

DATE: January 22, 2015

TO: Chris Saari

FROM: Joe Graham

SUBJECT: Wood Turtle in Crawford Creek, its floodplain and adjoining habitats and implications for assessing ecological risk from contaminated soils and sediments at the Koppers, Inc. Off-Property Site

In follow-up to our recent discussion with Dan Mazur of U.S. EPA, I am writing to provide information on documented observations of Wood Turtle (*Glyptemys insculpta*) within suitable habitat in the Town of Superior in Douglas County. I met with Ryan Magana, DNR Northwest District Ecologist, on January 20, 2016 to discuss the sediment and floodplain soil contamination at the Koppers, Inc. off-property site and the life history of Wood Turtle. In addition Ryan assisted me in the retrieval of documented observations of Wood Turtle from the Natural Heritage Inventory (NHI) database. A summary of our discussion and database review are presented below. I also include my recommendation for a response on related issues that were raised about this during review of the Human Health and Ecological Risk Assessment (HHERA) for the Koppers, Inc. Off-Property site.

Species Information and Guidance for Wood Turtle (*Glyptemys insculpta*)

Wood Turtle are a state listed threatened species and are legally protected. Detailed information on Wood Turtle habitat, diet, reproduction, ecology and management considerations are available in DNR Publication PUB-ER-684, updated April 2, 2015 (copy attached). Selected information from this publication is included below.

Documented Wood Turtle Observations in the Town of Superior in Douglas County

A minimum of 128 Wood Turtles were found during a research project (Strand) and opportunistic observations along waterways within the "Town of Superior" based on records obtained from the NHI database. Individual occurrences from 1994 to 2013 are shown in Table 1 (attached). The NHI data is sensitive information and is **exempt from the Wisconsin Open Records Law**. Therefore, more specific location information is not provided here and instead information is only presented to the township level. A photo of an individual turtle documented during a 2013 survey is also attached. In addition, Craig Roesler, DNR water quality biologist, told me that he observed numerous Wood Turtles in this same hydrological system during the 2015 field season.

According to HHERA and Beazer's response to EPA's comments on the ecological risk assessment portion a single Wood Turtle was also observed in the Crawford Creek floodplain during a field survey in 1999. The observations by DNR biologist and Beazer's consultants suggest that Wood Turtle may be fairly common within the suitable habitat that exists at the off-property site.

Important Considerations for Wood Turtle Exposure to COCs in Crawford Creek and its Floodplain:

1. Suitable habitat exists for Wood Turtle in Crawford Creek, the Nemadji River, and adjoining floodplains.
2. Wood Turtle overwinter in streams and would be exposed to contaminants in sediment during this time.
3. Wood Turtle generally do not stray more than 300 meters from their overwintering streams, and could potentially spend a significant amount of time in contaminated floodplain soils.
4. Wood Turtles are opportunistic feeders with omnivorous tendencies. They are known to eat various plant material including berries, leaves and mushrooms; a variety of invertebrates such as earthworms, insects, mollusks; and vertebrates such as young mice, amphibians and carrion (WDNR 2015). The variety in the diet of the Wood Turtle may additionally expose them to the contaminants found soil and sediment at the site.
5. Wood Turtle are not migratory and have greater potential for exposure to site contaminants unlike many of the migratory species used to assess ecological risk at this site.
6. Wood Turtle are long lived, with individuals living 50 years or more (Brown et. al.). They would be exposed to contaminants over a longer period of time than some of the shorter lived and/or migratory species used to assess ecological risk at this site.
7. Wood turtles exhibit nest site fidelity. Contaminated media within and near nesting locations is a potential concern since individual females are known to often use the same nesting location annually.
8. Wood Turtle appear to nest and successfully reproduce in this hydrologic system based on consistent observations of mature individuals and young over 20-years of records. However, it is unknown if contamination at the off-property site might be limiting reproduction through smaller clutch sizes, increased pre-hatchling mortality, lowered fitness of hatchlings, fewer hatchlings that make it to maturity, etc. The HHERA does not adequately address potential reproductive effects for Wood Turtle.
9. Snapping Turtle (*Chelydra serpentina*) and Painted Turtle (*Chrysemys picta*) are common associated species that can be found in overlapping areas/habitats with Wood Turtles. Does toxicological effect data exist for these species and would it be appropriate to use those values for this receptor in lieu of the avian values cited in the HHERA?
10. It is unclear if contaminants in Wood Turtle result in trophic impacts to predators such as raccoons, skunks and fox which are known to utilize turtle eggs and hatchlings as prey items.

Summary and Recommendation:

Wood Turtle is a state threatened species and is protected by Wisconsin law. Crawford Creek contains suitable habitat for Wood Turtle. Wood Turtle are consistently observed in this hydrologic system and can reasonably be expected to be present in areas of floodplain soil and sediment contamination at the site. In fact, Beazer's 1999 survey indicated that Wood Turtle were noted as being present in the Crawford Creek floodplain. The approach used in the HHERA may underestimate risk for Wood Turtle. **Any consideration of ecological risk at the Koppers Off-site property needs to adequately consider Wood Turtle using appropriate information to ensure protection of this species.**

Beazer's response to US EPA's 02/03/2012 comments on the HHERA simply noted that Wood Turtle were present in the 1999 survey and did not address all the specific concerns raised by EPA. This seems insufficient based on the comments and a more thorough response is needed from Beazer. I recommend that the HHERA be changed as recommended in the EPA comments. Specifically,

1. Make the following changes on page 45 of the HHERA
 - a. 2nd paragraph, DELETE 2nd bullet which reads, "the TRV used for reptiles are often the same as used for birds because reptile-specific TRVs are usually not available and avian TRVs are used their stead (due to the phylogenetic similarity of birds and reptiles)."
 - b. 3rd paragraph, DELETE the sentence that reads, "As a result of their higher intake rate per unit body weight, birds..."
2. We should inform Beazer that we do not agree that avian TRVs are an appropriate substitution for reptiles and request that a TRV value for turtles be used, if available. As EPA recommended, if turtle TRVs are not available then a line of evidence approach should be provided. Based on our NHI documentation for Wood Turtle in this hydrologic system a line of evidence approach for this site must consider the life history of wood turtles, that sexually mature wood turtles are present, that nesting and egg hatching occurs (above the OHWM & typically within 200 feet from the stream), and that juveniles are also present. Importantly, Wood Turtle are a long-lived species relative to all the species evaluated and the effects of bioaccumulation over time is not accounted for currently.

References:

Brown et.al., *Glyptemys insculpta (Wood Turtle) Longevity in the Wild*, D. Brown, M. Schrage, D. Ryan, R. Moen, M. Nelson, and R. Buech, Herpetological Review 46(2), 2015, Natural History Notes p243-244, accessed at http://www.fs.fed.us/nrs/pubs/jrnl/2015/nrs_2015_brown_001.pdf

WDNR 2015, *Wood Turtle (Glyptemys insculpta) Species Guidance*, Wisconsin Department of Natural Resources, PUB-ER-684, April 2015, 10pp.

Table 1: Spring/Summer Observations of Wood Turtles 1994-2013 in a Hydrologic System within the Town of Superior, Douglas County, Wisconsin

Year	Basking	Recapture	Dead	Juvenile	Observer
1994	4				Hoffman
2002	37				Strand
2003	9				Strand
2005	4				Strand
2007	29		1		Strand
2008	12	2 F			Strand
2010	2				Strand
2011	8				Strand
2012	9				Strand
2013	11	1 F		7	Strand
2013	5				Hanson, Graham
TOTALS	130	3	1	7	

Notes:

(1) Data accessed from NHI database on 01/20/2016

(2) The NHI data is sensitive information and is **exempt from the Wisconsin Open Records Law**. Therefore, more specific location information is not provided here and instead information is only presented to the township level.

Table 2: Element Occurrence Summary of NHI Data Accessed 01/20/2016

Common Name	Scientific name	Group	Type	State Status	Federal Status
Arrow-leaved Sweet-coltsfoot	Petasites sagittatus	Plant~	W	THR	
Seaside Crowfoot	Ranunculus cymbalaria	Plant~	W	THR	
Vasey's Rush	Juncus vaseyi	Plant~	W	SC	
Neat Spike-rush	Eleocharis nitida	Plant~	A	END	
A Flat-headed Mayfly	Maccaffertium pulchellum	Mayfly~	A	SC/N	
A Small Square-gilled Mayfly	Sparbarus maculatus	Mayfly~	A	SC/N	
American Eel	Anguilla rostrata	Fish~	A	SC/N	
Flat-stemmed Spike-rush	Eleocharis compressa	Plant~	A	SC	
Wood Turtle	Glyptemys insculpta	Turtle~	A	THR	

THR - Threatened

EDN - Endangered

SC - Special Concern

W - Wetland

A - Aquatic

SC/N – Special Concern no laws regulating use, possession or harvesting

L. Hanson holding Wood Turtle on 07/29/2013 in Town of Superior, J. Graham Photo



Supplemental Amphibian Information:

The HHERA used similar reasoning for not quantifying risk for amphibians such as frogs and salamanders (i.e. no toxicity values) and reasoned that the floodplain does not likely provide suitable habitat for frogs. The HHERA also stated that amphibians were not observed during biological surveys in spring/summer of 2015. Survey methods for amphibians differ from the typical biological monitoring activities conducted at contaminated sites and those efforts may not be specifically designed to find them. For example, audible survey methods are often used to identify the types of frogs that may be present based on their distinct calls.

Since the HHERA was written DNR has observed and documented the presences of amphibians in the Crawford Creek floodplain. Attached is a photo of a Northern Leopard Frog (*Lithobates pipiens*) taken during observations of the 2013 Geoprobe sampling for the supplemental investigation. This individual was found in the Crawford Creek floodplain upstream from the railroad grade. Amphibians can be indicators of biological health. The skin of amphibians is unique in that it acts like a semi-permeable membrane and may make them more susceptible to site contaminants. As the case with Wood Turtle, if existing toxicity data do not exist for amphibian receptors then consideration should be given to using a line of evidence approach to assess risk to amphibians which may be present within suitable habitat at the site.

Northern Leopard Frog (*Lithobates pipiens*) in the Impacted Portion of the Crawford Creek Floodplain on August 22, 2013, S. Inman Photo

