

**DRAFT**



# **Binational Freight Corridor Study**

Technical Memorandum 1. Economic, Geographic,  
and Demographic Definition of the Corridor

Prepared by the **Texas A&M Transportation Institute** in collaboration with:

Cambridge Systematics

Economic Development Research Group, Inc.

Centro de Investigación y Docencia Económicas A.C. (CIDE)

Felipe Ochoa y Asociados, S.C.

April 2017

**DRAFT**

**TABLE OF CONTENTS**

**List of Exhibits**..... **iii**

**Introduction**..... **1**

**Governance Context** ..... **3**

    Transportation Planning at the National Level ..... 3

    Highway Governance ..... 4

    Railway Governance ..... 7

    Seaport Governance ..... 8

    Border Crossing Development ..... 9

**Geographic Context**..... **12**

    Corridor Boundaries..... 12

    Rivers, Lakes, Mountains, and Riparian Corridors ..... 17

    States and Cities along the Corridors..... 21

    Corridor Highway Characteristics..... 24

    Road Classification Based on Commercial Vehicle Type ..... 29

    Rail Lines Characteristics..... 34

    Ports, Airports and Border Crossings..... 35

**Demographic Context**..... **38**

    Economically Active Population along the Corridors ..... 38

    Corridors and Population Density ..... 39

    Education Level along the Corridors..... 43

**Economic Context**..... **46**

    Municipal GDP along the Corridors..... 46

    Economic Clusters along the corridors..... 48

    Industrial Parks ..... 76

    Key Supply Chains ..... 82

    Top Supply Chains ..... 90

**References** ..... **95**

**Appendix Transearch Database Analysis** ..... **A-1**

# DRAFT

## LIST OF EXHIBITS

Exhibit 1. Highway Infrastructure Funding Mechanisms.....	5
Exhibit 2. National Highway Network Composition 2015. ....	7
Exhibit 3. Mexico Rail Infrastructure and Concessions, 2015.....	8
Exhibit 4. Mexico’s National Seaport System 2016.....	9
Exhibit 5. U.S.-Mexico Commercial Vehicle Border Crossings. ....	10
Exhibit 6. U.S.-Mexico Commercial Vehicle Border Crossings with City Details.....	11
Exhibit 7. Binational Freight Corridor Federal Highways 15 and 45 Buffer.....	13
Exhibit 8. Pacific Corridor Routes. ....	15
Exhibit 9. Binational Freight Corridor Federal Highways 45. ....	16
Exhibit 10. Total Distance of Corridors and Truck Tolling Costs.....	17
Exhibit 11. Natural Geography along Each Corridor.....	18
Exhibit 12. Main Rivers and Lakes in the Pacific Corridor.....	18
Exhibit 13. Main Mountains in the Pacific Corridor.....	19
Exhibit 14. Federal Protected Areas in the Pacific Corridor.....	20
Exhibit 15. Main Rivers and Lakes in the Central Corridor.....	20
Exhibit 16. Federal Protected Areas in the Central Corridor.....	21
Exhibit 17. Binational Freight Corridor. ....	22
Exhibit 18. Pacific Corridor States and Cities. ....	23
Exhibit 19. Central Corridor States and Cities. ....	24
Exhibit 20. Free and Toll Highways along the Corridor.....	25
Exhibit 21. Toll and Free Highways in the Pacific Corridor.....	26
Exhibit 22. Highway Characteristics in the Pacific Corridor.....	27
Exhibit 23. Toll and Free Highways in the Central Corridor.....	28
Exhibit 24. Highway Characteristics in the Central Corridor.....	29
Exhibit 25. Corridor Roadway Classification. ....	30
Exhibit 26. Rail Characteristics in the Pacific Corridor.....	31
Exhibit 27. Highway Specifications in the Pacific Corridor.....	32
Exhibit 28. Roadway Characteristics in the Central Corridor.....	33
Exhibit 29. Roadway Specifications in the Central Corridor.....	34
Exhibit 30. Railroad Track: Type and Longitude. ....	34
Exhibit 31. Rail Line Characteristics in the Corridors.....	35
Exhibit 32. Ports, Airports, and Border Crossings.....	36
Exhibit 33. Airports along the Pacific Corridor. ....	37
Exhibit 34. Airports along the Central Corridor. ....	37
Exhibit 35. Top 15 Municipalities by Active Economic Population in the Pacific Corridor.....	38
Exhibit 36. Top 15 Municipalities by Active Economic Population in the Central Corridor.....	39
Exhibit 37. Population Density by Municipalities.....	40
Exhibit 38. Top 15 Municipalities by Population Density in the Pacific Corridor.....	41
Exhibit 39. Top 15 Municipalities by Population Density in the Central Corridor.....	42
Exhibit 40. Percentage of Population of 18 Years That Has At Least One Approved Year of High School by Municipality.....	43

**DRAFT**

Exhibit 41. Top 15 Municipalities: Percentage of Population 18 Years Old and More That Has at Least One Degree of High School by Municipality in the Pacific Corridor. ....44

Exhibit 42. Top 15 Municipalities: Percentage of Population 18 Years Old and More that Has at Least One Degree of High School by Municipality in the Central Corridor. ....45

Exhibit 43. GDP by Municipalities. ....46

Exhibit 44. Top 15 Municipalities by GDP along the Pacific Corridor.....47

Exhibit 45. Top 15 Municipalities by GDP in the Central Corridor.....48

Exhibit 46. Economic Clusters along the Corridors. ....50

Exhibit 47. Automotive Cluster Location. ....51

Exhibit 48. Aerospace Cluster Location.....53

Exhibit 49. Logistics Cluster Location.....55

Exhibit 50. Lighting and Electrical Equipment Cluster Location.....57

Exhibit 51. Meat-Based Products Cluster Location. ....59

Exhibit 52. Ironwork Cluster Location.....61

Exhibit 53. Mining Cluster Location.....63

Exhibit 54. Food Elaboration and Processing Clusters Located along the Study Corridors .....65

Exhibit 55. Export Crop. Avocado.....67

Exhibit 56. Export Crop. Tomatoes .....69

Exhibit 57. Export Crops: Watermelons and cantaloupes.....71

Exhibit 58. Export Crops: Nuts, pistachios and peanuts.....73

Exhibit 59. Export Crops: Berries. Export Crops: Berries.....75

Exhibit 60. Industrial Parks Located along the Study Corridors. ....76

Exhibit 61. Industrial Parks Located along the Pacific Corridor (Atacomulco Route). ....77

Exhibit 62. Industrial Parks Located along the Central Corridor. ....78

Exhibit 63: U.S Census Data Top Imports by Value from Mexico to Western States (2015).....83

Exhibit 64: U.S Census Data Top Exports by Value to Mexico from Western States (2015).....84

Exhibit 65. Top Truck U.S. Export Commodities to Mexico from and through Arizona by Weight.....87

Exhibit 66. Top Truck Based U.S. Import Commodities from Mexico to and through Arizona by Weight.....88

Exhibit 67: Top U.S. Imports from Mexico by 2-digit Code through Arizona Ports of Entry .....89

Exhibit 68: Top U.S. Exports to Mexico by Chapter Datamyte 2016 .....90

Exhibit 69: Proposed Top 10 Supply Chains .....91

Exhibit 70: Fruits and Vegetables Supply Chain Products .....92

Exhibit 71: Electric Machinery Supply Chain Products.....93

Exhibit 72: Vehicles and Parts Supply Chain .....94



# DRAFT

## INTRODUCTION

Land trade between the United States and Mexico has grown more than four times since the implementation of the North American Free Trade Agreement. Truck trade is the dominant mode for cross-border transportation. The unique study approach is to analyze cross-border trade at the corridor level, from the point of origin to the point of destination at the supply chain level. Identifying ways to make supply chain cross-border movement more efficient will increase Arizona's economic development attracting freight-dependent businesses.

The Binational Freight Corridor Study will provide the Arizona Department of Transportation (ADOT) with sufficient information to broaden its understanding of manufacturing and production trends in the Phoenix–Mexico City Corridor (Pacific Corridor or Corridor 15) and the El Paso–Mexico City Corridor (Central Corridor or Corridor 45). Results from the study will provide information and data so that ADOT, in coordination with the Mexican Ministry of Transportation and Communications (Secretaría de Comunicaciones y Transportes [SCT]) and other Mexican federal and state agencies can outline improvement strategies focused upon the efficiency and competitiveness of the multimodal transportation system that serves the Pacific Corridor.

This first technical memorandum of the study provides a descriptive analysis of the study corridors' geographic, economic, and demographic context, as well as summarizing and mapping existing freight generating and attracting facilities within the market region defined for the Pacific and Central Corridors.

The information in this technical memorandum will serve as the foundation for the analyses that will be performed in future study tasks and it is organized as follows:

- The ***Governance Context*** section presents the general organization of the Mexican transportation system, describing the institutional relationships governing planning, finance, and policy of the highway, rail, seaports and border crossings serving freight in the country.
- The ***Geographic Context*** of the two corridors under analysis is presented with maps depicting the physical geography of the highway corridor and related multimodal freight assets. The highway corridors' characteristics, locations of coastal features, urbanized area boundaries and environmentally and biologically sensitive areas are described in this section of the report. Political geography in the region is mapped outlining states, municipalities, and city entities.
- The ***Demographic Context*** section presents population density, economically active population, municipal gross domestic product (GDP), and education level along the corridors.

## DRAFT

- The *Economic Context* is divided into two areas. The first one presents the location of key industrial clusters and logistics/distribution centers along the corridors, and the second part presents the results of the cross border trade data analysis that leads to the definition of the key supply chains that operate in the Pacific and Central corridors.

# DRAFT

## GOVERNANCE CONTEXT

### TRANSPORTATION PLANNING AT THE NATIONAL LEVEL

The Mexican Constitution establishes the structure of the federal government as a Republic with 32 sovereign states (1) and three branches: executive, legislative, and judicial.

Mexico's transportation system is under federal jurisdiction where the Executive Branch is responsible for transportation functions through SCT (2). The federal legislative body is responsible for annual budget appropriations and program oversight. Mexican states do not have governance attributions on the federal transportation infrastructure network. The states in Mexico need a concession to maintain, use, or build infrastructure.

The executive develops a National Development Plan (Plan Nacional de Desarrollo [PND]) for a period of six years, and all federal public administration agencies are required to follow the Plan's objectives (1). Sectorial and institutional plans and programs are developed based on the PND. Mexico's Public Federal Administration (Administración Pública Federal [APF]) comprises of secretaries or ministries and state-owned companies. The Ministry of Governance and Homeland Security (Secretaría de Gobernación) coordinates actions of the APF to fulfill executive orders (3).

According to the National Planning Law (4), the PND is defined as the rational and systematic management of the actions that, based on the powers of the Executive, will promote the economic, social, political and cultural activities, environmental protection and the reasonable use of the natural resources, as well as the territorial ordering of human settlements and urban development.

The Ministry of Finance and Public Credit (Secretaría de Hacienda y Crédito Público [SHCP]) coordinates the PND with the participations of interested parties (3). The SHCP also estimates the federal annual budget based on the PND, submitting it to the President who sends it to the Congress for review and approval. SHCP assesses and eventually approves investment programs of the APF.

All APF members are required to develop sectorial programs aligned with PND, taking into consideration proposals from the sector agencies and state governments, as well as input from social groups (4). APF members are also required to develop annual programs for the implementation and budgeting of the six-year PND.

The Peña Nieto administration defined the 2013–2018 PND with five national goals:

1. Mexico in Peace
2. Inclusive Mexico
3. Mexico with Quality Education

**DRAFT**

4. Prosperous Mexico
5. Mexico with Global Responsibility

The *Prosperous Mexico* goal establishes in sub-goal 4.9, “To have a transportation infrastructure that allows lower costs for economic activities,” the strategy to achieve this sub-goal is to “modernize, improve and preserve the infrastructure of the different transportation modes, as well as improve connectivity” (5).

The Mexican federal government defines transportation investment priorities through the 2014–2018 National Infrastructure Program (*Programa Nacional de Infraestructura 2014–2018* [PNI 2014–2018]), which is aligned with the 2013–2018 PND (6). The 2014–2018 PNI’s main objectives were to modernize and improve existing infrastructure through the implementation of 743 investment programs and projects that would make the country one of the most dynamic and vigorous economies of the 21st Century. The SHCP estimated a total investment of \$7.7 trillion pesos (US\$385 billion<sup>1</sup>), more than one third of the 2014 Mexican GDP.

SCT develops policies and programs for building and maintaining highways and federal bridges; construction of rail infrastructure; participation in border crossing construction and operation agreements; and coordinating with states, municipalities, and other stakeholders for the construction and modernization of transportation infrastructure (3).

**HIGHWAY GOVERNANCE**

Mexico has developed four main alternatives to fund roadway construction. The first one is through traditional federal funding budget sources based on the national annual planning and the PNI, as described above.

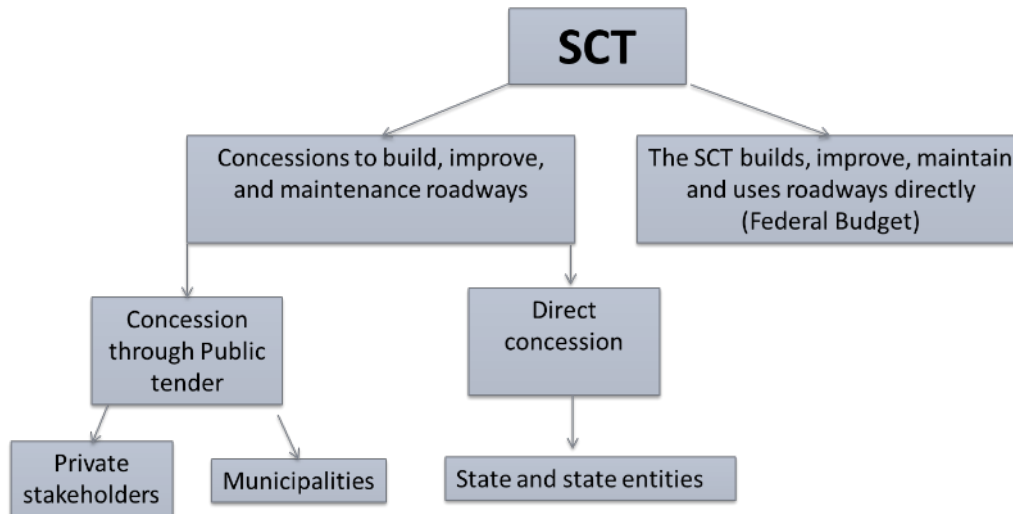
The second funding mechanism is through concessions to build transportation infrastructure through a public tender. SCT can grant concessions to private stakeholders, states, or municipalities for the construction, maintenance, and utilization of roads and bridges. The concession period cannot be greater than 20 years.

The third funding mechanism is through direct concession. SCT can grant concessions to states or other state entities without public tender. In this case, the state needs to follow the federal public tender rules to grant the construction contract.

The following diagram (Exhibit 1) depicts these three-highway infrastructure-funding mechanisms.

---

<sup>1</sup> Exchange rate US Dollars to Mexican Pesos is 20 pesos per 1 dollar.

**DRAFT**

Source: (9)

**Exhibit 1. Highway Infrastructure Funding Mechanisms.**

As a fourth option, states or municipalities can fund projects with federal funds earmarked to a specific project type under the Branch 33 (Ramo 33) of the Federal Fiscal Coordination Law (Ley de Coordinación Fiscal). Ramo 33 operation rules specify that states and municipalities can invest in roadway infrastructure up to 15 percent of the Social Infrastructure Contribution Fund (Fondo de Aportaciones para la Infraestructura Social). During 2016, this 15 percent represented \$9.2 billion pesos (US\$460 million) (7).

The State's Strengthening Contributions Fund (Fondo de Aportaciones para el Fortalecimiento de las Entidades Federativas) is another alternative fund that could be used for transportation infrastructure construction. It has the potential of being used for infrastructure projects such as street paving, but lacks clarity on the objectives and performance metric for the use of the resources (8).

The construction, operation and utilization, preservation and maintenance of roads and bridges, freight services, vehicle traffic, and other services are regulated by the Roads, Bridges and Federal Motor Carrier Law (9). The federal government builds and maintains federal highways through the SCT.

Bridge and roadway construction and maintenance are considered a public utility. SCT, directly or by request from a third party, can purchase or promote the expropriation of land, buildings and material banks needed for construction or maintained roadway infrastructure (9). The federal government could grant concessions to Mexican citizens and international groups (public or private) created according to the law through a public tender for the following transportation-related services (9):

## **DRAFT**

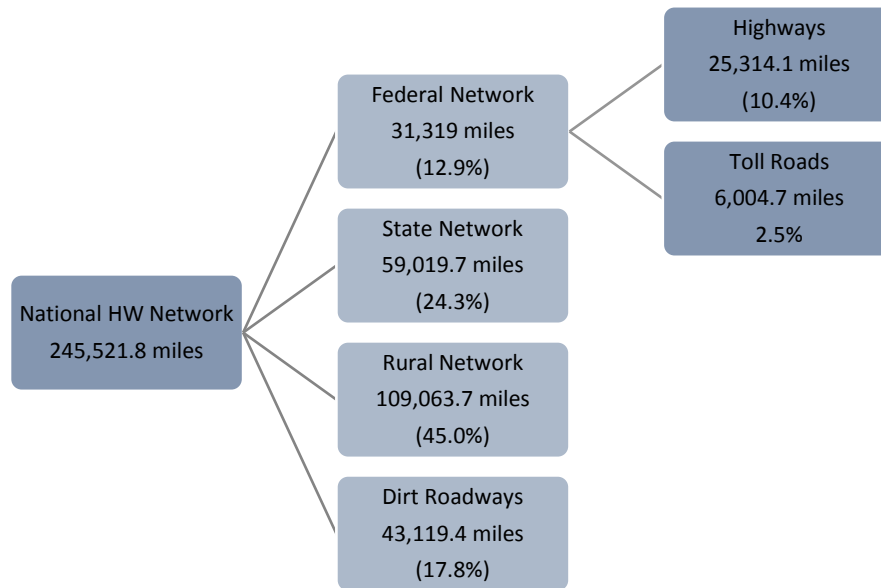
- Operation and utilization of the federal highway for freight, passenger, and tourism services
- Installation of domestic freight terminals and vehicle inspection facilities
- Rescue and towing services
- Mail services
- Construction, operation, and utilization of passenger terminals
- Construction of accesses, grade crossings, and other installations, in federal highway right of ways
- Establish truck stops (on non-toll roads)
- Installation of billboards and other advertisements
- Construction, modification, or extension of the right of ways
- Construction and operation of private bridges on Federal General Means of Communication (GMC)
- Private and cargo transport

To grant the concession or give an extension of an existing one, SCT negotiates the following with SHCP:

- Favorable opinions of the projected economic profitability: economic profitability is measured by comparing monetary revenues generated by the use, operation or utilization of the property under consideration, against the costs generated by the project during the time horizon under analysis. SCT sends the project's economic assessment to SHCP for review and opinions.
- When federal public resources are needed as part of the funding, the project is registered in the National Investment Portfolio (Cartera de Programas y Proyectos de Inversion).
- SCT determines the amount that the concessionaire has to pay to the federal government according to the law and presents the proposal to SHCP.

Mexico's highway infrastructure handles 55 percent of the total freight and 98 percent of the country's travelers (10). In 2015, the National Highway Network (NHN) extended 245,521.8 miles (390,301 km). The Federal Network consisted of 12.9 percent of the NHN (10.4 percent freeways and 2.5 percent toll roadways), the state network consisted of 24.3 percent, the rural network 45.0 percent, and improved dirt roads 17.8 percent (see Exhibit 2).

**DRAFT**



Source: (11)

*Exhibit 2. National Highway Network Composition 2015.*

**RAILWAY GOVERNANCE**

Rail infrastructure is considered a GMC and requires a concession for construction, operation and utilization of rail transport and provides public transportation service. All rail GMCs are considered federal property, and rail infrastructure built by a concessionaire will become part of the public domain (12). The rail concession is awarded through public tenders for private stakeholders and directly to states and municipalities.

Mexico’s rail infrastructure extends 16,607 miles, and 74.1 percent is under concession as main or secondary lines, 19.2 percent are auxiliary lines (railroad yards, storage tracks, transfer yards, etc.), and 6.7 percent are private tracks.

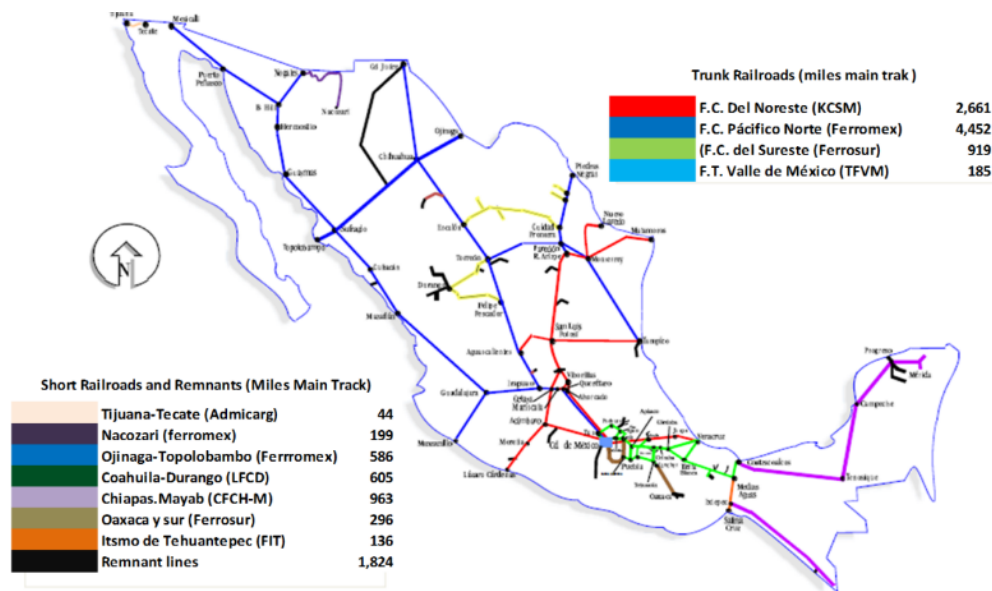
Ferromex has the concession of 54.2 percent of the trunk rail network, Kansas City Southern Mexico has 32.4 percent, and Ferrosur 11.2 percent. The rest of the network is part of several short lines under concession as follows:

- Ferromex has the concession for the Nacozari and Ojinaga-Topolobambo short lines (13).
- The government of Baja California owns a company that manages the Tijuana-Tecate Short Line.
- Coahuila-Durango railroad is property of Grupo Peñoles and Group Acerero del Norte, under 30 years of concession.

**DRAFT**

- Chiapas-Mayab railroad has a temporary operation permit, providing local services and the trackage rights to other rail concessionaries
- The Itsmo de Tehuantepec railroad is controlled by the Federal Government (14).

The following map presents the Mexican rail system in 2015 (Exhibit 3).



Source: (13)

Exhibit 3. Mexico Rail Infrastructure and Concessions, 2015.

**SEAPORT GOVERNANCE**

In Mexico, the Seaports Law (Ley de Puertos) regulates the construction, operation, administration, utilization, preservation, and maintenance of seaports, terminals, and facilities. The executive branch has the authority to develop seaports and public terminals through presidential permits. As the highest authority, the executive exercises seaport control through the SCT (15).

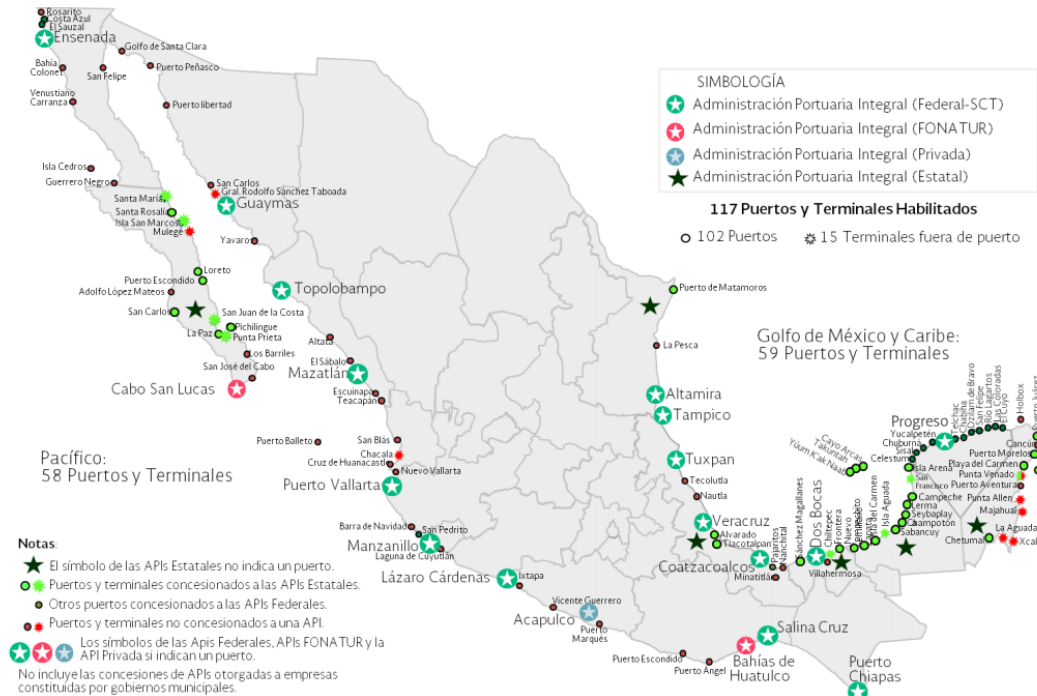
The construction and utilization of seaports and terminals are considered a public utility. The executive could expropriate lands and infrastructure needed to build seaports. The SCT can grant a concession, permission, or authorization for seaport and terminal operation and utilization (15).

The National Seaport System (Sistema Nacional Portuario) has 102 ports and 15 terminals, of which 71 are federal property and are concessioned to 25 Port Integral Administrations (Administración Portuaria Integral [API]) of those, 16 are controlled by the SCT, two by the National Promotion Tourism Fund, six are controlled by states and one is private (10). The



DRAFT

remaining 46 ports and terminals are not under the API control. Exhibit 4 presents the Mexican seaport infrastructure.



Source: (16)

Exhibit 4. Mexico’s National Seaport System 2016.

**BORDER CROSSING DEVELOPMENT**

The establishment of border crossing infrastructure is the responsibility of the Federal Government through the SCT in coordination with other agencies, including the Institute of Administration and Valuation of National Goods (Instituto Nacional de Administración y Avalúos de Bienes Nacionales) and the Ministry of Foreign Affairs (Secretaría de Relaciones Exteriores). Infrastructure development and operation can be concessioned to private entities, states, or municipalities.

However, the federal government is responsible for leading the process during negotiations with the bordering country (9). At the Mexico-U.S. border, there are seven rail border crossings in operation:

- Matamoros/Brownsville
- Nuevo Laredo/Laredo
- Piedras Negras/Eagle Pass
- Ciudad Juárez/El Paso (two crossings)
- Nogales/Nogales

# DRAFT

- Tijuana/San Ysidro

There are 47 active road border crossings serving privately owned vehicles, commercial vehicles or trucks, and pedestrians. There are 24 international crossings that serve commercial vehicles (see Exhibit 5 and Exhibit 6).



Source: (17, 18)

*Exhibit 5. U.S.-Mexico Commercial Vehicle Border Crossings.*

**DRAFT**

*Exhibit 6. U.S.-Mexico Commercial Vehicle Border Crossings with City Details.*

Commercial Border Crossing List USA-Mexico			
State	No.	Border Crossing	U.S./Mexican Cities
Texas	1	Veterans International Bridge	Brownsville/Matamoros
	2	Free Trade Bridge	Los Indios/Lucio Blanco
	3	Progreso International Bridge	Progreso/Nuevo Progreso
	4	Pharr-Reynosa Intl. Bridge on the Rise	Pharr/Reynosa
	5	McAllen-Hidalgo-Reynosa Bridge	Hidalgo/Reynosa
	6	Anzalduas International Bridge	Mission/Reynosa
	7	Roma-Ciudad Miguel Aleman Bridge	Roma/Ciudad Miguel Aleman
	8	World Trade Bridge	Laredo/Nuevo Laredo
	9	Laredo-Colombia Solidarity Bridge	Laredo/Colombia
	10	Camino Real International Bridge	Eagle Pass/Piedras Negras
	11	Del Rio-Ciudad Acuna Intl. Bridge	Del Rio/Ciudad Acuña
	12	Presidio Bridge	Presidio/Ojinaga
	13	Ysleta-Zaragoza Bridge	Ysleta/Zaragoza
	14	Bridge of the Americas	El Paso/Ciudad Juárez
Nuevo Mexico	15	Santa Teresa	Doña Ana/Ciudad Juárez
	16	Columbus	De Luna/Ascension
Arizona	17	San Luis II	San Luis/San Luis Rio Colorado
	18	Lukeville	Lukeville/Sonoyta
	19	Nogales Mariposa	Nogales/Nogales
	20	Naco	Naco /Naco
	21	Douglas	Douglas/Agua Prieta
California	22	Calexico East	Calexico/Mexicali
	23	Tecate	Tecate/Tecate
	24	Otay Mesa	Mesa de Otay/Tijuana

Source: (19)

# DRAFT

## GEOGRAPHIC CONTEXT

This section presents the definition of the two corridors under analysis, identifying the highway and rail routes, with a description of the characteristics of these transportation infrastructure networks, as well as states, municipal and city boundaries, and rivers, lakes and riparian corridors.

### **CORRIDOR BOUNDARIES**

The two corridors under analysis are:

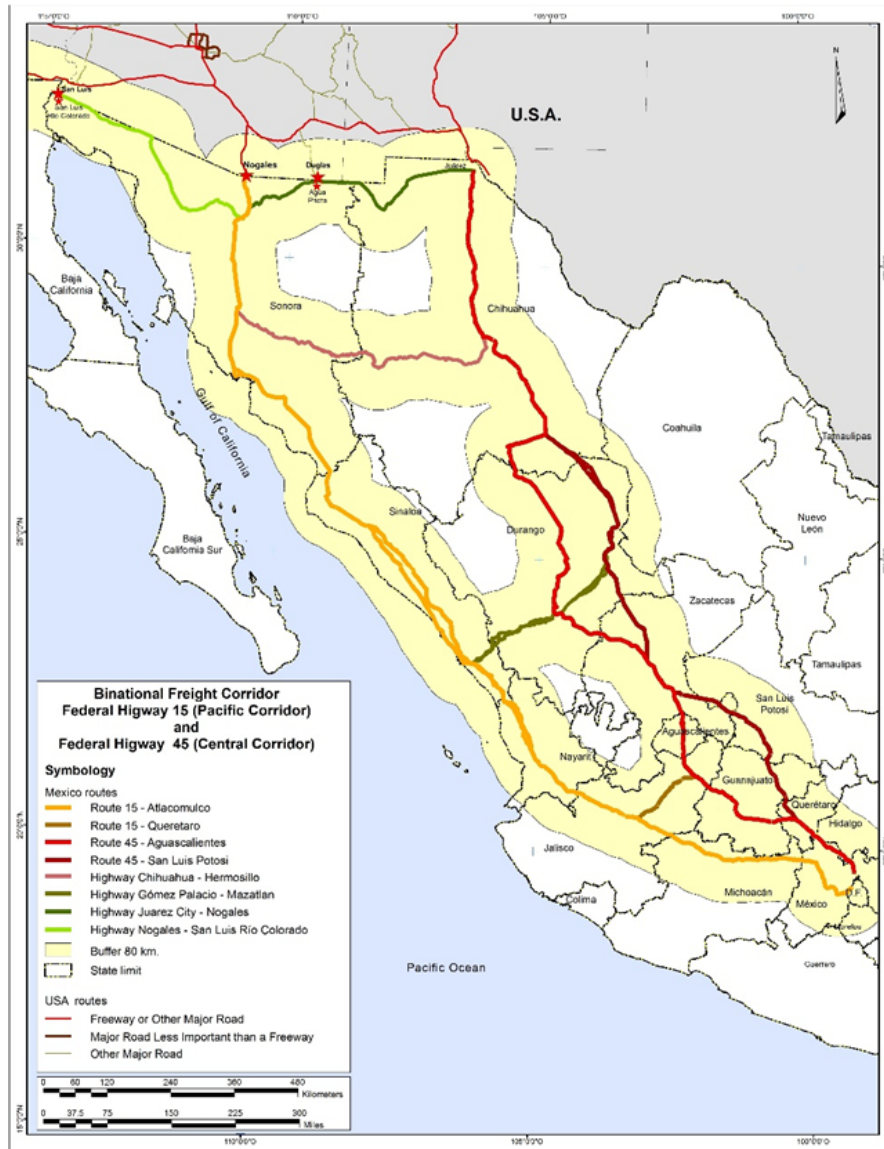
- Mexico–City Phoenix corridor (Pacific Corridor also known as Carretera Federal 15) or Route 15
- Mexico–El Paso Corridor (Central Corridor, also known as Carretera Federal 45) or Route 45

A buffer of 50 miles (80 km) around highways 15 and 45 was established in order to analyze the strategic facilities that are established along the highway corridor routes and rail lines. The buffer of 50 miles surrounding the corridors proved particularly useful to perform analysis of clusters located in the surrounding of both corridors (Exhibit 7).

Both corridors have a strategic importance for Mexican international land trade with the United States. In the Pacific Corridor, this importance is enhanced by the fact that it crosses two of the most populated and industrial metropolitan areas of the country (Mexico City and Guadalajara). It also goes through several important industrial clusters related to aerospace (Querétaro, Sonora), automotive (Guanajuato, Jalisco, Sonora), agriculture (Sinaloa and Sonora) and mining (Jalisco and Sonora). The states of Sinaloa and Sonora are considered Mexico's grain basket since they produce corn, wheat, and beans. Sinaloa has also an export-oriented agriculture in crops like tomatoes, peppers, and zucchini.

The Pacific Corridor also has strategic advantage since it serves important seaports in the Pacific Ocean, including Mazatlan, Topolobampo, and Guaymas. In comparison, the Central Corridor does not have access to the coast as it is located east of the Sierra Madre. Highway along the Pacific Corridor do not present major topographic obstacles (mountains, lakes) once the state of Nayarit has been reached. The Pacific Corridor is that is the longest route from Central Mexico to the U.S./Mexico border.

DRAFT



Sources: (20, 21)

Exhibit 7. Binational Freight Corridor Federal Highways 15 and 45 Buffer.

The Central Corridor connects several important urban areas such as Querétaro, San Luis Potosi, the metropolitan zone of la Laguna (Gomez Palacios and Torreon) and mid-size cities like Delicias and Chihuahua. This corridor serves several important industrial clusters in the aerospace (Querétaro, Chihuahua), automobile (Aguascalientes, San Luis Potosí, Chihuahua), mining (Zacatecas, Durango and Chihuahua), and agriculture (La Laguna, Chihuahua).

The Central Corridor has almost no topographic obstacles. However, being located east of the Western Sierra Madre prevents trade traffic to reach the Pacific or the Gulf of Mexico coast. The Corridor also has scarce water resources.

## **DRAFT**

There are three roads that connect the Central and the Pacific Corridors through the Sierra Madre Occidental (Western Sierra Madre). The most important one is the Laguna to Mazatlán highway that was recently upgraded with the construction of important bridge (Baluarte Bridge). The distance between Gomez Palacios and Mazatlan is 298 miles (479 km). In the northern part of the country, parallel to the U.S./Mexico border, there is a roadway that connects Ciudad Juárez and Nogales with a distance of 550 miles (885 km). The third connection is a small roadway between Chihuahua and Hermosillo via the Tarahumara Sierra, which does not have heavy truck traffic specifications. The distance of this roadway is 365 miles (588 km).

### **Pacific Corridor Routes**

Exhibit 8 shows the Pacific Corridor with two alternative routes, one through Atlacomulco and the other one via Queretaro. The Atlacoulco route goes from Mexico City, through the state of México (via Atlacomulco) and Michoacan. This route has less truck traffic than the Queretaro one due to: 1) higher tolls; 2) does not serves the very dynamic industrial cities in the Mexico City to Queretaro corridor; and 3) in the 2012–2014 period, the lack of security that prevailed in the state of Michoacan made traveling through this road dangerous for passengers and freight traffic.

The second alternative is through Queretaro. After Irapuato, driver have the alternative to connect with Highway 90 that makes connects with Highway 15 via La Piedad Michoacán, or continue to Guadalajara via Lagos de Moreno (Highway 450) and San Juan de los Lagos (Highway 80).

DRAFT



Source: (20, 21)

**Exhibit 8. Pacific Corridor Routes.**

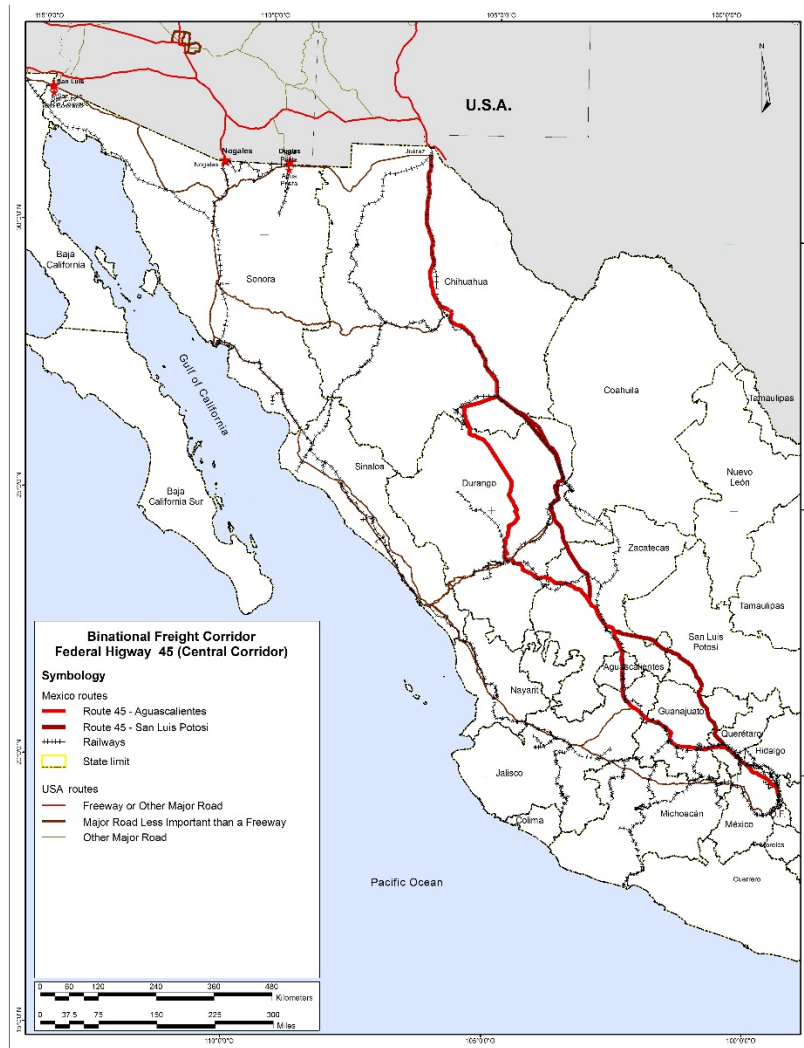
**Central Corridor Routes**

The Central Corridor is also known as the Pan-American Highway has also two alternative routes. The first (and most used alternative) is via Highway 57D to Queretaro, then to San Luis Potosi Potosi (Highway 57), to Zacatecas, Torreon, and Jimenez (Highway 49).

The second alternative is to continue through Querétaro, and travel to Aguascalientes, Zacatecas, Durango, Hidalgo del Parral, and Jimenez (Highway 45). After Jimenez, both alternatives merge and Highway 45 is the only alternative to go to Ciudad Juárez. See Exhibit 9.



DRAFT



Source: (20,21)

**Exhibit 9. Binational Freight Corridor Federal Highways 45.**

Exhibit 10 presents the distances between for the two alternative routes of each corridor under analysis. The difference between routes within each corridor is not significant; however, tolls do vary for each route. The toll costs were estimated for a 5-axle truck from the SCT website “Traza tu Ruta” that provides route costs for various vehicle types.



**DRAFT**

Exhibit 10. Total Distance of Corridors and Truck Tolling Costs.

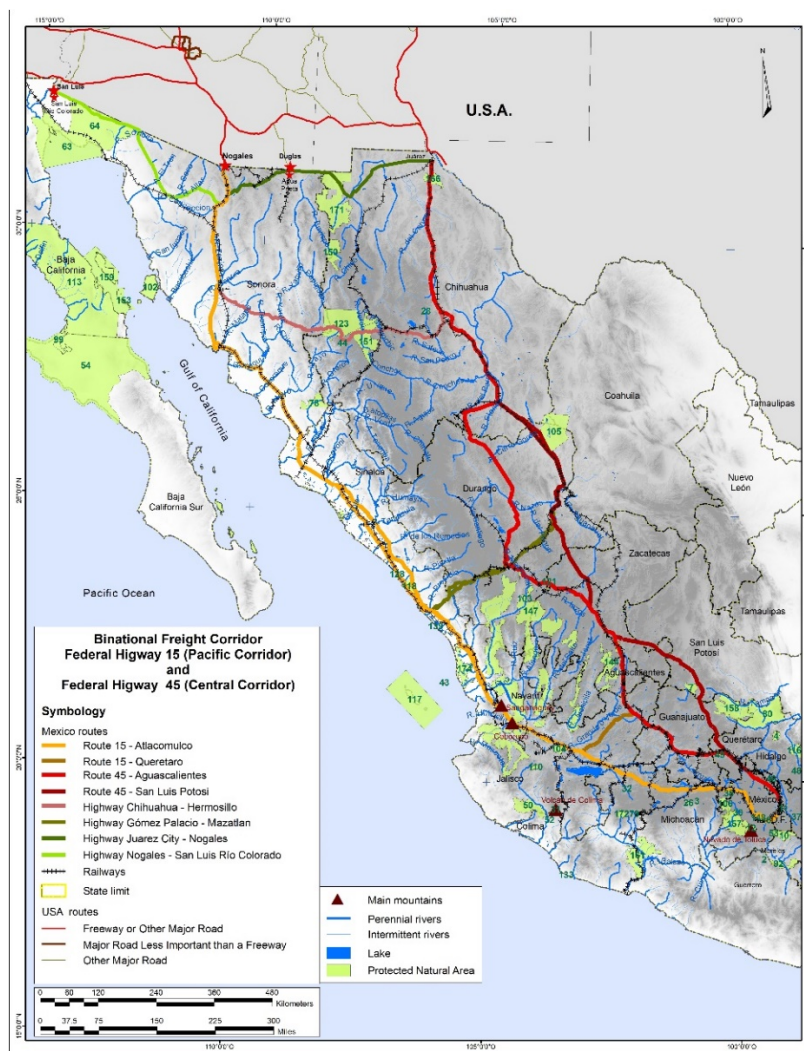
Corridor	Distance in Km	Distance in Miles	Toll Cost (\$pesos)	Toll Costs (US\$)
Pacific Corridor Mexico-Nogales via Atacomulco	2,158	1,341	5,618	300
Pacific Corridor Mexico-Nogales via Queretaro	2,185	1,358	5,735	306
Central Corridor Mexico Cd-Juárez via Aguascalientes	1,930	1,199	5,976	319
Central Corridor Mexico Cd Juárez via San Luis Potosi	1,772	1,101	3,985	216

Note: Exchange Rate 18.70 Pesos/US dollar, April 24 2016

Source: Distance, (20).

**RIVERS, LAKES, MOUNTAINS, AND RIPARIAN CORRIDORS**

Exhibit 11 shows main rivers, lakes, and federal protected natural areas along the Corridors.



**DRAFT**

Source: (20, 21, 22, 23)

**Exhibit 11. Natural Geography along Each Corridor.**

The Pacific Corridor via Atlacomulco has two river zones. The first zone is the high plateau of Michoacan, and the second is the coastal zone that begins in the state of Nayarit and ends in Sonora. The state of Sinaloa has greatest number of rivers throughout the corridor. The Pacific Corridor via Atlacomulco passes nearby Lake Cuitzeo, in Michoacan, and tangentially through the Chapala Lake in Jalisco.

The Pacific Corridor via Queretaro has less rivers compared to the Atlacomulco route (Exhibit 12). The route through Queretaro crosses the San Juan River in the State of Queretaro and the San Juan de Los Lagos River in the State of Jalisco. North of the state of Nayarit, the rivers crossed by route 15 are the same in both routes. This corridor does not cross any major lake ivia Querétaro or San Juan de los Lagos. However, the Pacific Corridor via Queretaro, Celaya, and Moroleon (highway 430), the roadway crosses the lakes of Yuriria in Guanajuato and Cuitzeo in Michoacan.

**Exhibit 12. Main Rivers and Lakes in the Pacific Corridor.**

Main Rivers, and Lakes in the Pacific Corridor via Atlacomulco		Main Rivers, and Lakes in the Pacific Corridor via Queretaro	
River	State	River	State
Rio Lerma	Mexico	Rio San Juan	Querétaro
Rio Bejuco	Michoacán	Rio San Juan de los Lagos	Jalisco
Rio Grande de Morelia	Michoacán	Rio Grande de Santiago	Nayarit
Rio Grande de Santiago	Nayarit	Rio Grande San Pedro Mezquital	Nayarit
Rio Grande San Pedro Mezquital	Nayarit	Rio Acaponeta	Nayarit
Rio Acaponeta	Nayarit	Rio Baluarte	Sinaloa
Rio Baluarte	Sinaloa	Rio Presidio	Sinaloa
Rio Presidio	Sinaloa	Rio Piaxtla	Sinaloa
Rio Piaxtla	Sinaloa	Rio Elota	Sinaloa
Rio Elota	Sinaloa	Rio San Lorenzo	Sinaloa
Rio San Lorenzo	Sinaloa	Rio Culiacan	Sinaloa
Rio Culiacan	Sinaloa	Rio Mocerito	Sinaloa
Rio Mocerito	Sinaloa	Rio Sinaloa	Sinaloa
Rio Sinaloa	Sinaloa	Rio Fuerte	Sinaloa
Rio Fuerte	Sinaloa	Rio Mayo	Sonora
Rio Mayo	Sonora	Rio Matape	Sonora
Rio Matape	Sonora	Rio Yaqui	Sonora
Rio Yaqui	Sonora	Rio Sonora	Sonora
Rio Sonora	Sonora		
Main Rivers, and Lakes in the Pacific Corridor via Atlacomulco		Main Rivers, and Lakes in the Pacific Corridor via Queretaro	

**DRAFT**

Lake	State	Lake	State
Cuitzeo	Michoacán	None	
Chapala (Tangentially)	Jalisco	None	

The Pacific Corridor via Atlatomulco spreads along the neo-volcanic axe of Parallel 19 and the Western Sierra Madre. Exhibit 13 lists the greatest mountains along the corridor. There are also fewer mountains in the Pacific Corridor via Queretaro compared to the route via Atlatomulco, since the route does not include the Nevado de Toluca in the State of Mexico.

*Exhibit 13. Main Mountains in the Pacific Corridor.*

Main Mountains in the Pacific Corridor via Atlatomulco		Main Mountains in the Pacific Corridor via Queretaro	
Mountain	Location	Mountain	Location
Nevado de Toluca	State of Mexico	Volcan de Colima	Colima
Volcan de Colima	Colima	Sanganaguey	Nayarit
Sanganaguey	Nayarit	Ceboruco	Nayarit
Ceboruco	Nayarit	Western Sierra Madre / Parallel	Nayarit, Sinaloa and Sonora
Western Sierra Madre / Parallel	Nayarit, Sinaloa and Sonora		

The Pacific Corridor crosses very few Federal Natural Protected Areas (Exhibit 14). The most important one is the “Cuenca Alimentadora del Distrito Nacional de Riego 43” (although known as CADNR 43 by its acronym in Spanish). The CADNR 43 basin is vast and spread through five different states: Zacatecas, Durango, Aguascalientes, Jalisco, and Nayarit; it covers an area of 2,329 hectares (5,752.77 Acres). Pacific Corridor also passes very close from a Special Biosphere Reserve dubbed “el Cajon de Diablo” near Guaymas, Sonora. Finally, it is important to point out the route that connects San Luis Rio Colorado to Sonoyta crosses the natural protected area dubbed “Great Desert of Altar and Pinacate Reserve.” The Pacific Corridor via Queretaro crosses the same Federal Natural Protected Areas as the Pacific Corridor via Atlatomulco.

**DRAFT**

*Exhibit 14. Federal Protected Areas in the Pacific Corridor.*

Federal Protected Areas in the Pacific Corridor via Atlacumulco		Federal Protected Areas in the Pacific Corridor via Queretaro	
Federal Natural Protected Area	Location	Federal Natural Protected Area	Location
CADNR 43	Jalisco and Nayarit	CADNR 43	Jalisco and Nayarit
Reserva Especial de la Biosfera “Cajon del Diablo”	Sinaloa	Reserva Especial de la Biosfera “Cajon del Diablo”	Sinaloa
Gran Desierto del Altar y Reserva del Pinacate	Sonora	Gran Desierto del Altar y Reserva del Pinacate	Sonora

The number of rivers in the Central Corridor (Exhibit 15) is substantially reduced when compared to route 15. Among the most important are the Rio Aguanaval and the Rio Nazas, which form the basin of La Laguna, an important agricultural region. Since this corridor is located between the two Sierra Madre (Western and Eastern), water is a scarce resource along the corridor.

*Exhibit 15. Main Rivers and Lakes in the Central Corridor.*

Main Rivers, and lakes on the Central Corridor via Aguascalientes		Main Rivers, and lakes in the Central Corridor via San Luis Potosí	
River	State	River	State
Rio San Juan	Querétaro	Rio San Juan	Queretaro
Rio Aguascalientes	Aguascalientes	Rio Aguanaval	Zacatecas Durango Coahuila
Rio Aguanaval	Zacatecas Durango Coahuila	Rio Nazas	Durango Coahuila
Rio Nazas	Durango, Coahuila	Rio Conchos	Chihuahua
Rio Parral	Chihuahua	Rio Chuviscar	Chihuahua
Rio Conchos	Chihuahua	Rio Grande	Chihuahua
Rio Chuviscar	Chihuahua		
Rio Grande	Chihuahua		

There are two lakes in the Central Corridor (Exhibit 16) via Aguascalientes located near the city of Durango: 1) Santa Lucia and 2) Santiaguito. There are no important mountains along the Central Corridor via Aguascalientes or 45 via San Luis Potosi.

# DRAFT

Exhibit 16. Federal Protected Areas in the Central Corridor.

Federal Protected Areas on the Central Corridor via Aguascalientes		Federal Protected Areas in the Central Corridor via San Luis Potosi	
Name of Natural Reserve	Location	Name of Natural Reserve	Location
CADNR 01	States of Aguascalientes and Zacatecas	Bolson del Mapimi	Durango, Coahuila and Chihuahua
Natural Protected Reserve from Salamayuca Sand Dunes	Chihuahua Central Corridor	Natural Protected Reserve from Salamayuca Sand Dunes	Chihuahua Central Corridor

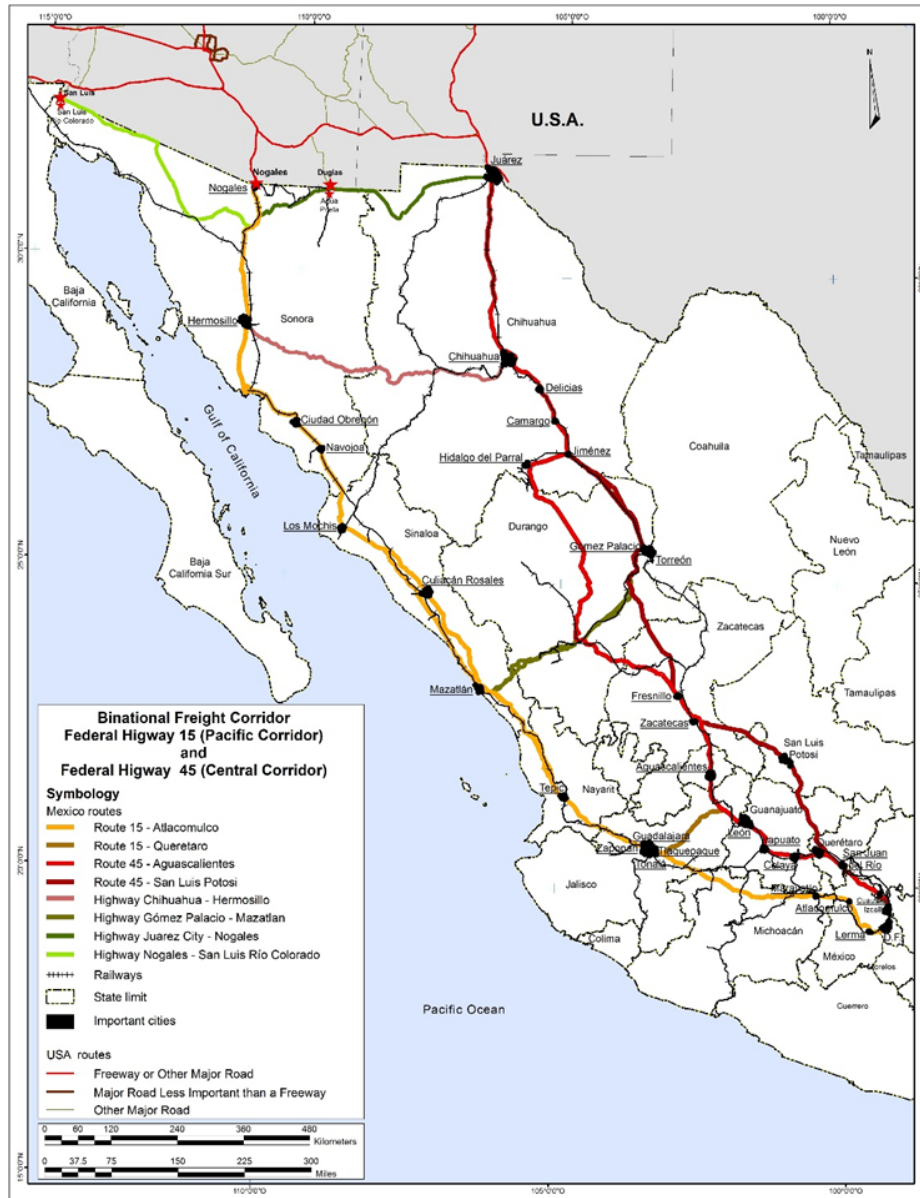
The Central Corridor via Aguascalientes crosses two Natural Protected Areas. The first one dubbed “Cuenca Alimentadora del Distrito Nacional de Riego 01” (although known as CADNR 01 by its acronym in Spanish) cover 97,699.68 hectares (241,421 acres). The basin spreads in two states: Zacatecas and Aguascalientes. The Central Corridor must also cross the Natural Protected Reserve from Samalayuca Sand Dunes located in route between the cities of Ciudad Juárez and Chihuahua.

The Central Corridor via San Luis Potosi crosses two Natural Protected Areas. The first one located in the border of the Natural Reserve Biosphere of Mapimi, between the cities of Gomez Palacio, Durango, and Jimenez, Chihuahua. The second natural is the Samalayuca Dunes.

### STATES AND CITIES ALONG THE CORRIDORS

The Pacific Corridor via Atacomulco goes through 7 states and 18 important cities or municipalities. The route through Queretaro goes through 8 states and 17 important cities and municipalities. From the Guadalajara Metropolitan region, north cities and municipalities are the same for both routes (Exhibit 17 and Exhibit 18).

DRAFT



Source: (20, 21)  
Exhibit 17. Binational Freight Corridor.



**DRAFT**

*Exhibit 18. Pacific Corridor States and Cities.*

Pacific Corridor via Atlatomulco: Main States and Cities		Pacific Corridor via Queretaro: Main States and Cities	
State	City/Municipality	State	City/Municipality
CDMX	Miguel Hidalgo	Estado de México	Cuautitlán Izcalli
CDMX	Cuajimalpa	Hidalgo	Tepeji del Río
CDMX	Alvaro Obregón	Querétaro	San Juan del Río
Estado de México	Lerma	Querétaro	Santiago de Queretaro
Estado de México	Atlatomulco	Guanajuato	Celaya
Michoacán	Maravatio	Guanajuato	Irapuato
Jalisco	Tonala	Jalisco	Tonala
Jalisco	Tlaquepaque	Jalisco	Tlaquepaque
Jalisco	Guadalajara	Jalisco	Guadalajara
Jalisco	Zapopan	Jalisco	Zapopan
Nayarit	Tepic	Nayarit	Tepic
Sinaloa	Mazatlan	Sinaloa	Mazatlan
Sonora	Culiacan Rosales	Sonora	Culiacan Rosales
Sinaloa	Los Mochis	Sinaloa	Los Mochis
Sonora	Navojoa	Sonora	Navojoa
Sonora	Ciudad Obregon	Sonora	Ciudad Obregon
Sonora	Hermosillo	Sonora	Hermosillo
Sonora	Nogales	Sonora	Nogales

The Central Corridor via Aguascalientes crosses eight states and 16 important cities or municipalities while the route through San Luis Potosi crosses seven states and 12 important cities or municipalities (See Exhibit 19).

**DRAFT**

Exhibit 19. Central Corridor States and Cities.

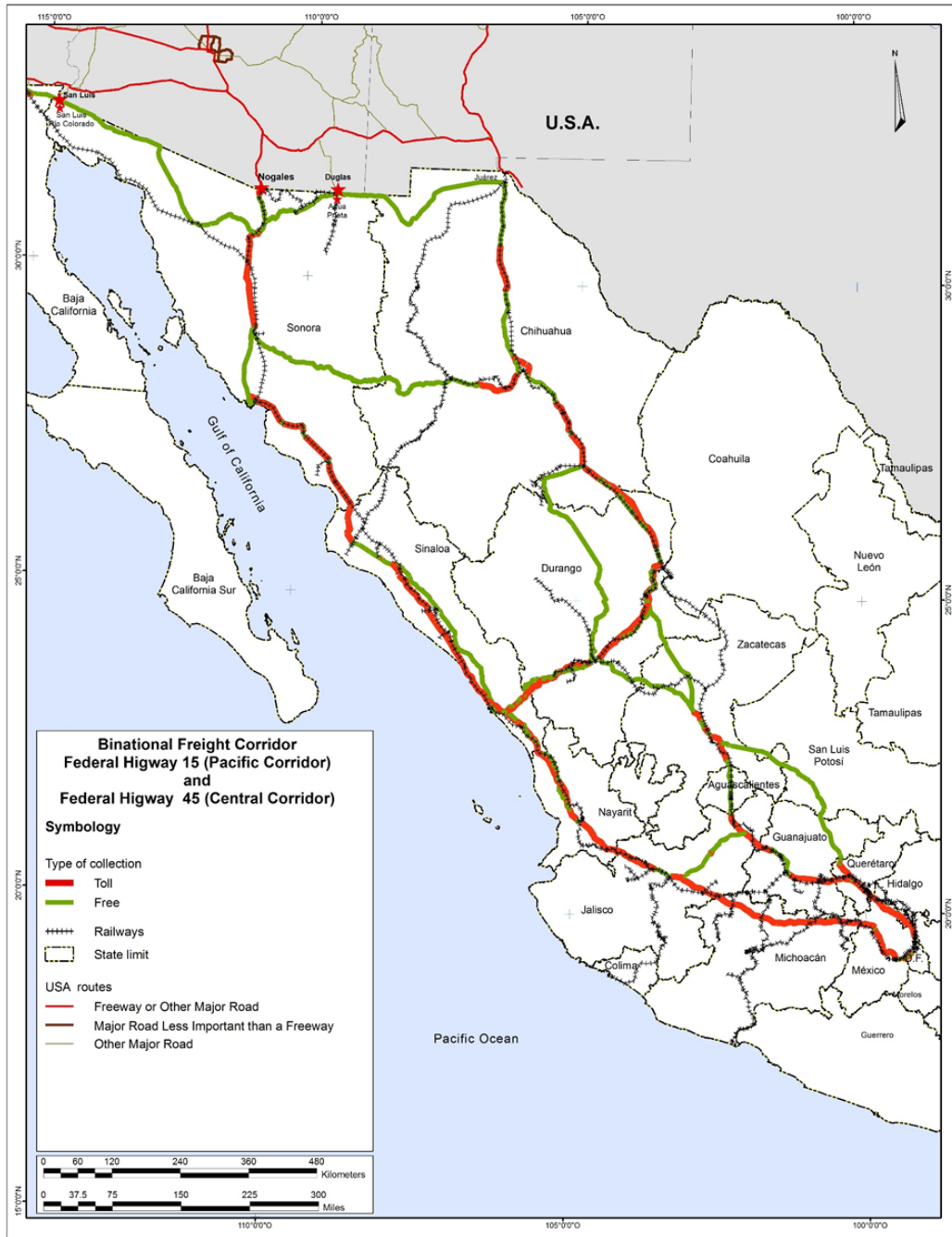
Central Corridor via Aguascalientes: Main States and Cities		Central Corridor via San Luis Potosi: Main States and Cities	
State	City/Municipality	State	City/Municipality
Estado de México	Cuautitlán Izcalli	Estado de México	Cuautitlán Izcalli
Hidalgo	Tepeji del Río	Hidalgo	Tepeji del Río
Querétaro	San Juan del Río	Querétaro	San Juan del Río
Querétaro	Querétaro	San Luis Potosí	San Luis Potosí
Guanajuato	Celaya	Zacatecas	Zacatecas
Guanajuato	Irapuato	Zacatecas	Fresnillo
Guanajuato	León	Coahuila	Torreon
Aguascalientes	Aguascalientes	Durango	Gómez Palacio
Zacatecas	Zacatecas	Chihuahua	Jimenez
Zacatecas	Fresnillo	Chihuahua	Ciudad Camargo
Durango	Durango	Chihuahua	Delicias
Chihuahua	Hidalgo del Parral	Chihuahua	Chihuahua
Chihuahua	Jimenez	Chihuahua	Ciudad Juárez
Chihuahua	Cd Camargo		
Chihuahua	Delicias		
Chihuahua	Chihuahua		
Chihuahua	Ciudad Juárez		

**CORRIDOR HIGHWAY CHARACTERISTICS**

Mexico’s highway system includes toll and free roadways. Most of the tolled facilities have more than two lanes, but there are some with two lanes (one per direction of travel). Usually access to major metropolitan areas is served by multiple lane roadways. Exhibit 20 shows roadway structure for the two corridors. The Pacific Corridor is mostly tolled, compared to the Central Corridor that has several toll-free roadway segments.



DRAFT



Source: (20, 21)

*Exhibit 20. Free and Toll Highways along the Corridor.*

Exhibit 21 shows that almost the complete trip from Mexico City to Nogales in the Pacific Corridor has the option of traveling on tolled roads. However, the route via Queretaro has more segments of free highways than the route via Atacomulco. In Sinaloa and Sonora, there are segments that do not offer an alternative to toll roads.

DRAFT



Source: (20, 21)

Exhibit 21. Toll and Free Highways in the Pacific Corridor.

Exhibit 22 presents the roadway distances for the potential routes along the Pacific Corridor.

**DRAFT**

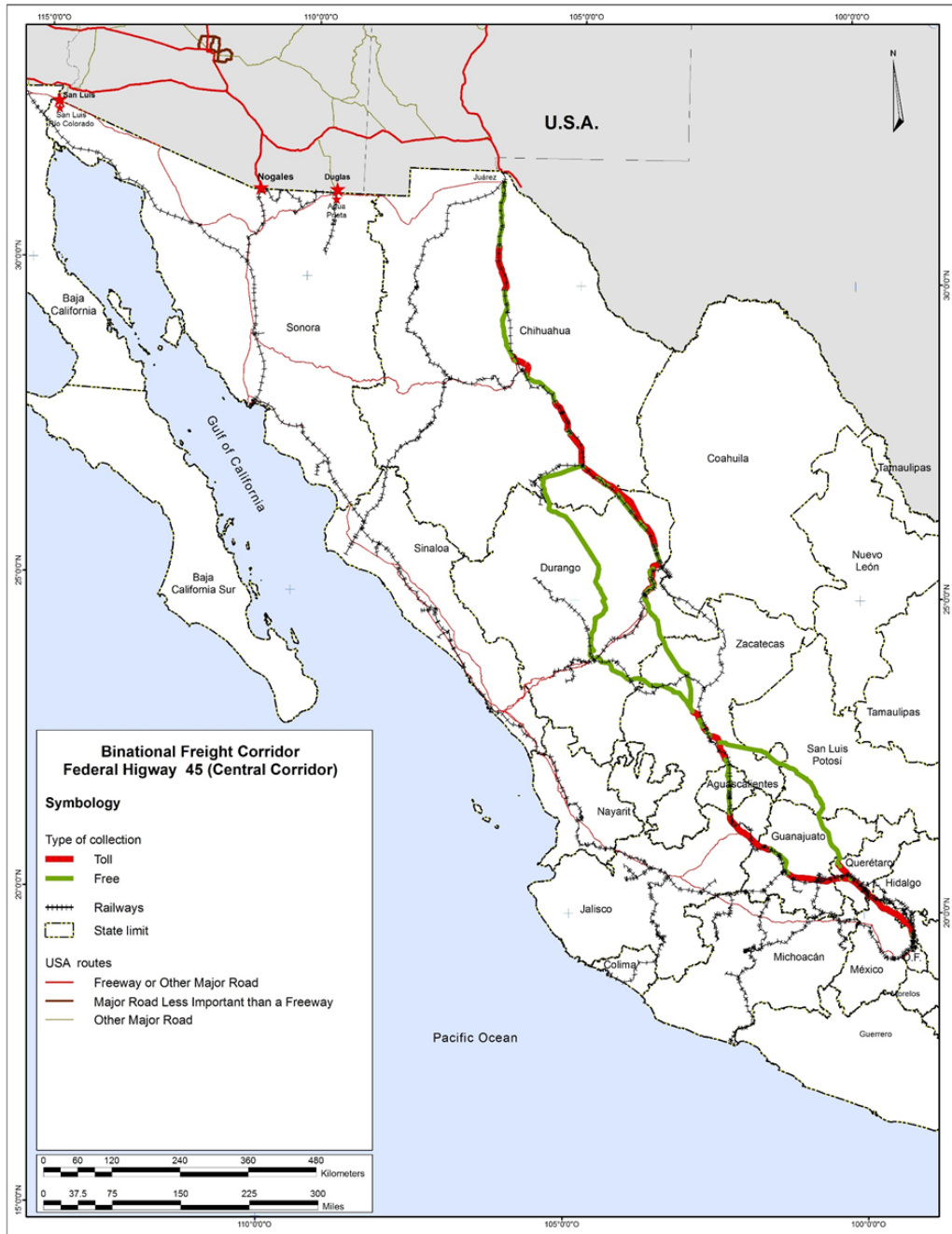
*Exhibit 22. Highway Characteristics in the Pacific Corridor.*

Road Type	Pacific Corridor via Atacomulco Miles (Km)			Pacific Corridor via Queretaro Miles (Km)		
	Toll	Non-Toll	Total	Toll	Non-Toll	Total
<b>2 Lanes</b>	1,067 (1,717)	189 (305)	1,265 (2,022)	875 (1,409)	281 (453)	1,156 (1,862)
<b>More than 2 Lanes</b>	95 (154)	59 (95)	154 (249)	194 (313)	80 (130)	274 (443)
<b>Total</b>	1,162 (1,871)	248 (400)	1,419 (2,271)	1,069 (1,722)	361 (583)	1,430 (2,305)

Note: Distances were estimated from the GIS maps, and may vary against the published distance by SCT.

Exhibit 23 show that in the Central Corridor, almost the complete trip from Mexico City to Ciudad Juárez can be made in two lane highways or toll roads, with some exceptions near the state of Zacatecas. In this corridor, drivers have plenty of options to choose from toll or highways except for some segments in the states of Chihuahua and Queretaro.

DRAFT



Source: (20, 21)

Exhibit 23. Toll and Free Highways in the Central Corridor.

**DRAFT**

Exhibit 24. Highway Characteristics in the Central Corridor.

Road Type	Central Corridor via Aguascalientes Miles (Km)			Central Corridor via San Luis Potosi Miles (Km)		
	Toll	Non-Toll	Total	Toll	Non-Toll	Total
2 Lanes	328 (528)	664 (1,069)	992 (1,597)	386 (622)	558 (898)	944 (1,520)
More than 2 Lanes	119 (192)	80 (130)	199 (322)	106 (170)	27 (44)	133 (214)
Total	447 (720)	744 (1,199)		492 (792)	585 (942)	1,077 (1,734)

Note: Distances were estimated from the GIS maps, and may vary against the published distance by SCT.

**ROAD CLASSIFICATION BASED ON COMMERCIAL VEHICLE TYPE**

Not all commercial vehicles can operate throughout the roadway network in Mexico. The Regulation Concerning Weights, Dimensions, and Capacity of Commercial Vehicles that Travel on the Highways and Bridges of Federal Jurisdiction (24), developed by the SCT, classifies the roadway network, establishing the following highway classes:

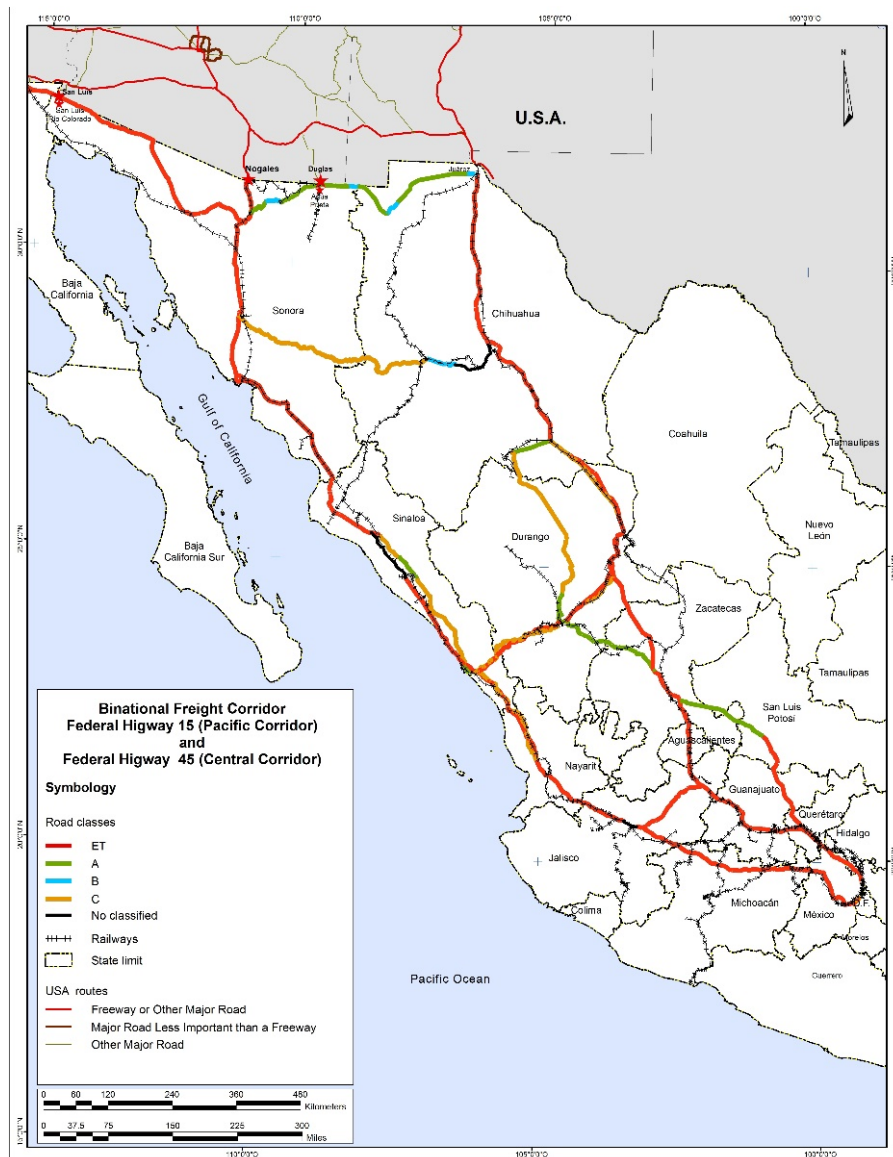
- **Roadway Type ET.** Transportation axis roadways are the highest category of roadways in Mexico. ET roadways are those that have geometric and structural characteristics that can accommodate the operation of vehicles with the maximum dimensions, capacity, and weight. ET roadways can be designated ET2 (two lanes) or ET4 (four lanes).
- **Roadway Type A.** Type A roadways allow for the operation of all vehicles authorized with the maximum dimensions, capacity, and weight, except those that by their dimensions and weight are only allowed on ET roadways. Type A roadways can be designated as A2 (two lanes) or A4 (four lanes).
- **Roadway Type B.** Type B roadways have lower design standards than Type A roadways, but they are included in the primary network; because of their geometric and structural characteristics, they serve interstate transportation. Type B roadways can be designated as B2 (two lanes) or B4 (four lanes).
- **Roadway Type C.** Type C roadways form the secondary roadway network. Due to their design characteristics, they serve medium trip lengths within states, establishing connections and links with the primary network.



# DRAFT

- **Roadway Type D.** Type D roadways form the feeder network and serve traffic within municipalities. They serve relatively short trip lengths, establishing connections with the secondary network (Type C roadways).

Long combination vehicles or full trailers as they are known in Mexico are allowed only on ET, A, or B roadways. Weight and size limits depend on the roadway type and vehicle characteristics. Exhibit 25 describes the roadway classification in each corridor.



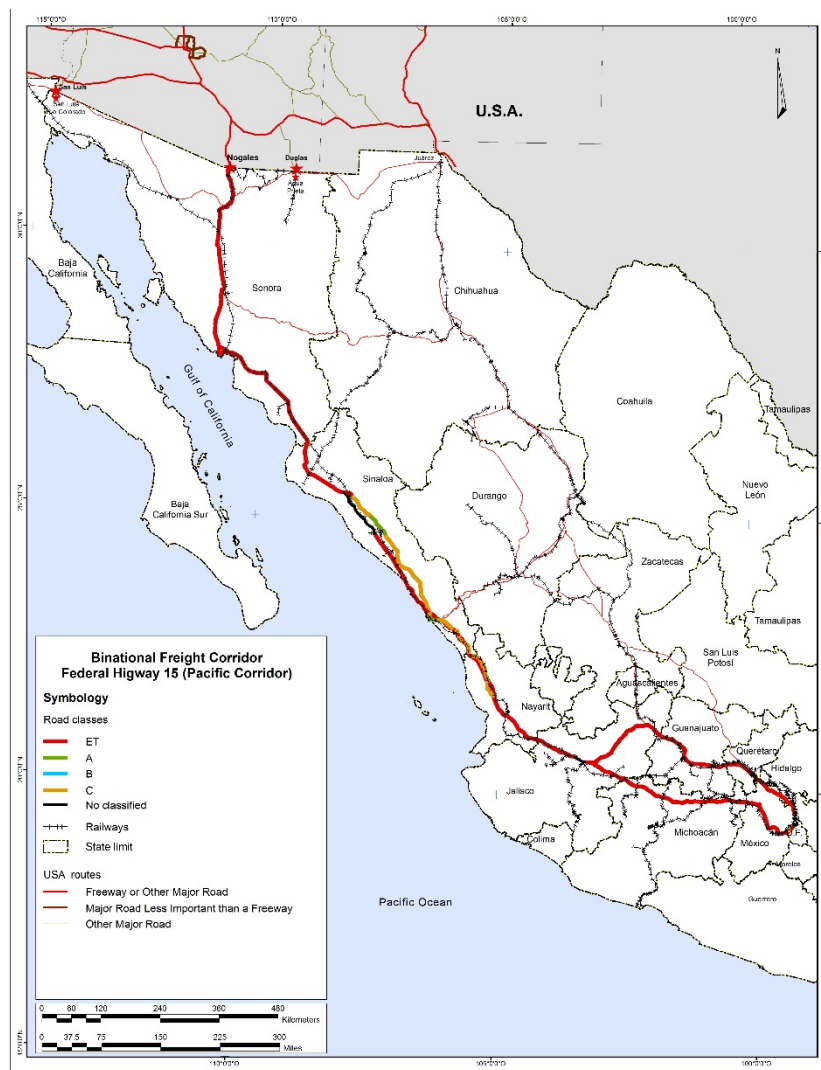
Source: (20,25)

Exhibit 25. Corridor Roadway Classification.

# DRAFT

Corridors 15 and 45 have each ET and A roads that allows heavy traffic. In the east-west connection roads, the only ET highway available is the Gómez Palacio to Mazatlán. Ciudad Juárez and Nogales are also connected with A and ET highways. The Road Chihuahua Hermosillo is not suitable for heavy traffic since it is a C type road.

The total number of miles from ET and A roads in the Pacific Corridor via Atlatomulco or Queretaro is very similar with a slight difference of 46 miles on the route via Queretaro (Exhibit 26 and Exhibit 27).



Source: (20, 21)

Exhibit 26. Rail Characteristics in the Pacific Corridor.

**DRAFT***Exhibit 27. Highway Specifications in the Pacific Corridor.*

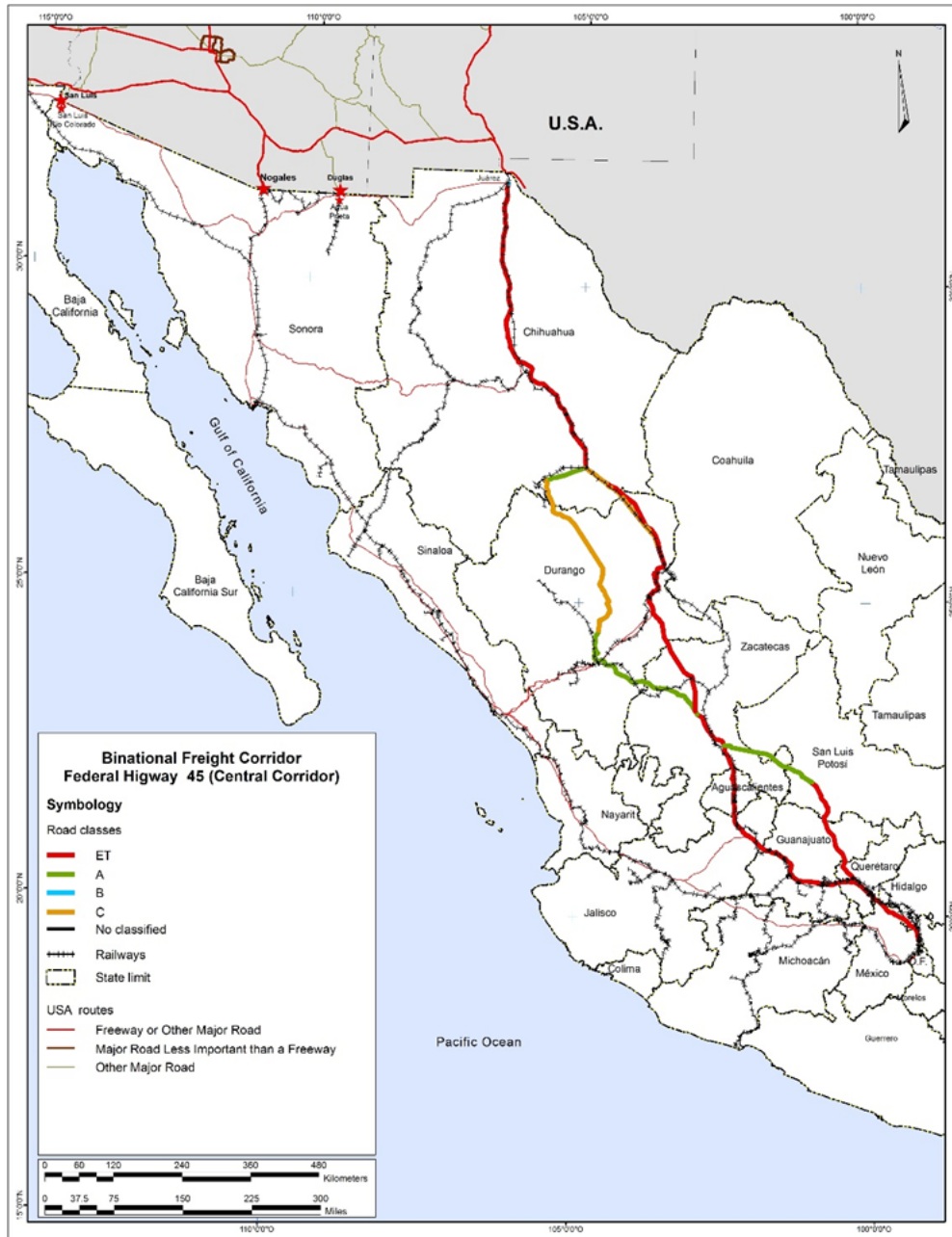
Road Classification	Pacific Corridor via Atlatomulco		Pacific Corridor via Queretaro	
	Miles	Kms	Miles	Kms
ET	1324	(2,132)	1,346	2,167
A				
B				
C	0.35	(0.56)		
NA	87	(140)	87	140
<b>Total</b>	<b>1,412</b>	<b>(2,273)</b>	<b>1,434</b>	<b>(2,308)</b>

Note: Distances were estimated from the GIS maps, and may vary against the published distance by SCT.

The total number of miles from ET and A roads in the Central Corridor via Aguascalientes or San Luis Potosi vary slightly. The Central Corridor via San Luis Potosi has 225 more miles of ET roads and 49.67 miles of Type A roads (Exhibit 28 and Exhibit 29) than the Aguascalientes routes.



DRAFT



Source: (20, 25)

Exhibit 28. Roadway Characteristics in the Central Corridor.

**DRAFT**

*Exhibit 29. Roadway Specifications in the Central Corridor.*

Road Classification	Central Corridor via Aguascalientes		Central Corridor via San Luis Potosi	
	Miles	Kms	Miles	kms
ET	762	(1,227)	939	1,511
A	223	(360)	115	(185)
B	0.07	(0.11)	0.04	(0.06)
C	211	(339)	28	(45)
NA				
<b>Total</b>	<b>1198</b>	<b>1928</b>	<b>1,082</b>	<b>(1,742)</b>

Note: Distances were estimated from the GIS maps, and may vary against the published distance by SCT.

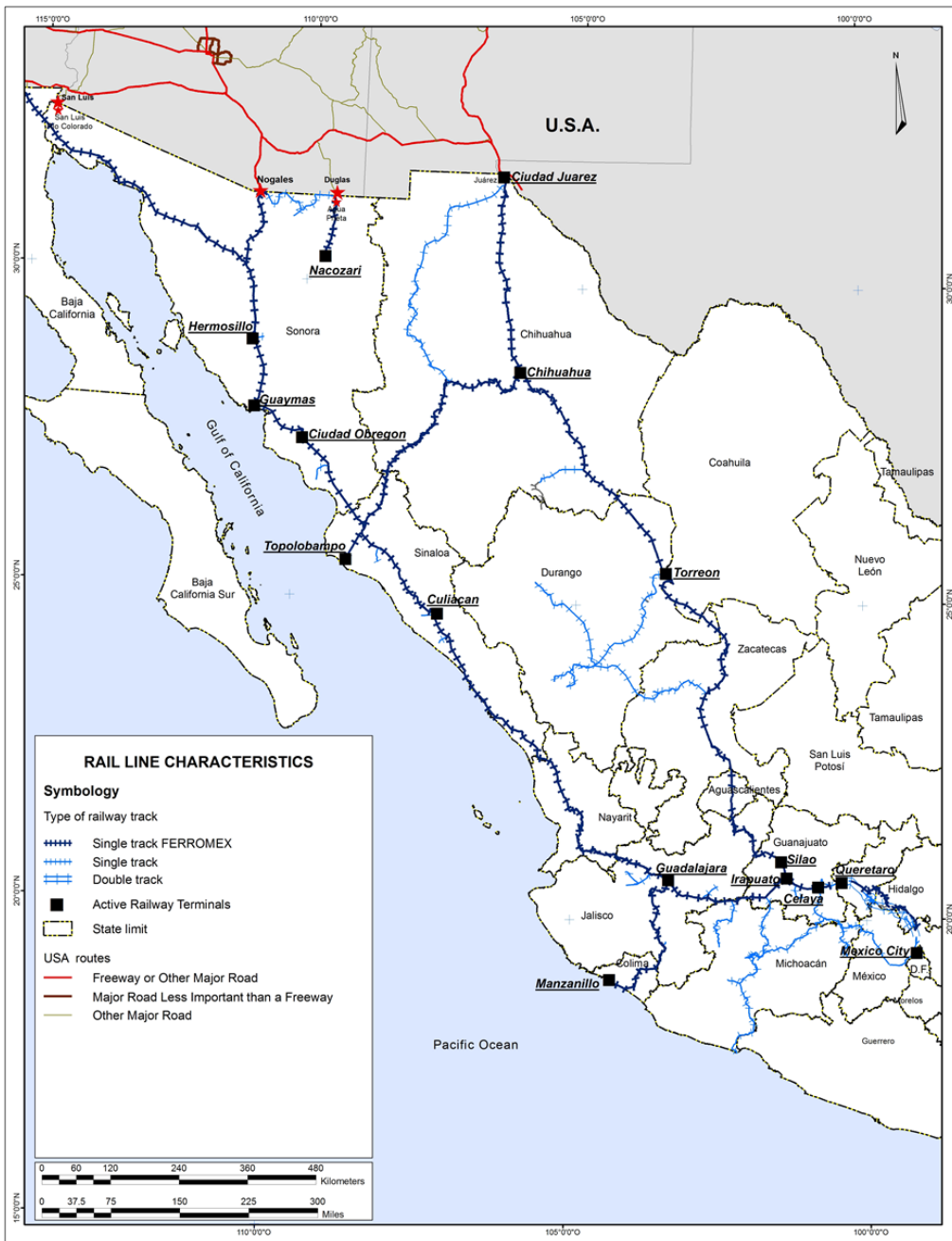
**RAIL LINES CHARACTERISTICS**

Exhibit 30 show the distance of the two rail corridors from Mexico City to Nogales and from Mexico City to Ciudad Juárez. The Chihuahua-Pacifico or Copper Canyon Railroad connects southern Texas with the Pacific Ocean. However, due to steep grades and tunnels, this rail line handles limited freight shipments. All rail lines on both corridors are single track. The Pacific Corridor rail line does not support double stack train due to clearance limitations in various tunnels north of the state of Nayarit. Ferromex is currently working to upgrade the line to be able to handle double stack trains. Exhibit 31 shows the location of railway terminals along each of the corridors and key port facilities served by Ferromex in the Pacific Corridor.

*Exhibit 30. Railroad Track: Type and Longitude.*

RAILROAD TRACK: TYPE AND LONGITUDE			
Route	Type of Track	Longitude in Km	Longitude in Miles
Mexico City to Ciudad Juárez	Single	1,982	1,232
Mexico City to Nogales	Single	2,389	1,485
Chihuahua - Topolobampo	Single	629	391

DRAFT



Source: (20, 21, 26)

Exhibit 31. Rail Line Characteristics in the Corridors.

**PORTS, AIRPORTS AND BORDER CROSSINGS**

Both corridors have important freight multimodal facilities that connect to the roadway network. Exhibit 32 shows the most important ports, airports, and border crossing along the Pacific and Central Corridors. The Pacific Corridor has more connectivity to international border crossings, with several crossings in Sonora, while in the Central Corridor, in the El

**DRAFT**

Paso/Ciudad Juarez area there are three commercial vehicle border crossings, Bridge of the Americas and Zaragoza-Yzysleta in Texas, and Santa Teresa in New Mexico.



Source: (20, 21, 26)

**Exhibit 32. Ports, Airports, and Border Crossings.**

The Pacific Corridor has more airports than the Central Corridor, particularly the Guadalajara airport that handles a large amount of air cargo (Exhibit 33 and Exhibit 34).

**DRAFT***Exhibit 33. Airports along the Pacific Corridor.*

Via Atlacomulco	Via Queretaro
CDMX/México City	CDMX/Mexico City
Toluca/Edo México	Queretaro/Queretaro
Morelia/Michoacán	León/Guanajuato
Guadalajara/Jalisco	Guadalajara/Jalisco
Tepic/Nayarit	Tepic/Nayarit
Mazatlán/Sinaloa	Mazatlán/Sinaloa
Culiacán/Sinaloa	Culiacan/Sinaloa
Los Mochis/Sinaloa	Los Mochis/Sinaloa
Ciudad Obregón/Sonora	Ciudad Obregón/Sonora
Guaymas/Sonora	Guaymas/Sonora
Hermosillo/Sonora	Hermosillo/Sonora
Nogales/Sonora	Nogales/Sonora

*Exhibit 34. Airports along the Central Corridor.*

Vila Aguascalientes	Via San Luis Potosí
CDMX/México City	CDMX/México City
Queretaro/Queretaro	Queretaro/Queretaro
Leon/Guanajuato	San Luis Potosí/San Luis Potosí
Aguascalientes/Aguascalientes	Zacatecas/Zacatecas
Zacatecas/Zacatecas	Torreón/Coahuila
Durango/Durango	Chihuahua/Chihuahua
Chihuahua/Chihuahua	Cd Juárez/Chihuahua
Cd Juárez/Chihuahua	

The Pacific Corridor serves directly the ports of Mazatlan, Toplobampo, and Guayamas. However, the Corridor has connectivity to the ports of Lazaro Cardenas and Manzanillo, which are the largest ports in terms of cargo handling in the country. The port of Manzanillo is served by Ferromex with the rail line connecting the Corridor north to Nogales and Mexicali.

## DRAFT

## DEMOGRAPHIC CONTEXT

**ECONOMICALLY ACTIVE POPULATION ALONG THE CORRIDORS**

The Economic Active Population (Población Económicamente Activa [PEA]) located in the Pacific Corridor via Atlatomulco shows interesting trends. The highest PEA is not located in the Mexico City Metropolitan area, but in the Metropolitan area of Guadalajara (Guadalajara and Zapopan), and the northern part of the Corridor in Hermosillo and Culiacan. In the Pacific Corridor via Queretaro, the highest levels of PEA are in two municipalities from the Bajio Area (Leon and Queretaro), as well as two municipalities in the Guadalajara metro area (Guadalajara and Zapopan). More interesting is the fact that the PEA in Leon is higher than the one in Guadalajara, which is considered the second most industrialized area of Mexico. This shows the bolstering economic dynamic of the Bajio Region, which gaining more importance in terms of industrial production than consolidated urban areas such as Mexico City or Guadalajara (Exhibit 35).

*Exhibit 35. Top 15 Municipalities by Active Economic Population in the Pacific Corridor.*

Top 15 municipalities by PEA in the Pacific Corridor Via Atlatomulco			Top 15 municipalities by PEA Via in the Pacific Corridor Via Queretaro		
State	Municipality	PEA	State	Municipality	PEA
Jalisco	Guadalajara	666,171	Guanajuato	León	703,468
Jalisco	Zapopan	599,709	Jalisco	Guadalajara	666,171
Sonora	Hermosillo	402,049	Jalisco	Zapopan	599,709
Sinaloa	Culiacan	378,953	Querétaro	Querétaro	404,974
CDMX	Álvaro Obregon	362,370	Sonora	Hermosillo	402,049
México	Toluca	360,282	Sinaloa	Culiacan	378,953
Jalisco	Tlaquepaque	286,851	Jalisco	Tlaquepaque	286,851
Jalisco	Tonala	232,160	Jalisco	Tonala	232,160
Sinaloa	Mazatlán	216,605	Guanajuato	Irapuato	226,555
CDMX	Miguel Hidalgo	193,221	México	Cuautitlan Izcalli	223,430
Nayarit	Tepic	182,871	México	Tultitlan	220,083
Sonora	Cajeme	178,161	Sinaloa	Mazatlán	216,605
Sinaloa	Ahome	177,160	Guanajuato	Celaya	207,687
Sinaloa	Guasave	106,284	Nayarit	Tepic	182,871
Sonora	Nogales	101,164	Sonora	Cajeme	178,161

In the Central Corridor via Aguascalientes, two municipalities from the Bajio Region (Leon and Querétaro) and two from Chihuahua are top ranked PEA (Exhibit 36). A similar trend can be seen in this corridor via San Luis Potosi, in which San Luis and Queretaro, also located in the Bajio region, and Chihuahua and Ciudad Juárez are the top rank by PEA.



**DRAFT***Exhibit 36. Top 15 Municipalities by Active Economic Population in the Central Corridor.*

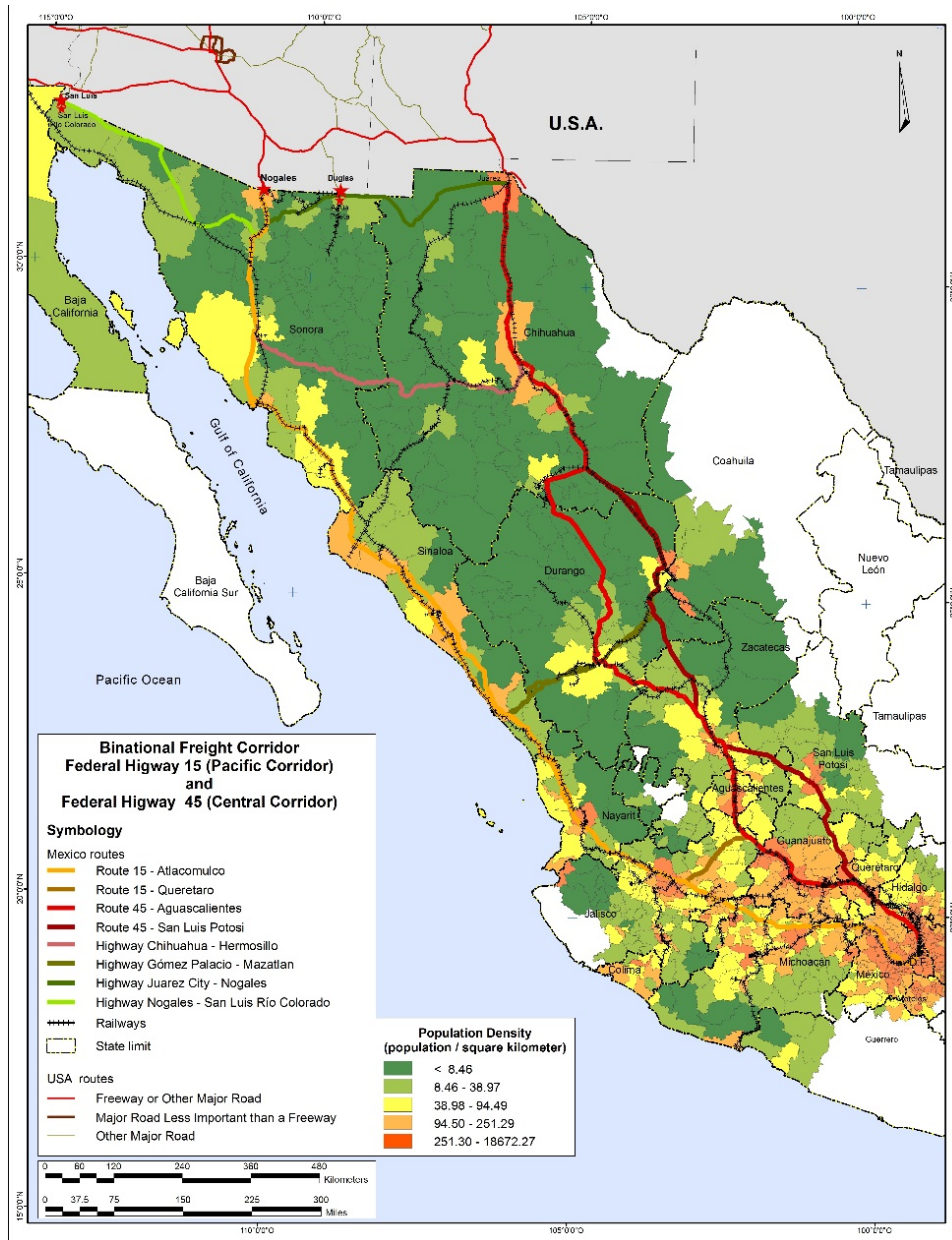
Top 15 municipalities by PEA in the Central Corridor via Aguascalientes			Top 15 municipalities by PEA in the Central Corridor via San Luis Potosí		
State	Municipality	EAP	State	Municipality	EAP
Guanajuato	Leon	703,468	Chihuahua	Juarez	597,127
Chihuahua	Juárez	597,127	Querétaro	Queretaro	404,974
Querétaro	Queretaro	404,974	Chihuahua	Chihuahua	390,819
Chihuahua	Chihuahua	390,819	San Luis Potosí	San Luis Potosi	369,709
Aguascalientes	Aguascalientes	382,550	México	Cuautitlan Izcalli	223,430
Durango	Durango	268,590	México	Tultitlan	220,083
Guanajuato	Irapuato	226,555	San Luis Potosí	Soledad de Graciano Sanchez	134,317
México	Cuautitlan Izcalli	223,430	Durango	Gomez Palacio	124,512
México	Tultitlan	220,083	Querétaro	San Juan del Río	114,768
Guanajuato	Celaya	207,687	Zacatecas	Guadalupe	77,867
Querétaro	San Juan del Río	114,768	Zacatecas	Fresnillo	77,638
Guanajuato	Salamanca	102,993	Querétaro	El Marqués	68,691
Querétaro	Corregidora	83,298	Chihuahua	Delicias	61,686
Zacatecas	Guadalupe	77,867	Durango	Lerdo	55,370
Zacatecas	Fresnillo	77,638	México	Huehuetoca	49,335
			Guanajuato	San Luis de la Paz	41,456

**CORRIDORS AND POPULATION DENSITY**

The center states have the highest concentration of population in the Pacific Corridor (Exhibit 37 and Exhibit 38). In fact, none of the municipalities of the northern states appears in the top 15 ranking. The highest densities are concentrated around the Metropolitan areas of Mexico City and Guadalajara.



DRAFT



Source: (20, 21, 27)

Exhibit 37. Population Density by Municipalities.

**DRAFT**

Exhibit 38. Top 15 Municipalities by Population Density in the Pacific Corridor.

Top 15 Municipalities by Population Density				Top 15 Municipalities by Population Density			
Pacific Corridor via Atlacomulco				Pacific Corridor via Queretaro			
State	Municipality	Density KM2	National Ranking	State	Municipality	Density KM2	National Ranking
Jalisco	Guadalajara	10,048.37	12	Jalisco	Guadalajara	10,048.37	12
CDMX	Miguel Hidalgo	8,245.12	17	México	Tultitlán	8,375.26	16
CDMX	Álvaro Obregón	7,683.65	19	Jalisco	Tlaquepaque	5,563.99	24
Jalisco	Tlaquepaque	5,563.99	24	México	Cuautitlán Izcalli	5,087.58	25
Jalisco	Tonalá	3,225.06	36	Jalisco	Tonalá	3,225.06	36
CDMX	Cuajimalpa de Morelos	2,702.90	38	México	Teoloyucan	2,029.78	43
México	Toluca	2,148.89	40	Querétaro	Querétaro	1,275.45	64
Jalisco	Zapopan	1,169.21	68	Guanajuato	León	1,262.09	65
México	Otzolotepec	794.50	77	Jalisco	Zapopan	1,169.21	68
México	Lerma	698.29	86	México	Huehuetoca	1,115.97	70
México	Temoaya	545.06	104	México	Coyotepec	1,043.17	71
México	Ocoyoacac	505.00	107	Guanajuato	Celaya	909.86	74
México	Ixtlahuaca	476.52	110	Querétaro	Corregidora	728.28	84
México	Atlacomulco	425.04	118	Guanajuato	Irapuato	671.78	88
Jalisco	Ocotlán	406.12	124	México	Tepetzotlán	518.64	106
Michoacán	Álvaro Obregón	139.59	264	Querétaro	El Marqués	192.26	208

In the Central Corridor, the highest density is also concentrated in Mexico City Metropolitan Area and in the municipalities of the Bajío Region. The northern States of Zacatecas, Durango, and Chihuahua are not in the top 10 rank (Exhibit 39).

**DRAFT**

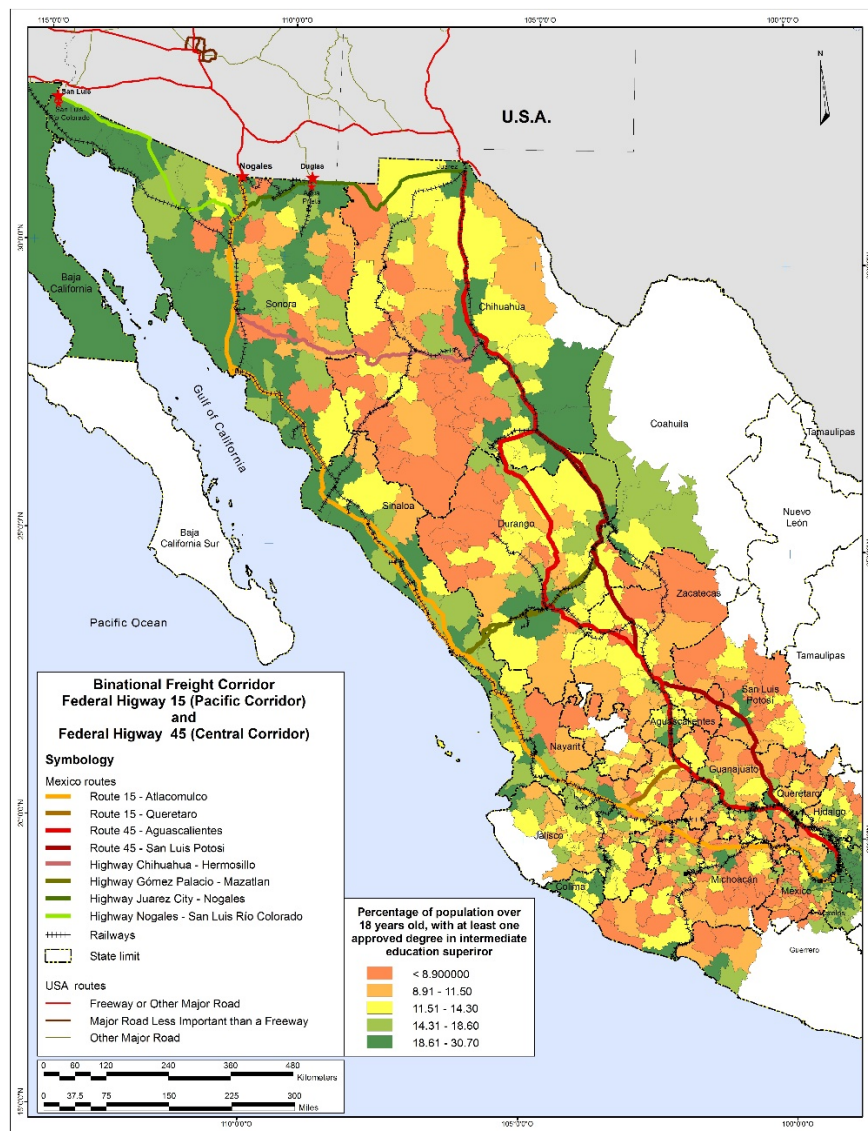
Exhibit 39. Top 15 Municipalities by Population Density in the Central Corridor.

Top 15 Municipalities by Population Density				Top 15 Municipalities by Population Density			
Central Corridor via Aguascalientes				Central Corridor via San Luis Potosi			
State	Municipality	Density KM2	Nat Ranking	State	Municipality	Density KM2	Nat Ranking
México	Tultitlán	8375.26	16	México	Tultitlán	8,375.26	16
México	Cuautitlán Izcalli	5087.58	25	México	Cuautitlán Izcalli	5,087.58	25
México	Teoloyucan	2029.78	43	México	Teoloyucan	2,029.78	43
Querétaro	Querétaro	1275.45	64	Querétaro	Querétaro	1,275.45	64
Guanajuato	León	1262.09	65	México	Huehuetoca	1,115.97	70
México	Huehuetoca	1115.97	70	México	Coyotepec	1,043.17	71
México	Coyotepec	1043.17	71	San Luis Potosí	Soledad de Graciano Sánchez	993.54	73
Guanajuato	Celaya	909.86	74	San Luis Potosí	San Luis Potosí	562.70	103
Aguascalientes	Aguascalientes	741.36	82	México	Tepotzotlán	518.64	108
Querétaro	Corregidora	728.28	84	Durango	Gómez Palacio	424.37	121
Guanajuato	Irapuato	671.78	88	Chihuahua	Juárez	397.79	128
México	Tepotzotlán	518.64	106	Querétaro	San Juan del Río	347.95	139
Guanajuato	Villagrán	464.43	112	Chihuahua	Delicias	287.62	159
Chihuahua	Juárez	397.79	126	Hidalgo	Tepeji del Río de Ocampo	249.55	176
Guanajuato	Salamanca	368.60	134	Zacatecas	Guadalupe	224.09	185

**DRAFT**

**EDUCATION LEVEL ALONG THE CORRIDORS**

The percentage of population of 18 years that has at least one approved year of high school by municipality was taken as a proxy to estimate the level of education of the population. Exhibit 40 and Exhibit 41 show that municipalities of the northern states (Sinaloa and Sonora), as well as those municipalities in the Mexico City Metropolitan area, have the highest percentage of people with at least one year of high school. Surprisingly, none of the municipalities from Bajio make it to the top seven places, even though this is one of the most dynamic economic regions in the country.



Source: (20, 21, 27)

*Exhibit 40. Percentage of Population of 18 Years That Has At Least One Approved Year of High School by Municipality*

**DRAFT**

*Exhibit 41. Top 15 Municipalities: Percentage of Population 18 Years Old and More That Has at Least One Degree of High School by Municipality in the Pacific Corridor.*

Top 15 municipalities: Percentage of Population 18 years old and more that has at least one degree of High School by Municipality				Top 15 municipalities: Percentage of Population 18 years old and more that has at least one degree of High School by Municipality			
Pacific Corridor via Atlacomulco				Pacific Corridor via Queretaro			
State	Municipality	Percentage of pop	Nat	State	Municipality	Percentage of pop	Nat
			Ranking				Ranking
Sonora	Nogales	24.6	23	México	Tultitlán	26.6	7
Sinaloa	Ahome	24.2	30	México	Cuautitlán Izcalli	26	12
Sinaloa	Salvador Alvarado	24.2	31	Sonora	Nogales	24.6	23
Sonora	Cajeme	23.2	41	México	Huehuetoca	24.6	21
D.F.	Álvaro Obregón	23	46	Sinaloa	Ahome	24.2	30
D.F.	Miguel Hidalgo	22.7	53	Sinaloa	Salvador Alvarado	24.2	31
Sonora	Hermosillo	22.6	59	Sonora	Cajeme	23.2	41
Sonora	Guaymas	22.6	58	Sonora	Hermosillo	22.6	59
Sinaloa	Mazatlán	22.4	64	Sonora	Guaymas	22.6	58
D.F.	Cuajimalpa de Morelos	21.6	81	Sinaloa	Mazatlán	22.4	64
Sinaloa	Culiacán	21.6	83	Querétaro	Querétaro	21.8	79
Sonora	Empalme	21.4	92	Sinaloa	Culiacán	21.6	83
Nayarit	Tepic	21.3	97	Sonora	Empalme	21.4	92
Jalisco	Guadalajara	21.3	93	México	Tepotzotlán	21.4	90
Sonora	Navojoa	21.1	107	Nayarit	Tepic	21.3	97
Nayarit	Tuxpan	19.4	177	Jalisco	Zapopan	19.6	167

The indicator of the population 18 years or more with at least one degree of high school is different for Corridor located in the Central Corridor. Top ranks are concentrated around Mexico City Metropolitan area, but there are a few municipalities from the Bajío (Querétaro and Soledad de Graciano Sanchez in the state of San Luis) that are also well placed (Exhibit 42). Finally, the northern state of Chihuahua also makes it in the top five rank.



**DRAFT**

*Exhibit 42. Top 15 Municipalities: Percentage of Population 18 Years Old and More that Has at Least One Degree of High School by Municipality in the Central Corridor.*

Top 15 municipalities: Percentage of Population 18 years old and more that has at least one degree of High School by Municipality				Top 15 municipalities: Percentage of Population 18 years old and more that has at least one degree of High School by Municipality			
Central Corridor via Aguascalientes				Central Corridor via San Luis Potosi			
State	Municipality	Percentage of pop	Nat Ranking	State	Municipality	Percentage of pop	Nat Ranking
México	Tultitlán	26.6	7	México	Tultitlán	26.6	7
México	Cuautitlán Izcalli	26.0	12	México	Cuautitlán Izcalli	26	12
México	Huehuetoca	24.6	21	México	Huehuetoca	24.6	21
Querétaro	Querétaro	21.8	79	Querétaro	Querétaro	21.8	79
Chihuahua	Delicias	21.5	86	Chihuahua	Delicias	21.5	86
México	Tepotzotlán	21.4	90	San Luis Potosí	Soledad de Graciano Sánchez	21.5	87
Chihuahua	Hidalgo del Parral	21.2	99	México	Tepotzotlán	21.4	90
México	Teoloyucan	20.6	133	México	Teoloyucan	20.6	133
Chihuahua	Chihuahua	20.5	135	Chihuahua	Chihuahua	20.5	135
México	Coyotepec	20.3	143	México	Coyotepec	20.3	143
Aguascalientes	Aguascalientes	20.1	149	San Luis Potosí	San Luis Potosí	20	155
Chihuahua	Camargo	19.7	159	Durango	Gómez Palacio	19.7	160
Querétaro	Corregidora	19.6	169	Chihuahua	Camargo	19.7	159
Chihuahua	Jiménez	19.2	183	Chihuahua	Jiménez	19.2	183
Durango	Durango	19.1	187	Chihuahua	Juárez	18.8	204

**DRAFT**

**ECONOMIC CONTEXT**

**MUNICIPAL GDP ALONG THE CORRIDORS**

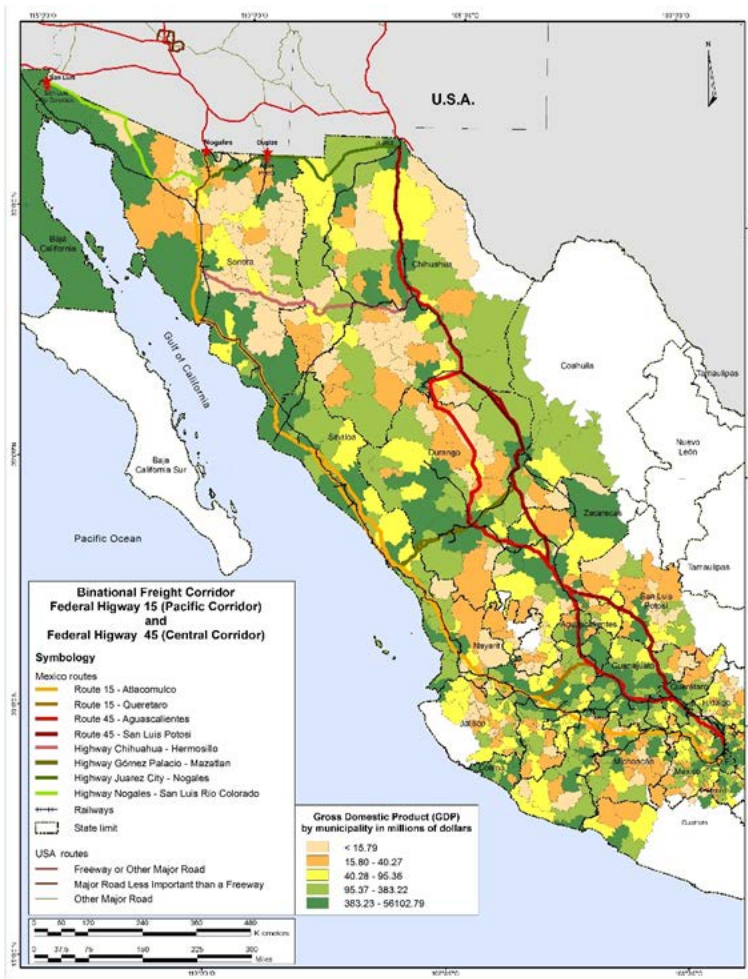
This section presents the GDP estimation for the top 15 municipalities located along the two corridors under analysis, with their two alternatives routes. The National Institute of Geography and Statistics (INEGI) does not report GDP at the municipal level. Therefore, a special algorithm was developed to calculate the municipal GDP (See Box 1).

Exhibit 43 and Exhibit 44 show that the metropolitan areas of Mexico City and Guadalajara have the largest GDP along the corridors. However, at least one city in each state along the Pacific Corridor in both routes is in the top 15 ranking.

**BOX 1.**

**GDP Estimations at the municipal level**

GDP was estimated using the aggregated value for the secondary and tertiary sectors from the 2014 mid-term Census (Conteo). However, the primary sector value is not available in the Conteo 2014. Therefore, the value for the primary sector was estimated using an extrapolation of the PEA and its production value and added to the secondary and tertiary sectors.



Source: (20, 21, 28)

*Exhibit 43. GDP by Municipalities.*



**DRAFT**

*Exhibit 44. Top 15 Municipalities by GDP along the Pacific Corridor.*

Top 15 municipalities by GDP in the Pacific Corridor via Atacomulco			Top 15 municipalities by GDP in the Pacific Corridor via Queretaro		
State	Municipality	GDP (Million USD of 2013)	State	Municipality	GDP (Million USD 2013)
CDMX	Miguel Hidalgo	42,663.62	Jalisco	Guadalajara	23,605.89
Jalisco	Guadalajara	23,605.89	Jalisco	Zapopan	20,383.75
CDMX	Álvaro Obregón	23,476.81	Guanajuato	León	15,593.15
Jalisco	Zapopan	20,383.75	Querétaro	Querétaro	14,821.65
México	Toluca	20,040.98	Sonora	Hermosillo	14,381.79
Sonora	Hermosillo	14,381.79	Sinaloa	Culiacán	10,659.94
CDMX	Cuajimalpa de Morelos	10,957.16	México	Cuautitlán Izcalli	9,743.60
Sinaloa	Culiacán	10,659.94	México	Tultitlán	6,416.61
Jalisco	Tlaquepaque	5,551.28	Guanajuato	Irapuato	5,876.11
Sinaloa	Mazatlán	5,043.41	Jalisco	Tlaquepaque	5,551.28
México	Lerma	4,860.71	Guanajuato	Celaya	5,289.43
Sonora	Cajeme	4,011.33	Sinaloa	Mazatlán	5,043.41
Nayarit	Tepic	4,007.48	Guanajuato	Silao	5,030.13
Sinaloa	Ahome	3,898.44	Sonora	Cajeme	4,011.33
Sonora	Nogales	1,967.79	Nayarit	Tepic	4,007.48

\*Average annual exchange rate 1 US Dollar = 12.85 Mexican Pesos. Source (29)

In the Central Corridor, the Mexico City metropolitan area is not in the top ranking, as in the Pacific Corridor, with cities such as Leon, Ciudad Juárez, Querétaro, San Luis Potosi, and Chihuahua in the top four in the two routes (Exhibit 45).

**DRAFT**

Exhibit 45. Top 15 Municipalities by GDP in the Central Corridor.

Top 15 municipalities by GDP in the Central Corridor via Aguascalientes			Top 15 municipalities by GDP in the Central Corridor via San Luis Potosi		
State	Municipality	GDP (Million USD of 2013)	State	Municipality	GDP (Million USD of 2013)
Guanajuato	León	15,593.15	San Luis Potosí	San Luis Potosí	15,773.86
Chihuahua	Ciudad Juárez	15,380.81	Chihuahua	Ciudad Juárez	15,380.81
Querétaro	Querétaro	14,821.65	Querétaro	Querétaro	14,821.65
Chihuahua	Chihuahua	10,910.47	Chihuahua	Chihuahua	10,910.47
México	Cuautitlán Izcalli	9,743.60	México	Cuautitlán Izcalli	9,743.60
Aguascalientes	Aguascalientes	9,691.74	México	Tultitlán	6,416.61
México	Tultitlán	6,416.61	Durango	Gómez Palacio	5,100.46
Guanajuato	Irapuato	5,876.11	Querétaro	San Juan del Río	3,748.34
Guanajuato	Celaya	5,289.43	Zacatecas	Fresnillo	3,245.66
Guanajuato	Silao	5,030.13	Querétaro	El Marqués	2,849.22
Durango	Durango	4,756.62	Zacatecas	Calera	1,949.23
Querétaro	San Juan del Río	3,748.34	San Luis Potosí	Villa de Reyes	1,867.64
Zacatecas	Fresnillo	3,245.66	Hidalgo	Tepeji del Río de Ocampo	1,770.21
Guanajuato	Salamanca	3,068.39	Guanajuato	San José Iturbide	1,310.51
Querétaro	El Marqués	2,849.22	México	Tepotzotlán	1,254.53

Average annual exchange rate 1 US Dollar = 12.85 Mexican Pesos Source (29)

**ECONOMIC CLUSTERS ALONG THE CORRIDORS**

This section of the report identifies and locates industrial clusters using the two corridors under analysis. This task includes two sets of information. The first one is the industry cluster information from Mexican icluster database (30). The second source of information is the industrial park database from the Mexican Association of Private Industrial Parks (Asociación Mexicana de Parques Industriales Privados [AMPIP]) (31).

**Icluster Information**

The project team identified eight industry sectors from the icluster database that are freight intensive or freight related along the corridors:

- Automotive
- Aerospace
- Logistics

## DRAFT

- Lighting and machinery
- Meat based products
- Mining
- Ironwork
- Agriculture/food processing

The export crops clusters were also analyzed as these is an important supply chain for the Pacific Corridor. The information for this analysis was developed using the Mexican Ministry of Agriculture (SAGARPA), *SIAP Sistema de Información Agroalimentaria y Pesquera, 2016*.

The Icluster system that was used to generate this information for the other clusters seeks to preserve the private information of facilities and firms located in each cluster, so it only provides the information industry names and a range of employees and geographical coordinates. The range of employee follows this distribution:

- 0 to 5
- 6 to 11
- 11 to 31
- 21 to 50
- 51 to 100
- 101 to 250
- More than 250

In order to identify those export-significant industries along the corridors, the database was analyzed and facilities with 30 or fewer employees were eliminated from the analysis. The study team also decided to focus on those clusters located in the municipalities along the two corridors under analysis, except for the mining clusters that tend to be far away from cities or metropolitan areas.

Exhibit 46 provides a general picture of the distribution of industry clusters along the two corridors under analysis. All other clusters are located in the surroundings of a metropolitan area, such as Mexico City/State of Mexico, Guadalajara/Zapopan or Gomez Palacios/Torreon, and other urban areas in the north of the country like Hermosillo, Sonora, or Ciudad Juárez, Chihuahua.

One exception to this pattern is the logistic cluster along the Pacific Corridor in Sinaloa. In this state, which is considered the Mexican agricultural belt that produces grain and produce crops (such as tomatoes) and grains, the logistic cluster is spread throughout the state. Agricultural activities of fresh produce may help to explain this decentralization in the logistic cluster.

DRAFT



Sources: (30, 32)

Exhibit 46. Economic Clusters along the Corridors.

**Automotive Cluster**

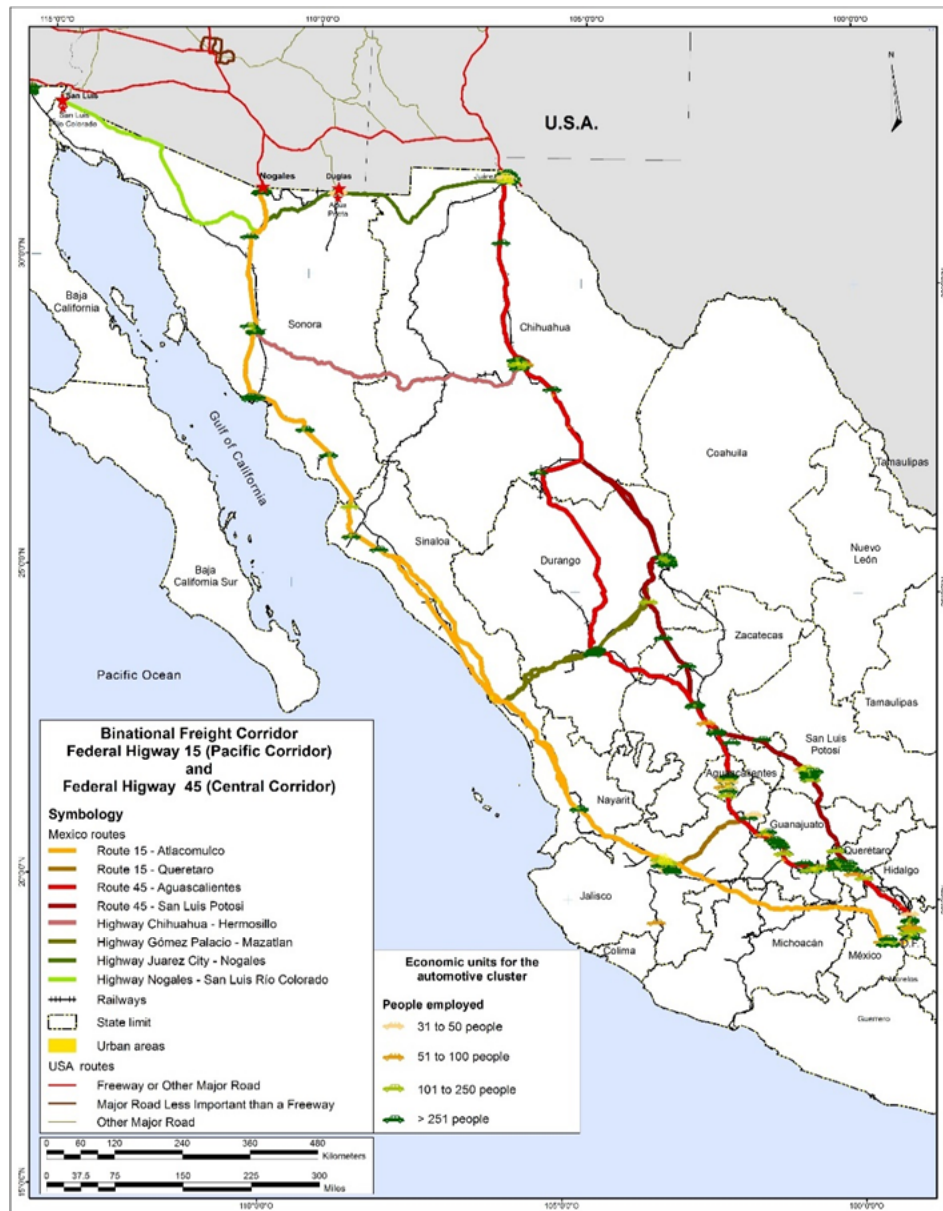
In 2015–2016, Mexico was ranked as the world’s seventh most important automobile producer in the world (33). In 2016, exports of vehicles and auto parts reached US\$88.1 billion, representing the highest commodity export and 23.6 percent of Mexico’s total exports (34).

Automotive clusters along the Pacific Corridor and 45 are clearly concentrated in three or four regions:

- Along the Pacific Corridor, assembly plants are in Mexico’s metropolitan area (Ecatepec and Lerma in the state of Mexico)
- The Bajío and Jalisco regions (Leon and Silao in Guanajuato and el Salto in Jalisco)
- In the northern region in Hermosillo, Sonora, with the Ford plant

**DRAFT**

Along the Central Corridor, assembly plants are also located in Mexico's metropolitan area (Ecatepec), the Bajío Region including Aguascalientes and San Luis Potosí and in the northern region in the city of Chihuahua. Clusters along both routes in this corridor also have important auto part manufacturers in Querétaro, San Luis Potosí, and Ciudad Juárez. Exhibit 47 presents the location of the automotive clusters in the corridors under analysis.



Sources: (30, 32)

*Exhibit 47. Automotive Cluster Location.*

## **DRAFT**

### *Aerospace Cluster*

The aerospace industry is relatively new strategic sector in Mexico. According to the Mexican export promotion agency (PROMÉXICO), in 2014, the value of production and exports of aeronautical products reached US\$6.4 billion that grew 18 percent during the last 10 years, generating more than 40,000 jobs, making Mexico the sixth supplier of aerospace equipment to the United States (35).

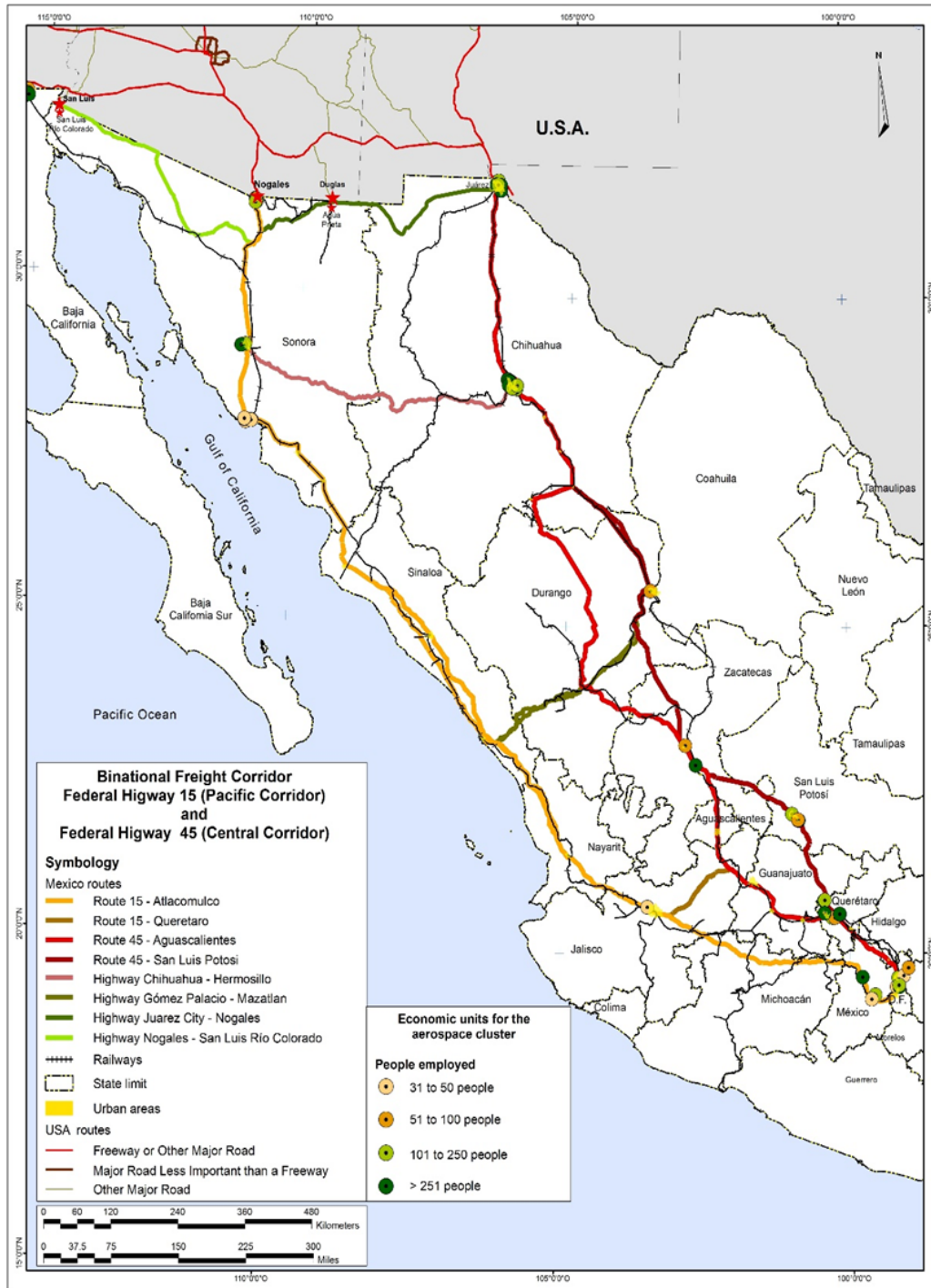
The aerospace industry has taken advantage of the agreements such as the Bilateral Aerospace Safety Agreement and the Wassenaar Agreement on Controls of Dual-Use Manufactures. The supplier base has quintupled, growing from 65 companies in 2005 to 305 companies registered in 2014.

The aerospace cluster along the Pacific Corridor is highly concentrated in Mexico City's Metropolitan area (including facilities nearby Toluca's airport), Querétaro, the most important cluster in Mexico for research, production and aircraft maintenance, and Hermosillo, Sonora. Some minor facilities are also located in Leon, Guanajuato, and Guadalajara, Jalisco.

In the Central Corridor, aerospace facilities are in Querétaro and in Chihuahua City and Ciudad Juárez, Chihuahua. There are also some minor aerospace plants in the state of San Luis Potosi, and the Metropolitan Region of La Laguna in Torreon and Gomez Palacio. Exhibit 48 presents the location of the aerospace clusters under analysis.



DRAFT



Sources: (30, 32)

*Exhibit 48. Aerospace Cluster Location.*

*Logistic Cluster*

Mexico’s dominant transportation mode is trucking, with a large number of motor carriers being owner-operator. The SCT’s 2015 statistics show that there were 134,726 trucking



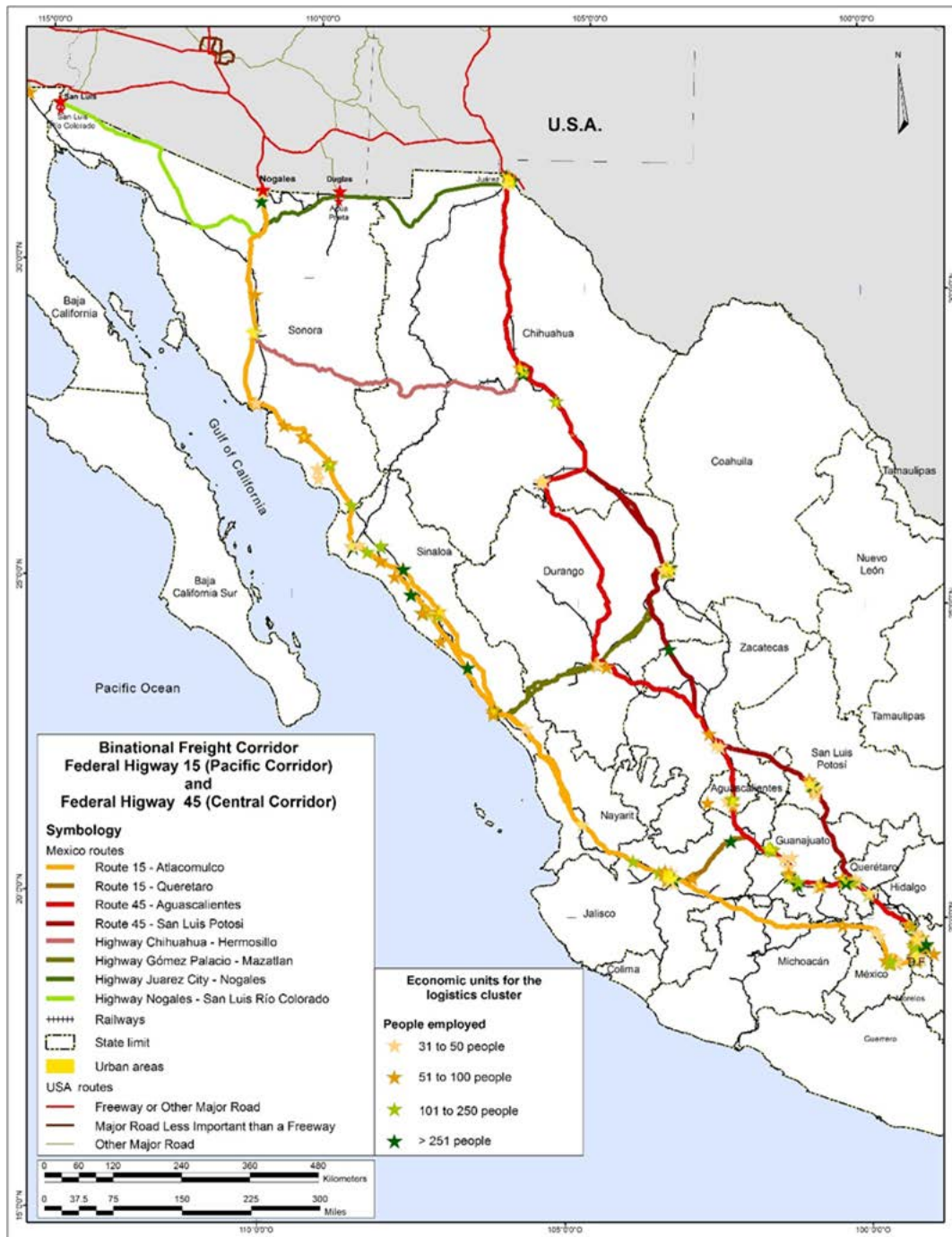
## **DRAFT**

companies registered, with 806,405 units. Owner-operator motor carriers are defined as those firms with 1 to 5 vehicles, and this category has 82 percent of the total number of registered firms, owning only 26 percent of the total number of vehicles (36).

The study team decided to eliminate all firms in the logistics sector with 31 employees to identify the location and characteristics of the firms in this cluster. Exhibit 49 shows that logistic cluster along the Pacific Corridor are concentrated around Mexico City Metropolitan area (including Toluca), the Bajío Region (Queretaro and Leon), and in Sinaloa. Sonora has also a Cluster around Nogales. An important feature of this logistics cluster is shown in Sinaloa with an extremely decentralized pattern that covers almost all important cities in the state. This trend may be related to the fact that Sinaloa is the main producer of fresh vegetables and grains in Mexico, which require expedited transport services from the production sites to the destination.

In the Central Corridor, the logistic clusters are located in México City, Queretaro, Aguascalientes, San Luis Potosí, Torreon/Gómez Palacio, and in Chihuahua and Ciudad Juárez.

DRAFT



Sources: (30, 32)

*Exhibit 49. Logistics Cluster Location.*

*Lighting and Electrical Equipment Cluster*

Lighting and electrical equipment are one of the fastest growing export industries in Mexico. In 2016, Mexico exported US\$76.4 billion in electrical equipment and machinery, representing 20.4 percent of total exports. This is the second most important export sector.

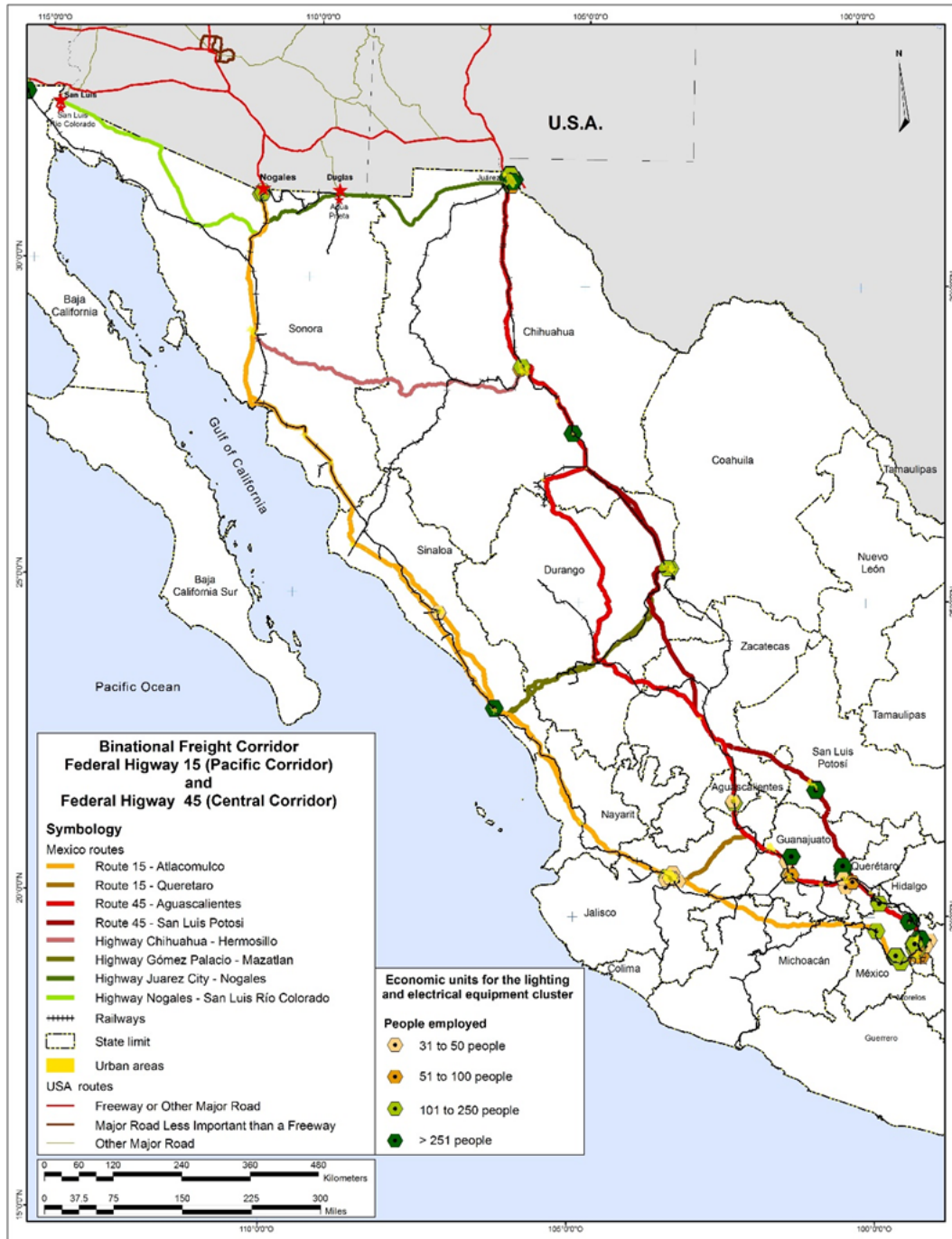
## **DRAFT**

According to the Atlas of Economic Complexity, in 2016, Mexico exported US\$15.2 billion in video display (3.9 percent of total exports), US\$11.8 billion of insulated wire (3 percent of total exports), US\$2.1 billion in electrical lighting and signaling equipment, and US\$596 million in electrical houseware (37).

The lighting and electrical equipment cluster along the Pacific Corridor is concentrated in Mexico City metropolitan zone and Toluca, Tepeji del Rio Hidalgo, Querétaro, and the metropolitan area of Leon and Silao. In the north, only Mazatlan, Sinaloa, and Nogales have related industry.

The Central Corridor shows has a higher concentration of industry than the Pacific Corridor. Industries are not only concentrated in the Metropolitan area of Mexico City, Tepeji, Hidalgo, and Queretaro, but also in San Luis Potosí, Torreon/Gomez Palacios, and three cities in Chihuahua: Delicias, Chihuahua, and Ciudad Juárez (Exhibit 50).

DRAFT



Sources: (30, 32)

Exhibit 50. Lighting and Electrical Equipment Cluster Location.

*Meat-Based Products Cluster*

According to the President of the Association of Meat Based Products, Mexico is the 7th producer of protein from animal origin in the world. In 2016, the total production of meat-

## **DRAFT**

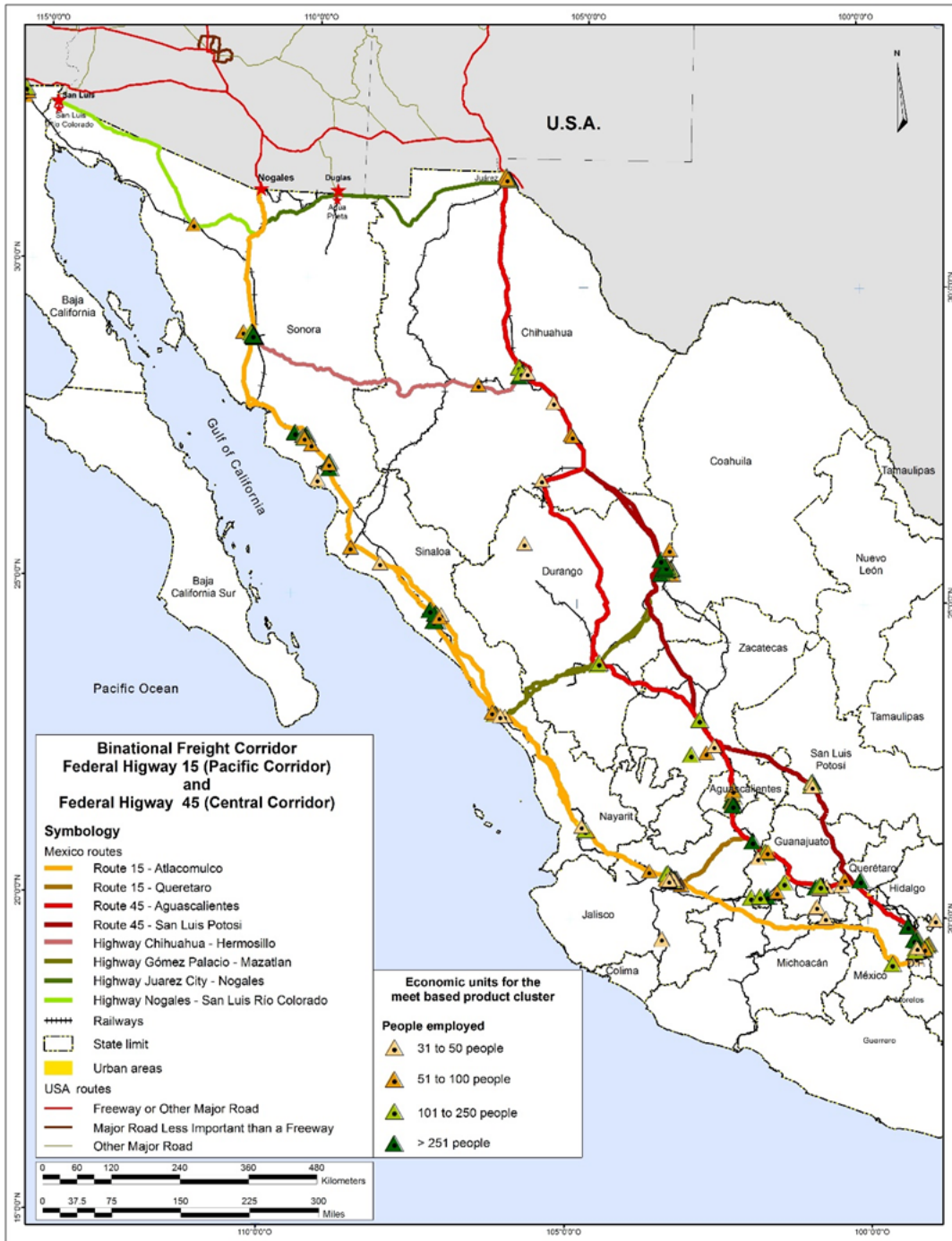
based products was 6.3 million tons, 47 percent poultry, 30 percent cattle, and 21 percent pork (38).

The meat-based cluster along the Pacific Corridor has several meat-based products clusters located around Queretaro (poultry), Guanajuato (pork), Aguascalientes (poultry), Jalisco (pork and cattle), Sinaloa (cattle), and Sonora (pork and cattle) (39). In 2016, Culiacan Sinaloa was the third most important municipality for meat production in Mexico, higher than any municipality in Sonora.

The Central Corridor shows a similar trend with Queretaro (poultry), Guanajuato (pork), Aguascalientes (poultry). However, one of the most important clusters of all three meat products (poultry, pork, and cattle) is in the La Laguna region (Torreon/Gomez Palacio). Chihuahua has also a cluster mainly related to cattle. See Exhibit 51.

.

DRAFT



Sources: (30, 32)

Exhibit 51. Meat-Based Products Cluster Location.



## **DRAFT**

### *Ironwork Cluster*

The ironwork industry in Mexico contributes to 14 percent of manufacturing GDP. This industry is closely linked to the production of appliance, automotive, and mining sectors since it is the main material for the production of these high-value articles (40).

The industry is facing important challenges. The first one is that there are a large number of small and medium size enterprises (SMEs). There are 23,100 enterprises in this sector, and 20,000 are SMEs (41). Other challenge is that that Mexico is still a large importer of machinery. According to the Atlas of Economic Complexity, in 2016, Mexico imported US\$2.94 billion in individual function machinery, US\$1.51 billion in metal casts, US\$1.09 billion in rubber machinery, and US\$928 million in heating machinery (42).

The Pacific Corridor has ironwork clusters in the Bajío region (Querétaro and Guanajuato), Jalisco, Sinaloa (Mazatlán and Culiacan), and Sonora (Hermosillo).

In the Central Corridor, the ironwork clusters are located in Querétaro, Guanajuato, and the two industrial cities in the state of Chihuahua, Ciudad Juárez, and Chihuahua. See Exhibit 52.



DRAFT



Sources: (30, 32)

Exhibit 52. Ironwork Cluster Location.

# DRAFT

## *Mining Cluster*

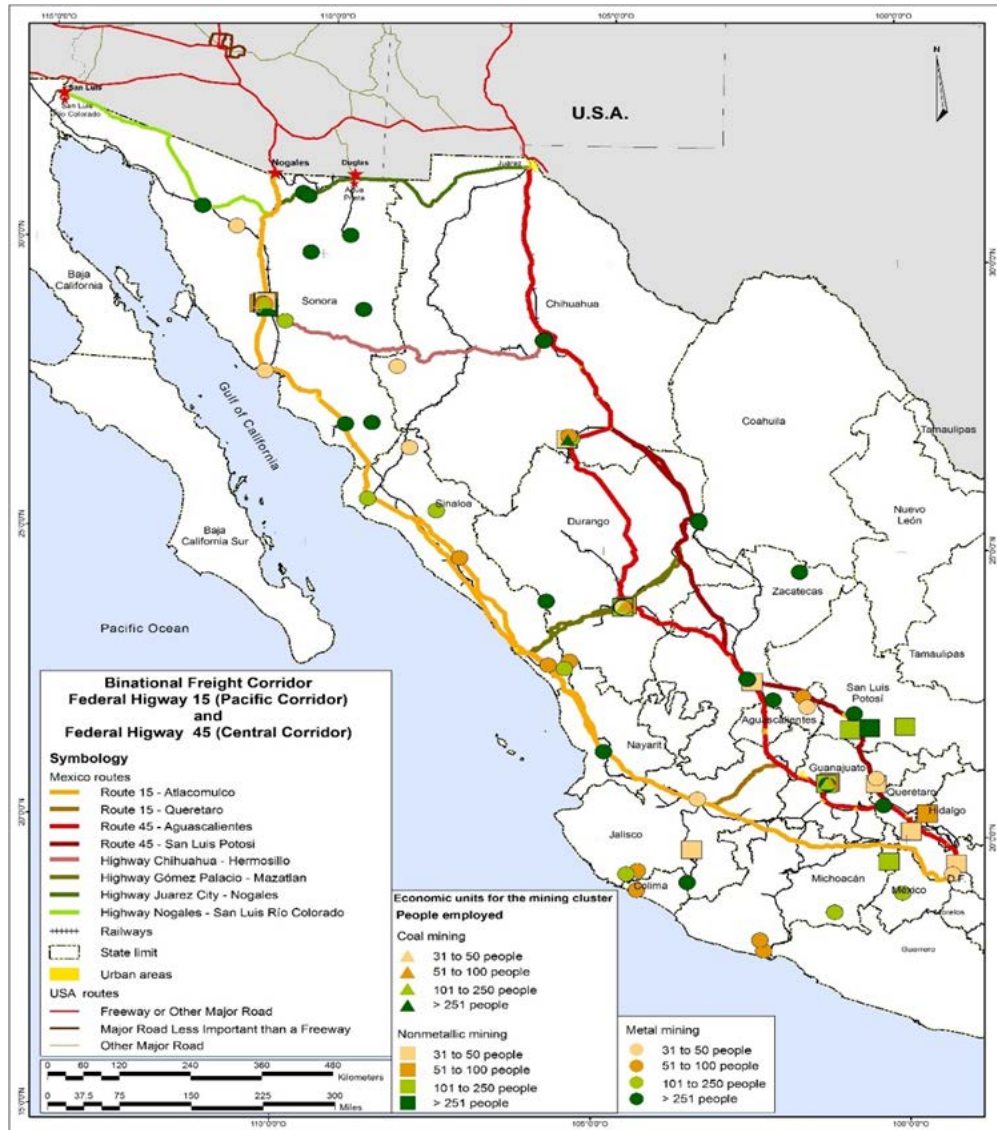
Mining is an important sector for Mexico since it represents 4 percent of the national of GDP. Mexico has the following ranking in metal production (43):

### **Mineral    World ranking by production in 2013**

- Silver                    1
- Fluorite                2
- Sodium Sulfate    3
- Lead                    4
- Copper                10
- Gold                    11

The mining cluster along the Pacific Corridor is concentrated in the state of Sonora. The main production of this cluster is gold and copper. In fact, Sonora ranks as the first Mexican producer in these two metals. In the Central Corridor, the main mining production is located in three states: San Luis Potosi (fluorite, copper, and zinc), Zacatecas (silver and gold), and Chihuahua (silver, gold, and lead). See Exhibit 53.

DRAFT



Sources: (30, 32)

Exhibit 53. Mining Cluster Location.

## **DRAFT**

### *Food elaboration and processing Cluster*

Food elaboration and processing has been acquiring a strategic importance through the years. The main industries in this cluster are bottled water, sodas and juices, canned fruits and vegetables, milk and dairy products, tortilla elaboration, bakery products and meat/poultry based products.<sup>44</sup>

This sector is showing a solid growth. According to 2014 report from PROMEXICO, the food processing industry in Mexico reached 135.493 billion USD and it represents 23.4% of the manufacturing GDP and 3.9% of the total Mexican GDP.

The food elaboration and processing cluster is clearly located in four different zones. The first zone is nearby the Metropolitan area of Mexico City and Toluca, a market of more than 18 million inhabitants. The second zone is the one located in the Bajío (specifically around the cities of Celaya, Irapuato and León) in which important plants from firms like Herdez and Sigma Alimentos are located. Along the Pacific Corridor, the food processing industry is concentrated in the states of Jalisco, Nayarit, Sinaloa and Sonora. Sinaloa, is the state with a much higher concentration of plants, since this state is considered the food reservoir of Mexico.

In the Central Corridor, the main food production is in Aguascalientes and the Laguna Zone (Lala and Chicolta plants) and in the State of Chihuahua specially around the cities of Delicias (milk and dairy products), Camargo (nuts) and Chihuahua See Exhibit 54.

DRAFT



Sources: (30, 32)

Exhibit 54. Food Elaboration and Processing Clusters Located along the Study Corridors

## **DRAFT**

### *Export Crops: Avocado*

Avocado is one of the fastest export crops and it has triple its production from 2008 to 2016. According to a report by the Ministry of Economy, avocado will probably surpass one million tons of export in 2016. The US is the most important export market for this crop (79%) while exports to Japan and Canada represents 9% and 6% respectively.<sup>45</sup>

However, it is important to know that the municipalities or regions that produce avocados must be certified that there are free of “screwworm” to be able to export this crop.

The Pacific Corridor has a strategic advantage in this export crop vis a vis the Central Corridor, since the most important producers are in Michoacán, Jalisco and Nayarit. More recently, Sinaloa and Sonora are also beginning to produce this crop, as shown in Exhibit 55.



DRAFT



Source:(46)

Exhibit 55. Export Crop. Avocado

## DRAFT

### *Export Crops: Tomatoes*

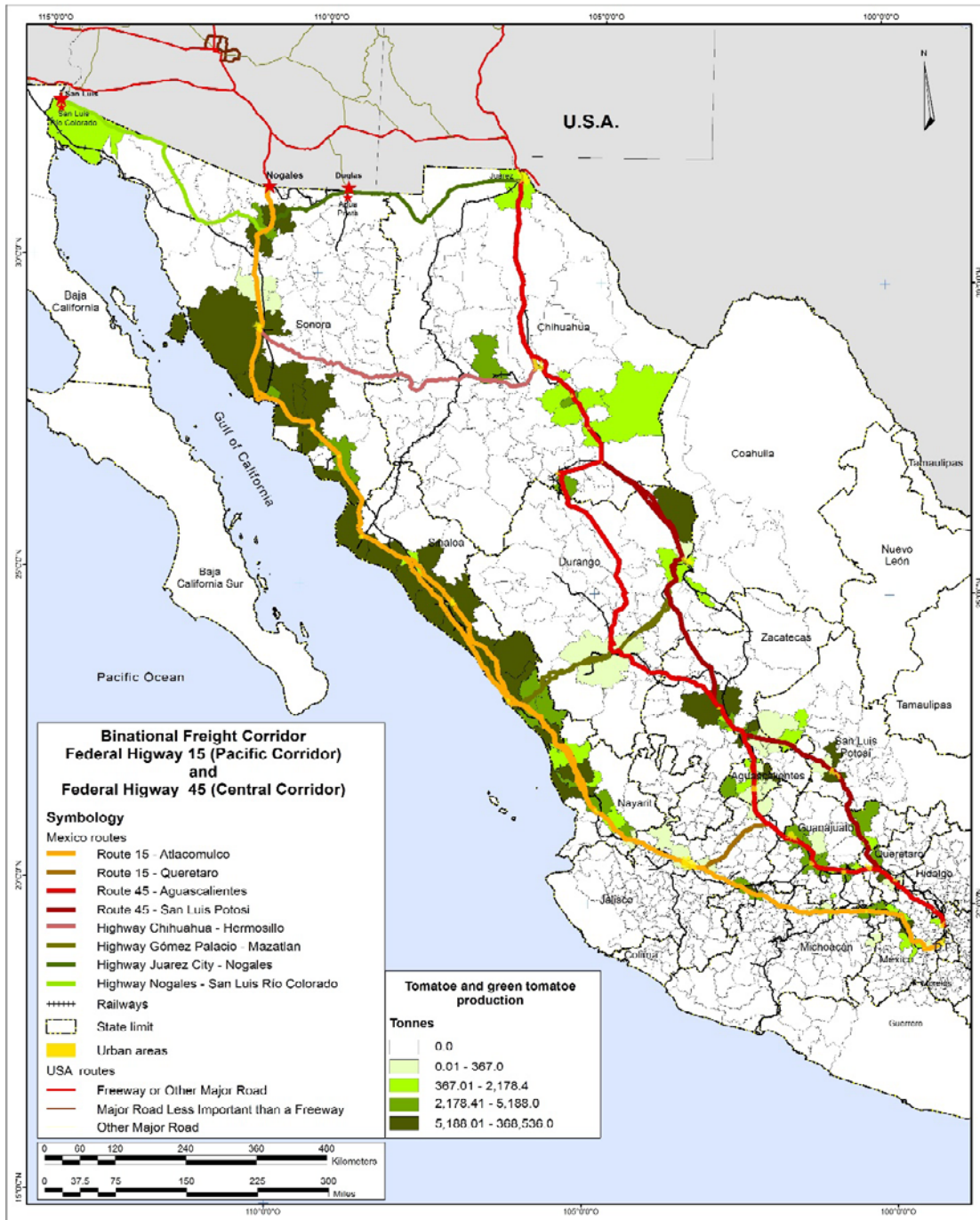
México was the world number one exporter of tomato by value in 2015 with almost 2.8 million tons per year.<sup>47</sup> The value of tomato exports by country is shown below.

- Mexico: US\$1.8 billion (21.6% of total worldwide tomatoes exports)
- Netherlands: \$1.7 billion (19.9%)
- Spain: \$1.1 billion (12.7%)
- Morocco: \$661.2 million (7.9%)
- Turkey: \$365.3 million (4.3%)
- France: \$347.1 million (4.1%)
- United States: \$335.3 million (4%)

The U.S. is the most important market since it receives 74% of this Mexican export of fresh tomatoes.

The Pacific Corridor has a strategic advantage in this crop since Nayarit, Sonora and especially Sinaloa (which has the highest yields for open fields) are the major producers of this crop. In the Central Corridor, the major producers are in San Luis Potosí, the Laguna Region and Durango (Exhibit 56).

DRAFT



Source:(44)  
Exhibit 56. Export Crop. Tomatoes

## **DRAFT**

### *Export Crops: Cantaloupes and Watermelons*

According to a SAGARPA report, Mexican exports of melon, watermelon and papaya are among the top five products marketed by the country. Watermelon is among one of the fastest rising production crops and Mexico ranks in second worldwide place by dollar value of exports behind Spain.(48).

- Spain: US\$331.7 million (24.8% of total watermelon exports)
- Mexico: \$316.9 million (23.7%)
- United States: \$125.8 million (9.4%)
- Italy: \$69.9 million (5.2%)
- Netherlands: \$60.8 million (4.5%)
- Greece: \$48.6 million (3.6%)

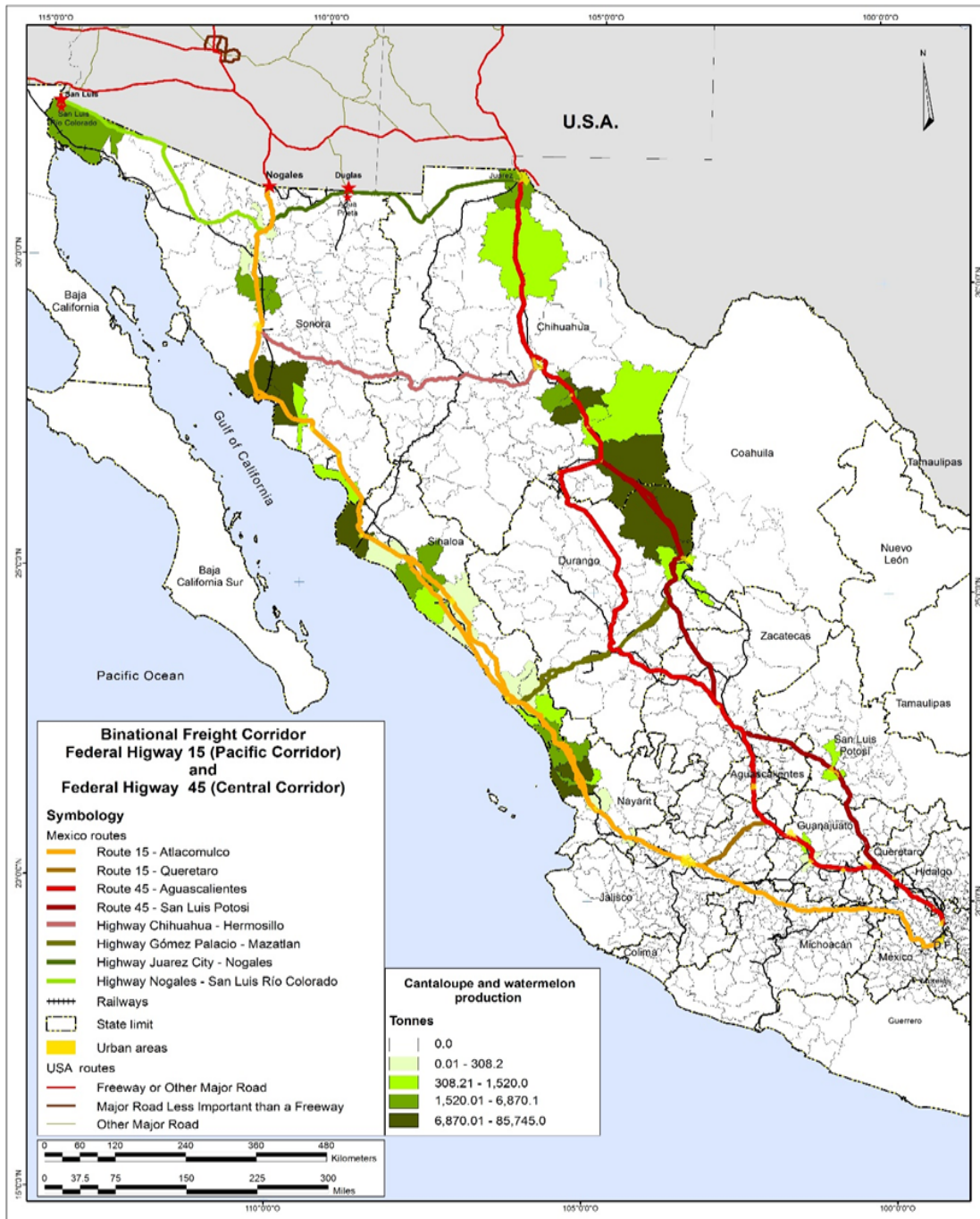
Production of cantaloupes is less important and Guatemala and Honduras have replaced México as an important supplier for the US market.

The Pacific Corridor has a strong advantage in the production of watermelon with Sonora being the top state producer in Mexico. Moreover, Nayarit and Sinaloa also produce watermelons. In the Central Corridor, Chihuahua and

In the Central Corridor, Chihuahua and Durango and Coahuila are the most important states to produce these crops. Coahuila deserves a special mention as the first producer of melons (Exhibit 57).



DRAFT



Source:(44)

Exhibit 57. Export Crops: Watermelons and cantaloupes

## **DRAFT**

### *Export Crops: Nuts, peanuts and pistachios*

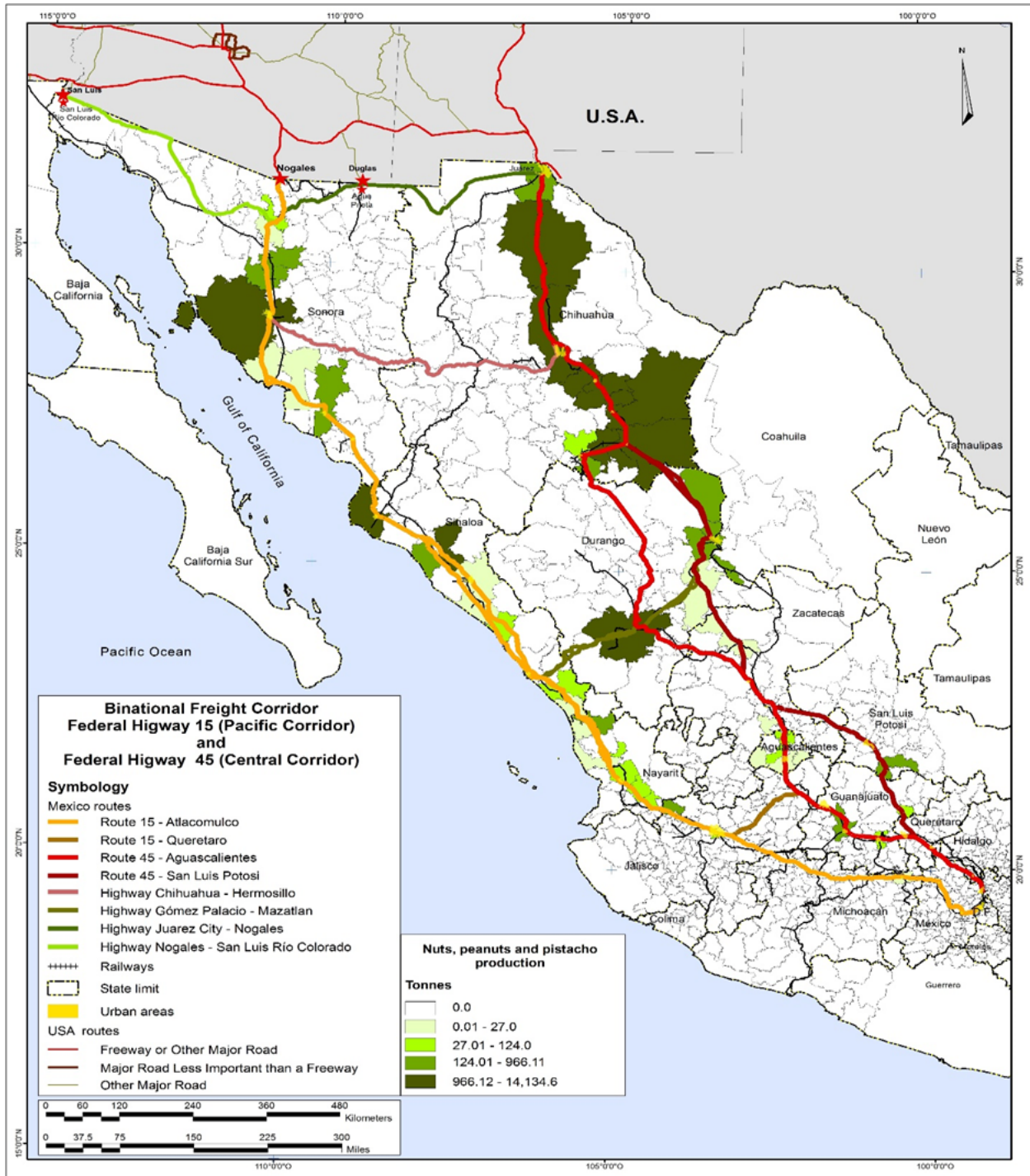
The rise of the production of candies in the US and China has led to a sharp increase in the production of nuts in Mexico. According to a report from the National Finance Agricultural Forestry and Fisheries, in 2013 Mexico exported 52,000 tons of nuts and made revenues for US\$259 million. Exports from 2000 to 2013 have grown at a 6% annual rate.

The Central Corridor has a decisive advantage in the production of nuts, since Chihuahua (the biggest producer), Coahuila and Durango are among the most relevant producers for these crops. Chihuahua is also an important producer of peanuts, but this crop is for internal consumption.

In the Pacific Corridor, Sonora is the most important producer of nuts, and Sinaloa is a peanut producer as seen in Exhibit 58.



DRAFT



Source:(44)

Exhibit 58. Export Crops: Nuts, pistachios and peanuts

## DRAFT

### *Export Crops: Berries*

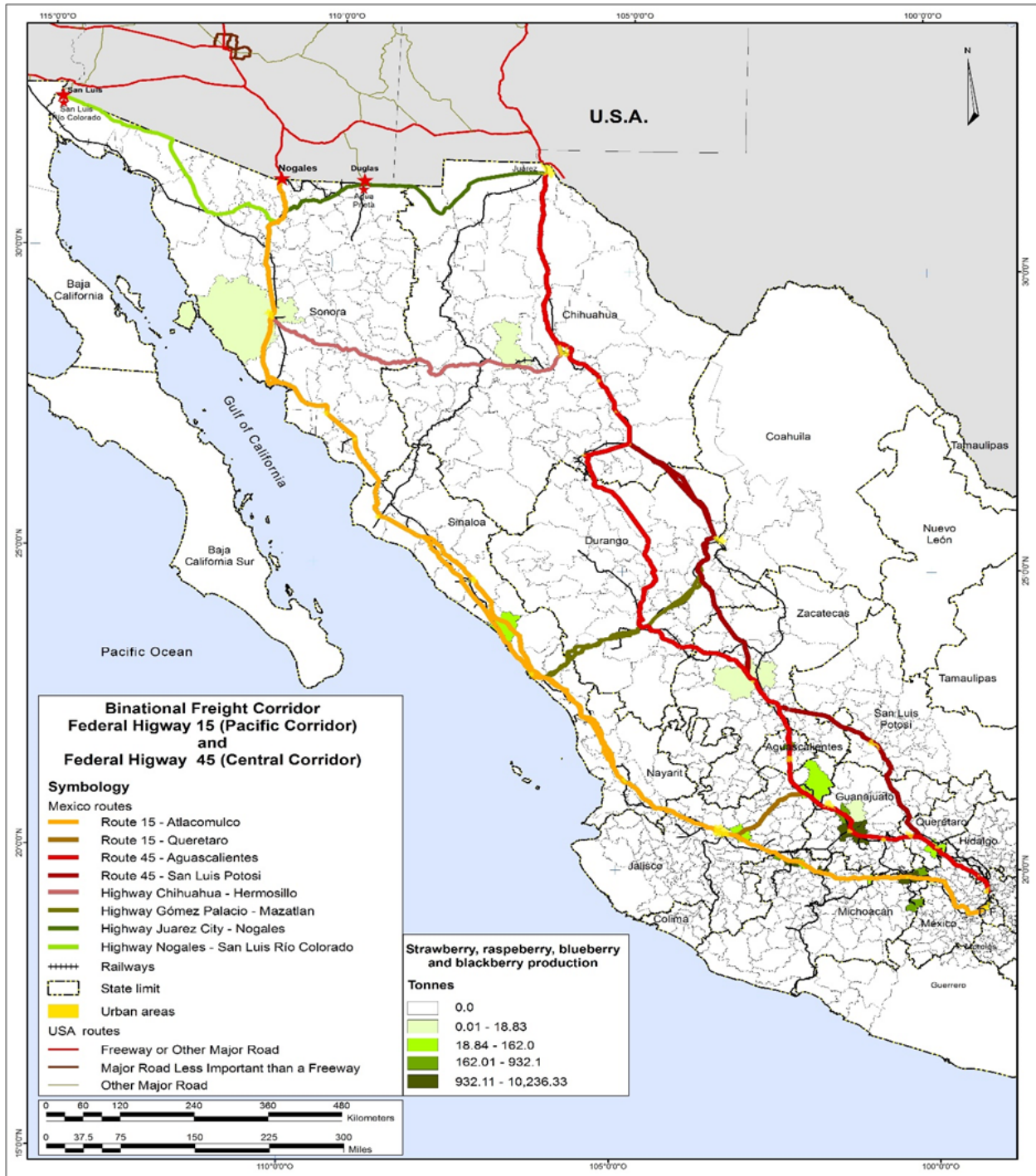
The National Agricultural Council (a Mexican organization that groups agricultural enterprises) reports that between 2014 and 2015, exports of berries increased 20% and in the past ten years they have increased 86% in volume and 90% in profits. This enormous increase can be explained by a steady and growing worldwide demand of these fruits that are gaining a strong preference among the consumers and by the Russian embargo, which has also favored Mexican exports.<sup>49</sup>

Figures reported by PROMEXICO indicate that from the 1.236 USD billion of exported berries in 2014, 40% were strawberries (fresh and frozen), 37% raspberries, 18% blackberries and 6% cranberries.<sup>50</sup>

Neither the Pacific or Central corridor have a strong advantage in the production of berries, since these crops are produced in the states of the Bajío (particularly Guanajuato) and Michoacán. Therefore, export to the US could choose one corridor or the other, depending on the location in the US where the berries will be exported.

However, Exhibit 59 shows that the strong demand for berries is encouraging new production zones located in Sonora and Jalisco, but also in the region of la Laguna and Chihuahua.

DRAFT



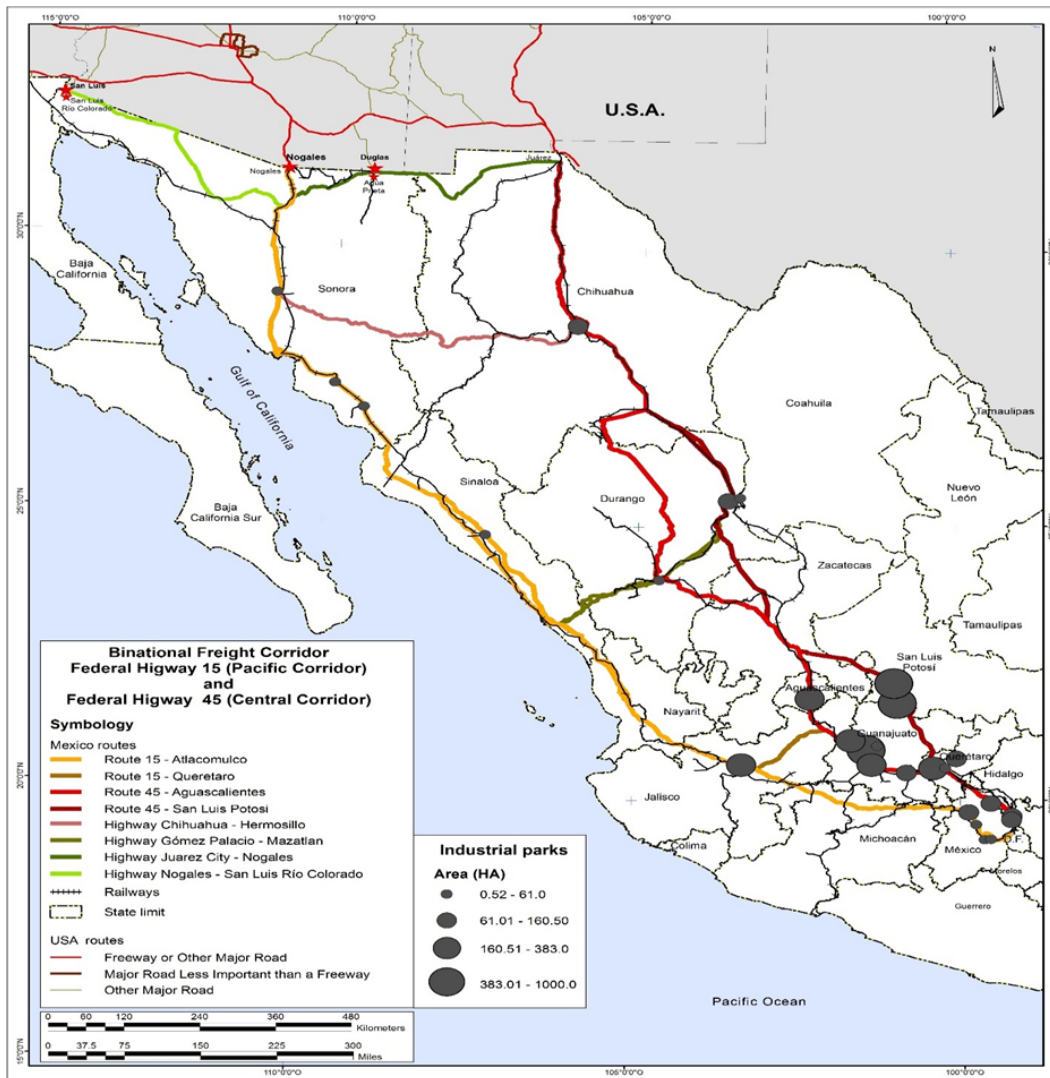
Source:(44)

Exhibit 59. Export Crops: Berries. Export Crops: Berries.

**DRAFT**

**INDUSTRIAL PARKS**

Industrial parks in Mexico make up most of the industries that export manufactured goods. AMPIP has a database that shows the location, size, and companies established in each industrial park (31). The AMPIP information was analyzed to identify the location of each industrial parks along each of the two corridors and the most representative industries. See Exhibit 60, Exhibit 61 and Exhibit 62.



Source: (31)  
*Exhibit 60. Industrial Parks Located along the Study Corridors.*



**DRAFT**

*Exhibit 61. Industrial Parks Located along the Pacific Corridor (Atacomulco Route).*

City	State	Industrial Park	Size (hectares)	Representative Companies	Industry Sector
Hermosillo	Sonora	Vie Verte Business Center Hermosillo	10	Bosch	Aerospace
Ciudad Obregon	Sonora	Nave Bacum 1	0.46	Yazaki	Automotive
Ciudad Obregon	Sonora	Nave Bacum 2	0.66		
Ciudad Obregón	Sonora	Parque Industrial Mazatlán	40	Café Marino, Dportenis, Agroindustrias del Norte, Plasticos agricolas y geomembranas de México	Food and beverages, clothing, chemicals, plastics
Navojoa	Sonora	Nave Etchojoa	0.6	Yazaki	Automotive
Culiacán	Sinaloa	Parque Industrial Guasave	22	Cemex	Construction
Guadalajara	Jalisco	Guadalajara Technology Park	216	Accel Logistics, Alpezzi Chocolate, Cablevision Red, DHL, Dicka, Flextronics, Fresenius Kabi, Liverpool, Mabe, Siemens	Food, logistics, home electronics, electronics
Guadalajara	Jalisco	Prologis Park Jalisco	6.4	Herbalife, Keysight Technologies, Logistorage, Prologis, Sunningdale Technologies, Victory Packaging	Food, electronics, logistics, service providers, plastics
Guadalajara	Jalisco	Prologis Park Periferico Sur	11.3	Laboratorios Pisa, Optimo Autopartes, Carso, Herdez	Pharma, construction, automotive, food
Guadalajara	Jalisco	Parque Industrial Tecnológico II	19.2	Bonafont, Heinz, Intel, Nextel	Food and beverages, electronics and technology
Guadalajara	Jalisco	Prologis Park El Bosque Distribution Center	3.03	Boehringer Ingelheim, SBLogistics, UTI, Boart Longyear	Pharma, logistics, construction
Guadalajara	Jalisco	Prologis Park El Salto	35	Omnilife, Expeditors, Angelíssima, Gates, ZF	Food, logistics, cosmetics, automotive
Guadalajara	Jalisco	Prologis Park Los Altos	29.4	IBM, Summa, Geodis, Chedraui, UTI	Technology, logistics, consumer goods

**DRAFT**

City	State	Industrial Park	Size (hectares)	Representative Companies	Industry Sector
Guadalajara	Jalisco	Parque Industrial Advance Guadalajara	21		
Guadalajara	Jalisco	Prologis Park Arrayanes	30	Big Cola, 7-eleven, Walmart, Farmacias Guadalajara	Food and beverages, pharma, distribution center
Tepetzotlán	State of Mexico	BTSD Parque Industrial Tepetzotlán 1	15	Confidencial	Logistics
Tepetzotlán	State of Mexico	Prologis Park Carrizal	12	Comercializadora México America, Ryder	Logistics
Tepetzotlán	State of Mexico	Prologis Park Cedros	30	Electrica Argos, LG, RadioMovil DIPSa, Johnson Controls	Electronics, service providers, automotive
Tepetzotlán	State of Mexico	CPA Logistics Center Tepetzotlán	17.5	Argos Eléctrica, Kimberly Clark, Scribe	Electronics and distribution center
Cuautitlán Izcalli	State of Mexico	Prologis Park Tres Rios	52	DHL, Rama Farmacéutica, Android de México, Bijou México	Logistics, pharma and automotive
Cuautitlán Izcalli	State of Mexico	Prologis Park Izcalli	30	APL, Autotek México	Logistics and automotive
Cuautitlán Izcalli	State of Mexico	Parque Microindustrial Cuautitlán Izcalli	2.7	Biotecca, Camiones Dina	Chemicals and transportation
Toluca	State of Mexico	Parque Industrial San Cayetano	44	Chocolates Turin, Constructora Chufani, Lechería Guadalajara, Petstar, Pronumex	Petrochemical, food and beverages, construction
Jilotepec	State of Mexico	Parque Industrial Jilotepec	115	ADS Mexicana, Servicios Químicos y Maquilas, Tecno Azul, Truper	Construction, petrochemical and metals
Atacomulco	State of Mexico	Parque Industrial Santa Barbara	107	Polyrafia, Refrigeración Ojeda, Sony Gas, Transportes Unidos del Centro	Petrochemical, transportation and home electronics
Ixtlahuaca	State of Mexico	Parque Industrial Ixtlahuaca	50	Corvaglia Clousores, Derileq, Intimark, VP Corp	Petrochemical, construction and metals

*Exhibit 62. Industrial Parks Located along the Central Corridor.*



**DRAFT**

City	State	Industrial Park	Size (hectares)	Companies	Industries
Ciudad Juárez	Chihuahua	Parque Industrial Juarez	6.86	Avery de México, Cesar Scott, Circuitos y Ensamblés, Cosma, Woodburn	Automotive and electronics
Ciudad Juárez	Chihuahua	Gema I Industrial Park	2.48	Bilco and Tianhai	Automotive
Ciudad Juárez	Chihuahua	Parque Industrial Omega		Eaton and Genpact	Electronics and other
Ciudad Juárez	Chihuahua	Gema II Industrial Park	0.36		
Ciudad Juárez	Chihuahua	Parque Industrial Intermex	11.32	Furukawa, ZF Electronics	Automotive and electronics
Ciudad Juárez	Chihuahua	Parque Industrial Aero Juarez	41.17	Danhil, EP Logística, Induspark, Itesa/Siemens, Luvata	Packing, logistics, electronics and automotive
Ciudad Juárez	Chihuahua	Las Torres Industrial Area	1.01	Accel Comercial, TPI Composites	Logistics and other
Ciudad Juárez	Chihuahua	Parque Industrial Intermex Sur	62.7	BMP America, Custom Profile, Jones Plastic, Longda	Home appliances, plastics and petrochemicals
Chihuahua	Chihuahua	Parque Industrial Intermex Carolina	30	Textron International	Aerospace
Chihuahua	Chihuahua	Parque Industrial Intermex Norte	14	EZ Air, Honeywell, Manoir Aerospace, and Visteon	Aerospace, electronics and automotive
Chihuahua	Chihuahua	Parque Industrial Intermex Aeropuerto	50	Sumidenseo	Automotive
Chihuahua	Chihuahua	Finsa El Saucito	14	Altec Electronica Chihuahua, Corrugados de Baja California and Industrial Labor	Electronics and other
Chihuahua	Chihuahua	Tabalaopa Industrial Park Chihuahua	53.7		
Torreón	Coahuila	Parque Industrial Amistad Torreón	19.14	Aramark Uniform, Honeywell, Kone, Leoni, ML Industries, Red Kap and Wrangler	Aerospace, automotive, textile and apparel

**DRAFT**

City	State	Industrial Park	Size (hectares)	Companies	Industries
Aguascalientes	Aguascalientes	Parque Industrial San Francisco IV	122	Genasco Yokohama	Automotive
Aguascalientes	Aguascalientes	Finsa Aguascalientes	161		
Aguascalientes	Aguascalientes	Douki Seisan Park		Nissan, Nitco, Posco, Sanoh, Magna, Tachi-S and Vantek	Automotive
San Luis Potosí	San Luis Potosí	Colinas de San Luis Industrial Park	300	Genasco Yokohama	Automotive
San Luis Potosí	San Luis Potosí	WTC Industrial	350	ABB, ABM Tool & Die, Cyvsa, El Bisonte, Flimsa, Motomex, Nippon Express, Otsccon, Sel, Techo State, Valeo and VIA Motors	Automotive, electronics and logistics
Villa de Reyes	San Luis Potosí	Parque Industrial Logistik	1000	Ampromex, Asahi Glass Company, Hyeunnam, Inprotec, Kostal, MPI de Mexico, Narmx, New Motech, Peter-Lacke, Plaka Comex, Sit Mobel, TRW Frenos	Aerospace, autmotive, plastics, logistics, electornics, other
León	Guanajuato	Colinas de León Industrial Park	230	MD Elektronik	Electronics
León	Guanajuato	Colinas del Rincón Industrial Park	100	Kromberg & Schubert	Automotive
León	Guanajuato	VYNMSA León Industrial Park	44	Hanwha, Hyundai Dymos, Koam, Hitachi, Hexacomb	Energy, automotive, plastics, packaging and other
Silao	Guanajuato	Advance Puerto Interior	27	Röchling	Automotive
Silao	Guanajuato	Santa Fe Industrial Parks Guanajuato Inland Port	650	Acero Sueco Palme de Leon, Bio Pappel, Mailhot de Mexico, Mc Systems, Roki Mexico, Schreiber, Technimark, Samot, Sovere de Mexico	Automotive, electronics, logistics and plastics
Silao	Guanajuato	Vestapark Guanajuato I		American Axel, Andrea, Baxter, Bodycote, Delphi, Mron, Rubena	Automotive, electronics and other

**DRAFT**

City	State	Industrial Park	Size (hectares)	Companies	Industries
Silao	Guanajuato	Las Colinas Industrial & Business Park	130	UGN, OMRON, Automotive Bend	Automotive
Guanajuato	Guanajuato	VYNMSA Guanajuato Industrial Park	61	Anderson Cook, Gemo, Inalfa, Kinugawa, SB Logistics and Webasto	Manufacture, automotive and logistics
Irapuato	Guanajuato	Parque Tecno Industrial Castro del Río	370	Acumen, Altopro, Iwai, Gugar, Okawa, Proasa, Ryobi, SB Logistics, Tamx, Topura, Yuken and TsTech	Automotive, electronics and plastics
Celaya	Guanajuato	Parque Industrial Cuadritos	3	Gobar System	Automotive
Celaya	Guanajuato	Novopark	2.2	2M Electric, Almex, BEC, CG Trucks, Coppel, In-Mec, Logistica Lex, Sefpnos	Electronics, manufacture, plastics, pharma
Celaya	Guanajuato	Parque Industrial Ayalkar	5	Infamol Mexico	Automotive
Celaya	Guanajuato	Parque Industrial Amistad Bajío	75	Bridgestone, G-One, H-One, Metal One, Michelin, PKC, Nistrans, Sonoco, Yachiyo, Yutaka	Automotive and manufacture
Queretaro	Queretaro	Advance 05	2.5	Nexttec Machinery and Mitsubishi Electric	Electronics and other
Queretaro	Queretaro	Advance Parque Tecnológico	70	Alestra, Naps, Wesco, Plásticos Carcal, Geiger, Panasonic, Hitec, Forschner, Shinsho, Trumpf, Airtech	Automotive, manufacture, plastics, metals and other
Queretaro	Queretaro	Business Park Conín	3.6		
Queretaro	Queretaro	Business Park Sendero	1.9	Distributoto, Ceus Lub and Suin.	Food and service providers
Queretaro	Queretaro	FINSA Queretaro	101	Alestra, Erreka Mex, Infema Mexico, Nihon Magencio, Merial Mexico, Nihon Plast, RC Digital, Whitman	Electronics, manufacture, automotive and plastics
Queretaro	Queretaro	Parque Aeroespacial Queretaro	100	Bombardier, Grupo Safran, and Meggitt	Aerospace

**DRAFT**

City	State	Industrial Park	Size (hectares)	Companies	Industries
Queretaro	Queretaro	VYNMSA Queretaro Industrial Park	18	Corruempaques, Federal Mogul, Hexacomb, Panduit, Variform	Automotive and packaging
El Marqués	Queretaro	Parque Industrial Advance Queretaro	36	Nutriplast	Plastics
Colón	Queretaro	Parque Industrial AeroTech	80	Airbus Helicopters, Nachi, AGM, Belcorp.	Aerospace and automotive

**KEY SUPPLY CHAINS**

A key element of this Binational Corridor Study is to analyze trade and transportation at the supply chain level. In order to identify the key supply chains that need to be analyzed in more detail in subsequent tasks of this project, three separate international trade databases were analyzed:

1. The 2015 U.S. Census data information on U.S. trade with Mexico by value in 2015.(51) The analysis was conducted based on commodity value, as this database does not provide volume by tonnage, and does not provide transportation mode or border crossing location.
2. The 2013 Transearch Database that was provided by ADOT. The database provides information on commodity weight and mode of transport movements, as well as port of entry.
3. 2016 Datamyne trade information. The database that was purchased for specifically for this project has detailed cross border transactions by 6-digit HS code, border crossing with date, transportation mode, shipper, weight, value, and an estimation of number of truckloads, railcar moves and point of origin and destination.

The results of the analysis of these trade databases is presented in this section with detailed information in the appendices of this report.

**U.S. Census Information Analysis**

The information that is provided at a 6-digit HS code was disaggregated to identify trade between the U.S. Western States of Arizona, California, Idaho, Nevada, Oregon and Washington, and Mexico in order to identify trade that most likely will cross the border at California, Arizona or El Paso in Texas. Exhibit 63 shows the top imports from Mexico to the western states. Detailed commodities were collapsed into broad commodity categories (2-digit HS code) for ease of interpretation. Exhibit 64 shows the top exports from the western states.

**DRAFT**

*Exhibit 63: U.S Census Data Top Imports by Value from Mexico to Western States (2015)*

Broad Commodity Category	Percent of top 100 imports from Mexico	Detailed commodities include:
Vehicles; Other than Railway or Tramway Rolling Stocks, and Parts and Accessories Thereof	29.70%	<ul style="list-style-type: none"> <li>• Passenger vehicles</li> <li>• Vehicles for transporting goods</li> <li>• Tractors</li> <li>• Trailers</li> <li>• Vehicle parts</li> <li>• Wheels</li> </ul>
Electrical Machinery and Equipment and Parts Thereof; Sound Recorders and Reproducers; Television Image and Sound Recorders and Reproducers, Parts and Accessories of Such Articles	29.10%	<ul style="list-style-type: none"> <li>• Reception apparatuses for televisions</li> <li>• Communications apparatuses (excluding telephones)</li> <li>• Photosensitive electrical apparatuses</li> <li>• Insulated electrical conductors</li> <li>• Wiring sets used in vehicles</li> </ul>
Nuclear Reactors, Boilers, Machinery and Mechanical Appliances; Parts Thereof	7.30%	<ul style="list-style-type: none"> <li>• Digital processing units</li> <li>• Refrigerators/freezers</li> <li>• Lifting and loading machinery</li> <li>• Turbines for turbo-jets and turbo-propellers</li> </ul>
Optical, Photographic, Cinematographic, Measuring, Checking, Medic or Surgical Instruments and Apparatus; Parts and Accessories	6.40%	<ul style="list-style-type: none"> <li>• Medical, surgical or dental instruments</li> <li>• Electro-diagnostic apparatuses</li> </ul>
Fruits and Nuts, Edible; Peel of Citrus Fruit or Melons	6.00%	<ul style="list-style-type: none"> <li>• Avocados</li> <li>• Berries</li> <li>• Grapes</li> <li>• Watermelons</li> <li>• Lemons and limes</li> </ul>
Edible Vegetables & Certain Roots & Tubers	5.70%	<ul style="list-style-type: none"> <li>• Tomatoes</li> <li>• Peppers</li> </ul>

**DRAFT**

Broad Commodity Category	Percent of top 100 imports from Mexico	Detailed commodities include:
		<ul style="list-style-type: none"> <li>• Cucumbers</li> <li>• Onions</li> <li>• Pumpkins</li> <li>• Asparagus</li> </ul>
Special Classification Provisions,	3.80%	<ul style="list-style-type: none"> <li>• Articles exported and returned</li> </ul>
Meat and Edible Meat Offal	1.60%	<ul style="list-style-type: none"> <li>• Meat of bovine animals (i.e. cows)</li> </ul>
Aircraft, Spacecraft, and Parts Thereof	1.30%	<ul style="list-style-type: none"> <li>• Parts of airplanes or helicopters</li> </ul>
Beverages, Spirits and Vinegar	1.20%	<ul style="list-style-type: none"> <li>• Spirits and Liquers</li> <li>• Beer</li> </ul>

*Exhibit 64: U.S Census Data Top Exports by Value to Mexico from Western States (2015)*

Commodity Definition (for HS Code)	Percent of top 100 exports to Mexico	Detailed commodities include:
Electrical Machinery and Equipment and Parts Thereof; Sound Recorders and Reproducers; Television Image and Sound Recorders and Reproducers, Parts and Accessories of Such Articles	29.00%	<ul style="list-style-type: none"> <li>• Communications apparatuses (excluding telephones)</li> <li>• Electronic integrated circuits</li> <li>• Processors and controllers</li> <li>• Electrical apparatuses</li> <li>• Reception apparatuses for televisions</li> </ul>
Ores, Slag and Ash	10.80%	<ul style="list-style-type: none"> <li>• Copper ores and concentrates</li> </ul>
	10.20%	<ul style="list-style-type: none"> <li>• Parts for automatic data processing machines</li> </ul>



**DRAFT**

Commodity Definition (for HS Code)	Percent of top 100 exports to Mexico	Detailed commodities include:
Nuclear Reactors, Boilers, Machinery and Mechanical Appliances; Parts Thereof		<ul style="list-style-type: none"> <li>• Automatic data processing storage units</li> <li>• Gas turbine parts</li> <li>• Engines</li> <li>• Parts for printers, copiers, and fax machines</li> <li>• Pumps and compressors</li> </ul>
Vehicles; Other than Railway or Tramway Rolling Stocks, and Parts and Accessories Thereof	9.50%	<ul style="list-style-type: none"> <li>• Body parts for vehicles</li> <li>• Other vehicle parts</li> <li>• Passenger vehicles</li> <li>• Wheels</li> <li>• Shock absorbers</li> </ul>
Mineral Fuels, Mineral Oils and Products of Their Distillation; Bituminous Substances; Mineral Waxes	8.30%	<ul style="list-style-type: none"> <li>• Petroleum oil</li> <li>• Natural gas</li> </ul>
Aircraft, Spacecraft, and Parts Thereof	6.90%	<ul style="list-style-type: none"> <li>• Civilian aircraft, engines, and parts</li> </ul>
Plastics and Articles Thereof	5.90%	<ul style="list-style-type: none"> <li>• Articles of plastic</li> <li>• Boxes, cases, crates</li> <li>• Fittings for tubes, pipes, and hoses</li> <li>• Plates, sheets, film</li> </ul>
Optical, Photographic, Cinematographic, Measuring, Checking, Medic or Surgical Instruments and Apparatus; Parts and Accessories	2.80%	<ul style="list-style-type: none"> <li>• Medical, surgical or dental instruments and appliances</li> </ul>
Aluminum and Articles Thereof	2.50%	<ul style="list-style-type: none"> <li>• Aluminum alloys, unwrought [not finished]</li> <li>• Aluminum alloy bars</li> </ul>
Fruits and Nuts, Edible; Peel of Citrus Fruit or Melons	2.20%	<ul style="list-style-type: none"> <li>• Apples</li> <li>• Grapes</li> </ul>

## DRAFT

### *Supply Chain definition from the Census Data*

Based on the top commodities traded between western states and Mexico, the top 10 supply chains that would require further analysis are:

- Vehicles
  - Vehicles are listed separated from vehicle parts because of their different shipping needs
- Autoparts
  - Some of the items from the category “Nuclear Reactors, etc.” can be included here, such as engines, because of their similarities
- Electronics
  - Some of the items from the category “Nuclear Reactors, etc.” can be included here, such as digital processing units, because of their similarities
  - Some of the items from the category “Optical, etc.” can be included here, such as “electro-diagnostic apparatuses” because of their similarities
- Fruits and Vegetables
  - Fruits and vegetables have been combined because of their similarities
  - Imports and exports will be analyzed separately because there are significant differences in the supply chain
- Meat
- Aircraft Parts
- Beverages
- Copper Ore
- Plastics
- Appliances
  - Objects such as refrigerators/freezers from the category “Nuclear Reactors, etc.” are included here because of their unique shipping needs

### *2013 Transearch Database*

The 2013 Transearch database includes 4-digit standard transportation commodity code (STCC) type commodity flows that are moved on Arizona’s transportation system, which includes freight moved from, to, within and through Arizona. Thus, binational trade from, to, and through Arizona is included; and associated truck and rail based top commodities by weight and value.

The Transearch database has a limitation that it only provides the first or the last node on Arizona’s roadway system for commodity flows. In other words, although truck based binational trade through the Arizona POE roadways located at the border between Arizona and Mexico can be identified, flows passing through Arizona and entering or leaving through ports of entry outside Arizona cannot be uniquely identified. For El Paso POE, a special assumption could be made that the flow enters or leaves Arizona through Interstate-10

**DRAFT**

highway. This would be an approximation to compare relative use between Arizona POEs and El Paso POEs.

With this level of information, the commodity flows along each corridor can only be understood in terms of proximity of origin or destination zones to an analysis corridor. In other words, the relative use of Pacific and Central Corridors are understood in terms of the Mexico states that are near the Pacific Corridor only, Central Corridor only, and both corridors. Corresponding to the top binational trade commodities, the splits between the corridors are shown in the following exhibits (Exhibit 65 and Exhibit 66).

The market shares on U.S. side, are estimated based on the information that the Transearch database provides, which is at the bureau of economic analysis (BEA) region level trading partner information. The top binational trade commodities and the top regions in U.S. are identified in the following exhibits (Exhibit 65 and Exhibit 66).

Important to note that the origins and destination identified in Transearch may not represent the ultimate origin or the ultimate destination; the reported origin or destination could be the location of an intermediate industry within the supply chain, or the state of the port of entry, even the main office address. This limitation will be solved once a detailed analysis of the key supply chains is performed during Task 2 of the project. The Appendix presents a detailed methodology that was used in the analysis of the Transearch Database.

*Exhibit 65. Top Truck U.S. Export Commodities to Mexico from and through Arizona by Weight*

Rank	STCC	STCC Description	Weight (in Tons)	% of Total Weight
1	01 22	Deciduous Fruits	341,677	10.20%
2	28 21	Plastic Mater or Synth Fibers	174,223	5.20%
3	10 21	Copper Ores	165,814	5.00%
4	33 12	Primary Iron or Steel Products	153,494	4.60%
5	26 21	Paper	121,942	3.60%
6	13 12	Natural Gas	119,880	3.60%
7	26 51	Containers or Boxes, paper	108,951	3.30%
8	37 14	Motor Vehicle Parts or Accessories	92,160	2.80%
9	30 71	Misc. Plastic Products	87,515	2.60%
10	29 11	Petroleum Refining Products	73,248	2.20%
11	28 12	Potassium or Sodium Compound	68,792	2.10%
12	36 74	Solid State Semi conducts	59,136	1.80%
13	20 82	Malt Liquors	58,092	1.70%
14	30 11	Tires or Inner Tubes	49,432	1.50%

**DRAFT**

Rank	STCC	STCC Description	Weight (in Tons)	% of Total Weight
15	24 21	Lumber or Dimension Stock	43,605	1.30%
16	20 11	Meat, Fresh or Chilled	41,465	1.20%
17	28 71	Fertilizers	38,311	1.10%
18	34 99	Fabricated Metal Products, Nec	38,209	1.10%
19	35 31	Construction Machinery or Equipment	34,065	1.00%
20	28 18	Misc. Industrial Organic Chemicals	33,734	1.00%
	Rest of Comm.		1,443,956	43.10%
	<b>Total</b>		<b>3,347,702</b>	<b>100.00%</b>

Source: (52)

**Exhibit 66. Top Truck Based U.S. Import Commodities from Mexico to and through Arizona by Weight**

Rank	STCC	STCC Description	Weight (in Tons)	% of Total Weight
1	01 39	Misc. Fresh Vegetables	2,528,943	34.20%
2	01 23	Tropical Fruits	361,942	4.90%
3	20 82	Malt Liquors	230,137	3.10%
4	20 86	Soft Drinks or Mineral Water	211,107	2.90%
5	14 71	Chem or Fertilizer Mineri Crude	177,343	2.40%
6	36 51	Radio or TV Receiving Sets	157,810	2.10%
7	01 33	Leafy Fresh Vegetables	157,131	2.10%
8	01 21	Citrus Fruits	151,332	2.00%
9	01 22	Deciduous Fruits	146,136	2.00%
10	39	Misc. Manufacturing Products	140,922	1.90%
11	20 37	Frozen Fruit, Veg or Juice	136,333	1.80%
12	32 21	Glass Containers	132,463	1.80%
13	01 31	Bulbs, roots or Tubers	129,469	1.70%
14	37 11	Motor Vehicles	125,165	1.70%
15	20 62	Sugar, Refined, Cane or Beet	108,491	1.50%
16	37 14	Motor Vehicle Parts or Accessories	106,725	1.40%
17	01 29	Misc. Fresh Fruits or Tree Nuts	88,606	1.20%
18	36 43	Current Carrying Wiring Equipment	69,968	0.90%

**DRAFT**

19	33 12	Primary Iron or Steel Products	60,116	0.80%
20	30 71	Misc. Plastic Products	59,329	0.80%
	Rest of Comm.		2,123,347	28.70%
	<b>Total</b>		<b>7,402,815</b>	<b>100.00%</b>

Source: (45)

**2016 Datamyne Database**

In order to identify the top 10 supply chains that will be analyzed in subsequent phases of this project, the Datamyne database was analyzed identifying all commodities that crossed (exports from Mexico to U.S. and imports to Mexico from U.S.) through all Arizona ports of entry. These commodities were sorted by 2-digit Harmonized System (HS) code. The following exhibits present top imports and exports (Exhibit 67 and Exhibit 68)

*Exhibit 67: Top U.S. Imports from Mexico by 2-digit Code through Arizona Ports of Entry*

No.	2 Digits Code	Chapter	Weight (Millions)	Value USD (Millions)	Truck Loads (Thousands)
1	7	Edible Vegetables & Certain Roots & Tubers	1,917.5	1,084.4	117.5
2	8	Edible Fruit & Nuts; Citrus Fruit or Melon Peel	948.2	391.7	52.4
3	85	Electric Machinery Etc.; Sound Equip; TV Equip; Pts.	111.2	1,606.5	17.7
4	48	Paper & Paperboard & Articles (Inc. Papr Pulp Artl)	87.8	75.2	11.8
5	17	Sugars and Sugar Confectionary	63.5	45.1	3.1
6	74	Copper and Articles Thereof	40.2	195.6	2.2
7	39	Plastics and Articles Thereof	39.1	18.8	6.8
8	87	Vehicles, Except Railway or Tramway, and Parts Etc	34.9	232.6	5.3
9	44	Wood and Articles of Wood; Wood Charcoal	34.2	7.1	1.8
10	84	Machinery Appliances	26.6	349.3	1.5
11	22	Beer	24.0	11.0	1.1
12	3	Fish, Crustaceans & Aquatic Invertebrates	22.3	251.8	1.7
13	83	Miscellaneous Articles of Base Metal	21.2	205.2	3.1
14	90	Optic, Photo Etc., Medic or Surgical Instruments Etc.	20.6	329.8	3.3
15	19	Prep Cereal, Flour, Starch or Milk; Bakers Wares	20.2	30.8	1.5
16	63	Textile Art Nesoi; Needlecraft Sets; Worn Text Art	13.6	81.5	3.7
17	73	Articles of Iron or Steel	8.1	8.8	1.1

Source: (53)

**DRAFT***Exhibit 68: Top U.S. Exports to Mexico by Chapter Datamyte 2016*

No.	2 Digits Code	Chapter	Weight (Millions)	Value USD (Millions)	Truck Loads (Thousands)
1	8	Edible Fruit & Nuts; Citrus Fruit or Melon Peel	243.6	300.4	11.8
2	48	Paper & Paperboard & Articles (Inc. Papr Pulp Artl)	122.3	193.7	12.5
3	85	Electric Machinery Etc.; Sound Equip; TV Equip; Pts.	91.6	1,063.5	18.1
4	39	Plastics and Articles Thereof	90.6	374.3	15.9
5	73	Articles of Iron or Steel	59.2	140.5	9.9
6	26	Ores, Slag and Ash	51.8	43.7	2.1
7	2	Meat and Edible Meat Offal	28.9	31.9	1.5
8	87	Vehicles, Except Railway or Tramway, and Parts Etc	26.6	258.0	3.4
9	20	Prep Vegetables, Fruit, Nuts or Other Plant Parts	19.1	19.8	1.0
10	44	Wood and Articles of Wood; Wood Charcoal	18.5	7.0	1.7
11	28	Norg Chem; Prec & Rare-Earth Met & Radioact Compd	17.9	11.2	0.9
12	52	Cotton, Including Yarn and Woven Fabric Thereof	15.7	33.5	0.9
13	83	Miscellaneous Articles of Base Metal	14.0	82.5	1.1
14	31	Fertilizers	13.7	5.4	0.6
15	84	Machinery Appliances	10.7	41.1	0.7
16	74	Copper and Articles Thereof	10.3	14.7	0.4
17	94	Furniture; Bedding Etc; Lamps Nesoi Etc; Prefab Bd	10.1	69.7	1.4
18	36	Explosives; Pyrotechnics; Matches; Pyro Alloys Etc	9.1	13.7	0.4
19	40	Rubber and Articles Thereof	7.8	45.5	0.5
20	72	Iron and Steel	6.9	7.0	0.5
21	38	Miscellaneous Chemical Products	6.8	33.4	0.9

Source: (46)

**TOP SUPPLY CHAINS**

From the analysis of the three databases presented above, it can be seen that the top commodities that are traded through Arizona ports of entry coincide. In order to identify the key supply chains that will be used for further analysis, the top traded commodities were grouped by supply chain. The supply chains were identified based on key logistics and transportation needs and characteristics. As per the Terms of Reference of this study, 10 key supply chains are proposed (Exhibit 69).



**DRAFT***Exhibit 69: Proposed Top 10 Supply Chains*

No.	Supply Chain	HS Chapters	Logistic Requirements
1	Fruits and Vegetables	7 & 8	Refrigerated
2	Electric Machinery	85	
3	Paper	48	Special loading and loading equipment
4	Sugars	17	Bulk or Bags
5	Copper and Ores, Slag and Ash	26 & 74	Loading and Unloading Facilities
6	Plastics	39	Transload facilities
7	Vehicles and Parts	87	Car Carrier Facilities
8	Meat	2	Refrigerated
9	Beer	22	Truck suspension
10	Wood and Articles of Wood; Wood Charcoal	44	

Source: (46)

### 3 Key supply Chains to Analyze

The terms of reference call for a detailed analysis of 3 key supply chains. The Study group proposed the following supply chains to be analyzed in detail:

#### *Fruits and Vegetables*

Fruits and vegetables supply chain is the most relevant to Pacific Corridor, as it represents 57.2 percent of the total binational trade through Arizona land ports of entry by truck and weight, these products require refrigerated facilities and fulfill the US Animal and Plant Health Inspection Services Fruits and Vegetables Import Requirements (FAVIR). The most important commodities trade under this supply chains are (Exhibit 70):

**DRAFT***Exhibit 70: Fruits and Vegetables Supply Chain Products*

Commercial Status	HS Code	HS Code Description	Weight (Millions)	Value USD (Millions)	Truck Loads (Thousands)
MX Exports	70200	Tomatoes, Fresh or Chilled	537.1	438.1	36.3
MX Exports	70310	Onions & Shallots, Fresh or Chilled	25.1	17.6	1.3
MX Exports	70410	Cauliflowers & Headed Broccoli, Fresh or Chilled	16.6	9.7	1.1
MX Exports	70610	Carrots & Turnips, Fresh or Chilled	9.2	2.8	0.6
MX Exports	70700	Cucumbers & Gherkins, Fresh or Chilled	370.7	137.8	23.3
MX Exports	70820	Beans, Fresh or Chilled	21.2	10.8	1.5
MX Exports	70920	Asparagus, Fresh or Chilled	24.8	32.7	2.0
MX Exports	70930	Aubergines, Fresh or Chilled	51.0	17.2	3.5
MX Exports	70940	Celery Other Than Celeriac, Fresh or Chilled	18.0	8.2	1.1
MX Exports	70960	Fruits of Genus Capsicum or Pimenta, Fresh or Chilled	380.5	242.4	26.0
MX Exports	70993	Null	380.9	117.6	16.4
MX Exports	70999	Null	56.0	17.1	3.1
MX Exports	71080	Other Vegetables, Raw or Cooked By Boiling, Frozen	14.6	14.7	0.8
MX Exports	71333	Dried Kidney Beans, Incl. White Pea Beans, Shelled	11.7	17.7	0.6
MX Exports	80440	Avocados, Fresh or Dried	14.3	29.9	0.7
MX Exports	80450	Guavas, Mangoes & Mangosteens, Fresh or Dried	108.6	65.9	14.4
MX Exports	80510	Oranges, Fresh or Dried	36.4	12.6	1.3
MX Exports	80550	Lemons and Limes	16.6	10.3	0.8
MX Exports	80610	Fresh Grapes	139.6	144.5	7.8
MX Exports	80711	Watermelons, Fresh	507.2	93.5	22.2
MX Exports	80719	Melons ( Except Watermelons ), Fresh	125.4	35.1	5.2
MX Imports	80610	Fresh Grapes	35.8	58.4	1.9
MX Imports	80719	Melons ( Except Watermelons ), Fresh	5.0	1.9	0.2
MX Imports	80810	Apples, Fresh	144.2	162.3	6.8
MX Imports	80830	Null	42.2	55.3	2.0
MX Imports	80930	Peaches, Incl. Nectarines, Fresh	16.5	22.5	0.8

Source: (46)

*Electric Machinery*

Electric machinery is the second supply chain proposed to be analyzed, these products represent 3.7 percent of the Arizona trade by weight and 14.4 percent of the total trade

**DRAFT**

value, compared with 9.6 percent of trade value of fruits and vegetables. It is the supply chain with the highest value US\$ 2,670.0 million (Exhibit 71).

*Exhibit 71: Electric Machinery Supply Chain Products*

Commercial Status	HS Code	HS Code Description	Weight (Millions)	Value USD (Millions)	Truck Loads (Thousands)
MX Exports	852692	Radio Remote Control Apparatus	9.0	143.2	0.5
MX Exports	853669	Electrical Plugs & Sockets, Voltage<=1000v	21.1	252.5	4.5
MX Exports	853690	Other Electrical Apparatus For Making Connection To or In Electrical Circuits, Voltage<=1000v	9.6	144.7	2.3
MX Exports	853890	Parts of Switches, Automatic Circuit Breakers, Relays or Connector	31.7	369.9	6.0
MX Exports	854420	Co-Axial Cable & Other Co-Axial Electric Conductors	8.8	55.6	1.2
MX Exports	854430	Ignition Wiring Sets & Other Wiring Sets, Used In Vehicles, Aircraft or Ships	15.5	480.9	1.5
MX Exports	854449	Other Insulated Electric Conductors, Voltage<=80v	15.4	159.7	1.7
MX Imports	850300	Parts, of Motors, of Generators, of Generating Sets, of Rotary Converters	5.5	28.2	0.5
MX Imports	853400	Printed Circuits	6.2	53.8	3.6
MX Imports	853690	Other Electrical Apparatus For Making Connection To or In Electrical Circuits, Voltage<=1000v	25.1	243.4	5.7
MX Imports	853890	Parts of Switches, Automatic Circuit Breakers, Relays or Connector	33.6	526.5	5.5
MX Imports	854449	Other Insulated Electric Conductors, Voltage<=80v	15.6	142.2	1.8
MX Imports	854470	Optical Fibre Cables, Made Up of Individually Sheathed Fibres	5.6	69.4	1.0

Source: (46)

The third supply chain in terms of weight is paper, followed closely by auto parts. Given the importance of the auto industry in Mexico and relationship with Arizona's manufacturing base, the third supply chain that is proposed for detail analysis is auto parts.

*Auto Parts*

Vehicles parts is the third most valuable supply chain as it represents more than US\$490.6 million trade between Arizona and Mexico, according to the 2016 Datamyte database. The main commodities of this supply chain are presented in Exhibit 72.

**DRAFT**

*Exhibit 72: Vehicles and Parts Supply Chain*

Commercial Status	HS Code	HS Code Description	Weight (Millions)	Value USD (Millions)	Truck Loads (Thousands)
MX Exports	870829	Other Parts & Accessories of Bodies ( Incl. Cabs ) of Motor Vehicles	24.6	190.6	4.2
MX Exports	870830	Brakes and Servo-Brakes; Parts Thereof	10.3	42.0	1.1
MX Imports	870829	Other Parts & Accessories of Bodies ( Incl. Cabs ) of Motor Vehicles	15.3	175.0	2.3
MX Imports	870830	Brakes and Servo-Brakes; Parts Thereof	5.5	51.7	0.5
MX Imports	870880	Suspension Shock Absorbers of Motor Vehicles	5.7	31.3	0.6

Source: (46)

# DRAFT

## REFERENCES

- 1 Constitución Política de los Estados Unidos Mexicanos, accessed 2/11/2017 from <http://www.diputados.gob.mx/LeyesBiblio/htm/1.htm>.
- 2 Ley de Vías Generales de Comunicación, 2014. Accessed 02/12/2017 from [http://www.sct.gob.mx/fileadmin/DireccionesGrales/DGAF/Juridico/leyes/Ley\\_de\\_V%C3%ADas\\_Generales\\_de\\_Comunicaci%C3%B3n.pdf](http://www.sct.gob.mx/fileadmin/DireccionesGrales/DGAF/Juridico/leyes/Ley_de_V%C3%ADas_Generales_de_Comunicaci%C3%B3n.pdf).
- 3 Federal Public Administration Act, 2016, accessed 02/12/2017 from <http://www.diputados.gob.mx/LeyesBiblio/ref/loapf.htm>.
- 4 Ley de Planation, 2016. Accessed 02/12/2017 from [http://www.diputados.gob.mx/LeyesBiblio/pdf/59\\_281116.pdf](http://www.diputados.gob.mx/LeyesBiblio/pdf/59_281116.pdf).
- 5 SEGOB, 2013, PND 2013-2018. Accessed 02/22/2017 from <http://pnd.gob.mx/>.
- 6 Presidencia, 2014. Plan Nacional de Infraestructura 2014-2018. Accessed 02/22/2017 from <http://presidencia.gob.mx/pni/>.
- 7 CEFP, 2016. Gasto Federalizado Identificado en el PEF 2016. Accessed 02/22/2017 from <http://www.cefp.gob.mx/publicaciones/documento/2016/enero/cefp0012016.pdf>.
- 8 CIEP 2014, El Fondo de Aportaciones para el Fortalecimiento de las Entidades Federativas (FAFEF), Accessed 02/16/2017 from <http://ciep.mx/el-fondo-de-aportaciones-para-el-fortalecimiento-de-las-entidades-federativas-fafef/>.
- 9 Ley de Caminos, Puentes y autotransporte Federal, 2016. Accessed 02/13/2017 from [http://www.diputados.gob.mx/LeyesBiblio/pdf/27\\_101016.pdf](http://www.diputados.gob.mx/LeyesBiblio/pdf/27_101016.pdf).
- 10 SCT, 2015, Programa Nacional de Infraestructura Accessed 02/21/2017 from [http://www.dof.gob.mx/nota\\_detalle.php?codigo=5342547&fecha=29/04/2014](http://www.dof.gob.mx/nota_detalle.php?codigo=5342547&fecha=29/04/2014).
- 11 SCT 2015, Statistical Yearbook 2015. Accessed 04/27/2017 from [http://www.gob.mx/cms/uploads/attachment/file/180665/Anuario\\_Estadistico\\_Sector\\_Comunicaciones\\_y\\_Transportes\\_2015.pdf](http://www.gob.mx/cms/uploads/attachment/file/180665/Anuario_Estadistico_Sector_Comunicaciones_y_Transportes_2015.pdf)
- 12 Ley Reglamentaria del Servicio Ferroviario, 2016. Accessed 02/13/2017 from [http://www.diputados.gob.mx/LeyesBiblio/pdf/209\\_080616.pdf](http://www.diputados.gob.mx/LeyesBiblio/pdf/209_080616.pdf).

## DRAFT

- 13 SCT, 2016. Anuario Estadístico Ferroviario 2015, Accessed 03/01/2017 from [http://www.sct.gob.mx/fileadmin/DireccionesGrales/DGTFM/Anuarios\\_DGTFM/Anuarios\\_pdf/Anuario\\_2015.pdf](http://www.sct.gob.mx/fileadmin/DireccionesGrales/DGTFM/Anuarios_DGTFM/Anuarios_pdf/Anuario_2015.pdf).
- 14 Villa Juan, Sacristan-Roy Emilio 2012. *Privatization of Mexican railroads: Fifteen years later, Research in Transportation Business & Management*. ISBN RTBM-00071.
- 15 Ley de Puertos, 2012. Accessed 03/13/2017 from [http://www.sct.gob.mx/fileadmin/\\_migrated/content\\_uploads/3\\_Ley\\_de\\_Puertos\\_01.pdf](http://www.sct.gob.mx/fileadmin/_migrated/content_uploads/3_Ley_de_Puertos_01.pdf).
- 16 National Seaport System, 2016. Accessed 03/13/2017 from [https://www.gob.mx/cms/uploads/attachment/file/116761/Sistema\\_Portuario\\_Nacional.pdf](https://www.gob.mx/cms/uploads/attachment/file/116761/Sistema_Portuario_Nacional.pdf).
- 17 Texas Department of Transportation Texas-Mexico international Bridges and Borders Crossing 2015. Accessed 02/10/2017 from <http://ftp.dot.state.tx.us/pub/txdot-info/iro/international-bridges.pdf>
- 18 U.S. Department of Transportation, Bureau of Transportation Statistics 2016. Accessed 02/15/2017 from [https://www.rita.dot.gov/bts/help\\_with\\_data/border\\_crossing\\_entry\\_data.html](https://www.rita.dot.gov/bts/help_with_data/border_crossing_entry_data.html)
- 19 Texas Department of Transportation Texas-Mexico International Bridges and Borders Crossing 2015, CBP Border Wait Times, <https://apps.cbp.gov/bwt/mobile.asp?action=n&pn=2601>.
- 20 INEGI, Red Nacional de Caminos RNC, 2016 <http://www.beta.inegi.org.mx/app/biblioteca/ficha.html?upc=702825219000>
- 21 INEGI, Marco Geoestadístico, 2016. <http://www.beta.inegi.org.mx/app/biblioteca/ficha.html?upc=702825217341>
- 22 CONABIO, Comisión Nacional para el Conocimiento y Uso de la Biodiversidad <https://www.gob.mx/conabio>
- 23 CONAMP, Comisión Nacional de Áreas Naturales Protegidas (PARA ÁREAS NATURALES) <http://www.gob.mx/conanp>
- 24 Reglamento sobre el Peso, Dimensiones y Capacidad de los vehículos de Autotransporte que transitan en los Caminos y Puentes de jurisdicción Federal.



## DRAFT

25 SCT Road Classification Map

26 INEGI, IMT, 2015, Datos vectoriales escala 1:1 000 000 – descarga.  
[http://www.inegi.org.mx/geo/contenidos/topografia/topografia\\_1m.aspx](http://www.inegi.org.mx/geo/contenidos/topografia/topografia_1m.aspx)

27 INEGI, Censo de Población y Vivienda 2010.  
<http://www.beta.inegi.org.mx/proyectos/ccpv/2010/>

28 INEGI, Censos Economicos 2014.  
<http://www.inegi.org.mx/est/contenidos/proyectos/ce/ce2014/default.aspx#Mas>

29 Historical Exchange Rate Mexican Pesos to U.S. Dolar, Accessed 03/14/2017 from:  
[https://www.banamex.com/economia\\_finanzas/es/divisas\\_metales/dolar\\_interbancario.htm](https://www.banamex.com/economia_finanzas/es/divisas_metales/dolar_interbancario.htm)

30 INEGI, Cluster Mapping Mexico.  
<http://www.icluster.inadem.gob.mx/index.php?idioma=ing>.

31 AMPIP, Industrial Park Location, <http://ampip.org.mx/en/industrial-parks-map/>.

32 INEGI, DENUÉ Directorio Estadístico Nacional de Unidades Económicas, 2016.  
<http://www.beta.inegi.org.mx/app/mapa/denue/default.aspx>

33 PROMÉXICO, The Mexican Automotive Industry: current situation, challenges and opportunities: <http://www.promexico.mx/documentos/biblioteca/the-mexican-automotive-industry.pdf>.

34 Daniel Workman, Mexico's top 10 exports: <http://www.worldstopexports.com/mexicos-top-exports/>.

35 PROMÉXICO, The Mexican Aerospace Industry, panorama of a growing strategic sector:  
<http://www.promexico.gob.mx/documentos/revista-negocios/pdf/jun-2015.pdf>.

36 Estadística Básica del Autotransporte Federal de 2007–2015, DGAF.

37 The Observatory of Economic Complexity.  
<http://atlas.media.mit.edu/en/profile/country/mex/#Exports>.

38 Producción de cárnicos en México será de 6.3 millones de toneladas.  
<http://www.20minutos.com.mx/noticia/150799/0/produccion-de-carnicos-en-mexico-sera-de-63-millones-de-toneladas/>.

**DRAFT**

- 39 FIRA, Panorama Alimentario 2016, carne de cerdo in  
[https://www.gob.mx/cms/uploads/attachment/file/200634/Panorama\\_Agroalimentario\\_Carne\\_de\\_Cerdo\\_2016.pdf](https://www.gob.mx/cms/uploads/attachment/file/200634/Panorama_Agroalimentario_Carne_de_Cerdo_2016.pdf). FIRA, Panorama Alimentario 2016, carne de bovino  
[https://www.gob.mx/cms/uploads/attachment/file/61948/Panorama\\_Agroalimentario\\_Carne\\_de\\_Bovino\\_2015.pdf](https://www.gob.mx/cms/uploads/attachment/file/61948/Panorama_Agroalimentario_Carne_de_Bovino_2015.pdf).
- 40 Actualidad de la industria metalmecánica en México,  
<http://www.metalmecanica.com/temas/Actualidad-de-la-industria-metalmecanica-de-Mexico+7093939?pagina=1>.
- 41 Pilar Juárez, Metalmecánica con valor de 7 MDD,  
[http://www.milenio.com/negocios/Metalmecanica-sector\\_Metalmecanica-manufactura-sector\\_automotriz\\_0\\_722327844.html](http://www.milenio.com/negocios/Metalmecanica-sector_Metalmecanica-manufactura-sector_automotriz_0_722327844.html).
- 42 The Observatory of Economic Complexity:  
<http://atlas.media.mit.edu/en/profile/country/mex/#Imports>.
- 43 Mineral Commodities Summary, US Geological Survey 2013.
- 44 For further information on this subject see PROMÉXICO:  
<https://www.gob.mx/promexico/acciones-y-programas/alimentos-procesados>.
- 45 El Economista, envíos de aguacate rebasarán 1 millón de toneladas:  
<http://eleconomista.com.mx/industrias/2016/12/29/envios-aguacate-rebasaran-1-millon-toneladas>
- 46 SAGARPA, SIAP Sistema de Información Agroalimentaria y Pesquera, 2016.  
<http://www.gob.mx/siap/acciones-y-programas/indicadores-economicos>
- 47 <http://www.worldstopexports.com/tomatoes-exports-country/>
- 48 For further information on this subject see:  
<http://www.worldstopexports.com/watermelon-exports-by-country/>
- 49 Mexico: Berry export revenues increase. <http://www.intracen.org/itc/blogs/market-insider/Mexico-berry-export-revenues-increase/>
- 50 Luis Bringas, Mexico: rising exports of berries. <http://ecomercioagrario.com/en/small-is-also-beautiful/>
- 51 U.S. Trade Census Bureau, <https://usatrade.census.gov/>
- 52 2013 Transearch Database provided by the Arizona Department of Transportation.
- 53 2016 Datamyne Database

## **DRAFT**

### **APPENDIX TRANSEARCH DATABASE ANALYSIS**

For ADOT's binational freight study, an analysis of ADOT's 2013 Transearch commodity flows database was performed to understand top U.S.-Mexico binational trade commodities by weight and value and their supply chain aspects, such as relative use of ports of entry, relative corridor uses on Mexico side and relative market shares on U.S. side.

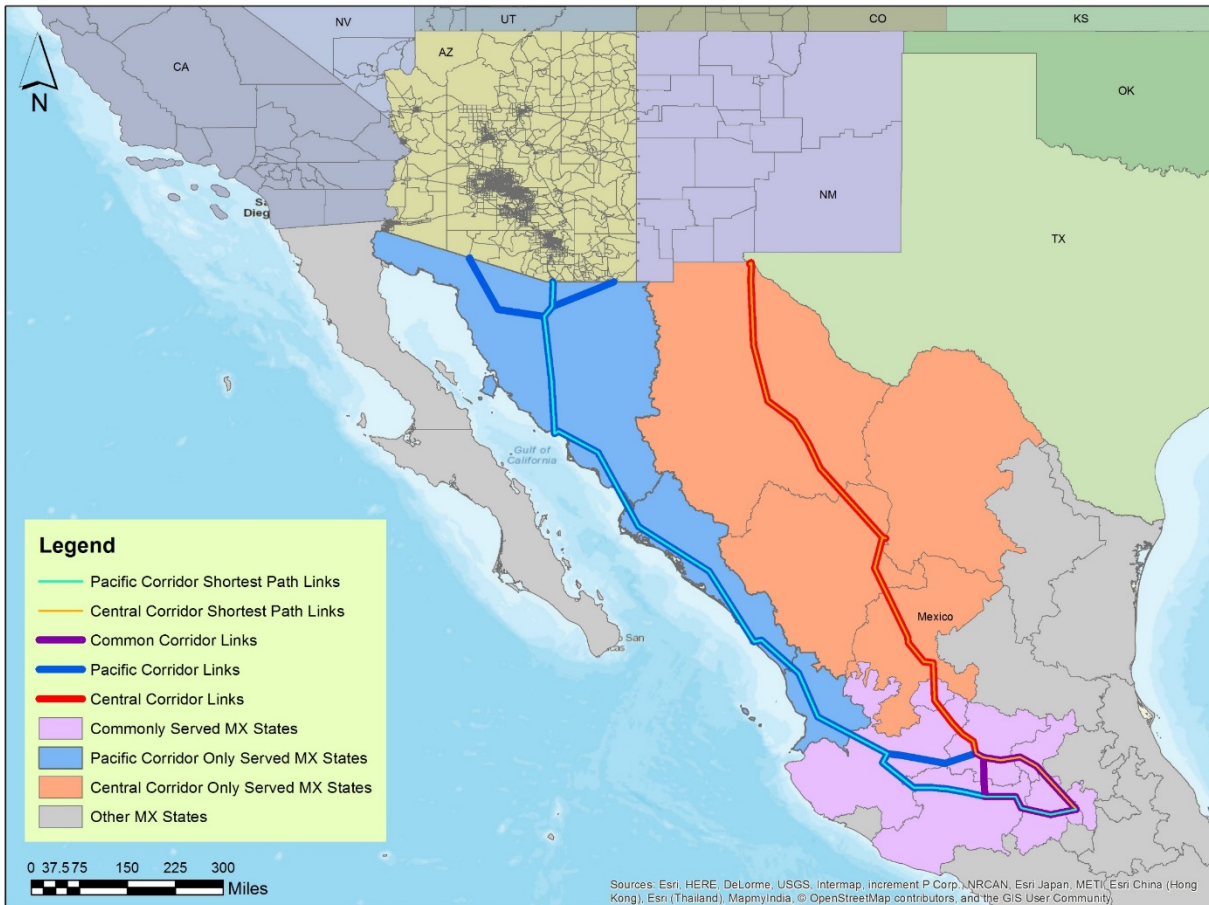
#### **Use and Limitations of ADOT's 2013 Transearch Database**

To meet the purpose, use and limitations of ADOT's 2013 Transearch database was assessed. The Consultant found that the database includes 4-digit standard transportation commodity code (STCC) type commodity flows that are moved on Arizona's transportation system, which includes freight moved from, to, within and through Arizona. Thus, binational trade from, to, and through Arizona is included; and associated truck and rail based top commodities by weight and value.

In the context of ports of entry (POEs), the Transearch database has a limitation that it only provides the first or the last node on Arizona's roadway system for commodity flows. In other words, although truck based binational trade through the Arizona POE roadways located at the border between Arizona and Mexico can be identified, flows passing through Arizona and entering or leaving through POEs outside Arizona cannot be uniquely identified. The rail based binational trade also cannot be allocated to specific POE rail lines using the database. For El Paso POE, a special assumption could be made that the flow enters or leaves Arizona through Interstate-10 highway. This would be an approximation to compare relative use between Arizona POEs and El Paso POE. Corresponding to the top commodities, the splits between the POEs are shown in this document.

In the context of corridor use on Mexico side, the Transearch database has a limitation that it is only an origin-destination data and does not provide assignment data for roads and rail lines. So, the corridor use can only be understood in terms of proximity of origin or destination zones to an analysis corridor. In other words, the relative use of Pacific and Central Corridors (as shown in Exhibit A- 1) are understood in terms of the Mexico states that the Consultant expects would be accessed through Pacific Corridor only, Central Corridor only, and both corridors. Corresponding to the top binational trade commodities, the splits between the corridors are shown in this document.

**DRAFT**



*Exhibit A- 1. Identified Corridors on Mexico Side for U.S.-Mexico Binational Trade from, to and through Arizona*

In the context of market shares on U.S. side, the Transearch database provides bureau of economic analysis (BEA) region level trading partner information. Corresponding to the top binational trade commodities, the top regions in U.S. are identified in this document.

In the context of both corridor uses and market shares, a limitation, however, is that some of the origins and destination identified in Transearch may not represent the ultimate origin or the ultimate destination; the reported origin or destination could be the location of an intermediate industry within the supply chain. So, the shares of trading partners provided by the database should be viewed with caution.

## **DRAFT**

### Recommended Commodities for Supply Chain Analysis

Using the summaries of ADOT's 2013 Transearch database, the top 20 commodities by weight moving by truck were identified, including the corresponding ranking by value and top origin-destination pair, as follows:

A. Commodity flows through Arizona POEs

1. Top 20 commodity flows (Exports, Imports and Total) through Arizona POEs by weight moving by truck (A- 2, A- 3 and A- 4).
2. Top 20 commodity flows (Exports, Imports and Total) through Arizona POEs serving the Western U.S. States and the Pacific Corridor/Commonly Served Mexican states - Top 20 commodities by weight moving by mode truck through Arizona POEs, with origin (or destination) in the western U.S. sates (i.e., Arizona, California, Idaho, Nevada, Oregon, and Washington) and origin (or destination) in the Pacific Corridor/Commonly Served Mexican states (A- 5, A- 6 and A- 7).

B. Commodity flows through El Paso POEs by weight, moving by truck, by direction (imports, exports, and total), prepare:

3. Top 20 commodity flows (Exports, Imports and Total) thought El Paso POE serving the Western U.S. States and the Central Corridor/Commonly Served Mexican states - Top 20 commodities by weight moving by mode truck through El Paso POE, with origin (or destination) in the western U.S. sates (i.e., Arizona, California, Idaho, Nevada, Oregon, and Washington) and origin (or destination) in the Central Corridor/Commonly Served Mexican states (A- 8, A- 9 and A- 10).

**DRAFT**

*Exhibit A- 2. Top U.S. Exports to Mexico through Arizona POEs by Weight Moving by Truck*

STCC	STCC Description	Rank Based on Weight	Rank Based on Value	Origin in Top OD Pair	Destination in Top OD Pair
01 22	Deciduous Fruits	1	4	Richland, WA BEA	Jalisco, MX
10 21	Copper Ores	2	7	Greenlee County, AZ	Sonora, MX
26 51	Containers or Boxes, paper	3	28	California Portion of Los Angeles BEA	Sonora, MX
33 12	Primary Iron or Steel Products	4	13	Illinois Portion of Chicago BEA	Sonora, MX
37 14	Motor Vehicle Parts or Accessories	5	1	Detroit, MI BEA	Sonora, MX
26 21	Paper	6	43	Georgia Portion of Savannah BEA	Sonora, MX
30 71	Misc Plastic Products	7	3	Detroit, MI BEA	Sonora, MX
29 11	Petroleum Refining Products	8	40	Detroit, MI BEA	Sonora, MX
20 82	Malt Liquors	9	47	Missouri Portion of St. Louis BEA	Mexico Other, MX
35 31	Constr Machinery or Equipment	10	2	Peoria, IL BEA	Sonora, MX
22 81	Yarn	11	2	Santa Cruz County, AZ	Sonora, MX
30 11	Tires or Inner Tubes	12	5	Charleston, SC BEA	Sonora, MX
34 99	Fabricated Metal Products, Nec	13	21	Texas Portion of El Paso BEA	Sonora, MX
28 71	Fertilizers	14	64	Cochise County, AZ	Sonora, MX
20 11	Meat, Fresh or Chilled	15	46	Maricopa County, AZ	Sonora, MX
37 11	Motor Vehicles	16	12	Illinois Portion of Chicago BEA	Sonora, MX
24 21	Lumber or Dimension Stock	17	81	Maricopa County, AZ	Sonora, MX
30 72	Misc Plastic Products	18	8	Maricopa County, AZ	Sonora, MX
28 19	Misc Indus Inorganic Chemicals	19	9	Maricopa County, AZ	Sonora, MX
36 13	Switchgear or Switchboards	20	6	Illinois Portion of Chicago BEA	Sonora, MX



**DRAFT***Exhibit A- 3. Top U.S. Imports to Mexico through Arizona POEs by Weight Moving by Truck*

STCC	STCC Description	Rank Based on Weight	Rank Based on Value	Origin in Top OD Pair	Destination in Top OD Pair
01 39	Misc Fresh Vegetables	1	1	Mexico Other, MX	Maricopa County, AZ
14 71	Chem or Fertilizer Mineri Crude	2	142	Sonora, MX	Mississippi Portion of Jackson BEA
01 22	Deciduous Fruits	3	11	Mexico Other, MX	Maricopa County, AZ
01 23	Tropical Fruits	4	5	Mexico Other, MX	Pima County, AZ
20 62	Sugar, Refined, Cane or Beet	5	19	Sonora, MX	Maricopa County, AZ
36 43	Current Carrying Wiring Equipment	6	2	Sonora, MX	Maricopa County, AZ
39	Misc Manufacturing Products	7	10	Mexico Other, MX	Maricopa County, AZ
01 21	Citrus Fruits	8	65	Mexico Other, MX	Maricopa County, AZ
35 37	Industrial Trucks, Etc.	9	7	Sonora, MX	Pima County, AZ
01 33	Leafy Fresh Vegetables	10	48	Mexico Other, MX	California Portion of Los Angeles BEA
20 82	Malt Liquors	11	41	Sonora, MX	Illinois Portion of Chicago BEA
01 31	Bulbs, roots or Tubers	12	29	Mexico Other, MX	California Portion of Los Angeles BEA
28 61	Gum or Wood Chemicals	13	60	Mexico, MX	California Portion of Los Angeles BEA
20 52	Biscuits, Crackers or Pretzles	14	52	Sonora, MX	Illinois Portion of St. Louis BEA
33 57	Nonferrous Wire	15	4	Sonora, MX	Maricopa County, AZ
35 48	Metalworking Machinery	16	8	Sonora, MX	Maricopa County, AZ
38 41	Surgical or Medical Instruments	17	14	Sonora, MX	Pima County, AZ

**DRAFT**

STCC	STCC Description	Rank Based on Weight	Rank Based on Value	Origin in Top OD Pair	Destination in Top OD Pair
01 29	Misc Fresh Fruits or Tree Nuts	18	17	Sonora, MX	Maricopa County, AZ
09 12	Fresh Fish or Whale Products	19	16	Sonora, MX	California Portion of Los Angeles BEA
23 31	Womens or Childrens Clothing	20	22	Sonora, MX	San Francisco, CA BEA

Note: Used the first node of entry from IDs 400106, 400088, 400067, 400203 to identify Arizona POEs.

*Exhibit A- 4. Combined Top U.S. Imports & U.S. Exports through Arizona POEs by Weight Moving by Truck*

STCC	STCC Description	Rank Based on Weight	Rank Based on Value	Origin in Top OD Pair	Destination in Top OD Pair
01 39	Misc Fresh Vegetables	1	2	Mexico Other, MX	Maricopa County, AZ
01 22	Deciduous Fruits	2	7	Mexico Other, MX	Maricopa County, AZ
14 71	Chem or Fertilizer Mineri Crude	3	208	Sonora, MX	Mississippi Portion of Jackson BEA
10 21	Copper Ores	4	17	Greenlee County, AZ	Sonora, MX
01 23	Tropical Fruits	5	9	Mexico Other, MX	Pima County, AZ
20 62	Sugar, Refined, Cane or Beet	6	27	Sonora, MX	Maricopa County, AZ
37 14	Motor Vehicle Parts or Accessories	7	2	Detroit, MI BEA	Sonora, MX
33 12	Primary Iron or Steel Products	8	20	Illinois Portion of Chicago BEA	Sonora, MX
26 51	Containers or Boxes,paper	9	45	California Portion of Los Angeles BEA	Sonora, MX
26 21	Paper	10	49	Georgia Portion of Savannah BEA	Sonora, MX

**DRAFT**

STCC	STCC Description	Rank Based on Weight	Rank Based on Value	Origin in Top OD Pair	Destination in Top OD Pair
20 82	Malt Liquors	11	44	Missouri Portion of St. Louis BEA	Mexico Other, MX
30 71	Misc Plastic Products	12	7	Detroit, MI BEA	Sonora, MX
36 43	Current Carrying Wiring Equipment	13	3	Sonora, MX	Maricopa County, AZ
39	Misc Manufacturing Products	14	2	Mexico Other, MX	Maricopa County, AZ
35 37	Industrial Trucks, Etc.	15	6	Sonora, MX	Pima County, AZ
01 21	Citrus Fruits	16	120	Mexico Other, MX	Maricopa County, AZ
33 57	Nonferrous Wire	17	5	Sonora, MX	Maricopa County, AZ
37 11	Motor Vehicles	18	6	Illinois Portion of Chicago BEA	Sonora, MX
01 33	Leafy Fresh Vegetables	19	81	Mexico Other, MX	California Portion of Los Angeles BEA
01 31	Bulbs, roots or Tubers	20	53	Mexico Other, MX	California Portion of Los Angeles BEA

Note: Used the last node of exit or the first node of entry from IDs 400106, 400088, 400067, 400203 to identify Arizona POEs.

**DRAFT**

*Exhibit A- 5. Top U.S. Exports to Mexico through Arizona POEs Serving Western U.S. States and the Pacific Corridor /Commonly Served Mexican states by Weight Moving by Truck*

STCC	STCC Description	Rank Based on Weight	Rank Based on Value	Origin in Top OD Pair	Destination in Top OD Pair
01 22	Deciduous Fruits	1	2	Richland, WA BEA	Jalisco, MX
10 21	Copper Ores	2	1	Greenlee County, AZ	Sonora, MX
26 51	Containers or Boxes,paper	3	14	Santa Cruz County, AZ	Sonora, MX
22 81	Yarn	4	18	Maricopa County, AZ	Sonora, MX
24 21	Lumber or Dimension Stock	5	50	California Portion of Los Angeles BEA	Sonora, MX
30 71	Misc Plastic Products	6	3	Santa Cruz County, AZ	Sonora, MX
28 71	Fertilizers	7	44	Pinal County, AZ	Sonora, MX
01 39	Misc Fresh Vegetables	8	49	Cochise County, AZ	Sonora, MX
20 11	Meat, Fresh or Chilled	9	41	Maricopa County, AZ	Sonora, MX
20 33	Canned Fruits,vegetables, Etc.	10	91	Maricopa County, AZ	Sonora, MX
26 21	Paper	11	76	Maricopa County, AZ	Sonora, MX
28 18	Misc Industrial Organic Chemicals	12	12	Maricopa County, AZ	Sonora, MX
28 19	Misc Indus Inorganic Chemicals	13	25	California Portion of Los Angeles BEA	Sonora, MX
29 11	Petroleum Refining Products	14	59	Maricopa County, AZ	Sonora, MX
33 12	Primary Iron or Steel Products	15	28	Maricopa County, AZ	Sonora, MX
36 74	Solid State Semiconducts	16	4	Maricopa County, AZ	Sonora, MX
30 72	Misc Plastic Products	17	5	California Portion of Los Angeles BEA	Sonora, MX
35 31	Constr Machinery or Equipment	18	8	Santa Cruz County, AZ	Sonora, MX
22 99	Textile Goods, Nec	19	29	Pima County, AZ	Distrito Federal, MX
26 49	Misc Converted Paper Products	20	53	Mexico Other, MX	California Portion of Los Angeles BEA

Note: Used the last node of exit from IDs 400106, 400088, 400067, 400203 to identify Arizona POEs.

**DRAFT**

*Exhibit A- 6. Top U.S. Imports from Mexico through Arizona POEs Serving Western U.S. States and the Pacific Corridor /Commonly Served Mexican states by Weight by Truck*

STCC	STCC Description	Rank Based on Weight	Rank Based on Value	Origin in Top OD Pair	Destination in Top OD Pair
20 62	Sugar, Refined, Cane or Beet	1	12	Sonora, MX	Maricopa County, AZ
14 71	Chem or Fertilizer Mineri Crude	2	138	Sonora, MX	Pima County, AZ
28 61	Gum or Wood Chemicals	3	44	Mexico, MX	California Portion of Los Angeles BEA
36 43	Current Carrying Wiring Equipment	4	2	Sonora, MX	Maricopa County, AZ
35 37	Industrial Trucks, Etc.	5	7	Sonora, MX	Pima County, AZ
20 37	Frozen Fruit, Veg or Juice	6	50	Sonora, MX	Maricopa County, AZ
33 57	Nonferrous Wire	7	4	Sonora, MX	Maricopa County, AZ
23 31	Womens or Childrens Clothing	8	16	Sonora, MX	San Francisco, CA BEA
09 12	Fresh Fish or Whale Products	9	9	Sonora, MX	California Portion of Los Angeles BEA
37 14	Motor Vehicle Parts or Accessories	10	6	Sonora, MX	Pima County, AZ
01 29	Misc Fresh Fruits or Tree Nuts	11	18	Sonora, MX	Maricopa County, AZ
35 48	Metalworking Machinery	12	8	Sonora, MX	Maricopa County, AZ
28 41	Soap or Other Detergents	13	24	Sonora, MX	Pima County, AZ
38 41	Surgical or Medical Instruments	14	11	Sonora, MX	Pima County, AZ
36 94	Elec Eq For Intern Comb Engine	15	1	Sonora, MX	Maricopa County, AZ
30 71	Misc Plastic Products	16	20	Sonora, MX	Maricopa County, AZ

**DRAFT**

STCC	STCC Description	Rank Based on Weight	Rank Based on Value	Origin in Top OD Pair	Destination in Top OD Pair
20 33	Canned Fruits,vegetables, Etc.	17	76	Sonora, MX	Maricopa County, AZ
37 11	Motor Vehicles	18	19	Sonora, MX	Maricopa County, AZ
23 99	Misc Fabricated Textile Products	19	15	Sonora, MX	Maricopa County, AZ
35 35	Conveyors or Parts	20	53	Sonora, MX	Pima County, AZ

Note: Used the first node of entry from IDs 400106, 400088, 400067, 400203 to identify Arizona POEs.

*Exhibit A- 7. Combined Top U.S. Imports & U.S. Exports through Arizona POEs Serving Western U.S. States and the Pacific Corridor /Commonly Served Mexican states by Weight by Truck*

STCC	STCC Description	Rank Based on Weight	Rank Based on Value	Origin in Top OD Pair	Destination in Top OD Pair
01 22	Deciduous Fruits	1	8	Richland, WA BEA	Jalisco, MX
10 21	Copper Ores	2	7	Greenlee County, AZ	Sonora, MX
20 62	Sugar, Refined, Cane or Beet	3	22	Sonora, MX	Maricopa County, AZ
26 51	Containers or Boxes,paper	4	32	California Portion of Los Angeles BEA	Sonora, MX
14 71	Chem or Fertilizer Mineri Crude	5	219	Sonora, MX	Pima County, AZ
22 81	Yarn	6	39	Santa Cruz County, AZ	Sonora, MX
30 71	Misc Plastic Products	7	9	Maricopa County, AZ	Sonora, MX
28 61	Gum or Wood Chemicals	8	94	Mexico, MX	California Portion of Los Angeles BEA
36 43	Current Carrying Wiring Equipment	9	2	Sonora, MX	Maricopa County, AZ
23 31	Womens or Childrens Clothing	10	11	Sonora, MX	San Francisco, CA BEA



**DRAFT**

STCC	STCC Description	Rank Based on Weight	Rank Based on Value	Origin in Top OD Pair	Destination in Top OD Pair
20 37	Frozen Fruit, Veg or Juice	11	84	Sonora, MX	Maricopa County, AZ
24 21	Lumber or Dimension Stock	12	82	Maricopa County, AZ	Sonora, MX
37 14	Motor Vehicle Parts or Accessories	13	6	Sonora, MX	Pima County, AZ
20 33	Canned Fruits,vegetables, Etc.	14	110	California Portion of Los Angeles BEA	Mexico, MX
35 37	Industrial Trucks, Etc.	15	10	Sonora, MX	Pima County, AZ
28 71	Fertilizers	16	70	Cochise County, AZ	Sonora, MX
33 57	Nonferrous Wire	17	4	Sonora, MX	Maricopa County, AZ
09 12	Fresh Fish or Whale Products	18	13	Sonora, MX	California Portion of Los Angeles BEA
26 21	Paper	19	73	California Portion of Los Angeles BEA	Sonora, MX
33 12	Primary Iron or Steel Products	20	53	Sonora, MX	Maricopa County, AZ

Note: Used the last node of exit or the first node of entry from IDs 400106, 400088, 400067, 400203 to identify Arizona POEs.

*Exhibit A- 8. Top U.S. Exports to Mexico through El Paso POE Serving Western U.S. States and Central Corridor/ Commonly Served Mexican states by Weight by Truck*

STCC	STCC Description	Rank Based on Weight	Rank Based on Value	Origin in Top OD Pair	Destination in Top OD Pair
28 21	Plastic Mater or Synth Fibres	1	4	California Portion of Los Angeles BEA	Mexico, MX
29 11	Petroleum Refining Products	2	24	California Portion of Los Angeles BEA	Distrito Federal, MX

**DRAFT**

STCC	STCC Description	Rank Based on Weight	Rank Based on Value	Origin in Top OD Pair	Destination in Top OD Pair
20 37	Frozen Fruit, Veg or Juice	3	46	San Francisco, CA BEA	Mexico, MX
20 23	Condensed, Evap or Dry Milk	4	11	Pinal County, AZ	Chihuahua, MX
36 74	Solid State Semiconducts	5	8	San Francisco, CA BEA	Distrito Federal, MX
35 73	Electronic Data Proc Equipment	6	1	San Francisco, CA BEA	Distrito Federal, MX
20 99	Misc Food Preparations, Nec	7	6	California Portion of Los Angeles BEA	Distrito Federal, MX
28 12	Potassium or Sodium Compound	8	69	San Francisco, CA BEA	Chihuahua, MX
37 14	Motor Vehicle Parts or Accessories	9	5	California Portion of Los Angeles BEA	Mexico, MX
30 71	Misc Plastic Products	10	14	California Portion of Los Angeles BEA	Mexico, MX
20 71	Candy or Other Confectionery	11	10	California Portion of Los Angeles BEA	Jalisco, MX
33 12	Primary Iron or Steel Products	12	43	California Portion of Los Angeles BEA	Chihuahua, MX
20 33	Canned Fruits,vegetables, Etc.	13	82	Fresno, CA BEA	Mexico, MX
20 82	Malt Liquors	14	62	San Francisco, CA BEA	Distrito Federal, MX
35 61	Industrial Pumps	15	3	California Portion of Los Angeles BEA	Distrito Federal, MX
33 52	Aluminum or Alloy Basic Shapes	16	18	California Portion of Los Angeles BEA	Aguascalientes, MX
20 15	Dressed Poultry, Fresh	17	86	San Francisco, CA BEA	Durango, MX
28 18	Misc Industrial Organic Chemicals	18	13	California Portion of Los Angeles BEA	Mexico, MX
28 51	Paints, Lacquers, Etc.	19	81	Mexico Other, MX	California Portion of Los Angeles BEA
20 86	Soft Drinks or Mineral Water	20	53	Mexico Other, MX	California Portion of Los Angeles BEA

Note: Used the last node of exit as ID 121 to identify El Paso POE.

**DRAFT**

*Exhibit A- 9. Top U.S. Imports from Mexico through El Paso POE Serving Western U.S. States and Central Corridor/ Commonly Served Mexican states by Weight by Truck*

STCC	STCC Description	Rank Based on Weight	Rank Based on Value	Origin in Top OD Pair	Destination in Top OD Pair
01 39	Misc Fresh Vegetables	1	23	Distrito Federal, MX	California Portion of Los Angeles BEA
20	Food or Kindred Products	2	126	Mexico, MX	California Portion of Los Angeles BEA
20 11	Meat, Fresh or Chilled	3	10	Mexico, MX	California Portion of Los Angeles BEA
20 34	Dehydr or Dried Fruit or Veg	4	89	Distrito Federal, MX	San Francisco, CA BEA
20 35	Pickled Fruits or Vegetables	5	37	Mexico, MX	San Francisco, CA BEA
20 37	Frozen Fruit, Veg or Juice	6	17	Mexico, MX	California Portion of Los Angeles BEA
20 62	Sugar, Refined, Cane or Beet	7	41	Chihuahua, MX	Maricopa County, AZ
20 71	Candy or Other Confectionery	8	24	Mexico, MX	California Portion of Los Angeles BEA
20 99	Misc Food Preparations, Nec	9	18	Mexico, MX	California Portion of Los Angeles BEA
23 11	Mens or Boys Clothing	10	9	Distrito Federal, MX	California Portion of Los Angeles BEA
24 31	Millwork or Cabinetwork	11	109	Distrito Federal, MX	California Portion of Los Angeles BEA
28 21	Plastic Mater or Synth Fibres	12	20	Distrito Federal, MX	California Portion of Los Angeles BEA
28 41	Soap or Other Detergents	13	39	Distrito Federal, MX	San Francisco, CA BEA
30 71	Misc Plastic Products	14	12	Mexico, MX	California Portion of Los Angeles BEA
32 53	Ceramic Floor or Wall Tile	15	66	Mexico, MX	San Francisco, CA BEA

**DRAFT**

STCC	STCC Description	Rank Based on Weight	Rank Based on Value	Origin in Top OD Pair	Destination in Top OD Pair
32 61	Vitreous China Plumbing Fixtures	16	67	Mexico, MX	California Portion of Los Angeles BEA
33 12	Primary Iron or Steel Products	17	42	Coahuila De Zaragoza, MX	Maricopa County, AZ
37 11	Motor Vehicles	18	4	Mexico, MX	California Portion of Los Angeles BEA
37 14	Motor Vehicle Parts or Accessories	19	1	Mexico, MX	San Francisco, CA BEA
39 41	Games or Toys	20	34	Mexico, MX	San Francisco, CA BEA

Note: Used the first node of entry as ID 121 to identify El Paso POE.

*Exhibit A- 10. Combined Top U.S. Imports & U.S. Exports through El Paso POE Serving Western U.S. States and Central Corridor/ Commonly Served Mexican states by Weight by Truck*

STCC	STCC Description	Rank Based on Weight	Rank Based on Value	Origin in Top OD Pair	Destination in Top OD Pair
20 37	Frozen Fruit, Veg or Juice	1	25	Mexico, MX	California Portion of Los Angeles BEA
01 39	Misc Fresh Vegetables	2	33	Distrito Federal, MX	California Portion of Los Angeles BEA
37 14	Motor Vehicle Parts or Accessories	3	1	Mexico, MX	San Francisco, CA BEA
37 11	Motor Vehicles	4	6	Mexico, MX	California Portion of Los Angeles BEA
28 21	Plastic Mater or Synth Fibres	5	9	California Portion of Los Angeles BEA	Mexico, MX
20 11	Meat, Fresh or Chilled	6	19	Mexico, MX	California Portion of Los Angeles BEA
30 71	Misc Plastic Products	7	12	Mexico, MX	California Portion of Los Angeles BEA

**DRAFT**

STCC	STCC Description	Rank Based on Weight	Rank Based on Value	Origin in Top OD Pair	Destination in Top OD Pair
20 23	Condensed, Evap or Dry Milk	8	23	Pinal County, AZ	Chihuahua, MX
20 71	Candy or Other Confectionery	9	15	California Portion of Los Angeles BEA	Jalisco, MX
20 99	Misc Food Preparations, Nec	10	11	California Portion of Los Angeles BEA	Distrito Federal, MX
29 11	Petroleum Refining Products	11	53	California Portion of Los Angeles BEA	Distrito Federal, MX
33 12	Primary Iron or Steel Products	12	44	California Portion of Los Angeles BEA	Chihuahua, MX
20 35	Pickled Fruits or Vegetables	13	43	California Portion of Los Angeles BEA	Distrito Federal, MX
24 31	Millwork or Cabinetwork	14	153	Distrito Federal, MX	California Portion of Los Angeles BEA
28 41	Soap or Other Detergents	15	50	Distrito Federal, MX	San Francisco, CA BEA
32 53	Ceramic Floor or Wall Tile	16	97	Mexico, MX	San Francisco, CA BEA
20 62	Sugar, Refined, Cane or Beet	17	59	Chihuahua, MX	Maricopa County, AZ
35 73	Electronic Data Proc Equipment	18	2	San Francisco, CA BEA	Distrito Federal, MX
20 33	Canned Fruits,vegetables, Etc.	19	85	Fresno, CA BEA	Mexico, MX
20 82	Malt Liquors	20	34	San Francisco, CA BEA	Distrito Federal, MX

Note: Used the last node of exit or the first node of entry as ID 121 to identify El Paso POE.