

## 5 Environmental Consequences

This chapter discusses the potential environmental impacts that could result from implementation of the Proposed Action and the No Action Alternative. Specifically, this EA considers effects on the environmental resource categories identified in Appendix A of FAA Order 1050.1E. Both the Proposed Action and the No Action Alternative were evaluated under forecasted 2015 conditions, the first year of implementation for the Proposed Action, and under forecasted 2020 conditions, five years after implementation of the Proposed Action. This evaluation includes consideration of the direct, indirect, and cumulative effects associated with the Proposed Action and No Action Alternative, as required under FAA Order 1050.1E.

Potential environmental impacts are identified for the environmental resource categories described in Section 4.3. Neither the Proposed Action nor the No Action Alternative would involve land acquisition; physical changes to the environment resulting from ground disturbance or construction activities; changes in patterns of population movement or growth, increases in public service demands, or business and economic activity; or generation, disturbance, transportation, or treatment of hazardous materials. Therefore, neither alternative is expected to result in impacts to certain environmental resource categories (please see Section 4.2 for a list of excluded categories). These environmental resource categories are not further discussed in this chapter.

**Table 5-1** identifies the environmental impact categories with potential to be affected by the Proposed Action, the thresholds of significance used to determine the potential for impacts (if applicable), and a side-by-side comparative summary of the potential for environmental impacts resulting from implementation of the Proposed Action under 2015 and 2020 forecast conditions.

**Table 5-1 Summary of Potential Environmental Impacts (1 of 2)**

Environmental Impact Category	Threshold of Significance	Significant Impact?	
		2015	2020
Noise	A significant noise impact would occur if analysis shows that the proposed action will cause noise sensitive areas to experience an increase in noise of DNL 1.5 dB or more at or above DNL 65 dB noise exposure when compared to the no action alternative for the same timeframe.	No	No
Compatible Land Use	A significant noise impact may occur if analysis shows that the proposed action will cause noise sensitive areas to experience an increase in noise of DNL 1.5 dB or more at or above DNL 65 dB noise exposure when compared to the no action alternative for the same timeframe.	No	No

**Table 5-1 Summary of Potential Environmental Impacts (2 of 2)**

<b>Environmental Impact Category</b>	<b>Threshold of Significance</b>	<b>2015</b>	<b>2020</b>
Department of Transportation Act, Section 4(f) Resources	A significant impact would occur pursuant to NEPA when a proposed action either involves more than a minimal physical use of a section 4(f) property or is deemed a "constructive use" substantially impairing the 4(f) property, and mitigation measures do not eliminate or reduce the effects of the use below the threshold of significance (e.g., by replacement in kind of a neighborhood park). Substantial impairment would occur when impacts to section 4(f) lands are sufficiently serious that the value of the site in terms of its prior significance and enjoyment are substantially reduced or lost.	No	No
Historic and Cultural Resources	A significant impact may occur when an action adversely affects a protected property and the responsible FAA official determines that the information from the State and/or Tribal Historic Preservation Officer addressing alternatives to avoid adverse effects and mitigation warrant further study.	No	No
Wildlife (Avian and Bat Species)	A significant impact to federally-listed threatened and endangered species would occur when the FWS or NMFS determines that the proposed action would be likely to jeopardize the continued existence of the species in question, or would result in the destruction or adverse modification of Federally-designated critical habitat in the affected area. An action need not involve a threat of extinction to federally listed species to meet the NEPA standard of significance. Lesser impacts including impacts on non-listed species could also constitute a significant impact.	No	No
Environmental Justice	A significant impact would occur if there were disproportionately high and adverse human health or environmental effects on minority and low-income populations.	No	No
Energy Supply (Aircraft Fuel)	A significant impact may occur when an action's construction, operation or maintenance would cause demands that would exceed available or future (project year) natural resources or energy supplies and the responsible FAA official determines that additional analysis in an EIS is necessary	No	No
Air Quality	Potentially significant air quality impacts associated with an FAA project or action would be demonstrated by the project or action exceeding one or more of the NAAQS for any of the time periods analyzed.	No	No
Climate	No significance thresholds have been established.	No	No

Source: FAA Order 1050.1E, Chg 1, Appendix A; ATAC Corporation, December 2013.  
Prepared By: ATAC Corporation, December 2014.

The following sections describe the impact findings for each environmental resource category, followed by a discussion of potential cumulative impacts.

## 5.1 Noise

This section discusses the analysis of aircraft noise exposure under the Proposed Action and the No Action Alternative under both 2015 and 2020 forecast conditions. This discussion includes identification of the differences in noise exposure between the Proposed Action and the No Action Alternative. This comparison is used to determine if implementation of the Proposed Action would result in significant noise impacts. Additional information on noise metrics and the basics of noise can be found in **Appendix E**. Detailed information on the noise analysis prepared for the CLT OAPM Project is included in the *CLT OAPM Noise Technical Report*, available on the project website (<http://www.oapmenvironmental.com>).

### 5.1.1 Summary of Impacts

Aircraft noise exposure was modeled for both the Proposed Action and the No Action Alternative under 2015 and 2020 forecast conditions. The noise analysis demonstrates that noise exposure resulting from implementation of the Proposed Action would not result in a day-night average sound level (DNL) increase of 1.5 dBA or higher in noise sensitive areas exposed to DNL 65 dB or higher. Therefore, the Proposed Action would not result in a significant noise impact.

### 5.1.2 Methodology

The noise analysis evaluated noise exposure to communities within the General Study Area generated by aircraft forecasted to be operating under Instrument Flight Rules (IFR) -filed flight plans, at altitudes between the surface (i.e., ground level) and up to 10,000 feet above ground level (AGL). IFR-filed aircraft activity was forecasted for the years 2015 and 2020 and used to model conditions under both the Proposed Action and the No Action Alternative. Noise modeling was conducted using Noise Integrated Routing System (NIRS) Version 6.1, the FAA-required noise model for projects involving air traffic changes over large areas and altitudes over 3,000 feet AGL.

If the Proposed Action is approved, the FAA expects to begin and complete implementation in 2015; therefore, aircraft noise modeling was completed for 2015 and five years later (2020), as required by FAA Order 1050.1E. Future year noise exposure levels modeled for the Proposed Action and the No Action Alternative were compared to determine whether there is a potential for noise impacts.

In both the 2015 and 2020 forecast scenarios, the Proposed Action and the No Action Alternative were modeled using the same number and type of aircraft operations. The Proposed Action does not include development or construction of facilities, such as runways or terminal expansions that would be necessary to accommodate an increase in aviation activity; therefore, no additional growth in operations is anticipated. The noise analysis reflects the change in noise exposure resulting from the proposed changes in aircraft routes (i.e., flight tracks) under the Proposed Action compared to the No Action Alternative.

Detailed information on IFR-filed aircraft operations within the General Study Area was assembled for input into NIRS, including the following data:

**Average Annual Day IFR-Filed Aircraft Flight Schedules:** The IFR-filed aircraft flight schedules identify arrival and departure times, aircraft types, and origin/destination information for an average annual day (AAD) in 2015 and in 2020. The AAD represents all

the aircraft operations for every day in a study year divided by 365, the number of days in a year. The AAD does not reflect a particular day, but is meant to represent a typical day over a period of a year. The forecast was based on the FAA's 2012 Terminal Area Forecast (TAF),<sup>29</sup> modified for 2015 and 2020 with additional details using previously identified arrival/departure times, aircraft types, and origin/destination information. For 2015, a total of 743,312 IFR operations (2,063 IFR operations for an average annual day) were modeled for all Study Airports. For 2020, a total of 828,172 IFR operations (2,296 IFR operations for an average annual day) were modeled for all Study Airports.

**Flight Tracks:** The flight tracks used in modeling were based on radar data collected for the existing conditions (2011) noise analysis and information provided by FAA Air Traffic Control (ATC) personnel. Aircraft routings under both the No Action Alternative and Proposed Action are depicted on **Exhibits 3-5** through **3-8** in Chapter 3, *Alternatives*. For the Proposed Action, flight tracks were developed from the aircraft procedures created by the CLT OAPM Design & Implementation (D&I) Team using the Terminal Area Route Generation, Evaluation, Traffic and Simulation (TARGETS) program. The majority of the No Action Alternative modeled flight tracks are based on the existing conditions noise analysis. The flight tracks for amended or new procedures that are part of the No Action Alternative were modeled based on input from the ATC subject matter experts who developed the procedures.

**Runway Use:** Runway use percentages were identified for all runways at the Study Airports. Forecasted aircraft operations were assigned to particular runways representing operating conditions at the Study Airports under Proposed Action and No Action Alternative conditions. The Proposed Action Alternative was not expected to change runway use patterns at the Study Airports compared to the No Action Alternative.

More detail related to the development of the NIRS model input files is provided in the *CLT OAPM Noise Technical Report*, available on the project website (<http://www.oapmenvironmental.com>).

As discussed in Section 4.3.1.1, the NIRS model was used to compute DNL values for 2015 and 2020 Proposed Action and No Action Alternative conditions at three sets of data points throughout the General Study Area:

1. 115,841 2010 Census block centroids;
2. 201,156 uniform grid points at 0.5-nautical mile (nm) intervals on a uniform grid covering the General Study Area, which were also used to calculate DNL values at potential Department of Transportation Act (DOT), Section 4(f) resources and historic sites; and,
3. 17,431 unique points representing Section 4(f) resources too small to be captured in the uniform grid, including 2,234 unique points representing National Register listed historic sites.

As discussed in Section 4.3.1.1, Section 14, paragraph 14.5e of Appendix A to FAA Order 1050.1E, requires analysis of aircraft noise using the DNL metric. **Table 5-2** provides the

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<sup>29</sup> U.S. Department of Transportation, Federal Aviation Administration, Terminal Area Forecast, 2012 (<https://aspm.faa.gov/main/taf.asp>).

criteria used to assess the changes in aircraft noise exposure attributable to the Proposed Action compared with the No Action Alternative. FAA Order 1050.1E defines a significant impact as an increase of DNL 1.5 dB at noise-sensitive land use locations (e.g., residences, schools, etc.) exposed to aircraft noise of DNL 65 dB or higher under the Proposed Action. For example, an increase from 63.5 dB to 65 dB is considered a significant impact.

In addition, in response to a recommendation made in 1992 by the Federal Interagency Committee on Noise (FICON), FAA Order 1050.1E also recommends that in instances where there are DNL increases of 1.5 dB or more at noise sensitive locations in areas exposed to aircraft noise of DNL 65 dB and higher, DNL increases of 3 dB or more in areas exposed to aircraft noise between DNL 60 dB and 65 dB should also be evaluated and disclosed. It is important to note that DNL increases of 3 dB in areas exposed to aircraft noise below DNL 65 dB are not considered “significant impacts” but are to be considered in the environmental evaluation of a proposed project.

FAA Order 1050.1E also stipulates that changes in exposure of DNL 5 dB or greater in areas exposed to aircraft noise between DNL 45 dB and 60 dB should be considered for airspace actions, such as changes to air traffic routes. This threshold was established in 1990, following issuance of an FAA noise screening procedure to evaluate whether certain airspace actions above 3,000 feet AGL might increase DNL levels by 5 dB or more. The noise screening procedure was prepared as a result of FAA experience that indicates that DNL increases 5 dB or more at cumulative levels well below DNL 65 dB could be disturbing to people and become a source of public concern.

**Table 5-2 Criteria for Determining Impact of Changes in Aircraft Noise**

DNL Noise Exposure Level	Increase in DNL with Proposed Action	Aircraft Noise Exposure Change Consideration
DNL 65 and higher	DNL 1.5 dB or more <sup>1/</sup>	Exceeds Threshold of Significance
DNL 60 to 65	DNL 3.0 dB or more <sup>2/</sup>	Reportable Noise Increase (Considered When Evaluating Air Traffic Actions)
DNL 45 to 60	DNL 5.0 dB or more <sup>3/</sup>	Reportable Noise Increase (Information Disclosed When Evaluating Air Traffic Actions)

*Notes:*

*1/ Source FAA, Order 1050.1E, Appendix A, Paragraph 14.3; Title 14 C.F.R. Part 150.21 (2) (d); and Federal Interagency Committee on Noise, Federal Agency Review of Selected Airport Noise Issues, August 1992.*

*2/ Source FAA Order 1050.1E, Appendix A, Paragraphs 14.4c and 14.5e; and Federal Interagency Committee on Noise, Federal Agency Review of Selected Airport Noise Issues, August 1992.*

*3/ Source FAA Order 1050.1E, Appendix A, Paragraph 14.5e.*

Source: FAA Order 1050.1E, Appendix A. June 8, 2004.

Prepared By: ATAC Corporation, September 2013.

### 5.1.3 Potential Impacts – 2015 and 2020

**Table 5-3** summarizes the results of the noise analysis for 2015 and 2020 conditions. The results for both years indicate that, when compared to the No Action Alternative, the Proposed Action would not result in a DNL 1.5 dB or higher increase in noise-sensitive areas exposed to DNL 65 dB or higher. Furthermore, no population would experience a reportable noise increase in areas exposed to DNL between 60 dB and 65 dB or between 45 dB and 60 dB. These results indicate that Proposed Action would not result in a

significant noise exposure impact on population exposed to DNL 65 dB or higher levels under the Proposed Action or produce reportable noise increases in areas exposed to DNL 45 dB to 65 dB.

**Table 5-3 Change in Potential Population Exposed to Aircraft Noise – 2015 and 2020**

DNL Noise Exposure Level Under the Proposed Action	Increase in DNL with the Proposed Action	Population Exposed to Noise that Exceeds the Threshold	
		2015	2020
DNL 65 and higher	DNL 1.5 dB or greater	0	0
DNL 60 to 65	DNL 3.0 dB or greater	0	0
DNL 45 to 60	DNL 5.0 dB or greater	0	0

Source: U.S. Census Bureau, 2010 Census (population centroid data), accessed August 2012; ATAC Corporation, July 2014 (NIRS modeling results).

Prepared by: ATAC Corporation, August 2014.

## 5.2 Compatible Land Use

This section discusses potential impacts to compatible land use under the Proposed Action and the No Action Alternative.

### 5.2.1 Summary of Impacts

Under both the Proposed Action and No Action Alternative, there would be no changes in aircraft noise exposure that would exceed the FAA’s significance threshold for noise impacts on people. Likewise, there are no conflicts with Federal, regional, State, local land use plans, policies and controls. Therefore, neither the Proposed Action nor the No Action Alternative would result in compatible land use impacts.

### 5.2.2 Methodology

FAA Order 1050.1E requires that EA documents discuss possible conflicts between the proposed action and the objectives of Federal, regional, State, local, and Tribal land use plans, policies, and controls for the area concerned. Potential impacts to compatible land use were focused on changes in aircraft noise exposure resulting from implementation of the Proposed Action. FAA Order 1050.1E states, “The compatibility of existing and planned land uses in the vicinity of an airport is usually associated with the extent of the airport’s noise impact. If the noise analysis concludes that there is no significant impact, a similar conclusion usually may be drawn with respect to compatible land use.”<sup>30</sup> The CLT OAPM Project does not result in direct impacts to land such as ground disturbance. Accordingly, the compatible land use analysis relies on changes in aircraft noise exposure between the Proposed Action and the No Action Alternative (discussed in Section 5.1) as the basis for determining compatible land use impacts within the General Study Area.

### 5.2.3 Potential Impacts – 2015 and 2020

As stated in Section 5.1, the Proposed Action, when compared with the No Action Alternative, would not result in changes in aircraft noise exposure in 2015 or 2020 that would exceed FAA’s significance thresholds. The Proposed Action would not result in newly non-compatible land uses or new exposure of population to noise levels of DML 65 dB or

<sup>30</sup> U.S. Department of Transportation, Federal Aviation Administration, Order 1050.1E, Appendix A, Sec. 4.1.a.

higher. Furthermore, the Proposed Action would not conflict with Federal, regional, State, local land use plans, policies and controls. Therefore, the Proposed Action would not result in significant compatible land use impacts.

Under the No Action Alternative, there would be no changes to air traffic routing in the General Study Area and no changes in aircraft noise exposure expected to occur in either 2015 or 2020. Therefore, the No Action Alternative would not result in significant compatible land use impacts.

### **5.3 Department of Transportation Act, Section 4(f) Resources**

This section discusses potential impacts to Department of Transportation (DOT) Act, Section 4(f) Resources. **Exhibit 4-4** depicts Section 4(f) resources within the General Study Area as described in Section 4.3.3.

#### **5.3.1 Summary of Impacts**

Evaluation of potential impacts to Section 4(f) resources focuses on changes in aircraft noise exposure resulting from implementation of the Proposed Action. Under the Proposed Action, the aircraft noise exposure analysis indicates that the Proposed Action would not change the noise environment in a way that would substantially impair any Section 4(f) resource identified within the General Study Area when compared with the No Action Alternative. Therefore, no constructive use of a Section 4(f) resource associated with the Proposed Action would occur and no impacts would be anticipated.

Under the No Action Alternative, no changes in air traffic routes in the General Study Area would occur; therefore, no changes to aircraft noise exposure or aircraft overflight patterns would occur over Section 4(f) resources and no impacts would be anticipated.

#### **5.3.2 Methodology**

The FAA evaluates potential effects on Section 4(f) resources in terms of both direct impacts (i.e., physical use) and indirect impacts (i.e., constructive use). A direct impact would occur as a result of land acquisition, construction, or other ground disturbance activities that would result in physical use of all or a portion of a Section 4(f) property. As land acquisition, construction, or other ground disturbance activities would not occur under either the Proposed Action or the No Action Alternative, neither alternative would have the potential to cause a direct impact to a Section 4(f) resource. Therefore, analysis of potential impacts to Section 4(f) resources is limited to identifying indirect impacts resulting from constructive use. A constructive use of a Section 4(f) resource would occur if there were a substantial impairment of the resource to the degree that the activities, features, or attributes of the site that contribute to its significance or enjoyment are substantially diminished. This could occur as a result of both visual and noise impacts. As regards aircraft noise, a constructive use would occur should noise levels substantially impair the resource.

Noise exposure levels were calculated for grid points placed at Section 4(f) properties. Section 5.1.2 includes further discussion on the grid points used in the Section 4(f) analysis. The analysis of potential impacts to Section 4(f) resources considered whether these properties would experience a significant noise increase, when comparing the Proposed Action with the No Action Alternative, using the applicable thresholds shown in **Table 5-2**.

FAA Order 1050.1E requires consideration of additional factors in determining whether to apply the thresholds listed above in determining the significance of noise impacts on Section 4(f) resources. If a reportable noise increase were to occur, the Section 4(f) properties would be evaluated further to determine if the project-related effects would constitute a constructive use. Further evaluation may include confirming that the property is in fact a Section 4(f) resource as well as identifying the specific attributes for which the property is managed (e.g., for traditional recreational uses or where other noise is very low and a quiet setting is a generally recognized purpose and attribute).

In cases where Land and Water Conservation Fund (LWCF) resources are “used” by a transportation project, FAA Order 1050.1E stipulates that replacement satisfactory to the Secretary of the Interior is specifically required for recreation lands aided by the Department of Interior’s LWCF. Therefore, these resources are considered as part of the Section 4(f) impact analysis process.

### **5.3.3 Potential Impacts – 2015 and 2020**

As stated in Section 5.1, the Proposed Action, when compared with the No Action Alternative, would not result in changes in aircraft noise exposure in 2015 or 2020 that would exceed the FAA’s significance threshold or result in reportable noise increases. Therefore, the Proposed Action would not result in potential impacts to Section 4(f) resources.

Under the No Action Alternative no changes to air traffic routes in the Charlotte Metroplex would occur in either 2015 or 2020 and no effects related to changes in aircraft noise exposure would be anticipated. Therefore, the No Action Alternative would not result in potential impacts to Section 4(f) resources.

## **5.4 Historic and Cultural Resources**

This section discusses the analysis of impacts to historic resources and tribal lands under the Proposed Action and the No Action Alternative. Section 4.3.4 provides information on historic resources and tribal lands within the General Study Area. The FAA has initiated consultation with the appropriate State Historic Preservation Officer (SHPO) and Tribal Historic Preservation Officers (THPOs), as well as relevant local agencies, in accordance with Section 106 of the *National Historic Preservation Act of 1966* (16 U.S.C. § 470 *et seq.*) and the implementing regulations at 36 C.F.R. Part 800.

### **5.4.1 Summary of Impacts**

The aircraft noise exposure analysis indicates that there would be no substantial change to the noise environment at any historic resources or tribal land under the Proposed Action compared with the No Action Alternative. Furthermore, any changes in aircraft traffic patterns would occur at altitudes and distances from viewers that would not substantially impair the view or setting of historic resources or tribal lands. Therefore, no adverse indirect effects to historic resources or tribal lands under the Proposed Action would be anticipated for 2015 or 2020.

Under the No Action Alternative, no changes to air traffic routes in the Charlotte Metroplex would occur in either 2015 or 2020 and no changes to aircraft noise exposure or changes in aircraft overflight patterns over historic resources or tribal lands would be anticipated. Therefore, no historic resources or tribal lands would be affected by aircraft noise, nor

would there be any visual impacts at historic resources or tribal lands under the No Action Alternative.

## **5.4.2 Methodology**

The *National Historic Preservation Act of 1966* requires the FAA to consider the effects of its undertakings on properties listed or eligible for listing in the National Register of Historic Places (i.e., National Register). In assessing whether an undertaking, such as the Proposed Action, affects a property listed or eligible for listing on the National Register, FAA must consider both direct and indirect effects. Direct effects include the physical removal or alteration of an historic resource. Indirect effects include changes in the environment of the historic resource that could substantially alter the characteristics that made it eligible for listing on the National Register. Such changes could include changes in noise exposure impacts.

An area of potential effects (APE) has been defined to assess the potential indirect effects of the Proposed Action on historic resources. Federal regulations define the APE as the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The scale and nature of an undertaking influences the APE and it may be different for different kinds of effects caused by the undertaking.

For purposes of this analysis, the APE is contiguous with the General Study Area. **Exhibit 4-5** in Section 4.3.4 shows the historic properties listed on the National Register that are found within the General Study Area.

All historic and cultural resources identified within the APE require further evaluation by the FAA to determine if the property may experience a potential adverse effect. Therefore, noise exposure levels at points representing historic properties listed on the National Register were calculated for purposes of determining potential adverse effects. In addition, noise exposure results for the uniform grid points (located at 0.5 nm intervals throughout the General Study Area) were evaluated for purposes of identifying potential adverse effects to historic properties that are eligible but may not be listed on the National Register. In the event that a significant or reportable noise increase was identified at one of these grid points, the surrounding area would be examined for the presence of eligible-to-be-listed historic properties.

The analysis of potential impacts to historic and cultural resources considers whether these properties would experience a significant noise increase, when comparing the Proposed Action with the No Action Alternative, using the applicable thresholds shown in **Table 5-2**. Properties exposed to DNL 65 dB or higher under the Proposed Action and an increase of DNL 1.5 dB or higher may be considered to be potentially adversely affected by the project. Formal consultation with the appropriate SHPO/THPO would be conducted to confirm this determination. If reportable increases in noise are detected for properties exposed to DNL between DNL 45 dB and lower than 65 dB, the FAA would consider further whether the increase would result in an adverse effect on historic properties. If the noise analysis indicates a reportable change for the resources, further research and/or survey on the subject property may be conducted to determine if the reportable increase would diminish the integrity of a property's setting for which the setting contributes to historical or cultural significance.

### 5.4.3 Potential Impacts – 2015 and 2020

As stated in Section 5.1, when compared with the No Action Alternative, the Proposed Action would not result in changes in aircraft noise exposure in 2015 or 2020 that would exceed FAA's significance threshold or result in reportable noise increases. Therefore, the Proposed Action would not result in potential impacts to historic or cultural resources.

Under the No Action Alternative no changes to air traffic routes in the Charlotte Metroplex would occur in either 2015 or 2020 and no effects related to changes in aircraft noise exposure would be anticipated. Therefore, the No Action Alternative would not result in impacts to historic or cultural resources.

## 5.5 Wildlife (Avian and Bat Species)

This section discusses the analysis of potential impacts to avian and bat species under the Proposed Action and the No Action Alternative.

### 5.5.1 Summary of Impacts

The greatest potential for impacts to wildlife species would result from wildlife strikes on avian and bat species at altitudes below 3,000 feet AGL. Under the Proposed Action, changes to air traffic flows would primarily occur at or above 3,000 feet AGL and operation levels would remain the same as the No Action Alternative. Therefore, the Proposed Action would not result in significant impacts to avian and bat species when compared with the No Action Alternative.

The No Action Alternative would not involve changes to air traffic flows, land acquisition, construction, or other ground disturbance activities. Therefore, the No Action Alternative would not result in significant impacts to fish, wildlife, or plants.

### 5.5.2 Methodology

The FAA's *Wildlife Strike Database* is the best information available for assessing potential impacts of aircraft on wildlife. Strike reports over the past 22 years aggregated nationally as well as for individual airports are available from the database to understand existing conditions. Strike reports are comparable to known information on the presence of specific species of concern to corroborate the reports.

This analysis involved a review of wildlife strike reports<sup>31</sup> for the Study Airports under both the Proposed Action and the No Action Alternative, and an evaluation of the potential for the presence of federal- and state-listed threatened and endangered species (i.e., special-status species) within the General Study Area. The FAA compared modifications in flight procedures to the occurrence of special-status species to qualitatively assess the likelihood of whether wildlife strikes might change under the Proposed Action.

### 5.5.3 Potential Impacts – 2015 and 2020

A significant impact would be likely to occur if the Proposed Action were to jeopardize the existence of special-status species or result in the destruction or adverse modification of

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<sup>31</sup> U.S. Department of Transportation, Federal Aviation Administration, *Wildlife Strike Database* ([http://www.faa.gov/airports/airport\\_safety/wildlife/database/](http://www.faa.gov/airports/airport_safety/wildlife/database/); accessed August 2014).

critical habitat in the General Study Area. However, the Proposed Action would primarily occur at or above 3,000 feet AGL, so there is no potential for the destruction or adverse modification of critical habitat in the General Study Area. Accordingly, the analysis is focused on the potential for significant impacts to species resulting from increased wildlife strikes with aircraft. Since 1990, the FAA has compiled reports of wildlife strikes with aircraft. The information is available to the public through the FAA's *Wildlife Strike Database* and the "Annual Report: Wildlife Strikes to Civil Aircraft in the United States." Between 1990 and 2013, the Wildlife Strike Database reported 152,181 wildlife strikes nationally.<sup>32</sup> Of the records that identify the type of animal involved in the strike incident, birds and bats represent 92.9 percent of all strikes.<sup>33</sup> Of those records, 96 percent of the strikes occurred below 3,000 feet AGL.<sup>34</sup> The Wildlife Strike Database reports that gulls have the highest occurrence of strikes (16 percent), followed by doves/pigeons (15 percent).<sup>35</sup>

The *Wildlife Strike Database* reports strike information by airport and includes information on species struck, strike elevation, and type and extent of aircraft damage. **Table 5-4** provides a summary of wildlife strikes reported for the Study Airport between 1990 and April 2014. In total, 1,315 records provide strike altitude for incidents at the Study Airports involving birds and bats. Of these, a total of 1,164 reported strikes (89 percent of all strike records) occurred at altitudes at or below 3,000 feet AGL. A total of 400 strikes reported at the Study Airports included species identification.

The *Migratory Bird Treaty Act (MBTA) of 1918* (16 U.S.C. §§ 703–712) protects all the bird species identified in these reports. Furthermore, federal and state laws protect listed endangered and threatened species. **Table 4-3** in Chapter 4, identifies the eight federal- and state-listed threatened and endangered bird and bat species found in North Carolina, South Carolina, and Virginia. These species include gray bat (*Myotis grisescens*), Indiana bat (*Myotis sodalis*), Virginia big-eared bat (*Corynorhinus (=Plecotus) townsendii virginianus*), piping plover (*Charadrius melodus*), wood stork (*Mycteria americana*), roseate tern (*Sterna dougallii dougallii*), Bachman's Warbler (*Vermivora bachmanii*), and red-cockaded woodpecker (*Picoides borealis*). Six of these species are known to occur in North Carolina (gray bat, Indiana bat, Virginia big-eared bat, piping plover, roseate tern, and red-cockaded woodpecker).<sup>36</sup> Four of these species are known to occur in South Carolina (piping plover, wood stork, Bachman's Warbler, and red-cockaded woodpecker).<sup>37</sup> Four of these species are known to occur in Virginia (Indiana bat, Virginia big-eared bat, roseate tern, and red-cockaded woodpecker).<sup>38</sup>

Four of the federal- and state-listed species are reported to occur in counties located within

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<sup>32</sup> Id.

<sup>33</sup> Id.

<sup>34</sup> Id.

<sup>35</sup> Id.

<sup>36</sup> North Carolina Department of Environment and Natural Resources, Natural Heritage Program List of the Rare Animal Species of North Carolina, 2014, <[http://portal.ncdenr.org/c/document\\_library/get\\_file?uuid=537d88dd-5168-4374-aaba-a159785bbf8e&groupId=61587](http://portal.ncdenr.org/c/document_library/get_file?uuid=537d88dd-5168-4374-aaba-a159785bbf8e&groupId=61587)>, accessed December 4, 2014.

<sup>37</sup> South Carolina Department of Natural Resources, SC Rare, Threatened & Endangered Species Inventory, <[http://www.dnr.sc.gov/species/pdf/SC\\_state\\_wide.pdf](http://www.dnr.sc.gov/species/pdf/SC_state_wide.pdf)>, accessed December 4, 2014.

<sup>38</sup> Commonwealth of Virginia Department of Conservation and Recreation's Division of Natural Heritage, Natural Heritage Resources of Virginia: Rare Animals, <[http://www.dcr.virginia.gov/natural\\_heritage/documents/anlist2013.pdf](http://www.dcr.virginia.gov/natural_heritage/documents/anlist2013.pdf)>

the General Study Area.<sup>39, 40, 41</sup> The gray bat is reported to occur in Buncombe, Haywood, and Transylvania Counties, North Carolina.<sup>42</sup> The Indiana bat is reported to occur in Haywood and Rutherford Counties, North Carolina.<sup>43</sup> The Virginia big-eared bat is reported to occur in Avery, Caldwell, Watauga, and Yancey Counties, North Carolina.<sup>44</sup> Finally, the red cockaded woodpecker (*Picoides borealis*) is reported to occur in Anson, Forsyth, and Montgomery Counties, North Carolina and Chesterfield and Laurens Counties, South Carolina.<sup>45,46</sup>

Habitat for the four listed species that are reported to occur in the General Study Area is primarily limited to woodlands; however, during winter two of the three bat species, the gray bat and the Indiana bat, retire to underground hibernacula typically located within caves in karst areas or locations with similar characteristics.<sup>47,48</sup> The Virginia big-eared bat resides in karst area caves year round.<sup>49</sup> The red-cockaded woodpecker typically subsides on tree-bound insects and its foraging habitat is generally limited to areas beneath the tree canopy in pine forests.<sup>50</sup> All four bat species forage within woodlands and forested areas.<sup>51,52,53</sup> The gray bat's foraging elevation generally extends up to 16 feet above open water bodies or riparian zones located near forested shorelines.<sup>54, 55</sup> Indiana bats typically forage in riparian zones and floodplains located near wooded areas as well as in upland forests, and sometimes over open areas and water.<sup>56</sup> The Indiana bat's foraging elevation ranges from six to 100 feet AGL.<sup>57</sup> The Virginia big-eared bat typically forages close to their caves,

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<sup>39</sup> U.S. Department of the Interior, U.S. Fish and Wildlife Service, Endangered and Threatened Species of North Carolina, <[http://www.fws.gov/Raleigh/es\\_tes.html](http://www.fws.gov/Raleigh/es_tes.html)>, accessed December 4, 2014.

<sup>40</sup> South Carolina Department of Natural Resources, SC Rare, Threatened & Endangered Species Inventory, <<http://www.dnr.sc.gov/species/index.html>>, accessed December 4, 2014.

<sup>41</sup> Commonwealth of Virginia Department of Conservation and Recreation's Division of Natural Heritage, Virginia Natural Heritage Database, < <https://vanhde.org/species-search>>, accessed December 4, 2014.

<sup>42</sup> U.S. Fish and Wildlife Service, Endangered and Threatened Species of North Carolina, <[http://www.fws.gov/Raleigh/es\\_tes.html](http://www.fws.gov/Raleigh/es_tes.html)>, accessed December 4, 2014.

<sup>43</sup> Id.

<sup>44</sup> Id.

<sup>45</sup> Id.

<sup>46</sup> South Carolina Department of Natural Resources, SC Rare, Threatened & Endangered Species Inventory, <<http://www.dnr.sc.gov/species/index.html>>, accessed December 4, 2014.

<sup>47</sup> U.S. Department of the Interior, U.S. Fish and Wildlife Service, Gray Bat Recovery Plan, July 1982. <[http://ecos.fws.gov/docs/recovery\\_plan/820701.pdf](http://ecos.fws.gov/docs/recovery_plan/820701.pdf)>, accessed January 9, 2014.

<sup>48</sup> U.S. Department of the Interior, U.S. Fish and Wildlife Service, Indiana Bat (*Myotis sodalis*) Draft Recovery Plan: First Revision. April 2007.

<sup>49</sup> U.S. Department of the Interior, U.S. Fish and Wildlife Service, Virginia Big-eared Bat (*Corynorhinus townsendii virginianus*) Plan for Controlled Holding, Propagation, and Reintroduction, August 2009.

<sup>50</sup> Rudolph, D. Craig, Conner, Richard N., Schaefer, Richard R, "Red-Cockaded Woodpecker Foraging Behavior in Relation to Midstory Vegetation." *The Wilson Bulletin* 114, no. 2, (June 2002): 235-242.

<sup>51</sup> U.S. Army Corps of Engineers, Species Profile: Gray Bat (*Myotis grisescens*) on Military Installations in the Southeastern United States, March 1998.

<sup>52</sup> U.S. Department of the Interior, U.S. Fish and Wildlife Service, Indiana Bat (*Myotis sodalis*) Draft Recovery Plan: First Revision. April 2007.

<sup>53</sup> U.S. Department of the Interior, U.S. Fish and Wildlife Service, Virginia Big-eared Bat (*Corynorhinus townsendii virginianus*) Plan for Controlled Holding, Propagation, and Reintroduction, August 2009.

<sup>54</sup> U.S. Army Corps of Engineers, Species Profile: Gray Bat (*Myotis grisescens*) on Military Installations in the Southeastern United States, March 1998.

<sup>55</sup> Georgia Department of Natural Resources, Wildlife Resources Division, Rare Species Profiles, "Gray Myotis (*Myotis grisescens*)", <[http://www.georgiawildlife.org/sites/default/files/uploads/wildlife/nongame/pdf/accounts/mammals/myotis\\_grisescens.pdf](http://www.georgiawildlife.org/sites/default/files/uploads/wildlife/nongame/pdf/accounts/mammals/myotis_grisescens.pdf)>, accessed January 10, 2014.

<sup>56</sup> Georgia Department of Natural Resources, Wildlife Resources Division, Rare Species Profiles, "Indiana Myotis (*Myotis sodalis*)", <[http://www.georgiawildlife.org/sites/default/files/uploads/wildlife/nongame/pdf/accounts/mammals/myotis\\_sodalis.pdf](http://www.georgiawildlife.org/sites/default/files/uploads/wildlife/nongame/pdf/accounts/mammals/myotis_sodalis.pdf)>, accessed January 10, 2014.

<sup>57</sup> U.S. Department of the Interior, U.S. Fish and Wildlife Service, Indiana Bat (*Myotis sodalis*) Draft Recovery Plan: First Revision. April 2007.

skirting woodlands, forest edges, old fields, and hay fields.<sup>58</sup> The Wildlife Strike Database does not include strike reports at the Study Airports for any of these species.

The number of aircraft operations between the Proposed Action and No Action Alternative would be the same. Therefore, the assessment of the potential impacts focuses on changes to flight paths and the potential for impact due to wildlife strikes. As shown in **Table 5-4**, only 11 percent of bird/bat strikes (147 of 1,315 total records) occurred at altitudes above 3,000 feet AGL. The decline in the number of strikes reported above 3,000 feet AGL indicates that there is less likelihood of bird/bat strikes at these altitudes. Under the Proposed Action, the changes to proposed flight paths would primarily occur at or above 3,000 feet AGL and no significant changes to arrival and departure corridors below 3,000 feet AGL would be expected. Because the four listed species identified are generally only active in areas close to the ground (below 100 feet AGL), no significant impacts to these species would be anticipated. The No Action Alternative would not involve changes to air traffic flows, land acquisition, construction, or other ground disturbance activities; therefore, no impacts to avian and bat species would occur.

**Table 5-4 FAA Wildlife Strike Database Records for Study Airports by Altitude (1990 - 2013)  
(1 of 2)**

Type of Strike	Airport	3,000 ft. AGL or less	>3,000 ft. AGL to ≤ 10,000 ft. AGL	Greater than 10,000 ft. AGL	Total
Identified Bird and Bat Species					
	CLT	315	13	0	328
	EQY	0	0	0	0
	GMU	2	0	0	2
	GSO	38	2	0	40
	GSP	20	0	0	20
	GYH	0	0	0	0
	HKY	0	0	0	0
	INT	2	1	0	3
	JQF	5	0	0	5
	RUQ	0	0	0	0
	SPA	1	0	0	1
	SVH	0	0	0	0
	UZA	1	0	0	1
<b>Total</b>		<b>384</b>	<b>16</b>	<b>0</b>	<b>400</b>

<sup>58</sup> U.S. Department of the Interior, U.S. Fish and Wildlife Service, Virginia Big-eared Bat (*Corynorhinus townsendii virginianus*) Plan for Controlled Holding, Propagation, and Reintroduction, August 2009.

**Table 5-4 FAA Wildlife Strike Database Records for Study Airports by Altitude (1990 - 2013)  
(2 of 2)**

Type of Strike	Airport	3,000 ft. AGL or less	>3,000 ft. AGL to ≤ 10,000 ft. AGL	Greater than 10,000 ft. AGL	Total
Unknown Bird and Bat Species	CLT	615	104	2	721
	EQY	2	0	0	2
	GMU	10	0	0	10
	GSO	89	15	0	104
	GSP	58	10	2	70
	GYH	2	1	0	3
	HKY	0	0	0	0
	INT	1	0	0	1
	JQF	1	1	0	2
	RUQ	0	0	0	0
	SPA	1	0	0	1
	SVH	0	0	0	0
	UZA	1	0	0	1
	Total		780	131	4
Grand Total		1,164	147	4	1,315
Percentage		89%	11%	0%	100%

Notes:

1/ The table does not include 299 strike reports that did not report altitudes.

2/ Percentages may not add up due to rounding.

Source: U.S. Department of Transportation, Federal Aviation Administration, *FAA Wildlife Strike Database* (<http://wildlife-mitigation.tc.faa.gov/wildlife/default.aspx>) (accessed December 4, 2013).

Prepared by: ATAC Corporation, December 2013.

## 5.6 Environmental Justice

This section presents a summary of the analysis of environmental justice impacts under the Proposed Action and the No Action Alternative.

### 5.6.1 Summary of Impacts

Neither the Proposed Action nor the No Action Alternative would displace people or businesses; therefore, implementation of the Proposed Action and No Action Alternative would not result in direct impacts in this category. No areas within the General Study Area would experience significant impacts to air quality or a significant impact related to a change in DNL exposure to people (see Section 5.1); therefore, no disproportionately high and adverse effects to children, minority populations, or low-income populations would occur under either the Proposed Action or the No Action Alternative.

### 5.6.2 Methodology

Executive Order (EO) 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, requires that federal agencies include environmental justice as part of their mission by identifying and addressing as appropriate, the potential for disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority populations and low-income populations. Environmental justice applies to all environmental resources. Therefore, a

disproportionately high and adverse human health or environmental effect on minority and low-income populations may represent a significant impact.

### **5.6.3 Potential Impacts – 2015 and 2020**

Under the Proposed Action, neither people nor businesses would be displaced. As discussed in Section 5.1, under the Proposed Action, no census block centroids in the General Study Area would experience a change in noise exposure in 2015 or 2020 that exceeds any of the FAA's significance thresholds for noise impacts on people. Therefore, no adverse direct or indirect effects would occur to any environmental justice populations within the General Study Area under the Proposed Action for 2015 and 2020.

Under the No Action Alternative, neither people nor businesses would be displaced. Furthermore, air traffic routes would not change and there would be no change in aircraft noise exposure in 2015 or 2020 that could result in an indirect impact. Therefore, the No Action Alternative would not result in disproportionately high and adverse human health or environmental effects on minority and low-income populations.

## **5.7 Energy Supply (Aircraft Fuel)**

This section discusses whether changes in the movement of aircraft would result in measurable effects on local energy supplies under the Proposed Action and the No Action Alternative.

### **5.7.1 Summary of Impacts**

The Proposed Action would result in a decrease in aircraft fuel burned for both study years: -0.79 percent in 2015 and -0.77 percent in 2020. Therefore, no significant impacts to energy supply would be anticipated.

The No Action Alternative would not involve changes to air traffic flows, construction, or other ground disturbance activities; therefore, the No Action Alternative would not result in the depletion of local energy supply.

### **5.7.2 Methodology**

The Proposed Action would not change the number of aircraft operations relative to the No Action Alternative, but it would involve changes to air traffic flows during the departure, descent, and approach phases of flight. These changes affect both the route an aircraft may follow as well as its climb-out and descent profiles. This in turn may directly affect aircraft fuel burn (or fuel expended). Aircraft fuel burn is considered a proxy for determining whether the Proposed Action would have a measurable effect on local energy supplies when compared with the No Action Alternative.

In addition to calculating aircraft noise exposure, the FAA's NIRS model calculates aircraft-related fuel burn (e.g., AAD flight schedules, flight tracks, and runway use). See Section 5.1.2 for further discussion on NIRS input data. Determining the difference in fuel burn between alternatives can be used as an indicator of changes in fuel consumption resulting from implementation of the Proposed Action when compared with the No Action Alternative.

### 5.7.3 Potential Impacts – 2015 and 2020

**Table 5-5** presents the results of the fuel burn analysis for the Proposed Action and No Action Alternative. When compared to the No Action Alternative, the Proposed Action would result in a fuel burn reduction of approximately 12 MT in 2015 (0.79 percent decrease) and a fuel burn reduction of approximately 14 MT in 2020 (0.77 percent increase). As fuel burn would decrease under the Proposed Action, no significant impacts to energy supply would be anticipated.

**Table 5-5 Energy Consumption Comparison**

	<u>2015</u>		<u>2020</u>	
	<u>No Action Alternative</u>	<u>Proposed Action</u>	<u>No Action Alternative</u>	<u>Proposed Action</u>
Fuel Burn (MT)	1,528.4	1,516.4	1,760.0	1,746.3
Volume Change (MT) (Proposed Action – No Action Alternative)		12		13.7
Percent Change from No Action Alternative		-0.79%		-0.77%

Note: MT = Metric Ton

Source: ATAC Corporation, August 2014 (NIRS modeling results).

Prepared by: ATAC Corporation, August 2014.

## 5.8 Air Quality

This section discusses the analysis of air quality impacts under the Proposed Action and the No Action Alternative.

### 5.8.1 Summary of Impacts

The Proposed Action would result in a decrease in emissions when compared to the No Action Alternative. Therefore, no significant impacts to air quality would be anticipated.

The No Action Alternative would not result in a change in the number of aircraft operations or air traffic routes; therefore, no impacts to air quality would be anticipated.

### 5.8.2 Methodology

Typically, significant air quality impacts would be identified if an action would result in the exceedance of one or more of the NAAQS for any time period analyzed.<sup>59</sup> Section 176(c) of the *Clean Air Act* requires that federal actions conform to the appropriate SIP in order to attain the air quality goals identified in the CAA. However, a conformity determination is not required if the emissions caused by a federal action would be less than the *de minimis* levels established in regulations issued by EPA.<sup>60</sup> FAA Order 1050.1E provides that further analysis for NEPA purposes is normally not required where emissions do not exceed the EPA's *de minimis* thresholds.<sup>61</sup> The EPA regulations identify certain actions that would not exceed these thresholds, including ATC activities and adoption of approach, departure, and enroute procedures for aircraft operations above the mixing height specified in the

<sup>59</sup> FAA Order 1050.1E, Chg.1, App. A, sec. 2.3.

<sup>60</sup> 40 C.F.R. § 93.153(b).

<sup>61</sup> FAA Order 1050.1E, Chg. 1, App. A, sec. 2.1c.

applicable SIP (or 3,000 feet AGL in places without an established mixing height). In addition, the EPA regulations allow federal agencies to identify specific actions as “presumed to conform” (PTC) to the applicable SIP.<sup>62</sup> In a notice published in the Federal Register, the FAA has identified several actions that “will not exceed the applicable *de minimis* emissions levels” and, therefore, are presumed to conform, including ATC activities and adoption of approach, departure, and enroute procedures for air operations.<sup>63</sup> The FAA’s PTC notice explains that aircraft emissions above the mixing height do not have an effect on pollution concentrations at ground level. The notice also specifically notes that changes in air traffic procedures above 1,500 feet AGL and below the mixing height “would have little if any effect on emissions and ground concentrations.”<sup>64</sup>

### 5.8.3 Potential Impacts – 2015 and 2020

The fuel burn analysis indicates that under the Proposed Action there would be a decrease in fuel burn (0.79 percent in 2015 and 0.77 percent in 2020) when compared to the No Action Alternative. This would result in a corresponding decrease in emissions and ground concentrations. Therefore, no significant impacts to air quality are anticipated. No further air quality analysis is necessary, a conformity determination is not required, and the Proposed Action would not result in a significant impact to air quality.

The No Action Alternative would not result in a change in the number of aircraft operations or air traffic routes; therefore, no impacts to air quality would be anticipated.

## 5.9 Climate

This section discusses greenhouse gas (GHG) emissions and effects to the climate as they relate to the Proposed Action and the No Action Alternative.

### 5.9.1 Summary of Impacts

Under the Proposed Action, fuel burn would decrease as would GHG emissions. Therefore, no impacts to climate would be anticipated.

The No Action Alternative would not result in a change in the number of aircraft operations or air traffic routes; therefore, no impacts to climate would be anticipated.

### 5.9.2 Methodology

In accordance with FAA guidance, estimated CO<sub>2</sub> emissions were calculated from the amount of fuel burned under the No Action Alternative and the Proposed Action in 2015 and 2020 (see Section 5.8). The resulting CO<sub>2</sub> emissions were then reported as CO<sub>2</sub>e.

### 5.9.3 Potential Impacts – 2015 and 2020

**Table 5-6** shows project-related CO<sub>2</sub>e emissions. In 2015, the Proposed Action would produce approximately 4,784 metric tons (MT) of CO<sub>2</sub>e and the No Action Alternative would produce approximately 4,822 MT of CO<sub>2</sub>e. This represents a decrease of approximately 38 MT of CO<sub>2</sub>e or a reduction of 0.79 percent under the Proposed Action when compared to

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<sup>62</sup> Id at 93.153(f).

<sup>63</sup> Federal Presumed to Conform Actions under General Conformity, 72 Fed. Reg. 41565 (July 30, 2007).

<sup>64</sup> Id.

the No Action Alternative. Similarly, in 2020, the Proposed Action would produce approximately 5,510 MT of CO<sub>2</sub>e and the No Action Alternative would produce approximately 5,553 MT of CO<sub>2</sub>e. This represents a decrease of approximately 43 MT of CO<sub>2</sub>e or a reduction of 0.77 percent under the Proposed Action when compared to the No Action Alternative.

**Table 5-6 CO<sub>2</sub>e Emissions – 2015 and 2020**

	2015		2020	
	No Action Alternative	Proposed Action	No Action Alternative	Proposed Action
<b>CO<sub>2</sub>e Emissions (MT)</b>	4,822.0	4,784.1	5,553.0	5,510.0
<b>Volume Change (MT)</b>		-37.9		-43
<b>(Proposed Action – No Action Alternative)</b>		-0.79		-0.77

*Note: CO<sub>2</sub>e = Carbon Dioxide Equivalent*

Source: ATAC Corporation, August 2014 (NIRS modeling results).

Prepared by: ATAC Corporation, August 2014.

## 5.10 Cumulative Impacts

Consideration of cumulative impacts applies to the impacts resulting from the implementation of the Proposed Action with other actions. CEQ regulations define cumulative impact as “an impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions.”<sup>65</sup> The regulations also state that cumulative impacts can result from individually minor, but collectively significant actions that take place over a period of time.

The Proposed Action would not result in any direct, indirect, or cumulative impacts to environmental resources within the General Study Area. Accordingly, no significant cumulative impacts would be anticipated.

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<sup>65</sup> 40 C.F.R § 1508.7