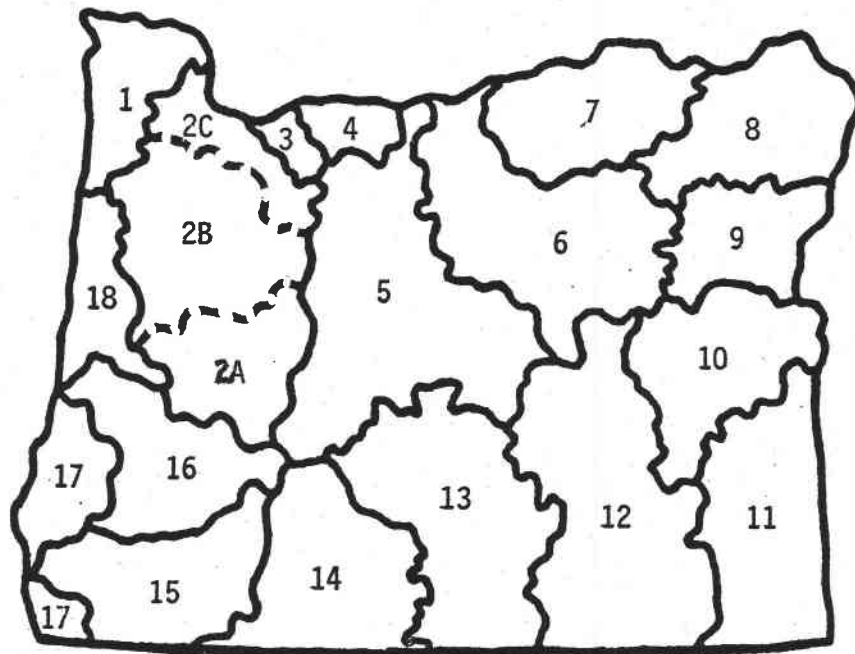


A RESOURCE SURVEY OF RIVER ENERGY
AND LOW-HEAD HYDROELECTRIC POWER POTENTIAL
IN OREGON

APPENDIX 10: MALHEUR BASIN



WATER RESOURCES RESEARCH INSTITUTE
Oregon State University
Corvallis, Oregon 97331

INDEX TO APPENDIX 10, MALHEUR BASIN

Drainage Basin Map 10-ii

Reach Hydro Potential Characteristics Sheets

Malheur River Main Stem Below

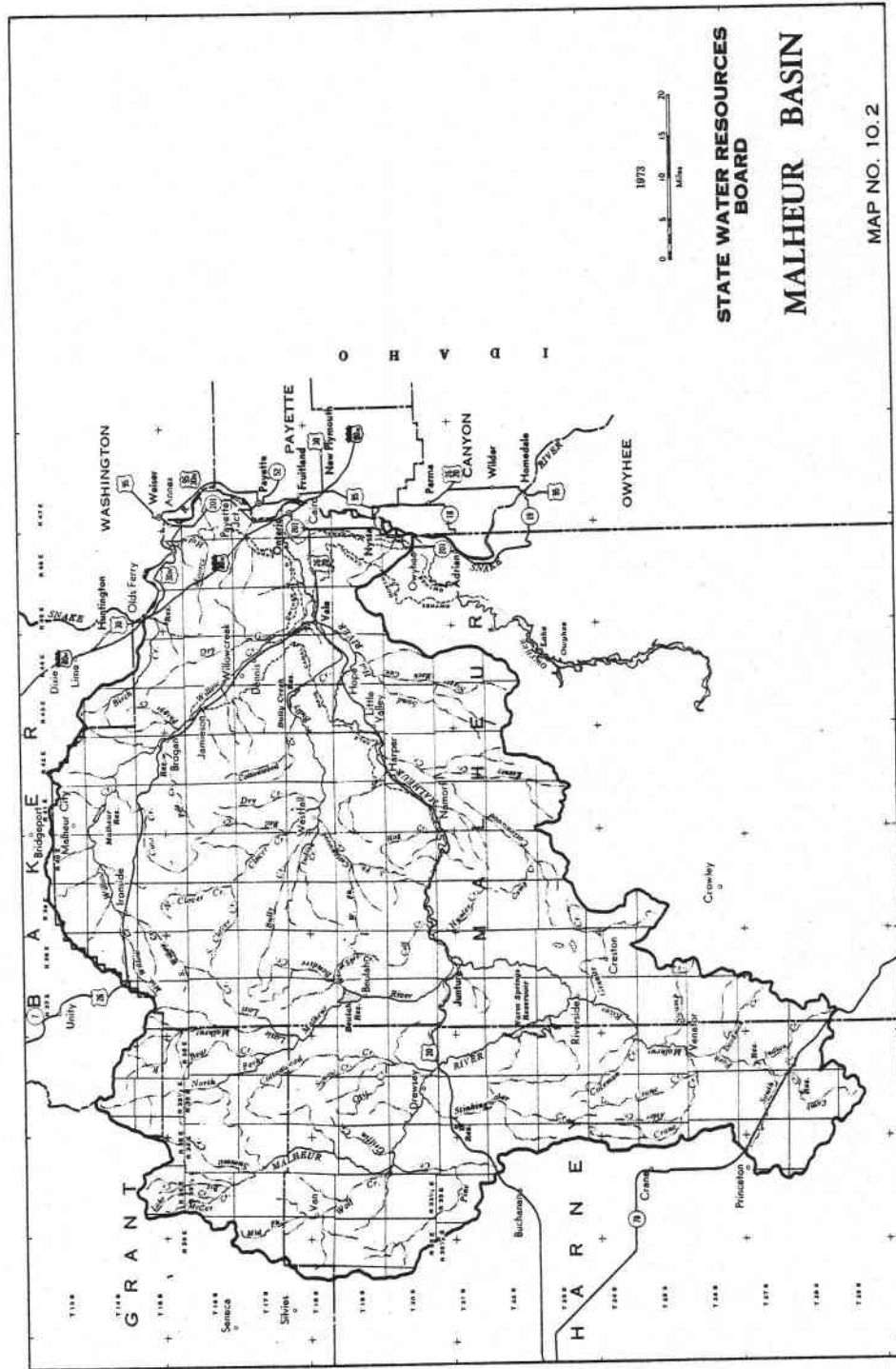
Warm Springs Dam 10- 1-9, 12-14

North Fork Malheur River 10-10 to 10-11

Malheur River Above Warm Springs

Reservoir 10-15 to 10-20

Reach Feasibility Analysis Sheets 10-21 to 10-22



REACH HYDRO POTENTIAL CHARACTERISTICS

REACH # 02-500-240-180-000-R0001

I. LOCATION

A. State	Oregon
B. County	Malheur
C. Township, Range	Sec. 16, T18S, R46E
D. Latitude, Longitude	44°00' N, 117°06' W
E. Stream Name	Malheur River
F. Major Basin Name	Malheur
G. River Mile	0.0 to 19.3

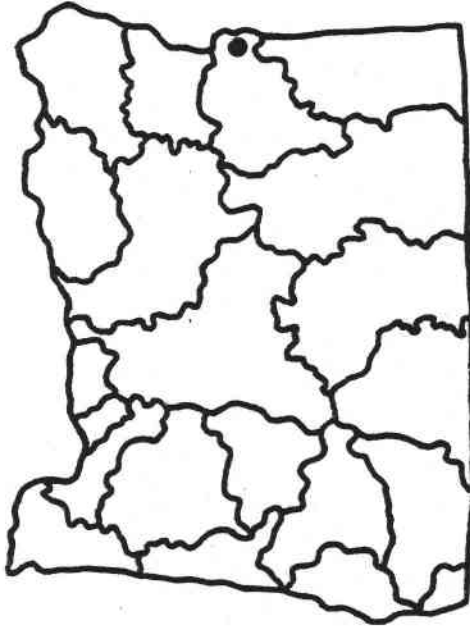
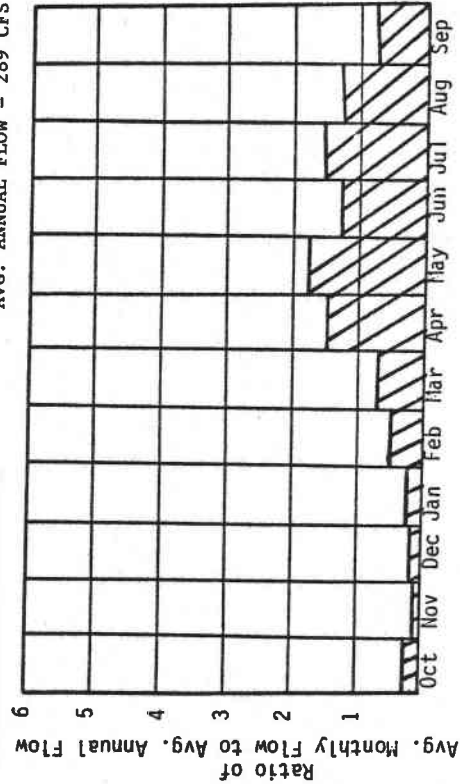
II. HYDROLOGIC AND HYDRAULIC CHARACTERISTICS

A. Upstream Elevation of Reach	2210	Ft. MSL
B. Downstream Elevation of Reach	2140	Ft. MSL
C. Total Available Head in Reach	70	Ft.
D. Average Slope in Reach	3.6	Ft./Mi.
E. Drainage Area above Reach Mouth	4999	Sq. Mi.
F. Inflow Classification	Regulated	

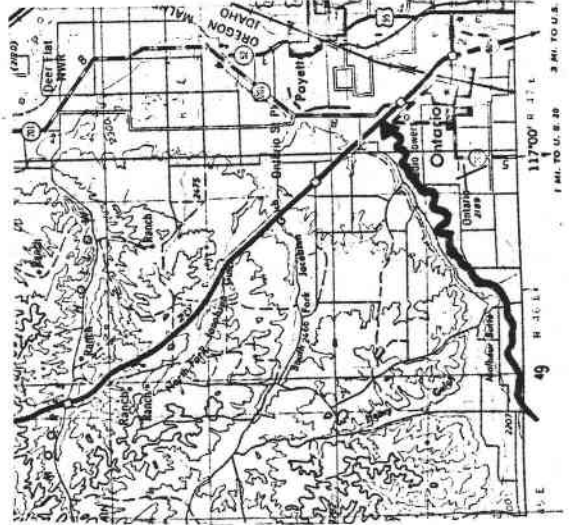
III. REACH FLOW DURATION AND THEORETICAL POTENTIAL ENERGY CHARACTERISTICS

I EXCEEDANCE I PERCENTAGE I	I DISCHARGE I CFS I	I THEORETICAL I PLANT SIZE I MW I	I ANNUAL ENERGY I AVAILABLE I GWH I	I PLANT I FACTOR I
I 95 I	I 33.5 I	I .20 I	I 1.74 I	I 1.000 I
I 80 I	I 65.6 I	I .39 I	I 3.20 I	I .939 I
I 50 I	I 145.8 I	I .87 I	I 5.91 I	I .780 I
I 30 I	I 244.9 I	I 1.45 I	I 7.97 I	I .626 I
I 10 I	I 437.5 I	I 2.60 I	I 9.97 I	I .439 I

IV. TYPICAL ANNUAL HYDROGRAPH



U.S.G.S. TOPO. SERIES
1:250,000 SCALE
MAP NAME: BAKER-BOISE



REACH HYDRO POTENTIAL CHARACTERISTICS

REACH # 02-500-240-180-000-R0002

I. LOCATION

A. State	Oregon
B. County	Malheur
C. Township, Range	Sec. 20, T8S, R45E
D. Latitude, Longitude	43° 59' N, 117° 14' W
E. Stream Name	Malheur River
F. Major Basin Name	Malheur
G. River Mile	19.3 to 20.3

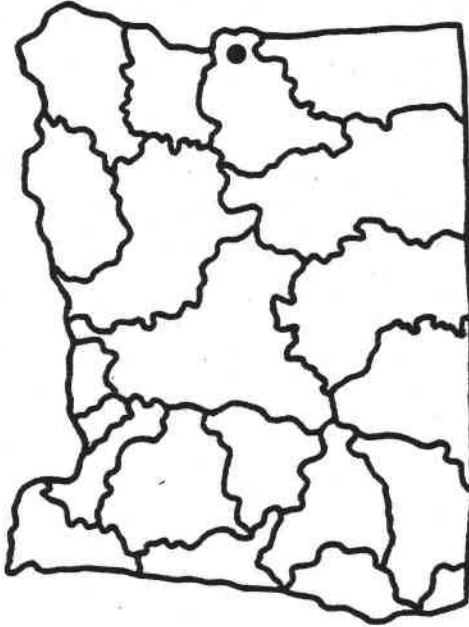
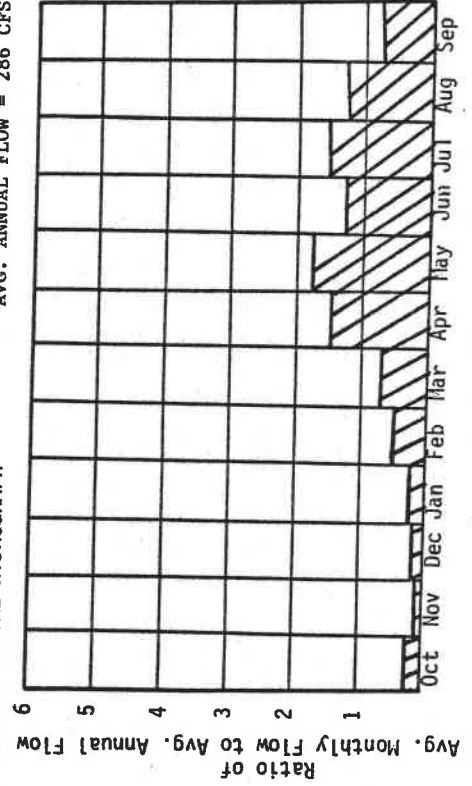
II. HYDROLOGIC AND HYDRAULIC CHARACTERISTICS

A. Upstream Elevation of Reach	2230	Ft. MSL
B. Downstream Elevation of Reach	2210	Ft. MSL
C. Total Available Head in Reach	20	Ft.
D. Average Slope in Reach	20	Ft./Mi.
E. Drainage Area above Reach Mouth	4951	Sq. Mi.
F. Inflow Classification	Regulated	

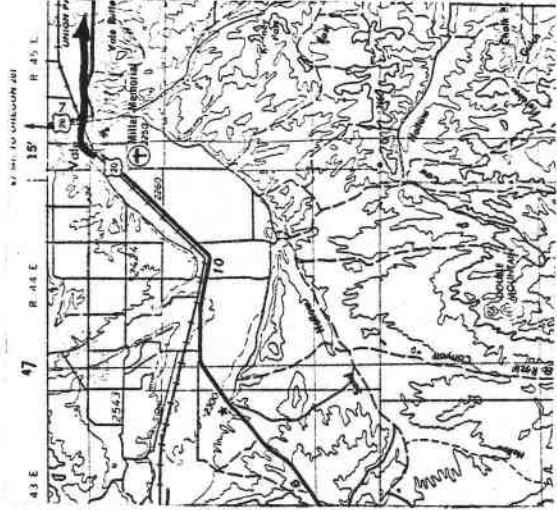
III. REACH FLOW DURATION AND THEORETICAL POTENTIAL ENERGY CHARACTERISTICS

I EXCEEDANCE I PERCENTAGE I I	I DISCHARGE I CFS I	I THEORETICAL I PLANT SIZE I MW I	I AVAILABLE I GWH I	I ANNUAL ENERGY I FACTOR I	I PLANT I I
I 95 I	I 33.2 I	I .06 I	I .49 I	I 1.000 I	I I
I 80 I	I 65.0 I	I .11 I	I .91 I	I .939 I	I I
I 50 I	I 144.6 I	I .25 I	I 1.67 I	I .780 I	I I
I 30 I	I 242.8 I	I .41 I	I 2.26 I	I .626 I	I I
I 10 I	I 433.9 I	I .74 I	I 2.83 I	I .439 I	I I

IV. TYPICAL ANNUAL HYDROGRAPH



U.S.G.S. TOPO. SERIES
1:250,000 SCALE
MAP NAME: BOISE



REACH HYDRO POTENTIAL CHARACTERISTICS

REACH # 02-500-240-180-000-R0003

I. LOCATION

A. State	Oregon
B. County	Malheur
C. Township, Range	Sec. 6, T19S, R44E
D. Latitude, Longitude	43°46'N, 117°16'W
E. Stream Name	Malheur River
F. Major Basin Name	Malheur
G. River Mile	20.3 to 28.8

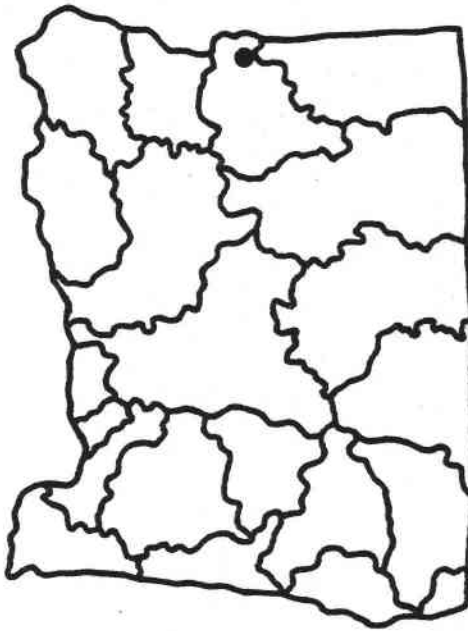
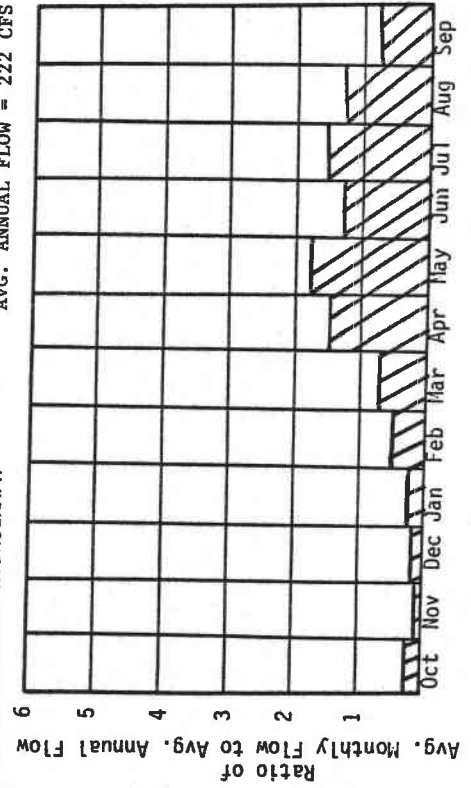
II. HYDROLOGIC AND HYDRAULIC CHARACTERISTICS

A. Upstream Elevation of Reach	2270	Ft. MSL
B. Downstream Elevation of Reach	2230	Ft. MSL
C. Total Available Head in Reach	40	Ft.
D. Average Slope in Reach	4.7	Ft./Mi.
E. Drainage Area above Reach Mouth	4082	Sq. Mi.
F. Inflow Classification	Regulated	

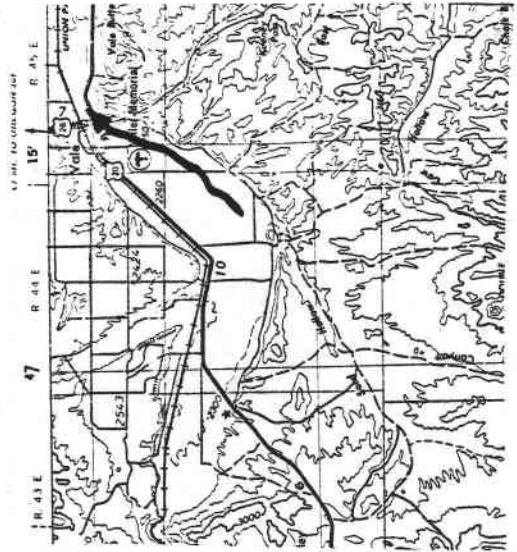
III. REACH FLOW DURATION AND THEORETICAL POTENTIAL ENERGY CHARACTERISTICS

I EXCEEDANCE I PERCENTAGE I	I DISCHARGE I CFS I	I THEORETICAL I PLANT SIZE I MW I	I ANNUAL ENERGY I AVAILABLE I GMWH I	I PLANT I FACTOR I
I 95 I	I 25.8 I	I .09 I	I .76 I	I 1.000 I
I 80 I	I 50.4 I	I .17 I	I 1.41 I	I .939 I
I 50 I	I 112.1 I	I .38 I	I 2.60 I	I .780 I
I 30 I	I 188.3 I	I .64 I	I 3.50 I	I .626 I
I 10 I	I 336.4 I	I 1.14 I	I 4.38 I	I .439 I

IV. TYPICAL ANNUAL HYDROGRAPH



U.S.G.S. TOPO. SERIES
1:250,000 SCALE
MAP NAME: BOISE



REACH HYDRO POTENTIAL CHARACTERISTICS

REACH # 02-500-240-180-000-R0004

I. LOCATION

A. State	Oregon
B. County	Malheur
C. Township, Range	Sec. 6, T19S, R44E
D. Latitude, Longitude	43°56'N, 117°23'W
E. Stream Name	Malheur River
F. Major Basin Name	Malheur
G. River Mile	28.8 to 40.0

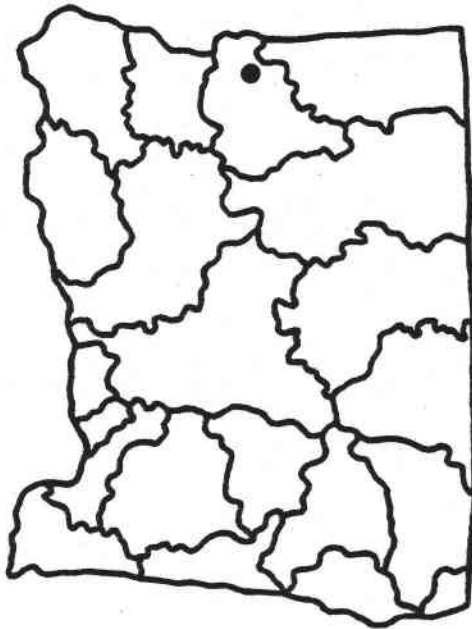
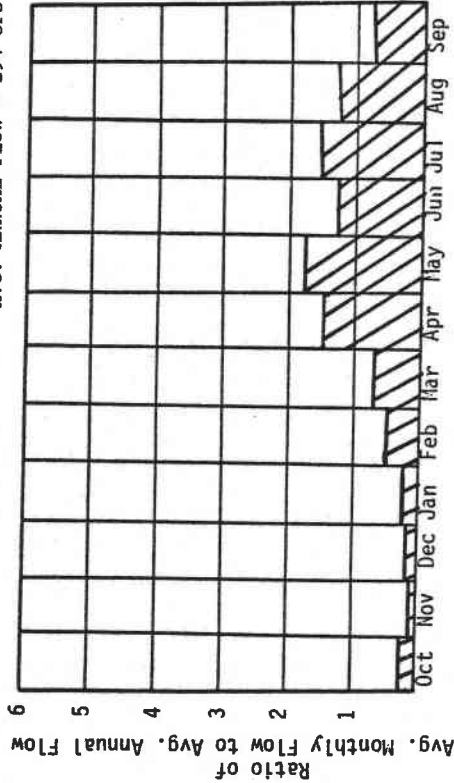
II. HYDROLOGIC AND HYDRAULIC CHARACTERISTICS

A. Upstream Elevation of Reach	2340	Ft. MSL
B. Downstream Elevation of Reach	2270	Ft. MSL
C. Total Available Head in Reach	70	Ft.
D. Average Slope in Reach	6.2	Ft./Mi.
E. Drainage Area above Reach Mouth	3358	Sq. Mi.
F. Inflow Classification	Regulated	

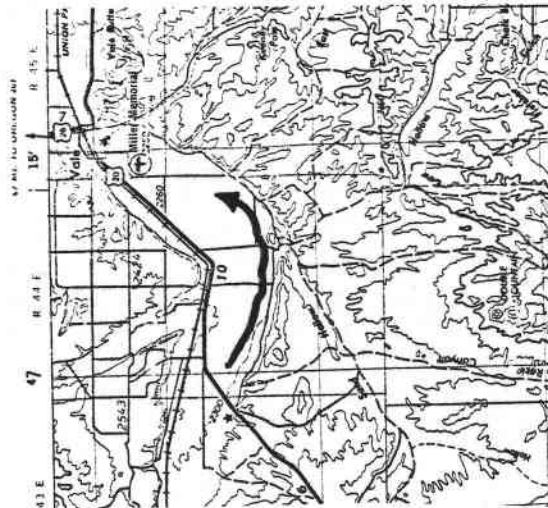
III. REACH FLOW DURATION AND THEORETICAL POTENTIAL ENERGY CHARACTERISTICS

I EXCEEDANCE I PERCENTAGE I	I DISCHARGE I CFS I	I THEORETICAL I PLANT SIZE I MW I	I ANNUAL ENERGY I AVAILABLE I GWH I	I PLANT I FACTOR I
I 95 I	I 22.5 I	I .13 I	I 1.17 I	I 1.000 I
I 80 I	I 43.9 I	I .26 I	I 2.14 I	I .939 I
I 50 I	I 97.7 I	I .58 I	I 3.96 I	I .780 I
I 30 I	I 164.1 I	I .97 I	I 5.34 I	I .626 I
I 10 I	I 293.2 I	I 1.74 I	I 6.68 I	I .439 I

IV. TYPICAL ANNUAL HYDROGRAPH



U.S.G.S. TOPO. SERIES
1:250,000 SCALE
MAP NAME: BOISE



REACH HYDRO POTENTIAL CHARACTERISTICS

REACH # 02-500-240-180-000-R0005

I. LOCATION

A. State	Oregon
B. County	Malheur
C. Township, Range	Sec. 18, T19S, R43E
D. Latitude, Longitude	43°53'N, 117°29'W
E. Stream Name	Malheur River
F. Major Basin Name	Malheur
G. River Mile	40.0 to 53.4

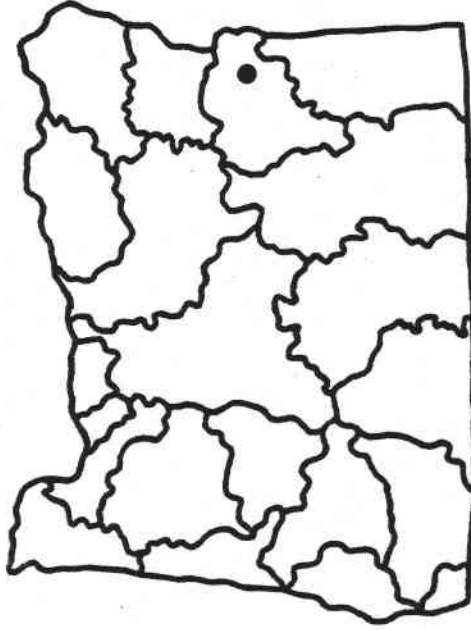
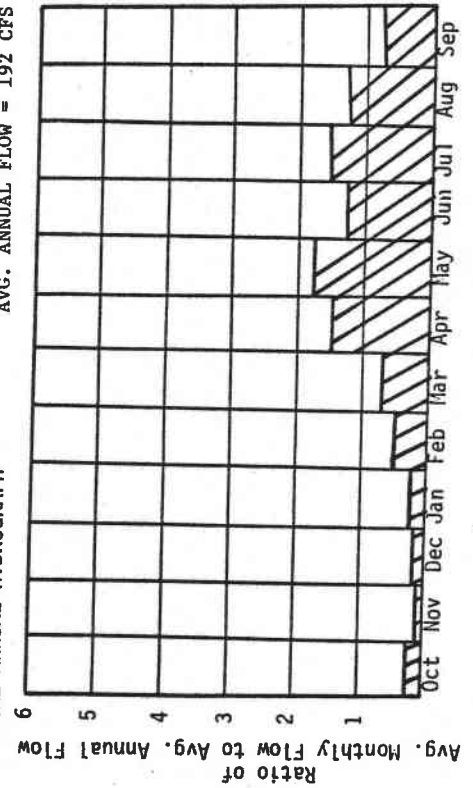
II. HYDROLOGIC AND HYDRAULIC CHARACTERISTICS

A. Upstream Elevation of Reach	2480	Ft. MSL
B. Downstream Elevation of Reach	2340	Ft. MSL
C. Total Available Head in Reach	140	Ft.
D. Average Slope in Reach	10.4	Ft./Mi.
E. Drainage Area above Reach Mouth	3332	Sq. Mi.
F. Inflow Classification	Regulated	

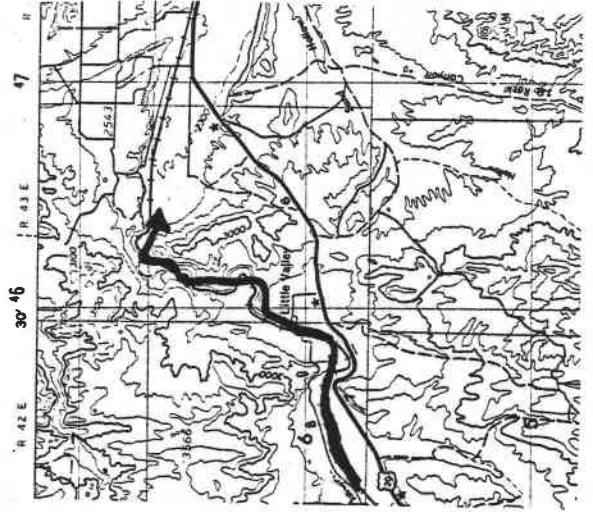
III. REACH FLOW DURATION AND THEORETICAL POTENTIAL ENERGY CHARACTERISTICS

I EXCEEDANCE I PERCENTAGE	I DISCHARGE I CFS	I THEORETICAL I PLANT SIZE I MW	I ANNUAL ENERGY I AVAILABLE I GWH	I PLANT I FACTOR
I 95	I 22.3	I .26	I 2.31	I 1.000
I 80	I 43.6	I .52	I 4.25	I .939
I 50	I 96.9	I 1.15	I 7.85	I .780
I 30	I 162.7	I 1.93	I 10.59	I .626
I 10	I 290.7	I 3.45	I 13.25	I .439

IV. TYPICAL ANNUAL HYDROGRAPH



U.S.G.S. TOPO. SERIES
1:250,000 SCALE
MAP NAME: BOISE



REACH HYDRO POTENTIAL CHARACTERISTICS

REACH # 02-500-240-180-000-R0006

I. LOCATION

A. State	Oregon
B. County	Malheur
C. Township, Range	Sec. 12, T20S, R4E
D. Latitude, Longitude	43° 50' N, 117° 39' W
E. Stream Name	Malheur River
F. Major Basin Name	Malheur
G. River Mile	53.4 to 64.8

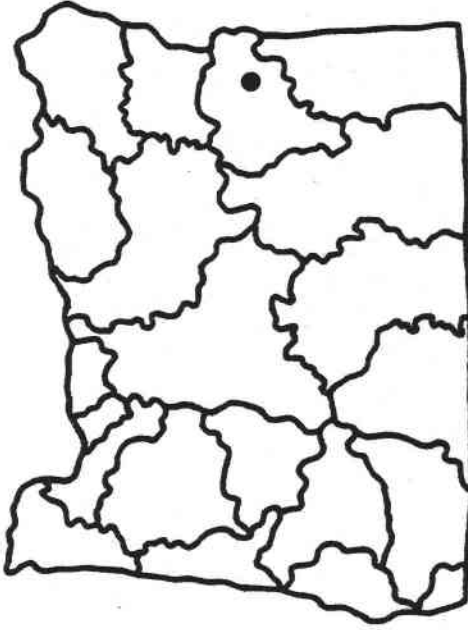
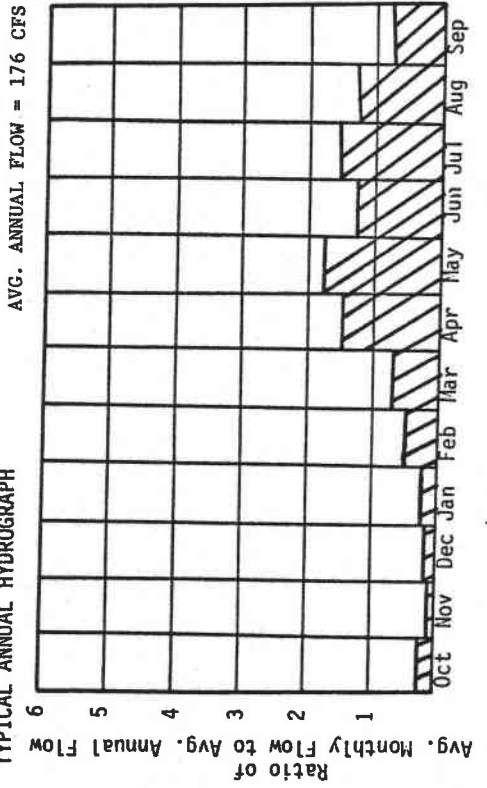
II. HYDROLOGIC AND HYDRAULIC CHARACTERISTICS

A. Upstream Elevation of Reach	2590	Ft. MSL
B. Downstream Elevation of Reach	2480	Ft. MSL
C. Total Available Head in Reach	110	Ft.
D. Average Slope in Reach	9.6	Ft./Mi.
E. Drainage Area above Reach Mouth	3052	Sq. Mi.
F. Inflow Classification	Regulated	

III. REACH FLOW DURATION AND THEORETICAL POTENTIAL ENERGY CHARACTERISTICS

I EXCEEDANCE I PERCENTAGE I	I DISCHARGE I CFS I	I THEORETICAL I PLANT SIZE I MW I	I ANNUAL ENERGY I AVAILABLE I GWH I	I PLANT I FACTOR I
I 95 I	I 20.4 I	I .19 I	I 1.66 I	I 1.000 I
I 80 I	I 39.8 I	I .37 I	I 3.06 I	I .939 I
I 50 I	I 88.6 I	I .83 I	I 5.65 I	I .780 I
I 30 I	I 148.9 I	I 1.39 I	I 7.61 I	I .626 I
I 10 I	I 265.9 I	I 2.48 I	I 9.52 I	I .439 I

IV. TYPICAL ANNUAL HYDROGRAPH



U.S.G.S. TOPO. SERIES
1:250,000 SCALE
MAP NAME: BOISE

