APPENDIX B:

MASSACHUSETTS NATURAL HERITAGE AND ENDANGERED SPECIES INFORMATION

Townsend BioMap2 Core Habitats and Critical Natural Landscapes

BioMap2 Cores in Townsend: For discussion of BioMap2 and the differences between the two major parts (Core Habitat (BC) and Critical Natural Landscape (CNL)), please see the NHESP website. http://www.mass.gov/dfwele/dfw/nhesp/land_protection/biomap/biomap_home.htm

BioMap2, like its predecessors, BioMap and Living Waters, is intended to be a guide to biodiversity conservation and is not regulatory. Priority Habitats and Estimated Habitats continue to be part of the regulations protecting rare species and are the representations of the regulated habitats of state listed species under the Massachusetts Endangered Species Ace (MESA).

There are eleven **BioMap2 Core Habitats** in Townsend: **BC2887** is very large and encompasses the Squannacook River across town, its surroundings, and much of eastern Townsend. For ease of discussion, this area is discussed below in sections. The other cores are smaller, see the attached map for locations of the Cores. Rare species ranks, given as approved in 2011, under the Massachusetts Endangered Species Act (MESA) are: SC – Species of Special Concern; T – Threatened; and E- Endangered. Delisted or Delisting – removal from the MESA list; most such species remain of conservation interest. SWAP species are non-MESA listed wildlife species of conservation concern and WL species are Watch List Plant species, non-listed plants of conservation concern. (There are no rare plants, MESA or WL, known from Townsend in the NHESP database.)
SWAP – State Wildlife Action Plan, is discussed at
http://www.mass.gov/dfwele/dfw/habitat/cwcs/cwcs_home.htm
WL – plant Watch List (WL), an unofficial, non-regulatory list of plants of known or suspected conservation concern that NHESP is interested in tracking, is discussed at
http://www.mass.gov/dfwele/dfw/nhesp/conservation/plants/plant_conservation.htm

There are seven areas of **Critical Natural Landscape** (CNL) in Townsend. Each is often connected to one or several of the Cores. Because BioMap2 Cores and CNL were calculated on different bases, there are areas where one or the other will occur alone.

BioMap2 Cores in Townsend are:
BC2603, embedded in the western part of **CNL1276**, is shared with Lunenburg. The BioMap2 components of BC2603 in Townsend include:
Forest Cores - identifies the best examples of large, intact forests that are least impacted by roads and development, providing critical "forest interior" habitat for numerous woodland species. Forest

Natural Heritage & Endangered Species Program
Field Headquarters, Westborough, MA 01581 **Tel:** (508) 389-6360 **Fax:** (508) 389-7891
An Agency of the Department of Fish & Game
http://www.nhesp.org

core minimum sizes range from about 500 acres in eastern Massachusetts and major river valleys, to over 2,000 acres in the western Massachusetts highlands.
Landscape Blocks - provide habitat for wide-ranging native species, support intact ecological processes, maintain connectivity among habitats, and enhance ecological resilience. They are large areas of intact and predominately natural vegetation, consisting of contiguous forests, wetlands, rivers, lakes, and ponds, as well as coastal habitats such as barrier beaches and salt marshes. Pastures and power-line rights-of-way, which are less intensively altered than most developed areas, are also included since they provide habitat and connectivity for many species. Different size thresholds were used to select the largest Landscape Blocks in certain ecoregions.

BC2748 extends from southwestern Townsend into Lunenburg. It is embedded in **CNL1274** in which also includes BC2791. BioMap2 components in BC2748 in Townsend include:
Forest Cores - identifies the best examples of large, intact forests that are least impacted by roads and development, providing critical "forest interior" habitat for numerous woodland species. Forest core minimum sizes range from about 500 acres in eastern Massachusetts and major river valleys, to over 2,000 acres in the western Massachusetts highlands.
Landscape Blocks - provide habitat for wide-ranging native species, support intact ecological processes, maintain connectivity among habitats, and enhance ecological resilience. They are large areas of intact and predominately natural vegetation, consisting of contiguous forests, wetlands, rivers, lakes, and ponds, as well as coastal habitats such as barrier beaches and salt marshes. Pastures and power-line rights-of-way, which are less intensively altered than most developed areas, are also included since they provide habitat and connectivity for many species. Different size thresholds were used to select the largest Landscape Blocks in certain ecoregions.
Wetland, Least disturbed wetland complexes**.**
Wetland Cores - identifies the most intact wetlands within less developed landscapes-those generally with intact upland buffers, little fragmentation, and minimally disturbed by other stressors associated with roads and development. These wetlands, selected across a diversity of ecological settings, are most likely to support critical wetland functions (i.e., natural hydrologic conditions, diverse plant and animal habitats, etc.) and are most likely to maintain these functions into the future. All wetland Priority Natural Communities are also included as part of Wetland Cores.
Upland Buffers of Wetland Cores -identifies upland areas adjacent to all Wetland Cores. If protected, these upland areas will help support the functioning of each wetland over the long-term.

BC2791 extends into Ashby, and is also embedded in **CNL1274.** In Townsend, BC2791 includes:
Forest Cores - identifies the best examples of large, intact forests that are least impacted by roads and development, providing critical "forest interior" habitat for numerous woodland species. Forest

Natural Heritage & Endangered Species Program
Field Headquarters, Westborough, MA 01581 **Tel:** (508) 389-6360 **Fax:** (508) 389-7891
An Agency of the Department of Fish & Game
http://www.nhesp.org

core minimum sizes range from about 500 acres in eastern Massachusetts and major river valleys, to over 2,000 acres in the western Massachusetts highlands.
Landscape Blocks - provide habitat for wide-ranging native species, support intact ecological processes, maintain connectivity among habitats, and enhance ecological resilience. They are large areas of intact and predominately natural vegetation, consisting of contiguous forests, wetlands, rivers, lakes, and ponds, as well as coastal habitats such as barrier beaches and salt marshes. Pastures and power-line rights-of-way, which are less intensively altered than most developed areas, are also included since they provide habitat and connectivity for many species. Different size thresholds were used to select the largest Landscape Blocks in certain ecoregions.

BC2802 and **BC 2806,** embedded in **CNL1277,** and **BC2821** embedded in **CNL1283** in east central Townsend, are only separated by roads. The BioMap2 components in these Cores include:
Aquatic Cores - identifies core habitat for fish Species of Conservation Concern and other aquatic Species of Conservation Concern. In addition to various rivers and streams, a 30 meter band around each river segment is mapped, as well as wetlands that are wholly or partially contained within the band. The resulting Aquatic Cores are designed to protect 10 MESA-listed fish, 17 non-listed fish, as well as 145 MESA-listed species with all or a portion of their life cycle in aquatic habitats.
Upland Buffers of Aquatic Cores - identifies upland areas adjacent to all Aquatic Cores. If protected, these upland areas will help protect river, stream, lake, and pond habitat over the long-term.

Listed Vertebrate Species
American Bittern, Botaurus lentiginosus, American Bitterns are heron-like birds that nest primarily in large cattail, tussock or shrub marshes and are very sensitive to disturbance.

BC2887 is very large and encompasses the Squannacook River across town, its surroundings, and much of eastern Townsend. For ease of discussion, this area is discussed below in sections. Because BioMap2 Cores and CNL were calculated on different bases, there are areas where one or the other will occur alone.
BC2887 and **CNL1276:** this section is in southeastern Townsend (mostly south of Rt. 119 and mostly east of Rt. 13 (except north of the town center where it continues north and west along the Squannacook for about a half mile). It includes somewhat undeveloped areas with tributaries that flow to the Squannacook. BC2887 and CNL1276 both continue east and south into Groton and Lunenburg. Because BC2887 goes into Pepperell and extends north and west, there is more of BC2887 in northeastern Townsend. In Townsend, this southeastern section of BC2887 and CNL1276 includes:

Natural Heritage & Endangered Species Program
Field Headquarters, Westborough, MA 01581 **Tel:** (508) 389-6360 **Fax:** (508) 389-7891
An Agency of the Department of Fish & Game
http://www.nhesp.org

Aquatic Cores - identifies core habitat for fish Species of Conservation Concern and other aquatic Species of Conservation Concern. In addition to various rivers and streams, a 30 meter band around each river segment is mapped, as well as wetlands that are wholly or partially contained within the band. The resulting Aquatic Cores are designed to protect 10 MESA-listed fish, 17 non-listed fish, as well as 145 MESA-listed species with all or a portion of their life cycle in aquatic habitats.
Upland Buffers of Aquatic Cores - identifies upland areas adjacent to all Aquatic Cores. If protected, these upland areas will help protect river, stream, lake, and pond habitat over the long-term.
Forest Cores - identifies the best examples of large, intact forests that are least impacted by roads and development, providing critical "forest interior" habitat for numerous woodland species. Forest core minimum sizes range from about 500 acres in eastern Massachusetts and major river valleys, to over 2,000 acres in the western Massachusetts highlands.
Landscape Blocks - provide habitat for wide-ranging native species, support intact ecological processes, maintain connectivity among habitats, and enhance ecological resilience. They are large areas of intact and predominately natural vegetation, consisting of contiguous forests, wetlands, rivers, lakes, and ponds, as well as coastal habitats such as barrier beaches and salt marshes. Pastures and power-line rights-of-way, which are less intensively altered than most developed areas, are also included since they provide habitat and connectivity for many species. Different size thresholds were used to select the largest Landscape Blocks in certain ecoregions.
Listed Invertebrate Species
Triangle Floater, *Alasmidonta undulata* (SC but has been proposed for delisting in 2011), are freshwater mussels commonly found in low-gradient river reaches with sand and gravel substrates and low to moderate water velocities, although they are found in a wide range of substrate and flow conditions.
Creepers, *Strophitus undulatus* (SC), are freshwater mussels that inhabit low-gradient reaches of small to large rivers with sand or gravel substrates; cool to warm-water with diverse fish assemblages best support Creepers.
Brook Snaketails, *Ophiogomphus aspersus* (SC), are dragonflies whose nymphs can be found in clear, sand-bottomed streams with intermittent rapids, often flowing through dense woodland.
Spatterdock Darners, *Rhionaeschna mutata* (SC), are dragonflies that inhabit vegetated ponds and pools, often with spatterdock as both larvae and adults. Surrounding upland forests provide protection while adults reach sexual maturity.
Zebra Clubtails, *Stylurus scudderi* (SC but has been proposed for delisting in 2011), are large dragonflies that inhabit medium-sized forested streams which usually have some intermittent rapids.
Listed Vertebrate Species

Natural Heritage & Endangered Species Program
Field Headquarters, Westborough, MA 01581 **Tel:** (508) 389-6360 **Fax:** (508) 389-7891
An Agency of the Department of Fish & Game
http://www.nhesp.org

Blanding's Turtles, *Emydoidea blandingii* (T), inhabit a mix of seasonal pools, marshes, shrub swamps, forest, and open uplands. After overwintering in deep wetlands mud, Blanding's Turtles move overland to vernal pools and shrub swamps to feed and mate. Loss of only a few adults annually can cause populations to decline as they do not reproduce until late in life (14-20 yrs), and have low replacement rates due to low nest and juvenile survivorship. Roads are the primary cause of adult mortality.
Bridle Shiners, *Notropis bifrenatus* (SC), are small (<5 cm) minnows that are found in clear water in slack areas of streams and rivers and are also found in lakes and ponds.
Vesper Sparrows, *Pooecetes gramineus* (T), are grassland birds whose habitats often include taller woody vegetation interspersed within the grassland. The habitats are typically dry, well-drained sites with a mixture of short grass, bare ground, and shrubs, trees, or other high structures from which males can sing, including telephone lines and poles.
Not used to identify BioMap2 cores, but occurrences in this core were captured by the BioMap2 mapping procedures:
Wood Turtle, *Glyptemys insculpta* (SC), habitat is streams and rivers preferably with long corridors of undeveloped, connected uplands extending on both sides of the waterways.
Eastern Box Turtle, *Terrapene carolina*, (SC), is a terrestrial turtle, inhabiting many dry and moist woodland habitats.
Great Blue Herons, *Ardea herodias*, delisted, a colonial nester in dead trees standing in flooded beaver swamps.
Non-listed SWAP species
Eastern Hognose Snakes, *Heterodon platirhinos*, are shy, slow-moving, thick-bodied snakes that specialize in feeding on toads, although they eat other amphibians and other small animals as well. They require sandy soils in their habitat; both wooded and open habitats are known.
Wetland, Least disturbed wetland complexes**.**
Wetland Cores - identifies the most intact wetlands within less developed landscapes-those generally with intact upland buffers, little fragmentation, and minimally disturbed by other stressors associated with roads and development. These wetlands, selected across a diversity of ecological settings, are most likely to support critical wetland functions (i.e., natural hydrologic conditions, diverse plant and animal habitats, etc.) and are most likely to maintain these functions into the future. All wetland Priority Natural Communities are also included as part of Wetland Cores.
Upland Buffers of Wetland Cores -identifies upland areas adjacent to all Wetland Cores. If protected, these upland areas will help support the functioning of each wetland over the long-term.

BC2887 in northeastern Townsend is embedded in **CNL1305.** It continues into Pepperell where it connects to the other parts of BC2887. The habitat values appear to continue north in New Hampshire. The area around Townsend Hill includes at least twenty Certified Vernal Pools, a

Natural Heritage & Endangered Species Program
Field Headquarters, Westborough, MA 01581 **Tel:** (508) 389-6360 **Fax:** (508) 389-7891
An Agency of the Department of Fish & Game
http://www.nhesp.org

cluster that provides important habitat variations for species that require vernal pools and wetlands. BioMap2 components in the northeastern part of BC2887 in Townsend include:
Forest Cores - identifies the best examples of large, intact forests that are least impacted by roads and development, providing critical "forest interior" habitat for numerous woodland species. Forest core minimum sizes range from about 500 acres in eastern Massachusetts and major river valleys, to over 2,000 acres in the western Massachusetts highlands.
Landscape Blocks - provide habitat for wide-ranging native species, support intact ecological processes, maintain connectivity among habitats, and enhance ecological resilience. They are large areas of intact and predominately natural vegetation, consisting of contiguous forests, wetlands, rivers, lakes, and ponds, as well as coastal habitats such as barrier beaches and salt marshes. Pastures and power-line rights-of-way, which are less intensively altered than most developed areas, are also included since they provide habitat and connectivity for many species. Different size thresholds were used to select the largest Landscape Blocks in certain ecoregions.

Listed Vertebrate Species
Blanding's Turtles, *Emydoidea blandingii* (T), inhabit a mix of seasonal pools, marshes, shrub swamps, forest, and open uplands. After overwintering in deep wetlands mud, Blanding's Turtles move overland to vernal pools and shrub swamps to feed and mate. Loss of only a few adults annually can cause populations to decline as they do not reproduce until late in life (14-20 yrs), and have low replacement rates due to low nest and juvenile survivorship. Roads are the primary cause of adult mortality.
Non-listed SWAP species
Smooth Green Snakes, *Opheodrys vernalis*, are small snakes of thick vegetation layers found in edges of marshes, wet meadows, fields, and forest edges or open forests.
Wetland, Least disturbed wetland complexes**.**
Wetland Cores - identifies the most intact wetlands within less developed landscapes-those generally with intact upland buffers, little fragmentation, and minimally disturbed by other stressors associated with roads and development. These wetlands, selected across a diversity of ecological settings, are most likely to support critical wetland functions (i.e., natural hydrologic conditions, diverse plant and animal habitats, etc.) and are most likely to maintain these functions into the future. All wetland Priority Natural Communities are also included as part of Wetland Cores.
Upland Buffers of Wetland Cores -identifies upland areas adjacent to all Wetland Cores. If protected, these upland areas will help support the functioning of each wetland over the long-term.

BC2887, and **CNL1282** and part of **CNL1308** and areas without CNL, is along the Squannacook River from about a half mile west of Rt. 13, and continues northwest past the water treatment plant,

Natural Heritage & Endangered Species Program
Field Headquarters, Westborough, MA 01581 **Tel:** (508) 389-6360 **Fax:** (508) 389-7891
An Agency of the Department of Fish & Game
http://www.nhesp.org

including Ash Swamp and some of Walker Brook, Mason Brook, and Lock Brook. BioMap2 components in this part of Townsend's section of BC2887 include:
Aquatic Cores - identifies core habitat for fish Species of Conservation Concern and other aquatic Species of Conservation Concern. In addition to various rivers and streams, a 30 meter band around each river segment is mapped, as well as wetlands that are wholly or partially contained within the band. The resulting Aquatic Cores are designed to protect 10 MESA-listed fish, 17 non-listed fish, as well as 145 MESA-listed species with all or a portion of their life cycle in aquatic habitats.
Upland Buffers of Aquatic Cores - identifies upland areas adjacent to all Aquatic Cores. If protected, these upland areas will help protect river, stream, lake, and pond habitat over the long-term.
Listed Invertebrate Species
Triangle Floater, *Alasmidonta undulata* (SC but has been proposed for delisting in 2011) are freshwater mussels commonly found in low-gradient river reaches with sand and gravel substrates and low to moderate water velocities, although they are found in a wide range of substrate and flow conditions.
Brook Snaketails, *Ophiogomphus aspersus* (SC), are dragonflies whose nymphs can be found in clear, sand-bottomed streams with intermittent rapids, often flowing through dense woodland.
Zebra Clubtails, *Stylurus scudderi* (SC but has been proposed for delisting in 2011), are large dragonflies that inhabit medium-sized forested streams which usually have some intermittent rapids.
Listed Vertebrate Species
Blanding's Turtles, *Emydoidea blandingii* (T), inhabit a mix of seasonal pools, marshes, shrub swamps, forest, and open uplands. After overwintering in deep wetlands mud, Blanding's Turtles move overland to vernal pools and shrub swamps to feed and mate. Loss of only a few adults annually can cause populations to decline as they do not reproduce until late in life (14-20 yrs), and have low replacement rates due to low nest and juvenile survivorship. Roads are the primary cause of adult mortality.
Wood Turtle, *Glyptemys insculpta* (SC), habitat is streams and rivers preferably with long corridors of undeveloped, connected uplands extending on both sides of the waterways. This is a regionally significant population.

Non-listed SWAP species
Eastern Hognose Snakes, *Heterodon platirhinos*, are shy, slow-moving, thick-bodied snakes that specialize in feeding on toads, although they eat other amphibians or other small animals as well. They require sandy soils in their habitat; both wooded and open habitats are known.

BC2891 is in **CNL1308** in northern Townsend along the New Hampshire line. It is separated from BC2892 only by Townsend Hill Road. Components of BioMap2 in Townsend in BC2891 include:

Natural Heritage & Endangered Species Program
Field Headquarters, Westborough, MA 01581 **Tel:** (508) 389-6360 **Fax:** (508) 389-7891
An Agency of the Department of Fish & Game
http://www.nhesp.org

Forest Cores - identifies the best examples of large, intact forests that are least impacted by roads and development, providing critical "forest interior" habitat for numerous woodland species. Forest core minimum sizes range from about 500 acres in eastern Massachusetts and major river valleys, to over 2,000 acres in the western Massachusetts highlands.
Landscape Blocks - provide habitat for wide-ranging native species, support intact ecological processes, maintain connectivity among habitats, and enhance ecological resilience. They are large areas of intact and predominately natural vegetation, consisting of contiguous forests, wetlands, rivers, lakes, and ponds, as well as coastal habitats such as barrier beaches and salt marshes. Pastures and power-line rights-of-way, which are less intensively altered than most developed areas, are also included since they provide habitat and connectivity for many species. Different size thresholds were used to select the largest Landscape Blocks in certain ecoregions.

BC2892 is in **CNL1308** in northern Townsend along the New Hampshire line. It is separated from BC2891 only by Townsend Hill Road and BC2895 by a narrow area of development along Parker Road. Components of BioMap2 in Townsend in BC2892 include:
Forest Cores - identifies the best examples of large, intact forests that are least impacted by roads and development, providing critical "forest interior" habitat for numerous woodland species. Forest core minimum sizes range from about 500 acres in eastern Massachusetts and major river valleys, to over 2,000 acres in the western Massachusetts highlands.
Landscape Blocks - provide habitat for wide-ranging native species, support intact ecological processes, maintain connectivity among habitats, and enhance ecological resilience. They are large areas of intact and predominately natural vegetation, consisting of contiguous forests, wetlands, rivers, lakes, and ponds, as well as coastal habitats such as barrier beaches and salt marshes. Pastures and power-line rights-of-way, which are less intensively altered than most developed areas, are also included since they provide habitat and connectivity for many species. Different size thresholds were used to select the largest Landscape Blocks in certain ecoregions.
Wetland, Least disturbed wetland complexes**.**
Wetland Cores - identifies the most intact wetlands within less developed landscapes-those generally with intact upland buffers, little fragmentation, and minimally disturbed by other stressors associated with roads and development. These wetlands, selected across a diversity of ecological settings, are most likely to support critical wetland functions (i.e., natural hydrologic conditions, diverse plant and animal habitats, etc.) and are most likely to maintain these functions into the future. All wetland Priority Natural Communities are also included as part of Wetland Cores.
Upland Buffers of Wetland Cores -identifies upland areas adjacent to all Wetland Cores. If protected, these upland areas will help support the functioning of each wetland over the long-term.

Natural Heritage & Endangered Species Program
Field Headquarters, Westborough, MA 01581 **Tel:** (508) 389-6360 **Fax:** (508) 389-7891
An Agency of the Department of Fish & Game
http://www.nhesp.org

BC2895 is in **CNL1308** in northwestern Townsend along the New Hampshire line. It is separated from BC2892 only by a narrow area of development along Parker Road. BioMap2 components in Townsend in BC2895 include:

Forest Cores - identifies the best examples of large, intact forests that are least impacted by roads and development, providing critical "forest interior" habitat for numerous woodland species. Forest core minimum sizes range from about 500 acres in eastern Massachusetts and major river valleys, to over 2,000 acres in the western Massachusetts highlands.

Landscape Blocks - provide habitat for wide-ranging native species, support intact ecological processes, maintain connectivity among habitats, and enhance ecological resilience. They are large areas of intact and predominately natural vegetation, consisting of contiguous forests, wetlands, rivers, lakes, and ponds, as well as coastal habitats such as barrier beaches and salt marshes. Pastures and power-line rights-of-way, which are less intensively altered than most developed areas, are also included since they provide habitat and connectivity for many species. Different size thresholds were used to select the largest Landscape Blocks in certain ecoregions.

Natural Heritage & Endangered Species Program
Field Headquarters, Westborough, MA 01581 **Tel:** (508) 389-6360 **Fax:** (508) 389-7891
An Agency of the Department of Fish & Game
http://www.nhesp.org