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STATE OF MINNESOTA
DEPARTMENT OF CONSERVATION
DIVISION OF GAME AND FISH

WILD RICE IN MINNESOTA 1/

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Wild rice has long been harvested and used for food by the Minnesota Indians and since the time of the first French voyageurs, more than 300 years ago, has been a subject of much interest. In recent years harvesting, processing and sale of wild rice in Minnesota has developed into a considerable local industry. Because of its increased sale and wide spread use as a table delicacy there are many requests for information about this native grain - questions such as: What kind of a plant is it? Where and how does it grow? How should it be planted to attract waterfowl? Can it be raised as a commercial crop? How is it harvested and processed? Where can wild rice be harvested and what are the regulations concerning the harvest?

As a bit of historical background many of the more important Indian village sites in Minnesota were near or on wild rice stands. Wild rice was an important source of food for both the Sioux and Chippewa Indians, and there were often battles between Indians of these two tribes for possession of rice stands. When with the coming of white man, the Indians were moved to reservations. Usually these reservations included some wild rice stands where the Indians could still harvest this grain. Many Minnesota lakes are named "Rice". Variants of the Chippewa name "manomin" (meaning "good berry") are applied to several lakes, a county, and a town. The Menomnie Indians of Wisconsin are literally the "wild rice people." On the Indian calendar the September moon is the "wild rice moon."

From the point of view of public interest, wild rice has nearly everything. It is a culinary delicacy. It is a well known food and attraction for waterfowl. It sells for quite a high price. It is associated with Indians and with the lakes and forests of Northern Minnesota. Judging from the inquiries received it appears that many people would like to know more about it.

What is Wild Rice?

Wild rice is an annual aquatic grass. It grows from seed each year as do barley, wheat and rye. Like the cultivated rice of commerce it grows in shallow water, usually in water less than three feet deep. Wild rice, however, is not the ancestor of cultivated rice and is related to it only about as close as oats is to corn. These two grasses belong to different tribes and genera of the grass family, wild rice having the botanical name Zizania aquatica and cultivated rice, Oryza sativa. The closest relative of our wild rice is the broad-leaved wild rice (Zizania latifolia) that grows in Manchuria and northeastern Asia.

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- 1/ Special Publication No. 18, Section of Research and Planning, July 1, 1964.
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The grain of wild rice is surrounded by a hull like oats and usually has a terminal awn or "beard" at the end of the hull. The hull is removed when the grain is processed. Structurally, wild rice differs from most other grasses in having six stamens in each male flower instead of three, and in having a hollow stem or straw that has cross partitions (septa) between the stem nodes.

Growth of Wild Rice

Wild rice seeds or grains lie on the lake or stream bottoms throughout the winter and germinate in spring to produce a single root and a thin ribbon-like submerged leaf. As the season progresses a tuft of ribbon-like leaves is produced, the upper ends of which float on the surface of the water. Along about July 1 the stem or stalk elongates and extends out of the water. This stem is topped by the flowers: the erect female flowers borne in a spike and the many drooping male flowers on slender spreading branches below them. The stalk continues to elongate and by mid-August usually extends 3 to 5 feet out of the water and is covered with grassy leaves. In shallow water and on fertile lake bottom soils the plants often "stool", each plant producing several stalks.

The grain on most stands begins to ripen during the last week in August and at that time a good stand from a distance looks much like a grain field. Some stands ripen earlier than others and there is often some difference in ripening dates even on parts of the same stand. There is also considerable difference in the height of the straw, size of the grains, and number of grains per head on different lakes. These differences probably represent both inherited and habitat differences. Usually the short, small-grained rice that grows along rivers or on sandy lake bottoms ripens earliest.

The top-most grain on the wild rice head ripens first and the grains below it ripen over a period of about 10 days progressively from the top downward. As the grains ripen then fall from the head into the water. Such "shattering" of the head is characteristic of many wild grasses and the non-shattering quality of cultivated grains has been developed as a result of thousands of years of selection and cultivation.

Harvesting of Wild Rice

Under Minnesota laws wild rice growing in public waters must be hand harvested, mechanical harvesters being prohibited. Harvesting is done with aid of two flails, which are usually tapered cedar sticks about 18 inches long. The rice harvester or "ricer" with a flail in each hand is seated in the front of a canoe or boat and his partner in the rear poles or paddles. With one flail a group of heads is bent over the canoe and then tapped with the other flail. The ripe grains fall into the canoe but the unripe grains remain on the head. Usually stands are harvested three or four times with a two-day interval between each harvesting. This schedule allows time for the grains to ripen.

Even when stands are hand harvested several times only a portion of the total crop is taken - usually about 25 percent - the rest falling into the water for reseeded and food for waterfowl. The amount harvested is usually about 100 pounds per acre of grain as it comes from the stand - non-processed or so-called "green" rice. From this about 40 pounds of processed rice suitable for food can be prepared. In recent years the price paid to harvester by buyers on the stands has usually been about 35 cents a pound although it has been as high as 75 cents. Price is influenced both by the quality of the rice and its abundance in any year.

Where Wild Rice Grows

Wild rice is native to eastern North America and is found from southeastern Manitoba eastward to the Atlantic Seaboard and southward to Florida and Louisiana. It is, however, most abundant in the Upper Great Lakes Region where there are many shallow water areas, especially lakes in glacial formations. In Minnesota there is more wild rice than in any other state or province and stands of this grain usually cover from 15,000 to 30,000 acres. In good rice years there are about 150 sizeable harvestable stands in Minnesota plus several hundred small stands and patches along lakes and streams.

Wild rice has marked preference for the quality of water in which it grows and is not found in prairie waters which have appreciable amounts of sulfate or "alkali" salts. In Minnesota the range is mostly limited to waters with concentration of sulfate or "alkali" salts lower than 10 parts per million of sulfate ion. Plantings of wild rice seed in prairie waters with higher concentrations of sulfates have generally failed. The westward and southern limit of the range in Minnesota follows the prairie edge, extending from Lake of Woods and Red Lake southward through Detroit Lakes, thence across Ottertail County in an arc through the intervening counties to the Twin Cities area. There is also some rice along the lower Mississippi River. Judging from lake names, it once grew farther south in central Minnesota where it has probably been exterminated by carp.

In Minnesota some of the best wild rice stands are in shallow lakes that lie within the flat basins of old and long-drained glacial lakes. Here surface drainage is often poor and the remnant lakes are quite shallow and have flat bottoms. Lakes that have had wild rice for many years usually have the following characteristics: (1) they contain much water shallower than four feet; (2) they are wide enough to have heavy wave action in spring or have a flow of water through them; (3) they have an organic bottom a few inches to a few feet thick, overlying a hard bottom; (4) they usually are fairly limy and have a total alkalinity exceeding 40 parts per million (there are stands, however, in softer water); (5) the water is low (below 10 p.p.m) in sulfates; (6) the drainage area feeding the lakes is usually fairly large and the outlet such that there is high water in some summers (times when high water drowns out cattails and other perennial emergent plants that would otherwise crowd out the rice); (7) water levels which in years of normal or deficient rainfall do not rise sharply (more than 6 inches) at any time during June or July when the wild rice is in the floating-leaf stage.

Wild Rice Seed and Seeding

When the wild rice grain is ripe and falls from the head it is still pliable and quite high in moisture. It falls into the water and sinks to the bottom before it can dry out. If wild rice seed is dried and stored and then planted the following spring there is little or no germination. The seed must be stored under moist and cool conditions. It can be stored in sacks submerged in a lake or spring, in which case the sacks should be in wire cages to keep out muskrats. Sacks of seed can be stored on racks in a root cellar with cakes of slowly melting ice dripping water on them. The sacks can be placed in tanks of cold water with some water running through them. Freezing does not harm the grains and rice frozen solid in a deep-freeze between fall and spring has given high germination. From experimental germination of wild rice it appears that germination must be preceded by a period of dormancy and that this dormancy can be broken by subjecting the seed for a time to low oxygen concentrations in the water - and probably cold. Germination then starts when the seed comes in contact with aerated water. This is anormal sequence of events in shallow lakes, there being a depletion of oxygen near the bottom mud in winter and

aeration from wave action or current flow in spring. This accounts, also, for non-germination of wild rice seed in rice lakes when the water level is abnormally high and the sudden reappearance of the stand when normal levels return - levels at which aeration to the bottom by wave action can be expected.

Waters in which wild rice grows are often somewhat brownish or tea-colored - but dark brown water is not favorable for this cuts down penetration of the light that the first submerged leaves must have if the plant is to grow. In such waters, especially over mucky bottoms, the rice seedlings may be crowded by such submerged plants as coontail (Ceratophyllum demersum), flat-stemmed pondweed (Potamogeton zosteriformis) and star duckweed (Lemna trisulca). Waterlilies may invade wild rice stands and shade out the rice.

Wild rice is usually planted by scattering the seeds over the surface of the water in areas of suitable depth and bottom. About a bushel of seed per acre is planted, or in small areas a large handful is scattered over an area about six feet on a side. The viable grains sink to the bottom immediately. Planting may be done either in fall after the harvest or in spring soon after the ice break-up. In areas intensely used by ducks spring planting is often preferable. The ducks may eat the seeds. If the site is suitable the stand will perpetuate itself year after year by self seeding.

If the area to be planted is small and has an inlet or outlet plant near the inlet or outlet. Bays and protected portions of lakes are better than areas fringing a wide sweep of deep water. Plantings in constructed paddies in water as shallow as six inches have been successful. Once the floating-leaf stage is passed the water can be gradually raised and then lowered, if desired, for harvesting.

Cattails and perennial reeds and rushes replace wild rice if allowed to become established. Such plants should be eradicated in paddies and in wild stands drowned out by occasional flooding. Usually there are years of high water about one year in four on wild rice stands that have remained as such for a long period of time.

Cultivation of Wild Rice

Planting of wild rice in constructed paddies has already been referred to. Such paddies should be on flat land adjacent to water supply, such as a drainage ditch. They should be diked with an impervious soil such as clay. For this reason sites with peaty soil overlying clay are especially good. Such sites are not uncommon in old glacial lake beds. Often such sites are covered with a sod of grasses and sedges. This sod should be plowed and thoroughly disced or strips of sod may rise and float after the area has been flooded for a time, because of accumulation of gases in the soil. The paddy should be constructed so that it can be drained. This usually necessitates pumping to fill it.

Although the price of wild rice suggests that it might be a profitable crop to raise in paddies yet attempts have often not been successful. The principle reason for this is that the heads, as previously noted, shatter and no successful mechanical means of taking more than a portion of the crop has been devised, even though considerable mechanical ingenuity has been used in attempting to build such equipment. What is needed is a non-shattering strain of wild rice that will have to be developed by a plant breeding program. This is presently being worked on at the University of Minnesota.

Diseases and Pests of Wild Rice

The most common wild rice pest is the "wild rice worm". This is the larva of a moth and is very similar in appearance to the common armyworm. The genus to which it belongs is Apamea. Little is known about its life history other than the moth lays its eggs in the wild rice flowers and the larvae probably pupate in soil on shore or in old rice straw. The larvae do not pupate until at least early winter and have been found in piles of rice hulls and straw at this time. The wild rice worm eats the maturing grains and at times harvested rice may be literally crawling with these worms. Infestation is heaviest close to shores and varies from year to year, suggesting that there is natural control through parasitism and environmental factors.

Some of the grains are often infected with ergot, a smut-like fungus infection which causes grains to be replaced by elongate grayish growths. Ergot infection is, however, usually not of great importance. In most rice stands plants will be found that have brownish or blackish spots on the leaves. These spots are often elongate. The cause of this rust-like infection is the fungus Helminthosporium. Occasionally heavy infestations of this disease cause the crop to fail and the stand to appear brown and blasted from the air. Muskrats at times bite off the green stalks at the waterline and blackbirds sometimes take considerable amounts of the grain.

In some years the crop on a particular stand will be mostly of unfilled hulls. This is probably caused by poor pollination when the rice is in flower. This condition is usually associated with hot dry weather or prolonged rainy periods during flowering. High winds and storms may also cause the mature stalks to blow over and lodge making harvesting difficult.

Harvesting Regulations

The general framework for wild rice harvesting regulations on public waters is provided by State Law (Chapter 84, Section 84.09 to 84.15 of the Game and Fish Laws). The law specifies that: harvesting on some stands is restricted to Indians or local residents who live within reservation boundaries; harvesting by machine is prohibited; boats or canoes used in the harvest shall not have a top width greater than 36 inches; hand flails shall not be longer than 30 inches or exceed a pound in weight; the pole used for poling a ricing boat must be forked at the end; and harvesting is not permitted between 3 p.m. and 9 a.m. Other necessary regulations as recommended by the Director of the Wild Rice Harvest and approved by the Commissioner are specified in the annual Commissioner's Order. These include: the general opening date for the harvest; any special opening dates for specific stands; a list of closed stands; and any special regulations such as "rest days".

A license to harvest wild rice costs \$3.00 and is required for each wild rice harvester. Such licenses are issued only to Minnesota residents. They are for sale at many places in the wild rice harvesting area. A license is also required for wild rice buyers and dealers, the fee ranging from \$15.00 to \$150.00 depending upon the amount of wild rice purchased and sold. In recent years the number of licensed harvesters has been about 10,000, figures for the last three years being 10,732 in 1961, 12,523 in 1962, and 9,635 in 1963.

Under Minnesota laws the State owns all wild rice growing in public waters "in its sovereign capacity and for the benefit of all its people".

Processing of Wild Rice

Wild rice grains when harvested are covered with a chaffy hull and are quite moist and flexible. Before the grain can be used as food the grain must be dried and hardened and the hulls and any debris removed. To accomplish this the grain is cured, parched, threshed and winnowed. Curing consists of placing the newly harvested grain on a flat surface, such as a floor, for several days in a layer several inches thick and stirring and turning it now and then to prevent heating.

Under primitive conditions parching was carried out by the Indians by placing small amounts of the cured grain in an iron kettle over a wood fire and stirring it with a paddle until the hulls are brittle and brown and the grain dry and hard. Threshing, by which the hulls are removed, was accomplished by dancing upon parched grains which had been placed in a hide-lined hole in the ground. Finally the hulls were removed by winnowing in the wind over a blanket. Usually each family or group of Indians picked and processed their own rice.

Today most wild rice is processed by commercial processors who use machinery of varying degrees of complexity. These processors buy the rice from the harvesters. Parching is done in containers rotated over a wood fire or gas flame: the simplest type being an oil drum rotated with a crank over a fire. Hulling or threshing equipment ranges from an oil drum containing a central shaft on which there are eccentric rubber-shod paddles to commercial oat hullers. Winnowing is usually done with a fanning mill and the final cleaning of the grain to remove grit and other undesirable material is often done with a gravity separator. There is no "standard" equipment and each processor has his own modifications; often custom built.

Size and Value of the Wild Rice Harvest

Buyers of wild rice are required to report the amount bought each year and from this information the total harvest is calculated. It has ranged from 73,000 pounds of non-processed rice in 1941 to 3,942,000 pounds in 1956. Figures for the past 10 years are presented below. Processed rice is calculated on the basis of 2.5 pounds of unprocessed rice being required to yield one pound of finished rice.

Year	As pounds of unprocessed wild rice	As pounds of processed wild rice
1954	3,355,000	1,342,000
1955	1,235,000	494,000
1956	3,942,000	1,577,000
1957	1,057,000	423,000
1958	3,224,000	1,290,000
1959	2,067,000	827,000
1960	2,301,000	920,000
1961	2,772,000	1,109,000
1962	1,292,000	517,000
1963	3,212,000	1,285,000
Averages	2,446,000	978,400

At 35 cents a pound for unprocessed rice this crop has had during this period an average value of \$856,000 a year to harvesters. The retail value, calculated at \$2.00 a pound for the processed rice has averaged \$1,956,800 a year - nearly two million dollars.

Cooking Wild Rice

The same methods used for cooking ordinary rice can be used for wild rice. Steeping the grains in several changes of boiling water until tender is especially good since the grains remain separated. Prolonged boiling is not desirable. Wild rice is excellent either as stuffing or a side dish served with wild duck.

Where and When Wild Rice is Harvested

The attached list includes the principal Minnesota wild rice stands arranged by counties. Those starred (*) are the larger and more available stands which are usually open to harvesting by both whites and Indians. The other stands are small, inaccessible or have harvesting restricted to Indians or local residents only. The size and density of any stand varies from year to year, as does the quality of the rice. Inspection or local inquiry should be made before planning to harvest. It should also be pointed out that stands ripen on different dates and the date for any stand varies somewhat from year to year depending on the weather. A general state-wide date is set each year for the opening of the harvesting season but this does not mean that the rice on any particular stand will be ripe enough for harvesting. If the grains do not separate easily from the heads the stand is not ripe and harvesting should not be attempted. In most years the majority of the stands are ripe about September 1. Stands that fringe rivers usually ripen earliest.

AITKIN COUNTY

Aitkin Lake T. 50, R. 23, S. 16-17-19
20-21-29-30
*Big Sandy Lake T. 49-50, R. 23-24
and all channels
and streams connecting
these four waters
Flowage Lake T. 49, R. 23-24, S. 24-25-30
*Minnewawa Lake T. 49, R. 23, S. 18-20-21-22
26-27-28-29-32-33
*Mallard Lake T. 45-46, R. 27, S. 23-10-11
*Moose Lake T. 51, R. 26, S. 27-28-32-34
Moose River from T. 51, R. 26
Moose Lake to State
Highway #169
Moose-Willow River
Management Area
Prairie River T. 51, R. 25
*Rat Lake T. 49-50, R. 23
Rice Lake T. 49, R. 24, S. 13-14-22-23-26
Rice Lake T. 47-48, R. 22, S. 33-4-5
Rock Lake T. 46-47, R. 24
*Sandy River T. 48, R. 24, S. 16-21-22-27
White Elk Lake T. 48-49, R. 23-24
T. 50, R. 26-27, S. 13-24-18-19

BECKER COUNTY

*Basswood Lake T. 142-143, R. 37
Blackbird Lake T. 140, R. 39, S. 16-21-22
Chippewa Lake T. 140, R. 39
*Height of Land Lake T. 139-140, R. 39
Hubble Pond T. 140, R. 39, S. 31
Little Flat Lake T. 141, R. 39, S. 29-30
Otter Tail River T. 140, R. 39, S. 16-21-22
between Rice and
Blackbird Lakes
Rice Lake T. 140, R. 37, S. 23, 24-25-26
Rice Lake T. 140, R. 39, S. 22-23-26
at Mitchell Dam
Shell Lake T. 140, R. 37-38

BELTRAMI COUNTY

*Manomin Lake T. 146, R. 35, S. 23-24-25
(Rice Lake)
(Battle Lake)
Robideau Lake T. 148, R. 30, S. 8-16-17-18-20
*Turtle River T. 148, R. 30

CARLTON COUNTY

Dead Fish Lake T. 49, R. 19, S. 1-12
Horn (Wild Rice) Lake T. 48, R. 18, S. 3
Jaskari Lake T. 48-49, R. 19, S. 1-2-36
Perch Lake T. 48-49, R. 18-19, S. 1-36-6-29-
30-31
Rice Portage Lake T. 49, R. 18-19, S. 24-25-26-35-36-30

CASS COUNTY

*Big Rice Lake T. 140-141, R. 26
*Boy Lake and River T. 141-142, R. 27-28
Big Sand Lake T. 141-142, R. 26, S. 3-4-5-8-33-34
*Brookway Lake T. 139, R. 30, S. 25-26-35-36
Drumbeater Lake T. 144, R. 27-28, S. 24-19-36
*Gull River Flowage T. 133, R. 29, S. 4-5-8-9-17
North of Hwy. 210
Hand Lake T. 139, R. 29, S. 14-15-22-23
Hattie Lake T. 138-139, R. 29, S. 6-29-30-31-32
16-21-4-9-3-10
Island Lake T. 139, R. 30, S. 7-8
Lake George T. 139-140, R. 26-27, S. 1-12-36-6-7-31
*Laura Lake T. 141-142, R. 26-27
Leach Lake
Boy Bay
Bear Island Rice Beds
Hardwood Point Rice Bed
*Squaw Point Rice Bed
Steamboat Bay Rice Bed
Sucker Bay Rice Bed
Wauboose Bay to Federal Dam
Lindsey Lake T. 139, R. 30, S. 27-28-33-34
*Little Boy River from T. 140-141-142, R. 27-28
Longville to Big Boy
Lake including Little
*Rice Lake and Inguadona
Lake
Norway Lake and Norway T. 138, R. 29-30
Brook from Norway Lake
to Hattie Lake
Pillager Lake and T. 133-134, R. 30
*Pillager Rice Bed
including the flowage
between
Portage Lake T. 139-140, R. 29-30, S. 13-14-23-
7-8-1-36-1-6-
36-31-30-31

CLEARWATER COUNTY

Lower Rice Lake T. 144-145, R. 38
Upper Rice Lake T. 145, R. 36-37

COOK COUNTY

Four Mile Lake T. 60, R. 5W, S. 4-8-9-16-17
Christina Lake T. 61, R. 3W, S. 28-29-32

CROW WING COUNTY

Clark Lake	T. 135, R. 28-29, S. 12-13-17-18
*Dean Lake	T. 136, R. 25-26, S. 12-13-7-8-17-18
Duck Lake	T. 138, R. 25, S. 19-20
Gilmore Rice Beds	T. 136, R. 26, S. 5-6-7-8
Greer Lake	T. 137, R. 27, S. 35-36
Johnson Garden Lake	T. 135, R. 28, S. 9-10-15-16
*Mississippi River in Crow Wing County	
Platte Lake	T. 42-43, R. 28-29, S. 36, 29-30-31- 32-5-6
Rice Lake	T. 145, R. 28, S. 32-33
Rice Lake (Deerwood)	T. 46, R. 28, S. 18-19

HUBBARD COUNTY

*Crow Wing River from Second Crow Wing Lake to First Crow Wing Dam	T. 139, R. 33, S. 28-29
*Fifth Crow Wing Lake	T. 140, R. 33, S. 17-18-30
*Fourth Crow Wing Lake Garfield Lake	T. 139, R. 33, S. 4-8-9 T. 143-144, R. 32, S. 4-5-8-9- 16-35-36
Hay Creek from the Becker County Line to Island Lake Kabekona River	T. 141, R. 35
*Mud Lake	T. 143, R. 32, S. 27
Potato Lake	T. 142, R. 33, S. 19-30
Shallow Lake	T. 141, R. 35, S. 22-23-26-27
Upper and Lower Bottle Lakes	T. 140, R. 33, S. 4-5-7-8 T. 141, R. 34, S. 1-2-11-12-13 14-15-23
Upper and Lower Rice Lakes	T. 143, R. 32, S. 27

ITASCA COUNTY

Bass Lake and Bass Creek and Bass Lake to the Mississippi River	T. 55-56, R. 26
*Big Fork River to Dora Lake	T. 147-148-149, R. 26-27
Blackwater and Cut- Off Lakes	T. 55, R. 26, S. 8-9-10-16-17
*Bowstring Lake	T. 146-147, R. 25-26
*Bowstring River	T. 147-148, R. 26
Decker Lake	T. 148, R. 29
Dixon Lake	T. 147-148, R. 27-28-29, S. 24-25-36 30-31-1-6 1-12-6-7
*Dora Lake	T. 149, R. 27, S. 1-12-13-14

ITASCA COUNTY

Dunbar Lake	T. 148-149, R. 27, S. 8-9-16
Gunnie Sack Lake	T. 59, R. 24, S. 9
Mississippi River	T. 55, R. 26-27
Otter Lake	T. 148, R. 29, S. 13-14
*Rice Lake	T. 148-149, R. 27, S. 1-2-35-36
Rice Lake	T. 59, R. 24, S. 8-9
Rice River and Bog	T. 60-61, R. 26, S. 34-5-6-8-17
All South of Bigfork	21-25-26-27
*Squaw Lake	T. 148-149, R. 27
Shoal Lake	T. 56, R. 25-26, S. 25-29-30-31
Two Route Lake	T. 55, R. 27, S. 12-13

KOOCHICHING COUNTY

Nett Lake	T. 65-66, R. 21-22
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LAKE COUNTY

Crooked Lake	T. 59, R. 6, S. 9-10-11-15-16
Sand Lake and Sand River	T. 59, R. 10-11
*Stoney Lake and Stoney River	T. 59-60, R. 10

MILLE LACS COUNTY

*Ogechie Lake	T. 42, R. 27, S. 4-5-8
*Onamia Lake	T. 42, R. 26-27, S. 25-36-29-30 31-32
Shakopee Lake	T. 42, R. 27, S. 14-15-22-23

MORRISON COUNTY

Platte River	T. 42-43, R. 29-30
Skunk Lake	T. 40, R. 31, S. 28-29-32-33
*Sullivan Lake	T. 42, R. 28-29, S. 1-11-12-13 14-6-7-8

OTTER TAIL COUNTY

*Gourd Lake	T. 133-134, R. 39, S. 24-25-26-35 36-19-30-2
*Grass Lake	T. 134, R. 38, S. 9
*Lake Emma	T. 133, R. 39, S. 7-8-17-18
*Maple Lake	T. 131, R. 36, S. 4-5
*Mud (Amor) Lake	T. 134, R. 40, S. 5-6-7
*Mud Lake and the OtterTail River north to Rice Lake	T. 136-137, R. 39
*Otter Tail River	T. 134-135, R. 39, S. 3-4-27-34
*Otter Tail River (Waterstreet)	T. 134, R. 41-42, S. 19-30-25-26

OTTER TAIL COUNTY

Peterson Lake	T. 134, R. 41, S. 3-4-9-10
Rice Lake	T. 135, R. 39, S. 8-9-16
Rice Lake	T. 136, R. 40, S. 32-33
*Rush Lake and the Otter Tail River north to Big Pine Lake	T. 135-136, R. 38-39, S. 20-21-18 7-6-36-25-24 13-17-18
*Star Lake	T. 135-136, R. 40-41

ST. LOUIS COUNTY

*Big Rice Lake	T. 60, R. 17, S. 2-3-9-10-11 14-15-16-17
Hay Lake	T. 59, R. 16, S. 29
Little Rice Lake	T. 60-61, R. 16-17, S. 31-36-1-6
Rice Lake	T. 64, R. 19, S. 19-29-30
Rice Lake	T. 59, R. 16, S. 28
Sandy Lake	T. 59, R. 18, S. 2-3-10-11
*Vermillion River	T. 64-65-66, R. 17-18
Washusk Lake	T. 55, R. 15, S. 17-18

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