SUMMARY OF STATEMAP GEOLOGIC MAPPING PROGRAM IN ARIZONA

Jon Spencer, Senior Geologist, Arizona Geological Survey

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For the past 50 years Arizona has had one of the fastest population-growth rates in the nation. Most of the growth has been in the Phoenix and Tucson metropolitan areas, but in the past 25 years growth has accelerated in outlying areas. Outlying communities that are experiencing rapid population growth have greater potential for conflicts between residential development and geologic resource exploitation, geologic hazard avoidance, and environmental preservation. Identification of geologic resources and hazards before development takes place can influence land-use zoning and future development so that adverse consequences are avoided. Furthermore, most of Arizona's abundant mineral resources are located in outlying areas. Resolution of scientific issues concerning deposit genesis and modification will require new geologic mapping in these areas.

The Arizona Geological Survey (AZGS) has worked closely with the Arizona Geologic Mapping Advisory Committee (GMAC) to prioritize geologic mapping needs in Arizona. During the first 10 years of its existence, the GMAC consistently recommended that the AZGS give highest priority to completing detailed geologic maps and digital map products for areas in the Phoenix-Tucson metropolitan corridor (Figs. 1, 2), which encompasses approximately 80% of Arizona's population on 20% of its land. Geologic mapping identified geologic hazards, including earth fissures and areas subject to flooding and debris flows, identified areas with potential for industrial and metallic mineral resources, and better outlined aquifer-basin geometry. Mapping of the Phoenix-Tucson metropolitan corridor is now largely complete.

The 2009 GMAC meeting included discussion and prioritization of long-range geologic mapping plans for the entire state. Arizona was divided into 13 regions, based on geography and drainage basins, and these were prioritized for new geologic mapping (Fig. 2). Six of the thirteen regions were considered high priority based on population growth and geologic issues that affect human welfare. The Phoenix-Tucson metropolitan corridor was included in the high-priority mapping regions because there are still a few areas without detailed geologic maps. Four of the other five high-priority regions center on rivers or watersheds with significant population growth and issues concerning ground-water supply, environmental quality, and access to geologic materials. The six high priority regions were affirmed as long-term priorities at more recent GMAC meetings, including in 2013, but new emphasis has been placed on mapping incompletely understood mineral deposits. This renewed emphasis resulted from decreased population growth rates and development in Arizona due to the great recession, and recent, at times spectacular, increases in metal and potash prices (as of 2014, some prices have returned to previous, lower levels, e.g., uranium and potash).

Arizona STATEMAP program, appropriations

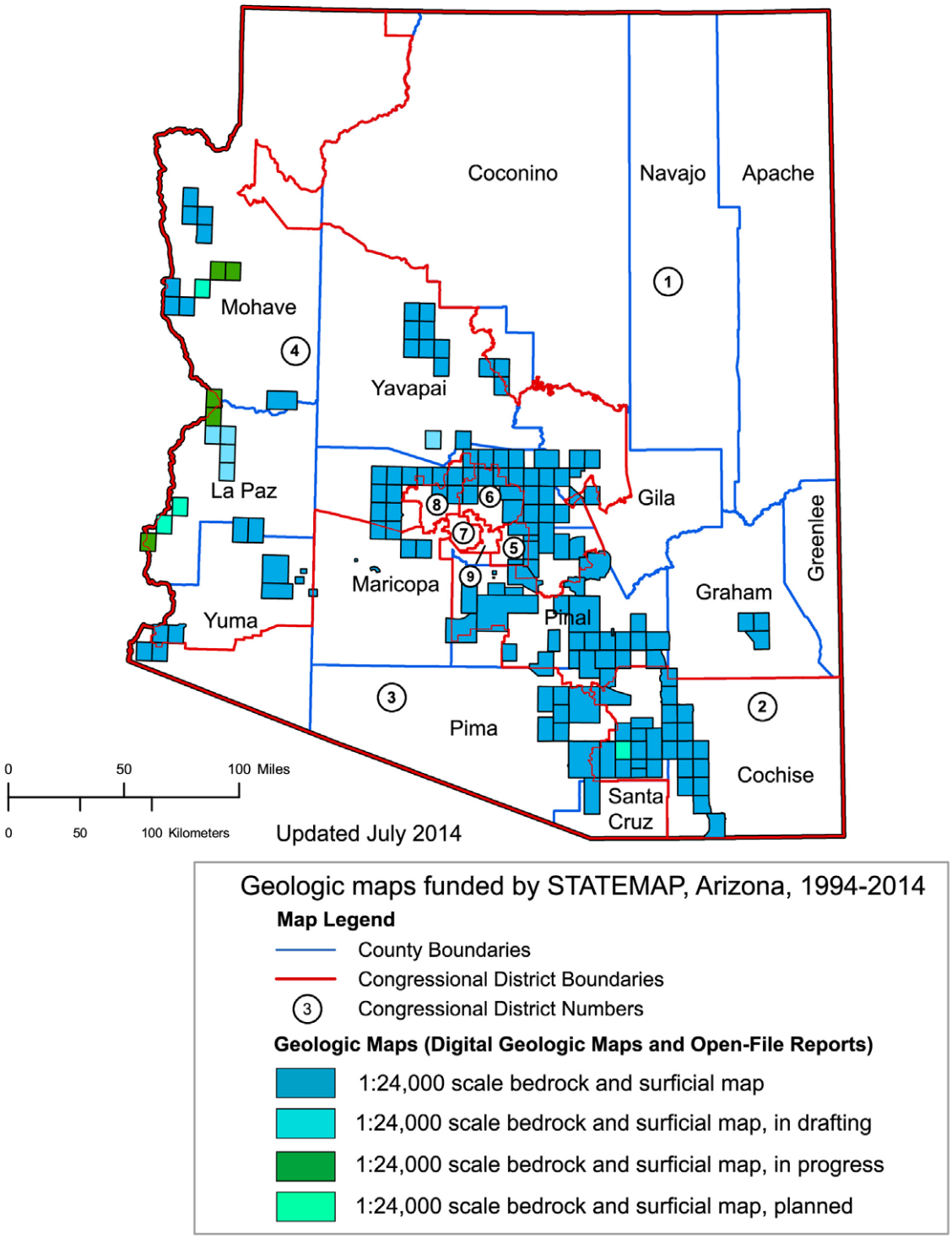
Federal Fiscal Year	Project Title	State Dollars	Federal Dollars	Total Dollars
1993	Western Arizona: SE Plomosa Mts., 1:12,000; Tank and Palomas Mts., 1:24,000; central Gila Bend Mts., 1:50,000; Salome and Little Horn 30' x 60' sheets, 1:100,000	92,464	80,161	172,625
1994	Northeast of Phoenix: Picketpost Mt., Superstition Mts. SW, 1:24,000; east ½ of Mesa 30' x 60' Quad., 1:100,000; surficial maps of ten 7 1/2' quads northeast of Phoenix	80,000	80,000	160,000
1995	Northeast of Phoenix: Apache Junction and Buckhorn 7 1/2' quads, 1:24,000; Mesa 30' x 60', 1:100,000; surficial maps of five 7 1/2' quadrangles NE of Phoenix	55,000	55,000	110,000
1996	East of Phoenix: Mormon Flat Dam and Horse Mesa 7 1/2' Quadrangles, 1:24,000; surficial map of Theodore Roosevelt Lake 30' x 60' Quadrangle, 1:100,000	136,247	136,247	272,494
1997	East of Phoenix: Five 7 1/2' quads, 1:24,000; Digital maps of Mesa, western Theodore Roos. Dam, Globe 30' x 60' Quads; Surficial maps, Casa Grande area, six 7 1/2' Quads	151,042	151,036	302,078
1998	North and west of Tucson: Sawtooth Mts., Samaniego Hills, Picacho Mts., and Ninetysix Hills, 1:24,000; Surficial maps of Tucson Mts. and Catalina Foothills	135,582	135,577	271,159
1999	Greater Tucson area: Avra Valley, Roskruge Mts, six 7 1/2' quads, 1:24,000; Oracle - Catalina area, two 7 1/2' quads, 1:24,000; Green Valley, four 7 1/2' quads, 1:24,000	127,123	126,401	253,524
2000	Phoenix - Tucson corridor: Mescal - Vail area, four 7 1/2' quads; surficial maps, Tubac area, two 7 1/2' quads; digital maps, Tucson - Phoenix corridor, 1:24,000 and 1:100,000	147,633	145,535	293,168
2001	Phoenix - Tucson corridor: NW Tucson area, 1;24,000; Buckeye Hills, Phoenix area, 1:24,000; Digital compilation, Tucson - Phoenix corridor, 1:24,000 and 1:100,000	227,614	227,325	454,939
2002	Phoenix-Tucson corridor: Sierrita Mts., 1:24,000; Benson-Huachuca City, 1:24,000; digital map compilation, east Phoenix area.	235,414	235,000	470,414
2003	Southern and western Arizona: Hassayampa Plain 1:24,000; Southeast Tucson 1:24,000; Bullhead City 1:24,000; Digital map compilation, Phoenix area.	211,174	210,665	421,839
2004	Southern and western Arizona: San Pedro trough 1:24,000; western Maricopa County 1:24,000; eastern Pima County digital compilation, 1:100,000	220,791	217,439	438,230
2005	Southern and western Arizona: San Pedro trough 1:24,000; Bullhead City 1:24,000; east Yuma 1:24,000; Gila Bend, Casa Grand, San Manuel digital compilations, 1:100,000	199,293	197,977	434,878
2006	Southern and western Arizona: San Pedro trough 1:24,000; Black Canyon City 1:24,000; Maricopa-Stanfield 1:24,000; SE Arizona digital compilation, 1:100,000	202,392	202,392	404,784
2007	Southern and western Arizona: San Pedro trough 1:24,000; NW Mohave County (Detrital Valley) 1:24,000	216,252	215,767	432,019
2008	Southern, central, and western Arizona: Rosemont mine area 1:24,000; Little Chino Valley 1:24,000; NW Mohave County (Detrital Valley) 1:24,000	218,058	217,761	435,819
2009	Yuma area, southwestern Arizona; Chino Valley, central Arizona; eastern Rincon Mountains, southeastern Arizona (all 1:24,000 geologic mapping projects)	195,655	195,221	390,876
2010	Prescott area, central Arizona; NW Mohave County (Detrital Valley), NW Arizona; Florence area, SE Arizona (all 1:24,000 scale geologic mapping projects)	192,191	191,957	384,138
2011	Artillery and Rawhide Mountains, SE Mohave County; Prescott area, Yavapai County; Safford area, Graham County (all 1:24,000 scale geologic maps)	222,387	221,853	435,819
2012	Plomosa Mountains and Cactus Plain, La Paz County (4 7 ½' quads); southern Bradshaw Mountains, Yavapai Co. (7 ½' Quad); Phoenix area geodatabase of aggregate resources	206,679	206,580	390,876
2013	Colorado River Valley, Lake Havasu City – Parker area and Cibola area, Mohave and La Paz Counties (3 7 ½' Quads); Kingman area (2 7 ½' Quads)	151,261	151,162	384,148
2014	Colorado River Valley [south of Blythe (1 Quad), Parker-Lake Havasu City area (2 Quads)], Kingman area (2 Quads)	171,331	171,501	342,832
	TOTALS	**3,795,754**	**3,772,395**	**7,568,149**

Association of American State Geologists

United States Geological Survey

NATIONAL COOPERATIVE GEOLOGIC MAPPING PROGRAM

STATEMAP Component: States compete for federal matching funds for geologic mapping



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USGS Geologic Mapping Program Office
Program Coordinator: Douglas A. Howard (703) 648-6978
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Figure 1.

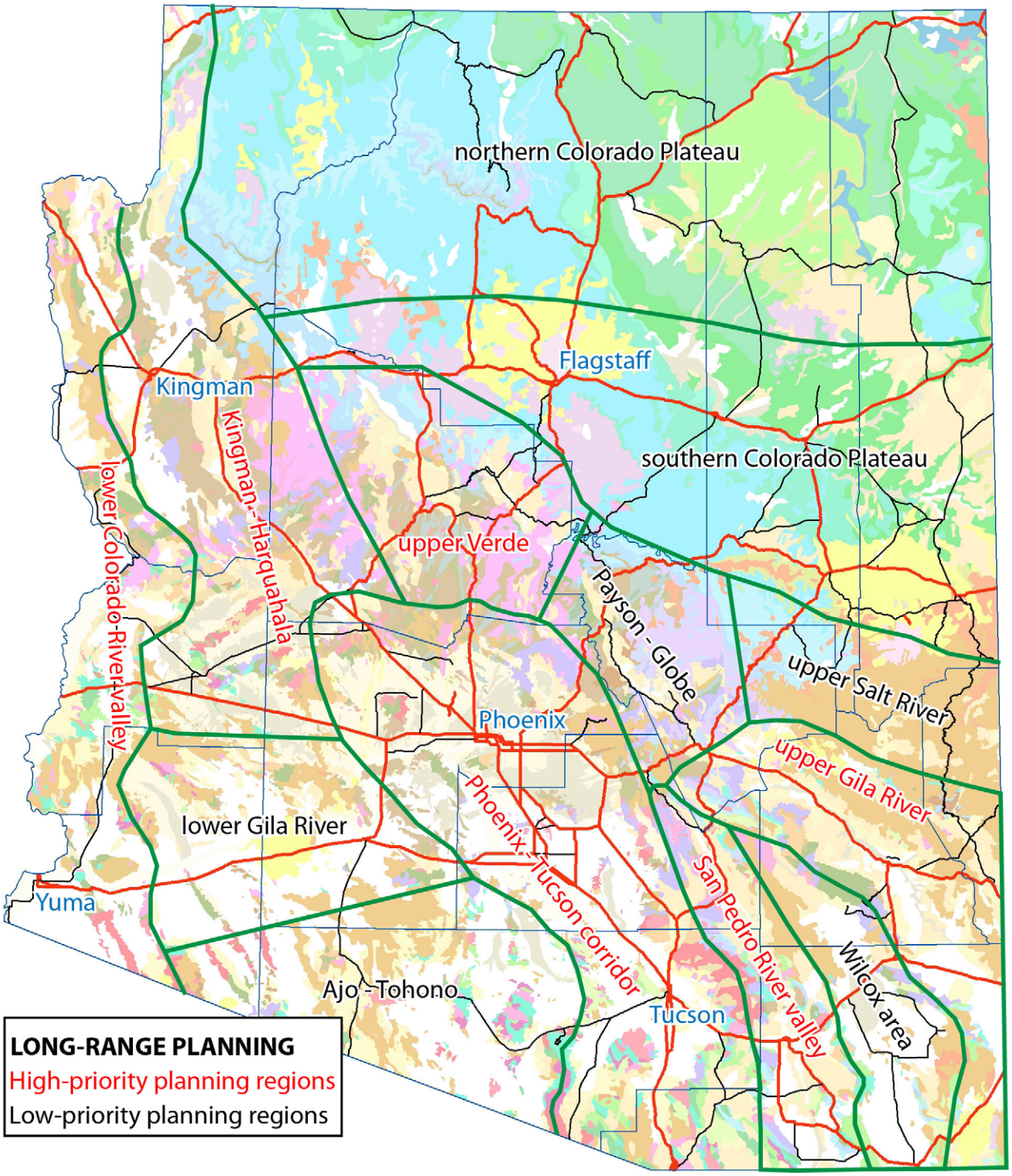
northern Colorado Plateau
Flagstaff
Kingman
Kingman - Harquahala
lower Colorado River valley
southern Colorado Plateau
upper Verde
Payson - Globe
upper Salt River
Phoenix
upper Gila River
Phoenix - Tucson corridor
lower Gila River
San Pedro River valley
Yuma
Wilcox area
Ajo - Tohono
Tucson
LONG-RANGE PLANNING
High-priority planning regions
Low-priority planning regions

Figure 2.

STATEMAP - STATEMENT OF OUTCOME

Bibliographic citations:

Ferguson, C.A., Youberg, A., Gilbert, W.G., Orr, T.M., Richard, S.M., and Spencer, J.E., 2001, Geologic map of the Mount Fagan 7.5' Quadrangle, eastern Pima County, Arizona: Arizona Geological Survey Digital Geologic Map 11, layout scale 1:24,000, with 33 page text (revised May, 2002).

Paragraph:

The Mount Fagan 7.5' Quadrangle map is a STATEMAP map product from 2001. The bedrock is highly complex in the map area due to multiple faulting episodes during the past 80 million years. Arizona Geological Survey geologists have been aware for several years that map users have been successful in identifying sites for water wells where faulting has created fracture permeability. The Mount Fagan 7.5' Quadrangle was used to identify a site for a water well at the intersection of two high-angle faults near the bed of an ephemeral creek. The attached letter explains the circumstances.

Letter: See next page

ANDRADA RANCH

V A I L • A R I Z O N A

August 3, 2012

Mr. M. Lee Allison, Director
The Arizona Geological Survey
416 West Congress Street, Suite 100
Tucson, AZ 85701

Dear Director Allison:

This is a letter to commend the excellent work, skills and public relations effort by your staff and notably Charles Ferguson.

Ironically commemorative of this, our 25th year of ranching operations, we initiated improvement of our water resources at our ranch headquarters earlier this year. I remembered the pleasure some years ago of meeting with Charles. I believe that occurred during his analysis/mapping of the Davidson Canyon. That feature happens to course through our ranch headquarters. It's likely that Charles and I simply bumped into each other while he was nearby to us.

As I worked through planning our project, I recalled Charles providing me with a page of raw geologic features of our immediate area...but couldn't find that page among my records. That lead me to contact your West Congress office on a 'cold call' basis. Charles wasn't in that morning; but, Jon Spencer took me in hand and provided me with a copy of our features from a much larger survey of the Davidson Canyon area. With this in hand, Charles was re-contacted, leading to his coming on a couple of occasions to walk through the significant geologic features with long discussions of these and the relevant soil and rock formations.

Our project was very successful, in huge part as a result of Charles' patient explanations and analyses. Jon Spencer had mentioned your office's determination to help the public as part of its important and wide-ranging responsibilities. Your office certainly met and exceeded that standard in this situation.

We have sung praises to all we have had occasion to talk with about Charles' and your office's courteous and helpful assistance. Thank you.

Respectfully,

Ed Notz

Edward U. Notz, Manager

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