8.0 CUMULATIVE IMPACTS

SEQRA requires a discussion of cumulative impacts where such impacts are "applicable and significant" (6 NYCRR § 617.9[b][5][iii][a]). Cumulative impacts are two or more individual environmental effects which, when taken together, are significant or which compound or increase other environmental effects. The individual effects may be effects resulting from a single project or, in certain circumstances, from separate projects.

Where individual effects of the Project may interact with other effects of the Project, such potential cumulative impacts have been addressed in Section 3.

This section addresses the potential cumulative impacts that may arise from interactions between the impacts of the Project and the impacts of other projects. In general, cumulative impact analysis of external projects is required where the external projects have been specifically identified and either are part of a single plan or program, or under common ownership or control. The subsections below provide a broader analysis than is strictly required by SEQRA. These subsections identify other projects, which are not owned by the Applicant, are not part of a common plan but which are proposed for construction in the Region and assess the extent to which the impacts of such projects may be cumulative with the impacts of the Project.

8.1 EXISTING PROJECTS

There are currently no operating utility-scale wind power projects in Jefferson County. The nearest existing project is the Maple Ridge Wind Farm, a 195 turbine, 320 MW wind energy facility located in the towns of Lowville, Martinsburg, and Harrisburg in Lewis County. This facility, in operation since 2006, is located approximately 25 miles from the Project site, and therefore does not have an impact on the Project site or the surrounding area within and near the Town of Clayton.

No other existing projects occur within the Town of Clayton or surrounding area that have environmental effects that would interact with potential adverse impacts identified for the Project.

8.2 PROPOSED OR FUTURE PROJECTS

Within Jefferson County and across New York State, several additional wind-powered generating facilities are in the project planning and development phases. The review and approval status of these projects is highly variable, ranging from preliminary site investigations to those with completed

system reliability impact studies (requirement of the New York Independent System Operator [NYISO]), detailed project plans, and landowner agreements.

The NYSIO oversees the New York Transmission System (the Grid) and has in place a process for permitting the interconnection of new electric generating facilities with the Grid. Consequently consideration of a project's status in the NYISO review process is a helpful measure for determining whether a proposed project may or may not be built.

The NYISO reviews projects in three main phases: submittal of an interconnection request, preparation of a feasibility study, and completion of a system reliability impact study. This review process separates projects, initially by feasibility to connect to the New York power grid via a selected transmission facility. Proposed projects in any phase of project review by the NYISO are identified on a comprehensive queue listing maintained by NYISO on their website http://www.nyiso.com. It is reasonable to assume, that wind power projects with in-progress system reliability impact studies and with upcoming proposed operation dates may be considered 'proposed' or 'future' projects for the purposes of this cumulative impact analysis.

In Jefferson County, four additional projects are considered proposed projects that may fall into this category (NYISO, queue accessed 1/19/2011). These include the following:

- St. Lawrence Wind Farm (79.5MW) proposed by AES –Acciona Energy NY, LLC.
- Cape Vincent (210MW) proposed by BP Alternative Energy NA, Inc.
- Dutch Gap Wind (250MW) proposed by PPM Energy, Inc.
- Hounsfield Wind (268.8MW) proposed by Wind Development Contract Co, LLC.

It is important to note that the assumption that all of these projects would ultimately become operational is dependent on a number of factors, which include completing the NYISO review; completing SEQRA review; completing state, federal, and local permitting; and securing adequate financing for turbine purchase and project construction. Regarding the last point, it is being widely reported (including in the January 2009 edition of *North American Windpower* magazine) that wind energy development companies across the U.S. and New York State are having more difficulty acquiring the necessary funding for their projects (Del Franco, 2009). Wind energy developments require high upfront capital investment in order to construct the projects, and the recent credit crisis has led to some developers being unable to obtain the necessary funding because the cost of capital is rising and access to credit is more difficult.

Any, or all of the proposed projects may not be approved and/or constructed, and therefore would not contribute to cumulative impacts associated with the construction and operation of the Project. Nonetheless, for purposes of this DEIS, it is assumed that all of the proposed projects will be approved and constructed, and provides the analysis which follows of potential cumulative impacts to the extent ascertainable. Only limited information about these projects is available, so only a limited analysis is possible.

The applicant for St. Lawrence Wind established an informational website at www.stlawrencewind.com. Review of this website indicates the project is located in the Town of Cape Vincent along the St. Lawrence River approximately 10 miles west of the proposed Project, as illustrated in Figure 17. The website also contains SEQRA as well as Federal and State wetland permitting documentation. As indicated on the website the project proposes the construction of 51 turbines.

The NYSDEC is the Lead Agency for the Hounsfield Wind Farm project and has posted information and documents related to the project on their website (http://www.dec.ny.gov/permits/54687.html). Review of these documents indicates that the project is located on Galloo Island in the Town of Hounsfield and is approximately 19 miles from the proposed Project (See Figure 17). As indicated on the website the project proposes the construction of 82 turbines.

The applicant for the Dutch Gap Wind Farm is PPM Energy, Inc. (Atlantic Wind LLC), now known as a subsidiary of Iberdrola Renewables. According to Iberdrola Renewables, at the time of the interconnection queue request, the Dutch Gap Wind project was envisioned to be an up to 250 MW project consisting of up to 125 wind turbines located in the Town of Orleans and other surrounding communities (located substantially east of the Project) (Burke, pers. comm.). However, at this time, the Dutch Gap Wind Farm project has not been conceived or planned, and no wind measurement data has been collected at any location within the potential future project area. A portion of the Dutch Gap Wind Farm was contemplated in the Town of Orleans, and the current zoning does not allow for wind measurement towers outside of their overlay district (which currently is only a small portion of the town). Without sufficient wind measurement data, the Project sponsor is uncertain of the viability of a project (Burke, pers. comm.). In addition, without an overlay expansion, the town would be unable to host a project. Zoning is currently being reviewed by town, planning and zoning board and restrictive zoning related to wind is anticipated. Therefore, the Project sponsor has determined this potential future project is on hold. Additionally, although the current interconnection request is for 250MW, it is understood that interconnection constraints/congestion would limit the future project

size as well. Further studies will be required to determine what size project could be conceivable. As a result of this uncertainty about the project, it is not further addressed for cumulative impacts with the current Project. In the event that this Project should go forward it would be subject to a full environmental impact review which would include, as appropriate, a cumulative impact analysis.

The consultant for the Cape Vincent Wind Farm established an informational website at http://www.erm.com/Public-Information-Sites1/New-York-Wind-Projects/Cape-Vincent-Wind-Power-Project/. Review of this website indicates the project is located to the south of the St. Lawrence Wind project. This project is approximately 10 miles west of the Project and consists of approximately 140 turbines (See Figure 17). The website contains additional SEQRA documentation for the Cape Vincent Wind Farm.

8.3 POTENTIAL CUMULATIVE EFFECTS

Given the separation distance of the above referenced projects, the possibility of these Projects having cumulative impacts to area residences from noise or shadow flicker is extremely remote as the turbines would not overlap or be interspersed with proposed Horse Creek turbines (i.e. be located within 0.5 mile of each other). Additionally, given the distance separating the projects, cumulative impacts to wetlands, streams, subsurface archeological resources, and soil/topography are not anticipated. Impacts to these resources as a result of the construction or operation of the Project will be localized, and largely temporary. Similarly, impacts to these resources at the project sites of the Hounsfield, St. Lawrence, and Cape Vincent wind power projects are anticipated to be localized to those project sites.

The occurrence of the projects in separate municipal jurisdictions makes impacts/benefits to local socioeconomic resources unlikely, in addition to community facilities and local zoning. However, potential cumulative impacts could include construction-related impacts to ports on Lake Ontario or St. Lawrence River (if offshore delivery is made) and to area roads and bridges. This would only occur if two or more projects were constructed simultaneously and if they used the same delivery ports and construction delivery routes. Should this situation arise, any cumulative impacts would be temporary and short-term in nature. Upon issuance of approvals of individual projects, coordination of transportation routes would be undertaken by the involved project developers to assure that the duration and extent of impact is minimized and that road repair/restoration work is accomplished at the appropriate time, and at no cost to the affected jurisdictions.

Other potential resource areas that may experience cumulative impacts include visual/aesthetic resource, and avian and bat populations. The potential cumulative impact of the construction and operation of the Project upon these resources, in consideration of the Hounsfield, Cape Vincent, and St. Lawrence Wind projects, are discussed further, below.

8.3.1 Potential Cumulative Effects to Visual/Aesthetic Resources

A possible cumulative impact resulting from the construction and operation of multiple proposed wind power projects within the county would be the effects on visual/aesthetic resources and community character. The cumulative impact of multiple projects will be highly variable depending upon the number of turbines visible, their proximity to the viewer, the landscape setting, and the viewer's attitude toward wind power. If multiple projects were visible from a particular viewpoint, the typical scenario would have portions of one project being visible in the foreground while another is visible in the background. Although a project may be visible from many miles away, its visual impact diminishes significantly at distances over 3.5 miles (Eyre, 1995). In addition, long distance views across Jefferson County are highly variable and often screened by built structures, topography and forest vegetation. Consequently, visibility of multiple projects (if they are ultimately built) would generally be restricted to elevated, open (agricultural) areas, where residential density is generally lower (as opposed to villages and hamlets which are often located in valley setting and have limited outward views to the landscape due to the presence of building and trees).

The western portion of the visual study area for the Project is also within the 10-mile-radius areas around both the proposed Cape Vincent and Saint Lawrence projects. Visually sensitive sites within this area include the Village of Chaumont, Chaumont Bay, Long Point State Park (on Point Peninsula), portions of the Saint Lawrence River shoreline, and portions of the Great Lakes Seaway Trail National Scenic Byway. There are likely numerous areas located west of the Project where turbines from the Horse Creek Project and turbines from one or both of the other proposed projects are visible. From on-shore locations in the western portion of the study area (including the Great Lakes Seaway Trail National Scenic Byway), the Horse Creek Project would be located east/eastward of a potential viewer while the other projects would be located to the west or westward of the viewer. In general, direct views of the Horse Creek Project from landward areas west of the Project will not include turbines from the other proposed projects. In these areas, turbines from the Horse Creek and other two proposed Projects would be located in opposite directions or at oblique angles from the viewer.

Views from offshore areas within the western part of the visual study area (including areas within the Saint Lawrence River and Lake Ontario) will likely include turbines from multiple projects. In all cases where turbines from multiple projects are visible, turbines from the Cape Vincent, Saint Lawrence, and/or Hounsfield projects would be significantly closer to the viewer than turbines from the Horse Creek Project. In these views, the turbines from the proposed Horse Creek Project would be visible in the distant background and in some cases could be screened by turbines from the other projects located nearer to the viewer.

Areas located east of the proposed Project are unlikely to incur significant cumulative visual impacts in the event that more than one of the presently proposed wind projects in the region is constructed. From areas east of the Project where turbines from the proposed Project are visible, the proposed Cape Vincent and Saint Lawrence projects would be located at least 10 miles further away (than the proposed Project) from the viewer (to the west). Although it is possible that some westward views of the Horse Creek Project could also include turbines from these other two projects in the distant background (i.e., minimally at distances of 10 miles greater than the proposed Horse Creek turbines in any given view), the addition of these more distant turbines is unlikely to result in significant additional impacts. Turbines from the proposed Hounsfield project are located at even greater distances, and if visible from any specific vantage point they would be minor elements in the distant background of the view.

Cumulative visual impacts were also considered in analyses conducted for the other proposed projects in the county. The proposed Cape Vincent and Saint Lawrence projects are located immediately adjacent to one another on contiguous land parcels. Analyses conducted for both of these projects included a visual resource evaluation of a 5-mile-radius area around each project (ACPNY, 2009; ERM, 2007; Tetra-Tech, 2007). Regarding cumulative impacts, the analysis concluded for the Cape Vincent project concluded that the cumulative effect of the two projects was essentially the same as if either project were doubled in size, and “to simply broaden the geographic range which will be subject to being within the boundary of a large wind power project, and to increase the number of turbines seen within those project boundaries” (ERM, 2007: 169). The analysis conducted for the Saint Lawrence project concluded that the cumulative impact from multiple projects “will be highly variable depending upon the number of turbines visible, their proximity to the viewer, the landscape setting and the viewer’s opinion regarding renewable energy” (Tetra-Tech, 2007: 4-2). The analysis for the Hounsfield project concluded that no cumulative visual impacts were expected because the viewshed for the Hounsfield project did not overlap with the viewsheds from the other proposed projects (ACPNY, 2009: 6-30).

Because of the relative proximity of the other proposed wind energy projects in Jefferson County, there are some locations within the visual study area for the Horse Creek Project from which turbines associated with multiple wind energy projects could potentially be visible. In all cases, the turbines from the Horse Creek Project and the other projects will be located either in opposite directions, at oblique angles to the viewer, or in the distant background if included in the same direct view.

8.3.2 Potential Cumulative Effects to Avian and Bat Populations

Cumulative impacts to avian and bat populations can be understood by assessing publicly available existing study results from nearby projects, including the proposed Hounsfield Wind Farm, the Cape Vincent Wind Farm, and the St. Lawrence Wind Farm. Each of these wind farms undertook preconstruction surveys similar in scope and duration to the Project, including breeding bird surveys, migratory bird surveys, raptor and/or waterfowl surveys, bat acoustic surveys, and bat mist net surveys. Additional information can also be derived from wind farms operating in New York and their associated post construction surveys.

With some notable exceptions, similar avian species were observed at the other project locations, and species composition was dependent upon proximity to the lakeshore and vegetative community diversity and composition. A summary of avian studies conducted for the Hounsfield Wind Farm, the Cape Vincent Wind Farm, and the St. Lawrence Wind Farm are presented in the Cumulative Impacts section of the Hounsfield DEIS (http://www.dec.ny.gov/permits/54687.html). The Hounsfield DEIS Cumulative Impact Assessment provides the following descriptions of potential avian impacts by project:

Table 32. Description of Potential Impacts Avian Impacts by Planned Jefferson County Projects[1]

	Hounsfield Wind	St. Lawrence Wind	Cape Vincent Wind	Horse Creek Wind
Breeding Birds	Displacement risk to Eastern Meadowlark, Upland Sandpiper, Northern Harrier and Bobolink. Collision risk to Eastern Kingbird, Red-tailed Hawk, Northern Harrier and Upland Sandpiper.	Impacts are not expected to be significant and are expected to be evenly distributed among species commonly seen.	Impacts expected to be even distributed among gulls, Canada goose, turkey vulture and American crow.	Displacement risk to Eastern Meadowlark, Bobolink, Northern Harrier, Upland Sandpiper, Horned Lark, and Grasshopper Sparrow, dependent upon turbine location.
Raptors	Collision risk larger in winter than inland sites in New York, particularly to Rough-legged Hawk and Bald Eagle, depending upon vole cycle on island.	Increased collision risk for Rough-legged and Red-tailed Hawks, however impacts are not expected to be significant.	Raptors in general did not have a high exposure indices due to low numbers recorded. Turkey vultures had a high exposure risk. Increased collision risk for Rough-legged and Red-tailed Hawks, but low impacts expected.	Migratory bird and raptor fatalities will probably be small and limited to Red-tailed Hawk and American Kestrel.
Waterfowl	Collision risk for waterfowl low on island due to small numbers of waterfowl activity that cross the island.	Increased risk to Canada goose, but not significant due to large numbers of species in the region.	Increased risk to Canada goose, but not significant due to regionally large population.	Waterbird habitat is sparse in the vicinity of the project area. Displacement impacts to Snow and Canada goose are not likely to be significant.

Notes:
[1]Characterizations derived from the Cumulative Impact section in the Hounsfield Draft Environmental Impact Statement accepted as complete by NYSDEC and incorporated into the Final Environmental Impact Statement prepared by NYSDEC.

Some cumulative impacts, such as displacement or collision may occur, regardless of the distance between the subject proposed facilities. Based upon the summary of potential impacts presented in Table 32, above, some cumulative impacts may occur in the form of displacement to species such as Eastern Meadowlark, Upland Sandpiper, Northern Harrier and Bobolink. There is also a common collision risk to Canada Goose among each project, but overall risk to the species is considered low due to a regionally large population.

Based upon a comprehensive analysis conducted for other operating wind projects across the United States, avian collision with wind turbines is estimated to range from 0 to 14 fatalities per MW per year (NWCC, 2010). Based upon post construction studies conducted between 2006 and 2009 at seven wind farms operating in New York, it is assumed that between 1.1 and 5.81 bird fatalities per megawatt could occur annually (Jain et al. 2007, Jain et al. 2008, Jain et al. 2009a, Jain et al.

2009b, Jain et al. 2009c, Jain et al. 2010a, Jain et al. 2010b, Stantec 2009, and Stantec 2010). Applying this range of impacts to the proposed wind energy facilities discussed above, the 654 total MWs of the combined projects could result in an estimated range of 720 to 3,800 cumulative avian fatalities per year for the four projects. While this number may sound large, it is a tiny fraction of the population that migrates through or resides in this area.

In addition, this range is substantially lower compared to other sources of bird mortality. On a national scale, the annual bird mortality associated with wind energy facilities is slight compared to other sources of mortality, such as vehicles (60 million or more deaths per year), building windows (97 to 976 million deaths per year), power and transmission lines (conservatively tens of thousands deaths per year, possibly closer to 174 million deaths per year), communication towers (conservatively 4 to 5 million deaths per year, possibly closer to 40 to 50 million deaths per year), electrocution (estimated tens of thousands per year), pesticides (at least 72 million deaths annually, likely far more), oil spills (hundreds of thousands of deaths per year), oil and wastewater pits (up to two million deaths per year), cats (hundreds of millions of deaths per year), agricultural practices (i.e., hay mowing, pesticides; at least 72 million), and hunting (up to 120 million) (Gill, 1995; Erickson *et al.*, 2001; USFWS, 2002, Ecology and Environment, 2009). A recent National Research Council study concluded that current wind energy generation in the United States is responsible for only 0.003% of anthropogenic avian mortality (NRC, 2007).

Cumulative impacts to bats may also occur as a result of the wind projects in this county, regardless of the distance between proposed facilities. Bat migration, acoustic and mistnetting studies were conducted at each of the Hounsfield Wind Farm, Cape Vincent Wind Farm, and St. Lawrence Wind Farm projects (American Consulting Professionals of New York, 2009). According to the Hounsfield DEIS, the majority of calls observed in each of the projects' acoustic studies were from Myotis sp., including Big Brown Bat, in addition to Silver-Haired Bats, and Hoary Bats. Acoustic studies at the Cape Vincent and St. Lawrence Wind project sites also reported calls from Indiana Bat. Indiana Bats were also captured in mistnetting efforts conducted at Horse Creek (see additional detail in Section 3.3). No Indiana Bats were observed at the Hounsfield Wind Farm. In recent years it has become evident that impacts to bats may actually be more of a concern than potential impacts to avian species (Luxmore, 2009). An analysis of bat fatalities at wind energy facilities across the U.S. resulted in an estimate of 0 to 39 bats per MW (NWCC, 2010). Based upon post construction studies conducted between 2006 and 2009 at seven wind farms operating in New York, it is assumed that between 0.46 and 15.0 bat fatalities per megawatt could occur annually (Jain et al. 2007, Jain et al. 2008, Jain et al. 2009a, Jain et al. 2009b, Jain et al. 2009c, Jain et al. 2010a, Jain et al. 2010b, Stantec 2009, and Stantec 2010). Applying this range of impacts to the proposed and existing wind

projects discussed above, the 654 total MW's of the combined projects could result in an estimated range of 301 to 9,810 cumulative bat fatalities per year. Of these estimated fatalities, a range of approximately 44 to 1,440 fatalities are projected as a result of the operation of the Project. It is difficult to estimate the significance of these fatality ranges, as little is understood about North American bat populations.