

**Susitna–Watana Hydroelectric Project  
(FERC No. 14241)**

**Wood Frog Occupancy and Habitat Use  
Study Plan Section 10.18**

**Initial Study Report  
Part C: Executive Summary and Section 7**

Prepared for

Alaska Energy Authority



**SUSITNA-WATANA HYDRO**

*Clean, reliable energy for the next 100 years.*

Prepared by

ABR Inc.—Environmental Research & Services

Forest Grove, Oregon and Fairbanks, Alaska

June 2014

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## EXECUTIVE SUMMARY

Wood Frog Occupancy and Habitat Use Study Section 10.18	
Purpose	The objectives of the Wood Frog Study are to: (1) review existing data on habitat use and distribution of breeding wood frogs ( <i>Rana sylvatica</i> ) in a broad region surrounding the Project area; (2) estimate the current occupancy rate for breeding wood frogs in suitable habitats in the study area through a combination of field surveys and habitat-occupancy modeling; (3) use information on current habitat occupancy and habitat use to estimate the habitat loss and alteration expected to occur from development of the Project; and (4) sample frogs opportunistically for the presence of the amphibian chytrid fungus <i>Batrachochytrium dendrobatidis</i> (Bd), which has been linked to worldwide amphibian population declines. Objectives one, two, and four were addressed in 2013 and the third objective will be addressed in the Project license application.
Status	The first year of the Wood Frog Occupancy and Habitat Use study for the Susitna-Watana Hydroelectric Project (FERC No. 14241) was conducted in 2013.
Study Components	This study has four components: Auditory Field Surveys, Occupancy Modeling and Habitat Associations, Acoustic Monitoring, and Chytrid Fungus Bioassay.
2013 Variances	The methodology for selecting sample locations (RSP Section 10.18.4.1) was adjusted because mapping and fish presence data were not yet available and access to the study sites on Cook Inlet Regional Working Group (CIRWG) lands was not permitted in 2013. Proposed field survey times (RSP Section 10.18.4.1) were adjusted due to logistical challenges.
Steps to Complete the Study	AEA will conduct auditory field surveys for habitat occupancy modeling (RSP Section 10.18.4.1, incorporating variances described in Section 4.1.1), focusing on areas not sampled in 2013, including CIRWG lands, the new Denali East Option (see Section 7.1.2), and areas at higher elevations (above 2,500 ft), some of which were still frozen at the time of sampling in 2013. AEA will also deploy acoustic monitors at five sites where frogs are detected on the first visit, to provide additional data on the frequency and duration of calling (RSP Section 10.18.4.1). In addition to the new Denali East corridor, another modification is the deletion of opportunistic swab sampling for the presence of chytrid amphibian fungus, which could not be sampled adequately without a substantially larger field sampling program.
Highlighted Results and Achievements	The status of wood frogs in the Project area was unknown prior to this study and few studies have established occupancy rates of wood frogs in Alaska. A total of 90 randomly selected wetlands and water bodies were surveyed for the presence of wood frogs. Frogs were found to be widely distributed in the areas surveyed over a variety of habitat types from tundra to forested wetlands. Frogs were detected at 13 of 42 (31.0 percent) locations with shallow water ( $\leq 1.5$ m [4.9 ft]), 34 of 48 (70.8 percent) locations with deep water ( $> 1.5$ m)

## Wood Frog Occupancy and Habitat Use Study Section 10.18

and at 47 of 90 water types (52 percent) overall. Therefore, the naïve estimate of frog occupancy (assuming 100 percent detectability) was 52.2 percent. The estimated detectability from the best model of frog occupancy was 60.6 percent (95 percent C.I. = 34.8–81.6 percent). That is, if frogs were present in a pond, the study team would, on average, detect them 60.6 percent of the time with one visit. The probability of detection increased to 84.5 percent with two visits and 93.9 percent with three visits. The best model of frog occupancy contained only one variable: water depth. Water depth was the most important variable affecting habitat suitability and occupancy. The estimated occupancy for shallow habitats was 36.8 percent (95 percent C.I. = 20.8–56.5 percent) and the estimated occupancy for deeper habitats was 81.8 percent (95 percent C.I. = 44.4–96.2 percent) with an overall occupancy estimate of 63.4 percent (95 percent C.I. = 36.3–84.0 percent). The acoustic data were used to calculate the detectability (60.8 percent) of frogs calling when the study team actually sampled, which was nearly identical to the estimate from occupancy modeling (60.6 percent). Concordance between these results provides strong evidence that the occupancy modeling provided a reasonable estimate of detectability and that the occupancy rates were adjusted appropriately. This concordance is key to producing meaningful habitat occupancy results for eventual use in estimating the potential habitat loss and alteration that may occur from development of the Project.

## 7. COMPLETING THE STUDY

### 7.1 Proposed Methodologies and Modifications

To complete this study, AEA will implement the methods in the Study Plan, except as described in Section 7.1.2. These activities include the following:

- Conduct auditory field surveys for habitat occupancy modeling (RSP Section 10.18.4.1, incorporating variances described in Section 4.1.1), focusing on areas not sampled in 2013, including CIRWG lands, the new Denali East Option (see Section 7.1.2 below), and areas at higher elevations (above 2,500 ft), some of which were still frozen at the time of sampling in 2013; and
- Deploy acoustic monitors at five sites where frogs are detected on the first visit, to provide additional data on the frequency and duration of calling (RSP Section 10.18.4.1).

#### 7.1.1 Decision Points from Study Plan

There were no decision points in the FERC-approved Study Plan to be evaluated for this study following the completion of 2013 work.

#### 7.1.2 Modifications to Study Plan

As described in the ISR Overview and depicted in Figure 1, AEA has added the Denali East Option (road and transmission corridor) to the study area. With regard to this study, the modified study area showing the addition of the Denali East Option is depicted in Figure 7.1-1.

Because of the small sample size obtained in 2013 ( $n = 7$ ), opportunistic capture and swabbing of adult frogs to sample for the presence of amphibian chytrid fungus (RSP Section 10.18.4.2) is not likely to provide meaningful results for evaluating the presence or absence of chytrid fungus with any confidence, as discussed in Section 5.4 above. Hence, opportunistic swab sampling of frogs has been dropped from the field effort for this study, and no further attempts will be made to sample for the presence of amphibian chytrid fungus, as was discussed and agreed to in the technical meeting on March 6, 2014 (see meeting notes here: [http://www.susitna-watanahydro.org/wp-content/uploads/2014/03/2014-03-06TT\\_Wildlife\\_MeetingNotes.pdf](http://www.susitna-watanahydro.org/wp-content/uploads/2014/03/2014-03-06TT_Wildlife_MeetingNotes.pdf)) and further discussed in consultation with USGS (see Appendix C).

### 7.2 Schedule

In general, the schedule for completing the FERC-approved Study Plan is dependent upon several factors, including Project funding levels authorized by the Alaska State Legislature, availability of required data inputs from one individual study to another, unexpected weather delays, the short duration of the summer field season in Alaska, and other events outside the reasonable control of AEA. For these reasons, the Study Plan implementation schedule is subject to change, although at this time AEA expects to complete the FERC-approved Study Plan

through the filing of the Updated Study Report by February 1, 2016, in accordance with the ILP schedule issued by FERC on January 28, 2014.

With regard to this specific study, AEA plans to complete all remaining data collection during the 2014 study season. Field surveys will focus on areas that were not sampled in 2013, including CIRWG lands, the Denali East Option, and areas at higher elevations (above 2,500 ft).

### **7.3 Conclusion**

Implementation of the Wood Frog Occupancy and Habitat Use Study is planned for 2014. The study team expects that the combination of study results from 2013 (including the variances described in Section 4 of this ISR), the results from 2014 (including the modifications described in Section 7.1.2 above), and integration with other studies will achieve the approved Study Plan objectives. This study is interrelated with the Evaluation of Wildlife Habitat Use Study (Study 10.19). AEA expects the approved Study Plan objectives for both this study and Study 10.19 will be achieved with the modifications to this study, as these modifications will enable the study team to adequately characterize habitat use by wood frogs and to model habitat occupancy in the study area to predict Project effects and develop PME measures for this species. The results of this study will be reported in the USR.

### **7.4 Figures**



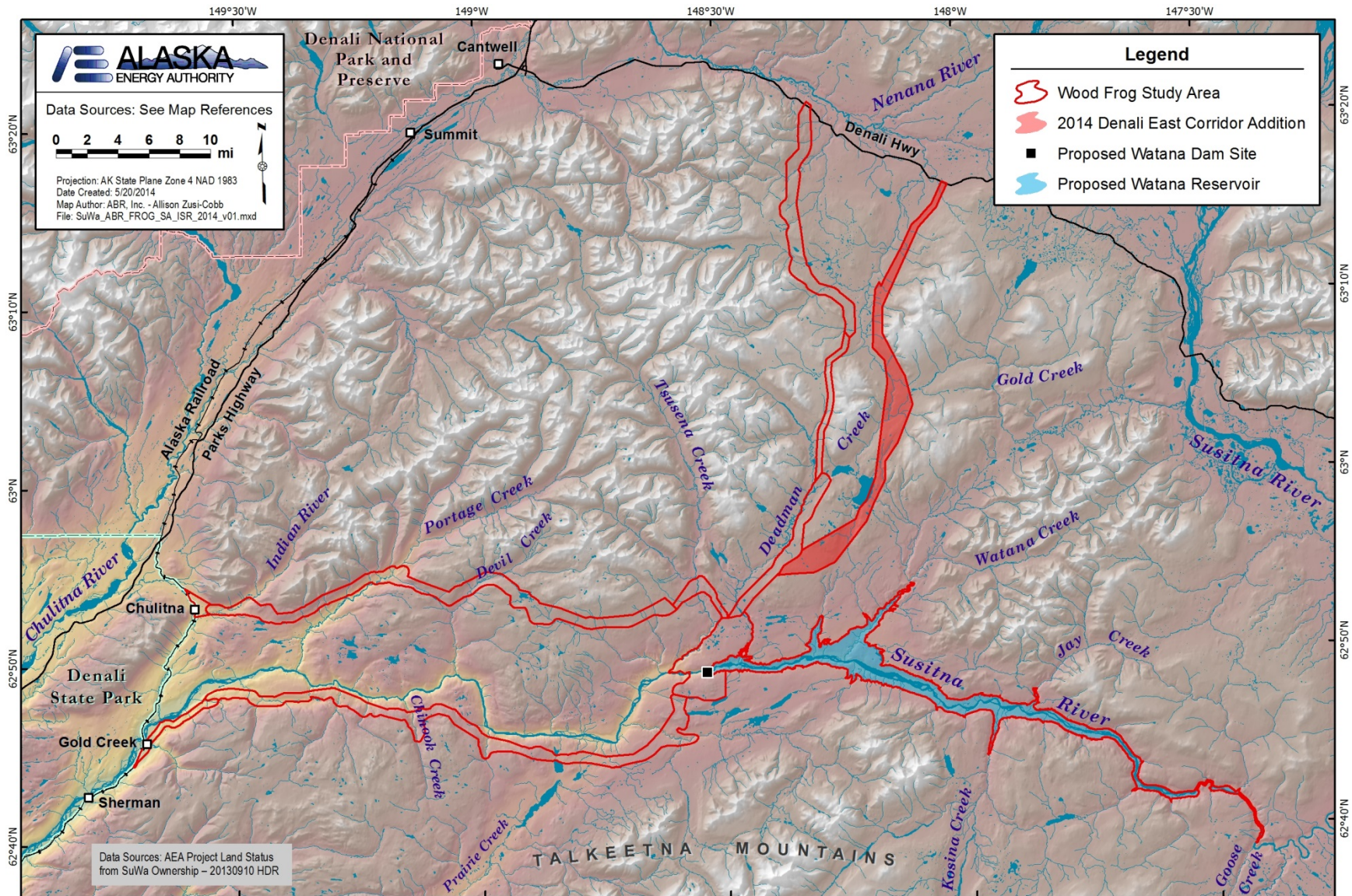


Figure 7.1-1. Updated Wood Frog Study Area.

PART C – APPENDIX C: RECORD OF CONSULTATION WITH USGS  
REGARDING SAMPLING FOR THE PRESENCE OF AMPHIBIAN  
CHYTRID FUNGUS





AEA Team Member		Other Party	
<b>Name:</b>	<i>Todd Mabee</i>	<b>Name:</b>	<i>Tara Chestnut</i>
<b>Organization:</b>	<i>ABR, Inc.</i>	<b>Organization:</b>	<i>USGS, Portland, OR</i>
<b>Study Area:</b>		<b>Phone Number:</b>	<i>503 251 3283</i>
<b>Date:</b>	<i>4 April 2014</i>	<b>Time:</b>	<i>1500</i>
Call Placed by: <input checked="" type="checkbox"/> AEA Team <input type="checkbox"/> Other Party			

**Others on Call:** none

**Subject:** eDNA Sampling for Chytrid Fungus

**Discussion:**

- ADFG interested in whether Bd is present in SuWa study area.
- Tara Chestnut (USGS expert on Wood frogs and Bd in AK) thinks one should assume Bd is everywhere in AK, given known occurrence in Denali SP, ANWR, & other locations. Doesn't think focusing on this question is very useful to advance the scientific knowledge of Bd in AK. Recommended that wood frogs be swabbed and captured, so that IF frogs tested positive for Bd that the frogs could provide a strain of Bd that could be used in future experiments. She felt this would help advance the understanding of Bd in Alaska and elsewhere. Agreed that the small sample size obtained last year (7 samples) is inadequate to provide any level of certainty about the presence of Bd in the area.
- eDNA technique can be used to determine if Bd is present but it can't isolate strains, also is expensive. Would need approximately 10 samples/wetland at a cost of approximately \$70/sample, therefore \$700/wetland. This would be cost prohibitive at the scale of the SuWa project.

Todd Mabee <tmabee@abrinc.com>

Apr 4, 2014

to Tara Chestnut, USGS

Hi Tara,

eDNA has been mentioned as an idea for sampling for Bd in Wood Frogs. Would this technique be an appropriate method to sample for Bd for Wood frogs? If so, how many samples would we need to obtain useful information? Do you have any idea on labs that process these samples and costs?

This may be easier to discuss on the phone, and if so, please feel free to suggest a time that would be convenient for you next week.

Hope you are well, and thank you!

Todd

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Chestnut, Tara <chestnut@usgs.gov>

Apr 8, 2014

to Todd Mabee, ABR

Hi Todd,

Hmm... I would need to know more about the study goals and objectives. I generally recommend against sampling for Bd for the sake of sampling for it. We know it's widespread so we don't gain much information by collecting samples without specific questions. Can you tell me more about the details?

Thanks,  
Tara

Brian Lawhead <lawhead@abrinc.com>

Apr 8, 2014

to Todd Mabee, ABR

Thanks, Todd. Please call her and tell her that it was an idea suggested specifically for the SuWa study by Dave Tessler of ADFG (whom she knows). And yes, it would be primarily intended to detect whether Bd is present in this remote study area before any roads/transmission corridors are punched in.

An idea of sampling intensity and sample analysis costs would be useful.

Please document these interactions using the appropriate contact log forms.

Thanks!  
Brian

---

From: Todd Mabee  
Sent: Tuesday, April 08, 2014 2:15 PM  
To: Brian Lawhead  
Cc: Todd J. Mabee  
Subject: Fwd: eDNA sampling for Bd?

---

Todd Mabee <tmabee@abrinc.com>

Apr 8, 2014

to Tara Chestnut, USGS

Hi Tara,

The idea was suggested specifically for the SuWa study by Dave Tessler of ADFG to detect whether Bd is present in this remote study area before any roads/transmission corridors are developed.

That's all the detail I have on this topic. Let me know if you want to discuss on the phone, might be easiest to talk through ideas and potential study options?

Thank you!

---

Todd Mabee <tmabee@abrinc.com>

Apr 11, 2014

to Tara Chestnut, USGS

Hi Tara,

Can we set up a time to talk on the phone next week? I'd like to get your thoughts on this latest sampling idea. I'm around most of the week, so just let me know if there would be a good time to talk.

Thank you!

---

Todd Mabee <tmabee@abrinc.com>

Apr 14, 2014

to Brian Lawhead, ABR

Hi Brian,

Had a good conversation with Tara, here's the summary. She thinks there is a high probability that Bd is in the SuWa area (and throughout AK) and that trying to answer the question of "is Bd there" is not a very useful one. Rather she thinks that it would be useful to understand how different strains of Bd affect the native populations of frogs. To answer this question you need swabs of frogs and their actual skin (therefore would need permit to collect frogs).

She thinks we could use the same approach as last year, except keep the frogs and send them to lab for sampling (@~\$125/frog). We only got 7 samples last year, so this wouldn't be terribly expensive.

FYI, eDNA does not allow you to detect strains of Bd, but only would answer the question of "presence". It is also expensive and requires a lot of samples to have a high probability of detecting Bd.

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