MINUTES

MONTANA HOUSE OF REPRESENTATIVES
51st LEGISLATURE - REGULAR SESSION

SUBCOMMITTEE ON LONG RANGE PLANNING

Call to Order: By Chairperson Connelly, on February 7, 1989, at 8:00 a.m.

ROLL CALL

Members Present: All

Members Excused: None

Members Absent: None

Staff Present: Claudia Montagne, Secretary; Carroll South, Staff Researcher, Legislative Fiscal Analyst's Office

Announcements/Discussion: REP. CONNELLY announced that the committee would meet with the Subcommittee on Natural Resources on Tuesday, February 14, at 1:00 p.m.

RECLAMATION AND DEVELOPMENT GRANT PROGRAM

Tape 35:A:000

MONTANA BOARD OF OIL AND GAS CONSERVATION, RANKING 12, Broadview Well.

FLOYD PODOLL, Chief Field Inspector, Billings Office, Montana Board of Oil and Gas Conservation, testified on the project. He stated that the grant request was for $65,600 for the plugging of the Broadview well. He said the owner considered the well, with its timbered cellar, a hazard to his livestock. The owner had told the Board that the salt water from this cellar was flowing towards his reservoir, used for both livestock and irrigation. MR. PODOLL reported that the water was causing surface contamination around the well and the drainage path. He said that the runoff from the well entered the Conover Reservoir, which had a spillway leading to the Broadview Pond. The Broadview Pond was used by the residents of the area as a recreational and fishing resource. MR. PODOLL said that the well was the result of natural resource exploration, drilled in 1922-1924 by a company now out of business with no connections to any current company. He said that a cement plug had been considered, and was determined to be a non-viable alternative. MR. PODOLL distributed photographs of the well site and the drainage path, including Broadview Pond.

SEN. MCLANE (36:A:054) asked if the water was reaching the landowner's reservoir, and MR. PODOLL said it was, especially after the melting of ice build-up in the winter.

SEN. HIMSL asked if the water could be used, and MR. PODOLL said that livestock wouldn't use it. SEN. HIMSL asked if there were any funds left in the Abandoned Well Reclamation Fund, and DEE RICKMAN of the Board of Oil and Gas Commission said there was some. There was a $10,000 annual appropriation to that fund, but not enough to take care of this particular problem. MS CHENEY said that the Abandoned Well Reclamation Fund was the $10,000 earmarked RIT money, which could be used by the Board of Oil and Gas each year. She said they had been uncertain as to whether or not it would be used this year. MS CHENEY said that a small amount of funds would be available from that source, with the balance provided from the RDGP. MS RICKMAN added that the $10,000 had been eliminated from the their proposed budget for the coming biennium.

MONTANA SALINITY CONTROL ASSOCIATION, RANKING 14, Salinity Control: A Nonpoint Source Pollution Management Program, (35:A:121).
JANE HOLZER, Director, Montana Salinity Control Association, distributed a packet of information (EXHIBITS 1, 2 and 3). She showed slides of the adverse impact of saline water on agriculture, and also on the infrastructure of the state such as schools, highways, foundations, utilities, wetlands and reservoirs for waterfowl, businesses and airports. She said that salinity was a threat to both ground and surface water, and that the state experienced concentrations of 55,000 TDS as compared to sea water at 35,000 TDS.

MS HOLZER said that the grant money would be used to continue reclamation work on an individual basis, for education and for urban projects.

PETE PURVIS (35:A:501), Chairman of the Montana Salinity Control Board, gave his support of the project.

EINAR HOVELAND, Cascade County Conservation District, stated his organization's support of the project.

DALE KEIL, farmer/rancher, Conrad, said that he was a client of the Montana Salinity Control Project and supported the grant application.

JO BRUNNER, Executive Secretary of the Montana Water Resources Association, testified in favor of the grant application.

RAY BECK, Administrator of the Conservation Districts Division, DNRC, spoke in support of the project.

PEGGY HAAGLUND, Montana Association of Conservation Districts, testified that her organization worked closely with the Salinity Control Association, and that this work was an important part of conservation planning.

REP. ROGER DeBRUYCKER, House District 13, testified for the project.

REP. BARDANOUVE announced that SEN. GREG JERGESON, Senate District 8, strongly supported the project, but was unable to come to the hearing.

SEN. HARRY "DOC" MCLANE, Senate District 42, said that there had been good results on farms and ranches in his district because of this program, and he strongly supported the grant application. Additional letters of support were submitted to the committee (EXHIBITS 4, 5 and 6).

MONTANA STATE UNIVERSITY WATER RESOURCES CENTER, RANKING 16, Mine Water Treatment and Metals Recovery Process, (35:A:588). HOWARD PEAVY, Water Resources Center, MSU, testified for the project. He said that acid mine drainage was filling the Berkeley Pit near the headwaters of the Clark Fork River. The water was rising more rapidly than originally forecasted, and needed attention sooner than planned. The only technology for treatment at the present time was liming, a process with which there were problems. MR. PEAVY said that they were developing a biological alternative, a sulfate reduction process using sulfate reducing bacteria. See EXHIBIT 7.

ROBERT HUNTER (35:B:000) Research Associate in the Department of Civil Engineering at MSU, and Ph.D. candidate presented particulars of the process and the progress to date using charts. He spoke of the possible recovery of the sulfur as well as the metals.

REP. BARDANOUVE (35:B:064) asked how large a project they had so far, and MR. HUNTER replied that they had completed very small experiments. With this grant, they would go to a 20x greater scale, using the sludge from Butte-Silver Bow as nutrient material for the bacteria instead of buying it. REP. BARDANOUVE asked how far they were from proof that the process was economically feasible, and if it were feasible, what costs would be involved in the technical feasibility. MR. HUNTER said they would have to go to a larger scale first, using acid mine drainage, and that the capital expenditure would be $1,000,000 to $2,000,000 per 1,000,000 gallons per day, the same as a wastewater treatment plany for a city of approximately 40,000 people producing 4,000,000 gallons per day. He added that the Berkeley Pit was filling at the rate of 7,000,000 gallons per day, 2 or 3 million of which came from current mining operations.

DR. PEAVY added that as Mr. Hunter had said, it would take approximately $10,000,000 to build this plant. There would be the possibility of metal recovery to generate revenue, citing the expected amount of copper in the pit at fill point to be 50,000,000 lbs.

REP. THOFT (35:B:130) asked about the firm in Missoula working on a filter process to accomplish the same ends, and MR. HUNTER said that the filter process would be part of the metals recovery process. DR. PEAVY said that filtration would remove the metals only after they were precipitated, not while they were in solution.

REP. BARDANOUVE asked how large a facility they would build with this grant, and MR. HUNTER said that the pilot scale would be 20x as big as their current experiments. If that proved out, they would compete for federal monies and private investments for a demonstration scale project.

REP. BARDANOUVE asked if this was original research, and MR. HUNTER said there had been other research done on individual processes, but that no one had put it all together as they had. He added that they had applied for a patent on the process. SEN. MCLANE (35:B:183) asked if this project was limited in application to the clean-up of the Berkeley Pit, and MR. HUNTER said it was well suited for a large point source, such as the Bingham Pit or the Troy Pit when they closed, together with a large source of waste material nearby. He did say that due to this limited application, it was difficult to sell this project and process to EPA.

CITY OF KALISPELL, RANKING 17, Lawrence Park Slope Stabilization and Reclamation, (35:B:205).
MIKE BAKER, Superintendent of Parks, Recreation and Public Lands for the City of Kalispell, testified in support of the project. He said that the project request included money from the city as well as in kind contributions. He distributed photographs of the gravel pit developed by the city a number of years ago which had exposed a hillside. The hillside, since 1983, had been sloughing away, and the city had been losing valuable parkland in the city. He said the purposes of the project had a two-fold scope: 1) Public safety and 2) Protection and enhancement of the diversity of the park as an educational, interpretive, and environmental resource in the center of the city.

SEN. HIMSL (35:B:306) said there was no question of the need for stabilization, and asked if they had worked out their relationship with the golf course. MR. BAKER said the project had nothing to do with the golf course. He said that the golf course, through their expansion, was going to move their holes around, and that there had been negotiations between the golf course and the Friends of Lawrence Park to divide up the property in the flat area. He said the golf course would not gain space from this. He said the only advantage to the golf course was aesthetic. SEN. HIMSL asked if the project preserved the original spring, and MR. BAKER said yes.

REP. BARDANOUVE asked where the reservoir would be, and MR. BAKER said the sealed reservoir would be north of the bank and would be a staging area for the irrigation of the golf course.

REP. THOFT (35:B:403) asked about the market value for gravel, and MR. BAKER said the gravel pit was a valuable resource, but there were numerous other pits. He said Parks and Recreation would sell the gravel removed to the Street Department and they would reimburse the Parks Department $25,000 for their cash contribution. REP. BARDANOUVE suggested that they were not, in fact, putting up any money. He said that other than what the legislature's grant was enabling them to generate for the project, the city was not contributing. There was continued conversation about the financing, relationship with the golf course, and the design of the project. REP. BARDANOUVE (35:B:470) suggested that, as good businessmen, they should sell this valuable gravel, and build a park somewhere else. MR. BAKER responded, saying that the gravel area accounted for 1 acre out of the total 60 acres.

SEN. HIMSL (35:B:515) commented on the uniqueness of the park as an isolated pristine environment within the city limits. REP. BARDANOUVE continued with his previous suggestion, stating if the park was such a valuable park, the city should put up some cash other than what the Legislature generated. He mentioned other communities in the state with city parks that were faced with similar problems that were not coming before the committee.

SEN. HIMSL again spoke about the history of the park, saying that the park project had been initially recommended by Governor Judge 8-10 years ago, and money was allocated for that purpose. It could not be done because of the city's inability to come up with its share and the money was set aside. This money was then used for Lone Pine Park. That was why the issue was before the committee again, albeit under different circumstances.

<u>GOVERNMENT OF BUTTE-SILVER BOW, RANKING 18,</u> Mine Subsidence Reclamation Project, 35:B:601).
JUDY TILLMAN, Assistant Director of the Community Development Department, Butte-Silver Bow, spoke for the project, which would extend the Emma Mine Site Park one block north. She said that the area was a subsidence area, and passed around photographs and a map of the area, EXHIBITS 8 and 9. She said that 44% of the buildings on the block had subsidence damage, and that new development had been precluded. This extension of the Emma Mine Park would be a vital part of urban revitalization, and she added that the Urban Revitalization Agency had been very active in the central business district, and had contributed $150,000 towards this project which was on the fringe of the business district.

REP. THOFT (36:A:001) asked if there were any remaining structures on the block, and MS TILLMAN said there were 5 structures, and that the money would be used for demolishing, reclaiming the land and construction of the park.

SEN. HIMSL asked if the project would violate regulations regarding historic sites. She said they would go the State Historic Preservation Office (SHPO) first. She said their

historic district was 10 miles square. Its purpose was to recognize the significance of the historic developments within the area. She said it was too large to be managed, and that the historic integrity of the area had been jeopardized and ruined already by subsidence.

GOVERNMENT OF BUTTE SILVER-BOW, RANKING 20, Mitigation of Mining and Smelting Damage Through Urban Forestry, (36:A:072). JUDY TILLMAN introduced the project, and JIM McCARTHY, Parks Supervisor, Butte-Silver Bow, spoke for the project, stating that the final result would be a self-sustaining tree program and nursery. He said they had a small tree farm in the maintenance center at the present time, which was where they had gotten the idea.

DEER LODGE VALLEY/MILE HIGH CONSERVATION DISTRICTS, RANKING 21, Restoration of Agricultural Productivity in Lands Affected by Mine Waste Pollution in the Clark Fork Basin, (36:A:124). DAN UELAND, rancher in Silver Bow County and landowner along Silver Bow Creek, and Chairman of the Mile High Conservation District said the project was for the reclamation of lands contaminated by irrigation from Silver Bow Creek. He said that while the creek was a Superfund site, the cleanup of which would correlate with their project, the lands in question (several thousand acres in a three county area) were on the bench and would not be affected by the Superfund project. He said this grant application was for Phase 3 of a 3-phase project.

REP. THOFT (36:A:193) asked if they had the technology, what was stopping the project, and MR. UELAND said they needed to go to larger scale trials on six 10-20 acre sites to determine the cost. REP. THOFT asked if the project would be cost effective, and MR. UELAND said no, due to the amount of chemicals (lime and phosphorus) needed, as well as the reclamation work. He added that as it stood now, the land was useless, with erosion problems developing.

HAZEL SPANGLER (36:A:246), a landowner who had test plots near Fairmont, said she had 1,000 acres of this land, and testified that 45 years ago, it was lush, but now was a wasteland.

BILL SCHAFER (36:A:345), Schafer and Associates, Bozeman, consultant for Mile High and Deer Lodge Valley Conservation Districts, spoke in favor of the project and spoke of the weeds present, and the species that had been discovered to grow on this land. He said that the project would fit into the overall plan of the conservation districts. He discussed the need to go to the field scale. The proposal was for four plots of 10 acres each. He said that liaison work with the EPA/DHES/DNRC would be an important part of the project to prevent overlap, and that there was a possibility of federal cost share funds.

REP. BARDANOUVE (36:A:443) commented that the initial application

of manure would only be a temporary solution, and MR. SCHAFER said that was true, and that with any forb establishment program, there would have to be a sustained fertilizer management program. At the present time with recent information, they would not use manure, and instead use lime and phosphorus to control the metals and the acid. REP. BARDANOUVE asked what the lime accomplished, and MR. SCHAFER said at a high pH, the metal would be insoluble and in a non available form, wouldn't move into the groundwater, and would not be taken up by plants. He said there was a chemical reaction that changed the form of the metal to a copper hydroxide mineral that was less soluble. The strategy would be to maintain the lime at concentrations so that acid production would be prevented for decades.

REP. BARDANOUVE (36:A:503) asked if it was economically feasible to add this lime to each acre. MR. SCHAFER said that looking at farm income only, it would not pay out, but if you looked at the weed abatement and abatement of pollution factors, the economics would begin to pay off. REP. BARDANOUVE asked if nature would heal itself in this situation. MR. SCHAFER said that nature, given enough time, could heal itself. The course of nature would be the erosion of the top 3-4 feet of soil over a couple of thousand years, thus revealing an uncontaminated substrate.

WHITEFISH COUNTY WATER AND SEWER DISTRICT, RANKING 23, Swift Creek Clay Banks Stabilization, (36:A:534).

REP. CONNELLY asked Ms Cheney to explain an issue regarding this project, and MS CHENEY said that the project was eligible for both the Renewable Resource Development (RRD), ranked 14, and the Reclamation and Development (RDGP) Programs, and was listed in both books. She said it was the same project, and would be funded in one or the other program.

DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION, CONSERVATION DISTRICTS DIVISION, RANKING 24, An Accelerated Soil Survey Program for Montana, (36:A:544).
LAURIE ZELLER, Administrative Assistant, Conservation Districts Division, DNRC, spoke for the project as set forth in EXHIBIT 10.

REP. BARDANOUVE (36:A:600) asked if this was a continuation of the mapping program going on at the present time, and MS ZELLER said yes, there was a mapping program going on, as it had for 50 years, and that they would like to complete the survey. She said with current staffing, the survey could be completed in Montana by 2000.

REP. THOFT asked if there was any federal funding, and MS ZELLER said there was $2,600,000 for 1989, and $2,100,000 for 1990, which would be for private land. She said there was also money for surveys on public land. She said that the grant money from the state they had received previously had been a positive factor in reduced funding cuts by the federal government.

ADJOURNMENT

Adjournment At: 10:35 a.m.

M. E. Connelly
REP. CONNELLY, Chairperson

MEC/cm

3225.min

DAILY ROLL CALL

Long Range Planning SUBCOMMITTEE

DATE 2/7/89

NAME	PRESENT	ABSENT	EXCUSED
Rep. Mary Ellen Connelly, Chair	✓		
Sen. Matt Himsl, Vice Chair	✓		
Rep. Francis Bardenouve	✓		
Sen. Harry McLane	✓		
Sen. Richard Manning	✓		
Rep. Bob Thoft	✓		

Form CS-30A
Rev. 1985

EXHIBIT 1
DATE 2-7-89
HB R & D Grant Prog

HISTORY OF MONTANA'S SALINITY CONTROL PROGRAM

The Triangle Conservation District (TCD) was organized in 1979 to provide a technical field team to develop reclamation plans for landowners on a farm-by-farm basis. The field team concept, which led to the TCD, was developed by Dr. Paul Brown, Agriculture Research Service, Marvin Miller, MT. Bureau of Mines & Geology, and Wendell Thacker, Soil Conservation Service, to identify recharge areas and make specific recommendations. The technical staff has received training from Miller, Brown and Jim Krall, MT. Agricultural Experiment Station, to control, reclaim and prevent saline seeps.

The TCD began with ten soil conservation districts in north-central Montana. The funding has been provided on a biennial basis by the MT. Legislature in 1979, 1981, 1983, 1985 and 1987 by special grants made available through Montana's coal and mineral taxes. As interest in the salinity problem and knowledge of the TCD program grew, two additional control organizations were formed. In 1982, seven conservation districts combined to form the Northeast Montana Saline Seep Association (NMSSA). In 1984, ten additional conservation districts joined to form the Southern Saline Seep District (SSSD). Each of the three organizations have their own board of directors made up of one elected supervisor from each conservation district. The supervisors are instrumental in securing funding each biennium and providing policy and priority decisions for the field team. The funding is administered through the Montana Department of Natural Resources and Conservation.

The Montana Salinity Control Association (MSCA) was formed in 1985 to encompass the 33 counties now involved or interested in saline seep control. A six-member executive board is made up of two supervisors from each of the three control organizations. Herbert Pasha, Chouteau County, was chairman of the TCD from 1979-1986 and the current chairman is Alvin Boxwell, Glacier County. Merton "Pete" Purvis, Roosevelt County, chairs the NMSSA and John Zinne, Stillwater County, chairs the SSSD. Each of these three supervisors serve on the MSCA executive board, which Pasha chaired until his retirement. The current chairman is Pete Purvis.

The field team headquarters is in Conrad, MT. and the staff travels to the 33 counties in Eastern MT. to provide technical assistance. The original team leader was Ted Dodge, a Soil Conservation Service employee who worked for TCD for four years 1979-1983, through the Intergovernmental Personnel Agreement. Jane Holzer, a technical staff member became program director in 1983. The technical staff of five integrates training in agronomy, soil science, hydrogeology, range and forage management for reclamation planning.

Participation in the program is voluntary. Each Soil Conservation District receives farmer applications and establishes priorities based on seep severity, access to recharge areas and probability of implementing a successful control plan. Applications are forwarded to the team office. The program is unique in that the landowners are charged for technical assistance. To be partially self-supporting, MSCA charges landowners for drilling, which comprise approximately one-third of the costs for technical assistance.

A key in the process of saline seep reclamation is to recognize the two essential parts of a seep: the discharge area, which expresses itself as a wet salinized spring, and the recharge or upslope area, where salinized ground water originates. The discharge area is easily recognized, but is only a symptom of the problem. Inefficient use of precipitation and soil moisture in the recharge area is the real culprit. Therefore, reclamation efforts should focus on utilization of excess moisture in the recharge area.

The field team investigation of each application is divided into five steps: initial review, drilling, fieldwork, plan development and delivery, and plan follow-up. An initial review of the saline seep(s) is done with the landowner/operator to determine the extent of seep development, cropping hisorty, surface water accumulation and any reclamation techniques tried to date. Important items used throughout the planning process are: the earliest and latest aerial photos available to enable stereoscopic viewing and document seep growth; U.S. Geological Survey topography maps; ASCS farm maps and SCS soil

survey information. Monitoring-well locations are plotted on the appropriate farm map, and a cost estimate is developed which reflects the anticipated cost of drilling. If the landowner accepts the cost-estimate and signs a cooperative agreement, the project proceeds. Prior to the inception of drilling, there are no costs to the individual.

Shallow ground water monitoring wells are drilled as the first step in the reclamation planning process. There are many benefits derived from the drilling program. First, the wells allow for more accurate identification of the potential recharge area of the seeps in question. Soil textures, soil water conditions and depth to bedrock or an impermeable layer are recorded during the drilling process. The owner/operators are encouraged to assist with the drilling and be involved throughout the entire planning process. They are more willing to implement the recommendations if they have helped develop them.

The fieldwork phase includes soil and water quality sampling and measurement of the static water table in the monitoring wells. An elevation survey of the wells, often assisted by the SCS, is also completed at this time. During plan development, information from the elevation survey, well logs and water table levels are combined to provide a two dimensional picture of the shallow ground water system and underlying geology. Ground water flow patterns are determined by comparing the relative water table elevations at each monitoring well location. A reclamation plan is delivered to the applicant with specific cropping recommendations as to where and what needs to be planted. The long term goals and management of the land as well as economics and federal farm program participation are taken into account in developing rotations.

The last step in the field team procedure is an on-going follow-up of plan implementation and reclamation progress. Cooperators are provided a well measurement device for periodic monitoring (monthly from April through October) of the depth to the water table. They send the measurements to the MSCA field office where well hydrographs are kept. Over time, the impact of land use decisions in the recharge area on the shallow ground water system will affect the seep or discharge area. Technical assistance is provided usually for 5-6 years or until reclamation of the salinized area back to productive land is complete. The ultimate goal is to lower and stabilize the water table at seven feet or more in the seep area through intensive cropping systems in the recharge area.

MSCA works closely with the Soil Conservation Service, Agricultural Research Service, MT. Bureau of Mines & Geology, MT. Agricultural Experiment Station, MT. Cooperative Extension Service and Agricultural Stabilization and Conservation Service to deliver up-to-date recommendations at each plan delivery and seasonally thereafter during follow-up. The local SCS and Extension Service are provided copies of each plan.

Since the program was funded in 1979, nearly 310 reclamation plans have been developed on over 9,100 acres of saline seep. Presently over 35 applications are in various stages of progress. The average seep acres per plan is 31, with the size ranging from 1 to 545 acres affected.

December, 1988 - Jane Holzer, MSCA Program Director

POTENTIAL GROWTH RATE OF SALINE SEEP ACREAGE AND ASSOCIATED POTENTIAL LOSS IN NET INCOME

Year	Acres	Net Income/Yr. Per Acre		Total Net Income for all Seep Acres Lost/Year	8% Present Value Factor	Discounted Net Income for each Year to Present Value
0	280,000	x $15.00	=	$ 4,200,000.00		
1	308,000	x $15.00	=	$ 4,620,000.00	.926	$4,278,120.00
2	338,800	x $15.00	=	$ 5,082,000.00	.857	$4,355,274.00
3	372,680	x $15.00	=	$ 5,590,200.00	.794	$4,438,618.00
4	409,948	x $15.00	=	$ 6,149,220.00	.735	$4,519,676.00
5	450,942	x $15.00	=	$ 6,764,130.00	.681	$4,606,372.00
6	496,037	x $15.00	=	$ 7,440,555.00	.630	$4,687,549.00
7	545,640	x $15.00	=	$ 8,184,600.00	.583	$4,771,621.00
8	600,204	x $15.00	=	$ 9,003,060.00	.540	$4,861,652.00
9	660,225	x $15.00	=	$ 9,903,375.00	.500	$4,951,687.00
10	726,247	x $15.00	=	$10,908,705.00	.463	$5,050,730.00
11	798,872	x $15.00	=	$11,983,080.00	.429	$5,080,825.00
12	878,759	x $15.00	=	$13,181,385.00	.397	$5,233,009.00
13	966,635	x $15.00	=	$14,499,525.00	.368	$5,335,825.00
14	1,063,329	x $15.00	=	$15,949,935.00	.340	$5,422,977.00
15	1,169,629	x $15.00	=	$17,544,435.00	.315	$5,526,497.00
16	1,286,592	x $15.00	=	$19,298,880.00	.292	$5,635,272.00
17	1,415,251	x $15.00	=	$21,228,765.00	.270	$5,731,766.00
18	1,556,776	x $15.00	=	$23,351,640.00	.250	$5,837,910.00
19	1,712,453	x $15.00	=	$25,686,795.00	.232	$5,959,336.00
20	1,883,698	x $15.00	=	$28,255,474.00	.215	$6,074,926.00

Present Value of Lost Net Income = $102,359,642.00

Note: Net income figured using an average of $80.00/ac for fixed and variable costs, including real estate and personal property taxes, and a 30 bus/ac average yield on crop fallow.

30 bus/ac X $3.50/bus = $105.00/ac Gross Income

$105.00/ac - $80.00/ac = $30.00/ac ÷ 2 yrs. = $15.00/ac

The total net income lost of $102 million + total cash input lost of $375 million would mean a loss of $477 million to Montana's economy over a 20 year period if saline seep reclamation and prevention is not addressed aggressively. Using a 2.5 multiplier effect from agriculture dollars spent and earned, $1 billion 192 million would be lost to Montana's economy.

Soil and Water Conservation News

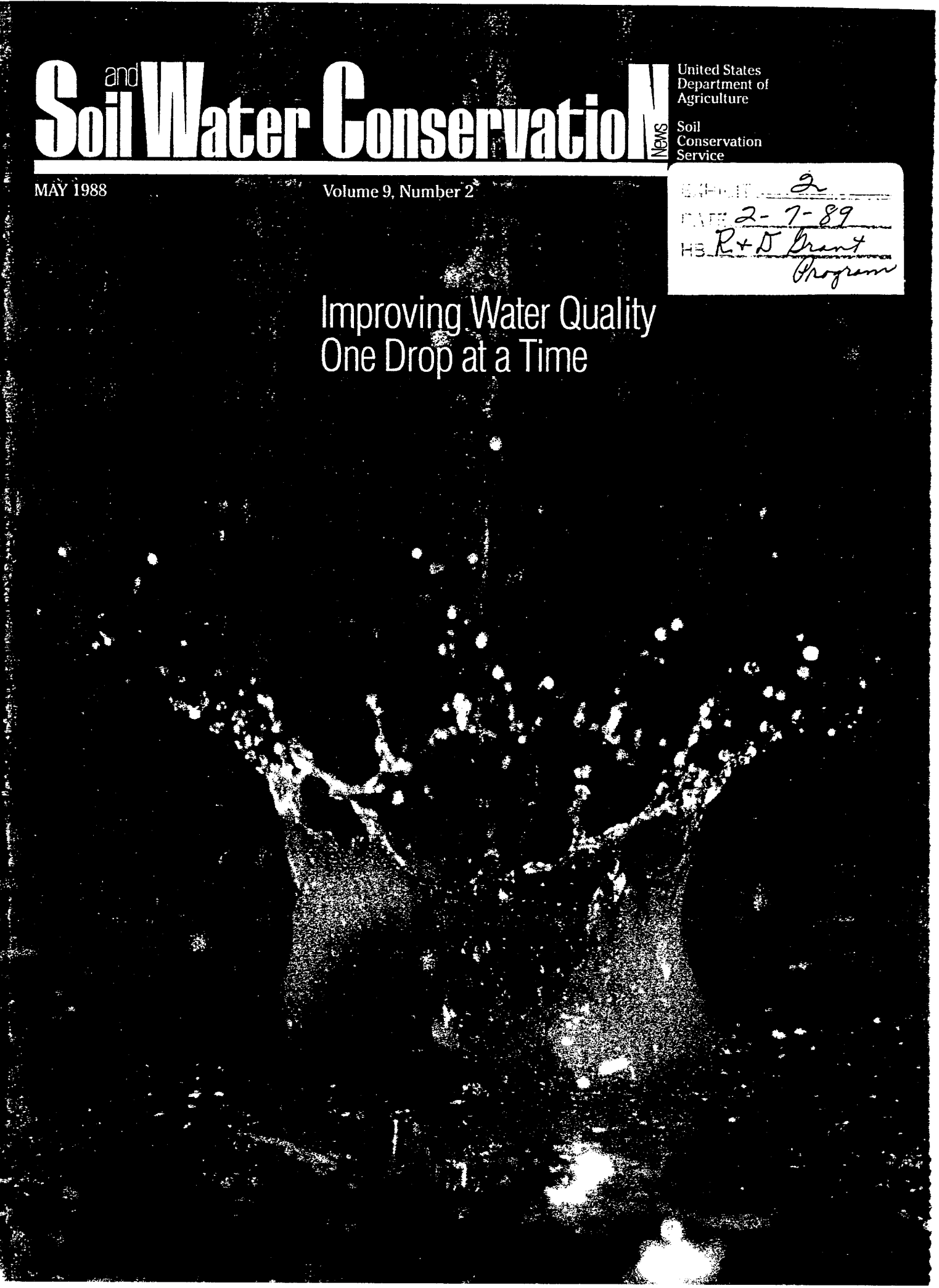
United States Department of Agriculture

Soil Conservation Service

MAY 1988

Volume 9, Number 2

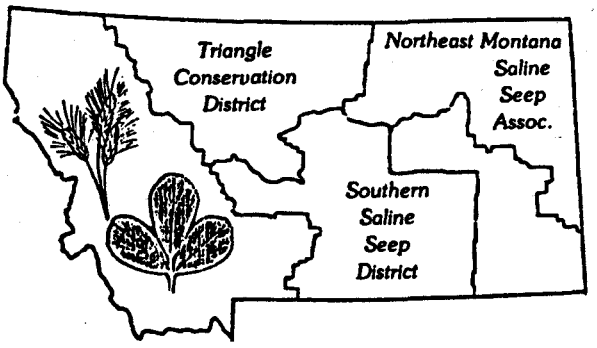
Improving Water Quality One Drop at a Time



Montana
Salinity Control Association

P. O. Box 1411
Conrad, Montana 59425
Phone (406)278-3071

Saline Seep Reclamation Areas



WATER QUALITY ANALYSES
SALINE SEEP MONITORING WELLS IN THREE DISTINCT GEOLOGIC FORMATIONS

		Judith River Formation			Colorado Shale		Fort Union Formation		Drinking Water
parameter	units	recharge	seep	reservoir	recharge	seep	recharge	seep	Standards
Ca	mg/l	410	419	406	452	456	116	412	ns
Mg		475	930	3570	669	3130	64.6	826	ns
Na		1880	3370	11170	869	4860	22.7	217	270+
K		27.3	15.1	47.3	7.3	19.6	4.1	14.6	ns
Fe		0.28	0.01	<0.002	0.007	0.049	<0.002	0.004	0.3
Mn		11.2	8.8	0.44	0.24	0.2	0.013	0.022	0.05
SiO2		45.5	43	0.3	15.2	16.5	12.3	11.8	ns
HCO3		7.1	15.1	381	445	935	594	651	ns
CO3		0	0	202.5	0	0	0	0	ns
Cl		103	181	439	59.6	836	3.5	41.3	250
SO4		6650	11000	36800	4880	20650	92.4	4170	250
NO3		60.2	192	136	57.8	330	4.2	2.6	10
F		2.8	4.0	2	0.3	<1	0.2	4	2
SAR		15.0	21.0	38.8	6.1	17.8	0.4	1.4	ns
pH		4.85	4.97	9.1	7.8	7.7	7.2	7.7	6.0-8.5
SpC	umhos/cm	10110	16650	41530	7225	24240	1109	5646	750-1000
TDS	mg/l	9668.8	16170	53154	7455	31233	914	6350	500
Al	ug/l	12000	15100	<30	<30	<30	<30	<30	ns
B		2760	2320	3020	530	810	510	2100	1000
Cd		26	27	25	<2	<2	<2	5	10
Cr		16	16	<2	<2	20	<2	6	50
Cu		54	33	22	33	70	<2	18	1000
Li		2290	5340	7250	230	1450	40	570	ns
Mo		25	30	60	< 20	80	< 20	< 20	5
Se		165	650	374	244	159	<1	60	10
Ni		910	990	120	20	150	<10	20	ns
Sr		3670	9890	9230	3560	16500	620	3720	ns
Zn		1110	1140	9	36	230	5	17	5000
oil/grease	mg/l	3	3						

ns - no standard set
\+ suggested level for sodium restricted diets

Exhibit 3
2/7/89 R&D Grants

Is saline seep a resource problem on your land?

YOUR CONSERVATION DISTRICTS ARE WORKING TO COMBAT SALINE SEEP AND WATER QUALITY PROBLEMS.

MONTANA SALINITY CONTROL ASSOCIATION (MSCA) IS A CONSERVATION DISTRICT PROGRAM WITH A PROFESSIONAL STAFF TRAINED IN SALINE SEEP INVESTIGATION AND RECLAMATION.

MSCA services include:

- SALINE SEEP RECLAMATION PLANNING
- WATER QUALITY SAMPLING AND TESTING
- MONITORING WELL INSTALLATION
- SOIL SAMPLING - SALT HAZARD OR HERBICIDE RESIDUAL
- FORAGE/CROP MANAGEMENT

Impacts of saline seep:

- LOSS OF DOMESTIC AND LIVESTOCK WATER SOURCES
- INCREASED SOIL EROSION
- LOSS OF PRODUCTIVE CROPLAND
- LOSS OF FIELD OPERATION EFFICIENCY
- DAMAGE TO ROADS AND FOUNDATIONS
- SEEPS CONTINUE TO GROW OVER TIME IF NOT ADDRESSED

To get started:

FILL OUT THE APPLICATION ON REVERSE SIDE; AND BRING IT TO YOUR LOCAL CD/SCS OFFICE. AN MSCA REPRESENTATIVE WILL CONTACT YOU FOR AN INITIAL SITE REVIEW. OR CALL 1-800-537-6717.

JOIN OVER 300 MONTANA FARMERS WHO HAVE USED MSCA SERVICES TO COMBAT SALINITY PROBLEMS.

EXHIBIT 4
DATE 2-7-89
HB R&D Grant Progra

SHERIDAN COUNTY CONSERVATION DISTRICT

Phone 765-1801 or 765-2252

119 N. Jackson

Plentywood, Montana 59254

February 10, 1989

Long Range Planning Committee
Mary Ellen Connelly, Chairperson
Francis Bardanouve
Bob Thoft
Richard Manning
Matt Himsl
Harry McLane
Capitol Station
Helena, Mt 59620

Dear Committee:

The Sheridan County Conservation District would like to voice our support for funding the Montana Salinity Control Association. This is an extremely worthwhile project; assistance from MSCA has proven to be very valuable to farmers fron Sheridan County in their effort to control problems brought about by saline seep.

Saline seep continues to be a problem throughout Montana. It can render fertile cropland essentially worthless. Water quality suffers degradation from effects of saline seep.

The identification of the specific cause of the saline seep is often difficult and the treatment of the affected area can also be a challange. For these reasons we feel that it is essential to continue the excellent work which has been started by the Montana Salinity Control Association and we urge you to consider funding this important project.

Thank you.

Sincerely,
Sheridan County Conservation District

Ellis Hagen

Ellis Hagen, Chairman

Shonkin, Montana 59476
February 6, 1989

EXHIBIT 5
DATE 2-7-89
HB R+D Grant Program

Rep. Mary Ellen Connelly
Capitol Station
Helena, Montana, 59601

Dear Rep. Connally:

I am writing in support of funding for the Montana Salinity Control Associaton. This is is one of the most important issues facing the legislature concerning farming in Montana.

Saline seep is a top priority conservation problem in our state. In recent years it's publicity has been overshadowed by drought and CRP problems and concerns. Seeps have been steadily eroding away at the acreage of much of the productive farm land of the state, increasing farm costs, decreasing farm gross and net income, and lowering the value of land, both in market price and for tax valuation purposes.

Saline seep also results in major water quality problems. A huge proportion of the livestock surface and shallow ground water sources have become toxic in recent years. Domestic supplies are also affected as shallow ground water, and streams, rivers and lakes become polluted with the salts which among other things, contain nitrates, and heavy metals (often including arsnic and selenium.)

Most of the prarie land east of the continental divide is subject to saline seep developement. Developement is in all stages, from potential to severe. A conservative estimate by state researchers in 1978 placed seep acreage at 200,000 in Montana. A conservative estimate in 1987 was 300,000 acres! The increase would likely have been almost double that if normal precipation had been received those years.

We farm on the Highwood Bench and have been active in saline seep control for 20 years. This area was one of the first areas to be severely affected. During the early seventies my father and I utilized the services of Dr. Paul Brown, Agricultural Research Service, USDA; Dr. Marvin Miller, hydrogeologist, Montana Tech; several individuals from the Plant and Soil Science Dept., MSU; the Soil Conservation Service, the Extension Service, and others to obtain specific information and recomendations taylored to our farm. The services included on site inspection and drilling, which led to information on soil depth, soil layering and soil texture. Also depth to water table and direction of flow of shallow ground water was determined. The relationships between saline seeps and past cropping practices were identified.

From the above information these people developed recommendations for cropping practices, surface water management, and monitoring systems for our farm which enabled us to make giant strides in halting the advance of saline seep, and in reclaiming land that had lost or was losing its productive capacity. Dozens of seeps that had been out of production are now producing equally with the surrounding land, and are undetectable to the eye. We are now "farming around" only three seeps on this land. Others in our area have had similar experiances.

This progress was made possible by the personalized services rendered by the people mentioned above who at that time were engaged in seep research. These services are no longer available through them and are available only through Montana Salinity Control Association, whose services we utilized last winter for land we had

recently rented. Implementation of effective controls on this land would have been very difficult without their recomendations.

During their first four years of existance, MSCD, then called Triangle Conservation District, was so successful in helping farmers assess seep problems and advising them on control measures, that they were expanded to cover most counties in eastern Montana. This was an expansion from eight to thirty-three counties. More saline seep control can be brought about by the continuation of MSCD, than through any other effort the state can make.

Although Triangle started out wholly supported by public funds, MSCD is now more self sufficient, charging for the work they do. However, the monies they raise through services are not adequate to cover all their operating and capital needs.

There are several reasons we believe the State should continue to fund MSCD:

1. Reclaimed saline seep areas produce more income to:

   a. Farmers--through higher production and decreased annual costs.

   b. Counties--through increased land valuations.

   c. The state--through increased property and income taxes.

   d. The Montana economy--through more dollars generated on the farm.

2. Farmer's seep problems largely have been caused by no fault of their oun. They have been caused from following farming practices recommended by the leading authorities for two generations, and from participating in federal farm programs requiring idle land.

3. MSCD's services are very much in demand, and they have an excellent record of getting seep control programs established on many farms.

4. The service they perform is not otherwise available.

5. It makes more sense to keep a good organization going than to drop it and have to start it up again later. The need will be there for a long time. Seep control programs have been proven workable, but a relatively small number of Montana's farms have had an intensive program initiated yet.

We know that MSCD has furnished you with the figures on numbers of farms serviced, acres involved, requests in the hopper, etc. so I will not duplicate here. The figures are impressive.

In conclusion, I believe the MSCD should be fully funded, not only for the sake of farmers, but for the good of all of Montana.

Sincerely,

Ronald A. Long

Ronald A. Long
Director,
Highwood Alkali Control Assn.

EXHIBIT 6
DATE 2-7-89
HB R+D Grant Program

February 6, 1989

Rep. Mary Ellen Connelly
Capital Station
Helena, Mt. 59620

Dear Rep. Connelly,

On Tuesday, February 7th the Montana Salinity Control Association will appear before the Long Range Planning Committee regarding their funding from the Resource Indemnity Trust Fund.

I am a member of the Highwood Alkali Control Association and it was here on the Highwood Bench that the first saline seep research was conducted. This research was organized and mostly paid for by the landowners in this area.

Through the efforts of Dr. Paul Brown and many others, from the late 1960's through the 1970's, methods of controlling and reducing saline seep were developed. The cooperation between the landowners and researchers was excellent. The tools for saline seep control that came out of these years of hard work are the very tools that the Montana Salinity Control Association are using now to help landowners battle saline seep in twenty-nine counties in Montana.

Ground water quality is becoming a major issue and the control of saline seep is directly related to maintaining the quality of ground water. We realized years ago during the research when saline seep moniter well samples were analyzed that we were dealing directly with ground water quality.

You will hear in testimony to your Committee that saline seep is still wide spread in Montana. The landowners are paying an average of 30% of the cost of the well drilling and technical expertise that is provided by the Montana Salinity Control Association. I urge you and your fellow Committee members to consider the factors of agricultural production, water quality and soil conservation when a recommendation concerning funding for the Montana Salinity Control Association is made.

Please continue funding the Montana Salinity Control Association because they are and have been doing an effective job for the landowners of Montana.

Sincerely,

Barry Wharram

Barry Wharram
Highwood Alkali Assn.
Highwood, Montana

EXHIBIT 7
DATE 2-7-89
HB RRGG Grants

TESTIMONY BEFORE THE LONG RANGE PLANNING COMMITTEE
IN REFERENCE TO
PROJECT NO. 16, RECLAMATION AND DEVELOPMENT GRANTS PROGRAM
ENTITLED
MINE WATER TREATMENT/METAL RECOVERY PROCESS

FEB. 7, 1989

MADAM PERSON
MR. CHAIRMAN, MEMBERS OF THE COMMITTEE.

FOR THE RECORD MY NAME IS HOWARD PEAVY AND I AM THE ACTING DIRECTOR OF THE MONTANA UNIVERSITY SYSTEM WATER RESOURCES CENTER AND PROFESSOR OF CIVIL ENGINEERING AT MSU. WITH ME IS ROBERT M. HUNTER, A PH.D. CANDIDATE AND RESEARCH ASSOCIATE IN THE DEPARTMENT OF CIVIL ENGINEERING AT MSU.

WE ARE HERE THIS MORNING TO DISCUSS THE SIGNIFICANCE OF THE PROJECT ENTITLED MINE WATER TREATMENT/METALS RECOVERY PROCESS AND TO ANSWER ANY QUESTIONS THAT YOU MAY HAVE CONCERNING THE PROJECT. WITH YOUR PERMISSION I WILL MAKE SOME BRIEF COMMENTS CONCERNING THE NATURE OF THE PROPOSED PROJECT AND THEN ASK MR. HUNTER TO DISCUSS THE CURRENT STATUS OF THE PROJECT AND THE GOALS AND OBJECTIVES THAT WILL BE PERUSED SHOULD THE PROJECT BE FUNDED.

ACID MINE DRAINAGE IS NOT A NEW PROBLEM TO MONTANA. SMALL STREAMS IN SEVERAL PARTS OF THE STATE HAVE BEEN IMPACTED BY THIS PROBLEM FOR YEARS. THE LARGEST SINGLE THREAT TO THE STATE WATERS IS THE ACID MINE WATER NOW FILLING THE BERKELEY PIT AT THE HEADWATERS OF THE OF THE CLARK FORK RIVER. YOUR HAVE PROBABLY HEARD TESTIMONY ALREADY CONCERNING THE RATE AT WHICH THE PIT IS FILLING AND ABOUT THE POOR QUALITY OF WATER. IT IS INCREASINGLY APPARENT THAT THIS PROBLEM WILL HAVE TO BE DEALT WITH MUCH SOONER THAN ORIGINALLY ANTICIPATED. IT SHOULD ALSO BE EMPHASIZED THAT, SHOULD THIS MATERIAL BE ALLOWED TO SPILL OVER INTO GROUND AND SURFACE WATERS, THE IMPACTED WILL EXTEND WELL BEYOND THE HEADWATERS AREA, AFFECTING THE CLARK FORK AT LEAST AS FAR AS ITS CONFLUENCE WITH THE BLACKFOOT, AND POSSIBLY AS FAR AS LAKE PEND OREILLE.

THE ONLY PROVEN TECHNOLOGY FOR TREATING LARGE VOLUMES OF ACID MINE WATER IS THE USE OF LIME. THIS MATERIAL ADDS CALCIUM AND HYDROXIDE TO THE WATER, THE LATTER OF WHICH REACTS WITH THE ACID TO NEUTRALIZE IT. EXCESS HYDROXIDE IONS THEN REACT WITH THE METALS THAT ARE IN SOLUTION, FORMING AN INSOLUBLE COMPLEX OF METAL HYDROXIDES THAT PRECIPITATES. THE MINERAL CONTENT OF THE WATER IS NOT REDUCED BY THE ADDITION OF LIME BUT IS, IN FACT, INCREASED BY THE ADDITION OF THE CALCIUM. THIS ADDITIONAL CALCIUM CREATES A NEW PROBLEM IN THAT IT REACTS WITH SULFATE, WHICH IS IN ABUNDANCE IN ACID MINE DRAINAGE, INCLUDING THE BERKELEY PIT, TO FORM A PRODUCT KNOWN AS GYPSUM. GYPSUM PRECIPITATES VERY SLOWLY AND IS GENERALLY VERY POORLY REMOVED WITH THE METAL PRECIPITATES IN THE LIMING PROCESS. VIRTUALLY EVERY INSTANCE IN WHICH LIME IS USED TO TREAT ACID MINE WASTE, DEPOSITS OF GYPSUM ARE NOTED IN THE SURFACE WATER DOWNSTREAM FROM THE OPERATION. THIS PROBLEM IS QUITE LIKELY TO OCURR IN THE CLARK FORK WHERE COLD TEMPERATURES WILL DELAY THE PRECIPITATION OF THE GYPSUM AND RESULT IN ITS TRANSPORT LONG DISTANCES DOWNSTREAM BEFORE THE REACTION IS COMPLETE. PRECIPITATES OF GYPSUM COAT BANKS AND BOTTOMS OF THE

EFFECTED STREAMS AND PLUG INTERGRAVEL AREAS USED FOR FISH SPAWNING AND THE PROPAGATION OF AQUATIC INSECTS THAT PROVIDE FISH FOOD. THE LARGE QUANTITY OF SULFATES (7,000 MG/L) AND THE LARGE DOSAGES OF LIME THAT WILL BE REQUIRED TO NEUTRALIZE THE HIGH ACIDITY IN THE PIT REPRESENTS A VERY SUBSTANTIAL THREAT TO THE ECOLOGY OF THE CLARK FORK IF TREATED MINE WATER IS DISCHARGED IN THE WATERSHED. THIS COULD OCCUR AT A TIME WHEN THE CLARK FORK IS WELL ON ITS WAY TO RECOVERY AND TO BECOMING A MAJOR RECREATIONAL AND ECONOMIC ASSET TO WESTERN MONTANA.

THE PROCESS THAT WE ARE TRYING TO DEVELOP WOULD OFFER AN ALTERNATIVE TO THE LIMING PROCESS. BY USING BIOLOGICAL PROCESSES, THE ACIDITY CAN BE REDUCED AND THE METALS PRECIPITATED WHILE AT THE SAME TIME REDUCING THE SULFATE CONTENT OF THE WATER, ALL WITHOUT ADDING OTHER MINERALS SUCH AS CALCIUM. THIS PROCESS, KNOWN AS SULFATE REDUCTION, CONVERTS THE SULFATE TO SULFIDE WHICH REACTS WITH THE METALS TO FORM INSOLUBLE METAL-SULFIDE COMPLEXES. METALS RECOVERED IN THIS FORM CAN BE READILY CONVERTED TO COMMERCIALLY USABLE FORM. THIS BECOMES SIGNIFICANT FORM AN ECONOMIC STAND POINT WHEN ONE CONSIDERS THAT THE WATER IN THE PIT IS ESTIMATED TO CONTAIN ABOUT 150 MILLION POUNDS OF METALS AT ITS SPILL POINT, MANY WITH COMMERCIAL VALUE. IT BECOMES SIGNIFICANT FROM AN ECOLOGICAL STANDPOINT WHEN ONE CONSIDERS THAT THE GYPSUM PROBLEM IS AVOIDED.

BIOLOGICAL SULFATE REDUCTION IS NOT A NEW PHENOMENA, NOR IS IT A PRODUCT OF GENETIC ENGINEERING. SULFATE REDUCING BACTERIA HAVE EXISTED AND "DONE THEIR THING" IN SEDIMENTS AT THE BOTTOM OF STREAMS AND LAKES FOR AT LEAST AS LONG AS MICROBIOLOGISTS HAVE STUDIED THESE ENVIRONMENTS. SULFATE REDUCING PROCESSES HAVE ALSO BEEN USED IN ENGINEERED SYSTEMS TO ACCOMPLISH GOALS SIMILAR TO THOSE PROPOSED IN THIS PROJECT. THESE PROCESSES HAVE NOT BEEN ECONOMICAL, HOWEVER, AND THEIR USE FOR LARGE QUANTITIES OF WASTE WATER WOULD BE QUITE PROHIBITIVE. THE EXPENSE ASSOCIATED WITH THE PROCESS IS DUE TO THE BACTERIA'S REQUIREMENT OF A CARBON SOURCE OF SIMPLE MOLECULAR STRUCTURE. IN THE PAST, THIS SOURCE HAS BEEN LACTATE, ACETATE OR ALCOHOL. BECAUSE THESE EXPENSIVE COMPOUNDS ARE USED IN RELATIVELY EQUAL PROPORTIONS TO THE AMOUNT OF ACID WASTE PROCESSED, THEIR USE IN A SITUATION INVOLVING FLOWS SUCH AS THOSE ENCOUNTERED IN THE PIT WOULD BE QUITE PROHIBITIVE.

THE THESIS OF THIS PROPOSAL IS THAT THE SAME REACTIONS CAN BE FUELED BY COMPOUNDS THAT ARE THE BY PRODUCT OF ANAEROBIC DIGESTION OF MUNICIPAL WASTE WATER SLUDGE, OR ANY OTHER SIMILAR ORGANIC WASTE PRODUCT. BY CAREFUL OPERATION OF THESE ENGINEERED SYSTEMS, WE BELIEVE THAT WE CAN OPTIMIZE THE PROCESS TO SUCH AN EXTENT THAT METALS, AND PERHAPS ELEMENTAL SULFUR, CAN BE HARVESTED FROM ACID MINE DRAINAGE AT A COST NEAR, IF NOT LESS THAN, THE VALUE OF THE EXTRACTED MATERIALS. IF THIS PROVES TO BE TRUE, THE BENEFITS OF THIS PROCESS OVER THE CONVENTIONAL LIMING WOULD BE TREMENDOUS IN TERMS OF BOTH THE OPERATING AND ENVIRONMENTAL COSTS.

MR. HUNTER HAS PREPARED CHARTS SHOWING PARTICULARS OF OUR PROCESS AND OF THE PROGRESS THAT WE HAVE MADE TO DATE. I'LL ASK HIM TO PRESENT THIS MATERIAL AT THIS TIME.

Exhibit 8

2/7/89

R & D Grants

Exhibit 8 consists of 2 original photographs. The exhibit is housed at the Historical Society.

Exhibit 9
2/7/89
B & D Grants

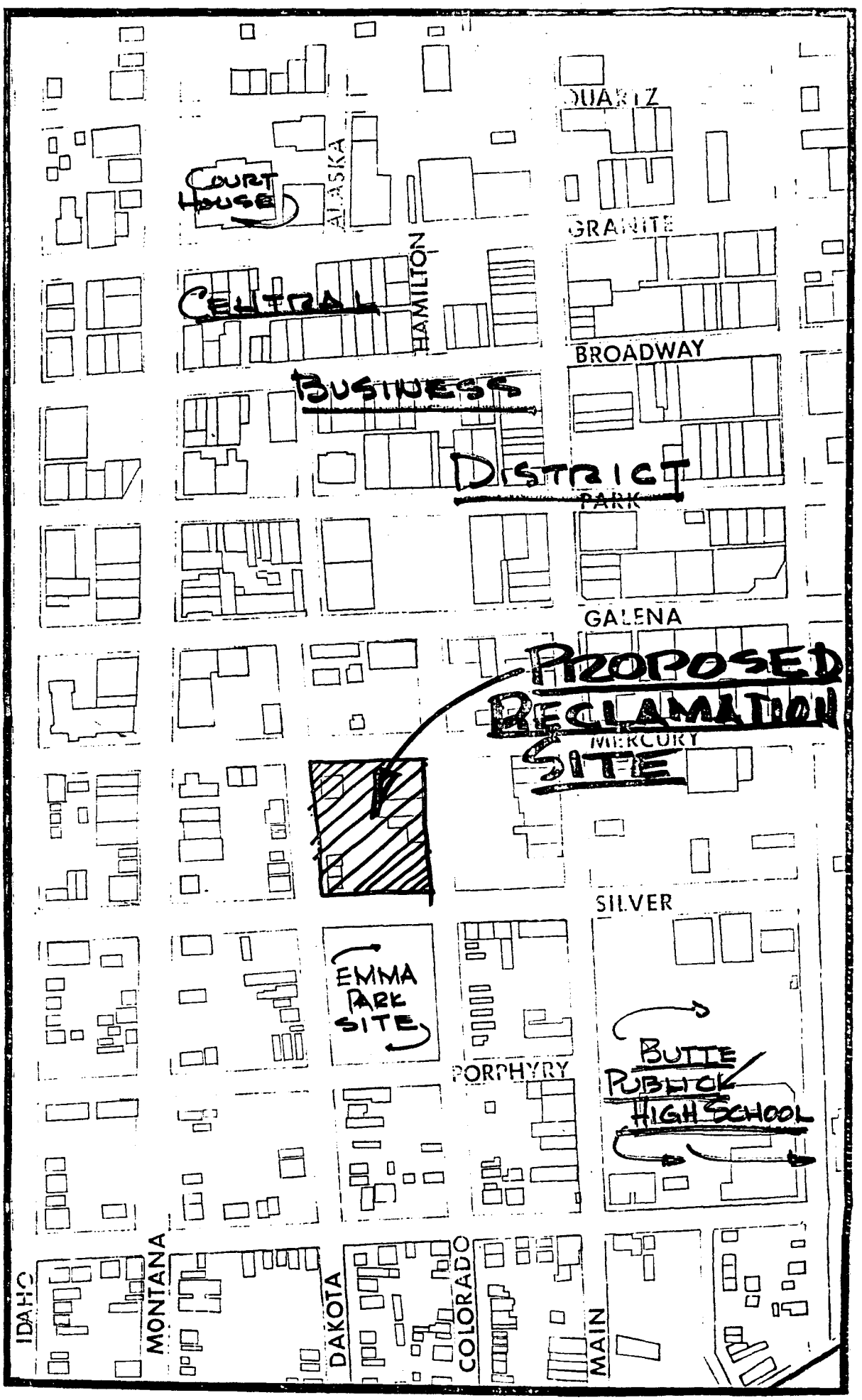


EXHIBIT 10
DATE 2-7-89
HB R-D Grant Proj

DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION

STAN STEPHENS, GOVERNOR

1520 EAST SIXTH AVENUE

STATE OF MONTANA

DIRECTOR'S OFFICE (406) 444-6699
TELEFAX NUMBER (406) 444-6721

HELENA, MONTANA 59620-2301

Madam Chairman, members of the committee:

My name is Laurie Zeller, administrative assistant, with the Conservation Districts Division of the Department of Natural Resources and Conservation.

The purpose of this application is to accelerate the soil survey progress on private lands in Montana. Presently, basic soils information is not available on 34 percent of all land in Montana, totalling about 21 million acres.

Conservation districts, in the period from 1984 to 1986, have answered around 9,000 requests specifically for soils information. Requests come from private landowners, planners and developers, real estate agents, local governments, state, and federal governments, and universities.

Soil surveys provide the very basic information needed for a multitude of planning activities, ranging from planning housing developments and subdivisions to insure soils are capable of sustaining sewage and septic systems, basements and foundations, streets and roads, and land fill sites, to planning recreation facilities such as ski areas, golf courses, and parks. Universities use basic soil information for the basis of many research projects and for computer models to predict specific crop yields and plant adaptability. State and federal agencies rely on soil surveys for several land management activities, some of which include water project planning, water reservations, and floodplain delineations. In addition, adequate soils information can also help farmers and ranchers avoid such things as saline seep, topsoil loss, a failed crop, or a inefficient irrigation system, all expensive problems to try to rectify.

The lack of basic soils information on 34 percent of lands in Montana represents one of the greatest resource needs in the state. The lack of this information can result in poor management decisions that may result in costly errors. This application would accelerate the progress by enabling an additional 600,000 acres to be surveyed over a two year period.

VISITOR'S REGISTER

Long Range Planning SUBCOMMITTEE

AGENCY(S) _____ DATE 2-7-89

DEPARTMENT RD&C Grant Proposals

NAME	REPRESENTING	SUPPORT	OPPOSE
Ray Beck	CDD/DNRC MSCA #14	X	
Jane Hoyer	MSCA #14	X	
Lynn Hovland	MACO #14	X	
Pete Lewis	MACO #14	X	
Floyd Podoll	Board of Oil & Gas #13	X	
Dee Rickman	DNRC-Oil & Gas Dist #10	X	
Howard S. Peavy	Water Center, MSU	X	
Peggy Haagsma	MT Assoc. of Con. Dist	✓	
Mike Baker	City of Kalispell.	✓	
Bob Hunter	MSU	X	
Dale L. Veit	Montana Stockgrowers	X	
J. Brown	13 (MWRA)	X	
Roger DeBruycker	Dist 13	X	
Kate Williams	MT Solinet	X	
Judie Tollman	Butte-Silver Bow	X	
Jim Jacka	"	X	
Jim McCarthy	Butte Silver Bow		
Laurie Zeller	CDD/DNRC	X	
Jon Ebelt	Mile High Conservation Dist	X	
Hazel L. Spangler	" " "	X	

IF YOU CARE TO WRITE COMMENTS, ASK SECRETARY FOR WITNESS STATEMENT.
IF YOU HAVE WRITTEN COMMENTS, PLEASE GIVE A COPY TO THE SECRETARY.

FORM CS-33A
Rev. 1985

VISITOR'S REGISTER

Long Range Planning SUBCOMMITTEE

AGENCY(S) _____ DATE 2/7/89

DEPARTMENT Research and Development Grants

NAME	REPRESENTING	SUP-PORT	OP-POSE
William M Schafer	Mile High CD	–	

IF YOU CARE TO WRITE COMMENTS, ASK SECRETARY FOR WITNESS STATEMENT.
IF YOU HAVE WRITTEN COMMENTS, PLEASE GIVE A COPY TO THE SECRETARY.

FORM CS-33A
Rev. 1985