

# **An Assessment of Sediment Injury in the Grand Calumet River, Indiana Harbor Canal, Indiana Harbor, and the Nearshore Areas of Lake Michigan**

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## *Volume III - Figures*

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*Prepared for:*

**U.S. Fish and Wildlife Service  
Bloomington Field Office  
620 South Walker Street  
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## List of Acronyms

%	percent
10-d	10 days
12-d	12 days
14-d	14 days
15-min	15 minutes
20-d	20 days
2,3,7,8-TCDD	tetrachlorodibenzo- <i>p</i> -dioxin
28-d	28 days
30-min	30 minutes
48-h	48 hours
7-d	7 days
8-d	8 days
96-h	96 hours
AOC	Area of Concern
ARCS Program	Assessment and Remediation of Contaminated Sediments in the Great Lakes Program
ASTM	American Society for Testing and Materials
AVS	acid volatile sulfides
BSAF	biota-sediment bioaccumulation factor
CCBP	Central Corn Belt Plain
CCME	Canadian Council of Ministers of the Environment
CCREM	Canadian Council of Resource and Environment Ministers
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 42 U.S.C. 9601 <i>et seq.</i>
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CI	confidence interval
CSO	combined sewer overflow
DDTs	<i>p,p'</i> -DDT, <i>o,p'</i> -DDT, <i>p,p'</i> -DDE, <i>o,p'</i> -DDE, <i>p,p'</i> -DDD, <i>o,p'</i> -DDD, and any metabolite or degradation product
DELT	deformities, fin erosion, lesions, and tumors
DL	detection limit
DO	dissolved oxygen
DQO	data quality objective
DuPont	E.I. du Pont de Nemours
DW	dry weight
EB	east branch
EBGCR	East Branch of the Grand Calumet River
EBGCR-I	East Branch of the Grand Calumet River I

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EBGCR-II	East Branch of the Grand Calumet River II
EC	Environment Canada
EC <sub>50</sub>	median effective concentration
ECBP	Eastern Corn Belt Plain
EPT	Ephemeroptera, Plecoptera, Trichoptera
FIELDS	Fully Integrated Environmental Location Decision Support
gamma-BHC	gamma-hexachlorocyclohexane (lindane)
GCRL	Grand Calumet River Lagoons
GIS	geographic information system
HC	Health Canada
HNTB	Howard, Needles, Tammen and Bergendoff Architects, Engineers, and Planners
IBI	Index of biotic integrity
ID	insufficient data
IDEM	Indiana Department of Environmental Management
IEC	Industrial Economics, Inc.
IH	Indiana Harbor
IHC	Indiana Harbor Canal
IJC	International Joint Commission
IL	Illinois
IN	Indiana
LC <sub>50</sub>	median lethal concentration
LEP	Little East Pond
LGB	Lake George Branch
LM	Lake Michigan
LTI	Limno-Tech, Inc.
LWP	Little West Pond
mean PEC-Q	mean probable effect concentration quotient
MESL	MacDonald Environmental Sciences Ltd.
mg	milligrams
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
mIBI	macroinvertebrate index of biotic integrity
mm	millimeters
MS	Microsoft
n	number of samples
NA	not applicable (i.e., all <DL values were >PEC; therefore total was not calculated)
NA'	not applicable (i.e., toxicity test or chemical analyses not performed).
ND	not determined; compounds were measured as less than the detection limit, but the detection limit is unknown
ND'	not determined; toxicity not determined because mortality was > 40%
ND''	not determined; the lab considered sample to be a hazard to personnel

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NE	northeast
NG	no guideline available
NH <sub>3</sub>	unionized ammonia
NH <sub>4</sub> <sup>+</sup>	ionized ammonia
NIPSCO	Northern Indiana Public Service Company
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge and Elimination System
NR	not reported
NRDA	Natural Resource Damage Assessment
NT	not toxic
NW	northwest
NYSDEC	New York State Department of Environmental Conservation
OC	organic carbon
OEPA	Ohio Environmental Protection Agency
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PEC	probable effect concentration (consensus-based)
PEC-Q	probable effect concentration quotient
QA/QC	quality assurance/quality control
QHEI	qualitative habitat evaluation index
RCRA	Resource Conservation and Recovery Act
RETEC	Remediation Technologies, Inc.
S.U.	standard unit
SAB	Science Advisory Board
SE	southeast
SEC	sediment effect concentration (consensus-based)
SEM	simultaneously extracted metals
SEM-AVS	simultaneously extracted metal minus acid volatile sulfides
SETAC	Society of Environmental Toxicology and Chemistry
SOD	sediment oxygen demand
SQG	sediment quality guideline
STP	sewage treatment plant
sum DDD	<i>p,p'</i> -DDD + <i>o,p'</i> -DDD
sum DDE	<i>p,p'</i> -DDE + <i>o,p'</i> -DDE
sum DDT	<i>p,p'</i> -DDT + <i>o,p'</i> -DDT
SVOC	semi-volatile organic chemical
SW	southwest
T	toxic
TEC	threshold effect concentration (consensus-based)
ThermoRetec	ThermoRetec Consulting Corporation
TOC	total organic carbon
Total DDT	<i>p,p'</i> -DDT, <i>o,p'</i> -DDT, <i>p,p'</i> -DDE, <i>o,p'</i> -DDE, <i>p,p'</i> -DDD, and <i>o,p'</i> -DDD
TRG	tissue residue guideline

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U.S. Steel	United States Steel (Division of USX Corporation)
USACE	United States Army Corps of Engineers
USC	United States Canal
USDOJ	United States Department of the Interior
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
USS Lead	USS Lead Refinery, Inc.
VOC	volatile organic compound
WB	west branch
WBGCR	West Branch of the Grand Calumet River
WBGCR-I	West Branch of the Grand Calumet River I
WBGCR-II	West Branch of the Grand Calumet River II
WW	wet weight
WWTP	wastewater treatment plant
µg/kg	micrograms per kilogram
µg/L	micrograms per liter
µmol/g	micromoles per gram

Figure 1.1. Map of study area.

