# Cootes Paradise as it was ... Jack Lord

In all of the discussions about restoring the marsh habitat of Cootes Paradise, a lot has been said about the "good old days" when that area was, in every sense, a paradise for hunters and nature lovers.

Today, when we look west from Highway 403 or the McQuesten (High-Level) Bridge on York Boulevard, we see an expanse of open water a mile wide and extending three miles into the distance. It is bordered on the north and south by rich, steep, wooded ravines of mainly oak and hickory, with maple, birch and hemlock predominating on the cooler slopes. Many who do not know the history of this area would describe Cootes Paradise as nothing more than a small shallow lake, and would have no reason to believe it had ever been anything else.

Those with especially acute vision or a good pair of binoculars might see, toward the extreme western end and along the margins, a fringe of reedy vegetation. The view reminds me of "the far end of town where the Grickle-grass grows", to quote Dr. Seuss in his prophetic children's poem *The Lorax*. (Read the poem and I think you'll understand what I mean.) That fringe of vegetation, largely reed manna grass, cattails and perhaps some water willow-herb in places, is all that remains of a thriving and complex community of aquatic plants that once filled the entire basin. That verdant marshland hosted a great abundance and diversity of wildlife. People who have lived in the Hamilton-Burlington area for more than a half century will remember Cootes Paradise as a very different sort of place than it is today.

For the many who do not recall those days, and even for the few who do, I thought it might be interesting to assemble some recollections of Cootes Paradise as it was, and to try to summarize how it changed.

To my knowledge, no comprehensive biological studies were undertaken in Cootes Paradise before the 1940's, and even general descriptions of the area prior to that decade are uncommon. The earliest testimonies are, in fact, mute ones. Archeological discoveries made more than two decades ago by McMaster University researchers suggest that aboriginal people were hunting along the shores of Cootes Paradise as far back as the Archaic Period, which extended from approximately 1500 B.C. to 800 B.C. Later archeological digs unearthed a seasonal fishing camp, circa 900 A.D., at Princess Point on the south side of the marsh, with clear evidence that the occupants had feasted on local fish, freshwater clams, turtles, deer and rodents. It seems that the area was periodically visited by native people through at least to the 17th century. Fish and wildlife were clearly very abundant and seem to have been the principal attraction for human visitors. (Scott, 1970.)

It is not certain whether there had ever been a European presence in the Dundas Valley prior to the arrival of Captain Thomas Coote, for whom the marshland was named. There are tantalizing but vague clues in the diaries and journals of missionaries and early travellers. Much could be speculated from these. Yet there is no incontrovertible proof.

Captain Thomas Coote was a British soldier who served a tour of duty at Niagara from 1782 to 1787 with the 34th (Cumberland) Regiment of Foot. He had a well-earned reputation as a hunter and outdoorsman and evidently found Cootes Paradise an excellent hunting ground. He became enamoured of the place and returned to spend his leaves there, wandering through the wetlands and hunting waterfowl. He was almost certainly the first non-native to spend significant time there. It is said that one of his favourite shooting stations was on Burlington Heights, possibly quite near where the McQuesten Bridge stands today. There he would set up a chair and blast away at the ducks and geese as they flew over the rise between the marsh and Burlington Bay (or Lake Geneva as it was called in those days).

One of the best available descriptions of pre-20th century Cootes Paradise is provided in the memoirs of a former Dundas area resident, Charles Durand, who, writing late in the 19th century, recalled the Dundas Marsh as it was during his childhood in 1818-19.

" ... It was a paradise for game of all kinds. Immense flocks of ducks and wild fowl, and wild animals innumerable in old times were seen there. It was also the resort of wild animals, such as the otter, perhaps beaver, minks and especially muskrats; snakes were abundant there of all kinds.

"The Marsh lay in a deep valley between the heights of Burlington Bay or between the bay and the town of Dundas and beneath the cover of the Hamilton and Flamboro ridges of mountains. A stream always ran in the middle of it from Dundas to the Bay. Around the north end of the Heights and into this stream which was partly clear water, fish came from the Bay, and from the outlet from the Bay into Lake Ontario. Thus all kinds of fish entered into the creek

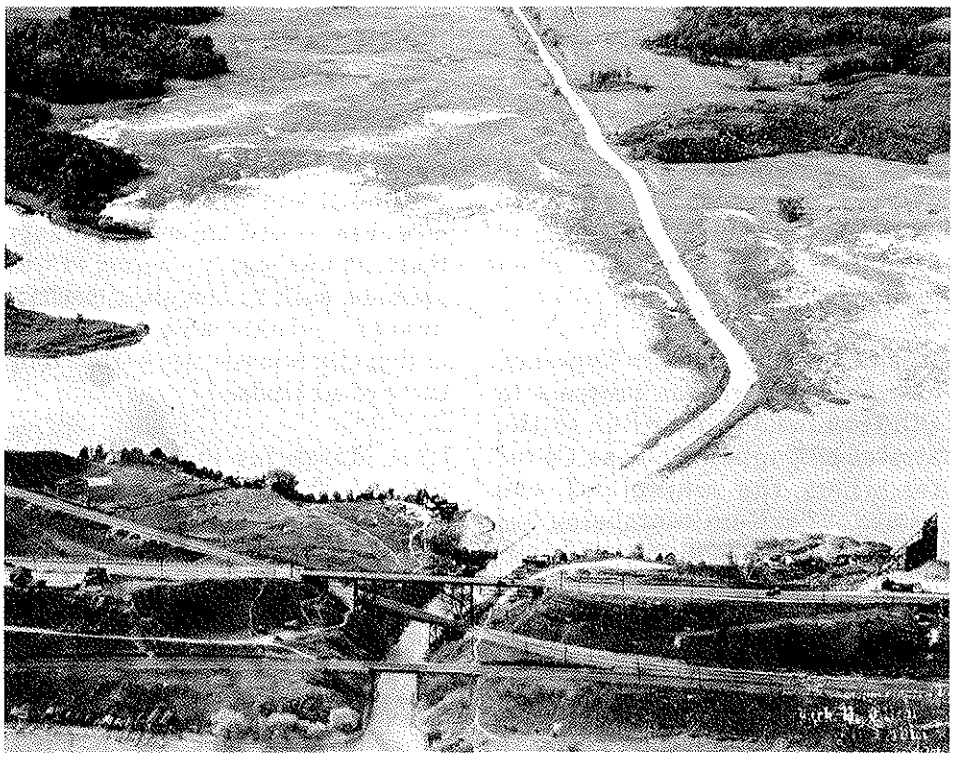
or river, as it was in old times, and went up the stream to the mountain in Dundas, where the falls of the mountain stopped them. Beautiful sea salmon used to be caught in abundance from 1800 to 1830, to my knowledge. The marsh was a dense watery bog and wild rice, water lilies and flowers that grow in water were abundant." (Durand, 1897.)

The stream to which Durand refers, running through the marsh from Dundas to the bay, is Spencer Creek. The creek wended its way tortuously through dense stands of emergent aquatic plants that filled the marsh throughout its length. Entrepreneurs, at the time Durand describes, repeatedly cleared the creek of encroaching vegetation and deepened it to accommodate large boats supplying their warehouses at what is now Dundas. The Desjardins Canal was dredged later in that century.

Historical maps cited by Painter et al (1989) suggest that prior to 1856, at least, the entire basin from the site of Dundas to Burlington Heights was completely filled with emergent aquatic plants.

Photographs at RBG and the Dundas Historical Society confirm that by the early part of the 20th century, the marsh vegetation was beginning to recede westward, leaving an expanse of open water at the eastern margin of the marsh adjacent to Burlington Heights. Still about 80% of Cootes Paradise was populated by aquatic plants. These plant communities seem to have been varied and diverse.

Over a period of more than 50 years beginning in the 1920's, naturalist George North, now deceased, was a keen observer of Cootes Paradise. He described the marsh as it was during the 1920's and early 1930's, in a carefully recorded conversation he had with me in 1976.



*Aerial view of the eastern end of Cootes Paradise in 1929, looking west with Burlington Heights in the foreground. Desjardins Canal is clearly demarcated. Aquatic plant communities cover about 80% of the basin.*

Photo courtesy of Hamilton Public Library.

According to North the most abundant emergent plant was cattail (probably *Typha latifolia*). It occupied the deeper water, its stands developing on floating mats of dead vegetation which were thus little affected by seasonal changes in water level. For this reason, he said, the patterns and boundaries of vegetation communities did not change markedly from year to year. The cattail communities were rich in associated species such as burreed (probably *Sparganium eurycarpum*), water lilies (probably *Nymphaea tuberosa*), and water smartweed (*Polygonum amphibium* and/or *P. punctatum*).

In the shallower west end of the marsh there were, according to North, various native marsh grasses although he was not able to recall which species. He did declare, however, that the introduced species reed manna grass (*Glyceria maxima*) was not present then, but became evident much later. This is an arguable point. Dore and McNeill (1980) suggested that reed manna grass must have been introduced to Cootes Paradise many years before the 1940's, and probably in the previous century when the Desjardins Canal was in heavy use. Their reasoning was predicated on the fact that the stands were so extensive and well-established by the 1940's. They also remarked that previously collected specimens of the grass had been misidentified. This would cast doubt on eyewitness accounts. (Reed manna grass is quite similar to American manna grass (*G. grandis*), a native species.)

In addition to these emergent species were "tremendous amounts of submerged aquatics." L.E. Wragg, a University of Toronto graduate student, described the marsh circa 1920 in the following way:

"Judging from reports of its condition 30 yr. ago, it must have been a remarkable place. In addition to the abundant growths of aquatic plants found there today, wild celery (*Vallisneria*) was common, and wild rice (*Zizania aquatica*) so abundant, that in rowing through the marsh, one's boat would be covered with rice. Water was so clean and food so plentiful that ducks remained in thousands until the ice formed." (Wragg, 1949.) Unfortunately Wragg did not cite specific references; he may have been drawing upon personal communication with one or more eyewitnesses but there is no way to be sure.

North concurred that the water in the deeper parts of Cootes Paradise, 8 or 10 feet deep in places, was so clear that one could see the bottom, and fish were clearly visible swimming at any depth. He also verified that wild rice was present although he did not recall seeing it in the quantities described by Wragg.

By the 1940's the whole eastern end of the Cootes Paradise was open water, although the western end was still beautifully lush with emergent aquatics. McMaster graduate student Ernest Kay, in a rough sketch map drawn between 1946 and 1948, showed submerged aquatic plants along both the north and south shores extending out quite far into the central part of the marsh, and also in various marsh inlets. He identified these without further elaboration as *Utricularia* (Bladderwort), *Elodea* (waterweed), *Ceratophyllum* (coon-tail) and *Myriophyllum* (water-milfoil). Of the seventy aquatic species in an accompanying checklist, he described these four genera, along with cattails (*Typha*) and manna grass (*Glyceria*) as the "main types" of aquatic plants in the marsh. He also reported, and I quote:

"A sizeable concentration of these submergents occurs at one point on the south shore, known as the Carp Pond. The water is one meter deep, and as the summer season progresses, these aquatics entirely fill an area of about two acres, making such a dense underwater mat that it is difficult to push a boat through the Pond."

He stated: "Of the entire 650 acres of area, over one half is covered by an emergent and submergent aquatic flora." (Kay, 1949.) Of course the corollary to Kay's observation is that somewhat less than half of Cootes Paradise was now open water without aquatic vegetation.

Cootes Paradise did not deteriorate over night, and most of the causes of its gradual decline were recognised long ago. The presence of reed manna grass, the destructive activities of carp combined with periods of high lake water levels, damaging wave action, and water turbidity caused summer algal blooms, carp movement and wave action, all contributed to inexorable change.

Kay described in detail the effects of carp roiling in the marsh inlets, uprooting aquatic plants and stirring up cloudy bottom sediments. Wragg, at the same period, also connected carp with water turbidity. He observed: "Submerged vegetation appears a dirty brown colour owing to the turbid water. This clears after the carp leave in August." (Wragg, 1949.) Kay attributed the disappearance of wild rice, which requires clear and slowly circulating water, to this increased turbidity.

In the early 1970's phosphate levels in the water, mainly from agricultural run-off and overload at the Dundas Sewage Treatment Plant, were 1,000 times higher than amounts sufficient to cause nuisance algal blooms. I can personally attest that in parts of Cootes Paradise during mid summer, the water was bright green with algae, and so turbid that I couldn't see my hand four to six inches under the surface. Needless to say, submerged plants would have difficulty photosynthesizing under such conditions.

*View from University Landing in July 1971. The aggressive perennial manna grass has filled the entire area with a solid monotypic stand.*

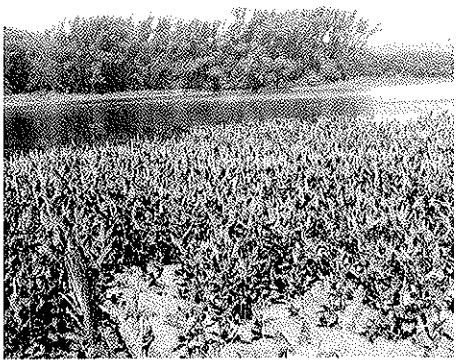
Photo: Jack Lord.

Also, the expanding acreage of open water began to have a snowballing effect on water turbidity and vegetation loss. Without the protective cover of emergent plants, the water became subject to wave action. This in turn stirred up the silty bottom sediments, adding to the turbidity and further impairing the growth and reproduction of plants. It was becoming clear that the open water would not likely revegetate by natural means.

I began monitoring the plants of Cootes Paradise in the summer of 1971, as part of a provincially-funded student project. I searched the waters of Cootes Paradise thoroughly for submerged and floating-leafed aquatics, particularly in those areas where dense stands had been described previously. Back in the late 1940's, William Judd had catalogued 24 submerged and floating-leafed species. (Judd, 1950.) Descriptions provided by other researchers allowed me to categorize 13 of them as being occasionally to frequently encountered. Yet in my search, extending over two summers, I could locate only ten

species. Another collector found a specimen of *Elodea* bringing the total to 11, a decline of 54% from the time of Judd's work. Furthermore, I could describe only six of these as being occasionally to frequently encountered. The remainder were found in just one or two locations, and even then in very small numbers. Even such pollution-tolerant species as sago pondweed (*Potamogeton pectinatus*) and coon-tail (*Ceratopyllum demersum*) were restricted mainly to shallow, relatively clear water such as along shorelines, the margins of *Glyceria* stands and where streams (Hopkins' Creek for example) emptied into the basin.

Occasional high water levels appear to be essential to the maintenance of a diverse marsh flora. High water tends to "knock back" large, dominant, herbaceous perennials and shrubs, leaving the vacated mud flats to be recolonized by annuals and smaller perennials thus increasing species diversity. At Cootes Paradise, this situation is complicated by the presence of reed manna grass and carp (*Cyprinus carpio*) which, aided by high water levels, have caused a declining vegetation cover and a lessening of plant diversity overall. The high water levels of 1952, for example, led to a severe drop in the total vegetation cover of Cootes Paradise. In part this was because carp had easy access to areas that were normally too shallow for them to reach. Their subsequent feeding and spawning activities proved exceptionally damaging, uprooting and destroying many of those plants that weren't simply flooded out.



*View from University Landing in August 1953 after record high water levels had flooded out manna grass and cattails. Vegetation maps indicate smartweed (Polygonum coccineum) in the foreground and waterlilies (Nymphaea tuberosa) in the open water beyond.*
Photo: Aleksander Tamsalu.

At that time RBG plant ecologist Aleksander Tamsalu was making detailed maps and species lists of the plants of Cootes Paradise. He documented the recolonization of the denuded mud flats. The year after the flooding, he identified bur-marigold (*Bidens cernua*) as second only to reed manna grass in overall abundance. "It is beautiful at the culmination of its flowering," he wrote, "when the marsh seems to be gold-plated by it." According to Tamsalu bur-marigold was common in shallow water, sand and clay along the shore, forming almost pure colonies. However, it also extended into deeper water where the substratum was muddy and where it alternated with colonies of common cattail (*Typha latifolia*). In these areas the bur-marigold stands, as described by Tamsalu, were richly diverse, and included such species as *Cyperus engelmannii*, *Typha latifolia*, *Polygonum hydropiperoides*, *Alisma triviale*, *Sagittaria latifolia*, *Leersia oryzoides*, *Gratiola neglecta*, *Rorippa palustris* var. *hispida*, *Polygonum punctatum* var. *leptostachyum*, *Epilobium hirsutum*, *Glyceria*, and *Juncus canadensis*. (Tamsalu, 1953.)

Water levels declined gradually through the remaining 1950's and 1960's. Emergent vegetation spread eastward again with the aggressive reed manna grass, in particular, reclaiming much of the previously vegetated sites, and also displacing those complex *Bidens*-type communities. Cattail stands were largely confined to the margins of the manna grass colonies. But the total vegetation cover never returned to the 1940's levels.

I learned a great deal about the dynamics of change in aquatic flora both from mapping the flora myself and studying the work of others from the previous decades. I became interested in trying to quantify exactly how much reed manna grass was present in the marsh. Thus, in the early autumn of 1972, I performed a complete transect study on the aquatic plant communities of Cootes Paradise. For those who do not know the process, this involved walking a series of equally-spaced parallel paths through the emergent aquatic vegetation, covering the entire vegetated area, including all the small bays and inlets along both shores. I dropped a one square meter sampling quadrat [sic] — it resembled an empty wooden picture frame — at measured intervals along each transect, and recorded all plant species found within each quadrat. When the work was completed I had, in total, 204 random samples.

In all I recorded 60 species of emergent aquatic plants. Reed manna grass was found in 158 of the quadrats, 77.5% of the total. Furthermore, it was the only species present in 124 quadrats, 60.8% of the total. This is an astonishing fact considering that the plant wasn't even recognized in the area until the 1940's. Its lack of gregariousness reflects its manner of growth. The grass typically forms a dense, protracted mat that precludes invasion by other plants. Through wind or wave action the plant spreads vegetatively as pieces of the mat break loose and drift to new sites.

*Composite panoramic view from Bull's Point looking south, July 1971.*
*Less than half the area of Cootes Paradise is covered by aquatic vegetation.*

Photo: Jack Lord.

By contrast, it is worth noting that the second most abundant plant in this study was cattail (*Typha* spp.), present in only 46 quadrats, 22.5% of the total. Cattail was associated with at least one other plant species (usually several) in 39 of those 46 quadrats.

Another period of high water level in 1973 resulted in exactly the same sort of shift in vegetation communities that Tamsalu had observed. Manna grass and, especially, cattails were cut back severely and the barren mud flats were again quickly covered by pioneering annuals such as burmarigold. And just as happened in the 1950's, manna grass gradually reoccupied much of its former range, but never to the coverage levels of the 1960's. This process of "one step forward and two steps back" has continued for several decades.

RBG's environmental biologist Len Simser took over the monitoring of aquatic plants in 1978. By 1985, according to Simser, only about 15% of the total acreage of Cootes Paradise remained vegetated with emergent aquatics. Today, the total coverage is closer to 10%. Submerged aquatic plants have become quite uncommon.

I would add here as a final point that in recent years the Seaway Commission has been stabilizing Lake Ontario water levels to some extent by means of the seaway locks at Cornwall. But this is having a detrimental effect on marshland dynamics generally (not just in Cootes Paradise) by eliminating the "knock back" factor described earlier. A task force is studying the matter.

And so we have seen, over the course of more than a century, the decline of Cootes Paradise from a dense marshland teeming with wildlife, to an open lake where plants are few and wildlife is comparatively scarce. This is the base from which Project Paradise begins. The problems have been identified. The solutions have been proposed. A long and complicated process of restoration lies ahead.

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