United States Department of Agriculture

Soil Conservation Service

Northeast NTC
160 East 7th Street
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Subject: Salinity Survey

Date: 15 September 1990

To: Ferris P. Algood
State Soil Scientist
USDA-Soil Conservation Service
P.O. Box 11350
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I apologize for not getting a detailed technical report on the joint USDA-SCS and USDOT-ACD salinity survey to you. However, though we continue to work on the report, progress has been slow as most of Bill O'Keefe and my time have been away from our offices this summer.

As discussed during our phone conversation on 14 September, we experienced problems in the field with the receiver to transmitter connector and lost some of our messages during field work on 6 and 7 June. On 6 September, I met with Bill O'Keefe in Cambridge, Massachusetts, and discussed the garbled messages and improvements to the imagery. We are still working on un-garbling the messages transmitted from Capp Ferry's land.

The following is a progress report. I have enclosed samples of the maps we have prepared to date. Figure 1 is a portion of a Rand McNally map showing our travels in Utah based on Loran-C. The unit was not always energized and spurious reflections were captured and can be noted in the mountainous areas east of Salt Lake City.

Figure 2 is a portion of a USGS topographic map showing the location of the vehicle and sampling points in a study area which was located immediately north of Salt Lake City. In this figure, several of the EM sample sites have been annotated. Figure 3 is an unannotated blow-up of the survey area displayed in Figure 2. All sample sites are displayed in Figure 3 along with the location of the vehicle at ten minute intervals. Figures 4 and 5 have been produced from Figure 3, using SURFER software and the INTRANSIT data file. In these figures, the distribution of soil salinity (in mmhos/cm) within the study site is displayed. In Figure 4, the contour interval is 4 mmhos/cm and values above 16 mmhos/cm have not been graphed. In Figure 5, the contour interval is 8 mmhos/cm and values above 64 mmhos/cm have not been graphed.

Figures 6 thru 8 depict salinity distributions within the Bear River Migratory Bird Refuge. In this survey, we were restricted to sampling along the dike. In Figure 6, values are expressed in mmhos/cm. These values were derived from a regression equation based on soil samples and EM measurements taken in the vertical and horizontal positions. However, at these high values, a linear relation between EM and saturated paste values is unlikely and the

accuracy of these absolute values cannot be assured. In Figures 7 and 8, I have mapped the distribution of relative EM values. Relative values were obtained by dividing the EM value at each sample site by the averaged value obtained for the Bird Refuge. Figure 7 represents the values obtained with the EM meter in the horizontal position. These values are more sensitive to soil salinity in the upper (<75 cm) part of the profile. Figure 8 represents the values obtained with the EM meter in the vertical position. In the vertical position, the EM meter measures the average conductivity within the upper 1.5 m of the soil profile.

I will prepare a final written report as soon as possible. However, I am scheduled to be in the field for five of the next seven weeks. I thank you for your patients and understanding.

With kind regards.

James A. Doolittle
Soil Scientist (GPR)

Portage
WASHAKIE INDIAN RES.
Plymouth
Clarkston
Cornish
Lewiston
Webster
Smithfield
WASATCH
Garden City
Bear Lake
South Lake
Riverside
Garland
Bothwell
Thatcher
Tremonton
Hyde Park
LOGAN
Providence
Hyrum
Paradise
NATIONAL
RANGE
Woodruff
Woodruff Creek Res.
Almy
Evanston
Corinne
Perry
Willard
Huntsville
FOREST
OGDEN
ROY
Ogden Bay Waterfowl Management Area
Seasonal Ferry
Mountain Green
Peterson
Stoddard
Devils Slide
Morgan
LAYTON
Great Salt Lake
Lake
DAVIS
SEE
ENLARGEMENT
ON BACK
Farmington
BOUNTIFUL
SALT LAKE CITY
WASATCH
Coalville
Hoytsville
Rockport
Silver Creek Jct.
Kimball Jct.
Lake Point Jct.
WEST
VALLEY
CITY
Park City
Oakley
Kamas
Marion
Francis
Woodland
Heber City
Midway
Charleston
TOOELE
Stockton
Cedar Fort
Upton
Pine Cliff
Tabiona

Fig 1

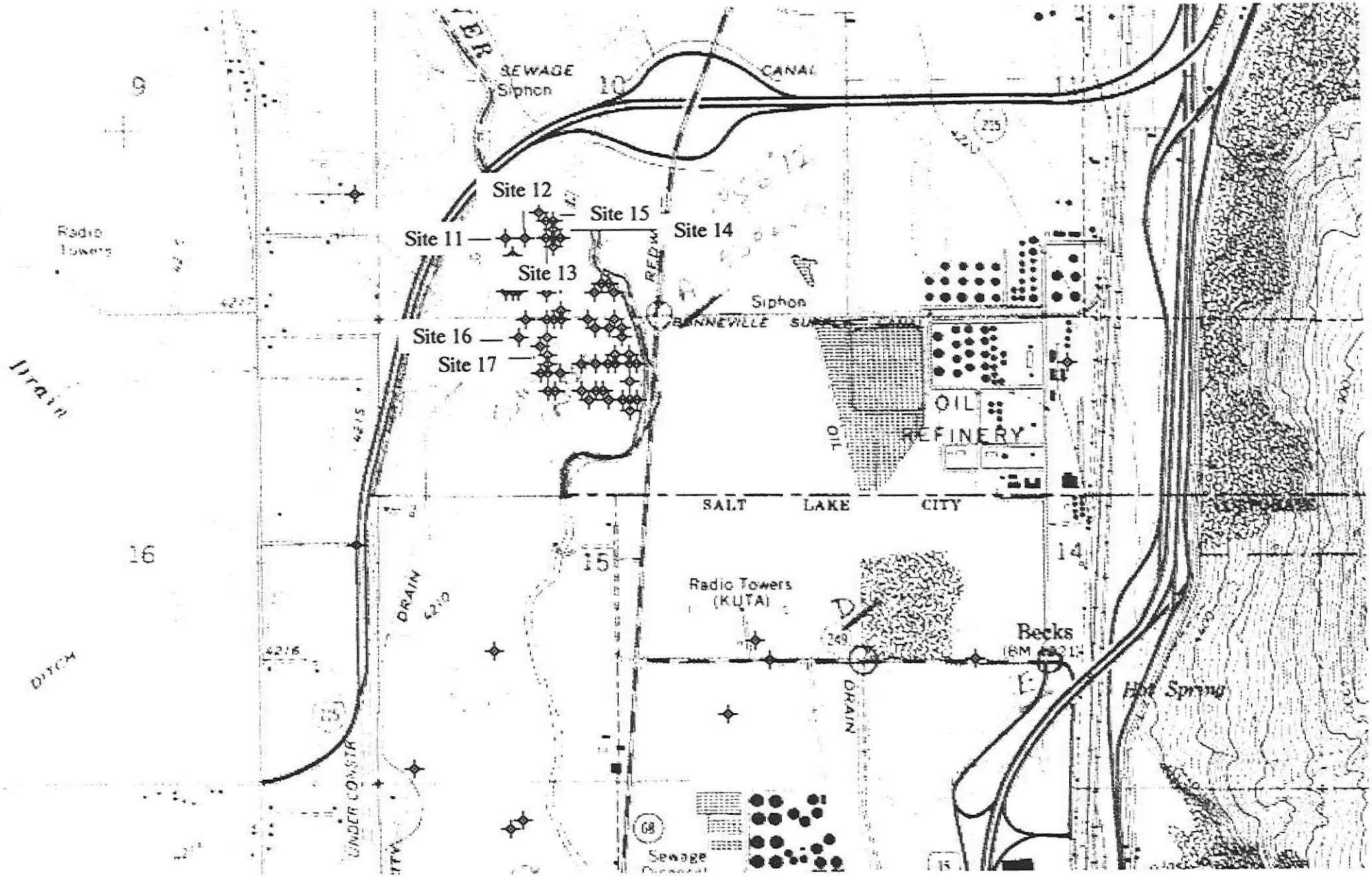
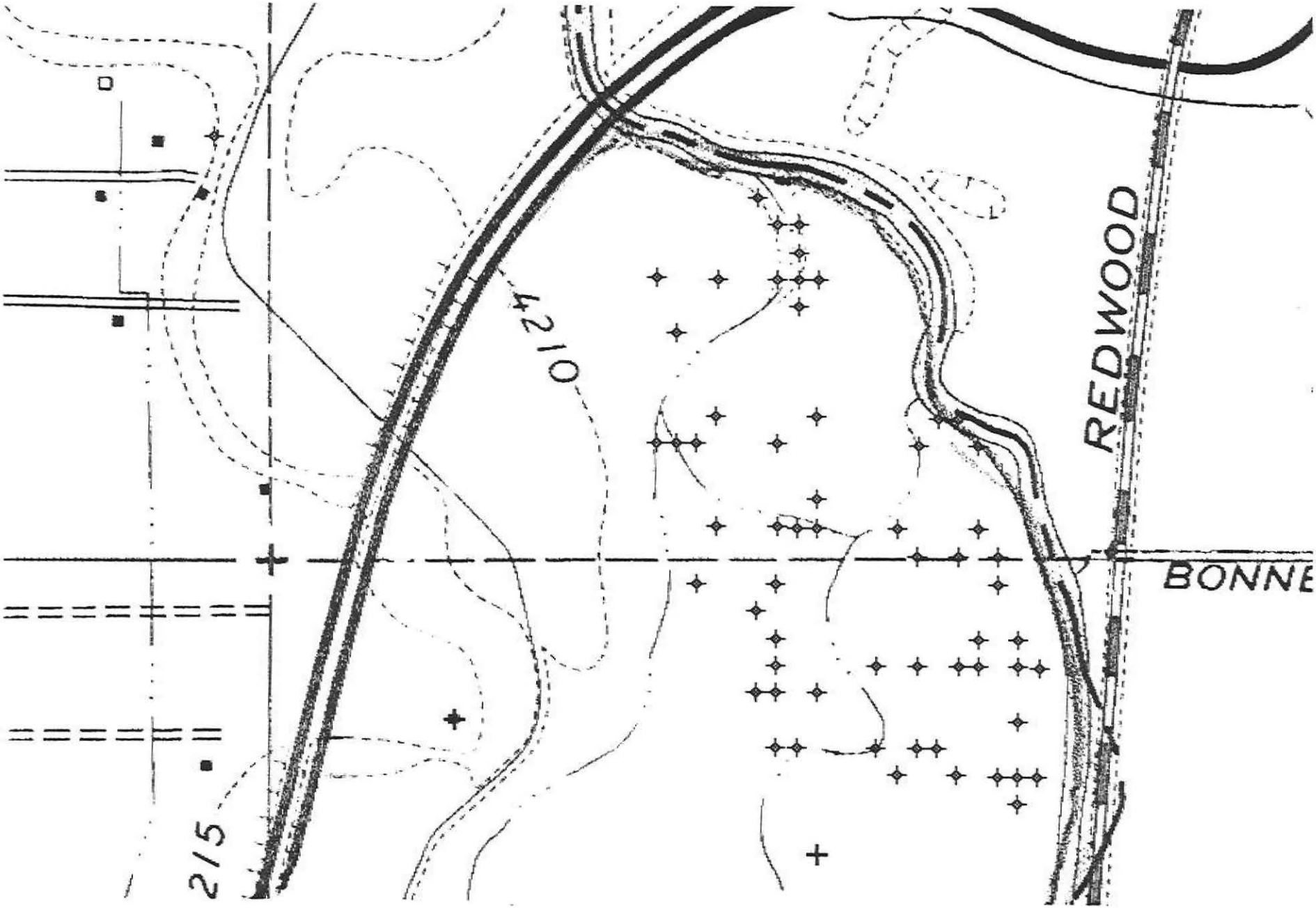

Site 12
Site 15
Site 14
Site 11
Site 13
Site 16
Site 17
SEWAGE
Siphon
CANAL
Siphon
OIL
REFINERY
SALT LAKE CITY
Radio Towers
(KUTA)
Becks
Hot Spring
DRAIN
DITCH
Sewage

Fig 2



F-3

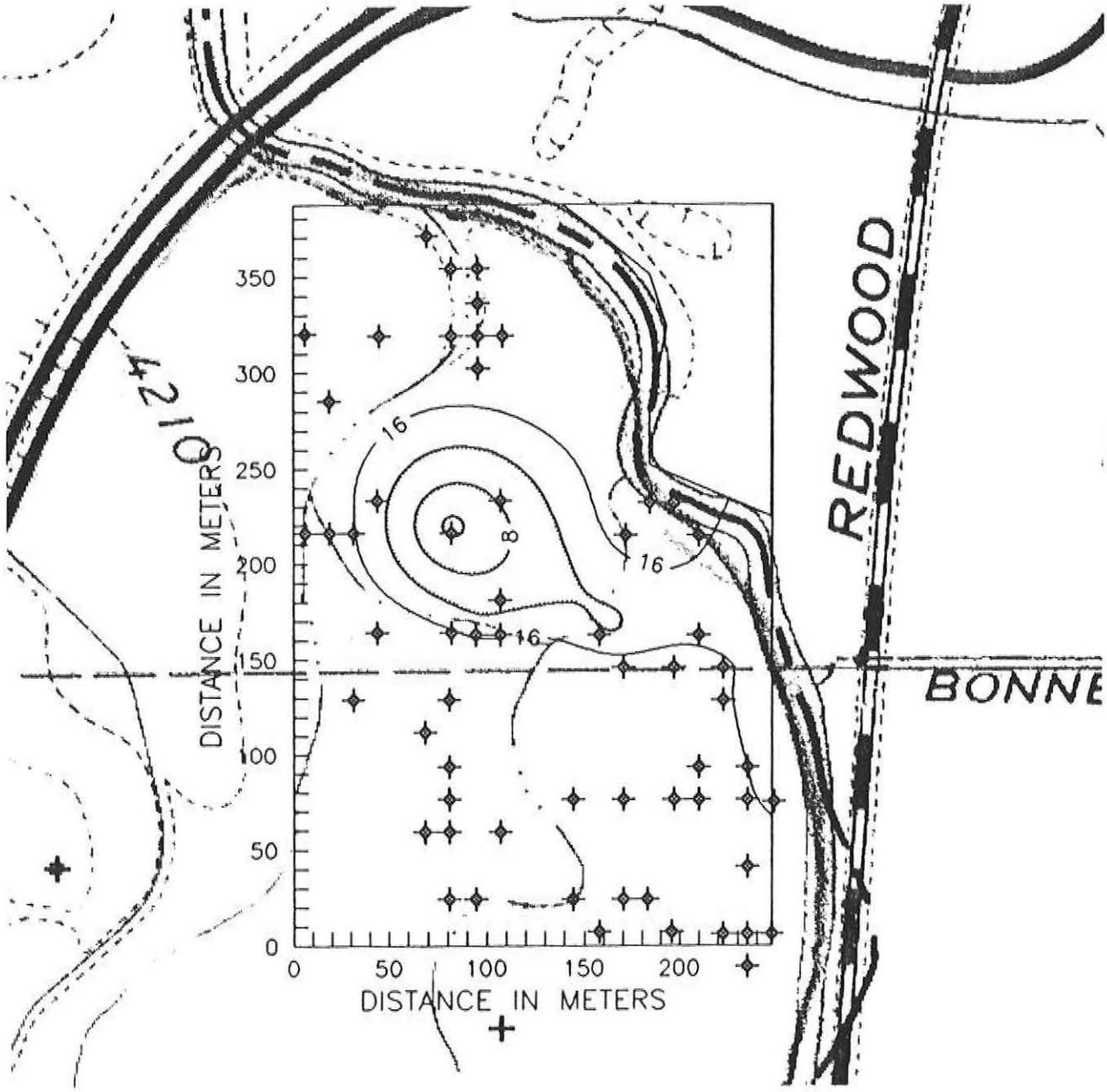

REDWOOD
BONNE
DISTANCE IN METERS
350
300
250
200
150
100
50
0
16
8
16
16
0
50
100
150
200
DISTANCE IN METERS

Fig 4

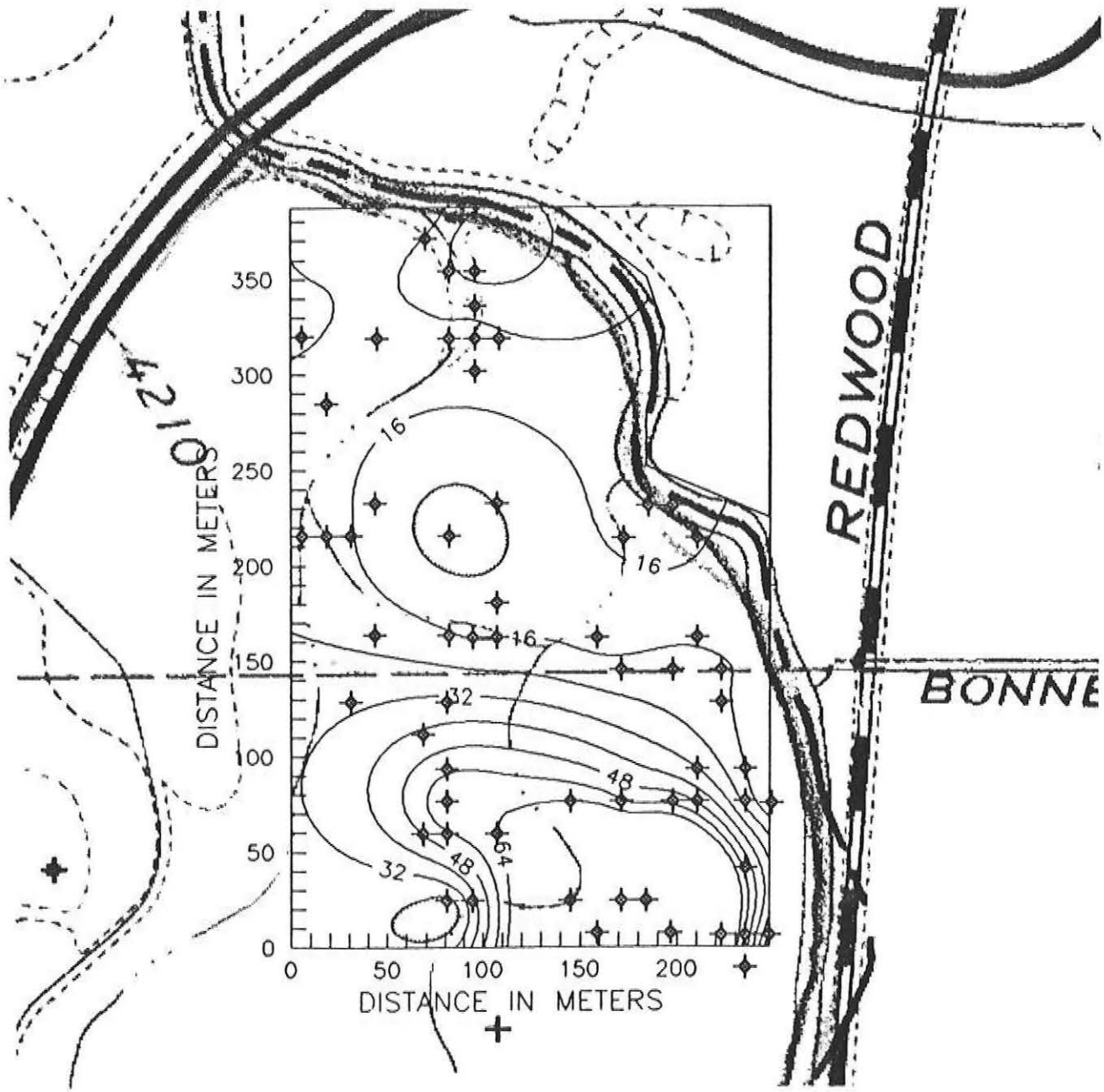

REDWOOD
BONNE
421
DISTANCE IN METERS
350
300
250
200
150
100
50
0
16
16
16
32
48
64
48
32
0
50
100
150
200
DISTANCE IN METERS

Fig 5

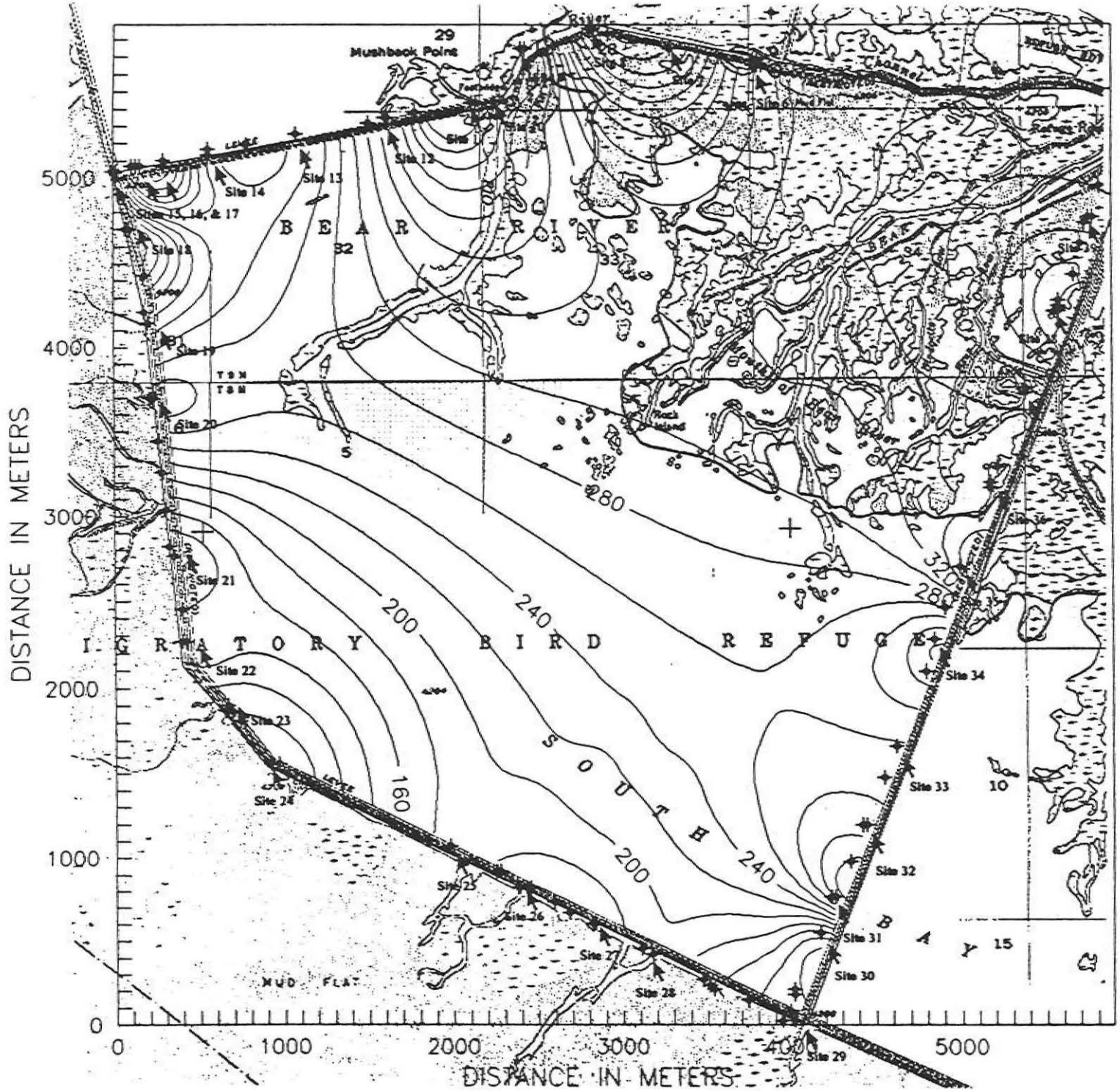
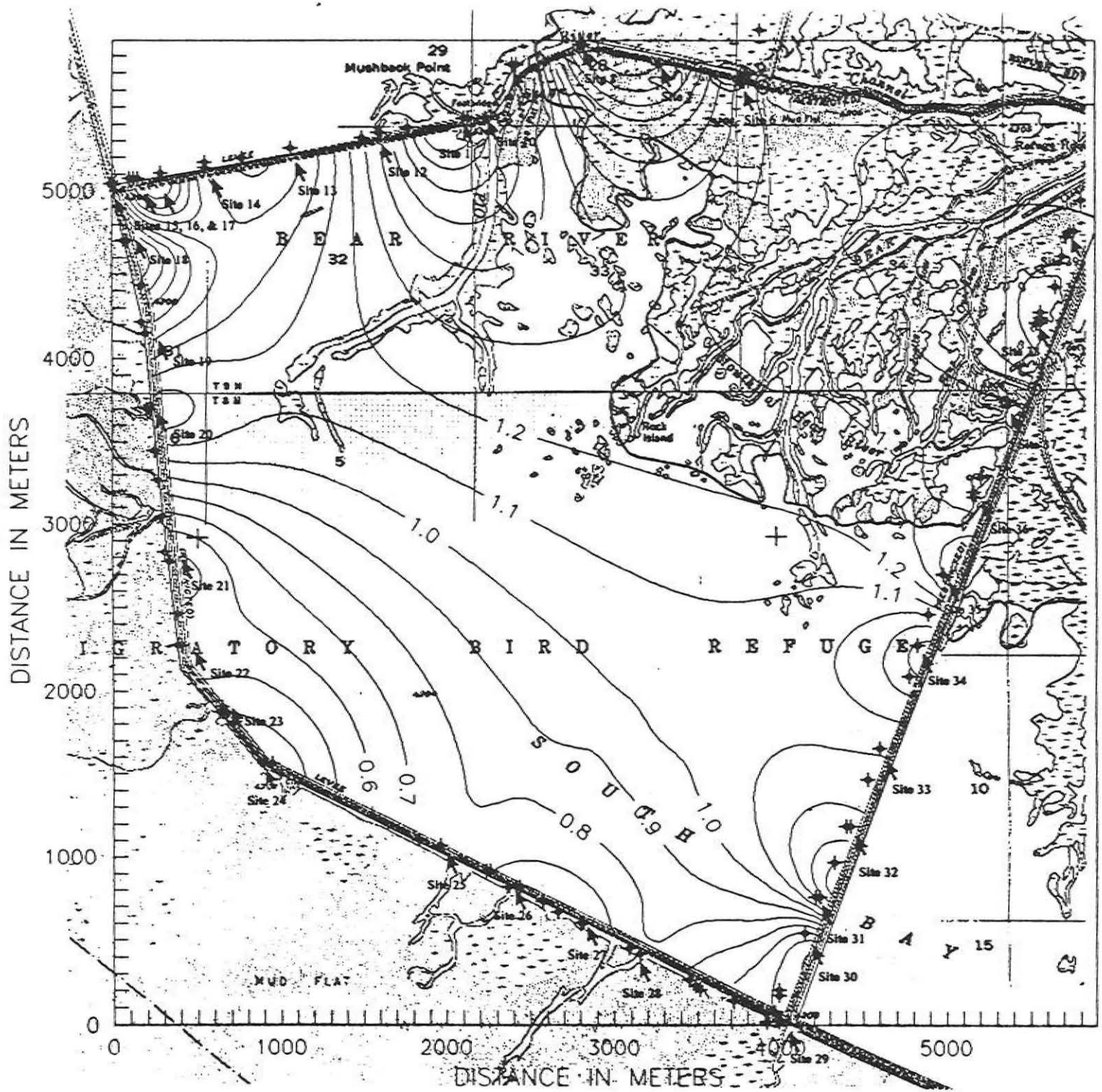
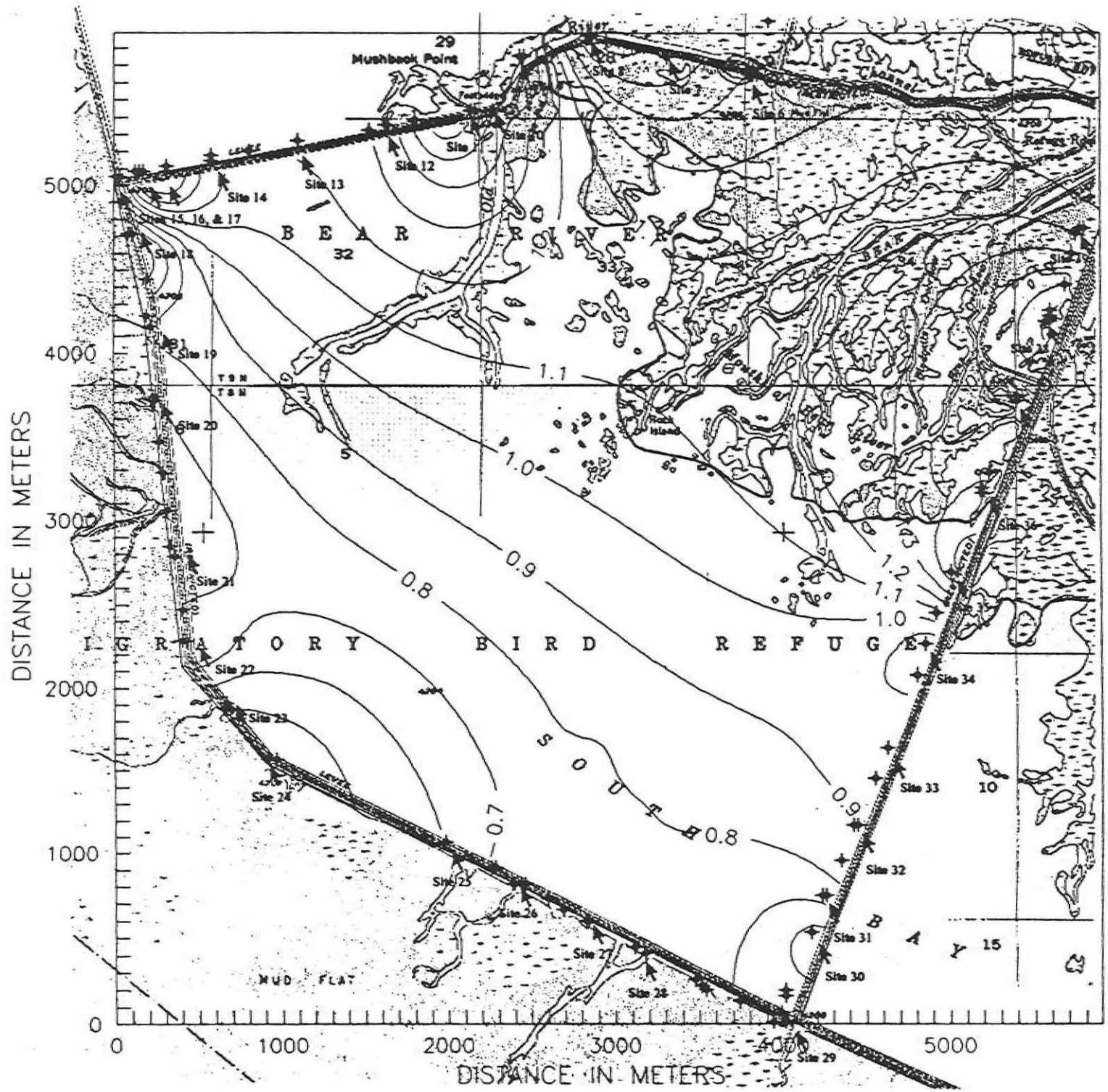

DISTANCE IN METERS
DISTANCE IN METERS
0
1000
2000
3000
4000
5000
Mushbeck Point
B E A R R I V E R
I G R A T O R Y B I R D R E F U G E
S O U T H B A Y
MUD FLAT
Site 1
Site 2
Site 3
Site 4
Site 5
Site 6
Site 7
Site 8
Site 9
Site 10
Site 11
Site 12
Site 13
Site 14
Site 15, 16, & 17
Site 18
Site 19
Site 20
Site 21
Site 22
Site 23
Site 24
Site 25
Site 26
Site 27
Site 28
Site 29
Site 30
Site 31
Site 32
Site 33
Site 34
160
200
240
280
320

Fig C



Mushback Point
29
Site 1
Site 12
Site 13
Site 14
Sites 15, 16, & 17
Site 18
Site 19
Site 20
Site 21
Site 22
Site 23
Site 24
Site 25
Site 26
Site 27
Site 28
Site 29
Site 30
Site 31
Site 32
Site 33
Site 34
Site 36
Site 37
Site 6 Mud Flat
Rock Island
BEAR RIVER
32
33
34
5
10
15
T 9 N
T 8 N
MIGRATORY BIRD REFUGE
SOUTH BAY
MUD FLAT
1.2
1.1
1.0
0.9
0.8
0.7
0.6
DISTANCE IN METERS
0
1000
2000
3000
4000
5000

Fig 7



Mushback Point
BEAR RIVER
SOUTH BAY
MUD FLAT
Rock Island
Site 12
Site 13
Site 14
Site 15, 16, & 17
Site 18
Site 19
Site 20
Site 21
Site 22
Site 23
Site 24
Site 25
Site 26
Site 27
Site 28
Site 29
Site 30
Site 31
Site 32
Site 33
Site 34
1.1
1.0
0.9
0.8
0.7
1.2
DISTANCE IN METERS
DISTANCE IN METERS
0
1000
2000
3000
4000
5000

Fig 8