

RESERVOIR SEDIMENT DATA SUMMARY

MODEL IMPLEMENTATION PROJECT #1 / 1  
NAME OF RESERVOIR DATA SHEET NO.

DAM	1. OWNER LAKE CO. CONS. DIST		2. STREAM TRIBE TO L. HERMAN		3. STATE S. D.	
	4. SEC. 16 TWP. 106N RANGE 53W		5. NEAREST P.O. MADISON		6. COUNTY LAKE	
	7. LAT. ° ' " LONG. ° ' "		8. TOP OF DAM ELEVATION 1727.5		9. SPILLWAY CREST ELEV. 1723.0	
RESERVOIR	10. STORAGE ALLOCATION		11. ELEVATION TOP OF POOL		12. ORIGINAL SURFACE AREA, ACRES	
	a. FLOOD CONTROL		1717.27		5	
	b. MULTIPLE USE				14	
	c. POWER				192	
	d. WATER SUPPLY				14	
	e. IRRIGATION				192	
	f. CONSERVATION				192	
WATERSHED	14. GROSS STORAGE, ACRE-FEET		15. DATE STORAGE BEGAN		6-26-80	
	g. INACTIVE				16. DATE NORMAL OPER. BEGAN	
					6-26-80	
	17. LENGTH OF RESERVOIR 0.85 MILES				AV. WIDTH OF RESERVOIR 0.24 MILES	
	18. TOTAL DRAINAGE AREA 2.42 SQ. MI.				22. MEAN ANNUAL PRECIPITATION INCHES	
	19. NET SEDIMENT CONTRIBUTING AREA 2.42 SQ. MI.				23. MEAN ANNUAL RUNOFF INCHES	
	20. LENGTH 3.41 MILES		AV. WIDTH 0.85 MILES		24. MEAN ANNUAL RUNOFF AC.-FT.	
	21. MAX. ELEV. 1800		MIN. ELEV. 1714		25. ANNUAL TEMP.: MEAN RANGE	
	26. DATE OF SURVEY		27. PERIOD YEARS		28. ACCL. YEARS	
	9-9-93		13		13	
29. TYPE OF SURVEY		30. NO. OF RANGES OR CONTOUR INT.		31. SURFACE AREA, ACRES		
SD		0.5 FT CONTOUR INT				
32. CAPACITY, ACRE-FEET		33. C/I. RATIO, AC.-FT. PER AC.-FT.				
26. DATE OF SURVEY		34. PERIOD ANNUAL PRECIPITATION		35. PERIOD WATER INFLOW, ACRE-FEET		
9-9-93				a. MEAN ANNUAL b. MAX. ANNUAL c. PERIOD TOTAL		
36. WATER INFL. TO DATE, AC.-FT.		a. MEAN ANNUAL b. TOTAL TO DATE				
26. DATE OF SURVEY		37. PERIOD CAPACITY LOSS, ACRE-FEET		38. TOTAL SED. DEPOSITS TO DATE, ACRE-FEET		
9-9-93		a. PERIOD TOTAL b. AV. ANNUAL c. PER SQ. MI.-YEAR		a. TOTAL TO DATE b. AV. ANNUAL c. PER SQ. MI.-YEAR		
2.1		.16 .19		2.1 (3403 YD <sup>3</sup> ) .16 .19		
26. DATE OF SURVEY		39. AV. DRY WGT., LBS. PER CU. FT.		40. SED. DEP., TONS PER SQ. MI.-YR.		
9-9-93		48.75		a. PERIOD b. TOTAL TO DATE		
		13		2239.6 TONS 1.2% 1590		
41. STORAGE LOSS, PCT.		42. SED. INFLOW, PPM		a. PERIOD b. TOT. TO DATE		

26. DATE OF SURVEY	43. DEPTH DESIGNATION RANGE IN FEET BELOW, AND ABOVE, CREST ELEVATION														
	-6 → -5	-5 → -4	-4 → -3	-3 → -2	-2 → -1	-1 → 0	0 → 1	1 → 2	2 → 3	3 → 4	4 → 44				
	PERCENT OF TOTAL SEDIMENT LOCATED WITHIN DEPTH DESIGNATION														
9-9-93	0.03%	0.06%	0.06%	0.6%	2.43%	8.96%	14.53%	38.59%	13.48%	16.03%	5.24%				
26. DATE OF SURVEY	44. REACH DESIGNATION PERCENT OF TOTAL ORIGINAL LENGTH OF RESERVOIR														
	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	-105	-110	-115	-120	-125
	PERCENT OF TOTAL SEDIMENT LOCATED WITHIN REACH DESIGNATION														
9-9-93															
45. RANGE IN RESERVOIR OPERATION															
WATER YEAR	MAX. ELEV.	MIN. ELEV.	INFLOW, AC.-FT.	WATER YEAR	MAX. ELEV.	MIN. ELEV.	INFLOW, AC.-FT.								
46. ELEVATION-AREA-CAPACITY DATA															
ELEVATION	AREA	CAPACITY	ELEVATION	AREA	CAPACITY	ELEVATION	AREA	CAPACITY							
REMARKS AND REFERENCES															
48. AGENCY MAKING SURVEY - SCS															
49. AGENCY SUPPLYING DATA - SCS															
50. DATE _____															

Sediment Depths and Elevations, Lake Herman MIP Dam #1

Orig. Sed.	Point Sed.	Depth		Elevation		Elevation from crest		diff.	sum	%total
		Depth, in.	Depth, ft.	W/ Sed.	W/O Sed.	W/ Sed.	W/O Sed.			
128	1	6	0.5	87.72	87.22	3.89	4.39	0.50		
129	2	6	0.5	87.79	87.29	3.82	4.32	0.50		
133	3	NoSample	NoSample	87.36	87.36	4.25	4.25	0.00		
69	4	5.5	0.45833333	87.85	87.39	3.76	4.22	0.46		
70	5	5.5	0.45833333	88.07	87.61	3.54	4.00	0.46	1.46	5.24%
68	6	7	0.58333333	88.46	87.87	3.15	3.74	0.58		
136	7	NoSample	NoSample	87.92	87.92	3.70	3.70	0.00		
52	217	3	0.25	88.39	88.14	3.22	3.47	0.25		
83	218	8	0.66666667	88.95	88.29	2.66	3.32	0.67		
132	219	3.5	0.29166667	88.65	88.36	2.96	3.25	0.29		
135	300	4.5	0.375	88.80	88.43	2.81	3.18	0.38		
82	301	10	0.83333333	89.34	88.51	2.27	3.10	0.83		
119	302	3.5	0.29166667	88.84	88.55	2.77	3.06	0.29		
127	303	4	0.33333333	88.89	88.56	2.72	3.05	0.33		
130	304	2	0.16666667	88.76	88.59	2.85	3.02	0.17		
137	305	2.5	0.20833333	88.82	88.61	2.79	3.00	0.21	4.46	16.03%
71	306	4.5	0.375	89.00	88.62	2.61	2.99	0.38		
81	307	10	0.83333333	89.54	88.70	2.07	2.91	0.83		
150	308	10	0.83333333	89.54	88.71	2.07	2.90	0.83		
72	309	5	0.41666667	89.17	88.75	2.44	2.86	0.42		
120	310	4	0.33333333	89.12	88.79	2.49	2.82	0.33		
80	311	4.5	0.375	89.34	88.97	2.27	2.64	0.38		
53	312	1.5	0.125	89.11	88.98	2.50	2.63	0.13		
113	313	2.5	0.20833333	89.28	89.07	2.33	2.54	0.21		
114	314	1.5	0.125	89.47	89.34	2.14	2.27	0.13		
79	315	1.5	0.125	89.69	89.57	1.92	2.04	0.13	3.75	13.48%
112	316	0.5	0.04166667	89.68	89.63	1.93	1.98	0.04		
164	317	10	0.83333333	90.53	89.70	1.08	1.91	0.83		
134	318	0.6	0.05	89.79	89.74	1.82	1.87	0.05		
165	319	10	0.83333333	90.61	89.78	1.00	1.83	0.83		
115	320	0.2	0.01666667	89.83	89.81	1.78	1.80	0.02		
67	321	1.2	0.1	89.91	89.81	1.70	1.80	0.10		
73	322	3.5	0.29166667	90.11	89.82	1.50	1.79	0.29		
131	323	2	0.16666667	90.02	89.85	1.59	1.76	0.17		
84	324	3	0.25	90.16	89.91	1.45	1.70	0.25		
152	325	7	0.58333333	90.53	89.94	1.08	1.67	0.58		
118	326	1.5	0.125	90.14	90.01	1.47	1.60	0.13		
126	327	0.7	0.05833333	90.10	90.04	1.51	1.57	0.06		
151	328	3	0.25	90.32	90.07	1.29	1.54	0.25		
149	329	10	0.83333333	90.98	90.15	0.63	1.46	0.83		
169	330	5	0.41666667	90.61	90.19	1.00	1.42	0.42		
156	331	3.5	0.29166667	90.49	90.20	1.12	1.41	0.29		
193	332	10	0.83333333	91.08	90.25	0.53	1.36	0.83		
155	333	4	0.33333333	90.59	90.26	1.02	1.35	0.33		
166	334	6	0.5	90.81	90.31	0.80	1.30	0.50		
54	335	0.3	0.025	90.34	90.31	1.27	1.30	0.03		

121	336	0.3	0.025	90.34	90.31	1.27	1.30	0.03		
174	337	7	0.58333333	90.91	90.33	0.70	1.28	0.58		
153	338	5	0.41666667	90.76	90.34	0.86	1.27	0.42		
176	339	9	0.75	91.13	90.38	0.48	1.23	0.75		
175	340	9	0.75	91.23	90.48	0.38	1.13	0.75		
106	341	3.5	0.29166667	90.81	90.52	0.80	1.09	0.29		
154	342	5	0.41666667	90.93	90.52	0.68	1.09	0.42		
177	343	8	0.66666667	91.21	90.55	0.40	1.06	0.67	10.73	38.59%
185	344	8	0.66666667	91.35	90.69	0.26	0.92	0.67		
66	345	0.5	0.04166667	90.82	90.78	0.79	0.83	0.04		
173	346	3	0.25	91.14	90.89	0.47	0.72	0.25		
167	347	6	0.5	91.41	90.91	0.20	0.70	0.50		
122	348	0.2	0.01666667	91.07	91.05	0.54	0.56	0.02		
111	349	0.2	0.01666667	91.08	91.07	0.53	0.54	0.02		
105	350	1	0.08333333	91.19	91.11	0.42	0.50	0.08		
163	351	2.5	0.20833333	91.35	91.14	0.26	0.47	0.21		
107	352	0.8	0.06666667	91.21	91.14	0.40	0.47	0.07		
55	353	0.4	0.03333333	91.21	91.18	0.40	0.43	0.03		
125	354	0.6	0.05	91.24	91.19	0.37	0.42	0.05		
157	355	1.5	0.125	91.40	91.27	0.22	0.34	0.13		
184	356	3	0.25	91.55	91.30	0.06	0.31	0.25		
198	357	5	0.41666667	91.74	91.33	-0.13	0.28	0.42		
182	358	4	0.33333333	91.76	91.43	-0.15	0.18	0.33		
104	359	2.5	0.20833333	91.66	91.45	-0.05	0.16	0.21		
178	360	3	0.25	91.75	91.50	-0.14	0.11	0.25		
74	361	1	0.08333333	91.59	91.51	0.02	0.10	0.08		
65	362	0.3	0.025	91.58	91.55	0.03	0.06	0.03		
202	363	5	0.41666667	92.00	91.59	-0.39	0.02	0.42	4.04	14.53%
183	364	3	0.25	91.89	91.64	-0.28	-0.03	0.25		
123	365	0.1	0.00833333	91.70	91.69	-0.09	-0.08	0.01		
206	366	4	0.33333333	92.04	91.70	-0.43	-0.09	0.33		
117	367	1.5	0.125	91.92	91.79	-0.31	-0.18	0.13		
199	368	2	0.16666667	91.99	91.83	-0.38	-0.22	0.17		
192	369	2.5	0.20833333	92.04	91.83	-0.43	-0.22	0.21		
85	370	1	0.08333333	91.93	91.85	-0.32	-0.24	0.08		
168	371	4	0.33333333	92.20	91.86	-0.59	-0.25	0.33		
116	372	0.2	0.01666667	91.92	91.91	-0.31	-0.30	0.02		
158	373	2.5	0.20833333	92.13	91.92	-0.52	-0.31	0.21		
194	374	2.5	0.20833333	92.14	91.93	-0.53	-0.32	0.21		
138	375	0.8	0.06666667	92.01	91.94	-0.40	-0.33	0.07		
56	376	0.2	0.01666667	91.98	91.96	-0.37	-0.35	0.02		
148	377	1	0.08333333	92.06	91.98	-0.45	-0.37	0.08		
124	378	0.1	0.00833333	92.05	92.05	-0.44	-0.44	0.01		
108	379	0.4	0.03333333	92.09	92.06	-0.48	-0.45	0.03		
102	380	0.3	0.025	92.13	92.10	-0.52	-0.49	0.03		
110	381	0.1	0.00833333	92.34	92.33	-0.73	-0.72	0.01		
101	382	0.2	0.01666667	92.43	92.41	-0.82	-0.80	0.02		
95	383	0.3	0.025	92.46	92.44	-0.85	-0.83	0.03		
78	384	0.3	0.025	92.49	92.46	-0.88	-0.85	0.03		
203	385	2	0.16666667	92.72	92.55	-1.11	-0.94	0.17		
89	386	0.1	0.00833333	92.58	92.57	-0.97	-0.96	0.01		

162	387	0.5	0.04166667	92.63	92.58	-1.02	-0.97	0.04		
103	388	0.2	0.01666667	92.62	92.60	-1.00	-0.99	0.02		
90	389	0.1	0.00833333	92.65	92.64	-1.03	-1.03	0.01	2.49	8.96%
204	390	2	0.16666667	92.82	92.65	-1.21	-1.04	0.17		
191	391	1	0.08333333	92.78	92.70	-1.17	-1.09	0.08		
181	392	0.5	0.04166667	92.84	92.79	-1.23	-1.18	0.04		
75	393	2	0.16666667	92.98	92.81	-1.37	-1.20	0.17		
109	394	0.2	0.01666667	92.87	92.86	-1.26	-1.25	0.02		
96	395	0.2	0.01666667	92.88	92.86	-1.26	-1.25	0.02		
64	396	0.1	0.00833333	92.95	92.94	-1.34	-1.33	0.01		
197	397	0.5	0.04166667	93.03	92.99	-1.42	-1.38	0.04		
94	398	0.3	0.025	93.03	93.01	-1.42	-1.39	0.03		
186	399	0	0	93.02	93.02	-1.41	-1.41	0.00		
57	400	0.1	0.00833333	93.04	93.03	-1.43	-1.42	0.01		
200	401	0.2	0.01666667	93.08	93.07	-1.47	-1.46	0.02		
88	402	0.3	0.025	93.18	93.16	-1.57	-1.54	0.03		
190	403	0.2	0.01666667	93.18	93.17	-1.57	-1.56	0.02		
189	404	0.1	0.00833333	93.18	93.17	-1.57	-1.56	0.01		
179	405	0.1	0.00833333	93.33	93.32	-1.72	-1.71	0.01		
172	406	0	0	93.36	93.36	-1.75	-1.75	0.00		
91	407	0.1	0.00833333	93.53	93.52	-1.92	-1.91	0.01		
60	408	0.2	0.01666667	93.65	93.63	-2.03	-2.02	0.02	0.68	2.43%
147	409	0.1	0.00833333	93.65	93.64	-2.04	-2.03	0.01		
195	410	0	0	93.67	93.67	-2.06	-2.06	0.00		
159	411	0	0	93.74	93.74	-2.13	-2.13	0.00		
86	412	0.2	0.01666667	93.76	93.74	-2.15	-2.13	0.02		
87	413	0.1	0.00833333	93.85	93.84	-2.24	-2.23	0.01		
93	414	0.2	0.01666667	93.88	93.86	-2.27	-2.25	0.02		
58	415	0	0	93.97	93.97	-2.36	-2.36	0.00		
100	416	0.1	0.00833333	94.03	94.02	-2.42	-2.41	0.01		
180	417	0	0	94.02	94.02	-2.41	-2.41	0.00		
76	418	0.3	0.025	94.07	94.04	-2.46	-2.43	0.03		
92	419	0.1	0.00833333	94.20	94.19	-2.59	-2.58	0.01		
63	420	0.1	0.00833333	94.26	94.25	-2.65	-2.64	0.01		
97	421	0.1	0.00833333	94.31	94.30	-2.70	-2.69	0.01		
170	422	0.2	0.01666667	94.35	94.33	-2.74	-2.72	0.02		
142	423	0.1	0.00833333	94.36	94.35	-2.75	-2.74	0.01		
61	424	0.2	0.01666667	94.37	94.36	-2.76	-2.75	0.02		
143	425	0.2	0.01666667	94.41	94.39	-2.80	-2.78	0.02		
205	426	0	0	94.47	94.47	-2.86	-2.86	0.00		
201	427	0	0	94.50	94.50	-2.89	-2.89	0.00		
161	428	0	0	94.56	94.56	-2.95	-2.95	0.00		
188	429	0	0	94.64	94.64	-3.03	-3.03	0.00	0.17	0.60%
196	430	0	0	94.86	94.86	-3.25	-3.25	0.00		
160	431	0	0	94.91	94.91	-3.30	-3.30	0.00		
171	432	0	0	94.96	94.96	-3.35	-3.35	0.00		
146	433	0	0	94.99	94.99	-3.38	-3.38	0.00		
141	434	0.1	0.00833333	95.17	95.16	-3.56	-3.55	0.01		
145	435	0	0	95.26	95.26	-3.65	-3.65	0.00		
144	436	0.1	0.00833333	95.32	95.31	-3.71	-3.70	0.01		
59	437	0	0	95.33	95.33	-3.72	-3.72	0.00		

77	438	0	0	95.36	95.36	-3.75	-3.75	0.00	0.02	0.06%
187	439	0	0	95.71	95.71	-4.10	-4.10	0.00		
62	440	0.2	0.01666667	95.93	95.91	-4.32	-4.30	0.02		
98	441	0	0	96.06	96.06	-4.45	-4.45	0.00		
99	442	0	0	96.60	96.60	-4.99	-4.99	0.00	0.02	0.06%
139	443	0.1	0.00833333	97.13	97.12	-5.52	-5.51	0.01		
140	444	0	0	98.39	98.39	-6.78	-6.78	0.00	0.01	0.03%

27.82 100.00%

Job ID : 001  
 Job name : MIP no. 1  
 Description : sdeiment survey  
 Reference :  
 Projection : None  
 Date printed: 11/16/93 2:24pm

Volume above a level	Surface 'Original W/O Sed.'
Base level	85.000 feet
Plan area above base level	13.4124 acres
Surface area above base level	13.4338 acres
Volume above base level	158986.432 Cu Yards

Volume above a level	Surface 'Natural'
Base level	85.000 feet
Plan area above base level	13.4124 acres
Surface area above base level	13.4296 acres
Volume above base level	162389.730 Cu Yards

3403.3 Cu. Yds

2.1 ac-ft

EXAMPLE  
 CALCS →

$$3403 \text{ cy} @ 60 \text{ pcf} = 2,760 \text{ tons}$$

$$13 \text{ yrs}$$

$$= 210 \text{ tons/yr}$$

$$1.7 \text{ mi}^2$$

$$1088 \text{ ACS}$$

$$= .2 \text{ tons/ac/yr}$$

USLE erosion rate

$$\approx 2 \text{ tons/ac/yr} \quad B/E = \text{SDR} = 10\% \text{ SDR}$$

SOUTH DAKOTA

MIP SEDIMENT SURVEY SITE #1

REB

12-14-93

SEDIMENT UNIT WEIGHT

SAMPLE 1 OF 2

WET WEIGHTS SAMPLE #1

CONTAINER WEIGHT = 0.0312516

CONTAINER WEIGHT + WET SOIL WEIGHT = 0.12516

WET SOIL WEIGHT = 0.0937516

VOLUME OF WET SOIL = 0.8 IN DIA. BY 4.5 IN LONG

VOLUME =  $\pi r^2 h = \pi (0.4)^2 4.5 = 2.26 \text{ IN}^3$

$2.26 \text{ IN}^3 \times \frac{1 \text{ FT}^3}{1728 \text{ IN}^3} = 0.0013 \text{ FT}^3$

$0.09375 / 0.0013 = \underline{\underline{72.11 \text{ LBS/FT}^3 \text{ WET}}}$

SAMPLE #2

WEIGHT OF CONTAINER 0.78 LBS

WEIGHT OF CONTAINER + WET SOIL = 8.86 LBS

WEIGHT OF WET SOIL = 8.08 LBS

VOLUME OF WET SOIL 5.95 INS. DIA BY 5.35 INS. HIGH

$= \pi (2.975)^2 (5.35) \frac{1 \text{ FT}^3}{1728 \text{ IN}^3} = 0.086 \text{ FT}^3$

$8.08 \text{ LBS} / 0.086 \text{ FT}^3 = \underline{\underline{93.95 \text{ LBS/FT}^3}}$

DRY WT OF SAMPLE 5.26 LBS

$5.26 / 0.086 = 61.16 \text{ LBS/FT}^3 \text{ DRY}$

DRY WT OF SAMPLE #1

$0.04723 / 0.0013 = 36.33 \text{ LBS/FT}^3$



SOUTH DAKOTA

MIP SEDIMENT SURVEY SITE #1

REB

4-15-94

SEDIMENT UNIT WEIGHT / DELIVERY RATIO 2 2

AVERAGE DRY WEIGHT OF SEDIMENT

$$(61.16 + 36.33) / 2 = 48.75 \text{ lbs/ft}^3$$

$$3403 \text{ yd}^3 @ 48.75 \text{ PCF} = \frac{27 \text{ ft}^3}{\text{yd}^3} \times \frac{48.75 \text{ lbs}}{\text{ft}^3} \times \frac{1 \text{ TN}}{2000 \text{ lbs}} \times 3403 \text{ yd}^3$$

$$= 2239.6 \text{ TONS}$$

$$2239.6 \text{ TNS} \div 13 \text{ YRS} = 172.3 \text{ TONS/YEAR}$$

$$2.42 \text{ mi}^2 = 1549 \text{ ACS}$$

$$= 0.111 \text{ TONS/AC/YEAR}$$

ESTIMATED EROSION RATE AVERAGE 5 TONS/AC/YR

$$\text{SDR} = 5 \div (0.111) = 45\%$$