April 14, 1977

PHASE II, UC, Mr. J. Meyer

In UC-Exhibits 4,5, and 6 of the Phase I hearing, reference was made to a ratio of soil water salinity and irrigation water quality by Mr. Meyer and others. Further, in the Water Quality Workshop (introduction to Phase II), March 23, 1977, the State Board staff referred to a ratio between soil water and irrigation water quality. A commonly accepted ratio of 3:1 soil water to irrigation water quality is shown in UC exhibits 1 and 2 for mineral soils and surface methods of irrigation.

In regard to organic soils, mainly in the Central Delta, Mr. Meyer has prepared from exhibits 4,5, and 6, the attached six graphs showing six measured ratios of soil water (ECsw) to irrigation water quality (ECw). This data was obtained from research trials conducted on peat soils in the Delta from 1973 thru 1976. The peat soils were field sampled at the beginning and end of each season and salinity was determined in the laboratory and reported as ECe.

The ECe salinities are shown in the bar graphs along with the ratios of soil water salinity (ECsw) to applied water salinity (ECw). The variance in the ratios of ECsw to ECw seems to depend upon soil management, frequency and type of leaching, and the plants' source of water. Range of ratios is from 3:1 to as high as 30:1.

The immediate source of plant moisture in the sub-irrigated peats is both from groundwater (water table water) and incoming river water and the ratios given do not necessarily imply a direct relationship between water applied and salinity of peat.

Graph 1 shows potatoes on peat soils that have been well leached in the winter each year and reflect a measured ratio of 4:1 to 10:1. Graph 2 shows asparagus, usually grown from 4 to 6 years, with only winter flooding. It has a summer water table of 30 inches to 50 inches in depth. The ratio increased gradually from 12:1 to 30:1.

Graphs 3 to 5 show corn grown on peat soils with varying incoming water quality and varying management practices.

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The Rindge Tract (graph 3), with only winter flooding, has a ratio of 5:1 to 11:1. Terminous (graph 4), with excellent quality water, had a ratio of 4:1 to 26:1. On Sherman Island (graph 5), careful, expensive winter leaching resulted in a ratio of 3:1, but indications are that the soil will return to a ratio of 12:1 to 20:1, as was found in 1974, without frequent, well-managed winter leaching.

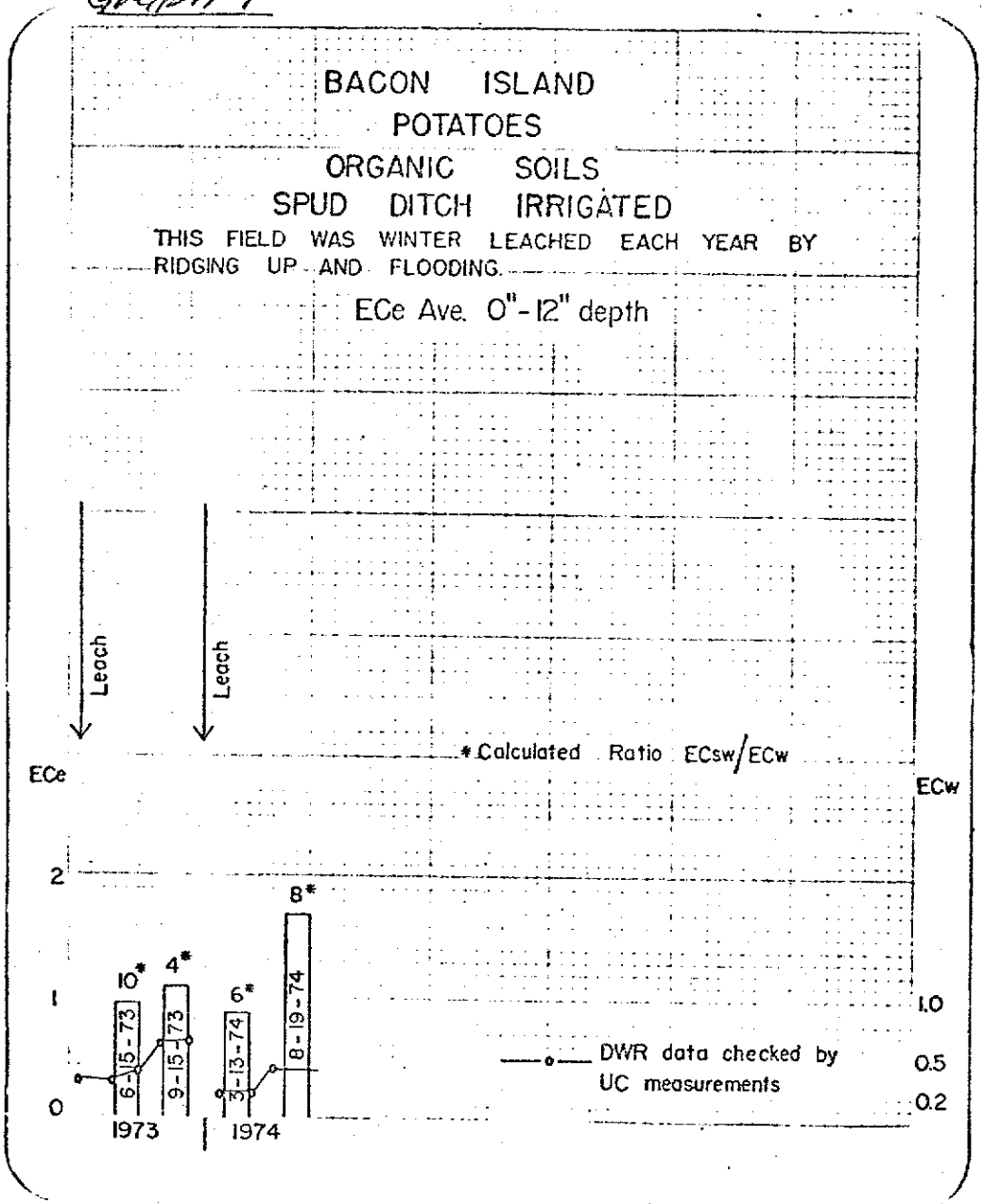
The Staten Island (graph 6) alfalfa, under sprinkling and excellent quality irrigation water, shows a moderately high ratio of 4:1 to 5:1.

In summary, the measured ratios of soil water to irrigation water indicate, in the peat soils with high water tables, higher ratios than mineral soils; and fairly high even with irrigation water of very low salinity content.

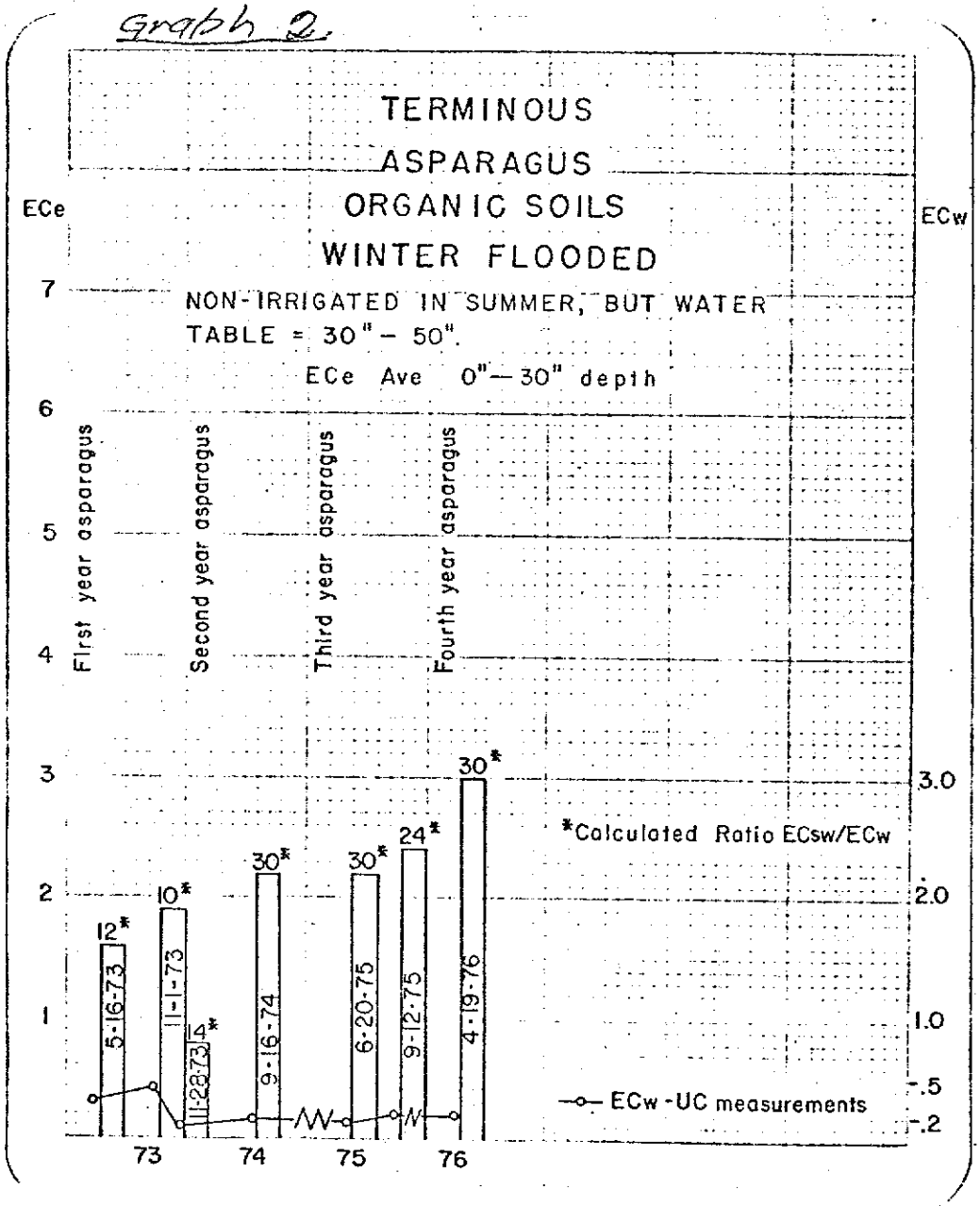
Under the best known management and good quality water, ratios of 4:1 to 6:1 are commonly found in peat soils.

Phase II - J. Meyer

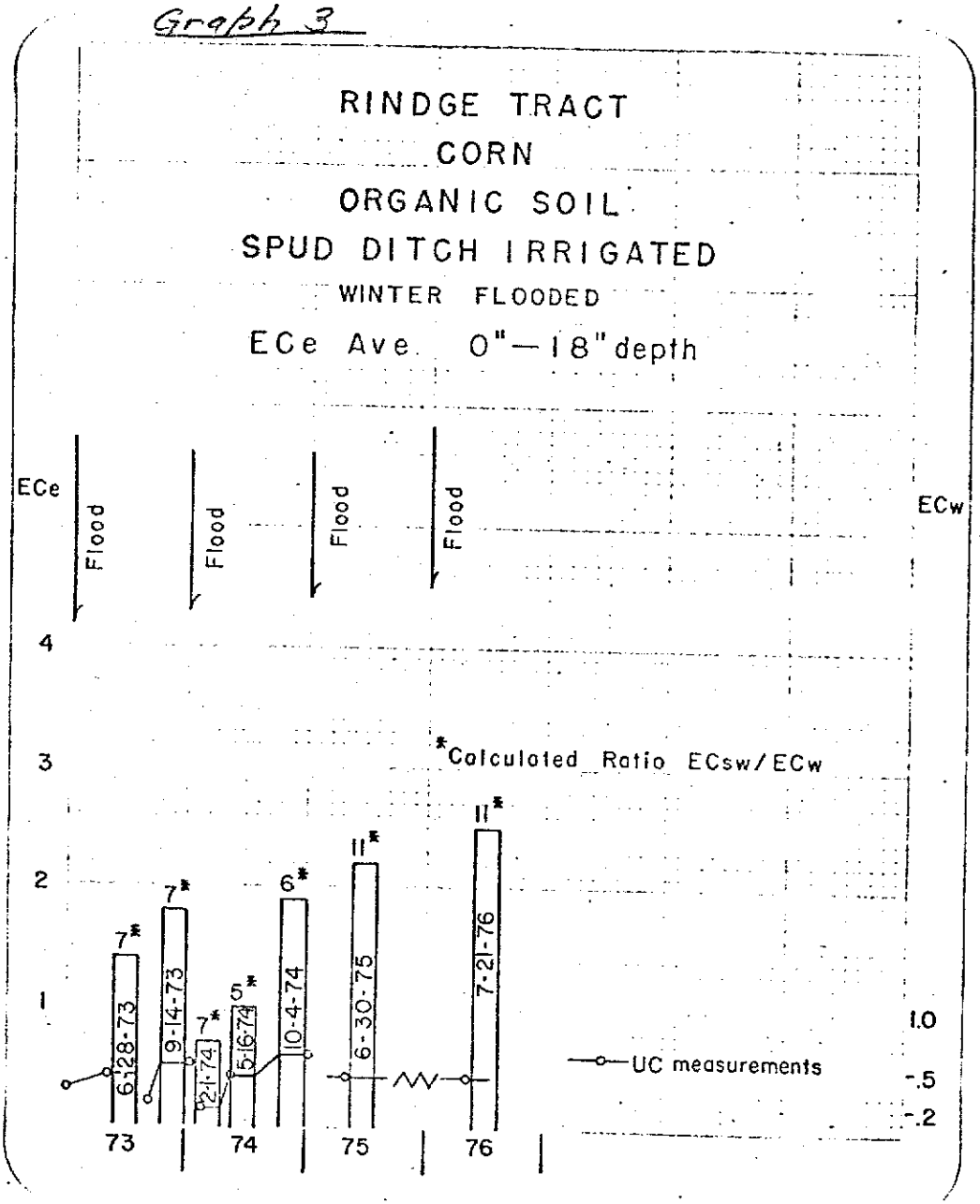
Graph 1



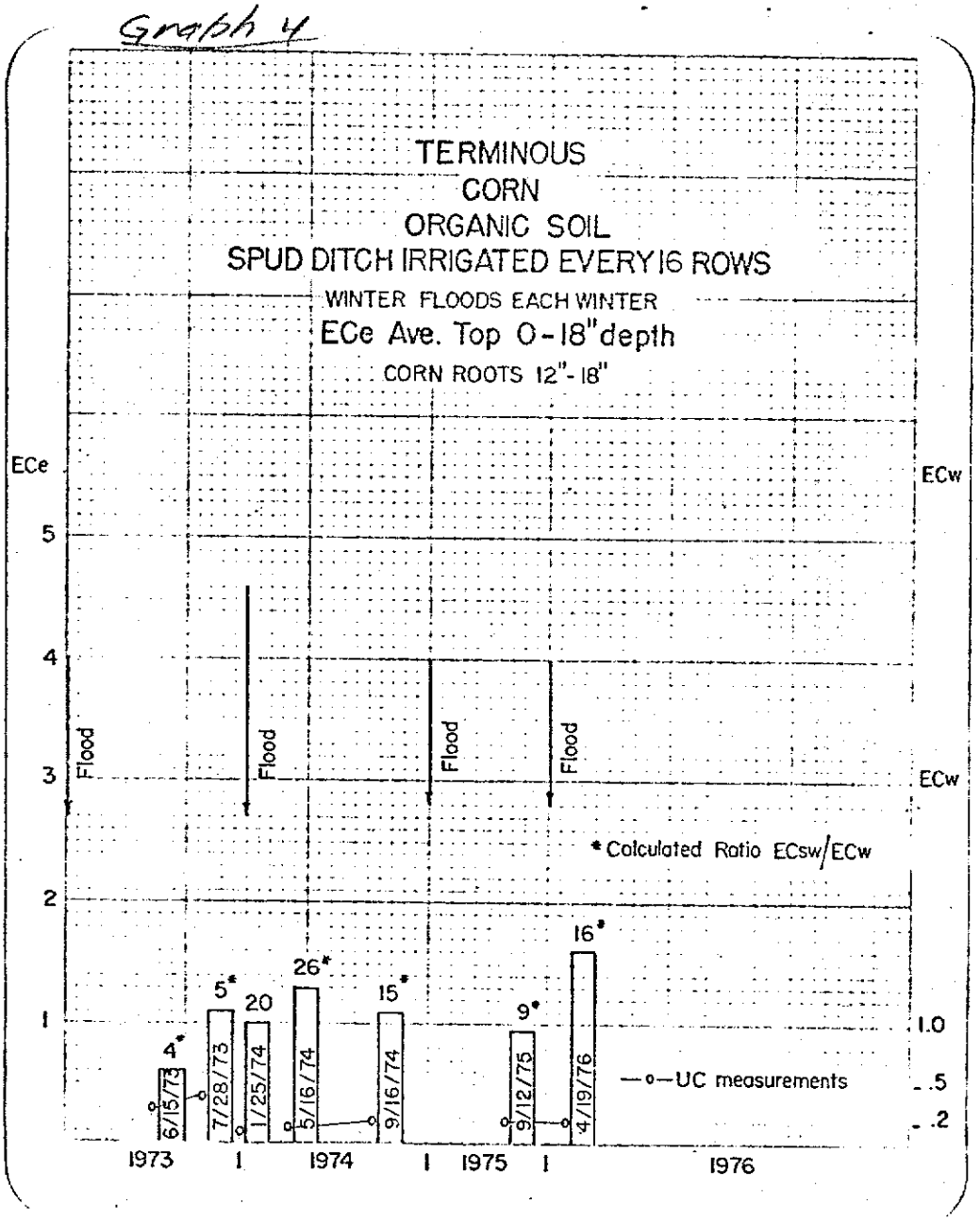
Graph 2.


TERMINOUS
ASPARAGUS
ORGANIC SOILS
WINTER FLOODED
NON-IRRIGATED IN SUMMER, BUT WATER TABLE = 30" – 50".
ECe Ave 0"–30" depth
ECe
ECw
7
6
5
4
3
2
1
3.0
2.0
1.0
.5
.2
First year asparagus
Second year asparagus
Third year asparagus
Fourth year asparagus
12*
10*
4*
30*
30*
24*
30*
5-16-73
11-1-73
11-28-73
9-16-74
6-20-75
9-12-75
4-19-76
*Calculated Ratio ECsw/ECw
ECw - UC measurements
73
74
75
76

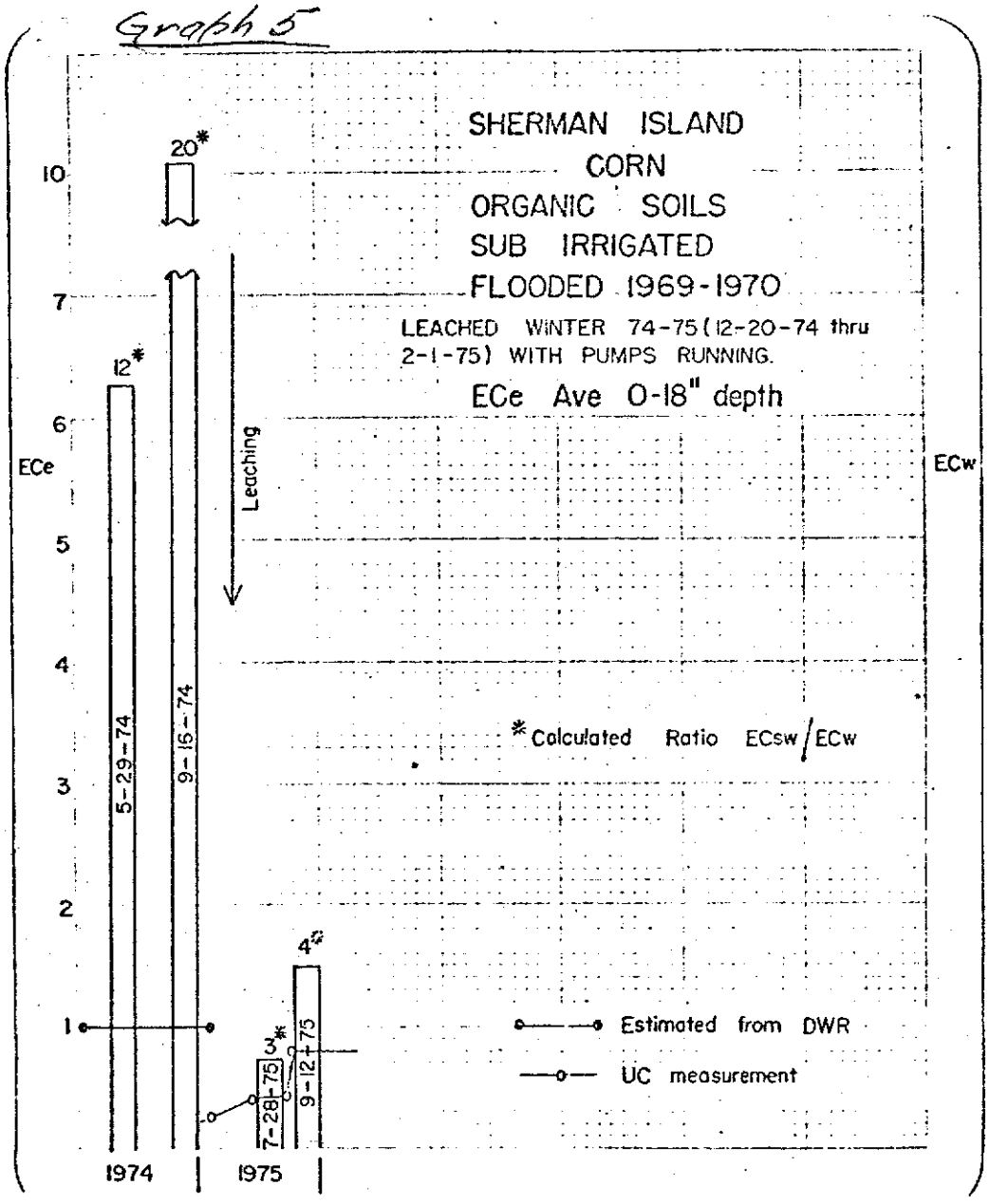
Graph 3


RINDGE TRACT
CORN
ORGANIC SOIL
SPUD DITCH IRRIGATED
WINTER FLOODED
ECe Ave. 0"—18" depth
ECe
ECw
Flood
Flood
Flood
Flood
4
3
2
1
*Calculated Ratio ECsw/ECw
7*
6-28-73
7*
9-14-73
7*
2-21-74
5*
5-16-74
6*
10-4-74
11*
6-30-75
11*
7-21-76
UC measurements
1.0
.5
.2
73
74
75
76

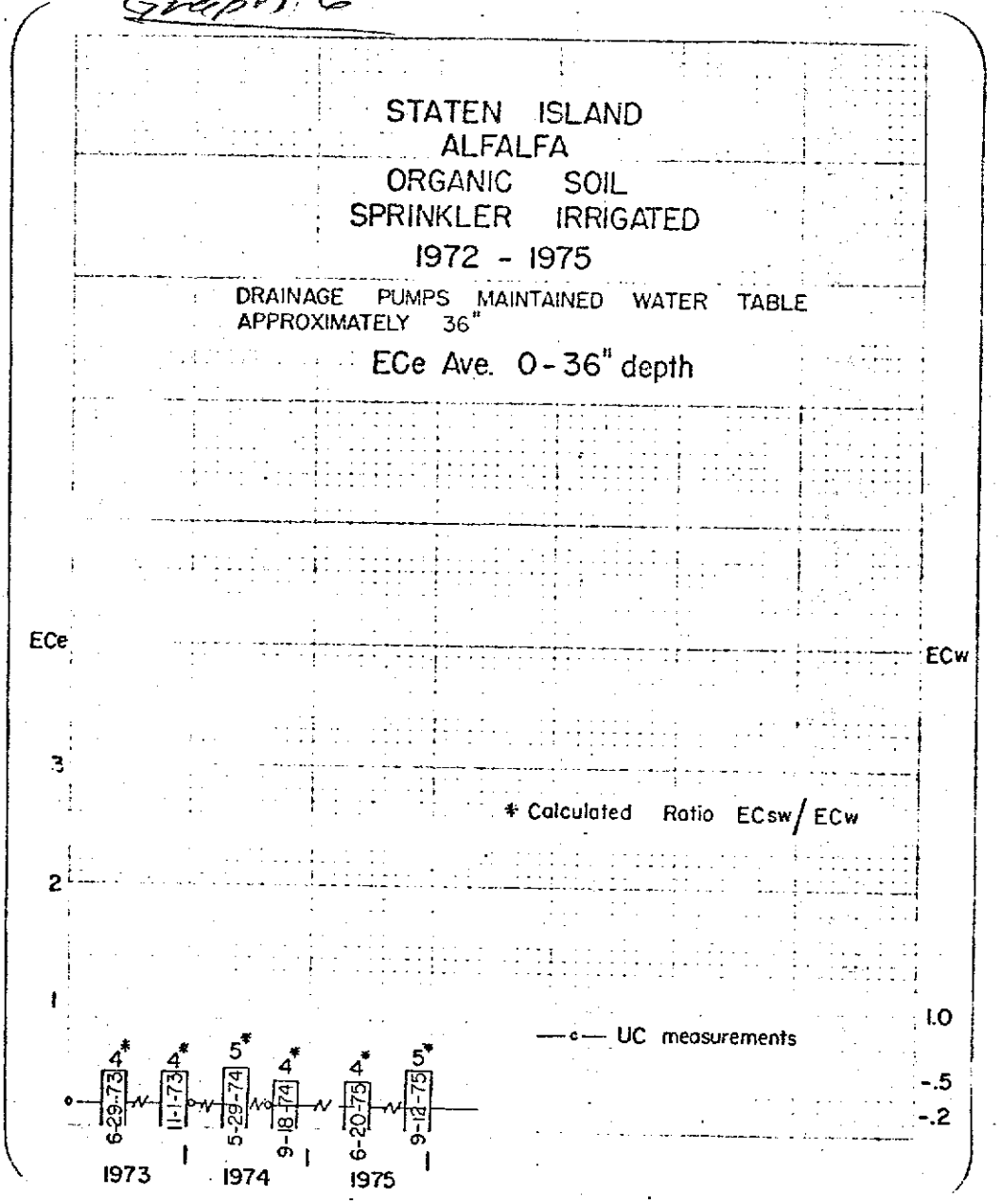
Graph 4


TERMINOUS
CORN
ORGANIC SOIL
SPUD DITCH IRRIGATED EVERY 16 ROWS
WINTER FLOODS EACH WINTER
ECe Ave. Top 0-18" depth
CORN ROOTS 12"-18"
ECe
ECw
5
4
3
2
1
Flood
Flood
Flood
Flood
ECw
*Calculated Ratio ECsw/ECw
4*
5*
20
26*
15*
9*
16*
6/15/73
7/28/73
1/25/74
5/16/74
9/16/74
9/12/75
4/19/76
—o—UC measurements
1.0
.5
.2
1973
1974
1975
1976

Graph 5


SHERMAN ISLAND
CORN
ORGANIC SOILS
SUB IRRIGATED
FLOODED 1969-1970
LEACHED WINTER 74-75 (12-20-74 thru 2-1-75) WITH PUMPS RUNNING.
ECe Ave 0-18" depth
ECe
ECw
Leaching
20*
12*
4*
5-29-74
9-16-74
7-28-75
9-12-75
1974
1975
* Calculated Ratio ECsw / ECw
Estimated from DWR
UC measurement

Graph 6


STATEN ISLAND
ALFALFA
ORGANIC SOIL
SPRINKLER IRRIGATED
1972 - 1975
DRAINAGE PUMPS MAINTAINED WATER TABLE APPROXIMATELY 36"
ECe Ave. 0 - 36" depth
ECe
ECw
3
2
1
* Calculated Ratio ECsw / ECw
UC measurements
1.0
-.5
-.2
4* 6-29-73
4* 11-1-73
5* 5-29-74
4* 9-18-74
4* 6-20-75
5* 9-12-75
1973
1974
1975