Station: *Middle Loup River at Dunning, Nebr.* Section: *C2* Date: *Dec. 14, 1950*

Block I
Preliminary data and computations

(1) w= *81* ; $\bar{u}$= *2.98* ; d= *2.10* ; d_s= *2.37* ; D_{65}(or k_s)= *0.00161* ; D_{35}= *0.00104* ; Conc = *1160* ; Q_{SM} = *1520* ; Temp = *32* °F

(2) $\sqrt{(RS)_m} = \bar{u}/32.6\log_{10}\frac{12.27dx}{k_s}$; $\sqrt{(RS)_m} = 2.98/32.6\log_{10}\frac{12.27(2.10)(1.60)}{(0.00161)} = 0.0207$; $(RS)_m = 0.000429$; $u_m = \sqrt{(RS)_m g} = 0.1174$

(3) $\delta = \frac{11.6\nu}{u_m} = \frac{11.6(1.93\times10^{-5})}{(0.1174)} = 0.001906$; $\frac{k_s}{\delta} = \frac{(0.00161)}{(0.001906)} = 0.845$; x= *1.60* ; $P = 2.303\log_{10}\frac{30.2dx}{k_s} = 2.303\log_{10}\frac{30.2(2.10)(1.60)}{(0.00161)} = 11.07$

(4) $A' = d_n/d_s = 0.3/2.37 = 0.127$; Percent of flow in sampled zone = *90.5* ; Load in sampled zone (Q_{ts}') = *1376*

	Meas. susp. sediment by class									
(5)	Size	.000036	.00029	.00058	.00116	.00232	.00464			
(6)	1/ %	11	19	54	15	1				
(7)	2/ %									
(8)	3/ %	6	13	49	24	6	2			

Notes: d_s - Depth at sampled verticals; d_n - Depth not sampled; 1/ From section size analysis; 2/ From other than section size analysis; 3/ From contracted section size analysis; 4/ The larger of $\frac{1.65\,D_{35}}{(RS)_m}$ or $\frac{0.4\times1.65\,D}{(RS)_m}$ from 1/; 5/ Load in sampled zone from 1/; 6/ Load in sampled zone from 2/

Block II
Computation of $i_B Q_B$

(1) D	(2) 4/ Ψ_m	(3) $\Phi_*/2$	(4) $1200D^{3/2}$	(5) i_b	(6) $i_B q_B$	(7) 43.2w	(8) $i_B Q_B$
.00058	4.00	0.530	0.0168	0.19	.00169	3,500	5.92
.00116	4.00	.530	.0474	.45	.01130	3,500	39.6
.00232	4.00	.530	.1341	.17	.01208	3,500	42.3
.00464	7.15	.128	.3794	.08	.00389	3,500	13.6
.00928	14.3	.01	1.073	.05	.000537	3,500	1.88
.01856	28.6	—	3.035	.04	—	3,500	—

(9) Method — For reference size

Block III — Computation by z_2

Determination of reference z_2

Reference size is *0.00058*

$\frac{Q_s'}{i_B Q_B} = \frac{I_1''}{J_1''}(PJ_1' + J_2')$; solve for z_2

$\frac{Q_s'}{i_B Q_B} = \frac{(743)}{(5.92)} = 126$; Try $z_2 = 0.44$

$\frac{20.1}{1.38}[11.07(0.85) - 0.84] = \frac{20.1}{1.38}(8.57) = 124.8$

use $z_2 = 0.44$

D	5/ Q_s'	6/ Q_s'	$i_B Q_B$	Mult.	z	A''	J_1''	$-J_2''$	J_1'	$-J_2'$	$\frac{PJ_1''+J_2''}{PJ_1'+J_2'}$	I_1''	$-I_2''$	$PI_1''+I_2''+1$	Total sediment discharge: Computed from 5/	Computed from 6/	Meas.	% Diff.
.000036	151			0.019	0.008	.0000343	1.00	1.02	0.87	0.62	10.05/9.01				168		138	+22
.00029	261			.40	.18	.000276	1.06	1.41	.84	.67	10.32/8.63				312		299	+4
.00058	743		5.92	1.00	.44	.000552						20.1	40.0	183.5	1086		1127	−4
.00116	206		39.6	2.01	.88	.001104						1.88	6.30	15.5	614		552	+11
.00232	14		42.3	3.19	1.40	.00221						.46	1.97	4.12	174		138	+26
.00464			13.6	4.32	1.90	.00442						.226	1.02	2.48	34		46	−26
.00928			1.88	5.70	2.51	.00884						.139	.563	1.98	4		—	—
															2392		2300	+4

Block IV — Computation by z_x

Determination of reference z_x and comparable $i_B Q_B$

Reference size is *0.00058*

$z_x = 0.54$ [0.54 is a z_4 from $4.6(V_s)^{0.7}$]

$i_B Q_B = \frac{J_1'' Q_s'}{I_1''(PJ_1' + J_2')} = \frac{(1.64)(743)}{11.3[11.07(0.88) - 0.92]} = 12.2$

D	5/ Q_s'	6/ Q_s'	$i_B Q_B$	Mult.	z	A''	J_1''	$-J_2''$	J_1'	$-J_2'$	$\frac{PJ_1''+J_2''}{PJ_1'+J_2'}$	I_1''	$-I_2''$	$PI_1''+I_2''+1$	Computed from 5/	Computed from 6/	Meas.	% Diff.
.000036	151			0.019	0.01	.0000343	1.00	1.02	0.87	0.62	10.05/9.01				168		138	+22
.00029	261			.40	.22	.000276	1.09	1.52	.84	.70	10.55/8.60				320		299	+7
.00058	743		12.2	1.00	.54	.000552						11.3	25.7	100.4	1225		1127	+9
.00116	206		81.6	2.01	1.09	.001104						.98	4.00	7.85	641		552	+16
.00232	14		87.2	3.19	1.72	.00221						.288	1.39	2.80	244		138	+77
.00464			28.0	4.32	2.33	.00442						.157	.75	1.99	56		46	+22
.00928			3.87	5.70	3.08	.00884						.102	.43	1.70	7		—	—
															2661		2300	+16

(9) (10) (11) (12) (13) (14) (15) (16) (17) (18) (19) (20) (21) (22) (23) (24) (25) (26) (27)

COMPUTATION OF TOTAL SEDIMENT DISCHARGE

(After Colby and Hembree, 1955, pl. 3)

468443 O - 59 (In pocket)