1.0 DRAFT FISH AND AQUATIC RESOURCES STUDY PLAN ANNOTATED OUTLINE

1.1 FISH AND AQUATIC RESOURCES STUDY PLAN

1.1.1 PROJECT NEXUS AND RATIONALE FOR STUDY [§ 5.9(B)(4)-(5)]

This Fish and Aquatic Resources Study Plan (Study Plan) is a part of the overall Cutler Relicensing Study Plan to evaluate the environmental conditions, including proposed changes in operations, of the Cutler Hydroelectric Project (Project) for Federal Energy Regulatory Commission (FERC) relicensing. Operation of the Project as proposed may have direct, indirect and/or cumulative effects on fish and aquatic resources.

The rationale for this study includes:

- Proposed operations with increased levels of reservoir fluctuations are expected to affect the aquatic environment.
- Information is lacking on benthic invertebrates and mollusks – both their presence and potential exposure to proposed Project operations.
- Implications for water quality in the reservoir or released from the reservoir are uncertain, considering the potential for interacting with sediments that may contain additional nutrients or contaminants.
- There is uncertainty as to how the proposed Project operations may affect the fish and aquatic community.

1.2 STUDY GOALS AND OBJECTIVES [§ 5.9(B)(1)]

Characterize the benthic invertebrate and mollusk community within the reservoir and zone of influence in the main tributaries.

Objectives will include:

- Summarize existing information.
- Assess the aquatic biological status of the Cutler Reservoir environment.
- Determine effects of continued Project operation on water quality of Cutler Reservoir and the Bear River downstream of Cutler Dam.
- Potential effects of proposed Project operation on fish and macroinvertebrates (including mussels) in Cutler Reservoir and downstream in the Bear River (e.g. stranding).
- Potential effects of proposed Project operations on aquatic habitat for resident fish and macroinvertebrates in Cutler Reservoir and downstream in the Bear River.
- If applicable, provide possible solutions to problems identified.

- Provide information for National Environmental Policy Act (NEPA) analysis of the affected environment.

1.3 RELEVANT RESOURCE MANAGEMENT GOALS AND PUBLIC INTEREST CONSIDERATIONS [§ 5.9(B)(2)]

Review existing aquatic species or relevant management plans for fishery, water quality and freshwater mollusks and benthic community:

1. Utah Department of Natural Resources. 2017. Final Bear River Comprehensive Management Plan. October 2017.
2. Utah Department of Natural Resources. 2000. Range-wide Conservation Agreement Strategy for Bonneville Cutthroat Trout (*Oncorhynchus clarki Utah*). Publication Number 00-19. December 2000.
3. Utah Division of Wildlife Resources. 2016. Three Species Monitoring Statewide Summary. Roundtail Chub (*Gila robusta*), Bluehead Sucker (*Catostomus discobolus*), Flannelmouth Sucker (*Catostomus latipinnis*). Publication Number 17-21.
4. Budy, P., K. Dahle, and G. Thiede. 2006. "An evaluation of the fish community of Cutler Reservoir and the Bear River above the reservoir with consideration of the potential for future fisheries enhancement." 2005 Annual Report to the Utah Department of Environmental Quality. Division of Water Quality.
5. Budy, P., M. Baker and S.K. Dahle. 2011. "Predicting fish growth potential and identifying water quality constraints: A spatially-explicit bioenergetics approach." Environmental Management 2011: 48: 691. https://doi.org/10.1007/s00267-011-9717-1. Accessed November 29, 2018.
6. Dees, T. 2007. "Effects of wastewater treatment plant discharge on benthic invertebrate communities in Cutler Reservoir." In Comparison of chemical and biological characteristics in Cutler Reservoir (Utah) near the inflows of the Logan River and the Logan Wastewater Treatment Plant, edited by W.A. Wurtsbaugh and R. Lockwood. Aquatic Ecology Practicum Class Report, College of Natural Resources, Utah State University. https://www.bearriverinfo.org/files-ou/digital-resources/pub__4974621.pdf. Accessed December 19, 2018.
7. Hovingh, P. 2004. "Intermountain freshwater mollusks, USA (Margaritifera, Anodonta, Conidea, Valvata, Ferrissia): Geography, conservation, and fish management implications." Monographs of the Western North American Naturalists 2:109-135. https://scholarsarchive.byu.edu/cgi/viewcontent.cgi?referer=http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=2ahUKEwjf4biXkazfAhXFMd8KHQZ4D-cQFjAAegQICBAC&url=http%3A%2F%2Fscholarsarchive.byu.edu%2Fcgi%2Fviewcontent.cgi%3Farticle%3D1010%26context%3Dmwnan&usg=AOvVaw0wB4W1t6CnuJPuKI-Fr8gs&httpsredir=1&article=1010&context=mwnan. Accessed December 19, 2018.
8. PacifiCorp. 2018. *Cutler Hydroelectric Project Resource Management Plan 5-year Monitoring Report 2013-2017.* PacifiCorp, Salt Lake City, Utah. http://www.pacificorp.com/content/dam/pacificorp/doc/Energy_Sources/Hydro/Hydro_Licensing/Cutler/03282018_Cutler_RMP-5yr_Monitor.pdf. Accessed December 19, 2018.
9. Rogers, T. 2017. Environmental DNA sampling of native Utah freshwater mussels at historical locations, and recommendations for future eDNA sampling. Stoller, J. 2007. "Benthic invertebrate biomass and densities in Cutler Reservoir near the inflow of the Logan River and the Logan Wastewater Treatment Plant." In *Comparison of chemical and biological characteristics in Cutler Reservoir (Utah)*

near the inflows of the Logan River and the Logan Wastewater Treatment Plant, edited by W.A. Wurtsbaugh and R. Lockwood. Aquatic Ecology Practicum Class Report, College of Natural Resources, Utah State University. https://www.bearriverinfo.org/files-ou/digital-resources/pub__4974621.pdf. Accessed December 19, 2018.

10. SWCA Environmental Consultants (SWCA). 2010. *Middle Bear River and Cutler Reservoir Total Maximum Daily Load (TMDL)*. Prepared for Utah Division of Water Quality. http://www.deq.utah.gov/ProgramsServices/programs/water/watersheds/approvedt mdls.htm. Accessed November 21, 2018.
11. U.S. Fish and Wildlife Service (USFWS). 2001. Status review for Bonneville cutthroat trout (*Oncorhynchus clarki Utah*). U.S. Fish and Wildlife Service Regions 1 and 6, Portland Oregon and Denver Colorado.
12. Utah Division of Wildlife Resources (UDWR). 2009. Rangewide Conservation Agreement and Strategy for Northern Leatherside. Utah Division of Wildlife Resources, Publication No. 9-11. Salt Lake City, Utah.
13. Utah Division of Wildlife Resources (UDWR). 2016. Conservation and Management Plan for Three Fish Species in Utah. Addressing needs for Roundtail Chub (*Gila robusta*), Bluehead Sucker (*Catostomus discobolus*), and Flannelmouth Sucker (*Catostomus latipinnis*). Utah Division of Wildlife Resources, Salt Lake City, Utah.
14. Utah State University (USU). 2018. *Watershed Science Annual Class Reports on the Fishery in Cutler Reservoir*. Utah State University, Logan City, Utah.
15. Wang, L., D.M. Robertson, and P.J. Garrison. 2007. "Linkages between Nutrients and Assemblages of Macroinvertebrates and Fish in Wadable Streams: Implication to Nutrient Criteria Development." Environmental Management 39: 194-212. https://doi.org/10.1007/s00267-006-0135-8. Accessed December 19, 2018.
16. Wurtsbaugh, W.A. and R. Lockwood [eds]. 2007. *Comparison of limnological characteristics in Cutler Reservoir (Utah) near the inflows of the Logan River and the Logan Wastewater Treatment Plant.* Aquatic Ecology Practicum Class Report, College of Natural Resources, Utah State University. https://www.bearriverinfo.org/files-ou/digital-resources/pub__4974621.pdf. Accessed December 19, 2018.

1.4 STUDY AREA

The study area for aquatic resources contains all Project features (encompassing the Project Boundary), which extends, for the purposes of characterization and analysis, from the edge of the Project Boundary up each major tributary within the reservoir zone of influence. The study area also includes the Bear River up to two miles downstream of the dam.

1.5 METHODS [§ 5.9(B)(6)]

1.5.1 RAPID BIOASSESSMENT OF BENTHIC MACROINVERTEBRATES

- Use Rapid Bioassessment technique (David et al. 1998) and establish survey sites in each of the four zones, as identified in the 2013 Water Quality Monitoring Report, to determine the health of the benthic community.

- Portions of the studies will occur in the fall of 2019.
    - Determine whether or not to conduct assessment before the 2019 drawdown (this would be ideal) or in the fall of 2020.
- Assessment will occur over only a few days. Study sites will be selected using stratified random sampling with the strata being the four reservoir zones that have been established in PacifiCorp's previous water quality monitoring efforts.
- This study requires personnel to have specific training or certification in Rapid Bioassessment technique.
- Equipment required includes kick net and/or Eckman dredge and graduated sieves to separate the detritus.

1.5.2 FRESHWATER MOLLUSK SURVEY

- During the drawdown planned for October 2019, a crew from Utah Division of Wildlife Resources (UDWR) will collect mollusk specimens and provide a report on findings.
- Discuss collection techniques with UDWR
- Determine what collaboration with PacifiCorp for the survey will be helpful.

1.5.3 SEDIMENT CHARACTERIZATION

- Core samples of reservoir sediments will be collected and analyzed for the presence and concentration of nutrients and/or contaminants that may be stirred up and released into the water column during periodic drawdowns under the proposed Project operation
- This work may be conducted by the sediment modeling crew. – See Sediment Analysis Study Plan.

1.6 ANALYSIS AND REPORTING

A Study Plan report will be prepared documenting the analyses and results of the fish and aquatic community; also included will be a summary of all collected information and discussion of the findings. Specifically, the report will address the following:

- Information on the benthic macroinvertebrate and the mollusk communities including presence, population size, and the extent of exposure to proposed Project operation.
- Analysis of the reservoir sediments and the level of concentration of nutrients and/or contaminants and the extent to which they could enter the water column with the proposed Project operations.
- A description and analysis of how proposed operations may affect the fish community.

1.7 SCHEDULE, PERIODIC REPORTING, AND ONGOING CONSULTATION

The anticipated Study Plan development and implementation schedule will be identified in a table that will be developed for the final Study Plan.

An Initial Study Report (ISR) will be prepared following the initial survey year. This report will be submitted to PacifiCorp for review and filed with the Federal Energy Regulatory Commission (FERC). The Initial Study Report will be consulted upon by stakeholders. If no additional information is warranted, the ISR will identify why no second year of surveys are warranted and that an Updated Study Report (USR) will not be filed. A letter will be filed with FERC in lieu of the USR identifying the lack of need for a second year of studies. If additional information is warranted, an USR would be filed following a survey in year 2. All study reports will be submitted to stakeholders for review and filed with FERC.

1.8 LEVEL OF EFFORT AND COST [§ 5.9(B)(7)]

To be determined.

1.9 REFERENCES

David S.M., K.M. Somers, R.A. Reid, R.J. Hall and R.E. Girard. 1998. Sampling protocols for the rapid bioassessment of streams and lakes using benthic macroinvertebrates. Queen's Printer for Ontario, 1998.

Kleinschmidt Associates. 2018. Cover page photo of Bear River Canyon. Matthew Harper.