**Aurora Mastodont Project – Matrix Analyses Project**  
**List of plant macrofossils**  
From unpublished draft of report on 2004 AMP  
Analyses by Catherine Yansa, Assistant Professor, Department of Geography, Michigan State University

<table>
<thead>
<tr>
<th>UNIT</th>
<th>TAXA (a) (Latin Name, Common Name)</th>
<th>RELATIVE ABUNDANCE</th>
<th>HABITAT OF TAXA (a) (study area=southern L. Mich. basin)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NON-VASCULAR PLANTS</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gyttja</td>
<td>Chara (green alga) oogonia [reproductive structure]</td>
<td>abundant (e.g., 790 oogonia/200 gm sample)</td>
<td>shallow eutrophic water; precipitates marl</td>
</tr>
<tr>
<td>Gyttja</td>
<td>Drepanocladus (sickle-leaf moss)</td>
<td>few (2-3 stems with leaves/200 gm sample)</td>
<td>a fen moss, found in shallow calcareous waters</td>
</tr>
<tr>
<td>Gyttja</td>
<td>Equisetum (horsetail)</td>
<td>rare (stem frag)</td>
<td>moist soils</td>
</tr>
<tr>
<td><strong>TREES &amp; SHRUBS</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gyttja</td>
<td>conifer wood - charred (some Picea (spruce))</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gyttja</td>
<td>Picea glauca (white spruce; seed)</td>
<td></td>
<td>well-drained soils; not in Chicago area today; in boreal forest and northern Great Lakes region bogs; parts of Lake Michigan basin + northern Great Lakes region</td>
</tr>
<tr>
<td>Gyttja</td>
<td>Picea mariana (black spruce; seed)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gyttja</td>
<td>Picea (seed wing)</td>
<td>1-2/sample; broken wing, can't id species</td>
<td></td>
</tr>
<tr>
<td>Gyttja</td>
<td>Picea (needles)</td>
<td>moderately abundant as fragments (~ 25 needles/sample)</td>
<td></td>
</tr>
<tr>
<td>Gyttja</td>
<td>Juniperus communis (common juniper)</td>
<td>few needles</td>
<td>sand dunes in Lake Michigan area</td>
</tr>
<tr>
<td>Gyttja</td>
<td>deciduous hardwood (wood-in process of identifying)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gyttja</td>
<td>Populus (poplar) seed</td>
<td>occasional (1-2/200 gm sample)</td>
<td>in study area</td>
</tr>
<tr>
<td>Gyttja</td>
<td>Betula populifolia-type (gray birch; fruit)</td>
<td>uncommon (1-2/sample); for sure Betula, probably B. populifolia</td>
<td>in study area</td>
</tr>
<tr>
<td><strong>MUDFLAT HERBS</strong> (Shoreline)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gyttja</td>
<td>Chenopodium hybridium var. gigantospermum (maple-leaved goosefoot)</td>
<td>some (2-4/200 gm sample)</td>
<td>disturbed areas (e.g., after fires, logging) within shaded woodlands; in study area</td>
</tr>
<tr>
<td>Gyttja</td>
<td><em>Chenopodium rubrum</em> (red goosefoot; seeds smaller than other Cheno.)</td>
<td>fairly common (2-5/200 gm sample); doesn’t inhabit region today--found in No. Great Plains were warmer &amp; drier</td>
<td>disturbed areas (e.g., shoreline fluctuations, after fires)-not native to study area - but native to Northern Great Plains to the west; indicates fluctuating, drying soils</td>
</tr>
<tr>
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</tr>
<tr>
<td>Gyttja</td>
<td><em>Potentilla</em> (cinquefoil)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gyttja</td>
<td><em>Ranunculus</em> (buttercup; crowfoot)</td>
<td>few (worn, couldn’t id species)</td>
<td>wet meadows; fens; lakeshores; several species in study area</td>
</tr>
<tr>
<td>Gyttja</td>
<td><em>Rumex martimus var. fueginus</em> (golden dock)</td>
<td>some (2-5/200 gm sample)</td>
<td>wet meadows; fens; lakeshores; moist forest; streambanks; several species in study area marshes; shores, streambanks, sometimes where brackish; in study area</td>
</tr>
<tr>
<td><strong>EMERGENTS (Aquatic-Emergents)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gyttja</td>
<td><em>Carex atherodes</em>-type (slough sedge)</td>
<td>some fruit (3-6/200 gm sample)</td>
<td>(100+ species of Carex; this is just a type id) marshes, wet meadows, prairie swales, pond margins; usually in shallow waer where may form dense stands; in study area peat mats or shallow water; in study area</td>
</tr>
<tr>
<td>Gyttja</td>
<td><em>Carex rostrata</em>-type (beaked sedge)</td>
<td>common (5-10 fruits/200 gm sample)</td>
<td>calcareous swamps &amp; fens; marshes; wet meadows; low prairie; lake shores; in study area shallow water, sandy or mucky shores, calcium-rich wet meadows, fens &amp; low prairie; Midwest and to south</td>
</tr>
<tr>
<td>Gyttja</td>
<td><em>Carex suberecta</em>-type (wedge-fruitied oval sedge)</td>
<td>some fruits (2-5/200 gm sample)</td>
<td>marshes; shores, bogs streambanks; swamps; in study area emergent in shallow to deep water (1-2 m deep) of marshes, ponds &amp; lakes; sometimes where brackish; in study area</td>
</tr>
<tr>
<td>Gyttja</td>
<td><em>Eleocharis palustris</em>-type (creeping spike-rush)</td>
<td>some fruits (some deterioration, can’t confirm species id)</td>
<td></td>
</tr>
<tr>
<td>Gyttja</td>
<td><em>Scirpus acutus</em> (hardstem-bulrush)</td>
<td>some fruits</td>
<td></td>
</tr>
<tr>
<td><strong>SUBMERGED AQUATICS</strong></td>
<td><strong>Najas flexilis</strong> (northern water-nymph)</td>
<td>very abundant (e.g., 72 fruit/200 gm sample)</td>
<td>aquatic plant; ponds, lakes, streams; usually in deep water (1-3 m); common in late Pleistocene, less common today; in study area</td>
</tr>
<tr>
<td>Gyttja</td>
<td>Potamogeton filiformis (threadleaf pondweed)</td>
<td>common (2-4 fruits/200-gm sample)</td>
<td>mostly shallow water (up to 1 m) in lakes (including Great Lakes) &amp; rivers; in study area</td>
</tr>
<tr>
<td>Gyttja</td>
<td>Potamogeton natans (floating pondweed)</td>
<td>common (1-3 fruits/200-gm sample)</td>
<td>usually shallow water (up to 2 m deep) of ponds, lakes, rivers &amp; peatlands; in study area</td>
</tr>
<tr>
<td>Gyttja</td>
<td>Potamogeton obtusifolius (bluntleaf-pondweed)</td>
<td>few fruit</td>
<td>lakes, ponds &amp; streams, peatland pools; in study area</td>
</tr>
<tr>
<td>Gyttja</td>
<td>Zannichellia palustris (horned pondweed)</td>
<td>rare (1/sample)</td>
<td>brackish water indicator; unexpected to be here</td>
</tr>
</tbody>
</table>

| OTHER FOSSILS |
| Gyttja | Freshwater bryozoans | few (2-4/sample) |

| Marl | NON-VASCULAR PLANTS |
| Marl | Chara (green alga) oogonia [reproductive structure] | incredibly abundant (e.g, 1300-1700 oogonia/200 gm sample) | shallow eutrophic water; precipitates marl |
| Marl | Drepanocladus (sickle-leaf moss) | few (2-3 stems with leaves/200 gm sample) | a fen moss, found in shallow calcareous waters |

| TREES & SHRUBS |
| Marl | conifer wood - some charred | see above |
| Marl | Picea glauca (white spruce; seed) | see above |
| Marl | Picea mariana (black spruce; needle) | 1-2 intact needles are P. mariana, unsure if the frags are those of P. mariana or P. glauca | see above |
| Marl | Picea (needles) | moderately abundant as fragments (~ 25 needles/sample) | see above |
| Marl | deciduous hardwood (wood-in process of identifying) | see above |
| Marl | Populus (poplar) bud | occasional (1-2/200 gm sample) | see above |
| Marl | Populus (poplar) seed | occasional (1-2/200 gm sample) | see above |
| Marl | charcoal fragments | common | see above |
| Marl | Rubus (raspberry) | few (1-2 fruit/200 gm sample) | moist soils; several species |

<p>| MUDFLAT HERBS (Shoreline) |
| Marl | Chenopodium hybridium var. gigantospermum | few (0-2/200 gm sample) | see above |</p>
<table>
<thead>
<tr>
<th>Marl</th>
<th>Species</th>
<th>Notes</th>
<th>See Above</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><em>Chenopodium rubrum</em></td>
<td>fairly common (2-5/200 gm sample); doesn’t inhabit region today--found in No. Great Plains were warmer &amp; drier</td>
<td>see above</td>
</tr>
<tr>
<td></td>
<td><em>Potentilla</em></td>
<td>few (worn, couldn’t id species)</td>
<td>see above</td>
</tr>
<tr>
<td></td>
<td><em>Ranunculus (buttercup)</em></td>
<td>few (worn, couldn’t id species)</td>
<td>see above</td>
</tr>
<tr>
<td></td>
<td><em>Rumex martimus var. fueginus</em></td>
<td>some (2-5/200 gm sample)</td>
<td>see above</td>
</tr>
<tr>
<td></td>
<td><em>Lycopus americanus</em> (American water-horehound)</td>
<td>some (2-5/200 gm sample)</td>
<td>wetland margins; marshes; wet meadows; lakeshores; streambanks; calcareous fens; in study area</td>
</tr>
<tr>
<td></td>
<td><em>Mentha arvensis var. villosa</em> (wild mint or field mint)</td>
<td>common (5-12/200 gm sample)</td>
<td>wet meadows; marshes; swamps; thickets; streambanks; springs; in study area</td>
</tr>
<tr>
<td></td>
<td><em>Polygonum hydropiperoides</em>-type (false water-pepper)</td>
<td>few (2-4/200 gm sample)</td>
<td>shallow water or wet soil; ponds; marshes; swamps; bogs &amp; fens; streambanks; lakeshores; in study area</td>
</tr>
<tr>
<td></td>
<td><em>Arabis</em> (cress or mustard)</td>
<td>few (1-3/200 gm sample)</td>
<td>different species each inhabit some of these: dunes; dry soil; prairie; shaded stream banks; calcareous soils; in study area</td>
</tr>
<tr>
<td></td>
<td>Umbelliferae (=Apiaceae)</td>
<td>few (1-3/200 gm sample)</td>
<td>family-level identification; several species, but all occupy moist soils; in study area</td>
</tr>
<tr>
<td></td>
<td><strong>EMERGENTS</strong> (Aquatic-Emergents)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Carex atherodes</em>-type (hairy-leaved lake sedge)</td>
<td>some fruit (3-6/200 gm sample)</td>
<td>see above</td>
</tr>
<tr>
<td></td>
<td><em>Carex rostrata</em>-type (beaked sedge)</td>
<td>common (5-10 fruits/200 gm sample)</td>
<td>see above</td>
</tr>
<tr>
<td></td>
<td><em>Carex suberecta</em>-type (many-head sedge)</td>
<td>some fruits (2-5/200 gm sample)</td>
<td>see above</td>
</tr>
<tr>
<td></td>
<td><em>Carex typhina</em>-type (common cat-tail sedge)</td>
<td>few (1-2/200 gm sample)</td>
<td>floodplain forest; marshy areas; in study area</td>
</tr>
<tr>
<td></td>
<td><em>Eleocharis palustris</em>-type</td>
<td>some fruits (some deterioration, can’t confirm species id)</td>
<td>see above</td>
</tr>
<tr>
<td></td>
<td><em>Scirpus acutus</em></td>
<td>abundant (12-22 seeds/200 gm sample)</td>
<td>see above</td>
</tr>
<tr>
<td>Marl</td>
<td><strong>Scirpus validus</strong> (softstem-bulrush)</td>
<td>common (5-10 seeds/200 gm sample)</td>
<td>shallow water &amp; shores of lakes, ponds, marshes, streams &amp; ditches; in study area</td>
</tr>
<tr>
<td>---</td>
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</tr>
<tr>
<td>Marl</td>
<td><strong>Juncus</strong> (rush)</td>
<td>few (1-2/200 gm sample); can not id species</td>
<td>several species, but all occupy moist soils, marshes or streambanks; in study area</td>
</tr>
<tr>
<td>Marl</td>
<td><strong>Typha latifolia</strong> (common cat-tail)</td>
<td>some (2-4 fruit/200 gm sample)</td>
<td>marshes, lakeshores, streambanks, pond margins, usually in shallow water; common in study area</td>
</tr>
<tr>
<td>Marl</td>
<td><strong>Sagittaria latifolia</strong> (common arrowhead)</td>
<td>some (2-5 fruit/200 gm sample)</td>
<td>shallow water, lakeshores, marshes &amp; pools in bogs; common in study area</td>
</tr>
</tbody>
</table>

**SUBMERGED AQUATICS**

<table>
<thead>
<tr>
<th>Marl</th>
<th><strong>Najas flexilis</strong> (naiad)</th>
<th>very abundant (e.g., 72 fruit/200 gm sample)</th>
<th>see above</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marl</td>
<td><strong>Potamogeton filiformis</strong></td>
<td>some (2-5 fruit/200 gm sample)</td>
<td>see above</td>
</tr>
<tr>
<td>Marl</td>
<td><strong>Potamogeton natans</strong></td>
<td>some (2-5 fruit/200 gm sample)</td>
<td>see above</td>
</tr>
<tr>
<td>Marl</td>
<td><strong>Potamogeton vaginatus</strong> (bigsheath-pondweed)</td>
<td>some (2-5 fruit/200 gm sample)</td>
<td>cold-water streams and lakes; in study area</td>
</tr>
<tr>
<td>Marl</td>
<td><strong>Potamogeton crispus</strong> (curly pondweed)</td>
<td>few (1-2/sample)</td>
<td>shallow to deep water of lakes (incl. Great Lakes) &amp; rivers; in study area</td>
</tr>
<tr>
<td>Marl</td>
<td><strong>Potamogeton pusillus</strong> (slender or small pondweed)</td>
<td>few (1-2/sample)</td>
<td>shallow water (to 2 m deep) of lakes &amp; ponds, occasionally in streams; in study area</td>
</tr>
<tr>
<td>Marl</td>
<td><strong>Ceratophyllum demersum</strong> (common hornwort)</td>
<td>few (1-2/sample)</td>
<td>shallow to deep water of lakes, ponds; water typically neutral to alkaline; common in study area</td>
</tr>
</tbody>
</table>

**OTHER FOSSILS**

<table>
<thead>
<tr>
<th>Marl</th>
<th>Freshwater bryozoans</th>
<th>few (2-4/sample)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Peat</td>
<td>sedge peat (abundances of bulrush, not enough moss to be a moss peat)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peat</td>
<td><strong>Chara</strong> (green alga) oogonia [reproductive structure]</td>
<td>some in lowermost sample (near marl), none above</td>
<td>see above</td>
</tr>
<tr>
<td>Peat</td>
<td><strong>Drepanocladus</strong> (sickle-leaf moss)</td>
<td>common (several stems with leaves/200 gm sample)</td>
<td>see above</td>
</tr>
</tbody>
</table>

**TREES & SHRUBS**
<table>
<thead>
<tr>
<th>Category</th>
<th>Plant Name</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peat</td>
<td>deciduous hardwood</td>
<td>(wood-in-process of identifying)</td>
</tr>
<tr>
<td>MUDFLAT HERBS</td>
<td><em>Chenopodium rubrum</em> (red goosefoot; seeds smaller than other Cheno.)</td>
<td>fairly common (2-5/200 gm sample); doesn't inhabit region today--found in Northern Great Plains were warmer &amp; drier</td>
</tr>
<tr>
<td>Peat</td>
<td><em>Chenopodium capitatum</em> (strawberry blite)</td>
<td>some (2-5/200 gm sample)</td>
</tr>
<tr>
<td>Peat</td>
<td><em>Potentilla</em> (cinquefoil)</td>
<td>some (4-7/sample)</td>
</tr>
<tr>
<td>Peat</td>
<td><em>Polygonum</em> (smartweed)</td>
<td>few (2-4/sample)</td>
</tr>
<tr>
<td>EMERGENTS</td>
<td><em>Carex atherodes</em>-type (slough sedge)</td>
<td>some fruit (3-6/200 gm sample)</td>
</tr>
<tr>
<td>Peat</td>
<td><em>Carex rostrata</em>-type (beaked sedge)</td>
<td>very abundant (30+ fruits/200 gm sample; most abundant in this facies)</td>
</tr>
<tr>
<td>Peat</td>
<td><em>Eleocharis palustris</em>-type (creeping spike-rush)</td>
<td>some fruits (some deterioration, can't confirm species id)</td>
</tr>
<tr>
<td>Peat</td>
<td><em>Scirpus acutus</em> (hardstem-bulrush)</td>
<td>very abundant (40+ fruits/200 gm sample; most abundant in this facies)</td>
</tr>
<tr>
<td>Peat</td>
<td><em>Scirpus validus</em> (softstem-bulrush)</td>
<td>abundant (20+ fruits/200 gm sample; most abundant in this facies)</td>
</tr>
<tr>
<td>Peat</td>
<td><em>Typha latifolia</em> (common cattail)</td>
<td>common (6-12 fruits/200 gm sample)</td>
</tr>
<tr>
<td>SUBMERGED AQUATICS</td>
<td><em>Najas flexilis</em> (northern water-nymph)</td>
<td>very abundant (e.g., 72 fruit/200 gm sample)</td>
</tr>
<tr>
<td>Buried Soil #2</td>
<td>very few fossils - degraded fossils (oxidized); abundant rootlets</td>
<td></td>
</tr>
<tr>
<td>NON-VASCULAR PLANTS</td>
<td></td>
<td></td>
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<tr>
<td></td>
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<td></td>
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<tr>
<td>----------------</td>
<td>-----------------------------------------------------------------</td>
<td>-----------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Buried Soil #2</strong></td>
<td><em>Chara</em> (green alga) oogonia [reproductive structure]</td>
<td>few (4-8 oogonia/200 gm sample)</td>
</tr>
<tr>
<td></td>
<td><strong>TREES &amp; SHRUBS</strong></td>
<td></td>
</tr>
<tr>
<td><em>Chara</em></td>
<td>charcoal fragments</td>
<td>few frags</td>
</tr>
<tr>
<td></td>
<td><em>Salix sp.</em> (willow; stem piece)</td>
<td>few pieces</td>
</tr>
<tr>
<td></td>
<td><em>Populus</em> (poplar) bud</td>
<td>few (1-2/200 gm sample)</td>
</tr>
<tr>
<td></td>
<td><strong>MUDFLAT HERBS</strong> (Shoreline)</td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Rumex martimus var. fueginus</em></td>
<td>few (1-2/200 gm sample)</td>
</tr>
<tr>
<td></td>
<td><strong>EMERGENTS</strong> (Aquatic-Emergents)</td>
<td></td>
</tr>
<tr>
<td><em>Scirpus acutus</em></td>
<td></td>
<td>few (1-3 seeds/200 gm sample)</td>
</tr>
<tr>
<td><em>Typha latifolia</em></td>
<td>(common cattail)</td>
<td>some (1-6 fruit/200 gm sample)</td>
</tr>
<tr>
<td></td>
<td><em>Sagittaria latifolia</em></td>
<td>common (2-50), but all but a few are degraded</td>
</tr>
<tr>
<td></td>
<td><strong>SUBMERGED AQUATICS</strong></td>
<td></td>
</tr>
<tr>
<td><em>Potamogeton natans</em></td>
<td></td>
<td>few (1-2 fruit/200 gm sample)</td>
</tr>
<tr>
<td></td>
<td><strong>OTHER FOSSILS</strong></td>
<td></td>
</tr>
<tr>
<td><em>insect puppa cocoons</em></td>
<td></td>
<td>few (1-2/sample)</td>
</tr>
<tr>
<td></td>
<td><strong>MUDFLAT HERBS</strong> (Shoreline)</td>
<td></td>
</tr>
<tr>
<td>Sandy silt(c)</td>
<td><em>Chenopodium rubrum</em></td>
<td>few (0-2/200 gm sample)</td>
</tr>
<tr>
<td></td>
<td><strong>EMERGENTS</strong> (Aquatic-Emergents)</td>
<td>very few (0-2 seeds/200 gm sample)</td>
</tr>
<tr>
<td>Sandy silt(c)</td>
<td><em>Scirpus acutus</em></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Typha latifolia</em> (common cattail)</td>
<td>few (1-2 fruit/200 gm sample)</td>
</tr>
</tbody>
</table>

(a) Taxonomy and Habitat based on:
(b) Peat sampled in backhoe trench F8, not in B-12 east wall.
(c) Rare fossils (almost sterile); degraded fossils (oxidized); abundant rootlets