

OSAC RESEARCH NEEDS ASSESSMENT FORM



Title of research need:

Describe the need:

The ability to distinguish between captive-bred versus wild individuals of a given species or taxon is important for ensuring compliance with both restrictions on captive breeding and on illegal taking or trade in protected species (1). Biological changes that occur based on short-term captivity are largely unknown and can be a confounding factor when differentiating between exclusively captive-bred and wild individuals (2). Forensic determination of illegal trade and harvesting practices of wild fauna is critical to their protection through identification of the source populations, which can include migratory species (3). Furthermore, the ability to differentiate captive and wild individuals allows the legal pet industry to be distinguished from illegal or fraudulent breeding programs. Stable isotope analysis of biological tissues has been used to examine variation between captive and wild-sourced populations (4, 5, 6, 7). However, more research is needed to establish stable isotope databases for species and populations, as well as their different tissue types, of forensic interest, using suitable biological source materials. Species listed by the US Endangered Species Act and the Convention on International Trade in Endangered Species of Wild Fauna and Flora are priorities for this research.

Keyword(s):

Submitting subcommittee(s): **Date Approved:**

Background Information:

1. Does this research need address a gap(s) in a current or planned standard? (ex.: Field identification system for on scene opioid detection and confirmation)

2. Are you aware of any ongoing research that may address this research need that has not yet been published (e.g., research presented in conference proceedings, studies that you or a colleague have participated in but have yet to be published)?

3. Key bibliographic references relating to this research need: (ex.: Toll, L., Standifer, K. M., Massotte, D., eds. (2019). Current Topics in Opioid Research. Lausanne: Frontiers Media SA. doi: 10.3389/978-2-88963-180-3)

1. TRAFFIC (2012). Captive Bred, or Wild Taken? TRAFFIC International, Cambridge, UK
2. Horreo, J. L., Valiente, A. G., Ardura, A., Blanco, A., Garcia-Gonzalez, C., & Garcia-Vazquez, E. (2017). Nature versus nurture? Consequences of short captivity in early stages. *Ecology and Evolution*, 8(1), 521–529.
3. Jiguet, F., Kardynal, K. J., & Hobson, K. A. (2019). Stable isotopes reveal captive vs wild origin of illegally captured songbirds in France. *Forensic Science International*, 302, 109884.
4. Wassenaar, L. I., & Hobson, K. A. (2006). Stable-hydrogen isotope heterogeneity in keratinous materials: mass spectrometry and migratory wildlife tissue subsampling strategies. *Rapid Communications in Mass Spectrometry : RCM*, 20(16), 2505–2510.
5. Turner Tomaszewicz, C. N., Seminoff, J. A., Price, M., & Kurle, C. M. (2017). Stable isotope discrimination factors and between-tissue isotope comparisons for bone and skin from captive and wild green sea turtles (*Chelonia mydas*). *Rapid Communications in Mass Spectrometry : RCM*, 31(22), 1903–1914.
6. Hebert, C. E., Popp, B. N., Fernie, K. J., Ka'apu-Lyons, C., Rattner, B. A., & Wallsgrove, N. (2016). Amino Acid Specific Stable Nitrogen Isotope Values in Avian Tissues: Insights from Captive American Kestrels and Wild Herring Gulls. *Environmental Science & Technology*, 50(23), 12928–12937.
7. Evans, R. D., Hickie, B., Rouvinen-Watt, K., & Wang, W. (2016). Partitioning and kinetics of methylmercury among organs in captive mink (*Neovison vison*): A stable isotope tracer study. *Environmental Toxicology and Pharmacology*, 42, 163–169.

4. Review the annual operational/research needs published by the National Institute of Justice (NIJ) at <https://nij.ojp.gov/topics/articles/forensic-science-research-and-development-technology-working-group-operational#latest>? Is your research need identified by NIJ?

Forensic Biology/DNA, Scientific Research, Increased information about the discriminatory power and sensitivity of alternate biological analyses (e.g., proteomics, microbiome, plants, animals) to associate individuals with crime scene evidence.

5. In what ways would the research results improve current laboratory capabilities?

This research will help provide novel forensic methods for enforcing wildlife trade regulations.

6. In what ways would the research results improve understanding of the scientific basis for the subcommittee(s)?

These methods would provide robust, quantifiable techniques that satisfy Daubert criteria for distinguishing captive bred and wild individuals.

7. In what ways would the research results improve services to the criminal justice system?

The ability to provide objective, scientific information pertinent to captive-bred and wild-caught organisms, and the laws and regulations governing them, allows the criminal justice system to determine if a violation has occurred. With this information, violators can be prosecuted, and non-violations can be dismissed, thus informing effective enforcement of laws and regulations.

8. Status assessment (I, II, III, or IV):

II

	Major gap in current knowledge	Minor gap in current knowledge
No or limited current research is being conducted	I	III
Existing current research is being conducted	II	IV

This research need has been identified by one or more subcommittees of OSAC and is being provided as an informational resource to the community.