

- Poison ivy (*Rhus radicans*) locally abundant.
 **Winterberry (*Ilex verticillata*) occasional.
 Red maple (*Acer rubrum*) common.
 Asiatic pepper-vine (*Amphelopsis brevipedunculata*) locally abundant.
 **Silky dogwood (*Cornus amomum*) locally common.
 Pumpkin-ash (*Fraxinus tomentosa*) abundant (excellent for wood ducks).
 **Buttonbush (*Cephalanthus occidentalis*) common.
 Swamp-haw (*Viburnum nudum*) occasional.
 Arrow-wood (*Viburnum dentatum*) locally abundant.

A study made during the growing season will undoubtedly add many other marsh and swamp plants as frosts had caused the vegetation to disintegrate before these observations were made. A few drifting plants of sago pondweed (*Potamogeton pectinatus*) and wild celery (*Vallisneria spiralis*) in the open water at the north end of the Dyke Marsh indicate that some of these important, submerged, seed plants still exist in sections where the water is clear enough to permit the necessary penetration of sunlight.

Muskrat signs were plentiful along most of the tidal channels, and raccoons and mink are among additional fur-bearers that are likely to occur there. In addition to the abundant, viviparus, Japanese snail, several native snails and clams, including *Goniobasis virginica*, *Helisoma* sp., *Musculium* sp., and larger thin-shelled clams, were common in the shallow waters. These, and a good supply of crayfish, compose useful sources of invertebrate foods for aquatic wildlife.

Any development program should include plans for partially filling the deeply dredged sections to create shallow zones, less than 6 feet in depth. It is possible that fill material can be obtained from the unproductive high areas that are being invaded by willows, and from the top layer of some excessively dense cattail beds that have no surface water. The latter areas would be greatly improved for aquatic wildlife by creating depths that range from a few inches to 3 feet at normal high tide. Much of the remaining Dyke Marsh has built up to an unproductive elevation through the accumulation of plant debris and silt. The creation of shallow, connected openings by means of a dragline operating from mats or by dredging may also be worthy of consideration, and the judicious use of explosives for creating small openings in the high sections of the marsh is worth a trial. However, an interspersed of approximately equal areas of marsh and shallow, open water would create optimum conditions for use by most types of aquatic wildlife. A sheltering ridge should be maintained between the east edge of the marsh and the wind-swept open river wherever feasible.

If the water is fairly clear, such valuable submerged plants as wild celery, sago pondweed, and other pondweeds (*Potamogeton* and *Najas* spp.) thrive best in water 3 to 5 feet deep. However, turbidity caused by the activities of bottomfeeding fish, especially carp and catfish, and by dredging operations as well as by algae and other material in the effluent from the sewage disposal plants retards the production of most submerged vegetation in this vicinity.

Much of the Belle Haven Marina appears to be too shallow for satisfactory motor boat use during the ebb-tide. Depths of at least 6 feet would facilitate such activities. A considerable volume of silt from that area could be used to backfill the nearby deeply dredged sections of the former marshes, thereby improving them for aquatic wildlife, while preventing the possible establishment of unwanted submerged vegetation in the shallow waters of the marina. The retaining walls of the marina are in poor condition and should be repaired before such deepening is undertaken.

Marsh plants vary considerably in their water requirements. Such important species as rice cutgrass, Walter's wild millet, smartweeds, tidemarsch waterhemp, and most sedges thrive best on sites that are flooded only by the higher stages of the normal tides; while wildrice, spatterdock, and arrow-arum usually make their optimum seed production on those sites that remain shallowly submerged during ebbtide.

Most of the waterfowl foods listed in this report will gradually become established by natural means wherever suitable water depths and bottom soils are supplied. This process can be hastened, however, by harvesting the seeds of outstanding food plants in nearby beds during September and broadcasting them immediately on the edges of the new fill.