

## U.S. System Summary: ARIZONA/SOUTHWEST



Arizona/Southwest High-Speed Rail System (Source: Texas A&M Transportation Institute)

The Arizona/Southwest high-speed rail system described in this summary groups several proposed HSR routes connecting California with major urban centers in Arizona and Nevada. The Arizona/Southwest high-speed rail system is a proposed system containing 1,321 miles of high-speed rail routes in five segments in the Southwestern U.S. states of Arizona, California, and Nevada. High-speed intercity passenger rail service in the Las Vegas to Victorville segment is being developed as a private initiative called XpressWest and has advanced to the *Planning/Environmental* stage. The XpressWest high-speed rail proposal is based on construction of new high-speed rail right-of-way

generally parallel to Interstate 15, with electric-powered trains and maximum speeds up to 150 mph. This segment is a part of the federally-designated California High-Speed Rail Corridor. The remaining four segments connect Phoenix, AZ with Tucson, AZ; Los Angeles, CA; San Diego, CA; and Las Vegas, NV. Development of high-speed intercity passenger rail in the Phoenix to Tucson segment is currently in the *Planning/Environmental* stage, while the remaining three segments are in the *Proposed* stage. The technical details of high-speed rail in these four segments are presently under study.

## SYSTEM DESCRIPTION AND HISTORY

### System Description

The Arizona/Southwest high-speed rail system consists of five segments, as summarized below.

#### Arizona/Southwest High-Speed Rail System Segment Characteristics

Segment Description	Distance	Segment Status	Designated Corridor?	Segment Population
Las Vegas, NV, to Victorville, CA	185 Miles	Planning/Environmental	Yes	6,176,120
Phoenix, AZ, to Tucson, AZ	121 Miles	Planning/Environmental	No	5,173,150
Phoenix, AZ, to Los Angeles, CA	373 Miles	Proposed	No	21,246,575
Phoenix, AZ, to San Diego, CA	355 Miles	Proposed	No	7,658,479
Phoenix, AZ, to Las Vegas, NV	287 Miles	Proposed	No	6,344,342

The Las Vegas, NV, to Victorville, CA, segment is 185 miles in length. Development of high-speed intercity passenger rail along the Las Vegas to Victorville segment is based on a private proposal known as XpressWest, formerly known as DesertXpress. The XpressWest proposal consists of electric-powered passenger trains operating at speeds up to 150 mph on dedicated high-speed rail right-of-way parallel to Interstate 15 between Las Vegas and Victorville. No stops between Las Vegas and Victorville are proposed as of this writing; as such, the population of the areas expected to be served by the route was 6,176,120 in 2010. However, XpressWest is examining how it could tie its proposed system with the California High-Speed Rail project in Palmdale, allowing direct access to Los Angeles over tracks shared with the California system. If this connection is established, the total population of the areas served by the proposed route would be 19,004,957 using 2010 population estimates.

**65 percent of the capital costs for the XpressWest high-speed rail project are expected to be financed through a loan from the FRA's Railroad Rehabilitation and Improvement Financing (RRIF) program.**

The Phoenix, AZ, to Tucson, AZ, segment is 121 miles in length and connects the two largest cities in Arizona. The total population of communities along this segment was 5,173,150 in 2010. Proposed intercity passenger rail service on this segment is currently being studied by the Arizona Department of Transportation (ADOT) as part of a Tier 1 Environmental Impact Study of high-capacity transit options in this segment.

The remaining three segments of the Arizona/Southwest high-speed rail system described in this summary are conceptual corridors proposed by the Arizona Department of Transportation (ADOT) in its *2010 Statewide Rail Framework Study*. The three corridors would provide connectivity between Phoenix and Los Angeles, San Diego, and Las Vegas, creating an interconnected network of high-speed rail service across the Southwestern U.S. The Phoenix, AZ, to Los Angeles, CA, segment is 373 miles in length and includes the Colorado River Valley region as well as Palm Springs and Riverside, CA, along the route. The total population of regions through which this conceptual corridor passes was 21,246,575 in 2010. The Phoenix, AZ, to San Diego, CA, segment is 355 miles in length and includes Yuma, AZ, and El Centro, CA, along the route. The total population of regions through which this conceptual corridor passes was 7,658,479 in 2010. The Phoenix, AZ, to Las Vegas, NV, segment is 287 miles in length and includes Wickenburg, AZ, and Kingman, AZ, along the route. The total population of regions through which this conceptual corridor passes was 6,344,342 in 2010.

### System History

Planning for high-speed intercity passenger rail in the Southwest region has primarily focused on developing a high-speed ground transportation link between Las Vegas and Southern California. A number of public and private proposals for high-speed, high-capacity ground transportation between the two regions have been considered since the late 1980s, recognizing the growing travel demand between the two regions and issues related to highway travel along Interstate 15 connecting the regions. Notable proposals include the California-Nevada Interstate MAGLEV project, a proposed MAGLEV project that would operate on a 268-mile route between Anaheim and Las Vegas for which planning has been on-going since 1987, and a feasibility study for conventional intercity passenger rail service



**Artist Rendering of XpressWest High-Speed Train (Source: XpressWest)**

between Las Vegas and Los Angeles, completed in 2007 by the Regional Transportation Commission of Southern Nevada.

Since 2005, planning for high-speed intercity passenger rail between Las Vegas and Los Angeles has been centered on the DesertXpress project, a proposed high-speed rail line connecting Las Vegas with Victorville, CA, approximately 85 miles northeast of downtown Los Angeles. The DesertXpress project, which was re-branded as XpressWest in 2012, is a privately-driven proposal that would construct a high-speed intercity passenger rail line on 185 miles of dedicated and grade-separated right-of-way between Las Vegas and Victorville on a route predominantly in the median of or immediately alongside Interstate 15. The XpressWest high-speed rail service is expected to include electric-powered trains operating at speeds up to 150 mph with up to three trains per hour during peak demand periods. The main motivation for selecting Victorville as a western terminal for the initial XpressWest service is that almost all freeway traffic between Las Vegas – Southern California passes through Victorville, and continuing service into the Los Angeles basin would be cost-prohibitive.

Most of the activities on the XpressWest project since 2005 have been focused on securing environmental clearance from a number of Federal agencies that have jurisdiction over the project due to the proposed route passing through

several public lands areas and also the use of Interstate 15 right-of-way. In July 2011, the Federal Railroad Administration (FRA) published a Record of Decision (ROD) for the XpressWest project, allowing the project to move forward to the pre-construction phase. Since the project is driven by private interests, many details of the project are not available to the public. The XpressWest website reports that the project is currently in the pre-construction phase, including finalizing the project's financing plan. One major element of the financing plan is an expected loan from the FRA's Railroad Rehabilitation and Improvement Financing (RRIF) program. The project's website also reports that the XpressWest is examining an extension of the proposed route from Victorville to Palmdale, CA, where it would connect with the planned California high-speed rail system as well as Metrolink, the Los Angeles-area commuter rail service. Additional connections to other regions, such as Phoenix, Salt Lake City, and Denver are also proposed by the XpressWest project. However, only the Las Vegas to Victorville project as described in the FRA ROD is considered in this summary.

Planning for high-speed intercity passenger rail in Arizona has been on-going since the early 1990s. In June 1992, the Arizona Legislature examined the feasibility of a statewide intercity passenger rail network, concluding that a line connecting Phoenix and Tucson, the state's two largest cities, should be targeted for investment. In April 1998, the





**Phoenix, Arizona**

*Arizona High Speed Rail Feasibility Study* was published. This study examined the potential for conventional diesel intercity rail service, electric high-speed rail service, and MAGLEV service between Phoenix and Tucson, including ridership forecasts, financial analysis, and preliminary environmental screening. Potential for high-speed, conventional, or commuter rail service in the Phoenix to Tucson segment was evaluated in the ADOT *2010 Statewide Rail Framework Study*. In 2011, ADOT initiated the Passenger Rail Corridor Study: Tucson to Phoenix. The goal of this project, which is currently on-going, is to conduct scoping activities for alternatives analysis and other preliminary environmental activities for high-capacity travel options in the Tucson to Phoenix corridor.

The ADOT 2010 Statewide Rail Framework Study also identified three intercity corridors as potential corridors where high-speed intercity passenger rail could be developed as part of an interconnected high-speed rail network in the Southwest U.S. These three corridors connected the Phoenix/Tucson region with Los Angeles, San Diego, and Las Vegas. The 2010 Statewide Rail Framework Study provided ridership projections, identified possible routes, and assessed potential issues with development of high-speed

rail in these three corridors. The study also recommended that ADOT pursue development of high-speed rail between Phoenix/Tucson and Denver/Albuquerque; however, no details of that corridor were provided in the study.

#### **Federally-Designated Corridors**

The Las Vegas to Victorville segment of the Arizona/Southwest high-speed rail system is part of the federally-designated California High-Speed Rail Corridor. Federal designation of the Las Vegas to Victorville segment was achieved as part of an extension of the existing California High-Speed Rail Corridor that was announced on July 2, 2009. The federally-designated route connects Las Vegas with Los Angeles, CA. The other four segments of the described Arizona/Southwest high-speed rail system are not currently part of a federally-designated high-speed rail corridor.

#### **Existing Intercity Passenger Rail Service**

Existing Amtrak intercity passenger rail service in the Arizona/Southwest region includes the tri-weekly Sunset Limited long-distance train, which travels from Tucson to Los Angeles through Maricopa (30 miles south of Phoenix), Yuma, and Palm Springs. The current Sunset Lim-

ited route covers portions of the segments being considered for high-speed intercity passenger rail in the Arizona/Southwest high-speed rail system, but does not cover the entire portion of any one segment.

*Sources: 2010 U.S. Census, XpressWest Website/Media Kit, DesertXpress – Las Vegas to Victorville EIS/ROD, Arizona High Speed Rail Feasibility Study, ADOT 2010 Statewide Rail Framework Study, Federal Railroad Administration, Amtrak System Timetable Fall 2011/Winter 2012.*

## **ESTIMATED SYSTEM COSTS AND FUNDING SOURCES**

### **Estimated System Costs**

The XpressWest proposal for high-speed intercity passenger rail in the Las Vegas to Victorville segment includes electric-powered trains operating at maximum speeds of 150 mph over dedicated high-speed rail right-of-way. Travel time over the 185-mile route is expected to be approximately 80 minutes with train frequencies up to three trains per hour during peak demand periods. The XpressWest consortium reports that the cost to construct and implement the XpressWest system, including infrastructure and rolling stock purchase, is estimated to be approximately \$6.9 billion. On a per-mile basis, the estimated capital cost of the XpressWest system is approximately \$37.3 million per mile (in 2012 dollars). No cost estimates for the possible extension of the XpressWest system to Palmdale, CA, have been developed.

Cost estimates for high-speed intercity passenger rail service in the other four segments grouped as the Arizona/Southwest high-speed rail system have also not been developed.

### **Projected Funding Sources**

The XpressWest proposal for high-speed intercity passenger rail between Las Vegas and Victorville is expected to cost approximately \$6.9 billion. The XpressWest consortium reports that it has applied for \$4.5 billion loan from the FRA's Railroad Rehabilitation and Improvement Financing (RRIF) program. The RRIF program was established as part of the Transportation Equity Act for the 21st Century (TEA-21) in 1998 and is authorized to provide direct loans and loan guarantees to eligible recipients. The XpressWest project is eligible for RRIF loans because it has incorporated as a railroad. If approved, the RRIF loan would cover approximately 65 percent of the project's costs and would fund land acquisition and infrastructure construction. The proposed RRIF loan would be paid back over a period of 35 years with operating revenue from the system. The balance of the project's capital costs, approxi-

mately \$1.4 billion, is expected to be provided by private sources. XpressWest reports that a separate financing will fund the procurement of rolling stock and signaling components.

No funding sources have been evaluated for the other four segments of the Arizona/Southwest high-speed rail system.

### **Recent Funding Awards**

No recent funding awards were provided directly to the three states for routes that encompass the described Arizona/Southwest high-speed rail system. However, the FRA reports that \$500,000 was awarded to a multi-state planning project to be led by the FRA known as the Southwest Corridor Planning project. The project is described as advance planning for integrated high-speed rail network development in the Southwest, including Arizona, California, and Nevada. The source for these funds was the FY 2010 high-speed rail appropriations. Although not directly related to the development of high-speed passenger rail in the described Arizona/Southwest system, the State of Nevada was awarded a grant of \$640,000 from FY 2010 high-speed rail appropriations to prepare a State Rail Plan.

*Source: XpressWest Website/Media Kit, Federal Railroad Administration.*

## **TRANSPORTATION SYSTEM IMPACTS**

### **Ridership Estimates**

Ridership forecasts for the Las Vegas to Victorville XpressWest high-speed rail project were developed as part of the project's Final Environmental Impact Statement, released in March 2011. The proposed project would result in travel times of 80 minutes over the 185-mile route with up to three trains per hour during peak demand periods. Ridership estimates were initially developed in December 2005 as part of the preliminary EIS activities for the project. The initial forecasts estimated that DesertXpress (now XpressWest) ridership for the year 2012 (third year after opening) would be 4,160,412 annual passengers, or approximately 22.8 percent of the total passenger trips between Southern California and Las Vegas. The 2005 study projected that by the year 2040, estimated ridership on the DesertXpress line would be 7,836,000 annual passengers.

As part of the EIS process for the DesertXpress project, an independent review of the initial (2005) ridership estimates was conducted in February 2008. The independent review raised a number of issues with the methodology used in the initial ridership estimates, most notably issues



related to ridership shifts from automobile and estimates of induced demand. Consequently, the independent review recommended that the initial ridership estimates be reduced by approximately 10 percent to account for these issues. This recommendation was adopted in the ridership forecasts published in the Final EIS for the DesertXpress in 2011. Ridership for the preferred alternative (electric multiple unit equipment) was estimated to be 2,472,305 in the first year of operations (2012), 4,635,012 for the third year (2015), and 6,504,131 for the buildout year (2027). Ridership forecasts using electric multiple unit equipment were approximately 27 percent higher than ridership forecasts with diesel-electric multiple units, due in part to the electric equipment reducing travel time by 16 minutes.

Sketch-level ridership forecasts for three of the four segments of the Arizona/Southwest high-speed rail system within the State of Arizona were developed as part of the ADOT 2010 Statewide Rail Framework Study. Ridership forecasts were developed for the year 2050 for the rail corridors connecting Phoenix/Tucson with Los Angeles, San Diego, and Las Vegas, with 6 to 12 daily round-trips used in the projections. Ridership projections for the Phoenix/Tucson to Los Angeles corridor were between 1,800,000 and 4,400,000 annual passengers. Ridership projections for the Phoenix/Tucson to San Diego corridor were between 300,000 and 600,000 annual passengers. Ridership projections for the Phoenix/Tucson to Las Vegas corridor were between 950,000 and 1,900,000 annual passengers.

### Mode Choice

According to its website media kit, the XpressWest project is expected to shift approximately 2 million annual automobile trips from parallel Interstate 15, reducing traffic along that route by approximately 25 percent. Details from the ridership estimates used in the Final EIS for the XpressWest project indicate that approximately 81 percent of passengers will shift from automobile, 14 percent from air, and 5 percent from bus. As recommended in the independent ridership review, no induced trips were considered in the Final EIS ridership estimates. The distribution of ridership sources attracted from other modes in the initial DesertXpress ridership estimate (evaluated for the diesel-electric train alternative) was as follows: shift from automobile, 73 percent; from air, 11 percent; from bus, 6 percent; and induced trips, 9 percent of ridership.

### Connectivity with Other High-Speed Rail Systems

Three of the five segments of the Arizona/Southwest high-speed rail system connect to the proposed California high-speed rail system in two locations, as follows: Los Angeles

(Phoenix to Los Angeles segment) and San Diego (Phoenix to San Diego segment). The XpressWest project has proposed a 50-mile extension of its proposed route to connect between its planned termini in Victorville and the California high-speed rail system in Palmdale, providing direct connection to Los Angeles Union Station over the California high-speed rail network.

*Source: XpressWest Website/Media Kit, DesertXpress – Las Vegas to Victorville EIS/ROD, DesertXpress Ridership Forecast Review, ADOT 2010 Statewide Rail Framework Study.*

### GOVERNANCE

Planning and development of high-speed intercity passenger rail in the Las Vegas to Victorville segment of the Arizona/Southwest high-speed rail system is being led by a private consortium named DesertXpress Enterprises, LLC (DXE). DXE reports that it has invested approximately \$51 million of private sector funds to develop the DesertXpress (now XpressWest) high-speed rail project since 2005. The U.S. Surface Transportation Board recognized DXE as a railroad in October 2011, allowing DXE to be eligible for RRIF loan funds. The Arizona Department of Transportation has led various studies for high-speed intercity passenger rail in Arizona, including planning activities within the four segments of the described Arizona/Southwest high-speed rail system radiating from Phoenix. The Western High-Speed Rail Alliance (WHSRA) has also been active in developing high-speed rail plans in the Southwest region. The WHSRA is comprised of Metropolitan Planning Organizations and other public agencies located in major western cities, including the Denver Regional Council of Governments, the Maricopa Association of Governments (Phoenix), the Regional Transportation Commission of Southern Nevada (Las Vegas, NV), the Regional Transportation Commission of Washoe County (Reno, NV), and the Utah Transit Authority (Salt Lake City). The main goal for the WHSRA is to determine the viability of developing and promoting a high-speed rail network in the Rocky Mountain region, with connections to the Pacific Coast and other U.S. regions.

*Source: XpressWest Website/Media Kit, Western High-Speed Rail Alliance Website.*

## **BIBLIOGRAPHY**

### **XpressWest High-Speed Rail Project Website**

URL: <http://www.XpressWest.com/>

### **XpressWest High-Speed Rail Project: Media Kit**

URL: <http://www.XpressWest.com/media-kit.html>

Date Accessed: July 23, 2012

### **DesertXpress – Las Vegas to Victorville EIS/ROD from FRA Environmental Reviews Website**

URL: <http://www.fra.dot.gov/Page/P0401>

### **Arizona Department of Transportation Passenger Rail Corridor Study: Tucson to Phoenix Website**

URL: <http://www.azdot.gov/passengerrail/>

### **Western High Speed Rail Alliance Website**

URL: <http://www.whsra.com>

### **DesertXpress – Las Vegas to Victorville EIS/ROD: DesertXpress Ridership Forecast Review**

Appendix D of Final EIS, includes December 2005 ridership study and February 2008 independent review

URL: [http://www.fra.dot.gov/rpd/downloads/Appendix\\_F\\_D\\_Ridership\\_Forecast\\_Review.pdf](http://www.fra.dot.gov/rpd/downloads/Appendix_F_D_Ridership_Forecast_Review.pdf)

Date Accessed: August 4, 2012

### **2010 Statewide Rail Framework Study: Final Report**

Prepared by the Arizona Department of Transportation, March 2010

URL: [http://www.bqaz.gov/PDF/Rail\\_Framework\\_Final\\_Report\\_031610.pdf](http://www.bqaz.gov/PDF/Rail_Framework_Final_Report_031610.pdf)

Date Accessed: March 20, 2012

### **Arizona High Speed Rail Feasibility Study: Final Report**

Prepared by Kimley-Horn and Associates for the Arizona Department of Transportation, April 1998

URL: [http://www.azdot.gov/mpd/Transit\\_Programs\\_Grants/PDF/AZ\\_High\\_Speed\\_Rail\\_Feasibility\\_Study\\_0498.pdf](http://www.azdot.gov/mpd/Transit_Programs_Grants/PDF/AZ_High_Speed_Rail_Feasibility_Study_0498.pdf)

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