

UPDATE ON THE STATUS OF BALD EAGLES IN ARIZONA, 2018-2022

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The Arizona Game and Fish Department (AZGFD), along with the Southwestern Bald Eagle Management Committee, implements management and conservation efforts for the Bald Eagle (*Haliaeetus leucocephalus*; Figure 1) in Arizona, including projects to monitor and protect the breeding and wintering populations (McCarty 2017). From January to May, AZGFD conducts aerial and ground surveys of nests at all known Bald Eagle breeding areas in the state to determine if pairs of adult eagles are present and, if eggs are laid, to document the success or failure of each nesting attempt (McCarty 2021). Additional survey time is dedicated toward searching for new nests and following up on observations of adult Bald Eagles and nests reported by the public, federal and tribal agencies, or other sources. Statewide, Bald Eagles are distributed along rivers, creeks, and lakes throughout central Arizona and to a lesser extent in the western, eastern, and northeastern parts of the state (Figure 2).



Figure 1. Bald Eagle at its nest at the Saguaro Lake breeding area, Maricopa County, AZ. Photo by Jennifer Presler

In 2018-2022, AZGFD discovered or confirmed 14 new Bald Eagle breeding areas in Arizona with 4 each found in Apache and Maricopa counties, 3 in Coconino County, 2 in Gila County, and one in Graham County. Nine of the new breeding areas were found at higher elevations (1,950-2,800 m) dominated by ponderosa pine (*Pinus ponderosa*) forests, 2 were in urban or rural environments in the Phoenix metropolitan area, 2 were in Sonoran desert habitat, and one was found at a middle elevation site consisting of pinyon pine (*Pinus sp.*), juniper (*Juniperus sp.*), and taller pine trees.

Of special interest was the discovery in 2020 of an active Bald Eagle nest in a saguaro cactus (*Carnegiea gigantea*), which successfully fledged one young (Figures 3 and 4) and is the first confirmed documentation of this nesting substrate in Arizona. Hunt et al. (1992) refers to an unconfirmed 1937 report of a nest in a saguaro on the lower Verde River, and others have reported Bald Eagle nests in giant columnar cacti (*Pachycereus spp.*) in interior Mexico (Brown et al. 1987) and coastal Baja California (Henny et al. 1993). With the addition of these 14 new areas, breeding Bald Eagles now occur across more of the White Mountains in eastern Arizona and farther south to the Pinaleno Mountains in Graham County.

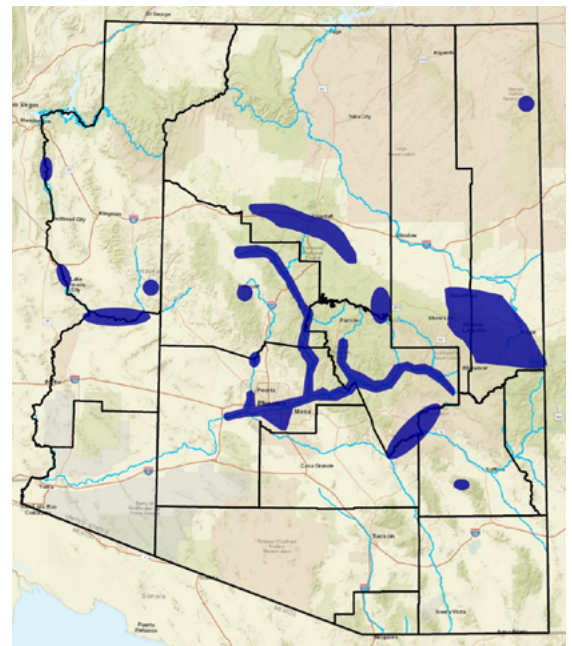


Figure 2. Known distribution of breeding Bald Eagles in Arizona as of 2022 (shaded blue). County outlines in black and major rivers in blue lines.



Figure 3. Adult Bald Eagle with one nestling, 3.5 weeks old, at the saguaro cactus nest. Photo by Kyle McCarty



Figure 4. Nestling Bald Eagle, 8-9 weeks old, at the saguaro cactus nest. Photo by Kyle McCarty

AZGFD tracks occupancy and productivity at all of the Bald Eagle breeding areas each year. An occupied breeding area is an area with one or more nest structures where at least one of several conditions is met, including observation of a pair of adult Bald Eagles at a nest, or one adult sitting in a nest apparently incubating, or eggs were laid, or young were hatched. In 2018-2022, 78-83% of the breeding areas were occupied (Table 1), compared to the average of 85% since 1970. Productivity, equal to the number of young fledged per occupied breeding area, averaged 0.88 which is well within historical ranges previously reported for the population and exhibited similar annual variability (Table 1; Figure 5; Driscoll et al. 1999, Allison et al. 2008, McCarty 2017). The total number of young fledged in 2018, 2021, and 2019 were the first, second, and fourth-most recorded, respectively, since monitoring programs began in the 1970s.

AZGFD biologists also put bands on nestlings at some breeding areas and attempt to resight bands on breeding adults to collect demographic information such as breeding tenure and individual longevity. The increased number of breeding areas has made it challenging to maintain a high nestling banding rate. From 2018-2022, time constraints and availability of AZGFD personnel, coupled with the sheer volume of areas and inaccessibility of many nests, has led to lower percentages of nestlings banded than in previous years (Table 2; McCarty 2017). Also, in 2020 the outbreak of COVID-19 caused AZGFD biologists to cancel banding events after March, leading to reduced banding that year. AZGFD continued to gather data on sightings of banded Bald Eagles through direct observations as well as from contracted nestwatchers and photographs from the public. One notable observation was the resighting of a banded breeding adult male Bald Eagle at Luna Lake in Apache County through 2020, which confirmed that this eagle was 32 years old before it was replaced by a new male (not banded) in 2021, making it the oldest breeding Bald Eagle ever known in Arizona.

Table 1. Productivity of Bald Eagle breeding areas in Arizona, 2018-2022.

Year	Breeding Areas	Occupied Breeding Areas	Successful Nesting Attempts	Young Fledged	% Nest Success	% Occupied	Mean Brood Size	Productivity
2018	87	69	44	70	64	79	1.6	1.01
2019	89	74	41	65	55	83	1.6	0.88
2020	92	73	36	56	51	79	1.5	0.79
2021	93	77	44	69	58	83	1.6	0.91
2022	94	73	39	61	53	78	1.6	0.84
5-year average	--	--	--	--	56	80	1.6	0.89

% Nest success=Successful÷Occupied

% Occupied=Occupied breeding area÷Known breeding areas

Mean brood size=Young fledged÷Successful nesting attempts

Table 2. Number of young hatched, fledged, and fledglings banded at Arizona Bald Eagle breeding areas 2018-2022.

Year	Number of young:			
	Hatched	Fledged	Fledged, banded (%)	Fledged, not banded (%)
2018	87	70	34 (48.6)	36 (51.4)
2019	72	65	26 (40.0)	39 (60.0)
2020	71	56	8 (14.3)	48 (85.7)
2021	87	69	20 (29.0)	49 (71.0)
2022	78	61	22 (36.1)	39 (63.9)
Totals	395	321	110 (34.3)	211 (65.7)

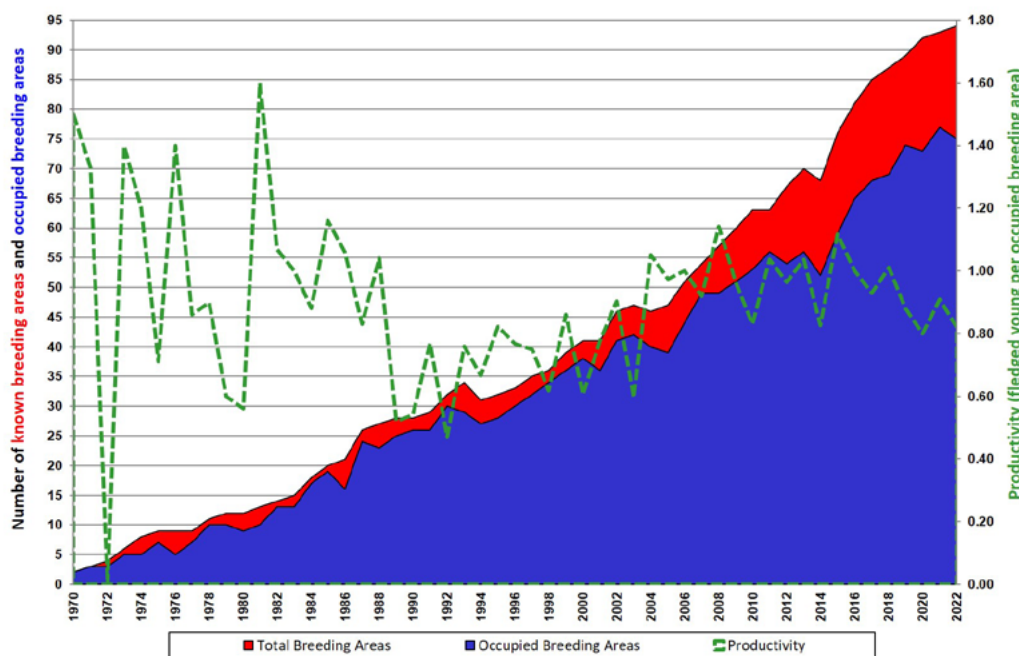


Figure 5. Number of known Bald Eagle breeding areas, number of occupied breeding areas, and Bald Eagle productivity in Arizona, 1970-2022.

Other noteworthy band resightings since 2017 included three Arizona-hatched Bald Eagles seen in southern California. One of the 3 was an immature bird in its second year and was photographed in July and August of 2018 at Big Bear Lake in San Bernardino County. Two other Arizona Bald Eagles were reported in Riverside County, California, including a fourth-year male at Perris Reservoir in March 2021 and a 5-year-old female observed with a banded adult California male in April 2021. The latter sighting of a pair suggested the possibility of breeding activity, but this was not confirmed.

The most recent sightings in southern California are not the first detections of breeding-age Bald Eagles from Arizona, but the observations indicate potential for the Arizona population to expand. Within Arizona, the number of known Bald Eagle breeding areas has grown considerably over the last 50 years from 2 in 1970 to 94 in 2022 (Figure 5). Some of the growth in the early years was an artifact of increased survey effort, however some was real (Driscoll et al. 1999). In the last 10 years alone, 38 new breeding areas were established in a variety of habitat types from upland desert to urban landscapes such as golf courses. AZGFD and a diverse group of partners will continue to monitor and protect nesting Bald Eagles to ensure the population has the chance to thrive into the future.

In addition to monitoring breeding eagles, AZGFD coordinated the Arizona Bald Eagle winter count annually in January 2018-2022 (Table 3) as part of a national survey to track wintering populations of the species (Eakle et al. 2015). The effort in Arizona was reduced in 2019 due to a federal government shutdown that prevented U.S. Forest Service personnel from completing many of the surveys, and adverse weather conditions and scheduling issues in 2021 also decreased the number of completed routes. The reduced effort is reflected in the unusually low numbers of eagles counted in those years. Otherwise, the winter count totals in 2018, 2020, and 2022 were above the average of 240 Bald Eagles in counts from 2008-2017 (McCarty et al. 2017). The 264 Bald Eagles counted in 2020 was the third highest over 15 years of the study, compared to 298 counted in 2012 and 266 in 2014.

Table 3. Bald Eagle winter counts in Arizona, 2018-2022.

Year*	Adults	Immatures	Unknown Age	Total
2018	172	63	9	244
2019	137	74	1	212
2020	174	78	12	264
2021	130	45	2	177
2022	174	63	11	248
Average	157	65	7	229

*A federal government shutdown in early 2019 and weather and scheduling issues in 2021 reduced survey effort and affected the number of eagles for those years.

ACKNOWLEDGMENTS

Kenneth Jacobson and Jennifer Presler reviewed an earlier version of this article and, in addition to Kurt Licence, also completed field work and data collection. Thanks also to Kathy Groschupf and Tom Gatz whose helpful suggestions improved this article. Finally, thanks to the members of the Southwestern Bald Eagle Management Committee for their continued support and participation in Bald Eagle protection.

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