Iowa Wetlands:
The proceedings of the Iowa Academy of Science
88(1), 1981; pp. 11-16.

Proc. Iowa Acad. Sci. 88(1):11-16, 1981

Iowa's Wetlands[1]

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The Wisconsin glacier created a 7.6 million acre prairie-marsh-pothole complex in north-central and northwest Iowa. Prairie marshes, valuable for wildlife habitat and water retention, have been relentlessly drained. In 1938, only about 50,000 acres of prairie marshland remained and in 1980 this had been reduced to 26,470 acres of natural marsh. Meandering rivers have been straightened, eliminating miles of river course. Only 1,637 miles are officially designated as meandered streams. While natural marshes and unchannelized streams are threatened aquatic habitats, other wetlands have actually increased. Artificial reservoirs provide 47,562 water acres and 47,700 farm ponds have been constructed. Proper public attitude could increase the acreage of marshland as well as reservoirs. Approximately 5,000 acres of prairie marsh and pothole habitat remains in private ownership. To protect these threatened wetlands, additional money and public support is needed.

INDEX DESCRIPTORS: Wetlands, marshes, rivers, reservoirs, drainage, wetland inventory.

Intrusion and withdrawal of glacial ice fields and the following periods of erosional action by wind and water created various land forms with numerous rivers, streams, and glaciated lakes and marshes. Glaciers, mainly the Wisconsin, created a vast complex of prairie interspersed with numerous potholes, marshes, shallow lakes, and 4 large deeper lakes (Fig. 1). Rich soils of the Clarion-Nicollet-Webster association and bountiful wildlife supported by the productive prairies and wetlands enticed early pioneers to settle. This glaciated region covered approximately 7.6 million acres which prompted Bennett (1938) to estimate 6 million acres of prairie-wetland in existence in the early 1800's.

The Swamp Land Act of 1850 granted 1,196,392 acres of public domain wetlands to the State of Iowa for swamp reclamation. This land was then turned over to the counties where it was bartered for public buildings, bridges, etc. and in some cases was sold for 25 to 75 cents an acre to immigration companies provided they put settlers on the land. Some county commissioners sold the land to themselves for nominal fees and some gave their lands to railroad companies (Shaw and Fredine, 1956). It is impossible to determine how much of the original Swamp Land Act was actual wetlands. Early wetland inventories include USDA inventories of 1906 and 1922 which listed 930,000 and 368,000 acres of wetlands, respectively.

As farming became a way of life for early settlers, they turned the rich prairie sod and began the task of conquering the great expanse of marshlands. Bennett (1938) estimated that by 1938 only about 50,000 acres of prime marshland remained. This estimate did not include large sovereign lakes. Mann, in 1955, published a wetland inventory which estimated 138,000 acres of water habitat; but these figures include additional wetland types such as seasonally-flooded lands and overflow areas along rivers. Conversion of these wetlands has continued from the time of settlement to the present day. Over 95 percent of our natural wetlands have now been drained.

Drainage was accomplished by many methods; however, creation of drainage ditches to rapidly dispose of the water allowed large acreages to be drained that otherwise would not have been feasible (Fig. 2). During severe droughts, the farming of some marshes resulted in the destruction of the protective water seal and reduced the water holding capabilities. Continued farming converted many of these wetlands into prime farmland. Tiling of marshes and wet meadow areas into drainage ditches dealt the final blow and served to lower the water table which aided in draining more permanent wetlands. Ditches and tile are an ever-present threat to the remaining wet areas in private ownership. Today, the numerous straight-line ditches remind us of what used to be and what we have done.

Table 1. *Wetland Types and Acreages in Iowa*

Wetland Type	Acres	Miles
Natural Marsh	26,470	—
Artificial Marsh	10,000	—
Natural Lakes	32,886	—
Small Manmade Lakes & Reservoirs	17,312	—
Large Manmade Reservoirs	30,250	—
River Oxbows and Overflow Wetlands	40,000	—
Farm Ponds	49,000	—
Inland Warm-Water Streams	51,588	6,593
Inland Cold-Water Streams	296	258
Border Rivers	324,785	619

Two important programs stemmed the entire elimination of these unique ecosystems. The first happened at the time of the original land office surveys when they designated 65 lakes and marshes as sovereign lands of the State of Iowa. The second was initiated in the late 1930's when the State Conservation Commisison, with the help of federal aid monies, made available through the Pittman-Robertson Act of 1937 (federal excise tax of 11 percent on all sporting arms and ammunition), actively pursued wetland acquisition. Many excellent marshes threatened with drainage and some drained marshes and lakebeds that proved too wet to farm were purchased. Most of these drained marshes were restored to dynamic wetlands (Fig. 3).

Presently, about 21,470 acres of natural marshes of Class 3, 4, and 5 (Stewart and Kantrud, 1971, Wetland Classification) and 32,886 acres of sovereign lakes with approximately 22,000 acres of surrounding uplands are in public ownership. Only a delicate filament, of this once vast complex, of approximately 5,000 acres of Type 3, 4, and 5 wetlands remain in private ownership. Wetland types and acreages are presented in Table 1.

NATURAL MARSHES AND LAKES

Of all wetlands in Iowa, none are more precious than natural marshes and potholes. Only a remnant of these wetlands remain to remind us of our heritage and allow us a glimpse into the past. We have preserved 21,470 acres of natural marsh through public ownership and created another 8,890 acres of artificial marsh. This acreage will prove invalu-

[1]Based on a contribution to the symposium "Perspectives on Iowa's Declining Flora and Fauna" held at the 92nd Session of the Iowa Academy of Science, 18 April 1980.

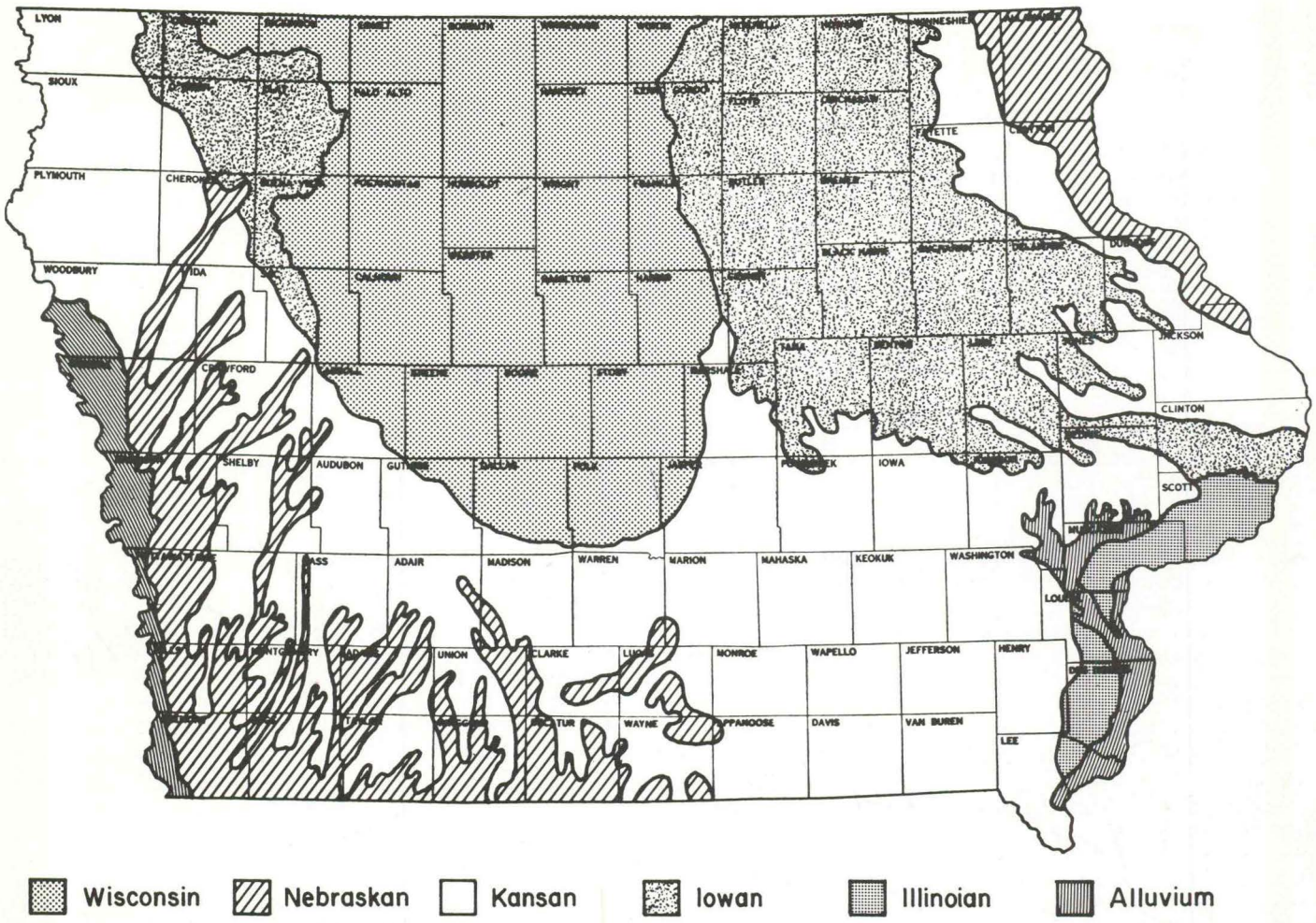

Fig. 1. *Glaciation of Iowa.*

able as outdoor classrooms for future generations, recreational areas, and as habitat for the myriad of birds and mammals that require aquatic or semi-aquatic habitat to survive. Ecologists often proclaim that the aquatic ecosystem is the most productive and diverse of all habitats and its value for wildlife species is unrivaled. Marshes also serve functional roles in agriculture by retaining surface water consequently reducing erosion, providing water for livestock, and replenishing ground water supplies.

Natural marshes are often called by many other names such as swamps, sloughs, lakes, bogs, potholes, and wet meadows. Marshes that are of major value are Classes 3, 4, and 5.

Type 3 marshes (inland shallow fresh) are categorized by water-logged soils with shallow water six inches or so which often dry out in summer. These marshes are very important to nesting waterfowl and other wetland species. Vegetation includes smartweed (*Polygonum* sp.), sedges (*Carex* sp.), spikerushes (*Eleocharis* sp.), arrowhead (*Sagittaria* sp.), bulrushes (*Scirpus* sp.), and cattails (*Typha* sp.).

Type 4 marshes (inland deep fresh) are deeper with six inches to three feet or more of water interspersed with cattails, bulrushes, phragmites (*Phragmites* sp.) burreed (*Sparganium* sp.), pond weeds (*Potamogeton* sp.), coontail (*Ceratophyllum* sp.), and water milfoil (*Myriophyllum* sp.).

Type 5 marshes (inland open fresh) are open or shallow lakes with less than ten feet of water and ringed with emergent vegetation usually cattails, bulrushes, and reeds. Open water usually displays several submergent plants like pondweeds, coontail, and water milfoil.

The larger and deeper lakes were designated as sovereign waters of the State of Iowa and approximately 32,886 acres of such waters are currently under the jurisdiction of the Iowa Conservation Commission.

Drainage has almost eliminated prairie marshes in private ownership. A recent survey by the Iowa Conservation Commission indicated aproximately 10,500 acres of marsh and undisturbed uplands. Of this, only about 5,000 acres are actual water. Although our past stewardship of wetlands is extremely poor, I believe there is a potential in the future to increase this acreage. The drained wetland basins are still present as is a seed bank of native plants (van der Valk and Davis, 1978a). A public commitment is needed to prompt public agencies to purchase land that could be returned to marshland. These basins can be reclaimed by destroying tile lines in the basin and by constructing dikes where necessary. Control structures to regulate water to avoid flooding adjacent landowners or to keep the area from going dry in late summer may also be required.

Since the glaciated period, natural lakes and marshes have been changing their character through sequences of erosion and harsh water

Fig. 2. *Prairie marsh being drained by construction of drainage ditch.*

action. This natural scenario results in shallowing of wetland basins. Deeper lakes become more shallow, shallow lakes become marshes, marshes transpose into wet meadows, and wet meadows yield to prairie or timerland. When the protective vegetation covering the prairie was destroyed by exploitation, erosion increased drastically and some marshes were destroyed in just a few years by siltation. The natural process has been altered to the point that man must continue to manipulate events to achieve a resemblance of the natural state.

Marshes that have an emergent vegetation to water ratio of 50-50 are the most attractive to a wide variety of wetland wildlife species as well as nesting waterfowl (Weller and Spatcher, 1965) (Bishop et al, 1979). Most natural marshes in public ownership are managed to maximize production of nesting waterfowl with secondary emphasis on furbearing animals and nongame species. In the natural state, marshes go through a wet-dry cycle. A drought dries out the marsh bottom which allows seeds of cattail, bullrushes, etc. to germinate which in turn creates a solid stand of emergents. When water returns to the marshes, very little open water is available and only a few species of birds find this stage attractive. Muskrats eventually come back and they begin to open up dense stands of emergents by cutting plants for house building material and food. An abundant food supply stimulates the muskrat population and numbers rapidly climb to a peak that exceeds the food supply. This is called an eat-out where muskrats will either partially or completely eliminate the vegetation. The marsh cycle will start over with the next drought. Often, high water levels and high winds cause marsh plants to break loose from the soft peat-type bottom and float away. Muskrats and flooding out create open water conditions. This is of course, a simplification of the actual process and many variations of this sequence result.

Severe drought that would result in complete revegetation occurs about every twenty years. Some wetlands change within 5 years from dense vegetation to open water and consequently remain mostly open

Fig. 3. *State-owned type 4 prairie marsh – an island in the midst of agricultural land.*

until the next drought. The open stage is not conducive to good wildlife production or to hunting or trapping recreation. Thus, the need to manipulate water levels becomes important. A dike or levee across the outlet to the wetland along with a water control structure allows the manager to artificially raise the water level in marshes which have silted in from excessive erosion or to maintain higher water levels in early spring to ensure water later in the summer. The water table lowered by tiling and drainage precludes the normal feeding of wetlands during the drier summer months. Water control also allows the manager to drain the marsh causing an artificial drought to revegetate an open marsh. Since man is a most impatient creature and the demand for maximum wildlife productivity is a priority, management capabilities are of extreme importance. We can best utilize our remaining marshes by shortening the open water periods and lengthening the productive 50-50 water-vegetative ratio.

OXBOWS, OVERFLOW WETLANDS, AND INLAND RIVERS

Natural phenomena have changed river courses and left oxbows as signatures to the force of nature, but natural changes are dwarfed by the magnitude of changes caused by modern machines and technology. Channelization of the mighty Missouri River is the most dramatic example of channel straightening. This once wide, wandering river was converted to a fast-flowing narrow drainage ditch. Other inland rivers once meandered across Iowa creating a great drainage system. The winding artistic nature of these river courses provided valuable habitat for fish as well as a wide variety of birds and mammals. However, as other wetlands which acted as water storage bodies were drained into the river systems and water impeding vegetation was removed from the landscape, the twisting rivers could not cope with additional runoff and severe flooding resulted. Stream straightening allowed water to escape

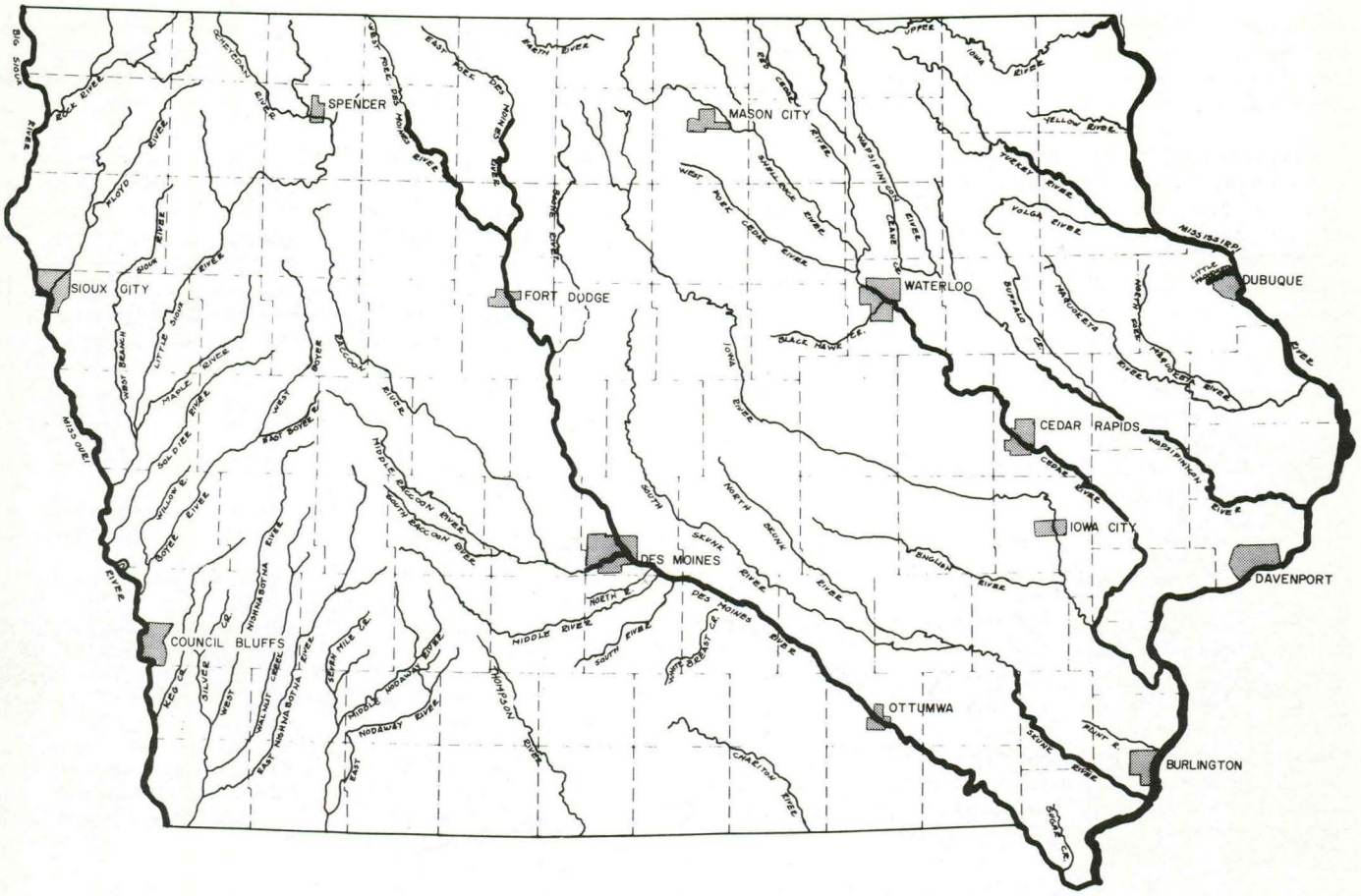

Fig. 4. *Meandered portions of Iowa rivers are outlined in black.*

faster and also provided additional farmland where river bends and bottomland hardwoods once existed. The 6,851 miles of inland streams is much less than half that which once existed when Iowa was first settled. Only 1,637 miles were designated as meandered streams in 1935 (Fig. 4). Much of the meandered portions of these rivers were altered prior to the 1935 designation that gave state ownership of these stream beds up to the high water mark. Current vigilance protects these river portions from further degradation.

Most of the channelization occurred in the early 1900's, but has continued on unmeandered rivers up to present day. Permits from the Corps of Army Engineers are now required before any alteration of navigable waters occurs. Little data are available on the miles of unstraightened water courses that remain, but they are truly a unique remnant of the past and need further protection.

The old river channels now cut off from the stream itself are called oxbows, and are valuable areas for fish and wildlife. An estimated 40,000 acres of oxbows and overflow areas remain in inland river floodplains. Less than half of this acreage is permanent water. Flooding periodically inundates low areas and recharges oxbows. Clearing of bottomland timber and filling wet areas for additional agricultural development continues to decrease this acreage. Consequently, its recreational and aesthetic values to the public and its value as habitat for wildlife are also decreased.

BORDER RIVER WETLANDS

Wetlands adjacent to or within the border rivers themselves are often overlooked. An estimated 324,785 acres constitute riverbeds of our border streams. While the Missouri River lost most of its valuable backwaters and marshes, the creation of locks and dams for navigation on the Mississippi created some excellent river marshes in its upper portions. While Allamakee and Clayton Counties boast the most valuable and picturesque river ponds and marshes, additional wetlands border the main channel down to Louisa County. The Upper Mississippi still offers some of the finest wetlands in the state and is experiencing heavy recreational use by hunters, fishermen, pleasure boaters, and sightseers.

While much of this acreage is in public ownership, marshes and lakes within the confines of the river are threatened by siltation and deposition of dredge spoil from channel dredging for navigation.

MAN-MADE RESERVOIRS, LAKES, AND PONDS

Recreational demand for boating, fishing, hunting, and camping have provided the impetus for construction of numerous small lakes and reservoirs. In addition, four large flood control reservoirs (30,250 acres) have been built by the Corps of Army Engineers. These man-

made water areas total 47,562 acres, most of which have been constructed in the southern half of Iowa where few natural wetlands exist. These impoundments provide excellent recreational opportunity and serve to reduce the demand on our natural lakes. We can expect wetland construction of this nature to continue and water acreage to increase.

Farm ponds gained popularity in the late 30's and early 40's, and construction has continued through present day. According to the 1973 survey by the Soil Conservation Service, some 47,700 ponds were built totaling 49,000 acres. Most farm ponds are in the more rolling terrain of southern Iowa where the main purpose was to retard erosion and provide water for livestock. As concern for protecting our valuable topsoil heightens, we can expect to see additional incentives for landowners to construct farm ponds. This type of artificial wetland produces benefits through hunting, fishing, swimming, wildlife habitat, and aesthetics as well as erosion control.

Construction of periodically flooded wetlands and marshes, primarily waterfowl hunting areas, are creating first-class water areas that are utilized by a variety of birds during migration. Artificial marshes of this nature will gradually increase in number as long as waterfowl hunting is allowed.

CURRENT EFFORTS AND FUTURE NEEDS

Currently, two programs are in operation to save prairie marshes. The first is financed from state duck stamp funds. This program was initiated in 1972 when a law was passed that required all waterfowl hunters to purchase a $1 state duck stamp. In 1979, it was changed to require hunters 16 years and older to purchase a $5 stamp. Approximately 15 percent of the present duck stamp funds are given to Ducks Unlimited in Canada to create waterfowl production areas. In Iowa, the funds are spent on wetland acquisition and development. State duck stamp revenue is between $275,000 and $300,000 annually.

The second program is a cooperative state and federal program utilizing funds from the federal duck stamp which is required of all waterfowl hunters 16 years or older. Iowa has been allowed to obligate up to $400,000 per year for the last two years to purchase waterfowl production wetlands.

While these two programs are headed in the right direction, they do not supply enough funds to purchase those wetlands in immediate danger of drainage, let alone purchase drained land for reclamation as wetlands. Sportsmen cannot bear this burden alone, and the public must become more knowledgeable about the value of these vital wetlands and push for protection. If public support is not forthcoming, the only water areas remaining will be those already in public trust. As with the prairies, a highly valuable part of our heritage is vanishing.

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