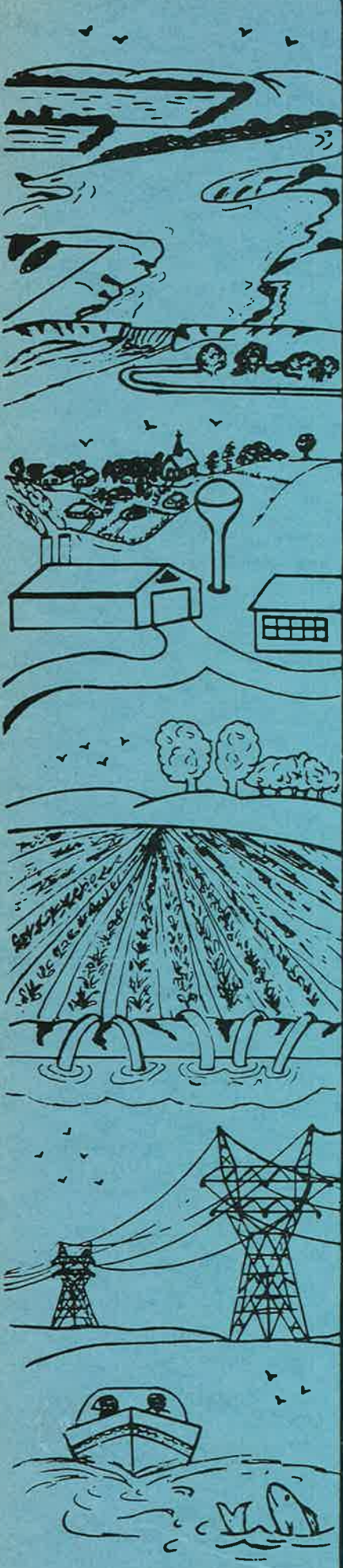


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Report of
NORTH DAKOTA STATE WATER CONSERVATION COMMISSION
 1301 State Capitol
BISMARCK, NORTH DAKOTA

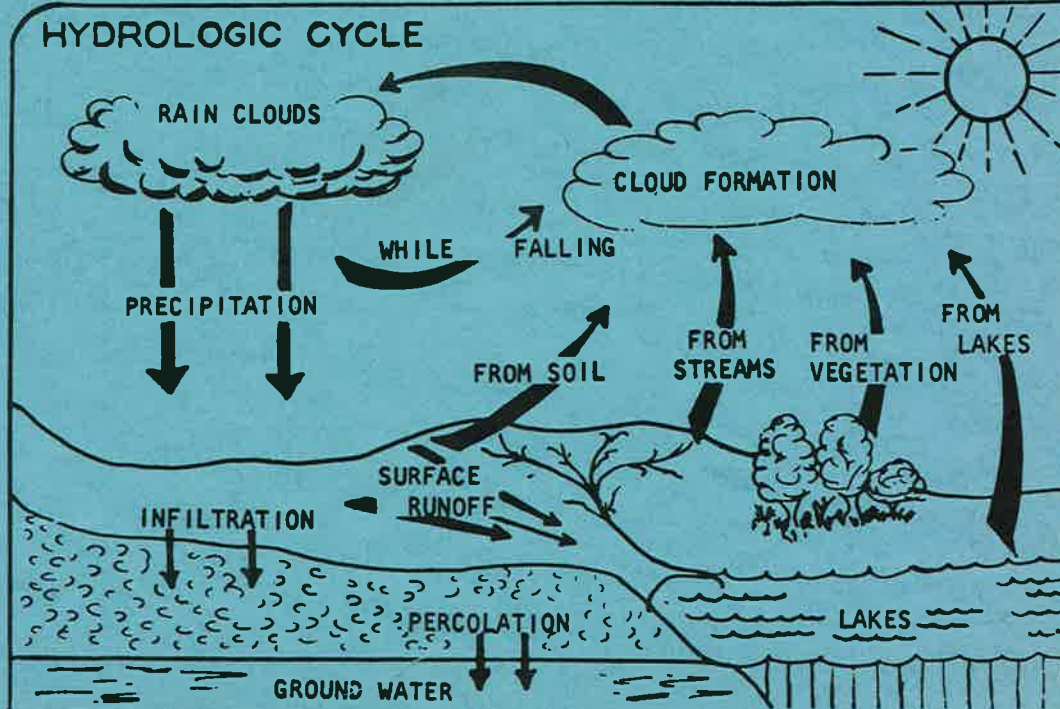
KULM DAM AND RECREATION COMPLEX
LaMOURE COUNTY

SORA PROJECT #23-10 - SWC PROJECT #259

Prepared in Cooperation with the
 North Dakota State Game & Fish Department
 North Dakota State Outdoor Recreation Agency
 North Dakota State Water Commission
 LaMoure County Park Board
 LaMoure County Water Management District

February 28, 1967

HYDROLOGIC CYCLE



NORTH DAKOTA STATE WATER COMMISSION

PROJECT REPORT

NAME: Kulm Dam and Recreation Complex, LaMoure County
PROJECT: SWC #259 - SORA #23-10
DATE: February 28, 1967

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14. Agreement for Construction

North Dakota State Water Commission

1301 State Capitol

223-8000 Ext. 251

Bismarck, North Dakota 58501

February 28, 1967

John Greenslit
State Liaison Officer
State Outdoor Recreation Agency
Bismarck, North Dakota 58501

RE: Kulm Dam and Recreation Complex,
SWC Project #259, SORA Project #23-10

Dear Mr. Greenslit:

Enclosed are seven copies of a development project proposal for the Kulm Dam and Recreation Complex in LaMoure County prepared by our office in cooperation with the LaMoure County Water Management District, State Game and Fish Department, and State Outdoor Recreation Agency.

Also included in the proposal are copies of the acquisition proposal - BOR Form 8-90 - for informational purposes.

Copies of this report are being provided all project participants. The LaMoure County Water Management District is the primary sponsor of the project.

Please keep us advised of the project's progress as it is submitted to the BOR for a Federal grant from the Land and Water Conservation Fund. We appreciate the cooperation of all concerned in the preparation of this report.

Sincerely yours,

Milo W. Hoisveen

Milo W. Hoisveen
Engineer-Secretary

MWH:JS:ka

cc: LaMoure County WMD
Game & Fish Dept.
Gordon Gray

Governor William L. Guy
Chairman
Richard P. Gallagher
Vice Chairman - Mandan

Harold Hanson
New England
Russell Dushinske
Devils Lake

Henry J. Steinberger
Donnybrook
Gordon K. Gray
Valley City

Arne Dahl, Ex-Officio Member
Comm. of Agriculture & Labor
Milo W. Hoisveen, Secretary
Chief Engineer & State Engineer

DEPARTMENT OF THE INTERIOR
BUREAU OF OUTDOOR RECREATION
PROJECT PROPOSAL - DEVELOPMENT

LEAVE BLANK FOR BOR USE ONLY

Date Received	Priority	Project Number
---------------	----------	----------------

Project Officer

Use this form for submission of individual projects which will develop lands and waters to facilitate their use by the public for outdoor recreation. If concurrent Acquisition is being undertaken, check here by North Dakota Game and Fish Department

SECTION 1

1. State or Territory **North Dakota** 2. Name and address of agency responsible for project **LaMoure County Water Management District, Litchville, North Dakota**

3. Project Title **Kulm Dam and Recreation Complex, LaMoure County, SORA Project #23-10**

4. Brief description of project **Located in Section 14, Township 133, Range 65, LaMoure County, midway between Kulm ('60 population-664) and Edgeley ('60 population-992), the project includes construction of a dam to create a 27 acre reservoir with an average depth of 12 feet and maximum depth of 31 feet. A picnic area, boat ramp and parking lot are to be developed and the area landscaped to enhance the area's natural beauty.**

Benefit-cost ratio for the project, including land costs shown on the acquisition proposal, is 2.22:1. The project is to be constructed on lands leased to the District by the Game and Fish Department which is purchasing the land through a separate project proposal to BOR. The State Outdoor Recreation Agency Plan indicates 1970 needs for fishing and picnicking areas in Region V and local unmet needs for boating would be partially met with this project.

5. Duration of project from **4-1-67** to **9-30-69** 6. Federal assistance requested **\$28,340** 7. Recommended priority **A**

8. Name, Organization, and Title of individual having day-to-day responsibility for direction of project **Arlis Hanson, Chairman
LaMoure County Water Management District
Litchville, North Dakota 58461** 9. Name and Address to appear on check **Milo W. Moisveen, State Fiscal Officer
1301 State Capitol
Bismarck, North Dakota 58501**

10. TERMS AND CONDITIONS: In submitting this Project Proposal, the State hereby accepts the Terms and Conditions set forth in the BOR Grants-in-Aid Manual, which will be a part of the Project Agreement for any grant awarded under this proposal.

11. CERTIFICATION: As the official designated to represent the State and act for the State for purposes of the Land and Water Conservation Fund Act, I recommend that assistance be made available from the Fund, when monies are available, in accordance with the recommended priority. No financial assistance has been given or promised under any other Federal program or activity with regard to the proposed project. The State or public agency to be responsible for the proposed project has the ability and

intention to finance its share of the costs of this project. The Applicant will not discriminate against any person on the basis of race, color, or national origin in the use of any property or facility acquired or developed pursuant to this proposal, and shall comply with the terms and intent of Title VI of the Civil Rights Act of 1964, P. L. 88-354 (1964), and of the regulations promulgated pursuant to such Act by the Secretary of the Interior and contained in 43 CFR 17.

(Signature)

John Greenslit

(Name)

(Date)

State Liaison Officer

(Title)

12. For State use
**7 SORA
1 Game & Fish Dept.
1 LaMoure County WND
1 LaMoure County Pk. Bd.
10 SVC**

February 28, 1967

DEPARTMENT OF THE INTERIOR
BUREAU OF OUTDOOR RECREATION
PROJECT PROPOSAL - ACQUISITION

LEAVE BLANK FOR BOR USE ONLY

Date Received	Priority	Project Number
---------------	----------	----------------

Project Officer

Use this form for submission of individual projects for acquiring lands and waters or interests in lands and waters for public outdoor recreation purposes. If concurrent Development is being undertaken, check here

SECTION 1

1. State or Territory North Dakota	2. Name and address of agency responsible for project North Dakota Game and Fish Department, Bismarck, N. D. 58501
---------------------------------------	---

3. Project Title
KULM RESERVOIR

4. Brief description of project

A dam is to be constructed creating a reservoir with about 27 surface acres. The reservoir will have sufficient depth to provide a high-quality fishing lake. The upper reaches of the reservoir will provide some wildlife habitat and public shooting. A limited amount of boating will be provided.

40 acres will be acquired.

5. Duration of project from 3/1/67 to 9/1/69	6. Federal assistance requested 50% cost-sharing on land and dam \$1,500.00	7. Recommended priority A
---	--	------------------------------

8. Name, Organization, and Title of individual having day-to-day responsibility for direction of project LaMoure County Water Management Board LaMoure, N.D.	9. Name and Address to appear on check Milo Hoisveen, Fiscal Officer 1301 State Capitol, Bismarck, N.D.
--	---

10. TERMS AND CONDITIONS: In submitting this Project Proposal, the State hereby accepts the Terms and Conditions set forth in the BOR Grants-in-Aid Manual, which will be a part of the Project Agreement for any grant awarded under this proposal.

11. CERTIFICATION: As the official designated to represent the State and act for the State for purposes of the Land and Water Conservation Fund Act, I recommend that assistance be made available from the Fund, when monies are available, in accordance with the recommended priority. No financial assistance has been given or promised under any other Federal program or activity with regard to the proposed project. The State or public agency to be responsible for the proposed project has the ability and

intention to finance its share of the costs of this project. The Applicant will not discriminate against any person on the basis of race, color, or national origin in the use of any property or facility acquired or developed pursuant to this proposal, and shall comply with the terms and intent of Title VI of the Civil Rights Act of 1964, P. L. 88-354 (1964), and of the regulations promulgated pursuant to such Act by the Secretary of the Interior and contained in 43 CFR 17.

John Greenslit

(Signature)

John Greenslit

(Name)

(Date)

State Liaison Officer

(Title)

12. For State use

SECTION 11

1. Nature and Extent of Use - A. For entire area in which acquisitions are to be made:
to provide dam and reservoir for water-based recreation --
primarily fishing
- B. For area to be acquired:

2. BOR Classification of area	3. Check one <input checked="" type="checkbox"/> New Site <input type="checkbox"/> Addition to existing site	4. Location County <u>LaMoure</u> Town <u>Edgeley</u> Town population _____ Miles from Town <u>4</u> , west
5. Total acres to be acquired appr. 40	6. Cover, acres in A. Forest _____ B. Rock _____ C. Cutover _____ D. Swamp _____ E. Grass <u>40</u> F. Desert _____ G. Water _____	
7. Topography, acres in A. Flat _____ B. Hilly _____ C. Rolling <u>X</u> D. Mountainous _____	8. Waterfront, feet on A. Ocean _____ B. Lake _____ C. Stream _____	9. Roadfront, feet on A. Dirt _____ B. Gravel _____ C. Paved _____

10. PARCELS TO BE ACQUIRED

PARCEL NUMBER	ACRES	ESTIMATED VALUE	NUMBER OF BUILDINGS	ESTIMATED VALUE	METHOD OF ACQUISITION	APPROX. DATE OF ACQUISITION	TOTAL VALUE
1	40.0	3,000.00	none	--	fee title	4/1/67	\$3,000.00

FOR CONCURRENT ACQUISITION AND DEVELOPMENT PROJECT SUBMISSIONS			TOTAL ESTIMATED VALUE \$		3,000.00
Total estimated acquisition value	\$3,000.00	Amount of Federal acquisition assistance requested		1,500.00	
Total estimated development costs	56,680.00	Source of remainder of funds			
TOTAL 59,680.00		Game and Fish Department appropriations			
Total amount of Federal assistance requested 29,840.00		No other federal funds have been requested.			
Source of remainder of funds					

SECTION 111 - ATTACHMENTS

- Attach, by reference number, the following supplemental documents necessary to process this Acquisition Project Proposal:
- A-660-1 *Project Justification.* A. Description of how the proposed project is in accord with the State outdoor recreation plan and would help meet priority needs identified in the plan. Indicate how the natural beauty of the area will be preserved. B. Indicate other organizations consulted during formulation of this proposal. C. Plans for Operations and Maintenance.
 - A-660-2 *Maps and Charts.* A. Simple plot plan or map showing the total area to be acquired and its relationship to the surrounding area. Annotate any plans for streets, highways, waterlines, sewers, etc. to be located on or near the involved area. (Key to show location within State, County, or city.) B. Description of any improvements on lands to be acquired. C. Description of all legal rights to be held by applicant and any other person or organization.
 - A-660-3 *Agreements.* A. Agreements or arrangements made with other organizations for participating in the project, or in later operation and maintenance of the completed project.
- The items shown below need *not* be submitted with the project proposal. However, during the course of execution of an approved project, the applicant should be prepared to submit them to the Bureau for review, as follows:
- A-660-4 Appraisal reports and other documentation of cost.
 - A-660-5 Satisfactory evidence of title (such as an opinion by the State Attorney General) for each parcel.
 - A-660-6 Five-year history of conveyances for each parcel listed in project proposal (name of parties involved, dates, interest conveyed and consideration).

NORTH DAKOTA STATE WATER COMMISSION

PROJECT DEVELOPMENT - JUSTIFICATION REPORT
KULM DAM AND RECREATION COMPLEX, LaMOURE COUNTY
SORA PROJECT #23-10
SWC PROJECT #259

February 28, 1967

D-660-1. Project Plan and Justification

- A. Development of the Kulm Dam and Recreation Complex will provide opportunities for fishing, boating, water skiing, and picnicking.

The North Dakota State Comprehensive Outdoor Recreation Plan as revised and updated, 1966, LONG RANGE PLAN TO 1980 document, pages 60, 61 and 62 indicates outdoor recreation needs in North Dakota.

The unmet needs in 1965 for fishing were 35,376 acres, by 1980 this will increase to 61,546 acres of needed additional fishing acres. In 1965 there was a statewide need for 8,655 additional acres for boating and water skiing, this will increase to a needed additional 30,310 acres by 1980. In 1965 there was a statewide need for 904 additional acres of picnicking, this will increase to a need for 1,743 acres.

The Kulm Dam and Recreation area project, as proposed will help to meet statewide needs identified in the North Dakota State Comprehensive Outdoor Recreation Plan, both immediate and long range.

The project is accorded BOR Priority designation "A."

- B. The Kulm Dam and Recreation Complex is located midway between Kulm (1960 population - 664) and Edgeley (1960 population - 992) in LaMoure County - Economic Region V of the North Dakota State Outdoor Recreation Plan.

The area is covered by natural grass and is presently used for pasture. County and township roads are to be improved by the respective entities to provide easy public access to the area from State Highway #13, located two miles north of the project.

A deep draw in the area provides a natural place to develop a reservoir which will cover 27 acres and have an average depth of 12 feet and a maximum depth of 31 feet. Tree and shrub plantings and general layout of the project features are planned so as to enhance the area's appearance and add to its natural beauty.

- C. A \$42,000 dam is planned for construction to create a 27 acre reservoir. Detailed cost estimates and plans are included with this proposal. The reservoir will be situated on 40 acres of land to be acquired by the State Game and Fish Department for an estimated \$3,000 as noted in the acquisition proposal, copies of which are included herein.

Recreation facilities for public use activities such as picnicking, boating, and fishing as well as facilities for parking and general area development are proposed as detailed on the cost estimate in the amount of \$8,500.

Engineering services for the project are to be provided by the State Water Commission and are estimated to cost \$4,000. The State Outdoor Recreation Agency administrative charge will be a standard four percent (4%) of total development costs or \$2,180.

In summary, the various project phases, their costs, and cost allocations are as follows:

<u>AGENCY</u>	<u>ADM. 4%</u>	<u>ENGR.</u>	<u>LAND</u>	<u>DAM</u>	<u>FACIL.</u>	<u>TOTAL</u>
SORA	\$1,090					\$ 1,090
LaMoure County WMD			\$ 750	\$ 4,250	\$4,250	9,250
Game & Fish Dept.			750	7,250		8,000
SWC		\$2,000		9,500		11,500
BOR	<u>1,090</u>	<u>2,000</u>	<u>1,500</u>	<u>21,000</u>	<u>4,250</u>	<u>29,840</u>
TOTALS	\$2,180	\$4,000	\$3,000	\$42,000	\$8,500	\$59,680

D. The agency primarily responsible for each project phase is as follows:

SORA Administration - SORA

Engineering - SWC

Land Acquisition - State Game & Fish Department

Dam Construction - SWC

Recreation Facilities Installation - LaMoure County
Water Management District

Financing - Bureau of Outdoor Recreation, SORA, Game
and Fish Department, SWC and LaMoure County
Water Management District.

All activities for the project will be coordinated by all project participants. The dam construction phase will be completed by private contractors under supervision of State Water Commission engineers.

E. It is estimated the project will serve a 50-mile radius area which has a 54,000 population. Anticipated annual visitation is 18,000 with an assumed value of \$1 per visitation. Annual operation and maintenance costs are estimated at \$1,800 and depreciation at

\$1,890 for total annual costs of \$3,690. With estimated annual benefits of \$18,000 less \$3,690 annual costs, the average annual net benefits are \$14,310.

Assuming the \$59,680 total costs were invested and compounded at four percent (4%) for 30 years, we would have a total product of \$193,566. With net annual benefits of \$14,310 for 30 years, we would receive total benefits of \$429,300 indicating a benefit-cost ratio of 2.22:1. A project economic feasibility report is included with this project proposal.

- F. The recreation complex will be operated and maintained by the LaMoure County Water Management District with technical assistance from the State Game and Fish Department and the State Water Commission. The area will be open to the public at all times. The District obtains its funds from a maximum 3-mill ad valorem tax levy on all property in the county. LaMoure County has a taxable valuation (1964) of \$11,164,953 in its 1,136 square mile area.

D-660-2. Maps and Charts:

- A. Included with this project proposal are the following maps and supporting data:
1. State map showing location of Kulm Project #23-10
 2. SWC #6190-259-3 "Kulm Reservoir Topography"
 3. SWC #6218-259-4 "Diversion Ditch Topography"
 4. SWC #6219-259-5 "Kulm Damsite Topography"
 5. SWC #6230-259-6 "Kulm Dam Log of Drill Holes"
 6. SWC #6279-259-7 "Kulm Dam Inlet and Outlet Details"
 7. SWC #6280-259-8 "Kulm Dam Slab Steel and Trash Rack"
 8. SWC #6667-259-9 "Kulm Dam Recreation Facilities"

9. Log of Test Holes - Soil Conservation Service Form 533
10. Detailed Geologic Investigation of Damsites (SCS 10-59)
11. Hydrology Report and Design Notes for Kulm Dam

B. The State Game and Fish Department is to acquire the necessary land in fee simple title. A water permit has been issued to the LaMoure County Water Management District by the State Engineer and a copy of the approved permit #1332 is included herein.

D-660-3. Agreements:

A. An agreement has been signed by all project participants for the development phases and land acquisition. A copy of the agreement dated November 23, 1966 is included herein. The LaMoure County Board of Commissioners approved the project on December 6, 1966 in accordance with Rules and Regulations of the State Outdoor Recreation Agency.

D-660-4. Plans:

A. Final construction plans will be submitted to the State Outdoor Recreation Agency as required.

Prepared by:

Jim Schulz, Assistant Secretary
North Dakota State Water Commission

Dist.
7 SORA
1 Game & Fish Dept.
1 LaMoure Co. WMD
1 LaMoure Pk. Bd.
10 SWC

NORTH DAKOTA STATE WATER COMMISSION

COST ESTIMATE

KULM DAM
 Project #259
 January 30, 1967

Water Control	\$	100.00
Embankment 43,000 yd. ³ + 20% + 5% @\$0.35		18,800.00
Core Excavation and Backfill 3,200 yd. ³ @\$0.75		2,400.00
30" Concrete Pipe 164' @\$14.00		2,300.00
48" Concrete Pipe 30' @\$20.00		600.00
Concrete Base		260.00
Riprap 1,600 yd. @\$4.00		4,800.00
Gravel 310 yd. @\$3.00		930.00
Seeding		200.00
Diversion Works 1,300 yd. ³ @\$0.40		520.00
Stripping Base 2,500 yd. ³ @\$0.30		750.00
Emergency Spillway 600 yd. ³ @\$0.60		360.00
4" Drain 220' @\$4.00		880.00
4" Valve and Valve Box		<u>200.00</u>
	Sub Total	\$33,100.00
Contingencies		3,100.00
Engineering		3,620.00
Indirect Costs		<u>2,180.00</u>
	TOTAL	\$42,000.00

NORTH DAKOTA STATE WATER COMMISSION

SWC PROJECT #259
SORA PROJECT #21-10

Recreation Facilities
Cost Estimate

Kulm Dam Recreation Area
February 20, 1967

<u>Item</u>	<u>Number</u>	<u>Estimated Unit Cost</u>	<u>Estimated Total Cost</u>
1. Picnic Area			
a. Table	5	40	\$ 200
b. Shelter	1	500	500
c. Fireplace	1	50	50
d. Trash Receptacle	5	20	100
e. Well and Hand Pump	1	Lump Sum	800
f. Comfort Station (Pit Type)	1 double	1,500	1,500
2. Boating Area			
a. Loading Ramp	1	1,500	1,500
3. Parking Lot			
a. Grading	40 hrs.	15.00/hr.	600
b. Crushed Gravel	2700 S.Y.	.18/S.Y.	486
c. Barriers	80	3.00	240
4. General Area Development			
a. Plant Trees	Lump Sum		500
b. Signs	Lump Sum		150
		Sub Total	\$ 6,626
		Contingencies	674
		Engineering	700
		Indirect Costs	500
		TOTAL	\$ 8,500

NORTH DAKOTA STATE OUTDOOR RECREATION AGENCY
 Project Economic Feasibility Report
 Benefit-Cost Ratio

Project Kulm Dam and Recreation Complex (SWC Project #259)

Location (Co.) LaMoure SORA # 23-10

I. BASIC DATA

A. Radius of anticipated use -	<u>50</u> miles
B. Population within use area -	<u>54,000</u>
C. Anticipated annual visitation -	<u>18,000</u>
D. Investment (include land) - (\$3,000)	\$ <u>59,680</u>
E. Estimated life of facilities -	<u>30</u> years

II. ANNUAL COSTS

A.. Operation and Maintenance -	\$ <u>1,800</u>
B. Depreciation (I.D ÷ I.E) - (exclude land)	\$ <u>1,890</u>
C. Total annual costs -	\$ <u>3,690</u>

III. ANNUAL BENEFITS

A. Assumed value per visitation -	\$ <u>1</u>
B. Est. Annual Benefits (III.A x I.C) -	\$ <u>18,000</u>
C. Average Annual Net Benefits - (III.B - II.C)	\$ <u>14,310</u>

IV. BENEFIT-COST RATIO

A. Factor for value of I. compounded $\frac{30 \text{ yrs. @ } 4\%}{(\text{Standard} - 30 \text{ yrs. @ } 4\% = 3.24339751)}$	<u>3.24339751</u>
B. Product of Investment (I.D) x factor (IV.A) -	\$ <u>193,566</u>
C. Total benefits (III.C x I.E) -	\$ <u>429,300</u>
D. Benefit-cost ratio (IV.C ÷ IV.B) -	<u>2.22:1</u>

Green Form - D-660-1.E.

NORTH DAKOTA STATE WATER COMMISSION

OFFICE MEMORANDUM

TO: Milo W. Hoisveen, Chief Engineer
FROM: Dale H. Glover, Office Engineer
SUBJECT: Kulm Dam - Description and Hydrology, SWC Project #259
DATE: February 23, 1967

The proposed Kulm Dam will be situated on a small intermittent stream six miles east and two miles north of Kulm, LaMoure County, North Dakota. The location will be in the southeast quarter of Section 14, Township 133 North, Range 65 West. The dam will create a reservoir having a water surface area of $27\frac{1}{2}$ acres and storage volume of 330 acre-feet with the pool at the normal elevation of 1,733 feet, MSL. The town of Kulm (population 664) and Edgeley (population 992) are each situated about eight miles from the dam-site. The entire population within a radius of 50 miles from the damsite is about 54,000. It is expected that the reservoir and adjacent recreation area will be extensively used, especially by persons living in Kulm and Edgeley. The maximum depth of the reservoir, when filled, will be 31 feet which is ample for the successful propagation of fish.

The contributing drainage area above the damsite is six square miles of moderately steep and rolling terrain, from which the annual volume of runoff should be somewhat greater than the average for the state as a whole. It is estimated that an average annual yield of 25 acre-feet will be realized from this area, or about 150 acre-feet per year. The only significant loss from the reservoir will be the annual net evaporation of about 60 acre-feet. Once the reservoir is filled, the annual runoff should easily maintain the pool at or near the desired normal elevation. Some small releases of water for stock may be required infrequently, but these releases would be of short duration and would not significantly lower the reservoir surface nor impair the project as primarily for recreation.

The dam structure will consist of an earth embankment with compacted impervious earth core. The service spillway will consist of a 24 inch reinforced concrete conduit. The emergency spillway will be a grass-covered chute at elevation 1,739 feet, MSL, or six feet higher than the service spillway. The storage cushion between the service spillway level and emergency spillway level will be 190 acre-feet, or more than enough to store completely a flood of 25-year frequency.

The following data apply to the project:

Height of Dam Embankment	43 feet
Length of Embankment	600 feet
Volume of Embankment	42,000 cubic yards
Elevation of Service Spillway	1,733 feet MSL
Storage Volume Below Elevation 1,733	320 acre-feet
Elevation of Emergency Spillway	1,739 feet MSL
Storage Volume Below Elevation 1,739	510 acre-feet

Flow Data, Estimated:

<u>Flow Frequency</u>	<u>Flow Volume</u>	<u>Maximum Inflow Rate</u>
25-year	185 A.F.	1,810 c.f.s.
50-year	207 A.F.	2,030 c.f.s.
100-year	229 A.F.	2,240 c.f.s.

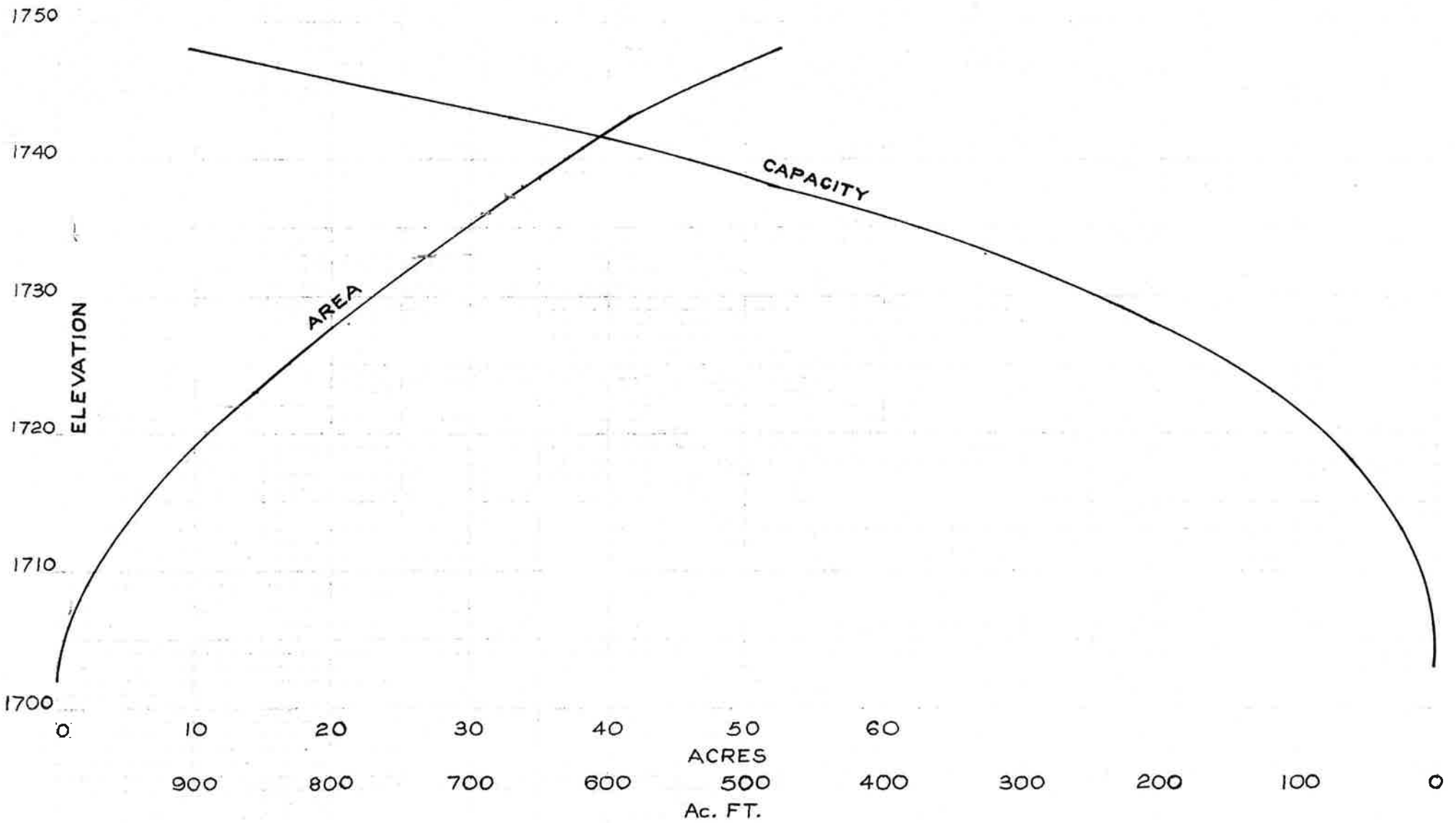
The top of the dam embankment will be at elevation 1,744 feet MSL. An adequate safety factor is provided, in that the flood of 50-year frequency would place the emergency spillway in use, but would not overtop the embankment.



Dale H. Glover
Office Engineer

KULM DAM

PROJ. NO. 259
AREA CAPACITY CURVE



Drainage Area = 6.5 Sq. Mi.

12-64 R.C.