MARSHES

IOWA'S RICHEST ACRES

SELECTION, DEVELOPMENT, MANAGEMENT

TATE CONSERVATION COMMISSION

INTRODUCTION

Marsh areas are our richest acres. Too often, marsh lands are thought to be only waterfowl areas yet they offer many benefits. They provide a home for rabbits and game birds. Furbearing animals, amphibians, shore birds and song birds share this mutual home. Marshes serve as nature's sponge - retaining and slowly releasing increasingly valuable ground water. Marshes provide hunting, fishing, boating, picnicking, nature study and camping to our growing population who are seeking relaxation and recreation.

This pamphlet was written as a guide to county conservation board members, conservation clubs, industry and individuals interested in the selection, development, management and maintenance of marsh areas.

I have attempted to generalize the information rather than go into great detail such as is found in a text book. It is hoped this manual will help in the proper conservation and development of marsh areas.

John A. Fish
Ass't Supt. Federal Aid

MARSH SITE SELECTION

There are obvious factors that limit the development of any potential marsh area. These factors should be detected on the initial inspection tour. Rejection of a potential area for one or more factors will prevent unnecessary preliminary costs.

Persons making the initial inspection must keep in mind the following basic factors which, when limited or absent, automatically disqualify a potential marsh site.

1. Marsh basin and basin slope.
2. Water supply.
3. Soils and geological formations.
4. Geographic location.
5. Availability for acquisition.
6. Natural Resources Council permits.

If a potential marsh site can qualify after basic factors have been checked, the services of a competent and qualified engineer should be secured. He should make detailed field surveys, plans, and final designs. Normally, the cost of engineering assistance is generally a small portion of the total project cost and will be returned by savings in design and construction.

The six limiting factors listed above are explained as to how each is related to the selection and development of a good marsh site and also how each limiting factor is interrelated to the other.

1. Marsh basin and basin slope.

A marsh basin can be defined as that portion of the area that can be covered by water, either naturally or by use of control structures and dikes.

Topography of a marsh basin is most important. It controls the amount and the depth of the impounded water as well as the amount of construction work required for control structures and dikes.

The optimum topography for a marsh area would be an area both broad and almost level, yet saucer-shaped. Such a basin would require very little dike construction and only the simplest of water control structures. It would give maximum water impoundment at optimum depth for good marsh management. Normal marsh water elevation as a rule should be so at least 75% of the marsh basin be covered by water less than two feet in depth.

Fig. 1a - - Side View of optimum marsh basin profile

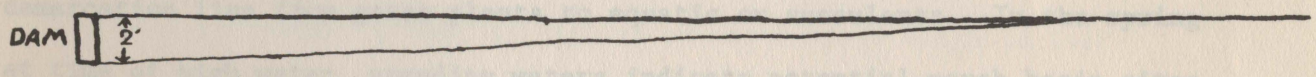
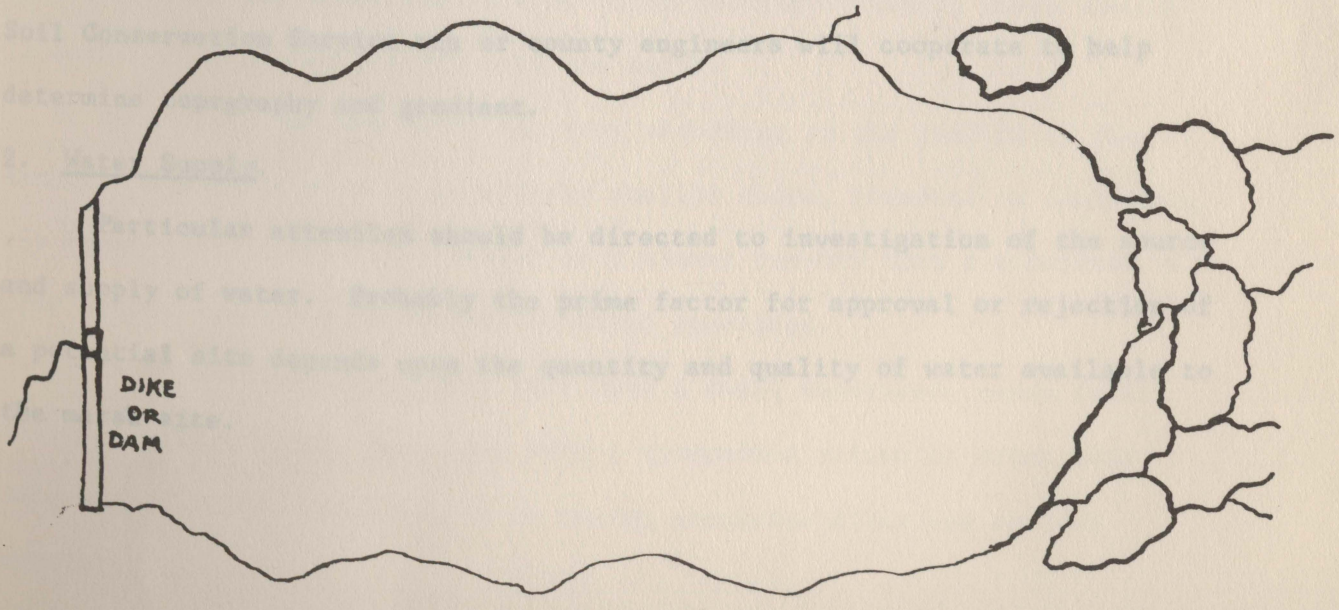


Fig. 1b - - Top view showing of optimum basin breadth and length



A basin with a slope of more than one percent, (one foot of fall for every 100 feet laterally) automatically eliminates the potential marsh area. An exception would be the combination hunting-fishing area explained later. The longer the marsh basin the more critical examination of the basin slope should be taken.

For example: A marsh basin that is 1320 feet long and has a gradient of one percent would require at the lower end a dike and control structure at least 13.2 feet high. The same area with a one-half mile basin length would require a 26.4 feet high structure and dike.

Likewise, the width of a marsh basin is considered under the same rules as the basin length. One important fact to keep in mind, is that a narrow marsh area does not normally lend to good marsh management nor to excellent waterfowl shooting.

Use natural indicators on the initial inspection which hint at the approximate shape and slope of a potential marsh basin. Look for a distinct demarcation line from grass plants to aquatic or succulents. In the spring at time of high water, standing waters indicate potential marsh basin sites.

Visual checks of topography and slope of basin are unreliable. The use of an ordinary hand level is sufficient to determine general gradient. Most Soil Conservation Service men or county engineers will cooperate to help determine topography and gradient.

2. Water Supply.

Particular attention should be directed to investigation of the source and supply of water. Probably the prime factor for approval or rejection of a potential site depends upon the quantity and quality of water available to the marsh site.

The marsh basin must have a sufficient supply of water at the proper seasons to insure a successful marsh habitat.

The amount of watershed affects the degree of design and construction requirements and controls the economic factors as well.

The watershed is defined as the surrounding upland from which runoff waters flow into the marsh basin.

The primary step towards initial investigations of a watershed should be the determination of a ratio of watershed area to marsh basin area.

Acreages of the watershed and the marsh basin can be plotted quite accurately by outlining both on a map traced from an aerial photograph of the area.

The tracing or over-lay can be done from current aerial photos kept in the county SCS or ASC offices. The photos are scaled 8 inches to the mile or one inch equals 660 feet. After outlining the apparent watershed and potential marsh basin from the aerial photo, checks then should be made on the ground against the tracing for greater accuracy.

The average length in feet multiplied by the average width in feet divided by 43,560 will give the approximate acreage.

A good watershed-marsh ratio is considered to be approximately 12 to 1. This means for every one acre of marsh covered by water, there should be 12 acres of watershed run-off into the marsh.

Of course the optimum ratio can vary according to the quality of the watershed. A watershed of comparatively shallow slope, forested or containing mostly heavy grass land, lends itself to a slower run-off than a watershed of steeper slopes and under severe agricultural practices.

It is imperative to remember that even a small watershed- marsh ratio, receiving a very intense storm, can dump a tremendous volume of water into an impoundment. This could result in losing expensive dikes and control structures.

Huge run-off volume from watershed requires more massive development construction resulting in higher development costs.

Siltation of the marsh basin is another limiting factor to consider. The life of a marsh is also determined by the amount of time the basin fills up to crest level either with silt or by the natural process of vegetation dying and decaying. Erosion control methods under good soil conservation practices on the watershed will help reduce the silt deposit in a marsh basin.

3. Soils and Geological Formations.

The ability of the potential marsh basin to retain impounded waters is another limiting factor. Unless a constant supply of water is available to replace loss by seepage, it becomes impracticable to develop such marsh areas.

One method of determining the ability of soil to hold water is by examination of a sample obtained by use of a soil auger. Exploratory holes five feet deep with undisturbed samples being taken at various location and levels on the potential site will indicate the porosity of the soil and its ability to hold water. Competent engineering services can be employed for this phase. On the initial investigation trip, wet soil conditions or standing water will indicate whether the site has some water holding qualities.

Geological formations such as sandstone and lime rock may result in conditions adverse to impounding water. Information on geological formation can be obtained from well drilling records.

Extreme caution should be exercised to prevent disturbing the water holding capacity of the soil by development construction. Materials used for construction of dikes and dams should be borrowed from outside the planned marsh basin if possible.

4. Location and related factors.

Location of the proposed marsh in respect to human activity has a direct bearing on site selection. A marsh area is more desirable nearer to heavily populated areas and provide more benefit than remote areas depending upon primary needs.

Yet chances for successful development diminish for obstacles such as power transmission lines and gas lines must be avoided.

A good site may be too expensive to acquire near large populations in heavy industrial areas.

Investigation as to drainage districts and tile lines must be made in respect to the water control rights of others.

5. Availability to Acquisition.

Complete control of the land is essential for any marsh development. This means acquiring the land or negotiating for a long term lease or easement. Outright title to the property is recommended. In case present land owners will not or cannot dispose of their holdings; a lease for the estimated lifetime of the area, setting out specific uses of the area, should be negotiated.

If not already acquainted, it is best to ascertain the ownership of the proposed site at the time of the initial inspection. This requires spending a little time at the county court house where ownership records are maintained.

To determine ownership, the location of the site should be known as to Section, Township and Range. County Auditors and Recorders are there to assist.

A copy of the deed kept in the Recorders office will give a legal description of the property. Sometimes the price paid by the current owner is stated. Internal Revenue Stamps affixed to the deed indicate the purchase price of the property except those with assumed mortgages.

6. Natural Resources Permits.

The Iowa Natural Resources Council was created to establish and enforce a plan for the control and protection of the surface and underground water resources of the State.

The act creating this agency also provided laws relating to flood control, conservation, development, and use of the water resources of Iowa.

According to law, everyone in the State must receive permission from the Natural Resources Council to construct levees along streams or to make channel changes. Permission must be granted for construction across waterways or adjoining floodplains or to make any excavation.

The law states that an application, plans and specifications in duplicate must be submitted to the Resources Council for approval.

Application forms and any pertinent information as to securing approval of projects should be secured from the Iowa Natural Resources Council. They cannot make field surveys or final designs for any project it might subsequently review.

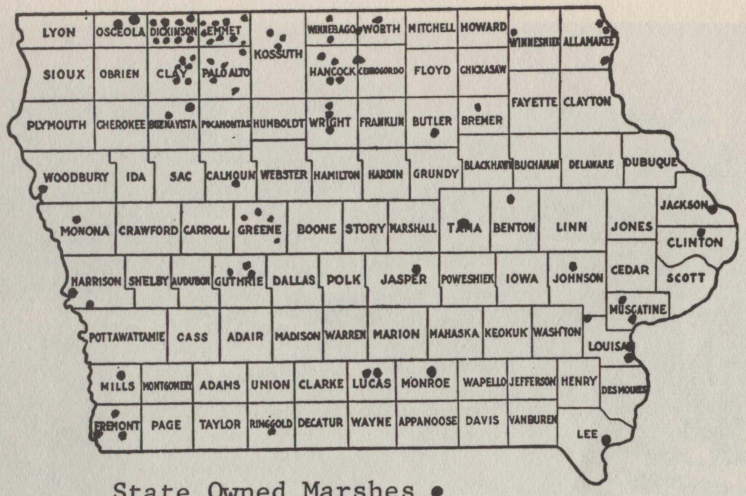
A permit is also required for the diversion, storage, or withdrawal of water for beneficial purposes. This applies to both surface and underground water.

The law requires that a $15.00 fee accompany the application to the Council. Upon receipt of the application a public hearing is set and held. The water commissioner will make the final determination as to the approval of the permit.

MARSH DEVELOPMENT

It is difficult to determine a possible marsh site if one is not experienced with development of the various types of marsh areas. Certain sites lend themselves to different types of development.

Upon initial inspection the potential area should be visualized as it would appear upon completion. Visits to various types of completed marsh developments will greatly assist the projected ideas that can be formulated.



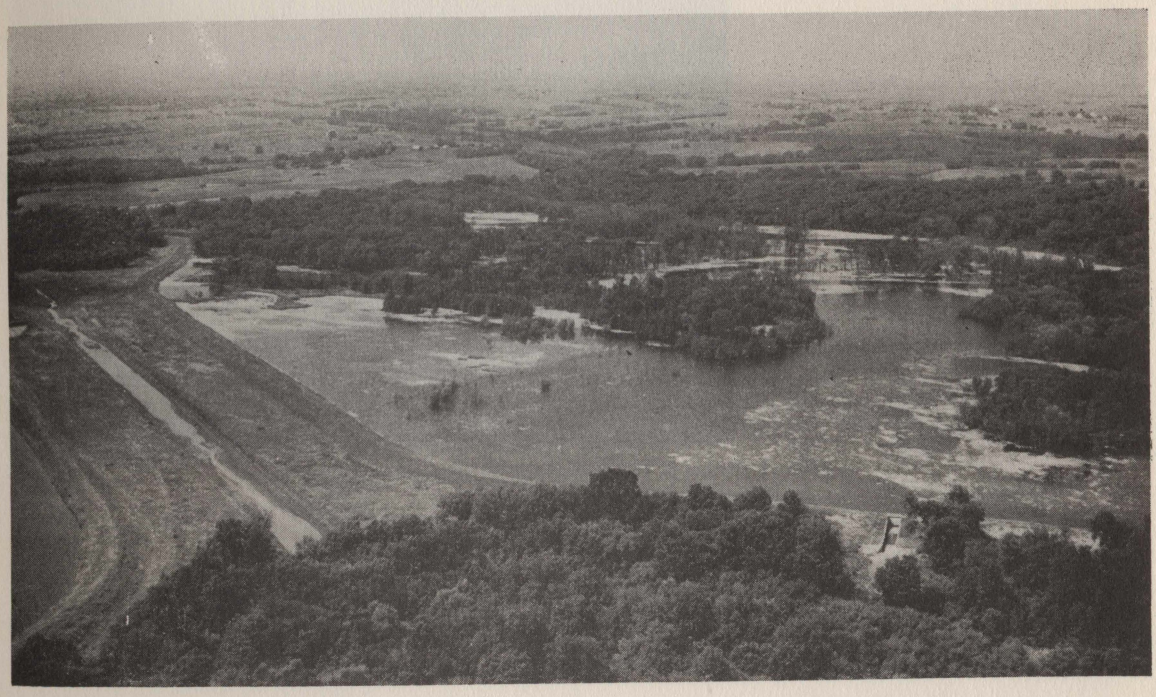
State Owned Marshes •

Prairie Pot-Hole Marsh

The simplest form of marsh is the natural pot-hole or saucer shaped marsh. The water supply for the area depends chiefly upon run-off from surrounding land. Water levels fluctuate with the amount of annual precipitation and loss of water through evaporation and transpiration.

Marsh area created by structure in watershed system.

The general development of an area of this type requires construction of a small dam with a drop inlet spillway. The drop inlet contains stop logs for water level manipulation. The impoundment is generally made in a watershed of relatively rolling or rough topography with suitable watershed and impoundment ratio. This type development often requires an auxiliary overflow in case of an intense run-off.



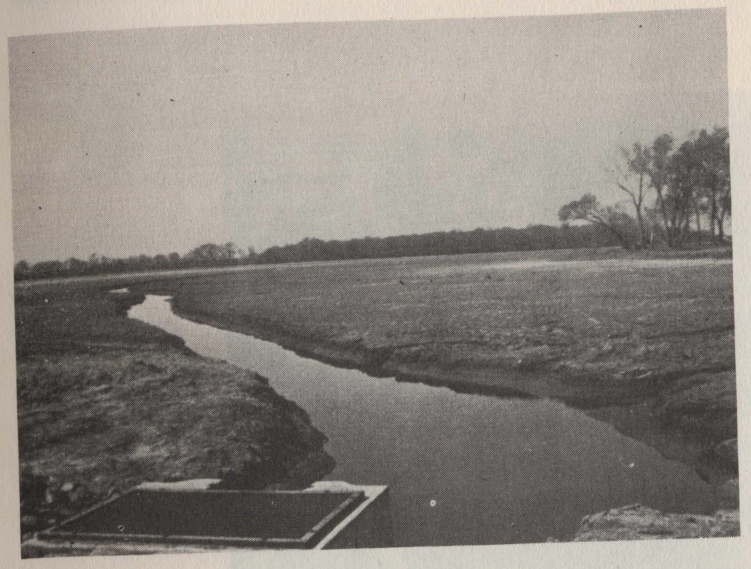
Colyn Area - Lucas County - Marsh impoundment.

Developed Prairie Marsh Area

The most common type development is the prairie marsh improved by installation of a water control structure at the lower end of the area. The control structure makes it possible to store a larger amount of water and to increase the size of the marsh. It also makes it possible to manipulate water levels for good marsh management. This is accomplished by installing or removing stop logs in the control structure to the desired level.

Marsh area created by partial restoration of former lakes.

Some drained lake beds can be partially restored by blocking drain tiles and by use of a simple water control structure. This type of marsh development is rare for it generally involves legal abandonment of a drainage district.



A little water and Iowa's rich soil produce ideal marsh habitat.

Marsh area developed by pumping operations.

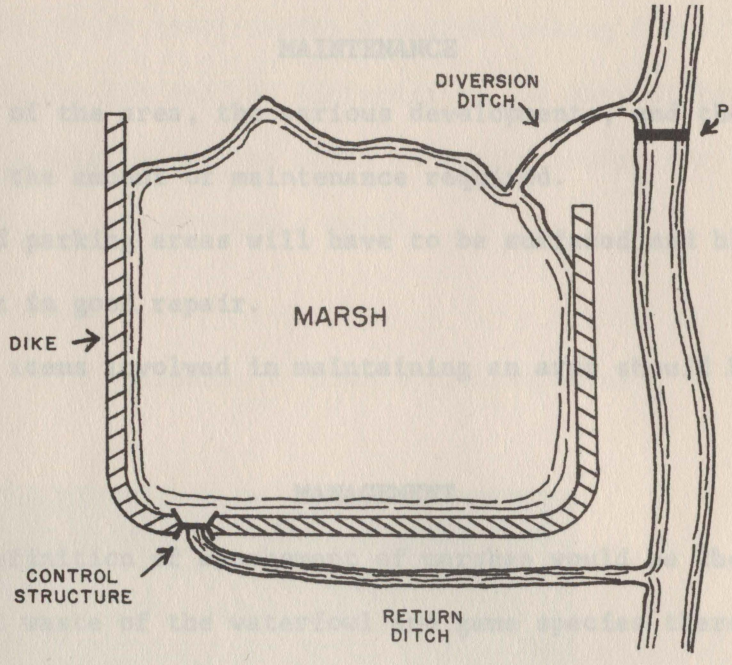
Using a system of dikes and a water control structure on a potential site near a reliable source of water, a marsh area can be developed successfully by pumping water from the source of water into the impounded area. One simple and efficient method of pumping is by use of a belt operated impeller type pump powered by an old used tractor.

Klum Lake - Louisa Co.

Hales Slough - Dickinson Co.

Marsh area created by diversion of stream flow.

A marsh area can be developed successfully by installation of a 'plug' across a stream and diversion of a portion of the flow into an impounded area. This type of development requires excellent hydrological engineering and a large level area to impound diverted waters. Care must be taken to allow a certain amount of water to remain flowing below the diversion point.



Marsh development by means of a reservoir, gates and dikes.

An expensive method of artificial means of marsh development is accomplished by construction of a permanent type dam across a reliable stream. By construction of dikes and strategically located control gates and water control structures, areas of shallow waters can be impounded for good marsh habitat.

Combination Fishing Water and Marsh.

The most popular area developed for all round recreational activity is the combination fishing lake and marsh area. This type area involves a rather massive dam and water control structure incorporating deep water for fisheries, complemented by rather shallow waters at the periphery and upper reaches of the basin.

This type area will require much development and will be costly to construct but provides multiple use to the public.

MANAGEMENT AND MAINTENANCE

With acquisition and development work accomplished, only half of the marsh plan is completed. The remaining work is classified as management and maintenance.

MAINTENANCE

The size of the area, the various developments, and the use of the area, will determine the amount of maintenance required.

Roads and parking areas will have to be surfaced and bladed. Dikes will have to be kept in good repair.

The many items involved in maintaining an area should be given careful consideration.

MANAGEMENT

A good definition of management of marshes would be the production and harvest without waste of the waterfowl and game species thereon.

Each marsh area must be considered different from any other and must be managed accordingly.

Most of the marshes in Iowa will be managed for the puddle ducks, especially the mallard. They require cover, food and shallow flooded vegetation.

By careful manipulation of water levels these three items can be obtained. Drawing down water levels in the spring and early summer will enable vegetation to grow.

Smart weed and millet grown to maturity and then shallow flooded is irresistible to a flight of hungry mallards.

Small marshes set up as refuges will provide cornfield shooting long after other marshes have been burned off!

Tall grasses at marsh edge and plantings of conifers and plum will provide cover for upland game.

Marsh management offers a most interesting chance to observe nature first hand. Watching a young brood of blue-wing teal coming down to the waters edge for the first time; seeing a muskrat making a trail of ever widening ripples as he swims to his den; or listening to the many different voices from the teeming population of the marsh is reward enough for the conservationist who selects, develops, and manages a marsh.

MARSHES - Iowa's Richest Acres.