5. Cumulative and Other Impacts

5.1 Introduction

A discussion of the potential cumulative impacts of a proposed action and alternatives is required by NEPA and agency-implementing regulations. The CEQ defines cumulative impacts as the "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. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time" (40 CFR 1508.7). Informed decisionmaking can be served through consideration of cumulative impacts.

Cumulative impacts analysis captures the impacts that result from a proposed action, in combination with the combined impacts of other similar past, present, or reasonably foreseeable future actions, regardless of the entity that implements them. Cumulative impacts are considered in the time and geographic contexts. In the case of this analysis, the relevant timeframe context includes the implementation and operational phases of the proposed action. The geographic context is the large geographic area being considered. As discussed in **Section 1.2.5**, the Proposed Action involves a large geographic area, spanning coastal areas and selected inland waterways, as well as offshore locations, in essentially the entire United States plus other strategic locations. Given this large geographic area of potential impacts, the potential impacts from constructing individual towers becomes diluted.

When applying the concept of cumulative impacts to a programmatic analysis, some additional consideration must be given to existing uncertainty associated with specific locations that will be selected in the future for the installation of AIS equipment and associated infrastructure development, as applicable. In addition, the concept of "reasonably foreseeable" has been defined as "sufficiently likely to occur that a person of ordinary prudence would take it into account in reaching a decision." *City of Shoreacres v. Waterworth*, 420 F.3d 440 (5th Cir. 2005), quoting *Sierra Club v. Marsh*, 976 F.2d 763, 767 (1st Cir. 1992). This interpretation of "reasonably foreseeable" should be carried forward in assessing cumulative impacts in the context of this programmatic analysis. The reasonably foreseeable standard has an important role in constraining cumulative impact analysis to a discussion of impacts that are more likely than not, as opposed to impacts that are only speculative.

In part to accommodate the issues of uncertainty, the PEIS incorporates the concept of "tiering." CEQ encourages the use of tiering "to eliminate repetitive discussions of the same issues and focus on issues ripe for decisions at each level of environmental review" (40 CFR 1502.20). Tiering is applied to environmental documentation of general matters and broad concepts (e.g., national programs or policy statements) with subsequent site-specific actions intended to be addressed by subsequent narrower site-specific environmental analyses (e.g., an environmental assessment of a tower construction project identified some time in the future). Such subsequent environmental analyses are intended to incorporate the PEIS by reference and concentrate solely on the site-specific issues then ripe for analysis (40 CFR 1508.28).

Given the relatively small footprint of potential construction projects or equipment installations under the proposed implementation of the NAIS project, the wide geographic separation of locations affected by these projects, and the ongoing uncertainty relative to the specific sites to be selected and the types of infrastructure to be utilized, cumulative impact assessment is particularly relevant to the site-specific environmental documentation to be tiered off of this PEIS. However, some generalizations can be formulated and are presented below.

5.2 Reasonably Foreseeable Future Actions

5.2.1 Other USCG Programs

Within the USCG, cumulative impacts would be assessed within the context of how implementation of the proposed NAIS project would combine with other existing or developing USCG data transmission/collection and tower program impacts to produce an additive effect. Relevant USCG programs were discussed in **Section 2** and are summarized below.

It is the practice of the USCG to collocate antenna sites and share telecommunication infrastructure for systems from different programs whenever technically feasible. Therefore, it would be anticipated that NAIS equipment would be integrated into existing sites for the USCG programs described below, where possible, or would be collocated with new sites as they develop. In such a case, because infrastructure would be shared, incremental cumulative impacts from adding the NAIS component to these sites would be a small subset of the overall site development plan and thus considered to be a negligible cumulative impact. Further, site and infrastructure sharing could be viewed as environmentally beneficial as compared to the impact of developing discrete equipment locations constructed for a single purpose.

National Distress and Response System Modernization Project (Rescue 21). The National Distress and Response System (NDRS), the USCG's short range VHF-FM radio system, consists of approximately 300 remotely controlled VHF radios and antenna high-level sites located throughout the terrestrial regions of the continental United States (including the Great Lakes and all major inland bays and waterways), Alaska, Hawaii, the Caribbean, and Guam. The NDRS forms the backbone of the USCG's Short Range Communication System. It uses VHF-FM radios to provide two-way voice communications coverage in coastal areas and navigable inland waterways where commercial or recreational traffic exists. The primary mission of the NDRS is to provide the USCG with a means to monitor the international VHF-FM distress frequency and to coordinate SAR response operations. Its secondary mission is to provide command and control communications for virtually all USCG missions.

Currently the NDRS consists of approximately 300 remotely controlled VHF radios and antenna high-level sites, and the USCG estimates that 377 sites are needed to provide full coverage of the coastal zone and inland waterways (USCG 2002). Modernization of the NDRS was Congressionally mandated by the *Department of Transportation and Related Agencies Appropriations Bill, 2002.* This bill states that the NDRS modernization would be fully deployed by Fiscal Year 2006 (USCG 2002).

Nationwide Differential Global Positioning System. The purpose of the National Differential Global Positioning System (NDGPS) is to provide accurate positioning and location information to travelers, emergency response units, and other customers. The system provides 1- to 3-meter navigation accuracy. This will improve collision notification systems, enable cooperative vehicle-highway collision-avoidance systems, and provide more accurate in-vehicle route guidance systems.

The USCG is a key member of the seven-agency partnership for the NDGPS. The other members of the project are the U.S. Air Force, Federal Railroad Administration, USACE, Federal Highway Administration, NOAA, and the Office of the Secretary of the U.S. Department of Transporation. Under Phase I of the proposed expansion, at least one reference station would provide a usable NDGPS transmission to a global positioning system user anywhere in the continental United States and portions of Alaska by the year 2000. Under Phase II, differential corrections from at least two reference stations (dual coverage) would be available anywhere in the continental United States by 2002. Reference station operation and maintenance are also considered during the 15-year life of NDGPS, as are actions that occur during decommissioning (DOT 1999).

Ports and Waterways Safety Systems. PAWSS is a major acquisition project to build new VTS where necessary and replace existing systems. It is also a process that reaches out to port stakeholders to comprehensively assess safety and identify needed corrective actions. The PAWSS VTS project is a national transportation system that collects, processes, and disseminates information on the marine operating environment and maritime vessel traffic in major U.S. ports and waterways. The PAWSS VTS mission is monitoring and assessing vessel movements within a Vessel Traffic Service Area, exchanging information regarding vessel movements with vessel and shore-based personnel, and providing advisories to vessel masters. Other USCG missions are supported through the exchange of information with appropriate USCG units. A major goal of the PAWSS VTS is to use AIS and other technologies that enable information gathering and dissemination in ways that add no additional operational burden to the mariner (USCG 2005).

Integrated Deepwater Systems Program ("Deepwater Program"). Many of the USCG's most critical missions—countering terrorist threats, rescuing mariners in distress, catching drug smugglers, stopping illegal migrants, and protecting the marine environment—demand forces that are able to operate effectively across a broad geographic spectrum, from overseas operating areas to U.S. EEZ, coastal, and port regions. USCG deepwater cutters and aircraft are designed to operate throughout these diverse environments. They comprise the first line of the USCG's layered defense against threats to America's homeland and maritime security.

Current USCG Deepwater assets are aging and technologically obsolete. They lack essential speed, interoperability, sensor, and communication capabilities, which in turn limit their overall mission effectiveness and efficiency. To address these shortfalls, the USCG established the Deepwater Program to replace and modernize its aging force of cutters and aircraft, and their supporting command-and-control and logistics systems. These new assets, which possess common systems and technologies, common operational concepts, and a common logistics base, will give the USCG a significantly improved MDA, as well as the improved ability to intercept and engage activities that pose a direct threat to U.S. sovereignty and security. The Deepwater Program is the largest and most innovative acquisition in the USCG's history and is expected to be completed in approximately 20 years.

The Deepwater Program will ensure that the USCG and the nation has cutters, aircraft, and command-and-control systems that can capably defend against maritime threats far out to sea, before they can reach U.S. citizens, territory, or vital interests.

5.2.2 Other Communications Towers

Communications towers, such as cellular telephone transmission towers, have proliferated in recent years and can be seen in business parks, industrial areas, neighborhoods, shopping malls, and along rural highways. Towers follow major highways and are found in cities, suburbs, and towns across America. While towers are seen everywhere today, cellular companies are under pressure to expand their networks' geographical boundaries due to increasing demand for wireless communications coverage (Wikle 2002).

This proliferation of antennas is the result of an increasing demand for wireless services and new technology (Tuesley 1999). In the United States, demand for wireless service translated into approximately 1,950,000 subscribers in 2005 (CTIA 2005). There was an approximate 85 percent increase in the number of cellular telephone service subscribers in the United States between 1995 and 2005. In 2001, the Cellular Telecommunications Industry Association (CTIA) reported that there were approximately 128,000 cellular telephone communications towers installed throughout the United States (CTIA 2005 and Wikle 2002). In June 2005, the CTIA reported that this number had grown to approximately 178,025 cellular telephone communications towers (CTIA 2005), which is a 20 percent increase since 2001.

5.3 Cumulative Impact Analysis by Resource Area

Cumulative impacts assessment is relevant to all resource categories analyzed in **Section 4** of this PEIS. However, assessing cumulative impacts for many resource areas on a regional or national basis for unknown future NAIS shore-based RF sites would be purely speculative at the PEIS level. Therefore, the following cumulative impacts discussion of individual resource categories is focused solely on those categories that were identified as having a likelihood for potential cumulative impacts.

Biological Resources. Within this category, there is particular concern with respect to potential cumulative impacts of communications towers on migratory birds. A detailed discussion of the potential impacts on migratory birds from the proposed implementation of the NAIS project is presented in **Section 4.6.2**. According to a USFWS representative, "The Service believes that the large number of towers that already exist probably does constitute a cumulative impact on migratory birds, and with the proliferation of towers that is expected over the next decade or so, that impact is going to increase exponentially. The Service feels that cumulative impacts are already significant and are probably going to become more significant …" (Willis 1999).

On a national basis, any new impacts on migratory birds due to implementation of the proposed NAIS project could likewise be considered as a cumulative impact when viewed in context of the thousands of towers across the United States that cause similar impacts (USFWS 2000). On a regional basis, the proposed implementation of the NAIS project could have additional cumulative impacts on particular species or groups of species where new NAIS towers are within particular flyways. For example, a new NAIS tower serving an inland waterway within a particular flyway could have direct adverse impacts on a certain species of bird using that flyway. Within the same flyway, an additional new NAIS tower sited on the shoreline could have additional, cumulative impacts on the particular species as that species makes its way north or south during its migrations.

Mitigation of cumulative impacts on migratory birds would be accomplished by those means identified in **Section 4.6.2** relating to tower height, lighting, type of structure, or site location, among other factors.

Cultural Resources. A detailed discussion of the potential impacts on cultural resources from the proposed implementation of the NAIS project is presented in **Section 4.7**. With respect to cumulative cultural resource impacts, it is unlikely that multiple, newly installed NAIS shore-based RF structures would cumulatively impact any single cultural resource. This conclusion is based upon the fact that NAIS would be implemented within a broad geographic area, as described in **Section 5.1.** In the unlikely event that the All Tower Builds Alternative was implemented, the USCG estimates that approximately 450 new shore-based RF structures would need to be installed to achieve the required nationwide coverage. As these 450 new shore-based RF sites would be spaced along 95,000 miles of coastline and inland waterways, it is unlikely that multiple NAIS shore-based RF sites would be installed close enough to one another to cause a cumulative impact on any discrete cultural resource.

Cumulative cultural resource impacts could occur from the proposed implementation of the NAIS project in two different ways. First, installation of new AIS equipment, either on existing structures, or on newly built towers, could lead to cumulative impacts on a discrete cultural resource where the particular resource is already impacted by similar types of equipment, such as the visual cluttering of a cultural resource by cellular communications towers. Secondly, installing new AIS equipment at or near a particular category of cultural resource in multiple sites nationwide could also lead to a cumulative impact on that category of cultural resource. For example, installing one new AIS receiver on a single historic bridge could have an adverse effect on that particular bridge. Installing AIS receivers on multiple historic bridges nationwide could lead to cumulative impacts on historic bridges as a category.

Mitigating cumulative impacts on cultural resources would be accomplished through the mitigation of individual cultural resource impacts at the site-specific implementation level. Specific information about specific potential mitigation measures is presented in **Sections 3.7 and 4.7.**

Visual Resources. A discussion of the broad issues associated with visual resources and impacts from communications towers is presented in **Sections 3.9 and 4.9**. If visual impacts from the proposed implementation of the NAIS project are identified at multiple sites, the potential for significant cumulative visual impacts increases. Cumulative visual impacts could also result where a new NAIS tower contributes to the visual clutter caused by other existing towers in a discrete area.

In the course of the proposed implementation of the NAIS project, the USCG would give consideration to the potential negative cumulative impacts on visual resources that could result from installing NAIS equipment on new towers. The USCG would address this issue on a site-specific basis during the implementation phase for NAIS. Any mitigation measures would be identified and addressed in the site-specific environmental documentation that will be prepared in follow-on environmental studies, as required, that would complement the analysis in this PEIS.

5.4 The Relationship Between Short-Term Uses of Man's Environment and the Maintenance and Enhancement of Long-Term Productivity and Irreversible or Irretrievable Commitment of Resources

NEPA regulations require that the relationship between short-term use of the environment and the impacts of such use might have on the maintenance and enhancement of long-term productivity of the affected environment be addressed. Impacts that narrow the range of beneficial uses of the environment are of particular concern. Such impacts can arise from the possibility that choosing one development option reduces future flexibility in pursuing other options, or from the possibility that giving over a parcel of land or other resource to a certain use eliminates the possibility of other uses being performed at the site. It is anticipated that implementation of the Proposed Action would not result in any impacts that would significantly narrow the range of future beneficial uses of the environment because it would not pose any long-term risks to health, safety, or the general welfare of the public communities surrounding USCG facilities. Rather, the proposed implementation of the NAIS project would be a benefit and alleviate long-term risks to health, safety, and general welfare.

NEPA regulations also require an analysis of irreversible or irretrievable impacts resulting from implementation of proposed actions or alternatives. Resources that are irreversibly or irretrievably committed to a project are those that are typically used on a long-term basis that cannot be recovered. These resources are irretrievable in that they would be used for one project when they could have been used for other purposes. Another impact that falls under the category of irretrievable commitment of resources is the destruction of natural resources that could limit the range of potential uses of the particular resource.

The proposed implementation of the NAIS project would require commitment of nonrenewable resources both for construction and long-term operations and maintenance. These resources include water, energy, lumber, sand and gravel, and metals. Use of these resources would represent an incremental effect on the regional consumption of these commodities. In addition, the NAIS project, if implemented, would commit work-force time for construction, engineering, environmental review and compliance, operation, and maintenance. All of these activities represent commitments of resources that could have been applied to projects other than NAIS. The following is a discussion of the irreversible and irretrievable commitments of resources by resource area.

There would be no irreversible or irretrievable commitment of resources with respect to noise, air quality, visual resources, land use, hazardous substances, socioeconomic resources (other than labor discussed above), or environmental justice. Where any potential irreversible or irretrievable commitments of resources are identified, they would only apply to new shore-based RF sites, especially towers that could be built under the Combination of Collocations and New Tower Builds Alternative and the All New Tower Builds Alternative. It is assumed any new shore-based RF site would be permanent once installed.

Earth Resources. Commitment of an area of land for a tower site would be permanent and would therefore result in an irretrievable commitment of earth resources. **Sections 3.4 and 4.4** present a detailed discussion of the earth resources potentially affected by the Proposed Action. Any effect implementation of the Proposed Action has on the earth resources would be an irreversible or irretrievable commitment of resources.

Water Resources. Commitment of an area of land for a new NAIS shore-based RF site could have permanent impacts on water resources, depending on the location of the site. **Sections 3.5 and 4.5** present a detailed discussion of the water resources potentially affected by the Proposed Action and alternatives. Any impact implementation of the Proposed Action has on water resources, including use of water as a resource for construction, would be an irreversible or irretrievable commitment of resources.

Biological Resources. **Sections 3.6, 4.6, and 5.3** discuss the potential impacts of RF tower structures on migratory birds. Any birds killed at proposed NAIS tower sites and resulting impacts on bird populations would be an irreversible or irretrievable commitment of resources. Any impacts on other biological resources would likely be localized and incremental, although permanent.

Cultural Resources. Ground-disturbing activities associated with the implementation of the proposed NAIS project would have the potential to result in irretrievable commitment of archaeological resources if present. Any visual impacts on historic buildings and structures through implementation of the proposed action or alternatives would be considered permanent, although it is possible that such impacts could be reversed should a site be abandoned and the tower and associated ancillary facilities and appurtenances removed.

Infrastructure. Energy consumed and waste generated and disposed of as a result of the proposed implementation of the NAIS project would be permanent, in that consumed energy through construction or operation of a facility would not be replaced and space used in solid waste management facilities for disposal of material associated with project implementation or operations would not be reversed. Transportation and drainage-related resources changed in some way through the implementation of the proposed action or future operations would be permanent.

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This EIS has been prepared under the direction of HQ USCG and the Ft. Worth Army Corps of Engineers. The individuals who assisted in resolving issues and providing agency guidance for this document are listed below.

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