1981

Monthly Report on the State of Rivers 1981

Albert Kuo
Virginia Institute of Marine Science

Monthly Report on the State of Rivers - September 1981

sponsored by

Virginia Institute of Marine Science

and

Virginia State Water Control Board

Summary of Field Surveys

(1) Regular slackwater runs

James: September 16 & 17, slack before flood (the survey on 16 was interrupted by storm)
Rappahannock: September 14, slack before flood
York and Pamunkey: September 15, slack before flood

Salinity, temperature and dissolved oxygen distributions are attached. Data for other parameters will be available later, and may be provided upon request.

(2) Spatfall surveys - by Dexter Haven

Surface and bottom salinities were measured weekly on September 8,14,21 and 28 at six stations around oyster growing area in the James. Partial data attached in Appendix A.

(3) Crab-fish joint trawl surveys - by W. A. VanEngel

Rappahannock: September 1
York and Pamunkey: September 3
James: September 18
Lynnhaven and Little Creek: September 17

Surface and bottom temperature, salinity, D.O., and secchi depth were measured at designated stations.

(4) Lower York surveys - by Paul Zubkoff

Surveys were conducted in the lower York downstream from Clay Bank on September 3,14,21 and 28. The parameters measured or sampled include temperature, salinity, D.O., secchi depth, chlorophyll 'a', silicate, nutrients and phytoplankton identification. Partial data attached in Appendix B.

For further information, make request to Dr. Albert Kuo, Virginia Institute of Marine Science, Gloucester Point, Virginia 23062. (804)642-2111.

Lesser Neap Tide: September 7

Comments on slackwater run data:

(1) The water temperature was fairly uniform throughout the rivers. The cooling trend continued, but with a very slow pace. The temperature decreased by about 1 to 2°C from that of the August survey.

(2) Salt water intruded further upstream in all three rivers by a distance of 5 to 8 kilometers (3 to 5 miles). Salinity increased by 1 - 2 °/oo over that of August survey at the upper portion of saline water. However, salinity either remained unchanged (Rappahannock River) or decreased slightly (York and James) at the lower portion of the estuaries. The data show that all three rivers were in the completely-mixed state (except in the deep hole near the mouth of the Rappahannock) at the time of survey, typical for low flow and spring tide conditions.

(3) In general, dissolved oxygen increased from that of August survey in all three rivers. As high as 2 mg/l increase was observed at some parts of the rivers. However, low DO (below 5 mg/l) still persisted at deep water near the mouths of the Rappahannock and the York. The lowest DO in the James was slightly below 5 mg/l, occurring at the usual location about 20 kilometers (12 miles) downstream of Hopewell.

Scheduled Surveys in October

(1) Regular slackwater surveys

James: October 6, Tuesday, slack before flood
Rappahannock: October 1, Thursday, slack before flood
York and Pamunkey: October 5, Monday, slack before flood

(2) Spatfall surveys - by Dexter Haven

Weekly salinity measurements in the James around oyster growing area.

(3) Lower York survey - by Paul Zubkoff

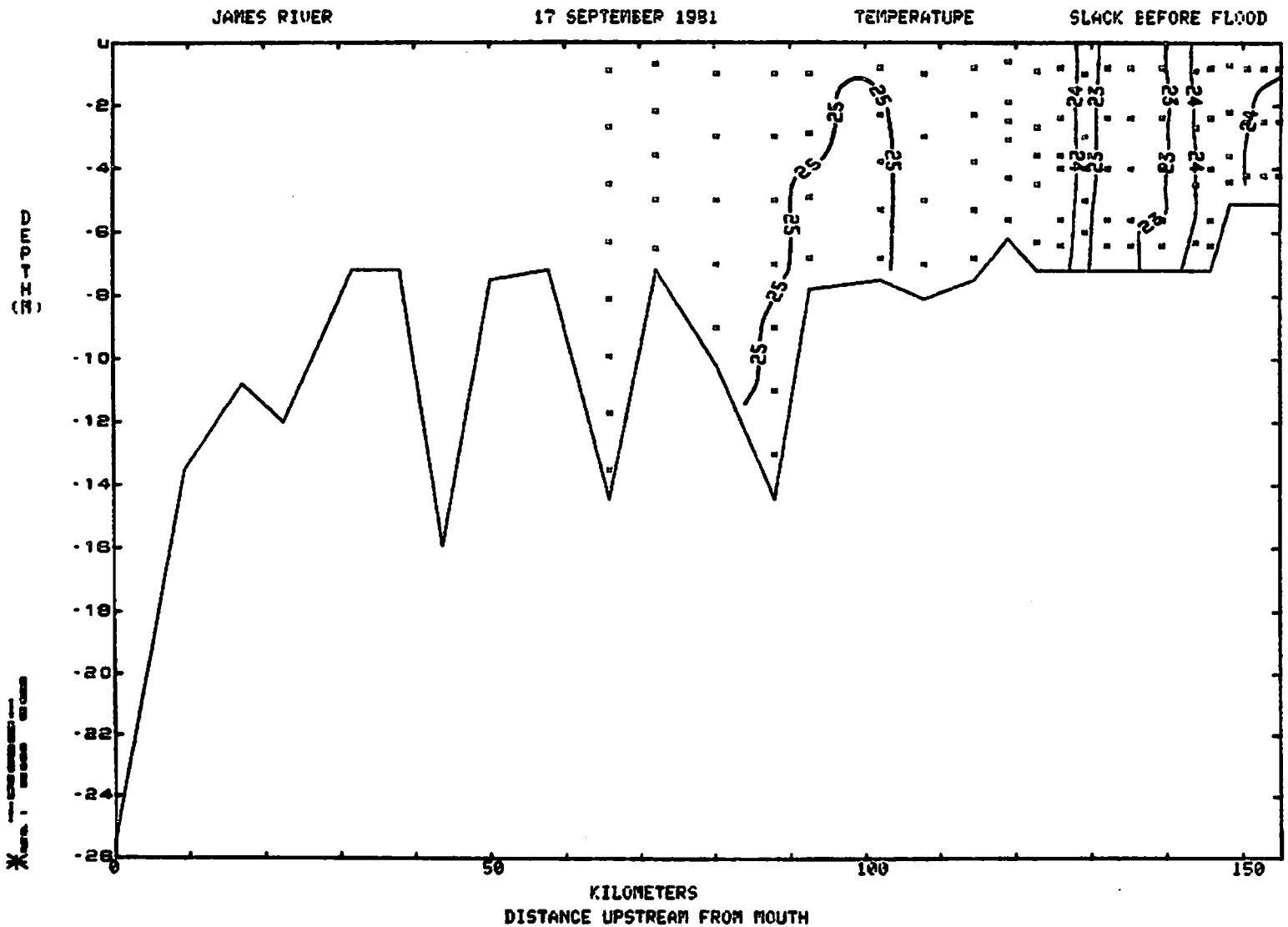
Surveys will be conducted on 12 and 26 October 1981. No nutrients will be measured.

(4) Crab-fish joint trawl survey - by W. A. VanEngel

Rappahannock: October 2
York and Pamunkey: October 6
James: October 8
Lynnhaven and Little Creek: October 9

(5) Zooplankton monitoring program - by George Grant

One survey will be conducted in late October. Salinity, temperature and dissolved oxygen will be measured at about 16 stations in the lower Bay.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17 SEPTEMBER 1981
TEMPERATURE
SLACK BEFORE FLOOD
DEPTH (M)
0
-2
-4
-6
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-18
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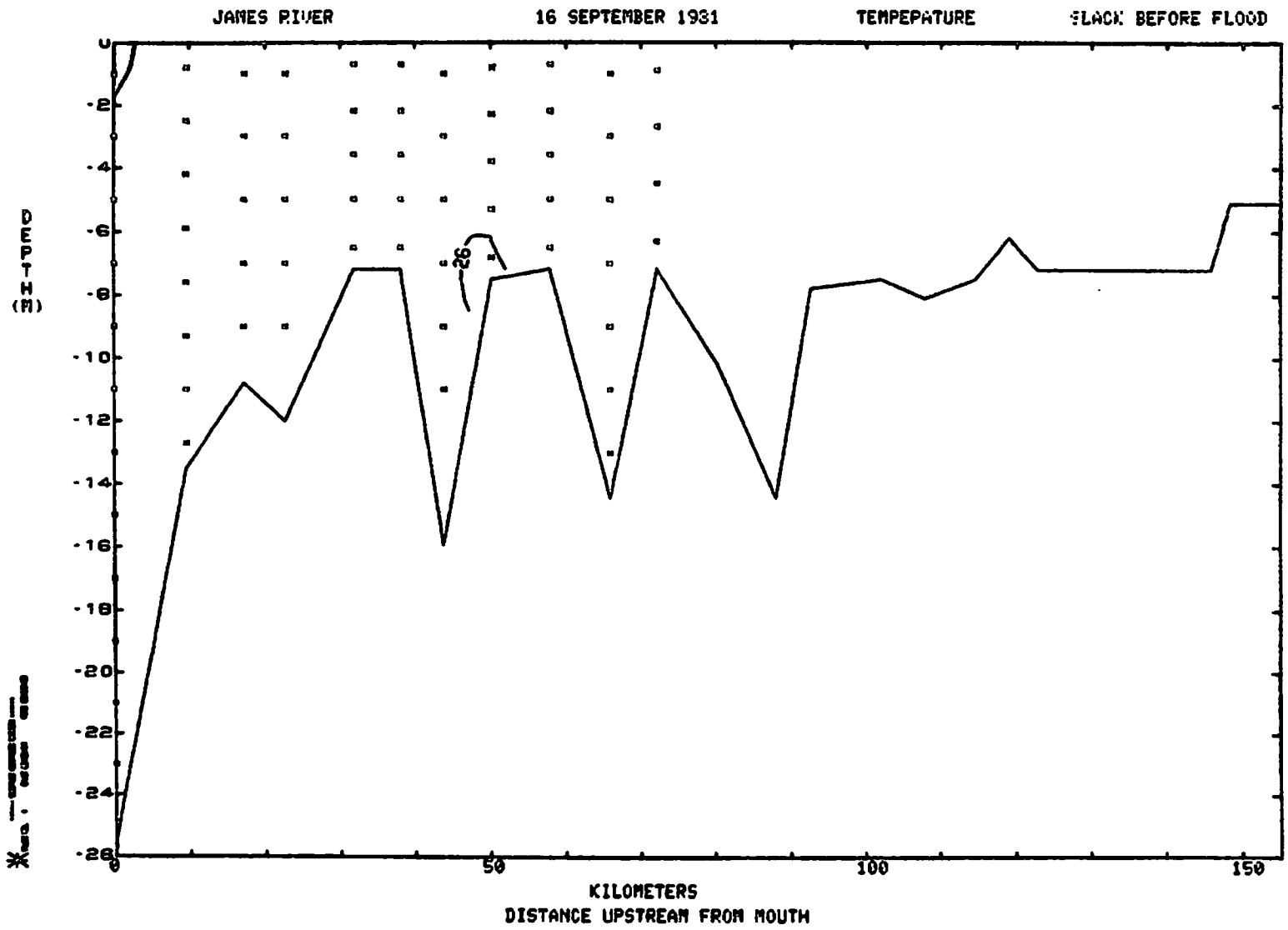
KILOMETERS
DISTANCE UPSTREAM FROM MOUTH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16 SEPTEMBER 1931
TEMPEPATURE
BLACK BEFORE FLOOD
DEPTH (M)
0
-2
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-8
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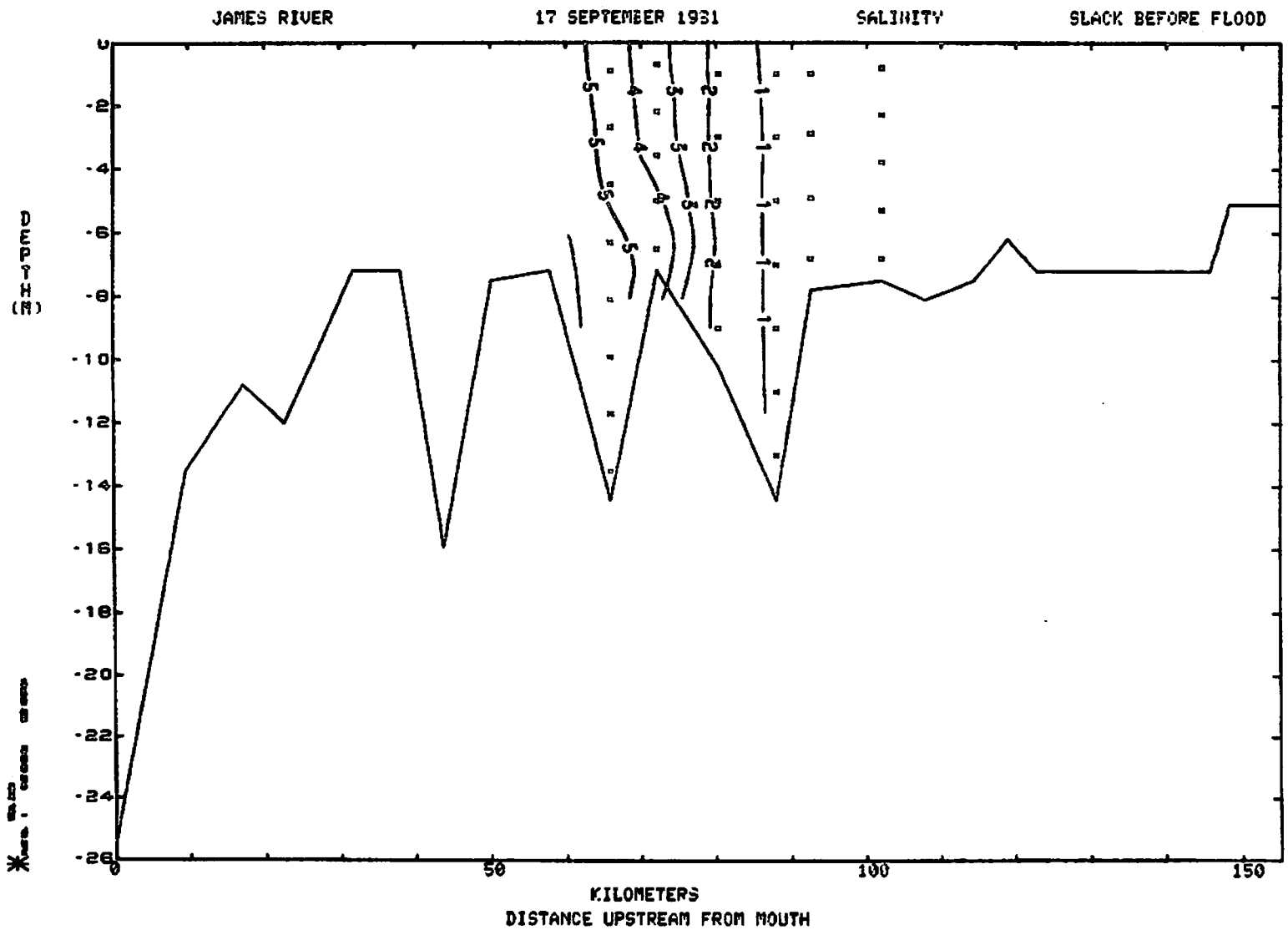
150
KILOMETERS
DISTANCE UPSTREAM FROM MOUTH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17 SEPTEMBER 1931
SALINITY
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0
-2
-4
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-8
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-12
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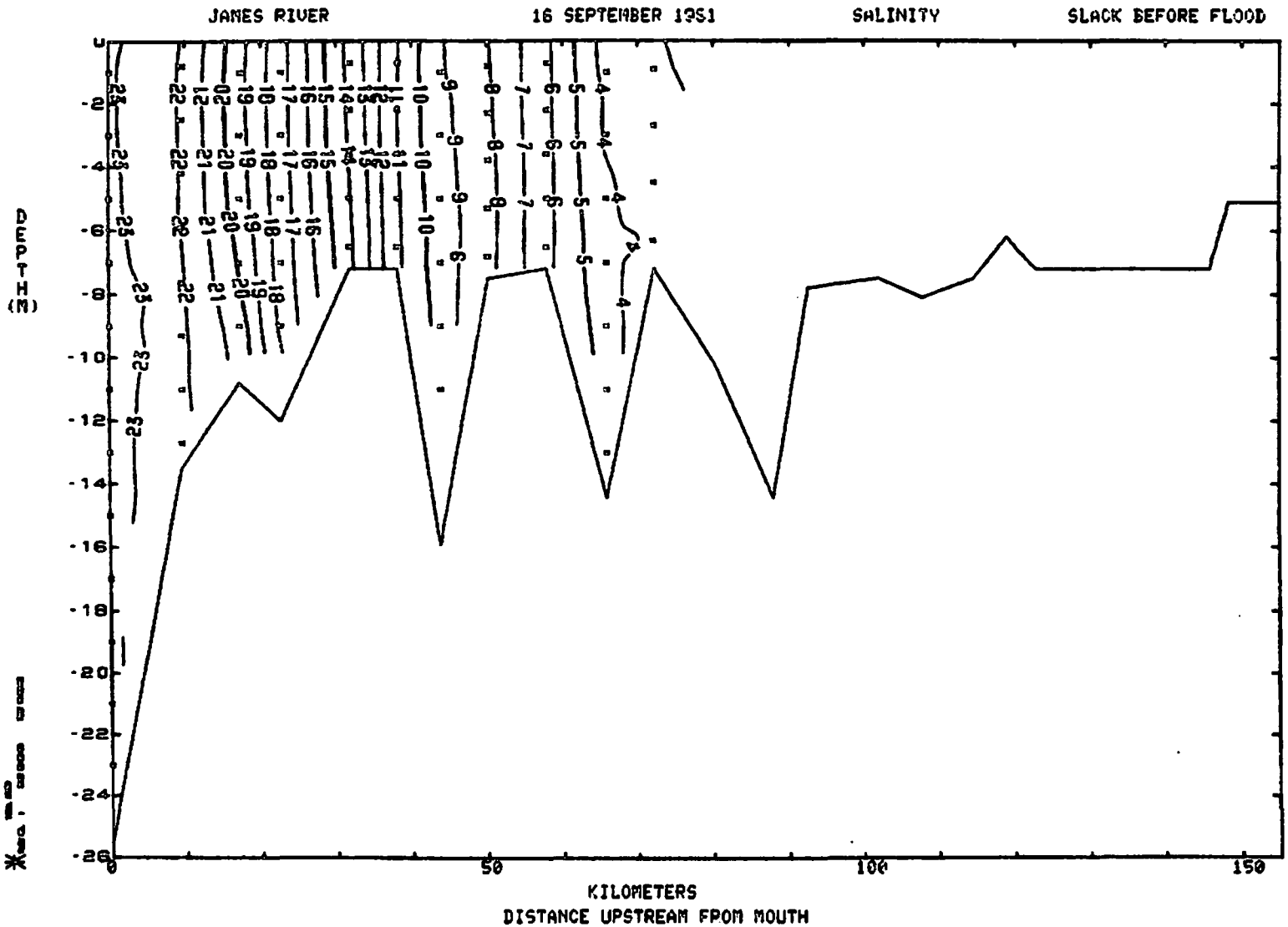
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100
150
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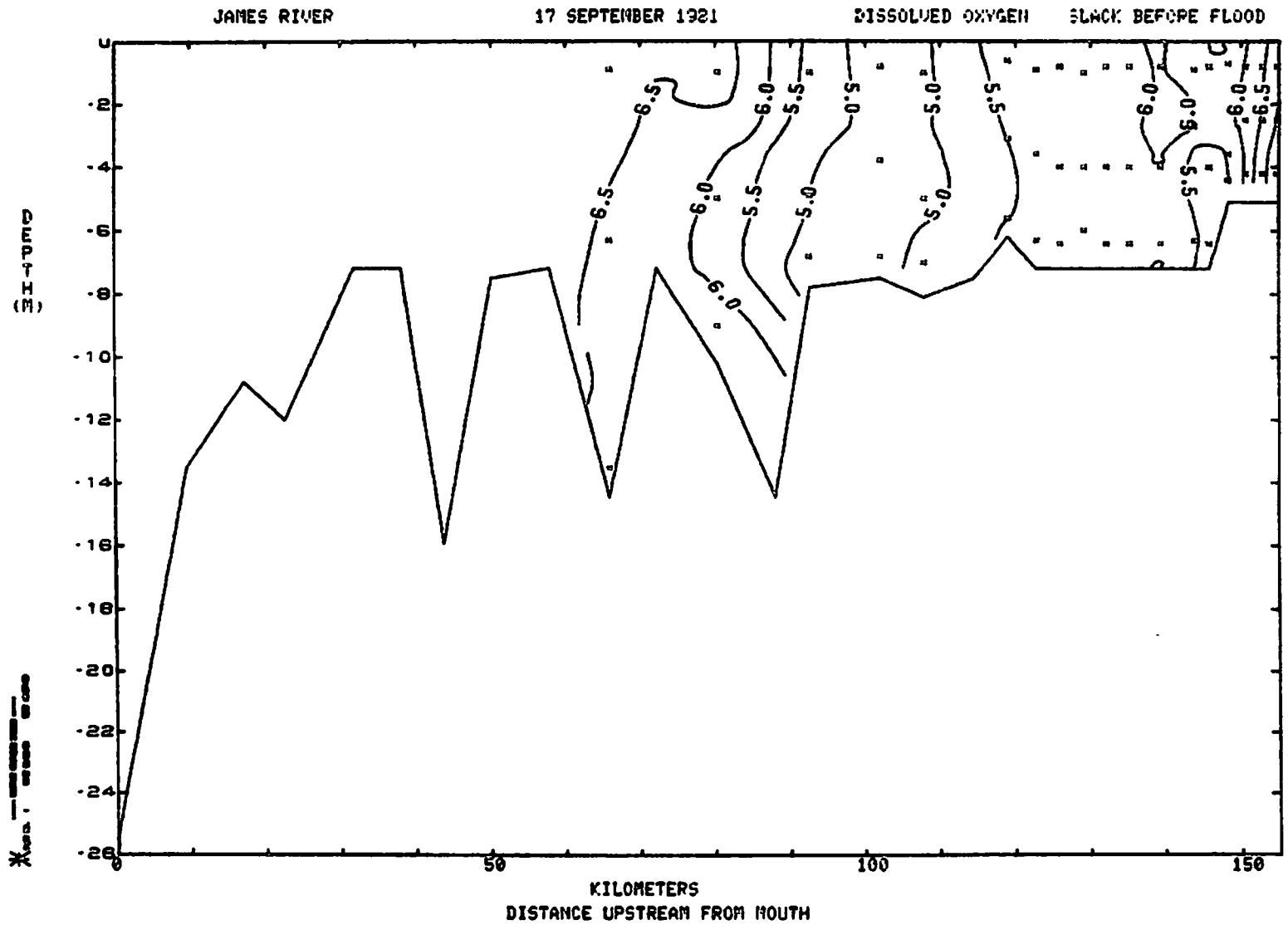
DISTANCE UPSTREAM FROM MOUTH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BLACK BEFORE FLOOD
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-10
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-14
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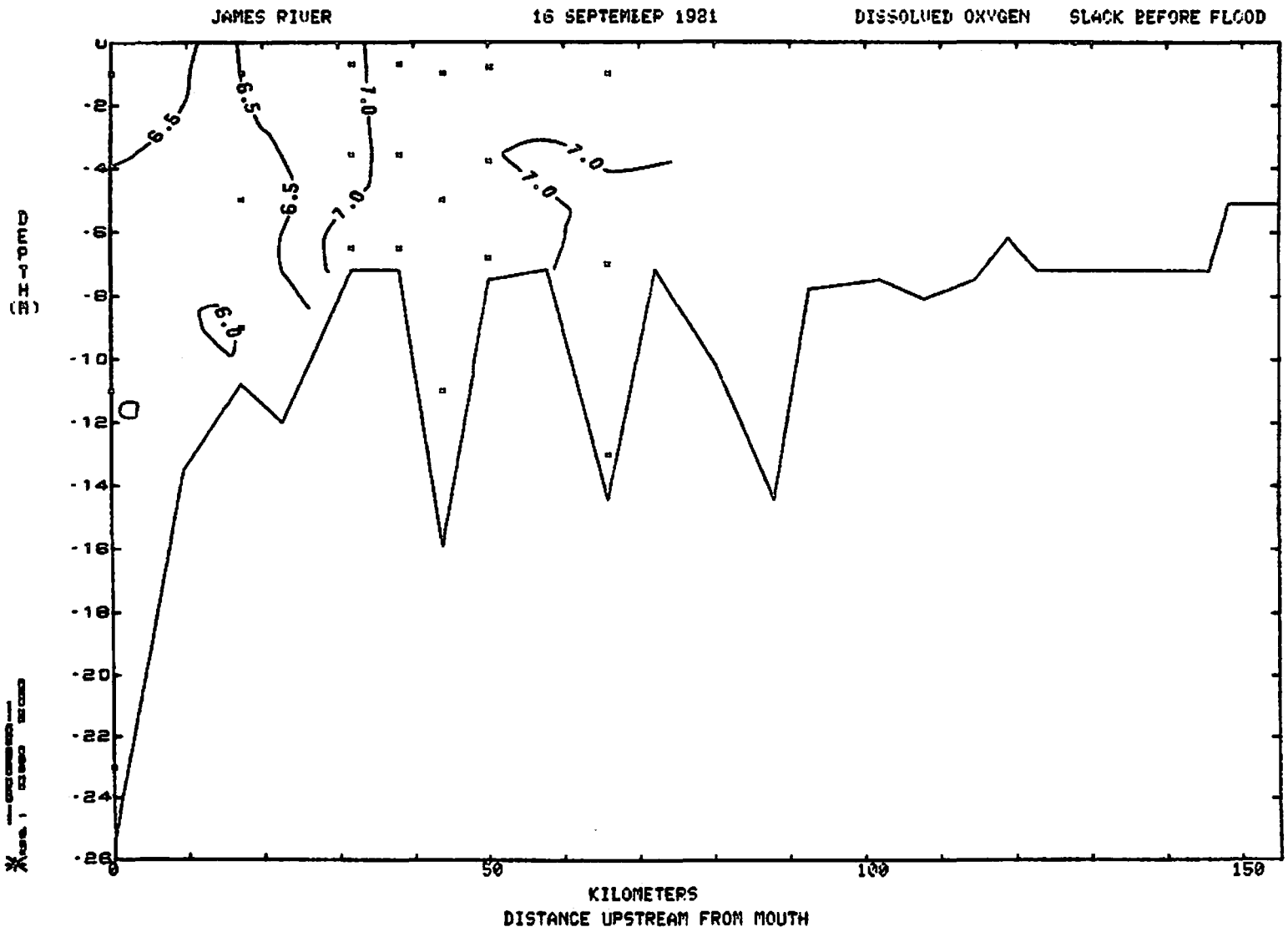
DISTANCE UPSTREAM FROM MOUTH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DEPTH (M)
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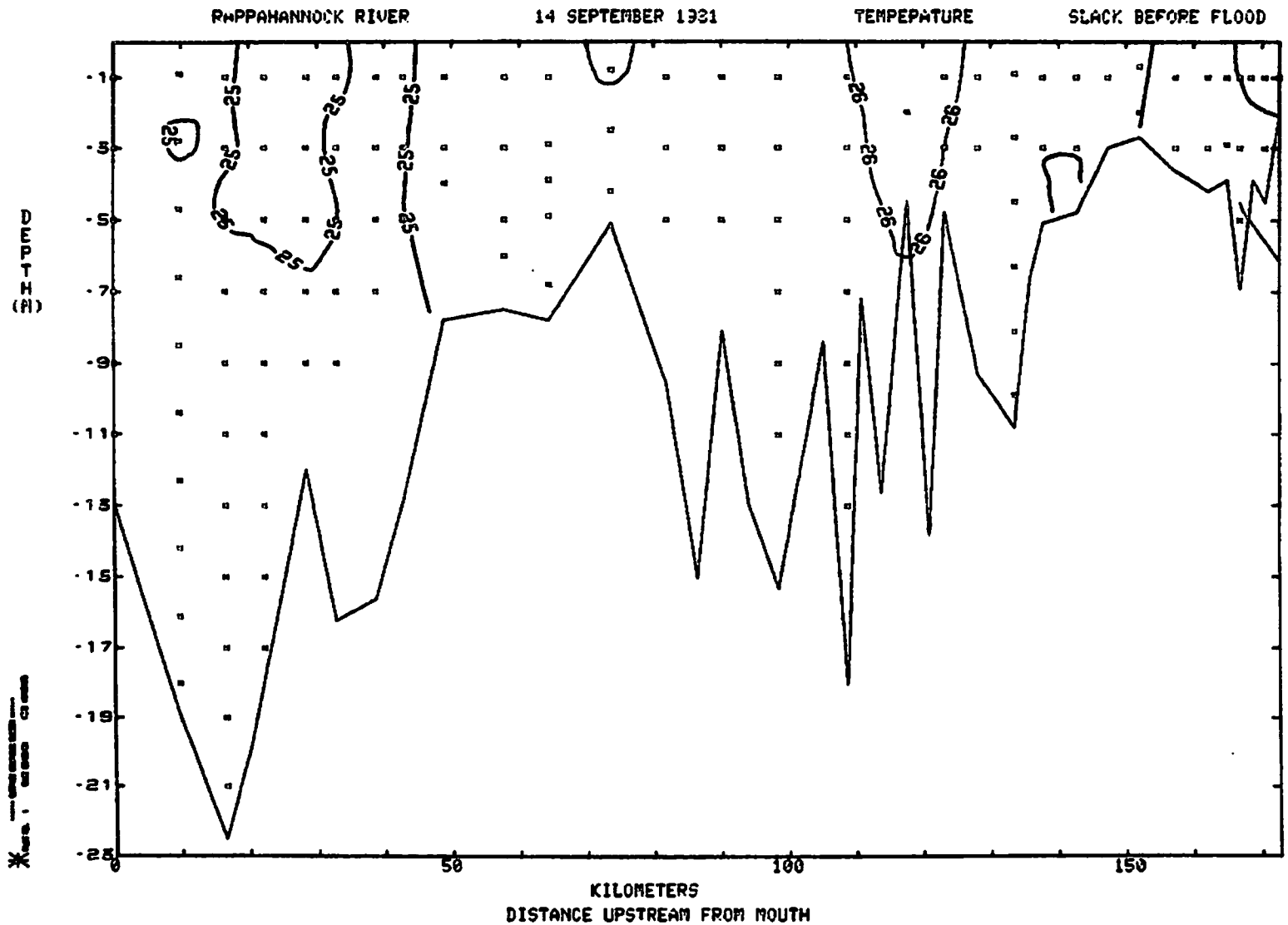
DISTANCE UPSTREAM FROM MOUTH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TEMPERATURE
SLACK BEFORE FLOOD
DEPTH (M)
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-3
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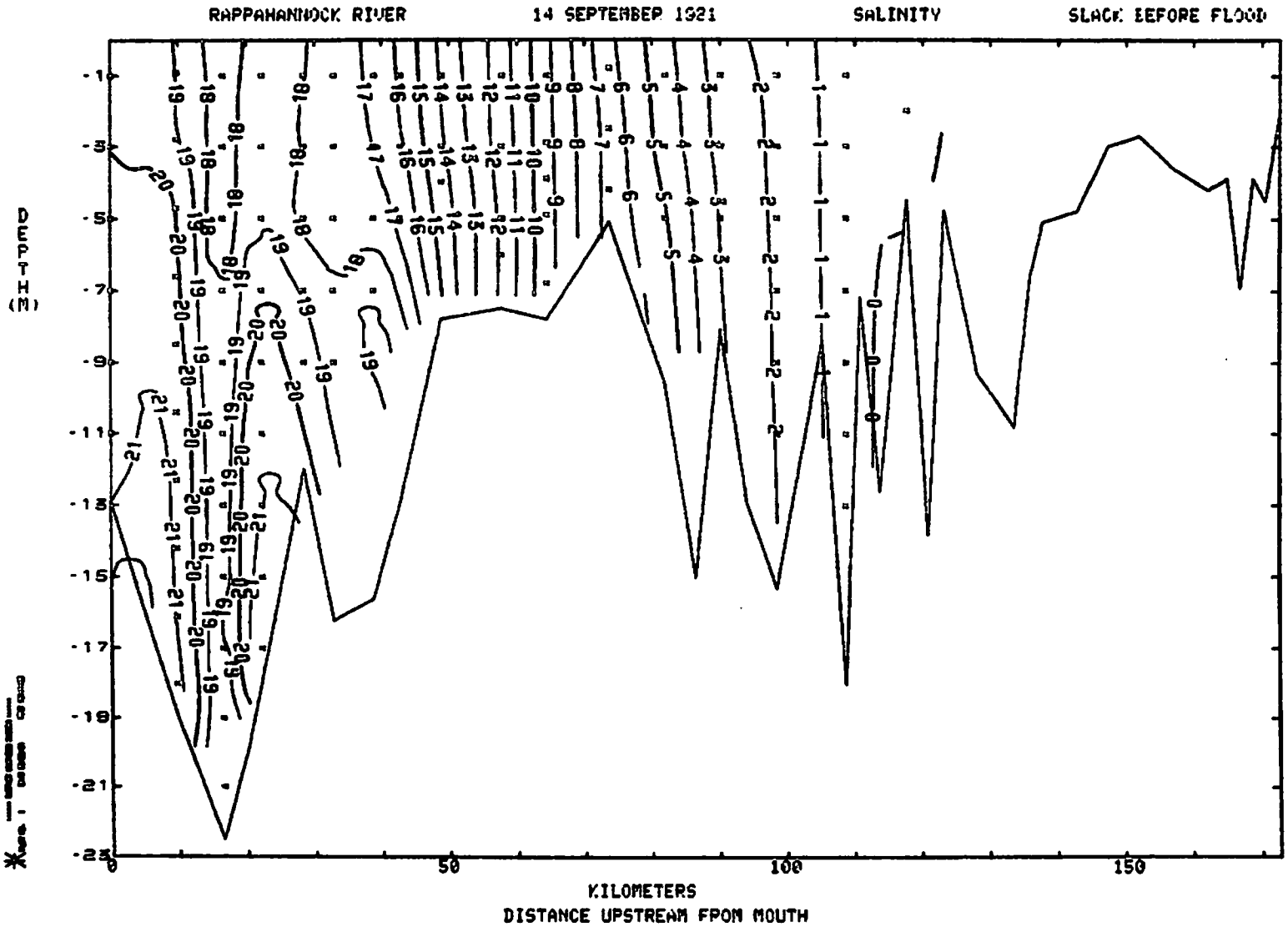
-23
25
26
0
50
100
150
KILOMETERS
DISTANCE UPSTREAM FROM MOUTH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SALINITY
SLACK BEFORE FLOOD
DEPTH (M)
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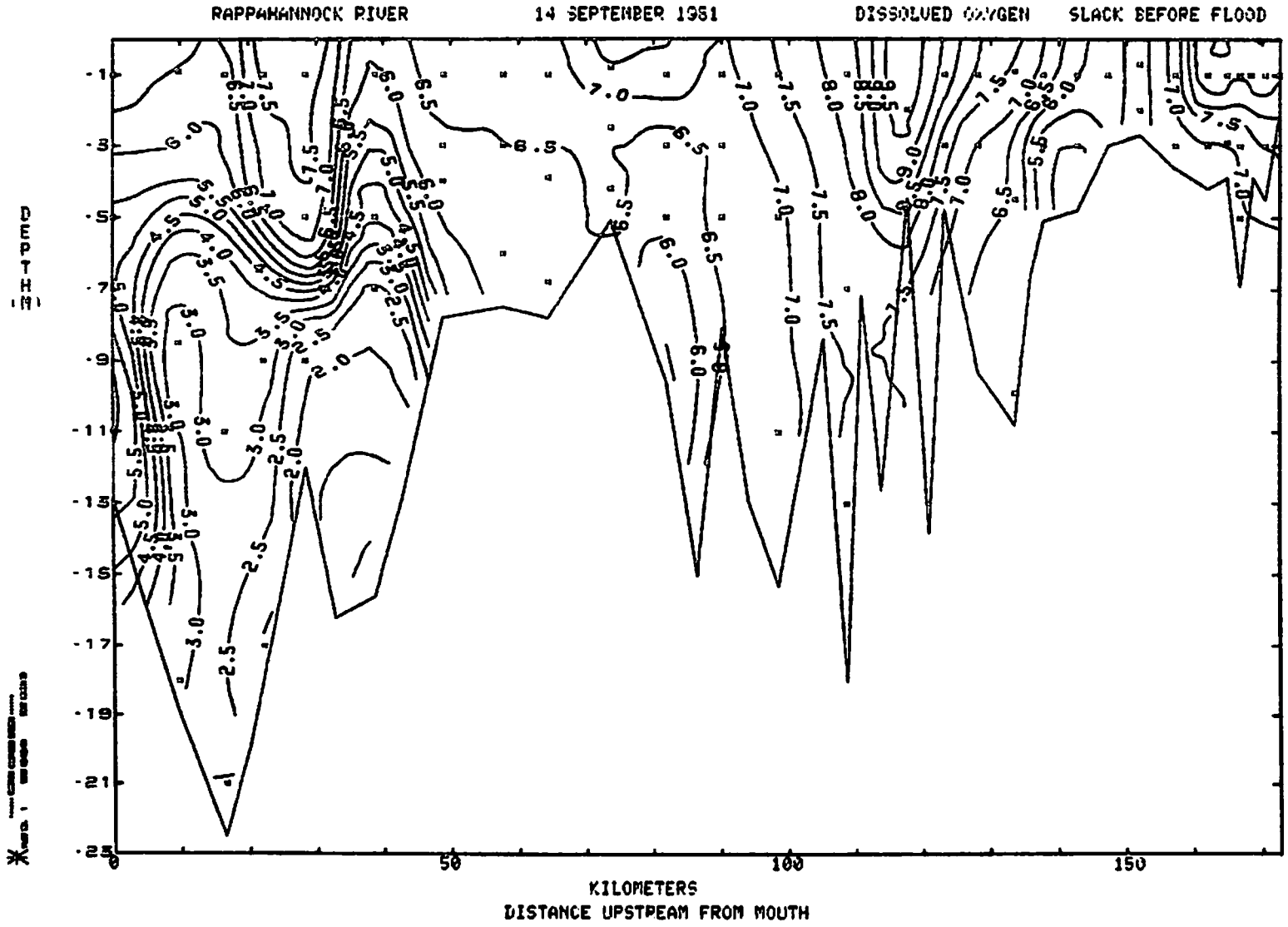
100
150
KILOMETERS
DISTANCE UPSTREAM FROM MOUTH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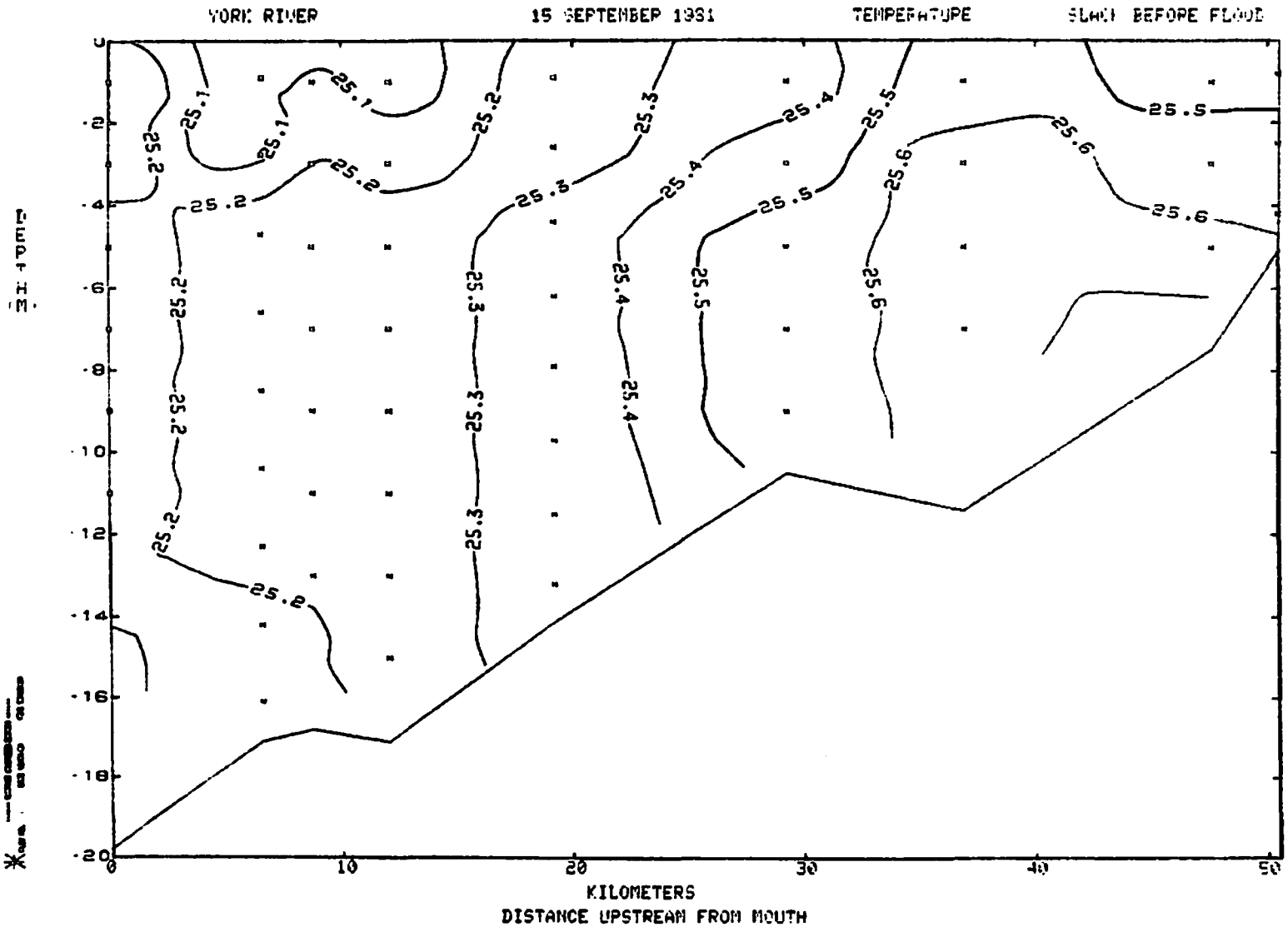
DISSOLVED OXYGEN
SLACK BEFORE FLOOD
DEPTH
KILOMETERS
DISTANCE UPSTREAM FROM MOUTH


YORK RIVER
15 SEPTEMBER 1981
TEMPERATURE
SLACK BEFORE FLOOD
DEPTH
0
2
4
6
8
10
12
14
16
18
20
0
10
20
30
40
50
KILOMETERS
DISTANCE UPSTREAM FROM MOUTH
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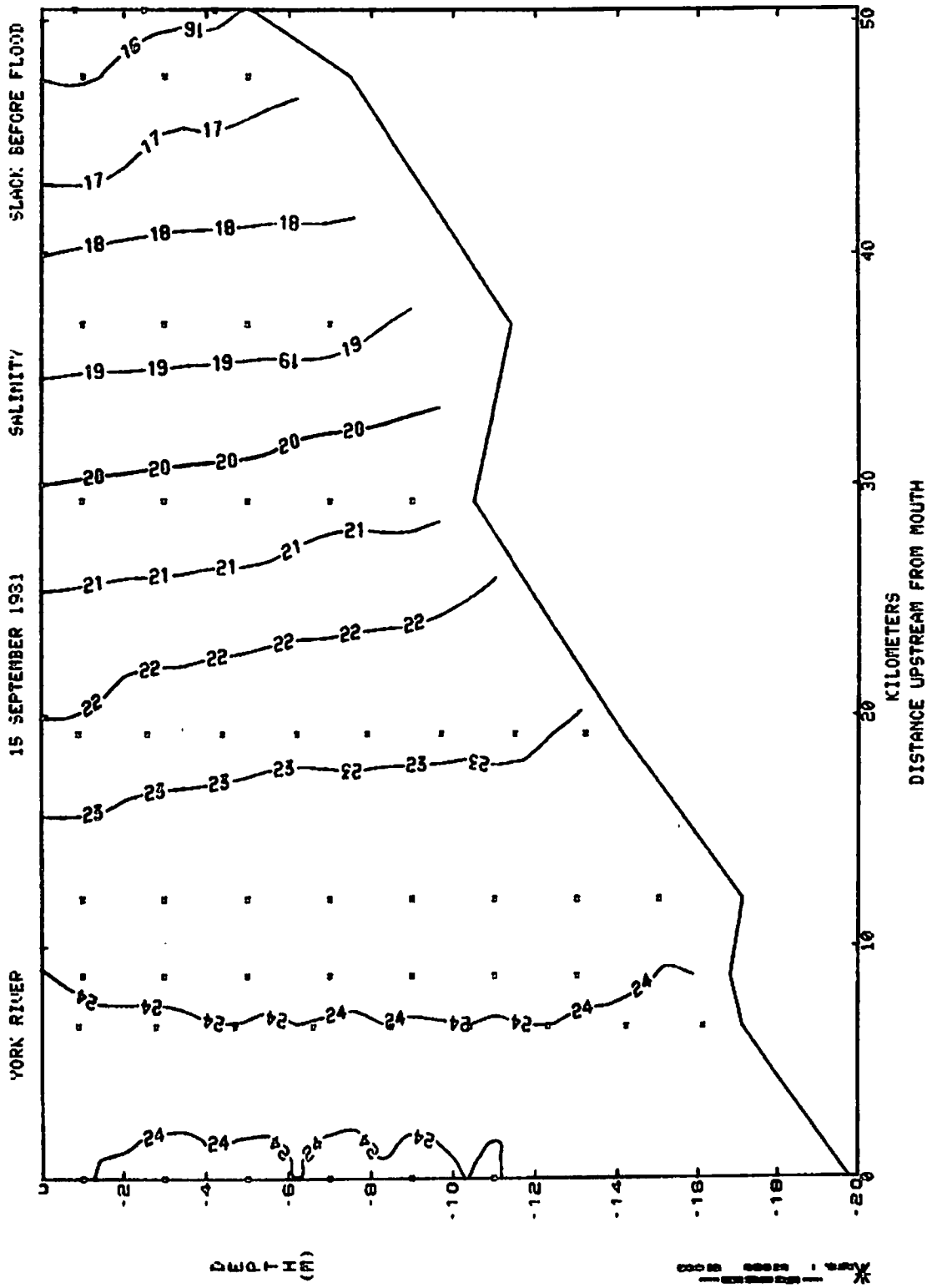
25.2
25.3
25.4
25.5
25.6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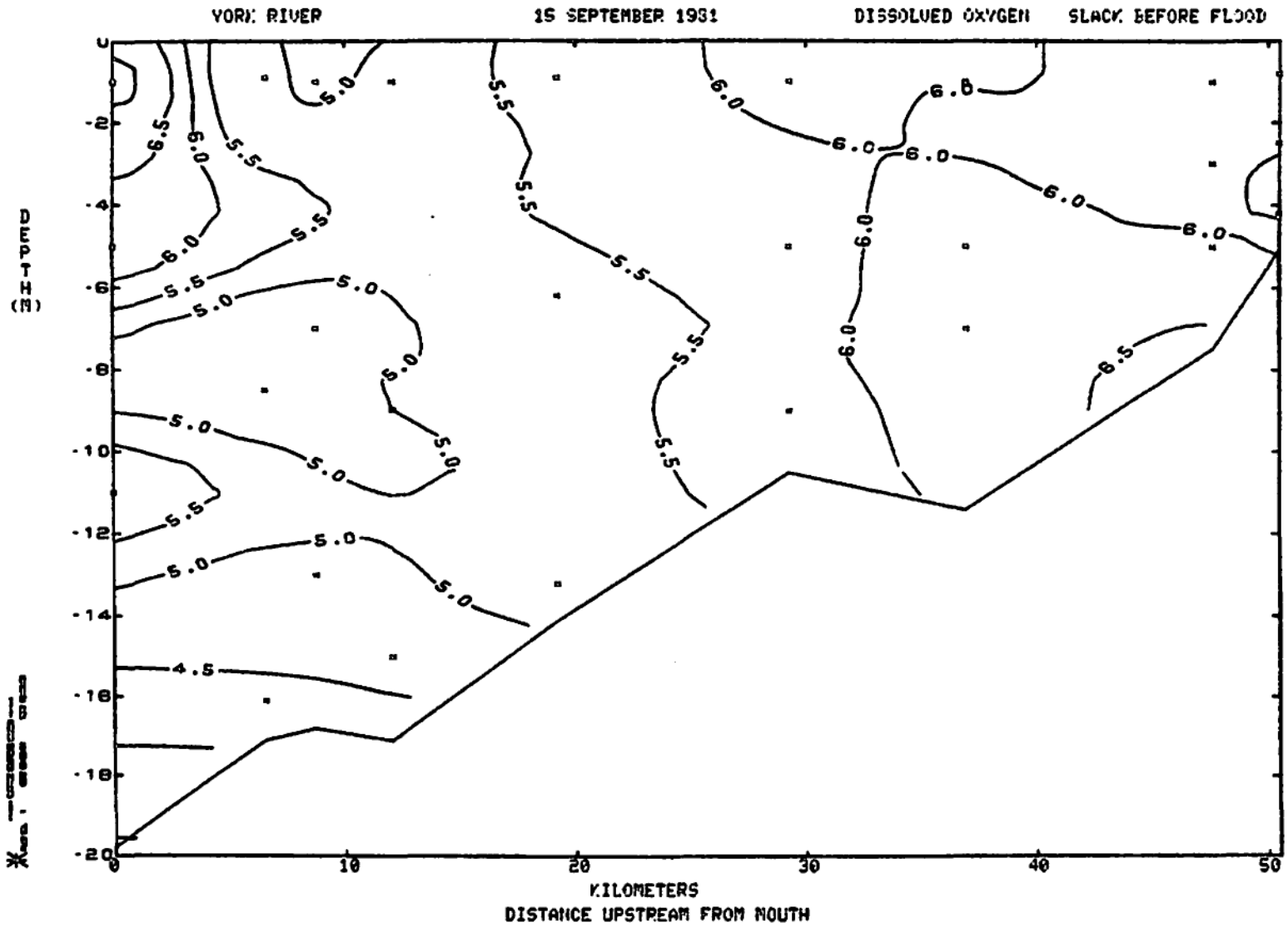
SALINITY
SLACK BEFORE FLOOD
KILOMETERS
DISTANCE UPSTREAM FROM MOUTH
DEPTH (M)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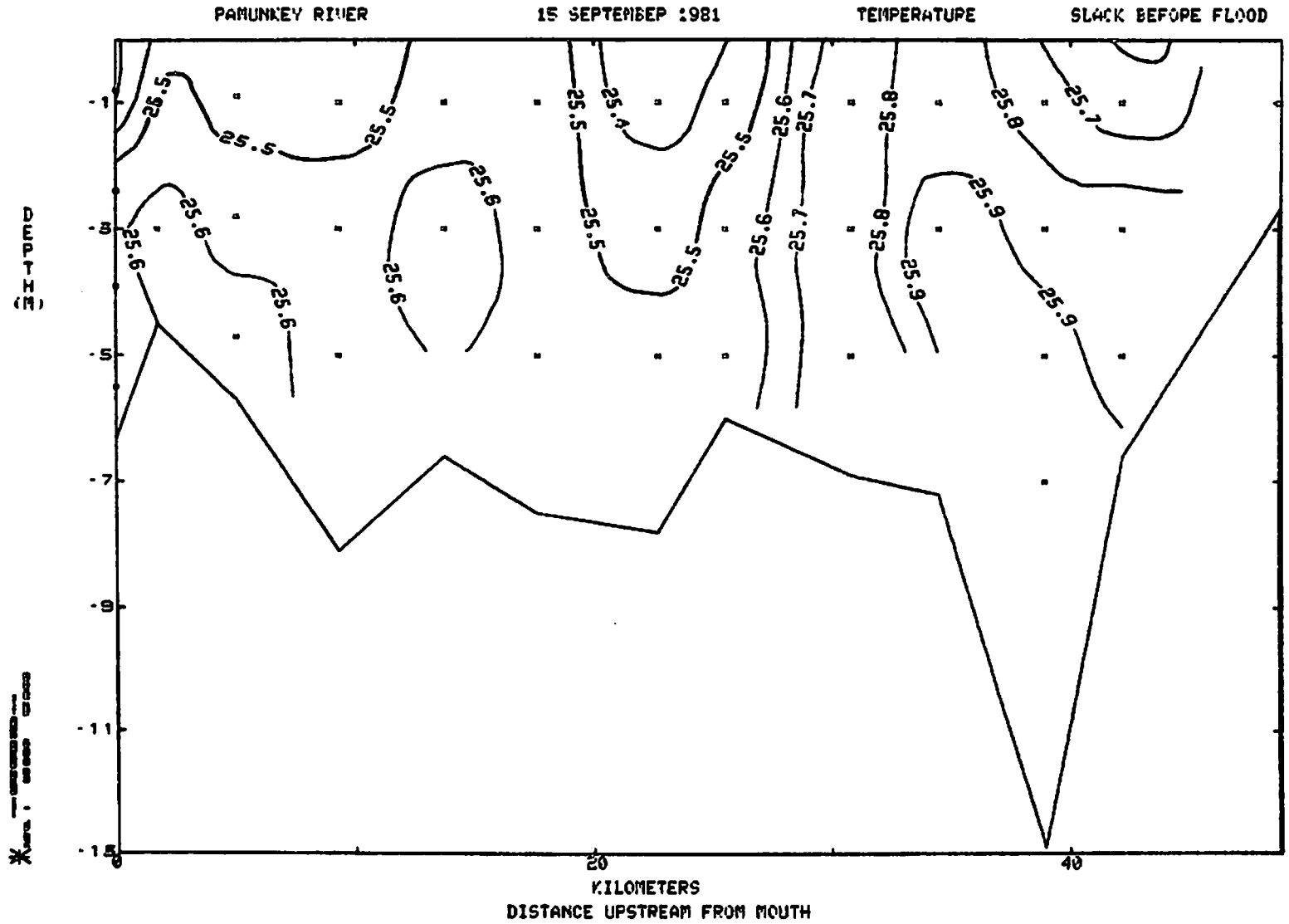
DISSOLVED OXYGEN
SLACK BEFORE FLOOD
DEPTH (M)
KILOMETERS
DISTANCE UPSTREAM FROM MOUTH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15 SEPTEMBER 1981
TEMPERATURE
SLACK BEFORE FLOOD
DEPTH (M)
-1
-3
-5
-7
-9
-11
-13
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20
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KILOMETERS
DISTANCE UPSTREAM FROM MOUTH
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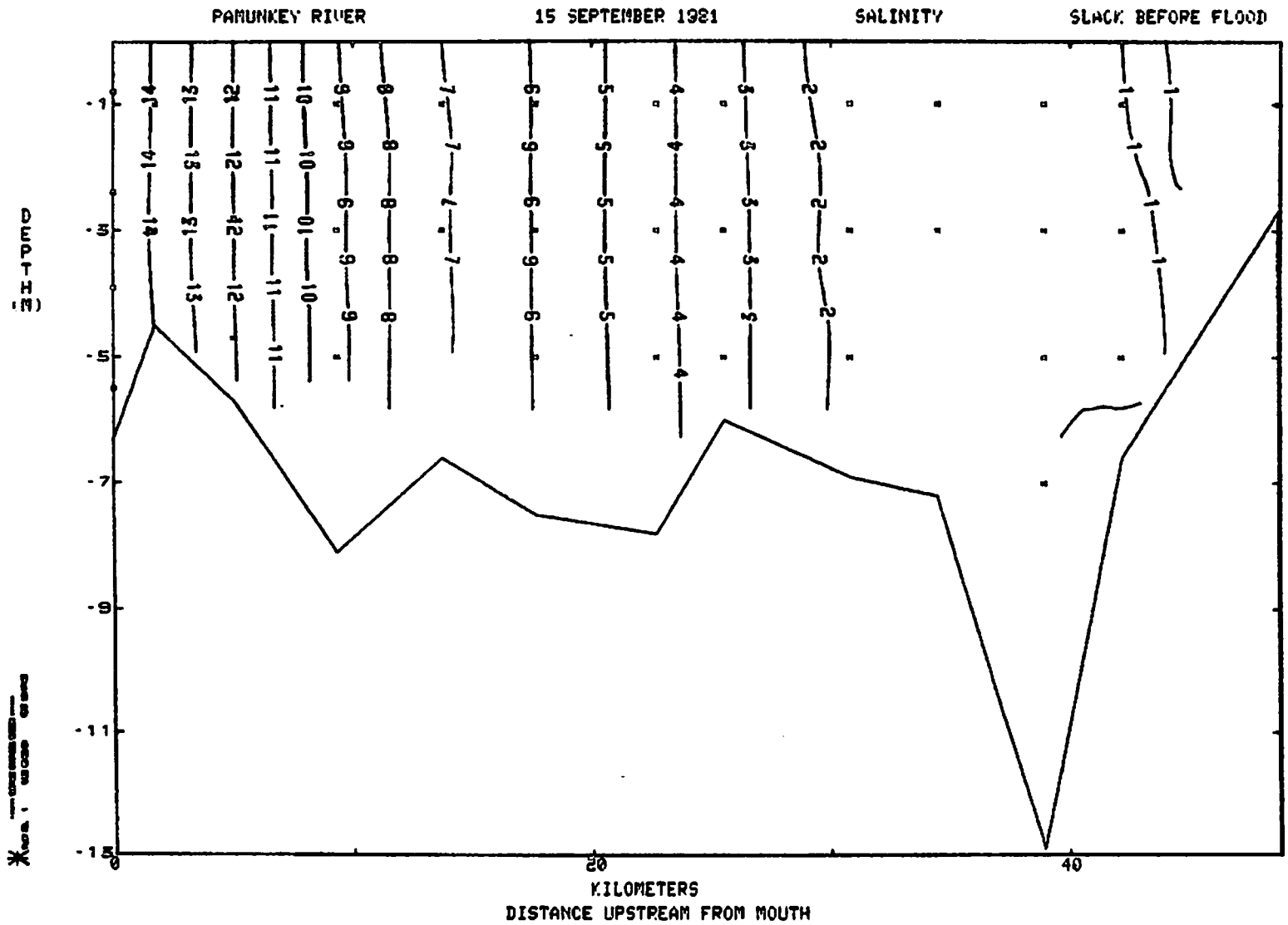
25.8
25.9


PAMUNKEY RIVER
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SALINITY
SLACK BEFORE FLOOD
DEPTH (M)
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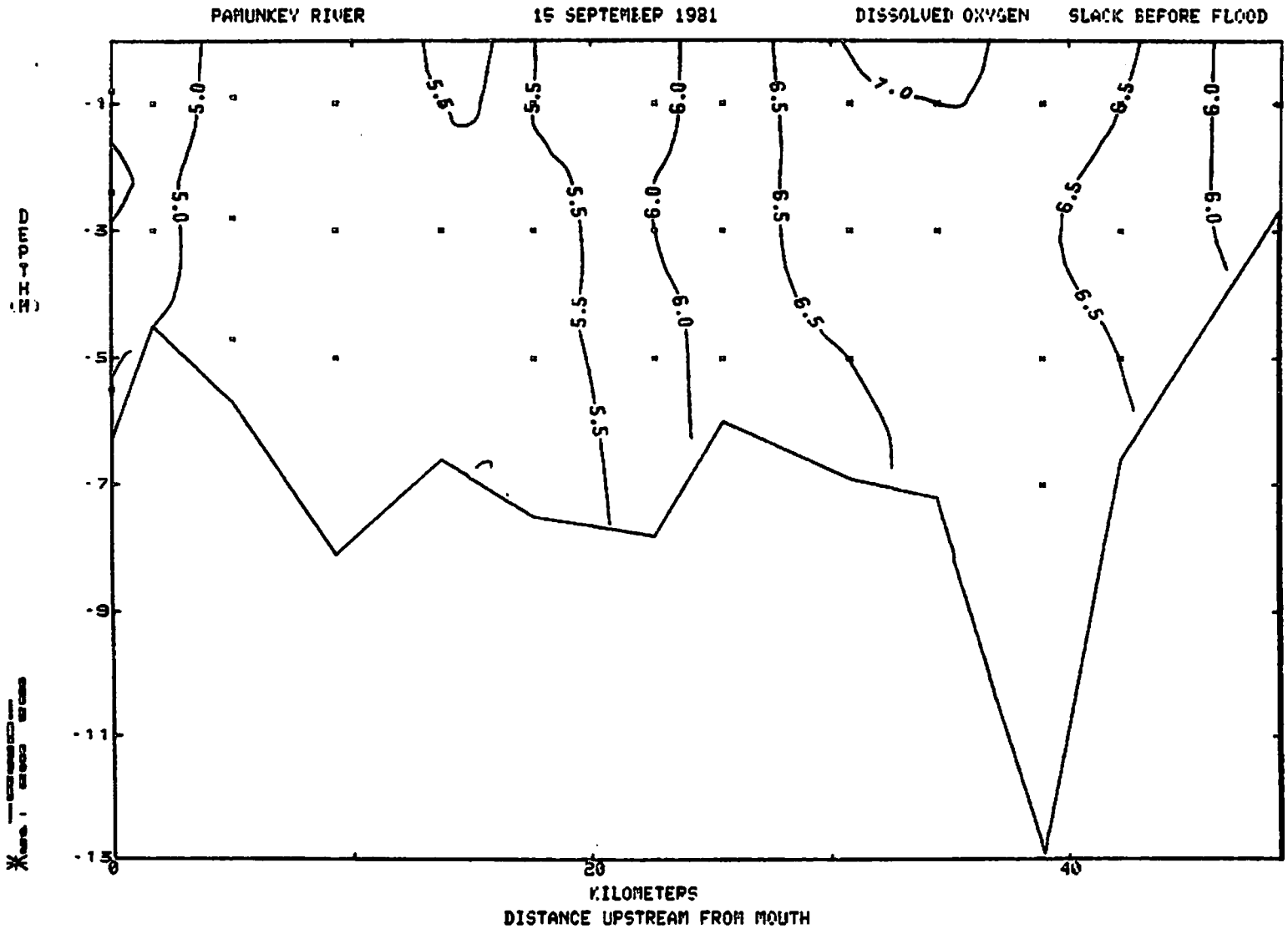
-11
-15
0
20
40
KILOMETERS
DISTANCE UPSTREAM FROM MOUTH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15 SEPTEMBER 1981
DISSOLVED OXYGEN
SLACK BEFORE FLOOD
DEPTH (M)
-1
-3
-5
-7
-9
-11
-13
0
20
40
KILOMETERS
DISTANCE UPSTREAM FROM MOUTH
5.0
5.5
6.0
6.5
7.0

Appendix A. Spatfall Surveys

Location	Depth	Date and Current 8 Sep Ebb	14 Sep Flood
Brown Shoal	Surface	20.3	--
	Bottom (2 m)	20.2	--
Wreck Shoal	Surface	16.7	18.9
	Bottom (3 m)	17.6	19.1
Horsehead	Surface	13.0	13.1
	Bottom (5 m)	13.7	13.1
Deep Water Shoal	Surface	11.9	10.8
	Bottom (2 m)	12.3	10.9
Buoy 32	Surface	10.7	9.3
	Bottom (2 m)	10.8	9.5
Buoy 36	Surface	9.8	9.1
	Bottom (3 m)	10.7	9.1

Appendix B. Lower York Surveys

Hydrographic Features at the Mouth of the York River

		Temperature °C	Salinity °/oo	Oxygen mg/ ℓ	Chlorophyll µg/ℓ
9/3/81	S	24.2	22.94	7.24	11.6
	B	23.5	23.48	4.10	9.3
9/14/81	S	25.1	23.66	7.38	15.9
	B	24.3	24.07	4.74	8.0
9/21/81	S	23.0	23.77	-	6.4
	B	21.9	23.83	-	9.6
9/28/81	S	20.7	24.00	5.8	9.5
	B	20.6	24.16	5.8	25.0

Localized Red waters were observed

9/21/81 - *Glenodinium danicum* dominated.

9/28/81 - Cryptophyte (unknown) dominated with *Glenodinium danicum* present.

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Summary of Field Surveys

(1) Regular slackwater runs

James: October 6, slack before flood
Rappahannock: October 1, slack before flood
York and Pamunkey: October 5, slack before flood

Salinity, temperature and dissolved oxygen distributions are attached. Data for other parameters will be available later, and may be provided upon request.

(2) Spatfall surveys - by Dexter Haven

Surface and bottom salinities were measured weekly on October 5 and 13 at six stations around oyster growing area in the James. Data are attached in Appendix A.

(3) Crab-fish joint trawl surveys - by W. A. VanEngel

Rappahannock: October 2
York and Pamunkey: October 6
James: October 26
Lynnhaven: October 9
Lynnhaven and Little Creek: October 26

Surface and bottom temperature, salinity, D.O., and secchi depth were measured at designated stations.

(4) Lower York surveys - by Paul Zubkoff

Surveys were conducted in the lower York downstream from Clay Bank on October 12 and 26. The parameters measured or sampled include temperature, salinity, D.O., secchi depth, chlorophyll 'a' and silicate.

(5) Zooplankton monitoring program - by George Grant

Salinity, temperature and dissolved oxygen were measured at 16 stations in the lower Bay on October 28 and 29.

For further information, make request to Dr. Albert Kuo, Virginia Institute of Marine Science, Gloucester Point, Virginia 23062. (804)642-2111.

Lesser Neap Tide: October 6

Comments on slackwater run data

(1) The water temperature was fairly uniform throughout the rivers. The cooling trend proceeds in a very rapid pace. The temperature decreased by 5°C to 7°C from that of September surveys which were conducted about 20 days earlier.

(2) Salinity shows little change from that of the October surveys. However, sign of further salt water intrusion may be detected by a lens of saltier water in the deeper layer near the mouth of the James and York rivers respectively.

(3) Because of the drastic decrease in water temperature, the dissolved oxygen has increased to above 6.0 mg/l throughout all three rivers except a short reach of upper tidal James. An unusual situation occurred at the upper tidal James where DO below 5.0 mg/l was observed at a short distance downstream of Richmond.

Scheduled Surveys in November

(1) Regular slackwater surveys

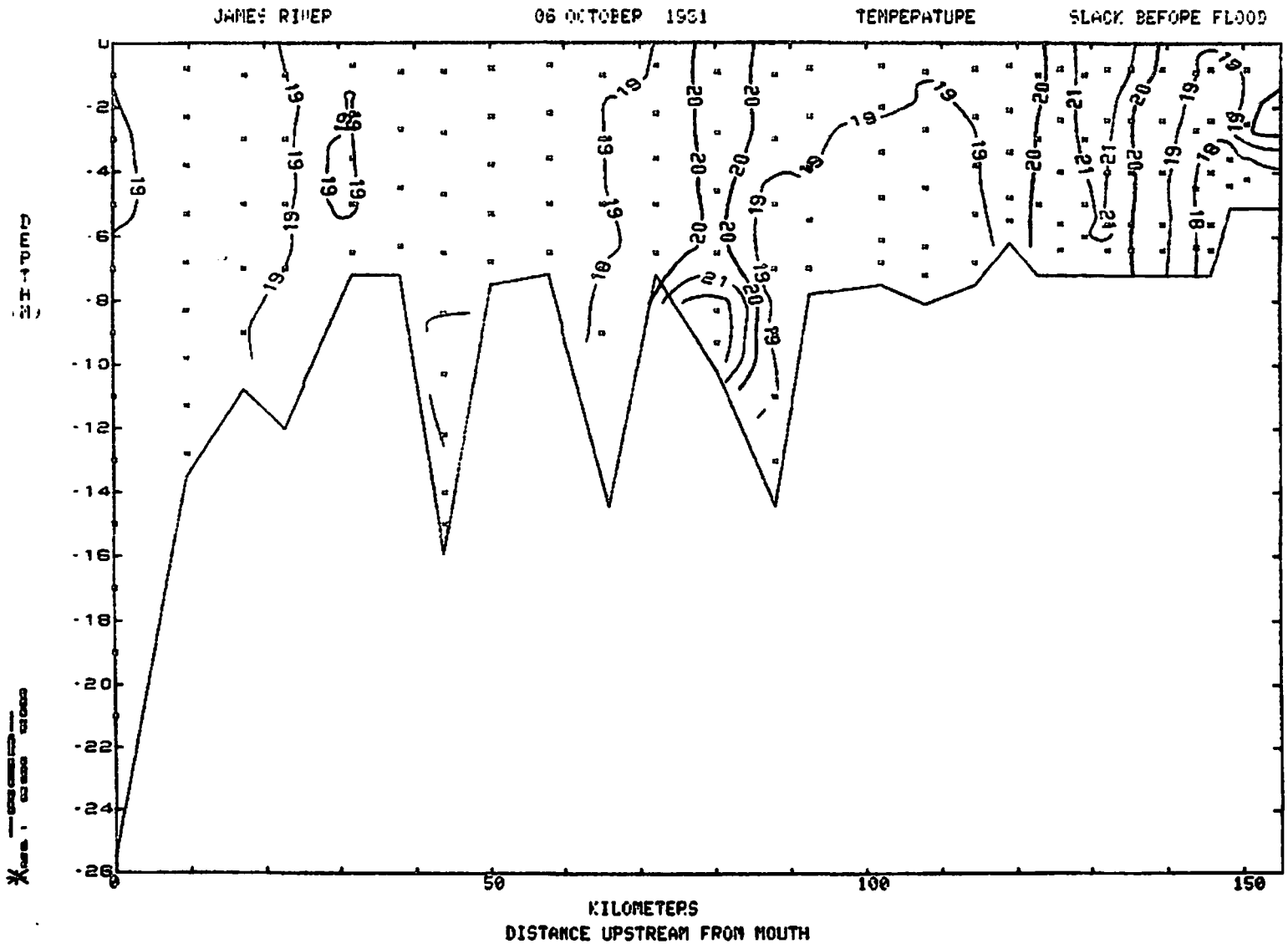
There is no scheduled slackwater survey in November. However, because of persistent high salinity in the rivers, additional surveys will be conducted in all three rivers to monitor salinity and temperature in the saline portions of the rivers.

(2) Lower York survey - by Paul Zubkoff

Surveys will be conducted on 4, 11 and 18 November 1981.

(3) Crab-fish joint trawl survey - by W. A. Van Engel

Rappahannock: November 2
York and Pamunkey: November 4
James: to be scheduled
Lynnhaven and Little Creek: to be scheduled


JAMES RIVER
06 OCTOBER 1981
TEMPERATURE
SLACK BEFORE FLOOD
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
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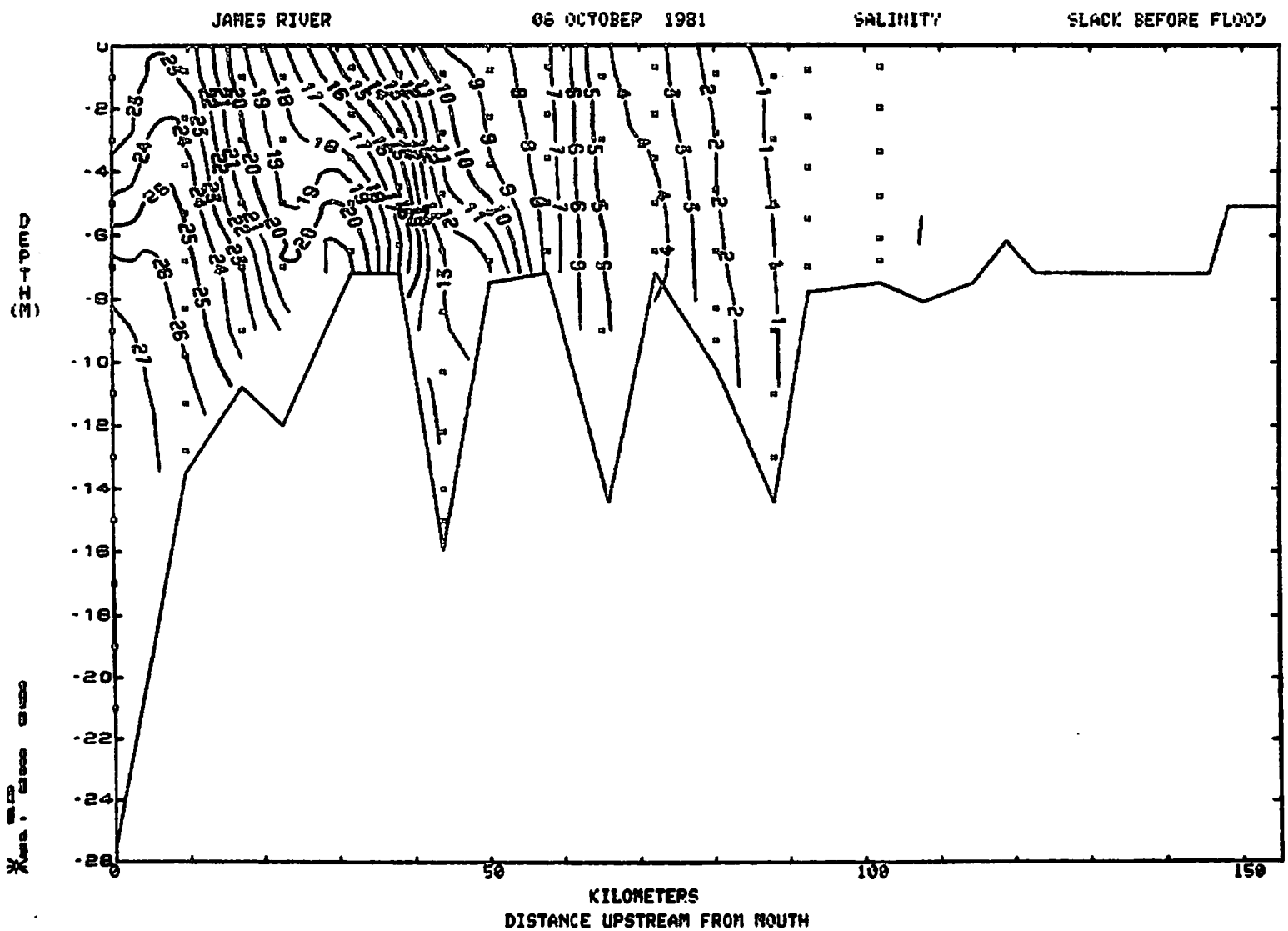
-22
-24
-26
0
50
100
150
KILOMETERS
DISTANCE UPSTREAM FROM MOUTH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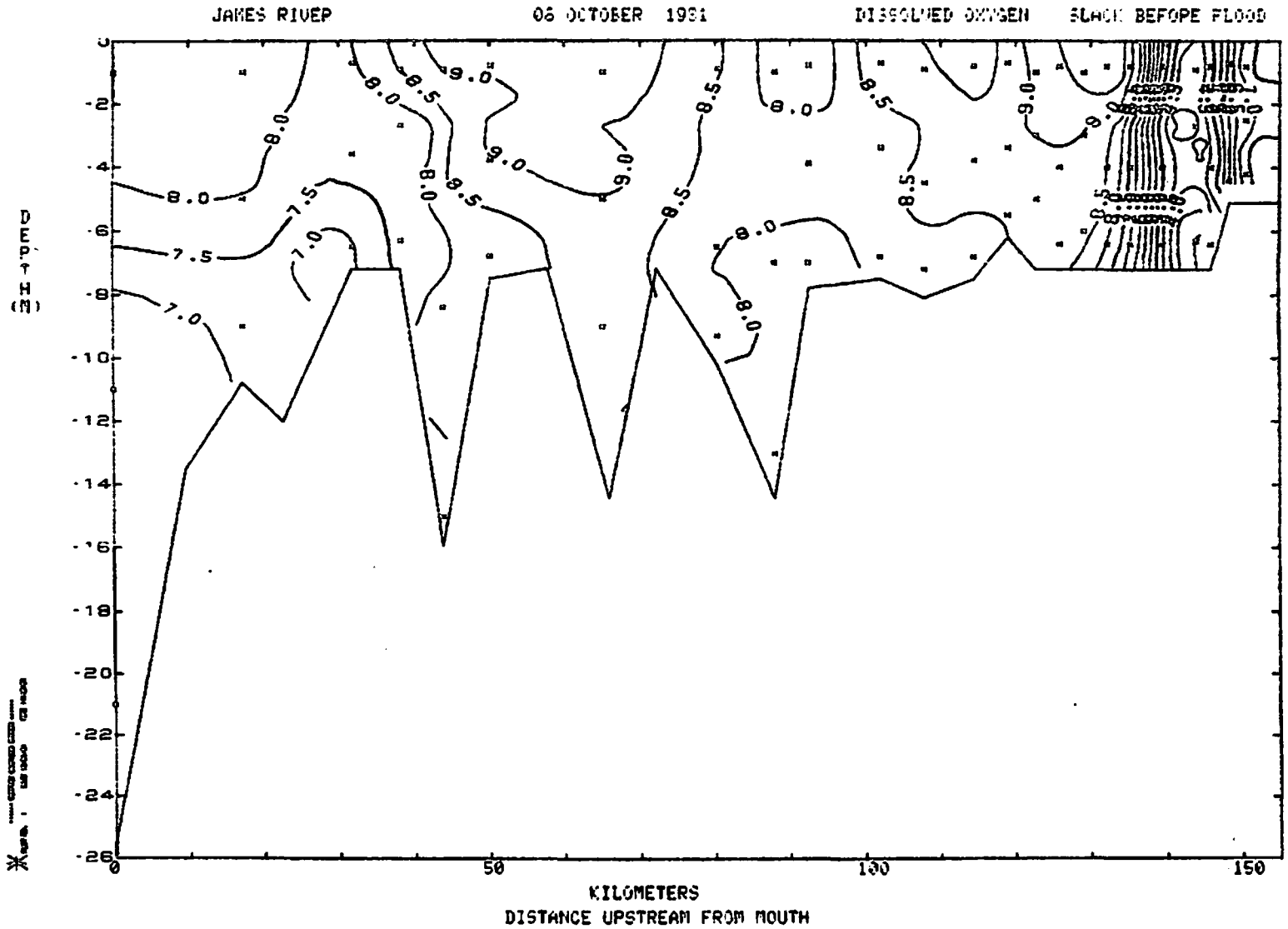
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8.0
7.5
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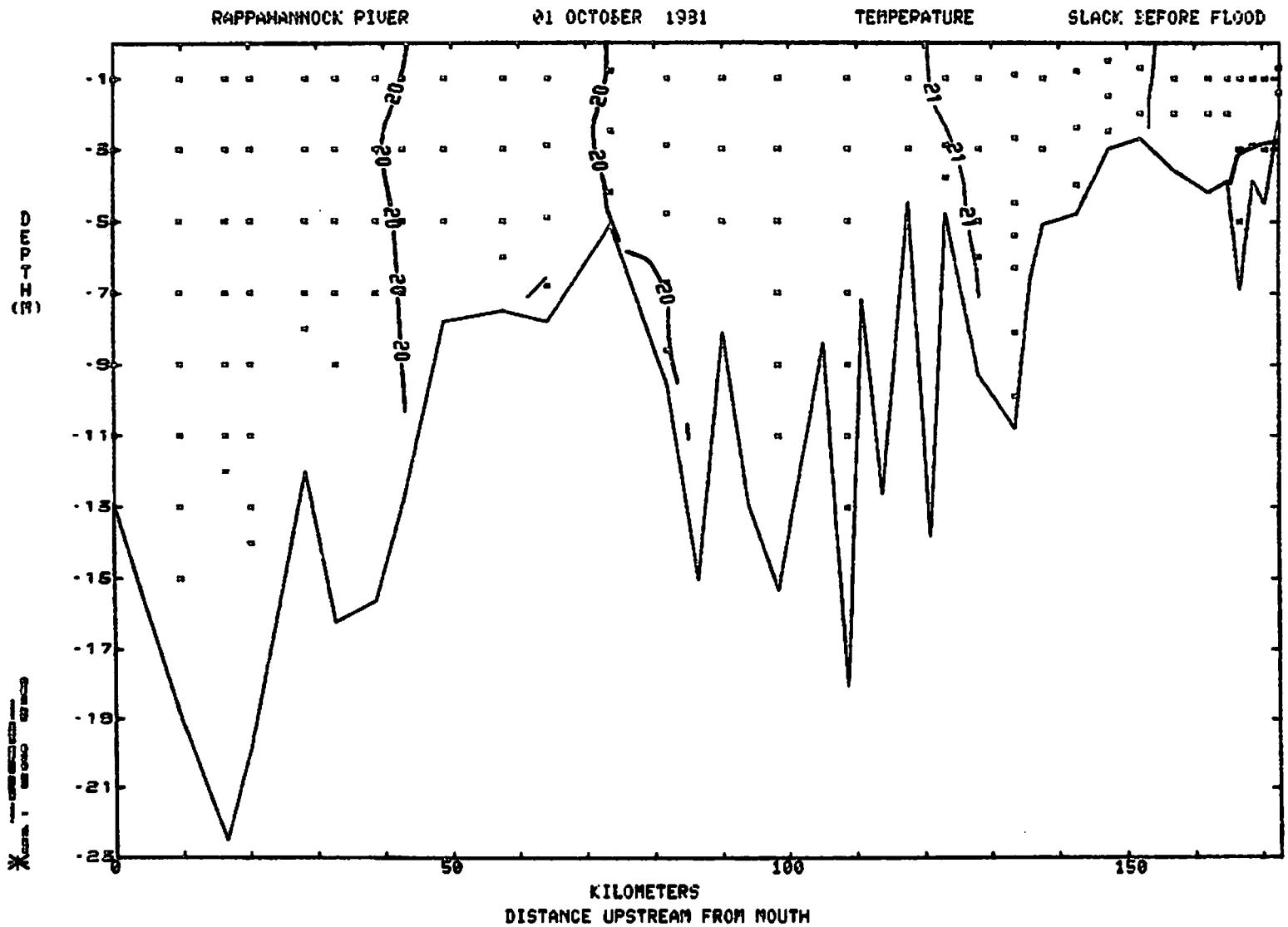
9.0


RAPPAHANNOCK RIVER
01 OCTOBER 1931
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DEPTH (M)
-1
-3
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KILOMETERS
DISTANCE UPSTREAM FROM MOUTH
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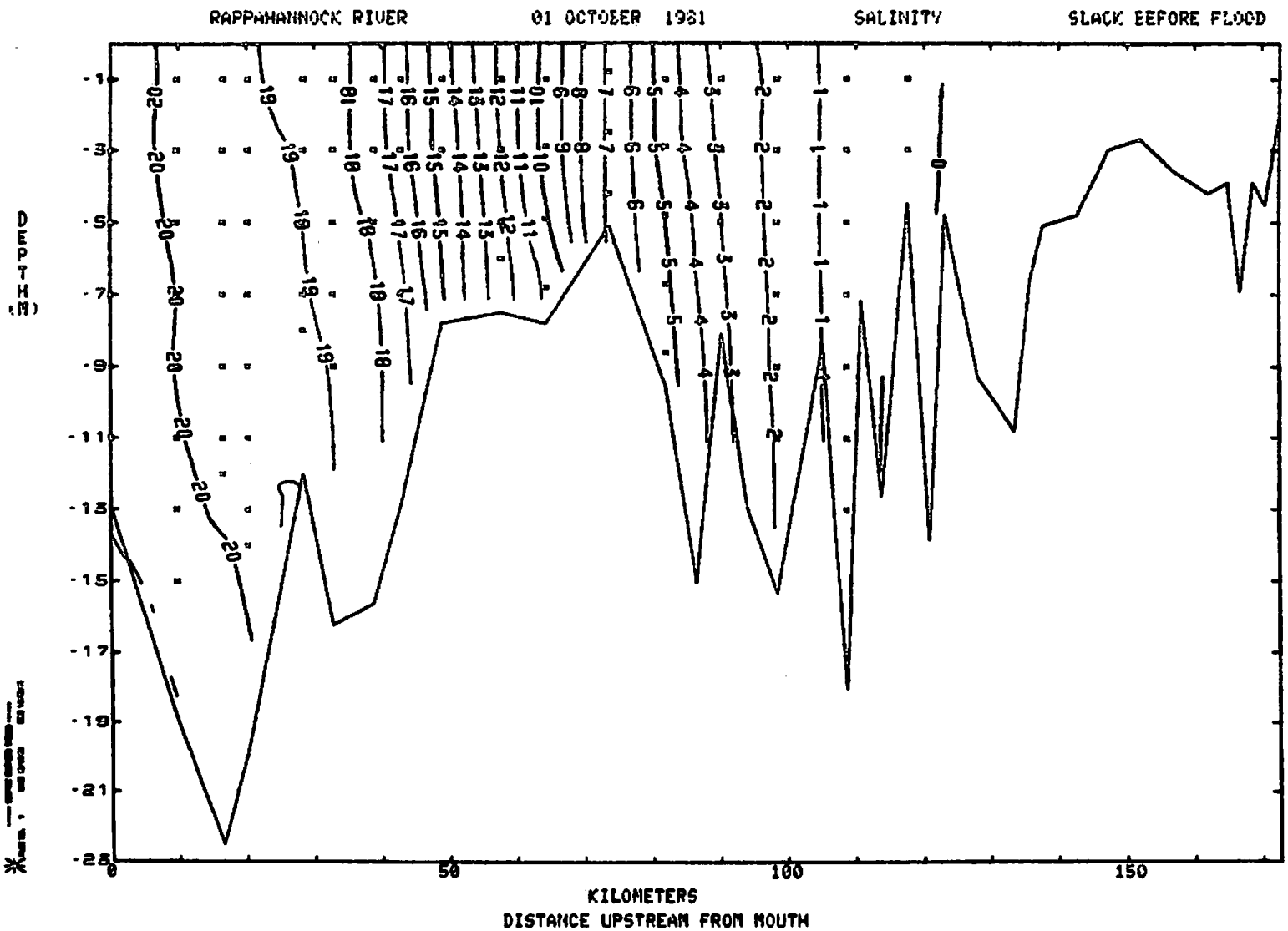
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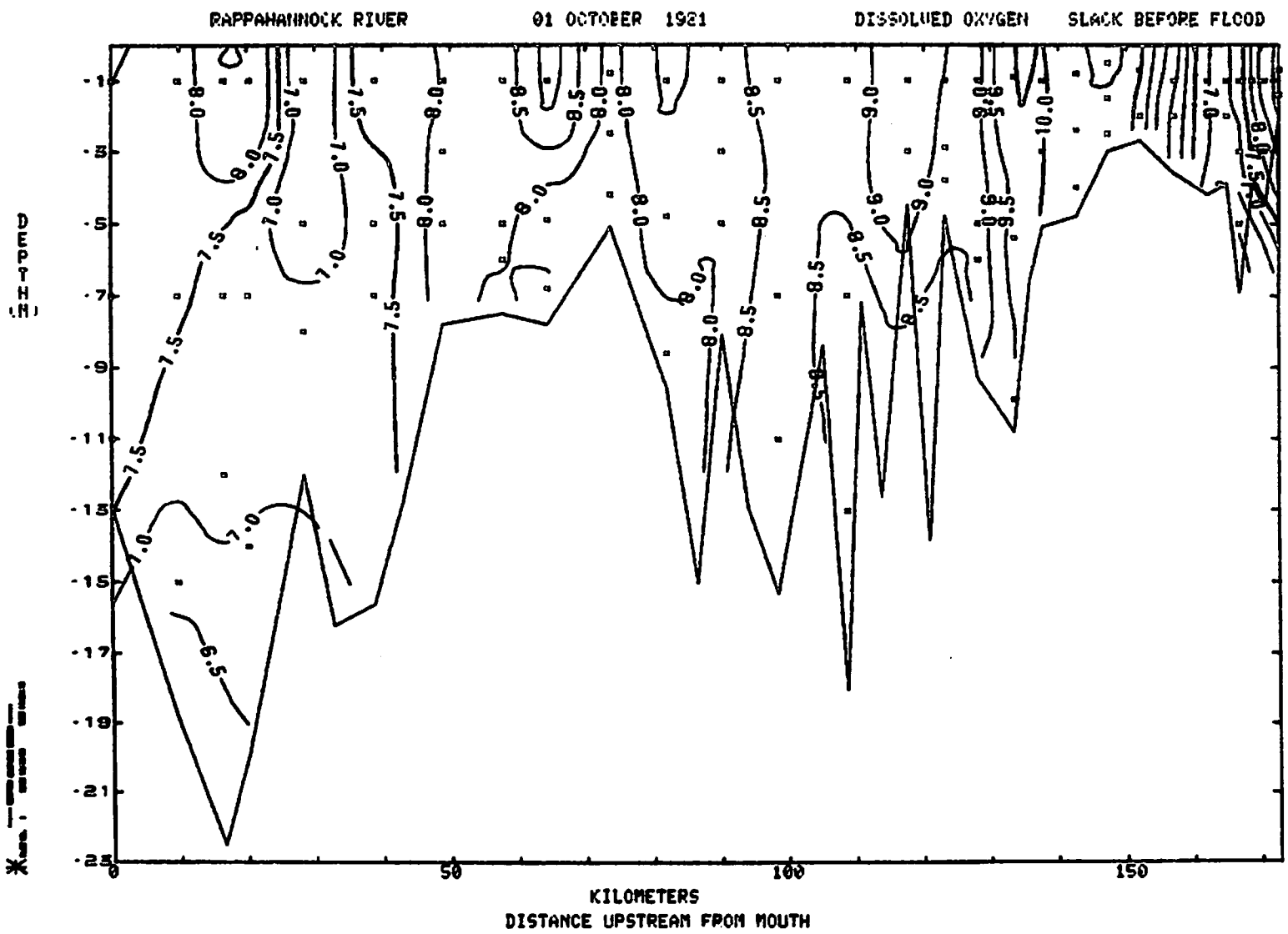
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01 OCTOBER 1921
DISSOLVED OXYGEN
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-1
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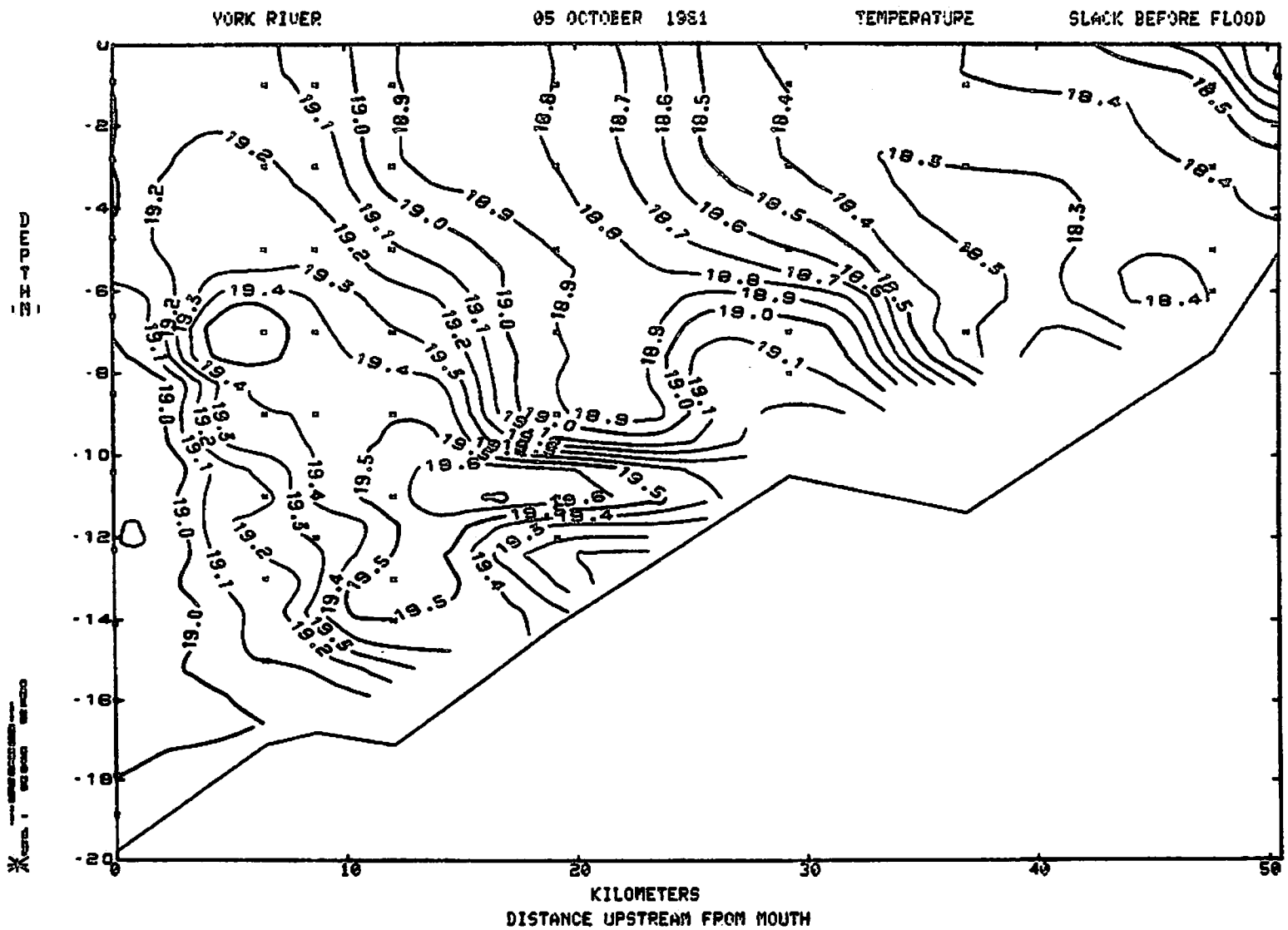
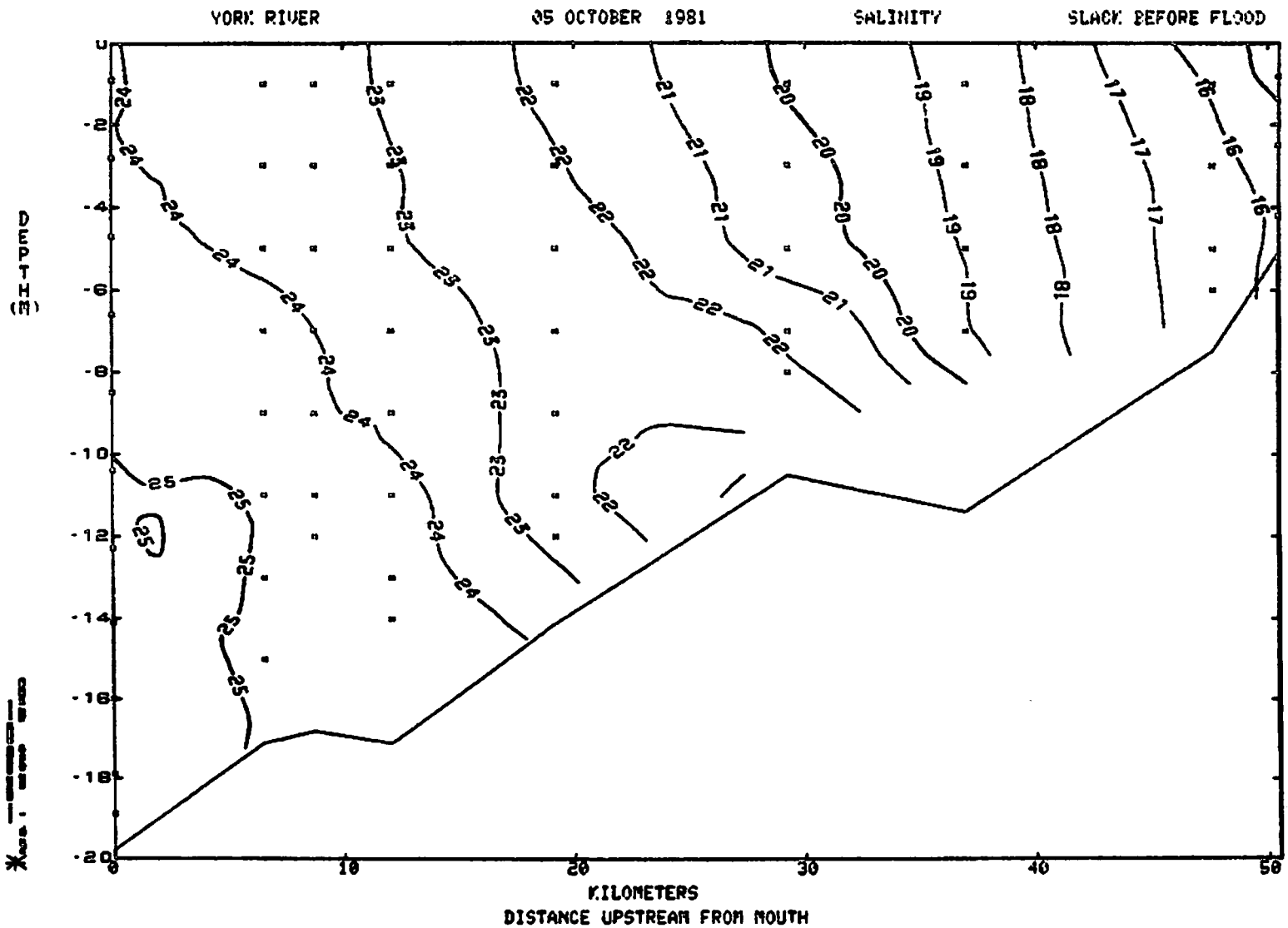

YORK RIVER
05 OCTOBER 1981
TEMPERATURE
SLACK BEFORE FLOOD
DEPTH
KILOMETERS
DISTANCE UPSTREAM FROM MOUTH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KILOMETERS
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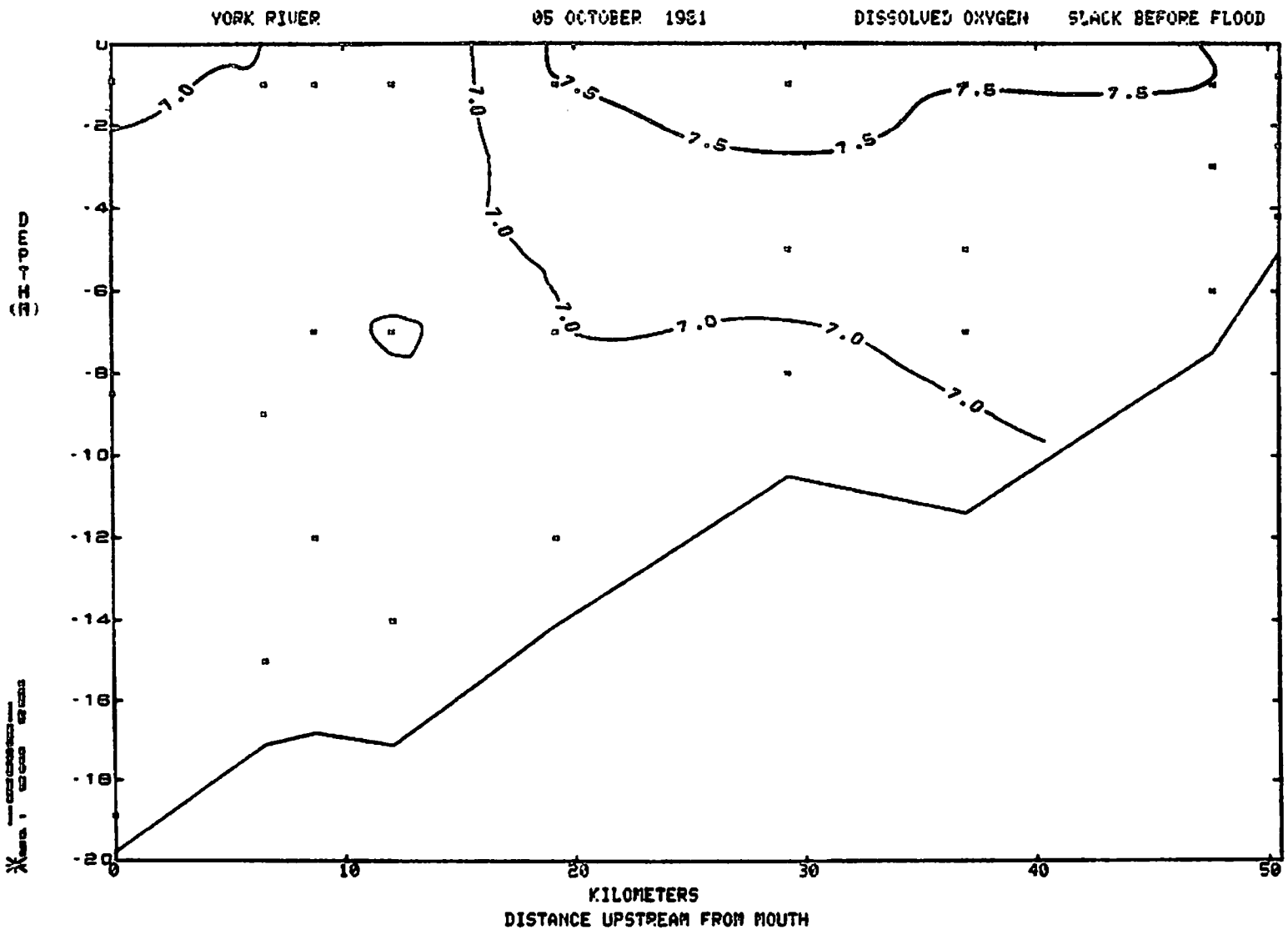
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40
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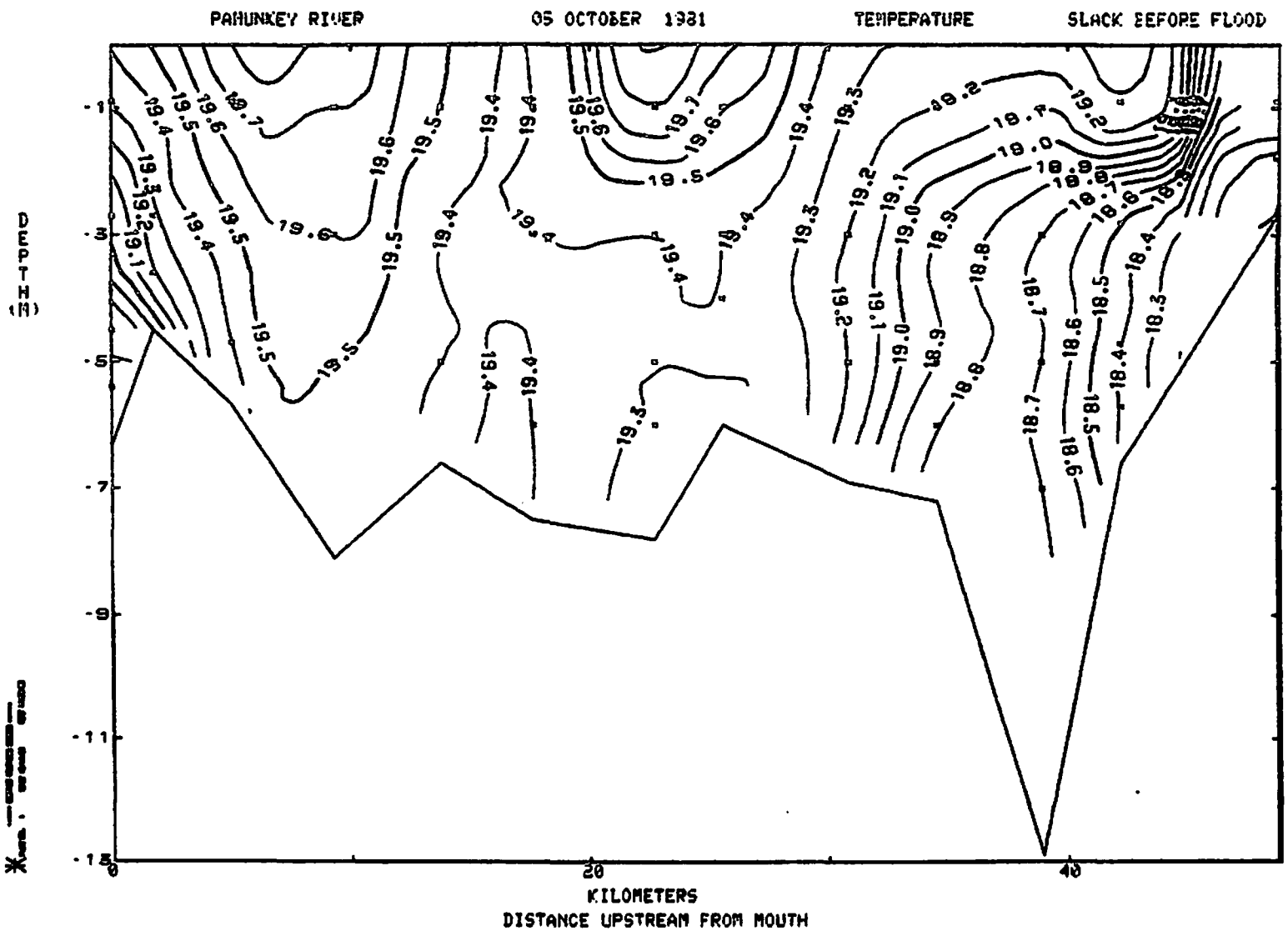
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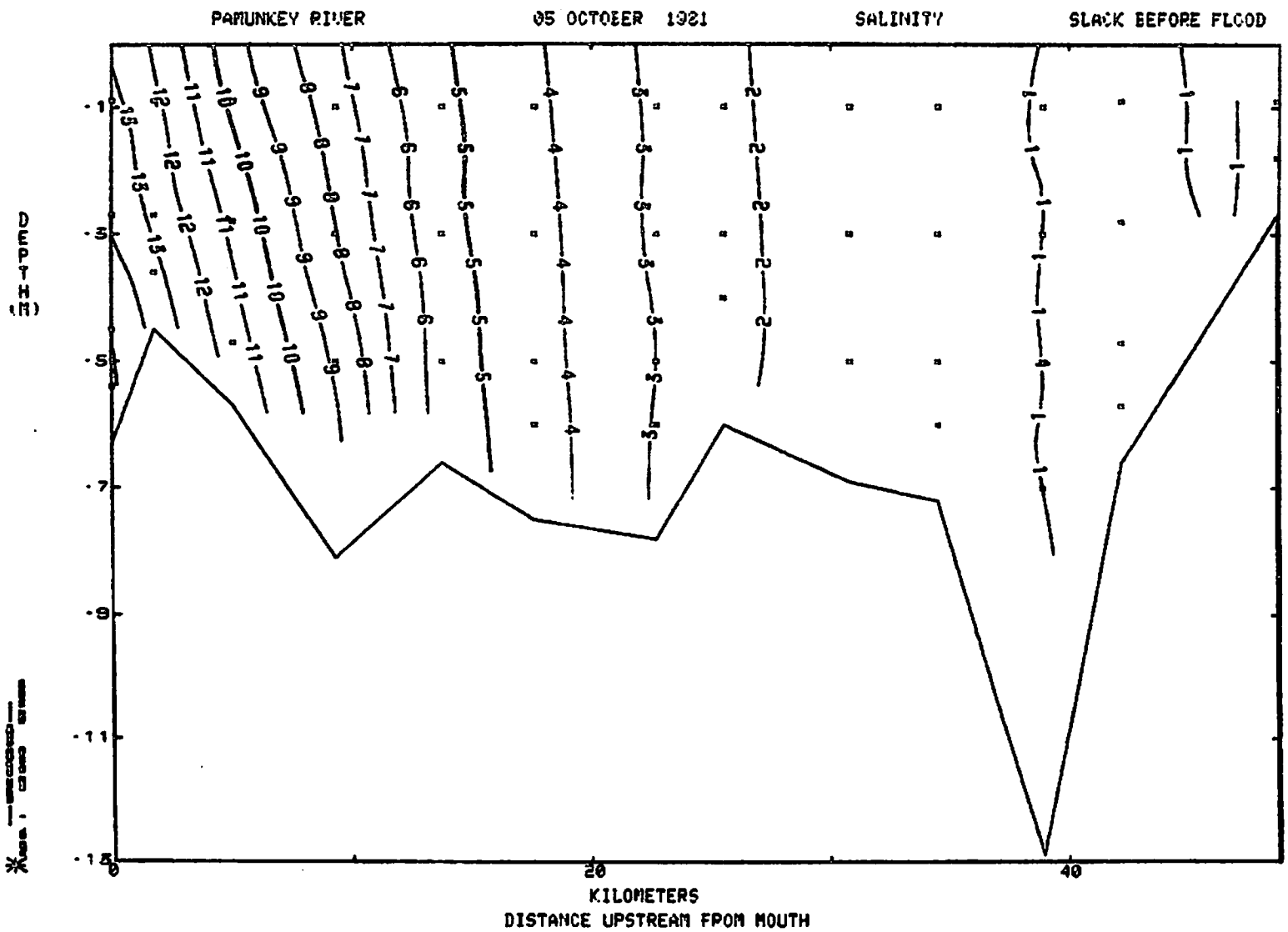
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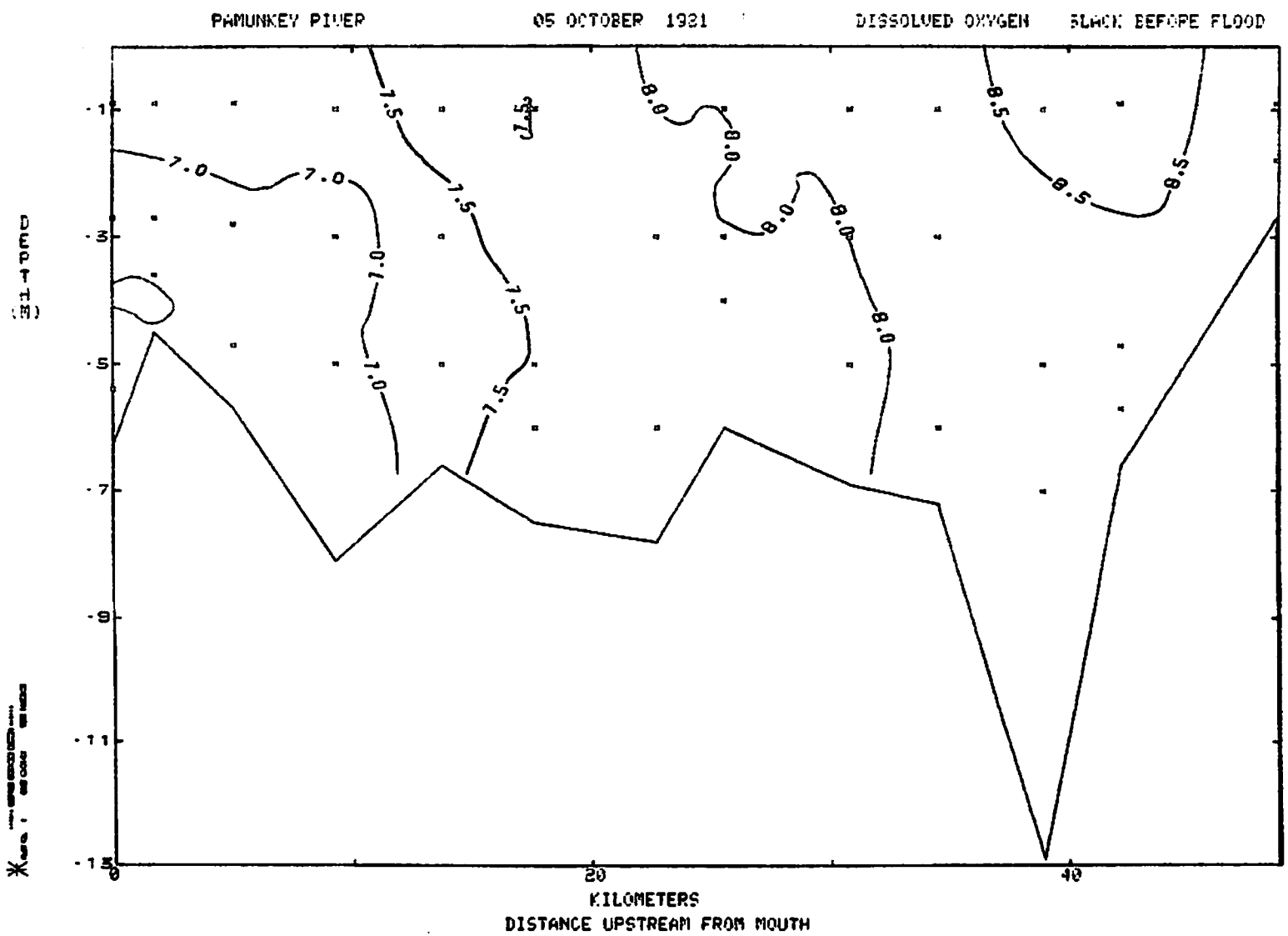
05 OCTOBER 1981
SALINITY
SLACK BEFORE FLOOD
DEPTH (M)
KILOMETERS
DISTANCE UPSTREAM FROM MOUTH


PAMUNKEY RIVER
05 OCTOBER 1981
DISSOLVED OXYGEN
BLACK BEFORE FLOOD
7.0
7.0
1.0
1.0
1.5
1.5
1.5
1.5
8.0
8.0
8.0
8.0
8.5
8.5
8.5
0
20
40
KILOMETERS
DISTANCE UPSTREAM FROM MOUTH

Appendix A. Spatfall Survey Results

Location	28 September		5 October		13 October	
	Surface (around slk hi)	Bottom	Surface (ebb)	Bottom	Surface (flood)	Bottom
Brown Shoal	21.228	21.485	19.499	19.754	--	--
Wreck Shoal	19.209	19.343	14.550	15.194	22.291	22.613
Horsehead Bar	13.573	13.713	10.716	11.697	18.137	18.112
Deep Water Shoal	10.525	10.342	10.443	10.488	17.162	17.194
Buoy 32	9.100	9.073	9.342	9.328	15.190	15.611
Buoy 36	--	--	8.245	8.225	14.073	14.216