ALBANY — A chickadee’s two-note song and a song sparrow’s trill can be subtly modified by low levels of PCBs, according to a study published this week in the journal PLOS ONE.

The study compared the songs of birds from a stretch of the Hudson River contaminated with polychlorinated biphenyls to those from an uncontaminated area in the Adirondacks. Lead author Sara DeLeon, who studied birdsongs for her doctoral thesis at the Cornell Lab of Ornithology, said computer analysis of song patterns showed variations in the chickadee’s “fee-bee” song and higher quality in the song sparrow’s trills.

Blood samples confirmed the presence of PCBs, which the birds ingest by eating contaminated insects.
The differences in the songs are not apparent to the human ear. But DeLeon identified distinct patterns by using sound analysis software developed at the Cornell lab. She said the songs of both species are well-studied and it’s been documented that there’s normally very little variation in the way black-capped chickadees sing.

Since dominant male chickadees are the ones that produce the most consistent songs, the variation linked to PCBs could have important consequences for breeding, DeLeon said.

A key finding was that the song disruption was tied to specific types of PCBs, which have 209 variations, say DeLeon and the other authors of the study released Wednesday.

“Effects of PCBs are extremely complicated,” co-author Andre Dhondt of the Lab of Ornithology said. "What this demonstrates is that most previous PCB studies may not give us the whole picture because they did not look at the specific type of PCB involved but just measured overall levels."

He said DeLeon found that birds with PCB exposure had changes in their songs, and then took the next step to isolate the specific type of PCB causing it.

The ill effects of PCBs on birds and wildlife are well-documented by decades of research, including many studies centered on the massive Superfund cleanup site where General Electric is dredging contaminated sediment from a stretch of the Hudson north of Albany. Most of the research has looked at mortality, reproduction and growth.

The impact of prolonged exposure to low levels of PCBs is less studied.

The research was funded by New York Sea Grant, a joint program of the State University of New York, Cornell University and the National Oceanic and Atmospheric Administration.