

Identified problems	Action Items	Combined Action Items
<p><b>Above Baribeau Drive</b> Stressor Analysis (Kristin Feindel and Jeff Dennis)</p> <ul style="list-style-type: none"> <li>• Low baseflow velocity due to undersized/misaligned culverts</li> <li>• Low DO at night, high DO swings due to missing riparian canopy with creation of wetlands due to undersized culvert and increased nutrients from urban runoff</li> <li>• Increased deposition of sediments due to ponding upstream of undersized culverts</li> </ul>	<ul style="list-style-type: none"> <li>• Increase culvert size</li> <li>• Reduce nutrients from urban runoff</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Culverts:</b> <ul style="list-style-type: none"> <li>- <b>Hydrologic and hydraulic (H&amp;H) Study to be done first watershed-wide</b></li> <li>- Thornton Oaks Trail Crossings – Replace with footbridges; Incorporate geomorphic concept Design 1</li> <li>- Replace culverts at main stem of Mare Brook crossing with <b>Baribeau Drive</b> with an open bottom culvert (H&amp;H study first)</li> <li>- Remove obstruction at Baribeau Drive southern tributary crossing</li> <li>- Replace and upgrade inlet/outlet of Western Thornton Oakes Property’s southern tributary</li> </ul> </li> <li>• <b>Chop and drop</b> from Windorf Circle to backside of Senior Housing at end of Matthew Drive (Included in Design 1)</li> <li>• <b>Detaching impervious cover</b> from stormwater / install stormwater BMPs</li> <li>• Follow-up bacteria monitoring in spring: Is waterfowl an issue above Baribeau?</li> </ul>
<p>Geomorphic Assessment (John Field)</p> <ul style="list-style-type: none"> <li>• Minimal log cover from Windorf Circle to backside of senior housing center on Matthew Drive</li> <li>• Undersized culverts between Windorf Circle and Matthew Drive</li> <li>• Armoring of bed downstream of Windorf Circle</li> <li>• Fine sediment upstream of culverts</li> <li>• Impounded reach due to undersized culvert</li> </ul>	<ul style="list-style-type: none"> <li>• Chop and drop from Windorf Circle to backside of Senior Housing at end of Matthew Drive</li> <li>• Replace undersized culvert with footbridge between Windorf Circle and Matthew Drive</li> <li>• Resize Baribeau Drive culverts – multiple small culverts</li> <li>• Concept design for just upstream of Matthew Drive (Geomorphic Design: Windorf Circle Site 1): Replace undersized walking path culvert with 17 ft footbridge, install chop and drop wood additions at strategically located positions</li> </ul>	
<p>Culvert Survey (Chris Baldwin and Matthew Pelletier)</p> <ul style="list-style-type: none"> <li>• Two locations of undersized culverts along Thornton Oaks Trail Network restricted stream channel flow</li> <li>• Main stem of Mare Brook crossing on Baribeau Road (twin 30-inch diameter by 47-foot length and a 30-inch by 72-foot length flood control culvert): Undersized with ponding upstream / restrictive flow; Obstructions at outlet of flood control culvert</li> </ul>	<ul style="list-style-type: none"> <li>• Remove culverts at two Thornton Oaks Trail crossings and replace with footbridges to restore stream channel (one of these sites is Geomorphic Design Site 1)</li> <li>• Replace culverts at main stem of Mare Brook crossing with Baribeau Drive with an open bottom culvert to restore stream channel (need H&amp;H study first)</li> <li>• Maintenance needed for Baribeau Drive’s southern tributary crossing</li> <li>• Replace and upgrade inlet/outlet of Western Thornton Oakes Property’s southern tributary</li> </ul>	

Identified problems	Action Items	Combined Action Items
<ul style="list-style-type: none"> <li>• Some obstruction at inlet and poor outlet of Baribeau Drive’s southern tributary crossing</li> <li>• Poor inlet and outlet of Western Thornton Oaks Property’s Southern Tributary causing blocked flow</li> </ul>		
<p>Structural Retrofits (Chris Baldwin)                      Headwaters: Thornton Oaks Walking Trails: There are several undersized, failing CMPs used at walking trail crossings that could be removed from the stream and replaced with pedestrian footbridges. The facilities manager at Thornton Oaks has offered to work with the Town.</p>		
<p>Other Sources</p> <ul style="list-style-type: none"> <li>• 2/2021 Technical Advisory Committee (TAC) Meeting notes, David Page: Waterfowl above Baribeau Drive, in spring, wetland, stagnant water upland of culverts</li> </ul>		

<p><b>Above Maine Street</b> Stressor Analysis (Kristin Feindel and Jeff Dennis)</p> <ul style="list-style-type: none"> <li>• Increased catastrophic drift due to increased stormflows due to urbanization (stream straightened and not much floodplain due to development) and loss of floodplain and wetland storage</li> <li>• Increased frequent disturbance of substrate and loss of substrate downstream due to decreased gravel &amp; sand habitat, increased bottom scoured to marine clay, urbanization and/or alteration of natural drainage patterns (including fill), loss of floodplain &amp; wetland storage, and undersized and misaligned culverts</li> <li>• Increased alteration of substrate and loss of habitat diversity due to channelization</li> <li>• Increased deposition of sediments due to ponding upstream of undersized culverts</li> <li>• Possible potential acute toxicity in stormflow due to parking lot &amp; school bus washing (9/2021, Jared Woolston: Changed the type of soap used to wash the bus; Kristin Feindel: Other pollutants being washed off buses)</li> <li>• Bacteria? (See “Other?” below)</li> </ul>	<ul style="list-style-type: none"> <li>• Increase floodplain access</li> <li>• Increase culvert size</li> <li>• Restore stream channel</li> <li>• Reduce pollutants from bus parking lot</li> <li>• Install stormwater BMPs</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Culverts:</b> <ul style="list-style-type: none"> <li>○ Remove armor downstream of Baribeau Drive culvert</li> <li>○ Upsize culvert at Barrows Street after H&amp;H</li> <li>○ Upsize culvert at Macmillian Drive after H&amp;H</li> <li>○ Upsize culvert at <b>Maine Street</b> after H&amp;H (Geomorphic Concept Design 3)</li> <li>○ Upsize culverts at Richards Drive tributary crossing</li> <li>○ Add riprap to outlet of Colonial Drive tributary crossing</li> </ul> </li> <li>• Remove fill and replace foot bridge just above Barrows Street (Geomorphic Concept Design 2)</li> <li>• <b>Remove bed armoring</b> just downstream of Barrows Street; Install wood additions or chop and drop</li> <li>• <b>Install anchored wood additions</b> upstream of MacMillan Drive; Bio stabilization (plantings, log jams, etc.) by homes</li> <li>• <b>Chop and drop</b> just upstream of Maine Street crossing (and downstream along with removing fill in floodplain – see Maine Street to Meadowbrook Road below)</li> <li>• Outreach to bus/transportation center</li> <li>• Replace Barrows and McMillan Street Outfalls/Down chutes at least two locations with deep sump catch basins with hooded outlets.</li> </ul>
<p>Geomorphic Assessment (John Field)</p> <ul style="list-style-type: none"> <li>• Narrow floodplain access between Barrows Street and Macmillan Drive</li> <li>• Narrow channel and armoring of bed downstream of Baribeau Drive culvert</li> <li>• Floodplain just upstream of Barrows Street constricted by fill; Barrows Street culvert undersized</li> </ul>	<ul style="list-style-type: none"> <li>• Remove armor downstream of Baribeau Drive culvert</li> <li>• Remove fill and replace foot bridge just above Barrows Street (Geomorphic Design Site 2); Resize culvert at Barrows Street</li> <li>• Remove bed armoring just downstream of Barrows Street; Install wood additions or chop and drop</li> <li>• Install anchored wood additions upstream of MacMillan Drive; Bio stabilization by homes</li> </ul>	

<ul style="list-style-type: none"> <li>• Armoring of bed downstream of Barrows Street culvert</li> <li>• Poor log cover, limited canopy, and limited wood in channel between Colonial Drive and Macmillan Drive</li> <li>• Localized scour downstream of Macmillan Drive culvert</li> <li>• Ponded upstream of culvert at Main Street</li> <li>• Fill constricts channel at Maine Street</li> </ul>	<ul style="list-style-type: none"> <li>• Replace Maine Street culvert (Geomorphic Design Site 3); chop and drop just upstream (and downstream along with removing fill in floodplain – see Maine Street to Meadowbrook Road below)</li> </ul>	<ul style="list-style-type: none"> <li>• Maine Street Baptist Church – Upper Maine Street: Provide stormwater management in the form of a gravel wetland or under drained soil filter with some storage below the church parking lot and roof.</li> <li>• Replace tree in existing Barrows Street Tree Box Filter and identify other locations within the Town right of way to install additional street enhancement and treatment BMPs.</li> <li>• Address chloride in the future as this is a very sandy watershed – encourage Planning Department to review new development with a lens to minimize need for salt (<i>watershed wide</i>)</li> <li>• Follow-up bacteria monitoring</li> </ul>
<p>Culvert Survey (Chris Baldwin and Matthew Pelletier)</p> <ul style="list-style-type: none"> <li>• Undersized culverts/restrictive flow at 4 crossings (Barrows Street Crossing, MacMillan Drive Crossing, Richards Drive Crossing, Maine Street Crossing)</li> <li>• Scouring at outlet of Barrows Street crossing</li> <li>• Obstructed outlet at Richards Drive Tributary Crossing</li> <li>• Failing cribstone at Maine Street Crossing</li> </ul>	<ul style="list-style-type: none"> <li>• Upsize culverts to restore channel at Barrows Street Crossing, Macmillan Drive Crossing, and Maine Street Crossing (Geomorphic Design Site 3) following an H&amp;H study first</li> <li>• Remove and upsize culverts to restore channel at Richards Drive Tributary crossing</li> <li>• Add riprap to outlet of Colonial Drive Tributary Crossing</li> </ul>	
<p>Structural Retrofits (Chris Baldwin)</p> <ul style="list-style-type: none"> <li>• Barrows and McMillan Street Outfalls/Down chutes: There are at least two locations with half-cut CMPs that were installed as down chutes to convey road runoff down to the stream. These have failed and are resulting in significant sediment loss through erosion and deposition in the stream. These could be replaced with deep sump catch basins with hooded outlets.</li> <li>• Maine Street Baptist Church – Upper Maine Street: There is a large parking lot and roof with no current stormwater management that sheds large amounts of runoff during storm events. The runoff concentrates at a 24-inch concrete cross culvert on the NW side of Maine Street and results in a fire hose on the SE side of the road. Considerable incising of the tributary occurs as it flows between Meadowbrook Road to the north and the Hospital to the south. Providing stormwater management in the form of a gravel wetland or under drained soil filter with some storage below the church parking lot and roof would control flow at the concrete cross culvert and reduce excessive flow and erosion at the outlet.</li> <li>• Barrows Street Tree Box Filter: Replace the tree in the existing tree box filter and identify other locations within the Town right of way to install additional street enhancement and treatment BMPs. These types of installations can raise public awareness and interest.</li> </ul>		

Other Sources

- 2/2021 TAC Meeting Notes: Stagnant water just below Baribeau crossing, large DO swings in 2016
- 2/2021 TAC Meeting Notes, Jeff Dennis: WMP should address chloride in the future as this is a very sandy watershed – encourage Planning Department to review new development with a lens to minimize need for salt
- 2/2021 TAC Meeting Notes, Kristin Feindel: Could do more water quality sampling for the area around Boody Street and Thompson Street (for bacteria hotspots?); 9/2021 SC Mtg Notes, Kristin Feindel: DEP plans to monitor more for bacteria from Barrows Drive to Maine Street impoundment (see next bullet below))
- 9/2021 SC Meeting Notes: Possible bacteria issue, high reading by DEP in 2015 yet no follow-up since – Possibly from Barrows Drive impoundment, David Page: Likely seasonal due to ducks (bacteria does not impact macroinvertebrates); 9/2021 SC Mtg, Jared Woolston: Local hospital has ponds feeding into Mare Brook, have signs that say ‘no feeding the ducks’
- 2/2021 TAC Mtg notes, Chris Baldwin: Likely heaving salting in upper watershed as there are a lot of medical businesses (Around Maine Street subwatershed); Opportunities in upper watershed to encourage to keep woody debris in the watershed (yet not yard waste))

<p><b>Above Harpswell Road</b> Stressor Analysis (Kristin Feindel and Jeff Dennis)</p> <ul style="list-style-type: none"> <li>• Possible increased temp due to impoundment/dam</li> <li>• Increased frequent disturbance of substrate and loss of substrate downstream due to decreased gravel &amp; sand habitat, increased bottom scoured to marine clay, urbanization and/or alteration of natural drainage patterns, and undersized and misaligned culverts</li> <li>• Increased deposition of sediments; Ponding upstream of undersized culverts</li> <li>• Decreased fish migration; Inadequate stream crossings and dams</li> </ul>	<ul style="list-style-type: none"> <li>• Increase culvert size</li> <li>• Restore stream channel</li> <li>• Explore impacts of dams</li> <li>• Install stormwater BMPs</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Culverts</b> <ul style="list-style-type: none"> <li>○ Upsize culvert at Meadowbrook Road after H&amp;H</li> <li>○ Upsize culvert at Sparwell Lane tributary crossing after H&amp;H and rebuild road</li> <li>○ Upsize culvert at <b>Harpswell Road</b> after H&amp;H</li> </ul> </li> <li>• <b>Chop and drop</b> from Maine Street to Coffin Pond</li> <li>• <b>Remove fill at Maine Street to Meadowbrook Rd</b></li> <li>• <b>Explore removal, repair, or modification of Coffin Pond Dam, involve community (Town Rec manages dam)</b> <ul style="list-style-type: none"> <li>○ Subcommittee to be established to look at weir structure, sediment contaminants, sediment movement, community values</li> </ul> </li> <li>• Address erosion at gravel access road to Coffin Pond</li> <li>• Retrofit Bowdoin College Athletic Field deep water detention basin with gravel wetland</li> <li>• Outreach to landowners on lawn fertilizer use (YardScaping) – <i>watershed wide</i></li> </ul>
<p>Geomorphic Assessment (John Field)</p> <ul style="list-style-type: none"> <li>• Severe scour downstream of Maine Street culvert with fill constricting channel at this crossing</li> <li>• Undersized culvert at Harpswell Road impacting entire upstream reach of 976 feet</li> <li>• John at 9/2021 SC Mtg: area below Maine street looks natural and undisturbed except along culverts</li> </ul>	<ul style="list-style-type: none"> <li>• Chop and drop from Maine Street to Coffin Pond</li> <li>• Remove fill at Maine Street to restore floodplain</li> <li>• Remove Coffin Pond dam to restore stream flow continuity</li> <li>• Resize Harpswell Road culvert to eliminated impoundment and restore stream flow continuity</li> </ul>	
<p>Culvert Survey (Chris Baldwin and Matthew Pelletier)</p> <ul style="list-style-type: none"> <li>• Undersized culverts at 3 crossings (Meadowbrook Road Crossing, Sparwell Lane Tributary Crossing, and Harpswell Road Crossing) causing restricted flow and ponding above Meadowbrook Road Crossing</li> <li>• Three other crossings surveyed within this subwatershed and were found to be in good condition with no recommendations</li> </ul>	<ul style="list-style-type: none"> <li>• Replace 3 undersized culverts to restore channel with larger culverts after an H&amp;H study first (Meadowbrook Road Crossing, Sparwell Lane Tributary Crossing, and Harpswell Road Crossing)</li> <li>• Rebuild the road at Sparwell Lane Tributary Crossing</li> </ul>	
<p>Structural Retrofits (Chris Baldwin)</p>		

<ul style="list-style-type: none"> <li>• Sparwell Road Crossing: This road crossing is on a main tributary of the main stem approximately 500-feet upstream of the confluence with the Mare Brook main stem. The culvert is undersized and failing and can be observed to be crushed and limiting passage of water and aquatic organisms. There are also large sediment deposits at both the inlet and outlet of the culvert. The road above is damaged with the west side of the road unraveling and excessive erosion on the downslope. Within the road are sewer and gas lines that are also in danger of failing. Attempts to repair the road in the past have been patchwork. The proposed fix would involve rebuilding approximately 300-feet of the road (elevate and provide proper drainage), culvert upsizing and lengthening, and stabilization of the roadside downslopes above the stream</li> <li>• Bowdoin College Athletic Field Deep Water Detention Basin: The existing detention basin provides flood control for runoff from the athletic fields at Bowdoin College. The basin provides very limited water quality to the runoff. The retrofit would involve the conversion of the deep-water detention basin to a gravel wetland. The gravel wetland could be sized to still provide flood control while offering significantly greater water quality treatment.</li> <li>• Coffin “Ice” Pond and Dam: Coffin Pond is located off Harpswell Road behind the Maine Pines Tennis Center and provides storage of runoff from the surrounding residential neighborhoods. Water elevations within the pond have been historically controlled at a dam structure located at the east end of the pond. Today, the pond and dam have fallen into a state of disrepair. The concrete dam flow controls are damaged and no longer function to control the water elevation. The west end of the pond is silting in which can be contributed to upstream siltation as well as the poorly functioning outlet structure. Finally, the gravel access road from Harpswell Road to the east is eroding and releasing sediment into the pond at the base of the steep hill and the small parking area. This area is a community asset and needs to be considered as such when looking at possible retrofits. A community led steering committee should determine whether the dam should be removed returning the stream to its natural state or rebuild the dam and provide better water elevation management. In both cases, the access road should be dealt with either through removal – if the dam is removed – or upgraded to prevent continued soil loss to the stream.</li> </ul>	
<p>Other Sources</p> <ul style="list-style-type: none"> <li>• 2/2021 TAC Meeting Notes: A lot of mowing companies around Meadowbrook Area – could fertilizer use here be an issue? Kristin Feindel: Should monitoring for nutrients in this area occur? Ryan Barnes: Some clay sewer pipes, can check with Sewer District to see if they know of any issues</li> </ul>	



<p><b>Below Harpswell Road/Above Runway</b> Stressor Analysis (Kristin Feindel and Jeff Dennis)</p> <ul style="list-style-type: none"> <li>Increased frequent disturbance of substrate and loss of substrate downstream due to decreased gravel &amp; sand habitat, increased bottom scoured to marine clay, and undersized and misaligned culverts</li> <li>Increased alteration of substrate and loss of habitat diversity due to decreased riparian buffer/canopy</li> <li>Increased deposition of sediments due to ponding upstream of undersized culverts</li> <li>Possible decreased oviposition of eggs in stream due to downstream culvert</li> </ul>	<ul style="list-style-type: none"> <li>Increase culvert size (Harpswell Road, see above)</li> <li>Increase riparian buffer/canopy</li> <li>Explore opportunities to improve runway crossing impacts</li> </ul>	<ul style="list-style-type: none"> <li>Culverts                             <ul style="list-style-type: none"> <li>Resize culvert at Navy Base fence (<i>Check with C. Baldwin</i>)                                     <ul style="list-style-type: none"> <li>Review culvert on Samuel Drive and stream between Samuel Drive and runway culvert</li> </ul> </li> <li><i>Jeff: Consider caddisfly migration in culvert design (watershed wide)</i></li> <li>Perimeter Road culvert – not high priority, H&amp;H would confirm</li> </ul> </li> <li>Remove armor downstream of culvert at Navy Base fence</li> <li><b>Below Perimeter Road: Install wood additions to channel and on floodplain/plant forested buffer (test plot first)</b> between Navy Base fence (owned by Bowdoin, “Perimeter Road”/extension of Allagash Road? = dirt extension of Allagash Drive – Samuel Adams is within base/West Road) and runway culvert</li> <li><b>Explore opportunities to identify runway crossing impact and possible improvements (adaptation techniques to adapt stream to the culvert)</b> <ul style="list-style-type: none"> <li>Any stormwater outfalls into this culvert?</li> <li>Fish tagging</li> <li>Could some areas of the stream be opened without impacting air traffic needs/safety?</li> </ul> </li> </ul>
<p>Geomorphic Assessment (John Field)</p> <ul style="list-style-type: none"> <li>Scour downstream of Harpswell Road culvert</li> <li>Swampy just above Navy Base due to Navy fence</li> <li>Armoring downstream of culvert at Navy Base fence</li> <li>Limited canopy and log cover between Navy Base fence and runway culvert</li> <li>Impounded at higher level and for long duration in past just above runway culvert</li> <li>3,922 linear feet of enclosed stream channel through runway culvert length</li> </ul>	<ul style="list-style-type: none"> <li>Resize culvert at Navy Base fence (Perimeter Road culvert) to eliminate impoundment and restore stream flow continuity</li> <li>Remove armor downstream of culvert at Navy Base fence</li> <li>Install wood additions to channel and on floodplain/plant forested buffer between Navy Base fence and runway culvert</li> <li>Daylight runway culvert to restore natural stream processes</li> </ul>	
<p>Culvert Survey (Chris Baldwin and Matthew Pelletier) - None</p>		
<p>Structural Retrofits (Chris Baldwin) - None</p>		
<p>Other Sources</p>		



<ul style="list-style-type: none"><li>• 2/2021 TAC Meeting Notes, Jeff Dennis: Nutrient data of 2015 and 2003 shows high nitrogen and phosphorus, fertilized lawns may have saturated the ground, possibly ducks (most of watershed is sewerd) – Kristin: If nutrients aren't impacting DO, not considered a major stressor</li><li>• 9/15/21: Rerouting stream around runway not likely – high ground south of runway</li><li>• David: Catch basin between the two runways</li></ul>	
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<p><b>Runway to Head of Tide</b> Stressor Analysis (Kristin Feindel and Jeff Dennis)</p> <ul style="list-style-type: none"> <li>Increased frequent disturbance of substrate and loss of substrate downstream due to decreased gravel &amp; sand habitat, increased bottom scoured to marine clay, urbanization and/or alteration of natural drainage patterns, and loss of access to floodplain</li> <li>Increased alteration of substrate and loss of habitat diversity due to channelization and decreased riparian buffer/canopy</li> <li>Decreased available habitat due to stream underground for long distance</li> <li>Decreased upstream fish migration due to inadequate stream crossings &amp; dams</li> <li>Potential toxicity in base flow due to soil &amp; groundwater contamination sites</li> </ul>	<ul style="list-style-type: none"> <li>Restore stream channel</li> <li>Increase riparian buffer/canopy</li> <li>Increase culvert size</li> <li>Investigate possible impact of former BNAS groundwater contamination to the stream</li> <li>Install stormwater BMPs</li> </ul>	<ul style="list-style-type: none"> <li><b>Culverts</b> <ul style="list-style-type: none"> <li>Resize Eagle Drive/Major Pope Ave culvert</li> </ul> </li> <li>Install wood additions to channel and on floodplain below the runway culvert</li> <li>Plant forested buffer downstream of runway culvert</li> <li>Chop and drop to increase stream complexity downstream of Eagle Drive/Major Pope Ave</li> <li>Investigate possible impact of former BNAS groundwater contamination to the stream                     <ul style="list-style-type: none"> <li>Landfill seeps</li> <li>Eastern plume</li> <li>(3<sup>rd</sup> is in Merriconeag subwatershed)</li> </ul> </li> </ul>
<p>Geomorphic Assessment (John Field)</p> <ul style="list-style-type: none"> <li>Higher banks/stream incision downstream of runway culvert due to culvert</li> <li>Limited canopy and stream straightening present on much of the reach below the runway culvert</li> <li>Impounded upstream of Eagle Drive/Major Pope Ave</li> </ul>	<ul style="list-style-type: none"> <li>Wood additions to channel and on floodplain below the runway culvert to increase stream complexity and raise streambed</li> <li>Planted forested buffer downstream of runway culvert for stream shading</li> <li>Replace Eagle Drive/Major Pope Ave culvert to eliminate impoundment</li> <li>Chop and drop to increase stream complexity downstream of Eagle Drive/Major Pope Ave</li> <li>Add wood (in stream and along shoreline) and remove berm (private property) to increase stream complexity and canopy cover and restore floodplain continuity</li> </ul>	<ul style="list-style-type: none"> <li>Coordinate communication amongst partners and committees (<i>watershed-wide</i>)</li> <li>Add wood (in stream and along shoreline) and remove berm to increase stream complexity and canopy cover and restore floodplain continuity</li> </ul>
<p>Culvert Survey (Chris Baldwin and Matthew Pelletier)</p> <ul style="list-style-type: none"> <li>Perched culvert at outlet of Merriconeag Road Crossing #1</li> </ul>	<ul style="list-style-type: none"> <li>Add riprap at outlet of Merriconeag Road Crossing #1</li> <li>Remove and install upsize culvert at Merriconeag Road Crossing #2 to restore channel</li> </ul> <p><i>(Not including two crossings above in watershed)</i></p>	

<ul style="list-style-type: none"> <li>Undersized culverts at Merriconeag Road Crossing #2 (multiple pipes) leading to restrictive flow; Blockage of outlet</li> </ul>		
Structural Retrofits (Chris Baldwin) – None		

<p><b>Merriconeag Stream</b> Stressor Analysis (Kristin Feindel and Jeff Dennis)</p> <ul style="list-style-type: none"> <li>• Increased temp due to impoundment/dam</li> <li>• Increased frequent disturbance of substrate &amp; loss of substrate downstream due to decreased gravel &amp; sand habitat, increased bottom scoured to marine clay, and urbanization and/or alteration of natural drainage patterns</li> <li>• Decreased upstream fish migration due to inadequate stream crossings &amp; dams</li> <li>• Potential toxicity in base flow due to soil &amp; groundwater contamination sites</li> </ul>	<ul style="list-style-type: none"> <li>• Investigate modification to Picnic Pond outlet</li> <li>• Install stormwater BMPs</li> <li>• Increase culvert size</li> <li>• Investigate possible impact of former BNAS groundwater contamination to the stream</li> </ul>	<ul style="list-style-type: none"> <li>• Culverts: <ul style="list-style-type: none"> <li>○ Resize Purinton Road culvert</li> </ul> </li> <li>• <b>Participate in / partner with MRRA task force:</b> What can be done at Picnic Pond and upstream ponds (Ponds A, B, C) – Add recommendations to the WMP when determined</li> <li>• Continue to investigate Picnic Pond’s impact to Merriconeag Stream: What can be done to assist in meeting Class standards</li> <li>• Investigate possible impact of former BNAS groundwater contamination to the stream</li> <li>• Install stormwater BMPs</li> </ul>
<p>Geomorphic Assessment (John Field)</p> <ul style="list-style-type: none"> <li>• Forested berm crosses floodplain and rock/possible old dam remnants crosses channel of Merriconeag Brook between Merriconeag Stream confluence upstream to Libby Crossing</li> <li>• Limited canopy and poor log cover from Merriconeag Stream confluence to Liberty Crossing</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Tidal influence along Merriconeag between confluence to Liberty Crossing</i></li> </ul>	
<p>Culvert Survey (Chris Baldwin and Matthew Pelletier) - None</p>		
<p>Structural Retrofits (Chris Baldwin) - None</p>		

Watershed-wide Action Items

- **Steering Committee to oversee implementation of final Mare Brook WMP and continue communication with various stakeholders**
- **Education and outreach** plan to identify purpose and method.
  - Education to landowners benefit of fallen trees/wood left in the Brook (yet yard waste along stream bank is not beneficial)
  - Outreach to landowners on lawn fertilizer use (YardScaping)
- **Stream monitoring:** Stream flow including above and below former BNAS
- **Hydrologic and hydraulic (H&H) study:** Culvert replacements to be prioritized after H&H study entire watershed and in conjunction with other factors (town paving schedule, funding, collaboration with other improvements)
- Address chloride in the future as this is a very sandy watershed – encourage Planning Department to review new development with a lens to minimize need for salt