

REPUBLICA DE CHILE
MINISTERIO DE OBRAS PUBLICAS
DIRECCION GENERAL DE AGUAS



ANALISIS REDES VIGILANCIA CALIDAD AGUAS TERRESTRES
ESTADISTICA HIDROQUIMICA NACIONAL. ETAPA I.

CUARTA REGION

PREPARADO POR:
AYALA, CABRERA Y ASOCIADOS LTDA.

DEPARTAMENTO DE CONSERVACION Y PROTECCION
DE RECURSOS HIDRICOS

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MINISTERIO DE OBRAS PUBLICAS
DIRECCION GENERAL DE AGUAS
DEPARTAMENTO DE CONSERVACION Y
PROTECCION DE RECURSOS HIDRICOS

Director General de Aguas	: Abog. Gustavo Manríquez C.
Sub-Director General de Aguas	: Ing. Andrés Benítez G.
Jefe Departamento	: Ing. Carlos Salazar M.
Inspección Fiscal	: Ing. Alberto Merino G.

AYALA, CABRERA Y ASOCIADOS LTDA.

Jefe de Proyecto	: Ing. Jorge Castillo G.
Profesionales	: Ing. Guillermo Cabrera F. Ing. Felipe Espinoza C.

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ANEXO

IV^a REGION

1. INTRODUCCION

Dado que la calidad de las aguas es tan importante como la cantidad de ésta, tanto para el riego como el consumo humano y animal, la Dirección General de Aguas del Ministerio de Obras Públicas tiene funcionando una red de calidad de aguas con el fin de caracterizar las aguas superficiales en todo el país desde el punto de vista físico-químico.

Debido a que la red de calidad de aguas que actualmente opera la Dirección General de Aguas está orientada a proveer información de carácter general, es que no permite la completa detección y vigilancia de problemas de contaminación existentes. Por lo anterior, se hace necesario disponer de información cada vez más elaborada en base a los antecedentes reunidos por las estaciones de muestreo de la red.

Para lograr el objetivo general antes indicado, se realizó el presente estudio, cuyos objetivos específicos fueron los siguientes:

- a) Efectuar el ordenamiento y procesamiento de toda la información de calidad de aguas, disponible en el Banco Nacional de Aguas y en el Laboratorio Ambiental de la DGA, desde 1980 a la fecha.
- b) Representar gráficamente la estadística hidroquímica nacional, con el objeto de apreciar en forma rápida y clara las características físico-químicas de las aguas superficiales.

Con el fin de lograr los objetivos anteriores se evaluó la información disponible en el Banco Nacional de Aguas y en el Laboratorio Ambiental, en relación al volumen de información, al grado de procesamiento y accesibilidad de ésta. De esta evaluación se concluyó que toda la información necesaria para realizar el estudio se encuentra correctamente procesada de modo que puede usarse directamente en el estudio y plenamente accesible.

En el presente informe, se presenta la información correspondiente a la Cuarta Región.

En el Capítulo 2 se presenta lo relativo a la recopilación de antecedentes, la metodología para el procesamiento de la información, la información procesada; y en el Capítulo 3 se entrega una breve caracterización de las aguas superficiales de la región, en función de los antecedentes recopilados en este estudio.

2. METODOLOGIA PARA EL PROCESAMIENTO DE LA INFORMACION

2.1 Recopilación de Antecedentes

Como primera actividad del estudio, se procedió a recopilar los antecedentes de calidad de aguas disponibles tanto en el Banco Nacional de Aguas (BNA), como en el Laboratorio Ambiental de la Dirección de Aguas.

En el BNA se encontraron ingresados los antecedentes de calidad correspondientes al período 1980-1989. La información posterior se encontró en el Laboratorio Ambiental DGA en forma de tablas de datos que hubo que traspasar a planillas de cálculo para su posterior uso.

2.2 Análisis de los Antecedentes Recopilados

Luego de la etapa anterior, se procedió al ensamble de los antecedentes recopilados en el BNA y en el laboratorio.

En el BNA se encontró información relativa a los siguientes parámetros:

Temperatura
pH
Conductividad
Cloro
Cloruro
CO₃⁻
HCO₃⁻
SO₄⁻
Ca dis
Mg dis
K dis
Na dis
B
As tot
Cu tot
Fe tot
N/NO₃
N/NO₂
N/NH₃
P/PO₄
SiO₂

En cambio los antecedentes recopilados en el laboratorio sólo indican los siguientes parámetros:

Temperatura
pH
Conductividad
Cloruro
CO₃⁻
HCO₃⁻
SO₄⁻
Ca
Mg
K
Na
B
As
Cu
Fe
N/NO₃
P/PO₄

Por lo tanto, al combinar la información del BNA con la del laboratorio se encontraron algunas discrepancias. Para solucionarlas se realizó una reunión con la Jefe del Laboratorio Ambiental de la DGA, en la cual se hicieron las siguientes observaciones:

- En el laboratorio sólo se determinan cloruros y no cloro, por lo tanto los antecedentes de cloro y cloruros encontrados en el BNA son en realidad cloruros, y la única diferencia entre ellos corresponde al método de laboratorio empleado.

- En el laboratorio no se realiza determinación de elementos totales o disueltos, sino que sólo de elementos extractables, es decir, una cantidad de material que queda comprendido entre el material total y el disuelto. Por lo tanto se asumió que los valores indicados como totales y disueltos en el BNA correspondían al mismo tipo de parámetros, lo que fue confirmado dado que los datos numéricos tenían los mismos órdenes de magnitud.

De esta forma se consideran para el análisis final un total de 16 parámetros, que son los mismos que se analizan actualmente en el laboratorio.

Por otro lado, dado que los análisis de laboratorio se realizan con posterioridad a la toma de muestras, es que en algunos

muestreos no se cumple la relación entre pH-carbonatos-bicarbonatos. Esta regla indica que si el pH es menor o igual a 8,3 no deberían encontrarse carbonatos en el agua, y si el pH es menor o igual a 4,5 tampoco se deberían encontrar bicarbonatos. Por lo tanto, al analizar los datos en forma individual, es necesario tomar en cuenta esta condición para no considerar a priori que los datos presentados están incorrectos.

Por último, es necesario indicar que en algunos muestreos aparece un valor dado por "<X". Lo anterior significa que el método de laboratorio empleado no permite discriminar cantidades menores a X de sustancia presente en la muestra y que el valor es a lo sumo X. Generalmente el valor anterior es bastante pequeño, y varía en el tiempo, al variar los métodos de laboratorio empleados para la determinación de los parámetros.

2.3 Análisis de la Información por Región

Luego de realizar el ensamble de los antecedentes, se realizó el conteo de la información recopilada, y se determinó el número total de estaciones por región, según lo indicado en el BNA; el número de muestreos por estación y el número de parámetros muestreados.

En este conteo se determinaron 85 estaciones en la región, de las cuales 70 tienen al menos un muestreo, ya sea completo o incompleto. Por otra parte existen antecedentes de otras estaciones que no aparecen identificadas en el BNA, de las cuales se han elegido 9 que presentan algún grado de información importante. Estas estaciones se dividen de la siguiente forma:

Estaciones Permanentes	:	34
Estaciones Eventuales	:	19
Estaciones Ocasionales	:	17
Estaciones Sin Identificación	:	9

En el Cuadro 2.3-1, se indica el número de muestreos para la región, con la cantidad de datos por parámetro, para las estaciones permanentes, en el Cuadro 2.3-2 para las eventuales, en el Cuadro 2.3-3 para las ocasionales y en el Cuadro 2.3-4 para las sin identificación. En el Cuadro 2.3-5 se presenta la duración de las estadísticas, la cantidad de muestreos por año y la fecha de instalación de las estaciones, para las estaciones permanentes, en el Cuadro 2.3-6 para las eventuales y en el Cuadro 2.3-7 para las ocasionales.

CUADRO 2.3-1
 NUMERO DE MUESTREOS POR ESTACION Y NUMERO DE MUESTRAS POR PARAMETRO
 IVª REGION
 ESTACIONES PERMANENTES

ESTACION	Nº	pH	Cond	T	CO3	HCO3	Cl	SO4	Ca	Mg	K	Na	As	B	Cu	Fe	N/NO3	Oxigeno	P/PO4
RIO LA LAGUNA ANTES RIO TORO	138	138	138	124	58	58	58	58	58	58	58	58	137	81	105	136	123	72	65
TERMAS DEL TORO	95	95	94	82	44	43	43	43	43	43	43	91	52	93	93	40	36	0	
RIO TORO ANTES JUNTA RIO LA LAGUNA	137	137	137	121	59	59	59	59	59	59	59	59	136	81	135	135	92	72	63
RIO MALO AGUAS ABAJO TRANQUE DE RELAVE	82	82	82	82	27	27	27	27	27	27	27	27	80	2	81	80	1	72	3
RIO TURBIO ANTES RIO ICAGUAZ	24	24	24	13	20	20	20	20	20	20	20	16	7	18	18	14	0	0	
RIO ICAGUAZ ANTES RIO TURBIO	48	48	48	40	45	45	45	45	45	45	45	43	30	29	44	39	24	23	
RIO TURBIO EN VARILLAR	135	135	135	124	54	54	54	54	43	43	54	54	131	79	131	131	118	73	65
ESTERO DERECHO EN ALCAHAJAZ	36	36	36	35	33	33	33	33	33	33	33	33	33	23	34	34	36	23	22
RIO CLARO EN RIVADAVIA (ANTES RIO TURBIO)	52	52	52	41	47	47	47	47	47	47	47	47	44	31	45	45	43	24	23
RIO ELQUI EN ALGARROBAL	59	59	59	46	50	50	50	50	40	40	50	50	48	32	49	49	49	26	24
RIO ELQUI EN ALMENDRAL	119	119	119	110	45	45	45	45	45	45	45	114	68	115	115	97	66	59	
RIO ELQUI EN LA SERENA	45	45	45	39	42	42	42	42	42	42	42	42	38	26	39	39	39	23	22
ESTERO CULEBROW EN EL SIFON	37	37	37	36	34	34	34	34	34	34	34	34	32	23	33	33	37	24	23
RIO MURTADO EN SAN AGUSTIN	16	16	16	15	16	16	16	16	16	16	16	16	12	12	16	16	11	6	11
RIO MURTADO EN ANGOSTURA DE PANQUE	18	18	18	17	18	18	18	18	18	18	18	18	12	12	18	18	11	7	11
RIO GRANDE EN LAS RAMADAS	18	18	18	17	18	18	18	18	18	18	18	18	11	11	18	18	10	6	10
RIO MOSTAZAL EN CUESTECITA	19	19	19	18	19	19	19	19	19	19	19	19	13	13	19	19	12	8	12
RIO GRANDE EN PUNTIJA SAN JUAN	23	23	23	21	23	23	23	23	23	23	23	23	13	13	22	22	11	8	11
RIO COGOTI EN FRAGUITA	19	19	19	18	19	19	19	19	19	19	19	19	13	13	19	19	12	9	11
RIO COGOTI ENTRADA EMBALSE COGOTI	23	23	23	19	23	23	23	23	23	23	23	23	14	14	23	23	11	7	11
RIO COMBARBALA EN RAMADILLAS	20	20	20	19	20	20	20	20	20	20	20	20	10	10	19	19	9	6	9
RIO COMBARBALA EN CAMINO PUNITAQUI	6	6	6	5	6	6	6	6	6	6	6	6	3	3	6	6	2	1	2
RIO GUATULAME EN EL TOME	26	26	26	22	26	26	26	26	26	26	26	26	15	15	25	25	11	7	11
ESTERO PUNITAQUI ANTES JUNTA RIO LIMARI	14	14	14	12	14	14	14	14	14	14	14	14	3	3	14	14	0	1	0
RIO LIMARI EN PANAMERICANA	27	27	27	24	27	27	27	27	27	27	27	27	16	15	25	25	13	8	12
RIO CHOAPA EN CUNCUMEN	30	30	30	21	30	30	30	30	30	30	30	30	19	21	27	26	18	10	19
RIO CUNCUMEN ANTES BOCATOMA DE CAHALES	10	10	10	8	10	10	10	10	10	10	10	10	7	7	10	10	6	5	6
RIO CHOAPA EN SALAMANCA	29	29	29	21	29	29	29	29	29	29	29	29	19	20	25	25	18	9	19
RIO CHALINGA EN CHALINGA	21	21	21	13	21	21	21	21	21	21	21	21	11	11	21	20	10	6	11
RIO CHOAPA EN PUENTE NEGRO	41	41	41	20	41	41	41	41	41	41	41	41	18	19	37	36	17	10	18
RIO ILLAPEL EN LAS BARRAS	30	30	30	21	30	30	30	30	30	30	30	30	19	20	26	26	18	10	19
ESTERO ALCO ANTES DEL RIO ILLAPEL	19	19	19	9	19	19	19	19	19	19	19	19	8	8	19	18	7	6	7
RIO ILLAPEL EN EL PERAL	23	23	23	21	23	23	23	23	23	23	23	23	19	19	23	23	18	10	19
ESTERO PUIPIO EN EL ROMERO	27	27	27	18	27	27	27	27	27	27	27	27	17	17	27	26	16	8	17

CUADRO 2.3-2
 NUMERO DE MUESTREOS POR ESTACION Y NUMERO DE MUESTRAS POR PARAMETRO
 IVª REGION
 ESTACIONES EVENTUALES

ESTACION	Nº	pH	Cond	T	CO3	NO3	Cl	SO4	Ca	Mg	K	Na	As	B	Cu	Fe	N/NO3	Oxigeno	P/PO4
RIO MALO ANTES FAENA MINERA EL INDI0	18	18	18	2	17	17	17	17	17	17	17	17	18	13	16	17	16	0	0
RIO MALO DESPUES FAENA MINERA EL INDI0	53	53	53	35	27	27	27	27	27	27	27	27	53	15	52	51	36	0	0
RIO MALO ANTES ESTERO NEGRO	16	16	16	10	13	13	13	13	13	13	13	13	14	8	14	14	7	0	0
ESTERO NEGRO ANTES RIO MALO	27	27	27	11	25	25	25	25	25	25	25	25	26	16	25	25	17	0	0
RIO TORO DESPUES ESTERO NEGRO Y RIO MALO	22	22	22	7	20	20	20	20	20	20	20	20	22	13	21	21	15	0	0
RIO TURBIO DESPUES RIO TORO Y RIO LA LAGUNA	107	107	107	92	51	51	51	51	51	51	51	51	102	80	101	101	94	71	64
RIO TURBIO EN HUANTA	76	76	76	76	25	25	25	25	25	25	25	25	74	70	75	75	72	72	65
RIO CLARO EN MONTEGRANDE	10	10	10	0	9	9	9	9	9	9	9	9	8	7	8	8	5	0	0
RIO RAPEL EN PALOMA	15	15	15	14	15	15	15	15	15	15	15	15	11	11	15	15	10	6	10
RIO RAPEL EN JUNTA ANTES RIO GRANDE	5	5	5	5	5	5	5	5	5	5	5	5	0	0	4	4	0	0	0
RIO COMBARBALA EN COMBARBALA	5	5	5	3	5	5	5	5	5	5	5	5	2	2	5	5	0	0	0
RIO COMBARBALA DESPUES PLANTA ENAMI	6	6	6	4	6	6	6	6	6	6	6	6	1	1	5	5	0	0	0
ESTERO EL INGENIO ANTES MINA LA COCINERA	7	7	7	5	7	7	7	7	7	7	7	7	2	2	7	7	0	0	0
ESTERO EL INGENIO DESPUES MINA LA COCINERA	6	6	6	4	6	6	6	6	6	6	6	6	2	2	6	6	0	0	0
RIO LINARI EN SAN JULIAN	11	11	11	10	11	11	11	11	11	11	11	11	6	6	11	11	5	2	5
ESTERO CUNCUEN EN CHACAY	8	8	8	0	8	8	8	8	8	8	8	8	0	0	5	5	0	0	0
ESTERO CAMISAS EN DESEMBOCADURA	11	11	11	5	11	11	11	11	11	11	11	11	5	6	8	8	5	1	5
RIO CHOAPA EN LAHAJUIDA	10	10	10	0	10	10	10	10	10	10	10	10	0	1	7	7	0	0	0
RIO ILLAPEL EN MUNTIL	11	11	11	4	11	11	11	11	11	11	11	11	3	4	7	7	3	1	3

CUADRO 2.3-3
 NUMERO DE MUESTREOS POR ESTACION Y NUMERO DE MUESTRAS POR PARAMETRO
 IVª REGION
 ESTACIONES OCASIONALES

ESTACION	Nº	pH	Cond	T	CO3	NO3	Cl	SO4	Ca	Mg	K	Na	As	B	Cu	Fe	N/NO3	Oxigeno	P/PO4
RIO LA LAGUNA EN SALIDA EMBALSE LA LAGUNA	3	3	3	3	3	3	3	3	3	3	3	3	3	0	3	3	0	0	0
RIO TORO ANTES RIO VACAS MELADAS	1	1	1	0	1	1	1	1	1	1	1	1	0	1	1	1	1	0	0
RIO DERECHO ANTES RIO COCHIGUAS	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
RIO COCHIGUAS ANTES ESTERO DERECHO	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
RIO ELQUI EN VICUNA	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
RIO ELQUI EN PUNTA DE PIEDRA	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
RIO MURTADO EN ENTRADA EMBALSE RECOLETA	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	0	0	0
RIO MURTADO SALIDA EMBALSE RECOLETA	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
RIO PAMA ENTRADA EMBALSE COGOTI	3	3	3	2	3	3	3	3	3	3	3	3	0	0	3	3	0	0	0
RIO GRANDE EN PALOMA 1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	0	0	0
RIO LINARI DESPUES EMBALSE PALOMA	2	2	2	0	2	2	2	2	2	2	2	2	2	2	2	2	0	0	0
RIO LINARI EN PEÑONES BAJOS	5	5	5	5	5	5	5	5	5	5	5	5	0	0	4	4	0	0	0
RIO LINARI EN PUNTILLA DE OVALLE	2	2	2	0	2	2	2	2	2	2	2	2	2	2	2	2	0	0	0
RIO LINARI EN BARRAZA	5	5	5	5	5	5	5	5	5	5	5	5	0	0	4	4	0	0	0
RIO CHALINGA EN SAN AGUSTIN	4	4	4	0	4	4	4	4	4	4	4	4	0	0	1	1	0	0	0
RIO CHOAPA EN DOÑA JUANA	4	4	4	0	4	4	4	4	4	4	4	4	0	0	3	3	0	0	0
RIO CHOAPA EN LA CAÑELA	3	3	3	0	3	3	3	3	3	3	3	3	0	0	0	0	0	0	0

CUADRO 2.3-4
 NUMERO DE MUESTREOS POR ESTACION Y NUMERO DE MUESTRAS POR PARAMETRO
 IVª REGION
 ESTACIONES SIN IDENTIFICACION

ESTACION	Nº	pH	Cond	T	CO3	HCO3	Cl	SO4	Ca	Mg	K	Na	As	B	Cu	Fe	N/NO3	Oxigeno	P/PO4
2-D (DREN G) TRANQUE EL INDI0	33	33	33	33	10	10	10	10	10	10	10	10	32	2	32	32	0	30	0
ESTERO CHALINGA EN LA PALMILLA	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	3	7
ESTERO PUNITAQUI EN DESEMBOCADURA	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4
RIO CUNCUMEN ANTES QUEBRADA EL CHINCHE	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	1	0	1
RIO CUNCUMEN ANTES RIO CHOAPA	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	1	0	1
RIO ELQUI EN PUENTE LAS ROJAS	12	12	12	12	12	12	12	12	12	12	12	12	11	12	12	12	12	11	12
RIO MALO ANTES RIO VACAS HELADAS	39	39	39	39	12	12	12	12	12	12	12	12	38	39	38	38	0	36	0
RIO TURBIO EN ALMENDRAL	3	3	3	3	0	0	0	0	0	0	0	0	3	3	2	2	3	3	3
RIO VACAS HELADAS ANTES RIO MALO	39	39	39	39	12	12	12	12	12	12	12	12	38	39	38	38	39	36	39

CUADRO 2.3-5
 NUMERO DE MUESTREOS
 ESTACIONES PERMANENTES

ESTACION	FECHA INST.	FECHA MUESTREO		8	8	8	8	8	8	8	8	8	8	8	8	9	9	9	9
		DESDE	ASTA	0	1	2	3	4	5	6	7	8	9	0	1	2	3		
RIO LA LAGUNA ANTES RIO TORO	01/69	09/81	04/93		5	11	12	12	11	12	12	11	12	13	12	12	3		
TERMAS DEL TORO	01/69	09/81	04/93		5	11	12	11	12	5				13	11	12	3		
RIO TORO ANTES JUNTA RIO LA LAGUNA	01/69	09/81	04/91		5	13	12	12	11	11	12	12	12	11	12	11	3		
RIO MALO AGUAS ABAJO TRAMQUE DE RELAVE	01/69	06/86	04/93							7	12	12	12	13	11	12	3		
RIO TURBIO ANTES RIO ICAGUAZ	01/69	10/81	03/86		4	7	4	6	2	1									
RIO ICAGUAZ ANTES RIO TURBIO	01/69	10/81	12/92		3	5	3	6	3	4	4	4	4	4	4	4			
RIO TURBIO EN VARILLAR	01/69	09/81	04/93		5	6	12	12	12	12	12	13	12	12	12	12	3		
ESTERO DERECHO EN ALCAMIAZ	12/83	04/84	12/92					5	4	4	4	4	4	4	4	3	4		
RIO CLARO EN RIVADAVIA (ANTES RIO TURBIO)	01/69	09/81	12/92		5	6	3	6	4	4	4	4	4	4	4	4			
RIO ELOUI EN ALGARROBAL	01/69	09/81	12/90		4	9	7	6	4	4	4	4	4	4	4	5	4		
RIO ELOUI EN ALMENDRAL	01/69	09/81	02/92		4	5	6	12	12	12	12	11	11	12	10	10	2		
RIO ELOUI EN LA SERENA	01/69	11/81	06/91		2	4	3	5	4	4	4	4	3	4	4	4			
ESTERO CULEBRON EN EL SIFON	01/69	04/84	12/92					5	4	4	4	4	4	4	4	4			
RIO MURTADO EN SAN AGUSTIN	01/69	03/85	12/92						3	2	3	1	3			4			
RIO MURTADO EN ANGOSTURA DE PANQUE	01/69	03/85	12/92						4	3	3	1	3			4			
RIO GRANDE EN LAS RAMADAS	01/69	03/85	12/92						4	4	2	1	3			4			
RIO HOSTAZAL EN CUESTECITA	01/69	03/85	12/92						3	4	4	1	3			4			
RIO GRANDE EN PUNTILLA SAN JUAN	01/69	01/82	12/92			1	4		4	3	4		3			4			
RIO COGOTI EN FRAGUITA	01/69	03/85	12/92						4	3	4	1	3			4			
RIO COGOTI ENTRADA EMBALSE COGOTI	01/69	11/81	12/92		1	2	4		4	1	3	1	3			4			
RIO COMBARBALA EN RAMADILLAS	01/69	12/82	12/92			1	4		4	2	2		3			4			
RIO COMBARBALA EN CAMINO PUNITAQUI	01/69	06/85	07/89						2	2	1		1						

CUADRO 2.3-5
 NÚMERO DE MUESTREOS
 ESTACIONES PERMANENTES
 (Continuación)

ESTACION	FECHA INST.	FECHA MUESTREO		8	8	8	8	8	8	8	8	8	8	9	9	9	9		
		DESDE	HASTA	0	1	2	3	4	5	6	7	8	9	0	1	2	3		
RIO QUATULAME EN EL TOME	01/69	11/81	12/92		1	2	4			4	3	4	1	3			4		
ESTERO PUNITAQUI ANTES JUNTA RIO LIMARI	01/69	11/81	12/86		1	2	4			4	3								
RIO LIMARI EN PANAMERICANA	01/69	11/81	12/92		1	2	4			4	3	4	1	3			5		
RIO CHOAPA EN CUNCLMEN	01/69	06/80	03/93	3	1	3						4	4	4	4		5	2	
RIO CUNCLMEN ANTES BOCATOMA DE CAHALES	01/69	02/86	03/93									4		1			3	2	
RIO CHOAPA EN SALAMANCA	01/69	05/80	03/93	3	1	2						4	4	4	4		5	2	
RIO CHALINGA EN CHALINGA	01/69	06/84	09/89						3	3	4	4	4	3					
RIO CHOAPA EN PUENTE NEGRO	01/69	05/80	03/93	2	2	5	2	4	4	4	4	4	4	3			5	2	
RIO ILLAPEL EN LAS BARRAS	01/69	05/80	03/93	4	1	2						4	4	4	4		5	2	
ESTERO AJUD ANTES DEL RIO ILLAPEL	01/69	04/84	03/93						4	4	4						5	2	
RIO ILLAPEL EN EL PERAL	01/69	02/86	03/93									4	4	4	4		5	2	
ESTERO PUPIO EN EL ROMERO	12/89	04/84	03/93						4	2	4	4	3	5	3			4	2

CUADRO 2.3-6
 NÚMERO DE MUESTREOS
 ESTACIONES EVENTUALES

ESTACION	FECHA INST.	FECHA MUESTREO:															
		DESDE	ASTA	8 0	8 1	8 2	8 3	8 4	8 5	8 6	8 7	8 8	8 9	9 0	9 1	9 2	9 3
RIO MALO ANTES FAENA MINERA EL INDIO	01/69	09/81	03/84		4	12	1	1									
RIO MALO DESPUES FAENA MINERA EL INDIO	01/69	09/81	05/86		5	13	12	10	8	5							
RIO MALO ANTES ESTERO NEGRO	01/69	10/80	08/84	1	4	4	6	1									
ESTERO NEGRO ANTES RIO MALO	01/69	10/80	03/84	1	5	13	7	1									
RIO TORO DESPUES ESTERO NEGRO Y RIO MALO	01/69	11/81	03/84		3	12	6	1									
RIO TURBIO DESPUES RIO TORO Y RIO LA LAGUNA	01/69	09/81	04/93		5	13	10	2		3	12	11	12	12	12	12	3
RIO TURBIO EN MUANTA	01/69	12/86	08/92							1	12	12	12	12	12	12	3
RIO CLARO EN MONTEGRANDE	01/69	10/81	03/83		4	5	1										
RIO RAPEL EN PALOMA	01/69	03/85	12/92						3	2	2	1	3			4	
RIO RAPEL EN JUNTA ANTES RIO GRANDE	01/69	12/82	09/83			1	4										
RIO COMBARBALA EN COMBARBALA	01/69	11/81	06/83		1	1	3										
RIO COMBARBALA DESPUES PLANTA ENAMI	01/69	11/81	09/83		1	1	4										
ESTERO EL INGENIO ANTES MINA LA COCINERA	01/69	11/81	09/83		1	2	4										
ESTERO EL INGENIO DESPUES MINA LA COCINERA	01/69	11/81	09/83		1	2	3										
RIO LIMARI EN SAN JULIAN	01/69	03/85	09/89						3	3	3		2				
ESTERO CUNCUMEN EN CHACAY	01/69	06/80	04/82	3	2	3											
ESTERO CARIAS EN DESEMBOCADURA	01/69	05/80	06/92	3	1	2						4				1	
RIO CHOAPA EN LAHANUIDA	01/69	05/80	11/82	3	2	5											
RIO ILLAPEL EN MUINTIL	01/69	05/80	12/89	4	1	2				1		3					

2.4 Presentación de la Información

Para realizar el análisis de las estadísticas, se consideraron sólo aquellas estaciones en las que había un mínimo de 5 parámetros. El resto de las estadísticas no fue analizado y sólo se ha consignado en el Anexo.

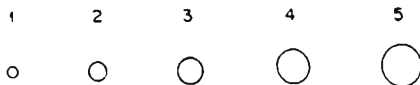
A modo de ejemplo, se muestran en el Cuadro 2.4-1 los datos para la estación Estero Derecho en Alcahuaz. En ese cuadro se pueden observar los valores de los parámetros y el valor de los estadígrafos calculados.

Por otro lado, con respecto a la representación gráfica de los antecedentes de calidad, se han elegido 4 representaciones de éstos parámetros.

El primer tipo de representación corresponde a las conductividades promedios, que son representadas mediante círculos de diferente diámetro de acuerdo a los valores de la conductividad. Para definir los rangos y los tamaños de los círculos a emplear, se utilizó la información de la norma de calidad de agua para riego (Noh 1333) que establece los siguientes límites para este parámetro, en $\mu\text{mhos/cm}$:

1.	< 750	No se detectan efectos
2.	750 - 1500	Puede haber efecto perjudicial en cultivos sensibles
3.	1500 - 3000	Efectos adversos en muchos cultivos. Necesita de manejo cuidadoso
4.	3000 - 7500	Agua que puede ser utilizada sólo en cultivos tolerantes en suelos permeables, con métodos de cultivo cuidadoso
5.	> 7500	No recomendable su uso en riego, ya que produce disminución notable de rendimiento en cualquier cultivo

En base a los valores anteriores se definieron los siguientes rangos de conductividad para su posterior representación:



CUADRO 2.4-1
ESTACION ESTERO DERECHO EN ALCAHUAZ

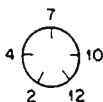
ESTACION : ESTERO DERECHO EN ALCAHUAZ
CODIGO BNA : 04311801-3
CIUENCA : RIO ELQUI

LATITUD S : 30 13
LONGITUD W : 70 29

ALTITUD : 1645 msnm

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/NO3 mg/l 6242	Oxígeno mg/l 6001	P/PO4 mg/l 6220	
10/04/84	17:30	7.75	140	16.0																
10/05/84	13:05	7.45	131	13.0	0.0	58.0	6.4	8.2	17.6	3.7	1.2	5.5	0.008		0.00	0.38	0.158		0.178	
8/06/84	12:50	7.60	122	7.0															0.169	
10/09/84	16:10	7.30	105	13.0	0.0	56.7	7.8	6.7	16.6	1.8	1.2	4.6	0.007		0.00	0.62	0.440		0.440	
10/12/84	18:50	8.15	73	16.0	0.0	35.4	5.7	1.9	10.6	1.2	0.8	2.8	0.003		0.00	0.62	0.077		0.169	
12/03/85	12:55	7.90	119	17.0	0.0	48.2	5.7	9.6	15.6	1.2	1.2	5.1	0.004		0.00	0.72	0.172		0.172	
11/06/85	12:35	7.90	110	11.0	0.0	51.3	7.4	12.0	17.0	1.8	1.2	5.1	0.002		0.01	0.73	0.127		0.127	
9/09/85	16:00	8.15	100	13.0	0.0	61.0	5.3	7.7	17.8	2.4	1.2	5.3	0.000		0.03	0.46	0.113		0.113	
4/12/85	17:00	7.85	110	19.0	0.0	56.7	5.0	6.7	16.6	2.6	0.8	4.1	0.001		0.01	0.43	0.172		0.172	
11/03/86	15:00	7.95	140	18.0	0.0	63.5	5.7	7.2	19.8	1.2	0.8	5.1	0.000		0.03	0.19	0.197		0.197	
10/06/86	11:35	7.10	102	14.0	0.0	63.5	5.0	7.2	17.6	2.4	1.2	5.1	0.008		0.02	0.17	0.580		0.580	
8/09/86	17:00	7.50	120	17.0	0.0	46.4	5.7	16.8	18.0	1.2	1.2	5.1	0.000		0.00	0.33	0.600		0.600	
11/12/86	13:10	7.55	220	15.0	0.0	48.8	3.6	19.2	16.8	2.6	0.8	4.6	0.001		0.00	0.74	0.270	7.7	0.270	
6/03/87	12:30	7.70	128	14.0	0.0	54.3	1.8	25.0	18.6	3.2	1.6	5.5	0.010	0.24	0.03	0.53	0.680	8.8	0.680	
8/06/87	16:35	7.55	130	9.0	0.0	48.8	5.3	15.9	16.4	2.7	0.8	5.1	0.005	0.31	0.00	0.18	0.078	9.8	0.078	
8/09/87	12:30	7.85	125	6.5	0.0	54.9	3.6	10.6	16.8	2.4	1.2	4.6	0.005	0.02	0.00	0.25	0.277	10.1	0.277	
10/12/87	13:25	7.65	72	9.0	0.0	27.5	5.3	3.8	8.2	1.3	0.8	2.8	0.006	0.21	0.01	1.13	0.195	9.7	0.195	
3/03/88	11:35	7.65	106	10.0	0.0	41.4	4.8	8.0	12.3	1.9	0.8	3.7	0.007	0.54	0.01	0.34	0.110	9.6	0.110	
7/06/88	11:50	7.60	125	9.0	0.0	53.7	3.2	10.1	14.7	2.3	0.8	4.6	0.005	0.20	0.01	0.27	0.045	10.9	0.045	
7/09/88	13:55	7.50	125	9.0	0.0	54.9	3.2	15.8	15.9	2.4	1.0	5.1	0.005	0.02	0.02	0.17	0.134	9.4	0.134	
6/12/88	11:10	7.65	137	11.0	0.0	61.0	3.5	16.3	16.6	2.8	0.9	5.3	0.008	0.41	0.02	0.44	0.180	9.1	0.180	
8/03/89	18:25	7.50	150	15.0	0.0	64.1	3.5	17.8	18.3	2.9	0.9	5.5	0.005	0.31	0.03	0.37	0.145	8.7	0.145	
13/06/89	15:35	7.40	140	8.0	0.0	54.9	5.3	17.5	17.9	2.9	1.2	5.5	0.005	0.26	0.01	0.25	0.148	10.1	0.148	
13/09/89	11:16	8.00	145	10.0	0.0	61.0	3.9	16.0	17.6	3.1	1.1	5.5	0.005	0.23	0.01	0.23	0.061	10.6	0.061	
7/12/89	11:50	6.80	335	10.5	0.0	56.7	3.9	15.4	18.4	3.0	0.7	5.3	0.005	0.20	0.01	0.30	0.073	9.3	0.073	
6/03/90	11:51	7.85	160	11.5	0.0	67.7	3.9	14.4	20.5	3.2	1.1	6.0	0.006	<0.01	0.25	0.131	9.5	0.131		
19/06/90	15:52	6.90	146	11.0	0.0	63.5	4.3	16.8	19.4	2.7	1.1	6.4	<0.005	1.13	0.01	0.25	0.341	9.7	<0.010	
6/09/90	15:55	6.60	130	12.5	0.0	59.8	3.9	16.8	18.9	2.8	1.0	5.5	<0.005	0.63	<0.01	0.20	0.139	9.1	<0.010	
27/12/90	12:25	7.10	124	17.0	0.0	64.1	3.5	15.8	18.5	2.6	1.1	6.4	<0.005	0.41	0.01	0.22	0.142	8.1	<0.010	
24/04/91	12:36	7.25	152	13.0															9.5	<0.010
19/06/91	14:57	7.40	193	9.5	0.0	70.7	5.3	17.3	19.9	3.1	1.2	7.4	<0.005	0.26	0.01	1.08	0.432	8.4	<0.010	
12/12/91	12:10	7.65	89	9.0	0.0	45.8	3.2	8.2	11.3	1.7	0.9	6.0	0.010	0.78	<0.01	0.58	0.064	9.7	<0.010	
5/03/92	11:20	7.15	143	13.0	0.0	61.0	3.8	12.0	16.3	2.6	1.0	5.5	0.020	<0.02	0.03	0.35	0.116	9.0	<0.010	
11/06/92	11:20	7.88	110	5.0	0.0	51.2	4.2	12.0	14.4	2.5	1.9	4.6	<0.005	0.31	0.01	0.28	0.103	10.2	<0.010	
3/09/92	11:30	7.25	110	5.5	0.0	45.7	3.1	13.0	14.8	1.4	0.7	4.1	<0.005	0.12	0.01	0.22	<0.01	10.8	<0.010	
4/12/92	11:55	7.00	85	9.5	0.0	40.9	2.5	9.6	11.5	1.7	1.2	3.2	<0.005	0.25	<0.01	0.56	0.043	10.0	<0.010	
N° DE DATOS		36	36	35	33	33	33	33	33	33	33	33	33	23	34	34	36	23	22	
PROMEDIO		7.53	132	11.9	0.0	54.3	4.5	12.5	16.4	2.3	1.0	5.0	0.004	0.34	0.01	0.41	0.198	9.5	0.009	
MINIMO		6.60	72	5.0	0.0	27.5	1.8	1.9	8.2	1.2	0.7	2.8	0.000	0.00	0.00	0.17	0.000	7.7	0.000	
MAXIMO		8.15	335	19.0	0.0	70.7	7.8	25.0	20.5	3.7	1.9	7.4	0.020	1.13	0.03	1.13	0.680	10.9	0.043	
DESV. STD.		0.37	45	3.6	0.0	9.3	1.3	5.0	2.8	0.7	0.2	1.0	0.004	0.24	0.01	0.24	0.156	0.8	0.010	

El segundo tipo de representación corresponde al pH, el que se ha representado mediante el sombreado del círculo de las conductividades, siguiendo el sentido de los punteros del reloj, según aumente el pH. Los valores de pH dentro del círculo se representan así:



En la Figura 2.4-1 se muestra como se vería la representación de conductividad eléctrica y de pH para la estación Estero Derecho en Alcahuaz.

FIGURA 2.4-1
REPRESENTACION pH Y CONDUCTIVIDAD

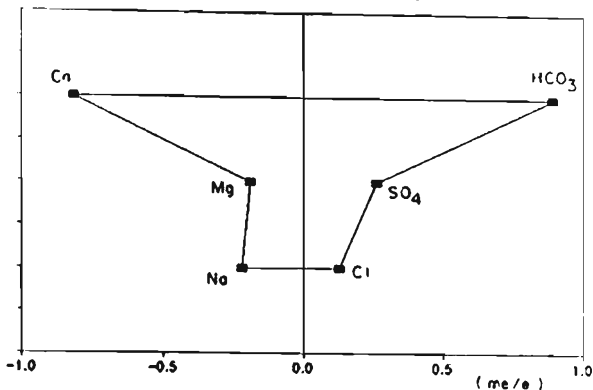
0,7,5

El tercer tipo de representación corresponde al diagrama de Stiff. La modalidad de diagrama de Stiff adoptada (diagrama de Stiff modificado) consiste en tres líneas horizontales paralelas y equidistantes, cortadas por una transversal perpendicular. De esta forma se generan 6 semirectas, 3 para el lado izquierdo, que representan a los cationes, y 3 para el lado derecho, que representan a los aniones. Uniendo los extremos de los trazos que representan los valores de las concentraciones de los seis cationes considerados, se forma un polígono. Los cationes considerados son, en el mismo orden en que se han representado de arriba hacia abajo, calcio, magnesio y sodio. Los aniones considerados son, en el mismo orden en que aparecen de arriba hacia abajo, bicarbonato, sulfato y cloruro. En cada semirecta se representa la concentración de cada ión en el agua por una longitud de trazo proporcional a ésta, expresada en términos de miliequivalentes/litro (meq/l).

Este tipo de diagrama, además de representar las concentraciones de los iones considerados, por la forma del polígono que se genera, permite obtener una rápida idea del contenido salino general del agua en términos de macroiones, de la predominancia de alguna de las sales más típicamente presentes en el agua, como son el bicarbonato de calcio, sulfato de magnesio y cloruro de sodio, y permite comprobar si el equilibrio macroiónico es correcto. Se muestra en la Figura 2.4-2 el diagrama de Stiff para la estación anterior.

FIGURA 2.4-2

DIAGRAMA DE STIFF
ESTERO DERECHO EN ALCAHUAZ



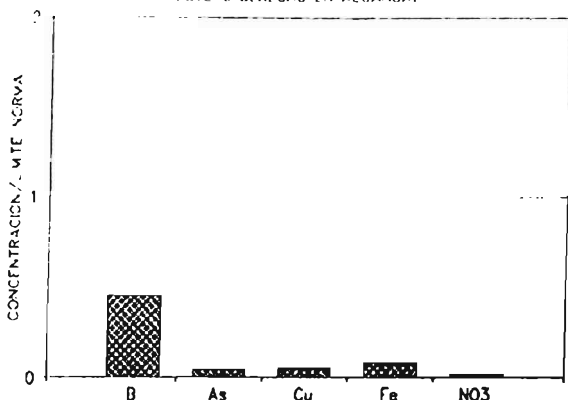
Del diagrama de Stiff anterior se observa que aproximadamente existe un balance entre el calcio y los carbonatos, balance que también se da en los otros pares de elementos, aunque los nombrados inicialmente presentan las mayores concentraciones.

Los microelementos boro, arsénico, cobre, fierro y nitratos, se han representado mediante un simple diagrama de barras en que, para hacer comparables los valores en relación a un patrón común, se ha representado el cociente entre ésta y la concentración establecida como límite en la norma de riego (NCh 1.333), para los cuatro primeros elementos de la lista.

Para los nitratos, por no estar estos normalizados para el riego, se ha adoptado el valor máximo especificado por la norma para agua potable (NCh 409). De esta forma, valores inferiores a 1,0 indican concentraciones inferiores a las establecidas como límite por la norma, en tanto valores superiores a 1,0 indican concentraciones excedidas. Incluso, el valor graficado representa el número de veces en que la concentración observada excede a la norma. Los valores límites considerados son los siguientes: B 0.75 mg/l, As 0.10 mg/l, Cu 0.20 mg/l, Fe 3.00 mg/l y NO₃ 10.00 mg/l. En la Figura 2.4-3 se presenta el gráfico para la estación anteriormente indicada.

FIGURA 2.4-3

DIAGRAMA DE BARRA NORMALIZADO
ESTERO DRECHO EN ALCAHUAZ



En el gráfico anterior se aprecia que todos los elementos están bajo la norma, aunque el boro se encuentra en mayor proporción, cercano a 0,3 mg/l.

2.5 Información Procesada

Se presenta en el Anexo la información correspondiente a la IVª Región.

En dicho Anexo, se presenta toda la información recopilada y el análisis estadístico sólo de las estaciones que poseen más de 5 muestreos. La primera parte del Anexo corresponde a la información de las estaciones que se encuentran debidamente ubicadas y la segunda parte a la información de las estaciones que no fue posible ubicar.

En los Planos N°5 y 6, se presenta la ubicación y los gráficos de las estaciones que poseen más de 10 muestreos. No se consideró la realización de gráficos para las estaciones con menos de 10 muestreos, ya que esto dificultaría la presentación de la información en los planos.

3. CONCLUSIONES SOBRE LA CALIDAD DE LAS AGUAS

La caracterización de las aguas de esta región, se presenta separada para las cuencas más importantes y ríos que la forman.

3.1 Cuenca del río Elqui

En la parte superior de la cuenca del río Elqui, especialmente en la cuenca del río Turbio, existen varios aportes de agua de mala calidad, expresada principalmente en términos de altas concentraciones de cobre, boro, arsénico y fierro, elementos asociados a yacimientos mineros en la zona. De estos aportes destaca el río Toro, por su conductividad relativamente alta, mayor de 1.500 $\mu\text{mhos/cm}$, bajo pH y alto contenido de los metales mencionados. Este afluente está influido por las aguas de las Termas del Toro, que presenta contenidos extraordinariamente altos de boro, arsénico y cloruro de sodio, entre otras sales. Los aportes de los ríos Laguna e Incaguaz, de relativamente buena calidad, diluyen los contaminantes del río Turbio, reduciéndolos a niveles levemente altos a la altura de Huantá y Varillar, con excepción del cobre, que permanece con valores altos en ambos lugares. La mezcla del río Turbio con el río Claro produce un mejoramiento adicional, de manera que aguas abajo de Vicuña el río presenta sólo niveles levemente altos de boro y cobre y muy reducidos de salinidad, tanto en términos del contenido iónico como de la conductividad.

3.2 Cuenca del río Limarí

Los aportes que forman el río Limarí, en la parte superior de la cuenca, presentan una buena calidad, en general, con bajos contenidos salinos, especialmente de cloruros y de metales, lo que se traduce en niveles muy bajos de conductividad. Entre estos ríos se incluyen el Hurtado, Rapel, Mostazal, Grande y Guatulame. Aguas abajo de Ovalle, a la altura de San Juan, el río Limarí presenta una buena calidad, similar a la de las cabeceras de la cuenca, con niveles relativamente altos de boro, aunque en concentraciones aún inocuas para especies vegetales. La salinidad sigue siendo baja, observándose un incremento relativo del cloruro de sodio. Entre San Juan y Limarí en Panamericana se produce un incremento de la salinidad, que se refleja en una mayor conductividad, superior a 750 $\mu\text{mhos/cm}$, y de un mayor contenido de macroiones, especialmente cloruro de sodio.

3.3 Cuenca del río Choapa

El río Choapa presenta en su cuenca superior una buena calidad, con bajos niveles de conductividad, sales disueltas y metales. A pesar del aporte del río Cuncumén, con niveles relativamente altos de cobre, la dilución que se produce hacia aguas abajo reduce estos niveles altos a valores normales. Los

aportes de los ríos Chalinga y Salamanca presentan calidades muy similares a las del río Choapa a la altura de Salamanca. El río Illapel, por su parte, presenta una situación muy similar a la del río Choapa, con aportes de buena calidad en su cuenca superior, la que se mantiene hasta la unión con el río Choapa, presentando ambos ríos calidades muy similares.

ANEXO
ESTADÍSTICA DE CALIDAD DE AGUAS IV REGION

MINISTERIO DE OBRAS PUBLICAS
DIRECCION GENERAL DE AGUAS
DEPARTAMENTO DE CONSERVACION Y P.R.N.

ESTACIONES PERMANENTES

ESTACION : RIO LA LAJUNA ANTES RIO TORO
CODIGO BNA : 04301800-B
CUENCA : RIO ELGUI

LATITUD S : 29 58
LONGITUD W : 70 05

ALTITUD : 2080 msnm

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6361	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/NO3 mg/l 6242	Oxígeno mg/l 6001	P/PO4 mg/l 6220
16/09/81	16:45	8.08	524		0.0	143.0	23.8	97.5	39.1	16.5	9.4	41.4	0.044	1.85	0.00	0.46			
6/10/81	14:05	8.10	460		0.0	153.0	22.0	85.0	30.1	17.9	7.0	35.6	0.047	2.33	0.01	2.00			
3/11/81	15:25	8.23	373		0.0	110.0	15.6	48.0	36.7	9.2	2.4	25.3	0.003	1.50	0.00	0.24	0.009		
11/11/81	17:00	8.25	374		0.0	123.0	17.4	66.3	37.7	10.5	1.6	26.4	0.000	1.85	0.02	0.60	0.267		
3/12/81	17:45	7.93	376		0.0	120.0	20.6	70.6	32.1	14.0	1.6	24.6	0.000	1.85	0.00	0.06	0.382		
5/01/82	16:00	7.48	413		0.0	122.0	34.7	58.1	36.1	15.8	1.6	35.6	0.040	2.00	0.01	0.04	0.129		
10/02/82	16:15	8.09	405		0.0	123.0	34.7	67.2	55.3	7.9	1.6	32.6	0.033	1.83	0.18	0.04	0.384		
9/03/82	13:10	8.27	410		0.0	129.0	26.6	84.1	55.3	6.1	1.6	35.2	0.033	2.50	0.00	0.27	0.278		
4/05/82	11:25	8.20	679		0.0	175.0	36.2	192.0	60.1	27.3	4.7	62.5	0.004	1.83	0.00	0.02	0.422		
1/06/82	11:35	8.25	624		0.0	171.0	33.0	164.0	60.1	18.2	4.7	60.7	0.096	2.65	0.01	0.05	0.517		
6/07/82	11:25	7.95	605		0.0	153.0	30.1	171.0	56.1	15.8	4.3	52.2	0.080	2.33	0.00	2.01	0.380		
11/08/82	12:25	7.85	558		0.0	156.0	28.4	125.0	52.9	10.9	2.4	54.7	0.000	0.00	0.00	1.98	0.504		
8/09/82	11:35	7.55	650										0.060						
22/09/82	16:10	7.05	528		0.0	149.0	25.5	95.1	50.1	13.4	3.1	43.7	0.030		0.04	0.21	0.386		
7/10/82	10:05	7.80	442	9.0	0.0	103.0	18.1	82.1	27.9	9.0	1.2	36.8	0.037	4.13	0.00	1.83	0.655		
7/12/82	10:55	7.25	396	12.0	0.0	115.0	14.9	69.2	25.9	9.7	1.6	23.9	0.012	2.33	0.02	6.40	0.422		
5/01/83	12:20	7.55	351	14.0	0.0	120.0	11.0	56.2	37.9	10.9	2.0	15.6	0.039		0.11	4.72	0.359		
8/02/83	17:25	6.40	334	20.0	0.0	99.5	12.4	56.2	29.9	10.9	2.0	19.8	0.016		0.00	0.34	0.145		
8/03/83	11:30	6.20	370	14.0	0.0	106.0	15.6	70.1	37.9	8.5	2.0	22.5	0.016		0.01	0.05	0.468		
12/04/83	11:25	6.30	416	12.0	0.0	110.0	17.4	74.0	40.9	13.4	2.4	18.4	0.032		0.00	0.11	0.468		
10/05/83	10:40	6.25	458	7.0	0.0	113.0	17.4	87.9	41.9	12.2	2.4	31.3	0.034		0.04	0.02	0.364		
8/06/83	9:20	6.60	444	3.0	0.0	123.0	17.4	88.9	39.9	14.5	3.1	32.2	0.031		0.01	0.01	0.400		
6/07/83	9:00	6.75	432	4.0	0.0	133.0	18.1	96.1	48.9	10.3	2.7	31.7	0.049		0.01	0.21	0.427		
10/08/83	11:45	8.45	432	4.0	0.0	117.0	16.3	91.3	42.9	11.5	2.7	30.3	0.027		0.00	0.17	0.411		
7/09/83	8:45	8.45	410	3.0	0.0	117.0	16.3	83.1	45.1	10.3	2.7	33.6	0.021		0.04	0.26	0.515		
5/10/83	8:35	7.55	377	6.0									0.017		0.03	0.81	0.330		
9/11/83	11:10	7.45	375	12.0									0.016		0.03	0.52			
14/12/83	11:25	8.10	337	14.0									0.010		0.04	0.61			
23/01/84	15:40	6.05	325	19.0									0.024		0.04	0.30			
15/02/84	9:25	6.85	385	11.0	0.0	117.0	12.8	71.6	37.9	10.2	2.4	22.8	0.017		0.02	0.16			
7/03/84	15:05	7.25	396	16.0									0.012		0.03	0.08			
17/04/84	11:55	6.60	437	10.0									0.035		0.00	0.08	0.508		
9/05/84	9:55	7.70	550	7.0	0.0	148.0	28.4	136.0	57.1	12.4	4.3	44.1	0.012		0.00	0.09	0.635		
13/06/84	9:55	6.85	564	5.0									0.066		0.00	0.06	0.594		
20/07/84	13:50	6.30	550	9.0									0.041		0.00	0.24	0.630		
2/08/84	16:20	7.05	565	9.0									0.057		0.00	0.24	0.605		
5/09/84	10:40	7.45	345	6.0	0.0	117.0	17.4	72.0	39.3	9.6	2.0	21.6	0.023		0.00	0.49	0.553		
3/10/84	12:40	6.50	342	9.0									0.012		0.00	0.35	0.623		
7/11/84	9:10	7.75	306	7.0									0.018		0.00	0.98	0.154		
6/12/84	10:35	7.35	275	11.0	0.0	101.0	9.2	44.2	32.1	7.4	2.0	14.0	0.029		0.02	3.44	0.463		

ESTACION : RIO LA LAGUNA ANTES RIO TORO (Continuación)

CODIGO BMA : 04301800-8

CUREMCA : RIO ELQUI

LATITUD S : 29 58

LONGITUD W : 70 05

ALTITUD : 2080 msnm

FECHA	HORA	pH u. pH20	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/NO3 mg/l 6242	Oxigeno mg/l 6001	P/PO4 mg/l 6220
9/01/85	11:05	6.55	260	13.0									0.021		0.00	0.51	0.477		
12/02/85	12:12	7.75	367	13.0									0.039		0.00	0.06	0.253		
5/03/85	12:10	6.45	421	14.0	0.0	109.0	18.4	105.0	41.3	9.1	3.1	33.1	0.033		0.00	0.44	0.506		
4/04/85	8:40	6.25	372	8.0									0.026		0.00	0.15	0.300		
8/05/85	14:55	7.25	435	13.0									0.041		0.11	0.00	0.492		
5/06/85	12:45	7.10	430	12.0	0.0	121.0	20.2	107.0	45.9	8.5	3.1	33.9	0.037		0.00	0.21	0.386		
3/07/85	10:15	8.65	426	6.0									0.031		0.06	0.05	0.413		
7/08/85	10:35	8.00	420	5.0									0.034		0.00	0.06	0.271		
4/09/85	10:15	8.15	430	7.0	0.0	127.0	18.1	104.0	47.5	7.8	3.1	33.9	0.043		0.01	0.08	0.332		
9/10/85	9:50	7.90	413	7.0									0.027		0.00	0.13	0.253		
6/11/85	10:20	7.80	400	11.0									0.033		0.01	0.93	0.348		
8/01/86	9:05	7.35	369	12.0									0.018		0.12	0.27	0.386		
5/02/86	10:05	7.45	370	14.0									0.013		0.05	0.77			
5/03/86	9:50	7.35	358	11.0	0.0	107.0	14.9	72.5	39.7	7.2	2.4	23.0	0.009		0.03	0.09	0.395		
3/04/86	9:30	7.80	434	9.0									0.028		0.00	0.07	0.436		
7/05/86	15:40	7.65	575	14.0									0.056		0.00	0.04			
4/06/86	15:20	8.25	565	9.0	0.0	159.0	33.3	112.0	51.5	12.2	5.3	51.0	0.059		0.00	0.22	2.270		
9/07/86	10:05	7.65	535	7.0									0.057		0.03	0.19			
6/08/86	17:05	8.30	637	12.0									0.079		0.00	0.00			
3/09/86	12:20	7.90	502	11.5	0.0	142.0	26.2	120.0	54.1	8.5	4.3	44.6	0.024		0.00	0.56	2.730		
8/10/86	16:00	7.20	250	8.0									0.006		0.03	0.33	1.870		
5/11/86	14:40	7.80	353	12.0									0.009		0.03	0.91	1.580	8.2	
4/12/86	11:50	7.85	480	12.3	0.0	119.0	16.7	94.6	44.3	10.2	3.1	29.9	0.098		0.00	4.74	1.810	8.2	
8/01/87	9:45	8.10	481	11.0									0.007		0.00	2.56			8.4
10/02/87	20:20	8.10	561	15.0									0.020		0.04	0.20	1.180	7.9	
11/03/87	12:15	8.25	391	13.0	0.0	103.0	11.0	78.8	39.3	8.4	2.4	20.7	0.023		0.03	0.53	1.240	8.3	
9/04/87	16:40	8.25	680	11.0									0.037		0.26	1.800	8.8		
7/05/87	15:40	8.45	670	8.0									0.046		0.01	0.119	8.8		
3/06/87	15:55	8.25	410	8.0	0.0	110.0	17.0	98.0	42.7	10.8	2.0	31.4	0.034	0.33	0.16	0.487	9.9	0.010	
9/07/87	14:30	7.75	390	10.5									0.030		0.08	0.370	10.1		
6/08/87	9:05	8.30	490	0.5									0.025		0.13				
4/09/87	8:50	7.90	342	3.0	0.0	106.0	13.8	63.4	37.5	8.8	1.6	18.9	0.021	0.16	0.53	0.306	10.8	0.014	
14/10/87	14:50	8.25	588	6.0									0.016	0.79	0.46	0.575	9.8	0.020	
5/11/87	16:10	8.15	420	9.0									0.026	0.93	1.03	0.181	8.8	0.014	
15/12/87	11:20	8.25	287	9.0	0.0	97.6	8.5	43.2	31.9	6.4	1.2	13.8	0.027	0.50	5.62	0.390	8.9	0.036	
5/01/88	15:03	8.10	295	12.0									0.006	0.62	8.75	0.341	8.7	0.008	
9/02/88	16:30	8.05	556	13.3									0.015	0.63	0.27	0.321	7.7	0.005	
9/03/88	11:10	8.20	350	9.0	0.0	86.6	25.3	68.0	37.4	8.2	1.7	19.8	0.029	0.66	0.14	0.690	9.1	0.006	
8/04/88	12:00	7.65	465	9.5									0.024	0.38	0.06	0.306	8.7		
6/05/88	10:18	8.15	344	4.5									0.029	0.27	0.04	0.347	10.0		
8/07/88	12:00	8.05	420	2.0									0.033	1.12	0.05		10.6		
9/08/88	15:40	8.20	870	9.0									0.097	1.00	0.07	0.598	8.7		
13/09/88	10:45	7.95	610	9.0	0.0	159.0	30.1	140.0	56.8	11.9	4.7	52.0	0.113	1.15	0.11	0.525	8.8	0.029	
19/10/88	16:18	7.65	690	9.0									0.065	0.76	0.15	0.332	8.5	0.005	
10/11/88	10:10	7.80	703	7.0									0.028	0.51	0.10	0.419	9.5	0.005	
14/12/88	16:15	7.80	425	14.0	0.0	122.0	18.0	88.4	42.5	10.0	2.3	30.4	0.039	0.56	0.22	0.297	7.8	0.008	
4/01/89	16:30	7.85	487	16.0									0.047	0.44	0.13	0.274	7.7	0.010	
8/02/89	17:45	8.05	670	16.0									0.036	0.46	0.18	0.239	8.3	0.023	
9/03/89	17:25	7.75	456	12.5	0.0	122.0	18.1	100.0	42.5	9.7	2.1	28.1	0.020	0.47	0.05	0.230	8.1	0.005	
12/04/89	15:00	8.05	627	10.5									0.033	0.89	0.04	0.324	8.6	0.005	
9/05/89	16:07	8.00	365	10.0									0.049	1.27	0.10	0.335	9.2	0.008	
7/06/89	13:50	7.75	580	6.0	0.0	153.0	34.4	128.0	53.0	12.1	4.9	53.4	0.055	0.77	0.05	0.356	9.6	0.008	
11/07/89	15:17	7.55	688	7.0									0.045	0.52	0.20	0.633	8.9	0.006	

ESTACION : RIO LA LAGUNA ANTES RIO TORO (Continuación)

CODIGO BNA : 04301800-8

CUENCA : RIO ELQUI

LATITUD S : 29 58

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ALTITUD : 2080 msnm

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/NO3 mg/l 6242	Cl:geno mg/l 5001	P/PO4 mg/l 6220	
3/08/89	11:20	7.65	684	9.0									0.033	0.47		0.10	0.312	10.6	0.018	
6/09/89	13:50	7.75	695	9.0	0.0	97.6	26.2	120.0	35.4	11.7	3.9	45.1	0.044	0.60		0.40	0.218	8.9	0.205	
31/10/89	14:30	7.25	580	9.0									0.030	0.30		0.24	0.280	8.8	0.005	
16/11/89	15:25	7.25	655	13.0									0.015	1.45		1.00	0.233	8.3	0.032	
13/12/89	10:15	7.25	485	8.0	0.0	107.0	14.9	105.0	45.1	11.4	2.4	29.4	0.022	0.53		0.22	0.169	9.1	0.005	
9/01/90	14:20	7.70	430	17.0									0.022	0.69		0.51	0.208		<0.010	
9/01/90	13:50	6.45	1931	19.0									0.899	4.23	5.88	28.77	3.115		<0.010	
12/02/90	14:31	7.90	614	16.0									0.017	0.42	0.04	0.10	0.242		<0.005	
8/03/90	14:45	7.90	472	14.0	0.0	120.8	188.8	85.5	43.5	10.3	2.2	26.2		0.68	<0.01	0.08	0.223		0.028	
4/04/90	16:25	7.35	575	14.0									<0.005	0.55		0.03	0.07	0.413	8.3	<0.010
10/05/90	14:00	8.10	825	11.0									0.050	0.73	<0.01	0.03	0.260		9.7	<0.010
18/06/90	14:40	8.25	595	10.0	0.0	126.3	32.6	139.8	44.5	4.6	57.0		0.049	0.99	0.01	0.16	0.553	9.1	<0.010	
4/07/90	13:16	7.90	796	8.0									0.049	0.63	<0.01	0.06	0.226		10.1	<0.010
16/08/90	14:06	7.95	741	10.0									0.030	1.35	0.02	0.06	0.441		9.6	<0.010
12/09/90	15:00	8.15	534	12.5	0.0	128.1	31.9	87.0	41.1	6.5	4.0	49.0	0.061	1.05	<0.01	0.45	0.425		8.4	<0.010
17/10/90	16:51	7.65	436	13.0									0.018	0.58	0.02	0.50	0.404		8.7	0.011
27/11/90	16:50	8.25	411	17.0									0.018	0.58	0.03	0.41	0.282		7.7	0.028
20/12/90	12:50	8.20	780	15.0	0.0	130.6	19.8	90.0	46.4	9.2	2.6	33.4	0.020	0.75	0.01	0.23	0.310		7.8	0.024
8/01/91	13:05	8.10	593	16.0									0.034	0.69	0.03	0.31	0.391		8.4	<0.010
20/02/91	10:30	7.60	530	9.0									0.290	0.70	0.08	12.70	0.556		9.4	0.032
21/03/91	10:15	7.55	494	10.0	0.0	137.2	21.6	96.0	45.4	10.2	2.6	36.3	0.043	0.74	0.04	9.13	0.541		9.3	<0.010
10/04/91	13:00	8.10	464	10.0									0.027	1.13	0.03	7.92	0.441		9.0	<0.010
15/04/91	13:30	8.00	917	7.5									0.040	0.77	0.01	0.17	0.559		9.5	<0.010
12/06/91	12:07	7.65	627	7.0	0.0	136.7	34.7	142.2	54.3	12.0	4.7	59.1	0.036	0.92	0.02	0.65	0.656		10.6	<0.010
24/07/91	12:00	7.75	840	5.0									0.037	1.71	0.01	0.99	0.656		10.9	0.013
28/08/91	09:47	7.50	611	5.0									0.026	1.64	0.02	1.66	0.724		9.5	0.015
25/09/91	16:50	7.85	602	13.0	0.0	151.9	28.3	129.7	51.9	12.0	4.0	47.8	0.028	0.61	<0.01	0.95	0.690		8.4	0.032
16/10/91	11:00	7.25	863	5.0									0.023	0.41	<0.01	1.65	0.469		10.2	<0.010
20/11/91	14:34	7.70	487	14.0									0.027	0.19	<0.01	1.60	0.475		7.8	0.013
11/12/91	16:10	7.15	511	12.0	0.0	145.8	24.8	143.6	49.1	10.8	3.5	63.5	0.022	1.25	0.01	1.90	0.615		8.5	<0.010
8/01/92	10:18	7.65	680	10.0									0.034	1.04	0.02	5.32	0.643		8.9	<0.010
19/02/92	15:05	7.05	350	16.0									0.023	0.60	0.03	0.53	0.392		8.3	<0.010
11/03/92	17:15	7.60	426	16.0	0.0	111.7	17.4	70.1	39.0	9.0	2.0	24.8	0.046	0.03	0.03	0.21	0.372		7.4	<0.010
8/04/92	15:40	8.05	530	11.5									0.032	0.60	0.02	0.30	0.372		8.4	<0.010
19/05/92	10:45	7.65	446	5.0									0.017	0.06	<0.01	0.05	0.392		9.8	<0.010
17/06/92	10:15	8.16	465	2.5	0.0	119.0	16.0	96.1	42.2	9.9	2.2	30.4	0.030	0.41	0.02	0.30	0.398		10.1	0.026
15/07/92	14:35	7.25	382	4.0									0.049	<0.02	0.03	0.22	0.405		10.4	0.062
11/08/92	12:50	7.30	362	5.0									0.040	0.65	0.01	0.32	0.454		10.1	0.014
7/09/92	13:00	7.65	416	8.0	0.0	120.8	19.1	86.0	42.4	7.7	2.0	29.9	0.024	0.45	0.02	0.26	0.194		10.4	<0.010
28/10/92	14:10	7.80	345	11.0									0.020	0.34	0.01	1.69	0.544		10.0	<0.010
24/11/92	15:00	7.25	326	10.0									0.021	0.30	0.05	2.75	0.363		9.4	<0.010
17/12/92	15:00	7.55	301	14.0	0.0	103.1	10.6	63.4	36.9	8.5	2.9	20.2	0.019	0.73	0.04	1.71	0.393		8.2	<0.010
5/01/93	13:20	6.80	290	14.0									0.031	0.29	0.02	5.85	0.423		8.6	<0.010
18/02/93	11:10	6.85	320	10.0									0.019	0.12		0.434	0.434		8.8	<0.010
21/04/93	12:38	7.60	371	8.0									0.029	<0.02	<0.01	0.17	0.426		9.2	0.039
Nº DE DATOS		138	138	124	58	58	58	58	58	58	58	58	136	79	97	136	123	72	56	
PROMEDIO		7.63	495	10.1	0.0	125.1	24.2	94.5	43.3	10.9	3.0	34.5	0.041	0.98	0.08	1.15	0.514	9.0	0.018	
MINIMO		4.45	250	0.5	0.0	86.6	8.5	43.2	25.9	6.1	1.2	13.8	0.000	0.00	0.00	0.009	0.000	7.4	0.000	
MAXIMO		8.65	1931	20.0	0.0	175.0	188.8	192.0	60.1	27.3	9.4	63.5	0.899	4.23	5.88	28.77	3.115	10.9	0.062	
DESV. STD.		0.62	186	3.9	0.0	19.6	23.0	31.4	8.2	3.4	1.5	13.0	0.079	0.80	0.59	3.07	0.457	0.9	0.013	

ESTACION : TERNAS DEL TORO
 CODIGO BNA : 04302805-7
 CUENCA : RIO ELQUI

LATITUD S : 29 50
 LONGITUD W : 70 02

ALTITUD : 3200 msnm

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/NO3 mg/l 6242	Oxígeno mg/l 6001	P/PO4 mg/l 6220
16/09/81	15:10	7.56	8102		0.0	146.0	2336.0	660.0	264.0	24.7	183.0	1497.0	12.400	13.90	0.06	0.00			
6/10/81	12:35	7.87	8422		0.0	134.0	2302.0	760.0	295.0	18.5	182.0	1499.0	9.930	13.50	0.03	0.22			
3/11/81	12:40	7.44	7828		0.0	175.0	2293.0	672.0	305.0	5.5	242.0	1402.0	14.700	13.20	0.00	0.16	0.759		
11/11/81	15:45	7.35	7514		0.0	195.0	2276.0	557.0	285.0	18.5	226.0	1425.0	10.100	13.80	0.00	0.12	0.693		
3/12/81	15:45	7.61	7710		0.0	180.0	2432.0	757.0	295.0	6.1	136.0	1402.0	14.600	13.20	0.00	0.13	0.730		
10/03/82	11:00	7.33	7735		0.0	170.0	2366.0	951.0	302.0	12.2	113.0	1609.0	18.800	11.90	0.03	0.21	0.522		
13/04/82	15:40	7.37	7200		0.0	178.0	2265.0	770.0	301.0	15.2	98.9	1368.0	10.500	12.20	0.00	0.09	0.524		
4/05/82	14:10	7.51	8260		0.0	185.0	1952.0	820.0	301.0	12.2	97.0	1368.0	10.800	13.20	0.00	0.09	0.544		
1/06/82	14:05	7.48	7233		0.0	178.0	1982.0	741.0	301.0	12.2	91.5	1354.0	8.000	13.00	0.00	0.09	0.549		
6/07/82	13:55	7.22	7288		0.0	175.0	1997.0	770.0	291.0	12.2	91.1	1363.0	13.500	12.20	0.00	0.15	0.549		
11/08/82	10:05	7.27	7253		0.0	175.0	1967.0	781.0	300.0	6.1	113.0	1460.0	16.000		0.00	0.06	0.492		
8/09/82	15:20	6.95	6524										18.100						
22/09/82	19:40	6.45	7274		0.0	181.0	1922.0	781.0	305.0	9.1	111.0	1391.0	8.750		0.01	0.00	0.578		
7/10/82	14:00	6.55	6757	49.0	0.0	168.0	2078.0	851.0	339.0	12.2	124.0	1448.0	14.200	13.90	0.02	0.04	0.499		
9/11/82	16:10	6.75	6665	39.0	0.0	176.0	2102.0	801.0	319.0	12.2	129.0	1356.0	12.300	14.20	0.00	0.09	0.583		
6/12/82	20:25	6.65	7169	39.0	0.0	181.0	2192.0	841.0	339.0	30.3	119.0	1485.0	10.500	15.30	0.00	0.04	0.535		
5/01/83	8:15	6.85	6683	36.0	0.0	180.0	2262.0	650.0	299.0	15.2	130.0	1370.0	13.300		0.00	0.08	0.488		
8/02/83	8:10	7.00	6683	36.0	0.0	173.0	2306.0	751.0	309.0	18.2	73.9	1526.0	8.850		0.02	0.14	0.321		
7/03/83	19:50	6.90	7013	38.0	0.0	126.0	2341.0	761.0	279.0	30.3	73.9	1526.0	11.200		0.00	0.06	0.840		
12/04/83	19:10	7.25	6439	36.0	0.0	177.0	2251.0	741.0	299.0	18.2	118.0	1444.0	12.500		0.00	0.05	0.495		
10/05/83	13:45	7.05	6873	33.0	0.0	177.0	2375.0	760.0	289.0	21.1	72.3	1508.0	11.300		0.01	0.07	0.384		
7/06/83	13:45	7.45	7256	30.0	0.0	179.0	2267.0	799.0	309.0	6.1	156.0	1508.0	12.200		0.02	0.00	0.490		
5/07/83	13:40	6.60	6984	32.0	0.0	183.0	2344.0	787.0	309.0	7.7	156.0	1508.0	15.100		0.00	0.07	0.447		
9/08/83	13:55	7.45	6938	29.0	0.0	183.0	2360.0	787.0	329.0	0.0	156.0	1531.0	10.900		0.01	0.11	0.675		
6/09/83	14:05	6.45	7081	34.0	0.0	182.0	2269.0	781.0	330.0	6.1	175.0	1490.0	10.400		0.03	0.13	0.578		
4/10/83	12:55	6.80	7461	35.0											0.03	0.07	0.452		
9/11/83	8:45	6.45	6420	46.0											0.02	0.06			
14/12/83	9:00	7.71	8110	42.0											0.16	0.34			
25/01/84	12:55	7.05	8500	36.0								8.500			0.02	0.07			
15/02/84	12:30	6.80	7021	42.0	0.0	95.2	2234.0	749.0	324.0	5.1	137.0	1347.0	9.860		0.00	0.04			
6/03/84	14:35	7.10	6975	39.0									8.100		0.06	0.03			
17/04/84	14:05	6.85	7200	27.0									12.900		0.00	0.12			
8/05/84	14:25	6.60	6907	43.0									11.700		0.00	0.10			
12/06/84	13:50	6.95	6300	44.0									15.200		0.00	0.54			
2/08/84	12:40	7.45	6400	36.0									14.900		0.00	0.07	0.587		
4/09/84	17:55	7.15	6220	35.0									13.600		0.00	0.09	0.845		
2/10/84	14:10	7.30	6520	36.0									14.500		0.00	0.14			
6/11/84	17:00	6.95	6688	43.0									13.200		0.00	0.09	0.230		
5/12/84	20:25	6.95	6830	47.0	0.0	166.0	2212.0	772.0	316.0	9.9	155.0	1278.0	13.100		0.00	0.11	0.201		
8/01/85	17:20	7.20	8500	34.0									13.900		0.00	0.20	0.303		
12/02/85	17:40	6.80	6830	47.0									17.200		0.00	0.10	0.438		
5/03/85	17:15	6.80	6740	48.0	0.0	175.0	2233.0	855.0	291.0	0.0	169.0	1508.0	13.000		0.00	0.25	0.165		
3/04/85	16:05	6.65	7010	46.0									13.100		0.01	0.17	0.456		
7/05/85	18:45	6.75	9000	44.0									12.400		0.07	0.06	0.492		
4/06/85	17:00	6.60	6938	41.0	0.0	121.0	2188.0	946.0	302.0	0.0	163.0	1490.0	13.100		0.00	0.15	0.463		
2/07/85	17:40	7.10	6238	34.0									14.500		0.07	0.21	0.483		
6/08/85	13:10	7.55	6745	34.0									14.600		0.00	0.09	0.445		
3/09/85	14:25	7.30	6744	34.0	0.0	181.0	2192.0	985.0	326.0	6.1	165.0	1508.0	14.100		0.03	0.16	0.422		
8/10/85	12:45	7.25	6650	37.0									13.600		0.00	0.13	0.422		
5/11/85	13:25	7.25	6846	36.0									13.900		0.02	0.13	0.420		

ESTACION : TERMAS DEL TORO (Continuación)
 CODIGO BNA : 04302805-7
 CUENCA : RIO ELQUI

LATITUD S : 29 50
 LONGITUD W : 70 02

ALTITUD : 3200 msnm

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/NO3 mg/l 6242	Oxigeno mg/l 6001	P/PO4 mg/l 6220	
3/12/85	17:30	7.15	8500	37.0	0.0	174.0	2201.0	913.0	301.0	4.4	158.0	1490.0	14.500		0.02	0.08	0.429			
7/01/86	14:00	6.75	6670	48.5									15.000		0.08	0.12	0.364			
4/02/86	14:38	6.80	6586	48.0									12.300		0.02	0.09				
4/03/86	20:10	6.75	7125	41.0	0.0	177.0	2138.0	853.0	299.0	1.2	15.3	1425.0	15.000		0.01	0.10				
2/04/86	18:08	6.85	6246	46.0									11.600		0.00	0.11				
7/05/86	11:50	7.20	5634	43.0									11.100		0.00	0.10				
8/01/90	9:52	7.30	8009	40.0									12.036	81.26	0.08	0.12		4.1		
9/01/90	10:36	6.75	6512	48.8									14.462	110.94	0.06	0.14				
13/02/90	11:03	6.90		49.2									13.938	91.49	0.08	0.18				
8/03/90	17:36	6.80	6653	48.0	0.0	177.0	2254.6	576.3	318.0	5.2	14.0	1407.6		101.73	0.04	0.04				
4/04/90	10:42	7.55	6430	40.5									14.003	93.54	0.07	0.14		5.4		
10/05/90	10:30	7.00	7335	39.0									11.511	90.00	0.03	0.11		3.5		
19/06/90	10:29	6.80	8065	48.0	0.0	177.0	2341.1	750.2	296.8	4.4	14.9	1508.8	12.019	133.45	0.04	24.60		4.4		
4/07/90	18:00	7.05	7000	48.0									9.215	88.42	0.02	0.09		3.8		
17/08/90	10:40	7.25	8204	40.0									11.773	172.33	0.03	0.15		4.3		
13/09/90	10:12	7.30	8163	40.0	0.0	178.2	2256.4	749.3	290.8	4.8	146.5	1407.6	12.413	96.57	0.02	0.05		4.3		
18/10/90	10:11	7.35	8080	40.0									10.068	93.54	0.03	0.12		4.2		
28/11/90	10:33	7.25	7876	41.0									11.314	86.37	0.03	0.10		3.9		
20/12/90	9:50	7.35	7500	38.5	0.0	172.7	2081.6	624.4	266.8	12.0	133.0	1288.0	12.101	111.96	0.05	0.09		4.0		
19/02/91	17:20	7.05	8290	48.0									13.610	131.40	0.08	0.18		2.9		
20/03/91	16:03	7.35	8080	41.5	0.0	244.0	2162.0	700.0	282.0	10.9	138.0	1334.0	11.773	125.25	0.05	0.08		3.6		
9/04/91	17:15	7.15	8120	40.0									12.233	135.49	0.05	0.15		3.9		
14/04/91	16:17	6.85	7880	49.0									10.265	70.01	0.03	0.90		4.1		
11/06/91	17:50	6.85	7700	47.0	0.0	203.2	2287.2	799.0	264.0	4.0	137.0	1343.2	11.183	105.81	0.05	0.08		3.0		
23/07/91	17:26	7.30	7942	41.0									11.052	317.63	0.03	0.14		4.0		
27/08/91	15:52	7.05	6610	49.0									12.495	171.31	0.04	0.16		3.0		
26/09/91	10:17	7.10	7343	48.0	0.0	220.8	2225.6	816.5	273.5	4.0	138.0	1306.4	10.724	71.03	0.04	0.12		2.7		
15/10/91	18:13	6.95	7670	48.0									13.085	81.26	0.01	0.15		3.2		
20/11/91	10:09	7.05	7590	41.0									14.069	116.05	0.03	0.16		4.1		
11/12/91	10:19	6.85	7445	48.0	0.0	179.4	2198.6	700.0	285.5	4.0	138.0	1350.1	15.463	103.77	0.03	0.24		3.2		
7/01/92	16:06	6.70	7215	49.0									11.905	172.33	0.03	0.26		2.2		
19/02/92	10:56	6.75	8040	49.0									14.651	108.89	0.05	0.11		2.3		
12/03/92	10:10	6.75	8250	49.5	0.0	181.2	2260.0	833.8	297.6	4.4	139.0	1435.2	16.693	89.45	0.05	0.10		1.6		
8/04/92	10:14	6.75	7500	48.0									15.831	109.91	0.05	0.08		1.7		
19/05/92	16:04	6.70	7270	48.5									14.241	59.77	0.04	0.11		1.9		
16/06/92	17:20	6.45	7630	47.5	0.0	176.9	2245.4	817.0	307.0	5.0	142.0	1564.0	13.267	80.24	0.07	0.06		2.0		
16/07/92	8:53	6.25	7890	46.5									17.126	141.63	0.05	0.12		2.6		
11/08/92	17:45	6.10	7880	48.5									13.550	102.75	0.03	0.17		1.8		
7/09/92	17:35	6.10	8154	47.0	0.0	208.0	2301.0	950.0	549.0	0.5	121.5	1117.8	13.662	76.15	0.04	0.06		2.2		
28/10/92	18:10	6.80	7500	48.5									13.922	85.35	0.04	0.15		1.9		
25/11/92	7:45	6.85	7510	48.5									14.701	93.64	0.11	0.14		2.1		
18/12/92	7:40	6.85	7570	48.5	0.0	209.3	2267.0	835.7	323.0	5.0	219.5	1518.0	15.377	116.04	0.06	0.01		4.1		
6/01/93	7:50	6.90	7510	49.0									14.052	78.19	0.08	0.09		4.0		
18/02/93	7:55	6.90	7740	48.0									16.779	67.96	0.07	0.20		2.2		
22/04/93	7:46	6.65	8290	49.0									15.134	84.32	0.07	0.37		1.6		
M# DE DATOS		95	91	82	44	43	43	43	43	43	43	43	91	52	93	93	40		36	
PROMEDIO		7.00	7318	42.3	0.0	176.1	2221.3	780.4	307.1	9.8	130.5	1429.4	12.957	85.01	0.03	0.39	0.497		3.1	
MINIMO		6.10	5634	27.0	0.0	95.2	1922.0	557.0	264.0	0.0	14.0	1117.8	8.000	11.90	0.00	0.00	0.165		1.6	
MAXIMO		7.87	9000	49.5	0.0	244.0	2432.0	985.0	549.0	30.3	242.0	1609.0	18.800	317.63	0.16	24.60	0.845		5.4	
DESV. STD.		0.35	667	5.9	0.0	24.2	119.7	91.1	41.4	7.1	48.5	92.1	2.210	56.04	0.02	2.53	0.148		1.0	

ESTACION : RIO TORO ANTES JUNTA RIO LA LAGUNA
 CODIGO BHA : 04302808-1
 CUENCA : RIO ELGUÍ

LATITUD S : 29 58
 LONGITUD W : 70 04

ALTITUD : 2170 msnm

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	NO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/NO3 mg/l 6242	Oxígeno mg/l 6001	P/PO4 mg/l 6220
16/09/81	17:05	4.52	2457		0.0	0.0	174.0	990.0	254.0	73.9	59.8	161.0	1.300	7.25	2.18	6.10			
6/10/81	14:35	4.64	2549		0.0	0.0	198.0	991.0	223.0	73.9	53.2	176.0	0.423	6.75	1.78	6.29			
3/11/81	15:00	4.60	1999		0.0	0.0	191.0	845.0	285.0	43.2	24.2	123.0	0.200	6.40	2.30	20.70	1.530		
11/11/81	16:45	4.70	1958		0.0	0.0	226.0	797.0	203.0	61.6	21.9	132.0	0.384	6.42	1.86	15.20	1.160		
3/12/81	17:30	4.47	1991		0.0	0.0	128.0	1081.0	254.0	55.3	13.7	123.0	0.460	5.12	4.00	6.15	1.780		
5/01/82	15:40	4.81	1966		0.0	0.0	139.0	1041.0	272.0	48.6	20.3	167.0	0.732	6.27	3.10	26.20	1.310		
10/02/82	15:45	4.34	1966		0.0	0.0	156.0	880.0	235.0	40.7	18.0	178.0	0.512	6.10	1.90	19.40	1.030		
9/03/82	13:30	4.20	1934		0.0	0.0	186.0	901.0	201.0	63.8	16.4	187.0	0.430	6.27	2.63	19.00	0.969		
13/04/82	13:10	4.37	1912		0.0	0.0	165.0	875.0	215.0	66.9	12.9	172.0	0.836	5.94	3.49	19.60	2.050		
4/05/82	12:20	4.45	1993		0.0	7.3	123.0	885.0	210.0	53.0	10.6	144.0	0.062	6.92	4.60	21.40	2.270		
1/06/82	12:05	4.55	2043		0.0	7.3	132.0	1001.0	235.0	66.9	12.5	162.0	0.438	5.27	4.20	16.30	2.140		
6/07/82	11:50	4.50	1925		0.0	0.0	143.0	951.0	200.0	65.9	12.5	186.0	0.632	6.60	4.20	3.50	2.140		
11/08/82	12:55	4.46	2292		0.0	0.0	140.0	1161.0	290.0	54.8	12.9	186.0	0.798	4.00	12.60	1.970			
8/09/82	11:30	4.85	1944										0.496						
22/09/82	16:25	4.65	1895										0.525						
7/10/82	10:10	4.65	1975	10.0	0.0	6.7	107.0	871.0	239.0	48.4	12.5	122.0	0.403	7.25	2.55	16.50	1.780		
9/11/82	11:25	6.65	1372	15.0	0.0	13.4	67.7	698.0	191.0	41.2	3.5	90.8	0.364	5.12	2.30	25.80	0.540		
7/12/82	10:30	7.20	1122	15.0	0.0	26.2	42.2	550.0	168.0	30.3	7.4	59.3	0.388	4.13	2.10	11.70	0.691		
5/01/83	12:10	7.05	1213	17.0	0.0	31.7	45.7	540.0	159.0	39.4	7.4	51.0	0.326		2.32	16.70	1.660		
8/02/83	17:20	5.40	1522	21.0	0.0	6.7	75.2	700.0	209.0	30.3	7.4	89.2	0.424		1.73	15.70	1.110		
8/03/83	11:40	5.45	1724	14.0	0.0	0.0	100.0	760.0	189.0	54.6	7.8	106.0	0.495		1.56	10.30	1.620		
12/04/83	11:15	5.00	1851	12.0	0.0	0.0	104.0	760.0	199.0	45.5	17.6	123.0	0.543		1.97	15.70	1.110		
10/05/83	10:30	5.25	1930	6.0	0.0	0.0	120.0	781.0	189.0	54.6	9.0	130.0	0.762		1.67	22.90	1.710		
8/06/83	9:10	5.85	2311	0.0	0.0	0.0	116.0	814.0	191.0	58.1	14.5	136.0	0.488		1.90	18.00	0.901		
6/07/83	8:55	6.05	1795	2.0	0.0	6.1	120.0	769.0	194.0	34.5	15.3	136.0	0.755		2.10	17.50	1.220		
10/08/83	11:35	5.35	2136	3.0	0.0	6.1	143.0	908.0	234.0	54.0	14.9	155.0	0.467		1.80	18.30	1.090		
7/09/83	8:40	6.50	1833	1.0	0.0	6.7	116.0	778.0	220.0	36.5	16.4	131.0	0.976		2.50	18.70	2.500		
5/10/83	8:30	7.35	1452	5.0									0.645		1.15	7.30	0.601		
9/11/83	11:15	6.35	1326	10.0									0.463		1.04	4.60			
14/12/83	11:20	4.67	1198	14.0									0.177		1.53	11.30			
25/01/84	15:35	4.35	1350	19.0									0.313		2.09	10.70			
15/02/84	9:20	4.75	1969	9.0									1.100		26.00	53.50			
7/03/84	15:15	4.20	2700	16.0									1.130		4.51	44.30			
17/04/84	12:20	4.80	2232	10.0									1.530		28.40	37.00	7.430		
9/05/84	9:50	5.30	1952	5.0	0.0	0.0	118.0	1047.0	231.0	45.1	15.6	129.0	0.959		13.90	43.50	4.570		
13/06/84	10:00	4.55	1948	3.0									0.700		5.06	21.60	2.540		
20/07/84	13:25	4.65	2172	9.0									0.618		2.68	10.20	1.350		
2/08/84	16:15	4.75	2247	8.0									0.633		2.79	6.00	1.470		
5/09/84	10:45	5.15	2032	5.0	0.0	0.0	109.0	1066.0	246.0	54.2	11.3	120.0	0.922		2.44	8.40	1.380		
3/10/84	12:35	5.45	1746	11.0									0.550		2.37	7.70	1.660		
7/11/84	9:05	7.15	968	5.0									0.645		2.67	15.20	0.811		
6/12/84	10:30	7.25	977	9.0	0.0	-4.5	30.1	457.0	147.0	27.1	6.3	34.9	0.838		3.11	33.50	0.651		
9/01/85	11:00	5.25	990	13.0									3.950		10.40	41.50	2.860		
12/02/85	12:10	5.75	1466	13.0									0.536		3.08	17.60	1.380		
5/03/85	12:05	5.10	1384	15.0	0.0	0.0	62.4	764.0	164.0	17.5	10.6	85.5	0.822		3.64	21.50	1.560		
4/04/85	8:30	5.25	1532	5.0									0.696		3.66	16.30	1.920		
8/05/85	14:50	4.95	1260	12.0									0.476		6.71	16.70	2.560		

ESTACION : RIO TORO ANTES JUNTA RIO LA LAGUNA (Continuacion)

CODIGO BMA : 04302808-1

CUENCA : RIO ELQUI

LATITUD S : 29 58

LONGITUD W : 70 04

ALTITUD : 2170 msnm

FECHA	HORA	pH u. pH 6020	Conduct ambos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	Ca mg/l 6341	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/NO3 mg/l 6242	Oxigeno mg/l 6001	P/PO4 mg/l 6220
5/06/85	12:40	4.90	1856	11.0	0.0	0.0	97.5	1110.0	195.0	15.2	11.7	115.0	1.360	25.30	79.40	8.270		
3/07/85	10:10	5.65	1661	5.0								0.644	14.20	26.20	5.250			
7/08/85	10:30	6.65	1627	4.0								0.638	3.11	16.80	0.741			
4/09/85	10:25	5.35	1961	6.0	0.0	12.2	111.0	1153.0	237.0	59.9	14.1	143.0	0.688	3.86	16.30	1.560		
9/10/85	9:55	5.80	1804	6.0								0.728	4.14	16.90	1.660			
6/11/85	10:25	5.05	1595	11.0								0.630	2.98	16.10	1.380			
8/01/86	9:00	5.05	1623	10.0								0.895	3.39	17.90	1.000			
5/02/86	10:00	4.90	1743	12.0								0.579	2.53	18.90				
5/03/86	9:40	4.80	1665	10.0	0.0	0.0	96.1	951.0	202.0	50.4	14.5	116.0	0.746	3.64	15.80	1.520		
3/04/86	9:25	4.85	1741	8.0								0.688	3.23	29.60	1.600			
7/05/86	15:33	4.85	1916	14.0								0.544	3.41	22.60				
4/06/86	15:35	4.95	1788	7.0	0.0	0.0	94.7	841.0	213.0	55.2	14.5	116.0	0.834	3.66	25.80	8.400		
9/07/86	10:00	5.10	1743	4.0								0.649	3.52	17.80				
6/08/86	17:00	4.95	1877	12.0								0.683	2.77	16.10				
8/10/86	15:15	4.50	1200	8.0								0.705	3.31	4.87	10.400			
5/11/86	13:26	4.85	2392	13.5								0.621	3.11	4.71	3.980	7.8		
4/12/86	11:15	7.30	1341	12.0	0.0	36.6	44.3	615.0	198.0	24.3	8.6	51.0	1.770	2.43	7.92	3.360	8.0	
7/01/87	19:45	4.90	1523	16.0								0.427	2.02	28.40				8.0
10/02/87	17:45	4.80	1713	18.8								0.273	2.35	9.89	7.190	7.6		
11/03/87	11:45	4.85	1636	13.0	0.0	6.1	79.4	807.0	161.0	70.3	12.5	98.4	0.663	2.53	23.60	6.210	8.2	
9/04/87	13:05	4.90	1955	9.0								1.254	2.48	15.40	5.650	8.6		
7/05/87	14:45	4.85	1910	7.0								0.820	3.65	16.90	1.080	9.3	0.005	
3/06/87	16:30	4.95	1756	7.5	0.0	0.0	113.0	841.0	197.0	49.1	13.7	136.0	0.615	3.34	1.90	5.06	0.873	9.2
9/07/87	13:45	4.95	1764	10.0								0.751	4.16	14.00	1.090	10.2		
6/08/87	8:45	5.15	2160	1.0								0.704	3.65	9.92	0.000			
4/09/87	8:45	5.25	1624	3.0	0.0	0.0	79.4	884.0	223.0	45.9	12.5	95.6	1.880	3.03	4.24	23.60	1.370	10.8
14/10/87	12:50	5.15	1537	7.0								0.818	3.17	2.83	14.60	1.270	8.6	0.012
5/11/87	13:15	5.70	1860	8.0								0.717	2.24	5.22	16.10	0.377	9.1	0.014
15/12/87	10:50	7.60	786	6.5	0.0	48.8	22.3	307.0	107.0	15.4	3.5	26.7	0.450	0.91	1.47	35.00	0.385	10.3
5/01/88	12:30	6.25	1115	9.5								0.449	2.38	2.70	26.00	0.335	8.3	0.005
9/02/88	12:40	5.15	1314	12.0								0.350	2.94	3.09	14.80	1.840	8.0	0.005
9/03/88	12:35	5.25	1270	10.0	0.0	3.0	46.3	600.0	158.0	32.2	8.1	60.7	1.050	2.13	4.20	19.50	1.300	9.1
8/04/88	11:33	4.95	1440	8.5								0.600	2.68	3.87	16.30	2.060	9.0	
6/05/88	8:50	5.45	1420	1.0								0.551	2.99	3.42	15.60	2.380	12.0	
10/06/88	10:15	5.35	1580	1.0	0.0	0.0	68.8	711.0	188.0	37.2	10.3	82.8	0.814	2.91	3.20	15.00	1.820	10.6
6/07/88	17:40	5.40	1627	1.0								0.542	3.47	5.05	13.30	0.000	11.2	0.008
9/08/88	14:20	5.90	1880	7.0								0.770	4.65	3.23	13.10	2.010	8.2	
13/09/88	15:50	4.60	2017	7.0	0.0	3.0	113.0	812.0	221.0	38.2	14.4	112.0	0.205	4.60	5.00	18.20	2.520	8.3
19/10/88	15:15	4.90	2020	10.5								0.839	2.94	3.30	10.00	2.090	8.4	0.005
10/11/88	9:45	4.95	1896	7.0								0.839	3.69	3.01	15.30	1.530	9.2	0.005
14/12/88	15:14	4.70	1721	15.0	0.0	0.0	77.6	831.0	198.0	41.0	13.8	108.0	0.851	3.95	3.79	15.30	2.290	7.7
4/01/89	15:55	4.95	1977	18.0								0.959	3.60	4.27	24.00	1.940	7.8	0.008
8/02/89	16:00	4.80	1861	18.0								0.851	3.73	3.70	14.80	1.810	7.9	0.015
9/03/89	16:55	5.15	1970	13.0	0.0	0.0	88.6	800.0	206.0	49.2	13.1	110.0	1.010	3.90	3.62	31.20	1.470	8.5
12/04/89	17:00	4.85	2073	9.5								0.783	6.35	4.65	18.70	2.730	9.0	0.005
9/05/89	17:30	4.75	2040	6.0								0.875	5.73	6.14	33.80	2.680	9.1	0.005
7/06/89	14:45	5.25	2075	4.0	0.0	0.0	83.3	813.0	218.0	42.8	15.6	113.0	0.720	2.81	4.35	17.40	0.110	9.6
11/07/89	17:15	5.60	2200	2.0								1.030	2.88	6.85	19.10	2.510	10.7	0.012

ESTACION : RIO TORO ANTES JUNTA RIO LA LAGUNA (Continuacion)

CODIGO BHA : 04302808-1

CUENCA : RIO ELQUI

LATITUD S : 29 58

LONGITUD W : 70 04

ALTITUD : 2170 msnm

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/NO3 mg/l 6242	Oxigeno mg/l 6001	P/PO4 mg/l 6220
3/08/89	10:12	5.80	1690										0.610	2.46	3.80	15.10	1.490	11.0	0.005
6/09/89	16:10	4.85	2292	7.0	0.0	0.0	91.1	850.0	219.0	45.0	15.0	116.0	0.939	3.78	4.89	18.90	2.220	10.0	0.005
31/10/89	14:10	5.30	1788	11.0									0.846	2.85	5.98	17.50	3.440	8.5	0.505
16/11/89	15:00	5.25	2245	15.0									0.172	14.20	5.19	19.60	2.660	8.2	0.023
13/12/89	11:30	4.95	1975	10.0	0.0	0.0	70.9	817.0	236.0	48.0	15.6	100.0	1.900	3.37	8.32	27.50	3.480	8.6	0.005
12/02/90	15:30	4.95	1705	18.4									0.872	3.66	5.80	25.00	2.392		0.010
8/03/90	16:10	4.65	2046	16.5	0.0	0.0	90.0	930.0	218.0	45.2	16.8	120.5	0.872	5.38	6.31	32.00	3.145		0.026
4/04/90	15:05	4.90	1995	15.0									1.301	3.70	8.65	27.00	3.981	7.6	+0.010
10/05/90	12:52	5.05	1905	8.0									0.884	4.27	6.50	23.19	3.529	9.2	+0.010
18/06/90	15:50	4.95	1947	7.5	0.0	0.0	111.0	880.0	214.8	44.4	16.0	130.6	0.835	6.81	5.06	22.40		8.8	+0.010
4/07/90	14:10	5.15	2230	7.5									1.084	4.17	6.96	27.65	2.641	9.5	0.011
16/08/90	15:15	5.10	1864	9.0									1.114	6.17	7.56	23.35		9.1	+0.010
12/09/90	16:01	5.05	1852	11.0	0.0	3.1	107.0	825.0	202.0	46.4	17.2	129.7	1.387	5.09	7.85	26.00		8.8	+0.010
17/10/90	17:44	5.05	1683	12.0									1.046	4.81	5.40	21.50		8.6	+0.010
27/11/90	17:55	5.35	1575	18.5									1.215	3.70	6.86	15.28		7.4	0.019
20/12/90	11:27	5.45	1621	14.0	0.0	0.0	81.5	778.1	196.0	41.2	14.4	112.7	0.428	4.83	5.90	19.03		8.2	0.015
8/01/91	11:10	5.25	1621	14.0									1.090	3.82	6.47	22.14		8.3	+0.010
20/02/91	9:20	5.50	1681	6.0									0.815	4.27	4.32	17.50		10.4	+0.010
21/03/91	9:25	5.15	1672	9.0	0.0	0.0	86.4	800.0	179.5	38.5	14.5	109.5	0.112	4.88	5.40	17.16		9.2	+0.010
10/04/91	12:10	5.45	1630	10.0									0.697	7.08	6.74	31.50		9.3	+0.010
15/04/91	12:44	5.70	1883	6.0									0.421	2.48	5.97	18.38		9.8	+0.010
12/06/91	11:14	5.65	1520	5.0	0.0	2.4	83.3	768.0	176.5	38.5	15.1	111.3	0.398	3.86	4.37	15.63		10.1	+0.010
24/07/91	11:07	5.35	1910	3.0									0.487	9.59	3.99	20.04		10.2	+0.010
28/08/91	9:00	6.70	1460	2.5									0.661	11.07	3.77	21.30		10.7	+0.010
25/09/91	17:28	5.25	1570	10.0	0.0	3.6	70.1	780.0	180.0	39.5	13.9	99.4	0.330	1.86	4.67	22.28		9.0	0.017
16/10/91	8:38	6.00	2180	0.0									0.507	2.37	4.09	19.95		10.8	+0.010
20/11/91	12:14	5.85	1641	12.5									0.490	3.04	5.38	20.93		8.1	+0.010
11/12/91	12:20	5.20	1670	10.0	0.0	0.0	76.2	724.8	192.4	40.6	12.4	96.6	0.625	6.42	14.96	34.40		8.7	+0.010
8/01/92	8:35	5.45	1488	6.0									0.418	6.16	9.25	30.72		9.4	+0.010
19/02/92	13:35	4.85	1454	16.0									0.480	4.88	7.50	25.11		8.0	+0.010
11/03/92	15:37	5.25	1444	17.0	0.0	6.7	75.5	706.0	179.6	35.6	13.1	98.4	1.210	2.22	7.85	21.77		7.6	+0.010
19/05/92	12:15	5.45	1602	6.5									0.743	2.37	6.85	19.45		10.0	+0.010
17/06/92	9:23	4.27	1685	1.5	0.0	0.0	82.6	725.0	194.0	44.0	14.6	112.2	0.817	4.01	5.65	23.04		10.8	0.030
15/07/92	15:40	5.20	1560	2.5									0.959	2.12	9.22	29.79		9.5	0.038
11/08/92	13:50	5.55	1623	7.0									0.875	4.73	3.70	14.43		9.6	+0.010
7/09/92	14:12	5.15	1736	10.0	0.0	0.6	79.7	749.7	172.3	46.1	14.3	111.8	0.661	2.58	4.27	28.80		9.3	+0.010
28/10/92	15:08	4.60	1407	14.0									1.319	2.94	24.63	79.64		8.6	+0.010
24/11/92	16:10	4.85	1413	7.5									1.453	3.04	24.52	60.65		9.4	+0.010
17/12/92	16:09	4.65	1340	15.0	0.0	0.0	45.4	883.7	169.0	33.0	13.8	67.2	1.718	4.16	21.45	51.55		8.3	+0.010
5/01/93	14:26	4.60	1133	16.0									0.886	2.58	15.55	56.10		8.0	+0.010
17/02/93	16:03	4.85	1360	16.0									1.011	2.22				7.8	+0.010
21/04/93	14:16	4.75	1524	9.5									1.427	2.02	6.51	26.13		9.2	0.036
Nº DE DATOS		137	137	121	59	59	59	59	59	59	59	59	136	81	135	135	92	72	63
PROMEDIO		5.22	1747	9.5	0.0	5.0	102.5	829.8	205.7	45.8	14.7	117.4	0.763	4.43	5.31	21.16	2.238	9.0	0.007
MINIMO		4.20	786	0.0	0.0	0.0	22.3	307.0	107.0	15.2	3.5	26.7	0.062	0.91	1.04	3.50	0.000	7.4	0.000
MAXIMO		7.60	2700	21.0	0.0	48.8	226.0	1161.0	290.0	73.9	59.8	187.0	3.950	14.20	28.40	79.64	10.400	12.0	0.038
DESV. STD.		0.68	335	4.7	0.0	9.9	41.6	158.6	32.8	13.1	8.7	35.7	0.441	2.12	4.99	12.23	1.835	1.0	0.008

ESTACION : RIO MALO AGUAS ABAJO TRANQUE DE RELAYE
 CODIGO BNA : 04302809-K
 CUENCA : RIO ELGUJ

LATITUD S : 29 47
 LONGITUD W : 70 01

ALTITUD : 3500 msnm

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO2 mg/l 6120	NO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8120	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/NO3 mg/l 6242	Oxigeno mg/l 6001	P/PO4 mg/l 6220
4/06/86	9:20	4.25	1560	6.0	0.0	0.0	13.1	941.0	180.0	34.9	12.5	53.8	0.386		7.96	41.00			
8/07/86	17:00	4.75	1726	6.0									0.454		8.91	34.60			
5/08/86	14:48	4.35	1681	7.0									0.356		6.11	35.10			
3/09/86	10:35	4.40	1683	5.0	0.0	0.0	18.8	1105.0	228.0	43.8	14.1	59.8	1.270		9.40	43.80			
7/10/86	15:30	4.75	1859	7.0									2.760		14.00	56.70			
4/11/86	16:38	4.50	784	7.0									0.526		8.57	33.30	6.260	8.2	
4/12/86	17:20	3.80	1925	11.0	0.0	0.0	12.8	1086.0	224.0	38.4	13.3	52.4			18.80	42.80			7.2
8/01/87	16:10	3.85	1985	13.0									0.760		8.84	31.60			7.1
11/02/87	15:25	4.20	1962	11.5									0.750		8.91	31.00			6.9
10/03/87	16:45	4.15	1720	11.0	0.0	0.0	11.0	711.0	183.0	31.0	13.3	59.8	2.780		8.25	55.50			6.9
8/04/87	16:50	3.95	1711	8.0									0.273		7.48	20.10			7.0
6/05/87	16:00	3.95	1795	4.0									0.951		8.49	30.70			8.4
3/06/87	10:05	4.45	1330	4.0	0.0	0.0	8.9	757.0	135.0	33.9	8.2	40.5	1.130		8.06	4.77			9.2
8/07/87	14:01	4.05	1660	4.0									1.870		13.80	34.40			8.1
5/08/87	16:15	4.35	1431	3.5									0.538		8.45	21.50			
3/09/87	15:50	5.40	1580	3.0	0.0	6.1	10.3	720.0	205.0	22.2	12.5	54.3	0.976		6.55				8.6
13/10/87	17:00	4.75	1265	6.0									0.955		7.64	18.40			0.006
4/11/87	16:30	4.70	1726	6.0									0.617		21.20	22.40			7.7
16/12/87	10:05	4.55	1623	5.5	0.0	0.0	12.1	898.0	224.0	23.9	12.9	46.9	2.270		21.50	44.00			0.005
8/01/88	10:45	3.75	2674	7.0									3.960		16.30	50.00			7.7
10/02/88	10:35	4.45	2139	7.0									1.130		20.70	73.40			6.7
8/03/88	15:55	4.40	1476	10.0	0.0	0.0	14.4	880.0	198.0	25.6	14.7	55.2	3.440		18.10	41.00			6.7
7/04/88	16:25	4.18	1560	7.0									0.900		13.10	46.90			7.5
5/05/88	14:30	4.65	1468	5.0									6.080		17.30	51.00			8.0
9/06/88	14:15	4.75	1530	5.0	0.0	0.0	12.8	778.0	171.0	26.8	12.4	57.0	5.840		10.50	39.50			0.005
7/07/88	15:00	4.85	1410	4.0									0.888		8.30	25.00			7.3
10/08/88	11:10	4.90	1420	5.0									2.010		8.18	35.80			7.4
14/09/88	10:50	4.20	1491	6.0	0.0	0.0	24.1	821.0	180.0	26.6	12.4	57.0	4.510		13.70	48.30			7.4
19/10/88	10:05	4.40	1532	5.0									1.440		8.70	12.50			8.0
9/11/88	11:30	4.60	1680	8.0									4.040		8.51	35.00			7.7
14/12/88	10:30	4.70	1453	7.0	0.0	0.0	9.2	802.0	186.0	26.5	13.5	67.6	1.270		9.78	29.80			7.3
5/01/89	9:56	4.70	1796	7.5									0.857		10.00	20.50			7.7
9/02/89	10:59	4.75	2172	9.0									0.913		10.40	23.40			7.4
10/03/89	10:27	4.60	1560	6.5	0.0	0.0	7.1	750.0	210.0	25.6	13.8	63.5	1.020		8.40	45.00			7.8
13/04/89	10:00	4.75	1616	6.0									0.913		8.57	37.00			7.8
10/05/89	10:20	4.75	1774	5.0									0.795		9.12	37.80			8.2
8/06/89	10:30	4.80	1800	4.0	0.0	0.0	11.0	850.0	235.0	27.6	16.6	84.0	0.770		9.70	21.70			8.0
12/07/89	10:14	4.70	1420	5.0									0.912		9.80	18.20			7.8
11/08/89	10:30	4.75	1412	6.0									0.849		8.80	19.70			8.0
7/09/89	10:12	4.80	1464	5.5	0.0	0.0	5.7	713.0	203.0	27.5	15.9	60.7	0.491		7.79	11.90			7.7
30/10/89	19:50	4.45	1600	6.0									0.902		17.20	28.30			7.9
16/11/89	10:15	4.90	1810	7.5									0.548		11.60	18.90			8.1
12/12/89	16:46	4.05	1781	9.0	0.0	0.0	5.7	817.0	248.0	32.2	21.8	65.3	1.660		15.00	37.50			7.1
8/01/90	8:47	5.13	1185	9.0									0.962		11.81	25.22			7.8
9/01/90	10:00	4.50	1715	9.5									0.671		13.90	33.37			
13/02/90	10:25	4.50	1482	10.0									0.369		14.50	33.50			
9/03/90	8:51	4.65	1354	8.0	0.0	0.0	7.4	690.6	180.0	30.4	12.8	59.8			15.35	23.75			

ESTACION : RIO MALO AGUAS ABAJO TRANQUE DE RELAVE (Continuación)
 CODIGO BNA : 04302809-K LATITUD S : 29 47
 CUENCA : RIO ELOUÍ LONGITUD W : 70 01

ALTITUD : 3500 msnm

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HC03 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/NO3 mg/l 6242	Oxigeno mg/l 6001	P/PO4 mg/l 6220
4/04/90	9:17	4.65	1340	8.0									1.450		20.05	37.50		7.9	
10/05/90	9:13	5.15	1440	8.0									0.897	1.11	15.50	31.48		7.4	
19/06/90	8:59	4.85	1506	8.0	0.0	0.0	13.8	1000.0	268.0	25.6	24.0	104.9	0.032		3.38	12.20		7.6	
5/07/90	9:15	4.85	1433	7.5									0.936	1.15	11.55	27.50		7.3	
17/08/90	9:15	4.80	1532	8.0									1.743		20.03	38.70		7.3	
13/09/90	8:57	4.80	1273	7.5	0.0	0.0	9.2	696.4	148.0	29.2	13.0	60.7	1.127		15.30	32.80		7.7	
18/10/90	9:00	4.50	1273	7.5									1.654		16.08	29.70		7.4	
28/11/90	9:20	5.40	1320	10.0									1.556		10.40	24.00		7.1	
20/12/90	8:43	5.10	1260	8.5	0.0	0.0	7.1	650.0	172.0	24.8	14.7	61.6	0.300		8.87	17.38		7.4	
19/02/91	16:00	4.95	1372	11.0									1.336		10.46	22.80		7.3	
20/03/91	14:53	5.05	1315	11.0	0.0	0.0	8.5	800.0	166.5	24.0	15.1	67.2	0.484		9.25	13.22		7.2	
9/04/91	15:46	5.25	1274	9.5									0.972		11.17	26.60		7.4	
14/04/91	15:00	5.15	1425	9.0									0.307		8.76	17.35		6.8	
11/06/91	16:28	5.30	1362	9.0	0.0	6.1	9.2	816.5	194.0	25.5	15.1	70.2	0.638		10.00	16.31		7.3	
23/07/91	17:01	5.05	1340	6.0									0.359		7.06	22.31		8.6	
27/08/91	15:10	6.05	1348	9.5									1.149		6.86	24.08		7.1	
26/09/91	9:05	5.00	1340	8.0	0.0	0.0	9.2	759.8	171.5	22.0	17.4	65.3	0.336		9.08	10.37		7.8	
15/10/91	16:02	5.75	1465	9.0									0.520		6.80	15.30		7.1	
20/11/91	8:56	5.15	1158	8.5									0.641		20.30	22.55		7.1	
11/12/91	9:02	4.75	1637	8.0	0.0	0.0	6.7	769.4	191.0	29.0	14.4	70.2	1.346		38.60	70.31		8.4	
7/01/92	14:48	4.85	1245	11.0									0.454		1.72	4.79		7.1	
19/02/92	9:28	6.40	1335	10.0									0.343		15.50	31.31		7.1	
12/03/92	9:05	5.15	1203	9.5	0.0	7.9	11.0	568.0	156.0	23.6	15.0	63.5	0.669		7.20	24.56		7.5	
8/04/92	8:55	4.60	1173	9.0									0.261		4.41	15.15		8.0	
19/05/92	14:47	4.85	1315	9.0									0.782		7.73	26.70		7.4	
16/06/92	16:56	3.70	1508	5.5	0.0	0.0	8.9	724.8	182.0	36.0	14.3	65.3	0.979		16.86	25.75		8.5	
16/07/92	8:27	5.40	800	1.0									0.583		13.67	30.40			
11/08/92	17:20	4.90	1410	5.0									0.585		7.28	21.68		8.8	
7/09/92	17:10	3.80	1495	6.5	0.0	0.0	9.2	878.0	179.6	29.6	13.4	63.5	0.604		17.25	36.49		8.4	
29/10/92	8:35	3.55	2232	7.0									2.119		53.66	114.70		7.5	
25/11/92	9:40	3.45	2138	8.0									1.985		55.80	101.00		7.6	
18/12/92	9:27	3.25	2235	8.0	0.0	0.0	4.6	1633.0	195.0	38.0	20.1	59.3	3.076		80.00	139.20		7.4	
6/01/93	8:47	3.65	2120	8.0									1.102		49.10	107.50		7.6	
18/02/93	8:50	4.95	1413	7.5									1.176					7.5	
22/04/93	8:50	4.50	1468	7.5									0.721		16.95	45.50		6.9	
Nº DE DATOS		82	82	82	27	27	27	27	27	27	27	27	80		81	80		72	
PROMEDIO		4.65	1530	7.3	0.0	0.7	10.4	837.6	193.1	29.0	14.8	62.6	1.262		14.13	34.54		7.6	
MINIMO		3.25	764	1.0	0.0	0.0	4.6	568.0	135.0	22.0	8.2	40.5	0.032		1.72	4.77		6.7	
MAXIMO		6.40	2674	13.0	0.0	7.9	24.1	1633.0	268.0	43.8	24.0	104.9	6.080		80.00	139.20		9.2	
DESV. STD.		0.54	303	2.2	0.0	2.0	4.1	197.2	29.8	5.4	3.2	11.5	1.161		11.94	22.90		0.5	

ESTACION : RIO TURBIO ANTES RIO ICAGUAR
 CODIGO BNA : 04303801-K
 CUENCA : RIO ELOUI

LATITUD S : 29 59
 LONGITUD W : 70 14

ALTITUD : 1630 msnm

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/NO3 mg/l 6242	Oxigeno mg/l 6001	P/PO4 mg/l 6220	
6/10/81	15:15	8.06	538		0.0	116.0	30.5	112.0	55.1	12.9	7.4	35.6	0.041	2.00	0.09	2.92				
3/11/81	16:10	8.06	534		0.0	100.0	26.2	139.0	55.1	14.8	3.9	35.6	0.071	1.85	0.29	3.18	0.099			
11/11/81	17:45	8.00	509		0.0	112.0	27.7	119.0	52.9	12.9	3.9	34.9	0.057	1.67	0.20	2.12	0.319			
3/12/81	18:45	7.83	542		0.0	100.0	27.7	140.0	55.7	12.3	2.4	34.5	0.000	2.17	0.49	1.77	0.490			
5/01/82	16:45	7.58	616		0.0	104.0	33.0	220.0	67.1	15.9	3.1	48.3	0.074	2.66	0.28	1.56				
10/02/82	18:00	8.27	531														0.368			
9/03/82	12:30	7.91	553		0.0	108.0	27.7	152.0	55.1	15.9	2.7	32.2	0.079	2.65	0.26	1.54	0.334			
13/04/82	12:00	7.87	645		0.0	102.0	33.0	218.0	66.1	21.3	3.9	50.8	0.101	1.50	0.60	2.35				
4/05/82	11:00	7.66	989														0.483			
6/07/82	10:55	7.48	908		0.0	87.3	51.0	365.0	94.2	26.7	6.7	69.0								
11/08/82	10:45	7.79	880		0.0	110.0	49.6	280.0	95.0	18.8	4.3	74.5								
6/01/83	10:55	7.55	481	16.0	0.0	120.0	8.5	116.0	55.7	16.4	3.1	20.5	0.172		0.37	20.20				
13/04/83	15:55	8.25	579	16.0	0.0	94.6	29.4	148.0	59.7	15.2	3.9	28.0	0.051		0.24	1.45				
6/07/83	15:10	8.35	625	8.0	0.0	101.0	29.1	182.0	66.7	17.6	4.3	43.2	0.123		0.31	2.18				
10/08/83	14:25	8.35	670	8.0	0.0	94.6	34.4	196.0	69.7	14.6	4.3	46.9	0.080		0.27	2.53				
16/02/84	15:20	7.20	544	21.0	0.0	89.1	21.6	166.0	58.9	12.8	3.5	30.3			0.96	2.90				
11/04/84	9:30	7.55	641	13.0													0.633			
8/05/84	11:10	7.65	859	11.0	0.0	48.2	44.0	303.0	88.6	19.2	6.7	55.6			4.29	4.26	0.852			
13/06/84	16:05	7.45	1130	7.0													0.786			
4/09/84	10:35	7.80	565	8.0	0.0	97.0	25.2	165.0	62.9	13.2	3.1	29.4	0.090		0.40	3.39	0.815			
5/12/84	16:10	7.75	380	17.0	0.0	101.0	13.1	107.0	49.1	13.5	2.7	17.5	0.085		0.26	9.00	0.562			
6/03/85	12:40	7.60	548	16.0	0.0	96.4	25.9	177.0	59.9	11.5	3.9	39.5	0.135		0.47	4.51	0.524			
4/06/85	11:30	7.85	621	10.0	0.0	87.9	27.7	195.0	59.9	15.8	4.7	44.1	0.185		1.57	4.54	0.481			
4/03/86	10:25	8.00	491	13.0	0.0	101.0	19.9	137.0	55.5	10.2	3.1	29.9	0.087		0.39	1.66	0.492			
W DE DATOS		24	24	13	20	20	20	20	20	20	20	20	16	7	18	18	14			
PROMEDIO		7.83	641	12.6	0.0	98.5	29.3	181.9	64.1	15.6	4.1	40.0	0.089	2.07	0.65	4.00	0.517			
MINIMO		7.20	380	7.0	0.0	48.2	8.5	107.0	49.1	10.2	2.4	17.5	0.000	1.50	0.09	1.45	0.099			
MAXIMO		8.35	1130	21.0	0.0	120.0	51.0	365.0	95.0	26.7	7.4	74.5	0.185	2.66	4.29	20.20	0.852			
DESV. STD.		0.30	177	4.2	0.0	14.4	10.1	66.3	13.0	3.7	1.3	14.2	0.039	0.42	0.94	4.30	0.200			

ESTACION : RIO ICAGUAZ ANTES RIO TURBIO
 CODIGO BNA : 04304800-7
 CUENCA : RIO ELQUI

LATITUD S : 29 59
 LONGITUD W : 70 14

ALTITUD : 1630 msnm

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/NO3 mg/l 6242	Oxigeno mg/l 6001	P/PO4 mg/l 6220
6/10/81	15:20	7.97	297		0.0	61.0	13.5	74.9	32.7									
11/11/81	17:35	8.10	283		0.0	67.1	10.3	43.2	34.5	8.1	2.4	10.3						
3/12/81	18:50	7.71	293		0.0	59.8	10.3	76.4	36.5	8.6	0.8	11.5	0.000	1.35	0.07	0.34	0.034	
5/01/82	16:50	7.57	300		0.0	61.0	12.1	87.9	38.1	5.5	0.8	11.0	0.000	0.00	0.02	0.31	0.239	
10/02/82	18:05	8.06	298							8.5	0.8	13.1	0.015	1.35	0.06	0.41		
9/03/82	12:30	7.94	264		0.0	65.3	10.3	68.2	34.1	8.5	0.8	13.3	0.008	2.17	0.04	0.54	0.239	
13/04/82	12:05	7.86	230		0.0	72.6	8.9	50.9	27.1	9.1	0.8	10.8	0.014	0.50	0.05	0.41	0.140	
6/07/82	10:50	7.47	234		0.0	65.3	8.9	58.1	28.1	8.5	0.8	10.8	0.014	0.50	0.05	0.41		
6/01/83	11:00	7.55	254	16.0	0.0	44.5	5.3	73.0	33.9	7.3	1.2	4.4	0.010					
13/04/83	16:00	8.45	332	16.0	0.0	44.5	10.3	90.3	37.9	13.4	1.2	7.4	0.005					0.88
6/07/83	15:15	8.00	306	7.0	0.0	50.6	7.1	80.7	34.9	7.9	1.2	9.7	0.012					0.95
16/02/84	15:25	7.10	289	20.0	0.0	59.2	6.0	78.8	37.9	9.0	1.2	7.4	0.004					0.79
11/04/84	9:35	7.60	290	11.0														
8/05/84	11:15	7.75	282	10.0	0.0	51.3	9.6	81.7	34.5	6.6	1.2	10.1	0.004					0.312
13/06/84	15:45	6.65	283	8.0														
4/09/84	10:30	7.45	203	9.0	0.0	65.3	11.0	40.3	27.5	4.9	1.2	7.4	0.007			1.31		0.350
5/12/84	16:05	7.65	152	16.0	0.0	41.5	5.7	36.5	19.2	5.6	1.2	4.6	0.004			0.65		0.703
6/03/85	12:45	7.90	249	15.0	0.0	48.2	7.4	83.6	33.5	5.5	1.2	8.3	0.002			2.24		0.287
4/06/85	11:35	8.05	246	9.0	0.0	54.3	8.9	67.2	31.9	4.9	1.2	9.7	0.002			0.62		0.289
3/09/85	10:30	8.30	230	7.0	0.0	61.0	9.2	62.4	33.5	4.7	1.2	10.1	0.002			0.58		0.298
4/03/86	10:22	8.05	268	12.0	0.0	63.5	8.2	69.2	35.7	5.4	1.2	10.1	0.002			0.61		0.287
4/06/86	17:45	7.70	260	8.0	0.0	69.6	11.7	57.6	31.7	6.6	1.6	9.7	0.002			0.70		0.300
3/09/86	18:20	7.45	230	11.0	0.0	55.5	9.6	51.9	30.1	3.7	1.2	9.2	0.007			0.82		1.650
5/12/86	12:50	7.85	320	15.5	0.0	42.7	16.7	76.9	35.9	6.4	1.2	7.8	0.007			0.75		1.910
10/03/87	11:05	7.85	393	13.0	0.0	54.3	5.3	106.0	39.3	9.5	1.6	10.6	0.005			3.63		0.710
4/06/87	15:25	7.90	272	8.0	0.0	48.8	10.6	76.4	32.0	6.9	7.1	0.8	9.7	0.005	0.71	3.70		0.690
4/09/87	13:15	8.00	230	9.0	0.0	67.1	6.7	49.0	30.5	5.4	1.2	7.8	0.008	0.07	0.16	2.45		0.207
16/12/87	13:35	7.60	157	9.0	0.0	36.6	5.3	31.7	19.4	3.2	0.8	4.6	0.018	0.45	0.07	0.61		0.291
9/03/88	13:53	7.75	265	11.0	0.0	61.0	9.9	64.4	31.5	5.9	0.8	8.3	0.005	0.55	0.14	0.60		0.061
10/06/88	14:00	7.75	300	4.0	0.0	53.7	6.4	75.0	32.4	6.3	0.9	6.4	0.007	0.55	0.14	0.60		0.254
13/09/88	13:35	7.75	267	7.0	0.0	61.0	8.2	63.4	31.3	5.9	0.8	8.3	0.005	0.17	0.08	1.49		0.303
15/12/88	9:45	7.95	272	9.0	0.0	67.1	8.2	58.0	29.2	5.4	1.0	8.3	0.015	0.02	0.07	0.20		0.335
9/03/89	10:15	7.15	280	9.5	0.0	67.1	7.1	64.8	31.7	6.3	1.0	9.7	0.012	0.32	0.08	0.46		0.297
6/06/89	17:00	7.20	256	6.0	0.0	67.1	7.1	5.0	34.0	6.0	0.9	11.0	0.007	0.33	0.66	0.54		0.178
5/09/89	14:50	7.50	325	6.5	0.0	67.1	7.4	48.0	29.2	6.2	1.2	11.0	0.005	0.19	0.04	0.55		0.268
11/12/89	14:50	7.40	335	16.0	0.0	56.8	7.4	95.0	42.5	5.8	1.1	9.4	0.005	0.15	0.04	0.44		0.151
7/03/90	15:32	7.85	268	17.0	0.0	70.2	7.4	64.0	34.6	6.9	1.1	9.7	0.005	0.27	0.05	0.52		0.121
18/06/90	12:40	7.50	261	7.0	0.0	69.0	9.6	68.2	33.6	6.2	1.2	12.4	0.005	0.47	0.04	0.36		0.181
13/09/90	12:57	7.15	271	11.0	0.0	65.3	8.5	72.0	28.7	6.5	1.2	10.6	0.005	1.05	0.06	0.52		0.447
20/12/90	14:12	7.75	592	20.0	0.0	64.7	9.9	82.0	43.0	6.7	1.2	12.6	0.005	0.59	0.03	0.30		0.301
21/03/91	11:45	7.60	150	0.0	0.0	71.3	9.2	77.8	35.2	6.6	1.0	12.4	<0.005	0.37	0.03	0.24		0.223
12/06/91	13:20	7.25	345	8.0	0.0	67.1	9.9	76.8	34.3	6.5	1.0	12.0	<0.005	0.31	0.03	0.17		0.298
25/09/91	15:30	7.25	230	13.5	0.0	67.1	7.8	52.8	27.6	4.9	0.8	9.2	<0.005	0.25	0.05	0.44		0.469
11/12/91	15:54	7.05	249	11.0	0.0	51.3	6.0	62.0	31.7	5.2	1.1	7.4	0.014	1.28	0.05	0.37		0.447
12/03/92	15:10	7.10	300	16.5	0.0	45.8	10.3	90.0	39.0	7.3	1.1	9.2	0.021	<0.02	0.12	0.42		0.223
16/06/92	12:00	7.92	283	5.0	0.0	53.1	7.1	75.0	33.1	6.6	1.1	9.2	<0.005	0.19	0.10	0.70		0.293
8/09/92	9:19	7.75	226	5.0	0.0	54.9	6.7	62.0	39.2	4.3	0.8	7.8	<0.005	0.08	0.08	0.63		0.097
18/12/92	11:05	6.85	340	9.0	0.0	44.5	6.0	71.1	31.3	5.1	1.8	6.4	<0.005	0.59	0.11	0.69		0.200
Nº DE DATOS		48	48	40	4	45	45	45	45	45	45	45	30	29	44	39	24	25
PROMEDIO		7.66	274	10.9	0.0	58.1	8.5	66.7	33.0	6.6	1.1	9.3	0.006	0.54	0.08	0.81	0.362	9.4
MINIMO		6.65	28	4.0	0.0	36.6	5.5	5.0	19.2	3.2	0.8	6.4	0.000	0.00	0.01	0.17	0.034	7.0
MAXIMO		8.80	592	20.0	0.0	72.6	16.7	106.0	45.0	13.4	2.4	13.3	0.021	2.17	0.66	3.80	1.910	10.8
DES. STD.		0.40	73	4.1	0.0	9.6	2.3	18.0	4.7	1.8	0.3	2.1	0.005	0.49	0.11	0.77	0.365	1.0

ESTACION : RIO TURBIO EN VARIILLAR
 CODIGO SNA : 04308800-9
 CUENCA : RIO ELQUI

LATITUD S : 29 56
 LONGITUD W : 70 32

ALTITUD : 870 metros

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	W/WO3 mg/l 6242	Cloruro mg/l 6001	P:PO4 mg/l 6220
25/09/81	13:30	7.71	661		0.0	101.0	34.0	175.0	64.3	20.1	9.8	40.2	0.095	2.65	0.32	4.86			
7/10/81	15:30	7.94	553		0.0	104.0	23.8	125.0	59.3	14.0	5.1	31.0	0.039	2.00	0.13	3.73			
4/11/81	16:10	8.00	498		0.0	100.0	22.7	92.2	46.7	11.1	3.1	31.0	0.039	2.50	0.20	2.80		0.000	
11/11/81	18:45	8.05	507		0.0	112.0	24.5	101.0	55.9	11.7	3.1	32.9	0.033	2.00	0.14	1.68		0.267	
2/12/81	9:35	7.71	503		0.0	105.0	25.2	128.0	52.7	13.5	2.4	29.2	0.000	0.17	0.14	1.14		0.350	
6/01/82	10:30	7.65	557		0.0	110.0	24.5	176.0	64.1	15.9	2.7	39.1	0.064	0.68	0.20	1.21			
9/02/82	19:40	8.24	512																
10/03/82	16:25	7.79	516		0.0	111.0	24.5	146.0	56.1	14.7	2.4	39.1	0.046	2.65	0.18	1.20		0.343	
14/04/82	15:35	7.90	585		0.0	98.2	30.1	190.0	66.1	17.0	3.5	40.7	0.112	1.83	0.37	1.78			
5/05/82	10:00	7.82	694																
6/07/82	10:20	7.76	603		0.0	102.0	30.1	206.0	65.1	18.2	3.5	37.2						0.558	
6/01/83	18:35	7.40	424	21.0	0.0	120.0	13.8	106.0	57.7	15.8	2.7	15.6	0.153		0.43	15.10		0.490	
4/02/83	12:25	7.35	445	20.0	0.0	99.5	14.2	108.0	37.9	20.5	2.4	22.1	0.059		0.16	4.22		0.185	
4/03/83	15:10	7.05	462	21.0	0.0	92.7	17.4	122.0	49.9	13.4	2.4	24.8	0.027		0.16	1.18		0.425	
13/04/83	17:45	7.90	535	17.0	0.0	101.0	22.3	126.0	51.7	18.2	3.1	22.3	0.036		0.19	1.14		0.472	
5/05/83	12:05	8.10	550	13.0	0.0	98.2	19.9	158.0	59.7	17.0	3.5	31.7	0.087		0.34	4.14		0.468	
3/06/83	12:20	8.20	564	10.0	0.0	106.0	23.8	142.0	55.9	18.7	3.5	33.6	0.061		0.25	1.62		0.429	
7/07/83	11:15	7.85	551	8.0	0.0	101.0	21.6	146.0	61.7	12.2	3.1	30.8	0.068		0.22	1.57		0.386	
5/08/83	12:25	7.65	557	11.0	0.0	94.6	21.6	158.0	60.7	11.5	3.5	33.1	0.052		0.25	1.90		0.472	
7/09/83	18:20	8.05	570	12.0	0.0	99.5	23.8	136.0	62.1	12.2	3.5	36.8	0.061		0.40	2.47		0.628	
6/10/83	11:00	8.15	645	14.0									0.475		0.37	13.30		0.352	
2/11/83	17:05	8.00	454	19.0									0.070		0.17	3.36			
12/12/83	17:50	7.90	392	21.0									0.037		0.16	3.38			
26/01/84	16:20	7.45	430	22.0									0.040		0.16	1.78			
16/02/84	16:55	6.85	490	23.0	0.0	92.7	21.6	144.0	56.9	10.2	3.1	23.9	0.061		0.80	2.56			
8/03/84	10:50	7.20	550	11.0									0.068		1.52	4.83			
12/04/84	14:10	7.75	557	19.0									0.145		1.94	6.50		0.583	
9/05/84	16:40	7.50	592	15.0	0.0	82.4	23.8	184.0	62.9	18.1	4.3	33.1	0.113		1.84	6.00		0.576	
7/06/84	16:55	7.72	657	12.0									0.126		0.76	2.84		0.633	
24/07/84	15:45	7.85	636	15.0									0.117		0.26	1.59		1.080	
3/08/84	11:25	7.45	620	11.0									0.096		0.28	1.84		0.974	
6/09/84	16:30	7.35	512	15.0	0.0	114.0	18.8	130.0	56.1	12.6	2.7	23.4	0.059		0.31	2.92		1.070	
4/10/84	11:05	7.35	456	12.0									0.045		0.11	1.52		1.140	
7/11/84	17:10	7.80	370	14.0									0.106		0.25	12.80		0.777	
4/12/84	18:25	7.65	329	19.0	0.0	104.0	11.3	78.3	46.9	9.2	2.7	13.3	0.103		0.29	17.50		0.520	
3/01/85	16:45	8.15	320	21.0									0.024		0.04	1.69		0.633	
13/02/85	16:30	7.85	417	23.0									0.039		0.15	0.86		0.472	
7/03/85	11:20	7.60	442	18.0	0.0	99.5	14.5	134.0	50.9	9.7	2.7	27.1	0.066		0.24	2.10		0.551	
18/04/85	12:20	7.65	475	16.0									0.048		0.77	2.60		0.359	
9/05/85	12:00	8.05	420	13.0									0.056		0.35	1.78		0.520	
6/06/85	12:15	7.85	491	13.0	0.0	96.4	20.2	159.0	55.9	13.4	3.5	32.2	0.089		0.90	3.70		0.520	
3/07/85	16:10	7.95	511	14.0									0.058		0.65	2.10		0.492	
7/08/85	15:25	7.95	510	12.0									0.046		0.24	1.24		0.507	
4/09/85	15:55	8.05	480	17.0	0.0	96.4	19.9	178.0	65.1	10.8	3.9	34.5	0.148		0.43	3.40		0.481	
10/10/85	10:05	7.95	530	15.0									0.055		0.28	1.36		0.368	
6/11/85	16:15	7.70	511	22.0									0.159		0.49	3.04		0.578	
5/12/85	10:40	7.85	425	18.5	0.0	98.2	19.9	142.0	59.1	11.3	3.5	27.6	0.088		0.38	2.36		0.477	

ESTACION : RIO TURBIO EN VARILLAR (Continuación)
 CODIGO BNA : 04308800-9
 CUENCA : RIO ELQUI

LATITUD S : 29 56
 LONGITUD W : 70 32
 ALTITUD : 870 msnm

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/MO3 mg/l 6242	Oxígeno mg/l 6001	P/PO4 mg/l 6220
3/01/86	10:36	8.10	465	18.0									0.068		0.43	3.06	0.526		
10/02/86	18:00	8.00	479	22.0									0.070		0.53	3.44			
12/03/86	11:12	8.00	500	18.0	0.0	101.0	19.9	151.0	59.3	9.6	3.5	31.3	0.077		0.33	1.60	0.556		
4/04/86	11:15	7.95	548	16.0									0.063		0.30	1.92	0.608		
8/05/86	11:35	8.00	613	14.0									0.070		0.33	1.87			
5/06/86	10:35	7.55	591	11.0	0.0	95.2	29.8	198.0	69.3	15.6	4.7	37.7	0.097		0.50	3.04	2.950		
10/07/86	15:30	7.45	655	13.0									0.073		0.45	2.26			
7/08/86	16:10	7.55	610	16.0									0.066		0.31	1.83			
4/09/86	15:50	7.65	636	19.0	0.0	98.9	30.1	191.0	74.1	9.7	4.7	42.3	0.074		0.39	2.03	3.280		
6/10/86	17:53	7.60	410	13.5									0.025		0.18	1.31	2.680		
12/11/86	10:00	7.55	500	15.0									0.156		0.66	43.30	2.300	8.5	
10/12/86	18:00	8.05	545	21.0	0.0	79.3	18.4	189.0	69.5	12.2	4.3	26.7	0.450		0.00	5.46	1.790	7.7	
7/01/87	11:00	8.00	510	15.0									0.048		0.00	5.80	9.0	9.0	
9/02/87	18:30	8.10	456	20.0									0.024		0.07	1.42	1.280	8.1	
9/03/87	16:40	8.20	516	21.0	0.0	96.4	16.3	134.0	49.1	15.4	3.5	25.7	0.087	0.74	0.32	3.72	1.570	8.3	
9/04/87	18:10	7.95	670	16.0									0.040	0.91	0.24	1.63	0.980	9.0	
5/05/87	16:40	7.65	690	11.5									0.176		0.56	5.52	0.625	9.6	0.007
8/06/87	11:00	8.15	545	8.3	0.0	85.4	26.6	171.0			2.7	35.9	0.101	0.58	0.60	2.85	0.608	10.4	0.007
10/07/87	10:55	7.90	611	7.0									0.066		0.51	1.69	0.338	10.8	
4/08/87	16:30	8.05	600	9.0									0.075		0.34	2.58			
7/09/87	18:40	8.05	500	8.5	0.0	104.0	15.6	122.0			2.4	23.9	0.130	0.26	0.44	4.55	0.446	10.9	0.005
8/10/87	18:00	8.25	550	13.0									0.087	0.96	0.30	3.34	0.662	9.3	0.014
5/11/87	19:40	8.10	445	13.0									0.056	0.87	0.44	3.94	0.182	0.014	
4/12/87	13:26	8.10	473	15.0	0.0	146.0	8.5	110.0			3.1	13.8	0.467	0.28	0.82	56.10	0.245	9.0	0.046
7/01/88	18:45	8.05	511	17.0									0.226	0.43	0.37	25.00	0.259	9.0	0.005
3/02/88	18:45	8.10	386	17.0									0.047	0.69	0.21	2.04	0.324	8.9	0.008
7/03/88	17:05	8.15	420	18.0	0.0	83.9	12.8	120.0			2.0	19.8	0.042	0.71	0.25	1.24	0.391	9.2	0.005
2/04/88	9:21	8.10	635	10.0									0.039	0.39	0.25	1.28	0.458	9.9	
3/05/88	16:10	8.05	447	11.0									0.053	0.33	0.18	1.00	0.452	9.8	
6/06/88	16:26	8.05	507	9.0	0.0	89.7	14.5	135.0			2.3	23.9	0.045	0.51	0.29	1.42	0.308	10.0	0.005
5/07/88	14:20	8.00	542	6.5									0.026	1.10	0.39	1.17		10.8	
2/08/88	14:15	8.00	621	10.0									0.058	1.07	0.24	1.23	0.601	9.7	
5/08/88	12:35	7.95	580	10.0									0.044	0.69	0.15	0.85	0.785	10.6	
13/09/88	16:35	8.00	600	14.0	0.0	97.6	22.3	175.0			3.4	31.3	0.094	0.52	0.35	1.35	0.549	9.1	0.008
14/10/88	15:30	8.15	650	16.5									0.124	1.74	0.31	1.29	0.543	8.0	0.005
7/11/88	16:00	8.15	618	19.5									0.108	0.75	0.41	1.80	0.514	8.4	0.005
7/12/88	15:00	8.10	558	18.0	0.0	104.0	18.1	154.0			3.1	32.7	0.165	0.88	0.40	1.91	0.458	8.6	0.008
3/01/89	17:26	8.20	600	20.0									0.096	0.63	0.33	1.80	0.446	7.9	0.006
7/02/89	17:07	8.05	723	20.0									0.090	0.54	0.35	1.93	0.471	7.8	0.010
7/03/89	16:00	8.25	545	18.0	0.0	104.0	21.6	153.0			3.1	32.7	0.066	0.56	0.46	1.80	0.365	9.5	0.005
11/04/89	18:00	7.70	670	14.0									0.087	1.09	0.32	2.78	0.455	8.8	0.005
8/05/89	15:30	7.70	818	12.0									0.090	1.35	0.46	2.56	0.511	9.5	0.008
5/06/89	15:45	7.75	660	10.5	0.0	94.6	25.2	210.0			4.7	40.5	0.091	0.61	0.54	2.25	0.499	10.1	0.006
7/07/89	14:50	7.45	724	9.0									0.096	0.56	0.70	2.63	0.794	9.5	0.005
3/08/89	17:00	7.85	875	10.0									0.076	0.58	0.54	2.29	0.400	10.3	0.005
4/09/89	15:40	7.35	734	5.0	0.0	91.5	26.2	205.0			4.2	37.7	0.099	0.76	0.54	2.47	0.283	8.8	0.005
11/10/89	10:23	7.85	690	10.0									0.270	0.54	1.33	5.37	0.527	9.9	0.005

ESTACION : RIO TURBIO EN VARILLAR (Continuación)
 CODIGO BNA : 04308800-9
 CUENCA : RIO ELQUI

LATITUD S : 29 56
 LONGITUD W : 70 32
 ALTITUD : 870 msnm

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/NO3 mg/l 6242	Oxigeno mg/l 6001	P/PO4 mg/l 6220
14/11/89	16:50	7.75	625	19.0									0.014	3.70	0.74	6.98	0.303	8.2	0.045
18/12/89	11:35	7.25	625	15.0	0.0	94.6	20.6	197.0			3.5	32.2	0.077	0.70	0.77	2.45	0.353	9.0	0.005
3/01/90	10:40	7.15	737	17.0									0.014	0.87	0.70	2.52	0.323		<0.010
6/02/90	12:31	7.05	523	19.0									0.082	0.64	0.53	1.72	0.366		<0.005
5/03/90	16:55	8.15	556	20.0	0.0	97.6	24.8	155.1	63.5	13.6	3.4	32.2		1.03	0.5	1.65	0.335		0.032
5/04/90	10:50	7.85	820	14.5									0.085	0.77	0.70	2.02	0.749	9.6	<0.010
7/05/90	15:30	8.25	667	16.0									0.085	0.95	0.54	2.40	0.354	9.0	<0.010
11/06/90	14:58	8.10	780	14.0	0.0	92.8	32.3	234.9	79.8	15.5	5.4	46.9	0.137	1.42	0.92	3.40	0.765	10.3	<0.010
5/07/90	15:09	7.95	663	11.5									0.103	0.97	0.75	2.93	0.425	10.1	<0.010
14/08/90	14:21	7.85	694	14.0									0.111	2.02	0.91	2.60	0.668	9.5	<0.010
6/09/90	11:00	7.25	730	13.5	0.0	83.6	32.6	244.0	71.2	17.6	4.9	46.0	0.180	1.21	1.30	4.36	0.805	9.1	<0.010
18/10/90	14:23	8.00	816	17.5									0.157	1.01	0.83	3.65	0.544	8.7	0.011
20/11/90	16:08	8.20	640	21.0									0.112	0.79	0.65	1.97	0.491	8.1	0.013
6/12/90	15:10	8.10	626	22.0	0.0	86.0	25.5	167.6	60.6	13.8	3.6	38.2	0.090	0.84	0.78	2.20	0.475	7.8	0.017
9/01/91	15:50	7.95	600	24.0									0.079	0.37	0.46	1.56	0.528	8.6	<0.010
20/02/91	13:30	7.65	774	18.5									0.223	0.44	0.83	10.60	0.615	8.7	<0.010
21/03/91	14:51	7.95	737	21.0	0.0	100.6	26.9	211.3	68.4	14.0	4.2	40.9	0.202	0.29	1.33	9.18	0.675	8.5	<0.010
10/04/91	11:09	8.05	770	13.5									0.154	1.24	1.27	5.32	0.687	9.7	<0.010
15/04/91	12:08	7.65	785	12.0									0.145	0.86	1.18	5.57	0.712	10.0	<0.010
7/06/91	10:45	7.50	737	8.0	0.0	86.0	36.1	284.3	83.8	17.4	5.6	49.9	0.159	1.10	1.38	5.31	0.796	11.4	0.011
4/07/91	15:27	7.65	687	11.0									0.137	2.29	0.77	5.32	0.712	10.0	<0.010
28/08/91	16:05	7.55	610	15.0									0.117	2.09	0.57	4.27	0.731	9.9	<0.010
26/09/91	15:40	7.65	742	18.0	0.0	83.6	30.1	224.8	72.6	14.4	4.7	51.5	0.090	0.68	1.26	3.42	0.802	8.8	0.017
16/10/91	15:11	7.60	647	15.5									0.141	0.63	0.93	8.01	0.397	8.9	<0.010
14/11/91	15:51	7.65	511	17.5									0.108	0.57	1.27	5.77	0.355	8.8	<0.010
11/12/91	18:40	7.70	553	18.0	0.0	71.4	20.9	184.0	64.8	12.2	3.7	30.4	0.098	1.74	2.00	7.30	0.503	8.7	<0.010
8/01/92	15:34	7.60	526	21.0									0.068	0.62	1.24	6.72	0.419	8.4	<0.010
21/02/92	12:25	6.85	478	17.5									0.083	0.84	0.79	3.31	0.510	8.8	<0.010
13/03/92	10:47	7.35	530	16.0	0.0	92.1	22.3	145.1	60.2	12.0	3.1	29.4	0.128	0.41	0.73	2.68	0.484	8.8	<0.010
9/04/92	9:25	7.80	647	11.0									0.072	0.82	0.53	2.20	0.490	10.0	<0.010
19/05/92	8:43	7.75	565	8.0									0.026	1.01	0.59	1.98	0.471	10.5	<0.010
9/06/92	14:15	8.07	578	8.0	0.0	92.1	24.5	171.0	65.1	13.7	4.1	35.9	0.207	0.93	1.01	4.17	0.589	12.0	0.036
16/07/92	11:45	7.25	603	6.0									0.144	1.17	0.78	3.22	0.477	11.1	0.041
12/08/92	11:05	7.25	688	8.0									0.070	0.99	0.52	2.43	0.574	10.6	<0.010
8/09/92	11:45	7.45	550	11.0	0.0	90.9	25.5	150.0	64.1	10.5	3.1	32.2	0.106	0.62	1.12	0.22	0.218	10.1	<0.010
27/10/92	15:00	7.15	550	17.0									0.256	0.40	2.11	11.17	0.472	8.8	<0.010
25/11/92	12:49	7.10	393	12.5									0.216	0.45	2.00	11.65	0.429	9.8	<0.010
23/12/92	10:52	7.10	420	13.0	0.0	70.8	11.3	131.1	50.0	10.0	3.5	21.2	0.255	0.57	0.04	0.04	0.478	9.9	<0.010
7/01/93	13:00	7.40	430	16.0									0.483	0.29	2.01	33.90	0.701	9.2	<0.010
19/02/93	12:06	7.50	405	15.0									0.093	0.21			0.417	9.9	<0.010
23/04/93	11:00	7.15	500	12.0									0.084	0.52	0.81	3.38	0.426	10.6	0.033
Nº DE DATOS		135	135	124		54	54	54	54	43	43	54	131	79	131	131	118	73	65
PROMEDIO		7.78	569	15.0	0.0	97.3	22.4	159.4	60.6	15.9	3.6	32.0	0.103	0.95	0.57	4.52	0.619	9.4	0.007
MINIMO		6.85	320	5.0	0.0	70.8	8.5	78.3	37.9	9.2	2.0	13.3	0.000	0.17	0.00	0.04	0.000	7.7	0.000
MAXIMO		8.25	875	24.0	0.0	146.0	36.1	284.3	85.8	20.5	9.8	51.5	0.483	3.70	2.11	56.10	3.280	12.0	0.046
DESV. STD.		0.33	110	4.3	0.0	11.7	6.0	40.0	8.8	3.0	1.2	8.3	0.083	0.65	0.45	7.14	0.478	0.9	0.010

ESTACION : ESTERO DERECHO EN ALCAHUAZ

CODIGO BNA : 04311801-3

CUENCA : RIO ELQUI

LATITUD S : 30 ° 3

LONGITUD W : 70 29

ALTITUD : 1645 msnm

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/NO3 mg/l 6242	Oxigeno mg/l 6001	P/PO4 mg/l 6220	
10/04/84	17:30	7.75	140	16.0															0.158	
10/05/84	13:05	7.45	131	13.0	0.0	58.0	6.4	8.2	17.6	3.7	1.2	5.5	0.008		0.00	0.38			0.178	
8/06/84	12:50	7.60	122	7.0															0.169	
10/09/84	16:10	7.30	105	13.0	0.0	56.7	7.8	6.7	16.6	1.8	1.2	4.6	0.007		0.00	0.62			0.440	
10/12/84	18:50	8.15	73	16.0	0.0	35.4	5.7	1.9	10.6	1.2	0.8	2.8	0.003		0.00	0.62			0.077	
12/03/85	12:55	7.90	119	17.0	0.0	48.2	5.7	9.6	15.6	1.2	1.2	5.1	0.004		0.00	0.72			0.172	
11/06/85	12:35	7.90	110	11.0	0.0	51.3	7.4	12.0	17.0	1.8	1.2	5.1	0.002		0.01	0.75			0.127	
9/09/85	16:00	8.15	100	13.0	0.0	61.0	5.3	7.7	17.8	2.4	1.2	5.3	0.000		0.03	0.46			0.113	
4/12/85	17:00	7.85	110	19.0	0.0	56.7	5.0	6.7	16.6	2.6	0.8	4.1	0.001		0.01	0.43			0.172	
11/03/86	15:00	7.95	140	18.0	0.0	63.5	5.7	7.2	19.8	1.2	0.8	5.1	0.000		0.03	0.19			0.197	
10/06/86	11:35	7.10	102	14.0	0.0	63.5	5.0	7.2	17.6	2.4	1.2	5.1	0.008		0.02	0.17			0.580	
8/09/86	17:00	7.50	120	17.0	0.0	46.4	5.7	16.8	18.0	1.2	1.2	5.1	0.000		0.00	0.33			0.600	
11/12/86	13:10	7.55	220	15.0	0.0	48.8	3.6	19.2	16.8	2.6	0.8	4.6	0.001		0.00	0.74			0.270	
6/03/87	12:30	7.70	128	14.0	0.0	54.3	1.8	25.0	18.6	3.2	1.6	5.5	0.010	0.24	0.03	0.53			0.680	7.7
8/06/87	16:35	7.55	130	9.0	0.0	48.8	5.3	15.9	16.4	2.7	0.8	5.1	0.005	0.31	0.00	0.18			0.078	9.8
8/09/87	12:30	7.85	125	6.5	0.0	54.9	3.6	10.6	16.8	2.4	1.2	4.6	0.005	0.02	0.00	0.25			0.277	10.1
10/12/87	13:25	7.65	72	9.0	0.0	27.5	5.3	3.8	8.2	1.3	0.8	2.8	0.006	0.21	0.01	1.13			0.195	9.7
3/03/88	11:35	7.65	106	10.0	0.0	41.4	4.8	8.0	12.3	1.9	0.8	3.7	0.007	0.54	0.01	0.34			0.110	9.6
7/06/88	11:50	7.60	125		0.0	53.7	3.2	10.1	14.7	2.3	0.8	4.6	0.005	0.20	0.01	0.27			0.045	10.9
7/09/88	13:55	7.50	125	9.0	0.0	54.9	3.2	15.8	15.9	2.4	1.0	5.1	0.005	0.02	0.02	0.17			0.134	9.4
6/12/88	11:10	7.65	137	11.0	0.0	61.0	3.5	16.3	16.6	2.8	0.9	5.3	0.008	0.41	0.02	0.44			0.180	9.1
8/03/89	18:25	7.50	150	15.0	0.0	64.1	3.5	17.8	18.3	2.9	0.9	5.5	0.005	0.31	0.03	0.37			0.145	8.7
13/06/89	15:35	7.40	140	8.0	0.0	54.9	5.3	17.5	17.9	2.9	1.2	5.5	0.005	0.26	0.01	0.25			0.168	10.1
13/09/89	11:16	8.00	145	10.0	0.0	61.0	3.9	16.0	17.6	3.1	1.1	5.5	0.005	0.23	0.01	0.23			0.061	10.6
7/12/89	11:50	6.80	335	10.5	0.0	56.7	3.9	15.4	18.4	3.0	0.7	5.3	0.005	0.20	0.01	0.30			0.073	9.3
6/03/90	11:51	7.85	160	11.5	0.0	67.7	3.9	14.4	20.5	3.2	1.1	6.0		0.56	<0.01	0.25			0.131	0.057
19/06/90	15:52	6.90	146	11.0	0.0	63.5	4.3	16.8	19.4	2.7	1.1	6.4	<0.005	1.13	0.01	0.25			0.341	9.7
6/09/90	15:55	6.60	130	12.5	0.0	59.8	3.9	16.8	18.9	2.8	1.0	5.5	<0.005	0.63	<0.01	0.20			0.139	9.1
27/12/90	12:25	7.10	124	17.0	0.0	64.1	3.9	15.8	18.5	2.6	1.1	6.4	<0.005	0.41	0.01	0.22			0.142	8.1
24/04/91	12:36	7.25	152	13.0															0.223	9.5
19/06/91	14:57	7.40	193	9.5	0.0	70.7	5.3	17.3	19.9	3.1	1.2	7.4	<0.005	0.38	0.01	0.22			0.223	9.5
12/12/91	12:10	7.65	89	9.0	0.0	45.8	3.2	8.2	11.3	1.7	0.9	6.0	0.010	0.78	<0.01	0.58			0.064	9.7
5/03/92	11:20	7.15	143	13.0	0.0	61.0	3.8	12.0	16.3	2.6	1.0	5.5	0.020	<0.02	0.03	0.35			0.116	9.0
11/06/92	11:20	7.88	110	5.0	0.0	51.2	4.2	12.0	14.4	2.5	1.9	4.6	<0.005	0.31	0.01	0.28			0.103	10.2
3/09/92	11:30	7.25	110	5.5	0.0	45.7	3.1	13.0	14.8	1.4	0.7	4.1	<0.005	0.12	0.01	0.22			<0.01	10.8
4/12/92	11:55	7.00	85	9.5	0.0	40.9	2.5	9.6	11.5	1.7	1.2	3.2	<0.005	0.25	<0.01	0.56			0.043	10.0
Nº DE DATOS		36	36	35	33	33	33	33	33	33	33	33	33	23	34	34	36	23	22	
PROMEDIO		7.53	132	11.9	0.0	54.3	4.5	12.5	16.4	2.3	1.0	5.0	0.004	0.34	0.01	0.41	0.198	9.5	0.009	
MINIMO		6.60	72	5.0	0.0	27.5	1.8	1.9	8.2	1.2	0.7	2.8	0.000	0.00	0.00	0.17	0.000	7.7	0.000	
MAXIMO		8.15	335	19.0	0.0	70.7	7.8	25.0	20.5	3.7	1.9	7.4	0.020	1.13	0.03	1.13	0.680	10.9	0.043	
DESV. STD.		0.37	45	3.6	0.0	9.3	1.3	5.0	2.8	0.7	0.2	1.0	0.004	0.24	0.01	0.24	0.156	0.8	0.010	

ESTACION : RIO CLARO EN RIVADAVIA (ANTES RIO TURBIO)
 CODIGO BMA : 04314801-K
 CUENCA : RIO ELQUI

LATITUD S : 29 59
 LONGITUD W : 70 33

ALTITUD : 810 msnm

FECHA	HORA	pH u.20	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/NO3 mg/l 6242	Oxígeno mg/l 6001	P/PO4 mg/l 6220	
25/09/81	13:50	7.84	268		0.0	97.6	6.7	37.0	29.1	8.3	3.1	9.2	0.006	1.67	0.00	1.00				
7/10/81	17:00	7.94	279		0.0	97.6	8.5	37.5	36.9	5.8	2.7	9.2	0.010	0.35	0.00	0.00				
4/11/81	17:45	7.96	274		0.0	105.0	5.3	20.2	36.7	6.2	1.2	10.0	0.000	1.35	0.02	0.24	0.000			
12/11/81	9:40	7.65	271		0.0	118.0	7.1	23.1	36.7	6.2	1.2	9.2	0.000	1.00	0.00	0.29	0.029			
1/12/81	12:25	7.77	272		0.0	115.0	9.2	36.0	36.5	8.6	1.2	11.3	0.000	0.50	0.00	0.12	0.450			
6/01/82	12:00	7.97	279		0.0	123.0	5.3	43.2	40.1	7.3	1.2	12.6	0.009	0.68	0.02	0.08				
9/02/82	20:25	8.19	287																	
11/03/82	11:25	7.90	284		0.0	124.0	5.3	47.1	40.1	8.5	1.2	12.0	0.020	1.35	0.01	0.21	0.461			
15/04/82	10:00	7.95	256		0.0	116.0	6.0	44.2	38.1	7.3	1.2	9.2	0.004	1.00	0.01	0.07	0.330			
5/05/82	11:20	7.90	279																	
7/07/82	14:40	7.67	220		0.0	101.0	4.6	34.1	30.1	7.3	1.2	8.3					0.323			
10/01/83	16:15	7.20	222	19.0	0.0	63.5	3.6	33.6	25.9	7.3	1.2	4.8	0.007		0.05	0.54				
14/04/83	15:05	7.95	262	13.0	0.0	88.5	5.3	35.1	29.9	9.7	1.6	6.4	0.038		0.00	0.29				
7/07/83	15:20	7.30	217	9.0	0.0	85.4	5.3	31.2	29.9	4.9	1.2	13.3	0.018		0.01	0.49				
16/02/84	17:05	6.85	222	20.0	0.0	89.1	4.3	24.5	31.7	3.9	1.6	6.9	0.006		0.03	0.28				
11/04/84	17:30	7.15	233	18.0																
9/05/84	18:30	7.45	224	15.0	0.0	97.0	6.4	30.7	31.5	5.5	1.6	8.3	0.006		0.00	0.24	0.434			
7/06/84	17:05	7.92	234	11.0																
7/09/84	17:55	7.15	196	12.0	0.0	85.4	7.8	19.7	26.7	4.3	1.2	6.4	0.005		0.00	0.24	0.418			
5/12/84	13:30	7.95	120	17.0	0.0	47.6	5.7	14.4	15.0	3.7	1.6	3.7	0.027		0.05	0.69	0.845			
11/03/85	19:05	7.80	204	14.0	0.0	78.7	7.4	27.9	29.5	2.4	1.2	7.4	0.002		0.00	8.20	0.208			
11/06/85	16:30	8.45	192	14.0	0.0	84.8	7.4	11.5	26.1	3.7	1.6	7.8	0.007		0.01	0.67	0.330			
4/09/85	17:25	7.85	175	14.0	0.0	84.8	8.2	29.3	29.7	3.7	1.6	8.3	0.007		0.08	0.93	0.280			
9/12/85	11:30	7.95	210	18.0	0.0	94.6	8.2	32.7	39.7	5.7	1.6	7.8	0.004		0.02	0.34	0.271			
10/03/86	17:50	7.95	273	19.0	0.0	110.0	8.0	32.7	33.3	5.7	1.6	7.8	0.004		0.02	0.11	0.395			
10/06/86	16:52	7.55	230	14.0	0.0	101.0	8.2	21.6	33.7	2.4	1.2	8.7	0.002		0.04	0.17	0.452			
9/09/86	11:50	7.80	231	16.0	0.0	98.9	5.7	33.6	36.1	2.4	1.6	7.8	0.006		0.01	0.11	1.600			
11/12/86	16:40	7.80	280	20.0	0.0	88.5	3.6	55.2	38.1	3.9	1.6	8.3	0.006		0.00	0.18	1.970			
5/03/87	19:20	7.85	291	18.0	0.0	103.0	5.3	61.5	36.3	7.8	2.0	13.8	0.005	0.11	0.00	2.30	1.300			
9/06/87	9:45	7.90	245	11.0	0.0	91.5	5.3	38.4	34.9	5.4	0.8	8.3	0.012	0.02	0.02	0.12	1.430	9.1		
8/09/87	16:50	7.85	213	11.0	0.0	88.5	5.3	27.9	30.7	5.4	1.2	4.6		0.02	0.00	0.34	0.493	8.4		
11/12/87	11:30	7.60	114	10.0	0.0	36.6	3.6	19.2	14.4	2.2	0.8	3.2	0.013	0.16	0.03	4.43	0.850	10.4	0.007	
2/03/88	17:51	7.85	365	16.0														10.4	0.012	
6/06/88	17:00	7.75	200	9.5	0.0	78.1	5.0	29.8	27.9	3.7	1.0	6.4	0.005	0.05	0.01	0.57	0.084	9.6	0.006	
6/09/88	10:24	7.65	185	10.0	0.0	79.3	6.4	34.6	28.6	4.1	1.0	6.9	0.010	0.02	0.02	0.23	0.394	10.5	0.008	
6/09/88	7:50	8.15	263	19.0	0.0	104.0	5.3	30.2	34.3	5.4	1.0	9.2	0.006	0.23	0.02	0.16	0.563	8.8	0.005	
2/03/89	9:30	7.80	287	15.0	0.0	116.0	3.5	38.5	38.7	5.5	1.4	9.7	0.005	0.27	0.01	0.22	0.320	9.7	0.005	
12/06/89	15:00	7.40	272	11.5	0.0	104.0	3.5	34.0	34.6	5.1	1.5	8.2	0.005	0.22	0.01	0.09	0.382	10.1	0.006	
12/09/89	17:47	7.90	367	8.0	0.0	107.0	7.4	45.1	40.0	6.6	1.5	9.7	0.005	0.09	0.01	0.18	0.239	10.1	0.005	
6/12/89	18:30	7.05	407	18.0	0.0	116.5	4.2	49.5	43.3	6.5	1.6	10.1	0.005	0.61	-0.01	0.15	0.332	8.9	0.005	
6/03/90	9:00	7.95	335	16.0	0.0	117.0	4.2	49.5	43.3	6.5	1.6	10.1	0.005	0.61	-0.01	0.15	0.332	8.9	0.005	
5/06/90	15:20	8.15	450	18.0	0.0	112.9	5.7	124.9	37.7	5.2	1.7	10.6	<0.005	1.38	0.02	0.17	0.590	10.2	<0.010	
13/09/90	16:35	8.20	408	23.0	0.0	123.8	6.7	40.0	43.2	5.9	1.4	9.2	<0.005	0.53	0.01	0.08	0.671	9.9	<0.010	
6/12/90	16:35	8.20	295	22.0	0.0	128.1	6.0	48.0	41.1	5.9	1.8	11.3	<0.005	0.26	0.02	0.04	1.052	8.6	0.011	
22/03/91	15:42	7.55	258	11.5	0.0	97.0	5.3	44.6	34.7	5.0	1.4	10.1	<0.005	0.85	-0.01	0.06	0.665	8.8	<0.010	
24/06/91	11:12	7.25	210	18.0	0.0	81.8	5.3	36.9	29.0	3.9	1.1	8.3	<0.005	0.19	0.01	0.15	0.746	10.2	<0.010	
24/09/91	16:00	7.75	210	18.0	0.0	116.5	4.2	49.5	43.3	6.5	1.6	10.1	<0.005	0.85	-0.01	0.06	0.665	8.8	<0.010	
4/12/91	17:42	6.80	492	18.0	0.0	74.8	5.3	36.9	29.0	3.9	1.1	8.3	<0.005	0.19	0.01	0.15	0.746	10.2	<0.010	
4/03/92	18:24	7.25	240	19.0	0.0	81.8	5.3	36.9	29.0	3.9	1.1	8.3	<0.005	0.19	0.01	0.15	0.746	10.2	<0.010	
10/06/92	17:44	8.08	204	10.0	0.0	74.8	5.3	36.9	29.0	3.9	1.1	8.3	<0.005	0.19	0.01	0.15	0.746	10.2	<0.010	
2/09/92	18:10	7.35	233	11.0	0.0	75.6	5.3	30.7	28.0	2.8	1.1	6.4	<0.005	0.30	0.01	0.30	0.346	10.4	0.034	
9/12/92	15:47	7.00	170	15.0	0.0	60.4	4.6	34.5	24.3	3.4	1.7	5.5	0.007	0.20	0.08	1.00	0.284	9.8	<0.010	
Nº DE DATOS		52	52	41																
PROMEDIO		7.72	260	15.1	0.0	47	47	47	47	47	47	47	47	31	45	45	43	24	21	
MINIMO		6.80	114	8.0	0.0	95.0	5.8	39.2	33.4	5.4	1.4	8.5	0.007	0.47	0.02	0.63	0.542	9.6	0.007	
MAXIMO		8.45	492	23.0	0.0	36.6	3.5	11.5	14.4	2.2	0.8	3.2	0.000	0.00	0.00	0.00	0.000	8.5	0.000	
DESV. STD.		0.36	71	3.8	0.0	128.1	9.2	168.0	62.4	13.2	3.1	13.8	0.038	1.67	0.08	8.20	1.970	10.6	0.044	
						19.4	1.4	25.1	7.5	2.1	0.4	2.3	0.007	0.46	0.02	1.56	0.599	0.8	0.008	

ESTACION : RIO ELQUI EN ALGARROBAL
 CODIGO BNA : 04320800-4
 CUENCA : RIO ELQUI

LATITUD S : 29 59
 LONGITUD W : 70 35

ALTITUD : 760 mm

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/NO3 mg/l 6242	Oxigeno mg/l 6001	P/PO4 mg/l 6220	
25/09/81	16:10	7.77	534		0.0	104.0	26.9	128.0	53.9	15.3	7.4	27.6	0.044	1.35	0.21	3.59				
8/10/81	10:15	8.02	475		0.0	110.0	22.0	100.0	51.1	12.9	5.9	26.7	0.006	2.00	0.03	1.64				
5/11/81	16:15	7.96	460		0.0	105.0	19.1	74.4	39.1	10.5	3.1	27.6	0.038	2.28	0.17	1.96	0.000			
2/12/81	11:00	7.87	468		0.0	110.0	22.3	116.0	47.7	15.3	2.0	26.0	0.000	1.85	0.09	0.90	0.411			
6/01/82	18:10	7.86	498		0.0	117.0	20.9	134.0	55.1	14.1	2.4	35.6	0.045	1.35	0.13	0.93				
8/02/82	18:40	9.34	484																0.314	
10/03/82	17:30	8.11	467		0.0	118.0	22.7	126.0	53.1	15.7	2.4	35.2	0.052	2.33	0.13	0.99	0.343			
2/04/82	16:05	7.97	470		0.0	109.0	20.9	122.0	44.1	21.3	2.7	28.7	0.033	0.35	0.19	1.13				
6/05/82	10:05	8.00	543																	
3/06/82	13:15	7.79	483																	
7/07/82	15:50	7.98	432		0.0	102.0	16.7	112.0	52.1	12.2	2.4	23.9								
12/08/82	13:40	7.48	389																	
22/09/82	10:55	6.75	385		0.0	90.9	13.5	110.0	44.1	9.7	1.6	20.7	0.007	0.17	1.12	0.94				
4/01/83	12:10	7.80	328	20.0	0.0	94.6	10.3	66.3	41.9	10.3	2.0	11.0	0.048		0.22	8.10	0.248			
14/04/83	15:20	7.55	409	19.0	0.0	94.6	13.8	94.1	45.9	12.8	2.4	16.6	0.020		0.08	0.76	0.411			
2/06/83	16:25	8.35	426	11.0	0.0	99.5	18.1	84.1	39.9	15.7	2.4	22.1	0.027		0.09	0.70	0.384			
4/07/83	18:45	8.25	413	11.0	0.0	101.0	14.5	94.1	47.9	8.5	2.4	20.2	0.042		0.10	0.91	0.332			
4/08/83	17:25	7.70	524	15.0	0.0	127.0	18.1	130.0	63.7	10.3	3.1	28.5	0.032		0.09	0.92	0.861			
8/09/83	18:25	8.35	393	13.0	0.0	89.7	12.8	86.9	47.1	6.7	2.4	21.1	0.042		0.20	1.60	0.506			
3/10/83	19:55	8.20	395	18.0														0.386		
16/02/84	18:00	7.15	380	21.0	0.0	95.2	12.8	57.6	46.3	7.7	2.4	17.0	0.033		0.51	1.91	0.465			
11/04/84	17:45	7.05	407	18.0														0.501		
10/05/84	9:40	7.45	406	13.0	0.0	97.0	15.6	101.0	49.3	8.6	2.7	20.2	0.050		0.72	2.19	0.605			
7/06/84	9:30	7.94	390	9.0														0.605		
7/09/84	11:55	7.20	360	14.0	0.0	96.4	15.6	80.7	45.3	5.5	2.4	16.6	0.032		0.15	2.26	1.150			
6/12/84	18:00	7.75	230	19.0	0.0	86.0	9.2	44.7	38.5	3.7	2.4	9.0	0.095		0.33	17.10	0.438			
6/03/85	17:05	7.75	355	23.0	0.0	103.0	12.8	85.5	45.1	7.3	2.4	19.1	0.047		0.21	6.17	0.269	0.0		
11/06/85	17:05	7.95	383	14.0	0.0	87.9	14.9	107.0	45.9	6.1	3.1	23.0	0.047		0.50	1.49	0.499			
2/09/85	16:15	8.00	400	15.0	0.0	90.9	16.3	146.0	55.3	9.6	3.5	28.0	0.188		0.38	2.68	0.404			
2/12/85	18:35	7.95	430	21.0	0.0	98.2	16.3	125.0	56.1	8.9	3.1	24.8	0.065		0.28	2.02	0.477			
3/03/86	16:27	8.15	448	23.0	0.0	107.0	16.7	113.0	53.5	8.4	2.7	23.0	0.037		0.18	0.90	0.538			
5/06/86	11:50	7.40	425	13.0	0.0	101.0	14.9	108.0	53.5	8.4	3.5	22.5	0.038		0.23	1.45	2.920			
4/09/86	17:00	7.85	476	17.0	0.0	105.0	20.9	114.0	52.1	9.1	3.9	27.6	0.027		0.19	1.15	2.950			
11/12/86	18:00	8.05	504	22.0	0.0	85.4	12.8	168.0	65.3	11.5	3.5	22.1	0.246		0.00	5.45	1.660	7.7		
9/03/87	18:50	7.90	450	20.0	0.0	96.4	14.8	120.0	46.1	13.7	3.1	22.1	0.054	0.69	0.22	2.51	1.350	8.8		
8/06/87	18:47	8.05	470	12.0	0.0	91.5	12.2	137.0			2.4	24.8	0.064	0.24	0.29	2.41	0.598	10.1	0.010	
8/09/87	17:30	7.95	350	11.0	0.0	91.5	14.2	91.3			2.4	17.5		0.12			1.000	10.2	0.046	
17/12/87	17:25	8.05	253	14.5	0.0	76.3	6.7	45.2			1.6	8.7	0.108	0.10	0.33	27.50	0.268	9.7	0.046	
7/03/88	14:40	8.10	451	16.0													0.370	8.9	0.005	
6/06/88	17:45	8.05	420	9.0	0.0	89.7	11.3	93.2			2.1	17.9	0.028	0.31	0.18	1.08	0.143	10.6	0.005	
15/09/88	13:22	8.05	450	13.5	0.0	91.5	14.5	120.0			2.5	22.1	0.118	0.21	0.37	1.19	0.598	9.8	0.006	
5/12/88	15:45	8.15	496	19.0	0.0	104.0	18.1	137.0			2.8	27.6	0.048	0.72	0.30	1.38	0.435	8.3	0.005	
1/03/89	18:08	7.90	520	20.0	0.0	104.0	19.9	140.0			3.0	29.4	0.172	0.56	0.57	2.66	0.365	7.6	0.005	
12/06/89	15:30	7.55	515	10.5	0.0	104.0	18.1	148.0			3.5	28.5	0.055	0.48	0.37	1.60	0.473	10.1	0.005	
12/09/89	18:20	7.65	685	8.0	0.0	97.6	20.6	140.0			3.4	28.5	0.059	0.67	0.35	1.61	0.300	10.4	0.005	
18/12/89	12:00	7.20	698	16.5	0.0	101.0	18.8	149.0			3.2	27.6	0.071	0.60	0.57	1.66	0.374	8.7	0.005	
9/03/90	13:15	7.40	559	19.0	0.0	105.0	20.6	140.7	64.5	12.7	3.4	27.6		1.02	0.35	1.76	0.368		0.047	

ESTACION : RIO ELQUI EN ALMORRAL
 CODIGO BNA : 04323800-0
 CUENCA : RIO ELQUI

LATITUD S : 29 59
 LONGITUD W : 70 53

ALTITUD : 400 msnm

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/HO3 mg/l 6242	Oxigeno mg/l 6001	P/PO4 mg/l 6220
25/09/81	17:05	7.79	617		0.0	140.0	34.0	135.0	66.3	15.3	7.8	31.0	0.035	1.50	0.08	2.06			
8/10/81	16:30	8.08	564		0.0	146.0	23.8	115.0	59.3	16.9	7.0	29.9	0.007	1.85	0.03	1.38			
5/11/81	9:45	7.98	545		0.0	140.0	22.7	93.2	44.7	11.1	3.5	29.9	0.007	1.18	0.22	1.08			
4/12/81	11:35	8.07	562		0.0	107.0	24.1	127.0	52.7	13.5	2.4	29.4	0.000	0.84	0.04	0.54	0.881		
7/01/82	10:30	8.69	579		0.0	117.0	24.5	152.0	60.1	17.1	2.4	37.9	0.030	0.00	0.05	0.38			
11/02/82	10:50	9.26	576														0.926		
12/03/82	10:05	8.16	577		0.0	143.0	24.5	144.0	64.1	18.4	2.4	38.6	0.033	2.33	0.06	0.66	0.815		
16/04/82	9:55	8.28	550		0.0	156.0	22.7	142.0	72.1	15.8	2.7	31.7	0.020	1.89	0.04	0.38			
9/07/82	9:45	7.83	523		0.0	138.0	20.9	136.0	66.1	15.8	2.7	29.2							
7/01/83	12:35	7.20	402	21.0	0.0	120.0	12.1	98.0	51.7	14.6	2.4	13.8	0.033		0.96	10.60			
18/04/83	16:45	7.95	488	18.0	0.0	120.0	15.6	104.0	53.7	15.8	3.1	19.8	0.022		0.08	0.66			
8/07/83	11:35	8.05	480	10.0	0.0	168.0	16.3	101.0	75.8	9.7	5.5	21.6	0.149		0.70	68.50			
7/10/83	10:30	7.70	405	15.0									0.128		0.34	8.80			
4/11/83	12:15	7.55	378	18.0									0.077		0.25	6.00			
15/12/83	18:55	7.75	326	21.0									0.016		0.06	2.09			
27/01/84	11:20	7.35	360	19.0									0.023		0.06	0.85			
17/02/84	16:55	7.25	448	23.0	0.0	119.0	17.0	101.0	54.9	11.5	2.7	20.2	0.017		0.23	0.88			
9/03/84	15:40	7.30	452	22.0									0.015		0.36	1.48			
12/04/84	17:25	7.30	483	19.0									0.054		0.47	1.60	0.321		
11/05/84	10:35	7.00	471	13.0	0.0	125.0	17.4	112.0	56.1	13.2	3.1	23.9	0.027		0.39	1.40	1.200		
11/06/84	18:35	7.69	550	8.0									0.027		0.20	0.96	0.793		
23/07/84	18:20	7.95	565	9.0									0.034		0.06	1.27	0.978		
10/08/84	11:35	7.80	470	12.0									0.024		0.03	0.96	1.240		
7/09/84	17:05	7.45	436	18.0	0.0	120.0	18.8	98.0	55.1	8.4	2.7	18.9	0.003		0.13	2.14	1.180		
5/10/84	12:25	7.60	390	16.0									0.037		0.05	1.26	1.130		
8/11/84	14:30	7.65	337	21.0									0.112		0.19	12.60	0.818		
6/12/84	18:50	7.85	270	20.0	0.0	124.0	9.2	59.6	45.9	9.2	3.1	11.5	0.136		0.28	22.10	0.117		
4/01/85	12:35	7.80	280	20.0									0.027		0.02	2.77	0.456		
18/02/85	18:30	7.85	404	22.0									0.027		0.08	0.64	0.664		
7/03/85	16:35	7.85	417	23.0	0.0	115.0	14.5	107.0	51.1	7.9	2.7	23.9	0.023		0.12	1.66	0.642		
19/04/85	12:20	7.95	428	17.0									0.031		0.20	1.02	0.490		
9/05/85	19:00	7.85	400	15.0									0.014		0.16	0.52	0.666		
10/06/85	17:20	8.15	436	15.0	0.0	115.0	14.9	113.0	53.9	7.9	3.1	25.7	0.026		0.39	1.31	0.644		
8/07/85	14:35	7.95	436	15.0									0.029		0.40	1.02	0.614		
8/08/85	13:00	8.00	340	14.0									0.019		0.10	0.58	0.436		
10/09/85	13:50	8.30	425	18.0	0.0	121.0	18.1	133.0	55.3	12.0	3.5	29.0	0.159		0.33	1.75	0.642		
11/10/85	10:50	7.95	511	19.0									0.029		0.11	0.67	0.547		
11/11/85	13:30	8.00	490	21.0									0.040		0.11	0.88	0.678		
9/12/85	14:05	8.10	500	23.0	0.0	126.0	18.1	126.0	62.3	11.3	3.5	26.7	0.037		0.15	1.06	0.766		
8/01/86	20:45	7.95	522	21.0									0.057		0.33	2.42	0.899		
12/02/86	12:07	7.95	511	21.0									0.069		0.92	3.02			
12/03/86	16:31	8.15	532	22.0	0.0	145.0	18.1	132.0	67.3	9.6	3.1	28.0	0.029		0.15	0.24	0.901		
4/04/86	17:05	8.15	556	20.0									0.018		0.08	0.70	0.926		
8/05/86	17:10	7.85	558	18.0									0.019		0.08	0.61			
11/06/86	12:35	7.70	487	16.0	0.0	137.0	21.6	115.0	65.3	9.6	3.9	26.2	0.027		0.14	0.87	0.850		
11/07/86	10:50	8.25	524	13.0									0.026		0.13	0.67			
8/08/86	11:50	7.75	550	15.0									0.028		0.05	0.52			

ESTACION : RIO ELQUI EN ALMENDRAL (Continuación)
 CODIGO BNA : 04323800-0
 CUENCA : RIO ELQUI

LATITUD S : 29 59
 LONGITUD W : 70 53

ALTITUD : 400 msnm

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	M/MO3 mg/l 6242	Oxigeno mg/l 6001	P/PO4 mg/l 6220
5/09/86	12:40	8.00	536	16.0	0.0	142.0	20.9	136.0	72.1	7.9	4.3	29.9	0.024		0.17	1.35	6.890		
9/10/86	10:10	7.70	440	16.0									0.015		0.10	0.93	4.260		
7/11/86	10:30	7.60	500	16.0									0.027		0.11	1.32	3.760	9.2	
12/12/86	9:25	7.95	490	17.0	0.0	110.0	14.9	146.0	65.3	10.2	3.5	23.9	0.094		0.00	5.60	2.920	9.5	
9/01/87	14:30	8.15	680	21.0									0.025		0.00	5.68		8.5	
12/02/87	12:40	8.15	460	20.5									0.009		0.13	0.86	2.090	8.7	
12/03/87	10:30	8.15	490	17.5	0.0	127.0	14.5	130.0	53.1	15.4	3.5	25.7	0.038	0.65	0.15	1.85	2.520	9.6	
10/04/87	11:00	8.10	586	15.0									0.022	0.71	0.08	0.65	3.220	9.9	
8/05/87	11:10	8.15	702	14.0									0.026		0.13	0.87	0.806	9.3	0.005
5/06/87	8:45	8.05	495	11.0	0.0	122.0	17.7	118.0	60.5	12.0	2.4	24.4	0.044	0.45	0.15	1.19	0.911	11.1	0.016
7/07/87	13:45	8.15	595	13.5									0.032		0.17	0.72	0.744	9.8	
7/08/87	9:00	7.95	720	9.5									0.024		0.13	1.46			
9/09/87	9:30	8.05	493	10.0	0.0	116.0	16.0	92.7	50.9	10.9	2.4	20.2		0.11			0.592	10.7	0.019
9/10/87	12:05	8.05	405	15.0									0.067	0.81	0.20	4.30	0.747	8.9	0.020
6/11/87	16:35	8.05	523	17.0									0.053	0.83	0.25	3.98	0.174	9.3	0.020
18/12/87	14:30	8.00	311	16.5	0.0	104.0	6.7	55.2	42.9	5.4	2.0	10.3	0.208	0.16	0.46	38.50	0.192	9.4	0.044
11/01/88	11:50	8.00	426	16.0									0.123	0.02	0.01	40.00	0.002	9.1	0.096
11/02/88	13:00	8.00	357	17.0									0.032	0.66	0.12	1.37	0.505	9.3	0.012
4/03/88	11:00	8.05	525	15.0												0.800	9.5	0.005	
13/04/88	11:05	8.10	415	14.0									0.026	0.24	0.11	0.58	0.584	10.1	
9/05/88	11:40	8.00	416	12.0									0.027	0.32	0.14	0.89	0.499	10.9	
13/06/88	11:15	8.05	580	9.0	0.0	108.0	12.8	98.0	51.5	9.0	2.1	20.0	0.011	0.42	0.12	0.85	0.128	11.1	0.006
13/07/88	12:40	8.05	480	11.0									0.005	1.05	0.11	0.47		9.4	
9/09/88	10:30	7.95	508	13.0	0.0	122.0	16.0	130.0	62.4	10.1	2.9	24.8	0.062	1.40	0.17	1.34	0.809	9.5	0.012
7/10/88	15:12	8.05	543	13.5									0.050	1.58	0.10	0.54	0.665	9.5	0.005
4/11/88	16:30	8.30	707	21.0									0.044	0.51	0.09	0.51	0.809	8.4	0.005
16/12/88	11:45	8.30	525	17.0	0.0	146.0	18.1	139.0	64.8	12.8	3.2	30.8	0.037	0.47	0.14	1.12	0.309	9.1	0.008
6/01/89	11:35	7.60	585	16.0									0.037	0.51	0.13	0.67	0.826	10.2	0.012
7/02/89	18:45	8.30	602	21.5									0.037	0.18	0.12	0.67	0.788	8.6	0.012
6/03/89	16:32	8.00	580	21.5	0.0	134.0	19.9	140.0	67.1	12.4	3.0	30.8	0.028	0.46	0.19	0.98	0.624	9.0	0.005
10/04/89	16:30	7.25	625	19.0									0.017	1.04	0.06	0.48	0.809	8.7	0.005
11/05/89	12:30	7.35	590	13.0									0.026	1.37	0.09	0.80	0.867	9.2	0.010
2/06/89	11:35	7.75	570	11.0	0.0	146.0	19.9	145.0	71.5	12.5	3.5	31.3	0.022	0.46	0.09	0.49	0.829	10.5	0.012
13/07/89	13:05	7.65	770	12.5									0.014	0.38	0.15	0.91	1.230	11.4	0.005
4/08/89	11:30	7.86	798	11.0									0.005	0.25	0.15	0.90	0.479	11.0	0.010
11/10/89	11:45	7.45	610	16.0									0.028	1.97	0.19	0.75	0.905	9.7	0.005
17/11/89	10:25	7.85	842	15.0									0.011	14.40	0.17	1.10	0.692	10.3	0.005
4/12/89	15:51	7.90	760	21.0	0.0	126.0	18.7	141.0	63.9	12.6	3.2	29.4	0.026	0.49	0.18	0.70	0.609	9.2	0.005
10/01/90	11:00	8.05	1125	19.5									-0.005	0.95	0.13	0.89	0.734		0.010
14/02/90	11:30	7.85	795	19.0									0.017	0.38	0.09	0.22	0.721		0.005
12/03/90	16:15	7.65	638	22.0	0.0	136.1	22.9	158.5	72.9	14.3	3.4	31.3		1.02	0.04	0.19	0.692		0.041
8/04/90	11:15	7.85	535	17.0									0.005	0.57	0.08	0.28	0.413	9.6	-0.010
8/05/90	16:36	8.30	598	18.0									0.015	0.62	0.06	0.36	0.840	9.4	-0.010
15/06/90	12:00	8.35	530	15.0	0.0	86.6	22.0	145.1	52.3	12.8	3.7	35.0	0.016	1.37	0.12	0.57	1.549	9.6	-0.010
6/07/90	12:46	8.10	702	13.5									0.013	0.36	0.07	0.35	0.805	10.1	-0.010
17/08/90	14:00	7.75	842	17.5									0.013	1.20	0.10	0.30	1.095	9.7	-0.010
14/09/90	10:00	7.85	572	14.5	0.0	108.0	21.3	164.7	53.4	14.8	3.8	34.0	0.013	0.97	0.06	0.25	1.263	10.4	-0.010

ESTACION : RIO ELOUI EN ALMEMORAL (Continuacion)
 CODIGO BNA : 04323800-0
 CUENCA : RIO ELOUI

LATITUD S : 29 59
 LONGITUD W : 70 53

ALTITUD : 400 msnm

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/NO3 mg/l 6242	Oxigeno mg/l 6001	P/PO4 mg/l 6220
9/10/90	10:27	8.35	480	15.0									0.024	0.80	0.16	0.82	1.086	9.8	<0.010
29/11/90	9:40	7.85	776	17.5									0.021	0.64	0.14	0.55	1.105	10.0	0.015
7/12/90	10:35	8.15	648	18.5	0.0	89.1	22.3	146.5	55.9	14.2	3.4	35.4	0.017	0.65	0.13	0.44	1.114	9.4	0.013
4/01/91	15:05	8.65	600	25.0									0.021	0.13	0.08	0.28	1.135	8.1	<0.010
20/02/91	15:55	7.65	735	24.0									0.072	0.14	0.33	3.35	1.760	8.3	<0.010
12/03/91	11:32	7.95	640	20.0	0.0	161.7	23.0	160.0	76.6	15.0	3.4	34.5	0.230	0.59	0.21	1.73	1.235	8.6	<0.010
12/04/91	10:20	7.75	583	12.0									0.027	1.93	0.16	1.11	1.017	10.1	<0.010
20/05/91	11:20	8.00	690	16.0									0.013	0.41	0.10	0.44	1.217	9.7	<0.010
6/06/91	16:12	8.20	625	16.0	0.0	144.6	25.5	170.0	74.9	14.2	3.7	35.0	0.024	0.52	0.21	0.90	1.412	9.4	<0.010
17/09/91	11:23	7.85	500	17.0	0.0	122.0	16.0	120.1	58.9	10.6	2.6	24.8	0.045	0.52	0.43	2.63	1.036	9.8	0.030
18/10/91	15:23	8.00	640	21.5									0.026	0.73	0.15	1.23	0.865	8.9	<0.010
14/11/91	17:00	7.95	473	21.0									0.031	0.39	0.25	1.12	0.840	8.1	<0.010
9/12/91	16:25	7.50	428	22.0	0.0	109.2	13.8	110.0	56.2	8.8	2.7	20.5	0.040	1.05	0.51	3.21	0.759	8.6	<0.010
3/01/92	16:34	7.65	525	23.5									0.025	0.37	0.30	1.79	0.815	8.6	<0.010
10/03/92	16:27	8.05	520	23.0	0.0	133.0	23.0	119.6	66.5	11.6	2.9	27.1	0.062	0.13	0.27	1.13	1.093	8.8	<0.010
6/04/92	12:24	7.60	495	18.0									0.039	0.56	0.25	3.90	0.779	8.5	<0.010
20/05/92	11:32	7.10	628	13.0									0.011	0.97	0.20	0.88	0.720	10.1	<0.010
9/06/92	16:00	8.27	468	12.5	0.0	123.3	17.7	115.3	58.8	10.7	3.6	24.8	0.055	0.61	0.37	2.99	0.851	9.4	0.041
16/07/92	12:50	7.50	697	9.5									0.063	<0.02	0.23	1.30	0.831	10.5	0.041
9/09/92	12:45	7.35	495	15.0	0.0	117.1	17.7	135.0	60.7	8.6	2.6	26.0	0.015	0.25	0.26	1.16	0.695	10.1	<0.010
25/11/92	13:47	6.85	340	16.5									0.078	0.32	0.83	6.12	0.707	9.3	<0.010
23/12/92	11:57	7.15	380	16.0	0.0	90.9	9.9	95.1	47.2	8.3	3.2	17.5	0.091	0.52	1.00	4.66	0.635	9.3	<0.010
8/01/93	11:13	7.40	351	16.0									0.117	0.32	0.78	8.18	0.749	9.3	<0.010
12/04/93	11:40	7.10	487	16.0									0.030		0.35	1.48	0.862	8.9	0.042
12/02/92	16:20	7.85	475	22.0									0.029	0.60	0.22	1.10	0.805	8.6	<0.010
N° DE DATOS		119	119	110	45	45	45	45	45	45	45	45	114	68	115	115	97	66	59
PROMEDIO		7.88	532	16.9	0.0	125.9	18.7	123.4	59.9	12.0	3.3	26.5	0.039	0.91	0.20	3.09	1.001	9.5	0.010
MINIMO		6.85	270	8.0	0.0	86.6	6.7	55.2	42.9	5.4	2.0	10.3	0.000	0.00	0.00	0.19	0.002	8.1	0.000
MAXIMO		9.26	1125	25.0	0.0	168.0	34.0	170.0	76.6	18.4	7.8	38.6	0.230	14.40	1.00	68.50	6.890	11.4	0.096
DESV. STD.		0.35	130	3.9	0.0	17.8	4.9	24.7	8.5	2.9	1.1	6.4	0.039	1.72	0.19	8.31	0.891	0.8	0.015

ESTACION : RIO ELQUI EN LA SERENA
 CODIGO BNA : 04335800-6
 CUENCA : RIO ELQUI

LATITUD S : 29 53
 LONGITUD W : 71 15

ALTITUD : 7 msnm

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/NO3 mg/l 6242	Oxigeno mg/l 6001	P/PO4 mg/l 6220
12/11/81	11:40	7.95	1508		0.0	168.0	222.0	230.0	114.0	41.2	9.4	109.0							
4/12/81	13:00	7.56	1820		0.0	142.0	340.0	264.0	154.0	48.0	7.0	124.0	0.000	1.00	0.00	0.25	1.420		
8/01/82	10:00	8.08	1992		0.0	110.0	391.0	310.0	165.0	50.9	7.8	156.0	0.020	2.33	0.00	0.08			
12/03/82	15:00	7.96	1997		0.0	176.0	386.0	340.0	186.0	46.4	8.2	187.0	0.023	7.50	0.01	0.28	1.030		
16/04/82	13:30	7.91	1727		0.0	207.0	285.0	298.0	174.0	98.5	7.4	147.0	0.012	1.50	0.00	0.15	1.280		
9/07/82	13:45	7.89	1180		0.0	261.0	136.0	235.0	135.0	26.1	5.5	98.4					1.250		
7/01/83	14:50	7.15	459	24.0	0.0	136.0	22.3	87.9	61.7	12.2	2.7	19.5	0.054		0.22	7.30			
18/04/83	17:35	7.90	667	20.0	0.0	164.0	44.7	130.0	69.7	21.8	3.9	36.1	0.017		0.03	0.57			
8/07/83	16:50	7.90	1185	15.0	0.0	158.0	89.0	382.0	141.0	30.9	19.9	80.0	0.312	33.50	156.00				
17/02/84	17:40	7.35	638	24.0	0.0	166.0	38.6	131.0	73.7	11.5	3.9	36.3	0.020		0.15	0.90			
13/04/84	9:00	7.35	738	19.0															0.400
11/05/84	14:00	7.25	773	17.0	0.0	194.0	59.9	150.0	82.6	19.2	4.7	50.6	0.016		0.05	0.54			1.210
14/06/84	10:30	7.25	720	13.0															1.420
12/09/84	10:00	7.05	621	16.0	0.0	160.0	59.9	118.0	74.7	16.9	4.3	34.0	0.003		0.15	3.78			1.760
8/03/85	12:35	7.85	500	19.0	0.0	139.0	23.8	118.0	58.9	9.7	3.5	31.7	0.018		0.13	1.75			0.863
7/06/85	17:30	8.10	550	15.0	0.0	145.0	30.1	134.0	63.9	10.9	3.9	38.2	0.058		0.35	1.90			0.307
13/09/85	11:00	8.15	600	16.0	0.0	175.0	56.0	163.0	71.1	21.5	4.3	53.1	0.022		0.08	0.49			0.684
5/12/85	16:20	7.95	950	25.0	0.0	196.0	100.0	178.0	100.0	20.2	6.3	69.0	0.010		0.03	0.34			0.714
10/03/86	12:50	7.85	1056	20.0	0.0	209.0	111.0	195.0	103.0	25.2	6.3	78.2	0.011		0.03	0.16			1.010
11/06/86	17:05	8.10	773	17.0	0.0	184.0	61.3	181.0	81.4	20.4	5.5	54.7	0.010		0.03	0.22			0.820
9/09/86	15:32	8.15	1186	18.0	0.0	160.0	158.0	221.0	98.2	28.0	7.0	92.0	0.000		0.00	0.11			6.400
12/12/86	13:05	8.15	862	20.0	0.0	183.0	77.6	160.0	88.6	19.2	5.5	60.7	0.018		0.00	2.57			3.360
12/03/87	16:06	8.25	800	25.0	0.0	181.0	63.5	171.0	72.7	25.0	5.5	56.1	0.015	0.70	0.05	0.56			2.690
5/06/87	13:00	8.30	794	14.0	0.0	183.0	54.9	161.0	81.6	19.4	3.5	55.6	0.020	0.36	0.05	0.57			1.030
9/09/87	17:25	8.10	625	17.0	0.0	153.0	35.5	130.0	68.1	15.6	3.1	34.5	0.20						0.963
21/12/87	13:30	7.95	385	16.0	0.0	116.0	13.8	74.0	50.9	6.8	2.7	15.6	0.229	0.16	1.16	25.00			0.350
11/03/88	12:10	8.25	564	17.5															0.820
13/06/88	17:00	8.20	700	12.0	0.0	137.0	31.9	111.0	63.0	12.0	2.6	30.4	0.011	0.56	0.08	0.59			0.157
12/09/88	10:20	8.25	880	11.0	0.0	178.0	62.4	170.0	87.1	17.3	4.0	53.8	0.026	1.49	0.05	0.25			1.060
16/12/88	16:00	7.65	1451	22.0	0.0	201.0	273.0	259.0	165.0	39.0	7.0	110.0	0.015	0.75	0.10	0.19			0.974
2/03/89	16:50	7.95	1245	18.5	0.0	122.0	188.0	235.0	105.0	31.8	6.8	100.0	0.007	0.61	0.02	0.30			0.764
2/06/89	16:05	8.25	1143	16.5	0.0	195.0	97.5	195.0	98.0	22.9	5.5	74.5	0.005	0.54	0.01	0.09			0.858
4/12/89	13:20	7.65	1805	16.5	0.0	94.6	272.0	279.0	130.0	46.5	7.2	109.0	0.005	0.60	0.02	0.12			0.813
13/03/90	11:30	7.45	1874	19.0	0.0	210.5	353.1	283.4	215.6	50.0	7.9	125.1	0.098	0.01	0.12	0.818			0.039
15/06/90	16:49	7.40	1250	16.0	0.0	83.0	203.1	230.1	89.6	31.6	6.8	108.6	<0.005	1.17	0.02	0.10			1.299
20/09/90	10:15	7.75	1405	14.0	0.0	137.9	180.8	234.0	92.8	34.0	6.2	101.2	0.006	0.97	0.01	0.21			1.267
26/12/90	15:06	8.05	2080	26.0	0.0	66.5	441.7	280.0	185.0	53.5	8.4	131.5	<0.005	0.62	0.03	0.26			1.356
12/03/91	16:22	7.95	2065	20.0	0.0	125.7	447.3	260.0	195.0	56.0	8.3	128.8	<0.005	0.66	0.02	0.19			1.460
21/06/91	12:05	7.75	816	12.0	0.0	180.6	55.6	199.8	95.6	18.4	5.5	53.4	0.021	0.32	0.37	5.51			1.630
23/09/91	11:12	7.70	1350	15.5	0.0	241.6	165.2	237.3	141.0	33.2	6.0	94.8	<0.005	0.67	0.02	0.12			1.549
5/12/91	17:02	8.10	891	25.0	0.0	170.2	77.6	186.8	85.6	20.4	5.0	67.2	0.017	1.06	0.01	0.27			0.858
16/03/92	12:12	7.20	1235	19.0	0.0	225.8	166.6	240.2	136.8	30.2	6.1	99.8	0.024	0.38	0.04	0.20			1.389
19/06/92	16:42	8.32	593	16.0	10.2	132.4	34.0	140.0	67.4	14.1	3.7	40.5	0.037	0.90	0.23	1.52			0.969
9/09/92	16:55	7.52	761	19.0	0.0	181.8	48.9	165.0	83.9	15.3	3.6	52.4	0.015	0.34	0.10	0.93			0.713
23/12/92	17:00	7.70	505	23.0	0.0	121.4	20.6	121.0	59.2	10.8	4.4	27.6	0.121	0.60	1.57	0.876			0.816
Nº DE DATOS		45	45	39		42	42	42	42	42	42	42	38	26	39	39	39	21	22
PROMEDIO		7.83	1060	18.2	0.2	163.6	142.4	199.7	106.3	28.2	5.9	76.8	0.032	1.04	0.99	5.68	1.246	11.1	0.014
MINIMO		7.05	385	11.0	0.0	66.5	13.8	74.0	50.9	6.8	2.6	15.6	0.000	0.16	0.00	0.08	0.157	8.4	0.000
MAXIMO		8.32	2080	26.0	10.2	261.0	447.3	382.0	215.6	98.5	19.9	187.0	0.312	7.50	33.50	156.00	6.400	13.5	0.044
DESV. STD.		0.34	489	3.8	1.5	40.3	125.8	69.6	42.8	17.2	2.8	40.4	0.060	1.57	5.27	24.74	1.015	1.3	0.014

ESTACION : ESTERO CULEBRON EN EL SIFON
 CODIGO BMA : 04400800-9
 CUENCA : COSTERAS R.ELOUI-R.L

LATITUD S : 29 58
 LONGITUD W : 71 18

ALTITUD : 70 msnm

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/NO3 mg/l 6242	Oxigeno mg/l 6001	P/PO4 mg/l 6220
13/04/84	9:40	7.30	1018	18.0															
11/05/84	14:55	7.15	1096	16.0	0.0	251.0	131.0	159.0	82.6	26.5	8.6	106.0	0.016		0.00	0.06	0.036		
14/06/84	10:55	7.40	1046	12.0															
12/09/84	10:30	7.30	1198	15.0	0.0	268.0	148.0	179.0	98.4	28.9	7.0	109.0	0.016				0.165		
10/12/84	10:55	7.50	1101	20.0	0.0	255.0	137.0	134.0	81.2	23.3	6.3	114.0	0.015		0.00	0.13	1.240		
8/03/85	15:15	7.60	1373	22.0	0.0	333.0	182.0	171.0	95.4	27.3	9.8	171.0	0.011		0.01	0.14	0.036		
10/06/85	11:00	7.65	1124	14.0	0.0	245.0	116.0	164.0	78.8	20.1	8.2	118.0	0.026		0.01	0.39	0.201	0.0	
13/09/85	12:15	7.95	900	17.0	0.0	248.0	132.0	176.0	77.2	26.4	7.8	120.0	0.002		0.04	0.14	0.000		
5/12/85	17:20	7.75	1020	20.0	0.0	281.0	128.0	166.0	90.4	22.7	7.8	125.0	0.014		0.03	0.11	0.029		
10/03/86	10:45	7.60	1221	19.0	0.0	303.0	141.0	195.0	89.2	25.2	12.1	142.0	0.006		0.05	0.14	0.136		
11/06/86	15:25	8.00	1130	15.0	0.0	267.0	151.0	159.0	89.2	25.2	9.0	125.0	0.021		0.54	2.18	0.610		
5/09/86	15:43	7.65	1233	15.5	0.0	271.0	179.0	172.0	98.2	23.1	9.0	133.0	0.005		0.65	2.35	0.350		
12/12/86	15:27	7.85	1181	19.5	0.0	287.0	129.0	185.0	90.8	25.6	7.8	128.0	0.012		0.00	2.15	0.790	5.6	
12/03/87	14:20	7.80	1496	19.5	0.0	308.0	168.0	198.0	84.4	34.5	9.0	151.0	0.015	0.99	0.02	0.17	0.900	9.1	
5/06/87	15:35	7.75	1130	13.0	0.0	241.0	129.0	163.0	82.0	25.2	7.0	120.0	0.007	0.54	0.01	0.38	0.291	9.4	0.094
10/09/87	11:10	7.90	1582	12.0	0.0	268.0	213.0	227.0	102.0	39.6	9.0	160.0	0.007	0.36	0.01	0.38	0.648	10.1	0.051
21/12/87	15:40	8.10	1436	17.5	0.0	311.0	191.0	183.0	92.4	28.4	6.7	167.0	0.021	0.54	0.01	0.38	0.291	9.4	0.094
4/03/88	15:25	8.15	1230	18.5															
14/06/88	11:51	7.75	1160	10.0	0.0	216.0	115.0	144.0	77.8	21.0	6.2	95.7	0.005	0.60	0.01	0.16	0.026	10.2	0.072
8/09/88	16:20	8.05	1627	14.0	0.0	256.0	260.0	240.0	76.8	34.0	1.8	221.0	0.015	0.79	0.02	0.05	1.140	*2.2	0.059
15/12/88	15:13	7.75	1292	16.5	0.0	305.0	191.0	226.0	92.0	31.0	7.2	185.0	0.017	0.93	0.05	0.42	0.118	12.8	0.117
6/03/89	12:30	7.45	1650	16.0	0.0	247.0	222.0	270.0	85.2	32.4	9.5	211.0	0.005	0.82	0.02	0.46	0.441	8.8	0.111
9/06/89	11:25	7.15	1125	8.5	0.0	220.0	139.0	195.0	87.0	25.5	7.6	118.0	0.005	0.67	0.01	0.30	0.049	10.8	0.071
14/09/89	15:35	7.60	1597	13.0	0.0	214.0	220.0	225.0	72.0	35.2	7.7	188.0	0.006	0.55	0.01	0.13	0.458	11.0	0.101
13/12/89	15:55	7.00	2210	18.0	0.0	239.0	322.0	250.0	83.9	46.0	8.6	234.0	0.005	0.78	0.01	0.15	0.253	11.2	0.163
12/03/90	12:00	7.10	2136	19.0	0.0	235.8	371.8	282.4	129.6	47.6	10.1	253.0	0.005	1.14	0.01	0.81	0.515		0.197
20/06/90	11:35	7.60	1830	12.0	0.0	154.4	297.1	295.0	60.4	39.6	2.1	248.4	<0.005	1.53	0.02	0.32	0.499	10.1	0.034
20/09/90	11:00	7.55	2043	14.0	0.0	175.1	313.0	288.0	58.4	44.4	9.5	239.2	0.010	1.13	0.01	0.20	0.248	10.1	0.089
26/12/90	16:10	8.05	2270	22.0	0.0	323.4	478.2	270.0	143.0	50.0	10.3	3.0	<0.005	0.78	0.02	0.57	0.080	12.8	0.126
12/03/91		8.06	2317		0.0	300.0	466.5	270.0	128.0	51.2	10.6	274.8	<0.005	0.81	0.01	0.15	0.606		0.123
13/06/91	14:26	7.15	2795	13.0	0.0	206.8	502.3	696.0	203.4	64.2	21.6	342.2	<0.005	0.76	0.02	0.35	1.586	8.9	0.108
23/09/91	16:06	7.40	1200	15.0	0.0	246.5	130.4	224.8	91.2	26.6	6.3	116.8	<0.005	0.57	0.02	0.10	0.154	8.1	0.060
9/12/91	12:28	7.40	1681	17.0	0.0	293.5	43.6	574.9	115.0	34.5	6.3	196.7	0.013	1.45	0.01	0.45	0.108	8.6	<0.010
16/03/92	16:20	7.35	1155	19.0	0.0	298.4	127.3	190.2	94.8	25.0	6.1	126.0	0.025	0.73	0.04	0.16	0.156	6.9	0.100
5/06/92	15:32	8.35	1002	12.0	7.8	158.0	112.7	160.0	56.7	22.2	6.8	110.4	<0.005	1.19	0.02	0.07	0.254	8.8	0.109
10/09/92	9:30	8.45	895	13.0	0.0	192.2	85.4	155.1	77.8	18.5	4.6	91.5	<0.005	0.69	0.01	0.06	0.103	8.0	0.080
23/12/92	16:20	7.35	987	18.0	0.0	269.7	111.0	157.1	82.6	22.2	7.7	117.3	0.023	0.90	0.65	2.98	0.254	9.1	0.142
Nº DE DATOS		37	37	36	34	34	34	34	34	34	34	34	32	23	33	33	37	24	23
PROMEDIO		7.65	1419	15.9	0.2	258.2	199.5	227.8	92.5	31.6	8.1	157.7	0.010	0.83	0.07	0.51	0.353	9.6	0.099
MINIMO		7.00	895	8.5	0.0	154.4	43.6	134.0	56.7	18.5	1.8	3.0	0.000	0.36	0.00	0.05	0.000	0.0	0.000
MAXIMO		8.45	2795	22.0	7.8	333.0	502.3	696.0	203.4	64.2	21.6	342.2	0.026	1.53	0.65	2.98	1.586	13.0	0.197
DESV. STD.		0.35	456	3.3	1.3	45.9	112.7	112.3	26.5	10.5	3.1	64.9	0.007	0.29	0.17	0.74	0.364	1.7	0.037

ESTACION : RIO HURTADO EN SAN JUAN
 CODIGO BNA : 04501800-8
 CUENCA : RIO LINARI

LATITUD S : 30 27
 LONGITUD W : 70 32

ALTITUD : 2025 msnm

FECHA	HORA	pH u. pH 6020	Conduct ambos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/NO3 mg/l 6242	Oxigeno mg/l 6001	P/PO4 mg/l 6220
26/03/85	13:00	7.54	173	13.0	0.0	42.1	7.4	37.9	27.1	0.6	1.2	3.7			0.00	0.27			
21/06/85	14:00	7.72	175	7.0	0.0	36.0	9.2	35.2	27.1	1.8	1.2	3.7			0.30	0.22			
16/09/85	14:15	6.95	202	9.0	0.0	42.1	11.0	52.8	30.7	2.4	1.2	8.1	0.004	1.28	0.00	0.35			
18/03/86	13:25	7.37	237	13.0	0.0	51.7	6.7	52.8	35.7	3.0	1.8	5.5			0.05	0.47			
10/06/86	13:00	7.3	212	8.0	0.0	37.8	9.9	30.7	30.7	2.4	1.2	6.4			0.05	0.37			
26/03/87	15:00	7.51	268	10.0	0.0	40.3	9.2	61.5	30.3	3.9	1.2	6.0	0.005	0.35	0.03	0.36	0.087	9.1	0.005
24/06/87	14:40	7.75	200	0.0	0.0	36.6	7.1	62.1	28.5	4.0	0.8	6.4	0.007	0.58	0.03	0.21	0.176	10.2	0.007
29/09/87	14:00	7.91	150	7.0	0.0	42.7	8.5	22.6	18.2	2.4	0.8	5.3	0.010	0.14	0.03	0.33	0.268	9.3	0.005
24/03/88	16:00	6.55	166	12.0	0.0	39.0	5.3	36.0	21.6	3.0	0.6	4.1	0.005	0.11	0.02	0.36	0.096	0.005	
16/03/89	12:00	8.05	490	12.0	0.0	116.0	8.1	52.0	58.5	11.7	2.6	25.3	0.005	0.15	0.05	0.28	0.026	0.005	
14/06/89	14:30	7.32	220	5.0	0.0	42.7	7.1	64.8	31.7	2.2	1.1	8.3	0.005	0.26	0.07	0.36	0.160	0.005	
27/09/89	12:40	7.25	230	7.0	0.0	36.6	7.4	65.8	30.3	3.8	1.5	7.4	0.005	0.25	0.04	0.35	0.226	0.005	
11/03/92	14:00	7.84	220	14.0	0.0	48.2	8.2	65.8	39.5	2.4	2.9	6.4	<0.005	<0.02	0.04	0.26	0.123	6.4	<0.01
10/06/92	16:00	7.11	223	4.0	0.0	36.6	4.6	48.0	15.4	2.4	1.0	4.8	<0.005	0.12	0.23	0.31	0.256	<0.01	
3/09/92	14:10	6.30	208	5.5	0.0	40.2	6.7	32.2	25.0	2.8	0.5	6.0	<0.005	0.57	0.33	0.32	0.514	9.6	<0.01
9/12/92	17:00	7.60	177	13.5	0.0	33.5	4.6	36.5	19.5	2.2	0.5	4.6	0.006	0.58	0.04	0.27	0.260	7.9	<0.01
Nº DE DATOS	16	16	15	16	16	16	16	16	16	16	16	16	12	12	16	16	11	6	11
PROMEDIO	7.45	222	9.1	0.0	45.3	8.2	54.0	29.1	3.4	1.2	7.1	0.004	0.37	0.03	0.32	0.197	8.8	0.003	
MÍNIMO	6.30	150	4.0	0.0	33.5	4.6	22.6	18.2	0.6	0.5	3.7	0.000	0.00	0.00	0.21	0.026	6.4	0.000	
MÁXIMO	8.05	490	14.0	0.0	116.0	18.1	132.0	58.6	11.7	2.9	25.3	0.010	1.28	0.07	0.40	0.514	10.2	0.007	
DESV. STD.	0.47	75	3.4	0.0	18.9	3.1	23.2	8.7	2.3	0.7	4.9	0.002	0.32	0.01	0.05	0.125	1.3	0.002	

ESTACION : RIO HURTADO EN ANGOSTURA DE PANQUE
 CODIGO BNA : 04503800-8
 CUENCA : RIO LINARI

LATITUD S : 30 26
 LONGITUD W : 71 00

ALTITUD : 485 msnm

FECHA	HORA	pH u. pH 6020	Conduct ambos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/NO3 mg/l 6242	Oxigeno mg/l 6001	P/PO4 mg/l 6220
20/03/85	16:25	8.14	346	22.0	0.0	124.0	11.0	54.3	50.1	6.1	2.0	9.2			0.00	0.15			
12/06/85	16:15	8.08	334	14.5	0.0	127.0	11.0	58.6	50.1	6.1	2.0	8.7			0.00	0.11			
17/09/85	10:15	8.18	423	18.5	0.0	166.0	14.5	86.5	67.1	7.2	2.0	18.6	0.000	1.28	0.00	0.08			
16/12/85	16:40	7.55	493	21.0	0.0	164.0	14.9	87.4	68.5	10.1	2.7	17.0			0.00	0.03			
19/03/86	12:05	7.66	544	21.0	0.0	222.0	18.1	115.0	73.3	18.0	3.1	25.3			0.02	0.05			
10/06/86	17:10	7.99	391	11.0	0.0	146.0	11.7	74.0	55.5	9.6	2.4	15.8			0.01	0.07			
31/12/86	11:00	7.52	505	24.7	0.0	185.0	9.6	96.1	71.1	10.1	2.7	19.3			0.00	0.06			
27/03/87	14:00	8.05	484	21.5	0.0	159.0	13.8	86.5	60.1	10.3	2.0	20.7	0.012	0.29	0.01	0.01	0.040	7.9	0.035
23/06/87	17:25	8.10	420	0.0	0.0	137.0	8.9	80.2	56.1	9.0	0.8	14.7	0.007	0.55	0.00	0.11	0.107	9.6	0.005
30/09/87	10:30	8.05	370	13.5	0.0	131.0	12.1	60.5	50.3	7.9	1.2	13.3	0.006	0.06	0.03	0.44	1.080	10.0	0.005
23/03/88	16:30	7.65	324	20.0	0.0	120.0	69.5	51.9	45.5	6.4	1.2	10.6	0.005	0.16	0.21	0.24	0.353	0.005	
16/03/89	16:30	7.50	470	23.0	0.0	110.0	16.3	125.0	57.7	11.6	2.6	24.8	0.005	0.05	0.01	0.10	0.011	0.005	
15/06/89	18:45	7.80	450	15.0	0.0	153.0	12.8	95.1	65.6	9.8	1.8	17.5	0.005	0.17	0.03	0.06	0.192	0.005	
27/09/89	18:00	8.00	397	14.0	0.0	91.5	14.9	105.0	64.2	10.5	1.9	20.2	0.005	0.22	0.02	0.17	0.152	0.005	
10/03/92	11:50	8.26	520	20.0	0.0	159.5	16.3	85.0	60.2	10.5	1.9	22.1	<0.005	<0.02	0.01	0.05	0.064	3.8	<0.01
16/06/92	11:15	8.49	400	10.0	0.0	126.3	7.0	75.8	51.7	7.3	2.0	12.6	0.017	0.11	0.07	17.36	0.647	0.043	
2/09/92	15:05	6.80	382	15.0	0.0	123.3	7.4	71.1	50.3	7.5	0.5	13.1	<0.03	0.60	0.03	3.17	0.967	8.2	<0.01
10/12/92	11:20	8.10	341	17.0	0.0	120.8	8.5	48.0	46.7	6.2	0.5	10.1	<0.005	0.54	0.02	0.86	0.490	8.5	<0.01
Nº DE DATOS	18	18	17	18	18	18	18	18	18	18	18	18	12	12	18	18	11	7	11
PROMEDIO	7.88	422	17.7	0.0	142.5	15.5	80.9	57.2	9.1	1.8	16.1	0.005	0.34	0.02	1.33	0.374	8.9	0.007	
MÍNIMO	6.80	324	10.0	0.0	91.5	7.0	48.0	45.5	6.1	0.5	8.7	0.000	0.00	0.00	0.01	0.011	7.9	0.000	
MÁXIMO	8.49	544	24.7	0.0	222.0	24.7	125.0	73.3	18.0	3.1	25.3	0.017	1.28	0.07	17.36	1.080	10.0	0.043	
DESV. STD.	0.38	66	4.2	0.0	29.7	15.5	21.0	8.9	2.8	0.7	5.0	0.004	0.55	0.01	3.95	0.360	0.7	0.011	

ESTACION : RIO GRANDE EN LAS NARAJAS
 CODIGO BNA : 04511800-2
 CUENCA : RIO LINARI

LATITUD S : 31 01
 LONGITUD W : 70 35

ALTITUD : 1360 msnm

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/NO3 mg/l 6242	Oxigeno mg/l 6001	P/PO4 mg/l 6220
19/03/85	16:05	7.68	173	16.0	0.0	54.3	14.9	12.5	24.0	1.2	1.2	6.2			0.00	0.16			
19/06/85	12:30	7.74	196	9.5	0.0	60.4	20.2	17.3	26.1	1.2	1.2	7.4			0.00	0.07			
24/09/85	13:30	8.06	137	15.0	0.0	63.5	18.8	21.6	27.7	1.2	1.2	12.4	0.023	0.00	0.00	0.13			
10/12/85	17:15	7.35	234	21.0	0.0	75.7	16.3	21.6	31.3	2.6	1.6	9.2			0.00	0.09			
11/03/86	12:50	7.90	259	19.0	0.0	95.2	19.9	23.5	35.7	3.0	1.6	12.4			0.00	0.68			
17/06/86	16:00	7.48	105	15.0	0.0	63.5	6.7	1.4	1.4	3.7	1.6	6.4			0.00	0.58			
18/06/86	12:10	7.68	226	12.0	0.0	69.6	21.6	25.0	25.7	4.9	1.6	12.9			0.01	1.14			
10/12/86	16:40	8.75	170	19.0	0.0	52.5	8.9	15.9	19.8	1.5	0.8	7.8			0.00	0.22	6.1		
12/03/87	17:25	7.70	256	20.0	0.0	76.9	19.9	28.8	30.1	3.0	1.2	14.3	0.015	0.54	0.01	0.18	0.096	8.1	0.007
16/06/87	12:45	7.85	250	0.0	0.0	67.1	21.3	28.8	27.7	3.7	1.2	14.3	0.034	0.74	0.00	0.08	0.271	10.2	0.012
16/03/88	14:20	6.75	157	17.0	0.0	53.7	12.0	16.8	19.4	1.9	0.7	7.4	0.031	0.21	0.01	0.12	0.002		0.005
16/03/89	14:40	7.90	322	20.0	0.0	110.0	19.9	35.5	44.5	4.9	1.1	12.9	0.005	0.10	0.01	0.12	0.002		0.013
28/06/89	14:30	7.45	282	10.0	0.0	91.5	21.6	31.7	38.6	4.9	1.1	13.8	0.005	0.34	0.02	0.09	0.137		0.005
25/09/89	16:10	7.92	180	14.0	0.0	61.0	13.1	24.0	22.6	2.6	1.1	10.6	0.020	0.42	0.62	0.82	0.248		0.005
16/03/92	18:10	8.19	233	17.0	0.0	92.1	15.2	21.1	30.7	2.9	1.1	10.6	0.012	-0.02	0.01	0.11	0.064	7.3	<0.010
23/06/92	13:20	8.19	195	8.5	0.0	64.0	9.2	23.0	23.6	2.4	1.0	8.0	0.033	0.14	0.01	0.20	0.254		0.018
23/09/92	17:35	6.60	170	12.0	0.0	54.9	7.1	16.8	19.0	2.7	0.5	7.4	0.020	0.04	0.02	0.39	0.303	8.7	<0.010
14/12/92	16:20	7.60	134	16.0	0.0	51.2	6.4	15.3	17.5	1.7	0.3	5.8	0.014	-0.02	0.02	0.22	0.194	7.8	<0.010
Nº DE DATOS		18	18	17	18	18	18	18	18	18	18	18	11	11	18	18	10	6	10
PROMEDIO		7.68	206	15.2	0.0	69.8	15.2	21.1	26.5	2.6	1.1	10.0	0.019	0.23	0.04	0.30	0.157	8.0	0.006
MINIMO		6.60	105	8.5	0.0	51.2	6.4	1.4	12.6	1.2	0.3	5.8	0.005	0.00	0.00	0.07	0.002	6.1	0.000
MAXIMO		8.75	322	21.0	0.0	110.0	21.6	35.5	44.5	4.9	1.6	14.3	0.034	0.74	0.62	1.14	0.303	10.2	0.018
DESV. STD.		0.49	56	3.9	0.0	16.6	5.4	7.6	7.7	1.1	0.3	2.9	0.010	0.21	0.14	0.30	0.107	1.3	0.005

ESTACION : RIO MOSTAZAL EN CUESTECITA
 CODIGO BNA : 04511801-2
 CUENCA : RIO LINARI

LATITUD S : 30 48
 LONGITUD W : 70 36

ALTITUD : 1250 msnm

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/NO3 mg/l 6242	Oxigeno mg/l 6001	P/PO4 mg/l 6220
18/03/85	17:28	7.73	232	16.0	0.0	96.4	11.0	28.8	38.1	1.2	1.2	4.1			0.00	0.20			
18/06/85	16:10	7.00	252	11.0	0.0	103.0	9.2	31.7	44.1	1.2	1.2	4.6			0.00	0.13			
23/09/85	16:50	8.00	270	16.5	0.0	109.0	9.2	42.3	47.5	2.4	1.6	8.3	0.003	1.92	0.00	0.78			
10/03/86	16:40	7.51	319	18.0	0.0	133.0	9.9	42.7	52.5	4.3	1.6	9.2			0.00	0.12			
17/06/86	17:45	7.51	122	12.0	0.0	63.5	3.2	5.3	15.8	2.4	1.2	5.1			0.02	0.52			
26/06/86	13:15	8.00	288	11.0	0.0	124.0	8.2	40.8	47.5	3.7	1.6	7.8			0.01	0.20			
16/12/86	15:00	8.55	315	18.0	0.0	94.0	5.3	62.0	42.3	3.9	1.6	7.6			0.00	0.09			7.7
12/03/87	16:30	7.67	345	17.5	0.0	122.0	11.7	45.6	49.1	4.6	1.2	11.5	0.005	0.26	0.01	0.16			0.005
15/03/87	15:30	7.85	345	15.0	0.0	104.0	3.6	110.3	58.9	5.1	0.8	8.6	0.030	0.84	0.16	0.74	0.467	9.8	0.010
22/09/87	14:10	8.25	260	13.0	0.0	106.0	3.9	29.8	30.1	3.7	0.8	6.4	0.005	0.08	0.04	0.36	0.309	8.1	0.005
17/12/87	17:00	7.20	90	13.0	0.0	33.6	3.6	13.0	13.0	1.6	0.4	2.3	0.008	0.18	0.05	1.05	0.081	5.3	0.019
17/03/88	9:00	7.95	216	13.0	0.0	83.6	6.7	25.9	32.7	3.0	0.7	5.5	0.012	0.06	0.01	0.22	0.148		0.005
14/04/89	16:15	7.05	365	16.0	0.0	128.0	9.2	55.0	54.1	5.1	1.4	10.1	0.005	0.02	0.02	0.46	0.169		0.012
27/06/89	16:00	7.35	380	11.5	0.0	159.0	9.2	49.0	60.9	6.0	1.6	9.7	0.005	0.15	0.02	0.16	0.379		0.005
22/09/89	15:40	7.60	250	13.0	0.0	94.0	5.7	39.9	38.0	3.8	1.2	7.4	0.005	0.23	0.02	0.50	0.264		0.005
17/03/92	10:25	8.17	345	14.0	0.0	122.0	8.2	47.0	48.7	4.3	1.5	8.3	<0.005	-0.02	0.01	0.15	0.234	8.4	<0.010
22/06/92	16:40	8.27	255	10.0	0.0	87.8	3.5	36.9	34.7	2.3	1.0	5.7	0.023	0.02	0.01	0.27	0.250		<0.010
24/09/92	10:25	6.80	232	8.5	0.0	77.4	3.9	33.1	30.2	2.9	0.5	5.5	<0.005	0.15	0.02	0.24	0.333	9.2	<0.010
15/12/92	10:10	7.60	186	12.0	0.0	60.0	6.0	28.8	25.2	2.5	0.4	5.1	<0.005	-0.02	0.03	0.27	0.327	8.7	<0.010
Nº DE DATOS		19	19	18	19	19	19	19	19	19	19	19	13	13	19	19	12	8	12
PROMEDIO		7.72	267	13.6	0.0	98.9	7.1	40.4	40.6	3.4	1.1	7.0	0.008	0.30	0.05	0.40	0.266	8.5	0.006
MINIMO		6.80	90	8.5	0.0	33.6	3.2	5.3	13.0	1.2	0.4	2.3	0.000	0.00	0.00	0.09	0.081	7.7	0.000
MAXIMO		8.55	380	18.0	0.0	159.0	11.7	110.0	60.9	6.0	1.6	11.5	0.030	1.92	0.52	1.78	0.467	9.8	0.019
DESV. STD.		0.45	77	2.8	0.0	28.6	2.7	21.0	12.9	1.3	0.4	2.3	0.008	0.50	0.11	0.40	0.101	0.6	0.005

ESTACION : RIO GRANDE EN PUNILLA SAN JUAN
 CODIGO BNA : 04523602-4
 CUENCA : RIO LIMARI

LATITUD S : 30 42
 LONGITUD W : 70 55

ALTITUD : 425 msnm

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	Am mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/MO3 mg/l 6242	Oxigeno mg/l 6001	P/PO4 mg/l 6220	
14/01/82	12:15	7.90	495		0.0	211.0	17.4	63.9	60.1	14.7	3.1	29.9	0.003	2.00	0.06	0.20				
25/02/83	13:10	8.38	284	21.5	0.0	124.0	5.3	27.4	32.3	4.9	1.2	14.7			0.01	2.33				
28/04/83	11:45	8.09	333	18.0	0.0	149.0	12.8	43.2	44.1	10.9	1.6	14.7			0.02	0.36				
29/06/83	15:50	8.34	414	13.0	0.0	177.0	11.0	46.6	52.1	10.9	1.6	14.7			0.00	0.13				
14/09/83	18:09	7.77	273	15.0	0.0	121.0	6.7	27.9	38.1	6.7	1.2	9.2								
14/03/85	15:30	8.27	343	21.5	0.0	163.0	8.9	26.9	51.1	6.7	2.0	9.2			0.00	0.08				
26/06/85	15:10	8.27	341	15.5	0.0	172.0	14.9	30.3	56.1	6.1	2.0	9.7			0.00	0.07				
3/09/85	10:10	7.99	349	14.0	0.0	169.0	12.8	36.5	51.3	7.2	2.0	16.6	0.000	0.00	0.00	0.09				
10/12/85	20:40	7.54	375	23.0	0.0	164.0	13.1	38.4	45.7	8.9	2.4	17.5			0.00	0.06				
6/03/86	11:45	8.21	393	22.0	0.0	178.0	11.7	50.0	41.5	13.9	3.5	24.8			0.00	0.05				
3/06/86	15:00	7.98	380	15.0	0.0	184.0	11.7	49.0	56.5	9.0	2.0	15.6			0.01	0.30				
2/12/86	17:00	9.25	330	20.5	0.0	135.0	7.1	38.4	39.1	6.3	1.6	12.0			0.00	0.15		8.7		
30/03/87	17:00	8.23	410	22.0	0.0	176.0	16.3	39.4	48.3	10.3	1.6	18.4	0.010	0.27	0.01	0.01	0.005	9.4	0.005	
30/06/87	16:40	8.25	380		0.0	171.0	10.6	35.5	53.5	2.7	1.2	17.9	0.014	0.79	0.00	0.04	0.180	10.0	0.005	
25/09/87	16:00	8.25	280	15.0	0.0	128.0	8.5	19.2	38.3	5.1	1.2	8.7	0.013	0.02	0.04	2.51	0.736	8.9	0.019	
23/12/87	16:00	7.90	184	18.5	0.0	82.4	7.1	13.0	26.9	2.8	1.2	5.5	0.016	0.26	0.03	4.95	0.955	8.2	0.096	
4/04/89	10:20	7.20	512	18.0	0.0	232.0	14.5	62.0	70.1	12.7	2.0	23.0	0.005	0.02	0.01	0.10	0.011		0.008	
30/06/89	15:20	8.15	385	15.0	0.0	159.0	14.5	45.6	47.2	10.6	1.7	17.9	0.005	0.19	0.03	0.08	0.061		0.005	
1/09/89	13:00	8.35	320	15.0	0.0	140.0	9.2	36.0	45.0	6.5	1.3	11.0	0.005	0.27	0.01	0.23	0.360		0.005	
1/04/92	16:25	8.30	407	18.0	0.0	186.7	9.6	39.9	58.5	8.3	1.8	13.3	<0.005	<0.02	<0.01	0.28	0.182	7.2	<0.010	
1/06/92	13:20	8.22	395	14.0	0.0	151.9	7.0	46.0	48.5	5.3	1.4	10.4	0.006	0.17	0.03	1.77	0.188		0.016	
1/10/92	12:45	6.90	245	15.5	0.0	106.7	6.7	26.8	33.1	4.5	0.5	7.6	0.010	0.35	0.03	3.01	0.719	8.8	<0.010	
24/12/92	10:20	8.00	294	17.5	0.0	135.4	8.8	30.7	42.1	5.6	0.5	9.4	<0.005	0.17	0.01	0.28	0.460	8.5	<0.010	
Nº DE DATOS		23	23	21		23	23	23	23	23	23	23	13	13	22	22	11		8	11
PROMEDIO		8.08	353	17.5	0.0	157.2	10.7	37.7	46.9	7.8	1.7	14.4	0.007	0.35	0.01	0.78	0.351	8.7	0.014	
MINIMO		6.90	184	13.0	0.0	82.4	5.3	15.0	26.9	2.7	0.5	5.5	0.000	0.00	0.00	0.01	0.005	7.2	0.000	
MAXIMO		9.25	512	23.0	0.0	232.0	17.4	63.9	70.1	14.7	3.5	29.9	0.016	2.00	0.06	4.95	0.955	10.0	0.096	
DESV. STD.		0.44	73	3.1	0.0	32.7	3.5	11.9	9.8	3.3	0.7	5.8	0.004	0.50	0.01	1.27	0.511	0.8	0.025	

ESTACION : RIO COGOTI EN FRAGATA
 CODIGO BNA : 04530800-6
 CUENCA : RIO LIMARI

LATITUD S : 31 07
 LONGITUD W : 70 52

ALTITUD : 1040 msnm

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/NO3 mg/l 6242	Oxigeno mg/l 6001	P/PO4 mg/l 6220
13/03/85	16:50	7.73	136	21.0	0.0	75.7	5.7	1.9	20.0	1.2	1.2	4.1			0.00	0.17			
7/06/85	15:20	7.68	146	14.0	0.0	78.7	7.4	2.9	20.0	2.4	1.2	4.6			0.00	0.21			
12/09/85	16:45	8.16	148	16.0	0.0	84.8	5.3	5.3	19.8	3.7	1.2	8.7	0.000	1.60	0.00	0.19		0.0	
10/12/85	8:20	7.39	168	16.0	0.0	88.5	5.0	4.8	20.8	3.8	1.6	6.4			0.00	0.15			
6/03/86	18:00	7.54	151	23.0	0.0	95.2	5.0	8.7	21.8	4.3	1.2	7.8			0.03	0.15			
17/06/86	12:20	7.84	165	11.0	0.0	82.4	5.0	10.1	23.8	2.4	1.6	7.6			0.01	0.60			
4/12/86	15:00	8.40	84	19.5	0.0	41.5	1.4	1.9	9.2	2.0	0.8	3.7			0.00	0.30		8.2	
5/03/87	15:00	7.54	160	22.0	0.0	84.2	6.0	2.9	18.0	4.0	1.2	7.8	0.005	0.23	0.01	0.19	0.052	8.3	0.005
4/06/87		7.70	94		0.0	45.8	4.3	4.3	11.4	2.6	0.8	4.1	0.013	0.39	0.01	0.97	0.797	10.2	0.018
23/09/87	15:15	7.85	130	15.0	0.0	61.0	5.3	5.3	14.4	3.3	0.8	5.8	0.005	0.02	0.04	0.66	0.522	9.2	0.010
14/12/87	10:00	7.15	52	10.0	0.0	24.4	3.6	0.0	5.8	1.0	0.4	2.3	0.012	0.23	0.05	2.72	0.113	9.9	
22/03/88	17:00	7.60	122	20.0	0.0	62.8	4.6	1.0	14.4	2.8	0.7	5.5	0.011	0.07	0.01	0.16	0.186		0.005
15/03/89	14:20	8.05	180	21.0	0.0	94.6	3.5	11.5	20.8	4.8	1.3	9.2	0.005	0.02	0.01	0.23	0.140		0.005
15/06/89	16:45	7.65	170	14.0	0.0	91.5	5.3	13.4	21.6	5.3	1.2	9.7	0.005	0.09	0.03	0.14	0.291		0.005
28/09/89	16:48	7.30	115	14.0	0.0	61.0	3.8	1.9	13.1	2.7	1.1	5.5	0.005	0.02	0.02	0.21	0.681		0.006
19/03/92	15:00	7.95	170	21.5	0.0	86.0	5.7	6.7	20.3	3.9	1.2	7.8	<0.005	0.13	<0.01	0.15	0.044	7.5	<0.010
25/06/92	14:35	7.78	110	7.0	0.0	46.4	2.2	6.2	11.9	1.7	1.6	3.6	0.042	0.11	0.24	21.91	0.435		0.121
26/09/92	9:10	6.20	101	8.5	0.0	47.5	2.1	7.6	11.3	2.1	0.4	4.6	<0.005	0.36	0.02	0.92	0.309	9.8	<0.010
17/12/92	14:15	8.20	81	16.0	0.0	39.6	3.5	1.9	9.1	1.6	0.3	3.9	<0.005	0.18	0.01	0.31	0.097	8.2	<0.010
Nº DE DATOS		19	19	18	19	19	19	19	19	19	19	19	13	13	19	19	12	9	11
PROMEDIO		7.67	131	16.1	0.0	68.0	4.5	5.2	16.2	2.9	1.0	5.9	0.008	0.27	0.03	1.60	0.306	7.9	0.016
MINIMO		6.20	52	7.0	0.0	24.4	1.4	0.0	5.8	1.0	0.3	2.3	0.000	0.02	0.00	0.14	0.044	0.0	0.000
MAXIMO		8.40	180	23.0	0.0	95.2	7.4	13.4	23.8	5.3	1.6	9.7	0.042	1.60	0.24	21.91	0.797	10.2	0.121
DESV. STD.		0.46	35	4.7	0.0	21.3	1.5	3.4	5.2	1.2	0.4	2.1	0.010	0.40	0.05	4.82	0.242	1.3	0.033

ESTACION : RIO COGOTI ENTRADA EMBALSE CUGUI.
 CODIGO BNA : 04531801-K
 CUENCA : RIO LIMARI

LATITUD S : 31 01
 LONGITUD W : 71 03

ALTITUD : 670 msnm

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/NO3 mg/l 6242	Oxigeno mg/l 6001	P/PO4 mg/l 6220
18/11/81	12:00	7.85	210		0.0	113.0	7.1	13.4	27.1	7.3	2.0	9.2	0.002	2.35	0.04	0.06			
28/01/82	20:20	6.94	240		0.0	129.0	7.1	14.9	32.1	7.9	2.0	9.4	0.003	1.83	0.03	0.07			
15/12/82	18:30	6.69	66		0.0	40.9	2.5	4.8	11.0	2.4	0.4	3.5			0.00	0.48			
24/02/83	14:15	8.16	238	24.0	0.0	155.0	6.4	5.8	20.2	14.7	0.8	11.5			0.00	0.25			
11/04/83	13:35	7.98	238	19.0	0.0	146.0	4.3	8.2	33.1	6.7	1.2	11.0			0.02	0.09			
15/06/83	18:35	7.94	244	16.0	0.0	122.0	13.5	7.2	28.1	6.1	1.2	14.7			0.00	0.09			
9/09/83	17:40	7.26	170	13.0	0.0	83.6	4.6	9.6	20.0	6.1	1.2	6.0			0.00	0.11			
13/03/85	17:10	7.85	242	22.0	0.0	133.0	7.4	4.8	32.1	4.9	1.2	7.4			0.00	0.09			
7/06/85	17:35	7.77	258	14.0	0.0	151.0	9.2	7.2	38.1	5.5	1.6	8.3			0.00	0.09			
12/09/85	18:10	8.09	279	17.0	0.0	157.0	7.1	13.9	39.5	6.0	1.6	14.9	0.001	1.43	0.00	0.02			
9/12/85	17:05	7.50	364	21.5	0.0	196.0	11.3	14.4	47.7	9.5	2.4	13.8			0.04	0.15			
5/12/86	13:00	8.95	158	22.5	0.0	80.5	2.1	9.1	18.4	4.0	0.8	6.9			0.00	0.26		7.6	
5/06/87		7.80	187		0.0	91.5	7.1	10.6	22.0	5.2	0.8	7.8	0.013	0.32	0.00	0.28	0.356	10.0	0.023
24/09/87	14:00	8.00	155	17.0	0.0	79.3	6.7	7.7	18.0	4.5	0.8	6.9	0.007	0.02	0.04	1.17	0.569	8.9	0.023
10/12/87	13:15	7.10	120	19.0	0.0	67.1	5.3	1.0	15.4	3.0	0.8	4.8	0.005	0.30	0.02	1.25	0.178	7.9	0.029
23/03/88	11:20	7.90	196	20.0	0.0	107.0	10.6	10.1	24.2	5.0	1.0	8.3	0.006	0.14	0.01	0.12	0.102		0.005
14/03/89	15:35	7.80	303	26.0	0.0	146.0	11.0	24.5	32.0	9.4	1.8	16.6	0.005	0.02	0.01	0.12	0.014		0.019
15/06/89	14:00	7.95	343	18.0	0.0	177.0	8.9	35.1	46.1	11.2	1.6	16.1	0.005	0.06	0.03	0.06	0.002		0.005
28/09/89	14:00	7.60	205	18.0	0.0	107.0	3.9	16.3	26.4	5.6	1.1	8.7	0.005	0.14	0.01	0.20	0.162		0.006
18/03/92	17:25	8.29	320	24.5	0.0	170.2	7.8	12.0	37.7	8.1	1.6	14.3	<0.005	<0.02	<0.01	0.08	0.031	7.7	<0.010
24/06/92	14:00	8.14	186	12.5	0.0	85.4	2.5	13.9	23.8	3.6	1.0	6.2	0.017	0.06	0.02	2.29	0.345		0.024
25/09/92	13:55	6.40	147	16.0	0.0	62.8	3.2	8.6	16.2	3.3	0.5	5.5	<0.005	0.21	0.02	1.04	0.333	8.3	<0.010
16/12/92	13:30	7.60	136	25.0	0.0	60.4	3.9	3.8	13.6	2.6	0.3	5.1	<0.005	0.26	0.01	0.26	0.061	7.5	<0.010
M# DE DATOS		23	23	19	23	23	23	23	23	23	23	23	14	14	23	23	11	7	11
PROMEDIO		7.72	218	19.2	0.0	115.7	6.7	11.2	27.1	6.2	1.2	9.4	0.005	0.51	0.01	0.38	0.196	8.3	0.012
MINIMO		6.40	66	12.5	0.0	40.9	2.1	1.0	11.0	2.4	0.3	3.5	0.000	0.00	0.00	0.02	0.002	7.5	0.000
MAXIMO		8.95	364	26.0	0.0	196.0	13.5	35.1	47.7	14.7	2.4	16.6	0.017	2.35	0.04	2.29	0.569	10.0	0.029
DESV. STD.		0.54	72	4.0	0.0	41.2	3.0	7.1	10.0	2.9	0.5	3.8	0.004	0.73	0.01	0.54	0.174	0.8	0.009

ESTACION : RIO COMBARBALA EN RAMADILLAS
 CODIGO BMA : 04532800-7
 CUENCA : RIO LINARI

LATITUD S : 31 13
 LONGITUD W : 70 57

ALTITUD : 1150 msnm

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/NO3 mg/l 6242	Oxigeno mg/l 6001	P/PO4 mg/l 6220
16/12/82	10:00	6.47	32		0.0	18.9	2.5	4.8	7.0	1.2	0.4	2.3			0.02	0.37			
24/02/83	9:00	7.82	102	18.0	0.0	74.4	3.6	0.5	14.0	6.1	0.8	5.5			0.00	1.36			
11/04/83	18:50	7.45	113	15.0	0.0	70.2	3.6	1.4	15.0	3.0	1.2	6.4			0.03	1.09			
16/06/83	12:45	7.58	95	10.0	0.0	61.0	4.6	1.9	12.0	4.3	0.8	5.5			0.01	0.86			
9/09/83	12:10	7.47	195	10.0	0.0	98.9	2.5	13.4	20.0	7.3	0.8	9.2							
13/03/85	14:55	7.59	114	16.0	0.0	60.4	5.7	0.5	15.0	1.8	1.6	3.7			0.00	1.05			
7/06/85	12:10	7.63	127	10.0	0.0	75.7	7.4	1.4	17.0	1.8	1.6	4.6			0.00	0.80			
12/09/85	13:40	8.16	140	13.0	0.0	96.4	3.6	4.8	21.6	3.7	2.0	9.2	0.000	1.12	0.00	0.86			
10/12/85	10:20	7.35	170	15.0	0.0	98.2	5.0	2.4	19.6	5.0	2.0	7.4			0.00	0.62			
6/03/86	20:20	8.10	172	17.0	0.0	121.0	5.0	1.9	23.8	4.9	2.0	10.1			0.00	0.70			
4/12/86	11:00	7.95	54	12.0	0.0	28.1	1.4	1.9	5.6	1.1	0.8	3.2			0.00	0.89		10.1	
23/09/87	17:50	7.75	115	13.0	0.0	54.9	6.7	1.4	10.2	3.0	1.2	6.0	0.010	0.02	0.03	1.11	0.116	9.3	0.049
10/12/87	18:30	7.25	50	15.5	0.0	24.4	3.6	1.0	5.2	1.2	0.4	2.8	0.006	0.21	0.01	1.11	0.099	8.5	0.005
14/03/89	18:00	7.05	227	18.5	0.0	128.0	7.1	2.0	24.5	7.2	1.8	12.0	0.005	0.02	0.01	0.52	0.403		0.012
16/06/89	11:12	7.65	156	8.0	0.0	85.4	7.1	1.0	16.0	5.0	1.1	8.3	0.005	0.11	0.03	0.35	0.055		0.005
29/09/89	11:34	7.05	90	8.0	0.0	48.8	3.5	0.4	8.7	2.4	1.1	4.6	0.005	0.09	0.01	0.45	0.136		0.006
19/03/92	11:20	8.20	146	15.0	0.0	79.9	5.7	1.9	17.5	4.4	1.3	8.3	<0.005	<0.02	0.01	0.45	0.051	7.9	<0.010
25/06/92	11:15	7.67	93	6.0	0.0	51.2	2.4	1.0	10.1	2.4	1.5	4.4	0.023	0.02	0.09	11.71	0.170		0.075
27/09/92	12:15	6.60	95	9.0	0.0	39.6	2.8	<0.5	7.4	1.8	0.5	4.1	<0.005	0.18	0.02	1.09	0.145	9.5	<0.010
17/12/92	11:20	7.70	47	9.0	0.0	25.0	2.8	<0.5	5.1	1.1	0.3	2.8	<0.005	0.20	0.01	0.37	0.031	9.2	<0.010
Nº DE DATOS		20	20	19	20	20	20	20	20	20	20	20	10	10	19	19	9	6	9
PROMEDIO		7.52	117	12.5	0.0	67.0	4.3	2.2	13.8	3.4	1.1	6.0	0.005	0.20	0.01	1.36	0.134	9.1	0.017
MINIMO		6.47	32	6.0	0.0	18.9	1.4	0.0	5.1	1.1	0.3	2.3	0.000	0.00	0.00	0.35	0.031	7.9	0.000
MAXIMO		8.20	227	18.5	0.0	128.0	7.4	13.4	24.5	7.3	2.0	12.0	0.023	1.12	0.09	11.71	0.403	10.1	0.075
DESV. STD.		0.45	50	3.7	0.0	30.9	1.8	2.8	6.1	1.9	0.5	2.7	0.006	0.31	0.02	2.46	0.105	0.7	0.025

ESTACION : RIO COMBARBALA EN CAMINO PUNITAQUI
 CODIGO BMA : 04532804-K
 CUENCA : RIO LINARI

LATITUD S : 31 09
 LONGITUD W : 71 02

ALTITUD : 825 msnm

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/NO3 mg/l 6242	Oxigeno mg/l 6001	P/PO4 mg/l 6220
28/06/85	15:00	8.34	560	19.0	0.0	217.0	51.4	64.8	46.1	23.1	5.1	40.0			0.00	0.08			
24/09/85	14:00	8.02	758	18.0	0.0	278.0	65.2	98.0	65.1	28.7	5.1	64.8	0.004	2.56	0.00	0.29			
21/03/86	13:10	7.65	854	18.0	0.0	381.0	68.1	93.2	67.3	45.1	6.7	70.8			0.03	0.11			
18/07/86	16:35	8.23	969	15.5	0.0	273.0	139.0	124.0	93.0	22.9	5.1	97.5			0.00	0.04			
30/06/87	11:55	7.65	770	0.0	0.0	241.0	63.8	120.0	60.1	34.3	5.9	58.9	0.005	0.39	0.03	0.87	1.040	8.2	0.296
10/07/89	11:40	8.38	862	16.0	0.0	299.0	64.9	105.0	65.8	36.5	4.3	63.5	0.005	0.05	0.03	0.04	0.350		0.035
Nº DE DATOS		6	6	5	6	6	6	6	6	6	6	6			6	6			
PROMEDIO		8.05	796	17.3	0.0	281.5	75.4	100.8	66.2	31.8	5.3	65.9			0.02	0.24			
MINIMO		7.65	560	15.5	0.0	217.0	51.4	64.8	46.1	22.9	4.3	40.0			0.00	0.04			
MAXIMO		8.38	969	19.0	0.0	381.0	139.0	124.0	93.0	45.1	6.7	97.5			0.03	0.87			
DESV. STD.		0.30	126	1.3	0.0	51.8	28.9	19.5	13.9	7.8	0.7	17.1			0.01	0.29			

ESTACION : RIO GUATULAME EN EL TONEL
 CODIGO BNA : 04537800-4
 CUENCA : RIO LIMARI

LATITUD S : 30 48
 LONGITUD W : 70 58

ALTITUD : 410 metros

FECHA	HORA	pH u. pH 6020	Conduct amhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6361	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8602	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/NO3 mg/l 6242	Oxígeno mg/l 6001	P/PO4 mg/l 6220
18/11/81	10:30	7.64	393		0.0	182.0	13.8	42.3	46.1	14.1	2.0	21.1	0.000	1.67	0.05	0.04			
29/01/82	9:10	7.99	405		0.0	191.0	13.5	47.1	45.1	14.7	2.0	22.3	0.000	1.50	0.04	0.05			
15/12/82	11:50	6.96	147		0.0	82.4	5.3	12.0	20.8	4.9	0.8	8.1			0.03	0.32			
25/02/83	16:00	8.28	336	21.5	0.0	161.0	7.1	32.2	32.3	13.5	1.6	18.4			0.01	2.64			
12/04/83	18:00	7.93	306	21.0	0.0	159.0	9.2	29.8	34.1	11.5	1.6	18.4			0.00	0.19			
15/06/83	15:30	8.46	319	20.3	0.0	153.0	9.9	28.8	36.1	9.7	1.6	17.5			0.00	0.05			
6/09/83	18:19	8.19	267	17.0	0.0	124.0	9.6	30.3	30.1	9.7	1.2	14.7							
14/03/85	12:00	8.05	347	23.0	0.0	145.0	12.8	35.5	40.1	9.1	2.0	12.9			0.00	0.04			
6/06/85	14:20	8.24	310	18.0	0.0	127.0	18.4	42.3	36.1	9.7	2.0	17.0			0.10	0.20			
4/09/85	13:50	8.12	309	21.0	0.0	145.0	14.5	40.5	37.5	9.6	2.4	21.8	0.000	1.12	0.00	0.09			
9/12/85	15:30	8.27	411	28.0	0.0	152.0	18.1	50.9	43.7	12.6	2.4	19.3			0.00	0.10			
6/03/86	12:25	7.47	424	23.0	0.0	209.0	16.7	42.3	53.5	13.2	2.4	21.1			0.00	0.10			
9/06/86	17:00	7.99	370	15.5	0.0	178.0	13.1	38.4	45.5	11.4	2.0	18.9			0.01	0.08			
3/12/86	15:10	8.20	420	27.5	0.0	179.0	10.3	57.2	47.1	13.2	2.4	20.7			0.00	0.03		12.1	
6/03/87	13:35	7.54	475	24.5	0.0	212.0	17.0	52.8	56.5	14.2	2.0	22.5	0.005	0.17	0.01	0.03	0.218		0.005
19/06/87	17:00	7.60	410		0.0	183.0	12.4	44.7	45.9	14.2	1.2	19.3	0.005	0.59	0.00	0.09	0.216	11.0	0.005
7/09/87	17:30	8.25	295	14.0	0.0	134.0	12.1	22.1	32.7	9.0	1.6	14.7	0.008	0.02	0.03	0.43	1.060	9.5	0.066
3/12/87	19:00	7.65	128	21.5	0.0	61.0	5.3	9.1	14.0	3.4	0.8	6.0	0.011	0.28	0.02	0.99	1.122	8.3	0.034
23/03/88	13:30	8.45	286	24.0	0.0	123.0	8.9	27.9	30.0	8.6	1.4	13.8	0.005	0.12	0.01	0.06	0.248		0.005
14/03/89	12:20	6.95	446	21.0	0.0	171.0	16.3	60.0	45.0	14.0	2.0	22.1	0.005	0.02	0.01	0.12	0.435		0.005
15/06/89	11:05	7.45	290	15.0	0.0	146.0	9.2	27.9	36.3	9.9	1.5	15.2	0.005	0.15	0.03	0.03	0.078		0.005
28/09/89	11:43	7.25	330	18.0	0.0	116.0	11.3	53.8	30.5	12.6	1.6	19.3	0.005	0.12	0.01	0.06			
18/03/92	14:00	8.30	505	22.5	0.0	180.6	16.3	72.0	54.6	14.7	1.9	24.8	<0.005	0.08	<0.01	0.10	0.668	4.4	<0.010
9/06/92	14:20	8.25	345	12.0	0.0	118.1	10.6	48.0	33.5	8.4	2.5	15.4	0.006	<0.02	0.06	2.24	1.263		0.138
25/09/92	10:50	7.40	260	16.0	0.0	117.7	6.3	26.8	28.9	7.2	0.5	11.3	<0.005	0.30	0.02	0.16	0.170	10.0	<0.010
16/12/92	19:10	8.40	237	20.5	0.0	106.7	6.0	21.1	26.2	6.3	0.5	10.2	<0.005	0.32	0.02	0.08	0.629	9.1	0.020
Nº DE DATOS		26	26	22	26	26	26	26	26	26	26	26	15	15	25	25	11	7	11
PROMEDIO		7.90	337	20.2	0.0	148.3	11.7	38.3	37.8	10.7	1.7	17.2	0.004	0.43	0.02	0.33	0.464	9.2	0.026
MINIMO		6.95	128	12.0	0.0	61.0	5.3	9.1	14.0	3.4	0.5	6.0	0.000	0.00	0.00	0.03	0.078	4.4	0.000
MAXIMO		8.46	505	28.0	0.0	212.0	18.4	72.0	56.5	14.7	2.5	24.8	0.011	1.67	0.10	2.64	1.263	12.1	0.138
DESV. STD.		0.44	88	4.1	0.0	36.2	3.9	14.6	10.1	3.1	0.6	4.6	0.002	0.52	0.02	0.65	0.380	2.3	0.048

ESTACION : ESTERO PUNITAQUI ANTES JUNTA RIO LIMARI
 CODIGO BNA : 04557800-3
 CUENCA : RIO LIMARI

LATITUD S : 30 42
 LONGITUD W : 71 31

ALTITUD : 50 msnm

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6000	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/WO3 mg/l 6242	Oxigeno mg/l 6001	P/PO4 mg/l 6220
19/11/81	16:45	7.79	2116		0.0	324.0	448.0	228.0	108.0	75.7	8.2	241.0	0.000	1.00	0.06	0.13			
19/01/82	16:50	7.89	2195		0.0	272.0	473.0	236.0	94.2	79.4	9.0	264.0	0.000	2.00	0.05	0.26			
20/12/82	17:35	7.62	1940	24.5	0.0	332.0	376.0	192.0	97.8	68.4	9.4	224.0			0.00	0.19			
22/02/83	10:55	8.22	1757	21.0	0.0	173.0	378.0	163.0	48.3	66.0	7.4	214.0			0.05	0.30			
13/04/83	15:35	7.86	1701	24.0	0.0	201.0	348.0	152.0	47.1	63.8	6.7	202.0			0.06	0.10			
30/06/83	10:05	8.16	1417	13.0	0.0	192.0	275.0	134.0	30.1	58.3	5.9	175.0			0.00	0.42			
7/09/83	14:24	8.36	1282	17.5	0.0	179.0	238.0	166.0	35.1	52.9	5.1	157.0			0.00	0.45			
21/03/85	13:40	7.94	250	24.0	0.0	78.7	9.2	41.3	39.1	1.8	1.2	4.1			0.00	0.16			
28/06/85	11:40	8.45	1014	15.5	0.0	284.0	142.0	99.4	64.1	36.5	6.7	94.7			0.00	0.03			
6/09/85	15:10	8.31	1128	16.5	0.0	193.0	179.0	140.0	34.7	41.3	6.7	139.0	0.001	0.80	0.00	0.22			
6/12/85	15:00	8.38	1278	27.5	0.0	209.0	199.0	129.0	45.7	37.8	8.2	146.0			0.03	0.07			
17/03/86	16:20	7.85	1288	26.0	0.0	304.0	235.0	147.0	65.3	49.2	8.6	156.0			0.01	0.06			
16/06/86	17:50	8.61	1230	14.0	0.0	317.0	212.0	150.0	68.3	49.8	7.8	149.0			0.02	0.08			
1/12/86	17:20	8.95	1500	27.5	0.0	293.0	258.0	148.0	71.1	49.1	8.2	182.0			0.00	0.16			10.8
Nº DE DATOS		14	14	12	14	14	14	14	14	14	14	14			14	14			
PROMEDIO		8.17	1435	20.9	0.0	239.4	269.3	151.8	60.6	52.1	7.1	167.7			0.02	0.19			
MINIMO		7.62	250	13.0	0.0	78.7	9.2	41.3	30.1	1.8	1.2	4.1			0.00	0.03			
MAXIMO		8.95	2195	27.5	0.0	332.0	473.0	236.0	108.0	79.4	9.4	264.0			0.06	0.45			
DESV. STD.		0.35	483	5.1	0.0	72.0	121.1	46.9	24.2	19.0	2.0	62.9			0.02	0.13			

ESTACION : RIO LIMARI EN PANAMERICANA
 CODIGO BNA : 04558800-9
 CUENCA : RIO LIMARI

LATITUD S : 30 40
 LONGITUD W : 71 33

ALTITUD : 45 msnm

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8640	As mg/l 8043	Soro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/NO3 mg/l 6242	Oxigeno mg/l 6001	P/PO4 mg/l 6220
19/11/81	16:50	7.69	2111		0.0	350.0	452.0	238.0	124.0	70.9	7.4	241.0	0.004	2.00	0.06	0.07			
19/01/82	17:00	7.76	1990		0.0	240.0	447.0	220.0	130.0	62.2	10.2	232.0	0.003	2.00	0.04	0.15			
20/12/82	17:25	7.49	1077	25.5	0.0	247.0	368.0	112.0	78.4	31.5	3.9	109.0			0.12	0.22			
22/02/83	11:30	8.12	1612	22.0	0.0	136.0	154.0	173.0	56.3	56.2	5.9	189.0			0.02	3.05			
13/04/83	15:50	8.04	964	22.5	0.0	177.0	169.0	93.7	52.1	32.2	3.9	101.0			0.01	0.41			
30/06/83	10:20	8.09	1562	13.0	0.0	262.0	292.0	134.0	58.1	59.6	5.9	178.0			0.00	0.06			
7/09/83	11:38	7.94	1270	15.5	0.0	167.0	231.0	172.0	40.1	49.8	5.1	150.0							
21/03/85	11:10	8.30	580	19.5	0.0	169.0	62.4	48.5	50.1	13.4	3.9	37.2			0.00	0.09			
20/06/85	13:00	8.19	819	12.5	0.0	232.0	112.0	81.7	60.1	25.5	4.7	69.0			0.00	0.04			
6/09/85	15:15	8.06	710	16.0	0.0	187.0	101.0	77.3	65.1	18.0	3.9	66.2	0.000	0.96	0.00	0.06			
6/12/85	15:15	7.79	1443	25.0	0.0	231.0	256.0	126.0	97.6	39.0	6.7	131.0			0.00	0.06			
17/03/86	15:35	7.61	1452	23.0	0.0	260.0	322.0	142.0	115.0	48.0	7.4	148.0			0.02	0.21			
16/06/86	16:20	8.42	1282	19.0	0.0	308.0	234.0	158.0	84.2	45.0	7.8	149.0			0.06	0.13			
12/12/86	16:00	8.45	1800	25.5	0.0	256.0	375.0	195.0	130.0	54.0	7.8	182.0			0.00	0.05		9.3	
23/03/87	16:30	7.87	1794	21.0	0.0	265.0	361.0	146.0	127.0	47.2	6.3	159.0	0.010	0.30	0.01	0.08	0.119	10.9	0.007
17/06/87	16:45	7.90	1645		0.0	256.0	312.0	165.0	98.6	53.4	0.8	166.0	0.012	0.63	0.00	0.01	0.002	12.4	0.014
25/09/87	12:00	8.25	1010	17.0	0.0	275.0	136.0	85.5	65.1	33.1	5.5	94.3	0.005	0.02	0.02	0.10	0.946	9.1	0.104
18/12/87	14:00	8.55	638	23.5	0.0	171.0	91.5	50.0	42.9	19.0	3.5	59.8	0.008	0.41	0.06	5.00	0.078	8.2	0.040
18/03/88	9:30	7.55	558	20.0	0.0	161.0	65.6	50.0	48.1	14.6	2.3	42.8	0.006	0.02	0.01	0.06	0.034		0.005
23/03/89	15:30	7.05	1407	22.5	0.0	195.0	278.0	143.0	98.0	41.5	5.7	131.0	0.005	0.06	0.01	0.14	0.169		0.008
22/06/89	12:35	7.35	1490	14.0	0.0	189.0	280.0	152.0	87.5	47.5	5.7	136.0	0.005	0.24	0.03	0.07	0.002		0.005
21/09/89	16:50	7.85	1550	21.0	0.0	116.0	324.0	183.0	80.7	48.8	6.0	159.0	0.005	0.42	0.01	0.24	0.027		0.006
13/03/92	13:25	8.17	2240	20.0	0.0	167.8	471.1	220.0	138.6	59.8	7.2	222.6	<0.005	<0.02	0.02	0.10	0.031	9.6	<0.010
21/03/92	10:30	8.35	2076	20.5	0.0	168.4	470.4	215.0	128.0	59.2	6.7	220.8	<0.005				0.009		
10/06/92	13:00	8.40	1480	14.0	0.0	254.5	213.4	175.3	90.7	46.9	8.0	131.5	0.005	0.10	0.03	0.80	0.967		0.174
4/09/92	10:45	6.80	830	14.5	0.0	210.0	101.0	94.1	61.2	25.4	1.8	71.7	<0.005	0.34	0.03	1.08	0.768	8.9	0.056
18/12/92	11:55	8.20	580	21.0	0.0	156.2	69.8	55.2	49.6	15.2	1.1	46.9	<0.005	0.39	0.02	0.11	0.212	8.2	0.016
Nº DE DATOS		27	27	24	27	27	27	27	27	27	27	27	16	15	25	25	13	8	12
PROMEDIO		7.93	1332	19.5	0.0	215.1	250.0	137.2	83.6	41.4	5.4	134.2	0.004	0.53	0.02	0.50	0.259	9.6	0.036
MINIMO		6.80	558	12.5	0.0	116.0	62.4	48.5	40.1	13.4	0.8	37.2	0.000	0.00	0.00	0.01	0.002	8.2	0.000
MAXIMO		8.55	2240	25.5	0.0	350.0	471.1	238.0	138.6	70.9	10.2	241.0	0.012	2.00	0.12	5.00	0.967	12.4	0.174
DESV. STD.		0.42	496	4.0	0.0	54.7	129.4	56.0	30.9	16.2	2.2	58.8	0.003	0.61	0.02	1.10	0.356	1.3	0.062

ESTACION : RIO CHOAPA EN CUJUNEN
 CODIGO BNA : 04703800-6
 CUENCA : RIO CHOAPA

LATITUD S : 31 58
 LONGITUD W : 70 36

ALTITUD : 960 msnm

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HC03 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/NO3 mg/l 6242	Oxigeno mg/l 6001	P/PO4 mg/l 6220	
5/06/80	11:15	7.38	192		0.0	75.7	8.9	33.1	22.2	7.7	0.8	6.4								
3/07/80	14:30	7.06	235		0.0	69.6	15.6	30.3	21.2	8.5	0.4	11.5				0.08				
5/08/80	9:00	7.45	251		0.0	78.7	6.7	25.9	25.5	4.9	0.4	9.7								
26/02/81	11:06	7.37	209		0.0	42.7	8.5	48.0	26.7	7.1	0.8	7.4				0.01	0.19			
8/01/82	12:20	7.92	256		0.0	82.4	10.3	45.6	31.1	5.6	0.8	14.5		1.00		0.00	0.30			
2/03/82		7.89	252		0.0	77.5	12.1	64.8	32.1	7.3	0.8	12.6		0.00		0.00	0.12			
8/04/82		8.02	254		0.0	81.2	13.8	64.8	33.1	6.7	0.8	12.0				0.00	0.04			
3/02/86	15:20	7.59	278		0.0	78.7	12.8	51.4	35.3	4.7	2.0	14.7	0.006	0.66		0.05	0.28			
15/05/86	16:20	7.78	274		0.0	69.6	12.4	57.6	37.5	2.4	1.6	13.8				0.04	0.22			
9/09/86	16:55	7.75	230	13.0	0.0	72.6	8.5	37.5	26.7	2.6	2.7	11.0				0.06	1.00			9.4
16/12/86	19:35	7.65	158	9.0	0.0	45.2	3.2	29.3	17.2	2.8	0.8	6.4								8.9
3/03/87	18:43	8.10	280	17.0	0.0	72.6	12.1	45.6	32.7	4.5	0.8	11.0	0.017	0.12		0.01	0.31	0.154		9.4
5/06/87	16:20	7.65	256	8.0	0.0	75.1	9.2	46.1	32.7	3.2	0.8	12.0				0.02	0.16	0.662		11.2
1/09/87	18:00	8.00	200	8.0	0.0	85.4	8.5	24.0	26.7	3.8	1.2	8.3	0.008	0.02		0.01	0.16	0.306		10.6
2/12/87	16:25	7.50	140	7.0	0.0	73.2	5.3	12.5	24.2	2.2	1.2	3.7	0.042	0.78		0.06	7.03			14.4
2/03/88	16:35	7.10	198	15.0	0.0	59.8	6.7	29.0	21.8	3.3	0.5	7.4	0.010	0.03		0.01	0.16	0.026		0.005
6/06/88		7.30	226	7.0	0.0	72.0	9.6	32.0	28.5	4.2	0.7	9.2	0.006	0.48		0.01	0.04	0.046		0.008
31/08/88	17:25	7.75	245	10.0	0.0	73.2	11.3	45.1	30.6	4.3	0.6	11.0	0.023	0.24		0.04	0.11	0.172		0.014
1/12/88	17:00	7.85	245	17.0	0.0	67.1	9.2	39.0	26.5	3.8	0.9	9.7	0.016	0.31		0.01	0.24	0.148		0.008
3/04/89	16:00	6.55	256	14.0	0.0	73.2	10.6	53.0	33.3	4.3	0.8	12.0	0.005	0.54		0.01	0.25	0.008		0.005
1/06/89	14:55	8.25	319	8.0	0.0	79.3	11.3	52.0	33.1	4.9	1.0	12.9	0.012	0.69		0.01	0.13	0.020		0.010
1/09/89	14:50	8.00	226	9.0	0.0	73.2	7.4	35.0	26.9	4.2	0.7	10.1	0.012	0.58		0.01	0.50	0.173		0.010
1/12/89	6:20	7.30	145	11.0	0.0	48.8	3.5	24.0	17.4	3.0	0.5	5.5	0.007	0.50		0.01	1.35	0.020		0.005
3/01/92	16:45	8.25	173	14.0	0.0	47.0	4.6	23.1	18.3	3.1	0.2	5.7	<0.005	0.02		0.02	0.72	0.677		<0.010
3/03/92	15:50	7.85	283	11.0	0.0	80.5	6.4	46.5	32.5	4.3	0.5	9.7	0.085	0.24		0.05	0.12	0.562		12.3
1/06/92	12:55	8.05	255	10.5	0.0	67.7	6.0	42.3	27.0	4.2	0.4	10.1	0.011	0.12		0.02	0.26	0.351		10.6
1/09/92	14:30	7.50	200	9.0	0.0	72.0	6.4	32.7	26.5	3.8	0.5	9.2	<0.005	0.16		0.02	0.53	0.625		9.8
2/12/92	15:35	6.10	130	12.0	0.0	48.8	6.0	14.4	15.1	2.5	0.6	4.6	<0.005	0.23		0.03	0.52	0.303		0.036
5/01/93	14:35	7.55	170	15.0	0.0	60.0	6.4	22.6	19.8	3.3	0.7	6.4	0.009	0.22		0.03	0.31	0.013		0.052
1/03/93	16:11	7.65	245	15.0	0.0	72.0	11.0	41.7	27.5	4.0	1.3	12.0	0.020	0.35		0.04	0.94	0.472		0.036
# DE DATOS		30	30	21	30	30	30	30	30	30	30	30	19	21	27	26	18	10	19	
PROMEDIO		7.61	226	11.4	0.0	69.2	8.8	38.3	27.0	4.4	0.8	9.7	0.015	0.34	0.02	0.62	0.263	10.8	0.029	
MINIMO		6.10	130	7.0	0.0	42.7	3.2	12.5	15.1	2.2	0.2	3.7	0.000	0.00	0.00	0.04	0.008	8.9	0.000	
MAXIMO		8.25	319	17.0	0.0	85.4	15.6	64.8	37.5	8.5	2.7	14.7	0.085	1.00	0.08	7.03	0.677	14.4	0.331	
DESV. STD.		0.46	46	3.2	0.0	11.6	3.0	13.4	5.8	1.6	0.5	2.9	0.018	0.26	0.02	1.32	0.235	1.5	0.071	

ESTACION : RIO CUNCIUMEN ANTES BOCATONA DE CANALES
 CODIGO BMA : 04704801-K
 CUENCA : RIO CHOAPA

LATITUD S : 31 50
 LONGITUD W : 70 36

ALTITUD : 1360 msnm

FECIA	NORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/NO3 mg/l 6242	Oxigeno mg/l 6001	P/PO4 mg/l 6220
5/02/86	15:10	7.44	485		0.0	48.2	16.3	165.0	67.3	7.8	4.7	16.1	0.006	0.32	0.51	1.91			
19/05/86	12:35	7.54	506		0.0	44.5	19.5	183.0	77.2	6.0	3.5	15.6			0.52	1.93			
9/09/86	15:10	7.75	465	11.0	0.0	42.7	15.6	140.0	61.7	2.6	2.0	12.4			0.51	1.79		7.1	
16/12/86	18:24	7.45	267	15.0	0.0	30.5	6.7	90.8	37.1	2.9	2.0	7.8			0.39	2.08		9.1	
15/12/88	18:00	7.60	472	17.0	0.0	42.7	14.5	165.0	68.7	4.9	2.0	12.9	0.008	0.40	0.87	1.78	0.052		0.017
15/01/92	13:35	7.40	295	12.0	0.0	29.8	8.1	87.4	38.7	2.8	0.5	7.8	<0.005	0.05	0.30	0.33	0.375	11.5	<0.010
18/03/92	12:25	8.25	291	12.0	0.0	42.0	7.4	87.4	39.6	3.1	0.5	8.7	<0.005	0.20	0.12	0.10	0.175	11.2	<0.010
15/09/92	13:30	7.30	275	8.0	0.0	51.9	8.5	71.1	39.4	3.0	0.5	8.3	0.007	<0.02	0.64	0.96	0.625	12.2	<0.010
20/01/93	13:50	7.80	277	13.0	0.0	97.6	11.3	40.8	33.2	5.2	1.6	12.0	0.009	0.14	0.03	0.21	0.519		0.042
19/03/93	15:55	7.30	331	15.0	0.0	45.7	12.0	104.7	46.3	3.2	2.2	9.7	0.005	0.22	0.31	0.34	1.462		0.029
Nº DE DATOS		10	10	8	10	10	10	10	10	10	10	10	7	7	10	10	6	5	6
PROMEDIO		7.58	366	12.9	0.0	47.6	12.0	113.5	50.9	4.1	1.9	11.1	0.005	0.19	0.42	1.14	0.535	10.2	0.015
MINIMO		7.30	267	8.0	0.0	29.8	6.7	40.8	33.2	2.6	0.5	7.8	0.000	0.00	0.03	0.10	0.052	7.1	0.000
MAXIMO		8.25	506	17.0	0.0	97.6	19.5	183.0	77.2	7.8	4.7	16.1	0.009	0.40	0.87	2.08	1.462	12.2	0.042
DESV. STD.		0.27	96	2.6	0.0	17.9	4.1	44.6	15.3	1.7	1.3	3.0	0.002	0.11	0.23	0.79	0.458	1.9	0.013

ESTACION : RIO CHOAPA EN SALAMANCA
 CODIGO SNA : 04711800-K
 CUENCA : RIO CHOAPA

LATITUD S : 31 47
 LONGITUD W : 70 58

ALTITUD : 500 msnm

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/NO3 mg/l 6242	Oxigeno mg/l 6001	P/PO4 mg/l 6220
29/05/80	17:15	7.42	269		0.0	109.0	12.4	47.1	34.9	8.5	0.8	9.7							
25/06/80	16:15	7.89	276		0.0	109.0	12.4	50.9	34.9	10.6	0.8	9.4							
21/08/80	12:00	7.72	292		0.0	103.0	10.3	46.6	33.9	7.3	0.4	13.6							
14/01/81	9:40	7.45	234		0.0	61.0	11.7	43.2	30.7	8.3	1.2	9.7			0.03	0.12			
13/01/82	11:06	8.12	388		0.0	164.0	15.6	47.1	47.1	12.5	1.2	19.1		1.00	0.02	0.00			
18/03/82		7.66	340		0.0	143.0	15.6	64.8	44.1	7.3	1.6	16.1			0.00	0.10			
5/02/86	11:30	7.73	383		0.0	145.0	16.3	52.4	45.9	9.4	5.1	19.3	0.000	0.00	0.05	0.09			
29/05/86	16:10	7.83	472		0.0	209.0	21.3	47.1	61.3	12.0	2.7	20.7			0.05	1.21			
9/09/86	12:45	8.65	326	17.0	0.0	106.0	12.1	52.8	39.1	5.6	1.6	13.8			0.02	0.26			7.4
16/12/86	15:25	7.90	200	20.0	0.0	63.5	5.7	36.0	24.4	3.3	1.2	9.2							9.0
2/03/87	16:40	8.25	330	24.0	0.0	312.0	14.5	47.1	34.1	6.8	2.0	16.8	0.021	0.11	0.01	0.29	0.248	8.0	0.005
4/06/87	11:40	6.95	312	12.0	0.0	113.0	12.8	49.0	42.9	5.0	1.6	13.8			0.11	1.56	0.712	10.4	0.046
26/09/87	19:00	7.10	226	15.0	0.0	97.6	8.5	25.9	28.9	4.6	1.2	10.3	0.009	0.02	0.03	0.94	0.552	9.4	0.015
1/12/87	16:55	6.95	176	17.0	0.0	85.4	5.3	14.9	27.1	2.9	1.6	5.5	0.101	0.72	0.13	9.44		11.2	0.025
17/03/88	17:00	7.25	227	21.0	0.0	89.7	12.1	36.0	31.5	4.6	1.1	10.1	0.005	0.02	0.02	0.16	0.417		0.005
7/06/88	13:46	6.95	296	9.0	0.0	102.0	12.8	38.5	39.3	5.8	1.1	12.0	0.005	0.41	0.03	0.07	0.312		0.005
5/09/88	13:53	8.05	315	18.0	0.0	116.0	12.8	52.0	41.9	6.5	1.3	13.8	0.020	0.05	0.04	0.18	0.613		0.005
14/12/88	14:30	8.30	367	20.0	0.0	140.0	12.8	44.0	41.7	7.4	3.5	15.6	0.005	0.23	0.01	0.16	0.090		0.015
20/03/89	15:45	8.45	360	22.0	0.0	140.0	14.2	52.0	46.0	8.1	2.1	15.6	0.011	1.10	0.01	0.10	0.242		0.006
6/06/89	11:46	7.35	396	12.0	0.0	159.0	13.1	54.0	53.0	9.0	2.5	16.1	0.005	0.43	0.01	0.09	0.273		0.050
12/09/89	16:44	8.45	305	15.0	0.0	104.0	13.1	52.0	38.6	6.7	1.4	13.8	0.005	0.54	0.01	0.23	0.254		0.015
18/12/89	17:25	9.00	278	18.0	0.0	73.2	11.3	44.2	27.0	5.8	1.0	12.0	0.007	0.49	0.01	0.13	0.080		0.005
17/01/92	13:45	7.95	261	22.0	0.0	90.3	8.5	35.1	32.3	5.2	0.5	10.5	<0.005	0.15	0.02	0.39	0.617		<0.010
20/03/92	12:30	8.05	370	17.0	0.0	134.2	12.4	59.0	44.1	7.7	0.7	16.1	<0.005	0.17	0.02	0.08	0.260		<0.010
15/06/92	13:10	7.65	320	11.0	0.0	111.0	11.0	50.0	39.2	6.6	0.6	13.3	<0.005	0.04	0.03	0.31	0.707	10.6	0.028
14/09/92	13:05	7.80	224	14.0	0.0	96.4	8.2	40.3	34.6	5.2	0.5	11.0	<0.005	0.09	0.03	0.43	0.284	10.1	<0.010
9/12/92	13:50	8.15	200	17.0	0.0	76.3	9.9	21.1	23.8	3.9	1.1	8.1	0.010	0.44	0.04	0.43	0.200		0.036
20/01/93	17:20	8.05	250	18.0	0.0	41.5	8.8	60.0	34.3	2.5	1.7	7.8	0.008	0.30	0.22	0.28	0.556		0.042
15/03/93	13:40	8.15	320	20.0	0.0	94.0	13.8	48.0	31.6	6.3	1.9	14.7	0.009	0.37	0.03	0.14	0.351		0.029
Nº DE DATOS		29	29	21	29	29	29	29	29	29	29	29	19	20	25	25	18	9	19
PROMEDIO		7.84	300	17.1	0.0	116.8	12.0	45.2	37.5	6.7	1.5	13.0	0.012	0.33	0.04	0.69	0.376	9.7	0.017
MINIMO		6.95	176	9.0	0.0	41.5	5.3	14.9	23.8	2.5	0.4	5.5	0.000	0.00	0.00	0.00	0.000	7.4	0.000
MAXIMO		9.00	472	24.0	0.0	312.0	21.3	64.8	61.3	12.5	5.1	20.7	0.101	1.10	0.22	9.44	0.712	11.2	0.050
DESV. STD.		0.51	68	3.9	0.0	50.3	3.2	10.9	8.4	2.4	1.0	3.6	0.021	0.30	0.05	1.82	0.196	1.3	0.015

ESTACION : RIO CHALINGA EN CHALINGA
 CODIGO BNA : 04713801-9
 CUENCA : RIO CHOAPA

LATITUD S : 31 46
 LONGITUD W : 70 59

ALTITUD : 475 msnm

FECHA	HORA	u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/NO3 mg/l 6242	Oxigeno mg/l 6001	P/PO4 mg/l 6220
5/06/84	16:15	8.27	303		0.0	131.0	12.8	46.1	37.3	7.3	1.6	13.6			0.00	0.16			
7/09/84	11:05	8.15	240		0.0	103.0	9.6	26.4	29.5	7.3	1.2	10.6			0.00	0.68			
5/12/84	15:15	7.34	156		0.0	65.3	7.4	19.7	21.0	3.8	1.6	6.9			0.00	0.86			
7/02/85	16:20	7.64	230		0.0	101.0	9.9	29.8	27.5	6.1	2.0	11.3			0.00	0.31			
8/05/85	14:30	7.96	247		0.0	103.0	11.0	31.2	31.9	4.9	1.6	13.8			0.00				
3/12/85	10:30	7.48	393		0.0	157.0	12.8	51.9	41.5	12.0	5.1	20.2			0.04	0.54			
5/02/86	19:05	7.32	383		0.0	151.0	14.5	50.0	39.1	12.4	5.9	21.6	0.006	0.00	0.11	2.49			
27/05/86	15:30	8.21	417		0.0	190.0	16.0	46.6	51.5	13.2	2.0	18.4			0.02	0.02			
5/09/86	18:40	8.10	302	16.0	0.0	128.0	12.1	52.4	39.1	7.5	1.6	16.1			0.02	0.08		9.0	
18/12/86	19:40	7.65	416	16.0	0.0	167.0	8.9	53.8	41.5	12.8	2.0	17.9			0.00	0.27		8.8	
4/03/87	11:25	8.20	445	17.0	0.0	181.0	15.6	44.2	45.5	13.0	1.2	19.3	0.005	0.23	0.01	0.37	0.233	8.7	0.023
8/06/87	13:00	7.60	300	15.0	0.0	107.0	11.0	45.2	34.7	7.4	1.2	15.2			0.01	0.11	0.405	10.8	0.020
28/09/87	12:00	7.60	330	17.0	0.0	165.0	10.3	29.8	38.9	12.3	1.2	13.1	0.009	0.02	0.02	0.46	0.882	9.8	0.055
1/12/87	18:10	7.30	143	19.0	0.0	48.8	5.3	15.4	14.4	2.8	1.2	6.0	0.052	0.64	0.01	3.06		8.5	0.034
17/03/88	19:00	8.05	202	22.0	0.0	101.0	12.3	22.5	27.7	6.4	1.4	11.0	0.008	0.18	0.01	0.19	0.332		0.005
28/06/88	16:40	7.35	274	13.0	0.0	95.8	9.6	28.0	28.2	6.5	1.2	10.8	0.007	0.53	0.02	0.20	0.218		0.046
23/09/88	15:45	8.25	352	18.0	0.0	153.0	11.3	42.0	39.1	10.8	1.4	15.6	0.018	0.02	0.01	0.24	0.029		0.010
14/12/88	13:05	7.75	389	24.0	0.0	165.0	18.1	38.0	39.9	12.1	2.2	21.2	0.008	0.22	0.01	1.17	0.207		0.087
29/03/89	13:00	6.50	360	14.0	0.0	165.0	10.6	38.5	41.7	11.6	1.4	16.1	0.005	0.30	0.01	0.14	0.163		0.005
6/06/89	11:00	8.55	335	10.0	0.0	140.0	13.1	43.0	39.5	11.0	2.5	15.6	0.005	0.47	0.01	0.07	0.076		0.045
6/09/89	10:30	8.25	297	12.0	0.0	119.0	11.3	48.0	35.2	9.2	1.6	14.7	0.005	0.41	0.01	0.22	0.369		0.019
Nº DE DATOS		21	21	13	21	21	21	21	21	21	21	21	11	11	21	20	10	6	11
PROMEDIO		7.79	310	16.4	0.0	130.3	11.6	38.2	35.5	9.1	1.9	14.7	0.012	0.27	0.02	0.58	0.291	9.3	0.032
MINIMO		6.50	143	10.0	0.0	48.8	5.3	15.4	14.4	2.8	1.2	6.0	0.005	0.00	0.00	0.02	0.029	8.5	0.005
MAXIMO		8.55	445	24.0	0.0	190.0	18.1	55.8	51.5	13.2	5.9	21.6	0.052	0.64	0.11	3.06	0.882	10.8	0.087
DES. STD.		0.47	83	3.7	0.0	37.0	2.9	11.3	8.5	5.2	1.2	4.2	0.013	0.19	0.02	0.79	0.227	0.8	0.024

ESTACION : RIO CHOAPA EN PUENTE NEGRO
 CODIGO BNA : 04716800-7
 CUENCA : RIO CHOAPA

LATITUD S : 31 41
 LONGITUD W : 71 16

ALTITUD : 180 msnm

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/MO3 mg/l 6242	Oxigeno mg/l 6001	P/PO4 mg/l 6220
29/05/80	10:15	7.48	349		0.0	151.0	16.0	48.0	42.3	14.5	1.6	14.7							
25/06/80	9:20	7.76	363		0.0	157.0	16.0	49.0	47.7	9.1	1.6	15.2							
27/01/81	9:20	7.36	346		0.0	122.0	15.2	46.1	40.9	11.8	2.0	17.0							
13/03/81	10:05	7.16	303		0.0	104.0	13.5	47.1	36.9	10.6	1.6	14.7			0.00	0.06			
12/01/82	10:30	8.02	617		0.0	258.0	34.7	61.5	57.7	23.1	4.7	46.7		2.00	0.01	0.04			
4/03/82	9:30	7.93	618		0.0	253.0	33.0	90.3	66.1	22.6	3.9	40.2			0.00	0.00			
13/04/82		8.03	594		0.0	240.0	36.5	120.0	58.1	26.9	5.1	39.1			0.00	0.00			
8/10/82	11:15	8.05	283		0.0	115.0	8.9	37.0	34.9	8.5	0.8	12.6			0.11	0.30			
10/11/82	8:35	7.55	195		0.0	89.7	7.4	22.1	23.8	5.5	0.8	9.0			0.25	1.65			
6/06/83	11:45	7.99	343		0.0	146.0	16.3	30.7	40.1	10.9	1.6	17.5							
2/09/83	11:30	7.60	303		0.0	128.0	11.0	25.0	30.1	10.9	0.8	14.7							
4/04/84	10:50	8.19	395		0.0	178.0	15.6	44.2	47.1	10.3	2.4	19.1			0.00	0.07			
5/06/84	9:30	8.30	413		0.0	175.0	17.4	53.3	48.9	12.2	2.4	18.4			0.00	0.19			
5/09/84	12:00	7.75	265		0.0	114.0	11.0	30.3	33.5	7.3	1.2	12.0			0.00	0.31			
4/12/84	11:00	7.50	153		0.0	73.8	5.7	16.8	23.2	3.2	1.6	5.5			0.00	2.44			
7/02/85	10:30	7.69	283		0.0	107.0	7.4	38.9	35.3	5.8	2.0	13.3			0.00	0.15			
6/05/85	11:00	7.84	351		0.0	142.0	16.7	43.2	45.9	6.1	2.7	20.2			0.00				
10/09/85	11:30	8.30	360		0.0	148.0	16.3	57.6	45.1	9.5	1.6	21.1			0.00	0.00			
6/12/85	8:08	8.08	425		0.0	163.0	19.9	58.6	43.5	11.9	4.3	28.5			0.03	0.00			
17/02/86	15:00	8.75	513		0.0	175.0	29.1	84.5	46.9	15.2	7.0	42.8	0.002	0.00	0.05	0.09			
16/05/86	11:30	8.37	549		0.0	228.0	28.4	71.1	61.3	14.3	4.7	36.8			0.00	0.08			
5/09/86	13:00	8.55	420	15.0	0.0	146.0	15.6	59.1	47.3	7.5	2.0	19.8			0.02	0.07			9.6
19/12/86	11:45	8.10	213	18.0	0.0	81.8	5.0	37.5	25.5	5.5	1.2	8.3			0.05	1.46			8.8
9/03/87	13:00	8.20	488	22.0	0.0	174.0	21.6	50.4	45.9	11.7	2.7	24.8	0.010	4.38	0.01	0.65	0.265	10.0	0.016
2/06/87	11:35	9.30	494	9.0	0.0	170.0	16.3	57.6	51.1	11.2	1.6	24.1			0.04	0.33	0.265	12.6	0.023
25/09/87	17:30	7.55	238	15.0	0.0	104.0	10.3	26.9	29.5	5.7	1.6	10.8	0.005	0.02	0.04	2.35	0.645	10.2	0.021
17/12/87	18:30	7.45	163	19.0	0.0	61.0	5.3	17.8	19.0	2.9	0.8	6.0	0.021	0.70	0.03	2.78	8.5	0.021	
4/03/88	12:55	7.35	315	20.0	0.0	101.0	10.3	35.0	32.7	5.6	1.2	11.0	0.008	0.21	0.03	0.58	0.303	0.005	
6/06/88	17:50	7.65	322	10.0	0.0	126.0	16.0	39.0	40.6	8.1	1.5	15.2	0.005	1.41	0.02	0.10	0.213	0.010	
7/09/88	9:20	7.85	402	12.0	0.0	146.0	14.5	55.2	45.2	9.8	1.3	17.5	0.009	0.06	0.01	0.02	0.052	0.012	
13/12/88	10:30	8.25	490	16.0	0.0	183.0	19.9	64.0	48.2	13.7	2.5	29.0	0.010	0.09	0.03	0.07	0.005	0.012	
6/04/89	16:10	8.65	430	23.0	0.0	140.0	24.8	74.0	35.7	14.3	3.5	36.7	0.006	0.53	0.01	0.17	0.009	0.012	
6/06/89	15:15	7.25	487	13.0	0.0	177.0	22.3	72.0	50.0	14.6	2.4	26.2	0.005	0.56	0.01	0.10	0.039	0.010	
8/09/89	15:00	8.55	364	15.0	0.0	131.0	13.1	56.0	42.8	9.3	1.5	17.0	0.005	0.58	0.01	0.18	0.083	0.010	
21/01/92	10:30	7.65	300	18.0	0.0	105.0	10.3	35.1	33.5	6.6	0.5	12.4	<0.005	0.04	0.02	0.11	<0.010	5.4	0.011
16/03/92	12:35	8.10	360	19.0	0.0	114.7	15.2	60.0	28.9	12.0	1.0	23.0	<0.005	0.12	0.02	0.04	0.363	11.0	0.016
1/07/92	14:40	7.35	303	10.0	0.0	122.0	10.6	44.2	41.4	8.1	0.9	14.7	0.005	0.12	0.03	0.22	1.275	10.2	0.011
23/09/92	17:20	8.10	274	16.0	0.0	105.0	10.6	42.3	36.0	6.6	0.5	13.5	<0.005	0.22	0.03	0.35	0.655	10.0	0.011
10/12/92	13:00	8.30	228	17.0	0.0	87.2	8.5	26.9	26.8	4.9	1.2	9.7	<0.005	0.22	0.04	0.22	0.091	0.029	
20/01/93	11:10	8.30	300	13.0	0.0	130.0	12.0	40.8	39.0	7.8	1.8	15.6	<0.005	0.32	0.03	0.10	0.061	0.039	
16/03/93	9:14	7.85	394	15.0	0.0	159.0	15.5	52.3	42.1	10.7	1.9	20.0	<0.005	0.23	0.02	0.17	0.146	0.033	
Nº DE DATOS		41	41	20	41	41	41	41	41	41	41	41	18	19	37	36	17	10	18
PROMEDIO		7.95	366	15.8	0.0	142.2	15.9	49.3	40.7	10.4	2.1	19.9	0.005	0.62	0.03	0.44	0.268	9.6	0.017
MINIMO		7.16	153	9.0	0.0	61.0	5.0	16.8	19.0	2.9	0.5	5.5	0.000	0.00	0.00	0.000	0.000	5.4	0.005
MAXIMO		9.30	618	23.0	0.0	258.0	36.5	120.0	66.1	26.9	7.0	46.7	0.021	4.38	0.26	2.78	1.275	12.6	0.039
DES. STD.		0.45	115	3.8	0.0	45.5	7.7	20.2	10.4	5.0	1.4	10.1	0.004	1.01	0.04	0.71	0.311	1.8	0.009

ESTACION : RIO ILLAPEL EN LAS BURRAS
 CODIGO BNA : 04721800-4
 CUENCA : RIO CHOAPA

LATITUD S : 31 30
 LONGITUD W : 70 49

ALTITUD : 1150 msnm

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 3043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/NO3 mg/l 6242	Oxigeno mg/l 6001	P/PO4 mg/l 6220
30/05/80	16:10	7.18	132		0.0	54.3	5.3	18.7	16.8	3.7	0.8	2.8							
26/06/80	12:30	7.51	148		0.0	69.6	8.2	13.0	21.2	3.7	0.8	3.5							
17/07/80	12:00	7.08	149		0.0	60.4	6.7	16.8	19.0	4.9	0.4	4.1							
12/08/80	12:05	7.95	200		0.0	78.7	1.8	7.7	25.5	2.4	0.4	3.9							
16/01/81	11:30	7.20	84		0.0	12.2	6.7	13.9	14.4	3.5	0.8	2.3			0.01	0.31			
14/01/82	11:40	7.85	166		0.0	77.5	3.2	13.4	23.4	3.8	0.8	7.6	1.00	0.00	0.00	0.05			
11/03/82		7.53	154		0.0	64.7	5.3	26.4	20.0	6.7	0.8	4.6			0.00	0.13			
7/02/86	18:30	7.45	167		0.0	60.4	7.1	24.5	21.8	3.5	2.7	6.4	0.000	0.00	0.03	0.14			
19/05/86	14:10	7.77	171		0.0	69.6	5.3	14.4	23.8	2.4	1.6	6.0			0.01	0.10			
4/09/86	12:40	7.45	178	14.0	0.0	54.9	3.6	28.3	18.4	3.0	1.2	5.5			0.02	0.18		9.9	
17/12/86	15:00	7.65	120	9.0	0.0	37.8	1.4	13.0	12.2	1.5	0.8	3.2			0.00	0.37		9.2	
4/03/87	15:00	7.95	170	17.0	0.0	63.5	5.7	19.2	22.4	2.8	1.2	5.5	0.013	0.08	0.01	0.36	0.166	10.5	0.007
22/06/87	14:10	6.95	138	8.0	0.0	50.0	3.6	20.2	20.4	1.2	0.8	4.8			0.00	0.08	0.230	10.8	0.012
27/09/87	16:25	7.25	122	9.0	0.0	48.8	5.3	7.2	13.8	2.2	1.2	4.1	0.005	0.02	0.01	0.35	0.245	11.3	0.025
11/12/87	15:20	6.45	67	12.0	0.0	24.4	3.6	0.5	6.8	1.0	0.4	1.8	0.010	0.70	0.01	0.70		14.4	0.225
15/03/88	18:00	6.80	111	15.0	0.0	47.6	6.7	12.5	5.4	2.2	0.7	4.1	0.006	0.14	0.01	0.29	0.113		0.005
9/06/88	16:05	6.45	140	7.0	0.0	53.7	5.0	16.0	18.8	2.6	1.0	4.6	0.005	0.42	0.02	0.14	0.160		0.005
6/09/88	14:42	7.30	156	10.0	0.0	54.9	6.4	20.2	18.8	2.6	1.0	6.0	0.010	0.03	0.01	0.20	0.078		0.005
7/12/88	15:10	7.50	173	17.0	0.0	67.1	3.5	24.5	21.9	3.4	1.3	6.4	0.005	0.12	0.02	0.21	0.180		0.015
21/03/89	16:45	7.70	170	16.0	0.0	64.1	3.5	23.0	21.7	3.1	1.3	5.5	0.005	0.42	0.01	0.20	0.087		0.005
22/06/89	14:47	7.25	175	8.0	0.0	73.2	3.9	24.0	23.0	3.7	1.3	6.4	0.005	0.42	0.01	0.12	0.186		0.015
15/09/89	16:15	7.20	229	7.0	0.0	61.0	5.7	21.0	20.2	3.2	1.3	5.5	0.005	0.42	0.01	0.32	0.148		0.010
26/12/89	18:30	6.75	136	18.0	0.0	54.9	3.5	144.0	16.8	2.6	1.0	5.1	0.005	0.39	0.01	0.32	0.151		0.005
20/01/92	17:00	8.15	106	16.0	0.0	44.5	3.2	13.0	14.7	1.9	0.5	3.7	<0.005	0.06	0.04	1.40	1.480	10.7	<0.010
19/03/92	15:10	8.25	161	14.0	0.0	65.9	4.6	15.8	21.7	2.7	0.5	4.6	0.011	<0.02	0.02	0.21	0.369	8.3	<0.010
16/06/92	16:35	7.35	110	8.0	0.0	51.2	2.8	19.0	17.7	2.2	0.5	4.4	<0.005	0.07	0.02	0.14	0.375	10.9	<0.010
24/09/92	16:00	6.40	128	9.0	0.0	46.4	1.8	14.9	15.9	2.0	0.4	3.7	<0.005	0.16	0.02	0.25	0.369	11.4	<0.010
17/12/92	15:50	7.45	90	13.0	0.0	36.6	3.5	8.6	10.3	1.4	0.7	3.5	<0.005	0.24	0.03	0.25	0.025		0.026
19/01/93	15:05	7.55	125	15.0	0.0	43.9	4.6	11.5	13.6	1.8	0.9	4.4	<0.005	0.15	0.03	0.28	0.393		0.046
17/03/93	16:45	7.40	168	15.0	0.0	57.0	7.4	17.7	18.5	2.5	1.5	7.1	<0.005	0.21	0.02	0.21	0.429		0.029
Nº DE DATOS		30	30	21	30	30	30	30	30	30	30	30	19	20	26	26	18	10	19
PROMEDIO		7.36	145	12.2	0.0	55.0	4.6	20.8	18.0	2.8	0.9	4.7	0.004	0.25	0.01	0.28	0.288	10.8	0.012
MINIMO		6.40	67	7.0	0.0	12.2	1.4	0.5	5.4	1.0	0.4	1.8	0.000	0.00	0.00	0.05	0.025	8.3	0.000
MAXIMO		8.25	229	18.0	0.0	78.7	8.2	144.0	25.5	6.7	2.7	7.6	0.013	1.00	0.04	1.40	1.480	14.4	0.046
DESV. STD.		0.46	34	3.7	0.0	14.5	1.7	23.7	4.8	1.1	0.5	1.4	0.003	0.24	0.01	0.26	0.312	1.6	0.011

ESTACION : ESTERO AUCO ANTES DEL RIO ILLAPEL
 CODIGO BNA : 04725800-6
 CUENCA : RIO CHOAPA

LATITUD S : 31 36
 LONGITUD W : 71 09

ALTITUD : 325 msnm

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/NO3 mg/l 6242	Oxigeno mg/l 6001	P/PO4 mg/l 6220
19/04/84	9:50	7.92	1030		0.0	276.0	23.8	296.0	151.0	35.3	2.4	31.0							
7/06/84	10:00	8.03	991		0.0	267.0	22.0	296.0	142.0	31.0	2.4	29.9							
10/09/84	10:30	8.19	902		0.0	188.0	18.8	284.0	122.0	21.6	2.7	28.5							
11/12/84	16:10	7.82	955		0.0	190.0	24.5	346.0	122.0	39.5	3.5	31.0							
13/02/85	16:00	7.81	890		0.0	195.0	20.6	283.0	127.0	27.3	3.9	27.8							
14/05/85	10:15	7.63	867		0.0	223.0	22.0	267.0	130.0	19.4	3.5	34.9							
16/09/85	9:00	8.09	856		0.0	232.0	22.3	241.0	131.0	23.8	2.4	32.6							
9/12/85	10:30	7.79	1120		0.0	248.0	25.5	400.0	146.0	43.8	5.5	44.4					0.17	0.19	
4/02/86	11:00	7.68	1135		0.0	266.0	27.3	384.0	161.0	34.2	5.5	44.1	0.001	0.00			0.08	0.12	
28/05/86	10:20	8.20	1024		0.0	279.0	28.0	350.0	165.0	31.8	3.5	39.1					0.03	0.14	
8/09/86	18:10	7.50	1056	17.0	0.0	197.0	26.2	332.0	129.0	32.5	2.7	41.4					0.04	0.05	8.6
19/12/86	12:50	7.75	1000	24.0	0.0	281.0	22.0	305.0	137.0	36.2	3.1	40.5					0.27	0.39	8.6
22/01/92	15:30	8.05	890	26.0	0.0	70.1	28.3	319.0	78.4	29.6	1.1	44.4	0.037	0.41	0.05	0.06	0.490	9.6	0.360
24/03/92	15:30	8.10	748	17.0	0.0	78.7	24.1	240.2	66.4	26.4	1.0	37.7	<0.005	0.22	0.02	0.07	0.025	7.6	<0.010
1/07/92	16:00	7.15	1115	12.0	0.0	73.2	28.0	407.8	127.6	31.2	1.0	35.0	0.009	<0.02	0.12	16.92	0.655	9.2	<0.010
30/09/92	15:00	7.25	930	17.0	0.0	75.1	23.7	341.0	106.3	29.1	1.0	34.0	<0.005	0.27	0.07	1.30	1.504	9.2	<0.010
23/12/92	11:00	7.55	1071	20.0	0.0	226.3	26.5	341.0	142.0	30.7	2.9	36.8	<0.005	0.29	0.04	0.13	0.109		0.029
13/01/93	11:00	7.60	1093	19.0	0.0	230.0	27.3	345.8	147.0	32.3	3.1	38.0	0.014	0.44	0.11	0.80	0.375		0.049
26/03/93	16:09	7.15	1050	18.0	0.0	239.0	28.0	336.0	142.5	32.0	3.1	38.6	0.005	0.52	0.03	0.09	<0.01		0.020
Nº DE DATOS		19	19	9	19	19	19	19	19	19	19	19	8	8	19	18	7	6	7
PROMEDIO		7.75	985	18.9	0.0	201.8	24.7	321.8	130.2	30.9	2.9	36.3	0.008	0.27	0.06	1.17	0.451	8.8	0.065
MINIMO		7.05	748	12.0	0.0	70.1	18.8	240.2	66.4	19.4	1.0	27.8	0.000	0.00	0.00	0.00	0.000	7.6	0.000
MAXIMO		8.20	1135	26.0	0.0	281.0	28.3	407.8	165.0	43.8	5.5	44.4	0.037	0.52	0.27	16.92	1.504	9.6	0.360
DESV. STD.		0.33	104	3.9	0.0	71.8	2.8	46.5	24.1	5.7	1.3	5.2	0.011	0.12	0.06	3.82	0.456	0.6	0.114

ESTACION : RIO ILLAPEL EN EL PERAL
 CODIGO BNA : 04726800-1
 CUENCA : RIO CHOAPA

LATITUD S : 31 40
 LONGITUD W : 71 16

ALTITUD : 240 msnm

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/MO3 mg/l 6242	Oxigeno mg/l 6001	P/PO4 mg/l 6220
17/02/86	15:15	8.07	805		0.0	284.0	37.9	162.0	90.0	23.7	9.4	49.7	0.000	0.00	0.07	0.28			
16/05/86	12:27	8.13	860		0.0	343.0	44.0	156.0	111.0	27.6	4.7	50.6			0.02	0.12			
2/09/86	16:35	8.85	500	15.0	0.0	170.0	12.1	82.1	53.1	12.5	3.1	28.5			0.03	0.15		8.0	
17/12/86	9:20	7.95	326	12.0	0.0	158.0	6.4	46.6	38.3	10.1	2.4	17.5			0.00	0.32		9.7	
9/03/87	15:20	6.70	670	25.0	0.0	227.0	29.4	104.0	57.5	21.5	3.9	46.9	0.013	4.67	0.01	0.28	0.215	10.2	0.012
20/06/87	13:35	9.10	454	13.0	0.0	182.0	9.2	50.0	50.1	9.4	2.0	22.5			0.02	0.09	0.248	10.2	0.081
26/09/87	11:30	7.70	500	15.0	0.0	146.0	12.1	50.0	44.9	9.9	1.6	14.3	0.005	0.02	0.03	0.69	0.925	8.8	0.023
15/12/87	18:20	7.45	117	18.0	0.0	51.9	3.6	12.2	14.2	2.6	0.8	5.1	0.012	0.60	0.03	2.15		9.8	0.017
7/03/88	11:30	7.45	291	16.0	0.0	131.0	12.1	34.0	35.6	8.0	1.5	12.9	0.007	0.20	0.01	0.29	0.283		0.019
7/06/88	16:55	7.30	393	11.0	0.0	159.0	16.0	56.0	49.3	11.0	1.9	17.7	0.005	1.23	0.03	0.20	0.280		0.059
9/09/88	11:00	8.70	596	11.0	0.0	226.0	22.3	100.0	70.9	17.5	2.5	29.4	0.011	0.10	0.01	0.07	0.417		0.059
12/12/88	18:00	8.40	760	18.0	0.0	238.0	37.9	120.0	61.2	24.5	4.0	54.3	0.012	0.20	0.04	0.08	0.034		0.010
10/01/89	17:15	8.20	874	25.0	0.0	268.0	39.0	120.0	65.7	26.2	4.9	57.5	0.007	0.66	0.03	0.26	0.341		0.025
20/03/89	11:00	8.30	720	16.0	6.0	201.0	44.3	148.0	56.2	28.5	4.4	58.0	0.010	0.40	0.01	0.06	0.169		0.005
6/06/89	16:53	8.25	87	13.0	0.0	278.0	41.1	175.0	94.0	29.1	4.3	52.4	0.005	0.50	0.01	0.21	0.447		0.024
8/09/89	12:22	8.05	594	13.0	0.0	204.0	16.7	80.0	58.9	15.4	2.4	26.2	0.005	0.42	0.03	0.15	0.192		0.025
22/01/92	10:15	8.18	370	16.0	0.0	152.6	8.2	30.0	39.4	9.3	0.8	17.0	<0.005	0.04	0.02	0.24	0.411	10.0	0.200
16/03/92	16:50	9.15	520	22.0	0.0	223.9	15.5	74.9	55.8	16.9	1.3	32.4	<0.005	0.12	0.03	0.15	0.695	9.0	0.202
26/06/92	15:15	7.60	362	10.0	0.0	143.0	11.0	60.5	48.9	10.9	0.9	17.0	0.007	0.09	0.12	3.34	0.025	8.0	0.168
23/09/92	12:30	7.30	397	13.0	0.0	129.4	8.2	66.3	47.8	9.7	0.5	14.7	<0.005	<0.02	0.04	0.39	0.940	10.5	0.045
16/12/92	16:20	7.80	226	22.0	0.0	100.0	9.2	25.9	28.2	5.9	1.6	10.8	<0.005	0.18	0.05	0.42	0.049		0.068
22/01/93	9:30	7.85	328	16.0	0.0	145.8	10.2	33.1	37.1	8.1	2.1	15.0	0.007	0.21	0.03	0.21	<0.010		0.078
26/03/93	15:40	8.00	451	23.0	0.0	201.0	14.1	59.0	51.7	12.9	3.4	24.6	<0.005	0.20	0.03	0.27	0.876		0.222
Nº DE DATOS		23	23	21	23	23	23	23	23	23	23	23	19	19	23	23	18	10	19
PROMEDIO		8.02	487	16.3	0.3	189.7	20.0	80.2	54.8	15.3	2.8	29.3	0.006	0.52	0.03	0.45	0.364	9.4	0.071
MINIMO		6.70	87	10.0	0.0	51.9	3.6	12.0	14.2	2.6	0.5	5.1	0.000	0.00	0.00	0.06	0.000	8.0	0.005
MAXIMO		9.15	874	25.0	6.0	343.0	44.3	175.0	111.0	29.1	9.4	58.0	0.013	4.67	0.12	3.34	0.940	10.5	0.222
DESY. STD.		0.58	217	4.5	1.2	64.9	13.4	46.3	21.0	7.8	1.9	16.8	0.003	1.01	0.02	0.74	0.286	0.9	0.070

ESTACION : ESTERO PUPIO EN EL ROMERO
 CODIGO BNA : 04810800-8
 CUENCA : COSTERAS R.CHOAPA-R.

LATITUD S : 31 52
 LONGITUD W : 71 19

ALTITUD : 175 msnm

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HC03 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/NO3 mg/l 6242	Oxigeno mg/l 6001	P/PO4 mg/l 6220	
26/04/84	12:15	8.01	628		0.0	326.0	12.8	74.4	65.7	30.4	2.7	27.1			0.00	0.08				
11/06/84	14:10	7.22	489		0.0	261.0	12.8	42.3	52.9	20.7	2.4	21.1			0.00	0.06				
26/09/84	13:15	8.32	373		0.0	200.0	7.8	24.0	50.1	12.0	2.0	13.3			0.00	0.07				
13/12/84	19:00	7.77	455		0.0	243.0	13.1	30.7	45.3	22.2	3.9	21.1			0.00	0.02				
16/02/85	13:05	7.94	515		0.0	278.0	24.5	47.1	60.9	19.4	3.5	23.7			0.00	0.09				
15/05/85	11:30	8.24	531		0.0	287.0	14.9	52.8	63.9	21.9	3.1	27.8			0.00					
25/02/86	14:10	7.82	635		0.0	303.0	14.9	71.6	70.7	26.5	3.5	29.7	0.002	1.26	0.02	0.94				
20/05/86	14:20	8.45	790		0.0	362.0	21.3	116.0	91.0	32.5	4.7	36.8			0.04	0.06				
2/12/86	20:00	7.70	514		0.0	254.0	12.8	43.2	46.3	24.6	3.9	24.8			0.05	0.00				
22/12/86	11:45	8.05	651	20.0	0.0	308.0	12.8	70.6	65.5	25.8	3.1	29.0			0.00	0.10		10.0		
9/03/87	18:10	7.95	630	22.0	0.0	273.0	28.4	70.1	57.9	26.7	2.4	34.0	0.008	4.45	0.01	0.12	0.049	6.6	0.010	
20/06/87	11:12	8.05	766	9.0	0.0	339.0	14.5	86.5	83.8	28.0	2.7	35.4			0.01	0.02	0.005	11.5	0.007	
28/09/87	16:12	7.40	401	16.0	0.0	201.0	12.1	33.6	45.5	16.3	2.7	16.8	0.008	0.02	0.02	0.27	1.110	9.9	0.059	
21/01/88	17:10	8.60	480	22.0	0.0	235.0	12.1	35.1	47.3	19.7	2.4	23.0	0.006	0.88	0.01	0.07		8.2	0.044	
6/04/88	17:30	7.50	480	19.0	0.0	257.0	17.4	47.5	54.0	21.9	2.5	23.9	0.005	0.11	0.01	0.09	0.303		0.040	
24/06/88	13:25	7.75	548	10.0	0.0	258.0	12.8	34.0	58.3	20.5	2.0	21.2	0.006	1.63	0.02	0.07	0.452		0.060	
21/09/88	13:15	7.25	500	14.0	0.0	269.0	16.0	42.0	54.4	21.1	2.3	25.3	0.011	0.02	0.01	0.06	0.151		0.021	
30/12/88	19:20	8.46	561	22.0	0.0	262.0	16.3	82.6	59.0	23.0	3.1	32.7	0.005	0.13	0.01	0.16	0.002		0.008	
10/03/89	14:20	8.45	646	22.0	6.0	269.0	12.4	60.0	60.0	24.9	3.2	29.4	0.007	0.36	0.01	0.09	0.052		0.012	
4/10/89	10:30	9.40	587	17.0	0.0	281.0	11.3	64.0	62.2	23.7	2.4	24.8	0.005	0.55	0.01	0.11	0.039		0.013	
29/12/89	18:50	7.50	612	23.0	0.0	305.0	13.1	59.6	64.3	24.7	3.4	29.2	0.005	0.50	0.01	0.06	0.232		0.014	
21/01/92	16:35	8.00	480	26.0	0.0	163.5	13.8	68.2	21.5	26.3	1.0	29.6	<0.005	0.03	0.02	0.11	0.309		0.238	
20/03/92	16:36	8.20	490	17.0	0.0	153.8	13.8	86.5	19.5	28.4	1.0	33.1	0.005	<0.02	0.02	0.05	0.194	11.0	<0.010	
22/09/92	17:00	7.95	360	15.0	0.0	165.4	8.9	30.2	28.7	17.1	0.9	17.2	<0.005	<0.02	0.02	0.23	<0.010	12.2	<0.010	
11/12/92	13:50	8.25	550	18.0	0.0	270.3	13.1	46.0	53.6	21.3	2.8	23.0	<0.005	0.11	0.03	0.13	0.109		0.036	
22/01/93	13:35	7.70	556	20.0	0.0	293.5	15.5	50.4	57.6	22.9	2.7	26.2	<0.005	0.18	0.03	0.13	0.424		0.052	
26/03/93	13:20	7.60	831	19.0	0.0	307.5	15.9	64.8	63.2	27.2	2.9	28.8	<0.005	0.31	0.02	0.12	0.182		0.039	
Nº DE DATOS		27				27		27		27		27		17		27		26		17
PROMEDIO		7.98	558	18.4	0.2	263.9	14.6	56.8	55.7	23.3	2.7	26.2	0.004	0.62	0.01	0.13	0.226	10.1	0.035	
MINIMO		7.22	360	9.0	0.0	153.8	7.8	24.0	19.5	12.0	0.9	13.3	0.000	0.00	0.00	0.00	0.000	6.6	0.000	
MAXIMO		9.40	831	26.0	6.0	362.0	28.4	116.0	91.0	32.5	4.7	36.8	0.011	4.45	0.05	0.94	1.110	12.2	0.238	
DESV. STD.		0.46	114	4.3	1.1	50.8	4.2	21.1	15.4	4.4	0.9	5.6	0.002	1.04	0.01	0.17	0.263	1.7	0.053	

ESTACIONES EVENTUALES

ESTACION : RIO MALO ANTES FAENA MINERA EL IMOID
 CODIGO BNA : 04302800-6
 CUENCA : RIO ELQUI

LATITUD S : 29 49
 LONGITUD W : 70 01

ALTITUD : 3280 msnm

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/NO3 mg/l 6242	Oxigeno mg/l 6001	P/PO4 mg/l 6220	
16/09/81	11:55	7.37	1032		0.0	104.0	17.0	424.0	114.0	55.2	15.6	23.0	0.520	1.35	0.43	6.89				
6/10/81	10:45	7.71	914		0.0	73.2	6.7	451.0	100.0	47.8	10.6	19.5	0.061	1.00	0.00	2.02	0.000			
11/11/81	12:30	7.50	307		0.0	75.7	5.3	91.3	52.9	7.4	1.6	9.2	0.203	1.85	0.25	28.80	0.250			
3/12/81	14:00	7.83	560		0.0	89.7	6.7	195.0	71.1	18.5	1.2	13.8	0.000	0.67	0.00	0.13	0.000			
5/01/82	11:20	7.33	619		0.0	94.0	34.7	235.0	90.6	18.2	2.4	17.2	0.004	1.67	0.00	0.09	0.000			
10/02/82	11:30	7.84	557		0.0	74.4	34.7	205.0	90.6	10.9	2.0	17.2	0.017	1.18	0.00	0.05	0.000			
10/03/82	9:10	7.49	659		0.0	77.5	44.3	242.0	70.5	36.5	2.4	18.4	0.004	0.83	0.01	0.25	0.010			
13/04/82	18:10	7.35	532		0.0	54.3	4.6	230.0	80.2	18.2	1.6	13.1	0.005	0.00	0.02	0.18	0.020			
4/05/82	16:40	7.81	527		0.0	79.9	4.6	195.0	80.2	15.2	1.6	11.5	0.009	0.00	0.00	0.66	0.000			
1/06/82	15:15	7.44	723		0.0	94.6	7.4	355.0	120.0	24.3	2.4	16.6	0.014	0.50	0.01	0.52	0.010			
6/07/82	15:45	7.21	674		0.0	87.3	6.0	280.0	106.0	21.9	3.1	17.2	0.010	1.35	0.01	0.09	0.010			
11/08/82	17:35	7.43	663		0.0	101.0	4.6	275.0	109.0	23.7	2.4	16.6	0.015	0.00	0.00	0.15	0.000			
23/09/82	12:05	7.55	672		0.0	84.2	2.8	240.0	90.0	18.2	2.0	14.9	0.000	0.10	0.22	0.100				
8/09/82	18:00	6.55	577										0.014							
7/10/82	17:45	6.65	760		0.0	72.6	2.8	245.0	94.8	15.2	2.0	14.3	0.019	1.50	0.00	0.67	0.000			
6/12/82	17:00	7.65	369		0.0	69.6	4.3	108.0	54.9	9.7	1.2	8.3	0.040	2.65	0.04	3.61	0.040			
12/04/83	14:55	8.75	897	3.0	0.0	104.0	3.6	300.0	121.0	23.0	2.4	12.9	0.016	0.00	0.53	0.000				
15/02/84	16:30	7.35	371	11.0	0.0	85.4	4.3	93.2	47.3	7.2	1.6	11.5	0.001		0.00	0.030				
Nº DE DATOS		18	18			17	17	17	17	17	17	17	18	13	16	17	16			
PROMEDIO		7.49	634		0.0	83.6	11.4	245.0	87.8	21.8	3.3	15.0	0.053	1.12	0.05	2.64	0.029			
MINIMO		6.55	307		0.0	54.3	2.8	91.3	47.3	7.2	1.2	8.3	0.000	0.00	0.00	0.00	0.000			
MAXIMO		8.75	1032		0.0	104.0	44.3	451.0	121.0	55.2	15.6	23.0	0.520	2.65	0.43	28.80	0.250			
DESV. STD.		0.46	185		0.0	13.1	12.8	98.3	22.3	12.9	3.7	3.7	0.121	0.56	0.11	6.73	0.059			

ESTACION : RIO MALO DESPUES FAENA MINERA EL INDIO
 CODIGO BMA : 04302801-4
 CUENCA : RIO ELQUI

LATITUD S : 29 49
 LONGITUD W : 70 01

ALTITUD : 3245 msnm

FECHA	HORA	pH u. 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8204	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	M/MO3 mg/l 6242	Oxigeno mg/l 6001	P/PO4 mg/l 6220
16/09/81	12:45	3.07	3490		0.0	0.0	42.2	2402.0	305.0	135.0	24.6	59.8	0.004	2.65	4.22	2.46			
6/10/81	11:25	3.29	2333		0.0	0.0	34.0	1341.0	285.0	55.4	32.1	38.2	0.028	1.67	5.30	4.94			
3/11/81	11:50	4.03	1892		0.0	0.0	15.2	1129.0	305.0	61.6	18.0	39.1	0.156	1.35	5.52	98.86	4.560		
11/11/81	14:55	3.70	1831		0.0	0.0	5.3	985.0	223.0	74.0	14.5	36.1	0.030	2.00	5.08	42.50	2.140		
3/12/81	14:45	3.48	2058		0.0	0.0	22.3	1282.0	192.0	105.0	10.9	62.1	0.057	1.67	3.49	37.20	2.780		
5/01/82	12:50	4.65	1960		0.0	0.0	34.7	1126.0	383.0	36.5	21.5	24.8	0.140	2.33	8.00	37.00	2.510		
10/02/82	12:00	4.12	1768		0.0	0.0	52.1	1176.0	210.0	79.4	12.1	52.9	0.063	3.00	6.80	35.40	2.510		
10/03/82	17:40	3.49	1878		0.0	0.0	44.3	1226.0	222.0	69.9	12.5	79.3	0.111	2.50	10.20	35.80	3.120		
13/04/82	17:40	3.74	1843		0.0	0.0	14.9	1176.0	230.0	72.9	10.2	89.9	0.077	1.34	13.20	33.20	4.260		
4/05/82	16:40	3.75	1964		0.0	0.0	12.1	1176.0	230.0	66.9	9.4	74.7	0.175	2.00	15.80	44.00	4.560		
1/06/82	16:00	3.78	1895		0.0	0.0	7.4	1151.0	251.0	66.9	9.0	90.1	0.266	1.50	14.10	36.20	4.860		
6/07/82	14:55	4.08	2035		0.0	0.0	30.1	1376.0	261.0	66.9	10.2	112.0	0.077	3.00	13.00	45.40	4.960		
11/08/82	16:30	3.72	1945		0.0	0.0	2.8	1181.0	210.0	75.1	12.9	77.0	0.098	1.04	22.80	52.40	5.260		
8/09/82	17:05	4.25	2354																
23/09/82	9:15	4.30	2018		0.0	0.0	4.6	1381.0	240.0	70.0	10.2	87.4	0.091	1.04	14.60	44.10	4.200		
7/10/82	17:50	3.85	2040		0.0	0.0	0.0	1157.0	279.0	72.7	9.8	86.2	0.133	1.35	11.20	46.60	5.020		
9/11/82	18:20	3.95	2083		0.0	0.0	18.1	1151.0	287.0	67.7	12.9	96.6	1.010	3.63	15.60	40.20	5.740		
6/12/82	18:15	4.25	1916		0.0	0.0	22.7	1171.0	279.0	65.4	15.6	93.6	0.261	2.50	14.00	33.20	5.490		
4/01/83	19:45	4.75	2427	10.0	0.0	0.0	36.2	1251.0	359.0	54.6	16.8	87.6	0.516	13.50	26.20	4.620			
7/02/83	18:45	4.90	2200	11.0	0.0	0.0	14.9	1101.0	289.0	66.6	14.1	83.7	0.536	6.80	40.40	5.610			
7/03/83	17:55	4.55	2117	10.0	0.0	0.0	12.4	1151.0	269.0	63.6	10.6	62.5	0.097	8.50	21.00	6.940			
12/04/83	17:55	4.45	1986	7.0	0.0	0.0	27.3	1101.0	259.0	63.6	14.1	52.6	1.210	8.00	32.90	3.180			
10/05/83	15:40	4.50	2242	5.0	0.0	0.0	54.2	1126.0	274.0	63.6	19.6	61.0	0.170	7.00	32.80	6.980			
5/06/83	15:35	4.35	1880	3.0	0.0	0.0	11.0	889.0	219.0	66.6	12.5	56.6	0.138	7.40	36.20	2.910			
5/07/83	15:40	4.58	2051	3.0	0.0	0.0	12.8	1117.0	269.0	78.8	14.9	64.4	0.615	8.10	37.60	3.680			
9/08/83	16:05	3.25	1836	6.0	0.0	0.0	11.0	1129.0	219.0	102.0	12.1	49.7	0.237	7.20	40.80	4.100			
6/09/83	15:25	5.45	1758	5.0	0.0	0.0	12.8	927.0	260.0	42.5	17.6	66.7	0.483	8.70	38.50	6.770			
4/10/83	14:40	4.40	2029	13.0	0.0	6.7	12.8	927.0	260.0	42.5	17.6	66.7	0.224	1.05	20.50	3.530			
8/11/83	18:50	4.35	1955	9.0									1.100	4.34	24.40				
13/12/83	19:05	4.03	1796	11.0									0.572	4.25	25.30				
25/01/84	11:40	3.85	1500	11.0									1.760	4.01	30.40				
15/02/84	14:55	3.50	2182	15.0									1.450	39.50	99.00				
6/03/84	18:40	3.40	2750	11.0									1.290	37.50	222.00				
17/04/84	15:30	3.50	3056	7.0									3.550	114.00	278.00				
8/05/84	16:25	4.20	2165	6.0									0.435	34.60	89.50				
12/06/84	15:55	4.00	2241	4.0									0.840	16.80	38.90				
4/09/84	14:55	4.05	1952	5.0									1.020	8.51	20.90	1.890			
2/10/84	15:30	4.70	1961	6.0									6.460	22.40	38.80				
6/11/84	15:35	4.00	1940	9.0									0.848	13.60	28.00	5.720			
5/12/84	18:25	5.45	1830	11.0	0.0	6.1	9.2	1086.0	326.0	54.1	10.2	35.9	4.340	77.80	77.00				
8/01/85	15:15	4.95	1820	14.0									2.440	61.00	202.00	7.570			
12/02/85	14:50	4.55	1795	16.0									1.220	9.63	39.20	3.680			
3/04/85	13:45	4.15	1863	10.0									0.859	8.41	52.60	3.920			
7/05/85	15:25	4.45	1250	8.0									2.090	15.90	69.20	6.000			
2/07/85	14:40	4.85	1530	6.0									1.670	14.60	39.20	4.370			
6/08/85	14:50	4.60	1726	6.0									0.609	9.32	40.80	3.340			
8/10/85	14:25	5.30	1693	10.0									0.910	9.52	38.40	3.460			
5/11/85	15:20	4.75	1702	13.0									0.753	8.30	34.90	3.060			
7/01/86	16:02	4.45	1660	14.0									0.598	8.09	37.20	1.800			
4/02/86	16:20	4.35	1724	14.0									0.286	7.41	34.10				
4/03/86	16:42	4.55	1623	11.0									0.744	8.68	41.40				
2/04/86	16:05	4.70	1520	9.0									0.416	6.80	37.90				
7/05/86	11:25	4.35	1593	9.0									0.569	7.82					

Nº DE DATOS	53	53	35	27	27	27	27	27	27	27	27	27	53	15	52	51	36
PROMEDIO	4.22	1973	9.1	0.0	0.7	20.9	1202.4	264.3	70.4	14.4	69.9	4.156	0.855	2.17	14.35	51.04	4.302
MINIMO	3.07	1250	3.0	0.0	0.0	0.0	899.0	192.0	36.5	9.0	24.8	0.004	1.34	1.05	2.46	1.800	
MAXIMO	5.45	3490	16.0	0.0	6.7	54.2	2402.0	383.0	135.0	32.1	127.0	6.460	3.63	114.00	278.00	7.570	
DESV. STD.	0.52	364	3.5	0.0	1.9	14.3	260.2	44.8	18.7	5.2	24.4	1.156	0.68	17.36	50.12	1.482	

ESTACION : RIO MALO ANTES ESTERO NEGRO
 CODIGO BNA : 04302802-2
 CUENCA : RIO ELQUI

LATITUD S : 29 47
 LONGITUD W : 70 00

ALTITUD : 3500 msnm

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/NO3 mg/l 6242	Oxigeno mg/l 6001	P/PO4 mg/l 6220
10/80		3.47	1700		0.0	0.0	19.5	801.0	168.0	18.1	6.3	37.2		1.82	2.13	37.90	1.220		
16/09/81		3.29	1994		0.0	0.0	26.9	981.0	213.0	61.6	23.5	35.6	0.142	1.85	4.14	5.29			
6/10/81	12:05	3.62	2082		0.0	0.0	25.5	1141.0	223.0	86.2	23.9	36.8	1.360	1.85	5.14	4.89			
3/11/81	12:15	4.35	1962		0.0	0.0	16.0	1225.0	345.0	55.4	18.0	44.4	0.200	2.50	5.19	4.21	2.560		
11/11/81	15:30	3.90	1805		0.0	0.0	8.9	937.0	203.0	74.0	11.3	36.8	0.059	3.00	4.28	4.63	1.900		
8/09/82	15:25	4.25	2012										0.066						
7/10/82	14:15	4.65	2046	10.0	0.0	0.0	0.0	1173.0	247.0	92.1	9.4	81.2	0.068	2.33	7.40	35.80	4.500		
9/11/82	16:20	4.25	1833	13.0	0.0	0.0	6.0	1061.0	239.0	60.4	10.2	67.8	0.232	2.82	8.70	37.80	4.300		
6/12/82	20:10	4.50	1810	9.0	0.0	0.0	16.7	1101.0	259.0	48.5	11.7	86.2	0.320	2.17	10.30	33.80	4.500		
5/01/83	8:25	4.65	2040	6.0	0.0	0.0	36.2	1126.0	269.0	60.7	11.7	70.1	0.070		8.20	18.20			
12/04/83	19:00	4.90	1650	11.0	0.0	0.0	27.3	1061.0	229.0	60.7	10.9	41.4	0.224		5.60	32.00			
5/07/83	13:50	4.80	2034	3.0	0.0	6.1	11.0	967.0	239.0	72.7	12.1	57.0	0.971		6.40	33.10			
9/08/83	14:05	5.15	1726	4.0	0.0	0.0	9.2	991.0	215.0	78.8	9.8	45.1	0.770		5.10	52.30			
6/09/83	13:50	4.45	1758	5.0	0.0	0.0	12.8	877.0	230.0	48.6	14.5	59.8	0.497		7.40	39.30			
4/10/83	13:10	4.60	2120	14.0													2.990		
15/02/84	12:15	4.15	2245	15.0									2.670		59.00	149.00			
Nº DE DATOS		16	16	10	13	13	13	13	13	13	13	13	14	8	14	14	14	7	
PROMEDIO		4.31	1926	9.0	0.0	0.5	16.6	1034.0	236.8	62.9	13.3	53.8	0.546	2.29	9.93	34.87	3.139		
MINIMO		3.29	1650	3.0	0.0	0.0	0.0	801.0	168.0	18.1	6.3	35.6	0.059	1.82	2.13	4.21	1.220		
MAXIMO		5.15	2245	15.0	0.0	6.1	36.2	1225.0	345.0	92.1	23.9	86.2	2.670	3.00	59.00	149.00	4.500		
DESV. STD.		0.51	167	4.1	0.0	1.6	8.6	117.4	39.8	18.3	5.1	17.1	0.700	0.43	13.76	35.14	1.232		

ESTACION : ESTERO NEGRO ANTES RIO MALO
 CODIGO BNA : 04302803-0
 CUENCA : RIO ELQUI

LATITUD S : 29 47
 LONGITUD W : 70 02

ALTITUD : 3500 msnm

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/NO3 mg/l 6242	Oxígeno mg/l 6001	P/PO4 mg/l 6220	
10/80		7.90	880		0.0	110.0	12.4	340.0	91.0	38.7	1.6	23.0	0.110	1.67	0.00	0.69		0.739		
16/09/81	13:10	7.99	966		0.0	104.0	44.0	370.0	100.0	56.0	5.5	25.3	0.110	1.35	0.03	0.97				
6/10/81	12:25	7.89	987		0.0	104.0	30.5	385.0	100.0	53.7	4.7	24.1	0.052	1.67	0.00	2.68				
3/11/81	12:20	7.99	963		0.0	95.2	12.1	348.0	132.0	34.5	2.4	24.8	0.021	1.85	0.00	0.74	0.393			
11/11/81	15:20	8.40	873		0.0	89.7	12.4	336.0	132.0	35.7	1.6	20.7	0.010	1.50	0.04	2.77	0.319			
3/12/81	15:15	8.20	974		0.0	79.9	8.5	465.0	147.0	27.7	1.6	19.5	0.000	1.35	0.04	0.92	0.438			
5/01/82	14:00	7.38	995		0.0	90.4	34.7	460.0	151.0	36.5	2.0	24.1	0.049	0.35	0.01	0.91	0.226			
10/02/82	12:55	8.02	986		0.0	84.2	43.6	460.0	171.0	24.3	2.4	27.6	0.049	2.33	0.00	0.11	0.440			
10/03/82	10:30	7.86	997		0.0	97.0	62.0	520.0	151.0	36.5	2.0	31.0	0.054	1.68	0.02	0.42	0.468			
13/04/82	15:55	7.78	968		0.0	94.6	7.4	495.0	150.0	42.5	2.0	23.4	0.044	0.17	0.02	0.98	0.488			
4/05/82	14:25	8.05	967		0.0	94.6	10.6	460.0	140.0	36.5	1.6	23.9	0.066	1.50	0.00	0.33	0.452			
1/06/82	14:15	7.95	873		0.0	102.0	12.1	430.0	135.0	39.5	1.6	23.9	0.062	1.35	0.00	0.41	0.637			
6/07/82	14:05	7.77	866		0.0	102.0	7.4	390.0	136.0	34.0	2.0	23.9	0.080	1.35	0.00	0.12	0.350			
11/08/82	15:25	7.58	880		0.0	113.0	7.4	375.0	130.0	30.5	1.2	25.1	0.089	0.00	0.36	0.585				
22/09/82	18:20	7.35	947		0.0	104.0	7.4	391.0	128.0	31.7	1.2	21.8	0.033	0.03	0.05	0.592				
8/09/82	15:30	6.55	875										0.059							
7/10/82	14:10	7.90	981	10.0	0.0	109.0	7.4	478.0	149.0	41.2	0.8	26.4	0.049	2.00	0.00	0.07	0.578			
9/11/82	16:20	6.20	910	13.0	0.0	79.3	7.4	439.0	136.0	43.6	1.2	20.7	0.026	1.50	0.03	14.50	0.603			
6/12/82	20:10	5.20	695	9.0	0.0	72.6	12.1	328.0	110.0	27.8	1.2	13.6	0.034	2.00	0.07	32.50	0.221			
5/01/83	8:30	5.65	936	5.0	0.0	56.7	11.0	400.0	119.0	42.4	1.2	11.0	0.009	0.05	0.05	7.00				
12/04/83	19:00	6.25	928	11.0	0.0	69.6	36.2	460.0	169.0	30.3	5.5	15.2	0.021	0.00	0.52					
7/06/83	13:55	6.40	1008	3.0	0.0	39.7	3.6	435.0	140.0	27.2	2.0	21.1	0.026	0.00	0.20					
5/07/83	13:50	6.40	1079	4.0	0.0	82.4	5.3	468.0	141.0	43.6	2.0	21.1	0.029	0.00	0.10					
9/08/83	14:10	6.25	1025	3.0	0.0	94.6	7.1	444.0	149.0	33.3	2.4	21.1	0.034	0.03	0.77					
6/09/83	13:55	5.50	1008	5.0	0.0	96.4	7.1	413.0	160.0	21.3	2.4	24.8	0.054	0.01	0.32					
4/10/83	13:10	6.20	868	14.0													0.400			
15/02/84	12:15	6.00	996	14.0	0.0	47.6	4.3	480.0	158.0	34.5	2.0	15.2	0.005	0.01	0.84					
Nº DE DATOS		27	27	11	25	25	25	25	25	25	25	25	26	16	25	25	17			
PROMEDIO		7.13	942	8.3	0.0	88.5	16.6	422.8	137.0	36.1	2.1	22.1	0.045	1.48	0.02	2.77	0.466			
MINIMO		5.20	695	3.0	0.0	39.7	3.6	328.0	91.0	21.3	0.8	11.0	0.000	0.17	0.00	0.05	0.221			
MAXIMO		8.40	1079	14.0	0.0	113.0	62.0	520.0	171.0	56.0	5.5	31.0	0.110	2.33	0.07	32.50	0.739			
DESV. STD.		0.95	74	4.2	0.0	18.7	15.2	52.7	20.2	8.1	1.2	4.4	0.027	0.53	0.02	6.77	0.139			

ESTACION : RIO TORO DESPUES ESTERO NEGRO Y RIO MALO
 CODIGO BMA : 04302804-9
 CUENCA : RIO ELQUI

LATITUD S : 29 48
 LONGITUD W : 70 01

ALTITUD : 3480 msnm

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8640	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/NO3 mg/l 6242	Oxígeno mg/l 6001	P/PO4 mg/l 6220
3/11/81	22:30	4.40	1734		0.0	0.0	86.9	1033.0	305.0	43.2	14.1	39.1	0.165	2.28	4.69	4.74		2.230	
11/11/81	15:35	4.70	1480		0.0	0.0	69.5	817.0	183.0	74.0	8.6	33.3	0.054	2.17	3.17	5.30		1.610	
3/12/81	15:20	4.44	1590		0.0	0.0	12.1	961.0	244.0	49.2	9.0	40.2	0.334	1.18	4.06	4.85		2.780	
5/01/82	14:20	4.49	1893		0.0	0.0	43.6	1161.0	302.0	51.7	15.6	31.7	0.163	1.67	4.80	28.60		1.770	
10/02/82	13:05	4.15	1629		0.0	0.0	34.7	961.0	219.0	62.0	8.6	44.1	0.049	1.67	4.00	25.70		1.710	
10/03/82	10:50	4.13	1672		0.0	0.0	35.5	973.0	201.0	60.8	7.8	59.8	0.108	2.00	5.40	27.20		2.270	
13/04/82	15:50	4.43	1320		0.0	0.0	6.0	830.0	180.0	54.7	3.9	41.2	0.092	0.83	3.30	16.20		2.120	
4/05/82	14:20	4.27	1589		0.0	0.0	7.4	1041.0	185.0	60.8	7.8	52.0	0.126	1.34	7.60	29.50		3.330	
1/06/82	14:50	4.25	1571		0.0	0.0	14.9	1081.0	190.0	72.9	5.9	60.9	0.141	1.50	8.00	26.30		3.360	
6/07/82	14:25	4.40	1581		0.0	0.0	22.7	951.0	190.0	72.9	9.8	75.9	0.112	1.50	7.80	29.60		3.090	
11/08/82	15:20	4.36	1686		0.0	0.0	20.9	1001.0	240.0	54.8	5.9	53.3	0.400	4.10	13.00			2.570	
8/09/82	15:35	4.65	1482										0.082						
7/10/82	14:05	4.60	1552		0.0	0.0	5.3	879.0	211.0	60.5	5.1	54.3	0.072	2.00	4.55	23.40		2.330	
9/11/82	16:15	4.50	1542		0.0	0.0	10.6	831.0	219.0	53.4	5.9	54.3	0.130	2.50	5.10	22.00		2.310	
6/12/82	20:15	4.90	1028		0.0	0.0	6.7	600.0	180.0	28.9	4.7	32.9	0.105	1.67	2.85	15.50		0.791	
5/01/83	8:40	5.05	1290	5.0	0.0	0.0	27.3	669.0	194.0	39.4	5.5	23.4	0.029		2.74	10.40			
12/04/83	19:05	5.30	1224	11.0	0.0	6.1	18.1	741.0	189.0	48.5	5.5	26.7	0.077		2.38	13.90			
7/06/83	14:00	5.55	1428	4.0	0.0	6.7	9.2	763.0	189.0	60.5	6.7	39.1	0.053		3.00	17.90			
5/07/83	13:55	5.15	1394	4.0	0.0	12.8	7.1	679.0	199.0	30.5	5.5	33.1	0.330		2.30	15.70			
9/08/83	14:15	5.20	1394	4.0	0.0	6.1	9.2	684.0	178.0	48.5	5.5	31.0	0.207		2.30	19.60			
6/09/83	14:00	4.45	1548	5.0	0.0	0.0	11.0	708.0	210.0	36.5	8.2	46.4	0.318		2.92	26.10	1.930		
15/02/84	12:20	4.15	1746	15.0									1.760		36.00	90.00			
Nº DE DATOS		22	22	7	20	20	20	20	20	20	20	20	22	13	21	21		15	
PROMEDIO		4.61	1517	6.9	0.0	1.6	22.9	868.2	210.4	53.2	7.5	43.6	0.223	1.72	5.76	22.17		2.280	
MINIMO		4.13	1028	4.0	0.0	0.0	5.3	600.0	178.0	28.9	3.9	23.4	0.029	0.83	2.30	4.74		0.791	
MAXIMO		5.55	1893	15.0	0.0	12.8	86.9	1161.0	305.0	74.0	15.6	75.9	1.760	2.50	36.00	90.00		3.360	
DESV. STD.		0.40	189	4.1	0.0	3.1	21.5	155.0	36.1	12.7	2.9	13.0	0.351	0.45	6.97	17.11		0.667	

ESTACION : RIO TURBIO DESPUES RIO TORO Y RIO LA LAGUNA (Continuación)
 CODIGO BNA : 04303800-1 LATITUD S : 29 58
 CUENCA : RIO ELQUI LONGITUD W : 70 07

ALTITUD : 2060 msnm

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	M/MO3 mg/l 6242	Oxigeno mg/l 6001	P/PC4 mg/l 6220
8/02/89	18:20	7.75	719	16.0									0.134	0.75	0.55	2.20	0.286	7.6	0.015
9/03/89	17:55	7.55	630	13.0	0.0	97.6	27.3	188.0	63.0	13.9	3.8	40.0	0.166	0.72	0.88	3.18	0.315	8.1	0.095
12/04/89	15:30	7.25	798	11.0									0.143	1.32	0.75	3.37	0.432	8.6	0.005
9/05/89	15:10	7.20	1357	7.5									0.157	2.07	1.60	4.80	0.476	8.4	0.066
7/06/89	12:56	7.10	1245	4.0	0.0	67.1	52.5	400.0	114.0	23.0	9.0	75.9	0.299	1.26	1.82	6.75	0.423	10.4	0.066
11/07/89	14:20	7.05	1290	5.0									0.464	1.26	3.68	7.95	0.686	9.6	0.005
3/08/89	11:50	7.30	1040	2.5									0.262	1.10	1.45	5.90	0.350	10.3	0.066
6/09/89	12:49	6.90	995	7.5	0.0	67.1	50.3	360.0	106.0	22.8	7.5	69.0	0.453	1.29	2.40	7.50	0.256	9.9	0.005
31/10/89	14:55	7.10	811	9.0									0.164	0.61	0.88	2.59	0.405	8.3	0.005
16/11/89	15:57	7.50	1244	13.0									0.022	+7.3	0.82	3.60	0.323	8.2	0.019
13/12/89	9:47	7.05	716	7.5	0.0	87.9	26.2	250.0	82.4	17.8	4.8	40.5	0.182	0.90	1.45	4.65	0.317	9.6	0.006
9/01/90	14:40	7.55	990	18.0									0.146	1.02	1.01	4.06	0.310		+0.010
12/02/90	12:40	7.55	639	14.2	0.0								0.163	0.77	1.08	2.98	0.316		+0.005
8/03/90	14:23	7.85	602	14.0	0.0	88.5	26.2	187.3	66.2	14.6	4.1	26.7	1.07	1.20	5.65	0.256			0.028
4/04/90	16:45	7.60	894	14.0									0.209	1.11	1.64	4.08	0.351	8.0	+0.010
10/05/90	14:30	7.10	1314	10.5									0.391	1.76	2.57	7.81	0.665	8.8	+0.010
18/06/90	13:16	6.85	1130	7.0	0.0	69.0	59.9	390.0	109.9	23.1	9.0	81.9	0.401	2.11	2.86	8.29	0.749	8.6	+0.010
4/07/90	11:40	6.95	1550	4.5									0.299	1.70	2.06	7.65	0.372	10.4	+0.010
16/08/90	12:12	7.40	1100	6.0									0.373	2.01	2.66	7.10	0.634	10.0	+0.010
12/09/90	14:00	6.85	957	11.0	0.0	70.2	57.4	374.6	93.0	23.0	7.8	73.8	0.384	1.99	2.40	7.70	0.877	8.5	+0.010
17/10/90	15:31	7.70	561	12.5									0.127	1.08	0.70	2.83	0.481	8.4	+0.017
27/11/90	16:26	8.05	607	18.0									0.233	0.88	1.53	3.35	0.606	7.4	0.017
20/12/90	13:15	7.65	990	15.5	0.0	120.8	31.6	190.0	74.4	14.8	5.0	48.1	0.126	1.13	1.23	3.69	0.229	7.8	0.028
8/01/91	13:30	7.55	890	17.0									0.208	0.54	1.24	3.73	0.454	7.5	+0.010
20/02/91	11:00	7.15	1033	10.0									0.361	0.62	1.28	15.20	0.609	8.7	+0.010
21/03/91	10:40	7.30	760	11.0	0.0	97.6	36.8	250.0	78.8	15.6	5.3	51.3	0.250	1.27	1.63	12.27	0.622	8.4	+0.010
10/04/91	13:25	7.70	894	11.0									0.355	1.34	1.91	14.76	0.774	8.7	+0.010
15/04/91	13:55	7.10	1215	7.0									0.394	1.61	2.85	10.23	0.721	9.7	+0.010
12/06/91	12:40	6.90	1115	6.0	0.0	47.6	62.4	469.7	118.0	24.4	10.3	85.6	0.426	1.87	2.61	9.38	0.933	9.6	+0.010
24/07/91	12:25	7.10	1390	4.5									0.310	2.90	1.67	8.90	0.846	10.3	+0.010
28/08/91	10:08	7.20	1222	5.0									0.430	2.71	1.83	11.44	0.805	9.9	+0.010
25/09/91	16:05	7.15	1000	11.5	0.0	68.3	52.4	398.6	26.4	22.0	8.7	74.5	0.269	1.86	2.89	6.80	1.067	9.0	0.019
16/10/91	11:25	7.20	1146	5.0									0.091	0.79	0.68	4.75	0.506	9.4	+0.010
20/11/91	15:00	7.45	698	14.5									0.140	0.73	2.00	5.94	0.594	8.0	+0.010
11/12/91	14:35	6.85	925	12.0	0.0	47.0	41.5	444.3	113.5	21.5	7.4	86.9	0.287	1.97	6.54	14.12	0.633	8.2	+0.010
8/01/92	10:40	7.35	838	10.0									0.219	1.47	3.50	15.60	0.590	8.9	+0.010
19/02/92	15:25	7.00	540	16.0									0.161	0.95	1.41	20.10	0.417	7.8	+0.010
11/03/92	16:43	7.30	534	16.0	0.0	88.5	26.9	165.2	63.5	13.4	3.8	36.8	0.204	0.37	1.23	4.45	0.532	8.2	+0.010
8/04/92	16:05	7.35	947	11.5									0.163	1.14	1.20	4.20	0.483	8.5	+0.010
19/05/92	10:16	7.35	852	4.0									0.128	1.98	0.93	3.50	0.556	9.4	+0.010
17/06/92	10:40	8.04	777	2.5	0.0	76.9	31.9	228.1	72.1	16.4	4.9	48.8	0.229	1.04	1.51	4.25	0.543	10.2	0.028
15/07/92	13:00	6.80	652	2.0									0.201	1.05	0.91	4.51	0.444	9.7	0.041
11/08/92	11:26	6.95	636	2.5									0.164	1.39	0.80	3.65	0.405	10.4	0.014
7/09/92	11:40	7.25	635	6.0	0.0	85.4	31.6	195.0	69.7	13.5	4.1	46.0	0.143	0.98	1.61	4.76	0.158	10.0	+0.010
28/10/92	12:00	7.30	504	9.0									0.265	0.54	3.68	11.34	0.393	9.5	+0.010
24/11/92	13:30	7.20	463	9.0									0.193	0.45	2.87	8.90	0.345	9.6	+0.010
17/12/92	13:35	6.75	408	12.0	0.0	68.3	14.5	155.1	50.7	11.1	3.8	23.9	0.271	0.81	3.27	7.91	0.460	8.7	+0.010
5/01/93	12:30	6.80	380	13.0									0.155	0.27	1.94	12.86	0.653	8.8	+0.010
18/02/93	11:30	6.80	430	10.5									0.120	0.30			0.562	9.1	+0.010
21/04/93	12:15	7.25	543	8.0									0.177	0.69	0.94	4.12	0.580	9.4	0.036
M# DE DATOS		107	107	92	51	51	51	51	51	51	51	51	112	80	101	101	94	71	64
PROMEDIO		7.35	789	9.6	0.0	86.9	34.1	227.3	70.8	17.4	5.0	48.1	0.190	1.37	1.20	5.48	0.597	9.0	0.007
MINIMO		6.15	379	2.0	0.0	47.0	12.1	97.5	26.8	8.0	1.6	15.6	0.022	0.02	0.00	1.14	0.018	7.4	0.000
MAXIMO		8.30	1550	20.0	0.0	120.8	62.7	469.7	118.0	34.4	19.2	87.6	0.650	4.73	6.54	20.10	3.530	10.8	0.041
DESV. STD.		0.45	264	4.5	0.0	15.9	14.0	101.7	22.5	5.1	2.9	18.9	0.122	0.83	1.01	3.83	0.510	0.8	0.009

ESTACION : RIO TURBIO EN MUJANTA
 CODIGO BNA : 04306800-8
 CUENCA : RIO ELQUI

LATITUD S : 29 51
 LONGITUD W : 70 23

ALTITUD : 1190 msnm

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/NO3 mg/l 6242	Oxigeno mg/l 6001	P/PO4 mg/l 6220
5/12/86	13:30	7.85	1023	15.0											0.50	2.31			8.3
9/01/87	9:45	8.15	702	14.0	0.0	82.4	16.7	557.0	169.0	39.0	6.3	31.7			0.00	5.74			9.4
12/02/87	10:00	8.15	462	15.5									0.049		0.25	1.31	1.040		8.8
11/03/87	17:00	8.05	495	17.0	0.0	87.9	14.5	131.0	47.1	13.1	3.1	24.8	0.067	0.84	0.28	2.95	1.610		8.5
9/04/87	16:15	7.95	757	14.5									0.067	1.38	0.30	2.03	1.970		8.9
7/05/87	17:40	7.90	920	10.0									0.156		0.87	5.11	0.429		9.9
4/06/87	16:00	8.05	535	10.0	0.0	79.3	23.0	161.0	57.3	14.2	2.4	30.8	0.103	0.56	0.37	1.99	0.464		9.8
9/07/87	17:28	7.85	642	7.0									0.070		1.01	4.31	0.540		10.2
6/08/87	13:15	7.90	650	5.0									0.095		0.49	2.28			
4/09/87	14:50	8.10	480	7.5	0.0	97.6	17.4	130.0	53.7	11.2	2.7	23.9	0.165	0.23	0.78	6.58	0.332		10.4
14/10/87	16:30	8.15	471	9.0									0.046	1.12	0.21	1.58	0.794		10.2
5/11/87	18:40	8.05	441	11.5									0.087	0.83	0.57	4.94	0.169		9.4
16/12/87	19:00	8.00	373	14.0	0.0	116.0	8.5	74.0	51.3	6.9	2.4	12.4	0.276	0.24	0.59	50.50	0.224		9.3
6/01/88	15:15	7.95	347	14.5									0.190	0.11	0.34	25.00	0.256		9.0
10/02/88	13:50	8.00	447	14.0									0.049	0.67	0.29	1.89	0.306		8.8
9/03/88	15:00	7.73	412	15.0	0.0	77.9	14.4	120.0	47.3	9.6	2.0	22.0	0.122	0.68	0.52	1.76	0.537		10.0
8/04/88	14:00	8.15	590	13.0									0.044	0.42	0.30	1.34	0.493		9.7
6/05/88	13:00	7.90	450	6.5									0.073	0.34	0.28	1.33	0.402		10.6
10/06/88	14:40	7.90	610	7.0	0.0	89.7	14.5	143.0	59.1	10.7	2.2	23.9	0.126	0.56	0.58	2.41	0.285		10.3
8/07/88	13:30	7.90	531	4.0									0.064	1.17	0.33	1.24			10.1
11/08/88	12:15	7.70	743	6.5									0.138	1.16	0.38	2.70	0.566		11.4
13/09/88	12:08	8.05	646	8.5	0.0	85.4	22.3	210.0	70.9	13.7	3.8	33.1	0.204	0.51	0.69	4.51	0.604		10.1
19/10/88	17:49	7.65	590	13.0									0.128	1.34	0.40	1.62	0.446		9.1
10/11/88	11:55	7.65	587	14.0									0.121	0.55	0.42	2.00	0.438		8.9
15/12/88	10:30	7.65	576	13.0	0.0	73.2	21.6	185.0	60.0	13.8	3.4	34.5	0.108	0.86	0.68	9.46	0.455		9.1
4/01/89	9:05	8.00	766	14.0									0.118	0.71	0.46	1.81	0.522		8.9
9/02/89	15:15	7.85	943	18.5									0.106	0.63	0.44	2.08	0.400		9.1
9/03/89	8:58	8.10	555	11.0	0.0	97.6	21.6	160.0	60.0	12.5	3.1	34.0	0.129	0.75	0.68	2.46	0.301		9.9
12/04/89	9:00	7.80	734	8.5									0.076	1.07	0.41	2.37	0.420		10.1
9/05/89	13:56	7.45	952	10.0									0.115	1.77	0.44	3.18	0.461		9.5
6/06/89	15:18	7.75	744	8.0	0.0	82.4	27.3	240.0	78.3	15.7	5.2	43.2	0.197	0.68	1.29	6.50	0.473		10.3
12/07/89	14:00	7.20	991	6.6									0.225	0.76	1.20	4.65	0.762		10.0
3/08/89	13:00	7.65	764	7.0									0.173	0.66	0.77	4.61	0.400		11.4
7/09/89	13:42	7.30	743	11.0	0.0	85.4	28.0	220.0	74.3	15.5	4.5	39.3	0.145	0.72	0.36	4.70	0.286		9.8
31/10/89	16:00	7.45	664	14.0									0.108	0.47	0.76	2.68	0.431		8.8
16/11/89	16:00	7.45	950	16.0									0.017	4.78	0.75	6.25	0.313		8.4
13/12/89	10:57	7.05	875	15.0	0.0	87.9	22.3	207.0	72.8	16.0	3.7	33.1	0.140	0.80	1.10	5.72	0.323		9.0
9/01/90	15:50	7.75	943	21.4									0.119	0.90	0.68	3.75	0.334		-0.010
13/02/90	13:20	7.60	795	18.4									0.089	0.65	0.62	1.91	0.466		-0.005
9/03/90	11:40	7.35	586	15.0	0.0	90.3	24.5	167.1	63.7	13.8	3.5	33.1	0.095	0.93	0.99	3.99	0.317		0.030
4/04/90	17:50	7.60	690	17.0									0.127	0.77	0.91	2.59	0.413		8.5
10/05/90	15:30	7.95	780	13.0									0.135	0.99	0.93	3.80	0.478		9.5
19/06/90	12:20	7.50	800	9.5	0.0	75.1	38.6	259.8	82.7	16.4	6.0	54.3	0.196	1.32	1.38	5.03	0.883		10.3
5/07/90	13:45	7.05	933	9.0									0.212	1.18	1.11	5.20	0.391		10.4
16/08/90	11:02	7.80	776	7.5									0.185	1.69	1.44	4.32	0.634		10.6
13/09/90	13:35	7.25	735	14.0	0.0	81.8	31.2	249.0	71.4	17.6	5.4	47.4	0.236	1.30	1.06	8.76	0.724		9.8
17/10/90	14:30	7.95	542	15.0									0.164	0.94	0.78	3.63	0.554		9.4

ESTACION : RIO TURBIO EN HUANTA (Continuación)
 CODIGO BNA : 04306800-8
 CUENCA : RIO ELOUI

LATITUD S : 29 51
 LONGITUD W : 70 23

ALTITUD : 1190 msnm

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/MO3 mg/l 6242	Oxígeno mg/l 6001	P/POL mg/l 6220
28/11/90	14:15	8.00	798	20.0									0.209	0.95	1.07	2.71	0.559	8.4	0.019
20/12/90	15:00	7.90	814	21.5	0.0	108.0	26.9	182.5	68.4	13.2	4.0	40.9	0.090	0.97	0.74	2.35	0.429	8.1	0.013
8/01/91	14:45	7.70	740	22.0									0.085	0.31	0.74	2.45	0.485	8.4	0.011
20/02/91	12:00	7.40	625	16.0									0.242	0.50	1.00	11.80	0.566	8.7	<0.010
21/03/91	12:20	7.65	665	17.0	0.0	87.2	29.0	220.0	66.8	13.2	4.5	43.2	0.108	0.98	1.66	10.60	0.603	8.6	<0.010
10/04/91	14:20	7.85	776	15.0									0.338	0.98	2.32	14.72	0.553	9.4	<0.010
15/04/91	14:55	7.60	1060	10.0									0.263	0.81	1.59	10.78	0.609	10.0	<0.010
12/06/91	14:00	7.55	955	10.5	0.0	69.5	45.7	330.4	88.0	17.6	6.7	61.6	0.232	1.44	1.71	6.43	0.774	10.3	0.056
24/07/91	13:15	7.35	928	8.0									0.165	2.15	0.91	5.14	0.675	10.3	<0.010
28/08/91	11:00	7.55	896	10.0									0.193	2.31	0.75	5.80	0.662	9.5	<0.010
25/09/91	14:18	7.30	23	15.0	0.0	74.4	31.9	230.5	73.6	14.0	5.0	52.4	0.120	0.94	1.41	4.18	0.771	8.7	0.017
16/10/91	12:20	7.60	860	10.5									0.124	0.68	0.74	6.24	0.469	9.2	<0.010
20/11/91	16:10	7.35	652	17.5									0.151	0.53	1.35	13.30	0.360	8.7	<0.010
11/12/91	16:41	7.25	533	15.5	0.0	62.9	18.1	180.1	63.3	11.8	3.6	28.5	0.124	1.72	2.40	7.80	0.425	8.8	<0.010
8/01/92	11:38	7.45	632	15.0									0.101	0.73	1.65	8.77	0.319	8.4	<0.010
20/02/92	9:45	7.50	468	15.0									0.073	0.72	0.75	3.20	0.451	8.9	<0.010
12/03/92	15:50	7.30	515	18.5	0.0	86.0	23.0	150.0	58.6	11.9	3.2	29.4	0.131	0.15	0.96	2.95	0.517	8.5	<0.010
8/04/92	17:05	7.70	547	14.0									0.067	0.75	0.51	2.35	0.471	9.5	<0.010
19/05/92	9:25	7.25	725	7.0									0.070	0.95	0.70	2.60	0.483	10.5	<0.010
16/06/92	10:50	8.07	528	5.0	0.0	78.7	23.0	187.3	61.7	13.4	3.9	35.9	0.228	0.72	1.54	5.02	0.884	10.9	0.026
16/07/92	10:51	7.20	910	4.0									0.128	0.20	0.71	3.35	0.425	11.2	0.038
12/08/92	9:25	7.25	642	6.0									0.061	0.82	0.55	3.05	0.520	10.7	0.018
8/09/92	10:00	7.40	558	8.0	0.0	81.2	22.4	156.0	61.3	10.8	3.3	34.0	0.123	0.60	0.89	3.35	0.194	10.2	<0.010
29/10/92	11:05	6.95	583	11.0									0.321	0.38	0.04	0.05	0.472	10.3	<0.010
23/11/92	12:08	6.75	370	11.5									0.136	0.22	1.64	8.90	0.460	9.3	<0.010
18/12/92	11:44	6.95	485	13.0	0.0	67.7	11.3	131.1	49.5	9.7	3.4	19.6	0.512	0.65	0.03	0.08	0.393	9.5	<0.010
6/01/93	11:40	7.15	384	14.0									0.435	0.30	1.60	33.10	0.423	9.6	<0.010
18/02/93	12:20	7.20	415	14.0									0.078	0.09			0.339	9.6	<0.010
21/04/93	11:20	7.10	471	10.0									0.085	0.41	0.57	3.96	0.405	9.8	0.042
Nº DE DATOS		76	76	76	25	25	25	25	25	25	25	25	74	70	75	75	72	72	65
PROMEDIO		7.64	662	12.3	0.0	84.2	23.1	199.3	68.4	14.2	3.9	34.7	0.143	0.87	0.81	5.63	0.519	9.5	0.008
MÍNIMO		6.75	23	4.0	0.0	62.9	8.5	74.0	47.1	6.9	2.0	12.4	0.017	0.09	0.00	0.05	0.169	8.1	0.000
MÁXIMO		8.15	1060	22.0	0.0	116.0	45.7	557.0	169.0	39.0	6.7	61.6	0.512	4.78	2.40	50.50	1.970	11.4	0.056
DESV. STD.		0.34	194	4.3	0.0	11.7	8.2	90.2	23.0	5.6	1.3	11.1	0.086	0.65	0.49	7.22	0.272	0.8	0.010

ESTACION : RIO CLARO EN MONTEGRANDE
 CODIGO BMA : 04314800-1
 CUENCA : RIO ELQUI

LATITUD S : 30 05
 LONGITUD W : 70 30

ALTITUD : 1120 msnm

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/NO3 mg/l 6242	Oxigeno mg/l 6001	P/PO4 mg/l 6220	
7/10/81	11:35	7.83	255		0.0	88.5	10.3	34.6	34.7	5.8	2.7	10.3	0.012	1.50	0.00	0.32				
4/11/81	12:30	7.71	226		0.0	72.6	5.3	31.7	28.5	5.0	1.2	8.1	0.000	1.35	0.00	0.31	0.000			
12/11/81	20:00	7.60	219		0.0	84.2	7.1	26.4	30.5	5.0	1.2	7.8	0.000	1.50	0.04	0.38	0.000			
1/12/81	11:15	7.39	228		0.0	84.8	9.6	41.3	28.5	7.3	0.8	8.7	0.000	0.35	0.00	0.14	0.350			
6/01/82	9:15	8.24	228		0.0	84.2	7.1	42.3	22.0	12.9	0.8	9.9	0.009	1.35	0.00	0.12				
9/02/82	16:50	7.94	232															0.219		
11/03/82	10:25	7.60	222		0.0	72.0	5.3	48.0	30.1	7.1	0.8	9.2	0.020	1.68	0.00	0.29	0.043			
2/04/82	11:20	7.56	205		0.0	76.3	4.6	46.6	30.1	6.1	1.2	7.4	0.009	0.00	0.02	0.17				
7/07/82	10:50	7.58	204		0.0	102.0	4.6	24.0	28.1	6.1	0.8	8.1								
11/01/83	13:20	7.30	193		0.0	85.4	3.6	18.3	23.8	7.3	1.2	4.8	0.005		0.04	0.64				
Nº DE DATOS		10	10		9	9	9	9	9	9	9	9	8	7	8	8	5			
PROMEDIO		7.68	221		0.0	83.3	6.4	34.8	28.5	6.9	1.2	8.2	0.007	1.10	0.01	0.30	0.122			
MINIMO		7.30	193		0.0	72.0	3.6	18.3	22.0	5.0	0.8	4.8	0.000	0.00	0.00	0.12	0.000			
MAXIMO		8.24	255		0.0	102.0	10.3	48.0	34.7	12.9	2.7	10.3	0.020	1.68	0.04	0.64	0.350			
DESV. STD.		0.26	17		0.0	8.7	2.2	9.9	3.5	2.3	0.6	1.5	0.005	0.44	0.01	0.16	0.116			

ESTACION : RIO RAPEL EN PALOMA
 CODIGO BMA : 04522800-2
 CUENCA : RIO LIMARI

LATITUD S : 30 45
 LONGITUD W : 70 37

ALTITUD : 1200 msnm

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/NO3 mg/l 6242	Oxigeno mg/l 6001	P/PO4 mg/l 6220
25/03/85	17:26	8.41	1161	13.5	0.0	248.0	171.0	124.0	46.1	40.7	7.4	130.0			0.00	0.07			
25/06/85	17:35	7.81	239	9.5	0.0	87.9	9.2	39.4	42.1	2.4	1.2	3.7			0.00	0.09			
25/09/85	17:15	8.02	251	13.0	0.0	90.9	7.1	49.0	43.5	2.4	1.2	7.4	0.003	1.12	0.00	1.86			
11/06/86	16:00	7.84	270	21.0	0.0	105.0	6.7	45.6	43.5	3.7	1.2	6.9			0.00	0.15			8.8
17/12/86	18:00	8.55	360	16.0	0.0	87.3	3.6	80.7	47.3	5.0	1.6	6.9			0.00	0.00			8.8
25/03/87	17:00	7.78	370	14.0	0.0	104.0	2.8	73.0	50.5	5.2	1.2	11.3	0.013	0.29	0.01	0.08	0.049	8.6	0.005
26/04/87	14:30	7.90	330	9.0	0.0	110.0	5.3	65.8	50.5	5.4	1.2	7.4	0.053	0.54	0.03	0.21	0.473	9.8	0.014
15/03/88	16:00	6.85	229	13.0	0.0	71.4	6.7	41.8	33.7	3.8	0.7	5.1	0.006	0.16	0.01	0.13	0.236		0.005
17/04/89	15:05	7.40	312	15.0	0.0	116.0	5.3	58.0	51.5	4.8	1.1	8.3	0.005	0.02	0.03	1.23	0.032		0.008
28/06/89	17:40	7.65	330	9.0	0.0	147.0	7.1	41.8	53.0	5.4	1.1	8.3	0.005	0.05	0.02	0.07	0.250		0.005
29/09/89	10:00	7.50	204	10.0	0.0	67.1	7.4	33.1	29.8	3.2	1.0	6.4	0.005	0.16	0.01	0.16	0.020		0.005
12/03/92	14:20	8.10	370	15.0	0.0	97.0	9.6	70.1	50.5	5.2	1.3	7.8	<0.005	<0.02	0.02	0.15	0.149	7.8	<0.010
11/04/92	16:13	8.08	294	8.0	0.0	84.8	4.9	48.0	37.7	3.7	1.2	5.8	<0.005	0.10	0.01	0.34	0.327		0.018
14/09/92	16:00	6.60	204	9.5	0.0	68.9	3.8	33.1	27.7	3.0	0.5	5.8	0.005	0.11	0.01	0.16	0.260	9.4	<0.010
11/12/92	13:50	7.60	255	12.5	0.0	71.4	6.0	36.5	31.0	3.4	0.3	5.1	0.007	0.14	0.02	0.41	0.278	8.6	0.014
Nº DE DATOS		15	15	14	15	15	15	15	15	15	15	15	11	11	15	15	10	6	10
PROMEDIO		7.74	346	12.8	0.0	103.8	17.5	54.0	42.6	6.5	1.5	15.1	0.009	0.24	0.01	0.34	0.207	8.8	0.007
MINIMO		6.60	204	8.0	0.0	67.1	3.6	33.1	27.7	2.4	0.3	3.7	0.000	0.00	0.00	0.00	0.020	7.8	0.000
MAXIMO		8.95	1161	21.0	0.0	248.0	171.0	124.0	53.0	40.7	7.4	130.0	0.055	1.12	0.03	1.86	0.471	9.8	0.018
DESV. STD.		0.50	225	3.3	0.0	43.7	41.1	23.3	8.3	9.2	1.6	50.8	0.014	0.30	0.01	0.49	0.135	0.6	0.005

ESTACION : RIO RAPEL EN JUNTA ANTES RIO GRANDE
 CODIGO BNA : 04522801-0
 CUENCA : RIO LIMARI

LATITUD S : 30 42
 LONGITUD W : 70 52

ALTITUD : 480 msnm

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/NO3 mg/l 6242	Oxigeno mg/l 6001	P/PO4 mg/l 6220	
31/12/82	10:55	7.38	441	18.5	0.0	221.0	12.4	60.0	49.7	26.0	1.2	16.1								
25/02/83	18:20	8.62	397	21.0	0.0	158.0	7.1	72.0	44.3	13.5	2.0	20.2								
5/04/83	18:30	7.84	454	19.0	0.0	214.0	7.1	66.3	60.1	15.8	2.0	19.3								
29/06/83	15:30	8.22	488	14.0	0.0	134.0	7.1	52.8	36.1	12.8	1.6	17.5								
6/09/83	12:40	8.20	306	14.0	0.0	115.0	6.7	51.9	30.1	15.8	1.2	10.1								
Nº DE DATOS		5	5	5	5	5	5	5	5	5	5	5								
PROMEDIO		8.05	417	17.3	0.0	168.4	8.1	60.6	44.1	16.8	1.6	16.6								
MINIMO		7.38	306	14.0	0.0	115.0	6.7	51.9	30.1	12.8	1.2	10.1								
MAXIMO		8.62	488	21.0	0.0	221.0	12.4	72.0	60.1	26.0	2.0	20.2								
DESV. STD.		0.42	63	2.8	0.0	42.4	2.2	7.7	10.5	4.8	0.4	3.6								

ESTACION : RIO COMBARBALA EN COMBARBALA
 CODIGO BNA : 04532802-3
 CUENCA : RIO LIMARI

LATITUD S : 31 10
 LONGITUD W : 71 00

ALTITUD : 875 msnm

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/NO3 mg/l 6242	Oxigeno mg/l 6001	P/PO4 mg/l 6220
18/11/81	14:30	8.57	502		0.0	292.0	24.5	9.1	59.1	16.5	6.3	32.2	0.004	2.17	0.11	0.46			
28/01/82	13:00	7.86	535		0.0	331.0	13.5	10.6	67.1	18.4	2.0	30.6	0.000	2.00	0.09	0.15			
23/02/83	15:30	8.28	239	25.5	0.0	155.0	5.3	0.0	32.3	4.9	1.6	13.8			0.02	0.82			
12/04/83	9:35	7.89	297	17.5	0.0	183.0	3.6	8.2	32.1	12.2	2.0	16.6			0.02	0.21			
16/06/83	11:55	8.11	237	15.0	0.0	140.0	9.2	2.4	30.1	6.7	1.2	12.0			0.00	0.13			
Nº DE DATOS		5	5		5	5	5	5	5	5	5	5			5	5			
PROMEDIO		8.14	362		0.0	220.2	11.2	6.1	44.1	11.7	2.6	21.0			0.05	0.35			
MINIMO		7.86	237		0.0	140.0	3.6	0.0	30.1	4.9	1.2	12.0			0.00	0.13			
MAXIMO		8.57	535		0.0	331.0	24.5	10.6	67.1	18.4	6.3	32.2			0.11	0.82			
DESV. STD.		0.26	130		0.0	76.8	7.5	3.1	15.7	5.3	1.9	8.6			0.04	0.26			

ESTACION : RIO COMBARBALA DESPUES PLANTA ENAMI
 CODIGO BNA : 04532803-1
 CUENCA : RIO LIMARI

LATITUD S : 31 08
 LONGITUD W : 71 02

ALTITUD : 825 msnm

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/NO3 mg/l 6242	Oxigeno mg/l 6001	P/PO4 mg/l 6220
18/11/81	12:40	7.66	570		0.0	149.0	17.4	146.0	76.2	19.6	3.1	22.3	0.000	1.00	0.10	0.20			
15/12/82	20:45	6.63	61		0.0	37.8	2.8	4.8	12.0	1.8	0.4	3.5			0.02	0.35			
23/02/83	17:05	8.26	275	28.0	0.0	136.0	5.3	20.2	52.3	7.3	1.6	14.7			0.07	1.00			
12/04/83	12:50	7.72	352	21.5	0.0	183.0	9.2	38.4	44.1	11.5	2.0	18.4			0.06	0.16			
15/06/83	19:15	7.44	312	16.0	0.0	168.0	9.2	19.2	38.1	9.7	1.6	16.6			0.12	0.16			
09/09/83	10:30	7.59	243	13.0	0.0	130.0	6.7	8.7	28.1	7.9	1.2	12.0							
Nº DE DATOS		6	6		6	6	6	6	6	6	6	6			6	6			
PROMEDIO		7.55	302		0.0	134.0	8.5	39.5	38.5	9.6	1.6	14.6			0.07	0.41			
MINIMO		6.63	61		0.0	37.8	2.8	4.8	12.0	1.8	0.4	3.5			0.02	0.16			
MAXIMO		8.26	570		0.0	183.0	17.4	146.0	76.2	19.6	3.1	22.3			0.12	1.00			
DESV. STD.		0.48	151		0.0	44.6	4.6	48.8	19.6	5.4	0.8	5.9			0.05	0.50			

ESTACION : ESTERO EL INGENIO ANTES MINA LA COCINERA
 CODIGO BNA : 04551800-0
 CUENCA : RIO LIMARI

LATITUD S : 30 24
 LONGITUD W : 71 12

ALTITUD : 300 msnm

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/NO3 mg/l 6242	Oxigeno mg/l 6001	P/PO4 mg/l 6220
20/11/81	15:00	7.53	965		0.0	398.0	85.1	77.8	67.1	44.0	4.7	93.1	0.000	1.83	0.07	0.23			
15/01/82	11:35	7.79	957		0.0	408.0	79.8	75.9	68.1	41.6	4.7	99.3	0.000	1.50	0.07	0.15			
23/12/82	13:45	7.55	946	20.5	0.0	297.0	145.0	100.0	65.7	44.9	2.7	97.7			0.06	0.07			
16/02/83	17:25	8.73	777	21.0	0.0	272.0	72.7	92.2	24.2	36.7	2.7	91.0			0.03	0.23			
15/04/83	15:40	7.74	986	21.0	0.0	323.0	102.0	96.1	44.1	46.8	3.5	96.6			0.00	0.52			
17/06/83	11:45	7.77	948	15.0	0.0	354.0	81.5	69.6	48.1	40.7	3.5	87.4			0.01	0.09			
29/09/83	10:40	7.75	1146	15.5	0.0	235.0	113.0	179.0	30.1	51.1	28.5	99.3			0.00	0.19			
N° DE DATOS		7	7	5	7	7	7	7	7	7	7	7			7	7			
PROMEDIO		7.84	961	18.6	0.0	326.7	97.0	98.7	49.6	43.7	7.2	94.9			0.03	0.21			
MINIMO		7.53	777	15.0	0.0	235.0	72.7	69.6	24.2	36.7	2.7	87.4			0.00	0.07			
MAXIMO		8.73	1146	21.0	0.0	408.0	145.0	179.0	68.1	51.1	28.5	99.3			0.07	0.52			
DESV. STD.		0.38	99	2.7	0.0	59.4	23.5	34.4	16.8	4.3	8.7	4.2			0.02	0.14			

ESTACION : ESTERO EL INGENIO DESPUES MINA LA COCINERA
 CODIGO BNA : 04551802-7
 CUENCA : RIO LIMARI

LATITUD S : 30 33
 LONGITUD W : 71 11

ALTITUD : 260 msnm

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/NO3 mg/l 6242	Oxigeno mg/l 6001	P/PO4 mg/l 6220
20/11/81	15:15	2.54	4616		0.0	0.0	347.0	2551.0	351.0	397.0	9.4	175.0	0.000	1.67	15.30	164.00			
15/01/82	11:50	2.66	4612		0.0	0.0	286.0	2551.0	351.0	446.0	11.7	177.0	0.017	2.65	13.20	267.00			
23/12/82	14:02	4.79	2899	26.0	0.0	9.8	177.0	1801.0	299.0	309.0	8.2	140.0			22.60	112.00			
15/04/83	15:55	6.12	3346	20.0	0.0	54.9	418.0	1258.0	316.0	228.0	9.0	166.0			151.00	4786.00			
17/06/83	11:55	6.94	3115	18.0	0.0	183.0	381.0	805.0	251.0	182.0	8.6	162.0			45.00	1540.00			
29/09/83	11:50	5.35	3385	17.0	0.0	92.7	247.0	1643.0	321.0	243.0	7.8	184.0			15.00	835.00			
N° DE DATOS		6	6		6	6	6	6	6	6	6	6			6	6			
PROMEDIO		4.73	3662		0.0	56.7	309.3	1768.2	314.8	300.8	9.1	167.5			43.68	1284.00			
MINIMO		2.54	2899		0.0	0.0	177.0	805.0	251.0	182.0	7.8	140.0			13.20	112.00			
MAXIMO		6.94	4616		0.0	183.0	418.0	2551.0	351.0	446.0	11.7	184.0			151.00	4786.00			
DESV. STD.		1.65	692		0.0	56.9	82.0	636.4	34.1	94.1	1.3	14.2			49.19	1642.83			

ESTACION : RIO LIMARI EN SAN JULIAN
 CODIGO BNA : 04552800-6
 CUENCA : RIO LIMARI

LATITUD S : 30 38
 LONGITUD W : 71 20

ALTITUD : 120 msnm

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/NO3 mg/l 6242	Oxigeno mg/l 6001	P/PO4 mg/l 6220
27/03/85	16:00	8.17	332	19.0	0.0	136.0	22.0	20.7	42.1	5.5	2.4	15.2			0.00	0.14			
28/06/85	11:00	8.21	356	14.0	0.0	145.0	27.7	26.9	44.1	7.3	2.4	16.6			0.00	0.07			
26/09/85	14:20	8.71	589	20.0	0.0	151.0	72.3	80.7	49.5	14.3	3.9	62.5	0.004	1.92	0.00	0.58			
24/03/86	14:00	7.71	750	20.0	0.0	248.0	96.1	96.1	67.3	22.9	4.7	76.3			0.01	0.10			
18/07/86	17:25	7.87	840	15.0	0.0	336.0	73.0	137.0	71.3	40.8	5.9	71.3			0.01	0.18			
30/12/86	20:30	7.37	796	24.5	0.0	237.0	87.9	93.7	67.1	17.1	5.1	74.9			0.00	0.05		9.2	
31/03/87	16:10	8.63	700	25.0	0.0	202.0	78.3	72.5	50.5	15.3	3.5	69.9	0.014	0.34	0.01	0.29	0.297		0.092
30/06/87	13:15	8.10	950		0.0	268.0	113.0	110.0	85.4	21.1	4.3	91.0	0.015	0.53	0.00	0.08	0.946	12.2	0.142
30/09/87	17:30	8.32	318	19.0	0.0	131.0	13.8	32.7	39.1	7.8	1.6	15.9	0.007	0.26	0.03	0.31	0.724		0.059
10/07/89	10:40	8.35	900	19.0	0.0	269.0	101.0	106.0	85.5	19.2	4.5	84.2	0.005	0.18	0.03	0.07	0.966		0.152
29/09/89	15:40	8.45	850	24.5	3.0	147.0	128.0	105.0	54.6	19.6	3.9	90.2	0.005	0.31	0.01	0.03	0.162		0.049
Nº DE DATOS		11	11	10	11	11	11	11	11	11	11	11	6	6	11	11	5		5
PROMEDIO		8.17	671	20.0	0.3	206.4	73.9	80.1	59.7	17.3	3.8	60.7	0.008	0.59	0.01	0.17	0.619		0.099
MINIMO		7.37	318	14.0	0.0	131.0	13.8	20.7	39.1	5.5	1.6	15.2	0.004	0.18	0.00	0.03	0.162		0.049
MAXIMO		8.71	950	25.0	3.0	336.0	128.0	137.0	85.5	40.8	5.9	91.0	0.015	1.92	0.03	0.58	0.966		0.152
DESV. STD.		0.38	225	3.6	0.8	66.2	36.1	36.3	15.9	9.3	1.2	28.6	0.004	0.60	0.01	0.16	0.332		0.042

ESTACION : ESTERO CUNCLUMEN EN CHACAY
 CODIGO BNA : 04704800-1
 CUENCA : RIO CHOAPA

LATITUD S : 31 49
 LONGITUD W : 70 36

ALTITUD : 1450 msnm

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/NO3 mg/l 6242	Oxigeno mg/l 6001	P/PO4 mg/l 6220
5/06/80	16:30	7.19	373		0.0	48.2	13.5	134.0	55.1	9.7	1.6	8.5							
3/07/80	17:10	7.23	439		0.0	54.3	12.1	144.0	59.3	8.5	0.8	13.6							
5/08/80	14:30	7.08	380		0.0	54.3	8.5	128.0	49.7	6.7	0.8	12.6							
23/01/81	9:10	7.16	274		0.0	36.6	13.5	94.1	40.9	4.7	1.2	6.7			0.38	1.30			
26/02/81	9:35	7.13	332		0.0	36.6	11.7	120.0	47.1	7.7	1.6	8.1			0.45	1.58			
9/01/82	19:00	7.35	549		0.0	45.2	24.1	215.0	79.2	10.0	2.0	19.1			0.92	3.78			
3/03/82	10:50	7.50	500		0.0	32.3	22.7	220.0	82.2	7.3	2.0	14.9			0.95	2.51			
8/04/82		7.48	507		0.0	39.1	20.9	220.0	80.2	9.7	2.0	14.9			1.12	2.52			
Nº DE DATOS		8	8		8	8	8	8	8	8	8	8			5	5			
PROMEDIO		7.27	419		0.0	43.3	15.9	159.4	61.7	8.0	1.5	12.3			0.76	2.34			
MINIMO		7.08	274		0.0	32.3	8.5	94.1	40.9	4.7	0.8	6.7			0.38	1.30			
MAXIMO		7.50	549		0.0	54.3	24.1	220.0	82.2	10.0	2.0	19.1			1.12	3.78			
DESV. STD.		0.15	89		0.0	7.9	5.4	47.6	15.4	1.7	0.5	4.0			0.29	0.87			

ESTACION : ESTERO CAMISAS EN DESEMBOCADURA
 CODIGO BNA : 04714800-6
 CUENCA : RIO CHOAPA

LATITUD S : 31 47
 LONGITUD W : 71 03

ALTITUD : 385 msnm

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	Al mg/l 8043	Soro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/NO3 mg/l 6242	Oxigeno mg/l 6001	P/PO4 mg/l 6220
29/05/80	15:30	7.50	461		0.0	201.0	19.5	61.0	59.3	15.1	1.6	20.0							
25/06/80	15:05	7.79	402		0.0	175.0	16.3	52.8	50.3	14.1	1.6	16.3							
21/08/80	14:20	8.12	406		0.0	163.0	12.1	54.8	44.5	13.2	0.4	21.6							
14/01/81	10:32	7.51	368		0.0	140.0	15.2	54.3	43.1	15.3	2.4	19.3			0.02	0.07			
13/01/82	10:05	7.86	490		0.0	220.0	18.4	61.5	55.7	18.1	1.6	23.7		1.17	0.00	0.00			
18/03/82		7.81	461		0.0	214.0	19.1	80.2	54.1	20.8	2.0	21.8			0.00	0.04			
20/03/89	17:30	6.60	465	21.0	0.0	180.0	16.0	60.0	49.3	14.0	1.8	21.2	0.005	0.49	0.01	0.26	0.233		0.021
6/06/89	13:27	7.75	436	14.0	0.0	180.0	14.9	64.0	51.4	14.5	1.7	20.2	0.005	0.64	0.01	0.12	0.179		0.032
12/09/89	17:30	7.90	380	11.0	0.0	153.0	11.3	60.0	43.7	12.2	1.6	18.2	0.005	0.40	0.01	0.30	0.083		0.017
18/12/89	18:09	8.15	398	18.0	0.0	159.0	11.3	50.0	43.2	12.0	1.8	18.9	0.005	0.50	0.01	0.17	0.095		0.021
26/06/92	16:15	7.80	419	10.0	0.0	176.3	7.1	36.5	36.4	16.7	0.5	16.1	<0.005	0.08	0.02	0.20	0.574	10.1	0.043
Nº DE DATOS		11	11	5	11	11	11	11	11	11	11	11	5	6	8	8	5		5
PROMEDIO		7.71	426	14.8	0.0	178.3	14.7	57.7	48.3	15.1	1.5	19.8	0.004	0.55	0.01	0.15	0.233		0.027
MINIMO		6.60	368	10.0	0.0	140.0	7.1	36.5	36.4	12.0	0.4	16.1	0.000	0.08	0.00	0.00	0.083		0.017
MAXIMO		8.15	490	21.0	0.0	220.0	19.5	80.2	59.3	20.8	2.4	23.7	0.005	1.17	0.02	0.30	0.574		0.043
DESV. STD.		0.40	37	4.2	0.0	23.9	3.7	10.2	6.4	2.5	0.6	2.2	0.001	0.33	0.01	0.09	0.179		0.010

ESTACION : RIO CHOAPA EN LANAHUJIDA
 CODIGO BNA : 04715800-1
 CUENCA : RIO CHOAPA

LATITUD S : 31 44
 LONGITUD W : 71 09

ALTITUD : 275 msnm

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	Al mg/l 8043	Soro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/NO3 mg/l 6242	Oxigeno mg/l 6001	P/PO4 mg/l 6220
29/05/80	12:15	7.55	334		0.0	130.0	14.5	49.0	41.3	11.5	1.6	13.1							
25/06/80	12:00	7.82	330		0.0	139.0	15.2	50.4	42.3	10.9	1.6	12.9							
18/07/80		7.32	382		0.0	127.0	12.1	40.3	42.3	9.7	0.4	19.3							
27/01/81	10:40	7.53	346		0.0	113.0	13.5	51.9	38.9	13.0	1.6	14.7			0.00	0.14			
13/03/81	11:45	7.44	282		0.0	97.6	13.5	44.2	34.9	10.6	1.2	12.6			0.02	0.04			
12/01/82	11:50	8.18	528		0.0	228.0	24.1	61.5	51.3	19.9	2.4	35.2		0.67	0.00	0.00			
4/03/82	10:20	7.76	550		0.0	233.0	26.2	80.2	62.1	19.6	3.5	32.2			0.00	0.03			
13/04/82		8.31	534		0.0	233.0	27.7	82.1	50.1	28.1	2.4	29.9			0.00	0.04			
8/10/82	15:00	7.42	269		0.0	106.0	10.6	33.1	37.9	4.9	0.8	12.0			0.20	0.35			
10/11/82	10:20	7.43	186		0.0	74.4	8.9	22.1	25.9	2.4	0.4	8.3			0.30	3.00			
Nº DE DATOS		10	10		10	10	10	10	10	10	10	10			7	7			
PROMEDIO		7.68	374		0.0	148.1	16.6	51.5	42.7	13.1	1.6	19.0			0.07	0.51			
MINIMO		7.32	186		0.0	74.4	8.9	22.1	25.9	2.4	0.4	8.3			0.00	0.00			
MAXIMO		8.31	550		0.0	233.0	27.7	82.1	62.1	28.1	3.5	35.2			0.30	3.00			
DESV. STD.		0.32	118		0.0	57.1	6.4	18.0	9.4	7.2	0.9	9.2			0.10	1.00			

ESTACION : RIO ILLAPEL EN HUINTEL
 CODIGO BNA : 04723800-5
 CUENCA : RIO CHOAPA

LATITUD S : 31 33
 LONGITUD W : 70 57

ALTITUD : 740 msnm

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/HCO3 mg/l 6242	Oxígeno mg/l 6001	P/PO4 mg/l 6220
30/05/80	12:00	7.35	200		0.0	99.5	8.5	23.5	27.5	9.1	1.6	5.1							
26/06/80	10:25	7.68	234		0.0	115.0	6.4	23.5	29.7	8.3	0.8	5.3							
17/07/80	10:10	7.34	224		0.0	103.0	5.3	13.9	29.7	4.9	0.4	7.4							
12/08/80	10:15	8.02	234		0.0	90.9	5.3	14.4	23.2	9.1	0.4	6.4							
16/01/81	10:00	7.20	144		0.0	48.8	5.0	15.4	18.4	6.0	1.2	4.1			0.03	0.26			
14/01/82	10:15	8.16	231		0.0	130.0	3.2	12.5	29.9	7.4	0.8	9.9		1.17	0.00	0.00			
11/03/82	10:00	7.99	207		0.0	110.0	3.6	24.5	32.1	6.1	0.8	6.9			0.00	0.05			
4/09/86	16:40	8.05	221	14.0	0.0	97.0	5.3	34.1	28.9	4.4	1.2	7.4			0.08	0.23		9.6	
22/06/89	12:16	7.60	268	10.0	0.0	128.0	5.7	26.0	36.0	7.4	1.5	9.2	0.005	0.40	0.01	0.09	0.341		0.021
15/09/89	14:15	8.35	322	12.0	0.0	116.0	5.7	23.0	32.4	6.6	1.4	8.3	0.005	0.53	0.01	0.20	0.226		0.019
26/12/89	18:30	6.75	136	18.0	0.0	30.5	13.1	144.0	61.6	4.3	1.7	11.7	0.011	0.65	0.87	2.07	0.039		0.005
Nº DE DATOS		11	11		11	11	11	11	11	11	11	11			7	7			
PROMEDIO		7.68	220		0.0	97.2	6.1	32.3	31.8	6.7	1.1	7.4			0.14	0.41			
MINIMO		6.75	136		0.0	30.5	3.2	12.5	18.4	4.3	0.4	4.1			0.00	0.00			
MAXIMO		8.35	322		0.0	130.0	13.1	144.0	61.6	9.1	1.7	11.7			0.87	2.07			
DESV. STD.		0.46	49		0.0	29.7	2.6	35.9	10.4	1.7	0.4	2.1			0.29	0.66			

ESTACIONES OCASIONALES

ESTACION : RIO LA LAGUNA EN SALIDA EMBALSE LA LAGUNA
 CODIGO BNA : 04300800-5
 CUENCA : RIO ELQUI

LATITUD S : 30 12
 LONGITUD W : 70 04

ALTITUD : 3125 msnm

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/NO3 mg/l 6242	Oxigeno mg/l 6001	P/PO4 mg/l 6220
13/04/83	12:00	8.65	282	9.0	0.0	88.5	10.3	44.2	27.9	10.9	1.2	9.9	0.007	0.00	0.04				
6/07/83	12:30	9.00	300	3.0	0.0	94.6	9.2	50.4	30.9	7.9	2.7	7.8	0.018	0.00	0.01				
14/02/84	19:30	7.70	281	14.0	0.0	97.6	6.0	35.5	29.5	7.7	1.2	12.4	0.011	0.00	0.30				

ESTACION : RIO TORO ANTES RIO VACAS HELADAS
 CODIGO BNA : 04302806-5
 CUENCA : RIO ELQUI

LATITUD S : 29 54
 LONGITUD W : 70 03

ALTITUD : 2530 msnm

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/NO3 mg/l 6242	Oxigeno mg/l 6001	P/PO4 mg/l 6220
10/80		4.19	1970		0.0	0.0	148.0	951.0	232.0	12.2	13.7	133.0		6.60	1.44	5.00	0.892		

ESTACION : RIO DERECHO ANTES RIO COCHIGUAS
 CODIGO BNA : 04311800-5
 CUENCA : RIO ELQUI

LATITUD S : 30 06
 LONGITUD W : 70 30

ALTITUD : 1120 msnm

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/NO3 mg/l 6242	Oxigeno mg/l 6001	P/PO4 mg/l 6220
11/11/81	19:50	7.70	303		0.0	179.0	7.1	0.0	41.7	6.8	1.2	11.5	0.000	0.84	0.02	0.13	0.477		

ESTACION : RIO COCHIGUAS ANTES ESTERO DERECHO
 CODIGO BNA : 04313800-6
 CUENCA : RIO ELQUI

LATITUD S : 30 06
 LONGITUD W : 70 30

ALTITUD : 1120 msnm

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/NO3 mg/l 6242	Oxigeno mg/l 6001	P/PO4 mg/l 6220
11/11/81	19:40	7.15	205		0.0	56.1	5.3	27.4	26.5	6.2	1.2	7.8	0.000	1.18	0.04	0.30	0.000		

ESTACION : RIO ELQUI EN VICUÑA
 CODIGO BNA : 04320801-2
 CUENCA : RIO ELQUI

LATITUD S : 30 02
 LONGITUD W : 70 43

ALTITUD : 610 msnm

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/HO3 mg/l 6242	Oxígeno mg/l 6001	P/PO4 mg/l 6220
12/11/81	10:10	8.30	454	0.0	121.0	19.1	79.3	-8.7	12.3	2.7	26.4	0.0	1.390	0.15	1.61	0.00			

ESTACION : RIO ELQUI EN PUNTA DE PIEDRA
 CODIGO BNA : 04331800-4
 CUENCA : RIO ELQUI

LATITUD S : 29 57
 LONGITUD W : 71 05

ALTITUD : 165 msnm

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/HO3 mg/l 6242	Oxígeno mg/l 6001	P/PO4 mg/l 6220
12/03/86	17:16	7.20	696	21.0	0.0	203.0	26.6	166.0	87.2	14.5	4.3	39.5	0.012		0.10	0.30	1.290		

ESTACION : RIO MURTADO EN ENTRADA EMBALSE RECOLETA
 CODIGO BNA : 04506800-5
 CUENCA : RIO LIMARI

LATITUD S : 30 28
 LONGITUD W : 71 03

ALTITUD : 425 msnm

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/HO3 mg/l 6242	Oxígeno mg/l 6001	P/PO4 mg/l 6220
8/04/83	12:00	7.98	369	17.0	0.0	143.0	7.1	62.4	50.1	9.7	1.6	14.7			0.00	0.27			

ESTACION : RIO MURTADO SALIDA EMBALSE RECOLETA
 CODIGO BNA : 04506801-3
 CUENCA : RIO LIMARI

LATITUD S : 30 29
 LONGITUD W : 71 05

ALTITUD : 375 msnm

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/HO3 mg/l 6242	Oxígeno mg/l 6001	P/PO4 mg/l 6220
15/01/82	9:50	7.22	400		0.0	156.0	12.1	59.1	57.1	10.3	2.7	15.2	0.003	1.83	0.06	0.10			

ESTACION : RIO PAMA ENTRADA EMBALSE COGOTI
 CODIGO BNA : 04534800-8
 CUENCA : RIO LIMARI

LATITUD S : 31 04
 LONGITUD W : 71 04

ALTITUD : 670 msnm

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/HO3 mg/l 6242	Oxígeno mg/l 6001	P/PO4 mg/l 6220
15/12/82	19:10	6.83	94		0.0	56.7	3.6	7.2	13.0	3.7	0.4	5.8			0.01	0.22			
24/02/83	16:00	8.06	171	24.0	0.0	98.9	4.6	5.8	20.2	4.9	0.8	7.4			0.02	0.24			
29/04/83	13:40	8.15	345	22.0	0.0	140.0	18.0	50.4	34.1	15.8	1.6	20.2			0.00	0.15			

ESTACION : RIO GRANDE EN PALOMA 1
 CODIGO BNA : 04540800-0
 CUENCA : RIO LIMARI

LATITUD S : 30 42
 LONGITUD W : 71 02 ALTITUD : 320 msnm

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/NO3 mg/l 6242	Oxigeno mg/l 6001	P/PO4 mg/l 6220
12/03/86	19:15	8.02	319	17.0	0.0	146.0	8.2	38.9	53.5	4.3	1.6	8.7			0.00	0.31			

ESTACION : RIO LIMARI DESPUES EMBALSE PALOMA
 CODIGO BNA : 04540802-7
 CUENCA : RIO LIMARI

LATITUD S : 30 42
 LONGITUD W : 71 02 ALTITUD : 310 msnm

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/NO3 mg/l 6242	Oxigeno mg/l 6001	P/PO4 mg/l 6220
14/01/81	11:30	7.44	363		0.0	188.0	12.1	29.3	52.1	11.2	2.7	15.4	0.000	1.67	0.03	0.61			
19/11/81	11:30	7.82	455		0.0	217.0	18.1	53.8	60.1	14.7	2.0	21.1	0.000	1.34	0.04	0.08			

ESTACION : RIO LIMARI EN PEÑONES BAJOS
 CODIGO BNA : 04550800-5
 CUENCA : RIO LIMARI

LATITUD S : 30 36
 LONGITUD W : 71 11 ALTITUD : 225 msnm

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/NO3 mg/l 6242	Oxigeno mg/l 6001	P/PO4 mg/l 6220
28/02/83	12:00	8.27	326	19.0	0.0	161.0	13.8	30.3	42.3	10.9	2.0	17.5			0.04	0.28			
13/04/83	12:05	7.66	329	16.0	0.0	165.0	12.8	31.2	42.1	10.9	2.0	17.5			0.03	0.34			
17/06/83	11:20	8.02	542	15.0	0.0	250.0	29.1	37.0	54.1	15.8	2.4	40.5			0.00	0.05			
29/09/83	11:26	8.02	415	16.5	0.0	185.0	2.5	49.5	48.1	11.5	2.0	18.9							
28/12/83	10:40	7.33	381	18.5	0.0	183.0	12.8	39.9	45.9	12.2	2.0	26.4			0.04	0.13			
Nº DE DATOS		5	5	5	5	5	5	5	5	5	5	5							
PROMEDIO		7.86	399	17.0	0.0	188.8	14.2	37.6	46.5	12.3	2.0	26.2							
MINIMO		7.33	326	15.0	0.0	161.0	2.5	30.3	42.1	10.9	2.0	17.5							
MAXIMO		8.27	542	19.0	0.0	250.0	29.1	49.5	54.1	15.8	2.4	40.5							
DESV. STD.		0.33	79	1.5	0.0	32.0	8.5	6.9	4.4	1.8	0.2	8.8							

ESTACION : RIO LIMARI EN PUNTILLA DE OVALLE
 CODIGO BNA : 04550801-3
 CUENCA : RIO LIMARI

LATITUD S : 30 37
 LONGITUD W : 71 13 ALTITUD : 190 msnm

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/NO3 mg/l 6242	Oxigeno mg/l 6001	P/PO4 mg/l 6220
19/11/81	15:20	7.64	450		0.0	178.0	27.3	49.0	43.1	14.7	2.7	33.8	0.000	2.00	0.03	0.18			
14/01/82	15:30	7.76	516		0.0	237.0	24.5	45.2	58.1	14.5	3.5	39.6	0.000	2.00	0.05	0.09			

ESTACION : RIO LIMARI EN BARRAZA
 CODIGO BMA : 04553800-1
 CUENCA : RIO LIMARI

LATITUD S : 50 39
 LONGITUD W : 71 29

ALTITUD : 48 msnm

FECHA	HORA	pH u. pH 6020	Conduct ambos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Hg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/NOS mg/l 6242	Oxigeno mg/l 6001	P/PO4 mg/l 6220
20/12/82	18:15	7.50	730	25.0	0.0	234.0	84.4	80.2	64.7	20.1	3.1	70.8			0.02	0.25			
28/02/83	10:00	8.29	554	22.5	0.0	192.0	52.5	57.6	52.3	17.1	2.7	39.5			0.02	0.50			
13/04/83	14:30	8.42	547	21.0	0.0	195.0	59.9	54.7	54.1	17.0	2.7	43.2			0.04	0.34			
30/06/83	9:40	8.04	1153	13.0	0.0	143.0	230.0	132.0	54.1	38.9	4.3	124.0			0.00	0.04			
26/09/83	11:45	8.25	609	17.0	0.0	159.0	80.1	78.3	54.1	17.0	2.4	54.3							
Nº DE DATOS		5	5	5	5	5	5	5	5	5	5	5							
PROMEDIO		8.10	761	19.7	0.0	183.8	101.4	81.0	56.7	22.0	3.1	66.4							
MINIMO		7.50	554	13.0	0.0	143.0	52.5	54.7	52.3	17.0	2.4	39.5							
MAXIMO		8.42	1153	25.0	0.0	234.0	230.0	132.0	64.7	38.9	4.3	124.0							
DESV. STD.		0.32	218	4.2	0.0	32.3	65.4	27.4	4.3	8.5	0.7	30.8							

ESTACION : RIO CHALINGA EN SAN AGUSTIN
 CODIGO BMA : 04713800-0
 CUENCA : RIO CHOAPA

LATITUD S : 31 42
 LONGITUD W : 70 49

ALTITUD : 990 msnm

FECHA	HORA	pH u. pH 6020	Conduct ambos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Hg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/NOS mg/l 6242	Oxigeno mg/l 6001	P/PO4 mg/l 6220
29/05/80	18:10	7.19	311		0.0	127.0	11.3	46.1	38.1	13.0	2.4	12.2							
25/06/80	17:15	7.48	307		0.0	121.0	12.4	40.8	39.5	6.4	1.6	10.6							
21/08/80	16:30	7.75	312		0.0	115.0	9.2	40.8	33.9	9.7	0.4	14.9							
14/01/81	13:05	7.27	338		0.0	128.0	13.5	42.7	40.9	13.0	2.7	15.6			0.02	0.03			

ESTACION : RIO CHOAPA EN DOÑA JUANA
 CODIGO BMA : 04730800-3
 CUENCA : RIO CHOAPA

LATITUD S : 31 39
 LONGITUD W : 71 20

ALTITUD : 105 msnm

FECHA	HORA	pH u. pH 6020	Conduct ambos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Hg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/NOS mg/l 6242	Oxigeno mg/l 6001	P/PO4 mg/l 6220
16/06/80	17:40	7.98	393		0.0	163.0	19.5	64.8	47.0	11.9	1.6	20.0							
21/01/81	13:00	7.32	332		0.0	119.0	15.2	50.0	34.9	15.3	1.6	16.3			0.02	0.10			
7/01/82	9:30	7.83	548		0.0	200.0	31.2	71.1	50.3	19.3	3.5	41.4			0.00	0.00			
24/02/82		7.66	523		0.0	181.0	36.5	120.0	48.1	22.0	2.7	37.9			0.00	0.00			

ESTACION : RIO CHOAPA EN LA CAÑELA
 CODIGO BMA : 04730801-1
 CUENCA : RIO CHOAPA

LATITUD S : 31 35
 LONGITUD W : 71 28

ALTITUD : 35 msnm

FECHA	HORA	pH u. pH 6020	Conduct ambos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Hg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/NOS mg/l 6242	Oxigeno mg/l 6001	P/PO4 mg/l 6220
16/06/80	17:20	7.84	400		0.0	166.0	16.0	66.3	43.5	17.5	2.4	20.2							
23/07/80	16:00	7.33	384		0.0	139.0	12.1	27.4	40.1	13.2	0.8	19.8							
14/08/80	14:30	7.69	380		0.0	139.0	15.4	42.3	40.1	9.7	0.8	21.6							

ESTACIONES SIN IDENTIFICACION

ESTACION : ESTACION : 2-D (DREN G) TRANQUE EL INDI0

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/HO3 mg/l 6242	Oxigeno mg/l 6001	P/PO4 mg/l 6220
9/01/90	9:22	4.35	2009	8.0									0.032		3.53	10.44			
13/02/90	9:50	3.65	1955	9.0									0.013		3.62	8.59			
9/03/90	9:15	3.80	2100	8.5	0.0	0.0	9.6	1056.7	285.6	29.6	22.4	99.4			3.45	8.11			
4/04/90	10:03	4.00	1853	9.0									0.017		3.57	13.10			6.4
19/06/90	9:45	4.00	1883	8.0	0.0	0.0	9.9	819.9	208.8	26.4	18.8	74.5	0.565		11.16	24.50			6.6
5/07/90	9:55	4.30	2140	8.5									0.047	1.14	3.25	11.70			6.5
17/08/90	9:50	3.90	1986	8.0									0.049		2.70	5.65			6.8
13/09/90	9:35	3.95	2124	8.0	0.0	0.0	12.4	999.0	260.5	33.0	18.1	191.2	0.030		2.50	2.73			6.7
18/10/90	9:35	3.85	1834	7.5									0.083		2.81	8.20			6.8
28/11/90	10:01	3.95	1856	8.5									0.026		2.92	8.29			6.8
20/12/90	9:15	4.15	1738	8.0	0.0	0.0	27.6	925.1	281.6	30.0	43.3	99.8	0.029		2.77	6.46			6.0
8/01/91	9:22	4.20	1835	8.0									0.056		2.79	8.32			6.6
19/02/91	16:20	4.15	1810	10.0									0.073		2.76	9.39			6.1
20/03/91	15:35	4.15	1940	10.0	0.0	0.0	13.8	1200.0	256.0	28.0	26.5	99.4	0.031		2.69	5.61			6.4
9/04/91	16:22	3.85	1834	9.0									0.046		2.60	10.55			6.4
14/04/91	15:40	4.15	1982	8.5									0.051		2.53	9.81			6.5
10/05/91	9:50	4.10	1711	9.0									0.040	1.09	3.43	11.95			6.3
11/06/91	17:15	4.05	1945	8.0	0.0	0.0	13.8	1248.0	267.0	28.5	27.0	102.1	0.026		2.54	6.28			6.4
27/08/91	14:15	4.60	1975	8.5									0.060		2.11	10.49			6.2
26/09/91	9:37	4.75	2041	7.5	0.0	0.0	17.0	1200.0	270.0	26.0	30.0	99.4	0.059		1.97	5.42			5.8
15/10/91	16:50	4.65	1955	8.0									0.053		2.09	8.02			6.1
20/11/91	9:36	4.30	2055	7.5									0.037		2.20	9.05			6.2
11/12/91	9:33	4.20	2243	7.0	0.0	0.0	16.0	1099.9	301.5	28.5	22.0	103.5	0.056		2.00	7.78			6.9
19/02/92	10:05	4.30	1995	8.0									0.040		2.65	11.20			6.9
12/03/92	9:58	3.95	2150	8.0	0.0	0.0	18.0	1277.0	308.4	27.2	35.5	104.0	0.073		2.61	11.75			6.9
8/04/92	9:30	4.00	1908	8.0									0.044		2.45	10.90			6.7
19/05/92	15:22	4.05	2200	8.0									0.051		2.60	11.11			7.0
29/10/92	9:05	4.20	1703	6.0									0.048		1.90	10.89			7.7
25/11/92	8:57	4.40	1705	6.0									0.047		2.10	12.74			7.3
18/12/92	8:50	4.70	1962	6.0	0.0	0.0	8.1	1037.4	255.0	25.5	41.0	90.6	0.092		1.91	6.88			7.0
6/01/93	9:15	4.15	1920	6.0									0.063		2.07	11.16			7.4
18/02/93	9:20	4.10	1616	7.0									0.085						7.3
22/04/93	9:22	3.85	1815	7.5									0.093		2.09	12.27			7.3
Nº DE DATOS		33	33	33	10	10	10	10	10	10	10	10	32		32	32			30
PROMEDIO		4.14	1933	8.0	0.0	0.0	14.6	1086.3	269.4	28.3	28.5	97.4	0.066		2.89	9.67			6.6
MINIMO		3.65	1616	6.0	0.0	0.0	8.1	819.9	208.8	25.5	18.1	74.5	0.013		1.90	2.73			5.8
MAXIMO		4.75	2243	10.0	0.0	0.0	27.6	1277.0	308.4	33.0	43.3	104.0	0.565		11.16	24.50			7.7
DESV. STD.		0.26	149	1.0	0.0	0.0	22.8	1653.4	409.5	42.9	44.0	147.9	0.093		1.65	4.00			2.1

ESTACION : ESTERO CHALINGA EN LA PALMILLA

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/NO3 mg/l 6242	Oxigeno mg/l 6001	P/PO4 mg/l 6220	
17/01/92	17:10	8.10	159	15.0	0.0	33.5	7.8	26.8	16.8	2.2	0.5	5.8	0.013	0.04	0.06	4.01	0.520		<0.010	
23/03/92	16:30	8.20	152	13.0	0.0	39.7	5.3	26.9	17.5	2.6	0.5	7.1	0.008	0.06	0.01	3.29	0.303	12.0	<0.010	
15/06/92	15:20	6.60	188	6.8	0.0	44.5	6.7	32.6	19.7	3.1	0.5	7.4	0.005	0.22	0.01	0.37	0.484	13.2	<0.010	
14/09/92	16:35	7.35	158	9.8	0.0	48.8	5.6	28.8	19.7	2.6	0.4	6.9	<0.005	0.06	0.01	0.17	0.743	8.8	<0.010	
7/12/92	16:04	7.85	156	12.8	0.0	43.9	6.7	17.7	14.5	2.4	0.9	6.2	0.009	0.11	0.03	0.21	0.115		0.036	
21/01/93	16:30	7.55	186	25.0	0.0	39.0	6.7	24.0	15.9	2.4	1.1	6.7	0.013	0.26	0.02	0.33	0.182		0.055	
15/03/93	17:00	7.50	175	19.0	0.0	41.5	7.8	28.8	16.9	2.3	1.3	8.7	0.009	1.22	0.02	0.33	0.743		0.033	
Nº DE DATOS		7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
PROMEDIO		7.51	164	12.9	0.0	41.6	6.7	26.5	17.3	2.5	0.7	7.0	0.008	0.28	0.02	0.82	0.441		0.018	
MINIMO		6.65	136	6.0	0.0	33.5	5.3	17.7	14.5	2.2	0.4	5.8	<0.005	0.04	0.01	0.17	0.115		<0.010	
MAXIMO		8.20	188	25.0	0.0	48.8	7.8	32.6	19.7	3.1	1.3	8.7	0.013	1.22	0.06	0.41	0.743		0.055	
DESV. STD.		0.50	18	5.6	0.0	4.5	0.9	4.3	1.8	0.3	0.3	0.9	0.004	0.39	0.02	1.31	0.234		0.021	

ESTACION : ESTERO PUNITAQUI EN DESEMBOCADURA

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/NO3 mg/l 6242	Oxigeno mg/l 6001	P/PO4 mg/l 6220
13/03/92	14:20	8.30	1730	25.0	0.0	245.3	312.0	170.0	72.7	60.1	7.5	187.7	<0.005	<0.02	0.01	0.02	0.011	11.9	<0.010
10/06/92	14:35	8.86	1305	15.5	0.0	242.2	191.1	135.0	75.1	43.4	7.9	125.0	<0.005	0.06	0.03	0.92	1.601		0.216
4/09/92	10:50	6.60	1264	17.0	0.0	250.8	154.2	110.0	59.0	39.2	2.4	112.2	0.007	0.15	0.02	0.44	1.365	8.4	0.132
18/12/92	14:00	8.00	1530	25.0	0.0	165.9	240.7	176.3	40.6	53.0	2.8	154.6	<0.005	0.12	0.02	0.04	0.388	12.4	<0.010

ESTACION : RIO CUNCUENEN ANTES QUEBRADA EL CHIMCHE

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/NO3 mg/l 6242	Oxigeno mg/l 6001	P/PO4 mg/l 6220
23/02/92	19:00	8.30	260	15.0															
4/06/92		8.02	333		0.0	51.2	14.2	96.1	46.9	3.7	1.9	9.7	<0.005	<0.02	0.50	0.71			
11/02/93	17:30	7.45	300	15.0	0.0	75.0	6.3	91.0	52.0	2.4	1.6	7.8	0.008	0.03	0.37	1.10	1.120		<0.010

ESTACION : RIO CUNCUENEN ANTES RIO CHOAPA

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/NO3 mg/l 6242	Oxigeno mg/l 6001	P/PO4 mg/l 6220
23/02/92	17:00	7.55	330	22.0															
4/06/92		7.55	332		0.0	69.6	14.2	70.1	45.1	4.9	1.8	10.6	<0.005	0.06	0.23	0.34			
11/02/93	16:30	7.10	324	20.0	0.0	93.2	6.0	74.0	47.5	3.6	1.7	10.6	0.008	0.18	0.11	0.80	0.980		<0.010

ESTACION : RIO ELQUI EN PUENTE LAS ROJAS

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/NO3 mg/l 6242	Oxígeno mg/l 6001	P/PO4 mg/l 6220
12/03/90	16:45	7.75	645	24.0	0.0	138.5	24.8	169.5	76.1	15.9	3.7	35.9		1.03	0.02	0.10	0.608		0.039
15/06/90	13:00	8.10	550	15.0	0.0	87.9	25.2	155.1	50.6	14.6	3.7	39.6	0.006	0.98	0.05	0.23	1.206	10.6	<0.010
14/09/90	10:40	7.85	600	15.5	0.0	95.8	28.4	170.0	54.0	17.8	3.7	41.4	0.010	0.98	0.02	0.13	1.070	10.8	<0.010
7/12/90	11:05	8.15	907	20.0	0.0	113.5	26.9	148.0	56.0	14.3	3.6	41.4	0.015	0.61	0.09	0.38	0.946	9.6	0.015
12/03/91	12:07	7.85	590	18.0	0.0	119.5	25.5	165.0	59.8	16.3	3.5	38.6	0.006	0.79	0.05	0.47	1.095	10.2	<0.010
24/06/91	12:35	7.90	736	13.5	0.0	149.5	24.8	170.0	76.5	14.1	4.0	34.5	0.019	0.53	0.18	1.41	1.436	10.0	<0.010
26/09/91	17:00	7.75	650	21.0	0.0	155.6	23.8	149.9	73.0	14.9	3.4	35.0	0.013	0.78	0.10	0.46	1.033	8.9	0.021
13/12/91	11:15	7.50	513	15.0	0.0	141.5	16.0	115.0	64.8	11.2	2.9	27.4	0.018	1.13	0.16	1.00	0.824	10.3	<0.010
10/03/92	17:05	8.05	590	24.5	0.0	142.8	24.5	145.1	68.3	13.3	3.4	35.0	0.037	0.25	0.11	0.31	0.949	8.9	<0.010
9/06/92	16:30	8.32	555	13.0	9.6	120.8	21.3	137.4	69.6	13.3	3.9	30.4	0.047	0.64	0.48	3.04	0.904	9.8	0.055
9/09/92	13:20	6.90	560	17.5	0.0	147.6	21.9	135.0	68.5	10.5	2.8	31.3	0.026	0.45	0.20	1.05	0.478	9.4	<0.010
23/12/92	12:26	7.55	442	20.0	0.0	111.7	13.8	111.9	52.8	9.6	3.5	20.9	0.043	0.44	0.54	2.67	0.671	9.6	<0.010
N° DE DATOS		12	12	12	12	12	12	12	12	12	12	12	11	12	12	12	12	11	12
PROMEDIO		7.81	612	18.1	0.8	127.1	23.1	147.7	64.2	13.8	3.5	34.3	0.022	0.72	0.17	0.94	0.935	9.8	0.011
MINIMO		6.90	442	13.0	0.0	87.9	13.8	111.9	50.6	9.6	2.8	20.9	0.006	0.25	0.02	0.10	0.478	8.9	<0.010
MAXIMO		8.32	907	24.5	9.6	155.6	28.4	170.0	76.5	17.8	4.0	41.4	0.047	1.13	0.54	3.04	1.436	10.8	0.055
DESV. STD.		0.36	113	3.7	2.7	21.1	4.1	19.3	8.9	2.3	0.3	5.8	0.015	0.26	0.16	0.94	0.254	3.0	0.018

ESTACION : RIO MALO ANTES RIO YACAS HELADAS

FECHA	HORA	pH u. pH 6020	Conduct mhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6171	Cu mg/l 8143	Fe mg/l 8201	N/NO3 mg/l 6242	Oxigeno mg/l 6001	P/PO4 mg/l 6220
9/01/90	13:10	4.95	2004	13.5									0.769	4.40	7.79	23.33			
12/02/90	16:50	4.85	1726	15.4									1.353	3.58	9.85	27.50			
7/03/90	17:10	4.95	2088	14.0	0.0	0.0	71.2	930.8	230.0	41.0	19.1	105.8		4.72	9.80	25.90			
4/04/90	12:55	4.75	2063	11.0									1.104	3.37	11.35	27.50			7.7
9/05/90	17:25	4.95	1540	6.5									0.700	3.96	8.52	24.64			9.6
18/06/90	17:15	4.95	1762	6.0	0.0	0.0	79.8	900.1	211.2	37.6	16.8	107.6	1.074	4.97	9.70	24.60			10.0
5/07/90	12:05	4.80	1958	3.0									0.736	3.76	8.55	23.60			9.1
16/08/90	16:55	4.95	1830	6.0									1.189	6.67	9.55	22.75			9.4
12/09/90	17:20	4.90	1630	8.5	0.0	0.0	81.5	773.3	180.4	41.2	15.1	97.5	0.841	4.07	7.40	17.30			8.5
18/10/90	12:40	4.80	1811	8.5									1.251	3.54	12.25	23.89			8.8
28/11/90	12:42	4.95	1754	14.0									0.831	3.17	6.44	16.12			7.8
19/12/90	17:40	4.85	1631	17.0	0.0	0.0	72.7	775.0	188.0	35.1	15.4	104.9	0.507	4.78	8.09	19.76			6.9
7/01/91	17:22	4.75	1546	15.0									0.848	4.03	7.31	19.29			7.8
19/02/91	12:40	5.10	1616	9.5									0.972	4.44	8.18	21.02			7.7
20/03/91	17:47	4.85	1621	14.0	0.0	0.0	69.4	880.0	185.0	35.0	15.6	97.5	0.917	5.24	8.14	21.52			7.8
9/04/91	13:10	4.85	1320	10.0									0.746	10.82	5.55	27.20			8.8
14/04/91	12:07	5.25	1376	6.0									0.503	2.68	8.14	20.70			8.9
12/06/91	9:35	5.35	1560	2.5	0.0	0.0	62.3	780.0	174.0	32.0	13.8	94.3	0.740	4.88	6.27	16.47			10.2
24/07/91	9:45	5.40	1690	1.0									0.513	12.45	5.56	21.53			12.6
27/08/91	18:00	6.30	1532	9.0									1.090	5.60	5.56	29.10			8.5
26/09/91	13:00	5.05	1764	7.0	0.0	0.0	73.4	840.0	187.0	33.5	15.8	95.7	0.405	1.97	7.22	12.47			9.2
15/10/91	12:50	5.45	1565	6.0									0.523	2.68	6.28	20.60			8.4
19/11/91	17:10	5.70	1512	14.5									0.956	2.94	16.38	22.64			7.4
10/12/91	17:10	5.00	1689	7.5	0.0	0.0	51.8	825.2	184.5	35.0	13.1	79.1	1.192	3.30	22.32	50.96			8.9
7/01/92	17:55	4.90	1530	15.0									0.464	7.13	13.95	25.90			7.6
19/02/92	16:55	4.80	1500	18.0									0.536	4.68	10.45	28.25			7.3
12/03/92	13:02	4.95	1348	13.5	0.0	6.1	52.4	701.0	175.0	32.0	13.4	81.9	1.150	1.71	9.64	22.84			7.2
8/04/92	12:55	5.15	1764	8.0									0.559	4.98	5.21	16.40			8.9
20/05/92	9:00	5.60	1600	2.0									0.435	2.48	6.65	18.58			10.3
16/06/92	15:30	4.01	1637	5.5	0.0	0.0	64.2	725.0	192.0	40.0	15.5	93.8	1.337	2.99	7.43	25.53			8.2
15/07/92	17:17	5.40	1530	4.0									0.855	1.97	6.77	21.83			8.8
11/08/92	15:25	5.00	1411	8.0									1.035	4.22	8.85	17.22			9.2
7/09/92	15:32	4.08	1585	10.5	0.0	0.0	57.7	807.0	187.6	36.4	14.5	98.0	0.739	2.53	7.87	27.85			8.8
28/10/92	16:47	4.10	1803	14.5									2.098	2.84	40.06	76.80			8.0
24/11/92	17:45	3.55	1830	10.0									1.496	3.35	44.38	69.10			8.4
17/12/92	17:30	3.70	1586	14.0	0.0	0.0	40.4	1097.0	178.0	37.5	15.4	64.4	2.868	4.93	41.50	105.55			7.5
5/01/93	16:01	3.85	1440	17.5									1.448	2.07	32.00	64.15			7.4
17/02/93	17:22	4.95	1295	12.5									0.708	2.07					8.3
21/04/93	15:50	4.75	1458	9.0									1.401	2.63	12.92	31.85			9.1
Nº DE DATOS		39	39	39	12	12	12	12	12	12	12	12	38	39	38	38			36
PROMEDIO		4.88	1639	9.9	0.0	0.5	64.7	836.2	189.4	36.4	15.3	93.4	0.963	4.17	12.21	29.27			8.6
MINIMO		3.55	1295	1.0	0.0	0.0	40.4	701.0	174.0	32.0	13.1	64.4	0.405	1.71	5.21	12.47			6.9
MAXIMO		6.30	2088	18.0	0.0	6.1	81.5	1097.0	230.0	41.2	19.1	107.6	2.868	12.45	44.38	105.55			12.6
DESV. STD.		0.53	191	4.5	0.0	1.9	97.8	1258.5	284.5	54.6	23.0	140.6	0.498	7.15	10.20	19.40			2.7

ESTACION : RIO TURBIO EN ALMORAL

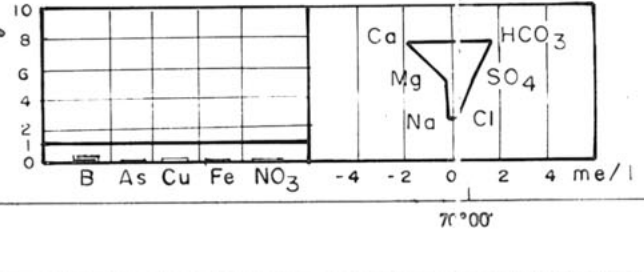
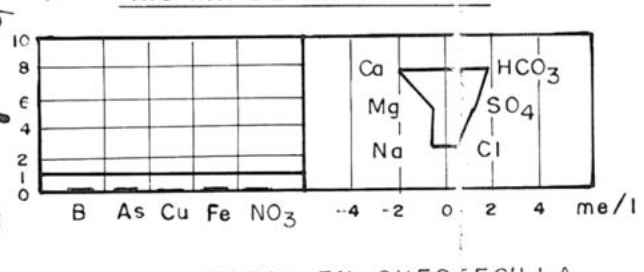
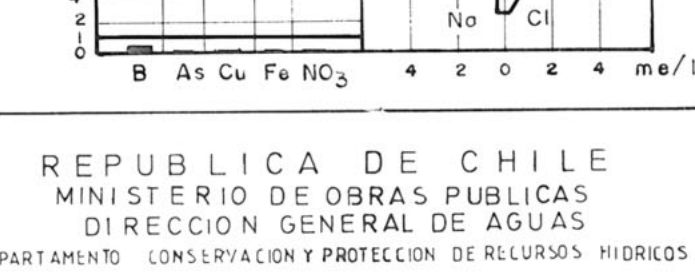
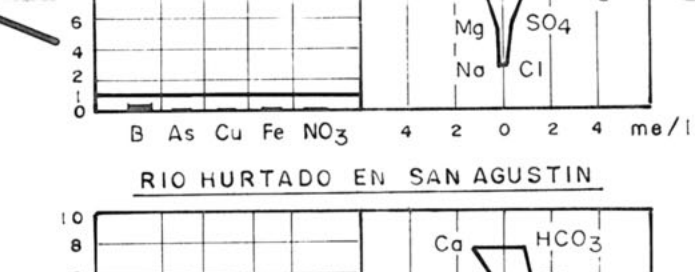
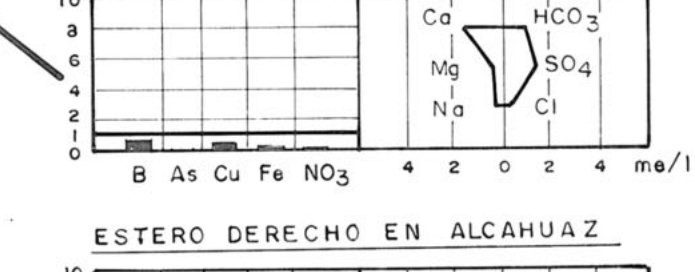
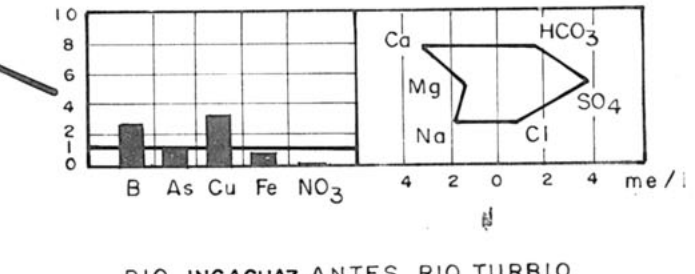
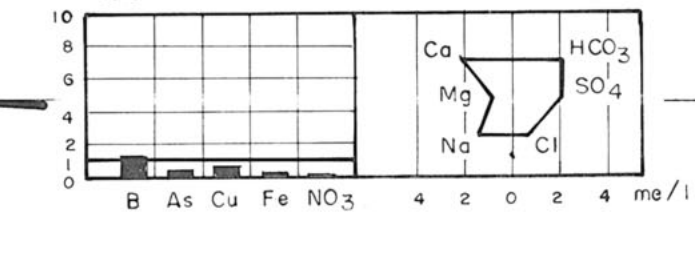
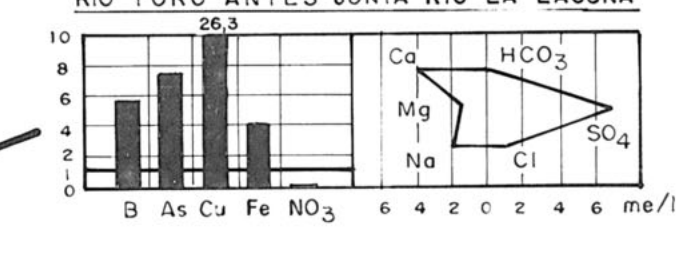
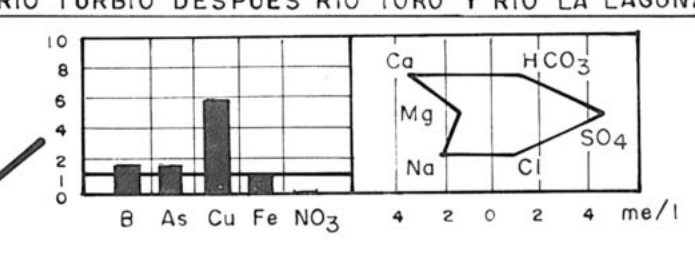
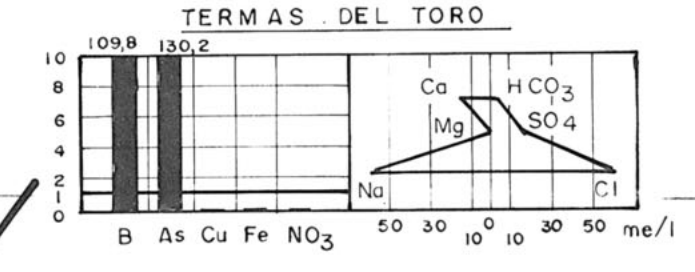
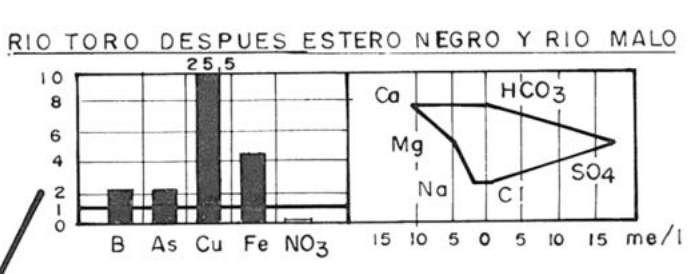
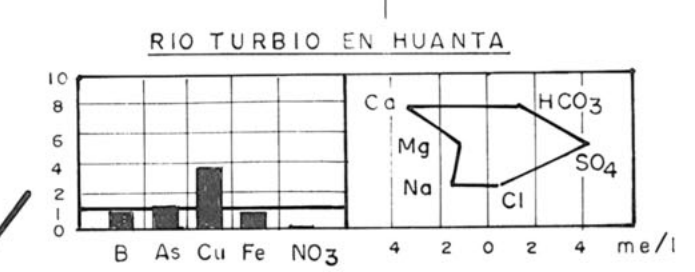
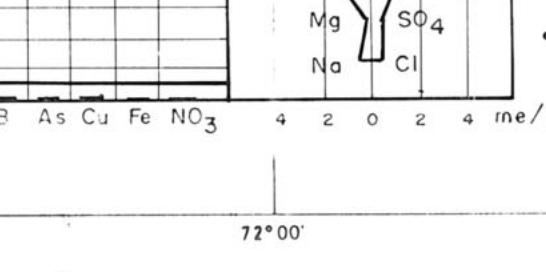
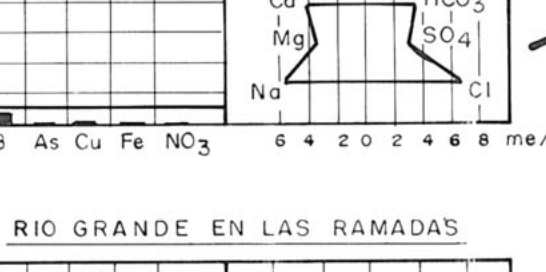
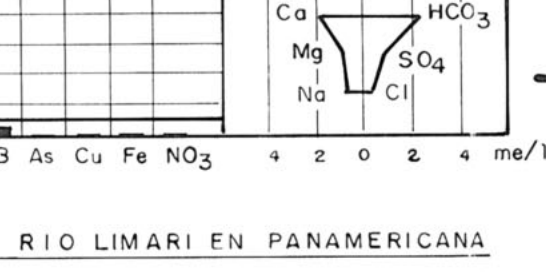
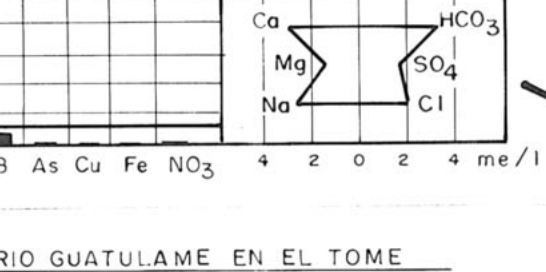
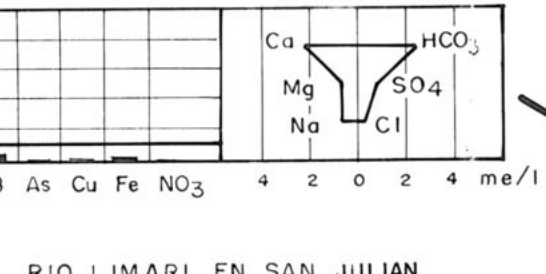
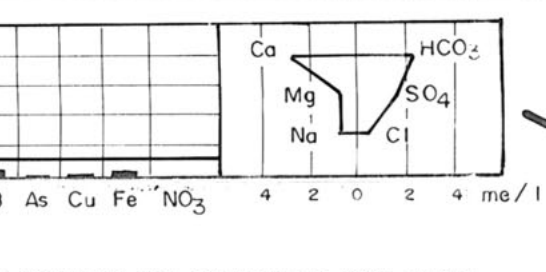
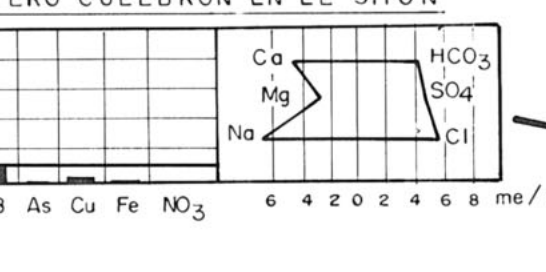
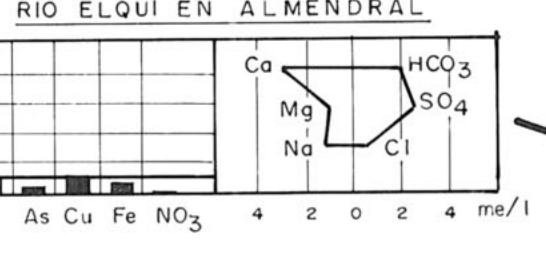
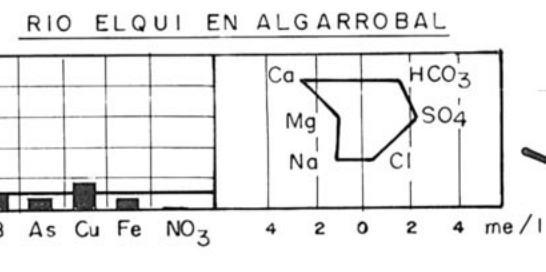
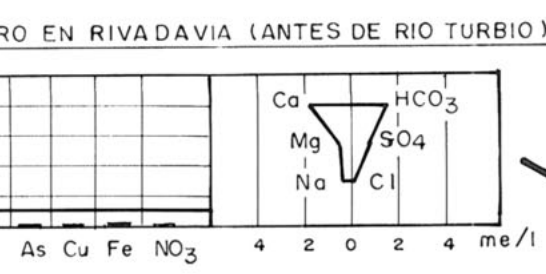
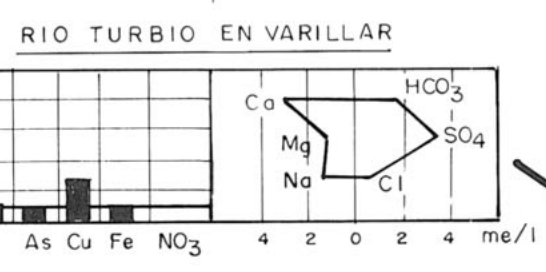
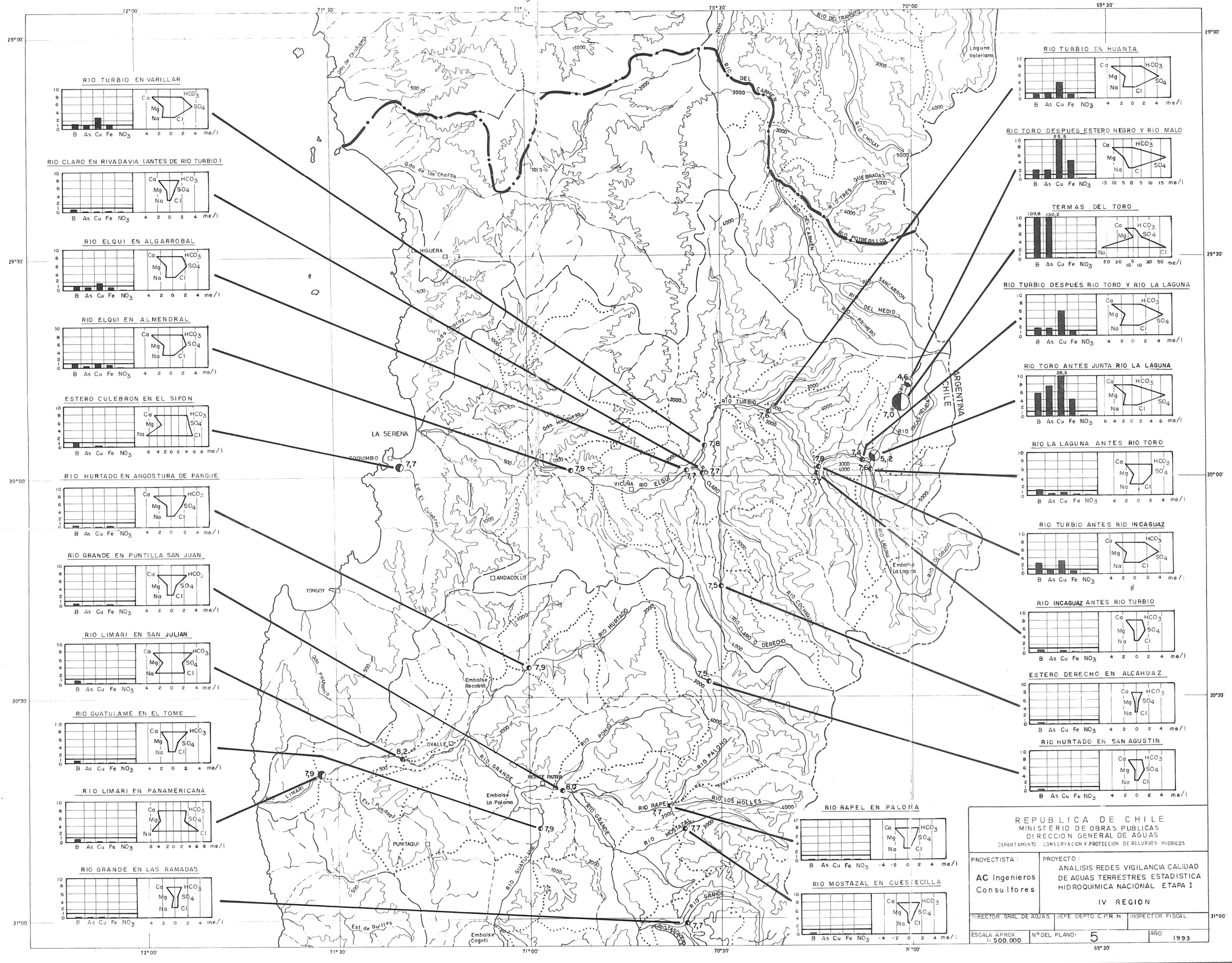
FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 5120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/NO3 mg/l 6242	Oxigeno mg/l 6001	P/PO4 mg/l 6220
13/08/92	12:04	7.65	581	12.5									0.033	0.63	0.16	1.01	0.894	10.3	<0.010
27/10/92	16:00	7.15	410	19.0									0.059	0.46	0.69	3.34	0.701	8.8	<0.010
22/02/93	13:41	7.00	410	19.0									0.039	0.11		0.834	8.8	<0.010	

ESTACION : RIO VACAS HELADAS ANTES RIO MALO

FECHA	HORA	pH u. pH 6020	Conduct µmhos/cm 5020	Temp. °C 5140	CO3 mg/l 6120	HCO3 mg/l 6080	Cloruro mg/l 6180	SO4 mg/l 6341	Ca mg/l 8122	Mg mg/l 8264	K mg/l 8402	Na mg/l 8440	As mg/l 8043	Boro mg/l 6101	Cu mg/l 8143	Fe mg/l 8201	N/NO3 mg/l 6242	Oxigeno mg/l 6001	P/PO4 mg/l 6220
9/01/90	13:15	5.65	1784	17.0									0.414	4.48	0.21	16.29	0.184		<0.010
12/02/90	16:55	5.40	1628	18.0									0.404	3.62	0.21	15.50	0.142		<0.005
17/03/90	17:15	5.45	1685	18.5	0.0	12.0	92.1	816.5	193.5	52.0	13.0	114.1	0.274	4.60	0.30	32.15	0.256		0.024
4/04/90	13:15	5.50	1833	13.0									0.375	3.29	0.17	15.00	0.192	7.6	<0.010
10/05/90	17:40	5.85	1503	6.0									0.274	3.65	0.10	12.04	0.114	9.8	<0.010
18/06/90	17:37	6.65	1482	5.0	0.0	3.7	53.2	680.1	172.0	41.6	11.0	88.3	0.658	4.60	0.40	50.10	0.400	9.3	<0.010
5/07/90	12:30	5.40	2608	2.0									0.438	5.70	0.06	9.05	0.133	10.3	<0.010
16/08/90	17:15	5.35	1574	5.5									0.253	6.36	0.18	18.28	0.332	9.2	<0.010
12/09/90	17:40	5.45	1636	7.0	0.0	3.7	48.6	712.2	176.0	46.8	11.2	86.9	0.347	2.96	0.17	22.80	0.270	8.8	<0.010
18/10/90	13:00	5.45	2146	13.0									0.440	3.82	0.08	9.21	0.154	8.1	<0.010
28/11/90	13:05	5.65	1724	18.0									0.287	3.29	0.15	12.00	0.142	7.2	0.024
19/12/90	18:05	5.40	1848	19.0	0.0	9.2	100.3	787.7	202.4	49.6	14.2	117.3	0.186	4.98	0.15	11.25	0.170	6.6	0.024
7/01/91	17:45	5.30	1784	16.0									0.339	3.99	0.15	13.18	0.129	7.9	<0.010
19/02/91	13:00	5.50	1871	14.0	0.0	4.8	100.3	820.0	188.8	50.0	13.8	120.5	0.418	4.40	0.15	13.90	0.173	7.3	<0.010
20/03/91	18:05	5.55	1746	14.0									0.139	5.44	0.20	11.48	0.204	7.5	<0.010
9/04/91	13:30	5.30	1681	12.0									0.241	5.55	0.14	16.16	0.129	8.3	<0.010
14/04/91	12:25	5.75	2140	5.0									0.385	2.53	0.07	11.76	0.105	9.2	<0.010
12/06/91	9:35	5.35	1846	1.5	0.0	2.4	111.3	864.0	197.2	52.8	15.2	127.9	0.146	4.83	0.13	8.71	0.226	10.5	<0.010
24/07/91	16:00	5.55	2010	0.0									0.228	10.92	0.19	11.60	0.301	12.7	<0.010
27/08/91	18:20	5.80	1930	8.0									0.225	7.03	0.13	14.83	0.285	8.6	0.019
26/09/91	13:20	5.60	1950	9.0	0.0	4.8	73.3	840.0	188.4	47.6	12.6	102.4	0.261	3.76	0.18	18.89	0.348	8.8	0.021
15/10/91	13:10	5.70	2400	10.0									0.330	4.37	0.03	6.76	0.126	7.7	<0.010
19/11/91	17:35	5.90	1565	15.0									0.353	2.78	0.12	13.36	0.295	7.2	<0.010
10/12/91	17:30	5.80	1715	8.0	0.0	7.3	105.6	629.2	178.0	38.6	10.8	87.4	0.267	4.22	0.16	25.05	0.382	8.4	<0.010
7/01/92	18:15	5.70	1646	16.0									0.257	4.73	0.13	29.55	0.282	7.4	<0.010
19/02/92	17:15	5.45	1630	20.0									0.300	5.44	0.21	15.15	0.274	6.9	<0.010
12/03/92	13:25	5.70	1665	16.5	0.0	13.4	86.5	768.5	197.8	43.6	11.9	109.5	0.669	1.66	0.20	19.49	0.195	6.8	<0.010
8/04/92	13:15	5.90	1950	10.5									0.517	5.19	0.69	23.50	0.280	8.4	<0.010
19/05/92	8:20	6.00	1970	2.0									0.376	5.65	0.22	7.35	0.313	10.4	0.190
16/06/92	19:50	4.66	1711	5.0	0.0	4.3	83.3	780.5	189.0	49.0	11.9	115.9	0.345	3.14	0.12	11.93	0.359	8.2	0.028
15/07/92	17:35	5.65	1790	1.0									0.669	1.91	0.24	23.43	0.248	9.7	0.036
11/08/92	15:45	5.35	1815	6.0									0.585	3.81	0.15	32.62	0.248	9.3	0.016
7/09/92	15:50	5.25	1580	11.0	0.0	8.5	81.2	750.0	191.2	46.5	10.7	105.8	0.280	2.32	0.13	14.42	0.188	8.8	<0.010
28/10/92	17:08	5.25	894	14.0									0.395	1.97	0.13	29.78	0.447	8.1	0.012
24/11/92	18:05	4.95	1126	8.0									0.150	1.66	0.11	10.28	0.375	8.9	<0.010
17/12/92	13:50	5.10	1208	14.0	0.0	8.5	40.4	523.5	155.0	25.0	9.5	52.0	0.254	3.19	0.08	8.57	0.417	7.4	<0.010
5/01/93	16:20	5.70	736	17.5									0.259	1.45	0.12	26.00	0.454	7.3	<0.010
17/02/93	17:45	5.75	1280	14.0									0.258	1.66		0.188	0.393	8.0	<0.010
21/04/93	16:05	5.65	1358	8.0									0.555	2.58	0.26	25.72	0.349	9.1	0.036

# DE DATOS	39	39	39	12	12	12	12	12	12	12	12	12	38	39	38	38	39	36	39
PROMEDIO	5.54	1696	10.7	0.0	6.9	81.3	747.7	185.8	45.3	12.2	102.3	0.349	4.04	0.18	17.56	0.257	8.5	0.011	
MINIMO	4.95	736	0.0	0.0	2.4	40.4	523.5	155.0	25.0	9.5	52.0	0.139	1.45	0.03	6.76	0.105	6.6	<0.010	
MAXIMO	6.65	2608	20.0	0.0	13.4	111.3	864.0	202.4	52.8	15.2	127.9	0.669	10.92	0.69	50.10	0.454	12.7	0.190	
REPV. STD.	0.34	393	5.6	0.0	10.9	124.0	1125.4	279.0	68.3	18.3	154.8	0.150	1.78	0.17	14.42	0.188	8.9	0.022	

LA SERENA



REPUBLICA DE CHILE
MINISTERIO DE OBRAS PUBLICAS
DIRECCION GENERAL DE AGUAS
DEPARTAMENTO CONSERVACION Y PROTECCION DE RECURSOS HIDRICOS

PROYECTISTA: AC Ingenieros Consultores
PROYECTO: ANALISIS REDES VIGILANCIA CALIDAD DE AGUAS TERRESTRES ESTADISTICA HIDROQUIMICA NACIONAL ETAPA I
IV REGION

DIRECTOR GRAL DE AGUAS: JEFE DEPTO. C.P.R.H.: INSPECTOR FISCAL:

ESCALA APROX. 1:500,000 N° DEL PLANO 5 AÑO 1993

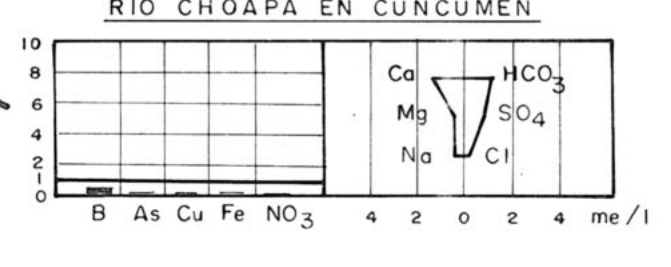
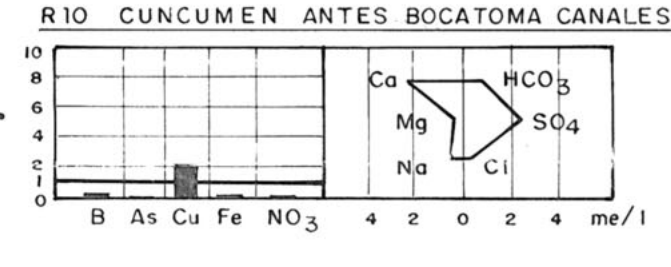
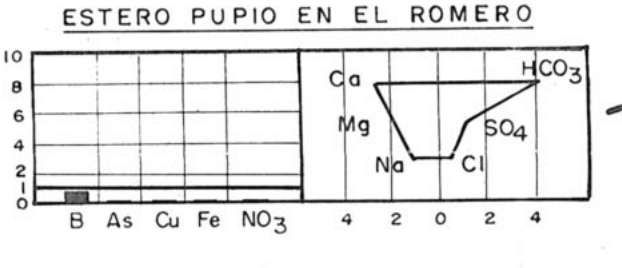
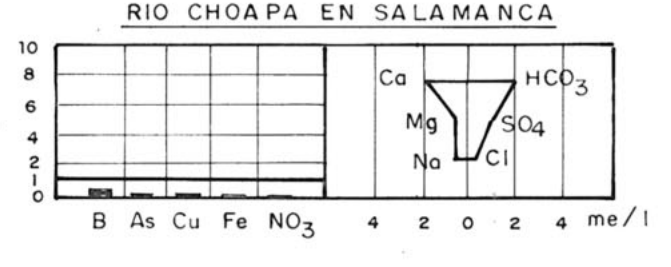
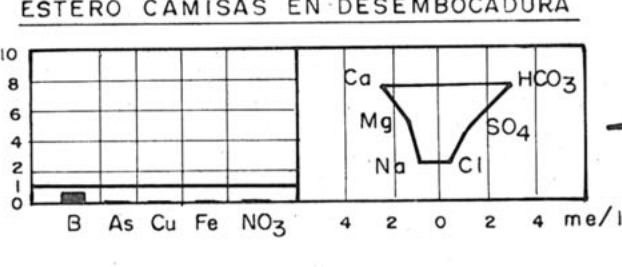
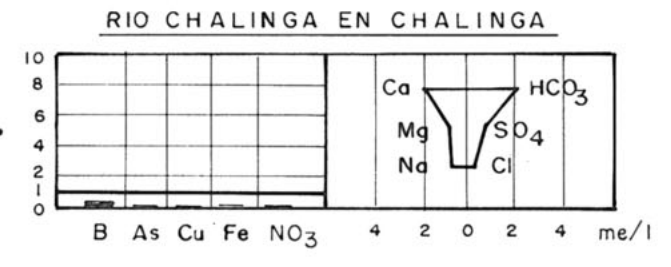
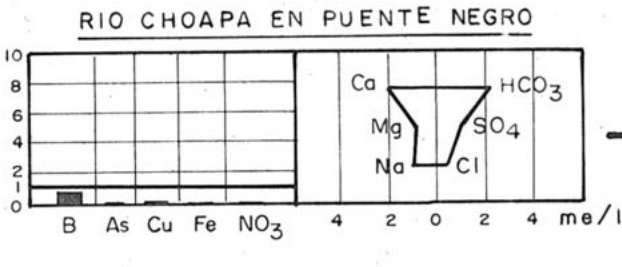
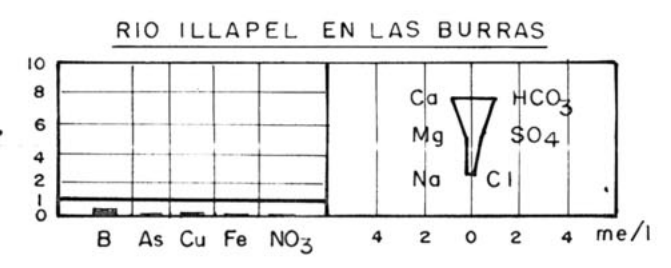
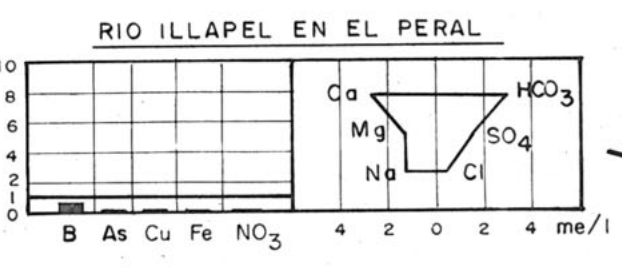
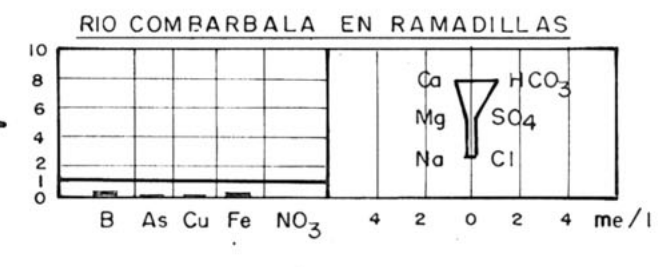
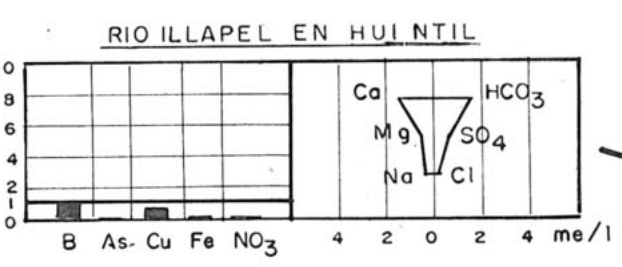
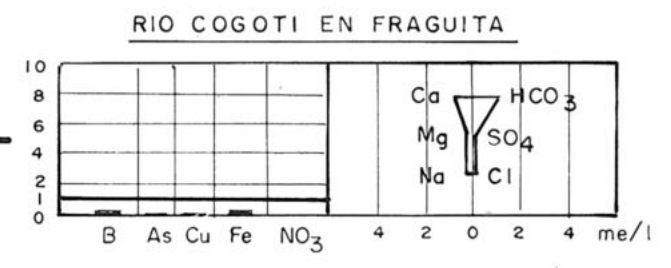
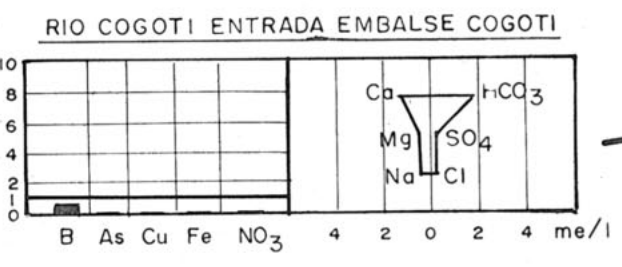
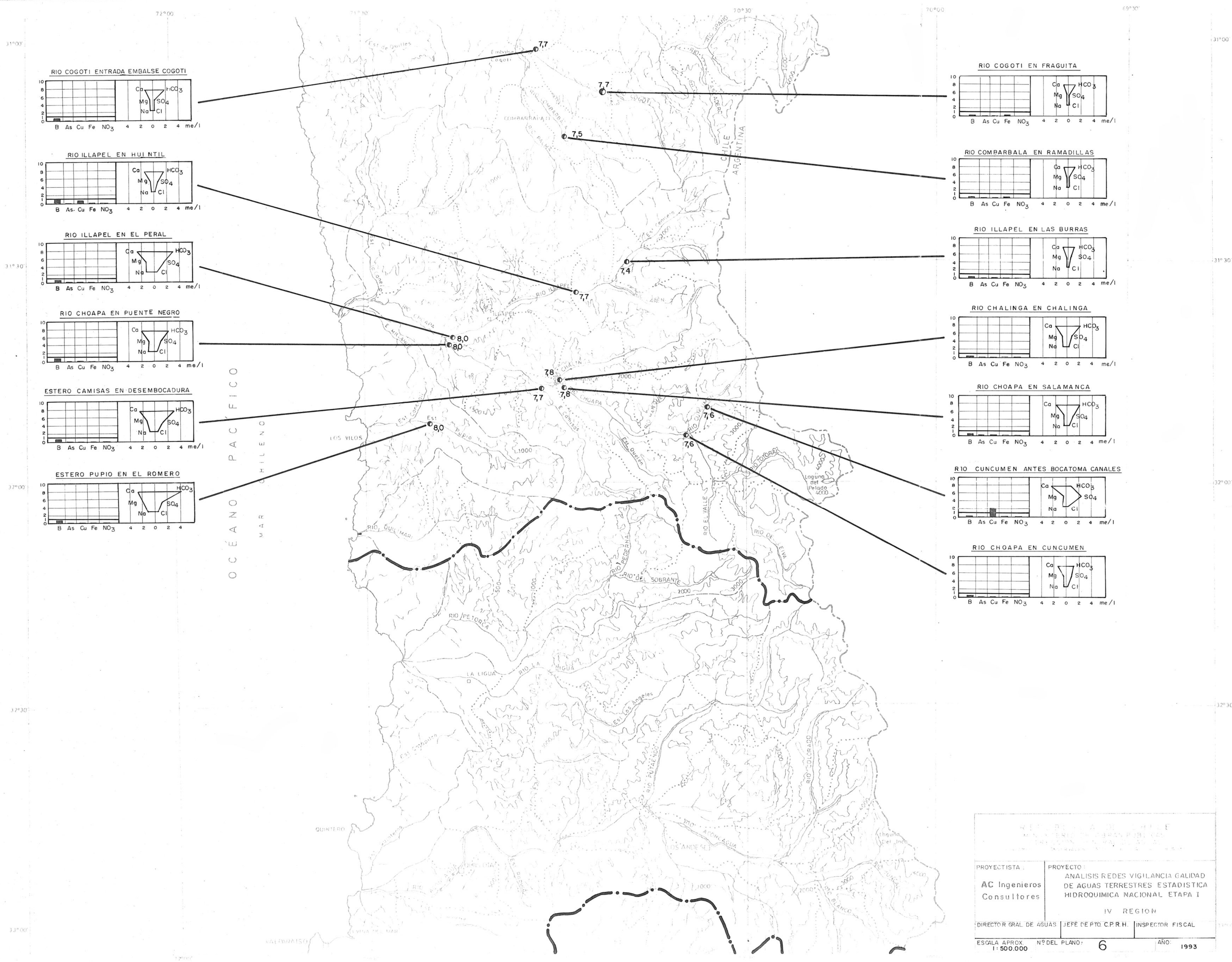
SIMBOLOGIA
CONDUCTIVIDAD ELECTRICA (µmhos/cm)
○ < 750 ○ 1500-3000 ○ > 7.500
○ 750-1.500 ○ 3000-7.500

PH
4 7 10
2 12
● LIMITE REGIONAL

BASE CARTOGRAFICA:
CARTA NACIONAL ESCALA 1:500,000
DEL INSTITUTO GEOGRAFICO MILITAR
1ª EDICION 1971- 2ª REIMPRESION 1975

COPIAPO
LA SERENA
SAN FELIPE

SAN FELIPE



OCEANO PACIFICO
MAR CHILENO

PROYECTISTA: AC Ingenieros Consultores		PROYECTO: ANALISIS REDES VIGILANCIA CALIDAD DE AGUAS TERRESTRES ESTADISTICA HIDROQUIMICA NACIONAL ETAPA I	
DIRECTOR GRAL DE AGUAS		JEFE DEPTO C.P.R.H.	
ESCALA APROX 1:500.000		N° DEL PLANO: 6	
AÑO: 1993		INSPECTOR FISCAL	

