

## Patuxent Wildlife Research Center

### Effects of Short Chain Chlorinated Paraffins (SCCPs) on developing birds



**The Challenge:** Short-Chain Chlorinated Paraffins (SCCPs) are complex technical mixtures of polychlorinated n-alkanes used in lubricants and coolants in metalworking, as flame retardants, and in paints, adhesives, sealants, textiles and polymeric materials, plastics and rubber. SCCPs are of concern because they are globally transported, bioaccumulate in wildlife and humans, and are environmentally persistent. Their toxicity has been demonstrated in multiple species and their presence has been detected in wild birds and their eggs far from primary manufacturing centers. However, few controlled studies have been conducted to determine the potential hazard and risk that SCCPs pose to free-ranging birds.



**The Science:** USGS biologists from Patuxent Wildlife Research Center (PWRC) are collaborating with scientists from Environment Canada to investigate the effects of embryonic exposure to SCCPs in birds. Eggs collected from American kestrel (*Falco sparverius*) and Japanese quail (*Coturnix japonica*) were injected with SCCPs at environmentally realistic concentrations and artificially incubated until hatching. Egg injections provide an approximation of the effects resulting from maternal deposition of a chemical in nature. Hatchling survival, growth, somatic indices and deformities were assessed. Molecular and biochemical indicators including changes in gene expression (RNAseq), oxidative stress levels, and thyroid hormone-related biomarkers are being analyzed.



**The Future:** Initial results suggest potential effects of SCCPs on thyroid functions in the kestrels. Results from this study will provide information to risk assessors on potential pathways that are adversely affected by SCCPs in birds. The U.S. EPA has recently issued a Significant New Use Rule governing SCCPs and is conducting a detailed assessment of the risk posed by SCCPs. Likewise, the Persistent Organic Pollutant Review Committee (POPRC) of the Stockholm Convention is considering adding SCCPs to its list of Persistent Organic Pollutants (POPs) and is continuing to gather information from studies such as this to help guide its decision.