ADF&G Fish Passage Prioritization

Gillian O'Doherty
Alaska Department of Fish & Game

Goal

Prioritize structures for replacement

Process

➢ Assess culverts for impacts to juvenile salmonid passage using a standard assessment protocol

➢ Use potential ecological benefits to prioritize sites for replacement

➢ Do not look at cost or road ownership

Working Prioritization- ecological considerations only

Need common metrics across all locations

- Fish presence
- Amount of habitat upstream
    - Stream
    - Lake
- Quality of habitat
    - Spawning areas?
    - Upwelling?
    - Thermal refugia?
- Severity of culvert barrier
- Potential to fail
- Potential to block adult salmon as well as juveniles

Working Prioritization

Do we have this data for all or most sites?

- Fish presence- kind of
- Amount of habitat upstream- estimable for 60-70% of sites
    - Stream
    - Lake
- Quality of habitat- nope
    - Spawning areas?
    - Upwelling?
    - Thermal refugia?
    - Pike?
- Severity of culvert barrier- yes
- Potential to fail- yes
- Potential to block adult salmon- yes

Site	Stream Name	Stream Miles	Lake Acres Rating	Anadromous Fish	FWFish	Barrier Multiplier	Perch	Condition	RGG	Score	Rank
20503429	Unnamed Tributary to Little Willow Creek	9.75	0	1		1.50		0.50	1	9.00	1
20501081	Meadow Creek tributary	2.17	1	2		2.50	1	0.50	1	4.51	2
20501807	Susitna River tributary	5.49	0	5		1.00			1	4.04	3
20501139	Little Meadow Creek	8.413	3	2	1	0.50			0.5	3.00	4
20501152	Cheri Lake Outlet	2.06	2	1		1.50		0.50	1	2.68	5
20502078	Salmon Creek tributary	2.26	0	4		1.00			1	1.96	6
20502106	Chulitna River tributary	1.82	0			1.50		0.50	1	1.64	7
20401310	Rabbit Slough	2.12	0	1		1.00		0.50	0.5	1.42	8
20502077	Salmon Creek tributary	0.93	0			2.50	1	0.50	1	1.40	9
20503431	Unnamed	0.8	1	1		1.50		0.50	1	1.25	10
20502115	Unnamed	1.01	0			2.00	1		1	1.21	11
20502134	Susitna River tributary	1.57	1			1.00			1	1.14	12
20501809	Susitna River tributary	0.63	1	1		1.50					
20501159	Unnamed	1.03	0			1.50					
20501802	Susitna River tributary	0.49	0	4		1.00					
20502088	Miami Creek	2.15	2			0.50					
20502133	Unnamed	1.7	1	2		0.50					
20501164	NULL	1.01	0	1		1.00					

	weight
Stream Miles	0.60
Lake Acres Rating	0.20
Salmon	0.15
FWFish	0.05
	1.00

Site	Road	Name	Stream Miles	Lake Acres	Lake Acres Rating	Salmon	FWFish	Barrier Multiplier with Cond	Score	Rank
20501394	Parks Highway	Trapper Creek	33.79	154	3	2	2	1	21.274	2
20501417	Talkeetna Spur Road	Answer Creek	14.88	74	1	2	1	1.5	14.217	4
20501480	Petersville Road	Ninemile Creek	20.3	218.5	3	2	0	1	13.08	5
20501434	Big Lake Road	Lucille Creek	17.43	0	0	2	1	1	10.808	6
20401337	Fishhook Road	Wasilla Creek	16.94	0	0	4	0	1	10.764	7
20501435	Beaver Lake Road	Meadow Creek	10.22	128	2	4	1	1	7.182	9
20501173	Cameo Road	Goose Creek	10.12	400	3	2	1	1	7.022	10
20502150	Parks Highway	Chulitna River tributary	8.6	0	0	2	0	1	5.46	12

Site	Road	Name	Stream Miles	Lake Acres	Lake Acres Rating	Salmon	FWFish	Barrier Multiplier with Cond	Score	Rank
20502068	Valdez Mining District Road	Windy Creek	25.29	0	0	0	1	1.5	22.836	1
20501394	Parks Highway	Trapper Creek	33.79	154	3	2	2	1	21.274	2
20502065	Valdez Mining District Road	Valdez Creek	17.76	0	0	0	1	1.5	16.059	3
20501417	Talkeetna Spur Road	Answer Creek	14.88	74	1	2	1	1.5	14.217	4
20501480	Petersville Road	Ninemile Creek	20.3	218.5	3	2	0	1	13.08	5
20501434	Big Lake Road	Lucille Creek	17.43	0	0	2	1	1	10.808	6
20401337	Fishhook Road	Wasilla Creek	16.94	0	0	4	0	1	10.764	7
20400584	Alascom Drive	Trail Creek	10.62	265	3	0	0	1.5	10.458	8

- 117 sites out of 406 with no habitat data at all
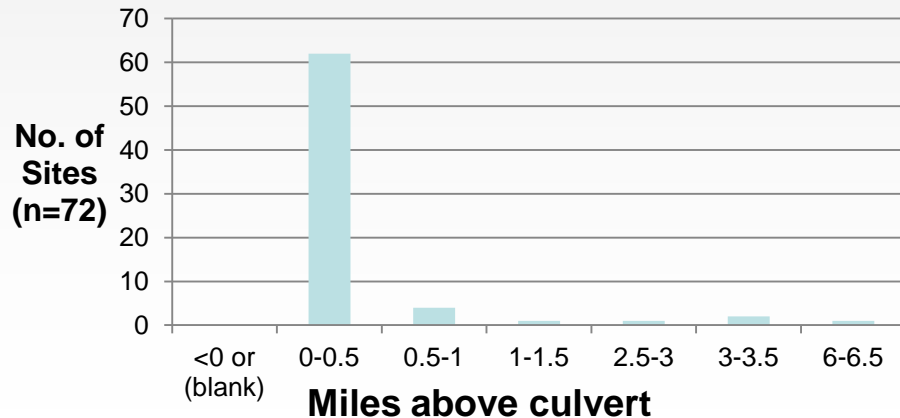- Fisheries data is spotty and difficult to collect

This is one of the most accessible and best researched areas in Alaska
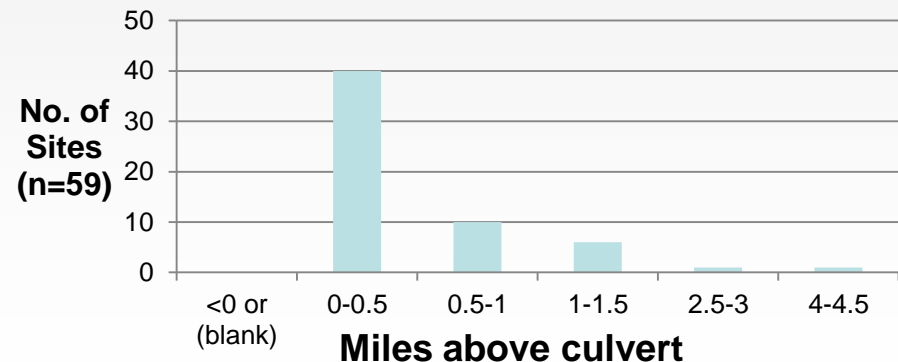
What can we say?

A relatively small number of culverts block many miles each
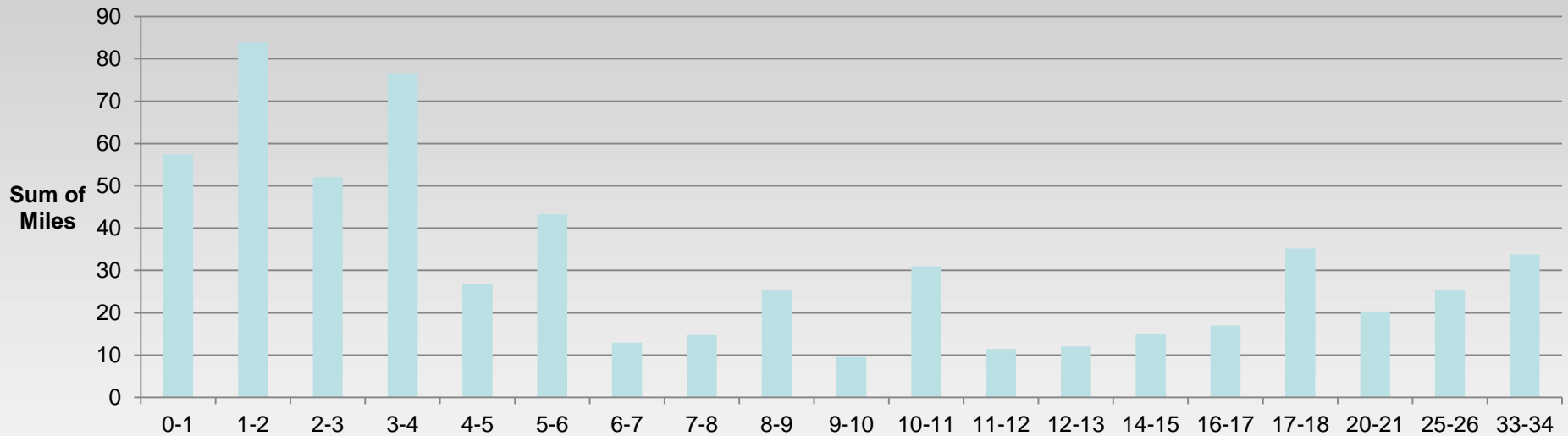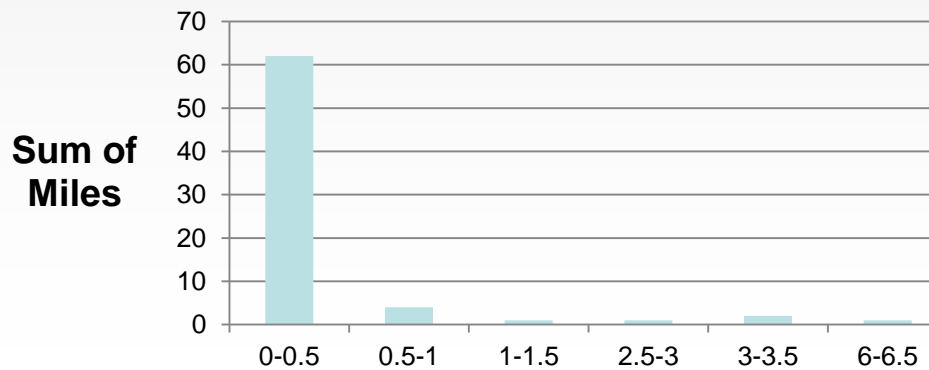

Mapped stream Miles above culverts in MSB

Number of Sites (n=406) — Miles above culvert

Haines

No. of Sites (n=72) — Miles above culvert

Juneau

No. of Sites (n=59) — Miles above culvert
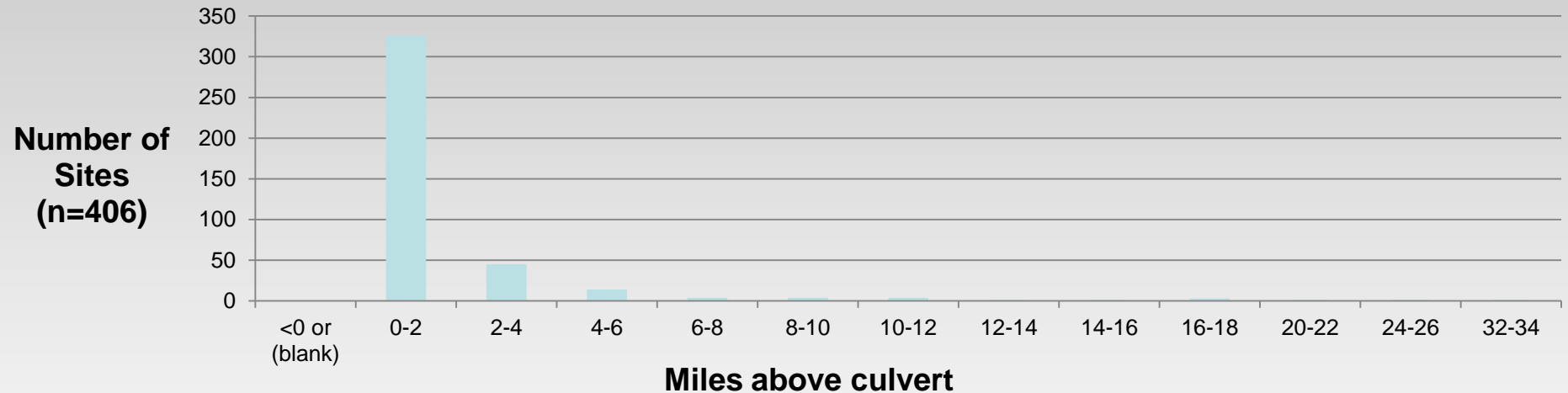
Even culverts that block little habitat individually add up
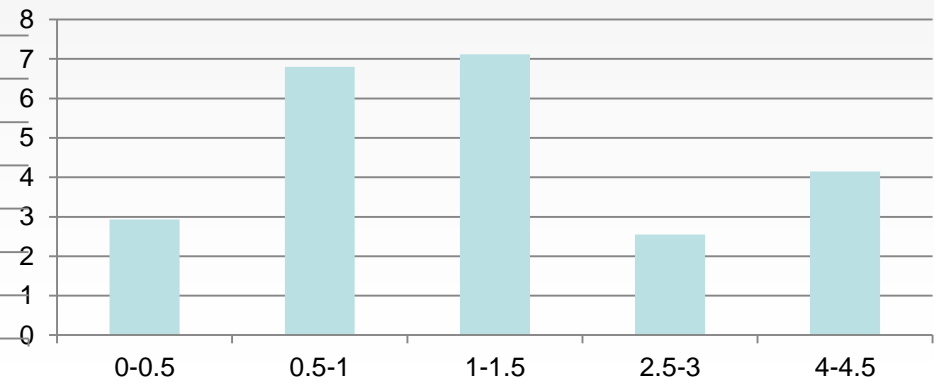
Prioritizations need to be customized

- Road Ownership
- Fish stocks of interest
- Cost
- Existing projects

20501435	Beaver Lake Road	Meadow Creek
20501173	Cameo Road	Goose Creek
20501238	Willow Creek Parkway	Shirley Lake outlet
20501449	Church Road	Meadow Creek
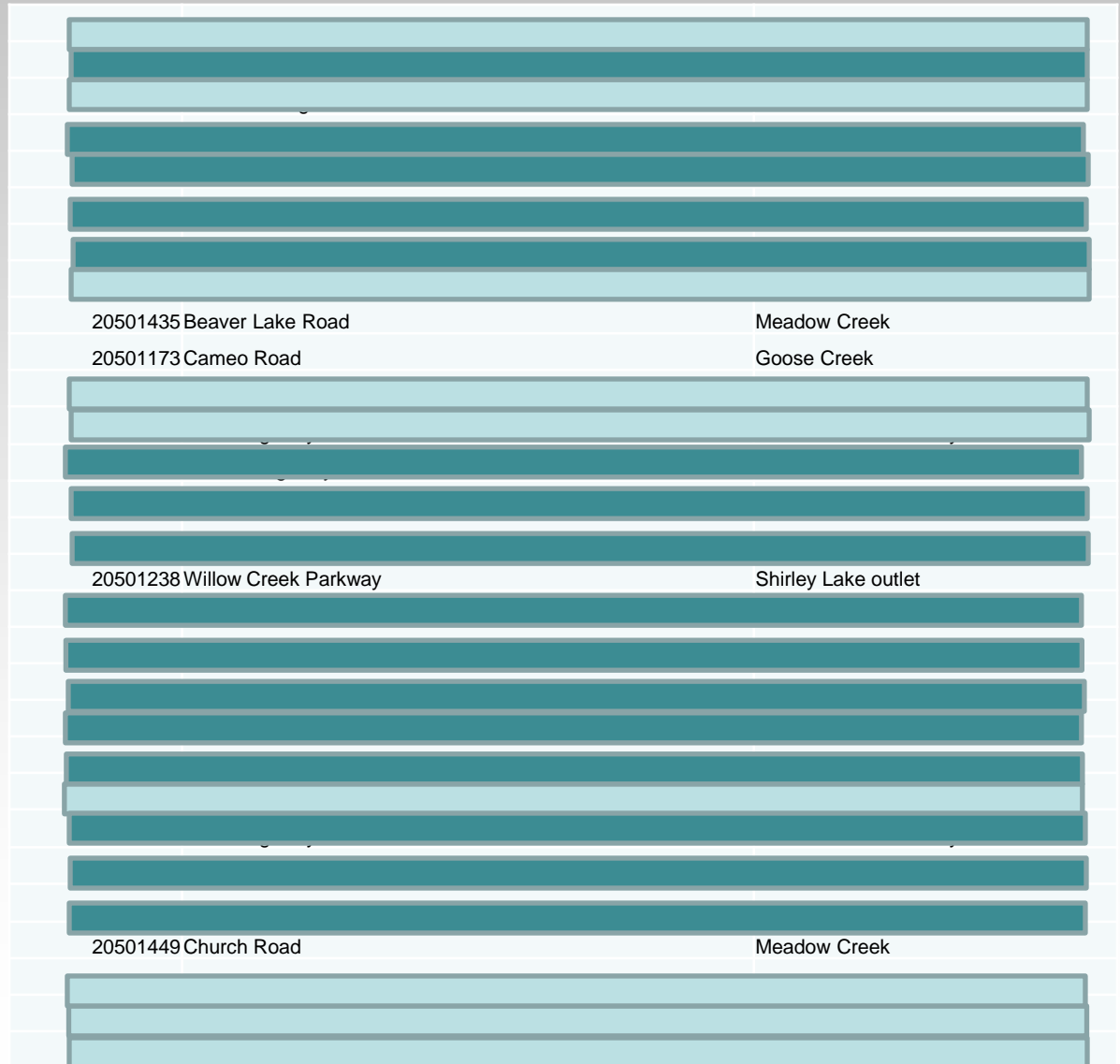
Regional Prioritization

Trying to compare like to like

Percentage of culverts in each outfall height category by region				
	0 feet	0-0.4 feet	0.4-1 feet	>1.0 feet
MSB	71.14	9.11	9.11	10.63
Southeast	77.66	7.27	10.11	4.96
Fairbanks	68.35	8.44	6.75	16.46
Elliott/Dal/Sts	62.57	4.68	4.39	28.36

Percentage of stream by gradient class by region								
	0-1%	1-2%	2-3%	3-4%	4-5%	5-6%	6-12%	12%+
MSB	47.37	13.16	15.79	7.89	5.26	7.02	3.51	0.00
Southeast	34.72	15.54	15.03	12.44	7.25	4.15	10.36	0.52
EDS	44.26	29.51	11.48	4.92	4.92	1.64	3.28	0.00

Percentage of backwatered sites by region		
	Yes	No
MSB	13.95	84.59
Southeast	20.62	77.64
EDS	29.33	68.44

Other options
- By fish species
- By stream type
- By topography
- By ecological value

Prioritizations need frequent updating

- As culverts get replaced
- As fisheries data improves
- As mapping improves

20501435	Beaver Lake Road	Meadow Creek
20501173	Cameo Road	Goose Creek
20501238	Willow Creek Parkway	Shirley Lake outlet
20501449	Church Road	Meadow Creek
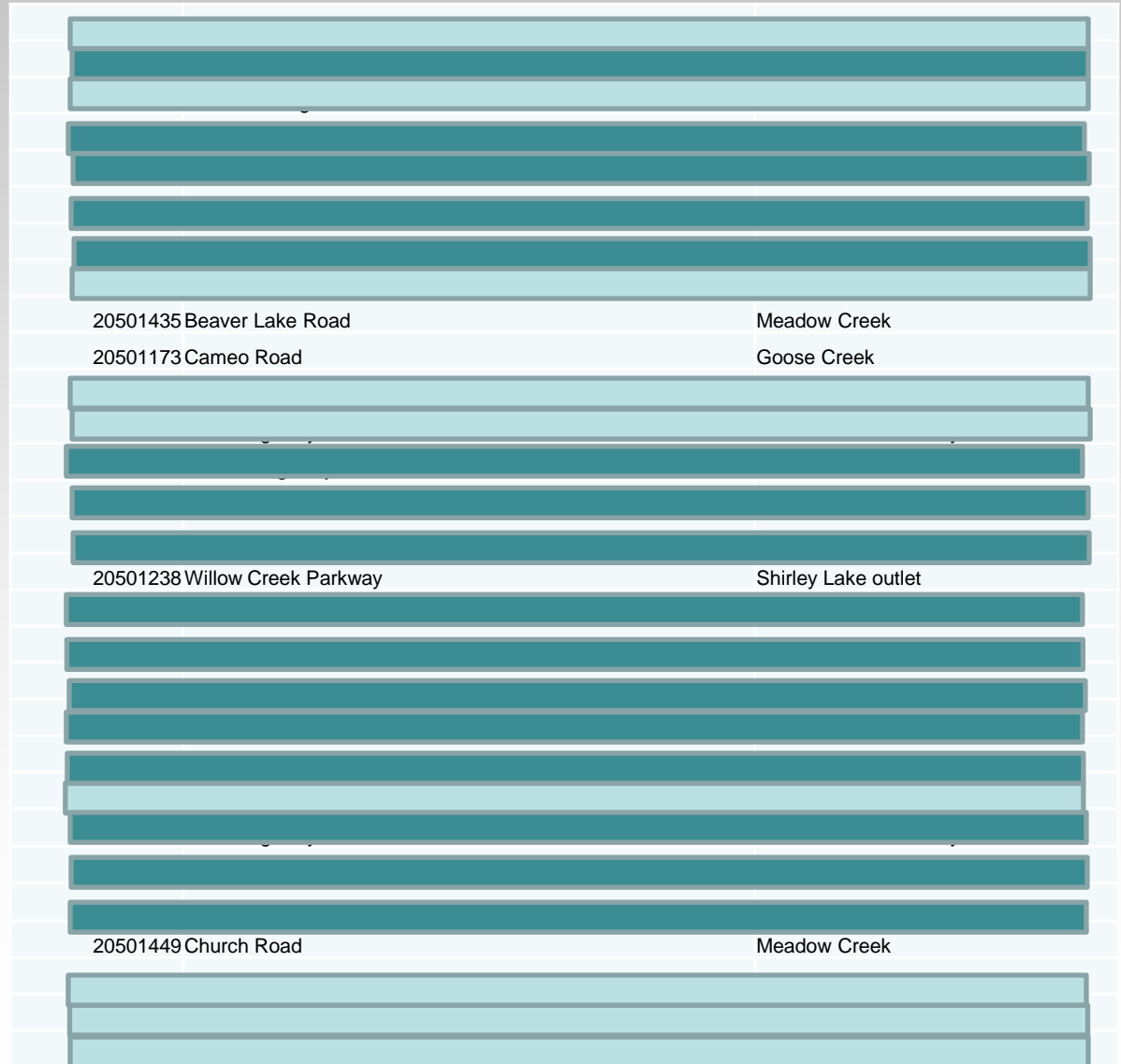
Professional judgement and local knowledge

- Limited habitat
- "not that bad"
- Maintenance issue
- Atypically costly

4.3 miles, gray culvert, 3 spp salmon

8 miles, gray culvert, 2 spp salmon

3.7 miles, Red, 1.0'+ perch, 0 spp fish

Best way to keep prioritizations live?

- Optimization models?
  - Not enough data for all regions
  - Need good stream maps

- Online?
  - How to ensure data is updated?

- On request?
  - No convenient but probably best quality data
  - Transparency