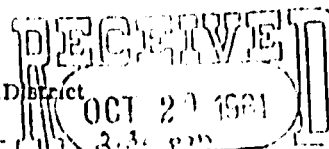


No. 874-3Water Division No. 3 JAMES RIVER District
(Blanks to be Filled by the Engineer for the W. R. C.)

APPLICATION FOR PERMIT TO APPROPRIATE WATER RESOURCES COMM.

To Appropriate Water within the State of South Dakota

(NOTE—Draw a line through items not applicable.)

1. Name of applicant South Dakota Department of Game, Fish and Parks
 Postoffice address Pierre, County Hughes, State South Dakota

- I. If a corporation _____
 (a) Name of same _____
 (b) Date and place of incorporation _____
 (c) Amount of capital stock _____
 (d) Amount paid in _____
 (e) Names and addresses of directors _____

(NOTE—A certified copy of articles of incorporation must accompany the application.)

II. Method of accomplishing the work and financial resources of the applicant:

- (a) Method of accomplishing work (Whether by contract, employment of others, or by direct labor)

- (b) Cash on hand, \$ _____ (c) Treasury stock, \$ _____
 (d) Bonds to be issued, \$ _____ (e) Other resources, \$ _____

2. Name of diversion work Willor Lake, Clark County
As required to fill lake to outlet level - approximately 950
 3. Amount of water claimed acre feet per year cubic feet per second _____
 4. Source of water supply Dry Draw
One point in the watershed located in the NW 1/4 NE 1/4 Sec. 26,
 5. Location of point of diversion T 114 R 57

_____ on _____ bank _____ County.

6. Annual period or periods during which water is to be used all year round

7. To be used for:

- I. Irrigation or domestic use: Gravity, overhead sprinkling or combination system? _____

- (a) Number of acres to be irrigated _____ acres.

- (b) Legal subdivisions to be irrigated _____

(NOTE—A list of lands to be irrigated, giving each subdivision and acreage thereof, should be written here, or may be appended as a part of this application. Same must also be shown on accompanying map.)

- (c) Statement as to domestic use (giving location, etc.) To the ordinary high water mark of the
inundated portion of Sec. 25, 26, 35, T 114- R 57.

II. Stockwatering, mining, milling, power, fish culture, fire protection and public recreation:

- (a) Nature of use public recreational purposes
 Name any of the above uses claimed _____

- (b) Amount of power to be generated _____ horse power.

Amount claimed for engine cooling _____

- (c) Location of plant _____

- (d) Method of developing power _____

- (e) Point where water will be returned to stream _____

8. Estimated cost of work:

(a) Head Gates, \$----- (b) Pumping plant, \$-----
 (c) Fluming, \$----- (d) Canal-earth, \$----- Rock, \$-----
 (e) Other structures ----- \$----- Total, \$-----

9. Description of diversion work:

I. Nature of works: (Reservoir, dam, ditch, flume, pumping plant, etc.)

II. Dimensions of works. Information requested not applicable. Willow Lake is a
 meandered lake. Maximum depth approximately 10 feet

(a) Dam: Height ----- feet; length at bottom ----- feet; length at top -----
 ----- feet; thickness at bottom ----- feet; thickness at top -----
 ----- feet; slope at front water face -----; slope at back face -----
 material used in construction -----

(b) Reservoir: Capacity when filled ----- acre feet. Surface area at highwater
 mark ----- 316 ----- acres.

DEPTH AT OUTLET-Feet	SURFACE AREA AT EACH DEPTH AT OUTLET--ACRES	ACRE-Feet CAPACITY

(c)* Head gate: Width ----- feet; height ----- feet;
 Material -----

(d) Canal: Total length ----- miles.

LOCATION BELOW HEADGATE	DEPTH	BOTTOM WIDTH	WIDTH AT WATER-LINE	GRADE PER MILE
At ----- Mile	----- feet	----- feet	----- feet	----- feet
At ----- Mile	----- feet	----- feet	----- feet	----- feet
At ----- Mile	----- feet	----- feet	----- feet	----- feet
At ----- Mile	----- feet	----- feet	----- feet	----- feet
At ----- Mile	----- feet	----- feet	----- feet	----- feet
At ----- Mile	----- feet	----- feet	----- feet	----- feet

(Give dimensions where reductions in size are made.)

10. Time required for completion of work ----- years. Not applicable - Willow Lake is a

meandered lake

11. Time required for complete application of water to the proposed beneficial use ----- years.

12. Choice of newspaper for publication of notice of intention to appropriate -----

STATE OF SOUTH DAKOTA

County of ----- Hughes ----- ss.

I, ----- Walter J. Fillmore -----, being first duly sworn
 on my oath depose and say: That my relation to the above described undertaking is that of owner, that I have
 read the above foregoing statement, examined the map accompanying the same, and that I know of my own
 personal knowledge that the matters therein stated and shown are true.

Signed -----

Subscribed and sworn to before me this ----- 20 ----- day of ----- October ----- 19-----

 Notary Public (or other qualified officer.)

Remarks by State Water Resources Commission:

"Vested right" claimed

STATE OF SOUTH DAKOTA
County of HUGHES } ss.

Pierre, South Dakota, December 21, 1962

This is to certify that the foregoing application was received by the Commission at 2:30 o'clock
12 m. upon the 20th day of October, 1961.

State Water Resources Commission

By: [Signature]

Chief Engineer, Executive Officer

Number of permit 874-3
274

Date of first receipt of application October 20, 1961

Date of return to applicant for correction, amendments or changes required as follows: _____, 19____

Date of receipt of corrected application _____, 19____

Date from which applicant may claim right 1889, 19____

Approved December 21, 1962, Recorded in Book 7 Page 304

This is to certify that we have examined the foregoing application for a permit to appropriate water of the State of South Dakota, and we hereby grant the same as stated herein, subject, however, to the following limitations and conditions:

1st. The equivalent of at least one-fifth of the work above specified is ~~to be~~ completed ~~on or before~~ _____, 19____

2nd. The whole of said work is ~~to be~~ completed ~~on or before~~ _____, 19____

3rd. The limit of time for proof of beneficial use of water appropriated in accordance herewith is

completed

4th. The water appropriated shall be used for the purpose of public recreation

5th. The prior right of all persons who, by compliance with the laws of the State of South Dakota, have acquired a right to the use of water must not be injuriously affected by this appropriation.

6th. The amount of the appropriation herein granted shall not exceed 950 acre feet annually
~~cubic feet per second; neither shall it exceed the capacity of the above described system of diversion works, nor the least amount of water that experience may hereafter indicate as necessary for the production of crops in the exercise of the best husbandry; and further, said appropriation must be limited to not more than one-seventieth (1/70) of one cubic foot of water per second of time for each acre of land to which water is actually~~
used for public recreation was

and beneficially ~~applied for irrigation~~ used for public recreation on or before June 30, 1955; said water to be used during the following described annual period:

Continuously
Witness my hand this 21st day of December, 1962

State Water Resources Commission

By: [Signature]

Chief Engineer, Executive Officer

Certificate of Construction Issued December 21, 1962

Water License Issued December 21, 1962

Permit No. 874-3Water Division No. 3 James River Water District**Certificate of Completion of Works**

TO ALL WHOM IT MAY CONCERN:

This is to Certify, That the Department of Game, Fish and Parksof Pierre, County of Hughes, and State of South Dakota, the holder Vested Right of Permit No. 874-3, issued upon ApplicationNo. 874-3, bearing date of priority of 1889, authorizing the diversion of 950 acre feet annually ~~xxxxxx~~ of the waters of a dry drawCounty of Clark, State of South Dakota, at s. point in the
NW 1/4 NE 1/4, Section 26, T114N, R57Wfor public recreation
purposes, has s fully complied with the provisions of the laws of the State of South Dakota relating to proof of recognized as
completion of the works of diversion set out and described in said Permit; that said works are ~~xxxxxx~~ satisfactory
condition for diverting and conveying to the place of intended use 950 acre feet annually ~~xxxxxx~~
~~xxxxxx~~ of water; and that the ~~xxxxxx~~ use of said water are described as follows,
to wit: to be used in place for public recreation.Witness my hand this 21st day of December A. D. 1962

State Water Resources Commission

By

J. W. GRIMES
Chief Engineer, Executive Officer

STATE OF SOUTH DAKOTA

WATER LICENSE No. 874-3

WHEREAS, On the 20th day of October A. D. 1961

the Department of Game, Fish and Parks

of Pierre County of Hughes and State of
South Dakota duly made application (No. 874-3) to us for a Vested Right
annually of the waters of a dry draw to use 950 acre feet
County of Clark, State of South Dakota, for public recreation
purposes; and

WHEREAS, On the 21st day of December A. D. 1962
Vested Right /Permit No. 874-3 was issued to said applicant... recognizing
completion of the works of diversion therein described on or before the
and application to beneficial use of said
water and,

WHEREAS, On the 20th day of October A. D. 1961
the holder of said permit duly made proof of the completion of adequate works for the diversion of 950 acre feet
annually of said waters, as evidenced by our Certificate No. 874-3
dated December 21, 1962 confirming the completion of works of sufficient capacity for
diverting and conveying to the place of intended use 950 acre feet annually
priority of 1889 and,

WHEREAS, On the 20th day of October A. D. 1961
proof was duly made of the application to beneficial use of 950 acre feet annually
to be used in place for public recreation;

NOW, THEREFORE, By the virtue of the authority vested in us by the laws of the State of South Dakota,
We hereby grant and confirm to the Department of Game, Fish and Parks
of Pierre Vested Right
the holder and owner of said permit No. 874-3
a water right dating from 1889 to the use of 930 acre feet annually
~~xxxxxxx~~ of the waters of a dry draw
In the County of Clark and State of South Dakota, or so much thereof as may be
necessary for the purposes hereinbelow mentioned, to be diverted at a point in the NW 1/4 NE 1/4 Section 26,
T114N, R57W
and ~~xxxxxxx~~ stored in place

for the purpose of public recreation

subject, however, to the laws of the State of South Dakota applicable to a license for the use of the waters of the State, and subject, also to the local or community customs, rules and regulations which have been or may be adopted from time to time by a majority of the users from a common source of supply, canal or lateral from which such water may be taken, when such rules and regulations have for their object the economical use of such water.

WITNESS, My hand and seal of our office at Pierre, South Dakota,
this 21st day of December A. D. Nineteen
Hundred and Sixty-Two.

State Water Resources Commission

By:

J. W. GRIMES
Chief Engineer, Executive Officer

STATE OF SOUTH DAKOTA

Water License No. -----

To -----

Source of Supply -----

County -----

Am't ----- c. f. s.

Point of Diversion -----

Place of Use -----

Purpose -----

Date of Priority -----

Recorded -----

in Book ----- of ----- Page -----

April 11, 1963

Walter J. Fillmore, Director
Department of Game, Fish and Parks
Pierre, South Dakota

Dear Walt:

Enclosed herewith are your "vested right" permits to appropriate water, certificate of completion of works and water licenses for the following applications:

<u>No.</u>	<u>Name of Lake</u>	<u>County</u>
867-3	Antelope Lake	Clark
868-3	Cottonwood Lake	Clark
869-3	Long Tree Lake	Clark
870-3	Reid Lake	Clark
871-3	Cherry Lake	Clark
872-3	Clear Lake	Clark
873-3	Bailley Lake	Clark
✓ 874-3	Villor Lake	Clark
875-3	Mud Lake	Clark
876-3	Cottonwood Lake	Codington

Sincerely,

J. W. ORMES
Chief Engineer, Executive Officer

JWJ:mf
Encls. as above

Location No.

Water Division No. Water District

Proof of Application of Water to Beneficial Use**PETITION OF HOLDER**

Ques. 1. State your name, residence, occupation and postoffice address.

Ans. South Dakota Department of Game, Fish and Parks, Pierre, South Dakota

Ques. 2. If acting in behalf of a corporation, state its name, principal place of business (if a foreign corporation, give name and postoffice of statutory agent,) your position with reference to same, and your authority for appearing in its behalf.

Ans.

Ques. 3. State date of posting and date of recording notice of appropriation.

Ans.

Ques. 4. State source of water supply and give exact location of point of diversion.

Ans. Dry Draw - one point in the watershed located in the NW 1/4 NE 1/4 Sec. 26,
T 114, R 57

Ques. 5. Describe your works of diversion giving length and height of each dam and state amount of water they are capable of conveying from point of diversion to place of use, and give name of canal or ditch or other works by which water is conducted to such place of use, and date of completion of same.

Ans. A meandered lake - depth 10 feet - 316 acres

Ques. 6. State for what purpose water is used and describe place of use. (If for irrigation, name each subdivision in which used, and number of acres in each subdivision that have ACTUALLY been irrigated with said water.)

Ans. Fish and wildlife propagation, conservation and recreation

Ques. 7. If for other than irrigation purpose, state how applied, amount of horse power generated etc.

Ans. Used in place in lake or reservoir

Ques. 8. What is the minimum amount of water required for the use specified above?

Ans. As required to fill lake to outlet level - approximately 950 acre-feet per year

Ques. 9. If you are not the person or representative of the corporation to whom above mentioned permit was originally issued, please state how ownership was acquired by present holder.

Ans.

Ques. 10. State when, how, in what amount and to what extent, the water diverted under above mentioned permit has been used.

Ans. A meandered lake. Used by the public for uses specified except for that
amount lost by evaporation and seepage

(Sign) [Signature]

I hereby certify that the foregoing testimony was read to the above subscriber before its signing, that I believe him to be the person he represents himself to be, and that said testimony was subscribed and sworn to before me, at my office in Pierre, County of Hughes

State of South Dakota, on this 20 day of October, A. D. 1965

Witnesses. [Signature]

11-6-65

I, the undersigned, do hereby certify that I am a duly qualified elector residing in the immediate vicinity of the diversion works designated in the foregoing testimony, that I have no interest in the works, water or land above described, that I have read the foregoing testimony and that I know of my own personal knowledge that the matters therein stated are true.

I

Location No. _____

**PROOF OF APPLICATION OF
WATER TO BENEFICIAL USE**

PETITION OF HOLDER

Amount of Water _____ c. f. s.

Source _____

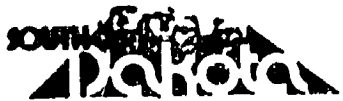
County _____

Purpose _____

Place of Use _____

Date of recording _____

Received and filed _____



Department of Water & Natural Resources

Jon Foss Building
522 East Capitol
Pierre, South Dakota 57501-3181

September 21, 1988

Richard Beringson, Secretary
Department of Game, Fish and Parks
Anderson Building
445 E Capitol
Pierre SD 57501

Dear Mr. Beringson:

I am writing to notify you that pursuant to the Notice of Intent to Validate Vested Water Right Claims dated June 20, 1988 that I intend to oppose validation of all Department of Game, Fish and Parks Vested Water Right Claims for lakes for the following reasons:

1. Until the outlet elevation for each lake is surveyed and the outlet elevation is set by the Water Management Board.
2. To allow the Vested Water Right Claim to be amended, if necessary, as follows:
 - a) Include the outlet elevation;
 - b) To correct the amount of water claimed;
 - c) To add the qualification that a vested claim is subject where necessary to installation of a concrete outlet structure to assure retention of the outlet as the established elevation; and
 - d) To add any amendments and qualifications necessary to clarify a Vested Right Claim.

Also, that I intend to oppose validation of all Department of Game, Fish and Parks Vested Water Right Claims for dams to allow the Vested Water Right Claim to be amended, if necessary, as follows:

1. To include the spillway elevation;
2. To correct the amount of water claimed; and
3. To add any amendments and qualifications necessary to clarify a Vested Right Claim.

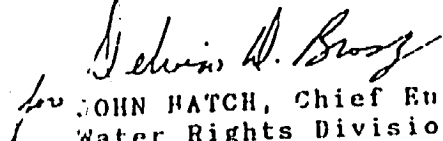


September 21, 1988
Richard Reringson, Secretary
Page 2

We will be working with your staff on these validations. We have already discussed setting outlet elevations before validating claims for lakes. Although the work necessary to complete the validation process will take several years to complete, the results should be of benefit to the public and to your Department. As the work is completed to validate each claim, the claim will be presented to the Water Management Board for validation.

Please advise if you have any questions.

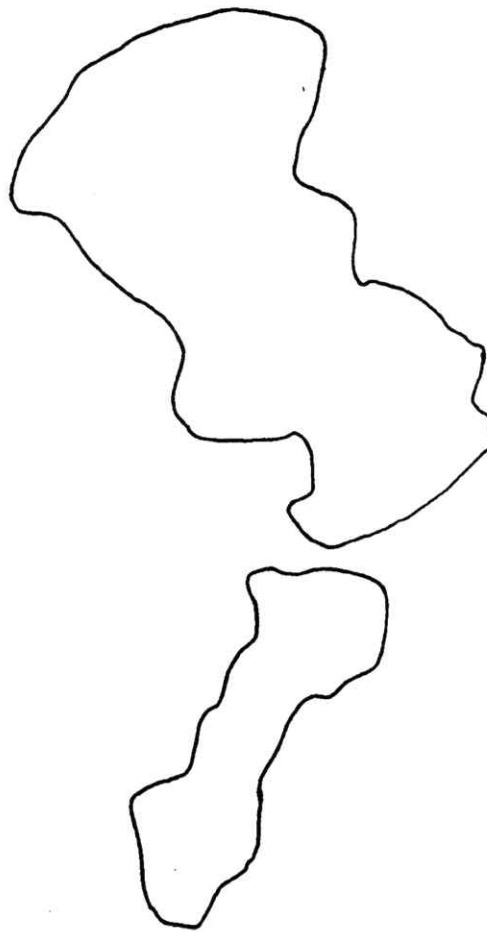
Very truly yours,


JOHN HATCH, Chief Engineer
Water Rights Division
605 773-3352

cc: Ron Koth, Department of Game, Fish and Parks

ORDINARY HIGH WATER MARK
INVESTIGATION
WILLOW LAKE & MUD LAKE

AUGUST 1988



CLARK COUNTY

DIVISION OF WATER RIGHTS

Table of Contents

Abstract	1
Introduction	2
General Information	3
Water Rights	3
Geology	3
Lake Investigation	5
Investigation Dates	5
Elevation References	5
OHWM Indicators	5
Shoreline Trees	5
Tree Categories	5
Boulder Lines	6
Erosion Lines	6
Boulder Water Marks	6
Outlet	6
Water Level Measurements	7
Conclusions	8
Recommendations	9
Bibliography	10
Appendix A: Lake Data	i
Appendix B: Figures 1-6	ii
Appendix C: Photos 1-11	iii

Abstract

This report contains the results of an investigation performed to determine the Ordinary High Water Mark (OHWM) and outlet elevation for Willow Lake and Mud Lake in Clark County. The primary factors considered in calculating the OHWM were the elevations of trees, boulder lines, and erosion lines.

Based on the findings in this report, the recommended elevation of the OHWM for Willow Lake and Mud Lake is 1767.7 feet mean sea level (msl). The recommended outlet elevation is 1767.2 feet msl.

Introduction

This investigation was conducted in response to a request by the Willow Lake Area Sportsman's Club to establish the OHWM and outlet elevation for Willow Lake. The official outlet and OHWM elevations will allow construction of a permanent outlet control structure and shoreline stabilization. Since Mud Lake is connected to Willow Lake and the water elevations on the two lakes are related, the OHWM for Mud Lake will also be established.

The Water Management Board is required by SDCL 43-17-21 to establish the OHWM on public lakes in South Dakota. The OHWM according to SDCL 43-17-20 (2) is defined in decisions rendered by the courts of this state.

In the case of Anderson v. Ray, 37 S.D. 17, 156 N.W. 591 (1916) the Court wrote:

In the case of freshwater rivers, and lakes in which there is no ebb and flow of the tide, but which are subject to irregular and occasional changes of height, without fixed quantity or time, except that they are periodical, recurring with the wet or dry seasons of the year-high water mark, as a line between the riparian owner and the public, is to be determined by examining the beds and banks, and ascertaining where the presence and action of the water are so common and usual, and so long-continued in all ordinary years, as to mark upon the soil of the bed a character distinct from that of the banks, in respect to vegetation, as well as respects the nature of the soil itself.

In the case of Flisrand v. Madson, 35 S.D. 457, 152 N.W. 796, 800-801 (1915) the court wrote:

Neither high or low water mark means the highest or lowest point reached by the waters of a lake during periods of extreme and continued freshets, or periods of extreme and continued drought, but does mean the high and low points of variation of such waters under ordinary conditions, unaffected by either extreme.

The South Dakota Supreme Court further defined "Ordinary High Water Mark" in the Waubay Lake Case by stating that:

...under ordinary circumstances, the OHWM will be set at the level where there is a distinct mark which evidences erosion and changes in the character of the soil, and destruction of terrestrial vegetation, which have occurred under the ordinary and continuous conditions of the lake, disregarding periods of extreme and periodic freshets, and disregarding the highest water mark which does not evidence soil and soil changes and destruction of vegetation occasioned under ordinary conditions. If a single distinct mark, occasioned under ordinary circumstances and evidencing all of the factors delineated above does not exist, i.e., there is conflicting evidence of the role of the OHWM, it is the level where significant major, and substantial terrestrial vegetation ends, that the OHWM is to be set. (cites omitted)

The determination of the OHWM is derived from the examination of the upper limits of the bed of the lake. This examination is conducted to ascertain where the continuous presence and action of the water has left a distinct mark; either by erosion, destruction of terrestrial vegetation, or some other easily recognized characteristic.

A meander line was established on Willow Lake in 1876. However, the meander line exists only on the area of the lake north of the culvert. The area south of the culvert known as Mud Lake does not have an established meander line. Ownership of the Mud Lake bottom is shown in Figure 6. The elevation of the meander line varies from 1763 feet msl to 1775 feet msl (Figure 2). It should be noted that the meander line is not a boundary line, but a traverse run roughly following the bank or shore of a lake for the purpose of locating the approximate water boundaries. The meander line defines neither the boundaries of the lake nor the extent of the area of land which is owned by the abutting landowner, but is a means of determining the number of acres of land subject to sale.

General Information

Willow Lake and Mud Lake are located in Clark County within Sections 25, 26, 35, and 36 of T114N, R57W. Willow lake, which is used for fishing, hunting, and wildlife habitat, has a surface area of approximately 350 acres. Mud Lake has a surface area of approximately 100 acres. The lakes receive most of their recharge water in the form of direct precipitation on the lake surfaces and runoff from the drainage basin which has a contributing surface area of 10,208 acres (Figure 3). The topography of the drainage basin can be described as rugged and hummocky with many sloughs present. The drainage basin has 3-4% slopes with total relief of about 70 feet.

The lakes are connected by a culvert which is located near the center of the NE 1/4 of section 35, T114N, R57W. The culvert has a diameter of 3.3 feet with an invert elevation of 1765.4 feet msl. Due to the close proximity of the lakes, it is also believed that there is a hydrologic connection. There are few OHWM indicators around Mud Lake. Therefore, since the lakes are connected and have the same outlet, both lakes were assumed to have the same OHWM which was determined using OHWM indicators around Willow Lake.

Water Rights

The South Dakota Department of Game, Fish and Parks holds Vested Water Right Claim No. 874-3 for Willow Lake. The amount of water claimed is "as required to fill lake to outlet level - approximately 950 acre-feet per year" to be used "in place" at Willow Lake for public recreation. The priority date of the Vested Water Right Claim is 1889.

Geology

Willow Lake and Mud Lake are kettle lakes. They were formed as

blocks of stagnant glacial ice became isolated from the main ice mass and were buried or surrounded by sediments and formed depressions known as kettles. When the ice later melted, the depressions often filled with water and became lakes or sloughs.

The surficial deposits of this area are made up primarily of Pleistocene glacial deposits of late Wisconsin age. According to South Dakota Geological Survey (SDGS) test holes located one mile east and two miles west of the lake, the glacial deposits, consisting primarily of till, are approximately 300 feet thick in this area. Glacial till, unstratified glacial drift, consisting of clay, sand, gravel and boulders intermingled, forms a barrier isolating potential aquifers from the surface.

Six glacial aquifers have been mapped in Clark County. None of these aquifers extend into the immediate vicinity of Willow Lake or Mud Lake. This suggests that no hydrologic connection of any consequence exists between the lakes and any aquifer.

Lake Investigation

Investigation Dates

Field investigations were conducted at Willow Lake and Mud Lake on the following dates: October 27-30, 1987; February 1, 1988; and May 5, 1988.

Elevation References

Elevations in this report are referenced to a United States Geological Survey bench mark. The bench mark is located about 17 miles south of Clark, SD. It is located near the corner of the following sections: Section 1, T113N, R58W; Section 6, T113N, R57W; Section 31, T114N, R57W; and Section 36, T114N, R58W. The bench mark is located 59 feet north and 21 feet east of the road intersection center point. It consists of a chiseled square on the end of a precast concrete wing culvert, and is set at an elevation of 1764.90 feet msl.

OHWM Indicators

A. Shoreline Trees

Trees, which are the largest and most permanent expression of upland growth, are used to determine a relationship between the growth characteristics of the trees at various elevations and the OHWM elevation. Records of ordinary high water levels are reflected in the well established trees growing along the upper limits of a lake's bed. Cottonwood, ash, and willow are the most predominant trees that grow along the shores of South Dakota lakes. Research has shown that most trees will not survive if water levels exceed one half to one tree diameter above the base elevation of the tree for more than 25 percent of the growing season.

A few cottonwood trees, representative of other cottonwood trees around Willow Lake, were cored to determine their approximate age. The ages are included with the photographs in Appendix C. The ages shown are minimum ages due to the fact that the rings were difficult to count; especially near the end of the core representing the center of the tree. Therefore, the trees are probably several years older than shown.

B. Tree Categories

The trees along the shoreline of Willow Lake are divided into three categories:

1. The first category of trees are those where the lakeside base elevation (the elevation where the soil meets the lakeside of the tree trunk) is below the OHWM elevation (Photos 1-3). This is apparent in the erosion of the soil and the destruction and decay of the tree which is caused by the zone of soil saturation smothering part of the root

system. These trees survive because part of their root system is above the zone of saturation.

2. The second category of trees are those where their lakeside base elevation is from zero to one half foot above the OHWM elevation (Photo 4). These trees show signs of butt swell and erosion. The root system is surfacely exposed and growing away from the lake.
3. The third category of trees are those with a lakeside base elevation approximately one foot above the OHWM elevation (Photo 5). These trees show lesser degrees of butt swell, little or no root erosion, and some surface roots.

C. Boulder Lines

Boulder lines, which develop as a result of ice action at the shoreline, are present at different locations around Willow Lake (Photos 6-7). Ice movement at the shoreline can be explained by three main causes: (1) thermal expansion of the ice sheet; (2) wind action upon ice flows or a partial ice sheet; and (3) changes of the water level. Boulder lines at Willow Lake can most probably be attributed to thermal expansion and wind action. Changes in water level would be minimal during ice cover conditions.

Thermal expansion causes a compressive force to be transmitted toward the shoreline. As a result of these forces, any material on the shoreline is pushed landward. Wind action is more likely to affect the shoreline in the spring. An open lane of water is formed adjacent to the shoreline due to the more rapid heating of shoreline material. Wind can then push free floating ice sheets toward any shoreline depending on wind direction. The effect of wind pushing the ice sheet landward can force any shoreline material in the same direction.

D. Erosion Lines

Erosion lines (changes in slope) help to delineate lake water levels over the life span of a lake. These erosion lines are more of an indication of extreme (not ordinary) high water conditions due to the fact that the extreme high water causes eroded material to be deposited at elevations greater than the OHWM. Therefore, one would expect the OHWM elevation to be slightly below the average erosion line elevation. Most of the good erosion lines on Willow Lake were located at the base of wave cut cliffs.

E. Water Marks on Boulders

There were many boulders around Willow Lake which showed signs of water levels at greater elevations than the OHWM. These boulders (Photos 8-10) simply serve to show that there have been extreme water level conditions at higher elevations than the recommended OHWM. Water level marks as high as 1769.2 feet msl were observed on several boulders.

Outlet

The outlet for both lakes is located at the northeast corner of Willow lake. The outlet consists of a topographical low spot which is approximately thirty feet wide. It appears that attempts have been made to raise the outlet elevation by placing cement blocks and tires across the opening of the outlet (Photo 11). However, after closely examining the area, it was determined that the outlet elevation should be at an elevation of 1767.2 feet msl. Any water draining from Willow Lake flows to the north about 1.5 miles where it drains into Dry Lake No. 2.

Water Level Measurements

The Division of Water Rights began measuring lake levels on Willow Lake in 1983 (Figure 5). During the principle field investigation, October 27-30, 1987, the water level was as 1766.1 feet msl.

Conclusions

The physical features on the lake such as boulder lines between elevations 1767.0 feet msl and 1768.3 feet msl, trees at elevations between 1766.9 feet msl and up, and erosion lines between elevations 1767.5 feet msl and 1769.0 feet msl all act as indicators for determining the Ordinary High Water Mark. Based upon the evidence available, the Ordinary High Water Mark has been determined to be at an elevation of 1767.7 feet msl. The outlet elevation has been determined to be at an elevation of 1767.2 feet msl.

James L. Wendte

James L. Wendte
Natural Resources Engineer

AGENDA

WATER MANAGEMENT BOARD MEETING OCTOBER 5 & 6, 1988

Place: Room 216, Joe Foss Building, 523 E Capitol, Pierre SD
Scheduled Hearing Times are Estimates and May be Delayed due to Prior Agenda Items

October 5, 1988

- Group Photograph of Board members
- 8:30 am Call to Order
Approval of July 27, 1988 Board minutes
Proposed Board meeting dates for 1989 - March 1 & 2, May 10 & 11, July 26 & 27, October 4 & 5 and December 6 & 7
Set March 1989 meeting location (Rapid City Suggested)
Status and review of water rights litigation -- Larry Donovan and John Guhin
- Discussion on Bentonite Report presented to the Board for review at the July Board meeting -- Ken Buhler
- Consider Requests for Water Quality Variances to:
- 1) Apply Rotenone to Remove Rough Fish from Stockade Lake, Dept. of Game, Fish & Parks -- Joe Bowar
 - 2) Apply Rotenone to Remove Rough Fish from Interstate Lake in Brookings County, Dept. of Game, Fish & Parks -- Joe Bowar
- 8:45 am Discussion on Reclamation and Cleanup Bonding -- Susan Bowar and Dianne Shade
- 9:00 am Administer Oath to the Water Rights Staff
Cancellation Considerations
- 9:15 am Consider Ground Water Discharge Plan Application No. GWD2-88, Sand Livestock Systems, Inc.
- 9:45 am Break
- 10:00 am Introduction of Water Rights Staff, Board and Legislative Oversight Committee
Consideration of New Permit Applications
- Consider Request for an Environmental Impact Statement and Setting a Discovery Schedule Regarding Water Permit Application No. 1443-1, Minerva Explorations Limited -- Ron Duvall
- 10:30 am Consider Petition for Declaratory Ruling regarding Water Permit Nos. 40-2A and 1812-2, Robert and Mark Tubbs -- Del Brosz
- 11:00 am Consider Request by the Big Stone Power Plant to Grant an Interim Waiver to Qualification No. 2 on Water Right No. 1983-3 -- Susan Bowar
- 11:30 am Consider Water Permit Application No. 5189-3, Isabelle Fryer -- Ron Duvall
Consider Cancellation of Water Permit No. 4780-3, Vincent and Isabelle Fryer -- Ron Duvall
- 12:00 Lunch

- 1:00 pm Consideration of Findings of Fact, Conclusions of Law and Final Decision on Denial of Water Permit Application No. 1441-1, Golden Reward Mining Company
Consider Water Permit Application No. 1447-1, Golden Reward Mining Company -- Ken Buhler
- 1:30 pm Consider Petition for Declaratory Ruling Regarding the Ordinary High Water Mark and Outlet Elevation for Punished Woman Lake -- Gale Selken
- 2:00 pm Consider Establishing the Ordinary High Water Mark and Setting the Outlet Elevation for Willow Lake in Clark County -- Jim Wendte
- 2:30 pm Consider Establishing the Ordinary High Water Mark and Setting the Outlet Elevation for Fish Lake in Aurora County -- David Brown

Recess

October 6, 1988

Reconvene

- 8:30 am Consider Proposed Chemigation Rules Chapter 74:02:09 -- Del Brosz
- 9:30 am Break
- 9:45 am Consider Noncompliance with Amended Qualification on Water Permit No. 5145-3, Paul M Juel -- Tim Schaal
- 10:45 am Consider Petition for Declaratory Ruling Regarding the Legal Status of Vested Water Right Claim No. 1856-3, Department of Game, Fish & Parks -- Tom Brandner

Adjourn

Mr. Hatch stated in 1983 Water Permit Application No. 4953-3 was issued to the Department of Game, Fish and Parks to increase the storage capacity of the lake and to raise the outlet by 0.7 feet. The Department of Game, Fish and Parks still has Vested Right Claim No. 882-3.

Mr. Freeman MOVED, SECONDED by Mr. Brink to DEFER cancellation of Water Right No. 4953-3 until the conclusion of this meeting.
MOTION CARRIED.

Ordinary High Water Mark -- Willow Lake

Jim Wendte presented the report on the Ordinary High Water Mark Investigation for Willow Lake and Mud Lake (copy on file). Mr. Wendte stated a letter was received from Matt Valentine (copy on file). Mr. Valentine was concerned that this action would raise the water level in the lake. Mr. Wendte stated he talked with Mr. Valentine and indicated to him that it was not our intention to raise the lake level. The recommended elevation will change the present elevation only slightly. Water will enter on Mr. Valentines land approximately the same time that it heads out the outlet, with the recommended outlet elevation.

Chairman Gunderson administered the oath to Martin Warkenthein.

Mr. Warkenthein stated they felt that possibly the water level should be a little higher. The Department of Game, Fish and Parks uses the area for a production area and would like to see it as low as they can. Adding a couple inches to the elevation would help keep more water in Willow Lake. It will not hurt anybody. Mr. Warkenthein stated he has talked to everyone around the lake but Matt Valentine. Willow Lake does not take the silt, Mud Lake does.

Mr. Freeman MOVED, SECONDED by Mr. Brink to adopt the following:

1. That the Ordinary High Water Mark for Willow Lake and Mud Lake be established at an elevation of 1767.7 feet msl.
2. That the outlet elevation for Willow Lake and Mud Lake be set at 1767.2 feet msl and that Vested Water Right Claim No. 874-3 be amended to establish the outlet elevation at 1767.2 feet msl and to include Mud Lake in No. 874-3.
3. That Vested Water Right Claim No. 874-3 be amended to correct the amount of water claimed from "as required to fill lake to outlet level - approximately 950 acre-feet per year" to "sufficient water to fill Willow Lake and Mud Lake annually to the outlet elevation of 1767.2 feet msl".
4. That Vested Water Right Claim No. 874-3 be amended with the qualification that No. 874-3 is subject to installation of a concrete outlet structure to assure retention of the outlet at elevation 1767.2 feet msl.

MOTION CARRIED.

Meeting recessed at 6:00 pm.

Meeting reconvened 8:30 am, October 6, 1988.

Consideration of Proposed Chemigation Rules Chapter 74:02:09

Delvin Brosz presented the board with a copy of the Proposed Chemigation Rules with the suggested changes by the Office of



DENR
SOUTH DAKOTA

DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES

JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
denr.sd.gov

Memo to File

Willow Lake in Clark County

VWR No. 874-3

The OHWM was set by the Water Management Board on October 5, 1988.

OHWM elevation 1767.7 fmsl NGVD29

The outlet elevation was set by the Water Management Board on October 5, 1988.

Outlet elevation 1767.2 fmsl NGVD29