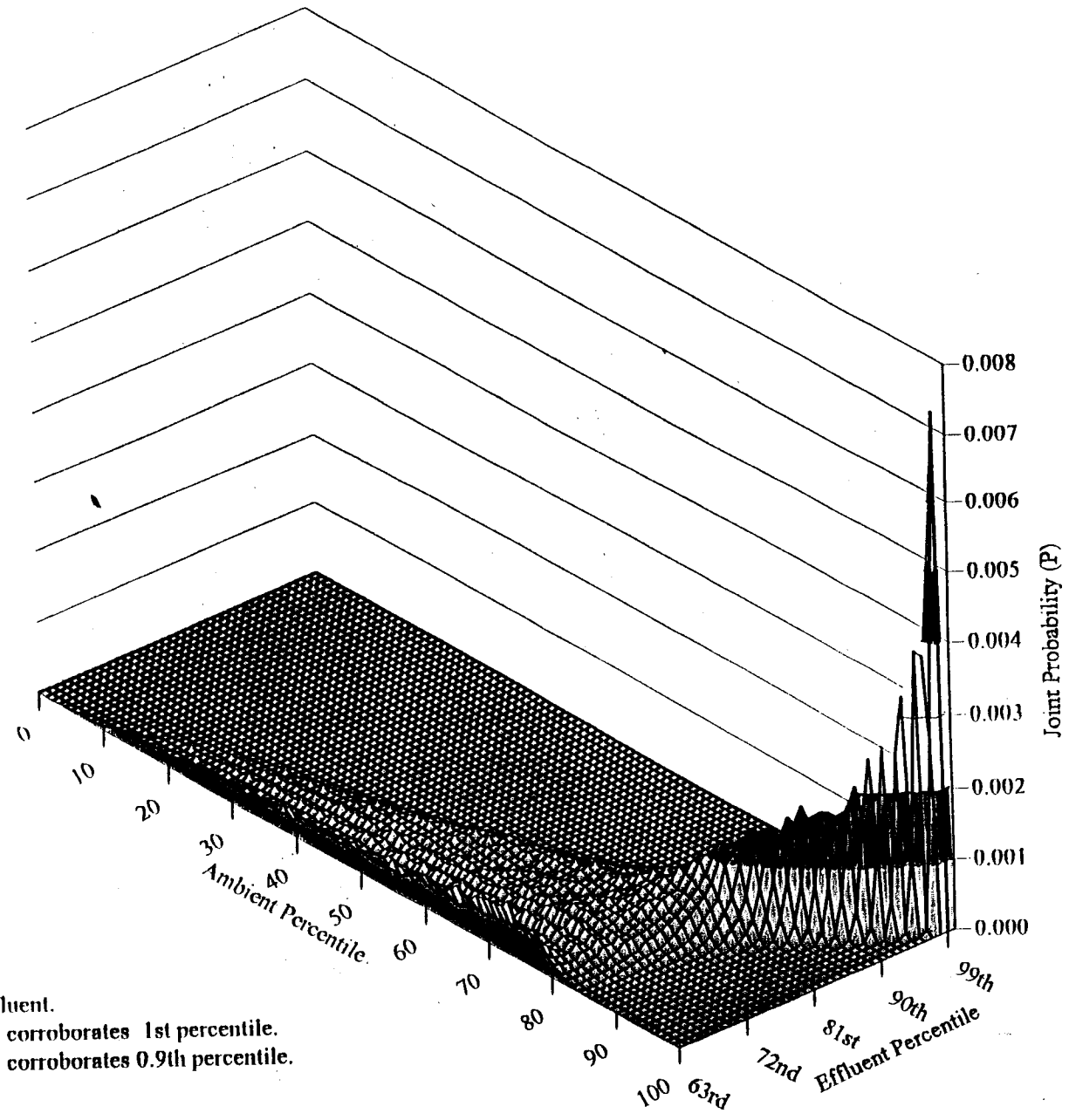
3RWN Ambient and Effluent Discharge Joint Probability



Notes:

1. P=0.612 for zero effluent.
2. 7Q10 flow (0.16cfs) corroborates 1st percentile.
3. 5Q30 (0.15cfs) flow corroborates 0.9th percentile.

3RWN Time and Dilution Factors Compared to Joint Probability P

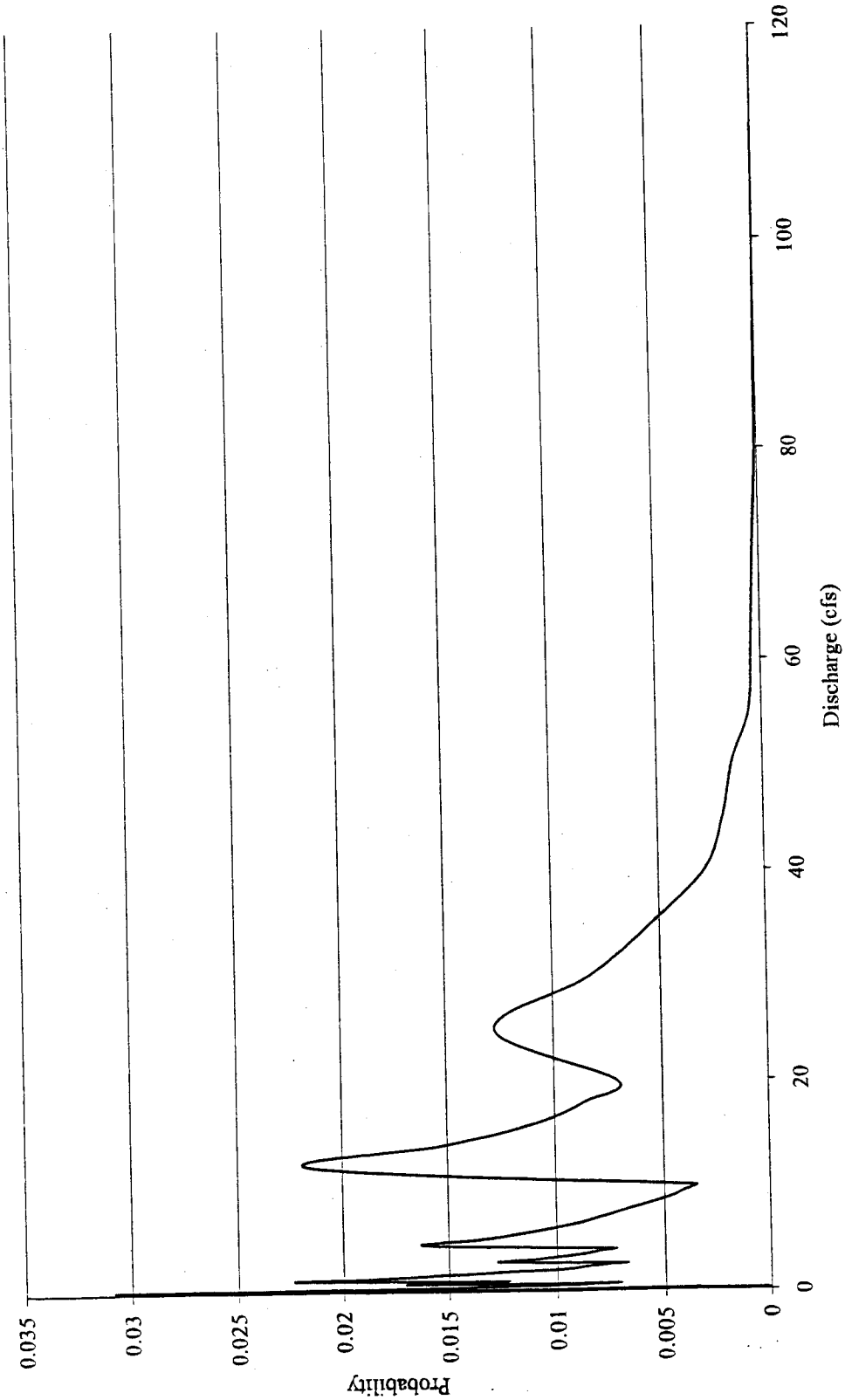
	Percent corroborating joint probability greater than P			Dilution Factors (DF)				
P	Total Time	Effluent Present[a]	Unique DF[b]	Min.	Max.	μ	σ	No.[b]
0.00000	39%	100%	100%	3.6	5294	193	452	1520
0.00000	38%	98%	94%	5.3	5294	194	451	1428
0.00001	37%	96%	92%	5.4	5294	198	456	1391
0.00001	37%	95%	89%	5.6	4883	197	440	1357
0.00002	36%	93%	87%	5.8	4517	197	425	1328
0.00002	35%	91%	86%	5.8	4517	198	426	1304
0.00005	32%	84%	80%	6.3	4517	201	430	1215
0.00007	30%	76%	74%	6.9	4517	207	434	1131
0.00010	27%	68%	68%	7.5	3906	209	411	1034
0.00050	8.9%	23%	11%	11	3189	151	533	172
0.00080	5.3%	14%	5.3%	14	28	19	3	81
0.00100	4.0%	10%	3.6%	15	25	20	2	54
0.00200	1.3%	3.4%	0.72%	18	24	21	2	11
0.00300	0.33%	0.85%	0.26%	19	22	20	1	4
0.00400	0.33%	0.85%	0.07%	19	19	19		1
0.00500	0.23%	0.60%						
0.00600	0.13%	0.34%						
0.00700	0.03%	0.08%						
0.00731	0.00%	0.00%						

[a] Effluent is present approximately 38% of the time.

[b] Based on number of unique DF w/P>0; there are multiple occurences of some DF.

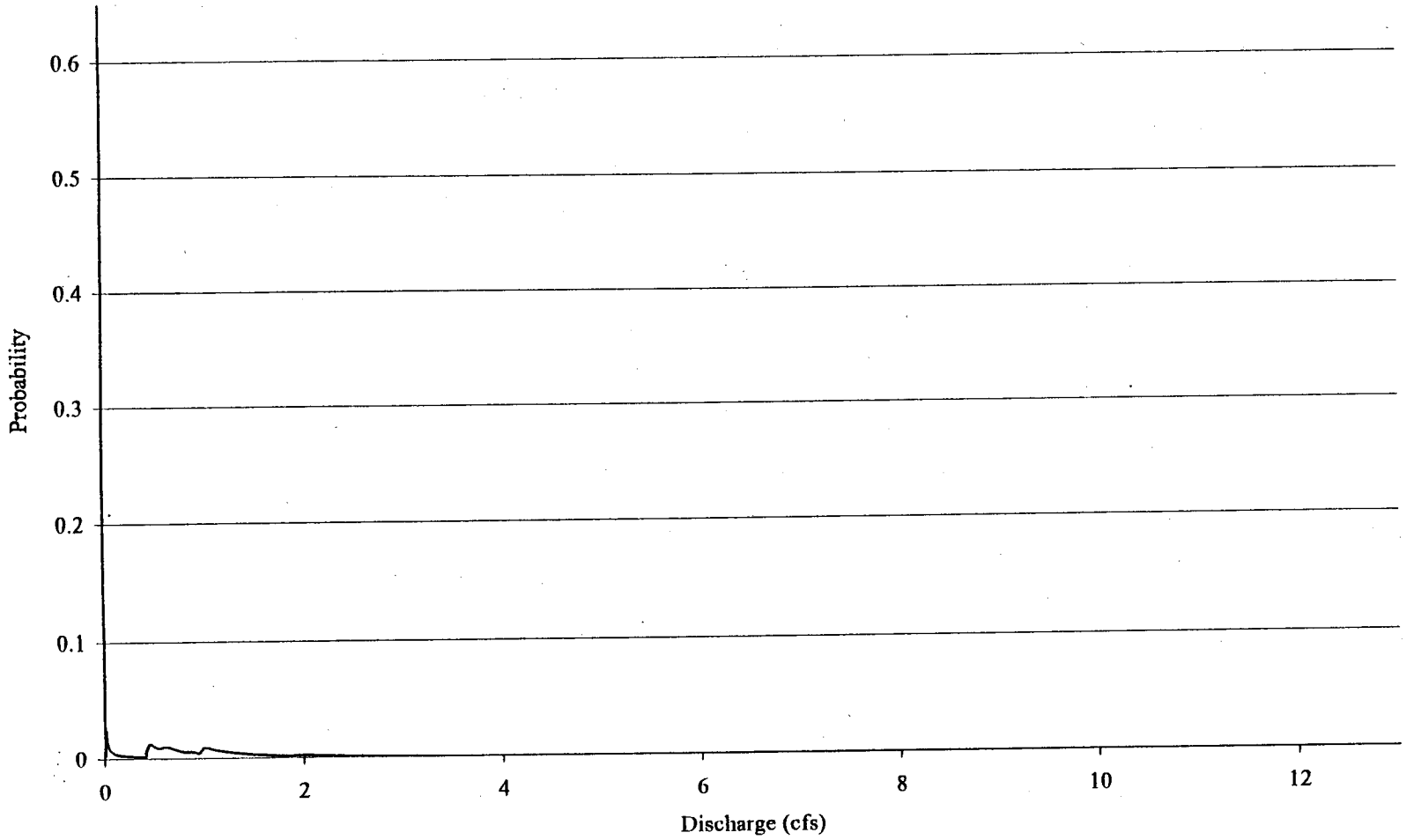
APPROXIMATE

3RWN Ambient Distribution

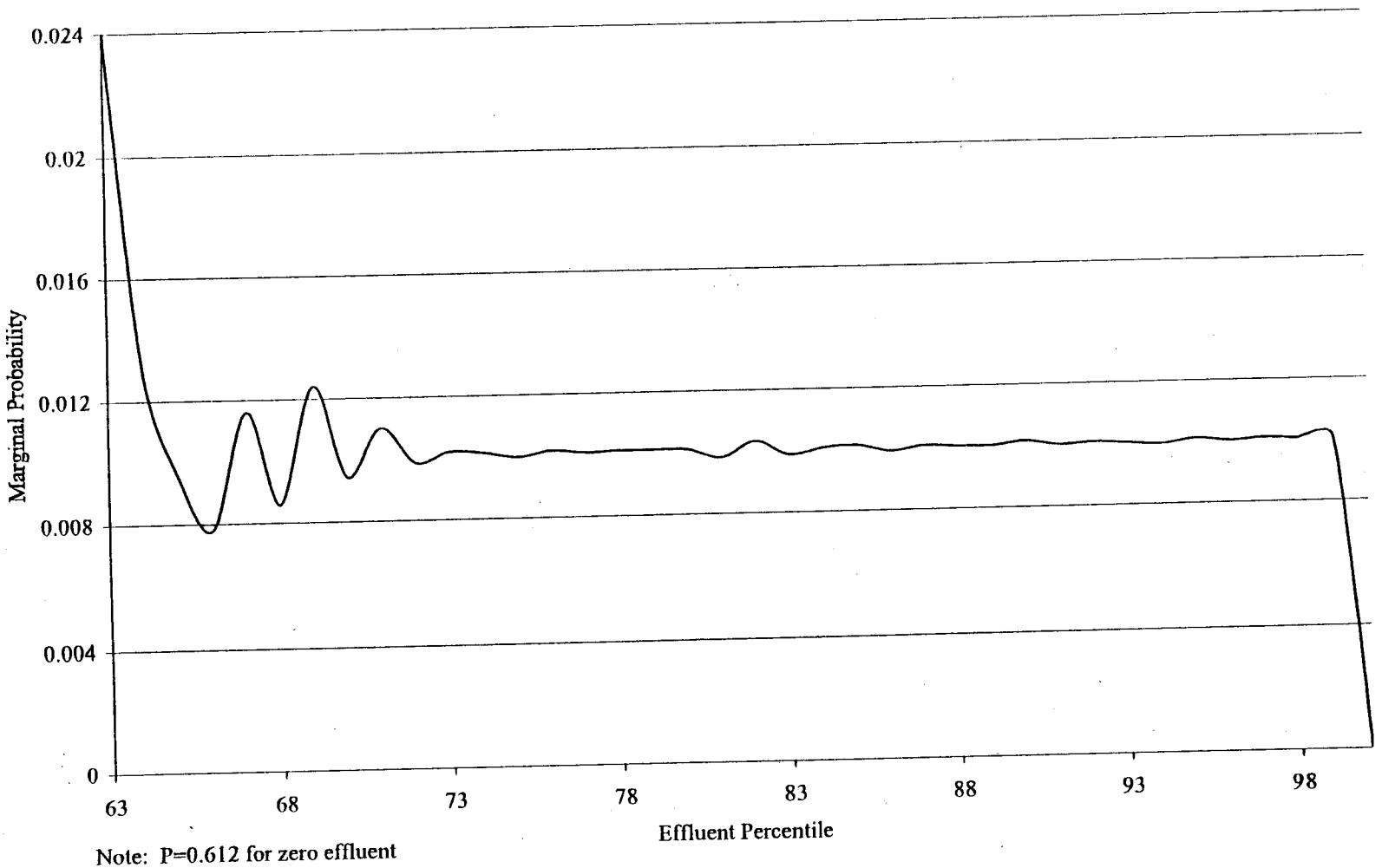


Approximate

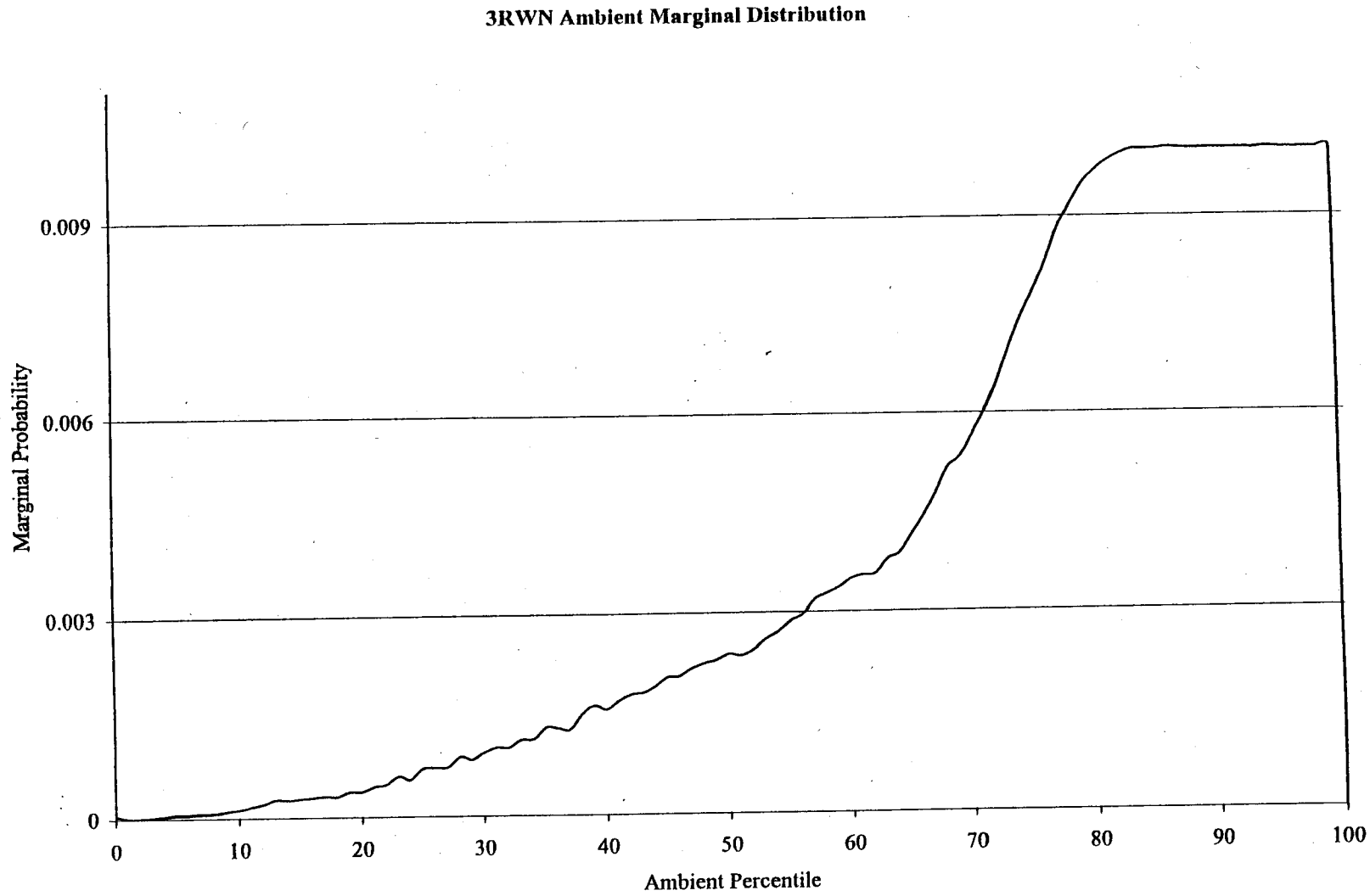
3RWN Effluent Distribution



3RWN Effluent Marginal Distribution

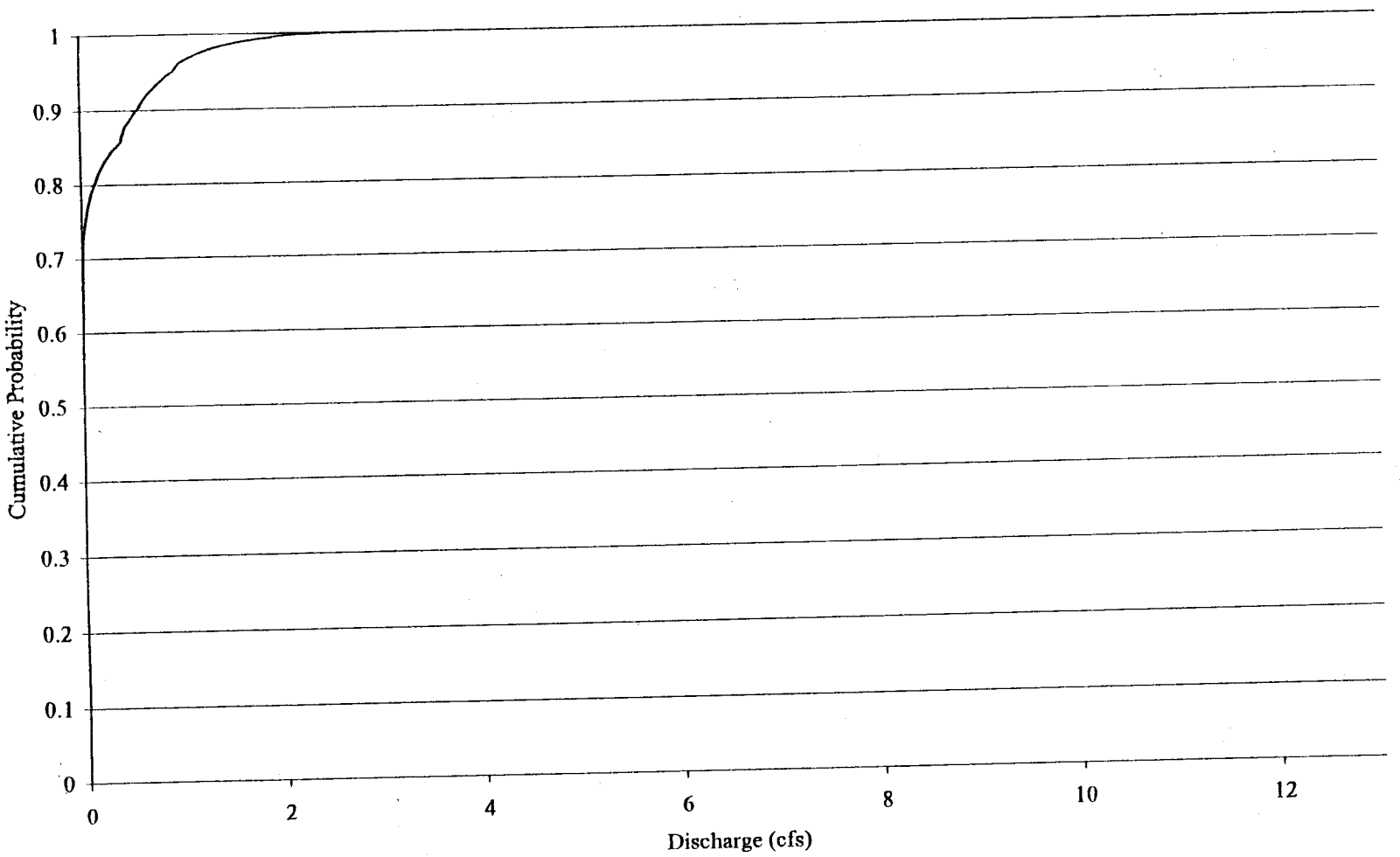


Note: P=0.612 for zero effluent


3RWN Ambient Marginal Distribution
Marginal Probability
0.009
0.006
0.003
0
0
10
20
30
40
50
60
70
80
90
100
Ambient Percentile

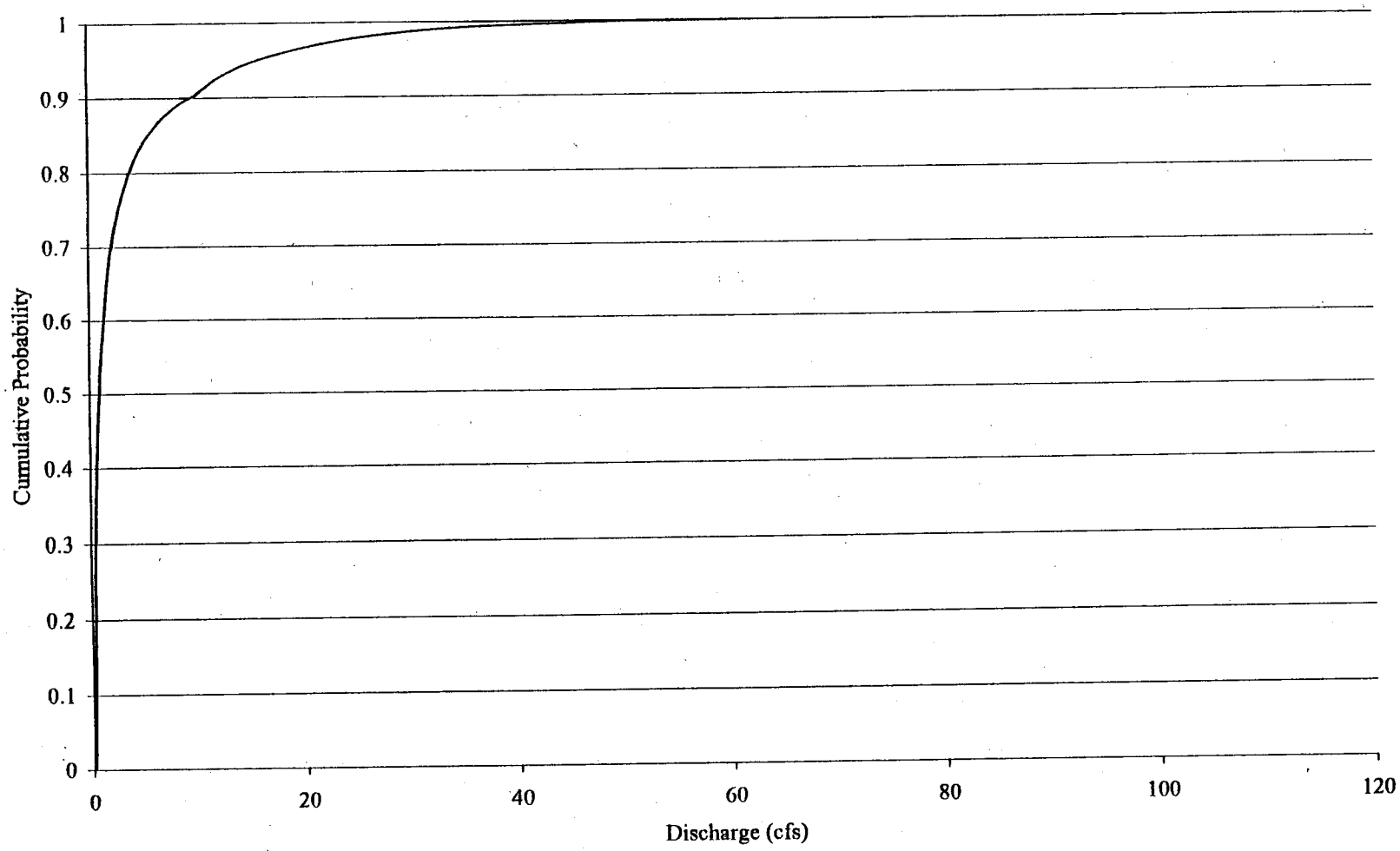
Approximate

3RWN Effluent Cumulative Distribution

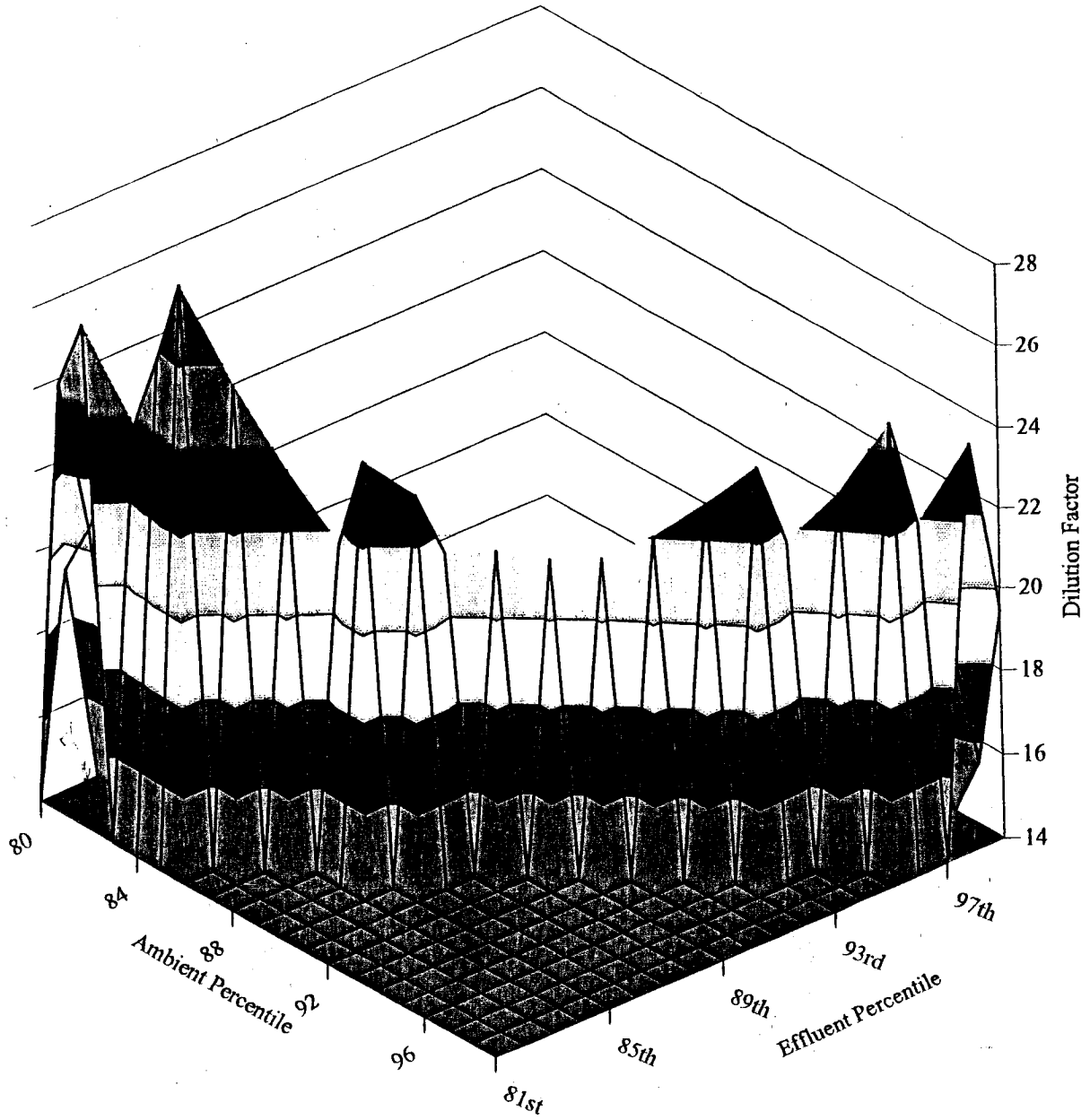


Approximate

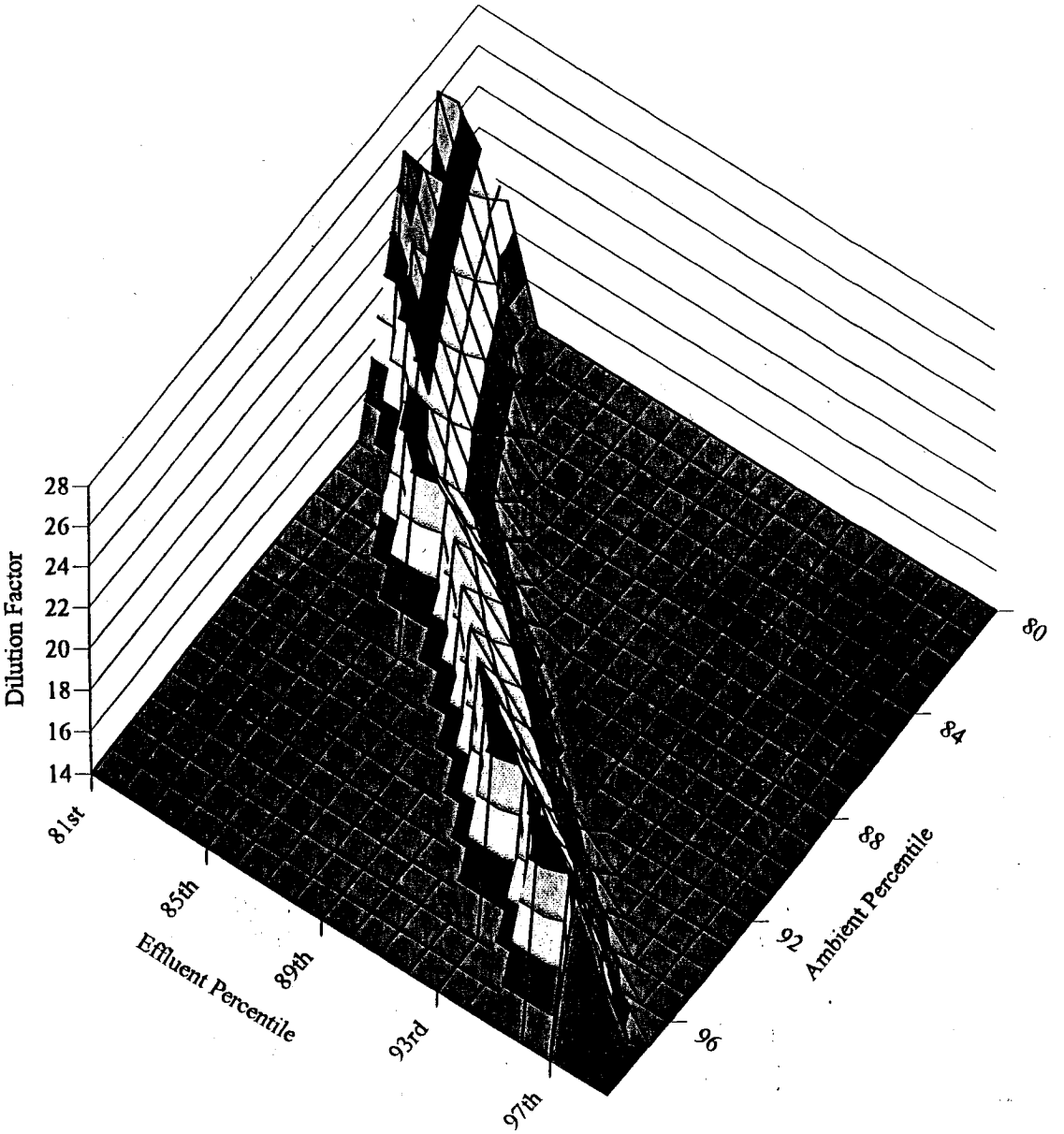
3RWN Ambient Cumulative Distribution



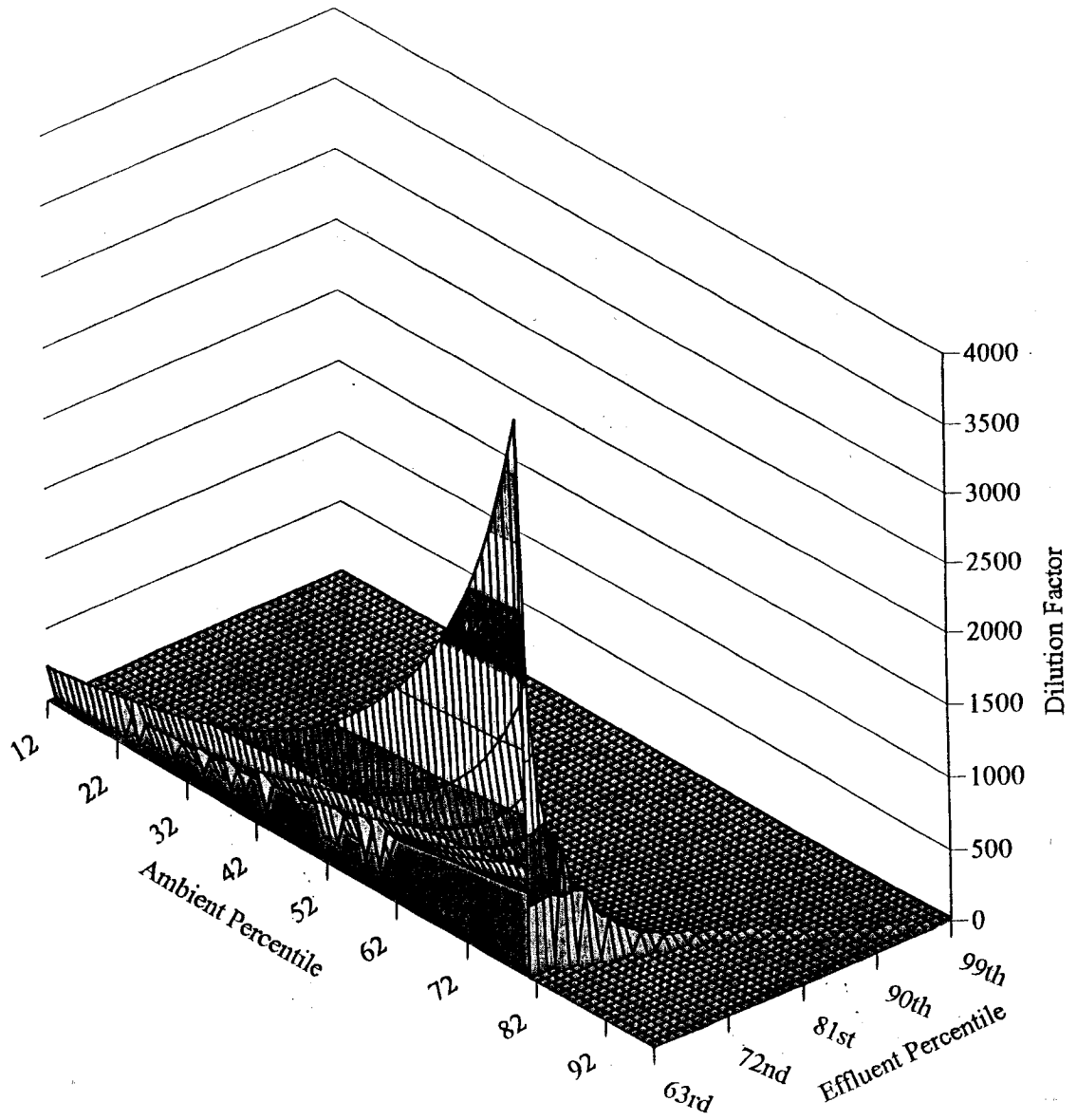
3RWN Dilution Factors w/P>=0.0008



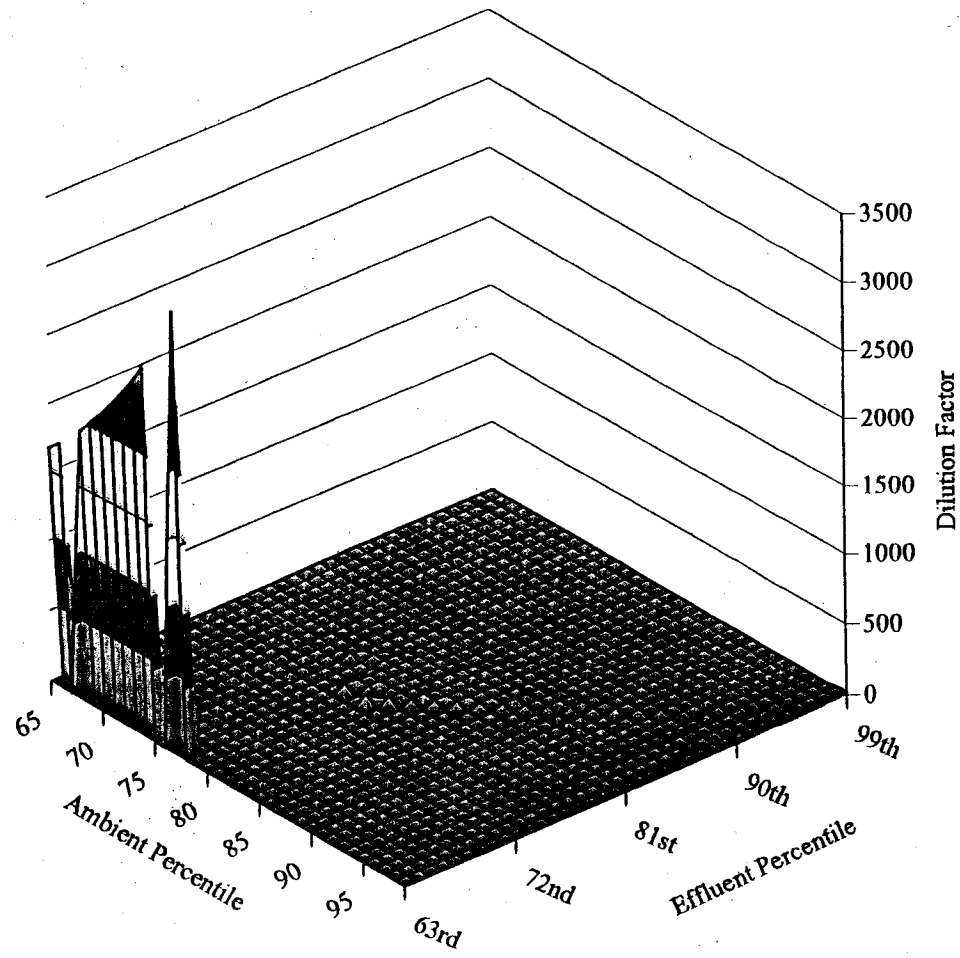
3RWN Dilution Factors w/P>=0.0008



3RWN Dilution Factors w/P>=0.0001



3RWN Dilution Factors w/P>=0.0005



From: Lisa Allen
To: Brian Pippin
Date: Thu, Feb 18, 1999 9:57 AM
Subject: Port of Seattle

Attached is your table. When comparing the flow in the table to the percentiles, my query would pick the lower range (for example, with 23 flow, 0 goes from 0-1 to 61-62, I used 0-1 range for these values).

The values I have in the percentile table are currently unrounded. Access carries numbers it calculates out to several decimal places. For example, some of the 24 flows are 0.163. In the percentile table, the 0-1 range value is 0.0869999974966049 the 1-2 range is 0.163000002503395. Because 0.163 is less than the 1-2 range number, these 24 flow results will be placed in the 0-1 range.

I checked 1 cell and I matched the original data set. If you want more qc accomplished, let me know.

PERCENTILE	23 FLOW	24 FLOW
0	0	0.08699....
1	0	0.1630....
2	0	0.1720....
⋮	⋮	⋮
61	0	1.41199....
62	0.00100...	1.473....
⋮	⋮	⋮
99	1.796....	33.05599...
100	12.899...	101.671....

RE: 23 FLOW, HOW CAN THE 62nd PERCENTILE = THE 63 ED ?

24 FLOWS OF Q = 0.163 COUNTED HERE ?

		24 FLOW			
		0 - 1	1 - 2	...	99 - 100
		Q < 0.1630...	0.1630... ≤ Q < 0.1720...		33.05599... ≤ Q
0 - 62	Q < 0.00100...	COUNT	COUNT		COUNT
62 - 63	0.00100... ≤ Q < ?	COUNT	COUNT		COUNT
⋮					
99 - 100	1.796 ≤ Q	COUNT	COUNT		COUNT

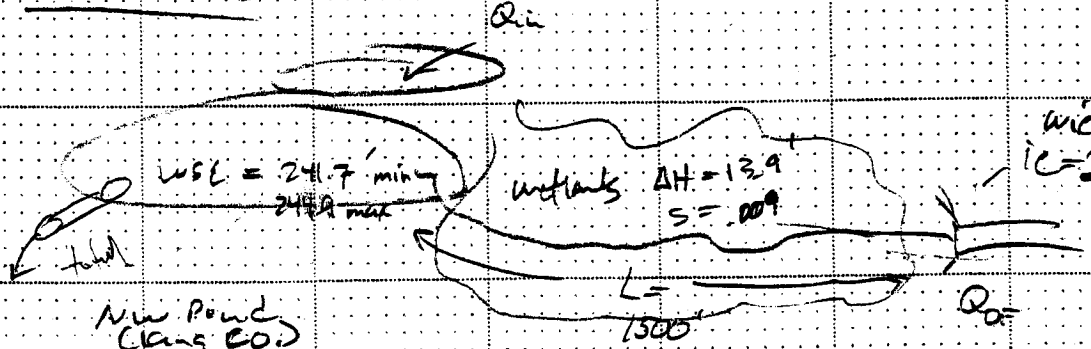
23 FLOW

Parametrix, Inc.

PROJECT _____ JOB NO _____

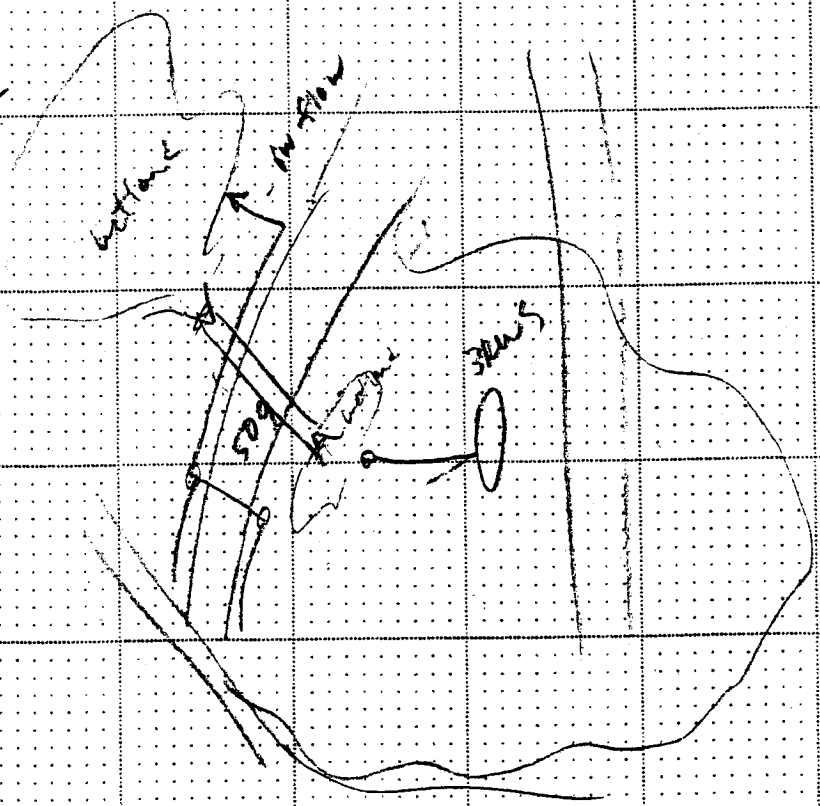
BY _____ DATE _____ CHECKED _____ DATE _____ SHEET _____ OF _____

NW Ponds

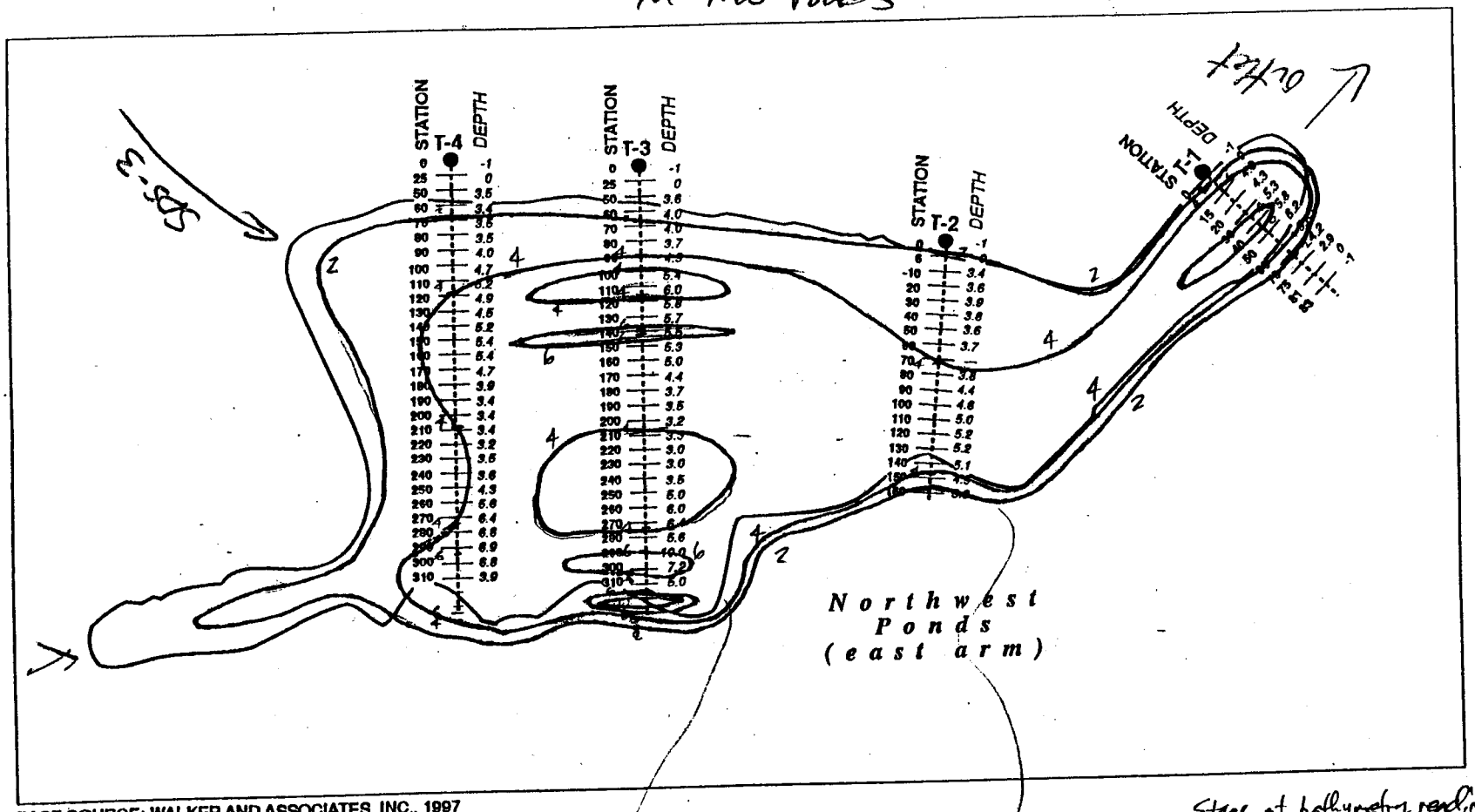


NW Pond Elevation (ft)	Q
241.4	0
242.4	2
243.4	5
244.4	7
244.9	5
245.1	10

Walker Ck



Low Flow Stages in NW Ponds



BASE SOURCE: WALKER AND ASSOCIATES, INC., 1997

Stage at bathymetry readings = 11.25

T-1 TRANSECT NUMBER & LOCATION

NOTE: 0 STATION LOCATION =TOP OF BERM

0 25 50 100
SCALE IN FEET

TAYLOR ASSOCIATES
Port of Seattle
Stream Effects Study
Figure Januar 997

AR 024664

Ambient				Effluent									
				0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100
Upper Q				14	0.62	0.15	0.015	0.005	0	0	0	0	0
	Lower Q		%	0.62	0.15	0.015	0.005	0	0	0	0	0	0
		Median	T	0.97	0.37	0.05	0.005	0.002	0	0	0	0	0
120	9.4	15	0-10	37514	5018	0	0	0	0	0	0	0	0
9.4	3.9	5.7	10-20	6229	27341	5105	2860	1568	0	0	0	0	0
3.9	2.1	2.8	20-30	179	7564	7596	7767	18578	0	0	0	0	0
2.1	1.4	1.7	30-40	0	1403	4697	5231	33170	0	0	0	0	0
1.4	0.9	1.1	40-50	0	11	2338	4119	35519	0	0	0	0	0
0.9	0.61	0.76	50-60	0	0	213	3325	36400	0	0	0	0	0
0.61	0.45	0.52	60-70	0	0	1	1408	43311	0	0	0	0	0
0.45	0.34	0.38	70-80	0	0	0	237	38393	0	0	0	0	0
0.34	0.26	0.3	80-90	0	0	0	20	70113	0	0	0	0	0
0.26	0.1	0.22	90-100	0	0	0	0	12796	0	0	0	0	0
				420024									

Ambient				Effluent									
				0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100
Upper Q				14	0.62	0.15	0.015	0.005	0	0	0	0	0
	Lower Q		%	0.62	0.15	0.015	0.005	0	0	0	0	0	0
		Median	T	0.97	0.37	0.05	0.005	0.002	0	0	0	0	0
120	9.4	15	0-10	0.08931	0.01195	0	0	0	0	0	0	0	0
9.4	3.9	5.7	10-20	0.01483	0.06509	0.01215	0.00681	0.00373	0	0	0	0	0
3.9	2.1	2.8	20-30	0.00043	0.01801	0.01808	0.01849	0.04423	0	0	0	0	0
2.1	1.4	1.7	30-40	0	0.00334	0.01118	0.01245	0.07897	0	0	0	0	0
1.4	0.9	1.1	40-50	0	0.00003	0.00557	0.00981	0.08456	0	0	0	0	0
0.9	0.61	0.76	50-60	0	0	0.00051	0.00792	0.08666	0	0	0	0	0
0.61	0.45	0.52	60-70	0	0	0.00000	0.00335	0.10312	0	0	0	0	0
0.45	0.34	0.38	70-80	0	0	0	0.00056	0.09141	0	0	0	0	0
0.34	0.26	0.3	80-90	0	0	0	0.00005	0.16693	0	0	0	0	0
0.26	0.1	0.22	90-100	0	0	0	0	0.03046	0	0	0	0	0
				1.00000									

7Q10 = 0.16 cfs %T = 99.224% 3259 hrs/42024 hrs

5Q30 = 0.15 cfs % = 99.6% 1825 hrs/42024 hrs

Parametrix, Inc.

PROJECT _____ JOB NO _____

BY _____ DATE _____ CHECKED _____ DATE _____ SHEET _____ OF _____

N-day Analysis

Location - Miller Cr @ WDM = 24

Daily time series - WDM = 90 (Transformed from Hourly)

47-years of data

A. 7Q10

$T_r = \frac{n+1}{m}$ m = rank (1 = lowest)

n = 47

$T_r = 10$ 10%

$10 = \frac{48}{m}$ m = 4.8, use 5

Q = 0.16 cfs

B. 5Q30

$T_r = \frac{n+1}{m}$

$30 = \frac{48}{m}$ m = 1.6 use 2 0.1%

Q = 0.15 cfs