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### 930502

# LEGISLATIVE COMMISSION ON MINNESOTA RESOURCES (LCMR)

### BIENNIAL REPORT

PURSUANT TO:

M.S.116P.09, Subd. 7

**JANUARY 15, 1993** 

#### COMMISSION MEMBERS

Senators: Charles Berg, Gregory Dahl\*, Dennis Frederickson, Bob Lessard, William Luther, Gene Merriam, Chair, Roger Moe, Earl Renneke\*

Representatives: Virgil Johnson, Phyllis Kahn, Henry Kalis, Tony Kinkel, Willard Munger, Tom Osthoff, John Sarna, Brad Stanius

(\*Term Expired January 4, 1993)

#### CITIZEN ADVISORY COMMITTEE MEMBERS

Arlan Anderson, C. Merle Anderson, Chair, Patricia Baker, Ty Bischoff, Al Brodie, Bob DeVries, Nancy Gibson, Christine Kneeland, Jack LaVoy, Darby Nelson, Joseph Sizer

> John Velin, Director 65 State Office Building St. Paul, MN 55155 (612)296-2406

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#### SIX-YEAR STRATEGIC PLAN FOR GUIDING RECOMMENDED EXPENDITURES FROM MINNESOTA FUTURE RESOURCES FUND, MINNESOTA ENVIRONMENT AND NATURAL RESOURCES TRUST FUND, AND OIL OVERCHARGE MONEY ... Appendix AA

Contains:

1991

Constitution of the State of Minnesota, Article XI, Appropriations and Finances, Section 14, Environment and Natural Resources Fund M.S. Chapter 116P, Environment and Natural Resources Trust Fund

### THE FOLLOWING INFORMATION IS ALSO REQUESTED IN: 116P.09, SUBD. 7

(4)	Recommendations to implement successful projects and programs into a state agency's standard operations
(6)	The source and amount of all revenue collected and distributed by the Commission, including all administrative and other expenses
	F.Y. 1992 \$335,650 Actual F.Y. 1993 \$365,735 Estimated
(8)	Any findings or recommendations that are deemed proper to assist the legislature in formulating legislation
(9)	A list of all gifts and donations with a value over \$1,000 Rosemount, Inc. \$4,500 (Negotiated Court Settlement)

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#### LEGISLATIVE COMMISSION ON MINNESOTA RESOURCES (LCMR) 65 State Office Building - St. Paul MN 55155 - (612) 296-2406 John Velin, Director

#### FACT SHEET

The Legislative Commission on Minnesota Resources (LCMR) consists of 16 senior legislators who are appointed by their peers (M.S. 116P.05). The function of the LCMR is to make funding recommendations to the legislature for special natural resource projects. These projects help maintain and enhance Minnesota's natural resources. Today's LCMR developed from a program initiated in 1963. Since that time, over \$235 million has been spent on projects recommended by LCMR to protect and enhance Minnesota's natural resources.

Recommendations are funded by the legislature from three sources: (1) the Minnesota Future Resources Fund, which receives money from tax on cigarettes (M.S. 116P.13); (2) federal oil overcharge funds (M.S. 4.071, Subd. 2); and (3) the new Minnesota Environment and Natural Resources Trust Fund (Trust Fund) (M.S. 116P).

The Trust Fund was established by constitutional amendment in 1988. The corpus of the trust will receive 40% of the net state lottery receipts through the year 2000. The income from the trust fund will provide a perpetual source of funding for projects according to the strategic plan. A strategic plan for the Trust Fund was developed from a grass roots approach by conducting a series of regional forums and a statewide natural resources congress in which all citizens were encouraged to attend and provide comments. An 11 member statewide citizens' advisory committee presented a draft strategic plan for approval by the LCMR and referral to the legislature.

The Trust Fund is designed to supplement existing natural resource activities and provide a longterm permanent and stable source of funding. Money will be spent to pay for projects such as conservation easements on wetlands, to provide resources for protection and management of natural resources, enhance public education about natural resources and the environment and preserve and enhance fish, wildlife, land, water and other natural resources.

Biennially, proposed projects are submitted to the LCMR for their recommendation to the legislature and ultimately be included in the state's budget plan. The LCMR recommends which of the three funding sources to use for each project in their recommendations. Research proposals are also referred to an expert peer review panel. Approved projects must be conducted and completed according to an approved work plan. After a project is completed, the results and final report are reviewed by the LCMR.

Any individual, organization (profit or nonprofit), community or state agency can submit a proposal for consideration. The Request for Proposals for the 1995-97 biennium will be announced December 1993. Recommendations for allocations will be announced by the LCMR during the summer of 1994.

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**COMMISSION MEMBERS:** Senators: Charles Berg, Gregory Dahl\*, Dennis Frederickson, Bob Lessard, William Luther, Gene Merriam, Chair, Roger Moe, Earl Renneke\* **Representatives:** Virgil Johnson, Phyllis Kahn, Henry Kalis, Tony Kinkel, Willard Munger, Tom Osthoff, John Sarna, Brad Stanius

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Date: 1/93

#### LCMR PROPOSAL REVIEW AND RECOMMENDATION PROCESS

November 1990: Request for abstracts.

February 1991: 2,200 abstracts on natural resource needs, projects and ideas received by the LCMR in response to a request for abstracts.

Summer 1991: Summer factfinding and public regional forums held in the Willmar, Mankato and Grand Rapids vicinities. Agendas were developed from the abstracts submitted to the LCMR.

September 28, 1991: Natural Resources Congress, St. Paul. Presentation of Draft Strategic Plan to guide expenditures from the Trust Fund by the Citizen Advisory Committee. Review of 1991 Trust Fund projects and the RIM program.

October 1991: Revision of Strategic Plan for Trust Fund by Citizen Advisory Committee.

November 1991: Adoption of Strategic Plan for the Trust Fund, Future Resources Fund, and Oil Overcharge money by the Legislative Commission on Minnesota Resources.

**December 1991:** Request for Proposal (RFP) for 1993-95 biennium funding issued by Legislative Commission on Minnesota Resources for the Minnesota Future Resources Fund, (M.S. 116P.13) Trust Fund (M.S. 116P.08) and Oil Overcharge (M.S. 4.071) (one RFP for all three funds.)

January 1992: Held workshop sessions for assistance with RFP's.

February 1992: 810 proposals for \$378 million received by the Legislative Commission on Minnesota Resources.

Spring 1992: Proposal Review based on priorities and criteria in RFP.

May and June 1992: Held hearings on proposals by LCMR. 183 program managers were invited to make a presentation of their proposal to the Commission.

July 1992: Adopted 96 Project Recommendations (for all three funds) for funding beginning July 1, 1993.

August 1992: Workshops held for assistance with LCMR workprograms.

September 1992: Workprograms for recommended projects submitted to LCMR.

November 1992: Peer Review of 26 Research Proposals recommended by LCMR.

January 15, 1993: Biennial Report due to the Legislature from LCMR.

January - May 1993: Consideration of LCMR recommendations by the Minnesota Legislature.

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#### **1993 FUNDING STRATEGIES**

There are ninety-six projects recommended by the Commission. Most of the projects include or affect more than one natural resource issue area. Consequently, while many of the projects summarized below within a particular natural resource could also be included in several issue areas, they are divided for ease of discussion.

Six projects (\$1,942,000) are recommended to inventory and monitor key natural resources to assist in management for use and preservation.

Twelve projects (\$4,384,000) are in the agricultural area which are designed to encourage the adoption of integrated pest management, research biological control of pests and implement resource management practices to address agricultural point source and nonpoint source water pollution.

Four projects (\$838,000) are categorized as energy and are designed to reduce emissions and increase energy efficiency through use of alternative fuels, innovative transportation and conservation programs.

Four projects are forestry related (\$433,000) and will increase reforestation and increase the understanding of managing forest ecosystems.

Fifteen projects are categorized as providing information and education relating to natural resources (\$2,416,000). These projects include research on urban-suburban use of fertilizers and pesticides, a wetland field study program, increasing urban environmental awareness, outdoor classrooms, internships, nature programs and development of environmental interpretive programs.

Three projects are in the land area (\$975,000) and coordinate and expand inventory activities providing base maps, and mapping layers and enhance land use planning for the Mississippi River corridor.

One project (\$179,000) is to determine mineral (aggregate) technology potential.

Twenty-five projects are recreation (\$17,176,000). These projects are to develop, improve and rehabilitate state and regional parks. Acquire and develop trails, including assisting the development of networks of recreational and commuter bicycle trails. Enhance recreational resources to meet needs of seniors, ethnic communities and people with disabilities. Provide natural and historic resource preservation and interpretation. Create lake and river access.

One project (\$270,000) is designed to stimulate market development for wood waste.

Nine projects are specifically water related (\$4,085,000). These projects implement programs for prevention of non-point source pollution on a watershed basis; protect, monitor and improve lake and river quality; continue county geologic atlas and groundwater sensitivity mapping and research the hydrologic interaction of surface and groundwater.

Fifteen projects are in wildlife, fisheries and plants (\$7,427,000). These projects will acquire and protect critical habitat, native prairies, unique and/or sensitive areas; establish publicly accessible fish and wildlife habitat and increase the planting of native species on public and private land. There will be research on ecologically sound methods to control or eradicate exotic species and research on the impacts of releases of genetically engineered fishes.

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# LCMR 1993 RECOMMENDATIONS January 14, 1993 In Bill Order

Subd. 1		TOTAL APPRORIATIONS (Summary by Fund)	
	•	Minnesota Future Resources Fund Minnesota Environment and Natural Resources Trust Fund (noted as TF)	14,213,000 24,595,000
		Oil Overcharge Money in the Special Revenue Fund (noted as OOC)	2,012,000
		TOTAL	40,820,000
			1. 1. 1. 1.
Subd. 2	S	LCMR Administration	695,000
Subd. 3		AGRICULTURE	4,384,000
3(a)	00	C BIOLOGICAL CONTROL OF PLANT AND ANIMAL PESTS - Continuation	880,000
3(b)		COVER CROPS IN A CORN AND SOYBEAN ROTATION	.150,000
3(d)		DEMONSTRATION OF PRODUCTION SCALE WASTE COLLECTION IN AQUACULTURE	100,000
3(e)	TF	(RIM) RESERVE CONSERVATION EASEMENTS - Continuation	500,000
3(f)		ALTERNATIVE AQUACULTURE METHODS	230,000
3(g) 3(h)		MINNESOTA AQUACULTURE DEVELOPMENT PROGRAM MANAGING AGRICULTURAL ENVIRONMENTS OF NORTH-CENTRAL MINNESOTA SANDY SOILS - Continuation	480,000
3(i)	· .	NUTRIENT AVAILABILITY FROM LAND-APPLIED MANURE	280,000
3(j) 3(la)		EFFECTIVE MANURE MGMT. IN CONS. TILLAGE SYSTEMS FOR KARST AREAS	500,000
3(k) 3(l)	000	C DEVELOPING SOIL SPECIFIC NITROGEN MANAGEMENT AS A BMP	294,000
Subd. 4	$\sim$	ENERGY CREDITICING ENERGY AND CO.2	230,000
4(a) 4(b)	000	COPERATIONAL IMPLICATIONS OF ALTERNATE TRANSIT BUS FUELS	78,000
4(c)	.000	CTHE BUS, BIKE OR CAR POOL (B-BOP) CHALLENGE	150,000
4(d)	000	C TREE AND GRASS PRODUCTION FOR ETHANOL	380,000
Subd. 5	••••	FORESTRY	433,000
5(a)	· `	DEVELOPMENT OF TREE SEED ORCHARD COMPLEX	80,000
5(D) 5(C)		REFORESTATION IN RAMSEY COUNTY PARKS AND OPEN SPACE	93,000 50.000
5(d)		DEVELOPING QUALITY HARDWOOD FORESTS	210,000
			and and a second se
Subd. 6	•	GENERAL	1,942,000
6(a)	ाम स	MINNESOTA COUNTY BIOLOGICAL SURVEY - Continuation	900,000
0(D) 6(c)	11-	DESCRIPTION AND EVALUATION OF MINNESOTA OLD GROWTH FORESTS - Continuation	250.000
6(d)	1 1	MISSISSIPPI HEADWATERS RIVER INQUIRY AND EDUCATION PROJECT	75,000
6(e)		ANADROMOUS FISH MONITORING	137,000
0(1)			80,000
Subd. 7		INFORMATION/EDUCATION	2,416,000
7(a) 7(b)		QUANTIFY PESTICIDE AND FERTILIZER RUNOFF FROM GOLF COURSES. DEVELOPING MULTILISE LIPBAN GREEN SPACE	49,000
7(c)		K-12 PRAIRIE WETLAND FIELD STUDY PROGRAM - ECOLOGY BUS	270,000
7(d)	TF	THE ON-LINE MUSEUM: COMPUTER AND INTERACTIVE VIDEO	260,000
7(e) 7(f)		ENVIRONMENTAL EDUCATION OUTREACH PROGRAM	215,000
7(g)	· .	THE ECOLOGY OF MINNESOTA - BOOK	51,000
-7(h)	ना	GREEN STREET: AN URBAN ENVIRONMENTAL AWARENESS PROJECT	550,000
7(1)		MINNEHAHA PARK ENVIRONMENTAL INTERPRETIVE CENTER NICOLLET CONSERVATION CLUB SWANTAKE INTERPRETIVE ROOM	18,000
7(k)		PROJECT CITY CAMP: EXPERIENTIAL URBAN ENVIRONMENTAL EDUCATION	130,000
7(l) 7(m)		GRANITE QUARRY PARK AND INTERPRETIVE CENTER PLANNING	50,000
7(n) 7(n)	•	MULTIPLE-USE FOREST MANAGEMENT LEARNING KIT	15.000
7(o)		AN OUTDOOR CLASSROOM TO IMPROVE RURAL ENVIRONMENTAL EDUCATION	60,000
Subd 8		LAND	975 000
8(a)	ंना	BASE MAPS FOR 1990's - Continuation	710,000
8(b) 8(c)		RURAL COUNTY USE OF NAPP FLIGHT	90,000
~~~			179,000
Subd. 9			
9(a)		MITIGATING CONCRETE AGGREGATE PROBLEMS IN MINNESOTA	179,000

	Subd. 10	).	RECREATION	
•	•		(items (a) through (I) are Trust Fund Acceleration, and total 10,298,000)	17,176,000
	10(a)	TF	STATE PARK BETTERMENT	3,000,000
	10/b)	TF	AMERICANS WITH DISABILITIES ACT: RETROFITTING REGIONAL PARKS	220,000
	10(c)	TF	TRAIL LINKAGES, METROPOLITAN REGIONAL NETWORK	2,327,000
	10(d)	TF	INITATE ACQUISTION OF THE GATEWAY SEGMENT OF THE WILLARD MUNGER STATE TRAIL INTO DOWNTOWN ST PAUL	200,00
	10(e)	TF	BIRCH LAKE REGIONAL BIKEWAYWAI KWAY	450,000
	10(8)	म	CEDAR LÁKÉ TRAIL DEVELOPMENT	610.000
	10(a)	л. ТГ	STATE TRAIL DEVELOPMENT - Continuation	2,327,000
	10(g) 10(h)	म	SHING F CREEK TRAILINPROVEMENTS	130,000
	10(1)	TE	UI YDAL EHARRET ISI AND REGIONAL PARK TRAIL	246 000
	10(i)	TE	COMO DARK EAST LAKESUODE DECLAMATION	163 000
	10(1)	T	CDAIN BELT MISSISSIDD DI/EDEDANT DEVELOPMENT	300,000
	-10(N)	TE		325,000
	10(i) 10(m)	TE		1 000 000
	10(11)	иг 11		4 000 000
ż.	10(0)	् <b>।</b> इ	SAINT LOUIS RIVER LAND ACQUISITION	044.000
· .	10(0)			944,000
	10(p)			1,000,000
	10(q)		COOPERATIVE TRAILS GRANT PROGRAM	346,000
	10(r)		AGASSIZ RECREATIONAL TRAILS (A.R.T.)	650,000
	10(s)		MESABITRAIL ACQUISITION, PLANNING AND DEVELOPMENT	700,000
	10(t)		RECREATIONAL PROGRAMMING: INCLUSIVENESS FOR PERSONS WITH DISABILITIES	160,000
	10(u)		ENHANCED RECREATIONAL OPPORTUNITIES FOR SOUTHEAST ASIAN ETHNIC COMMUNITIES	300,000
	10(v)		URBAN COMMUNITY GARDENING PROGRAM - Continuation	110,000
	10(w)		NATIONAL REGISTER GRANTS PROGRAM	165,000
	10(x)		HISTORICAL RESEARCH AND PLANNING FOR TRAVERSE DES SIOUX	68,000
	10(y)	•	PENINSULA POINT TWO RIVERS HISTORICAL PARK	435,000
				in the second
		•		1 1
	Subd. 11		WATER	4,085,000
	11(a)	ना	MINNESOTA RIVER IMPLEMENTATION-Continuation	1,100,000
Ċ	11(b)		LOCAL RIVER PLANNING - Continuation	480,000
	11(c)	ना	MERCURY REDUCTION IN FISH - Continuation	200,000
,	11(d)		STREAM FLOW PROTECTION	280,000
	11(e)		SOUTH CENTRAL MINNESOTA GROUNDWATER CONTAMINATION SUSCEPTIBILITY PROJECT - Continuation	290,000
	11(f)		WHITE BEAR LAKE LEVELS FEASIBILITY STUDY	228,000
	11(g)	TF	COUNTY GEOLOGIC ATLASES AND REGIONAL HYDROGEOLIGIC ASSESSMENTS - Continuation	850,000
	11(h)		SEPTIC SYSTEM REPLACEMENT FOR WATER RELATED TOURISM BUSINESSES	500,000
	110	÷.,	OPTICAL BRIGHTENERS: INDICATORS OF SEWAGE CONTAMINATION OF GROUNDWATERS	157.000
				,
		÷		
ł	Subd. 12		WASTE	1. Tat 1.
	12(a)		COMPOST AND WOOD LITH IZATION PROGRAM	270 000
		•		21,01000
ġ	Subd. 13	•	WILDLIFE FISHERIES PLANTS	7 427 000
	13(a)	TE	THE CHICAL HARTAT MATCH SCIENTIFIC AND NATIRAL AREAS WILDLIFE AND PRAIRIE ACOULISITION - Continuation	4 000 000
	13/h)	.चा		4,000,000
	13(c)	TE	NIM STATEWINE FISHERIES HARITAT DEVELOPMENT	697 000
,	13(d)		TAM OTATENDET DE CRITICAL WINTER HARITAT AREAS ON INTENSIVELY FARMED LAND	100,000
2	13(4)			20,000
	13/0	1.1	WIEMACKI WATERSHED DESTODATION	59,000
	13(a)			75 000
	13(6)	TE		200,000
	1976	16	NUMERONICAL ACQUISITION FOR ANALER ACCESS AND MAINTED TA AND DEVELOPMENT	300,000
	19(1)	•	ESTABLISHING GUGE RESTING STEETIN NORTHERN MINNESOTA AND RELOCATION OF GIANT CANADA GOSLINGS	21,000
	13()	1 A.	TRAINIC EQUITION TO ANALY THE MININEARULID PARK SYSTEM	60,000
	13(K) 19/0	те .	THEOLORE WITTH PARK TAMARACK BUG PRESERVATION PROJECT	40,000
	13(1)	11-	BIOLOGICAL CONTROL OF EURASIAN WATERMILFOIL, AND PURPLE LOOSESTRIFE - CONUNUAUON	400,000
	13(M) 13(-)		REPLACEMENT OF EURASIAN WATERMILFOIL WITH NATIVE MINNESOTA PLANTS	40,000
	13(N) = 12(a)		INTEGRATED CONTROL OF PURPLE LOOSESTRIFE	90,000
	15(0)		ECOLOGICAL IMPACTS OF RELEASING GENETICALLY ENGINEERED FISHES	175,000

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Sec. ... MINNESOTA RESOURCES 1 2 Subdivision 1. Total 3 \$20,407,000 \$20,413,000 Appropriation 4 Summary by Fund 5 Minnesota Future 6 Resources Fund \$7,106,000 \$7,107,000 7 Minnesota Environment and 8 **Q** Natural Resources 10 Trust Fund \$12,295,000 \$12,300,000 11 Of this appropriation \$5,149,000 the 12 first year and \$5,149,000 the second 13 year are for trust fund acceleration. 14 Oil Overcharge 15 Money in the Special \$1,006,000 16 Revenue Fund \$1,006,000 17 The appropriations in this section are 18 available until June 30, 1995. 19 In this section: (a) "Future resources fund" means the 20 21 Minnesota future resources fund 22 referred to in Minnesota Statutes, 23 section 116P.13. 24 (b) "Trust fund" means the Minnesota 25 environment and natural resources trust 26 fund referred to in Minnesota Statutes, 27 section 116P.02, subdivision 6. 28 (C) "Trust fund acceleration" means the 29 Minnesota environment and natural 30 resources trust fund to be expended 31 only for capital investments in parks and trails referred to in Minnesota 32 33 Statutes, section 116P.11, paragraph

34 (b), clause (3).

1/14/93

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(d) "oil overcharge money" means the

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1 2	money referred to in Minnesota Statutes, section 4.071, subdivision 2.	
3 4	Subd. 2. Legislative Commission on Minnesota Resources	695,000
5 6 7 8 9	\$255,000 of this appropriation is from the future resources fund and \$440,000 is from the trust fund pursuant to Minnesota Statutes, section 116P.09, subdivision 5.	
10 11 12 13 14 15 16 17 18 19 20 21 22	For the biennium ending June 30, 1995, the commission shall monitor the programs in this section; assess the status of the state's natural resources; convene a state resource congress; establish priorities for, request, review, and recommend programs for the 1995-1997 biennium from the future resources fund, environment and natural resources trust fund, and oil overcharge money, and for support of the citizen advisory committee activities.	
23	Subd. 3. Agriculture	
24 25	(a) Biological Control of Plant and Animal Pests	880,000
26 27 28 29 30 31 32 33 34 35 36 37 38	This appropriation is from the oil overcharge money to the commissioner of administration for transfer to the commissioner of agriculture to develop, test, and implement biological control agents to reduce the use of petroleum-based chemicals. A grant request to supplement this appropriation must be submitted to the United States Department of Agriculture and the results reported to the legislative commission on Minnesota resources.	
39 40	(b) Cover Crops in a Corn and Soybean Rotation	150,000
41 42 43 44 45 46 47 48 49	This appropriation is from the future resources fund to the commissioner of agriculture for a contract with the University of Minnesota for the development of economic management strategies of cover crops for corn and soybean rotations to reduce soil erosion, nitrate leaching, and pesticide use.	
40 51	(c) Increasing Utilization of Federal Cost Share Feedlot Funds	480,000
52 53 54 55 56 57	This appropriation is from the future resources fund to the commissioner of agriculture to provide technical assistance for the rehabilitation of priority feedlots with water quality concerns.	
58 59 60	(d) Demonstration of Production Scale Waste Collection in Aquaculture	100,000
61	This appropriation is from the future	

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resources fund to the commissioner of the pollution control agency for a contract with Minnesota aquafarms to evaluate operational efficiencies of a fish waste collection system and to evaluate the potential for the waste collection system to meet state water quality requirements.

9 (e) Reinvest in Minnesota 10 **Conservation Reserve Easements** 

500,000

11 This appropriation is from the trust fund to the board of water and soil 12 13 resources to accelerate the RIM program to acquire perpetual conservation 14 15 easements on marginal agricultural 16 lands. Up to \$100,000 may be used 17 to implement conservation practices on the easements. None of this 18 19 appropriation may be used for 20 administrative costs.

21 (f) Alternative Aquaculture 22 Methods

230,000

23 This appropriation is from the future resources fund to the commissioner of 24 25 agriculture to develop and evaluate 26 alternative methods of raising fish, focusing on water conservation through waste removal, and collection involving recirculating aquaculture systems. 30 Grant requests to supplement this 31 appropriation must be submitted to the 32 United States Department of Agriculture 33 and the national Sea Grant program and 34 the results reported to the legislative commission on Minnesota resources. 35

36 Minnesota Aquaculture (q) Development Program

#### 230,000

38 This appropriation is from the future resources fund to the commissioner of 39 40 agriculture to conduct a grant program 41 for the evaluation and development of 42 environmentally sound aquaculture 43 systems.

44 (h) Managing Agricultural 45 Environments of North-Central Minnesota Sandy Soils 46

480,000

47 This appropriation is from the future 48 resources fund to the commissioner of 49 agriculture for a contract with the University of Minnesota to develop 50 51 improved management strategies for 52 water, nitrogen, and herbicide use on sandy soils in north central Minnesota 53

54 (i) Nutrient Availability -55 From Land-Applied Manure

280,000

56 This appropriation is from the future resources fund to the commissioner of 57 58 agriculture for a contract with the 59 University of Minnesota to determine 60 nutrient availability from manure/soil/crop systems to improve 61 62 manure utilization by crops, reduce

environmental impacts on water 1 2 resources, and provide best management practices (BMPs) to guide manure 3 4 management decisions. 5 (j) Effective Manure Management in Conservation Tillage Systems 6 7 500,000 for Karst Areas 8 This appropriation is from the future Q resources fund to the commissioner of 10 agriculture for a contract with the University of Minnesota to investigate 11 12 factors that influence losses of 13 contaminants to surface and 14 groundwater. The emphasis will be on 15 soil, crop residue, and manure management to maximize crop recovery of 16 17 nitrogen and minimize losses to surface 18 and groundwater. 19 (k) Nutrient Recycling 260,000 20 Through Plants and Animals 21 This appropriation is from the future 22 resources fund to the commissioner of 23 agriculture for a contract with the University of Minnesota to improve techniques to predict nitrogen 24 25 26 mineralization from manure and soil 27 organic matter in west central 28 Minnesota. 29 (1) Developing Soil Specific 30 Nitrogen Management as a Best 31 Management Practice (BMP) 294,000 32 This appropriation is from the oil 33 overcharge money to the commissioner of 34 administration for transfer to the 36 commissioner of agriculture for development of new soil specific, 36 37 variable rate nitrogen applications 38 that will increase operating efficiency 39 and reduce applied nitrogen without 40 reducing yield. 41 Subd. 4. Energy 230,000 42 (a) Reducing Energy and CO2 43 This appropriation is from the oil 44 overcharge money to the commissioner of 45 administration for a contract with the 46 center for energy and urban environment 47 to develop a comprehensive action plan 48 that will focus on energy efficiency, alternative energy, and fuel switching 49 50 through an assessment of opportunities 51 for the reduction of CO2 and other 52 greenhouse gases. 53 (b) Operational Implications 78,000 54 of Alternate Transit Bus Fuels 55 This appropriation is from the oil 56 overcharge money to the commissioner of 57 administration for a contract with the 58 metropolitan transit commission to test 59 alternate bus fuels to evaluate their 60 potential for reduced fuel consumption

	-1	and increased operational efficiency.	
с. С. с.	2	(C) The Bus, Bike, or Car	
. <u>.</u>	3	Pool (B-BOP) Challenge	150,000
	4	This appropriation is from the oil	
	5	overcharge money to the commissioner of	
	6	administration for a contract with the	
	7	center for energy and urban environment	· · · ·
	8	to reduce energy use by the delivery of	an a
	.9	an employer-based program that cost	
	10	effectively reduces the use of single	
	11	occupant vehicles by commuters who	
	12	pledge to B-BOP or telecommute	
	13	regularly during the summer.	
÷., `.,	14	(d) Tree and Grass Production	· · · ·
	15	for Ethanol	380,000
	·		
	16 .	This appropriation is from the oil	
	17	overcharge money to the commissioner of	1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 -
: .	18	administration for a contract with the	
	19	agricultural utilization research	
	20	supply biomage feedetock derived from	
	22.	trees and grass to a national renewable	
	23	energy laboratory (NREL). United States	•
	24	Department of Energy Engineering	
	25	Development facility for converting	
	26	biomass to ethanol and thermochemical	
	27	fuels. This appropriation is	
·.	28	contingent on a NREL agreement by	
	29	January 1, 1994, to purchase biomass.	
· ·	30	Subd. 5. Forestry	
	31	(a) Development of Tree	· · ·
	32	Seed Orchard Complex	80,000
	33	This appropriation is from the future	
	34	resources fund to the commissioner of	
	35	natural resources for production of	
• 5.1	36	genetically improved forest tree seed.	
	37	(b) Como Park Replanting Program	93,000
	38	This appropriation is from the future	
	39	resources fund to the commissioner of	10 A.
	40	trade and economic development for a	÷.,
	41	contract with the metropolitan council	
	42	for a subgrant to the city of St. Paul	
	43	to replant areas in Como Park that have	
	44	lost trees due to disease, age, or	
	45	other causes.	
: .	46	(c) Reforestation in Ramsev	
	47	County Parks and Open Space	50.000
	48	This appropriation is from the future	
	49	resources fund to the commissioner of	
•	50	natural resources for a contract with	· · · · · ·
	51	Ramsey county to accelerate the	
· · · · ·	52	reforestation program in Ramsey county	
	53	regional and county parks to replace	
	54	trees lost to storm damage, drought,	
11	55	and disease and begin establishment of	
1	50	new prantings. None of this	
	58	administration	
,	50		
	59	(d) Developing Quality	

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		and the second	
	1	Hardwood Forests	210,000
•	2 3 4	This appropriation is from the future resources fund to the commissioner of natural resources for a contract with	
	5	the University of Minnesota to conduct	
	6	research on the effects of different	
	7	canopy gap sizes and site preparation	
;	8	methods on natural hardwood	
	9	regeneration.	a ta se
	10	Subd. 6. General	
	11	(a) Minnesota County Biological	
	12	Survey - Continuation	900,000
	13	This appropriation is from the trust	
	14	fund to the commissioner of natural	4
	15	resources to continue the Minnesota	
	10	collection (\$432,000) and management of	
	18	data on the distribution of rare	
	19	plants, animals and natural habitats	
	20	(\$288,000) and to provide for	
	21	distribution and integration of rare	1 - A
	22	features information (\$180,000).	• • •
	22	(b) Minnegota(a Porost-Pird	1.1.1.1
	23	Diversity Initiative - Continuation	500,000
	0.5		
	25	fund to the commissioner of natural	
	20	resources to monitor forest songhird	
	28	populations and to utilize geographic	
	29	information system tools to correlate	
١.	30	forest bird populations with dynamics	
	31	of the forest landscape.	
	32	(c) Description and Evaluation	•
	33	of Minnesota Old Growth Forests -	
	34	Continuation	250,000
	35	This appropriation is from the future	
	36	resources fund to the commissioner of	1
	37	natural resources to accelerate the	
	38	evaluation of old growth candidate	
	39	stands (\$90,000), develop detailed	1 I
	40	descriptions of old growth forest types	12 July 1
	41	(SIIU, UUU), and determine habitat	
	43	forests (\$50.000) for completion of the	. 9.
	44	implementation of the department of	
	45	natural resources old growth guidelines.	
	16	(d) Mississippi Nordenborg Dison	
÷	40	(d) MISSISSIPPI Headwaters River	75 000
	<b>4</b> /	Induity and Education Flolect	15,000
	48	This appropriation is from the future	
,	49	resources fund to the commissioner of	
	50	natural resources for a contract with	
	51	the Mississippi headwaters board to	1 (A) 
1	52	provide for the investigation of river	
	53	corridor biology, hydrology, and cultura	ι <u>i</u> ·
	54	issues, training of local government	
	55 .	officials, and public education on	
	50	TTART DIOLECTION SULATEGIES.	
	57	(e) Anadromous Fish Monitoring	137,000
	58	This appropriation is from the future	
	59	resources fund to the commissioner of	

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• • •	1 2 7	natural resources for biologic monitoring to improve the management of	
	4	shore of Lake Superior.	enter Antonio
•	5 6	(f) Land and Water Conservation Fund Administration	80,000
	7	This appropriation is from the future	
	9	natural resources for administration of	
· · ·	10	the federal land and water conservation	
	11	program and other contract	
	12	administration activities assigned to	
•	13	the commissioner in this section.	
	14	Subd. 7. Information/Education	
	15	(a) Quantify Pesticide and	
	16	Fertilizer Runoff from Golf Courses	49,000
, t	17	This appropriation is from the future	
	18	resources fund to the commissioner of t	he
	19	pollution control agency for a contract	
	20	district for a study of the quantity of	1
	22	pesticide and fertilizer runoff water	11 - A.
Ċ.	23	from golf courses and an assessment of	1. A.
	24	the impact of these contaminants on	
	25	downstream waterbodies. This	·. · · ·
	26 27	appropriation must be matched by \$49,000 of nonstate funds.	
	28	(b) Developing Multi-Use	
	29	Urban Green Space	220,000
	. 30	This appropriation is from the future	
	31	resources fund to the commissioner of	
1	32	trade and economic development for a	$(x_i,y_i) \in \{i,j\}$
·. ·	33	contract with the Minneapolis park and	
· .	34	forfeited lands into neighborhood	•
1	36	gardens, orchards, alternative	
	37	landscape demonstration areas, and tree	
	38	nurseries.	
	20	(a) K-12 Prairie Motland Field	
	40	Study Program - Ecology Bus	270,000
	41	This appropriation is from the future	
	42	resources fund to the commissioner of	
	43	education for a contract with Heron	
	44	Lake Environmental Learning Center,	
	45	inc., to purchase, equip, and operate	
	47	interdisciplinary K-12 school	
	48	environmental education program in	· · · · ·
	49	southwest Minnesota. This	•
	50	appropriation is contingent on the	
	51	learning center employing a specialist	
•	52 53	to guide student and teacher participation in the ecology bus.	
÷.	54 55	(a) The On-Line Museum: Computer and Interactive Video	260,000
÷.,	56	This appropriation is from the trust	
	57	fund to the commissioner of education	
	58.	for a contract with the science museum	•
	59	of Minnesota to create an interactive wideo data base of solected cultural	1. 1. 1. 1.
		Aree mara pase of selected cultural	

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1 and natural history collections as a 2 prototype for a unique learning 3 experience in environmental education 4 for museum visitors and school children. 5 (e) Environmental Education 215,000 6 Outreach Program This appropriation is from the future 8 resources fund to the commissioner of education for a contract with 10 metropolitan waste control commission 11 (MWCC) to develop a multidisciplinary 12 environmental science and math curriculum for grades K-12 and 13 14 team-taught by private sector volunteers, teachers, and MWCC volunteer staff. A grant request to 15 16 17 supplement this appropriation must be 18 submitted to the United States 19 Environmental Protection Agency and the 10 results reported to the legislative commission on Minnesota resources. 21 22 This appropriation must be matched by 23 an equal amount of nonstate funds. 24 (f) Summer Youth History Program 100,000 25 This appropriation is from the future resources fund to the Minnesota state 26 27 historical society to provide summer 28 employment for high school students of 29 at least 50 percent minority or 30 disadvantaged at historic sites. 31 The Ecology of Minnesota -(g) 51,000 32 Book 33 This appropriation is from the future resources fund to the University of 34 Minnesota for a grant to the university press to assist in the preparation and 35 36 37 production of a book presenting a 38 comprehensive overview of Minnesota's 39 natural environment. 40 Green Street: An Urban (h) 550,000 41 Environmental Awareness Project 42 This appropriation is from the trust 43 fund to the commissioner of education 44 for a contract with the science museum 45 of Minnesota to develop a 46 comprehensive, coordinated urban 47 environmental education project, which 48 will be a core exhibit and outreach 49 program focused on revealing the links between modern lifestyles and major 50 51 environmental issues. (i) Minnehaha Park Environmental 52 53 Interpretive Center 337,000 54 This appropriation is from the future 55 resources fund to the commissioner of 56 trade and economic development for a 57 contract with the metropolitan council 58 for a subgrant to the Minneapolis park 59 and recreation board to adaptively 60 reuse the Longfellow house in Minnehaha 61 Park as an urban interpretive center.

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	1	(j) Nicollet Conservation Club	
	2	Swan Lake Interpretive Room	18,000
	2	ml 1	
	3.	This appropriation is from the future	1.1
	. 5	trade and economic development for a	1 
•	6	contract with the Nicollet conservation	14
	7	club to equip a Swan Lake interpretive	
. •	8	center at the Nicollet conservation	•
÷ .	9 -	club. Facilities will be open for	
5	10	use by local school groups and state	· · ·
	11	agencies for interpretive programs	· · ·
1	12	and meetings at no charge. This	
	13	appropriation must be matched by	
	. 14	an equal amount of nonstate funds.	
	15	(k) Broject City Camp.	
	16	Experiential Urban Environmental	
	17	Education	130.00
			2007.00
•	18	This appropriation is from the future	• *
.17	19	resources fund to the commissioner of	-
	20	education for a contract with Pillsbury	
	21	Neighborhood Services, Inc., to	
	22	implement Project City Camp, to help	
	23	inner city poor and minority youth and	11 - 1 <sub>2</sub> - 1
	24	adults understand the urban environment	
	25	and its impact on human development.	100 A. (1997) 1997 - 1997 - 1997 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1
	26	(1) Cranita Quarry Bark and	•
	20	(1) Granice Quarry Park and Interpretive Center Planning	50 00
	<b></b>	Incorpretive conter riaming	20,00
	28	This appropriation is from the future	2.1
	29	resources fund to the commissioner of	
	30	trade and economic development for a	
1	31	contract with Stearns county to study	
	32	the features of the quarry sites and	
	33	plan for the development of an	
	34	Interpretive and recreational regional	
	35	matched by \$50,000 of popetate funds	• . `
	50	matched by 550,000 of monstate funds.	· · ·
	37	(m) Expanded Crosby Farm Park	
	38	Nature Program	91,00
	•		
	39	This appropriation is from the future	
	40	resources fund to the commissioner of	
	41	education for a contract with the city	
	42	of St. Paul to accelerate the nature	. A
	43	study program established at Crosby	
•	44	Farm Park utilizing the como 200, como	
	45	Dark	
		raix.	• ·
	47	(n) Multiple-Use Forest	
•	48	Management Learning Kit	15,00
	49.	This appropriation is from the future	•
	50	resources fund to the commissioner of	
	51	education for a contract with Deep	÷
	52	Portage environmental learning center	
-	53	to develop a multiple use forest	
•	54	management learning kit. This	
	55	appropriation must be matched by \$5,500	
4.5	20	or nonstate runds.	
	57	(a) An Outdoor Classroom to	•
1	58	Improve Rural Environmental	• • • •
•	59	Education	60.00
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	60	This appropriation is from the future	

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	1 2 3 4 5 6 7 8 9 10	resources fund to the commissioner of education for a contract with the Faribault County Environmental Learning Center, Inc., in cooperation with area 4-H, communities and schools, for an outdoor classroom project using native Minnesota vegetation, to train instructors, educate youth and community members, and evaluate changes in environmental awareness.	
	11	Subd. 8. Land	
•	12 13	(a) Base Maps for 1990s- Continuation	710,000
	14 15 16 17 18 19 20 21 22 23	This appropriation is from the trust fund to the commissioner of administration to provide the state share of a 50/50 match program with the United States Geological Survey to continue statewide coverage of orthophoto maps, update mapping for the state major urban areas, and plan for future cooperative mapping and air photos programs.	
	24 25	(b) Rural County Use of National Aerial Photography Program Flight	90,000
	26 27 28 29 30 31 32 33 34 35 36 37 38	This appropriation is from the future resources fund to the commissioner of administration for a contract with Houston county to evaluate the quality of digital planimetric map products and the effectiveness of national aerial photography program products in meeting the needs of Houston county users and to assist other counties in the future use of the products. This project must comply with the data compatibility requirements set forth in subdivision 15.	
	39 40 41	(c) Recreational Resource Planning in the Metro Mississippi Corridor	175,000
	42 43 44 45 46 47 48 49 50 51 52 53	This appropriation is from the future resources fund to the commissioner of natural resources for a contract with the University of Minnesota to investigate the potential for enhancing and enriching the recreational opportunities along the Mississippi river in the metropolitan corridors of the Mississippi National River and Recreational Area (MNRRA). This appropriation must be matched by \$25,000 of nonstate funds.	
	54	Subd. 9. Minerals	-
	55 56	(a) Mitigating Concrete Aggregate Problems in Minnesota	179,000
	57 58 59 60 61	This appropriation is from the future resources fund to the commissioner of transportation for a contract with the University of Minnesota to study means of mitigating concrete aggregate	-

1	problems in southern Minnesota.	
2	Subd. 10. Recreation	
3 4	The appropriations in items (a) to (1) are for trust fund acceleration.	
5	(a) State Park Betterment	3,000,00
6 7 8 9 10 11 12 13	This appropriation is from the trust fund to the commissioner of natural resources to develop, improve, and rehabilitate state park facilities to meet growing user demand as well as prevent further deterioration of outstanding historically significant structures.	
14 15	(b) Americans with Disabilities Act: Retrofitting Regional Parks	220,00
16 17 18 19 20 21 22 23 24	This appropriation is from the trust fund to the commissioner of trade and economic development for a contract with the metropolitan council to make subgrants to regional park implementing agencies to retrofit existing facilities to meet federal Americans with Disabilities Act (ADA) requirements.	9
25 26	(c) Trail Linkages, Metropolitan Regional Network	2,327,00
27 28 29 30 31 32 33 34	This appropriation is from the trust fund to the commissioner of trade and economic development for a contract with the metropolitan council to make subgrants to acquire and improve regional trails which link existing and planned regional, local, and state parks and trails:	
35 36 37 38	(d) Initiating Acquisition of the Gateway Segment of the Willard Munger State Trail into Downtown St. Paul	200,00
39 40 41 42 43 44 45 46 47 48	This appropriation is from the trust fund to the commissioner of natural resources for acquisition and development of the trail right-of-way of the gateway segment of the Willard Munger state trail into downtown St. Paul. This appropriation is for acquisition and development only and must be done in cooperation with the city of St. Paul.	
49 50	(e) Birch Lake Regional Bikeway/Walkway	450,000
51 52 53 54 55 56 57 58 59 60	This appropriation is from the trust fund to the commissioner of trade and economic development for a contract with the metropolitan council for a subgrant to Ramsey county which shall cooperate with the city of White Bear Lake to develop a bikeway/walkway linking trunk highway 96 regional bikeway with Tamarack nature center and business centers, and a trailside	

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interpretive program. This appropriation is contingent on this facility being designated part of the metropolitan regional park and open space system.

(f) Cedar Lake Trail Development

This appropriation is from the trust fund to the commissioner of trade and economic development for a contract with the metropolitan council for a subgrant to the Minneapolis park and recreation board to plan and construct Cedar Lake recreational and nonmotorized commuter trail from Highway 100 to downtown Minneapolis intersecting with the chain of lakes. This appropriation must be matched by \$200,000 of nonstate funds. This appropriation is contingent on this facility being designated part of the metropolitan regional park and open space system.

23 State Trail Development (q)

24 This appropriation is from the trust fund to the commissioner of natural 26 resources to start development of the Paul Bunyan state trail, the 28 development of an abandoned railroad grade located between Barnum and 29 Carlton, and provide for the acquisition and development of a trail connection from Harmony to the Root river state trail.

34 (h) Shingle Creek Trail Improvement

35 This appropriation is from the trust 36 fund to the commissioner of trade and 37 economic development for a contract 38 with the metropolitan council for a 39 subgrant to the Minneapolis park and 40 recreation board to develop the Shingle Creek trail connection between 41 42 Minneapolis and Hennepin county 43 regional trail.

44 Lilydale/Harriet Island (i) 45 Regional Park Trail

> This appropriation is from the trust fund to the commissioner of trade and economic development for a contract with the metropolitan council for a contract with the city of St. Paul to plan and construct a pedestrian bicycle trail in the Lilydale/Harriet Island

(j) Como Park East Lakeshore 54 55 Reclamation

Regional Park.

163,000

56 This appropriation is from the trust 57 fund to the commissioner of trade and 58 economic development for a contract 59 with the metropolitan council for a 60 subgrant to the city of St. Paul to 61 provide site improvements for 62 reclamation and restoration of severely

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610,000

2,327,000

130,000

246,000

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eroded areas on east lakeshore in Como 1 2 Park.

(k) Grain Belt Mississippi Riverfront Development

This appropriation is from the trust fund to the commissioner of trade and economic development for a contract with the metropolitan council for a subgrant to the Minneapolis park and recreation board, which shall cooperate with the Minneapolis community development agency to create riverfront recreational park and marina facilities through acquisition and development of Mississippi riverfront property. This appropriation is contingent on this facility being designated part of the metropolitan regional park and open space system.

(1) Acquisition of Palace Restaurant Site on Mississippi River

325,000

300,000

This appropriation is from the trust fund to the commissioner of trade and economic development for a contract with the metropolitan council for a subgrant to the Minneapolis park and recreation board to acquire the Palace Restaurant property located on the east bank of the Mississippi for open space and recreational opportunities. This appropriation is contingent on this facility being designated part of the metropolitan regional park and open space system.

35 (m) Access to Lakes and Rivers -36 Continuation

1,000,000

37 This appropriation is from the trust fund to the commissioner of natural 38 39 resources to accelerate access to lakes 40 and rivers statewide. \$500,000 is for 41 boat access to lakes and rivers and 42 \$500,000 is for shoreline access and fishing piers statewide.

44 (n) Saint Louis River Land Acquisition

1,000,000

46 This appropriation is from the trust fund to the commissioner of natural 47 48 resources to acquire and protect 49 undeveloped lands known for their 50 resource and recreation values located 51 along the Saint Louis, Cloquet, and 52 Whiteface rivers.

53 (o) Lake Minnetonka Water 54 Access Acquisition 944,000

55 This appropriation is from the future 56 resources fund to the commissioner of 57 natural resources to acquire land for a 58 water access site on Maxwell and 59 Crystal Bays in Lake Minnetonka.

60 Lake Superior Safe Harbors -(p) 61 Continuation 1,000,000

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This appropriation is from the future resources fund to the commissioner of natural resources to acquire a site not to exceed 25 acres and construct a Lake Superior safe harbor site at Silver Bay in cooperation with the north shore management board. This appropriation is contingent on additional funding being requested from the IRRRB, the United States Army Corps of Engineers, and other federal/local sources as described in the north shore harbors plan.

13 (q) Cooperative Trails Grant Program 14

346,000

This appropriation is from the future resources fund to the commissioner of natural resources for a grant program to assist in the acquisition and development of local connections to planned and existing state trails and other public recreation facilities. This appropriation is available only for trails inside the metropolitan area as defined in MS section 473.351, subd. 1.

#### (r) Agassiz Recreational 26 27 Trails (ART)

This appropriation is from the future resources fund to the commissioner of trade and economic development for a contract with Norman county in cooperation with the ART committee to plan, purchase and develop Agassiz recreational trails and improve four local parks.

(s) Mesabi Trail Acquisition, Planning and Development

38 This appropriation is from the future resources fund to the commissioner of trade and economic development for a contract with the St. Louis and Lake county regional rail authority to plan 43 and begin acquiring and developing a 132-mile multipurpose trail linking the Mesabi iron range between Grand Rapids 46 and Ely. This appropriation must be matched by \$350,000 cash from IRRRB or nonstate funds.

49 (t) Recreational Programming: 50 Inclusiveness for Persons with Disabilities 51

This appropriation is from the future resources fund to the commissioner of education for a contract with Vinland National Center to provide staff training and consultation, targeted outreach and resource education, to enhance the inclusiveness, accessibility, and utilization of existing recreational programs by persons with disabilities.

650,000

700,000

160,000

	1 2 3	(u) Enhanced Recreational Opportunities for Southeast Asian Ethnic Communities	300,000
	4 5 6 7 8 9 10 11	This appropriation is from the future resources fund to the commissioner of natural resources to provide community education, develop bilingual communication exchanges, and cultural and sensitivity training with community members and natural resource professionals.	
	12 13	(v) Urban Community Gardening Program	110,000
	14 15 16 17 18 19 20 21 22 23	This appropriation is from the future resources fund to the commissioner of trade and economic development for a contract with the Natural Resource/Self Reliance center to provide technical assistance and information to neighborhood based groups, special populations, and municipalities for community gardening, including the rehabilitation of urban open space.	
	24 25	(w) National Register Grants Program	165,000
	26 27 28 29 30 31 32 33 34 35 36	This appropriation is from the future resources fund to the Minnesota state historical society to assist in the preservation of outstanding historical properties such as Pickwick Mill (1854-58), Sibley County Courthouse (1879), Wendelin Grimm Farmstead (1876) and Tugboat Edna G (1896), and other emergency needs of properties of national or statewide historic significance.	
•	37 38	(x) Historical Research and Planning for Traverse Des Sioux	68,000
	39 40 41 42 43 44 45	This appropriation is from the future resources fund to the Minnesota state historical society to research and develop a master plan for Traverse des Sioux, a historic site owned by the Minnesota historical society and located in Nicollet county.	
	46 47	(y) Peninsula Point Two Rivers Historical Park	435,000
	48 49 50 51 52 53 54 55	This appropriation is from the future resources fund to the commissioner of trade and economic development for a contract with the city of Anoka to develop Peninsula Point Two Rivers Historical Park located at the confluence of the Rum and Mississippi rivers.	
-	56	Subd. 11. Water	
	57 58	(a) Minnesota River Implementation - Continuation 1	,100,000
	59 60	This appropriation is from the trust fund to the commissioner of the	

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pollution control agency to accelerate the adoption of best management practices (BMPs) and to accelerate related state and local implementation activities for the Minnesota river basin.

(b) Local River Planning -Continuation

480,000

This appropriation is from the future resources fund to the commissioner of natural resources for contracts of up to two-thirds of the cost to counties or groups of counties acting pursuant to a joint powers agreement, to develop comprehensive plans for the management and protection of rivers in northern and central Minnesota. The commissioner of natural resources shall include in the work plan for review and approval by the legislative commission on Minnesota resources a proposed list of rivers and a planning process developed by the consensus of the affected counties. All plans must meet or exceed the requirements of state shoreland and floodplain laws. Up to \$100,000 is available for administration and technical assistance.

29 (c) Mercury Reduction in Fish -30 Continuation

This appropriation is from the trust fund to the commissioner of the pollution control agency for a contract with the University of Minnesota to complete pilot studies testing mercury reduction in fish for Minnesota waters. Grant requests to supplement this appropriation must be submitted to the United States Environmental Protection Agency and the results reported to the legislative commission on Minnesota resources.

#### (d) Stream Flow Protection

280,000

290,000

200,000

This appropriation is from the future resources fund to the commissioner of natural resources to collect stream habitat data (width, depth, velocity, substrate, water elevation) in up to 39 watersheds to develop community-based flows that protect stream resources. This project must comply with the data compatibility requirements set forth in subdivision 15.

54 (e) The South Central Minnesota
55 Groundwater Contamination
56 Susceptibility Project 57 Continuation

58 This appropriation is from the future 59 resources fund to the commissioner of 60 natural resources for a contract with 61 Mankato state university to couple 62 surface hydrology, subsurface geology, 63 and hydrogeology for environmental 64 analysis to assess present

environmental conditions, establish 1 2 benchmarks, and develop regional priorities for south central 3 4 Minnesota. This project must comply 5 with the data compatibility 6 requirements set forth in subdivision 7 15. 8 (f) White Bear Lake Levels 228,000 9 Feasibility Study 10 This appropriation is from the future 11 resources fund to the commissioner of natural resources to install additional 12 13 observation wells at White Bear Lake 14 (\$50,000) to study lake and groundwater relationships, to conduct a feasibility study to address lake level issues 15 16 17 (\$50,000), and to abandon or retrofit 18 existing augmentation wells (\$128,000). 19 County Geologic Atlases (g) 20 and Regional Hydrogeologic 21 Assessments - Continuation 850,000 22 \$425,000 is from the trust fund to the 23 University of Minnesota, Minnesota geologic survey, and \$425,000 is from 24 25 the trust fund to the commissioner of natural resources to expand production 26 27 of county geologic atlases and regional hydrogeologic assessments. This 28 29 project must comply with the data 30 compatibility requirements set forth in 31 subdivision 15. 22 (h) Septic System Replacement for Water Related Tourism Businesses 33 -500,000 34 This appropriation is from the future 35 resources fund to the commissioner of 36 trade and economic development to 37 provide matching grants of up to \$10,000 to resorts and related tourism businesses located on lakes and rivers 38 39 40 for replacement of failing or 41 nonconforming septic systems. 42 (i) Optical Brighteners: 42 Indicators of Sewage Contamination of Groundwaters 157,000 43 44 This appropriation is from the future 45 resources fund to the commissioner of 46 the pollution control agency for a 47 contract with Dakota county to study 48 the correlation of optical brighteners 49 present in domestic sewage from 50 detergent use with nonagricultural 51 nitrogen as interferences with atrazine 52 detection. 53 Subd. 12. Waste 54 (a) Compost and Wood Utilization 55 270,000 Program 56 This appropriation is from the future 57 resources fund to the commissioner of trade and economic development for a 58 59 contract with the metropolitan council 60 for a subgrant to the city of St. Paul

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1 to establish a system to compost and 2 market the organic waste materials. 3 Subd. 13. Wildlife, Fisheries, Plants 4 Reinvest in Minnesota -(a) 5 Critical Habitat Match, Scientific and Natural Area, Wildlife, and 6 7 4,000,000 Prairie Acquisition 8 This appropriation is from the trust g fund to the commissioner of natural resources to accelerate the reinvest in Minnesota program. \$2,600,000 is to 10 11 12 protect and improve critical fish, 13 wildlife, and native plant habitat 14 through critical habitat match; 15 \$1,000,000 is to acquire land for 16 scientific and natural areas; \$300,000 17 is to acquire North American waterfowl 18 management plan projects; and \$100,000 19 is to acquire prairie bank easements to protect native prairie on private lands. 20 21 (b) Reinvest in Minnesota 22 Wildlife Habitat Stewardship and 23 900,000 Property Development 24 This appropriation is from the trust 25 fund to the commissioner of natural 26 resources to accelerate the reinvest in 27 Minnesota program, to develop state 28 land, to protect wildlife and native 29 plant populations, restore native plant 30 communities, and enhance wildlife 31 habitat. 32 (c) Reinvest in Minnesota -33 Statewide Fisheries Habitat 34 Development 687,000 35 This appropriation is from the trust 36 fund to the commissioner of natural 37 resources to accelerate the reinvest in 38 Minnesota program through the 39 development of trout, walleye, and 40 smallmouth bass habitat in streams, 41 removal of the Flandrau dam on the 42 Cottonwood river to allow migration of 43 fish, and the installation of aeration 44 systems on winterkill-prone lakes. 45 (d) Establishment of Critical Winter Habitat Areas on 46 47 Intensively Farmed Land 100,000 48 This appropriation is from the future 49 resources fund to the commissioner of 50 natural resources for a contract with Pheasants Forever, Inc., to acquire and establish areas of critical winter 51 52 53 habitat for wildlife on farmland in 54 Scott county. This appropriation must 55 be matched by \$60,000 nonstate funds. 56 (e) Wild Turkey Hunting 57 Safety/Education 39,000 58 This appropriation is from the future 59 resources fund to the commissioner of 60 natural resources for a contract with 61 the wild turkey federation to develop a 62 program to promote safety in the sport

	1 2 3	of wild turkey hunting, to minimize accidents, and improve hunter/landowner relationships.	
•	4	(f) Niemackl Watershed Restoration	500,000
	5 6 7 8 9	This appropriation is from the future resources fund to the commissioner of natural resources for the restoration of the Niemackl watershed by improvement of water quality, flood	
	10 11	reduction, fish and wildlife habitat, and recreation through citizen	
•	12 13 14	participation with federal, state, and local governments, and nongovernment agencies. \$200,000 is available to	
	15 16 17	begin the project and the remaining \$300,000 is contingent on a match of \$300,000 of nonstate funds.	
	18 19	(g) Deer Critical Habitat Survey - Koochiching County	75,000
	20 21	This appropriation is from the future resources fund to the commissioner of	
1	22 23	natural resources in cooperation with Koochiching county to conduct an	
	24 25 26	intensive survey of deer winter cover in Koochiching county to identify critical babitat for deer for improved	
	27 28	timber management and for deer population management. This	
	29 30	appropriation must be matched by \$5,000 of nonstate funds.	
	31 32 33	(h) Reinvest in Minnesota - Fisheries Acquisition for Angler Access and Habitat Development	300,000
	34 35	This appropriation is from the trust fund to the commissioner of natural	
	36 37 38	Minnesota program. \$50,000 is for trout stream easements; \$50,000 is for	
	39 40 41	warm water stream easements; and \$200,000 is for aquatic management areas acquisition.	
	42 43 44	(i) Establishing Goose Nesting Sites in Northern Minnesota and Relocation of Giant Canada Goslings	21,000
•	45 46 47	This appropriation is from the future resources fund to the commissioner of natural resources for a contract with	
	48 49 50	Geese International, Inc., to manufacture and place 160 permanent goose nesting sites in the Squaw Lake	
	51 52	and Baudette areas and to purchase a four-wheel drive vehicle capable of	
• •	53 54 55	towing a trailer for 400 goslings. This appropriation must be matched by \$31,890 from Geese International, Inc.	
	56 57	(j) Prairie Ecosystem Restoration in the Minneapolis Park System	60,000
	58 59 60 61 62	This appropriation is from the future resources fund to the commissioner of trade and economic development for a contract with the Minneapolis park and recreation board to restore and	

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1 2 3 4 5	rehabilitate the remnant, secondary, and introduced prairie tracts in the Minneapolis park system. This appropriation must be matched by \$60,000 from nonstate funds.	
6 7	(k) Theodore Wirth Park Tamarack Bog Preservation Project	40,000
8 9 10 11 12 13 14 15 16 17 18	This appropriation is from the future resources fund to the commissioner of trade and economic development for a contract with the People for Minneapolis Parks fund in cooperation with the Minneapolis park and recreation board to restore the Theodore Wirth park tamarack bog, improve the access trail, construct a boardwalk, and develop and install self-guided interpretive signage.	
19 20 21	(l) Biological Control of Eurasian Water Milfoil and Purple Loosestrife	400,000
22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39	This appropriation is from the trust fund to the commissioner of natural resources to research biological control for purple loosestrife and Eurasian water milfoil. \$100,000 is for the propagation, release, and evaluation of insects for purple loosestrife control; \$50,000 is for the development of mycoherbicides to control purple loosestrife; \$200,000 is for evaluation of biocontrol agents for Eurasian water milfoil fungi and insects and is contingent on a match of \$100,000 of nonstate funds; and \$50,000 is to research the biology of Eurasian water milfoil and is contingent on a \$100,000 match of nonstate funds. The purple loosestrife research must be	
40 41	done in cooperation with the commissione of agriculture.	r
42 43 44	(m) Replacement of Eurasian Water Milfoil with Native Minnesota Plants	40,000
45 46 47 48 49 50 51	This appropriation is from the future resources fund to the commissioner of natural resources for a contract with the White Bear Lake conservation district to research the replanting of areas treated for Eurasian water milfoil with native aquatic plants.	
52 53	(n) Integrated Control of Purple Loosestrife	90,000
54 55 56 57 58 59 60 61 62	This appropriation is from the future resources fund to the commissioner of agriculture in cooperation with the commissioner of natural resources to accelerate evaluation of integrated biological control agents for purple loosestrife infestations in Houston, Hennepin, Wabasha, Goodhue, Winona and Rice counties.	

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(o) Ecological Impacts of Releasing Genetically Engineered Fishes

This appropriation is from the future resources fund to the commissioner of agriculture in cooperation with the commissioner of natural resources for a contract with the University of Minnesota to assess impacts of the release of genetically engineered fish on Minnesota's game fish and aquatic ecosystems and formulate recommendations to reduce detrimental impacts through measurement of bioenergetic and behavioral traits.

16 Subd. 14. MFRF Contingent Account

If cancellations or increased revenue, or both, create an excess balance in the future resources fund, up to \$600,000 for the biennium is appropriated from the fund for acquisition or development of state land or other projects that are part of a natural resources acceleration activity, when deemed to be of an emergency or critical nature. This appropriation is also available for projects initiated by the legislative commission on Minnesota resources that are found to be proper in order for the commission to carry out its legislative charge.

This appropriation is not available until the legislative commission on Minnesota resources has made a recommendation to the legislative advisory commission regarding each expenditure from the account. The legislative advisory commission must then hold a meeting and provide its recommendation on each item, which may be spent only with the approval of the governor.

Subd. 15. Data Compatibility Requirements

During the biennium ending June 30, 1995, the data collected by the projects funded under this section that have common value for natural resource planning and management must conform to information architecture as defined in guidelines and standards adopted by the information policy office. Data review committees may be established to develop or comment on plans for data integration and distribution and shall submit semiannual status reports to the legislative commission on Minnesota resources on their findings. In addition, the data must be provided to and integrated with the Minnesota land management information center's geographic data bases with the

175,000

1 2	integration costs borne by the activity receiving funding under this section.
3	Subd. 16. Work Program
	The improvement of the second s
4	It is a condition of acceptance of the
5	appropriations in this section that any
6	agency or entity receiving the
7	appropriation must submit a work
8	program and semiannual progress reports
9	in the form determined by the
10	legislative commission on Minnesota
11	resources. None of the money provided
12	may be spent unless the commission has
13	approved the pertinent work program
	approved one perturned work program
1.7	Subd 17 Temporary Positions
14	Subu. 17. Temporary Postcions
16	Provide and here at the second second
12	Persons employed by a state agency and
16	paid by an appropriation in this
17	section are in the unclassified civil
18	service, and their continued employment
19	is contingent upon the availability of
20	money from the appropriation. The
21	positions are in addition to any other
22	approved complement for the agency.
23	Part-time employment of persons is
24	authorized.
47	authollzeu.
25	Subd 19 Match Boguiroments
2.1	Subu 10. Match Requirements
26	Ruunnuistississa in this
20	Appropriations in this section that
21	must be matched and for which the match
_28	has not been committed by January 1,
29.,	1994, must be canceled.
30	Subd. 19. Purchase of Recycled
30 31	Subd. 19. Purchase of Recycled and Recyclable Materials
30 31	Subd. 19. Purchase of Recycled and Recyclable Materials
30 31 32	Subd. 19. Purchase of Recycled and Recyclable Materials A political subdivision, public or
30 31 32 33	Subd. 19. Purchase of Recycled and Recyclable Materials A political subdivision, public or private corporation, or other entity
30 31 32 33 34	Subd. 19. Purchase of Recycled and Recyclable Materials A political subdivision, public or private corporation, or other entity that receives an appropriation in this
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30 31 32 33 34 35 36	Subd. 19. Purchase of Recycled and Recyclable Materials A political subdivision, public or private corporation, or other entity that receives an appropriation in this section must comply with Minnesota Statutes, sections 16B.121 to 16B.125,
30 31 32 33 34 35 36 37	Subd. 19. Purchase of Recycled and Recyclable Materials A political subdivision, public or private corporation, or other entity that receives an appropriation in this section must comply with Minnesota Statutes, sections 16B.121 to 16B.125, requiring the purchase of recycled,
30 31 32 33 34 35 36 37 38	Subd. 19. Purchase of Recycled and Recyclable Materials A political subdivision, public or private corporation, or other entity that receives an appropriation in this section must comply with Minnesota Statutes, sections 16B.121 to 16B.125, requiring the purchase of recycled, repairable, and durable materials, the
30 31 32 33 34 35 36 37 38 39	Subd. 19. Purchase of Recycled and Recyclable Materials A political subdivision, public or private corporation, or other entity that receives an appropriation in this section must comply with Minnesota Statutes, sections 16B.121 to 16B.125, requiring the purchase of recycled, repairable, and durable materials, the purchase of uncoated paper stock, and
30 31 32 33 34 35 36 37 38 39 40	Subd. 19. Purchase of Recycled and Recyclable Materials A political subdivision, public or private corporation, or other entity that receives an appropriation in this section must comply with Minnesota Statutes, sections 16B.121 to 16B.125, requiring the purchase of recycled, repairable, and durable materials, the purchase of uncoated paper stock, and the use of soy-based ink, the same as
30 31 32 33 34 35 36 37 38 39 40 41	Subd. 19. Purchase of Recycled and Recyclable Materials A political subdivision, public or private corporation, or other entity that receives an appropriation in this section must comply with Minnesota Statutes, sections 16B.121 to 16B.125, requiring the purchase of recycled, repairable, and durable materials, the purchase of uncoated paper stock, and the use of soy-based ink, the same as if it were a state agency.
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30 31 32 33 34 35 36 37 38 39 40 41 42	Subd. 19. Purchase of Recycled and Recyclable Materials A political subdivision, public or private corporation, or other entity that receives an appropriation in this section must comply with Minnesota Statutes, sections 16B.121 to 16B.125, requiring the purchase of recycled, repairable, and durable materials, the purchase of uncoated paper stock, and the use of soy-based ink, the same as if it were a state agency. Subd. 20. Minnesota Statutes 1992,
30 31 32 33 34 35 36 37 38 39 40 41 42 43	Subd. 19. Purchase of Recycled and Recyclable Materials A political subdivision, public or private corporation, or other entity that receives an appropriation in this section must comply with Minnesota Statutes, sections 16B.121 to 16B.125, requiring the purchase of recycled, repairable, and durable materials, the purchase of uncoated paper stock, and the use of soy-based ink, the same as if it were a state agency. Subd. 20. Minnesota Statutes 1992, section 116P.10, is amended to read:
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30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47	Subd. 19. Purchase of Recycled and Recyclable Materials A political subdivision, public or private corporation, or other entity that receives an appropriation in this section must comply with Minnesota Statutes, sections 16B.121 to 16B.125, requiring the purchase of recycled, repairable, and durable materials, the purchase of uncoated paper stock, and the use of soy-based ink, the same as if it were a state agency. Subd. 20. Minnesota Statutes 1992, section 116P.10, is amended to read: 116P.10 [ROYALTIES, COPYRIGHTS, PATENTS.] This section applies to projects supported by the trust fund, the Minnesota future resources fund, and the oil overcharge
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$\begin{array}{c} 30\\ 31\\ 32\\ 33\\ 34\\ 35\\ 36\\ 37\\ 38\\ 39\\ 40\\ 41\\ 42\\ 43\\ 44\\ 45\\ 44\\ 45\\ 45\\ 51\\ 10\\ 51\\ 10\\ 10\\ 10\\ 10\\ 10\\ 10\\ 10\\ 10\\ 10\\ 1$	<pre>Subd. 19. Purchase of Recycled and Recyclable Materials A political subdivision, public or private corporation, or other entity that receives an appropriation in this section must comply with Minnesota Statutes, sections 16B.121 to 16B.125, requiring the purchase of recycled, repairable, and durable materials, the purchase of uncoated paper stock, and the use of soy-based ink, the same as if it were a state agency. Subd. 20. Minnesota Statutes 1992, section 116P.10, is amended to read: 116P.10 [ROYALTIES, COPYRIGHTS, PATENTS.] This section applies to projects supported by the trust fund, the Minnesota future resources fund, and the oil overcharge money referred to in section 4.071, subdivision 2, each of which is referred to in this section as a "fund". The trust fund owns and shall take title to</pre>
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$\begin{array}{c} 30\\ 31\\ 32\\ 33\\ 35\\ 36\\ 37\\ 38\\ 39\\ 40\\ 41\\ 42\\ 44\\ 45\\ 46\\ 49\\ 50\\ 52\\ 53\\ 54\\ \end{array}$	<pre>Subd. 19. Purchase of Recycled and Recyclable Materials A political subdivision, public or private corporation, or other entity that receives an appropriation in this section must comply with Minnesota Statutes, sections 16B.121 to 16B.125, requiring the purchase of recycled, repairable, and durable materials, the purchase of uncoated paper stock, and the use of soy-based ink, the same as if it were a state agency. Subd. 20. Minnesota Statutes 1992, section 116P.10, is amended to read: 116P.10 [ROYALTIES, COPYRIGHTS, PATENTS.] This section applies to projects supported by the trust fund, the Minnesota future resources fund, and the oil overcharge money referred to in section 4.071, subdivision 2, each of which is referred to in this section as a "fund". The trust fund owns and shall take title to the percentage of royalty, copyright, or patent resulting from a project supported by the trust fund equal to</pre>
$\begin{array}{c} 30\\ 31\\ 32\\ 33\\ 35\\ 36\\ 37\\ 38\\ 39\\ 40\\ 41\\ 42\\ 43\\ 4\\ 45\\ 46\\ 7\\ 48\\ 9\\ 50\\ 51\\ 25\\ 3\\ 5\\ 5\\ 5\\ 5\\ 5\\ 5\\ 5\\ 5\\ 5\\ 5\\ 5\\ 5\\ 5\\$	<pre>Subd. 19. Purchase of Recycled and Recyclable Materials A political subdivision, public or private corporation, or other entity that receives an appropriation in this section must comply with Minnesota Statutes, sections 16B.121 to 16B.125, requiring the purchase of recycled, repairable, and durable materials, the purchase of uncoated paper stock, and the use of soy-based ink, the same as if it were a state agency. Subd. 20. Minnesota Statutes 1992, section 116P.10, is amended to read: 116P.10 [ROYALTIES, COPYRIGHTS, PATENTS.] This section applies to projects supported by the trust fund, the Minnesota future resources fund, and the oil overcharge money referred to in section 4.071, subdivision 2, each of which is referred to in this section as a "fund". The trust fund owns and shall take title to the percentage of royalty, copyright, or patent resulting from a project supported by the trust fund equal to the percentage of the project's total</pre>
$\begin{array}{c} 30\\ 31\\ 32\\ 33\\ 35\\ 36\\ 37\\ 38\\ 39\\ 40\\ 41\\ 423\\ 44\\ 45\\ 46\\ 47\\ 49\\ 50\\ 523\\ 54\\ 55\\ 55\\ 55\\ 55\\ 56\end{array}$	<pre>Subd. 19. Purchase of Recycled and Recyclable Materials A political subdivision, public or private corporation, or other entity that receives an appropriation in this section must comply with Minnesota Statutes, sections 16B.121 to 16B.125, requiring the purchase of recycled, repairable, and durable materials, the purchase of uncoated paper stock, and the use of soy-based ink, the same as if it were a state agency. Subd. 20. Minnesota Statutes 1992, section 116P.10, is amended to read: 116P.10 (ROYALTIES, COPYRIGHTS, PATENTS.] This section applies to projects supported by the trust fund, the Minnesota future resources fund, and the oil overcharge money referred to in section 4.071, subdivision 2, each of which is referred to in this section as a "fund". The trust fund owns and shall take title to the percentage of royalty, copyright, or patent resulting from a project supported by the trust fund equal to the percentage of the project's total funding provided by the trust fund.</pre>
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$\begin{array}{c} 30\\ 31\\ 32\\ 33\\ 35\\ 36\\ 37\\ 39\\ 40\\ 4\\ 43\\ 44\\ 45\\ 46\\ 78\\ 90\\ 55\\ 55\\ 55\\ 55\\ 55\\ 55\\ 55\\ 55\\ 55\\ 5$	<pre>Subd. 19. Purchase of Recycled and Recyclable Materials A political subdivision, public or private corporation, or other entity that receives an appropriation in this section must comply with Minnesota Statutes, sections 16B.121 to 16B.125, requiring the purchase of recycled, repairable, and durable materials, the purchase of uncoated paper stock, and the use of soy-based ink, the same as if it were a state agency. Subd. 20. Minnesota Statutes 1992, section 116P.10, is amended to read: 116P.10 [ROYALTIES, COPYRIGHTS, PATENTS.] This section applies to projects supported by the trust fund, the Minnesota future resources fund, and the oil overcharge money referred to in section 4.071, subdivision 2, each of which is referred to in this section as a "fund". The trust fund owns and shall take title to the percentage of royalty, copyright, or patent resulting from a project supported by the trust fund equal to the percentage of the project's total funding provided by the trust fund. Cash receipts resulting from a royalty, copyright, or patent, or the sale of the trust fund's right to the sale of the trust fund's right to the sale of the truet fund's right to the sale of the percentage of the right to the sale of the truet fund's right to the sale of the truet fund's right to the sale of the percentage of the right to the sale of the truet fund's right to the sale of the percentage of the right to the sale of the truet fund's right to the sale of the percentage of the percentage</pre>
$\begin{array}{c} 30\\ 31\\ 32\\ 33\\ 35\\ 36\\ 37\\ 39\\ 40\\ 4\\ 4\\ 4\\ 4\\ 4\\ 4\\ 4\\ 4\\ 4\\ 5\\ 5\\ 5\\ 5\\ 5\\ 5\\ 5\\ 5\\ 5\\ 5\\ 5\\ 5\\ 5\\$	<pre>Subd. 19. Purchase of Recycled and Recyclable Materials A political subdivision, public or private corporation, or other entity that receives an appropriation in this section must comply with Minnesota Statutes, sections 16B.121 to 16B.125, requiring the purchase of recycled, repairable, and durable materials, the purchase of uncoated paper stock, and the use of soy-based ink, the same as if it were a state agency. Subd. 20. Minnesota Statutes 1992, section 116P.10, is amended to read: 116P.10 [ROYALTIES, COPYRIGHTS, PATENTS.] This section applies to projects supported by the trust fund, the Minnesota future resources fund, and the oil overcharge money referred to in section 4.071, subdivision 2, each of which is referred to in this section as a "fund". The trust fund owns and shall take title to the percentage of royalty, copyright, or patent resulting from a project's total funding provided by the trust fund. Cash receipts resulting from a royalty, copyright, or patent, or the sale of the truet fund's rights to a royalty, copyright, or patent, or the sale of the truet fund's rights to a royalty, copyright, or patent, or the sale of the truet fund's rights to a royalty, copyright, or patent, or the sale of the truet fund's rights to a royalty,</pre>
$\begin{array}{c} 30\\ 31\\ 32\\ 33\\ 35\\ 36\\ 37\\ 39\\ 40\\ 41\\ 42\\ 44\\ 45\\ 46\\ 7\\ 49\\ 55\\ 55\\ 55\\ 55\\ 55\\ 55\\ 55\\ 55\\ 55\\ 5$	<pre>Subd. 19. Purchase of Recycled and Recyclable Materials A political subdivision, public or private corporation, or other entity that receives an appropriation in this section must comply with Minnesota Statutes, sections 16B.121 to 16B.125, requiring the purchase of recycled, repairable, and durable materials, the purchase of uncoated paper stock, and the use of soy-based ink, the same as if it were a state agency. Subd. 20. Minnesota Statutes 1992, section 116P.10, is amended to read: 116P.10 [ROYALTIES, COPYRIGHTS, PATENTS.] This section applies to projects supported by the trust fund, the Minnesota future resources fund, and the oil overcharge money referred to in section 4.071, subdivision 2, each of which is referred to in this section as a "fund". The trust fund owns and shall take title to the percentage of royalty, copyright, or patent resulting from a project supported by the trust fund equal to the percentage of the project's total funding provided by the trust fund. Cash receipts resulting from a royalty, copyright, or patent, or the sale of the trust fund's rights to a royalty, copyright, or patent, must be credited in this referred to a royalty, copyright, or patent, must be credited</pre>
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	<pre>Subd. 19. Purchase of Recycled and Recyclable Materials A political subdivision, public or private corporation, or other entity that receives an appropriation in this section must comply with Minnesota Statutes, sections 16B.121 to 16B.125, requiring the purchase of recycled, repairable, and durable materials, the purchase of uncoated paper stock, and the use of soy-based ink, the same as if it were a state agency. Subd. 20. Minnesota Statutes 1992, section 116P.10, is amended to read: 116P.10 [ROYALTIES, COPYRIGHTS, PATENTS.] This section applies to projects supported by the trust fund, the Minnesota future resources fund, and the oil overcharge money referred to in section 4.071, subdivision 2, each of which is referred to in this section as a "fund". The trust fund owns and shall take title to the percentage of royalty, copyright, or patent resulting from a project supported by the trust fund equal to the percentage of the project's total funding provided by the trust fund. Cash receipts resulting from a royalty, copyright, or patent, or the sale of the truet fund's rights to a royalty, copyright, or patent, must be credited immediately to the principal of the truet fund on the principal of the truet fund the princi</pre>
# 1/14/93

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included in the budget plan, the commission may vote to relinquish the ownership or rights to a royalty, copyright, or patent resulting from a project supported by the trust fund to the project's proposer when the amount of the original grant or loan, plus interest, has been repaid to the trust fund.





# ACTUAL AND ESTIMATES OF REVENUE AVAILABLE TO LCMR FOR FUNDING RECOMMENDATIONS

Appropriation Year		Environment and Natural Resources Trust Fund	Future Resources Fund	Oil Overcharge	TOTAL
1989	Actual	0	18,590,000	0	18,590,000
1991	Actual	14,960,000	14,534,000	3,500,000	32,994,000
*1993	Estimate	24,600,000 *	14,228,000	2,012,000	40,840,000
1995	Estimate	11,500,000	13,000,000	0	24,500,000
1997	Estimate	12,500,000	12,500,000	0	25,000,000
1999	Estimate	15,500,000	12,000,000	0	27,500,000
1999	Estimate	15,500,000	12,000,000	0	27,500,000

Revenue estimates for 1993 are from Department of Finance

Revenue estimates for 1995-99 are LCMR estimates - no Department of Finance figures available \* 1993 is higher because of the 1992 amendment to MS 116P.11 which accelerated the timing of expenditures and designates the acceleration to be for capital projects for parks and trails. This amounts to approximately \$10,000,000.

# STATE ENVIRONMENT AND NATURAL RESOURCE EXPENDITURES

For selected agencies, comparing fiscal years 1990 and 1992

	FY 1990	FY 1992
Department of Natural Resources	166,378,000	177,756,000
Pollution Control Agency	31,594,000	47,445,000
Office of Waste Management	9.144.000	20,281,000
University of Minnesota	8,418,000	9.099.000
Health Denartment	8,494,000	8.076.000
Legislative Commission on Minnesota Resources	7 233 000	14.370.000
Reard of Water and Soil Resources	6 275 000	8,330,000
State Blanning Ageney (Minnesota Blanning (Only EOB for EY92)	3 888 000	322,000
Department of Administration   MIC. (part of State Planning in EY90)	0,000,000	927,000
Department of Administration, Line (part of Glate Framming in 7 100)	1 785 000	1 730 000
Department of Transportation	1 517 000	2 124 000
Department of Agriculture	307.000	2,124,000
Department of Irade and Economic Development (Fait Grants and	307,000	0,047,000
Metropolitan Area Regional Parks Maintenance and Operations)	440.000	407.000
Minnesota Wisconsin Boundary Area Commission	110,000	127,000
Total	245,143,000	293,634,000
Tatal dollar increase		48,491,000

Total dollar increase Total percent increase

Does not include State Bonding, Gift or Federal Funds. Data from Statewide Accounting System as of closing for FY90/92 - 20%

## Excerpted from "State of Minnesota, Comprehensive Annual Financial Report for the Year Ended June 30, 1992"

## STATE OF MINNESOTA

### ENVIRONMENT AND NATURAL RESOURCES NONEXPENDABLE TRUST FUND BALANCE SHEET JUNE 30, 1992 (IN THOUSANDS)

ASSETS

Cash and Cash Equivalent	5	 	· · · · · · · · · · · · · · · · · · ·		\$ 39.658
Interfund Receivables		 	 		1,398
Total Accets			•	n e The second	\$ 41.056
		 	 ••••••	••••••	<u>φ 41,000</u>

LIABILITIES AND FUND BALANCES

Liabilities: Interfund Payables			 			<u>\$765</u>
Total Liabilities		••••••		••••••		\$ 765
Fund Balances: Reserved for Trust Principal				-		\$ 40,291
Total Fund Balances	•••••		 			\$ 40,291
Total Liabilities and Fund (	Balances		 ••••••		••••••	<u>\$ 41,056</u>

# ENVIRONMENT AND NATURAL RESOURCES EXPENDABLE TRUST FUND BALANCE SHEET

JUNE 30, 1992 (IN THOUSANDS)

ASSETS

			· · · ·
Cash and Cash Equivalents	 	·	 \$ 10.643
Interfund Receivables			 765
Total Assets	 		 \$ 11.408

#### LIABILITIES AND FUND BALANCES

Liabilities:						-	1.1.4
Accounts Payable						\$	605
Total Liabilities						\$	605
Fund Balances:							
Total Fund Palanas	urposes		••••••	·····	••••••	<u> </u>	0,803
Total Liabilities and	l Fund Bal	ances				<u>\$ 1</u> \$ 1	1,408_

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# Excerpted from "State of Minnesota, Comprehensive Annual Financial Report for the Year Ended June 30, 1992"

### STATE OF MINNESOTA

### MINNESOTA RESOURCES FUND BALANCE SHEET JUNE 30, 1992 (IN THOUSANDS)

ASSETS

Cash and Cash Equivalents	******	· .		\$ 2112
Accounts Receivable	 •••••••••••••••••••••••••••••••••••••			788
			•	· · · · ·
Total Assets	 ••••••	•••••••••••••••••••••••••••••••••••••••	••••••	\$ 2,900

### LIABILITIES AND FUND BALANCES

Liabilities:			.T. N.	•			
Accounts Payable						\$	864
Total Liabilities		•				\$	864
						<u>+</u>	
und Balances: Reserved Fund Balances: Reserved for Encumbrances						.\$	1.514
Total Reserved Fund Balan	ces	••••••			· · · · · · · · · · · · · · · · · · ·	<u>\$</u>	1,514
Unreserved Fund Balances: Designated for Appropriation	n Carryover.					\$	522
Total Unreserved Fund Bala	ances			•••••		<u>\$</u>	522
Total Fund Balances						\$	2,036
Total Liabilities and Fund	Balances					<u>\$</u>	2,900





LEGISLATIVE COMMISSION ON MINNESOTA RESOURCES (LCMR) 1991

# Laws 1991 Chapter 254 Article 1 Section 14 Minnesota Resources

Legislative appropriations from the following sources:

1.1	Minnesota Future Resources Fund	16,534,000
· · ·	Environment and Natural Resources Trust Fund (noted as TF)	14,960,000
· ·	Oil Overcharge (Subd. 13)	3,500,000
		34,994,000
Subd 2	I CMR Administration	850,000
Cube. L		
Subd. 3	RECREATION	4,349,000
(a)	Off-Highway Vehicle Recreation Area	75,000
(b)	Superior Hiking Trail	400,000
TF (c)	Rails-to-Trails Acquisition and Development	1,000,000
(c)	Local Rivers Planning	400,000
(d)	Access to Lakes and Rivers	1,000,000
TF (e)	Land/Water Resource Management, Lower St. Croix Riverway	360,000
	Mississippi River Valley Blufflands Initiative	150,000
(d)	Reclamation of Recreation Systems & Environmental Resources	200,000
(9) (h)	Preservation of Historic Shipwrecks. Lake Superior	100,000
//) //)	Land & Water Conservation Fund Administration	84,000
	Historic Records Database-Final Phase	180,000
· (k)	Fur Trade Research and Planning	250,000
(1)	Mustery Cave Resource Evaluation	150,000
W		
Subd A	WATER	5,769,000
TE (a)	Stream and Watershed Information System	200,000
TE (b)	S Con Minnesota Surface Water Resource Atlases/Data Base	300,000
	Minnesota River Basin Water Quality Monitoring	700,000
(d)	Waterwatch-Citizen Monitoring and Protection Program	272,000
	Bioremedial Technology for Groundwater	96,000
	County Geologic Atlas and Groundwater Sensitivity Mapping	1.400.000
(n)	Aquifer Analyses in Southeast Minnesota	73,000
(9) TE (b)	Close Water Partnership Grants to Local Units of Government	700.000
	Connon Divor Watershed Grants	60.000
1F(I) TE(I)	Milianting Moreling in Northeast Minnesota Lakes	300.000
	Development and Application of Agration Technologies	148.000
(N)	Lake Superior Initiative/Institute for Research	400,000
(I) (m)	Lake Mille Lacs Public Land Lise Plan	20.000
(11) TE (6)	Ecological Evaluation of Year-Round Aeration	100,000
	Ecological Evaluation of Teal-Round Astration	250,000
TE (o)	Well Sealing Cost-Share Grants	750,000
IF (P)	Wen Geaning Cost-Charlo Cranto	
Subd 5	FDUCATION	2,885,000
TF (a)	Environmental Education Program	790,000
(b)	Teacher Training for Environmental Education	5,000
TF (c)	Video Education Research and Demonstration Project	100,000
TF (d)	Integrated Resource Momt Education and Training Program	300,000
(e)	Continuing Ed in Outdoor Rec For Natural Resource Mars	125,000
TF (f)	Environmental Exhibits Collaborative	400,000
(a)	Upper Mississippi River Environmental Education Center	600,000
(b)	Urban Rangers Program	100,000
(1)	Crosby Farm Park Nature Program	85,000
(i)	Youth in Natural Resources	250,000
(k)	Environmental Education for Handicapped	130,000
		A AAA AAA
Subd. 6	AGRICULTURE	2,090,000
TF (a)	Biological Control of Pests	000,000
(b)	Review Levels of Pesticides at Spill Sites	300,000
(c)	Effective Nitrogen/Water Mgt for Sensitive Areas	300,000
TF (d)	Conservation Reserve Lasements	420,000
(e)	Native Grass and Wildflower Seed	130,000
· (f)	Community Gardening Program	110,000

		and the second	2 A
Subd 7	FORESTRY		1.850.000
	Minnesstele Old Oreuth Ferenter Observator and Identification		450,000
(a)	Minnesola's Old-Growin Poresis: Character and Identification		150,000
(b)	Nutrient Cycling and Tree Species Suitability		220,000
ini	State Forest Land Acquisition		500 000
(0)	Departmention and Menorment of Minnesstels Oak Factor		005,000
(a)	Regeneration and management of minnesota's Oak Porests		225;000
(e)	Private Forest Management for Oak Regeneration	and the second	200,000
(ก)	Aspen Hybrids and New Tissue Culture Techniques		70,000
	Asses Deservices and New Hose Couldred Feelingues	and the second	0,000
· . (g) .	Aspen Decay models for mature Aspen Stands	and the second	85,000
TF (h)	Generic Environmental Impact Statement		400,000
1		and the second second	
Subd. 8	FISHERIES		2,020,000
· (a)	Pilot Fish Pond Complex-Fisheries Development and Education		250 000
(44)	Anusquiture Conility Durchase and Day and Oscalia Oscalia		4 000 000
(D)	Aquaculture Facility Purchase and Dev and Genetic Gamelish		1,200,000
(C)	Cooperative Urban Aquatic Education Program		340,000
	Catch and Release Program		35,000
(u)	Calcin and Release Frogram		55,000
.(e)	Metropolitan Lakes Fishing Opportunities		. 75,000
(f)	Lake Minnetonka Bass Tracking		85.000
(1)	Steeling Survey	in the second	25 000
(g)	Slocking Survey		35,000
Subd 9	WILD/ IFF		4.500.000
			-,000,000
ir (a)	Insecticide impact on wetland and upland wildlife		000,000
TF (b)	Biological Control of Eurasian Water Milfoil		100.000
10	Microbial and Constin Strategies For Masquite Control		150 000
(0)	Microbial and Genetic Strategies For Mosquito Control		130,000
TF (d)	Minnesota County Biological Survey	and the product of the second	1,000,000
TE (e)	Data Base for Plants of Minnesota		130.000
			100,000
1 F (I)	Aquatic invertebrate Assessment Archive	1	130,000
TF (g)	Wetlands Forum		40,000
	Essement Acquisition on Restored Wetlands		400 000
			400,000
(1)	Swan and Heron Lake Area Projects	· · ·	1,000,000
· (i)	Wildlife Oriented Rec Fac/Sandstone Unit Nat Wildlife Refuge		9.000
	Acquisition and Development of Scientific and Natural Areas		200,000
(K)	Acquisition and Development of Scientific and Natural Areas		300,000
· (I) · ·	Black Bear Research in East Central Minnesota		100,000
(m)	Partnership for Accelerated Wild Turkey Management	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	50,000
TE (-)	Desters Themes Sedles Deberts Bird Constructs	and the second	50,000
(n) ·	Restore Thomas Sadier Roberts Bird Sanctuary		50,000
TF (o)	Changes in Ecosystem on Biodiversity of Forest Birds		300,000
(n)	Establish Northern Rantors Rehabilitation and Ed Facility		75 000
(P)			10,000
(q)	Effect of Avian Flu Virus in Mailard Ducks		16,000
Subd 40		-	1 926.000
Subu. IV.			4,020,000
TF (a)	Base Maps for 1990's	· · · · · · · · · · · · · · · · · · ·	1,900,000
(b)	Accelerated Soil Survey		1 270 000
	Statewide Netl Methode Jew/DW/Methode a Mar. Distance		750,000
· 1 F (C)	Statewide Nati Wetlands Inviewi/Watersned Map Digitization		750,000
(d)	Statewide Land Use Update		338,000
(e)	Local Geographic Information System Program	et e e e e	143 000
(0)			140,000
.(1)	Geographic Information System Control Point Inventory		175,000
(a)	Land Use and Design Strategies to Enhance Env Quality		100.000
(5)	Medal Dasidantial Land Line Quidelines		450,000
(U) (2	Model Residential Land Use Guidennes		150,000
Subd 11	MINEDALS		
Oubu. II			
· (a)	Subsurface Greenstone Belts in Southwestern Minnesota	1. Sec. 1. Sec	120,000
Subd 12	WASTE	and the second second second	225 000
JUDU, 1Z			230,000
(a)	Remediation of Soils by Co-Composting with Leaves		135,000
(b)	Land Spreading of Yard Wastes		100 000
			,
Subd. 13	OIL OVERCHARGE	· · · ·	3,500.000
(a)	Traffic Signal Timing and Optimization Program		1 175 000
(4)			1,113,000
(D)	waste Crump Rubber in Roadways		100,000
(C)	Biodegradable Plastics-Microbial and Crop Plant Systems	and the second second second	150.000
(d)	Agricultural Energy Savings Information		450,000
	ngnoanara Energy Cavings Information	a de la companya de l	130,000
(e) ·	Residential Urban Environmental Resource Audit		150,000
· · (f) ·	Means for Producing Lignin-Based Plastics	and a second second	100.000
â	Celluloso Bayons for Backaging		450 000
ເສ	Conulose reayons for Fackaging		150,000
(h)	Tree and Shrub Planting for Energy in Minnesota Communities		1,250.000
(i)	Oil Overchame Program Administration		200 000
w a			200,000
- U) -	Energy Efficiency Standards for Residential Construction		75,000
		1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 -	1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 -
Subd 14	MEDE Contingent Account		· ·
Julu, 14		· • .	
Subd 15	General Reduction	e de la companya de l	2 000 000
			2,000,000
2 <sup>1</sup>			· ·
Subd. 21	Carryforward		
1	MI 80 Ch 335 Art 1 Sec 20 Subd 3 (a) (b) Subd 11 (a)		

Laws 1991 Chapter 254 Article 1

7 Sec. 14. MINNESOTA RESOURCES 8 Subdivision 1. Total 9 Appropriation 34,994,000 10 Summary by Fund 11 Minnesota Future Resources Fund 12 16,534,000 Minnesota Environment and Natural 13 Resources Trust Fund 14 15 14,960,000 16 Oil Overcharge Money in the Special Revenue Fund 17 3,500,000 18 The appropriations in this section are from the Minnesota future resources 19 20 fund, unless another fund is named. 21 22 The appropriations in this section are 23 available until June 30, 1993. 24 Subd. 2. Legislative Commission on 25 Minnesota Resources 850,000 26 For the biennium ending June 30, 1993, 27 the commission shall monitor the 28 programs in this section; assess the 29 status of the state's natural 30 resources; convene a state resource 31 congress; establish priorities for, 32 request, review, and recommend programs 33 for the 1993-1995 biennium from the 34 Minnesota future resources fund, 35 Minnesota environment and natural resources trust fund, and oil overcharge money, and for support of 36 37 38 the Citizen Advisory Committee 39 activities. Subd. 3. Recreation 4Ó 41 (a) Off-highway Vehicle 75,000 42 Recreation Area This appropriation is to the commissioner of natural resources to 43 44 conduct a study in cooperation with the 45 46 Minnesota 4-WD Association on the 47 feasibility of an off-highway vehicle 48 recreation area. 400,000 49 (b) Superior Hiking Trail 50 This appropriation is to the 51 . commissioner of natural resources for 52 planning and administrative assistance

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#### 05/18/91

[REVISOR ] PER/MP CCRSF1533D

and a grant to the Superior Hiking 1 Trail Association for planning, development, and limited use of ٦ 4 easement acquisition. The use of conservation corps resources is 5 strongly encouraged. Up to \$80,000 is 6 available to the commissioner for 7 planning and administrative g q assistance. Available federal and private money is appropriated. 10 400,000 11 (c) Local Rivers Planning 12 This appropriation is to the 13 commissioner of natural resources for grants of up to two-thirds of the cost 14 15 to counties, or groups of counties 16 acting pursuant to joint powers 17 agreement, to develop comprehensive 18 plans for the management and protection 19 of up to eight rivers in northern and 20 central Minnesota. The commissioner of 21 natural resources shall include in the 22 work plan for review and approval by 23 the legislative commission on Minnesota 24 resources a proposed list of rivers and 25 a planning process developed by 26 consensus of the affected counties. 27 All plans must meet or exceed the requirements of state shoreland and 28 29 floodplain laws. 30 (d) Access to Lakes and Rivers 1,000,000 31 This appropriation is to the 32 commissioner of natural resources to 33 provide boat access to major recreation 34 lakes and rivers and to construct 35 fishing piers in accordance with established priorities, inventory, map, 36 37 and construct shore access sites in the 38 metropolitan area. 39 (e) Land and Water Resource Management, 360,000 40 Lower St. Croix Riverway 41 This appropriation is from the . 42 Minnesota environment and natural 43 resources trust fund to the commissioner of natural resources for a 44 45 grant to the Minnesota-Wisconsin 46 Boundary Area Commission to develop a 47 management strategy, improved technical 48 capability, and sustained local 49 government and landowner stewardship on 50 the jointly managed lower St. Croix. 51 (f) Mississippi River Valley 52 150,000 Blufflands Initiative 53 This appropriation is from the Minnesota environment and natural 54 resources trust fund to the commissioner of natural resources to 55 56 assist local units of government to 57 58 develop the tools necessary to protect the outstanding scenic and biological 59 resources of the blufflands of the 60 Mississippi Valley in Goodhue, Wabasha, 61 Winona, and Houston counties. 62

(g) Reclamation of Recreation Systems 1 and Environmental Resources 200,000 2 This appropriation is to the University of Minnesota, College of Architecture 7 and Landscape Architecture, to ٦. 6 investigate urban design strategies for enhancing recreational amenities in 8 suburban areas. The investigation 9 shall be done in cooperation with the 10 metropolitan council. The legislative 11 commission on Minnesota resources may 12 🕐 convene a steering committee to ensure 13 coordination and practical results. (h) Preservation of Historic 14 15 Shipwrecks, Lake Superior 100,000 \$80,000 is to the Minnesota historical 16 17 society to investigate the historic 18 significance of shipwrecks on the North 19 Shore of Lake Superior in accordance 20 with priorities for placement on the National Register of Historic Places; 21 to develop preservation plans to implement the federal Abandoned 22 23 24 Shipwrecks Act; and to conduct a survey 25 of the underwater resources in the 26 vicinity of Split Rock Lighthouse. 27 \$20,000 is to the commissioner of 28 natural resources to develop facilities 29 at Split Rock Lighthouse State Park for 30 diver access. 31 (i) Land and Water Conservation 32 Fund Administration 84,000 33 This appropriation is to the 34 commissioner of natural resources for 35 administration of the federal land and 36 water conservation program and other 37 grant administration activities 38 assigned to the commissioner in this 39 section. 40 (j) Historic Records Database -41 Final Phase 180,000 42 This appropriation is to the Minnesota 43 historical society to automate and make 44 widely accessible the society's 45 collections. 46 (k) Fur Trade Research and Planning 250,000 This appropriation is to the Minnesota 47 historical society to plan and design 48 49 the visitor center at the Northwest 50 Company Fur Post Historic Site, and for site improvements at that site. No 51 52 more than \$100,000 may be spent for 53 site improvements. 54 (1) Mystery Cave Resource 150,000 55 Evaluation 56 This appropriation is to the commissioner of natural resources to 57 perform a resource inventory and study 58 of Mystery Cave to include groundwater, 59

05/18/91

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05/18/91 [REVISOR ] PER/MP CCRSF1533D cave meteorology, geology, and biology 1 2 as part of the park plan. 3 (c) Rails-to-Trails Acquisition and Development 1,000,000 4 This appropriation is from the Minnesota environment and natural 6 7 resources trust fund to the commissioner of natural resources for acquisition and development of trails 8 **Q** . 10 in accordance with established ll priorities. 12 Subd. 4. Water 13 (a) Stream and Watershed 14 Information System 200,000 15 This appropriation is from the 16 Minnesota environment and natural 17 resources trust fund to the 18 commissioner of state planning to develop an integrated system of 19 20 information relating to streams, watersheds, and retrieval and analysis 21 22 tools. 23 (b) South Central Minnesota Surface 24 Water Resource Atlases and Data Base 300,000 25 This appropriation is from the Minnesota environment and natural resources trust fund to the 26 27 28 commissioner of natural resources for a 29 grant to Mankato State University for 30 development of surface hydrology 31 atlases and data base in both hard and electronic format for the 13 counties 32 33 of south central Minnesota. 34 (C) Minnesota River Basin Water 35 700,000 Quality Monitoring 36 This appropriation is from the Minnesota environment and natural 37 resources trust fund to the commissioner of the pollution control 38 39 -40 agency. This is the final two years of 41 a multiagency four-year effort to 42 identify the sources of nonpoint 43 pollution threatening the water quality 44 and uses of the Minnesota River. The 45 results will be used to direct state 46 and local implementation programs. 47 Federal matching money is appropriated. 48 (d) Waterwatch - Citizen Monitoring 49 and Protection Program 272,000 50 This appropriation is to the 51 commissioner of the pollution control agency to encourage and coordinate 52 53 citizen and student volunteer monitoring of water quality and 54 55 biological indicators for Minnesota's 56 lakes and streams. 57 (e) Bioremedial Technology for 58 Groundwater 96,000

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This appropriation is to the University of Minnesota, Department of Civil and Mineral Engineering, for a pilot demonstration of technology for in situ biodegradation of organic pollutants in groundwater.

(f) County Geologic Atlas and 8 Groundwater Sensitivity Mapping

1,400,000

9 \$800,000 is from the Minnesota 10 environment and natural resources trust fund to the University of Minnesota, 11 12 Minnesota Geologic Survey, to expand 13 production of county geologic atlases 14 and create a new atlas services office.

\$600,000 is from the Minnesota 15 16 environment and natural resources trust 17 fund to the commissioner of natural 18 resources for groundwater sensitivity 19 mapping.

20 (g) Aquifer Analyses in southeast 21 Minnesota

22 This appropriation is to the commissioner of natural resources for a 23 24 grant to Winona State University to 25 perform aquifer tests in southeast 26 Minnesota in order to determine aquifer. 27 characteristics, surface-subsurface 28 groundwater interaction, and aquifer 29 interaction.

30 (h) Clean Water Partnership Grants 31 to Local Units of Government

700,000

73,000

32 This appropriation is from the 33 Minnesota environment and natural 34 resources trust fund to the commissioner of the pollution control 35 36 agency for Clean Water Partnership 37 grants under Minnesota Statutes, section 115.096. In addition to the 38 39 required work program, grants may not be approved until grant proposals have been submitted to the legislative commission on Minnesota resources and 40 41 42 43 the commission has either made a 44 recommendation or allowed 30 days to 45 pass without making a recommendation.

46 (i) Cannon River Watershed Grants 60,000

300,000

47 This appropriation is from the 48 Minnesota environment and natural resources trust fund to the board of 49 50 water and soil resources to provide research and demonstration grants to 51 52 counties consistent with the 53 comprehensive local water management 54 program under Minnesota Statutes, 55. chapter 110B, as part of the Cannon River watershed protection program. 56

(j) Mitigating Mercury in Northeast 57 58 Minnesota Lakes

This appropriation is from the 59

Minnesota environment and natural 1 resources trust fund to the 2 3 commissioner of the pollution control 4 agency to investigate how to mitigate 5 the damage caused by the presence of 6 mercury in northeast Minnesota lakes. 7 (k) Development and Application of 8 Aeration Technologies 148,000 9 This appropriation is to the University 10 of Minnesota, St. Anthony Falls 11 Hydraulic Laboratory, to study how to 12 optimize membrane aeration and the 13 hydraulic design of bypass type aerator 14 systems. (1) Lake Superior Initiative - Institute 15 16 for Research 400,000 17 This appropriation is to the University 18 of Minnesota, Graduate School, to 19 establish an institute for Lake Superior Research that would develop a 20 21 strong multifaceted research effort. 22 (m) Lake Mille Lacs Public Land Use Plan 23 20,000 24 This appropriation is to the 25 commissioner of natural resources to plan for shoreline management of 26 27 publicly-owned lands around Lake Mille 28 Lacs. 29 (n) Ecological Evaluation of 30 Year-Round Aeration 100,000 31 This appropriation is from the 32 Minnesota environment and natural 33 resources trust fund to the 34 commissioner of natural resources to 35 collect baseline data on aerated and 36 nonaerated lakes and determine 37 ecological impacts of aeration. 250,000 38 (o) Erosion Control Cost-Sharing 39 This appropriation is from the 40 Minnesota environment and natural 41 resources trust fund to the board of 42 water and soil resources to share in 43 the cost of conservation practices to 44 control soil erosion and protect water 45 quality, including water quality 46 practices that divert water from 47 sinkholes, under Minnesota Statutes, section 103C.501. 48 750,000 49 (p) Well Sealing Cost-Share Grants 50 This appropriation is from the Minnesota environment and natural ·51 resources trust fund to the board of 52 water and soil resources to make grants 53 to counties for sharing the cost of 54 sealing wells under Minnesota Statutes, 55 section 1031.331. 56

57 Subd. 5. Education

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8

#### 1 (a) Environmental Education Program

790,000

\$400,000 is from the Minnesota environment and natural resources trust 3 fund to the commissioner of education to develop and implement model K-12 environmental education curriculum integration. This program will 7 incorporate ongoing models of other 9 deliverers of environmental education.

10 \$30,000 is from the Minnesota 11 environment and natural resources trust 12 fund to the commissioner of education 13 for a grant to the Minnesota Community 14 Education Association to incorporate 15 environmental education into the 16 community education system.

17 \$60,000 is from the Minnesota 18 environment and natural resources trust 19 fund to the commissioner of natural 20 resources to complete a long-term plan 21 for the development and coordination of 22 environmental learning centers.

23 \$85,000 is from the Minnesota 24 environment and natural resources trust 25 fund to the commissioner of state 26 planning for a grant to the Audubon Center of the Northwoods for an assessment of environmental learning 27 28 29 center programs and services.

30 \$215,000 is from the Minnesota 31 environment and natural resources trust 32 fund to the commissioner of state 33 planning to develop a statewide 34 The environmental education plan. statewide plan will integrate the 35 36 plans, strategies, and policies of the 37 department of education, post-secondary 38 institutions, the department of natural 39 resources, and other deliverers of 40 environmental education.

41 (b) Teacher Training for Environmental 42 Education

43 This appropriation is to the 44 commissioner of education for a grant 45 to the St. Paul Chapter of the National 46 Audubon Society for scholarships for 47 the training of teachers in 48 environmental education integration.

49 (C) Video Education Research and 50 Demonstration Project

51 This appropriation is from the 52 Minnesota environment and natural resources trust fund to the 53 commissioner of education for a grant 54 55: to Twin Cities Public Television to 56 develop a video education demonstration 57 project and a model for a statewide video environmental education 58 59 communication network.

(d) Integrated Resource Management 60 Education and Training Program 61

300,000

5,000

100,000

This appropriation is from the 3 2 Minnesota environment and natural 3 resources trust fund to the 4 commissioner of natural resources to 5 provide training and internship 6 programs in natural resource management. 7 (e) Continuing Education in Outdoor Recreation for Natural 8 9 Resource Managers 125,000 10 This appropriation is to the University of Minnesota, Department of Forest 11 12 Resources, to develop and implement an 13 outdoor recreation short course for 14 natural resource planners and managers 15 with outdoor recreation 16 responsibilities. 17 (f) Environmental Exhibits 18 Collaborative 400,000 19 This appropriation is from the 20 Minnesota environment and natural 21 resources trust fund to the Science 22 Museum of Minnesota to establish a 23 statewide collaborative to share and 24 create traveling water-related exhibits and programs for schools and family 25 groups at different sites. 26 27 (g) Apper Mississippi River 28 Environmental Education Center This project did not proceed 29 This appropriation is to the 30 commissioner of natural resources for a because the Federal commitment commissioner of natural resources for a grant to the city of Winona to develop detailed architectural designs necessary to obtain federal construction funding for an Upper Mississippi River Environmental Education Center. This appropriation is contingent upon federal commitment 31 was not received. 32 33 34 35 36 37 of at least \$6,000,000 for construction 38 39 and for future operation and 40 maintenance. 100,000 41 (h) Urban Rangers Program This appropriation is to the 42 43 commissioner of education for a grant to the Minneapolis Park and Recreation 44 45 Board to develop an urban environmental 46 curriculum for elementary students and 47 families conducted at 44 city 48 recreation centers. (i) Crosby Farm Park Nature Program 85,000 49 50 This appropriation is to the commissioner of education for a grant 51 52 to the city of St. Paul to institute a nature study program at Crosby Farm 53 Park to introduce inner city residents 54 and minorities to learning -55 56 opportunities concerning natural 57 resources and how to conserve and protect those resources. , 58 250,000 (j) Youth in Natural Resources 59

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1 This appropriation is to the 2 commissioner of natural resources to 3 develop a career exploration program 4 for minority youths and to test their 5 vocational interests, skills, and 6 aptitudes. (k) Environmental Education for 8 Handicapped 130,000 This appropriation is to the 10 commissioner of education for a grant 11 to Vinland National Center to develop a 12 program model in environmental 13 education, including education of 14 . persons with disabilities, and to teach 15 the model to educators, 16 environmentalists, and the disability 17 community. 18 Subd. 6. Agriculture 19 (a) Biological Control of Pests 650,000 20 This appropriation is from the 21 Minnesota environment and natural 22 resources trust fund to the 23 commissioner of agriculture to collect 24 and identify potential biological 25 control agents, and to develop and test 26 biological control agents for a variety 27 of pests. A grant request to 28 supplement this appropriation must be 29 submitted to the U.S. Department of 30 Agriculture and the results reported to 31 the legislative commission on Minnesota 32 resources. 33 (b) Review Levels of Pesticides 34 at Spill Sites 300,000 35 This appropriation is to the commissioner of agriculture for a 36 literature search and publication of 37 38 remediation technologies for pesticide 39 spills, laboratory research on the fate 40 of elevated levels of pesticides in soil, and evaluation of bioremediation 41 42 techniques. 43 (c) Effective Nitrogen and Water 44 Management for Sensitive Areas 300,000 45 This appropriation is to the 46 commissioner of agriculture to provide 47 an integrated research information base 48 on risks of groundwater pollution 49 involved in nitrogen and water 50 management for crop production. 600,000 51 (d) Conservation Reserve Easements 52 This appropriation is from the 53 Minnesota environment and natural 54 resources trust fund to the board of 55 water and soil resources to acquire 56 perpetual easements on wetlands and to 57 acquire perpetual easements under 58 Minnesota Statutes, section 103F.515, 59 subdivision 3, with priority for 60 wetland areas, to enhance wildlife

1 habitat, control erosion, and improve 2 water quality. (e) Native Grass and Wildflower Seed 130,000 3 4 This appropriation is to the 5 commissioner of agriculture in 6 cooperation with the commissioner of 7 natural resources to develop the 8 varietal, cultural, and market **Q** information necessary to encourage 10 expanded commercial production of 11 Minnesota origin native wildflower and 12 grass seed. 13 (f) Community Gardening Program 110,000 14 This appropriation is to the University 15 of Minnesota, Minnesota Extension 16 Service, in cooperation with the 17 Minnesota State Horticultural Society 18 and the Self Reliance Center to provide 19 gardening information and technical 20 assistance in metropolitan and nonmetropolitan areas. 21 22 Subd. 7. Forestry 23 (a) Minnesota Old-Growth Forests -Character and Identification 24 150,000 25 This appropriation is to the 26 commissioner of natural resources to 27 develop quantitative, structural 28 definitions of Minnesota old-growth 29 forest types, examine the importance of old growth as sensitive habitat, and 30 31 evaluate old-growth forest stands that. 32 are identified as the department of natural resources old-growth guidelines 33 34 are implemented. 35 (b) Nutrient Cycling and Tree 36 Species Suitability 220,000 37 This appropriation is to the University 38 of Minnesota, Department of Forest 39 Resources, to assess the role of 40 nutrient cycling and associated 41 management practices for sustainability 42 of Minnesota's forest resources under 43 scenarios of increased harvesting and 44 atmospheric change. 45 (c) State Forest Land Acquisition 500,000 46 This appropriation is to the 47 commissioner of natural resources to 48 acquire lands in the highest priority purchase compartments in the R. J. 49 50 Dorer Memorial Hardwood State Forest. 51 (d) Regeneration and Management of 225,000 52 Minnesota's Oak Forests This appropriation is to the University 53 of Minnesota, Minnesota Extension 54 55 Service, for research and education in 56 oak regeneration and management. 57 (e) Private Forest Management

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1 for Oak Regeneration

This appropriation is to the

4 increase technical assistance to

Minnesota for oak regeneration.

commissioner of natural resources to

private forest landowners in southern

05/18/91

2

3

5

200,000

7 (f) Aspen Hybrids and New Tissue Culture Techniques 70,000 8 9 This appropriation is to the University 10 of Minnesota, Department of Forest 11 Resources, to research tissue cult Resources, to research tissue cultured 12 aspen and hybrid aspen clones. 13 (g) Aspen Decay Models for Mature 14 Aspen Stands 85,000 15 This appropriation is to the commissioner of natural resources to 16 17 contract with Koochiching county and 18 the University of Minnesota, College of 19 Natural Resources, to develop models 20 for aspen decay in mature aspen stands. 21 (h) Generic Environmental Impact 22 Statement 400,000 23 This appropriation is from the 24 environment and natural resources trust 25 fund to the Environmental Quality Board for preparation of a generic 26 27 environmental impact statement. 28 Subd. 8. Fisheries 29 (a) Pilot Fish Pond Complex - Fisheries 30 Development and Education 250,000 31 This appropriation is to the commissioner of natural resources for a grant to the Leech Lake Band of 32 33 34 Chippewa Indians to develop fish ponds 35 for production of sportfish and baitfish. 36 37 (b) Aquaculture Facility Purchase and 38 Development and Genetic Gamefish 39 Growth Studies 1,200,000 This appropriation is to the University 40 41 of Minnesota, College of Natural 42 Resources, to acquire and develop an 43 aquaculture facility and to continue 44 research on genetically engineered 45 gamefish. 46 (c) Cooperative Urban Aquatic 47 Education Program 340,000 48 This appropriation is to the 49 commissioner of natural resources to 50 expand urban fishing opportunities and 51 awareness. (d) Catch and Release Program 35,000 52 53 This appropriation is to the 54 commissioner of natural resources to accelerate the catch and release 55 -44-

[REVISOR ] PER/MP CCRSF1533D 1 portion of the CORE program for 2 matching grants to local anglers clubs 3 for promotion of catch and release 4 statewide. The work must be done in cooperation with the Minnesota 5 6 Sportfishing Congress and other interested groups. 8. (e) Metropolitan Lakes Fishing 9 Opportunities 75,000 10 This appropriation is to the 11 commissioner of natural resources to 12 study metropolitan area lakes to 13 determine if recreational fishing opportunities are being maximized. 14 The 15 study must be done in cooperation with 16 the Minnesota Sportfishing Congress and 17 other interested groups. 18 (f) Lake Minnetonka Bass Tracking 85,000 19 This appropriation is to the 20 commissioner of natural resources to 21 study the impacts of bass fishing 22 contests. The study must be done in 23 cooperation with the Minnesota 24 Sportfishing Congress and other •1 25 interested groups. 26 (g) Stocking Survey 35,000 27· This appropriation is to the 28 commissioner of natural resources to 29 survey organizations to determine the 30 level of interest in public and private fish stocking activities. The survey must be done in cooperation with the 31 32 Minnesota Sportfishing Congress and 33 -34 other interested groups. 35 Subd. 9. Wildlife 36 (a) Insecticide Impact on Wetland and Upland Wildlife 650,000 37 38 This appropriation is from the 39 Minnesota environment and natural 40 resources trust fund to the 41 commissioner of natural resources to 42 research the effect of insecticides on 43 wetland and upland wildlife and 44 habitats. 45 (b) Biological Control g 000 46 Euragian Water Milfoil This project did not proceed due 47 to lack of match from the Freshwater This appropriation is from the 48 Minnesota environment and natural 49 resources trust fund to the 50 commissioner of natural resources to 51 continue a cooperative research program 52 between the department of natural 53 resources, Freshwater Foundation, and 54 the University of Minnesota leading to Foundation. It is now funded by the Minnesota Future Resources Fund. LAWS of MINNESUTA for 1992, Ch. 513, Art. 2 Biological Control of the University of Minnesota leading to biological control of Eurasian water milfoil. This appropriation must be 54 Eurasian Water Milfoil 160,000 55 56 This appropriation is to the commissioner patched by \$200,000 from the Freshwater 57 of natural resources for a research Foundation. 58 program leading to biological control

59 (c) Microbial and Genetic Strategies

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of Eurasian water milfoil.

05/18/91

150,000

for Mosquito Control

1 2

4

5 6

7

This appropriation is to the University 3 of Minnesota, Department of Entomology, to enhance mosquito control by development of microbial agents that are environmentally safe and specific for mosquitoes.

8 (d) Minnesota County Biological 9 Survey

1,000,000

130.000

130,000

10 This appropriation is from the 11 Minnesota environment and natural 12 resources trust fund to the 13 commissioner of natural resources to 14 continue the biological survey in 15 Minnesota counties previously funded by 16 Laws 1989, chapter 335, article 1, 17 section 29, subdivision 3, item (t).

18 (e) Data Base for Plants of Minnesota

19 This appropriation is from the 20 Minnesota environment and natural 21 resources trust fund to the University 22 of Minnesota to computerize the data 23 base for Minnesota plants, including 24 precise information on the 25 distribution, ecology, history, and 26 management of each species.

27 (f) Aquatic Invertebrate Assessment 28 Archive

29 This appropriation is from the 30 Minnesota environment and natural 31 resources trust fund to the commissioner of the pollution control 32 33 agency, in cooperation with the Science 34 Museum of Minnesota, to continue work 35 on a record system for aquatic -36 invertebrates and assign pollution 37 tolerance values and to develop an 38 information system for the zebra mussel.

39 (g) Wetlands Forum

This appropriation is from the Minnesota environment and natural 40 41 resources trust find to the commissioner of natural resources to improve communication and information 42 43 44 exchange regarding wetlands in the metropolitan area. This appropriation must be matched by \$40,080 from the 45 46 47 Freshwater Foundation. 48

49 (h) Easement Acquisition on 50 Restored Wetlands

51 This appropriation is from the 52 Minnesota environment and natural 53 resources trust fund to the board of water and soil resources for a pilot 54 55 program to acquire permanent 56 conservation easements on federally restored or enhanced wetlands and :57 58 adjacent lands in cooperation with the 59 United States Fish and Wildlife Service 60 and the Izaak Walton League.

This project did not proceed due to lack of match from the Freshwater Foundation.

400,000

1,000,000

9,000

300,000

100,000

50,000

1 (i) Swan and Heron Lake Area 2 Projects

3 This appropriation is to the 4 commissioner of natural resources. First priority is for acquisition that 5 qualifies for federal match. Second priority is for land management 7 activities. Federal and other matching 8 a money is appropriated. Any full-time 10 equivalent positions associated with 11 this appropriation are for land 12 acquisition work.

13 (j) Wildlife Oriented Recreation
14 Facilities at Sandstone Unit National
15 Wildlife Refuge

16 This appropriation is to the 17 commissioner of natural resources to 18 contract with Rice Lake National 19 Wildlife Refuge for recreation facility 20 development and access at the Sandstone 21 Unit of Rice Lake National Wildlife 22 Refuge.

23 (k) Acquisition and Development of 24 Scientific and Natural Areas

25 This appropriation is to the
26 commissioner of natural resources to
27 acquire and develop scientific and
28 natural area sites consistent with the
29 state scientific and natural areas plan.

30 (1) Black Bear Research in East 31 Central Minnesota

32 This appropriation is to the University 33 of Minnesota, Bell Museum of Natural 34 History, to develop landscape ecology 35 concepts and better understand the 36 problem of bear damage to crops.

37 (m) Partnership for Accelerated 38 Wild Turkey Management

39 This appropriation is to the
40 commissioner of natural resources to
41 increase wild turkey stocking. This
42 appropriation must be matched by
43 \$50,000 from the National Wild Turkey
44 Federation.

45 (n) Restore Thomas Sadler Roberts 46 Bird Sanctuary

50,000

47 This appropriation is from the
48 Minnesota environment and natural
49 resources trust fund to the
50 commissioner of natural resources for a
51 grant to the Minneapolis Park and
52 Recreation Board to restore and improve
53 public access to the Thomas Sadler
54 Roberts Bird Sanctuary. This
55 appropriation must be matched by
56 \$50,000 of local money.

57 (0) Changes in Ecosystem on 58 Biodiversity of Forest Birds

300,000

This appropriation is from the 1 Minnesota environment and natural 2 resources trust fund to the commissioner of natural resources to monitor forest songbird populations and 3 to develop geographic information system tools to correlate forest bird 7 8 populations with dynamics of the forest 9 landscape. This appropriation must be 10 matched by \$200,000 from a combination 11 of nonstate funds and the state nongame 12 wildlife program. 13 (p) Establish Northern Raptors 14 Rehabilitation and Education Facility 75,000 15 This appropriation is to the University 16 of Minnesota, Raptor Center, to 17 establish a raptor rehabilitation and release facility at the Audubon Center 18 19 of the Northwoods. 20 (q) Effect of Avian Flu Virus in Mallard Ducks 16,000 21 22 This appropriation is to the University of Minnesota, Department of Veterinary 23 24 Pathobiology, to research the effects 25 of Avian influenza on Mallard ducks. 26 Subd. 10. Land 27 (a) Base Maps for 1990s 1,900,000 28 This appropriation is from the 29 Minnesota environment and natural 30 resources trust fund to the 31 commissioner of state planning to 32 provide the state match for a federal 33 program to complete a major portion of 34 the statewide air photo and base map coverage. The federal share is 35 36 appropriated. 1,270,000 37 (b) Accelerated Soil Survey 38 This appropriation is to the University 39 of Minnesota, Agriculture Experiment 40 Station, to complete the soil survey in 41 counties under contract as of July 1, 1988. Up to \$270,000 is for initiation 42 -43 of a survey in Koochiching county provided that the county share of the 44 45 cost of the survey shall be one-third of the cost, reduced by a percentage equal to the percent of land located in 46 47 the county that is owned by the federal 48 49 or state government that exceeds five 50 percent, and further adjusted by the ratio of the adjusted net tax capacity 51 52 per capita of the county to the 53 adjusted net tax capacity per capita of 54 the state. (c) Statewide National Wetlands 55 56 Inventory, Protected Waters Inventory, 750,000 57 Watershed Map Digitization

58 This appropriation is from the 59 Minnesota environment and natural 60 resources trust fund to the

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1 commissioner of natural resources to 2 complete the digitization of the 3 national wetlands inventory, protected water inventory, and watershed 5 boundaries. 6 (d) Statewide Land Use Update 338,000 This appropriation is to the 8 commissioner of state planning for a 9 grant to The International Coalition to 10 complete a statewide land use update of 11 all land and water resources outside 12 the Twin City metropolitan area. 13 (e) Local Geographic Information 14 System Program 143,000 15 This appropriation is to the 16 commissioner of state planning for a 17 grant to The International Coalition to 18 expand the applicability and use of 19 geographic information by developing 20 programs and providing training at the 21 local level. (f) GIS Control Point Inventory 22 175,000 23 This appropriation is to the 24 commissioner of state planning to 25 produce a statewide inventory of known public land survey control points using 26 27 data from all levels of government. 28 (g) Land Use and Design Strategies 29 to Enhance Environmental Quality 100,000. 30 This appropriation is to the University of Minnesota, College of Architecture 31 -32 and Landscape Architecture, to develop a land use and design concept for 33 34 typical sites on light rail transit and 35 freeway systems. The work must be done 36 in consultation with the Metropolitan 37 Council and the Regional Transit Board. 38 (h) Model Residential Land Use 150,000 39 Guidelines 40 This appropriation is to the University of Minnesota, Department of Landscape 41 42 Architecture, to illustrate and 43 disseminate residential land 44 development guidelines that address a 45 broad range of environmental concerns. 46 The work must be done in consultation with the Metropolitan Council. The 47 48 legislative commission on Minnesota resources may convene a steering 49 50 committee to ensure coordination and 51 practical results. 52 Subd. 11. Minerals 53 Subsurface Greenstone Belts in 120,000 Southwestern Minnesota 54 55 This appropriation is to the University of Minnesota, Minnesota Geologic 56 57 Survey, to apply aeromagnetic interpretation techniques and test 58

drilling to determine greenstone and 1 associated mineral potential in 3 southwestern Minnesota. 4 Subd. 12. Waste 5 (a) Remediation of Soils by 6 Co-Composting with Leaves 135,000 This appropriation is to the office of waste management for a grant to the 8 9 Minneapolis Community Development 10 Agency to develop a treatment method 11 for soils contaminated with 12 semi-volatile compounds by 13 co-composting with leaves. 14 (b) Land Spreading of Yard Wastes 100,000 15 This appropriation is to the office of 16 waste management for a grant to the 17 ] University of Minnesota, Soils Science 18 Department, to determine the maximum 19 and optimum rates that yard wastes can be applied to soils without reducing 20 21 yields or endangering the environment. 22 Subd. 13. Oil Overcharge 23 The appropriations in this subdivision .24 are from oil overcharge money, as 25 defined in Minnesota Statutes, section 26 4.071, in the special revenue fund. (a) Traffic Signal Timing and 27 28 Optimization Program 1,175,000 29 This appropriation is to the 30 commissioner of administration for 31 transfer to the commissioner of 32 transportation. \$125,000 is for 33 traffic signal retiming and 34 optimization training and \$1,050,000 35 for a cost share program for signal 36 retiming. \$675,000 of the cost share 37 program is available only as cash flow 38 permits. . 39 (b) Waste Crumb Rubber in Roadways 100,000 40 This appropriation is to the 41 commissioner of administration for 42 transfer to the commissioner of 43 transportation to improve hot-mix 44 asphalt pavement performance through
45 the use of crumb tire rubber and
46 selected polymer additives. The 47 process will use waste tires generated 48 in Minnesota. This appropriation must be matched by \$100,000 from other 49 50 sources. 51 (c) Biodegradable Plastics - Microbial 150,000 52 and Crop Plant Systems This appropriation is to the 53 commissioner of administration for a 54 55 grant to the University of Minnesota, 56 Department of Agronomy and Plant Genetics, to genetically engineer yeast 57 58 and crop plants to produce low-cost

-50-

59

program.

1 polyhydroxybutyric, a biodegradable 2 plastic, to substitute for 3 petroleum-based plastics. (d) Agricultural Energy Savings 4 5 Information 150,000 This appropriation is to the б. commissioner of administration for a 8 grant to the Agricultural Utilization Research Institute to conduct a series 9 10 of conferences, communication products, and intensive workshops in order to transfer the results of state-funded 11 12 13 research to agricultural practitioners. (e) Residential Urban Environmental 14 15 Resource Audit 150,000 16 This appropriation is to the 17 commissioner of administration for a 18 grant to the St. Paul Neighborhood 19 Energy Consortium to develop and 20 implement neighborhood workshops and one-on-one consultations as part of an 21 22 environmental urban resource audit and 23 a broad educational campaign. 24 (f) Means for Producing Lignin-Based 25 Plastics 100,000 26 This appropriation is to the 27 commissioner of administration for a 28 grant to the University of Administration 29 Department of Forest Products, to 30 develop means for fabricating 31 engineering plastics based upon 31 develop hyperoduct ligning and grant to the University of Minnesota, 33 corresponding raw materials from wheat 34 straw. 35 (g) Cellulose Rayons for 36 Packaging 150,000 37 This appropriation is to the 38 commissioner of administration for a grant to Bemidji State University, 39 40 Center for Environmental Studies, to 41 research and develop cellulose rayons. 42 (h) Tree and Shrub Planting for Energy in Minnesota Communities 1,250,000 43 44 This appropriation is to the commissioner of administration for a 45 grant to the commissioner of natural 46 resources to develop research-based 47 48 quidelines and publications and to 49 provide matching grants for energy conservation tree planting. \$950,000 of this appropriation is available only 50 51 as cash flow permits. 52 53 (i) Oil Overcharge Program 200,000 54 Administration This appropriation is to the 55 commissioner of administration for 56 57 processing and oversight of grants and 58 allocations in the Oil Overcharge

75,000

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1 (j) Energy Efficiency Standards for 2 Residential Construction

This appropriation is to the 3 commissioner of administration for a 4 grant to the University of Minnesota, 5 Cold Climate Housing Center for the 6 development of performance-based standards for energy efficient new home 8 **g** . construction and procedures for This appropriation 10 implementation. must be matched by \$75,000 of nonstate 11 funds. This appropriation is available 12 only as cash flow permits. 13

14 Subd. 14. MFRF Contingent Account

In addition to the specific amounts 15 16 appropriated from the Minnesota future 17 resources fund by this section, any 18 increase in the projected revenue up to \$600,000 for the biennium to the fund 19 in excess of the amount indicated in 20 21 subdivision 1 that would otherwise be available for expenditure during the 1992-1993 biennium is appropriated to 22 23 24 the legislative commission on Minnesota 25 resources future resources fund 26 contingent account for disbursement by 27 the commission in accordance with the 28 procedure identified in this 29 subdivision.

30 This appropriation is for acquisition 31 or development of state land or other 32 projects that are part of a natural 33 resources acceleration activity, when 34 deemed to be of an emergency or 35 critical nature. This appropriation is 36 also available for projects initiated 37 by the legislative commission on 38 Minnesota resources that are found to 39 be proper in order for the commission 40 to carry out its legislative charge.

41 This appropriation is not available 42· until the legislative commission on 43 Minnesota resources has made a 44 recommendation to the legislative 45 advisory commission regarding each 46 expenditure from the account. The 47 legislative advisory commission must 48 then hold a meeting and provide its 49 recommendation on each item, which may 50 be spent only with the approval of the 51 governor.

52 Subd. 15. General Reduction

53 As cash flow in the Minnesota future 54 resources fund permits, but no later 55 than June 30, 1993, the commissioner of 56 finance in consultation with the 57 legislative commission on Minnesota's 58 resources director shall transfer 59 \$2,000,000 from the unencumbered balance in the fund to the general fund. 60

61 Subd. 16. Compatible Data

62 During the biennium ending June 30,

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1 1993, the data collected by the projects funded under this section that have common value for natural resource planning and management must conform to Æ information architecture as defined in guidelines and standards adopted by the information policy office. Data review committees may be established to 8 9 develop or comment on plans for data 10 integration and distribution and shall 11 submit semiannual status reports to the 12 legislative commission on Minnesota 13 resources on their findings. In 14 addition, the data must be provided to 15 and integrated with the Minnesota land 16 management information center's 17 geographic data bases with the 18 integration costs borne by the activity 19 receiving funding under this section. This requirement applies to all 20: 21 projects funded under this section, 22 including, but not limited to, the 23 following projects:

24 Recreation: Subdivision 3, paragraphs
25 (d) and (e);

26 Water: Subdivision 4, paragraphs (a), 27 (b), (c), (f), and (g);

28 Agriculture: Subdivision 6, paragraph
29 (d);

30 Wildlife: Subdivision 9, paragraphs 31 (d), (e), (h), (k), and (p);

32 Land: Subdivision 10, paragraphs (a), 33 (b), (c), (d), (e), and (f);

34 Minerals: Subdivision 11.

35 Subd. 17. Work Program

It is a condition of acceptance of the 36 37 appropriations made from the Minnesota future resources fund, Minnesota 38 39 environment and natural resources trust 40 fund, and oil overcharge money 41 according to Minnesota Statutes, 42 section 4.071, subdivision 2, that the 43 agency or entity receiving the 44 appropriation must submit a work 45 program and semiannual progress reports 46 in the form determined by the 47 legislative commission on Minnesota resources. None of the money provided 48 may be spent unless the commission has 49 50 approved the pertinent work program.

51 Subd. 18. Temporary Positions

52 The approved full-time equivalent of 53 the following agencies shall be 54 increased for the biennium as indicated 55 for the appropriations in this section: 56 Board of Water and Soil Resources - 1 57 Pollution Control Agency - 6 58 State Planning Agency - 3

#### 05/18/91

1 Department of Agriculture - 4

2 Department of Education - 4

3 Department of Administration - 1

4 Department of Natural Resources - 36

5 Persons employed by a state agency and 6 paid by an appropriation in this section are in the unclassified civil 7 8 service, and their continued employment q is contingent upon the availability of 10 money from the appropriation. The 11 positions are in addition to any other approved complement for the agency. 12 13 Part-time employment of persons is 14 authorized.

15 Subd. 19. Match Requirements

16 Appropriations in this section that 17 must be matched and for which the match 18 has not been committed by January 1, 19 1992, must be canceled. Amounts 20 canceled to the Minnesota future 21 resources fund are appropriated to the 22 contingent account created in 23 subdivision 14.

24 Subd. 20. Patents and Royalties

If an appropriation in this section from the Minnesota future resources fund results in a patent and subsequent royalties, payment of 50 percent of the royalties received, net of patent servicing costs, must be paid to the Minnesota future resources fund, until the entire appropriation made by this section is repaid.

34 Subd. 21. Carryforward

35 The appropriation in Laws 1989, chapter 36 335, article 1, section 29, subdivision 37 3, paragraph (e), Development of Forest 38 Soil Interpretations, is available 39 until December 31, 1991.

40 The appropriation in Laws 1989, chapter 41 335, article 1, section 29, subdivision 42 3, paragraph (h), Statewide Public 43 Recreation Map, is available until June 44 30, 1992.

45 The appropriation in Laws 1989, chapter 46 335, article 1, section 29, subdivision 47 11, paragraph (o), High Flotation Tire 48 Research is available until June 30, 49 1992.



1 9 8 9 RESEARCH P R O J E C T S


# 1989 RESEARCH PROJECT ABSTRACTS SUMMARY

Purple Loosestrife Research	\$200,000 Page 56
Redesign of Ambient Ground Water Monitoring Program	\$196,000 Page 58
Minnesota River Basin Water Quality Monitoring	\$700,000 Page 59
PCBs and Mercury in the St. Louis and Mississippi Rivers Program	\$500,000 Page 60
Biological Manipulation of Wastewater Treatment Ponds	\$146,000 Page 61
Medical Waste Incinerator Evaluation	\$250,000 Page 62
Dioxin from Incinerator Emissions	\$296,000 Page 63
Household Batteries Recycling and Disposal	\$90,000 Page 64
Municipal Solid Waste Incinerator Ash as a Soil Amendment	\$100,000 Page 65
Health Risk Assessment Modeling for Composting	\$80,000 Page 66
Contaminants in Minnesota Wildlife	\$174,000 Page 67
Pesticide Breakdown Products Survey	\$330,000 Page 68
Indoor Air Quality Assessment Protocol	\$108,000 Page 69
Community Lead Abatement Project	\$100,000 Page 70
Biological Control of Plant and Animal Pests in Minnesota	\$500,000 Page 71
Biogeochemical Prospecting	\$150,000 Page 73
Research in Taconite Refinement	\$200,000 Page 74
Land Use Impacts on Lake Superior	\$240,000 Page 75
Chemical Transport in Groundwater	\$300,000 Page 77
Lake Aeration Techniques and Hydrologic Forecasting	\$828,000 Page 78
Water Filter for Iron Removal	\$28,000 Page 80
Simulation of Minnesota's Future Forest Economy	\$100,000 Page 81
Oak Wilt Research	\$88,000 Page 82
Lignin-Based Engineering Plastics	\$108,000 Page 83
High Flotation Tire Research Project	\$40,000 Page 84
Sonar Measurements of Fish and Abundance in Minnesota Lakes	\$60,000 Page 85
Combustion Emissions from densified-Refuse Derived Fuel Pellets	\$150,000 Page 86
Peat for Containment of Municipal Incinerator Ash	\$150,000 Page 87
Evaluation of Peat in Poultry Waste Treatment	\$130,000 Page 88
Groundwater Quality Assessment Procedure	\$90.000 Page 89



FOR THE PERIOD ENDING JUNE 30, 1991

This project was supported by MN Future Resources Fund (MS 116.13)

## TITLE: PROGRAM MANAGER: ORGANIZATION: LEGAL CITATION: APPROP. AMOUNT:

Purple Loosestrife Research Luke Skinner MN Department of Natural Resources M.L. 1989, Chp. 335, Art. 1, Sec. 29, Subd. 3(u) \$200,000

# STATEMENT OF OBJECTIVES

### LIFE HISTORY AND PHYSIOLOGY RESEARCH

Research was initiated on purple loosestrife's life history, which was necessary for the development of sound Integrated Pest Management (IPM) strategies combining biological, cultural, and chemical control.

#### RESULTS

Aspects of seed dormancy, long-term viability, and conditions promoting or inhibiting germination were investigated. Purple loosestrife produces enormous seed banks, capable of surviving extended periods of dormancy, and germinates at relatively low temperatures. Control of large infestations of purple loosestrife is usually short-lived due to the presence of a large and persistent seed bank. Consequently, it is recommended that attempts be made to control recently established small populations before attempting to control long-established, large populations of loosestrife.

## PROJECT RESULTS USE AND DISSEMINATION

The results have application for wetland management across the northern latitudes of North America. These results have been presented in two papers in refereed journals with international circulation. These results also have been presented in Minnesota Department of Natural Resources' (DNR) Special Publication No 146, which is available to resource management personnel both within and outside Minnesota.

## STATEMENT OF OBJECTIVES

## BASELINE DATA FOR IMPLEMENTING BIOLOGICAL CONTROL

Data on genetic diversity, and denotation of ecological and morphological characteristics of purple loosestrife populations in Minnesota were collected to prepare for and accelerate implementation of biological control in Minnesota.

## RESULTS

It was determined that purple loosestrife, wand loosestrife, and various cultivars sold in the horticultural trade could not be reliably and consistently differentiated from one another on the bases of morphology. Cultivars produced viable seed from a large variety of crossings and even self-pollination. In addition, analytical methods were developed to describe the amount of genetic diversity in purple loosestrife both within and among different populations of loosestrife.

### PROJECT RESULTS USE AND DISSEMINATION

This research confirmed that the Minnesota Legislature acted appropriately in prohibiting the sale of loosestrife cultivars because they can contribute to the spread of purple loosestrife in Minnesota. These results have been presented in DNR Special Publication No. 146. Implementation of biological control began in 1992 and will utilize results of this research in the future.

## STATEMENT OF OBJECTIVES

## LONG-TERM IPM STRATEGIES

A plan for long-term IPM strategies was developed to find replacement species that will prevent expansion or re-establishment of purple loosestrife populations. Specifically, two species of grasses were studied to determine their potential to suppress seedling recruitment.

## RESULTS

These two grass species proved ineffective at suppressing loosestrife seedling establishment. These results demonstrate the high degree of difficulty encountered in attempts to limit establishment of purple loosestrife from the seed bank. The herbicide 2,4-D was a more effective means of doing so. Unfortunately, it is not a long-term solution. The use of herbicides for loosestrife control can only be effective if they are used in an integrated approach. Consequently, it is recommended that attempts be made to control recently established, small populations before attempting to control long-established, large populations of loosestrife.

## PROJECT RESULTS USE AND DISSEMINATION

As with the objective for LIFE HISTORY AND PHYSIOLOGY RESEARCH, these results have application to wetland management across North America. These results have been presented in one paper in a refereed journal with international circulation and in DNR Special Publication No. 146.

## STATEMENT OF OBJECTIVES

DETERMINE IMPACT OF PURPLE LOOSESTRIFE ON WETLANDS

Research on the impact of purple loosestrife on nutrient cycling in wetland ecosystems and surface water quality was conducted.

## RESULTS

Though some differences were found between purple loosestrife and cattail in nutrient concentrations and decomposition rates, these studies did not produce evidence to suggest that large differences in nutrient cycling in wetlands result from displacement of cattail by loosestrife.

#### PROJECT RESULTS USE AND DISSEMINATION

These results have been presented in DNR Special Publication No. 146.

FOR THE PERIOD ENDING JUNE 30, 1991 This project was supported by MN Future Resources Fund (MS 116.13)

TITLE: PROGRAM MANAGER: ORGANIZATION: LEGAL CITATION: APPROP. AMOUNT: Redesign of Ambient Ground Water Monitoring Program Don Jakes MN Pollution Control Agency M.L. 1989, Chp. 335, Art. 1, Sec. 29, Subd. 4(a) \$196.000

## STATEMENT OF OBJECTIVES

To evaluate the current ambient ground water monitoring network in light of state and local government needs for ground water quality information, and recommend an improved design.

#### RESULTS

The project identified significant needs on the state and local level for ground water information that were not being met by the current program as well as an overall need to better coordinate the collection and evaluation of ground water quality data in Minnesota. In general, local units of government need quantitative information on baseline ground water quality conditions to assist with developing land use management and water well drilling policies, and to enhance drinking water protection for households relying on domestic water wells. This information is also needed by state agencies to provide a scientific basis for developing ground water protection policies and regulations, distinguish new pollutant impacts from existing conditions, assess the effectiveness of ground water protection programs, and predict impacts of proposed drinking water guidelines. The project recommended utilizing a three component design to meet these needs: 1) statewide baseline ground water quality monitoring with regional assessments, 2) water quality trend monitoring low-level ground water contamination, and 3) regional monitoring cooperatives with local units of government and other interested parties. The recommended design utilizes a statistically-based monitoring network requiring a minimum of six years of data collection efforts with biennial reporting.

#### PROJECT RESULTS USE AND DISSEMINATION

The recommendations of the project have been used to establish the Ground Water Monitoring and Assessment Program (GWMAP). In addition, two publications were prepared in conjunction with this project and are available at the Minnesota Pollution Control Agency. The "1990 Catalog of Ground Water Monitoring Programs and Projects in Minnesota," describes the sources for ground water data available in the state. The "Redesign of the Ambient Ground Water Monitoring Program," presents the project results. In the future, GWMAP will be publishing biennial reports on the quality of Minnesota's ground water resources and preparing an informational brochure describing the program for more widespread distribution.

FOR THE PERIOD ENDING JUNE 30, 1991 This project was supported by MN Future Resources Fund (MS 116.13)

TITLE: PROGRAM MANAGER: ORGANIZATION: LEGAL CITATION: APPROP. AMOUNT:

Minnesota River Basin Water Quality Monitoring Wayne Anderson MN Pollution Control Agency M.L. 1989, Chp. 335, Art 1, Sec. 29, Subd. 4(b) \$700,000

### STATEMENT OF OBJECTIVES

A joint effort of federal, state, and local governmental units for assessing mainstem, major tributary, and ground water nonpoint source (NPS) inputs to the Minnesota River for the purpose of targeting future water quality management programs. A comprehensive monitoring network was set up in the Minnesota River Basin from the dam at Lac Qui Parle Reservoir to the mouth. The overall monitoring program included components which assessed: major nutrients, suspended sediments, BOD, organics, biomonitoring bioassays, toxic studies, and land-use. Mainstem river and major tributaries were monitored in addition to separate springs on or near the banks of the mainstem and selected tributaries.

## RESULTS

This project allowed for a greater understanding of the pathways of water movement, pollutant concentrations, storm event pollutant dynamics, selected biological population conditions, greatly expanded understanding of the land-use activities in the basin, and a greater overall understanding of the river system.

## PROJECT RESULTS USE AND DISSEMINATION

The results of this project were used to guide and expand the assessment effort for the last two years of the project (1991 and 1992). This work will result in identifying mainstem and major tributaries contributing the greatest nonpoint source pollutant loadings. The overall results of this study will be used to guide and direct the setting of water quality goals and the targeting of water quality improvement efforts in the Minnesota River Basin.

FOR THE PERIOD ENDING JUNE 30, 1991

This project was supported by MN Future Resources Fund (MS 116.13)

TITLE: PROGRAM MANAGER: ORGANIZATION: LEGAL CITATION: APPROP. AMOUNT: PCBs and Mercury in the St. Louis and Mississippi Rivers Program Daniel D. Helwig MN Pollution Control Agency M.L. 1989, Chp. 335, Art. 1, Sec. 29, Subd. 4(c) \$500,000

## STATEMENT OF OBJECTIVES

To determine sources of PCBs and mercury to the St. Louis and Mississippi Rivers and Crane and Sandpoint lakes.

#### RESULTS

Mercury deposition (and associated run-off from the watershed) account for the majority of mercury to northeastern Minnesota waterways. Annual deposition was the lowest at International Falls at 5.5 ug/m2/yr and the highest at Bethel (12.6 ug/m2/yr). Deposition rates were primarily controlled by precipitation rates. Highest concentrations of mercury in St. Louis River water samples were found near the Western Lake Superior Sanitary District (49 ng/l) and near Grassy Point. Highest concentrations in the Mississippi River were found the in the Twin Cities area (9ng/l). Highest concentrations in Crane and Sandpoint Lakes were 4 ng/l with little variance, indicating that atmospheric sources predominate.

Particulate PCB loading in the Mississippi River indicates a fivefold increase from Coon Rapids (3.7 kg/90 days) to Hastings 17.1 kg/90 days). The Minnesota River contributed 27% of the PCB loading and the Metropolitan Waste Control Commission added 2%. Approximately 55% may be contributed from nonpoint sources. Solvent exchange device samplers for PCBs indicate that Rice Creek may be an important source to the Mississippi River. On the lower St. Louis River, PCB loading information indicates that PCBs are stored in the Cloquet Reservoirs and that Western Lake Superior Sanitary District inputs may triple the upstream load.

### PROJECT RESULTS USE AND DISSEMINATION

Effluent standards for identified dischargers will be included in permits. A superfund site in the Rice Creek watershed will be investigated for PCB contamination. Minnesota Pollution Control Agency reports will be sent to interested parties. News releases will be issued as appropriate. Presentations can be made upon request.

FOR THE PERIOD ENDING JUNE 30, 1991 This project was supported by MN Future Resources Fund (MS 116.13)

TITLE: PROGRAM MANAGER: ORGANIZATION: LEGAL CITATION: APPROP. AMOUNT: Biological Manipulation of Wastewater Treatment Ponds Dr. Judy Helgen MN Pollution Control Agency M.L. 1989, Chp. 335, Art. 1, Sec. 29, Subd. 4(d) \$146,000

### STATEMENT OF OBJECTIVES

To survey waste stabilization ponds in Minnesota to quantify pertinent biological, chemical and physical parameters that affect the water quality of the discharge water, including a study of budgets of carbon and nitrogen in the ponds, in cooperation with Dr. Stefan's project on the hydraulics and physical modelling of the intensive study site at Harris, Minnesota. Also, to provide field data for modelling pond performance, and to provide information to MPCA Municipal staff for pond procedures.

## RESULTS

At least 18 chemical and physical parameters were measured, and zooplankton and algae populations were analyzed quantitatively through the ice-free season. The ponds are very efficient at removal of C and N. The total suspended solids (TSS) was strongly related to the amount of algae, which in turn was significantly related to the level of oxygen, necessary for the breakdown of influent solids. At Harris, when Daphnia densities were high, algae was low, indicating Daphnia were controlling the algae by eating them. This produced extremely clear water, but elevated phosphorus levels on occasion. At Janesville, Daphnia did not develop strongly because the algae were not edible. In ponds where algae develop beyond control by Daphnia, there can be TSS violations. We related histories of TSS violations of 216 communities to the alkalinity of their public well water supply, and found the number of times TSS exceeded both the 45 and 60 mg/L was significantly related to higher alkalinity in the water, which may promote more algae growth.

### PROJECT RESULTS USE AND DISSEMINATION

A poster was given at the Water Resources conference in Minneapolis in February, 1992 by Dr. Judy Helgen, who also presented the project at the MPCA Water School in October, 1992. Dr. Brezonik, Dr. Stefan, and Dr. Helgen will be presenting the complete results to the Water Quality Division in December, 1992. The following reports have been written: Helgen, J. 1992\Biology and Chemistry of Waste Stabilization Ponds in Minnesota. Final Technical Report to the MN State Legislature 94 pp; and Rockne, K. 1992\The Chemical Water Quality of Wastewater Stabilization Ponds in Minnesota. Masters thesis, University of Minnesota.

FOR THE PERIOD ENDING JUNE 30, 1992 This project was supported by MN Future Resources Fund (MS 116.13)

TITLE: PROGRAM MANAGER: ORGANIZATION: LEGAL CITATION: APPROP. AMOUNT: Medical Waste Incinerator Evaluation Peter Torkelson MN Pollution Control Agency M.L. 1989, Chp. 335, Art. 1 Sec. 29, Subd. 4(f) \$250,000

### STATEMENT OF OBJECTIVES

Incineration as a form of solid waste treatment and disposal for medical waste is an activity of concern throughout Minnesota. This study sorted and examined infectious waste streams from three nonmetropolitan medical waste incinerators in Minnesota and measured the spectrum and quantity of pollutants emitted in the incinerators' air emissions and ash.

## RESULTS

By weight, the bulk of the waste items encountered were drapes and gowns, packaging, laboratory cuvettes and containers, and non-infectious liquids. A typical hospital waste stream comprised 44% non-chlorinated plastic, 2% chlorinated plastic, 18% paper/cardboard, 13% fluid, 12% glass, and 11% other. This limited amount of sorted waste was then incinerated and tested for particulate, dioxins, and acid gases. Carbon dioxide, oxygen, carbon monoxide, total hydrocarbons, sulfur dioxide, nitrogen oxides, and combustion chamber temperatures were monitored continuously throughout all testing. Correlations between emissions data and waste charging were examined. Plastic tubing was responsible for nearly all of the hydrogen chloride emissions. Metal emissions were positively correlated with combustibles and negatively correlated with metallic items. Long residence times reduced carbon monoxide, total hydrocarbon, and particulate matter emissions. Little difference was observed between starved-air and excess-air incinerators. All three incinerators exceeded state limits for particulate matter and/or opacity.

### PROJECT RESULTS USE AND DISSEMINATION

The 200-page report was sent to all Minnesota hospitals. All states were notified, and 32 states requested copies. The report has also been sent to all who have requested it. To date, about 310 total copies have been distributed. Results of this study were presented at the annual Air and Waste Management Association Convention in June, 1992. A direct result of this study is that all hospital incinerators in Minnesota have to either demonstrate compliance with Air Quality rules or cease operation.

FOR THE PERIOD ENDING JUNE 30, 1991

This project was supported by MN Future Resources Fund (MS 116.13)

TITLE: PROGRAM MANAGER: ORGANIZATION: LEGAL CITATION: APPROP. AMOUNT: Dioxin From Incinerator Emissions Fardin Oliaei MN Pollution Control Agency M.L. 1989, Chp. 335, Art. 1, Sec. 29, Subd. 4(g) \$296,000

## STATEMENT OF OBJECTIVES

Recognizing that toxic organic chemicals such as chlorinated dioxins and furans may be emitted from incinerators and deposited in lakes, accumulate in fish and be consumed by the public, the Minnesota Pollution Control Agency (MPCA) requires, as part of the permitting process, that a risk exposure assessment be conducted. This study is important because current models indicate that at certain sites contaminated fish may be a major source of exposure to cancer causing chemicals. Reducing the uncertainty of these models will allow more effective regulation of emitting sources of hydrophobic organic carbons (HOCs) such as dioxins and furans.

The overall objective of this study was to evaluate existing models describing the bioaccumulation of hydrophobic organic chemicals in fish to develop a working model for predicting fish concentrations in aquatic systems impacted by incinerator emissions.

#### RESULTS

Using the extensive data base provided in this study, the existing models describing the bioaccumulation of hydrophobic organic chemicals (HOCs) in fish were evaluated. As a result, model-derived bioaccumulation factors (BAFs) were developed to estimate the concentration of selected HOCs in various species of fish. Therefore, the framework was developed by which the MPCA staff could estimate in a scientifically-defensible fashion, the uptake of selected toxic chemicals by various species of fish in a lake potentially impacted by emissions from a local or regional municipal solid waste incinerator.

### PROJECT RESULTS USE AND DISSEMINATION

The dispersion, transport, and deposition of measured or predicted emissions of target chemicals from incinerators yield modeled concentrations in the water or sediments. Application of model-derived BAF (this study) will yield the concentration of target chemical in fish. The predicted concentration can then be linked to an exposure assessment and risk assessment model to evaluate potential toxicity to human.

FOR THE PERIOD ENDING JUNE 30, 1991 This project was supported by MN Future Resources Fund (MS 116.13)

TITLE: PROGRAM MANAGER: ORGANIZATION: LEGAL CITATION: APPROP. AMOUNT: Household Batteries Recycling and Disposal Leslie C. Goldsmith MN Pollution Control Agency M.L. 1989, Chp. 335, Art. 1, Sec. 29, Subd. 4(h) \$90,000

## STATEMENT OF OBJECTIVES

The project had three main objectives: a) to examine the environmental impacts of battery disposal, particularly concentrating on toxic heavy metals such as mercury and cadmium; b) to examine the development of feasible collection, processing and management systems for household batteries; and c) to identify further solutions or research needs in the area.

## RESULTS

The project showed that household batteries were a major source of mercury and cadmium in solid waste.

## PROJECT RESULTS USE AND DISSEMINATION

Most of the recommendations contained in the report have been implemented as laws or in battery management programs. The laws developed as a result of the study utilize several different approaches to reduce heavy metals, particularly mercury and cadmium.

When feasible, the Legislature limited the amount of mercury permitted in batteries. These laws contain timeframes that will continue to reduce the amount of mercury in batteries over the next several years, with a requirement for mercury-free batteries by 1996. For battery types that could not have their toxicity reduced, a different approach was taken. These batteries were either banned or made subject to mandatory collection programs supported by the manufacturers.

As a result of this project and the laws derived from it, Minnesota has been established as a national leader in the control of toxic metals from batteries. The report developed for this project has been widely requested and distributed throughout Minnesota and the United States.

### **1989 RESEARCH PROJECT**

FOR THE PERIOD ENDING JUNE 30, 1991

This project was supported by MN Future Resources Fund (MS 116.13)

TITLE: PROGRAM MANAGER: ORGANIZATION: LEGAL CITATION: APPROP. AMOUNT: Municipal Solid Waste Incinerator Ash as a Soil Amendment Robert Criswell MN Pollution Control Agency M.L. 1989, Chp. 335, Art. 1, Sec. 29, Subd. 4(i) \$100,000

### STATEMENT OF OBJECTIVES

To determine the potential for municipal solid waste (BSW) incinerator ash to be used as a nutrient source and/or soil amendment for agricultural crop production.

#### RESULTS

Growth of alfalfa and Swiss chard in ash-amended soils was similar to or was greater than that in soils amended with potassium and phosphorus fertilizer, indicating that the ash can supply essential nutrients for plant growth. Positive growth response was probably due to phosphorus and micro-nutrients in the ash. At the applied ash rates from the three test ashes, no toxic effects on plant growth were observed. High levels of molybdenum and sodium were observed in both plants. Plant uptake of cadmium was high in one test ash. Both cadmium and molybdenum could be of concern if sufficient amounts are ingested by animals. An increase in soil pH, phosphorus and potassium levels was observed with resultant availability dependent on ash type. Soluble salts increased in the incubation study as higher application rates were used. Because of ash variability, recommendations concerning their land application will need to be made on an individual incinerator and ash quality basis. Land application potential would be enhanced if materials containing certain trace elements (i.e., mercury/cadmium batteries, motor oil, car batteries), metal debris and glass could be recycled prior to incineration.

## PROJECT RESULTS USE AND DISSEMINATION

Results of the project will be considered in the development of rules for ash utilization of which land application of ash will be one component. Presently some ash generators have shown interest in doing a larger scale evaluation of land application of ash. There may be increased interest in using MSW incinerator ash as a soil amendment now that the U.S. Environmental Portection Agency has disignated it as a nonhazardous waste.

FOR THE PERIOD ENDING JUNE 30, 1991 This project was supported by MN Future Resources Fund (MS 116.13)

TITLE: PROJECT MANAGER: ORGANIZATION: LEGAL CITATION: APPROP. AMOUNT: Health Risk Assessment Modeling for Composting Kevin J. Kain MN Pollution Control Agency M.L. 1989, Chp. 335, Art. 1, Sec. 29, Subd. 4(j) \$80,000

### STATEMENT OF OBJECTIVES

To develop a model for assessing the health risks of composting municipal solid waste, assigning comparative risks between selected solid waste management alternatives, and the extent of impacts on ground water, air quality, and occupational exposures.

## **RESULTS**

A. <u>Risk Comparison</u>. Each MSW management alternative in this study - landfills, incineration, and composting - can release chemicals constituents to the environment, and entails a degree of risk. The comparison of health risks associated with these solid waste management alternatives is complicated by the fact that each alternative release contaminants into different environmental (air, water, and land) media, and each generates different pollutants with varying toxicities and health risks.

B. <u>Users of Finished (MSW) Compost Products</u>. The primary issue of concern is the use of the finished compost as an agricultural soil amendment was determined to be the potential build-up of metals and persistent organic chemicals in soil with continued application.

C. <u>Compost Facility Workers</u>. At the time the project was completed there was a general lack of data regarding levels of hazardous agents (dusts, pathogens, chemicals) in workplace air at MSW composting facilities. Actual collection of new data was not a part of this project. As a result, the potential for worker exposure via inhalation cannot be adequately assessed. The potential for adverse health effects from exposure to biological aerosols is unknown.

D. <u>General Public in the Vicinity of MSW Compost Facility</u>. The various technologies for processing and composting MSW engineering controls and government regulations, in particular Minnesota's Solid Waste Management Rules, limit the potential for release of chemical constituents to environmental media such as ground water and surface water. There is a lack of empirical data, however, regarding the generation and atmospheric dispersion of fugitive dusts from the pre-processing areas, windrows, curing, and storage piles.

#### PROJECT RESULTS USE AND DISSEMINATION

The Compost Health Risk Assessment and Risk Comparison Between Solid Waste Management Alternatives documents to date have been sent out to approximately 180 persons including all county solid waste officers in Minnesota. Copies of the documents were also handed out at the Minnesota Pollution Control Agency's 1992 Annual Solid Waste Conference. Solid waste managers in government and industry are using the results as they plan solid waste facilities, both public and private.

FOR THE PERIOD ENDING JUNE 30, 1991

This project was supported by MN Future Resources Fund (MS 116.13)

TITLE: PROGRAM MANAGER: ORGANIZATION: LEGAL CITATION: APPROP. AMOUNT: Contaminants in Minnesota Wildlife Daniel D. Helwig MN Pollution Control Agency M.L. 1989, Chp. 335, Art. 1, Sec. 29, Subd. 4(k) \$174,000

#### STATEMENT OF OBJECTIVES

To conduct a survey of contaminants in Minnesota's wildlife.

### RESULTS

Some mink and river otter appear to be accumulating significant concentrations of PCBs, potentially capable of impairing reproduction in certain localities in the state. Ruffed grouse and ring-necked pheasant exhibited low background levels or nondetectable levels of most contaminants analyzed. However, some pheasant composites had lead liver concentrations exceeding that which is considered elevated or evidence of lead exposure. White-tailed deer did not bioaccumulate persistent organochlorine pesticides, PCBs and metals. Young ducks contained low levels of most metals analyzed, but blue-winged teal had elevated selenium liver concentrations.

In addition, juvenile loons that died from disease had a significantly higher mean mercury concentration than either juveniles that died from injury or live-caught juveniles. It is not known whether mercury contributes to reduced resistance to disease or to changes in survivability. Lead poisoning was diagnosed as the cause of death for 17 percent of the adult loons that were necropsied and may also seriously impact loon populations in Minnesota.

## PROJECT RESULTS USE AND DISSEMINATION

Water quality criteria and standards to protect wildlife will be developed as the scientific basis for them becomes available. Minnesota Pollution Control Agency reports will be sent to interested parties. News releases will be issued as appropriate. Presentations can be made upon request.

FOR THE PERIOD ENDING JUNE 30, 1991 This project was supported by MN Future Resources Fund (MS 116.13)

TITLE:

PROGRAM MANAGER: ORGANIZATION: LEGAL CITATION: APPROP. AMOUNT: Pesticide Breakdown Products Survey Tomas Klaseus MN Department of Health M.L. 1989, Chp. 335, Art. 1, Sec. 29, Subd. 7(a) \$330,000

## STATEMENT OF OBJECTIVES

The objectives of the project were to: a) develop or validate analytical methods for detecting and quantifying at least ten pesticide breakdown products in drinking water, and b) to identify the occurrence and concentration of these pesticide breakdown products and their parent compounds in approximately 60 public and private drinking water wells which were systematically selected and sampled three times.

### RESULTS

Analytical methods were developed or validated for 18 pesticide breakdown products and seven parent compounds. Sixty-six wells were selected and sampled at least three times. Forty wells had at least one atrazine breakdown product and eleven wells had at least one alachlor breakdown product. The following table presents summary information on pesticide breakdown occurrence and concentration:

Pesticide/	Number of	Reported	<b>Recommended Drinking</b>
Breakdown Products	Wells	Range (ng/L)	Water Limit (ng/L)
atrazine	41	pp - 11,000	3,000
deethylatrazine	39	pp- 2,200	3,000
deisopropylatrazine	17	pp- 140	3,000
alachlor	6	pp- 1,400	4,000
2,6-diethylanaline	7	pp- 6	4,000
demethoxymethly alachlor	7	pp- 7	4,000

Although the number of wells with detectable pesticide breakdown products or parent compounds was quite high, the concentrations detected were usually low. With the exception of one well which exceeded the recommended drinking water limit for atrazine, all pesticides/breakdown products detected in these wells were within current MDH recommended drinking water limits.

#### PROJECT RESULTS USE AND DISSEMINATION

The results were shared primarily with the well owners, tenants, and the Minnesota Department of Agriculture (MDA). The MDA has responsibility for the regulation of pesticide use. As a result of the project findings, MDA developed or validated analytical methods for the major atrazine breakdown products and analyzed some follow-up samples for MDH. MDA intends to incorporate atrazine breakdown product and possibly other breakdown product analyses into future ground-water and surface-water monitoring activities. MDA has also evaluated the information along with other states' breakdown product information relative to current regulatory activities and will continue to utilize the information in developing atrazine best management practices and possible future regulatory actions.

FOR THE PERIOD ENDING JUNE 30, 1991 This project was supported by MN Future Resources Fund (MS 116.13)

The project was supported by MIA I deale resources I and (ME) I

TITLE: PROGRAM MANAGER: ORGANIZATION: LEGAL CITATION: APPROP. AMOUNT: Indoor Air Quality Assessment Protocol Laura Oatman MN Department of Health M.L. 1989, Chp. 335, Art. 1, Sec. 29, Subd. 7(c) \$108,000

## STATEMENT OF OBJECTIVES

Development of a protocol for assessment of indoor air quality problems in homes. The protocol is intended to minimize indoor air pollution and associated health effects by providing a procedure for identifying potential problems, suggest effective methods to solve indoor air problems, and provide useful information for general residential design and operational guidelines.

## **RESULTS**

The indoor air protocol consists of two documents: 1) a short publication that provides general background information on indoor air including blank worksheets to be used in conducting an investigation; and 2) a reference manual that describes in detail the various steps associated with the protocol and the use of the worksheets during an investigation.

## **PROJECT RESULTS USE AND DISSEMINATION**

The final protocol and reference manual will be available upon request to housing professionals and local health agencies for their use in diagnosing residential indoor air problems.

FOR THE PERIOD ENDING JUNE 30, 1991 This project was supported by MN Future Resources Fund (MS 116.13)

TITLE: PROGRAM MANAGER: ORGANIZATION: LEGAL CITATION: APPROP. AMOUNT: Community Lead Abatement Project Douglas Benson MN Department of Health M.L. 1989, Chp. 335, Art. 1, Sec. 29, Subd. 7(d) \$100,000 noncompetitive grant to Lead Free Kids, Inc.; contract managed by Minnesota Department of Health

## STATEMENT OF OBJECTIVES

To determine the costs and benefits of subsidized lead abatement compared to costs of lead-caused impairment of children.

### RESULTS

Lead Free Kids, Inc., studied the effect of abatement of lead-contaminated soil and dust on blood levels in 79 children in Minneapolis and St. Paul. Loose paint and household dust and dirt were cleaned. Outdoor soil was covered with clean soil or sand and wood chips. Sand boxes with clean sand were provided for children to play. Lead-related information was provided to families. The average blood lead level for children in the test group decreased 2.7 micrograms per deciliter (from 14.1 to 11.4) while the average blood lead level for children in the control group increased 5.2 micrograms per deciliter (from 14.5 to 19.7). Therefore, the intervention resulted in lowering the average blood lead level of the test group by 7.9 micrograms per deciliter as compared to the control group. The U.S. Environmental Protection Agency was cited as estimating a loss of future earnings of \$1,040 per year for a blood lead level of 15 micrograms per deciliter. This is a lifetime loss of earnings of \$49,920 over a worklife of 48 years. The average cost of intervention for this project was \$1,316 per child.

#### PROJECT RESULTS USE AND DISSEMINATION

Report available on request - "Cost Study for Determining the Benefit of Lead Prevention", June 12, 1991, by Judy Adams, David Stoppel, Bruce Huff, Patrick Reagan, and Howard Mielke.

FOR THE PERIOD ENDING JUNE 30, 1991 This project was supported by MN Future Resources Fund (MS 116.13)

TITLE:

PROGRAM MANAGER: ORGANIZATION: LEGAL CITATION: APPROP. AMOUNT: Biological Control of Plant and Animal Pests in Minnesota Dr. Dharma Sreenivasam MN Department of Agriculture M.L. 1989, Chp. 335, Art. 1, Sec. 29, Subd. 8(b) \$500,000

## STATEMENT OF OBJECTIVES

This is a cooperative effort between the Minnesota Department of Agriculture and the University of Minnesota Departments of Entomology and Agronomy and Plant Genetics.

A study was initiated to identify "yellows" condition in Canada thistle and develop it as a biological control agent; to control leafy spurge using two flea beetles; to identify and isolate the sex pheromone components of a larval parasitoid of the European corn borer and use it as a monitoring tool; to develop a serological test for a microsporidian to allow evaluating field populations of ECB infection; to develop microbial pathogens for field trials against ECB; to examine biological factors that limit the effectiveness of an egg parasite of ECB and develop methodology for mass production and field testing of this parasite; to determine if a nematode can provide acceptable field control of larval corn rootworms; to quantify the effect of natural enemies on key alfalfa insect pests; to study feasibility of "salting" breeding sites with parasitized pupae to control filth flies; and to develop anticipatory biological control of the gypsy moth with native and introduced multi-host parasites.

### RESULTS

Progress has been made in the isolation and identification of the "thistle yellows" causal organism. This disease reduced the amount of stored root sugar and thus decreased thistle winter-hardiness. Two flea beetles released at 9 leafy spurge sites in 1989 were recovered the following year; the center 10% of each release site was virtually spurge-free.

A four-pronged approach for the European corn borer biological control yielded: A sex pheromone of one larval parasite of ECB has been identified and a preliminary synthesized product was found attractive to the parasite. Serological assays have been developed in the lab for two pathogens of ECB. Cell culture (in vitro) systems for the cultivation of the two pathogenic microsporidia were developed. Inundatory field releases of the egg parasitoid, Trichogramma nubilale were evaluated with significant lower damage levels in the release plots. Egg parasitism rates were higher on simple surfaces compared to complex surfaces. The MDA lab developed a method for mass production of the egg parasitoid. A larval parasitoid provided by USDA-APHIS at Mission, Texas was released in southeast Minnesota. Fall surveys did not recover this parasitoid.

Mass rearing facilities were set up for the nematode, Steinernema carpocapsae, a bioassay was developed using larval corn rootworms. Parasitization determined for pea aphid in alfalfa was 90% in early spring dropping to 10% by second cutting and for alfalfa weevil 50%. A Minnesota strain of the parasite, M.zaraptor, released indoors during September-November, survived the winter to emerge the following spring. This strain was most active at or above 85°F compared to other strains from NY, NE and KS.

Two multi-host gypsy moth parasites, a tachinid fly and a stingless ichneumonid wasp, had been released

in Minnesota in 1937, 1971-77, and 1983 without confirmation of establishment. The tachinid fly has been recovered from whitemarked tussock moth in 1989 and 1990 during our survey. The ichneumonid wasp was recovered from our releases in 1990. Mass production of the wasp is underway.

### PROJECT RESULTS USE AND DISSEMINATION

All of the projects have been continued into the next biennium. Canada thistle disease will be identified leading to the development of an application method. Leafy spurge biological control is promising and is expected to produce enough biocontrol agents for redistribution. Biological control studies of the European corn borer are pointing toward the use of combinations of microbial pathogens and parasitoids affecting egg and larval stages. Corn rootworm studies will determine nematode effectiveness at different application rates. Alfalfa studies will concentrate on impact of foliar insecticides on aphids, alfalfa weevil and their natural enemies. Filth fly biological control will focus on survival and efficacy of parasites at several livestock facilities in Minnesota. Gypsy moth biological control will continue to mass produce parasites and expand release sites.

University of Minnesota, 1991 spring quarter -- eight seminars presented on LCMR projects. Scientific publications: six in 1990 and six in 1991. Presentations at national, regional and state scientific symposia and meetings.

FOR THE PERIOD ENDING JUNE 30, 1991

This project was supported by MN Future Resources Fund (MS 116.13)

TITLE: PROGRAM MANAGER: ORGANIZATION: LEGAL CITATION: APPROP. AMOUNT: Biogeochemical Prospecting Steven Hauck Natural Resources Research Institute, University of MN M.L. 1989, Chp. 335, Art. 1, Sec. 29, Subd. 11(b) \$150,000

## STATEMENT OF OBJECTIVES

To determine whether or not and in what plant tissues heavy metals were bioconcentrated.

- 2. To determine the vertical and horizontal distribution of heavy metals in glacial overburden.
  - To determine whether or not stress in plants due to heavy metals in the soil can be detected by ground spectral radiometry.
  - Use geostatistical and GIS techniques to evaluate the spatial relationships that affect and control bioconcentration of heavy metals in a northern boreal forest.

## RESULTS

1.

3.

4.

The data have shown that common northeastern Minnesota plant species (black spruce, balsam fir, largeleaved aster, alder, labrador tea, and aspen), soil, and glacial till are effective sampling media for delineating subsurface heavy metal mineralization. Ecological site characterizations using vegetation mapping, soil nutrient studies, microbial analysis (Bacillus cereus) and statistical analysis explained some of the geochemical relationships. Glacial till analysis showed a range of values (from background to anomalous) of various metals occurred in the till's fine fraction, was available to plants, and accounts for some heavy metal anomalies in plant tissues. Analysis of the ground spectral radiometry data showed statistically significant spectral shifts occurring in six of the nine species sampled over mineralized sites. Microbial and soil nutrient analyses show that interpretations of heavy metals and their effect on microbial population must also consider organic matter contents and nutrient mineralization rates. Geostatistics showed sampling density was a function of the variable of interest and the site itself, while GIS allowed mapping and evaluation of spatially related data, i.e., plant species distribution, soil chemistry, tissue element concentration, nutrient levels, etc. Both GIS and geostatistics were useful for identifying buried heavy metal mineralization.

#### PROJECT RESULTS USE AND DISSEMINATION

-Five reports/papers (reports are or will be listed on GEOREF and GEOARCHIVE international electronic databases, available at U.S. Geological Survey library in Reston, VA, available at Minnesota Legislative and University of Minnesota Duluth and NRRI libraries and at UMD Geology Department).

-Five poster presentations at professional meetings.

-One oral presentation to mining/mineral exploration professional organization.

-Data were used by one exploration company to help justify drilling of an additional drill hole on one of the properties.

### FOR THE PERIOD ENDING JUNE 30, 1991 This project was supported by MN Future Resources Fund (MS 116.13)

TITLE: PROGRAM MANAGER: ORGANIZATION: LEGAL CITATION: APPROP. AMOUNT: Research in Taconite Refinement Rodney L. Bleifuss Natural Resources Research Institute, University of MN M.L. 1989, Chp. 335, Art. 1, Sec. 29, Subd. 11(c) LCMR, \$200,000 IRRRB, \$50,000

## STATEMENT OF OBJECTIVES

The research objective was to establish new and innovative flowsheets for decreasing the silica content of Minnesota taconite concentrates. The purpose was to demonstrate to the iron and steel industry that it would be economically feasible to produce low-silica concentrates from Minnesota. These low-silica concentrates or pellets could provide the feedstock for domestic direct reduced iron (DRI) plants or for the new direct steelmaking technology being developed in the U.S. and overseas. This research program was needed to demonstrate to the steel industry that Minnesota taconites could provide the quality concentrates required as well as, or better than, foreign ore suppliers.

## RESULTS

The test results demonstrated that it is feasible to produce low-silica (-2.0 percent) concentrates from any of the taconite mines in Minnesota. The data also show that the incremental direct operating costs would be reasonable, ranging from about \$1.00 to \$2.50 per ton of concentrate depending upon the flowsheet used and the nature of the original ore. The flowsheets developed were innovative but are based on established mineral processing technology and have provided the industry with a realistic base upon which to develop preliminary economic development models.

### **PROJECT RESULTS USE AND DISSEMINATION**

Although the original grant was to CMRL/NRRI, through the cooperative efforts of the Minnesota Department of Natural Resources and LCMR staff, matching funds were obtained from the American Iron and Steel Institute (AISI). Seven mining and steelmaking companies provided \$210,000 to the project over two years. Therefore, the information developed was conveyed directly to the organizations who had the most need and interest in the project as it progressed. They also had direct input throughout the course of the project and provided technical consultation to the principal investigators. Column flotation, which was tested as part of this project, is being tested currently in a commercial taconite operation. The formal technical reports have been issued and are available to the public. Selected topics have been the subject of papers presented at technical meetings.

FOR THE PERIOD ENDING JUNE 30, 1991 This project was supported by MN Future Resources Fund (MS 116.13)

TITLE: PROGRAM MANAGER: ORGANIZATION: LEGAL CITATION: APPROP. AMOUNT: Land Use Impacts on Lake Superior Donald C. McNaught University of MN M.L. 1989, Chp. 335, Art. 1, Sec. 29, Subd. (11f) \$240,000

## STATEMENT OF OBJECTIVES

Field surveys and laboratory experiments were conducted in the far western arm of Lake Superior in 1989-91 to determine the influence of northshore streams on phytoplankton productivity. Similar surveys assessed water quality parameters in the nearshore zone associated with two streams, measured bacterial biomass in stream plumes and responses of bacteria to water quality changes.

We mapped, digitized and quantified land uses and disturbances that could potentially affect water quality in two North Shore watersheds representing a range of conditions, and analyzed general land characteristics of the Minnesota Lake Superior drainage basin that could potentially affect water quality. We also collected water samples from the Lester River and St. Louis River, measured the inhibition of these waters using normal ecosystem functions as zooplankton feeding, and developed a behavioral zooplankton bioassay to measure the impact of small amounts of pollutants in such waters.

## RESULTS

The region's waters remain oliogotrophic, with relatively low algal biomass and productivity, high dissolved oxygen in bottom waters, low TP and high dissolved inorganic -N. Picoplankton (<2 um) appeared to provide a large fraction of this biomass and production. Algal biomass and productivity were significantly higher in the nearshore plume of the Lester River, chiefly during snowmelt, due to phosphorus stimulation. Enrichment growth bioassays and alkaline phosphatase (APA) assays showed that phytoplankton were P-deficient. A resuspension event from a windstorm in August, 1990, "browned out" over 100 sq. miles of surface, greatly increased phosphorus levels, and increased epilimnetic productivity. Such large-scale, intermittent events are likely to be important in the transport of inorganic and organic particles to the rest of the lake.

The abundance and production of heterotrophic bacterioplankton were measured in the western arm of Lake Superior during 1989 and 1990. There were more bacterioplankton during 1989 than in 1990 at a site 2.5 km from the mouth of the Lester River. During both years bacterioplankton densities generally decreased from the epilimnion to the bottom at this site. Bacterial cells were larger during 1989 than 1990. After the suspended solid load in the surface waters increased more than ten times at the furthest site offshore the Lester River. Bacterial density and production were related to water temperature. Detailed maps and data derived from land use were published in an NRRI Technical Report.

Lester River was mildly toxic from July, 1989 through May, 1990. Surprisingly, toxicity increased from station 1 at the mouth, where waters inhibited zooplankton feeding 39%, to station 7 in a headwaters tributary at Highway 19, where feeding was reduced 88%. Chemical analyses did not correlate with toxicity. An ultrasensitive behavioral assay was developed, sensitive to pollutants at levels as low as 10-6 molar NaBr. In addition, a simple bioassay was developed for a common pollutant, methylmercury.

# PROJECT RESULTS USE AND DISSEMINATION

Two manuscrips for submission to peer reviewed journals are in preparation. Copies will be sent to LCMR when they are complted (R. Hicks). Other publications include: Johnston, C. NRRI Technical Report NRRI/TR-91/07; Chen Tianyi and D.C. McNaught, 1992, Toxicity of methylmercury to <u>Daphnia pulex</u>. Bull. Environ. Contam. Toxicol. 49:606; D.C. McNaught, 1992, Zooplankters as indicators of ecosystem health: past findings and future directions, J. Aq. Ecosystem Health. 1. (in press). Also, there have been numerous presentations of the project at scientific conferences throughout the Great Lakes Region and Canada.

FOR THE PERIOD ENDING JUNE 30, 1991

This project was supported by MN Future Resources Fund (MS 116.13)

TITLE: PROJECT MANAGERS: ORGANIZATION: LEGAL CITATION: APPROP. AMOUNT: Chemical Transport in Groundwater Otto D. Strack and Steven J. Eisenreich Dept. of Civil and Mineral Engineering, University of MN M.L. 1989, Chp. 335, Art. 1, Sec. 29, Subd. 11(h) \$300,000

#### STATEMENT OF OBJECTIVES

The appropriation is for the civil and mineral engineering department to develop, test, and implement interactive models to simulate groundwater transport of chemicals.

#### RESULTS

A new theory has been developed for simulating chemical transport in groundwater. This theory consists of two parts; one part deals with the spreading of contaminants in a plume due to large scale (hundreds of feet in size) inhomogeneities in aquifer properties, the other part deals with spreading due to chemical reactions. Both parts of the theory have been tested. The spreading due to inhomogeneities was tested by comparison with the results obtained from numerical experiments. The chemical aspects were considered in the laboratory.

One of the main advantages of the new theory over existing ones is that it predicts the movement of the front of the contaminant plume, and therefore the first arrival time of pollutants. A visiting scientist from the Netherlands, who participated in the project, succeeded in developing an efficient manner of solving the rather complex equations. As a result, implementation in existing computer programs will be a relatively simple matter.

### **PROJECT RESULTS USE AND DISSEMINATION**

The theory for spreading due to inhomogeneities has been published in Water Resources Research ("A Mathematical Model for Dispersion with a Moving Front in Groundwater," by O.D.L. Strack, Water Resources Research, Vol. 28, No 11, pp 2973-2980). The method of solution using this theory will be submitted for publication shortly. The full theory including the chemical transport will be submitted for publication later. The complete theory is at present available in the Masters Thesis of Mark Fairbrother. The method of solving the equations efficiently will be reported in the PhD thesis of the Dutch scientist.

The frontal arrival time will be implemented in the analytic element computer models available to state employees, as well as in computer program currently being developed with funds from the USEPA.

FOR THE PERIOD ENDING JUNE 30, 1991.

This project was supported by MN Future Resources Fund (MS 116.13)

## TITLE: PROGRAM MANAGER: ORGANIZATION: LEGAL CITATION: APPROP. AMOUNT:

Lake Aeration Techniques and Hydrologic Forecasting R. Arndt, H. Stefan, J. Gulliver, C. Song, and R. Andricevic St. Anthongy Falls Hydraulic Laboratory, University of MN M.L. 1989, Chp. 335, Art. 1, Sec. 29, Subd. 11(i) \$828,000

## STATEMENT OF OBJECTIVES

This work was aimed at technological innovation in three areas: 1) Development of new aeration techniques in lakes, rivers and wastewater; 2) development of methods to better forecast water quality and ice behavior in rivers, lakes and groundwater; and 3) development of new instrumentation for ice research. Analytical and numerical methods as well as laboratory and field experiments will be used to achieve the objectives.

#### RESULTS

#### AERATION TECHNIQUES

a) A novel aeration device has been developed which has superior operational characteristics and significantly lowered operating costs than conventional aeration devices. The Metropolitan Waste Control Commission is currently evaluating this device under contract to SAFHL; b) A prototype aerator for oxygen transfer under ice was built and tested during the winters of 1989-90 and 1990-91. It performed as expected, providing good oxygenation without destroying the ice cover. Ramsey County is now operating the device; c) Computer simulation of a jet-pump aerator has been completed and coded on the Cray-2 Supercomputer. Significant methods for improved aerator efficiency have been identified.

#### FORECAST METHODS

a) A new methodology for designing and analyzing three-dimensional sampling networks for groundwater quality monitoring have been developed. Several numerical simulations have been carried out to verify the techniques developed, providing a cost-effective procedure for extensive groundwater monitoring; b) A novel water quality assessment technique determining the impact of hydroplant operation on water quality has been developed. This procedure has been used to assess the potential water quality impact of three Minnesota hydropower sites, which are currently in the license application stage. Mitigation techniques were developed where necessary. The technology is also in use in other states; c) The water quality dynamics of wastewater stabilization ponds were studied by extensive water temperature, dissolved oxygen and light measurements at the Harris site. Subsequently computer simulation models were developed for temperature stratification dynamics, and daphnia populations in these ponds; d) Forecast methods for ice induced flooding have been developed using river morphology, river discharge and weather data pertinent to ice jams. A computer model for predicting ice formation, ice jams and spring break up has been developed. The computer simulations agree very well with available field data.

### DEVELOPMENT OF INSTRUMENTATION FOR ICE STUDIES

Initial measurements were made to develop a simple cost-effective method for synoptic ice surveys in rivers and lakes. This feasibility study showed that an ultrasound pulsing technique showed promise. Further work is required to fully develop the technique.

## PROJECT RESULTS USE AND DISSEMINATION

a) Publications: project reports, 6; journal articles, 15; M.S. Theses, 4; Ph.D. Dissertations, 3; b) A novel aerator developed at SAFHL is being evaluated by MWCC; c) a winter lake aerator designed and built at SAFHL is now operated by Ramsey County; d) Hydropower water quality assessment and mitigation techniques developed at SAFHL are currently in use in Minnesota and the rest of the U.S.; e) Seven graduate degrees awarded as a result of this research.

FOR THE PERIOD ENDING JUNE 30, 1991 This project was supported by MN Future Resources Fund (MS 116.13)

TITLE: PROGRAM MANAGER: ORGANIZATION: LEGAL CITATION: APPROP. AMOUNT: Water Filter for Iron Removal Maurice M. Kreevoy Dept. of Chemistry, University of MN M.L. 1989, Chp. 335, Art. 1, Sec. 29, Subd. 11(k) \$28,000

## STATEMENT OF OBJECTIVES

The overall objective of this work was to develop a solid-supported membrane system for the removal of iron from industrial or domestic water. We focused on the synthesis and testing of dialkylphosophoric acids.

#### RESULTS

Candidate materials were tested against aqueous solutions of iron complexed by excess citric acid. The citric acid was used because most iron in natural water is thought to be complexed.

Di-(2-ethylhexyl) phosphoric acid, which is commercially available, was found to be effective, but too water soluble for practical use.

To obtain a less soluble, liquid reagent we attempted to prepare dioleylphosphoric acid from oleyl alcohol and POC13 or P205. We could not prepare it pure. Our best preparations contained -60% monooleylphosphoric acid. These mixtures were effective extractants of iron, and much more resistant to water than di(2-ethylhexyl) phosphoric acid, but still not acceptable. Monooleylphosphoric acid is much more water soluble than dioleylphosphoric acid, and also a good emulsifying agent. Pure dioleylphosphoric acid might well have the required characteristics. We also determined the apparent interfacial acid dissociation constant of the mixed oleylphosphoric acids; it is a little lower than ideal but may be acceptable.

## PROJECT RESULTS USE AND DISSEMINATION

This work has been presented at a national American Chemical Society meeting and several smaller meetings, but it has not yet been published. To be useful, practically, a method needs to be found to prepare an inexpensive liquid, non-emulsifying, phosphoric acid ester, such as dioleylphosphoric acid.

FOR THE PERIOD ENDING JUNE 30, 1991

This project was supported by MN Future Resources Fund (MS 116.13)

# TITLE: PROGRAM MANAGER: ORGANIZATION:

LEGAL CITATION: APPROP. AMOUNT: Simulation of Minnesota's Future Forest Economy Howard Hoganson No. Central Experiment Station & Dept. of Forest Resources University of MN M.L. 1989, Chp. 335, Art. 1, Sec. 29, Subd. 11(1) \$100,000

## STATEMENT OF OBJECTIVES

To develop methods and evaluate, from a strategic viewpoint, the Minnesota timber supply situation in terms of its ability to support increased forest-based economic development.

### RESULTS

RxWRITE and DTRAN, two new models for timber supply analysis and forest management planning were developed and linked. RxWRITE, the prescription model, links the new statewide forest inventory with DTRAN, a statewide forest planning model, by generating a wide range of potential management options for each forest inventory plot in the state. RxWRITE uses key components of a state-of-the-art individual tree growth model and includes a data base containing statewide forest survey information, information on management costs, and locational information relating the survey plot locations with specific mill locations and the existing road networks. Work in developing DTRAN was coordinated with a project funded by the University of Minnesota Center for Transportation studies. Applications of DTRAN demonstrated that spatial aspects of timber supply can now be considered in more detail than was previously considered possible.

#### **PROJECT RESULTS USE AND DISSEMINATION**

The modelling systems developed were selected by an outside consultant as the primary forest management planning models to be used in the analysis for the Generic Environmental Impact Statement on timber harvesting in Minnesota (GEIS). The baseline data synthesized as part of this study made it possible to utilize more detailed information in the GEIS than would otherwise have been possible with the short time frame involved. With modest future financial support these systems could help make the GEIS more than a "snapshot" analysis of the current forestry situation. The results provides a statewide modelling system that can be updated as situations change or more information becomes available. Users' guides describing DTRAN and RxWRITE have been developed and are available as University of Minnesota Department of Forest Resources Staff Series papers. Detailed seminars were presented to key Minnesota Land Commissioners. The Ontario Ministry of Natural Resources has funded a two-year study with the University of Minnesota to identify how these modelling methods could be used for strategic planning in northern Ontario.

FOR THE PERIOD ENDING JUNE 30, 1991 This project was supported by MN Future Resources Fund (MS 116.13)

TITLE: PROGRAM MANAGER: ORGANIZATION: LEGAL CITATION: APPROP. AMOUNT: Oak Wilt Research David W. French University of MN M.L. 1989, Chp. 335, Art. 1, Sec. 29, Subd. 11(m) \$88,000

## STATEMENT OF OBJECTIVES

To develop control measures to stop spread of oak wilt through root grafts and by insect vectors and to provide guidelines for control programs.

### RESULTS

We have developed the technology needed to stop spread of the fungus through common root systems and have demonstrated these techniques many times in several communities in those counties where oak wilt is a problem. We have also developed a biological control of oak wilt using a harmless fungus which kills the oak wilt fungus thus preventing spread from wilting oaks with spores.

We have helped perfect chemical injections to save infected trees and prevent spread of oak wilt to healthy trees. The fungicide is Propiconazole.

### PROJECT RESULTS USE AND DISSEMINATION

We have published articles on how to control oak wilt and have offered seminars and demonstrations in those areas where oak wilt occurs.

FOR THE PERIOD ENDING JUNE 30, 1991 This project was supported by MN Future Resources Fund (MS 116.13)

TITLE: PROGRAM MANAGER: ORGANIZATION: LEGAL CITATION: APPROP. AMOUNT: Lignin-Based Engineering Plastics Simo Sarkanen Dept. of Forest Products, University of MN M.L. 1989, Chp. 335, Art. 1, Sec. 29, Subd. 11(n) \$108.000

### STATEMENT OF OBJECTIVES

Paper is manufactured from pulp that is produced industrially by removing lignins from wood chips. If the pulp mills in Cloquet and International Falls, Minnesota, were to be run at maximum capacity, more industrial byproduct lignins would be generated than could be used as fuel in the recovery furnaces at both sites. Consequently this project was dedicated to finding ways of converting excess byproduct lignins from the pulp mills at Cloquet and International Falls into biodegradable polymeric materials or plastics. The work itself bore important economic and environmental implications.

#### RESULTS

The project culminated in the successful formulation, <u>for the first time ever</u>, of cohesive polymeric materials fabricated exclusively from an industrial byproduct Jack pine kraft lignin preparation. The task was accomplished by separating from the raw starting material those components that are capable of interacting with one another in a well-defined way. The lignin-based polymeric materials themselves were formed by solvent-casting in teflon molds.

#### PROJECT RESULTS USE AND DISSEMINATION

The results from the project are being used directly in creating lignin-based polymeric materials with improved strength properties by blending with small quantities (-10%) of other components. The work is being carried out as a part of a research and development effort funded by LCMR during the 1991-93 biennium. Despite the significance of these achievements, the results are not being otherwise disseminated before comprehensive patent applications can be filed. Nevertheless, accounts of the work have found their way into some unsolicited newspaper and magazine articles.

FOR THE PERIOD ENDING JUNE 30, 1991

This project was supported by MN Future Resources Fund (MS 116.13)

## TITLE: PROGRAM MANAGER: ORGANIZATION:

LEGAL CITATION: APPROP. AMOUNT: High Flotation Tire Research Project Charles Blinn Mille Lacs Area CDC and Dept. of Forest Resources University of MN M.L. 1989, Chp. 335, Art. 1, Sec. 29, Subd. 11(0) \$40,000

### STATEMENT OF OBJECTIVES

- 1. To determine the current state of knowledge on high flotation tires and their impacts.
  - To establish field studies comparing the impact of high flotation and conventional logging systems on aspen regeneration.
- 3. To compare the logging productivity and costs of high flotation and conventional systems.
  - To explore biological or physical explanations for losses of aspen regeneration.
  - To refine silvicultural guidelines and conduct workshops to facilitate exchange of information.

## RESULTS

2.

4. 5.

The second season of harvesting was completed in the summer of 1992 and analysis of those results are proceeding. The four harvests completed in 1991 have been summarized and show no obvious trend in productivity or cost between high flotation and conventional logging. Further analysis, combining all data, will allow for more meaningful and more complete conclusions.

The production of aspen suckers on permanent plots has been measured on all plots with regeneration as of September, 1992. Plots must be remeasured in the Fall of 1993 and then the relationship between aspen suckering and harvesting systems as well as other covariates such as soil moisture, trafficking, and previous vegetation can be explored.

### **PROJECT RESULTS USE AND DISSEMINATION**

Meetings with cooperators (DNR Divisions of Forestry and Wildlife, Mille Lacs Area CDC, and Minnesota Forest Products Inc.) to discuss the direction of the study have occurred regularly over the course of the study. A presentation was given at the 1990 Winter Meeting of the American Society of Agricultural Engineers. When the research is complete, it will be developed into extension publications, and presentations will be developed for the transfer of information to the interested groups including loggers, land managers and landowners. The project will also be presented as a Ph.D. dissertation and one or more scientific publications.

FOR THE PERIOD ENDING JUNE 30, 1991 This project was supported by MN Future Resources Fund (MS 116.13)

TITLE: PROGRAM MANAGER: ORGANIZATION: LEGAL CITATION: APPROP. AMOUNT: Sonar Measurements of Fish Abundance in Minnesota Lakes Robert O. Megard Dept. of Ecology, Evolution and Behavior, University of MN M.L. 1989, Chp. 335, Art. 1, Sec. 29, Subd. 11(q) \$60,000

## STATEMENT OF OBJECTIVES

The objective was to develop new methods for mapping the distributions of fish and zooplankton in lakes with the use of a new sonar system that includes a loran navigation receiver.

#### RESULTS

A loran navigation receiver was added to a sonar system developed recently by the project manager. The system consists of a microcomputer connected to a high-frequency sonar unit. New computer software was designed in order to operate the enhanced system, and to collect, display, and analyze the sonar and loran data. Other software was written to make summary data files that are used to create maps with Geographic Information System software in a larger computer. Procedures for collecting data were developed during sonar surveys of five lakes, and maps were made with data obtained from one of the lakes.

#### PROJECT RESULTS USE AND DISSEMINATION

The new sonar-loran system and its capabilities have been described at national and international meetings of two professional societies. Data obtained with the system are the basis for a paper that will soon be submitted to a technical journal for publication, and the system will be an integral part of future research projects dealing with zooplankton and fish to lakes. The system also is used for teaching students in Ecology classes at the University of Minnesota.

FOR THE PERIOD ENDING JUNE 30, 1991 This project was supported by MN Future Resources Fund (MS 116.13)

#### TITLE:

## PROGRAM MANAGER: ORGANIZATION: LEGAL CITATION: APPROP. AMOUNT:

Combustion Emissions from densified-Refuse Derived Fuel (d-RDF) Pellets: Bench Scale Studies
Vance G. Leak
Natural Resources Research Institute, University of MN
M.L. 1989, Chp. 335, Sec. 29, Subd. 11(s)
\$150,000

## STATEMENT OF OBJECTIVES

While "fluff-RDF" combustion is characterized by rapid volatilization at low temperatures, which may be the combustion stage when the dioxin, dibenzofurans, PCB refractory compounds are formed, "densified-RDF" combustion can be controlled to more favorable stoichiometric conditions through heat transfer and surface effects of these dense compacts. The objective of this project is to study at the bench scale the combustion emissions from d-RDF pellets/briquets under carefully controlled and monitored conditions.

The principal focus will be to control pollutant emissions from D-RDF by controlling the physical parameters of the raw feedstock and the finished densified shape.

#### RESULTS

A test lot each of typical d-RDF and cleaned "factory scrap" was characterized in a bench-scale test unit. Due to the small sample size and furnace size matchup with the continuous emissions monitoring apparatus, the principal focus was on the heavy metal content of the ash and critical temperature region of smoldering combustion with production of 2,3,7,8-tetrachloro-dibenzo-p-dioxin (TCDD). While the heavy metal profile showed a considerable variation, a sharply defined temperature region of approximately 700°C was identified for enhanced production of TCDD with d-RDF containing chlorinated plastics. A sample of typical d-RDF was ashed for heavy metal analysis.

A series of low-temperature, low oxygen combustion tests were run on both the d-RDF pellets and the scrap paper pellets. The total halogen content for the d-RDF pellets was 2,414 ppm (probably chlorine). Analyses were performed on the samples for TCDD; while very low concentrations TCDD were detected for the d-RDF run at 400°, 500°, 600°, and 800°C, the test at 700°C resulted in a TCDD concentration of 97pg/g. The wastepaper (non-chlorinated plastic) pellets had extremely low concentrations of TCDD or was not detected. This spike of high TCDD was investigated by a second set of experiments at 700°C for both the d-RDF samples. The concentration of TCDD was even higher in the repeat testing with results of 485 pg/g and 729 pg/g for sample one and 381 and 137 pg/g for sample two. Repeat testing at 800°C showed the virtual annihilation of TCDD at this higher temperature zone.

### PROJECT RESULTS USE AND DISSEMINATION

St. Louis County (MN) is currently using these results to advise commissioners on refuse derived fuel produced from municipal waste streams.

FOR THE PERIOD ENDING JUNE 30, 1991

This project was supported by MN Future Resources Fund (MS 116.13)

## TITLE: PROGRAM MANAGER: ORGANIZATION:

LEGAL CITATION: APPROP. AMOUNT: Peat for Containment of Municipal Incinerator Ash Rodney L. Bleifuss and John R. Ludwig Coleraine Minerals Research Laboratory Natural Resources Research Institute University of MN-Duluth M.L. 1989, Chp. 335, Art. 1, Sec. 29, Subd 11(t) \$150,000

## STATEMENT OF OBJECTIVES

The main objective of this project was to investigate an alternative cost-effective storage system for MSW incinerator ash residues, particularly fly ash which contains the highest percentage of leachable heavy metals. The initial proposal was to use peat with the addition of lime to control the pH in a closed impoundment system. The concept was that the combination of peat and lime in a water saturated closed basin would fix the leachable metals as hydroxides and prevent their release to the environment. This concept was suggested as an alternative to the MPCA impoundment systems which were designed with leachate collection systems which would allow the percolation of water through the ash which in time would leach most of the soluble heavy metals, and other soluble components such as sulfates and chlorides, and eventually return them to the environment. The proposed "passive containment" system was submitted as a realistic alternative to the monofill fly-ash containment systems proposed by MPCA.

## RESULTS

The ash characterization study and leach tests showed that the leachable metals of major environmental concern in the ash are cadmium and lead. However, significant amounts of other constituents such as copper, zinc, chloride and sulfate will also leach from some ash residues. During the course of the program it was shown that papermill sludge was more effective than the peat and lime combinations initially proposed. Column leach tests carried out in several 3-foot by 5-foot concrete cylinders confirmed the efficacy of papermill sludge as a means by which to stabilize the heavy metals. The heavy metal concentrations in the effluent from the test cylinder easily met drinking water standards. The key to the success was the growth of sulphate reducing bacteria in the columns which fixed the heavy metals a sulfides which are extremely stable in a water-saturated anaerobic (oxygen free) environment. The test data clearly show that a passive containment system based on sulphate reducing bacteria, i.e., a biological filter offers a practical solution to the protection of the environment from heavy metal contamination.

## PROJECT RESULTS USE AND DISSEMINATION

The technology has been disseminated through two technical presentations and through informal discussions with MPCA and incinerator operators and distribution of a project summary report to interested parties.

FOR THE PERIOD ENDING JUNE 30, 1991 This project was supported by MN Future Resources Fund (MS 116.13)

TITLE: PROGRAM MANAGER: ORGANIZATION: LEGAL CITATION: APPROP. AMOUNT: Evaluation of Peat in Poultry Waste Treatment Thomas E. Levar Natural Resources Research Institute, University of MN M.L. 1989 Chp. 335, Art. 1, Sec. 29, Subd. 11(u) \$130,000

### STATEMENT OF OBJECTIVES

To analyze Minnesota peat and poultry waste materials for physical and chemical properties to determine optimum conditions for the treatment and composting of these mixtures. To implement and monitor scaled-up experiments for composting peat and poultry waste mixtures.

To analyze and evaluate composted mixtures of poultry waste and peat.

### RESULTS

1.

2.

3.

This project provided the first evaluation, in Minnesota, of using mixtures of peat and poultry manure in static aerated pile composting. A variety of poultry manures and manure litters were evaluated for nutrient content, and other physical and chemical properties that are important for composting. Minnesota peats were evaluated for sorptive properties and bulking amendments for use with the manures in a passively aerated composting process. Based on the evaluations, numerous compost piles were designed, constructed, and monitored. A computer program was developed to optimize the proportion of manure and peat to be mixed for effective composting, and thus effective treatment of poultry wastes. This method of composting is slightly more expensive than other composting methods, but has the advantage of being easily adapted to on-farm applications.

### **PROJECT RESULTS USE AND DISSEMINATION**

Composting turkey litter manure with peat is being carried out by several members of the Minnesota Turkey Growers Association (MTGA). The project results are also being used for further evaluations of composting technologies for treating agricultural wastes. Dissemination of the results has been through the Natural Resources Research Institute newsletter, NRRI NOW, the Agricultural Utilization Research Institute, and the University Extension Service. Further use of the results of this project are expected in the treatment and handling of liquid hog and cattle manures and in handling of other agricultural manures.

FOR THE PERIOD ENDING JUNE 30, 1991 This project was supported by MN Future Resources Fund (MS 116.13)

TITLE: PROGRAM MANAGER: ORGANIZATION: LEGAL CITATION: APPROP. AMOUNT: Groundwater Quality Assessment Procedure Dr. Robert C. Melchior Bemidji State University M.L. 1989 Chp. 335, Art. 1, Sec. 29, Subd. 12(a) \$90,000

## STATEMENT OF OBJECTIVES

To develop a procedure for the assessment of regional groundwater quality based on county, state and other sampling records. Also, to develop a technique to test the groundwater quality assessment procedure against a known standard.

### **RESULTS:**

Procedure has been completed and tested. It is now undergoing field trials with the Beltrami County Planning Office, the local offices of the Minnesota Department of Health, Department of Natural Resources, and the Board of Water and Soil Resources.

### PROJECT RESULTS USE AND DISSEMINATION

The project has been used in faculty and student research during the testing phase and is currently being used in field trials localities. Project will be disseminated to all state, county and local officials who request it. At conclusion of field trials project will be mailed to all county planning agencies in the state.
STRATEGIC P L A N



# LEGISLATIVE COMMISSION ON MINNESOTA RESOURCES FIRST BIENNIAL REVISION

# SIX-YEAR STRATEGIC PLAN FOR GUIDING RECOMMENDED EXPENDITURES

FROM

# MINNESOTA FUTURE RESOURCES FUND

# MINNESOTA ENVIRONMENT AND NATURAL RESOURCES TRUST FUND

## **OIL OVERCHARGE MONEY**

DECEMBER, 1991

This plan incorporates the Revision to the July 1990-July 1996 Strategic Plan for the Trust Fund and is based on a draft submitted by the Citizen Advisory Committee as advisory to the

LEGISLATIVE COMMISSION ON MINNESOTA RESOURCES

65 State Office Building St. Paul MN 55155 (612) 296-2406

APPENDIX AA

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## I. LEGISLATIVE COMMISSION ON MINNESOTA RESOURCES

The Legislative Commission on Minnesota Resources (LCMR) was created in 1963 to provide the Legislature with the background necessary to evaluate programs proposed to preserve, develop and maintain the natural resources.

The LCMR is comprised of 16 members, consisting of the chairs of the House and Senate committees on environment and natural resources, the chairs of the House appropriations and Senate finance committees, six members of the Senate appointed by the subcommittee on committees of the committee on rules and administration and six members of the House appointed by the Speaker. At least two members from the Senate and two members from the House must be from the minority caucus. The members elect their officers, rotating the Chair from the Senate to the House every two years. The LCMR employs a full time professional and support staff.

The LCMR has and will continue to make recommendations to the Legislature each odd year for appropriations from the Minnesota Future Resources Fund supported by a portion of the state cigarette tax. In 1988, the LCMR was also charged to make funding recommendations for a portion of the oil overcharge money and for the new Environment and Natural Resources Trust Fund. The first funding recommendations from the Trust Fund were approved in 1991 for a two-year period. The next appropriations are scheduled to begin in July 1993.

The LCMR develops its recommendations after an extensive review of current problems. The LCMR requests both written and oral advice from a wide variety of interested and knowledgeable citizens. After examination and discussion of the issues, the members suggest solutions as recommended appropriations. The LCMR recommendations become law when enacted by the Legislature.

The Citizen Advisory Committee (CAC), consisting of 11 citizen members, advises the LCMR on the development of a statewide strategic plan for the environment and natural resources which will guide expenditure recommendations from the trust fund. The governor appoints the Chair, one member from each congressional district, and three additional at large members.

## PLANNING PROCESS

The Strategic Plan is a six-year plan first adopted in December 1989. The plan is to guide recommendations for natural resource expenditures. The plan is revised every two years. This plan is the first biennial revision and incorporates all three funding sources for the first time.

The priority strategies in the plan are to guide the LCMR's biennial recommendations for expenditure from the three funding sources. These strategies are incorporated in the Request for Proposals (RFP) issued by the Commission in December 1991. The proposals received in response to the RFP will be evaluated against the Criteria in the plan (also incorporated into the RFP). These strategies and criteria may be modified each time the plan is revised.

## RECOMMENDATIONS

The Commission will make its funding recommendations to the Legislature by August of 1992. The Commission will determine which funding source is appropriate for a proposed project recommendation based on the funding criteria. When acted upon by the 1993 Legislature, and with Commission work program approval, funds will be available for projects beginning July 1, 1993.

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## II. FUNDING SOURCES

The Strategic Plan is for guiding expenditure recommendations from the Legislative Commission on Minnesota Resources to the Minnesota Legislature for natural resource projects. Funding recommendations are from three sources.

## FUNDING SOURCES:

• <u>Minnesota Future Resources Fund</u> (MS 116P.13) estimated amount available \$15 million for July 1993-June 1995 biennium funding.

For new, innovative or accelerative natural resource projects designed to help maintain and enhance Minnesota's natural resources.

• <u>Minnesota Environment and Natural Resource Trust Fund</u> (Trust Fund) (MS 116P.08) estimated amount available \$13 million for July 1993 - June 1995 biennium funding.

For the management, preservation and enhancement of Minnesota's environment and natural resources. Trust Fund expenditures must conform to the strategic plan and Trust Fund law.

## **A. Trust Fund Vision**

All Minnesotans have an obligation to use and manage our natural resources in a manner that promotes wise stewardship and enhancement of the state's resources for ourselves and for future generations. The Trust Fund is a perpetual fund that provides a legacy from one generation of Minnesotans to the many generations to follow. It shall be used to preserve, protect, restore and enhance both the bountiful and the threatened natural resources that are the collective heritage of every Minnesotan. It shall also be used to nurture a sense of responsibility by all, and to further our understanding of Minnesota's resource base and the consequences of human interaction with the environment.

### **B. Trust Fund Mission**

The mission of the Trust Fund is to ensure a long-term secure source of funding for environment and natural resource activities whose benefits are realized only over an extended period of time.

• <u>Oil Overcharge Money</u> (MS 4.071) estimated amount available \$1 million for July 1993 - June 1995 biennium funding.

For projects resulting in decreased dependence on fossil fuels and for technology transfer with the same purpose.

## **III. PRIORITY FUNDING STRATEGIES**

The Commission seeks proposals based on priority strategies that are developed through fact-finding, public input and results of previous projects. Priority strategies are modified on a two-year time frame.

For the biennium ending June 1995, the priority strategies are listed below. These strategies are included in the Request for Proposals issued in December 1991. Projects selected from among the proposals submitted in response to the RFP will receive funding beginning July 1993 (two year duration).

#### NOTES ON STRATEGIES:

• All strategies are priorities for funding. The order does not reflect any other prioritization.

• All or part of the strategies marked with (R) could include or accomplish section 84.95, subd.2 of the Reinvest in Minnesota program (RIM).

• Strategies marked with a (C) are capital improvement projects.

• Strategies marked with  $\blacklozenge$  are strategies recommended by the Citizen Advisory Committee for Trust Fund expenditure.

• Unless indicated, the strategies apply to all three funding sources.

#### PRIORITY STRATEGIES

## <u>GENERAL</u>

G.1 - Create qualitative and quantitative benchmarks for key natural resources to permit effective monitoring and assessment of environmental trends.  $\blacklozenge$ 

G.2 - Develop/expand techniques utilizing biological indicators in diagnosing environmental conditions.

G.3 - Implement a generalist approach to natural resource management.

### AGRICULTURE

A.1 - Encourage the adoption of integrated pest management techniques through demonstration, technical assistance and new research.  $(\mathbf{R})$ 

A.2 - Increase low-input/sustainable management of agricultural land through education, incentives and research regarding management practices such as erosion reduction, biological pest control, and environmentally safe (friendly) agricultural inputs and practices. (R)  $\blacklozenge$ 

A.3 - Establish incentive programs to encourage farming practices that are consistent with protection and enhancement of wildlife habitat. (R)

A.4 - Implement resource management practices which address agricultural non-point source and point source water pollution (e.g. feedlot waste). (R)

A.5 - Increase production and marketing of native plants as specialty crops; encourage cooperation between private sectors and agencies. (R)

A.6 - Research genetic engineering of plants for disease and pest resistance, nitrogen fixing and other environmental benefits.

## ENERGY

E.1 - Reduce emissions and increase energy efficiency through use of alternative fuels, innovative transportation programs (e.g. bicycle commuter corridors) and technologies.

E.2 - Develop and implement energy efficiencies that address all phases of energy use and waste generation from production through disposal (e.g. fluorescent light bulbs). Note: the goal is to reduce energy use and increase efficiency without shifting the environmental burden.

E.3 - Increase energy efficiency in the commercial sector through research and technology transfer.

E.4 - Stimulate application of alternative energy sources and strategies that have a high probability for successful demonstration and transfer.

E.5 - Develop and implement building designs that incorporate waste reduction, recycling and energy efficiencies in building materials, construction and operation.

#### FORESTRY

F.1 - Expand rural and urban reforestation including community shade tree programs. Implement tree planting for energy conservation, CO2 abatement, erosion control, wildlife, and other benefits. (R) •

F.2 - Broaden and increase the understanding of managing forest ecosystems. (R)

F.3 - Research the sustainability of the land after repeated harvest and removal of mature timber. (R)  $\blacklozenge$ 

F.4 - Reduce potential impacts of tree diseases (e.g. oak wilt, Dutch elm disease).

F.5 - Develop a strategy for reforestation and afforestation and evaluate the feasibility of utilizing fast growing trees in that strategy.

F.6 - Research and implement more efficient resource extraction and processing to achieve added-value of wood products. (MN Future Resources Fund)

F.7 - Acquire land for state forests.

### **INFORMATION AND EDUCATION**

IE.1 - Research and promote education on reduced water consumption and on the consequences of and alternatives to urban-suburban use of fertilizers and pesticides. (R)  $\blacklozenge$ 

IE.2 - Stimulate the integration of environmental education topics into curricula, e.g. math and english, for K-12 and post-secondary (including associated teacher training) with an inclusion on measured outcomes. (R)  $\blacklozenge$ 

IE.3 - Encourage interest in science and math through new or modified environmental education programs in order to meet projected demands for environmental professionals with an inclusion on measured outcomes.

IE.4 - Incorporate environmental topics into preparatory professional training and education, highlighting linkages between the professional fields and environmental concerns (e.g. MBA programs, vocational and trade schools, engineering programs).

IE.5 - Establish environmental education delivery systems for local government officials (e.g. county board, SWCD, township and municipal officials) to aid local officials in making environmentally sound decisions. (R)

IE.6 - Implement and apply proposed or existing Geographic Information Systems (GIS) into programs or activities.

## LAND

L.1 - Coordinate and expand (a) inventory activities which will provide base maps on a bioregional basis or on a watershed basis incorporating both ground and surface water and (b) inventory and monitoring activities which will provide mapping layers. (R)  $\blacklozenge$ 

L.2 - Establish priorities for coordination/digitization of collected data on a watershed basis. +

L.3 - Identify the long-term impacts of urban growth to create plans for and implement environmentally sensitive development.  $\blacklozenge$ 

L.4 - Identify and evaluate which natural resources in urban areas are being overused. •

## **MINERALS**

M.1 - Determine new mineral resource and technology potential. (Minnesota Future Resources Fund)

### RECREATION

R.1 - Develop, improve and rehabilitate state and regional parks. (C)

R.2 - Acquire land for river easements, and public access for lakes and rivers. (R) (C)  $\blacklozenge$ 

R.3 - Acquire trails for general use, including biking and for persons with disabilities. (R) (C)  $\blacklozenge$ 

R.4 - Enhance recreational resources in urban areas with a focus on the diverse recreational needs of seniors, ethnic communities, and people with disabilities.

R.5 - Develop a network of recreational and commuter bicycle trails. (C)

R.6 - Improve fishing and hunting opportunities through targeted access, acquisition, and habitat management. (R) (C)

R.7 - Build additional fishing piers in urban areas. (R) (C)

R.8 - Provide natural and historic resource preservation and interpretation.

R.9 - Analyze trends of recreational use rates and conflicts. Assess the economic and environmental impacts of recreational activities.

## WASTE

WAS.1 - Stimulate market development for recycled goods. (Minnesota Future Resources Fund)

#### WATER

W.1 - Provide for urban and rural wetland restoration, information, education and easement acquisition to enhance wildlife, control erosion, provide water storage, and improve water quality. (R)

W.2 - Implement education, technical assistance and incentive programs for prevention of nonpoint source pollution on a watershed basis. (R)  $\blacklozenge$ 

W.3 - Investigate and implement effective, coordinated methods of protecting, monitoring and improving lake and river quality (e.g. broaden the base of water monitoring activities through citizen and local government partners). (R)  $\blacklozenge$ 

W.4 - Research the hydrologic interaction of surface and groundwater. •

W.5 - Continue county geologic atlas and groundwater sensitivity mapping. •

## WILDLIFE, FISHERIES, PLANTS

WFP.1 - Acquire and protect critical habitat, native prairies, unique and/or sensitive areas and scenic bluffs. (R) (C) ♦

WFP.2 - Develop and implement methods to protect, restore, or establish publicly accessible fish and wildlife habitat (game and nongame). (R) (C)  $\blacklozenge$ 

WFP.3 - Assess predator control strategies to enhance fish and wildlife.(R)

WFP.4 - Increase the planting of native species (e.g. native prairie) on public and private land (e.g. on highways, or in lieu of lawns). (R)

WFP.5 - Research ecologically sound methods to control or eradicate exotic species of plants or animals which are or may become a threat to the environment. (R)  $\blacklozenge$ 

WFP.6 - Research the impacts (risks and/or benefits) of releases of genetically engineered organism.

## IV. CRITERIA FOR EVALUATION OF PROPOSALS

Proposed projects are evaluated based on a set of criteria determined by the LCMR. For proposals submitted for the biennium ending June 1995, the following criteria will be applied.

A. FOR PROPOSALS RECOMMENDED FROM ALL FUNDING SOURCES: Project Managers must be accountable and able to complete project objectives.

B. Highest priority will be given to proposals that best meet the following criteria. The total potential score for each criterion is written in parentheses.

• SIGNIFICANCE - Addresses significant environmental or natural resource issues. (9)

• UNDERLYING CAUSES - Addresses underlying causes, stresses prevention of environmental degradation and emphasizes wise stewardship. (9)

• LEGISLATIVE ANALYSIS - Addresses needs identified through other legislative initiatives. (9)

• LEVERAGING - Leverages funding (nonstate). (9)

• COORDINATION - Demonstrates a coordinated, multidisciplinary approach. (7)

• SHORT DURATION - One biennium (7)

• INNOVATION - Innovative approach. (7)

• INFORMATION BASE - Provides a significant useful addition to the information base. (5)

• ACCELERATION - Accelerates natural resource programs, does not supplant existing funding. (5)

• STATEWIDE SIGNIFICANCE - (5)

C. In addition, Trust Fund expenditures must conform to the Trust Fund law (M.S. 116P.08).

## BACKGROUND AND PROPOSAL REVIEW PROCESS

February 1991: 2,200 abstracts on natural resource needs, projects and ideas received by the LCMR in response to a request for abstracts.

Summer 1991: Summer factfinding and public regional forums held in the Willmar, Mankato and Grand Rapids vicinities. Agendas were developed from the abstracts submitted to the LCMR.

September 28, 1991: Natural Resources Congress, St. Paul. Presentation of Draft Strategic Plan to guide expenditures from the Trust Fund by the Citizen Advisory Committee. Review of 1991 Trust Fund projects and the RIM program.

October 1991: Revision of Strategic Plan for Trust Fund by Citizen Advisory Committee.

November 1991: Adoption of Strategic Plan for the Trust Fund by the Legislative Commission on Minnesota Resources.

**December 1991:** Request for Proposal (RFP) for 1993-95 biennium funding issued by Legislative Commission on Minnesota Resources for the Minnesota Future Resources Fund, (M.S. 116P.13) Trust Fund (M.S. 116P.08) and Oil Overcharge (M.S. 4.071) (one RFP for all three funds.)

February 1992: Proposals due to the Legislative Commission on Minnesota Resources.

Spring 1992: Proposal Review based on priorities and criteria in RFP.

May 1992: Begin hearings on proposals by LCMR.

July 1992: Adopt Project Recommendations (for all three funds) for funding beginning July 1, 1993. Submit recommendation to the Minnesota Legislature.

September 1992: Workprograms for recommended projects submitted to LCMR.

November 1992: Peer Review of Research Proposals recommended by LCMR.

January 15, 1993: Biennial Report due to the Legislature from LCMR.

January - May 1993: Consideration of LCMR recommendations by the Minnesota Legislature.

June 1993: Workprogram approval by LCMR.

July 1993 - July 1995: Project implementation (6 month status reports, final report due July 1995)

Appendix A

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## TRUST FUND LAW ELIGIBILITY

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## A. THE TRUST FUND LAW ALLOWS FUNDING IN THE FOLLOWING AREAS:

- 1. the reinvest in Minnesota program as provided in section 84.95, subd. 2;
- 2. research that contributes to increasing the effectiveness of protecting or
  - managing the state's environment or natural resources;
  - collection and analysis of information that assists in developing the state's environmental and natural resources policies;
- 4. enhancement of public education, awareness, and understanding necessary for the protection, conservation, restoration, and enhancement of air, land, water, forests, fish, wildlife and
  - other natural resources;
  - capital projects for the preservation and protection of unique natural resources;
  - activities that preserve or enhance fish, wildlife, land, air, water, and other
    - natural resources that otherwise may be substantially impaired or destroyed in any area of the state;
- 7. administrative and investment expenses incurred by the state board of
  - investment in investing deposits to the trust fund; and
  - administrative expenses subject to the limits in section 116P.09.

• The state recreation system and the metro regional recreation system is included in the definition of natural resources and therefore is eligible for funding.

## **B.** ACTIVITIES INELIGIBLE FOR FUNDING FROM THE TRUST FUND ARE:

- purposes of environmental compensation and liability under Chapter 115B and response actions under Chapter 115C;
- purposes of municipal water pollution control under the authority of Chapters 115 and 115, including combined sewer overflow under Section 116.162;
- costs associated with the decommissioning of nuclear power plants;
- hazardous waste disposal facilities;
- solid waste disposal facilities; or
- projects or purposes inconsistent with the strategic plan.

## C. 116P.03 TRUST FUND NOT TO SUPPLANT EXISTING FUNDING

(a) The trust fund may not be used as a substitute for traditional sources of funding environmental and natural resources activities, but the trust fund shall supplement the traditional sources, including those sources used to support the criteria in section 116P.08, subdivision 1. The trust fund must be used primarily to support activities whose benefits become available only over an extended period of time.

## D. CONSTITUTION OF THE STATE OF MINNESOTA

## ARTICLE XI

## APPROPRIATIONS AND FINANCES

Sec. 14. Environment and natural resources fund. A permanent Minnesota environment and natural resources trust fund is established in the state treasury. The principal of the environment and natural resources trust fund must be perpetual and inviolate forever, except appropriations may be made from up to 25 percent of the annual revenues deposited in the fund until fiscal year 1997 and loans may be made of up to five percent of the principal of the fund for water system improvements as provided by law. This restriction does not prevent the sale of investments at less than the cost to the fund, however, all losses not offset by gains shall be repaid to the fund from the earnings of the fund. The net earnings from the fund shall be appropriated in a manner prescribed by law for the public purpose of protection, conservation, preservation and enhancement of the state's air, water, land, fish, wildlife and other natural resources. Not less than 40 percent of the net proceeds from any state-operated lottery must be credited to the fund until the year 2001. (Adopted, November 8, 1988; Amended November 6, 1990)

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Appendix B

# MINNESOTA STATUTES 1992

**Environmental Protection Funds** 

# **CHAPTER 116P**

# ENVIRONMENT AND NATURAL RESOURCES TRUST FUND

116P.01 Findings.
116P.02 Definitions.
116P.03 Trust fund not to supplant existing funding.
116P.04 Trust fund account.
116P.05 Legislative commission on Minnesota resources.
116P.06 Advisory committee.
116P.07 Resources congress.

116P.08 Trust fund expenditures; exceptions; plans.
116P.09 Administration.
116P.10 Royalties, copyrights, patents.
116P.11 Availability of funds for disbursement.
116P.12 Water system improvement loan program.
116P.13 Minnesota future resources fund.

## 116P.01 FINDINGS.

The legislature finds that all Minnesotans share the responsibility to ensure wise stewardship of the state's environment and natural resources for the benefit of current citizens and future generations. Proper management of the state's environment and natural resources includes and requires foresight, planning, and long-term activities that allow the state to preserve its high quality environment and provides for wise use of its natural resources. The legislature also finds that to undertake such activities properly, a long-term, consistent, and stable source of funding must be provided.

History: 1988 c 690 art 1 s 5

#### 116P.02 DEFINITIONS.

Subdivision 1. Applicability. The definitions in this section apply to sections 116P.01 to 116P.13.

Subd. 2. Advisory committee. "Advisory committee" means the advisory committee created in section 116P.06.

Subd. 3. Board. "Board" means the state board of investment.

Subd. 4. Commission. "Commission" means the legislative commission on Minnesota resources.

Subd. 5. Natural resources. "Natural resources" includes the outdoor recreation system under section 86A.04 and regional recreation open space systems as defined under section 473.351, subdivision 1.

Subd. 6. Trust fund. "Trust fund" means the Minnesota environment and natural resources trust fund established under Minnesota Constitution, article XI, section 14.

History: 1988 c 690 art 1 s 6: 1989 c 335 art 1 s 269

## 116P.03 TRUST FUND NOT TO SUPPLANT EXISTING FUNDING.

(a) The trust fund may not be used as a substitute for traditional sources of funding environmental and natural resources activities, but the trust fund shall supplement the traditional sources, including those sources used to support the criteria in section 116P.08, subdivision 1. The trust fund must be used primarily to support activities whose benefits become available only over an extended period of time.

(b) The commission must determine the amount of the state budget spent from traditional sources to fund environmental and natural resources activities before and after the trust fund is established and include a comparison of the amount in the report under section 116P.09, subdivision 7.

History: 1988 c 690 art 1 s 7

Appendix C

## 116P.04 TRUST FUND ACCOUNT.

Subdivision 1. Establishment of account and investment. A Minnesota environment and natural resources trust fund, under article XI, section 14, of the Minnesota Constitution, is established as an account in the state treasury. The commissioner of finance shall credit to the trust fund the amounts authorized under this section and section 116P.10. The state board of investment shall ensure that trust fund money is invested under section 11A.24. All money earned by the trust fund must be credited to the trust fund. The principal of the trust fund and any unexpended earnings must be invested and reinvested by the state board of investment.

Subd. 2. [Repealed, 1990 c 610 art 1 s 59]

Subd. 3. Revenue. Nothing in sections 116P.01 to 116P.12 limits the source of contributions to the trust fund.

Subd. 4. Gifts and donations. Gifts and donations, including land or interests in land, may be made to the trust fund. Noncash gifts and donations must be disposed of for cash as soon as the board prudently can maximize the value of the gift or donation. Gifts and donations of marketable securities may be held or be disposed of for cash at the option of the board. The cash receipts of gifts and donations of cash or capital assets and marketable securities disposed of for cash must be credited immediately to the principal of the trust fund. The value of marketable securities at the time the gift or donation is made must be credited to the principal of the trust fund and any earnings from the marketable securities are earnings of the trust fund.

Subd. 5. Audits required. The legislative auditor shall audit trust fund expenditures to ensure that the money is spent for the purposes provided in the commission's budget plan.

History: 1988 c 690 art 1 s 8; 1990 c 610 art 1 s 44; 1991 c 343 s 1

## 116P.05 LEGISLATIVE COMMISSION ON MINNESOTA RESOURCES.

Subdivision 1. Membership. (a) A legislative commission on Minnesota resources of 16 members is created, consisting of the chairs of the house and senate committees on environment and natural resources or designees appointed for the terms of the chairs, the chairs of the house appropriations and senate finance committees or designees appointed for the terms of the chairs, six members of the senate appointed by the subcommittee on committees of the committee on rules and administration, and six members of the house appointed by the speaker.

At least two members from the senate and two members from the house must be from the minority caucus. Members are entitled to reimbursement for per diem expenses plus travel expenses incurred in the services of the commission.

(b) Members shall appoint a chair who shall preside and convene meetings as often as necessary to conduct duties prescribed by this chapter.

(c) Members shall serve on the commission until their successors are appointed.

(d) Vacancies occurring on the commission shall not affect the authority of the remaining members of the commission to carry out their duties, and vacancies shall be filled in the same manner under paragraph (a).

Subd. 2. Duties. (a) The commission shall recommend a budget plan for expenditures from the environment and natural resources trust fund and shall adopt a strategic plan as provided in section 116P.08.

(b) The commission shall recommend expenditures to the legislature from the Minnesota future resources fund under section 116P.13.

(c) It is a condition of acceptance of the appropriations made from the Minnesota future resources fund, Minnesota environment and natural resources trust fund, and oil overcharge money under section 4.071, subdivision 2, that the agency or entity receiving the appropriation must submit a work program and semiannual progress reports in the form determined by the legislative commission on Minnesota resources. None of the money provided may be spent unless the commission has approved the pertinent work program.

(d) The commission may adopt operating procedures to fulfill its duties under sections 116P.01 to 116P.13.

**History:** 1988 c 690 art 1 s 9; 1989 c 335 art 1 s 269; 1990 c 594 art 1 s 56; 1991 c 254 art 2 s 39; 1991 c 343 s 2

## 116P.06 ADVISORY COMMITTEE.

Subdivision 1. Membership. (a) An advisory committee of 11 citizen members shall be appointed by the governor to advise the legislative commission on Minnesota resources on project proposals to receive funding from the trust fund and the development of budget and strategic plans. The governor shall appoint at least one member from each congressional district. The governor shall appoint the chair.

(b) The governor's appointees must be confirmed with the advice and consent of the senate. The membership terms, compensation, removal, and filling of vacancies for citizen members of the advisory committee are governed by section 15.0575.

Subd. 2. Duties. (a) The advisory committee shall:

(1) prepare and submit to the commission a draft strategic plan to guide expenditures from the trust fund;

(2) review the reinvest in Minnesota program during development of the draft strategic plan;

(3) gather input from the resources congress during development of the draft strategic plan;

(4) advise the commission on project proposals to receive funding from the trust fund; and

(5) advise the commission on development of the budget plan.

(b) The advisory committee may review all project proposals for funding and may make recommendations to the commission on whether the projects:

(1) meet the standards and funding categories set forth in sections 116P.01 to 116P.12;

(2) duplicate existing federal, state, or local projects being conducted within the state; and

(3) are consistent with the most recent strategic plan adopted by the commission.

History: 1988 c 690 art 1 s 10; 1989 c 335 art 1 s 269; 1991 c 254 art 2 s 40; 1991 c 343 s 3

## 116P.07 RESOURCES CONGRESS.

2:

The commission must convene a resources congress at least once every biennium and shall develop procedures for the congress. The congress must be open to all interested individuals. The purpose of the congress is to collect public input necessary to allow the commission, with the advice of the advisory committee, to develop a strategic plan to guide expenditures from the trust fund. The congress also may be convened to receive and review reports on trust fund projects. The congress shall also review the reinvest in Minnesota program.

History: 1988 c 690 art 1 s 11; 1991 c 254 art 2 s 41; 1991 c 343 s 4

## 116P.08 TRUST FUND EXPENDITURES; EXCEPTIONS; PLANS.

Subdivision 1. Expenditures. Money in the trust fund may be spent only for:

(1) the reinvest in Minnesota program as provided in section 84.95, subdivision

(2) research that contributes to increasing the effectiveness of protecting or managing the state's environment or natural resources;

(3) collection and analysis of information that assists in developing the state's environmental and natural resources policies;

(4) enhancement of public education, awareness, and understanding necessary for

the protection, conservation, restoration, and enhancement of air, land, water, forests, fish, wildlife, and other natural resources;

(5) capital projects for the preservation and protection of unique natural resources;

(6) activities that preserve or enhance fish, wildlife, land, air, water, and other natural resources that otherwise may be substantially impaired or destroyed in any area of the state;

(7) administrative and investment expenses incurred by the state board of investment in investing deposits to the trust fund; and

(8) administrative expenses subject to the limits in section 116P.09.

Subd. 2. Exceptions. Money from the trust fund may not be spent for:

(1) purposes of environmental compensation and liability under chapter 115B and response actions under chapter 115C;

(2) purposes of municipal water pollution control under the authority of chapters 115 and 116, including combined sewer overflow under section 116.162;

(3) costs associated with the decommissioning of nuclear power plants;

(4) hazardous waste disposal facilities;

(5) solid waste disposal facilities; or

(6) projects or purposes inconsistent with the strategic plan.

Subd. 3. Strategic plan required. (a) The commission shall adopt a strategic plan for making expenditures from the trust fund, including identifying the priority areas for funding for the next six years. The strategic plan must be updated every two years. The plan is advisory only. The commission shall submit the plan, as a recommendation, to the house of representatives appropriations and senate finance committees by January 1 of each odd-numbered year.

(b) The commission may accept or modify the draft of the strategic plan submitted to it by the advisory committee before voting on the plan's adoption.

Subd. 4. Budget plan. (a) Funding may be provided only for those projects that meet the categories established in subdivision 1.

(b) Projects submitted to the commission for funding may be referred to the advisory committee for recommendation.

(c) The commission must adopt a budget plan to make expenditures from the trust fund for the purposes provided in subdivision 1. The budget plan must be submitted to the governor for inclusion in the biennial budget and supplemental budget submitted to the legislature.

(d) Money in the trust fund may not be spent except under an appropriation by law.

Subd. 5. Public meetings. All advisory committee and commission meetings must be open to the public. The commission shall attempt to meet at least once in each of the state's congressional districts during each biennium.

Subd. 6. Peer review. (a) Research proposals must include a stated purpose, timeline, potential outcomes, and an explanation of the need for the research. All research proposals must be reviewed by a peer review panel before receiving an appropriation from the trust fund.

(b) In conducting research proposal reviews, the peer review panel shall:

(1) comment on the methodology proposed and whether it can be expected to yield appropriate and useful information and data;

(2) comment on the need for the research and about similar existing information available, if any;

(3) comment on whether the research proposed meets the categories of subdivision 1; and

(4) report to the commission and advisory committee on clauses (1) to (3).

(c) The peer review panel also must review completed research proposals that have received an appropriation from the trust fund and comment and report upon whether the project reached the intended goals.

Subd. 7. Peer review panel membership. (a) The peer review panel must consist of at least five but not more than 11 members who are knowledgeable in general research methods, including but not limited to the areas of air quality research, water research, forest research, fish and wildlife management research, environmental health research, and soil conservation research. Not more than two members of the panel may be employees of state agencies.

(b) Members of the peer review panel shall be selected by the commission and serve four-year staggered terms according to section 15.059. The commission may select additional temporary members for any research proposal deemed to be too technical for adequate peer review by the panel in paragraph (a). Members of the peer review panel shall elect a chair every two years who shall be responsible for convening meetings of the panel as often as is necessary to fulfill its duties as prescribed in this section. Compensation of panel members is governed by section 15.059, subdivision 3.

**History:** 1988 c 690 art 1 s 12; 1989 c 335 art 1 s 178; 1991 c 254 art 2 s 42,43; 1991 c 343 s 5,6

## 116P.09 ADMINISTRATION.

Subdivision 1. Administrative authority. The commission may appoint legal and other personnel and consultants necessary to carry out functions and duties of the commission. Permanent employees shall be in the unclassified service. In addition, the commission may request staff assistance and data from any other agency of state government as needed for the execution of the responsibilities of the commission and advisory committee and an agency must promptly furnish it.

Subd. 2. Liaison officers. The commission shall request each department or agency head of all state agencies with a direct interest and responsibility in any phase of environment and natural resources to appoint, and the latter shall appoint for the agency, a liaison officer who shall work closely with the commission and its staff.

Subd. 3. Appraisal and evaluation. The commission shall obtain and appraise information available through private organizations and groups, utilizing to the fullest extent possible studies, data, and reports previously prepared or currently in progress by public agencies, private organizations, groups, and others, concerning future trends in the protection, conservation, preservation, and enhancement of the state's air, water, land, forests, fish, wildlife, native vegetation, and other natural resources. Any data compiled by the commission shall be made available to any standing or interim committee of the legislature upon the request of the chair of the respective committee.

Subd. 4. Personnel. Persons who are employed by a state agency to work on a project and are paid by an appropriation from the trust fund or Minnesota future resources fund are in the unclassified civil service, and their continued employment is contingent upon the availability of money from the appropriation. When the appropriation has been spent, their positions must be canceled and the approved complement of the agency reduced accordingly. Part-time employment of persons for a project is authorized.

Subd. 5. Administrative expense. The administrative expenses of the commission shall be paid from the various funds administered by the commission as follows:

(1) Through June 30, 1993, the administrative expenses of the commission and the advisory committee shall be paid from the Minnesota future resources fund. After that time, the prorated expenses related to administration of the trust fund shall be paid from the earnings of the trust fund.

(2) After June 30, 1993, the prorated expenses related to administration of the trust fund may not exceed an amount equal to four percent of the projected earnings of the trust fund for the biennium.

Subd. 6. Conflict of interest. A commission member, advisory committee member, peer review panelist, or an employee of the commission may not participate in or vote on a decision of the commission, advisory committee, or peer review panel relating to an organization in which the member, panelist, or employee has either a direct or indirect personal financial interest. While serving on the legislative commission, advisory committee, or peer review panel, or being an employee of the commission, a person shall avoid any potential conflict of interest.

Subd. 7. **Report required.** The commission shall, by January 15 of each oddnumbered year, submit a report to the governor, the chairs of the house appropriations and senate finance committees, and the chairs of the house and senate committees on environment and natural resources. Copies of the report must be available to the public. The report must include:

(1) a copy of the current strategic plan;

(2) a description of each project receiving money from the trust fund and Minnesota future resources fund during the preceding biennium;

(3) a summary of any research project completed in the preceding biennium;

(4) recommendations to implement successful projects and programs into a state agency's standard operations;

(5) to the extent known by the commission, descriptions of the projects anticipated to be supported by the trust fund and Minnesota future resources account during the next biennium;

(6) the source and amount of all revenues collected and distributed by the commission, including all administrative and other expenses;

(7) a description of the assets and liabilities of the trust fund and the Minnesota future resources fund;

(8) any findings or recommendations that are deemed proper to assist the legislature in formulating legislation;

(9) a list of all gifts and donations with a value over \$1,000:

(10) a comparison of the amounts spent by the state for environment and natural resources activities through the most recent fiscal year; and

(11) a copy of the most recent compliance audit.

History: 1988 c 690 art 1 s 13; 1991 c 254 art 2 s 44-46; 1991 c 343 s 7-10

## 116P.10 ROYALTIES, COPYRIGHTS, PATENTS.

The trust fund owns and shall take title to the percentage of a royalty, copyright, or patent resulting from a project supported by the trust fund equal to the percentage of the project's total funding provided by the trust fund. Cash receipts resulting from a royalty, copyright, or patent, or the sale of the trust fund's rights to a royalty, copyright, or patent, must be credited immediately to the principal of the trust fund. Before a project is included in the budget plan, the commission may vote to relinquish the ownership or rights to a royalty, copyright, or patent resulting from a project supported by the trust fund to the project's proposer when the amount of the original grant or loan, plus interest, has been repaid to the trust fund.

History: 1988 c 690 art 1 s 14

#### 116P.11 AVAILABILITY OF FUNDS FOR DISBURSEMENT.

(a) The amount biennially available from the trust fund for the budget plan developed by the commission consists of the interest earnings generated from the trust fund. Interest earnings generated from the trust fund shall equal the amount of interest on debt securities and dividends on equity securities. Gains and losses arising from the sale of securities shall be apportioned as follows:

(1) if the sale of securities results in a net gain during a fiscal year, the gain shall be apportioned in equal installments over the next ten fiscal years to offset net losses in those years. If any portion of an installment is not needed to recover subsequent losses identified in paragraph (b), it shall be added to the principal of the fund; and (2) if the sale of securities results in a net loss during a fiscal year, the net loss shall be recovered from the gains in paragraph (a) apportioned to that fiscal year. If such gains are insufficient, any remaining net loss shall be recovered from interest and dividend income in equal installments over the following five fiscal years.

(b) For funding projects through fiscal year 1997, the following additional amounts are available from the trust fund for the budget plans developed by the commission:

(1) for the 1991-1993 biennium, up to 25 percent of the revenue deposited in the trust fund in fiscal years 1990 and 1991;

(2) for the 1993-1995 biennium, up to 20 percent of the revenue deposited in the trust fund in fiscal year 1992 and up to 15 percent of the revenue deposited in the fund in fiscal year 1993;

(3) for the 1993-1995 biennium, up to 25 percent of the revenue deposited in the trust fund in fiscal years 1994 and 1995, to be expended only for capital investments in parks and trails; and

(4) for the 1995-1997 biennium, up to ten percent of the revenue deposited in the fund in fiscal year 1996.

(c) Any appropriated funds not encumbered in the biennium in which they are appropriated cancel and must be credited to the principal of the trust fund.

History: 1988 c 690 art 1 s 15; 1990 c 594 art 1 s 57; 1990 c 612 s 14; 1992 c 513 art 2 s 27; 1992 c 539 s 10

## 116P.12 WATER SYSTEM IMPROVEMENT LOAN PROGRAM.

Subdivision 1. Loans authorized. (a) If the principal of the trust fund equals or exceeds \$200,000,000, the commission may vote to set aside up to five percent of the principal of the trust fund for water system improvement loans. The purpose of water system improvement loans is to offer below market rate interest loans to local units of government for the purposes of water system improvements.

(b) The interest on a loan shall be calculated on the declining balance at a rate four percentage points below the secondary market yield of one-year United States treasury bills calculated according to section 549.09, subdivision 1, paragraph (c).

(c) An eligible project must prove that existing federal or state loans or grants have not been adequate.

(d) Payments on the principal and interest of loans under this section must be credited to the trust fund.

(e) Repayment of loans made under this section must be completed within 20 years.

(f) The Minnesota public facilities authority must report to the commission each year on the loan program under this section.

Subd. 2. Application and administration. (a) The commission must adopt a procedure for the issuance of the water system improvement loans by the public facilities authority.

(b) The commission also must ensure that the loans are administered according to its fiduciary standards and requirements.

History: 1988 c 690 art 1 s 16

## 116P.13 MINNESOTA FUTURE RESOURCES FUND.

Subdivision 1. Revenue sources. The money in the Minnesota future resources fund consists of revenue credited under section 297.13, subdivision 1, clause (1).

Subd. 2. Interest. The interest attributable to the investment of the Minnesota future resources fund must be credited to the fund.

Subd. 3: Revenue purposes. Revenue in the Minnesota future resources fund may be spent for purposes of natural resources acceleration and outdoor recreation, including but not limited to the development, maintenance, and operation of the state outdoor recreation system under chapter 86A and regional recreation open space systems as defined under section 473.351, subdivision 1.

History: 1988 c 690 art 1 s 17; 1989 c 335 art 1 s 179

# THE LEGISLATIVE COMMISSION ON MINNESOTA RESOURCES

Commission Members: Senator Gene Merriam, Chair Senators: Charles Berg, Greg Dahl, Dennis Frederickson, Bob Lessard, William Luther, Roger Moe, Earl Renneke

Representatives: Virgil Johnson, Phyllis Kahn, Henry Kalis, Tony Kinkel, Willard Munger, Tom Osthoff, John Sarna, Brad Stanius

## CITIZEN ADVISORY COMMITTEE (CAC)

Citizen Advisory Committee Members: C. Merle Anderson, Chair, Al Brodie, Ruth Fitzmaurice, Joseph Sizer, Bob De Vries, Gena Doyscher, John Rose, Jack LaVoy, Darby Nelson, Christine Kneeland, Patricia Baker

