

Protocol for Monitoring Springs at Ozark National Scenic Riverways, Missouri. Heartland I&M Network

SOP 1: Preparation for Field Sampling and Laboratory Processing

Version 1.10 (11/4/2019)

Revision History Log:

Previous Version #	Revision Date	Author	Changes Made	Reason for Change	New Version #
1.0	11/4/2019	Dodd	Revised equipment list for fish		1.1

This SOP provides information to prepare for the field season, including lists required of field and laboratory equipment. It also provides information on keeping records of staff time spent on sampling trips, checking water levels at the park, and obtaining collecting permits. A list of required data sheets with a brief explanation of their purpose is provided.

I. General Preparations

- A. Prior to the field season all crew members should review the entire protocol, including SOPs. The following list includes key points to consider in preparing for the upcoming field season.
- B. The team leader of each sampling crew must prepare a field notebook for the survey year. The notebook should contain entries for observer names, field hours, and unique happenings that may influence how the data is reported. Information included in trip reports is based on what is recorded in field notebooks, so it is imperative that they are clearly organized for ease of field note entry. Notebook entries should be recorded daily to ensure accuracy. An example of a notebook log is shown in Fig. 1.

Date	Travel time (hours)	Field time (hours)	Non-project time (hours)	Lunch (hours)
30 Sep 2006	3	8	0	0.5
1 Oct 2006	0	8	1	0.5
2 Oct 2006	3	8	0	0.5
Notes: J. Smith and H. Simpson traveled to OZAR to conduct spring monitoring at Welch Spring. Field assistance was provided by B. Jones and K. Adams. Returned to headquarters. Non-project time included discussing other projects with Park staff.				

Figure 1. Example of a field notebook for recording scheduling, travel and field time, and personnel information.

- C. Monitoring will be conducted during the period 15 July-31 August. Inclement weather and personnel workloads will preclude the scheduling of sampling events to specific annual dates. Sampling dates should be scheduled and logistics organized prior to the start of each field season. Monitoring efforts will require a three person crew (two people to sample and one to record data and provide general assistance) for vegetation and habitat assessment. Fish sampling will require a crew of four to six people depending on the spring sampled and the gear used.
- D. An equipment list will be compiled and equipment organized and made ready for the field season several weeks prior to the first sampling tour to make sure that all supplies are available and all equipment is in working condition. This allows time to make required repairs and order replacement equipment. Inspect the sample nets and wash bucket to ensure there are no tears in the nets or screen. Ensure water quality meters can be calibrated and are properly functioning as described in SOP #4. Equipment and supplies for field and laboratory use is shown in Table 1.

Table 1. Field equipment and supplies.

Number Required	Description
General	
Per Person	Waders and boots Life jackets Rain Gear Polarized sunglasses First aid kit Insect repellent & sunscreen
1	Two-way radio & charger
1	Directions to sample sites, sample site maps, list of GPS coordinates
1	Clip board
5	Pencils
Complete set	Data sheets and bottle labels printed on waterproof paper
1	GPS unit
1	Digital camera
1	Field log book
1	Flagging tape, roll
1	Tool box with miscellaneous tools
Habitat Assessment & Water Quality	
1	1.0 m ² PVC sample cell frame
2	Laminated plastic substrate sheet with Wentworth scale codes
1	Tape measure
1	Range finder
1	Velocity meter with copies of operations manuals
1	Datasonde for water quality, pvc cage and lock and chain (for deployment of datasonde)
1	Top-setting wading rod, 1.5 m

Table 1. Continued.

Number Required	Description
Aquatic Vegetation Sampling	
1	Water scope or view bucket
1	1.0 m ² PVC sample cell frame
1	10x magnifying hand lens
1	Plant press with blotter sheets and newspaper for pressing reference plants
6	1-quart storage bottles for temporary storage of reference plants
Invertebrate Sampling	
1	Sample net: EPA style kick net (i.e., Slack Surber) with 500µm mesh net fitted with 0.25 m ² sample frame
1	Nylon scrub brush
1	Hand rake or the "Garden claw"
5	Labeled sample bottles (plastic 1 gallon wide mouth bottles)
Varies per # of samples	Preservative-95% ethyl alcohol in 1-L plastic Nalgene bottles for storage. Bring extra quantities preservative to ensure enough is available to preserve all samples. Recommend minimum of 3 gallons of alcohol per spring.
2	Forceps
2	Polypropylene wash bottles
1	U.S. Standard sieve, 500-µm mesh size
2	5-gallon white buckets
1	Benthic sample wash bucket with 500-µm mesh size
1	Shallow white pan
Invertebrate Sample Processing	
1	U.S. Standard sieve 500-µm mesh sieve
1	White plastic pan for elutriating samples
1	Petri dish or similar sorting container
3	Multi-well Petri dishes for separating sorted insects
1	Dissecting stereomicroscope
Several	Forceps (fine point)
Several	Clean plastic bottles with labels inside and out for storage of processed samples
As needed	Preservative (70-80% ethyl alcohol)
Several	Storage vials (4 dram or larger) with labels for reference collection specimens
Fish Sampling	
1-2	Backpack electrofishing unit (backpack, cathode, anode, batteries, battery charger)
1	Tow barge electrofishing unit (barge, generator, pulse box, cathode, anode, gas can with gas, oil)
1	Electrofishing boat (generator, pulse box & cradle, boom & cords)
1	Boat motor, 5 hp, gas can with gas and oil
2	Holding pens
3	Aquarium nets
3	Aerators, battery powered
4	Dipnets
1	Dipnet, long-handled (for electrofishing boat)
Per person	Electrofishing gloves
Varies per # of samples	10% buffered formalin and 1-L plastic Nalgene bottles for carrying, bring extra quantities to ensure enough is available to preserve all samples.
5	5-gallon white buckets
12	1-gallon jugs
1	Measuring board Weighing balance, large with batteries Weighing balance, small with batteries
1	
1	
1	
1	
Per instrument	Extra batteries for water quality meters, weighing balance
1	Volt/Ohm meter
1	Fish collecting permit for State of Missouri

II. Field and Laboratory Forms

Print copies of field sheets and labels on waterproof paper. Data should be recorded with waterproof ink or #2 lead pencil. Example data sheets are provided as attachments to their corresponding SOPs.

Table 2. List of field forms and data sheets required for spring community monitoring for the sampling season.

TITLE	PURPOSE	NUMBER OF COPIES NEEDED PER REACH
In-stream habitat assessment form	Recording physical data from spring-runs	1
Aquatic vegetation assessment form	Recording the percent occurrence of aquatic vegetation from sample cells	6
Unknown species form	Recording unknown species of aquatic vegetation	1
Fish Reach & Weather Conditions	Recording site and weather	1
Fish Community Field Form	Recording fish collection data	As needed
Fish Cover field form	Recording in-stream cover for fish community	1
Bank habitat form	Recording bank habitat data	1
Discharge form	Recording stream discharge	1
Aquatic invertebrate identification & enumeration sheets	Recording names of identified taxa and their densities	As needed

IV. Collecting Permits

Collecting permits for sampling fish in Missouri must be obtained from the Missouri Department of Conservation. The state of Missouri does not currently require a collecting permit for aquatic plants or stream invertebrates, exclusive of mussels or crayfish. Contact information for applying for permits is:

Missouri Department of Conservation, P.O. Box 180, Jefferson City, MO 65102-0180, (573) 751-4115