United States Government Accountability Office

Report to the Ranking Member, Committee on Transportation and Infrastructure, House of Representatives

May 2017

TRIBAL TRANSPORTATION

Better Data Could Improve Road Management and Inform Indian Student Attendance Strategies

GAO-17-423

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GAO Highlights

Highlights of GAO-17-423, a report to the Ranking Member, Committee on Transportation and Infrastructure, House of Representatives.

Why GAO Did This Study

Roads on tribal lands are of particular importance for connecting people to essential services, such as schools, because of the remote location of some tribes. These roads are often unpaved and may not be well maintained. The federal government funds two programs to improve and maintain roads on tribal lands. BIA maintains the NTTFI and DMR databases to support these programs.

GAO was asked to review condition and school-access issues related to roads on tribal lands. This report examines: (1) the extent to which the NTTFI and DMR systems provide useful data on these roads; (2) any challenges to improving and maintaining these roads; and (3) what is known about the connection between road condition and school attendance as well as other aspects of school transportation. GAO reviewed documents and relevant literature; analyzed road-inventory and student-attendance data; and interviewed federal, state, local, and tribal transportation and education officials. GAO visited three selected tribes, based on road mileage and presence of BIE schools, among other factors.

What GAO Recommends

GAO is making eight recommendations including that BIA, in coordination with stakeholders, reexamine the need for NTTFI data and improve the quality of DMR data, and that BIE provide guidance to collect transportation-related absence data. Interior agreed with five of the recommendations, did not take a position on two, and disagreed with one. GAO continues to believe its recommendations are valid, as discussed further in this report.

View GAO-17-423. For more information, contact Rebecca Shea at (202) 512-2834 or SheaR@gao.gov.

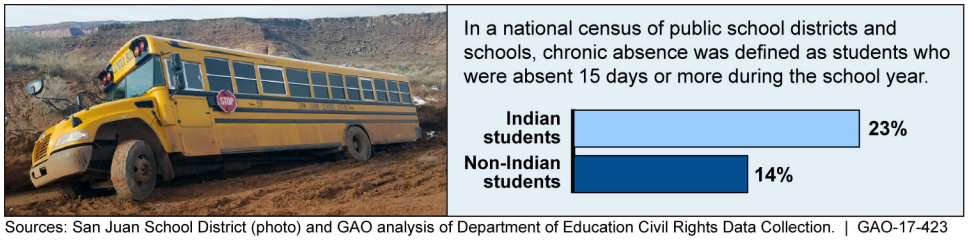
What GAO Found

The two databases maintained by the Department of the Interior's (Interior) Bureau of Indian Affairs (BIA) include some data fields useful for identifying tribal roads eligible for federal funding, but other fields may be too inaccurate to be useful for performance reporting and oversight. Specifically, the National Tribal Transportation Facility Inventory (NTTFI) provides useful data for identifying the roughly 161,000 miles of roads on tribal lands that are eligible for federal funding. However, the purpose for which these data are used has changed, and GAO found incomplete and inconsistent road-description and condition data, raising questions about the continued value of collecting these data. Similarly, BIA's Deferred Maintenance Reporting (DMR) system provides useful data on roughly 29,000 miles of BIA-owned roads eligible for federal funding, but GAO found inaccuracies in fields related to road-condition and road-maintenance needs. BIA does not document its road-maintenance cost estimates, and some tribes under-report performed maintenance. As a result, budget justification and performance reporting using these fields may not accurately reflect maintenance costs and needs. Federal standards for internal control suggest agencies design information systems and use quality information to achieve objectives.

Funding constraints, overlapping jurisdictions, and adverse weather make improving and maintaining roads on tribal lands challenging. However, intergovernmental partnerships have helped mitigate challenges in some cases. For example, in 2013, federal, state, and tribal agencies partnered on a $35-million project to pave a BIA earth road on the Navajo Nation when the main U.S. highway was closed due to a landslide. By partnering, the agencies completed the project in about 3 months and prior to the start of the school year, eliminating a 45-mile detour.

GAO's literature review and interviews with education officials indicate that road conditions can be a barrier to attendance, and Department of Education data show that Indian students have a higher chronic absence rate than other students (see fig.). At Interior, the Bureau of Indian Education's (BIE) schools generally do not collect data on transportation-related causes for absences, despite broader federal guidance that recommends doing so. BIE's attendance system lists causes, but transportation-related causes are currently not among them. Thus, BIE cannot quantify the effect of road conditions and target appropriate interventions. Rough road conditions in some areas also contribute to greater wear on school vehicles and associated higher maintenance costs.

School Bus on the Navajo Nation (Utah) and the National Rate of Students Chronically Absent, School Year 2013–14



Sources: San Juan School District (photo) and GAO analysis of Department of Education Civil Rights Data Collection. | GAO-17-423

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Abbreviations

ADT	average daily traffic
BIA	Bureau of Indian Affairs
BIE	Bureau of Indian Education
CFR	Code of Federal Regulations
DMR	deferred maintenance reporting
Interior	Department of the Interior
DOT	Department of Transportation
Education	Department of Education
ERIC	Education Resources Information Center
FHWA	Federal Highway Administration
IRR	Indian Reservation Roads
LOS	level of service
MAP-21	Moving Ahead for Progress in the 21st Century Act
NAEP	National Assessment of Educational Progress
NTTFI	National Tribal Transportation Facility Inventory
RIFDS	Road Inventory Field Database System
RMP	Road Maintenance Program
SCI	surface condition index
SUV	sport-utility vehicle
TIGER	Transportation Investment Generating Economic Recovery
TTP	Tribal Transportation Program

U.S. GOVERNMENT ACCOUNTABILITY OFFICE
441 G St. N.W.
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May 22, 2017

The Honorable Peter DeFazio
Ranking Member
Committee on Transportation and Infrastructure
House of Representatives

Dear Mr. DeFazio:

Roads are a vital link connecting people to education, employment, health care, and other essential services, and are of particular importance on tribal lands because of the remote location of some tribes.[1] However, roads on tribal lands are often unpaved and may not be well maintained. These factors can create transportation challenges for tribal communities. Several tribes and tribal associations have raised concerns about the inability of Indian students on tribal lands to get to school on roads that are in poor condition.[2]

The federal government provides funding for road improvement and maintenance to tribes through two key programs: the Tribal Transportation Program (TTP) and the Road Maintenance Program (RMP).[3] The TTP is jointly administered by the Department of the Interior's (Interior) Bureau of Indian Affairs (BIA) and the Department of Transportation's (DOT) Federal Highway Administration (FHWA). The TTP provides funds to over 560 federally recognized tribes for the planning, design, construction, and maintenance of transportation facilities—such as roads, bridges, bus shelters, and parking lots—identified in the National Tribal Transportation Facility Inventory (NTTFI). The NTTFI is a database maintained by BIA. While BIA is responsible for ensuring the accuracy of data in the system, data are entered and owned by individual tribes. NTTFI data includes transportation facilities eligible

[1]For this report, we have defined tribal lands as lands that include any federally recognized Indian tribe's reservation, off-reservation trust lands, pueblo, or colony, and Alaska Native regions established pursuant to the Alaska Native Claims Settlement Act, Pub. L. No. 92-203, 85 Stat. 688 (1971) (codified as amended at 43 U.S.C. §§ 1601 et seq.). Tribal lands do not include Oklahoma Tribal Statistical Areas for this report.

[2]For the purposes of this report, we use the term Indian to generally refer to American Indian and Alaska Native people.

[3]Pub. L. No. 114-94 § 1117-1118; 129 Stat. 1312,1356 -1358 (2015) codified at 23 U.S.C. §§ 201-202 and 25 U.S.C. § 318a.

for assistance under the TTP. In fiscal year 2016, the TTP received an authorization of $465 million in federal funding from the Fixing America's Surface Transportation Act, with the authorized amount increasing by $10-million per year until the funding level reaches $505 million in fiscal year 2020.[4] The RMP is administered by BIA and funds the maintenance of only BIA roads on tribal lands. BIA has received about $25 million annually in RMP funding since the 1990s, according to agency officials. BIA uses a Deferred Maintenance Reporting (DMR) system to track, among other things, the amount of maintenance conducted and deferred on the BIA road system. You asked us to review issues concerning road conditions on tribal lands and how these conditions relate to students' school attendance. This report examines:

1. the extent to which the NTTFI and the DMR system provide useful data about road conditions on tribal lands;
2. any challenges stakeholders face in improving and maintaining roads on tribal lands; and
3. what is known about the connection between road conditions on tribal lands and school attendance as well as other aspects of school transportation.

To determine the extent to which the NTTFI and DMR systems provide useful data on road conditions on tribal lands, we reviewed agency guidance, policies, and system documentation; conducted electronic data testing, such as for completeness, out-of-range values, and logical inconsistencies; attended a training workshop on NTTFI data entry; and interviewed FHWA, BIA, and tribal officials about each system. We compared information about each data system's design, monitoring, edit checks, and other processes for promoting data accuracy, consistency, and completeness to federal standards for internal control. We analyzed the NTTFI data as of September 2015—the most recent data available at the time of our review—and the quarterly DMR system inventory and road-condition data for fiscal years 2009 through 2015—the most recent full year of data available matching the NTTFI file year. Based on the steps we took, we determined that these data were sufficiently reliable for some purposes, but not others, as described later in the report.

To identify any challenges stakeholders face in improving and maintaining roads on tribal lands, we reviewed (1) relevant federal laws, regulations,

[4]Pub. L. No. 114-94 §1101(a)(3)(A),129 Stat. 1312,1322 (2015).

guidance, and funding processes for the TTP and RMP; (2) program documentation such as FHWA budget justifications and BIA's RMP funding information for fiscal years 2009 through 2016; and (3) documents related to conducting road improvement and maintenance, such as selected tribes' program agreements and lists of tribal transportation projects. We conducted three site visits to 10 selected schools and 7 transportation offices within the Navajo, Pine Ridge, and Rosebud Indian reservations. While all 567 federally recognized tribes were considered for site visit selection, these three sites were chosen because they reflect factors such as different BIA regions; considerable tribal and BIA road mileage; presence of Bureau of Indian Education (BIE) schools; and different program agreements. During our site visits, in addition to meeting with school, tribal, and transportation officials, we observed road conditions first-hand, including riding on school busses along their delivery routes. As part of one site visit, we conducted a facilitated group discussion with 10 tribes from the BIA Great Plains and Rocky Mountain Regions. Our site visits provide information and illustrative examples on a range of road condition and student attendance issues on tribal lands but are not generalizable to all tribal nations. We obtained geospatial data from the Navajo Nation on road ownership, road surface type, and road maintenance partnerships for two school districts within the Nation. We also attended four tribal transportation-related conferences and interviewed various officials and stakeholders, including FHWA and BIA headquarters and regional officials about their coordination with tribes. During the course of our review, we met with various federal, state, local, and tribal transportation and education officials including tribal technical assistance experts and representatives from national associations.

To determine what is known about the connection between road conditions on tribal lands and school attendance and other aspects of school transportation, we took several steps. To describe attendance including for Indian students in general, we analyzed national data from two data sets collected by the Department of Education (Education). We assessed the reliability of attendance data by reviewing related documentation and interviewing knowledgeable agency officials, among other steps, and determined that these data were sufficiently reliable for our purposes. To identify studies concerning the connection between road conditions and school attendance, we searched for academic studies published since 2000, and we reviewed a list of studies compiled by Education's National Library of Education. We used a data collection instrument to consistently record information about key findings related to the connection between road condition and attendance from each

relevant source. As part of our site visits to the three tribes noted above, we selected 10 schools and districts to visit that had similar student demographics (e.g., mostly Indian and mostly low-income) and school bus routes of varying road surface types. For these schools and districts, we analyzed available documentation and information on student attendance and school bus routes; directly observed bus routes; and interviewed school and district officials on the effects of road conditions on attendance as well as other school transportation issues. We also interviewed officials from Education, Interior's Bureau of Indian Education (BIE), and other national-level stakeholders from tribal organizations. We compared information on BIE's efforts in this area with guidance from an education forum and federal standards for internal control. Additional details on our scope and methodology, including a list of tribal and other entities from whom we obtained information for this review are contained in appendix I.

We conducted this performance audit from December 2015 to May 2017 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on the audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Background

Tribal Transportation Program

BIA and FHWA (through its Office of Federal Lands Highway) jointly administer the TTP, to address transportation needs of tribes. The TTP is funded through the highway account of the Highway Trust Fund and is designed to address eligible transportation-related activities on tribal lands.[5] Activities eligible for program funding include planning, design, construction, and maintenance of roads listed in the NTTFI.[6] Program funding is distributed to tribes by formula after "set-asides"—funding amounts that the Secretary of Transportation may or must deduct from

[5]Federal surface transportation programs are primarily funded by taxes on motor fuels and other truck-related taxes that are deposited into the Highway Trust Fund.

[6]Tribal Transportation Program funds can be used for eligible Title 23 transportation related activities which are defined in 23 U.S.C. § 202 (a) and 25 C.F.R. Part 170.

the funding for various purposes—are determined.[7] Program funds can also be used for the state and local matching share of apportioned federal-aid highway funds. Tribes may select from various federal contracts and agreements to implement their transportation programs.[8] BIA maintains the NTTFI data system, which includes transportation facilities—existing and proposed—on Indian reservations and within tribal communities and all public roads on tribal lands.[9]

Road Maintenance Program

The purpose of the BIA RMP is to preserve, repair, and restore the BIA system of bridges and roadways and to ensure that TTP-eligible highway structures are maintained.[10] The RMP is designed to address the maintenance needs of roads owned by the BIA. RMP activities include routine and emergency road maintenance, bridge maintenance, and snow and ice removal, among other things. Road maintenance does not include new construction, improvement, or reconstruction.[11] BIA has 12 regions, two of which do not have any BIA roads—the Alaska and Eastern Oklahoma BIA Regions. The BIA Division of Transportation operates and maintains the BIA road system through the remaining 10 regional offices.[12] BIA roads—which are also in the NTTFI—are open to the public

[7]Under the formula, the amounts provided to the tribes (the tribal shares) are determined based on a ratio of eligible road mileage and total population each tribe bears to the total eligible mileage and total population of all American Indians and Alaskan Natives, as well as a percentage of the need distribution factors and population adjustment factors from the 2011 funding amount. The TTP set asides are for: program administration (up to 5 percent); tribal planning (2 percent); tribal bridges (up to 3 percent); tribal safety projects (up to 2 percent); and tribal supplementary funding ($82.5 million, plus 12.5 percent of the amount by which total TTP funding in a fiscal year exceeds $275 million).

[8]Tribes may select from among various types of federal agreements to implement TTP-funded projects. Responsibility for project implementation rests with FHWA, BIA, or tribal authorities depending on which agreement is in effect.

[9]Transportation facilities include roads, paths, trails, walkways, public-parking facilities, rest areas, ferry boat terminals, and transit terminals. Our review only includes roads, paths, trails, and walkways in the NTTFI, which we will refer to collectively as roads. A proposed road means any road, including a primary access route that will serve public transportation needs, that meets the eligibility requirements of the TTP, and does not currently exist. 25 C.F.R. § 170.5 (2016).

[10]According to BIA, the basic authority for the RMP is found at 25 U.S.C. § 318a. .

[11]According to BIA officials, road improvement activities such as placing aggregate materials, installing new drainage culverts, and elevating the road surface are not authorized under the RMP.

[12]Tribal governments may perform road maintenance on BIA system roads on behalf of BIA using RMP funding upon entering into a self-determination contract or self-governance compact under Pub. L. No. 93-638 as amended.

and are often major access corridors for tribal communities and the public. The road system consists of more than 930 BIA-owned bridges, one ferry system, and approximately 29,000 miles of proposed and existing roads. About 75 percent of the existing roads are not paved. Five of the 10 BIA regions that have BIA roads—the Western, Navajo, Southwestern, Northwestern, and Rocky Mountain BIA Regions—have about 80 percent of the total BIA road miles.

Indian School Attendance

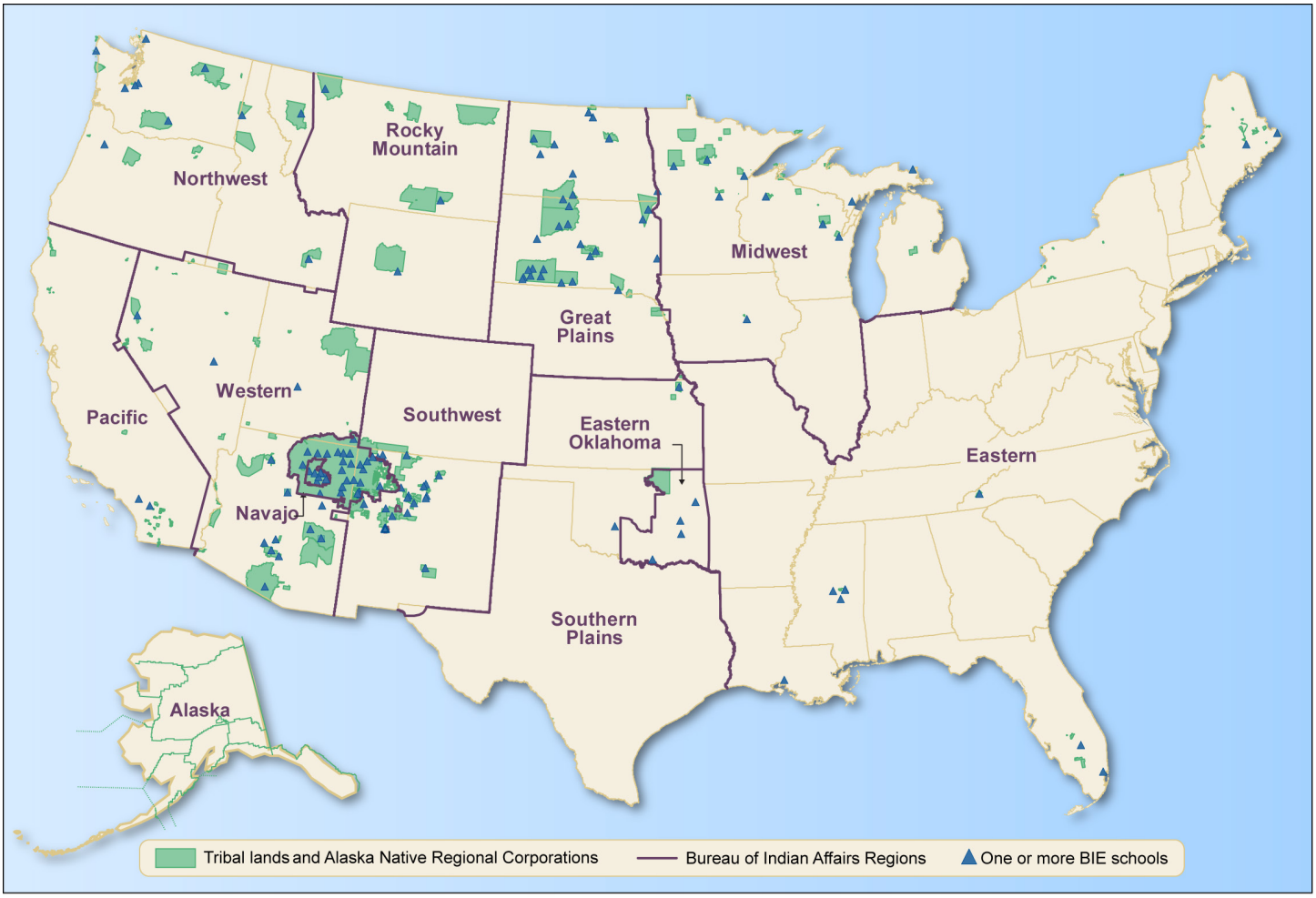
About 550,000 Indian students are enrolled in public elementary and secondary (kindergarten to grade 12) schools in the United States, not counting BIE schools.[13] In addition, BIE funds 185 schools serving about 41,000 students living on or near tribal lands.[14] (See fig. 1.) BIE operates about one-third of its schools directly and tribes operate the other two-thirds mostly through federal grants. Unlike public schools, BIE schools receive nearly all of their funding from the federal government, including about $50 million annually to transport students. We recently placed federal programs serving tribes, including BIE's administration of education programs, on our *High-Risk Series*.[15]

[13]This estimate is for school year 2013–14, according to our analysis of Education's Civil Rights Data Collection.

[14]For this report, we refer to BIE schools as including both BIE-operated and tribally operated schools, unless specified otherwise. BIE's 185 schools include mostly schools where students live at home with daily transportation to school. According to BIE, over a third of its schools have one or more dormitories, including 14 stand-alone dormitories where about 1,300 public school students live and from which they are transported to school. According to BIE officials, BIE documents generally refer to 183 schools, as certain schools are collocated.

[15]At the start of each Congress, we update our *High-Risk Series*, which highlights government operations that are particularly vulnerable to waste, fraud, abuse, and mismanagement or that need broad-based transformation. See GAO, *High-Risk Series: Progress on Many High-Risk Areas, While Substantial Efforts Needed on Others*, GAO-17-317 (Washington, D.C.: Feb. 15, 2017).

Figure 1: Locations of Tribal Lands in the United States Having Bureau of Indian Education Schools by Bureau of Indian Affairs' Regions



Source: GAO analysis of Bureau of Indian Education (BIE) and United States Census Bureau information. | GAO-17-423

On tribal lands, Indian elementary and secondary students generally attend either public or BIE schools. The majority of Indian students on tribal lands are enrolled in public school districts. In some cases, students may have a choice to attend either public or BIE schools, and they do not necessarily enroll in the school closest to their home. On certain tribal lands, there may only be one school.

Inaccuracies Limit the Usefulness of Some BIA Data on the Condition of Roads on Tribal Lands

Data fields pertaining to road inventory in BIA's NTTFI and DMR databases are useful for the purpose of identifying roads eligible for federal tribal funding. However, we found that data fields pertaining to the description and condition of roads in the NTTFI are not complete, accurate, or consistently collected. As a result, road-description and condition data may lack the accuracy needed for reporting and agency oversight efforts, calling into question the usefulness of maintaining these NTTFI data fields. Similarly, we found that the DMR system, which BIA uses to report information on maintenance of BIA-owned roads, contains data that are not accurate. These data issues compromise FHWA's and BIA's ability to support efforts to oversee the TTP and RMP which fund roads on tribal lands, including maintaining and improving the federally owned roads for which BIA is responsible.

NTTFI Data Identifies Roads Eligible for Funding, but Inaccuracies Limit the Usefulness of Road-Description and Condition Data

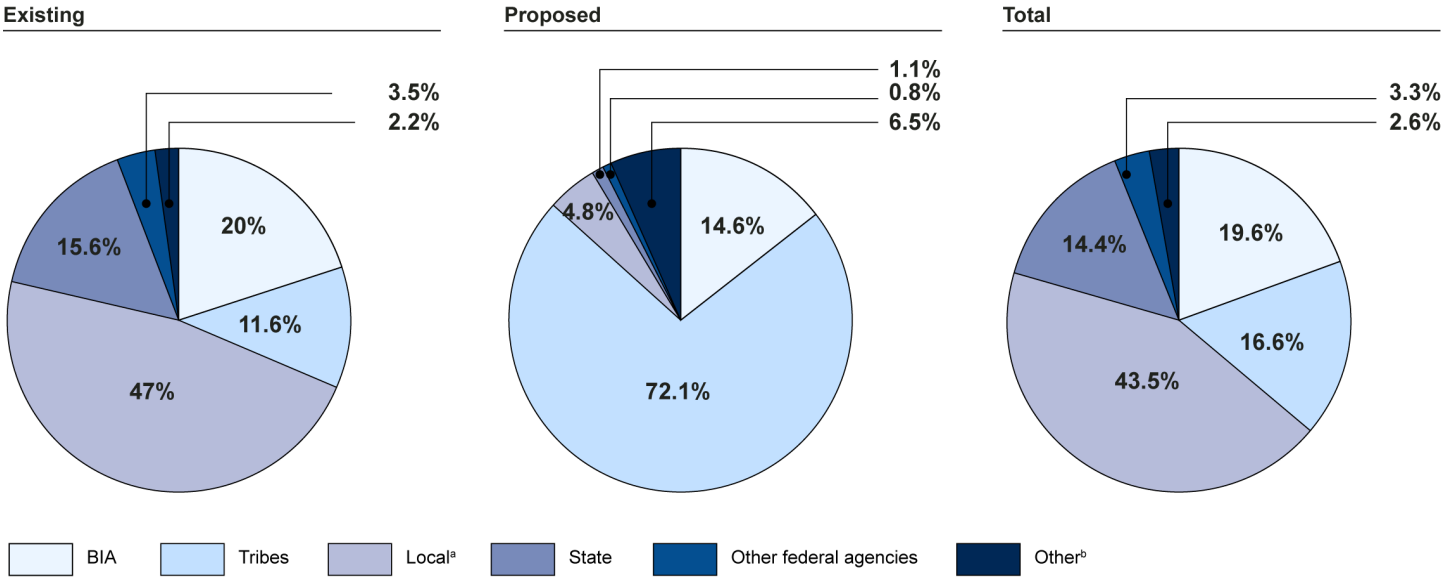
NTTFI Useful for Identifying Roads Eligible for Federal Tribal Transportation Program Funding

We found that NTTFI inventory data—such as road location, length, and ownership—are reasonably complete and accurate, and therefore useful, for identifying roads eligible for TTP funding. This assessment is based on our electronic testing and review of BIA's process for entering new data for these fields. For example, we found that inventory data were complete, in that fields associated with roads in the inventory were reasonably complete and within expected ranges. In addition, controls are in place to ensure accuracy such as when new road segments are proposed for TTP eligibility or are updated by tribes, BIA reviews those submissions, including road survey information, to verify the road before it is made official in the system. The NTTFI road inventory identifies about 161,000 miles of existing and proposed roads on tribal lands that are eligible for TTP funding. The inventory spans 12 BIA regions and includes roads of various surface types and owners (see app. II).[16] According to

[16]Our review did not include ensuring that the roads in the inventory meet the current statutory requirements for inclusion in the NTTFI. We also did not sample or evaluate the individual accuracy of the records in the NTTFI such as those to identify road length or existing road-surface type.

our analysis, BIA owns 20 percent (29,456 miles) of the existing road miles on tribal lands and the tribes own almost 12 percent (17,029 miles), leaving about 68 percent (100,796 miles) of the existing road miles under the control of state, local, and other entities. (See fig. 2.)

Figure 2: Existing and Proposed Roads in the National Tribal Facility Inventory (NTTFI) by Owner, as of October 31, 2015



Source: GAO analysis of Bureau of Indian Affairs (BIA) data. | GAO-17-423

Note: Includes roads, paths, trails, and walkways in the NTTFI. Does not include facilities identified as bridges, parking facilities, ferry boat terminals, transit terminals, airstrips, or overlapping routes. Interstate highways are typically owned by the state.

[a]Includes counties, townships, and municipalities.

[b]Includes petroleum and mining, utility company, or any other agencies, groups, or enterprises not included in one of the other owner categories.

Inaccuracies and Changes in the Use of Road-Description and Condition Data Limit Their Usefulness for Reporting and Oversight Efforts

In contrast, our electronic testing of NTTFI data on road-description and condition data, such as surface type, surface condition, and daily traffic count, found missing, inaccurate, and out-of-date entries. Despite these issues, FHWA—the agency responsible for the TTP budget—uses the NTTFI data for reporting and oversight purposes. For example, FHWA uses these data to report on the condition and use of tribal roads in its

performance reports and annual budget justifications.[17] In addition, BIA uses these data to generate information for its internal use, such as estimating construction costs to improve TTP roads. BIA officials said that these data were originally included in NTTFI to support TTP-funding allocations but are no longer used for this purpose. Nevertheless, BIA continues to collect these data fields from tribes and maintain existing data on these fields in the NTTFI. Federal standards for internal control state that to achieve agency objectives, management should (1) design information systems and related control activities including continuing to evaluate those activities for continued relevance and effectiveness and (2) use quality information.[18] Given the data quality limitations we identified in our electronic testing and changes in program requirements, this raises questions about the continued need to collect these road-condition and description data because they are of limited use for reporting and oversight efforts. Several factors, described below, have affected the quality and usefulness of road-description and condition data. These factors include: (1) changes in the role these data fields play in funding decisions, (2) lack of clarity in BIA's guidance to tribes for reporting these data fields, and (3) limited data-monitoring activities.

Change in Need for Road-Description and Condition Data Leads to Data Quality Issues

According to BIA officials, road-description and condition data were originally collected to support TTP-funding allocations, but acknowledged that these data fields are no longer used for that purpose. This is in contrast to inventory data, described above, which continues to be used to identify roads eligible for TTP-funding. Specifically, prior to 2012, road-description and condition data fields were used in the funding formula to determine the distribution of tribal-funding shares.[19] When road-description and condition data were used for funding purposes, missing,

[17]Road-description data such as vehicle miles traveled, percent of unpaved road miles, and changes in road condition are found in FHWA annual budget estimates and condition and performance reports. For example, see U.S. Department of Transportation, Office of the Assistant Secretary for Budget and Programs and Chief Financial Officer, *FHWA FY 2017 Budget Estimates*, accessed March 28, 2017, https://www.transportation.gov/mission/budget/fhwa-fy-2017-budget-estimates and U.S. Department of Transportation, Federal Highway Administration and Federal Transit Administration, *2013 Status of the Nation's Highways, Bridges, and Transit: Conditions & Performance Report to Congress* (2013) 11-3, 11-6, 11-11.

[18]GAO, *Standards for Internal Control in the Federal Government*, GAO-14-704G (Washington, D.C.: September 2014).

[19]The Indian Reservation Roads Program was changed and renamed in 2012 to the TTP by the Moving Ahead for Progress in the 21st Century Act (MAP-21). Pub. L. No. 112-141 § 1119, 126 Stat. 405, 473 (2012).

out-of-date, or erroneous data could pose a risk to funding decisions. Road-description and condition data collected after 2012 are no longer needed for this purpose, thus eliminating a key incentive for tribes—which are responsible for entering the data—to ensure the data are complete, accurate, and up-to-date.[20] Federal standards for internal control state that management should design its information systems and related control activities to achieve the entity's objectives including continuing to evaluate those activities for continued relevance and effectiveness.[21] Although BIA officials acknowledged that changes in a regulation affecting how the data are used have contributed to the problem of outdated and unreliable data, they have not made changes to NTTFI data collection since its use in the funding formula was discontinued in 2012. BIA officials also noted that while they generally do not use NTTFI road-description and condition data for system-wide reporting, they do make this information available to FHWA, which has used it to report on road condition in its annual budget justification and its *Conditions and Performance Report to Congress*. While NTTFI road-description data are relevant for this purpose, it is unclear how useful the current data are for such a purpose given the results of our electronic testing. Collecting and maintaining road-description and condition data involves both tribal and BIA resources; however, until BIA can clearly define a relevant purpose for collecting these data, it is difficult to justify the continued collection of data that are not current, complete, or accurate.

[20]The current TTP funding formula uses 2004 through 2012 NTTFI data but does not use post-2012 NTTFI data to determine tribal-funding allocations. Prior to MAP-21, the TTP tribal share formula was needs-based, utilizing pavement condition, average daily traffic, road lengths, and other data in the NTTFI as inputs. Updates to these data made after 2012 do not affect the determination of the annual Tribal Share amounts.

[21]GAO-14-704G.

Unclear BIA Guidance Contributes to Outdated and Inaccurate Data

BIA's guidance to tribes on how to "code" the data when entering it into NTTFI is unclear. This can result in inconsistent collection and outdated data, both of which can lead to inaccuracies when these fields are used for budget justification and performance reporting.[22] For example, required NTTFI data fields pertaining to traffic counts (average daily traffic on major arterial roads) and surface condition (surface condition index) are outdated and may not be comparable across tribes. BIA's guidance does not require data to be updated on a routine basis, and condition data is not required to be collected in the same manner by all tribes. In particular:

> *Average daily traffic (ADT):*[23] ADT is a measurement of the amount of traffic that is using the road and, among other things, is intended to be used to: (1) determine the design standards to which a road should be built (such as whether the road surface should be gravel or paved); (2) manage road maintenance (such as determining which roads to maintain and what treatments to use); and (3) report on the number of vehicle miles being traveled (such as for analyzing road usage trends). Research and guidance on industry practices indicate that ADT on major roads is typically counted every 2 to 6 years.[24] We found that BIA does not provide direction in its coding guide on how often to take traffic counts and most of NTTFI's traffic counts for major arterial roads are between 6 and 12 years old. In particular, of the existing major arterial road sections in NTTFI—totaling 1,872 miles—none

[22]BIA developed a coding guide to provide the definitions of the data attributes stored within the Road Inventory Field Data System (RIFDS) module of the NTTFI. RIFDS is the application field personnel use to enter data into the NTTFI. The coding guide includes field definitions, allowed ranges, data types, and data lengths. See U.S. Department of the Interior, Bureau of Indian Affairs, Office of Tribal Services, Division of Transportation, *Indian Reservation Roads: Coding Guide and Instructions for the IRR Inventory*, (Draft 10-16-2007).

[23]We reviewed only existing major arterial roads because only these roads are required to have an ADT in the NTTFI database. For all other classifications of roads the ADT is optional. Major arterial roads are those characterized as serving traffic between major population centers and having traffic volumes of 10,000 vehicles per day or greater, or those having more than two lanes of traffic.

[24]U.S. Department of Transportation, Federal Highway Administration, *Traffic Monitoring Guide* (September 2013) 3–65 and Minnesota Department of Transportation, *Transportation Research Synthesis: Collecting and Managing Data on Local Roads*, TRS 1207 (September 2012) 4.

have had their ADT counted in the last 3 years, 0.3 percent (6 miles) have been counted in the last 4 years, 3.8 percent (72 miles) have been counted in the last 6 years, and 81 percent (1,517 miles) have been counted in the last 12 years. As a result, ADT information contained in NTTFI likely does not reflect current road usage and cannot reliably inform reporting or decisions related to design standards or maintenance management.

Surface condition index (SCI):[25] SCI is a measurement of road surface condition that can be used to identify and prioritize maintenance needs. According to industry guidance, road conditions are typically evaluated every 1 to 4 years because conditions deteriorate over time.[26] There is no requirement in BIA's coding guide to specify how often SCI should be updated, and we found that the SCI for about 85 percent (81,080 of the 95,510 miles) of existing paved and gravel roads (those which are required to be evaluated for SCI) could not have been updated in at least the last 4 years, and almost 50 percent could not have been updated in at least the last 8 years.[27] Further, because the coding guide allows tribes to use any nationally acceptable method to rate a road, data may not be collected consistently from those evaluating the roads.[28] As a result of outdated SCI data that is inconsistently collected, NTTFI lacks reliability for use in

[25]We reviewed only existing paved and gravel roads because only those roads are required to be evaluated for SCI. Earth and primitive roads are not evaluated for SCI.

[26]U.S. Department of Transportation, Federal Highway Administration, *Practical Guide for Quality Management of Pavement Condition Data Collection* (February 2013) 13, 14; National Cooperative Highway Research Program, *NCHRP Synthesis 401: Quality Management of Pavement Condition Data Collection* (2009) 17, 28; and Illinois Department of Transportation, Division of Highways, *Bureau of Local Roads and Streets Manual*,(October 2008) 45-2(1).

[27]Because NTTFI records the date when the record for a particular road section has been updated, we determined the SCI information for a section would have to have been updated on or before the date of the last update. We used this as the basis for determining when the SCI could have been last updated.

[28]Nationally-accepted methods include visual assessments of condition matched to pictures and automated assessments of condition, which measure items such as road roughness and cracking. In cases where a nationally-accepted road-rating method cannot be used, tribes can use the method described in the BIA Maintenance Handbook. This method is based on an inspection and rating (on a 0 to 5 scale) of items such as patching, cracking, and depressions. Ratings for each item are averaged, and the resulting value is multiplied by 20 to fit the scale (0 to 100) for reporting SCI information to the NTTFI.

prioritizing TTP projects and making the most efficient use of resources. Further, FHWA's use of SCI data may contribute to inaccuracy in its reporting on the overall condition of the system and whether it is improving or worsening.

In addition to these specific limitations, the BIA coding guide—which provides guidance for those collecting and inputting data into the NTTFI—was last updated as a draft released in 2007 and contains outdated references. For example, the guide refers to the Indian Reservation Roads (IRR) Program—the program prior to the TTP. Moreover, in 2008, FHWA issued a review of the then-IRR Program. The FHWA's review, among other things, found that the coding guide had conflicting, confusing, and ambiguous instructions or definitions.[29] In its review, FHWA recommended that the BIA revise the guide to remove subjective interpretations and ambiguous directions to improve data consistency and accuracy. BIA has not updated the coding guide to address FHWA's review and recommendations, but BIA officials stated that they have taken some efforts to improve the data.[30]

BIA officials acknowledged that outdated and inaccurate data exist within the NTTFI but noted that it is the tribes that are responsible for entering this information. BIA officials noted that tribes may have less incentive to update data fields such as ADT, SCI, and other road-description and condition data because, as noted above, this information is no longer used as a factor in determining the allocation of TTP funds to tribes. Federal standards for internal control state that management should use quality information. Moreover, these standards recommend that management design control activities, such as providing clear guidance to achieve their objectives.[31] If BIA determines that it needs to collect these data to achieve the agencies' objectives, it will not have assurance that the tribes can provide quality information on road use and surface condition until it can provide more clear guidance to them.

[29]U.S. Department of Transportation, Federal Highway Administration, *Indian Reservation Roads Program: Comprehensive Inventory Report* (January 2008).

[30]For example, BIA conducts quarterly calls with tribes to discuss and resolve data quality issues and is working with tribes to implement a tribal NTTFI quality assurance review team.

[31]GAO-14-704G.

Lack of Monitoring Contributes to Missing and Conflicting Data

While the NTTFI has some automated data entry checks for road-description and condition information, BIA does not monitor these fields for missing or conflicting data, resulting in persistently incomplete and inaccurate data. For example, we found that road-description and condition data associated with about 14 percent (22,000 miles) of existing and proposed road miles have not been updated since they were imported into NTTFI in 2004. In our analysis we identified conflicting data, indicating inaccurate information, as well as missing data for required fields. We found, for example:

- About 6 percent (8,630 miles) of entries pertaining to the 147,281 miles of existing roads are missing their required "functional class" code, which is used to determine the construction standard for the road, such as identifying the appropriate pavement type.[32] Without complete functional class information on existing roads, it is not possible to know if the road is adequately constructed or needs to be improved when making funding estimates. Without this information on proposed roads, planning estimates of system-wide funding to construct these roads may be in error.
- Approximately 6 percent (9,553 miles) of entries pertaining to all roads have the "construction need" coded as "proposed," but the required "existing surface type" is blank (i.e., not coded as "proposed") making it unclear whether these roads are existing or proposed. Also, about 70 percent (9,553 miles) of the 13,380 miles of proposed roads are missing their required "existing surface type" code which should show them to be "proposed." Accurate information in these fields helps ensure that agencies clearly know which roads are proposed and which are existing, knowledge that is essential for planning maintenance and construction and developing the costs for those plans.

BIA officials told us that they are aware of these data errors, which they believe are primarily from data that were imported into NTTFI from the previous inventory system in 2004. These officials also noted that there is not a systematic reporting function to identify these errors and generate an error report to support correction efforts. While there are some automated checks on the system that tribes use to enter and update data

[32]The BIA coding guide uses functional class to delineate the difference between various roads based on the type and amount of traffic that use them and how they serve traffic in the community.

in the NTTFI, they do not apply to data already in the system. With respect to data entry checks, for example, certain fields only accept a specific range of values for data entry, and some fields require documentation for entries that require BIA's review before official inclusion into the NTTFI. These checks are intended to eliminate the possibility of entering incorrectly coded data or the inclusion of erroneous data. No similar error reporting or checks for compliance with expected values are applied to existing data. According to BIA officials, this is because they do not own the tribal data that is in the system they manage and therefore cannot make changes to the data once it has been accepted into the system. Tribes are required to update their data annually.[33] Nevertheless, BIA has a stewardship responsibility to ensure the NTTFI's data accuracy. Federal internal control standards state that information systems and related control activities, such as monitoring to identify missing or erroneous data, should be designed to facilitate timely and targeted corrections.[34] Without complete and accurate road-description and condition data, BIA and tribes will be limited in their ability to assess the needs for the entire road system within their scope and identify TTP priorities. Having more complete and accurate data would also better support FHWA's budget-justification and performance reporting.

New TTP regulations recently went into effect that may mitigate some of the data errors we identified.[35] These regulations require the tribes to, among other things, submit specified documentation by November 7, 2017 to BIA and FHWA for approval for all proposed NTTFI roads that currently exist in the NTTFI in order to remain in the inventory.[36] According to BIA officials, this review and verification may correct some of the problems with the proposed road data in NTTFI. BIA officials told us that they are in the process of developing the details of how the review will work and what options they may be able to take to ensure the proposed road data are accurate, including possibly removing proposed road sections containing data errors from the inventory.

[33]25 C.F.R. § 170.444.

[34]GAO-14-704G

[35]Tribal Transportation Program, 81 Fed. Reg. 78,456 (Nov. 7, 2016) codified at 25 C.F.R. Part 170.

[36]25 C.F.R. §170.443(b).

Quality of Some DMR Data May Affect Reporting on Performance and Deferred Maintenance

DMR Identifies BIA Roads Eligible for Federal Road Maintenance Program Funding

The DMR system provides an inventory of BIA roads by location, length, and route that may be maintained with RMP funds. Separate from the NTTFI, BIA maintains the DMR system containing the inventory of BIA-owned roads eligible for maintenance funded by the RMP.[37] DMR records consist of data on individual road sections with fields pertaining to the description, such as surface type, level of service, and maintenance needed, performed, and deferred of each section. We found the DMR data to be useful for identifying roads in the BIA inventory. Table 1 shows the distribution of these roads across the 10 BIA regions in which they are located; two BIA regions have no BIA roads. While the BIA roads are also in the NTTFI, the DMR database includes additional data, such as deferred maintenance, which is not in the NTTFI.

Table 1: Road Surface Type for Proposed and Existing Roads in the Deferred Maintenance Reporting (DMR) System, by Bureau of Indian Affairs' (BIA) Region, as of October 31, 2015

Miles		**Existing road surface's type**				
BIA Region	**Proposed**	**Paved**	**Gravel**	**Earth**	**Primitive**	Total
Eastern	1	363	495	167	139	**1,165**
Great Plains	2	898	842	281	12	**2,034**
Midwest	5	466	648	535	18	**1,675**
Navajo	0	1,531	89	4,130	228	**5,979**
Northwest	0	606	753	2,045	47	**3,452**
Pacific	0	184	75	394	88	**742**
Rocky Mountain	0	875	421	841	409	**2,546**
Southern Plains	0	51	85	135	0	**270**
Southwest	7	571	385	3,701	87	**4,749**
Western	34	1,602	707	3,230	725	**6,298**
Total	**49**	**7,149**	**4,499**	**15,459**	**1,752**	**28,911**

Source: GAO analysis of BIA data. | GAO-17-423

[37]BIA-owned roads as identified in the NTTFI are also eligible for TTP funding.

Note: Mileage does not add to total due to rounding and 3 miles of road that are not identified as proposed or existing. There are no BIA roads in the Alaska or Eastern Oklahoma BIA regions, and therefore are not included in the table. Paved roads are concrete and bituminous roads. Primitive roads are ones where people have driven enough times to form a road, but the ground has never been graded.

DMR Data Used for Performance and Deferred Maintenance Reporting May Be Inaccurate

In management of the RMP, BIA sets goals and reports on its performance; however, we found that some data in the DMR system—specifically, data on the current level of service (overall condition of the road), cost of needed maintenance, and amount of maintenance performed—may not be sufficiently accurate for BIA's use in this reporting.[38] This reporting includes assessing the amount of deferred maintenance for the BIA road system and reporting how BIA has met its performance targets for the RMP. BIA uses deferred maintenance to (1) quantify the amount of maintenance needed (in dollars) on BIA roads in Interior's annual budget justification and (2) report on maintenance performance targets to the Indian Affairs Performance Management System, information that is found in BIA's annual budget justification and performance information.[39] BIA uses level of service data from DMR to calculate and report the percentage of miles of BIA roads in acceptable condition in the performance report. If the level of service data is in error, then the resulting performance reporting will also be inaccurate. As noted previously, according to federal internal control standards, management should use quality information to make informed decisions and in communicating both internally and externally.[40] Controls to ensure that quality information is used include: obtaining relevant data (that are reasonably free from error) from reliable sources, obtaining that information on a timely basis, and processing that data into quality information that faithfully represents what it purports to represent.

To determine the amount of deferred maintenance on BIA roads, BIA first calculates the maintenance needed by multiplying a unit cost of

[38]The BIA Transportation Facilities Maintenance Handbook states that the level of service is an overall condition rating of the roadway and all associated safety features. The overall condition of a road should include, but is not limited to the inspection of: (1) roadway surface, (2) shoulders, (3) culverts, (4) ditches and drainage, (5) roadside appurtenances/guardrail, (6) traffic signs, (7) pavement markings, and (8) traffic patterns.

[39]The Indian Affairs Performance Management System is the system of record for reporting and analyzing data collected on Indian Affairs (IA) programs. The system consists of performance measures, measure definition templates to facilitate consistent reporting, and performance targets for monitoring overall program success.

[40]GAO-14-704G.

maintenance per mile, based on a road section's level of service, by the length of the road section. However, we found that two of the factors—level of service and unit cost of maintenance—that BIA uses in its maintenance cost calculations may be unreliable, resulting in inaccurate estimates of maintenance needs. In particular:

Level of service (LOS): LOS is a qualitative road condition rating (on a 1 to 5 scale) based on road surface, drainage, pavement marking, and other characteristics which change over time. BIA officials stated that every BIA road is evaluated on an annual basis. However, it is not possible to determine specifically when each road section's LOS was last updated because the DMR system does not record this information. Without knowing when the LOS information was last updated, BIA does not have reasonable assurance that LOS data represent actual road conditions, or whether BIA is meeting its performance measures for the RMP.

Unit cost of maintenance: Unit maintenance costs are used to identify the estimated annual costs of maintaining a particular road section. BIA develops unit costs per mile based on a road's geographic location, surface type, and level of service to estimate the amount of maintenance needed for the entire road section.[41] However, BIA officials told us that they had no formal documentation showing how the unit cost estimates were prepared. According to leading practices for cost estimation, one key step for ensuring high-quality cost estimates is to document the estimate that includes auditable and traceable data sources for each cost element.[42] Because BIA does not document unit cost estimates, it cannot determine the reliability of the estimates' sources or the quality of the estimate of maintenance needs based on their use.

After determining the amount of maintenance needed, BIA subtracts the amount of maintenance performed as reported by BIA and tribes in the DMR from the needed maintenance to determine the amount of deferred

[41]For example in 2016, BIA estimated that a gravel road one mile long in the Great Plains Region with a LOS indicating it is in fair condition would require $7,650 to maintain it for the year.

[42]GAO, *GAO Cost Estimating and Assessment Guide*, GAO-09-3SP (Washington, D.C.: March 2009).

maintenance. However, BIA officials stated that there is under-reporting of performed maintenance by some tribes. In particular, BIA officials noted that approximately 172 tribes have an agreement with BIA to administer the RMP and maintain BIA roads in their area, but only about 40 percent of those tribes report on their road maintenance activities which results in the DMR system having incomplete data on maintenance performed.[43] BIA officials stated that they continue their educational efforts to stress the value of the collection and reporting of performed maintenance. However, these officials told us the reporting of maintenance performed at the road section level can be difficult because the maintenance work is not always performed at one specific road section, and it is challenging to allocate maintenance activities over multiple sections. BIA officials told us that they are considering alternative means of reporting the maintenance performed amounts to increase the completeness of the maintenance performed measure; however, they do not have a specific plan in place to address this issue at this time.

Because BIA's estimates of needed maintenance may be inaccurate and tribes' reporting on performed maintenance is incomplete, calculations of deferred maintenance—the difference between estimated maintenance needed and actual maintenance performed—that support BIA's budget submission and performance reporting may be similarly inaccurate. This lack of quality information can preclude Congress and agency officials from having a clear understanding of BIA road conditions and from making informed decisions about RMP priorities and funding levels.

[43]These agreements can include self-determination, or 638 contracts, and self-governance compacts under the Indian Self-Determination and Education Assistance Act as amended. Pub. L. No. 93-638, 88 Stat. 2203 (1975), codified at 25 U.S.C. §§ 5301-5423. Through these agreements, the tribe can assume the functions and duties that the Secretary of the Interior would have performed related to transportation planning, construction management, program administration, design, construction, road maintenance, and other activities associated with administering the road network.

Stakeholders Face Various Challenges to Improving Roads on Tribal Lands, Although Partnerships Have Helped to Mitigate

Based on our review of various planning and funding documents as well as interviews with selected stakeholders—including federal, state, local, and tribal officials—we identified funding constraints, overlapping jurisdictions, and adverse weather as some of the challenges faced in improving and maintaining roads on tribal lands. However, we found examples of collaboration among different stakeholders to improve coordination and resource sharing that helped mitigate some of these challenges.

Funding Constraints, Jurisdictional Issues, and Adverse Weather Complicate Road Improvements and Maintenance on Tribal Lands

Funding Constraints

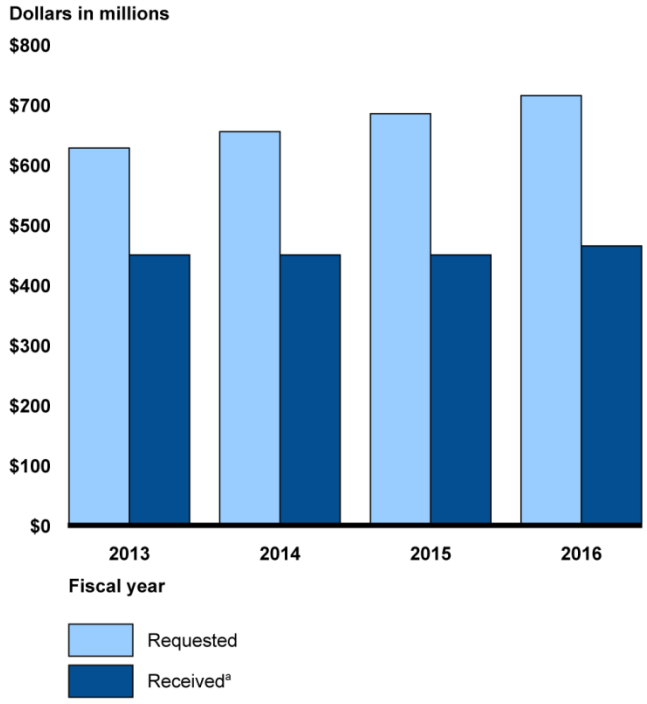
TTP annual appropriations fluctuated between about $424 and $441 million from fiscal years 2013 to 2016, and were less than FHWA's budget request each year.[44] (See fig. 3.) Federal, tribal, and other stakeholders we interviewed noted that constrained funding has limited the ability of tribes to improve and maintain roads on tribal lands and contributed to the deterioration of these roads.[45] In addition, current funding levels have led to less frequent maintenance and improvement activities than desired, according to some tribal officials. For example, a transportation official from a Great Plains region tribe said that annual

[44]Dollars are in nominal terms. Annual inflation as measured by the Gross Domestic Product Price Index was less than two percent over this time period. We are reporting TTP funding from fiscal years 2013 through 2016 because these are the only years that FHWA could provide data on requested funding. TTP annual appropriations from fiscal years 2009 through 2012 decreased, on average, by about 2 percent.

[45]While some larger tribes have gaming revenue structures in place to support tribal programs, such revenue structures may not be a resource for most tribes. In 2015, we reported that slightly less than half of federally recognized tribes had gaming operations, and only a few large operations accounted for a major portion of the gaming revenue. GAO, *Indian Gaming: Regulation and Oversight by the Federal Government, States, and Tribes*, GAO-15-355 (Washington, D.C.: June 3, 2015).

TTP funding allows for resurfacing their reservation's 54-mile paved road network every 73 years, when the existing roadway network needs to be resurfaced at least every 20 years to maintain the roads in an acceptable condition.

Figure 3: Tribal Transportation Program Funding, Requested and Received (Fiscal Years 2013–2016)



Source: GAO Analysis of Federal Highway Administration data. | GAO-17-423

[a]For simplicity in this report, we use the terms appropriated and received interchangeably.

RMP funding has also remained relatively flat, at about $25 million per year from fiscal years 2009 through 2015, while the number of BIA roads eligible for these funds increased over this time period, from 26,868 to 28,859 miles.[46] Over 85 percent of these BIA road miles are located on the lands of 59 tribes within six BIA regions. According to BIA and tribal transportation officials, RMP funding levels have not kept pace with the growing road maintenance requirements due to the addition of new roads,

[46]Fiscal year 2015 RMP funding data were the most recent and complete fiscal year data available at the time of our review.

the need to address existing roads' maintenance backlogs, and emergency operational requirements. For example, according to BIA and tribal officials, as much as 90 percent of some tribes' annual RMP funds can be expended during the winter for snow and ice removal, leaving little for other road maintenance activities the remainder of the year. Also, according to these officials, the remoteness, rugged environment, and unavailability of materials on some tribal lands leads to comparatively higher costs for maintaining roads located in these areas, which further exacerbate funding constraints. Also, as roads fall into disrepair through the delay of or inability to fund road maintenance, the more expensive roads become to maintain. Deferring maintenance may result in greater future reconstruction expenditures. Most state and local transportation officials we spoke with said their agencies also face funding constraints that inhibit their road-improvement and maintenance efforts on tribal lands. Moreover, the amount of road maintenance funding expended on tribal lands has generally been less than the amount expended on similar roads in neighboring jurisdictions, according to BIA and tribal officials. For example, according to a 2008 analysis completed by a BIA Navajo Region official, counties bordering the Navajo Nation's reservation receive about two times more road maintenance funding per mile to maintain county-owned roads compared to the road maintenance funding BIA receives to maintain its roads on the Navajo Nation.

Over the past several years, BIA and tribal officials have tried to address road maintenance funding concerns by requesting additional RMP funding. In March 2016, Interior and tribal officials created a workgroup to analyze, record, and develop data for road maintenance budget needs. This group recently held discussions with BIA officials about establishing a new budget category for roads and transportation so that requirements such as road maintenance receive greater visibility in the budget.[47] At the time of our review, discussions pertaining to this initiative were ongoing.

[47]The RMP receives annual appropriations under the Tribal Priority Allocations that is within the Interior's Tribal Government Budget Category. Programs or sub-activities within the Indian Affairs budget structure are grouped together by their similarities, mission, and relationship to each other. These groups are referred to as a Budget Activity—of which there are eight under the Operation of Indian Programs. There is not a budget activity that represents roads and transportation. Road maintenance is a sub-activity under the Tribal Government budget activity.

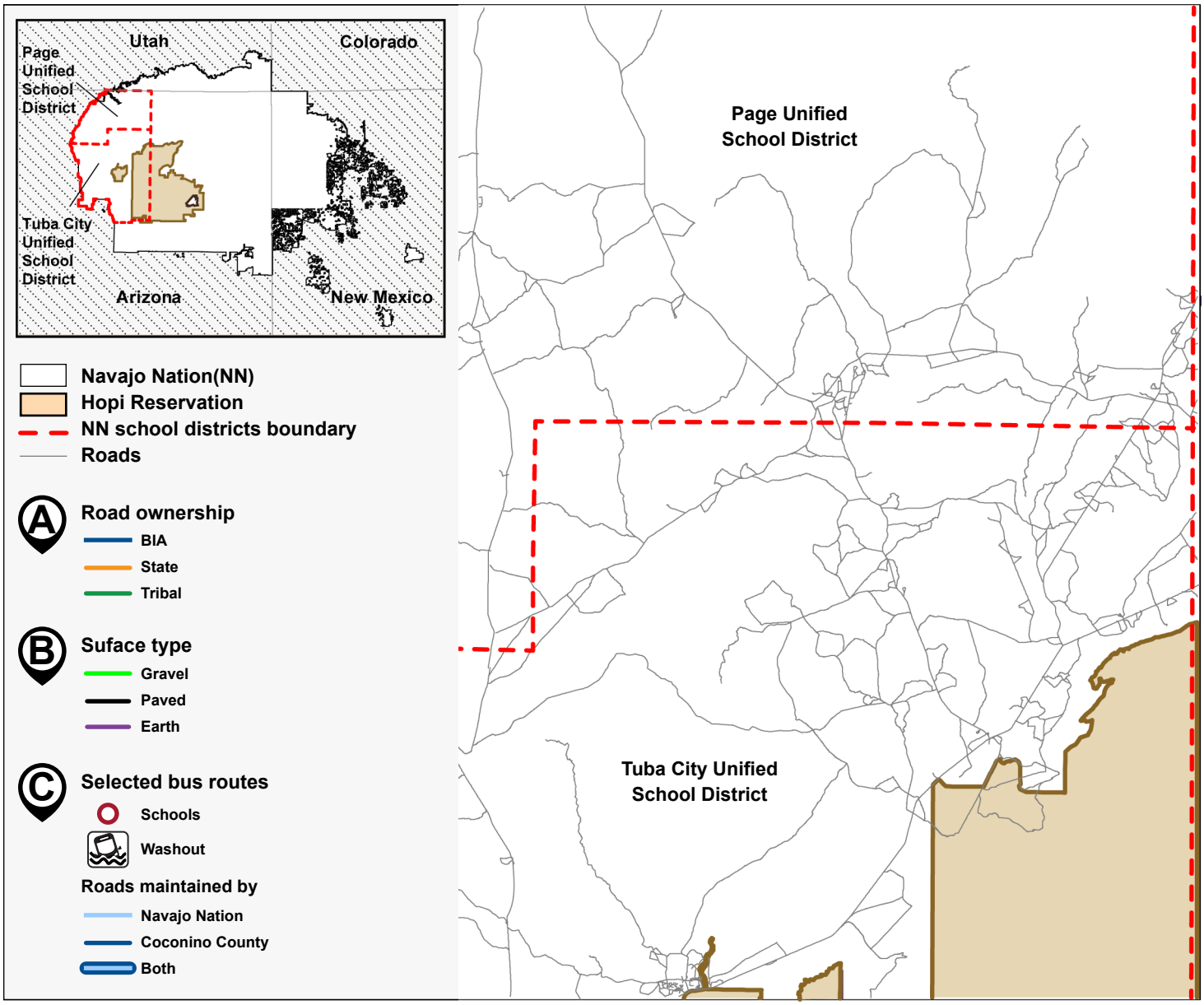
Overlapping Jurisdictions

Overlapping jurisdictions on tribal roads may create confusion and access issues that can delay or prevent road maintenance and improvement activities. Tribal lands may be owned by a tribe, an individual Indian, or a non-Indian. This varied ownership creates interspersed parcels or a checkerboard pattern of ownership on some tribal lands. According to federal, state, county, and tribal transportation officials, documentation of road ownership and rights-of-way do not always exist or are not always known, a lack that further complicates the ability of stakeholders to conduct road maintenance and improvement activities. Also, different, changing, or uncertain management responsibilities pertaining to roads on tribal lands that are owned by different stakeholders can make collaboration challenging as the decision-making on road priorities and funding sources are also dispersed. For example, two adjacent school districts within the Navajo Nation use many of the same roads for their school bus routes. These roads not only have multiple road owners but they also have different types of road surfaces—paved, gravel, and earth—which require different types of maintenance. (See fig. 4.) Because of differences in priorities among road owners, the amount of maintenance performed on the roads varies, leading to differences in road condition and potential impediments to transportation.

Interactive graphic

Figure 4: Road Ownership, Surface Type, and School Bus Route Maintenance Responsibility in Page and Tuba City Unified School Districts on the Navajo Nation in Arizona

Directions: Rollover each letter **icon A through C to** see more information regarding road ownership, surface type, and selected bus routes with road maintenance responsibilities.

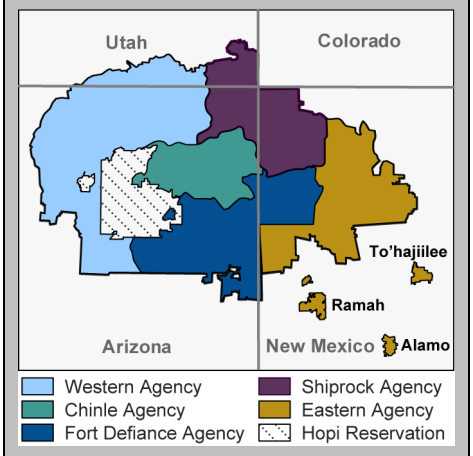


Sources: GAO analysis of Navajo Nation Division of Transportation and Coconino County (Arizona) data and MapInfo (Map). | GAO-17-423.

Print instructions | To access a printable version of this graphic, go to appendix III.

Navajo Nation Road Infrastructure

The Navajo Nation has the largest Indian reservation and is the only tribal nation that has a dedicated Bureau of Indian Affairs Region. The Navajo reservation is approximately the geographic size of West Virginia, encompassing over 26,000 square miles within the boundaries of Arizona, New Mexico, and Utah. The Navajo Nation's land base also includes the three Navajo satellite communities of Ramah, Alamo, and Tohajiilee, located in western and central New Mexico. The three states' departments of transportation, along with counties, the BIA, and Navajo Nation, oversee and fund maintenance and construction of approximately 14,221 miles of roads.



Source: GAO analysis of Bureau of Indian Affairs Navajo Region data. | GAO-17-423

Other challenges stem from changing roles and responsibilities, liability concerns, and differing approaches to meeting regulatory requirements, for example:

- Some challenges can occur as roles and responsibilities shift from federal to tribal control. For example, in 2013, the Navajo Nation signed a TTP Agreement with FHWA that changed the roles and responsibilities for both the BIA Navajo Region and the Navajo Nation.[48] Under the agreement, the Navajo Nation assumed responsibility for conducting TTP work that used to be managed by BIA. However, according to federal and tribal transportation officials, it will take time for the Navajo Nation to build its capacity to assume the roles and responsibilities previously performed by BIA. According to a BIA Navajo Region official, they have been adjusting their capacity as their functions and duties diminish over time. As of December 2016, the BIA Navajo Region and the Navajo Nation were still in the process of transitioning operational roles and responsibilities, according to BIA officials.
- According to some federal and tribal transportation officials, tribal councils' preferences or officials' decisions may not always align with previously established plans and priorities.[49] For example, in April 2016, an Oglala Sioux tribal official halted the development of a new gravel quarry location that was believed to be a sacred site. As a result, tribal transportation officials used the next nearest quarry, approximately 50 miles away, thus increasing road maintenance costs.
- Liability issues can halt or delay maintenance work. For example, the La Jolla Band of Luiseño Indians is located in a mountainous region of northern San Diego County, California, where rock falls are prone to occur. When rocks fall on a remote section of a state highway that runs through tribal lands, according to a tribal transportation official, the tribe must wait for state authorities to respond, even though the tribe has equipment that can remove the fallen rocks. According to

[48]The BIA Navajo Region is comprised of five BIA Agencies: Chinle, Eastern Navajo, Fort Defiance, Shiprock, and Western Navajo. These agencies provide various technical services under the direction of the BIA Navajo Region Office in Gallup, New Mexico. They are aligned with the Navajo Nation's political subdivisions into local governmental entities similar to county entities. The Navajo Nation is divided into chapters, as the smaller units of government similar to municipalities.

[49]Tribal councils are the governing bodies of tribes that influence and can make decisions about the priorities and funding of tribal programs and activities.

this official, the state prohibits the tribe from conducting emergency maintenance work to avoid potential liability issues. As a result, local traffic can be blocked for extended time periods while waiting for state workers to respond.

- Differing approaches to compliance with the National Environmental Policy Act can affect delivery of maintenance and improvement projects.[50] For example, according to a 2013 Department of Transportation's Inspector General report, existing agreements between FHWA and BIA do not reconcile the two agencies' different processes and requirements for National Environmental Policy Act approvals on TTP projects.[51] According to some federal and tribal officials we spoke to, differences exist, in particular, in the process for acquiring a right-of-way for project construction. FHWA grants categorical exclusions in certain cases where tribes need to establish or amend an existing right-of-way while BIA requires tribes to prepare an environmental assessment for these cases, which is resource-intensive, according to federal and tribal officials.[52] According to tribal officials, BIA retains right-of-way approval authority for projects on land it owns or holds in trust for tribes, and completing TTP projects at these locations results in additional time and cost. In November 2016, a final rulemaking included clarification that is expected to minimize or eliminate conflicts that involve differences in federal processes.[53] The final rule specifies that FHWA's categorical exclusions will apply to all qualifying TTP projects involving construction or maintenance of roads regardless of whether BIA or FHWA is responsible for overseeing the tribe's TTP.[54]

[50]Pub. L. No. 91-190, 83 Stat. 852 (1970) codified at 42 U.S.C. § 4321-4370.

[51]U.S. Department of Transportation, Office of Inspector General Audit Report, *Opportunities Exist to Strengthen FHWA's Coordination, Guidance, and Oversight of the Tribal Transportation Program*, Report Number MH-2014-003 (Washington, D.C. Oct. 30, 2013).

[52]A categorical exclusion means a category of actions that do not individually or cumulatively have a significant effect on the human environment and which a federal agency has found to have no such effect. (40 C.F.R. § 1508.4) FHWA regulations identify highway resurfacing, restoration, rehabilitation and reconstruction projects that involve acquisition of no more than a minor amount of right-of-way as meeting the criteria for a categorical exclusion and normally do not require any further National Environmental Policy Act analysis. (23 C.F.R. § 771.117 (c)(26), (e)) It is expected that the vast majority of TTP funded projects are subject to a FHWA categorical exclusion.

[53]81 Fed. Reg. 78456, 78460 (Nov. 7, 2016).

[54]25 C.F.R. §170.453 (2016).

Adverse Weather

According to various transportation and education officials we met with, adverse weather can exacerbate maintenance challenges on roads located on tribal lands. While adverse weather—such as drought, heavy rain, high winds, and snow—can negatively affect all areas, communities that are located in more geographically dispersed areas and have more variations in land topography along a vast road network can experience particularly difficult challenges. Further these officials said that these challenges can be more severe on larger reservations that have more earth and gravel roads. According to federal and tribal transportation and education officials we spoke with:

- prolonged droughts can result in nearly impassable roads due to sand dunes, rocky surfaces, and deep holes that non-4-wheel drive vehicles cannot traverse;
- heavy rains can lead to flash flooding and washing out of earth roads, cutting off communities from important access points;
- high winds can lead to dust storms causing traffic accidents and blockage of the only accessible road; and
- snowfall can lead to icy and muddy road conditions, creating deep ruts along a road and preventing access by rescue and other vehicles.

According to federal and tribal transportation officials, after most adverse weather events, road maintenance workers are unable to quickly deliver assistance to some remote locations because unpaved roads may be impassible. In addition, workers are often unable to conduct necessary maintenance activities during and immediately after some weather events because they must wait to use the equipment until the adverse weather ends and the ground dries. Also, although federal and tribal transportation officials may have maintenance equipment located at different maintenance yards or prepositioned in strategic locations around tribal lands to address normal and emergency road maintenance needs, they said that the remote distances may still prevent immediate responses. These situations can isolate some people within their communities and away from essential services until emergency road maintenance can be conducted, according to officials. Compounding this challenge, officials said, is the lack of or limited access to telecommunications on tribal lands, limitations that can prevent tribal residents and public users from even

communicating routine and emergency maintenance situations while they are in remote tribal lands.[55]

Partnerships Have Helped to Overcome Some Challenges

According to federal and tribal officials we spoke to, tribes that have collaborated in partnerships with federal, state, and local governments to complete road maintenance and improvement projects had overcome some funding, material, labor, and equipment challenges. Based on our site visits and interviews with various transportation officials, we identified selected examples of federal, state, local, and tribal collaboration. (See app. IV, table 5.) Below are three examples of larger coordinated, multi-partner road improvement and maintenance projects that we identified.

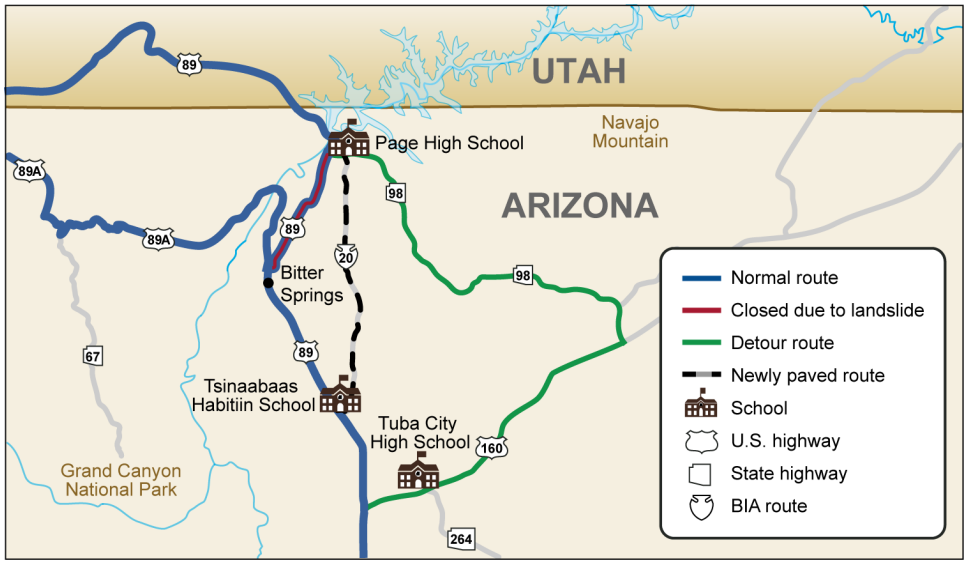
In 2013, FHWA, BIA, Arizona Department of Transportation, and the Navajo Nation partnered on a $35 million emergency relief project to pave about 27 miles of BIA Route 20, which was an earth road, during the closure of a 23-mile stretch of U.S. Highway 89 after a landslide damaged a portion of the highway. [56] (See fig. 5.) The highway closure caused the Arizona Department of Transportation to set-up a detour affecting travel to Page, Arizona, from points south. The detour (along Arizona State Highway 98 and U.S. Highway 160) affected hundreds of Navajo school students and was 45 miles longer than the direct route into Page along U.S. Highway 89. According to federal, state, and tribal officials through effective coordination, BIA Route 20 was paved in about three months and completed prior to the start of the school year so that students could benefit from a shorter drive on a better road surface.[57]

[55]GAO, *Telecommunications: Additional Coordination and Performance Measurement Needed for High-Speed Internet Access Programs on Tribal Lands*, GAO-16-222 (Washington, D.C.: Jan. 29, 2016) and GAO, *Telecommunications: Challenges to Assessing and Improving Telecommunications for Native Americans on Tribal Lands*, GAO-06-189 (Washington, D.C.: Jan. 11, 2006).

[56]BIA Route 20 was locally known as Coppermine Road. BIA Route 20 was adopted temporarily into the state highway system and named U.S. Highway 89T during the paving project. After the reconstruction of U.S. Highway 89 was completed, U.S. Highway 89T was returned to the BIA and was again referred to as BIA Route 20.

[57]The U.S. Highway 89T project was eligible for reimbursement through the FHWA's emergency relief program, which provides funding to state and local agencies for the repair or reconstruction of highways, roads, and bridges that are damaged in natural disasters and catastrophic failures.

Figure 5: Access to Three Schools Using U.S. Highway, State Highway, and Bureau of Indian Affairs (BIA) Routes during a Road Closure

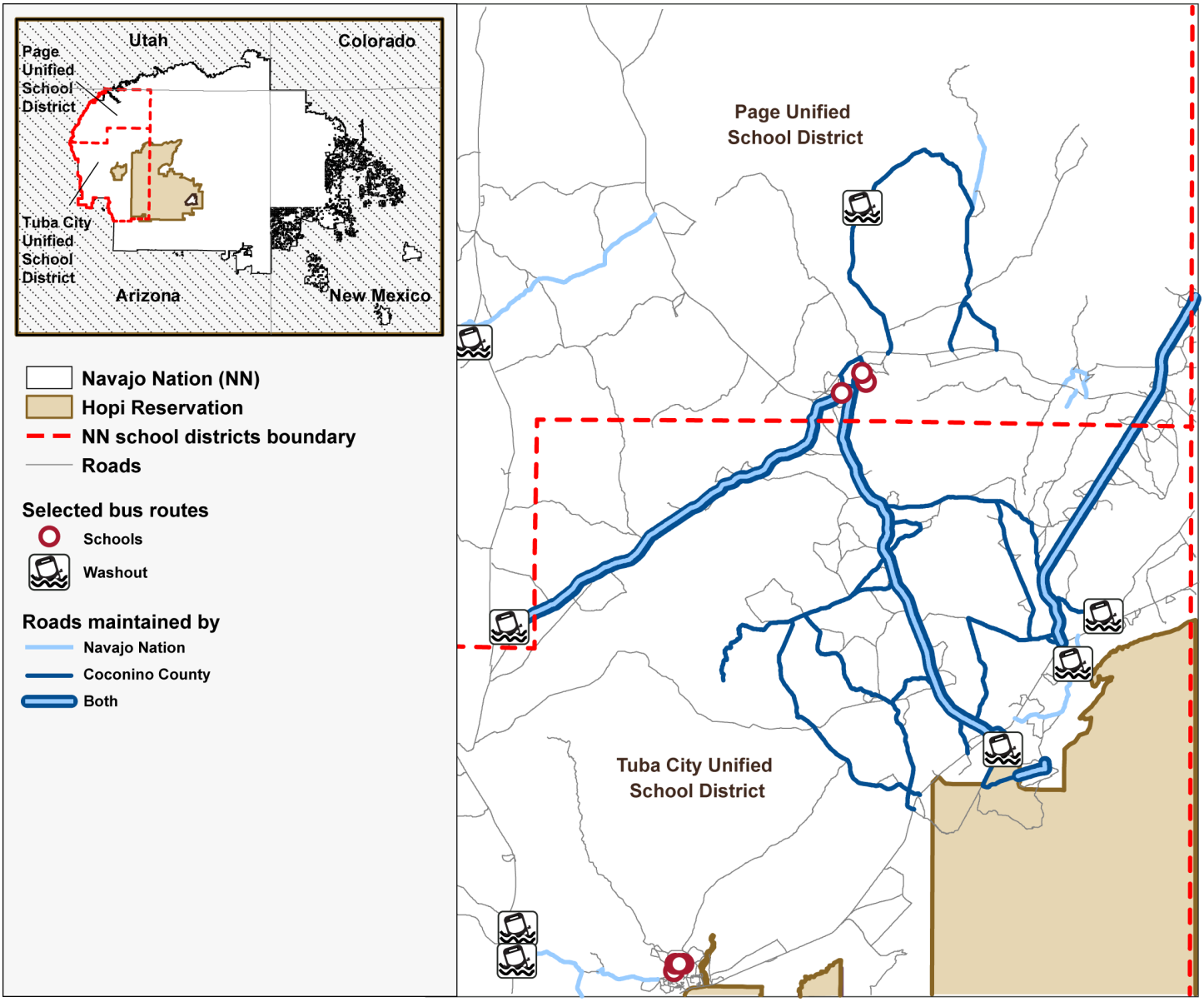


Sources: GAO analysis of Arizona Department of Transportation data and Map Resources (Map). | GAO-17-423

In 2014, the Navajo Nation Division of Transportation and Coconino County (Arizona) established a matching fund program whereby the county and the Navajo Nation each contributed $200,000 to maintain school bus routes in the area, among other projects.[58] (See fig. 6.) The goal of the program was to implement minor drainage and surfacing projects on the roads maintained by the county. According to Coconino County officials, in addition to the increased road maintenance, the plan for this funding was to improve school bus route conditions, reduce road maintenance costs, and increase safety. Transportation officials also said the partnering enabled the Navajo Nation and the county to use maintenance funds more efficiently and focus on blading roads versus having to constantly repair roads damaged by winter and summer storm events.

[58]In 2014, Coconino County (Arizona) voters passed Proposition 403, which authorized a collection of a three-tenths of a cent ($0.003) sales tax for 20 years to fund the maintenance and preservation of roads maintained by Coconino County and fund those costs related to, but not limited to, snowplowing, earth road grading, chip sealing paved roads, road maintenance, and other road-related expenses.

Figure 6: School Bus Route Maintenance Responsibility between the Navajo Nation and Coconino County in Page and Tuba City Unified School Districts on the Navajo Nation in Arizona



Source: GAO analysis of Navajo Nation Division of Transportation and Coconino County (Arizona) data and MapInfo (Map). | GAO-17-423

While partnerships have been effective in two cases described above, collaboration among stakeholders can be difficult and achieving beneficial outcomes can take time. For example, in the third case, the Hopi Tribe, Navajo Nation, BIA Hopi Agency, and Navajo County (Arizona) have been working together since 2009 to obtain funding for the Hopi 60 (Low Mountain Road) project. According to transportation officials, the road construction project would pave about 14 miles of BIA Route 60 of which about 11 miles are located on Hopi tribal lands and about 3 miles are located on the Navajo Nation. This BIA route is an earth road that is the primary school-bus route for multiple school districts. According to transportation officials, during adverse weather conditions, BIA Route 60 becomes impassible and causes drivers on Hopi lands to take a 106-mile detour along Arizona State Highway 264. These stakeholders partnered to submit federal discretionary grant applications in 2009 to obtain about $22 million and in 2015 to obtain about $29 million needed for this project but were not successful.[59] Stakeholders continued to pursue funding and were recently awarded $1.5 million from the State of Arizona. According to county transportation officials, stakeholders plan to submit another federal discretionary grant application in 2017 to secure funding for the remainder of the project's cost.

[59]Federal discretionary grant applications refer to the Transportation Investment Generating Economic Recovery Program grants awarded by the Department of Transportation.

Indian Students Have Higher Absence Rates, and Road Conditions Can Be a Barrier to School Attendance on Tribal Lands, Although Data Are Limited

Indian Students Nationwide Have Higher Absence Rates than Non-Indian Students, but Research about the Effect of Road Conditions Is Limited

Higher Absence Rates

Nationwide, Indian elementary and secondary school students are absent more than non-Indian students, according to our analysis of national data from two Department of Education (Education) surveys. Education administers one survey to all public school districts but not BIE schools, and the other survey goes to a generalizable sample of schools and students, including BIE schools and students. We found that Indian students' higher rates of absences are evident at public schools serving mostly Indian students and at BIE schools, which would likely be on or near tribal lands.

In a census of public school districts and schools taken during the school year 2013–14, the national chronic absence rate for Indian students was 23 percent per year as compared to the national average of 14 percent per year for non-Indian students, according to our analysis of one

Education measurement of absenteeism.[60] Education asked for the number of students in schools who were absent 15 or more days in the school year.[61] Our analysis showed that this rate was higher at schools across the country where Indian students represented at least 90 percent of the students. In particular, we found that 28 percent of Indian students were absent 15 or more days at schools where most students were Indian, such as schools in districts we visited.[62]

According to a 2015 Education survey of students intended to measure academic achievement, Indian students in grade 8 self-reported being absent more than non-Indian students. (See fig. 7.) Likewise, this pattern applied to Indian and non-Indian students in grade 4.[63] The survey asked students in grades 4 and 8 for the number of days they were absent in the last month.

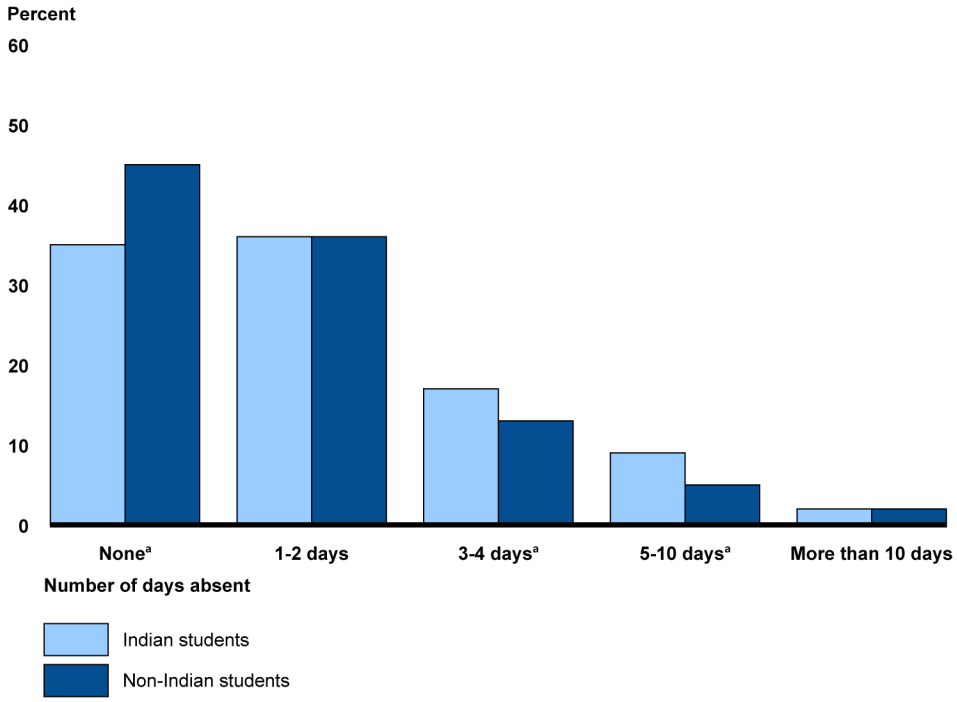
[60]According to Education officials, this census, known as the Civil Rights Data Collection, in school year 2013–14 covered all public school districts as well as the public schools they include, but was not administered to BIE schools. Education administers the data collection to each school district, which in turn, provides information for the district as a whole and its schools.

[61]Fifteen or more days of school absences is one of various ways to measure "chronic absenteeism," according to Education officials in the Office for Civil Rights, which administers the Civil Rights Data Collection.

[62]According to our analysis of the Civil Rights Data Collection, about 400 schools in this census had 90 percent or greater Indian students. However, Education officials noted that this data source does not collect information on whether schools or students are located on tribal lands.

[63]This generalizable survey is part of the National Assessment of Educational Progress, which is designed to assess student achievement.

Figure 7: Number of Days Grade 8 Students Reported They Were Absent in the Last Month, 2015



Source: GAO analysis of Department of Education data. | GAO-17-423

Note: The margin of error was no more than plus or minus four percentage points (at the 95 percent level). Estimates may not total 100 percent due to rounding.

[a]Difference in percentages is significant at the 95 percent level.

Grade 8 Indian students at BIE schools—which are generally located on reservations—at times reported being absent more than Indian students not at BIE schools. Specifically, the self-reported absences in grade 8 for "three or four days" in the last month and "more than ten days" in the last month were higher for BIE students, as compared to Indian students at other schools.[64]

[64]The difference was statistically significant at the 95 percent level. Education did not report data for grade 4 students at BIE schools since the grade 4 BIE school participation rate was below 70 percent.

Limited Research on Effect of Road Conditions

In our literature review, we did not identify any studies on the role that road conditions have on student attendance in the United States, including for Indian students living on tribal lands.[65] However, we found studies about developing countries that identified road conditions as one of several factors influencing student attendance. While these studies were not specifically about the United States or Indian students living on tribal lands, they indicate that poor road conditions can decrease school attendance and road improvements can increase attendance in certain contexts. For example, a 2010 study of Trinidad and Tobago found that road improvement increased student attendance by 16 to 18 percent, among other educational outcomes.[66] In addition, a 2006 study of a program in Bangladesh to improve and maintain rural roads and markets reported that school participation, measured as the average percentage of school-age children in school, increased about 20 percent for boys and girls whose villages participated.[67] A third study of rural Pakistan found that higher levels of community development were associated with significantly reduced likelihood of dropout in certain scenarios; the level of development included seven indicators, such as two indicators of whether a community had paved roads.[68]

According to literature we reviewed, there are many factors connected with student attendance. The factors that may be connected with school attendance and absences in the United States and other countries generally fall into four categories: individual, family, school, and environmental or community. Literature we reviewed has identified numerous examples of factors in these categories. (See fig. 8.) Road

[65]Among the studies we identified about the United States were literature reviews describing the four categories of factors that may affect student attendance, but not specifically mentioning road conditions in this country.

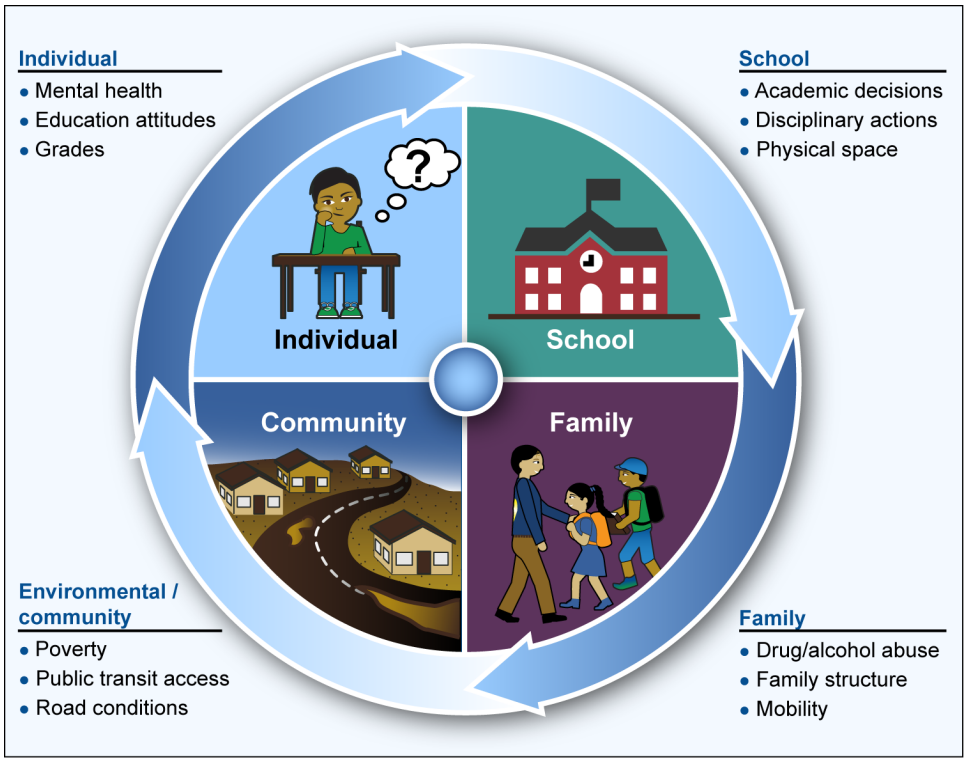
[66]Ainsley Charles. "Rural Roads, Education, and Agriculture: A Micro-Econometric Evaluation Study Using Trinidad and Tobago Data," (American University PhD Dissertation, 2010). According to the study, road improvement also increased educational achievement up to the equivalent of half a school year among children at the early childhood and advanced secondary education levels.

[67]Shahidur R. Khandker, Zaid Bakht, and Gayatri B. Koolwal, *The Poverty Impact of Rural Roads: Evidence from Bangladesh.* (Washington, DC: World Bank Policy Research Working Paper 3875, April 2006).

[68]Cynthia B. Lloyd, Cem Mete, and Monica J. Grant, "The Implications of Changing Educational and Family Circumstances for Children's Grade Progression in Rural Pakistan: 1997–2004," *Economics of Education Review*, vol. 28 (2009).

conditions are an example of an environmental or community factor that may be connected with school attendance.[69]

Figure 8: Select Examples of Factors Connected with School Attendance



Source: GAO analysis of literature. | GAO-17-423

[69]Federal and national association officials mentioned several factors, consistent with our literature review, including home environment, limited engagement in school, and high levels of poverty. Similarly, factors cited by school and district officials included health of students or family members, home life such as care-giving responsibilities or limited family support, policies and enforcement when students have many absences, and poverty.

Selected School Officials Identified Road Conditions as a Factor That Can Affect Attendance, but Data Are Limited

School Officials Noted Road Conditions Are among the Factors Affecting Student Absences

Attendance Rates and Earth Roads in One Navajo Nation School District

At one district on the Navajo Nation, attendance rates in school year 2015-16 were lower for certain students on a few particularly challenging bus routes on earth roads. These routes are altered and truncated during adverse weather. District data showed these students' attendance rate was about 91 percent, compared to the district's 95 percent overall attendance rate. This difference in attendance rate—some of which may relate to road conditions—would be equivalent to about seven additional days of absences, according to district officials.

Source: Central Consolidated School District, New Mexico (serving Navajo Nation). | GAO-17-423

Road conditions are one of the factors leading to absences for Indian youth on tribal lands, according to officials at all 10 local schools and districts we visited serving three tribes. Road conditions reflect the surface type and level of maintenance, among other things. On large reservations as with the three we visited, students may live far from school, and in many cases their residences and schools are only accessible by earth and gravel roads. At these 10 schools and districts, officials told us that adverse weather worsens road conditions on tribal lands and sometimes affects student attendance.[70] Officials said that school-provided transportation—buses and sport-utility vehicles (SUVs)—are the most common means of student transportation. A few school and district officials said that certain students may not have alternatives to school-provided transportation to get to school, such as a ride from family, or that weather or road conditions may preclude students from getting to school on their own. Thus, when the school vehicle or the student cannot access the pick-up location due to road conditions, the student may miss part or all of the school day. For example, at one school we visited, the principal noted that students who lived far from the bus route (at least 12 to 20 miles away) have at times missed school, as families said they could not reach the bus stop due to impassable roads with mud or snow. Additionally, occasional bus breakdowns, such as getting stuck in the mud, can affect student attendance, such as arriving late to school, according to officials in one district on Navajo Nation.

School and district officials also mentioned that school attendance was lower when they altered or halted school bus routes because of adverse weather conditions that compounded the already poor road conditions. Eight of 10 schools and districts we visited said that during adverse weather they sometimes kept schools open but altered or did not serve certain bus routes. School and district officials said that these changes to

[70]We visited nine schools and districts in person, and we interviewed officials of one district by phone who were not available at the time of our visit.

bus routes resulted in some students missing school that lived along those routes. When a bus route is truncated from its original route, students or their families often have to travel even farther than their regular bus stop to meet the bus, such as at a main road, travel that can affect attendance, because families have no way to reach the farther bus stops, for example. On the Pine Ridge Reservation, one school superintendent told us that certain families who live in remote locations along earth roads do not have 4-wheel drive vehicles to reach the farther bus stop when roads become muddy or snow-covered.

Student absences can also result when school officials decide not to serve a bus route on a particular day. At a school in the central part of the Pine Ridge Reservation, school officials said that the school did not serve certain routes a few times in a year due to weather and safety concerns, such as heavy snowfall and icy road conditions. School officials told us that students on these routes could not get to school, and the school recorded their absences as excused. In addition to the three tribes we visited, officials we interviewed from BIE, Education, and other tribes told us that they heard similar concerns about challenging or impassable road conditions that affect student attendance. One tribal transportation expert said that the problem is particularly problematic for tribes with larger reservations due to the longer distances that people must travel and typically poor road conditions.

Officials at schools and districts we visited mentioned a few strategies they sometimes used to try to mitigate the challenging road conditions and promote students' access to school. However, at times, even these strategies did not allow students to get to school. For example, one school superintendent on the Pine Ridge Reservation in South Dakota noted that the school used SUVs on certain routes, but even its SUVs were unable to reach students due to the excessive snow or mud on earth roads for a total of about three to four days over the course of the school year. Additionally, as noted above, telecommunication challenges, such as limited or no internet access on tribal lands, affects the potential to use technology for virtual education.[71] (See app. V for additional details on strategies used by officials of the three tribes we visited.)

[71]For more information, see GAO-16-222 and GAO-06-189.

Schools Have Limited Data on Reasons for Absences

Guidance from the National Forum on Education Statistics, a body commissioned by Education, and other sources have stated that public school districts' data collection on reasons for student absences is important to understand these reasons in order to take actions to ultimately increase attendance.[72] The Education Department does not require school districts to collect particular data about reasons for absences, according to Education officials. Public school districts develop their own attendance systems, which may vary across districts, including reasons for absences. Nonetheless, the education forum provided non-binding guidance in 2009 on how school districts should develop attendance systems and document reasons for absences. Among other things, the guidance stated the importance of a comprehensive and manageable classification of student attendance, including reasons for absences. It suggested a series of reasons for absences for states and districts to consider, including transportation issues. Data on reasons for absences would then be helpful to inform interventions to increase attendance. Similarly, guidance jointly issued in 2015 by four departments—Education, Health and Human Services, Housing and Urban Development, and Justice—emphasized the importance of collecting and using absence data to improve attendance for those students who miss many days of school, including understanding reasons for absences.[73]

Three of the 10 schools and districts we visited—one BIE school and two public school districts— collected data on the number of student absences related to road and weather conditions.[74] According to officials at these locations, road conditions leading to student absences typically were accompanied by adverse weather, such as heavy rainfall, snowfall,

[72]National Forum on Education Statistics, *Every School Day Counts: The Forum Guide to Collecting and Using Attendance Data,* NFES 2009–804. U.S. Department of Education, National Center for Education Statistics, (Washington, DC: 2009). Though the forum's publications do not necessarily represent the policy or views of the Department of Education, the forum undertakes activities such as proposing good practices to help state agencies and local school districts.

[73]Policy Letter signed by Attorney General and Secretaries of Education, Health and Human Services, Housing and Urban Development. Dear Colleague Letter. Oct. 7, 2015.

[74]Schools may count absences differently, such as for class periods, part of the day, or the full day. For example, at one district we visited, officials said that elementary school absences referred to half of the day, while absences for secondary schools referred to individual class periods. We focused on measures of absences rather than tardiness in light of available Education data presented previously, and the greater amount of instructional time missed, among other reasons.

or strong winds. The percentage of absences at these three locations due to adverse weather and road conditions ranged from a fraction of 1 percent to 4 percent, according to the data. However, because parents did not provide a reason for the absence in many cases, the actual percentage of absences due to roads and weather may be higher. For the one BIE school that collected data on reasons for absences due to road and weather conditions, it decided on its own initiative to create a category for these absences. A school official said that weather-related absences generally were more likely to involve students who lived along earth or gravel roads. For example, due to snow, buses may not be able to reach students living along certain earth or gravel roads, or families may not be able to bring students to the bus stop. The official noted it is important for the school to know why students are absent in general, and how often students are absent, specifically, due to road and weather conditions in order to understand the extent that these conditions affect students' ability to get to school. This information can help schools set priorities and target interventions depending on the extent of such absences.

The other five BIE schools we visited did not collect data in a way that would capture absences due to road and weather conditions.[75] Officials at two schools said that they recorded absences due to difficult road conditions as more general excused absences. For example, such absences were due to truncated bus routes or snowbound students who lived in remote areas accessible only by earth roads. At another school, officials did not seem aware of the ability to count and track a specific category of absences due to road and weather conditions, on a school-wide basis.

According to BIE officials we spoke to, some schools may not collect absence data for road and weather conditions due to various circumstances such as school staff turnover, competing priorities among school attendance staff, or limited emphasis from BIE to collect data on these reasons for absences. Further, BIE has not provided guidance to its schools regarding capturing reasons for absences related to roads and weather. Documentation for the system used to collect absence data

[75]We visited six BIE schools and four public school districts, as these entities would collect information on transportation and attendance. Also, many BIE schools have responsibilities of school districts in some respects, as we have previously noted. See, for example, GAO, *Indian Affairs: Management Challenges Continue to Hinder Efforts to Improve Indian Education,* GAO-13-342T (Washington, D.C.: Feb. 27, 2013).

states that each absence should have a reason entered by the school.[76] However, BIE has not provided instructions or suggestions to the 185 schools it funds to consider including road and weather conditions in their attendance system. For example, it has not issued a sample list of reasons that schools can use or tailor for local circumstances. According to BIE officials, BIE has not done so because it wants to give schools flexibility on which reasons they should collect on absences. However, BIE has not taken basic steps to facilitate optional data collection by schools that may be inclined to do so, such as those that are more affected by poor roads. For example, BIE's existing attendance system currently provides a list from which schools can select reasons, or schools can create other reasons on their own. Road and weather conditions are not included as reasons on the existing list, and thus a school would have to create these reasons as causes for absences. In the capacity to provide technical support to schools, BIE could provide guidance to collect these data. Without such guidance, affected BIE schools as well as the Bureau itself will continue to lack insight into the effect of roads and weather on absences and the ability to target interventions accordingly. In addition, BIE and its schools do not have detailed information on this connection to identify patterns or trends or for discussion with federal, tribal, and other stakeholders, including on funding levels or road priorities.

Road Conditions Affect Vehicle Maintenance Costs, Which May Not Be Fully Addressed in BIE's Transportation-Funding Formula

Road conditions, along with distances on large tribal lands and choices to enroll in farther schools, may contribute to increased transportation time and safety risks for students, and increased costs for schools and tribes. Officials from two schools expressed concern about the time of students' bus rides and the long school days for children, including young children in elementary school. For example, on one of our site visits, we followed an afternoon bus route in dry weather that covered about 30 miles on mostly earth roads to drop off about 30 students, including elementary school students. The route's duration was about 90 minutes. At times, the school bus drove about 5 miles per hour on the earth roads, such as when ascending inclines without guard rails or traveling on earth roads with large rocks or ruts. The school principal said that the earth roads take more time to travel and lengthen students' time on the bus. At another district we visited, several routes were at least 100 miles one-way, according to a list of bus routes from the district.

[76]BIE's information system that contains attendance data, among other information on students, is known as the Native American Student Information System.

Road conditions on tribal lands may also present various safety risks to students and transportation staff. Some roads may have few or no sidewalks, shoulders, or guardrails, among other features, according to our observations and a tribal organization. For example, on the Pine Ridge Reservation, we rode on a school bus route with a gravel road that led to a wooden bridge, and both sides did not have guardrails. (See fig. 9.) The wooden bridge's weight limit was nearly reached by the weight of the bus with students on it, according to a bus driver at the school.

Figure 9: School Bus Route Traversing a Wooden Bridge on the Pine Ridge Reservation

Source: GAO. | GAO-17-423

Further, school and district officials told us about challenges with vehicle maintenance due to road conditions, as described in further detail below. For example, a BIE school we visited in the Navajo Nation reported that about 43 percent of its bus miles were on earth roads. The school principal stated that additional vehicle maintenance—such as replacing tires, shocks, and other bus parts—resulted from the rough conditions on poorly maintained earth roads.

Road conditions on tribal lands, including the surface type such as earth and gravel roads and the level of road maintenance, contribute to the wear and tear on vehicles, such as the school buses and SUVs that transport students daily. Although road conditions affect vehicle

maintenance and thus overall transportation costs, BIE—which supplies federal funding for transportation to BIE schools—has not reviewed its formula in a decade to consider costs of vehicle maintenance or other possible factors.[77]

Poor road conditions can increase costs for vehicle maintenance and transportation overall.[78] Research suggests that rougher road surfaces, such as unpaved roads as compared to paved roads, tend to increase the maintenance and operational costs for vehicles, including buses, depending on the levels of road maintenance and the design of the road among other things.[79] According to information from a school transportation organization, road and weather conditions can have an impact on the frequency and cost of school bus maintenance. For example, in one school district we visited in the Navajo Nation, officials said that the school buses serving the part of the district with more earth roads accounted for the majority of the costs for vehicle maintenance, compared to the rest of the district, which had more total miles but fewer miles of earth roads.

These increased transportation costs are consistent with our prior work on BIE school spending.[80] Specifically, we noted the geographically dispersed locations and poor road conditions, including the vehicle-related maintenance, contributed to schools' higher transportation costs per student, on average, for those on tribal lands, such as BIE schools, than the national average. In contrast to schools on tribal lands, we noted that slightly more than half of public schools nationwide are located in cities or suburbs, and therefore may be unlikely to face similarly poor road conditions or long bus routes.

[77]BIE funding to transport students is distinct from the RMP's and TTP's funding used to maintain and improve roads.

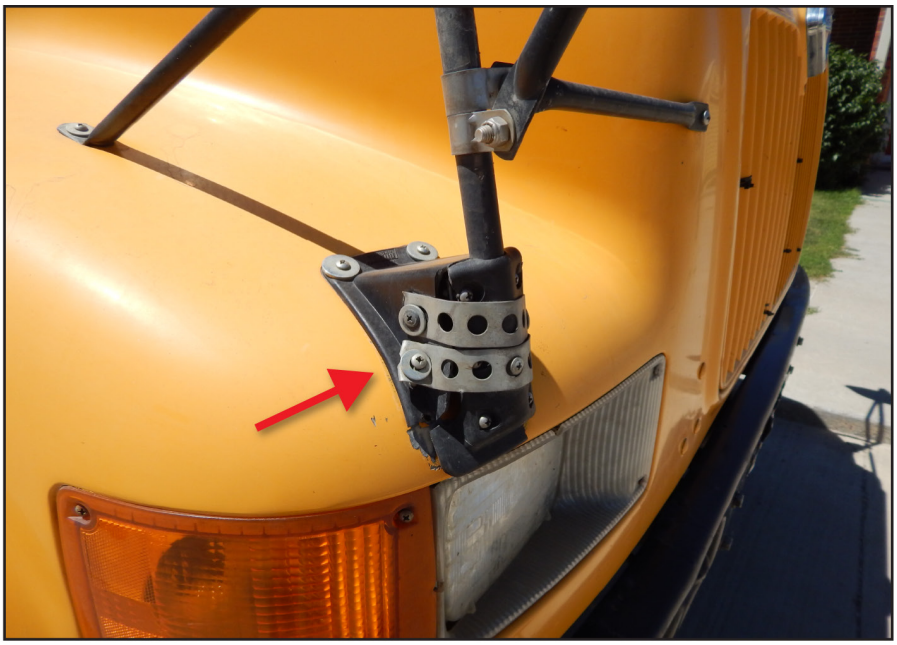
[78]For the purposes of this section, we refer to vehicle maintenance to include maintenance and repairs.

[79]See, for example, Henry Kerali, J.B. Odoki, and Eric Stannard, *Highway Development and Management 4, Vol. I.* (Washington, D.C.: 2006).

[80]GAO, *Indian Affairs: Bureau of Indian Education Needs to Improve Oversight of School Spending*, GAO-15-121 (Washington, D.C.: Nov. 13, 2014*); Bureau of Indian Affairs Schools: Expenditures in Selected Schools Are Comparable to Similar Public Schools, but Data Are Insufficient to Judge Adequacy of Funding and Formulas*, GAO-03-955 (Washington, D.C.: Sept. 4, 2003); and *BIA and DOD Schools: Student Achievement and Other Characteristics Often Differ from Public Schools',* GAO-01-934 (Washington, D.C.: Sept. 28, 2001).

Officials from 7 of the 10 schools and school districts we visited told us about or showed us examples of wear and tear on school vehicles resulting from poor road conditions. For example, officials at two BIE schools on the Pine Ridge Reservation and a public school district on the Rosebud Reservation described how vehicles experience prolonged vibration caused by riding over the grooved surfaces that tend to form on earth and gravel roads (known as "washboard" roads). Vehicles traveling these roads require more frequent maintenance than those traveling on paved roads, according to these officials. Such safety-related maintenance work can include brake or oil changes, replacements of side mirrors or door and window parts, and repairs of windshields. (See fig. 10.) During rides on school buses or SUVs, we observed bumpy road conditions and the vehicle's vibrating when driving over rough earth and gravel surfaces. According to district officials at one public school district that we visited on the Rosebud Reservation, their buses generally travel on gravel roads and typically have a life expectancy of about a decade. In contrast, school buses that operate under normal conditions which are generally on paved roads have a life expectancy of about 12 to 15 years, according to a report by a school transportation organization.

Figure 10: Windshield and Side Mirror Bracket Repairs on a School Bus Serving Routes on Gravel Roads on the Rosebud Reservation



Source: GAO. | GAO-17-423

BIE's formula for determining amounts to allocate to BIE schools for transportation, which was formalized in 2005, does not distinguish between gravel and paved roads. The formula generally considers both gravel and paved roads as "improved" roads for funding purposes.[81] The mileage on these "improved" roads plus an adjusted mileage (increased by 20 percent) on "unimproved" roads, which generally includes earth roads, determines a school's transportation funding amount, subject to the available appropriation.[82] When we asked BIE officials about the rationale for treating gravel and paved roads similarly from a funding perspective, they responded that the gravel helps to make the roads more passable in adverse weather, compared to other roads that do not have gravel or other materials applied. However, because BIE's school transportation funding formula does not consider the likely higher maintenance costs for vehicles traveling on rough gravel roads, its allocation of resources may be misaligned with needs.

Federal standards for internal control state that federal agencies should periodically review policies and related control activities for continued relevance and effectiveness in achieving objectives and addressing risks.[83] However, BIE has not reviewed its transportation funding formula since 2005 nor has it implemented a recommendation we made in 2003 pertaining to the formula.[84] Further, BIE and BIA officials said that they have not communicated in recent years about BIE's transportation formula. For example, BIA transportation officials told us that they did not know that BIE was classifying roads using the terms "improved" and "unimproved," which BIA officials said they no longer use. Further, BIE

[81]25 C.F.R. §§ 39.710-711. The regulation defines "unimproved" as unengineered earth roads that do not have adequate gravel or other aggregate surface materials applied and do not have drainage ditches or shoulders. 25 C.F.R. § 39.701.

[82]Schools provide mileage annually to BIE based on an average daily odometer reading of buses during a specified week; these mileage data are not part of the mileage data collected for the TTP.

[83]GAO-14-704G.

[84]In 2003, we analyzed the transportation formula and recommended that it include an indication of isolation, such as the distance to the nearest service facility, among other things. Isolation may increase costs as vehicles travel farther for service. In our 2003 report, we measured isolation as the distance to a service center and found that isolation was a significant predictor of transportation costs for BIE-operated schools, the sample for which data were available. Yet BIE did not implement this recommendation, partly due to competing priorities. According to BIE officials, there was also difficulty agreeing on how to measure isolation in the context of instructional funds. Nonetheless, our report contained one possible way to measure isolation for transportation funds. See GAO-03-955.

has not formally worked with tribes on its transportation formula since 2005. According to federal internal control standards, agencies should communicate with external parties when needed in order to achieve objectives. As a result of not communicating with BIA or tribes, BIE has not benefitted from technical expertise and experiences of BIA or tribes and does not know whether transportation funding is distributed in a way that reflects disparate maintenance needs. BIE officials said they understood the importance of aligning funding with transportation costs and said that funding formulas used by states may provide a good model for BIE to consider.

Conclusions

Road conditions on tribal lands pose challenges in connecting people to education, employment, health care, and other essential services. These challenges are especially magnified during adverse weather because of the remote location of some tribes and the prevalence of unpaved roads that are prone to weather-related damage. Useful, accurate, and consistent data in the NTTFI and DMR system can support road management and program oversight efforts. However, the purpose for which NTTFI data are used has changed, in that, since 2012 updates to NTTFI, data have not been used as a determinant in allocating TTP funding to tribes. In addition, guidance to tribes for entering data into NTTFI is dated, and limited monitoring of data that are entered has resulted in missing or conflicting entries that affect the accuracy and completeness of these data. These conditions lead to NTTFI data on road descriptions and conditions that provide limited usefulness for management and program oversight purposes and raise questions about the value of maintaining the NTTFI as it is currently constructed. Similarly, DMR may contain potentially outdated level of service data describing road conditions. In addition, DMR may contain inaccurate data on maintenance needs because BIA does not document how it develops maintenance cost estimates and tribes under-report maintenance performed. As a result, reports and budget submissions that rely on these data may not accurately reflect road conditions or maintenance needs and associated costs. This can inhibit the ability of Congress and BIA management to make informed decisions about RMP priorities and funding levels for the BIA road system.

Many factors affect student attendance, among them the condition of roads. BIE-funded schools vary in the data they collect and on the reasons for student absences. Expanded guidance to schools to collect such information would allow BIE to identify whether poor road conditions and adverse weather affect attendance to better target interventions. Poor road conditions also affect vehicle maintenance costs, which may not be

fully addressed in BIE's formula for funding student transportation. However, BIE has not recently reviewed its funding formula and does not know whether transportation funding is distributed in a way that reflects disparate maintenance needs. By working with BIA and tribes to revise the transportation-funding formula, BIE has the opportunity to consider how varying road conditions and other factors affect maintenance costs and best align its resource allocation in relation to current needs.

Recommendations for Executive Action

We are making eight recommendations to the Secretary of the Interior.

To help ensure that NTTFI is able to provide quality information to support management and program oversight efforts, we recommend that the Secretary of the Interior direct the Assistant Secretary-Indian Affairs to take the following three actions:

- coordinate with the FHWA and tribal stakeholders and reexamine the need for road-description and condition data currently collected in the NTTFI and eliminate fields that do not serve an identified purpose,
- for fields determined to have continued relevance for management and program oversight take steps to improve the quality of these data by clarifying guidance in the NTTFI coding guide that tribes use to collect data and by providing additional guidance on steps needed to ensure that data are consistently reported, and
- establish a process to monitor data to facilitate timely and targeted corrections to missing or erroneous data.

To improve the DMR, we recommend that the Secretary of the Interior direct the Assistant Secretary-Indian Affairs to take the following three actions:

- develop a means to document when the level of service for each road section was last evaluated,
- develop and maintain documentation supporting the unit costs of maintenance used to estimate maintenance needs, and
- develop a process for more complete and accurate reporting occurring under existing authority of RMP funds expended for performed maintenance on BIA roads.

To improve data on reasons for student absences, we recommend that the Secretary of the Interior direct the Assistant Secretary-Indian Affairs to provide guidance to BIE schools to collect data on student absences related to road and weather conditions.

To best align resources allocation decisions to needs, we recommend that the Secretary of the Interior direct the Assistant Secretary-Indian Affairs to review the formula to fund transportation at BIE schools and determine, with BIA and tribal stakeholders, what adjustments, such as distinguishing between gravel and paved roads, are needed to better reflect transportation costs for schools.

Agency Comments and Our Evaluation

We provided a draft of this report to the Departments of the Interior, Transportation, and Education for review and comment. The Departments of Transportation and Education provided technical comments, which we incorporated in the report, as appropriate. Interior agreed with five of the eight recommendations in our report and described actions under way or planned to address them. Interior neither agreed nor disagreed with two of our recommendations and did not agree with one of our recommendations. Interior's comments are reproduced in appendix VI.

Interior agreed with our three recommendations for ensuring that NTTFI can provide quality information to support management and program oversight efforts. Interior said that eliminating fields that do not serve an identified purpose will reduce the large amount of missing and erroneous data and noted that it will take steps to improve the quality of data by updating the NTTFI coding guide.

Interior agreed with two of our recommendations for improving DMR and disagreed with one.

- Interior agreed with our recommendation to document when the level of service for each road section was last evaluated. Interior noted it would take this action for roads and bridges that have been reconstructed or improved and for roads that have been evaluated at a condition level of fair or better since the last reporting cycle. Interior said that it is taking this approach because it believes improvement to level of service can only occur with reconstruction and not solely from road maintenance. This is a good first step towards addressing our recommendation. However, we continue to believe that Interior also needs to know the level of service and needs to periodically evaluate and document the evaluation date for all roads in order to effectively identify and prioritize road maintenance needs.

- Interior agreed with our recommendation to develop and maintain documentation supporting unit costs of maintenance used to estimate maintenance needs. Interior noted that it intends to take

this action for tribes it directly serves, which we believe is a good first step towards addressing this recommendation. While we understand that tribes not directly served by BIA may not have to report documentation of maintenance costs, BIA should continue to obtain information from all tribes or other sources through other means that are available and document the unit-cost estimates for maintenance of all BIA roads. This will enable Interior to develop complete and reliable cost estimates for all BIA roads.

- Interior disagreed with our recommendation to improve the DMR by coordinating with tribal stakeholders to develop a process for complete and accurate reporting of Road Maintenance Program (RMP) funds expended for maintenance performed on BIA roads. Interior stated that this action cannot be reasonably accomplished as it conflicts with the intent of federal law and the minimum-reporting requirements when a tribal entity takes over the day-to-day actions and tasks of a program. In response to Interior's concerns we have revised our recommendation to clarify that Interior should develop a reporting process that can be implemented with existing authority. We continue to believe that Interior can develop a reporting process for the RMP and could request tribes with self-determination contracts and self-governance compacts to follow such a process and could implement such a process for tribes that it serves directly. By coordinating with tribes and encouraging their self-reporting of RMP funds expended for maintenance as well as improving data collected on RMP activities that Interior administers, Interior can improve the reporting of maintenance performed on BIA roads and would be better positioned to provide Congress with more accurate and complete information for funding decisions.

Interior neither agreed nor disagreed with our recommendations to provide guidance to BIE schools to collect data on student absences related to road and weather conditions and to review the formula to fund transportation at BIE schools and determine what adjustments are needed. Nevertheless, Interior stated that it will explore the addition of a field within its Native American Student Information System to capture whether an individual student's absence is due to inclement weather or road conditions. In addition, Interior noted that it does not have authority to make changes to the rule governing its formula to fund transportation without proper engagement in a consultation process with tribes, but said that it will take our recommendation under advisement. We continue to believe that these recommendations are important for BIE to implement.

As previously noted, we recently placed Indian programs, including Indian education, serving Indian tribes and their members on our High-Risk Series. Given past and ongoing challenges, it is critical that BIE take action to enhance student access to school. By facilitating data collection on student absences related to roads and weather, BIE will be in a better position to understand the extent and consider strategies to address the effect of road and weather conditions on student attendance. Additionally, consultation with tribes is fully consistent with our recommendation on the transportation funding formula. By working with tribes and BIA on the transportation funding formula, BIE will gain critical knowledge and experience that will provide it the information needed to adjust a formula that has not been adjusted in a decade.

We are sending copies of this report to the appropriate congressional committees and the Secretaries of the Interior, Transportation, and Education. In addition, the report is available at no charge on GAO's website at http://www.gao.gov.

If you or members of your staff have questions about this report, please contact me at (202) 512-2834 or shear@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made major contributions to this report are listed in appendix VII.

Sincerely yours,

Rebecca Shea
Acting Director, Physical Infrastructure

Appendix I: Objectives, Scope, and Methodology

We addressed the following objectives: (1) To what extent do the National Tribal Transportation Facility Inventory (NTTFI) and Deferred Maintenance Reporting (DMR) system provide useful data about road conditions on tribal lands? (2) What challenges, if any, do stakeholders face in improving and maintaining roads on tribal lands? (3) What is known about the connection between road conditions on tribal lands and school attendance as well as other aspects of school transportation?

To determine the extent to which the NTTFI and DMR systems provide useful data on road conditions on tribal lands, we reviewed federal regulations, strategic plans, performance reports, agency reports, industry practices, guidance, policies, and system documentation pertaining to the collection, coding, and use of both databases; conducted electronic data testing, such as for completeness, out-of-range values, and logical inconsistencies; attended a training workshop on NTTFI data entry; and interviewed Federal Highway Administration (FHWA), Bureau of Indian Affairs (BIA), and tribal officials about the systems. We analyzed the NTTFI data as of September 2015—which was the most recent available data at the time of our review—and the quarterly DMR system inventory and road condition data for federal fiscal years 2009 through 2015. The most recent data available was the first quarter 2016 DMR data, however, we decided not to use it because we could not get full year data and we wanted to ensure that the date of the most recent DMR data matched the most recent NTTFI data we were able to obtain. To assess the usability of the data, we reviewed the results of our electronic testing, interviewed BIA officials regarding system controls (such as data system design, monitoring, and edit checks) and other processes (such as cost estimating practices) in place to promote data accuracy, consistency, and completeness. We compared the information about each data system design, monitoring, edit checks, and other processes to federal standards for internal control.[1] We determined that these data were sufficiently reliable for some purposes, such as the road section's location, owner, and road surface type (existing roads only) for the NTTFI, but not others, as described in the report.

NTTFI data are part of BIA's Road Inventory Field Database System (RIFDS)—a broader database of BIA managed roads. To better understand the overall system and data entry requirements, we attended

[1]We analyzed NTTFI data for all 12 BIA Regions and DMR data for ten BIA Regions. Two BIA regions-- Alaska and Eastern Oklahoma Regions— do not have BIA roads and are thus not reflected in the assessment of DMR data.

a RIFDS training workshop that focused on the process of entering and deleting NTTFI data. The NTTFI data includes inventory, description, and condition data for all Tribal Transportation Program (TTP) eligible roads, bridges, and other transportation facilities in all 12 BIA Regions.[2] Our review included only roads (including paths and trails). We conducted electronic testing of the following NTTFI data fields:

- Region,
- Reservation
- Route Number
- Section Number
- Ownership
- Functional Classification
- Existing Surface Type
- Length of Section
- Average Daily Traffic Year
- Existing Average Daily Traffic
- Surface Condition Index (SCI)/ Wearing Surface Condition
- Date of Update

To identify which road sections in the NTTFI are proposed and which are existing, we used two data fields—the Construction Need and Existing Surface Type fields. Road sections with *either* the Construction Need data field equal to "4" (proposed) *or* the Existing Surface Type data field equal to "0" (proposed) were classified as a proposed road section. Road sections with *neither* the Construction Need data field equal to "4" (proposed) *nor* the Existing Surface Type data field equal to "0" were classified as existing. If both of those data fields were blank, we categorized the road section as unknown. Our review did not include ensuring that the road sections in the inventory met the current statutory requirements for inclusion in the NTTFI, and we did not physically inspect roads to assess the accuracy of road section length or surface type entries.

[2]NTTFI facilities include, for example bridges, parking facilities, ferry boat terminals, transit terminals, and airstrips.

The DMR system includes inventory and condition data for all BIA roads in 10 of the 12 BIA Regions. There are no BIA roads in the Alaska and Eastern Oklahoma BIA regions, according to BIA officials, so these regions were not included in our assessment of DMR data. We conducted electronic testing on the following DMR data fields:

- Region
- Reservation
- Year
- Quarter
- Length
- Surface Type
- Level of Service
- Maintenance Need
- Maintenance Performed
- Maintenance Deferred

To identify any challenges stakeholders face in improving and maintaining roads on tribal lands, we reviewed relevant federal laws such as the Intermodal Surface Transportation Efficiency Act of 1991;[3] Transportation Equity Act for the 21st Century;[4] the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users;[5] Moving Ahead for Progress in the 21st Century Act (MAP-21);[6] and Fixing America's Surface Transportation Act.[7] We also reviewed the federal regulation, guidance, and funding processes pertaining to the TTP and RMP.[8] We reviewed both TTP and RMP program documentation including reports to Congress on the program's performance measures and program goals. We analyzed FHWA budget justification data and BIA RMP funding data for fiscal years 2009 through 2016 to understand the annual level of

[3]Pub. L. No. 102-240, 105 Stat. 1914 (1991).

[4]Pub. L. No. 105-178, 112 Stat. 107 (1998).

[5]Pub. L. No.109-59, 119 Stat. 1144 (2005).

[6]Pub. L. No. 112-141, 126 Stat. 405 (2012).

[7]Pub. L. No.114-94,129 Stat. 1312 (2015).

[8]25 C.F.R. Part 170.

funding for each program during those years. We also reviewed tribal transportation documents for conducting road improvement and maintenance, such as selected tribes' program agreements (e.g., for TTP), lists of tribal transportation projects and priority lists, and various management plans.

We interviewed FHWA and BIA headquarters and regional officials to gain a better understanding of the TTP and RMP programs and examine how the agencies coordinate with tribes to maintain and improve roads on tribal lands. We also interviewed federal, state, local, and tribal transportation officials on how they plan, prioritize, and coordinate road projects, address jurisdictional issues and National Environmental Policy Act requirements,[9] and manage other factors affecting road maintenance and improvement on tribal lands. We conducted site visits to 10 selected schools and school districts and 7 transportation offices within the Navajo, Pine Ridge, and Rosebud Indian Reservations. The Navajo Nation is located in Arizona, New Mexico, and Utah and is within the BIA Navajo Region; the Oglala Sioux and Rosebud Sioux Tribes are located in South Dakota and are within the BIA Great Plains Region. While all 567 federally recognized tribes were considered for selection, these three sites were chosen because they reflect factors such as different BIA regions; considerable tribal and BIA road mileage; presence of Bureau of Indian Education (BIE) schools; and different program agreements. During our site visits, in addition to meeting with school, tribal, and transportation officials, we observed road conditions first-hand, including riding on school busses along their delivery routes. As part of one site visit, we conducted a facilitated group discussion with 10 tribes from the BIA Great Plains and Rocky Mountain Regions, including two tribes we visited. Our site visits provide information and illustrative examples on a range of road condition and student attendance issues on tribal lands but are not generalizable to all tribal areas. We also attended four tribal transportation-related conferences through which we met with various tribal officials. We also met with tribal technical assistance experts and representatives from national Indian associations such as the National Congress of American Indians, Intertribal Transportation Association, National Indian Education Association, and the National Indian Justice Center. Last, we obtained geospatial data from the Navajo Nation on road ownership, road surface type, and road maintenance partnerships for two school districts within the Navajo Nation. After analyzing the

[9]Pub. L. No. 91-190, 83 Stat. 852 (1970) codified at 42 U.S.C. § 4321-4370.

geospatial data and partnership information, we developed maps and provided those maps to the Navajo Nation and Coconino County (Arizona) for them to review our analysis and validate that we developed accurate maps.

To determine what is known about the connection between road conditions on tribal lands and school attendance as well as school transportation, we used a variety of methods. We reviewed relevant laws, regulations, and guidance from the Department of Education (Education) and Department of the Interior's BIE. To provide national data about student attendance including for Indians, we analyzed two Education data sets—the Civil Rights Data Collection for school year 2013–14 and the National Assessment of Educational Progress for 2015.[10] For both data sets, we used the most recently available data and assessed reliability by reviewing related documentation and interviewing knowledgeable agency officials, among other steps. Based on these efforts, we determined that these data were sufficiently reliable for our purposes.

We also interviewed Education and BIE officials on these issues and conducted a literature review of national and international academic studies written about factors that affect student attendance. Specifically, we searched for (1) connections between road conditions on tribal lands and school attendance in the United States and/or other countries; (2) connections between road conditions and school attendance in the United States and/or other countries; (3) factors connected with school attendance in the United States for Indian students; or (4) factors connected with school attendance, in general, in the United States. We identified peer-reviewed studies published since 2000 through searches in research databases, including the Education Resources Information Center (ERIC), Scopus, and WorldCat. We also reviewed a list of studies related to school attendance compiled and provided by the National Library of Education of the Department of Education. Based on our database searches and the list from Education, we reviewed abstracts and introductions of studies, and determined that a total of 39 sources were at least minimally relevant. We determined that 10 of the 39

[10]The National Assessment of Educational Progress (NAEP) is a nationally representative survey of public, private, BIE, and Department of Defense schools. NAEP is mainly intended to assess academic achievement. These data are subject to sampling error. That is, because the survey data were collected using generalizable probability samples, this sample is only one of a large number of samples that might have been selected. Since each sample could provide different estimates, we indicated differences in percentage estimates that were statistically significant at the 95 percent confidence level.

identified studies were both methodologically sufficient and topically relevant to the research objective. The 10 studies examined factors connected with school attendance and absenteeism, which were generally grouped into one or more of four categories: individual factors, family factors, school factors, and environment or community factors, where road conditions and related issues, such as adequate public transportation, generally fell within the environment or community factor category. We used a data collection instrument to consistently record information about key findings related to the connection between road condition and attendance from each relevant source.

Lastly, as part of our site visits with the three Tribal Nations noted above, we selected ten BIE schools and public school districts to visit on those reservations. We selected schools and districts with at least 50 enrolled students and similar student demographics—mostly Indian and mostly low-income—and with school bus routes of varying road surface types (i.e., paved, gravel, and earth). At these 10 schools and districts, we collected available information on attendance, school bus routes, and road conditions along school bus routes. We interviewed school and district officials, including superintendents, principals, transportation directors, business managers, bus drivers, as well as tribal community officials.[11] Topics of these interviews and related data requests addressed reasons of student absences, conditions of roads serving the school, and changes to school bus routes due to road conditions, among others. We directly observed the road conditions on school bus routes by riding on or following behind school vehicles such as buses and sports utility vehicles. We compared this information with guidance from an education forum and federal standards for internal control.[12] During our site visits, we took photographs and videos of road conditions on tribal lands, the equipment used to maintain and repair them, and vehicles the schools use to transport students on those roads. We also attended a group discussion with tribal and education officials of the Oglala Sioux Tribe at the request of a tribal education organization. The interviews and literature results are not generalizable across all tribal nations;

[11]We visited nine schools and districts in person, and interviewed officials of one district by phone because they were not available at the time of our visit.

[12]We reviewed guidance issued by the National Forum on Education Statistics, a body commissioned by the Department of Education. Though the forum's publications do not necessarily represent the policy or views of the Department of Education, the forum undertakes activities such as proposing good practices to help state agencies and local school districts.

nonetheless, they do provide qualitative and quantitative evidence on the connection between road conditions on tribal lands and student attendance. Tribal and other entities we interviewed or collected information from for all objectives are listed in table 2.

Table 2: Non-Federal Stakeholders GAO Interviewed

Tribal Stakeholders: Tribes and Alaska Native Entities	**State**
1. Cheyenne River Sioux Tribe	South Dakota
2. Cherokee Nation	Oklahoma
3. Confederated Salish and Kootenai Tribe	Montana
4. Craig Tribal Association	Alaska
5. Crow Tribe	Montana
6. Fort McDowell Yavapai Nation	Arizona
7. Karuk Tribe	California
8. Lummi Tribe	Washington
9. Native Village of Unalakleet	Alaska
10. Navajo Nation	Arizona, New Mexico, Utah
11. Nez Perce Tribe	Idaho
12. Northern Cheyenne Tribe	Montana
13. Oglala Sioux Tribe	South Dakota
14. Omaha Tribe	Nebraska
15. Puyallup Tribe	Washington
16. Pueblo of Isleta	New Mexico
17. Pueblo of Santa Clara	New Mexico
18. Rosebud Sioux Tribe	South Dakota
19. Salt River Pima-Maricopa Indian Community	Arizona
20. Sisseton-Wahpeton Oyate	South Dakota
21. Spirit Lake Tribe	North Dakota
22. Standing Rock Sioux Tribe	North Dakota
23. The Chickasaw Nation	Oklahoma
24. Tohono O'odham Nation	Arizona
25. Yankton Sioux Tribe	South Dakota
Education Stakeholders: Schools and Districts	
Serving Navajo Nation	
1. Beclabito Day School	New Mexico
2. Black Mesa Community School	Arizona
3. Central Consolidated School District	New Mexico
4. Chilchinbeto Community School	Arizona

Education Stakeholders: Schools and Districts		
	Serving Navajo Nation	
5.	Greasewood Springs Community School	Arizona
6.	Kayenta Unified School District	Arizona
7.	Page Unified School District	Arizona
8.	Pine Springs Day School	Arizona
9.	Tohaali Community School	New Mexico
10.	Tonalea Day School	Arizona
11.	Tuba City Unified School District	Arizona
	Serving Oglala Sioux Tribe (Pine Ridge Reservation)	
12.	Bennett County School District	South Dakota
13.	Crazy Horse School	South Dakota
14.	Kadoka Area School District	South Dakota
15.	Little Wound School	South Dakota
16.	Oglala Lakota County School District	South Dakota
	Serving Rosebud Sioux Tribe (Rosebud Reservation)	
17.	St. Francis Indian School	South Dakota
18.	Todd County School District	South Dakota
19.	White River School District	South Dakota
Other Groups: States and Counties		
1.	Arizona Department of Transportation	Arizona
2.	California Department of Transportation	California
3.	New Mexico Department of Transportation	New Mexico
4.	South Dakota Department of Transportation	South Dakota
5.	Wyoming Department of Transportation	Wyoming
6.	Apache County	Arizona
7.	Coconino County	Arizona
8.	Navajo County	Arizona
9.	Oglala Lakota County	South Dakota
10.	San Juan County	New Mexico
11.	San Juan County	Utah
12.	Todd County	South Dakota

Source: GAO. | GAO-17-423

We conducted this performance audit from December 2015 to May 2017, in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Appendix II: NTTFI Road Miles Data by BIA Region, Owner, and Road Surface Type

The Bureau of Indian Affairs (BIA) uses the National Tribal Transportation Facility Inventory (NTTFI) to document existing and proposed roads on tribal lands that are eligible for Tribal Transportation Program (TTP) funding. According to our analysis, we found that the NTTFI identifies over 147,000 existing road miles, over 13,000 proposed road miles for a total of about 161,000 miles of existing and proposed roads on tribal lands in the 12 BIA regions.[1]

Table 3: Proposed and Existing Road Miles in the National Tribal Facility Inventory (NTTFI), by Bureau of Indian Affairs (BIA) Region, as of October 31, 2015

Region	Existing	Proposed	Regional total
Alaska	15,049	9,982	**25,031**
Eastern	3,515	251	**3,767**
Eastern Oklahoma	15,608	90	**15,698**
Great Plains	16,423	413	**16,836**
Midwest	20,647	1,039	**21,688**
Navajo	14,341	42	**14,383**
Northwest	14,337	347	**14,684**
Pacific	5,946	76	**6,022**
Rocky Mountain	9,906	662	**10,567**
Southern Plains	11,307	129	**11,436**
Southwest	6,914	108	**7,023**
Western	13,287	241	**13,528**
National total	**147,281**	**13,380**	**160,663**

Source: GAO analysis of BIA data. | GAO-17-423

Note: Includes roads, paths, trails, and walkways in the NTTFI. Does not include facilities identified as bridges, parking facilities, ferry boat terminals, transit terminals, airstrips, or overlapping routes. Mileages may not add to total due to rounding. Regional totals do not add to the total because sufficient information was not available for 2 miles of road to determine if they were proposed or existing.

Of the existing roads identified in the NTTFI, about 40 percent are

[1]Our review did not include ensuring that the roads in the inventory meet the current statutory requirements for inclusion in the NTTFI. We also did not sample or individually evaluate the individual accuracy of the records in the inventory such as road length or existing road surface type.

identified as paved (concrete or bituminous), about 25 percent as gravel, and about 35 percent as either earth or primitive type roads like two-track or wagon trails.[2] The majority of BIA- and tribal-owned roads are identified as earth or primitive while state- and local-owned roads are mostly identified as paved or gravel.

Table 4: Road Miles and Surface Type for Existing Roads in the National Tribal Facility Inventory (NTTFI) by Owner, as of October 31, 2015

Owner	Existing road miles	Road surface type (in percent of owner miles)				
		Paved	Gravel	Earth	Primitive[a]	Total
BIA	29,456	24	16	54	6	**100**
Tribes	17,029	6	8	62	24	**100**
Local[b]	69,257	41	41	16	2	**100**
State	23,031	94	4	2	0	**100**
Other federal agencies	5,215	2	33	47	18	**100**
Other[c]	3,293	1	7	62	30	**100**
All owners	**147,281**	**39**	**25**	**29**	**6**	**100**

Source: GAO analysis of BIA data. | GAO-17-423

Note: Includes roads, paths, trails, and walkways in the NTTFI. Does not include facilities identified as bridges, parking facilities, ferry boat terminals, transit terminals, airstrips, or overlapping routes. Interstate highways are typically owned by the state. Percentages may not add due to rounding.

[a]Roads where people have driven enough times to form a road, but the ground has never been graded.

[b]Includes counties, townships, and municipalities.

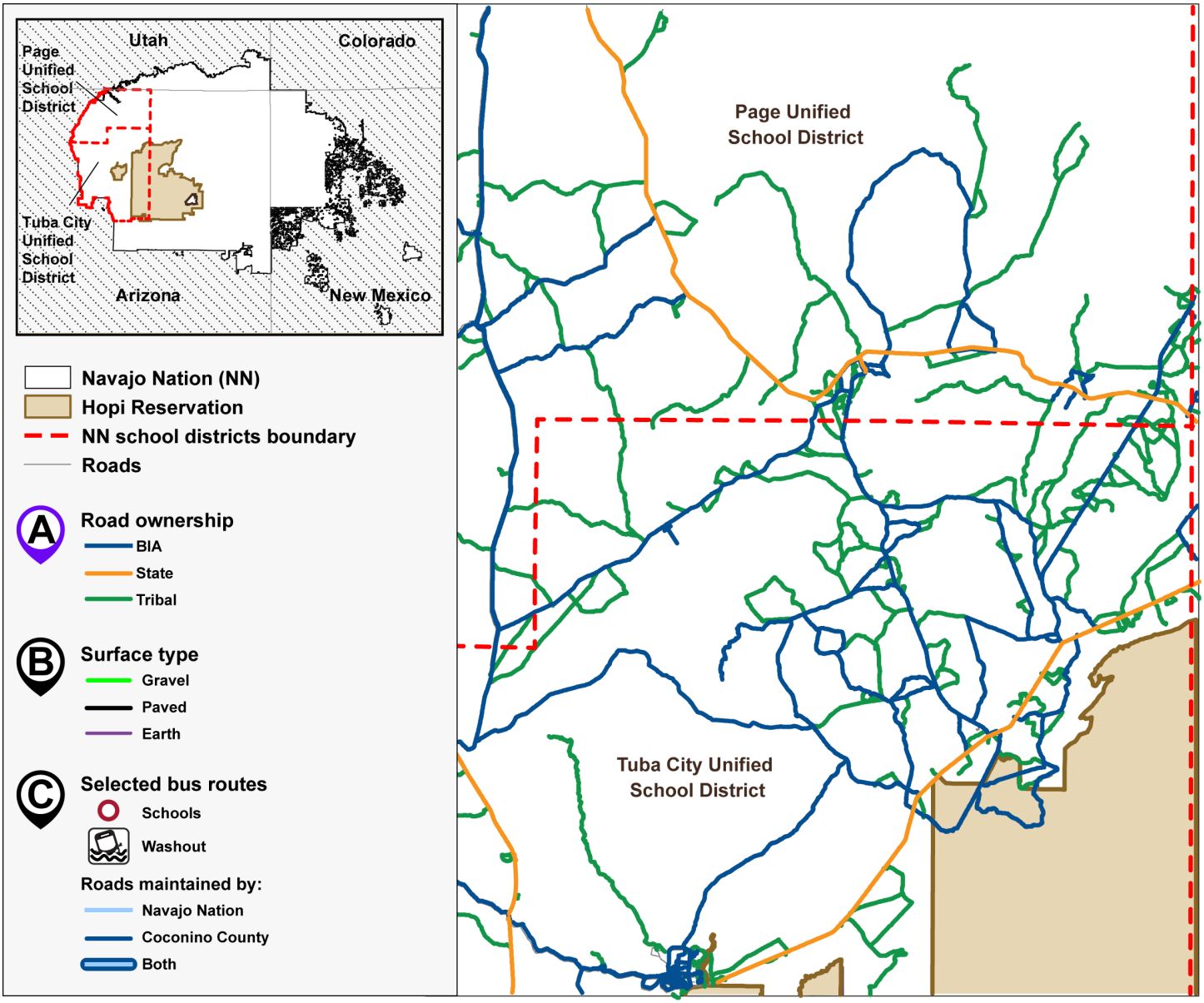
[c]Includes petroleum and mining, utility company, or any other agencies, groups, or enterprises not included in one of the other owner categories.

[2]A bituminous road is one that is paved or coated with asphalt (a black tar like substance obtained by evaporating petroleum), rock and/or sand. A primitive road is one where people have driven enough times to form a road, but the ground has never been graded. A primitive road may appear as two ruts carved in the ground by tires.

Appendix III: Road Ownership, Surface Type, and School Bus Route Maintenance Responsibility in Selected School Districts

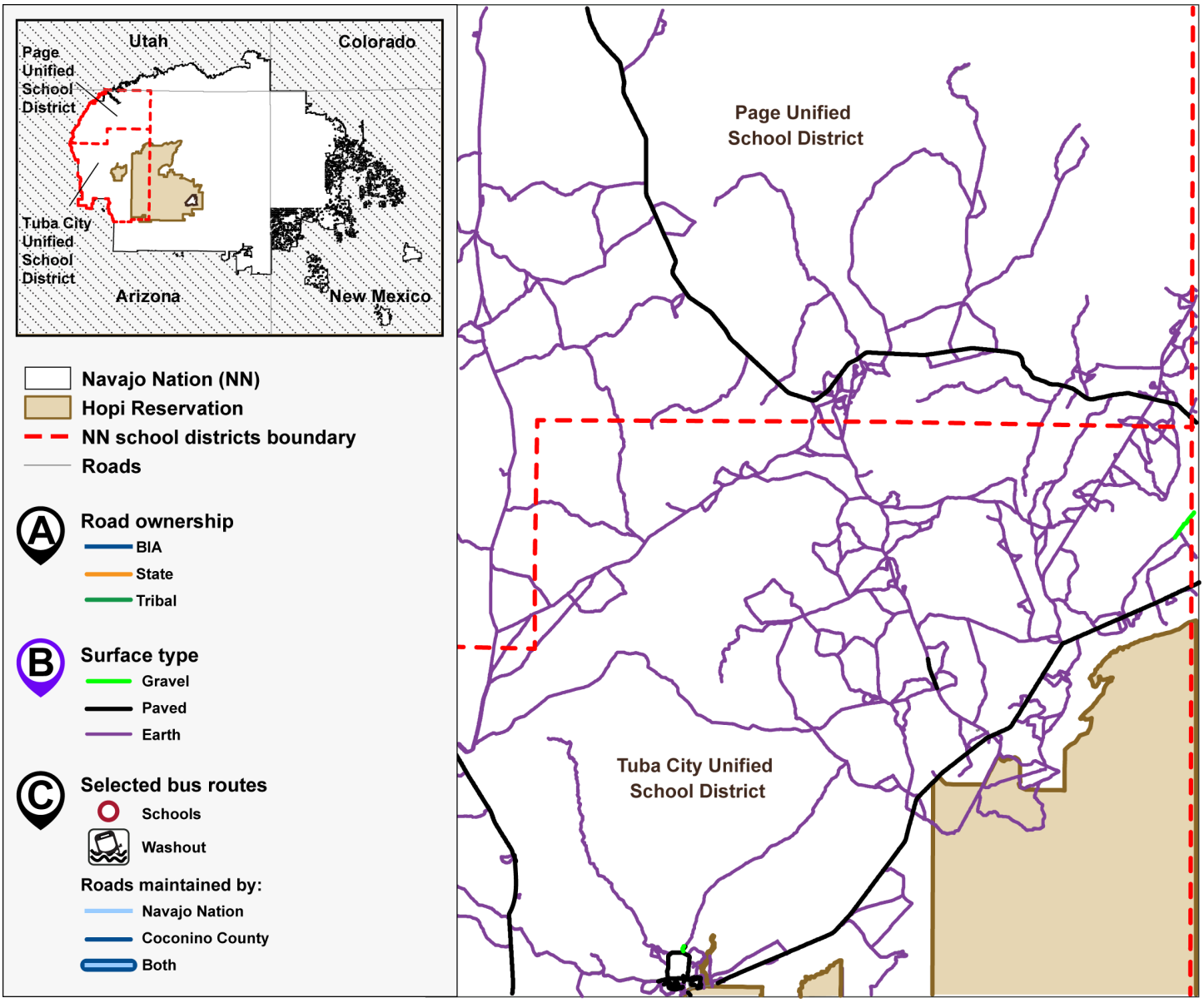
Figures 11 through 13 include the rollover information for road ownership, surface type, and school bus route maintenance responsibility in Page and Tuba City Unified School Districts on the Navajo Nation in Arizona (Corresponds to Interactive Fig. 4).

Figure 11: Road Ownership in Page and Tuba City Unified School Districts on the Navajo Nation in Arizona



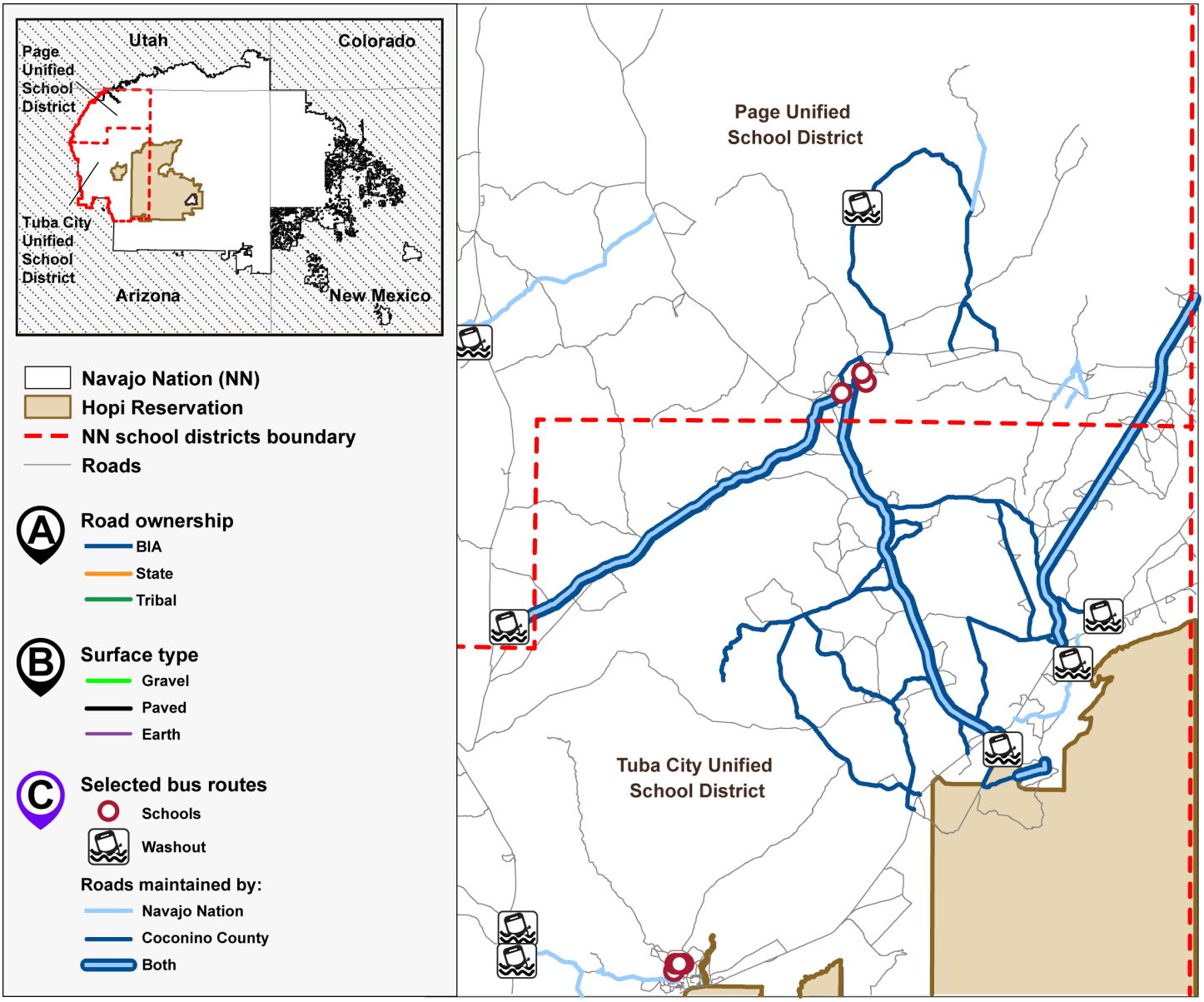
Source: GAO analysis of Navajo Nation Division of Transportation and Coconino County (Arizona) data and MapInfo (Map). | GAO-17-423

Figure 12: Surface Type in Page and Tuba City Unified School Districts on the Navajo Nation in Arizona



Source: GAO analysis of Navajo Nation Division of Transportation and Coconino County (Arizona) data and MapInfo (Map). | GAO-17-423

Figure 13: School Bus Route Maintenance Responsibility between the Navajo Nation and Coconino County in Page and Tuba City Unified School Districts on the Navajo Nation in Arizona



Source: GAO analysis of Navajo Nation Division of Transportation and Coconino County (Arizona) data and MapInfo (Map). | GAO-17-423

Appendix IV: Selected Examples of Partnerships for Road Improvement and Maintenance on Tribal Lands

Below are selected examples of partnerships between federal, state, local, and tribal entities that primarily shared the costs to conduct road maintenance and improvements on tribal lands (see table 5).

Table 5: Selected Examples of Partnerships That Have Improved and Maintained Roads on Tribal Lands

Federal/ tribal stakeholder(s)	Partner(s)	Description	Outcome
Karuk Tribe (California)	California Department of Transportation and Federal Highway Administration (FHWA)	The Panamnik: Orleans Community Center Connectivity Plan used the Intergovernmental Fund Transfer Agreement[a] for the federal, state, and tribal partnering (2016). This agreement enabled the Karuk Tribe to receive additional federal transportation funding from the State of California via FHWA. Through this agreement, the tribe provided $23,720 and also received $183,080 in transferred state funding.	According to the Karuk Tribe Department of Transportation Director, the agreement's template will allow tribes and states across the nation to partner in new ways and access more funding sources to implement their tribal transportation improvement goals. Specifically, this project supported the development of a multi-modal connectivity plan encompassing the community of Orleans, California.
Flandreau Santee Sioux Tribe (South Dakota)	Flandreau Township (South Dakota)	The Three Mile Road Project (2011) under a Joint Powers Agreement was a tribal-township partnership to provide road maintenance on a township-owned road. The tribe provided about $2 million and the township provided about $400,000 to reconstruct a 3-mile gravel road to be a paved road. Both parties agreed, among other things, that the tribe would be responsible for maintaining the newly paved road and if resources were not available, they agreed to let the road revert back to gravel.	According to Bureau of Indian Affairs '(BIA) Great Plains Region officials, the agreement allowed both the tribe and township to meet road maintenance and improvement needs in a rural community that served about 25 families. This paved road was important because it connected this rural community to a county highway that accessed essential services.
Rosebud Sioux Tribe (South Dakota)	Todd County (South Dakota)	The Six Mile Corner Project (2016) was awarded a Transportation Investment Generating Economic Recovery (TIGER) Program grant. The tribe provided $9,504,000, the county provided $500,000, and the TIGER funding provided $14,620,000 to support the project. The Six Mile Project reconstructed about 16.1 miles of BIA Route 7 from the City of Rosebud to U.S. Highway 83 on the Rosebud Indian Reservation.	Among other improvements and safety enhancements that were completed, a full roadway was reconstructed, including paving ten miles of gravel roads. According to TIGER documentation, benefits of this project included improved emergency service response times.

Federal/ tribal stakeholder(s)	Partner(s)	Description	Outcome
Oglala Sioux Tribe (South Dakota)	South Dakota Department of Transportation and Custer County (South Dakota)	The Cheyenne River Bridge Replacement Project (2012) was a state-county-tribal partnership to replace an aging bridge due to its poor condition. The tribe provided $1,000,000, the state provided $1,975,241, and the county provided $493,810. Bridge improvements and maintenance can be paid for with TTP funding.	According to federal and Oglala Sioux Tribe officials, while partnering on road projects is not common in the Great Plains Region, partnering on bridge projects is. This partnership resulted in a new bridge that connected the community to essential services.
BIA Navajo Region (Arizona, New Mexico, and Utah)	Coconino County (Arizona) and the Navajo Nation (Arizona, New Mexico, and Utah)	Through a Cooperative Agreement (1996), BIA has provided $33,000 annually to Coconino County, Arizona, to conduct road blading services on about 286 miles of BIA earth roads that also serve as school bus routes[b] These roads are located in north and central part of Arizona that is the western part of the Navajo Nation. The Navajo Nation has contributed $134,000 annually to this agreement.	According to both stakeholders, this partnership allows BIA to meet its road maintenance requirements that covered a large area on the Navajo Nation. Some of these roads serve as school bus routes. This agreement also benefits the county by sustaining work for maintenance crews. Additionally, by using the county's equipment, BIA reduces the wear and tear on BIA's equipment.
BIA Navajo Region (Arizona, New Mexico, and Utah)	San Juan County (Utah)	Through a Cooperative Agreement (2017) the BIA Navajo Region provides funding to San Juan County to conduct road maintenance on about 130 miles of earth roads that were owned by BIA in southern Utah that is in the northwest part of the Navajo Nation. The pending agreement doubled the prior annual funding provided by BIA to $170,000 to account for the increased costs associated with road maintenance.	According to both stakeholders, this partnership allows BIA to meet its road maintenance requirements in a remote location on the Navajo Nation. County crews efficiently access and address what BIA maintenance crews cannot because of their limited resources and the distance from the area. This agreement also benefited the county in sustaining work for its maintenance crews.
Navajo Nation (Arizona, New Mexico, and Utah)	Navajo County (Arizona), Peabody Western Coal Company, Black Mesa Region Chapters, and Local School Districts	The Red Dog Gravel Project (2012) is multi-stakeholder partnership to crush, haul, and place Peabody's red dog gravel—which refers to the type and color of gravel in the region—on the 125 miles of road in most need of repair. Peabody has provided the gravel free of charge, and all partners have shared the costs of handling and placing the material.	According to Navajo Nation officials, as of 2017, about 120,000 tons of gravel has been delivered to ten Navajo Nation chapters in the Black Mesa region.

Source: GAO. | GAO-17-423

[a]23 U.S.C. § 202(a)(9). Under MAP-21, the federal government encouraged the cooperation of state, local, and tribal entities for the Tribal Transportation Program. The Karuk Tribe, in collaboration with the Department of the Interior's Office of the Solicitor, developed a template 23 U.S.C. § 202(a)(9) Intergovernmental Fund Transfer Agreement for the partnering to occur.

[b]Since 2014, Coconino County additionally provided $330,000 in labor, equipment, materials, and fuel to maintain the school bus routes

Appendix V: Select Strategies of Visited Schools to Mitigate Difficult Road Conditions

According to officials at the 10 schools and districts that we visited, they or others have used several strategies to lessen the effect of road conditions on tribal lands; these strategies aim to improve students' access to attend school (see table 6).

Table 6: Select Strategies Noted by School Officials to Mitigate Difficult Road Conditions on Tribal Lands and Enhance School Access

Strategy	Description	Comment
Use of sports-utility vehicles (SUV)	Several schools and districts we visited said that they used SUVs to transport some students on a routine or as needed basis.	SUVs accommodate fewer passengers per vehicle than a bus or mini-bus (lower capacity). One school superintendent said that very inclement weather has occasionally prevented SUV's from reaching students. Also, in one district we visited, officials said that state requirements only allow buses for daily transport of students.
Boarding school	Students live at the school they attend. They may go home during weekends, various breaks, or other times. For example, about a third of BIE schools have a dormitory component along with the school, though not all students at these schools live in the dormitory.	About an eighth of BIE students are boarding students (living at the school they attend). Students may live at the school for non-transportation reasons, such as home environment. Also, the dormitory component of a boarding school adds costs for staff, utilities, food, and other expenses for school operations.
Arrangements for individual students	Officials at schools or districts told us examples of handling individual cases of a few remote students, such as housing them in available on-site quarters or paying tuition to a district in another state to enroll those students. At another district we visited, officials said that some students have stayed with relatives who lived closer to the school, such as during inclement weather.	Individual arrangements may help with a limited number of students, but can be difficult or costly to apply to larger numbers of students.

Source: GAO analysis and interviews with visited schools, districts, and BIE. | GAO-17-423

Note: We did not visit boarding schools because not all of their students receive daily transportation to and from school and because students may live at the school for non-transportation reasons, as well.

Appendix VI: Comments from the Department of the Interior

United States Department of the Interior

OFFICE OF THE SECRETARY
Washington, DC 20240

MAY 02 2017

Mr. Frank Rusco
Director, Natural Resources and Environment
U.S. Government Accountability Office
441 G Street NW
Washington, DC 20548

Dear Mr. Rusco:

Thank you for the opportunity to review and comment on the Government Accountability Office (GAO) draft report entitled, *Tribal Transportation: Better Data Could Improve Road Management and Inform Indian Student Attendance Strategies* (GAO-17-423). We appreciate GAO's review of: (1) useful data on roads that the National Tribal Transportation Facility Inventory (NTTFI) and the Bureau of Indian Affairs' (BIA) Deferred Maintenance Reporting (DMR) systems provide; (2) the challenges to improving and maintaining these roads; (3) the connection between road condition and school attendance; and (4) other aspects of school transportation.

The GAO issued eight recommendations to the Department to address its findings. Below is a summary of actions planned to implement the recommendations.

To help ensure that NTTFI is able to provide quality information to support management and program oversight efforts, we recommend that the Secretary of the Interior direct the Assistant Secretary-Indian Affairs to take the following three actions:

1. **coordinate with the Federal Highway Administration (FHWA) and Tribal authorities and reexamine the need for road description and condition data currently collected in the NTTFI and eliminate fields that do not serve an identified purpose;**
2. **for fields determined to have continued relevance for management and program oversight take steps to improve the quality of these data by clarifying guidance in the NTTFI coding guide tribes use to collect data and providing additional guidance on steps needed to ensure that data are consistently reported; and**
3. **establish a process to monitor data to facilitate timely and targeted corrections to missing or erroneous data.**

Response: Indian Affairs concurs with the first recommendation to reexamine the need for road description and condition data currently collected in the NTTFI and eliminate fields that do not serve an identified purpose.

Indian Affairs concurs with the second recommendation. The BIA will take steps to improve the quality of data by clarifying guidance in the form of an updated NTTFI coding guide for fields that specifically apply to the FHWA's program and management oversight reporting

requirements. This will ensure consistent reporting of data by tribes and field personnel for future updates to the NTTFI database.

Indian Affairs concurs with the third recommendation to establish a process to monitor data to facilitate timely and targeted corrections to missing or erroneous data. Eliminating fields that do not serve an identified purpose per the first recommendation will reduce the large amount of missing and erroneous data. Correction of erroneous non-BIA and non-tribal data is the primary responsibility of public authorities (county, state, municipalities and other Federal agencies) who own these roads. The BIA and FHWA would defer to the specific public authority's data and not rely solely on the data of the NTTFI.

To improve the DMR, we recommend that the Secretary of the Interior direct the Assistant Secretary-Indian Affairs to take the following three actions:

4. **develop a means to document when the level of service for each road section was last evaluated;**
5. **develop and maintain documentation supporting unit costs of maintenance used to estimate maintenance needs; and**
6. **in coordination with Tribal authorities, develop a process for complete and accurate reporting of Road Maintenance Program (RMP) funds expended for performed maintenance on BIA roads.**

Response: Indian Affairs concurs with the fourth recommendation to develop additional procedures to determine the level of service and include the date the road/bridge section was evaluated, to the extent the law allows. This will specifically apply to roads/bridges which have been reconstructed or improved, as well as those roads which have been evaluated at a condition level of fair or better (good and excellent) since the last reporting cycle. This considers the impacts to level of service that can only improve with reconstruction and not solely from road maintenance. Most of the earth and primitive roads will not change from poor or failing.

Indian Affairs concurs with the fifth recommendation to develop and maintain documentation supporting unit costs of maintenance, as allowed by law, to estimate maintenance needs for direct service locations.

Indian Affairs does not concur with the sixth recommendation to coordinate with Tribal governments to develop a process for complete and accurate reporting of RMP funds expended for performed maintenance on BIA roads. This action cannot be reasonably accomplished as it conflicts with the intent of Public Law 93-638 Indian Self-Determination Education Assistance Act (ISDEAA) and the minimum reporting requirements when a Tribal entity takes over the day-to-day actions/tasks of the program. The reporting under ISDEAA is strictly limited to non-construction reporting in the annual financial statement. This limits BIA's ability to gather this data from the tribal entities unless the tribes are willing to assist the BIA in this effort. Otherwise, the BIA will be required to perform a non-contractible action for collecting this data. Moreover, this action is not feasible since the required data (cost and work location) are in the performing tribal entities' possession. However, Indian Affairs will work with those BIA locations that currently run the program as a direct service to the public and consider tribal self-reporting of performance data as detailed in our response.

7. **To improve data on reasons for student absences, we recommend that the Secretary of the Interior direct the Assistant Secretary-Indian Affairs to provide guidance to BIE schools to collect data on student absences related to road and weather conditions.**

Response: The Native American Student Information System (NASIS) currently collects data reflecting full school closures due to inclement weather. The Bureau of Indian Education (BIE) is exploring the addition of a field within NASIS to capture whether an individual student's absence is due to inclement weather or road conditions. The BIE will consult with the NASIS vendor to discuss the feasibility and cost involved for this additional requirement and consider implementation based on this information and available resources.

8. **To best align resources allocation decisions to needs, we recommend that the Secretary of the Interior direct the Assistant Secretary-Indian Affairs to review the formula to fund transportation at BIE schools and determine with BIA and tribal stakeholders what adjustments, such as distinguishing between gravel and paved roads, are needed to better reflect transportation costs for schools.**

Response: The Department will take this recommendation under advisement. We have no authority to make changes to the final rule without proper engagement in a consultation process with tribes.

The Department has also reviewed the CD with the draft video and does not have any comments.

If you have any questions about this response, please contact Michael Oliva, Director, Division of Internal Evaluation and Assessment at (703) 390-6537.

Sincerely,

Michael Black
Acting Assistant Secretary
for Indian Affairs

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Appendix VII: GAO Contact and Staff Acknowledgments

GAO Contact

Rebecca Shea, (202) 512-2834 or shear@gao.gov

Staff Acknowledgments

In addition to the contact name above, Mike Armes (Assistant Director), Aisha Cabrer (Analyst-in-Charge), Les Locke, Matt Saradjian, Irina Carnevale, Georgeann Higgins, Jeff Malcolm, Sara Ann Moessbauer, Melinda Cordero, Malika Rice, Cheryl Peterson, Jeanette Soares, Geoffrey Hamilton, Elizabeth Sirois, Jerry Sandau, Mitchell B. Karpman, David Blanding, Jr., Justin Fisher, Leia Dickerson, Melissa Bodeau, Benjamin T. Licht, and Jon Melhus made key contributions to this report. Jacques Arsenault and Theresa Perkins made key contributions to the multimedia for this report.