SUPPLEMENT TO INSTREAM FLOW STUDY PLAN

BLUE LAKE PROJECT (FERC) 2230

City and Borough of Sitka Electric Department

April 2004

INTRODUCTION and BACKGROUND

This document provides supplemental information to Instream Flow Study Plan prepared by the City and Borough of Sitka Electric Department (City) as part of relicensing for the Blue Lake hydroelectric Project (Project), FERC No. 2230. That document, distributed in February, 2004, presented general methods and concepts and target species and life stages.

In addition to the study plan, the City also conducted an interagency meeting on March 4, 2004, to discuss details of the draft study plan. In response to that meeting's draft minutes, Alaska Department of Fish and Game (ADF&G), via e-mail dated 3/18/04 (transmitted to all recipients of this document), requested a study plan detailing certain aspects of the site selection and field measurement. Further, National Marine Fisheries Service (NMFS), via e-mail dated 3/25/04 and 4/2/04 requested explanations of certain proposals regarding site selection.

The Draft Instream Flow Study Plan proposed two methods, one based on hydraulic habitat measurement and the other based on the US Forest Service (USFS) Expert Habitat Mapping (EHM) technique, as discussed in the March 4 meeting.

In partial response to the 3/18/04 ADF&G e-mail, the City convened a teleconference with that agency's Anchorage Instream Flow Coordinator on 3/25/04 to discuss techniques and equipment for the "IFIM" component of the studies. Draft minutes of that teleconference were distributed by the City on 4/02/04 and are currently under agency review.

Following that teleconference and discussions with USFS, it has been agreed that the instream flow studies will proceed based only on the hydraulic measurement component. The City does not currently plan to use the EHM component described in the minutes of the March 4 meeting.

Proposals made in this document are to be reviewed as if they were sections or text in the Instream Flow Study Plan. Once approved, we propose to directly incorporate language from this document in the Final Instream Flow Study Plan.

As discussed in the meetings, it is vitally important that we complete the instream flow work prior to the onset of any required Blue Lake reservoir spilling, to assure being able to control streamflow in the measurable flow regime. Because certain aspects of the

Study Planning process are still being reviewed and finalized, we will address the requested points in this document with the goal of finalizing a unified document during Summer, 2004.

INFORMATION REQUESTED IN AGENCY E-MAILS

Information requested in the ADF&G and NMFS e-mail has been broken into 7sections, to be addressed in this document:

1. **Instream Flow Study Objectives**
2. **Instream Flow Study Timetable**
3. **Blue Lake Reservoir Operations Model***
4. **Request to Utilize IFIM Methods**
5. **Techniques and Equipment**
6. **Products Produced**
7. **Study Sites**

* The Reservoir Operations Model, while not mentioned in the comments, is an integral part of the instream flow study and evaluation process.

1. Instream Flow Study Objectives

The primary objective of the Sawmill Creek instream flow studies is to produce, for each target species and life stage, a **Discharge vs. "Habitat" relationship** from which, for any given Sawmill Creek discharge a corresponding Habitat value could be determined. The Habitat value in this relationship may be calculated using traditional techniques, as described in various Instream Flow Incremental Methodology (IFIM) publications, or may be developed based on detailed knowledge of certain species and life stages, as discussed later.

2. Instream Flow Timetable.

Q vs. Habitat Relationships. It is the City's objective to complete all instream flow field work during April or May, 2004, prior to the usual annual "spill" period at Blue Lake reservoir. Following the field work, data reduction and initial analysis will proceed over the Summer months, with a draft Instream Flow Technical Analysis Report submitted by September, 2004 for agency review. This report will document Materials and Methods and Results and will allow agency review of the quality field data and subsequent model calibration.

Concurrently, the City will, through agency consultation, work toward approval of HSI curves for selected species/life stages (where appropriate) and evaluation criteria for those species life stages which will be addressed using other than traditional IFIM or PHABSIM techniques. We envision a further meeting or teleconference in early Summer, 2004, to discuss and hopefully finalize rationale and techniques for evaluating, specifically, steelhead/rainbow and coho spawning in reaches below the Falls at SM 0.71.

The City wishes to complete the Q vs. Habitat Relationship phase of the instream flow work by November, 2004, in order to facilitate the instream flow negotiations necessary to complete relicensing.

3. Blue Lake Reservoir Operations Model. This component of the instream flow studies is necessary to provide alternative flow regimes to be evaluated using the Q vs. Habitat relationships discussed above. The City has presented initial descriptive material on the model and intends to further refine the model and work with agencies to be sure all parties understand model logic and output capabilities.

It is the City's goal to finalize the model by November, 2004, to allow it's use as a tool in the instream flow and further Project operations negotiations necessary to complete relicensing. We envision at least one meeting or teleconference during Summer and/or Fall, 2004 to further discuss and develop the Reservoir Operations Model.

4. Request to Utilize IFIM Methods.

In their 3/18/04 e-mail, ADF&G requested that "data collection methods follow standard IFIM procedures, as described in Bovee et al. (1998), to allow the opportunity to use IFIM or less intensive analyses as discussed at the meeting". The City, during the teleconference with ADF&G on 3/25/04, fully committed to doing all field measurements with site selection, equipment, techniques, data recording, forms and other aspects, according to approved IFIM specifications, and in such a way as to assure ultimate consistency with existing IFIM and PHABSIM software.

5. Techniques and Equipment.

Detailed description of Techniques and Equipment were the subject of the 3/25/04 teleconference and subsequent minutes. It is the City's goal to let the minutes of that meeting, as approved by all reviewing agencies, serve as the relevant section of the final Instream Flow Study Plan. Note that these minutes address very detailed specifications for equipment, measurement techniques and locations which are not presented in this document.

6. Products Produced.

The following products (respective dates) will be produced during the course of the instream flow studies:

Field Measurements	**April, 2004**

Instream Flow Study Plan

Revised Draft	**June, 2004**
Final	**August, 2004**

(Please note that, although these dates reflect revision and finalization after completion of field work, that, through this document and ongoing study planning and review, we plan to complete field work according to approved field methods. The remainder of the plan will involve HSI curves and analysis methods which will take place after Plan finalization.)

Field Measurements Data Report **June or July, 2004**

This report will document Methods and Materials and Results for all measurements. It will contain copies of field notes and reduced data, and will be accompanied by data files suitable for agency use in their own software.

Initial Data Analysis Report **August, September, 2004**

This report will document initial data analysis, focusing on hydraulic simulation and calibration and possibly early Q vs. Habitat runs using generic curves.

Final Instream Flow Data Report. **November, 2004**

This report will document the final hydraulic simulation and Q vs. Habitat software as it is approved prior to beginning the evaluation of actual flow regimes. It is important that this report reflect approval of all aspects of computer-based capabilities prior to onset of the regime evaluations.

Reservoir Operations Model Report **November, 2004**

This report will document the status of the Reservoir Operations Model relative to input-output setup and Model capabilities, prior to onset of instream flow negotiations. Similar to the Q vs. Habitat capabilities, it is very important that all aspects of the Reservoir Operations Model be agreed upon by all parties prior to beginning flow regime evaluations.

7. Study Sites.

In the March 4 instream flow meeting and subsequent minutes, it was proposed that instream flow study sites would be selected in various stream reaches in the following way (for reference in this section, please see Attachment I):

- **Below the Falls at SM 0.71.** For spawning, cross-sections would be placed to represent exact areas of known steelhead and coho spawning. Analysis would be via evaluation of depths and velocities at various flows at the exact spawning locations.

  For rearing below the Falls, a site or sites would be selected to represent area(s) thought by the site selection team to represent juvenile salmonid rearing habitat. Analysis would be via traditional PHABSIM techniques using rearing HSI curves.

- **Above the Falls.** One area each in reaches 4 and 5 would be selected to represent the overall habitat or habitat known to support various resident trout habitats. Also, these areas would be analyzed using traditional PHABSIM techniques for species of concern, most likely rainbow trout, but also salmon or steelhead if agreed upon.

Following are our current proposals for site selection within the various stream areas discussed above.

Below the Falls at SM 0.71 (Site descriptions in this section are supported by maps in Attachment I)

Spawning: Sites would be selected to correspond to the most active areas in which spawning was actually observed to occur. In addition, within these areas, cross-sections would be placed to precisely transect spawning area, to facilitate simulating effects of various flows (and respective depths and velocities) at the sites. In the meeting and minutes, we speculated that to represent the vast majority of stream area in which steelhead and coho (the selected target species) were observed spawning, we could measure two or three cross-sections at approximately three locations.

In her 3/25/04 and 4/02/04 e-mails, Katharine Miller of NMFS questioned this proposal and asked why we didn't propose to measure all sites where spawning had been observed.

To address this question, we compiled the exact spawning locations of all steelhead and coho during the 2002 and 2003 field seasons. All but 4 of the 378 spawning observations for both species occurred within six specific sites. Within those sites, all spawning occurred on specific gravel bars which will be observable during cross-section selection. Four spawning salmon were observed in areas defined as "other" which were outside the specific named stream locations. Of the 374 spawning observations within named sites, 65 and 63 percent of steelhead and coho, respectively, were observed in the Falls Pool (Table 1).

Table 1. Percentages of steelhead and coho spawning at various observation points on Sawmill Creek, 2002 and 2003 surveys combined (FP=Falls Pool, PMO=Pulp Mill Outflow Pool, PFA=Pipe Fitting Area, WBP=Wild Bill's Pool, CA=Concrete Area, Index=Index Area, near bridge)

Species	FP	PMO	PFA	WBP	CA	Index	Other
Steelhead	65.3	16.6	8.5	.4	6.6	2.2	.4
Coho	62.2	23.4	3.7	0	8	1	0

For steelhead, an additional 17.6, 8.5 and 6.6 percent of spawners were observed in the Pipe Fitting Area, and the Concrete Area, respectively. This represents 97 percent of all steelhead spawning observations over two years in the reaches below the Falls.

For coho, an additional 23.4, 3.7 and 7.5 percent of spawners, respectively, were observed in these specific areas, for a total of 97.2 percent of all coho spawning observations over two years in the reaches below the Falls.

For these reasons, we propose to place cross-sections sufficient to describe the observed spawning habitat in the Falls Pool, Pulp Mill Outflow, and Concrete Area to address the spawning component of this instream flow study. While the Pipe Fitting Area supported additional spawning, it is in a steep, cascade area which might be dangerous and difficult, and is therefore not included.

Rearing. For steelhead and coho rearing below the Falls, we propose to select an area representing the limited amount of reduced velocity water thought to provide rearing habitat for both species. We further propose to use such an area in the Index Pool for two reasons:

1. Limited rearing has been observed in the north bank of this pool over the study period;

2. The area is easily accessible regardless of flow conditions, allowing further observations and perhaps more detailed field measurement over the remainder of the study period.

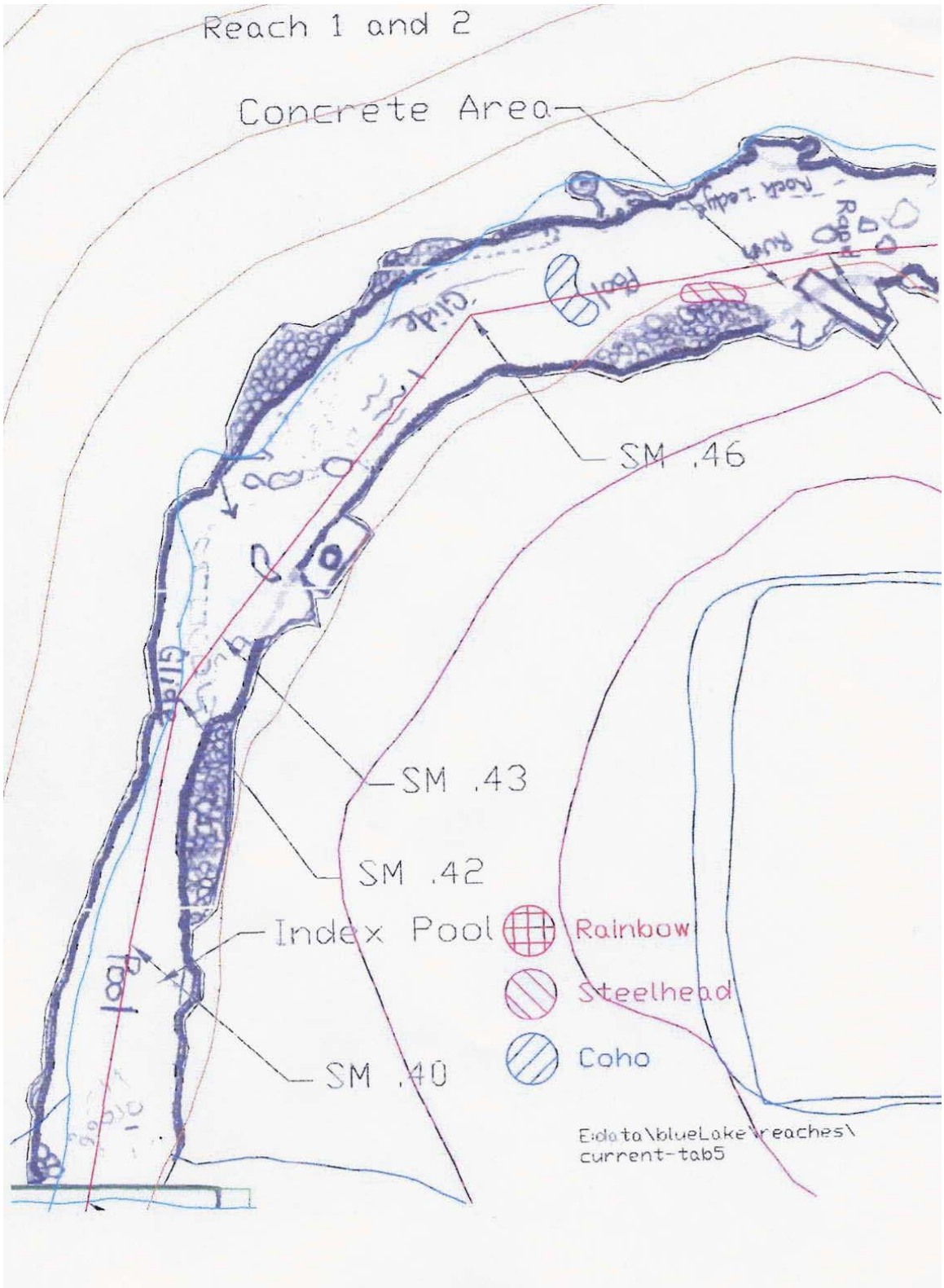
Areas Upstream of the Falls.

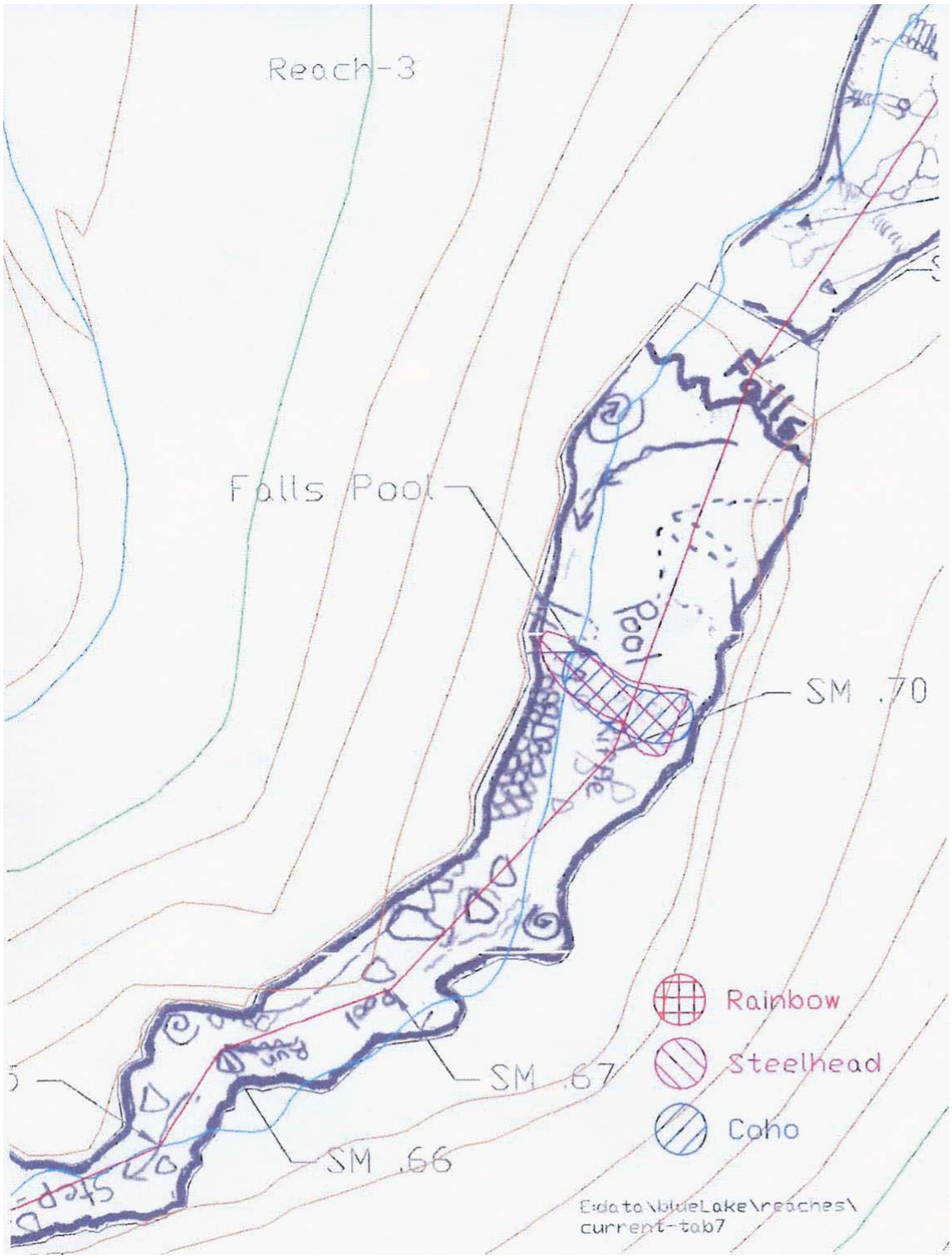
Reach 4. We propose to place cross-sections sufficient to describe the tailout of the Slot Pool because it is an areas in which most rainbow trout adults have been observed, and which represents the extensive habitat in that area.

Reach 5. We propose to measure a pool tailout just downstream of the footbridge on the south stream, again because it has supported the largest number of adult rainbow trout and probably represents good rearing area.

ATTACHMENT I

Stream maps of 2002 and 2003 Sawmill Creek steelhead coho and rainbow spawning.


Reach 1 and 2
Concrete Area
SM .46
SM .43
SM .42
Index Pool
SM .40
Rainbow
Steelhead
Coho
E:\data\blueLake\reaches\
current-tab5


Reach-3
Falls Pool
Falls
Pool
SM .70
SM .67
SM .66
Rainbow
Steelhead
Coho
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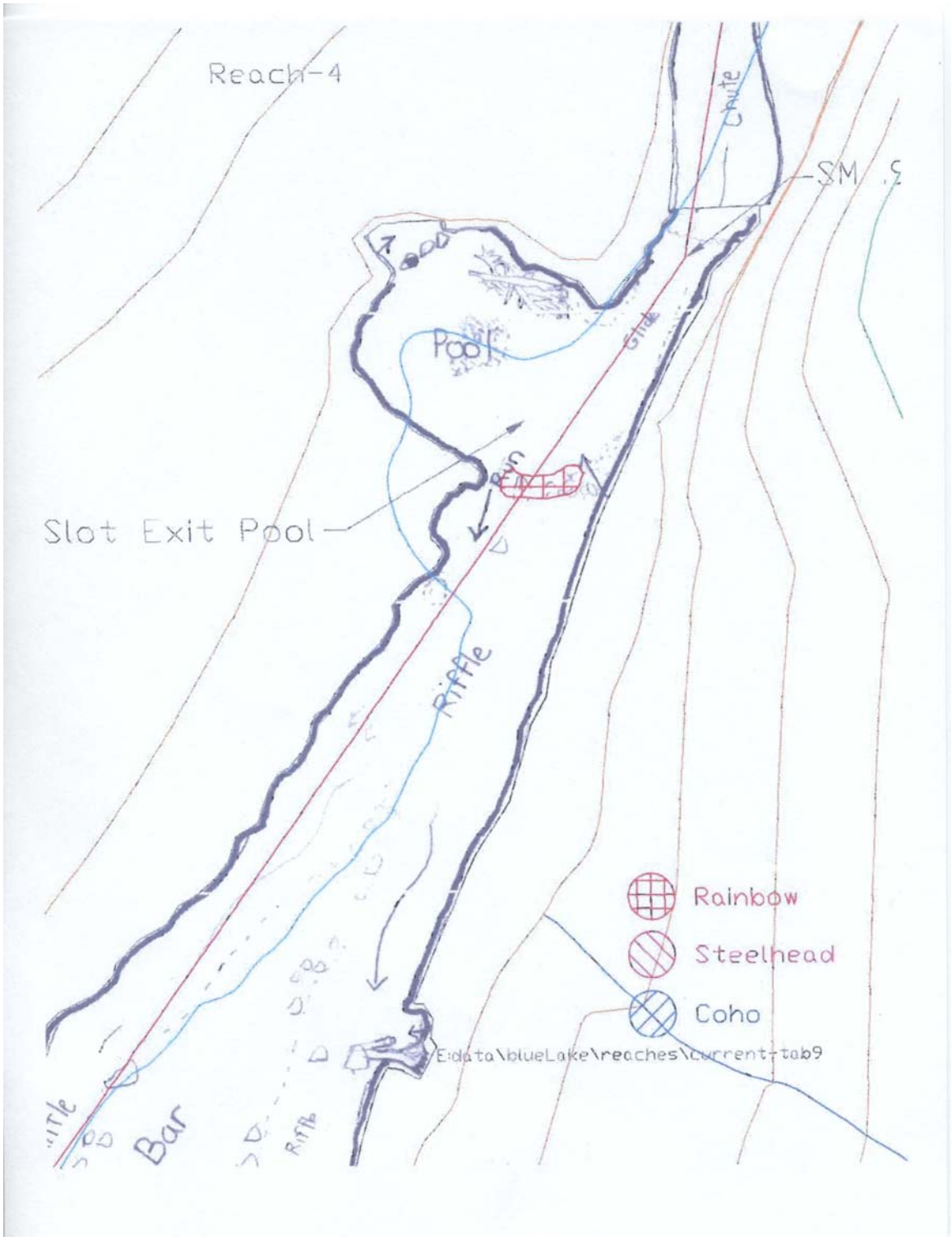
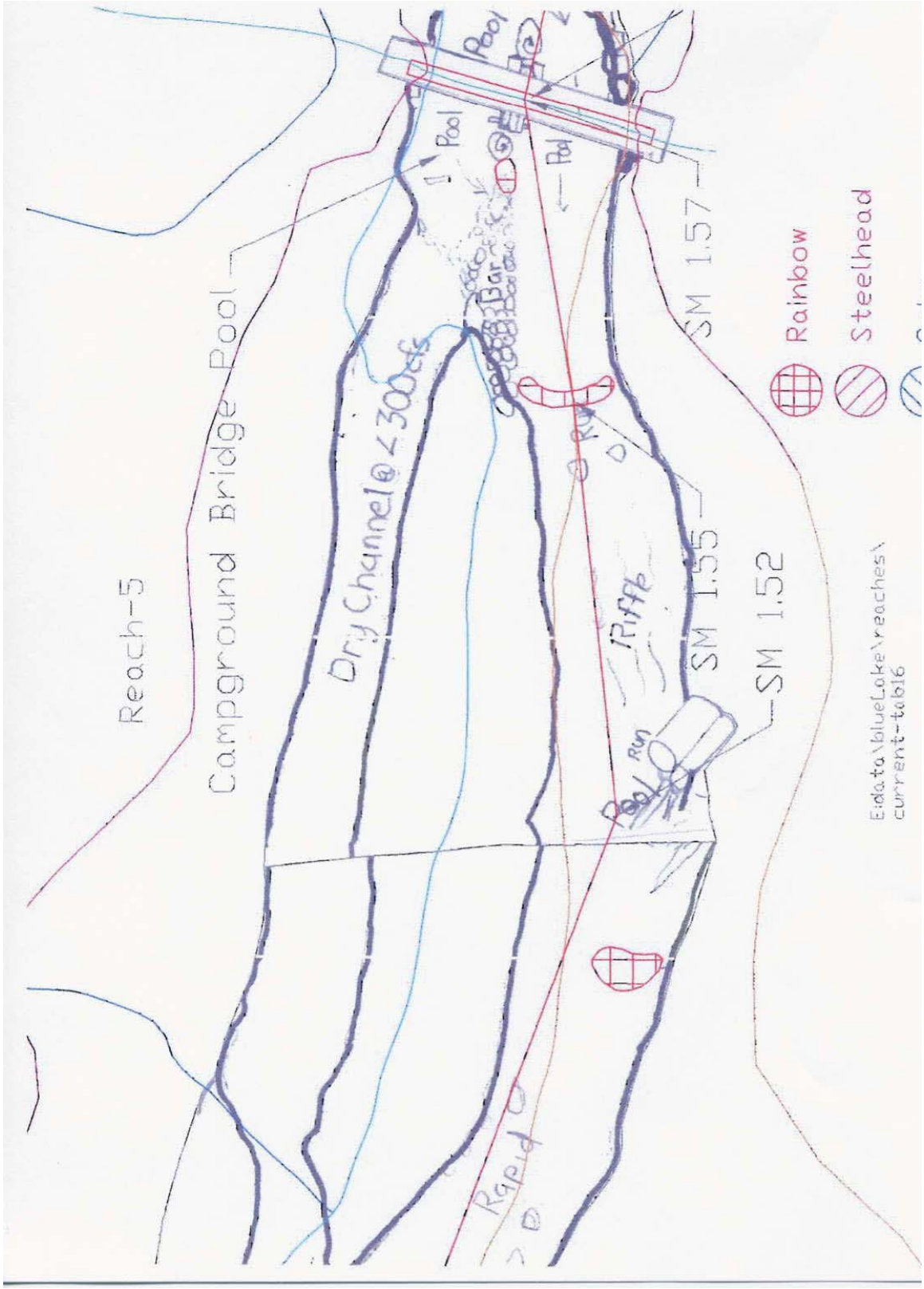
Reach-3
SM .61
Rapids
Scour Pool
Run
Pipe Fitting Area
Rainbow
Steelhead
Coho
SM .55
GLIDE
RIFFLE
Pulp Mill Outfal
E:data\blueLake\reaches\
current-tab6
SM .49


Reach-4
Chute
SM
Pool
Glide
Run
Slot Exit Pool
Riffle
Rainbow
Steelhead
Coho
E:\data\blueLake\reaches\current-tab9
Bar
Riffle


Reach-5
Campground Bridge Pool
Dry Channel @ < 300cfs
Pool
Pool
Bar
Pool
Run
Riffle
Pool
Run
Rapid
SM 1.57
SM 1.55
SM 1.52
Rainbow
Steelhead
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