Dry Fork Blackfoot eDNA Sampling
STATEMENT OF WORK (SOW)

1.0 Background

The Bureau of Land Management (BLM) Missoula Field Office developed a collaborative project with Montana Fish, Wildlife and Parks (MTFWP), U.S. Fish and Wildlife Service (USFWS), and U.S. Forest Service (USFS) to increase the distribution and abundance of bull trout in the Blackfoot River basin. The focus of this project is to introduce translocated bull trout into previously unoccupied habitats above natural barriers. To better understand bull trout distribution and potential donor population sources in the watershed, the BLM would like to survey the Dry Fork of the North Fork of the Blackfoot River (Dry Fork) for bull trout and westslope cutthroat trout environmental DNA (eDNA). Dry Fork, near Ovando, MT, is a remote, relatively large basin in the Scapegoat Wilderness Area and bull trout distribution and presence there is largely unknown. This will provide project partners with information required to make informed decisions associated with the project going forward.

2.0 Scope

The BLM and project partners require the retrieval of eDNA samples from the Dry Fork Basin. Dry Fork is accessed via 6-mile hike from the Hobnail Tom Trailhead. Targeted streams include Dry Fork, Cabin Cr, Dwight Cr, Canyon Cr, Conger Cr, and several unnamed drainages covering more than 25 stream miles.

3.0 Objectives

The goal of this contract is to have approximately 80 locations sampled for eDNA in the Dry Fork Basin. The Dry Fork Basis is remote, only accessed by foot or horseback, and may require the assistance of packstock. The results of this effort will provide important fish distribution information in this remote section of the Blackfoot River watershed.

4.0 Tasks

The contractor will be responsible for securing any pack horse assistance needed prior to initiation of field work. During the period of performance, eDNA should be collected during relatively low-water conditions (i.e. July 15th to November 1st). The contractor is responsible for returning any government furnished property, including collected samples, immediately after completion of field work. The contractor is also required to provide a brief summary report detailing trail conditions encountered, intermittent stream reaches, dry sampling locations, fish barriers, and any other pertinent information. The BLM will have the samples processed as a separate action from this contract.

5.0 Delivery

The contractor shall deliver eDNA samples immediately upon completion to:

Bureau of Land Management
c/o Paul Scarr
3255 Fort Missoula Rd
Missoula, MT 59804

The report can be emailed to pfscarr@blm.gov at a later date within the period of performance.

6.0 Government-Furnished Property

- If necessary, BLM can provide a Geotech pump and battery for eDNA collection.
- 100 eDNA sample kits and sample envelopes.
- If necessary, BLM can provide a lithium generator to charge batteries in the backcountry.

7.0 Security
There are no security requirements related to this contract.

8.0 Place of Performance
The place of performance is in the Dry Fork basin, near Ovando, MT. The downstream end of the project area is 6 miles by trail from the Hobnail Tom Trailhead. Completion of the summary report will be completed at the contractor's facility.

9.0 Period of Performance
The period of performance is from when the contract is awarded until September 30th, 2027.

Dry Fork Blackfoot eDNA Sampling

Information Packet

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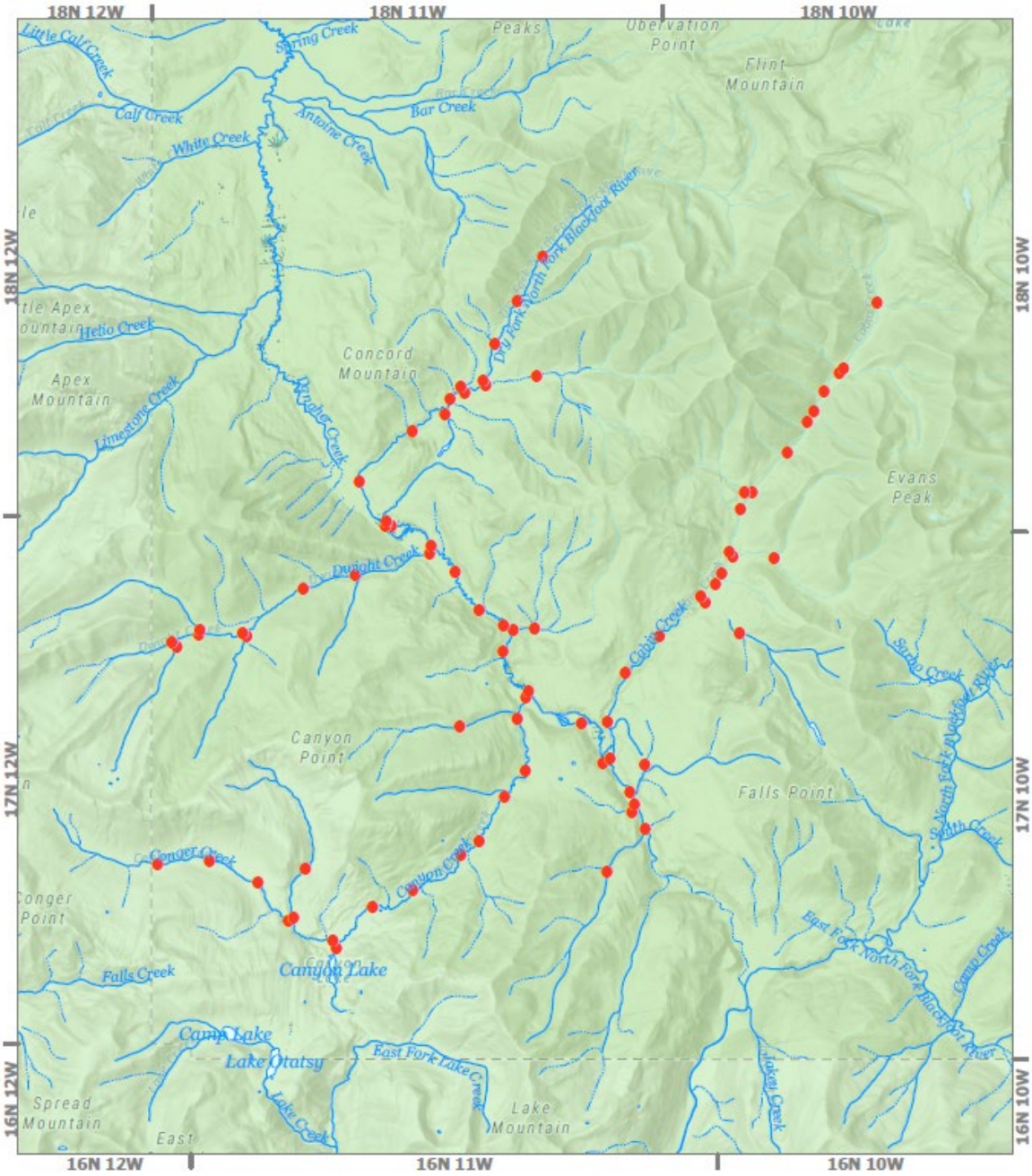
Background and Important Information

- eDNA sampling should be completed during relatively low-water conditions (i.e. July 15th to November 1st). This will ensure greater accuracy in eDNA results.
- BLM can provide a Geotech Geopump if necessary. The pump plus battery weighs 10-15lbs. We only have one battery, so another battery should be acquired by the contractor or BLM can provide a portable lithium generator (approx. 50lbs) to charge batteries in the backcountry.
- There is a backcountry Forest Service cabin (North Fork Cabin) located near the mouth of Dry Fork. This cabin can likely be used for food and gear storage for logistical purposes. The contractor can likely utilize the cabin facilities (kitchen, bunk beds, etc) if needed. BLM will coordinate with Seeley Ranger District to determine availability. However, because this cabin is at the mouth of the Dry Fork, it likely will not be a huge benefit as base camp.
- BLM will provide 100 eDNA sampling kits. These kits are not heavy but they are bulky. Please retain and return all plastic parts from the kits because they are sterilized and reused.
- Most of the sampling locations are accessible by trail and/or short bushwhack. The basin was surveyed by a BLM fisheries technician in 2025 to discern what trails were passable, locations of fish barriers, sightings of fish, etc. This report can be shared to provide contractors with recent status of trail conditions in the project area. Most of the sampling locations for this project was accessed during this effort, but the upper sampling extents of each stream are just past where the BLM fish tech made it to, so there may be relatively longer bushwhacks required to reach these locations.
- We anticipate that many sampling locations will be dry, especially in the mainstem Dry Fork. Please record which sites were dry at the time of sampling. If there is surface water present upstream or downstream within 300m of the provided locations, please take a sample there with the same site ID and accurately record the alternate Lat/Long information.
- The project area is in grizzly bear country. Please have available measures to properly hang or store food and carry bear spray.
- The contractor is responsible for acquiring and coordinating any pack help required. There are outfitting businesses based in nearby Seeley Lake, Holland Lake, and Ovando, MT.
- There are a total of 79 sampling locations. A georeferenced pdf can be provided for use with Avenza or other compatible GPS/GIS products.
- Please fill out the envelope provided with required information and use the site IDs provided within Table 1 of this document.

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
MISSOULA FIELD OFFICE

Dry Fork eDNA Sampling Locations



Legend

0 1 2 Miles

Projected Coordinate System: NAD 1983 Albers
Geographic Coordinate System: GCS North American 1983
Datum: D North American 1983

NORTH

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of this data for individual use or aggregate use with other data. BLM data may be updated without notice.

Creator: pfscarr

Date: 5/13/2026

Path: \\blm\dfs\loc\GBP\MT\MSFO\gis_users_scratch\pscarr\Dry Fork eDNA\Dry Fork eDNA.aprx

Table 1. Sampling Locations-

Site_ID	Stream Name	Longitude	Latitude	UTM_Zone	UTM_X	UTM_Y
2460-1	Canyon Creek	-113.01435	47.19524	12	347419	5228827
2490-1	Conger Creek	-113.015245	47.19643	12	347355	5228962
2469-2	Canyon Creek	-113.005651	47.20206	12	348098	5229569
2587-1	Conger Creek	-113.025925	47.1997	12	346556	5229346
2594-1		-113.024688	47.20032	12	346651	5229412
2469-1	Canyon Creek	-112.995831	47.20485	12	348850	5229860
2524-1		-112.939781	47.21491	12	353122	5230870
2496-1	Canyon Creek	-112.984272	47.21055	12	349741	5230471
2587-2	Conger Creek	-113.033362	47.20599	12	346011	5230059
2517-2	Canyon Creek	-112.979838	47.21282	12	350083	5230714
2539-1		-112.942873	47.21771	12	352896	5231188
2594-2		-113.021833	47.20831	12	346890	5230294
2529-1	Dry Fork North Fork Blackfoot River	-112.942252	47.21891	12	352946	5231320
2551-1		-112.943449	47.22091	12	352861	5231544
2587-3	Conger Creek	-113.045029	47.20964	12	345138	5230488
2587-4	Conger Creek	-113.057607	47.20902	12	344183	5230445
2517-1	Canyon Creek	-112.973689	47.2201	12	350569	5231512
2579-1		-112.939825	47.22546	12	353148	5232043
2562-1	Dry Fork North Fork Blackfoot River	-112.949905	47.2257	12	352385	5232089
2577-1	Cabin Creek	-112.94819	47.22634	12	352517	5232156
2545-2	Canyon Creek	-112.968696	47.22454	12	350960	5231995
2639-1	Cabin Creek	-112.948824	47.23241	12	352486	5232833
2605-1	Dry Fork North Fork Blackfoot River	-112.955169	47.23217	12	352005	5232818
2545-1	Canyon Creek	-112.970626	47.23297	12	350837	5232936
2596-2		-112.984544	47.23163	12	349780	5232814
2591-1	Canyon Creek	-112.968551	47.23651	12	351004	5233325
2629-1	Dry Fork North Fork Blackfoot River	-112.967904	47.23748	12	351056	5233432
2639-2	Cabin Creek	-112.944518	47.24053	12	352834	5233726
2608-2		-112.916883	47.247	12	354943	5234393
2639-3	Cabin Creek	-112.936303	47.24667	12	353473	5234393
2646-1	Dry Fork North Fork Blackfoot River	-112.97405	47.24402	12	350609	5234171
2608-1		-112.925145	47.25211	12	354332	5234977
2640-1		-112.966433	47.24775	12	351196	5234570
2649-1	Cabin Creek	-112.926221	47.25307	12	354253	5235086
2644-1		-112.971639	47.24757	12	350802	5234560

2659-1	Dry Fork North Fork Blackfoot River	-112.973953	47.24823	12	350628	5234638
2652-1	Cabin Creek	-112.922681	47.25521	12	354527	5235316
2662-1	Cabin Creek	-112.921222	47.2568	12	354642	5235491
2672-1		-112.908565	47.25928	12	355606	5235742
2694-1	Dry Fork North Fork Blackfoot River	-112.979867	47.25092	12	350188	5234948
2660-1		-112.918471	47.25962	12	354858	5235799
2688-1	Cabin Creek	-112.919345	47.26043	12	354794	5235890
2603-1		-113.036064	47.24662	12	345924	5234580
2606-1		-113.052972	47.24483	12	344639	5234415
2681-1	Dwight Creek	-113.036986	47.24711	12	345855	5234636
2671-1	Dwight Creek	-113.054163	47.24546	12	344551	5234487
2680-1	Dwight Creek	-113.047681	47.24681	12	345045	5234624
2700-1		-113.04739	47.24765	12	345070	5234717
2694-2	Dry Fork North Fork Blackfoot River	-112.985688	47.25724	12	349766	5235662
2695-1	Cabin Creek	-112.916662	47.26735	12	355016	5236654
2678-2	Dwight Creek	-113.022357	47.25442	12	346983	5235419
2678-1	Dwight Creek	-113.009781	47.25652	12	347941	5235628
2690-1	Dwight Creek	-112.991804	47.26023	12	349312	5236006
2723-1	Cabin Creek	-112.913785	47.27028	12	355241	5236975
2720-1		-112.915667	47.27018	12	355099	5236968
2701-1	Dry Fork North Fork Blackfoot River	-112.991436	47.26136	12	349343	5236131
2724-1		-113.001059	47.2648	12	348624	5236532
2763-1	Dry Fork North Fork Blackfoot River	-113.002496	47.26471	12	348515	5236525
2735-1	Cabin Creek	-112.905255	47.27681	12	355904	5237685
2731-1		-113.002284	47.26536	12	348533	5236597
2738-1	Cabin Creek	-112.900407	47.28182	12	356284	5238232
2745-1	Cabin Creek	-112.898897	47.28362	12	356404	5238430
2763-2	Dry Fork North Fork Blackfoot River	-113.008789	47.27206	12	348060	5237354
2756-1	Cabin Creek	-112.896435	47.28671	12	356598	5238768
2757-1	Cabin Creek	-112.892706	47.28988	12	356889	5239114
2781-1	Cabin Creek	-112.891641	47.29064	12	356971	5239196
2769-1	Dry Fork North Fork Blackfoot River	-112.996014	47.28036	12	349050	5238252
2765-1		-112.988082	47.28309	12	349658	5238539
2777-1	Dry Fork North Fork Blackfoot River	-112.986859	47.28568	12	349758	5238824
2779-1	Dry Fork North Fork Blackfoot River	-112.983349	47.28646	12	350025	5238904
2776-1		-112.978304	47.2878	12	350411	5239044

2776-2		-112.965901	47.28941	12	351353	5239199
2796-1		-112.984251	47.28747	12	349960	5239019
2790-1	Dry Fork North Fork Blackfoot River	-112.978882	47.2887	12	350369	5239145
2791-1	Cabin Creek	-112.883494	47.30142	12	357616	5240380
2801-1	Dry Fork North Fork Blackfoot River	-112.976061	47.29468	12	350600	5239804
2836-1	Dry Fork North Fork Blackfoot River	-112.970658	47.30162	12	351028	5240565
2836-2	Dry Fork North Fork Blackfoot River	-112.964493	47.30906	12	351514	5241380
9999-9		-112.94896	47.20801	12	352427	5230161

eDNA Sampling Protocol- (K. Carim et al. 2016)

The Environmental DNA Sampling Kit

The NGC provides collaborators with eDNA kits (Box 1) that contain all the equipment and supplies required for field sampling. Although we do not endorse any specific brand, the instructions assume the use of a battery-powered peristaltic pump. Many of these supplies are "disposables" that are retained and returned to the NGC to be cleaned and reused. You may also assemble your own kit as described in Appendix A. But be sure that the filters, filter assemblies, tools used to handle samples, and interiors of bags used to store samples are clean. Precisely adhere to these specifications to ensure that your results are reliable and consistent with other eDNA samples. This document assumes that you have a kit supplied by NGC, or one containing identical elements. Also, note that although the pump comes in a hard-sided case, our field teams often transfer the unit to a well-protected portion of a backpack for transit into the field.

Box 1: The Environmental DNA Sampling Kit

The displayed kit contains the materials supplied by the National Genomics Center for Wildlife and Fish Conservation. If you are building your own kit, see Appendix A for additional information.

1. Duffelbag containing eDNA sampling equipment
2. Pump
3. Tubing with adapter
4. Filter holder with filter (in clean bag)
5. eDNA sampling protocol
6. Forceps (in clean bag)
7. Clean gloves
8. Outflow bucket
9. Clean sample bags with desiccant (for storing filters after sample is taken)
10. Sample box with letter-sized envelopes, pencils, and indelible ink markers
11. Black bag for used equipment (**please return used supplies for cleaning and reuse**)
12. White bag with unused site kits
13. Battery charger
14. Pump battery (with backup battery)
15. Alligator clip adapter for battery
16. GPS unit (**not shown and not provided; note that most cellphones have apps for determining geolocation**)

Note: Items 4, 6, 7, and 9 constitute a site kit, and come in a 1-gallon resealable bag. A site kit has all the supplies needed for collecting one sample.

Procedures for Avoiding Contamination

The most important thing you can do to ensure the accuracy of your eDNA results is to avoid contamination of the field sample. The primary sources of contamination are anything that has previously come in contact with the target species or its DNA: hands, clothes, waders, the pump, used supplies, even the field vehicle. If you suspect that any forceps, filter holders, samples, or anything else has become contaminated, stop sampling and start over with a new site kit. Carry spare site kits for these circumstances (see note in Box 1).

The pump, tubing, outflow bucket, and used equipment are sources of contamination because they are exposed to the surrounding environment at every sampling site. Avoid handling these items once you have donned the clean gloves. We have adopted the convention of storing clean items in a white bag, and used or contaminated items in a black bag. Generally, remove the clean site kits from the white plastic bag only as needed. If you are backpacking to a sampling location, it is fine to remove enough field kits—plus spares—to complete the day's work; it is a good idea to transfer them in a new clean bag prior to use. However, a kit that leaves the white bag should never be returned to the white bag. Used equipment goes into the black "used equipment" bag and is never touched again in the field.

Choosing a Sampling Location at a Site

Choose a bank or island location—the flatter, the better—that allows you to lay out all of the sampling equipment without risk of it being blown away or falling into the stream. During sampling, always stay downstream of the sampling location. This includes you and all the sampling equipment. During sampling, the filter cup should be placed in a well-mixed portion of the flow (the center of the main current if possible). Avoid eddies or splash pools where DNA could wash off contaminated materials (like waders or tubing), flow upstream, and contaminate the sample.

Field Collection Protocol

Step 1: Connect the Pump

- Remove the pump and battery and set in a stable area. Connect the pump to the battery using the power cord or alligator clips.

Step 2: Install the Tubing

- Ensure the tubing has been loaded into the pump following the orientation indicated by the sticker placed on the pump. Lift the quick-release lever to load the tubing into the pump head. Center the tubing in the track, and lower the quick-release lever. Once the tubing has been loaded, thread the outflow end of the tubing from the pump through the hose clamp on the bucket to keep it in place for an accurate measure of how much water has been pumped (fig. 1). The hose clamp will keep the tubing in the bucket during pumping.

Figure 1—Outflow end of tubing threaded through hose clamp and placed into outflow bucket.

Step 3: Start the Pump

- Turn the pump on. Ensure that the pump switch is in the FORWARD direction, and test that air is being sucked through the filter adapter on the palm of your hand. If the tubing is oriented in the wrong direction through the pump head, or the pump switch is in the reverse direction, air will be blowing out of the adapter end of the tube, and may contaminate the sample. If the pump will not turn on or pull water, see Troubleshooting.

Step 4: Remove the Site Kit

- Remove a site kit from the white bag and immediately close the white bag. Put on a pair of gloves from the site kit. Once you have gloves on, be careful not to touch anything that may be contaminated with DNA (such as yourself and the pump).

Step 5: Forceps and Sample Bag

- Remove the bag containing clean forceps and the sample bag containing the silica desiccant. Unseal these bags without removing the contents and set them in an area where they are easily accessible, and away from contaminated materials (such as the bucket and pump).

Step 6: Install the Filter Assembly

- Remove the packaged filter assembly from the site kit. Open the bag containing the filter assembly, but do not remove it from the bag. Instead, orient the filter holder in the bag so that it can be attached to the tubing without removing it from the bag. In

Figure 2—Attaching the filter assembly to the adapter while using the packaging bag.

essence, you are treating the bag as a secondary "glove" to prevent contamination before collecting the sample. Press the filter holder on to the filter holder adapter on the tubing (fig. 2) so the connection is snug (enough to prevent the filter assembly from falling off). Here you are touching the tubing, which is considered dirty, with a gloved hand. If you are right-handed, use the left hand to hold the tubing (vice versa if left-handed). This is the natural thing to do, and this way the hand that is closer to the filter when you are removing it from the cup (fig. 2) will be clean.

Step 7: Stream Placement of Filter Assembly

- Place the filter assembly into the stream (fig. 3). Be careful not to sample in any area with backflow that could result in contamination of the sample. You may prefer to hold the filter assembly in place, but we often place a rock on the tubing just behind the assembly and pin it facing upstream on or near the stream bottom. Take care to avoid stirring up sediment that may clog the filter, or using a rock so large that it compresses the tubing. Sometimes even this approach will not work, so be creative. Whichever method you use to hold the cup under water during sample collection, remember to keep the cup upstream and in the water column where it will not pick up sediment from the bottom. Note that placing the dominant (clean) hand in the water and grabbing a rock does not render the hand unclean; at that point, the stream and everything in it is part of the sample.
- Assuming that you are not holding the filter assembly to collect the sample, then the main job is to monitor things: Make sure that the current does not dislodge the cup and make sure that the bucket is filling as you watch for the water to reach the 5-L mark. Things will happen. The tube may fall out of the bucket and need to be reinserted, the bucket may tilt and almost spill, or the filter may clog. While you are monitoring, if you ever need to touch the bucket, tube, pump, or anything else considered to be dirty, try to remember to use your nondominant (=dirty) hand.
- If the bucket appears to be filling very slowly, look for signs of filter clogging (or check to see whether the pump speed was set at less than maximum). It generally

Figure 3—Collecting a field sample. Filter cup is submerged in the main current upstream from the pump and bucket. In this case, the cup is held in place in the current with a rock.

takes 8 to 9 minutes to filter 5 L of water from clear streams, so if you have filtered that long but have collected only 2 to 3 L, it is likely that the filter is clogged. Other signs are an excessive amount of bubbles in the tubing and outflow, or the discharge of very little water from the tubing. See Troubleshooting for instructions on how to proceed.

Step 8: Drain and Dry the Filter

- When 5 L of water have been pumped, lift the cup up and away from the stream and allow the pump to run for approximately 30 seconds to dry the filter.

Step 9: Remove Cup From Filter Assembly

- Remove the cup from the filter assembly (fig. 4); it does not unscrew, but pops off. At this point you are finished with this cup and you can set it aside.

Step 10: Fold Filter and Secure in Sample Bag

- Remove the forceps from their protective bag, being careful to not touch the tips to anything except the filter. Use forceps to fold the filter paper in half and then in quarters with the filtrate side facing in (fig. 5). Place the filter into the sample bag containing the desiccant beads, ensuring that it is at the bottom of the bag and in contact with the beads. Allow nothing to come in contact with the inside of the silica bag except for the filter. Push out any excess air from the bag and seal completely.

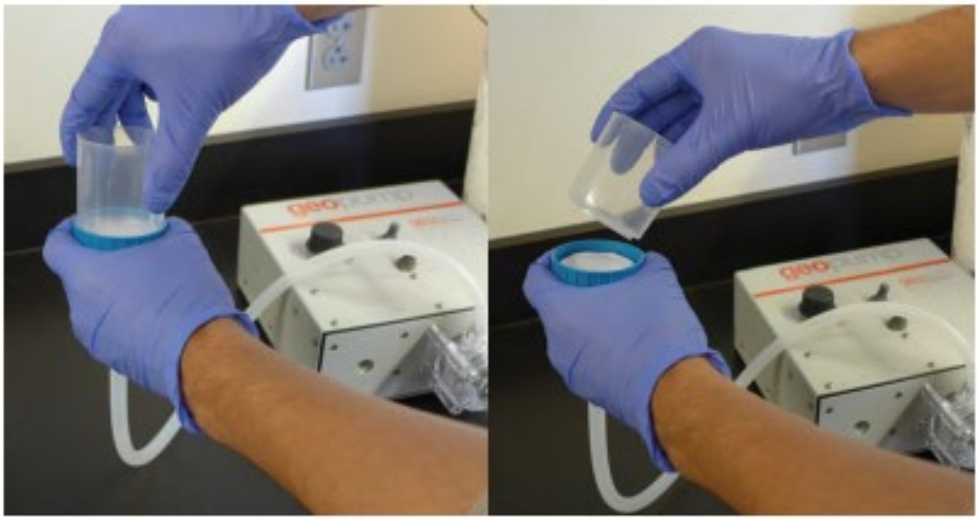


Figure 4—Removing the cup from the filter assembly.

Figure 5—Folding the filter paper, filtrate (usually brown) side in.

Step 11: Label Sample Bag

- At this point, you have secured an eDNA sample in a clean environment. Turn off the pump, take off your gloves, and label the bag with the date, sample identification (e.g., stream name and sample number), GPS coordinates, number of filters sampled, and your initials (fig. 6).

Step 12: Place Sample Bag in Envelope

- Label a letter-sized envelope with the same information on the sample bag, place the sample bag in the envelope, and seal it (see Troubleshooting if you used multiple filters to collect the sample at a site because of clogging). This envelope provides extra protection for the sample and provides redundant labeling.

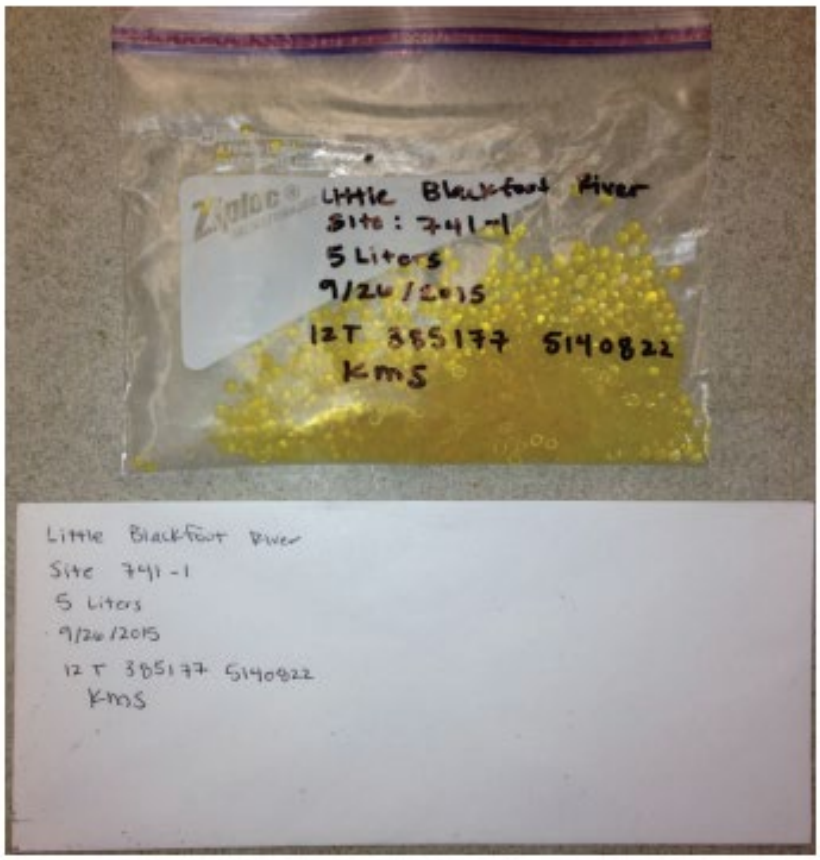


Figure 6—An example of a properly labeled sample.

Step 13: Clean Up

- Clean up the used supplies. Put all of the used plastic and forceps back into the 1-gallon (4-L) site kit bag. Make sure that you have removed the blue base of the filter cup from the tubing. Double-check to ensure you have not forgotten to pack up anything—the forceps are easy to overlook. Place the used bag in the black "used equipment bag," discard the water from the outflow bucket, and pack up—you are ready to move to the next site. If you are backpacking to remote sites, it is good practice to store clean and dirty kits separately, preferably in white and black garbage sacks.

Step 14: Storing Samples

- Environmental DNA samples are stable in silica desiccant beads for several weeks. Nevertheless, keep them away from water, heat, and sunlight. We recommend that samples be stabilized no more than 2 weeks after collection either by storing the bagged filters in a freezer or, preferably, by sending them to us at NGC so we can extract the DNA. Desiccant beads contain a colored indicator, generally blue, orange, or yellow, indicating that the desiccant is dry and can absorb water. Desiccant that has lost its color cannot absorb water and therefore cannot dry out a

filter or keep it dry. If a sample bag contains desiccant that has lost its color, don't use it. If desiccant in a bag containing a sample loses its color, get out a new site kit and, using the sterile forceps, transfer the sample to a new bag. Should a dry sterile bag not be available, place the bag containing the sample in a freezer.

Step 15: What to Return to NGC

- Return the samples, pump, and used and unused supplies to the NGC. There is no need to separate or dispose of used kit materials. Upon receipt, we recycle all plastic bags and sterilize the filter assembly and forceps for use in future sample collection.

Troubleshooting

If the pump will not turn on or provide suction, or initially seems slow:

- Check that the battery is properly connected. Adjusting the alligator clips or detaching and reinserting the circular adapter can help. Also make sure that the alligator clips are clipped to the proper terminal (e.g., red to red).
- Make sure the speed control knob is at the maximum setting.
- Try using a backup battery if available, or charge the original battery. After extended use and recharging, batteries will sometimes fail to hold a charge. Emergency replacements are often available. Standard 12-volt lantern batteries provide an adequate (though disposable) alternative power source.
- Check that the quick-release tubing lever is lowered.
- Loosen the pump head and move the tubing a few inches forward or backward; once the tubing gets worn, it will not pump as efficiently. Also, lift the quick-release lever and move the tubing laterally. At times it gets pinched and is not in the designated groove.
- Double-check that the tubing direction is correct (adapter end is loaded in the way indicated on pump) and that the switch is in the FORWARD position. NOTE: If the tubing is threaded backwards or the switch is not in the FORWARD position, the pump will be pushing air toward the filter rather than pulling air through it. Replace the filter assembly if this happens.

If pumping slows because the filter clogs:

- If a 5-L sample cannot be collected with a single filter because of clogging, follow the instructions for filter removal and labeling (steps 8–11), then use materials from a fresh kit to resume sampling until a total of 5 L of water have been filtered. In this case, label the plastic sample bags of each filter to indicate both the order of use and the approximate number of liters that were pumped through each filter. For example, you may have one sample bag labeled "SAMPLE #1- 4L" and the other "SAMPLE #2-1L." Label the sample bags with the same date and identification number as in Step 12. Store the filters in individual silica bags, but together in the same letter-sized envelope.