

SANITARY SURVEY OF IOWA LAKES
BY A.H. WIETERS, CHIEF ENGINEERING DIVISION, STATE DEPARTMENT OF HEALTH
PRINTED IN THE OKOBOJI PROTECTIVE ASSOCIATION BULLETIN No. 24, May 1928

Nature endowed Iowa with a number of beautiful lakes. Iowa lakes are typical prairie lakes and therefore have a unique charm. Since there are so few lakes within the state, those few have become very popular as vacation and recreational centers and attract great crowds of people during the summer season. These large crowds constitute a serious problem in sanitation, and if we are to maintain our few lakes as healthful vacation and recreation centers, certain existing conditions must be remedied.

These lakes are far too valuable to Iowa as a whole to allow them to become polluted or allow conditions on the lake shore to remain, or become dangerous to health.

Fortunately, the lakes themselves have been kept relatively free from contamination and it will be no great task to prevent future pollution. Certain practices which will be enumerated later, have developed in the resorts on the lakes, which are in need of correction.

It was for this reason that the State Department of Health made a detailed investigation of the lakes district in Dickinson County and of Clear Lake during the past summer with the view of determining the status of sanitation at the present time, and to point out certain necessary measures to eliminate existing evils as well as to prevent further violations of good sanitary practice. To accomplish this purpose the support and co-operation of every one interested in the lakes is needed. If every one who lives at the lakes, or who spends vacations there will so conduct himself that good sanitary conditions can be maintained and if he will induce his neighbor to do the same, the desired result will be attained. Most of the people take this attitude, but unfortunately there are enough people living at, or visiting these resorts who continue with insanitary practices, so as to necessitate a certain amount of regulation by local and state authorities.

The larger lakes of Iowa are located in the north central and northwest portion of the state. They are easily accessible. The banks are for the most part not steep, but gradually rise from the water edge to the rolling farm land. Quite an extensive fringe of timber has been left standing, at least since the early days of settlement. The water in the deeper lakes is clear and blue. Although the lakes are not in their original condition of pristine purity, fortunately no gross pollution has been discharged in to the larger lakes.

Among this larger lakes in the state are Spirit Lake, East Okoboji Lake, West Okoboji Lake and Clear Lake. These lakes have been developed more as recreational centers than have other lakes. For this reason and in view of the fact that the work by the Department of Health had to be limited, these lakes were chosen for the detailed survey. It is hoped that, in the future, other lakes can be included in additional surveys.

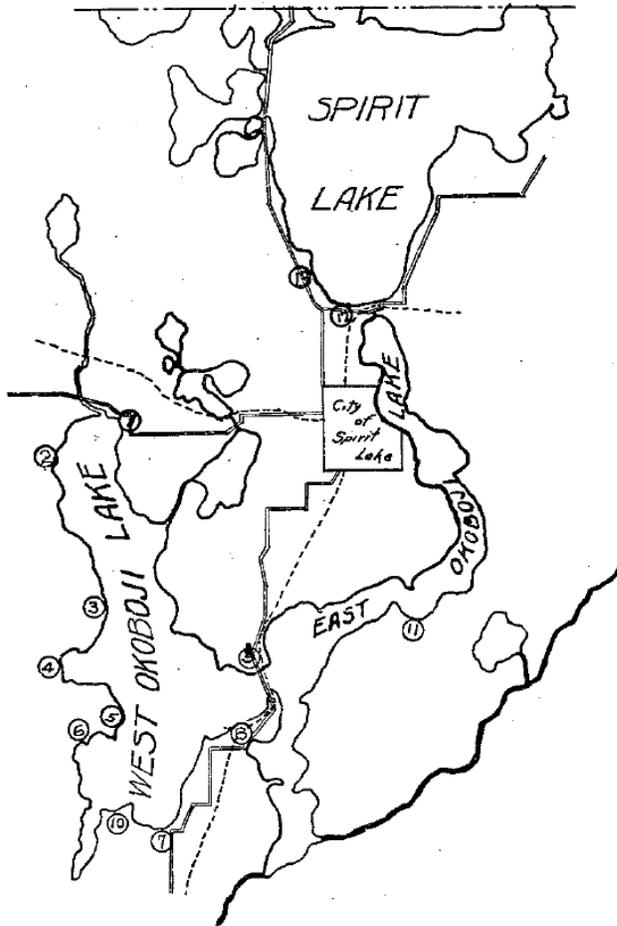
The detailed work of the survey was carried out by Assistant Engineers M. J. Lonergan and L.A. Christenson, under the direction of the Chief Engineer.

Two complete reports, one for the Dickinson County area, by Mr. Lonergan, and one for Clear Lake, by Mr. Christensen, were made and copies were filed with city officials, resort owners, and others directly

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interested in this work. The reports contain specific recommendations and the authorities in charge were asked to secure compliance with the recommendation made.

OKOBOJI – SPIRIT LAKE GROUP



- MAP OF IOWA GREAT LAKES
- | | |
|---------------------|----------------------|
| 1. Methodist Camp | 8. Arnolds Park |
| 2. Egrelharve | 9. Okoboji |
| 3. Manhattan Beach | 10. West Okoboji |
| 4. Miller's Bay | 11. Y. M. C. A. Camp |
| 5. Crescent Beach | 12. Orleans |
| 6. Y. W. C. A. Camp | 13. Templar Park |
| 7. Terrace Park | |

This system of magnificent lakes is mostly within the boundaries of Dickinson County. The north end of six or eight beautiful small lakes all connected to Spirit Lake. Spirit Lake itself is a body of water extending four miles north and south approximately four miles east and west at the widest point. On the west there are six or eight small lakes, all having their outlets into Spirit Lake.

East Okoboji Lake begins about one-eighth mile south of Spirit Lake and extends in southerly direction about eight miles. It varies in width from ten rods at a place call the Narrows to two miles at the widest place. It connects with West Okoboji Lake near Arnolds Park, so that the two lakes are in fact one body of water.

West Okoboji Lake is six miles in length and varies in width from one to three miles. It is deepest lake of the group, the maximum depth being 182 feet. Its beauty is enhanced by numerous bays and promontories, some of the latter rising abruptly from the water's edge. The lakes are all connected, Spirit Lake and West

Okoboji Lake draining into East Okoboji Lake and thence on through the Gar Lakes into the Little Sioux River and ultimately into the Missouri River.

The lake system of Dickinson County has at least one hundred miles of lake shore, a large proportion of which has sandy beaches, affording splendid opportunity for bathing. The banks of nearly the entire lake system are fringed with native timber. A large portion of the shore has been platted into lots. Hundreds of cottages have been built. There are good roads extending around the lakes, and for most

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of the distance, the roads are only a few rods from the lake shore. Located on or near the banks of the lakes are a number of towns and numerous summer resorts.

ARNOLDS PARK. Arnolds Park is located on a point of land between West Okoboji Lake and Minnwashta Lake, the latter being an arm of East Okoboji Lake. Arnolds Park is the most congested of the lake resorts during the summer season. The permanent population is about five hundred, while during the summer season the population reaches approximately five thousand, and on some Sundays and holidays, the number may increase to twenty thousand. The water works system, sewer and sewage disposal plant and garbage collection are municipally owned and operated.

Water is taken from West Okoboji Lake and is chlorinated. The water supply is satisfactory, provided the water is continuously chlorinated. Part of the town is sewered and the sewage is satisfactorily treated before it is discharged into Minnewashta Lake. Although these modern facilities are available there are many cottages that are not utilizing them. It is worthy to note that during the survey in 1927 there were found within the city limits 201 earth pit toilets, nearly all of which could be eliminated by making connections to existing sewers, and forty-nine shallow wells, water from twenty-three of which was analyzed and only four were considered satisfactory.

WEST OKOBOJI. West Okoboji is located on the southwest shore of West Okoboji Lake. It consists of 138 cottages and eight permanent homes. Water is supplied by individual wells and sewage disposed of through earth toilets and septic tanks. Of the forty-five wells in the town, water samples from ten were analyzed and six were found unsafe. The polluted condition of these wells may no doubt be ascribed to the method of sewage disposal. In the area there were found twenty-seven septic tanks and cesspools and forty-five earth pit toilets.

OKOBOJI. Okoboji is an incorporated town of 150 people. The summer population reaches as high as 2,500. It is located just north of and adjacent to Arnolds Park and extends along the east shore of West Okoboji Lake for a distance of about five miles. There are 308 cottages, twenty-nine homes and fifteen other buildings. Of the sixty-eight wells in this area, water samples from forty-eight were analyzed and forty-four of these forty-eight were found to be unsafe. It is natural to conclude that this contamination is due to the sixty-two cesspools and septic tanks and the 214 earth pit toilets found in this region.

ORLEANS. The incorporated town of Orleans is located along the south shore of Spirit Lake, directly north of the City of Spirit Lake. The permanent population is about 150, while the summer population is estimated to be from 800 to 1,000. There are 177 cottages and twenty-homes. Besides the thirty-three wells in the district, about seventy-five cottages are served by Spirit Lake municipal waterworks. There are sixty eight septic tanks or cesspools and 118 earth pit toilets within the incorporated limits.

SPIRIT LAKE AND MILFORD. The towns of Spirit Lake and Milford have waterworks and sewage disposal plants. The water supply of Spirit Lake is derived from a series of sand points and is chlorinated. Milford uses untreated lake water.

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Besides the incorporated towns mentioned above, there are located on the shores around the lakes or within the towns, several summer resorts and beaches. On West Okoboji Lake there is located the Methodist Camp, Egralharve, Manhattan Beach, Millers Bay, Crescent Hotel, Y.W.C.A Camp, Terrace Park and the Inn. On East Okoboji Lake is the Y.M.C.A Camp, and on Spirit Lake is located Templar Park. All of these resorts and Camps are occupied a part of the time during the summer season. Just how many people frequent these places is not known, but it is known that the number is very large.

Sanitary conditions in most of these places are fair, but some undesirable features exist.

SANITATION OF THE LAKES AREA

In the proper sanitation of such areas as were investigated in the summer of 1927 two objectives were sought. (1) The prevention of the pollution of the lakes and (2) the prevention of spread of disease among the cottagers and other who frequent the resorts.

As previously mentioned, the lakes themselves have been kept quite free from gross pollution. Exceptions to this general condition were noted in the discharge, directly into the lakes of wastes from a gas plant, a septic effluent and a large school house and from several homes and cottages. Steps have already been taken to have these conditions remedied. It is imperative that no sewage, garbage or industrial waste be discharged into any of the lakes, if the lakes are to be kept reasonably free from pollution. No doubt there are some sewer outlets that were not discovered by the engineers, but it is hoped that all of these can be eliminated in a short time.

Another evil that has existed in the past and which must be discontinued is pollution as a result of ice harvesting. Improvised shacks are built on the ice and used as toilets by workmen and the dejecta is deposited directly on the ice. When the ice breaks up this material may be carried to a waterworks intake with serious results. Several serious epidemics of typhoid fever have been reported as the results of wastes from a typhoid patient getting into a water intake after been deposited on the ice.

People having fishing shacks are also admonished to be careful not to deposit excreta on the ice.

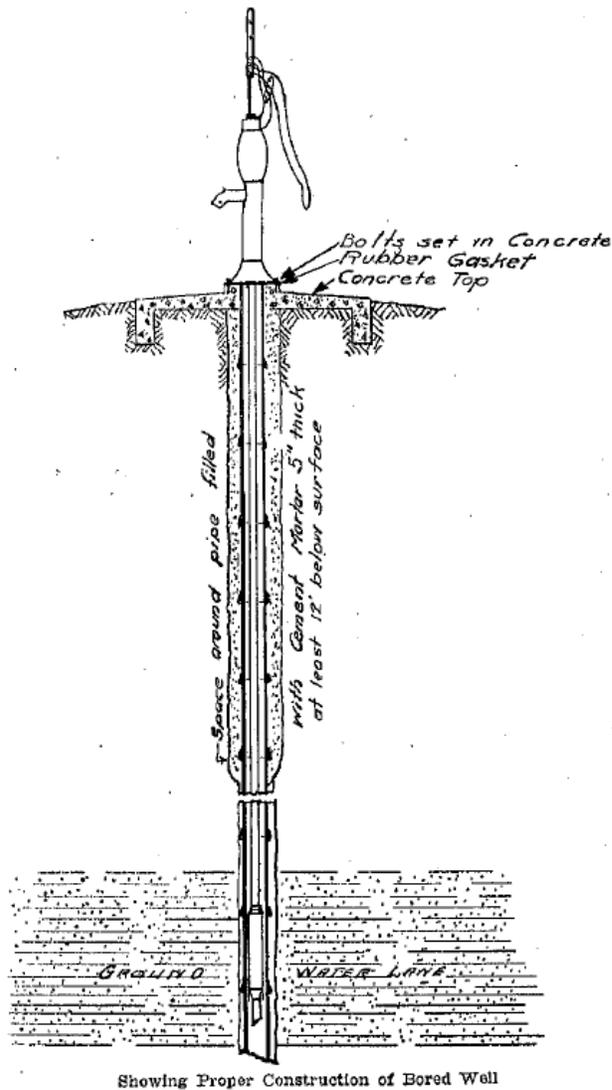
The sanitation of the resorts with the object of preventing the spread of disease among those people who live in the cottages and those who occasionally visit the resorts presents a difficult problem. This is especially true of the congested areas. For instance in one resort town the permanent population is 500, the holiday and Sundays, crowds of 20,000 to 25,000 people congregate in this comparatively small area. Sanitary conveniences which might be adequate for the cottage population are overtaxed on such days.

Another factor that enters into the problem is the carelessness of those individuals who come from just a short time. Where a cottage is occupied by the owner, greater pains are ordinarily taken to keep the premises in good condition from a sanitary standpoint. In some of the resorts a large percentage of the cottages are rented for a few days or at the most a couple of weeks. In addition to these there are people who camp for a few days and those who bring a picnic lunch and spend only a day. It is the

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transient population that causes the greatest problem. Naturally they are more careless than the permanent population and it is difficult to enforce compliance with any existing regulations.

The important things to be taken into consideration in resort sanitation are (1) water supply (2) sewage disposal (3) garbage and rubbish disposal (4) food supply. In the congested areas a public water supply of known purity seems the only satisfactory solution. Results of analysis indicated that the water as a whole from private wells is unsatisfactory.



In many places the public water supply is taken directly from the lake. In one instance the water is filtered, in several it is chlorinated, while in others it is untreated. A survey of the conditions surrounding the lakes and the results of numerous analyses indicate that the lake water is unsafe for drinking without treatment. In most instances, if the intake is located in deep water a considerable distance off-shore, chlorination is sufficient to insure safety of the water. In a few instances filtration is desirable to remove periodic turbidity. However in all instances the lakes water should not be used for drinking and domestic purposes unless chlorinated.

Likewise in the congested areas a public sewer system is the only safe method of sewage disposal and should be installed in all such areas. All cottages should be required to connect with the sewer system thereby eliminating all outdoor toilets.

In the less congested areas or in isolated cottages, however, public utilities of this kind are not economically feasible. It therefore becomes necessary to develop private water supplies and sewage disposal systems.

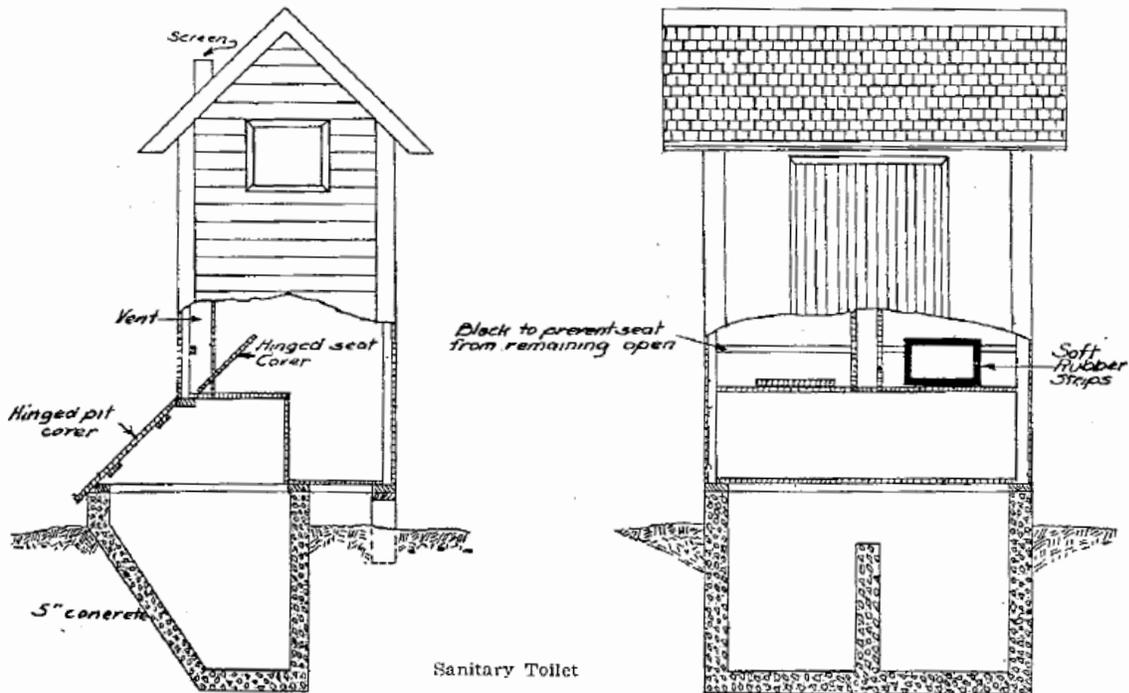
Accompanying are cuts showing an ideal well and a sanitary outside toilet.

The well should be located on the highest ground available and should be all means be on ground higher than and at least 100 feet away from the outside toilet, cesspool or septic tank. The casing should be of some impervious materials, especially to a depth of 12 to 15 feet below the surface of the ground. Iron casing is very satisfactory and vitrified sewer tile is also satisfactory if the joints are tightly sealed. The

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cover should be of impervious material, preferably of concrete and should be at least one foot high than the surrounding ground. The casing should extend through the well cover and the pump head should be rigidly bolted to the cover. A rubber gasket should be placed under the pump head.



Sanitary Toilet

Where cottages are close together where water and sewer are not available, either a chemical toilet or a toilet with a water tight pit as is shown on the accompanying cut, are the only satisfactory types. The important features are: (1) Water-proof pit, (2) Insect-proof superstructure. Concrete is the best material for the pit. In fly-proofing the superstructure the following features are important: (a) The seats should be provided with hinged covers, blocked so that they will not remain open unless they are held open. (b) All openings into the pit such as vents should be screened.

Flies constitute a serious menace at resorts where crowds congregate. Flies can be most readily controlled by the elimination of breeding places. To prevent breeding it is necessary to place garbage and other organic refuse in tightly covered containers. The garbage should be removed or incinerated or by feeding hogs in some remote place. In the congested areas the collection of garbage by the city, or under strict city supervision is most satisfactory. Taxes are levied for this purpose and garbage is regularly collected from all the cottages. The garbage is regularly collection must be handled individually in the case of isolated cottages or in case of small isolated groups of cottages. Usually a farmer nearby is willing to collect the garbage and feed it to hogs.

There should be a rigid supervision over food and dairy products. In many instances food is cooked and served in open booths which literally swarm with flies. This is, of course, insanitary and dangerous. The

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supervision over food and dairy products should extend to include medical examination of the food handlers.

The State Department of Health, having general supervision over sanitation and the Department of Agriculture having general supervision over food and dairy products do not have sufficient personnel to supervise the reports as closely as is desirable. This general supervision should be augmented by local supervision.

The best solution to the problem would be a whole time county health unit. Most of the communities and resorts are too small to warrant individual whole-time county units or district units, a district taking in all the resorts and towns within a limited area which could conveniently be supervised from a central head-quarters. It would be well to have authorizing legislation for the establishment of whole-time county or district health units. In the meantime, it is possible for some of the larger resort towns to pool their resources and maintain whole-time health supervision at least during the rush months in the summer. Whole-time health supervision whether it be operated by the city, county or district is one of the greatest needs of these areas.