Overview of Technical Analysis And Presentation Of 8-Hour Ozone Boundary Options

June 17, 2003

Gary Neuroth, Air Pollution Evaluations & Solutions
Jana Hutchins, Arizona State University

- Meteorology
- Modeling
- Air Quality Monitoring Data
- Receptor Areas
- Existing and Potential Source Areas
- 8-Hour Ozone Boundary Options

Data Providers

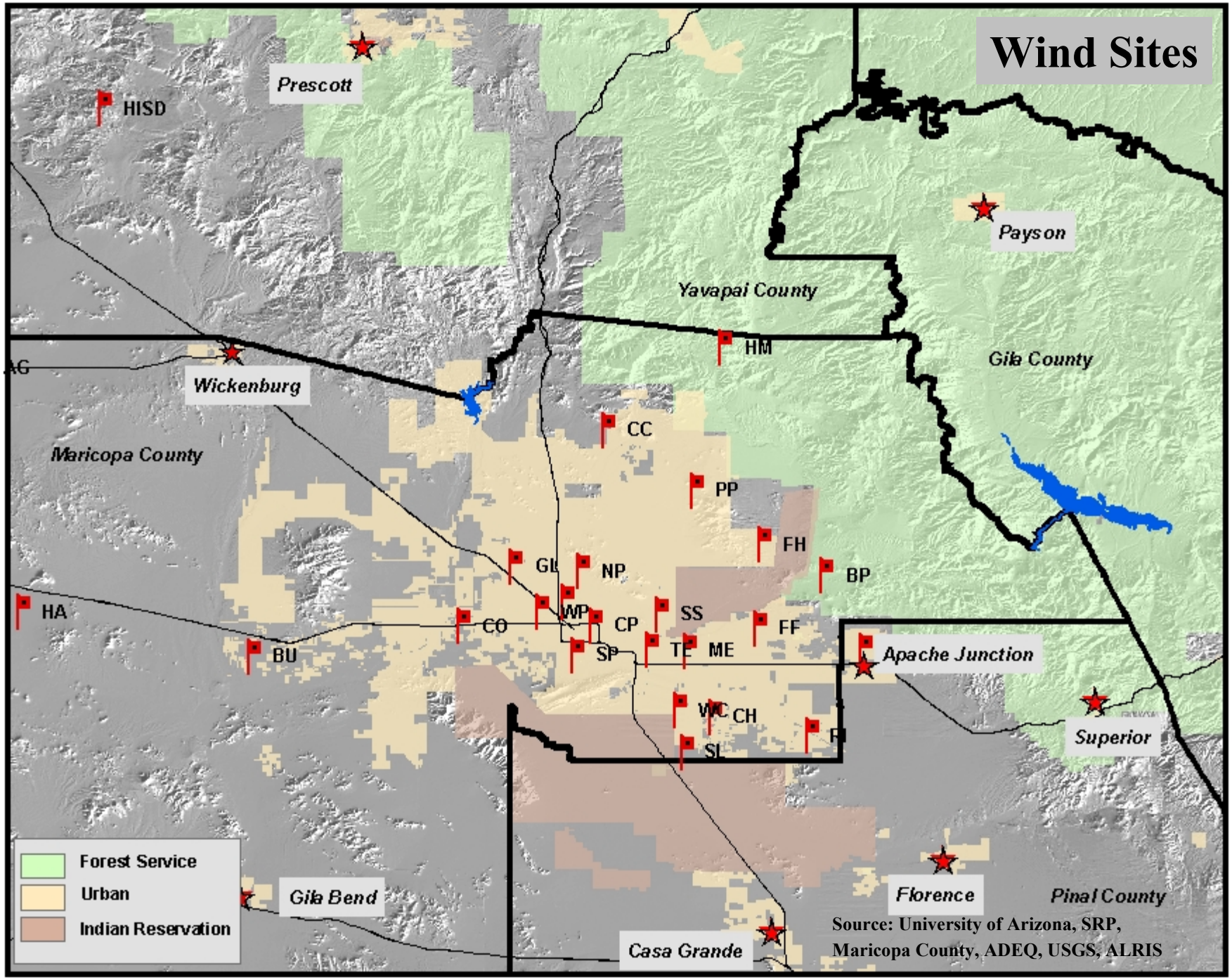
- Arizona Department of Environmental Quality (ADEQ)
- Arizona Land Resource Information Systems (ALRIS)
- Arizona State University (ASU) – Department of Mechanical and Aerospace Engineering - Drs. Fernando, Grossman-Clarke, and Lee
- Gila River Indian Community
- Maricopa County
- Maricopa Association of Governments (MAG)
- Pinal County
- Salt River Project
- Town of Payson
- U.S. EPA
- U.S. Geological Survey (USGS)
- University of Arizona
- Yavapai County
- Air Pollution Evaluations & Solutions - Gary Neuroth
- Western Regional Air Partnership (WRAP)

Maps Prepared by:

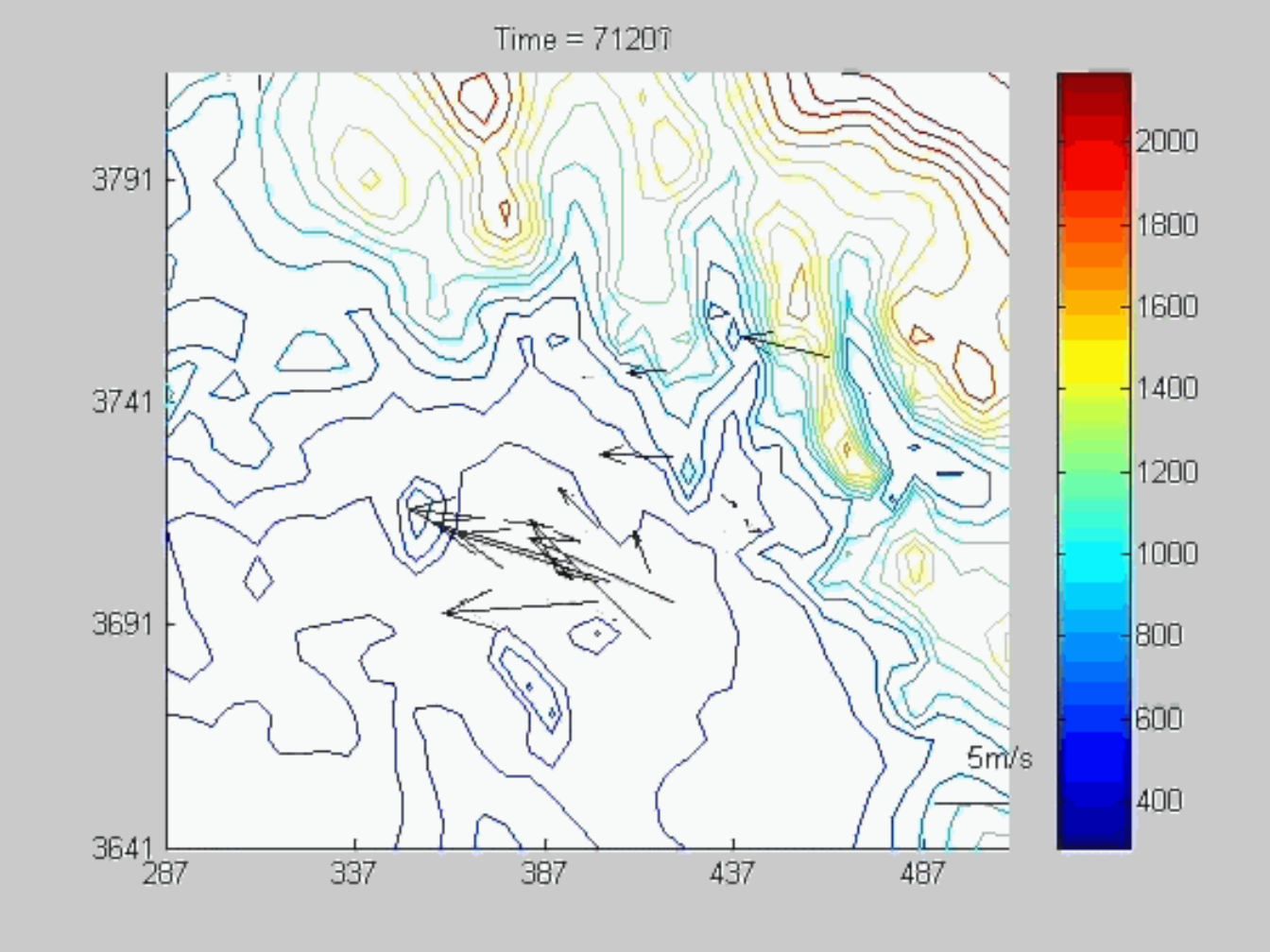
ASU - GIS Services, Information Technology

Jana Hutchins, Michael Zoldak and Robert Murray

Meteorology

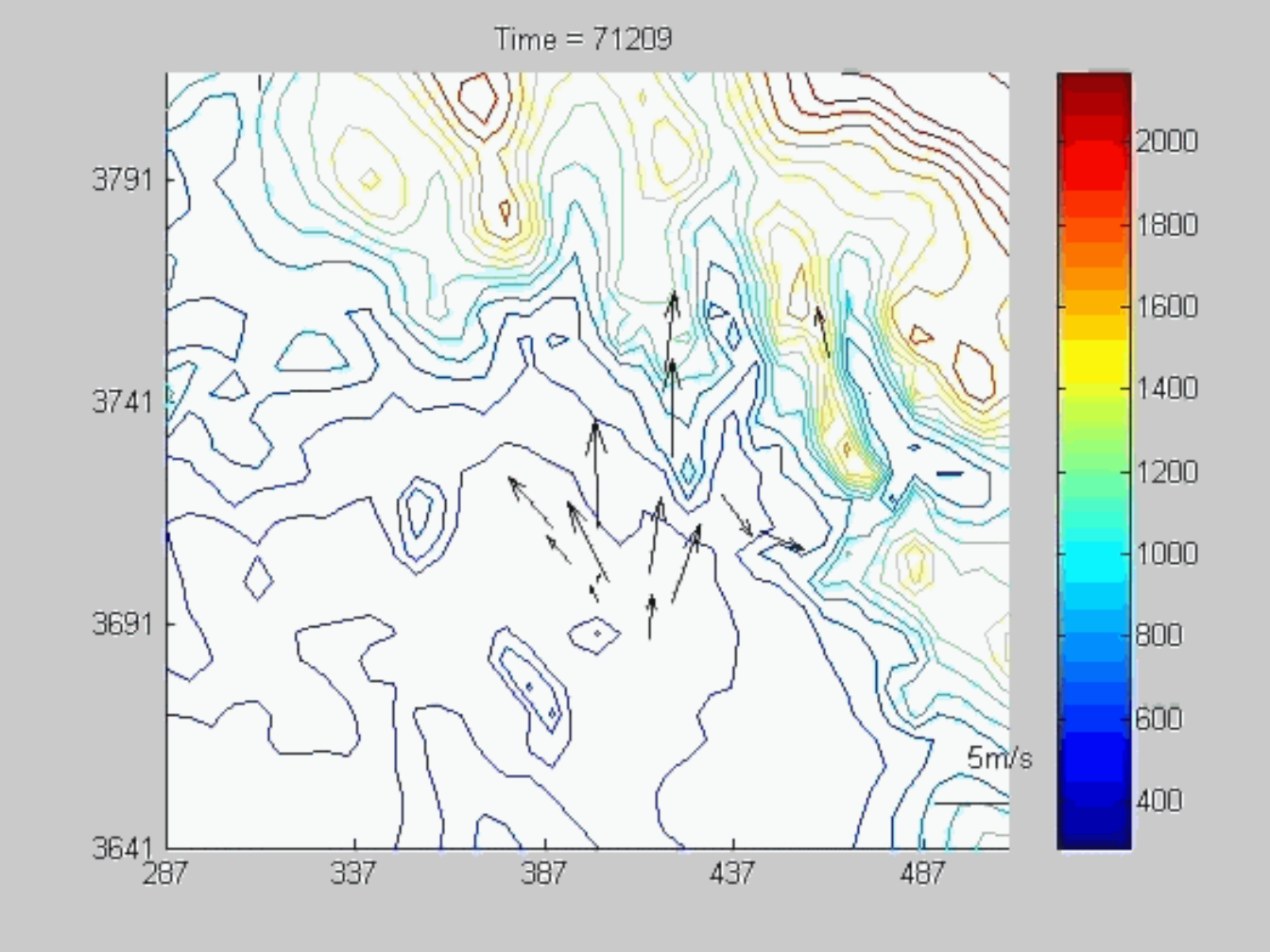

Wind Sites
Prescott
HISD
Payson
Yavapai County
HM
Gila County
Wickenburg
CC
Maricopa County
PP
FH
GL
NP
BP
HA
WP
CP
SS
CO
FF
BU
SP
TE
ME
Apache Junction
WC
CH
Superior
SL
Forest Service
Urban
Indian Reservation
Gila Bend
Florence
Pinal County
Casa Grande
Source: University of Arizona, SRP,
Maricopa County, ADEQ, USGS, ALRIS

Drainage Winds



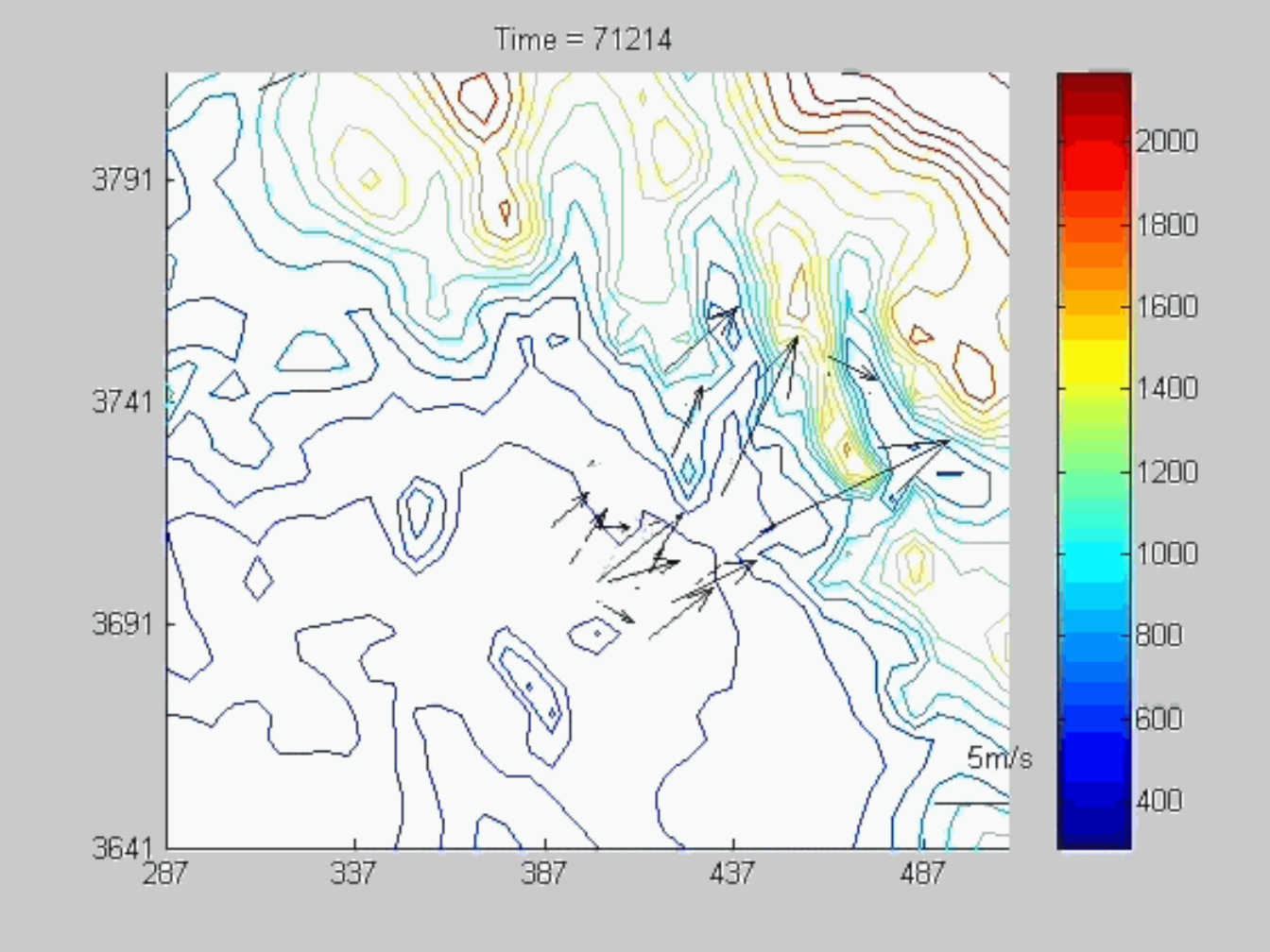
Source: ADEQ, Maricopa County Monitoring sites

A.M. Transition Winds



Source: ADEQ, Maricopa County Monitoring sites

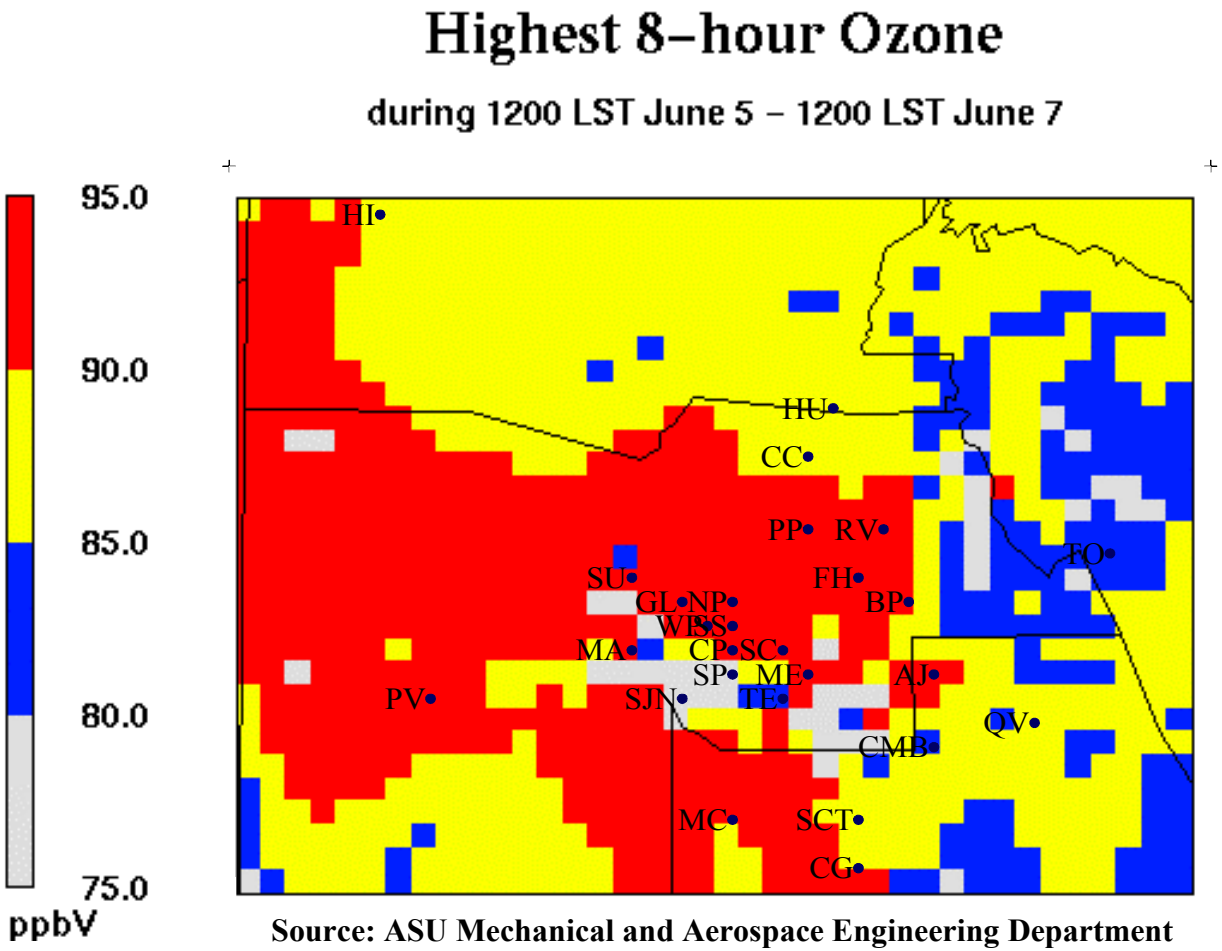
Upslope Winds



Source: ADEQ, Maricopa County Monitoring sites

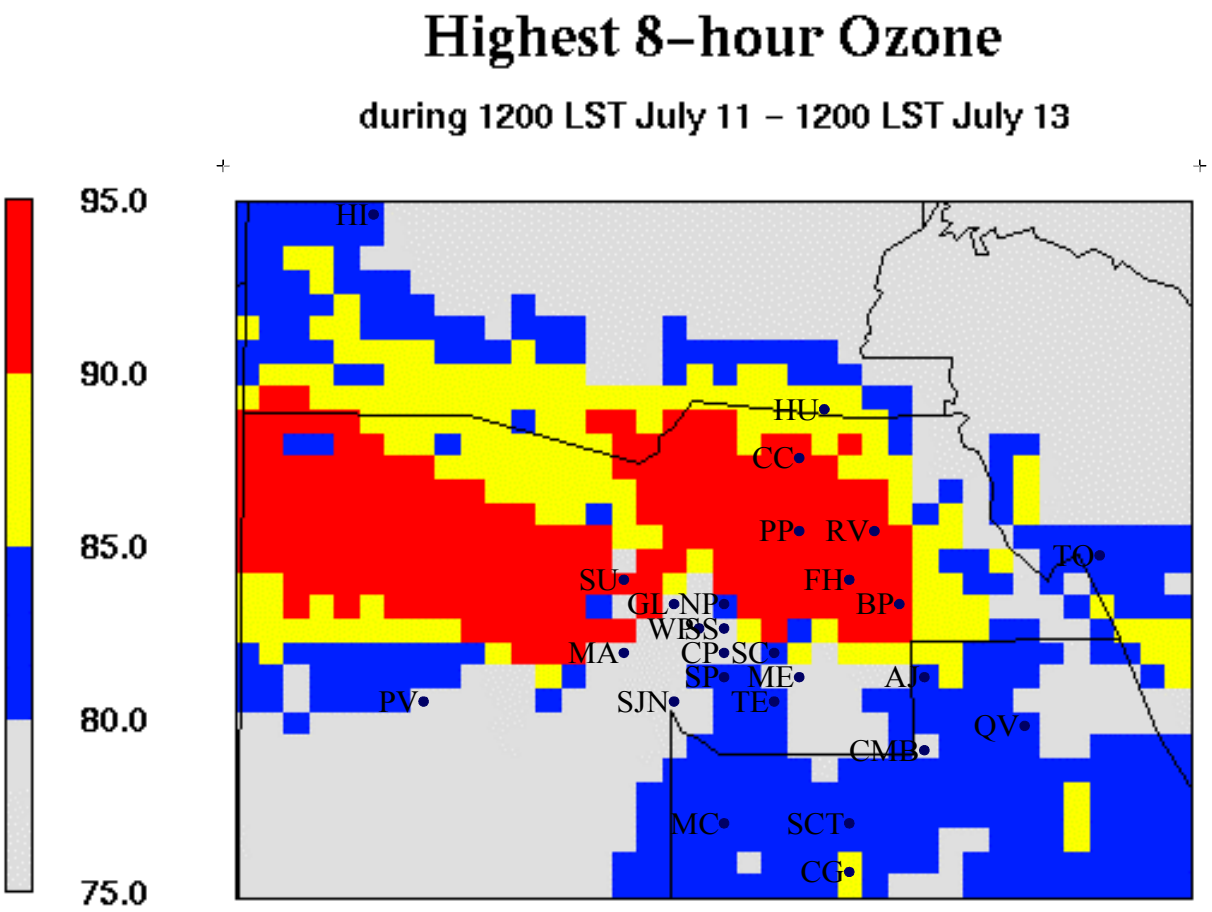
Modeling

Highest 8hr Ozone: June 6th



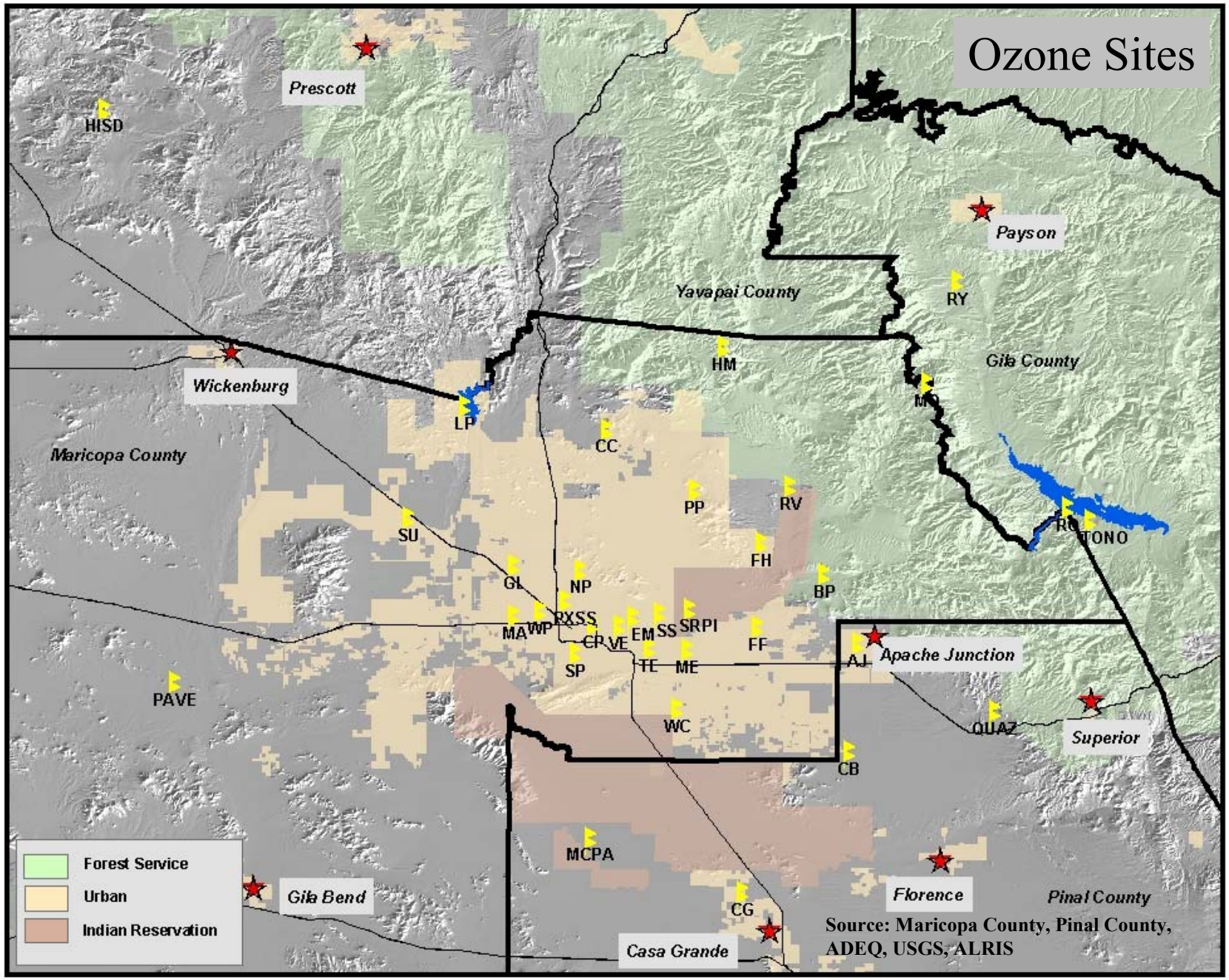
Source: ASU Mechanical and Aerospace Engineering Department

Highest 8hr Ozone: July 12th



Source: ASU Mechanical and Aerospace Engineering Department

Air Quality Monitoring Data


Ozone Sites
Prescott
HISD
Payson
RY
Yavapai County
Gila County
HM
Wickenburg
LP
CC
Maricopa County
PP
RV
SU
TONO
FH
GL
NP
BP
MA
WP
RXSS
CP
VE
EM
SS
SRPI
FF
AJ
Apache Junction
SP
TE
ME
PAVE
WC
QUAZ
Superior
CB
MCPA
Forest Service
Urban
Indian Reservation
Gila Bend
Florence
Pinal County
CG
Casa Grande
Source: Maricopa County, Pinal County, ADEQ, USGS, ALRIS

Annual Fourth Highest 8-Hour Ozone Concentration in Parts per Billion (PPB)									
Monitor Site	**Abbreviation**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**
Maricopa County									
Blue Point	BP			83	**89**	**87**	**87**	80	**86**
Cave Creek	CC							83	**86**
Central Phoenix	CP	**85**	76	77	79	78	76	75	76
Falcon Field	FF			81	83	82	75	81	84
Fountain Hills	FH			**88**	**86**	**86**	**85**	83	**86**
Glendale	GL	80	72	76	70	81	81	78	83
Humboldt Mountain	HM			81	**90**	**86**	82	**85**	**90**
Lake Pleasant	LP				82	81	82	73	
Maryvale	MA			78	**86**	77	80	73	84
Mesa	ME	**92**	**90**	84	80	83	75	74	72
Mt. Ord	MO			84	**88**	**87**	**90**	77	
North Phoenix	NP	**92**	**95**	**91**	**89**	84	**86**	**86**	**85**
Palo Verde	PAVE		71	77	80	80	80	74	78
Emergency Management	EM			**85**	81	**86**	70	63	
Super Site	PXSS		**87**	79	79		76	79	76
Pinnacle Peak	PP	**91**	**91**	82	**86**	83	**86**	**85**	84
Rio Verde	RV			**85**	79	**86**	**86**	83	**85**
Roosevelt	RO			84					
Salt River Pima	SRPI	**92**	**92**	82	**87**	82			
South Phoenix	SP	84	**91**	75	80	75	83	76	81
South Scottsdale	SS	**89**	**87**	76	78	72	80	79	77
Surprise	SU							71	79
Tempe	TE						78	79	80
Vehicle Emissions	VE	**92**	80						
West Chandler	WC			77	74	69	74	78	83
West Phoenix	WP	84	81	78	**86**	**91**	81	75	84
Gila County									
Rye	RY			56	65	80			
Tonto N.M.	TONO								**87**
Pinal County									
Apache Junction	AJ	**91**	**85**	82	82	80	82	78	80
Casa Grande	CG	71	79	72	68	78	75	74	78
Queen Valley	QUAZ							79	83
Yavapai County									
Hillside	HISD		**85**	76	83	84	83	76	**89**

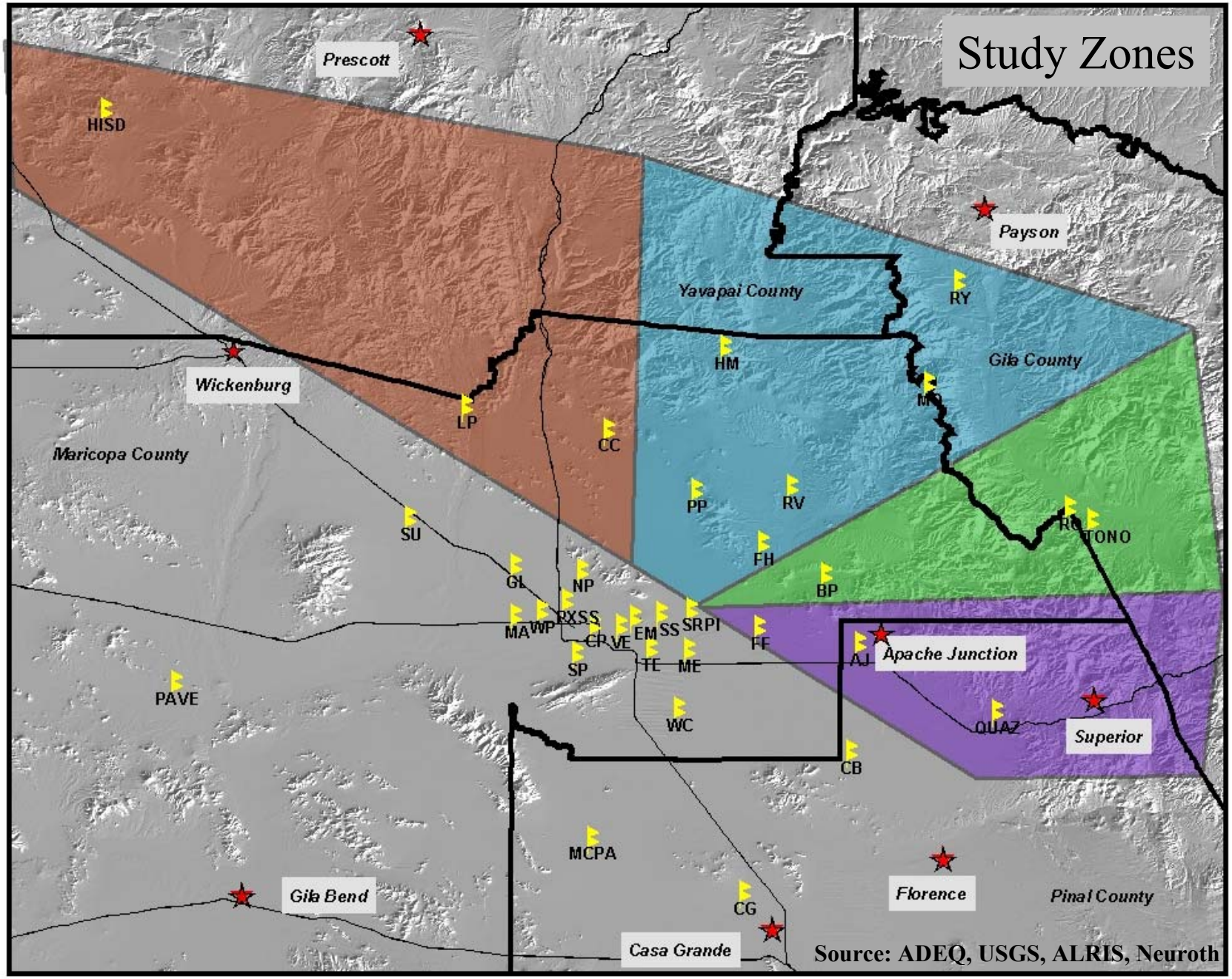
Values in blue indicate an exceedance of the 8-hour ozone standard

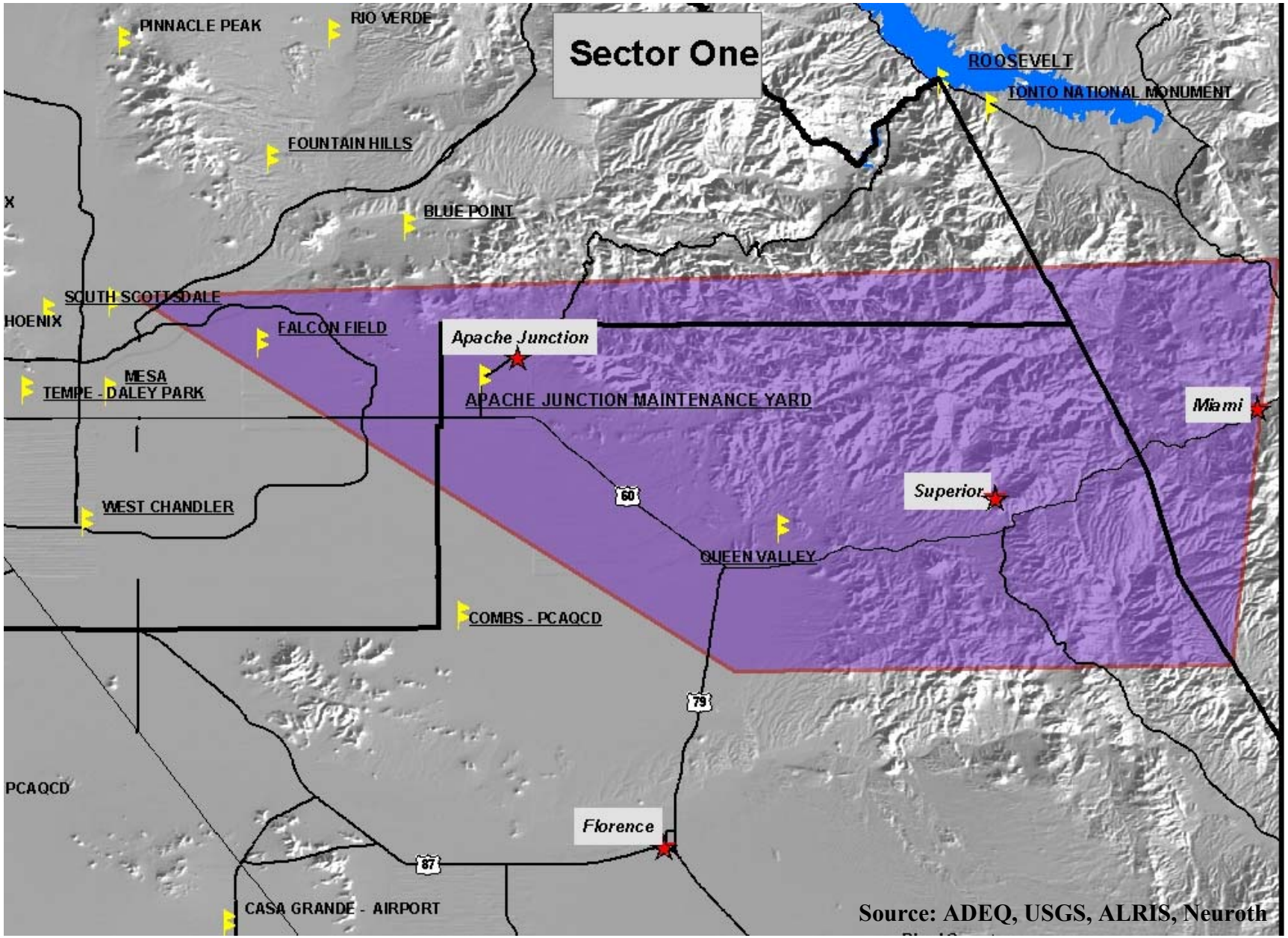
Three-Year Average of the Annual Fourth Highest 8-Hour Ozone Concentration in Parts per Billion (PPB)							
Monitor Site	**Abbreviation**	**1995-1997**	**1996-1998**	**1997-1999**	**1998-2000**	**1999-2001**	**2000-2002**
Maricopa County							
Blue Point	BP			**86**	**87**	84	84
Cave Creek	CC						
Central Phoenix	CP	79	77	78	77	76	75
Falcon Field	FF			82	80	79	80
Fountain Hills	FH			**86**	**85**	84	84
Glendale	GL	76	72	75	77	80	80
Humboldt Mountain	HM			**85**	**86**	84	**85**
Lake Pleasant	LP				81	78	
Maryvale	MA			80	81	76	79
Mesa	ME	**88**	84	82	79	77	73
Mt. Ord	MO			**86**	**88**	84	
North Phoenix	NP	**92**	**91**	**88**	**86**	**85**	**85**
Palo Verde	PAVE		76	79	80	78	77
Emergency Management	EM			84	79	73	
Super Site	PXSS		81	68	67	67	77
Pinnacle Peak	PP	**88**	**86**	83	**85**	84	**85**
Rio Verde	RV			83	83	**85**	84
Roosevelt	RO						
Salt River Pima	SRPI	**88**	**87**	83			
South Phoenix	SP	83	82	76		74	80
South Scottsdale	SS	84	80	75	76	77	78
Surprise	SU						75
Tempe	TE						79
Vehicle Emissions	VE						
West Chandler	WC			73	72		79
West Phoenix	WP	81	81	**85**	**86**	82	80
Gila County							
Rye	RY			67			
Tonto N.M.	TONO						
Pinal County							
Apache Junction	AJ	**86**	83	81	81	80	80
Casa Grande	CG	74	73	72	77	79	79
Queen Valley	QUAZ						
Yavapai County							
Hillside	HISD		81	81	83	81	82

Values in red indicate a violation of the 8-hour ozone standard

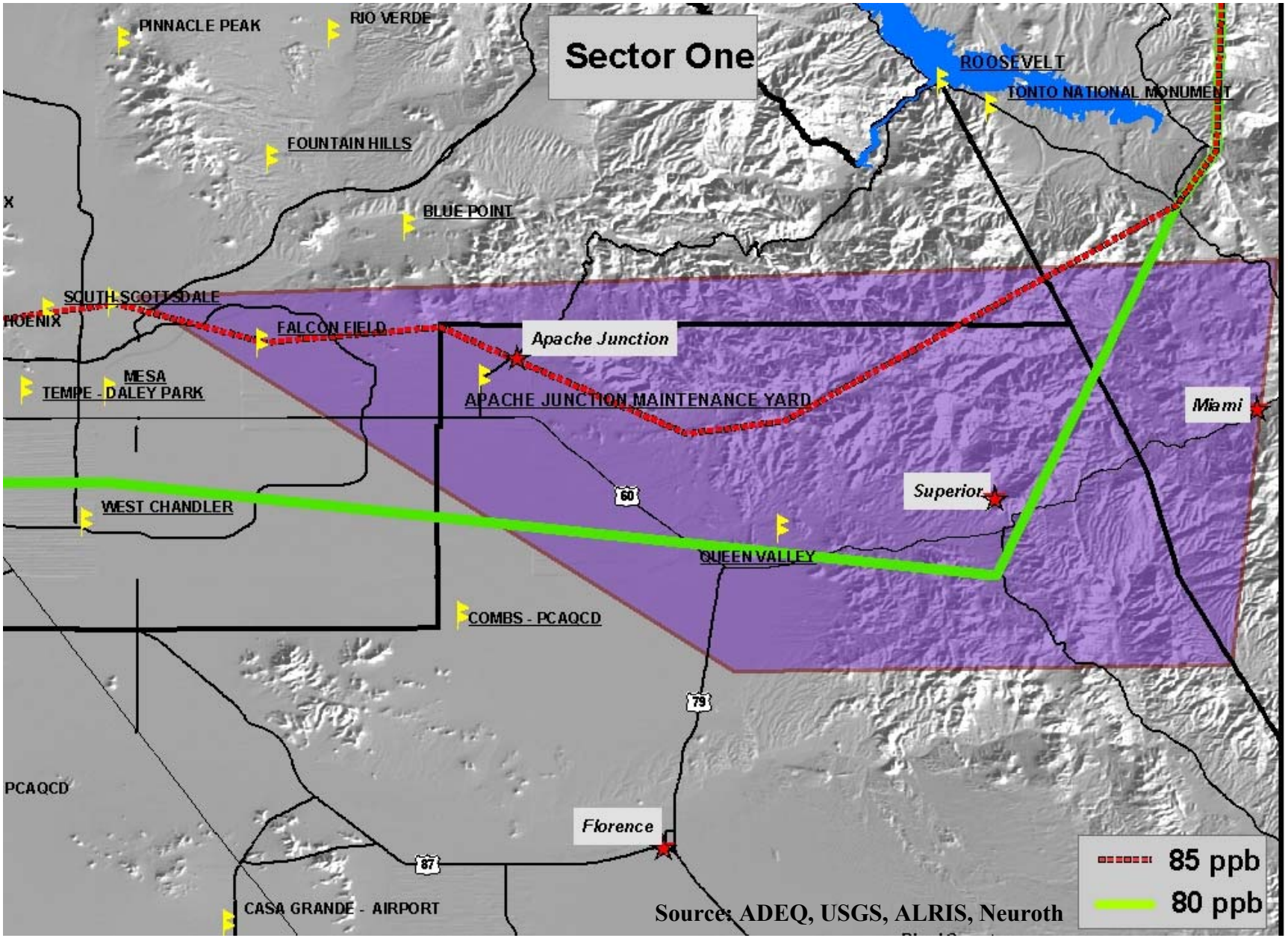
2003, 8-Hour Ozone Standard Exceedances to Date in Parts per Billion (PPB) (Preliminary data as of June 11, 2003)					
Monitor Site	**Abbreviation**	**May 11**	**May 21**	**May 22**	**May 27**
Maricopa County					
Blue Point	BP				**86**
Cave Creek	CC	**87**			**88**
Central Phoenix	CP				
Falcon Field	FF				
Fountain Hills	FH				
Glendale	GL	**88**	**85**		
Humboldt Mountain	HM	**90**		**87**	**89**
Lake Pleasant	LP				
Maryvale	MA	**86**			
Mesa	ME				
Mt. Ord	MO				
North Phoenix	NP	**88**			
Palo Verde	PAVE				
Emergency Management	EM				
Super Site	PXSS				
Pinnacle Peak	PP	**89**			**85**
Rio Verde	RV				
Roosevelt	RO				
Salt River Pima	SRPI				
South Phoenix	SP				
South Scottsdale	SS	**85**			
Surprise	SU				
Tempe	TE				
Vehicle Emissions	VE				
West Chandler	WC				
West Phoenix	WP				
Gila County					
Rye	RY				
Tonto N.M.	TONO				
Pinal County					
Apache Junction	AJ				
Casa Grande	CG				
Queen Valley	QUAZ				
Yavapai County					
Hillside	HISD				

Receptor Areas

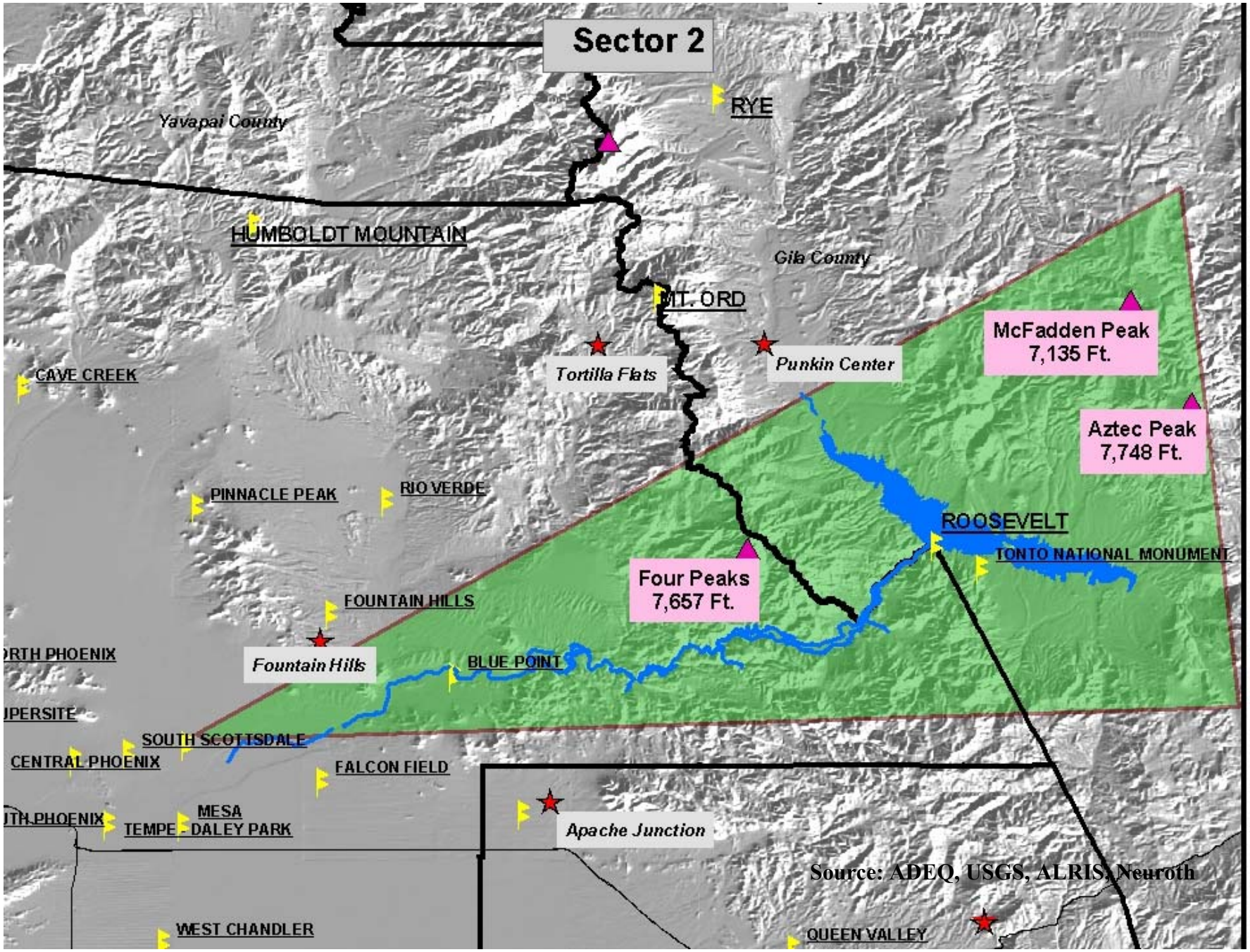

Study Zones
Prescott
Payson
Wickenburg
Apache Junction
Superior
Gila Bend
Florence
Casa Grande
Yavapai County
Gila County
Maricopa County
Pinal County
HISD
RY
HM
LP
CC
PP
RV
SU
FH
BP
TONO
GL
NP
MA
WP
RXSS
CR
VE
EM
SS
SRPI
FF
AJ
SP
TE
ME
PAVE
WC
QUAZ
CB
MCPA
CG
Source: ADEQ, USGS, ALRIS, Neuroth



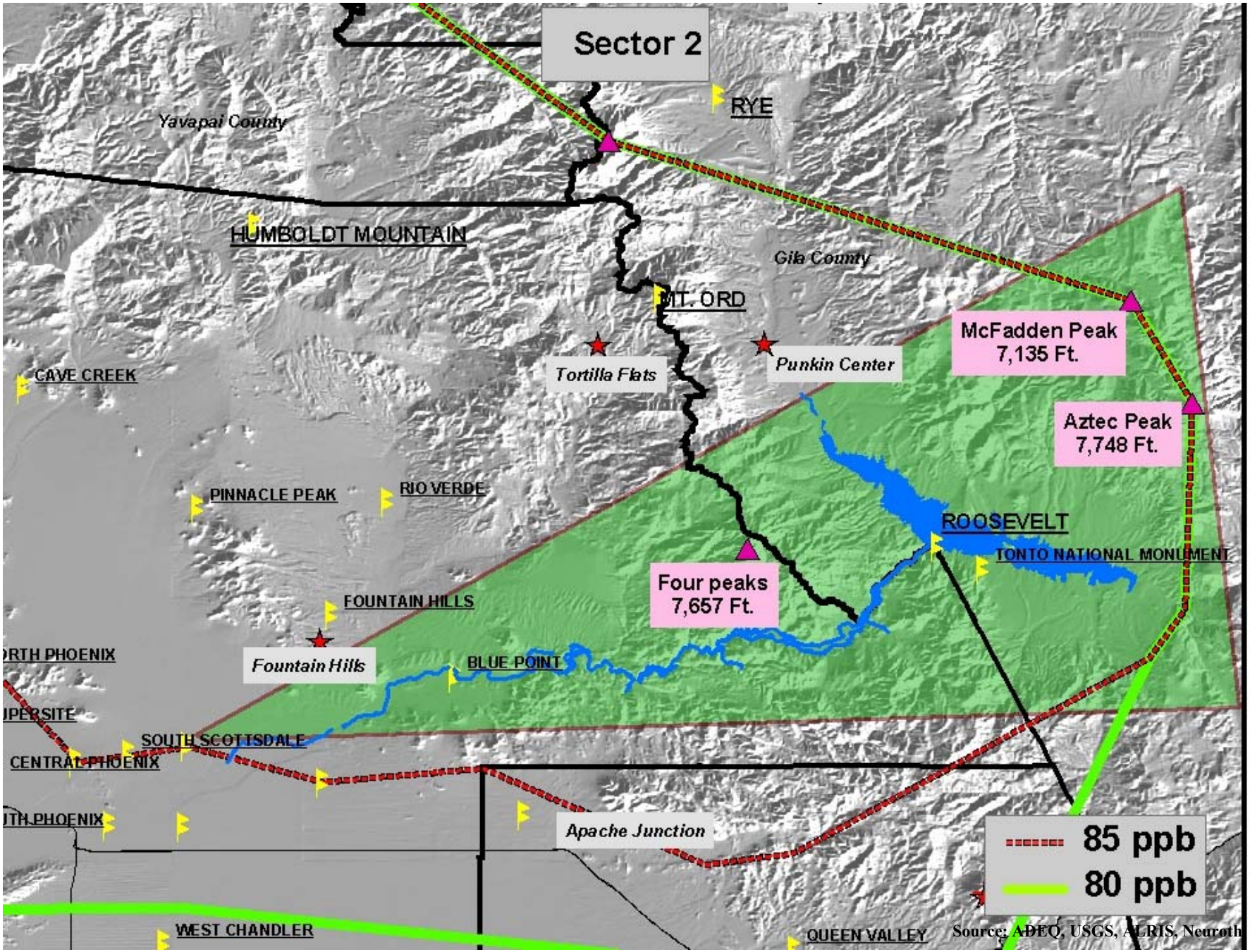
Source: ADEQ, USGS, ALRIS, Neuroth



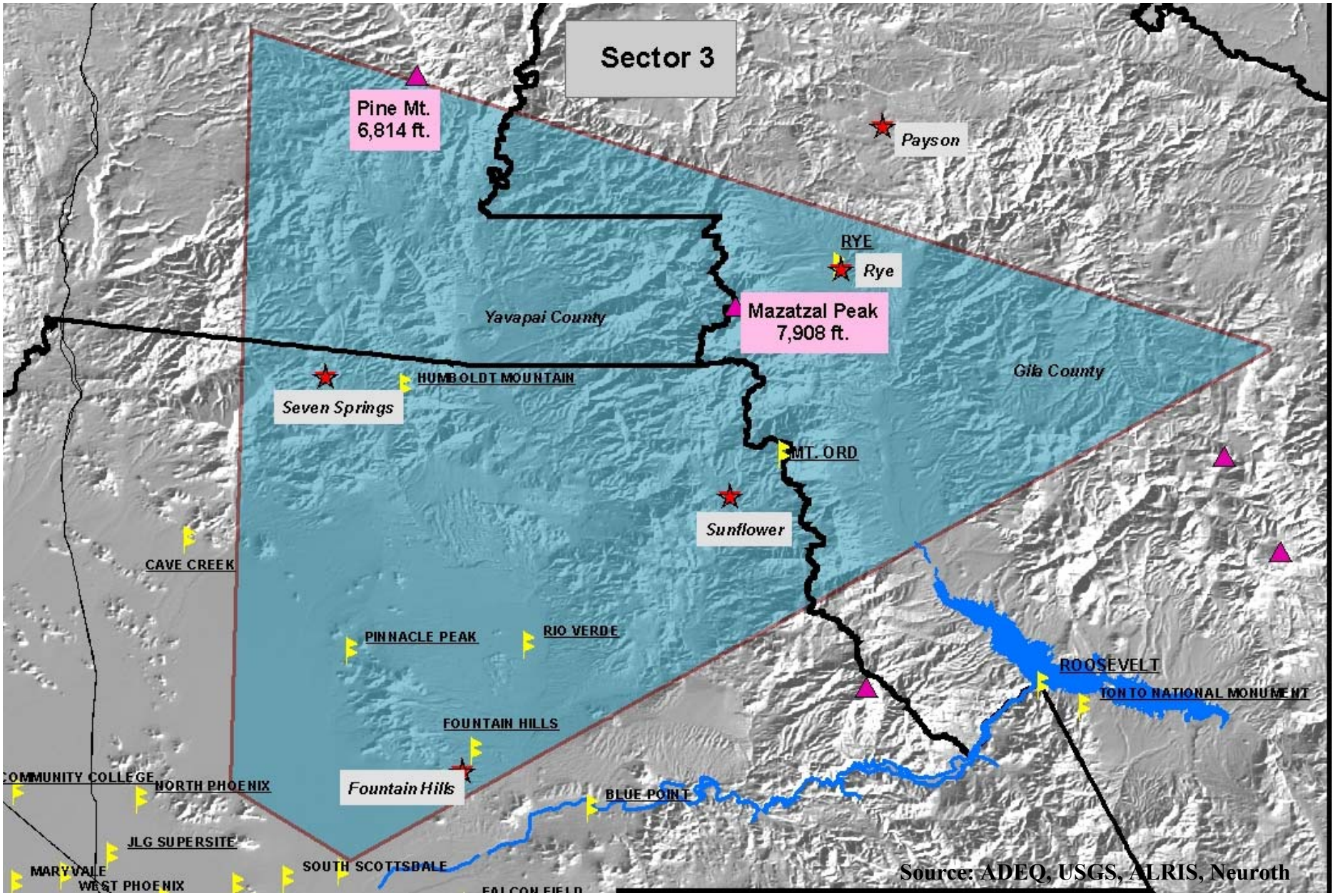
Source: ADEQ, USGS, ALRIS, Neuroth

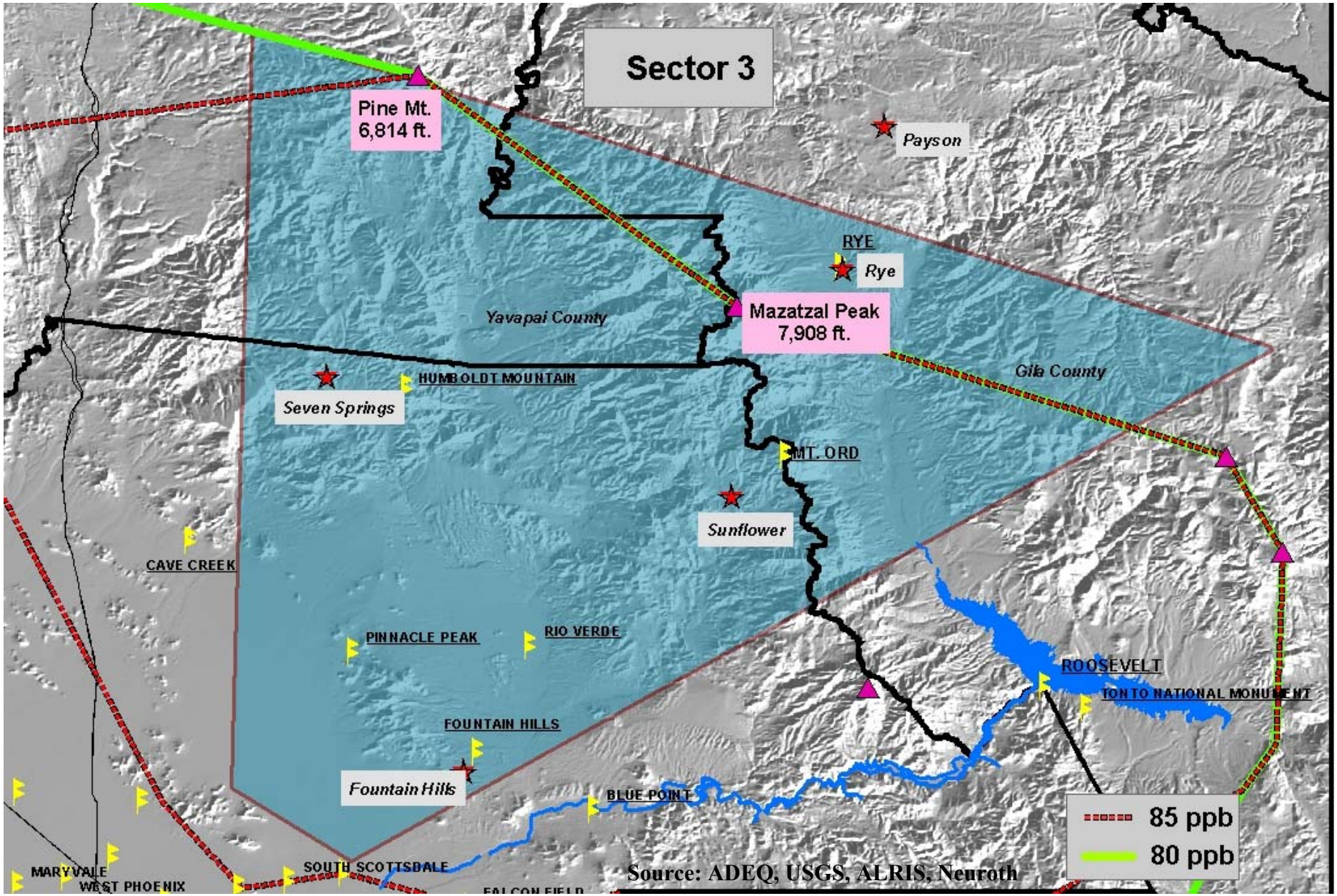


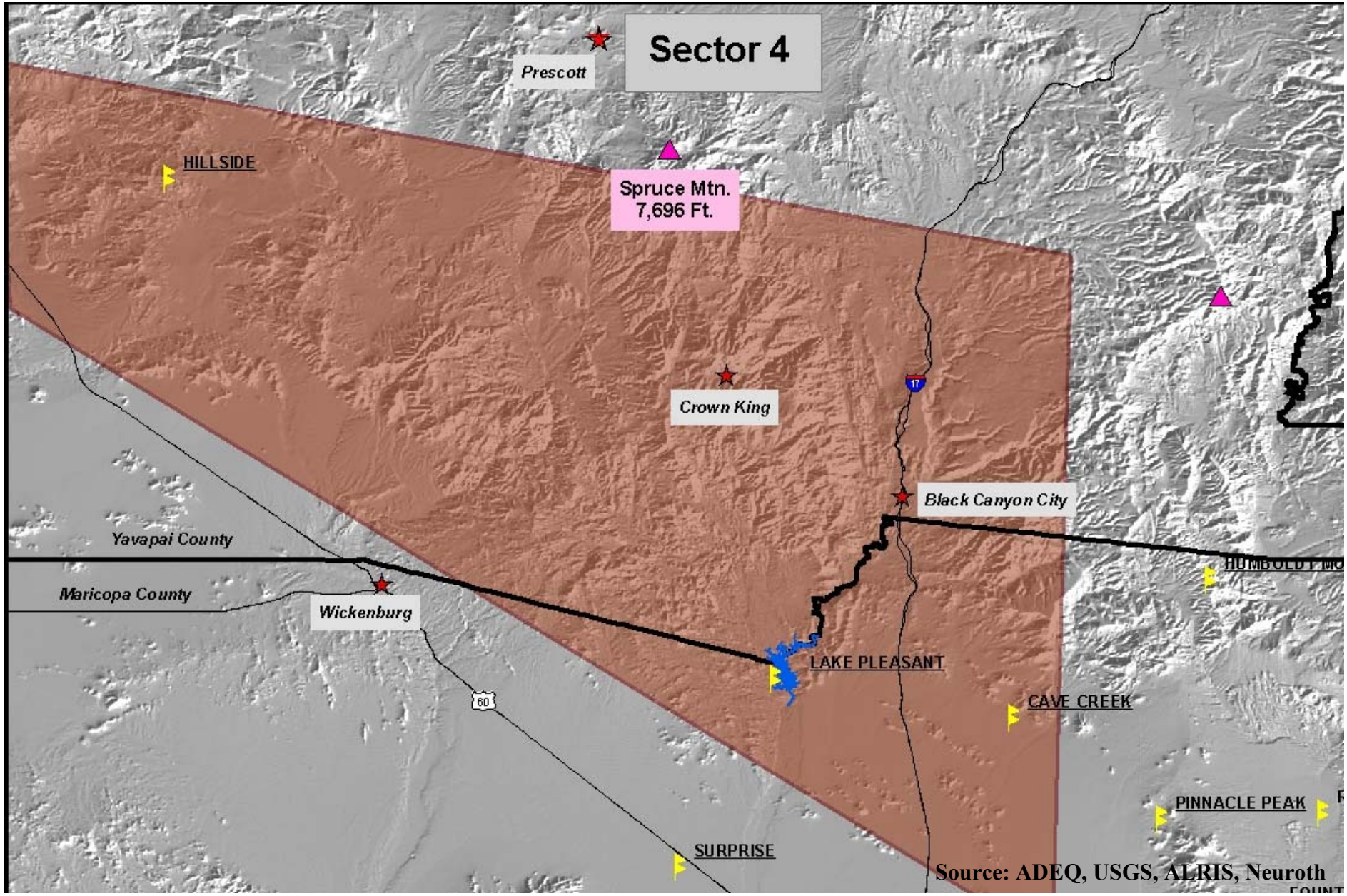
Source: ADEQ, USGS, ALRIS, Neuroth



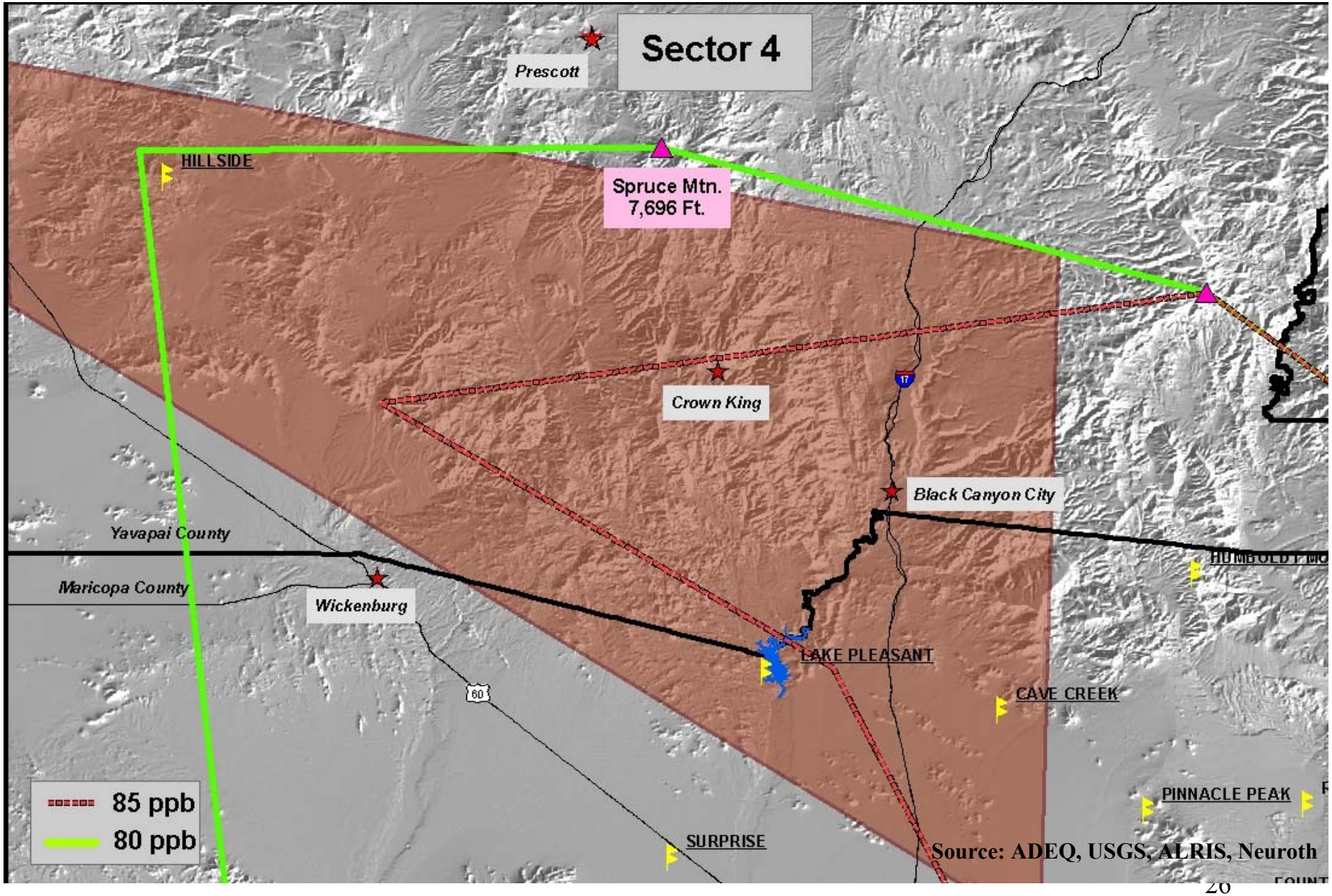
Source: ADEQ, USGS, ALRIS, Neuroth


Sector 3
Pine Mt.
6,814 ft.
Payson
RYE
Rye
Mazatzal Peak
7,908 ft.
Yavapai County
Gila County
HUMBOLDT MOUNTAIN
Seven Springs
MT. ORD
Sunflower
CAVE CREEK
PINNACLE PEAK
RIO VERDE
ROOSEVELT
TONTO NATIONAL MONUMENT
FOUNTAIN HILLS
Fountain Hills
COMMUNITY COLLEGE
NORTH PHOENIX
BLUE POINT
JLG SUPERSITE
MARYVALE
WEST PHOENIX
SOUTH SCOTTSDALE
Source: ADEQ, USGS, ALRIS, Neuroth

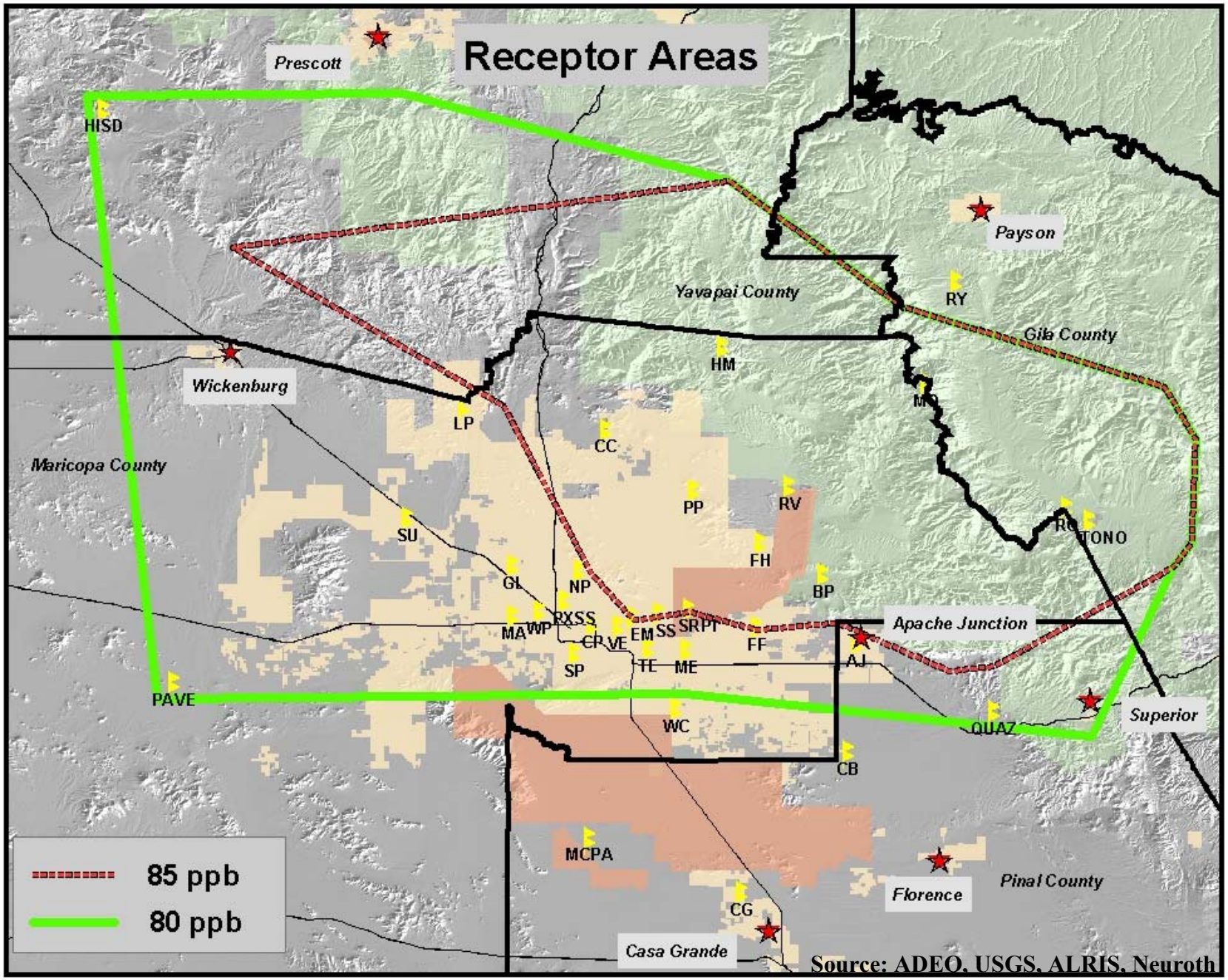

Sector 3
Pine Mt.
6,814 ft.
Payson
RYE
Rye
Mazatzal Peak
7,908 ft.
Yavapai County
Gila County
HUMBOLDT MOUNTAIN
Seven Springs
MT. ORD
Sunflower
CAVE CREEK
PINNACLE PEAK
RIO VERDE
ROOSEVELT
TONTO NATIONAL MONUMENT
FOUNTAIN HILLS
Fountain Hills
BLUE POINT
MARYVALE
WEST PHOENIX
SOUTH SCOTTSDALE
85 ppb
80 ppb
Source: ADEQ, USGS, ALRIS, Neuroth



Source: ADEQ, USGS, ALRIS, Neuroth

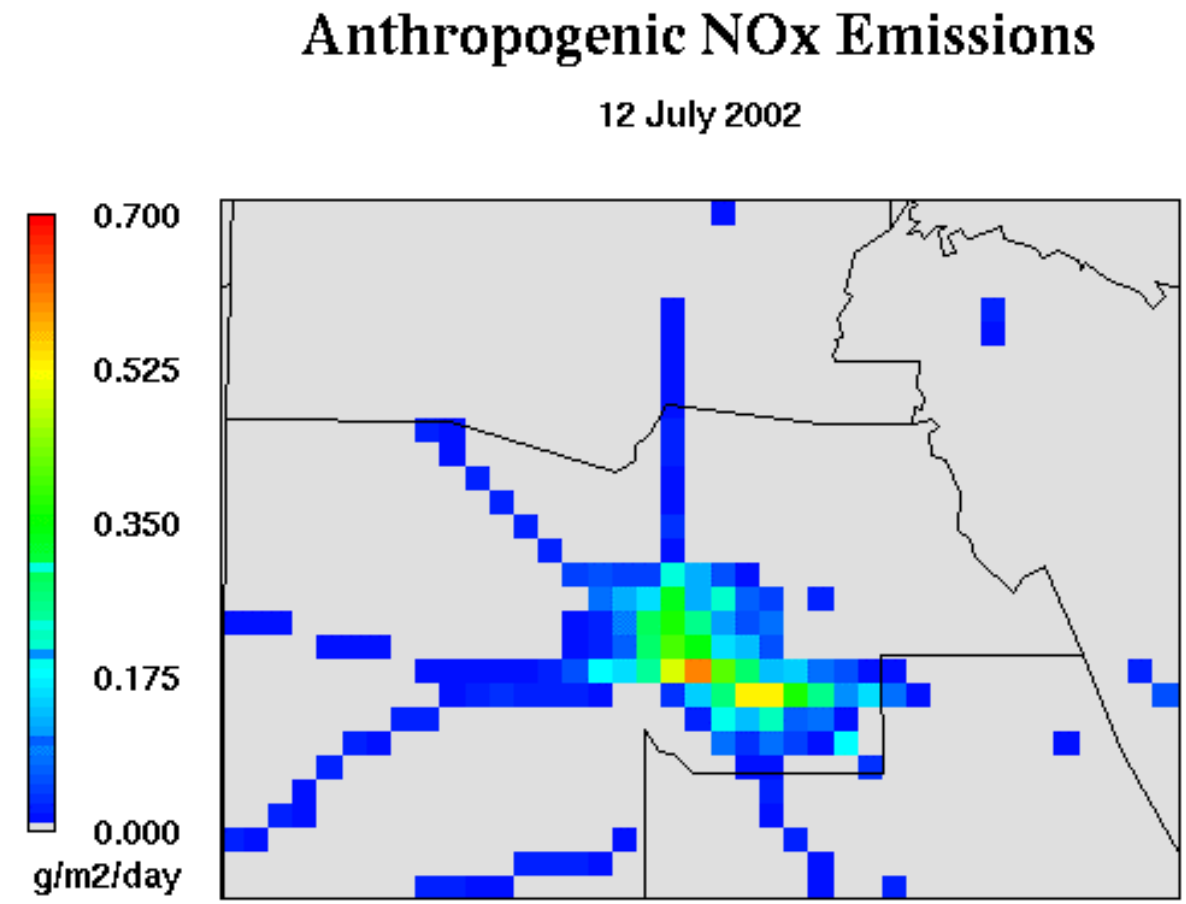


Source: ADEQ, USGS, ALRIS, Neuroth


Receptor Areas
Prescott
Payson
Yavapai County
Gila County
Wickenburg
Maricopa County
Apache Junction
Superior
Florence
Pinal County
Casa Grande
HISD
RY
HM
LP
CC
PP
RV
SU
FH
GL
NP
BP
MA
WP
RXSS
CR
VE
EM
SS
SRPT
FF
AJ
SP
TE
ME
PAVE
WC
QUAZ
CB
MCPA
CG
85 ppb
80 ppb
Source: ADEQ, USGS, ALRIS, Neuroth

Existing and Potential Source Areas

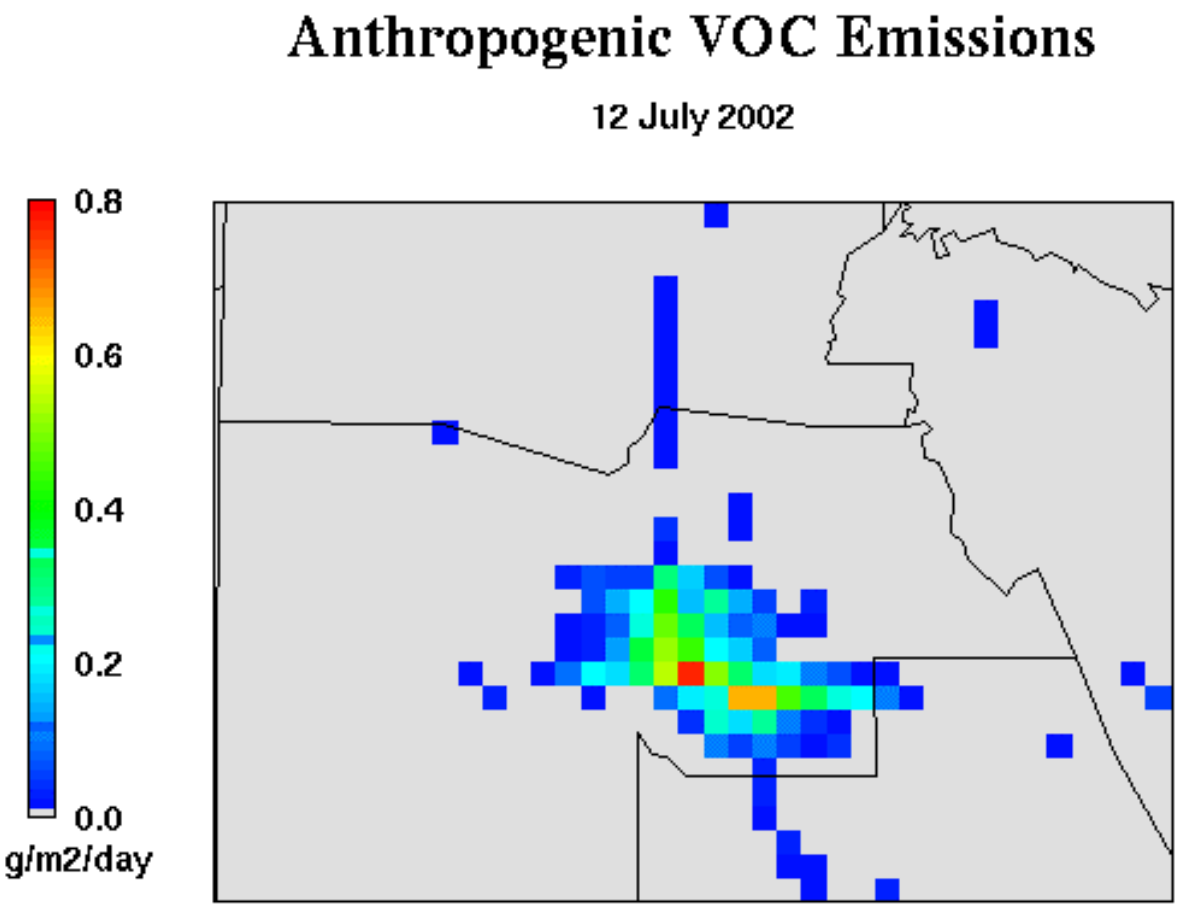
Smoke Results



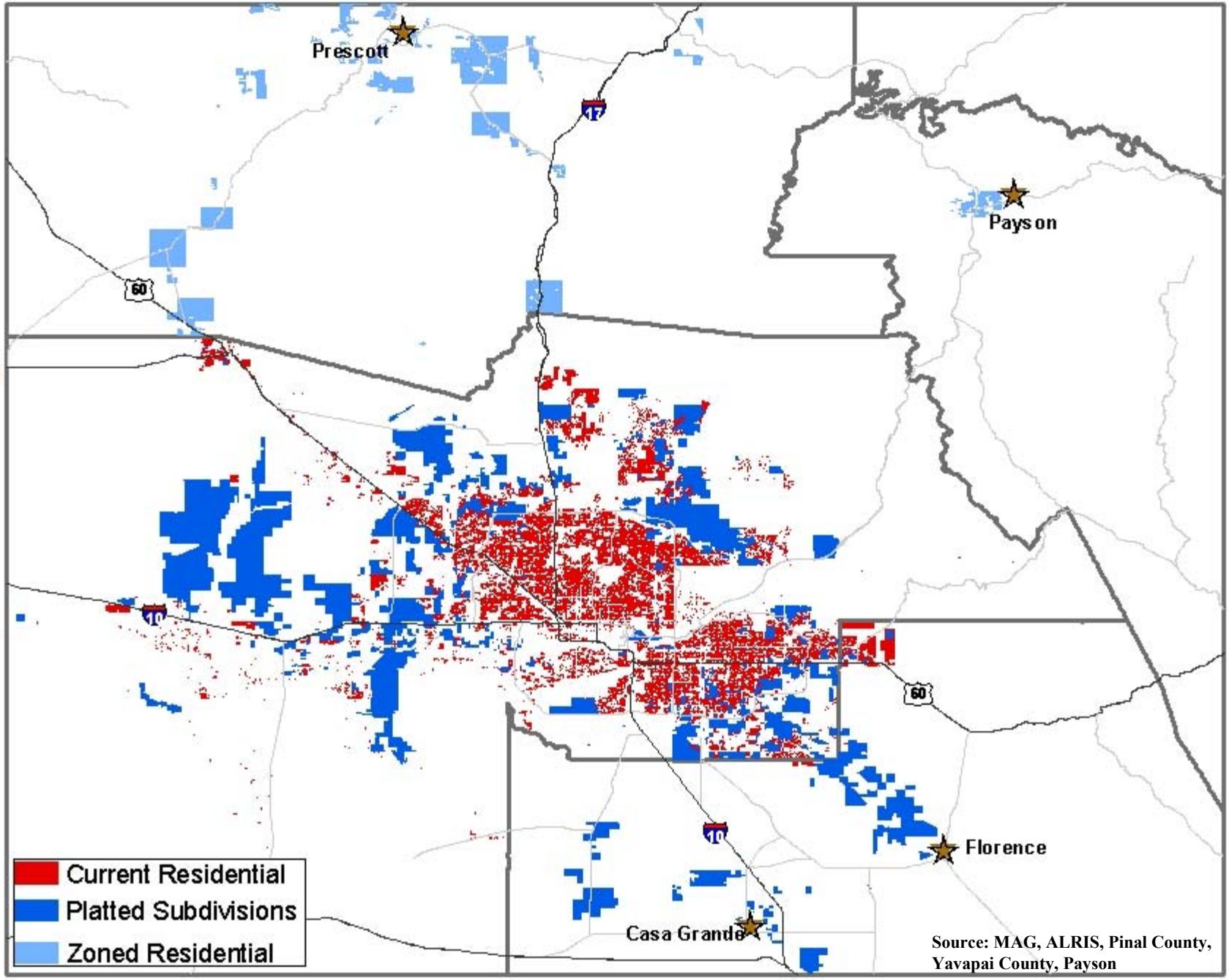
Sources: ASU Mechanical and Aerospace Engineering Department, MAG and WRAP

PAVE by MCNC

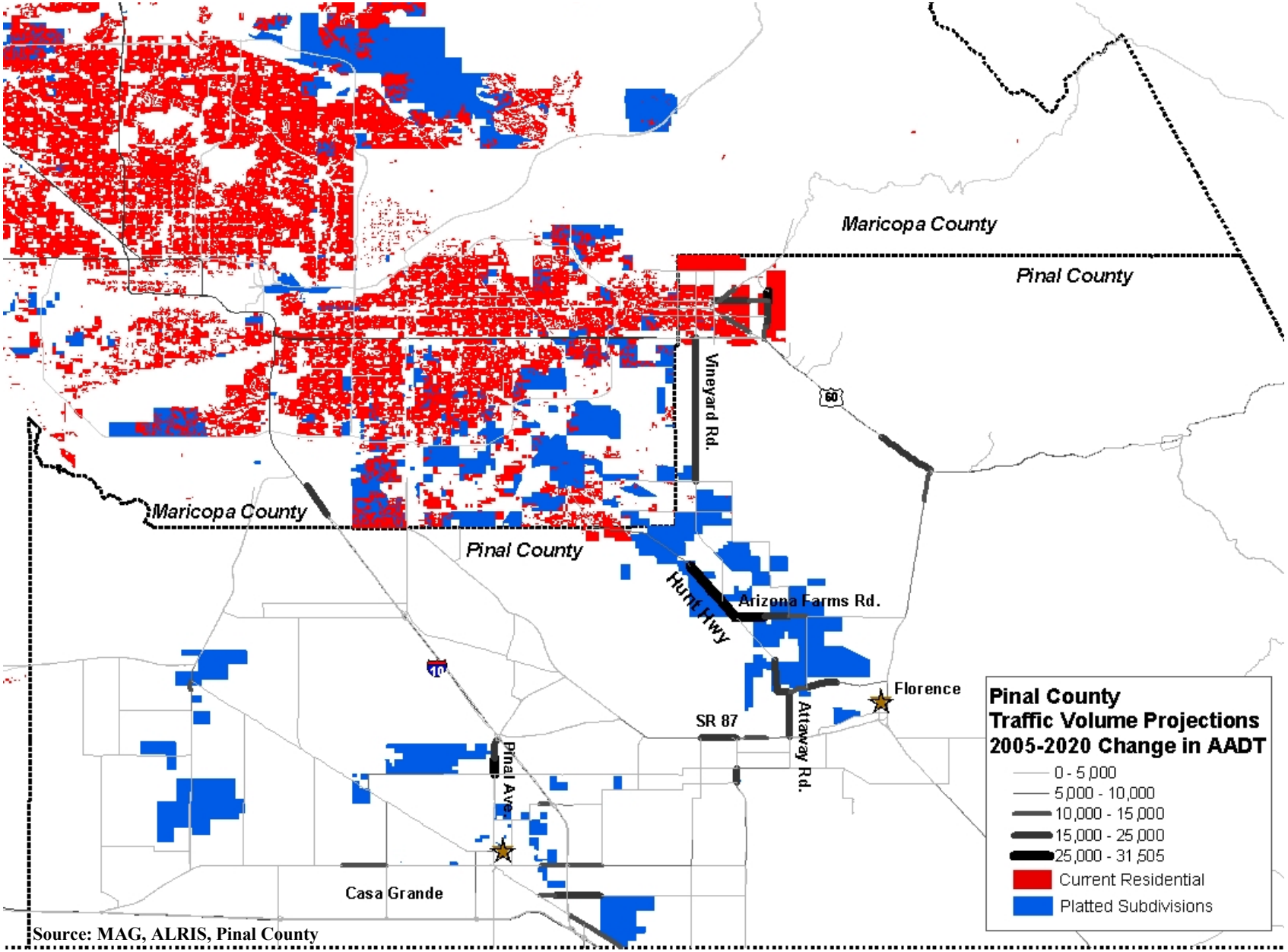
Smoke Results



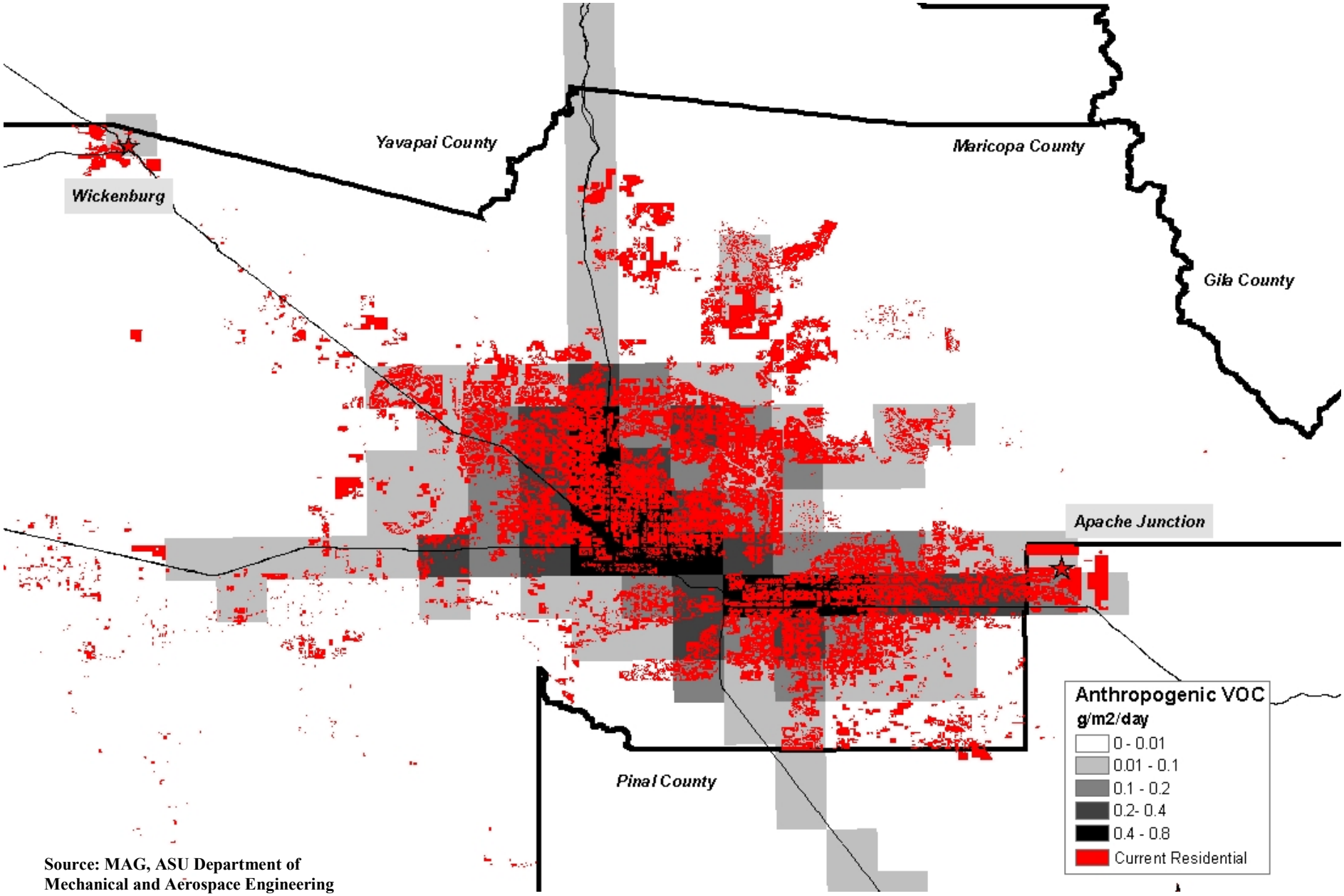
Sources: ASU Mechanical and Aerospace Engineering Department, MAG and WRAP



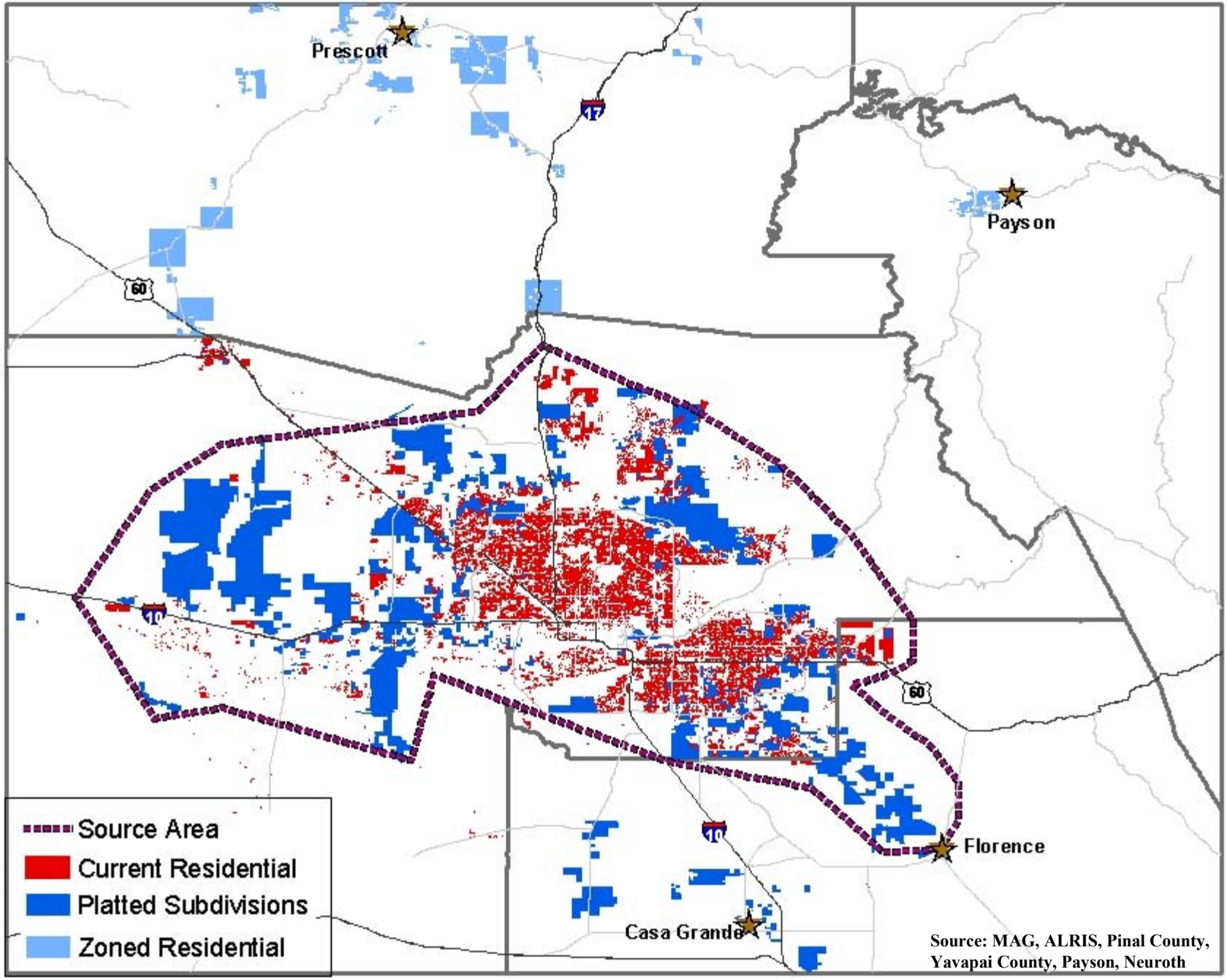
Source: MAG, ALRIS, Pinal County, Yavapai County, Payson



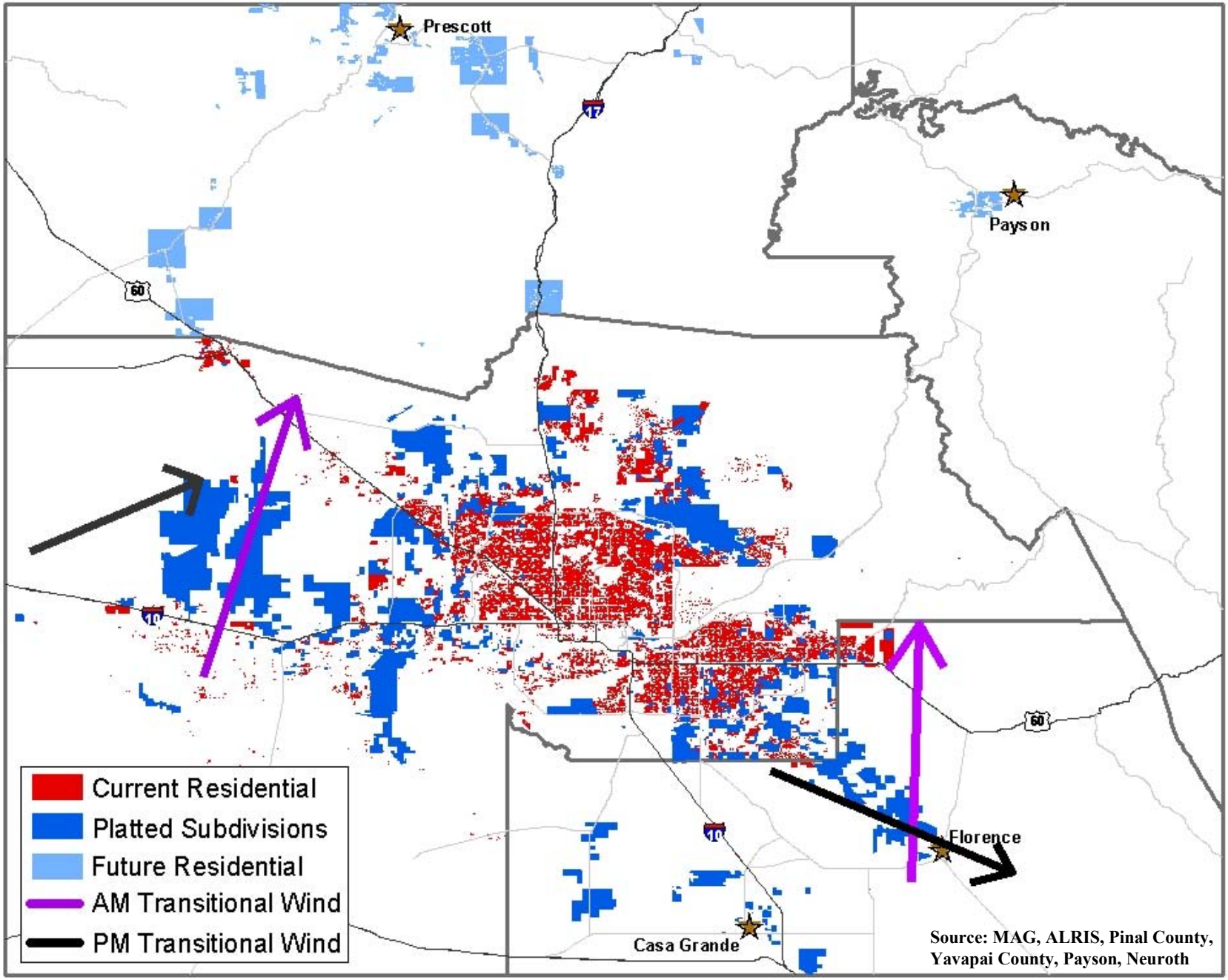
Source: MAG, ALRIS, Pinal County

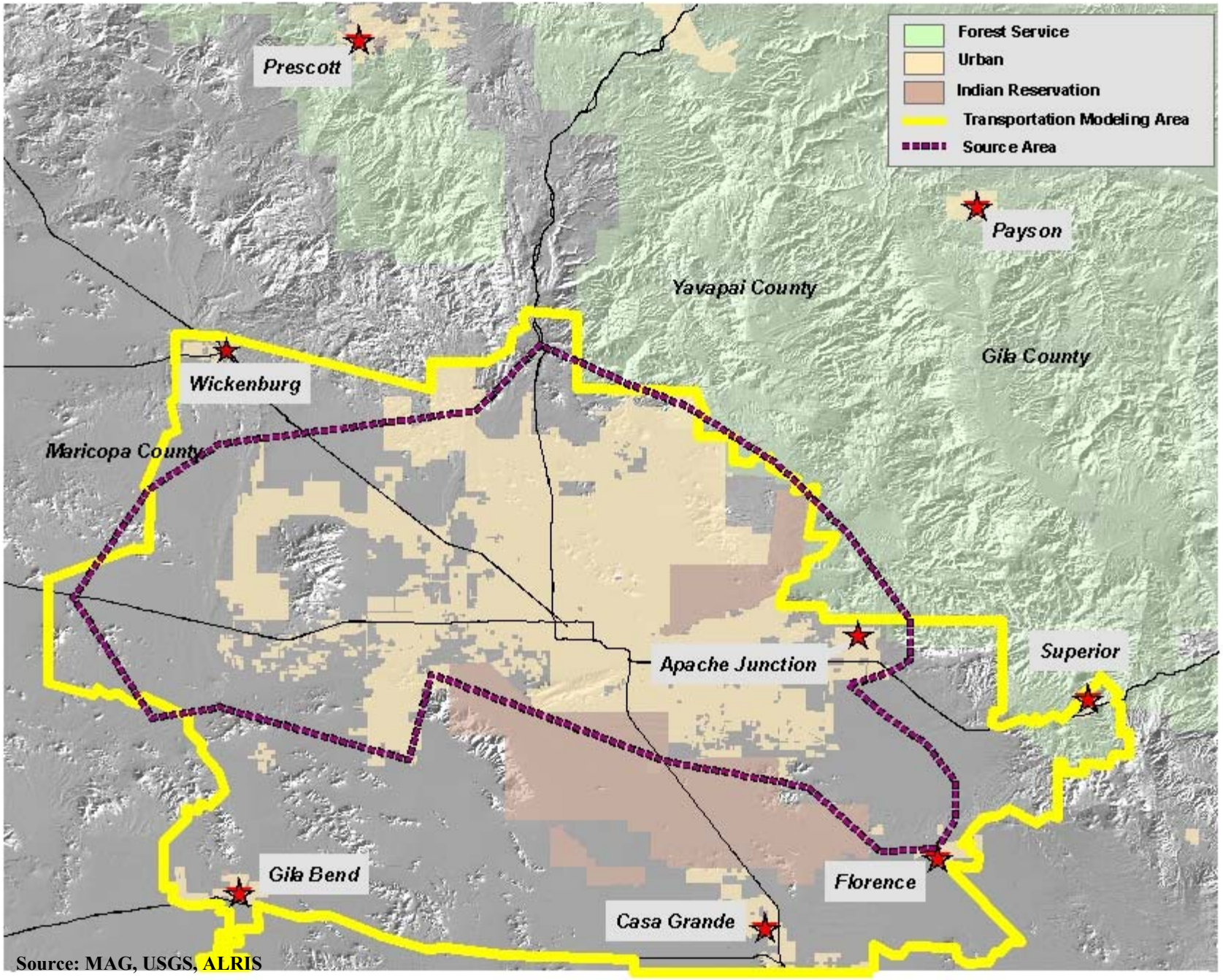


Source: MAG, ASU Department of Mechanical and Aerospace Engineering

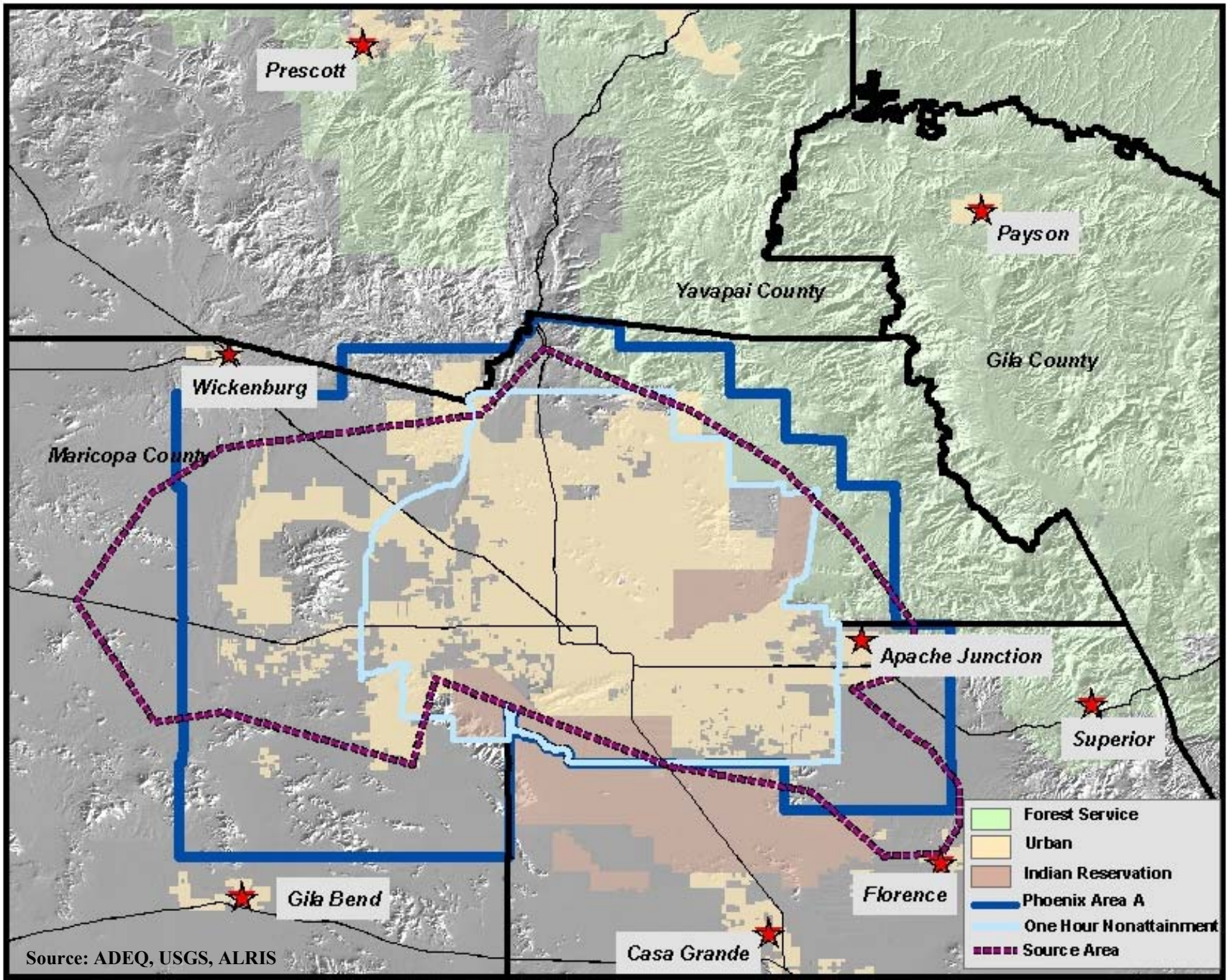


Source: MAG, ALRIS, Pinal County, Yavapai County, Payson, Neuroth


Prescott
Payson
Florence
Casa Grande
17
60
10
Current Residential
Platted Subdivisions
Future Residential
AM Transitional Wind
PM Transitional Wind
Source: MAG, ALRIS, Pinal County, Yavapai County, Payson, Neuroth

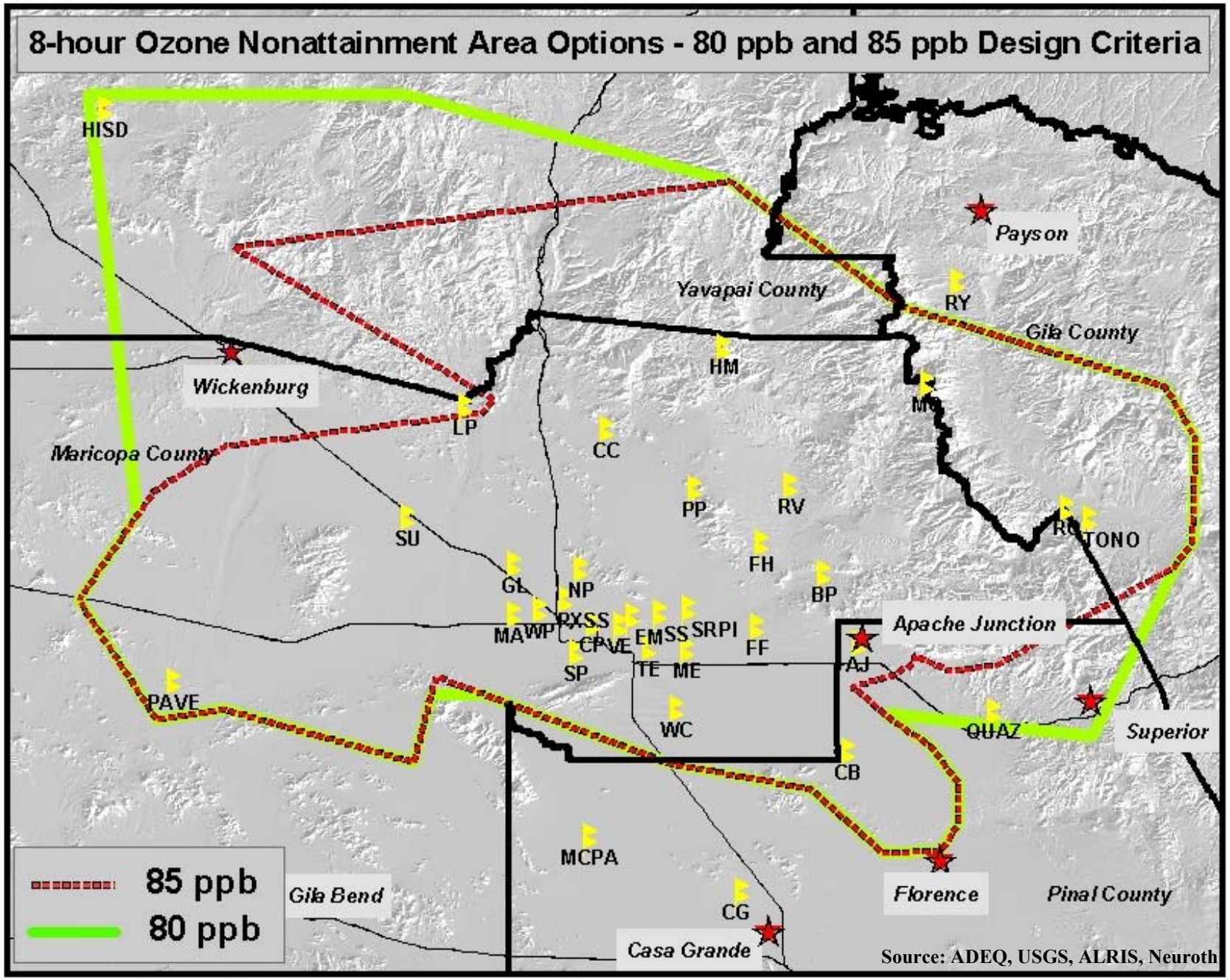


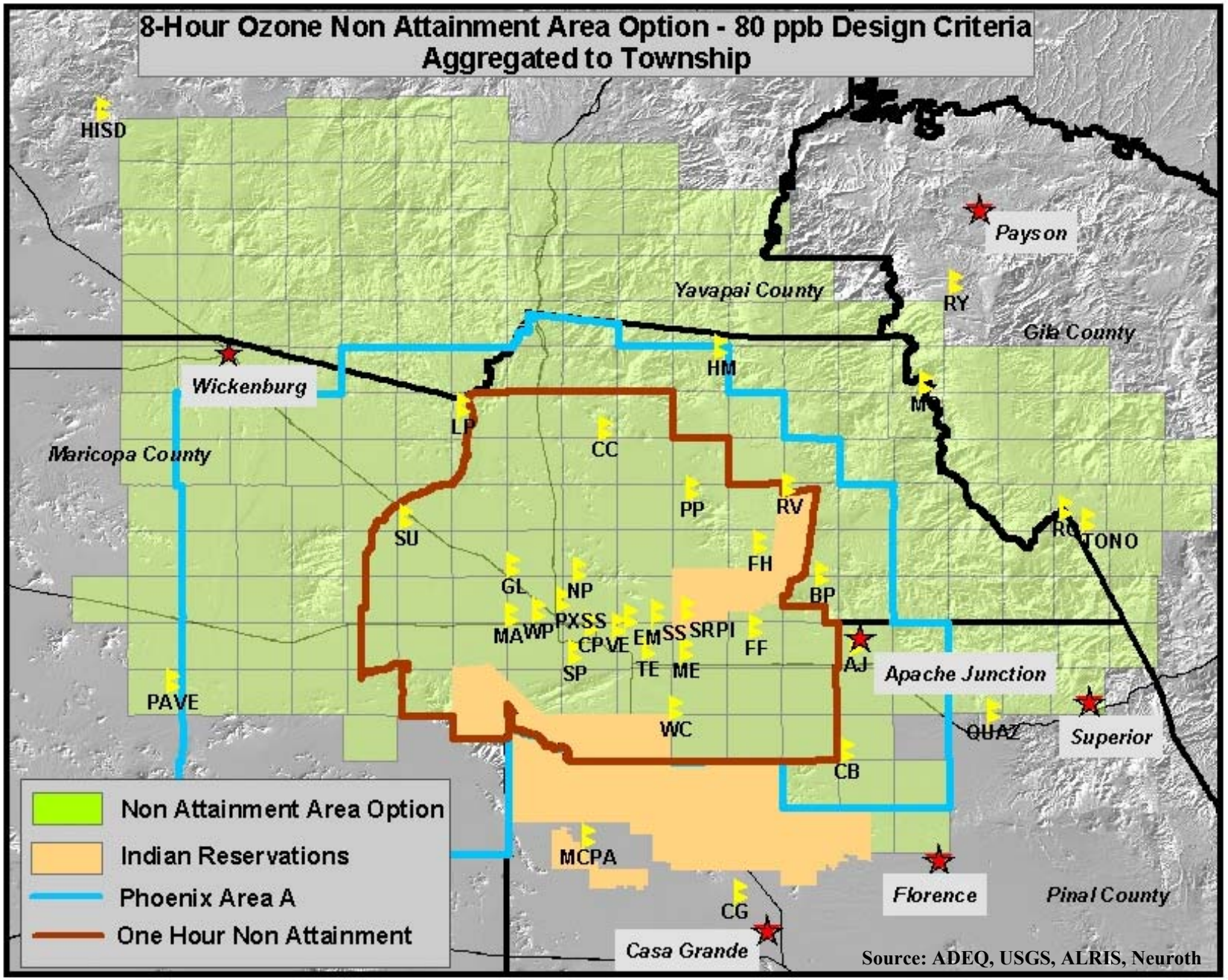
Source: MAG, USGS, ALRIS

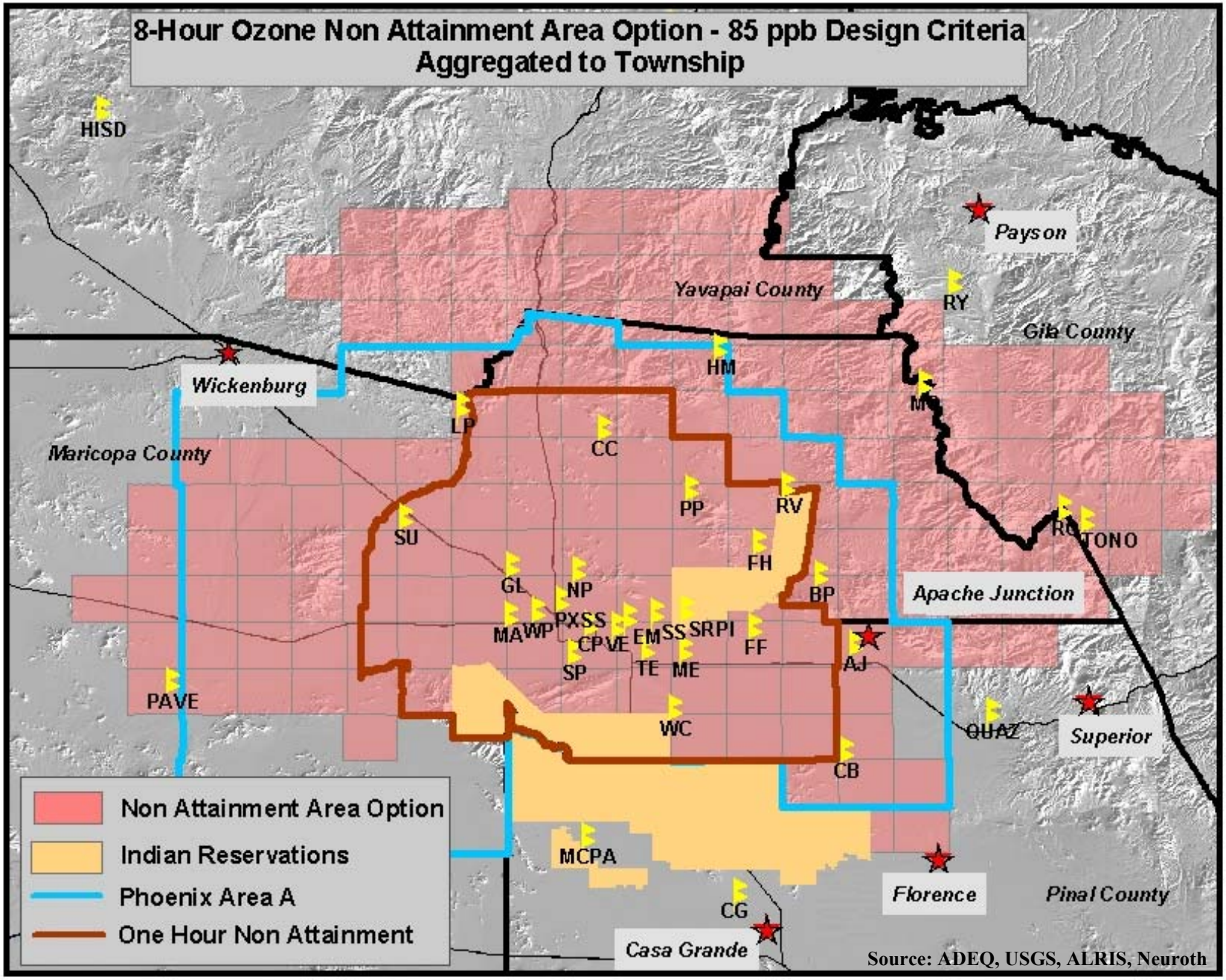


Source: ADEQ, USGS, ALRIS

8-Hour Ozone Boundary Options


8-hour Ozone Nonattainment Area Options - 80 ppb and 85 ppb Design Criteria
HISD
Payson
Yavapai County
RY
Gila County
HM
Wickenburg
LP
MO
Maricopa County
CC
PP
RV
SU
RO
TONO
FH
GL
NP
BP
PX
SS
MA
WP
CP
VE
EM
SS
SR
PI
FF
Apache Junction
AJ
SP
TE
ME
PAVE
WC
QUAZ
Superior
CB
MCPA
85 ppb
80 ppb
Gila Bend
Florence
Pinal County
CG
Casa Grande
Source: ADEQ, USGS, ALRIS, Neuroth


8-Hour Ozone Non Attainment Area Option - 80 ppb Design Criteria
Aggregated to Township
HISD
Payson
Yavapai County
RY
Gila County
Wickenburg
HM
M
LP
CC
Maricopa County
PP
RV
SU
TONO
FH
GL
NP
BP
MA
WP
PX
SS
CP
VE
EM
SS
SRPI
FF
AJ
Apache Junction
SP
TE
ME
PAVE
WC
QUAZ
Superior
CB
Non Attainment Area Option
Indian Reservations
Phoenix Area A
One Hour Non Attainment
MCPA
Florence
Pinal County
CG
Casa Grande
Source: ADEQ, USGS, ALRIS, Neuroth


8-Hour Ozone Non Attainment Area Option - 85 ppb Design Criteria
Aggregated to Township
HISD
Payson
Yavapai County
RY
Gila County
HM
Wickenburg
LP
CC
Maricopa County
PP
RV
SU
TONO
FH
GL
NP
BP
Apache Junction
MA
WP
PX
SS
CP
VE
EM
SS
SRPI
FF
SP
TE
ME
AJ
PAVE
WC
QUAZ
Superior
CB
MCPA
Florence
Pinal County
CG
Casa Grande
Non Attainment Area Option
Indian Reservations
Phoenix Area A
One Hour Non Attainment
Source: ADEQ, USGS, ALRIS, Neuroth