OSAC Research Needs Assessment Form

Title of research need: Transfer and Persistence of Soils

Keywords: Transfer, Persistence, Fidelity, Soil Types, Sorting, Moisture Content, Morphology

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

(If SAC review identifies additional subcommittees, add them to the box above.)

Background information:

1. Description of research need:

Soil contains components with differences in shape, size, density, magnetic susceptibility, and other physical properties. Sorting processes may take place during and/or after transfer of soil from a source to evidence. Research is needed to investigate the effects of different variables on the relative abundance of soil components after transfer. Variables that could be considered include but are not limited to the type of donor substrate, receiving substrate, time since transfer, and environmental factors such as moisture content.

2. Key bibliographic references relating to this research need:

Chazottes, V. et al. (2004) Particle size analysis of soils under simulated scene of crime conditions: the interest of multivariate analyses. Forensic Science International, 140: 159-166.
Croft, D.J. and Pye, K. (2004) Multi-technique comparison of source and primary transfer soil samples: an experimental investigation. Science & Justice, 44: 21 – 28.
Garzanti, E. et al. (2006) Petrology of Nile River sands (Ethiopia and Sudan): Sediment budgets and erosion patterns. Earth and Planetary Science Letters, 252: 327–341

3a. In what ways would the research results improve current laboratory capabilities?

This research would provide increased front-end understanding of the possible effects of several factors on the forensic analysis of soils. This foundation would assist laboratories in developing well-informed and scientifically grounded policies regarding these analyses (e.g. defining time limitations on sample collections from clothing worn after an incident). Furthermore, the information obtained may enhance analysts' understanding of the significance of features identified in submitted samples.

3b. In what ways would the research results improve understanding of the scientific basis for the subcommittee(s)?

*Increased understanding of the effects of specific variables, both individually and as a group
*Stronger foundation for describing hypotheses (as opposed to limiting to personal experiences)
*Improved comprehension of the effects of soil sorting via activities and other common factors; possible quantification of resulting shifts in mineral populations

3c. In what ways would the research results improve services to the criminal justice system?

The results will assist by strengthening the ability of the analysts to speak to the following points – based on soil types and sorting factors:

1. Limitations to sample size/population
2. Identification and significance of unusual characteristics
3. Restrictions on ability to conduct comparisons
4. Enhanced confidence in analytical results
5. Effects of specific case factors (e.g. time, water, location)

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

	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.

Subcommittee Approval date:

(Approval is by majority vote of subcommittee. Once approved, forward to SAC.)

SA

1. Does the SAC agree with the research need? Yes No ◯

2. Does the SAC agree with the status assessment? Yes No ◯

If no, what is the status assessment of the SAC:

Approval date:

(Approval is by majority vote of SAC. Once approved, forward to NIST for posting.)