# Field guide for collecting and documenting oiled samples

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*Version 3.0; Sri Lanka, June 2023; creddy@whoi.edu*

# If in doubt, take samples

# Summary

- This guide outlines the “best case” steps for safe and proper collection and documentation of “oiled” field samples.
- Due to logistics and availability of supplies, the “best case” may not be feasible, but that is OK. Try your best.
- This guide was developed for situations when glass jars are neither available nor suited for the circumstances.

# Why field samples?

We want to collect and analyze field samples across a continuum of locations and times because:

- Laboratory experiments, alone, cannot replicate real-world situations.
- Helps responders design and implement best available methods to limit the damages and clean-up following an oil spill.
- Allows for detailed insights into the transport, fate, and effects of the spilled oil.
- Properly constrains estimates of the extent of damages (e.g., not all oils have the same toxicity).
- Adds to the science of oil spills and lessons learned can be applied to planning and responding to future spills.

# Outline

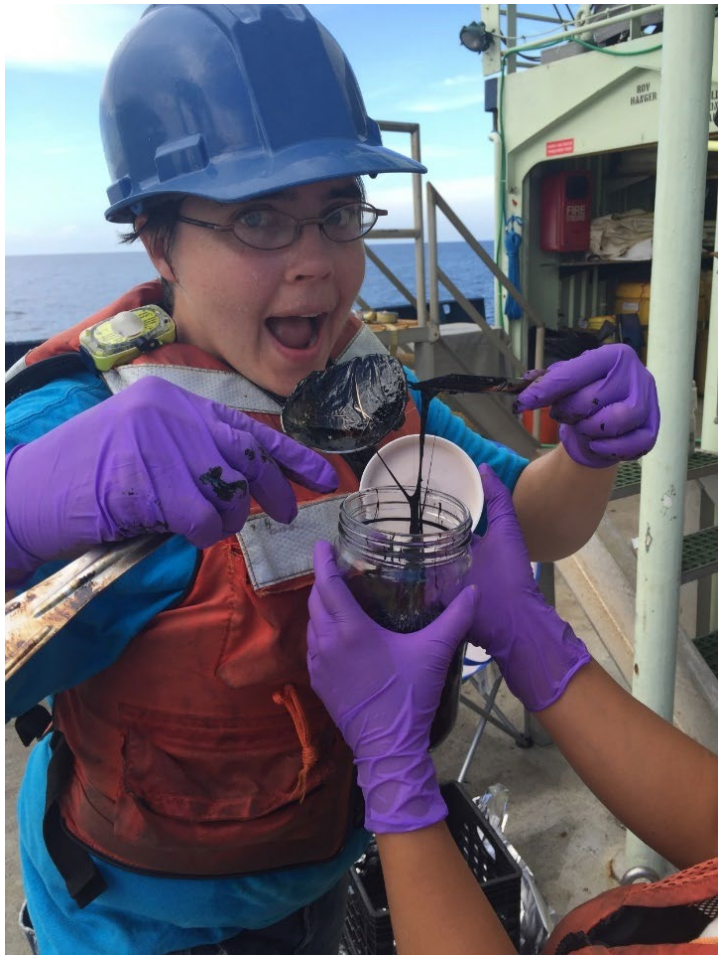
1. Safety
2. Types of oily residues
3. Provenance and the continuum of confidence
4. Materials
5. Labelling protocol
6. Sampling and packaging

# 1. Safety

- No samples are worth harm to you.
- Use the buddy system.
- Let others know where you are going and expect to return. Provide updates.  Develop a plan if hurt.
- Hydrate, bring snacks, first-aid kit, and bring spare clothes. Avoid over exposure.
- Sunscreen and insect repellant are fine to use with caution. (See next sections)
- Proper PPE.
  - Gloves are advised.
  - The most volatile compounds should have been lost and hence inhalation is unlikely.
  - Do not bring samples close to your face to smell.
- If oil touches your skin, wash with soap/water and/or alcohol wipes.
- If oil contacts your clothes, evaluate and consider changing.
- There is no specific material safety data sheet (MSDS) for the oily residues you will be collecting, but refer to website below. Note that these datasheets consider a non-weathered product and hence exposure to inhalation or eyes is more likely.
  - https://www.shell.com/business-customers/marine/fuel/ulsfo.html

Be careful to not store oiled samples in standard refrigerators and strive to use explosive-proof ones.
https://ehs.berkeley.edu/sites/default/files/publications/storing-flammable-liquids-refrigerators-freezers-factsheet-31labfridge.pdf

# Samples should not be eaten…



# KEEP RECORDS

- Chains of Custody
- Photos
- Videos
- Notes
- Distinct and understandable labels

ENVIRONMENTAL HAZARDS SERVICES, L.L.C.

7469 Whitepine Road Richmond, Virginia 23237 Phone (804) 275-4788 Fax (804) 275-4907

# CHAIN OF CUSTODY FORM

| | | | |
|---|---|---|---|
| ***Company Name:*** | Washington State University | | ***Date:*** _____ |
| ***Address:*** | Environmental Health & Safety / P.O. Box 641172 | | ***Contact Name:*** _____ |
| ***City, State, Zip:*** | Pullman, WA 99164 | | ***Sampler Name:*** _____ |
| ***EHS Client Account #:*** | 49-3308 D | | ***Project #:*** _____ |
| ***Phone# :*** | (509) 335-5604 | ***Fax#:*** (509) 335-4442 | ***P.O. #:*** _____ |

| | | Asbestos | | | | | Lead | | | | | | Other Metals (Specify metals below) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Number | Sample Date & Time | Bulk ID by PLM | Asbestos Wipe | Fiber Count (PCM) | TEM Air | TEM Chatfield (Bulk) | Air | Paint | Soil | Wipe | TCLP (Pb) | Waste Water | TCLP RCRA 8 | | | | | Air Volume (L) OR Wipe Area ($ft^2$) OR Scrape Area($cm^2$) | Comments |
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|---|---|---|
| Released by: | Signature: | Date/Time: |
| Received by: | Signature: | Date/Time: |
| Released by: | Signature: | Date/Time: |
| Received by: | Signature: | Date/Time: |

# 2. Types of samples

Based on the type of spilled and the extent of weathering, we are interested in five types of samples:

- Original oil
- Water
- Surface sheen
- Sediment
- Oil blobs.
- Oil/sand patties.
- Rock scrapings.
- Oiled vegetation.
- Animals
- Oiled debris.

# Original oil

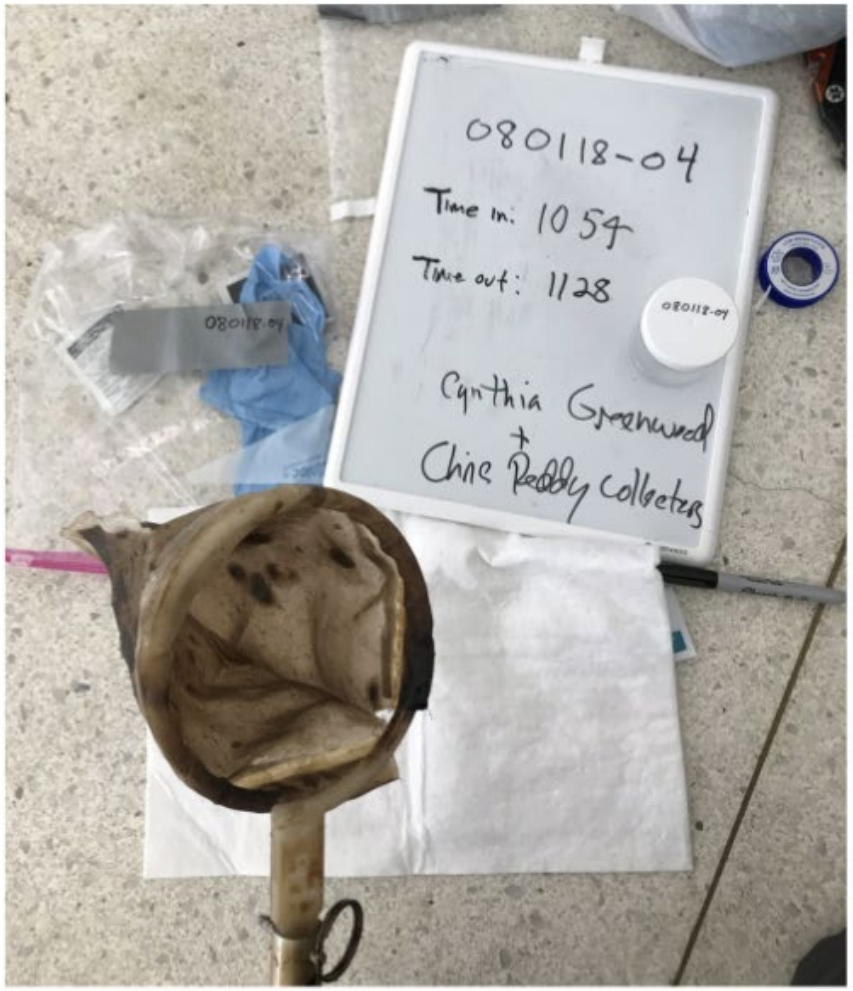
Absolutely critical for response, forensics, and damage assessment

# Water

Surface or deep?
Sampling device
Storage?
**Hold time?**
Quality control?

# Surface sheen

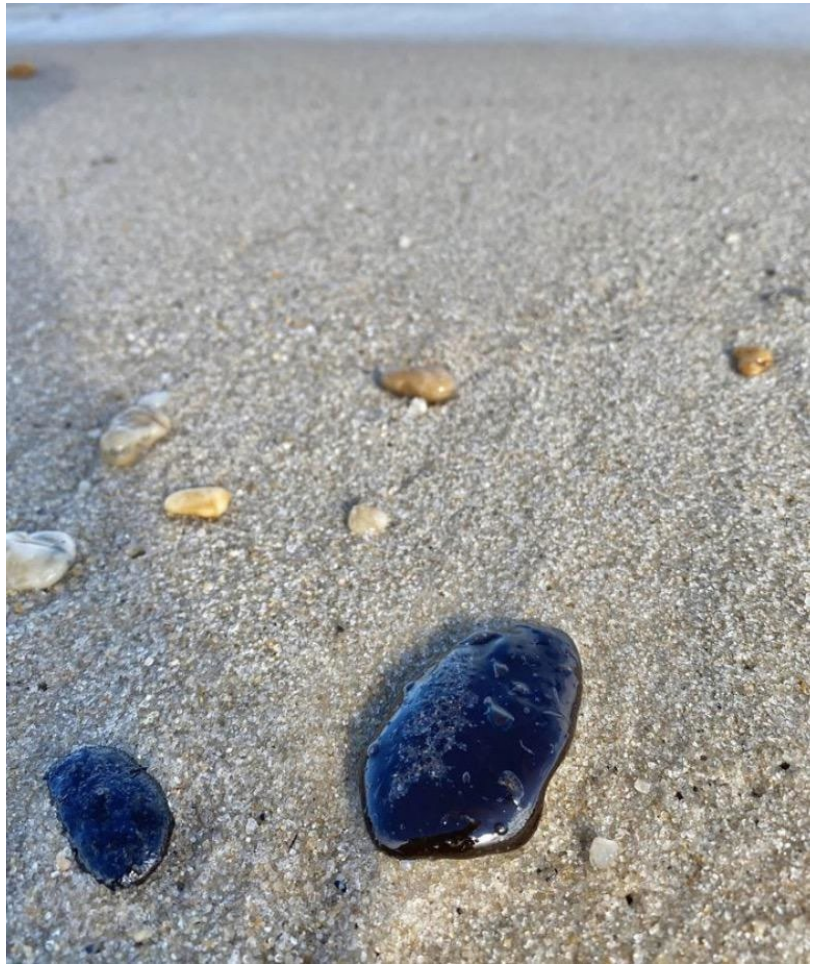
080118-04



# Sediment

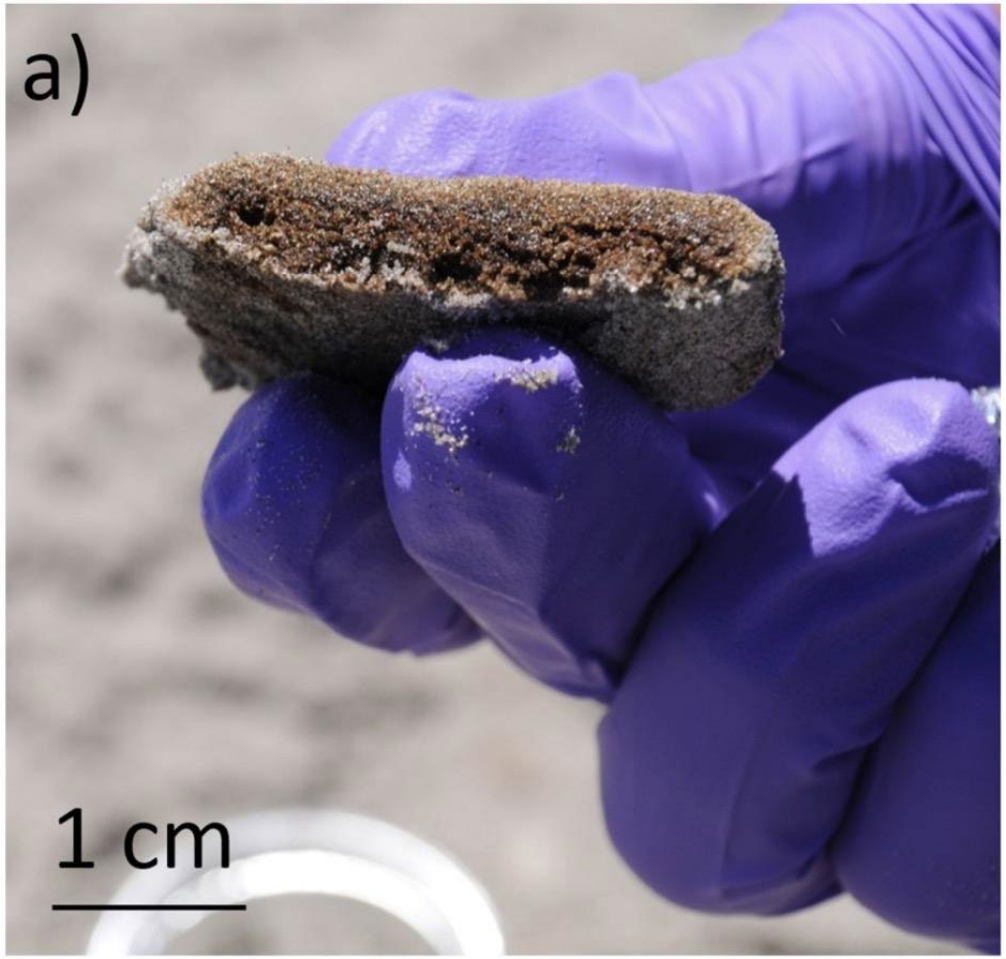
Surface or core
Sampling device
Storage?
Hold time?
Quality control?

# Oil blobs



Be careful-> blobs can be sticky

# Oil/sand patties


One patty or a composite of
several can be treated as a single sample.

# Rock scrapings



Close ups of surrounding oil




Zoom out ---------> Zoom in ----------> Sample

# Oiled vegetation

Be careful one can easily sink in marshes, mangroves, and other wetlands. In addition, these are fragile areas and do not trample to access samples. Not worth it.

# Animals (extreme caution!)



Do not handle any oiled animals (alive or dead) unless permitted. They need to documented. In addition, oiled animals can be so stressed that they may bite or attack (even when they are otherwise thought to be docile).

# Oiled debris (broken shells, bottles, etc).

If samples are too big, try to get small pieces, such as cutting plastic bottles. Be safe.

# 3. Continuum of confidence

- The rest of this document will provide details on the “best case” sampling protocol.
- It simply may not be achievable to follow the best case.
- Try your best to follow the spirit of the protocol. Keep notes so we can place these samples along our continuum of confidence.
- Placement within our continuum of confidence helps us decide the utility and the extent of the results from the analysis of field samples.

# Continuum of confidence

Only date collected/approximate location

Detailed notes; dates; coordinates photos; Labelling protocol; background information.

Less confidence when interpreting results

More confidence when interpreting results

Useful and relegated to background knowledge

Included in peer-reviewed research

# 4. Materials

- Aluminum foil (ok if straight from the roll)
- Ziploc bags (or other plastic bags, such as grocery store)
- Gloves
- Duct tape (needed to write labels and secure packaging)
- Markers
- Index cards
- Notebook
- Paper towels. (Your best friend. Use without prejudice to wipe hands, tools, packaging, and even to collect/handle samples). Discard after single use into garbage bag
- Garbage bags
- Soap/water in a squirt bottle (if necessary to wash hands, tools, packaging, etc)
- Rinsing water (for soap/water)
- Metal sampling tools (forks, spoons, knives, tweezers, pliers)
- Alcohol wipes (avoid scented if possible; removing oil and cleaning tools)
- Camera that includes time/date/location. (We like the solocator app: https://solocator.com)
- Utility knife.

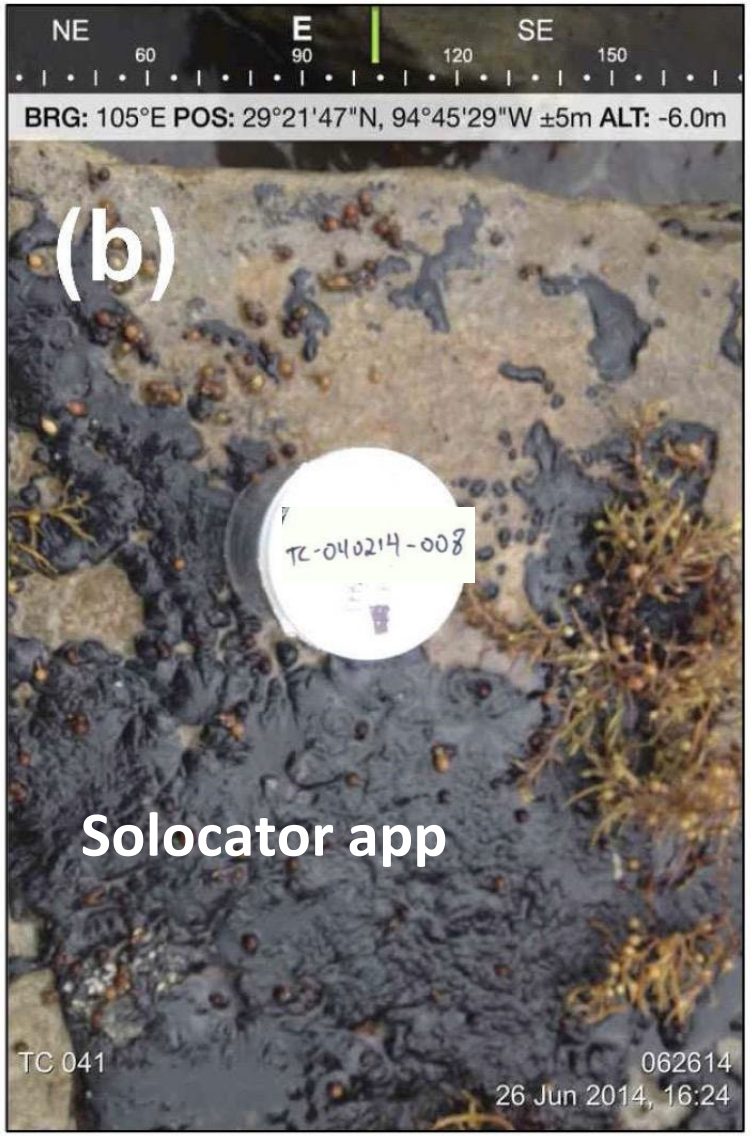
# 5. Labelling protocol (example)

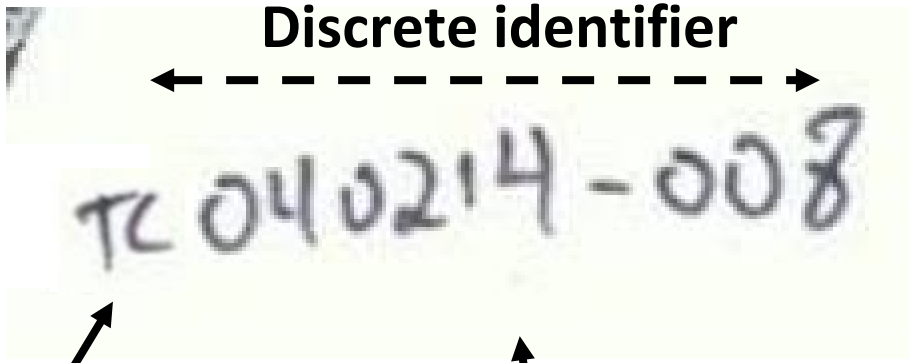
Develop a discrete label that encodes information.  Here is one example:

**PERU0X0Y21-0Z-frog**

MAU=Mauritius (designates the oil spill)
X=Month of the year
Y=Day of the month
21=year
Z=the sample number for the specific day.

# Example for labelling samples




**TC=Texas City oil spill**

**The 8th sample collected on April 2, 2014**

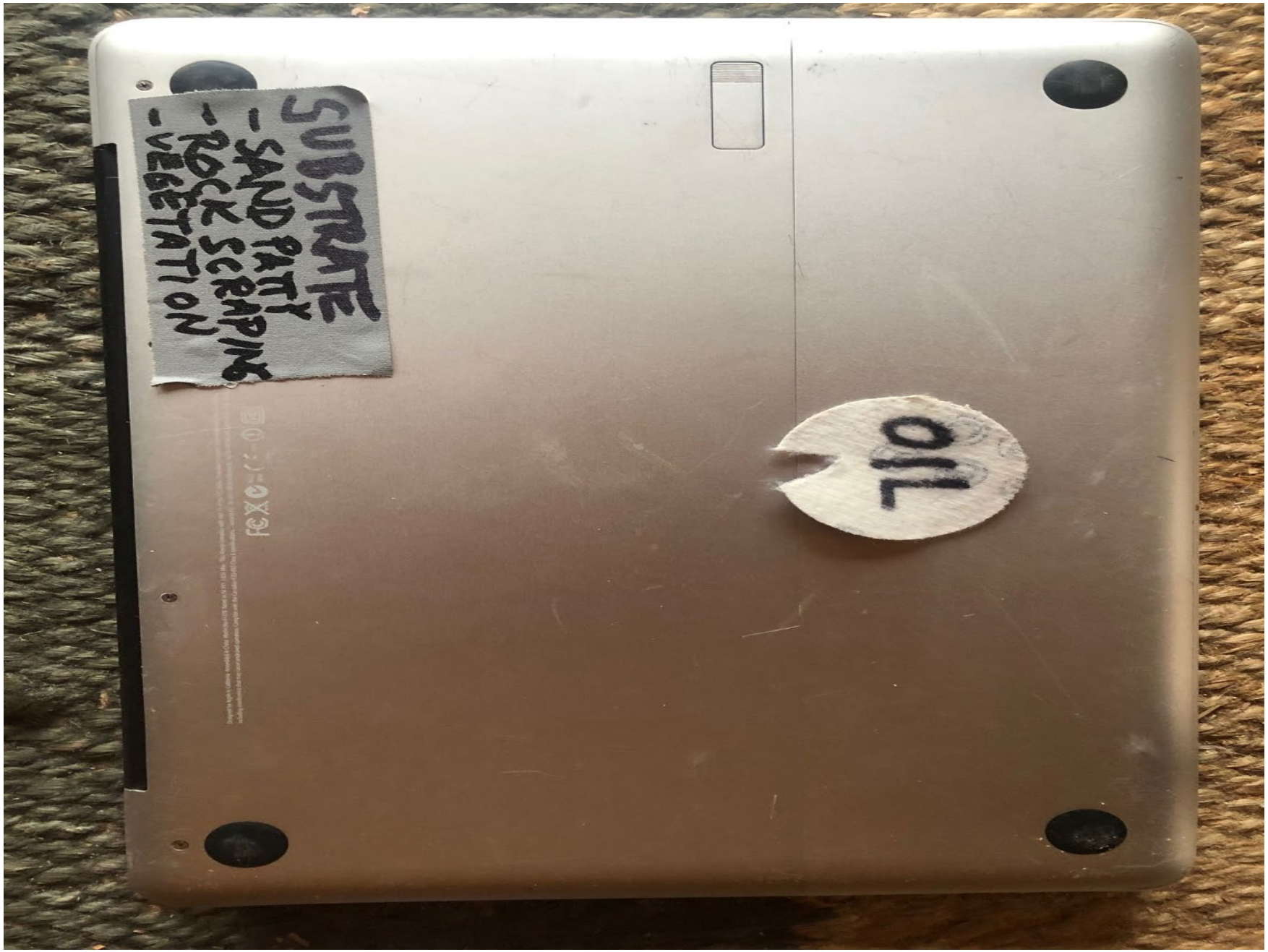
# Any questions?

- Email us anytime:

Chris Reddy; creddy@whoi.edu

# 6. Sampling and packaging

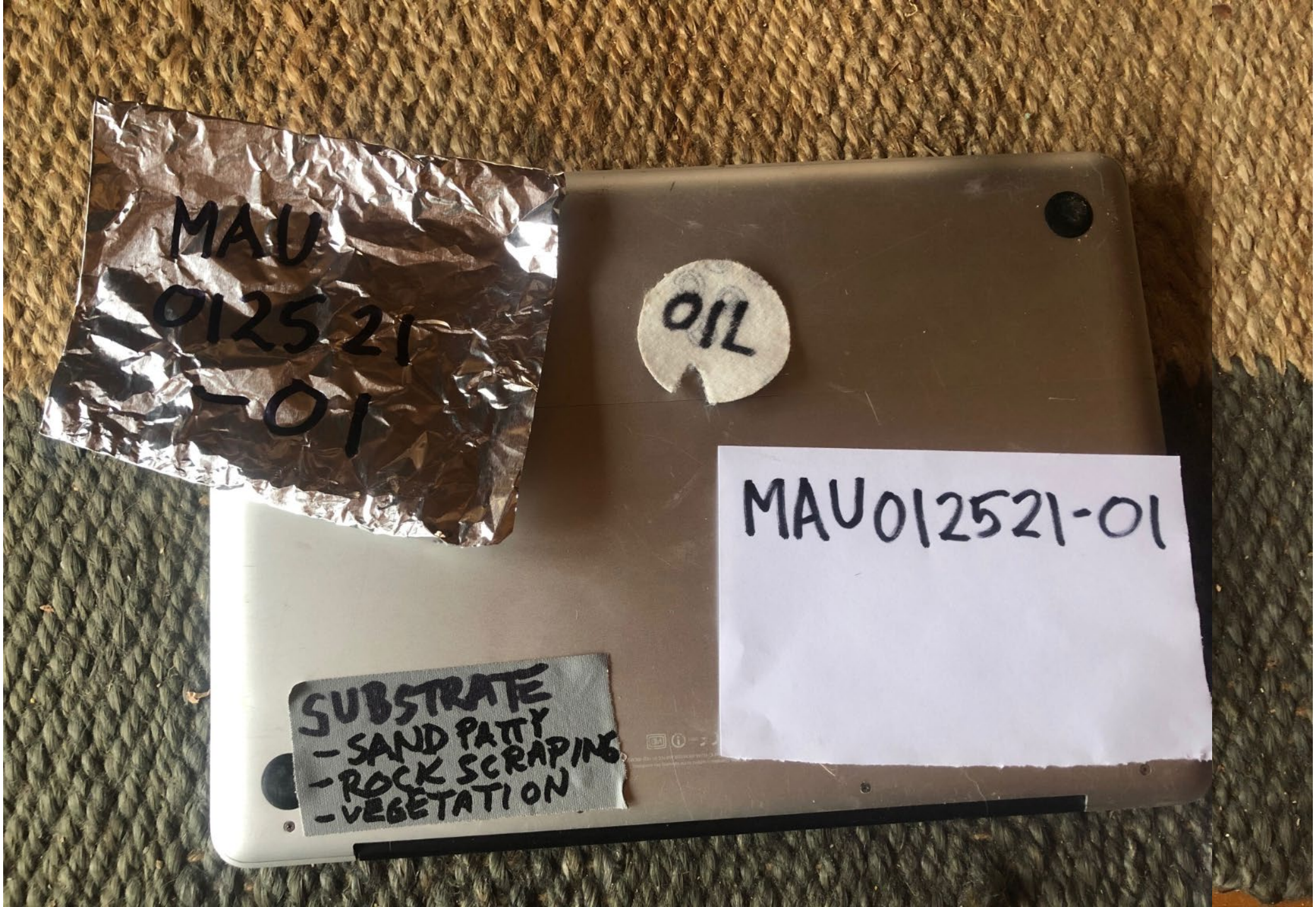
- Keep notes and record any local or pertinent information
  - Was area cleaned-up?
  - Pristine prior to spill or impacted?
  - Locals have insight?
  - Weather on day of sampling?
- Record sample ID, date, time, lat/long; sample type.
- Avoid contacting the samples with sunscreen. Includes in the notes the brand of sunscreen.




**Sample identified**

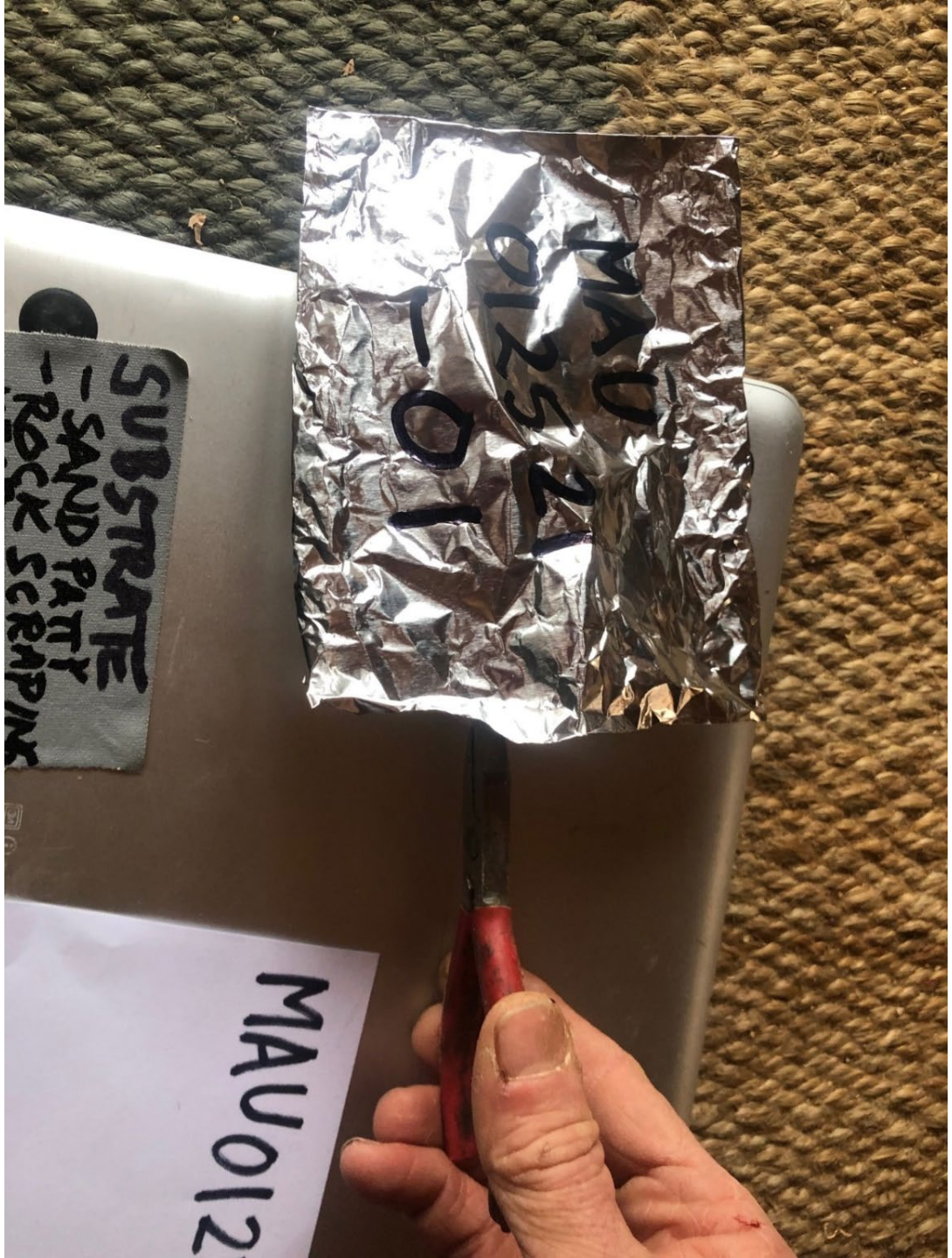

**Label assigned**

**If you take one pic, this is it:**
**where,**
**type,**
**and sample ID.**




**More Labelling**

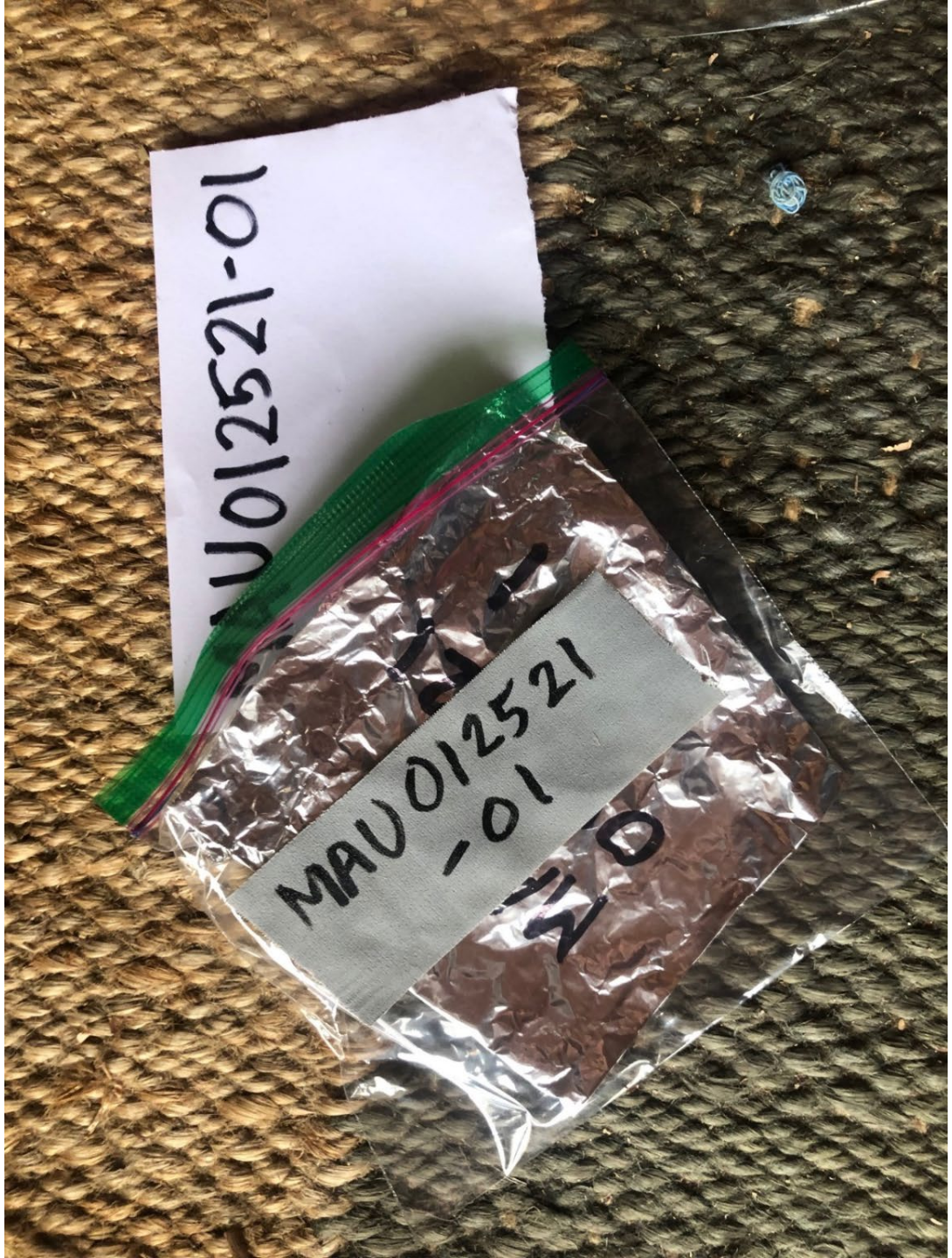

**Sample handling**



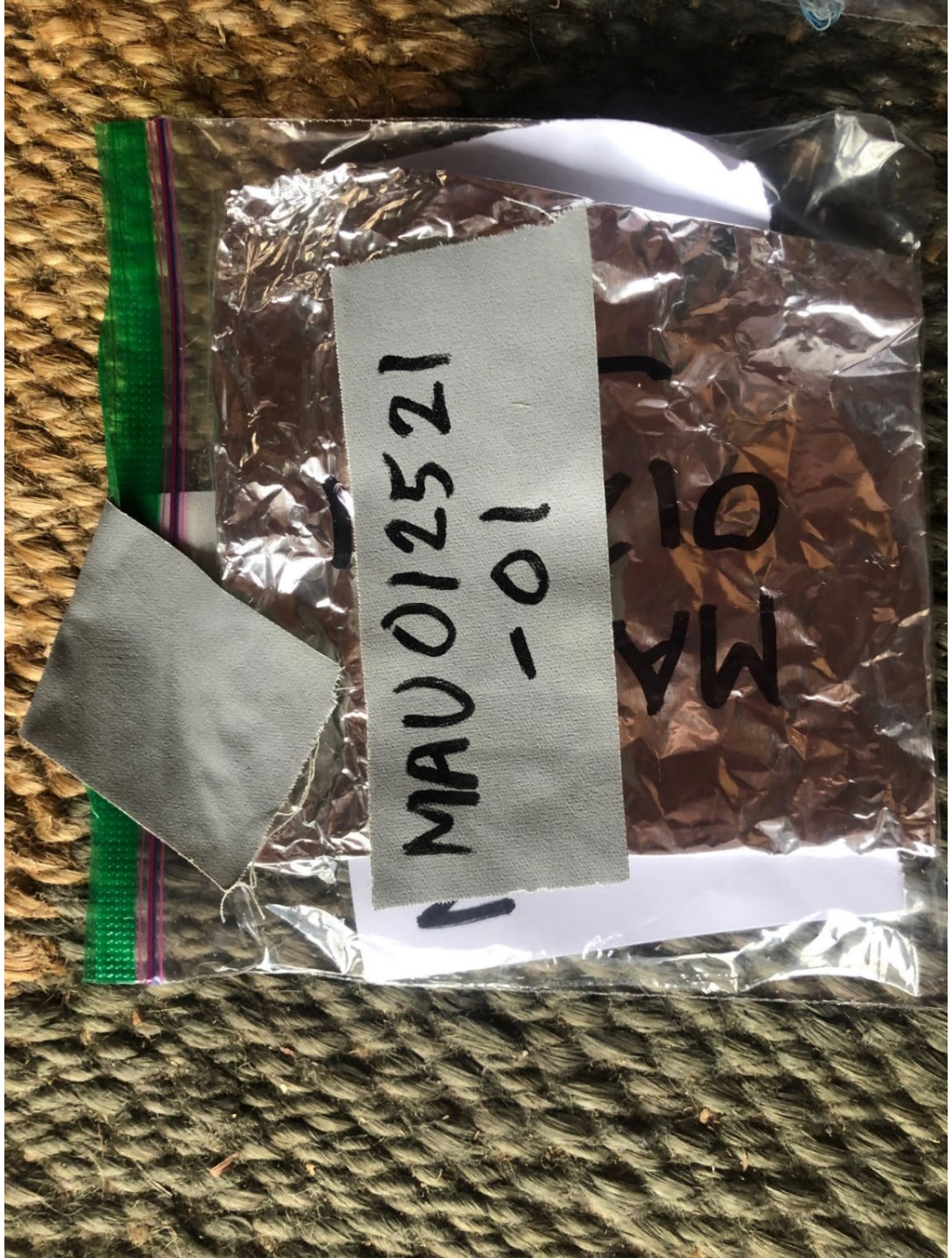

**Sample handling**

# Clean-up of tools

- Clean tools with alcohol wipes, soap and water, or simply friction with paper tool.
- If tools are too oiled to easily clean, package in Ziploc bag.
- Dispose of wipes into a trash bag. Do not re-use.




**Secure sample**

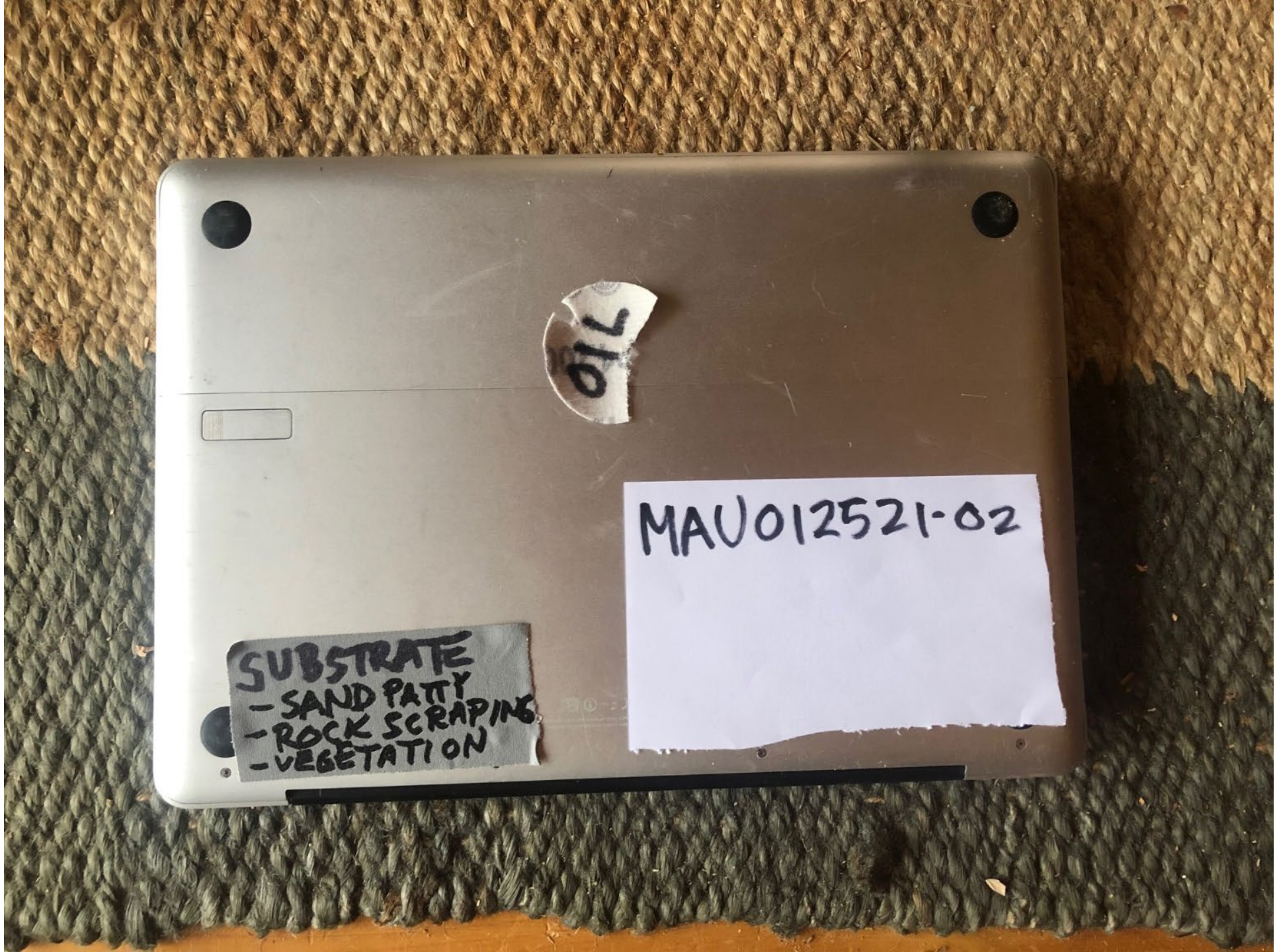



**Each sample will have:**

1. **Discrete ID.**
2. **Wrapped in Al foil.**
3. **Secured in a single plastic bag.**
4. **Label repeated several times.**

**Keep samples cool**

Follow protocol for additional samples
(See pictures of some steps).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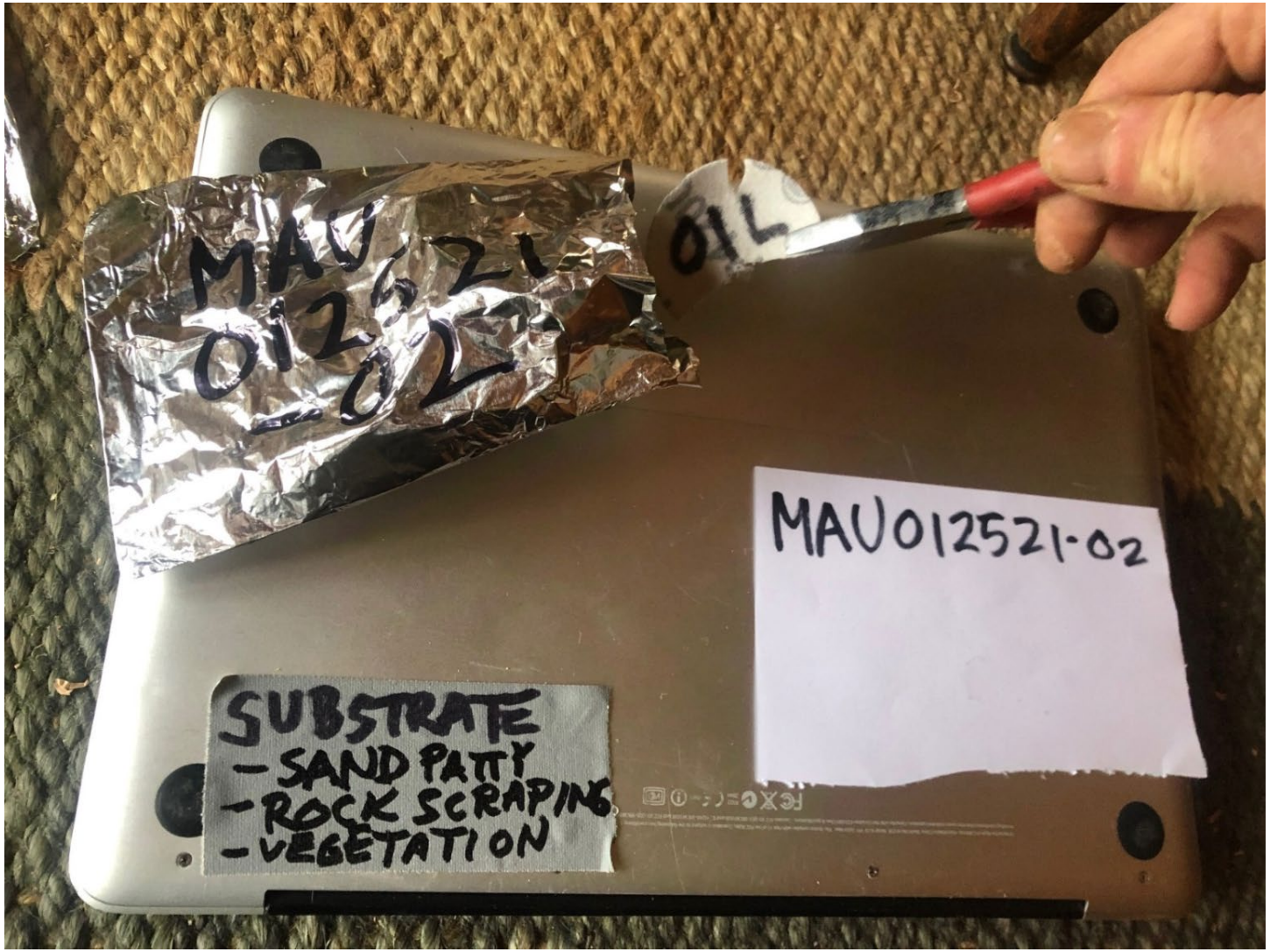
SUBSTRATE
- SAND PATTY
- ROCK SCRAPING
- VEGETATION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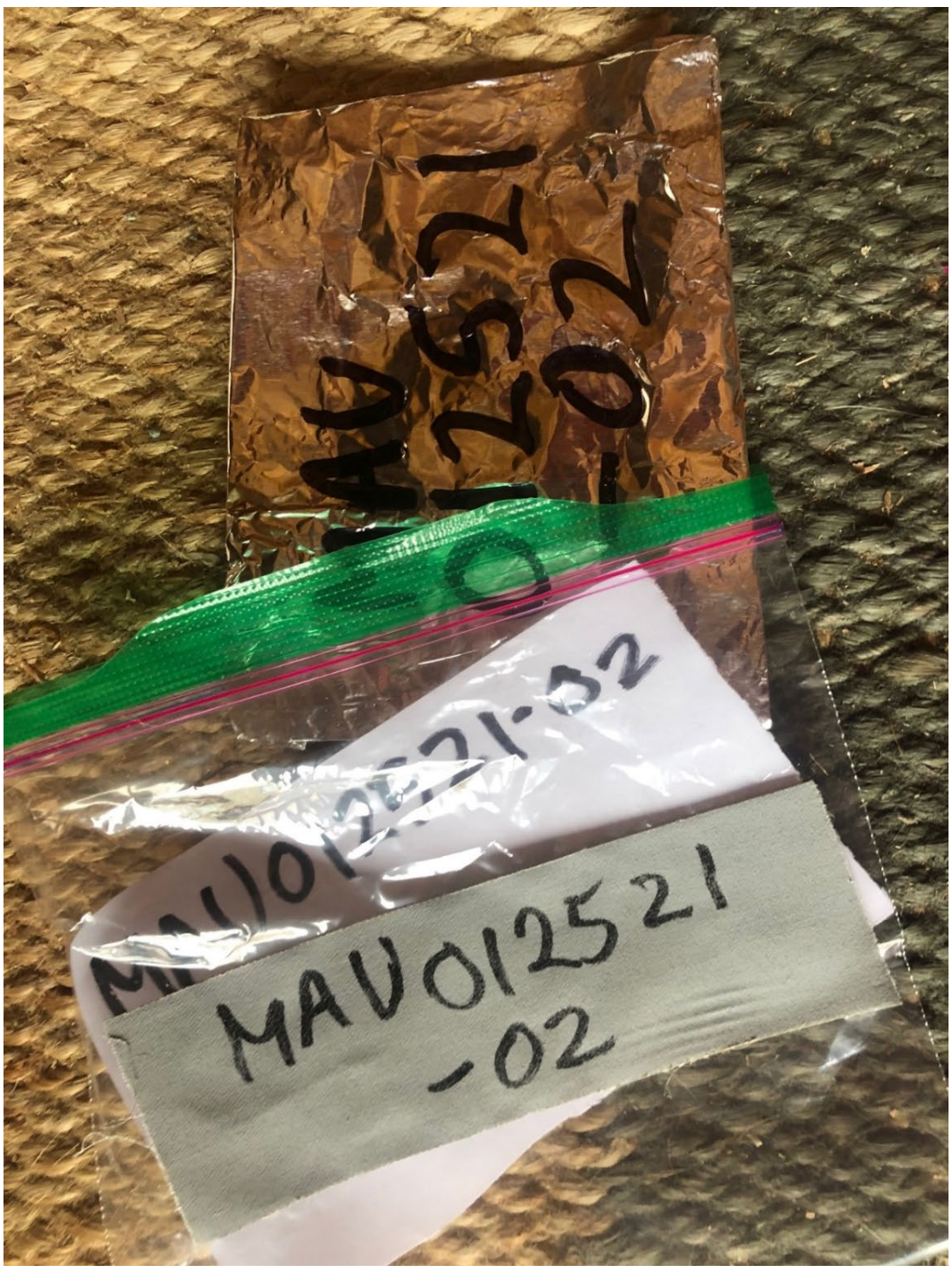
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Continue….


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# When done sampling for the day

- Place each individual sample into a large bag and secure with tape.
- Provide a brief description of the samples.
- Try to keep samples ”cool” and out of direct sunlight.


ALL SAMPLE MAURITIUS 2021
Jan 25, 21 MAU012521-01,-02
SC Johnson
Family Company
Zip
POWER SHIELD
Technology

# Additional days?

- Repeat previous steps.
- Place all of the sampling “days” within a garbage bag and then into a cardboard box with packing peanuts if available.
- Include notes with sample ID, date, lat/long, and sample type. Handwritten is fine. Email a copy of the notes and representative photos.

# Other tips

- Work slow and methodically; one sample with proper ID and secured is better than three with no details.
- Control samples of an aluminum-foil envelope.
- Even if samples do not look like the were from the spill but may be oil-like, collect.
- Keep simple notes.
- Action pictures are great.