	**1.8**	**2.3**
1997	**6.1**	**9.7**	**20**	**3.3**	**3.7**	**4.9**	**1.4**	**1.7**	**2.3**
1998	**4.9**	**7.6**	**17**	**3.1**	**3.7**	**4.8**	**1.4**	**1.7**	**2.2**
1999	**4.6**	**7.2**	**18**	**3.1**	**3.6**	**4.6**	**1.4**	**1.6**	**2.1**
2000	**3.6**	**5.8**	**15**	**2.5**	**2.8**	**3.7**	**1.2**	**1.4**	**1.8**
2001	**3.3**	**5.1**	**12**	**2.2**	**2.5**	**3.2**	**1.0**	**1.3**	**1.6**
2002	**3.2**	**5.0**	**12**	**1.9**	**2.2**	**2.8**	0.9	**1.1**	**1.4**
2003	**3.0**	**4.5**	**10**	**1.8**	**2.1**	**2.7**	0.9	**1.1**	**1.3**
2004	**4.0**	**6.1**	**14**	**1.8**	**2.1**	**2.7**	0.9	**1.1**	**1.3**
2005	**3.3**	**5.1**	**13**	**1.6**	**1.9**	**2.4**	0.8	0.9	**1.2**
2006	**2.7**	**4.0**	**9.9**	**1.5**	**1.6**	**2.1**	0.7	0.8	**1.1**
2007	**3.2**	**4.9**	**12**	**1.4**	**1.6**	**2.1**	0.7	0.8	**1.0**
2008	**3.3**	**5.0**	**11**	**1.4**	**1.6**	**2.1**	0.6	0.8	**1.0**
2009	**3.2**	**5.0**	**11**	**1.3**	**1.5**	**2.0**	0.6	0.7	0.9
2010	**3.0**	**4.6**	**11**	**1.2**	**1.3**	**1.7**	0.5	0.6	0.8
2011	**2.5**	**3.7**	**8.4**	**1.1**	**1.3**	**1.6**	0.5	0.6	0.8
2012	**2.3**	**3.6**	**9.2**	**1.1**	**1.3**	**1.6**	0.4	0.5	0.6
2013	**2.0**	**3.0**	**7.2**	**1.0**	**1.2**	**1.5**	0.4	0.5	0.6
2014	**2.1**	**3.3**	**8.0**	**1.0**	**1.1**	**1.4**	0.4	0.4	0.6
2015	**2.0**	**3.1**	**7.0**	0.9	**1.0**	**1.4**	0.4	0.4	0.5
2016	**2.5**	**3.7**	**7.5**	0.9	**1.1**	**1.5**	0.3	0.4	0.6
2017	**2.6**	**4.0**	**9.1**	**1.0**	**1.1**	**1.5**	0.4	0.4	0.6
2018	**2.4**	**3.6**	**8.6**	**1.0**	**1.1**	**1.4**	0.4	0.4	0.6

Bold values indicate exceedances

TABLE 5-28b: RATIO OF PREDICTED LARGEMOUTH BASS CONCENTRATIONS TO LABORATORY-DERIVED NOAEL FOR TRI+ PCBS - LOWER RIVER

	River Mile 152			River Mile 113			River Mile 90			River Mile 50		
Year	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)
1993	**6**	**8**	**11**	**4**	**5**	**8**	1.0	**1.2**	**1.6**	0.9	**1.1**	**1.5**
1994	**4**	**5**	**8**	**3**	**4**	**7**	0.9	**1.1**	**1.4**	0.8	1.0	**1.3**
1995	**4**	**5**	**7**	**3**	**4**	**6**	0.8	1.0	**1.3**	0.7	0.9	**1.2**
1996	**4**	**6**	**8**	**3**	**4**	**5**	0.7	0.9	**1.2**	0.7	0.8	**1.1**
1997	**4**	**5**	**7**	**3**	**3**	**5**	0.7	0.8	**1.1**	0.6	0.7	1.0
1998	**7**	**9**	**14**	**6**	**7**	**11**	**1.5**	**1.8**	**2.4**	**1.3**	**1.6**	**2.2**
1999	**3**	**4**	**6**	**2**	**3**	**4**	0.6	0.8	**1.0**	0.6	0.7	0.9
2000	**3**	**3**	**5**	**1.9**	**2.5**	**4**	0.5	0.6	0.9	0.5	0.6	0.8
2001	**3**	**4**	**5**	**1.9**	**2.4**	**4**	0.5	0.6	0.8	0.4	0.5	0.7
2002	**3**	**3**	**5**	**2.0**	**2.5**	**4**	0.5	0.6	0.8	0.4	0.5	0.7
2003	**2.3**	**3**	**5**	**1.8**	**2.3**	**4**	0.5	0.6	0.8	0.4	0.5	0.7
2004	**2.0**	**2.6**	**4**	**1.7**	**2.1**	**3**	0.4	0.5	0.7	0.4	0.5	0.7
2005	**1.9**	**2.4**	**4**	**1.5**	**1.9**	**3**	0.4	0.5	0.7	0.4	0.4	0.6
2006	**2.1**	**2.7**	**4**	**1.4**	**1.9**	**3**	0.4	0.4	0.6	0.3	0.4	0.6
2007	**1.9**	**2.4**	**4**	**1.4**	**1.8**	**3**	0.3	0.4	0.6	0.3	0.4	0.5
2008	**2.0**	**2.5**	**4**	**1.5**	**1.9**	**2.9**	0.4	0.5	0.6	0.3	0.4	0.6
2009	**1.7**	**2.2**	**3**	**1.4**	**1.8**	**2.7**	0.4	0.4	0.6	0.3	0.4	0.5
2010	**1.6**	**2.0**	**3**	**1.2**	**1.5**	**2.3**	0.3	0.4	0.5	0.3	0.3	0.5
2011	**1.8**	**2.3**	**4**	**1.3**	**1.6**	**2.5**	0.3	0.4	0.5	0.3	0.3	0.5
2012	**1.6**	**2.1**	**3**	**1.2**	**1.6**	**2.5**	0.3	0.4	0.5	0.3	0.3	0.4
2013	**1.8**	**2.3**	**3**	**1.3**	**1.7**	**2.5**	0.3	0.4	0.5	0.3	0.3	0.5
2014	**1.6**	**2.1**	**3**	**1.2**	**1.6**	**2.4**	0.3	0.4	0.5	0.3	0.3	0.4
2015	**1.5**	**1.9**	**3**	**1.2**	**1.5**	**2.3**	0.3	0.4	0.5	0.2	0.3	0.4
2016	**1.6**	**2.0**	**3**	**1.2**	**1.6**	**2.4**	0.3	0.4	0.5	0.3	0.3	0.5
2017	**1.4**	**1.8**	**2.8**	**1.1**	**1.5**	**2.2**	0.3	0.4	0.5	0.3	0.3	0.4
2018	**1.3**	**1.7**	**2.5**	**1.0**	**1.3**	**2.0**	0.3	0.3	0.5	0.2	0.3	0.4

Bold values indicate exceedances

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TABLE 5-29a: RATIO OF PREDICTED LARGEMOUTH BASS CONCENTRATIONS TO LABORATORY-BASED LOAEL FOR TRI+ PCBS -UPPER RIVER

	River Mile 189			River Mile 168			River Mile 154		
Year	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)
1993	**2.3**	**3.7**	**11**	**1.1**	**1.3**	**1.7**	0.5	0.5	0.7
1994	**1.7**	**2.7**	**6.6**	**1.0**	**1.2**	**1.6**	0.4	0.5	0.6
1995	**2.0**	**3.2**	**6.7**	**1.0**	**1.1**	**1.4**	0.4	0.5	0.6
1996	**1.2**	**1.9**	**4.6**	0.7	0.8	**1.1**	0.3	0.4	0.5
1997	**1.2**	**2.0**	**4.1**	0.7	0.8	**1.0**	0.3	0.4	0.5
1998	**1.0**	**1.6**	**3.4**	0.6	0.8	**1.0**	0.3	0.3	0.5
1999	0.9	**1.5**	**3.6**	0.6	0.7	0.9	0.3	0.3	0.4
2000	0.7	**1.2**	**3.0**	0.5	0.6	0.8	0.2	0.3	0.4
2001	0.7	**1.0**	**2.5**	0.4	0.5	0.7	0.2	0.3	0.3
2002	0.7	**1.0**	**2.5**	0.4	0.4	0.6	0.2	0.2	0.3
2003	0.6	0.9	**2.1**	0.4	0.4	0.5	0.2	0.2	0.3
2004	0.8	**1.2**	**2.8**	0.4	0.4	0.6	0.2	0.2	0.3
2005	0.7	**1.0**	**2.6**	0.3	0.4	0.5	0.2	0.2	0.2
2006	0.5	0.8	**2.0**	0.3	0.3	0.4	0.1	0.2	0.2
2007	0.7	**1.0**	**2.4**	0.3	0.3	0.4	0.1	0.2	0.2
2008	0.7	**1.0**	**2.3**	0.3	0.3	0.4	0.1	0.2	0.2
2009	0.7	**1.0**	**2.3**	0.3	0.3	0.4	0.1	0.1	0.2
2010	0.6	0.9	**2.3**	0.2	0.3	0.3	0.1	0.1	0.2
2011	0.5	0.8	**1.7**	0.2	0.3	0.3	0.1	0.1	0.2
2012	0.5	0.7	**1.9**	0.2	0.3	0.3	0.09	0.1	0.1
2013	0.4	0.6	**1.5**	0.2	0.2	0.3	0.08	0.1	0.1
2014	0.4	0.7	**1.6**	0.2	0.2	0.3	0.07	0.09	0.1
2015	0.4	0.6	**1.4**	0.2	0.2	0.3	0.07	0.09	0.1
2016	0.5	0.8	**1.5**	0.2	0.2	0.3	0.07	0.09	0.1
2017	0.5	0.8	**1.9**	0.2	0.2	0.3	0.07	0.09	0.1
2018	0.5	0.7	**1.8**	0.2	0.2	0.3	0.07	0.09	0.1

TABLE 5-29b: RATIO OF PREDICTED LARGEMOUTH BASS CONCENTRATIONS TO LABORATORY-DERIVED LOAEL FOR TRI+ PCBS - LOWER RIVER

	River Mile 152			River Mile 113			River Mile 90			River Mile 50		
Year	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)
1993	**1.2**	**1.5**	**2.3**	0.8	**1.0**	**1.6**	0.2	0.2	0.3	0.2	0.2	0.3
1994	0.9	**1.1**	**1.6**	0.7	0.9	**1.3**	0.2	0.2	0.3	0.2	0.2	0.3
1995	0.8	1.0	**1.4**	0.6	0.8	**1.2**	0.2	0.2	0.3	0.2	0.2	0.2
1996	0.9	**1.1**	**1.7**	0.6	0.7	**1.1**	0.1	0.2	0.2	0.1	0.2	0.2
1997	0.8	**1.0**	**1.5**	0.6	0.7	**1.1**	0.1	0.2	0.2	0.1	0.2	0.2
1998	**1.5**	**1.9**	**2.9**	**1.2**	**1.5**	**2.3**	0.3	0.4	0.5	0.3	0.3	0.4
1999	0.6	0.8	**1.2**	0.5	0.6	0.9	0.1	0.2	0.2	0.1	0.1	0.2
2000	0.5	0.7	**1.0**	0.4	0.5	0.8	0.1	0.1	0.2	0.1	0.1	0.2
2001	0.6	0.7	**1.1**	0.4	0.5	0.8	0.1	0.1	0.2	0.1	0.1	0.1
2002	0.6	0.7	**1.1**	0.4	0.5	0.8	0.1	0.1	0.2	0.1	0.1	0.1
2003	0.5	0.6	0.9	0.4	0.5	0.7	0.1	0.1	0.2	0.1	0.1	0.1
2004	0.4	0.5	0.8	0.3	0.4	0.7	0.1	0.1	0.2	0.1	0.1	0.1
2005	0.4	0.5	0.7	0.3	0.4	0.6	0.1	0.1	0.1	0.1	0.1	0.1
2006	0.4	0.5	0.8	0.3	0.4	0.6	0.1	0.1	0.1	0.1	0.1	0.1
2007	0.4	0.5	0.7	0.3	0.4	0.6	0.1	0.1	0.1	0.1	0.1	0.1
2008	0.4	0.5	0.8	0.3	0.4	0.6	0.1	0.1	0.1	0.1	0.1	0.1
2009	0.3	0.4	0.7	0.3	0.4	0.6	0.1	0.1	0.1	0.1	0.1	0.1
2010	0.3	0.4	0.6	0.2	0.3	0.5	0.1	0.1	0.1	0.1	0.1	0.1
2011	0.4	0.5	0.7	0.3	0.3	0.5	0.1	0.1	0.1	0.1	0.1	0.1
2012	0.3	0.4	0.6	0.3	0.3	0.5	0.1	0.1	0.1	0.1	0.1	0.1
2013	0.4	0.5	0.7	0.3	0.3	0.5	0.1	0.1	0.1	0.1	0.1	0.1
2014	0.3	0.4	0.7	0.3	0.3	0.5	0.1	0.1	0.1	0.1	0.1	0.1
2015	0.3	0.4	0.6	0.2	0.3	0.5	0.1	0.1	0.1	0.1	0.1	0.1
2016	0.3	0.4	0.6	0.2	0.3	0.5	0.1	0.1	0.1	0.1	0.1	0.1
2017	0.3	0.4	0.6	0.2	0.3	0.5	0.1	0.1	0.1	0.1	0.1	0.1
2018	0.3	0.3	0.5	0.2	0.3	0.4	0.1	0.1	0.1	0.0	0.1	0.1

Bold values indicate exceedances

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TABLE 5-30a: RATIO OF PREDICTED LARGEMOUTH BASS CONCENTRATIONS TO LABORATORY-DERIVED NOAEL ON A TEQ BASIS - UPPER RIVER

	River Mile 189			River Mile 180			River Mile 168			River Mile 154		
Year	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)
1993	0.5	0.9	**2.8**	0.00	0.00	0.00	0.5	0.6	0.8	0.2	0.2	0.3
1994	0.4	0.6	**1.8**	0.00	0.00	0.00	0.5	0.5	0.7	0.2	0.2	0.3
1995	0.5	0.8	**1.7**	0.00	0.00	0.00	0.4	0.5	0.6	0.2	0.2	0.3
1996	0.3	0.5	**1.2**	0.00	0.00	0.00	0.3	0.4	0.5	0.1	0.2	0.2
1997	0.3	0.5	**1.1**	0.00	0.00	0.00	0.3	0.3	0.4	0.1	0.2	0.2
1998	0.2	0.4	0.9	0.00	0.00	0.00	0.3	0.3	0.4	0.1	0.2	0.2
1999	0.2	0.3	0.9	0.00	0.00	0.00	0.3	0.3	0.4	0.1	0.1	0.2
2000	0.2	0.3	0.8	0.00	0.00	0.00	0.2	0.3	0.3	0.1	0.1	0.2
2001	0.2	0.2	0.7	0.00	0.00	0.00	0.2	0.2	0.3	0.09	0.1	0.1
2002	0.2	0.2	0.7	0.00	0.00	0.00	0.2	0.2	0.3	0.09	0.1	0.1
2003	0.1	0.2	0.6	0.00	0.00	0.00	0.2	0.2	0.2	0.08	0.09	0.1
2004	0.2	0.3	0.7	0.00	0.00	0.00	0.2	0.2	0.2	0.08	0.09	0.1
2005	0.2	0.2	0.7	0.00	0.00	0.00	0.1	0.2	0.2	0.07	0.08	0.1
2006	0.1	0.2	0.6	0.00	0.00	0.00	0.1	0.1	0.2	0.06	0.08	0.1
2007	0.2	0.2	0.6	0.00	0.00	0.00	0.1	0.1	0.2	0.06	0.07	0.09
2008	0.2	0.2	0.6	0.00	0.00	0.00	0.1	0.1	0.2	0.06	0.07	0.09
2009	0.2	0.2	0.6	0.00	0.00	0.00	0.1	0.1	0.2	0.05	0.06	0.08
2010	0.1	0.2	0.6	0.00	0.00	0.00	0.1	0.1	0.2	0.05	0.06	0.07
2011	0.1	0.2	0.5	0.00	0.00	0.00	0.1	0.1	0.1	0.04	0.05	0.07
2012	0.1	0.2	0.5	0.00	0.00	0.00	0.1	0.1	0.1	0.04	0.05	0.06
2013	0.1	0.1	0.4	0.00	0.00	0.00	0.09	0.1	0.1	0.03	0.04	0.05
2014	0.1	0.2	0.4	0.00	0.00	0.00	0.09	0.1	0.1	0.03	0.04	0.05
2015	0.1	0.1	0.4	0.00	0.00	0.00	0.08	0.09	0.1	0.03	0.04	0.05
2016	0.1	0.2	0.4	0.00	0.00	0.00	0.09	0.1	0.1	0.03	0.04	0.05
2017	0.1	0.2	0.5	0.00	0.00	0.00	0.09	0.1	0.1	0.03	0.04	0.05
2018	0.1	0.2	0.5	0.00	0.00	0.00	0.09	0.1	0.1	0.03	0.04	0.05

Bold values indicate exceedances

TABLE 5-30b: RATIO OF PREDICTED LARGEMOUTH BASS CONCENTRATIONS TO LABORATORY-DERIVED NOAEL ON A TEQ BASIS - LOWER RIVER

	River Mile 152			River Mile 113			River Mile 90			River Mile 50		
Year	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)
1993	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
1994	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1
1995	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.1	0.1
1996	0.1	0.1	0.2	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.1	0.1
1997	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.1
1998	0.1	0.2	0.3	0.1	0.1	0.2	0.1	0.1	0.2	0.1	0.1	0.2
1999	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.1
2000	0.1	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.1
2001	0.1	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.1
2002	0.1	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.1
2003	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0
2004	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0
2005	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
2006	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
2007	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
2008	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
2009	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
2010	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2011	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2012	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2013	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2014	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2015	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2016	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2017	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2018	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Bold values indicate exceedances

TABLE 5-31
COMPARISON OF MEASURED STRIPED BASS CONCENTRATIONS
TO TOXICITY REFERENCE VALUES

		<<--- Tri+ in Tissue -->>		<<--- Tri+ in Tissue -->>		<< -- TEQ in Eggs: Lipid Normalized -->>			
		Field-Based NOAEL		Lab-Based LOAEL		LOAEL		NOAEL	
River Mile	Year	Average	95%UCL	Average	95%UCL	Average	95% UCL	Average	95% UCL
12	1993	0.4	0.7	0.1	0.2	0.02	0.03	0.01	0.01
27	1993	0.8	**1.3**	0.3	0.4	0.03	0.05	0.01	0.02
33	1993	**1.4**	**2.7**	0.5	0.9	0.04	0.07	0.02	0.03
40	1993	0.5	0.7	0.2	0.2	0.02	0.03	0.01	0.01
74	1993	**1.0**	**1.6**	0.3	0.5	0.05	0.09	0.02	0.04
112	1993	**1.2**	**1.8**	0.4	0.6	0.08	0.14	0.04	0.06
152	1993	**4.0**	**5.7**	**1.3**	**1.9**	0.21	0.36	0.09	0.16
26	1994	0.5	0.8	0.2	0.3	0.02	0.04	0.01	0.02
37	1994	0.6	**1.0**	0.2	0.3	0.03	0.06	0.01	0.03
40	1994	0.6	0.9	0.2	0.3	0.03	0.04	0.01	0.02
74	1994	0.8	**1.4**	0.3	0.5	0.03	0.05	0.02	0.02
112	1994	**1.0**	**2.7**	0.3	0.9	0.09	0.32	0.04	0.14
152	1994	**2.1**	**3.2**	0.7	**1.1**	0.17	0.23	0.08	0.10
27	1995	0.6	0.9	0.2	0.3	0.04	0.06	0.02	0.03
36	1995	0.4	0.5	0.1	0.2	0.02	0.02	0.01	0.01
59	1995	0.7	0.9	0.2	0.3	0.11	0.17	0.05	0.08
76	1995	0.6	0.7	0.2	0.2	0.02	0.02	0.01	0.01
113	1995	0.5	0.9	0.2	0.3	0.02	0.04	0.01	0.02
152	1995	**2.1**	**2.7**	0.7	0.9	0.12	0.16	0.05	0.07
12	1996	0.4	0.6	0.1	0.2	0.02	0.04	0.01	0.02
29	1996	0.6	0.9	0.2	0.3	0.03	0.04	0.01	0.02
40	1996	0.5	0.7	0.2	0.2	0.03	0.05	0.01	0.02
74	1996	0.6	0.8	0.2	0.3	0.03	0.05	0.01	0.02
112	1996	0.6	**1.0**	0.2	0.3	0.06	0.13	0.03	0.06
152	1996	**1.6**	**3.6**	0.5	**1.2**	0.15	0.36	0.07	0.16

Bold values indicate exceedances

306486

TABLE 5-31a: RATIO OF PREDICTED STRIPED BASS CONCENTRATIONS TO TRI+ PCB-BASED TRVs

	River Mile 152						River Mile 113					
	Tri+-based Field-derived TRV NOAEL			Tri+-based Lab-derived TRV LOAEL			Tri+-based Field-derived TRV NOAEL			Tri+-based Lab-derived TRV LOAEL		
Year	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)
1993	**9.3**	**11.8**	**17.7**	3.1	**3.9**	**5.9**	**1.3**	**1.6**	**2.4**	0.4	0.5	0.8
1994	**6.5**	**8.4**	**12.5**	**2.2**	**2.8**	**4.2**	**1.1**	**1.4**	**2.1**	0.4	0.5	0.7
1995	**5.8**	**7.2**	**11.0**	**1.9**	**2.4**	**3.7**	**1.0**	**1.2**	**1.9**	0.3	0.4	0.6
1996	**6.8**	**8.7**	**13.0**	**2.3**	**2.9**	**4.3**	0.9	**1.2**	**1.8**	0.3	0.4	0.6
1997	**6.2**	**7.8**	**11.7**	**2.1**	**2.6**	**3.9**	0.9	**1.1**	**1.7**	0.3	0.4	0.6
1998	**11.5**	**14.3**	**22.0**	**3.8**	**4.8**	**7.3**	**1.8**	**2.4**	**3.6**	0.6	0.8	**1.2**
1999	**4.6**	**5.9**	**8.8**	**1.5**	**2.0**	**2.9**	0.7	0.9	**1.4**	0.2	0.3	0.5
2000	**4.0**	**5.1**	**7.7**	**1.3**	**1.7**	**2.6**	0.6	0.8	**1.2**	0.2	0.3	0.4
2001	**4.3**	**5.6**	**8.3**	**1.4**	**1.9**	**2.8**	0.6	0.8	**1.2**	0.2	0.3	0.4
2002	**4.3**	**5.4**	**8.2**	**1.4**	**1.8**	**2.7**	0.6	0.8	**1.2**	0.2	0.3	0.4
2003	**3.6**	**4.7**	**7.2**	**1.2**	**1.6**	**2.4**	0.6	0.7	**1.1**	0.2	0.2	0.4
2004	**3.1**	**4.0**	**6.1**	**1.0**	**1.3**	**2.0**	0.5	0.7	**1.0**	0.2	0.2	0.3
2005	**2.9**	**3.8**	**5.7**	**1.0**	**1.3**	**1.9**	0.5	0.6	0.9	0.2	0.2	0.3
2006	**3.2**	**4.1**	**6.3**	**1.1**	**1.4**	**2.1**	0.5	0.6	0.9	0.2	0.2	0.3
2007	**2.9**	**3.8**	**5.6**	**1.0**	**1.3**	**1.9**	0.4	0.6	0.9	0.1	0.2	0.3
2008	**3.1**	**3.9**	**5.9**	**1.0**	**1.3**	**2.0**	0.5	0.6	0.9	0.2	0.2	0.3
2009	**2.6**	**3.4**	**5.2**	0.9	**1.1**	**1.7**	0.4	0.6	0.9	0.1	0.2	0.3
2010	**2.5**	**3.2**	**4.8**	0.8	**1.1**	**1.6**	0.4	0.5	0.7	0.1	0.2	0.2
2011	**2.8**	**3.6**	**5.5**	0.9	**1.2**	**1.8**	0.4	0.5	0.8	0.1	0.2	0.3
2012	**2.5**	**3.3**	**4.9**	0.8	**1.1**	**1.6**	0.4	0.5	0.8	0.1	0.2	0.3
2013	**2.7**	**3.6**	**5.4**	0.9	**1.2**	**1.8**	0.4	0.5	0.8	0.1	0.2	0.3
2014	**2.6**	**3.3**	**5.0**	0.9	**1.1**	**1.7**	0.4	0.5	0.8	0.1	0.2	0.3
2015	**2.3**	**3.0**	**4.6**	0.8	**1.0**	**1.5**	0.4	0.5	0.7	0.1	0.2	0.2
2016	**2.4**	**3.1**	**4.7**	0.8	**1.0**	**1.6**	0.4	0.5	0.8	0.1	0.2	0.3
2017	**2.2**	**2.8**	**4.3**	0.7	0.9	**1.4**	0.4	0.5	0.7	0.1	0.2	0.2
2018	**2.0**	**2.6**	**3.9**	0.7	0.9	**1.3**	0.3	0.4	0.6	0.1	0.1	0.2

Bold values indicate exceedances

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TABLE 5-31b: RATIO OF PREDICTED STRIPED BASS CONCENTRATIONS TO TEQ-BASED TRVs

	River Mile 152						River Mile 113					
	TEQ-based Field-derived TRV NOAEL			TEQ-based Lab-derived TRV LOAEL			TEQ-based Field-derived TRV NOAEL			TEQ-based Lab-derived TRV LOAEL		
Year	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)	25th (mg/kg wet weight)	Median (mg/kg wet weight)	95th Percentile (mg/kg wet weight)
1993	0.28	0.36	0.54	0.12	0.16	0.24	0.04	0.05	0.07	0.02	0.02	0.03
1994	0.20	0.25	0.38	0.09	0.11	0.17	0.03	0.04	0.06	0.01	0.02	0.03
1995	0.17	0.22	0.33	0.08	0.10	0.15	0.03	0.04	0.06	0.01	0.02	0.03
1996	0.21	0.26	0.39	0.09	0.12	0.17	0.03	0.04	0.05	0.01	0.02	0.02
1997	0.19	0.24	0.35	0.08	0.10	0.16	0.03	0.03	0.05	0.01	0.01	0.02
1998	0.35	0.43	0.67	0.15	0.19	0.30	0.06	0.07	0.11	0.02	0.03	0.05
1999	0.14	0.18	0.27	0.06	0.08	0.12	0.02	0.03	0.04	0.01	0.01	0.02
2000	0.12	0.15	0.23	0.05	0.07	0.10	0.02	0.02	0.04	0.01	0.01	0.02
2001	0.13	0.17	0.25	0.06	0.08	0.11	0.02	0.02	0.04	0.01	0.01	0.02
2002	0.13	0.16	0.25	0.06	0.07	0.11	0.02	0.02	0.04	0.01	0.01	0.02
2003	0.11	0.14	0.22	0.05	0.06	0.10	0.02	0.02	0.03	0.01	0.01	0.02
2004	0.09	0.12	0.19	0.04	0.05	0.08	0.02	0.02	0.03	0.01	0.01	0.01
2005	0.09	0.11	0.17	0.04	0.05	0.08	0.01	0.02	0.03	0.01	0.01	0.01
2006	0.10	0.12	0.19	0.04	0.06	0.08	0.01	0.02	0.03	0.01	0.01	0.01
2007	0.09	0.11	0.17	0.04	0.05	0.08	0.01	0.02	0.03	0.01	0.01	0.01
2008	0.09	0.12	0.18	0.04	0.05	0.08	0.01	0.02	0.03	0.01	0.01	0.01
2009	0.08	0.10	0.16	0.04	0.05	0.07	0.01	0.02	0.03	0.01	0.01	0.01
2010	0.07	0.10	0.14	0.03	0.04	0.06	0.01	0.01	0.02	0.00	0.01	0.01
2011	0.08	0.11	0.17	0.04	0.05	0.07	0.01	0.02	0.02	0.01	0.01	0.01
2012	0.08	0.10	0.15	0.03	0.04	0.07	0.01	0.02	0.02	0.01	0.01	0.01
2013	0.08	0.11	0.16	0.04	0.05	0.07	0.01	0.02	0.02	0.01	0.01	0.01
2014	0.08	0.10	0.15	0.03	0.04	0.07	0.01	0.02	0.02	0.01	0.01	0.01
2015	0.07	0.09	0.14	0.03	0.04	0.06	0.01	0.01	0.02	0.00	0.01	0.01
2016	0.07	0.09	0.14	0.03	0.04	0.06	0.01	0.01	0.02	0.01	0.01	0.01
2017	0.07	0.08	0.13	0.03	0.04	0.06	0.01	0.01	0.02	0.00	0.01	0.01
2018	0.06	0.08	0.12	0.03	0.03	0.05	0.01	0.01	0.02	0.00	0.01	0.01

Bold values indicate exceedances

TABLE 5-32: RATIO OF MODELED DIETARY DOSE AND EGG CONCENTRATIONS TO BENCHMARKS BASED ON 1993 DATA FOR FEMALE TREE SWALLOW FOR TRI+ CONGENERS

	<<<< ----- Dietary Dose ---- >>>>				<<<< ---- Egg Concentration ---- >>>>			
Location	LOAEL vs. Average ADD Hazard Quotient	LOAEL vs. 95% UCL ADD Hazard Quotient	NOAEL vs. Average ADD Hazard Quotient	NOAEL vs. 95% UCL ADD Hazard Quotient	LOAEL vs. Average Conc. Hazard Quotient	LOAEL vs. 95% UCL Conc Hazard Quotient	NOAEL vs. Average Conc. Hazard Quotient	NOAEL vs. 95% UCL Conc. Hazard Quotient
Upper River								
Thompson Island Pool (189)	NA	NA	0.7	**1.2**	NA	NA	**1.0**	**1.7**
Stillwater (168)	NA	NA	**1.2**	**5.5**	NA	NA	**1.7**	**7.8**
Federal Dam (154)	NA	NA	0.3	0.5	NA	NA	0.4	0.7
Lower River								
143.5	NA	NA	0.04	0.1	NA	NA	0.06	0.1
137.2	NA	NA	0.08	0.3	NA	NA	0.1	0.4
122.4	NA	NA	0.04	0.1	NA	NA	0.06	0.2
113.8	NA	NA	0.04	0.2	NA	NA	0.06	0.2
100	NA	NA	0.02	0.1	NA	NA	0.03	0.2
88.9	NA	NA	0.01	0.02	NA	NA	0.01	0.03
58.7	NA	NA	0.03	0.3	NA	NA	0.04	0.4
47.3	NA	NA	0.04	0.3	NA	NA	0.05	0.4
25.8	NA	NA	0.01	0.02	NA	NA	0.01	0.03

Bold value indicates exceedances

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TABLE 5-33: RATIO OF MODELED DIETARY DOSE BASED ON FISHRAND FOR FEMALE TREE SWALLOWS BASED ON THE SUM OF TRI+ CONGENERS FOR THE PERIOD 1993 - 2018

Year	LOAEL 189 Average	NOAEL 189 Average	LOAEL 168 Average	NOAEL 168 Average	LOAEL 154 Average	NOAEL 154 Average	LOAEL 152 Average	NOAEL 152 Average	LOAEL 113 Average	NOAEL 113 Average	LOAEL 90 Average	NOAEL 90 Average	LOAEL 50 Average	NOAEL 50 Average
1993	NA	0.5	NA	0.8	NA	0.2	NA	0.09	NA	0.07	NA	0.06	NA	0.04
1994	NA	0.4	NA	0.7	NA	0.2	NA	0.08	NA	0.07	NA	0.06	NA	0.04
1995	NA	0.4	NA	0.6	NA	0.2	NA	0.08	NA	0.07	NA	0.05	NA	0.04
1996	NA	0.3	NA	0.5	NA	0.2	NA	0.08	NA	0.06	NA	0.05	NA	0.04
1997	NA	0.3	NA	0.4	NA	0.2	NA	0.08	NA	0.06	NA	0.05	NA	0.04
1998	NA	0.3	NA	0.4	NA	0.2	NA	0.07	NA	0.06	NA	0.05	NA	0.03
1999	NA	0.3	NA	0.4	NA	0.1	NA	0.07	NA	0.06	NA	0.05	NA	0.03
2000	NA	0.3	NA	0.3	NA	0.1	NA	0.07	NA	0.06	NA	0.04	NA	0.03
2001	NA	0.2	NA	0.3	NA	0.1	NA	0.07	NA	0.05	NA	0.04	NA	0.03
2002	NA	0.2	NA	0.2	NA	0.1	NA	0.06	NA	0.05	NA	0.04	NA	0.03
2003	NA	0.2	NA	0.2	NA	0.09	NA	0.06	NA	0.05	NA	0.04	NA	0.03
2004	NA	0.2	NA	0.2	NA	0.09	NA	0.06	NA	0.05	NA	0.04	NA	0.03
2005	NA	0.2	NA	0.2	NA	0.08	NA	0.06	NA	0.05	NA	0.04	NA	0.03
2006	NA	0.2	NA	0.2	NA	0.08	NA	0.06	NA	0.05	NA	0.04	NA	0.03
2007	NA	0.1	NA	0.2	NA	0.07	NA	0.06	NA	0.05	NA	0.03	NA	0.03
2008	NA	0.1	NA	0.2	NA	0.06	NA	0.05	NA	0.04	NA	0.03	NA	0.02
2009	NA	0.1	NA	0.2	NA	0.06	NA	0.05	NA	0.04	NA	0.03	NA	0.02
2010	NA	0.1	NA	0.1	NA	0.05	NA	0.05	NA	0.04	NA	0.03	NA	0.02
2011	NA	0.10	NA	0.1	NA	0.05	NA	0.05	NA	0.04	NA	0.03	NA	0.02
2012	NA	0.1	NA	0.1	NA	0.04	NA	0.05	NA	0.04	NA	0.03	NA	0.02
2013	NA	0.1	NA	0.1	NA	0.04	NA	0.05	NA	0.04	NA	0.03	NA	0.02
2014	NA	0.1	NA	0.1	NA	0.04	NA	0.05	NA	0.04	NA	0.03	NA	0.02
2015	NA	0.09	NA	0.1	NA	0.03	NA	0.04	NA	0.04	NA	0.03	NA	0.02
2016	NA	0.09	NA	0.1	NA	0.03	NA	0.05	NA	0.04	NA	0.03	NA	0.02
2017	NA	0.08	NA	0.1	NA	0.03	NA	0.04	NA	0.04	NA	0.03	NA	0.02
2018	NA	0.08	NA	0.1	NA	0.03	NA	0.04	NA	0.04	NA	0.03	NA	0.02

Bold value indicates exceedances

TABLE 5-34: RATIO OF MODELED EGG CONCENTRATIONS TO BENCHMARKS FOR FEMALE TREE SWALLOWS BASED ON THE SUM OF TRI+ CONGENERS FOR THE PERIOD 1993 - 2018

Year	LOAEL 189 Average	NOAEL 189 Average	LOAEL 168 Average	NOAEL 168 Average	LOAEL 154 Average	NOAEL 154 Average	LOAEL 152 Average	NOAEL 152 Average	LOAEL 113 Average	NOAEL 113 Average	LOAEL 90 Average	NOAEL 90 Average	LOAEL 50 Average	NOAEL 50 Average
1993	NA	0.6	NA	**1.1**	NA	0.3	NA	0.1	NA	0.1	NA	0.09	NA	0.06
1994	NA	0.6	NA	1.0	NA	0.3	NA	0.1	NA	0.1	NA	0.08	NA	0.06
1995	NA	0.5	NA	0.9	NA	0.3	NA	0.1	NA	0.09	NA	0.07	NA	0.06
1996	NA	0.5	NA	0.7	NA	0.2	NA	0.1	NA	0.09	NA	0.07	NA	0.05
1997	NA	0.5	NA	0.6	NA	0.2	NA	0.1	NA	0.09	NA	0.07	NA	0.05
1998	NA	0.4	NA	0.6	NA	0.2	NA	0.2	NA	0.19	NA	0.15	NA	0.11
1999	NA	0.4	NA	0.5	NA	0.2	NA	0.1	NA	0.09	NA	0.07	NA	0.05
2000	NA	0.4	NA	0.5	NA	0.2	NA	0.1	NA	0.08	NA	0.06	NA	0.05
2001	NA	0.3	NA	0.4	NA	0.2	NA	0.1	NA	0.08	NA	0.06	NA	0.04
2002	NA	0.3	NA	0.3	NA	0.1	NA	0.09	NA	0.08	NA	0.06	NA	0.05
2003	NA	0.3	NA	0.3	NA	0.1	NA	0.09	NA	0.07	NA	0.06	NA	0.04
2004	NA	0.3	NA	0.3	NA	0.1	NA	0.09	NA	0.07	NA	0.06	NA	0.04
2005	NA	0.2	NA	0.3	NA	0.1	NA	0.09	NA	0.07	NA	0.06	NA	0.04
2006	NA	0.2	NA	0.3	NA	0.1	NA	0.08	NA	0.07	NA	0.05	NA	0.04
2007	NA	0.2	NA	0.2	NA	0.1	NA	0.08	NA	0.07	NA	0.05	NA	0.04
2008	NA	0.2	NA	0.2	NA	0.09	NA	0.08	NA	0.07	NA	0.05	NA	0.04
2009	NA	0.2	NA	0.2	NA	0.08	NA	0.08	NA	0.07	NA	0.05	NA	0.04
2010	NA	0.2	NA	0.2	NA	0.07	NA	0.07	NA	0.06	NA	0.05	NA	0.03
2011	NA	0.1	NA	0.2	NA	0.07	NA	0.07	NA	0.06	NA	0.05	NA	0.03
2012	NA	0.1	NA	0.2	NA	0.06	NA	0.07	NA	0.06	NA	0.04	NA	0.03
2013	NA	0.1	NA	0.2	NA	0.05	NA	0.07	NA	0.06	NA	0.04	NA	0.03
2014	NA	0.1	NA	0.2	NA	0.05	NA	0.07	NA	0.06	NA	0.04	NA	0.03
2015	NA	0.1	NA	0.2	NA	0.05	NA	0.07	NA	0.06	NA	0.04	NA	0.03
2016	NA	0.1	NA	0.2	NA	0.05	NA	0.07	NA	0.06	NA	0.05	NA	0.03
2017	NA	0.1	NA	0.2	NA	0.05	NA	0.07	NA	0.06	NA	0.05	NA	0.03
2018	NA	0.1	NA	0.2	NA	0.05	NA	0.07	NA	0.06	NA	0.04	NA	0.03

Bold value indicates exceedances

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TABLE 5-35: RATIO OF MODELED DIETARY DOSE AND EGG CONCENTRATIONS TO BENCHMARKS BASED ON 1993 DATA FOR FEMALE TREE SWALLOW ON TEQ BASIS

	<<<< ----- Dietary Dose ---- >>>>				<<<< ---- Egg Concentration ---- >>>>			
Location	LOAEL vs. Average ADD Hazard Quotient	LOAEL vs. 95% UCL ADD Hazard Quotient	NOAEL vs. Average ADD Hazard Quotient	NOAEL vs. 95% UCL ADD Hazard Quotient	LOAEL vs. Average Conc. Hazard Quotient	LOAEL vs. 95% UCL Conc Hazard Quotient	NOAEL vs. Average Conc. Hazard Quotient	NOAEL vs. 95% UCL Conc. Hazard Quotient
Upper River								
Thompson Island Pool (189)	NA	NA	0.1	0.2	NA	NA	0.4	0.6
Stillwater (168)	NA	NA	0.2	**1.0**	NA	NA	0.6	**3.0**
Federal Dam (154)	NA	NA	0.05	0.08	NA	NA	0.2	0.3
Lower River								
143.5	NA	NA	0.007	0.02	NA	NA	0.02	0.05
137.2	NA	NA	0.01	0.06	NA	NA	0.04	0.2
122.4	NA	NA	0.008	0.02	NA	NA	0.02	0.06
113.8	NA	NA	0.008	0.03	NA	NA	0.02	0.09
100	NA	NA	0.004	0.02	NA	NA	0.01	0.07
88.9	NA	NA	0.002	0.003	NA	NA	0.005	0.01
58.7	NA	NA	0.005	0.05	NA	NA	0.02	0.2
47.3	NA	NA	0.006	0.05	NA	NA	0.02	0.1
25.8	NA	NA	0.002	0.003	NA	NA	0.006	0.01

TABLE 5-36: RATIO OF MODELED DIETARY DOSE TO BENCHMARKS BASED ON FISHRAND FOR FEMALE TREE SWALLOW USING TEQ FOR THE PERIOD 1993 - 2018

	<<< DIETARY DOSE >>						
	NOAEL 189	NOAEL 168	NOAEL 154	NOAEL 152	NOAEL 113	NOAEL 90	NOAEL 50
Year	Average	Average	Average	Average	Average	Average	Average
1993	0.08	0.13	0.04	0.12	0.09	0.08	0.07
1994	0.07	0.12	0.04	0.10	0.08	0.07	0.06
1995	0.07	0.11	0.03	0.09	0.07	0.06	0.05
1996	0.06	0.09	0.03	0.11	0.07	0.06	0.05
1997	0.06	0.08	0.03	0.09	0.07	0.05	0.05
1998	0.05	0.07	0.03	0.17	0.14	0.11	0.10
1999	0.05	0.07	0.03	0.07	0.06	0.05	0.04
2000	0.04	0.06	0.02	0.07	0.05	0.04	0.04
2001	0.04	0.05	0.02	0.07	0.05	0.04	0.03
2002	0.04	0.04	0.02	0.07	0.05	0.04	0.03
2003	0.03	0.04	0.02	0.06	0.05	0.04	0.03
2004	0.03	0.04	0.02	0.05	0.04	0.04	0.03
2005	0.03	0.03	0.01	0.05	0.04	0.03	0.03
2006	0.03	0.03	0.01	0.05	0.04	0.03	0.03
2007	0.02	0.03	0.01	0.05	0.04	0.03	0.03
2008	0.02	0.03	0.01	0.05	0.04	0.03	0.03
2009	0.02	0.03	0.010	0.04	0.04	0.03	0.03
2010	0.02	0.02	0.009	0.04	0.03	0.03	0.02
2011	0.02	0.02	0.008	0.04	0.03	0.03	0.02
2012	0.02	0.02	0.007	0.04	0.03	0.03	0.02
2013	0.02	0.02	0.007	0.05	0.04	0.03	0.02
2014	0.02	0.02	0.006	0.04	0.03	0.03	0.02
2015	0.02	0.02	0.006	0.04	0.03	0.02	0.02
2016	0.02	0.02	0.006	0.04	0.03	0.03	0.02
2017	0.01	0.02	0.006	0.04	0.03	0.03	0.02
2018	0.01	0.02	0.006	0.04	0.03	0.02	0.02

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TABLE 5-37: RATIO OF MODELED EGG CONCENTRATION TO BENCHMARKS BASED ON FISHRAND FOR FEMALE TREE SWALLOW USING TEQ FOR THE PERIOD 1993 - 201

	<<< EGG CONCENTRATION >>						
	NOAEL 189	NOAEL 168	NOAEL 154	NOAEL 152	NOAEL 113	NOAEL 90	NOAEL 50
Year	Average	Average	Average	Average	Average	Average	Average
1993	0.25	0.41	0.12	0.13	0.10	0.08	0.06
1994	0.23	0.37	0.11	0.12	0.10	0.08	0.06
1995	0.21	0.33	0.10	0.11	0.09	0.07	0.05
1996	0.19	0.27	0.09	0.11	0.09	0.07	0.05
1997	0.17	0.24	0.09	0.10	0.08	0.07	0.05
1998	0.16	0.22	0.08	0.24	0.19	0.15	0.11
1999	0.15	0.21	0.08	0.11	0.09	0.07	0.05
2000	0.14	0.18	0.07	0.10	0.08	0.06	0.05
2001	0.12	0.15	0.06	0.09	0.08	0.06	0.04
2002	0.11	0.13	0.06	0.09	0.08	0.06	0.05
2003	0.10	0.12	0.05	0.09	0.07	0.06	0.04
2004	0.10	0.11	0.05	0.09	0.07	0.06	0.04
2005	0.09	0.11	0.04	0.09	0.07	0.06	0.04
2006	0.08	0.10	0.04	0.08	0.07	0.05	0.04
2007	0.08	0.09	0.04	0.08	0.06	0.05	0.04
2008	0.07	0.09	0.03	0.08	0.07	0.05	0.04
2009	0.07	0.08	0.03	0.08	0.07	0.05	0.04
2010	0.06	0.07	0.03	0.07	0.06	0.05	0.03
2011	0.05	0.07	0.03	0.07	0.06	0.05	0.03
2012	0.05	0.07	0.02	0.07	0.06	0.04	0.03
2013	0.05	0.07	0.02	0.07	0.06	0.04	0.03
2014	0.05	0.06	0.02	0.07	0.06	0.04	0.03
2015	0.05	0.06	0.02	0.07	0.05	0.04	0.03
2016	0.05	0.06	0.02	0.07	0.06	0.05	0.03
2017	0.04	0.06	0.02	0.07	0.06	0.05	0.03
2018	0.04	0.06	0.02	0.07	0.06	0.04	0.03

TABLE 5-38: RATIO OF MODELED DIETARY DOSE AND EGG CONCENTRATIONS TO BENCHMARKS BASED ON 1993 DATA FOR FEMALE MALLARD FOR TRI+ CONGENERS

	<<<< ----- Dietary Dose ---- >>>>				<<<< ---- Egg Concentration ---- >>>>			
Location	LOAEL vs. Average ADD Hazard Quotient	LOAEL vs. 95% UCL ADD Hazard Quotient	NOAEL vs. Average ADD Hazard Quotient	NOAEL vs. 95% UCL ADD Hazard Quotient	LOAEL vs. Average Conc. Hazard Quotient	LOAEL vs. 95% UCL Conc Hazard Quotient	NOAEL vs. Average Conc. Hazard Quotient	NOAEL vs. 95% UCL Conc. Hazard Quotient
Upper River								
Thompson Island Pool (189)	0.05	0.09	0.5	0.9	NA	NA	0.4	0.6
Stillwater (168)	0.1	0.2	**1.0**	**1.7**	NA	NA	0.8	**1.3**
Federal Dam (154)	0.03	0.05	0.3	0.5	NA	NA	0.2	0.3
Lower River								
143.5	0.006	0.01	0.06	0.1	NA	NA	0.03	0.04
137.2	0.009	0.02	0.09	0.2	NA	NA	0.05	0.09
122.4	0.005	0.04	0.05	0.4	NA	NA	0.02	0.06
113.8	0.004	0.03	0.04	0.3	NA	NA	0.02	0.03
100	0.003	0.04	0.03	0.4	NA	NA	0.01	0.07
88.9	0.002	0.03	0.02	0.3	NA	NA	0.005	0.01
58.7	0.003	0.03	0.03	0.3	NA	NA	0.01	0.02
47.3	0.004	0.04	0.04	0.4	NA	NA	0.02	0.1
25.8	0.002	0.03	0.02	0.3	NA	NA	0.006	0.01

Bold values indicate exceedances

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TABLE 5-39: RATIO OF MODELED DIETARY DOSE TO BENCHMARKS FOR FEMALE MALLARD BASED ON FISHRAND RESULTS FOR THE TRI+ CONGENERS

Year	LOAEL 189 Average	NOAEL 189 Average	LOAEL 168 Average	NOAEL 168 Average	LOAEL 154 Average	NOAEL 154 Average	LOAEL 152 Average	NOAEL 152 Average	LOAEL 113 Average	NOAEL 113 Average	LOAEL 90 Average	NOAEL 90 Average	LOAEL 50 Average	NOAEL 50 Average
1993	0.3	**2.6**	0.06	0.6	0.02	0.2	0.01	0.14	0.01	0.11	0.01	0.09	0.01	0.08
1994	0.2	**2.0**	0.05	0.5	0.02	0.2	0.01	0.12	0.01	0.10	0.01	0.08	0.01	0.07
1995	0.2	**2.0**	0.05	0.5	0.02	0.2	0.01	0.10	0.01	0.08	0.01	0.07	0.01	0.06
1996	0.1	**1.1**	0.04	0.4	0.01	0.1	0.01	0.13	0.01	0.09	0.01	0.07	0.01	0.06
1997	0.1	**1.1**	0.03	0.3	0.01	0.1	0.01	0.11	0.01	0.08	0.01	0.06	0.01	0.05
1998	0.2	**1.5**	0.03	0.3	0.01	0.1	0.02	0.20	0.02	0.16	0.01	0.13	0.01	0.12
1999	0.1	**1.3**	0.03	0.3	0.01	0.1	0.01	0.08	0.01	0.07	0.01	0.06	0.01	0.05
2000	0.09	0.9	0.03	0.3	0.01	0.1	0.01	0.08	0.01	0.06	0.01	0.05	0.00	0.04
2001	0.07	0.7	0.02	0.2	0.009	0.09	0.01	0.09	0.01	0.06	0.00	0.05	0.00	0.04
2002	0.09	0.9	0.02	0.2	0.008	0.08	0.01	0.08	0.01	0.06	0.00	0.05	0.00	0.04
2003	0.1	**1.1**	0.02	0.2	0.008	0.08	0.01	0.07	0.01	0.06	0.00	0.05	0.00	0.04
2004	0.1	**1.4**	0.02	0.2	0.007	0.07	0.01	0.06	0.01	0.05	0.00	0.04	0.00	0.04
2005	0.09	0.9	0.02	0.2	0.007	0.07	0.01	0.06	0.00	0.05	0.00	0.04	0.00	0.03
2006	0.09	0.9	0.01	0.1	0.006	0.06	0.01	0.06	0.00	0.05	0.00	0.04	0.00	0.03
2007	0.09	0.9	0.01	0.1	0.006	0.06	0.01	0.06	0.00	0.05	0.00	0.04	0.00	0.03
2008	0.1	**1.2**	0.01	0.1	0.005	0.05	0.01	0.06	0.00	0.05	0.00	0.04'	0.00	0.03
2009	0.1	**1.3**	0.01	0.1	0.005	0.05	0.01	0.05	0.00	0.04	0.00	0.04	0.00	0.03
2010	0.08	0.8	0.01	0.1	0.004	0.04	0.01	0.05	0.00	0.04	0.00	0.03	0.00	0.03
2011	0.08	0.8	0.01	0.1	0.004	0.04	0.00	0.05	0.00	0.04	0.00	0.03	0.00	0.03
2012	0.06	0.6	0.01	0.1	0.004	0.04	0.01	0.05	0.00	0.04	0.00	0.03	0.00	0.03
2013	0.05	0.5	0.01	0.1	0.003	0.03	0.01	0.06	0.00	0.04	0.00	0.03	0.00	0.03
2014	0.06	0.6	0.009	0.09	0.003	0.03	0.01	0.05	0.00	0.04	0.00	0.03	0.00	0.03
2015	0.06	0.6	0.009	0.09	0.003	0.03	0.00	0.05	0.00	0.04	0.00	0.03	0.00	0.02
2016	0.09	0.9	0.009	0.09	0.003	0.03	0.00	0.05	0.00	0.04	0.00	0.03	0.00	0.03
2017	0.1	**1.0**	0.009	0.09	0.003	0.03	0.00	0.05	0.00	0.04	0.00	0.03	0.00	0.03
2018	0.1	**1.0**	0.009	0.09	0.003	0.03	0.00	0.05	0.00	0.04	0.00	0.03	0.00	0.02

Bold values indicate exceedances

TABLE 5-40: RATIO OF EGG CONCENTRATIONS TO BENCHMARKS FOR FEMALE MALLARD BASED ON FISHRAND RESULTS FOR THE TRI+ CONGENERS

Year	LOAEL 189 Average	NOAEL 189 Average	LOAEL 168 Average	NOAEL 168 Average	LOAEL 154 Average	NOAEL 154 Average	LOAEL 152 Average	NOAEL 152 Average	LOAEL 113 Average	NOAEL 113 Average	LOAEL 90 Average	NOAEL 90 Average	LOAEL 50 Average	NOAEL 50 Average
1993	NA	0.2	NA	0.4	NA	0.1	NA	0.00	NA	0.00	NA	0.00	NA	0.00
1994	NA	0.2	NA	0.4	NA	0.1	NA	0.00	NA	0.00	NA	0.00	NA	0.00
1995	NA	0.2	NA	0.3	NA	0.1	NA	0.00	NA	0.00	NA	0.00	NA	0.00
1996	NA	0.2	NA	0.3	NA	0.09	NA	0.00	NA	0.00	NA	0.00	NA	0.00
1997	NA	0.2	NA	0.2	NA	0.09	NA	0.00	NA	0.00	NA	0.00	NA	0.00
1998	NA	0.2	NA	0.2	NA	0.08	NA	0.00	NA	0.00	NA	0.00	NA	0.00
1999	NA	0.1	NA	0.2	NA	0.08	NA	0.00	NA	0.00	NA	0.00	NA	0.00
2000	NA	0.1	NA	0.2	NA	0.07	NA	0.00	NA	0.00	NA	0.00	NA	0.00
2001	NA	0.1	NA	0.1	NA	0.06	NA	0.00	NA	0.00	NA	0.00	NA	0.00
2002	NA	0.1	NA	0.1	NA	0.05	NA	0.00	NA	0.00	NA	0.00	NA	0.00
2003	NA	0.1	NA	0.1	NA	0.05	NA	0.00	NA	0.00	NA	0.00	NA	0.00
2004	NA	0.1	NA	0.1	NA	0.05	NA	0.00	NA	0.00	NA	0.00	NA	0.00
2005	NA	0.09	NA	0.1	NA	0.04	NA	0.00	NA	0.00	NA	0.00	NA	0.00
2006	NA	0.08	NA	0.10	NA	0.04	NA	0.00	NA	0.00	NA	0.00	NA	0.00
2007	NA	0.08	NA	0.09	NA	0.04	NA	0.00	NA	0.00	NA	0.00	NA	0.00
2008	NA	0.07	NA	0.09	NA	0.03	NA	0.00	NA	0.00	NA	0.00	NA	0.00
2009	NA	0.07	NA	0.08	NA	0.03	NA	0.00	NA	0.00	NA	0.00	NA	0.00
2010	NA	0.06	NA	0.07	NA	0.03	NA	0.00	NA	0.00	NA	0.00	NA	0.00
2011	NA	0.05	NA	0.07	NA	0.03	NA	0.00	NA	0.00	NA	0.00	NA	0.00
2012	NA	0.05	NA	0.07	NA	0.02	NA	0.00	NA	0.00	NA	0.00	NA	0.00
2013	NA	0.05	NA	0.07	NA	0.02	NA	0.00	NA	0.00	NA	0.00	NA	0.00
2014	NA	0.05	NA	0.06	NA	0.02	NA	0.00	NA	0.00	NA	0.00	NA	0.00
2015	NA	0.05	NA	0.06	NA	0.02	NA	0.00	NA	0.00	NA	0.00	NA	0.00
2016	NA	0.05	NA	0.06	NA	0.02	NA	0.00	NA	0.00	NA	0.00	NA	0.00
2017	NA	0.04	NA	0.06	NA	0.02	NA	0.00	NA	0.00	NA	0.00	NA	0.00
2018	NA	0.04	NA	0.06	NA	0.02	NA	0.00	NA	0.00	NA	0.00	NA	0.00

Bold values indicate exceedances

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TABLE 5-41: RATIO OF MODELED DIETARY DOSE AND EGG CONCENTRATIONS TO BENCHMARKS FOR FEMALE MALLARD BASED ON 1993 DATA ON A TEQ BASIS

	<<< ---- Dietary Dose ----->>>>>>>				<<<< ---- Egg Concentration ---- >>>>			
Location	LOAEL vs. Average ADD Hazard Quotient	LOAEL vs. 95% UCL ADD Hazard Quotient	NOAEL vs. Average ADD Hazard Quotient	NOAEL vs. 95% UCL ADD Hazard Quotient	LOAEL vs. Average Conc. Hazard Quotient	LOAEL vs. 95% UCL Conc Hazard Quotient	NOAEL vs. Average Conc. Hazard Quotient	NOAEL vs. 95% UCL Conc. Hazard Quotient
Upper River								
Thompson Island Pool (189)	**93**	**345**	**933**	**3450**	NA	NA	**4.2**	**6.6**
Stillwater (168)	**156**	**397**	**1556**	**3973**	NA	NA	**7.9**	**14**
Federal Dam (154)	**135**	**279**	**1353**	**2795**	NA	NA	**1.9**	**3.3**
Lower River								
143.5	**9.2**	**26**	**92**	**256**	NA	NA	0.7	**1.2**
137.2	**10**	**28**	**105**	**281**	NA	NA	**1.3**	**2.3**
122.4	**5.9**	**74**	**59**	**741**	NA	NA	0.6	**1.6**
113.8	**5.8**	**73**	**58**	**731**	NA	NA	0.5	0.9
100	**5.2**	**77**	**52**	**766**	NA	NA	0.3	**2.0**
88.9	**3.8**	**67**	**38**	**666**	NA	NA	0.1	0.3
58.7	**4.1**	**67**	**41**	**674**	NA	NA	0.4	0.7
47.3	**4.6**	**74**	**46**	**737**	NA	NA	0.5	**3.8**
25.8	**3.8**	**66**	**38**	**664**	NA	NA	0.2	0.3

Bold values indicate exceedances

TABLE 5-42: RATIO OF MODELED DIETARY DOSE TO BENCHMARKS FOR FEMALE MALLARD FOR PERIOD 1993 - 2018 ON A TEQ BASIS

Year	LOAEL 189 Average	NOAEL 189 Average	LOAEL 168 Average	NOAEL 168 Average	LOAEL 154 Average	NOAEL 154 Average	LOAEL 152 Average	NOAEL 152 Average	LOAEL 113 Average	NOAEL 113 Average	LOAEL 90 Average	NOAEL 90 Average	LOAEL 50 Average	NOAEL 50 Average
1993	**66**	**659**	**12**	**117**	**3.9**	**39**	**16**	**163**	**13**	**130**	**11**	**107**	**16**	**160**
1994	**52**	**515**	**11**	**107**	**3.6**	**36**	**14**	**139**	**11**	**114**	**9.3**	**93**	**14**	**136**
1995	**50**	**500**	**9.2**	**92**	**3.1**	**31**	**11**	**109**	**9.0**	**90**	**8.4**	**84**	**10**	**105**
1996	**29**	**292**	**7.6**	**76**	**2.7**	**27**	**15**	**153**	**10**	**98**	**7.7**	**77**	**15**	**151**
1997	**28**	**279**	**6.8**	**68**	**2.5**	**25**	**12**	**120**	**8.8**	**88**	**6.8**	**68**	**12**	**116**
1998	**38**	**385**	**6.6**	**66**	**2.7**	**27**	**21**	**206**	**16**	**165**	**14**	**144**	**19**	**195**
1999	**34**	**340**	**6.1**	**61**	**2.4**	**24**	**8.2**	**82**	**6.7**	**67**	**6.3**	**63**	**7.7**	**77**
2000	**24**	**239**	**5.1**	**51**	**2.0**	**20**	**8.6**	**86**	**6.1**	**61**	**5.2**	**52**	**8.2**	**82**
2001	**20**	**197**	**4.1**	**41**	**1.7**	**17**	**9.2**	**92**	**6.2**	**62**	**4.7**	**47**	**8.8**	**88**
2002	**23**	**234**	**3.7**	**37**	**1.6**	**16**	**7.9**	**79**	**5.9**	**59**	**4.7**	**47**	**7.5**	**75**
2003	**28**	**279**	**3.5**	**35**	**1.6**	**16**	**6.7**	**67**	**5.4**	**54**	**4.4**	**44**	**6.2**	**62**
2004	**33**	**331**	**3.4**	**34**	**1.4**	**14**	**5.6**	**56**	**4.6**	**46**	**4.3**	**43**	**5.0**	**50**
2005	**23**	**229**	**3.2**	**32**	**1.3**	**13**	**5.5**	**55**	**4.3**	**43**	**3.9**	**39**	**5.0**	**50**
2006	**22**	**219**	**2.8**	**28**	**1.2**	**12**	**5.7**	**57**	**4.3**	**43**	**3.5**	**35**	**5.2**	**52**
2007	**21**	**213**	**2.6**	**26**	**1.1**	**11**	**5.0**	**50**	**4.1**	**41**	**3.3**	**33**	**4.4**	**44**
2008	**30**	**298**	**2.6**	**26**	**1.1**	**11**	**5.1**	**51**	**4.1**	**41**	**3.5**	**35**	**4.6**	**46**
2009	**30**	**301**	**2.6**	**26**	**1.0**	**10**	**4.2**	**42**	**3.7**	**37**	**3.3**	**33**	**3.5**	**35**
2010	**19**	**194**	**2.2**	**22**	0.8	**8.5**	**4.8**	**48**	**3.5**	**35**	**2.8**	**28**	**4.3**	**43**
2011	**19**	**190**	**2.0**	**20**	0.8	**7.9**	**4.3**	**43**	**3.7**	**37**	**2.8**	**28**	**3.9**	**39**
2012	**15**	**147**	**2.0**	**20**	0.7	**7.4**	**4.6**	**46**	**3.7**	**37**	**2.8**	**28**	**4.2**	**42**
2013	**12**	**123**	**1.9**	**19**	0.6	**6.3**	**5.5**	**55**	**3.8**	**38**	**2.7**	**27**	**5.1**	**51**
2014	**15**	**150**	**1.9**	**19**	0.6	**6.4**	**4.6**	**46**	**3.6**	**36**	**2.7**	**27**	**4.2**	**42**
2015	**15**	**148**	**1.9**	**19**	0.6	**6.2**	**4.4**	**44**	**3.4**	**34**	**2.6**	**26**	**4.0**	**40**
2016	**22**	**219**	**1.9**	**19**	0.6	**6.2**	**3.9**	**39**	**3.2**	**32**	**2.8**	**28**	**3.3**	**33**
2017	**23**	**233**	**1.9**	**18.8**	0.6	**6.3**	**3.7**	**37**	**2.9**	**29**	**2.8**	**28**	**3.1**	**31**
2018	**24**	**238**	**1.9**	**18.6**	0.6	**6.3**	**3.9**	**39**	**2.9**	**29**	**2.5**	**25**	**3.4**	**34**

Bold values indicate exceedances

306499

306500

TABLE 5-43: RATIO OF MODELED EGG CONCENTRATION TO BENCHMARKS FOR FEMALE MALLARD FOR PERIOD 1993 - 2018 ON A TEQ BASIS

Year	LOAEL 189 Average	NOAEL 189 Average	LOAEL 168 Average	NOAEL 168 Average	LOAEL 154 Average	NOAEL 154 Average	LOAEL 152 Average	NOAEL 152 Average	LOAEL 113 Average	NOAEL 113 Average	LOAEL 90 Average	NOAEL 90 Average	LOAEL 50 Average	NOAEL 50 Average
1993	NA	**2.6**	NA	**4.3**	NA	**1.3**	NA	**1.37**	NA	**1.08**	NA	0.88	NA	0.65
1994	NA	**2.4**	NA	**3.8**	NA	**1.2**	NA	**1.21**	NA	**1.00**	NA	0.82	NA	0.60
1995	NA	**2.1**	NA	**3.4**	NA	**1.1**	NA	**1.17**	NA	0.96	NA	0.77	NA	0.57
1996	NA	**1.9**	NA	**2.9**	NA	**1.0**	NA	**1.17**	NA	0.94	NA	0.75	NA	0.56
1997	NA	**1.8**	NA	**2.5**	NA	0.9	NA	**1.09**	NA	0.88	NA	0.71	NA	0.53
1998	NA	**1.7**	NA	**2.3**	NA	0.9	NA	**2.45**	NA	**2.01**	NA	**1.59**	NA	**1.17**
1999	NA	**1.6**	NA	**2.2**	NA	0.8	NA	**1.11**	NA	0.93	NA	0.73	NA	0.54
2000	NA	**1.4**	NA	**1.9**	NA	0.7	NA	**1.03**	NA	0.82	NA	0.66	NA	0.49
2001	NA	**1.3**	NA	**1.6**	NA	0.6	NA	0.97	NA	0.78	NA	0.61	NA	0.45
2002	NA	**1.2**	NA	**1.3**	NA	0.6	NA	0.97	NA	0.80	NA	0.63	NA	0.47
2003	NA	**1.1**	NA	**1.2**	NA	0.5	NA	0.90	NA	0.75	NA	0.61	NA	0.45
2004	NA	**1.0**	NA	**1.2**	NA	0.5	NA	0.93	NA	0.76	NA	0.60	NA	0.45
2005	NA	0.9	NA	**1.1**	NA	0.5	NA	0.89	NA	0.74	NA	0.57	NA	0.42
2006	NA	0.9	NA	**1.0**	NA	0.4	NA	0.84	NA	0.70	NA	0.53	NA	0.40
2007	NA	0.8	NA	0.9	NA	0.4	NA	0.81	NA	0.68	NA	0.51	NA	0.38
2008	NA	0.7	NA	0.9	NA	0.4	NA	0.87	NA	0.72	NA	0.55	NA	0.41
2009	NA	0.7	NA	0.9	NA	0.3	NA	0.86	NA	0.71	NA	0.55	NA	0.41
2010	NA	0.6	NA	0.8	NA	0.3	NA	0.75	NA	0.61	NA	0.47	NA	0.35
2011	NA	0.6	NA	0.7	NA	0.3	NA	0.74	NA	0.63	NA	0.47	NA	0.36
2012	NA	0.5	NA	0.7	NA	0.2	NA	0.72	NA	0.61	NA	0.46	NA	0.35
2013	NA	0.6	NA	0.7	NA	0.2	NA	0.71	NA	0.60	NA	0.45	NA	0.34
2014	NA	0.6	NA	0.7	NA	0.2	NA	0.72	NA	0.60	NA	0.45	NA	0.34
2015	NA	0.5	NA	0.6	NA	0.2	NA	0.69	NA	0.57	NA	0.43'	NA	0.33
2016	NA	0.5	NA	0.6	NA	0.2	NA	0.77	NA	0.61	NA	0.47	NA	0.35
2017	NA	0.5	NA	0.6	NA	0.2	NA	0.77	NA	0.62	NA	0.47	NA	0.35
2018	NA	0.4	NA	0.6	NA	0.2	NA	0.71	NA	0.58	NA	0.44	NA	0.32

Bold values indicate exceedances

TABLE 5-44: RATIO OF MODELED DIETARY DOSE AND EGG CONCENTRATIONS TO BENCHMARKS BASED ON 1993 DATA FOR FEMALE BELTED KINGFISHER FOR TRI+ CONGENERS

	<<<< ----- Dietary Dose ---- >>>>				<<<< ---- Egg Concentration ---- >>>>			
Location	LOAEL vs. Average ADD Hazard Quotient	LOAEL vs. 95% UCL ADD Hazard Quotient	NOAEL vs. Average ADD Hazard Quotient	NOAEL vs. 95% UCL ADD Hazard Quotient	LOAEL vs. Average Conc. Hazard Quotient	LOAEL vs. 95% UCL Conc Hazard Quotient	NOAEL vs. Average Conc. Hazard Quotient	NOAEL vs. 95% UCL Conc. Hazard Quotient
Upper River								
Thompson Island Pool (189)	**1.1**	**2.1**	**4.2**	**8.4**	**75**	**150**	**122**	**243**
Stillwater (168)	0.6	**1.8**	**2.3**	**6.9**	**42**	**124**	**67**	**201**
Federal Dam (154)	0.1	0.2	0.5	0.9	**9.8**	**15**	**16**	**25**
Lower River								
143.5	0.09	0.1	0.4	0.5	**6.5**	**8.7**	**11**	**14**
137.2	0.2	0.4	0.7	**1.7**	**13**	**31**	**21**	**50**
122.4	0.07	0.1	0.3	0.5	**5.3**	**9.2**	**8.5**	**15**
113.8	0.08	0.1	0.3	0.4	**5.5**	**7.8**	**8.9**	**13**
100	0.03	0.08	0.1	0.3	**2.4**	**5.9**	**3.9**	**9.5**
88.9	0.06	0.08	0.2	0.3	**4.3**	**5.9**	**6.9**	**9.6**
58.7	0.07	0.1	0.3	0.6	**5.0**	**9.9**	**8.1**	**16**
47.3	0.06	0.1	0.3	0.5	**4.6**	**9.7**	**7.4**	**16**
25.8	0.04	0.06	0.2	0.2	**3.2**	**3.9**	**5.1**	**6.3**

Bold values indicate exceedances

306502

TABLE 5-45: RATIO OF MODELED DIETARY DOSE AND EGG CONCENTRATIONS TO BENCHMARKS BASED ON 1993 DATA FOR FEMALE GREAT BLUE HERON FOR TRI+ CONGENERS

	<<<< ---- Dietary Dose ---- >>>>				<<<< ---- Egg Concentration ---- >>>>			
Location	LOAEL vs. Average ADD Hazard Quotient	LOAEL vs. 95% UCL ADD Hazard Quotient	NOAEL vs. Average ADD Hazard Quotient	NOAEL vs. 95% UCL ADD Hazard Quotient	LOAEL vs. Average Conc. Hazard Quotient	LOAEL vs. 95% UCL Conc Hazard Quotient	NOAEL vs. Average Conc. Hazard Quotient	NOAEL vs. 95% UCL Conc. Hazard Quotient
Upper River								
Thompson Island Pool (189)	0.5	0.9	**1.8**	**3.7**	**22**	**45**	**83**	**170**
Stillwater (168)	0.2	0.3	0.6	**1.0**	**7.4**	**11**	**28**	**40**
Federal Dam (154)	0.04	0.06	0.1	0.2	**1.7**	**2.5**	**6.6**	**10**
Lower River								
143.5	0.04	0.05	0.2	0.2	**2.0**	**2.4**	**7.7**	**9.2**
137.2	0.09	0.2	0.3	0.7	**4.1**	**8.9**	**16**	**34**
122.4	0.03	0.05	0.1	0.2	**1.6**	**2.5**	**5.9**	**10**
113.8	0.03	0.04	0.1	0.1	**1.6**	**1.7**	**6.2**	**6.4**
100	0.01	0.03	0.06	0.1	0.7	**1.2**	**2.7**	**4.6**
88.9	0.03	0.04	0.1	0.2	**1.4**	**1.9**	**5.4**	**7.3**
58.7	0.03	0.04	0.1	0.1	**1.5**	**1.7**	**5.8**	**6.6**
47.3	0.03	0.04	0.1	0.2	**1.4**	**1.8**	**5.2**	**6.9**
25.8	0.02	0.03	0.08	0.1	**1.0**	**1.2**	**3.9**	**4.7**

Bold values indicate exceedances

TABLE 5-46: RATIO OF MODELED DIETARY DOSE AND EGG CONCENTRATIONS TO BENCHMARKS BASED ON 1993 DATA FOR FEMALE BALD EAGLE FOR TRI+ CONGENERS

	<<<< ----- Dietary Dose ---- >>>>				<<<< ---- Egg Concentration ---- >>>>			
Location	LOAEL vs. Average ADD Hazard Quotient	LOAEL vs. 95% UCL ADD Hazard Quotient	NOAEL vs. Average ADD Hazard Quotient	NOAEL vs. 95% UCL ADD Hazard Quotient	LOAEL vs. Average Conc. Hazard Quotient	LOAEL vs. 95% UCL Conc Hazard Quotient	NOAEL vs. Average Conc. Hazard Quotient	NOAEL vs. 95% UCL Conc. Hazard Quotient
Upper River								
Thompson Island Pool (189)	**1.7**	**3.3**	**7**	**13**	**304**	**589**	**481**	**931**
Stillwater (168)	0.3	0.4	**1.2**	**1.5**	**54**	**70**	**85**	**110**
Federal Dam (154)	0.2	0.4	0.9	**1.5**	**39**	**70**	**62**	**111**
Lower River								
143.5	0.2	0.4	0.9	**1.5**	**39**	**70**	**62**	**111**
137.2	0.8	**2.0**	**3.3**	**7.7**	**148**	**352**	**234**	**557**
122.4	0.2	0.3	0.8	**1.0**	**34**	**47**	**55**	**75**
113.8	0.2	0.2	0.7	**1.0**	**31**	**44**	**49**	**69**
100	0.2	0.6	0.8	**2.4**	**36**	**111**	**57**	**175**
88.9	0.1	0.2	0.5	**1.0**	**23**	**44**	**36**	**69**
58.7	0.1	0.2	0.6	0.9	**27**	**40**	**42**	**63**
47.3	0.2	0.5	0.7	**1.8**	**31**	**83**	**48**	**131**
25.8	0.1	0.2	0.5	0.9	**22**	**43**	**34**	**68**

Bold values indicate exceedances

306503

306504

TABLE 5-47: RATIO OF MODELED DIETARY DOSE TO BENCHMARKS BASED ON FISHRAND FOR FEMALE BELTED KINGFISHER BASED ON THE SUM OF TRI+ CONGENERS FOR THE PERIOD 1993 - 2018

Year	LOAEL 189 Average	NOAEL 189 Average	LOAEL 168 Average	NOAEL 168 Average	LOAEL 154 Average	NOAEL 154 Average	LOAEL 152 Average	NOAEL 152 Average	LOAEL 113 Average	NOAEL 113 Average	LOAEL 90 Average	NOAEL 90 Average	LOAEL 50 Average	NOAEL 50 Average
1993	0.7	**2.9**	0.3	**1.2**	0.1	0.4	0.1	0.4	0.1	0.3	0.1	0.2	0.0	0.2
1994	0.7	**2.7**	0.3	**1.1**	0.1	0.4	0.1	0.3	0.1	0.2	0.0	0.2	0.0	0.2
1995	0.6	**2.4**	0.2	**1.0**	0.1	0.3	0.1	0.3	0.1	0.2	0.0	0.2	0.0	0.2
1996	0.4	**1.8**	0.2	0.8	0.1	0.3	0.1	0.3	0.1	0.2	0.0	0.2	0.0	0.1
1997	0.4	**1.4**	0.2	0.7	0.1	0.3	0.1	0.3	0.0	0.2	0.0	0.1	0.0	0.1
1998	0.4	**1.6**	0.2	0.7	0.1	0.3	0.1	0.5	0.1	0.4	0.1	0.3	0.1	0.3
1999	0.4	**1.4**	0.2	0.6	0.1	0.2	0.1	0.2	0.0	0.2	0.0	0.1	0.0	0.1
2000	0.3	**1.1**	0.1	0.5	0.1	0.2	0.0	0.2	0.0	0.1	0.0	0.1	0.0	0.1
2001	0.2	0.9	0.1	0.4	0.0	0.2	0.0	0.2	0.0	0.1	0.0	0.1	0.0	0.1
2002	0.3	**1.0**	0.1	0.4	0.0	0.2	0.0	0.2	0.0	0.1	0.0	0.1	0.0	0.1
2003	0.3	**1.0**	0.1	0.4	0.0	0.2	0.0	0.2	0.0	0.1	0.0	0.1	0.0	0.1
2004	0.3	**1.2**	0.1	0.4	0.0	0.2	0.0	0.2	0.0	0.1	0.0	0.1	0.0	0.1
2005	0.2	**1.0**	0.1	0.3	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.1
2006	0.2	0.8	0.1	0.3	0.0	0.1	0.0	0.2	0.0	0.1	0.0	0.1	0.0	0.1
2007	0.2	0.8	0.1	0.3	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.1
2008	0.2	**1.0**	0.1	0.3	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.1
2009	0.3	**1.0**	0.1	0.3	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.1
2010	0.2	0.7	0.1	0.2	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.1
2011	0.2	0.7	0.1	0.2	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.1
2012	0.2	0.6	0.1	0.2	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.1
2013	0.1	0.6	0.1	0.2	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.1
2014	0.2	0.6	0.0	0.2	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.1
2015	0.1	0.6	0.0	0.2	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.1
2016	0.2	0.7	0.0	0.2	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.1
2017	0.2	0.7	0.0	0.2	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.1
2018	0.2	0.8	0.0	0.2	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.1

Bold values indicate exceedances

TABLE 5-48: RATIO OF MODELED DIETARY DOSE TO BENCHMARKS BASED ON FISHRAND FOR FEMALE GREAT BLUE HERON BASED ON THE SUM OF TRI+ CONGENERS FOR THE PERIOD 1993 - 2018

Year	LOAEL 189 Average	NOAEL 189 Average	LOAEL 168 Average	NOAEL 168 Average	LOAEL 154 Average	NOAEL 154 Average	LOAEL 152 Average	NOAEL 152 Average	LOAEL 113 Average	NOAEL 113 Average	LOAEL 90 Average	NOAEL 90 Average	LOAEL 50 Average	NOAEL 50 Average
1993	0.3	**1.3**	0.1	0.3	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.1
1994	0.3	**1.1**	0.06	0.25	0.02	0.09	0.03	0.11	0.02	0.09	0.02	0.07	0.02	0.07
1995	0.3	**1.0**	0.05	0.21	0.02	0.08	0.02	0.10	0.02	0.07	0.02	0.06	0.01	0.06
1996	0.2	0.7	0.04	0.17	0.02	0.07	0.03	0.12	0.02	0.08	0.01	0.06	0.01	0.05
1997	0.1	0.5	0.04	0.14	0.01	0.06	0.02	0.10	0.02	0.07	0.01	0.05	0.01	0.05
1998	0.2	0.7	0.04	0.15	0.02	0.07	0.04	0.17	0.03	0.13	0.03	0.11	0.03	0.11
1999	0.1	0.6	0.04	0.14	0.01	0.06	0.02	0.07	0.01	0.06	0.01	0.05	0.01	0.04
2000	0.1	0.4	0.03	0.12	0.01	0.05	0.02	0.06	0.01	0.05	0.01	0.04	0.01	0.04
2001	0.1	0.4	0.02	0.10	0.01	0.04	0.02	0.07	0.01	0.05	0.01	0.04	0.01	0.03
2002	0.1	0.4	0.02	0.09	0.01	0.04	0.02	0.06	0.01	0.05	0.01	0.04	0.01	0.03
2003	0.1	0.4	0.02	0.08	0.01	0.04	0.01	0.06	0.01	0.04	0.01	0.03	0.01	0.03
2004	0.1	0.5	0.02	0.08	0.01	0.04	0.01	0.05	0.01	0.04	0.01	0.03	0.01	0.03
2005	0.1	0.4	0.02	0.07	0.01	0.03	0.01	0.04	0.01	0.04	0.01	0.03	0.01	0.03
2006	0.1	0.4	0.02	0.07	0.01	0.03	0.01	0.05	0.01	0.04	0.01	0.03	0.01	0.03
2007	0.1	0.3	0.02	0.06	0.01	0.03	0.01	0.04	0.01	0.03	0.01	0.03	0.01	0.02
2008	0.1	0.4	0.02	0.06	0.01	0.03	0.01	0.04	0.01	0.04	0.01	0.03	0.01	0.03
2009	0.1	0.5	0.02	0.06	0.01	0.02	0.01	0.04	0.01	0.03	0.01	0.03	0.01	0.02
2010	0.1	0.3	0.01	0.05	0.01	0.02	0.01	0.04	0.01	0.03	0.01	0.02	0.01	0.02
2011	0.1	0.3	0.01	0.05	0.00	0.02	0.01	0.04	0.01	0.03	0.01	0.02	0.01	0.02
2012	0.1	0.3	0.01	0.05	0.00	0.02	0.01	0.04	0.01	0.03	0.01	0.02	0.01	0.02
2013	0.1	0.3	0.01	0.05	0.00	0.02	0.01	0.04	0.01	0.03	0.01	0.02	0.01	0.02
2014	0.1	0.3	0.01	0.04	0.00	0.02	0.01	0.04	0.01	0.03	0.01	0.02	0.01	0.02
2015	0.1	0.2	0.01	0.04	0.00	0.01	0.01	0.04	0.01	0.03	0.01	0.02	0.00	0.02
2016	0.1	0.3	0.01	0.04	0.00	0.02	0.01	0.03	0.01	0.03	0.01	0.02	0.01	0.02
2017	0.1	0.3	0.01	0.04	0.00	0.01	0.01	0.03	0.01	0.03	0.01	0.02	0.01	0.02
2018	0.1	0.4	0.01	0.04	0.00	0.02	0.01	0.03	0.01	0.02	0.01	0.02	0.00	0.02

Bold values indicate exceedances

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TABLE 5-49: RATIO OF MODELED DIETARY DOSE TO BENCHMARKS BASED ON FISHRAND FOR FEMALE BALD EAGLE BASED ON THE SUM OF TRI+ CONGENERS FOR THE PERIOD 1993 - 2018

Year	LOAEL 189 Average	NOAEL 189 Average	LOAEL 168 Average	NOAEL 168 Average	LOAEL 154 Average	NOAEL 154 Average	LOAEL 152 Average	NOAEL 152 Average	LOAEL 113 Average	NOAEL 113 Average	LOAEL 90 Average	NOAEL 90 Average	LOAEL 50 Average	NOAEL 50 Average
1993	0.8	**3.1**	0.2	0.9	0.1	0.4	0.3	**1.1**	0.2	0.7	0.0	0.2	0.0	0.2
1994	0.5	**2.1**	0.2	0.8	0.1	0.3	0.2	0.8	0.2	0.6	0.0	0.1	0.0	0.1
1995	0.6	**2.4**	0.2	0.7	0.1	0.3	0.2	0.7	0.1	0.5	0.0	0.1	0.0	0.1
1996	0.4	**1.5**	0.1	0.6	0.1	0.2	0.2	0.8	0.1	0.5	0.0	0.1	0.0	0.1
1997	0.4	**1.5**	0.1	0.5	0.1	0.2	0.2	0.7	0.1	0.5	0.0	0.1	0.0	0.1
1998	0.3	**1.2**	0.1	0.5	0.1	0.2	0.3	**1.3**	0.3	**1.0**	0.1	0.2	0.1	0.2
1999	0.3	**1.1**	0.1	0.5	0.1	0.2	0.1	0.5	0.1	0.4	0.0	0.1	0.0	0.1
2000	0.2	0.9	0.1	0.4	0.0	0.2	0.1	0.5	0.1	0.3	0.0	0.1	0.0	0.1
2001	0.2	0.8	0.1	0.3	0.0	0.2	0.1	0.5	0.1	0.3	0.0	0.1	0.0	0.1
2002	0.2	0.8	0.1	0.3	0.0	0.2	0.1	0.5	0.1	0.4	0.0	0.1	0.0	0.1
2003	0.2	0.7	0.1	0.3	0.0	0.1	0.1	0.4	0.1	0.3	0.0	0.1	0.0	0.1
2004	0.2	0.9	0.1	0.3	0.0	0.1	0.1	0.4	0.1	0.3	0.0	0.1	0.0	0.1
2005	0.2	0.8	0.1	0.3	0.0	0.1	0.1	0.3	0.1	0.3	0.0	0.1	0.0	0.1
2006	0.2	0.6	0.1	0.2	0.0	0.1	0.1	0.4	0.1	0.3	0.0	0.1	0.0	0.1
2007	0.2	0.8	0.1	0.2	0.0	0.1	0.1	0.3	0.1	0.3	0.0	0.1	0.0	0.1
2008	0.2	0.8	0.1	0.2	0.0	0.1	0.1	0.3	0.1	0.3	0.0	0.1	0.0	0.1
2009	0.2	0.8	0.1	0.2	0.0	0.1	0.1	0.3	0.1	0.2	0.0	0.1	0.0	0.1
2010	0.2	0.7	0.0	0.2	0.0	0.1	0.1	0.3	0.1	0.2	0.0	0.1	0.0	0.0
2011	0.1	0.6	0.0	0.2	0.0	0.1	0.1	0.3	0.1	0.2	0.0	0.1	0.0	0.0
2012	0.1	0.6	0.0	0.2	0.0	0.1	0.1	0.3	0.1	0.2	0.0	0.1	0.0	0.0
2013	0.1	0.5	0.0	0.2	0.0	0.1	0.1	0.3	0.1	0.2	0.0	0.1	0.0	0.0
2014	0.1	0.5	0.0	0.1	0.0	0.1	0.1	0.3	0.1	0.2	0.0	0.1	0.0	0.0
2015	0.1	0.5	0.0	0.1	0.0	0.1	0.1	0.3	0.1	0.2	0.0	0.0	0.0	0.0
2016	0.1	0.6	0.0	0.2	0.0	0.1	0.1	0.3	0.1	0.2	0.0	0.1	0.0	0.0
2017	0.2	0.6	0.0	0.2	0.0	0.1	0.1	0.3	0.1	0.2	0.0	0.1	0.0	0.0
2018	0.1	0.6	0.0	0.2	0.0	0.1	0.1	0.2	0.0	0.2	0.0	0.0	0.0	0.0

Bold values indicate exceedances

TABLE 5-50: RATIO OF MODELED EGG CONCENTRATIONS TO BENCHMARKS FOR FEMALE KINGFISHER BASED ON THE SUM OF TRI+ CONGENERS FOR THE PERIOD 1993 - 2018

Year	LOAEL 189 Average	NOAEL 189 Average	LOAEL 168 Average	NOAEL 168 Average	LOAEL 154 Average	NOAEL 154 Average	LOAEL 152 Average	NOAEL 152 Average	LOAEL 113 Average	NOAEL 113 Average	LOAEL 90 Average	NOAEL 90 Average	LOAEL 50 Average	NOAEL 50 Average
1993	**52**	**84**	**21**	**35**	**7.1**	**11**	**6.7**	**11**	**4.7**	**7.6**	**3.8**	**6.1**	**3.3**	**5.4**
1994	**47**	**76**	**20**	**32**	**6.5**	**10**	**5.1**	**8.3**	**4.2**	**6.8**	**3.4**	**5.5**	**3.0**	**4.8**
1995	**43**	**69**	**17**	**28**	**5.8**	**9.4**	**4.7**	**7.6**	**3.6**	**5.8**	**3.0**	**4.9**	**2.7**	**4.3**
1996	**31**	**50**	**14**	**23**	**5.1**	**8.2**	**5.4**	**8.8**	**3.7**	**6.0**	**2.9**	**4.7**	**2.5**	**4.1**
1997	**24**	**39**	**12**	**20**	**4.6**	**7.4**	**4.6**	**7.5**	**3.4**	**5.5**	**2.7**	**4.3**	**2.3**	**3.7**
1998	**28**	**45**	**12**	**20**	**4.9**	**7.9**	**8.7**	**14.0**	**7.0**	**11.2**	**5.8**	**9.4**	**5.0**	**8.2**
1999	**25**	**40**	**11**	**18**	**4.4**	**7.1**	**3.7**	**6.0**	**3.0**	**4.9**	**2.5**	**4.0**	**2.2**	**3.5**
2000	**19**	**31**	**9.5**	**15**	**3.9**	**6.3**	**3.4**	**5.5**	**2.6**	**4.2**	**2.2**	**3.5**	**1.9**	**3.0**
2001	**16**	**26**	**7.9**	**13**	**3.3**	**5.4**	**3.5**	**5.7**	**2.6**	**4.2**	**2.0**	**3.2**	**1.7**	**2.8**
2002	**18**	**29**	**7.0**	**11**	**3.1**	**5.0**	**3.3**	**5.4**	**2.6**	**4.3**	**2.0**	**3.3**	**1.7**	**2.8**
2003	**18**	**29**	**6.4**	**10**	**2.8**	**4.6**	**3.1**	**4.9**	**2.4**	**3.9**	**1.9**	**3.1**	**1.6**	**2.6**
2004	**21**	**34**	**6.3**	**10**	**2.7**	**4.3**	**2.7**	**4.4**	**2.2**	**3.6**	**1.9**	**3.0**	**1.6**	**2.6**
2005	**17**	**28**	**5.8**	**9.3**	**2.5**	**4.0**	**2.6**	**4.2**	**2.1**	**3.4**	**1.7**	**2.8**	**1.5**	**2.4**
2006	**15**	**24**	**5.2**	**8.4**	**2.3**	**3.7**	**2.8**	**4.5**	**2.1**	**3.3**	**1.6**	**2.6**	**1.3**	**2.2**
2007	**14**	**23**	**4.9**	**8.0**	**2.1**	**3.4**	**2.4**	**3.9**	**2.0**	**3.2**	**1.5**	**2.4**	**1.3**	**2.1**
2008	**17**	**27**	**4.7**	**7.6**	**2.0**	**3.2**	**2.5**	**4.1**	**2.1**	**3.3**	**1.6**	**2.6**	**1.4**	**2.2**
2009	**18**	**29**	**4.6**	**7.5**	**1.8**	**3.0**	**2.4**	**3.9**	**2.0**	**3.2**	**1.6**	**2.5**	**1.3**	**2.1**
2010	**13**	**21**	**4.1**	**6.6**	**1.6**	**2.6**	**2.2**	**3.6**	**1.7**	**2.8**	**1.3**	**2.1**	**1.1**	**1.8**
2011	**12**	**20**	**3.8**	**6.1**	**1.4**	**2.3**	**2.4**	**3.8**	**1.8**	**2.9**	**1.3**	**2.2**	**1.1**	**1.8**
2012	**11**	**18**	**3.8**	**6.1**	**1.3**	**2.1**	**2.3**	**3.7**	**1.8**	**2.9**	**1.3**	**2.2**	**1.1**	**1.8**
2013	**10**	**17**	**3.7**	**5.9**	**1.2**	**1.9**	**2.4**	**3.8**	**1.8**	**2.9**	**1.3**	**2.2**	**1.1**	**1.8**
2014	**10**	**17**	**3.4**	**5.5**	**1.1**	**1.8**	**2.3**	**3.7**	**1.8**	**2.8**	**1.3**	**2.1**	**1.1**	**1.8**
2015	**10**	**16**	**3.3**	**5.3**	**1.1**	**1.8**	**2.1**	**3.3**	**1.6**	**2.7**	**1.3**	**2.0**	**1.0**	**1.7**
2016	**13**	**21**	**3.3**	**5.4**	**1.1**	**1.8**	**2.0**	**3.3**	**1.7**	**2.7**	**1.3**	**2.2**	**1.1**	**1.8**
2017	**13**	**21**	**3.4**	**5.4**	**1.1**	**1.7**	**2.0**	**3.3**	**1.6**	**2.6**	**1.3**	**2.1**	**1.1**	**1.8**
2018	**14**	**22**	**3.3**	**5.3**	**1.1**	**1.8**	**1.9**	**3.1**	**1.5**	**2.5**	**1.2**	**1.9**	**1.0**	**1.6**

Bold values indicate exceedances

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TABLE 5-51: RATIO OF MODELED EGG CONCENTRATIONS TO BENCHMARKS FOR FEMALE GREAT BLUE HERON BASED ON THE SUM OF TRI+ CONGENERS FOR THE PERIOD 1993 - 2018

Year	LOAEL 189 Average	NOAEL 189 Average	LOAEL 168 Average	NOAEL 168 Average	LOAEL 154 Average	NOAEL 154 Average	LOAEL 152 Average	NOAEL 152 Average	LOAEL 113 Average	NOAEL 113 Average	LOAEL 90 Average	NOAEL 90 Average	LOAEL 50 Average	NOAEL 50 Average
1993	**15**	**57**	**3.0**	**11.3**	**1.1**	**4.3**	**6.6**	**25**	**4.4**	**17**	**3.5**	**13**	**3.4**	**13**
1994	**14**	**52**	**2.9**	**10.9**	**1.0**	**3.8**	**4.8**	**18**	**3.9**	**15**	**3.1**	**12**	**2.9**	**11**
1995	**13**	**47**	**2.4**	**9.0**	0.9	**3.4**	**4.3**	**16**	**3.2**	**12**	**2.8**	**10**	**2.6**	**9.9**
1996	**8.6**	**32**	**1.9**	**7.2**	0.8	**2.9**	**5.3**	**20**	**3.4**	**13**	**2.6**	**9.9**	**2.4**	**9.2**
1997	**6.5**	**24**	**1.6**	**6.2**	0.6	**2.4**	**4.4**	**17**	**3.1**	**12**	**2.4**	**9.0**	**2.2**	**8.3**
1998	**7.8**	**30**	**1.8**	**6.7**	0.8	**3.0**	**7.5**	**29**	**6.0**	**23**	**5.2**	**19**	**4.8**	**18.1**
1999	**6.9**	**26**	**1.6**	**6.1**	0.7	**2.6**	**3.2**	**12**	**2.5**	**9.5**	**2.1**	**8.0**	**2.0**	**7.7**
2000	**5.1**	**19**	**1.3**	**5.0**	0.6	**2.2**	**2.9**	**11**	**2.1**	**8.1**	**1.8**	**6.8**	**1.7**	**6.4**
2001	**4.2**	**16**	**1.1**	**4.2**	0.5	**1.9**	**3.1**	**12**	**2.2**	**8.2**	**1.6**	**6.2**	**1.5**	**5.8**
2002	**4.9**	**18**	**1.0**	**3.8**	0.5	**1.8**	**2.9**	**11**	**2.2**	**8.4**	**1.7**	**6.4**	**1.5**	**5.8**
2003	**5.1**	**19**	0.9	**3.5**	0.4	**1.6**	**2.6**	**9.8**	**2.0**	**7.5**	**1.6**	**5.9**	**1.4**	**5.4**
2004	**6.3**	**24**	0.9	**3.6**	0.4	**1.6**	**2.1**	**7.9**	**1.8**	**6.7**	**1.5**	**5.7**	**1.4**	**5.2**
2005	**4.9**	**19**	0.8	**3.2**	0.4	**1.4**	**2.0**	**7.7**	**1.6**	**6.1**	**1.4**	**5.2**	**1.3**	**4.8**
2006	**4.2**	**16**	0.8	**2.8**	0.4	**1.3**	**2.4**	**9.0**	**1.6**	**6.1**	**1.3**	**4.8**	**1.2**	**4.4**
2007	**4.2**	**16**	0.7	**2.8**	0.3	**1.2**	**1.9**	**7.2**	**1.5**	**5.8**	**1.2**	**4.5**	**1.1**	**4.1**
2008	**5.1**	**19**	0.7	**2.6**	0.3	**1.1**	**2.0**	**7.4**	**1.6**	**6.1**	**1.3**	**4.8**	**1.1**	**4.3**
2009	**5.5**	**21**	0.7	**2.7**	0.3	**1.1**	**1.8**	**6.8**	**1.5**	**5.6**	**1.2**	**4.6**	**1.1**	**4.2**
2010	**3.7**	**14**	0.6	**2.3**	0.3	**1.0**	**1.8**	**6.6**	**1.3**	**4.9**	1.0	**3.8**	0.9	**3.5**
2011	**3.6**	**14**	0.6	**2.1**	0.2	0.8	**2.0**	**7.4**	**1.4**	**5.3**	**1.0**	**3.9**	0.9	**3.5**
2012	**3.3**	**12**	0.6	**2.1**	0.2	0.8	**1.8**	**7.0**	**1.4**	**5.2**	**1.1**	**4.0**	0.9	**3.5**
2013	**3.0**	**11**	0.5	**2.0**	0.2	0.7	**2.0**	**7.5**	**1.4**	**5.4**	**1.1**	**4.0**	0.9	**3.5**
2014	**3.0**	**11**	0.5	**1.9**	0.2	0.7	**1.9**	**7.1**	**1.4**	**5.2**	**1.0**	**3.9**	0.9	**3.4**
2015	**2.9**	**11**	0.5	**1.8**	0.2	0.7	**1.6**	**6.2**	**1.3**	**4.8**	1.0	**3.7**	0.9	**3.3**
2016	**4.0**	**15**	0.5	**1.9**	0.2	0.7	**1.5**	**5.7**	**1.3**	**4.8**	**1.0**	**3.9**	0.9	**3.5**
2017	**3.9**	**15**	0.5	**1.9**	0.2	0.7	**1.5**	**5.5**	**1.2**	**4.5**	1.0	**3.7**	0.9	**3.4**
2018	**4.2**	**16**	0.5	**1.9**	0.2	0.7	**1.4**	**5.3**	**1.1**	**4.1**	0.9	**3.4**	0.8	**3.1**

Bold values indicate exceedances

TABLE 5-52: RATIO OF MODELED EGG CONCENTRATIONS TO BENCHMARKS FOR FEMALE BALD EAGLE BASED ON THE SUM OF TRI+ CONGENERS FOR THE PERIOD 1993 - 2018

Year	LOAEL 189 Average	NOAEL 189 Average	LOAEL 168 Average	NOAEL 168 Average	LOAEL 154 Average	NOAEL 154 Average	LOAEL 152 Average	NOAEL 152 Average	LOAEL 113 Average	NOAEL 113 Average	LOAEL 90 Average	NOAEL 90 Average	LOAEL 50 Average	NOAEL 50 Average
1993	**139**	**219**	**41**	**64**	**16**	**26**	**35**	**76**	**27**	**51**	**21**	**11**	**18**	**11**
1994	**95**	**150**	**37**	**58**	**15**	**24**	**24**	**54**	**23**	**44**	**19**	**9.7**	**16**	**9.7**
1995	**110**	**174**	**34**	**53**	**14**	**22**	**21**	**47**	**19**	**39**	**16**	**8.8**	**14**	**8.8**
1996	**68**	**108**	**26**	**40**	**11**	**17**	**27**	**56**	**20**	**37**	**15**	**8.0**	**13**	**8.0**
1997	**67**	**106**	**23**	**36**	**11**	**17**	**23**	**50**	**18**	**35**	**14**	**7.3**	**11**	**7.3**
1998	**53**	**85**	**23**	**36**	**11**	**17**	**43**	**93**	**37**	**75**	**29**	**15.7**	**24**	**16**
1999	**52**	**82**	**22**	**35**	**10**	**16**	**17**	**38**	**15**	**30**	**12**	**6.8**	**10**	**6.8**
2000	**42**	**67**	**18**	**28**	**8.5**	**13**	**15**	**33**	**13**	**25**	**10**	**5.8**	**8.7**	**5.8**
2001	**37**	**58**	**16**	**25**	**7.9**	**12**	**16**	**36**	**13**	**25**	**9.5**	**5.2**	**7.7**	**5.2**
2002	**36**	**57**	**13**	**21**	**7.0**	**11**	**16**	**35**	**13**	**26**	**9.7**	**5.2**	**7.7**	**5.2**
2003	**32**	**50**	**13**	**20**	**6.5**	**10**	**14**	**31**	**12**	**23**	**9.1**	**4.9**	**7.2**	**4.9**
2004	**43**	**68**	**13**	**21**	**6.5**	**10**	**11**	**26**	**11**	**21**	**8.8**	**4.8**	**7.1**	**4.8**
2005	**37**	**58**	**12**	**18**	**5.8**	**9.1**	**11**	**24**	**9.7**	**19**	**7.8**	**4.4**	**6.4**	**4.4**
2006	**29**	**46**	**10**	**16**	**5.2**	**8.3**	**12**	**27**	**9.7**	**19**	**7.2**	**4.0**	**5.8**	**4.0**
2007	**35**	**55**	**9.9**	**16**	**5.0**	**7.9**	**10**	**24**	**9.4**	**18**	**6.9**	**3.8**	**5.4**	**3.8**
2008	**35**	**56**	**10**	**16**	**4.7**	**7.4**	**11**	**25**	**9.8**	**19**	**7.3**	**4.0**	**5.7**	**4.0**
2009	**35**	**56**	**9.6**	**15**	**4.5**	**7.1**	**9.6**	**22**	**8.8**	**18**	**7.0**	**3.8**	**5.4**	**3.8**
2010	**33**	**53**	**8.2**	**13**	**3.9**	**6.2**	**9.0**	**20**	**7.7**	**15**	**5.9**	**3.2**	**4.6**	**3.2**
2011	**26**	**41**	**7.8**	**12**	**3.6**	**5.8**	**11**	**24**	**8.6**	**17**	**6.1**	**3.2**	**4.7**	**3.2**
2012	**26**	**41**	**7.9**	**12**	**3.1**	**5.0**	**9.4**	**21**	**8.2**	**16**	**6.1**	**3.2**	**4.6**	**3.2**
2013	**21**	**34**	**7.3**	**12**	**2.9**	**4.6**	**11**	**23**	**8.5**	**17**	**6.1**	**3.3**	**4.6**	**3.3**
2014	**24**	**37**	**6.8**	**11**	**2.8**	**4.4**	**9.6**	**21**	**8.2**	**16**	**6.0**	**3.1**	**4.6**	**3.1**
2015	**22**	**34**	**6.5**	**10**	**2.7**	**4.2**	**8.7**	**20**	**7.7**	**15**	**5.8**	**3.0**	**4.4**	**3.0**
2016	**25**	**40**	**7.1**	**11**	**2.7**	**4.3**	**8.7**	**20**	**8.0**	**16**	**6.1**	**3.2**	**4.7**	**3.2**
2017	**28**	**45**	**7.1**	**11**	**2.8**	**4.4**	**8.0**	**18**	**7.4**	**15**	**5.9**	**3.2**	**4.6**	**3.2**
2018	**26**	**41**	**6.8**	**11**	**2.8**	**4.4**	**7.4**	**17**	**6.8**	**13**	**5.3**	**2.8**	**4.1**	**2.8**

Bold values indicate exceedances

306509

306510

TABLE 5-53: RATIO OF MODELED DIETARY DOSE AND EGG CONCENTRATIONS TO BENCHMARKS BASED ON 1993 DATA FOR FEMALE BELTED KINGFISHER ON TEQ BASIS

	<<<< ----- Dietary Dose ---- >>>>				<<<< ---- Egg Concentration ---- >>>>			
Location	LOAEL vs. Average ADD Hazard Quotient	LOAEL vs. 95% UCL ADD Hazard Quotient	NOAEL vs. Average ADD Hazard Quotient	NOAEL vs. 95% UCL ADD Hazard Quotient	LOAEL vs. Average Conc. Hazard Quotient	LOAEL vs. 95% UCL Conc Hazard Quotient	NOAEL vs. Average Conc. Hazard Quotient	NOAEL vs. 95% UCL Conc. Hazard Quotient
Upper River								
Thompson Island Pool (189)	**124**	**250**	**1237**	**2498**	**20**	**41**	**82**	**166**
Stillwater (168)	**54**	**103**	**537**	**1027**	**7.9**	**15**	**31**	**61**
Federal Dam (154)	**12**	**17**	**116**	**174**	**1.9**	**2.8**	**7.4**	**11**
Lower River								
143.5	**11**	**14**	**112**	**138**	**1.9**	**2.3**	**7.4**	**9.1**
137.2	**23**	**50**	**226**	**499**	**3.7**	**8.3**	**15**	**33**
122.4	**8.8**	**14**	**88**	**144**	**1.4**	**2.4**	**5.8**	**9.5**
113.8	**9.2**	**10**	**92**	**105**	**1.5**	**1.7**	**6.1**	**6.8**
100	**4.0**	**9.3**	**40**	**93**	0.7	**1.2**	**2.6**	**5.0**
88.9	**7.8**	**11**	**78**	**109**	**1.3**	**1.8**	**5.1**	**7.0**
58.7	**8.4**	**12**	**84**	**117**	**1.4**	**1.9**	**5.6**	**7.4**
47.3	**7.8**	**13**	**78**	**126**	**1.3**	**1.9**	**5.1**	**7.6**
25.8	**5.7**	**7.1**	**57**	**71**	0.9	**1.1**	**3.7**	**4.5**

Bold values indicate exceedances

TABLE 5-54: RATIO OF MODELED DIETARY DOSE AND EGG CONCENTRATIONS TO BENCHMARKS BASED ON 1993 DATA FOR FEMALE GREAT BLUE HERON ON TEQ BASIS

	<<<< ---- Dietary Dose ---- >>>>				<<<< ---- Egg Concentration ---- >>>>			
Location	LOAEL vs. Average ADD Hazard Quotient	LOAEL vs. 95% UCL ADD Hazard Quotient	NOAEL vs. Average ADD Hazard Quotient	NOAEL vs. 95% UCL Conc. Hazard Quotient	LOAEL vs. Average Conc. Hazard Quotient	LOAEL vs. 95% UCL Conc Hazard Quotient	NOAEL vs. Average Conc. Hazard Quotient	NOAEL vs. 95% UCL Conc. Hazard Quotient
Upper River								
Thompson Island Pool (189)	**62**	**125**	**616**	**1245**	**204**	**417**	**340**	**694**
Stillwater (168)	**26**	**39**	**256**	**388**	**69**	**98**	**115**	**164**
Federal Dam (154)	**5.2**	**7.7**	**52**	**77**	**16**	**23**	**27**	**39**
Lower River								
143.5	**5.6**	**6.8**	**56**	**68**	**19**	**23**	**31**	**38**
137.2	**11**	**25**	**114**	**246**	**38**	**82**	**63**	**137**
122.4	**4.4**	**7.0**	**44**	**70**	**15**	**23**	**24**	**39**
113.8	**4.6**	**4.9**	**46**	**49**	**15**	**16**	**25**	**26**
100	**2.0**	**4.9**	**20**	**49**	**6.6**	**11**	**11**	**19**
88.9	**4.0**	**5.6**	**40**	**56**	**13**	**18**	**22**	**30**
58.7	**4.2**	**5.2**	**42**	**52**	**14**	**16**	**24**	**27**
47.3	**4.0**	**6.0**	**40**	**60**	**13**	**17**	**21**	**28**
25.8	**2.9**	**3.6**	**29**	**36**	**9.6**	**11**	**16**	**19**

Bold values indicate exceedances

306511

306512

TABLE 5-55: RATIO OF MODELED DIETARY DOSE AND EGG CONCENTRATIONS TO BENCHMARKS BASED ON 1993 DATA FOR FEMALE BALD EAGLE ON TEQ BASIS

	<<<< ----- Dietary Dose ---- >>>>				<<<< ---- Egg Concentration ---- >>>>			
Location	LOAEL vs. Average ADD Hazard Quotient	LOAEL vs. 95% UCL ADD Hazard Quotient	NOAEL vs. Average ADD Hazard Quotient	NOAEL vs. 95% UCL ADD Hazard Quotient	LOAEL vs. Average Conc. Hazard Quotient	LOAEL vs. 95% UCL Conc Hazard Quotient	NOAEL vs. Average Conc. Hazard Quotient	NOAEL vs. 95% UCL Conc. Hazard Quotient
Upper River								
Thompson Island Pool (189)	**221**	**427**	**2208**	**4272**	**92**	**178**	**2194**	**4246**
Stillwater (168)	**39**	**51**	**392**	**505**	**16**	**21**	**390**	**502**
Federal Dam (154)	**28**	**51**	**285**	**511**	**12**	**21**	**283**	**508**
Lower River								
143.5	**28**	**51**	**285**	**512**	**12**	**21**	**283**	**508**
137.2	**107**	**256**	**1074**	**2555**	**45**	**107**	**1067**	**2539**
122.4	**25**	**34**	**250**	**344**	**10**	**14**	**249**	**342**
113.8	**23**	**32**	**226**	**317**	**9.4**	**13**	**225**	**315**
100	**26**	**80**	**260**	**803**	**11**	**34**	**258**	**798**
88.9	**17**	**32**	**167**	**318**	**7.0**	**13**	**166**	**316**
58.7	**19**	**29**	**194**	**288**	**8.1**	**12**	**193**	**286**
47.3	**22**	**60**	**223**	**599**	**9.3**	**25**	**221**	**596**
25.8	**16**	**31**	**157**	**312**	**6.6**	**13**	**156**	**310**

Bold values indicate exceedances

TABLE 5-56: RATIO OF MODELED DIETARY DOSE TO BENCHMARKS BASED ON FISHRAND FOR FEMALE BELTED KINGFISHER USING TEQ FOR THE PERIOD 1993 - 2018

Year	LOAEL 189 Average	NOAEL 189 Average	LOAEL 168 Average	NOAEL 168 Average	LOAEL 154 Average	NOAEL 154 Average	LOAEL 152 Average	NOAEL 152 Average	LOAEL 113 Average	NOAEL 113 Average	LOAEL 90 Average	NOAEL 90 Average	LOAEL 50 Average	NOAEL 50 Average
1993	**110**	**1100**	28	276	9.0	90	8.6	86	6.0	60	4.8	48	4.3	43
1994	**100**	998	26	259	8.1	81	6.6	66	5.4	54	4.3	43	3.8	38
1995	92	915	22	223	7.3	73	6.0	60	4.6	46	4.3	43	3.5	35
1996	68	679	18	182	6.3	63	7.0	70	4.7	47	4.1	41	3.2	32
1997	55	548	16	156	5.5	55	5.9	59	4.4	44	3.4	34	3.0	30
1998	60	605	16	157	6.2	62	**11.0**	**110**	**8.8**	88	7.4	74	**6.5**	**65**
1999	55	547	15	146	5.5	55	4.7	47	3.8	38	3.1	31	2.8	28
2000	43	433	12	123	4.9	49	4.3	43	3.3	33	2.7	27	2.4	24
2001	37	370	10	102	4.1	41	4.4	44	3.2	32	2.5	25	2.2	22
2002	39	393	9.1	91	3.9	39	4.2	42	3.3	33	2.6	26	2.2	22
2003	40	396	8.2	82	3.5	35	3.9	39	3.0	30	2.4	24	2.1	21
2004	45	449	8.2	82	3.4	34	3.4	34	2.8	28	2.3	23	2.0	20
2005	37	368	7.5	75	3.1	31	3.2	32	2.6	26	2.1	21	1.9	19
2006	32	324	6.7	67	2.9	29	3.5	35	2.6	26	2.0	20	1.7	17
2007	31	312	6.4	64	2.6	26	3.0	30	2.5	25	1.9	19	1.6	16
2008	35	352	6.1	61	2.5	25	3.1	31	2.6	26	2.0	20	1.7	17
2009	37	373	6.1	61	2.3	23	3.0	30	2.4	24	2.0	20	1.7	17
2010	27	271	5.4	54	2.1	21	2.8	28	2.1	21	1.6	16	1.4	14
2011	26	256	4.9	49	1.8	18	3.0	30	2.3	23	1.7	17	1.4	14
2012	23	234	4.8	48	1.7	17	2.8	28	2.2	22	1.7	17	1.4	14
2013	22	221	4.8	48	1.5	15	3.0	30	2.2	22	1.7	17	1.4	14
2014	22	222	4.5	45	1.4	14	2.9	29	2.2	22	1.6	16	1.4	14
2015	22	216	4.2	42	1.4	14	2.6	26	2.1	21	1.6	16	1.3	13
2016	27	266	4.3	43	1.4	14	2.5	25	2.1	21	1.7	17	1.4	14
2017	26	263	4.4	44	1.4	14	2.5	25	2.0	20	1.6	16	1.4	14
2018	27	274	4.3	43	1.4	14	2.3	23	1.9	19	1.5	15	1.3	13

Bold values indicate exceedances

306513

306514

TABLE 5-57: RATIO OF MODELED DIETARY DOSE TO BENCHMARKS BASED ON FISHRAND FOR FEMALE GREAT BLUE HERON USING TEQ FOR THE PERIOD 1993 - 2018

Year	LOAEL 189 Average	NOAEL 189 Average	LOAEL 168 Average	NOAEL 168 Average	LOAEL 154 Average	NOAEL 154 Average	LOAEL 152 Average	NOAEL 152 Average	LOAEL 113 Average	NOAEL 113 Average	LOAEL 90 Average	NOAEL 90 Average	LOAEL 50 Average	NOAEL 50 Average
1993	**47**	**470**	**9.8**	**98**	**3.4**	**34**	**2.2**	**22**	**1.5**	**15**	**1.2**	**12**	**1.1**	**11**
1994	**43**	**425**	**9.3**	**93**	**3.1**	**31**	**1.6**	**16**	**1.4**	**14**	**1.1**	**11**	**1.0**	**10**
1995	**39**	**390**	**7.8**	**78**	**2.7**	**27**	**1.5**	**15**	**1.1**	**11**	**1.0**	**10**	0.9	**9.0**
1996	**28**	**277**	**6.3**	**63**	**2.4**	**24**	**1.8**	**18**	**1.2**	**12**	1.0	**9.9**	0.8	**8.3**
1997	**22**	**216**	**5.4**	**54**	**2.0**	**20**	**1.5**	**15**	**1.1**	**11**	0.8	**8.3**	0.7	**7.5**
1998	**25**	**250**	**5.7**	**57**	**2.4**	**24**	**2.6**	**26**	**2.1**	**21**	**1.8**	**18**	**1.6**	**16**
1999	**22**	**223**	**5.2**	**52**	**2.1**	**21**	**1.1**	**11**	0.9	**8.8**	0.7	**7.4**	0.7	**7.0**
2000	**17**	**170**	**4.3**	**43**	**1.8**	**18**	1.0	**9.8**	0.8	**7.5**	0.6	**6.3**	0.6	**5.9**
2001	**14**	**144**	**3.6**	**36**	**1.5**	**15**	**1.0**	**10.5**	0.8	**7.5**	0.6	**5.8**	0.5	**5.3**
2002	**16**	**159**	**3.3**	**33**	**1.5**	**15**	1.0	**9.8**	0.8	**7.7**	0.6	**5.9**	0.5	**5.3**
2003	**16**	**164**	**3.0**	**30**	**1.3**	**13**	0.9	**8.9**	0.7	**6.9**	0.6	**5.5**	0.5	**5.0**
2004	**19**	**193**	**3.0**	**30**	**1.3**	**13**	0.7	**7.3**	0.6	**6.3**	0.5	**5.3**	0.5	**4.8**
2005	**15**	**155**	**2.7**	**27**	**1.2**	**12**	0.7	**7.0**	0.6	**5.8**	0.5	**4.8**	0.4	**4.4**
2006	**13**	**135**	**2.4**	**24**	**1.1**	**11**	0.8	**8.1**	0.6	**5.7**	0.4	**4.5**	0.4	**4.0**
2007	**13**	**131**	**2.3**	**23**	**1.0**	**9.7**	0.7	**6.6**	0.5	**5.4**	0.4	**4.2**	0.4	**3.8**
2008	**15**	**154**	**2.2**	**22**	0.9	**9.3**	0.7	**6.7**	0.6	**5.7**	0.5	**4.5**	0.4	**4.0**
2009	**17**	**165**	**2.3**	**23**	0.9	**8.8**	0.6	**6.2**	0.5	**5.3**	0.4	**4.3**	0.4	**3.9**
2010	**12**	**116**	**1.9**	**19**	0.8	**7.8**	0.6	**6.0**	0.5	**4.6**	0.4	**3.6**	0.3	**3.2**
2011	**11**	**110**	**1.8**	**18**	0.7	**6.8**	0.7	**6.8**	0.5	**5.0**	0.4	**3.7**	0.3	**3.2**
2012	**10**	**101**	**1.8**	**18**	0.6	**6.4**	0.6	**6.3**	0.5	**4.9**	0.4	**3.7**	0.3	**3.2**
2013	**9**	**93**	**1.7**	**17**	0.6	**5.6**	0.7	**6.8**	0.5	**5.0**	0.4	**3.7**	0.3	**3.2**
2014	**9**	**94**	**1.6**	**16**	0.5	**5.5**	0.6	**6.5**	0.5	**4.9**	0.4	**3.7**	0.3	**3.1**
2015	**9**	**91**	**1.5**	**15**	0.5	**5.3**	0.6	**5.6**	0.5	**4.5**	0.4	**3.5**	0.3	**3.0**
2016	**12**	**118**	**1.6**	**16**	0.5	**5.4**	0.5	**5.2**	0.5	**4.5**	0.4	**3.7**	0.3	**3.2**
2017	**12**	**117**	**1.6**	**16**	0.5	**5.2**	0.5	**5.1**	0.4	**4.3**	0.4	**3.5**	0.3	**3.2**
2018	**12**	**124**	**1.6**	**16**	0.6	**5.5**	0.5	**4.8**	0.4	**3.9**	0.3	**3.2**	0.3	**2.9**

Bold values indicate exceedances

TABLE 5-58: RATIO OF MODELED DIETARY DOSE TO BENCHMARKS BASED ON FISHRAND FOR FEMALE BALD EAGLE USING TEQ FOR THE PERIOD 1993 - 2018

Year	LOAEL 189 Average	NOAEL 189 Average	LOAEL 168 Average	NOAEL 168 Average	LOAEL 154 Average	NOAEL 154 Average	LOAEL 152 Average	NOAEL 152 Average	LOAEL 113 Average	NOAEL 113 Average	LOAEL 90 Average	NOAEL 90 Average	LOAEL 50 Average	NOAEL 50 Average
1993	**101**	**1007**	**30**	**296**	**12**	**118**	**26**	**258**	**17**	**173**	**4.0**	**40**	**3.7**	**37**
1994	**69**	**688**	**27**	**266**	**11**	**110**	**18**	**184**	**15**	**149**	**3.5**	**35**	**3.3**	**33**
1995	**80**	**796**	**24**	**244**	**10**	**101**	**16**	**159**	**13**	**133**	**3.2**	**32**	**3.0**	**30**
1996	**49**	**493**	**19**	**186**	**8.0**	**80**	**19**	**191**	**13**	**125**	**3.0**	**30**	**2.7**	**27**
1997	**49**	**487**	**17**	**167**	**7.9**	**79**	**17**	**170**	**12**	**119**	**2.7**	**27**	**2.5**	**25**
1998	**39**	**388**	**17**	**167**	**7.7**	**77**	**31**	**314**	**25**	**254**	**5.9**	**59**	**5.3**	**53**
1999	**38**	**378**	**16**	**161**	**7.4**	**74**	**13**	**129**	**10**	**101**	**2.5**	**25**	**2.3**	**23**
2000	**31**	**306**	**13**	**128**	**6.2**	**62**	**11**	**112**	**8.5**	**85**	**2.1**	**21**	**2.0**	**20**
2001	**27**	**265**	**11**	**113**	**5.7**	**57**	**12**	**123**	**8.3**	**83**	**1.9**	**19**	**1.8**	**18**
2002	**26**	**260**	**10**	**97**	**5.1**	**51**	**12**	**118**	**8.7**	**87**	**2.0**	**20**	**1.8**	**18**
2003	**23**	**232**	**9.3**	**93**	**4.8**	**48**	**10**	**104**	**7.9**	**79**	**1.9**	**19**	**1.7**	**17**
2004	**31**	**313**	**10**	**96**	**4.7**	**47**	**8.8**	**88**	**7.3**	**73**	**1.8**	**18**	**1.6**	**16**
2005	**27**	**266**	**8.4**	**84**	**4.2**	**42**	**8.3**	**83**	**6.6**	**66**	**1.6**	**16**	**1.5**	**15**
2006	**21**	**209**	**7.4**	**74**	**3.8**	**38**	**9.1**	**91**	**6.4**	**64**	**1.5**	**15**	**1.4**	**14**
2007	**25**	**254**	**7.2**	**72**	**3.6**	**36**	**8.2**	**82**	**6.1**	**61**	**1.4**	**14**	**1.3**	**13**
2008	**26**	**257**	**7.3**	**73**	**3.4**	**34**	**8.5**	**85**	**6.5**	**65**	**1.5**	**15**	**1.4**	**14**
2009	**26**	**255**	**7.0**	**70**	**3.3**	**33**	**7.5**	**75**	**6.1**	**61**	**1.5**	**15**	**1.3**	**13**
2010	**24**	**242**	**6.0**	**60**	**2.8**	**28**	**6.9**	**69**	**5.1**	**51**	**1.2**	**12**	**1.1**	**11**
2011	**19**	**190**	**5.6**	**56**	**2.6**	**26**	**8.0**	**80**	**5.6**	**56**	**1.3**	**13**	**1.1**	**11**
2012	**19**	**189**	**5.7**	**57**	**2.3**	**23**	**7.2**	**72**	**5.5**	**55**	**1.3**	**13**	**1.1**	**11**
2013	**15**	**154**	**5.3**	**53**	**2.1**	**21**	**7.9**	**79**	**5.7**	**57**	**1.3**	**13**	**1.1**	**11**
2014	**17**	**172**	**4.9**	**49**	**2.0**	**20**	**7.3**	**73**	**5.5**	**55**	**1.2**	**12**	**1.1**	**11**
2015	**16**	**158**	**4.7**	**47**	**1.9**	**19**	**6.7**	**67**	**5.2**	**52**	**1.2**	**12**	**1.0**	**10**
2016	**18**	**183**	**5.1**	**51**	**2.0**	**20**	**6.7**	**67**	**5.3**	**53**	**1.3**	**13**	**1.1**	**11**
2017	**20**	**205**	**5.1**	**51**	**2.0**	**20**	**6.2**	**62**	**5.0**	**50**	**1.2**	**12**	**1.1**	**11**
2018	**19**	**187**	**5.0**	**50**	**2.0**	**20**	**5.7**	**57**	**4.5**	**45**	**1.1**	**11**	**1.0**	**10**

Bold values indicate exceedances

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TABLE 5-59: RATIO OF MODELED EGG CONCENTRATIONS TO BENCHMARKS BASED ON FISHRAND FOR FEMALE BELTED KINGFISHER USING TEQ FOR THE PERIOD 1993 - 2018

Year	LOAEL 189 Average	NOAEL 189 Average	LOAEL 168 Average	NOAEL 168 Average	LOAEL 154 Average	NOAEL 154 Average	LOAEL 152 Average	NOAEL 152 Average	LOAEL 113 Average	NOAEL 113 Average	LOAEL 90 Average	NOAEL 90 Average	LOAEL 50 Average	NOAEL 50 Average
1993	**14**	**56**	**3.5**	**14**	**1.2**	**5.0**	**1.4**	**5.6**	1.0	**3.9**	0.7	**2.8**	0.7	**2.8**
1994	**13**	**51**	**3.3**	**13**	**1.1**	**4.5**	**1.1**	**4.3**	0.9	**3.5**	0.6	**2.5**	0.6	**2.5**
1995	**11.6**	**46**	**2.8**	**11**	**1.0**	**4.0**	1.0	**3.9**	0.7	**3.0**	0.6	**2.3**	0.6	**2.3**
1996	**8.0**	**32**	**2.2**	**8.9**	0.9	**3.4**	**1.1**	**4.6**	0.8	**3.1**	0.5	**2.1**	0.5	**2.1**
1997	**6.1**	**24**	**1.9**	7.7	0.7	**3.0**	1.0	**3.9**	0.7	**2.8**	0.5	**1.9**	0.5	**1.9**
1998	**7.3**	**29**	**2.0**	**8.0**	0.9	**3.5**	**1.8**	**7.1**	**1.4**	**5.7**	**1.1**	**4.2**	**1.1**	**4.2**
1999	**6.5**	**26**	**1.9**	**7.4**	0.8	**3.0**	0.8	**3.1**	0.6	**2.5**	0.5	**1.8**	0.5	**1.8**
2000	**4.8**	**19**	**1.5**	**6.1**	0.7	**2.6**	0.7	**2.8**	0.5	**2.1**	0.4	**1.6**	0.4	**1.6**
2001	**4.0**	**16**	**1.3**	**5.1**	0.6	**2.2**	0.7	**2.9**	0.5	**2.1**	0.4	**1.4**	0.4	**1.4**
2002	**4.6**	**18**	**1.2**	**4.6**	0.5	**2.1**	0.7	**2.7**	0.5	**2.1**	0.4	**1.4**	0.4	**1.4**
2003	**4.8**	**19**	**1.1**	**4.2**	0.5	**1.9**	0.6	**2.5**	0.5	**2.0**	0.3	**1.3**	0.3	**1.3**
2004	**5.8**	**23**	**1.1**	**4.2**	0.5	**1.8**	0.5	**2.2**	0.5	**1.8**	0.3	**1.3**	0.3	**1.3**
2005	**4.6**	**18**	**1.0**	**3.8**	0.4	**1.7**	0.5	**2.1**	0.4	**1.7**	0.3	**1.2**	0.3	**1.2**
2006	**3.9**	**16**	0.9	**3.4**	0.4	**1.6**	0.6	**2.3**	0.4	**1.7**	0.3	**1.1**	0.3	**1.1**
2007	**3.9**	**16**	0.8	**3.3**	0.4	**1.4**	0.5	**1.9**	0.4	**1.6**	0.3	**1.0**	0.3	**1.0**
2008	**4.7**	**19**	0.8	**3.2**	0.3	**1.4**	0.5	**2.0**	0.4	**1.7**	0.3	**1.1**	0.3	**1.1**
2009	**5.1**	**20**	0.8	**3.2**	0.3	**1.3**	0.5	**1.9**	0.4	**1.6**	0.3	**1.1**	0.3	**1.1**
2010	**3.5**	**14**	0.7	**2.7**	0.3	**1.1**	0.4	**1.8**	0.3	**1.4**	0.2	0.9	0.2	0.9
2011	**3.3**	**13**	0.6	**2.5**	0.2	**1.0**	0.5	**1.9**	0.4	**1.5**	0.2	0.9	0.2	0.9
2012	**3.0**	**12**	0.6	**2.5**	0.2	0.9	0.5	**1.8**	0.4	**1.4**	0.2	0.9	0.2	0.9
2013	**2.8**	**11**	0.6	**2.4**	0.2	0.8	0.5	**1.9**	0.4	**1.4**	0.2	0.9	0.2	0.9
2014	**2.8**	**11**	0.6	**2.3**	0.2	0.8	0.5	**1.9**	0.4	**1.4**	0.2	0.9	0.2	0.9
2015	**2.7**	**11**	0.5	**2.2**	0.2	0.8	0.4	**1.7**	0.3	**1.3**	0.2	0.9	0.2	0.9
2016	**3.6**	**15**	0.6	**2.3**	0.2	0.8	0.4	**1.6**	0.3	**1.3**	0.2	0.9	0.2	0.9
2017	**3.6**	**14**	0.6	**2.3**	0.2	0.8	0.4	**1.6**	0.3	**1.3**	0.2	0.9	0.2	0.9
2018	**3.9**	**15**	0.6	**2.2**	0.2	0.8	0.4	**1.5**	0.3	**1.2**	0.2	0.8	0.2	0.8

Bold values indicate exceedances

TABLE 5-60: RATIO OF MODELED EGG CONCENTRATIONS BASED ON FISHRAND FOR FEMALE GREAT BLUE HERON USING TEQ FOR THE PERIOD 1993 - 2018

Year	LOAEL 189 Average	NOAEL 189 Average	LOAEL 168 Average	NOAEL 168 Average	LOAEL 154 Average	NOAEL 154 Average	LOAEL 152 Average	NOAEL 152 Average	LOAEL 113 Average	NOAEL 113 Average	LOAEL 90 Average	NOAEL 90 Average	LOAEL 50 Average	NOAEL 50 Average
1993	**141**	**235**	28	46	10	17	7.4	12	5.0	8.3	4.0	6.6	3.8	6.3
1994	**127**	**211**	27	44	9.3	15	5.4	9.0	4.4	7.4	3.5	5.9	3.3	5.5
1995	**116**	**194**	22	37	8.2	14	4.8	8.0	3.6	6.0	3.1	5.2	3.0	4.9
1996	**80**	**133**	18	29	7.1	12	5.9	9.9	3.8	6.4	2.9	4.9	2.7	4.6
1997	**60**	**100**	15	25	5.9	10	4.9	8.2	3.5	5.8	2.7	4.5	2.5	4.1
1998	**73**	**121**	16	27	7.3	12	8.5	14	6.7	11.2	5.8	9.7	5.4	8.9
1999	**64**	**107**	15	25	6.3	11	3.6	5.9	2.8	4.7	2.4	4.0	2.3	3.8
2000	**47**	**78**	12	20	5.5	9.1	3.2	5.3	2.4	4.0	2.0	3.4	1.9	3.2
2001	**39**	**65**	10	17	4.5	7.6	3.5	5.8	2.4	4.0	1.8	3.1	1.7	2.9
2002	**45**	**75**	9.4	16	4.4	7.3	3.2	5.3	2.5	4.1	1.9	3.2	1.7	2.9
2003	**48**	**79**	8.5	14	3.9	6.6	2.9	4.9	2.2	3.7	1.8	2.9	1.6	2.7
2004	**58**	**97**	8.7	15	3.8	6.4	2.4	3.9	2.0	3.3	1.7	2.8	1.6	2.6
2005	**46**	**76**	7.8	13	3.5	5.9	2.3	3.8	1.8	3.0	1.5	2.6	1.4	2.4
2006	**39**	**65**	7.0	12	3.3	5.4	2.7	4.5	1.8	3.0	1.4	2.4	1.3	2.2
2007	**39**	**65**	6.8	11	2.9	4.9	2.1	3.6	1.7	2.9	1.3	2.2	1.2	2.0
2008	**47**	**78**	6.5	11	2.8	4.7	2.2	3.7	1.8	3.0	1.4	2.4	1.3	2.1
2009	**51**	**85**	6.6	11	2.7	4.5	2.0	3.4	1.7	2.8	1.4	2.3	1.2	2.1
2010	**35**	**58**	5.6	9.3	2.4	3.9	2.0	3.3	1.4	2.4	1.1	1.9	1.0	1.7
2011	**33**	**55**	5.2	8.6	2.0	3.4	2.2	3.7	1.6	2.6	1.2	1.9	1.0	1.7
2012	**30**	**51**	5.2	8.6	1.9	3.2	2.1	3.4	1.6	2.6	1.2	2.0	1.0	1.7
2013	**28**	**46**	4.9	8.2	1.7	2.8	2.2	3.7	1.6	2.6	1.2	2.0	1.0	1.7
2014	**28**	**46**	4.6	7.7	1.7	2.8	2.1	3.5	1.5	2.6	1.2	1.9	1.0	1.7
2015	**27**	**45**	4.4	7.4	1.6	2.7	1.8	3.1	1.4	2.4	1.1	1.8	1.0	1.6
2016	**37**	**61**	4.6	7.7	1.6	2.7	1.7	2.8	1.4	2.4	1.2	1.9	1.0	1.7
2017	**37**	**61**	4.8	7.9	1.6	2.7	1.6	2.7	1.3	2.2	1.1	1.8	1.0	1.7
2018	**39**	**65**	4.6	7.6	1.7	2.9	1.6	2.6	1.2	2.0	1.0	1.7	0.9	1.5

Bold values indicate exceedances

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TABLE 5-61: RATIO OF MODELED EGG CONCENTRATIONS TO BENCHMARKS BASED ON FISHRAND FOR FEMALE BALD EAGLE USING TEQ FOR THE PERIOD 1993 - 2018

Year	LOAEL 189 Average	NOAEL 189 Average	LOAEL 168 Average	NOAEL 168 Average	LOAEL 154 Average	NOAEL 154 Average	LOAEL 152 Average	NOAEL 152 Average	LOAEL 113 Average	NOAEL 113 Average	LOAEL 90 Average	NOAEL 90 Average	LOAEL 50 Average	NOAEL 50 Average
1993	**42**	**1001**	**12**	**294**	**4.9**	**117**	**11**	**256**	**7.2**	**172**	**1.7**	**39**	**1.6**	**37**
1994	**29**	**684**	**11**	**265**	**4.6**	**109**	**7.7**	**183**	**6.2**	**148**	**1.5**	**35**	**1.4**	**33**
1995	**33**	**791**	**10**	**243**	**4.2**	**100**	**6.6**	**158**	**5.5**	**132**	**1.3**	**32**	**1.2**	**30**
1996	**21**	**490**	**7.8**	**185**	**3.3**	**79**	**8.0**	**189**	**5.2**	**124**	**1.2**	**29**	**1.1**	**27**
1997	**20**	**484**	**7.0**	**166**	**3.3**	**78**	**7.1**	**169**	**5.0**	**118**	**1.1**	**27**	**1.0**	**25**
1998	**16**	**386**	**7.0**	**166**	**3.2**	**76**	**13.1**	**312**	**10.6**	**252**	**2.5**	**58**	**2.2**	**53**
1999	**16**	**375**	**6.7**	**160**	**3.1**	**74**	**5.4**	**129**	**4.2**	**101**	**1.1**	**25**	1.0	**23**
2000	**13**	**304**	**5.3**	**127**	**2.6**	**61**	**4.7**	**111**	**3.6**	**85**	0.9	**21**	0.8	**19**
2001	**11**	**263**	**4.7**	**112**	**2.4**	**57**	**5.1**	**122**	**3.5**	**83**	0.8	**19**	0.7	**18**
2002	**11**	**258**	**4.1**	**97**	**2.1**	**51**	**4.9**	**118**	**3.6**	**86**	0.8	**20**	0.7	**18**
2003	**9.7**	**230**	**3.9**	**92**	**2.0**	**47**	**4.3**	**104**	**3.3**	**78**	0.8	**18**	0.7	**16**
2004	**13**	**311**	**4.0**	**95**	**2.0**	**47**	**3.7**	**87**	**3.0**	**72**	0.8	**18**	0.7	**16**
2005	**11**	**264**	**3.5**	**83**	**1.7**	**42**	**3.4**	**82**	**2.8**	**66**	0.7	**16**	0.6	**15**
2006	**8.7**	**208**	**3.1**	**73**	**1.6**	**38**	**3.8**	**90**	**2.7**	**63**	0.6	**15**	0.6	**14**
2007	**11**	**253**	**3.0**	**71**	**1.5**	**36**	**3.4**	**82**	**2.6**	**61**	0.6	**14**	0.5	**13**
2008	**11**	**256**	**3.0**	**72**	**1.4**	**34**	**3.5**	**84**	**2.7**	**65**	0.6	**15**	0.6	**13**
2009	**11**	**254**	**2.9**	**69**	**1.4**	**32**	**3.1**	**74**	**2.5**	**60**	0.6	**15**	0.5	**13**
2010	**10**	**240**	**2.5**	**59**	**1.2**	**28**	**2.9**	**69**	**2.1**	**51**	0.5	**12**	0.5	**11**
2011	**7.9**	**189**	**2.4**	**56**	**1.1**	**26**	**3.3**	**79**	**2.3**	**56**	0.5	**13**	0.5	**11**
2012	**7.9**	**187**	**2.4**	**57**	**1.0**	**23**	**3.0**	**71**	**2.3**	**55**	0.5	**13**	0.4	**11**
2013	**6.4**	**153**	**2.2**	**53**	0.9	**21**	**3.3**	**78**	**2.4**	**57**	0.5	**13**	0.5	**11**
2014	**7.2**	**171**	**2.0**	**49**	0.8	**20**	**3.0**	**72**	**2.3**	**55**	0.5	**12**	0.4	**11**
2015	**6.6**	**157**	**2.0**	**47**	0.8	**19**	**2.8**	**66**	**2.2**	**52**	0.5	**12**	0.4	**10**
2016	**7.6**	**182**	**2.1**	**51**	0.8	**20**	**2.8**	**67**	**2.2**	**53**	0.5	**13**	0.5	**11**
2017	**8.5**	**203**	**2.1**	**51**	0.8	**20**	**2.6**	**61**	**2.1**	**50**	0.5	**12**	0.5	**11**
2018	**7.8**	**186**	**2.1**	**49**	0.8	**20**	**2.4**	**56**	**1.9**	**44**	0.5	**11**	0.4	**9.6**

Bold values indicate exceedances

TABLE 5-62: RATIO OF MODELED DIETARY DOSES TO BENCHMARKS FOR FEMALE BATS BASED ON 1993 DATA FOR THE TRI+ CONGENERS

Location	LOAEL vs. Average ADD Hazard Quotient	LOAEL vs. 95% UCL ADD Hazard Quotient	NOAEL vs. Average ADD Hazard Quotient	NOAEL vs. 95% UCL ADD Hazard Quotient
Upper River				
Thompson Island Pool (189)	**3.0**	**5.2**	**14**	**24**
Stillwater (168)	**5.2**	**24**	**24**	**115**
Federal Dam (154)	**1.2**	**2.1**	**5.8**	**10**
Lower River				
143.5	0.2	0.4	0.8	**2.0**
137.2	0.3	**1.4**	**1.6**	**6.5**
122.4	0.2	0.5	0.9	**2.2**
113.8	0.2	0.8	0.9	**3.5**
100	0.09	0.6	0.4	**2.9**
88.9	0.04	0.08	0.2	0.4
58.7	0.1	**1.3**	0.6	**5.9**
47.3	0.2	**1.1**	0.7	**5.4**
25.8	0.05	0.08	0.2	0.4

Bold values indicate exceedances

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TABLE 5-63: RATIO OF MODELED DIETARY DOSES TO TOXICITY BENCHMARKS FOR FEMALE BAT FOR TRI+ CONGENERS FOR THE PERIOD 1993 - 2018

Year	LOAEL 189 Average	NOAEL 189 Average	LOAEL 168 Average	NOAEL 168 Average	LOAEL 154 Average	NOAEL 154 Average	LOAEL 152 Average	NOAEL 152 Average	LOAEL 113 Average	NOAEL 113 Average	LOAEL 90 Average	NOAEL 90 Average	LOAEL 50 Average	NOAEL 50 Average
1993	**2.0**	**9.4**	**3.3**	**16**	**1.0**	**4.7**	0.4	**1.9**	0.3	**1.5**	0.3	**1.2**	0.2	0.9
1994	**1.9**	**8.7**	**3.0**	**14**	0.9	**4.4**	0.4	**1.7**	0.3	**1.4**	0.2	**1.2**	0.2	0.8
1995	**1.7**	**7.9**	**2.7**	**13**	0.8	**4.0**	0.4	**1.7**	0.3	**1.4**	0.2	**1.1**	0.2	0.8
1996	**1.5**	**7.1**	**2.2**	**11**	0.8	**3.5**	0.4	**1.7**	0.3	**1.3**	0.2	**1.1**	0.2	0.8
1997	**1.4**	**6.6**	**2.0**	**9.2**	0.7	**3.3**	0.3	**1.5**	0.3	**1.3**	0.2	**1.0**	0.2	0.7
1998	**1.3**	**6.2**	**1.8**	**8.6**	0.7	**3.2**	0.7	**3.5**	0.6	**2.9**	0.5	**2.3**	0.4	**1.7**
1999	**1.2**	**5.8**	**1.7**	**8.0**	0.6	**3.0**	0.3	**1.6**	0.3	**1.3**	0.2	**1.0**	0.2	0.8
2000	**1.1**	**5.2**	**1.5**	**6.9**	0.6	**2.7**	0.3	**1.5**	0.2	**1.2**	0.2	0.9	0.1	0.7
2001	**1.0**	**4.7**	**1.2**	**5.8**	0.5	**2.4**	0.3	**1.4**	0.2	**1.1**	0.2	0.9	0.1	0.6
2002	0.9	**4.3**	**1.1**	**5.0**	0.5	**2.1**	0.3	**1.4**	0.2	**1.1**	0.2	0.9	0.1	0.7
2003	0.8	**4.0**	**1.0**	**4.5**	0.4	**2.0**	0.3	**1.3**	0.2	**1.1**	0.2	0.9	0.1	0.6
2004	0.8	**3.7**	0.9	**4.4**	0.4	**1.8**	0.3	**1.3**	0.2	**1.1**	0.2	0.9	0.1	0.6
2005	0.7	**3.4**	0.9	**4.1**	0.4	**1.7**	0.3	**1.3**	0.2	**1.0**	0.2	0.8	0.1	0.6
2006	0.7	**3.2**	0.8	**3.7**	0.3	**1.6**	0.3	**1.2**	0.2	1.0	0.2	0.8	0.1	0.6
2007	0.6	**2.9**	0.7	**3.4**	0.3	**1.4**	0.2	**1.2**	0.2	1.0	0.2	0.7	0.1	0.5
2008	0.6	**2.7**	0.7	**3.3**	0.3	**1.3**	0.3	**1.2**	0.2	**1.0**	0.2	0.8	0.1	0.6
2009	0.5	**2.5**	0.7	**3.1**	0.3	**1.2**	0.3	**1.2**	0.2	**1.0**	0.2	0.8	0.1	0.6
2010	0.5	**2.3**	0.6	**2.9**	0.2	**1.1**	0.2	**1.1**	0.2	0.9	0.1	0.7	0.1	0.5
2011	0.4	**2.1**	0.6	**2.6**	0.2	**1.0**	0.2	**1.1**	0.2	0.9	0.1	0.7	0.1	0.5
2012	0.4	**2.0**	0.6	**2.6**	0.2	0.9	0.2	**1.0**	0.2	0.9	0.1	0.7	0.1	0.5
2013	0.4	**2.1**	0.6	**2.6**	0.2	0.8	0.2	**1.0**	0.2	0.9	0.1	0.6	0.1	0.5
2014	0.4	**2.0**	0.5	**2.4**	0.2	0.7	0.2	**1.0**	0.2	0.8	0.1	0.6	0.1	0.5
2015	0.4	**1.9**	0.5	**2.3**	0.2	0.7	0.2	0.98	0.2	0.8	0.1	0.6	0.1	0.5
2016	0.4	**1.8**	0.5	**2.3**	0.2	0.7	0.2	**1.1**	0.2	0.9	0.1	0.7	0.1	0.5
2017	0.4	**1.7**	0.5	**2.3**	0.1	0.7	0.2	**1.1**	0.2	0.9	0.1	0.7	0.1	0.5
2018	0.4	**1.6**	0.5	**2.3**	0.1	0.7	0.2	**1.0**	0.2	0.8	0.1	0.6	0.1	0.5

Bold values indicate exceedances

TABLE 5-64: RATIO OF MODELED DIETARY DOSES TO BENCHMARKS FOR FEMALE BAT BASED ON 1993 DATA ON A TEQ BASIS

Location	LOAEL vs. Average ADD Hazard Quotient	LOAEL vs. 95% UCL ADD Hazard Quotient	NOAEL vs. Average ADD Hazard Quotient	NOAEL vs. 95% UCL ADD Hazard Quotient
Upper River				
Thompson Island Pool (189)	**13**	**23**	**133**	**232**
Stillwater (168)	**23**	**109**	**232**	**1089**
Federal Dam (154)	**5.5**	**9.4**	**55**	**94**
Lower River				
143.5	0.8	**2.0**	**7.8**	**20**
137.2	**1.5**	**6.2**	**15**	**62**
122.4	0.8	**2.2**	**8.4**	**22**
113.8	0.9	**3.4**	**8.7**	**34**
100	0.4	**2.8**	**4.0**	**28**
88.9	0.2	0.4	**2.0**	**3.6**
58.7	0.6	**5.6**	**6.2**	**56**
47.3	0.7	**5.1**	**7.0**	**51**
25.8	0.2	0.4	**2.1**	**3.6**

Bold values indicate exceedances

306522

TABLE 5-65: RATIO OF MODELED DIETARY DOSES TO TOXICITY BENCHMARKS FOR FEMALE BAT ON A TEQ BASIS FOR THE PERIOD 1993 - 2018

Year	LOAEL 189 Average	NOAEL 189 Average	LOAEL 168 Average	NOAEL 168 Average	LOAEL 154 Average	NOAEL 154 Average	LOAEL 152 Average	NOAEL 152 Average	LOAEL 113 Average	NOAEL 113 Average	LOAEL 90 Average	NOAEL 90 Average	LOAEL 50 Average	NOAEL 50 Average
1993	**8.9**	**89**	**15**	**149**	**4.4**	**44**	**6.7**	**67**	**5.3**	**53**	**4.3**	**43**	**3.2**	**32**
1994	**8.3**	**83**	**13**	**135**	**4.1**	**41**	**5.9**	**59**	**4.9**	**49**	**4.0**	**40**	**2.9**	**29**
1995	**7.5**	**75**	**12**	**119**	**3.8**	**38**	**5.7**	**57**	**4.7**	**47**	**3.8**	**38**	**2.8**	**28**
1996	**6.8**	**68**	**10**	**100**	**3.4**	**34**	**5.7**	**57**	**4.6**	**46**	**3.7**	**37**	**2.7**	**27**
1997	**6.3**	**63**	**8.8**	**88**	**3.1**	**31**	**5.3**	**53**	**4.3**	**43**	**3.5**	**35**	**2.6**	**26**
1998	**5.9**	**59**	**8.1**	**81**	**3.0**	**30**	**12**	**120**	**9.9**	**99**	**7.8**	**78**	**5.7**	**57**
1999	**5.5**	**55**	**7.6**	**76**	**2.8**	**28**	**5.4**	**54**	**4.6**	**46**	**3.6**	**36**	**2.7**	**27**
2000	**4.9**	**49**	**6.6**	**66**	**2.5**	**25**	**5.0**	**50**	**4.0**	**40**	**3.2**	**32**	**2.4**	**24**
2001	**4.4**	**44**	**5.5**	**55**	**2.2**	**22**	**4.7**	**47**	**3.8**	**38**	**3.0**	**30**	**2.2**	**22**
2002	**4.1**	**41**	**4.7**	**47**	**2.0**	**20**	**4.8**	**48**	**3.9**	**39**	**3.1**	**31**	**2.3**	**23**
2003	**3.8**	**38**	**4.3**	**43**	**1.9**	**19**	**4.4**	**44**	**3.7**	**37**	**3.0**	**30**	**2.2**	**22**
2004	**3.5**	**35**	**4.1**	**41**	**1.7**	**17**	**4.6**	**46**	**3.7**	**37**	**2.9**	**29**	**2.2**	**22**
2005	**3.3**	**33**	**3.9**	**39**	**1.6**	**16**	**4.4**	**44**	**3.6**	**36**	**2.8**	**28**	**2.1**	**21**
2006	**3.0**	**30**	**3.5**	**35**	**1.5**	**15**	**4.1**	**41**	**3.4**	**34**	**2.6**	**26**	**1.9**	**19**
2007	**2.8**	**28**	**3.2**	**32**	**1.4**	**14**	**4.0**	**40**	**3.3**	**33**	**2.5**	**25**	**1.9**	**19**
2008	**2.6**	**26**	**3.1**	**31**	**1.3**	**13**	**4.3**	**43**	**3.5**	**35**	**2.7**	**27**	**2.0**	**20**
2009	**2.4**	**24**	**3.0**	**30**	**1.2**	**12**	**4.2**	**42**	**3.5**	**35**	**2.7**	**27**	**2.0**	**20**
2010	**2.2**	**22**	**2.7**	**27**	**1.0**	**10**	**3.7**	**37**	**3.0**	**30**	**2.3**	**23**	**1.7**	**17**
2011	**2.0**	**20**	**2.5**	**25**	0.9	**9.4**	**3.6**	**36**	**3.1**	**31**	**2.3**	**23**	**1.7**	**17**
2012	**1.9**	**19**	**2.5**	**25**	0.8	**8.4**	**3.5**	**35**	**3.0**	**30**	**2.3**	**23**	**1.7**	**17**
2013	**2.0**	**20**	**2.5**	**25**	0.8	**7.6**	**3.5**	**35**	**3.0**	**30**	**2.2**	**22**	**1.7**	**17**
2014	**1.9**	**19**	**2.3**	**23**	0.7	**7.0**	**3.5**	**35**	**2.9**	**29**	**2.2**	**22**	**1.7**	**17**
2015	**1.9**	**19**	**2.2**	**22**	0.7	**6.8**	**3.4**	**34**	**2.8**	**28**	**2.1**	**21**	**1.6**	**16**
2016	**1.8**	**18**	**2.2**	**22**	0.7	**6.8**	**3.8**	**38**	**3.0**	**30**	**2.3**	**23**	**1.7**	**17**
2017	**1.6**	**16**	**2.2**	**22**	0.7	**6.6**	**3.8**	**38**	**3.0**	**30**	**2.3**	**23**	**1.7**	**17**
2018	**1.6**	**16**	**2.1**	**21**	0.7	**6.6**	**3.5**	**35**	**2.8**	**28**	**2.1**	**21**	**1.6**	**16**

Bold values indicate exceedances

TABLE 5-66: RATIO OF MODELED DIETARY DOSES TO BENCHMARKS FOR FEMALE RACCOONS BASED ON 1993 DATA FOR THE TRI+ CONGENERS

Location	LOAEL vs. Average ADD Hazard Quotient	LOAEL vs. 95% UCL ADD Hazard Quotient	NOAEL vs. Average ADD Hazard Quotient	NOAEL vs. 95% UCL ADD Hazard Quotient
Upper River				
Thompson Island Pool (189)	0.6	**1.0**	**2.7**	**4.7**
Stillwater (168)	**1.0**	**4.2**	**4.5**	**19**
Federal Dam (154)	0.2	0.4	**1.0**	**1.7**
Lower River				
143.5	0.04	0.08	0.2	0.4
137.2	0.07	0.3	0.3	**1.2**
122.4	0.04	0.09	0.2	0.4
113.8	0.04	0.1	0.2	0.6
100	0.02	0.1	0.08	0.6
88.9	0.01	0.03	0.06	0.1
58.7	0.03	0.2	0.1	**1.0**
47.3	0.03	0.2	0.2	**1.0**
25.8	0.01	0.02	0.06	0.1

Bold values indicate exceedances

306524

TABLE 5-67: RATIO OF MODELED DIETARY DOSES TO TOXICITY BENCHMARKS FOR FEMALE RACCOON FOR TRI+ CONGENERS FOR THE PERIOD 1993 - 2018

Year	LOAEL 189 Average	NOAEL 189 Average	LOAEL 168 Average	NOAEL 168 Average	LOAEL 154 Average	NOAEL 154 Average	LOAEL 152 Average	NOAEL 152 Average	LOAEL 113 Average	NOAEL 113 Average	LOAEL 90 Average	NOAEL 90 Average	LOAEL 50 Average	NOAEL 50 Average
1993	0.5	**2.2**	0.6	**2.7**	0.2	0.8	0.1	0.4	0.1	0.3	0.05	0.2	0.04	0.2
1994	0.4	**2.1**	0.5	**2.5**	0.2	0.7	0.1	0.3	0.1	0.3	0.04	0.2	0.03	0.2
1995	0.4	**1.9**	0.5	**2.2**	0.1	0.7	0.1	0.3	0.1	0.2	0.05	0.2	0.03	0.1
1996	0.4	**1.6**	0.4	**1.8**	0.1	0.6	0.1	0.3	0.1	0.2	0.05	0.2	0.03	0.1
1997	0.3	**1.5**	0.3	**1.6**	0.1	0.6	0.1	0.3	0.0	0.2	0.04	0.2	0.03	0.1
1998	0.3	**1.4**	0.3	**1.5**	0.1	0.5	0.1	0.6	0.1	0.5	0.09	0.4	0.06	0.3
1999	0.3	**1.3**	0.3	**1.4**	0.1	0.5	0.1	0.3	0.05	0.2	0.04	0.2	0.03	0.1
2000	0.3	**1.2**	0.3	**1.2**	0.1	0.5	0.1	0.3	0.04	0.2	0.04	0.2	0.03	0.1
2001	0.2	**1.1**	0.2	**1.0**	0.1	0.4	0.1	0.2	0.04	0.2	0.03	0.2	0.02	0.1
2002	0.2	**1.0**	0.2	0.9	0.1	0.4	0.1	0.2	0.04	0.2	0.03	0.2	0.03	0.1
2003	0.2	0.9	0.2	0.8	0.1	0.3	0.05	0.2	0.04	0.2	0.03	0.2	0.02	0.1
2004	0.2	0.9	0.2	0.8	0.1	0.3	0.05	0.2	0.04	0.2	0.03	0.2	0.02	0.1
2005	0.2	0.8	0.2	0.7	0.1	0.3	0.05	0.2	0.04	0.2	0.03	0.1	0.02	0.1
2006	0.2	0.7	0.1	0.6	0.1	0.3	0.04	0.2	0.04	0.2	0.03	0.1	0.02	0.1
2007	0.1	0.7	0.1	0.6	0.1	0.2	0.04	0.2	0.04	0.2	0.03	0.1	0.02	0.1
2008	0.1	0.7	0.1	0.6	0.05	0.2	0.05	0.2	0.04	0.2	0.03	0.1	0.02	0.1
2009	0.1	0.6	0.1	0.5	0.04	0.2	0.05	0.2	0.04	0.2	0.03	0.1	0.02	0.1
2010	0.1	0.6	0.1	0.5	0.04	0.2	0.04	0.2	0.03	0.2	0.03	0.1	0.02	0.1
2011	0.1	0.5	0.1	0.5	0.04	0.2	0.04	0.2	0.03	0.2	0.03	0.1	0.02	0.1
2012	0.1	0.5	0.1	0.5	0.03	0.2	0.04	0.2	0.03	0.2	0.02	0.1	0.02	0.1
2013	0.1	0.5	0.1	0.5	0.03	0.1	0.04	0.2	0.03	0.2	0.02	0.1	0.02	0.1
2014	0.1	0.5	0.1	0.4	0.03	0.1	0.04	0.2	0.03	0.1	0.02	0.1	0.02	0.1
2015	0.1	0.5	0.1	0.4	0.03	0.1	0.04	0.2	0.03	0.1	0.02	0.1	0.02	0.1
2016	0.1	0.4	0.1	0.4	0.03	0.1	0.04	0.2	0.03	0.2	0.02	0.1	0.02	0.1
2017	0.1	0.4	0.1	0.4	0.03	0.1	0.04	0.2	0.03	0.2	0.02	0.1	0.02	0.1
2018	0.1	0.4	0.1	0.4	0.03	0.1	0.04	0.2	0.03	0.1	0.02	0.1	0.02	0.1

Bold values indicate exceedances

TABLE 5-68: RATIO OF MODELED DIETARY DOSES TO BENCHMARKS FOR FEMALE RACCOON BASED ON 1993 DATA ON A TEQ BASIS

Location	LOAEL vs. Average ADD Hazard Quotient	LOAEL vs. 95% UCL ADD Hazard Quotient	NOAEL vs. Average ADD Hazard Quotient	NOAEL vs. 95% UCL ADD Hazard Quotient
Upper River				
Thompson Island Pool (189)	**6.4**	**10**	**64**	**101**
Stillwater (168)	**15**	**37**	**150**	**373**
Federal Dam (154)	**1.9**	**3.2**	**19**	**32**
Lower River				
143.5	0.4	0.7	**4.4**	**6.9**
137.2	0.8	**2.2**	**8.0**	**22**
122.4	0.5	0.8	**4.9**	**7.5**
113.8	0.5	**1.2**	**5.1**	**12**
100	0.2	**3.6**	**2.1**	**36**
88.9	0.3	0.9	**3.2**	**8.9**
58.7	0.2	**1.9**	**1.9**	**19**
47.3	0.7	**3.0**	**6.7**	**30**
25.8	0.2	0.6	**2.4**	**6.3**

Bold values indicate exceedances

306526

TABLE 5-69: RATIO OF MODELED DIETARY DOSES TO TOXICITY BENCHMARKS FOR FEMALE RACCOON ON A TEQ BASIS FOR THE PERIOD 1993 - 2018

Year	LOAEL 189 Average	NOAEL 189 Average	LOAEL 168 Average	NOAEL 168 Average	LOAEL 154 Average	NOAEL 154 Average	LOAEL 152 Average	NOAEL 152 Average	LOAEL 113 Average	NOAEL 113 Average	LOAEL 90 Average	NOAEL 90 Average	LOAEL 50 Average	NOAEL 50 Average
1993	**14**	**140**	**5.8**	**58**	**1.5**	**15**	**1.5**	**15**	**1.2**	**12**	0.9	**9.3**	0.7	**7.0**
1994	**13**	**129**	**5.2**	**52**	**1.4**	**14**	**1.3**	**13**	**1.1**	**11**	0.9	**8.7**	0.6	**6.4**
1995	**12**	**119**	**4.7**	**47**	**1.3**	**13**	**1.2**	**12**	**1.0**	**10**	**1.3**	**13.1**	0.6	**6.1**
1996	**11**	**106**	**3.9**	**39**	**1.1**	**11**	**1.3**	**13**	1.0	**9.9**	**1.3**	**12.9**	0.6	**5.9**
1997	**9.7**	**97**	**3.3**	**33**	**1.0**	**10**	**1.2**	**12**	0.9	**9.3**	0.7	**7.5**	0.6	**5.6**
1998	**9.0**	**90**	**3.1**	**31**	**1.0**	**10**	**2.6**	**26**	**2.1**	**21**	**1.7**	**17**	**1.2**	**12**
1999	**8.5**	**85**	**2.9**	**29**	0.9	**9.5**	**1.2**	**12**	1.0	**9.6**	0.8	**7.6**	0.6	**5.7**
2000	**7.8**	**78**	**2.6**	**26**	0.9	**8.5**	**1.1**	**11**	0.9	**8.5**	0.7	**6.8**	0.5	**5.1**
2001	**6.9**	**69**	**2.1**	**21**	0.7	**7.5**	**1.0**	**10**	0.8	**8.1**	0.6	**6.4**	0.5	**4.8**
2002	**6.3**	**63**	**1.8**	**18**	0.7	**6.7**	**1.0**	**10**	0.8	**8.3**	0.7	**6.6**	0.5	**4.9**
2003	**5.9**	**59**	**1.6**	**16**	0.6	**6.1**	0.9	**9.5**	0.8	**7.8**	0.6	**6.3**	0.5	**4.7**
2004	**5.4**	**54**	**1.6**	**16**	0.6	**5.8**	1.0	**9.6**	0.8	**7.8**	0.6	**6.3**	0.5	**4.7**
2005	**5.1**	**51**	**1.5**	**15**	0.5	**5.4**	0.9	**9.2**	0.8	**7.6**	0.6	**5.9**	0.4	**4.4**
2006	**4.7**	**47**	**1.3**	**13**	0.5	**4.9**	0.9	**8.7**	0.7	**7.2**	0.6	**5.5**	0.4	**4.1**
2007	**4.3**	**43**	**1.2**	**12**	0.5	**4.5**	0.8	**8.4**	0.7	**7.0**	0.5	**5.3**	0.4	**4.0**
2008	**4.0**	**40**	**1.2**	**12**	0.4	**4.2**	0.9	**9.0**	0.7	**7.4**	0.6	**5.7**	0.4	**4.3**
2009	**3.8**	**38**	**1.1**	**11**	0.4	**3.9**	0.9	**8.9**	0.7	**7.3**	0.6	**5.7**	0.4	**4.2**
2010	**3.5**	**35**	**1.1**	**11**	0.3	**3.5**	0.8	**7.7**	0.6	**6.3**	0.5	**4.9**	0.4	**3.6**
2011	**3.1**	**31**	0.9	**9.5**	0.3	**3.1**	0.8	**7.7**	0.6	**6.4**	0.5	**4.9**	0.4	**3.7**
2012	**2.9**	**29**	0.9	**9.2**	0.3	**2.8**	0.8	**7.5**	0.6	**6.3**	0.5	**4.8**	0.4	**3.6**
2013	**2.9**	**29**	**1.0**	**9.5**	0.3	**2.5**	0.7	**7.4**	0.6	**6.2**	0.5	**4.7**	0.4	**3.5**
2014	**3.0**	**30**	0.9	**8.8**	0.2	**2.3**	0.7	**7.4**	0.6	**6.2**	0.5	**4.6**	0.3	**3.5**
2015	**2.8**	**28**	0.8	**8.3**	0.2	**2.2**	0.7	**7.1**	0.6	**5.9**	0.4	**4.5**	0.3	**3.4**
2016	**2.7**	**27**	0.8	**8.2**	0.2	**2.2**	0.8	**7.8**	0.6	**6.3**	0.5	**4.8**	0.4	**3.6**
2017	**2.6**	**26**	0.8	**8.2**	0.2	**2.2**	0.8	**7.8**	0.6	**6.3**	0.5	**4.8**	0.4	**3.6**
2018	**2.4**	**24**	0.8	**8.0**	0.2	**2.2**	0.7	**7.2**	0.6	**5.9**	0.4	**4.5**	0.3	**3.3**

Bold values indicate exceedances

TABLE 5-70: RATIO OF OBSERVED MINK AND OTTER PCB CONCENTRATIONS TO BENCHMARKS

Species and Statistic	North Hudson Valley	South Hudson Valley	Hudson Valley
	Comparison to Low Range LOAEL[1] 1983 - 1986		
Mink liver - average	0.5	0.6	
Mink liver - minimum	0.1	0.1	
Mink liver - maximum	**1.4**	**2.8**	
Otter liver - average			**1.9**
Otter liver - minimum			0.6
Otter liver - maximum			**5.9**
	Comparison to Upper Range LOAEL[2] 1983 - 1986		
Mink liver - average	0.2	0.2	
Mink liver - minimum	0.03	0.0	
Mink liver - maximum	0.5	**1.1**	
Otter liver - average			0.7
Otter liver - minimum			0.2
Otter liver - maximum			**2.4**

Notes: Bold values indicate exceedances

[1] Impaired reproductive success with liver concentration of 1.23 mg/kg (Platanow and Karstad, 1973)

[2] Reduced growth of mink kits with 3.1 mg/gm liver (Wren *et al.*, 1987)

TABLE 5-71: RATIO OF MODELED DIETARY DOSES TO BENCHMARKS FOR FEMALE MINK BASED ON 1993 DATA FOR THE TRI+ CONGENERS

Location	LOAEL vs. Average ADD Hazard Quotient	LOAEL vs. 95% UCL ADD Hazard Quotient	NOAEL vs. Average ADD Hazard Quotient	NOAEL vs. 95% UCL ADD Hazard Quotient
Upper River				
Thompson Island Pool (189)	**36**	**57**	**359**	**566**
Stillwater (168)	**19**	**76**	**188**	**760**
Federal Dam (154)	**5.8**	**9.2**	**58**	**92**
Lower River				
143.5	**3.1**	**4.3**	**31**	**43**
137.2	**6.2**	**15**	**62**	**150**
122.4	**2.5**	**4.5**	**25**	**45**
113.8	**2.7**	**4.3**	**27**	**43**
100	**1.2**	**3.4**	**12**	**34**
88.9	**1.9**	**2.6**	**19**	**26**
58.7	**2.4**	**5.8**	**24**	**58**
47.3	**2.2**	**5.6**	**22**	**56**
25.8	**1.5**	**1.8**	**15**	**18**

Bold values indicate exceedances

TABLE 5-72: RATIO OF MODELED DIETARY DOSES TO BENCHMARKS FOR FEMALE OTTER BASED ON 1993 DATA FOR THE TRI+ CONGENERS

Location	LOAEL vs. Average ADD Hazard Quotient	LOAEL vs. 95% UCL ADD Hazard Quotient	NOAEL vs. Average ADD Hazard Quotient	NOAEL vs. 95% UCL ADD Hazard Quotient
Upper River				
Thompson Island Pool (189)	**291**	**562**	**2906**	**5623**
Stillwater (168)	**52**	**67**	**520**	**671**
Federal Dam (154)	**37**	**67**	**375**	**673**
Lower River				
143.5	**37**	**67**	**375**	**673**
137.2	**141**	**336**	**1413**	**3362**
122.4	**33**	**45**	**329**	**453**
113.8	**30**	**42**	**298**	**417**
100	**34**	**106**	**342**	**1057**
88.9	**22**	**42**	**220**	**419**
58.7	**26**	**38**	**256**	**379**
47.3	**29**	**79**	**293**	**789**
25.8	**21**	**41**	**207**	**411**

Bold values indicate exceedances

306530

TABLE 5-73: RATIO OF MODELED DIETARY DOSES TO TOXICITY BENCHMARKS FOR FEMALE MINK FOR TRI+ CONGENERS FOR THE PERIOD 1993 - 2018

Year	LOAEL 189 Average	NOAEL 189 Average	LOAEL 168 Average	NOAEL 168 Average	LOAEL 154 Average	NOAEL 154 Average	LOAEL 152 Average	NOAEL 152 Average	LOAEL 113 Average	NOAEL 113 Average	LOAEL 90 Average	NOAEL 90 Average	LOAEL 50 Average	NOAEL 50 Average
1993	**26**	**257**	**13**	**134**	**4.3**	**43**	**3.4**	**34**	**2.4**	**24**	**2.0**	**20**	**1.7**	**17**
1994	**23**	**233**	**12**	**123**	**3.9**	**39**	**2.7**	**27**	**2.2**	**22**	**1.8**	**18**	**1.5**	**15**
1995	**21**	**213**	**11**	**107**	**3.5**	**35**	**2.5**	**25**	**1.9**	**19**	**1.6**	**16**	**1.4**	**14**
1996	**16**	**157**	**8.8**	**88**	**3.1**	**31**	**2.8**	**28**	**2.0**	**20**	**1.6**	**16**	**1.3**	**13**
1997	**13**	**127**	**7.7**	**77**	**2.8**	**28**	**2.4**	**24**	**1.8**	**18**	**1.4**	**14**	**1.2**	**12**
1998	**14**	**141**	**7.5**	**75**	**2.9**	**29**	**4.7**	**47**	**3.8**	**38**	**3.1**	**31**	**2.6**	**26**
1999	**13**	**127**	**6.9**	**69**	**2.7**	**27**	**2.0**	**20**	**1.7**	**17**	**1.4**	**14**	**1.2**	**12**
2000	**10**	**99**	**5.9**	**59**	**2.4**	**24**	**1.9**	**19**	**1.4**	**14**	**1.2**	**12**	**1.0**	**10**
2001	**8.5**	**85**	**4.9**	**49**	**2.0**	**20**	**1.9**	**19**	**1.4**	**14**	**1.1**	**11**	0.9	**9**
2002	**9.1**	**91**	**4.3**	**43**	**1.9**	**19**	**1.8**	**18**	**1.4**	**14**	**1.1**	**11**	0.9	**9**
2003	**9.2**	**92**	**3.9**	**39**	**1.7**	**17**	**1.7**	**17**	**1.3**	**13**	**1.1**	**11**	0.9	**9**
2004	**11**	**105**	**3.8**	**38**	**1.6**	**16**	**1.5**	**15**	**1.3**	**13**	**1.0**	**10**	0.9	**9**
2005	**8.6**	**86**	**3.6**	**36**	**1.5**	**15**	**1.5**	**15**	**1.2**	**12**	1.0	**10**	0.8	**8**
2006	**7.5**	**75**	**3.2**	**32**	**1.4**	**14**	**1.5**	**15**	**1.2**	**12**	0.9	**9**	0.7	**7**
2007	**7.3**	**73**	**3.0**	**30**	**1.3**	**13**	**1.4**	**14**	**1.1**	**11**	0.8	**8**	0.7	**7**
2008	**8.3**	**83**	**2.9**	**29**	**1.2**	**12**	**1.4**	**14**	**1.2**	**12**	0.9	**9**	0.7	**7**
2009	**8.8**	**88**	**2.8**	**28**	**1.1**	**11**	**1.4**	**14**	**1.1**	**11**	0.9	**9**	0.7	**7**
2010	**6.3**	**63**	**2.5**	**25**	**1.0**	**10**	**1.2**	**12**	1.0	**10**	0.7	**7**	0.6	**6**
2011	**6.0**	**60**	**2.3**	**23**	0.9	**9**	**1.3**	**13**	**1.0**	**10**	0.8	**8**	0.6	**6**
2012	**5.5**	**55**	**2.3**	**23**	0.8	**8**	**1.3**	**13**	**1.0**	**10**	0.8	**8**	0.6	**6**
2013	**5.2**	**52**	**2.3**	**23**	0.7	**7**	**1.3**	**13**	**1.0**	**10**	0.7	**7**	0.6	**6**
2014	**5.2**	**52**	**2.1**	**21**	0.7	**7**	**1.3**	**13**	1.0	**10**	0.7	**7**	0.6	**6**
2015	**5.1**	**51**	**2.0**	**20**	0.7	**7**	**1.2**	**12**	0.9	**9**	0.7	**7**	0.6	**6**
2016	**6.3**	**63**	**2.0**	**20**	0.7	**7**	**1.2**	**12**	1.0	**10**	0.8	**8**	0.6	**6**
2017	**6.2**	**62**	**2.0**	**20**	0.6	**6**	**1.2**	**12**	0.9	**9**	0.7	**7**	0.6	**6**
2018	**6.5**	**65**	**2.0**	**20**	0.7	**7**	**1.1**	**11**	0.9	**9**	0.7	**7**	0.6	**6**

Bold values indicate exceedances

TABLE 5-74: RATIO OF MODELED DIETARY DOSE TO TOXICITY BENCHMARKS FOR FEMALE OTTER FOR TRI+ CONGENERS FOR THE PERIOD 1993 - 2018

Year	LOAEL 189 Average	NOAEL 189 Average	LOAEL 168 Average	NOAEL 168 Average	LOAEL 154 Average	NOAEL 154 Average	LOAEL 152 Average	NOAEL 152 Average	LOAEL 113 Average	NOAEL 113 Average	LOAEL 90 Average	NOAEL 90 Average	LOAEL 50 Average	NOAEL 50 Average
1993	**133**	**1329**	39	390	16	155	46	459	31	307	7.1	71	6.6	66
1994	**91**	**909**	35	351	14	144	33	328	26	265	6.3	63	5.9	59
1995	**105**	**1051**	32	322	13	132	28	282	24	236	5.7	57	5.3	53
1996	**65**	**652**	25	245	11	105	34	339	22	223	5.3	53	4.8	48
1997	**64**	**643**	22	220	10	104	30	303	21	211	4.8	48	4.4	44
1998	**51**	**513**	22	221	10	101	56	559	45	452	10	105	9.5	95
1999	**50**	**499**	21	212	9.8	98	23	230	18	180	4.5	45	4.1	41
2000	**40**	**405**	17	168	8.1	81	20	199	15	151	3.8	38	3.5	35
2001	**35**	**351**	15	149	7.5	75	22	219	15	148	3.5	35	3.1	31
2002	**34**	**343**	13	128	6.7	67	21	211	15	154	3.5	35	3.2	32
2003	**31**	**307**	12	122	6.3	63	19	185	14	140	3.3	33	3.0	30
2004	**41**	**413**	13	126	6.3	63	16	156	13	130	3.2	32	2.9	29
2005	**35**	**351**	11	111	5.5	55	15	147	12	118	2.9	29	2.6	26
2006	**28**	**277**	9.7	97	5.0	50	16	161	11	113	2.7	27	2.4	24
2007	**34**	**336**	9.5	95	4.8	48	15	147	11	109	2.6	26	2.3	23
2008	**34**	**339**	9.6	96	4.5	45	15	151	12	117	2.8	28	2.4	24
2009	**34**	**337**	9.2	92	4.3	43	13	133	11	108	2.6	26	2.3	23
2010	**32**	**319**	7.9	79	3.7	37	12	123	9.1	91	2.2	22	2.0	20
2011	**25**	**251**	7.4	74	3.5	35	14	142	10	100	2.3	23	2.0	20
2012	**25**	**249**	7.5	75	3.0	30	13	128	9.8	98	2.2	22	1.9	19
2013	**20**	**204**	7.0	70	2.8	28	14	140	10	101	2.3	23	2.0	20
2014	**23**	**227**	6.5	65	2.6	26	13	129	9.8	98	2.2	22	1.9	19
2015	**21**	**209**	6.2	62	2.5	25	12	119	9.2	92	2.1	21	1.8	18
2016	**24**	**241**	6.8	68	2.6	26	12	119	9.5	95	2.3	23	2.0	20
2017	**27**	**270**	6.8	68	2.6	26	11	110	8.9	89	2.2	22	1.9	19
2018	**25**	**246**	6.6	66	2.6	26	10	101	8.0	80	1.9	19	1.7	17

Bold values indicate exceedances

TABLE 5-75: RATIO OF MODELED DIETARY DOSES TO BENCHMARKS FOR FEMALE MINK BASED ON 1993 DATA ON A TEQ BASIS

Location	LOAEL vs. Average ADD Hazard Quotient	LOAEL vs. 95% UCL ADD Hazard Quotient	NOAEL vs. Average ADD Hazard Quotient	NOAEL vs. 95% UCL ADD Hazard Quotient
Upper River				
Thompson Island Pool (189)	**28**	**44**	**792**	**1233**
Stillwater (168)	**18**	**55**	**510**	**1536**
Federal Dam (154)	**4.3**	**6.8**	**120**	**191**
Lower River				
143.5	**2.5**	**3.4**	**69**	**96**
137.2	**4.9**	**12**	**137**	**322**
122.4	**2**	**3.5**	**57**	**97**
113.8	**2.2**	**3.3**	**61**	**93**
100	0.9	**4.3**	**26**	**121**
88.9	**1.6**	**2.5**	**46**	**71**
58.7	**1.8**	**4.3**	**50**	**120**
47.3	**2.0**	**5.0**	**55**	**139**
25.8	**1.2**	**1.7**	**34**	**49**

Bold values indicate exceedances

TABLE 5-76: RATIO OF MODELED DIETARY DOSES TO BENCHMARKS FOR FEMALE OTTER BASED ON 1993 DATA ON A TEQ BASIS

Location	LOAEL vs. Average ADD Hazard Quotient	LOAEL vs. 95% UCL ADD Hazard Quotient	NOAEL vs. Average ADD Hazard Quotient	NOAEL vs. 95% UCL ADD Hazard Quotient
Upper River				
Thompson Island Pool (189)	**225**	**434**	**6286**	**12140**
Stillwater (168)	**45**	**60**	**1254**	**1683**
Federal Dam (154)	**29**	**52**	**817**	**1467**
Lower River				
143.5	**29**	**52**	**808**	**1453**
137.2	**108**	**258**	**3038**	**7230**
122.4	**25**	**35**	**711**	**978**
113.8	**23**	**32**	**644**	**904**
100	**26**	**82**	**735**	**2309**
88.9	**17**	**32**	**476**	**910**
58.7	**20**	**30**	**550**	**827**
47.3	**23**	**61**	**635**	**1720**
25.8	**16**	**32**	**447**	**890**

Bold values indicate exceedances

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TABLE 5-77: RATIO OF MODELED DIETARY DOSES TO TOXICITY BENCHMARKS FOR FEMALE MINK ON A TEQ BASIS FOR THE PERIOD 1993 - 2018

Year	LOAEL 189 Average	NOAEL 189 Average	LOAEL 168 Average	NOAEL 168 Average	LOAEL 154 Average	NOAEL 154 Average	LOAEL 152 Average	NOAEL 152 Average	LOAEL 113 Average	NOAEL 113 Average	LOAEL 90 Average	NOAEL 90 Average	LOAEL 50 Average	NOAEL 50 Average
1993	**26**	**737**	**10**	**284**	**3.1**	**87**	**7.1**	**199**	**5.1**	**142**	**4.1**	**114**	**3.5**	**99**
1994	**24**	**672**	**9.3**	**262**	**2.8**	**79**	**5.6**	**157**	**4.6**	**129**	**3.7**	**104**	**3.2**	**89**
1995	**22**	**616**	**8.2**	**229**	**2.6**	**72**	**5.1**	**144**	**4.0**	**112**	**3.7**	**103**	**2.9**	**81**
1996	**17**	**479**	**6.8**	**190**	**2.3**	**63**	**5.8**	**164**	**4.1**	**114**	**3.5**	**99**	**2.7**	**76**
1997	**14**	**401**	**5.8**	**164**	**2.0**	**57**	**5.0**	**141**	**3.8**	**106**	**3.0**	**83**	**2.5**	**70**
1998	**15**	**422**	**5.7**	**158**	**2.1**	**59**	**9.7**	**272**	**7.8**	**219**	**6.5**	**182**	**5.5**	**154**
1999	**14**	**386**	**5.3**	**148**	**1.9**	**54**	**4.2**	**118**	**3.4**	**96**	**2.8**	**79**	**2.4**	**67**
2000	**11**	**317**	**4.5**	**126**	**1.7**	**48**	**3.8**	**108**	**3.0**	**84**	**2.4**	**68**	**2.1**	**58**
2001	**10**	**274**	**3.7**	**105**	**1.5**	**42**	**3.9**	**110**	**2.9**	**82**	**2.3**	**63**	**1.9**	**53**
2002	**10**	**280**	**3.3**	**92**	**1.4**	**38**	**3.8**	**105**	**3.0**	**84**	**2.3**	**65**	**1.9**	**54**
2003	**10**	**276**	**3.0**	**83**	**1.2**	**35**	**3.5**	**97**	**2.7**	**77**	**2.2**	**62**	**1.8**	**51**
2004	**11**	**298**	**2.9**	**82**	**1.2**	**33**	**3.1**	**88**	**2.6**	**73**	**2.1**	**60**	**1.8**	**50**
2005	**9.0**	**252**	**2.7**	**76**	**1.1**	**31**	**3.0**	**85**	**2.5**	**69**	**2.0**	**56**	**1.7**	**46**
2006	**8.0**	**224**	**2.4**	**68**	**1.0**	**28**	**3.2**	**89**	**2.4**	**67**	**1.8**	**52**	**1.5**	**43**
2007	**7.6**	**214**	**2.3**	**64**	0.9	**26**	**2.8**	**78**	**2.3**	**64**	**1.8**	**49**	**1.4**	**40**
2008	**8.2**	**230**	**2.2**	**61**	0.9	**24**	**2.9**	**82**	**2.4**	**68**	**1.9**	**53**	**1.5**	**43**
2009	**8.5**	**238**	**2.1**	**60**	0.8	**23**	**2.8**	**79**	**2.3**	**65**	**1.8**	**51**	**1.5**	**42**
2010	**6.5**	**182**	**1.9**	**54**	0.7	**20**	**2.6**	**72**	**2.0**	**56**	**1.6**	**43**	**1.3**	**36**
2011	**6.1**	**170**	**1.7**	**49**	0.6	**18**	**2.7**	**76**	**2.1**	**59**	**1.6**	**44**	**1.3**	**36**
2012	**5.6**	**156**	**1.7**	**48**	0.6	**16**	**2.6**	**73**	**2.1**	**58**	**1.6**	**44**	**1.3**	**36**
2013	**5.4**	**150**	**1.7**	**48**	0.5	**15**	**2.7**	**75**	**2.1**	**58**	**1.6**	**43**	**1.3**	**35**
2014	**5.4**	**151**	**1.6**	**45**	0.5	**14**	**2.6**	**73**	**2.0**	**57**	**1.5**	**43**	**1.2**	**35**
2015	**5.2**	**146**	**1.5**	**43**	0.5	**13**	**2.4**	**67**	**1.9**	**54**	**1.5**	**41**	**1.2**	**33**
2016	**6.1**	**171**	**1.5**	**43**	0.5	**13**	**2.4**	**68**	**2.0**	**56**	**1.6**	**44**	**1.3**	**36**
2017	**6.0**	**167**	**1.5**	**43**	0.5	**13**	**2.4**	**67**	**1.9**	**54**	**1.5**	**43**	**1.3**	**35**
2018	**6.1**	**171**	**1.5**	**42**	0.5	**13**	**2.2**	**63**	**1.8**	**51**	**1.4**	**39**	**1.2**	**32**

Bold values indicate exceedances

TABLE 5-78: RATIO OF MODELED DIETARY DOSES TO TOXICITY BENCHMARKS FOR FEMALE OTTER ON A TEQ BASIS FOR THE PERIOD 1993 - 2018

Year	LOAEL 189 Average	NOAEL 189 Average	LOAEL 168 Average	NOAEL 168 Average	LOAEL 154 Average	NOAEL 154 Average	LOAEL 152 Average	NOAEL 152 Average	LOAEL 113 Average	NOAEL 113 Average	LOAEL 90 Average	NOAEL 90 Average	LOAEL 50 Average	NOAEL 50 Average
1993	**107**	**3003**	**31**	**877**	**12**	**342**	**96**	**2683**	**64**	**1796**	**15**	**413**	**14**	**389**
1994	**75**	**2089**	**28**	**790**	**11**	**318**	**68**	**1916**	**55**	**1546**	**13**	**371**	**12**	**343**
1995	**85**	**2384**	**26**	**725**	**10**	**292**	**59**	**1650**	**49**	**1379**	**12**	**342**	**11**	**310**
1996	**54**	**1514**	**20**	**554**	**8.3**	**233**	**71**	**1983**	**47**	**1302**	**11**	**316**	**10**	**284**
1997	**53**	**1485**	**18**	**495**	**8.2**	**229**	**63**	**1770**	**44**	**1235**	**10**	**284**	**9.2**	**258**
1998	**43**	**1198**	**18**	**495**	**8.0**	**224**	**117**	**3267**	**94**	**2640**	**22**	**615**	**20**	**555**
1999	**42**	**1164**	**17**	**476**	**7.7**	**215**	**48**	**1346**	**38**	**1054**	**9.4**	**264**	**8.6**	**241**
2000	**34**	**953**	**14**	**380**	**6.4**	**180**	**42**	**1166**	**32**	**886**	**7.9**	**221**	**7.3**	**204**
2001	**30**	**827**	**12**	**335**	**5.9**	**166**	**46**	**1278**	**31**	**865**	**7.2**	**203**	**6.6**	**184**
2002	**29**	**806**	**10**	**289**	**5.3**	**148**	**44**	**1232**	**32**	**902**	**7.4**	**208**	**6.6**	**185**
2003	**26**	**721**	**9.8**	**273**	**4.9**	**138**	**39**	**1084**	**29**	**818**	**7.0**	**195**	**6.2**	**173**
2004	**34**	**945**	**10**	**281**	**4.9**	**138**	**33**	**914**	**27**	**758**	**6.7**	**189**	**6.0**	**169**
2005	**29**	**809**	**8.9**	**248**	**4.4**	**122**	**31**	**859**	**25**	**689**	**6.2**	**172**	**5.6**	**155**
2006	**23**	**645**	**7.8**	**218**	**3.9**	**110**	**34**	**944**	**24**	**663**	**5.7**	**159**	**5.1**	**142**
2007	**27**	**767**	**7.6**	**212**	**3.8**	**106**	**31**	**858**	**23**	**640**	**5.4**	**151**	**4.8**	**134**
2008	**28**	**771**	**7.6**	**214**	**3.5**	**99**	**32**	**883**	**24**	**682**	**5.8**	**162**	**5.1**	**142**
2009	**27**	**763**	**7.3**	**205**	**3.4**	**94**	**28**	**778**	**23**	**632**	**5.5**	**155**	**4.9**	**137**
2010	**26**	**722**	**6.3**	**177**	**2.9**	**83**	**26**	**720**	**19**	**532**	**4.6**	**130**	**4.1**	**115**
2011	**20**	**573**	**5.9**	**166**	**2.7**	**77**	**30**	**832**	**21**	**584**	**4.7**	**133**	**4.1**	**115**
2012	**20**	**565**	**6.0**	**168**	**2.4**	**66**	**27**	**747**	**20**	**572**	**4.7**	**132**	**4.0**	**113**
2013	**17**	**468**	**5.6**	**156**	**2.2**	**61**	**29**	**818**	**21**	**593**	**4.9**	**136**	**4.1**	**116**
2014	**19**	**519**	**5.2**	**145**	**2.1**	**58**	**27**	**756**	**20**	**571**	**4.7**	**131**	**4.0**	**111**
2015	**17**	**479**	**5.0**	**139**	**2.0**	**56**	**25**	**693**	**19**	**540**	**4.5**	**126**	**3.8**	**107**
2016	**20**	**547**	**5.4**	**151**	**2.0**	**57**	**25**	**698**	**20**	**554**	**4.7**	**132**	**4.1**	**115**
2017	**22**	**607**	**5.4**	**151**	**2.1**	**58**	**23**	**641**	**19**	**521**	**4.6**	**128**	**4.1**	**113**
2018	**20**	**554**	**5.2**	**146**	**2.1**	**58**	**21**	**589**	**17**	**466**	**4.1**	**114**	**3.6**	**101**

Bold values indicate exceedances

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TABLE 6-1: SENSITIVITY ANALYSIS- SELECTED TOXICITY QUOTIENT OUTPUT

Percentiles	Kingfisher Egg 189 LOAEL 1993	Kingfisher Egg 189 NOAEL 1993	Kingfisher Egg 168 LOAEL 1993	Kingfisher Egg 168 NOAEL 1993	Kingfisher Egg 154 LOAEL 1993	Kingfisher Egg 154 NOAEL 1993	Kingfisher Egg 189 LOAEL 2015	Kingfisher Egg 189 NOAEL 2015	Kingfisher Egg 168 LOAEL 2015	Kingfisher Egg 168 NOAEL 2015	Kingfisher Egg 154 LOAEL 2015
2%	27	49	5	11	2.4	5	4	6	1.3	1.5	0.4
5%	52	83	15	24	6.5	10	8	13	2.9	4.6	1.0
10%	58	94	17	28	7.5	12	10	16	3.3	5.3	1.2
15%	64	103	19	31	8.5	14	11	17	3.6	5.9	1.3
20%	69	111	21	34	9.2	15	12	19	3.9	6.3	1.4
25%	74	119	22	36	9.9	16	13	21	4.2	6.8	1.5
30%	79	128	24	39	10.6	17	14	22	4.5	7.3	1.6
35%	85	138	26	42	11.4	18	15	24	4.8	7.7	1.8
40%	91	148	28	45	12.2	20	16	26	5.1	8.3	1.9
45%	98	160	30	48	13.2	21	18	28	5.5	9.0	2.0
50%	106	173	32	53	14.3	23	19	31	6.0	9.7	2.2
55%	116	188	35	58	15.5	25	21	34	6.5	10.5	2.4
60%	127	207	39	63	17.1	28	23	37	7.2	11.6	2.6
65%	141	228	43	70	19.1	31	26	42	8.0	12.9	2.9
70%	158	258	49	78	21.3	34	29	47	8.9	14.3	3.3
75%	180	292	55	89	24.3	39	33	53	10.2	16.3	3.7
80%	211	340	64	104	28.2	45	38	61	11.8	18.8	4.3
85%	249	404	76	123	33.5	54	46	73	14.0	22.4	5.1
90%	309	499	94	151	41.1	67	56	91	17.2	27.8	6.3
95%	404	650	126	204	54.6	89	74	121	22.5	36.8	8.4
98%	500	800	150	250	70.0	100	90	150	28.0	45.0	10.0

TABLE 6-1: SENSITIVITY ANALYSIS- SELECTED TOXICITY QUOTIENT OUTPUT

Percentiles	Eagle Egg 168 LOAEL 2015	Eagle Egg 154 LOAEL 2015	Eagle 189 LOAEL 1993	Eagle 168 LOAEL 1993	Eagle 154 LOAEL 1993	Eagle 189 LOAEL 2015	Eagle 168 LOAEL 2015	Eagle 154 LOAEL 2015	Mink 189 LOAEL 1993	Mink 168 LOAEL 1993	Mink 154 LOAEL 1993
2%	0.5	0.4	0.3	0.0	0.01	0.0	0.01	0.00	11	5	2.3
5%	2.4	1.1	0.5	0.1	0.04	0.1	0.01	0.01	18	7	3.1
10%	2.9	1.3	0.5	0.1	0.05	0.1	0.02	0.01	20	7	3.3
15%	3.5	1.5	0.6	0.1	0.05	0.1	0.02	0.01	21	8	3.5
20%	3.9	1.7	0.6	0.1	0.06	0.1	0.02	0.01	22	8	3.6
25%	4.3	1.9	0.6	0.1	0.06	0.1	0.02	0.01	23	8	3.7
30%	4.7	2.0	0.6	0.2	0.06	0.1	0.02	0.01	24	8	3.8
35%	5.1	2.2	0.7	0.2	0.07	0.1	0.03	0.01	25	9	3.9
40%	5.6	2.4	0.7	0.2	0.07	0.1	0.03	0.01	26	9	4.0
45%	6.0	2.6	0.7	0.2	0.08	0.1	0.03	0.01	26	9	4.1
50%	6.4	2.7	0.7	0.2	0.08	0.1	0.03	0.01	27	9	4.2
55%	6.9	2.9	0.8	0.2	0.08	0.1	0.03	0.01	28	10	4.3
60%	7.4	3.1	0.8	0.2	0.09	0.1	0.03	0.01	29	10	4.4
65%	8.0	3.4	0.8	0.2	0.09	0.1	0.04	0.01	30	10	4.6
70%	8.7	3.6	0.8	0.2	0.10	0.1	0.04	0.02	31	10	4.7
75%	9.5	3.9	0.9	0.3	0.10	0.1	0.04	0.02	33	11	4.8
80%	10.4	4.2	0.9	0.3	0.11	0.1	0.05	0.02	34	11	5.0
85%	11.6	4.6	1.0	0.3	0.12	0.2	0.05	0.02	36	12	5.2
90%	13.3	5.2	1.0	0.3	0.13	0.2	0.06	0.02	39	13	5.5
95%	16.3	6.2	1.1	0.4	0.15	0.2	0.07	0.02	43	14	6.0
98%	20.0	8.0	1.3	0.5	0.17	0.4	0.08	0.06	0	16	7.0

306537

TABLE 6-1: SENSITIVITY ANALYSIS- SELECTED TOXICITY QUOTIENT OUTPUT

Percentiles	Kingfisher Egg 154 NOAEL 2015	Kingfisher 189 LOAEL 1993	Kingfisher 168 LOAEL 1993	Kingfisher 154 LOAEL 1993	Kingfisher 189 LOAEL 2015	Kingfisher 168 LOAEL 2015	Kingfisher 154 LOAEL 2015	Eagle Egg 189 LOAEL 1993	Eagle Egg 168 LOAEL 1993	Eagle Egg 154 LOAEL 1993	Eagle Egg 189 LOAEL 2015
2%	0.8	0.4	0.1	0.0	0.0	0.01	0.01	29	4	2	3
5%	1.7	0.6	0.2	0.1	0.1	0.03	0.01	72	16	7	10
10%	1.9	0.6	0.2	0.1	0.1	0.03	0.01	86	20	8	12
15%	2.1	0.6	0.2	0.1	0.1	0.04	0.01	97	23	10	14
20%	2.3	0.7	0.2	0.1	0.1	0.04	0.01	108	26	11	15
25%	2.5	0.7	0.2	0.1	0.1	0.04	0.01	117	28	12	17
30%	2.6	0.7	0.2	0.1	0.1	0.04	0.01	125	31	13	18
35%	2.8	0.7	0.2	0.1	0.1	0.04	0.02	134	33	14	19
40%	3.0	0.8	0.2	0.1	0.1	0.04	0.02	141	36	15	21
45%	3.3	0.8	0.2	0.1	0.1	0.05	0.02	150	39	16	22
50%	3.6	0.8	0.3	0.1	0.1	0.05	0.02	158	41	17	23
55%	3.9	0.8	0.3	0.1	0.1	0.05	0.02	167	44	18	25
60%	4.2	0.9	0.3	0.1	0.2	0.05	0.02	176	47	19	26
65%	4.7	0.9	0.3	0.1	0.2	0.05	0.02	185	51	20	28
70%	5.2	0.9	0.3	0.1	0.2	0.05	0.02	196	55	22	30
75%	5.9	0.9	0.3	0.1	0.2	0.05	0.02	209	59	24	32
80%	6.9	1.0	0.3	0.1	0.2	0.06	0.02	223	65	26	35
85%	8.2	1.0	0.3	0.1	0.2	0.06	0.02	240	72	28	39
90%	10.2	1.1	0.3	0.1	0.2	0.06	0.02	262	82	32	43
95%	13.5	1.2	0.4	0.2	0.2	0.06	0.02	296	98	38	51
98%	17.0	1.4	0.5	0.2	0.3	0.08	0.04	350	120	45	60

306538

TABLE 6-1: SENSITIVITY ANALYSIS- SELECTED TOXICITY QUOTIENT OUTPUT

Percentiles	Mink 189 LOAEL 2015	Mink 168 LOAEL 2015	Mink 154 LOAEL 2015	Otter 189 LOAEL 1993	Otter 168 LOAEL 1993	Otter 154 LOAEL 1993	Otter 189 LOAEL 2015	Otter 168 LOAEL 2015	Otter 154 LOAEL 2015
2%	1.8	1.0	0.4	43	7	3	4	0.8	0.5
5%	2.9	1.3	0.5	78	16	7	10	2.2	1.1
10%	3.2	1.4	0.5	86	19	8	11	2.7	1.3
15%	3.4	1.5	0.5	92	21	9	12	3.0	1.4
20%	3.6	1.5	0.6	97	22	9	13	3.3	1.5
25%	3.8	1.6	0.6	101	24	10	14	3.6	1.6
30%	4.0	1.6	0.6	105	26	10	15	3.9	1.7
35%	4.2	1.7	0.6	109	27	11	16	4.1	1.8
40%	4.3	1.7	0.6	113	29	12	16	4.4	1.9
45%	4.5	1.7	0.6	116	30	12	17	4.7	2.0
50%	4.7	1.8	0.6	120	32	13	18	5.0	2.1
55%	4.9	1.8	0.7	124	33	14	19	5.3	2.2
60%	5.1	1.9	0.7	129	35	14	20	5.6	2.3
65%	5.3	1.9	0.7	134	37	15	21	6.0	2.4
70%	5.6	2.0	0.7	139	40	16	22	6.4	2.6
75%	5.9	2.0	0.7	144	42	17	23	6.9	2.8
80%	6.3	2.1	0.8	150	46	18	25	7.5	3.0
85%	6.7	2.2	0.8	158	50	19	26	8.2	3.2
90%	7.4	2.3	0.8	168	56	21	29	9.1	3.5
95%	8.5	2.4	0.9	184	65	25	33	11.0	4.0
98%	10.0	2.8	1.1	225	80	30	40	15.0	5.0

306540

Table 6-2: Ranges of Percent Contribution to Variance of Input Parameters

	Kingfisher	Kingfisher Egg	Bald Eagle	Eagle Egg	Mink	River Otter
Assumption						
Fish concentration	38% - 98%	10% - 20%	>90%	28% - 63%	34% - 70%	76% - 93%
Percent fish in diet	28% - 69%	NA	1% - 2%	NA	4% - 10%	3% - 8%
Benthic invertebrate concentration	<1%	NA	NA	NA	10% - 18%	<1%
Percent aquatic invertebrates	<1%	NA	NA	NA	1% - 4%	0.5% - 1.3%
Ingestion rate	1% - 2%	NA	<1%	NA	1% - 4%	<1%
Body weight	1% - 2%	NA	1% - 2%	NA	19% - 39%	<1%
Biomagnification factor	NA	10% - 20%	NA	37% - 72%	NA	NA
Toxicity reference value[1]		76% - 82%				

Notes:

1 -- The kingfisher egg TRV was the only TRV with a recommended uncertainty factor.

Table 6-3: Rank Correlation Sensitivity Analysis Results (R^2)

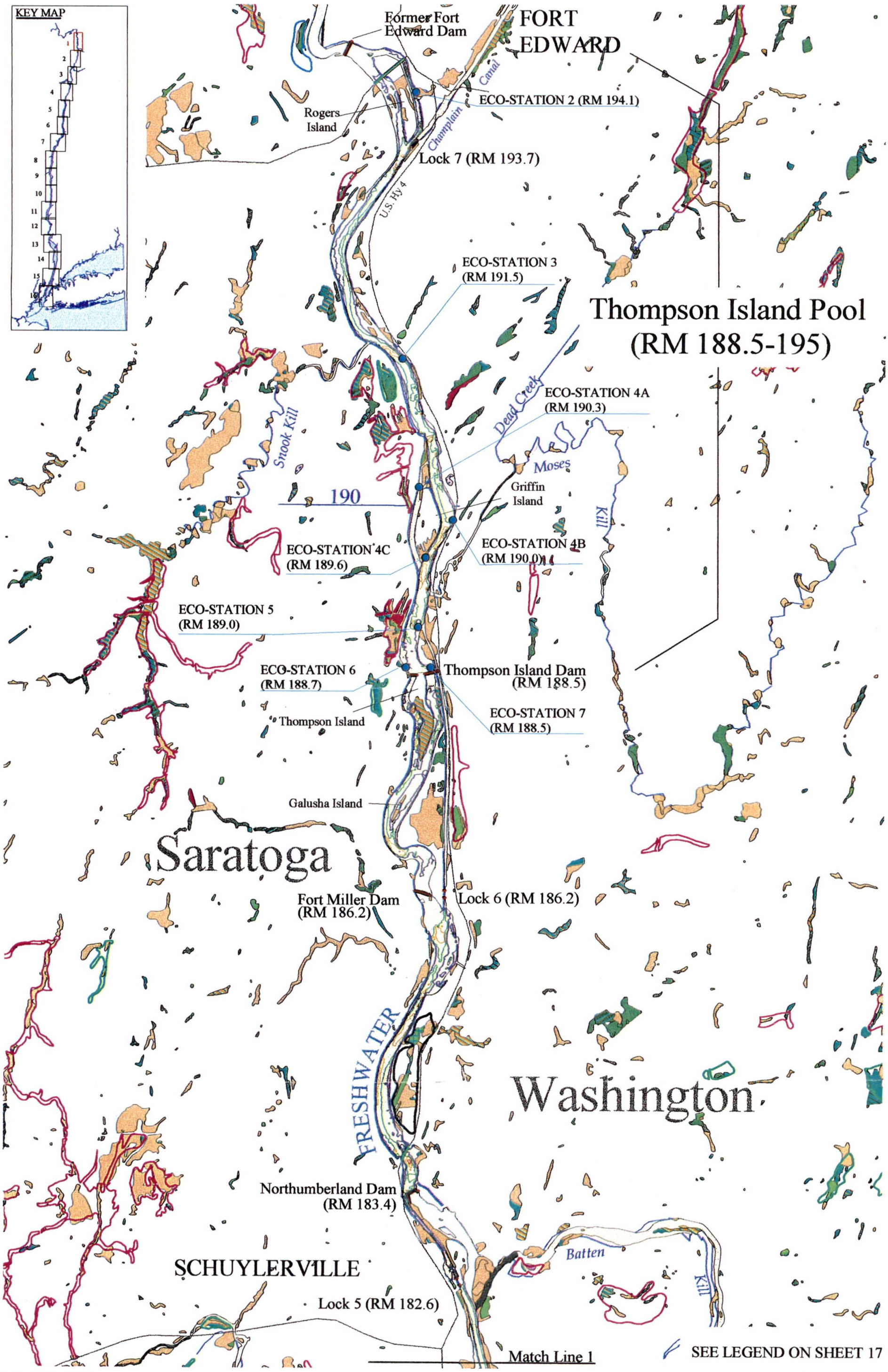
	Kingfisher	Kingfisher Egg	Bald Eagle	Bald Eagle Egg	Mink	River Otter
Assumption						
Fish concentration	0.91 - 0.98	0.76 - 0.85	0.91 - 0.98	0.52 - 0.89	0.52 - 0.83	0.87 - 0.95
Percent fish in diet	0.20 - 0.32	NA	0.10 - 0.22	NA	0.19 - 0.31	0.17 - 0.27
Benthic invertebrate concentration	0.02 - 0.08	NA	NA	NA	0.08 - 0.18	< -0.01
Percent aquatic invertebrates	0.02 - 0.10	NA	NA	NA	0.09 - 0.23	-0.14 - - 0.19
Ingestion rate	0.06 - 0.10	NA	0.08 - 0.14	NA	0.12 - 0.22	< -0.01
Body weight	-0.10 - -0.21	NA	-0.09 - -0.18	NA	-0.42 - -0.71	-0.07 - -0.15
Biomagnification factor	NA	0.48 - 0.78	NA	0.59 - 0.83	NA	NA
Toxicity reference value[1]	NA	-0.72 - -0.84	NA	NA	NA	NA

Notes:

1 -- The kingfisher egg TRV was the only TRV with a recommended uncertainty factor.

Plates

306542



Hudson River PCBs Reassessment RI/FS Revised Baseline Ecological Risk Assessment October, 2000	Plate 1 Habitat Map	Sheet 1 of 17

Match Line 1

Fish Creek

180

GREENWICH

KEY MAP

Saratoga

US Rte 4

FRESHWATER

Washington

STILLWATER

170

ECO-STATION 8A
(RM 169.5)

Match Line 2

WASHINGTON CO.

RENSSELAER CO.

ECO-STATION 8B
(RM 169.2)

SEE LEGEND ON SHEET 17

TAMS

TAMS Consultants, Inc.

N W E S

2000 0 2000 4000
Scale in Feet

500 0 500 1000 1500
Scale in Meters

Hudson River PCBs Reassessment RI/FS Revised Baseline Ecological Risk Assessment October, 2000	Plate 1 Habitat Map	Sheet 2 of 17

(RM 169.5)

Match Line 2

ECO-STATION 8B
(RM 169.2)

Lock 4 / Stillwater Dam
(RM 168.2)

Hoosic

MECHANICVILLE

Green Island

Lock 3
(RM 166.0)

Saratoga

River

Quack Island

Lock 2 (RM 163.5)

KEY MAP

FRESHWATER

Rensselaer

160

Lock 1 (RM 159.4)

ECO-STATION 9
(RM 159.0)

Campbell Island

WATERFORD

Mohawk

Erie

Canal

River

Peebles
Island

Match Line 3

SEE LEGEND ON SHEET 17

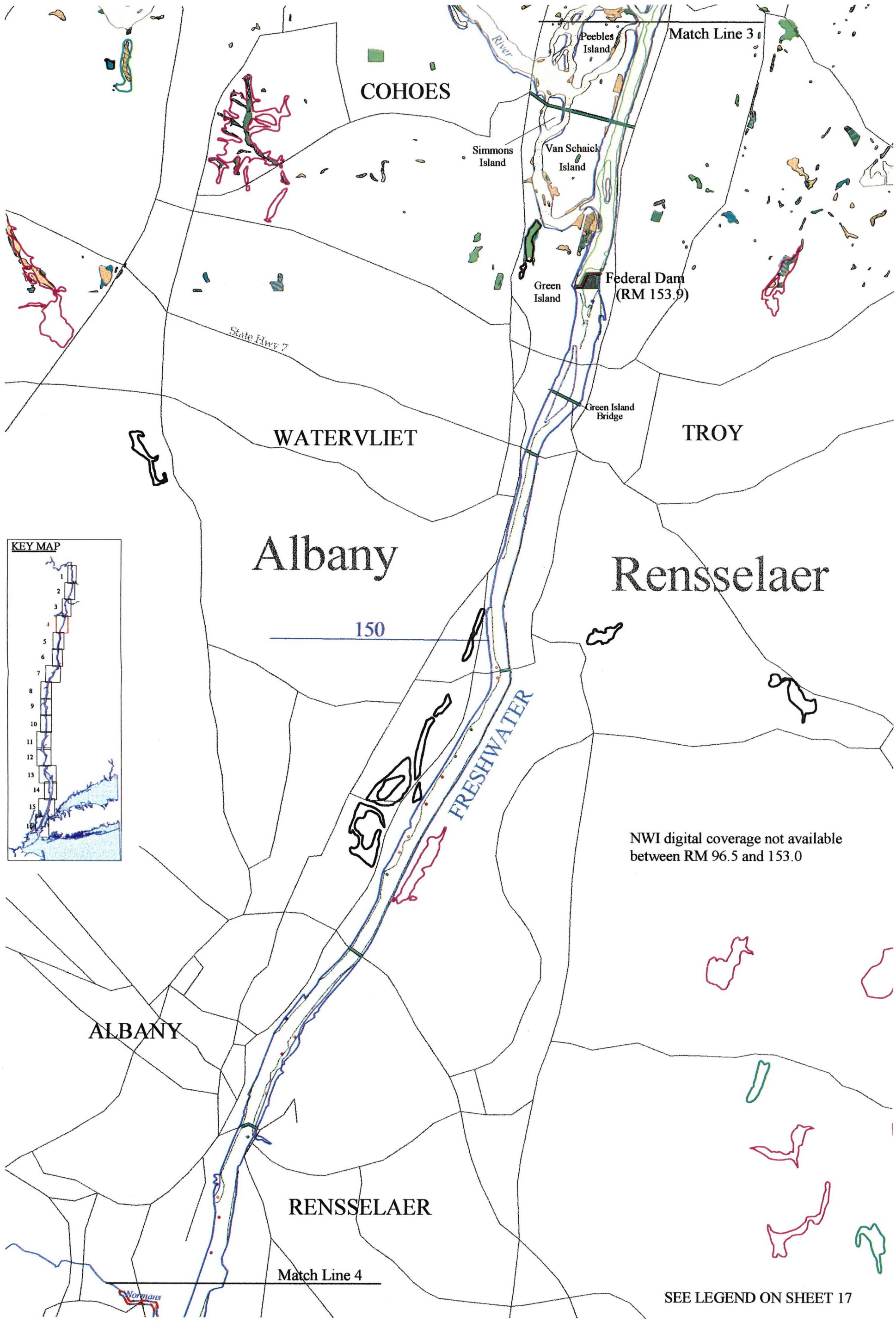
TAMS
TAMS Consultants, Inc.

N W E S

2000 0 2000 4000
Scale in Feet

500 0 500 1000 1500
Scale in Meters

Hudson River PCBs Reassessment RI/FS Revised Baseline Ecological Risk Assessment October, 2000	Plate 1 Habitat Map	Sheet 3 of 17



TAMS
TAMS Consultants, Inc.

N W E S

2000 0 2000 4000
Scale in Feet
500 0 500 1000 1500
Scale in Meters

Hudson River PCBs Reassessment RI/FS Revised Baseline Ecological Risk Assessment October, 2000	Plate 1 Habitat Map	Sheet 4 of 17

Match Line 4

Normans Kill

ECO-STATION 10
(RM 143.5)

140

Papscanee Marsh and Creek

FRESHWATER

KEY MAP

Shad and Schermerhorn Islands

Rensselaer

CASTLETON-
ON-HUDSON

ECO-STATION 11A
(RM 137.2)

ECO-STATION 11B
(RM 136.7)

NY State Thruway

Schodack and Houghtaling
Islands and Schodack Creek

NWI digital coverage not available
between RM 96.5 and 153.0

Coeymans Creek

RENSSELAER CO.
COLUMBIA CO.

Hannacroix Creek

ALBANY CO.
GREENE CO.

Match Line 5

SEE LEGEND ON SHEET 17

TAMS
TAMS Consultants, Inc.

N W E S

2000 0 2000 4000
Scale in Feet

500 0 500 1000 1500
Scale in Meters

Hudson River PCBs Reassessment RI/FS Revised Baseline Ecological Risk Assessment October, 2000	Plate 1 Habitat Map	Sheet 5 of 17

ALBANY CO.
GREENE CO.

Match Line 5

130

KEY MAP

Mill Creek Wetlands

NWI digital coverage not available between RM 96.5 and 153.0

FRESHWATER

Columbia

Coxsackie Creek

Rattlesnake Island

Coxsackie Island Backwater

Coxsackie Island

COXSACKIE

Stockport Creek and Flats

Greene

ECO-STATION 12A (RM 122.7)

Stockport Middle Ground Island

ECO-STATION 12B (RM 122.4)

Vosburgh Swamp and Middle Ground Flats

Stockport

Creek

Match Line 6

120

Sleepy Hollow Lake

SEE LEGEND ON SHEET 17

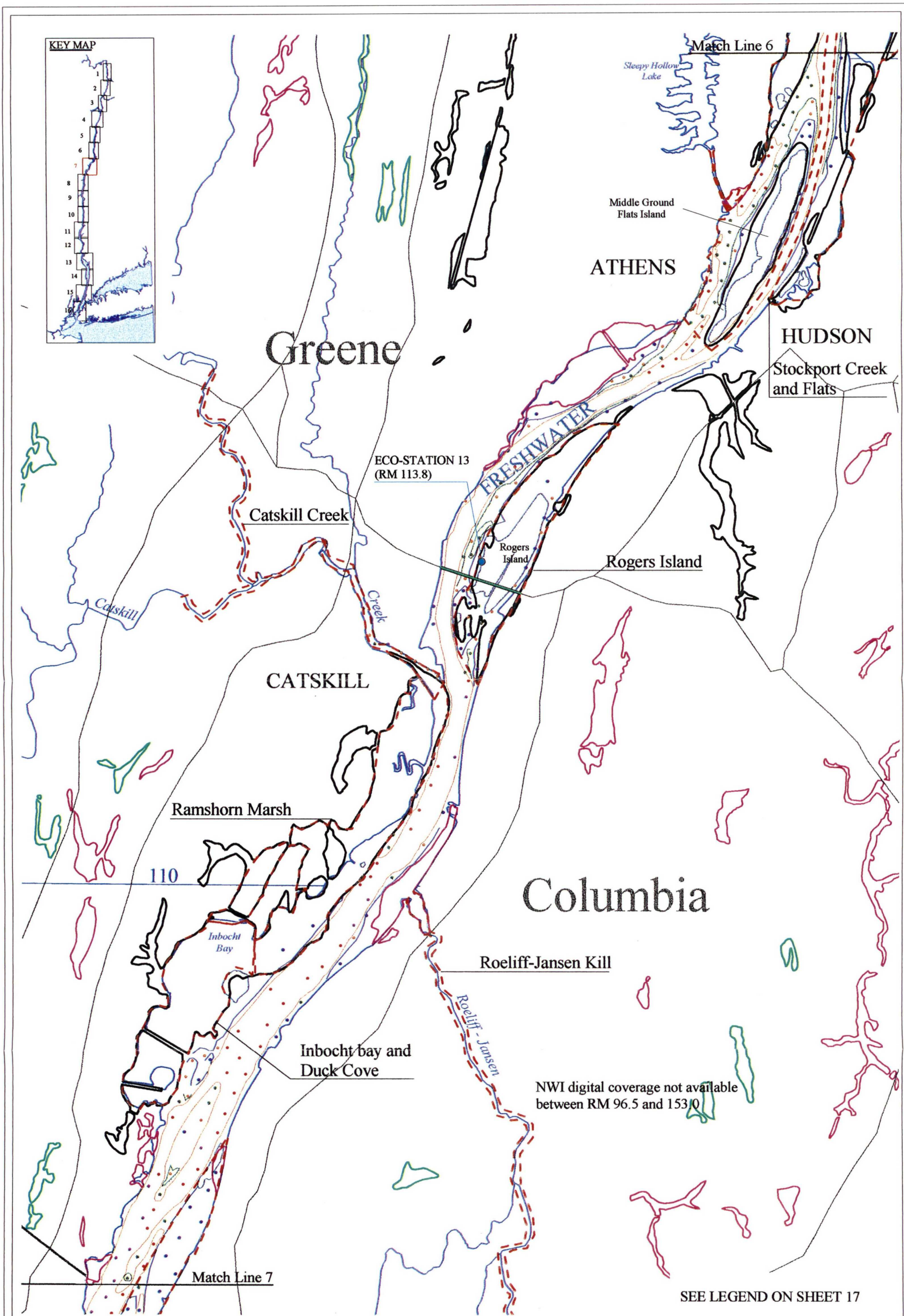
TAMS
TAMS Consultants, Inc.

N W E S

2000 0 2000 4000
Scale in Feet

500 0 500 1000 1500
Scale in Meters

Hudson River PCBs Reassessment RI/FS Revised Baseline Ecological Risk Assessment October, 2000	Plate 1 Habitat Map	Sheet 6 of 17



TAMS
TAMS Consultants, Inc.

N W E S

2000 0 2000 4000
Scale in Feet

500 0 500 1000 1500
Scale in Meters

Hudson River PCBs Reassessment RI/FS Revised Baseline Ecological Risk Assessment October, 2000	Plate 1 Habitat Map	Sheet 7 of 17

NWI digital coverage not available between RM 96.5 and 153.0

Match Line 7

Germantown-Clermont Flats

Ulster

Esopus Estuary

Creek

Esopus

COLUMBIA CO.
DUTCHESS CO.

SAUGERTIES

TIVOLI

100

KEY MAP

ECO-STATION 14
(RM 100.0)

North and South Tivoli Bays

FRESHWATER

Dutchess

The Flats

Kingston-Rhinecliff Bridge

Match Line 8

SEE LEGEND ON SHEET 17

TAMS
TAMS Consultants, Inc.

N W E S

2000 0 2000 4000
Scale in Feet

500 0 500 1000 1500
Scale in Meters

Hudson River PCBs Reassessment RI/FS Revised Baseline Ecological Risk Assessment October, 2000	Plate 1 Habitat Map	Sheet 8 of 17

Match Line 8

KINGSTON

Dutchess

Rondout Creek

Creek

Rondout

90

Vanderburgh Cove
and Shallows

Kingston Deepwater

FRESHWATER

ECO-STATION 15A
(RM 89.4)

Esopus
Meadows

ECO-STATION 15B
(RM 88.9)

Ulster

KEY MAP

Match Line 9

SEE LEGEND ON SHEET 17

TAMS

TAMS Consultants, Inc.

N W E S

2000 0 2000 4000
Scale in Feet

500 0 500 1000 1500
Scale in Meters

Hudson River PCBs Reassessment RI/FS Revised Baseline Ecological Risk Assessment October, 2000	Plate 1 Habitat Map	Sheet 9 of 17

Match Line 9

80

Poughkeepsie
Deepwater

FAIRVIEW

Ulster

FRESHWATER

Mid-Hudson
Bridge

End of Freshwater
Start of Brackish Water

POUGHKEEPSIE

U.S. Hy No. 9

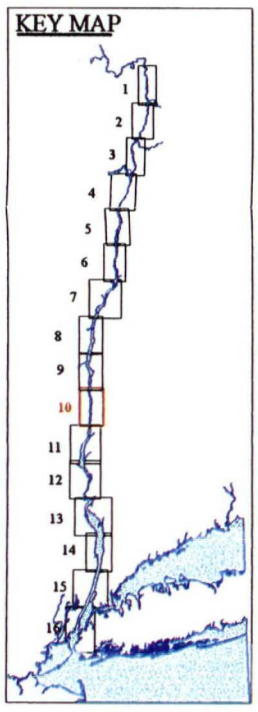
BRACKISH WATER

Dutchess

Match Line 10

SEE LEGEND ON SHEET 17

KEY MAP



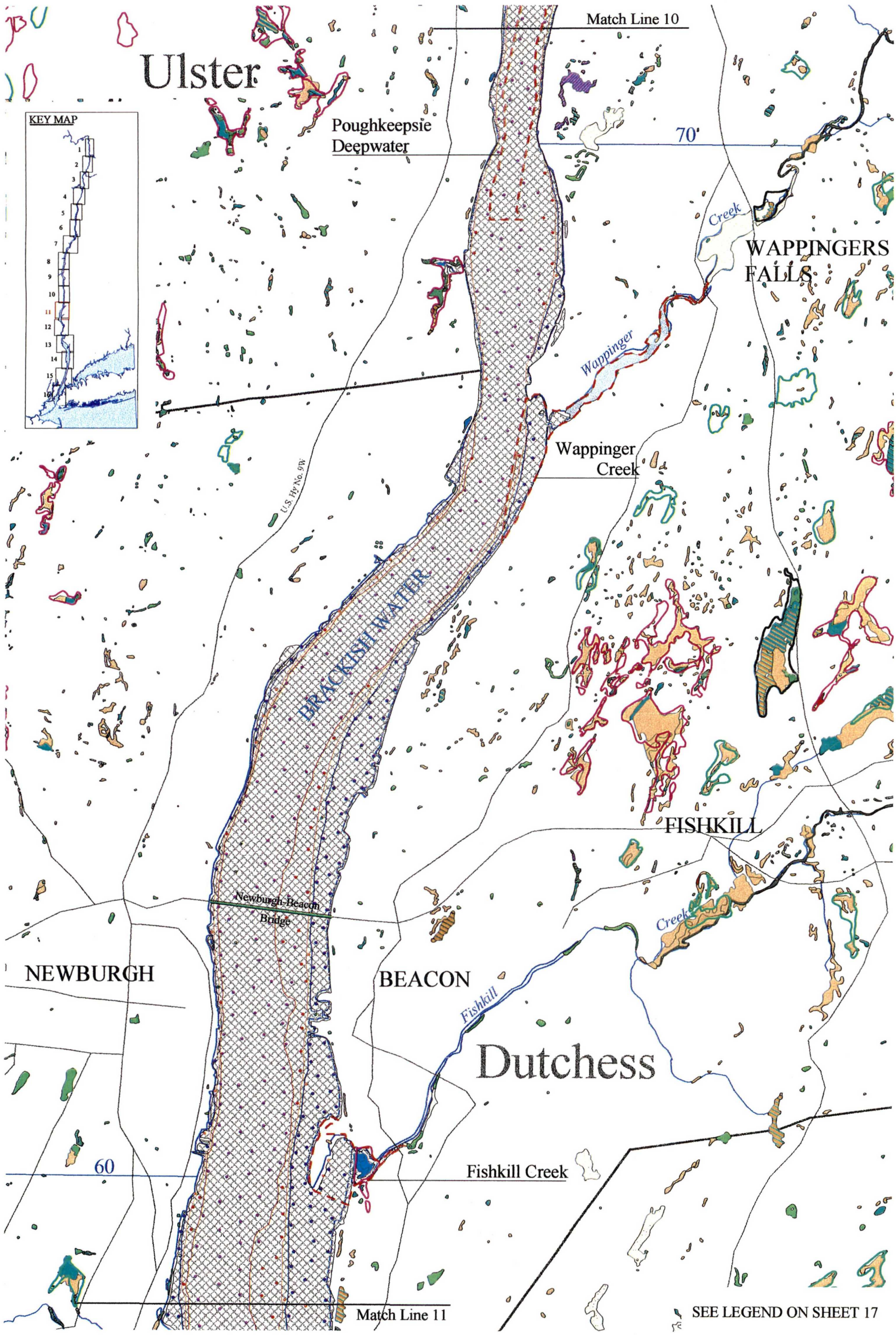
TAMS
TAMS Consultants, Inc.

N
W E
S

2000 0 2000 4000
Scale in Feet

500 0 500 1000 1500
Scale in Meters

Hudson River PCBs Reassessment RI/FS Revised Baseline Ecological Risk Assessment October, 2000	Plate 1 Habitat Map	Sheet 10 of 17



TAMS

TAMS Consultants, Inc.

N W E S

2000 0 2000 4000
Scale in Feet

500 0 500 1000 1500
Scale in Meters

Hudson River PCBs Reassessment RI/FS Revised Baseline Ecological Risk Assessment October, 2000	Plate 1 Habitat Map	Sheet 11 of 17

Match Line 11

ECO-STATION 16
(RM 58.7)

Moodna Creek

Moodna Creek

Orange

CORNWALL

Putnam

COLD SPRING

Hudson River Miles 44-56

KEY MAP

Constitution Marsh

Constitution Island

HIGHLAND FALLS

BRACKISH WATER

50

PUTNAM CO.

WESTCHESTER CO.

Bear Mountain Bridge

Iona Island Marsh

ECO-STATION 17
(RM 47.3)

Iowa Island

Match Line 12

SEE LEGEND ON SHEET 17

TAMS

TAMS Consultants, Inc.

N W E S

2000 0 2000 4000
Scale in Feet

500 0 500 1000 1500
Scale in Meters

Hudson River PCBs Reassessment RI/FS Revised Baseline Ecological Risk Assessment October, 2000	Plate 1 Habitat Map	Sheet 12 of 17

Match Line 12

Iona Island Marsh

Hudson River
Miles 44-56

PEEKSKILL

KEY MAP

End of Brackish Water

Start of Salt Water

40

Westchester

Croton River

Haverstraw Bay

SALT WATER

HAVERSTRAW

Croton River and Bay

OSSINING

NEW CITY

Match Line 13

SEE LEGEND ON SHEET 17

TAMS
TAMS Consultants, Inc.

N W E S

2000 0 2000 4000
Scale in Feet

500 0 500 1000 1500
Scale in Meters

Hudson River PCBs Reassessment RI/FS Revised Baseline Ecological Risk Assessment October, 2000	Plate 1 Habitat Map	Sheet 13 of 17

Match Line 13

30

OSSINING

NYACK

Tappan Zee Bridge

Westchester.

Rockland

TARRYTOWN

Piermont Marsh

ECO-STATION 18
(RM 25.8)

KEY MAP

SALT MARSH

20

Match Line 14

SEE LEGEND ON SHEET 17

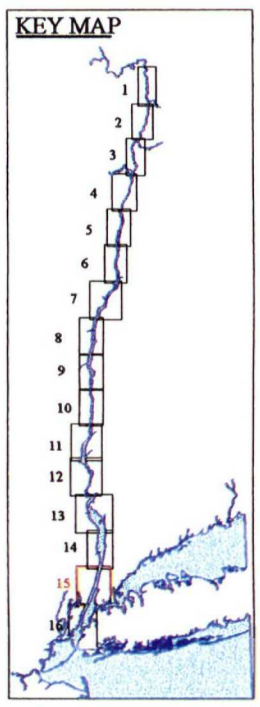
TAMS
TAMS Consultants, Inc.

N W E S

2000 0 2000 4000
Scale in Feet

500 0 500 1000 1500
Scale in Meters

Hudson River PCBs Reassessment RI/FS Revised Baseline Ecological Risk Assessment October, 2000	Plate 1 Habitat Map	Sheet 14 of 17



Match Line 14

YONKERS

Westchester

TENAFLY

ENGLEWOOD

WETCHESTER CO.

BRONX CO.

SALT WATER

River

FORT LEE

George Washington Bridge

10

Bronx

Harlem

Match Line 15

SEE LEGEND ON SHEET 17

TAMS

TAMS Consultants, Inc.

N W E S

2000 0 2000 4000
Scale in Feet

500 0 500 1000 1500
Scale in Meters

Hudson River PCBs Reassessment RI/FS Revised Baseline Ecological Risk Assessment October, 2000	Plate 1 Habitat Map	Sheet 15 of 17

Match Line 15

SALT WATER

Lincoln Tunnel

HOBOKEN

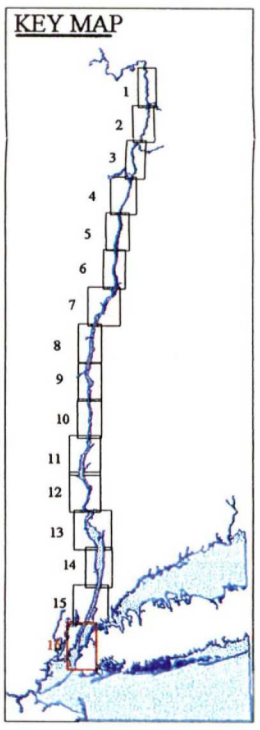
Holland Tunnel

JERSEY CITY

Kings

SALT WATER

KEY MAP



SEE LEGEND ON SHEET 17

TAMS

TAMS Consultants, Inc.

N W E S

2000 0 2000 4000
Scale in Feet

500 0 500 1000 1500
Scale in Meters

Hudson River PCBs Reassessment RI/FS Revised Baseline Ecological Risk Assessment October, 2000	Plate 1 Habitat Map	Sheet 16 of 17

LEGEND

FRESHWATER — Water Salinity Boundary
Road
Dam and Lock
Bridge
Match Line
River Mile Marker
Ulster — County
TROY — Town
Shoreline

Approximate Water Depth
(Sounding measurements in feet)

- 0 - 5
- 6 - 11
- 12 - 17
- 18 - 29
- 30 - 1000

Significant Habitat (NYSDOS, 1987)

Ecological Sampling Locations
(Hudson River Database, August, 2000)

Approximate Water Depth
(Contour lines in feet)

- 6
- 12
- 18
- 30

New York Regulated Wetlands (NYSDEC: From Article 24 of the Environmental Conservation Law)

- Class I Wetlands
- Class II Wetlands
- Class III Wetlands
- Class IV Wetlands

National Wetlands Inventory (U.S. Fish and Wildlife Service)
Categories divided into Class

- E1OW : ESTURARINE SUB-TIDAL OPEN WATER
- E1UB : ESTUARINE SUB-TIDAL UNCONSOLIDATED BOTTOM
- E2AB : ESTUARINE INTERTIDAL AQUATIC BED
- E2EM : ESTUARINE INTERTIDAL EMERGENT
- E2EM/OW : ESTUARINE INTERTIDAL EMERGENT/OPEN WATER
- E2FL : ESTURARINE INTERTIDAL FLATS
- E2RS : ESTURATINE INTERTIDAL ROCKY
- E2SB : ESTUARINE INTERTIDAL STREAMBED
- E2SS/EM : ESTUARINE INTERTIDAL SCRUB-SHRUB/EMERGENT
- E2US : ESTUARINE INTERTIDAL UNCONSOLIDATED SHORE
- L1UB : LACUSTRINE LIMNETIC UNCONSOLIDATED BOTTOM
- L2US : LACUSTRINE LITTORAL UNCONSOLIDATED SHORE
- L2AB : LACUSTRINE LITTORAL AQUATIC BED
- L2EM : LACUSTRINE LITTORAL EMERGENT
- L2UB : LACUSTRINE LITTORAL UNCONSOLIDATED BOTTOM
- L2US : LACUSTRINE LITTORAL UNCONSOLIDATED SHORE
- PAB : PALUSTRINE AQUATIC BED
- PAB/SS : PALUSTRINE AQUATIC BED/SCRUB-SHRUB
- PAB/UB : PALUSTRINE AQUATIC BED/UNCONSOLIDATED BOTTOM
- PEM : PALUSTRINE EMERGENT
- PEM/AB : PALUSTRINE EMERGENT/AQUATIC BED
- PEM/FO : PALUSTRINE EMERGENT/FORESTED
- PEM/SS : PALUSTRINE EMERGENT/SCRUB-SHRUB
- PEM/UB : PALUSTRINE EMERGENT/UNCONSOLIDATED BOTTOM
- Pf : PALUSTRINE FARMED
- Pfd : PALUSTRINE FARMED PARTIALLY DRAINED DITCHED
- Pfh : PALUSTRINE FARMED DIKED IMPOUNDED
- Primarely Upland Areas, but may include unclassified wetlands such as man-modified areas, non photoidentifiable areas and/or unintentional omissions
- PFL : PALUSTRINE FLAT
- PFO : PALUSTRINE FORESTED
- PFO/EM : PALUSTRINE FORESTED/EMERGENT
- PFO/SS : PALUSTRINE FORESTED/SCRUB-SHRUB
- PFO/UB : PALUSTRINE FORESTED/UNCONSOLIDATED BOTTOM
- POW : PALUSTRINE OPEN WATER
- PSS : PALUSTRINE SCRUB-SHRUB
- PSS/AB : PALUSTRINE SCRUB-SHRUB/AQUATIC BED
- PSS/EM : PALUSTRINE SCRUB-SHRUB/EMERGENT
- PSS/FO : PALUSTRINE SCRUB-SHRUB/FORESTED
- PSS/UB : PALUSTRINE SCRUB-SHRUB/UNCONSOLIDATED BOTTOM
- PSS/US : PALUSTRINE SCRUB-SHRUB/UNCONSOLIDATED SHORE
- PUB : PALUSTRINE UNCONSOLIDATED BOTTOM
- PUB/AB : PALUSTRINE UNCONSOLIDATED BOTTOM/AQUATIC BED
- PUB/EM : PALUSTRINE UNCONSOLIDATED BOTTOM/EMERGENT
- PUB/FO : PALUSTRINE UNCONSOLIDATED BOTTOM/FORESTED
- PUB/SS : PALUSTRINE UNCONSOLIDATED BOTTOM/SCRUB-SHRUB
- PUS : PALUSTRINE UNCONSOLIDATED SHORE
- R1AB/EM : RIVERINE TIDAL AQUATIC BED/EMERGENT
- R1EM : RIVERINE TIDAL EMERGENT
- R1OW : RIVERINE TIDAL OPEN WATER
- R1UB : RIVERINE TIDAL UNCONSOLIDATED BOTTOM
- R1US : RIVERINE TIDAL UNCONSOLIDATED SHORE
- R2UB : RIVERINE LOWER PERENNIAL UNCONSOLIDATED BOTTOM
- R2US : RIVERINE LOWER PERENNIAL UNCONSOLIDATED SHORE
- R3RB : RIVERINE UPPER PERENNIAL ROCK
- R3UB : RIVERINE UPPER PERENNIAL UNCONSOLIDATED BOTTOM
- R3US : RIVERINE UPPER PERENNIAL UNCONSOLIDATED SHORE

Notes:

1) The digital maps are NOT the official maps. While considerable effort has been made to ensure that the digital maps are an accurate representation of the official maps, they should be used with an awareness of the possibility of error.

2) There is a gap in the NWI digital coverage between RM 96.5 and 153.0 Therefore, only the NYS Regulated Wetlands are presented for this portion of the river.

3) Federal Dam on Sheet No. 4 marks the division between the Upper Hudson River and Lower Hudson River.

4) Coordinate System used: New York East State Plane, NAD 27.

Sources:

National Wetlands Inventory were downloaded from U.S. Fish and Wildlife Service at http://wetlands.fws.gov/. Coordinate systems were transformed from UTM 18, NAD27 to NY (East) State Plate, NAD27.

New York State Regulated Wetlands were downloaded from Cornell Web site: http://cugir.mannlib.cornell.edu/browse_lis/browse_lis.html. The data is based on the Freshwater Wetlands Mapping and Classification Regulations (6 NYCRR Part 664), Persuant to Article 24 of the Environmental Conservation Law. Wetland lines indicate "the approximate location of the actual boundaries of the wetlands" (ECL 24-0301(3)). For a final determination of the actual location of a wetland it is necessary to contact the DEC office for the region in which the wetland occurs.

Above Lock 5, contour lines (in feet) were provided in elevation (New York State Barge Canal Datum). The elevation for the water surface was calculated for each pool based on a flow of 3,090 cfs. The water depth was obtained by subtracting the river bottom elevation from the water surface elevation, then rounded to the closest 0.5 foot. Below Lock 5, the bathymetry information was digitized from the NOAA Digital Nautical Charts.

The significant habitat locations and the water salinity boundaries were taken from New York State Department of State (NYSDOS) Hudson River Significant Coastal Fish and Wildlife Habitat Documentation, November 15, 1987.

The Upper Hudson River shoreline, rivermiles, the dams and locks and the Ecological Sampling Locations were taken from the Database for the Hudson River PCBs Reassessment RI/FS, Release 5, August 2000, TAMS Consultants and Environmental Protection Agency.

Roads and Lower Hudson River county boundaries were taken from the Hudson River Watershed Database & Mapping Project, developped by NOAA, Office of Response and Restoration, Coastal Protection and Restoration Division.

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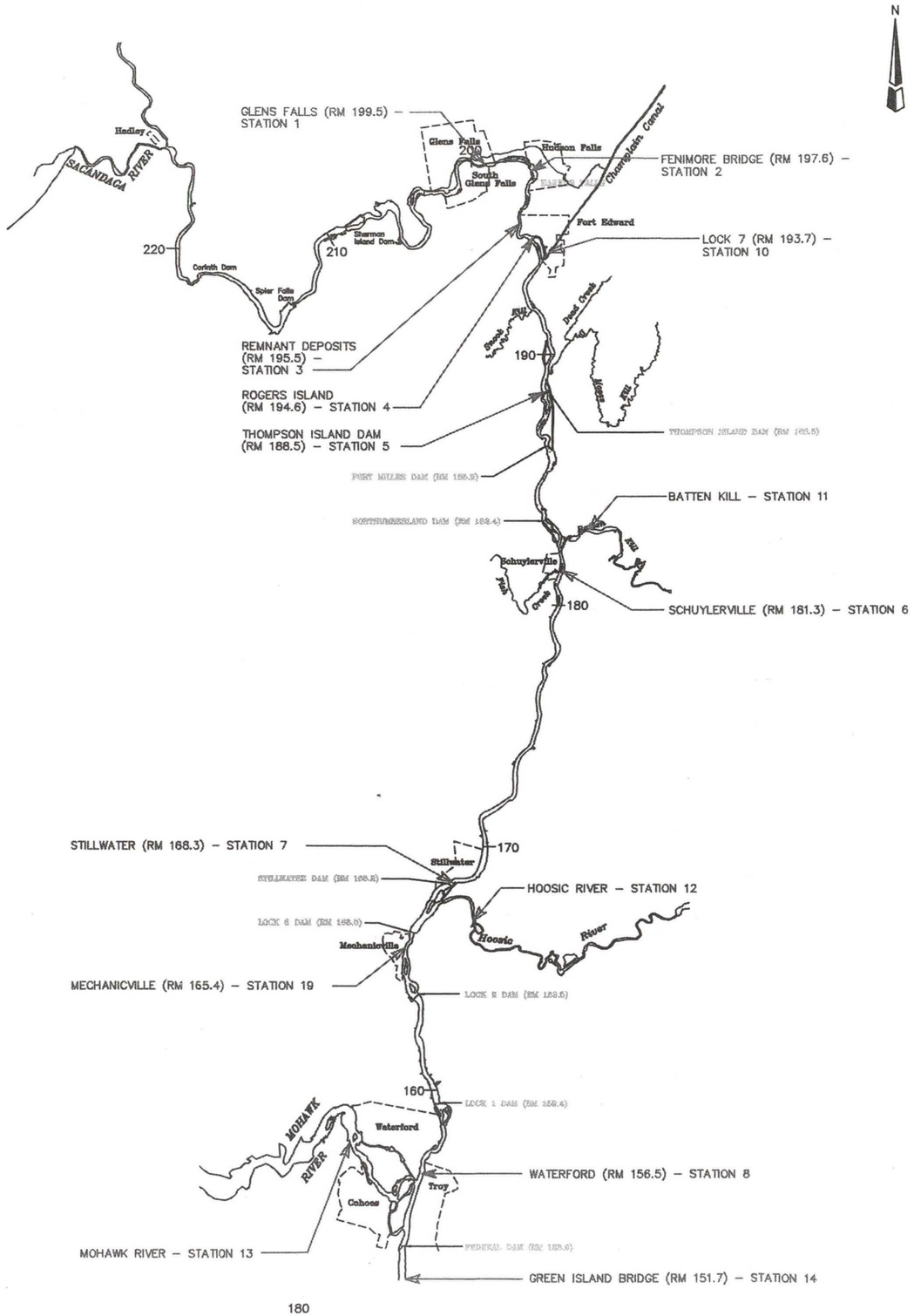
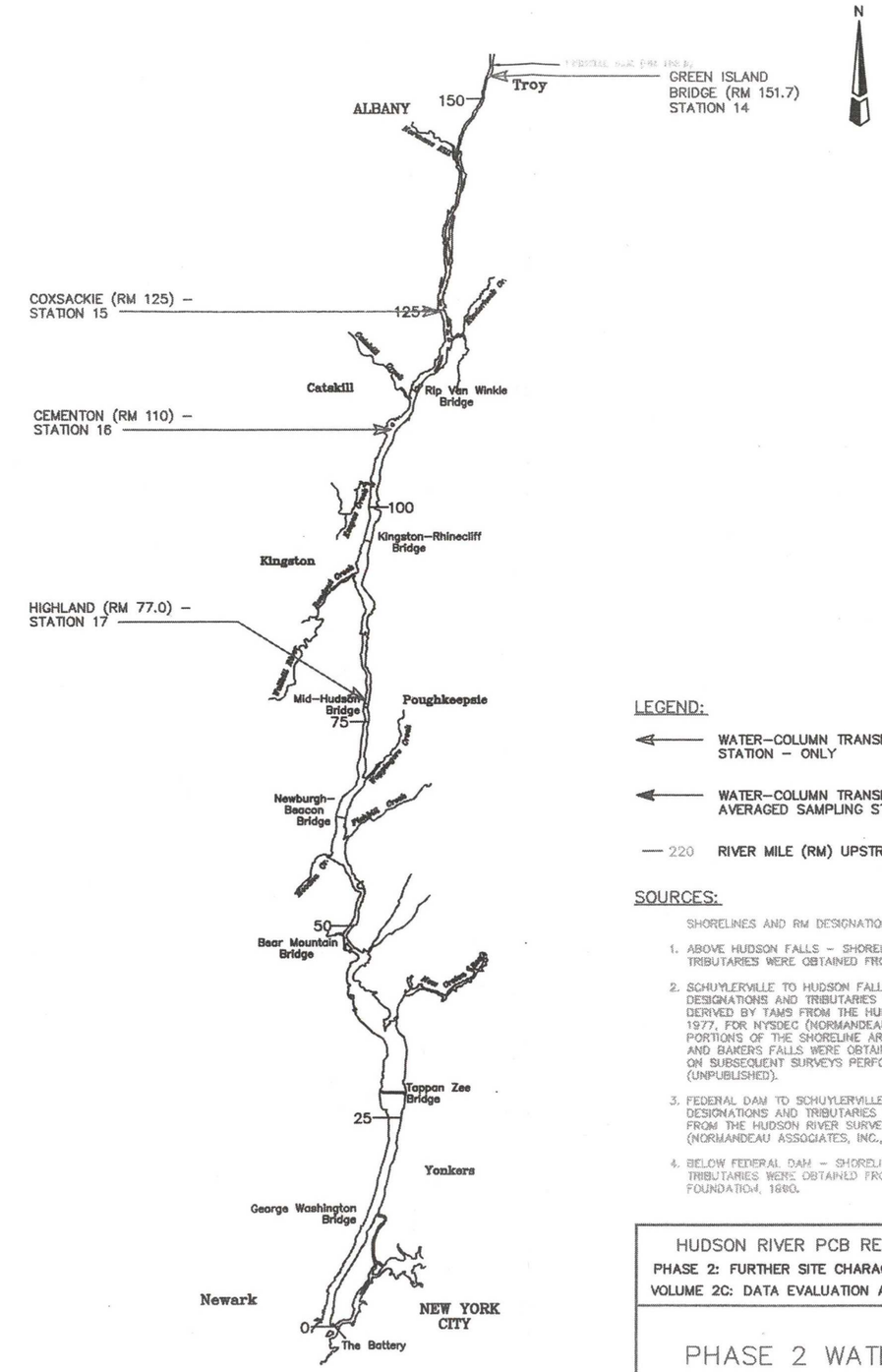
N W E S

2000 0 2000 4000
Scale in Feet
500 0 500 1000 1500
Scale in Meters

Hudson River PCBs Reassessment RI/FS Revised Baseline Ecological Risk Assessment October, 2000	Plate 1 Habitat Map	Sheet 17 of 17



UPPER HUDSON RIVER



LOWER HUDSON RIVER

LEGEND:

WATER–COLUMN TRANSECT SAMPLING STATION – ONLY

WATER–COLUMN TRANSECT AND FLOW–AVERAGED SAMPLING STATION

— 220 RIVER MILE (RM) UPSTREAM OF THE BATTERY

SOURCES:

SHORELINES AND RM DESIGNATIONS ARE APPROXIMATE.

1. ABOVE HUDSON FALLS – SHORELINE, RM DESIGNATIONS AND TRIBUTARIES WERE OBTAINED FROM USGS TOPOGRAPHIC MAPS.
2. SCHUYLERVILLE TO HUDSON FALLS – SHORELINE, RM DESIGNATIONS AND TRIBUTARIES WERE PRINCIPALLY DERIVED BY TAMS FROM THE HUDSON RIVER SURVEY, 1976–1977, FOR NYSDEC (NORMANDEAU ASSOCIATES, INC., 1977). PORTIONS OF THE SHORELINE AROUND ROGERS ISLAND AND BAKERS FALLS WERE OBTAINED FROM NYSDEC BASED ON SUBSEQUENT SURVEYS PERFORMED IN 1988–1992 (UNPUBLISHED).
3. FEDERAL DAM TO SCHUYLERVILLE – SHORELINE, RM DESIGNATIONS AND TRIBUTARIES WERE DERIVED BY GE FROM THE HUDSON RIVER SURVEY, 1976–1977, FOR NYSDEC (NORMANDEAU ASSOCIATES, INC., 1977).
4. BELOW FEDERAL DAM – SHORELINE, RM DESIGNATIONS AND TRIBUTARIES WERE OBTAINED FROM THE HUDSON RIVER FOUNDATION, 1990.

HUDSON RIVER PCB REASSESSMENT RI/FS
PHASE 2: FURTHER SITE CHARACTERIZATION AND ANALYSIS
VOLUME 2C: DATA EVALUATION AND INTERPRETATION REPORT

PHASE 2 WATER–COLUMN SAMPLING LOCATIONS IN HUDSON RIVER

TAMS / Gradient

PLATE 2

File No. 49 File Name: PLATE1-2.dwg Date: 11-23-94 User: PM