



Ramboll June 8, 2018
Response to Cabinet Comments on the
Herrington Lake Phase II Plan

The Draft Herrington Lake Phase I Technical Memorandum and Phase II Plan (hereafter referred to as the Phase I Memo and Phase II Plan) was sent to the Commonwealth of Kentucky Energy and Environmental Cabinet (Cabinet) on May 2, 2018. The Cabinet provided comments on the Phase I Memo and Phase II Plan during a teleconference call between the Cabinet and Kentucky Utilities (KU) representatives on May 29, followed by a letter with written comments provided by the Cabinet to KU on June 1, 2018. The June 1 letter from the Cabinet states that comments are provided first for the Phase II Field Sampling Plan so that resolution of these comments can allow the proposed mid-June field effort to proceed as planned. Therefore, these responses to Cabinet comments are focused on the Phase II Plan portion of the Cabinet comments. The responses to the remainder of the Phase I Technical Memorandum comments will be provided under separate cover.

This letter provides responses to the Cabinet comments for the Phase II Proposed Field Sampling Plan and the Phase II QAPP Addendum: Herrington Lake Young of the Year (YOY) Bass Assessment. Comments from the Cabinet are provided in italics, followed by responses. These Cabinet comments and the May 29th call included discussion of an updated sample location and clarifications requested on field forms. Therefore, these responses to Cabinet comments include the following attachments to facilitate the Cabinet approval for implementation of the Phase II field program in mid-June.

Attachments Provided (including the documents in which they would be found)

Phase II Field Sampling Plan (Section 6 within the Phase I Tech Memo)

- Updated Figure 6-1B - Phase II Proposed Sampling for Lower Herrington Lake (which shows the new LHL-2 location requested by the Cabinet)
- Updated Table 6-1 - Phase II Proposed Sample Locations and Types (which includes fish samples for the new LHL-2 location requested by the Cabinet)

Phase II YOY Fish Assessment SOP (each form attached has new fields added, as requested in specific comments)

- Updated YOY Fish Collection Effort Form
- Updated YOY Fish Health Examination Form
- Updated YOY Group or Individual Fish Visual Inspection Form

QAPP Addendum: YOY Assessment

- Updated YOY Fish Collection Effort Form

Phase I SW SOP

- Updated Surface Water Collection and Profiling Data Form (this was provided in response to the May 29th call, with new field for data collected that previously was handwritten on the sheets)

Phase I Sediment and Porewater SOP

- New Sediment Collection and Porewater Sampler Deployment Form (also provided in response to May 29th call, a form to facilitate recording of observations during sediment sampling that were previously recorded in field log books).

Phase II - Proposed Field Sampling Plan

Comment 1:

The Department is aware that the water level in Herrington Lake has been kept below normal summer pool over the last several months due to construction on the Kennedy Bridge. At one time the water level was approximately 20 feet below normal level, and it is our understanding that the level is now at 734 feet above sea level, and will remain at that level for the immediate future, which is approximately 6 feet below normal summer pool. With the upcoming Phase II YOY sampling which is tentatively scheduled for June, please provide information as to any potential changes either in methods or in timing the change in water level might require for the Phase II plan related to the YOY sampling.

Response: The lake level as of June 8, 2018 is approximately 729 feet above mean sea level (msl). The Kentucky Department of Transportation (DOT) requires water level remain at a maximum of 734 feet above mean sea level (msl) until bridge construction is complete. Rainfall is necessary to increase the lake level from the current 729 feet to the 734 feet msl. Rainfall is unpredictable, so the lake level measurements will be recorded at the time of sampling. As was discussed during the May 29th call, it is expected that water levels during the 2018 YOY sample collection will be a maximum depth of 734 feet msl, which is approximately 6 feet below the full summer pool water level of 740 msl. The start of the 2018 YOY study was already delayed approximately 2 weeks because the cooler spring potentially delayed the bass spawning cycle. The bass will spawn regardless of the water levels. The lower water level in the lake as a whole will result in less shallow submerged spawning habitat in inlets, such as Curds Inlet (i.e., some of the spawning habitat in the shallow inlets will be exposed at lower water levels). The water level conditions are a requirement of Kentucky DOT, so they cannot be adjusted. It is uncertain how much the spawning habitat will be reduced within Curds Inlet as a result of the lower water level. The fisheries field team will do an initial evaluation of the available YOY fish during the first few days of the 2018 field effort to determine if there will be sufficient YOY fish to perform the study. It is expected that there will be sufficient fish, but if the field team determines the YOY study is not feasible due to water level impacts on spawning habitat, this will be communicated to the team and the Cabinet as soon as practical.

Comment 2:

It is requested that fish tissue sample location LHL-2 be resampled. This would add an additional three (3) composite fish tissue samples.

Response: The location LHL-2 was added to the Phase II Plan (i.e., the Dix dam location). Figure 6-1B was updated showing Phase II sampling locations, including LHL-2. The narrative portion of the Phase II plan was also updated to include this additional location. Table 6-1 was updated to show three additional composite fish were added to the sample counts. The updated Figure 6-1B and Table 6-1 are provided as attachments to these comment responses.

Comment 3:

The field sheets must be updated to reflect the actual measurements that are taken for Phase II sampling. For the fish sampling, a column should be added for the weight of the fish.

Response: The fish tissue collection field data sheet used in the Phase I field effort was directly copied from the Kentucky Fish Sampling SOP, as identified in the 2017 Herrington Lake Fish Sampling SOP. The fish tissue collection field data sheet was updated to include a new column for weight (previously, only length was identified). The updated field data sheet is provided as an attachment to this response to comment letter.

Comment 4:

On Page 5, flathead cat fish should be listed as predator fish, not bottom feeder/scavenger fish.

Response: Section 2.1 of the Phase I Technical Memorandum refers to the catfish as “A bottom scavenger/ bottom dwelling ambush predator - channel catfish (*Ictalurus punctatus*) and flathead catfish (*Pylodictis olivaris*) were target species from the lake. Northern hogsucker and spotted sucker were collected from Dix River downstream from the dam where catfish were not present.” Thereafter, references to the fish species in the Phase I Technical Memorandum and Phase II Plan were overly truncated to indicate catfish as bottom dwellers/scavengers. The revised Phase I Technical Memorandum and Phase II Plan will clarify that the channel catfish is the bottom scavenger and the flathead catfish is the bottom dwelling ambush predator.

Comment 5:

Please clarify if the YOY fish selected for tissue analysis will be included in the deformity analysis, and if so describe the selection process. The procedure for determining which of the YOY fish will be analyzed should be specified in the SOP.

Response: A random approach will be used for the removal of live fish from the sampling well at the end of each day to obtain YOY fish for fish tissue residue analysis. Specifically, a random scoop of fish from all fish collected during the day will be done. The fish randomly selected for tissue residue analysis will be photographed with sufficient detail to identify abnormalities, if any. The randomly selected fish, including fish with abnormalities (if any), will be frozen and ultimately submitted to the laboratory on dry ice. This random approach will ensure that there is not a biased attempt to include or exclude deformed fish from the YOY fish tissue residue analysis. Because the deformed fish (if any) will be photographed and accounted for, they will be included in the discussion of the bass deformities assessment as well. The language of the *Herrington Lake YOY Bass Assessment and Phase II Fish Tissue Sampling SOP* was updated to indicate the handling described in this response. In addition, the YOY fish collection form was updated to show the photo numbers for photos taken. The updated YOY Fish Collection Effort Form is attached.

SOP: Herrington Lake YOY Bass Assessment and Phase II Fish Tissue Sampling

Comment 1:

The Department notes that the preservation methods for the fish--, 95% ethyl alcohol or Formalin, (which the Division of Water uses for fish preservation), should be selected based on whether the fish are being preserved for laboratory analysis or for deformity analysis. Please explain how the preservation method will be determined.

Response: The type of preservation should not affect the outcome of a YOY bass assessment but Ramboll and our third-party laboratory have identified use of 95% ethyl alcohol because this is consistent with the preservation method used by Downstream Strategies (2016) in collecting fish for the Lemly study (2018). In addition, the use of formalin poses safety issues, as the formalin vapors can cause damage to the human eye even with protective glasses are worn. The fish will be processed and photographed immediately upon return from the field effort, so the color degradation that can occur in alcohol is not as much of an issue for this sampling effort as it could be for preservation over months or years. Therefore, the potential health effects of formalin use outweigh the potential benefits of formalin use for this particular project.

Comment 2:

Please specify the laboratory method to be used for fish tissue sample preparation. The Department's Environmental Services Branch (ESB) lab uses EPA 3050B (SW-846 3rd Edition).

Response: The laboratory prepares the samples in accordance with the Puget Sound Estuary Program, which cross references the EPA 3050B (SW-846 3rd Edition). So, the laboratory method is consistent with the method specified by the ESB. The Phase II plan was revised to specify the preparation method.

Comment 3:

Each fish selected for analysis should be photographed to show key identification characteristics.

Response: Each fish will be photographed to show key identification characteristics. For YOY fish with no observed abnormalities, the fish will be photographed in groups with sufficient spacing to show key characteristics. Fish with deformities, if any, will be photographed individually or potentially in small groups.

Comment 4:

For fish selected for composite samples, the length of the shortest fish should be no less than 75% the length of the longest fish.

Response: The fish selected for the composite samples will follow the standard protocol that the shortest fish will be no less than 75% the length of the longest fish. This was protocol was consistently followed in the Phase I field effort, but to avoid future confusion, a new column was added to the [Fish Tissue Collection Form](#) which shows length and weight, so that the data are recorded in a standardized form.

Comment 5:

On page 7 it states that YOY and adult fish whole-body composite tissues will be analyzed by USEPA SW846 Method 6020 for selenium. Please confirm the method to be used for lab analysis and whether it is 6020A or 6020B, which reflect revisions to the SW-846 6020 methods.

Response: The Phase II plan was updated to indicate the fish will be analysed by 6020A and explain that there are subtle difference between 6020A and 6020B that do not affect the Herrington Lake data. These differences are briefly described below:

- 6020B includes consideration of elements not considered in 6020A, but 6020A addresses the constituents of interest for Herrington Lake.
- 6020B has lower detection-limit criteria but because all Herrington Lake fish samples show some detection of selenium (instead of non-detections), this does not affect the Phase 1 Herrington Lake data.
- 6020B has a slightly different way to establishing instrument detection limits (the mean of the blank is added to three times the standard deviation of ten replicate analyses of the reagent blank). This does not affect the Herrington Lake data, again because this change affects the lower end of the detection range and all Herrington Lake fish showed detections of selenium.
- 6020B requires a daily linear range standard if you want to report at concentrations greater than the high calibration standard. The Herrington Lake selenium data were reported within the calibration ranges, so improvements to allow reporting greater than the calibration range were not applicable.

Phase II - QAPP Addendum: Herrington Lake YOY Bass Assessment

Comment 1:

Please revise the Fish Health Examination Form to include a field for the species identification of fish and columns for collection location, photo number and identification.

Response: Two forms from the QAPP Addendum were revised as follows:

- The Fish Health Examination Form already included YOY fish sampling location and a field for species distribution in the sample.
- The Individual Fish Example - Inspection Form title was revised to indicate Group or Individual Fish Inspection Form. In addition, new fields were added for species and photo number(s). The form was also revised to include the new LHL-2 location and a field was added for photo numbers. If there are fish with deformities identified, they will be given discrete sample ID numbers for detailed photographs. The sample ID nomenclature was added to the revised QAPP Addendum.

Comment 2:

Section 4.1 YOY Bass Health Assessment Approach. The following statement is found near the bottom of page four. The YOY bass identified as "normal" will be photographed in groups." Please clarify how they will be grouped. Please note that groups of fish that are photographed should still be able identify details of the fish, markings, etc.

Response: The YOY Bass Assessment SOP discussion was revised to indicate that fish will be grouped into groups of 20, 50, or 100 fish in a 20 inch X 10 inch picture field, with adequate resolution to see fish markings and fish condition status. The goal will be to get the maximum fish per group with the least number of photographs that while ensuring that there is clear resolution of the fish markings and conditions.

Comment 3:

QAPP Addendum Section 5.2. Phase II - ESB Split Sampling. It is stated that approximately 10% of fish tissue samples will be submitted to the ESB as split samples for analysis. The Department reserves the right to request additional split samples as necessary and will notify Ramboll in advance.

Response: It is noted that the Cabinet reserves the right to request additional split samples.