

ATTACHMENT 27
CUMULATIVE IMPACTS ANALYSIS REPORT FOR
PR-10

**CUMULATIVE IMPACT ANALYSIS REPORT
FOR
COMPLETION OF CONSTRUCTION PR-10
ADJUNTAS TO UTUADO**

JULY 2024

1.0 Cumulative Impacts Analysis

1.1 Regulatory Setting

Cumulative impacts are those that result from past, present, and reasonably foreseeable future actions, combined with the potential impacts of the proposed action construction. A cumulative effect assessment considers a review of the collective impacts posed by other entities reasonably foreseeable projects. Cumulative impacts can result from individually minor, but collectively substantial, impacts taking place over a period of time.

Cumulative impacts to resources in the proposed action area may result from residential, commercial, industrial, and highway development, as well as from agricultural development and the conversion to more intensive types of agricultural cultivation. The described land use activities can degrade habitat and species diversity through consequences such as displacement and fragmentation of habitats and populations, alteration of hydrology, contamination, erosion, sedimentation, disruption of migration corridors, and changes in water quality. They can also contribute to potential community impacts identified for the project, such as changes in community character, traffic patterns, housing availability, and employment.

Guidance for assessing cumulative impacts for the proposed action were obtained from various documents such as:

- CEQ's cumulative effects guidance, Considering Cumulative Effects under NEPA (https://ceq.doe.gov/publications/cumulative_effects.html)
- Cumulative Effects Evaluation Handbook, Florida Department of Transportation, December 2012)([cee-quickguide-2012-12187f493e7030554f3fabfd1bb0d26ce010649a6fe5abda42f9bca6b2688cc971584e7a78d16b57446195e7cf524360033b6aa53d145c2a4fb8af985ed371d9eefa.pdf](https://www.fdot.com/ceq/quickguide/2012-12187f493e7030554f3fabfd1bb0d26ce010649a6fe5abda42f9bca6b2688cc971584e7a78d16b57446195e7cf524360033b6aa53d145c2a4fb8af985ed371d9eefa.pdf)) ([fdotwww.blob.core.windows.net](https://www.fdot.com/ceq/quickguide/2012-12187f493e7030554f3fabfd1bb0d26ce010649a6fe5abda42f9bca6b2688cc971584e7a78d16b57446195e7cf524360033b6aa53d145c2a4fb8af985ed371d9eefa.pdf))

Construction and operation of the proposed action build alternative would result in direct and indirect impacts that could contribute to cumulative effects to the built and natural environment when combined with other related past, present, and reasonably foreseeable future actions.

1.1.1 Methodology

Cumulative impacts were identified by comparing the impacts of the proposed action and other past, current, or proposed actions in the area to establish whether, in the aggregate, they could result in cumulative environmental impacts. Both direct and indirect impacts are assessed. The cumulative effect analysis focuses on those issues and resources that would be affected by

aggregation of stress factors on the environment and does not address in detail those topics that would not have additional environmental effects from the cumulative condition. The analysis provided in this section considered the effects of the other projects and the build alternative in assessing whether a particular environmental parameter would experience cumulative adverse impacts. Specific geographic boundaries for cumulative effects are determined for each resource analyzed and may vary accordingly.

Information about further actions anticipated to occur within the proposed action area were obtained from the Puerto Rico Permits Management Office (PMO), which is the local entity through which private and public projects are submitted for their review and approval. They maintain records of projects and permits in a GIS database. In general, since the proposed action area is in a rural area that exhibits rugged terrain conditions resulting from its location within the Central Mountainous area known as Cordillera Central, significant urbanized areas are not observed within corridor of the proposed action except as those associated with the towns of Adjuntas and Utuado. The main access roadway within the area is constituted PR-123, a two (2) lane road whose construction started more than a century ago, to facilitate the transportation of coffee to the Port of Ponce. Information obtained from the U.S. Census indicate that the population of the area exhibit low income and education levels, which in helps to explain the lack of extensive commercial and/or industrial uses in the area. Agricultural uses are still observed but not as extensive as the ones observed during the early and middle part of the twentieth century. Current U.S. Census data indicates a trend toward the reduction in population (estimated in - 6.2 % and -24.9 % between 2000 and 2020 for Adjuntas and Utuado respectively), a pattern also observed across most of the Island. The lack of extensive urbanized areas helps to explain the current underdeveloped conditions. The following eight steps serve as the guidelines for identifying and assessing cumulative impacts.

- Identify the resources to consider in the cumulative impact analysis by gathering input from knowledgeable individuals and reliable information sources.
- Define the geographic boundary of the Resource Study Area (RSA) for each resource to be addressed in the cumulative impact analysis.
- Describe the current health and historical context of each resource.
- Identify the direct and indirect impacts of the proposed project that might contribute to a cumulative impact on the identified resources.
- Identify a set of current and reasonably foreseeable future actions or projects and their associated environmental impacts to include in the cumulative impact analysis.
- Assess cumulative impacts.
- Report the results of the cumulative impact analysis.

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- Assess the need for mitigation and/or recommendations for actions by other agencies to address a cumulative impact.

1.1.2 Affected Environment

PR-123 between Adjuntas and Utuado with an approximate length of 14 kilometers constitute the last section of roadway whose relocation as the designated PR-10 has not been completed after the approval of a FEIS in 1979. The north section of PR-10 starting in the Municipality of Arecibo and ending of the Municipality of Utuado was constructed and currently in operation, as well as south section starting in the Municipality of Ponce and ending in the Municipality of Adjuntas has been also completed and in operation. It is important to indicate that both sections are terrestrially interconnected by a section of PR-123 with an estimated length of 14 kilometers with an Annual Average Traffic (AADT) of 4,239 vehicles per day for 2022 (reference Multimodal Long Range Transportation Plan 2050, page 199). This roadway is located toward the east side bank of Rio Grande de Arecibo, while the proposed action is located toward the west side of the Rio Grande de Arecibo.

The proposed action area is located, in the central mountainous part of Puerto Rico and currently lacks visible and extensive development. Average rainfall in Puerto Rico is 70 inches (1990 – 2020). Rainfall varies geographically and is much more abundant in the northern part of the island than in the southern part, because the latter lies in a rain shadow caused by the central mountain range, which forces the northeasterly trade winds to rise and precipitation to fall on the windward slopes (**Atlas of Ground-Water Resources in Puerto Rico and the U.S. Virgin Islands**, USGS, Report 94-4198, 1996). Annual rainfall ranges from 30 inches in the western end of the south coast area valleys to about 160 inches near the top of El Yunque (Colón-Dieppa and Torres Sierra, 1991, p. 475). Rainfall also varies seasonally. The driest month is February and the wettest months are September and October. The municipalities of Adjuntas and Utuado, where the proposed action is located exhibit an average annual rainfall of 73.7 and 70.9 inches respectively. This condition results in the development of an exuberant vegetation along the entire proposed action corridor, a condition that is not observed toward the southern coastal plains of the Island.

Residential uses are scattered within the area which exhibit some forested zones resulting from the shift of an agriculturally based economy at the beginning of the last century to an industrial and services based one starting approximately in 1948 when Operation Bootstrap (“Operación Manos a la Obra”) promoted by the local government, provided tax incentives to mainland-based industries (like pharmaceutical and petrochemical ones) that established their operations in Puerto Rico in an effort to pull the Island into the global economy. Another incentive was the possibility of benefiting from a cheap labor force. This initiative resulted in the internal

populations movement to urban areas, which consequently resulted in the significant reduction of the previous century agriculturally based economy that included coffee plantations were common with the area as well as subsistence agricultural practices. As these practices were abandoned or significantly reduced, secondary forested areas began to dominate the landscape. Toward the north a south part of the proposed action area, sugar cane plantations flourished during the past century until the 1990's, when lower cost of sugar obtained from external sources, gradually affected the economics of the operation, and eventually caused their disappearance. Under this conditions, lower scale agricultural uses in the proposed action area remained accompanied by a low development of commercial and industrial uses. Residential uses in rural areas retained its characteristics while most of the previously coffee plantations were abandoned, resulting in the population of these areas with common flora species observed within the region. This condition was documented in the FEIS approved in 1979. Because of the previous described conditions, the proposed action area remains not significantly changed with respect to its land uses characteristics after the shift of the Island's economy and lack of urban development requiring to expand the area infrastructure (i.e.; potable water, electricity, municipal roadways, etc.) to accommodate new developments. Recent U.S. Census data indicates that a trend toward a reduction in the populations of the municipalities of Adjuntas and Utuado is still being experienced in the proposed action area, when considering 2000 to 2020 information. Also, as indicated in section 5.2.4 Natural Features of the EA characteristics of the observed flora exhibit the results of the changes in agricultural practices through the years as a well as the damages caused by the storm winds caused by hurricanes María and Fiona on 2017 and 2022 respectively. These impacts have been documented by both local and federal agencies.

1.1.3 Reasonably Foreseeable Projects

The proposed action has been included in the Multimodal Long-Range Transportation Plan (MLRTP) 2050 and a review of its recommendations discloses the fact that no additional new highway construction projects have been identified or planned to be developed in this area by the PRHTA/FHWA. Repair projects aimed to correct damages caused by Hurricane María and Fiona have been identified,

A review of the PMO database disclosed the fact that aside from the PRHTA, no other government agency has submitted for its review, projects within the study area (see **Table 1**). With respect to private entities, small projects consisting of lots segregations, permit applications for small businesses, individual residences repairs in the aftermath of hurricane María and PRHTA sponsored projects for the repairs of PR-123 and PR-10 constitute the most significant ones identified from the data review (see **Figure 1**).

Table 1: Projects Obtained from the PMO Database within the Proposed Action Area

Project Name	Project Location	Project Description	Anticipated Completion Date
Land Use Consultation for a multiple single unit tourism project of 100 cabins	PR-123, km. 45.5 Adjuntas, PR	Tourism private project	05/24/2005 Not approved, archived
Use Permit for a small business	PR-123, km. 39.8, Adjuntas, PR	Permit filed to operate a small business	Approved in 01/27/2022
Permit for segregation of 9 residential lots	PR-135, km. 81.6, Adjuntas, PR	Permit to segregate lost from a bigger property	Approved in 09/04/2019
Communication Antenna Use Permit	PR-523 interior Utuado, PR	Permit to operate Antenna after its construction	Approved in 04/21/2015
Use Permit for Coffee Farm	Adjuntas, PR	Permit to operate a coffee farm business	Approved 03/23/2022
Catering Services Use Permit	PR-123, km. 41.5, Adjuntas, PR	Permit to operate a catering service business	Approved 01/27/2022
Repairs of bridge 1355 due to scour of its abutments (PRHTA)	PR-123 Adjuntas, PR	Environmental Review	Completed in 2015
Repair of a state road	PR-527, km. 0.70 Adjuntas, PR	Consultation for the Repair of highway due to a landslide caused by hurricane Maria	Approved in 2020 Completed
PR-10 by PRHTA	Adjuntas-Utuado, PR	Environmental and infrastructure local consultations for Sections II, III, IV and V consisting of a two (2) lanes roadway and an auxiliary lane for uphill cars passing of heavy trucks (3.65 meters width)	Approved between 2015 and 2021. If HUD CDBG-MIT funding granted in 2024, project may be completed in 2030.

The projected horizon considered for the foreseeable projects analysis is of 20 years in the future.

1.1.4 Resources Subject to Cumulative Impact Analysis

Based on the nature of the proposed project, the affected project area, and the impact analysis for each resource conducted for this EA, it was determined that the following resources would not require detailed cumulative impact analysis for the reason described under each resource area:

1.1.4.1 Land Use

The RSA for land use and planning covers the proposed action ROW acquisition area and its immediate vicinity and the communities observed along the path of PR-123. It shall be noted that proposed action area is comprised of vacant lots with no urban developments, except for mostly scattered residential uses. Some agricultural uses are also observed, mostly close to the town of Adjuntas as observed from recent aerial photographs. Most commercial uses within the area are observed in the towns of Adjuntas and Utuado, outside the physical boundaries of the proposed action ROW or adjacent. They are observed toward the north and south boundaries of the proposed action corridor. Some cafeteria/bars small businesses are located along the path of PR-123. Development of the area has been curtailed by the rugged conditions of the area with low population density and local zoning restrictions promote the conservation of this lands. Also, it is important to note that approximately 790 acres have been already acquired for the construction of the proposed action since 2016. This means that no development has occurred in those government owned properties and would not occur. This observation also applies to the remaining properties remaining properties of Section IV to be acquired by the PRHTA. A review of the ROW acquisition for the project reveals that basically all the properties located between the proposed action and the Rio Grande de Arecibo will be owned by the Government of Puerto Rico. It shall be noted, that the corridor for this highway has been incorporated in the state and local planning that restricts their development due to the zoning district for conservation designation of the area but at the same time recognizing the protection of the corridor the planned PR-10 construction (see **Figure 2**). The proposed communities in which the proposed project is located are almost entirely built out, containing few undeveloped or vacant parcels.

Since no extensive urban developments would be allowed within the limits of the RSA no direct, indirect, or cumulative impacts are anticipated and no further analysis is required for none of the considered alternatives.

1.1.4.2 Parks and Recreation

The RSA for parks and recreation facilities includes those resources located within the ROW of the proposed action and adjacent properties as discussed in section 5.1.12 Compliance with Section 4(f) of the EA. Since no designated parks or recreation facilities were identified for the resource no direct, indirect, or cumulative impact are anticipated and no further analysis is required for none of the considered alternatives.

1.1.4.3 Farmland

The RSA for this resource is the ROW and adjacent properties. Some agricultural uses are observed. Some agricultural uses may be observed near the ROW of the project close to Section V in the municipality of Adjuntas. However, the proposed action does not have a direct nor indirect impact on this area since it is located at a higher elevation than the one of proposed action. In addition, a review of the high agricultural value map developed by the U.S. Department of Agriculture did not disclose the presence of this type of soils within the proposed action corridor (see Section 5.1.9 of the EA). Therefore, based upon the available information and analysis above, direct, or indirect cumulative impacts to farmland are not anticipated, and no further analysis is required for the no build, improvement to PR-123 and the proposed action alternatives.

1.1.4.4 Historic Resources

The RSA for this resource is the ROW of the proposed action and its immediate vicinity. As discussed in section 5.1.11 of the EA, no archaeological/historic resources were identified within the proposed action corridor. Because of this finding, an endorsement letter of SHPO under provisions of Section 10 of the NHPA was issued for the proposed action. The No build alternative would have no direct, indirect, or cumulative impact, however, the alternative of improving PR-123 would have direct, indirect impact on some historical resources since the structures erected along the path of the roadway are considered historic resources due to their construction more than 100 years ago. Therefore, this would require to coordinate with the SHPO and the Puerto Rico Institute of Culture (PRIC). No cumulative impacts are expected from this alternative adoption. With respect to the proposed action alternative, since no designated parks or recreation facilities were identified for the resource no direct, indirect, or cumulative impact are anticipated and no further analysis is required.

1.1.4.5 Community Impacts

The components of community impacts that could have the potential to be affected on a cumulative basis include community disruption deriving from roadway construction and increased urbanization due to expanded pavement; modified/new ramps; concrete barriers, etc.

Additionally, modification of current community character due to the presence of a new roadway, need to relocated institutional uses such as schools, churches, medical facilities, or work places, that could affect the cohesion of the communities is considered as part of the analysis of this type of impacts. None of the previously described facilities existed along the path of the proposed action corridor as discussed in section 5.2.3 Community Facilities and Services of the EA.

The RSA for community impact assessment includes the proposed action ROW and its immediate vicinity. Development within the RSA has not occurred due to the legacy land use characteristics of the area and the acquisition of the ROW already completed for sections II, III, and V of the proposed project as well as the rugged topographical condition of the area. This implies that the characteristics of the communities of area have not changed since none of the institutional facilities associated with this type of impact has been constructed and is not being planned. Because of the described condition, and the fact that the proposed action does not divide an existing residential area, none of the usual community disruption impacts are reasonably foreseen for the proposed action, except for a direct but temporary impact resulting from the movement of heavy trucks and construction equipment at the start and ending points of the proposed action construction access.

The study area census tract data do not characterize the resident population as a predominantly minority population. On the contrary, the population along this corridor contains a homogeneous population sharing the same socioeconomic characteristics of the municipalities. Therefore, as required to be considered by EO 12898, to disproportionate impact on either low-income communities nor minorities are anticipated.

The no build alternative would have no direct, indirect, or cumulative impact on communities. However, community impacts from construction of the build alternative would include temporary access control and disruption from construction materials delivery and other activities; air pollutant emissions from construction activities; and temporary noise-level elevations from construction equipment operations. These direct impacts have been described and addressed in sections 5.1.4 and 5.1.13 of the EA respectively and are associated to the construction activities. No indirect impacts during the construction are anticipated.

Based upon the above provided information and analysis, community impact related direct or indirect cumulative impacts are not anticipated to result, and no further analysis is necessary and no additional measures are required; however, it should be noted that the proposed action would result in a more resilient terrestrial infrastructure that will provide benefits for the community in the aftermath of a natural disaster since a more secure and modern access to emergency response teams, medical, and supplies and materials access would be available.

Finally, the proposed action implementation would be considered beneficial on a cumulative basis.

1.1.4.6 Utilities

Utilities (communications, electricity, potable water, sanitary sewer lines, etc.) are actively planned for and developed based upon service needs of the area in which they are provided. The RSA considered for this project is the ROW of the proposed action and its proximity. It shall be noted that due to the rural character of the area sanitary sewer lines are not available and residents use individual septic systems. A sanitary sewer system is basically available only in the urbanized areas located in the towns of Adjuntas and Utuado and their immediate vicinity. This is a common characteristic of the rural areas of the center part of the Island. Also, the project does require electricity since no lighting poles are considered in the design resulting from the location of the proposed action in a rural area.

The no build alternative would not have direct, indirect, or cumulative impacts while the alternative to provide improvements to PR-123 would result in impacts to existing utilities during the performance of construction activities since there would be a necessity to relocate to minimize their disruption. For the proposed action minimal impacts to utilities are expected due to their limited presence along the ROW. Any need to relocate a portion of a utility would be coordinated with the corresponding entity. Based upon the provided information direct or indirect cumulative impacts to utilities are not anticipated to result, and no further analysis is necessary and no additional measures are required.

1.1.4.7 Traffic and Transportation

The proposed action area is currently served by PR-123, which constitutes the only principal and terrestrial interconnection between the municipalities of Adjuntas and Utuado. As indicated in the affected environmental description, this old roadway has two (2) lanes, one in each direction, whose construction began in late nineteenth century during the Spaniard government. Therefore, from a traffic and transportation perspective, the condition of the proposed action area has remained unchanged.

A review of available government database and PRHTA/FHWA programming for the RSA, defined by the area, disclosed the fact that there are no foreseeable future transportation projects proposed for the area except for the proposed action, as discussed in section 5.4 of the EA and the 20250 Multimodal Long Range Transportation Plan for Other Urbanized Areas approved on December 27, 2023. The traffic network (i.e., RSA) used in the traffic forecasting process consists of the existing transportation system (PR-123), as well as projects with committed for future funding that were included in 2050 Multimodal Plan. As a result, the

forecasting network includes not only facilities and services in place today, but also those transportation improvements planned for future funded and committed for implementation through the horizon year. As previously discussed, the traffic analysis considers cumulative traffic impacts from all state and local projects within the study area.

Reasonably foreseeable traffic volumes for the proposed action have been considered as discussed in sections 2.1 Background Information, Existing Conditions, and Trends of PR-123 and Vicinity; section 5.2.3 Community Facilities and Services, Transportation and Accessibility of the EA. The no build and the PR-123 improvement alternative would not change the current transportation condition of the RSA and therefore no direct, indirect, or cumulative adverse effect of the RSA are anticipated. The proposed action would have a positive direct impact on the traffic conditions of the RSA with an enhanced resiliency but no cumulative impact requiring further analysis is necessary.

1.1.4.8 Hydrology and Floodplains

The RSA for the analysis of this subject is the geographic context for the analysis of cumulative impacts associated with hydrology and floodplain is the area covered by the ROW of proposed action and adjacent properties. The RSA has not been subjected to urbanization pressure over the past 50 years or more, and therefore no alteration of the local hydrology and floodplains have occurred. Most of the areas within the RSA are unpaved, and natural drainages features have remained unaltered. As discussed in Section 5.1.10 Flood Management of the EA, the proposed action would result in only one floodplain encroachment. The no build or PR-123 improvement alternative does not result in encroachment of floodplains, and therefore no direct, indirect, or cumulative impacts are expected for these alternatives. The proposed action would require to build a bridge over the flood plain associated with the Rio Grande de Arecibo River and 19 additional bridges to maintain the hydrologic conditions of the area. The proposed cross over the Rio Grande de Arecibo 100-year flood would not pose no risk to life or property associated with the proposed works. The development of the proposed action and the lack of additional developments within the RSA would not flood upstream of the proposed project improvements; therefore, no transportation routes would be interrupted or terminated beyond existing conditions.

Avoidance, Minimization, and/or Mitigation Measures, for the proposed action would not result in any adverse impacts to the natural and beneficial floodplain values, would not result in a significant change in flood risks or damage, does not have significant potential for interruption or termination of emergency services or emergency routes, and is not considered an adverse encroachment. The proposed action would not contribute to a cumulative impact to hydrology or floodplains.

Any future projects not anticipated at this time would also be required to analyze their individual and cumulative impacts to hydrology and floodplains. These proposed projects would be required to be designed such that conveyance facilities have adequate capacity to meet projected flows. Similarly, FEMA and local requirements ensure that development within the floodplain or floodway consider potential effects to buildings and their occupants or visitors. Based upon the information and analysis above, direct, or indirect cumulative impacts related to hydrology and floodplains are not anticipated to result, and no further analysis is necessary and no additional measures are required.

1.1.4.9 Water Quality/Sedimentation

The RSA for this resource is related has been established as a function of the location of the proposed action in the context of its location and vicinity of surface bodies water. Therefore, the Rio Grande de Arecibo River and its watershed constitute the RSA identified for the analysis of cumulative impacts associated with water quality for the proposed action. The RSA has undergone very limited urbanization over the past 50 years, resulting in minimal increase of stormwater runoff volumes. Most of the area remains unpaved and covered with vegetation, with rural communities scattered over region. Urban development has remained located within the towns of Adjuntas and Utuado, a condition that is not expected to change because of the Adjuntas and Utuado current Land Use Plans restrictions. It shall be indicated that water quality of the Rio Grande de Arecibo constitutes an important subject for consideration of the EA since downgradient toward the north of the Dos Bocas reservoir, a major potable water intake of what is locally known as the “Superaqueduct,” built by the Puerto Rico Aqueduct and Sewer Authority (PRASA) started its operation in 1996. Said facility has daily maximum design capacity for 100 million gallons per Day (MGD) out of which approximately 65 MGD are conveyed to the San Juan Metropolitan Area and the remaining 35 MGD are distributed among eight municipalities along its path. Once the raw water is treated at the Antonio Santiago Vázquez filtration plant (located at an approximate distance of 17.4 kilometers toward the north east boundary of the town of Utuado, in the municipality of Arecibo), the water is distributed through a 72” diameter pipe that runs mostly along the ROW of PR-22. For practical purposes, the Dos Bocas reservoir constitutes a sediment trap that serves to protect the intake of the potable water system from high loads of sediments originated in the upper parts of its drainage basin as indicated in studies conducted by the U.S. Geological Services (USGS) that are discussed later in this section. Finally, it shall be noted that Lago Adjuntas, which is located near section IV and V of the proposed action, was used as a source of potable in the past, is no longer operating as a source of potable water due to the cumulative effects of sedimentation in the lake. This effect is related to sources of sediments located toward the southern sections of the drainage basin.

In Puerto Rico, the Department of Natural and Environmental Resources (DNER) has received delegation from the EPA to develop and enforce the Water Quality Standards Regulation (WQSR) that requires the agency to conduct regular monitoring of the quality for the protection of the resources for recreation, prevention of the resource's degradation and protection as sources of potable water for the population. The Rio Grande de Arecibo is a surface body of water that has been designated as a class SD under provisions of Rule 1302.2 of the WQSR based on the designated use to be protected. This designation applies to all surface bodies of water except for those classified as SE which applies to Laguna Cartagena, Laguna Tortuguero and any other surface body of water with exceptional quality or high ecological or recreational value which may be designated by the pertinent agency through a Resolution requiring this classification for protection of the waters. Section 303 (d) of the Clean Water Act authorizes the EPA to assist the state and its territories in listing impaired water surface bodies of water and developing as needed Total Mass Daily Loads (TMDLs) to protect these waterbodies. A TMDL establishes the maximum amount of a pollutant allowed in the waterbody and serves as the starting point or planning tool for restoring water quality. Therefore, on a biannual basis, the DNER publishes a 303 (d) and 305 (b) Integrated Report (drna.pr.gov/wp-content/uploads/2024/04/Water-Quality-Area-PR-2022-305b-303d-IR.pdf). This report identifies the surface bodies of water or segments of them, that based on the results of water quality laboratory test results, have been identified as surface bodies whose qualities have been degraded as result of the discharges it receives. Said report also provides information about the potential sources of pollutants and describes the specific water quality parameter being impaired. In the 2022 report, which was published on September 2023 information pertaining to river segment ID 5007A2 and the monitoring station 50025000 ([How's My Waterway - Waterbody Report \(epa.gov\)](#)) located in the Rio Grande de Arecibo located downgradient from the area of the proposed action resulted in the listing as an impaired waterbody for the following parameters:

- Chromium VI
- Enterococcus
- Pesticides
- Temperature
- Total Phosphorus
- Turbidity
- Total Nitrogen

This means that the Rio Grande de Arecibo River is currently receiving discharges that are causing high concentrations for the listed parameters.

The report also indicates that the following potential sources of pollutants have been identified:

- Agriculture
- Collection System Failure
- Confined Animal Feeding Operations
- Landfill
- Major Municipal Point Sources
- Minor Industrial Point Sources
- Onsite Wastewater Systems
- Urban Runoff/Storm Sewers

It is important to indicate that no TMDL has been yet developed for this segment of the river, and therefore, the DNER needs to establish a strategy to deal with these conditions through the application of its WQSR through the requirement of permits to regulated activities and the development of a Management Plan for the river's basin. Also, it shall be noted that parameters causing impairment appear to be mostly related with current agricultural uses, properties not in use with exposed soils, and the extensive use of individual septic systems resulting from the lack of sanitary sewer systems operated by the Puerto Rico Aqueduct and Sewer Authority (PRASA) observed in the drainage basin. None of these conditions are expected to change in the foreseeable future.

The no build alternative would maintain the current degraded water quality condition of the RSA and therefore no direct, indirect, or cumulative impact from its adoption are expected. The alternative of improving current PR-123 would have temporary direct impact on the water quality resulting from an increase of turbidity during the performance of construction activities. However, no indirect nor cumulative impacts are expected.

Construction of the proposed action could result in the temporary erosion of soil, thereby cumulatively degrading water quality during the proposed action construction. In addition, a minimal increase in impervious surface area of the roadway will increase the amount of stormwater runoff, transportation-related pollutants entering the storm drain system. However, the construction of the proposed action as well as other ones being proposed by others would have to comply with existing regulations regarding construction practices that minimize risks of erosion and runoff. Among the various regulations are the 2022 Construction General Permit (CGP) issued by the EPA establishes in its section 3.0 water quality based effluent limitations that consider the characteristics of the receiving body of water. Section 3.1 of the CGP indicates that "EPA may insist that you install additional controls (to meet the narrative

water quality-based effluent limit above) on a site-specific basis, or require you to obtain coverage under an individual permit, if information in your NOI or from other sources indicates that your discharges are not controlled as necessary to meet applicable water quality standards.” Section 3.2 of the CGP also indicates that for any portion of the site that discharges to a sediment or nutrient-impaired water or to a water that is identified by your State, Tribe, or EPA as Tier 2, Tier 2.5, or Tier 3 for antidegradation purposes,4.3 and you must comply with the stabilization deadline specified in Part 2.2.14b.iii. you must comply with the inspection frequency specified in Part 2.2.14b iii.” In addition, section 3.3 establishes a turbidity benchmark monitoring for sites discharging dewatering water to protect the water quality of sensitive waters. This benchmark is established in 50 Nephelometric Turbidity Units (NTU), and imposes additional inspection and control measures detailed in the permit.

The tiered surface body of water designation specified by the EPA on its CGP is assigned by the DNER, and currently there are no Tier 2.5 designated water bodies in the Puerto Rico Water Quality Standards. Tier 2 waters are identified on a parameter-by-parameter basis by the agency. The DNER define Tier III waters “are those which are classified as either Class SA or Class SE. Class SA waters are defined as "Coastal waters and estuarine waters of high quality and/or exceptional ecological or recreational value whose existing characteristics shall not be altered, except by natural causes, in order to preserve the existing natural phenomena." Class SA waters include bioluminescent lagoons and bays such as La Parguera and Monsio José in Lajas, Laguna Joyuda in Cabo Rojo, Laguna Grande in Fajardo, Bahía de Mosquito in Vieques, and any other coastal or estuarine waters of exceptional quality of high ecological value or recreational which may be designated by Puerto Rico, through Resolution, as requiring this classification for protection of the waters. Class SE waters are defined as "Surface waters and wetlands of exceptional ecological value, whose existing characteristics should not be altered in order to preserve the existing natural phenomena." Class SE waters include Laguna Tortuguero, Laguna Cartagena and any other surface water bodies of exceptional ecological value as may be designated by Puerto Rico through Resolution.”

The stringent BMPs and inspection procedures established in the CGP would help to minimize degradation of water quality at individual project construction sites. At a local level, the DNER also requires to develop a Plan for the Control of Erosion and Sedimentation of construction project, which will add another regulatory requirement for the construction of the proposed action. Therefore, compliance with the applicable section of the WQSR would ensure that water quality is maintained to the MEP for potential projects within the RSA. It should be noted that the construction of the proposed action required to acquire many residential properties along the path of the ROW resulted in the elimination of non-point sources of contaminants within the drainage basin resulting from the operation of individual septic tanks

systems and discharges of “grey waters” (which are defined as non-sanitary wastewaters generated by residential kitchen sinks discharges among others). Therefore, although minimum, the elimination of these sources of non-point discharges would result in an improvement of the current level of enterococcus reaching the Rio Grande de Arecibo. Also, the diversion of a significant volume of traffic from PR-123 to the proposed action would result in a reduction of the generation of pollutants since the proposed action would be designed to incorporate environmental protective practices such as the provision of vegetative swales and oil/water separators at the storm sewer system points of discharge discussed in section 5.2.1 Land Development and 5.3 Control Monitoring, Mitigation and Environmental Commitments of the EA. Based upon the provided information and analysis, temporary direct impacts during construction would be mitigated through compliance with regulatory requirements applicable for the construction of the proposed action. No indirect cumulative impacts related to water quality and stormwater runoff are anticipated to result, and no further analysis is necessary and no additional measures are required. It shall be indicated, that an indirect positive water quality impact would result from the elimination of some residences septic tanks systems that were eliminated because of the ROW acquisition.

Regarding to the sedimentation of the Rio Grande de Arecibo and its effect on water quality, as well as its impact on the available storage capacity of the Dos Bocas reservoir (built in 1942), after which the intake of the “Superaqueduct” was built, a review of studies conducted by the U.S. Geological Survey and Universities was conducted. This review was focused on the following subjects:

➤ **Information about levels of sedimentation**

- The Dos Bocas reservoir construction was completed by 1942 by the Puerto Rico Electric Power Authority (PREPA) legacy agency as a hydroelectric power facility with a total storage capacity of 30,420 acre-feet and a drainage basin area of 170 square miles (including approximately 6.2 of the Garzas Lake). According to a draft study prepared by the DNER on March 2004, the estimated annual sedimentation rate of the reservoir was estimated in 3,566 acre-feet/square mile/year, with an estimated date for full loss of storage capacity estimated to occur in 2052. Land uses particularly those related with agricultural practices are identified as one of the main sources of sediment generation in the watershed.
- A report entitled Evaluation of Storm Sediments in Rio Grande de Arecibo watershed prepared by Jairo Díaz Ramírez (University of California), Luis Rómulo Pérez García (University of Puerto Rico, Mayaguez Campus) and

John J. Ramírez Avila (Mississippi State University) published on September 2008 ([\(PDF\) Evaluation of Storm Sediments in Rio Grande de Arecibo Watershed, Puerto Rico. \(researchgate.net\)](#)) concluded that:

- Factors promoting sedimentation in the Rio Arecibo de Arecibo River watershed are land use, steep drainage basin slopes, frequent and high magnitude of rainfall, characteristic of major tropical disturbances
 - Preliminary analyses indicated a correlation between the sedimentation rate and a runoff quickly rising in the area.
- A report entitled Sedimentation History of Lago Dos Bocas, Puerto Rico 1942-2005, Luis R. Soler López for the USGS, report 2007-5053 ([SIR2007_5053.pdf \(usgs.gov\)](#)) establishes that storm events (such as Hurricane Georges in 1998) causes massive sediment transport to the river as evidenced by the before and after estimated sediment trap efficiency of the Dos Bocas reservoir. The storage loss for the reservoir was estimated in 54% of the total capacity for 2005.

➤ **Predicted Sedimentation rates resulting from the project construction**

The annual sedimentation rate for the Dos Bocas Reservoir has been estimated in 5.05 cubic meters/acre/year. Therefore, considering that the no build alternative area is 209 acres, the estimated annual sediment contribution of this alternative would be 1,055.45 cubic meters (209 acres x 5.05 cubic meters/acre/year). For the proposed action alternative, the paved roadway area would reduce the total impact area by 32.69 acres which is calculated by multiplying the project length by its width (7,539.22 meters x 17.55 meters). This impervious area is estimated in 132,313.31 square meters (32.29 acres). Therefore, the net exposed area is estimated in 176.31 acres (209 acres – 32.69 acres) which results in an estimated annual sedimentation rate of 890.36 cubic meters (176.31 x 5.05 cubic meters/acre/year). The estimated sediment load contribution resulting from the proposed action construction represents a small reduction when compared to the no build alternative and is the result of the new impervious area. The total proposed action area sediment generation rate is estimated in approximately 0.000017% of the total sediment generation of the Rio Grande de Arecibo watershed.

Based upon the provided information and analysis, direct or indirect cumulative impacts

related to sediment generation are not anticipated to occur. Therefore, no further analysis is necessary and no additional measures are required.

1.1.4.10 Landslide/ Geology/Soils

The RSA for this subject is comprised by the ROW for the proposed action and its immediate vicinity. As a result of the limited urban development of the area, through the span of 50 years, most of the impacts associated with the effects of landslides pertain to those affecting the integrity of state roads PR-123 and PR-10. Landslides induced by heavy rain were one of the top three hazards impacting the island, second only to flooding and hurricane-force winds, also along the stretch of the proposed action area, landslide is the second highest hazard risk behind hurricane wind. This condition has remained the same through the years. The municipalities of Utuado and Adjuntas have very high to extreme susceptibility to landslides. Also, their occurrence has been triggered by the effects of heavy rain events associated with storms and hurricanes a condition that has been documented by the USGS. Various geotechnical studies have been and will continue to be conducted for the design of the proposed action. These studies have identified conditions of the existing soils/geology along the path of the proposed project corridor and have resulted in recommendations for the design of the proposed roadway which have been discussed in section 5.2.1 of the EA. The specific topics covered in this section are: Soil Suitability, Assessment of Landslides Hazard Risks. Experience obtained from incidents affecting the stability of previous sections of PR-10 currently in operations have been also considered in the design of the proposed project. After considering available information, it is understood that the No build and the alternative of Improving PR-123 would have a direct or indirect commutative impact. For the proposed action alternative, and based upon the above provided information and analysis, direct or indirect cumulative impacts related to geology, soils, or landslide are not anticipated to result, and no further analysis is necessary and no additional measures are required.

1.1.4.11 Climate Change

The RSA for this subject discussion of the proposed action ROW and its immediate vicinity. "Climate change" refers to the gradual, long-term alterations in climate measures, encompassing factors like rainfall, temperature, and wind patterns. Consideration of this subject as part of the EA development is a recent requirement, due to its predicted negative

impact on EJ communities in the aftermath of more frequent natural disasters. Therefore, existing scattered residential uses along the path of the proposed action corridor constitutes the baseline for the analysis of this subject. A discussion about climate change has been included at the end of section 5.2.4 Natural Features of the EA. The proposed action construction will fulfill the originally planned route, by providing a more resilient terrestrial infrastructure for the region.

For the No build and the alternative to improve PR-123, no direct or indirect cumulative impact are anticipated to occur and therefore no additional analyses are necessary. For the proposed action alternative, the relatively limited scale of this project with respect to the region as well as the fact that currently, vehicular traffic travels through the RSA resulting in a source of tail pipe gases that contribute to the air basin allow to reasonably conclude that no meaningful contribution to the climate change resulting from the construction of the proposed action can be expected. However, the design of the proposed action has incorporated provisions for the protection of the roadway and would serve to minimize the vulnerability of the communities of the area by improving their terrestrial access. Additional information about this subject has been included in section 5.2.4 Natural Features, Other Factors of the EA. Based upon the information and analysis above, direct, or indirect cumulative impacts are not anticipated to result, and no further analysis is necessary and no additional measures are required.

1.1.4.12 Air Quality/GHG

The RSA for air quality is regional in nature, however, this central area regional air basin is different from the one of the north and south coastal zones of the Island given the marked differences that are observed. Because of this reason, the RSA for this parameter analysis has been defined as the air basin comprised by the municipalities of Adjuntas and Utuado. Air quality of the air basin is good since no major sources of generators of mobile air pollutants such as roadways carrying high levels of vehicular traffic nor major stationary sources of air pollutants (industrial and or commercial) are present. This condition has remained unchanged for the past 50 years. The area has been retained its designation as an attainment area for all criteria pollutants included in the National Ambient Air Quality Standards (NAAQS) established by the EPA which are: Carbon Monoxide (CO), Lead (Pb), Particulate Matter

(PM), Nitrogen Dioxide (NO₂), Ozone (O₃) and Sulfur Dioxide (SO₂). These standards include Carbon Monoxide and Particulate Matter (PM) which are associated with transportation related sources such as the operation of combustion vehicles. However, also under provisions of the CAA, the EPA was required to develop standards applicable to emission of hazardous air pollutants (HAPs) not designated as criteria but are known or suspected to cause cancer or other health such as damage to immune, neurologic, reproductive, and respiratory systems at a national and regional scale. Although the universe of toxic air pollutants includes 188 toxics compounds, on its latest guidelines the FHWA identified nine (9) of them for their analysis in transportation related projects analysis for the National Environmental Policy Act (NEPA) documents. They are: acetaldehyde, acrolein, benzene, 1,3-butadiene, diesel particulate matter plus diesel exhaust organic gases, ethylbenzene, formaldehyde, naphthalene, and polycyclic organic matter. Current FHWA guidelines pertaining to the discussion of this subject on NEPA compliance documents only requires to conduct a qualitative air quality impact analysis for these criteria pollutants for projects with annual average daily traffic (AADT) of less than 140,000 vehicles per day. Since the proposed action AADT has been estimated in approximately 5,000 vehicles per day with an annual rate of grow estimated in a range of 1.0 to 1.5% per year, no qualitative analysis is required for the proposed action NEPA compliance document.

Regarding to the emissions of Carbin Monoxide (CO) and Particulate Matter (PM), the proposed action will result in a decrease of vehicular traffic along PR-123 since approximately an 80% of the current vehicular traffic is expected to use the new roadway. Therefore, current residents along PR-123 would experience an improvement in the air quality while along the corridor of the proposed action, which shows scattered presence of residences a slight increase in air pollutants would be experienced. These include emissions of CO and PM. An Exception of this statement is the fact that during the proposed action construction a temporary increase in the emission of PM may be observed during the performance of earthwork activities which will be controlled using water spraying techniques. These measures and additional ones are described in section 5.1.4 of the EA. However, in the context of the air basin in which the proposed action is located, the air quality would remain unchanged or improved resulting from the operation of a safer and modern roadway. In addition, EPA emission rates show a trend toward their future reduction due to the increased efficiency of combustion engines and the

shift toward the electric vehicles adoption. Cumulative projects shall include local development which based on the land use constraints and reduction in population in the area is not considered a reasonable possibility. Therefore, from an air quality standpoint, and considering that no additional transportation related projects nor intensive urban development are planned no direct, indirect, or cumulative impact are required.

Due to the relatively limited number of construction and operation of cumulative projects identified within the air basin minimal degradation of the local air quality, as well as the air quality of the basin is expected. Air quality would be temporarily degraded during construction activities that occur separately or simultaneously; based on current available information which includes a trend for the reduction in population for the region, only minimal incremental cumulative impacts on the quality of regional air are expected. This follows from the extrapolation of non-significant incremental addition of pollutants from traffic from residential, commercial, and industrial development and the use of heavy equipment and trucks associated with construction of limited projects. It should be noted that the proposed action is a transportation infrastructure resiliency improvement action and does not constitute a direct trip generator. In addition, mitigation measures described in section 5.3 Control Monitoring, Mitigation and Environmental Commitments of the EA would adequately address construction-related air quality impacts.

In summary, considering the limited near number of future projects proposed for the proposed action area, that may contribute to exceeding NAAQS federal standards, the low vehicular traffic volume expected from the proposed action construction (which basically will absorb the current vehicular traffic using PR-123 allow to qualitatively indicate that no air quality impacts are foreseen, and that current good air quality would be maintained; therefore, it does not present an adverse cumulative impact. Implementation of the proposed action would improve traffic flow and congestion currently being experienced by users of PR-123 as well as air quality of existing residences along this roadway resulting from the diversion of traffic toward the new roadway. The no build alternative as well as improvement alternative of PR-123 would result in no direct, indirect, or cumulative impacts. Based upon the previously provided information and analysis, direct or indirect cumulative impacts related to air quality are not anticipated to result, and no further analysis is necessary and no additional measures

are required.

Regarding to the Green House Gases (GHG) the no build alternative and the improvement of PR-123 would have no direct, indirect, or cumulative impact on the RSA. No national standards have been established for GHGs. Similarly, the United States Environmental Protection Agency (USEPA) has not established criteria or thresholds for ambient GHG emissions pursuant to its authority to establish motor vehicle emission standards for CO₂ under the Clean Air Act. GHGs are different from other air pollutants evaluated in federal environmental reviews because impacts are not localized or regional due to their rapid dispersion into the global atmosphere. Therefore, it is difficult to isolate and understand the GHG emissions impacts for a particular transportation project given there is no scientific methodology for attributing specific climatological changes to that transportation project's emissions. Based on the nature of GHG emissions and the exceedingly small potential for GHG impacts from the proposed project, that the GHG emissions from the proposed action will not play a meaningful role in a determination of an environmentally preferable alternative or the selection of the preferred alternative. No alternatives-level GHG analysis has been performed for this project since GHG emissions is very small in the context of the affected environment.

The construction of the proposed action will serve to reduce the Vehicle Miles Traveled (VMT) because of the shorter length of the proposed action as discussed in Section 5.2.4 Natural Features, Other Factors of the EA. This reduced distance would translate into a reduction of the emission of CO₂ emitted by the vehicular traffic which in turn would result in a reduction of the effects of the potential GHG impact on a local level, since at a regional level this impact would not be significant. In recognition of this fact, the FHWA currently requires GHG analysis for the development of long-range transportation plans that are directed for the planning of transportation modes at a regional level. Based upon the previously provided information and analysis, direct or indirect cumulative impacts related to air quality are not anticipated to result, and no further analysis is necessary and no additional measures are required.

1.1.4.13 Noise

The RSA for noise includes sensitive noise receptors (e.g., residences, institutional uses, churches, etc.) within the ROW and adjacent properties. Over the past 50 years, ambient noise conditions have remained typical of those observed in rural areas of Puerto Rico due to the lack of urban developments of the area. The proposed action is expected to contribute to temporary and permanent cumulative noise impacts. Permanent impacts are not expected due to the low vehicular traffic volume forecasted for the area and the results traffic noise levels analyses conducted using FHWA Traffic Noise Model as described in section 5.1.14 Noise Abatement and Control of the EA. During construction, noise impacts are expected to occur due to the use of construction equipment and movement of heavy trucks during the performance of earthwork activities, but on limited areas resulting from the low residential density and lack of urban development nearby the construction zones. Typical noise reduction strategies such as the requirement of mufflers in good working conditions, for heavy equipment and trucks would be required to contractors to minimize noise impacts during construction. Because no additional construction projects have been identified to occur within the RSA, no cumulative impacts are expected.

Based on the previous analysis, direct or indirect cumulative impacts related to noise are not anticipated to result, and therefore, no further analysis is necessary and no additional measures are required.

1.1.4.14 Natural Systems

Natural Communities

The RSA pertaining to natural communities is the ROW and its immediate vicinity. This limit exceeds by far the area of construction impact for the proposed action, since during the acquisition process it was found that many of the properties consist of relatively large farms which due to local legal restriction did not permit their acquisition while leaving the remanent without an access to a public roadway.

The RSA is located within the boundaries of a Subtropical Wet Forest (The Ecological Life Zones of Puerto Rico and the U.S. Virgin Islands by J.J. Ewel and J.L. Whitman of December 1973). According to this reference this ecological zone can be described as follows:

“Subtropical Wet Forest occupies much of the higher parts of Puerto Rico’s mountains and, like the wet- and rain-forest life zones, is not found in any other island in the study region. This is a high rainfall life zone, encompassing areas with mean annual precipitation within the approximate range of 2000 to 4000 mm per year. Rainfall range in mean annual rainfall from 2150 mm to 2900 mm. Soil moisture drops below field capacity at these three stations only for three months, at most, and the water deficit is very small. Significant amounts of runoff occur at each of these sites during at least seven months and, in some cases, all year. The annual runoff is greater than the rainfall input in most areas of the Subtropical Dry Forest zone. The abundant moisture of this life zone is evident in the character of the vegetation. Epiphytic ferns, bromeliads, and orchids are common, the forests are relatively rich in species, and the growth rates of successional trees are rapid.”

While the previous general description serves to provide a context of the ecological characteristics of the RSA, more recent studies were conducted on 2002 and supplemented with consultations with the DNER and the USFWS. All the previous studies conducted for the proposed action corridor have identified the presence of common flora/fauna species, and provided support that the areas were used for agricultural purposes in the past that in many cases were abandoned. This is especially true for the cultivation of coffee. Additional information about this subject can be observed in section 5.2.4 Natural Features of the EA. The natural communities within the RSA have largely remained in the areas due to the lack of urbanization over the last 50 years, except for the damages caused to vegetation caused in the aftermath of hurricanes through the years (Georges in 1998; Maria in 2017, and Fiona in 2022). A review implementation of any of the build alternatives would not result in impacts to USFWS critical habitat or wildlife corridors because neither exists within the RSA. Furthermore, implementation of the build alternatives would not result in permanent impacts to natural communities of special concern. Vegetation communities/land cover types that would be permanently impacted within the RSA include undeveloped and agricultural lands. Implementation of the build alternative would permanently impact approximately 209 acres of rural undeveloped land. Given that the proposed project’s impacts were already addressed by acquiring and transferring to the DNER, a property comprising 369.64 cuerdas (358.92 acres) as mitigation for the ecological and trees impacts to be caused by the proposed action. Based upon the information and analysis above, direct, or indirect cumulative impacts related

to natural communities are not anticipated to result, and no further analysis is necessary and no additional measures are required. The no build alternative and the improvement to PR-123 would have no impact on the existing natural systems since they would remain in their current condition, therefore no direct or indirect cumulative impacts are anticipated to occur and no further analysis is required.

Wetlands and Other Waters

The RSA pertaining to wetlands was established to be constituted by the ROW of the proposed action including the riverine systems associated with the presence of the Rio Grande de Arecibo River (see Figure 4). Limited riverine wetland systems and other waters within the RSA have largely remain unchanged due to the lack of urbanization activities conducted over the last 50 years. The rugged topography of the area promotes a fast drainage of the soils, a condition that does not support the presence of extensive wetlands as evidenced in the figures and discussion of Section 5.1.15 Wetland Protection of the EA. Wetland areas within the proposed action corridor were identified using the National Wetland Inventory Maps developed by the U.S. Fish and Wildlife Service (USFWS), except for Section II of the proposed action for which a detailed jurisdictional delineation was conducted as part of its USACE permit process. Using available project drawings for Sections III, IV and V as well as because structures would be used as a measure to avoid or minimize impacts on wetlands and jurisdictional waters, it has been estimated that approximately 4.0 acres of wetlands and/or jurisdictional waters of the U.S. would be impacted. However, most of those impacts would be temporary and once the proposed action construction is completed, they would revert to their natural condition except for 0.35 acres of the Rio Grande de Arecibo River that would be permanently impacted by the bridge structure of section II It is important to indicate that this river crossing, which may be considered as the most significant in terms of its size does not affect wetlands, because they are not observed in the proposed action limits. Project-specific analysis would be required for Sections III, IV and V as well as any other no foreseen developments to ensure that impacts to wetlands or other waters are assessed and adequately mitigated. Implementation of the no build alternative and/or improvements to PR-123 would not result in impacts to wetlands or jurisdictional waters of the U.S. Also considering that the proposed project's impacts would be addressed through Avoidance and Minimization

measures required by the USACE the proposed action contribution to wetlands and other waters impacts would not be cumulatively considerable. Based upon the information and analysis above, direct, or indirect cumulative impacts related to wetlands and other waters are not anticipated to result, and no further analysis is necessary and no additional measures are required.

Plant Species

The RSA pertaining to plant species is ROW of the proposed action and its vicinity. Plant species within the RSA have been studied since the preparation of the original FEIS preparation in 1979 and updated with additional studies as well as with consultation with agencies pertinent this subject such as the DNER and the USFWS. This subject has been discussed in Sections 5.1.7 Endangered Species and 5.2.4 Natural Features, Vegetation, Wildlife of the EA. These efforts have not disclosed the presence of rare/endangered plant species or of unique value. Therefore, the proposed action would not result in cumulative impacts to special-status plant species. Also, there are no foreseeable planned projects for the RSA that may result in cumulative impacts for the current plant species. Based upon the previous provided information and analysis, direct or indirect cumulative impacts related to plant species are not anticipated to result, and no further analysis is necessary and no additional measures are required. The no action and alternative for improvements to PR-123 would not result in direct and/or indirect cumulative impacts and no further analyses is required.

Rare and Endangered Species

The RSA pertaining to rare/endangered or threatened species is constituted by the ROW and immediate vicinity of the proposed action. The RSA has remained in its rural condition for more than 50 years without the pressure exerted by the urban sprawl resulting from its rugged topography and limited commercial/ industrial developments. A review of the presence of these species and/or their habitats along the path of proposed action corridor has been continuously revised in coordination with the DNER and the USFWS, which the local and state federal agencies with jurisdiction. Field surveys conducted along the project through the years and more recently, by reviewing the USFWS database known as IPAC ([IPaC: Home \(fws.gov\)](#)) have not disclosed the presence of designated flora/fauna habitats although some

of the listed species may be observed within areas beyond the RSA. For this reason, conservation measures for the protection of species such as the Puertorican boa (*Chilabothrus inornatus* (*Epicrates inornatus*)) through the adoption of a Programmatic Biological Opinion (PBO) issued by the USFWS would be adopted during the construction of the project. For the protection of other species such as: Puerto Rican Broad-winged Hawk (*Buteo platypterus brunnescens*), Puerto Rican Parrot (*Amazona vittate*), Puerto Rican Sharp shinned Hawk (*Accipiter striatus venator*) which have not been found, but may be present in nearby areas, measures for their protection during their breeding season will be incorporated in the proposed action contract documents. Also, a Flora/Fauna Management Plan has been developed and approved by the DNER. This plan requires the presence of an on-site biologist that will be inspecting the area before the commencement of clearing and grubbing activities. Additional Information about this subject has been provided in Section 5.1.7 Endangered Species of the EA.

As discussed previously since no protected species have been found within the RSA, protective measures required to be adopted by regulatory agencies the proposed project action would not result in direct, or indirect, cumulative impacts to those threatened/protected species are anticipated; therefore, no further analysis is necessary and no additional measures are required.

1.14.15 Existing Stressors/ Pollution Burden

On October 21, 2022 the EPA published a report entitled **Cumulative Impacts Research Recommendations for EPA's Office of Research and Development** ([Cumulative Impacts Research | US EPA](#)). On its guidance documents pertaining to this subject, EPA indicates that:

“Exposures to pollutants in the environment, including in air, water, and soil, lead to adverse impacts to human health and the environment. These pollutants are also referred to as chemical stressors. There is growing recognition that other types of stressors, referred to as nonchemical stressors, also affect human health and wellbeing. These include socioeconomic disadvantages, lack of environmental assets (e.g., greenspace) in a community, and health vulnerabilities. Chemical and non-chemical stressors may accumulate over time from one or more sources. For example, studies have shown that there is an association between the 1930's practice of redlining and the current location of urban heat islands, air pollution levels, and health disparities.

Cumulative impacts are the totality of exposures to combinations of chemical and non-chemical stressors and their effects on health, well-being, and quality of life outcomes.”

To obtain specific data review of EPA’s EJ Screen was conducted. This tool is helpful to obtain EJ mapping and screening tool based on nationally consistent data and approach that combines environmental and demographic indicators in maps and reports. A discussion about the results of the findings obtained from the review of this toll are discussed in section 5.1.17 of the EA while copy of the reports obtained from this reference are included in Attachment 21 of the EA.

The alignment of the proposed action traverses through Guaonico Ward in Utuado and Capaéz Ward of Adjuntas. The population’s densities of both wards are low, having an average of 249 residents per acre. Socio-economic characteristics of the population data for the area obtained from the U.S. Census population exhibit a general trend towards a decline of its population. The Justice40 ([Justice40 Initiative | Department of Energy](#)) was also used to verify these results. A review of this data revealed the fact that based on their income, residents of the area incomes are considered within the poverty descriptor limits. There are approximately 54 households within the centerline of the proposed corridor crossing the Guaonico Ward, which have a per capita income of \$9,600. Approximately 108 households with a capital income of \$8,114.00 are located in Capaéz Ward. Due to the existing topography of the area and the gradient of the highway, the roadway corridor will only traverse near two pockets of residential units. At the northern side of the proposed corridor, the closest residences are located at an approximate distance of 150 meters from the proposed highway. Existing mountainous terrain and vegetation will serve to shield most of these residents, located adjacent to PR-123, from the proposed corridor. Regarding to the lower end of the corridor in the Municipality of Adjuntas, the corridor traverses through a mountainous area where two pockets of residences are located approximately 135 and 100 meters from the future highway, respectively.

Further review of the Environmental Data Indicators show that these communities are not subjected to the selected variables of environmental stressors assessed in the EJ Screen. Residents that are adjacent and close to PR-123 in Juan Gonzalez Ward of Adjuntas exhibit higher impacts by these environmental stressors. The EA independently assessed most of these

factors and reached the same conclusions. The determination that the proposed action would not have a disproportionate effect on these communities is based on the following:

1. The residents in these areas are presently not subject to environmental stressors as enumerated by EPA in the EJ Screen Environmental data and will not be subject to any disproportionate impacts by the proposed action.
2. The proposed action will not lead to a significant increase in traffic through their communities. About 80% of the current traffic will be redirected to the new highway, substantially decreasing the presence of heavy freight trucks and through traffic on PR-123. This altered traffic pattern will occur within an isolated corridor, separated from the communities to the west by existing mountainous terrain and vegetation.
3. The proposed action will not hinder the access of these communities to essential services or cultural destinations such as churches, parks, community centers, medical offices, and public services.
4. The proposed action will not alter or reduce the accessibility of these communities to transportation infrastructure for these communities.
5. The benefits outlined in the purpose and need of the Environmental Assessment are fair to all resident segments within the region or in the two municipalities.

The RSA for this subject discussion of the proposed action ROW and its immediate vicinity. Consideration of this subject as part of the EA development is a recent requirement, due to its predicted negative impact on EJ communities in the aftermath of more frequent natural disasters. Therefore, existing scattered residential uses along the path of the proposed action corridor constitutes the baseline for the analysis of this subject. As previously indicated, a discussion about this subject has been included at the end of section 5.1.17 of the EA. The proposed action construction will fulfill the originally planned route, by providing a more resilient terrestrial infrastructure for the region.

For the No build and the alternative to improve PR-123, no direct or indirect cumulative impact are anticipated to occur and therefore no additional analyses are necessary. For the proposed

action alternative, the improved access to the communities allow to reasonably conclude that positive benefits can be expected from the construction of the proposed action. However, the design of the proposed action has incorporated provisions for the protection of the roadway and would serve to minimize the vulnerability of the communities of the area by improving their terrestrial access. Additional information about this subject has been included in section 5.2.4 Natural Features, Other Factors of the EA. Based upon the information and analysis above, direct, or indirect cumulative impacts are not anticipated to result, and no further analysis is necessary and no additional measures are required.

1.1.5 Avoidance, Minimization, and/or Mitigation Measures

Implementation of the measures described in section 5.3 Control Monitoring, Mitigation and Environmental Commitments of the EA provide details about the measures developed that would minimize, and reduce impacts identified impacts. Similarly, any future project proposed

FIGURES

FIGURE 1
FIGURE SHOWING THE RESULTS OF THE PMO SUBMITTED, APPROVED AND
FUTURE PROJECTS FOR THE PROPOSED ACTION AREA

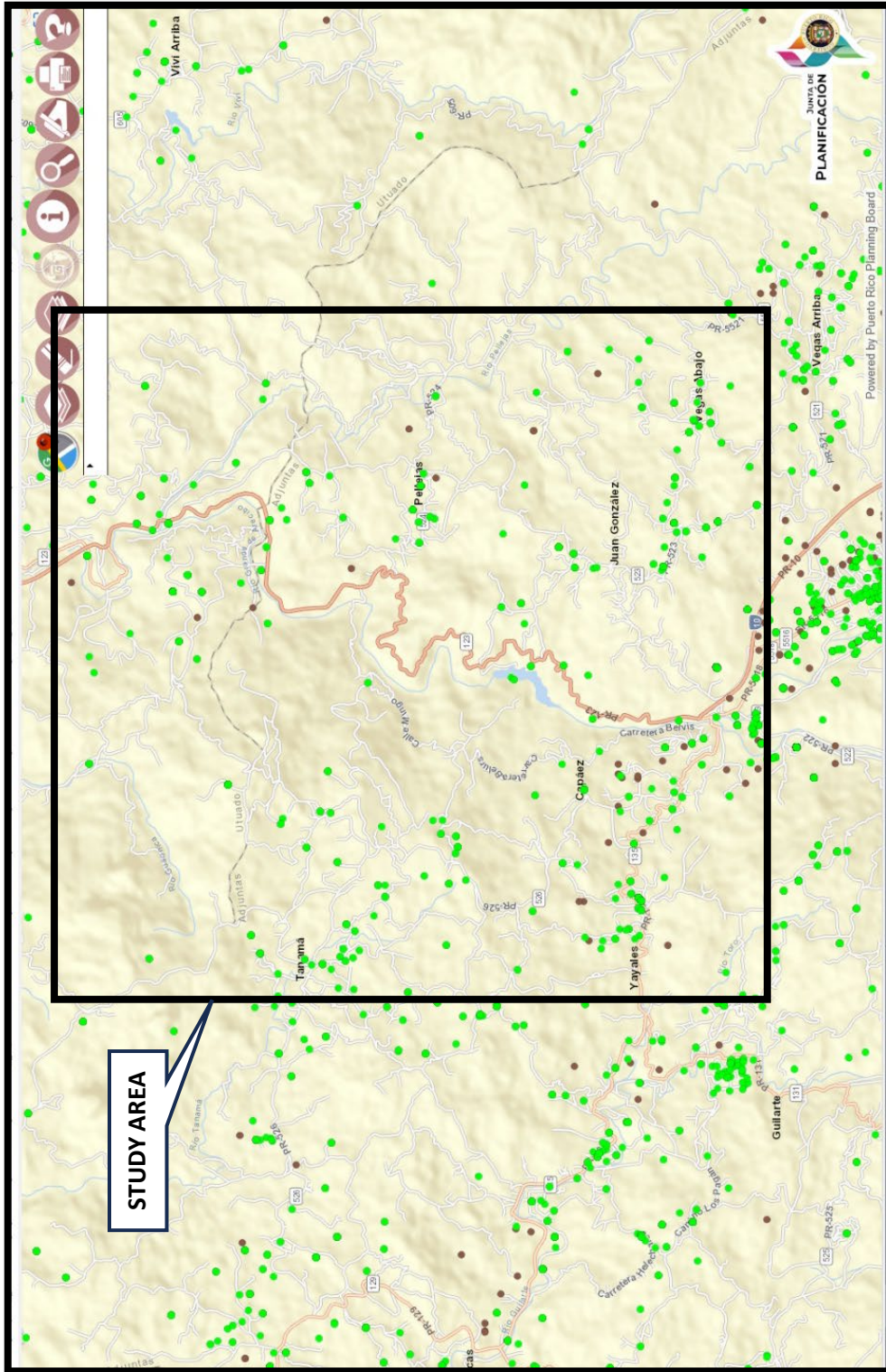
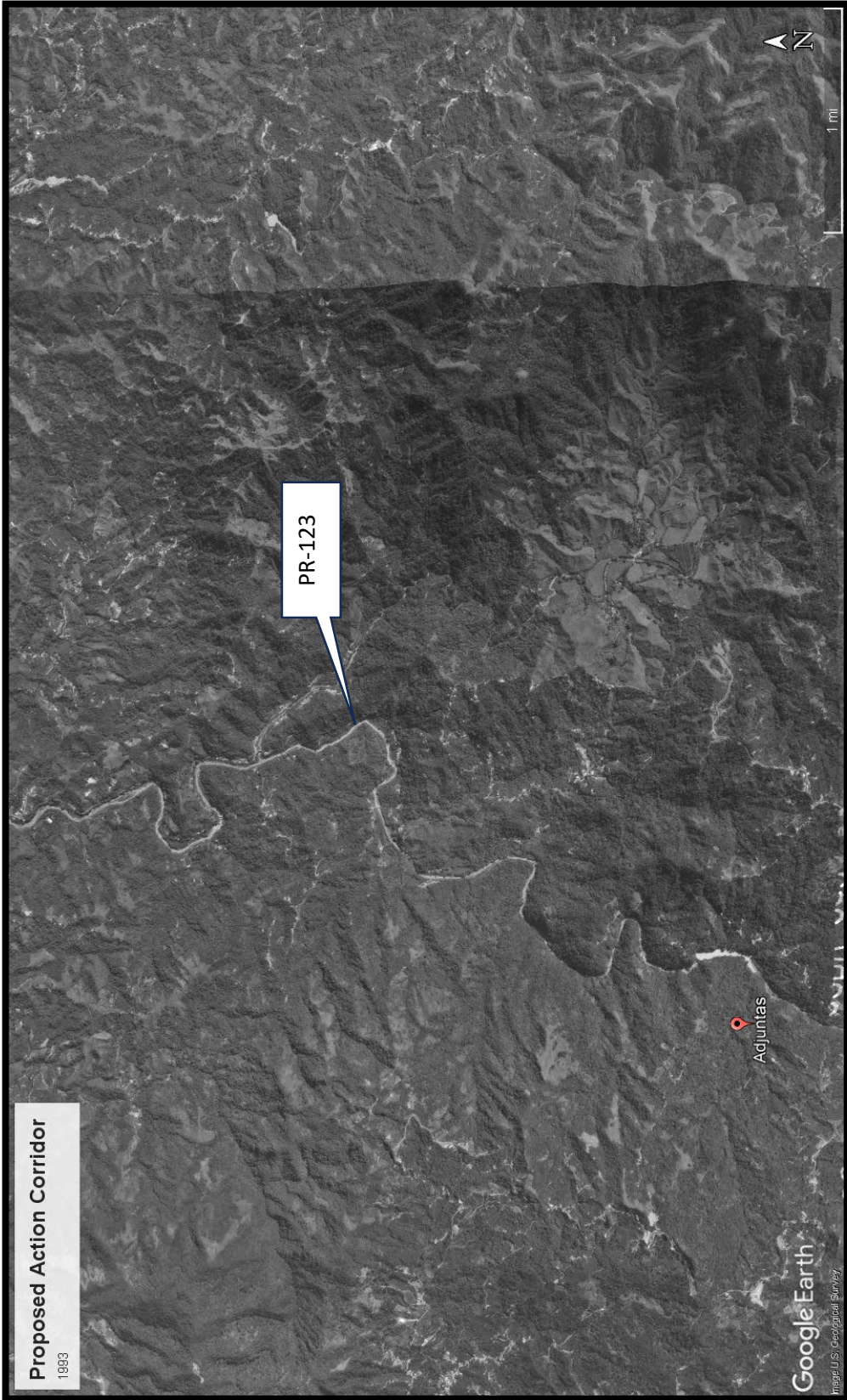




FIGURE 2
AERIAL PHOTOGRAPHS OF THE PROPOSED ACTION CORRIDOR





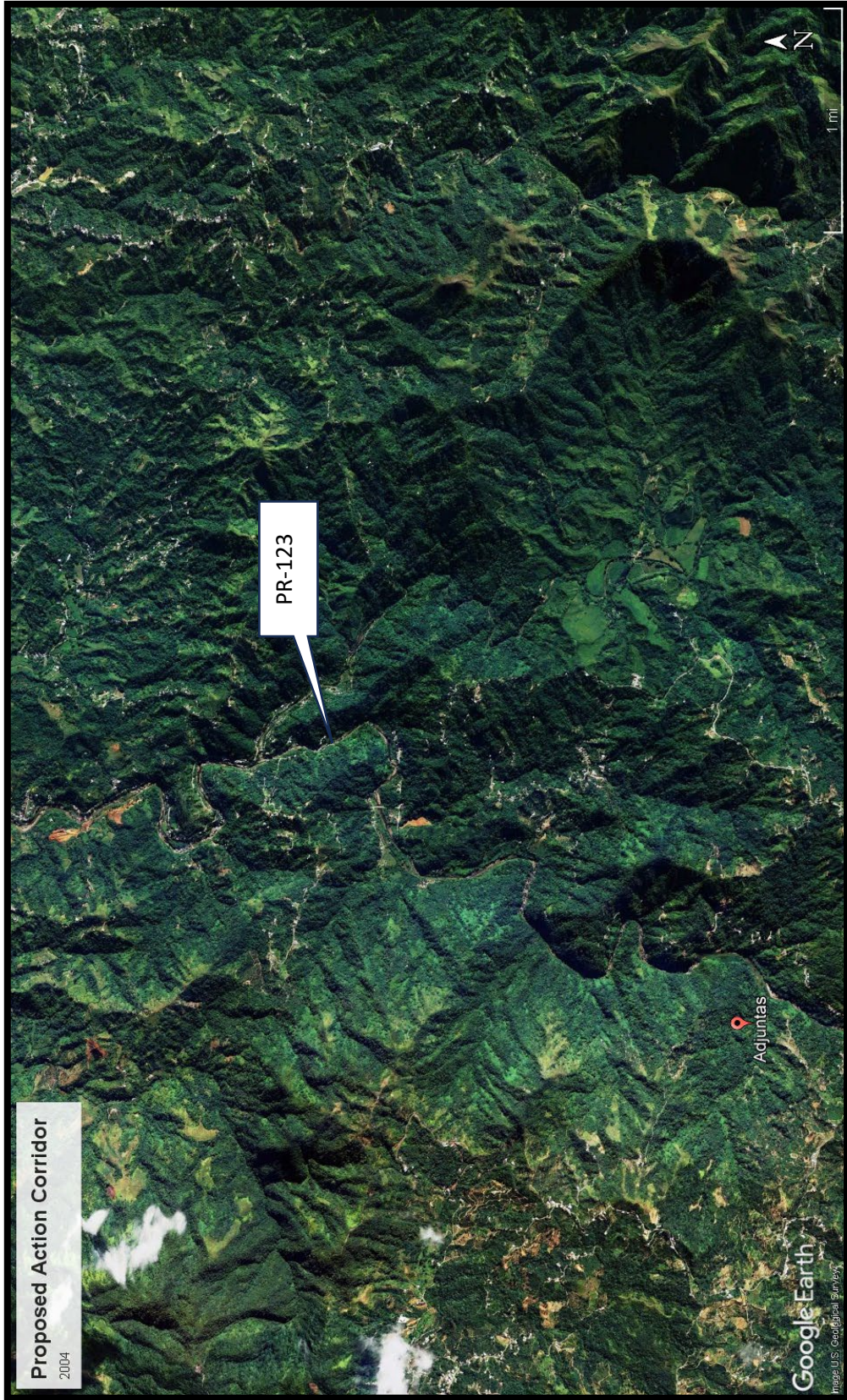
Proposed Action Corridor

1983

PR-123

Adjuntas

Google Earth
Image U.S. Geological Survey



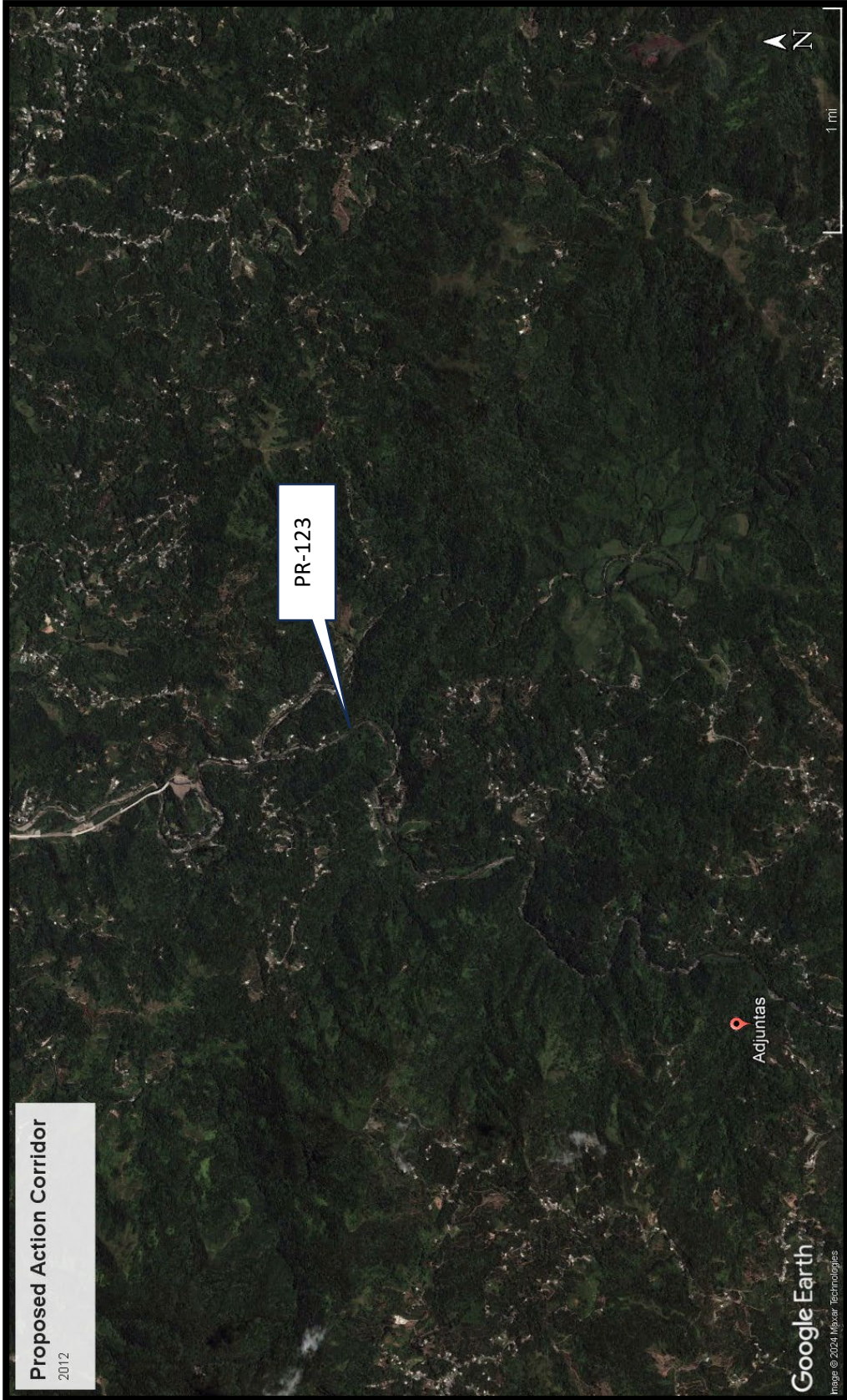






FIGURE 3
LAND USE DESIGNATIONS ALONG THE PROPOSED ACTION CORRIDOR

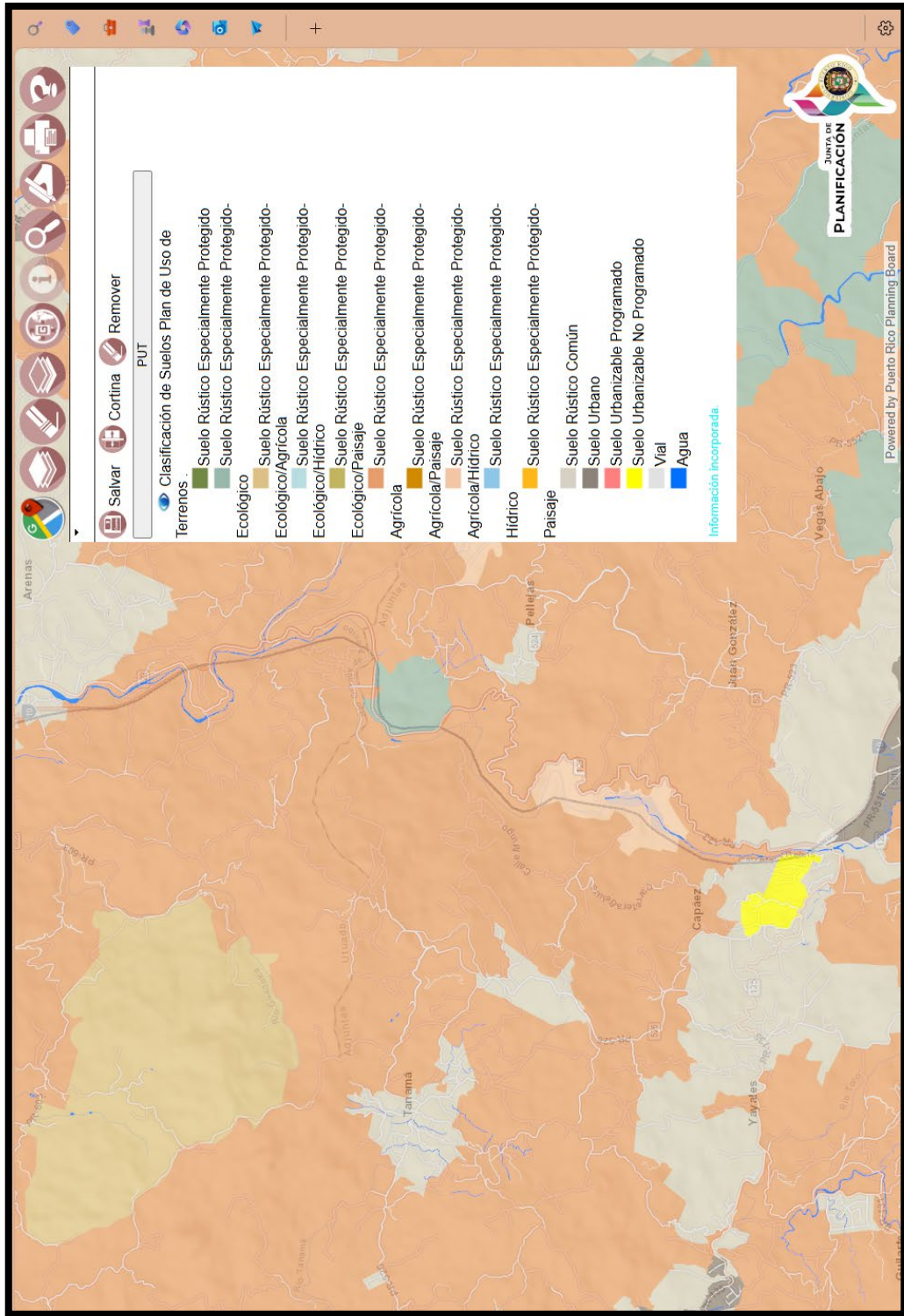


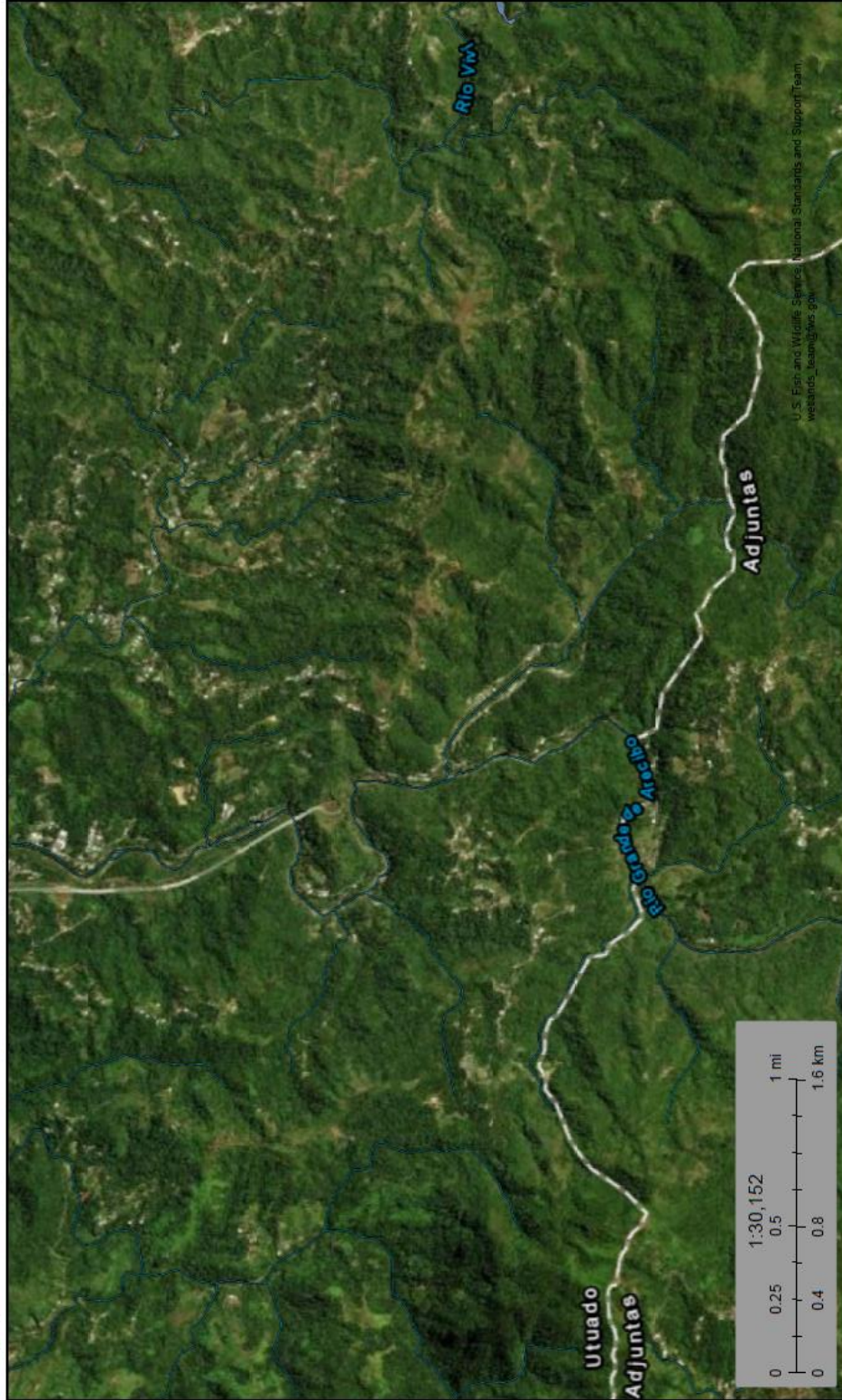
FIGURE 4
WETLAND AREAS WITHIN THE PROPOSED ACTION AREA AS PER THE NATIONAL
WETLAND INVENTORY MAPS PUBLISHED BY THE USFWS



U.S. Fish and Wildlife Service

National Wetlands Inventory

WetlandMapUtua



August 5, 2024

Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

U.S. Fish and Wildlife Service, National Standards and Support Team
wetlands_team@fws.gov

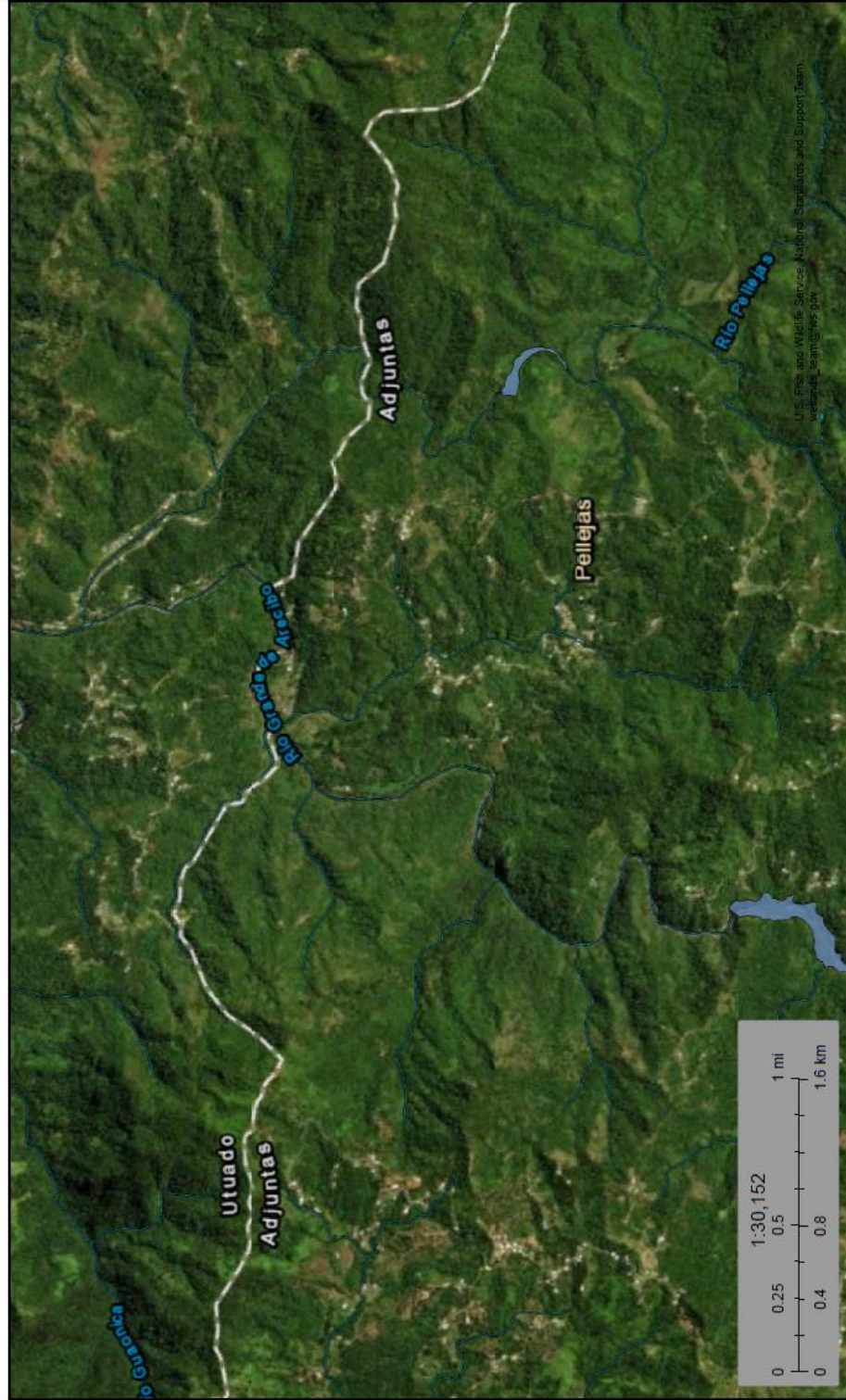
This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

National Wetlands Inventory (NWI)
This page was produced by the NWI mapper



National Wetlands Inventory

WetlandMapPR10Center



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August 5, 2024

Wetlands

-  Estuarine and Marine Deepwater
-  Estuarine and Marine Wetland
-  Freshwater Emergent Wetland
-  Freshwater Forested/Shrub Wetland
-  Freshwater Pond
-  Lake
-  Other
-  Riverine

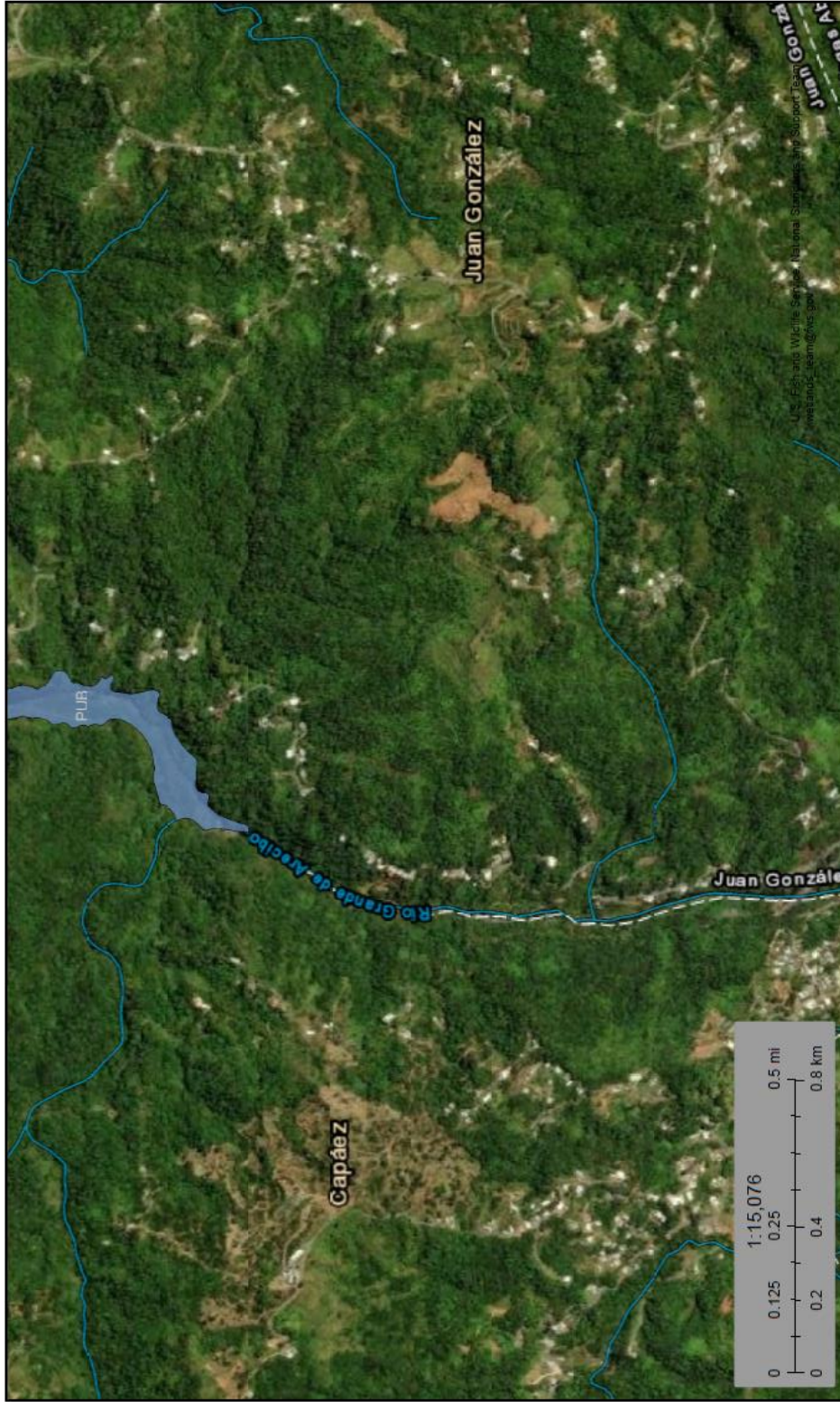
National Wetlands Inventory (NWI)
This page was produced by the NWI mapper



U.S. Fish and Wildlife Service

National Wetlands Inventory

Wetlands Map PR-10 (Adjuntas)



August 5, 2024

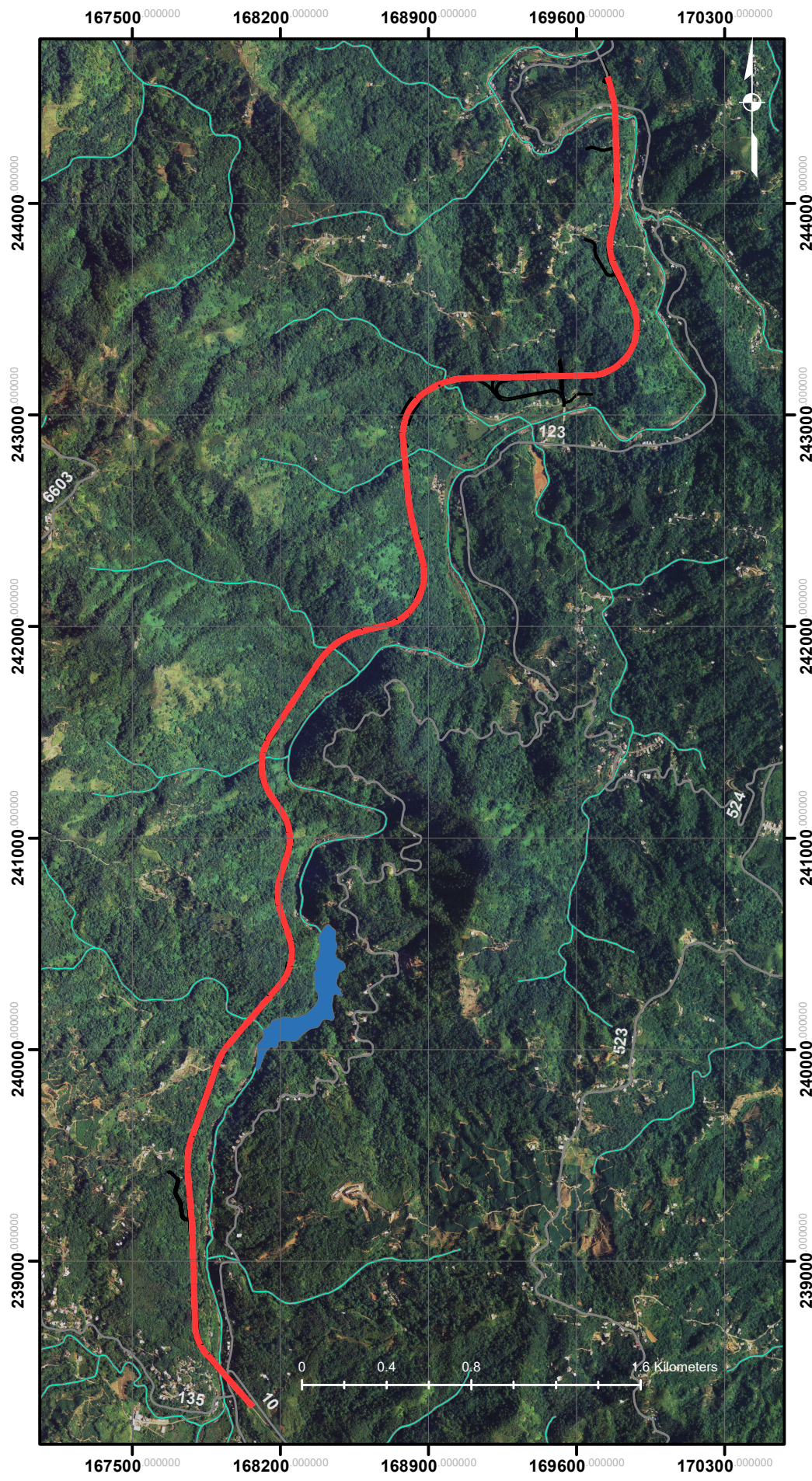
Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
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National Wetlands Inventory (NWI)
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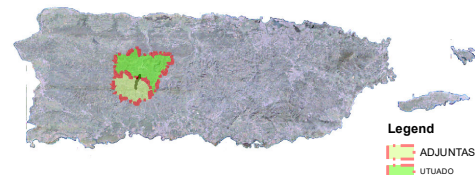
WETLAND MAP PR-10 CORRIDOR



This wetland map includes wetland areas identified by the U.S. Fish and Wildlife Service from the National Wetland Inventory for the area surrounding the Puerto Rico Highway and Transportation Authority's (PRHTA) proposed project to complete the PR-10 corridor between the municipalities of Utuado and Adjuntas.

Wetland data were obtained in:
<https://fwprimary.wim.usgs.gov/wetlands/apps/wetlands-mapper/>.

LOCATION



PUERTO RICO
**HIGHWAYS &
 TRANSPORTATION**
 AUTHORITY



Legend

- PR-10_Alignment
- State Roads
- Other
- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Riverine

