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Natural Resource Stewardship and Science

The California Condor (*Gymnogyps californianus*) Monitoring Program at Grand Canyon National Park

2016–2018 Annual Report

Natural Resource Report NPS/GRCA/NRR—2019/1958





ON THIS PAGE
A Condor chick with its head feathers still intact suns next to an older bird with its bald head (NPS/ JEFF OLSON)

ON THE COVER
Condor chick 850, wild hatched on Newton Butte in Grand Canyon National Park (© XAVIER LIONEL)

The California Condor (*Gymnogyps californianus*) Monitoring Program at Grand Canyon National Park

2016–2018 Annual Report

Natural Resource Report NPS/GRCA/NRR—2019/1958

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Contents

Page

Figures v

Tables vi

Executive Summary vii

Acknowledgments viii

List of Acronyms viii

Background 1

Role of Grand Canyon 3

Program Objectives 4

Methods 5

- Population Monitoring 5
- Nest Watch 6
  - Hazing 6
  - Threat Reduction 7
- Education & Outreach 7
  - Informal Outreach 8
  - Formal Education & Interpretive Programs 9
  - Internal Training and Communication 9
  - Website 10

Results and Discussion 12

- Flock Size 12
- Nesting Efforts 13
  - 2016 Nests 14
  - 2017 Nests 16
  - 2018 Nests 16
- Hazing 18
- Volunteers, Staffing, and Budget 19

Contents (continued)

Page

Micro-trash 20

Education & Outreach 21

National Public Lands Day 22

Internal Training and Communication 22

Recommendations 24

Literature Cited 25

Appendix A: Example SW Condor Datasheet 27

Appendix B: Condor Gossip Sheet 29

Figures

Page

Figure 1. Condor 193, hatched in captivity in 1998, flies over Grand Canyon skies in 2017.....1

Figure 2. Approximate current wild Condor range with current release sites denoted (USFWS 2018).....2

Figure 3. SOAR intern Cale Wisher monitors the 2018 Battleship Nest.....3

Figure 4. GIP intern, Desiree Espericueta, searches for Condors at Mojave Point after getting a positive signal for Condor 521 in the area.....5

Figure 5. Condor 316 perched on ledge near Ooh Aah Point, a popular tourist location, Grand Canyon National Park, Arizona.....6

Figure 6. A group of Grand Canyon visitors learns about Condors from a biologist monitoring them on the rim.....7

Figure 7. Ranger Elyssa Shalla gives a Condor program on the North Rim.....9

Figure 8. The Grand Canyon National park Condor specific webpage.....10

Figure 9. Newton Butte 2016 nest cave as seen from the western peninsula of Newton Butte, Grand Canyon National Park, Arizona.....14

Figure 10. Parents 354+496 at 2017 nest cave, Marble Canyon, Grand Canyon National Park, Arizona.....16

Figure 11. Condor chick 954 perched in the Muav layer below the Battleship, moments after fledging (NPS/ BOB GEORGE).....17

Figure 12. GIP interns Sarah Ciarrachi and Phillip Andrews get ready to monitor Condors via radio telemetry.....18

Figure 13. Condor Bob, aka Bob George, one of the Park Service's most dedicated volunteers, tracking down nesting Condors.....19

Figure 14. Children dress up like a Condor during a classroom visit by Grand Canyon Education Staff.....20

Figure 15. The public release on September 22, 2018 had an attendance of over 760 individuals.....22

Tables

Page

Table 1. History of the South West CA Condor population recovery (totals for entire population). 12

Table 2. Percentage of Southwestern California Condor population using Grand Canyon National Park during monitoring efforts between 2016-2018. 13

Table 3. Pairs displaying courtship behavior and nesting attempts in Grand Canyon National Park for 2016- 2018 as of November 15, 2018. 15

Table 4. Effort tracking birds and proportion detected and tracked, along with volunteers. 19

Table 5. Summary Data for Grand Canyon National Park education and outreach. 21

Executive Summary

The California Condor was the first ever species listed under the Endangered Species Act when there were only 22 individuals left in the wild. There are currently 4 wild populations: Southern California, Central California, Southwestern (AZ & UT), and Baja California, Mexico. There is currently a proposal to introduce another population to the wilds of Northern California.

Grand Canyon National Park has been a partner in the recovery of the wild Southwest population of the California Condor since reintroduction in 1996 due to both historical and current usage by these birds. The park contributes in two important ways: 1) by educating its many visitors about the California Condor, it's status, and the threats to it, and 2) by monitoring the population within the park especially any active nests and fledged chicks. The first wild hatched chick for this population was in 2003 in Grand Canyon. As of December 31, 2018 there were 90 birds in the wild Southwest population, 46 of whom were of breeding age (>5-6 years of age), 38 of which seem to have paired (i.e. there are potentially 19 wild pairs).

Acknowledgments

Grand Canyon staff would like to acknowledge its partners in the South West Condor Working group: The Peregrine Fund, U.S. Fish and Wildlife Service (USFWS), Bureau of Land Management, National Park Service, U.S. Forest Service, Arizona Game and Fish Department, Utah Division of Wildlife Resources, Hualapai Tribe, Navajo Nation, Kaibab Band of Paiute Indians, and Arizona Center for Nature Conservation/ Phoenix Zoo. Collectively, these agencies, tribes, and organizations form the Southwest Condor Working Group (SWCWG, 2016 USFWS). We are also grateful for our partners who manage the overall Condor population and the additional subpopulations. Grand Canyon is permitted by the USFWS to conduct condor related activities under permit TE-19473.

List of Acronyms

AZ – Arizona

BLM – Bureau of Land Management

DOI – Department of the Interior

ESA – Endangered Species Act

GIP – Geo-scientists in Parks Internship

GPS – Global Positioning Satellite

ID – Identification

NP – National Park

SOAR – Seeking Opportunities through Academic Recruitment Internship

SWCWG – South West Condor Working Group

USFWS – U.S. Fish and Wildlife Service

U.S. – United States

UT – Utah

VHF – Very High Frequency

Background



Figure 1. Condor 193, hatched in captivity in 1998, flies over Grand Canyon skies in 2017. (© LEIGHTON CHEN).

The largest land bird of North America, the scavenger California Condor (*Gymnogyps californianus*, hereafter "Condor", **Error! Reference source not found.**) once flew from California to Florida, m oving along the Atlantic coast as far north as Western New York (Chamberlin *et al.*2005) and were common over the skies of the Grand Canyon (Osborn 2007). During the Pleistocene their range shrank to the west coast, coinciding with the effects of climatic change (Stroud-Settles 2015) and the loss of many megafauna species during the late Pleistocene extinction (Snyder and Snyder 2000, Chamberlain *et al*. 2005, Osborn 2007). They flew from British Columbia, Canada to Baja California, Mexico until the late 1900s when they had disappeared from much of region, most likely as a result of secondary poisoning (USFWS 1967).

In 1976, with only 60 individuals left in the wild, the Condor was federally listed as the first endangered species under the Endangered Species Act (USFWS 1996a). In 1982 it was estimated that only 22 Condors remained in the wild (Walters et al. 2008). The U.S. Fish and Wildlife Service (USFWS) and the California Fish and Game Commission agreed to establish a captive breeding program at the nearby San Diego and Los Angeles Zoos (Coffey 2014), and later, the Oregon Zoo and The Peregrine Fund's World Center for Birds of Prey in Boise, Idaho. Captures of wild birds began in 1982 and in 1987, AC-9, the last Condor to be taken into captivity, was caught, making the Condor extinct in the wild (USFWS 1996b). In 1991 Condors were re-released into the wild in southern California (Walters et al. 2008), and after classification as "nonessential experimental population" under 10(j) of the Endangered Species Act (ESA), released into the wild in northern

Arizona in 1996 (Austin et al. 2002, Smith et al. 2017). Within four months after the initial 1996 release by The Peregrine Fund at Vermilion Cliffs National Monument, the Condor's range expanded to once again include the Grand Canyon (Osborn 2007). In 2003, the first wild hatched chick was successfully reared in the red wall limestone layer of the Salt Creek Drainage in Grand Canyon National Park (Olson 2004, Austin et al. 2007).

There are currently 4 wild populations: Southern California, Central California, Southwestern U.S. (AZ & UT), and Baja California, Mexico (**Error! Reference source not found.**). There is currently a proposal to introduce another population to the wilds of Northern California (NPS 2017). Condors continue to be released yearly into the wild from captive populations and zoos monitor the genetics carefully. Every Condor is assigned a unique, non-changing, Studbook number by the San Diego Zoo (Mace 2017), which researchers use to communicate about the birds even when their local identification or tags change. Human-related mortality agents such as micro-trash ingestion, and poisoning from lead and other chemical proxies continue to be one of the major threats to the population.

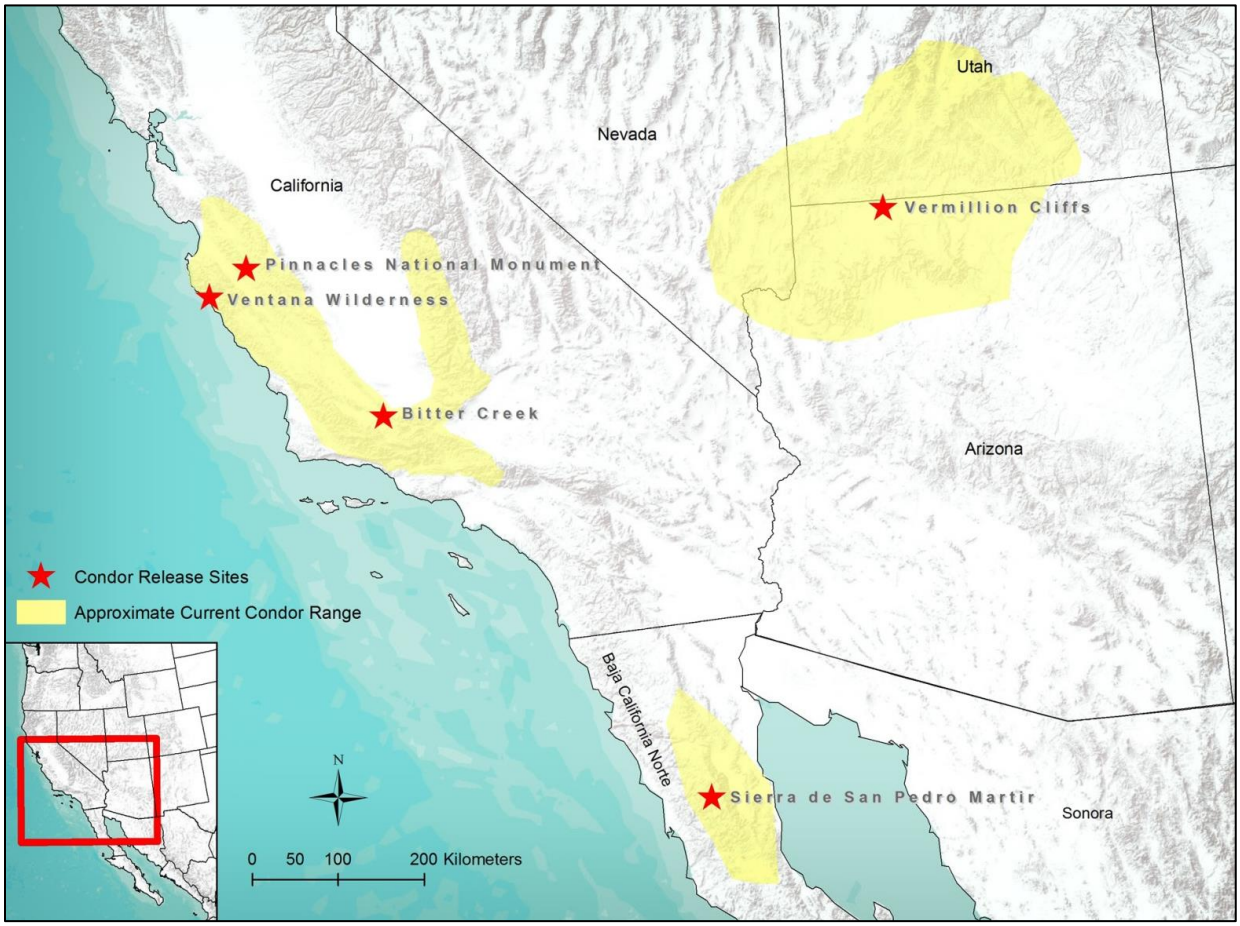


Figure 1. Approximate current wild Condor range with current release sites denoted (USFWS 2018).

Role of Grand Canyon



Figure 3. SOAR intern Cale Wisher monitors the 2018 Battleship Nest. (NPS/ DESIREE ESPERICUETA).

Grand Canyon National Park (NP) has been a partner in the Southwestern Condor population's recovery and the Southwest Condor Working Group (SWCWG) since the beginning (Austin et al. 2002). As federally administered land, the park provides a protected land resource such for critical breeding, nesting, and scavenging habitat with minimized threats. Because of Grand Canyon's status as a National Park, inadvertent exposure from lead and micro trash are diminished, as well as from poaching and involuntary shooting (Stroud-Settles 2014).

The Science and Resource Management, Wildlife Program at Grand Canyon NP conducts a highly successful, volunteer-based California Condor monitoring program initiated in 2009. Volunteers, interns, and staff with avian training and biological backgrounds conduct radio telemetry and visual scans for Condors along the South Rim, as well as nest monitoring within park boundaries (**Error! R eference source not found.**). They also respond to reports of troubled birds and haze when necessary. Importantly they share this collected data with partners. Also, rangers park-wide undertake the important effort of educating the public on the importance of Condors and the threats to their existence.

Program Objectives

1) To monitor Condor activity and collect data regarding behavior, breeding, nesting, and mortalities.
2) To haze habituated Condors (if any during that given year), discouraging future inappropriate Condor-human interactions.
3) To educate visitors and update park staff on the history of the Condor, recovery issues associated with the use of lead ammunition and other human-caused environmental changes, and current preservation initiatives.
4) To communicate efficiently with partners and assist them when needed and where possible.
5) To utilize information about Condors within park boundaries to evaluate and mitigate potential impacts of park activities to the population (as compliance with the National Environmental Protection Act of 1975).
6) To employ volunteers to foster and achieve the project objectives.

Methods

Population Monitoring



Figure 4. GIP intern, Desiree Espericueta, searches for Condors at Mojave Point after getting a positive signal for Condor 521 in the area. (NPS/ PHILLIP ANDREWS).

The Peregrine Fund manages the release site on the BLM's Vermilion Cliff's National Monument in northern Arizona. Each individual Condor in the Southwestern population has been fitted with a tag number over their right and left patagial (wings) with sewn in global positioning satellite (GPS) and/or very high frequency (VHF) transmitters before release. The VHF signal is line-of-sight and transmitting on a frequency that is unique to each individual. We conducted presence-absence surveys for VHF tagged birds with a Communications Specialists R1000 receiver and a unidirectional Yagi antenna. Once birds are detected by VHF, visual scans are completed to see if birds are visible (**Error! Reference source not found.**). All surveys are conducted within the park a long the South Rim of the canyon, ranging from Boucher Canyon to Desert View, or from within the canyon or from the North Rim. Birds with GPS devices are monitored by The Peregrine Fund to identify larger patterns of movement and are particularly useful for more elusive birds. This data is shared with the park on request.

Data is recorded on a datasheet in the field (Appendix A). In 2016 data was entered into a Microsoft Excel database, and shared with The Peregrine Fund via Dropbox software. Due to restrictions by the Department of Interior (DOI) on using Dropbox we switched to a DOI shared google spreadsheet in 2017. Grand Canyon staff monthly export the data into an excel spreadsheet to share with The Peregrine Fund. Staff from seven other parks and Bureau of Land Management (BLM) lands in the Condor recovery area have access but as of 2018, Zion NP is the main other park inputting monitoring information in the database. Condor assigned USFWS staff also have access to the DOI shared drive.

The park also assists The Peregrine Fund with monitoring birds directly after release events at the Vermilion Cliffs release site on BLM managed lands. Occasionally, Peregrine Fund staff assist park

staff in the field locating nests within the Park, and the two entities communicate frequently about the status of Condors and Condor nests in the park.

Nest Watch



Figure 2. Condor 316 perched on ledge near Ooh Aah Point, a popular tourist location, Grand Canyon National Park, Arizona. (© LEIGHTON CHEN).

A majority of the surveying done by park staff is to monitor the health of nests within the boundaries of Grand Canyon NP. This includes using telemetry and visual cues to identify nesting pairs and to locate nest caves. The Peregrine Fund shares GPS data that indicates nesting behavior and then park staff follow up on the ground. Locating nests can be problematic and time consuming in Grand Canyon, mainly due to its immense and challenging topographical landscape, making the California standardized nest monitoring protocols (Sandhaus 2008) unsuitable for use in Arizona. In the Canyon the Condor utilizes the geological layer of the Red wall Limestone, which forms massive, impassable cliffs that soar as high as 800 feet and start about half way below the rim of the canyon to the river, as it's favored nesting area. They often leave a characteristic whitewash below a nest cave. Many of the formations Condors choose to nest in cannot be seen in their entirety from many locations and some nests must be monitored after a considerable trek to a vantage point below the rim.

If nest caves are located they are monitored through a spotting scope and all adult and chick activity is recorded. When chicks are seen, staff communicate information on the chick to partners so that a Studbook Identification (ID) number can be assigned. Staff continue to monitor nests until chicks have either fledged or perished. Fledglings are monitored until they fly off and disappear. Staff anxiously watch for them to see if they survive the winter and usually they eventually show up at the Peregrine Fund's capture site to be tagged.

Hazing

Park staff monitor Condors for potential incidences that might lead to habituation with humans. Habituation to human activity and structures leads birds to greater risk of behavioral conditioning which ultimately reduces their ability to survive in the wild. When necessary, trained Grand Canyon staff haze birds to prevent habituation using USFWS developed and permitted protocols. Staff might

also haze fledglings if they ended up on a trail or somewhere not safe for them to be (**Figure 2**). Certain areas of the park have proved to be problem points over the years. Protocol requires all hazing events conducted by park staff to be recorded in order to track individual behavioral issues and help focus hazing-related efforts.

Threat Reduction

Park staff also monitor park activities that might threaten or deter Condors from engaging in their natural behavior. For example, staff are on hand to determine what Condors are around before the park initiates drone surveys and keeps an eye on potential conflicts during the surveys. The biologists update the helibase staff regularly on the status of nesting birds and areas to avoid when flying. Occasionally we are asked to monitor during Search and Rescue efforts and often Condors are one of the first to alert us to humans who have gone over the edge of the canyon and did not survive. In addition, park staff make sure that any other wildlife or pack stock, and potential Condor food sources, that might have to be euthanized (usually due to a car collision in the case of wildlife) are euthanized with non-lead bullets to prevent adding contaminated food on the landscape. When it is not possible to use non-lead bullets carcasses are buried deeply so that scavengers such as the Condor cannot utilize them as a food source.

Education & Outreach



Figure 6. A group of Grand Canyon visitors learns about Condors from a biologist monitoring them on the rim. (NPS).

Grand Canyon NP has continued to focus on communication of the reintroduction program to diverse audiences. In addition to the regularly scheduled formal Condor programs offered on the North and South Rims of the Grand Canyon, several other interpretive efforts have enabled contacts with audiences that would not be reached by traditional methods. The team effort by Grand Canyon NP to work with and represent the Condor reintroduction program reaches a large numbers of visitors from diverse audiences with potentially far ranging effects well beyond the local area.

Informal Outreach

Two GRCA programs take part in informal interpretive Condor presentations: the Wildlife program and the Interpretation and Resource Education program.

While conducting the population monitoring and Nest watch programs, wildlife staff interact with curious visitors and closely integrate monitoring the activities of the Condors with educating visitors on Condor biology, recovery efforts, and recovery setbacks and challenges, and lead reduction messages (**Error! Reference source not found.**). Staff assist visitors with the identification of C ondors and other avian species and provide interpretive material. Sometimes entire busloads of visitors gather around to ask the Condor staff about what they are doing. By engaging visitors while actively collecting data on Condor activity and behavior, visitors are exposed to real-time Condor recovery efforts which will hopefully make a more powerful, long-term impression that will ultimately lead to action on their part (e.g., educating friends or family or using non-lead ammunition).

The Interpretation staff's informal outreach includes casual "Condor roves". Condor roves are year-round, but usually take place in summer months. Informal interpretative contacts are an additional integral element of telling the story of California Condors at Grand Canyon NP. Park rangers conduct roving interpretation to people present along the South Rim, especially during periods of Condor activity. This may involve setting up a spotting scope to show a perched Condor or simply pointing them out in flight. Rangers may also answer questions regarding potential Condor viewing locations or explain identification techniques when visitors have seen a different bird and want to know how to tell if it is a Condor. Although such contacts are not as in-depth as formal interpretive programs, rangers are trained to know how to move a contact that is simply informational towards one that is more interpretive with a resource message. Grand Canyon NP's Environmental Education branch also makes informal contacts at the "Kids Table" that includes pictures of the California Condor, skull, and egg. These are used daily in informal contacts, short presentations, and during Condor sightings on the South Rim. Within the canyon itself, park staff give Condor talks an average of one to two per week, but the totals have not been tracked.

Formal Education & Interpretive Programs



Figure 7. Ranger Elyssa Shalla gives a Condor program on the North Rim. (NPS).

The Interpretation Division also presents formal programs on the Condor. Formal Condor programs only take place during the typical peak visitor season, from June through August, and typically last about an hour. All of these presentations focus on the current successes and challenges of the reintroduction program and include a strong Condor resource preservation message as well as a concerted effort to acknowledge the partnership among various agencies, tribes, and organizations that constitute the SWCWG. Issues such as breeding success, the use of non-lead ammunition, and other human-caused environmental issues inspire extensive post-program conversations with audience members who often demonstrate great acceptance and awareness of these subjects. These in-depth conversations after the formal presentations clearly indicate to the presenters that the information is not only being received, but also being passed on to a wider audience. Visitors commonly state that they plan to talk to a family member back home about using non-lead ammunition.

The Environmental Education branch of the Division of Interpretation also present curriculum-based educational programs and educational outreach Ranger Visits to classrooms that often cover information about the Condor. Since 2014 staff have presented “The Condor’s Flight”, a distance learning program which reaches people across the country. These state-of-the-art distance learning programs for classrooms, senior centers, and adult learning institutions generally take place between December and May. The “Condor’s Flight” program teaches students about endangered species and the ecological principles of adaptation and habitat through the story of the Condor.

Internal Training and Communication

The wildlife staff also takes time to train other park, concessionaire, and partner staff to help ensure that accurate information about Condors is readily available to all who might interact with the public

or who would want to know. This includes many presentations throughout the year as well as email updates.

Website

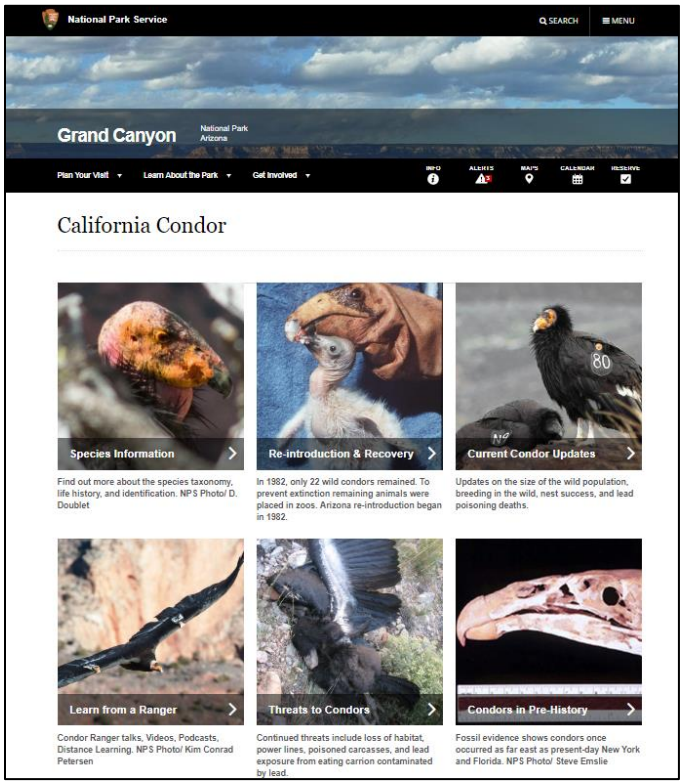


Figure 8. The Grand Canyon National park Condor specific webpage.

Beginning in 2008, the park has maintained a Condor specific webpage (https://www.nps.gov/grca/learn/nature/california-condor.htm) and has provided regular "Condor Updates" for the interested public (**Error! Reference source not found.**). The "Condor updates" are u pdated twice yearly, usually after the Southwest Condor Working Group (SWCWG) meetings. In recent years it has been the most frequently visited site on Grand Canyon's website. A "Condor gossip chart" (Appendix B) is also regularly updated and made available through the Condor webpage. This chart is also distributed to all of the National Park units that fall within the current Southwestern Condor population range (Bryce Canyon NP, Cedar Breaks National Monument, Glen Canyon National Recreation Area, Grand Canyon NP, Horace Albright Training Center, Grand Canyon –Parashant National Monument, Pipe Springs National Monument, and Zion NP) as well as other partners in the SWCWG and other staff at Grand Canyon to help them address any Condor-related inquires.

The park is working with other National Parks to create a standardized Condor subject page residing within the National Park Service web domain and that all parks with wild Condors can pull

information from. This would include parks that have different sub-populations of Condor (Southwestern, southern and central California, and Baja California, Mexico).

Results and Discussion

Flock Size

As of December 31, 2018 there were 90 birds in the wild Southwestern population (**Table 1**) including 90 free flying birds and in the Vermilion Cliffs flight pen, 1 injured and 3 captive bred birds awaiting release. There are 46 birds are of breeding age (>5-6 years of age) of which 38 seem to have paired (i.e. there are 19 potential pairs). Some birds in the population have had partners that have died and do not seem to have established a new partnership and were not counted as paired birds. There are also 3 permanent captive mentors which are not counted as part of the SW total.

Table 1. History of the South West CA Condor population recovery (totals for entire population).

Year	Nests	Fledges	Releases	Mortalities	SW Total	Wild Total	Captive Total	Total
1996	0	0	6	0	6	26	–[A]	–[A]
1997	0	0	13	3	16	45	–[A]	–[A]
1998	0	0	8	2	22	48	–[A]	–[A]
1999	0	0	7	1	28	61	–[A]	–[A]
2000	0	0	13	11	30	67	–[A]	–[A]
2001	0	0	0	1	29	72	–[A]	–[A]
2002	0	0	11	4	36	93	–[A]	–[A]
2003	1	1	7	1	40	84	131	215
2004	2	1	8	2	48	113	132	245
2005	2	2	14	4	60	128	147	275
2006	3	0	9	7	53	131	153	284
2007	2	1	5	3	59	144	154	298
2008	2	0	9	4	59	144	154	298
2009	2	0	14	8	67	167	154	321
2010	1	0	6	8	75	188	162	350
2011	3	2	7	8	74	181	189	370
2012	4	0	15	16	73	210	180	390
2013	7	3	15	13	78	235	169	404

Table 2 (continued). History of the South West CA Condor population recovery (totals for entire population).

Year	Nests	Fledges	Releases	Mortalities	SW Total	Wild Total	Captive Total	Total
2014	6	2	9	9	73	228	193	421
2015	6	1	8	5	78	268	167	435
2016	7	2	4	4	76	276	170	446
2017	4	3	6	3	82	290	173	463
2018	17	3	16	4	90	–[B]	–[B]	–[B]

[A] The park does not have this data and was unable to extract it from existing reports.

[B] The 2018 data for the other populations has not yet been shared.

The data from **Table 1** indicates that the Condor population in the Southwest has had a steady increase in nests and wild fledged chicks recently, and that mortality rates have fallen since 2014, presumable due to Utah and Arizona's efforts to get the lead out of the system through gut raffles (where hunters bring in guts of animals that have been harvested with lead in exchange for being entered into a raffle for prizes), non-lead ammunition exchange programs, and over all education efforts by all of the SWCWG partners.

Over half of the wild population continues to use Grand Canyon for at least part of the year (**Table 3**) although only the nesting birds seem to stay around in the heat of the summer.

Table 3. Percentage of Southwestern California Condor population using Grand Canyon National Park during monitoring efforts between 2016-2018.

Year	# of days tracked	Individuals Detected	% of Population	# of Hazing Events
2016	168	53	63%	0
2017	91	54	66%	0
2018	127	58	55%	0

Nesting Efforts

Of the two wild fledglings in 2016 one chick was hatched within the park and the other within Vermilion Cliffs National Monument. In 2017 none of the successful fledglings came from within Grand Canyon NP while in 2018 all three of them did.



Figure 9. Newton Butte 2016 nest cave as seen from the western peninsula of Newton Butte, Grand Canyon National Park, Arizona. (NPS/ BOB GEORGE).

Common areas in the park for nesting Condors are: the west facing side of the Battleship formation, Marble Canyon, the south facing side of Dana Butte, Salt Creek, the Thunder River drainage, and the West Kaibab Plateau. Pairs appear to use the same formations year after year and while they do re-use nests they don't do so two years in a row.

2016 Nests

In 2016 we originally observed 4 pairs with courtship and nesting behavior in Grand Canyon (**Table 1**). Of those, pairs 280/ 187 and 447/ 203 seemed to abandon the attempt relatively quickly. Pair 280/ 187 re-nested in a cave on the west facing wall of the Battleship formation that they used successfully in 2011. It appeared that they may have laid an egg but by late summer they had abandoned the nest site.

Table 4. Pairs displaying courtship behavior and nesting attempts in Grand Canyon National Park for 2016- 2018 as of November 15, 2018.

General Locality	Year	Female ID	Male ID	Est. Lay Date	Est. Hatch Date	Successful?[A]	Chick ID
Battleship	2016	280	187	–	–	No	–
Deer Creek	2016	447	203	–	–	No	–
Dana Butte	2016	297	123	3/01/2016	–	No	–
Newton Butte	2016	521	423	3/16/2016	–	Yes	850
Thunder River	2017	447	203	–	–	No	–
Battleship	2017	280	187	3/11/2017	5/08/207	No	–
Dana Butte	2017	297	123	3/09/2017	5/06/2017	No	–
Marble Canyon	2017	496	349	–	5/30/2016	No	891
Tower of Ra	2018	316/297	123	–	–	No	–
Thunder River	2018	647	582	–	–	–[B]	–[B]
Newton Butte	2018	521	423	3/12/2018	–	No	–
Battleship	2018	280	187	–	4/13/2018	Yes	954
Marble Canyon	2018	496	354	3/11/2018	–	Yes	952
Tapeats Creek	2018	447	203	3/11/2018	5/7/2018	Yes	955

[A] Successful = chick fledged.

[B] Not yet confirmed.

Our only successful pair in 2016, 521/ 423 nested in a cave on the west facing wall of Newton Butte (Figure 9). They successfully fledged chick 850 on Veteran's Day. It disappeared shortly after its fledge and was not spotted again until visitors, volunteers, and staff reported seeing it in April with accompanying photos from Indian Garden (cover photo). In July it appeared at The Peregrine Fund's Vermilion Cliff site and was tagged at with T0.

2017 Nests



Figure 10. Parents 354+496 at 2017 nest cave, Marble Canyon, Grand Canyon National Park, Arizona. (© ALAN CLAMPITT).

In 2017 there were 4 courting pairs in the park (**Table 4**). Pair 447/ 203 again made an attempt in the Thunder River area but was deemed to have been abandoned from The Peregrine Fund's monitoring of satellite data on the pair. Pair 280 /187 again nested on the west facing side of the Battleship formation and pair 297/ 123 on Dana Butte.

The only pair in Grand Canyon to hatch a chick in 2017 was 349/ 496 who nested upriver of Marble Canyon on the boundary of the Grand Canyon NP, Glenn Canyon National Recreation Area, and Navajo Nation Lands (**Error! Reference source not found.**). The pair was visible by t he public from the Navajo Bridge, a common rest stop along Highway 67 and was monitored by two dedicated volunteers (for The Peregrine Fund) who fielded many questions from the public. Staff from the Grand Canyon and The Peregrine Fund were able to watch chick 891 hatch on May 30th after 60 days of incubation. The chick did not survive to fledging and the necropsy results were inconclusive as to cause of death.

2018 Nests

Due to extreme drought, northern Arizona experienced many drought related deaths to both wildlife and livestock in the spring and summer months. It appeared that 2018 would be a good year to be a scavenger, like the Condor, with plenty of food on the landscape. In 2018, there were 6 nesting/ courtship attempts in Grand Canyon (**Table 4**). At first two females 316/ 297 appeared to be courting with 123 and exploring caves on Tower of Ra formation. Later in the spring it appeared that 297 was out of the equation. Given that 297/ 123 had attempted to nest for several years in a row unsuccessfully we had some hope that the new 316/ 123 pair would have more success (note: 123's original mate was 127 who died in 2009 from lead poisoning). However this pair abandoned their attempts in June.



Figure 11. Condor chick 954 perched in the Muav layer below the Battleship, moments after fledging (NPS/ BOB GEORGE).

The 349/ 496 pair once again nested in the vicinity of Marble Canyon, this time away from the public eyes down river from the Navajo bridge and firmly in Grand Canyon NP boundaries. Chick 952 fledged in October. Pair 280/ 187 also re-nested this year on the west facing side of the Battleship formation. This pair lead staff on a chase, at one point it was assumed that they had abandoned nesting attempts only for them to reappear with courtship nesting behavior. The assumption, was that the pair had nested once, experienced nesting failure, and then had re-nested in a new cave. That assumption was proved false once chick 954 fledged in mid-October which meant that it was from the original nesting attempt and there had been no re-nesting. After days of watching staff realized that 280 often visited several nest caves in the vicinity before landing at the actual nest cave, or even near the fledged chick, which may have created some confusion. As of November 19, 2018 chicks 952 and 954 are doing well and are being tended to by their parents.

Satellite data from The Peregrine Fund indicated that pair 647 /582 were likely nesting in the Thunder River drainage. Early on NPS and Peregrine Fund staff hiked into the canyon to try and locate this nest. Then in September volunteers from the Grand Canyon Field Institute attempted to locate what was thought to be a near fledging chick. Park staff finally located chick 955 still in the nest and unfledged but close to it in the Thunder River Amphitheatre. There is some thought, based on satellite data that a second pair 447 / 203 might also be nesting in the Thunder River area closer to Tapeats Creek. As of mid-November that nest remains unconfirmed.



Figure 12. GIP interns Sarah Ciarrachi and Phillip Andrews get ready to monitor Condors via radio telemetry. (NPS/ LIMARIS SOTO).

The Newton Butte pair 521/ 423 also led us on in 2018. It appears that they made an initial nesting attempt on Newton Butte in March (which remains un-located) but then by mid-June it was clearly abandoned as, according to satellite data, 521 spent the entire month of June in Zion NP to the north without returning once. However, in August the two were again seen pair flying and 521 was seen several times flying with a full crop in the vicinity of Newton Butte (**Error! Reference source not f ound.**). It appears that they were not successful this year in their first year re-nesting after successfully rearing their first chick 850.

The year 2018 matches 2013 in the highest number of successful nests within Grand Canyon NP boundaries (NPS data). We expect this number to only increase as the number of breeding pairs in the wild is at its highest number since reintroduction (The Peregrine Fund, personal communication).

Hazing

Amazingly, no birds have had to be hazed in Grand Canyon NP in 2016-2018 (**Table 3**). However, there were a few close calls.

In May of 2017 we had several reports of Condors (birds 193, 266, and 316) on the South Kaibab Trail near Ooh Aah Point, acting strangely and approaching humans. When personnel arrived on scene, there was no Condor, but much chatter from the visitors about a Condor nearby. Wildlife staff stayed in the vicinity all day and kept vigilant attention, but no Condor was ever verified to need hazing. The only evidence collected was a visitor's picture of said bird. A carcass was later identified near Pipe Spring which was heavily utilized by Condors. It is suspected that the Ooh Aah Point bird was taking a break from feeding on this carcass. In 2018 we had a report of Condor 521 landing next to non-wildlife NPS staff at Shoshone Point (**Error! Reference source not found.**). No action was t aken for the 2018 report. We kept a close eye on the recently fledged bird from the Battleship formation which was perched directly above the Tonto trail for some time.

Volunteers, Staffing, and Budget



Figure 13. Condor Bob, aka Bob George, one of the Park Service's most dedicated volunteers, tracking down nesting Condors.

Between 2013-2015 the Volunteer Nest Watch program was funded primarily through Grand Canyon Association donations at about $10,000/year. Between 2016-2018 the park had some funding from a multi-park project coordinated by Pinnacles NP (part of the California sub-population) called "Condor Parks Unite" which focused on getting parks some consistent messaging about Condors and funding non-lead ammunition training for staff.

In 2016 both staff and volunteers were at a low (**Error! Reference source not found.**) due to staff t urnover and a switch to recruiting volunteers who already lived in the canyon due to both budget and housing limitations.

Table 4. Effort tracking birds and proportion detected and tracked, along with volunteers.

YEAR	# Days tracked	# of Individual Birds Detected	SW pop. size	% of pop	# of nests in GRCA	# Fledged in GRCA	# Hazing Events	# Vols	Total Vol Hours
2012	178	62	73	85%	3	0	34	7	1,779
2013	283	63	78	81%	3	3	56	15	2,234
2014	224	71	73	97%	0	0	45	7	1,863
2015	177	56	78	72%	2	0	10	14	1,488
2016	167	52	76	68%	4	2	0	5	930
2017	91	54	82	66%	3	0	0	4	207
2018	127	58	96	60%	3	3	0	6	947

Condor Bob (aka Bob George) who accounted for the majority of the survey hours during the Condor breeding season and has been awarded the Presidential Volunteer award for achieving over 5,000 volunteer hours to public lands (**Error! Reference source not found.**). Condor Bob did not return f or the 2017 season but did in 2018. Another key volunteer is Phantom Ranch resident, Sjors Horstman, who is critical to winter monitoring when other staffing is at its lowest. In 2017 volunteers included the addition of a high school Seeking Opportunities through Academic Recruitment (SOAR) intern. This program seeks to help high school students learn job skills and help the park out and their hours are counted as volunteers. These individuals work throughout the school year and quite often are retained to assist as a Youth Conservation Corp intern in the summer (where they are not counted as interns but are paid staff). Outside of the volunteers the park has used Geo-scientists in Park (GIP) interns to help round out our Condor staff. The park did not track GIP's Condor specific hours.

In 2018 the park also recruited Hawk Watch volunteers who are already doing work in the canyon to use datasheets whenever they noted a Condor. This group tallies migratory birds from Yaki Point every fall. They recorded some significant Condor observations. They are volunteers but the park did not track their Condor specific time. They should continue to be used in the future as they are excellent birders who are excited to see and learn about Condors.

Micro-trash

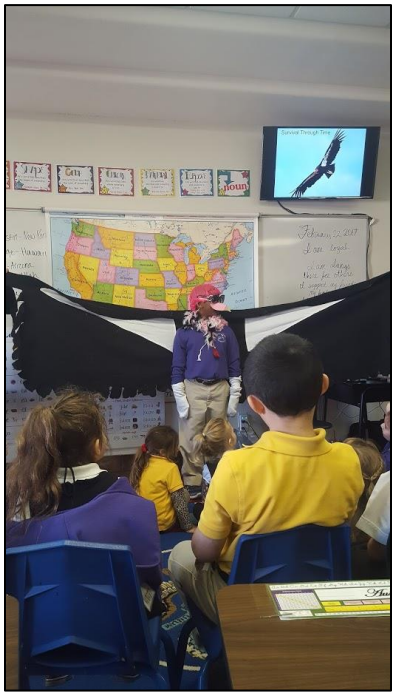


Figure 14. Children dress up like a Condor during a classroom visit by Grand Canyon Education Staff. (NPS/ AMALA POSEY).

The park supports "over the Rim" litter clean-ups through special use permits. In 2017 one was issued to the Arizona Mountaineering Club who solicited skilled volunteers and club members to assist. The park educates volunteers pre-clean up on the importance of certain habitat to Condors and

the threats of micro-trash. In 2017, 46 volunteers logged 382 hours and collected 340 pounds/ 4 cubic yards of trash. In addition they also collected 5 pounds 15 ounces of coins amounting to $55.36. The area below Mather's Point accounted for 97% of the coins collected (Furniss 2017).

Education & Outreach

This continues to be one of the most important contributions Grand Canyon makes to the Southwest Condor Working Group partnership (**Table 5**). Grand Canyon NP has a huge devoted following of people and has an annual visitation of >6 million people from all over the world. Many of those visitors come away with a story about Condors and bring it back to their own communities. In addition, Grand Canyon has the facilities to bring Condors into classrooms both locally (**Error! R eference source not found.**) and around the world.

Informal outreach varies the most because it usually relates to whether or not there are Condor nests visible from the rim in any given year, or if we have regular Condor sightings. When visitors see either staff monitoring Condors and their nests or the birds themselves there are simply more opportunities to connect with them.

Table 5. Summary Data for Grand Canyon National Park education and outreach.

Year	Informal Contacts (Biologists)	Informal Contacts (Rangers)	Formal Condor Programs	Curriculum based Programs	Ranger visits to classrooms	Distance Learning Programs	Condor Website Visits
2012	20,384	18,500	424	–	–	–[A]	N/A
2013	58,987	14,900	554	–	–	–[A]	N/A
2014	20,203	5,100	320	–	–	–	40,691
2015	7,496	10,740	192	–	–	–	N/A
2016	5,097	4,850	420	66	49	8	N/A
2017	477	2,540	201	58	70	20	N/A
2018	4,364	4,440	285	64	64	11	N/A

[A] Distance Learning programs specific to the Condor started in 2014

National Public Lands Day



Figure 15. The public release on September 22, 2018 had an attendance of over 760 individuals. (NPS/ CALE WISHER).

The Peregrine Fund schedules a public Condor release annually to coincide with National Public Lands Day (annually on the 4th Saturday in September) since the inception of the Southwestern recovery program in. Other partners from the Southwest Condor Working Group help co-host and broadcast the event. Grand Canyon NP assists the effort by both providing Interpretive Staff to help educate the public and biological staff to assist in monitoring the birds post release. The event is held on BLM managed Vermilion Cliffs National Monument land from a viewing area that is situated below the cliffs where the release pen is situated. Spotting scopes are provided by private partners (in 2018 by Swarovski and Optik).

In 2016 there were an estimated 200 attendees, in 2017 around 500. The 2018 release was the 23rd public release and had the largest attendance date with >760 attendees (**Error! Reference s ource not found.**). For the first time in 2018, the park broadcast the joint press release on their webpage and posted it on their social media sites. The 2018 event also included an auction for Condor related art along with information tables and personnel from all partners for the public to interact with. We can only expect this event to keep growing.

Internal Training and Communication

Throughout the year Wildlife staff and interns give presentations to park staff and concessionaires (especially the bus drivers) to educate them on Condor biology and threats in order for them to pass that information on to the public. In addition Grand Canyon communicates new information about Condors that comes from the working group to other parks within the re-introduction area usually via email. Occasionally we respond to various requests from other parks to assist them with putting on a program. For example we are assisting Glen Canyon Recreation Area add Condor specific information to a Kid's Christmas Bird Count they have

planned for December of 2018 at Lee's Ferry, not far from the Navajo Bridge and Marble Canyon.

In 2017 the park was able to use funding from a multi-park project (Condor Parks unite) to host a Non-Lead Ammunition training for and to pay The Peregrine Fund for the participation of its staff. All of Grand Canyon staff, Condor park employees, U.S. Fish & Wildlife Condor employees, and Working Group partner staff were invited to this event in which Chris Parish demonstrated the benefits of using non-lead ammo and educated on the effects of lead ammo within the national avian communities. This assists in understand the impacts and differences in how lead and non-lead ammunition work.

Recommendations

1. Nest monitoring should take priority over signal checks. If nests are easily visible and somewhat accessible, nests should be monitored at least 3 days a week.
2. Continue to utilize a group of volunteers to foster the project objectives and whenever possible, recruit high school volunteers through the SOAR program. We successfully fostered a group of 4 volunteers in 2017 and 2018. We should continue to train interested members of our community and other GRCA divisions to participate in Condor nest monitoring, in conjunction with increasing our numbers and data. Employing high school students through the SOAR program as unpaid interns is a great way to achieve this. This program not only integrates them to a NPS work environment but also allows for them to move into upper level or pathways positions.
3. Provide Condor and firearm/ ammunition training to GRCA park staff. Every member of both the Wildlife and Interpretation staff should be knowledgeable about the history of the relationship between Condors and lead, as well as current preservation initiatives. It is clear that all individuals who give Condor talks or frequently participate in Condor roves should understand this delicate balance. Not only is it important to know what to discuss with the general public about sensitive and political issue that surrounds non-lead, but what approach should be taken. Moreover, non-lead ammunition training provides first-hand visual experience with both types of ammunition allowing for better communication between visitors and GRCA staff.
4. Continue to build inter-agency relations and communications regarding the timely exchange of information on the status and location of nests, transmitter changes, mortalities, etc. It is crucial to continue a cooperative relationship and effective means of communication between The Peregrine Fund and Grand Canyon NP staff. Information should be mainstreamed through the GRCA Condor Coordinator.
5. Continue to foster relations with Grand Canyon Conservancy, the official non-profit partner of Grand Canyon NP. Grand Canyon Conservancy has provided funding for Condor staff and volunteer positions, and supports Condor recovery by publishing brochures for public distribution and helping seek donations for the AGFD gut pile raffle.
6. Amplify the Condor specific visitor education and interaction. There has been a decline in visitor contacts pertaining to Condor-specific topics due to the lack of staff. It is critical for the Grand Canyon NP's Wildlife current staff to update and utilize the Condor field material during rim surveys and to make public outreach a primary element of the GRCA Condor program.
7. Continue to work with other parks to create and finalize the National Park Service Condor subject site.

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Appendix A: Example SW Condor Datasheet

Obs. Name(s) :																Date:		Number of Visitors Contacted:				
Weather:																Time:						
FAILED or no VHS				INTERMITTENT		Observer UNIT Code:								Observer Location:								
Brd	S/H	tag	LP	RP	S	V	M	A	F	C	H	B	N	P	O							
114	m95	14			114	114	114	114	114	114	114	114	114	114	114							
123	f95	23			123	123	123	123	123	123	123	123	123	123	123							
162	m97	62			162	162	162	162	162	162	162	162	162	162	162							
187	m98	87			187	187	187	187	187	187	187	187	187	187	187							
193	m98	93			193	193	193	193	193	193	193	193	193	193	193							
203	m99	03			203	203	203	203	203	203	203	203	203	203	203							
241	f01	41			241	241	241	241	241	241	241	241	241	241	241							
243	m01	43			243	243	243	243	243	243	243	243	243	243	243							
266	m02	66			266	266	266	266	266	266	266	266	266	266	266							
275	m02	75			275	275	275	275	275	275	275	275	275	275	275							
280	f02	80			280	280	280	280	280	280	280	280	280	280	280							
293	m03	-3			293	293	293	293	293	293	293	293	293	293	293							
296	f03	-6			296	296	296	296	296	296	296	296	296	296	296							
297	f03	97			297	297	297	297	297	297	297	297	297	297	297							
316	f03	16			316	316	316	316	316	316	316	316	316	316	316							
342	m04	42			342	342	342	342	342	342	342	342	342	342	342							
349	m04	A9			349	349	349	349	349	349	349	349	349	349	349							
354	m04	54			354	354	354	354	354	354	354	354	354	354	354							
379	m05	79			379	379	379	379	379	379	379	379	379	379	379							
383	f05	83			383	383	383	383	383	383	383	383	383	383	383							
388	m05	88			388	388	388	388	388	388	388	388	388	388	388							
389	f05	89			389	389	389	389	389	389	389	389	389	389	389							
409	f06	9			409	409	409	409	409	409	409	409	409	409	409							
423	m06	E3			423	423	423	423	423	423	423	423	423	423	423							
435	m07	35			435	435	435	435	435	435	435	435	435	435	435							
441	m07	F1			441	441	441	441	441	441	441	441	441	441	441							
447	f07	47			447	447	447	447	447	447	447	447	447	447	447							
453	f07	F3			453	453	453	453	453	453	453	453	453	453	453							
455	f07	55			455	455	455	455	455	455	455	455	455	455	455							
496	f08	H9			496	496	496	496	496	496	496	496	496	496	496							
521	f09	J1			521	521	521	521	521	521	521	521	521	521	521							
523	m09	J3			523	523	523	523	523	523	523	523	523	523	523							
528	f09	28			528	528	528	528	528	528	528	528	528	528	528							
530	m09	30			530	530	530	530	530	530	530	530	530	530	530							
541	f09	J4			541	541	541	541	541	541	541	541	541	541	541							
561	m10	61			561	561	561	561	561	561	561	561	561	561	561							
582	m10	82			582	582	582	582	582	582	582	582	582	582	582							
586	m10	K6			586	586	586	586	586	586	586	586	586	586	586							
593	f11	L3			593	593	593	593	593	593	593	593	593	593	593							
601	m11	01			601	601	601	601	601	601	601	601	601	601	601							
605	m11	5			605	605	605	605	605	605	605	605	605	605	605							
610	f11	1			610	610	610	610	610	610	610	610	610	610	610							
611	m11	11			611	611	611	611	611	611	611	611	611	611	611							
618	f11	18			618	618	618	618	618	618	618	618	618	618	618							
619	m11	19			619	619	619	619	619	619	619	619	619	619	619							
634	f11	L4			634	634	634	634	634	634	634	634	634	634	634							
640	f12	40			640	640	640	640	640	640	640	640	640	640	640							
647	f12	M7			647	647	647	647	647	647	647	647	647	647	647							
653	f12	53			653	653	653	653	653	653	653	653	653	653	653							
677	f13	77			677	677	677	677	677	677	677	677	677	677	677							
679	f13	N7			679	679	679	679	679	679	679	679	679	679	679							
680	m13	N8			680	680	680	680	680	680	680	680	680	680	680							
691	m13	N6			691	691	691	691	691	691	691	691	691	691	691							
701	m13	N1			701	701	701	701	701	701	701	701	701	701	701							
721	f13	21			721	721	721	721	721	721	721	721	721	721	721							
727	f14	p7			727	727	727	727	727	727	727	727	727	727	727							
731	f14	p1			731	731	731	731	731	731	731	731	731	731	731							
735	m14	p5			735	735	735	735	735	735	735	735	735	735	735							
741	f14	p8			741	741	741	741	741	741	741	741	741	741	741							
743	f14	p4			743	743	743	743	743	743	743	743	743	743	743							
752	m14	p2			752	752	752	752	752	752	752	752	752	752	752							
754	?14	4			754	754	754	754	754	754	754	754	754	754	754							
757	f14	P7			757	757	757	757	757	757	757	757	757	757	757							
761	f14	P9			761	761	761	761	761	761	761	761	761	761	761							
766	?14	P6			766	766	766	766	766	766	766	766	766	766	766							
775	f15	R5			775	775	775	775	775	775	775	775	775	775	775							
786	m15	R8			786	786	786	786	786	786	786	786	786	786	786							

Frequencies not available for public distribution

790	f15	**90**			790	790	790	790	790	790	790	790	790	790	790					
801	f15	**R1**			801	801	801	801	801	801	801	801	801	801	801					
802	m15	**02**			802	802	802	802	802	802	802	802	802	802	802					
809	f16	**9**			809	809	809	809	809	809	809	809	809	809	809					
812	f16	**12**			812	812	812	812	812	812	812	812	812	812	812					
817	m16	**17**			817	817	817	817	817	817	817	817	817	817	817					
826	f16	**T5**			826	826	826	826	826	826	826	826	826	826	826					
833	f16	**T3**			833	833	833	833	833	833	833	833	833	833	833					
834	m16	**T8**			834	834	834	834	834	834	834	834	834	834	834					
836	f16	**T6**			836	836	836	836	836	836	836	836	836	836	836					
843	m16	**T1**			843	843	843	843	843	843	843	843	843	843	843					
844	f16	**44**			844	844	844	844	844	844	844	844	844	844	844					
847	f16	**T7**			847	847	847	847	847	847	847	847	847	847	847					
849	?16	**T9**			849	849	849	849	849	849	849	849	849	849	849					
850	?16	**T0**			850	850	850	850	850	850	850	850	850	850	850					
855	f17	**V1**			855	855	855	855	855	855	855	855	855	855	855					
857	m17	**V2**			857	857	857	857	857	857	857	857	857	857	857					
858	f17	**V9**			858	858	858	858	858	858	858	858	858	858	858					
873	f17	**VC**			873	873	873	873	873	873	873	873	873	873	873					
883	m17	**V3**			883	883	883	883	883	883	883	883	883	883	883					
884	f17	**V4**			884	884	884	884	884	884	884	884	884	884	884					
886	f17	**VF**			886	886	886	886	886	886	886	886	886	886	886					
896	?17	**V6**			896	896	896	896	896	896	896	896	896	896	896					
897	?17	**V7**			897	897	897	897	897	897	897	897	897	897	897					
898	?17				898	898	898	898	898	898	898	898	898	898	898	untagged Vermilion Cliffs chick 2017				
952	?18				952	952	952	952	952	952	952	952	952	952	952	untagged Marble Canyon chick 2018				
954	?18				954	954	954	954	954	954	954	954	954	954	954	untagged Netwon Butte chick 2018				
61	m91	**61**			61	61	61	61	61	61	61	61	61	61	61	captive mentor	**Datasheet updated:**	**10/25/2018**		
535	m09	**J5**			535	535	535	535	535	535	535	535	535	535	535	VC Captive				
727	f14	**p7**			727	727	727	727	727	727	727	727	727	727	727	VC Captive				

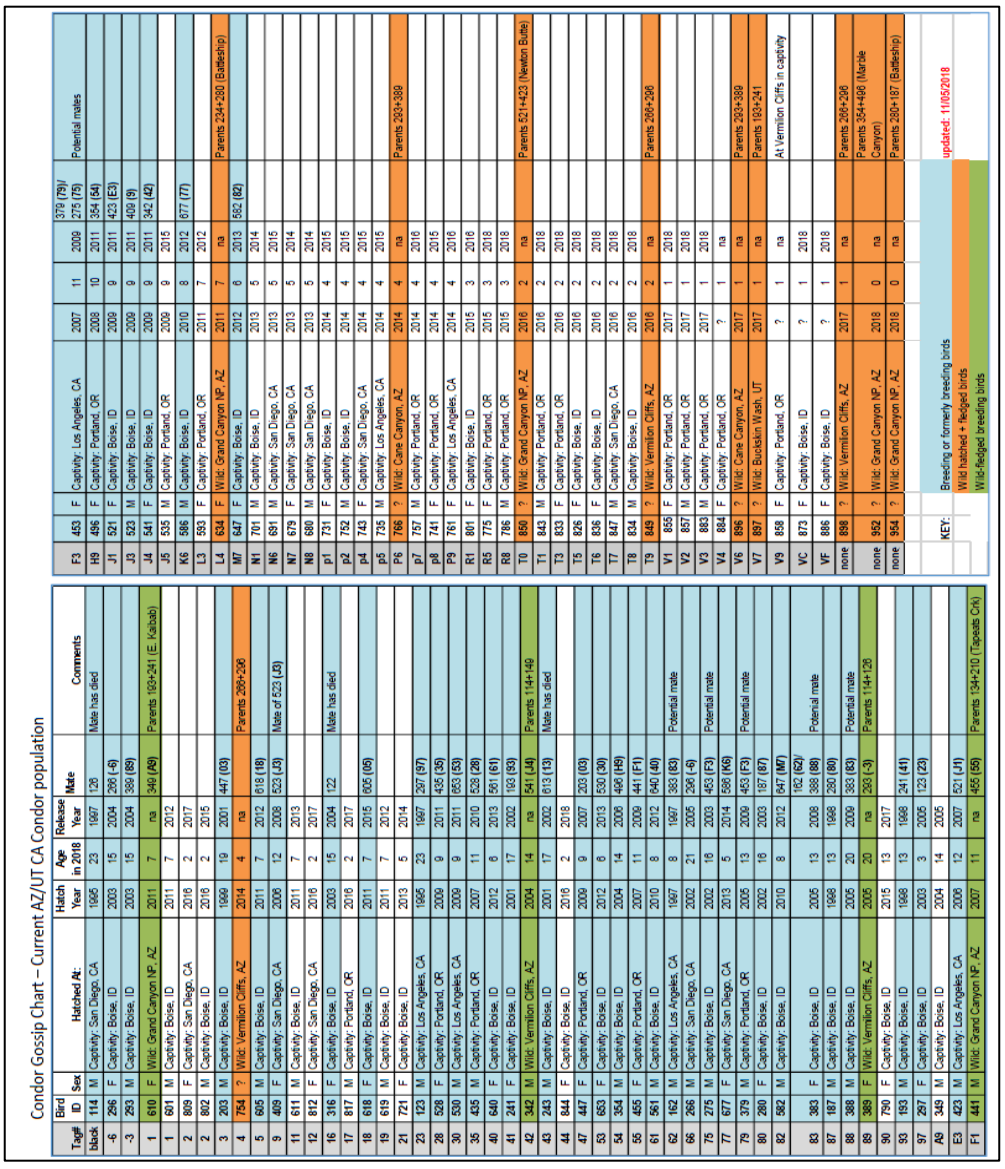
BIRD	TIME	OBSERVATIONS	(Please write notes, especially if you see something or use the "O" code. Use another sheet or back if necessary.)

KEY for type of detection/ event: **(S/H = Sex/ Hatch year)**

S=signal, V=visual, M=moving, A=At Carcass (@C), F=feeding, C=crop full, H=hazed, B=breeding behavior N=visiting a nest, P=signal problem, O=Other major event

DATE ENTERED INTO DB: **DATA ENTERED BY:**

Appendix B: Condor Gossip Sheet



Condor Gossip Chart – Current AZ/UT CA Condor population

Tag# black	Bird ID	Sex	Hatched At:	Hatch Year	Age in 2018	Release Year	Mate	Comments
114	M	Captivity; San Diego, CA	1986	23	1987	126	Mate has died	
296	F	Captivity; Boise, ID	2003	15	2004	296 (-6)		
293	M	Captivity; Boise, ID	2003	15	2004	389 (89)		
610	F	Wild: Grand Canyon NP, AZ	2011	7	na	340 (A9)	Parents 193+241 (E. Kaibab)	
601	M	Captivity; Boise, ID	2011	7	2012			
809	F	Captivity; San Diego, CA	2016	2	2017			
802	M	Captivity; Boise, ID	2016	2	2015			
203	M	Captivity; Boise, ID	1999	19	2001	447 (03)		
754	?	Wild: Vermilion Cliffs, AZ	2014	4	na		Parents 268+296	
605	M	Captivity; Boise, ID	2011	7	2012	618 (18)		
409	F	Captivity; San Diego, CA	2006	12	2008	523 (J3)	Mate of 523 (J3)	
611	M	Captivity; Boise, ID	2011	7	2013			
812	F	Captivity; San Diego, CA	2016	2	2017			
316	F	Captivity; Boise, ID	2003	15	2004	122	Mate has died	
817	M	Captivity; Portland, OR	2016	2	2017			
618	F	Captivity; Boise, ID	2011	7	2015	605 (05)		
619	M	Captivity; Boise, ID	2011	7	2012			
721	F	Captivity; Boise, ID	2013	5	2014			
123	M	Captivity; Los Angeles, CA	1995	23	1997	297 (97)		
528	F	Captivity; Portland, OR	2009	9	2011	435 (35)		
530	M	Captivity; Los Angeles, CA	2009	9	2011	553 (53)		
435	M	Captivity; Portland, OR	2007	11	2010	528 (28)		
640	F	Captivity; Boise, ID	2012	6	2013	561 (61)		
241	F	Captivity; Boise, ID	2001	17	2002	193 (93)		
342	M	Wild: Vermilion Cliffs, AZ	2004	14	na	541 (J4)	Parents 114+149	
243	M	Captivity; Boise, ID	2001	17	2002	613 (13)	Mate has died	
844	F	Captivity; Boise, ID	2018	2				
447	F	Captivity; Portland, OR	2009	9	2007	203 (03)		
653	F	Captivity; Boise, ID	2012	6	2013	530 (30)		
354	M	Captivity; Boise, ID	2004	14	2006	496 (H9)		
455	F	Captivity; Portland, OR	2007	11	2009	441 (F1)		
561	M	Captivity; Boise, ID	2010	8	2012	640 (40)		
162	M	Captivity; Los Angeles, CA	1997	8	1997	383 (83)	Potential mate	
266	M	Captivity; San Diego, CA	2002	21	2005	296 (-6)		
275	M	Captivity; Boise, ID	2002	16	2003	453 (F3)	Potential mate	
677	F	Captivity; San Diego, CA	2013	5	2014	596 (N6)		
379	M	Captivity; Portland, OR	2006	13	2009	453 (F3)	Potential mate	
280	F	Captivity; Boise, ID	2002	16	2003	187 (87)		
582	M	Captivity; Boise, ID	2010	8	2012	647 (M7)		
						162 (62)/		
383	F	Captivity; Boise, ID	2005	13	2008	388 (88)	Potential mate	
187	M	Captivity; Boise, ID	1988	13	1988	280 (80)		
388	M	Captivity; Boise, ID	2005	20	2009	383 (83)	Potential mate	
389	F	Wild: Vermilion Cliffs, AZ	2005	20	na	293 (-3)	Parents 114+128	
790	F	Captivity; Boise, ID	2015	13	2017			
193	M	Captivity; Boise, ID	1988	13	1988	241 (41)		
297	F	Captivity; Boise, ID	2003	3	2005	123 (23)		
349	M	Captivity; Boise, ID	2004	14	2005			
423	M	Captivity; Los Angeles, CA	2006	12	2007	621 (J1)		
441	M	Wild: Grand Canyon NP, AZ	2007	11	na	455 (55)	Parents 134+210 (Tapeats Crk)	

F3	453	F	Captivity; Los Angeles, CA	2007	11	2009	379 (79)/ 275 (75)	Potential mates
H9	496	F	Captivity; Portland, OR	2008	10	2011	354 (54)	
J1	521	F	Captivity; Boise, ID	2009	9	2011	423 (E3)	
J3	523	M	Captivity; Boise, ID	2009	9	2011	409 (9)	
J4	541	F	Captivity; Boise, ID	2009	9	2011	342 (42)	
J5	535	M	Captivity; Portland, OR	2009	9	2015		
K6	596	M	Captivity; Boise, ID	2010	8	2012	677 (77)	
L3	593	F	Captivity; Portland, OR	2011	7	2012		
L4	634	F	Wild: Grand Canyon NP, AZ	2011	7	na		Parents 234+280 (Battleship)
M7	647	F	Captivity; Boise, ID	2012	6	2013	582 (82)	
N1	701	M	Captivity; Boise, ID	2013	5	2014		
N6	691	M	Captivity; San Diego, CA	2013	5	2015		
N7	679	F	Captivity; San Diego, CA	2013	5	2014		
N8	680	M	Captivity; San Diego, CA	2013	5	2014		
p1	731	F	Captivity; Boise, ID	2014	4	2015		
p2	752	M	Captivity; Boise, ID	2014	4	2015		
p4	743	F	Captivity; San Diego, CA	2014	4	2015		
p5	735	M	Captivity; Los Angeles, CA	2014	4	2015		
P6	768	?	Wild: Cane Canyon, AZ	2014	4	na		Parents 293+389
p7	757	M	Captivity; Portland, OR	2014	4	2016		
p8	741	F	Captivity; Portland, OR	2014	4	2015		
P9	761	F	Captivity; Los Angeles, CA	2014	4	2016		
R1	801	F	Captivity; Boise, ID	2015	3	2016		
R5	775	F	Captivity; Portland, OR	2015	3	2018		
R8	786	M	Captivity; Portland, OR	2015	3	2018		
T0	850	?	Wild: Grand Canyon NP, AZ	2016	2	na		Parents 521+423 (Newton Butte)
T1	843	M	Captivity; Portland, OR	2016	2	2018		
T3	833	F	Captivity; Portland, OR	2016	2	2018		
T5	826	F	Captivity; Boise, ID	2016	2	2018		
T6	836	F	Captivity; San Diego, CA	2016	2	2018		
T7	847	M	Captivity; San Diego, CA	2016	2	2018		
T8	834	M	Captivity; Boise, ID	2016	2	2018		
T9	849	?	Wild: Vermilion Cliffs, AZ	2016	2	na		Parents 268+296
V1	855	F	Captivity; Portland, OR	2017	1	2018		
V2	857	M	Captivity; Portland, OR	2017	1	2018		
V3	883	M	Captivity; Portland, OR	2017	1	2018		
V4	884	F	Captivity; Portland, OR	?	1	na		
V6	896	?	Wild: Cane Canyon, AZ	2017	1	na		Parents 293+389
V7	897	?	Wild: Buckskin Wash, UT	2017	1	na		Parents 193+241
V9	858	F	Captivity; Portland, OR	?	1	na		At Vermilion Cliffs in captivity
VC	873	F	Captivity; Boise, ID	?	1	2018		
VF	886	F	Captivity; Boise, ID	?	1	2018		
none	898	?	Wild: Vermilion Cliffs, AZ	2017	1	na		Parents 268+296
none	962	?	Wild: Grand Canyon NP, AZ	2018	0	na		Parents 354+496 (Marble Canyon)
none	954	?	Wild: Grand Canyon NP, AZ	2018	0	na		Parents 280+187 (Battleship)

KEY:
Breeding or formerly breeding birds
Wild hatched + Fledged birds
Wild-fledged breeding birds

updated: 11/05/2018

The Department of the Interior protects and manages the nation's natural resources and cultural heritage, provides scientific and other information about those resources, and honors its special responsibilities to American Indians, Alaska Natives, and affiliated Island Communities.

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