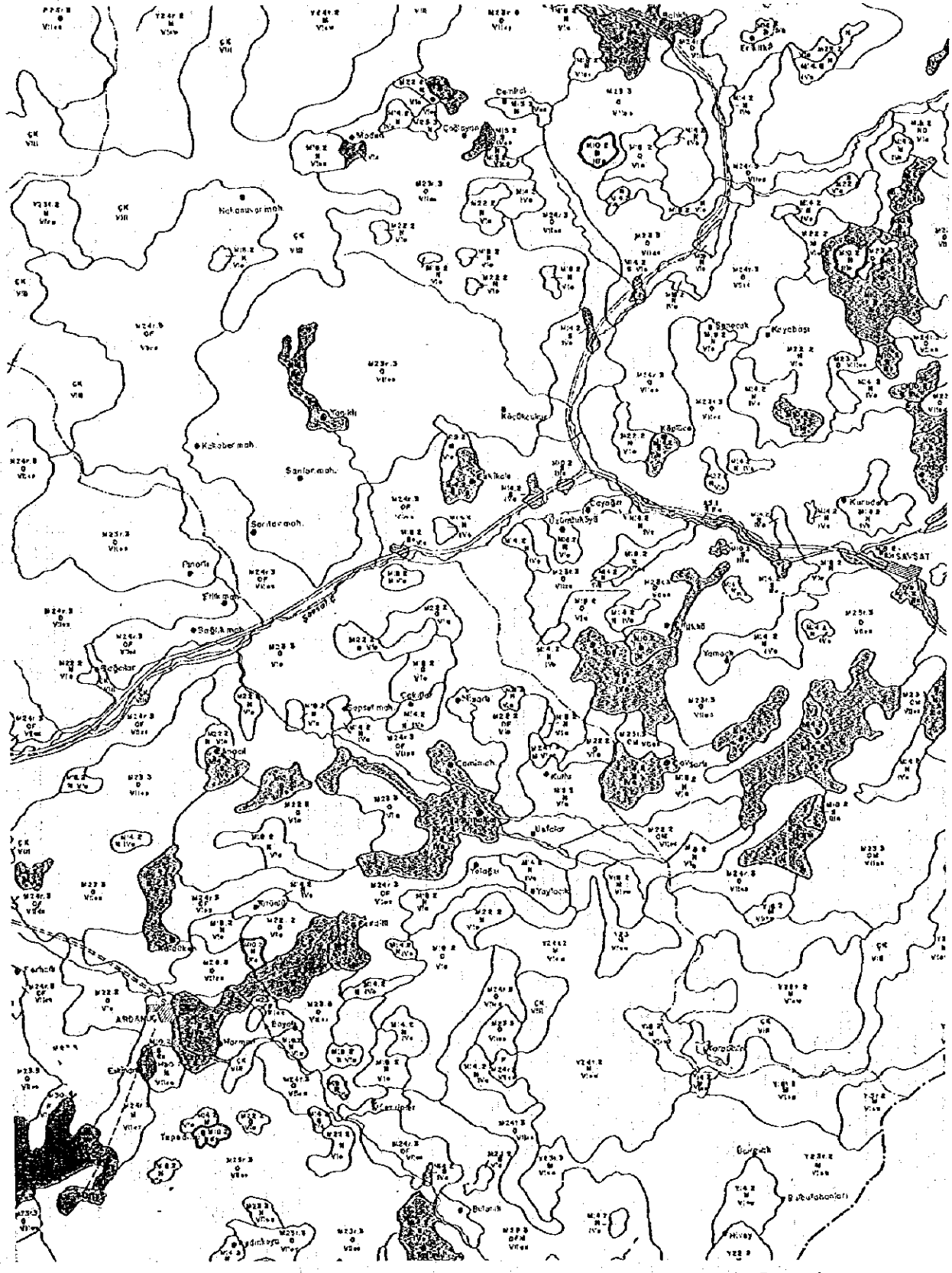
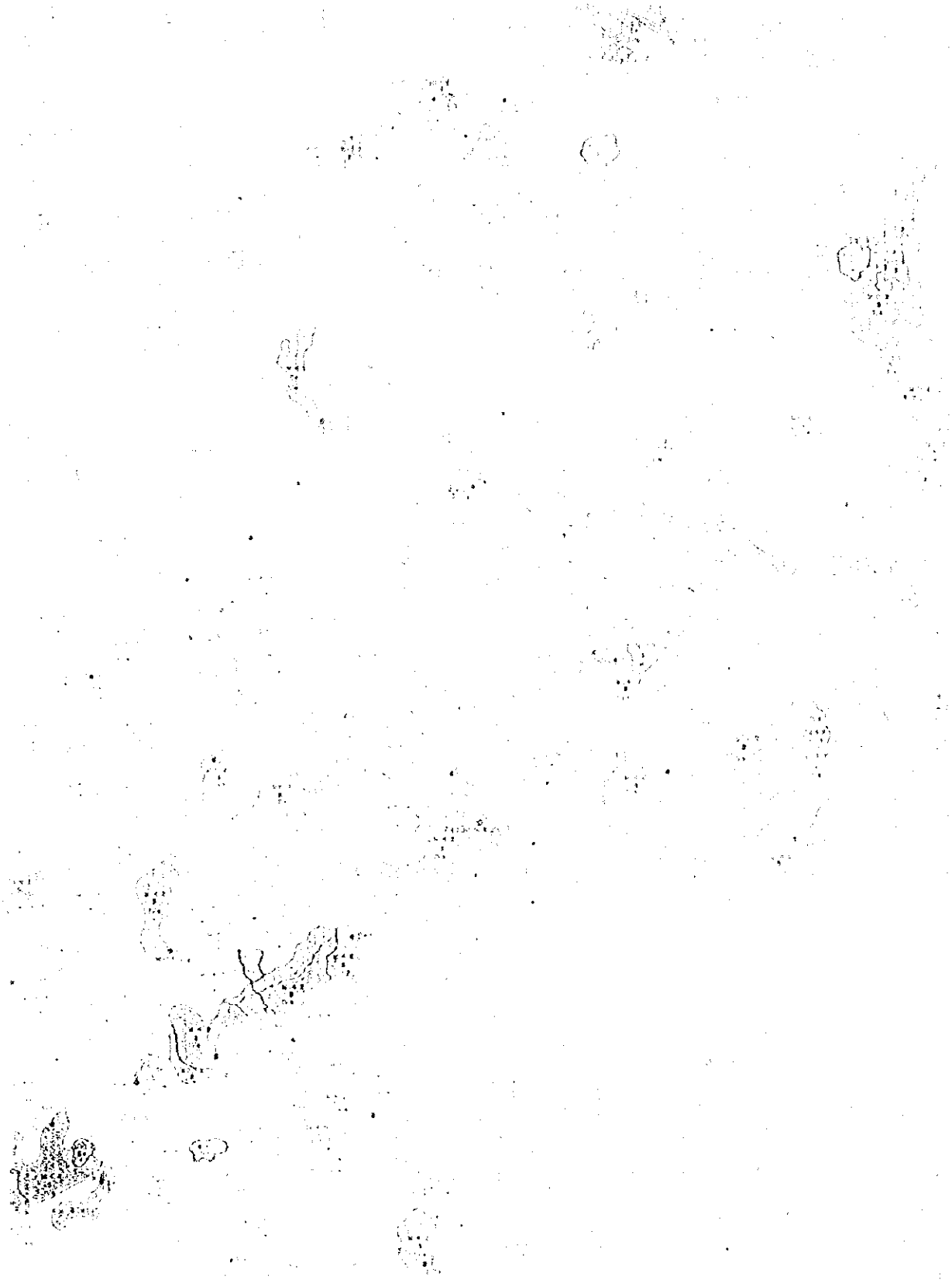


Figure 13-5 Soil Distribution



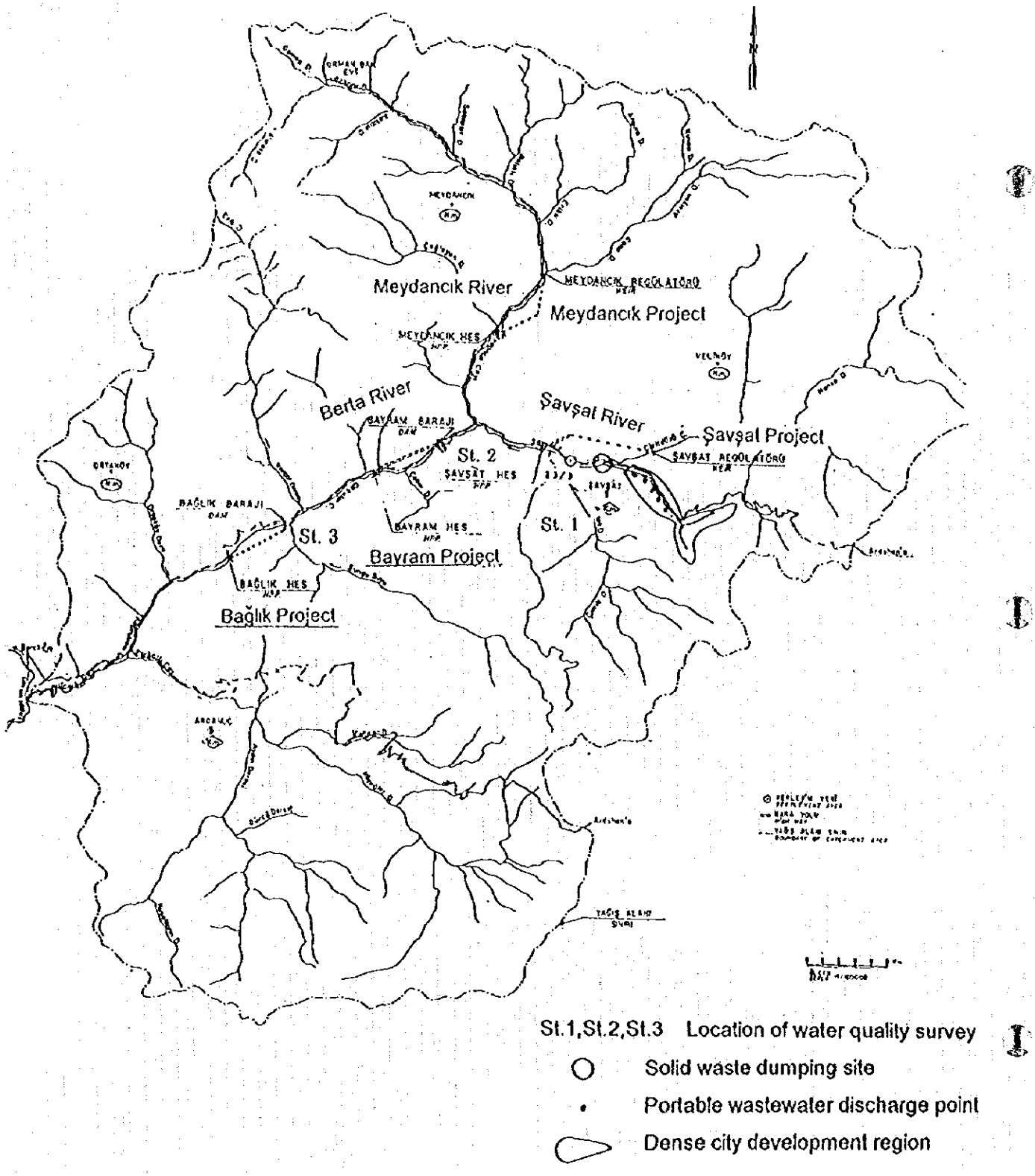


Figure 13-6 River Water Utilization Plan of Berta River System and Pollution Sources

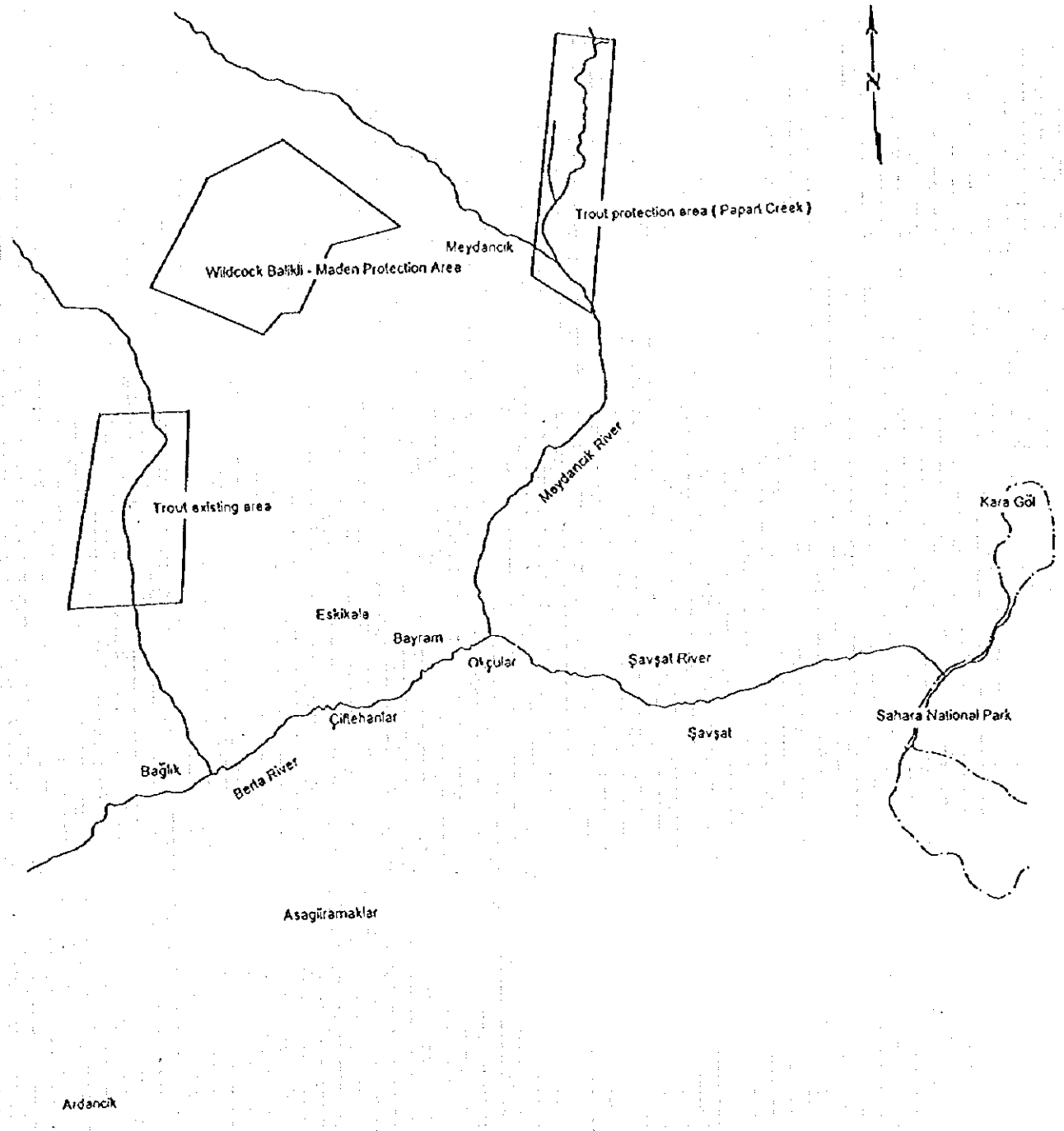


Figure 13-7 Location of Trout Existing Area and Protection Area

(To be continued)

Legend

——— : Highly destroyed coppice forest area

—·— :Agricultural,Treeless land

– – – – : Quercus cocelfera,Picea sp.,Abies sp. coppice forest

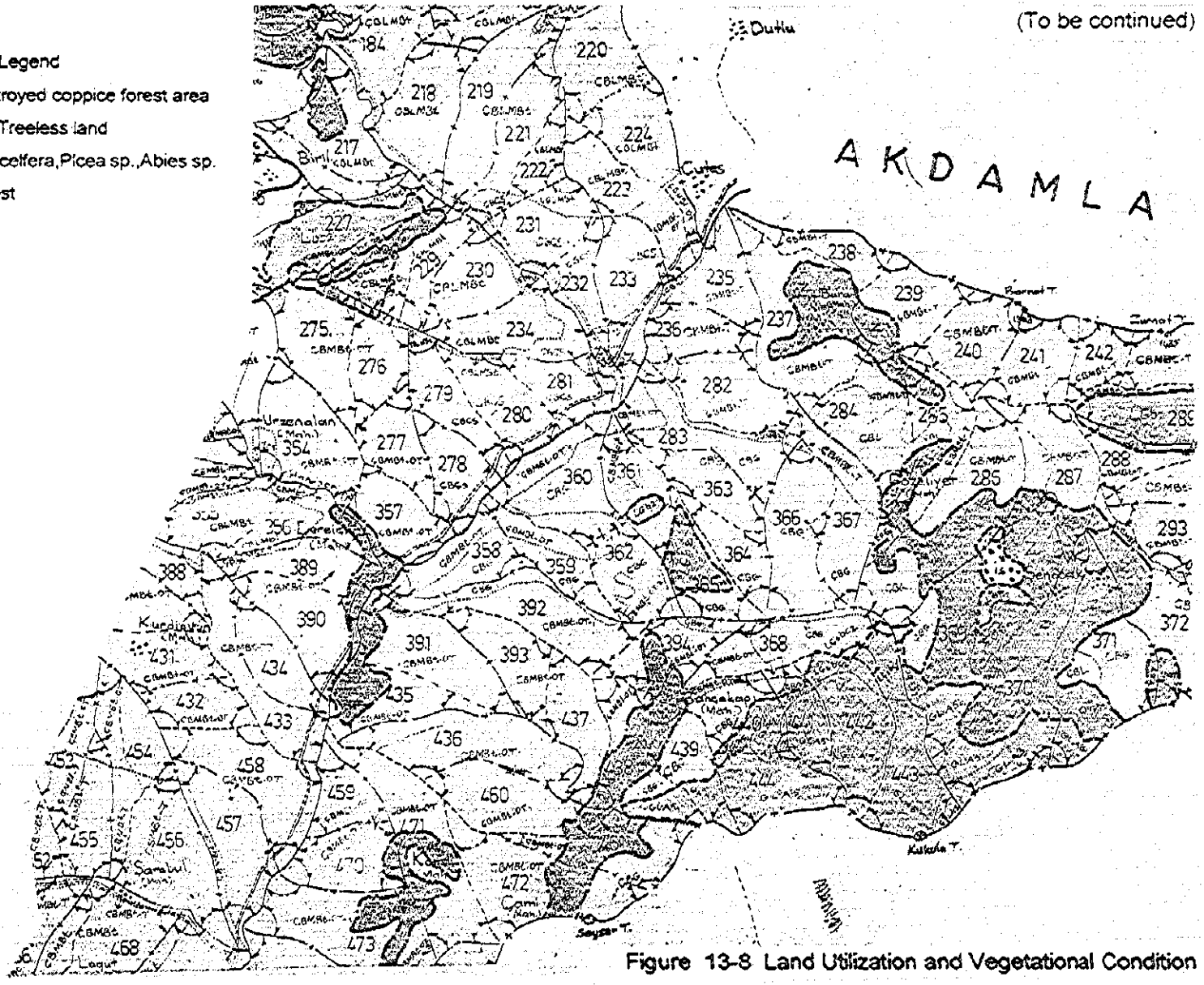


Figure 13-8 Land Utilization and Vegetational Condition

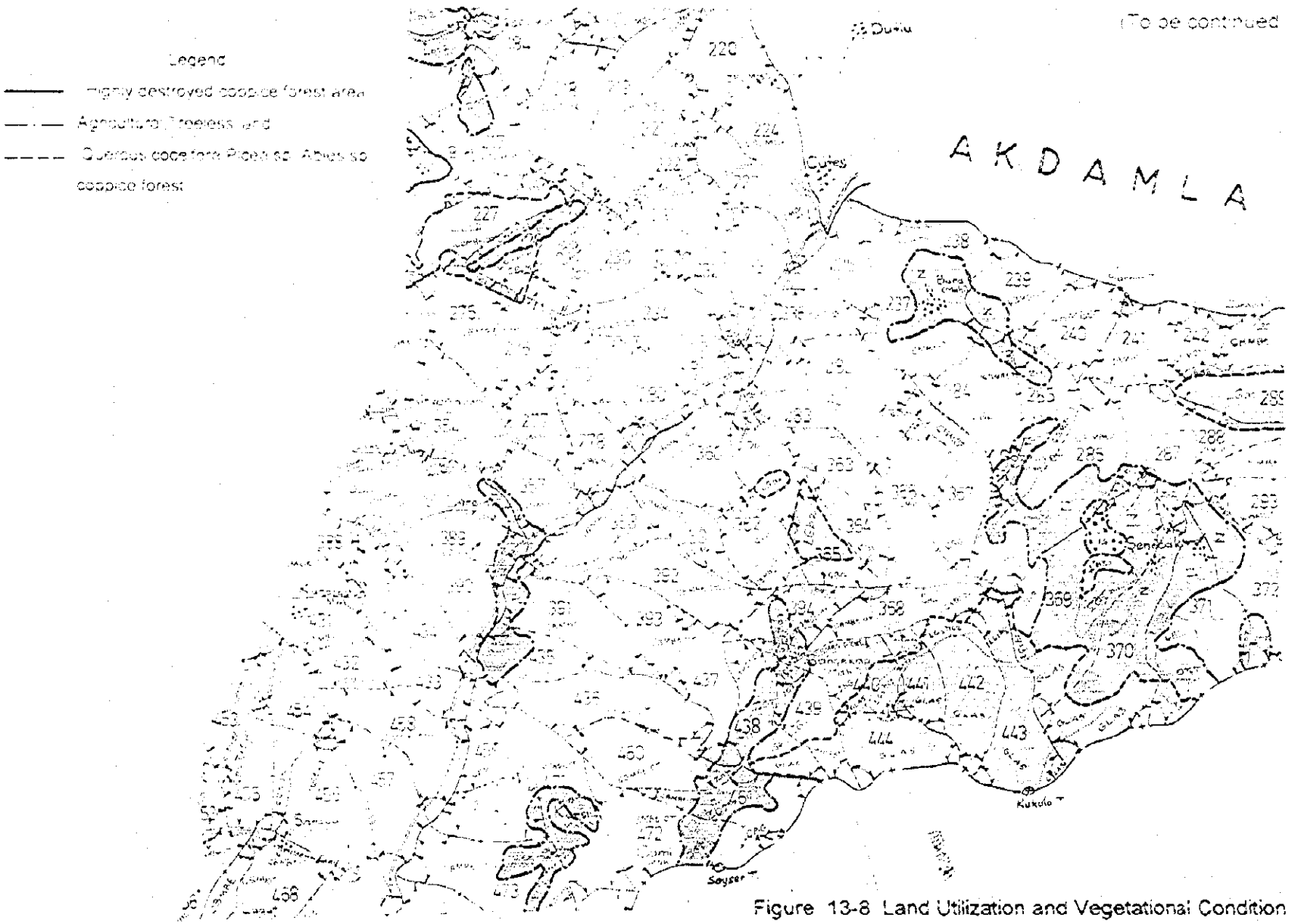


Figure 13-8 Land Utilization and Vegetational Condition

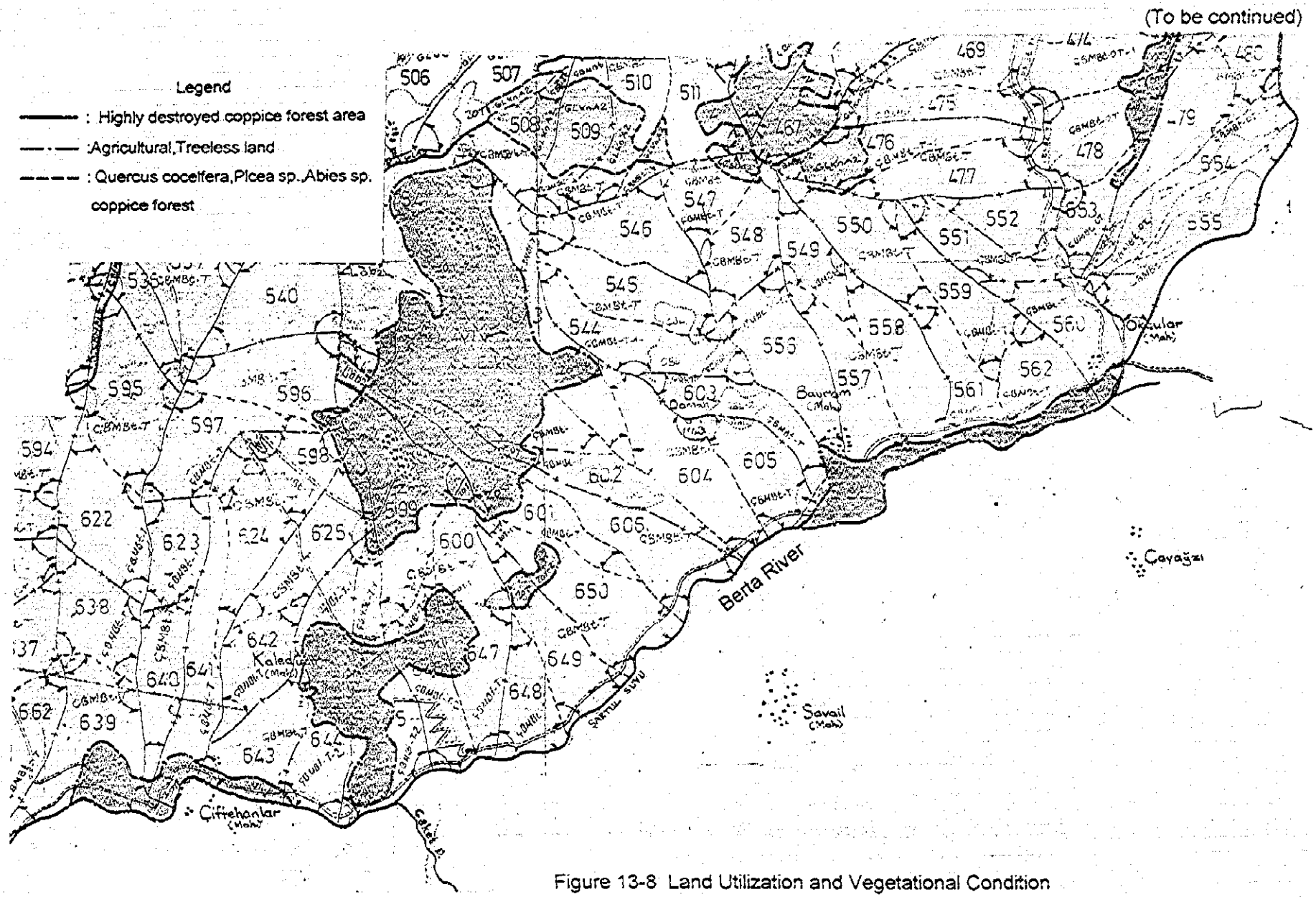


Figure 13-8 Land Utilization and Vegetational Condition

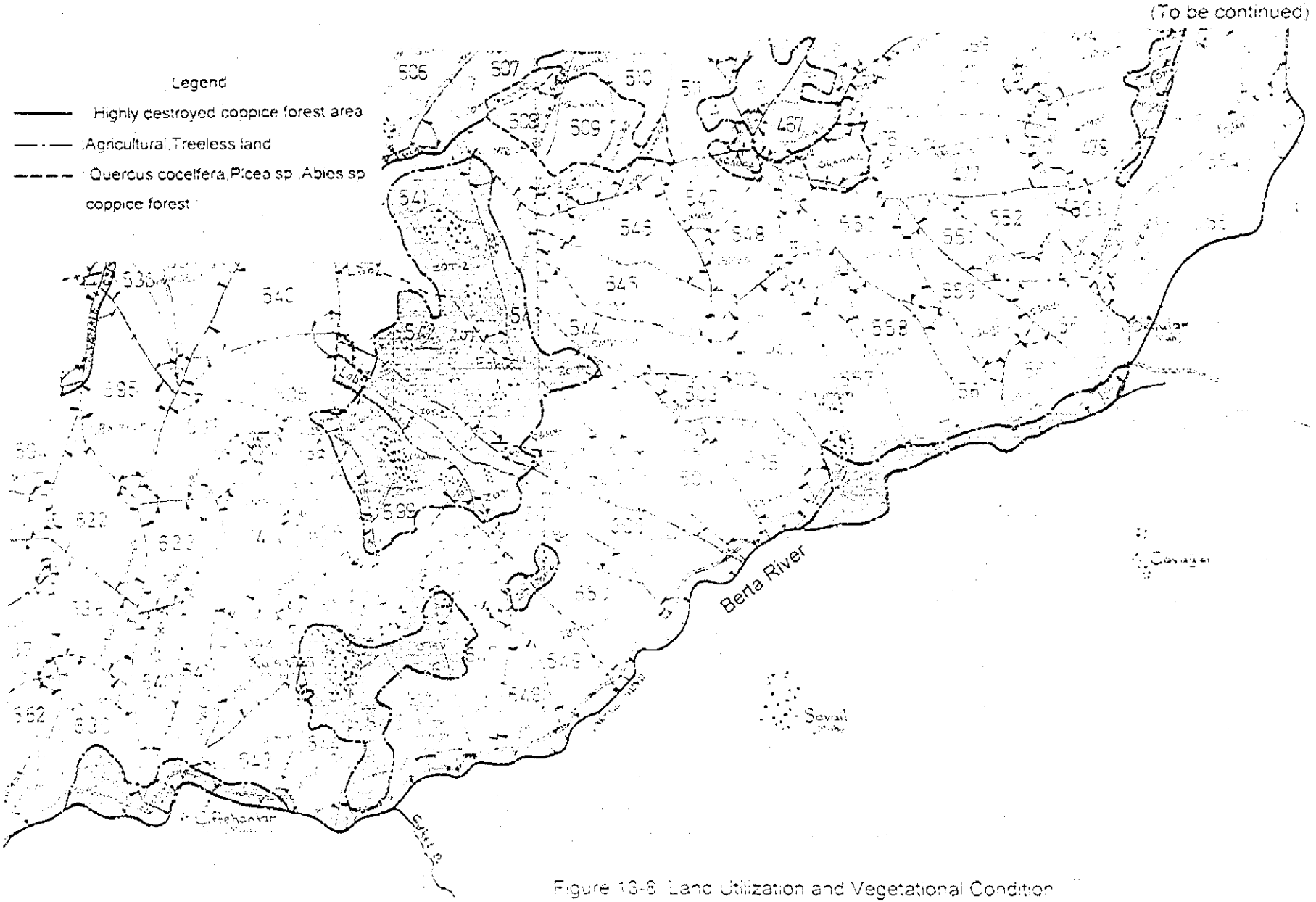


Figure 13-8 Land Utilization and Vegetational Condition

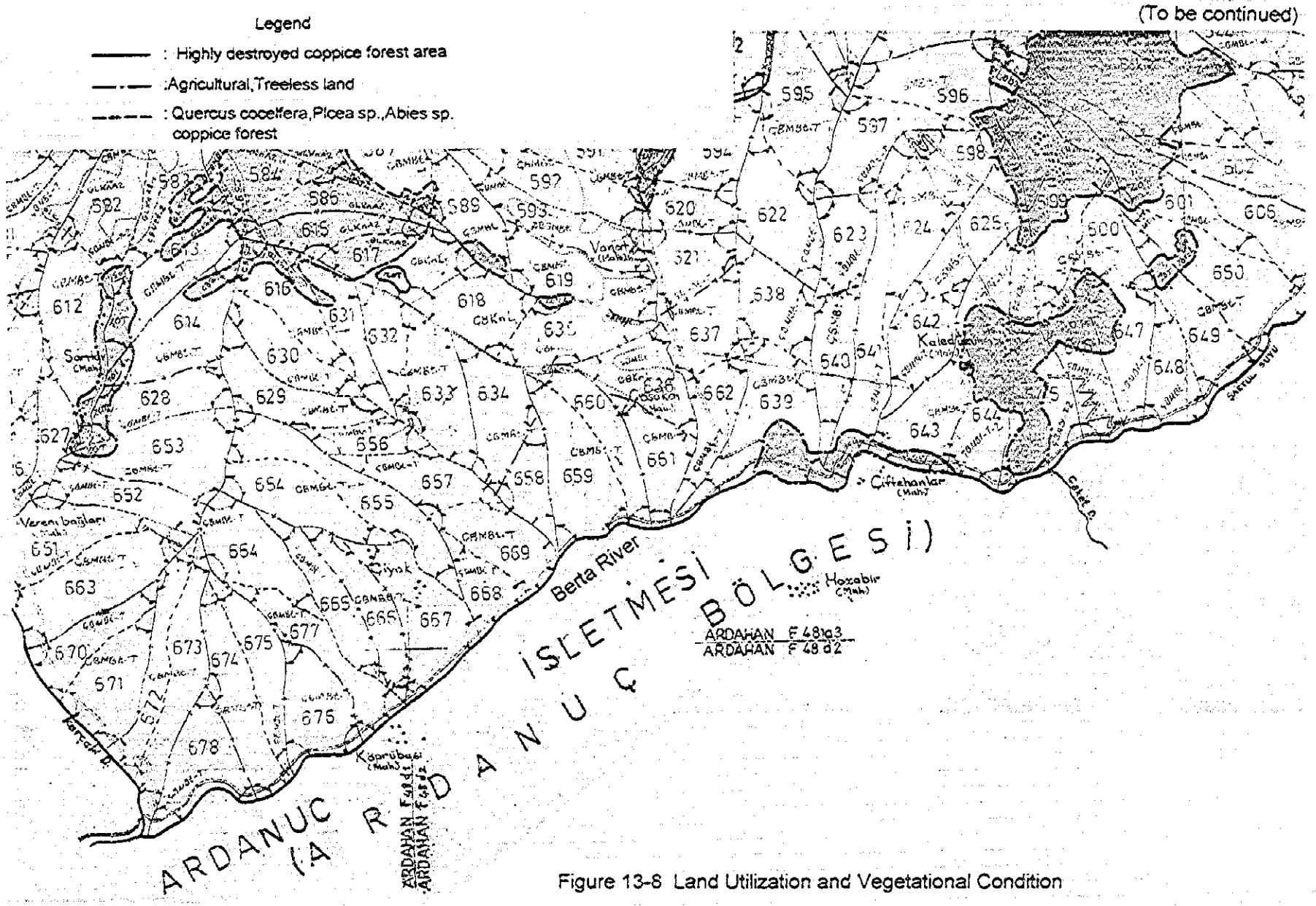


Figure 13-8 Land Utilization and Vegetational Condition

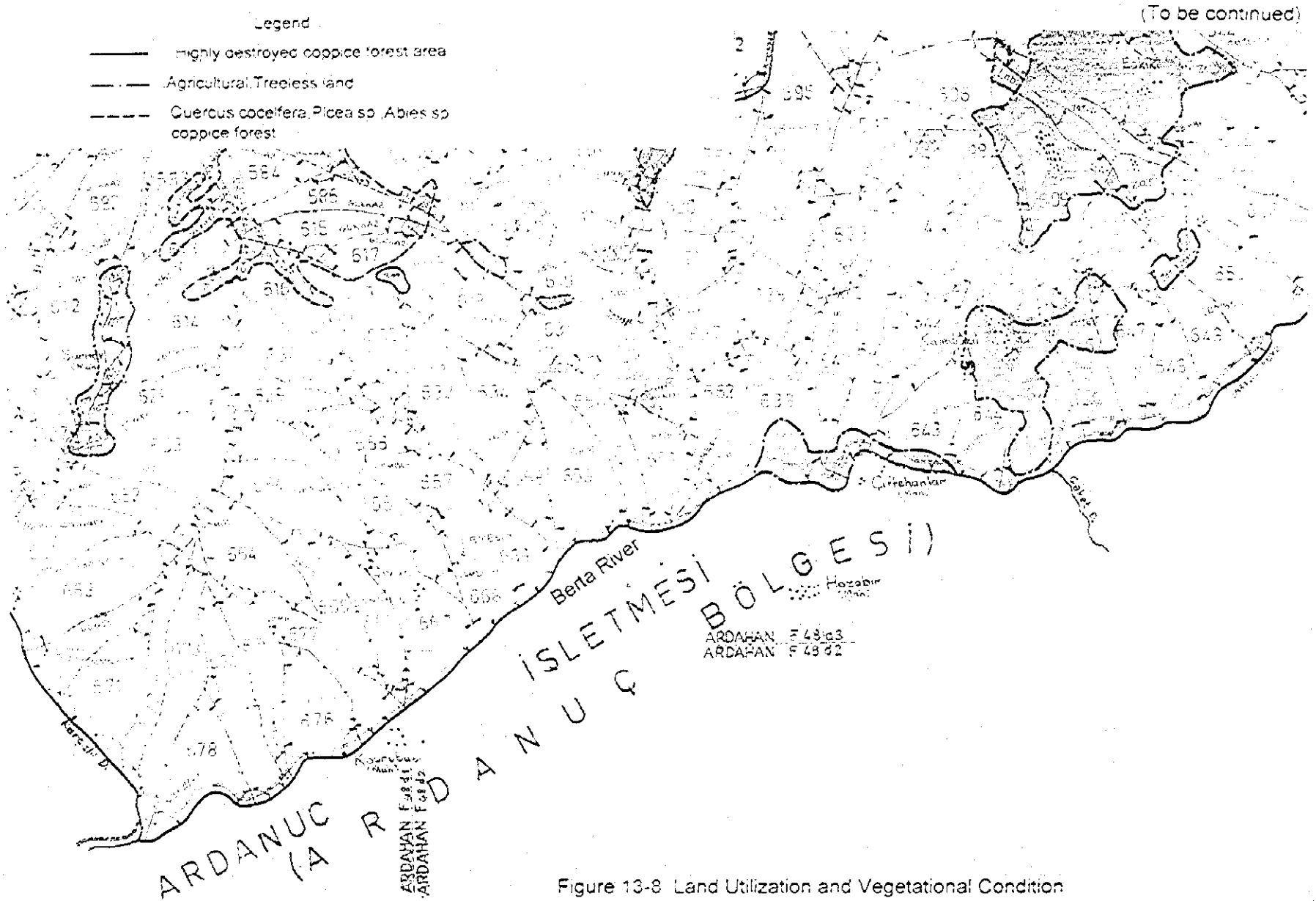


Figure 13-8 Land Utilization and Vegetational Condition

(To be continued)

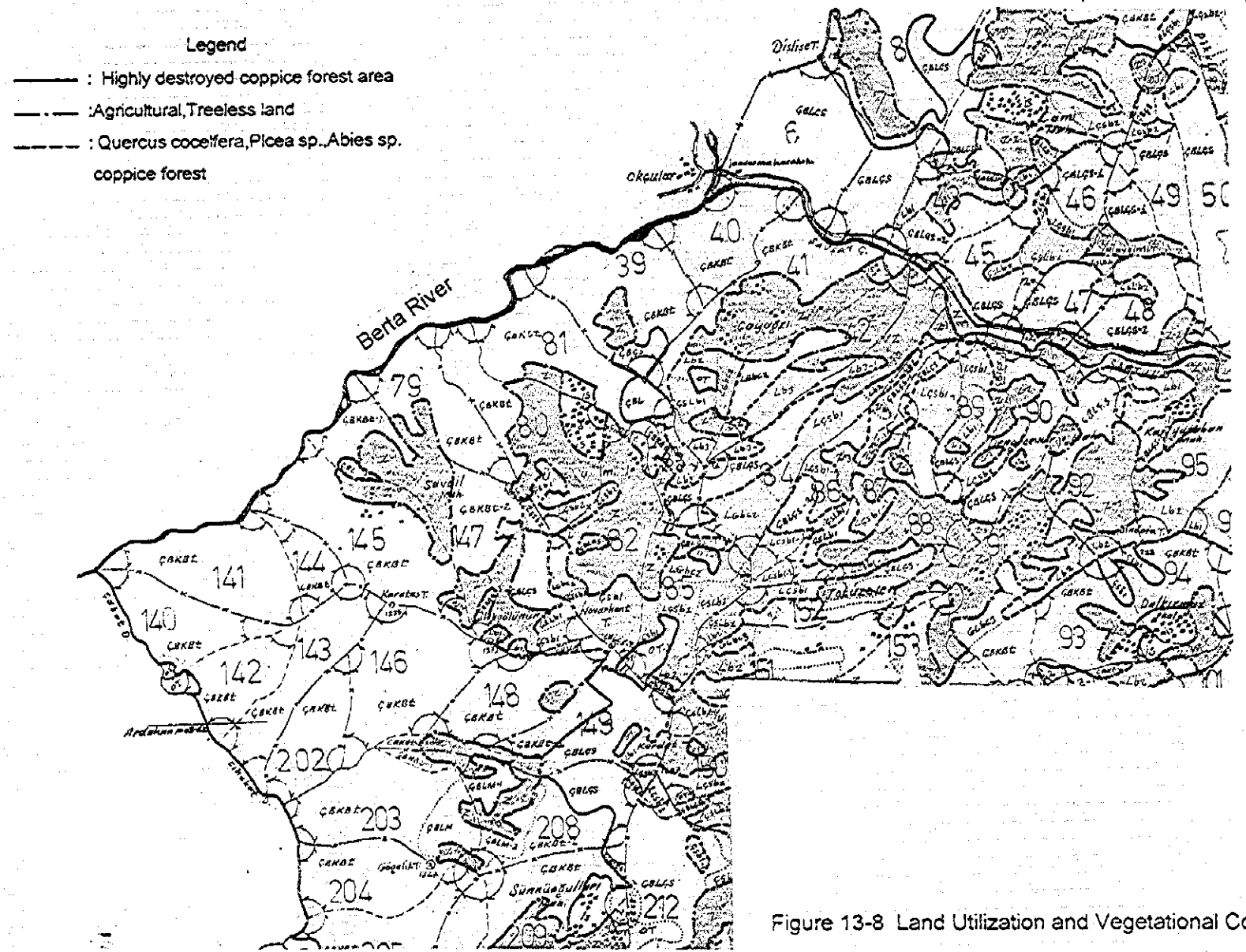


Figure 13-8 Land Utilization and Vegetational Condition

(To be continued)

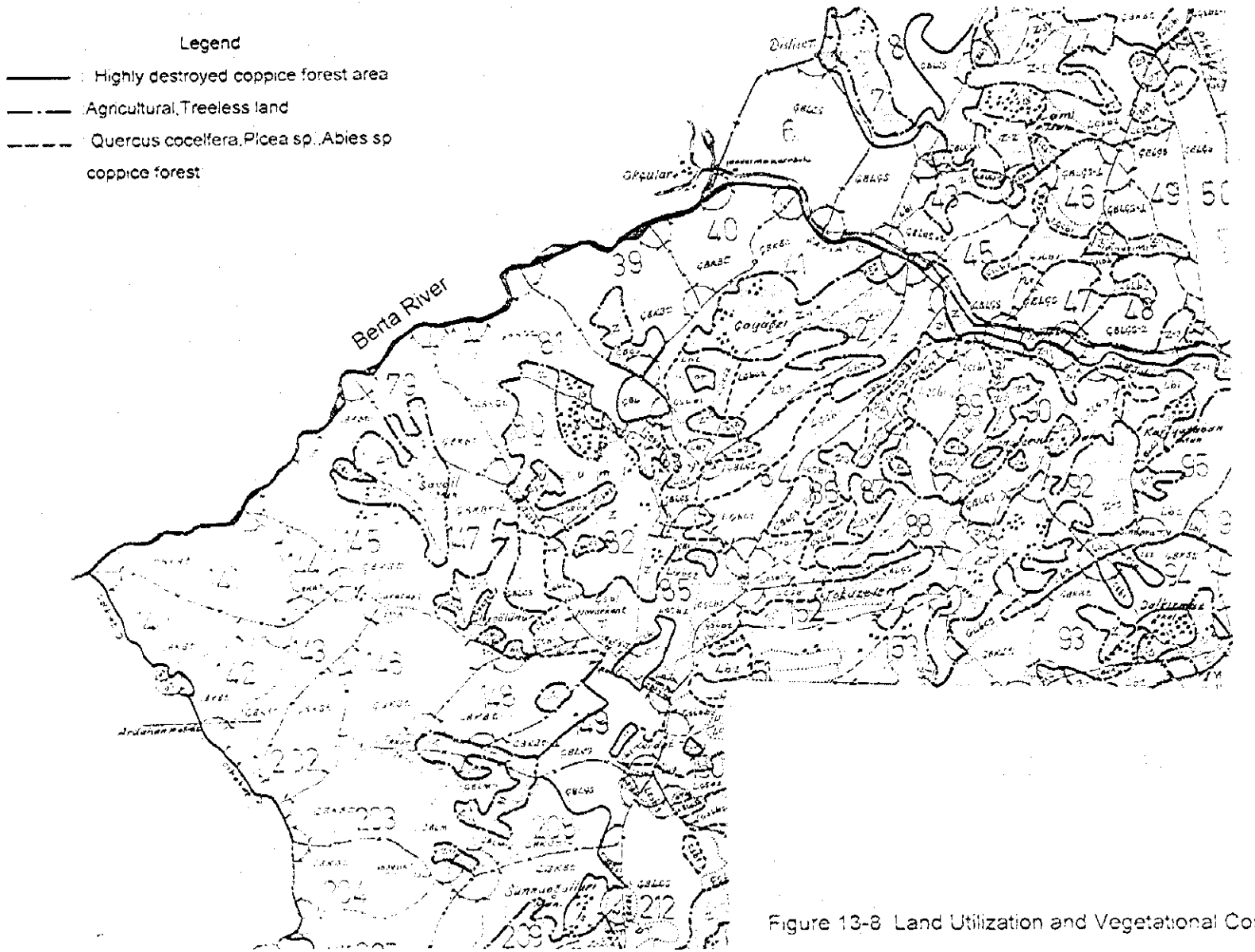


Figure 13-8 Land Utilization and Vegetational Condition

(To be continued)

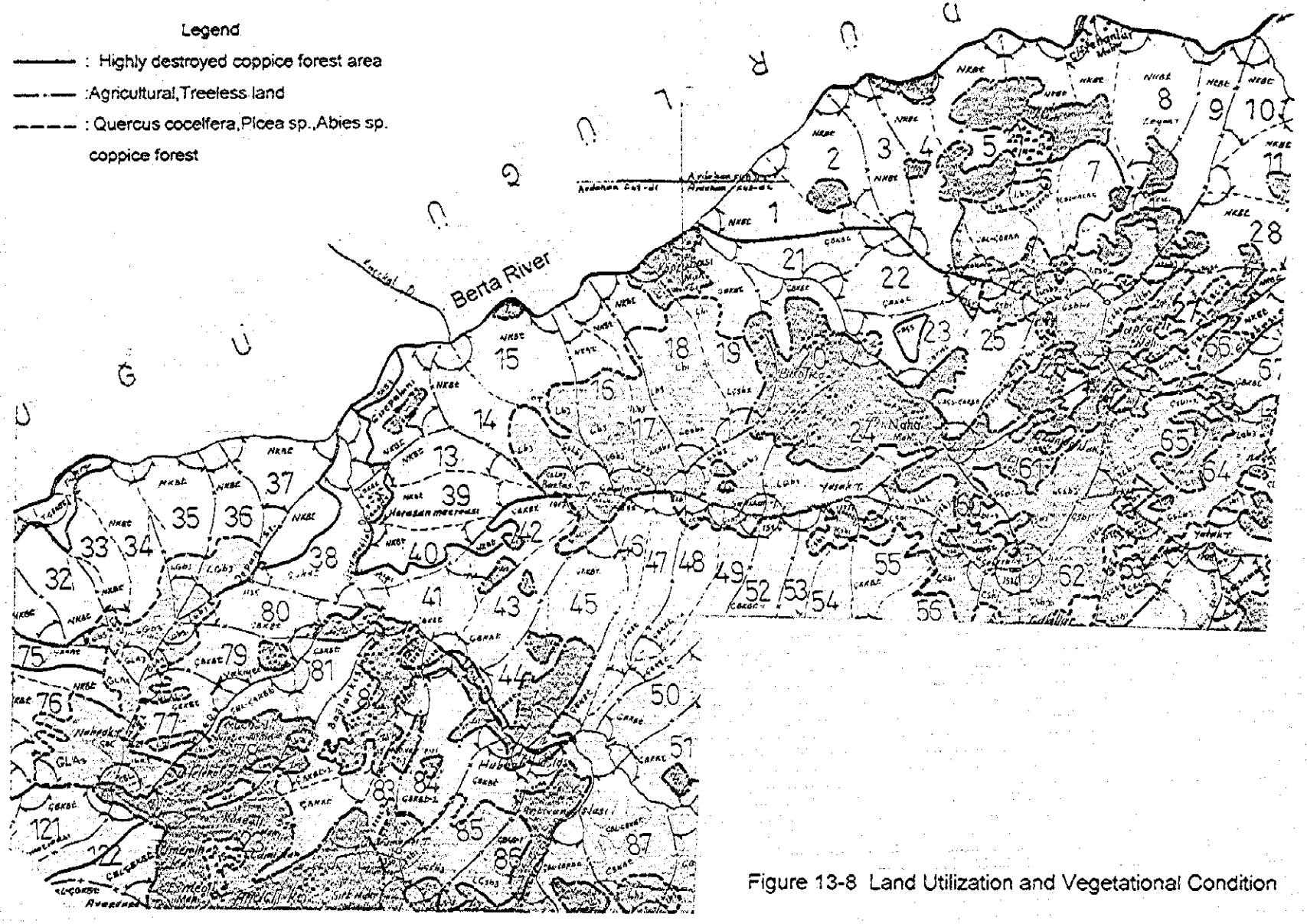


Figure 13-8 Land Utilization and Vegetational Condition

(To be continued)

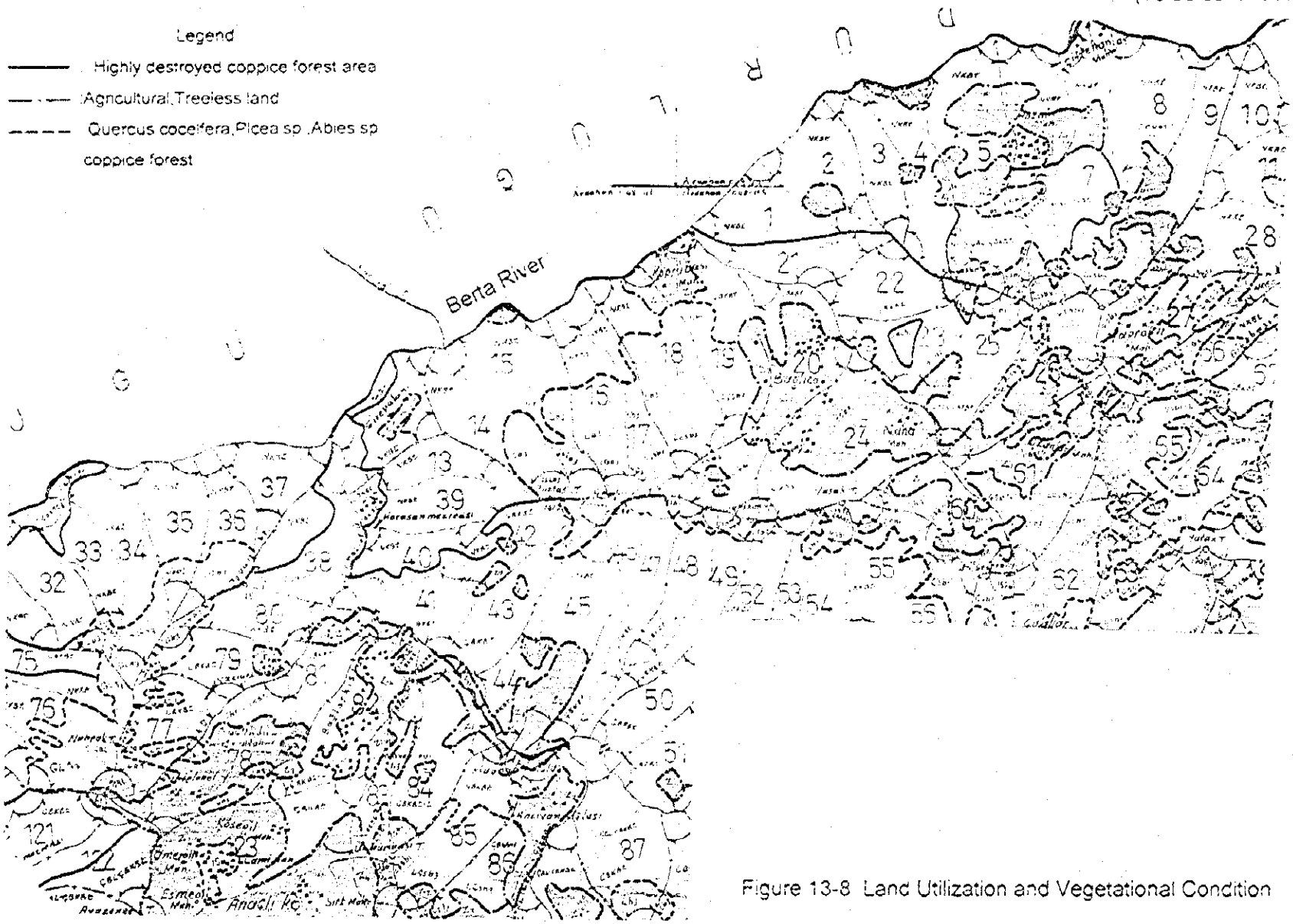


Figure 13-8 Land Utilization and Vegetational Condition

(To be continued)

Legend

——— : Highly destroyed coppice forest area

—·— :Agricultural,Treeless land

– – – : Quercus cocelfera,Picea sp.,Abies sp.

coppice forest

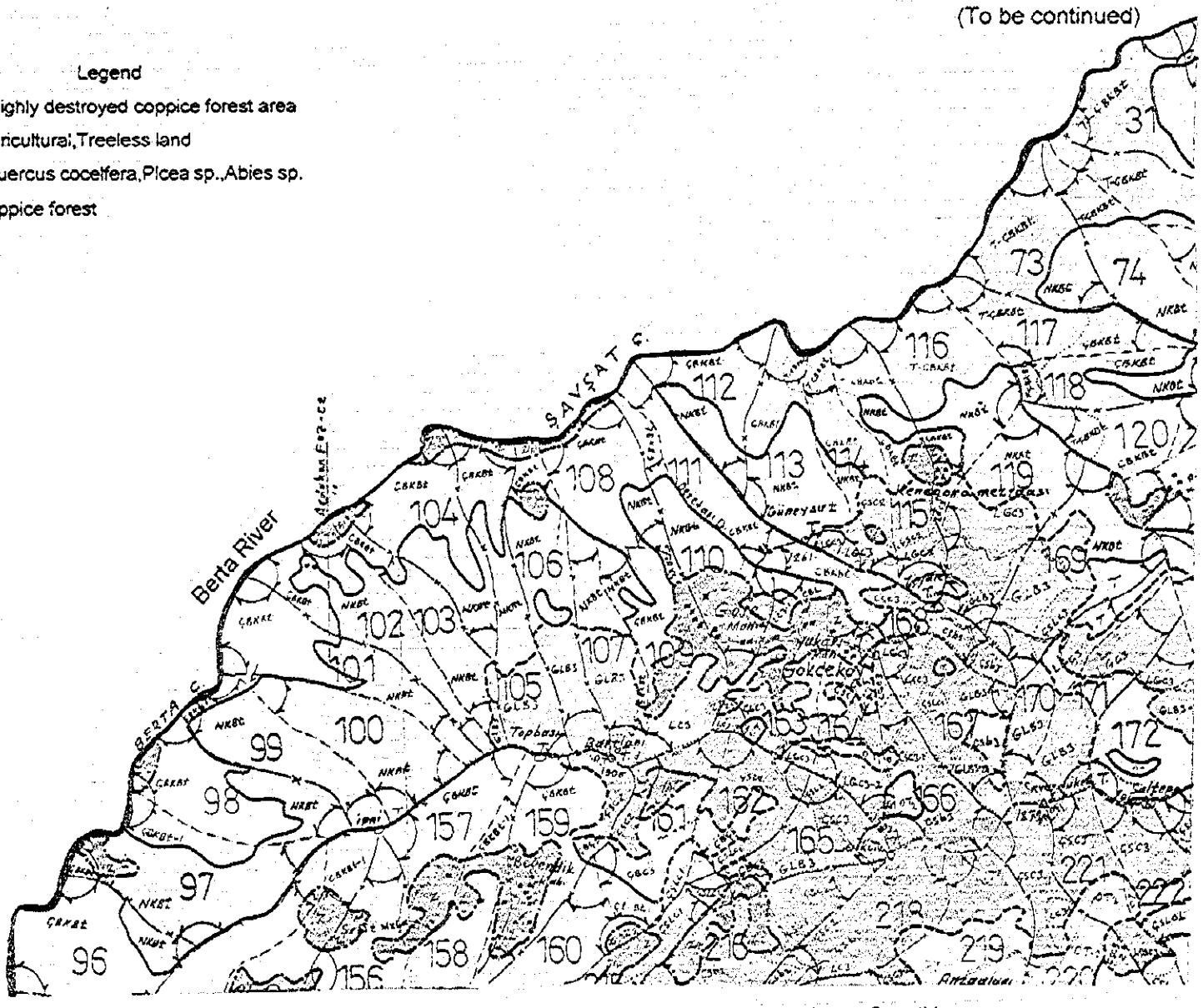


Figure 13-8 Land Utilization and Vegetational Condition

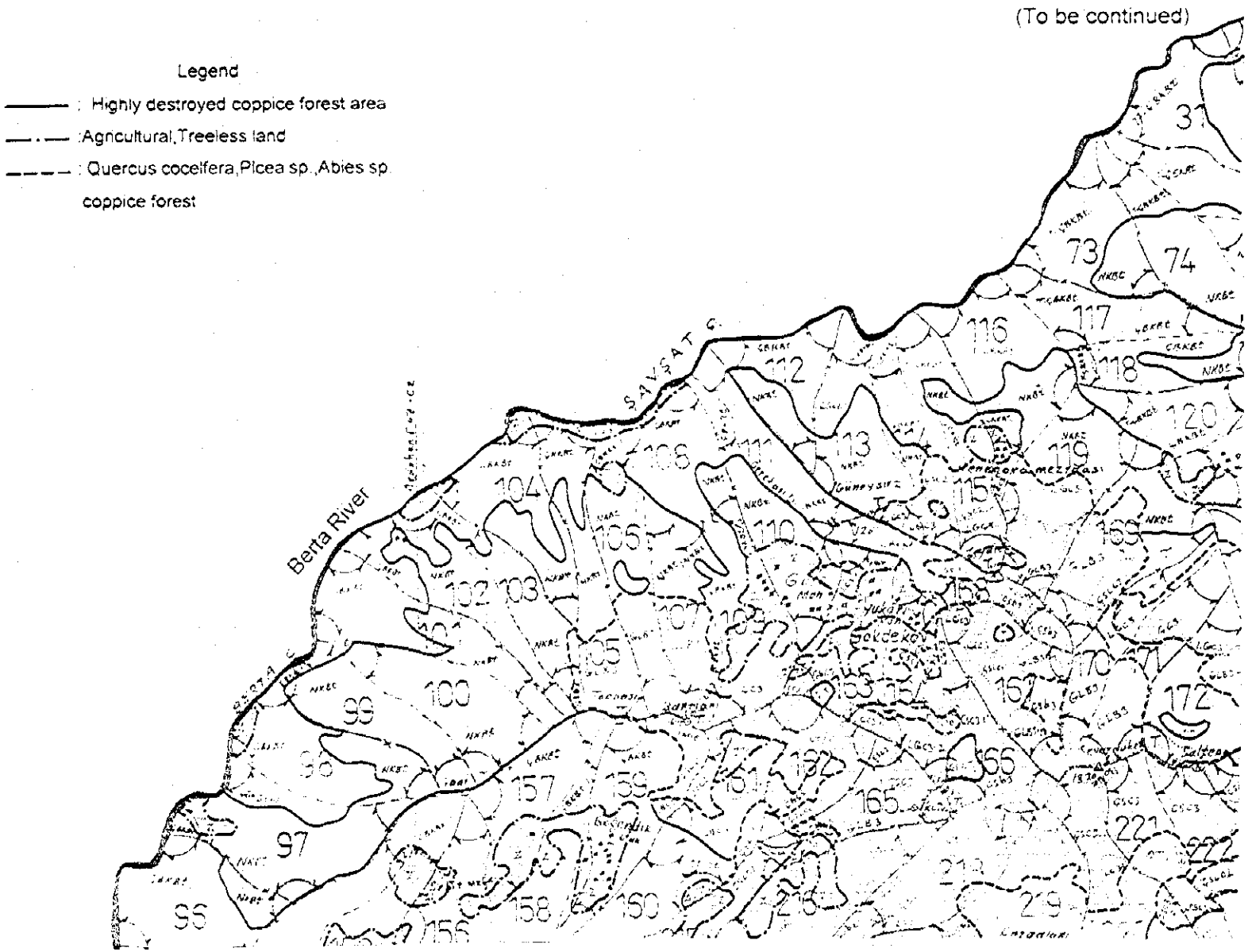


Figure 13-8 Land Utilization and Vegetational Condition

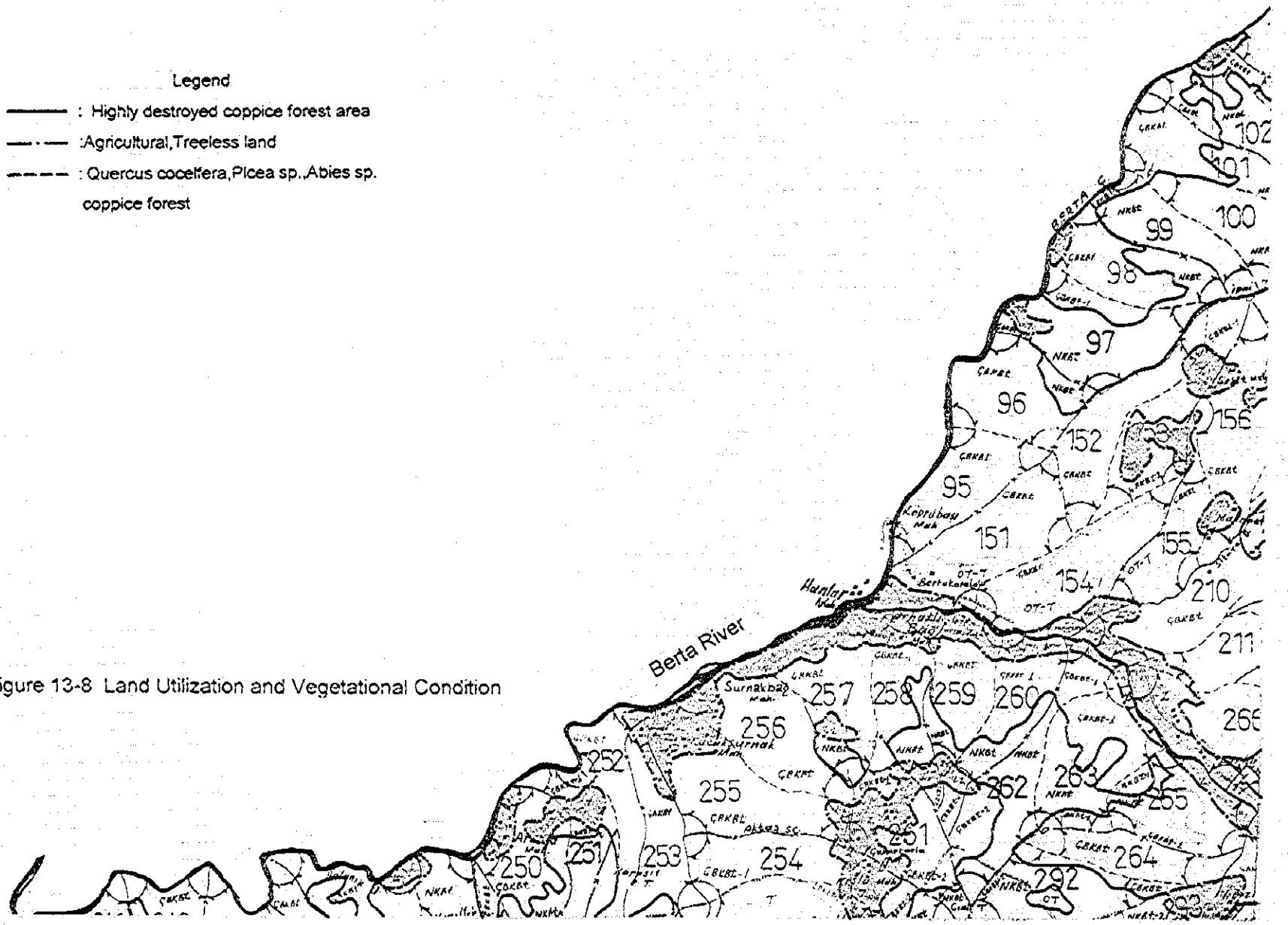


Figure 13-8 Land Utilization and Vegetational Condition

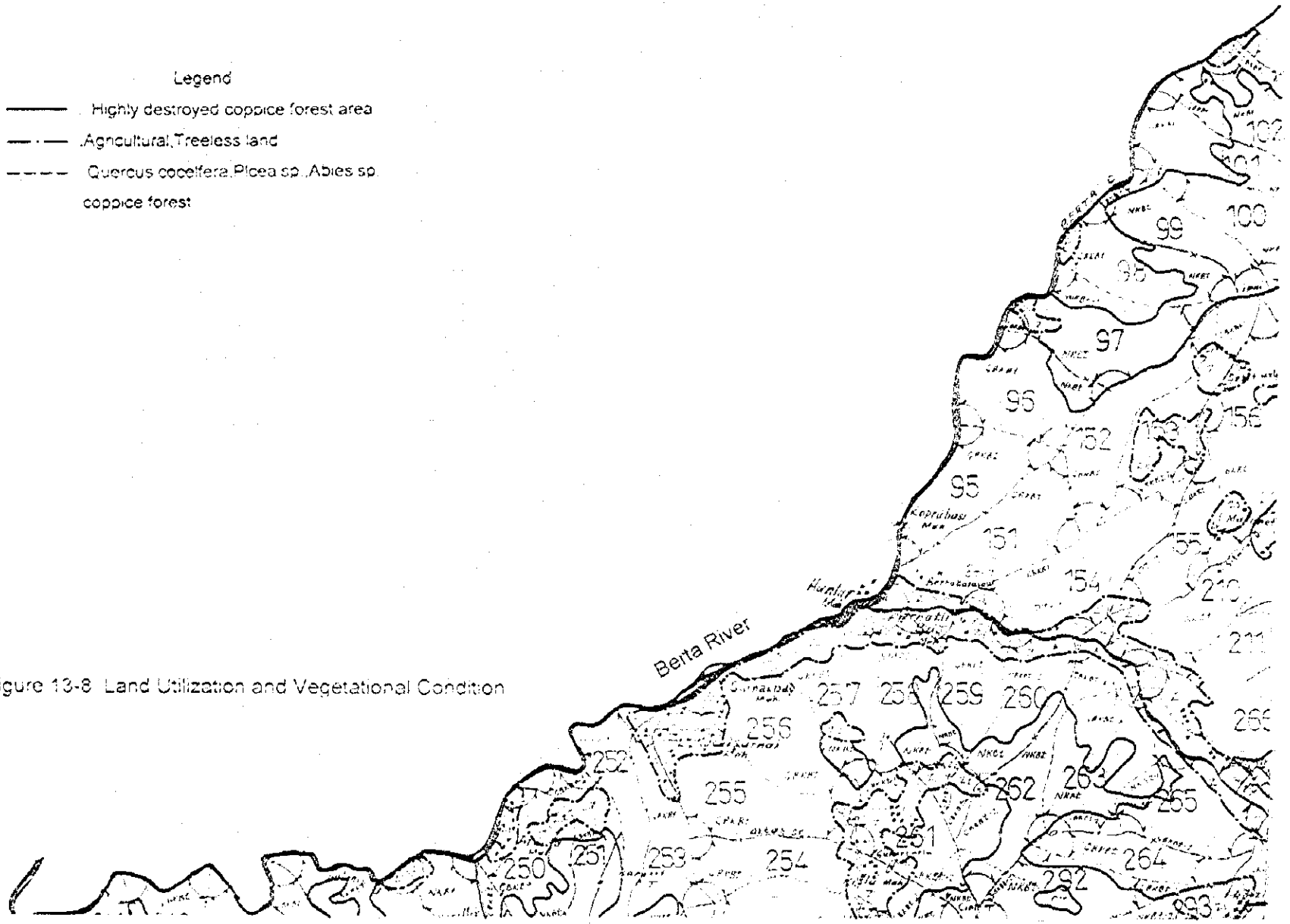


Figure 13-8 Land Utilization and Vegetational Condition

Figure 13-9 Scenery of Bayram Dam Site

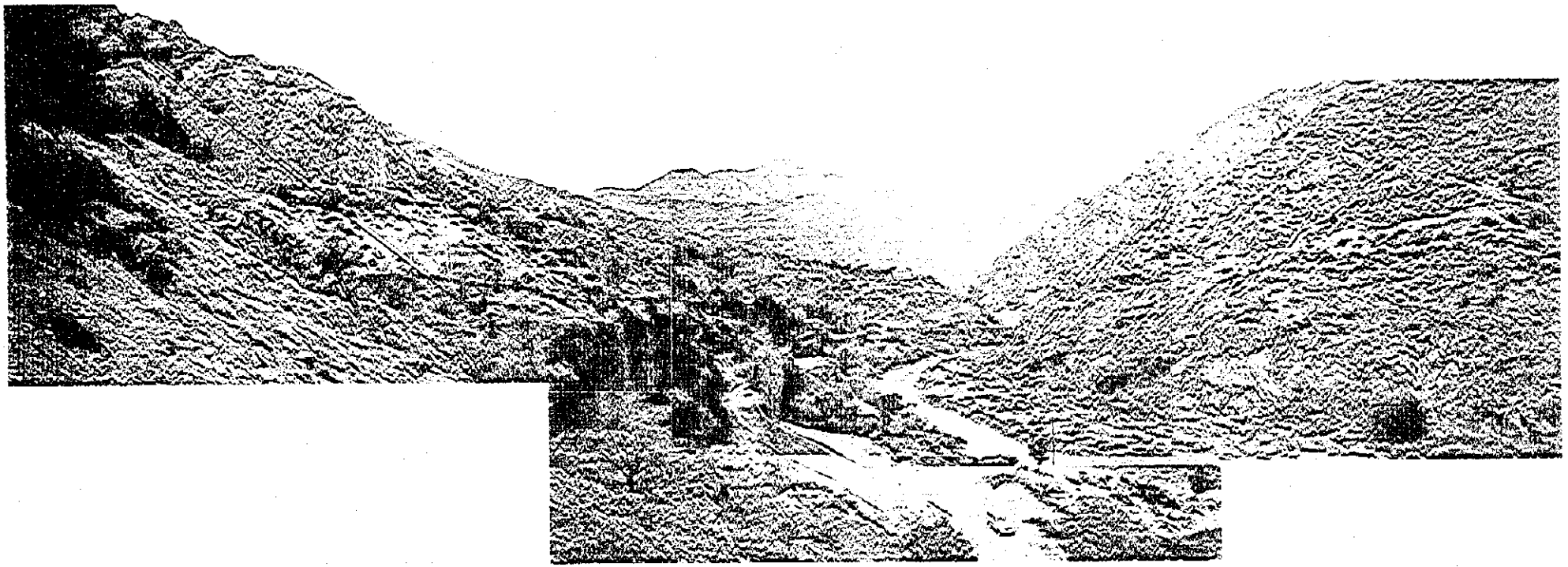


Figure 13-9 Scenery of Bayram Dam Site

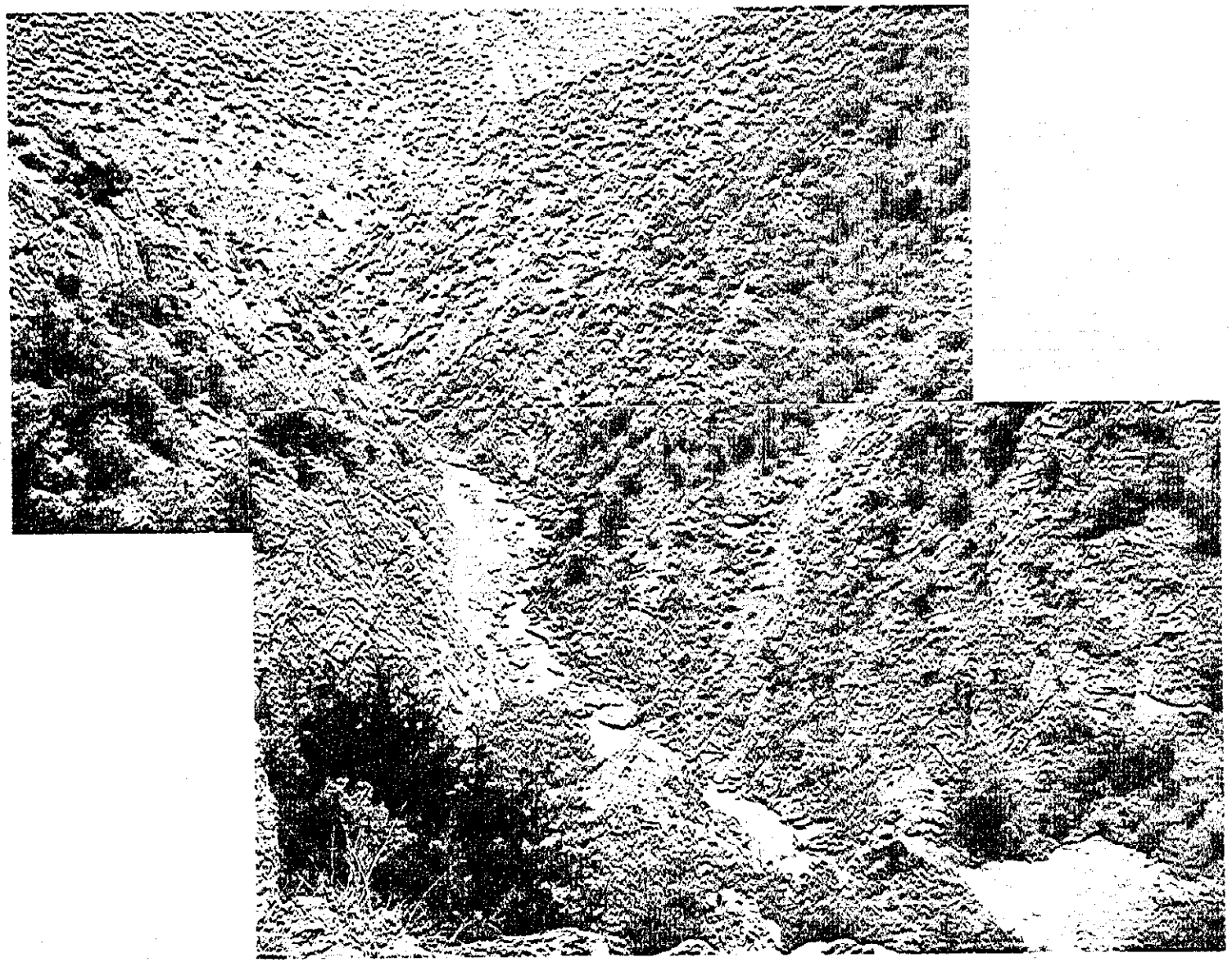


Figure 13-10 Scenery of Bağlık Dam Site

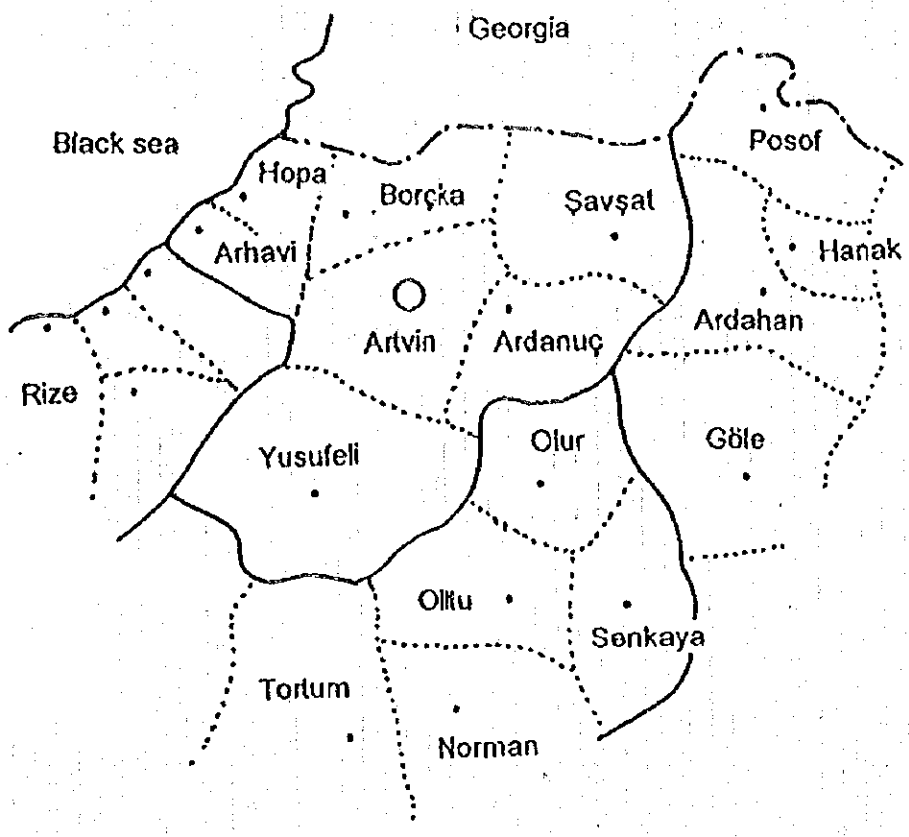


Figure 13-11 Administrative Boundary

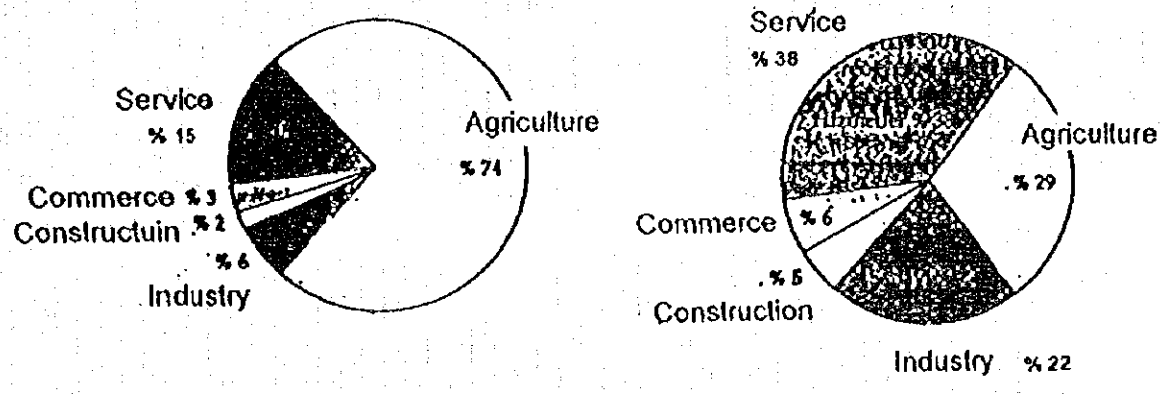


Figure 13-12 Labor Distribution and Production in Artvin Province(1985)

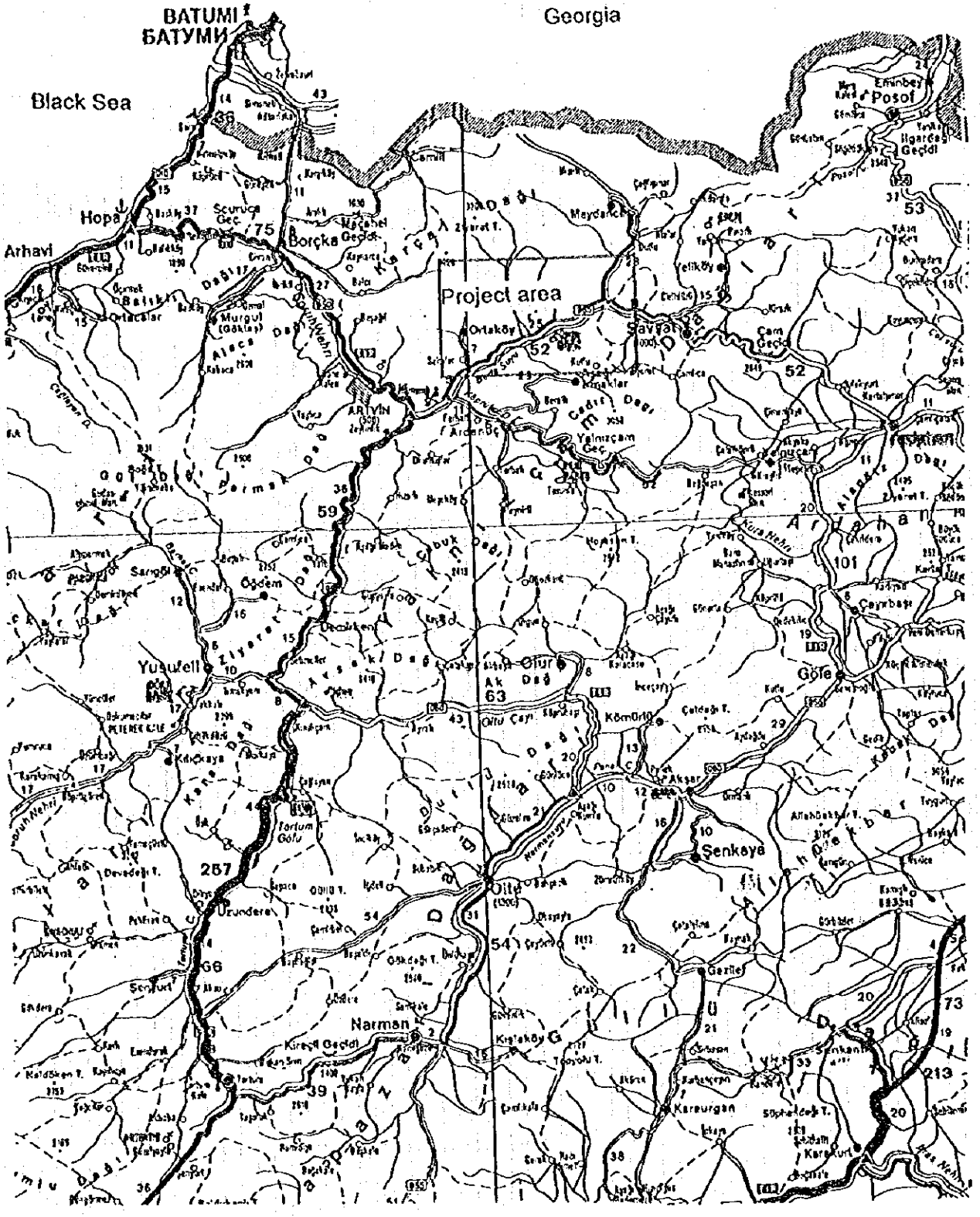


Figure 13-13 Transportation Route

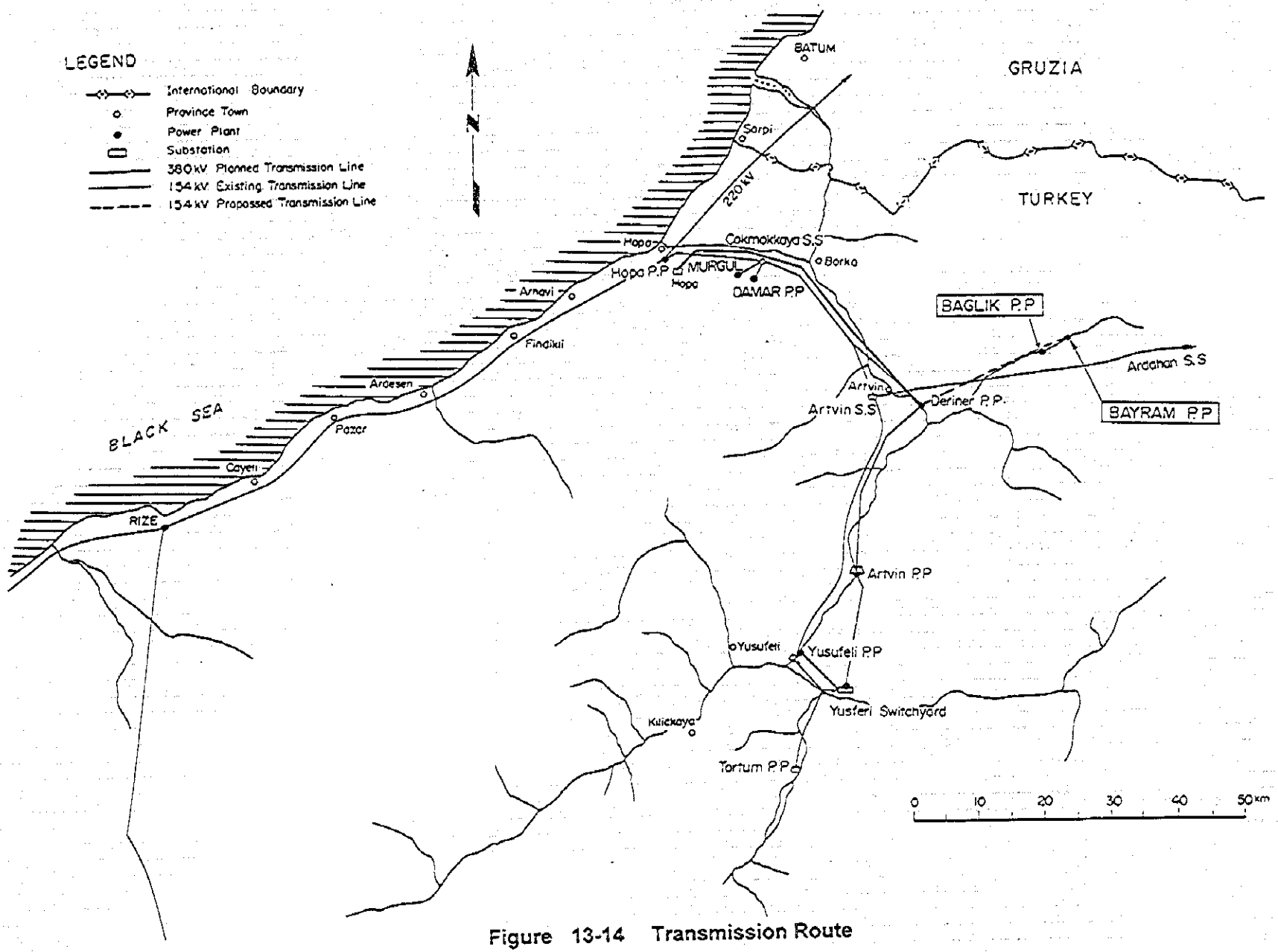


Figure 13-14 Transmission Route

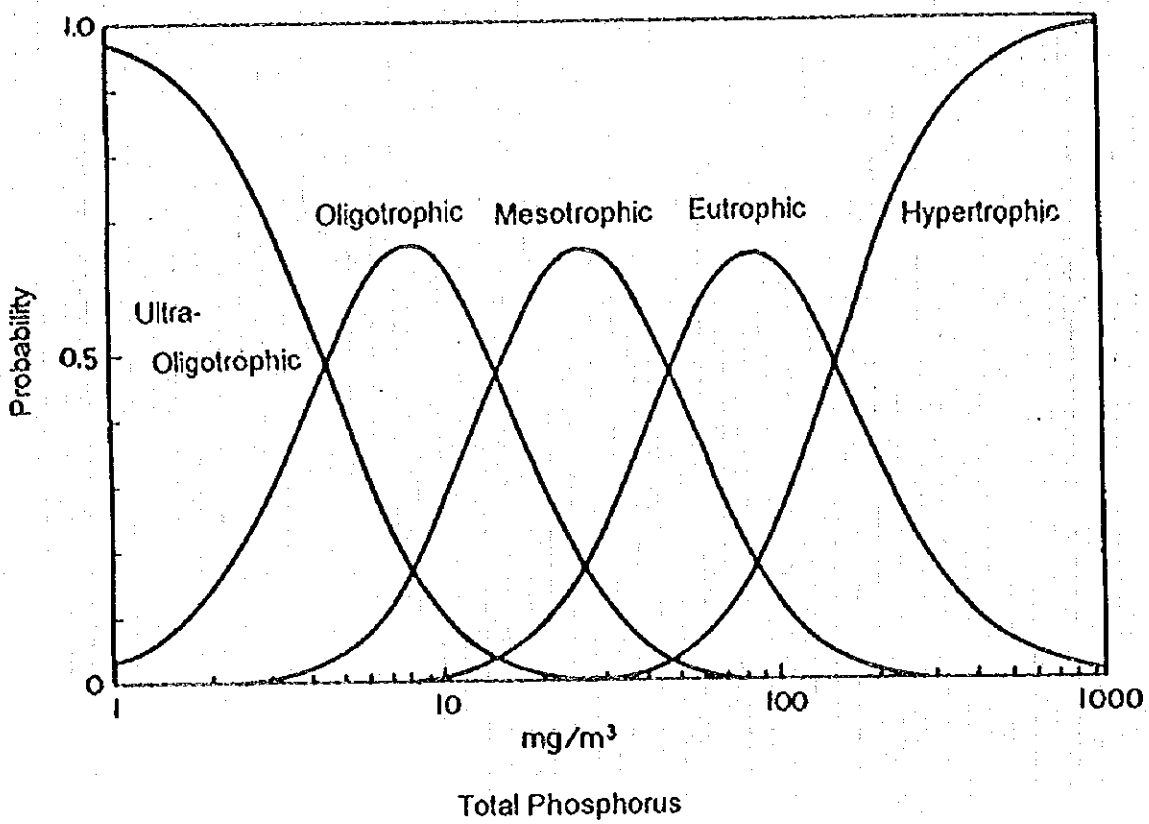


Figure 13-15 Probability Distribution of Nutrition Level

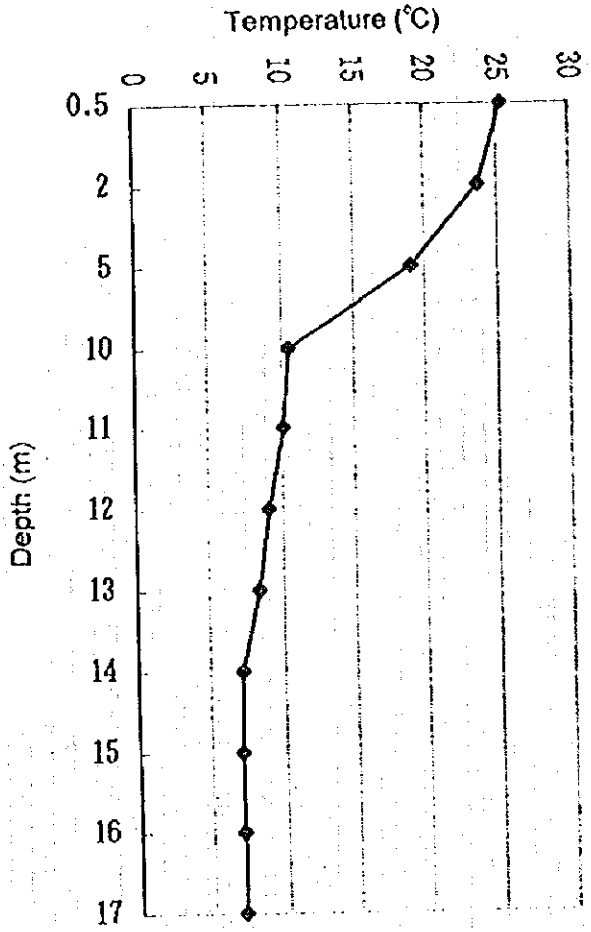


Figure 13-16 Vertical Distribution of Water Temperature at Tortum Lake in Summer

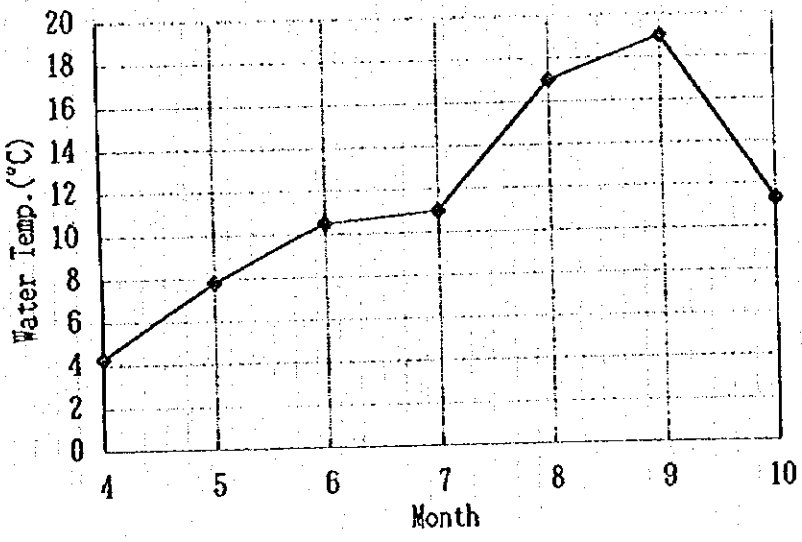


Figure 13-17 Water Temperature of Berta River (Observation Term: 1990-1994)

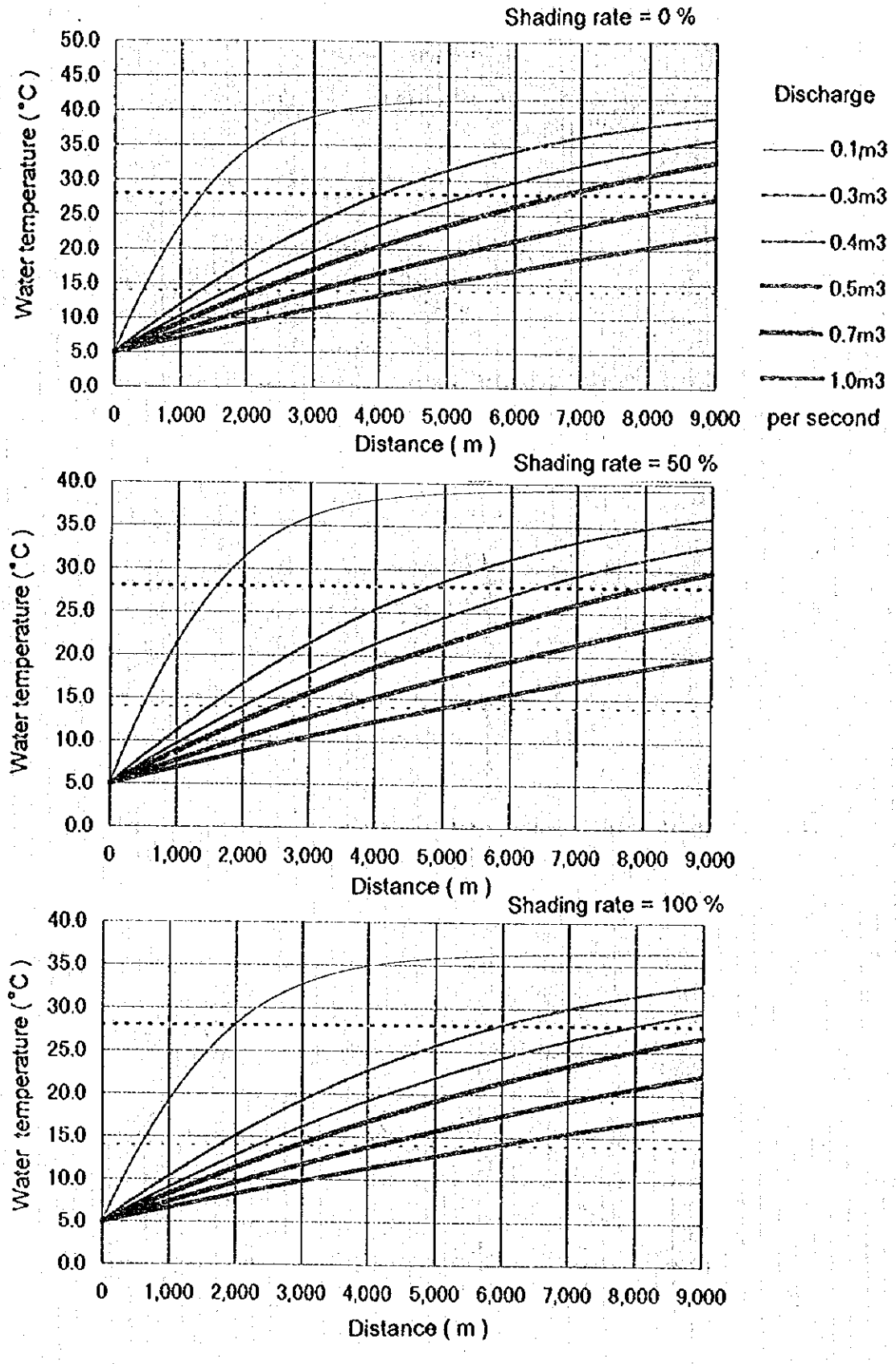


Figure 13-18 Water Temperature Change obtained by Model Simulation

Case (1) Air temperature = 43°C

Humidity = 82 %

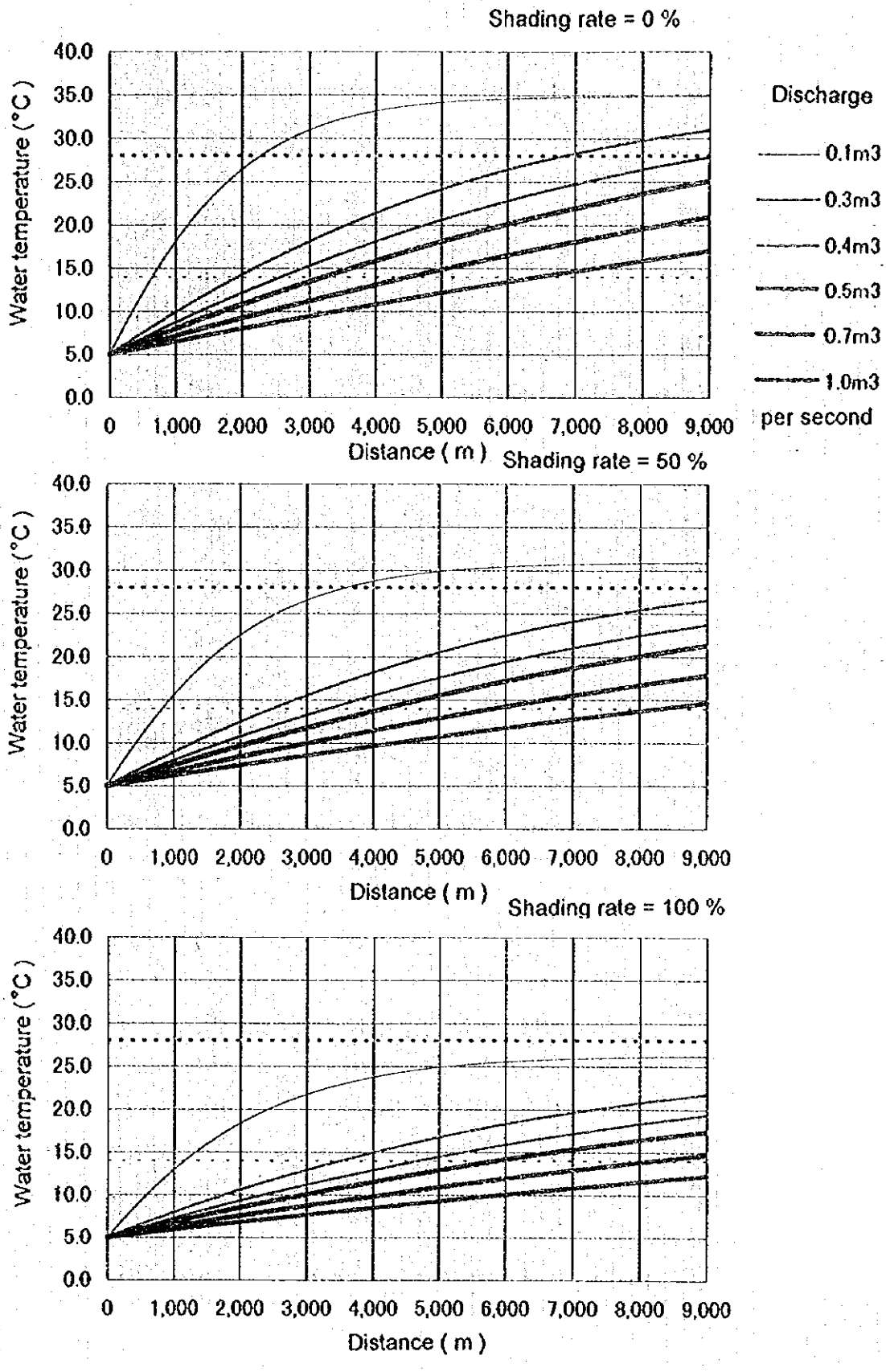


Figure 13-18 Water Temperature Change obtained by Model Simulation

Case (2) Air temperature = 34°C

Humidity = 70 %

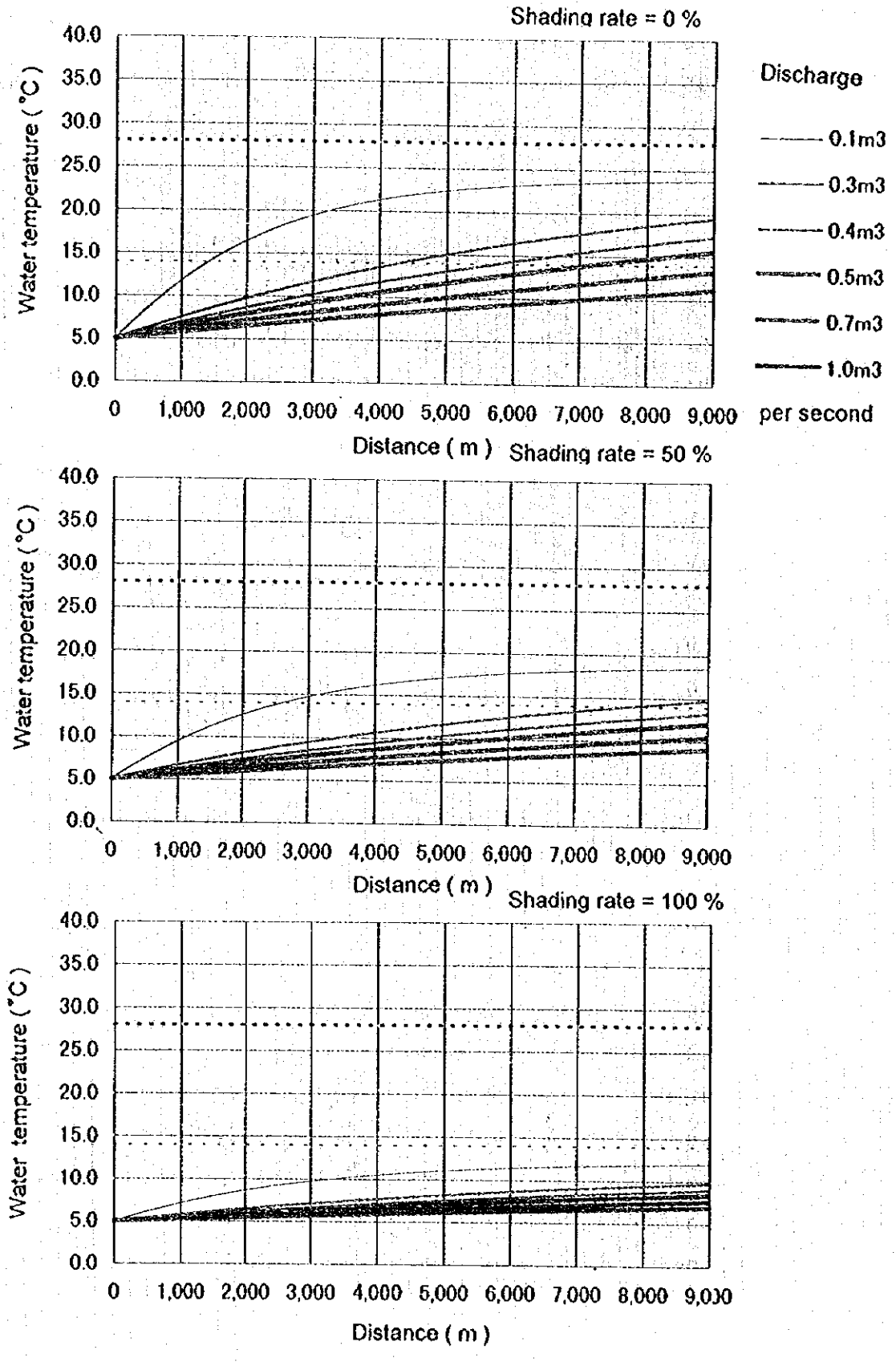


Figure 13-18 Water Temperature Change obtained by Model Simulation

Case (3) Air temperature = 21°C

Humidity = 72 %

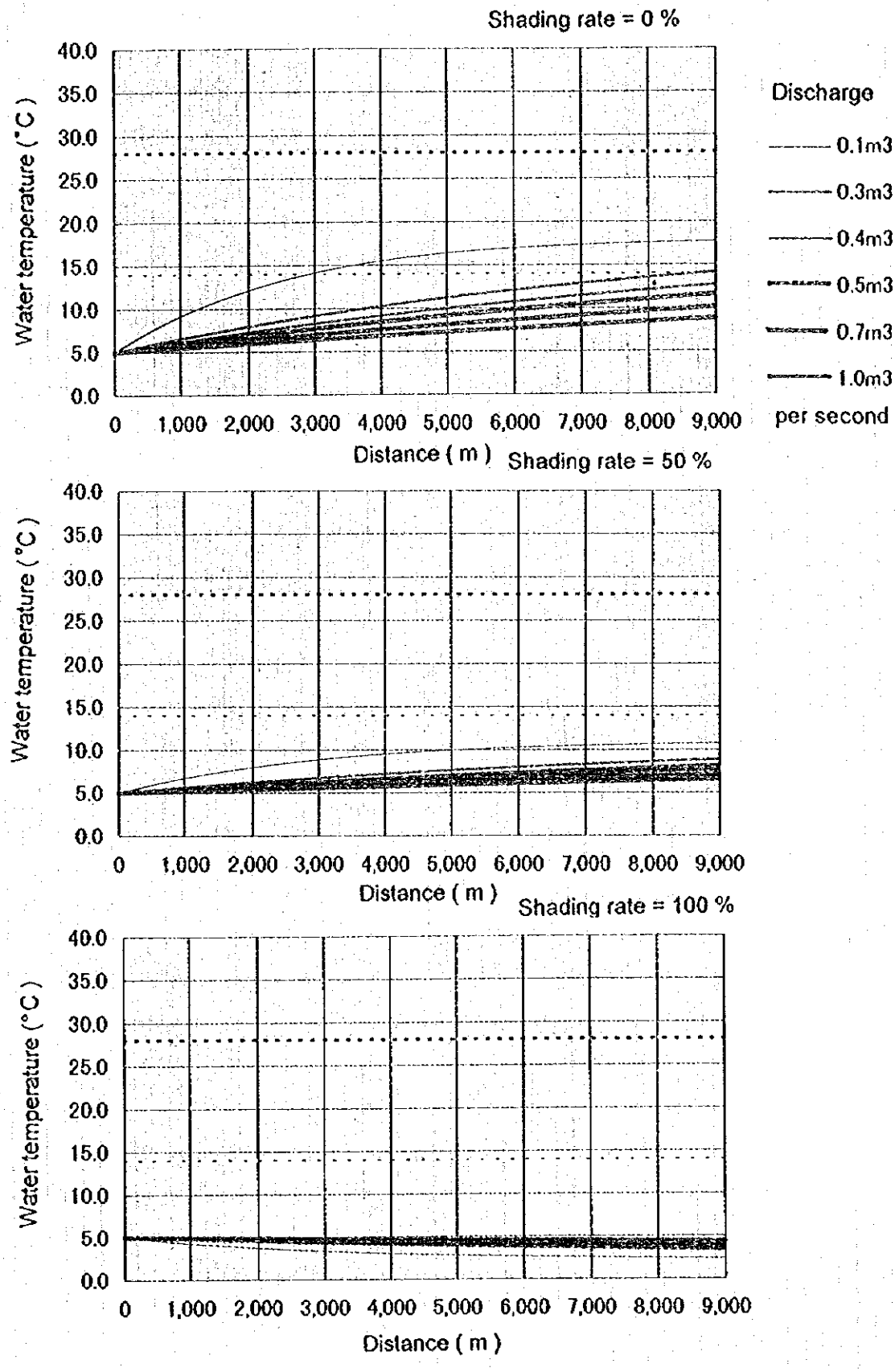


Figure 13-18 Water Temperature Change obtained by Model Simulation

Case (4) Air temperature= 12°C
Humidity = 61%

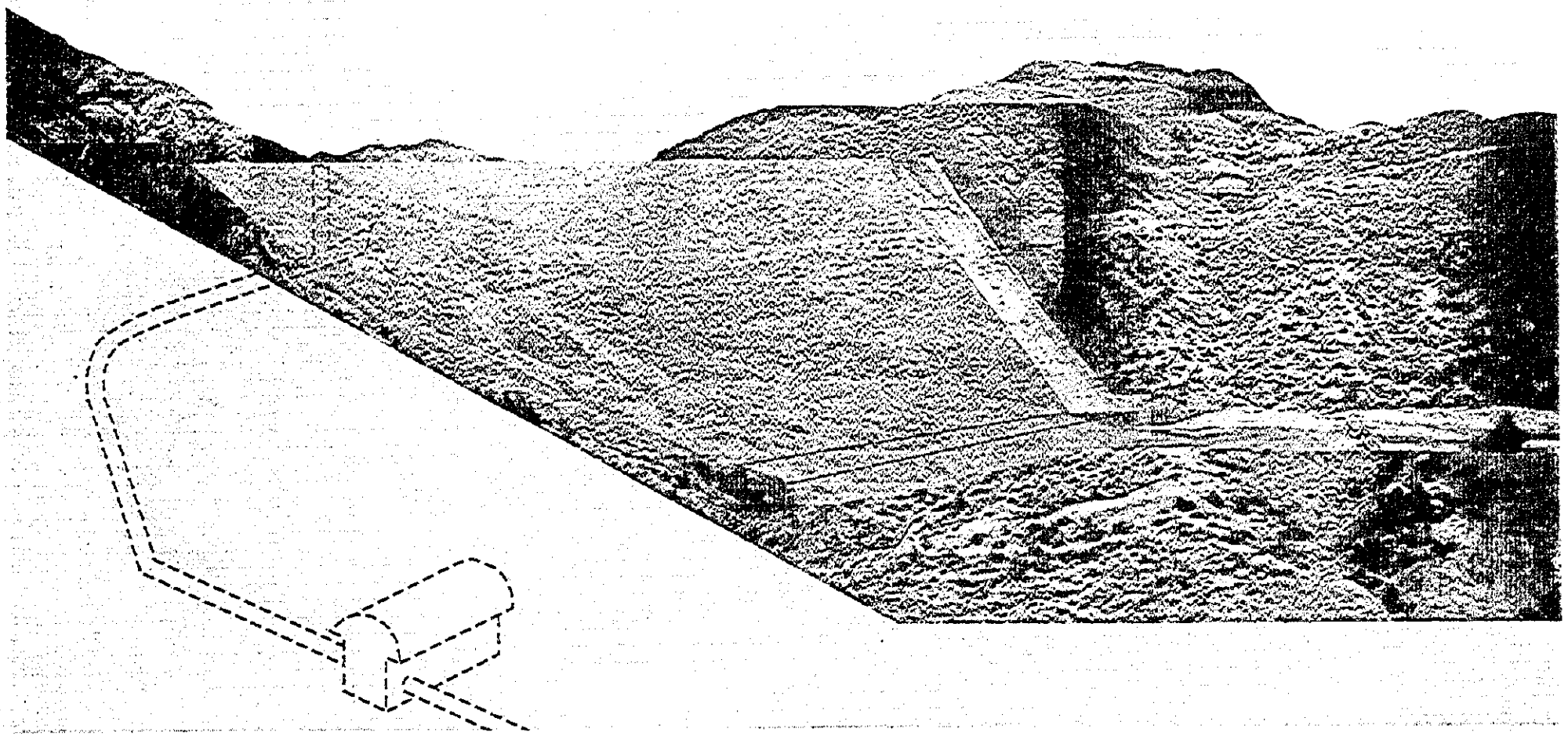


Figure 13-19 Future Scenery of Bayram Dam Site

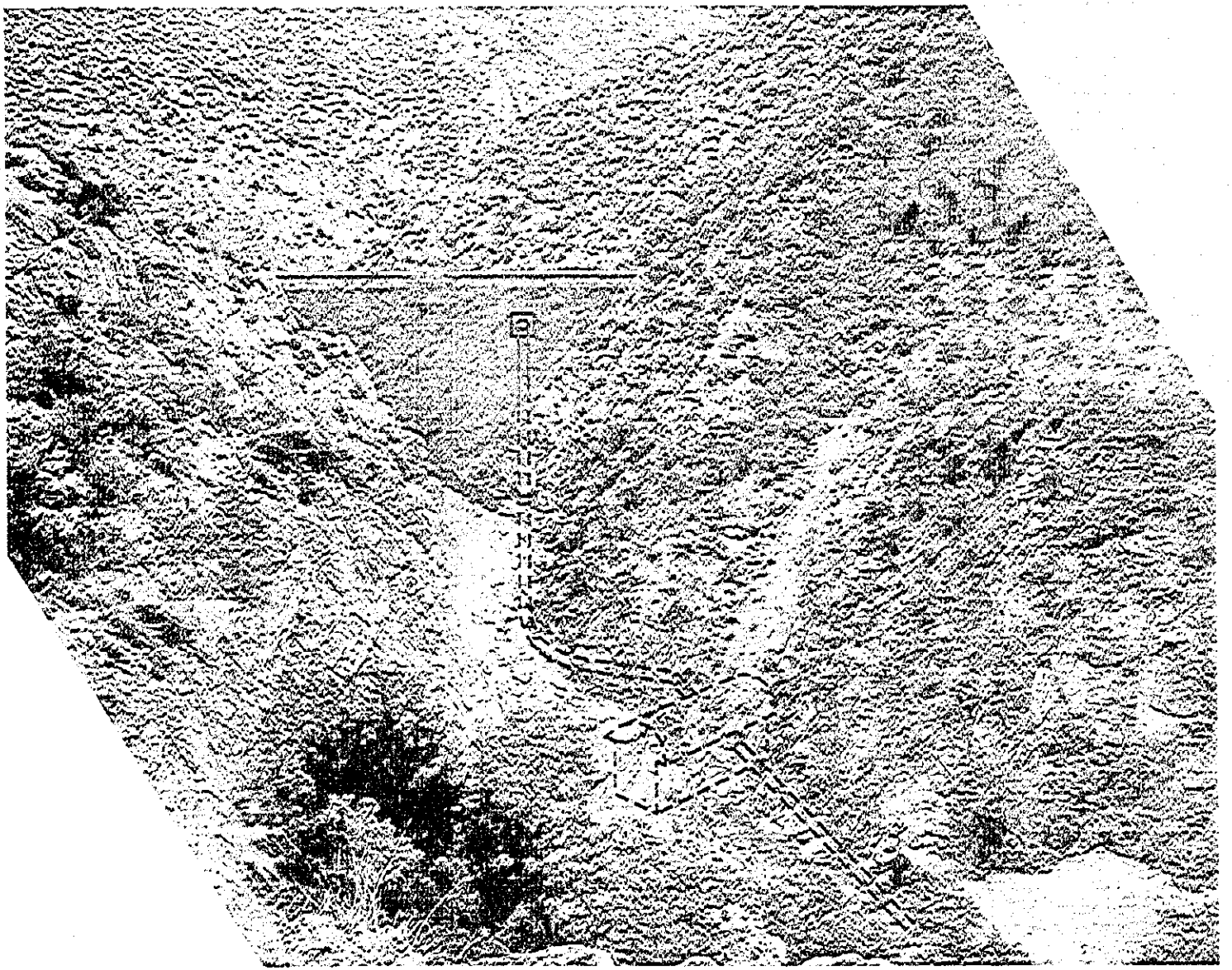


Figure 13-20 Future Scenery of Baglik Dam Site

Table 13-1 Project Items

	Project Name	Bayram	Bağlık
Reservoir	Catchment Area (km^2)	1,159	1,509
	Annual Average Inflow (m^3/sec)	19.20	24.90
	High Water Level (m)	740.00	530.00
	Normal Water Level (m)	722.00	528.50
	Low Water Level (m)	686.00	527.00
	Available Drawdown (m)	54.00	3.00
	Gross Storage Capacity(10^6m^3)	133.00	7.30
	Effective Storage Capacity(10^6m^3)	113.00	1.00
	Reservoir Area (km^2)	3.38	0.37
Dam Type	Type	Rock Fill	Con.Gra.
	Height from Foundation (m)	145	74
	Crest Length(m)	415	190
	Volume(10^3m^3)	6,200	195
Penstock	Type	Tunnel	Tunnel
	Diameter(m)	3.3	3.6
	Length(m)	321	213
Power House	Type	Undergr.	Undergr.
Tailrace Tunnel	Type	Hosresho	Hosresho
	Diameter(m)	4.6	4.9
	Length(m)	7,930	4,454
Development Plan	Firm Discharge(m^3/sec)	10.70	13.00
	Maximum Discharge(m^3/sec)	43.00	52.00
	Tail Water Level(m)	530.00	392.00
	Gross Head (m)		
	Maximum	213.00	138.00
	Normal	192.00	136.50
	Minimum	156.00	135.00
	Loss of Head(m)	9.10	5.60
	Effective Head(m)		
	Maximum	200.90	132.40
	Normal	182.90	130.90
	Minimum	146.90	129.40
	Installed Capacity(MW)	68	59
	Firm Peak Power(MW)	58.0	56.4
	Annual Energy(Gwh)		
	Average	247.9	221.4
	Firm	141.4	124.2
	Secondary	106.5	97.2
Environmental Protection Discharge (m^3/sec)		0.5	0.5

Table 13-2(1) Construction Schedule

Item	Quantity	1st				2nd				3rd				4th				5th			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Preparatory Works										→ Diverting river flow										Commencement of filling reservoir →	
Diversion Tunnel	D : 5.70 m L : 795 m						Ex	Conc												Plug	
Coffer Dam	Em : 109 × 10^3 m^3								Em												
Dam	Ex : 745 × 10^3 m^3 Em : 6,036 × 10^3 m^3 Grouting : 58,600 m							Ex				Em									
											Gr										
Spillway	Ex : 595 × 10^3 m^3 Conc : 47,800 m^3							Ex			Conc										
Outlet Works							Ex								Conc						
Intake	Ex : 103,000 m^3 Conc : 6,200 m^3							Ex							Conc						
Penstock	Ex : 5,000 m^3 Conc : 2,300 m^3 L : 321 m									Adit	Ex				Conc						
Powerhouse	Access Tunnel L : 906 m Cable Tunnel L : 375 m Ex : 27,000 m^3 Conc : 9,100 m^3							Ex							Conc						
								Ex								Conc					
										Ex											
											Conc										
Surge Chamber															Ex	Conc					
Tailrace Tunnel	D : 4.60 m L : 7,930 m						Adit				Ex										
Switchyard																					
Hydraulic Equipment	Outlet Valve : 1 Unit Spillway Gate : 2 Units Intake Gate : 1 Unit Draft Gate : 1 Unit Tailrace Gate : 1 Unit Penstock : 600 t																				
Electro-Mechanical Equip.								Manufacturing					Draft		Crane					Commencement of operation →	
																Installation					Wet test
Transmission Line																					

Table 13-2(2) Construction Schedule

Item	Quantity	1st				2nd				3rd				4th				5th			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Preparatory Works							→ Diverting river flow														Commencement of filling reservoir →
Diversion																					Plug
Dam	Ex : 147 × 10³ m³ Dam Conc. : 195 × 10³ m³ Grouting : 18,100 m						Ex		Conc Gr												
Spillway	Ex : 21,000 m³ Conc : 9,600 m³							Ex	Conc												
Intake	Conc : 500 m³														Conc						
Penstock	Ex : 3,000 m³ Conc : 1,300 m³ L : 213 m								Adit	Ex					Conc						
Powerhouse	Access Tunnel L : 563 m Cable Tunnel L : 268 m Ex : 33,000 m³ Conc : 10,500 m³						Ex Ex		Ex						Conc Conc						
Surge Chamber										Cond				Ex	Conc						
Tailrace Tunnel	D : 4.90 m L : 4,454 m						Adit	Ex							Conc						
Hydraulic Equipment	Spillway Gate : 2 Units Intake Gate : 1 Unit Draft Gate : 1 Unit Tailrace Gate : 1 Unit Penstock : 350 t																				
Electro-Mechanical Equip.								Manufacturing						Draft		Crane	Installation				Commencement of operation → Wet test
Transmission Line																					

Table 13-3 Land Expropriation Cost and Relocation Cost

Item	da	US$
Land expropriation cost		
Bayram and Bağlık dam reservoir	243.9	$1,378 \times 10^3$
Borrow area	105.25	685×10^3
Total		$2,063 \times 10^3$
Relocation cost for public facilities		$19,192 \times 10^3$
Total		$21,255 \times 10^3$

Table 13-4 Monthly Mean Air Temperature

Location	Jan.	Feb.	Mar.	Apr.	May	Jun	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Artvin (1948-1991)	2.7	3.9	7.1	12.1	15.9	18.7	20.6	20.6	17.8	13.8	9.2	4.5
Şavşat (1964-1990)	-1.4	-0.3	4.1	9.6	14.2	17.2	20.2	20.2	16.8	11.3	5.4	0.6

Table 13-5 Monthly Precipitation

Location	Jan.	Feb.	Mar.	Apr.	May	Jun	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Artvin (1946-1994)	88.8	72.2	55.0	53.2	54.0	47.5	29.3	27.0	35.1	58.7	68.0	90.7
Şavşat (1957-1994)	50.2	50.3	52.7	73.0	77.2	84.0	51.1	40.3	38.5	50.6	60.9	66.3

Table 13-6 Monthly Snow Depth

Location	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Şavşat (1958-1987)	93	83	86	22						34	97	125

Table 13-7 Wind Velocity and Direction

Location	Jan.	Feb.	Mar.	Apr.	May	Jun	Jul.
Artvin	18.8 SE	22.1 SSE	21.8 NW	21.4 NNW	18.8 NW	21.5 SSW	17.8 NW
(1959 -	18.8 ESE						
1990)	Aug.	Sept.	Oct.	Nov.	Dec.		
	16.0 WNW	17.5 NW	15.2 SW	24.2 NW	23.0 SE		

Table 13-8 Monthly Humidity

Location	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Arvin (1948-1991)	63	63	62	61	64	67	71	71	69	66	64	64
Şavşat (1964-1987)	61	59	59	60	63	64	64	63	61	63	66	66

Table 13-10 'Water Flow Rate at Bayram Dam Site

Dam Site : Bayram Catchment Area : 1,159 km^2

(m^3/sec)

Year	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Ave.
1942	12.6	25.6	12.7	11.2	14.4	21.0	95.7	99.5	44.4	21.7	11.5	9.6	31.7
1943	10.7	12.8	12.1	9.2	8.5	10.1	33.3	47.5	30.6	16.0	9.8	7.8	17.4
1944	8.2	9.0	8.6	7.5	8.6	19.1	32.5	106.8	54.1	30.0	11.1	8.7	25.4
1945	7.7	8.9	6.3	5.6	5.4	6.8	24.7	44.6	35.4	15.3	7.4	5.8	14.5
1946	6.2	6.2	5.8	7.4	5.6	9.2	30.1	48.3	41.0	19.7	12.1	7.7	16.6
1947	11.5	8.8	6.9	6.7	7.6	20.3	30.1	23.5	18.9	9.1	5.8	5.2	12.9
1948	6.3	10.9	6.9	6.6	6.6	6.9	32.2	47.8	42.6	13.3	7.6	7.3	16.3
1949	6.9	6.3	5.3	5.0	5.0	8.4	20.1	44.9	25.5	8.6	6.1	5.5	12.3
1950	5.7	5.3	4.9	4.6	5.1	11.1	39.4	47.8	26.3	14.1	7.0	5.1	14.7
1951	8.9	7.6	6.4	5.9	5.9	8.8	31.1	37.8	32.5	13.5	7.6	8.0	14.5
1952	13.9	10.8	7.8	7.1	8.5	10.4	41.8	44.9	33.0	18.7	8.5	6.4	17.7
1953	5.6	5.5	5.0	4.5	5.3	6.3	29.0	46.5	34.9	16.2	8.8	8.4	14.7
1954	6.9	7.0	5.5	5.6	6.8	12.2	41.3	63.1	47.3	24.4	10.5	7.9	19.9
1955	6.9	6.4	5.8	4.7	5.3	7.6	17.6	27.8	16.6	6.0	3.9	3.9	9.4
1956	3.9	4.0	4.4	4.0	6.3	7.9	30.6	37.8	33.8	15.1	6.8	5.6	13.4
1957	5.0	4.7	4.2	3.4	5.6	14.9	31.7	45.4	38.4	15.6	7.1	5.8	15.2
1958	5.6	6.0	5.6	4.9	5.4	11.0	32.5	46.5	34.9	13.7	6.5	6.5	14.9
1959	6.1	6.0	6.0	6.0	5.0	12.2	33.3	55.6	43.4	18.5	9.7	7.6	17.4
1960	10.1	9.4	7.2	12.6	21.9	30.3	74.2	81.9	50.0	25.0	11.5	7.0	28.4
1961	6.6	6.0	5.4	3.7	4.4	8.0	31.7	36.4	24.7	6.8	3.5	3.4	11.7
1962	3.9	5.0	7.5	5.6	6.7	23.9	42.1	53.0	34.6	14.4	6.4	6.3	17.4
1963	6.2	6.5	6.5	6.9	7.9	10.5	58.8	89.7	84.4	44.1	17.2	8.4	28.9
1964	7.9	7.3	6.7	6.3	6.4	13.7	44.7	64.3	47.9	14.8	7.6	6.9	19.5
1965	11.2	8.0	10.6	7.0	6.5	24.9	51.0	58.0	41.7	17.0	4.9	3.3	20.3
1966	12.0	13.2	8.3	8.9	10.9	13.8	41.7	66.1	34.9	13.6	5.2	5.1	19.5
1967	4.1	3.3	4.0	3.3	4.2	9.6	32.9	68.8	35.8	28.7	12.4	9.3	18.0
1968	7.9	9.6	21.3	12.4	12.3	23.6	111.6	122.1	61.5	27.1	13.1	10.5	36.1
1969	9.8	9.2	8.8	5.2	5.9	15.1	46.0	72.7	25.7	8.3	4.7	5.5	18.1
1970	13.9	8.1	7.4	7.1	9.2	15.7	43.2	37.7	17.1	8.6	6.3	7.0	15.1
1971	14.6	9.9	8.6	6.8	9.1	19.7	30.3	60.0	40.5	13.2	10.4	4.4	19.0
1972	7.9	7.6	9.5	6.7	7.1	12.7	56.6	51.3	47.3	19.7	8.3	9.6	20.4
1973	8.4	8.7	6.5	5.9	9.6	11.4	31.3	57.6	45.5	19.1	6.7	5.1	18.0
1974	6.3	8.1	6.9	5.3	5.2	14.6	23.0	58.6	28.0	8.1	5.3	9.8	14.9
1975	5.5	5.6	5.3	5.3	5.3	13.8	53.4	47.8	34.1	11.0	4.9	5.4	16.5
1976	7.8	6.1	5.2	5.7	6.0	13.9	48.3	78.4	51.8	23.2	8.4	7.1	21.8
1977	11.3	8.2	6.9	5.6	6.4	11.1	31.2	56.0	37.1	15.4	7.7	6.5	17.0
1978	8.2	7.7	5.9	5.5	9.2	16.5	45.4	74.9	48.3	22.0	9.7	6.3	21.6
1979	6.8	7.3	7.3	8.0	10.3	13.9	35.7	60.2	48.7	22.7	8.6	5.1	19.6
1980	7.4	13.9	10.7	7.5	8.0	18.0	59.0	65.9	27.5	10.8	6.9	5.8	20.1
1981	7.5	8.0	7.6	6.2	6.7	11.9	26.5	49.7	59.1	20.8	8.5	7.7	18.3
1982	7.5	8.2	8.8	7.9	6.8	9.3	34.0	44.1	19.0	13.3	8.3	5.7	14.4
1983	9.0	8.5	4.8	6.2	5.6	20.4	47.7	60.9	39.5	12.0	3.4	3.4	18.5
1984	8.2	15.2	7.5	6.3	6.8	21.5	36.4	49.2	28.4	17.5	8.0	4.6	17.5
1985	3.8	5.8	4.8	4.6	6.2	18.5	68.4	65.6	20.8	7.5	5.1	8.5	18.3
1986	14.5	10.6	9.1	7.3	9.4	18.3	53.0	56.7	50.3	19.1	4.6	4.9	21.5
1987	6.2	5.4	4.8	5.7	17.2	12.2	65.8	89.8	42.0	7.8	7.3	10.0	22.9
1988	7.8	7.6	7.2	8.2	12.5	32.6	83.8	96.6	60.3	26.8	14.4	12.9	30.9
1989	18.2	15.4	13.4	9.3	10.2	67.0	111.1	70.2	40.4	12.1	4.1	5.7	31.4
1990	6.3	6.0	5.2	3.6	5.6	18.2	45.4	72.5	34.9	16.6	5.4	5.5	18.8
1991	7.2	12.5	7.5	5.8	7.1	26.5	47.1	35.9	27.4	11.9	5.9	4.4	16.6
1992	4.1	4.2	4.9	4.8	5.0	12.9	52.0	55.0	68.0	18.2	9.1	6.9	20.4
1993	19.7	19.8	8.9	9.0	8.5	15.9	66.5	85.7	61.2	17.7	7.9	6.7	27.3
1994	6.2	15.9	9.5	9.1	9.9	23.3	64.6	45.3	24.6	9.5	6.2	5.0	19.1
Ave.	8.4	8.7	7.4	6.5	7.8	16.0	45.7	59.5	39.2	16.5	7.9	6.7	19.2

Table 13-11 Water Flow Rate at Bağlık Dam Site

Dam Site :Bağlık

Catchment Area :1509 km^2 (m^3/sec)

Year	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Ave.
1942	16.7	32.8	16.8	15.0	19.1	27.0	116.0	120.3	55.5	27.9	15.4	13.0	39.6
1943	14.3	17.0	16.0	12.5	11.6	13.6	42.1	59.1	38.8	20.9	13.2	10.7	22.5
1944	11.1	12.2	11.7	10.3	11.7	24.7	41.1	128.7	67.0	38.0	14.8	11.8	31.9
1945	10.5	12.1	8.7	7.8	7.7	9.4	31.7	55.6	44.7	20.1	10.2	8.1	18.9
1946	8.7	8.7	8.2	10.1	7.9	12.5	38.2	60.0	51.4	25.5	16.0	10.5	21.5
1947	15.4	12.0	9.5	9.3	10.5	26.2	38.2	30.1	24.5	12.3	8.1	7.4	16.9
1948	8.7	14.6	9.6	9.1	9.1	9.5	40.8	59.4	53.3	17.6	10.5	10.1	21.0
1949	9.5	8.8	7.4	7.1	7.1	11.4	25.9	55.9	32.7	11.6	8.6	7.8	16.1
1950	8.0	7.5	6.9	6.6	7.3	14.9	49.5	59.4	33.6	18.5	9.6	7.2	19.1
1951	12.1	10.4	8.8	8.2	8.3	11.9	39.5	47.4	41.1	17.8	10.5	10.9	18.9
1952	18.3	14.5	10.6	9.8	11.6	14.0	52.3	55.9	41.8	24.2	11.6	8.9	22.8
1953	7.9	7.7	7.0	6.5	7.5	8.8	36.9	57.8	44.0	21.1	12.0	11.4	19.0
1954	9.5	9.7	7.7	7.8	9.5	16.2	51.7	77.5	58.9	31.3	14.0	10.8	25.4
1955	9.6	8.9	8.1	6.7	7.5	10.5	22.9	35.3	21.7	8.3	5.7	5.6	12.6
1956	5.6	5.8	6.3	5.8	8.8	10.7	38.8	47.4	42.7	19.9	9.4	7.9	17.4
1957	7.1	6.7	6.0	5.0	7.9	19.6	40.1	56.6	48.2	20.5	9.8	8.1	19.6
1958	7.9	8.4	7.8	6.9	7.7	14.7	41.1	57.8	44.0	18.0	9.0	9.0	19.4
1959	8.4	8.4	8.3	8.3	7.1	16.2	42.1	68.7	54.2	24.0	13.1	10.5	22.4
1960	13.5	12.7	9.9	16.7	28.3	38.4	90.8	99.7	62.1	32.0	15.4	9.7	35.8
1961	9.2	8.4	7.6	5.4	6.4	10.9	40.1	45.8	31.7	9.4	5.2	5.1	15.4
1962	5.6	7.1	10.3	7.9	9.4	30.6	52.6	65.6	43.7	18.9	8.8	8.7	22.4
1963	8.7	9.0	9.0	9.5	10.8	14.0	72.6	108.9	102.7	55.0	22.4	11.4	36.2
1964	10.8	10.0	9.2	8.7	8.9	18.1	55.8	79.0	59.6	19.5	10.4	9.5	25.0
1965	14.9	11.0	14.2	9.6	9.0	31.8	63.3	71.6	52.2	22.1	7.0	4.9	26.0
1966	15.9	17.5	11.3	12.1	14.7	18.2	52.1	81.2	44.0	17.9	7.3	7.2	24.9
1967	5.9	4.9	5.8	4.9	6.2	12.9	41.6	84.3	45.1	36.5	16.4	12.6	23.1
1968	10.7	12.9	27.4	16.4	16.3	30.2	134.4	146.5	75.8	34.5	17.3	14.1	44.7
1969	13.1	12.5	11.9	7.4	8.4	19.8	57.4	88.9	32.9	11.3	6.7	7.7	23.2
1970	18.3	11.1	10.1	9.7	12.5	20.5	54.0	47.3	22.3	11.7	8.8	9.7	19.7
1971	19.2	13.3	11.7	9.4	12.3	25.5	38.5	73.9	50.7	17.4	14.0	6.4	24.3
1972	10.8	10.4	12.8	9.3	9.8	16.8	69.9	63.6	59.0	25.5	11.3	13.0	26.0
1973	11.4	11.8	8.9	8.2	13.0	15.1	39.7	71.1	56.8	24.7	9.3	7.2	23.1
1974	8.7	11.1	9.4	7.5	7.4	19.2	29.6	72.3	35.7	11.1	7.5	13.3	19.4
1975	7.8	7.9	7.5	7.5	7.5	18.1	66.2	59.4	43.0	14.7	7.0	7.6	21.2
1976	10.6	8.5	7.3	8.0	8.4	18.3	60.1	95.5	64.3	29.7	11.4	9.8	27.7
1977	15.0	11.2	9.5	7.9	9.0	14.8	39.5	69.2	46.6	20.2	10.6	9.0	21.9
1978	11.2	10.5	8.2	7.7	12.6	21.5	56.7	91.4	60.1	28.3	13.1	8.8	27.5
1979	9.4	10.1	10.0	10.9	13.9	18.3	45.0	74.1	60.5	29.1	11.7	7.3	25.0
1980	10.1	18.3	14.4	10.3	10.9	23.4	72.8	80.9	35.1	14.4	9.5	8.2	25.7
1981	10.2	11.0	10.3	8.7	9.3	15.9	33.8	61.7	72.9	26.8	11.6	10.5	23.6
1982	10.3	11.0	11.8	10.6	9.2	12.4	45.7	59.4	25.6	17.9	11.2	7.7	19.4
1983	12.0	11.4	6.4	8.3	7.5	27.5	64.3	82.0	53.2	16.1	4.6	4.5	24.8
1984	11.1	20.4	10.1	8.5	9.1	29.0	49.1	66.3	38.2	23.5	10.7	6.2	23.5
1985	5.1	7.8	6.4	6.2	8.3	24.9	92.2	88.4	28.0	10.1	6.8	11.4	24.6
1986	19.5	14.3	12.2	9.8	12.6	24.6	71.4	76.3	67.8	25.7	6.1	6.6	28.9
1987	8.4	7.2	6.4	7.6	23.2	16.4	88.6	121.0	56.6	10.4	9.8	13.4	30.8
1988	10.4	10.2	9.6	11.0	16.8	43.9	112.9	130.2	81.3	36.0	19.3	17.4	41.6
1989	24.4	20.7	18.0	12.4	13.6	90.2	149.8	94.6	54.4	16.3	5.5	7.6	42.3
1990	8.0	7.9	7.0	4.8	7.4	23.6	60.7	96.9	51.9	22.4	7.5	7.4	25.5
1991	9.3	17.2	10.3	7.5	9.6	35.4	59.3	46.8	40.6	16.7	7.9	5.8	22.2
1992	5.2	6.4	6.6	5.8	5.8	17.0	69.9	85.2	82.0	26.6	11.4	9.4	27.6
1993	29.7	27.9	13.5	11.7	12.8	22.4	84.5	119.7	77.5	24.1	11.1	9.2	37.0
1994	7.3	19.2	12.0	11.5	12.1	30.6	84.9	61.7	33.6	13.5	8.5	6.3	25.1
Ave.	11.3	11.9	10.1	8.9	10.6	21.2	58.3	75.3	49.9	21.7	10.7	9.1	24.9

Table 13-12 Water Quality of Berta River (November)

Loc.	Temp(°C)	pH(-)	DO(mg/l)	COD(mg/l)	NH3-N	NO2-N	NO3-N	PO4-P	T-P	O-P
St.1	8.2	8.46	10.4	16	0.08	0.003	0.7	0.09	0.21	0.12
St.2	8.6	8.40	10.4	>1	0.08	0.002	0.4	0.03	0.04	0.01
St.3	9.7	8.35	10.8	4	0.07	0.002	0.3	0.01	0.07	0.06
I			8	25	0.2	0.002	5		0.02	
II			4	50	1	0.01	10		0.16	
III			3	70	2	0.05	20		0.65	
IV			>3	>70	>2	>0.05	>20		>0.65	
E.C.L-(a)			7.5	3					0.005	
E.C.L-(b)			5	8					0.1	

St.1 : Şavşat, St.2 : Bayram, St.3 : Bağlık point.
Unit : mg/l
I,II,III,IV : Water class
E.C.L -(a),(b) : Eutrophication control limit
Water flow rate (m^3/sec) on 27th of November :

Location	Discharge
2327	6.5
St.1(23/3)	10.1
23/2	1.37
St.2 (Bayram dam site)	6.16
St.3 (Bağlık dam site)	9.74

Table 13-13 Local Irrigation Activity

Village	Water source	Size(da)	Crops	Fertilizer
Bayram		no		
Derelci	Canal	153	Corn,Pasture	
Bağlık	Tributary	50	Corn	350kg/year/ 920m^2
			Potato 300kg/ 920m^2	
			Bean 250kg/ 920m^2	
Okçular	Canal	120	Corn 450kg/ da	3 tons/ da
	(6 m3/da-daily,		Pasture 250kg/ da	
	30 m3/da-season)			
Savail	no			
Köprübaşı	no			
Ciftehanlar	Spring	150	Corn, fluits	Animal fertilizer
	(6 m^3/da-daily,			
	30 m^3/da-season)			
Horsan	Spring	9200m^2	Corn	Animal fertilizer
mezrassi	(3 tons/ 920m^2		Potato 300kg/920m^2	
	- season)		Bean 250kg/920m^2 Fluits	

Footnotes : No other river and river water utilization.

Source ; By hearing survey, 1996

Table 13-14 Fish Living in Berta River System

Salmoniformes	Salmonidae	Salmo trutta labrax(*)
		Salmo trutta macrostiguma
Cypriniformes	Cyprinidae	Cyprinus carpio
		Alburnoides bipunctatus
		Barbus plebejus escherichi
		Barbus cycloepsis (***)
		Barbus capio capio
		Chondrostoma colchicum
		Gabio gabio
		Leuciscus cephalus
		Leuciscus borysthenrous
		Capoeta capoeta steboidi
		Capoeta tinca
		Vinba vinva tenella
	Gobitidae	Necomacheius angorae
		Necomacheius porthera
Siluriformes	Siluridae	Silunis glanis (**)

Living zone (*) : Artvin - Hatilla creek , Berta creek, Karcal creek, Yusuferi - Barhal creek (Production and hunting).

(**) : Limited in Çoruh river.

(***) : Limited in Çoruh Hatilla creek.

Source : Information from Hacetepe University and the Ministry of Forest (1996)

Table 13-15 Animals Living in Artvin Region

Local name		Species
Mammals		
Maral geyik	Deer	Cervus elaphus maral
Karaca	Roe	Capreolus capreolus
Yaban keçisi	Wild goat	Capra aegagrus
Bezoar keçisi	Bozoar goat	Capra cretensis
Yaban domuzu	Wild pig	Sus scrofa
Dağ keçisi		
Kakım	Ermine	Mustella arminea
Çengel boynuzlu dağ keçisi	Chamois	Ropicapra ropicapra
Çakal	Jackal	Canis aureus
Boz ayı, esmer ayı	Bear	Urous arctos
Tilki	Fox	Vulpes vulpes
Vaşak	Lynx	Lynx lynx
Pars	Leopard	Panthera par dustuliane
Kurt	Wolf	Canis lupus
Porsuk	Badger	Meles meles
Avrupa tavşanı	Europian rabbit	Lepus eunopeanus cavcasicus
Su Samuru	Otter	Lutra lutra
Ağaç sansarı	Tree pine marten	Martes nivalis
Kaya sansarı	Rock marten	Martes forne
Gelincik	Weasel	Martes nivalis
Sincap	Squirrel	Seturus vulgaris
Reptiles and Amphibia		
	Hylidae	Hyla arborea
	Pelodytidae	Peloytes caucassicus
	Ranidae	Rana ridibunda
	Emydidae	Emys orbicularis
	Lacertidae	Lacerta derjugini
		Ophisops elegans
	Testudinidae	Testudo graeca
	Viperidae	Vipera kaznakovi (Protected)

(Bird)

English name	Species
-	Tetraogal caspius
Cavcasian black cock	Lyrurus molkosiewrczi
Red partridge	Alectoris chukar
Quail	Coturnix coturnix
Stock dove	Stroptopelta tirtur
Wood cock	Scolopox rusticola
Bustard	Otis tarda
Rock pigeon	Columba livia
Fieldfare thrush	Turdus pilaris
Black bird	Turdus merula
	Ortolus oriolus
	Amas platyrhnchas
Duck	Amas strepera
Falcon	Falco peregrinus
Elenor falcon	Falco peregrinus
	Circus cyaneus
Steppe falcon	Circus macrourus
Meadow falcon	Circus pygoraus
	Falco cherrug
	Falco biarmicus
White head sea eagle	Haliaetus leucoryphus
Pigeon falcon	Falco columbarius
	Falco subbuteo
Red foot kestrel	Falco vespertinus
Small k	Falco naumanni
Kestrel	Falco tinnunrulus
Shoot foot hawk	Accipito brevipes
Black vulture	Aegypius monachus
Red vulture	Gyps fulvus
Beared vulture	Gypaetus barbatus
White vulture	Neophron percnoptenus
Snake eagle	Circaetus gallicus
W.sea eagle	Haliaetus albicilla
Rock eagle	Aquila chrysaetas
	Aquila heliaca
Steppe eagle	Aquila rapax
Other eagles	Accipiter nisus
	Citcus aerugunosus
	Milcus migrans
	Buteo buteo
	Pernis apivorus
	Hieratus faciatus
	Hieratus pennatus
	Milcus milcus

(Insects)

Acrididae	Acrida bicolor anatolica, Aiolopus thalassinus thalassinus, Anacridium aegyptium aegyptium, Calliptamus barbarus barbarus, Calliptamus barbarus cephalotes, Calliptamus barbarus pallidipes, Calliptamus italicus italicus, Calliptamus tenuicercis tenuicercis, Chorthippus apricarius, Chorthippus dorsatus dichrous, Chorthippus macrecerus macrecerus, Chorthippus mollis mollis, Dociostaurus brevicolis, Dociostaurus genei, Dociostaurus hauensteini, Euprepocnemis polarans polarancs,Oedaus decrorus, Oedipoda germanica meridionalis, Oedipoda miniata miniata, Oediipoda schocji, Pseudoceles lateritius, Pseudoceles oedipoides, Ramburiella bolivari, Stauroderus scalaris scalaris, Stauroderus nigrogeniculatus, Sphingonotus turcicus, Thisoicetrinus pterostichus
Empusidae	Empusa fasciata
Gryllidae	Acheta domesticus, Gryllus bimaculatus, Gryllus campestris, Oecanthus pellucens
Gryllotalpidae	Gryllotalpa gryllotalpa, Bolicvaria brachyptera, Hierodula transcaucasica, Mantis religiosa
Mantidae	Bolivivaria brachyptera, Hierodula transcaucasia, Mantis religiosa
Pyrgomorphidae	Pyrgomorpha guentheri
Tetrigidae	Tetrix depressa depressa
Tettigonidae	Anadrymadusa adzhharica, Bucephaloptera bucephala, Conocephalus discolor, Homorocoryphus nitidulus, Isophya zernovi, Leptophyes slbovittata, Pradrymadusa aksirayi, Parapholidoptera dignata, Parapholidoptera dignata ziganensis, Phaneroptera nana sparsa, Poecilimon ersisi, Poecilimon smillis, Poecilimon tauricola, Platycleis intermedia
Tridactylidae	Tridaccylus variegatus

Table 13-16 Trend on Population and Agricultural Area at Upstream Area

Population Decrease Trend at Upstream Area

Year	Veliköy	Ciritdüzü	Tepeköy	Şenocak	Küplüce	Kurudere	Çoraklı	Dalkırmaz
1970	1,054	842	1,716	472	561	528	1,061	468
1975	988	1,251	1,680	525	562	725	1,568	580
1980	980	814	1,522	452	507	471	912	480
1985	768	642	1,226	378	290	407	687	335
1990	633	505	929	329	341	343	587	260

(Source: Şavşat City Office, 1996)

Trend on Agricultural Land Area (Da)

Year	Veliköy	Ciritdüzü	Tepeköy	Şenocak	Küplüce	Kurudere	Çoraklı	Dalkırmaz
1986	6,000	3,790	6,160	740	2,100	2,100	4,175	1,020
1989	3,800	735		620		4,950	2,800	580
1991	3,668		5,764	1,664	1,231	1,061	2,238	1,020

(Source: Şavşat City Office, 1996)

Table 13-17 Movement of Residents at Several Villages

	Center village	Summer Popu.	Winter Popu.
Bayram(Mah)	Eskikale	200	250
Dereici (Mah)		130	130
Bağlık (Mah)		10	50-60
Okçular(Mah)	Eskikale	45	45
Savail(Mah)	Üzümlü	80	80
Köprübaşı(Mah)		60	40
Çiftehanlar(Mah)		120	120
Horasan mezraasi	Anacli Köy	395	50-60
Çayağzı			395

(by hearing survey, 1996)

Table 13-18 Land Utilization in Artvin Province

Type	Artvin	Şavşat	Ardanuç
Pasture	521,659	137,719	16,600
Meadow	153,942	84,885	32,875
Forest	1,651,117	301,163	369,445
Brush land	936,940	192,464	72,076
Dry agriculture with fallow	12,899	-	10,109
Dry agriculture without fallow	305,424	97,630	49,583
Irrigated field	48,831	19,920	5,230
Orchard	22,220	880	1,800
Vineyard	6,500,200	155	
Tea	46,585	-	-
Nuts	18,415	-	-
Olive	4,400	-	50
Total agriculture area	3,730,115	835,847	558,381
Settlement area	104,469	34,765	7,319
Water surface area	-	-	-
River bed	5,675	1,050	-
Bank	1,525	-	-
Swampy	50	-	-
Rocky and others uncultivated land	1,410,346	242,546	41,680
Total not agriculture area	1,522,065	278,371	48,999
Total area	5,252,180	1,104,218	607,380

(Source; Census of Population: 1990)

Table 13-19 Some Agriculture Income of Activities Province

(Artvin province; 1994))

Type of activity	Area (da)	Production cost (TL/da)	Annual income (TL/da)
Mixed fluits ochard	719.28	4,500,000	3,236,760,000
Vegetable	472.97	3,750,000	1,773,637,000
Poplar tree	42.97	2,100,000	90,237,000
Vineyard	323.72	1,200,000	388,464,000
Pasture	22.75	500,000	11,375,000
Irrigated class (1)	16.00	1,800,000	28,800,000
Irrigated class (2)	16.88	1,500,000	25,320,000
Not irrigated	83.75	600,000	50,250,000
Total			7,680,563,000
Annual agricultural income/ family			49,095,902
Annual income by animal raising /family			14,728,770
Annual total income			63,824,672
Annual total income per capita			14,842,946
Maximum total annual income per capita			22,264,419
Minimum total annual income per capita			5,37,1789

Table 13-20 Income and Employment

Village	Major source	Monthly income	Unemployment
Bayram	Agriculture and animal breeding	10,000,000 TL/house	50 (20%)
Dereici	Agriculture and animal breeding		
Bağlık	Animal breeding, agriculture and forestry	5,000,000 TL/house social works	No person having special works. Employed person recorded is 5.
Okçular	Agriculture and animal breeding	8,000,000 TL/house	20 (44%)
Savail	Agriculture and animal breeding	10,000,000 TL/house	40 (50%)
Köprübaşı	Animal breeding and fruits production	5,000,000 TL/house	30 (75%)
Çiftehanlar	Agriculture, breeding and forestry Transportation	10,000,000 TL/house	50 (42%)
Horasan mezraasi	Animal breeding and vegetable	5,000,000 TL/house	Not so many

Footnotes; ( ) shows percentage to winter population.

Source; By hearing survey, 1996.

Table 13-21 Main Civil Works of Bayram Project

Item	Description	Amount of Works	
Diversion Tunnel	Type: Horseshoe Pressure		
	D: 5.70 m	Tunnel Ex	28,000 m^3
	L: 795 m	Lining Conc.	6,600 m^3
Cofferdam	Type: Rockfill	Em	109 x 10^3 m^3
Dam	Type: Rockfill	Ex. In open	745 x 10^3 m^3
	Height: 145 m	Em. of Core	868 x 10^3 m^3
		Em. of Filter	802 x 10^3 m^3
		Em. of Rock	4,367 x 10^3 m^3
		Total Approx. (including coffer dam)	6,200 x 10^3 m^3
Spillway	Type: Shute		
	B: 10.0 m	Ex. In open	595 x 10^3 m^3
	H: 12.5 m	Concrete	47,800 m^3
		Gate	2 sets
Intake	Type: Horizontal		
		Ex. In open	103,000 m^3
		Concrete	6,200 m^3
		Gate	1 set
Intake Tunnel	Type: Circular Pressure		
	D: 3.3 m	Tunnel Ex.	2,000 m^3
	L: 65 m	Lining Conc.	700 m^3
Penstock	Type: Embedded		
	D: 3.3~2.5m	Tunnel Ex.	5,000 m^3
	L: 321 m	Filling Conc.	2,300 m^3
		Steel	600 t
Power house	Type: Underground		
	B: 19.0 m	Cavern Ex.	27,000 m^3
	H: 41.0 m	Concrete	9,100 m^3
	L: 44.5 m	Gate	1 set
Tailrace Tunnel	Type: Horseshoe Non Pressure		
	D: 4.6 m	Tunnel Ex.	212,000 m^3
	L: 7,930 m	Lining Conc.	37,600 m^3
		Gate	1 set

Table 13-22 Main Civil Works of Bağlık Project

Item	Description	Amount of Works	
Dam	Type: Concrete Gravity		
		Ex. In open	147 x 10^3 m^3
		Concrete	195 x 10^3 m^3
	Height: 74 m		
Spillway	Type: Shute		
	B: 14.0 m	Ex. In open	21,000 m^3
	H: 11.0 m	Concrete	9,600 m^3
		Gate	2 sets
Power Intake	Type: Attached to Dam body	Concrete	500 m^3
		Gate	1 set
Penstock	Type: Embedded		
	D: 3.6~3.0 m	Tunnel Ex.	3,000 m^3
	L: 213 m	Filling Conc.	1,300 m^3
		Steel	350 t
Power house	Type: Underground		
	B: 21.0 m	Cavern Ex.	33,000 m^3
	H: 41.5 m	Concrete	10,500 m^3
	L: 50.0 m	Gate	1 set
Tailrace Tunnel	Type: Horseshoe Non Pressure		
	D: 4.9 m	Tunnel Ex.	141,000 m^3
	L: 4,454 m	Lining Conc.	15,100 m^3
		Gate	1 set

Table 13-23 Excavation Works and Wastsoil Disposal Area

Project	Purpose	Mark	Area ($1,000m^2$)	Volume ($1,000m^3$)	Remarks
Bayram Project	Quarry Site	Q	90	4,000	Party within Bayram reservoir
H.W.L.= 740 m	Borrow Area	A	500	-	Alternative Area
	Borrow Area	B	460	-	Alternative Area
	Borrow Area	C	830	1,500	Selected Area
	Disposal Area, Aggregate Plant for Bayram & Bağlık Project	D1	160	2,800	Within Bayram reservoir
	Disposal Area	D2	60	1,100	Within Bayram reservoir
	Disposal Area	D3	30	400	Within Bayram reservoir
	Disposal Area & Concrete Plant	D4	50	900	
	Disposal Area & Penstock Factory for Bayram & Bağlık Project	D5	30	500	
	Disposal Area	D6	20	200	
	Concrete Plant, Grout Plant	T1	2	-	
	Core Stock Pile	T2	20	-	
	Concrete Plant, Camp Facilities	T3	20		
Bağlık Project	Disposal Area	D7	40	400	
H.W.L. = 530 m	Disposal Area	D8	10	100	
	Disposal Area	D9	20	200	
	Disposal Area	D10	20	200	
	Concrete Plant	T4	1	-	
	Concrete Plant, Camp Facilities	T5	10	-	

Table 13-24 Machinery and Equipment for the Project

Item		Machinery and Equipment		Bayram	Bağlık
Dam	Excavation	Wheel loader	7.7m^3 class	3	2
		Dump truck	45/32t class	12	6
		Bulldozer	42/32t class	10	5
		Crawler drill	15m^3/min	2	2
	Embankment	Wheel loader	7.7m^3 class	6	-
		Dump truck	45/32t class	24	-
		Bulldozer	42/32t class	16	-
		Vibratory roller	15t class	6	-
	Concrete	Aggregate plant	150t/h	1	-
		Concrete plant	60m^3/h	1	-
	Dam concrete	Cable crane	13.5t	-	1
		Aggregate plant	150t/h	-	1
		Concrete plant	120m^3/h	-	1
Underground power house	Excavation	Jumbo	2 boom	2	2
		Load haul dump	3.8m^3	3	3
		Shotcrete	10m^3/h	3	3
	Concrete	Concrete pump	85m^3/h	2	2
		Concrete plant	60m^3/h	1	1
	Installation	Crane	120t class	1	1
Tailrace tunnel	Excavation	Jumbo	3 boom	6	4
		Load haul dump	3.8m^3	6	4
		Shotcrete	10m^3/h	6	4
	Concrete	Concrete pump	85m^3/h	6	4
		Concrete plant	60m^3/h	2	1

Table 13-25 Air Temperature and Humidity at Artvin and Şavşat

Month		4	5	6	7	8	9	10
Air temperature (°C)								
Artvin	max.	34.4	36.4	39.0	42.0	43.0	39.4	33.9
	min.	-4.3	-0.6	3.7	9.7	9.8	4.2	-1.6
	mean	12.0	16.1	18.7	20.6	20.6	17.9	13.8
Muratlı	max.	37.8	36.5	41.7	41.1	35.5	35.2	29.0
	min.	-3.2	2.5	2.4	9.9	10.8	4.4	0.4
	mean	11.6	15.5	18.5	20.8	20.5	18.0	13.7
Ardanuç	max.	33.5	36.7	40.5	43.0	42.5	38.8	43.1
	min.	-3.5	1.5	3.0	7.9	7.2	7.2	3.4
	mean	13.0	17.2	20.3	23.2	23.0	23.0	19.8
Şavşat	max.	20.9	31.6	36.0	38.0	38.8	35.1	31.0
	min.	-8.5	-2.0	-4.6	6.0	4.2	0.9	-6.5
	mean	9.6	14.5	17.3	20.2	20.4	16.7	11.4
Humidity (%)								
Şavşat	max.	77	77	74	83	79	69	76
	min.	44	51	51	58	54	54	54
	mean	60	63	64	64	63	61	63
Artvin	max.	70	74	74	84	80	80	77
	min.	48	56	58	65	64	54	52
	mean	61	65	68	72	71	70	66

Table 13-26 Equation and Parameters to be used in Prediction of Water Temperature

Parameter	Case = XX	
B	= 3.00	Width of river(m)
q	= 1,000,000	Density of water (kg/m^3)
Cp	= 4,190.00	Specific heat of water (Ws/kg/centigrade)
Q	= variable	Flow rate (m^3/s)
A	= 49.00	Altitude of sun (degree)
Ea	= 0.00	Water vapor pressure (mmHg)
C	= 0.00	Amount of cloud (0-1)
P	= 1.00	Shading rate (0-1)
Rs	= 0.05	Reflection rate of sun ray (0-1)
D	= 5.67E-08	Stefan-Boltzmann's constant
Ta	= 43.00	
Ke	= 40.00	Resistance quotient of latent heat (W/m^{2}Hg)
TO	= 5.00	Water temperature (centigrade)
X	= 10.00	Definite interval to be used in calculation (m)

Fundamental equation

T'=T+dT/dx'X

T'=Water temperature at next interval (centigrade)
T=Water temperature of definite interval (centigrade)
dT/dx+Water temperature change at definite interval (centigrade)

Related equation

dT/dx=B/(qCpQ)*(Hs-Hsr+Ha-Har-Hb+He+Hc)

Hs=Radiant heat by sun (W/m^2)
Hsc=Reflection of Hs (W/m^2)
Ha=Radiant heat by air (W/m^2)
Har=Reflection of Ha (W/m^2)
Hb=Radiant heat by water surface (W/m^2)
He=Latent heat (W/m^2)(transfer of heat by evaporation)
Hc=Sensible heat (W/m^2)(transfer of heat by conduction)

Hs-Hsr=1390*(sinA)*(10-Y)*(1-0.65C2)*(I-P)*(1-Rs)

Y=0.055*(1+0.053*Ea)*(cosecA)

Ha-Har=0.97*D*(Ta+273)4*(Ca+0.031*Ea0.5)

Ca=0.74*(2.67*(35.6-Ta)/(10(5.35-2.8*Z))

Z=1-0.65*C^2

Hb=0.97*D*(T+273)4

He=Ke*(Ea-Ew)

Hc=0.5*Ke*(Ta-T)

Equation to be used to calculate saturated water vapor pressure

E=10(-2613/(T+273)-0.003499(T+273)+11.1844)

(E: Saturated water vapor pressure (mmHg))

Ea=E*Ha/100

(Ha : Lelative humidity (%), T * Air temperature (centrigrade))

Table 13-27 Some Limitations on Water Temperature for Carp (Cyprinus Carpio)

Item	Range (°C)
Suitable temperature for egg hatching	14-30(18-22), (20-22)
Growth	20-28
Temperature to pass winter	7<
Suitable range for spawning	14-20, 18-20
Egg hatching rate	24 (50%)
Temperature fluctuation from 20°C	
15°C up	0 % in spawning
12°C down	0% in spawning
Up from temperature less than 10°C	no influence
Down from the temperature less than 7°C	no influence
Suitable range to live to be assumed	higher than 14°C and lower than 28°C

Source; Ecological data of aquatic organisms, Japan (1983)

Table 13-28 Value of Parameter to be used in Estimation of Water Temperature

By using monthly maximum temperature value from 1949 to 1985 at Artvin		
Case 1	Air temperature	43°C (July :42°C , August: 43°C)
	Humidity	82 % (July :84 % , August: 80%)
Case 2	Air temperature	34°C (April)
	Humidity	70 % (April)
By using monthly mean temperature value from 1949 to 1985 at Artvin		
Case 3	Air temperature	21°C (July: 21°C, August: 21°C)
	Humidity	72% (July: 72%, August: 71%)
Case 4	Air temperature	12°C (April)
	Humidity	61% (April)

Shading rate of sun light

0 % , 50 %, 100 %

River width 3 m

Discharge from dam : 0.1 ,0.3 , 0.4 , 0.5 , 0.7 , 1.0 m^3/sec

5°C(Data from Tortum Lake)

Table 13-29 Estimated Monthly Mean Discharge between Bayram and Kaledüzü Dam Site

Sub-basin between Bayram and Kaledüzu Dam

Catchment Area :55 km^2 (m^3/sec)

Year	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Ave.
1942	0.7	1.4	0.7	0.6	0.8	1.2	5.3	5.5	2.5	1.2	0.6	0.5	1.8
1943	0.6	0.7	0.7	0.5	0.5	0.6	1.8	2.6	1.7	0.9	0.5	0.4	1.0
1944	0.5	0.5	0.5	0.4	0.5	1.1	1.8	5.9	3.0	1.7	0.6	0.5	1.4
1945	0.4	0.5	0.3	0.3	0.3	0.4	1.4	2.5	2.0	0.8	0.4	0.3	0.8
1946	0.3	0.3	0.3	0.4	0.3	0.5	1.7	2.7	2.3	1.1	0.7	0.4	0.9
1947	0.6	0.5	0.4	0.4	0.4	1.1	1.7	1.3	1.0	0.5	0.3	0.3	0.7
1948	0.3	0.6	0.4	0.4	0.4	0.4	1.8	2.6	2.4	0.7	0.4	0.4	0.9
1949	0.4	0.3	0.3	0.3	0.3	0.5	1.1	2.5	1.4	0.5	0.3	0.3	0.7
1950	0.3	0.3	0.3	0.3	0.3	0.6	2.2	2.6	1.5	0.8	0.4	0.3	0.8
1951	0.5	0.4	0.4	0.3	0.3	0.5	1.7	2.1	1.8	0.7	0.4	0.4	0.8
1952	0.8	0.6	0.4	0.4	0.5	0.6	2.3	2.5	1.8	1.0	0.5	0.4	1.0
1953	0.3	0.3	0.3	0.3	0.3	0.4	1.6	2.6	1.9	0.9	0.5	0.5	0.8
1954	0.4	0.4	0.3	0.3	0.4	0.7	2.3	3.5	2.6	1.4	0.6	0.4	1.1
1955	0.4	0.4	0.3	0.3	0.3	0.4	1.0	1.5	0.9	0.3	0.2	0.2	0.5
1956	0.2	0.2	0.2	0.2	0.4	0.4	1.7	2.1	1.9	0.8	0.4	0.3	0.7
1957	0.3	0.3	0.2	0.2	0.3	0.8	1.8	2.5	2.1	0.9	0.4	0.3	0.8
1958	0.3	0.3	0.3	0.3	0.3	0.6	1.8	2.6	1.9	0.8	0.4	0.4	0.8
1959	0.3	0.3	0.3	0.3	0.3	0.7	1.8	3.1	2.4	1.0	0.5	0.4	1.0
1960	0.6	0.5	0.4	0.7	1.2	1.7	4.1	4.5	2.8	1.4	0.6	0.4	1.6
1961	0.4	0.3	0.3	0.2	0.2	0.4	1.8	2.0	1.4	0.4	0.2	0.2	0.6
1962	0.2	0.3	0.4	0.3	0.4	1.3	2.3	2.9	1.9	0.8	0.4	0.3	1.0
1963	0.3	0.4	0.4	0.4	0.4	0.6	3.3	5.0	4.7	2.4	1.0	0.5	1.6
1964	0.4	0.4	0.4	0.3	0.4	0.8	2.5	3.6	2.7	0.8	0.4	0.4	1.1
1965	0.6	0.4	0.6	0.4	0.4	1.4	2.8	3.2	2.3	0.9	0.3	0.2	1.1
1966	0.7	0.7	0.5	0.5	0.6	0.8	2.3	3.7	1.9	0.8	0.3	0.3	1.1
1967	0.2	0.2	0.2	0.2	0.2	0.5	1.8	3.8	2.0	1.6	0.7	0.5	1.0
1968	0.4	0.5	1.2	0.7	0.7	1.3	6.2	6.8	3.4	1.5	0.7	0.6	2.0
1969	0.5	0.5	0.5	0.3	0.3	0.8	2.6	4.0	1.4	0.5	0.3	0.3	1.0
1970	0.8	0.4	0.4	0.4	0.5	0.9	2.4	2.1	0.9	0.5	0.4	0.4	0.8
1971	0.8	0.5	0.5	0.4	0.5	1.1	1.7	3.3	2.2	0.7	0.6	0.2	1.0
1972	0.4	0.4	0.5	0.4	0.4	0.7	3.1	2.8	2.6	1.1	0.5	0.5	1.1
1973	0.5	0.5	0.4	0.3	0.5	0.6	1.7	3.2	2.5	1.1	0.4	0.3	1.0
1974	0.3	0.5	0.4	0.3	0.3	0.8	1.3	3.2	1.6	0.4	0.3	0.5	0.8
1975	0.3	0.3	0.3	0.3	0.3	0.8	3.0	2.6	1.9	0.6	0.3	0.3	0.9
1976	0.4	0.3	0.3	0.3	0.3	0.8	2.7	4.3	2.9	1.3	0.5	0.4	1.2
1977	0.6	0.5	0.4	0.3	0.4	0.6	1.7	3.1	2.1	0.9	0.4	0.4	0.9
1978	0.5	0.4	0.3	0.3	0.5	0.9	2.5	4.1	2.7	1.2	0.5	0.3	1.2
1979	0.4	0.4	0.4	0.4	0.6	0.8	2.0	3.3	2.7	1.3	0.5	0.3	1.1
1980	0.4	0.8	0.6	0.4	0.4	1.0	3.3	3.7	1.5	0.6	0.4	0.3	1.1
1981	0.4	0.4	0.4	0.3	0.4	0.7	1.5	2.8	3.3	1.1	0.5	0.4	1.0
1982	0.4	0.5	0.5	0.4	0.4	0.5	1.9	2.4	1.1	0.7	0.5	0.3	0.8
1983	0.5	0.5	0.3	0.3	0.3	1.1	2.6	3.4	2.2	0.7	0.2	0.2	1.0
1984	0.5	0.8	0.4	0.4	0.4	1.2	2.0	2.7	1.6	1.0	0.4	0.3	1.0
1985	0.2	0.3	0.3	0.3	0.3	1.0	3.8	3.6	1.2	0.4	0.3	0.5	1.0
1986	0.8	0.6	0.5	0.4	0.5	1.0	2.9	3.1	2.8	1.1	0.3	0.3	1.2
1987	0.3	0.3	0.3	0.3	1.0	0.7	3.6	5.0	2.3	0.4	0.4	0.6	1.3
1988	0.4	0.4	0.4	0.5	0.7	1.8	4.6	5.4	3.3	1.5	0.8	0.7	1.7
1989	1.0	0.9	0.7	0.5	0.6	3.7	6.2	3.9	2.2	0.7	0.2	0.3	1.7
1990	0.3	0.3	0.3	0.2	0.3	1.0	2.5	4.0	1.9	0.9	0.3	0.3	1.0
1991	0.4	0.7	0.4	0.3	0.4	1.5	2.6	2.0	1.5	0.7	0.3	0.2	0.9
1992	0.2	0.2	0.3	0.3	0.3	0.7	2.9	3.0	3.8	1.0	0.5	0.4	1.1
1993	1.1	1.1	0.5	0.5	0.5	0.9	3.7	4.7	3.4	1.0	0.4	0.4	1.5
1994	0.3	0.9	0.5	0.5	0.5	1.3	3.6	2.5	1.4	0.5	0.3	0.3	1.1
Ave.	0.5	0.5	0.4	0.4	0.4	0.9	2.5	3.3	2.2	0.9	0.4	0.4	1.1

Table 13-30 Estimated Monthly Mean Discharge between Bağlik Dam Site and G.S.No.2334

Sub-basin between Bağlik Dam and G.S.No.2334

Catchment Area :32 km^2 (m^3/sec)

Year	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Ave.
1942	0.4	0.6	0.4	0.4	0.4	0.6	1.7	1.7	1.0	0.6	0.4	0.3	0.7
1943	0.3	0.4	0.4	0.3	0.3	0.3	0.8	1.0	0.7	0.5	0.3	0.3	0.5
1944	0.3	0.3	0.3	0.3	0.3	0.5	0.8	1.8	1.1	0.7	0.3	0.3	0.6
1945	0.3	0.3	0.2	0.2	0.2	0.2	0.6	1.0	0.8	0.4	0.3	0.2	0.4
1946	0.2	0.2	0.2	0.3	0.2	0.3	0.7	1.0	0.9	0.5	0.4	0.3	0.4
1947	0.4	0.3	0.2	0.2	0.3	0.5	0.7	0.6	0.5	0.3	0.2	0.2	0.4
1948	0.2	0.3	0.3	0.2	0.2	0.3	0.8	1.0	0.9	0.4	0.3	0.3	0.4
1949	0.3	0.2	0.2	0.2	0.2	0.3	0.5	1.0	0.6	0.3	0.2	0.2	0.4
1950	0.2	0.2	0.2	0.2	0.2	0.3	0.9	1.0	0.7	0.4	0.3	0.2	0.4
1951	0.3	0.3	0.2	0.2	0.2	0.3	0.7	0.8	0.8	0.4	0.3	0.3	0.4
1952	0.4	0.3	0.3	0.3	0.3	0.3	0.9	1.0	0.8	0.5	0.3	0.2	0.5
1953	0.2	0.2	0.2	0.2	0.2	0.2	0.7	1.0	0.8	0.5	0.3	0.3	0.4
1954	0.3	0.3	0.2	0.2	0.3	0.4	0.9	1.2	1.0	0.6	0.3	0.3	0.5
1955	0.3	0.2	0.2	0.2	0.2	0.3	0.5	0.7	0.5	0.2	0.2	0.2	0.3
1956	0.2	0.2	0.2	0.2	0.2	0.3	0.7	0.8	0.8	0.4	0.2	0.2	0.4
1957	0.2	0.2	0.2	0.2	0.2	0.4	0.8	1.0	0.9	0.4	0.3	0.2	0.4
1958	0.2	0.2	0.2	0.2	0.2	0.3	0.8	1.0	0.8	0.4	0.2	0.2	0.4
1959	0.2	0.2	0.2	0.2	0.2	0.4	0.8	1.1	0.9	0.5	0.3	0.3	0.5
1960	0.3	0.3	0.3	0.4	0.6	0.7	1.4	1.5	1.0	0.6	0.4	0.3	0.6
1961	0.2	0.2	0.2	0.2	0.2	0.3	0.8	0.8	0.6	0.2	0.2	0.2	0.3
1962	0.2	0.2	0.3	0.2	0.3	0.6	0.9	1.1	0.8	0.4	0.2	0.2	0.5
1963	0.2	0.2	0.2	0.3	0.3	0.3	1.2	1.6	1.5	0.9	0.5	0.3	0.6
1964	0.3	0.3	0.2	0.2	0.2	0.4	1.0	1.3	1.0	0.4	0.3	0.3	0.5
1965	0.3	0.3	0.3	0.3	0.2	0.6	1.1	1.2	0.9	0.5	0.2	0.2	0.5
1966	0.4	0.4	0.3	0.3	0.4	0.4	0.9	1.3	0.8	0.4	0.2	0.2	0.5
1967	0.2	0.2	0.2	0.2	0.2	0.3	0.8	1.3	0.8	0.7	0.4	0.3	0.5
1968	0.3	0.3	0.6	0.4	0.4	0.6	1.9	2.0	1.2	0.7	0.4	0.3	0.7
1969	0.3	0.3	0.3	0.2	0.2	0.4	1.0	1.4	0.6	0.3	0.2	0.2	0.5
1970	0.4	0.3	0.3	0.3	0.3	0.4	0.9	0.8	0.5	0.3	0.2	0.3	0.4
1971	0.4	0.3	0.3	0.2	0.3	0.5	0.7	1.2	0.9	0.4	0.3	0.2	0.5
1972	0.3	0.3	0.3	0.2	0.3	0.4	1.1	1.1	1.0	0.5	0.3	0.3	0.5
1973	0.3	0.3	0.2	0.2	0.3	0.4	0.7	1.2	1.0	0.5	0.2	0.2	0.5
1974	0.2	0.3	0.2	0.2	0.2	0.4	0.6	1.2	0.7	0.3	0.2	0.3	0.4
1975	0.2	0.2	0.2	0.2	0.2	0.4	1.1	1.0	0.8	0.3	0.2	0.2	0.4
1976	0.3	0.2	0.2	0.2	0.2	0.4	1.0	1.4	1.1	0.6	0.3	0.3	0.5
1977	0.4	0.3	0.3	0.2	0.2	0.3	0.7	1.1	0.8	0.4	0.3	0.2	0.4
1978	0.3	0.3	0.2	0.2	0.3	0.5	1.0	1.4	1.0	0.6	0.3	0.2	0.5
1979	0.2	0.3	0.3	0.3	0.3	0.4	0.8	1.2	1.0	0.6	0.3	0.2	0.5
1980	0.3	0.4	0.3	0.3	0.3	0.5	1.2	1.3	0.7	0.3	0.3	0.2	0.5
1981	0.3	0.3	0.3	0.2	0.3	0.4	0.7	1.0	1.2	0.5	0.3	0.3	0.5
1982	0.3	0.3	0.3	0.3	0.2	0.3	1.1	1.4	0.6	0.4	0.3	0.2	0.5
1983	0.3	0.3	0.2	0.2	0.2	0.7	1.6	2.0	1.3	0.4	0.1	0.1	0.6
1984	0.3	0.5	0.2	0.2	0.2	0.7	1.2	1.6	0.9	0.6	0.3	0.1	0.6
1985	0.1	0.2	0.2	0.1	0.2	0.6	2.2	2.2	0.7	0.2	0.2	0.3	0.6
1986	0.5	0.3	0.3	0.2	0.3	0.6	1.7	1.9	1.6	0.6	0.1	0.2	0.7
1987	0.2	0.2	0.2	0.2	0.6	0.4	2.2	2.9	1.4	0.2	0.2	0.3	0.7
1988	0.2	0.2	0.2	0.3	0.4	1.1	2.7	3.2	2.0	0.9	0.5	0.4	1.0
1989	0.6	0.5	0.4	0.3	0.3	2.2	3.6	2.3	1.3	0.4	0.1	0.2	1.0
1990	0.2	0.2	0.2	0.1	0.2	0.5	1.4	2.3	1.7	0.6	0.2	0.2	0.6
1991	0.2	0.5	0.3	0.2	0.2	0.8	1.1	1.0	1.3	0.5	0.2	0.1	0.5
1992	0.1	0.2	0.2	0.1	0.1	0.4	1.7	3.1	1.2	0.8	0.2	0.2	0.7
1993	1.0	0.8	0.5	0.3	0.4	0.6	1.6	3.3	1.4	0.6	0.3	0.2	0.9
1994	0.1	0.3	0.2	0.2	0.2	0.7	1.9	1.6	0.8	0.4	0.2	0.1	0.6
Ave.	0.3	0.3	0.3	0.2	0.3	0.5	1.1	1.4	1.0	0.5	0.3	0.2	0.5

Table 13-31 Reservoir Operation of Bayram Project

Unit $10^6 m^3$

	Year	Inflow	Evaporation	Power Discharge	Environment Discharge	Spill	Total Outflow
1	1942	998.64	2.82	719.10	3.97	243.33	969.22
2	1943	549.41	2.73	551.56	3.97	0.00	558.27
3	1944	803.53	2.70	636.47	3.97	154.57	797.71
4	1945	457.91	2.65	468.71	3.97	0.00	475.32
5	1946	525.01	2.58	502.90	3.97	0.00	509.46
6	1947	406.79	2.57	430.93	3.97	0.00	437.47
7	1948	512.54	2.51	486.49	3.97	0.00	492.98
8	1949	389.08	2.49	397.35	3.97	0.00	403.82
9	1950	464.57	2.46	450.70	3.97	0.00	457.13
10	1951	458.18	2.57	442.51	3.97	0.00	449.05
11	1952	557.13	2.68	552.22	3.97	0.00	558.87
12	1953	463.30	2.54	450.80	3.97	0.00	457.31
13	1954	628.09	2.66	598.47	3.97	19.74	624.83
14	1955	296.56	2.39	338.58	3.97	0.00	344.94
15	1956	421.05	2.35	382.20	3.97	0.00	388.52
16	1957	478.52	2.49	470.73	3.97	0.00	477.19
17	1958	471.40	2.52	464.70	3.97	0.00	471.18
18	1959	552.19	2.56	534.24	3.97	0.00	540.77
19	1960	895.78	2.83	712.87	3.97	173.19	892.86
20	1961	369.76	2.48	404.57	3.97	0.00	411.02
21	1962	551.52	2.42	518.96	3.97	0.00	525.36
22	1963	914.65	2.65	666.12	3.97	223.16	895.90
23	1964	617.20	2.67	599.86	3.97	24.67	631.17
24	1965	643.13	2.64	651.25	3.97	1.82	659.68
25	1966	614.92	2.61	595.66	3.97	7.20	609.44
26	1967	571.85	2.51	523.54	3.97	14.44	544.46
27	1968	1,139.87	2.85	740.53	3.97	389.40	1,136.75
28	1969	571.95	2.65	578.12	3.97	24.88	609.62
29	1970	476.69	2.55	461.20	3.97	0.00	467.72
30	1971	600.41	2.66	583.48	3.97	0.00	590.11
31	1972	642.03	2.67	614.86	3.97	12.66	634.16
32	1973	567.68	2.63	573.73	3.97	3.29	583.62
33	1974	472.67	2.50	465.15	3.97	0.00	471.63
34	1975	519.29	2.50	517.89	3.97	0.00	524.36
35	1976	690.13	2.56	597.28	3.97	72.54	676.35
36	1977	535.96	2.64	532.77	3.97	0.00	539.38
37	1978	683.62	2.64	618.08	3.97	54.10	678.78
38	1979	618.21	2.63	603.55	3.97	14.11	624.26
39	1980	635.32	2.69	592.24	3.97	39.33	638.23
40	1981	579.29	2.60	524.79	3.97	38.54	569.90
41	1982	455.55	2.63	454.67	3.97	0.00	461.27
42	1983	583.47	2.57	595.99	3.97	0.00	602.53
43	1984	552.32	2.56	530.36	3.97	0.00	536.90
44	1985	577.63	2.55	523.51	3.97	54.25	584.28
45	1986	677.79	2.64	646.56	3.97	26.28	679.45
46	1987	720.80	2.60	570.16	3.97	131.83	708.55
47	1988	975.42	2.77	700.15	3.97	245.93	952.83
48	1989	992.47	2.87	698.96	3.97	320.75	1,026.55
49	1990	593.79	2.51	560.00	3.97	24.35	590.83
50	1991	524.41	2.56	519.39	3.97	0.00	525.92
51	1992	643.85	2.48	560.75	3.97	61.61	628.80
52	1993	861.65	2.82	685.73	3.97	172.86	865.37
53	1994	601.54	2.70	605.54	3.97	1.95	614.15
Total		32,106.39	138.15	29,206.82	210.64	2,550.77	32,106.37
Ave.		605.78	2.61	551.07	3.97	48.13	605.78
Max.		1,139.87	2.87	740.53	3.97	389.40	1,136.75
Min.		296.56	2.35	338.58	3.97	0.00	344.94

Table 13-32 Reservoir Operation of Bağlık Project

Unit $10^6 m^3$

	Year	Inflow	Evaporation	Power Discharge	Environment Discharge	Spill	Total Outflow
1	1942	1,216.32	0.34	921.08	3.97	289.92	1,215.32
2	1943	717.37	0.35	713.05	3.97	0.00	717.37
3	1944	1,003.39	0.35	811.68	3.97	187.40	1,003.39
4	1945	610.83	0.35	606.53	3.97	0.00	610.85
5	1946	659.85	0.35	655.51	3.97	0.00	659.83
6	1947	563.73	0.35	559.70	3.97	0.00	564.01
7	1948	640.77	0.35	636.17	3.97	0.00	640.48
8	1949	523.52	0.34	519.21	3.97	0.00	523.53
9	1950	592.58	0.34	588.80	3.97	0.00	593.11
10	1951	585.26	0.35	580.41	3.97	0.00	584.73
11	1952	718.18	0.35	713.86	3.97	0.00	718.18
12	1953	593.43	0.34	589.12	3.97	0.00	593.43
13	1954	796.40	0.35	762.55	3.97	29.54	769.40
14	1955	443.75	0.34	440.44	3.97	0.00	444.75
15	1956	514.93	0.34	509.64	3.97	0.00	513.95
16	1957	615.99	0.34	611.68	3.97	0.00	615.99
17	1958	608.88	0.34	604.54	3.97	0.00	608.86
18	1959	696.67	0.35	692.35	3.97	0.00	696.67
19	1960	1,121.07	0.35	913.10	3.97	203.65	1,121.07
20	1961	524.73	0.34	521.42	3.97	0.00	525.73
21	1962	680.86	0.34	675.55	3.97	0.00	679.86
22	1963	1,122.23	0.35	847.99	3.97	269.93	1,122.23
23	1964	799.51	0.35	760.10	3.97	35.10	799.51
24	1965	834.53	0.34	814.16	3.97	17.06	835.53
25	1966	779.58	0.34	755.43	3.97	19.84	779.58
26	1967	701.94	0.34	668.23	3.97	28.41	700.94
27	1968	1,406.78	0.35	941.80	3.97	460.66	1,406.77
28	1969	767.65	0.34	720.05	3.97	44.29	768.65
29	1970	609.22	0.34	603.90	3.97	0.00	608.22
30	1971	758.38	0.34	744.36	3.97	10.70	759.38
31	1972	809.96	0.34	776.41	3.97	28.23	808.96
32	1973	742.95	0.35	732.46	3.97	6.70	743.48
33	1974	610.06	0.34	597.04	3.97	8.17	609.53
34	1975	671.35	0.34	660.99	3.97	6.89	672.18
35	1976	858.65	0.34	761.76	3.97	91.74	857.81
36	1977	692.61	0.35	688.29	3.97	0.00	692.61
37	1978	861.40	0.35	785.73	3.97	71.36	861.40
38	1979	794.73	0.35	766.36	3.97	24.58	795.26
39	1980	811.01	0.35	743.44	3.97	62.73	810.49
40	1981	731.18	0.35	683.37	3.97	43.48	731.16
41	1982	616.21	0.34	612.90	3.97	0.00	617.21
42	1983	801.04	0.34	748.12	3.97	48.61	801.04
43	1984	724.86	0.34	720.55	3.97	0.00	724.86
44	1985	781.64	0.34	653.61	3.97	122.73	780.64
45	1986	911.06	0.34	818.53	3.97	89.22	912.06
46	1987	954.90	0.34	725.47	3.97	224.12	953.90
47	1988	1,288.18	0.35	908.33	3.97	375.54	1,288.18
48	1989	1,367.41	0.34	906.57	3.97	457.53	1,368.41
49	1990	800.34	0.34	732.95	3.97	63.08	800.34
50	1991	699.94	0.34	687.48	3.97	8.15	699.94
51	1992	854.63	0.34	739.07	3.97	110.25	853.63
52	1993	1,170.14	0.35	901.59	3.97	264.23	1,170.14
53	1994	801.02	0.34	755.10	3.97	42.64	802.05
Total		41,563.74	18.19	37,588.42	210.64	3,746.50	41,563.73
Ave.		784.22	0.34	709.22	3.97	70.69	784.22
Max.		1,046.78	0.35	941.98	3.97	460.66	1,406.77
Min.		443.75	0.34	440.44	3.97	0.00	444.75

Table 13-33 Content of Expropriation for Dam-Reservoir Area on Bayram Project

Elevation (m)	Agriculture Land (da)	House and Public Facility
630-640	--	Concrete house(2)
640-650	ST2(10.3)	--
650-660	KT3(0.8)	House(5)
660-670	ST2(6.8),ST3(5.5),MbK(2.0)	House(3)
670-680	ST1(2.5),ST2(15.8),ST3(7.8) Mbk(4.0),KTT2(6.3),KTT3(2.3), KT3(2.0)	House(17)
680-690	ST1(13.0),ST2(7.5),ST3(9.5), Mbk(2.5),KTT2(0.8)	Primary school and lodge Mosque, Road maintenance building and waterhouse, House(13), Concrete house(5) Shop(4)
690-700	ST2(8.0),ST3(9.5),Mbk(1.8), KT3(4.0)	House(6)
770-710	ST2(10.5),ST3(11.5),KT3(24.0)	House(6)
710-720	ST2(3.5),ST3(10.3),KTT3(8)	House(2)
730-740	ST2(12.0),ST3(18.75)	Concrete house(6)
Total	ST1(15.5),ST2(90.65),ST3(74.85), KTT2(9.1),KTT3(2.3),KT3(6.8), Mbk(10.3)	House(52), Concrete house(13), Primary school(1), and lodge(1), Road maintenance building(1) and warehouse(1), Shop(4)
Area total	239.5 da	Dwelling area total: 4.4 da

Total area to be expropriated: 243.9 da

Legend: ST 1, 2 and 3, Irrigated land class 1,2 and 3, KTT 2 and 3, Non irrigated land class 2 and 3. Mbk, Orchard, KT, Non utilized land.

Table 13-34 Land Expropriation Value for Dam-Reservoir Area on Bayram Project

Elevation (m)	Expropriation Value (10^6 TL)	Actual Payment Value (10^6 TL)	Net Income Losses (10^6 TL)
630-640	1,147.49	1,032.24	77.46
640-650	1,520.15	1,520.15	50.67
650-660	1,194.51	1,075.47	0.09
660-670	4,317.68	4,081.91	223.24
670-680	11,767.21	11,061.89	628.06
680-690	25,430.44	23,399.78	1,538.72
690-700	5,551.13	5,249.10	286.94
700-710	5,997.47	5,682.78	366.52
710-720	2,459.56	2,375.74	110.50
720-730	2,476.87	2,476.87	81.91
730-740	7,464.49	7,089.34	376.93
Total			
TL in 1995 price	69,327.00	65,045.27	3,681.04
US$	1,378 x 10^3		

Table 13-35 Land Expropriation Value for Dam-Reservoir Area on Bağlık Project

Elevation (m)	Expropriation Value (10^6 TL)	Actual Payment Value (10^6 TL)	Net Income Losses (10^6 TL)
460-530	0.00	0.00	0.00

Table 13-36 Content of Expropriation of Borrow and Waste Soil Dumping Site

Bağlık Project (No: da)	Agricultural Land (da)	House and Public Facility
Disposal (D8: 10)		
Disposal (D9: 20)		
Disposal (D10: 10)		
Concrete, Grout Plant (T4: 1)		
Camp, concrete Plant (T5: 5)		

Bayram Project	Agricultural Land (da)	House and Public Facility
Borrow Area (C: 870)	KT3(105.25)	House(12), concrete(47), Mosque(1)
Quarry Site (Q: 90)		
Disposal, concrete Plant Yard (D4: 50)		
Disposal, Penstock Factory (D5: 30)		
Disposal, Concrete Plant yard (D6: 20)		
Disposal (D7: 30)		
Grout Plant Yard (T1: 1)		
Stock Pile Yard (T2: 20)		
Camp and concrete Plant Yard (T3: 20)		

Remarks: Disposal area and other yards will be given back to original owner after finishing utilization for construction works by land leveling and arrangement.

Table 13-37 Land Expropriation Value and Net Income Losses

	Expropriation Value (10^6 TL)	Actual Payment Value (10^6 TL)	Net Income Losses (10^6 TL)
Bağlık Project			
460-530 m	0.00	0.00	0.00
Disposal (D8)			
Disposal (D9)			
Disposal (D10)			
Concrete, grout plant (T4)			
Camp, concrete plant (T5)			
Bayram Project			
630-740m	69,327.00	65,045.27	3,681.04
Quarry site (Q)			
Borrow area (C)	34,465.70 (685×10^3 US$)	31,229.29	2,318.10
Disposal, concrete plant (D4)			
Disposal, Penstock factory (D5)			
Disposal, concrete plant (D6)			
Disposal (D7)			
Grout plant (T1)			
Stock pile (T2)			
Camp and concrete plant (T3)			
Total TL in 1995 price	103,972.70	96,274.56	5,999.14
US$	$2,063 \times 10^3$		

Table 13-38 Relocation and Improvement Cost for Public Facilities

Item				Cost (US$)
Road	Bağlık Project	Relocation	14.0km	$8,400 \times 10^3$
		Improvement	7.75 km	$3,255 \times 10^3$
	Bayram project	Relocation	5.7 km	$3,420 \times 10^3$
		Improvement	7.95 km	$3,339 \times 10^3$
Electricity Line	Bayram-Bağlık Route	6km		176×10^3
	Bağlık-Deriner Route	20 km		586×10^3
Telephone Line	Bayram-Bağlık Route	6 km		4×10^3
	Bağlık-Deriner Route	20 km		12×10^3

Table 13-39 Environmental Preservation Measures

Items	Preservation measures	Amount	Cost (10^3US$)
Savail Borrow Area	Drainage Channel	2,000 m	300*-1
	Slope protection	15,000 m^2	150*-1
Wast Water of Camp	Treatment Plant	2 units	90*-2
Wast Water of Concrete Plant	Settling Basin	4 units	60*-3
2 Water Reduction Sections (Bayram and Bağlık Project)	Discharge	0.3~0.7 m^3/sec	3 months of dry season

*-1: Included into unit cost of embankment of impervious core

*-2 Included into unit cost of embankment of impervious core

*-3 Included into unit cost of concrete