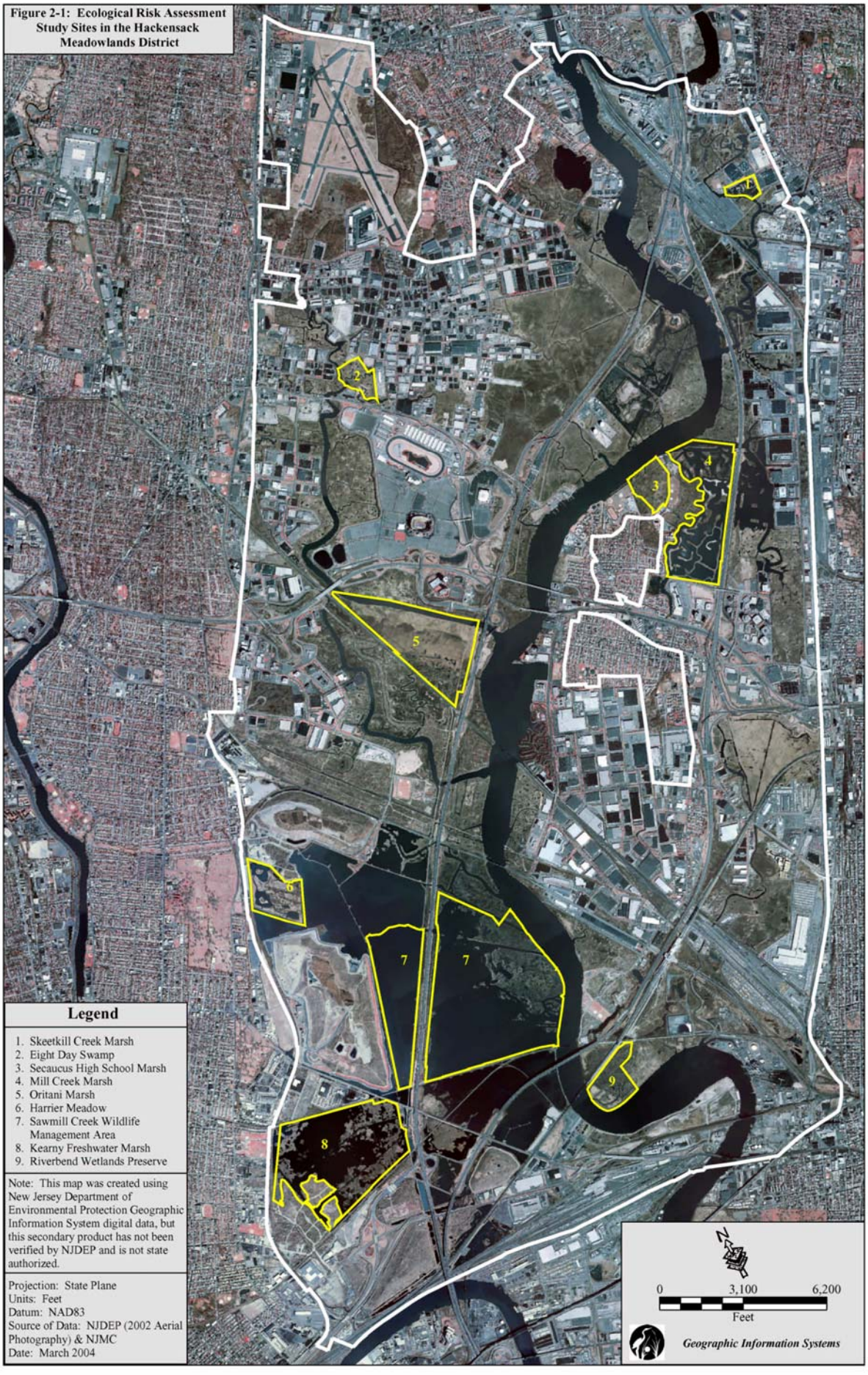
Figure 2-1: Ecological Risk Assessment Study Sites in the Hackensack Meadowlands District



Legend

1. Skeetkill Creek Marsh
2. Eight Day Swamp
3. Secaucus High School Marsh
4. Mill Creek Marsh
5. Oritani Marsh
6. Harrier Meadow
7. Sawmill Creek Wildlife Management Area
8. Kearny Freshwater Marsh
9. Riverbend Wetlands Preserve

Note: This map was created using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state authorized.

Projection: State Plane
Units: Feet
Datum: NAD83
Source of Data: NJDEP (2002 Aerial Photography) & NJMC
Date: March 2004

N

0 3,100 6,200
Feet

Geographic Information Systems

X:\Projects\Site-Location\NJ\Hackensack\AISA_MAPS\AISA_Riverbend.mxd

Map Location	Legend	MEADOWLANDS ENV. RESEARCH INST	N
	Sample Sites Sediment Benthic & Sediment Image Source: Spectrum Mapping, L.L.C.	Riverbend Marsh	ENSR INTERNATIONAL
	Scale: 0 500 1,000 Feet	Date: September 26, 2003	Figure 2-2

X:\Projects\Site-Location\NJ\Hackensack\AISA_MAPS\AISA_Seacaucus.mxd

Map Location	Legend	MEADOWLANDS ENV. RESEARCH INST	N
	Sample Sites Sediment Benthic & Sediment Image Source: Spectrum Mapping, L.L.C.	Secaucus High School Marsh	ENSR INTERNATIONAL
	Scale: 0 500 1,000 Feet	Date: September 26, 2003	Figure 2-3

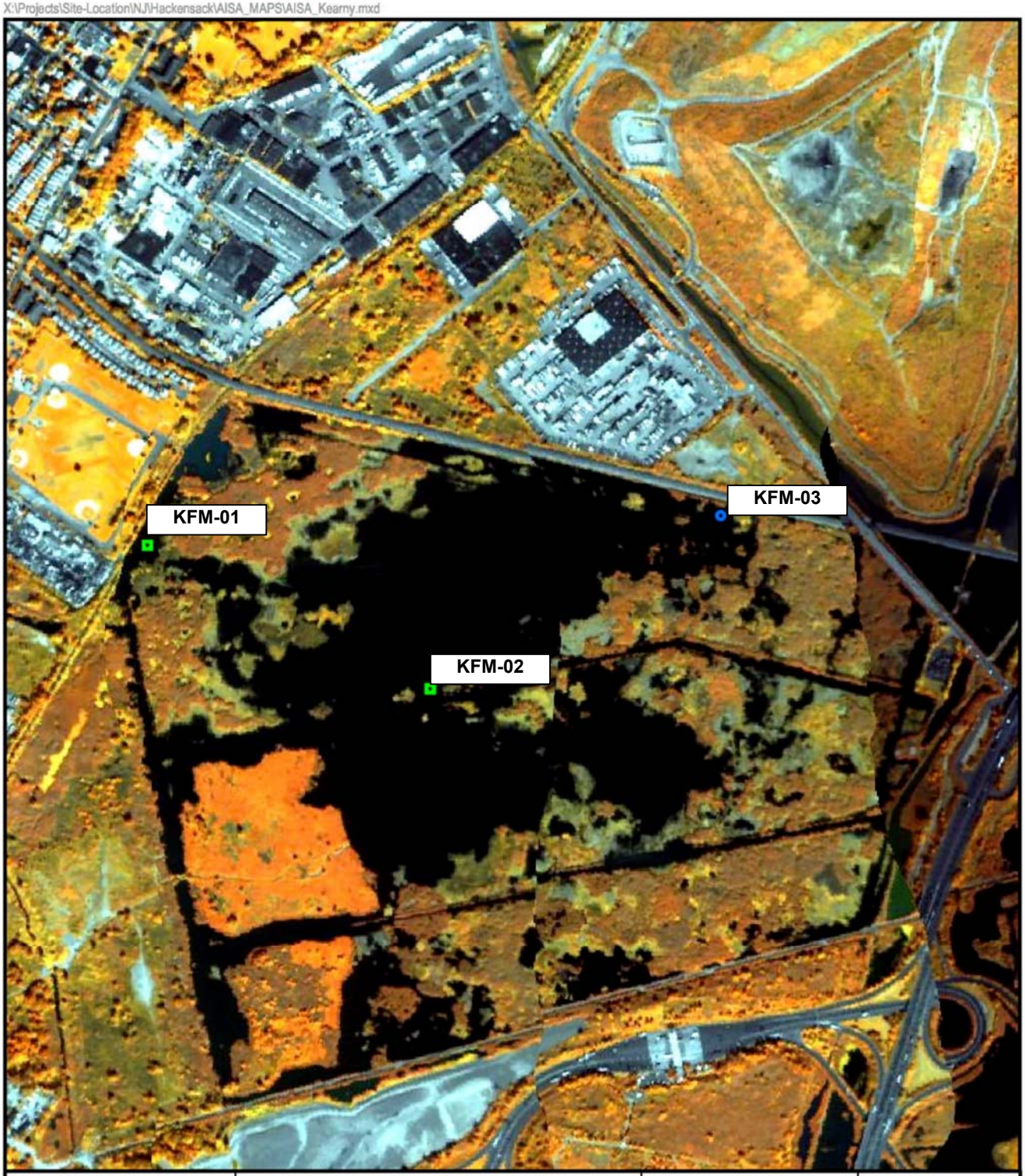
X:\Projects\Site-Location\NJ\Hackensack\AISA_MAPS\AISA_Sawmill-Site02.mxd

Map Location	Legend	MEADOWLANDS ENV. RESEARCH INST	N
	Sample Sites Sediment Benthic & Sediment Image Source: Spectrum Mapping, L.L.C.	Sawmill Marsh	ENSR INTERNATIONAL
	Scale: 0 500 1,000 Feet	Date: September 26, 2003	Figure 2-4

X:\Projects\Site-Location\NJ\Hackensack\AISA_MAPS\AISA_Oritani.mxd

Map Location	Legend	MEADOWLANDS ENV. RESEARCH INST	N
	Sample Sites Sediment Benthic & Sediment Image Source: Spectrum Mapping, L.L.C.	Oritani Marsh	ENSR INTERNATIONAL
	Scale: 0 500 1,000 Feet	Date: September 26, 2003	Figure 2-5

X:\Projects\Site-Location\NJ\Hackensack\AISA_MAPS\AISA_Kearny.mxd



Map Location	Legend	MEADOWLANDS ENV. RESEARCH INST	N
	Sample Sites Sediment Benthic & Sediment Image Source: Spectrum Mapping, L.L.C.	Kearny Freshwater Marsh	ENSR INTERNATIONAL
	Scale: 0 500 1,000 Feet	Date: September 26, 2003	Figure 2-6

Figure 4-1. U.S. EPA. Superfund Ecological Risk Assessment Process

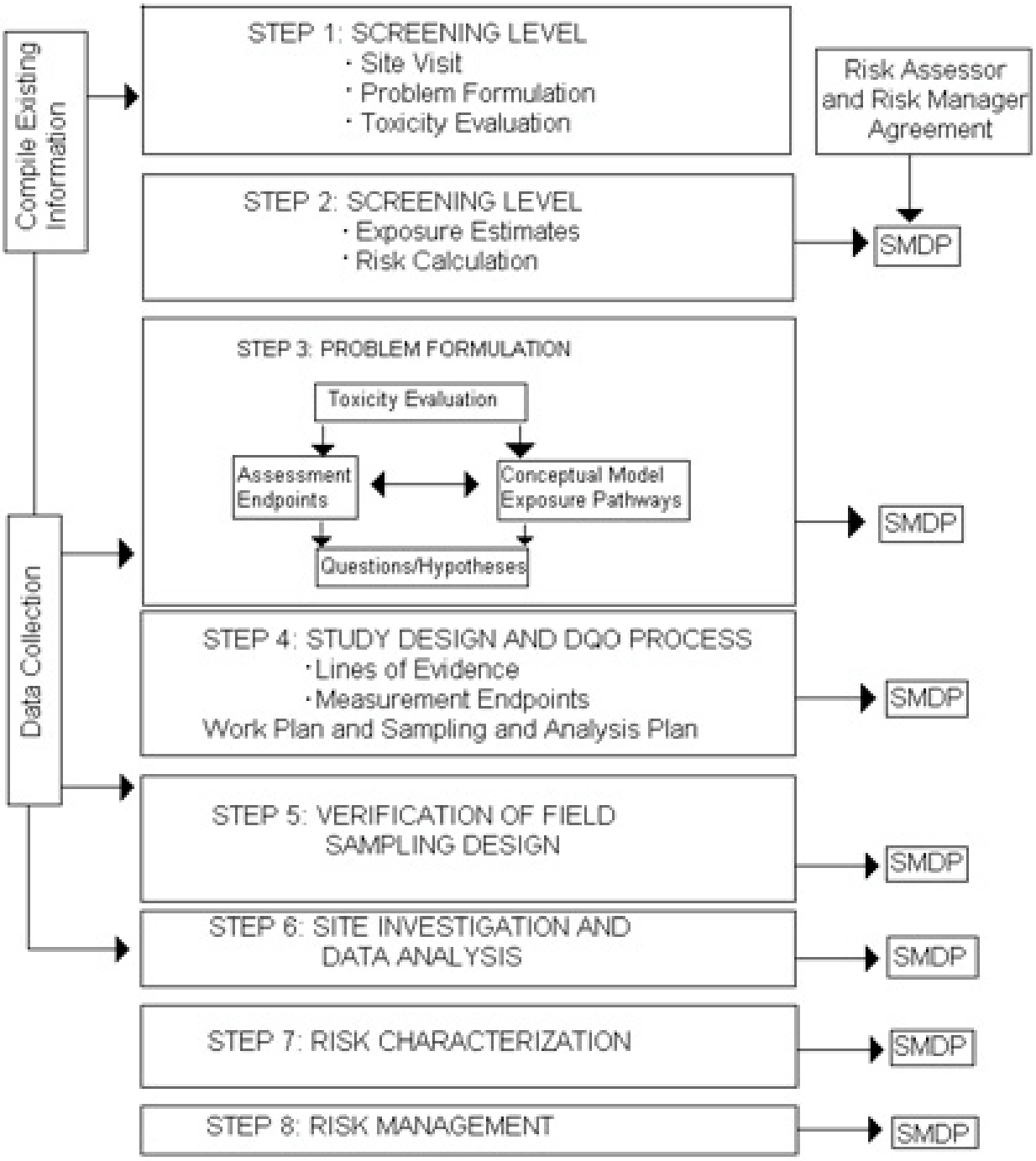

Compile Existing Information
STEP 1: SCREENING LEVEL
· Site Visit
· Problem Formulation
· Toxicity Evaluation
Risk Assessor and Risk Manager Agreement
STEP 2: SCREENING LEVEL
· Exposure Estimates
· Risk Calculation
SMDP
STEP 3: PROBLEM FORMULATION
Toxicity Evaluation
Assessment Endpoints
Conceptual Model Exposure Pathways
Questions/Hypotheses
SMDP
Data Collection
STEP 4: STUDY DESIGN AND DQO PROCESS
· Lines of Evidence
· Measurement Endpoints
Work Plan and Sampling and Analysis Plan
SMDP
STEP 5: VERIFICATION OF FIELD SAMPLING DESIGN
SMDP
STEP 6: SITE INVESTIGATION AND DATA ANALYSIS
SMDP
STEP 7: RISK CHARACTERIZATION
SMDP
STEP 8: RISK MANAGEMENT
SMDP

Figure 4-2. Conceptual Site Model – Meadowlands Wetland Risk Assessment

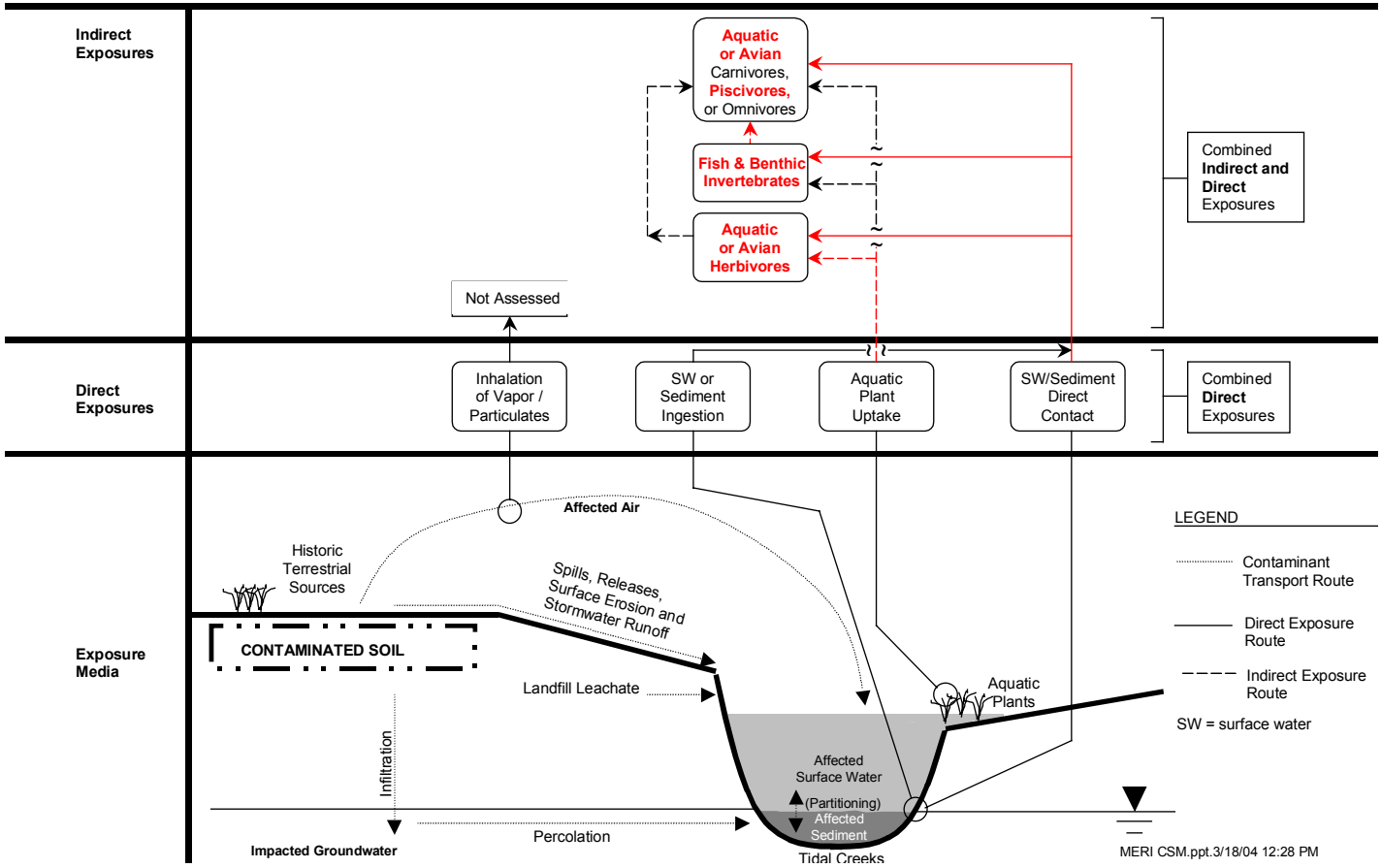


Figure 5-1. Wildlife Risk Curve for Arsenic

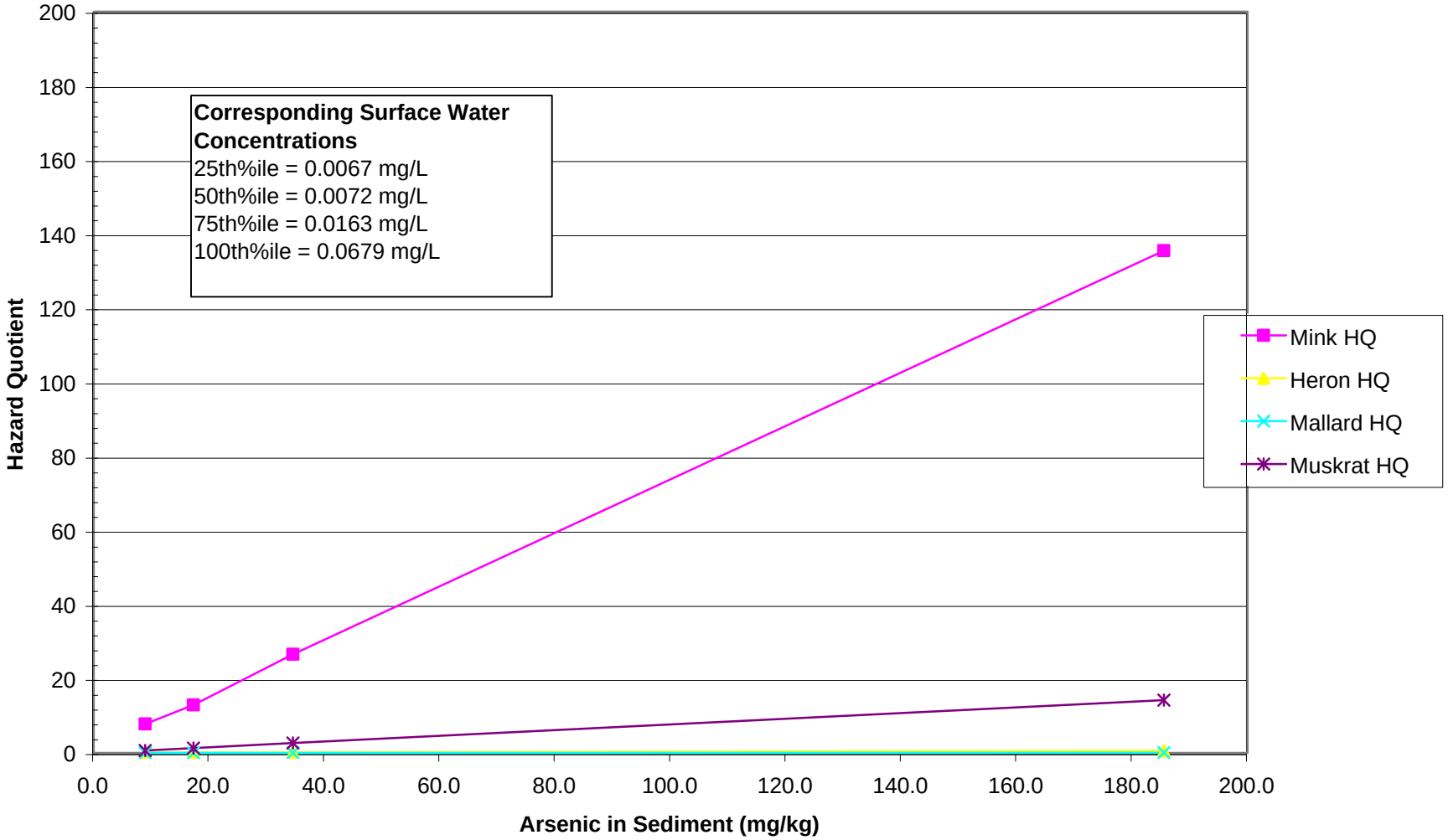


Figure 5-2. Wildlife Risk Curve for Cadmium

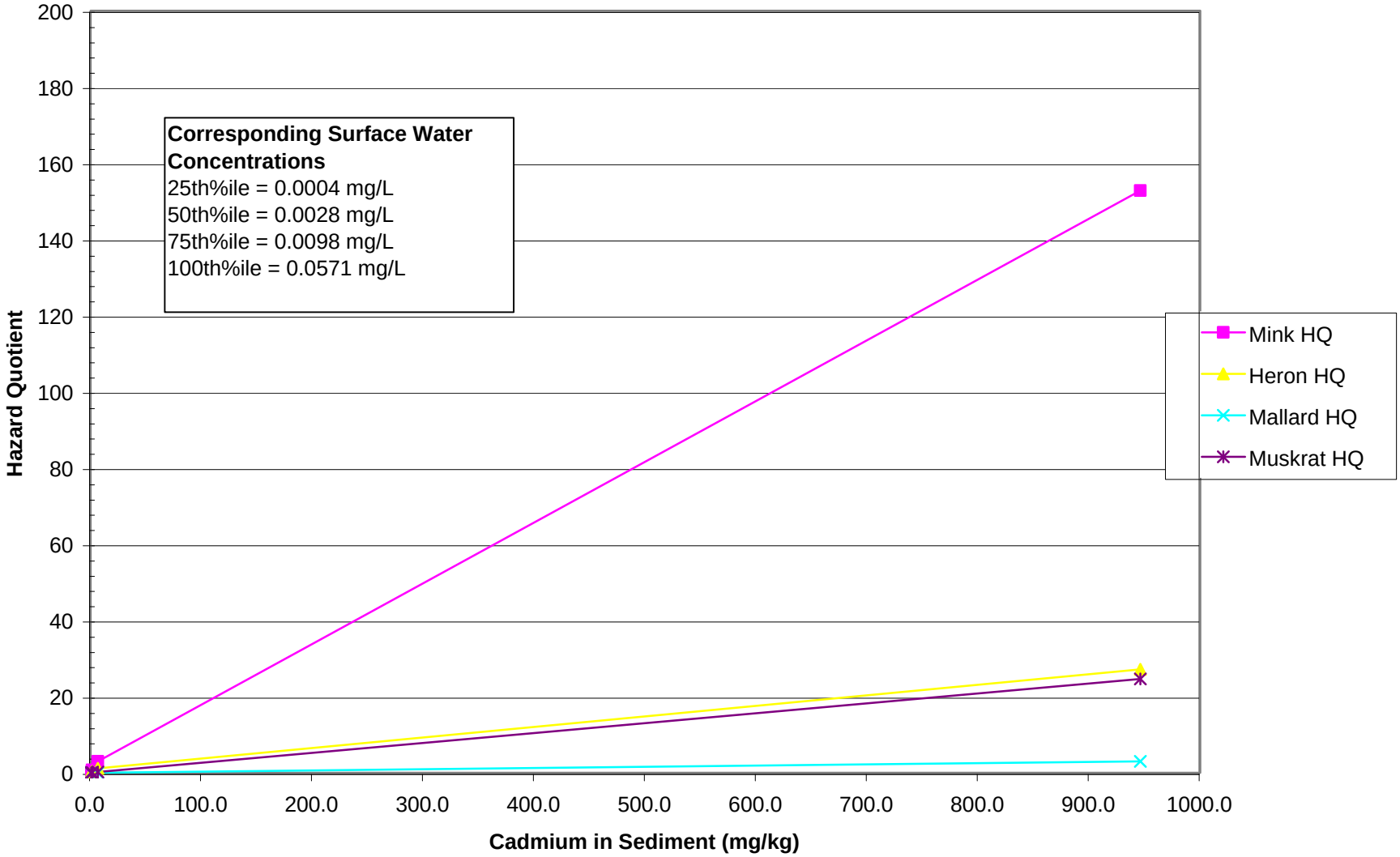


Figure 5-3. Wildlife Risk Curve for Chromium

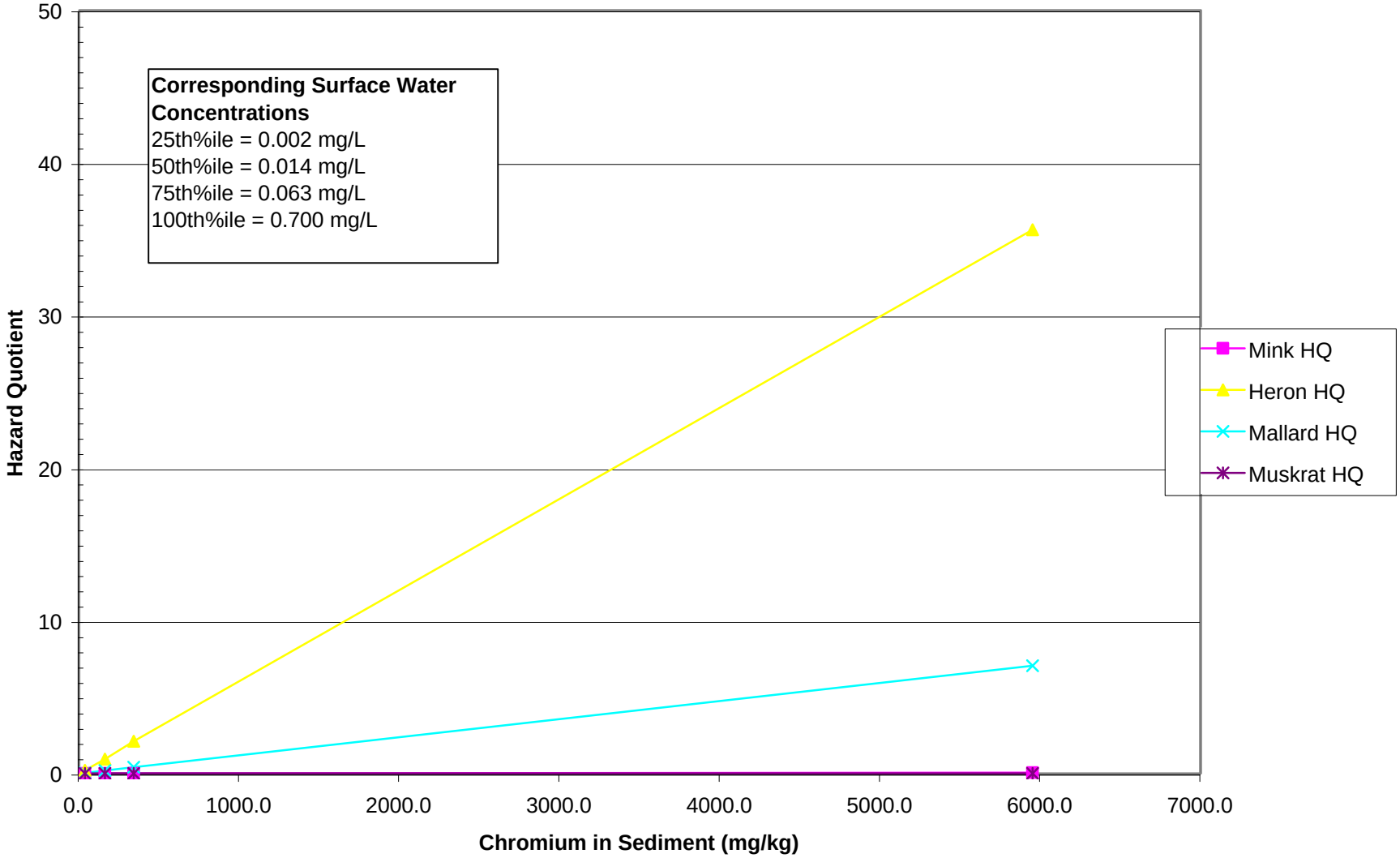


Figure 5-4. Wildlife Risk Curve for Copper

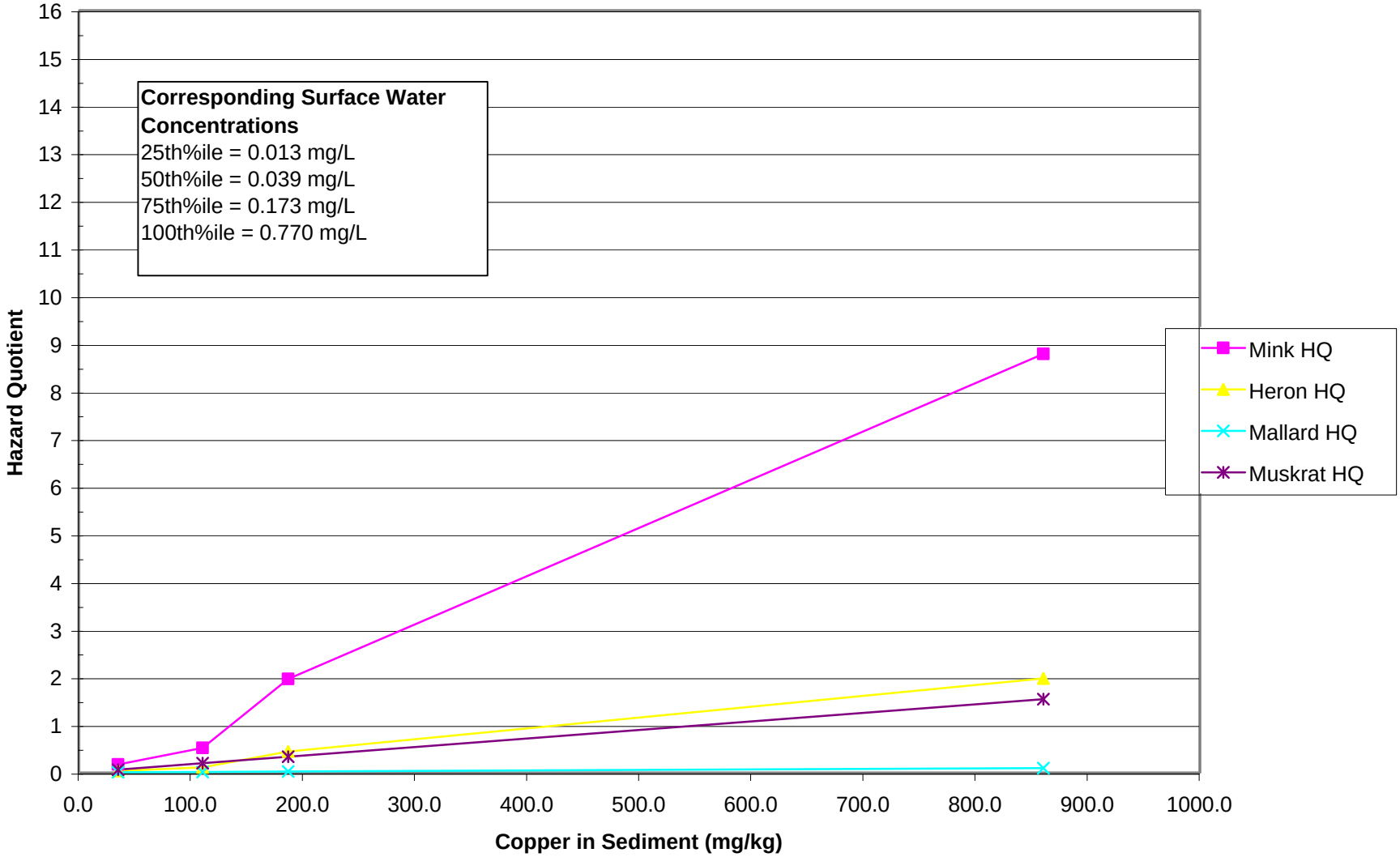


Figure 5-5. Wildlife Risk Curve for Lead

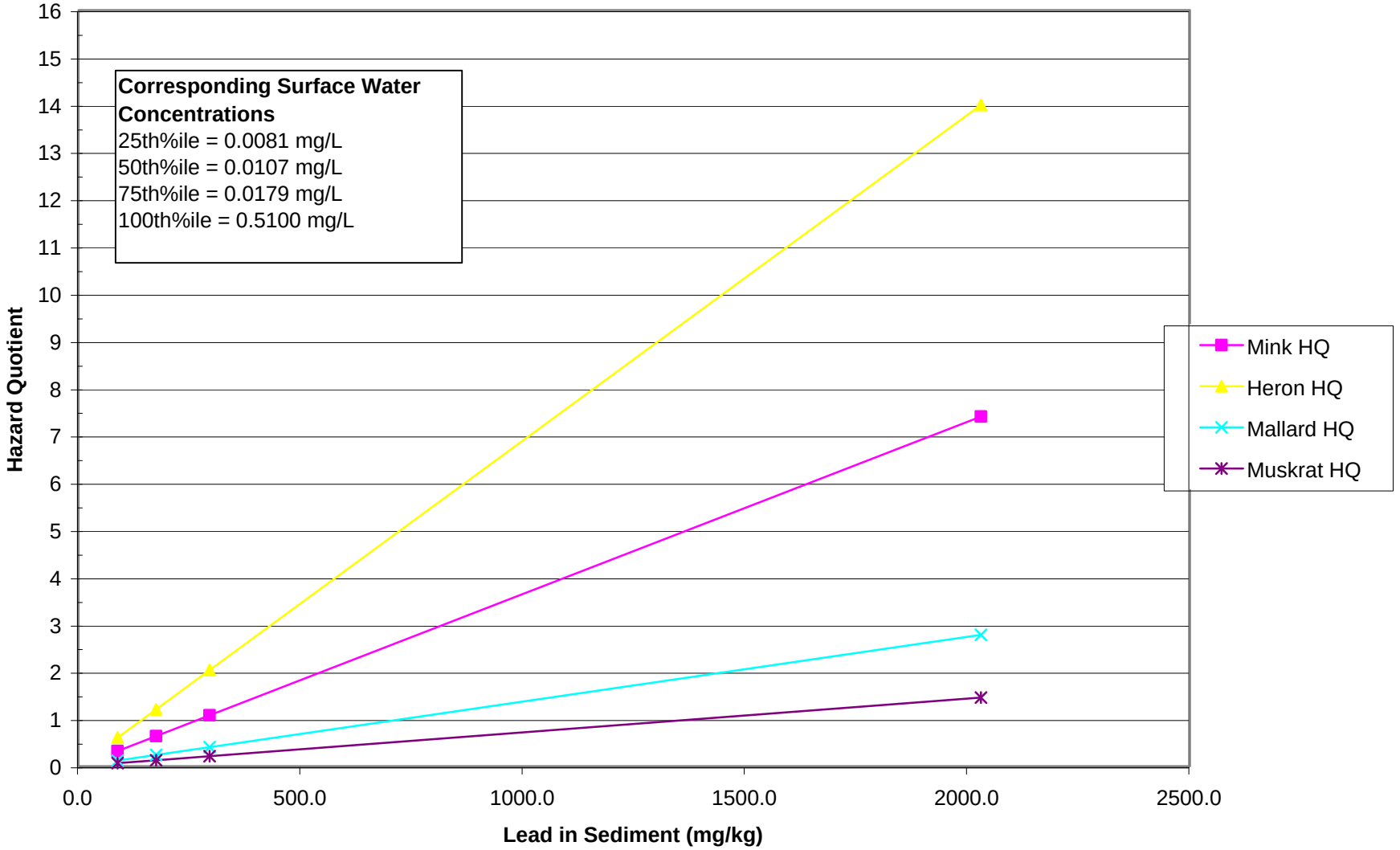


Figure 5-6. Wildlife Risk Curve for Mercury

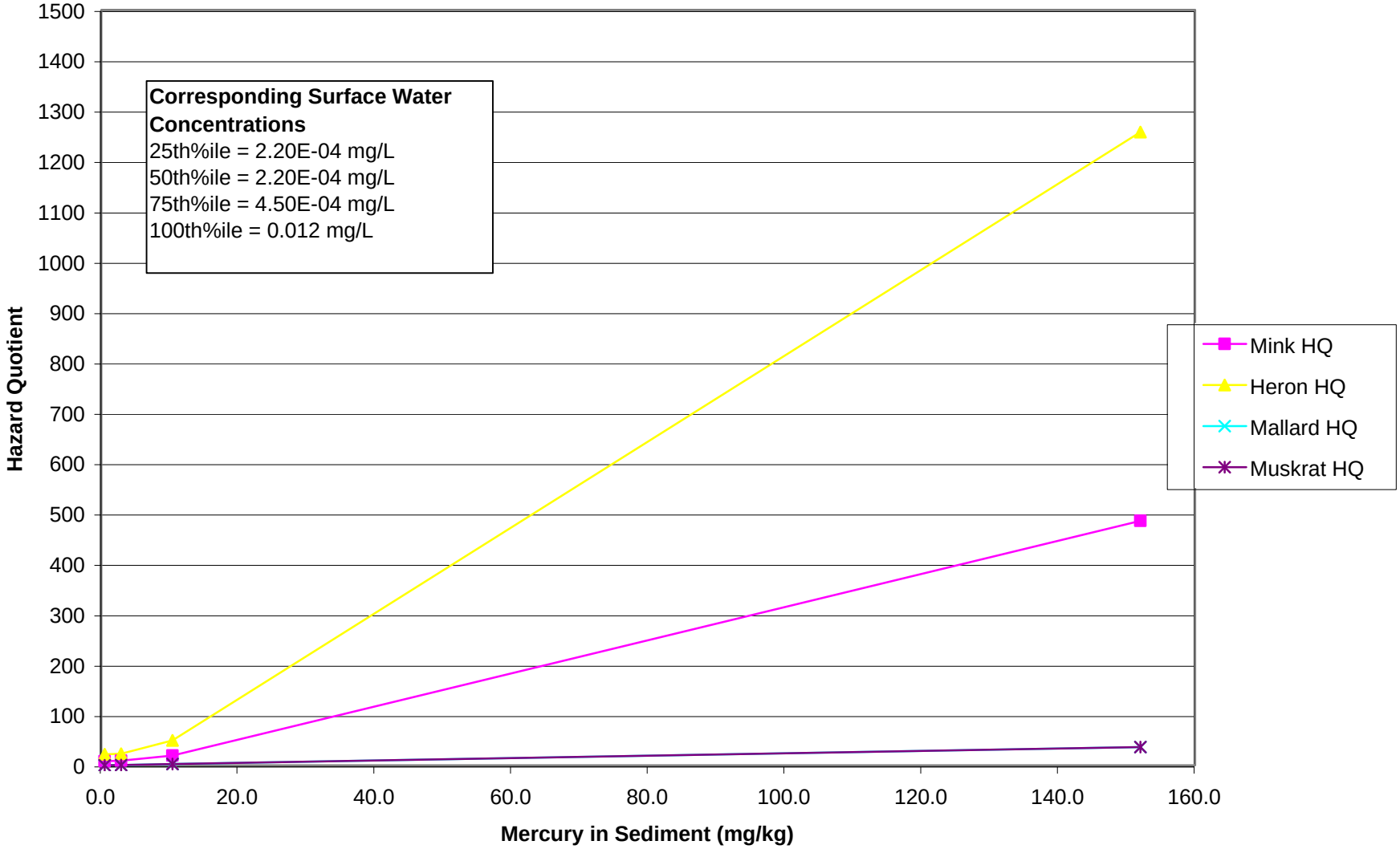


Figure 5-7. Wildlife Risk Curve for Zinc

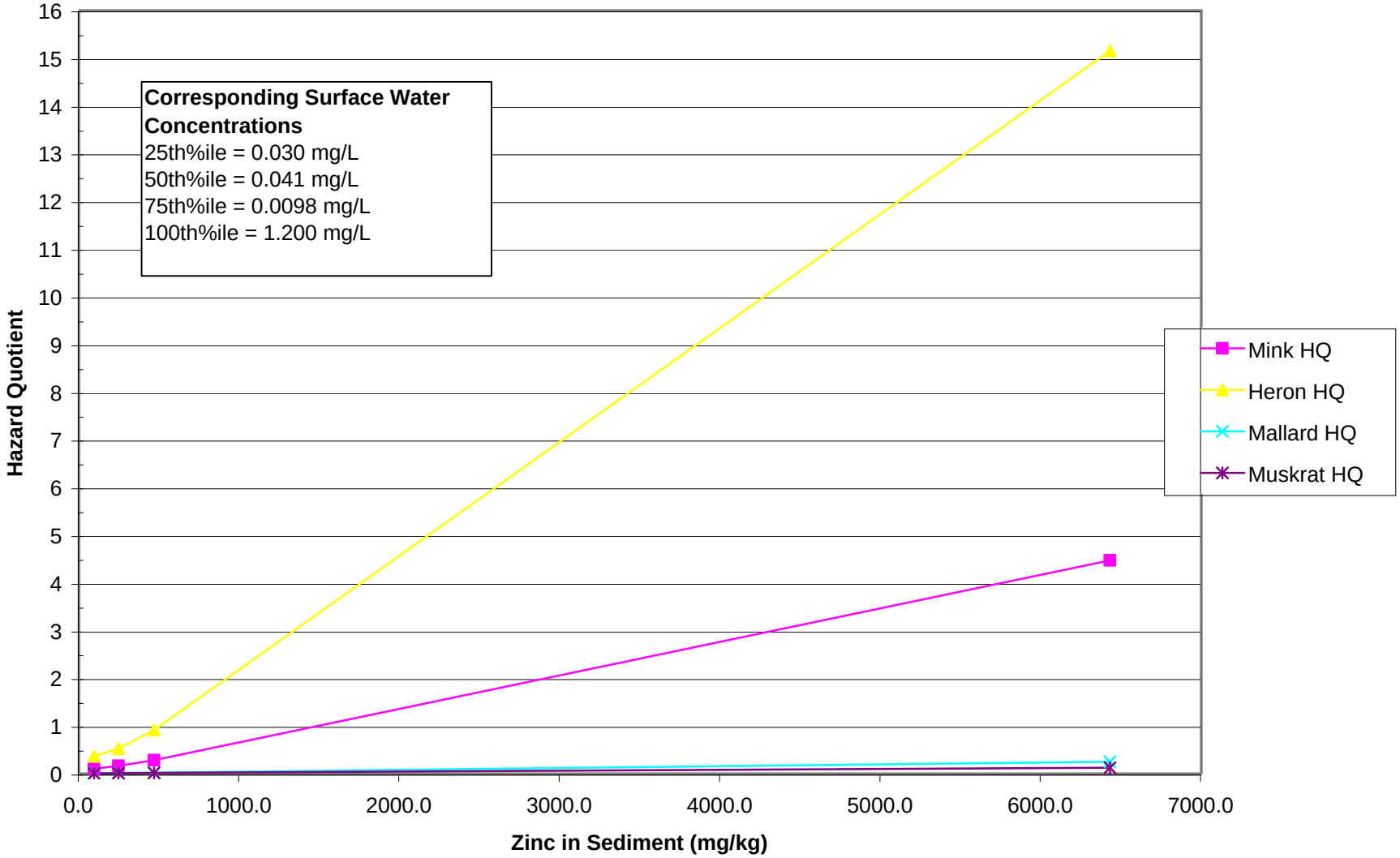


Figure 5-8. Wildlife Risk Curve for Alpha Chlordane

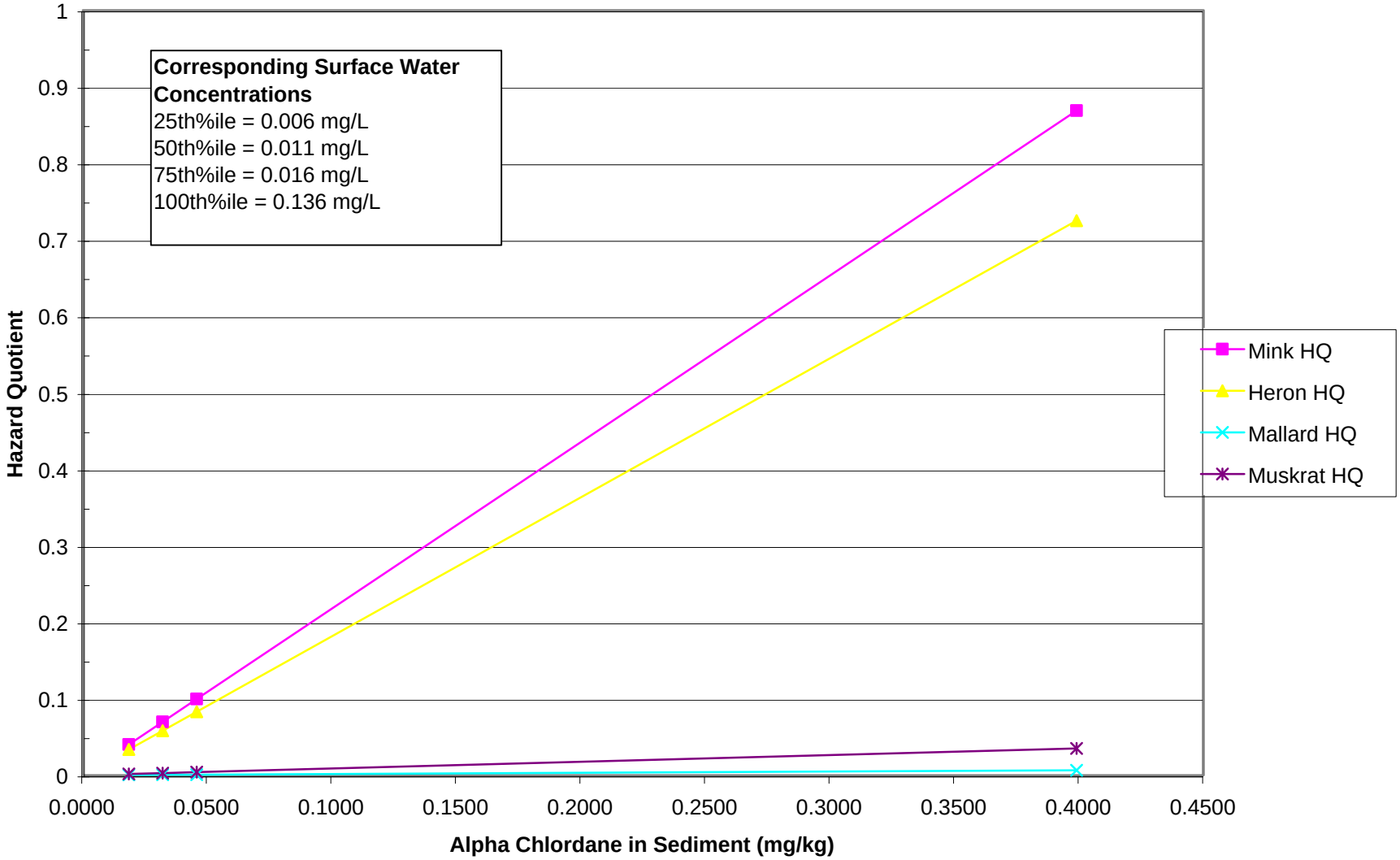


Figure 5-9. Wildlife Risk Curve for 4,4-DDE

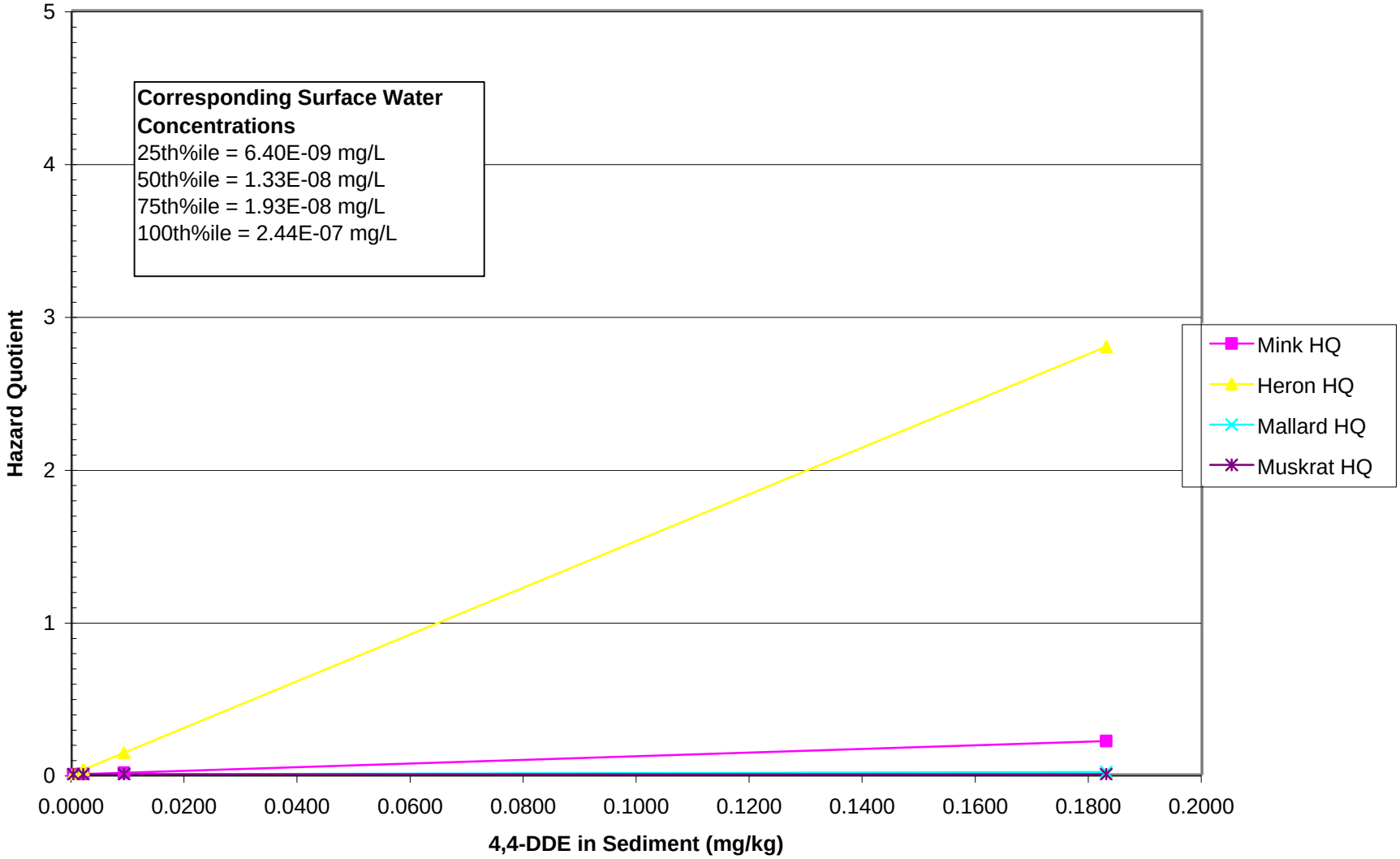


Figure 5-10. Wildlife Risk Curve for Total PAHs

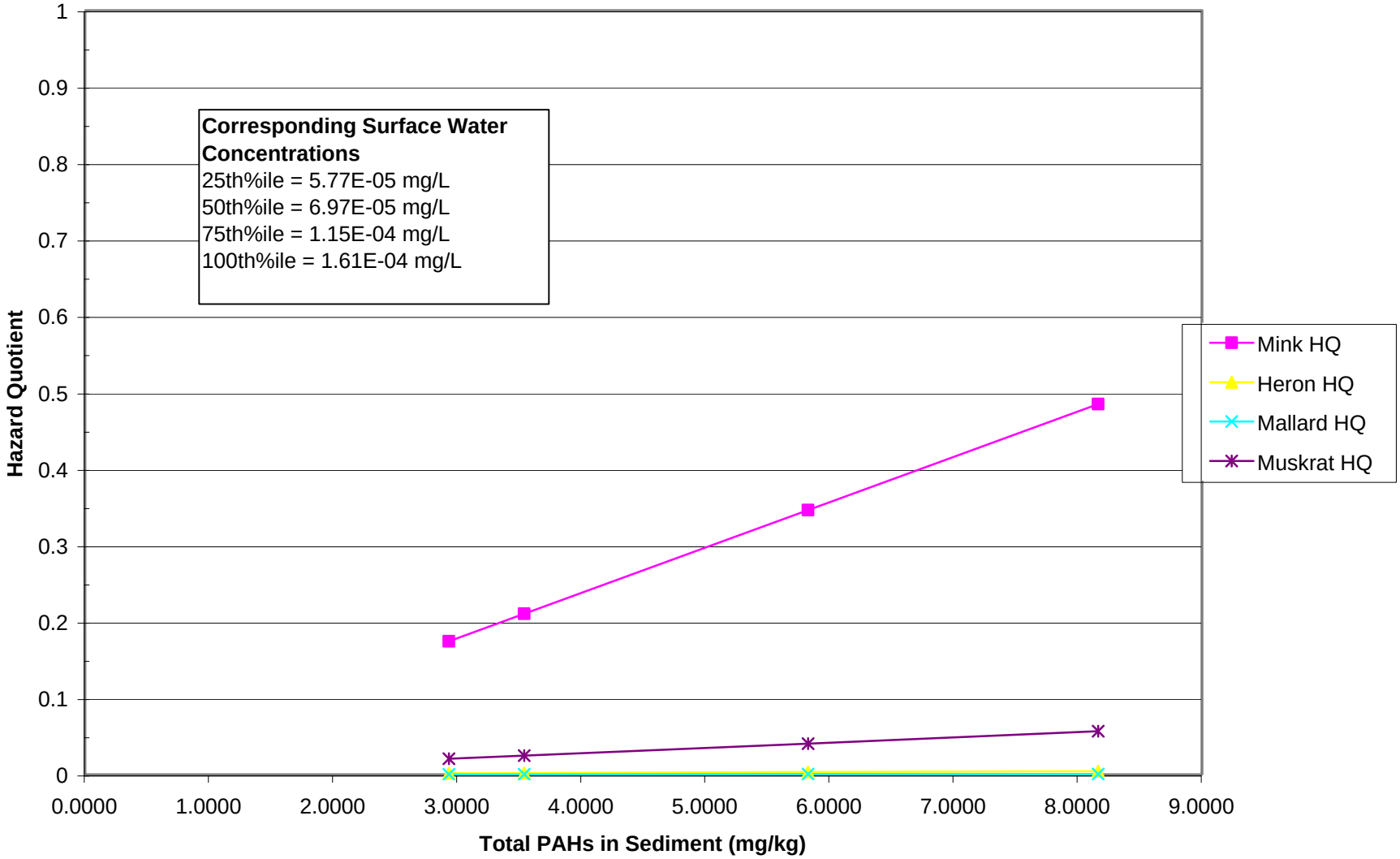


Figure 5-11. Wildlife Risk Curve for Total PCBs

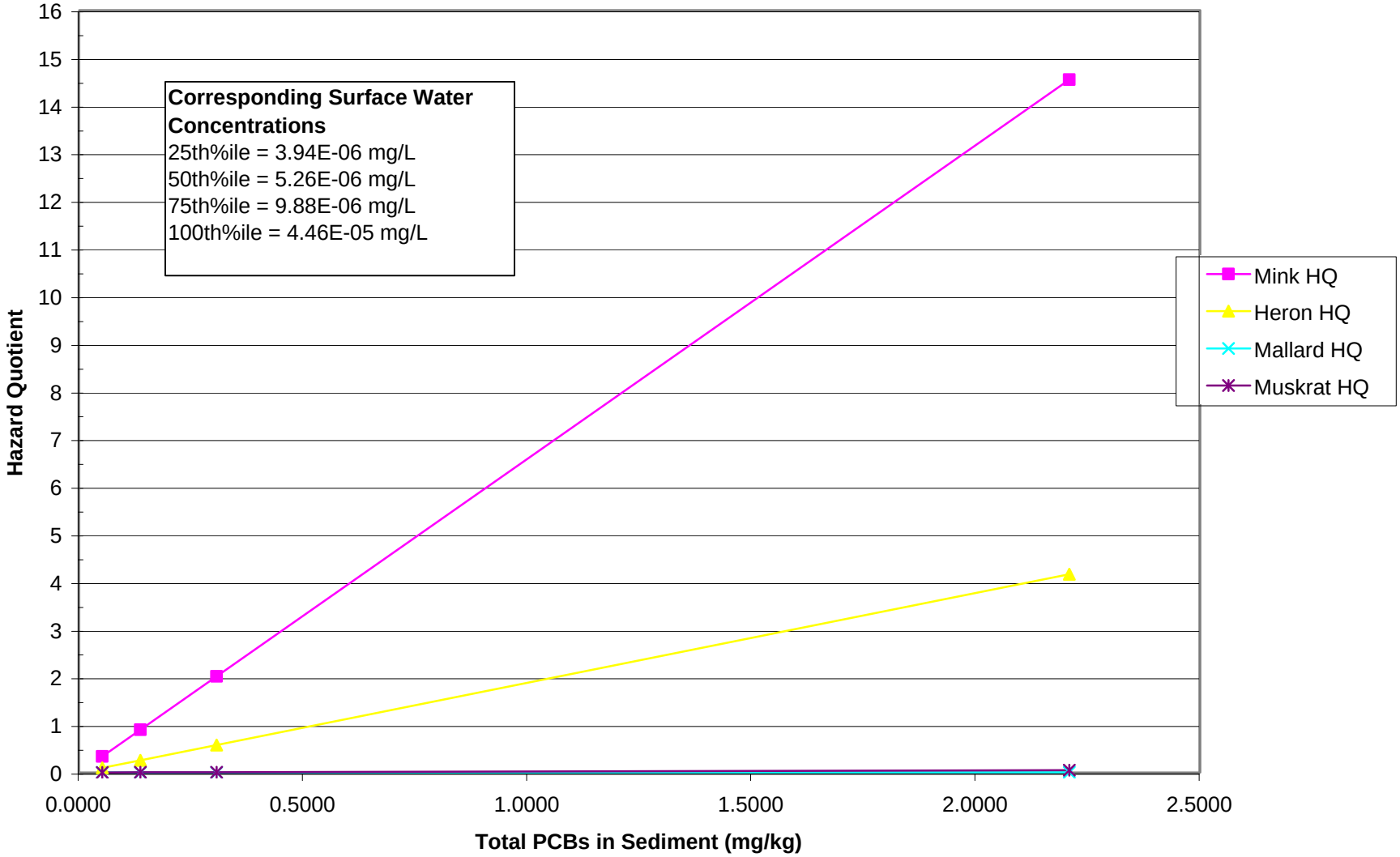


Figure 5-12 Variation in Arsenic HQs With and Without Surface Water Contribution

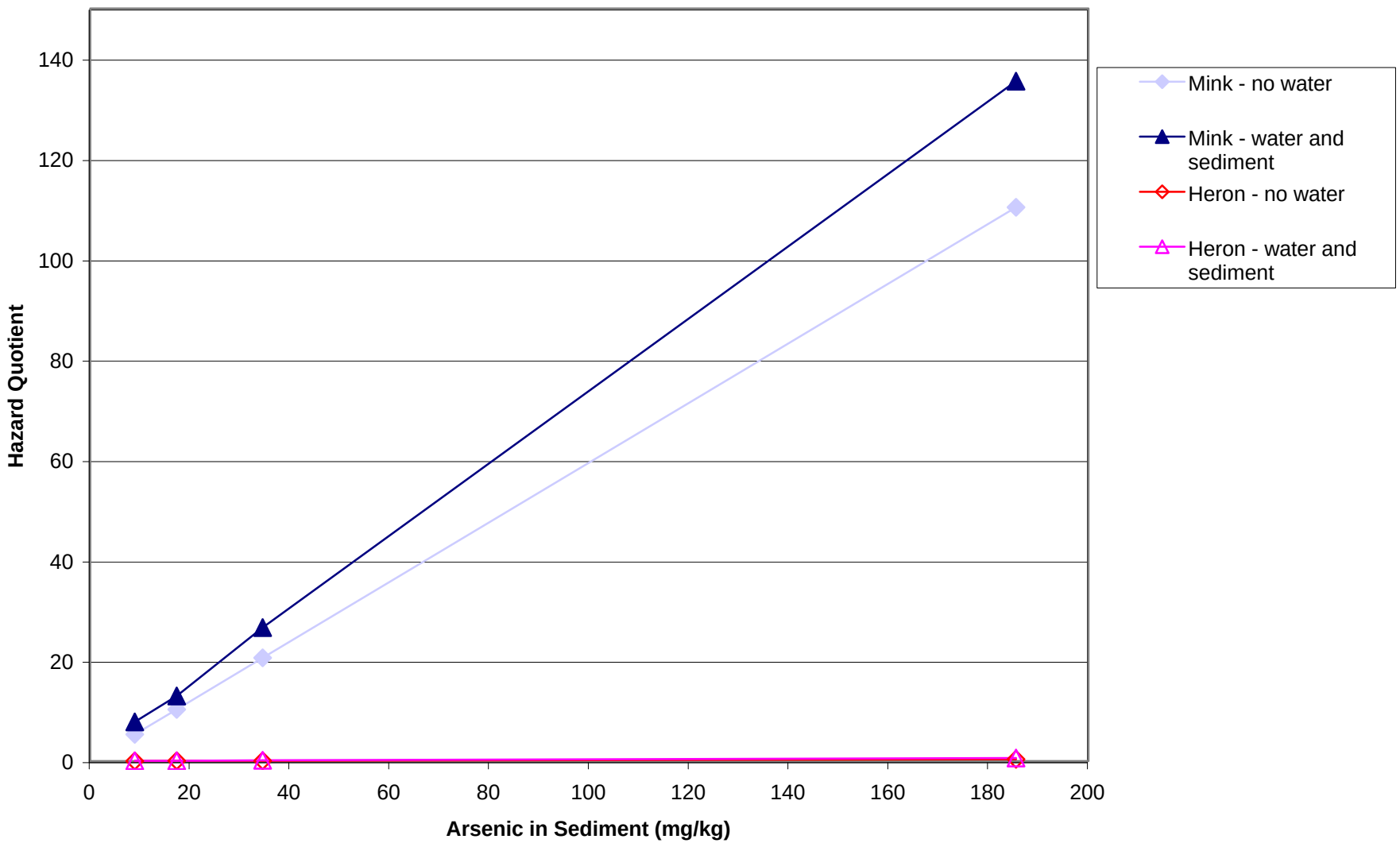


Figure 5-13 Variation in Lead HQs With and Without Surface Water Contribution

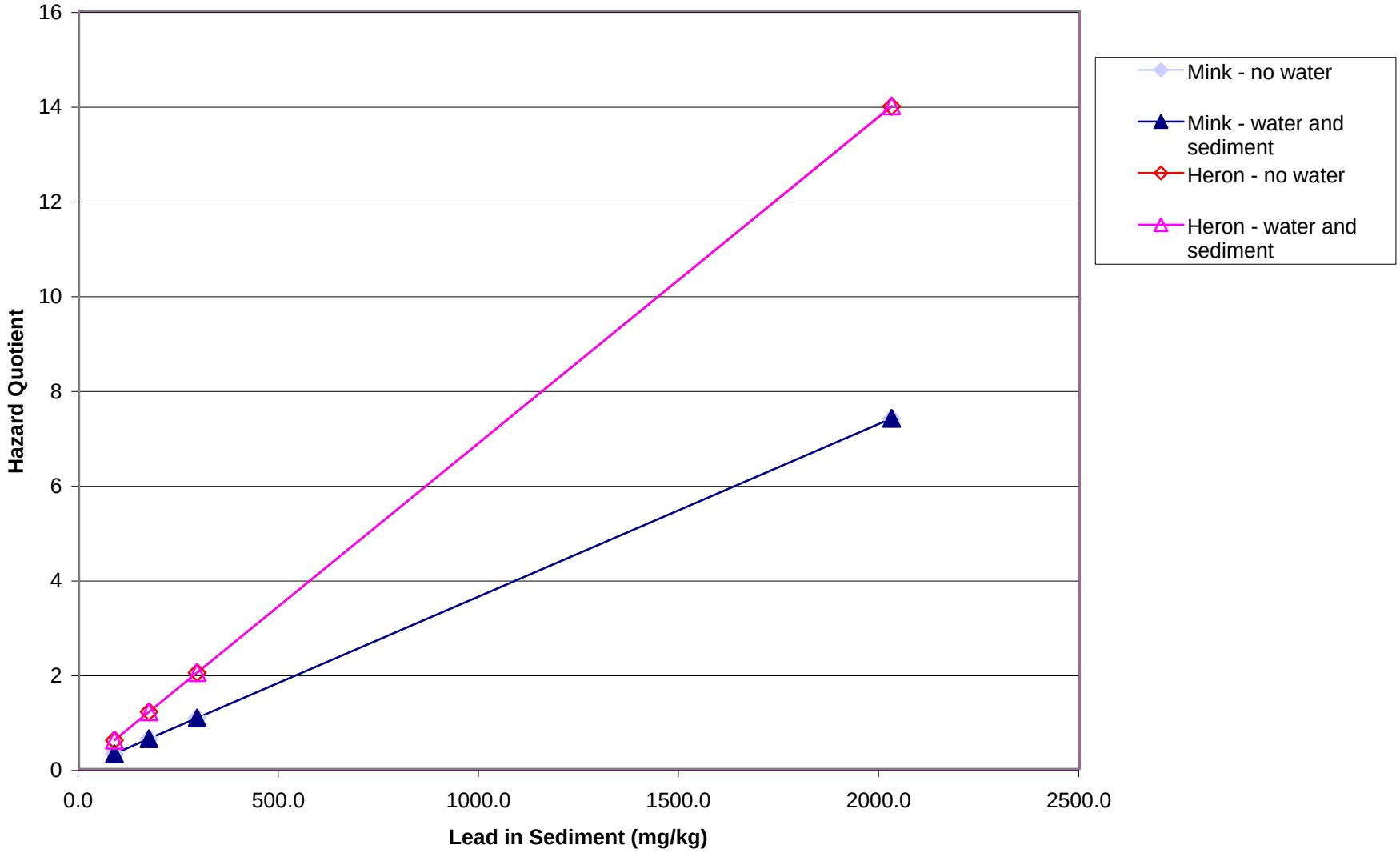


Figure 5-14 Variation in Zinc HQs With and Without Surface Water Contribution

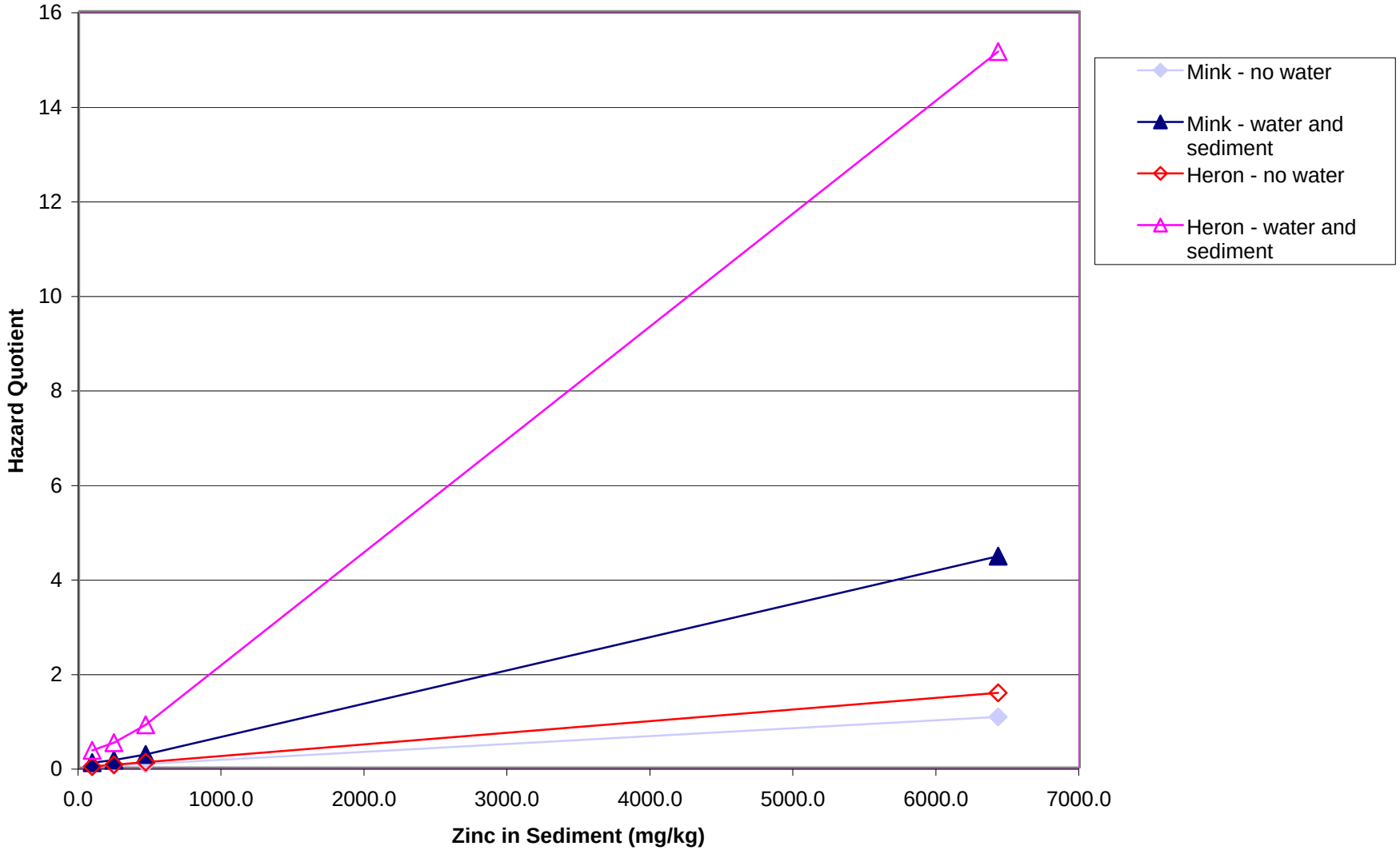


Figure 5-15 Variation in tPCB HQs With and Without Surface Water Contribution

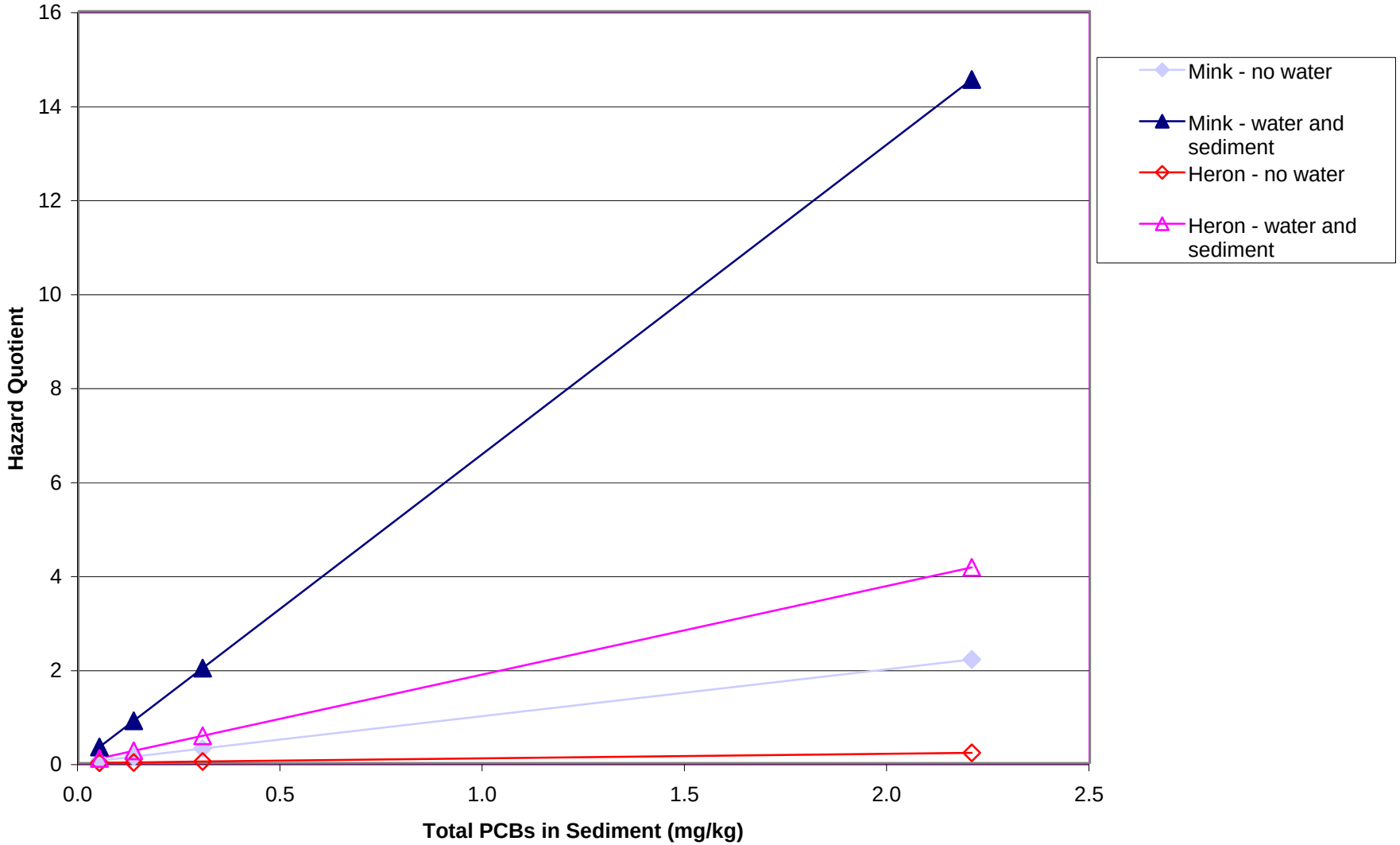


Figure 6-3. Benthic Density/Number of Species and COPC Ecological Effects Quotient (EEQ)

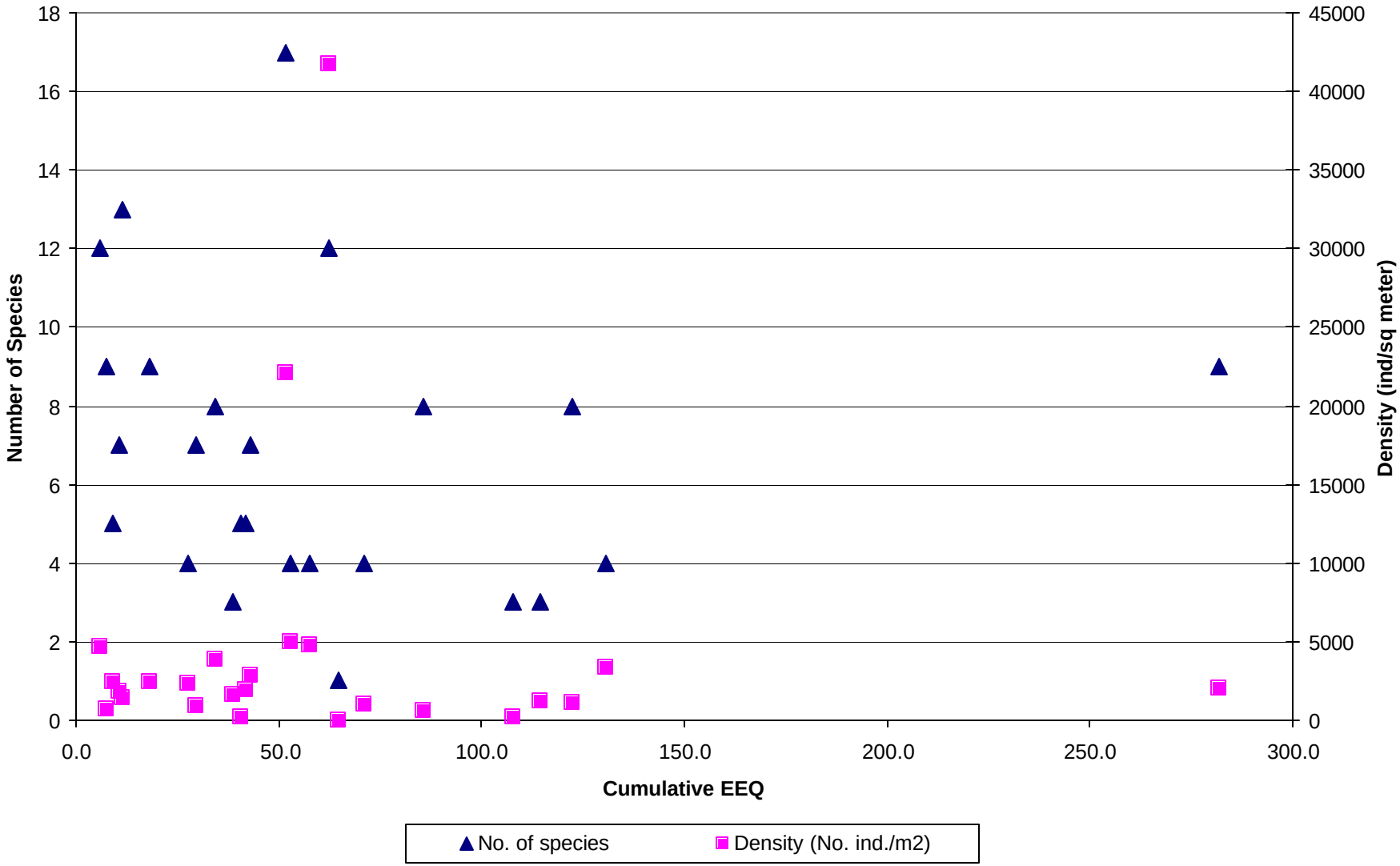


Figure 6-2. Benthic Diversity/Evenness and COPC Ecological Effects Quotient (EEQ)

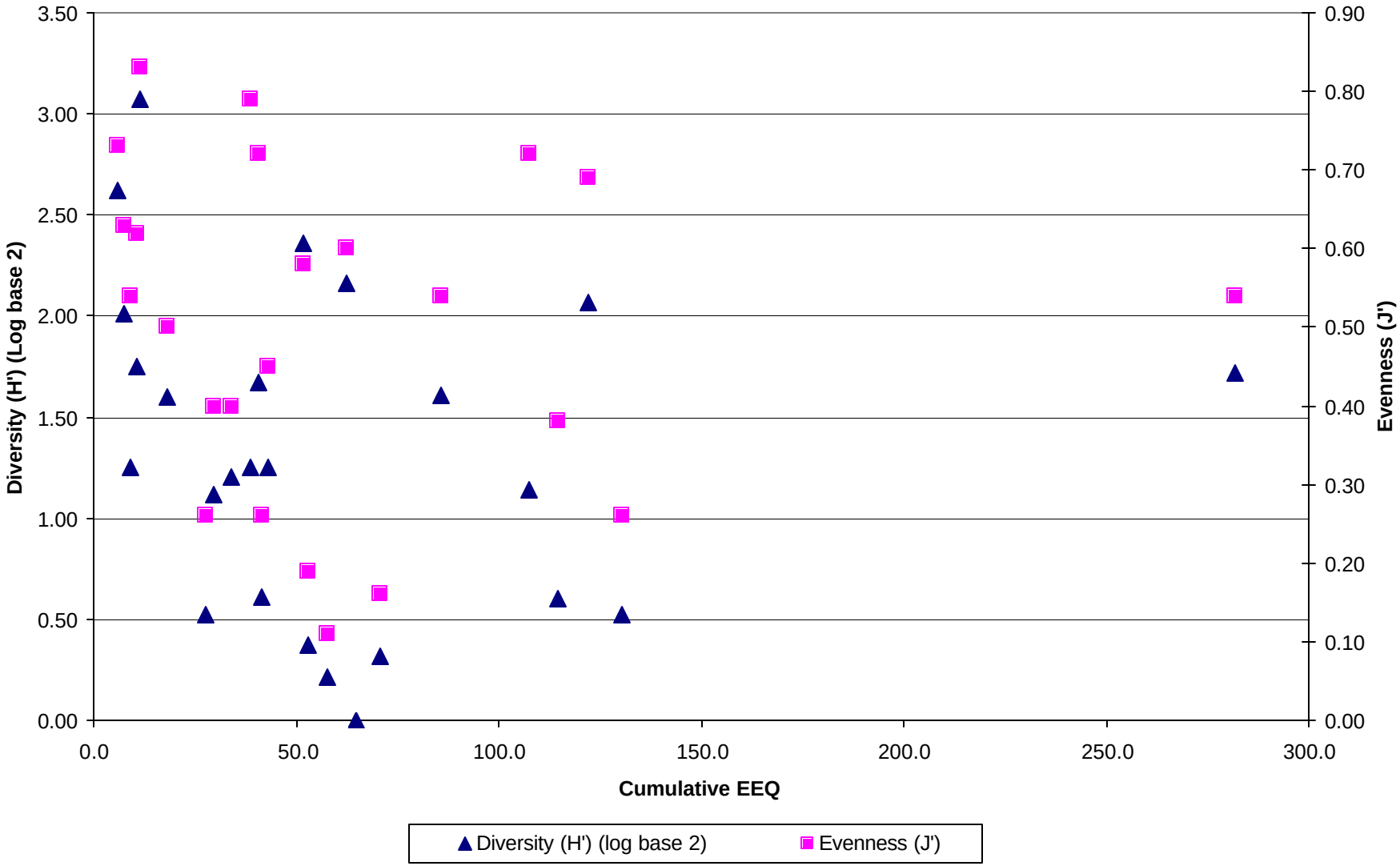


Figure 6-1. Whole Sediment Toxicity Test and COPC Low Effect Level (LEL) Ecological Effects Quotient (EEQ)