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January 31, 2011

Ms. Susan Svirsky
EPA Rest of River Project Manager
United States Environmental Protection Agency
c/o Weston Solutions
10 Lyman Street
Pittsfield, MA 01201

Re: Housatonic River Rest of River; *Comments on Housatonic River – Rest of River, Revised Corrective Measures Study Report*, October 2010

Dear Ms. Svirsky:

The Commonwealth of Massachusetts, through its Executive Office of Energy and Environmental Affairs (EEA), Massachusetts Department of Environmental Protection (MassDEP) and the Massachusetts Department of Fish & Game (DFG), is pleased to submit comments on General Electric's October 2010 Revised Corrective Measures Study. We commend EPA for requiring General Electric to present a wide array of potential remedial alternatives, and we commend the company for presenting a detailed and informative evaluation of the advantages and disadvantages of the different approaches.

After extensive review of the remedial alternatives presented to date, the Commonwealth has concluded that none of the current combinations of alternatives achieve the remediation goals without causing irreparable harm to this unique, diverse and vital ecosystem that has been designated by the Commonwealth as an Area of Critical Environmental Concern (ACEC). The Housatonic River watershed is one of the most biologically rich ecosystems in the Commonwealth, and supports many species found nowhere else in Massachusetts. The Commonwealth is concerned that in some areas the remediation of PCBs may result in destructive ecological impacts to this rich and unique system. We therefore propose an alternative: a phased, long-term remedy that minimizes human health risks posed by PCBs in the environment, while at the same time taking care to weigh potential benefits of remediation against potential injury to the ecosystem. Our proposed approach is to remove PCBs when needed to protect human health, or when other compelling goals may be achieved without causing ecological harm. This means that our approach leans away from performing intrusive work solely in the name of meeting purported ecological goals; because in virtually all instances the actual and inevitable damage to this existing, unique ecological resource will far exceed the theoretical benefit of lower PCB concentrations.

The key components of the Commonwealth's proposed remedy are as follows:

- Excavate Woods Pond to remove approximately 286,000 cubic yards of PCB-contaminated sediment and bring the average concentration of PCBs in Woods Pond to 1 ppm, with the highest concentration at 6 ppm. This excavation would eliminate up to 25% of the mass of PCBs in the *entire rest of the river* from Lenox to the Long Island Sound. It would also increase the sediment trapping efficiency of the pond, protect downstream public health and safety in the event of a dam failure, and enhance recreational uses of the pond. These benefits can be achieved without causing any significant ecological damage, as there are no rare species habitats within the pond; a nearby staging area is available; and a nearby rail line could transport the excavated material off-site.

- At this time, perform no bank or river excavation and stabilization, because this work is not necessary to meet the human health goals identified by the EPA (due to the low concentrations of PCBs) and will inevitably cause severe and long-lasting destruction of the Housatonic River ecosystem and state-listed rare species, which far outweighs any environmental benefits from PCB removal.

- In the floodplain, focus on locations totaling 57 acres where there are significant PCB concentrations. Avoid excavation in the highly sensitive rare species habitats and use institutional controls to address public health risk. In the less sensitive areas in this location, a combination of institutional controls, site-wide averaging, and carefully targeted excavation should be used to address the risk.

- Transport all excavated material off-site, taking advantage of the nearby rail line. Under no circumstances should there be a hazardous waste landfill constructed in Berkshire County for the excavated material. To do so plainly adds insult to injury.

- Perform ongoing monitoring of the success of past and future remediation efforts, ongoing consideration of new technologies as they become available, and reconsider final options for the remaining PCBs as more data is gathered.

- Immediately improve existing institutional controls to prevent human exposure, such as more plentiful fish advisory warnings, regular newspaper advertisements and other informational outreach programs.

Introduction

The Housatonic River suffers from a legacy of contamination resulting from PCBs that were released from the GE facility in Pittsfield from the 1930s through the 1970s, contaminating the Housatonic River sediment, banks, and floodplain soils. Despite this legacy of contamination, the Housatonic River Watershed encompasses a rich and unique ecosystem supporting many rare plant and animal species and their associated habitats, including wetlands, floodplains, vernal pools, surface waters, and forested areas. These are natural resources precious to the Commonwealth, and they must be protected, even as we rightfully demand that contamination from decades of industrial abuse be rectified once and for all.

The various sediment and floodplain alternative combinations presented to date, while potentially meeting remediation goals set through extensive public processes, would cause irreparable harm to this fragile ecosystem by disrupting habitats and ecosystem processes that have shaped the river and its floodplains for thousands of years. This is not acceptable.

After careful consideration of the alternatives by the Commonwealth's environmental agencies, we present and argue forcefully for a practical, incremental remediation approach that protects human health but also preserves the river, and the unique and irreplaceable habitat it creates, for the benefit of current and future generations. This approach has been developed by application of the Commonwealth's nation-leading environmental standards and is fully consistent with EPA's goal of Overall Protection of Human Health and the Environment. On this basis, we put our approach forward without reservation.

Recognition of the ecological uniqueness and importance of the Housatonic River watershed is at the core of this proposal, and we discuss in detail the dramatic impact the remedial measures evaluated in the CMS would have on the meandering character of the river, its banks, the floodplain, and on MESA state-listed species and their habitat to underscore the importance of preserving this ecosystem.

The tables and figures referenced throughout this discussion are contained in Appendix A to this letter.

The Ecological Uniqueness and Significance of the Housatonic River Watershed

The Housatonic River watershed is one of the most biologically rich and unique regions of the Commonwealth. Its limestone bedrock creates an exceptional hydrological base, supporting rich, calcareous soils and wetlands found only in this region. These rich soils and wetlands of the valley floor create a unique ecosystem which supports many species found nowhere else in Massachusetts. The Housatonic River watershed is home to 110 species of plants and 51 species of animals that are protected under Massachusetts Endangered Species Act, M.G.L. c. 131A, ("MESA") and the MESA regulations at 321 CMR 10.00. It also contains 13 high priority Natural Communities, 12 certified vernal pools and up to 107 potential vernal pools.

In addition to the wide range of state-listed species under MESA, the Housatonic River supports a substantial and highly productive fisheries resource. Thirty-seven species of fish have been found in the river and its supporting waters providing important, valuable and diverse recreational fisheries for both warm and coldwater species. Moreover, the Housatonic supports coldwater habitat including the main stem of the Housatonic River and its direct tributaries. These coldwater fisheries are protected under 314 CMR 4.06 of the MA Surface Water Quality Standards ("MA WQS") as coldwater habitat. The MA WQS require that both the fish population and habitat be protected and maintained as designated or existing uses. Recognizing these unique resources, the Commonwealth has designated the Upper Housatonic Watershed (which includes the primary study area of the CMS) as an Area of Critical Environmental Concern (ACEC). In that designation, the EEA Secretary found as follows:

> The Upper Housatonic River Area of Critical Environmental Concern (ACEC) encompasses the 13-mile corridor of the Housatonic River from southern Pittsfield to northern Lee, and portions of the supporting watersheds that drain into the river from the east and west. This section of the Housatonic River includes a complex ecosystem of the river, adjacent wetlands and floodplains, coldwater tributary streams, large expanses of wildlife and rare species habitat, and the steep, forested, western slopes of October Mountain State Forest. There are also historical and archaeological resources, farmland and open space, and scenic and recreational areas. The ACEC includes all nine of the inland resource features listed in the ACEC Regulations - including fisheries, wetlands and surface waters, water supply areas, floodplains and steep slopes, agricultural and forested areas, historical and archaeological resources, wildlife and rare species habitats, and public recreational and natural areas.
>
> The regionally significant biodiversity and wildlife habitat in the designated area is indicated by the exceptional number of rare species (32), Certified and Potential Vernal

> Pools (46), and the combined total of 11,405 acres or 93% of the area delineated as viable habitat by the Division of Fisheries and Wildlife's (DFW) Natural Heritage & Endangered Species Program (NHESP). Of this total, 7,869 acres (64%) of the ACEC is designated as BioMap Core Habitat and Supporting Natural Landscapes, 3,536 acres (29%) as Living Waters Core Habitat and Critical Supporting Watershed. Regulated areas of rare species Priority Habitats and Estimated Habitats total 3,130 acres or 25% of the ACEC, with the majority of these acres included in the BioMap and Living Waters areas. There are more than 21 river miles of Coldwater Fisheries, with breeding populations of native brook trout, and other fishery resources totaling approximately 30 fish species. Common wildlife in the region includes bobcat, coyote, deer, bear, and moose. The extensive wildlife habitats of the ACEC, including many rare and unique habitats, illustrate the close ecological interdependence of the various natural and cultural resource features of the ACEC. The area is important for fishing, tourism, recreation, forestry, and agriculture.

Upper Housatonic River ACEC Designation, March 30, 2009, p. 1.

The Primary Study Area (the "PSA") for the Rest of River remediation extends from the confluence of the East and West Branches of the Housatonic River in Pittsfield, to Woods Pond in Lenox. This stretch of Housatonic River in the PSA is a low-gradient, large river that is free to migrate across hundreds of acres of protected open space and sculpt the floodplain. The meandering river is constantly reshaping the landscape, creating an incredible diversity of habitats including oxbow wetlands, backwaters, sloughs, and vernal pools (Figures 7-9). The fertile soils, shifting banks and dynamic nature of the river are precisely what make the Housatonic River segments of the PSA an ecologically unique resource among all the major rivers in the Commonwealth. The PSA also supports an abundance of diverse and ecologically sensitive wildlife resources including 25 state-listed species (Table 1).

In addition, the Commonwealth's Division of Fisheries and Wildlife ("DFW"), a division of the Department of Fish & Game, owns one or both sides of approximately 85% of the land along the river's bank in the PSA, including the 818 acre George L. Darey Housatonic Valley Wildlife Management Area (the "Darey WMA"). The Darey WMA is spread across multiple parcels consisting of river-front and floodplain and is one of western Massachusetts' most heavily utilized wildlife management areas for all types of passive recreation, including hunting, fishing, trapping, hiking, canoeing, kayaking, bird watching, and wildlife viewing. Thus, in addition to its regulatory interests, the Commonwealth is a major landowner within the PSA, with stewardship responsibilities over a wildlife management area that is highly valued by recreational stakeholders.

<u>The PSA is a Critical Area for Biodiversity and State-listed Species</u>

The Housatonic River watershed supports one of the greatest concentrations of plant and animal species listed for protection under MESA in the Commonwealth. The Commonwealth has documented 25 state-listed species within the PSA alone, including 6 species that are listed as "Endangered" and 9 that are listed as "Threatened." The list of these 25 state-listed species is shown in Table 1.

The Commonwealth has divided the PSA into four sections as illustrated in Figure 1. It is striking that almost the entire PSA is mapped as priority habitat for one or more state-listed species by DFW's Natural Heritage & Endangered Species Program ("NHESP") pursuant to the MESA regulations (Figure 2). Figures 3, 4 and 5, in turn, depict the high degree of overlap between priority habitats of individual species, with some areas mapped for up to 15 state-listed species at any given point on the ground.

Moreover, there are high concentrations of state-listed species, including **core areas**[1] for subsets of species, throughout the PSA, as described in more detail below.

Section 1 of the PSA (from the confluence of the East and West Branches, south to the Pittsfield Sewage Treatment Plant) has a high concentration of state-listed species, including priority habitat for 18 of the 25 listed species in the PSA (Figure 4). It also contains core areas for the following 11 species: American Bittern (*Botaurus lentiginosus*), Common Moorhen (*Gallinula chloropus*), Wood Turtle (*Glyptemys insculpta*), Triangle Floater (*Alasmidonta undulata*), Riffle Snaketail (*Ophiogomphus carolus*), Ostrich Fern Borer (*Papaipema* sp. 2), Mustard White (*Pieris oleracea*), Tuckerman's Sedge (*Carex tuckermanii*), Hairy Wild Rye (*Elymus villosus*), Bristly Buttercup (*Ranunculus pensylvanicus*), and Wapato (*Sagittaria cuneata*).

Section 2 of the PSA (from the Pittsfield Sewage Treatment Plant, south to New Lenox Road in Lenox) has a high concentration of state-listed species, including priority habitat for 14 of the 25 listed species in the PSA (Figure 4). It also contains core areas for the following 5 species: Wood Turtle (*Glyptemys insculpta*), Rapids Clubtail (*Gomphus quadricolor*), Mustard White (*Pieris oleracea*), Narrow-leaved Spring Beauty (*Claytonia virginica*), and Wapato (*Sagittaria cuneata*).

Section 3 of the PSA (from New Lenox Road in Lenox, south to the north end of Woods Pond) has a high concentration of state-listed species, including priority habitat for 18 of the 25 listed species in the PSA (Figure 5). It also contains core areas for the following 8 species: American Bittern (*Botaurus lentiginosus*), Common Moorhen (*Gallinula chloropus*), Rapids Clubtail (*Gomphus quadricolor*), Mustard White (*Pieris oleracea*), Gray's Sedge (*Carex grayi*), Narrow-leaved Spring Beauty (*Claytonia virginica*), Bur Oak (*Quercus macrocarpa*), and Wapato (*Sagittaria cuneata*).

Section 4 of the PSA (Woods Pond, including the northern portion of the pond) includes priority habitat for 10 of the 25 listed species in the PSA. It also contains core areas for the following 4 species: American Bittern (*Botaurus lentiginosus*), Common Moorhen (*Gallinula chloropus*), Bur Oak (*Quercus macrocarpa*), and Wapato (*Sagittaria cuneata*).

As shown in Figure 6, the PSA contains core areas for 15 species, which covers a majority of the PSA. While all 25 of the state-listed species with habitat in the PSA may experience some level of negative impact due to remediation activities, the 15 species for which core areas have been designated are particularly sensitive to such impacts, and are listed in Table 2.

From a MESA standpoint, the Housatonic River watershed has long been recognized for its diversity of rare species, many of which are found nowhere else in the Commonwealth. Moreover, recent field surveys conducted by the NHESP have greatly improved our understanding of the distribution of state-listed species, vernal pool-breeding amphibians, and important natural communities. The results of these surveys are summarized in a 2010 NHESP report entitled, *Rare Species and Natural Community Surveys in the Housatonic River Watershed of Western Massachusetts*, contained in Appendix B.

The NHESP surveys targeted a total of 60 state-listed species including 31 plants, 3 butterflies and moths, 5 dragonflies and damselflies, 2 freshwater mussels, 4 fish, 2 salamanders, 3 turtles, and 10 marsh birds. The project also targeted 12 priority (S1-S3) natural community types. A total of 47 target species and 21 non-target state-listed species were encountered during these surveys. Among the newly documented species were 10 Endangered, 5 Threatened, and 6 Special Concern species. Moreover, all of the target

[1] A "core area" for any given state-listed species is defined by the NHESP as a portion of the priority habitat that is of particularly high quality or habitat that is critical to survival and reproduction of the local population, or both.

natural communities were found, plus an additional 4 priority natural community types were documented for the first time in the critical supporting watershed.

In short, these recent MESA-related surveys provide fresh documentation of the wide range of robust state-listed species and amphibian populations within the PSA that occur despite PCB contamination. These surveys underscore the critical importance of avoiding and minimizing impacts to these species and their habitats as a core consideration of the Rest of River remedy selection process, and counsel strongly against sacrificing an actual, existing rich ecology in the name of achieving a theoretical ecological benefit from PCB removal.

The Importance of Preserving the Meandering and Dynamic Character of the Housatonic River and Floodplain

Natural areas with a high degree of "ecosystem integrity" retain not only a full complement of native plants and animals, but also the natural *processes* that maintain those species in the long term. Low gradient rivers with intact, undeveloped floodplains will move, and it is this channel migration that maintains a diverse mosaic of wetlands and habitats that support species diversity over time. One of the most unique aspects of the Housatonic River and floodplain in the PSA is the degree of meandering of the river and the presence of backwaters, side channels, oxbows, and remnant oxbows that have developed into diverse wetlands. Indeed, it is extremely unusual to see this morphology in rivers of this size in Massachusetts or elsewhere in southern New England. To underscore this critical point, we have included a series of visual representations in Appendix A (Figures 7, 8 and 9) that illustrate the channel migration and wetlands formation process that characterize the Housatonic River system.

Figure 7 illustrates the great diversity of wetland types and habitat features created by the meandering Housatonic River within the PSA.

Figure 8 illustrates how these vital habitat features are formed by the meandering river. River segments that remain relatively stable allow for the establishment of streamside and aquatic vegetation, while fallen trunks and branches (snags) provide additional aquatic habitat. Gradual channel migration and sudden meander cut-offs greatly increase the variety of habitats available on the floodplain through continual creation of floodplain wetlands, which then undergo gradual vegetation succession.

As shown in Figure 8a, gradual erosion occurs on the outer bank of a meander while sediment deposition occurs on the inner bank. This process causes the river to migrate, thereby creating a deeper, more sinuous meander. Eventually, often during a major storm, the river channel cuts off to establish a straighter path, creating an oxbow lake (Figure 8b; Figure 7). Over time, the floodplain ponds reconnect to the river during flood events, leading to sediment deposition in the oxbows, as well as an exchange of organisms. As the oxbows gradually fill with sediment, the changes in vegetation ("succession") lead to the great diversity of wetland types found in the PSA, including oxbow lakes, vernal pools, sloughs, side channels, shrub swamps, marshes, wet meadows, and various types of floodplain forest (Figures 8c-d).

Figure 9 illustrates two recent examples of meander cutoff, oxbow and side channel formation from the 1970s to 1990s. Recent M.S. thesis research by Heather Pierce and Dr. Melinda Daniels of the University of Connecticut, confirms that the Housatonic has undergone considerable channel migration from the 1940s through 2001, with particularly dramatic changes during the 1970s. Among other findings, this research highlights that current geofluvial models do not adequately predict the amount of channel migration that was observed during the study period. Scientists are only beginning to understand complex riverine systems such as the Housatonic, so there is a great deal of uncertainty about the effects of any attempts by humans to manipulate

these systems. The implications of this uncertainty for the remediation selection process are discussed later in this letter.

In short, for these floodplain ecosystem processes to continue to maintain biological diversity, the stream banks must be deformable—that is, the river must be able to shape its floodplain and erode and deposit sediment. ***In the absence of channel migration, floodplain oxbows and wetlands will gradually fill with sediment over time, and the diverse mosaic of wetlands in different states of succession will be lost.***

Thus, it is important to consider carefully the uniqueness of the Housatonic River system, including the severity of such a loss on the ecology and biodiversity of the Commonwealth and Southern New England, when selecting a remedy for Rest of River. We cannot stress enough that there simply are no other rivers in Massachusetts (and few in New England) of the size of the Housatonic with the kind of floodplain dynamics illustrated in Figures 7 through 9. These defining characteristics of the Housatonic River, in turn, weigh heavily in the Commonwealth's development of its proposed remediation approach.

Reduction of Human Health Risks – A Commonwealth Priority

The Commonwealth strongly supports remedial alternatives that reduce the level of risk to human health from the PCBs in the system. The Human Health Risk Assessment (HHRA) report for the Rest of River (ROR) evaluated three primary exposure scenarios through which people may be exposed to PCBs, including direct contact with soil and sediment during recreational, residential, commercial and agricultural activities in the floodplain; consumption of fish and waterfowl taken from the river; and consumption of agricultural products produced in the floodplain such as milk, eggs and plants. The results of the HHRA demonstrated that remedial actions for the ROR are necessary to reduce human health risks.

The revised CMS presents an analysis of the ability to achieve certain human health risk standards through a combination of various sediment and floodplain alternatives. For consumption of agricultural products, all proposed alternatives will meet acceptable risk standards, including the Monitored Natural Recovery (MNR) option. For consumption of fish and waterfowl taken from the river, none of the proposed alternatives, including those that remove a large amount of material, will allow fish and waterfowl to be safely consumed within a reasonable time period. While we recognize some alternatives eventually achieve this goal faster than others, all the time periods are lengthy (e.g. within 50 to 100 years in some cases). In the short-term, these risks can be avoided by maintaining and further strengthening existing institutional controls.

For direct contact with soil and sediment, current conditions do not meet human health standards in many of the floodplain areas and in one sediment area (located within the banks of Woods Pond). Using highly protective assumptions about human health exposure frequencies, EPA has established a range of acceptable concentration limits to guide the remedy selection. The Commonwealth supports this range, and advocates remediation to meet the EPA's upper bound limit of ten minus four human health excess cancer risk, and further remediation to add a layer of protection when it can be done without causing significant environmental damage.

Preserving the Special Character of the Housatonic River Ecosystem – A Commonwealth Priority

Earlier in this letter the Commonwealth highlighted the uniqueness and importance of the Housatonic River ecosystem, underscoring its exemplary value from a MESA and biodiversity perspective and the dynamic nature of the meandering action of the river in creating habitats. Thus, our assessment of the acceptability of each remedial alternative in the revised CMS focused on the extent to which the alternative would result in short and long term adverse impacts on these defining ecological features.

General Conclusions

As a result of our review, the Commonwealth has reached the following general conclusions in regard to the expected impact of the range of remediation alternatives in the revised CMS (except for monitored natural recovery) on the Housatonic River ecosystem:

1. Extensive bank and river bottom stabilization associated with sediment remediation alternatives SED 3 – SED 10 (+/-14 linear miles) are proposed solely to address perceived ecological risks from PCB contamination; none of these proposals are needed to meet EPA's human health goals. Yet all of these alternatives will have a particularly severe and long-lasting impact on the integrity of the Housatonic River-floodplain ecosystem as well as on state-listed species and their habitats.

2. The short and long-term impacts of floodplain remediation on state-listed species and the Housatonic River-*floodplain* ecosystem, are in some cases substantial and should be avoided, but, are generally of less of a long term concern when compared to the scope and long lasting impact resulting from large scale bank and river bottom stabilization in the PSA.

   Consistent with EPA's own remediation guidance, the Commonwealth believes that the long and short term benefits of meeting certain Ecological Interim Media Protection Goals ("IMPGs") must be weighed against the environmental damage that would be incurred through the remediation actions necessary to achieve those IMPGs. (EPA 2005, *Contaminated Sediment Remediation Guidance for Hazardous Waste Sites*; see also NRC 2001, *A Risk Management Strategy for PCB-Contaminated Sediments*).

3. The Commonwealth believes that any potential benefits associated with remediation to achieve ecological IMPGs would be far outweighed by the short and long-term damage to the meandering character of the Housatonic River ecosystem and to the associated state-listed species and their habitats. Consequently, as discussed elsewhere in this letter, the selected ROR remedy should focus on eliminating public health hazards associated with direct contact exposure to PCBs.

Impacts on the integrity of the Housatonic River and Floodplain Ecosystem

As discussed in detail earlier in this letter, the natural riverine processes of meandering, erosion, and channel migration lead to creation of floodplain wetlands and landforms including levees, side channels, backwaters, sloughs, and oxbows. These wetlands and landforms develop and evolve on a time scale of tens to hundreds of years. The resulting floodplain comprises complex heterogeneous patches (i.e., "mosaics") of different successional stages, including herbs, grasses, deciduous trees, and conifers, creating high species diversity.

The effects of armoring and stabilizing the river banks on the floodplain wetlands created by the above natural processes are as follows:

- First and foremost, the armoring or stabilization of the banks will eliminate the meandering and channel migration of the river. The affected portions of the river would evolve into a single-thread channel without the complex mosaic of floodplain wetlands that currently exist.

- If the channel migration process is eliminated, the existing wetland habitats will eventually fill in with fine sediment, re-forest, and meld into one homogenous habitat, with lower species diversity.

- The species that rely on the mosaic of wetlands and plants for foraging, refugia, and/or rearing will also vanish.

- These habitats, functions, and values cannot be fully re-created or restored by human intervention, because the habitats result from interactions of complex processes operating over hundreds of years.

- "Soft" engineering methods for bank stabilization will have the same impact on floodplain wetlands as bank armoring. Both are designed to prevent erosion and channel migration. While soft engineering methods may look better aesthetically, they will not prevent or mitigate the above described impacts to floodplain wetlands.

- Additional functions and values that would be lost or degraded by armoring or stabilizing the river banks include:

    - Energy dissipation (slowing down the flood waters);
    - Surface and subsurface water storage and exchange (making water available to animals and underground aquifers);
    - Landscape hydrologic connections (connecting habitats together for wildlife and plants);
    - Trapping, retaining, and cycling of elements and compounds (e.g. nutrients)
    - Particulate detention (holding sand, silt, and clay in the floodplain);
    - Organic matter transport (moving organic matter around);
    - Detrital biomass (creating and storing decaying leaves and other organic debris);
    - Spatial structure of habitats (providing multiple places for wildlife and plants to live);
    - Connectivity of habitats and movement routes (providing a means of connecting different types of habitats together and allowing movement of animals).

In short, the impacts associated with the implementation of the SED 3–SED 10 remediation alternatives would have long-lasting and potentially irreversible adverse effects on the natural process of channel migration. This result would, in turn, fundamentally alter the integrity of a riverine system that supports and maintains the diversity of unique ecological features, species and habitats that are the hallmarks of the Housatonic River in the PSA.

In the floodplain, the impacts associated with excavation include alteration of soils, vegetation, and hydrology in certain wetland types such as marshes and vernal pools. This outcome will make successful restoration challenging, and the loss of mature floodplain forest will take many decades to regenerate. Moreover, excavation of the floodplain results in habitat fragmentation associated with road and staging area construction, causes impacts to state-listed species, and increases the risk of introducing invasive species. For these reasons, the Commonwealth's remedial approach prioritizes the excavation of floodplain areas for the protection of human health, and avoids intrusive work when performed solely for perceived ecological benefit.

Impacts to State-Listed Species protected by MESA

The revised CMS contains detailed analyses of the extent to which various remedial alternatives will impact state-listed species and their habitats, as well as an analysis of the feasibility of restoring various habitat types, post-remediation. Although the Commonwealth disagrees with some of the methods used[2], and some of the species-specific impact analyses, the Commonwealth agrees with the general conclusion that except for monitored natural recovery, all of the remedial alternatives identified in the revised CMS will result in the "take" of numerous state-listed species.

For example, in a preliminary analysis, we estimate that combined alternatives SED3/FP3 and SED10/FP9 may result in the take of 26 and 22 state-listed species, respectively. We further determined on a preliminary basis that SED3/FP3 and SED10/FP9 have the potential to result in a significant impact to the local populations of 9 and 6 state-listed species respectively. As discussed earlier in this letter, we are particularly concerned about the potential for moderate to severe long-term impacts to the 15 species found in "core areas" in the PSA (listed in Table 2), which, due to their distribution, life history characteristics, and/or challenges associated with restoration of their habitat, are particularly vulnerable to remediation activities.

Compliance with Location-Specific ARARS such as MESA is Crucial to Avoiding, Minimizing and Mitigating Impacts of the ROR Remedy on the Housatonic River System

During this CMS process, the Commonwealth has consistently commented to EPA and GE that the selected remedy's compliance with state applicable and relevant or appropriate standards (ARARs) is essential to ensuring that impacts resulting from the remedy are avoided, minimized and mitigated consistent with the substantive requirements of the Commonwealth's applicable and relevant statutes, regulations and requirements. One such ARAR is the Massachusetts Endangered Species Act (MESA). We have also made clear our position that GE has a legal obligation to comply with state ARARs, independent of the prior settlement of the Commonwealth's NRD claim.

The Commonwealth notes that in section 2.1.3 of the revised CMS (pp. 2-5 to 2-9) GE argues that only those federal and state laws and regulations that specifically address "hazardous substances that will remain on-site or the media containing such substances" constitute ARARs. GE's position is that federal or state laws or regulations that require avoidance or minimization of non-pollutant impacts of the remedy or that require the restoration of or compensatory mitigation for resources impacted by the contamination or the implementation of the ROR remedy are not ARARs. GE also argues that any resource impacts caused by the contamination or the implementation of the remedy were addressed by the settlement of the NRD claim.

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[2] In the revised CMS, GE states that, "For most species with Priority Habitat in Reaches 5 and/or 6, based on the location and extent of Priority Habitat and the foraging and dispersal characteristics of the species, it appears that the longitudinal extent of the local population is also fairly represented by the mapped Priority Habitat area(s) in those reaches." This would mean that, in many cases, the "local population" would be confined to one or more portions of the PSA. As acknowledged in the revised CMS, the NHESP determined that GE's approach to defining the local population may be "overly narrow" in some cases, and this remains the position of the NHESP. Nonetheless, the NHESP believes that the more narrow approach to determining "Impact on Significant Portion of the Local Population" applied by GE in the revised CMS is valid for the more narrow purpose of evaluating impacts of proposed remedial alternatives on those portions of the local population (i.e. subpopulations) located within Reaches 5 and 6 (and Reaches 7 and 8, as applicable). In summary, although the Commonwealth may disagree on the some of the species-specific conclusions regarding "significant impact" presented by GE in Appendix L, and would characterize them as analyses of significant impact on local *sub*populations, we believe that it is useful approach when weighing the severity of impacts to state-listed species against the potential benefits of meeting the ecological IMPGs.

Thus, in section 5.4 (p. 5-95) and in the introduction to Appendix L to the revised CMS (the MESA assessment of the remedy alternatives, p. IN-3), GE concludes that because MESA does not specifically address hazardous substances that will remain onsite or the media containing them, it is not an ARAR. Consequently, GE chose not to evaluate the potential application of MESA's long-term Net Benefit provisions associated with a take of a state-listed species to the remedy alternatives, notwithstanding EPA's express direction to GE to do so.

In setting out its ARAR analysis in section 2.1.3 (p. 2-5), GE states that it considered EPA's 1989 guidance document for identifying ARARs. This guidance includes a discussion of the federal Endangered Species Act ("ESA") as an ARAR, and states that substantive compliance with the ESA *"means that the lead agency must identify whether a threatened or endangered species, or its critical habitat, will be affected by a proposed response action. If so, the agency must avoid the action or take appropriate mitigation measures so that the action does not affect the species or its critical habitat."* See EPA's CERCLA Compliance with Other Laws Manual: Part II. Clean Air Act and Other Environmental Statutes and State Requirements (August, 1989), p. 4-12. EPA makes clear that not only is the federal ESA an ARAR that is applicable to a *response action* that will affect a federally-listed species or its habitat, but also that any potential or actual impacts caused by the response action must be avoided or mitigated. That same common sense analysis applies to other location-specific ARARs such as MESA.

Accordingly, the Commonwealth reiterates its position that (1) ARARs include requirements that address the resource areas, species and their habitats that are impacted by the implementation of the remedial action; and (2) GE has a legal obligation - independent from the resolution of the NRD claim - to fully restore and mitigate for all resources impacted by the contamination or the implementation of the ROR remedy, as required by the federal and state ARARs. We therefore request EPA to affirmatively reject GE's position on the record as part of its response to the revised CMS.

The Commonwealth Proposal

The Commonwealth proposes a multi-phased, long term remedy for the Rest of River that immediately addresses human health risks for direct exposure to sediment and floodplain areas; includes ongoing monitoring and the potential for continued remediation to ensure ongoing compliance with human health standards; and requires the ongoing evaluation and potential implementation of innovative remedial approaches and technologies. The remedial proposal is fully consistent with state and federal regulatory frameworks and consists of the following six significant components:

1. **Remediation of specific floodplain areas and one sediment exposure area identified in the CMS to address human health risks for direct exposure to sediment and floodplain soils.**

   The Commonwealth has identified approximately 57 acres in the floodplain to be remediated to meet human health risk goals. One of the proposed floodplain alternatives, (FP 4) also identifies 15 acres to achieve ecological cleanup goals for amphibians in vernal pools. The Commonwealth does not propose to remediate the amphibian areas, because this would cause more ecological harm than benefit. We believe that restoration of these vernal pools will not result in the actual replication of the vernal pools and associated amphibian communities that existed prior to the removal of the pools.

   Within the 57 acres identified in the floodplain to meet human health risk standards, the NHESP identified sensitive areas that house particularly vulnerable state-listed species, and other areas of extremely important ecological value. The Commonwealth proposes that no excavation be performed in these areas; rather, that risk standards be addressed in these core habitat areas through the implementation of institutional controls including, but not limited to, advisories, educational materials, notifications, boot washing stations, signage, hygiene and laundering

instructions, etc. The Commonwealth proposes that the remaining acres be remediated through a combination of soil removal techniques as well and/or the implementation of institutional controls, particularly where access to the areas may cause significant impact to the ecology of the system. However, we stress that these remaining acres also have ecological value, and that intrusive work within these areas should be judicious and approached as a last resort. The Commonwealth strongly urges EPA and GE to work closely with the state at the design phase of the project to help refine the remediation work and minimize ecological impacts in these areas, and to take maximum advantage of achieving acceptable average concentrations by performing more excavation in areas of high concentrations and/or low ecological value, and less excavation in areas of low concentrations and/or high ecological value. The Commonwealth is finalizing a map that shows these areas, and will submit it shortly as an addendum to these comments.

In addition to the floodplain areas, the Commonwealth's conceptual remedy provides for the remediation of one sediment area located on the banks of Woods Pond referred to as SA 3 in the CMS. This is the only sediment area that does not meet human health risk standards for direct contact with sediment, and this area can be remediated without significant environmental damage. SA 3 encompasses approximately 11 acres and extends approximately 6 meters from the shore of Woods Pond. The Commonwealth recommends that this area be remediated as proposed in the SED 10 remedy presented in the CMS.

Due to the ecological impacts resulting from remediation of the river and its banks as described above, no bank work for the Housatonic River is proposed for this phase of the cleanup as it is not needed to address immediate human health risks. However, the Commonwealth's proposal does recognize that future remediation of the river and banks may be necessary to maintain conditions protective of human health, based upon the results of future monitoring and assessment (See also Paragraph 4 below).

2. **Bulk source removal of the majority of contaminated media in Woods Pond to an average of 1 mg/kg (1 part-per-million, or 1 ppm).**

The Commonwealth believes that removal of PCBs in Woods Pond will not cause significant adverse effects to rare and endangered species and their habitats. This is because there are no state-listed rare species habitats within the pond or surrounding area, and the non-listed species would actually benefit from sediment removal by restoring open-water habitat and water quality such as dissolved oxygen. Given the absence of environmental harm, it is a priority for the Commonwealth that GE remove a significant source of PCB material in the pond. After careful review of the costs and benefits of various removal options, the Commonwealth believes that a removal to obtain a pond-wide average of 1 ppm with no area exceeding 6 ppm strikes the right balance. Removal action to achieve a lower concentration than that encounters significant diminishing returns. For example, we estimate that to achieve 1 ppm on average, removal of approximately 286,000 cubic yards is needed. But to achieve 1 ppm in all areas of the pond would require doubling that amount of excavation to dredge 575,000 cubic yards. Most of the contamination in the ROR system is located between the confluence of the East and West branches of the river and Woods Pond Dam. Some of the highest concentrations of PCBs in the ROR system are found within Woods Pond. Further, based on approximations of mass estimated during previous work[3], approximately 15 to 25% of the mass in the entire ROR system is in Woods Pond itself. Remediation to an average of 1 ppm level would result in the approximate removal of 92% of the PCBs in the pond. A significant dredge of sediment and PCB mass from the pond will also increase Woods Pond's PCB trapping efficiency, thereby improving and enhancing the natural ability of the pond to capture contaminated sediment eroding from the

[3] *Housatonic River – Rest of River RCRA Facility Investigation Report*, September 2003

upstream banks[4]. In addition, removing significant quantities of PCBs behind Woods Pond Dam will protect public health against downstream contamination if there were ever a dam failure. As an ancillary benefit, this dredge would deepen the pond from its current depth of 2.5-5.5 feet to a range of 4.7-9.8 feet, thereby greatly enhancing recreational opportunities.

3. **Ongoing evaluation of innovative remedial approaches and technologies.**

A significant problem with the proposed remedies is that there is no detailed mechanism for the on-going evaluation and application of innovative remedial approaches and technologies. The Commonwealth proposes that GE be required to evaluate on a regular basis the availability of innovative remedial approaches and technologies that can be utilized to reduce human health and ecological risks without unacceptable consequences to the ecosystem, and that GE implement, to the extent feasible, such approaches and technologies should they become available.

4. **Ongoing monitoring and remediation as needed to meet and maintain human health standards and to remove accumulated sediment behind Woods Pond Dam.**

The Commonwealth's conceptual remedy requires compliance with human health standards on an ongoing basis. Accordingly, this proposal requires GE to perform: a) ongoing monitoring and assessment of areas remediated under Paragraphs 1 and 2 above; b) additional remediation to the extent necessary to meet and maintain human health standards as determined by such monitoring and assessment; and c) removal of excessive amounts of contaminated sediment that accumulate behind Woods Pond dam to sustain an average of 1 ppm throughout the pond.

Continuing source control upstream of the Rest of River system as well as the work proposed as the first phase of this remedy (See also Paragraphs 1 and 2 above) will likely alter PCB levels, and re-assessment will allow for the collection of data that are representative of these new conditions and more applicable for subsequent remedial decisions.

Monitoring and assessment will be conducted to evaluate how successful/effective the preliminary measures have been to eliminate the human health risks and control the continuing sources. This could include qualitative evaluation of the institutional controls on consumption of fish from the river, quantitative assessment of potential recontamination of the floodplain, and a quantitative evaluation of the effectiveness of a Woods Pond sediment trap. Secondly, the assessment will evaluate the potential for implementing additional response actions to address the remaining contamination in the river and floodplain, considering new technologies and methodologies, as well as the success of similar restoration projects on the Housatonic River (e.g., cleanup and restoration of vernal pools) or on analogous river systems. Monitoring will include routine sampling and analysis of fish tissue, river sediment, Woods Pond sediment, and floodplain soil. Periodic evaluations of the ecosystem (i.e., fluctuations of threatened/endangered species and habitat changes) will also be necessary. The assessments will continue until the conditions in the river are documented to pose no significant risk to human health and the environment. It is a long-term commitment by the Commonwealth, EPA and GE.

5. **Implementation of more comprehensive institutional controls for consumption of fish and waterfowl taken from the river.**

Although there are institutional controls in the form of consumption advisories currently in place, the Commonwealth endorses the implementation of a more comprehensive program of institutional controls, including, but not limited to, implementation of extensive public

[4] The dredge of the pond consists of the entire 60 acres in area and depths throughout where PCBs are detected.

educational programs and providing incentives for those relying on fish and waterfowl for sustenance purposes. In general, we recommend improved signage, regular local newspaper advertisements and other informational literature and outreach programs.

Problems cited from the past measures have included vandalism of signage and fencing, inadequate signage, and fisherman ignoring biota consumption advisories. Also, many people were reportedly unaware of prohibitions or risks, indicating a need for added public outreach. In addition to signage we recommend regular inspections of these areas to ensure signs are present and in good condition, and in order to document areas where frequent activity is occurring. In these frequently visited areas, there needs to be better communication through outreach, public notice, best management practices, and other measures. Overall, there needs to be more frequent presence in these areas. As was done with the residential fill program, fact sheets should be made available at all access points and agency websites. Any institutional controls applied will need to be re-visited based on information gathered from regular inspections and public outreach.

To improve the existing array of institutional controls, we recommend that EPA require GE to submit for approval an institutional control program. Under such a program, GE should perform an ongoing review of the current uses, and any new specific recreational uses, of the various exposure areas to determine and implement notice, education and best management practices to minimize exposure to users and visitors to these properties. GE would further monitor (at a frequency to be proposed by GE and approved by the agencies) effectiveness of this program, report to the agencies and make adjustments to further reduce risk.

6. Disposal of all removed material out of state to an existing approved facility utilizing rail transport.

The Commonwealth ***vigorously*** opposes two disposal options outlined in the revised CMS that call for disposal of removed material to be sited within Berkshire County. These two options include a Confined Disposal Facility (CDF) to be built within a local waterbody and the installation of an Upland Disposal Facility constructed in an area near the River. The Commonwealth opposes the creation of new landfills, given that there are existing, off-site, permitted disposal facilities that are equipped to accept this material.

Woods Pond is a potential location for both the CDF and the Upland Disposal Facility[5]. However, as mentioned previously in this letter, the Upper Housatonic River Area has been designated by the Commonwealth to be an ACEC. The ACEC includes all nine inland resource features as designated by regulation, including fisheries, wetlands and surface waters, water supply areas, floodplains and steep slopes, agricultural and forested areas, historical and archaeological resources, wildlife and rare species habitats, and public recreational and natural areas. A disposal facility in or around Woods Pond is clearly not appropriate in this type of area, and the prohibition against siting a landfill in an ACEC has previously been identified as an ARAR by the Commonwealth. In addition, installation of a disposal facility would not meet the requirements of several of the Commonwealth's regulations including the Massachusetts Water Quality Certification regulations (314 CMR 9.06) and the Massachusetts Wetlands Protection Act regulations (310 CMR 10.00). The CDF would also reduce necessary flood compensatory storage area.

[5] There are also two additional upland disposal facility locations identified including Forest Street in Lee and near Rising Pond.

Installation of a disposal facility in Berkshire County would also have extremely negative impacts to the communities surrounding the facility including economic, aesthetic, recreational, and potential health impacts should the facility fail. Further, construction of yet another such facility just expands the number of locations that would be affected by PCB-contamination, requiring additional long-term monitoring, operation and management beyond what is already a long-term burden on the community, and which runs counter to the concept of the anti-degradation provisions incorporated into the Massachusetts site cleanup regulations. The costs (including the social costs) of such a facility must be weighed against the simplicity and finality of disposal of this material in a pre-existing facility. The Commonwealth therefore supports disposal at an existing, out of state disposal facility properly permitted to receive such materials, and believes that rail is a feasible alternative to transport the material.

The current freight rail system owned by Housatonic Railroad Company, Inc. runs adjacent to the portions of the Housatonic River subject to removal actions under our concept, including Woods Pond. GE evaluated the feasibility of utilizing rail transport in the CMS but determined to not consider it due to "logistical issues". The Commonwealth disagrees that logistical issues prohibit the use of rail for transport of media. In fact, the CMS presents the results of an evaluation examining the feasibility of using rail by a consultant hired by GE. That consultant concluded that rail transport of excavated materials would be technically feasible. Based on our experience on other projects, the Commonwealth believes that rail is a cost-effective and efficient way to transport contaminated media.

Conclusion

In conclusion, the Commonwealth Proposal is consistent with EPA's goal of Risk Management to achieve Overall Protection of Human Health and the Environment, and is superior to any of the various proposals made to date in balancing protection of public health and conservation of natural ecosystems. As acknowledged by EPA, a sound remediation approach involves complex balancing of competing interests and values. By taking a common sense, incremental approach to cleaning up the Housatonic River, we can protect the health of our citizens while preserving the integrity of this unique place for the benefit of future generations. We urge you to incorporate our Proposal into your final disposition of this matter, which is of vital importance to the Commonwealth.

We appreciate the opportunity to present our views on this important matter.

Sincerely,

Richard K. Sullivan, Jr.
Secretary, Executive Office of Energy
and Environmental Affairs

Kenneth L. Kimmell
Commissioner, Massachusetts
Department of Environmental Protection

Mary Griffin
Commissioner, Massachusetts
Department of Fish and Game[6]

ecc: GE – Michael Carroll, Andrew Silfer
EPA – Curt Spalding, Ira Leighton Richard Cavagnero, Tim Conway, Dean Tagliaferro, Holly Inglis
MassDEP – Mike Gorski, Eva Tor, Jeff Mickelson, Paul Locke, John Ziegler
DFG/DFW – Wayne F. MacCallum, Mark Tisa, Jon Regosin, Beth Lambert, Richard Lehan

Appendix A – Tables & Figures
Appendix B – NHESP 2010 Report entitled "Rare Species and Natural Community Surveys in the Housatonic River Watershed of Western Massachusetts"

[6] These comments include the input of a team of staff biologists at the Natural Heritage and Endangered Species Program within DFG, and engineers and risk assessment specialists at MassDEP. The Secretary and the Commissioners have relied upon their staffs' respective technical expertise in formulating this proposal.

Appendix A

Tables & Figures

Table 1. State-listed species occupying the PSA

Common Name	Scientific Name	Status
Foxtail Sedge	*Carex alopecoidea*	Threatened
Hairy Wild Rye	*Elymus villosus*	Endangered
Bald Eagle	*Haliaeetus leucocephalus*	Endangered
Tuckerman's Sedge	*Carex tuckermanii*	Endangered
Zebra Clubtail	*Stylurus scudderi*	Special Concern
Bur Oak	*Quercus macrocarpa*	Special Concern
Bristly Buttercup	*Ranunculus pensylvanicus*	Special Concern
Common Moorhen	*Gallinula chloropus*	Special Concern
Jefferson Salamander	*Ambystoma jeffersonianum*	Special Concern
Ostrich Fern Borer	*Papaipema sp. 2*	Special Concern
Rapids Clubtail	*Gomphus quadricolor*	Threatened
Arrow Clubtail	*Stylurus spiniceps*	Threatened
Gray's Sedge	*Carex grayi*	Threatened
American Bittern	*Botaurus lentiginosus*	Endangered
Crooked-stem Aster	*Symphyotrichum prenanthoides*	Threatened
Water Shrew	*Sorex palustris*	Special Concern
Spine-crowned Clubtail	*Gomphus abbreviatus*	Endangered
Narrow-leaved Spring Beauty	*Claytonia virginica*	Endangered
Triangle Floater	*Alasmidonta undulata*	Special Concern
Brook Snaketail	*Ophiogomphus aspersus*	Special Concern
Wood Turtle	*Glyptemys insculpta*	Special Concern
Mustard White	*Pieris oleracea*	Threatened
Wapato	*Sagittaria cuneata*	Threatened
Riffle Snaketail	*Ophiogomphus carolus*	Threatened
Intermediate Spike-seed	*Eleocharis intermedia*	Threatened

Table 2. State-listed species for which Core Areas were delineated.

Common Name	Scientific Name	Status
American Bittern	*Botaurus lentiginosus*	Endangered
Common Moorhen	*Gallinula chloropus*	Special Concern
Wood Turtle	*Glyptemys insculpta*	Special Concern
Triangle Floater	*Alasmidonta undulata*	Special Concern
Rapids Clubtail	*Gomphus quadricolor*	Threatened
Riffle Snaketail	*Ophiogomphus carolus*	Threatened
Ostrich Fern Borer	*Papaipema* sp. 2	Special Concern
Mustard White	*Pieris oleracea*	Threatened
Gray's Sedge	*Carex grayi*	Threatened
Tuckerman's Sedge	*Carex tuckermanii*	Endangered
Bur Oak	*Quercus macrocarpa*	Special Concern
Bristly Buttercup	*Ranunculus pensylvanicus*	Special Concern
Narrow-leaved Spring Beauty	*Claytonia virginica*	Endangered
Hairy Wild Rye	*Elymus villosus*	Endangered
Wapato	*Sagittaria cuneata*	Threatened

Figure 1. Housatonic "PSA" habitat sections.

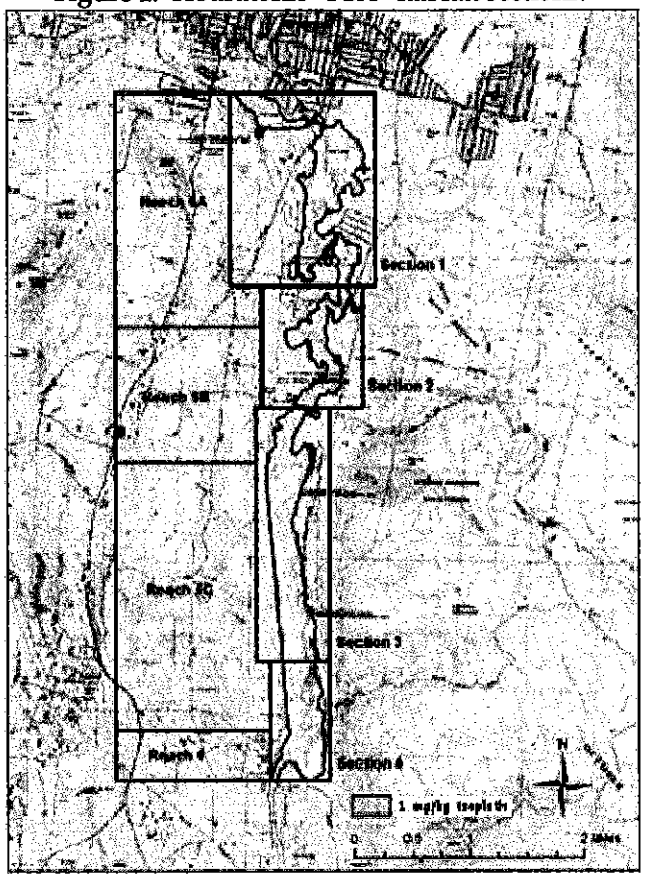


Figure 2. Regulatory habitat within the PSA.

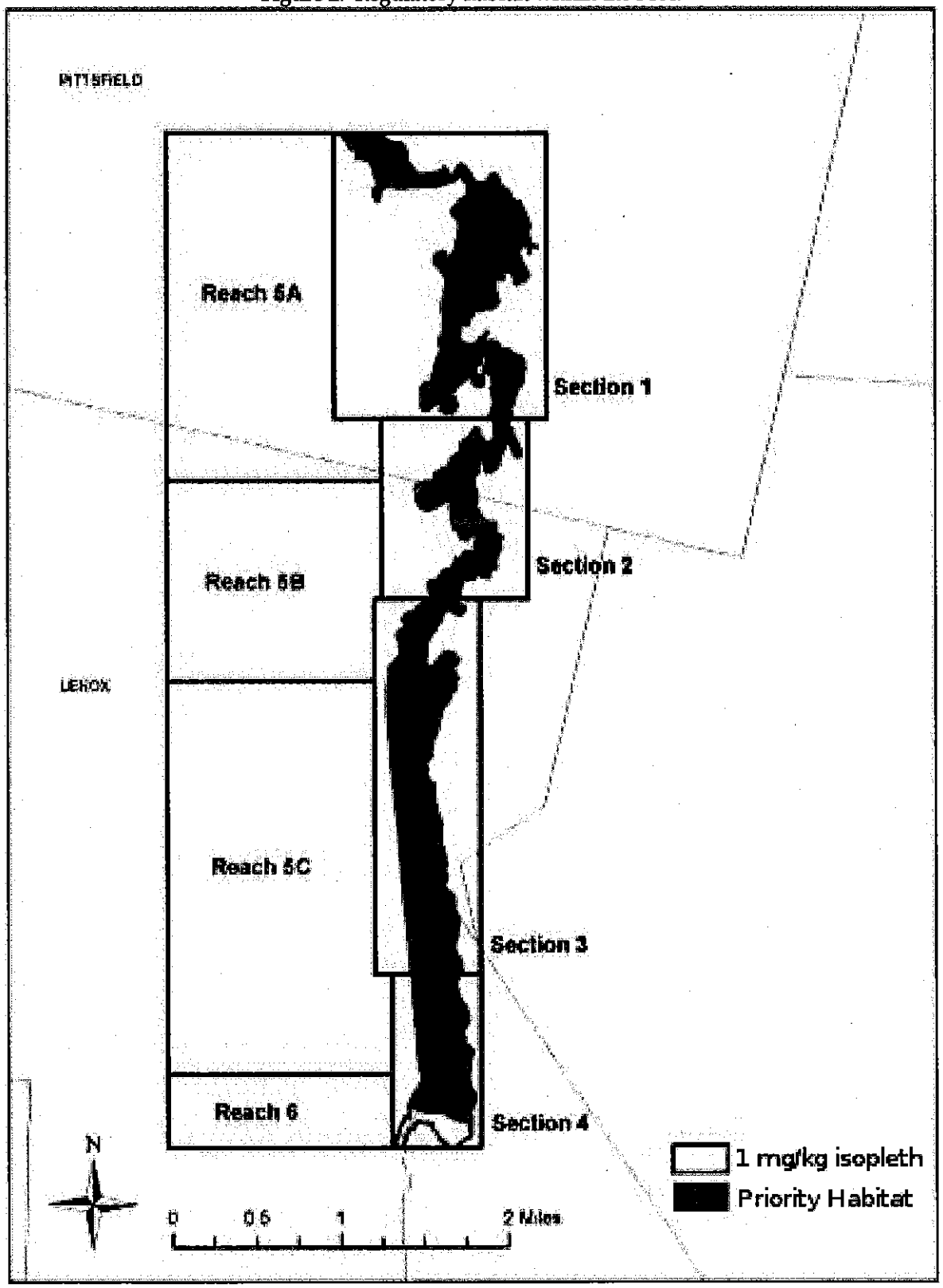


Figure 3. Overlap of Priority Habitats in the PSA.

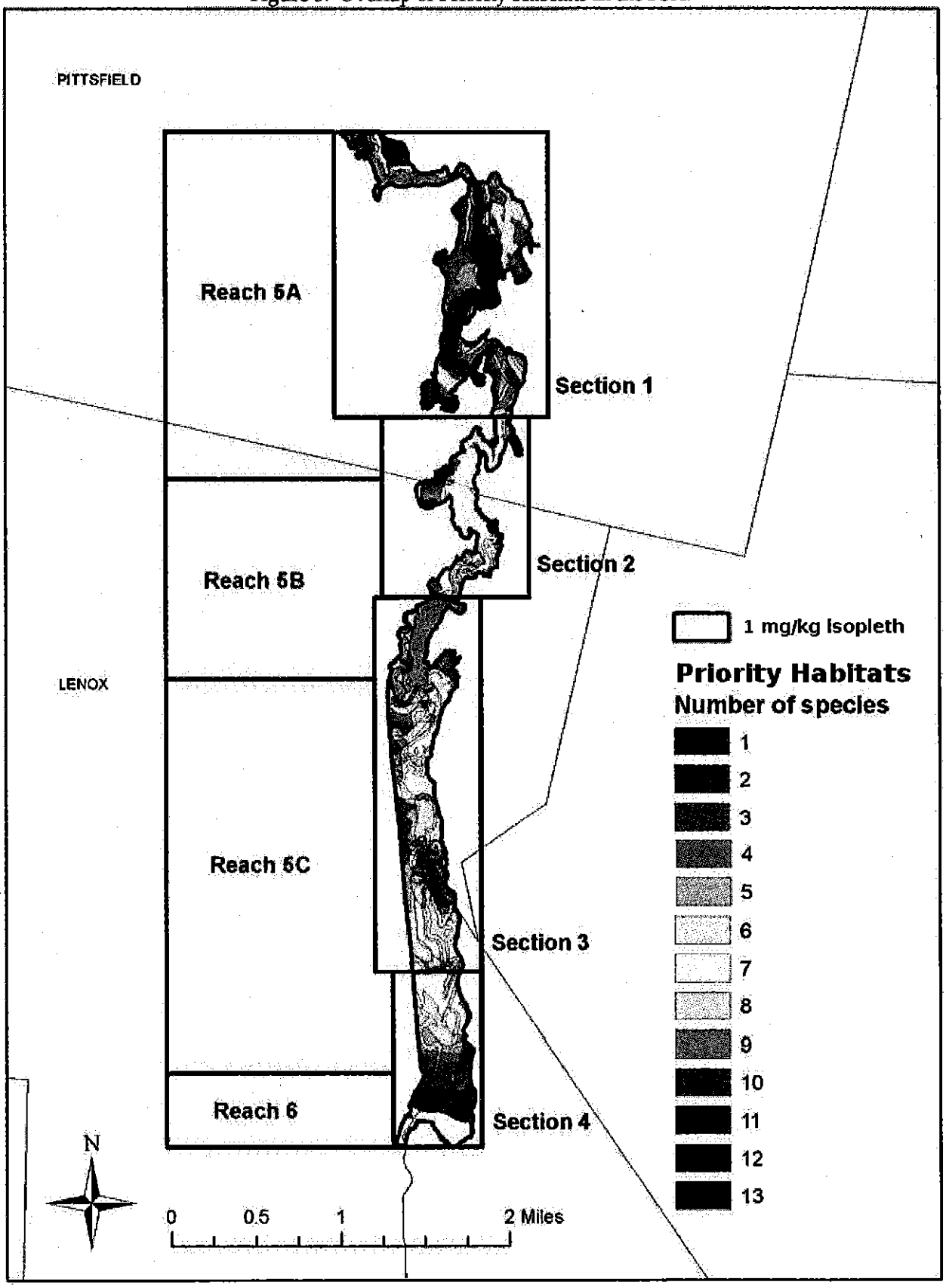


Figure 4. Overlap of Priority Habitats in habitat sections 1 and 2 of the PSA.

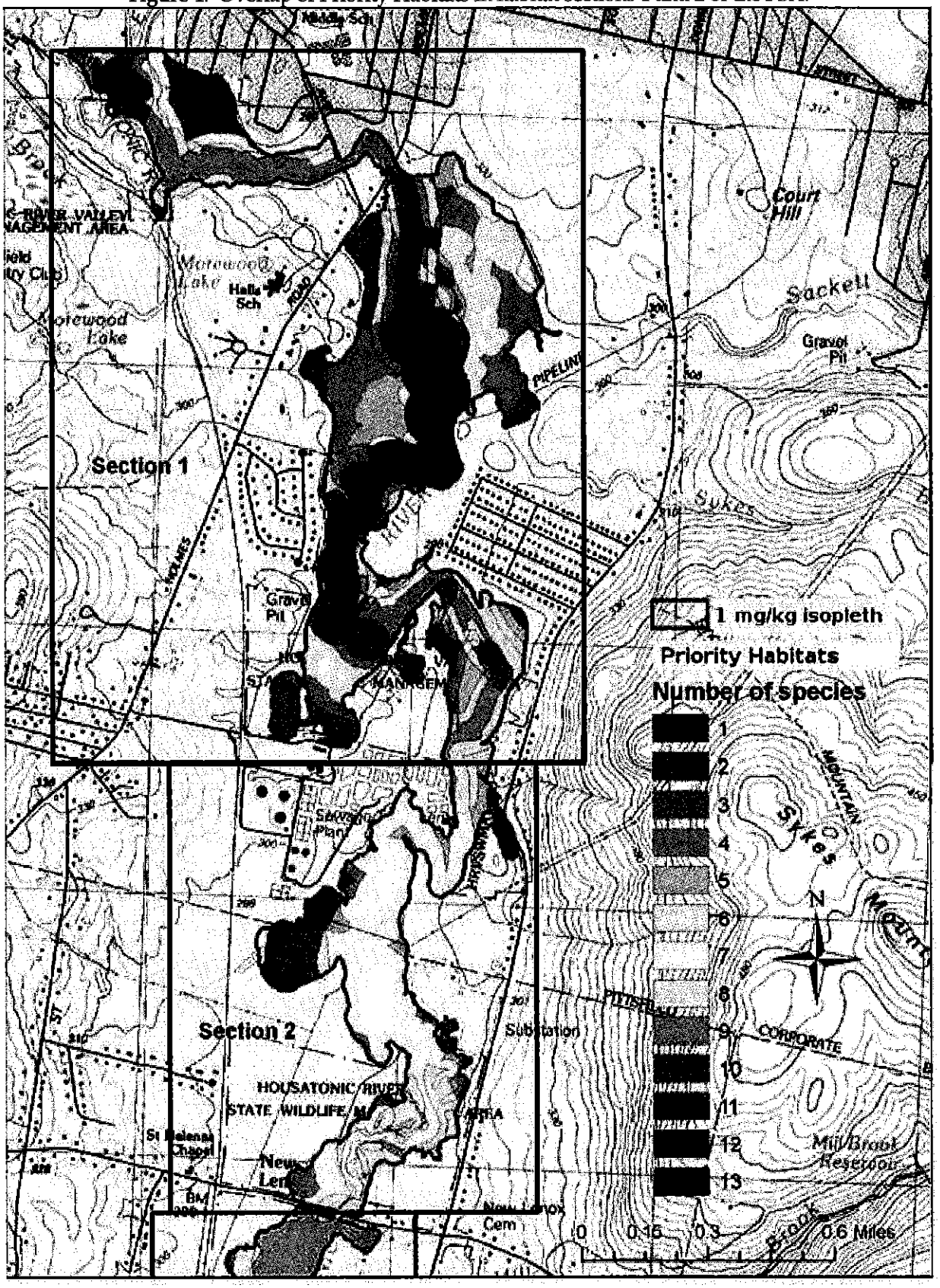


Figure 5. Overlap of Priority Habitats in habitat sections 3 and 4in the PSA.

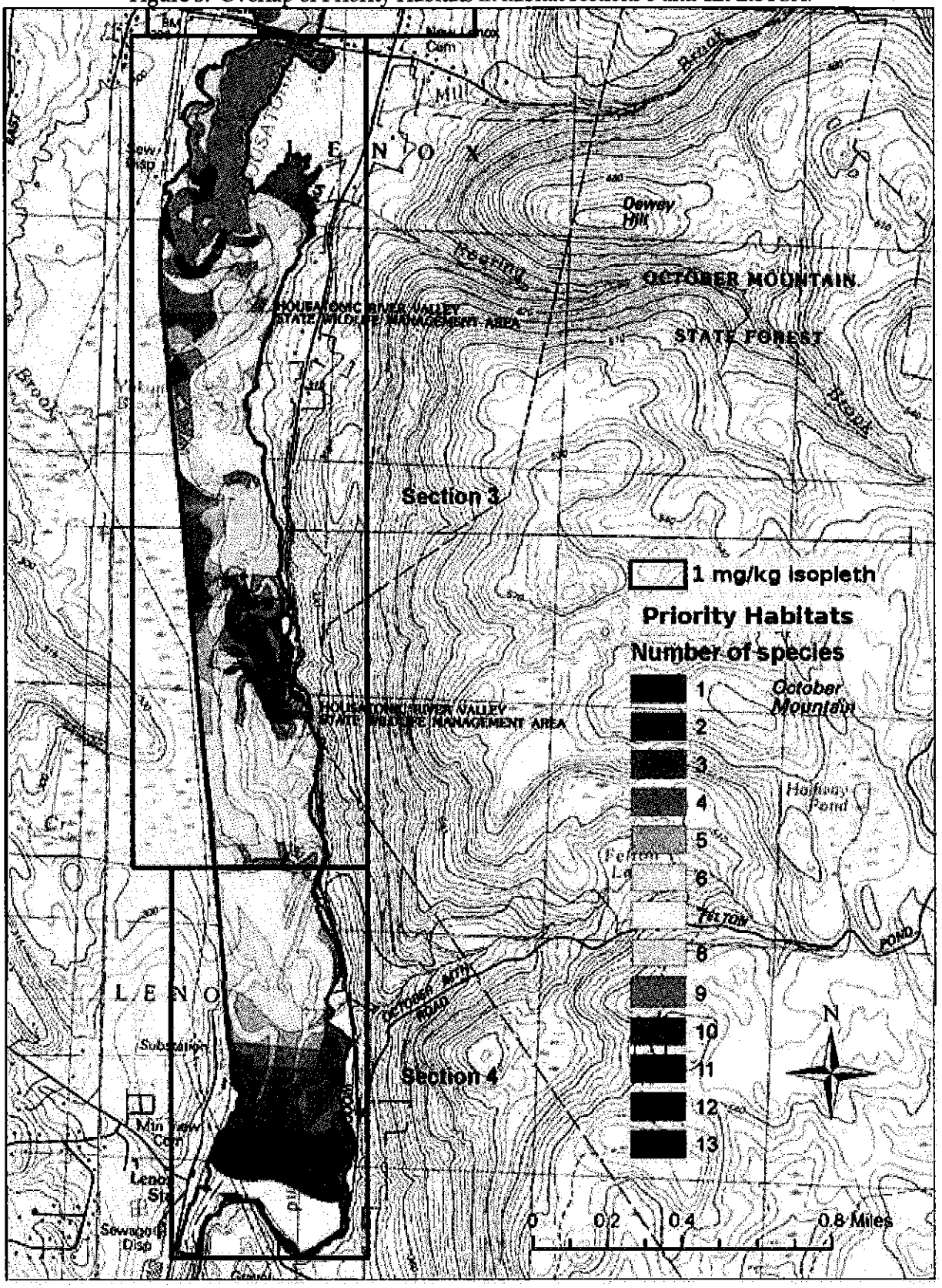


Figure 6. Core Areas for 13 species within the PSA.

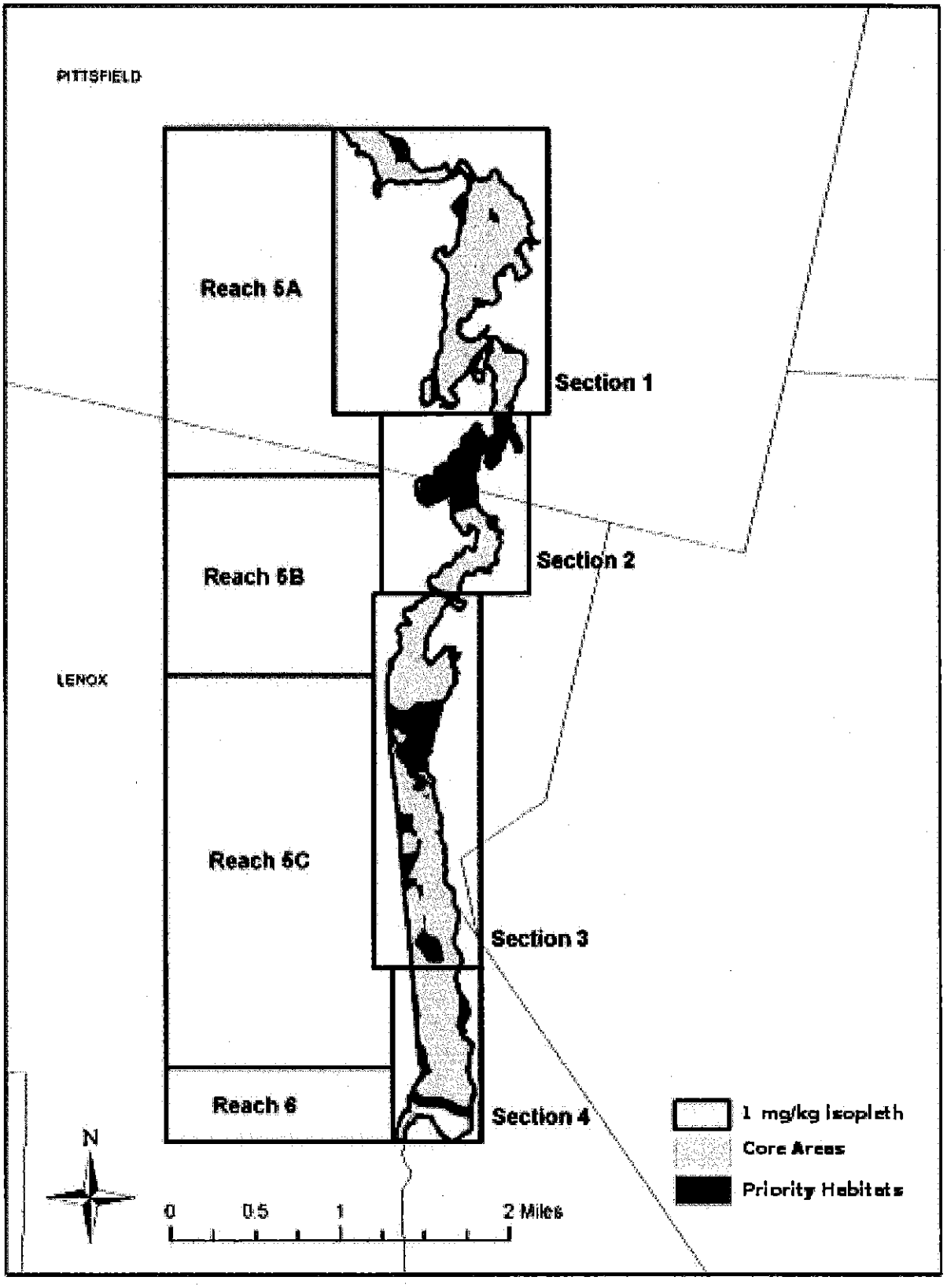

PITTSFIELD
Reach 5A
Section 1
Reach 5B
Section 2
LENOX
Reach 5C
Section 3
Reach 6
Section 4
N
0
0.5
1
2 Miles
1 mg/kg Isopleth
Core Areas
Priority Habitats

Figure 7. Meander, Oxbow, and Floodplain Processes

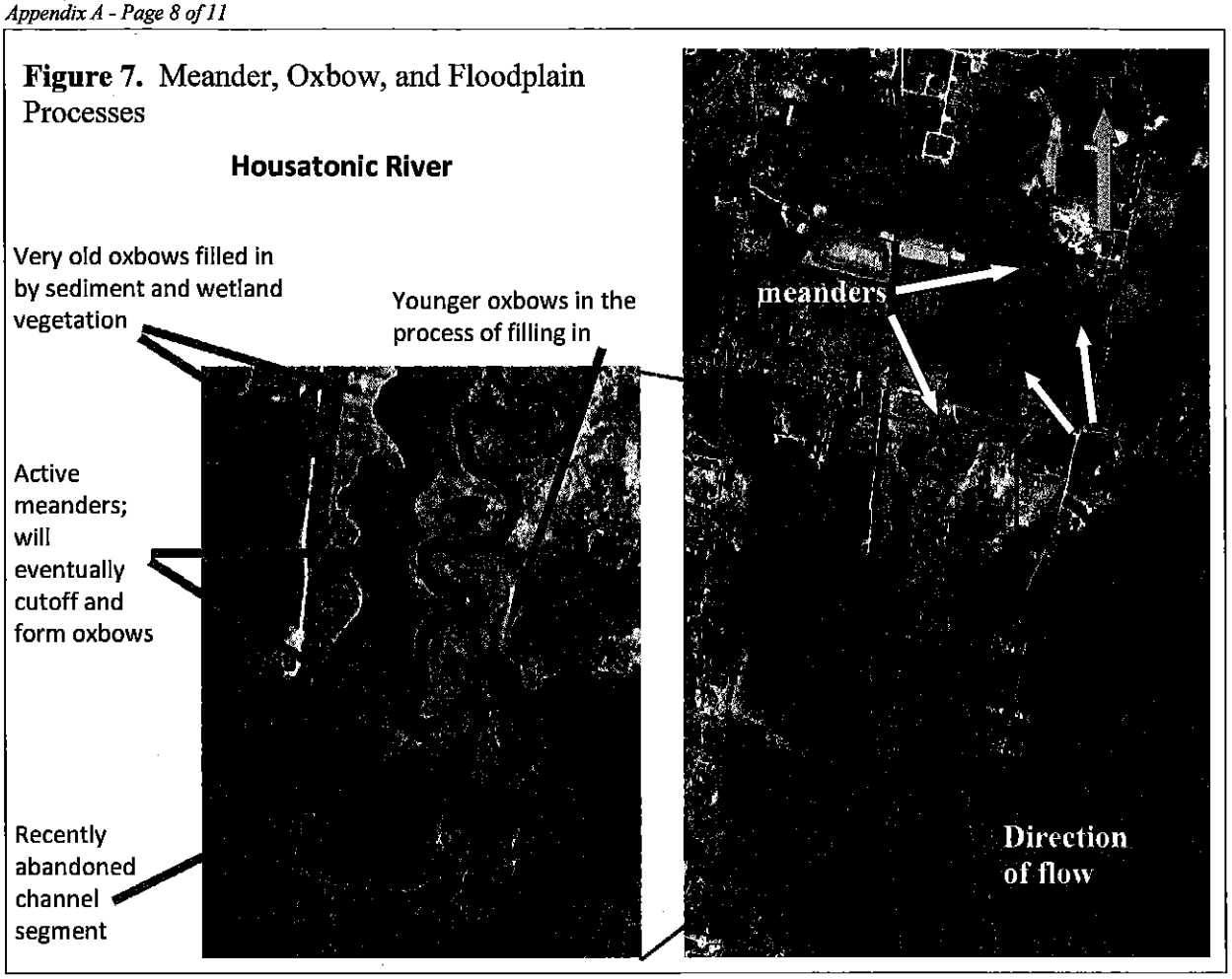
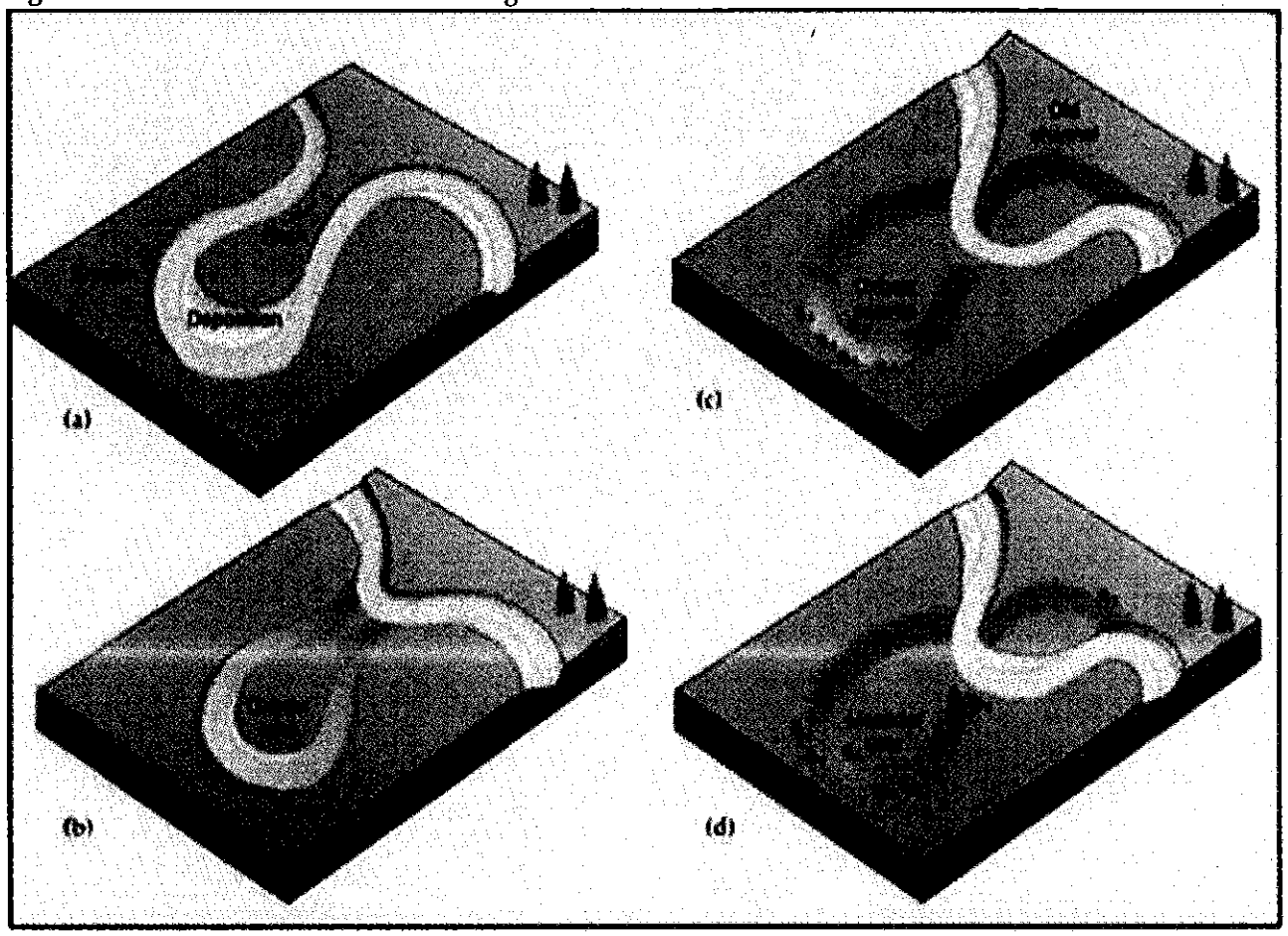


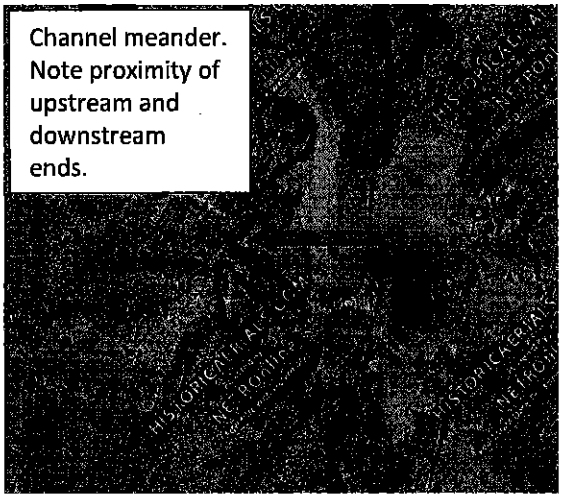
Figure 8. Housatonic River Habitat-forming Processes



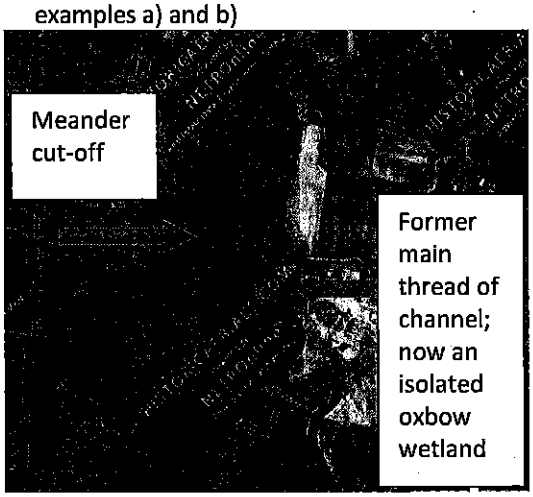
(Central Michigan University College of Science and Technology)

Figure 9. Recent Examples of Meander Cutoff and Side Channel Formation in the PSA

a. Locations of post-1971 channel change examples a) and b)



b. Example a. 1971 aerial photo of the Housatonic River. Screen shot from aerialphotos.com.



c. Example a. 1997 aerial photo of the Housatonic River. Screen shot from aerialphotos.com.

d. Detailed view of meander cutoff from MassGIS 2005 aerial photo.

e. 1971 aerial photo. Arrow shows location of 1997 side channel.

f. 1997 aerial photo. Arrow shows location of new side channel.

Appendix B

NHESP 2010 Report

Rare Species and Natural Community Surveys in the Housatonic River Watershed of Western Massachusetts