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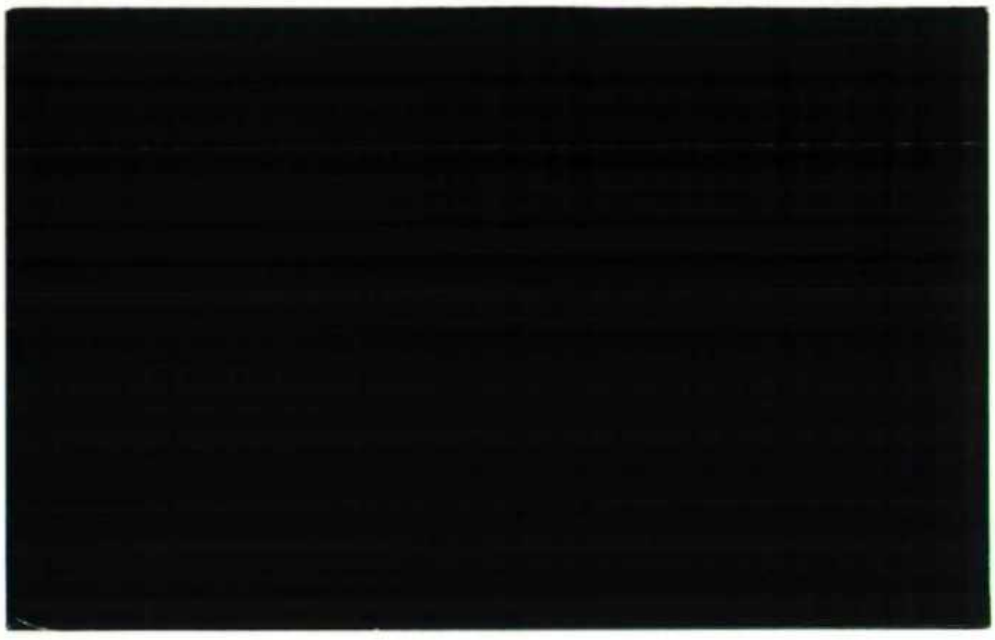

Modelling pH and Aluminium in the Alwen and Brenig Reservoirs

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by

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Contents

1. Introduction

This report was prepared for the Welsh Water authority to assess the future water quality problems on the Alwen and Brenig reservoirs, N Wales.

We use a physically based, lumped porometer model of hydro-chemical processes to establish present and possible future stream chemistry at the outflow of the two reservoirs, in response to changing atmospheric deposition and changing land use.

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2. Catchment characteristics and data

2.1 SOILS DATA

The soils of the Alwen and Brenig catchments are described by the Soil Survey of England and Wales (198?) and are grouped into three soil associations; the Crowdy 2 association (map unit 1013b), the Wilcocks 2 association (map unit 721d) and the Hafren association (map unit 654a). The Crowdy association consists dominantly of raw acid peat soils with peat thicker than 40 cm whilst the Wilcocks and Hafren associations are mainly comprised of stagnopodsols and stagnohumic gleys up to 1 m in depth. In general the associations are linked altitudinally with Hafren soils on hill tops overlying Lower Palaeozoic bedrock, Wilcocks soils dominating the hillslopes and overlying head and till deposits and Crowdy soils in the valley bottoms.

To apply the model to the Brenig and Alwen catchments the chemical characteristics of the soil types were lumped by both soil profile depth and bulk density assuming bulk density of peat soils to be 300 kg/m^3 and 1000 kg/m^3 for mineral soils. Chemical data from four example profiles are given in table 1 which also demonstrates the use of the lumping scheme and the final lumped values incorporated in the models.

The soils of the two catchments were considered to be essentially similar and so the same lumped parameter values were used for both model applications. Sulphate adsorption parameters were set equal to measured values for similar soils in Scotland (maximum adsorption capacity = 6 mmol m^{-3} and half saturation coefficient = 1000 mmol m^{-2}). Mean annual soil temperature was set to 7°C and partial pressure of CO_2 was assumed to be 50 times atmospheric. Average soil depth was taken as 1 m, depth averaged bulk density as 656 Kg m^{-3} and a porosity fraction of 0.45. A value of 9.0 was assumed for the aluminium selectivity coefficient which corresponds to values for micro-cystalline gibbsite reported in recent literature (Cosby, *et al* 1986).

Table 1 Soil chemistry data

	Horizon Depth (m)	% Exchangeable Ca	Mg	Na	K	CEC (meq/100g)
Stagnopodsol	.1	5.9	7.8	4.8	4.4	16.53
	.2	1.3	0.6	2.4	1.0	11.62
	.2	1.3	0.0	3.9	1.0	6.92
	.5	1.6	0.0	5.1	1.2	4.95
(depth weighted mean)		1.9	0.9	4.3	1.4	7.8
Peat	.3	9.0	13.0	5.5	4.3	16.27
	.3	16.0	26.0	7.8	2.0	13.32
(depth weighted mean)		12.5	19.5	7.0	3.0	14.79
Stagnopodsol	.1	11.0	16.0	5.5	4.3	13.5
	.2	3.6	3.2	2.3	0.9	12.07
	.2	4.9	2.1	2.8	0.9	6.54
	.5	6.8	3.1	2.0	0.7	4.54
(depth weifhted mean)		6.2	4.2	2.6	1.1	7.34
Peat	.3	17.6	18.5	7.4	7.0	14.07
	.3	26.5	11.0	6.5	2.8	14.72
(depth weighted mean)		22.0	15.0	7.0	4.9	14.35
Depth and bulk density weighted mean values.		9.0	8.1	4.8	1	10.2

2.2 RAINFALL CHEMISTRY

Rainfall chemistry data for the area was obtained from the Welsh Water Authority regional survey undertaken in 1985. A bulk rainfall collector was situated at the Alwen dam during this study and samples were collected weekly. The rainfall chemistry used for this application represents the volume weighted annual mean for 1985. The quality of the data is good and the charge balance error is less than 5% whilst the ratio of Na : C1 is 0.82 which compares well with the standard seasalt ratio of 0.86. Rainfall volume was taken as 1474 mm and 1448 mm at the Alwen and Brenig, respectively and these figures represent the mean of seven years data included in the Welsh Water Report (Heller, 1985).

Rainfall chemistry used in the model applications is shown in Table 2 together with the observed rainfall chemistry for 1985. The difference between the two represents increased input from dry deposition calculated from the basis of chloride conservativity and this extra input was added into the wet deposition and so follows the same deposition sequence pattern (Warren Springs Laboratory, 1983). The effective seasalt dry deposition factors used were 1.68

and 1.46 for the Brenig and Alwen, respectively. This reflects the fact that the Brenig catchment is 40% afforested and the increased dry deposition is due to the ability of the trees to scavenge dry and occult deposition. Effective sulphate dry deposition factors were calculated to give steady state present day conditions and were 1.78 and 2.9, respectively. The higher factor at Alwen is inevitable because of the high SO_4 output at Alwen and assuming similar deposition chemistry. This difference is not easily explained.

Table 2 Observed and effective rainfall concentrations (μeq/ℓ)

	Observed	Alwen (+ dry factor)	Brenig (+ dry factor)
Ca	22	25	27
Mg	36	53	61
K	7	9	10
Na	150	234	269
NH_4	29	29	29
Cl	182	266	306
SO_4	73	235	151
NO_3	22	22	22

2.3 WATER CHEMISTRY

Two sources of water chemistry were available, the WWA regional survey data sampled the input streams to both reservoirs at the road bridges and the Dee Reservoirs Report (Heller, 1985) documents more detailed sampling of the inputs, reservoirs and outputs. The two data sets for the input streams were analysed and mean chemistries were consistent so the regional analysis data were utilised for the input streams and the Dee Reservoir Report data were utilised for the reservoir outflow modelling. The Brenig data demonstrate a very high alkalinity balancing high concentrations of all base cations. Neither the input stream, reservoir or output stream is acidified, pH is consistently around 7.0 (or above) and inorganic aluminium concentrations are low. Nevertheless, total aluminium concentrations indicate that some aluminium is present in organically complexed forms.

At the Alwen, however, the situation is less obvious. High alkalinities and base cation concentrations are reported for the input stream whilst the output is considerably more acidic. Data from the Dee Reservoirs Report (and Heller *pers comm*) was used for the Alwen outflow and this is characterised by high solute concentrations of both SBC and SAA. pH is around 4.5 whilst inorganic aluminium concentrations are relatively high. In both systems, streamwater shows high concentration of sea-derived salts.

3. The conceptual basis of the MAGIC model

The most serious effects of acidic deposition on catchment surface water quality are thought to be decreased pH and alkalinity and increased base cation and aluminium concentrations. In keeping with an aggregated approach to modelling whole catchments, a relatively small number of important soil processes - processes that could be treated by reference to average soil properties - could produce these responses. In two papers, Reuss (1980, 1983) proposed a simple system of reactions describing the equilibrium between dissolved and adsorbed ions in the soil soil water system. Reuss and Johnson (1985) expanded this system of equations to include the effects of carbonic acid resulting from elevated CO_2 partial pressure in soils and demonstrated that large changes in surface water chemistry would be expected as either CO_2 or sulphate concentrations varied in the soil water. MAGIC has its roots in the Reuss-Johnson conceptual system, but has been expanded from their simple two-component (Ca-Al) system to include other important cations and anions in catchment soil and surface waters.

Atmospheric deposition, mineral weathering and exchange processes in the soil and soil water are assumed to be responsible for the observed surface water chemistry in a catchment. Alkalinity is generated in the soil water by the formation of bicarbonate from dissolved CO_2 and water:

$$CO_2 + H_2O = H^+ + HCO_3^- \qquad (1)$$

Bicarbonate ion concentrations in soil water are calculated using the familiar relationships between the partial pressure of CO_2 (P_{CO_2}, atm) and hydrogen ion activity in the soil water:

$$[HCO^{3-}] = K_c \frac{P_{CO_2}}{[H^+]} \qquad (2)$$

where the combined constant K_c is known for a given temperature (Stumm and Morgan, 1970).

The free hydrogen ion produced (eqn. 1) reacts with an aluminium mineral (e.g. gibbsite) in the soil:

$$3H^+ + Al(OH)_3\ (s) = Al^{3+} + 3H_20 \qquad (3)$$

The MAGIC model assumes a cubic equilibrium relationship between Al and H^+. The equilibrium expression for this reaction is:

$$K_{Al} = \frac{[Al^{3+}]}{[H^+]^3} \qquad (4)$$

where the accolades indicate aqueous activities. Classically this is considered as relationship to $Al(OH)_3$ solubility controls. However here, as in most previous modelling studies while a cubic relationship is still used it represents potentially a variety of chemical reactions. As such the equilibria constant does not have to have the value for the solubility product for gibbsite. Several aqueous complexation reactions of Al^{3+} are included in the model (Cosby *et al.* 1985). These reactions are temperature dependent and appropriate corrections for temperature and ionic strength are made in the model.

Generally, the cation exchange sites on the soil matrix have higher affinity for the trivalent aluminium cation than for di- or monovalent base cations. An exchange of cations between the dissolved and adsorbed phase results:

$$Al^{3+} + 3BCX(s) = AlX_3(s) + 3BC^{+} \quad (5)$$

where X is used to denote an adsorbed phase and BC^{+} represents a base cation. The net result of these reactions is the production of alkalinity (e.g. $Ca(HCO_3)_2$). As CO_2 partial pressure or the availibility of base cations on the soil exchange sites increases, the equilibrium reactions proceed further to the right hand side in each case resulting in higher alkalinity.

When the solution is removed from the contact with the soil matrix and is exposed to the atmosphere (i.e. soil water enters the stream channel), the CO_2 partial pressure of the solution declines. the pH of the solution increases as CO_2 is lost to the atmosphere. Because the solution is no longer in contact with the soil matrix, cation exchange reactions no longer occur. The alkalinity and base cation concentrations are thus unchanged.

If the exchangeable base cations on the soils become depleted, less aluminium is exchanged from the soil water (eqn. 3) and the Al^{3+} concentration in the water entering the stream is higher. As the streamwater loses CO_2 and the pH begins to rise the solubility of aluminium species in the stream is exceeded and a solid phase of aluminium precipitates. These aluminium precipitation reactions retard the increase of streamwater pH as the CO_2 degasses, resulting in lower streamwater pH for the case where exchangeable cations are less available.

Less adsoprtion of aluminium by the soils also decreases the soil and surface water alkalinity. Consider an abbreviated definition of the alkalinity of soil and surface waters:

$$ALK = (HCO_3^{-}) - (H^{+}) - 3(Al^{3+}) \quad (6)$$

where the parentheses indicate molar concentrations. It is apparent that as the ability of the catchment soils to exchange Al^{3+} declines and aluminium and hydrogen ion concentrations increase, the alkalinity of the solution must decline, even though the source of HCO_3^{-} is not affected.

The process of acidification is controlled in part by the rate at which the exchangeable base cations on the soil are depleted. This in turn is affected by the rate of re-supply through weathering of base cations from primary

minerals and the rate of loss through leaching of base cations from the soil. Leaching of base cations is affected mainly by the concentration of strong acid anions (i.e SO_4^{2-}, NO_3^-, Cl^-, and F^-) and base cations in the solution moving through the soil. As anions increase in concentration, there must be an equivalent increase in cation concentration to maintain a charge balance.

The model calculates the concentrations of four strong acid anions in both soil and streamwater (SO_4^{2-}, Cl^-, NO_3^- and F^-). Sulphate has an adsorbed phase in soil and the relationship between adsorbed phase and the relationship between adsorbed sulphate (E_s, meq kg^{-1}) and the concentration of dissolved sulphate (SO_4^{2-}, meq m^{-3}) in soil water is assumed to follow a Langmuir isotherm (Singh, 1984).

$$E_s = E_{mx} \frac{\left[SO_4^{2-}\right]}{C + \left[SO_4^{2-}\right]} \tag{7}$$

E_{mx} = maximum adsorption capacity of the soils (meq kg^{-1})
C = *half saturation concentration (meq* m^{-3})

If anions derived from atmospheric deposition are accompanied by H^+, as is the case for acid deposition, the excess H^+ will initially displace base cations from the soil exchange sites. As the base saturation declines, aluminium and hydrogen ion become increasingly important in maintaining the ionic charge balance in solution. The water delivered to the stream becomes more acidic as the acidic deposition persists.

The model assumes that only Al^{3+} and four base cations are involved in cation exchange between soil and soil solution. The exchange reactions are modelled assuming an equilibrium-like expression (Gaines and Thomas, 1953):

$$S_{A1BC} = \frac{\left[BC^{2+}\right]^3 E_{Al}^2}{\left[Al^{3+}\right]^2 E_{BC}^3} \quad \text{or} \quad S_{A1BC} = \frac{\left[BC^{+}\right]^3 E_{Al}}{\left[Al^{3+}\right] E_{BC}^3} \tag{8}$$

For divalent or monovalent base cations respectively, where the accolades indicate aqueous activities, S_{A1BC} is a selectivity coefficient (Reuss, 1983) and the E_{xx} 's indicate exchangeable fractions of the appropriate ions on the soil complex. If the amount of Ca^{2+} on the soil of a catchment were given by X meq kg^{-1}, then

$$E_{Ca} = \frac{X}{CEC} \tag{9}$$

where CEC is the cation exchange of the soil (meq kg^{-1}).

The base saturation (BS) of the soil is then the sum of the exchangeable fractions of base cations:

$$BS = E_{Ca} + E_{Mg} + E_{Na} + E_K = 1 - E_{Al} \tag{10}$$

If the aluminium - base cation exchange equations in the model (eqn. 8) are combined with the aluminium solubility equation (eqn. 4), the results are equations that are Gaines-Thomas expressions for hydrogen ion base cation exchanges.

The parameters describing the cation exchange process in the model are the selectivity coefficients, $S_{Al BC}$ (one coefficient for each base cation, Ca^{2+}, Mg^{2+}, Na^{+}, K^{+}) and the soil cation exchange capacity, CEC.

The MAGIC model is thus composed of:

1. A set of equilibrium equations which quantitatively described the equilibrium soil processes and the chemical changes that occur as soil water enters the stream channel.

2. A set of mass balance equations which quantitatively describe the catchment input-output relationships for base cations and strong acid anions and streamwater.

3. A set of definitions which relate the variables in the equilibrium equations to the variables int he mass balance equations.

Details of of the equations and the model structure have been given by Cosby et al. (1985).

4. Present day observed v predicted water chemistry

Observed and simulated mean chemistry is given in Table 3. At Brenig a good fit is achieved to all base cations except for Na where the simulated result is higher than the observed. This is the combined result of very high input concentrations and low runoff yield. It should be pointed out that the yield factor should be higher as the values used here are for the reservoir outflow. If the rainfall input is increased, however, the concentration factor will be decreased and so we will have to increase the dry deposition factor to achieve Cl balance. The effect of the reservoir is to introduce a storage to the catchment system and so rainfall runoff relationships may not be as simple as assumed here. In any case, the good agreement between observed and simulated concentrations backs up the assumption used. pH is above 7.0 and alkalinity is around 250 $\mu q\ l^{-1}$. Aluminium concentrations are, therefore, extremely low and as it is unlikely that increased acidification will occur at Brenig and equally unlikely that Al concentration will increase.

Table 3 Observed and simulated input stream chemistry ($\mu eq\ell^{-1}$)

	ALWEN		BRENIG	
	Observed	Simulated	Observed	Simulated
Ca	150	147	309	306
Mg	120	144	234	231
K	15	19	23	23
Na	311	349	396	416
NH_4	7	4	20	22
Cl	388	389	470	469
SO_4	344	346	232	237
NO_3	10	13	46	32
Al	30	48	15	26
pH	<6.0	4.6	>7.0	7.6
AlK	<100	-89	369	261

At Alwen the model simulates the observed water chemistry well except for Na, as at Brenig. Aluminium concentrations here are higher than at Brenig due to the considerably lower pH. The high level of sulphate in the outflow is matched here by increasing sulphate dry deposition although this gives an unusually high dry deposition factor for a moorland site. The possibility exists that sulphate is mineralised in the lake or that sulphate bearing soils or rock strata are present. It must be stressed that the major ion chemistry at this site requires a rigorous examination.

5. Simulated water quality under present land use

Given that the model used here is driven by the deposition of strong acid anions, the catchment water chemistry is subject to change during the near future as acid emission policy brings about a likely decrease in acid emission. Figures 1 and 2 demonstrate the simulated hydrogen and aluminium (3^+) response at Alwen for three possible deposition scenario's; constant deposition at present day levels; a linear 30% decrease by year 2000 thereafter constant at that level; and, a linear 70% decrease by year 2000 thereafter constant at that level. Clearly, the former represents the worst case and the latter represents the best possible case given current emission control policy. The 30% decrease scenario is perhaps most likely of all three. It must be remembered that any change in water quality due to land use change (afforestation) effects will be set against this changing background quality.

At Alwen the constant deposition scenario causes a slightly increased acidity

and consequently higher aluminium levels. The 30% decrease scenario holds hydrogen and aluminium at almost present day levels (i.e a slight increase) while the 70% decrease demonstrates a marked recovery in both hydrogen and aluminium. It must be stressed that the future response at Alwen will most likely lie anywhere between the two extreme deposition scenario's.

At Brenig the well buffered stream water maintains a pH of >7.0 into the foreseeable future, due mainly to the high weathering rates of base cations, even under the constant deposition scenario. The possibility exists that the high outflow concentrations of base cations are the result of reservoir construction work and/or the relatively recent filling of the reservoir. It is not possible to characterise this within the present modelling study.

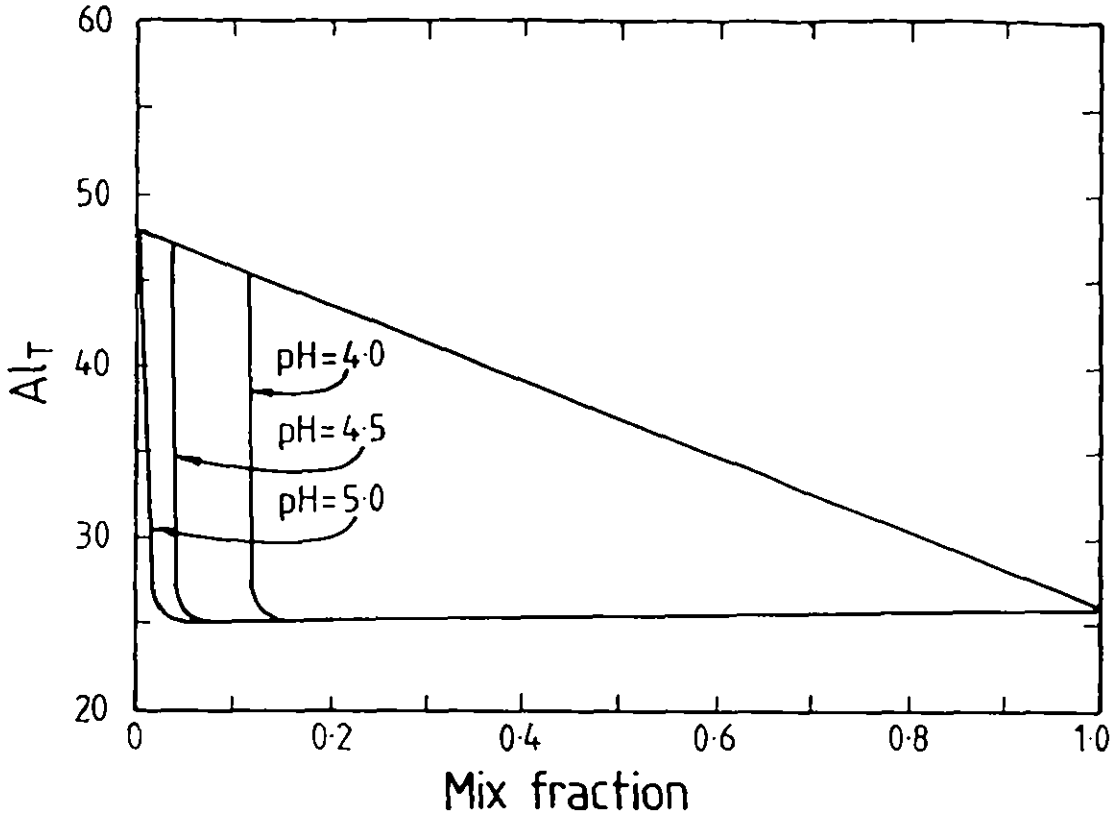
6. Simulated water quality following afforestation

For assessing land use change effects we chose the future deposition scenario of 30% decrease. The effect of growing a forest will be to; (i) cause a loss of base cations from the soil through plant uptake; (ii) increase the dry and occult deposition of atmospheric pollutants by canopy filtering and; (iii) change the run-off yield of the catchment. Both (i) and (iii) may be empirically estimated but (ii) is dependent upon tree species, planting density, tree exposure, percent of forest cover etc and so we can only estimate the effect. Future simulations were run using a canopy filtering factor of 1.5 and 2 times present day to give a range of responses. It must be stressed that the actual response could lie anywhere between the stream quality from the 30%decrease scenario under moorland conditions (no filtering factor) and the 2x scenario.

Figure 3 shows that at Alwen, afforestation will have a significant acidifying effect with a consequent dramatic increase in aluminium concentration (Figure 4). Clearly, the larger the filtering factor used in the model, the higher the hydrogen and aluminium levels. It should be noted that the absolute aluminium concentration from the model output may be incorrect as little is known as regards canopy filtering processes. The relative changes from present day concentration, however, may be regarded as 'ball park' figures. That is afforestation of the Alwen catchment may raise aluminium concentration by between 2 and 4 times background by 2034.

7. Mixing relationships at the outflow confluence

A relatively simple mixing model was employed to examine the effect of



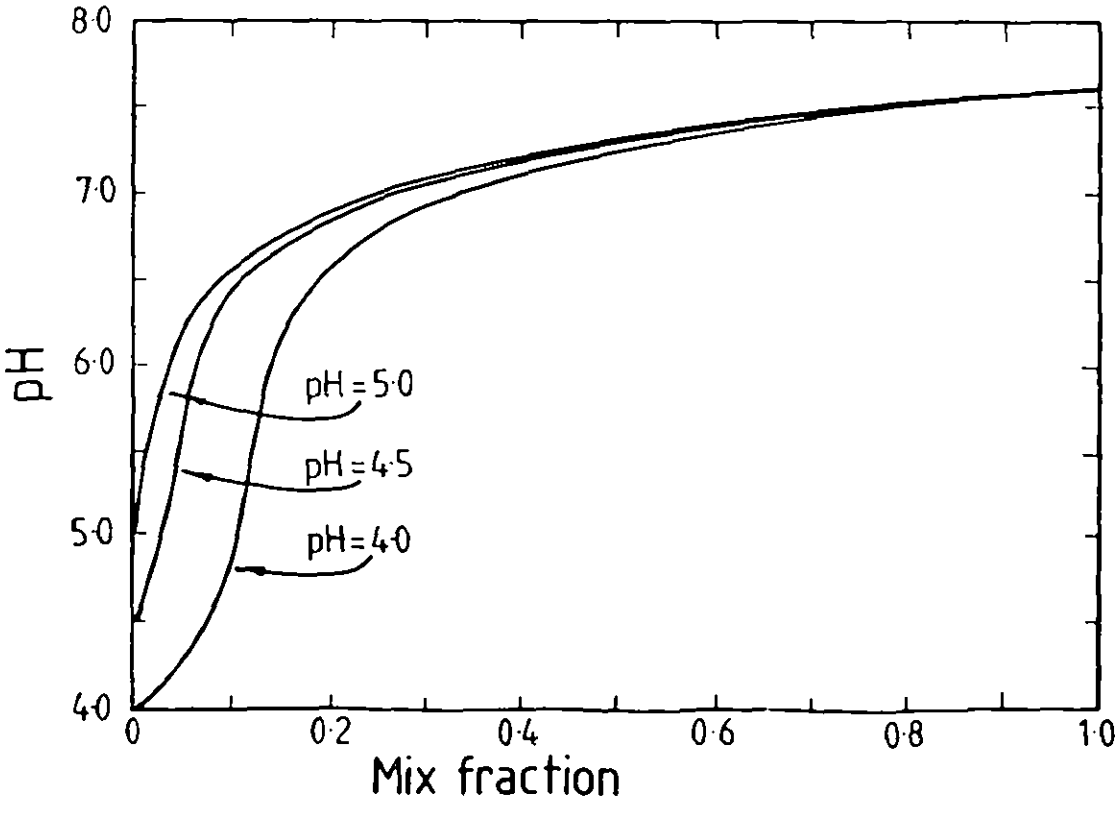


Figure 5 The response of aluminium and hydrogen to mixing different proportions of water from Alwen and Brenig under three assumed levels of pH for the Alwen water.

mixing varying proportions of water from the Brenig and Alwen reservoirs. Figure 5 shows the response of pH following mixing of different proportions of water from the two reservoirs. Three curves are shown for pH 4.0, 4.5 and 5.0 to represent the ranges of pH discussed in the earlier simulations. These three pH curves relate to the pH of the Alwen water and assume, as predicted by the model, that the Brenig pH will be almost constant in the future at pH 7.0. A mix fraction of 1 represents 100% Brenig water and a mix fraction of 0 represents 100% Alwen water. Clearly, from this figure for mixes with less than 20% Brenig water, pH of the water drops markedly whilst above 20% the system is buffered.

With respect to aluminium, Figure 6 shows four curves. First, a linear mix between the two end member compositions, that is c.25 $\mu eq\ \ell^{-1}$ for the Brenig and c.50 $\mu eq\ \ell^{-1}$ for the Alwen. This straight line assumes conservative mixing with no aluminium precipitation. If, on the other hand, we allow precipitation of aluminium the mixing situation and resultant aluminium concentration is not so clear. Again, three levels of pH are taken for the Alwen water and the mix fraction is as described earlier. Assuming a pH of 4.0 in Alwen the mixing curve follows the conservative line until the pH=4.0 solubility curve is reached whereupon it follows this line and aluminium concentrations in the water drop dramatically, for a small change in mix fraction, as aluminium precipitates. The slight increase at higher mix fractions is due to aluminate fractions.

Clearly from Figure 6 the tentative conclusion is that for mix fractions above 0.2 (that is 20% Brenig water) aluminium concentrations will be low provided precipitation occurs. It is not possible to determine whether or not precipitation will occur as this depends on residence times, other species present, etc. It can only be concluded that resulting aluminium concentration of the mix will lie somewhere between the conservative line and the non-conservative lines.

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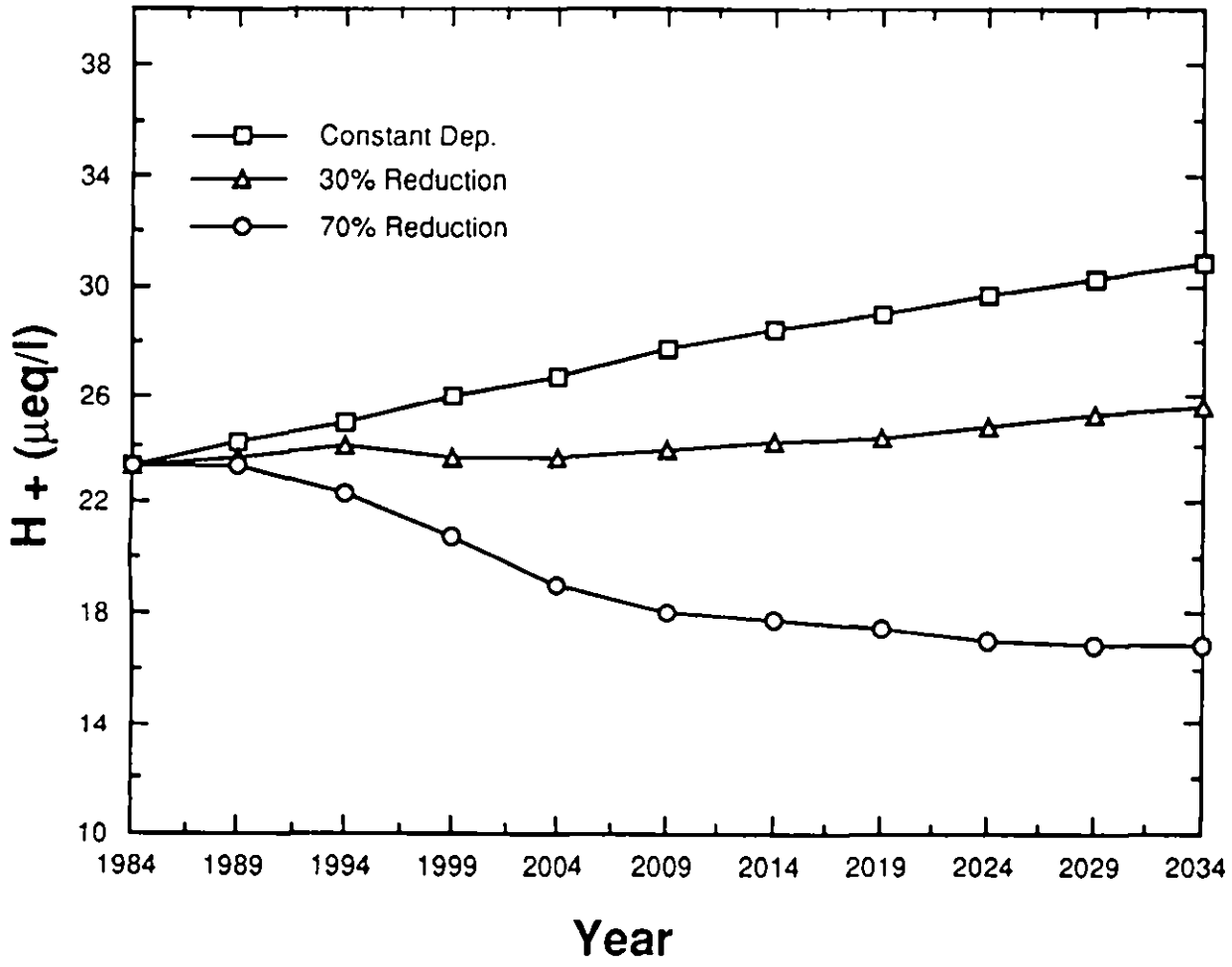


Figure 1 Predicted hydrogen concentration at the Alwen outflow under deposition reduction scenarios

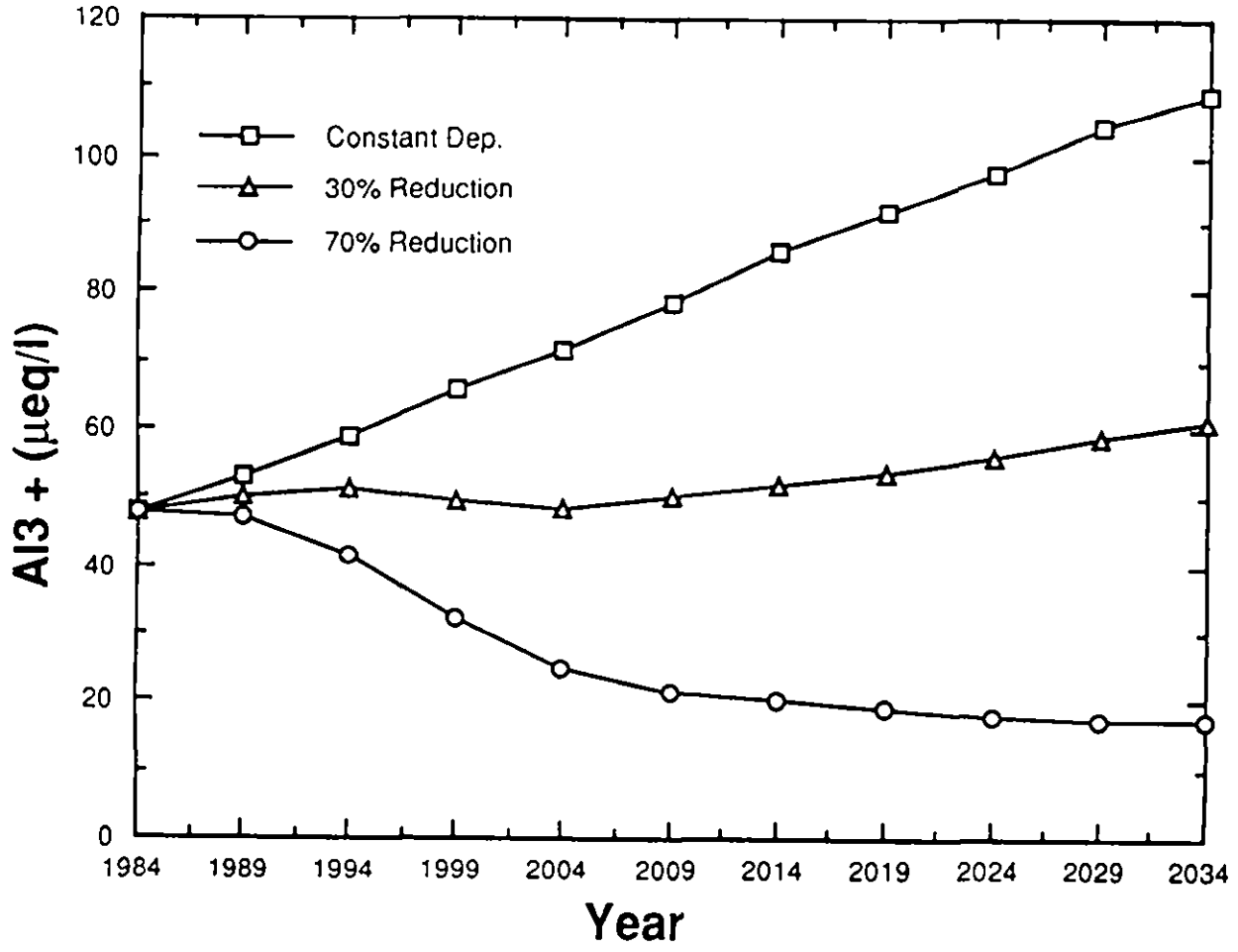


Figure 2 Predicted aluminium concentration at the Alwen outflow under deposition reduction scenarios

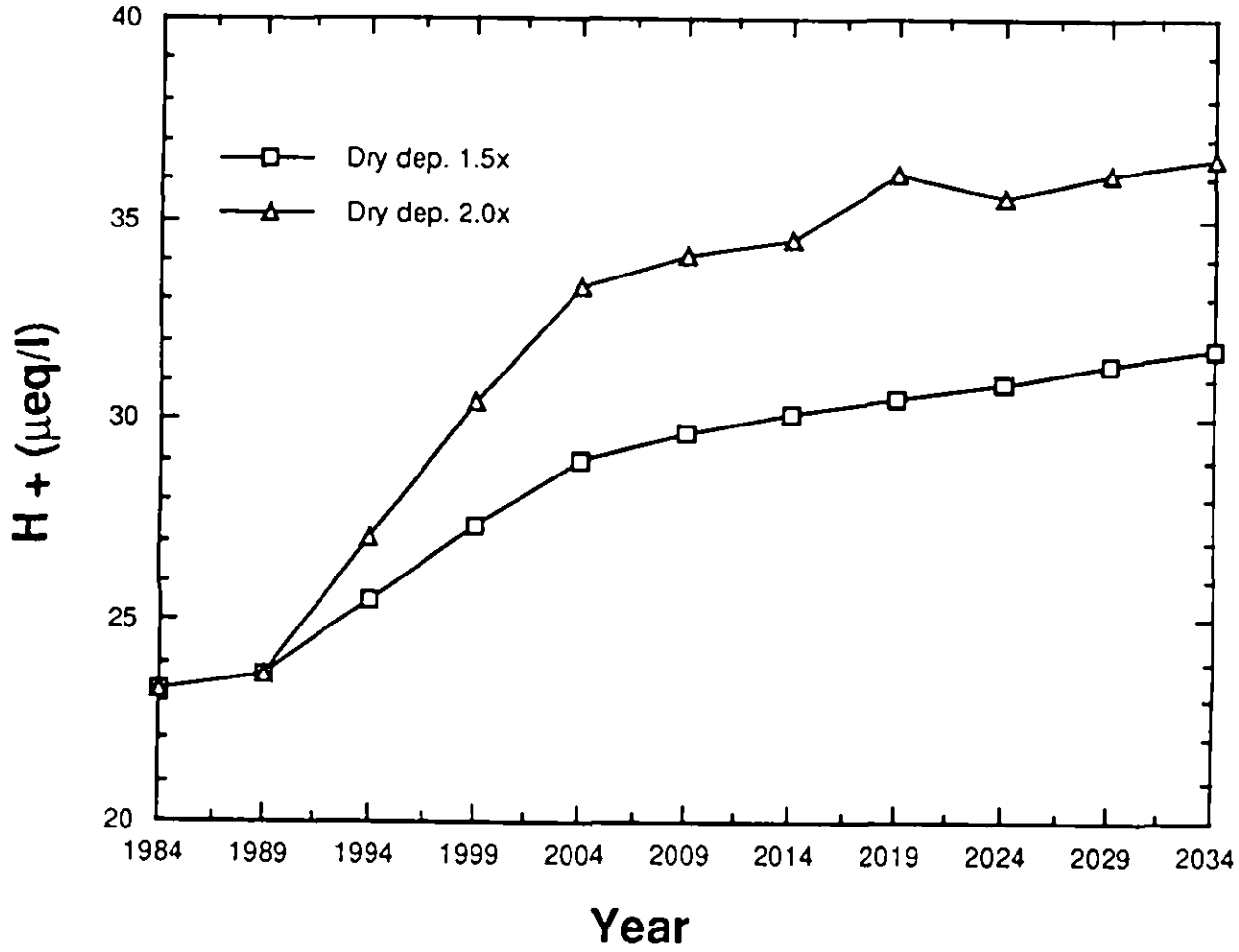


Figure 3 Predicted hydrogen concentration at the Alwen outflow using two forest filtering scenarios

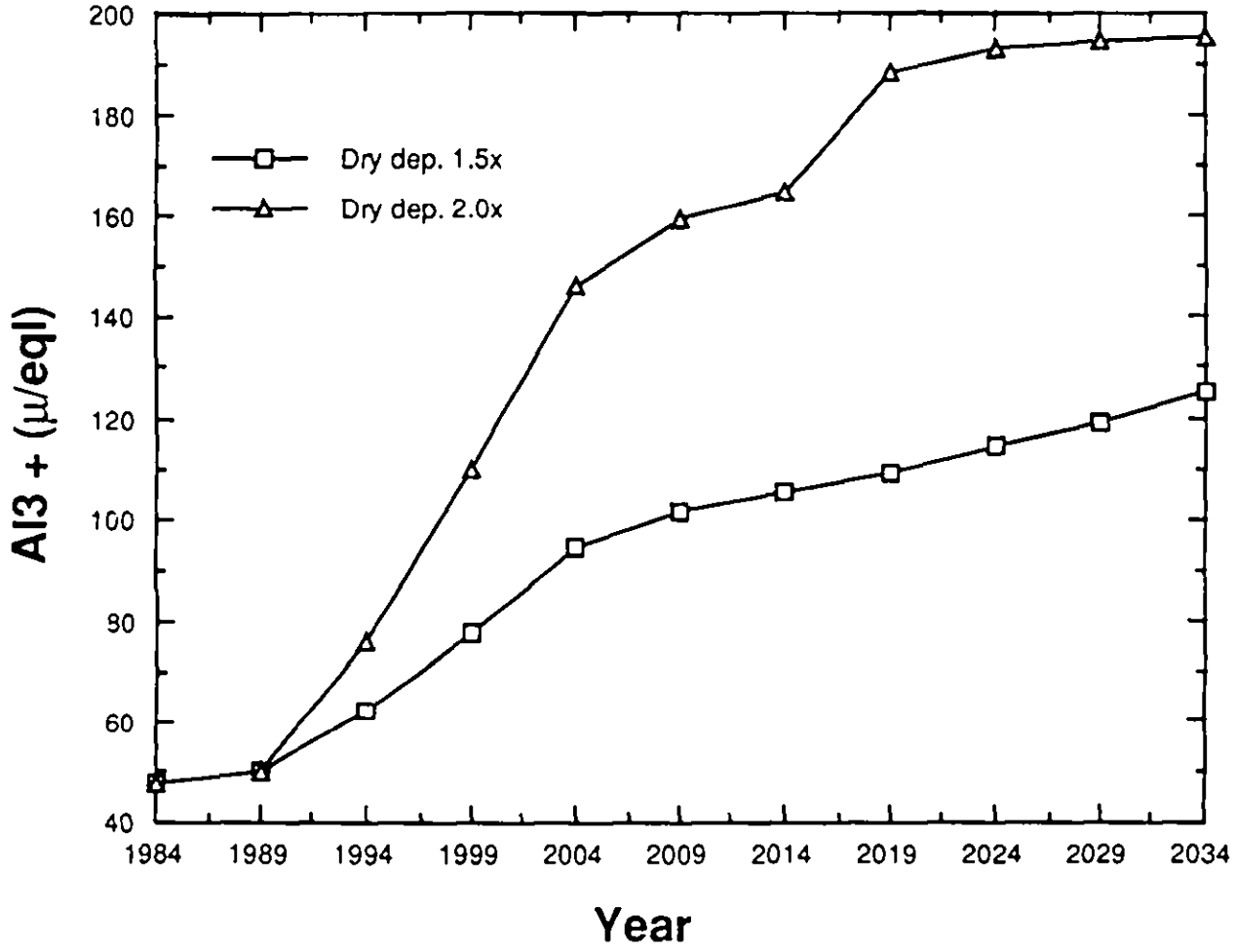


Figure 4 Predicted aluminium concentration at the Alwen outflow using two forest filtering scenarios

Appendix 1 Model output

ALWEN

HINDCAST
AND
FORECAST

30% Decrease
No Forest

---------- HINDCAST ----------

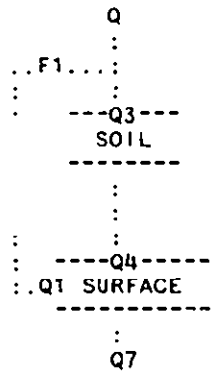
MAGIC VERSION 3.01 (27 OCT 87) RUN DATE = 06/01/89 RUN TIME = 13:29:23

CATCHMENT = Alwen Input

HINDCAST SIMULATION PERIOD = 140 YEARS MONTHLY VARIATION = N START YEAR = 1844 END YEAR = 1984

CONVERGENCE CRITERION = 1.00 MEQ/M3 INTEGRATION TIME STEP = 0.5000 YEARS

ROUTING OF FLOW THROUGH THE CATCHMENT IS:
F1 = % OF RUNOFF BYPASSING SOIL (OVERLAND FLOW)



	--%-	----------CM----------			
	F1	Q1	Q3	Q4	Q7
ANNUAL AVE	0.0	0.0	100.8	100.8	100.8

MEAN ANNUAL RUNOFF = 1.008 M/YR

MEAN ANNUAL PRECIPITATION = 1.474 M/YR

	DEPOSITION PARAMETERS FOR YEAR 1984				DEPOSITION PARAMETERS FOR YEAR 1844			
	PRECIP CONC (MEQ/M3)	DEPOSITION FACTOR	SEASALT CONC (MEQ/M3)	EXCESS CONC (MEQ/M3)	PRECIP CONC (MEQ/M3)	DEPOSITION FACTOR	SEASALT CONC (MEQ/M3)	EXCESS CONC (MEQ/M3)
PH	3.76				9.35			
CA	25.0	1.0	10.0	15.0	25.0	1.0	10.0	15.0
MG	53.0	1.0	51.1	1.9	53.0	1.0	51.1	1.9
NA	234.0	1.0	228.2	5.8	234.0	1.0	228.2	5.8
K	9.0	1.0	5.0	4.0	9.0	1.0	5.0	4.0
NH4	29.0	1.0	0.0	29.0	0.0	1.0	0.0	0.0
SO4	235.0	1.0	27.7	207.3	32.8	1.0	27.7	5.2
CL	266.0	1.0	266.0	0.0	266.0	1.0	266.0	0.0
NO3	22.0	1.0	0.0	22.0	0.0	1.0	0.0	0.0
F	0.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0

THE FOLLOWING CONDITIONS ARE SET FOR Alwen Input

CONSTANT	STREAM
RETENTION TIME (YR)	0.00
RELATIVE AREA (FRAC)	0.00
LOG10(KALOH3)	9.00
TOT ORG (MMOL/M3)	0.00
PK1 ORG	4.50
PK2 ORG	10.25
MEAN DEPTH (M)	0.00

CONSTANT	SOIL
SOIL DEPTH (M)	1.00
POROSITY (FRAC)	0.45
BULK DENSITY (KG/M3)	656.00
CEC (MEQ/KG)	102.00
SO4 HALFSAT (MEQ/M3)	1100.00
SO4 MAXCAP (MEQ/KG)	6.00
LOG10(KALOH3)	9.00
LOG10(SALCA)	0.20
LOG10(SALMG)	1.41
LOG10(SALNA)	-0.60
LOG10(SALK)	-3.42
TOT ORG (MMOL/M3)	0.00
PK1 ORG	4.25
PK2 ORG	10.25
PORE VOLUME (M)	0.45
SOIL MASS (KG/M2)	656.00

	STREAM		SOIL	
	TEMP DEG C	PCO2 ATM	TEMP DEG C	PCO2 ATM
ANNUAL AVE	7.0	0.0003	7.0	0.0150

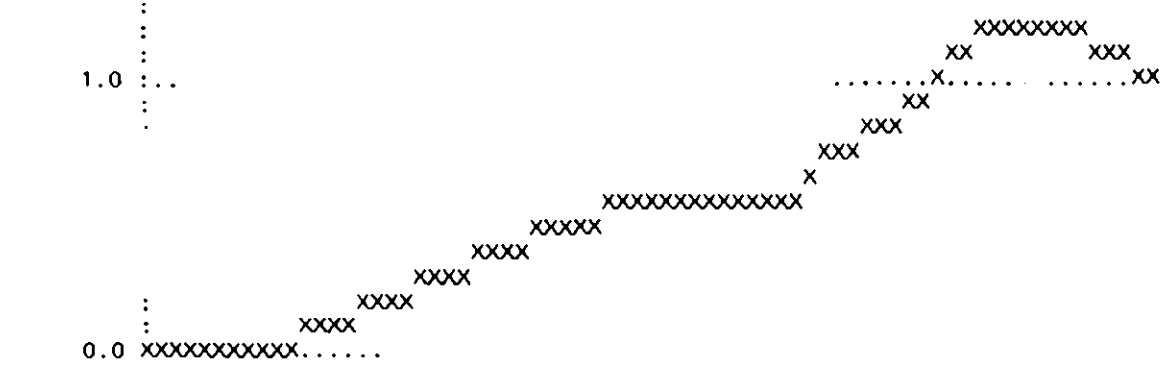
	SOIL			
	UPTAKE		WEATHERING	
	MEQ/M2/YR START YEAR	MEQ/M2/YR END YEAR	MEQ/M2/YR BACKGROUND	HYDROGEN ION POWER
CA	0.0	0.0	0.0	0.00
MG	0.0	0.0	0.0	0.00
NA	0.0	0.0	0.0	0.00
K	0.0	0.0	0.0	0.00
NH4	-90.0	-90.0	0.0	0.00
SO4	0.0	0.0	0.0	0.00
CL	0.0	0.0	0.0	0.00
NO3	-60.0	-60.0	0.0	0.00
F	0.0	0.0	0.0	0.00

	SOIL	
	TREATMENT	
	MEQ/M2/YR START YEAR	MEQ/M2/YR END YEAR
CA	0.0	0.0
MG	0.0	0.0
NA	0.0	0.0
K	0.0	0.0
NH4	0.0	0.0
SO4	0.0	0.0
CL	0.0	0.0
NO3	0.0	0.0
F	0.0	0.0

	SOIL	
	%UPTAKE	%TREATMENT
ANNUAL AVE	100.0	100.0

---------- HINDCAST SEQUENCES ----------

HINDCAST ATM WET-DEPOS. USED FOR: NH4 SO4 NO3



SEQUENCE NAME: UK (WARREN SPRINGS)
START YEAR = 1844 END YEAR = 1984

BREAK	YEAR	FACTOR
1	1860	0.040
2	1912	0.580
3	1932	0.540
4	1940	0.750
5	1950	0.880
6	1961	1.170
7	1967	1.210

THERE IS NO CHANGE FOR ANY ION IN HINDCAST DRY-DEP FACTOR

THERE IS NO CHANGE FOR ANY ION IN HINDCAST UPTAKE IN SOIL

THERE IS NO CHANGE FOR ANY ION IN HINDCAST TREATMENT SOIL

---------- FORECAST ----------

MAGIC VERSION 3.01 (27 OCT 87) RUN DATE = 06/01/89 RUN TIME = 13:29:23

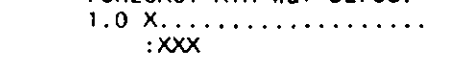
CATCHMENT = Alwen Input

FORECAST SIMULATION PERIOD = 50 YEARS MONTHLY VARIATION = N START YEAR = 1985END YEAR = 2034

CONVERGENCE CRITERION = 1.00 MEQ/M3 INTEGRATION TIME STEP = 0.5000 YEARS

---------- FORECAST SEQUENCES ---

FORECAST ATM WET-DEPOS. USED FOR: NH4 SO4 NO3



SEQUENCE NAME:
START YEAR = 1985 END YEAR = 2034

BREAK	YEAR	FACTOR

```
          XXX                                                          2000      0.700
             XXXX                                                      2034      0.700
                 XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
```

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    .
    :
0.0 :...
```

THERE IS NO CHANGE FOR ANY ION IN FORECAST DRY-DEP FACTOR

THERE IS NO CHANGE FOR ANY ION IN FORECAST UPTAKE IN SOIL

THERE IS NO CHANGE FOR ANY ION IN FORECAST TREATMENT SOIL

1934 ANNUAL AVE Alwen Input

	PRECIP	STREAM	SOIL		PRECIP	STREAM	SOIL		PRECIP	STREAM	SOIL		SOIL
	MEQ/M3				MEQ/M3				MEQ/M3				
CA	25.0	87.0	87.0	H	93.5	1.9	12.5	PH	4.0	5.7	4.9	ES %	16.3
MG	53.0	149.1	149.1	ALK	-93.5	1.2	0.2	AL3+	0.0	0.0	7.2	ECA %	16.0
NA	234.0	354.2	354.2	SBC	321.0	608.4	608.4	HCO3	0.0	3.2	24.3	EMG %	10.9
K	9.0	18.1	18.1	SAA	431.6	610.5	610.1	CO3	0.0	0.0	0.0	ENA %	3.7
NH4	17.2	2.5	2.5	TOT AL	0.0	0.9	15.0	HA-	0.0	0.0	0.0	EK %	1.6
SO4	152.6	213.9	213.5	AQ SO4	152.6	213.9	213.9	A--	0.0	0.0	0.0	BS %	32.3
CL	266.0	389.0	389.0	TOT F	0.0	0.0	0.0						
NO3	13.0	7.6	7.6	SUM +	431.6	613.1	634.6						
F	0.0	0.0	0.0	SUM -	431.6	613.8	634.4						

	ATMOSPHERIC DEPOSITION			CATCHMENT				TOTAL AMOUNT		ATMOSPHERIC DEPOSITION			CATCHMENT	
	WET	DRY	TOTAL	WEATH	UPTAKE	OUTFLOW	NTFLUX	SOIL		WET	DRY	TOTAL	OUTFLOW	NTFLUX
	MEQ/M2/YR			MEQ/M2/YR				MEQ/M2		MEQ/M2/YR			MEQ/M2/YR	
CA	36.8	0.0	36.8	0.0	0.0	87.7	50.8	10754.0	H	137.8	0.0	137.8	1.9	-135.8
MG	78.1	0.0	78.1	0.0	0.0	150.3	72.2	7355.3	ALK	-137.8	0.0	-137.8	1.2	138.9
NA	344.9	0.0	344.9	0.0	0.0	357.0	12.1	2631.2	SBC	473.2	0.0	473.2	613.3	140.1
K	13.3	0.0	13.3	0.0	0.0	18.3	5.0	1104.7	SAA	636.2	0.0	636.2	615.4	-20.8
NH4	25.3	0.0	25.3	0.0	22.8	2.5	-22.8	1.1	TOT AL	0.0	0.0	0.0	0.9	0.9
SO4	225.0	0.0	225.0	0.0	0.0	215.6	-9.3	738.5	AQ SO4	225.0	0.0	225.0	215.6	-9.3
CL	392.1	0.0	392.1	0.0	0.0	392.1	0.0	175.0	TOT F	0.0	0.0	0.0	0.0	0.0
NO3	19.2	0.0	19.2	0.0	11.5	7.7	-11.5	3.4	SUM +	636.2	0.0	636.2	618.0	-18.3
F	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	SUM -	636.2	0.0	636.2	618.7	-17.5

1939 ANNUAL AVE Alwen Input

	PRECIP	STREAM	SOIL		PRECIP	STREAM	SOIL		PRECIP	STREAM	SOIL		SOIL
	MEQ/M3				MEQ/M3				MEQ/M3				
CA	25.0	95.4	95.4	H	119.1	4.1	13.3	PH	3.9	5.4	4.9	ES %	18.2
MG	53.0	158.9	158.9	ALK	-119.1	-3.4	-4.2	AL3+	0.0	0.3	8.7	ECA %	15.6
NA	234.0	363.0	363.0	SBC	321.0	636.1	636.1	HCO3	0.0	1.5	22.9	EMG %	10.3

K	9.0	18.8	18.8	SAA	461.1	643.3	642.7	CO3	0.0	0.0	0.0	ENA % 3.6
NH4	21.0	3.1	3.1	TOT AL	0.0	1.8	17.5	HA-	0.0	0.0	0.0	EK % 1.6
SO4	179.1	245.0	244.4	AQ SO4	179.1	245.0	245.0	A--	0.0	0.0	0.0	BS % 31.1
CL	266.0	389.0	389.0	TOT F	0.0	0.0	0.0					
NO3	15.9	9.3	9.3	SUM +	461.1	644.1	665.7					
F	0.0	0.0	0.0	SUM -	461.1	644.9	665.6					

	ATMOSPHERIC DEPOSITION			CATCHMENT				TOTAL AMOUNT		ATMOSPHERIC DEPOSITION			CATCHMENT	
	WET	DRY	TOTAL	WEATH	UPTAKE	OUTFLOW	NTFLUX	SOIL		WET	DRY	TOTAL	OUTFLOW	NTFLUX
	-----MEQ/M2/YR-----			-----MEQ/M2/YR-----				-------MEQ/M2-------		-----MEQ/M2/YR------			--MEQ/M2/YR---	
CA	36.8	0.0	36.8	0.0	0.0	96.1	59.3	10480.9	H	175.5	0.0	175.5	4.1	-171.4
MG	78.1	0.0	78.1	0.0	0.0	160.2	82.1	6972.4	ALK	-175.5	0.0	-175.5	-3.4	172.1
NA	344.9	0.0	344.9	0.0	0.0	365.9	21.0	2549.4	SBC	473.2	0.0	473.2	641.2	168.0
K	13.3	0.0	13.3	0.0	0.0	18.9	5.6	1078.2	SAA	679.6	0.0	679.6	648.5	-31.1
NH4	30.9	0.0	30.9	0.0	27.8	3.1	-27.8	1.4	TOT AL	0.0	0.0	0.0	1.9	1.9
SO4	264.1	0.0	264.1	0.0	0.0	247.0	-17.1	830.6	AQ SO4	264.1	0.0	264.1	247.0	-17.1
CL	392.1	0.0	392.1	0.0	0.0	392.1	0.0	175.0	TOT F	0.0	0.0	0.0	0.0	0.0
NO3	23.5	0.0	23.5	0.0	14.1	9.4	-14.1	4.2	SUM +	679.6	0.0	679.6	649.2	-30.4
F	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	SUM -	679.6	0.0	679.6	650.0	-29.6

1944 ANNUAL AVE Alwen Input

	PRECIP	STREAM	SOIL		PRECIP	STREAM	SOIL		PRECIP	STREAM	SOIL		SOIL
	-------MEQ/M3-------				-------MEQ/M3-------				-------MEQ/M3-------				-------
CA	25.0	105.0	105.0	H	134.4	7.2	14.3	PH	3.9	5.1	4.8	ES %	19.9
MG	53.0	169.1	169.1	ALK	-134.4	-9.4	-9.6	AL3+	0.0	1.4	10.8	ECA %	15.1
NA	234.0	367.4	367.4	SBC	321.0	661.0	661.0	HCO3	0.0	0.8	21.4	EMG %	9.7
K	9.0	19.4	19.4	SAA	478.6	674.0	673.3	CO3	0.0	0.0	0.0	ENA %	3.4
NH4	23.3	3.4	3.4	TOT AL	0.0	4.7	20.8	HA-	0.0	0.0	0.0	EK %	1.6
SO4	195.0	274.7	274.0	AQ SO4	195.0	274.8	274.8	A--	0.0	0.0	0.0	BS %	29.8
CL	266.0	389.0	389.0	TOT F	0.0	0.0	0.0						
NO3	17.6	10.3	10.3	SUM +	478.6	674.5	694.6						
F	0.0	0.0	0.0	SUM -	478.6	674.9	694.7						

	ATMOSPHERIC DEPOSITION			CATCHMENT				TOTAL AMOUNT		ATMOSPHERIC DEPOSITION			CATCHMENT	
	WET	DRY	TOTAL	WEATH	UPTAKE	OUTFLOW	NTFLUX	SOIL		WET	DRY	TOTAL	OUTFLOW	NTFLUX
	-----MEQ/M2/YR-----			-----MEQ/M2/YR-----				-------MEQ/M2-------		-----MEQ/M2/YR------			--MEQ/M2/YR---	
CA	36.8	0.0	36.8	0.0	0.0	105.8	69.0	10159.5	H	198.0	0.0	198.0	7.3	-190.7
MG	78.1	0.0	78.1	0.0	0.0	170.5	92.3	6534.2	ALK	-198.0	0.0	-198.0	-9.5	188.6
NA	344.9	0.0	344.9	0.0	0.0	370.4	25.5	2429.7	SBC	473.2	0.0	473.2	666.3	193.1
K	13.3	0.0	13.3	0.0	0.0	19.6	6.3	1048.2	SAA	705.5	0.0	705.5	679.4	-26.1
NH4	34.3	0.0	34.3	0.0	30.9	3.4	-30.9	1.5	TOT AL	0.0	0.0	0.0	4.8	4.8
SO4	287.4	0.0	287.4	0.0	0.0	276.9	-10.5	911.4	AQ SO4	287.4	0.0	287.4	277.0	-10.4
CL	392.1	0.0	392.1	0.0	0.0	392.1	0.0	175.0	TOT F	0.0	0.0	0.0	0.0	0.0
NO3	26.0	0.0	26.0	0.0	15.6	10.4	-15.6	4.6	SUM +	705.5	0.0	705.5	679.9	-25.5
F	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	SUM -	705.5	0.0	705.5	680.3	-25.2

1949 ANNUAL AVE Alwen Input

	PRECIP	STREAM	SOIL		PRECIP	STREAM	SOIL		PRECIP	STREAM	SOIL		SOIL
	-------MEQ/M3-------				-------MEQ/M3-------				-------MEQ/M3-------				-------
CA	25.0	113.7	113.7	H	147.0	9.3	15.2	PH	3.8	5.0	4.8	ES %	21.1
MG	53.0	176.0	176.0	ALK	-147.0	-14.3	-15.1	AL3+	0.0	3.0	13.1	ECA %	14.6

NA	234.0	367.6	367.6	SBC	321.0	677.2	677.2	HCO3	0.0	0.7	20.1
K	9.0	20.0	20.0	SAA	493.2	695.7	694.9	CO3	0.0	0.0	0.0
NH4	25.1	3.7	3.7	TOT AL	0.0	7.9	24.5	HA-	0.0	0.0	0.0
SO4	208.1	295.6	294.7	AQ SO4	208.1	295.8	295.8	A--	0.0	0.0	0.0
CL	266.0	389.0	389.0	TOT F	0.0	0.0	0.0				
NO3	19.1	11.2	11.2	SUM +	493.2	695.6	715.0				
F	0.0	0.0	0.0	SUM -	493.2	696.4	715.0				

	EMG %	9.0
	ENA %	3.2
	EK %	1.5
	BS %	28.3

	ATMOSPHERIC DEPOSITION			CATCHMENT				TOTAL AMOUNT
	WET	DRY	TOTAL	WEATH	UPTAKE	OUTFLOW	NTFLUX	SOIL
	-----MEQ/M2/YR------			-----MEQ/M2/YR----------				-------MEQ/M2-------
CA	36.8	0.0	36.8	0.0	0.0	114.6	77.8	9792.8
MG	78.1	0.0	78.1	0.0	0.0	177.4	99.2	6054.8
NA	344.9	0.0	344.9	0.0	0.0	370.5	25.6	2301.8
K	13.3	0.0	13.3	0.0	0.0	20.1	6.8	1015.3
NH4	37.1	0.0	37.1	0.0	33.4	3.7	-33.4	1.7
SO4	306.8	0.0	306.8	0.0	0.0	297.9	-8.8	967.2
CL	392.1	0.0	392.1	0.0	0.0	392.1	0.0	175.0
NO3	28.1	0.0	28.1	0.0	16.9	11.3	-16.9	5.0
F	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	ATMOSPHERIC DEPOSITION			CATCHMENT	
	WET	DRY	TOTAL	OUTFLOW	NTFLUX
	-----MEQ/M2/YR------			--MEQ/M2/YR---	
H	216.7	0.0	216.7	9.4	-207.3
ALK	-216.7	0.0	-216.7	-14.4	202.3
SBC	473.2	0.0	473.2	682.6	209.4
SAA	727.0	0.0	727.0	701.3	-25.7
TOT AL	0.0	0.0	0.0	8.0	8.0
AQ SO4	306.8	0.0	306.8	298.2	-8.6
TOT F	0.0	0.0	0.0	0.0	0.0
SUM +	727.0	0.0	727.0	701.2	-25.8
SUM -	727.0	0.0	727.0	701.9	-25.0

1954 ANNUAL AVE Alwen Input

	PRECIP	STREAM	SOIL
	-------MEQ/M3-------		
CA	25.0	125.0	125.0
MG	53.0	184.6	184.6
NA	234.0	369.6	369.6
K	9.0	20.6	20.6
NH4	28.6	4.2	4.2
SO4	232.1	324.0	323.1
CL	266.0	389.0	389.0
NO3	21.7	12.7	12.7
F	0.0	0.0	0.0

	PRECIP	STREAM	SOIL
	-------MEQ/M3-------		
H	170.2	12.0	16.4
ALK	-170.2	-22.3	-22.5
SBC	321.0	699.8	699.8
SAA	519.7	725.7	724.8
TOT AL	0.0	14.0	29.7
AQ SO4	232.1	324.6	324.6
TOT F	0.0	0.0	0.0
SUM +	519.7	726.2	743.7
SUM -	519.7	726.2	743.5

	PRECIP	STREAM	SOIL
	-------MEQ/M3-------		
PH	3.8	4.9	4.8
AL3+	0.0	6.5	16.5
HCO3	0.0	0.5	18.7
CO3	0.0	0.0	0.0
HA-	0.0	0.0	0.0
A--	0.0	0.0	0.0

	SOIL

ES %	22.7
ECA %	14.0
EMG %	8.2
ENA %	3.0
EK %	1.5
BS %	26.6

	ATMOSPHERIC DEPOSITION			CATCHMENT				TOTAL AMOUNT
	WET	DRY	TOTAL	WEATH	UPTAKE	OUTFLOW	NTFLUX	SOIL
	-----MEQ/M2/YR------			-----MEQ/M2/YR----------				-------MEQ/M2-------
CA	36.8	0.0	36.8	0.0	0.0	126.0	89.1	9378.0
MG	78.1	0.0	78.1	0.0	0.0	186.1	107.9	5539.2
NA	344.9	0.0	344.9	0.0	0.0	372.6	27.7	2170.6
K	13.3	0.0	13.3	0.0	0.0	20.8	7.5	979.5
NH4	42.1	0.0	42.1	0.0	37.9	4.2	-37.9	1.9
SO4	342.1	0.0	342.1	0.0	0.0	326.6	-15.4	1043.9
CL	392.1	0.0	392.1	0.0	0.0	392.1	0.0	175.0
NO3	32.0	0.0	32.0	0.0	19.2	12.8	-19.2	5.7
F	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	ATMOSPHERIC DEPOSITION			CATCHMENT	
	WET	DRY	TOTAL	OUTFLOW	NTFLUX
	-----MEQ/M2/YR------			--MEQ/M2/YR---	
H	250.8	0.0	250.8	12.1	-238.7
ALK	-250.8	0.0	-250.8	-22.5	228.3
SBC	473.2	0.0	473.2	705.4	232.2
SAA	766.1	0.0	766.1	731.5	-34.6
TOT AL	0.0	0.0	0.0	14.1	14.1
AQ SO4	342.1	0.0	342.1	327.2	-14.9
TOT F	0.0	0.0	0.0	0.0	0.0
SUM +	766.1	0.0	766.1	732.1	-34.0
SUM -	766.1	0.0	766.1	732.0	-34.1

1959 ANNUAL AVE Alwen Input

	PRECIP	STREAM	SOIL
	-------MEQ/M3-------		
CA	25.0	139.9	139.9

	PRECIP	STREAM	SOIL
	-------MEQ/M3-------		
	195.9	14.6	17.9

	PRECIP	STREAM	SOIL
	-------MEQ/M3-------		
PH	3.7	4.8	4.7

	SOIL

ES %	24.7

MG	53.0	195.4	195.4	ALK	-195.9	-32.6	-32.8	AL3+	0.0	11.7	21.7	ECA % 13.2
NA	234.0	372.5	372.5	SBC	321.0	729.3	729.3	HCO3	0.0	0.4	17.1	EMG % 7.3
K	9.0	21.5	21.5	SAA	549.3	765.3	764.3	CO3	0.0	0.0	0.0	ENA % 2.8
NH4	32.4	4.7	4.7	TOT AL	0.0	22.6	37.7	HA-	0.0	0.0	0.0	EK % 1.4
SO4	258.7	362.0	361.0	AQ SO4	258.7	363.1	363.1	A--	0.0	0.0	0.0	BS % 24.8
CL	266.0	389.0	389.0	TOT F	0.0	0.0	0.0					
NO3	24.6	14.4	14.4	SUM +	549.3	765.9	781.9					
F	0.0	0.0	0.0	SUM -	549.3	765.8	781.5					

	ATMOSPHERIC DEPOSITION			CATCHMENT				TOTAL AMOUNT		ATMOSPHERIC DEPOSITION			CATCHMENT	
	WET	DRY	TOTAL	WEATH	UPTAKE	OUTFLOW	NTFLUX	SOIL		WET	DRY	TOTAL	OUTFLOW	NTFLUX
	-----MEQ/M2/YR------			-----MEQ/M2/YR----------				------MEQ/M2------		-----MEQ/M2/YR------			--MEQ/M2/YR---	
CA	36.8	0.0	36.8	0.0	0.0	141.1	104.2	8895.9	H	288.7	0.0	288.7	14.7	-274.0
MG	78.1	0.0	78.1	0.0	0.0	197.0	118.9	4972.2	ALK	-288.7	0.0	-288.7	-32.8	255.9
NA	344.9	0.0	344.9	0.0	0.0	375.5	30.5	2024.5	SBC	473.2	0.0	473.2	735.2	262.0
K	13.3	0.0	13.3	0.0	0.0	21.7	8.4	939.8	SAA	809.7	0.0	809.7	771.4	-38.2
NH4	47.8	0.0	47.8	0.0	43.0	4.8	-43.0	2.1	TOT AL	0.0	0.0	0.0	22.8	22.8
SO4	381.3	0.0	381.3	0.0	0.0	364.8	-16.5	1140.2	AQ SO4	381.3	0.0	381.3	366.0	-15.3
CL	392.1	0.0	392.1	0.0	0.0	392.1	0.0	175.0	TOT F	0.0	0.0	0.0	0.0	0.0
NO3	36.2	0.0	36.2	0.0	21.7	14.5	-21.7	6.5	SUM +	809.7	0.0	809.7	772.1	-37.6
F	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	SUM -	809.7	0.0	809.7	771.9	-37.8

1964 ANNUAL AVE Alwen Input

	PRECIP	STREAM	SOIL		PRECIP	STREAM	SOIL		PRECIP	STREAM	SOIL		SOIL
	--------MEQ/M3-------				--------MEQ/M3-------				--------MEQ/M3-------				-------
CA	25.0	153.8	153.8	H	210.1	17.2	19.6	PH	3.7	4.8	4.7	ES %	26.2
MG	53.0	200.7	200.7	ALK	-210.1	-45.6	-45.0	AL3+	0.0	19.1	28.3	ECA %	12.4
NA	234.0	370.7	370.7	SBC	321.0	747.4	747.4	HCO3	0.0	0.4	15.7	EMG %	6.4
K	9.0	22.2	22.2	SAA	565.6	795.8	794.9	CO3	0.0	0.0	0.0	ENA %	2.6
NH4	34.5	5.0	5.0	TOT AL	0.0	34.1	47.7	HA-	0.0	0.0	0.0	EK %	1.3
SO4	273.4	391.5	390.6	AQ SO4	273.4	393.6	393.6	A--	0.0	0.0	0.0	BS %	22.7
CL	266.0	389.0	389.0	TOT F	0.0	0.0	0.0						
NO3	26.2	15.3	15.3	SUM +	565.6	796.4	810.3						
F	0.0	0.0	0.0	SUM -	565.6	796.2	810.6						

	ATMOSPHERIC DEPOSITION			CATCHMENT				TOTAL AMOUNT		ATMOSPHERIC DEPOSITION			CATCHMENT	
	WET	DRY	TOTAL	WEATH	UPTAKE	OUTFLOW	NTFLUX	SOIL		WET	DRY	TOTAL	OUTFLOW	NTFLUX
	-----MEQ/M2/YR------			-----MEQ/M2/YR----------				------MEQ/M2------		-----MEQ/M2/YR------			--MEQ/M2/YR---	
CA	36.8	0.0	36.8	0.0	0.0	155.1	118.2	8336.7	H	309.7	0.0	309.7	17.3	-292.4
MG	78.1	0.0	78.1	0.0	0.0	202.3	124.2	4358.8	ALK	-309.7	0.0	-309.7	-45.9	263.7
NA	344.9	0.0	344.9	0.0	0.0	373.7	28.8	1872.4	SBC	473.2	0.0	473.2	753.4	280.3
K	13.3	0.0	13.3	0.0	0.0	22.4	9.1	895.8	SAA	833.7	0.0	833.7	802.2	-31.5
NH4	50.9	0.0	50.9	0.0	45.8	5.1	-45.8	2.3	TOT AL	0.0	0.0	0.0	34.4	34.4
SO4	403.0	0.0	403.0	0.0	0.0	394.7	-8.3	1210.2	AQ SO4	403.0	0.0	403.0	396.7	-6.3
CL	392.1	0.0	392.1	0.0	0.0	392.1	0.0	175.0	TOT F	0.0	0.0	0.0	0.0	0.0
NO3	38.6	0.0	38.6	0.0	23.2	15.4	-23.1	6.9	SUM +	833.7	0.0	833.7	802.8	-30.9
F	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	SUM -	833.7	0.0	833.7	802.6	-31.1

1969 ANNUAL AVE Alwen Input

	PRECIP	STREAM	SOIL		PRECIP	STREAM	SOIL		PRECIP	STREAM	SOIL		SOIL
	--------MEQ/M3-------				--------MEQ/M3-------				--------MEQ/M3-------				-------

CA	25.0	161.6	161.6	H	209.2	18.9	21.0	PH	3.7	4.7	4.7	ES %	26.5
MG	53.0	195.3	195.3	ALK	-209.2	-56.3	-56.7	AL3+	0.0	25.7	35.2	ECA %	11.5
NA	234.0	364.9	364.9	SBC	321.0	744.1	744.1	HCO3	0.0	0.3	14.7	EMG %	5.5
K	9.0	22.4	22.4	SAA	564.5	802.6	801.6	CO3	0.0	0.0	0.0	ENA %	2.4
NH4	34.4	5.0	5.0	TOT AL	0.0	43.9	57.6	HA-	0.0	0.0	0.0	EK %	1.3
SO4	272.5	398.4	397.4	AQ SO4	272.5	401.2	401.2	A--	0.0	0.0	0.0	BS %	20.6
CL	266.0	389.0	389.0	TOT F	0.0	0.0	0.0						
NO3	26.1	15.2	15.2	SUM +	564.5	803.1	816.8						
F	0.0	0.0	0.0	SUM -	564.5	803.0	816.3						

	ATMOSPHERIC DEPOSITION			CATCHMENT				TOTAL AMOUNT		ATMOSPHERIC DEPOSITION			CATCHMENT	
	WET	DRY	TOTAL	WEATH	UPTAKE	OUTFLOW	NTFLUX	SOIL		WET	DRY	TOTAL	OUTFLOW	NTFLUX
	-----MEQ/M2/YR------			-----MEQ/M2/YR----------				------MEQ/M2------		-----MEQ/M2/YR------			--MEQ/M2/YR---	
CA	36.8	0.0	36.8	0.0	0.0	162.8	126.0	7722.6	H	308.3	0.0	308.3	19.1	-289.2
MG	78.1	0.0	78.1	0.0	0.0	196.8	118.7	3746.4	ALK	-308.3	0.0	-308.3	-56.8	251.5
NA	344.9	0.0	344.9	0.0	0.0	367.8	22.9	1741.5	SBC	473.2	0.0	473.2	750.1	276.9
K	13.3	0.0	13.3	0.0	0.0	22.6	9.3	849.6	SAA	832.1	0.0	832.1	809.0	-23.1
NH4	50.7	0.0	50.7	0.0	45.6	5.1	-45.6	2.3	TOT AL	0.0	0.0	0.0	44.2	44.2
SO4	401.6	0.0	401.6	0.0	0.0	401.6	0.0	1224.4	AQ SO4	401.6	0.0	401.6	404.4	2.8
CL	392.1	0.0	392.1	0.0	0.0	392.1	0.0	175.0	TOT F	0.0	0.0	0.0	0.0	0.0
NO3	38.4	0.0	38.4	0.0	23.1	15.4	-23.1	6.9	SUM +	832.1	0.0	832.1	809.5	-22.6
F	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	SUM -	832.1	0.0	832.1	809.4	-22.7

1974 ANNUAL AVE Alwen Input

	PRECIP	STREAM	SOIL		PRECIP	STREAM	SOIL		PRECIP	STREAM	SOIL		SOIL
	--------MEQ/M3-------				--------MEQ/M3-------				--------MEQ/M3-------				-------
CA	25.0	160.7	160.7	H	197.1	20.4	22.1	PH	3.7	4.7	4.7	ES %	25.8
MG	53.0	179.8	179.8	ALK	-197.1	-66.2	-65.5	AL3+	0.0	32.1	40.6	ECA %	10.5
NA	234.0	357.5	357.5	SBC	321.0	720.0	720.0	HCO3	0.0	0.3	14.0	EMG %	4.7
K	9.0	22.0	22.0	SAA	550.7	786.9	786.0	CO3	0.0	0.0	0.0	ENA %	2.2
NH4	32.6	4.8	4.8	TOT AL	0.0	53.0	65.2	HA-	0.0	0.0	0.0	EK %	1.2
SO4	260.0	383.5	382.6	AQ SO4	260.0	386.8	386.8	A--	0.0	0.0	0.0	BS %	18.6
CL	266.0	389.0	389.0	TOT F	0.0	0.0	0.0						
NO3	24.7	14.4	14.4	SUM +	550.7	788.0	800.0						
F	0.0	0.0	0.0	SUM -	550.7	787.2	800.0						

	ATMOSPHERIC DEPOSITION			CATCHMENT				TOTAL AMOUNT		ATMOSPHERIC DEPOSITION			CATCHMENT	
	WET	DRY	TOTAL	WEATH	UPTAKE	OUTFLOW	NTFLUX	SOIL		WET	DRY	TOTAL	OUTFLOW	NTFLUX
	-----MEQ/M2/YR------			-----MEQ/M2/YR----------				------MEQ/M2------		-----MEQ/M2/YR------			--MEQ/M2/YR---	
CA	36.8	0.0	36.8	0.0	0.0	161.9	125.1	7092.8	H	290.5	0.0	290.5	20.6	-270.0
MG	78.1	0.0	78.1	0.0	0.0	181.3	103.1	3190.2	ALK	-290.5	0.0	-290.5	-66.8	223.8
NA	344.9	0.0	344.9	0.0	0.0	360.3	15.4	1647.1	SBC	473.2	0.0	473.2	725.7	252.6
K	13.3	0.0	13.3	0.0	0.0	22.2	8.9	803.8	SAA	811.7	0.0	811.7	793.2	-18.6
NH4	48.0	0.0	48.0	0.0	43.2	4.8	-43.2	2.1	TOT AL	0.0	0.0	0.0	53.5	53.5
SO4	383.2	0.0	383.2	0.0	0.0	386.5	3.3	1187.9	AQ SO4	383.2	0.0	383.2	389.9	6.7
CL	392.1	0.0	392.1	0.0	0.0	392.1	0.0	175.0	TOT F	0.0	0.0	0.0	0.0	0.0
NO3	36.4	0.0	36.4	0.0	21.9	14.6	-21.9	6.5	SUM +	811.7	0.0	811.7	794.3	-17.5
F	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	SUM -	811.7	0.0	811.7	793.5	-18.2

1979 ANNUAL AVE Alwen Input

	PRECIP	STREAM	SOIL		PRECIP	STREAM	SOIL		PRECIP	STREAM	SOIL		SOIL

	--------MEQ/M3-------		
CA	25.0	156.1	156.1
MG	53.0	162.8	162.8
NA	234.0	353.0	353.0
K	9.0	21.5	21.5
NH4	30.8	4.5	4.5
SO4	247.5	365.4	364.5
CL	266.0	389.0	389.0
NO3	23.4	13.7	13.7
F	0.0	0.0	0.0

	--------MEQ/M3-------		
H	185.1	21.4	23.0
ALK	-185.1	-73.1	-73.2
SBC	321.0	693.3	693.3
SAA	536.8	768.0	767.1
TOT AL	0.0	59.5	71.9
AQ SO4	247.5	369.0	369.0
TOT F	0.0	0.0	0.0
SUM +	536.8	767.6	779.9
SUM -	536.8	768.3	780.6

	--------MEQ/M3-------		
PH	3.7	4.7	4.6
AL3+	0.0	36.7	45.6
HCO3	0.0	0.3	13.4
CO3	0.0	0.0	0.0
HA-	0.0	0.0	0.0
A--	0.0	0.0	0.0

ES %	24.9
ECA %	9.6
EMG %	4.0
ENA %	2.1
EK %	1.1
BS %	16.9

	ATMOSPHERIC DEPOSITION			CATCHMENT				TOTAL AMOUNT
	WET	DRY	TOTAL	WEATH	UPTAKE	OUTFLOW	NTFLUX	SOIL
	-----MEQ/M2/YR------			-----MEQ/M2/YR----------				-------MEQ/M2-------
CA	36.8	0.0	36.8	0.0	0.0	157.4	120.5	6477.3
MG	78.1	0.0	78.1	0.0	0.0	164.1	85.9	2717.2
NA	344.9	0.0	344.9	0.0	0.0	355.8	10.9	1582.1
K	13.3	0.0	13.3	0.0	0.0	21.7	8.4	760.4
NH4	45.4	0.0	45.4	0.0	40.8	4.5	-40.9	2.0
SO4	364.8	0.0	364.8	0.0	0.0	368.3	3.5	1143.7
CL	392.1	0.0	392.1	0.0	0.0	392.1	0.0	175.0
NO3	34.4	0.0	34.4	0.0	20.7	13.8	-20.7	6.1
F	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	ATMOSPHERIC DEPOSITION			CATCHMENT	
	WET	DRY	TOTAL	OUTFLOW	NTFLUX
	-----MEQ/M2/YR------			--MEQ/M2/YR---	
H	272.8	0.0	272.8	21.5	-251.2
ALK	-272.8	0.0	-272.8	-73.7	199.1
SBC	473.2	0.0	473.2	698.9	225.7
SAA	791.3	0.0	791.3	774.1	-17.2
TOT AL	0.0	0.0	0.0	59.9	59.9
AQ SO4	364.8	0.0	364.8	372.0	7.2
TOT F	0.0	0.0	0.0	0.0	0.0
SUM +	791.3	0.0	791.3	773.7	-17.6
SUM -	791.3	0.0	791.3	774.4	-16.9

1984 ANNUAL AVE Alwen Input

	PRECIP	STREAM	SOIL
	--------MEQ/M3-------		
CA	25.0	149.8	149.8
MG	53.0	146.9	146.9
NA	234.0	350.6	350.6
K	9.0	20.9	20.9
NH4	29.0	4.2	4.2
SO4	235.0	346.9	346.2
CL	266.0	389.0	389.0
NO3	22.0	12.9	12.9
F	0.0	0.0	0.0

	PRECIP	STREAM	SOIL
	--------MEQ/M3-------		
H	173.0	22.4	23.8
ALK	-173.0	-80.8	-80.4
SBC	321.0	668.3	668.3
SAA	523.0	748.8	748.0
TOT AL	0.0	66.7	78.3
AQ SO4	235.0	351.0	351.0
TOT F	0.0	0.0	0.0
SUM +	523.0	749.6	761.0
SUM -	523.0	749.1	761.0

	PRECIP	STREAM	SOIL
	--------MEQ/M3-------		
PH	3.8	4.7	4.6
AL3+	0.0	42.0	50.4
HCO3	0.0	0.3	12.9
CO3	0.0	0.0	0.0
HA-	0.0	0.0	0.0
A--	0.0	0.0	0.0

	SOIL
ES %	23.9
ECA %	8.7
EMG %	3.4
ENA %	2.1
EK %	1.1
BS %	15.3

	ATMOSPHERIC DEPOSITION			CATCHMENT				TOTAL AMOUNT
	WET	DRY	TOTAL	WEATH	UPTAKE	OUTFLOW	NTFLUX	SOIL
	-----MEQ/M2/YR------			-----MEQ/M2/YR----------				-------MEQ/M2-------
CA	36.8	0.0	36.8	0.0	0.0	151.0	114.2	5889.9
MG	78.1	0.0	78.1	0.0	0.0	148.1	70.0	2328.0
NA	344.9	0.0	344.9	0.0	0.0	353.4	8.5	1534.1
K	13.3	0.0	13.3	0.0	0.0	21.1	7.8	719.8
NH4	42.7	0.0	42.7	0.0	38.5	4.3	-38.5	1.9
SO4	346.4	0.0	346.4	0.0	0.0	349.7	3.3	1098.0
CL	392.1	0.0	392.1	0.0	0.0	392.1	0.0	175.0
NO3	32.4	0.0	32.4	0.0	19.5	13.0	-19.5	5.8
F	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	ATMOSPHERIC DEPOSITION			CATCHMENT	
	WET	DRY	TOTAL	OUTFLOW	NTFLUX
	-----MEQ/M2/YR------			--MEQ/M2/YR---	
H	255.0	0.0	255.0	22.5	-232.5
ALK	-255.0	0.0	-255.0	-81.5	173.5
SBC	473.2	0.0	473.2	673.6	200.4
SAA	770.9	0.0	770.9	754.8	-16.1
TOT AL	0.0	0.0	0.0	67.2	67.2
AQ SO4	346.4	0.0	346.4	353.8	7.4
TOT F	0.0	0.0	0.0	0.0	0.0
SUM +	770.9	0.0	770.9	755.6	-15.3
SUM -	770.9	0.0	770.9	755.1	-15.8

1989 ANNUAL AVE Alwen Input

	PRECIP	STREAM	SOIL
	MEQ/M3		
CA	25.0	141.3	141.3
MG	53.0	132.1	132.1
NA	234.0	348.0	348.0
K	9.0	20.2	20.2
NH4	26.7	3.9	3.9
SO4	218.8	326.6	325.9
CL	266.0	389.0	389.0
NO3	20.2	11.8	11.8
F	0.0	0.0	0.0

	PRECIP	STREAM	SOIL
	MEQ/M3		
H	157.4	23.0	24.4
ALK	-157.4	-85.8	-86.1
SBC	321.0	641.6	641.6
SAA	505.1	727.4	726.7
TOT AL	0.0	71.4	83.4
AQ SO4	218.8	330.8	330.8
TOT F	0.0	0.0	0.0
SUM +	505.1	727.5	739.3
SUM -	505.1	727.7	739.3

	PRECIP	STREAM	SOIL
	MEQ/M3		
PH	3.8	4.6	4.6
AL3+	0.0	45.6	54.4
HCO3	0.0	0.3	12.6
CO3	0.0	0.0	0.0
HA-	0.0	0.0	0.0
A--	0.0	0.0	0.0

	SOIL
ES %	22.9
ECA %	7.9
EMG %	2.9
ENA %	2.0
EK %	1.0
BS %	13.9

	ATMOSPHERIC DEPOSITION			CATCHMENT				TOTAL AMOUNT
	WET	DRY	TOTAL	WEATH	UPTAKE	OUTFLOW	NTFLUX	SOIL
	MEQ/M2/YR			MEQ/M2/YR				MEQ/M2
CA	36.8	0.0	36.8	0.0	0.0	142.4	105.5	5338.0
MG	78.1	0.0	78.1	0.0	0.0	133.1	55.0	2014.3
NA	344.9	0.0	344.9	0.0	0.0	350.8	5.9	1496.5
K	13.3	0.0	13.3	0.0	0.0	20.4	7.1	682.4
NH4	39.3	0.0	39.3	0.0	35.4	3.9	-35.4	1.8
SO4	322.5	0.0	322.5	0.0	0.0	329.2	6.7	1045.4
CL	392.1	0.0	392.1	0.0	0.0	392.1	0.0	175.0
NO3	29.8	0.0	29.8	0.0	17.9	11.9	-17.9	5.3
F	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	ATMOSPHERIC DEPOSITION			CATCHMENT	
	WET	DRY	TOTAL	OUTFLOW	NTFLUX
	MEQ/M2/YR			MEQ/M2/YR	
H	232.0	0.0	232.0	23.2	-208.8
ALK	-232.0	0.0	-232.0	-86.5	145.5
SBC	473.2	0.0	473.2	646.7	173.6
SAA	744.5	0.0	744.5	733.2	-11.2
TOT AL	0.0	0.0	0.0	72.0	72.0
AQ SO4	322.5	0.0	322.5	333.4	10.9
TOT F	0.0	0.0	0.0	0.0	0.0
SUM +	744.5	0.0	744.5	733.3	-11.2
SUM -	744.5	0.0	744.5	733.5	-10.9

1994 ANNUAL AVE Alwen Input

	PRECIP	STREAM	SOIL
	MEQ/M3		
CA	25.0	129.2	129.2
MG	53.0	117.4	117.4
NA	234.0	344.5	344.5
K	9.0	19.3	19.3
NH4	23.8	3.5	3.5
SO4	198.6	298.7	298.0
CL	266.0	389.0	389.0
NO3	18.0	10.5	10.5
F	0.0	0.0	0.0

	PRECIP	STREAM	SOIL
	MEQ/M3		
H	137.9	23.3	24.7
ALK	-137.9	-87.4	-87.9
SBC	321.0	610.4	610.4
SAA	482.6	698.2	697.5
TOT AL	0.0	72.8	84.9
AQ SO4	198.6	302.6	302.6
TOT F	0.0	0.0	0.0
SUM +	482.6	697.7	709.6
SUM -	482.6	698.5	709.9

	PRECIP	STREAM	SOIL
	MEQ/M3		
PH	3.9	4.6	4.6
AL3+	0.0	47.0	55.9
HCO3	0.0	0.3	12.4
CO3	0.0	0.0	0.0
HA-	0.0	0.0	0.0
A--	0.0	0.0	0.0

	SOIL
ES %	21.3
ECA %	7.2
EMG %	2.6
ENA %	2.0
EK %	1.0
BS %	12.7

	ATMOSPHERIC DEPOSITION			CATCHMENT				TOTAL AMOUNT
	WET	DRY	TOTAL	WEATH	UPTAKE	OUTFLOW	NTFLUX	SOIL
	MEQ/M2/YR			MEQ/M2/YR				MEQ/M2
CA	36.8	0.0	36.8	0.0	0.0	130.2	93.4	4840.1
MG	78.1	0.0	78.1	0.0	0.0	118.3	40.2	1777.1
NA	344.9	0.0	344.9	0.0	0.0	347.3	2.4	1476.3
K	13.3	0.0	13.3	0.0	0.0	19.5	6.2	649.1
NH4	35.1	0.0	35.1	0.0	31.5	3.5	-31.6	1.6
SO4	292.7	0.0	292.7	0.0	0.0	301.1	8.3	971.7
CL	392.1	0.0	392.1	0.0	0.0	392.1	0.0	175.0
NO3	26.6	0.0	26.6	0.0	16.0	10.6	-16.0	4.8
F	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	ATMOSPHERIC DEPOSITION			CATCHMENT	
	WET	DRY	TOTAL	OUTFLOW	NTFLUX
	MEQ/M2/YR			MEQ/M2/YR	
H	203.2	0.0	203.2	23.5	-179.7
ALK	-203.2	0.0	-203.2	-88.1	115.1
SBC	473.2	0.0	473.2	615.3	142.2
SAA	711.4	0.0	711.4	703.8	-7.6
TOT AL	0.0	0.0	0.0	73.4	73.4
AQ SO4	292.7	0.0	292.7	305.0	12.3
TOT F	0.0	0.0	0.0	0.0	0.0
SUM +	711.4	0.0	711.4	703.2	-8.2
SUM -	711.4	0.0	711.4	704.1	-7.3

1999 ANNUAL AVE Alwen Input

	PRECIP	STREAM	SOIL
	MEQ/M3		
CA	25.0	116.5	116.5
MG	53.0	105.1	105.1
NA	234.0	341.7	341.7
K	9.0	18.4	18.4
NH4	20.9	3.0	3.0
SO4	178.4	270.0	269.4
CL	266.0	389.0	389.0
NO3	15.8	9.3	9.3
F	0.0	0.0	0.0

	PRECIP	STREAM	SOIL
	MEQ/M3		
H	118.4	23.3	24.7
ALK	-118.4	-86.6	-87.1
SBC	321.0	581.6	581.6
SAA	460.2	668.3	667.6
TOT AL	0.0	72.0	84.1
AQ SO4	178.4	273.6	273.6
TOT F	0.0	0.0	0.0
SUM +	460.2	668.0	680.0
SUM -	460.2	668.6	680.0

	PRECIP	STREAM	SOIL
	MEQ/M3		
PH	3.9	4.6	4.6
AL3+	0.0	46.7	55.7
HCO3	0.0	0.3	12.4
CO3	0.0	0.0	0.0
HA-	0.0	0.0	0.0
A--	0.0	0.0	0.0

	SOIL
ES %	19.7
ECA %	6.5
EMG %	2.3
ENA %	2.0
EK %	0.9
BS %	11.8

	ATMOSPHERIC DEPOSITION			CATCHMENT			
	WET	DRY	TOTAL	WEATH	UPTAKE	OUTFLOW	NTFLUX
	MEQ/M2/YR			MEQ/M2/YR			
CA	36.8	0.0	36.8	0.0	0.0	117.4	80.5
MG	78.1	0.0	78.1	0.0	0.0	105.9	27.8
NA	344.9	0.0	344.9	0.0	0.0	344.5	-0.5
K	13.3	0.0	13.3	0.0	0.0	18.5	5.2
NH4	30.8	0.0	30.8	0.0	27.7	3.1	-27.7
SO4	262.9	0.0	262.9	0.0	0.0	272.2	9.3
CL	392.1	0.0	392.1	0.0	0.0	392.1	0.0
NO3	23.3	0.0	23.3	0.0	14.0	9.3	-14.0
F	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	TOTAL AMOUNT
	SOIL
	MEQ/M2
	4404.8
	1607.7
	1471.3
	620.5
	1.4
	893.9
	175.0
	4.2
	0.0

	ATMOSPHERIC DEPOSITION			CATCHMENT	
	WET	DRY	TOTAL	OUTFLOW	NTFLUX
	MEQ/M2/YR			MEQ/M2/YR	
H	174.4	0.0	174.4	23.5	-151.0
ALK	-174.4	0.0	-174.4	-87.3	87.2
SBC	473.2	0.0	473.2	586.3	113.1
SAA	678.4	0.0	678.4	673.6	-4.8
TOT AL	0.0	0.0	0.0	72.6	72.6
AQ SO4	262.9	0.0	262.9	275.8	12.9
TOT F	0.0	0.0	0.0	0.0	0.0
SUM +	678.4	0.0	678.4	673.3	-5.1
SUM -	678.4	0.0	678.4	673.9	-4.5

2004 ANNUAL AVE Alwen Input

	PRECIP	STREAM	SOIL
	MEQ/M3		
CA	25.0	106.7	106.7
MG	53.0	97.5	97.5
NA	234.0	342.7	342.7
K	9.0	17.7	17.7
NH4	20.3	3.0	3.0
SO4	174.3	254.1	253.5
CL	266.0	389.0	389.0
NO3	15.4	9.0	9.0
F	0.0	0.0	0.0

	PRECIP	STREAM	SOIL
	MEQ/M3		
H	114.4	23.4	24.8
ALK	-114.4	-87.2	-87.8
SBC	321.0	564.6	564.6
SAA	455.7	652.1	651.5
TOT AL	0.0	72.6	84.6
AQ SO4	174.3	257.6	257.6
TOT F	0.0	0.0	0.0
SUM +	455.7	651.6	663.6
SUM -	455.7	652.4	663.8

	PRECIP	STREAM	SOIL
	MEQ/M3		
PH	3.9	4.6	4.6
AL3+	0.0	47.3	56.3
HCO3	0.0	0.3	12.3
CO3	0.0	0.0	0.0
HA-	0.0	0.0	0.0
A--	0.0	0.0	0.0

	SOIL
ES %	18.7
ECA %	6.0
EMG %	2.2
ENA %	2.0
EK %	0.9
BS %	11.0

	ATMOSPHERIC DEPOSITION			CATCHMENT			
	WET	DRY	TOTAL	WEATH	UPTAKE	OUTFLOW	NTFLUX
	MEQ/M2/YR			MEQ/M2/YR			
CA	36.8	0.0	36.8	0.0	0.0	107.6	70.7
MG	78.1	0.0	78.1	0.0	0.0	98.3	20.2
NA	344.9	0.0	344.9	0.0	0.0	345.4	0.5
K	13.3	0.0	13.3	0.0	0.0	17.8	4.5
NH4	29.9	0.0	29.9	0.0	26.9	3.0	-26.9
SO4	257.0	0.0	257.0	0.0	0.0	256.2	-0.8
CL	392.1	0.0	392.1	0.0	0.0	392.1	0.0
NO3	22.7	0.0	22.7	0.0	13.6	9.1	-13.6
F	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	TOTAL AMOUNT
	SOIL
	MEQ/M2
	4029.6
	1490.9
	1474.1
	596.3
	1.3
	852.4
	175.0
	4.1
	0.0

	ATMOSPHERIC DEPOSITION			CATCHMENT	
	WET	DRY	TOTAL	OUTFLOW	NTFLUX
	MEQ/M2/YR			MEQ/M2/YR	
H	168.7	0.0	168.7	23.6	-145.1
ALK	-168.7	0.0	-168.7	-87.9	80.8
SBC	473.2	0.0	473.2	569.1	95.9
SAA	671.8	0.0	671.8	657.3	-14.4
TOT AL	0.0	0.0	0.0	73.2	73.2
AQ SO4	257.0	0.0	257.0	259.6	2.6
TOT F	0.0	0.0	0.0	0.0	0.0
SUM +	671.8	0.0	671.8	656.8	-14.9
SUM -	671.8	0.0	671.8	657.6	-14.1

2009 ANNUAL AVE Alwen Input

	PRECIP	STREAM	SOIL
	MEQ/M3		
CA	25.0	101.0	101.0
MG	53.0	94.5	94.5
NA	234.0	345.6	345.6
K	9.0	17.3	17.3
NH4	20.3	3.0	3.0
SO4	174.3	251.8	251.2
CL	266.0	389.0	389.0
NO3	15.4	9.0	9.0
F	0.0	0.0	0.0

	PRECIP	STREAM	SOIL
	MEQ/M3		
H	114.4	24.0	25.3
ALK	-114.4	-92.0	-92.6
SBC	321.0	558.3	558.3
SAA	455.7	649.8	649.1
TOT AL	0.0	77.1	89.0
AQ SO4	174.3	255.4	255.4
TOT F	0.0	0.0	0.0
SUM +	455.7	649.9	661.8
SUM -	455.7	650.0	661.2

	PRECIP	STREAM	SOIL
	MEQ/M3		
PH	3.9	4.6	4.6
AL3+	0.0	50.7	59.7
HCO3	0.0	0.3	12.1
CO3	0.0	0.0	0.0
HA-	0.0	0.0	0.0
A--	0.0	0.0	0.0

	SOIL
ES %	18.6
ECA %	5.5
EMG %	2.0
ENA %	2.0
EK %	0.8
BS %	10.3

	ATMOSPHERIC DEPOSITION			CATCHMENT			
	WET	DRY	TOTAL	WEATH	UPTAKE	OUTFLOW	NTFLUX
	MEQ/M2/YR			MEQ/M2/YR			
CA	36.8	0.0	36.8	0.0	0.0	101.8	65.0
MG	78.1	0.0	78.1	0.0	0.0	95.2	17.1
NA	344.9	0.0	344.9	0.0	0.0	348.3	3.4
K	13.3	0.0	13.3	0.0	0.0	17.4	4.2
NH4	29.9	0.0	29.9	0.0	26.9	3.0	-26.9
SO4	257.0	0.0	257.0	0.0	0.0	253.8	-3.2
CL	392.1	0.0	392.1	0.0	0.0	392.1	0.0
NO3	22.7	0.0	22.7	0.0	13.6	9.1	-13.6
F	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	TOTAL AMOUNT
	SOIL
	MEQ/M2
	3691.1
	1398.5
	1463.7
	574.6
	1.3
	846.4
	175.0
	4.1
	0.0

	ATMOSPHERIC DEPOSITION			CATCHMENT	
	WET	DRY	TOTAL	OUTFLOW	NTFLUX
	MEQ/M2/YR			MEQ/M2/YR	
H	168.7	0.0	168.7	24.2	-144.5
ALK	-168.7	0.0	-168.7	-92.7	76.0
SBC	473.2	0.0	473.2	562.8	89.6
SAA	671.8	0.0	671.8	654.9	-16.8
TOT AL	0.0	0.0	0.0	77.7	77.7
AQ SO4	257.0	0.0	257.0	257.4	0.5
TOT F	0.0	0.0	0.0	0.0	0.0
SUM +	671.8	0.0	671.8	655.1	-16.7
SUM -	671.8	0.0	671.8	655.2	-16.5

2014 ANNUAL AVE Alwen Input

	PRECIP	STREAM	SOIL
	MEQ/M3		
CA	25.0	96.0	96.0
MG	53.0	92.4	92.4
NA	234.0	346.7	346.7
K	9.0	17.0	17.0
NH4	20.3	3.0	3.0
SO4	174.3	251.2	250.6
CL	266.0	389.0	389.0
NO3	15.4	9.0	9.0
F	0.0	0.0	0.0

	PRECIP	STREAM	SOIL
	MEQ/M3		
H	114.4	24.6	25.8
ALK	-114.4	-97.7	-98.4
SBC	321.0	552.1	552.1
SAA	455.7	649.2	648.6
TOT AL	0.0	82.6	94.3
AQ SO4	174.3	255.1	255.1
TOT F	0.0	0.0	0.0
SUM +	455.7	649.2	660.8
SUM -	455.7	649.5	660.4

	PRECIP	STREAM	SOIL
	MEQ/M3		
PH	3.9	4.6	4.6
AL3+	0.0	54.8	63.7
HCO3	0.0	0.2	11.8
CO3	0.0	0.0	0.0
HA-	0.0	0.0	0.0
A--	0.0	0.0	0.0

	SOIL
ES %	18.6
ECA %	5.0
EMG %	1.9
ENA %	1.9
EK %	0.8
BS %	9.7

	ATMOSPHERIC DEPOSITION			CATCHMENT			
	WET	DRY	TOTAL	WEATH	UPTAKE	OUTFLOW	NTFLUX
	MEQ/M2/YR			MEQ/M2/YR			
CA	36.8	0.0	36.8	0.0	0.0	96.8	60.0
MG	78.1	0.0	78.1	0.0	0.0	93.1	15.0
NA	344.9	0.0	344.9	0.0	0.0	349.5	4.5
K	13.3	0.0	13.3	0.0	0.0	17.1	3.9
NH4	29.9	0.0	29.9	0.0	26.9	3.0	-26.9
SO4	257.0	0.0	257.0	0.0	0.0	253.2	-3.8
CL	392.1	0.0	392.1	0.0	0.0	392.1	0.0
NO3	22.7	0.0	22.7	0.0	13.6	9.1	-13.6
F	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	TOTAL AMOUNT
	SOIL
	MEQ/M2
	3378.9
	1318.4
	1443.3
	554.5
	1.3
	845.1
	175.0
	4.1
	0.0

	ATMOSPHERIC DEPOSITION			CATCHMENT	
	WET	DRY	TOTAL	OUTFLOW	NTFLUX
	MEQ/M2/YR			MEQ/M2/YR	
H	168.7	0.0	168.7	24.8	-143.9
ALK	-168.7	0.0	-168.7	-98.5	70.2
SBC	473.2	0.0	473.2	556.5	83.4
SAA	671.8	0.0	671.8	654.4	-17.4
TOT AL	0.0	0.0	0.0	83.2	83.2
AQ SO4	257.0	0.0	257.0	257.2	0.2
TOT F	0.0	0.0	0.0	0.0	0.0
SUM +	671.8	0.0	671.8	654.4	-17.4
SUM -	671.8	0.0	671.8	654.7	-17.1

2019 ANNUAL AVE Alwen Input

	PRECIP	STREAM	SOIL
	MEQ/M3		
CA	25.0	91.3	91.3
MG	53.0	90.8	90.8
NA	234.0	347.0	347.0
K	9.0	16.7	16.7
NH4	20.3	3.0	3.0
SO4	174.3	250.9	250.3
CL	266.0	389.0	389.0
NO3	15.4	9.0	9.0
F	0.0	0.0	0.0

	PRECIP	STREAM	SOIL
	MEQ/M3		
H	114.4	25.2	26.4
ALK	-114.4	-103.9	-104.5
SBC	321.0	545.8	545.8
SAA	455.7	648.8	648.3
TOT AL	0.0	88.5	99.9
AQ SO4	174.3	255.1	255.1
TOT F	0.0	0.0	0.0
SUM +	455.7	648.7	660.0
SUM -	455.7	649.1	659.8

	PRECIP	STREAM	SOIL
	MEQ/M3		
PH	3.9	4.6	4.6
AL3+	0.0	59.2	67.9
HCO3	0.0	0.2	11.6
CO3	0.0	0.0	0.0
HA-	0.0	0.0	0.0
A--	0.0	0.0	0.0

	SOIL
ES %	18.5
ECA %	4.6
EMG %	1.8
ENA %	1.9
EK %	0.8
BS %	9.1

	ATMOSPHERIC DEPOSITION			CATCHMENT			
	WET	DRY	TOTAL	WEATH	UPTAKE	OUTFLOW	NTFLUX
	MEQ/M2/YR			MEQ/M2/YR			
CA	36.8	0.0	36.8	0.0	0.0	92.0	55.2
MG	78.1	0.0	78.1	0.0	0.0	91.5	13.4
NA	344.9	0.0	344.9	0.0	0.0	349.8	4.8
K	13.3	0.0	13.3	0.0	0.0	16.9	3.6
NH4	29.9	0.0	29.9	0.0	26.9	3.0	-26.9
SO4	257.0	0.0	257.0	0.0	0.0	252.9	-4.1
CL	392.1	0.0	392.1	0.0	0.0	392.1	0.0
NO3	22.7	0.0	22.7	0.0	13.6	9.1	-13.6
F	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	TOTAL AMOUNT
	SOIL
	MEQ/M2
CA	3091.2
MG	1247.6
NA	1419.7
K	535.8
NH4	1.3
SO4	844.3
CL	175.0
NO3	4.1
F	0.0

	ATMOSPHERIC DEPOSITION			CATCHMENT	
	WET	DRY	TOTAL	OUTFLOW	NTFLUX
	MEQ/M2/YR			MEQ/M2/YR	
H	168.7	0.0	168.7	25.4	-143.2
ALK	-168.7	0.0	-168.7	-104.7	64.0
SBC	473.2	0.0	473.2	550.1	77.0
SAA	671.8	0.0	671.8	654.0	-17.7
TOT AL	0.0	0.0	0.0	89.2	89.2
AQ SO4	257.0	0.0	257.0	257.1	0.1
TOT F	0.0	0.0	0.0	0.0	0.0
SUM +	671.8	0.0	671.8	653.9	-17.9
SUM -	671.8	0.0	671.8	654.3	-17.5

2024 ANNUAL AVE Alwen Input

	PRECIP	STREAM	SOIL
	MEQ/M3		
CA	25.0	86.8	86.8
MG	53.0	89.5	89.5
NA	234.0	347.0	347.0
K	9.0	16.5	16.5
NH4	20.3	3.0	3.0
SO4	174.3	250.5	250.0
CL	266.0	389.0	389.0
NO3	15.4	9.0	9.0
F	0.0	0.0	0.0

	PRECIP	STREAM	SOIL
	MEQ/M3		
H	114.4	26.0	27.0
ALK	-114.4	-111.3	-110.9
SBC	321.0	539.8	539.8
SAA	455.7	648.5	647.9
TOT AL	0.0	95.6	105.9
AQ SO4	174.3	255.1	255.1
TOT F	0.0	0.0	0.0
SUM +	455.7	649.7	659.9
SUM -	455.7	648.7	659.3

	PRECIP	STREAM	SOIL
	MEQ/M3		
PH	3.9	4.6	4.6
AL3+	0.0	64.6	72.5
HCO3	0.0	0.2	11.3
CO3	0.0	0.0	0.0
HA-	0.0	0.0	0.0
A--	0.0	0.0	0.0

	SOIL
ES %	18.5
ECA %	4.2
EMG %	1.7
ENA %	1.9
EK %	0.8
BS %	8.5

	ATMOSPHERIC DEPOSITION			CATCHMENT			
	WET	DRY	TOTAL	WEATH	UPTAKE	OUTFLOW	NTFLUX
	MEQ/M2/YR			MEQ/M2/YR			
CA	36.8	0.0	36.8	0.0	0.0	87.5	50.6
MG	78.1	0.0	78.1	0.0	0.0	90.2	12.1
NA	344.9	0.0	344.9	0.0	0.0	349.8	4.9
K	13.3	0.0	13.3	0.0	0.0	16.7	3.4
NH4	29.9	0.0	29.9	0.0	26.9	3.0	-26.9
SO4	257.0	0.0	257.0	0.0	0.0	252.5	-4.5
CL	392.1	0.0	392.1	0.0	0.0	392.1	0.0
NO3	22.7	0.0	22.7	0.0	13.6	9.1	-13.6
F	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	TOTAL AMOUNT
	SOIL
	MEQ/M2
CA	2826.9
MG	1184.2
NA	1395.3
K	518.3
NH4	1.3
SO4	843.6
CL	175.0
NO3	4.1
F	0.0

	ATMOSPHERIC DEPOSITION			CATCHMENT	
	WET	DRY	TOTAL	OUTFLOW	NTFLUX
	MEQ/M2/YR			MEQ/M2/YR	
H	168.7	0.0	168.7	26.2	-142.5
ALK	-168.7	0.0	-168.7	-112.2	56.5
SBC	473.2	0.0	473.2	544.1	71.0
SAA	671.8	0.0	671.8	653.7	-18.1
TOT AL	0.0	0.0	0.0	96.3	96.3
AQ SO4	257.0	0.0	257.0	257.1	0.2
TOT F	0.0	0.0	0.0	0.0	0.0
SUM +	671.8	0.0	671.8	654.9	-16.9
SUM -	671.8	0.0	671.8	653.9	-17.8

2029 ANNUAL AVE Alwen Input

	PRECIP	STREAM	SOIL
	MEQ/M3		
CA	25.0	82.2	82.2
MG	53.0	88.1	88.1
NA	234.0	346.6	346.6
K	9.0	16.3	16.3
NH4	20.3	3.0	3.0
SO4	174.3	250.2	249.7
CL	266.0	389.0	389.0
NO3	15.4	9.0	9.0
F	0.0	0.0	0.0

	PRECIP	STREAM	SOIL
	MEQ/M3		
H	114.4	26.5	27.5
ALK	-114.4	-116.8	-117.0
SBC	321.0	533.2	533.2
SAA	455.7	648.2	647.6
TOT AL	0.0	100.9	111.6
AQ SO4	174.3	255.1	255.1
TOT F	0.0	0.0	0.0
SUM +	455.7	648.3	658.9
SUM -	455.7	648.4	658.8

	PRECIP	STREAM	SOIL
	MEQ/M3		
PH	3.9	4.6	4.6
AL3+	0.0	68.6	76.8
HCO3	0.0	0.2	11.1
CO3	0.0	0.0	0.0
HA-	0.0	0.0	0.0
A--	0.0	0.0	0.0

	SOIL
ES %	18.5
ECA %	3.8
EMG %	1.6
ENA %	1.8
EK %	0.7
BS %	8.0

	ATMOSPHERIC DEPOSITION			CATCHMENT				TOTAL AMOUNT
	WET	DRY	TOTAL	WEATH	UPTAKE	OUTFLOW	NTFLUX	SOIL
	MEQ/M2/YR			MEQ/M2/YR				MEQ/M2
CA	36.8	0.0	36.8	0.0	0.0	82.8	46.0	2585.6
MG	78.1	0.0	78.1	0.0	0.0	88.8	10.7	1127.5
NA	344.9	0.0	344.9	0.0	0.0	349.4	4.5	1372.1
K	13.3	0.0	13.3	0.0	0.0	16.4	3.1	502.0
NH4	29.9	0.0	29.9	0.0	26.9	3.0	-26.9	1.3
SO4	257.0	0.0	257.0	0.0	0.0	252.2	-4.8	842.8
CL	392.1	0.0	392.1	0.0	0.0	392.1	0.0	175.0
NO3	22.7	0.0	22.7	0.0	13.6	9.1	-13.6	4.1
F	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	ATMOSPHERIC DEPOSITION			CATCHMENT	
	WET	DRY	TOTAL	OUTFLOW	NTFLUX
	MEQ/M2/YR			MEQ/M2/YR	
H	168.7	0.0	168.7	26.7	-142.0
ALK	-168.7	0.0	-168.7	-117.7	51.0
SBC	473.2	0.0	473.2	537.5	64.3
SAA	671.8	0.0	671.8	653.4	-18.4
TOT AL	0.0	0.0	0.0	101.7	101.7
AQ SO4	257.0	0.0	257.0	257.1	0.1
TOT F	0.0	0.0	0.0	0.0	0.0
SUM +	671.8	0.0	671.8	653.5	-18.2
SUM -	671.8	0.0	671.8	653.6	-18.1

2034 ANNUAL AVE Alwen Input

	PRECIP	STREAM	SOIL
	MEQ/M3		
CA	25.0	77.7	77.7
MG	53.0	86.9	86.9
NA	234.0	346.1	346.1
K	9.0	16.0	16.0
NH4	20.3	3.0	3.0
SO4	174.3	249.9	249.4
CL	266.0	389.0	389.0
NO3	15.4	9.0	9.0
F	0.0	0.0	0.0

	PRECIP	STREAM	SOIL
	MEQ/M3		
H	114.4	27.1	28.0
ALK	-114.4	-123.5	-123.0
SBC	321.0	526.7	526.7
SAA	455.7	647.8	647.3
TOT AL	0.0	107.3	117.2
AQ SO4	174.3	255.1	255.1
TOT F	0.0	0.0	0.0
SUM +	455.7	648.2	657.8
SUM -	455.7	648.1	658.3

	PRECIP	STREAM	SOIL
	MEQ/M3		
PH	3.9	4.6	4.6
AL3+	0.0	73.5	81.1
HCO3	0.0	0.2	10.9
CO3	0.0	0.0	0.0
HA-	0.0	0.0	0.0
A--	0.0	0.0	0.0

	SOIL
ES %	18.5
ECA %	3.5
EMG %	1.6
ENA %	1.8
EK %	0.7
BS %	7.6

	ATMOSPHERIC DEPOSITION			CATCHMENT				TOTAL AMOUNT
	WET	DRY	TOTAL	WEATH	UPTAKE	OUTFLOW	NTFLUX	SOIL
	MEQ/M2/YR			MEQ/M2/YR				MEQ/M2
CA	36.8	0.0	36.8	0.0	0.0	78.3	41.5	2366.9
MG	78.1	0.0	78.1	0.0	0.0	87.5	9.4	1077.0
NA	344.9	0.0	344.9	0.0	0.0	348.9	4.0	1350.6
K	13.3	0.0	13.3	0.0	0.0	16.2	2.9	486.8
NH4	29.9	0.0	29.9	0.0	26.9	3.0	-26.9	1.3
SO4	257.0	0.0	257.0	0.0	0.0	251.9	-5.1	842.1
CL	392.1	0.0	392.1	0.0	0.0	392.1	0.0	175.0
NO3	22.7	0.0	22.7	0.0	13.6	9.1	-13.6	4.1

	ATMOSPHERIC DEPOSITION			CATCHMENT	
	WET	DRY	TOTAL	OUTFLOW	NTFLUX
	MEQ/M2/YR			MEQ/M2/YR	
H	168.7	0.0	168.7	27.3	-141.3
ALK	-168.7	0.0	-168.7	-124.5	44.2
SBC	473.2	0.0	473.2	530.9	57.8
SAA	671.8	0.0	671.8	653.0	-18.7
TOT AL	0.0	0.0	0.0	108.2	108.2
AQ SO4	257.0	0.0	257.0	257.1	0.1
TOT F	0.0	0.0	0.0	0.0	0.0
SUM +	671.8	0.0	671.8	653.4	-18.4

ALWEN

FORECAST

Decreased emmissions (30%)

Forest Dry Deposition Factor 1.5

1984 ANNUAL AVE Alwen Input

	PRECIP	STREAM	SOIL
	MEQ/M3		
CA	25.0	149.8	149.8
MG	53.0	146.9	146.9
NA	234.0	350.6	350.6
K	9.0	20.9	20.9
NH4	29.0	4.2	4.2
SO4	235.0	346.9	346.2
CL	266.0	389.0	389.0
NO3	22.0	12.9	12.9
F	0.0	0.0	0.0

	PRECIP	STREAM	SOIL
	MEQ/M3		
H	173.0	22.4	23.8
ALK	-173.0	-80.8	-80.4
SBC	321.0	668.3	668.3
SAA	523.0	748.8	748.0
TOT AL	0.0	66.7	78.3
AQ SO4	235.0	351.0	351.0
TOT F	0.0	0.0	0.0
SUM +	523.0	749.6	761.0
SUM -	523.0	749.1	761.0

	PRECIP	STREAM	SOIL
	MEQ/M3		
PH	3.8	4.7	4.6
AL3+	0.0	42.0	50.4
HCO3	0.0	0.3	12.9
CO3	0.0	0.0	0.0
HA-	0.0	0.0	0.0
A--	0.0	0.0	0.0

	SOIL
ES %	23.9
ECA %	8.7
EMG %	3.4
ENA %	2.1
EK %	1.1
BS %	15.3

	ATMOSPHERIC DEPOSITION			CATCHMENT				TOTAL AMOUNT
	WET	DRY	TOTAL	WEATH	UPTAKE	OUTFLOW	NTFLUX	SOIL
	MEQ/M2/YR			MEQ/M2/YR				MEQ/M2
CA	36.8	0.0	36.8	0.0	0.0	151.0	114.2	5889.9
MG	78.1	0.0	78.1	0.0	0.0	148.1	70.0	2328.0
NA	344.9	0.0	344.9	0.0	0.0	353.4	8.5	1534.1
K	13.3	0.0	13.3	0.0	0.0	21.1	7.8	719.8
NH4	42.7	0.0	42.7	0.0	38.5	4.3	-38.5	1.9
SO4	346.4	0.0	346.4	0.0	0.0	349.7	3.3	1098.0
CL	392.1	0.0	392.1	0.0	0.0	392.1	0.0	175.0
NO3	32.4	0.0	32.4	0.0	19.5	13.0	-19.5	5.8
F	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	ATMOSPHERIC DEPOSITION			CATCHMENT	
	WET	DRY	TOTAL	OUTFLOW	NTFLUX
	MEQ/M2/YR			MEQ/M2/YR	
H	255.0	0.0	255.0	22.5	-232.5
ALK	-255.0	0.0	-255.0	-81.5	173.5
SBC	473.2	0.0	473.2	673.6	200.4
SAA	770.9	0.0	770.9	754.8	-16.1
TOT AL	0.0	0.0	0.0	67.2	67.2
AQ SO4	346.4	0.0	346.4	353.8	7.4
TOT F	0.0	0.0	0.0	0.0	0.0
SUM +	770.9	0.0	770.9	755.6	-15.3
SUM -	770.9	0.0	770.9	755.1	-15.8

1989 ANNUAL AVE Alwen Input

	PRECIP	STREAM	SOIL
	MEQ/M3		
CA	25.0	141.3	141.3
MG	53.0	132.1	132.1
NA	234.0	348.0	348.0
K	9.0	20.2	20.2
NH4	26.7	3.9	3.9
SO4	218.8	326.6	325.9
CL	266.0	389.0	389.0
NO3	20.2	11.8	11.8
F	0.0	0.0	0.0

	PRECIP	STREAM	SOIL
	MEQ/M3		
H	157.4	23.0	24.4
ALK	-157.4	-85.8	-86.1
SBC	321.0	641.6	641.6
SAA	505.1	727.4	726.7
TOT AL	0.0	71.4	83.4
AQ SO4	218.8	330.8	330.8
TOT F	0.0	0.0	0.0
SUM +	505.1	727.5	739.3
SUM -	505.1	727.7	739.3

	PRECIP	STREAM	SOIL
	MEQ/M3		
PH	3.8	4.6	4.6
AL3+	0.0	45.6	54.4
HCO3	0.0	0.3	12.6
CO3	0.0	0.0	0.0
HA-	0.0	0.0	0.0
A--	0.0	0.0	0.0

	SOIL
ES %	22.9
ECA %	7.9
EMG %	2.9
ENA %	2.0
EK %	1.0
BS %	13.9

	ATMOSPHERIC DEPOSITION			CATCHMENT				TOTAL AMOUNT
	WET	DRY	TOTAL	WEATH	UPTAKE	OUTFLOW	NTFLUX	SOIL
	MEQ/M2/YR			MEQ/M2/YR				MEQ/M2
CA	36.8	0.0	36.8	0.0	0.0	142.4	105.5	5338.0
MG	78.1	0.0	78.1	0.0	0.0	133.1	55.0	2014.3
NA	344.9	0.0	344.9	0.0	0.0	350.8	5.9	1496.5
K	13.3	0.0	13.3	0.0	0.0	20.4	7.1	682.4
NH4	39.3	0.0	39.3	0.0	35.4	3.9	-35.4	1.8
SO4	322.5	0.0	322.5	0.0	0.0	329.2	6.7	1045.4
CL	392.1	0.0	392.1	0.0	0.0	392.1	0.0	175.0
NO3	29.8	0.0	29.8	0.0	17.9	11.9	-17.9	5.3
F	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	ATMOSPHERIC DEPOSITION			CATCHMENT	
	WET	DRY	TOTAL	OUTFLOW	NTFLUX
	MEQ/M2/YR			MEQ/M2/YR	
H	232.0	0.0	232.0	23.2	-208.8
ALK	-232.0	0.0	-232.0	-86.5	145.5
SBC	473.2	0.0	473.2	646.7	173.6
SAA	744.5	0.0	744.5	733.2	-11.2
TOT AL	0.0	0.0	0.0	72.0	72.0
AQ SO4	322.5	0.0	322.5	333.4	10.9
TOT F	0.0	0.0	0.0	0.0	0.0
SUM +	744.5	0.0	744.5	733.3	-11.2
SUM -	744.5	0.0	744.5	733.5	-10.9

1994 ANNUAL AVE Alwen Input

	PRECIP	STREAM	SOIL
	MEQ/M3		
CA	25.0	144.2	144.2
MG	53.0	131.1	131.1
NA	234.0	375.9	375.9
K	9.0	20.5	20.5
NH4	23.8	3.9	3.9
SO4	198.6	320.4	319.7
CL	266.0	441.5	441.5
NO3	18.0	12.0	12.0
F	0.0	0.0	0.0

	PRECIP	STREAM	SOIL
	MEQ/M3		
H	137.9	24.9	26.0
ALK	-137.9	-103.1	-103.4
SBC	321.0	671.6	671.6
SAA	482.6	773.9	773.2
TOT AL	0.0	87.9	99.3
AQ SO4	198.6	325.5	325.5
TOT F	0.0	0.0	0.0
SUM +	482.6	773.9	785.0
SUM -	482.6	774.2	785.0

	PRECIP	STREAM	SOIL
	MEQ/M3		
PH	3.9	4.6	4.6
AL3+	0.0	57.8	66.3
HCO3	0.0	0.2	11.8
CO3	0.0	0.0	0.0
HA-	0.0	0.0	0.0
A--	0.0	0.0	0.0

	SOIL
ES %	22.5
ECA %	7.1
EMG %	2.6
ENA %	2.0
EK %	1.0
BS %	12.7

	ATMOSPHERIC DEPOSITION WET	DRY	TOTAL	CATCHMENT WEATH	UPTAKE	OUTFLOW	NTFLUX	TOTAL AMOUNT SOIL
	MEQ/M2/YR			MEQ/M2/YR				MEQ/M2
CA	36.8	4.9	41.8	0.0	0.0	145.3	103.6	4822.0
MG	78.1	10.4	88.5	0.0	0.0	132.1	43.6	1775.3
NA	344.9	46.0	390.9	0.0	0.0	378.9	-12.0	1534.3
K	13.3	1.8	15.0	0.0	0.0	20.7	5.6	651.2
NH4	35.1	4.7	39.7	0.0	35.8	4.0	-35.8	1.8
SO4	292.7	39.0	331.8	0.0	0.0	323.0	-8.8	1033.8
CL	392.1	52.3	444.4	0.0	0.0	445.1	0.7	198.3
NO3	26.6	3.5	30.1	0.0	18.1	12.1	-18.1	5.4
F	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	ATMOSPHERIC DEPOSITION WET	DRY	TOTAL	CATCHMENT OUTFLOW	NTFLUX
	MEQ/M2/YR			MEQ/M2/YR	
H	203.2	27.1	230.3	25.1	-205.2
ALK	-203.2	-27.1	-230.3	-104.0	126.3
SBC	473.2	63.1	536.2	677.0	140.8
SAA	711.4	94.9	806.3	780.1	-26.2
TOT AL	0.0	0.0	0.0	88.6	88.6
AQ SO4	292.7	39.0	331.8	328.1	-3.7
TOT F	0.0	0.0	0.0	0.0	0.0
SUM +	711.4	94.9	806.3	780.1	-26.2
SUM -	711.4	94.9	806.3	780.4	-25.9

1999 ANNUAL AVE Alwen Input

	PRECIP	STREAM	SOIL
	MEQ/M3		
CA	25.0	146.5	146.5
MG	53.0	132.8	132.8
NA	234.0	425.9	425.9
K	9.0	21.0	21.0
NH4	20.9	4.0	4.0
SO4	178.4	329.7	329.0
CL	266.0	506.4	506.4
NO3	15.8	12.0	12.0
F	0.0	0.0	0.0

	PRECIP	STREAM	SOIL
	MEQ/M3		
H	118.4	26.8	27.8
ALK	-118.4	-124.4	-124.8
SBC	321.0	726.2	726.2
SAA	460.2	848.1	847.4
TOT AL	0.0	108.4	119.3
AQ SO4	178.4	336.2	336.2
TOT F	0.0	0.0	0.0
SUM +	460.2	848.4	858.9
SUM -	460.2	848.3	858.5

	PRECIP	STREAM	SOIL
	MEQ/M3		
PH	3.9	4.6	4.6
AL3+	0.0	73.1	81.3
HCO3	0.0	0.2	11.1
CO3	0.0	0.0	0.0
HA-	0.0	0.0	0.0
A--	0.0	0.0	0.0

	SOIL
ES %	23.0
ECA %	6.4
EMG %	2.3
ENA %	2.2
EK %	0.9
BS %	11.8

	ATMOSPHERIC DEPOSITION WET	DRY	TOTAL	CATCHMENT WEATH	UPTAKE	OUTFLOW	NTFLUX	TOTAL AMOUNT SOIL
	MEQ/M2/YR			MEQ/M2/YR				MEQ/M2
CA	36.8	11.1	47.9	0.0	0.0	147.6	99.7	4314.3
MG	78.1	23.4	101.6	0.0	0.0	133.9	32.4	1591.3
NA	344.9	103.5	448.4	0.0	0.0	429.3	-19.1	1644.1
K	13.3	4.0	17.2	0.0	0.0	21.2	4.0	628.3
NH4	30.8	9.2	40.0	0.0	36.0	4.0	-36.0	1.8
SO4	262.9	78.9	341.8	0.0	0.0	332.3	-9.5	1058.2
CL	392.1	117.6	509.7	0.0	0.0	510.4	0.7	227.5
NO3	23.3	7.0	30.4	0.0	18.2	12.1	-18.2	5.4
F	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	ATMOSPHERIC DEPOSITION WET	DRY	TOTAL	CATCHMENT OUTFLOW	NTFLUX
	MEQ/M2/YR			MEQ/M2/YR	
H	174.4	52.3	226.8	27.0	-199.8
ALK	-174.4	-52.3	-226.8	-125.4	101.4
SBC	473.2	141.9	615.1	732.0	116.9
SAA	678.4	203.5	881.9	854.8	-27.1
TOT AL	0.0	0.0	0.0	109.3	109.3
AQ SO4	262.9	78.9	341.8	338.8	-3.0
TOT F	0.0	0.0	0.0	0.0	0.0
SUM +	678.4	203.5	881.9	855.2	-26.7
SUM -	678.4	203.5	881.9	855.1	-26.8

2004 ANNUAL AVE Alwen Input

	PRECIP	STREAM	SOIL
	MEQ/M3		
CA	25.0	147.2	147.2
MG	53.0	137.3	137.3
NA	234.0	484.4	484.4
K	9.0	21.8	21.8
NH4	20.3	4.4	4.4
SO4	174.3	351.7	351.0
CL	266.0	571.2	571.2
NO3	15.4	13.2	13.2
F	0.0	0.0	0.0

	PRECIP	STREAM	SOIL
	MEQ/M3		
H	114.4	28.7	29.5
ALK	-114.4	-149.1	-149.7
SBC	321.0	790.7	790.7
SAA	455.7	936.1	935.4
TOT AL	0.0	132.5	143.1
AQ SO4	174.3	360.1	360.1
TOT F	0.0	0.0	0.0
SUM +	455.7	936.0	946.2
SUM -	455.7	936.4	945.9

	PRECIP	STREAM	SOIL
	MEQ/M3		
PH	3.9	4.5	4.5
AL3+	0.0	90.8	98.9
HCO3	0.0	0.2	10.5
CO3	0.0	0.0	0.0
HA-	0.0	0.0	0.0
A--	0.0	0.0	0.0

	SOIL
ES %	24.2
ECA %	5.7
EMG %	2.1
ENA %	2.3
EK %	0.9
BS %	11.0

	ATMOSPHERIC DEPOSITION			CATCHMENT				TOTAL AMOUNT
	WET	DRY	TOTAL	WEATH	UPTAKE	OUTFLOW	NTFLUX	SOIL
	MEQ/M2/YR			MEQ/M2/YR				MEQ/M2
CA	36.8	17.2	54.0	0.0	0.0	148.4	94.3	3834.3
MG	78.1	36.5	114.6	0.0	0.0	138.4	23.8	1460.9
NA	344.9	161.0	505.9	0.0	0.0	488.3	-17.6	1769.5
K	13.3	6.2	19.5	0.0	0.0	22.0	2.6	613.4
NH4	29.9	14.0	43.9	0.0	39.5	4.4	-39.5	2.0
SO4	257.0	119.9	376.9	0.0	0.0	354.5	-22.4	1118.0
CL	392.1	183.0	575.1	0.0	0.0	575.8	0.7	256.6
NO3	22.7	10.6	33.3	0.0	20.0	13.3	-20.0	5.9
F	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	ATMOSPHERIC DEPOSITION			CATCHMENT	
	WET	DRY	TOTAL	OUTFLOW	NTFLUX
	MEQ/M2/YR			MEQ/M2/YR	
H	168.7	78.7	247.4	29.0	-218.5
ALK	-168.7	-78.7	-247.4	-150.3	97.1
SBC	473.2	220.8	694.0	797.1	103.1
SAA	671.8	313.5	985.3	943.6	-41.7
TOT AL	0.0	0.0	0.0	133.6	133.6
AQ SO4	257.0	119.9	376.9	363.0	-13.9
TOT F	0.0	0.0	0.0	0.0	0.0
SUM +	671.8	313.5	985.3	943.5	-41.7
SUM -	671.8	313.5	985.3	943.9	-41.4

2009 ANNUAL AVE Alwen Input

	PRECIP	STREAM	SOIL
	MEQ/M3		
CA	25.0	138.0	138.0
MG	53.0	135.0	135.0
NA	234.0	512.9	512.9
K	9.0	22.1	22.1
NH4	20.3	4.5	4.5
SO4	174.3	370.5	369.9
CL	266.0	583.5	583.5
NO3	15.4	13.5	13.5
F	0.0	0.0	0.0

	PRECIP	STREAM	SOIL
	MEQ/M3		
H	114.4	29.8	30.5
ALK	-114.4	-165.0	-164.6
SBC	321.0	807.9	807.9
SAA	455.7	967.5	966.8
TOT AL	0.0	148.0	157.4
AQ SO4	174.3	380.4	380.4
TOT F	0.0	0.0	0.0
SUM +	455.7	967.7	976.6
SUM -	455.7	967.7	977.1

	PRECIP	STREAM	SOIL
	MEQ/M3		
PH	3.9	4.5	4.5
AL3+	0.0	102.1	109.3
HCO3	0.0	0.2	10.2
CO3	0.0	0.0	0.0
HA-	0.0	0.0	0.0
A--	0.0	0.0	0.0

	SOIL
ES %	25.2
ECA %	5.0
EMG %	1.9
ENA %	2.4
EK %	0.9
BS %	10.2

	ATMOSPHERIC DEPOSITION			CATCHMENT				TOTAL AMOUNT
	WET	DRY	TOTAL	WEATH	UPTAKE	OUTFLOW	NTFLUX	SOIL
	MEQ/M2/YR			MEQ/M2/YR				MEQ/M2
CA	36.8	18.4	55.3	0.0	0.0	139.1	83.8	3386.4
MG	78.1	39.1	117.2	0.0	0.0	136.1	18.9	1355.7
NA	344.9	172.5	517.4	0.0	0.0	517.0	-0.4	1819.7
K	13.3	6.6	19.9	0.0	0.0	22.2	2.3	601.8
NH4	29.9	15.0	44.9	0.0	40.4	4.5	-40.4	2.0
SO4	257.0	128.5	385.5	0.0	0.0	373.5	-12.0	1162.2
CL	392.1	196.0	588.1	0.0	0.0	588.1	0.0	262.6
NO3	22.7	11.3	34.0	0.0	20.4	13.6	-20.4	6.1

	ATMOSPHERIC DEPOSITION			CATCHMENT	
	WET	DRY	TOTAL	OUTFLOW	NTFLUX
	MEQ/M2/YR			MEQ/M2/YR	
H	168.7	84.3	253.0	30.1	-223.0
ALK	-168.7	-84.3	-253.0	-166.3	86.7
SBC	473.2	236.6	709.7	814.4	104.6
SAA	671.8	335.9	1007.7	975.2	-32.4
TOT AL	0.0	0.0	0.0	149.2	149.2
AQ SO4	257.0	128.5	385.5	383.5	-2.0
TOT F	0.0	0.0	0.0	0.0	0.0
SUM +	671.8	335.9	1007.7	975.5	-32.2

	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	SUM -	671.8	335.9	1007.7	975.5	-32.2

2014 ANNUAL AVE Alwen Input

	PRECIP	STREAM	SOIL
	MEQ/M3		
CA	25.0	127.2	127.2
MG	53.0	131.6	131.6
NA	234.0	518.3	518.3
K	9.0	22.1	22.1
NH4	20.3	4.5	4.5
SO4	174.3	371.7	371.1
CL	266.0	583.5	583.5
NO3	15.4	13.5	13.5
F	0.0	0.0	0.0

	PRECIP	STREAM	SOIL
	MEQ/M3		
H	114.4	30.6	31.2
ALK	-114.4	-176.3	-175.7
SBC	321.0	799.2	799.2
SAA	455.7	968.7	968.1
TOT AL	0.0	159.1	168.1
AQ SO4	174.3	382.5	382.5
TOT F	0.0	0.0	0.0
SUM +	455.7	969.4	978.0
SUM -	455.7	969.0	978.1

	PRECIP	STREAM	SOIL
	MEQ/M3		
PH	3.9	4.5	4.5
AL3+	0.0	110.4	117.4
HCO3	0.0	0.2	9.9
CO3	0.0	0.0	0.0
HA-	0.0	0.0	0.0
A--	0.0	0.0	0.0

	SOIL
ES %	25.2
ECA %	4.4
EMG %	1.8
ENA %	2.3
EK %	0.9
BS %	9.5

	ATMOSPHERIC DEPOSITION			CATCHMENT			
	WET	DRY	TOTAL	WEATH	UPTAKE	OUTFLOW	NTFLUX
	MEQ/M2/YR			MEQ/M2/YR			
CA	36.8	18.4	55.3	0.0	0.0	128.2	72.9
MG	78.1	39.1	117.2	0.0	0.0	132.6	15.5
NA	344.9	172.5	517.4	0.0	0.0	522.5	5.1
K	13.3	6.6	19.9	0.0	0.0	22.3	2.4
NH4	29.9	15.0	44.9	0.0	40.4	4.5	-40.4
SO4	257.0	128.5	385.5	0.0	0.0	374.7	-10.8
CL	392.1	196.0	588.1	0.0	0.0	588.1	0.0
NO3	22.7	11.3	34.0	0.0	20.4	13.6	-20.4
F	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	TOTAL AMOUNT
	SOIL
	MEQ/M2
CA	2994.7
MG	1270.1
NA	1804.1
K	590.0
NH4	2.0
SO4	1165.1
CL	262.6
NO3	6.1
F	0.0

	ATMOSPHERIC DEPOSITION			CATCHMENT	
	WET	DRY	TOTAL	OUTFLOW	NTFLUX
	MEQ/M2/YR			MEQ/M2/YR	
H	168.7	84.3	253.0	30.9	-222.2
ALK	-168.7	-84.3	-253.0	-177.7	75.4
SBC	473.2	236.6	709.7	805.6	95.9
SAA	671.8	335.9	1007.7	976.5	-31.2
TOT AL	0.0	0.0	0.0	160.3	160.3
AQ SO4	257.0	128.5	385.5	385.6	0.1
TOT F	0.0	0.0	0.0	0.0	0.0
SUM +	671.8	335.9	1007.7	977.2	-30.5
SUM -	671.8	335.9	1007.7	976.7	-30.9

2019 ANNUAL AVE Alwen Input

	PRECIP	STREAM	SOIL
	MEQ/M3		
CA	25.0	117.4	117.4
MG	53.0	129.2	129.2
NA	234.0	519.3	519.3
K	9.0	22.1	22.1
NH4	20.3	4.5	4.5
SO4	174.3	371.2	370.5
CL	266.0	583.5	583.5
NO3	15.4	13.5	13.5
F	0.0	0.0	0.0

	PRECIP	STREAM	SOIL
	MEQ/M3		
H	114.4	31.3	32.0
ALK	-114.4	-186.9	-187.2
SBC	321.0	788.0	788.0
SAA	455.7	968.2	967.5
TOT AL	0.0	169.4	179.1
AQ SO4	174.3	382.7	382.7
TOT F	0.0	0.0	0.0
SUM +	455.7	968.0	977.2
SUM -	455.7	968.4	977.3

	PRECIP	STREAM	SOIL
	MEQ/M3		
PH	3.9	4.5	4.5
AL3+	0.0	118.3	125.8
HCO3	0.0	0.2	9.7
CO3	0.0	0.0	0.0
HA-	0.0	0.0	0.0
A--	0.0	0.0	0.0

	SOIL
ES %	25.2
ECA %	3.9
EMG %	1.7
ENA %	2.3
EK %	0.9
BS %	8.8

	ATMOSPHERIC DEPOSITION			CATCHMENT			
	WET	DRY	TOTAL	WEATH	UPTAKE	OUTFLOW	NTFLUX
	MEQ/M2/YR			MEQ/M2/YR			
CA	36.8	18.4	55.3	0.0	0.0	118.3	63.1
MG	78.1	39.1	117.2	0.0	0.0	130.2	13.0
NA	344.9	172.5	517.4	0.0	0.0	523.5	6.1
K	13.3	6.6	19.9	0.0	0.0	22.3	2.4
NH4	29.9	15.0	44.9	0.0	40.4	4.5	-40.4
SO4	257.0	128.5	385.5	0.0	0.0	374.2	-11.3
CL	392.1	196.0	588.1	0.0	0.0	588.1	0.0

	TOTAL AMOUNT
	SOIL
	MEQ/M2
CA	2655.1
MG	1199.1
NA	1775.1
K	578.2
NH4	2.0
SO4	1163.9
CL	262.6

	ATMOSPHERIC DEPOSITION			CATCHMENT	
	WET	DRY	TOTAL	OUTFLOW	NTFLUX
	MEQ/M2/YR			MEQ/M2/YR	
H	168.7	84.3	253.0	31.6	-221.5
ALK	-168.7	-84.3	-253.0	-188.4	64.7
SBC	473.2	236.6	709.7	794.3	84.5
SAA	671.8	335.9	1007.7	975.9	-31.7
TOT AL	0.0	0.0	0.0	170.8	170.8
AQ SO4	257.0	128.5	385.5	385.8	0.3
TOT F	0.0	0.0	0.0	0.0	0.0

NO3	22.7	11.3	34.0	0.0	20.4	13.6	-20.4	6.1	SUM +	671.8	335.9	1007.7	975.8	-31.9
F	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	SUM -	671.8	335.9	1007.7	976.2	-31.5

2024 ANNUAL AVE Alwen Input

	PRECIP	STREAM	SOIL
	MEQ/M3		
CA	25.0	108.5	108.5
MG	53.0	127.3	127.3
NA	234.0	519.2	519.2
K	9.0	22.1	22.1
NH4	20.3	4.5	4.5
SO4	174.3	370.4	369.8
CL	266.0	583.5	583.5
NO3	15.4	13.5	13.5
F	0.0	0.0	0.0

	PRECIP	STREAM	SOIL
	MEQ/M3		
H	114.4	32.1	32.7
ALK	-114.4	-198.2	-198.6
SBC	321.0	777.1	777.1
SAA	455.7	967.4	966.7
TOT AL	0.0	180.5	190.1
AQ SO4	174.3	382.7	382.7
TOT F	0.0	0.0	0.0
SUM +	455.7	967.6	976.7
SUM -	455.7	967.7	976.3

	PRECIP	STREAM	SOIL
	MEQ/M3		
PH	3.9	4.5	4.5
AL3+	0.0	126.8	134.2
HCO3	0.0	0.2	9.5
CO3	0.0	0.0	0.0
HA-	0.0	0.0	0.0
A--	0.0	0.0	0.0

	SOIL
ES %	25.2
ECA %	3.5
EMG %	1.6
ENA %	2.3
EK %	0.8
BS %	8.2

	ATMOSPHERIC DEPOSITION			CATCHMENT			
	WET	DRY	TOTAL	WEATH	UPTAKE	OUTFLOW	NTFLUX
	MEQ/M2/YR			MEQ/M2/YR			
CA	36.8	18.4	55.3	0.0	0.0	109.4	54.1
MG	78.1	39.1	117.2	0.0	0.0	128.3	11.1
NA	344.9	172.5	517.4	0.0	0.0	523.4	6.0
K	13.3	6.6	19.9	0.0	0.0	22.2	2.3
NH4	29.9	15.0	44.9	0.0	40.4	4.5	-40.4
SO4	257.0	128.5	385.5	0.0	0.0	373.4	-12.1
CL	392.1	196.0	588.1	0.0	0.0	588.1	0.0
NO3	22.7	11.3	34.0	0.0	20.4	13.6	-20.4
F	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	TOTAL AMOUNT
	SOIL
	MEQ/M2
	2362.7
	1139.1
	1745.0
	566.4
	2.0
	1162.4
	262.6
	6.1
	0.0

	ATMOSPHERIC DEPOSITION			CATCHMENT	
	WET	DRY	TOTAL	OUTFLOW	NTFLUX
	MEQ/M2/YR			MEQ/M2/YR	
H	168.7	84.3	253.0	32.3	-220.7
ALK	-168.7	-84.3	-253.0	-199.7	53.3
SBC	473.2	236.6	709.7	783.3	73.6
SAA	671.8	335.9	1007.7	975.1	-32.5
TOT AL	0.0	0.0	0.0	182.0	182.0
AQ SO4	257.0	128.5	385.5	385.8	0.3
TOT F	0.0	0.0	0.0	0.0	0.0
SUM +	671.8	335.9	1007.7	975.4	-32.3
SUM -	671.8	335.9	1007.7	975.4	-32.2

2029 ANNUAL AVE Alwen Input

	PRECIP	STREAM	SOIL
	MEQ/M3		
CA	25.0	100.3	100.3
MG	53.0	125.5	125.5
NA	234.0	518.5	518.5
K	9.0	22.0	22.0
NH4	20.3	4.5	4.5
SO4	174.3	369.7	369.0
CL	266.0	583.5	583.5
NO3	15.4	13.5	13.5
F	0.0	0.0	0.0

	PRECIP	STREAM	SOIL
	MEQ/M3		
H	114.4	32.7	33.3
ALK	-114.4	-208.7	-209.0
SBC	321.0	766.3	766.3
SAA	455.7	966.6	966.0
TOT AL	0.0	190.9	200.2
AQ SO4	174.3	382.7	382.7
TOT F	0.0	0.0	0.0
SUM +	455.7	966.6	975.4
SUM -	455.7	966.9	975.4

	PRECIP	STREAM	SOIL
	MEQ/M3		
PH	3.9	4.5	4.5
AL3+	0.0	134.8	142.0
HCO3	0.0	0.2	9.3
CO3	0.0	0.0	0.0
HA-	0.0	0.0	0.0
A--	0.0	0.0	0.0

	SOIL
ES %	25.1
ECA %	3.1
EMG %	1.5
ENA %	2.2
EK %	0.8
BS %	7.7

	ATMOSPHERIC DEPOSITION			CATCHMENT			
	WET	DRY	TOTAL	WEATH	UPTAKE	OUTFLOW	NTFLUX
	MEQ/M2/YR			MEQ/M2/YR			
CA	36.8	18.4	55.3	0.0	0.0	101.1	45.8
MG	78.1	39.1	117.2	0.0	0.0	126.5	9.4
NA	344.9	172.5	517.4	0.0	0.0	522.6	5.2
K	13.3	6.6	19.9	0.0	0.0	22.2	2.3
NH4	29.9	15.0	44.9	0.0	40.4	4.5	-40.4
SO4	257.0	128.5	385.5	0.0	0.0	372.6	-12.9

	TOTAL AMOUNT
	SOIL
	MEQ/M2
	2113.5
	1088.2
	1717.3
	554.9
	2.0
	1160.9

	ATMOSPHERIC DEPOSITION			CATCHMENT	
	WET	DRY	TOTAL	OUTFLOW	NTFLUX
	MEQ/M2/YR			MEQ/M2/YR	
H	168.7	84.3	253.0	33.0	-220.1
ALK	-168.7	-84.3	-253.0	-210.3	42.7
SBC	473.2	236.6	709.7	772.4	62.7
SAA	671.8	335.9	1007.7	974.4	-33.3
TOT AL	0.0	0.0	0.0	192.4	192.4
AQ SO4	257.0	128.5	385.5	385.8	0.3

CL	392.1	196.0	588.1	0.0	0.0	588.1	0.0	262.6	TOT F	0.0	0.0	0.0	0.0	0.0
NO3	22.7	11.3	34.0	0.0	20.4	13.6	-20.4	6.1	SUM +	671.8	335.9	1007.7	974.3	-33.3
F	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	SUM -	671.8	335.9	1007.7	974.6	-33.0

2034 ANNUAL AVE Alwen Input

	PRECIP	STREAM	SOIL
	MEQ/M3		
CA	25.0	92.9	92.9
MG	53.0	123.9	123.9
NA	234.0	517.5	517.5
K	9.0	21.8	21.8
NH4	20.3	4.5	4.5
SO4	174.3	368.9	368.4
CL	266.0	583.5	583.5
NO3	15.4	13.5	13.5
F	0.0	0.0	0.0

	PRECIP	STREAM	SOIL
	MEQ/M3		
H	114.4	33.3	33.8
ALK	-114.4	-218.9	-218.2
SBC	321.0	756.1	756.1
SAA	455.7	965.9	965.3
TOT AL	0.0	201.0	209.1
AQ SO4	174.3	382.7	382.7
TOT F	0.0	0.0	0.0
SUM +	455.7	966.0	973.6
SUM -	455.7	966.1	974.6

	PRECIP	STREAM	SOIL
	MEQ/M3		
PH	3.9	4.5	4.5
AL3+	0.0	142.6	148.9
HCO3	0.0	0.2	9.2
CO3	0.0	0.0	0.0
HA-	0.0	0.0	0.0
A--	0.0	0.0	0.0

	SOIL
ES %	25.1
ECA %	2.8
EMG %	1.5
ENA %	2.2
EK %	0.8
BS %	7.3

	ATMOSPHERIC DEPOSITION			CATCHMENT			
	WET	DRY	TOTAL	WEATH	UPTAKE	OUTFLOW	NTFLUX
	MEQ/M2/YR			MEQ/M2/YR			
CA	36.8	18.4	55.3	0.0	0.0	93.6	38.3
MG	78.1	39.1	117.2	0.0	0.0	124.9	7.7
NA	344.9	172.5	517.4	0.0	0.0	521.6	4.2
K	13.3	6.6	19.9	0.0	0.0	22.0	2.1
NH4	29.9	15.0	44.9	0.0	40.4	4.5	-40.4
SO4	257.0	128.5	385.5	0.0	0.0	371.9	-13.6
CL	392.1	196.0	588.1	0.0	0.0	588.1	0.0
NO3	22.7	11.3	34.0	0.0	20.4	13.6	-20.4
F	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	TOTAL AMOUNT
	SOIL
	MEQ/M2
CA	1903.3
MG	1045.4
NA	1693.4
K	544.0
NH4	2.0
SO4	1159.5
CL	262.6
NO3	6.1
F	0.0

	ATMOSPHERIC DEPOSITION			CATCHMENT	
	WET	DRY	TOTAL	OUTFLOW	NTFLUX
	MEQ/M2/YR			MEQ/M2/YR	
H	168.7	84.3	253.0	33.6	-219.4
ALK	-168.7	-84.3	-253.0	-220.7	32.3
SBC	473.2	236.6	709.7	762.1	52.4
SAA	671.8	335.9	1007.7	973.6	-34.1
TOT AL	0.0	0.0	0.0	202.6	202.6
AQ SO4	257.0	128.5	385.5	385.7	0.2
TOT F	0.0	0.0	0.0	0.0	0.0
SUM +	671.8	335.9	1007.7	973.7	-34.0
SUM -	671.8	335.9	1007.7	973.9	-33.8

ALWEN

FORECAST

Decreased emmissions (30%)

Forest Dry Deposition Factor 2.0

1984 ANNUAL AVE Alwen Input

	PRECIP	STREAM	SOIL
	MEQ/M3		
CA	25.0	149.8	149.8
MG	53.0	146.9	146.9
NA	234.0	350.6	350.6
K	9.0	20.9	20.9
NH4	29.0	4.2	4.2
SO4	235.0	346.9	346.2
CL	266.0	389.0	389.0
NO3	22.0	12.9	12.9
F	0.0	0.0	0.0

	PRECIP	STREAM	SOIL
	MEQ/M3		
H	173.0	22.4	23.8
ALK	-173.0	-80.8	-80.4
SBC	321.0	668.3	668.3
SAA	523.0	748.8	748.0
TOT AL	0.0	66.7	78.3
AQ SO4	235.0	351.0	351.0
TOT F	0.0	0.0	0.0
SUM +	523.0	749.6	761.0
SUM -	523.0	749.1	761.0

	PRECIP	STREAM	SOIL
	MEQ/M3		
PH	3.8	4.7	4.6
AL3+	0.0	42.0	50.4
HCO3	0.0	0.3	12.9
CO3	0.0	0.0	0.0
HA-	0.0	0.0	0.0
A--	0.0	0.0	0.0

	SOIL
ES %	23.9
ECA %	8.7
EMG %	3.4
ENA %	2.1
EK %	1.1
BS %	15.3

	ATMOSPHERIC DEPOSITION			CATCHMENT			
	WET	DRY	TOTAL	WEATH	UPTAKE	OUTFLOW	NTFLUX
	MEQ/M2/YR			MEQ/M2/YR			
CA	36.8	0.0	36.8	0.0	0.0	151.0	114.2
MG	78.1	0.0	78.1	0.0	0.0	148.1	70.0
NA	344.9	0.0	344.9	0.0	0.0	353.4	8.5
K	13.3	0.0	13.3	0.0	0.0	21.1	7.8
NH4	42.7	0.0	42.7	0.0	38.5	4.3	-38.5
SO4	346.4	0.0	346.4	0.0	0.0	349.7	3.3
CL	392.1	0.0	392.1	0.0	0.0	392.1	0.0
NO3	32.4	0.0	32.4	0.0	19.5	13.0	-19.5
F	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	TOTAL AMOUNT
	SOIL
	MEQ/M2
CA	5889.9
MG	2328.0
NA	1534.1
K	719.8
NH4	1.9
SO4	1098.0
CL	175.0
NO3	5.8
F	0.0

	ATMOSPHERIC DEPOSITION			CATCHMENT	
	WET	DRY	TOTAL	OUTFLOW	NTFLUX
	MEQ/M2/YR			MEQ/M2/YR	
H	255.0	0.0	255.0	22.5	-232.5
ALK	-255.0	0.0	-255.0	-81.5	173.5
SBC	473.2	0.0	473.2	673.6	200.4
SAA	770.9	0.0	770.9	754.8	-16.1
TOT AL	0.0	0.0	0.0	67.2	67.2
AQ SO4	346.4	0.0	346.4	353.8	7.4
TOT F	0.0	0.0	0.0	0.0	0.0
SUM +	770.9	0.0	770.9	755.6	-15.3
SUM -	770.9	0.0	770.9	755.1	-15.8

1989 ANNUAL AVE Alwen Input

	PRECIP	STREAM	SOIL
	MEQ/M3		
CA	25.0	141.3	141.3
MG	53.0	132.1	132.1
NA	234.0	348.0	348.0
K	9.0	20.2	20.2
NH4	26.7	3.9	3.9
SO4	218.8	326.6	325.9
CL	266.0	389.0	389.0
NO3	20.2	11.8	11.8
F	0.0	0.0	0.0

	PRECIP	STREAM	SOIL
	MEQ/M3		
H	157.4	23.0	24.4
ALK	-157.4	-85.8	-86.1
SBC	321.0	641.6	641.6
SAA	505.1	727.4	726.7
TOT AL	0.0	71.4	83.4
AQ SO4	218.8	330.8	330.8
TOT F	0.0	0.0	0.0
SUM +	505.1	727.5	739.3
SUM -	505.1	727.7	739.3

	PRECIP	STREAM	SOIL
	MEQ/M3		
PH	3.8	4.6	4.6
AL3+	0.0	45.6	54.4
HCO3	0.0	0.3	12.6
CO3	0.0	0.0	0.0
HA-	0.0	0.0	0.0
A--	0.0	0.0	0.0

	SOIL
ES %	22.9
ECA %	7.9
EMG %	2.9
ENA %	2.0
EK %	1.0
BS %	13.9

	ATMOSPHERIC DEPOSITION			CATCHMENT			
	WET	DRY	TOTAL	WEATH	UPTAKE	OUTFLOW	NTFLUX
	MEQ/M2/YR			MEQ/M2/YR			
CA	36.8	0.0	36.8	0.0	0.0	142.4	105.5
MG	78.1	0.0	78.1	0.0	0.0	133.1	55.0
NA	344.9	0.0	344.9	0.0	0.0	350.8	5.9
K	13.3	0.0	13.3	0.0	0.0	20.4	7.1
NH4	39.3	0.0	39.3	0.0	35.4	3.9	-35.4
SO4	322.5	0.0	322.5	0.0	0.0	329.2	6.7
CL	392.1	0.0	392.1	0.0	0.0	392.1	0.0
NO3	29.8	0.0	29.8	0.0	17.9	11.9	-17.9
F	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	TOTAL AMOUNT
	SOIL
	MEQ/M2
CA	5338.0
MG	2014.3
NA	1496.5
K	682.4
NH4	1.8
SO4	1045.4
CL	175.0
NO3	5.3
F	0.0

	ATMOSPHERIC DEPOSITION			CATCHMENT	
	WET	DRY	TOTAL	OUTFLOW	NTFLUX
	MEQ/M2/YR			MEQ/M2/YR	
H	232.0	0.0	232.0	23.2	-208.8
ALK	-232.0	0.0	-232.0	-86.5	145.5
SBC	473.2	0.0	473.2	646.7	173.6
SAA	744.5	0.0	744.5	733.2	-11.2
TOT AL	0.0	0.0	0.0	72.0	72.0
AQ SO4	322.5	0.0	322.5	333.4	10.9
TOT F	0.0	0.0	0.0	0.0	0.0
SUM +	744.5	0.0	744.5	733.3	-11.2
SUM -	744.5	0.0	744.5	733.5	-10.9

1994 ANNUAL AVE Alwen Input

	PRECIP	STREAM	SOIL
	MEQ/M3		
CA	25.0	159.0	159.0
MG	53.0	144.6	144.6
NA	234.0	407.2	407.2
K	9.0	21.6	21.6
NH4	23.8	4.4	4.4
SO4	198.6	342.5	341.8
CL	266.0	494.1	494.1
NO3	18.0	13.4	13.4
F	0.0	0.0	0.0

	PRECIP	STREAM	SOIL
	MEQ/M3		
H	137.9	26.4	27.3
ALK	-137.9	-119.7	-119.6
SBC	321.0	732.5	732.5
SAA	482.6	849.9	849.2
TOT AL	0.0	103.9	114.5
AQ SO4	198.6	348.9	348.9
TOT F	0.0	0.0	0.0
SUM +	482.6	850.4	860.7
SUM -	482.6	850.2	860.6

	PRECIP	STREAM	SOIL
	MEQ/M3		
PH	3.9	4.6	4.6
AL3+	0.0	69.4	77.4
HCO3	0.0	0.2	11.3
CO3	0.0	0.0	0.0
HA-	0.0	0.0	0.0
A--	0.0	0.0	0.0

	SOIL
ES %	23.7
ECA %	7.1
EMG %	2.6
ENA %	2.1
EK %	1.0
BS %	12.7

	ATMOSPHERIC DEPOSITION			CATCHMENT			
	WET	DRY	TOTAL	WEATH	UPTAKE	OUTFLOW	NTFLUX
	MEQ/M2/YR			MEQ/M2/YR			
CA	36.8	9.8	46.7	0.0	0.0	160.3	113.6
MG	78.1	20.8	99.0	0.0	0.0	145.8	46.8
NA	344.9	92.0	436.9	0.0	0.0	410.5	-26.4
K	13.3	3.5	16.8	0.0	0.0	21.8	5.0
NH4	35.1	9.3	44.4	0.0	40.0	4.4	-40.0
SO4	292.7	78.1	370.8	0.0	0.0	345.2	-25.6
CL	392.1	104.6	496.6	0.0	0.0	498.0	1.4
NO3	26.6	7.1	33.7	0.0	20.2	13.5	-20.2
F	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	TOTAL AMOUNT
	SOIL
	MEQ/M2
	4803.7
	1773.3
	1592.2
	653.3
	2.0
	1095.3
	221.5
	6.0
	0.0

	ATMOSPHERIC DEPOSITION			CATCHMENT	
	WET	DRY	TOTAL	OUTFLOW	NTFLUX
	MEQ/M2/YR			MEQ/M2/YR	
H	203.2	54.2	257.4	26.6	-230.8
ALK	-203.2	-54.2	-257.4	-120.6	136.8
SBC	473.2	126.2	599.3	738.4	139.0
SAA	711.4	189.7	901.1	856.7	-44.4
TOT AL	0.0	0.0	0.0	104.7	104.7
AQ SO4	292.7	78.1	370.8	351.7	-19.1
TOT F	0.0	0.0	0.0	0.0	0.0
SUM +	711.4	189.7	901.1	857.2	-43.9
SUM -	711.4	189.7	901.1	857.0	-44.1

1999 ANNUAL AVE Alwen Input

	PRECIP	STREAM	SOIL
	MEQ/M3		
CA	25.0	174.7	174.7
MG	53.0	159.5	159.5
NA	234.0	511.4	511.4
K	9.0	23.5	23.5
NH4	20.9	4.9	4.9
SO4	178.4	390.6	389.9
CL	266.0	623.7	623.7
NO3	15.8	14.8	14.8
F	0.0	0.0	0.0

	PRECIP	STREAM	SOIL
	MEQ/M3		
H	118.4	29.7	30.5
ALK	-118.4	-165.2	-165.4
SBC	321.0	869.2	869.2
SAA	460.2	1029.2	1028.5
TOT AL	0.0	148.3	158.3
AQ SO4	178.4	400.9	400.9
TOT F	0.0	0.0	0.0
SUM +	460.2	1029.3	1038.7
SUM -	460.2	1029.5	1038.7

	PRECIP	STREAM	SOIL
	MEQ/M3		
PH	3.9	4.5	4.5
AL3+	0.0	101.9	109.5
HCO3	0.0	0.2	10.2
CO3	0.0	0.0	0.0
HA-	0.0	0.0	0.0
A--	0.0	0.0	0.0

	SOIL
ES %	26.2
ECA %	6.2
EMG %	2.3
ENA %	2.4
EK %	0.9
BS %	11.8

	ATMOSPHERIC DEPOSITION			CATCHMENT			
	WET	DRY	TOTAL	WEATH	UPTAKE	OUTFLOW	NTFLUX
	MEQ/M2/YR			MEQ/M2/YR			
CA	36.8	22.1	59.0	0.0	0.0	176.1	117.2
MG	78.1	46.9	125.0	0.0	0.0	160.8	35.8
NA	344.9	206.9	551.9	0.0	0.0	515.5	-36.3
K	13.3	8.0	21.2	0.0	0.0	23.7	2.5
NH4	30.8	18.5	49.2	0.0	44.3	4.9	-44.3
SO4	262.9	157.8	420.7	0.0	0.0	393.7	-27.0
CL	392.1	235.3	627.3	0.0	0.0	628.7	1.4
NO3	23.3	14.0	37.4	0.0	22.4	15.0	-22.4
F	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	TOTAL AMOUNT
	SOIL
	MEQ/M2
	4227.4
	1577.4
	1813.4
	636.8
	2.2
	1215.1
	279.9
	6.7
	0.0

	ATMOSPHERIC DEPOSITION			CATCHMENT	
	WET	DRY	TOTAL	OUTFLOW	NTFLUX
	MEQ/M2/YR			MEQ/M2/YR	
H	174.4	104.7	279.1	30.0	-249.1
ALK	-174.4	-104.7	-279.1	-166.6	112.6
SBC	473.2	283.9	757.0	876.1	119.1
SAA	678.4	407.0	1085.4	1037.4	-48.0
TOT AL	0.0	0.0	0.0	149.5	149.5
AQ SO4	262.9	157.8	420.7	404.1	-16.6
TOT F	0.0	0.0	0.0	0.0	0.0
SUM +	678.4	407.0	1085.4	1037.5	-47.9
SUM -	678.4	407.0	1085.4	1037.7	-47.7

2004 ANNUAL AVE Alwen Input

	PRECIP	STREAM	SOIL
	MEQ/M3		
CA	25.0	182.7	182.7
MG	53.0	174.7	174.7
NA	234.0	628.9	628.9
K	9.0	25.6	25.6
NH4	20.3	5.7	5.7
SO4	174.3	450.9	450.3
CL	266.0	753.4	753.4
NO3	15.4	17.4	17.4
F	0.0	0.0	0.0

	PRECIP	STREAM	SOIL
	MEQ/M3		
H	114.4	32.9	33.4
ALK	-114.4	-219.5	-219.0
SBC	321.0	1012.0	1012.0
SAA	455.7	1221.8	1221.1
TOT AL	0.0	201.7	210.3
AQ SO4	174.3	466.7	466.7
TOT F	0.0	0.0	0.0
SUM +	455.7	1221.7	1229.7
SUM -	455.7	1222.1	1230.6

	PRECIP	STREAM	SOIL
	MEQ/M3		
PH	3.9	4.5	4.5
AL3+	0.0	140.9	147.5
HCO3	0.0	0.2	9.4
CO3	0.0	0.0	0.0
HA-	0.0	0.0	0.0
A--	0.0	0.0	0.0

	SOIL
ES %	29.0
ECA %	5.4
EMG %	2.0
ENA %	2.6
EK %	0.9
BS %	11.0

	ATMOSPHERIC DEPOSITION			CATCHMENT			
	WET	DRY	TOTAL	WEATH	UPTAKE	OUTFLOW	NTFLUX
	MEQ/M2/YR			MEQ/M2/YR			
CA	36.8	34.4	71.2	0.0	0.0	184.1	112.9
MG	78.1	72.9	151.0	0.0	0.0	176.1	25.1
NA	344.9	321.9	666.8	0.0	0.0	633.9	-32.9
K	13.3	12.4	25.6	0.0	0.0	25.9	0.2
NH4	29.9	27.9	57.8	0.0	52.1	5.8	-52.1
SO4	257.0	239.9	496.8	0.0	0.0	454.5	-42.3
CL	392.1	365.9	758.0	0.0	0.0	759.4	1.4
NO3	22.7	21.2	43.9	0.0	26.3	17.6	-26.3
F	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	TOTAL AMOUNT
	SOIL
	MEQ/M2
CA	3658.5
MG	1441.8
NA	2049.7
K	632.7
NH4	2.6
SO4	1360.6
CL	338.2
NO3	7.8
F	0.0

	ATMOSPHERIC DEPOSITION			CATCHMENT	
	WET	DRY	TOTAL	OUTFLOW	NTFLUX
	MEQ/M2/YR			MEQ/M2/YR	
H	168.7	157.4	326.1	33.2	-293.0
ALK	-168.7	-157.4	-326.1	-221.2	104.9
SBC	473.2	441.6	914.8	1020.1	105.3
SAA	671.8	627.0	1298.8	1231.6	-67.2
TOT AL	0.0	0.0	0.0	203.4	203.4
AQ SO4	257.0	239.9	496.8	470.5	-26.4
TOT F	0.0	0.0	0.0	0.0	0.0
SUM +	671.8	627.0	1298.8	1231.4	-67.3
SUM -	671.8	627.0	1298.8	1231.9	-66.9

2009 ANNUAL AVE Alwen Input

	PRECIP	STREAM	SOIL
	MEQ/M3		
CA	25.0	168.2	168.2
MG	53.0	173.5	173.5
NA	234.0	682.4	682.4
K	9.0	26.6	26.6
NH4	20.3	5.9	5.9
SO4	174.3	488.2	487.4
CL	266.0	777.9	777.9
NO3	15.4	18.0	18.0
F	0.0	0.0	0.0

	PRECIP	STREAM	SOIL
	MEQ/M3		
H	114.4	34.2	34.7
ALK	-114.4	-246.3	-246.3
SBC	321.0	1050.8	1050.8
SAA	455.7	1284.1	1283.4
TOT AL	0.0	228.3	237.1
AQ SO4	174.3	507.3	507.3
TOT F	0.0	0.0	0.0
SUM +	455.7	1284.2	1292.4
SUM -	455.7	1284.5	1292.6

	PRECIP	STREAM	SOIL
	MEQ/M3		
PH	3.9	4.5	4.5
AL3+	0.0	159.7	166.5
HCO3	0.0	0.2	9.1
CO3	0.0	0.0	0.0
HA-	0.0	0.0	0.0
A--	0.0	0.0	0.0

	SOIL
ES %	30.7
ECA %	4.6
EMG %	1.9
ENA %	2.7
EK %	0.9
BS %	10.2

	ATMOSPHERIC DEPOSITION			CATCHMENT			
	WET	DRY	TOTAL	WEATH	UPTAKE	OUTFLOW	NTFLUX
	MEQ/M2/YR			MEQ/M2/YR			
CA	36.8	36.8	73.7	0.0	0.0	169.6	95.9
MG	78.1	78.1	156.2	0.0	0.0	174.9	18.6
NA	344.9	344.9	689.8	0.0	0.0	687.9	-1.9
K	13.3	13.3	26.5	0.0	0.0	26.8	0.3
NH4	29.9	29.9	59.8	0.0	53.9	6.0	-53.9
SO4	257.0	257.0	514.0	0.0	0.0	492.1	-21.9
CL	392.1	392.1	784.2	0.0	0.0	784.2	0.0
NO3	22.7	22.7	45.4	0.0	27.2	18.2	-27.2

	TOTAL AMOUNT
	SOIL
	MEQ/M2
CA	3132.1
MG	1335.4
NA	2145.2
K	632.8
NH4	2.7
SO4	1437.6
CL	350.1
NO3	8.1

	ATMOSPHERIC DEPOSITION			CATCHMENT	
	WET	DRY	TOTAL	OUTFLOW	NTFLUX
	MEQ/M2/YR			MEQ/M2/YR	
H	168.7	168.7	337.4	34.5	-302.9
ALK	-168.7	-168.7	-337.4	-248.2	89.2
SBC	473.2	473.2	946.3	1059.2	112.9
SAA	671.8	671.8	1343.5	1294.4	-49.1
TOT AL	0.0	0.0	0.0	230.1	230.1
AQ SO4	257.0	257.0	514.0	511.3	-2.6
TOT F	0.0	0.0	0.0	0.0	0.0
SUM +	671.8	671.8	1343.5	1294.5	-49.1

	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	SUM -	671.8	671.8	1343.5	1294.7	-48.8

2014 ANNUAL AVE Alwen Input

	PRECIP	STREAM	SOIL
	MEQ/M3		
CA	25.0	150.9	150.9
MG	53.0	169.3	169.3
NA	234.0	690.4	690.4
K	9.0	27.1	27.1
NH4	20.3	5.9	5.9
SO4	174.3	489.6	488.8
CL	266.0	777.9	777.9
NO3	15.4	18.0	18.0
F	0.0	0.0	0.0

	PRECIP	STREAM	SOIL
	MEQ/M3		
H	114.4	35.0	35.5
ALK	-114.4	-262.7	-263.1
SBC	321.0	1037.6	1037.6
SAA	455.7	1285.5	1284.8
TOT AL	0.0	244.5	253.5
AQ SO4	174.3	510.2	510.2
TOT F	0.0	0.0	0.0
SUM +	455.7	1286.0	1294.2
SUM -	455.7	1285.9	1293.8

	PRECIP	STREAM	SOIL
	MEQ/M3		
PH	3.9	4.5	4.4
AL3+	0.0	172.0	178.8
HCO3	0.0	0.2	8.8
CO3	0.0	0.0	0.0
HA-	0.0	0.0	0.0
A--	0.0	0.0	0.0

	SOIL
ES %	30.8
ECA %	4.0
EMG %	1.8
ENA %	2.7
EK %	0.9
BS %	9.4

	ATMOSPHERIC DEPOSITION			CATCHMENT				TOTAL AMOUNT
	WET	DRY	TOTAL	WEATH	UPTAKE	OUTFLOW	NTFLUX	SOIL
	MEQ/M2/YR			MEQ/M2/YR				MEQ/M2
CA	36.8	36.8	73.7	0.0	0.0	152.1	78.4	2697.8
MG	78.1	78.1	156.2	0.0	0.0	170.7	14.4	1253.8
NA	344.9	344.9	689.8	0.0	0.0	695.9	6.0	2129.5
K	13.3	13.3	26.5	0.0	0.0	27.3	0.7	630.2
NH4	29.9	29.9	59.8	0.0	53.9	6.0	-53.9	2.7
SO4	257.0	257.0	514.0	0.0	0.0	493.5	-20.5	1440.5
CL	392.1	392.1	784.2	0.0	0.0	784.2	0.0	350.1
NO3	22.7	22.7	45.4	0.0	27.2	18.2	-27.2	8.1
F	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	ATMOSPHERIC DEPOSITION			CATCHMENT	
	WET	DRY	TOTAL	OUTFLOW	NTFLUX
	MEQ/M2/YR			MEQ/M2/YR	
H	168.7	168.7	337.4	35.3	-302.1
ALK	-168.7	-168.7	-337.4	-264.8	72.6
SBC	473.2	473.2	946.3	1045.9	99.6
SAA	671.8	671.8	1343.5	1295.8	-47.7
TOT AL	0.0	0.0	0.0	246.5	246.5
AQ SO4	257.0	257.0	514.0	514.3	0.3
TOT F	0.0	0.0	0.0	0.0	0.0
SUM +	671.8	671.8	1343.5	1296.3	-47.3
SUM -	671.8	671.8	1343.5	1296.1	-47.4

2019 ANNUAL AVE Alwen Input

	PRECIP	STREAM	SOIL
	MEQ/M3		
CA	25.0	136.1	136.1
MG	53.0	166.5	166.5
NA	234.0	691.1	691.1
K	9.0	27.4	27.4
NH4	20.3	5.9	5.9
SO4	174.3	488.3	487.6
CL	266.0	777.9	777.9
NO3	15.4	18.0	18.0
F	0.0	0.0	0.0

	PRECIP	STREAM	SOIL
	MEQ/M3		
H	114.4	35.9	36.3
ALK	-114.4	-279.1	-279.4
SBC	321.0	1021.1	1021.1
SAA	455.7	1284.3	1283.6
TOT AL	0.0	260.7	269.4
AQ SO4	174.3	510.4	510.4
TOT F	0.0	0.0	0.0
SUM +	455.7	1284.5	1292.5
SUM -	455.7	1284.6	1292.4

	PRECIP	STREAM	SOIL
	MEQ/M3		
PH	3.9	4.4	4.4
AL3+	0.0	184.3	191.0
HCO3	0.0	0.2	8.6
CO3	0.0	0.0	0.0
HA-	0.0	0.0	0.0
A--	0.0	0.0	0.0

	SOIL
ES %	30.7
ECA %	3.4
EMG %	1.7
ENA %	2.7
EK %	0.9
BS %	8.7

	ATMOSPHERIC DEPOSITION			CATCHMENT				TOTAL AMOUNT
	WET	DRY	TOTAL	WEATH	UPTAKE	OUTFLOW	NTFLUX	SOIL
	MEQ/M2/YR			MEQ/M2/YR				MEQ/M2
CA	36.8	36.8	73.7	0.0	0.0	137.2	63.5	2344.3
MG	78.1	78.1	156.2	0.0	0.0	167.8	11.6	1189.2
NA	344.9	344.9	689.8	0.0	0.0	696.7	6.8	2096.4
K	13.3	13.3	26.5	0.0	0.0	27.6	1.1	625.7
NH4	29.9	29.9	59.8	0.0	53.9	6.0	-53.9	2.7
SO4	257.0	257.0	514.0	0.0	0.0	492.2	-21.7	1438.4
CL	392.1	392.1	784.2	0.0	0.0	784.2	0.0	350.1

	ATMOSPHERIC DEPOSITION			CATCHMENT	
	WET	DRY	TOTAL	OUTFLOW	NTFLUX
	MEQ/M2/YR			MEQ/M2/YR	
H	168.7	168.7	337.4	36.2	-301.2
ALK	-168.7	-168.7	-337.4	-281.3	56.1
SBC	473.2	473.2	946.3	1029.3	83.0
SAA	671.8	671.8	1343.5	1294.6	-49.0
TOT AL	0.0	0.0	0.0	262.8	262.8
AQ SO4	257.0	257.0	514.0	514.4	0.5
TOT F	0.0	0.0	0.0	0.0	0.0

NO3	22.7	22.7	45.4	0.0	27.2	18.2	-27.2	8.1	SUM +	671.8	671.8	1343.5	1294.7	-48.8
F	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	SUM -	671.8	671.8	1343.5	1294.9	-48.6

2024 ANNUAL AVE Alwen Input

	PRECIP	STREAM	SOIL		PRECIP	STREAM	SOIL		PRECIP	STREAM	SOIL		SOIL
	MEQ/M3				MEQ/M3				MEQ/M3				
CA	25.0	123.5	123.5	H	114.4	36.6	37.0	PH	3.9	4.4	4.4	ES %	30.7
MG	53.0	164.3	164.3	ALK	-114.4	-294.3	-294.4	AL3+	0.0	195.8	202.3	ECA %	3.0
NA	234.0	690.4	690.4	SBC	321.0	1005.8	1005.8	HCO3	0.0	0.2	8.5	EMG %	1.6
K	9.0	27.6	27.6	SAA	455.7	1283.0	1282.3	CO3	0.0	0.0	0.0	ENA %	2.6
NH4	20.3	5.9	5.9	TOT AL	0.0	275.8	284.2	HA-	0.0	0.0	0.0	EK %	0.9
SO4	174.3	487.0	486.3	AQ SO4	174.3	510.3	510.3	A--	0.0	0.0	0.0	BS %	8.1
CL	266.0	777.9	777.9	TOT F	0.0	0.0	0.0						
NO3	15.4	18.0	18.0	SUM +	455.7	1283.1	1290.8						
F	0.0	0.0	0.0	SUM -	455.7	1283.3	1290.9						

	ATMOSPHERIC DEPOSITION			CATCHMENT				TOTAL AMOUNT		ATMOSPHERIC DEPOSITION			CATCHMENT	
	WET	DRY	TOTAL	WEATH	UPTAKE	OUTFLOW	NTFLUX	SOIL		WET	DRY	TOTAL	OUTFLOW	NTFLUX
	MEQ/M2/YR			MEQ/M2/YR				MEQ/M2		MEQ/M2/YR			MEQ/M2/YR	
CA	36.8	36.8	73.7	0.0	0.0	124.5	50.8	2059.5	H	168.7	168.7	337.4	36.9	-300.5
MG	78.1	78.1	156.2	0.0	0.0	165.6	9.4	1137.1	ALK	-168.7	-168.7	-337.4	-296.7	40.7
NA	344.9	344.9	689.8	0.0	0.0	695.9	6.1	2064.1	SBC	473.2	473.2	946.3	1013.9	67.6
K	13.3	13.3	26.5	0.0	0.0	27.8	1.3	619.8	SAA	671.8	671.8	1343.5	1293.2	-50.3
NH4	29.9	29.9	59.8	0.0	53.9	6.0	-53.9	2.7	TOT AL	0.0	0.0	0.0	278.0	278.0
SO4	257.0	257.0	514.0	0.0	0.0	490.9	-23.1	1436.2	AQ SO4	257.0	257.0	514.0	514.4	0.4
CL	392.1	392.1	784.2	0.0	0.0	784.2	0.0	350.1	TOT F	0.0	0.0	0.0	0.0	0.0
NO3	22.7	22.7	45.4	0.0	27.2	18.2	-27.2	8.1	SUM +	671.8	671.8	1343.5	1293.4	-50.2
F	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	SUM -	671.8	671.8	1343.5	1293.6	-50.0

2029 ANNUAL AVE Alwen Input

	PRECIP	STREAM	SOIL		PRECIP	STREAM	SOIL		PRECIP	STREAM	SOIL		SOIL
	MEQ/M3				MEQ/M3				MEQ/M3				
CA	25.0	113.0	113.0	H	114.4	37.2	37.6	PH	3.9	4.4	4.4	ES %	30.6
MG	53.0	162.4	162.4	ALK	-114.4	-308.0	-307.5	AL3+	0.0	206.2	212.1	ECA %	2.7
NA	234.0	689.3	689.3	SBC	321.0	992.4	992.4	HCO3	0.0	0.2	8.4	EMG %	1.5
K	9.0	27.7	27.7	SAA	455.7	1281.7	1281.1	CO3	0.0	0.0	0.0	ENA %	2.6
NH4	20.3	5.9	5.9	TOT AL	0.0	289.4	297.0	HA-	0.0	0.0	0.0	EK %	0.9
SO4	174.3	485.8	485.1	AQ SO4	174.3	510.3	510.3	A--	0.0	0.0	0.0	BS %	7.7
CL	266.0	777.9	777.9	TOT F	0.0	0.0	0.0						
NO3	15.4	18.0	18.0	SUM +	455.7	1282.2	1289.2						
F	0.0	0.0	0.0	SUM -	455.7	1282.1	1289.6						

	ATMOSPHERIC DEPOSITION			CATCHMENT				TOTAL AMOUNT		ATMOSPHERIC DEPOSITION			CATCHMENT	
	WET	DRY	TOTAL	WEATH	UPTAKE	OUTFLOW	NTFLUX	SOIL		WET	DRY	TOTAL	OUTFLOW	NTFLUX
	MEQ/M2/YR			MEQ/M2/YR				MEQ/M2		MEQ/M2/YR			MEQ/M2/YR	
CA	36.8	36.8	73.7	0.0	0.0	113.9	40.2	1832.9	H	168.7	168.7	337.4	37.5	-299.9
MG	78.1	78.1	156.2	0.0	0.0	163.7	7.5	1095.0	ALK	-168.7	-168.7	-337.4	-310.5	26.9
NA	344.9	344.9	689.8	0.0	0.0	694.8	5.0	2036.4	SBC	473.2	473.2	946.3	1000.3	54.0
K	13.3	13.3	26.5	0.0	0.0	27.9	1.4	613.2	SAA	671.8	671.8	1343.5	1292.0	-51.6
NH4	29.9	29.9	59.8	0.0	53.9	6.0	-53.9	2.7	TOT AL	0.0	0.0	0.0	291.8	291.8
SO4	257.0	257.0	514.0	0.0	0.0	489.6	-24.3	1434.2	AQ SO4	257.0	257.0	514.0	514.3	0.4

CL	392.1	392.1	784.2	0.0	0.0	784.2	0.0	350.1	TOT F	0.0	0.0	0.0	0.0	0.0
NO3	22.7	22.7	45.4	0.0	27.2	18.2	-27.2	8.1	SUM +	671.8	671.8	1343.5	1292.5	-51.1
F	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	SUM -	671.8	671.8	1343.5	1292.3	-51.2

2034 ANNUAL AVE Alwen Input

	PRECIP	STREAM	SOIL
	MEQ/M3		
CA	25.0	104.3	104.3
MG	53.0	161.0	161.0
NA	234.0	688.4	688.4
K	9.0	27.7	27.7
NH4	20.3	5.9	5.9
SO4	174.3	484.8	484.1
CL	266.0	777.9	777.9
NO3	15.4	18.0	18.0
F	0.0	0.0	0.0

	PRECIP	STREAM	SOIL
	MEQ/M3		
H	114.4	37.7	38.1
ALK	-114.4	-318.8	-318.9
SBC	321.0	981.4	981.4
SAA	455.7	1280.8	1280.1
TOT AL	0.0	300.1	308.3
AQ SO4	174.3	510.2	510.2
TOT F	0.0	0.0	0.0
SUM +	455.7	1281.0	1288.6
SUM -	455.7	1281.1	1288.5

	PRECIP	STREAM	SOIL
	MEQ/M3		
PH	3.9	4.4	4.4
AL3+	0.0	214.4	220.8
HCO3	0.0	0.2	8.2
CO3	0.0	0.0	0.0
HA-	0.0	0.0	0.0
A--	0.0	0.0	0.0

	SOIL
ES %	30.6
ECA %	2.4
EMG %	1.5
ENA %	2.5
EK %	0.9
BS %	7.3

	ATMOSPHERIC DEPOSITION			CATCHMENT			
	WET	DRY	TOTAL	WEATH	UPTAKE	OUTFLOW	NTFLUX
	MEQ/M2/YR			MEQ/M2/YR			
CA	36.8	36.8	73.7	0.0	0.0	105.1	31.4
MG	78.1	78.1	156.2	0.0	0.0	162.3	6.0
NA	344.9	344.9	689.8	0.0	0.0	693.9	4.1
K	13.3	13.3	26.5	0.0	0.0	27.9	1.4
NH4	29.9	29.9	59.8	0.0	53.9	6.0	-53.9
SO4	257.0	257.0	514.0	0.0	0.0	488.7	-25.3
CL	392.1	392.1	784.2	0.0	0.0	784.2	0.0
NO3	22.7	22.7	45.4	0.0	27.2	18.2	-27.2
F	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	TOTAL AMOUNT
	SOIL
	MEQ/M2
CA	1654.5
MG	1061.2
NA	2013.3
K	606.3
NH4	2.7
SO4	1432.4
CL	350.1
NO3	8.1
F	0.0

	ATMOSPHERIC DEPOSITION			CATCHMENT	
	WET	DRY	TOTAL	OUTFLOW	NTFLUX
	MEQ/M2/YR			MEQ/M2/YR	
H	168.7	168.7	337.4	38.0	-299.4
ALK	-168.7	-168.7	-337.4	-321.3	16.1
SBC	473.2	473.2	946.3	989.3	42.9
SAA	671.8	671.8	1343.5	1291.0	-52.5
TOT AL	0.0	0.0	0.0	302.5	302.5
AQ SO4	257.0	257.0	514.0	514.3	0.3
TOT F	0.0	0.0	0.0	0.0	0.0
SUM +	671.8	671.8	1343.5	1291.3	-52.2
SUM -	671.8	671.8	1343.5	1291.4	-52.2

BRENIG

HINDCAST
AND
FORECAST

30% Decrease
No Forest

---------- HINDCAST ----------

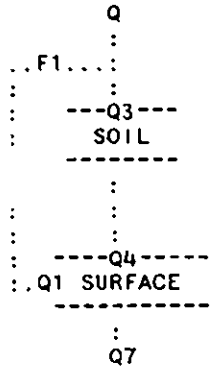
MAGIC VERSION 3.01 (27 OCT 87) RUN DATE = 06/01/89 RUN TIME = 15:37:34

CATCHMENT = Brenig Input

HINDCAST SIMULATION PERIOD = 140 YEARS MONTHLY VARIATION = N START YEAR = 1844 END YEAR = 1984

CONVERGENCE CRITERION = 1.00 MEQ/M3 INTEGRATION TIME STEP = 0.5000 YEARS

ROUTING OF FLOW THROUGH THE CATCHMENT IS:
F1 = % OF RUNOFF BYPASSING SOIL (OVERLAND FLOW)



	--%-	----------CM----------			
	F1	Q1	Q3	Q4	Q7
ANNUAL AVE	0.0	0.0	94.5	94.5	94.5

MEAN ANNUAL RUNOFF = 0.945 M/YR

MEAN ANNUAL PRECIPITATION = 1.448 M/YR

	---------- DEPOSITION PARAMETERS FOR YEAR 1984 ----------				---------- DEPOSITION PARAMETERS FOR YEAR 1844 ----------			
	PRECIP CONC (MEQ/M3)	DEPOSITION FACTOR	SEASALT CONC (MEQ/M3)	EXCESS CONC (MEQ/M3)	PRECIP CONC (MEQ/M3)	DEPOSITION FACTOR	SEASALT CONC (MEQ/M3)	EXCESS CONC (MEQ/M3)
PH	4.08				6.58			
CA	27.0	1.0	11.5	15.5	11.5	1.0	11.5	0.0
MG	61.0	1.0	58.8	2.2	58.8	1.0	58.8	0.0
NA	269.0	1.0	262.5	6.5	262.5	1.0	262.5	0.0
K	10.0	1.0	5.8	4.2	5.8	1.0	5.8	0.0
NH4	29.0	1.0	0.0	29.0	0.0	1.0	0.0	0.0
SO4	151.0	1.0	31.8	119.2	32.8	1.0	31.8	1.0
CL	306.0	1.0	306.0	0.0	306.0	1.0	306.0	0.0
NO3	22.0	1.0	0.0	22.0	0.0	1.0	0.0	0.0
F	0.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0

THE FOLLOWING CONDITIONS ARE SET FOR Brenig Input

CONSTANT	STREAM
RETENTION TIME (YR)	0.00
RELATIVE AREA (FRAC)	0.00
LOG10(KALOH3)	9.00
TOT ORG (MMOL/M3)	0.00
PK1 ORG	4.50
PK2 ORG	10.25
MEAN DEPTH (M)	0.00

CONSTANT	SOIL
SOIL DEPTH (M)	1.00
POROSITY (FRAC)	0.45
BULK DENSITY (KG/M3)	656.00
CEC (MEQ/KG)	102.00
SO4 HALFSAT (MEQ/M3)	1100.00
SO4 MAXCAP (MEQ/KG)	6.00
LOG10(KALOH3)	9.00
LOG10(SALCA)	8.79
LOG10(SALMG)	8.72
LOG10(SALNA)	2.63
LOG10(SALK)	-0.36
TOT ORG (MMOL/M3)	0.00
PK1 ORG	4.25
PK2 ORG	10.25
PORE VOLUME (M)	0.45
SOIL MASS (KG/M2)	656.00

	STREAM		SOIL	
	TEMP DEG C	PCO2 ATM	TEMP DEG C	PCO2 ATM
ANNUAL AVE	7.0	0.0003	7.0	0.0150

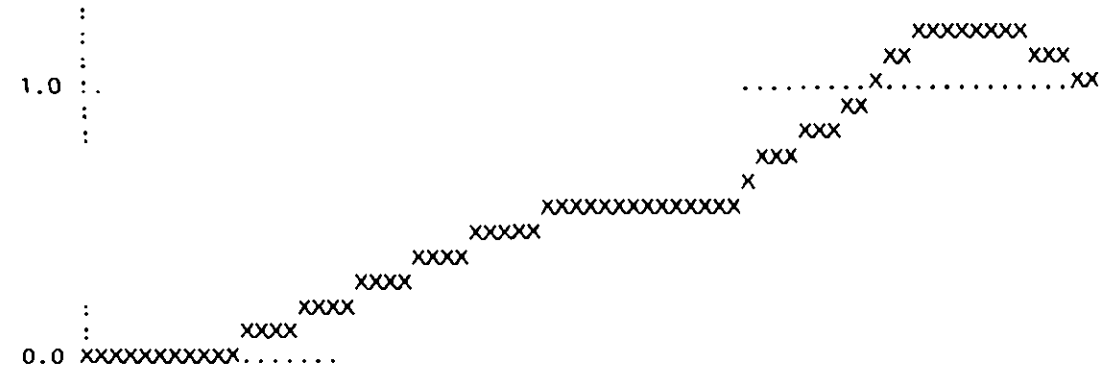
	SOIL			
	UPTAKE		WEATHERING	
	MEQ/M2/YR START YEAR	MEQ/M2/YR END YEAR	MEQ/M2/YR BACKGROUND	HYDROGEN ION POWER
CA	0.0	0.0	220.0	0.00
MG	0.0	0.0	105.0	0.00
NA	0.0	0.0	0.0	0.00
K	0.0	0.0	7.0	0.00
NH4	-50.0	-50.0	0.0	0.00
SO4	0.0	0.0	0.0	0.00
CL	0.0	0.0	0.0	0.00
NO3	-5.0	-5.0	0.0	0.00
F	0.0	0.0	0.0	0.00

	SOIL	
	TREATMENT	
	MEQ/M2/YR START YEAR	MEQ/M2/YR END YEAR
CA	0.0	0.0
MG	0.0	0.0
NA	0.0	0.0
K	0.0	0.0
NH4	0.0	0.0
SO4	0.0	0.0
CL	0.0	0.0
NO3	0.0	0.0
F	0.0	0.0

	SOIL	
	%UPTAKE	%TREATMENT
ANNUAL AVE	100.0	100.0

---------- HINDCAST SEQUENCES ----------

HINDCAST ATM WET-DEPOS. USED FOR: CA MG NA K NH4 SO4 NO3



SEQUENCE NAME: UK (WARREN SPRINGS)
START YEAR = 1844 END YEAR = 1984

BREAK	YEAR	FACTOR
1	1860	0.040
2	1912	0.580
3	1932	0.540
4	1940	0.750
5	1950	0.880
6	1961	1.170
7	1967	1.210

THERE IS NO CHANGE FOR ANY ION IN HINDCAST DRY-DEP FACTOR

THERE IS NO CHANGE FOR ANY ION IN HINDCAST UPTAKE IN SOIL

THERE IS NO CHANGE FOR ANY ION IN HINDCAST TREATMENT SOIL

---------- FORECAST ----------

MAGIC VERSION 3.01 (27 OCT 87) RUN DATE = 06/01/89 RUN TIME = 15:37:34

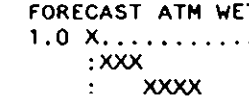
CATCHMENT = Brenig Input

FORECAST SIMULATION PERIOD = 50 YEARS MONTHLY VARIATION = N START YEAR = 1985 END YEAR = 2034

CONVERGENCE CRITERION = 1.00 MEQ/M3 INTEGRATION TIME STEP = 0.5000 YEARS

---------- FORECAST SEQUENCES ----------

FORECAST ATM WET-DEPOS. USED FOR: CA MG NA NH4 SO4 NO3



SEQUENCE NAME:
START YEAR = 1985 END YEAR = 2034

BREAK	YEAR	FACTOR

XXX
XXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

2000	0.700
2034	0.700

:
0.0 :.

THERE IS NO CHANGE FOR ANY ION IN FORECAST DRY-DEP FACTOR

THERE IS NO CHANGE FOR ANY ION IN FORECAST UPTAKE IN SOIL

THERE IS NO CHANGE FOR ANY ION IN FORECAST TREATMENT SOIL

1934 ANNUAL AVE Brenig Input

	PRECIP	STREAM	SOIL
	MEQ/M3		
CA	20.7	283.4	283.4
MG	60.1	221.2	221.2
NA	266.4	411.5	411.5
K	8.3	19.3	19.3
NH4	17.2	13.2	13.2
SO4	102.8	151.6	151.6
CL	306.0	468.9	468.9
NO3	13.0	19.0	19.0
F	0.0	0.0	0.0

	PRECIP	STREAM	SOIL
	MEQ/M3		
H	49.3	0.0	1.0
ALK	-49.3	309.7	308.9
SBC	355.4	935.3	935.3
SAA	421.9	639.5	639.5
TOT AL	0.0	29.9	0.9
AQ SO4	102.8	151.6	151.6
TOT F	0.0	0.0	0.0
SUM +	421.9	948.5	949.6
SUM -	421.9	949.2	949.5

	PRECIP	STREAM	SOIL
	MEQ/M3		
PH	4.3	7.7	6.0
AL3+	0.0	0.0	0.0
HCO3	0.0	298.6	309.8
CO3	0.0	1.0	0.0
HA-	0.0	0.0	0.0
A--	0.0	0.0	0.0

	SOIL
ES %	12.1
ECA %	11.6
EMG %	9.5
ENA %	4.5
EK %	2.1
BS %	27.7

	ATMOSPHERIC DEPOSITION			CATCHMENT			
	WET	DRY	TOTAL	WEATH	UPTAKE	OUTFLOW	NTFLUX
	MEQ/M2/YR			MEQ/M2/YR			
CA	30.0	0.0	30.0	220.0	0.0	267.8	237.8
MG	87.0	0.0	87.0	105.0	0.0	209.1	122.1
NA	385.7	0.0	385.7	0.0	0.0	388.8	3.1
K	12.0	0.0	12.0	7.0	0.0	18.2	6.2
NH4	24.9	0.0	24.9	0.0	12.4	12.5	-12.4
SO4	148.9	0.0	148.9	0.0	0.0	143.3	-5.6
CL	443.1	0.0	443.1	0.0	0.0	443.1	0.0
NO3	18.9	0.0	18.9	0.0	0.9	17.9	-0.9
F	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	TOTAL AMOUNT
	SOIL
	MEQ/M2
CA	7855.1
MG	6455.3
NA	3217.3
K	1417.1
NH4	5.9
SO4	546.6
CL	211.0
NO3	8.5
F	0.0

	ATMOSPHERIC DEPOSITION			CATCHMENT	
	WET	DRY	TOTAL	OUTFLOW	NTFLUX
	MEQ/M2/YR			MEQ/M2/YR	
H	71.4	0.0	71.4	0.0	-71.3
ALK	-71.4	0.0	-71.4	292.6	364.0
SBC	514.6	0.0	514.6	883.9	369.2
SAA	610.9	0.0	610.9	604.3	-6.5
TOT AL	0.0	0.0	0.0	28.3	28.3
AQ SO4	148.9	0.0	148.9	143.3	-5.6
TOT F	0.0	0.0	0.0	0.0	0.0
SUM +	610.9	0.0	610.9	896.4	285.5
SUM -	610.9	0.0	610.9	897.0	286.1

1939 ANNUAL AVE Brenig Input

	PRECIP	STREAM	SOIL
	MEQ/M3		
CA	22.7	289.0	289.0
MG	60.4	225.1	225.1
NA	267.2	415.1	415.1

	PRECIP	STREAM	SOIL
	MEQ/M3		
H	60.1	0.0	1.0
ALK	-60.1	303.7	304.1
SBC	359.1	948.8	948.8

	PRECIP	STREAM	SOIL
	MEQ/M3		
PH	4.2	7.7	6.0
AL3+	0.0	0.0	0.0
HCO3	0.0	292.9	305.0

	SOIL
ES %	13.3
ECA %	11.4
EMG %	9.4

K	8.8	19.6	19.6	SAA	440.3	661.4	661.4	CO3	0.0	1.0	0.0	ENA % 4.5
NH4	21.0	16.1	16.1	TOT AL	0.0	29.4	0.9	HA-	0.0	0.0	0.0	EK % 2.1
SO4	118.4	169.3	169.3	AQ SO4	118.4	169.3	169.3	A--	0.0	0.0	0.0	BS % 27.4
CL	306.0	468.9	468.9	TOT F	0.0	0.0	0.0					
NO3	15.9	23.2	23.2	SUM +	440.3	965.0	966.0					
F	0.0	0.0	0.0	SUM -	440.3	965.1	966.6					

	ATMOSPHERIC DEPOSITION			CATCHMENT				TOTAL AMOUNT		ATMOSPHERIC DEPOSITION			CATCHMENT	
	WET	DRY	TOTAL	WEATH	UPTAKE	OUTFLOW	NTFLUX	SOIL		WET	DRY	TOTAL	OUTFLOW	NTFLUX
	-----MEQ/M2/YR------			-----MEQ/M2/YR----------				------MEQ/M2------		-----MEQ/M2/YR------			--MEQ/M2/YR---	
CA	32.9	0.0	32.9	220.0	0.0	273.1	240.2	7762.8	H	87.1	0.0	87.1	0.0	-87.1
MG	87.4	0.0	87.4	105.0	0.0	212.7	125.3	6363.1	ALK	-87.1	0.0	-87.1	287.0	374.1
NA	386.9	0.0	386.9	0.0	0.0	392.3	5.4	3197.0	SBC	520.0	0.0	520.0	896.6	376.6
K	12.8	0.0	12.8	7.0	0.0	18.6	5.8	1422.5	SAA	637.5	0.0	637.5	625.0	-12.5
NH4	30.4	0.0	30.4	0.0	15.2	15.2	-15.2	7.2	TOT AL	0.0	0.0	0.0	27.7	27.7
SO4	171.4	0.0	171.4	0.0	0.0	160.0	-11.4	604.3	AQ SO4	171.4	0.0	171.4	160.0	-11.4
CL	443.1	0.0	443.1	0.0	0.0	443.1	0.0	211.0	TOT F	0.0	0.0	0.0	0.0	0.0
NO3	23.1	0.0	23.1	0.0	1.2	21.9	-1.1	10.4	SUM +	637.5	0.0	637.5	911.9	274.4
F	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	SUM -	637.5	0.0	637.5	912.1	274.5

1944 ANNUAL AVE Brenig Input

	PRECIP	STREAM	SOIL		PRECIP	STREAM	SOIL		PRECIP	STREAM	SOIL		SOIL
	--------MEQ/M3-------				--------MEQ/M3-------				--------MEQ/M3-------				-------
CA	23.9	295.1	295.1	H	66.6	0.0	1.0	PH	4.2	7.7	6.0	ES %	14.6
MG	60.6	229.1	229.1	ALK	-66.6	297.9	298.7	AL3+	0.0	0.0	0.0	ECA %	11.2
NA	267.7	417.9	417.9	SBC	361.4	962.2	962.2	HCO3	0.0	287.3	299.6	EMG %	9.2
K	9.2	20.1	20.1	SAA	451.2	682.0	682.0	CO3	0.0	0.9	0.0	ENA %	4.5
NH4	23.3	17.8	17.8	TOT AL	0.0	28.8	0.9	HA-	0.0	0.0	0.0	EK %	2.1
SO4	127.6	187.5	187.5	AQ SO4	127.6	187.5	187.5	A--	0.0	0.0	0.0	BS %	27.0
CL	306.0	468.9	468.9	TOT F	0.0	0.0	0.0						
NO3	17.6	25.7	25.7	SUM +	451.2	980.0	981.1						
F	0.0	0.0	0.0	SUM -	451.2	980.0	981.8						

	ATMOSPHERIC DEPOSITION			CATCHMENT				TOTAL AMOUNT		ATMOSPHERIC DEPOSITION			CATCHMENT	
	WET	DRY	TOTAL	WEATH	UPTAKE	OUTFLOW	NTFLUX	SOIL		WET	DRY	TOTAL	OUTFLOW	NTFLUX
	-----MEQ/M2/YR------			-----MEQ/M2/YR----------				------MEQ/M2------		-----MEQ/M2/YR------			--MEQ/M2/YR---	
CA	34.7	0.0	34.7	220.0	0.0	278.8	244.2	7651.4	H	96.5	0.0	96.5	0.0	-96.4
MG	87.7	0.0	87.7	105.0	0.0	216.5	128.8	6251.7	ALK	-96.5	0.0	-96.5	281.5	378.0
NA	387.7	0.0	387.7	0.0	0.0	394.9	7.3	3164.3	SBC	523.3	0.0	523.3	909.2	386.0
K	13.3	0.0	13.3	7.0	0.0	19.0	5.7	1429.2	SAA	653.4	0.0	653.4	644.5	-8.9
NH4	33.7	0.0	33.7	0.0	16.8	16.8	-16.8	8.0	TOT AL	0.0	0.0	0.0	27.2	27.2
SO4	184.8	0.0	184.8	0.0	0.0	177.1	-7.6	659.5	AQ SO4	184.8	0.0	184.8	177.1	-7.6
CL	443.1	0.0	443.1	0.0	0.0	443.1	0.0	211.0	TOT F	0.0	0.0	0.0	0.0	0.0
NO3	25.5	0.0	25.5	0.0	1.3	24.3	-1.3	11.6	SUM +	653.4	0.0	653.4	926.1	272.7
F	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	SUM -	653.4	0.0	653.4	926.1	272.7

1949 ANNUAL AVE Brenig Input

	PRECIP	STREAM	SOIL		PRECIP	STREAM	SOIL		PRECIP	STREAM	SOIL		SOIL
	--------MEQ/M3-------				--------MEQ/M3-------				--------MEQ/M3-------				-------
CA	24.9	299.6	299.6	H	72.0	0.0	1.1	PH	4.1	7.7	6.0	ES %	15.4
MG	60.7	231.8	231.8	ALK	-72.0	293.8	293.6	AL3+	0.0	0.0	0.0	ECA %	11.1

NA	268.1	419.2	419.2	SBC	363.2	971.1	971.1	HCO3	0.0	283.4	294.5
K	9.4	20.5	20.5	SAA	460.4	697.3	697.3	CO3	0.0	0.9	0.0
NH4	25.1	19.3	19.3	TOT AL	0.0	28.4	0.9	HA-	0.0	0.0	0.0
SO4	135.3	200.6	200.6	AQ SO4	135.3	200.6	200.6	A--	0.0	0.0	0.0
CL	306.0	468.9	468.9	TOT F	0.0	0.0	0.0				
NO3	19.1	27.8	27.8	SUM +	460.4	990.4	991.5				
F	0.0	0.0	0.0	SUM -	460.4	991.1	992.0				

	EMG %	9.0
	ENA %	4.4
	EK %	2.1
	BS %	26.6

	ATMOSPHERIC DEPOSITION			CATCHMENT				TOTAL AMOUNT
	WET	DRY	TOTAL	WEATH	UPTAKE	OUTFLOW	NTFLUX	SOIL
	-----MEQ/M2/YR------			-----MEQ/M2/YR----------				-------MEQ/M2-------
CA	36.1	0.0	36.1	220.0	0.0	283.1	247.0	7523.2
MG	87.9	0.0	87.9	105.0	0.0	219.0	131.1	6126.1
NA	388.3	0.0	388.3	0.0	0.0	396.2	7.9	3125.9
K	13.7	0.0	13.7	7.0	0.0	19.4	5.7	1435.7
NH4	36.4	0.0	36.4	0.0	18.2	18.2	-18.2	8.7
SO4	195.9	0.0	195.9	0.0	0.0	189.6	-6.3	699.1
CL	443.1	0.0	443.1	0.0	0.0	443.1	0.0	211.0
NO3	27.6	0.0	27.6	0.0	1.4	26.2	-1.4	12.5
F	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	ATMOSPHERIC DEPOSITION			CATCHMENT	
	WET	DRY	TOTAL	OUTFLOW	NTFLUX
	-----MEQ/M2/YR------			--MEQ/M2/YR---	
H	104.3	0.0	104.3	0.0	-104.2
ALK	-104.3	0.0	-104.3	277.7	381.9
SBC	525.9	0.0	525.9	917.7	391.8
SAA	666.6	0.0	666.6	658.9	-7.7
TOT AL	0.0	0.0	0.0	26.8	26.8
AQ SO4	195.9	0.0	195.9	189.6	-6.3
TOT F	0.0	0.0	0.0	0.0	0.0
SUM +	666.6	0.0	666.6	935.9	269.3
SUM -	666.6	0.0	666.6	936.6	270.0

1954 ANNUAL AVE Brenig Input

	PRECIP	STREAM	SOIL
	-------MEQ/M3-------		
CA	26.8	305.7	305.7
MG	61.0	235.6	235.6
NA	268.9	421.6	421.6
K	9.9	21.0	21.0
NH4	28.6	21.9	21.9
SO4	149.3	217.6	217.6
CL	306.0	468.9	468.9
NO3	21.7	31.6	31.6
F	0.0	0.0	0.0

	PRECIP	STREAM	SOIL
	-------MEQ/M3-------		
H	81.8	0.0	1.1
ALK	-81.8	288.2	287.6
SBC	366.6	983.9	983.9
SAA	477.0	718.1	718.1
TOT AL	0.0	27.9	0.9
AQ SO4	149.3	217.6	217.6
TOT F	0.0	0.0	0.0
SUM +	477.0	1005.8	1007.0
SUM -	477.0	1006.3	1006.9

	PRECIP	STREAM	SOIL
	-------MEQ/M3-------		
PH	4.1	7.7	6.0
AL3+	0.0	0.0	0.0
HCO3	0.0	278.0	288.6
CO3	0.0	0.9	0.0
HA-	0.0	0.0	0.0
A--	0.0	0.0	0.0

	SOIL

ES %	16.5
ECA %	10.8
EMG %	8.8
ENA %	4.3
EK %	2.1
BS %	26.1

	ATMOSPHERIC DEPOSITION			CATCHMENT				TOTAL AMOUNT
	WET	DRY	TOTAL	WEATH	UPTAKE	OUTFLOW	NTFLUX	SOIL
	-----MEQ/M2/YR------			-----MEQ/M2/YR----------				-------MEQ/M2-------
CA	38.8	0.0	38.8	220.0	0.0	288.9	250.1	7382.6
MG	88.3	0.0	88.3	105.0	0.0	222.7	134.4	5988.4
NA	389.4	0.0	389.4	0.0	0.0	398.4	9.0	3084.8
K	14.4	0.0	14.4	7.0	0.0	19.9	5.5	1443.0
NH4	41.4	0.0	41.4	0.0	20.7	20.7	-20.7	9.9
SO4	216.2	0.0	216.2	0.0	0.0	205.7	-10.5	750.9
CL	443.1	0.0	443.1	0.0	0.0	443.1	0.0	211.0
NO3	31.4	0.0	31.4	0.0	1.6	29.8	-1.6	14.2
F	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	ATMOSPHERIC DEPOSITION			CATCHMENT	
	WET	DRY	TOTAL	OUTFLOW	NTFLUX
	-----MEQ/M2/YR------			--MEQ/M2/YR---	
H	118.4	0.0	118.4	0.0	-118.4
ALK	-118.4	0.0	-118.4	272.3	390.8
SBC	530.8	0.0	530.8	929.8	399.0
SAA	690.6	0.0	690.6	678.6	-12.0
TOT AL	0.0	0.0	0.0	26.3	26.3
AQ SO4	216.2	0.0	216.2	205.7	-10.5
TOT F	0.0	0.0	0.0	0.0	0.0
SUM +	690.6	0.0	690.6	950.5	259.9
SUM -	690.6	0.0	690.6	951.0	260.3

1959 ANNUAL AVE Brenig Input

	PRECIP	STREAM	SOIL
	-------MEQ/M3-------		
CA	28.8	313.8	313.8

	PRECIP	STREAM	SOIL
	-------MEQ/M3-------		
H	92.7	0.0	1.1

	PRECIP	STREAM	SOIL
	-------MEQ/M3-------		
PH	4.0	7.6	6.0

	SOIL

ES %	17.9

MG	61.3	240.8	240.8	ALK	-92.7	281.1	280.5	AL3+	0.0	0.0	0.0	ECA %	10.6
NA	269.8	424.6	424.6	SBC	370.3	1001.0	1001.0	HCO3	0.0	271.1	281.5	EMG %	8.6
K	10.5	21.7	21.7	SAA	495.4	745.3	745.3	CO3	0.0	0.8	0.0	ENA %	4.3
NH4	32.4	24.8	24.8	TOT AL	0.0	27.2	0.9	HA-	0.0	0.0	0.0	EK %	2.2
SO4	164.9	240.6	240.6	AQ SO4	164.9	240.6	240.6	A--	0.0	0.0	0.0	BS %	25.6
CL	306.0	468.9	468.9	TOT F	0.0	0.0	0.0						
NO3	24.6	35.8	35.8	SUM +	495.4	1025.8	1027.0						
F	0.0	0.0	0.0	SUM -	495.4	1026.4	1027.0						

	ATMOSPHERIC DEPOSITION			CATCHMENT				TOTAL AMOUNT		ATMOSPHERIC DEPOSITION			CATCHMENT	
	WET	DRY	TOTAL	WEATH	UPTAKE	OUTFLOW	NTFLUX	SOIL		WET	DRY	TOTAL	OUTFLOW	NTFLUX
	-----MEQ/M2/YR------			-----MEQ/M2/YR----------				-------MEQ/M2-------		-----MEQ/M2/YR------			--MEQ/M2/YR---	
CA	41.7	0.0	41.7	220.0	0.0	296.6	254.9	7222.2	H	134.2	0.0	134.2	0.0	-134.2
MG	88.7	0.0	88.7	105.0	0.0	227.6	138.9	5830.8	ALK	-134.2	0.0	-134.2	265.6	399.9
NA	390.6	0.0	390.6	0.0	0.0	401.3	10.7	3036.4	SBC	536.2	0.0	536.2	945.9	409.7
K	15.2	0.0	15.2	7.0	0.0	20.5	5.3	1451.6	SAA	717.4	0.0	717.4	704.3	-13.1
NH4	46.9	0.0	46.9	0.0	23.5	23.5	-23.4	11.2	TOT AL	0.0	0.0	0.0	25.7	25.7
SO4	238.7	0.0	238.7	0.0	0.0	227.4	-11.4	817.7	AQ SO4	238.7	0.0	238.7	227.4	-11.4
CL	443.1	0.0	443.1	0.0	0.0	443.1	0.0	211.0	TOT F	0.0	0.0	0.0	0.0	0.0
NO3	35.6	0.0	35.6	0.0	1.8	33.8	-1.8	16.1	SUM +	717.4	0.0	717.4	969.4	252.0
F	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	SUM -	717.4	0.0	717.4	969.9	252.5

1964 ANNUAL AVE Brenig Input

	PRECIP	STREAM	SOIL		PRECIP	STREAM	SOIL		PRECIP	STREAM	SOIL		SOIL
	--------MEQ/M3-------				--------MEQ/M3-------				--------MEQ/M3-------				-------
CA	29.9	320.5	320.5	H	98.7	0.0	1.1	PH	4.0	7.6	5.9	ES %	19.1
MG	61.4	244.7	244.7	ALK	-98.7	273.3	273.5	AL3+	0.0	0.0	0.0	ECA %	10.3
NA	270.2	426.2	426.2	SBC	372.4	1013.8	1013.8	HCO3	0.0	263.7	274.6	EMG %	8.3
K	10.8	22.3	22.3	SAA	505.6	766.8	766.8	CO3	0.0	0.8	0.0	ENA %	4.2
NH4	34.5	26.4	26.4	TOT AL	0.0	26.4	0.9	HA-	0.0	0.0	0.0	EK %	2.2
SO4	173.5	259.8	259.8	AQ SO4	173.5	259.8	259.8	A--	0.0	0.0	0.0	BS %	24.9
CL	306.0	468.9	468.9	TOT F	0.0	0.0	0.0						
NO3	26.2	38.1	38.1	SUM +	505.6	1040.3	1041.5						
F	0.0	0.0	0.0	SUM -	505.6	1040.2	1041.6						

	ATMOSPHERIC DEPOSITION			CATCHMENT				TOTAL AMOUNT		ATMOSPHERIC DEPOSITION			CATCHMENT	
	WET	DRY	TOTAL	WEATH	UPTAKE	OUTFLOW	NTFLUX	SOIL		WET	DRY	TOTAL	OUTFLOW	NTFLUX
	-----MEQ/M2/YR------			-----MEQ/M2/YR----------				-------MEQ/M2-------		-----MEQ/M2/YR------			--MEQ/M2/YR---	
CA	43.4	0.0	43.4	220.0	0.0	302.9	259.5	7035.4	H	142.9	0.0	142.9	0.0	-142.9
MG	88.9	0.0	88.9	105.0	0.0	231.2	142.3	5651.1	ALK	-142.9	0.0	-142.9	258.3	401.3
NA	391.3	0.0	391.3	0.0	0.0	402.8	11.5	2979.8	SBC	539.2	0.0	539.2	958.0	418.8
K	15.6	0.0	15.6	7.0	0.0	21.1	5.4	1460.3	SAA	732.2	0.0	732.2	724.6	-7.5
NH4	50.0	0.0	50.0	0.0	25.0	25.0	-25.0	11.9	TOT AL	0.0	0.0	0.0	25.0	25.0
SO4	251.2	0.0	251.2	0.0	0.0	245.5	-5.6	870.5	AQ SO4	251.2	0.0	251.2	245.5	-5.6
CL	443.1	0.0	443.1	0.0	0.0	443.1	0.0	211.0	TOT F	0.0	0.0	0.0	0.0	0.0
NO3	37.9	0.0	37.9	0.0	1.9	36.0	-1.9	17.1	SUM +	732.2	0.0	732.2	983.0	250.9
F	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	SUM -	732.2	0.0	732.2	983.0	250.8

1969 ANNUAL AVE Brenig Input

	PRECIP	STREAM	SOIL		PRECIP	STREAM	SOIL		PRECIP	STREAM	SOIL		SOIL
	--------MEQ/M3-------				--------MEQ/M3-------				--------MEQ/M3-------				-------

CA	29.9	321.9	321.9	H	98.3	0.0	1.2	PH	4.0	7.6	5.9	ES %	19.5
MG	61.4	244.6	244.6	ALK	-98.3	268.7	268.2	AL3+	0.0	0.0	0.0	ECA %	10.0
NA	270.2	425.0	425.0	SBC	372.3	1014.4	1014.4	HCO3	0.0	259.2	269.2	EMG %	8.0
K	10.8	22.8	22.8	SAA	505.0	772.8	772.8	CO3	0.0	0.8	0.0	ENA %	4.1
NH4	34.4	26.3	26.3	TOT AL	0.0	26.0	0.9	HA-	0.0	0.0	0.0	EK %	2.2
SO4	172.9	265.9	265.9	AQ SO4	172.9	265.9	265.9	A--	0.0	0.0	0.0	BS %	24.3
CL	306.0	468.9	468.9	TOT F	0.0	0.0	0.0						
NO3	26.1	37.9	37.9	SUM +	505.0	1040.7	1042.0						
F	0.0	0.0	0.0	SUM -	505.0	1041.5	1042.2						

	ATMOSPHERIC DEPOSITION			CATCHMENT				TOTAL AMOUNT		ATMOSPHERIC DEPOSITION			CATCHMENT	
	WET	DRY	TOTAL	WEATH	UPTAKE	OUTFLOW	NTFLUX	SOIL		WET	DRY	TOTAL	OUTFLOW	NTFLUX
	-----MEQ/M2/YR------			-----MEQ/M2/YR----------				-------MEQ/M2-------		-----MEQ/M2/YR------			--MEQ/M2/YR---	
CA	43.3	0.0	43.3	220.0	0.0	304.2	261.0	6833.2	H	142.4	0.0	142.4	0.0	-142.4
MG	88.9	0.0	88.9	105.0	0.0	231.2	142.2	5463.3	ALK	-142.4	0.0	-142.4	253.9	396.3
NA	391.2	0.0	391.2	0.0	0.0	401.7	10.4	2924.5	SBC	539.0	0.0	539.0	958.6	419.5
K	15.6	0.0	15.6	7.0	0.0	21.6	5.9	1467.1	SAA	731.2	0.0	731.2	730.3	-0.9
NH4	49.8	0.0	49.8	0.0	24.9	24.9	-24.9	11.9	TOT AL	0.0	0.0	0.0	24.6	24.6
SO4	250.4	0.0	250.4	0.0	0.0	251.3	0.9	885.7	AQ SO4	250.4	0.0	250.4	251.3	0.9
CL	443.1	0.0	443.1	0.0	0.0	443.1	0.0	211.0	TOT F	0.0	0.0	0.0	0.0	0.0
NO3	37.8	0.0	37.8	0.0	1.9	35.9	-1.9	17.1	SUM +	731.2	0.0	731.2	983.5	252.3
F	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	SUM -	731.2	0.0	731.2	984.2	253.0

1974 ANNUAL AVE Brenig Input

	PRECIP	STREAM	SOIL		PRECIP	STREAM	SOIL		PRECIP	STREAM	SOIL		SOIL
	-------MEQ/M3-------				-------MEQ/M3-------				-------MEQ/M3-------				-------
CA	28.9	317.9	317.9	H	93.2	0.0	1.2	PH	4.0	7.6	5.9	ES %	19.0
MG	61.3	240.8	240.8	ALK	-93.2	265.5	264.7	AL3+	0.0	0.0	0.0	ECA %	9.7
NA	269.8	421.7	421.7	SBC	370.5	1003.5	1003.5	HCO3	0.0	256.1	265.8	EMG %	7.7
K	10.5	23.1	23.1	SAA	496.3	763.4	763.4	CO3	0.0	0.7	0.0	ENA %	4.0
NH4	32.6	25.0	25.0	TOT AL	0.0	25.7	0.9	HA-	0.0	0.0	0.0	EK %	2.2
SO4	165.6	258.5	258.5	AQ SO4	165.6	258.5	258.5	A--	0.0	0.0	0.0	BS %	23.7
CL	306.0	468.9	468.9	TOT F	0.0	0.0	0.0						
NO3	24.7	36.0	36.0	SUM +	496.3	1028.5	1029.8						
F	0.0	0.0	0.0	SUM -	496.3	1028.9	1029.4						

	ATMOSPHERIC DEPOSITION			CATCHMENT				TOTAL AMOUNT		ATMOSPHERIC DEPOSITION			CATCHMENT	
	WET	DRY	TOTAL	WEATH	UPTAKE	OUTFLOW	NTFLUX	SOIL		WET	DRY	TOTAL	OUTFLOW	NTFLUX
	-----MEQ/M2/YR------			-----MEQ/M2/YR----------				-------MEQ/M2-------		-----MEQ/M2/YR------			--MEQ/M2/YR---	
CA	41.9	0.0	41.9	220.0	0.0	300.5	258.6	6632.0	H	135.0	0.0	135.0	0.0	-135.0
MG	88.7	0.0	88.7	105.0	0.0	227.5	138.8	5284.6	ALK	-135.0	0.0	-135.0	250.9	385.9
NA	390.7	0.0	390.7	0.0	0.0	398.5	7.9	2878.2	SBC	536.5	0.0	536.5	948.3	411.8
K	15.2	0.0	15.2	7.0	0.0	21.8	6.6	1470.6	SAA	718.7	0.0	718.7	721.4	2.7
NH4	47.2	0.0	47.2	0.0	23.6	23.6	-23.6	11.2	TOT AL	0.0	0.0	0.0	24.3	24.3
SO4	239.8	0.0	239.8	0.0	0.0	244.3	4.5	864.1	AQ SO4	239.8	0.0	239.8	244.3	4.5
CL	443.1	0.0	443.1	0.0	0.0	443.1	0.0	211.0	TOT F	0.0	0.0	0.0	0.0	0.0
NO3	35.8	0.0	35.8	0.0	1.8	34.0	-1.8	16.2	SUM +	718.7	0.0	718.7	971.9	253.3
F	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	SUM -	718.7	0.0	718.7	972.3	253.6

1979 ANNUAL AVE Brenig Input

PRECIP STREAM SOIL PRECIP STREAM SOIL PRECIP STREAM SOIL SOIL

	MEQ/M3		
CA	28.0	312.0	312.0
MG	61.1	235.7	235.7
NA	269.4	418.6	418.6
K	10.3	23.2	23.2
NH4	30.8	23.6	23.6
SO4	158.3	248.0	248.0
CL	306.0	468.9	468.9
NO3	23.4	34.0	34.0
F	0.0	0.0	0.0

	MEQ/M3		
H	88.1	0.0	1.2
ALK	-88.1	262.2	262.4
SBC	368.8	989.6	989.6
SAA	487.7	750.9	750.9
TOT AL	0.0	25.4	0.9
AQ SO4	158.3	248.0	248.0
TOT F	0.0	0.0	0.0
SUM +	487.7	1013.2	1014.5
SUM -	487.7	1013.1	1014.6

	MEQ/M3		
PH	4.1	7.6	5.9
AL3+	0.0	0.0	0.0
HCO3	0.0	253.0	263.6
CO3	0.0	0.7	0.0
HA-	0.0	0.0	0.0
A--	0.0	0.0	0.0

ES %	18.4
ECA %	9.4
EMG %	7.5
ENA %	4.0
EK %	2.2
BS %	23.1

	ATMOSPHERIC DEPOSITION			CATCHMENT				TOTAL AMOUNT
	WET	DRY	TOTAL	WEATH	UPTAKE	OUTFLOW	NTFLUX	SOIL
	MEQ/M2/YR			MEQ/M2/YR				MEQ/M2
CA	40.5	0.0	40.5	220.0	0.0	294.9	254.4	6448.9
MG	88.5	0.0	88.5	105.0	0.0	222.8	134.2	5127.0
NA	390.1	0.0	390.1	0.0	0.0	395.6	5.5	2844.9
K	14.9	0.0	14.9	7.0	0.0	21.9	7.1	1471.3
NH4	44.6	0.0	44.6	0.0	22.3	22.3	-22.3	10.6
SO4	229.2	0.0	229.2	0.0	0.0	234.3	5.1	834.3
CL	443.1	0.0	443.1	0.0	0.0	443.1	0.0	211.0
NO3	33.8	0.0	33.8	0.0	1.7	32.1	-1.7	15.3
F	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	ATMOSPHERIC DEPOSITION			CATCHMENT	
	WET	DRY	TOTAL	OUTFLOW	NTFLUX
	MEQ/M2/YR			MEQ/M2/YR	
H	127.6	0.0	127.6	0.0	-127.6
ALK	-127.6	0.0	-127.6	247.8	375.4
SBC	534.0	0.0	534.0	935.2	401.2
SAA	706.1	0.0	706.1	709.6	3.4
TOT AL	0.0	0.0	0.0	24.0	24.0
AQ SO4	229.2	0.0	229.2	234.3	5.1
TOT F	0.0	0.0	0.0	0.0	0.0
SUM +	706.1	0.0	706.1	957.5	251.3
SUM -	706.1	0.0	706.1	957.4	251.3

1984 ANNUAL AVE Brenig Input

	PRECIP	STREAM	SOIL
	MEQ/M3		
CA	27.0	306.1	306.1
MG	61.0	231.0	231.0
NA	269.0	416.4	416.4
K	10.0	23.2	23.2
NH4	29.0	22.2	22.2
SO4	151.0	237.0	237.0
CL	306.0	468.9	468.9
NO3	22.0	32.0	32.0
F	0.0	0.0	0.0

	PRECIP	STREAM	SOIL
	MEQ/M3		
H	83.0	0.0	1.2
ALK	-83.0	261.3	260.6
SBC	367.0	976.7	976.7
SAA	479.0	737.9	737.9
TOT AL	0.0	25.3	0.9
AQ SO4	151.0	237.0	237.0
TOT F	0.0	0.0	0.0
SUM +	479.0	999.0	1000.2
SUM -	479.0	999.2	999.8

	PRECIP	STREAM	SOIL
	MEQ/M3		
PH	4.1	7.6	5.9
AL3+	0.0	0.0	0.0
HCO3	0.0	252.1	261.8
CO3	0.0	0.7	0.0
HA-	0.0	0.0	0.0
A--	0.0	0.0	0.0

	SOIL
ES %	17.7
ECA %	9.2
EMG %	7.3
ENA %	3.9
EK %	2.2
BS %	22.6

	ATMOSPHERIC DEPOSITION			CATCHMENT				TOTAL AMOUNT
	WET	DRY	TOTAL	WEATH	UPTAKE	OUTFLOW	NTFLUX	SOIL
	MEQ/M2/YR			MEQ/M2/YR				MEQ/M2
CA	39.1	0.0	39.1	220.0	0.0	289.3	250.2	6286.9
MG	88.3	0.0	88.3	105.0	0.0	218.3	129.9	4991.6
NA	389.5	0.0	389.5	0.0	0.0	393.5	4.0	2821.2
K	14.5	0.0	14.5	7.0	0.0	22.0	7.5	1469.7
NH4	42.0	0.0	42.0	0.0	21.0	21.0	-21.0	10.0
SO4	218.6	0.0	218.6	0.0	0.0	224.0	5.3	802.9
CL	443.1	0.0	443.1	0.0	0.0	443.1	0.0	211.0
NO3	31.9	0.0	31.9	0.0	1.6	30.3	-1.6	14.4
F	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	ATMOSPHERIC DEPOSITION			CATCHMENT	
	WET	DRY	TOTAL	OUTFLOW	NTFLUX
	MEQ/M2/YR			MEQ/M2/YR	
H	120.2	0.0	120.2	0.0	-120.2
ALK	-120.2	0.0	-120.2	246.9	367.1
SBC	531.4	0.0	531.4	923.0	391.6
SAA	693.6	0.0	693.6	697.3	3.7
TOT AL	0.0	0.0	0.0	23.9	23.9
AQ SO4	218.6	0.0	218.6	224.0	5.3
TOT F	0.0	0.0	0.0	0.0	0.0
SUM +	693.6	0.0	693.6	944.0	250.4
SUM -	693.6	0.0	693.6	944.2	250.6

1989 ANNUAL AVE Brenig Input

	PRECIP	STREAM	SOIL
	MEQ/M3		
CA	25.8	299.5	299.5
MG	60.8	225.8	225.8
NA	268.5	414.0	414.0
K	9.7	23.2	23.2
NH4	26.7	20.4	20.4
SO4	141.5	224.9	224.9
CL	306.0	468.9	468.9
NO3	20.2	29.4	29.4
F	0.0	0.0	0.0

	PRECIP	STREAM	SOIL
	MEQ/M3		
H	76.4	0.0	1.2
ALK	-76.4	260.3	259.7
SBC	364.7	962.5	962.5
SAA	467.8	723.2	723.2
TOT AL	0.0	25.2	0.9
AQ SO4	141.5	224.9	224.9
TOT F	0.0	0.0	0.0
SUM +	467.8	983.0	984.2
SUM -	467.8	983.6	984.2

	PRECIP	STREAM	SOIL
	MEQ/M3		
PH	4.1	7.6	5.9
AL3+	0.0	0.0	0.0
HCO3	0.0	251.2	260.8
CO3	0.0	0.7	0.0
HA-	0.0	0.0	0.0
A--	0.0	0.0	0.0

	SOIL
ES %	17.0
ECA %	9.0
EMG %	7.1
ENA %	3.9
EK %	2.2
BS %	22.2

	ATMOSPHERIC DEPOSITION			CATCHMENT				TOTAL AMOUNT
	WET	DRY	TOTAL	WEATH	UPTAKE	OUTFLOW	NTFLUX	SOIL
	MEQ/M2/YR			MEQ/M2/YR				MEQ/M2
CA	37.3	0.0	37.3	220.0	0.0	283.0	245.7	6146.4
MG	88.1	0.0	88.1	105.0	0.0	213.4	125.3	4877.9
NA	388.8	0.0	388.8	0.0	0.0	391.3	2.5	2804.8
K	14.0	0.0	14.0	7.0	0.0	21.9	7.9	1466.1
NH4	38.6	0.0	38.6	0.0	19.3	19.3	-19.3	9.2
SO4	205.0	0.0	205.0	0.0	0.0	212.5	7.6	767.2
CL	443.1	0.0	443.1	0.0	0.0	443.1	0.0	211.0
NO3	29.3	0.0	29.3	0.0	1.5	27.8	-1.5	13.3
F	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	ATMOSPHERIC DEPOSITION			CATCHMENT	
	WET	DRY	TOTAL	OUTFLOW	NTFLUX
	MEQ/M2/YR			MEQ/M2/YR	
H	110.6	0.0	110.6	0.0	-110.6
ALK	-110.6	0.0	-110.6	246.0	356.6
SBC	528.1	0.0	528.1	909.6	381.4
SAA	677.4	0.0	677.4	683.4	6.1
TOT AL	0.0	0.0	0.0	23.8	23.8
AQ SO4	205.0	0.0	205.0	212.5	7.6
TOT F	0.0	0.0	0.0	0.0	0.0
SUM +	677.4	0.0	677.4	928.9	251.5
SUM -	677.4	0.0	677.4	929.5	252.1

1994 ANNUAL AVE Brenig Input

	PRECIP	STREAM	SOIL
	MEQ/M3		
CA	24.2	291.3	291.3
MG	60.6	219.8	219.8
NA	267.8	411.1	411.1
K	9.2	23.0	23.0
NH4	23.8	18.2	18.2
SO4	129.7	208.0	208.0
CL	306.0	468.9	468.9
NO3	18.0	26.2	26.2
F	0.0	0.0	0.0

	PRECIP	STREAM	SOIL
	MEQ/M3		
H	68.1	0.0	1.2
ALK	-68.1	260.1	259.9
SBC	361.9	945.3	945.3
SAA	453.8	703.2	703.2
TOT AL	0.0	25.2	0.9
AQ SO4	129.7	208.0	208.0
TOT F	0.0	0.0	0.0
SUM +	453.8	963.5	964.8
SUM -	453.8	963.2	964.4

	PRECIP	STREAM	SOIL
	MEQ/M3		
PH	4.2	7.6	5.9
AL3+	0.0	0.0	0.0
HCO3	0.0	250.9	261.0
CO3	0.0	0.7	0.0
HA-	0.0	0.0	0.0
A--	0.0	0.0	0.0

	SOIL
ES %	15.9
ECA %	8.8
EMG %	7.0
ENA %	3.9
EK %	2.2
BS %	21.9

	ATMOSPHERIC DEPOSITION			CATCHMENT				TOTAL AMOUNT
	WET	DRY	TOTAL	WEATH	UPTAKE	OUTFLOW	NTFLUX	SOIL
	MEQ/M2/YR			MEQ/M2/YR				MEQ/M2
CA	35.1	0.0	35.1	220.0	0.0	275.3	240.2	6030.0
MG	87.7	0.0	87.7	105.0	0.0	207.8	120.0	4789.2
NA	387.8	0.0	387.8	0.0	0.0	388.5	0.7	2796.3
K	13.4	0.0	13.4	7.0	0.0	21.7	8.4	1459.9
NH4	34.4	0.0	34.4	0.0	17.2	17.2	-17.2	8.2
SO4	187.8	0.0	187.8	0.0	0.0	196.6	8.7	717.2
CL	443.1	0.0	443.1	0.0	0.0	443.1	0.0	211.0
NO3	26.1	0.0	26.1	0.0	1.3	24.8	-1.3	11.8
F	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	ATMOSPHERIC DEPOSITION			CATCHMENT	
	WET	DRY	TOTAL	OUTFLOW	NTFLUX
	MEQ/M2/YR			MEQ/M2/YR	
H	98.6	0.0	98.6	0.0	-98.6
ALK	-98.6	0.0	-98.6	245.8	344.4
SBC	524.0	0.0	524.0	893.3	369.3
SAA	657.1	0.0	657.1	664.5	7.4
TOT AL	0.0	0.0	0.0	23.8	23.8
AQ SO4	187.8	0.0	187.8	196.6	8.7
TOT F	0.0	0.0	0.0	0.0	0.0
SUM +	657.1	0.0	657.1	910.5	253.5
SUM -	657.1	0.0	657.1	910.3	253.2

1999 ANNUAL AVE Brenig Input

	PRECIP	STREAM	SOIL
	MEQ/M3		
CA	22.7	282.9	282.9
MG	60.4	213.8	213.8
NA	267.2	408.4	408.4
K	8.8	22.7	22.7
NH4	20.9	16.0	16.0
SO4	117.9	190.4	190.4
CL	306.0	468.9	468.9
NO3	15.8	23.0	23.0
F	0.0	0.0	0.0

	PRECIP	STREAM	SOIL
	MEQ/M3		
H	59.8	0.0	1.2
ALK	-59.8	261.3	261.0
SBC	359.0	927.8	927.8
SAA	439.8	682.3	682.3
TOT AL	0.0	25.3	0.9
AQ SO4	117.9	190.4	190.4
TOT F	0.0	0.0	0.0
SUM +	439.8	943.8	945.1
SUM -	439.8	943.6	944.6

	PRECIP	STREAM	SOIL
	MEQ/M3		
PH	4.2	7.6	5.9
AL3+	0.0	0.0	0.0
HCO3	0.0	252.1	262.1
CO3	0.0	0.7	0.0
HA-	0.0	0.0	0.0
A--	0.0	0.0	0.0

	SOIL
ES %	14.8
ECA %	8.7
EMG %	6.9
ENA %	3.9
EK %	2.2
BS %	21.7

	ATMOSPHERIC DEPOSITION			CATCHMENT			
	WET	DRY	TOTAL	WEATH	UPTAKE	OUTFLOW	NTFLUX
	MEQ/M2/YR			MEQ/M2/YR			
CA	32.8	0.0	32.8	220.0	0.0	267.3	234.5
MG	87.4	0.0	87.4	105.0	0.0	202.1	114.7
NA	386.9	0.0	386.9	0.0	0.0	385.9	-1.0
K	12.8	0.0	12.8	7.0	0.0	21.5	8.7
NH4	30.2	0.0	30.2	0.0	15.1	15.1	-15.1
SO4	170.7	0.0	170.7	0.0	0.0	179.9	9.2
CL	443.1	0.0	443.1	0.0	0.0	443.1	0.0
NO3	22.9	0.0	22.9	0.0	1.1	21.8	-1.2
F	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	TOTAL AMOUNT
	SOIL
	MEQ/M2
	5942.8
	4728.0
	2797.3
	1451.9
	7.2
	663.8
	211.0
	10.4
	0.0

	ATMOSPHERIC DEPOSITION			CATCHMENT	
	WET	DRY	TOTAL	OUTFLOW	NTFLUX
	MEQ/M2/YR			MEQ/M2/YR	
H	86.6	0.0	86.6	0.0	-86.6
ALK	-86.6	0.0	-86.6	246.9	333.6
SBC	519.9	0.0	519.9	876.8	356.9
SAA	636.8	0.0	636.8	644.7	8.0
TOT AL	0.0	0.0	0.0	23.9	23.9
AQ SO4	170.7	0.0	170.7	179.9	9.2
TOT F	0.0	0.0	0.0	0.0	0.0
SUM +	636.8	0.0	636.8	891.9	255.2
SUM -	636.8	0.0	636.8	891.7	254.9

2004 ANNUAL AVE Brenig Input

	PRECIP	STREAM	SOIL
	MEQ/M3		
CA	22.4	277.4	277.4
MG	60.3	210.1	210.1
NA	267.1	407.6	407.6
K	8.7	22.5	22.5
NH4	20.3	15.6	15.6
SO4	115.5	179.6	179.6
CL	306.0	468.9	468.9
NO3	15.4	22.4	22.4
F	0.0	0.0	0.0

	PRECIP	STREAM	SOIL
	MEQ/M3		
H	58.2	0.0	1.2
ALK	-58.2	262.6	261.8
SBC	358.5	917.5	917.5
SAA	436.9	670.9	670.9
TOT AL	0.0	25.4	0.9
AQ SO4	115.5	179.6	179.6
TOT F	0.0	0.0	0.0
SUM +	436.9	933.1	934.3
SUM -	436.9	933.6	934.0

	PRECIP	STREAM	SOIL
	MEQ/M3		
PH	4.2	7.6	5.9
AL3+	0.0	0.0	0.0
HCO3	0.0	253.4	262.9
CO3	0.0	0.7	0.0
HA-	0.0	0.0	0.0
A--	0.0	0.0	0.0

	SOIL
ES %	14.0
ECA %	8.6
EMG %	6.9
ENA %	3.9
EK %	2.1
BS %	21.5

	ATMOSPHERIC DEPOSITION			CATCHMENT			
	WET	DRY	TOTAL	WEATH	UPTAKE	OUTFLOW	NTFLUX
	MEQ/M2/YR			MEQ/M2/YR			
CA	32.4	0.0	32.4	220.0	0.0	262.1	229.7
MG	87.4	0.0	87.4	105.0	0.0	198.5	111.2
NA	386.7	0.0	386.7	0.0	0.0	385.2	-1.5
K	12.6	0.0	12.6	7.0	0.0	21.2	8.6
NH4	29.4	0.0	29.4	0.0	14.7	14.7	-14.7
SO4	167.3	0.0	167.3	0.0	0.0	169.7	2.4
CL	443.1	0.0	443.1	0.0	0.0	443.1	0.0
NO3	22.3	0.0	22.3	0.0	1.1	21.2	-1.1
F	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	TOTAL AMOUNT
	SOIL
	MEQ/M2
	5883.6
	4690.2
	2805.0
	1443.4
	7.0
	632.7
	211.0
	10.1
	0.0

	ATMOSPHERIC DEPOSITION			CATCHMENT	
	WET	DRY	TOTAL	OUTFLOW	NTFLUX
	MEQ/M2/YR			MEQ/M2/YR	
H	84.2	0.0	84.2	0.0	-84.2
ALK	-84.2	0.0	-84.2	248.2	332.4
SBC	519.1	0.0	519.1	867.0	348.0
SAA	632.7	0.0	632.7	634.0	1.3
TOT AL	0.0	0.0	0.0	24.0	24.0
AQ SO4	167.3	0.0	167.3	169.7	2.4
TOT F	0.0	0.0	0.0	0.0	0.0
SUM +	632.7	0.0	632.7	881.8	249.1
SUM -	632.7	0.0	632.7	882.2	249.5

2009 ANNUAL AVE Brenig Input

	PRECIP	STREAM	SOIL
	MEQ/M3		
CA	22.4	275.2	275.2
MG	60.3	208.7	208.7
NA	267.1	408.4	408.4
K	8.7	22.3	22.3
NH4	20.3	15.6	15.6
SO4	115.5	177.5	177.5
CL	306.0	468.9	468.9
NO3	15.4	22.4	22.4
F	0.0	0.0	0.0

	PRECIP	STREAM	SOIL
	MEQ/M3		
H	58.2	0.0	1.2
ALK	-58.2	261.1	261.7
SBC	358.5	914.6	914.6
SAA	436.9	668.8	668.8
TOT AL	0.0	25.3	0.9
AQ SO4	115.5	177.5	177.5
TOT F	0.0	0.0	0.0
SUM +	436.9	930.2	931.5
SUM -	436.9	929.9	931.8

	PRECIP	STREAM	SOIL
	MEQ/M3		
PH	4.2	7.6	5.9
AL3+	0.0	0.0	0.0
HCO3	0.0	251.9	262.8
CO3	0.0	0.7	0.0
HA-	0.0	0.0	0.0
A--	0.0	0.0	0.0

	SOIL
ES %	13.9
ECA %	8.5
EMG %	6.8
ENA %	3.9
EK %	2.1
BS %	21.4

	ATMOSPHERIC DEPOSITION			CATCHMENT			
	WET	DRY	TOTAL	WEATH	UPTAKE	OUTFLOW	NTFLUX
	MEQ/M2/YR			MEQ/M2/YR			
CA	32.4	0.0	32.4	220.0	0.0	260.0	227.7
MG	87.4	0.0	87.4	105.0	0.0	197.2	109.9
NA	386.7	0.0	386.7	0.0	0.0	385.9	-0.8
K	12.6	0.0	12.6	7.0	0.0	21.1	8.5
NH4	29.4	0.0	29.4	0.0	14.7	14.7	-14.7
SO4	167.3	0.0	167.3	0.0	0.0	167.8	0.5
CL	443.1	0.0	443.1	0.0	0.0	443.1	0.0
NO3	22.3	0.0	22.3	0.0	1.1	21.2	-1.1
F	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	TOTAL AMOUNT
	SOIL
	MEQ/M2
	5840.8
	4663.0
	2811.0
	1435.7
	7.0
	626.8
	211.0
	10.1
	0.0

	ATMOSPHERIC DEPOSITION			CATCHMENT	
	WET	DRY	TOTAL	OUTFLOW	NTFLUX
	MEQ/M2/YR			MEQ/M2/YR	
H	84.2	0.0	84.2	0.0	-84.2
ALK	-84.2	0.0	-84.2	246.7	330.9
SBC	519.1	0.0	519.1	864.3	345.3
SAA	632.7	0.0	632.7	632.0	-0.6
TOT AL	0.0	0.0	0.0	23.9	23.9
AQ SO4	167.3	0.0	167.3	167.8	0.5
TOT F	0.0	0.0	0.0	0.0	0.0
SUM +	632.7	0.0	632.7	879.0	246.3
SUM -	632.7	0.0	632.7	878.8	246.1

2014 ANNUAL AVE Brenig Input

	PRECIP	STREAM	SOIL
	MEQ/M3		
CA	22.4	274.2	274.2
MG	60.3	208.2	208.2
NA	267.1	409.2	409.2
K	8.7	22.3	22.3
NH4	20.3	15.6	15.6
SO4	115.5	177.1	177.1
CL	306.0	468.9	468.9
NO3	15.4	22.4	22.4
F	0.0	0.0	0.0

	PRECIP	STREAM	SOIL
	MEQ/M3		
H	58.2	0.0	1.2
ALK	-58.2	261.0	261.2
SBC	358.5	913.9	913.9
SAA	436.9	668.4	668.4
TOT AL	0.0	25.3	0.9
AQ SO4	115.5	177.1	177.1
TOT F	0.0	0.0	0.0
SUM +	436.9	929.5	930.8
SUM -	436.9	929.5	930.9

	PRECIP	STREAM	SOIL
	MEQ/M3		
PH	4.2	7.6	5.9
AL3+	0.0	0.0	0.0
HCO3	0.0	251.9	262.3
CO3	0.0	0.7	0.0
HA-	0.0	0.0	0.0
A--	0.0	0.0	0.0

	SOIL
ES %	13.9
ECA %	8.5
EMG %	6.8
ENA %	3.9
EK %	2.1
BS %	21.3

	ATMOSPHERIC DEPOSITION			CATCHMENT			
	WET	DRY	TOTAL	WEATH	UPTAKE	OUTFLOW	NTFLUX
	MEQ/M2/YR			MEQ/M2/YR			
CA	32.4	0.0	32.4	220.0	0.0	259.1	226.8
MG	87.4	0.0	87.4	105.0	0.0	196.8	109.4
NA	386.7	0.0	386.7	0.0	0.0	386.7	0.0
K	12.6	0.0	12.6	7.0	0.0	21.0	8.4
NH4	29.4	0.0	29.4	0.0	14.7	14.7	-14.7
SO4	167.3	0.0	167.3	0.0	0.0	167.4	0.1
CL	443.1	0.0	443.1	0.0	0.0	443.1	0.0
NO3	22.3	0.0	22.3	0.0	1.1	21.2	-1.1
F	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	TOTAL AMOUNT
	SOIL
	MEQ/M2
	5805.1
	4640.0
	2813.0
	1428.5
	7.0
	625.6
	211.0
	10.1
	0.0

	ATMOSPHERIC DEPOSITION			CATCHMENT	
	WET	DRY	TOTAL	OUTFLOW	NTFLUX
	MEQ/M2/YR			MEQ/M2/YR	
H	84.2	0.0	84.2	0.0	-84.2
ALK	-84.2	0.0	-84.2	246.7	330.9
SBC	519.1	0.0	519.1	863.6	344.6
SAA	632.7	0.0	632.7	631.7	-1.0
TOT AL	0.0	0.0	0.0	23.9	23.9
AQ SO4	167.3	0.0	167.3	167.4	0.1
TOT F	0.0	0.0	0.0	0.0	0.0
SUM +	632.7	0.0	632.7	878.4	245.7
SUM -	632.7	0.0	632.7	878.4	245.7

2019 ANNUAL AVE Brenig Input

	PRECIP	STREAM	SOIL
	MEQ/M3		
CA	22.4	273.4	273.4
MG	60.3	207.8	207.8
NA	267.1	409.6	409.6
K	8.7	22.2	22.2
NH4	20.3	15.6	15.6
SO4	115.5	177.1	177.1
CL	306.0	468.9	468.9
NO3	15.4	22.4	22.4
F	0.0	0.0	0.0

	PRECIP	STREAM	SOIL
	MEQ/M3		
H	58.2	0.0	1.2
ALK	-58.2	260.3	260.7
SBC	358.5	913.1	913.1
SAA	436.9	668.4	668.4
TOT AL	0.0	25.2	0.9
AQ SO4	115.5	177.1	177.1
TOT F	0.0	0.0	0.0
SUM +	436.9	928.7	929.9
SUM -	436.9	928.7	930.3

	PRECIP	STREAM	SOIL
	MEQ/M3		
PH	4.2	7.6	5.9
AL3+	0.0	0.0	0.0
HCO3	0.0	251.1	261.8
CO3	0.0	0.7	0.0
HA-	0.0	0.0	0.0
A--	0.0	0.0	0.0

	SOIL
ES %	13.9
ECA %	8.4
EMG %	6.8
ENA %	3.9
EK %	2.1
BS %	21.2

	ATMOSPHERIC DEPOSITION			CATCHMENT			
	WET	DRY	TOTAL	WEATH	UPTAKE	OUTFLOW	NTFLUX
	MEQ/M2/YR			MEQ/M2/YR			
CA	32.4	0.0	32.4	220.0	0.0	258.4	226.0
MG	87.4	0.0	87.4	105.0	0.0	196.4	109.1
NA	386.7	0.0	386.7	0.0	0.0	387.1	0.4
K	12.6	0.0	12.6	7.0	0.0	21.0	8.3
NH4	29.4	0.0	29.4	0.0	14.7	14.7	-14.7
SO4	167.3	0.0	167.3	0.0	0.0	167.3	0.0
CL	443.1	0.0	443.1	0.0	0.0	443.1	0.0
NO3	22.3	0.0	22.3	0.0	1.1	21.2	-1.1
F	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	TOTAL AMOUNT
	SOIL
	MEQ/M2
CA	5773.5
MG	4619.0
NA	2812.2
K	1421.7
NH4	7.0
SO4	625.4
CL	211.0
NO3	10.1
F	0.0

	ATMOSPHERIC DEPOSITION			CATCHMENT	
	WET	DRY	TOTAL	OUTFLOW	NTFLUX
	MEQ/M2/YR			MEQ/M2/YR	
H	84.2	0.0	84.2	0.0	-84.2
ALK	-84.2	0.0	-84.2	246.0	330.2
SBC	519.1	0.0	519.1	862.9	343.8
SAA	632.7	0.0	632.7	631.6	-1.1
TOT AL	0.0	0.0	0.0	23.8	23.8
AQ SO4	167.3	0.0	167.3	167.3	0.0
TOT F	0.0	0.0	0.0	0.0	0.0
SUM +	632.7	0.0	632.7	877.6	244.9
SUM -	632.7	0.0	632.7	877.6	244.9

2024 ANNUAL AVE Brenig Input

	PRECIP	STREAM	SOIL
	MEQ/M3		
CA	22.4	272.8	272.8
MG	60.3	207.5	207.5
NA	267.1	409.8	409.8
K	8.7	22.1	22.1
NH4	20.3	15.6	15.6
SO4	115.5	177.1	177.1
CL	306.0	468.9	468.9
NO3	15.4	22.4	22.4
F	0.0	0.0	0.0

	PRECIP	STREAM	SOIL
	MEQ/M3		
H	58.2	0.0	1.2
ALK	-58.2	259.5	260.2
SBC	358.5	912.2	912.2
SAA	436.9	668.3	668.3
TOT AL	0.0	25.1	0.9
AQ SO4	115.5	177.1	177.1
TOT F	0.0	0.0	0.0
SUM +	436.9	927.8	929.1
SUM -	436.9	927.9	929.9

	PRECIP	STREAM	SOIL
	MEQ/M3		
PH	4.2	7.6	5.9
AL3+	0.0	0.0	0.0
HCO3	0.0	250.4	261.3
CO3	0.0	0.7	0.0
HA-	0.0	0.0	0.0
A--	0.0	0.0	0.0

	SOIL
ES %	13.9
ECA %	8.4
EMG %	6.7
ENA %	3.9
EK %	2.1
BS %	21.2

	ATMOSPHERIC DEPOSITION			CATCHMENT			
	WET	DRY	TOTAL	WEATH	UPTAKE	OUTFLOW	NTFLUX
	MEQ/M2/YR			MEQ/M2/YR			
CA	32.4	0.0	32.4	220.0	0.0	257.8	225.4
MG	87.4	0.0	87.4	105.0	0.0	196.1	108.8
NA	386.7	0.0	386.7	0.0	0.0	387.3	0.5
K	12.6	0.0	12.6	7.0	0.0	20.9	8.3
NH4	29.4	0.0	29.4	0.0	14.7	14.7	-14.7
SO4	167.3	0.0	167.3	0.0	0.0	167.3	0.0
CL	443.1	0.0	443.1	0.0	0.0	443.1	0.0
NO3	22.3	0.0	22.3	0.0	1.1	21.2	-1.1
F	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	TOTAL AMOUNT
	SOIL
	MEQ/M2
CA	5744.7
MG	4599.2
NA	2809.6
K	1415.2
NH4	7.0
SO4	625.4
CL	211.0
NO3	10.1
F	0.0

	ATMOSPHERIC DEPOSITION			CATCHMENT	
	WET	DRY	TOTAL	OUTFLOW	NTFLUX
	MEQ/M2/YR			MEQ/M2/YR	
H	84.2	0.0	84.2	0.0	-84.2
ALK	-84.2	0.0	-84.2	245.2	329.5
SBC	519.1	0.0	519.1	862.1	343.0
SAA	632.7	0.0	632.7	631.6	-1.1
TOT AL	0.0	0.0	0.0	23.7	23.7
AQ SO4	167.3	0.0	167.3	167.3	0.0
TOT F	0.0	0.0	0.0	0.0	0.0
SUM +	632.7	0.0	632.7	876.8	244.1
SUM -	632.7	0.0	632.7	876.9	244.2

2029 ANNUAL AVE Brenig Input

	PRECIP	STREAM	SOIL
	MEQ/M3		
CA	22.4	272.5	272.5
MG	60.3	207.4	207.4
NA	267.1	410.0	410.0
K	8.7	22.1	22.1
NH4	20.3	15.6	15.6
SO4	115.5	177.1	177.1
CL	306.0	468.9	468.9
NO3	15.4	22.4	22.4
F	0.0	0.0	0.0

	PRECIP	STREAM	SOIL
	MEQ/M3		
H	58.2	0.0	1.2
ALK	-58.2	259.5	259.6
SBC	358.5	911.9	911.9
SAA	436.9	668.3	668.3
TOT AL	0.0	25.1	0.9
AQ SO4	115.5	177.1	177.1
TOT F	0.0	0.0	0.0
SUM +	436.9	927.5	928.8
SUM -	436.9	927.9	929.3

	PRECIP	STREAM	SOIL
	MEQ/M3		
PH	4.2	7.6	5.9
AL3+	0.0	0.0	0.0
HCO3	0.0	250.4	260.7
CO3	0.0	0.7	0.0
HA-	0.0	0.0	0.0
A--	0.0	0.0	0.0

	SOIL
ES %	13.9
ECA %	8.4
EMG %	6.7
ENA %	3.9
EK %	2.1
BS %	21.1

	ATMOSPHERIC DEPOSITION			CATCHMENT				TOTAL AMOUNT
	WET	DRY	TOTAL	WEATH	UPTAKE	OUTFLOW	NTFLUX	SOIL
	MEQ/M2/YR			MEQ/M2/YR				MEQ/M2
CA	32.4	0.0	32.4	220.0	0.0	257.5	225.1	5717.9
MG	87.4	0.0	87.4	105.0	0.0	196.0	108.6	4580.5
NA	386.7	0.0	386.7	0.0	0.0	387.4	0.7	2806.1
K	12.6	0.0	12.6	7.0	0.0	20.8	8.2	1409.0
NH4	29.4	0.0	29.4	0.0	14.7	14.7	-14.7	7.0
SO4	167.3	0.0	167.3	0.0	0.0	167.3	0.0	625.4
CL	443.1	0.0	443.1	0.0	0.0	443.1	0.0	211.0
NO3	22.3	0.0	22.3	0.0	1.1	21.2	-1.1	10.1
F	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	ATMOSPHERIC DEPOSITION			CATCHMENT	
	WET	DRY	TOTAL	OUTFLOW	NTFLUX
	MEQ/M2/YR			MEQ/M2/YR	
H	84.2	0.0	84.2	0.0	-84.2
ALK	-84.2	0.0	-84.2	245.2	329.5
SBC	519.1	0.0	519.1	861.8	342.7
SAA	632.7	0.0	632.7	631.6	-1.1
TOT AL	0.0	0.0	0.0	23.7	23.7
AQ SO4	167.3	0.0	167.3	167.3	0.0
TOT F	0.0	0.0	0.0	0.0	0.0
SUM +	632.7	0.0	632.7	876.5	243.8
SUM -	632.7	0.0	632.7	876.9	244.2

2034 ANNUAL AVE Brenig Input

	PRECIP	STREAM	SOIL
	MEQ/M3		
CA	22.4	272.2	272.2
MG	60.3	207.3	207.3
NA	267.1	410.1	410.1
K	8.7	22.0	22.0
NH4	20.3	15.6	15.6
SO4	115.5	177.1	177.0
CL	306.0	468.9	468.9
NO3	15.4	22.4	22.4
F	0.0	0.0	0.0

	PRECIP	STREAM	SOIL
	MEQ/M3		
H	58.2	0.0	1.2
ALK	-58.2	259.5	259.1
SBC	358.5	911.7	911.7
SAA	436.9	668.3	668.3
TOT AL	0.0	25.1	0.9
AQ SO4	115.5	177.1	177.1
TOT F	0.0	0.0	0.0
SUM +	436.9	927.3	928.5
SUM -	436.9	927.9	928.7

	PRECIP	STREAM	SOIL
	MEQ/M3		
PH	4.2	7.6	5.9
AL3+	0.0	0.0	0.0
HCO3	0.0	250.4	260.2
CO3	0.0	0.7	0.0
HA-	0.0	0.0	0.0
A--	0.0	0.0	0.0

	SOIL
ES %	13.9
ECA %	8.3
EMG %	6.7
ENA %	3.9
EK %	2.1
BS %	21.0

	ATMOSPHERIC DEPOSITION			CATCHMENT				TOTAL AMOUNT
	WET	DRY	TOTAL	WEATH	UPTAKE	OUTFLOW	NTFLUX	SOIL
	MEQ/M2/YR			MEQ/M2/YR				MEQ/M2
CA	32.4	0.0	32.4	220.0	0.0	257.3	224.9	5693.1
MG	87.4	0.0	87.4	105.0	0.0	195.9	108.6	4562.6
NA	386.7	0.0	386.7	0.0	0.0	387.6	0.8	2802.3
K	12.6	0.0	12.6	7.0	0.0	20.8	8.2	1403.1
NH4	29.4	0.0	29.4	0.0	14.7	14.7	-14.7	7.0
SO4	167.3	0.0	167.3	0.0	0.0	167.3	0.0	625.4
CL	443.1	0.0	443.1	0.0	0.0	443.1	0.0	211.0
NO3	22.3	0.0	22.3	0.0	1.1	21.2	-1.1	10.1

	ATMOSPHERIC DEPOSITION			CATCHMENT	
	WET	DRY	TOTAL	OUTFLOW	NTFLUX
	MEQ/M2/YR			MEQ/M2/YR	
H	84.2	0.0	84.2	0.0	-84.2
ALK	-84.2	0.0	-84.2	245.2	329.5
SBC	519.1	0.0	519.1	861.5	342.5
SAA	632.7	0.0	632.7	631.6	-1.1
TOT AL	0.0	0.0	0.0	23.7	23.7
AQ SO4	167.3	0.0	167.3	167.3	0.0
TOT F	0.0	0.0	0.0	0.0	0.0
SUM +	632.7	0.0	632.7	876.3	243.6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