Clear and Foster Creek Fish Passage Assessment and Prioritization Project

Clear and Foster Creek Fish Passage Assessment and Prioritization Project – Final Report

Clear and Foster Creek Fish Passage Assessment and Prioritization Project

Work Progression:

Clear and Foster

- ✓ Determining fish bearing streams and potential crossings
- ✓ Landowner permission process for field measurements
- ✓ Field measurements
- ✓ Data Entry
- ✓ Hydraulic and cost analysis
- ✓ **Prioritization**
- ✓ **Final report generation**

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Artificial Barrier Tally

- **223 potential artificial barriers were discovered in total**
- **159 were on Fish Bearing Streams**
- **69 had profile data taken for them county had similar data for about 60 more (~129)**
- **81 were deemed problem crossings or other type of artificial barrier based on hydraulic analysis and 77 of these were prioritized**

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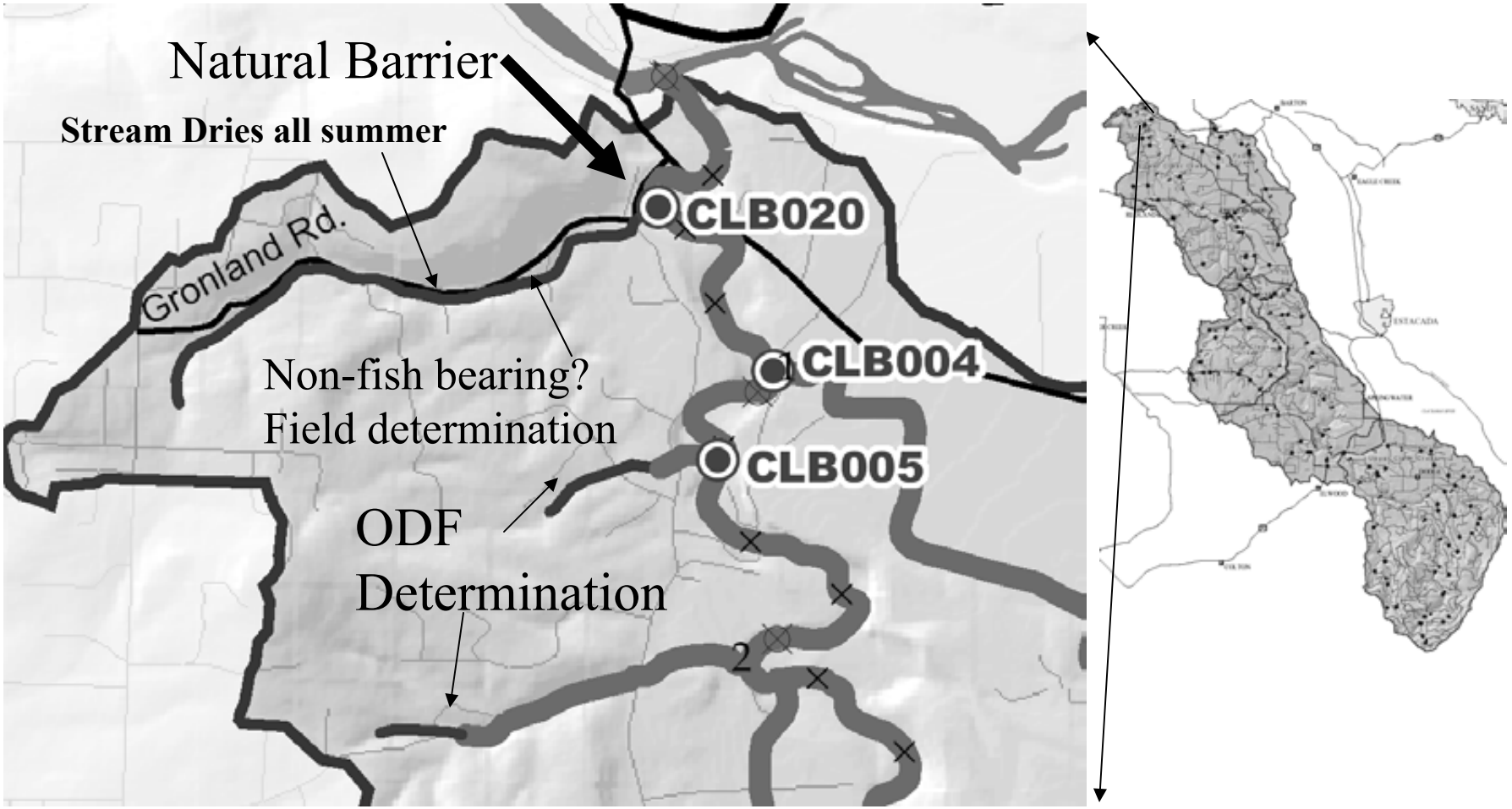
Artificial Barrier Tally

- **There were a total of 16 potential artificial barriers on fish streams that were not surveyed mainly because of access issues**
- **Of these non-surveyed barriers <u>two</u> were potentially important barriers that would have a moderate or high priority of repair**
- **There were other un-surveyed crossings on fish bearing streams that were bridges, open arches, or successfully installed streambed simulation culverts that were not surveyed as well.**

Fish Bearing Status and Crossings



Barriers along mainstem tributaries common

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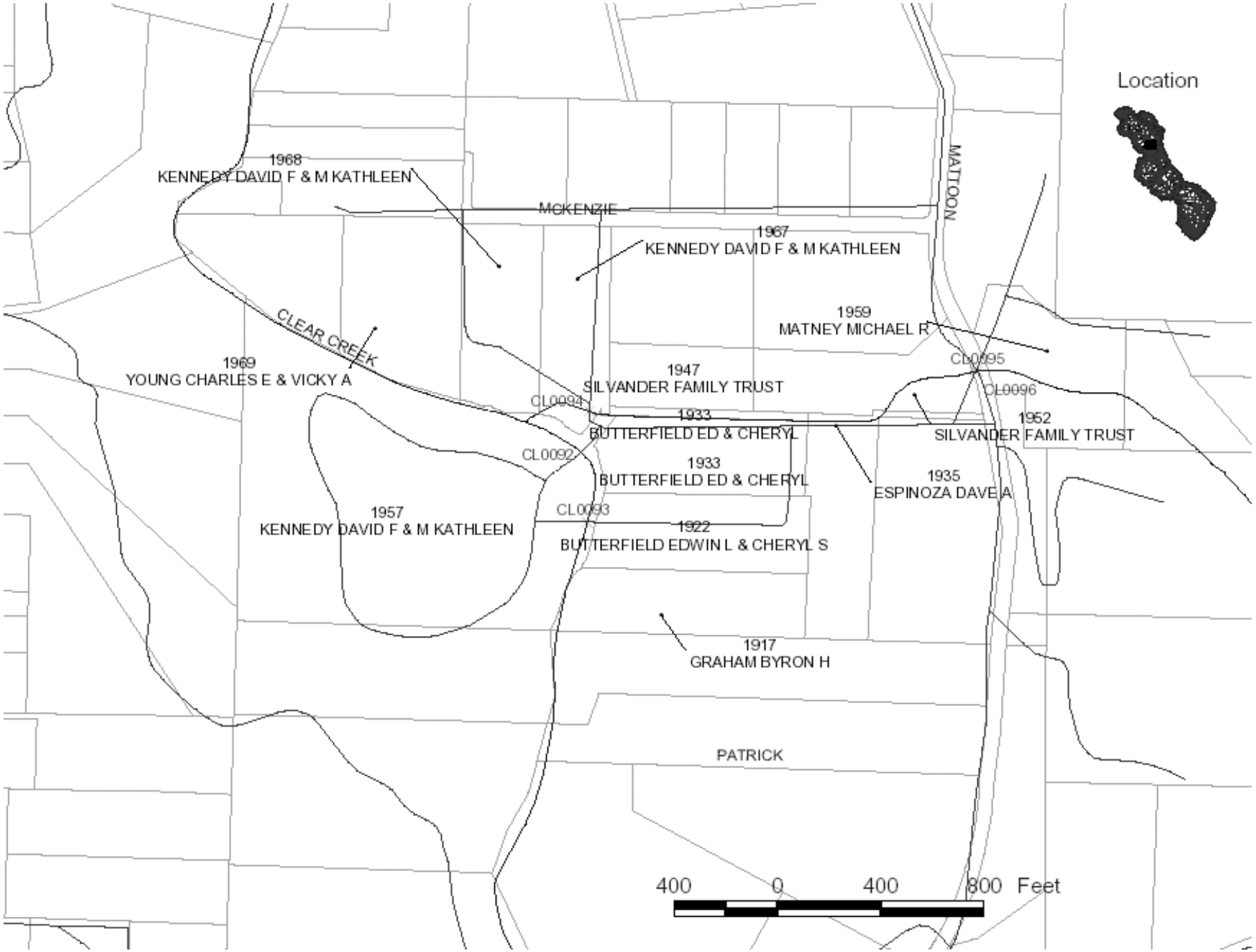
Landowner Permission Process

- **Objectives**
  - Establish contact and introduce the project
  - Gain permission to examine potential fish passage barriers on the ownership
  - Educate and exchange information
  - Communicate results

Tax Lot Codes

ACCOUNTKEY	OWNER	SITUS_CITY	SITUS
1905	WOLFARD KEITH B & DAPHNE	OREGON CITY	20253 S REDLAND RD
1906	KELL ALTERMAN & RUNSTEIN LLP	ESTACADA	21977 CIRCLE DIAMOND LN
1907	KELL ALTERMAN & RUNSTEIN LLP	ESTACADA	21954 CIRCLE DIAMOND LN
1908	TOMMAS NELLIE C	ADDRESS	NO SITUS
1909	TOMMAS NELLIE C	ADDRESS	NO SITUS
1910	KIMMA KEVIN & YUKO	ADDRESS	NO SITUS
1911	STAATS LEONARD TRUSTEE	OREGON CITY	20052 S REDLAND RD
1912	HUMBYRD OPAL TRUSTEE	OREGON CITY	20071 S RIDGE RD
1913	ALLEN VICTOR LLC	ADDRESS	NO SITUS
1914	TURENNE CHARLES A TRUSTEE	OREGON CITY	20188 S REDLAND RD
1915	KLIMA JEROME R JR	OREGON CITY	20131 S REDLAND RD
1916	KIMMA KEVIN & YUKO	ADDRESS	NO SITUS
1917	GRAHAM BYRON H	ESTACADA	21800 S MIJA LN


Location
1968
KENNEDY DAVID F & M KATHLEEN
MCKENZIE
1967
KENNEDY DAVID F & M KATHLEEN
MATTOON
1959
MATNEY MICHAEL R
CLEAR CREEK
1969
YOUNG CHARLES E & VICKY A
1947
SILVANDER FAMILY TRUST
CL0095
CL0096
CL0094
1933
BUTTERFIELD ED & CHERYL
1952
SILVANDER FAMILY TRUST
CL0092
1933
BUTTERFIELD ED & CHERYL
1935
ESPINOZA DAVE A
1957
KENNEDY DAVID F & M KATHLEEN
CL0093
1922
BUTTERFIELD EDWIN L & CHERYL S
1917
GRAHAM BYRON H
PATRICK
400
0
400
800 Feet

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Tools for Outreach

- **Mailings**
- **Flyers**
- **Press releases**
- **CRBC Newsletter**
- **CRBC Website**
- **Public meetings – CRBC meetings, small community outreach meetings, open house, final report presentation.**
- **Personal Contact Phone and House visits**

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Field Protocol Components

- **Field measurements must be tied to specific objectives and needs for cost analysis and prioritization. They include:**
  - **Fish use status at crossing** (from updated ODF maps with interim classification for unknown streams along with field verification of presence used for crossing status and habitat use above blockage)
  - **Stream slope/profile** (critical in determining which design options are viable for cost information)
  - **Presence of bedrock or shallow fill** to bedrock (critical in determining design options)
  - **Degree of drop at outlet or inlet** of culvert (essential in determining fish passage status)

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Field Protocol Components

- **Field measurements continued:**
  - **Length and slope of culvert** (essential in determining fish passage status)
  - **Size of existing culvert** (useful in pointing to inlet drop at higher flows or in determining risk of catastrophic failure in relation to streamflow)
  - **Height of fill and width of road** (critical to know in determining needed replacement culvert length for cost information)
  - **Stream width** (necessary to size replacement culvert options and in determining replacement bridge span for cost estimates)

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Fish Passage Status

- **Fish Passage Status Calculations Focused on:**
  - **Culvert slope (0.5% and 4% were key values)**
  - **Drop at outlet (6 inches and 4 feet were key values**
  - **Evidence of backwatering (downstream riffle elevation in relation to culvert outlet and inlet elevation)**
  - **Inlet width and drop compared to stream width**

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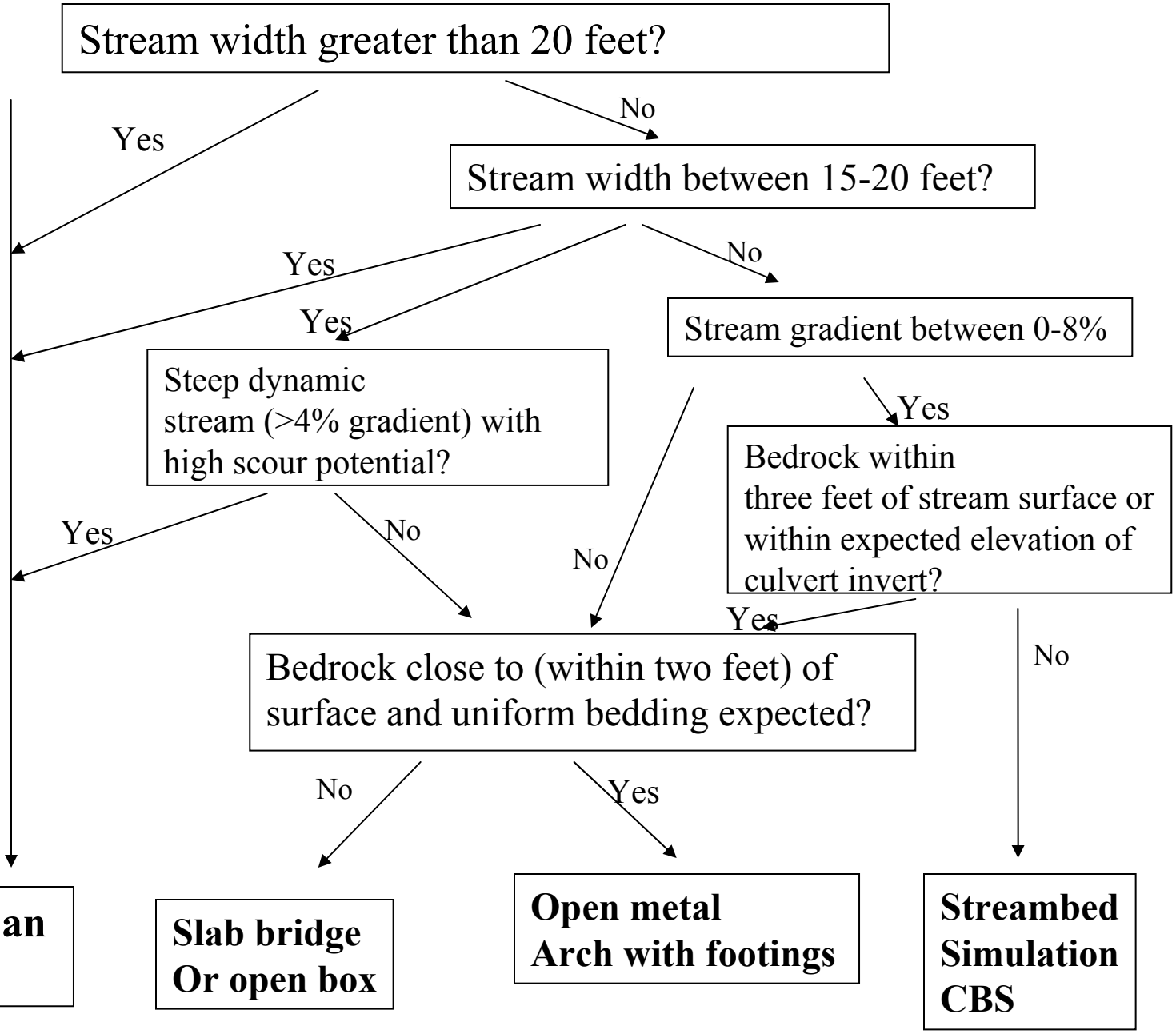
Hydraulic Analysis

- Fish Passage Status based on slopes and drops
- Needed size and design type of new crossing

Criteria for crossing Decision for cost Analysis for crossing that are barriers



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Cost Information

Total Number of Fixes =	**81**
Cost of Fixes on Anadromous =	**$3,601,532**
Cost of Fixes on Resident only =	**$3,658,054**
Total	**$7,259,586**

County Culverts	**43**
Anadromous	**$2,986,717**
Resident Only	**$2,506,547**
Total	**$5,493,264**

Max Fix	**$732,000**
Min Fix	**$5,460**
Average Cost	**$92,733**

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Prioritization Equation

[RISE] = {B * S * [(H*Q) + C)]}

Where:

- Rise = Replacement Index Score Ecological
- B = Degree of barrier
- S = Species immediately downstream of crossing
- H = Habitat available upstream (ft)
- Q = Habitat Quality index
- C = Connectivity

Another equation will divide total by cost of structure to factor in cost

- Cost = The cost of the replacement in dollars

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Degree of Barrier

- **From field data and other sources – Criteria in detail in DMR**
  - 1.0 Full Barrier; 0.5 Juvenile/Weak swimming fish only; 0 No barrier
  - Based on Drops, Slope of Culvert and channel constriction at inlet for juvenile
  - Backwatered culverts may require additional calculations using a backwatering program like FishXing
- **Sources**
  - Base field data detailed protocol
  - County field data with additional info
  - Anecdotal information for some crossings due to access issues including written plans and observations

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Species Present Downstream

- **Classed on the following**
  - **Steelhead or Coho - 1.0**
  - **Native resident fish - 0.2**
  - **Non-native or no fish - 0 (not prioritized)**

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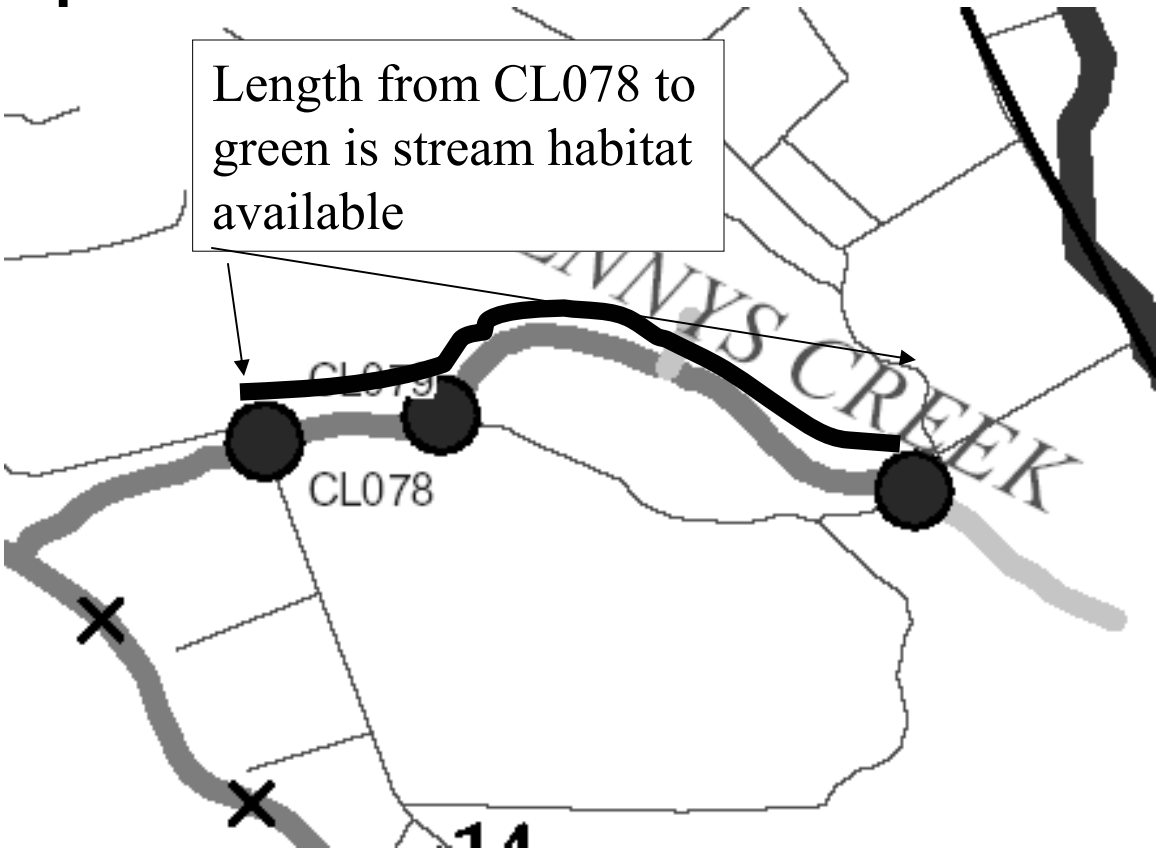
Habitat available upstream

- **From the crossing to the upstream end of fish use**



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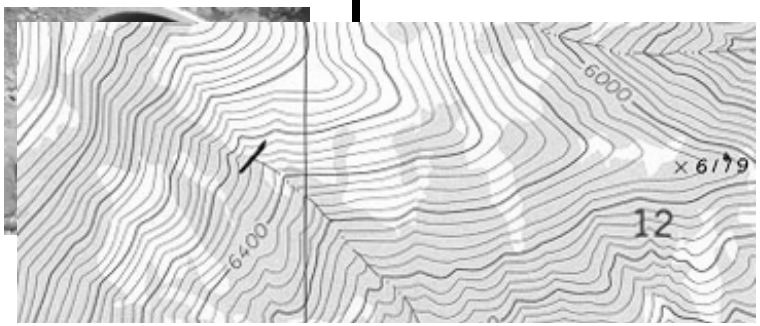
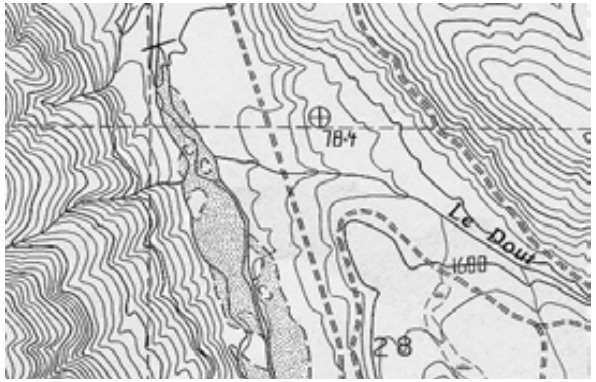
Habitat Quality index

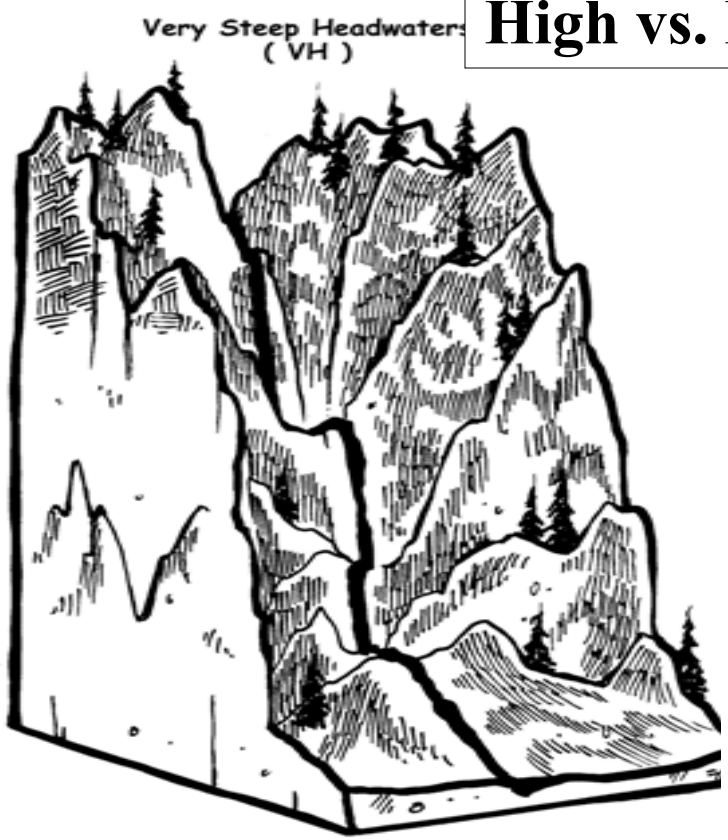
- **This will be a critical factor in deciding how to weigh it**
- **Uses the existing habitat type classification to determine it based on percentage low gradient habitat vs. high and confined gradient habitat the more low gradient habitat the higher the number**
- **Varies from 1-2**

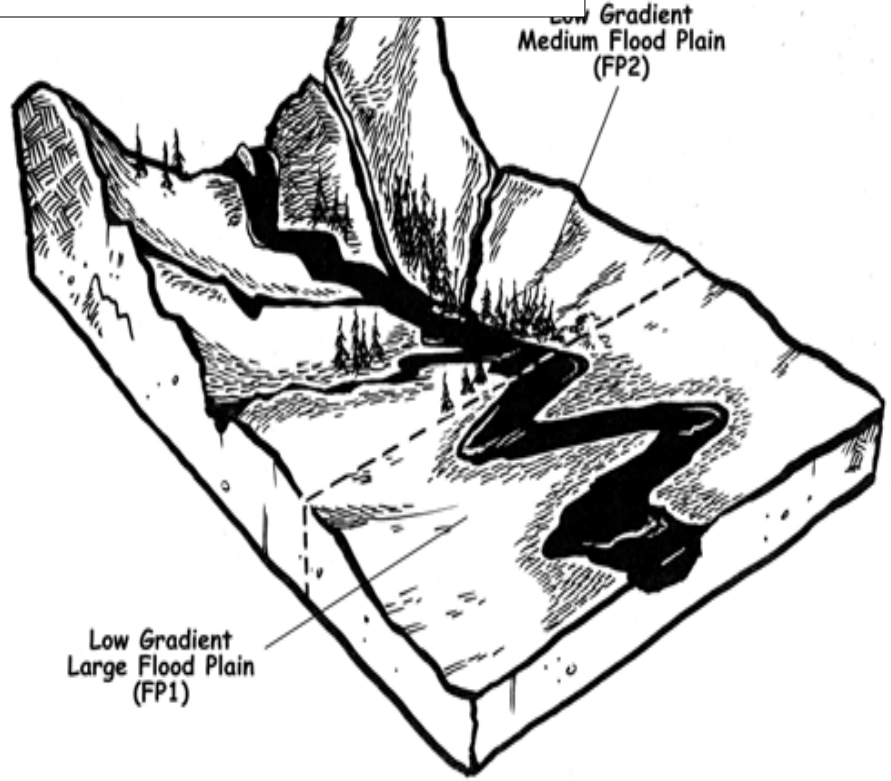




C
F
F
A
a
P
P

High vs. Low Gradient Habitat





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Connectivity

- **This is a classification based on length from crossing to Clackamas river.**
- **A well connected stream reach near the Clackamas would have the equivalent weighting of about 1500 feet of upstream habitat in the equation**

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High Priority Streams

1. **CL209: A pipe across Clear Creek that creates a drop that blocks juvenile and weak swimming fish passage**
2. **CL069A: A ford across Clear Creek that creates a drop that blocks juvenile and weak swimming fish passage.**
3. **CL088: A box culvert on Little Clear Creek that has almost 15 miles of fish bearing stream habitat upstream that blocks fish passage for most or all fish.**
4. **CL216: A ford on Clear Creek that has a 2 foot drop that creates a possible barrier for juvenile and weak swimming fish.**

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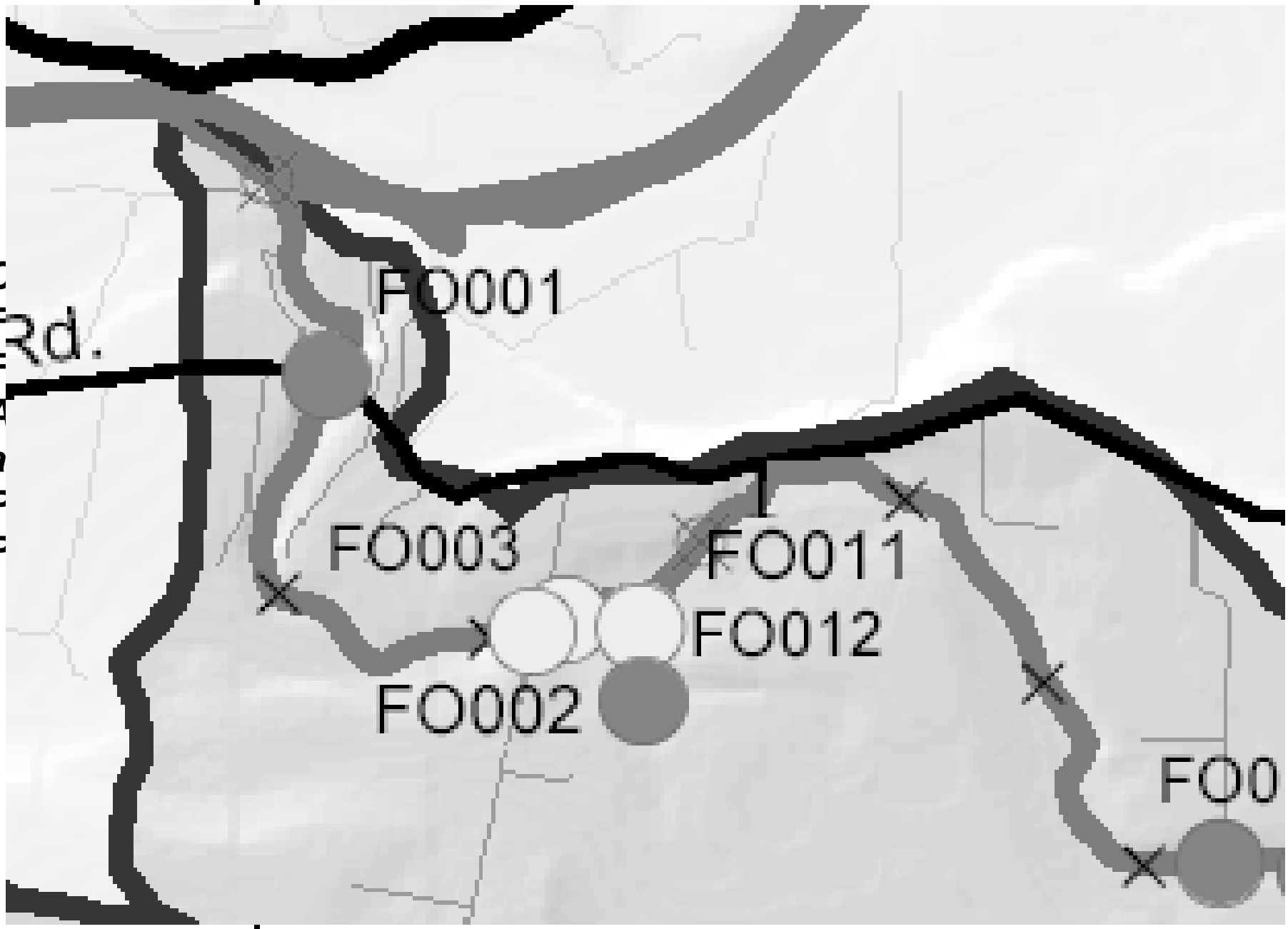
High Priority Streams

6. **FO003: A culvert that blocks fish passage on Foster Creek**
7. **FO002: An irrigation dam that partially blocks fish passage immediately upstream of FO003.**
8. **CL068: A corrugated metal pipe culvert blocking fish passage on Mosier Creek**

9 **CL100: Two concrete culverts on a very low use road that partially block fish passage on a large tributary to Clear creek that probably can be removed.**

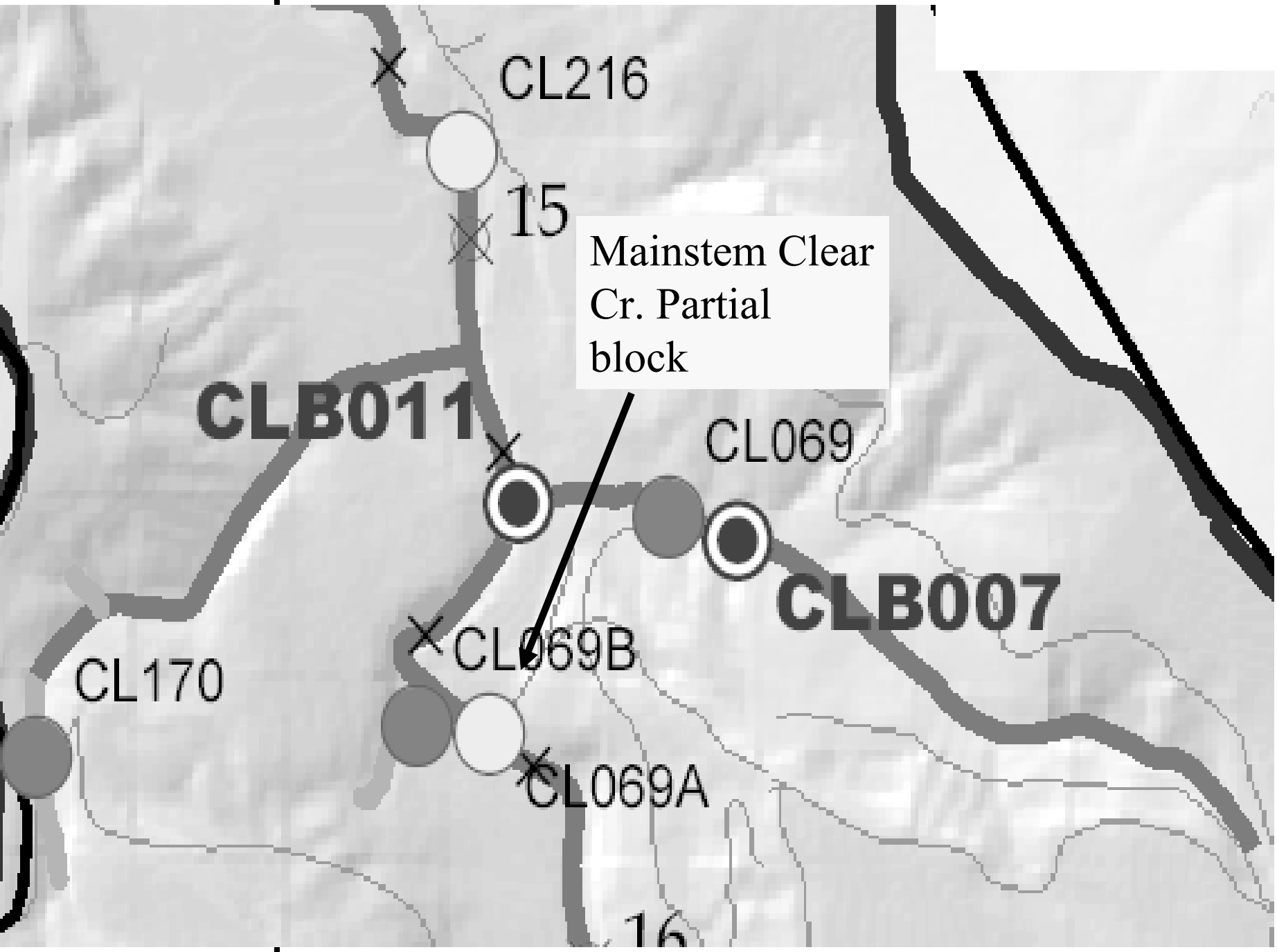
High Priority Crossing Example 1

A diversion dam on Foster Creek (numbered FO002 #7) that may be mitigated by developing a fish ladder below it. (Estimated cost is about $15,000


Rd.
FO001
FO003
FO011
FO012
FO002
FO0

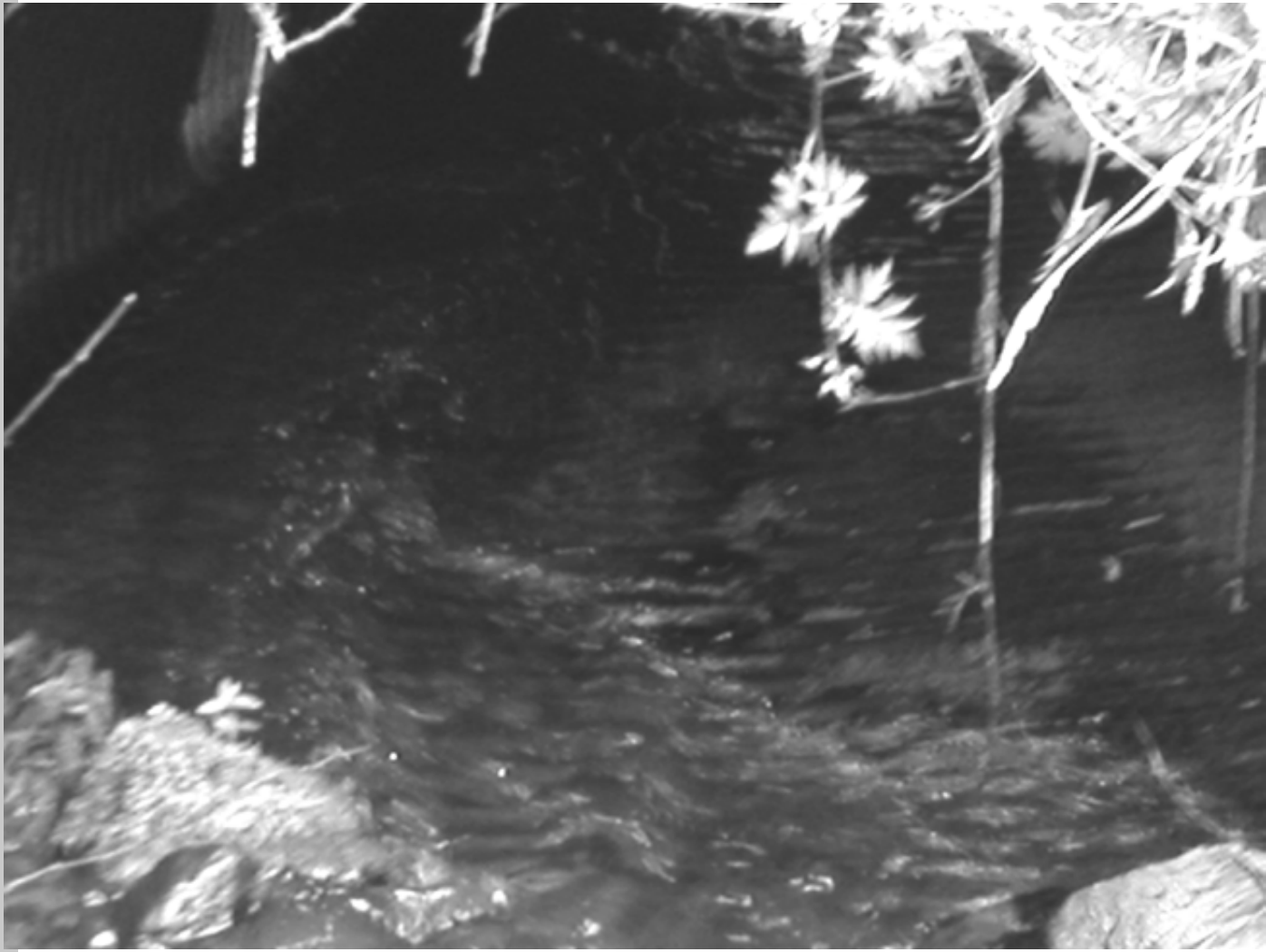
High Priority Crossing: Example 2

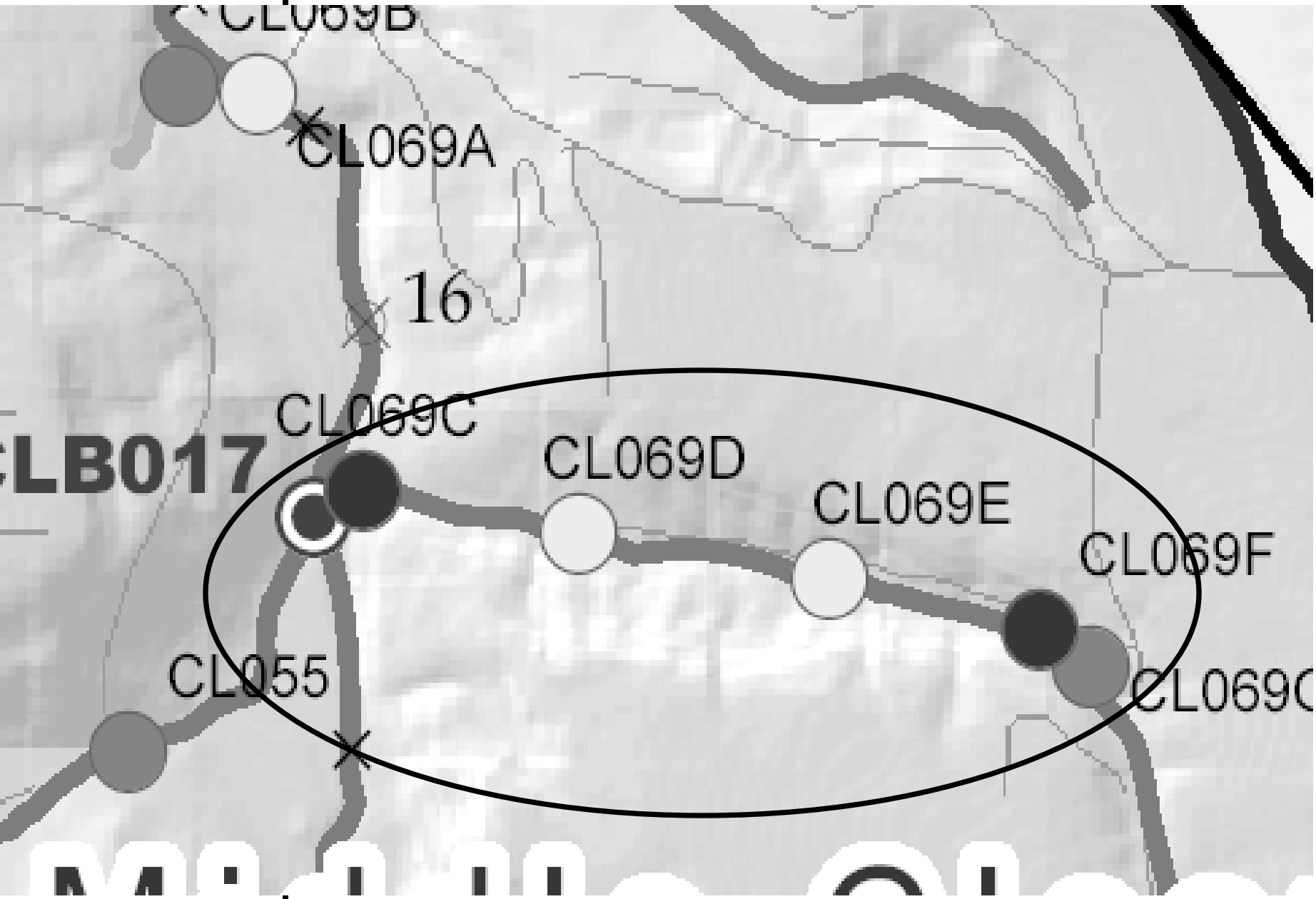
A ford on Clear Creek (numbered CL069A #2) not previously documented discovered during field work) that is a partial fish passage blockage that could be mitigated by created and roughened channel along part of the channel. (Estimated cost about $7,500)


CL216
15
Mainstem Clear Cr. Partial block
CLB011
CL069
CLB007
CL069B
CL170
CL069A
16

High Priority Crossings: Example 3

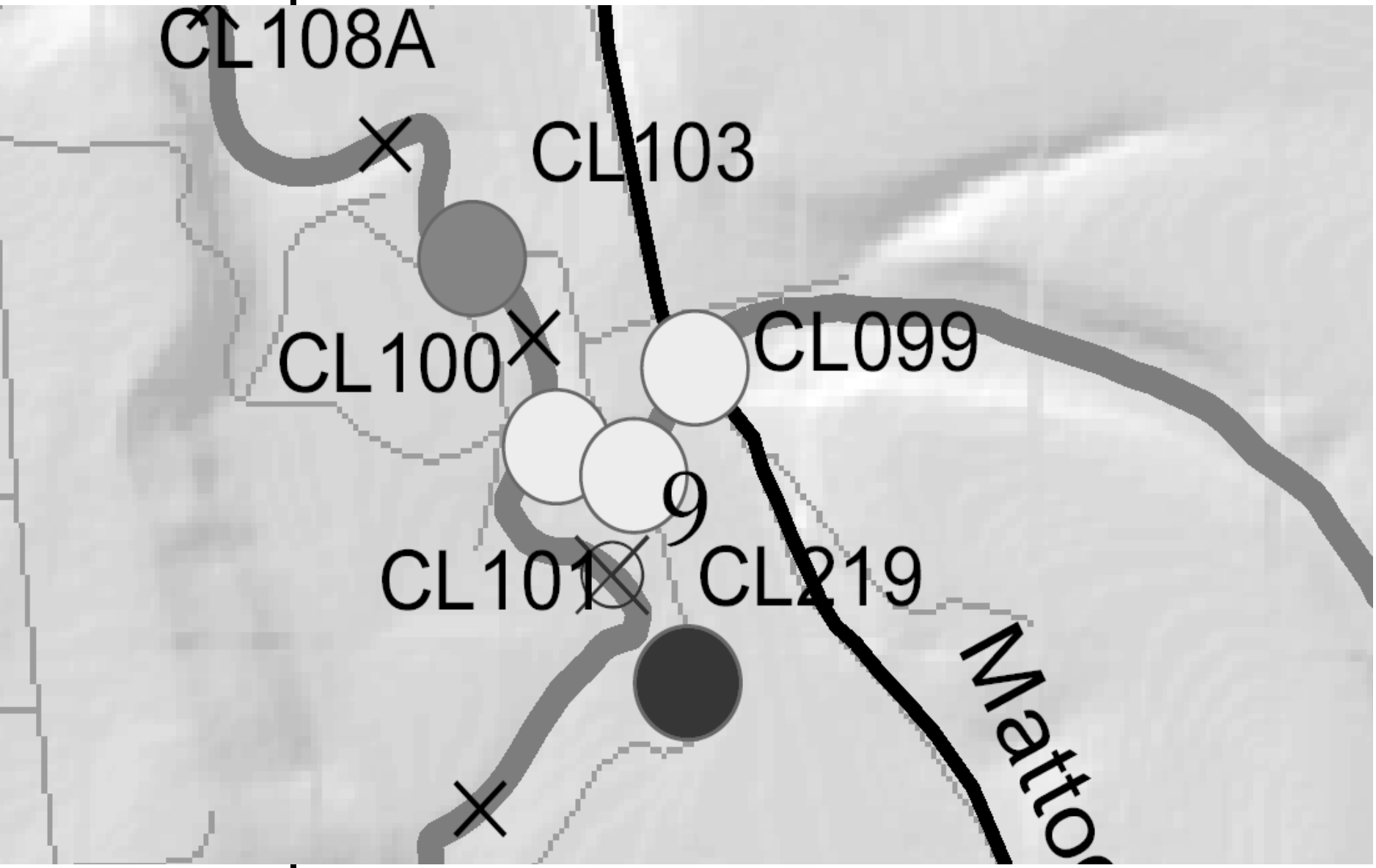
A series of culverts on a low gradient tributary that connects directly to Clear Creek (CL069C, D, E, F moderate priorities stream and culverts not previously documented, discovered during field work summer 2002) that can be removed or replaced. (Estimated cost about $65,000 if all culverts replaced)




CL069B
CL069A
16
CL069C
CLB017
CL069D
CL069E
CL069F
CL055
CL069G

High Priority Crossings: Example 4

Two culverts on Spring Creek a direct tributary to Clear Creek. This near its mouth is a high quality low gradient tributary. There is one culvert (CL100 #9) that probably can be removed as it is a semi abandoned road. Another culvert (CL101, Sylvan Road) is culvert on a private paved road. Another culvert upstream (CL099) is a county culvert on Mattoon road. The cost of removing and replacing the two private culverts is $93,000. The county culvert estimate (by the county) for replacement is $361,000.


CL108A
CL103
CL100
CL099
9
CL101
CL219

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Clear and Foster future

1. **These priorities should aid in finding funding sources for replacement**
2. **The locations of both artificial and natural barriers as well cost of replacement data will be critical in creating an effective watershed action plan**
3. **Priorities should not be strictly followed for instance some funding sources may want to key on complete blockages and/or anadromous fish passage only**