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Preliminary Biodiversity Assessment of the Algonquin Gas Pipeline in the Towns of Yorktown and Cortlandt, Westchester County, New York

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Report to Community Watersheds Clean Water Coalition

27 July 2014
Revised 29 September 2014

Introduction

At the request of Community Watersheds Clean Water Coalition, and in response to the proposed expansion of transmission capacity and the right-of-way (ROW), Hudsonia reconnoitered segments of the Algonquin Gas Pipeline ROW and associated wetlands in the towns of Yorktown and Cortlandt, Westchester County, New York (U.S. Geological Survey, 1956, Photorevised 1981, Mohegan Lake, N.Y., 7.5 minute topographic map sheet). I spent two days in the field on 1 and 9 July 2014, as well as examining geologic, topographic, and wetland maps, and selected documents and maps associated with the development proposal. The weather during field work was hot, sunny the first day and cloudy the second day, calm or with a light breeze, and with precipitation limited to the last half hour of the second day. Total field time was about 16 hours. I recorded approximate locations of noteworthy features with a Garmin GPS 12 or read coordinates from Google Earth. The scope of this assessment did not include checking wetland boundary delineations, performing complete surveys of flora or fauna, or walking the entire pipeline ROW in Yorktown and Cortlandt.

Hudsonia does not take positions for or against land use projects. We conduct research and provide results and recommendations to the involved parties and the public. Our expertise is focused on wild plants, animals, and habitats (e.g., Kiviat and Stevens 2001, Kiviat 2013, Kiviat and Johnson 2013). Hudsonia's aim is to enable and encourage a decision-making process that addresses biodiversity scientifically and comprehensively, and assists decision-makers in minimizing impacts on biodiversity and its environmental support.

Observations and Discussion

The vegetation of the ROW was oldfield-like, predominantly of upland plant species, with wetland plants in a number of areas where either the pipeline crossed larger wetlands or where small wetlands occurred on the ROW. Many species of native plants were present, some (e.g., common milkweed [*Asclepias syriaca*] and Indian-hemp [*Apocynum cannabinum*]) occurring in large patches. Many species of nonnative plants were also present; stiltgrass (*Microstegium vimineum*) was widespread and abundant, and the nonnative form of common reed (*Phragmites australis*) occurred in patches but multiflora rose (*Rosa multiflora*) was uncommon and mostly small (probably deer-browsed).

Common milkweed, Indian-hemp, Canada thistle (*Cirsium arvense*), and other plants provided resources for flower-visiting insects which were common along with their predators. Several species of butterflies were conspicuous (great spangled fritillary, little wood satyr, common wood nymph, silver-spotted skipper, and unidentified skippers), along with several dragonfly species. Utility rights-of-way are commonly important habitats for butterflies (e.g., Berg et al. 2013).

Except for small areas, the ROW was bordered by extensive mature hardwood forest that included a good number of large trees in the 60-90+ cm dbh size range. Sugar maple, oaks, and black birch were common, along with several less common tree species. West of Lexington Avenue the forests were also mature but more urban-influenced with black locust and Norway maple common. These forests are part of a large forested area that is unusual for its extent in Westchester County.

Wetlands

The Applicant delineated wetland boundaries on the ROW. Maps prepared for the Applicant unfortunately do not provide landmarks or coordinates that would enable easy location of mapped wetlands in the field. I reviewed the AIM wetland report (TRC 2014a) and looked for wetlands opportunistically on the ROW. I found several locations on the ROW that supported wetland plants; these are probably federal jurisdictional wetlands (Table 1). A few wetland flags were visible on the ROW, especially at the wetland east of Stoney Street (shown first in Table 1). However, I believe the wetlands listed in Table 1 were either omitted from the Applicant's wetland delineation report (TRC 2014a) or under-delineated. Furthermore, very few sedges (*Carex* spp.) were recorded on the wetland field data sheets in the delineation report (TRC 2014a), despite the abundance and diversity of sedges on upland and wetland habitats of the ROW. The apparent inattention to sedges underlines the importance of checking the accuracy of wetland delineations, because many sedges are important wetland indicator species, and sedges are an important component of biodiversity at this site. It should be possible to find most or all of the wetlands on the ROW by recognizing wetland indicator plants, especially those species listed in Table 1 plus other *Carex* species, and the wetlands located thusly should be confirmed and delineated by means of soil characteristics. Although some of these wetlands are very small, they are likely to be important habitats for plants and wildlife.

Table 1. Small wetlands on the existing Algonquin Pipeline right-of-way that mostly lacked boundary delineation flags. Based on the plants listed and other features, these appear to be undelineated wetlands, or undelineated portions of delineated wetlands.

UTM E	UTM N	Wetland plants[1]	Notes
597633	4573241	*Typha, Scirpus atrovirens, Eleocharis tenuis, Polygonum sagittatum*	Beginning 10 m E of gate at Stoney Street; on intermittent stream draining into Wetland A-34 and Hunter Brook (shown on Applicant maps but may not have been completely mapped)
596286	4572211	*Carex vulpinoidea, C. lurida*	
596707	4572501	*Carex lurida, Polygonum sagittatum*	
596805	4572585	*Scirpus atrovirens*	40+ m long E-W
596983	4572695	Not recorded	E side of old stone wall crossing ROW
597048	4572709	*Carex vulpinoidea, Thelypteris palustris, Scirpus atrovirens*	
597221	4572782	*Scirpus atrovirens, Polygonum sagittatum*	S side of ROW

[1]Not necessarily a complete list of wetland indicator plants.

The wetland field data sheets reproduced in TRC (2014a) contain many misspelled plant names. The inaccuracies in spelling (which could have been corrected following field work) suggest there might also be incorrect plant identifications or other errors.

Rare Plants

I found several rare plants on the ROW. This does not constitute a comprehensive survey of rare species, which should be conducted before planning of the pipeline upgrade is completed. Regionally-rare species are rare in the Hudson Valley region but not necessarily statewide in New York (Kiviat and Stevens 2001); these species are important for conserving biological diversity in the region because they may contain unique genes or be of regional ecological or educational significance. Although some common and a few rare plants are referenced in TRC (2014b), it is unclear how comprehensive a flora survey or rare plants survey was conducted by the Applicant's consultants in Westchester County.

Bush's sedge (*Carex bushii*; S3 ; see photograph below). I found this sedge at two locations between Stoney Street and Lexington Avenue. There were small groups of culms (aerial stems) at these locations. At the first location, a south-facing slope in the northern edge of the ROW, Bush's sedge co-occurred with a native rose (*Rosa virginiana* or *R. carolina*); at the second location Bush's sedge was near the unidentified milkweed (see below) and various wetland plants in a (partially?) delineated wetland on the southern edge of the ROW.

Bush's sedge (*Carex bushii*; New York Natural Heritage Program rank S3) on the Algonquin Pipeline right-of-way west of Stoney Street, 9 July 2014.

Narrow-leaved sedge (*Carex amphibola*; NYNHP rank S1, listed as Endangered in New York). I found this species at two locations on the right-of-way. Although narrow-leaved sedge is listed as Endangered in New York, it may be more frequent in New York than this listing indicates (R. Naczi, personal communication). Nonetheless, the species may be at least regionally-rare and is listed as Endangered, thus for now merits protection on the right-of-way.

New Jersey tea (*Ceanothus americanus*; regionally-rare). I found several clumps of this small subshrub, in flower, on a south-facing slope in the northern part of the right-of-way between Stoney Street and Lexington Avenue. Also at this location I found three stems of butterfly-weed (orange milkweed; *Asclepias tuberosa*, also regionally-rare).

Unidentified milkweed (*Asclepias* sp.). This milkweed keyed out to swamp milkweed (*Asclepias incarnata*, a common species) but the leaves were broader, the stem hairier, and the flower color darker than what I consider typical for swamp milkweed in the Hudson Valley. Several stems occurred at two locations west of the second Bush's sedge location in the southern and central portions of the ROW. This could be purple milkweed (*Asclepias purpurascens*; S2S3) or a hybrid of purple milkweed and swamp milkweed. The identification needs to be checked.

Dodder (*Cuscuta*). I found at least two plants of dodder on the ROW on an upland slope west of Wetland A-10. The plants were not yet in flower and thus were unidentifiable to species. This habitat was too dry for the common swamp dodder (*Cuscuta gronovii*), and the dodder may be one of several rare dodder species that occur in the Hudson Valley. (Several native dodders of meadows or shrublands could occur here, including *Cuscuta campestris* [S1, State Endangered], *Cuscuta compacta* [S3], *Cuscuta pentagona* [S3], and *Cuscuta polygonorum* [S1, State Endangered] [NEWFS 2013, Weldy et al. 2014].)

River birch (*Betula nigra*; Rare S3) was reported in Wetland B13 in the Town of Cortlandt (TRC 2014a). No further information was available to me. Inasmuch as *"nigra"* means black, this could be a recording error for black birch (*Betula lenta*, a common species) which occurs along the ROW edges. If it was indeed river birch, this may be an unusual native occurrence on the east side of the Hudson River.

Yellow birch (*Betula alleghaniensis*). I found scattered sapling-size and pole-size stems, mostly in the southern edges of the ROW but at least once in the northern edge, at various locations between Lexington Avenue and Stoney Street as well as east of Stoney Street. Yellow birch is not a rare species in New York and is found almost throughout the state (Weldy et al. 2014). However, this species is uncommon to rare southward and near the Hudson River. The presence of a number of yellow birches in the forest edges along the ROW may indicate a relict cool microclimate favorable to other cool-climate species and important for biodiversity conservation.

The diversity of true sedges (*Carex* species), all of which are native to the region, is a noteworthy feature of the pipeline ROW. Although we did not identify them all, I estimate there were 15 or more species on the ROW. This is a notable component of the diverse native flora of the ROW.

In addition to the plants discussed above, several other rare native plant species could occur on the ROW. A current Hudsonia study in Columbia County has identified several rare native plants on electric transmission rights-of-way which are ecologically similar to the Algonquin pipeline ROW.

Rare Animals

The existing ROW contains potential or actual habitat for certain rare animals of conservation concern. In at least one location at the northern edge of the ROW between Stoney Street and Lexington Avenue,

there was a large rock with a south-facing 1 cm wide crack that is potential summer roosting habitat for the small-footed bat, a New York State species of Special Concern. Northern metalmark is a very rare butterfly that may occur in transmission ROW habitat (Barbour 1997); Barbour mentioned other rare biota he found in ROWs (the Barbour article is about electric transmission ROWs which are ecologically similar to gas pipeline ROWs). The forest adjoining the Algonquin ROW west of Stoney Street supports Species of Greatest Conservation Need birds including scarlet tanager and wood thrush.

Potential habitat for the bog turtle, a species listed by New York as Endangered and federally listed as Threatened, was reportedly identified by the Applicant's consultants in Wetland A-10; however, I have been unable to obtain the report on this assessment (a bog turtle assessment was mentioned in TRC 2014b as intended to be performed in spring 2014). I examined an extensive portion of this wetland just north of Route 35 and west of Lexington Avenue (south of the entrance road to the Yorktown Golf and Baseball Center) that was dominated by tussock sedge (*Carex stricta*) and a tall (1 meter) rhizomatous sedge in vegetative condition that was possibly lakeside sedge (*Carex lacustris*). The sediment was soft to a depth of about 25 cm. Wetland A-10 between the Club entrance road and Route 35 generally shows urban influences but is floristically diverse and dominated by native plants. This wetland not only contains potential bog turtle habitat and spotted turtle (State Special Concern) habitat, but also suitable habitat for a wide diversity of birds, other herpetofauna (reptiles and amphibians), dragonflies, damselflies, and other animals. Although this wetland may have experienced higher-than-natural siltation in recent years, additional siltation could be damaging to the potential bog turtle habitat which receives drainage from the ROW. Under the federal bog turtle recovery plan, because a portion of the wetland meets the criteria for potential habitat, the entire wetland, including the portion on and adjoining the ROW, must be considered potential bog turtle habitat (Klemens 2001).

The mature forests, with large trees and dead or injured trees, offer potential summer roosting and nursery habitat for the federally and state Endangered Indiana bat and other bats.

Siltation

Poor siltation control practices on construction sites are widespread (Paterson 1994; Kiviat, personal observations). Prefabricated silt fencing was considered subject to technical deficiency, poor installation, and inadequate maintenance (Paterson 1994), and field measurements showed that silt fencing removed little of the fine sediment from stormwater leaving construction sites (Barrett et al. 1995, 1998). An existing filter fabric silt fence east of Stoney Street, evidently intended to prevent sediment from the equipment road on a steep slope escaping into a small stream draining north-to-south through Wetland A-34, on 9 July had a segment where sediment had overtopped the fence during a recent storm (see photo, below). This stream flows into Hunter Brook which flows into the New Croton Reservoir approximately 1.8 miles (map distance) SSW of Wetland A-34. This illustrates the risk that the proposed pipeline construction poses to the New York City reservoir system, as well as to wetland and stream habitats.

Hunter Brook is listed by the DEC as a trout-spawning stream. It is likely that trout spawn in small tributaries as well as the mainstem of Hunter Brook. Siltation, associated nutrient loading, and removal of woody vegetation from Hunter Brook or its tributaries could compromise the quality of this stream system for trout.

Filter-fabric silt fence overtopped by storm flow draining into Wetland A-34, photographed 9 July 2014. Photograph looking downhill from the pipeline right-of-way just east of Stoney Street.

The surface waters tributary to the East-of-Hudson portion of the New York City water supply watershed were designated as Critical Resource Waters (U.S. Army Engineers 2002). This designation requires more stringent conditions for wetland permits. A general review and analysis of the impacts of pipeline construction on water quality is in Kiviat and Richardson (2014), who stated that pipeline construction projects "...affect stream channel configurations, increase turbidity and suspended sediment in surface waters, increase nutrient loading of surface waters, reduce dissolved oxygen (DO), change sediment characteristics of stream and wetland bottoms, remove water from streams, and remove riparian vegetation. Some of these changes ...last for a few days or weeks and some almost certainly ... last more than a season." Impacts of the AIM pipeline project on streams and wetlands would be cumulative with other transmission, transportation, residential, commercial, industrial, and forestry projects in the towns of Yorktown and Cortlandt. I expect that siltation from pipeline upgrading will cause damage to biodiversity as well as contributing a significant amount of suspended sediment to the New York City water supply system.

Widening the Right-of-way

Most of the pipeline right-of-way I reconnoitered is bordered on the north side by mature hardwood forest with scattered large trees (ca 60-90 cm dbh). The AIM proposal apparently includes widening the right-of-way by about 75 feet to the north. This would require clearing a large collective area of forest. Clearing forest would reduce potential habitat for summer roosting of Indiana bat and other bats, breeding of several forest songbird Species of Greatest Conservation Need, and many other organisms, as well as almost certainly creating a large amount of soil erosion and siltation into streams and wetlands. Forests are crucial for the maintenance of good water quantity and quality in waterbodies and wetlands (Wilder and Kiviat 2008). I question whether widening the right-of-way is necessary to increase transmission capacity of the pipeline, and whether the probable attendant siltation to local habitats and the New York City water supply system is justifiable.

Recommendations

The entire ROW should be re-checked for small wetlands. All wetlands on the ROW should be delineated (and prior delineations checked) and assessed by an independent wetland scientist, and the federal, state, and local status of all wetlands determined or re-determined. It is the responsibility of the applicant (AIM) to accurately address the jurisdictional status of these wetlands. Wetland delineations are commonly subject to error that results in small wetlands being entirely overlooked, or wetlands being delineated at a smaller size than actual wetland size. Even delineated wetlands that have been checked by the U.S. Army Engineers or the New York State Department of Environmental Conservation are subject to such errors. AIM activities must comply with any local wetland laws as well as with federal and state wetlands regulations.

The ROW should not be widened, and equipment should not be run off the existing ROW. AIM should be able to increase the capacity of the pipeline within the existing ROW. Because many gas pipelines are planned, under construction, or being upgraded in New York and other states, the AIM project will set a precedent for other pipeline projects. Furthermore, there is an issue of cumulative environmental impacts from the network of pipelines under construction or upgrading, or proposed for construction or upgrading. There may be local tree ordinances that require mapping, identification, and measurement of trees proposed to be removed, and applications for local permits.

A thorough survey of vascular flora (higher plants) should be conducted throughout the ROW and all adjacent areas that may be disturbed by clearing, siltation or other impacts. This work should be conducted by experienced, independent botanists. The purpose is to identify and record the locations of all the flora so that construction and restoration can be managed successfully with minimal impact on native plant populations and minimal facilitation of the spread of nonnative plants. In my brief survey and assessment I was not able to conduct a comprehensive species survey nor record highly accurate locations, but I found a number of species of sedges and other native plants that were not reported in the AIM DEIS.

Thorough surveys should be conducted of butterflies and dragonflies using the ROW since there is evidence of potentially important diversity and abundance in these groups of organisms. There may also be rare species that I did not detect in my limited field time. These surveys should be conducted by experienced independent biologists.

Native plants should be salvaged from the ROW for restoration after construction. The small wetlands on the ROW may be recreated after construction using the salvaged plant material (re-created wetlands will need to be monitored and managed by hand-pulling of undesirable nonnative plants). The most important native plants include the sedges, spike-rushes, bulrushes, milkweeds (all species), Indian-hemp, New Jersea tea, and native roses. Bush's sedge, narrow-leaved sedge, and any other native plants currently ranked S1, S2, or S3 by the New York Natural Heritage Program should have the highest priority. The dodder(s) should be identified by an expert botanist in August when they are in flower and any S1, S2, or S3 dodder(s) added to the priority salvage list. Hudsonia has successfully salvaged and replanted field dodder (*Cuscuta pentagona*) by excavating, storing, and replanting live host plants at a landfill capping project in James Baird State Park, Dutchess County (unpublished report and updates to

New York State Office of Parks, Recreation, and Historic Preservation). Creating or recreating wetlands requires considerable expertise in hydrology, soil science, and botany.

Certain nonnative weeds should be removed from the ROW before construction to prevent their being spread on the ROW and from the ROW into adjoining natural habitats. Japanese spiraea (*Spiraea japonica*), nonnative viburnums (*Viburnum* species), and black swallowwort (*Cynanchum louiseae*) are high priority species for removal. Removal should be effected without use of herbicides which would be a threat to rare and common native plants and probably animals as well. Moreover, a large storm could carry herbicide residues into the New York City water supply system. *Phragmites* and purple loosestrife are not harmful in this situation and do not need to be controlled unless they spread to the point of overgrowing uncommon or rare native plants. Stiltgrass is so abundant and readily spread that it is likely impossible to control. TRC (2014) included a management plan for nonnative weeds which needs further adaptation to the local situation.

AIM funds should be put into escrow for a full-time independent environmental monitor administered by, e.g., the town CACs or the New York City Department of Environmental Protection. This individual would monitor siltation control, equipment (to make sure it stays on the ROW), the appropriate procedures for salvaging and restoring native plants, and other environmental practices. It is not adequate for construction and restoration to be monitored only by the Applicant's consultants. There should also be compliance bonding to ensure remediation or restoration if damage occurs, and to ensure that permit conditions are met.

Wetland mitigation, if required, should not include "enhancing" or "restoring" existing wetlands by means of "invasive" plant control. Such projects rarely achieve significant biodiversity maintenance or enhancement, and are usually temporary (i.e., they revert after several years). Instead, appropriate hydrology, soils and plant assemblages should be created (and maintained indefinitely) for specific rare or uncommon native biota known to occur in or near the project area.

Acknowledgments

Melissa Fadden assisted with field work. Gretchen Stevens and Laura Lukas (Hudsonia) and Robert Naczi (New York Botanical Garden) assisted with plant identification.

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