History
of
Arizona’s Transportation System

Arizona State University
Memorial Union

Richard L. Powers, P.E.
Foot trails to Superhighways
Arizona – Transportation
Ancient Footpaths
Ancient Trails

Figure 1. Some of the major Native American trails used in Prehistoric and Historic times (Base map: Walker and Bufkin 1986).
Spanish Explorer Routes
1520 - 1776
Mountain Men Trails
1825 - 1834
Routes of Explorers
1844 - 1858
Toll Roads in Arizona
1850’s – 1890’s

Senator Highway – Arizona’s First Toll Road

The crown jewel of Arizona’s backroads of the Bradshaw Mountains, the Senator Highway was first built between 1866 and 1867 as part of the Prescott and Lynn Creek Toll Road. The charge was $1.50 per wagon and fifty cents (4 “bits”) for a horse and rider. This was considered expensive in its day.

1864 - Toll roads were authorized by Territorial Legislature.
Stage Routes
Toll Roads
1840 - 1869
Military Trails
1850 - 1880

Figure 6. Routes commonly used by the Military during the Indian Wars Era (Base map: Walker and Bufkin 1986).
Famous Trails

Five pathways that brought civilization to Arizona:
- Santa Cruz Trail, which led explorers from Mexico to Tucson.
- Gila Trail, route of the Forty-niners and the Butterfield Stage across southern Arizona.
- Colorado River, from the Gulf of California, north to Ehrenberg, and then overland to Prescott.
- Beale's Wagon Road, the main northern passageway across Arizona.
- Honeymoon Trail, from Utah to northern and eastern Arizona.
The U.S. Camel Corps

Hi Jolly

In 1856 became one of the first camel drivers ever hired by the US Army to lead the camel corps experiment in the Southwest.
Arizona’s River Ports & Ferry 1852 - 1909
Arizona’s Railroad Growth 1888 - 1976

Refer to numbered table for key to maps.

1888, 1900 & 1920 maps show existence of railroads by their initial corporate names. The 1972 map indicates current operating companies.
Rail Service 1898

1898
Early Air Travel 1890’s
The First Roads in Arizona
First Freight Haulers
State takes Control of the Roads

Prior to 1909 - All road expenditures were made under direction of County Board of Supervisors

1909 – 1912 - March 18, 1909 Territorial road law created office of Territorial Engineer J.B. Girand, The Board of Control was established to manage expenditures – Board of Supervisors were required to levy taxes to pay for road improvements.

1912 – Arizona becomes 48th State (AHD created)
1912 State Highway Map

Original Arizona State Highway System (Not numbered)

1 - Phoenix to Yuma Highway
2 - Phoenix – Prescott – Camp Verde – Flagstaff – Grand Canyon Highway
3 - Nogales – Tucson – Florence – Chandler – Mesa – Phoenix Highway
4 - Tucson – Empire – Tombstone – Bisbee – Douglas Highway
5 - Phoenix – Roosevelt – Globe – San Carlos - Safford – Clifton – Duncan Highway

The Northern Highway (added in 1913) Old route 66 alignment.
Apache Trail

Apache Trail Highway of Arizona
120-Mile Automobile Trip
Between GLOBE and PHOENIX via ROOSEVELT DAM
One-Day Detour Through Bowie and Maricopa on Southern Pacific "Sunset Route"
1913 Arizona Good Roads Tour Book
Last Car to Pass over Apache Trial (Old mp 52-59)

Road flooded by waters of Apache Lake June 23, 1927
This Event Caused the Arizona State Legislature to abolish the old Board of Directors of State Institutions. August 11, 1927 created:

- Arizona State Highway Commission
  - 5 Member Board
  - 6 Year terms
  - Represent counties

- Arizona State Highway Department
  - State Highway Engineer
  - Adopted original highway system
MODERN ERA
Road Oil
to
Asphalt Paving
Significant Changes to the State Highway System Since 1950

- Paving U.S. 93 from Congress to Kingman
- Adding and Paving SR 87 from Mesa to Payson
- Adding Current State Highways on Navajo Reservation
- Paving All of SR 69 from Phoenix to Prescott
- Adding and Paving SR 260 from Payson to Showlow
- Constructing SR 95 from Parker to Topock
- Adding SR 90 from Benson to Sierra Vista
- Constructing the Entire Interstate System
- Constructing Freeways in Phoenix Metropolitan Area
Dramatic Growth of the State Highway System from 1950 to 2006
Interstate Construction Boom
1958 - 1990
<table>
<thead>
<tr>
<th>Route</th>
<th>Route Name</th>
<th>Total Miles</th>
<th>Frontage Miles</th>
<th>Year Complete</th>
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<tbody>
<tr>
<td>8</td>
<td>Yuma – Casa Grande Highway</td>
<td>178.33</td>
<td>112.06</td>
<td>1979</td>
</tr>
<tr>
<td>10</td>
<td>Various Segment Names</td>
<td>392.33</td>
<td>320.30</td>
<td>1990</td>
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<tr>
<td>15</td>
<td>Nevada - Utah</td>
<td>29.39</td>
<td>6.80</td>
<td>1974</td>
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<tr>
<td>17</td>
<td>Black Canyon Freeway</td>
<td>145.76</td>
<td>119.18</td>
<td>1973</td>
</tr>
<tr>
<td>19</td>
<td>Nogales - Tucson Freeway</td>
<td>63.35</td>
<td>83.04</td>
<td>1981</td>
</tr>
<tr>
<td>40</td>
<td>Topock-Flagstaff-Holbrook-Lupton</td>
<td>359.48</td>
<td>206.42</td>
<td>1985</td>
</tr>
</tbody>
</table>

**Total FHWA Mileage = 1,168.64**
1975
MAP

1975 INTERSTATE SYSTEM OF ARIZONA

ARIZONA DEPARTMENT OF TRANSPORTATION PLANNING SURVEY GROUP

LEGEND:
- INTERSTATE TRAVELLED-SEC
- OUTSIDE HOMES: INTERSTATE STANDARDS OF DESIGN FOR HIGHWAY TRAFFIC
- INTERSTATE, APPROVED ALIGNMENT

MAPPNG FOR:
- MOHAVE
- COCONINO
- NAVAJO
- APACHE
- GILA
- MARICOPA
- YAVAPAI
- YUMA
- PINAL
- PIMA
- SANTA CRUZ

INSET MAP:
- MARICOPA COUNTY
- PHOENIX METROPOLITAN AREA
The Majority of Interstate Construction Occurred Between 1963-1979
State Highway Mileage Growth

1951 - 3945 Miles
2000 - 6620 Miles
2005 - 6800 Miles
2004 State Highway Map
Comparison of the Historical and Projected Arizona Population Growth with Sun Corridor and All Other Counties
Population Projections for Maricopa and Pinal Counties (DES)

Historical and Projected (ADES) Population for Maricopa and Pinal Counties

Year

Combined Population in millions

1940 1960 1980 2000 2020 2040 2060

0 0.7 1.0 1.6 2.2 3.3 4.6 5.9 7.1 8.1 9.0 9.3
2050
16.0 Million

Source:
Maricopa Association of Governments
Arizona Growth and Development Facts

- 13.3 million Population by 2055
  - U of A projects 14.6 million by 2036
- 220,000 Average Yearly Population Increase through 2005
  - Equivalent to another Phoenix every 7 years
- 88,000 New Housing Units/Year Average
  - 15,000 direct construction-related and 17,000 indirect jobs created for each 10,000 new housing units.
Arizona Growth and Development Facts (cont.)

- Up to 3% per Year Growth in non-Farm Jobs
- Up to 7% per Year Growth in Total Personal Income
- Up to 5% per Year Growth in Retail Sales
Potential Constraints on Growth and Development

- **Land Ownership** – Only 18% Private
  - Checkerboard ownership in some areas

- **Natural Boundaries**
  - Geography of the state

- **Water**
  - Ground water diminishing
  - Can the 100-year supply guarantee be maintained?
Potential Constraints on Growth and Development (cont.)

- Transportation and Utilities Infrastructure
  - Can it keep up?
    - Decision-making
    - Funding
    - Time to put in place

- Environment
  - Will people want to live in Arizona?
    - Air quality
    - Congestion
    - Natural environment
Potential Constraints on Growth and Development (cont.)

- Energy
  - Sources
  - Supply
  - Cost
Today (Congestion)
Growth in Historical and Projected Total Annual VMT for Arizona
Fatal Accident Rate on Arizona Roads
Since 1955

Year
Fatality Rate/100M
VMT

1955
1965
1975
1985
1995
2005

0 2 4 6 8 10
Revenue & Funding
State Highway Construction $
History of State and Federal Gas Taxes

<table>
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<tr>
<th>Year</th>
<th>State Gas Tax in cents</th>
<th>Federal Gas Tax in cents</th>
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<tr>
<td>1940</td>
<td>0</td>
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<td>1960</td>
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<td>1970</td>
<td>0.10</td>
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<td>1980</td>
<td>0.15</td>
<td>0.05</td>
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<tr>
<td>1990</td>
<td>0.25</td>
<td>0.10</td>
</tr>
<tr>
<td>2000</td>
<td>0.30</td>
<td>0.15</td>
</tr>
<tr>
<td>2010</td>
<td>0.35</td>
<td>0.20</td>
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Figure 4. Federal Fuel Tax Rate Adjustments to Restore Purchasing Power

Note: The inflation effects are based on the Consumer Price Index, actual rates from 1998 through 2006 and estimated from 2007 through 2015.

From AASHTO Future needs of U.S. Transportation System report....
Distribution of State HURF Funds

Year

Percent of Total

Counts
Cities
DPS & Others
ADOT
Environmentally Sensitive Highways
Arizona Highway Department

Arizona Department of Transportation

Urban Freeway Systems

Growth
<table>
<thead>
<tr>
<th>Location</th>
<th>Roadways</th>
</tr>
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<tbody>
<tr>
<td>Central</td>
<td>Interstate 10 (Maricopa Freeway), Interstate 17 (Black Canyon Freeway)</td>
</tr>
<tr>
<td></td>
<td>South of Loop 101, State Route 51 (Piestewa Freeway), State Route 143</td>
</tr>
<tr>
<td></td>
<td>(Hohokam Expressway), State Route 153 (Sky Harbor Expressway)</td>
</tr>
<tr>
<td>East Valley</td>
<td>Loop 101 (Pima Freeway), Loop 101 (Price Freeway), Loop 202 (Red Mountain Freeway)</td>
</tr>
<tr>
<td></td>
<td>Loop 202 (Santan Freeway), State Route 87 (Beeline Highway)</td>
</tr>
<tr>
<td></td>
<td>State Route 802 (Williams Gateway Freeway), US 60 (Superstition Freeway)</td>
</tr>
<tr>
<td>Northwest</td>
<td>Interstate 17 (Black Canyon Freeway) North of Loop 101</td>
</tr>
<tr>
<td></td>
<td>Loop 101 (Agua Fria Freeway), Loop 303 North of I-10</td>
</tr>
<tr>
<td></td>
<td>State Route 74 (Carefree Highway), US 60 (Grand Avenue)</td>
</tr>
<tr>
<td>Southwest</td>
<td>Interstate 10 (Papago Freeway), Loop 202 (South Mountain Freeway)</td>
</tr>
<tr>
<td></td>
<td>Loop 303 South of I-10, State Route 85</td>
</tr>
<tr>
<td></td>
<td>State Route 801</td>
</tr>
</tbody>
</table>
THANK YOU
Welcome to Richard L. Powers Sr. Online

Author of Images of America “Apache Trail”

Arizona Historian

Richard L. Powers, P.E., is a longtime resident of Arizona and avid history buff with a keen interest in Arizona and local history. While working for the Arizona Department of Transportation (ADOT) he became interested in Arizona’s transportation history and has given presentations on this topic. In addition to Arizona’s Interstate Highways System history and the history of the Apache Trail a unique road, the subject of this new book.

Rick’s Bio

Order Your Signed Copy Today!

Upcoming Events

Valley of the Sun Romance Writers
Mr. Powers will be giving a presentation to the Valley of the Sun Romance Writers membership on Tuesday, September 13, 2011.

APWA History Presentation
Presentation will be made at the monthly AZ APWA Luncheon meeting on September 14th, at 12:00 noon. The luncheon will be held at the Phoenix Country Club.

ASU Materials Conference
Rick will be presenting the History of Arizona’s Transportation system at the annual ASU Materials Conference on Tuesday November 11th at 11:00am. The conference will be held in the Memorial Union on the Arizona State University campus in Tempe.

Globe Historical Society First Friday
The Future of Transportation in Arizona
Driving in Arizona could get pricey

Will the need for more freeways finally take its toll on Arizona motorists? Two Senate bills submitted this week would legalize the construction of toll roads or pay-as-you-go freeway lanes that could be built and operated by private companies. Backers of SB1576 and SB1635 point to the success of toll roads in other states such as Texas and a dearth of alternatives for the rapid expansion of Arizona’s congested highway system.

BY J. CRAIG ANDERSON TRIBUNE
East Valley Tribune
Feb. 3

Toll Roads?

Pinal to launch toll road study

The first-ever feasibility study looking at a toll road to link the fastest-growing areas of Pinal County to the East Valley has been commissioned.

March 1, 2007

The study comes after years of discussion about solutions to ease gridlock in Pinal County and adjacent East Valley communities.
WASHINGTON—The United States needs to employ innovative public-private partnerships to combat increasingly crippling congestion on its aging transportation infrastructure system, Transportation Secretary Mary E. Peters told American business leaders at the U.S. Chamber of Commerce symposium on transportation and the global economy.

Traditionally, transportation has been funded by a combination of federal and state governments, but government funds no longer are sufficient to meet demands of the future. Forecasts of up to 70 percent growth in freight demand in the next 10 years are causing federal and state officials to rethink the way transport projects are funded, Peters said.........
Solo drivers step closer to carpool lanes

Mary Jo Pitzl
The Arizona Republic
Feb. 14, 2007 12:00 AM

Faced with growing traffic congestion on the state's freeways, a legislative panel Tuesday opted for a new approach: Pay for the fast lane.

Two ideas that would let single drivers pay to use the carpool lane cruised to unanimous approval from the Senate Transportation Committee. But the embrace of tolls only went so far: A proposal to build toll roads to serve the Valley's exploding suburbs failed.
Report of the

EIGHTY-EIGHTH ARIZONA TOWN HALL

“ARIZONA’S RAPID GROWTH AND DEVELOPMENT: NATURAL RESOURCES AND INFRASTRUCTURE”

Prescott, Arizona
April 9 – 12, 2006

Arizona is in urgent need of accurate population estimates and projections for planning purposes.

Explosive growth and sprawl have resulted in an array of interconnected impacts...
Governor’s Town Hall
Growth in AZ

Increased demand management and conservation can help Arizona meet its water needs for future growth, development and the economic vitality of communities.

Arizona must integrate land use and transportation planning.

Increased demand management and conservation can help Arizona meet its water needs for future growth, development and the economic vitality of communities.
Vision 21 – Recommendations for
INCREASE DEDICATED TRANSPORTATION REVENUES

Increase Fuel Taxes

Establish a Dedicated Statewide Sales Tax

Establish dedicated statewide development fees for system expansion

Rededicate Flight Property Taxes to the State Aviation Fund

Establish State Toll Road Authority Encourage
Public-Private Partnerships
Expand Privatization Authority
Increase Minimum Federal Highway Trust Fund Distributions

Increase in Highway User Fund Bonding Capacity

Establish Automatic Enactment of State Gas Tax Increase to Offset Federal Fuel Tax Reductions

Restore Local Transportation Taxing Authority

Authorize State Collection of Tribal Vehicle Taxes
# Multi-Modal Transportation

## Table ES.6  Demand/Utilization of Transportation Modes

<table>
<thead>
<tr>
<th>Mode</th>
<th>Metric</th>
<th>Demand/Utilization</th>
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<tbody>
<tr>
<td>Road</td>
<td>Vehicle Miles of Travel (VMT)</td>
<td>150,000,000 276,000,000</td>
</tr>
<tr>
<td>Rail</td>
<td>Daily boardings</td>
<td>207 409</td>
</tr>
<tr>
<td>Transit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercity Bus</td>
<td>Daily boardings</td>
<td>670 910</td>
</tr>
<tr>
<td>Urban Transit</td>
<td>Daily boardings</td>
<td>271,000 429,000</td>
</tr>
<tr>
<td>Rural Bus</td>
<td>Daily boardings</td>
<td>4,100 7,400</td>
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<tr>
<td>Aviation</td>
<td>Daily enplanements</td>
<td>47,600 104,100</td>
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<tr>
<td>Bicycle</td>
<td>Daily trips</td>
<td>310,300 501,100</td>
</tr>
<tr>
<td>Pedestrian</td>
<td>Daily trips</td>
<td>976,400 1,597,500</td>
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## Freight Shipments by Mode

<table>
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<tr>
<th>ARIZONA</th>
<th>Tons (millions)</th>
<th>Value (billions $)</th>
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<tbody>
<tr>
<td><strong>State Total</strong></td>
<td>182</td>
<td>292</td>
</tr>
<tr>
<td><strong>By Mode</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Air</td>
<td>&lt;1</td>
<td>&lt;1</td>
</tr>
<tr>
<td>Highway</td>
<td>151</td>
<td>249</td>
</tr>
<tr>
<td>Other(^a)</td>
<td>&lt;1</td>
<td>&lt;1</td>
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<tr>
<td>Rail</td>
<td>30</td>
<td>43</td>
</tr>
<tr>
<td>Water</td>
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<td>0</td>
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<tr>
<td><strong>By Destination/Market</strong></td>
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<tr>
<td>Domestic</td>
<td>169</td>
<td>266</td>
</tr>
<tr>
<td>International</td>
<td>12</td>
<td>26</td>
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Note: Modal numbers may not add to totals due to rounding.

\(^a\) The “Other” category includes international shipments that moved via pipeline or by an unspecified mode.
Domestic Truck Freight Flows
Domestic Rail Freight Flows
Building a Quality Arizona

Statewide Transportation Framework Studies

In *Building a Quality Arizona*, Councils of Governments (COGs) and Metropolitan Planning Organizations (MPOs) from around the state worked with the Arizona Department of Transportation, the Arizona State Legislature, the Governor’s Office, and the business community to identify and document state infrastructure needs.
The state Long-Range Transportation Plan (LRTP) is ADOT’s role in implementing Building a Quality Arizona (bqAZ) the Statewide Framework Transportation Planning Study. By grounding the LRTP goals and objectives in bqAZ, ADOT is defining its role in implementing the agreed upon vision and guiding principles. Once the LRTP is adopted it will be ADOT’s commitment to the partnership required to implement bqAZ. It is important to remember that bqAZ included local roads and other types of facilities and the LRTP does not. It only includes the state transportation system.

Scott Omer
Rail Service

1898
Figure ES.11  Arizona’s Highway, Rail, and Air Transportation System

Arizona Rail & Aviation Network

Legend

- Interstate
- U.S. Route
- State Route
- Rail Lines
- Commercial Airport
Aviation

Phoenix Sky Harbor International Airport accommodates over 555,200 takeoffs and landings annually, making it the 8th busiest airport in the world!