EPA Region 5 Records Ctr.
232548

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5

DATE: February 16, 2005

SUBJECT: Robin Home Range

FROM: James Chapman, Ph.D., Ecologist

TO: Milt Clark, Ph.D., Regional Scientist

Modeled exposure to robins foraging in PCB-contaminated floodplains provided the basis for calculating terrestrial remedial goals at the Sheboygan River and Harbor, WI, Superfund site (Chapman 1999). Robins utilize different portions of their foraging area "on a fairly regimented schedule", roughly every hour in one study (Swihart and Johnson 1986), so they would be expected to receive an integrated exposure from throughout their foraging area. Two values for robin foraging areas were used: 0.15 ha during the nestling stage (young in the nest), and 0.81 ha during the fledgling stage (young out of the nest, but still dependent on the adult pair). The home ranges are mean values for deciduous forest in Ontario (Weatherhead and McRae 1990, also cited in USEPA 1993). For a given robin pair, the fledgling-stage foraging area is an expansion of (includes) the nestling-stage area (Weatherhead and McRae 1990). For the Sheboygan ERA, the home ranges were operationally defined as square areas 126 ft on a side (nestling stage) and 295 ft on side (fledgling stage).

In the Sheboygan ERA, the effect of different soil remedial options on the number of robin foraging areas at risk was assessed, and the percent risk reduction calculated (number of foraging areas at risk with no action / number at risk at a given soil remedial target). The soil remedial target selected at Sheboygan resulted in a 90 % reduction in the number of nestling-stage foraging areas at risk. [Another aspect of the Sheboygan ERA is that foraging area was used to adjust exposure to robins since elevated soil PCB concentrations occurred in a narrow band of about 100 ft from the river banks, and levels beyond 100 ft were 1 to 2 orders of magnitude lower. This consideration does not apply to the former impoundments at Kalamazoo site because the contaminated area extends much further from the river than at Sheboygan].

I recommend calculating surface-weighted average concentration (SWAC) in the floodplain for both nestling- and fledgling-stage robin foraging areas to determine the effect on volume and cost. I also recommend assessing the percent reduction in the number of nestling-stage foraging areas at risk assuming that remediation is performed according to the fledgling-stage SWACs. In this manner, cost and risk reduction may be compared between the two approaches.

Chapman, J. 1999. Sheboygan River and Harbor Floodplain Terrestrial Ecological Risk Assessment. Prepared for USEPA Region 5.

Swihart, R. and S. Johnson. 1986. Foraging decisions of American Robins: somatic and reproductive tradeoffs. Behav Ecol Sociobiol 19: 275-282.

USEPA. 1993. Wildlife Exposure Factors Handbook. vol. I and II. Office of Research and Development. EPA/600/R-93/187a and b. http://cfpub.epa.gov/ncea/cfm/wefh.cfm?ActType=default

Weatherhead, P. and S. McRae. 1990. Brood care in American robins: implications for mixed reproductive strategies by females. Anim Behav 39: 1179-1188.