OVERVIEW / EXISTING CONDITIONS:

As requested by the Ipswich Open Space Program and the Ipswich Department of Planning and Development, Seekamp Environmental Consulting, Inc., (SEC) has prepared the following General Natural Resource Inventory for the approximately 44 acre Conservation Parcel located at the end of Colonial Drive (Map 53B, Lot 44). It is SEC's understanding that the Town of Ipswich is planning to construct a parking area and trailhead to encourage use of this parcel. As such, at the end of this report, SEC has included recommendations for improvements to the site to facilitate general passive recreational use by the public, as well as educational opportunities for area schools. In addition, SEC has included a brief discussion of invasives management for the species identified on site, and a section on vernal pools at the site.

The Conservation Parcel is bound to the north by the Colonial Drive residential subdivision; to the west by an area of Bordering Vegetated Wetland, the Ipswich Woods residential subdivision, and private property with an equestrian cross country course; to the south by private property and the Ipswich River; and to the east by railroad tracks (Boston to Newburyport commuter line) and the Ipswich River. The northern and western property boundaries, and a portion of the southern boundary, are denoted by stone walls. The site also contains one, and possibly two, oxbow remnants, where the Ipswich River previously flowed. These can be seen on the aerial photographs as semi-circles which run parallel to the river's current location.

SEC conducted an initial assessment of this area on April 20, 2007, and a follow-up evaluation on May 3, 2007, for the purposes of documenting existing site conditions, identifying plants and wildlife found on the parcel, and significant site features. The results of our assessment are detailed below, and depicted on the attached "General Natural Resources Inventory Sketch", prepared by Seekamp Environmental Consulting, Inc. (Appendix A) and accompanying photographs (Appendix B). SEC has also included a site locus map, Natural Heritage Map (showing rare species habitats), and FEMA floodplain map. A summary of the findings can be found in the attached Executive Summary at the front of this document.

METHODOLOGY:

In order to characterize the natural resources located within the Conservation Parcel, SEC began by walking the entire site, to the extent possible due to flooding from a major storm event (April 16 – 18, 2007); documenting the general habitats present, as well as adjoining land uses. On the second site visit, SEC again walked the property more fully (flooding had substantially subsided), in order to identify the approximate limits of each habitat type, as well as any outstanding site or habitat features and/or evidence of wildlife usage. During our assessment of the Conservation Parcel, SEC identified seven (7) separate, general habitat types, based upon vegetation, soils, hydrology and proximity to the Ipswich River. The approximated limits of these habitat types are depicted on the above-referenced sketch. General descriptions of each area are provided below, including typical vegetation, evidence of wildlife usage, the presence of invasive plant species, and potential for recreational and educational purposes.

HISTORY, ARCHEOLOGICAL FEATURES AND OBSERVED HUMAN IMPACTS:

History / Archeological Features:

Although not the focus of the General Natural Resources Inventory, SEC would like to take this opportunity to make a few observations related to the history of the site. Based upon our field observations, it appears that the site was periodically used for timber harvesting over the last 100 years or more. Portions of the site contain even aged stands approximately 40 – 50 years old (evidence of clear cutting), while other areas have been selectively cut, as trees are unevenly-aged, with the largest trees approximately 60 – 70 years old. In addition the area was probably used for sheep grazing during the "sheep craze" of the 1830's. This theory is supported by the stone walls surrounding three sides of the site; and the shallow A / A_1 horizons of two of the soil profiles, indicative of use by small hoofed animals such as sheep. No evidence of plowing was noted in the upland soil profile (no 12 – 18" A_p layer). However, the fine sandy loam upland soils may have been utilized for the growing of crops. The rich floodplain (fluvaquents) soils appear to be too wet to support crops, and no evidence of drainage ditches were noted on site.

One observation of potential archeological interest is a ditch / berm feature observed on the boundary between the upland forest and adjacent wetland, within the western portion of the site. This feature appears to run in a straight line, roughly parallel to the western stone wall. As the photographs in Attachment 2 show, the berm is approximately 18" high, with the ditch on the wetland side. When soils within the ditch were profiled (see Table 4), SEC found spodosols with a cemented iron-rich layer approximately 16 inches below the surface. These soils and the berm / ditch structure suggest that the site may have been used for small-scale bog iron mining during the 17th century, such as has been documented on a large scale in Saugus, MA (Saugus Iron Works). Other potential archeological projects for the site include the search for historic use of the riverfront by Native Americans. Two separate riverbank areas could be explored: the current riverfront east of the railroad tracks, or the historic riverfront of the oxbow remnant discussed above. Unfortunately, neither area can be easily accessed from Colonial Drive: to reach the oxbow, approximately 75 feet of wetland (at its narrowest point) must be crossed; the current riverfront must be accessed by canoe or by walking down the railroad right-of-way.

Human Impacts:

The railroad tracks, themselves, are the largest human impact observed, as it bisects the site, and separates the majority of the property from the river, as well as presenting a hazard for citizens visiting the site. In addition to the railroad tracks, SEC observed several areas of dumping (garbage), including dumping related to the railroad construction / maintenance; two deer stands, at least one of which appears to be recently used; the remains of a contemporary "hobo camp" within the woods on the main parcel; three trails; and two canoe landings, one with an associated campsite and fire pits, permanent dock / groin, and a rudimentary ladder up a tree for jumping into the river. This latter canoe landing area was utilized for a campfire between SEC's two site visits. It is unclear if the area is accessed by water or overland.

Two water quality issues were noted during the site visits; one apparently a case of deliberate pollution and the other apparently inadvertent siltation. SEC observed oil sheen on at least two areas of open water in the southwest portion of the site, and an empty gasoline can,

suggesting that neighbors may have been attempting to control mosquitoes by pouring oil / gasoline on mosquito breeding areas. The second water quality issue appears to be sedimentation (silt / sand), possibly from the Ipswich Woods Subdivision. One of the streams within the wetland (General Habitat Area II) contained approximately 6" – 8" of fine sand and silt within its banks. Although it is possible that this sediment is natural, it is doubtful, as the other streams in the vicinity did not exhibit this amount of sediment loading. Also, the manner in which the sediment was deposited (thin layers) suggested an intermittent up-stream source. SEC did not attempt to trace the sediment back to a source, due to time constraints.

SOILS AND HYDROLOGIC REGIME:

Hydrology:

The entire site appears to be located within the floodplain of the Ipswich River, as is shown on the attached FEMA floodplain map (Attachment 6). The hydrology of the property can be divided into two sections, that dominated by up-gradient wetlands / overland flow from adjacent upland, and that dominated by seasonal flooding of the Ipswich River. The majority of the site is the former; governed by the extensive off-site wetland to the west (between Colonial Drive and Ipswich Woods), with secondary hydrology for this area associated with overland runoff from the north. SEC observed a series of low-gradient, braided streams, primarily located within General Habitat Area II. One of these streams contains a significant amount silt and sand, discussed above. The natural substrate of these streams seems to be fine gravel and / or organic material. As the streams are not shown on the attached USGS Map (Ipswich Quadrangle), it is assumed that they are intermittent. However, a stream analysis was not conducted as part of this report. A site visit by a member of the Conservation Commission or other knowledgeable person could confirm their status in late summer as intermittent, if the streams are seen to have ceased flowing.

The hydrology of the extreme southern portion of the site, as well as that of the two sections of the site east of the railroad tracks, is clearly dominated by periodic flooding of the Ipswich River. However, as noted during the April 2007 site visit, during extreme flooding conditions, it appears that the wetland of the oxbow remnant is hydrologically connected to the river to the south via surface flow. This is significant, as there was strong evidence of vernal pool activity (wood frog chorusing) within the oxbow wetland during the April 2007 site visit. A direct surface water connection between the river and the potential vernal pool(s) could result in the introduction of fish into the pools, which would prey upon species utilizing the pools for breeding. The area of wood frog chorusing could not be investigated during either site visit, as the area was still flooded.

The Assessor's Map shows two culverts under the railroad tracks, however, only one culvert was found. A 36"± granite box culvert was noted under the railroad tracks, with an associated stream to the Ipswich River, in the northeast portion of the site. However, the up-gradient end of the culvert was plugged with a significant amount (4' – 6' deep) of woody debris (see Attachment 2 for photographs of this area). It is possible that the blockage is related to beaver activity, as recent beaver activity was noted (see Attachment B photo of Habitat Type V). It is possible that the second culvert shown on the Assessor's Map has completely silted in, and / or has become covered with debris. This blockage causes flooding on the site for extended periods of time.

Soils:

As shown on the attached Natural Resource Conservation Service (NRCS) soils map (Attachment 5), the site primarily consists of four soil classification units: Sudbury Fine Sandy Loam; Fluvaquents, frequently flooded; Wareham Loamy Sand, very stony; and Hinckley Gravelly Fine Sand Loam. In addition, two small areas of additional soil types are associated with the site: Scarboro Mucky Loamy Fine Sand; and Paxton Fine Sandy Loam. Four soil profiles were completed by SEC during the site visit of May 2007. With the exception of the iron-containing spodosols at the berm / ditch feature described above, soils observed on site were consistent with the NRCS soils map. It is not coincidental that, to a large degree, habitat types roughly follow soil map units, as soils often dictate dominant vegetation at a site. Soil colors in the soils profiles below are from the Munsell Color Book. As noted below, SEC believes that the soil within the ditch (bog iron area) can be classified Pipestone.

Table 1 - Wetland Soil 1 (within Habitat II)

Horizon	Depth	Color	Texture
O	2" – 0"	10 YR 2/2	Fibric
A	0" – 18"	10 YR 2/2	Sandy Loam
B_1	18" – 21"	10 YR 4/1	Sand
B_2	21" +	10 Y 4/1 (Gley page 1)	Sand

Table 2 - Wetland Soil 2 (Within Habitat I)

Horizon	Depth	Color	Texture
O	2" – 0"	2.5 YR 2.5/2	Fibric
A	0" – 3"	10 YR 2/2	Sandy Loam
B_1	3" - 18"	7.5 YR 2.5/3	Sandy Loam
B_2	18" +	10 Y 3/2	Sand

Table 3 - Upland Soil 1 (Within Habitat III)

Horizon	Depth	Color	Texture
O	2" – 0"	5YR 2.5/2	Fibric
A	0" – 5"	10 YR 2/1	Sandy Loam
B_1	5" – 22"	7.5 YR 3/4	Fine Sandy Loam
B_2	22" +	10 YR 4/4	Fine Sandy Loam w/ small stones

Table 4 - Spodosol (Border between Habitat I / III) possibly Pipestone

Horizon	Depth	Color	Texture
O	2" – 0"	10 YR 2/1	Fibric
A	0" – 12"	10 YR 4/4	Sandy loam
E	12" – 16"	2.5 YR 5/2	Sand (Albic horizon)
B_s	16" +	2.5 TY 3/4	Cemented sand (spodic horizon)

GENERAL HABITAT AREAS:

Habitat Type I: Palustrine, Broad-leaved Deciduous Forested Wetland (Interior)

Location / Aspect:
Habitat Type I is located in two areas at the site: within the western portion of the conservation parcel and the southeastern portion of the site. Other than hummock and hollow typography typical of red maple swamps, the habitat area is level.

Typical Vegetation:
Vegetation within this interior (non-riverfront) forested wetland includes a wide variety of species. The moderately dense, unevenly-aged tree stratum is dominated by red maple (*Acer rubrum*), with white pine (*Pinus strobus*) and tupelo (*Nyssa sylvatica*) occasionally found. The sapling / shrub horizon is generally dominated by highbush blueberry (*Vaccinium corymbosum*); with red maple (*Acer rubrum*), speckled alder (*Alnus rugosa*), and silky dogwood (*Cornus amomum*) commonly found; and sweet pepperbush (*Clethra alnifolia*), wild raisin / withe-rod (*Viburnum cassinoides*), gooseberry (*Ribes sp.*) and swamp rose (*Rosa palustris*) occasionally found. Species within the herbaceous layer were very diverse, and varied in density from moderately sparse to moderately dense. Species found include sphagnum mosses (*Sphagnum spp.*), grasses (*Gramineae spp*.), rushes (Sciprus spp.), sedges (*Carex spp.*), sensitive fern (*Onoclea sensibilis*), goldthread (*Coptis groenlandica*), skunk cabbage (*Symplocarpus foetidus*), horsetail (*Equisetum spp*.), club mosses (*Lycopodium spp.*), cinquefoil (*Potentilla spp.*), swamp violet (*Viola palustris*), soft rush (*Juncus effusus*), woolgrass (*Scirpus cyperinus*), small flower crowfoot (*Ranunculus aborvtivus*), bedstraw (*Galium spp.*), and wood anemone (*Anemone quinquefolia*). The linana layer, where present, consisted of a moderately dense to very dense population of greenbrier (*Smilax rotundafolia*), or grape (*Vitus sp.*).

Invasive Plant Species:
Occasional thick stands of greenbrier were noted in several portions of this habitat type; primarily at the eastern edge of the Habitat I, south of Habitat II. Approximate areas of invasive species are shown on the attached habitat sketch (Appendix 1).

Structural Diversity:
Structural diversity within Habitat Type I is high. The herbaceous layer density is generally moderate, and the shrub, sapling, and tree layers exhibit moderate to high density, providing cover for amphibians, reptiles, game birds, and small mammals. In addition, this habitat area contains areas of open water, at least one of which serves as a vernal pool; as well as numerous standing dead trees, which serve as nesting sites for birds and other animals. Several nesting cavities were noted during the site visits, although no wildlife was observed currently utilizing these nesting sites.

Current / Potential Wildlife Use:
SEC observed numerous signs of wildlife usage of this area, including browse of shrubs and herbaceous vegetation by deer (*Odocoileus virginianus*). In addition, SEC observed deer scat and prints, and heard a woodpecker drumming. Direct observation of wildlife was limited to several songbirds, several green frog (*Rana clamitans*) adults and tadpoles, and wood frog

(*Rana sylvatica*) egg masses. Based upon available habitat (i.e., food, cover, etc.), it is likely that Habitat Zone I provides habitat for songbirds; upland gamebirds such as ruffed grouse (*Bonasa umbellus*), ring-necked pheasant (*Phasianus colchicus*), wild turkey (*Meleagris gallopavo*); birds of prey such as eastern screech owl (*Otus asio*) and broadwinged hawk (*Buteo platypterus*); and small mammals such as eastern chipmunk (*Tamias striatus*), eastern cottontail rabbit (*Sylvilagus floridanus*), raccoon (*Procyon lotor*), eastern skunk (*Mephitis mephitis*), gray squirrel (*Sciurus carolinensis*), and white-footed mouse (*Peromyscus spp*.), among others. Larger mammals, including white-tailed deer (*Odocoileus virginiansus*), coyote (*Canis latrans*) and red fox (*Vulpes vulpes*) also would be expected to utilize the abundant food sources within this wetland system. Reptiles and amphibians expected to inhabit this area include such species as: garter snakes (*Thamnophis sirtalis*), smooth green snakes (*Opheodrxs vernalis*), ribbon snakes (*Thamnophis sauritus*), black racer (*Coluber constrictor*), water snake (*Nerodia sipedon*), redbacked salamander (*Plethodon cinereus*), and newts (*Trituris spp.*).

Potential for Recreational or Educational Use:
Diverse vegetation and wildlife, as well as the vernal pool documented by SEC, provide an excellent opportunity for environmental education; as well as passive recreation, such as bird watching. However, access is limited, as the northern portion of this habitat must be crossed to reach the vernal pool. This area is not suited for trails, unless elevated boardwalks or bog bridges are constructed. See below for recommendations related to access.

Habitat Type II: Palustrine, Non-persistent Emergent Wetland

Location / Aspect: Habitat Area II is located along the western property boundary, in the northwest portion of the site. The topography is similar to that described in Habitat Type I.

Typical Vegetation:
Vegetation within the area is heavily dominated by a dense population skunk cabbage and sensitive fern (*Onoclea sensibilis*). In interior portions of this habitat, the tree layer is almost completely absent; and the sapling / shrub layer is sparse and widely scattered. Other portions of this habitat include a moderately sparse tree stratum dominated by red maple, primarily at the habitat area edges; and clusters of speckled alder and silky dogwood. Additional herbaceous species noted include sphagnum mosses, iris (*Iris spp.*), grasses (*Gramineae spp*.), rushes (*Juncus spp.*), sedges (*Carex spp.*), horsetail, and swamp violet. The liana layer, where present, consisted of a moderately dense population of grape (*Vitus sp.*).

Invasive Plant Species:
No invasive plants were noted within this habitat area. However, it was very early in the growing season, and therefore the presence of invasive plants cannot be ruled out.

Structural Diversity: Structural diversity within the wetland is relatively limited, with minimal shrub, sapling and tree strata. However, the herbaceous layer is extremely dense; and shrubs, where present are densely clustered; therefore, the area provides cover for birds, reptiles, amphibians, and small mammals. The area also contains a series of low-gradient, braided streams, and numerous windthrows (trees downed by wind), which adds to the structural diversity and habitat value for wildlife.

Current / Potential Wildlife Use:
White-tailed deer hoof prints were noted in several locations within this habitat area, as well as raccoon tracks along the intermittent streams which crossed the habitat area. In addition, SEC observed a woodcock (*Philohela minor*) within this habitat area. Based upon the food, cover, and nesting habitat provided by Habitat Area II, it is likely that the area is utilized by additional species: turtles, ruffed grouse, goldfinch (*Carduelis tritis*), warblers (*Dendroica spp.*), cedar waxwings (*Bombycilla cedrorum*), rufus-sided towhee (*Pipilo erythophthalmus*), veery (*Catharus fuscescens*), vireo (*Vireo spp.*), wood thrush (*Hylocichla mustelina*), American robin (*Turdus migratorius*), swamp sparrow (*Melospiza georgiana*), red-headed wooded woodpecker (*Melanerpes erythrocephalus*), yellow-bellied sapsucker (*Sphyrapicus varius*), eastern cottontail rabbit, raccoon, and red squirrel (*Tamiasciurus hudsonicus*).

Potential for Recreational or Educational Use:
Although species diversity in this habitat area was relatively low, SEC considers the quality of this wetland high. Wetlands of this type, dominated by skunk cabbage and sensitive fern with a spare tree canopy, are normally not this extensive. The lack of shrub / sapling strata allows the visitor to see for a reasonable distance, thereby improving the chances for the observing wildlife, such as the woodcock seen during the April 2007 site walk. However, as discussed above, access to this habitat is limited (wetland crossing required), and travel through this wetland is difficult due to extremely wet soils, and at least two stream crossings.

Habitat Type III: Uneven-aged, Upland Floodplain Forest:

Location / Aspect:
Habitat Type III is located in the center of the main property, and continues to the southwestern corner of the site. This area is nearly level.

Typical Vegetation:
Vegetation within Habitat Type III predominantly includes a moderately dense tree stratum of oaks (*Quercus spp.*) and shagbark hickory (*Carya ovata*), typical of upland forest in southern New England. The tree stratum was dominated by white oak (*Q. alba*), with northern red oak (*Q. rubra*) and shagbark hickory commonly found, and white pine, American beech (*Fagus grandifolia*), and Norway spruce (*Picea abies*) occasionally found. The sapling / shrub strata included the above species, as well as highbush blueberry; with maple-leafed viburnum (*Viburnum acerifolium*), downy shadbush (*Amalanchier arborea*), and glossy buckthorn (*Rhamnus frangula*) occasionally found. The herbaceous stratum was generally limited in density, and consisted primarily of Canada mayflower (*Maianthemum canadense*) and trout lily / yellow adders tongue (*Lilium canadense*); with tree clubmoss / princess pine (*Lycopodium obscurum*), bracken fern (*Pteridium aquilinum*), wintergreen / checkerberry / teaberry (*Gaultheria procumbens*) and partridgeberry (*Mitchella repens*) commonly found; and grasses (*Gramineae spp.*), sheep laurel (*Kalmia angustifolia*) and wood anenomea (*Anemone quinquefolia*) occasionally found.

Invasive Plant Species:
As noted above, glossy buckthorn was occasionally found throughout this habitat type.

Structural Diversity:
Structural diversity within Habitat Type III is moderate. As stated above, the area predominantly represents a mid-successional, uneven-aged oak / hickory forest, with a moderately limited shrub and herbaceous development. No liana stratum was noted.

Current / Potential Wildlife Use:
Evidence of wildlife use observed by SEC during our April and May 2007 site evaluations include browse by deer; tree nesting holes, small mammal burrows (i.e., chipmunk, voles, etc.); and use by various songbirds. One garter snake was noted. The following represents species that would likely use the habitat provided by Area III during some portion of their life cycle: upland game birds, songbirds, small mammals, such as eastern cottontail (*Sylvilagus floridanus*), red squirrel, and beaver (*Castor canadensis*); and white-tailed deer.

Potential for Recreational or Educational Use:
This area is very well suited for passive recreation (walking, bird watching, wildlife and plant identification). Again however, access from the north (proposed parking area) is limited due to the wetlands described above.

Habitat Type IV: Riverbank Habitat (Palustrine, Broadleaf Deciduous Scrub - Shrub Wetland and Upland Cut Bank)

Location / Aspect: Habitat Area IV follows the Ipswich River at the eastern and southern property boundaries. Slopes range from 3% to approximately 30%, with eastern and southern exposures. The soils and slopes are consistent with a glacial esker.

Typical Vegetation:
Vegetation within this habitat type along the river's edge can be sub-divided into two distinct vegetative structures: palustrine, broad-leaved deciduous, scrub-shrub wetland and upland cut-bank habitat. The scrub-shrub wetland, located along the southern property boundary, is dominated by very dense stands of silky dogwood (*Cornus amomum*), with occasional speckled alder; but little if any herbaceous plants, and no tree or sapling strata. In general, the cut bank habitat, found along the eastern property boundary, contains more diverse vegetation. The generally steep bank ranges from approximately 1 to 10+ feet high, however, two locations within this habitat are utilized for canoe launch / haul-out locations (see Attachment 1). The tree and sapling strata, is dominated by red maple, with occasional gray birch (*Betula populifolia*). Additional shrub / sapling species present in this sub-habitat include highbush blueberry, sweet pepperbush, red maple, and downy shadbush. The herbaceous layer, where present is dominated by grasses (Gramineae spp.) and other typical upland forest species, such as Canada mayflower and tree club moss.

Invasive Plant Species:
No invasive plant species were noted within this habitat type. However, it was very early in the growing season, and therefore the presence of invasive plants cannot be ruled out.

Structural Diversity: Structural diversity within the southern portion of the scrub-shrub habitat is limited, as there is no sapling, tree or herbaceous strata. However, the density of vegetation, as well as downed trees and rocks within this area provides excellent cover and

basking locations for reptiles and amphibians; and cover for songbirds. The eastern portion of the habitat type (cut bank) is more consistent with typical riverbank habitat, with trees overhanging the water. Therefore, the area provides cover for reptiles, amphibians, songbirds, and small mammals. However, as stated above, the herbaceous layer is relatively sparse.

Current / Potential Wildlife Use:
As discussed above, the dense silky dogwood stands of Habitat Area IV provide excellent cover for a variety of birds, reptiles and amphibians. During the May 2007 site visit, SEC observed several turtles basking on logs and rocks. Based upon the food, cover, and nesting habitat provided by Habitat Area IV, it is likely that the area is utilized by green-backed heron (*Butorides striatus*) and Black-crowned night heron (*Nycticorax nycticorax*), both of which are extremely difficult to observe, due to their shy nature. Other bird species expected to utilize this riverside habitat include barred owls, belted kingfishers (*Ceryle alcyon*) and a variety of duck species. Small mammals, such as mink (*Mustela vision*) and river otter (*Lontra canadensis*) would also likely utilize this area.

Potential for Recreational or Educational Use:
The recreation potential for this area is high. A trail currently exists along the majority of the bull-nose shaped area to the east of the railroad tracks. A second trail was noted along the river edge west of the railroad tracks, but could not be investigated due to high water conditions. There is a small channel which connects the river with the remnant river channel north of the main channel. In addition, the two aforementioned canoe launch / haul-out locations offer respite for canoeists. Current users have created campfire pits, the largest of which is surrounded by four logs used for seating. A makeshift "dock" or groin of sorts has been constructed out of railroad ties, and provides a stable location for tying up a canoe. Finally this area boasts a "diving tree," where boards have been nailed in a tree overhanging the water, such that swimmers can jump into the river. This area was even utilized during the major flooding of April 2007, as was evidenced by use of a temporary campfire location (the main pit was under water). It is unclear if the area is accessed from land via the railroad right-of way, or by water. Minimal trash was noted, however, SEC did observe a few empty beer cans.

Habitat Type V: Palustrine, Broad-leaved Deciduous Forested Wetland (Oxbow)

Location / Aspect: Habitat Area V is located in the northeastern portion of the site, west of the railroad tracks. The topography appears to be level.

Typical Vegetation:
This oxbow remnant, created when the Ipswich River shifted to the east, is classified as a palustrine broad-leaved deciduous, forested wetland. Vegetation within this habitat type was difficult to assess as it was flooded during both site visits. The moderately dense tree stratum appeared to be dominated by red maple, with possibly green ash and tupelo occasionally to be found. The moderately dense sapling / shrub horizon was likely dominated by highbush blueberry and red maple. It is highly likely that very little herbaceous material is present, due to regular and prolonged flooding. If the blocked culvert at the north end of the habitat is cleared, it is probable that a more diverse population of vegetation, especially herbaceous plants could exist.

Invasive Plant Species:
Glossy buckthorn was sporadically found along the western edge of this habitat area.

Structural Diversity: Structural diversity within the forested wetland appears to be moderate, primarily consisting of moderately dense tree and shrub strata. However, SEC was unable to completely assess structural diversity within this habitat type. The tree and shrub layers appear dense; therefore, the area could provide cover for large animals (deer), reptiles, amphibians, and songbirds.

Current / Potential Wildlife Use:
Habitat Area V provides cover for a wide variety of animals, as well as a source of drinking water for large and small mammals, and birds. Wood frog chorusing indicates that the area may be considered potential vernal pool habitat for amphibians and reptiles. Based upon the food, cover, and nesting habitat provided by Habitat Area V, it is likely that the area is utilized by additional species, including black-crowned night heron, green-backed heron, barred owls, water snakes, and green frogs, among others.

Potential for Recreational or Educational Use:
The upland edges of this oxbow remnant provide the opportunity for potential archeological discovery by local school children. As noted in the Site History / Potential Archeological Features section of this report, the town website notes that Native Americans routinely utilized the river's edge in Ipswich. As such, there is the potential for educational opportunities related to archeology, as well as local history, and anthropology (regarding Native American life). Access to the western upland edge requires crossing the wetlands of Habitat Types I and II; access to the eastern side requires walking down a portion of the of the railroad right-of-way, which is inadvisable, as well as unlawful.

Habitat Type VI: Even-Aged, Upland Floodplain Forest (Riverfront)

Location / Aspect:
Habitat Area VI is located near the Ipswich River, east of the railroad tracks. The area is generally level, but slopes up to the adjacent railroad tracks.

Typical Vegetation:
As with Habitat Type III, vegetation within the even-aged, mid-successional, upland forest is also typical of southern New England. Although dominated by oaks and shagbark hickory, this habitat differs from Habitat Type III in that the tree stratum is even-aged, which reduces structural diversity; and is also located adjacent to the river, and therefore would provide additional habitat features. Tree stratum was dominated by northern red oak and red maple, with white oak and shagbark hickory commonly found, and white pine and American beech occasionally found. The moderately sparse sapling / shrub strata included the above species, with highbush blueberry, sweet pepperbush and gray-stem dogwood (*Cornus racemosa*) occasionally found. The herbaceous stratum was generally moderate in density, and consisted primarily of Canada mayflower, trout lily and tree club moss; with wintergreen, partridgeberry and grasses (*Gramineae spp.*) occasionally found.

Invasive Plant Species:
No invasive species were noted within this habitat area. However, it was very early in the growing season, and therefore the presence of invasive plants cannot be ruled out.

Structural Diversity:
As noted above, this habitat type displays less structural diversity than Habitat III, with limited sapling / shrub strata, and only moderate herbaceous stratum.

Current / Potential Wildlife Use:
Habitat Area VI provides browse for large mammals, such as white-tailed deer. The herbaceous material also provides browse for small mammals, including eastern cottontail. Based upon the food, cover, and nesting habitat provided by Habitat Area VI, it is likely that the area is utilized by additional species, including upland gamebirds, barred owls, red-tailed hawk (*Buteo jamaicensis*), song birds, and small mammals. It would also provide excellent habitat for the northern harrier / marsh hawk (*Circus cayneus*), which is listed as a Threatened Species in Massachusetts.

Potential for Recreational or Educational Use:
As with Habitat Type IV, this peninsula-like area provides an excellent opportunity for recreation. As discussed above, the area has an existing trail, and is currently utilized by campers and canoeists. At this time, preferred access is from the river only.

Habitat Type VII: Uneven-Aged, Upland Floodplain Forest (Partially Sloped)

Location / Aspect: Habitat Area VII is located along the northern property boundary. The area slopes steeply to the south; then levels out as it approaches Habitat Type I (red maple swamp).

Typical Vegetation:
Vegetation within the upland habitat includes a variety of species, with varying densities and percent dominance. However, in general terms, the area includes a moderately dense tree stratum dominated by white oak, red oak, and shagbark hickory; a moderately sparse sapling / shrub stratum dominated by highbush blueberry, glossy buckthorn, and American hornbeam / musselwood / blue beech / ironwood (*Carpinus caroliniana*); with honeysuckle (*Linocera sp.*) occasionally found; and a moderately dense herbaceous stratum dominated by trout lily, with Canada mayflower commonly found, and wood anemone, and cranesbill (Geranium sp.), garlic mustard (*Alliaria petiolata*) occasionally found.

Invasive Plant Species:
Glossy buckthorn was found throughout this habitat area. In addition, a moderately dense population of garlic mustard, and sporadic specimens of honeysuckle were found adjacent to the area for the proposed parking area.

Structural Diversity: Structural diversity within the upland forest was moderate, with moderately dense shrub / sapling and tree strata, and very dense herbaceous strata. Therefore, the area provides cover for reptiles, amphibians, upland game birds, songbirds, and small mammals.

Current / Potential Wildlife Use:
Habitat Area VII provides browse for large mammals, such as white-tailed deer. The herbaceous material also provides cover and browse for small mammals, including eastern cottontail. Based upon the food, cover, and nesting habitat provided by Habitat Area VII, it is likely that the area is utilized by additional species, including upland game birds, songbirds, eastern screech owl, and small mammals such as those listed above in Habitat Type III.

Potential for Recreational or Educational Use:
This habitat type has high potential for recreational and educational use, as it has the easiest access, and currently includes a trail. The steep slope, however, may make use by less active persons difficult.

VERNAL POOLS:

As part of the General Natural Resources Inventory, SEC searched for vernal pools and potential vernal pool habitat. Vernal pools are shallow depressions in the landscape which fill with snowmelt, rainfall and / or groundwater for a short period of time in the early spring. These depressions serve as critical breeding habitat for a variety of amphibians (frogs, toads and salamanders), and a food source for reptiles (turtles). Vernal pools certified by the MA Natural Heritage and Endangered Species Program receive special protection under state law, specifically the Wetlands Protection Act and the MA Endangered Species Act.

During the April 2007 site visit, SEC heard large numbers of wood frogs (*Rana sylvatica*) chorusing in two portions of the site: Habitat Type I (western section) and the southern half of Habitat Type V. In the former location, cadisfly larvae (*Trichoptera sp.*), an obligate vernal pool species, was noted at that time. The latter area was too heavily flooded to investigate. During the May 2007 site visit, several wood frog egg masses were noted within the previously identified vernal pool habitat in Habitat Type I area. As wood frogs are a second obligate vernal pool species, information gathered on this pool will be submitted by SEC for certification by the MA Natural Heritage and Endangered Species Program.

Unfortunately, although wood frogs were clearly breeding within the second potential vernal pool habitat (Habitat Type V), this area could not be certified. In addition, due to the surface water connection of this area to the Ipswich River to the south (discussed above), it is possible that fish may have entered the breeding habitat and preyed upon the egg masses. Based upon the large number of frogs chorusing, it seems likely that this could be excellent breeding habitat. However, the prolonged flooding caused by the block culvert(s) is likely also diminishing the habitat quality for vernal pool breeders.

For additional information regarding vernal pool habitat and identification of vernal pool species, SEC recommends "A Field Guide to the Animals of Vernal Pools", by Leo P. Kenney and Matthew R. Burne, published jointly by the MA Division of Fisheries and Wildlife - Natural Heritage and Endangered Species Program, and the Vernal Pool Association in May 2000.

INVASIVES MANAGEMENT:

In addition to the non-native and / or invasive plants discussed above (greenbrier, glossy buckthorn, garlic mustard, and honeysuckle), a dense stand of Japanese knotweed (*Polygonum cuspidatum*), as well as occasional honeysuckle shrubs were noted along the railroad tracks. It is recommended that an invasives management plan be instituted as soon as possible. The initial emphasis should be in the immediate eradication of the garlic mustard and Japanese knotweed populations. As the garlic mustard is adjacent to Colonial Drive, and in the proximity of the parking area, it can be removed by digging. Care should be taken to ensure that the garlic mustard removed is destroyed by burying or burning, so that it does not spread to another area of town.

The Japanese knotweed removal is more problematic, as it is adjacent to the railroad tracks, and in relative proximity to the Ipswich River. SEC recommends a focused, multi-year approach, where the stalks are cut back towards the end of the growing season, after they have flowered; then painted with a small amount of Roundup®, which will be pulled into the root system by the plant as it approaches senescence. It is likely that this procedure would need to be repeated annually until the plant is eradicated. Approval from the Ipswich Conservation Commission will be required, as the knotweed appears to be located within the Riverfront Area of the Ipswich River.

Removal of the glossy buckthorn and honeysuckle will be more difficult, as they are woody, well established, and in the case of the glossy buckthorn, widely dispersed. As such SEC recommends removal of young buckthorn individuals using mechanical means, or by similar procedure to that described for knotweed. Mature buckthorn shrubs and all honeysuckle shrubs will need to be cut down to the ground and herbicide applied, if possible, as the stump will undoubtedly sprout. The problem is widespread, so it is recommended that the Town take a multi-year approach, and enlist the assistance of Boy Scouts and high school students looking for volunteer work, for the non-herbicide work.

RECOMMENDATIONS:

SEC makes the following recommendations for the Conservation Parcel:

1. Institute an invasive management program as described above.

2. Remove deer stands, and post "no hunting" signs around the perimeter of the property. Post signs near the campfire / canoe haul out area prohibiting littering.

3. Clean out the box culvert identified by SEC (north end of the property). Attempt to locate the southern culvert and, if blocked, clear it as well.

4. Improve the trail within habitat VI / Habitat IV along the river. A bog bridge will be needed in one location as it appears to be prone to flooding, and a few downed trees need to be removed (cut). A bog bridge is easily assembled. It consists of one log, cut lengthwise, and placed side by side on two shorter logs, placed at either end, perpendicular to the bridge deck. As an alternative to a bog bridge, the trail could be

moved inland. Approval from the Ipswich Conservation Commission as part of a Request for Determination of Applicability filing under the MA Wetlands Protection Act and Ipswich Wetlands Protection Bylaw will be required for this work, as the trail is located within 200 feet of the Ipswich River. Consider installing a chain link fence along the railroad track to prohibit access to the area via the right of way.

5. Continue to investigate the presence of vernal pool habitat for certification. Submit proof of the presence of obligate vernal pool species to the MA Natural Heritage and Endangered Species Program.

6. Encourage archeological investigation of the berm / ditch (bog iron) area, and the upland edge of the oxbow remnant for potential evidence of Native American habitation.

7. Construct an above-grade boardwalk to cross the wetland near its narrowest point to allow for access to extensive upland areas in the center of the site, as well as to allow visitors to view the remarkable vegetation within Habitat Type II. An approximate location for this structure is shown on Attachment 1. Approval from the Ipswich Conservation Commission as part of a Notice of Intent filing under the MA Wetlands Protection Act and Ipswich Wetlands Protection Bylaw will be required for this work.

8. Construct a loop trail within Habitat Area III as shown on the above sketch.. Approval from the Ipswich Conservation Commission as part of a Notice of Intent filing under the MA Wetlands Protection Act and Ipswich Wetlands Protection Bylaw will be required for this work, where the trail is located within 100 feet of wetlands or 200 feet of the Ipswich River.

9. Publish a brochure publicizing the canoe haul out location / “picnic area”. A separate brochure can show the trail system proposed for the main parcel west of the railroad tracks.