

Middle Fork Project
 AQ 2 – Fish Population
 Technical Study Plan
 Report Overview



March 10, 2008

Study Objectives

- Document fish species composition, distribution, and abundance in the Project bypass and peaking reaches.
- Characterize fish growth, condition factor, and population age structure in the Project bypass and peaking reaches.
- Characterize fish species composition, relative abundance, and size in Project reservoirs and diversion pools.

AQ 2 – Fish Population

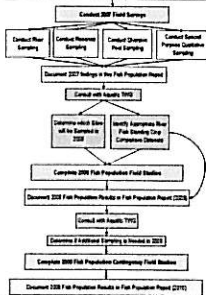
Study Elements and Reports

Figure AQ-2.1. Fish Population Objectives, Studies, Data Elements, and Reports

Document fish species composition, distribution, and abundance in the bypass and peaking reaches.

Characterize fish growth, condition factor, and population age structure in the bypass and peaking reaches.

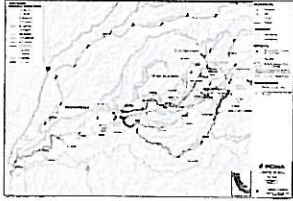
Characterize fish species composition, relative abundance, and size in Project reservoirs and diversion pools.



Fish Population Study Sites

- Rivers (21 Sites)
- Reservoirs (4)
- Diversion Pools (3)

Wide Scale Map



2

Survey Results

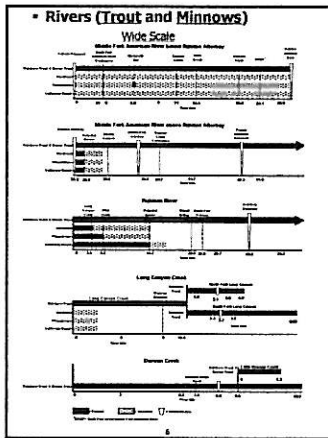
- Distribution and Diversity
- Abundance
- Trout Biomass
- Fish Population Comparison Sites
- Fish Size, Age, Growth and Condition Factor
- Timing of Fry
- Others
 - *Electrofishing versus Snorkeling*
 - *Small Stream Diversion Pool Sampling*
 - *Species and Lifestage Periodicity Chart*
 - *Water Temperature*

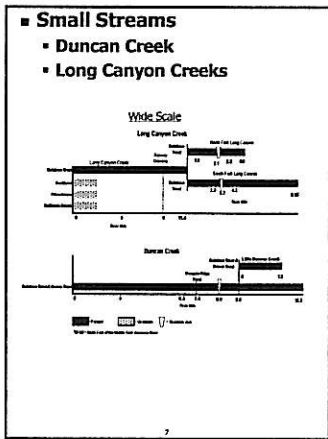
4

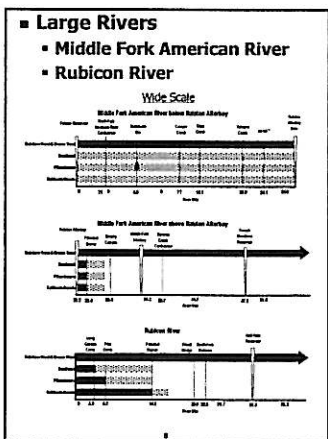
■ Distribution and Diversity

- Rivers
 - *Project Bypass and Peaking*
 - Others
 - *Comparison Rivers*
 - *Above Small Stream Diversions*
 - Diversity
- Reservoirs
 - *Hell Hole Reservoir, French Meadows Reservoir, Middle Fork Interbay, Ralston Afterbay (see CPUE)*

5

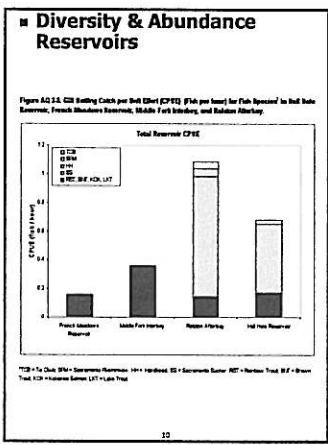


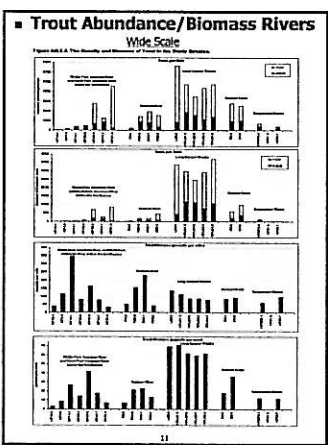




Diversity Rivers Wide Scale

Table with multiple columns and rows, likely a data table for river diversity metrics.





- **Hardhead/Pikeminnow Abundance**

- **Ralston Afterbay**
 - 6 Hardhead
 - 5 Pikeminnow
- **Large River Sites**

Table 101: Summary of Fish Abundance at River Comparison Sites

Species	Sample	Count	Length (mm)	Sex	Age	Weight (g)	Condition	Notes
Hardhead	101-01	1	100	M	1	20	Good	
	101-02	1	95	F	1	18	Good	
	101-03	1	110	M	1	25	Good	
	101-04	1	105	M	1	22	Good	
	101-05	1	90	F	1	15	Good	
	101-06	1	115	M	1	28	Good	
Pikeminnow	102-01	1	120	M	1	35	Good	
	102-02	1	115	M	1	32	Good	
	102-03	1	125	M	1	40	Good	
	102-04	1	130	M	1	45	Good	
	102-05	1	140	M	1	55	Good	

Note: Detailed table with multiple rows of data for various species and samples.

- **Fish Population Comparison Sites**

- **Upstream and Downstream Diversions Sites**
 - South Fork Long Canyon Diversion
 - North Fork Long Canyon Diversion
 - Duncan Creek Diversion
- **Upstream and Downstream of Reservoir Sites**
 - French Meadows Reservoir
 - Hell Hole Reservoir
- **Comparison River Sites Versus Peaking or Bypass Reach Sites**

13

- **Physical Comparability of River Comparison Sites**

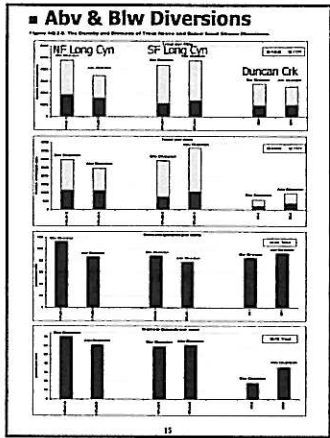
Table 102: Summary of Physical Comparability of River Comparison Sites

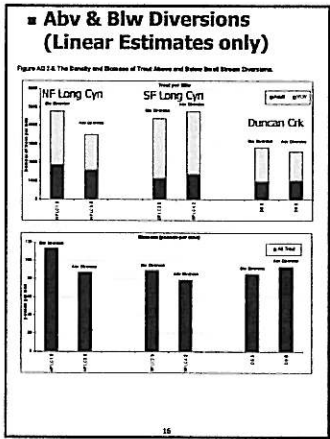
Wide Scale

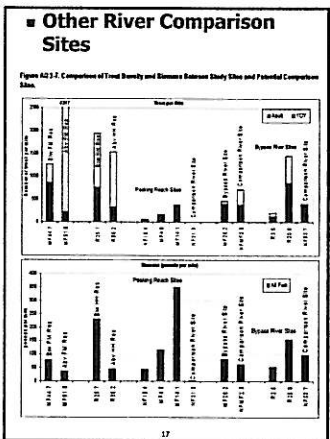
Site	Channel Width	Channel Depth	Flow Velocity	Substrate Composition	Bank Stability	Channel Gradient	Channel Obstructions
101-01	100m	2m	0.5 m/s	Gravel/Sand	Stable	1%	None
101-02	80m	1.5m	0.3 m/s	Silt/Clay	Unstable	2%	Small rocks
101-03	120m	3m	0.7 m/s	Gravel	Stable	1.5%	None
101-04	90m	2.5m	0.6 m/s	Sand/Gravel	Stable	1.8%	None
101-05	110m	2.8m	0.65 m/s	Gravel	Stable	1.6%	None
101-06	105m	2.6m	0.62 m/s	Gravel	Stable	1.7%	None

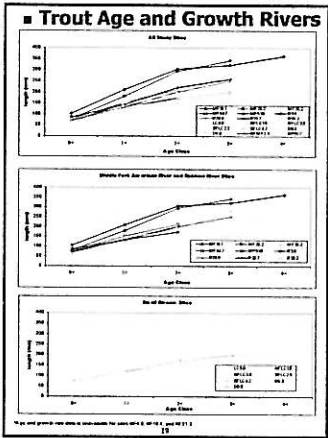
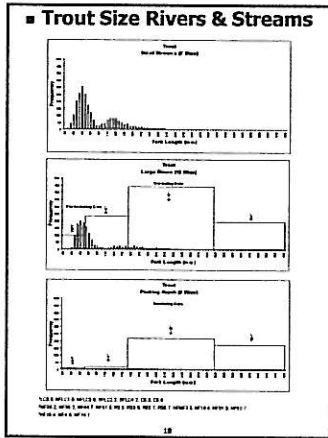
Note: Detailed table with multiple rows of data for various physical characteristics.

14









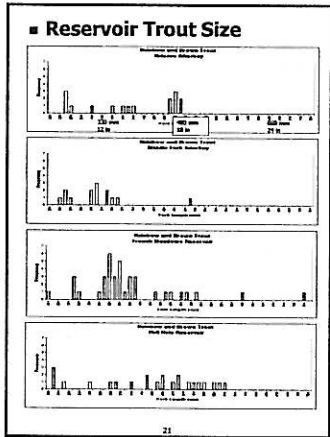
Trout Condition Factors in Rivers

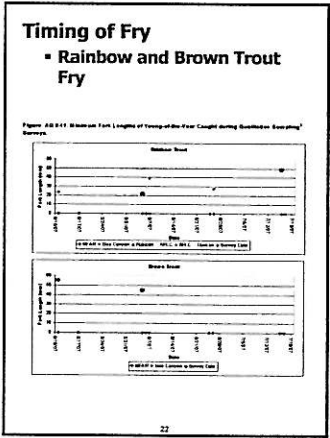
Table A3.8.1: Maximum Trout (MT) and Brown Trout (BT) Condition Factors

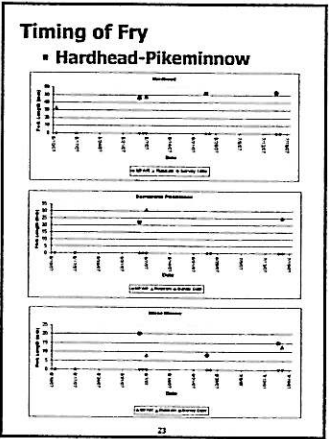
River Name and Site ID	MT		BT	
	Condition Factor	n	Condition Factor	n
Middle Park Anvils River (Intermediate to Section Adjacent)	-	96	-	96
Site #11	1.1	96	-	96
Middle Park Anvils River from Middle Park Reservoir to Section Adjacent	1.02	30	1.21	2
Site #12	-	-	-	-
Middle Park Anvils River upstream of Middle Park Reservoir	1.01	43	1.05	4
Site #13	1.00	3	1.07	13
Site #14	1.07	13	1.05	3
Middle Park	1.04	11	-	Not Observed
Site #15	1.03	60	1.16	4
Site #16	1.00	77	1.13	6
Site #17	1.00	30	0.98	1
Long Canyon Creek	1.10	17	-	Not Observed
Site #18	1.03	70	-	Not Observed
Site #19	1.04	143	-	Not Observed
South Park Long Canyon Creek	1.01	49	-	Not Observed
Site #20	1.11	25	-	Not Observed
Cameron Cr. r.	1.10	62	1.06	3
Site #21	1.17	63	1.05	15
North Park of the Middle Park Anvils River	1.08	22	-	Not Observed
Site #22	-	-	-	-
Site #23	-	-	-	-
Site #24	1.10	60	-	Not Observed
Site #25	1.10	60	-	Not Observed

n = number of fish, n = degree to which condition factor was observed.

20







Other Survey Results

- **Electrofishing Versus Snorkeling**
- **Small Stream Diversion Pool Sampling**
- **Species and Lifestage Periodicity**
- **Water Temperature**



24

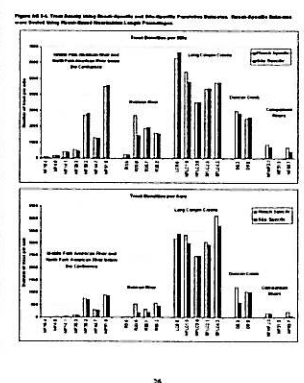
■ Species/Lifestage Periodicity

Table 65-1. Species and Life Stage Periodicity

Species	Month											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Brook Trout												
Smallmouth Bass												
Rock Bass												
White Bass												
Yellow Perch												
Spottail Shiner												
Bluegill												
Catfish												
Shiner												
Crayfish												
Dragonfly												
Bowfly												
Stonefly												
Amphibian												
Snake												
Beetle												
Worm												
Plant												
Fungus												
Algae												
Moss												
Lichen												
Other												

25

■ Reach-Specific Density



26
