Black-capped Vireo Post-delisting Monitoring

Interim Report

December 2024

U.S. Fish and Wildlife Service

Texas Coastal and Central Plains Ecological Services Field Office

Fort Worth, Texas

Summary

The Endangered Species Act (ESA) requires the U.S. Fish and Wildlife Service (Service) to monitor the status of all species that are delisted due to recovery, in cooperation with the States, for no less than five years. This process, known as post-delisting monitoring, is meant to ensure the species continues its healthy status following the removal of ESA protections. The Post-delisting Monitoring Plan (PDMP) for the black-capped vireo (*Vireo atricapilla*) was developed by the Service along with our partners to provide a process to monitor the status of the species until the year 2030.

This interim report represents the halfway point of the PDMP and provides data and information collected by the Service and our partners to evaluate the species' status. We are pleased to report that the black-capped vireo continues to thrive in greater numbers than was known at the time it was delisted in 2018. Of note in this interim report is the data from major populations, which continue to show strong abundance numbers and low brown-headed cowbird parasitism rates. Additionally, six large populations have been reported that were previously not included in the 2016 Species Status Assessment (Salt Canyon, Broadheart Preserve, Government Canyon State Natural Area, McGillivray and Leona McKie Muse Wildlife Management Area and two Texas Department of Transportation road transects) and three properties originally reported with small populations in the SSA, now show substantial numbers of vireos (Bandera Corridor Conservation Bank, Balcones Canyonlands Preserve, and Possum Kingdom State Park). Not all locations showed increases; a few properties reported fewer numbers than previously documented, for reasons not currently understood (South Llano River State Park and Devil's Sinkhole State Natural Area). Residual threats to the species still exist; however, it appears that the magnitude of these threats continues to decline or is managed. Continuing to track these threats as well as employ management techniques for habitat and species management (e.g., cowbird control, prescribed fire) is still important for the black-capped vireo.

There are many factors that have led to the success story of the black-capped vireo. Of primary importance are the numerous research projects that resulted in practices to manage stressors on the species and its habitat. The Service's first report on the status of the vireo was completed in 1985, which led to its listing as endangered in 1987. At that time, approximately 300 birds could be accounted for across the entire breeding range and the largest known population was about 50 pairs in the Austin, Texas area. Additionally, the population at Fort Cavazos (then named Fort Hood) was almost non-existent, with only a couple of males reportedly passing through. Today, the Austin area is estimated to have over 400 pairs and Fort Cavazos over 9,000. These large populations resulted from efforts to improve and expand available habitat and to increase reproductive success through the control of brown-headed cowbirds. Additionally, the creation of the Balcones Canyonlands National Wildlife Refuge and the Balcones Canyonlands Preserve greatly facilitated these efforts in the Austin area where habitat would otherwise have been permanently lost to development.

During the post-delisting monitoring period, our partners put forth an outstanding effort to ensure we continued to track the species' status within the U.S. portion of the range. We employed the use of citizen science as a trial for small public lands populations; we conducted a pilot project

using automated recording units to detect singing males, and we utilized rural highways as a means for conducting transect point counts in the heart of the range. These and other stories can be found in the annual post-delisting monitoring newsletters at: https://www.fws.gov/library/collections/black-capped-vireo-post-delisting-newsletters.

Based on the information we have received thus far, we believe the black-capped vireo is stable to increasing following its delisting, and no thresholds have been reached that need to be addressed through an active response. Our recommendation moving forward is to continue the strong effort of monitoring the species at the same or greater level in the second half of the post-delisting monitoring period. We are extremely grateful to all our partners who have greatly contributed to the effort of monitoring, management, and reporting information included in this interim report.

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Disclaimer

The post-delisting monitoring effort for the black-capped vireo is a cooperative effort between the Service, States, other Federal agencies, and non-governmental partners. In this regard, data generated by partners follows the Post-delisting Monitoring Plan guidance in most instances, but some data/information may have been collected by other methods, such as the continuance of long-term monitoring, generally accepted biological methodologies, anecdotal information, or other means. In all cases, the interpretation of data/information was aligned with the intent and guidance of the Black-capped Vireo Post-delisting Monitoring Plan, with the objective of understanding the biological status of the species as compared to the information documented in the Black-capped Vireo Species Status Assessment.

I.   Introduction

The black-capped vireo (BCVI) was removed from the List of Endangered and Threatened Wildlife on May 16, 2018 due to recovery (83 FR 16228). Following the delisting, the U.S. Fish and Wildlife Service, in coordination with the States and other partners, developed a post-delisting monitoring plan (PDMP) to ensure the species remains secure from risk of extinction (USFWS 2018). The Endangered Species Act requires a species be monitored for no less than five years if delisted due to recovery. The Black-capped Vireo PDMP provides a strategy for monitoring the species status for a 12-year period. This interim report summarizes the information collected under the PDMP to evaluate progress at the end of year six (USFWS 2018, p. 20).

The PDMP consists of two components to monitor the biological status of the BCVI: abundance trends and residual threat trends. Abundance monitoring targets localities on managed lands in the U.S. portion of the breeding range, as well as population trends at major population centers. Within the SSA, known localities of BCVI evaluated under the SSA were categorized as those having between 30 and 99 males (manageable localities) and those with 100 or greater (likely resilient localities). Under the PDMP, both manageable and likely resilient localities were categorized as Tier 1 localities; any known populations with less than 30 males were considered Tier 2 localities. Further, only localities where access for surveys was possible were included, resulting in the 19 localities shown in Table 1. Monitoring of residual threats is accomplished through evaluation of land use changes, livestock, deer and exotic herbivore trends, as well as monitoring of brown-headed cowbird (BHCO) parasitism on nesting BCVI.

Table 1. Original 19 Tier 1 properties from PDMP, Recovery Unit location, and Abundance as reported in Species Status Assessment (SSA).		
Recovery Unit	Locality	SSA Abundance of males (pop. estimate)
Oklahoma	Wichita Mountains Wildlife Refuge	121 (3,300)
Oklahoma	Fort Sill Military Installation	603
TX Central	South Llano River State Park	95
TX Central	Mason Mountain Wildlife Management Area	126
TX North	Canyon of the Eagles	45
TX North	Balcones Canyonlands National Wildlife Refuge	158
TX North	Fort Cavazos Military Installation	918 (7,748)
TX South	Love Creek Preserve	30
TX South	Rancho Diana	37
TX South	Shield Ranch	54
TX South	Kerr Wildlife Management Area	463
TX West	Big Bend National Park	30
TX West	Independence Creek	39
TX West	Devil's Sinkhole State Natural Area	40
TX West	Kickapoo Caverns State Park	64
TX West	Devils River State Park	81
TX West	Devils River State Natural Area	171
TX West	Dolan Falls	102
TX West	Devils River Conservation Easements	357

The PDMP establishes thresholds and responses for monitoring results to provide a process for evaluating the species status during the PDMP timeframe. These thresholds were developed based on the "3 R" concept utilized in the Species Status Assessment (USFWS 2016, SSA). The "3 Rs," resiliency, redundancy, and representation, were initially evaluated in the SSA, which characterized the species' viability leading to its delisting.

A. Thresholds for Resiliency

The thresholds for resiliency are based on both the long-term population trends and nest monitoring data collected at major population centers, as well as nest monitoring data collected from all other Tier 1 localities. At the time of PDMP development, the major population centers considered were Fort Cavazos (formerly Fort Hood), Fort Sill, Wichita Mountains Wildlife Refuge (WR), Balcones Canyonlands National Wildlife Refuge (NWR), and Kerr Wildlife Management Area (WMA).

1. Long term population trends threshold

At the end of year 6 and 9 of the PDM plan, observed trends in population estimates at the major localities in Texas (listed above) should not decline to less than half the average of an equivalent previous timeframe. In Oklahoma, the Wichita Mountains WR and Fort Sill localities are contiguous and separated from other large populations by large distances. Declines in this northernmost population may be more difficult to reverse due to the distance of other potential source populations. For these reasons, the observed trends in population estimates at the major localities in Oklahoma should not decline to less than 70% of the average of an equivalent timeframe. Previous timeframes are dependent on survey effort at each locality and should represent a reasonable sample for comparison.

If population estimates for one or more of these properties reaches this threshold, population estimation surveys will be scheduled annually, and the locality authority and the Service will evaluate the need for additional management actions based on the reason(s) for the decline. The population will be re-evaluated in subsequent years to determine if the status has improved. If the population has not improved, additional coordination with the managing authority and the Service will develop actions to reverse the decline.

2. BHCO parasitism threshold

Tier 1 localities monitoring nests should stay below a 40% nest parasitism rate averaged over the first and second 6-year time frames. The response to this threshold being met will be increased cowbird control to bring parasitism rates back under the 40% threshold.

B. Threshold for Redundancy

Redundancy thresholds are based on the number of manageable and likely resilient localities. This threshold evaluates census data collected from Tier 1 managed properties and uses limits based on the results of the worst-case scenario, for the Short Term forecast in the SSA. If this scenario occurs in the 12-year period of the PDMP, the threshold would be reached and responses required. However, due to natural fluctuations in species abundance, and ability to monitor all locations, thresholds will be evaluated at years 6, 9, and 12 within the PDMP timeframe. Additionally, the inability to obtain census data from managed properties will require modification of the threshold as described in Section X of the PDMP.

From Table 1, the threshold is the expected number of Tier 1 localities (manageable and likely resilient) that are moderately or highly likely to persist under decreased management over the short term (30 years). The forecasted outcome (threshold) is nine manageable and eight likely

resilient localities (Table 2). To determine that the threshold of nine manageable and eight likely resilient localities within the U.S. breeding range has not been met, data from monitoring 75% of the Table 1 localities or other known localities that are shown to meet the minimum number of males through survey data, and any newly discovered localities will be used to compare with the forecasted threshold.

Table 2. Redundancy threshold numbers of Tier 1 manageable and likely resilient localities. Adapted from the SSA (USFWS 2016).			
	Current Conditions	Short Term Scenario	Threshold (75% of localities)
Manageable Localities	10	9	7
Likely Resilient Localities	9	8	6
Total	19	17	13

C. Threshold for Representation

The threshold for representation is based on the distribution of Tier 1 localities across the U.S. breeding range. Table 3 shows the distribution of these localities at the time of the SSA (current conditions) and the expected distribution by recovery unit (excluding private localities) as forecast under the worst-case scenario in the SSA. Similar to the thresholds for redundancy, representation is based on the short-term distribution predictions for the worst-case scenario in the SSA. These thresholds consist of the number of forecasted managed properties (excluding private localities) under short-term decreased management conditions within the U.S. recovery units. If any of these forecasted outcomes occur in the 12-year period of the PDM plan, the thresholds would be met and responses required. However, due to natural fluctuations in species abundance, and inability to monitor all locations, thresholds will be evaluated at years 6, 9, and 12 within the PDMP timeframe. Additionally, thresholds would reflect the 75% minimum census data collected (see Table 2). The inability to obtain census data from managed properties will require modification of the thresholds as described in Section X of the PDMP.

Table 3. Representation threshold using forecasted scenario of projected number of Tier 1 manageable (ML) and likely resilient localities (LRL) based on current conditions under short and long term, decreased management conditions. Adapted from the SSA (USFWS 2016).

Forecasted Scenario of Existing Number of Known Localities	Unit	Current Conditions		Short Term Decreased Mgmt.	
		ML	LRL	ML	LRL
	Oklahoma	0	2	0	2
	Central	1	1	2	0
	North	1	2	0	2
	South	3	1	2	1
	West	5	3	5	3
	Total	10	9	**9**	**8**

II.   Abundance Monitoring

Localities with major populations and long-term monitoring programs (Fort Cavazos, Fort Sill, Wichita Mountains WR, Balcones Canyonlands NWR, and Kerr WMA) were recommended to provide estimates of abundance derived from survey data collected every other year. For other Tier 1 localities, the recommendation for abundance monitoring is a minimum of two surveys in the first and second 6-year timeframes (but no later than year 11) to produce 4 censuses under the plan. The practicality and availability of resources to provide these surveys may be limiting at some localities. To determine if monitoring thresholds are exceeded, survey data from at least 75% of Tier 1 localities may be used for evaluation. At the time of the PDMP, this represented 14 of the 19 accessible Tier 1 localities.

The PDMP also recommended, if resources allowed, monitoring of Tier 2 locations that are believed to maintain manageable numbers of BCVI (i.e., last survey indicates population close to 30 adult males). Two surveys were recommended, once within each 6-year interval and with at least 5 years between the first and last surveys.

A. Resiliency
1. Long Term Monitoring Trends

Long-term monitoring data was collected from four of the five major populations within the range of the BCVI. Fort Sill did not collect abundance data, but has maintained BHCO trapping efforts on the property. Although not considered a major population in the PDMP, this evaluation also includes Mason Mountain WMA, which has a substantial population that is regularly monitored. Table 4 provides information collected from the major populations during the interim reporting period (2019 to 2024).

Table 4. Population Trend Data from Major Populations collected during the interim reporting period, as well as the numbers evaluated in the SSA. Numbers represent estimate or minimum number of males identified.

	Locality	Recovery Unit	SSA	2019	2020	2021	2022	2023	2024
1	Fort Cavazos	TX North	7,748	6,486	*	8,596	**	7,104	9,279
2	Fort Sill	Oklahoma	709	*	*	*	*	*	*
3	Wichita Mtns WR	Oklahoma	3,300	3,245	3,607	*	4,704	5,379	6,231
4	Kerr WMA	TX South	463	510	*	423	*	528	*
5	Mason Mtn WMA	TX Central	126	231	284	384	227	274	188
6	Balcones NWR	TX North	158	528	*	363	*	*	*

*no data collected or pop estimate not calculated.
** data omitted as outlier

To address the long-term monitoring threshold, average population estimates from an equivalent timeframe compared to average of PDMP reporting timeframes are presented in Table 5.

Table 5. Evaluation of resiliency threshold for the five major population trends within the PDMP. Mason Mtn WMA was added due to large population known to occur on the property.

	Locality	Recovery Unit	Timeframe	Average	Interim Report Average
1	Fort Cavazos	TX North	2013-2018	7,427	7,866
2	Fort Sill	Oklahoma	2013-2018	748	*
3	Wichita Mtns WR	Oklahoma	2015-2018	4,094	4,633
4	Kerr WMA	TX South	2013-2018	474	487
5	Mason Mtn WMA	TX Central	2013-2018	213	265
6	Balcones NWR	TX North	2015-2016	363	446

*no data collected

2. BHCO Parasitism

Nest monitoring data was collected at some major populations with additional or occasional data collected from other monitoring efforts. Nest monitoring data is limited at most localities, and some information is from very small sample sizes. More robust data is consistently obtained from Shield Ranch, Fort Cavazos, and Balcones Canyonlands Preserve. Fort Cavazos maintains long-term data (average of 4.5% parasitism rate), a comprehensive BHCO management program, and conducts research to improve upon BHCO management. The Fort previously set its threshold of parasitism rate at 10%, but based on evidence that the population could sustain higher rates, has recently set the goal of 20% across the installation.

Considering limitations on resources resulting in small sample sizes, parasitism rates based on available data for the interim period are provided in Table 6. Nest monitoring data during the reporting period was gathered from all recovery units in Texas and in Oklahoma. Two localities surpassed the 40% threshold (Broadheart Preserve and Kickapoo Caverns) in 2022.

Table 6. Information/data collected at black-capped vireo localities related to BHCO parasitism rates and mitigation.

Locality	Recovery Unit	BHCO mitigation method	Monitoring data	Estimated parasitism rate
Fort Cavazos	TX North	Nest monitoring	Long term average 4.5%	4.5%
Broadheart Preserve	TX Central	Nest monitoring	2022 – 3 nests/2 parasitized.	67%
Wichita Mtns WR	Oklahoma	Nest monitoring	2021 – 26 nests/2 parasitized.	8%
			2022 - 30 nests/1 parasitized.	3%
			2024 – 42 nests/12 parasitized.	29%
Salt Canyon	Oklahoma	Nest monitoring	2024 – 2 nests/0 parasitized.	0
Kerr WMA	TX South	Trapping	N/A	N/A
Mason Mtn WMA	TX Central	Trapping	N/A	N/A
Balcones NWR	TX North	Nest Monitoring	2019 - 17 nests/3 parasitized.	18%
Muse WMA	TX North	Trapping	N/A	N/A
Gov. Canyon SNA	TX South	Nest Monitoring	2022 – 16 nests/1 parasitized.	6%
			2023 – 6 nests/1 parasitized.	17%
Kickapoo Caverns	TX West	Nest monitoring	2021 – 22 nests/4 parasitized.	18%
			2022 – 16 nests/8 parasitized.	50%
Canyon of the Eagles	TX North	Nest Monitoring	2022 – 16 nests/4 parasitized.	25%
Balcones Canyonlands Preserve (Travis Co and Austin)	TX North	Nest Monitoring	2019 – 37 nests/0 parasitized.	0
			2020 – 39 nests/2 parasitized.	5%
			2021 – 72 nests/5 parasitized.	7%
			2022 – 64 nests/2 parasitized.	3%
			2023 – 84 nests/0 parasitized.	0
Shield Ranch	TX South	Nest Monitoring	2019 – 61 nests/3 parasitized.	4%
			2021 – 56 nests/7 parasitized.	13%

				2024 – 59 nests/6 parasitized	10%
Love Creek Preserve	TX South	Nest Monitoring	2019 – 11 nests/0 parasitized.	0	
Possum Kingdom SP	TX North	Anecdotal	None detected	N/A	
Colorado Bend SP	TX Central	Nest Monitoring	2023 – 9 nests/1 parasitized.	11%	
Lost Maples SP	TX South	Nest Monitoring	2023 – 13 nests/0 parasitized.	0	

B. Redundancy

The Redundancy evaluation is provided in Table 7 for Tier 1 localities and Table 8 for Tier 2 localities with respect to the worst-case scenario forecasted in the SSA. Tiers were assigned based on survey data and/or population estimate. If one or more of the surveys of a locality met the Tier 1 criterion (minimum of 30 males) or point count data was appropriate for population estimate that met the Tier 1 minimum, it was assigned Tier 1. Localities that did not meet this standard were assigned Tier 2.

Table 7. Current Tier One localities[1] including the Recovery Unit, number of males evaluated in the SSA, and PDM data from 2019 to 2024. Asterisks indicate where no surveys or data were collected or available. Orange shaded rows represent new Tier 1 localities not included in the SSA. Green shaded rows represent Tier 1 localities previously assessed as Tier 2 in the PDMP. Gray shaded indicates only one survey completed.

	Locality	Recovery Unit	SSA	2019	2020	2021	2022	2023	2024
1	Wichita Mtns WR	Oklahoma	121	109	141	*	178	183	211
2	Salt Canyon	Oklahoma	N/A	41	*	*	*	*	27
3	Broadheart Preserve[2]	TX Central	N/A	8 (>30)	*	9 (>30)	*	*	*
4	Hext Route	TX Central	N/A	*	*	*	19	32	23
5	Little Devils Route	TX Central	N/A	35	*	*	29	22	19
6	Mason Mtn WMA	TX Central	126	231	284	384	227	274	188
7	Clearwater Ranch	TX North	24	*	*	34	*	*	*
8	BCP (Travis Co and Austin)	TX North	19	23	41	45	51	51	75
9	Fort Cavazos	TX North	918	1146	401	1080	1286	905	793

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[1] Tiers were assigned based on survey data or population estimate. If one or more of the surveys of a locality met the Tier 1 criterion (minimum of 30 males) or point count data was appropriate for population estimate that met the Tier 1 minimum, it was assigned Tier 1. Localities that did not meet this standard were assigned Tier 2.

[2] Data collected from 100-acre plots indicates a density when applied to entire parcel would meet the Tier 1 level (>30).

#	Locality	Region	SSA						
10	Canyon of the Eagles	TX North	45	*	*	*	74	*	*
11	Balcones Canyonlands NWR	TX North	158	117	*	116	99[3]	153[4]	*
12	Muse WMA	TX North	N/A	25	65	*	39	23	*
13	Possum Kingdom SP	TX North	5	*	3	33	51	*	*
14	Gov Canyon SNA	TX South	N/A	*	23	72	95	74	*
15	Bandera Corridor Conservation Bank	TX South	17	7	*	*	*	*	69
16	Kerr WMA	TX South	463	510	*	423	*	528	*
17	Shield Ranch	TX South	54	37	*	27	*	*	26 (>100)[5]
18	Love Creek Preserve (pop. est.)	TX South	30	33 (574)	*	27 (560)	*	*	38 (645)
19	Big Bend NP	TX West	30	*	*	23	30	*	*
20	Dolan Falls Preserve (pop. est.)	TX West	102	47 (511)	*	60 (1,120)	*	*	*
21	Independence Creek Preserve (pop. est.)	TX West	39	50 (428)	*	30 (950)	*	*	*
22	Kickapoo Caverns SP	TX West	64	*	*	13	54	*	*

Table 8. Current Tier 2 localities including Recovery unit, number of males evaluated in the SSA, and PDM data from 2019 to 2024. Asterisks indicate where no surveys or data were collected or available. Red shaded rows represent locality was evaluated as a Tier 1 in the SSA. Green shading indicates previously unknown population.

	Locality	Recovery Unit	SSA	2019	2020	2021	2022	2023	2024
1	Quartz Mtn SP	Oklahoma	15	*	*	*	*	*	21
2	Roman Nose SP	Oklahoma	N/A	*	*	*	*	*	2
3	Colorado Bend SP	TX Central	22	*	*	*	*	23	14
4	South Llano River SP	TX Central	95	*	*	*	*	7	*
5	Barton Creek Preserve	TX North	2	*	0	1	1	*	*

[3] Partial survey of previously un-surveyed areas.
[4] Partial survey of new or under-surveyed areas.
[5] Distinct partial surveys; density of entire area indicates population well over 100 males.

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#	Locality	Region							
6	Dinosaur Valley SP	TX North	2	*	2	*	*	2	*
7	Inks Lake SP	TX North	5	*	*	3	*	4	4
8	Parrie Haynes	TX North	2	3	6	8	10	10	9
9	Camp Bullis	TX South	2	7	1	3	4	*	*
10	Friedrich Wilderness	TX South	N/A	*	*	*	2	*	*
11	Garner SP	TX South	7	*	*	*	*	1	*
12	Hill Country SNA	TX South	4	*	*	*	*	2	*
13	Lost Maples SNA	TX South	21	*	*	6	*	7	*
14	Rancho Diana	TX South	37	13	20	3	*	27	*
15	Hilda Route	TX South/Central	N/A	1	*	*	*	*	*
16	Allen Creek Route	TX South/Central/West	N/A	13	*	19	26	28	22
17	Devil's Sinkhole SNA	TX West	40	*	*	8	26	*	*
18	Escondido Draw	TX West	9	17	21	20	20	17	19
19	Indian Mtn Route	TX West	N/A	24	*	22	19	25	27

During the reporting period, six additional localities were determined to be Tier 1 that were not included in the 2016 SSA. Also during the reporting period, three localities increased from Tier 2 to Tier 1, and three Tier 1 decreased to Tier 2.

Redundancy evaluation for the interim reporting period considers manageable and likely resilient localities as established in the SSA. Table 9 provides the original information from the PDMP and includes interim reporting information based on surveys and population estimates that would meet those definitions.

Table 9. Redundancy threshold evaluation from PDMP updated to include information generated during the interim reporting period.

	SSA condition	SSA Short Term Scenario	PDM Threshold	Interim Period
Manageable Localities	10	9	7	13
Likely Resilient Localities	9	8	6	9*
Total	19	17	13	22

*Localities included: Wichita Mtns WR, Mason Mtn SP, Fort Cavazos, Balcones Canyonlands NWR, Kerr WMA, Love Creek Preserve, Dolan Falls Preserve, Shield Ranch, and Independence Creek Preserve.

C. Representation

The evaluation of representation used the survey data generated during the reporting period to categorize BCVI localities as was done in the SSA. Localities were grouped based on the

highest reported number of males, or population estimate, as either a manageable locality or likely resilient locality. Table 10 provides the original SSA information and interim reporting numbers.

Table 10. Representation threshold using forecasted scenario of project number of Tier 1 manageable (ML) and likely resilient localities (LRL) based on SSA conditions and short term decreased management conditions.						
Unit	SSA condition		Short Term Decreased Mgmt Forecast		Interim Reporting Info	
	ML	LRL	ML	LRL	ML	LRL
Oklahoma	0	2	0	2	1	1
Central	1	1	2	0	3	1
North	1	2	0	2	5	2
South	3	1	2	1	2	3
West	5	3	5	3	2	2
Total	10	9	9	8	13	9

D. Resiliency, Redundancy, and Representation Evaluation

Long-term BCVI monitoring shows stable to increasing trends at the major populations across the U.S. breeding range. Threshold evaluation shows all major populations where data was collected to have maintained large populations during the first 6-year period of post-delisting monitoring. Brood parasitism rates collected vary, and with the exception of two locations (one with a very small sample size; one in single year), have maintained rates below the 40% threshold. The number of Tier 1 localities available for evaluation in the PDMP (19, Table 1) has increased to 23 (including Fort Sill); six of the current Tier 1 localities were unknown at the time of the SSA and three were previously evaluated as Tier 2 in the SSA, but currently considered Tier 1. Three previous Tier 1 localities have been downgraded to Tier 2 status. Survey data was collected from 19 localities considered to be Tier 2.

The redundancy threshold evaluation in Table 9 indicates the current status of BCVI is above the threshold in the PDMP. The representation evaluation in Table 10 shows all recovery units above the threshold, with the exception of Oklahoma and Texas West. However, survey coverage was lacking for these units and did not meet the 75% coverage recommended in the PDMP. Oklahoma is lacking data from Fort Sill, which is known to have a substantial population. Additionally, the Salt Canyon population in Oklahoma, which was presumed functionally extirpated at the time of SSA, has recorded the largest population since its discovery. The Texas West Unit had seven localities complete surveys, five of which were from Table 1.

III. Residual Threat Trends

The PDMP recognized residual threats that remain an influence on the BCVI and the need to evaluate these during the post-delisting monitoring period. These threats consist of land use changes, livestock, deer and exotic herbivore trends, as well as monitoring of BHCO parasitism on nesting BCVI (evaluated under section A.2. above).

A. Land Use Trends

The land use trends evaluation utilizes the same methodology from the SSA. This process summarizes data from the USDA Agricultural Census for counties within the U.S. breeding range of the BCVI. Census data from landowners reported as "rangeland" is assumed to best represent areas there BCVI could occur. Since the SSA, two additional Agricultural Census Reports have been published (2017 and 2022), included in Figure 1.
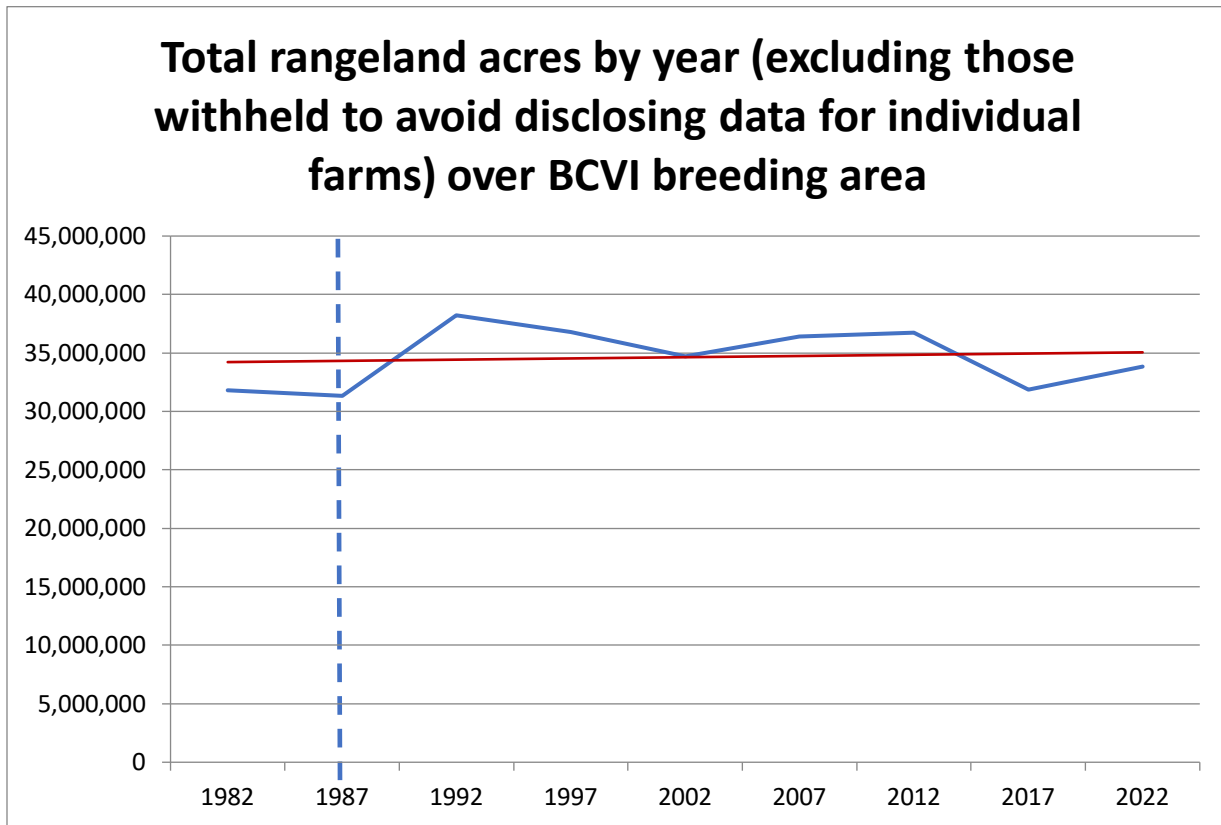
Figure 1. Total rangeland acres by year (excluding those withheld) over entire U.S. black-capped vireo breeding range. Dashed line shows year in which black-capped vireo was listed as endangered (1987). Red line illustrates regression line.
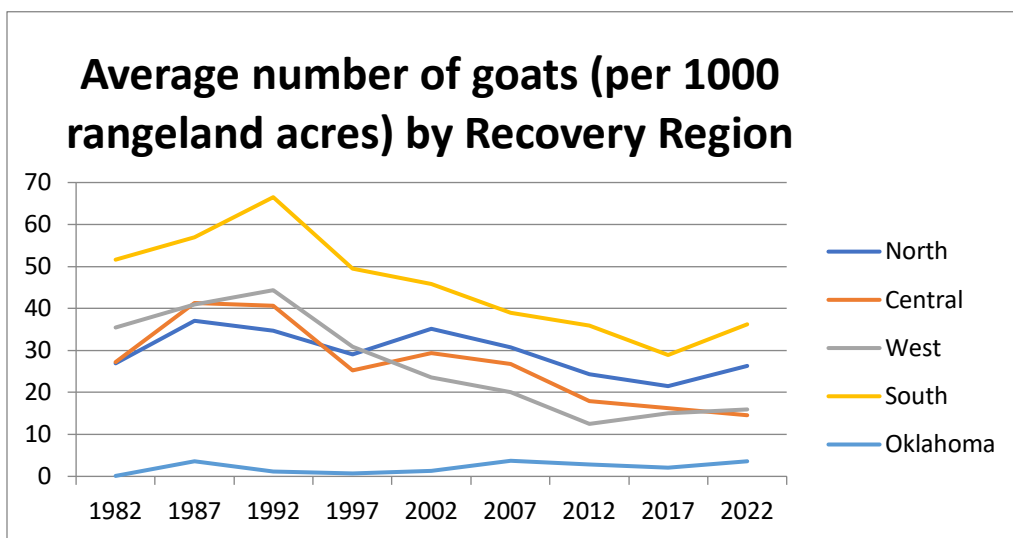
B. Goat Trends

The evaluation of goat abundance also utilizes the same methodology from the SSA. This process summarizes data from the USDA Agricultural Census for counties within the U.S. breeding range of the BCVI. The average number of goats per 1000 acres of rangeland (from section IIIA. above) is tracked across census data since 1982. Since the SSA, two additional Agricultural Census Reports have been published (2017 and 2022). Overall goat trends for the U.S. breeding range are shown in Figure 2. Figure 3 shows goat trends broken down by BCVI recovery unit in the U.S. range.
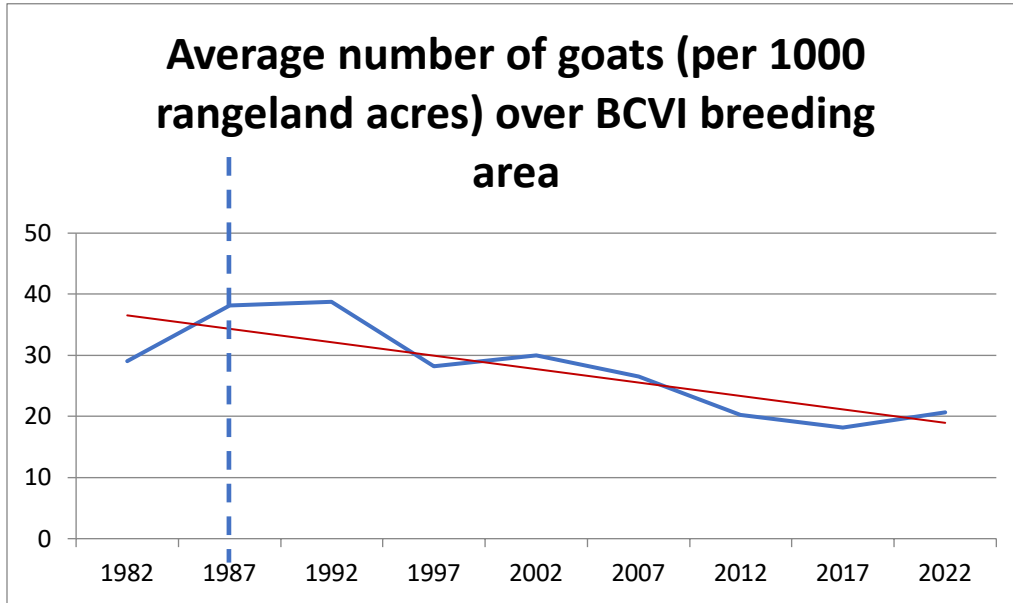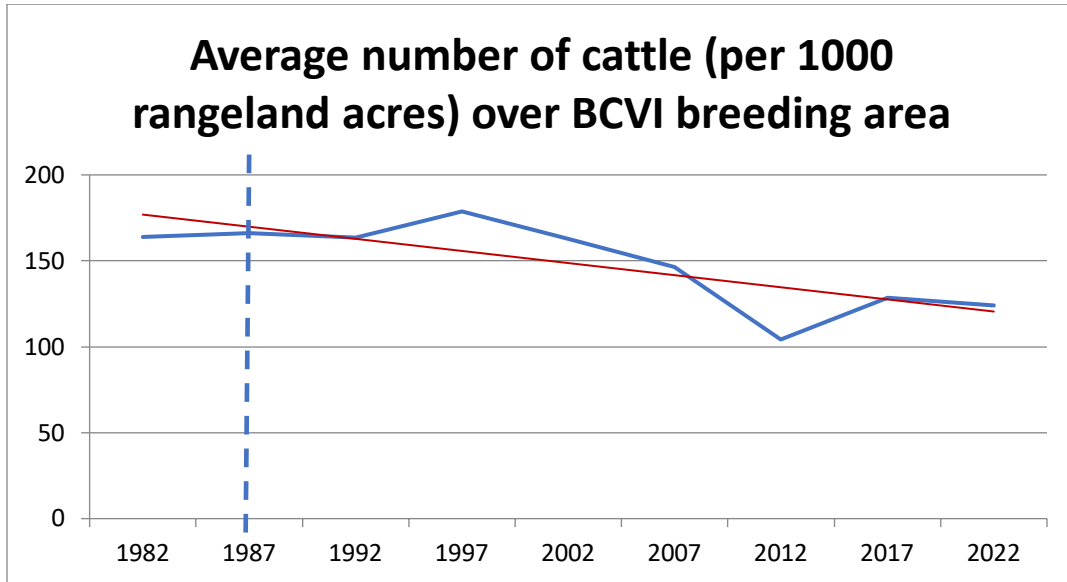

Figure 2. Average number of goats (per 1,000 rangeland acres) over entire U.S. black-capped vireo breeding range. Dashed line shows year in which black-capped vireo was listed as endangered (1987).

Figure 3. Average number of goats (per 1000 rangeland acres) by Recovery Unit in the U.S.

C. Cattle Trends

The evaluation of cattle trends also uses the same methodology from the SSA. This process summarizes data from the USDA Agricultural Census for counties within the U.S. breeding range of the BCVI. The average number of cattle per 1000 acres of rangeland (from section IIIA. above) is tracked across census data since 1982. Since the SSA, two additional Agricultural Census Reports have been published (2017 and 2022). Overall cattle trends for the U.S. breeding range are shown in Figure 4. Figure 5 shows cattle trends broken down by BCVI recovery unit in the U.S. range.

Figure 4. Average number of cattle (per 1,000 rangeland acres) over entire U.S. black-capped vireo breeding range. Dashed line shows year in which black-capped vireo was listed (1987). Black line illustrates regression trend line.
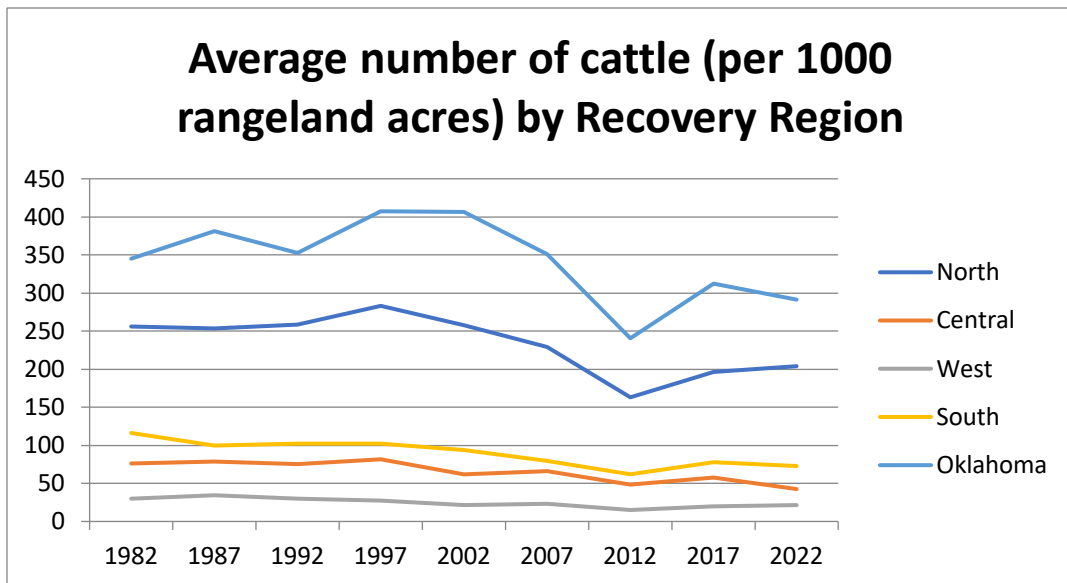

Figure 5. Average number of cattle (per 1,000 rangeland acres) by Recovery Unit in the U.S.

D. Cowbird Trends

In addition to the nest monitoring data used for the resiliency analysis above, additional data from Breeding Bird Survey (BBS) routes that occur within the U.S. portion of the BCVI range were used in the SSA to provide information on BHCO abundance in the range of the species. Figures 6 and 7 show the trend in BHCO detections within the general breeding range of the BCVI in the U.S. generated from BBS surveys since 1967.
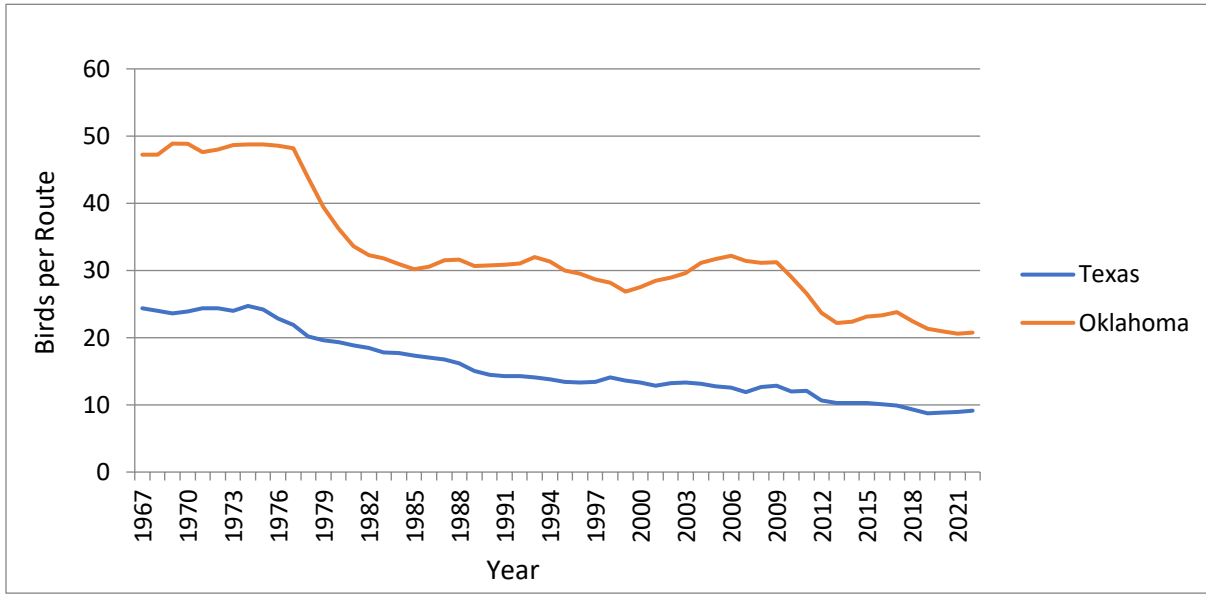

Figure 6. Relative abundance trend for brown-headed cowbirds in Texas and Oklahoma based on Breeding Bird Survey data.
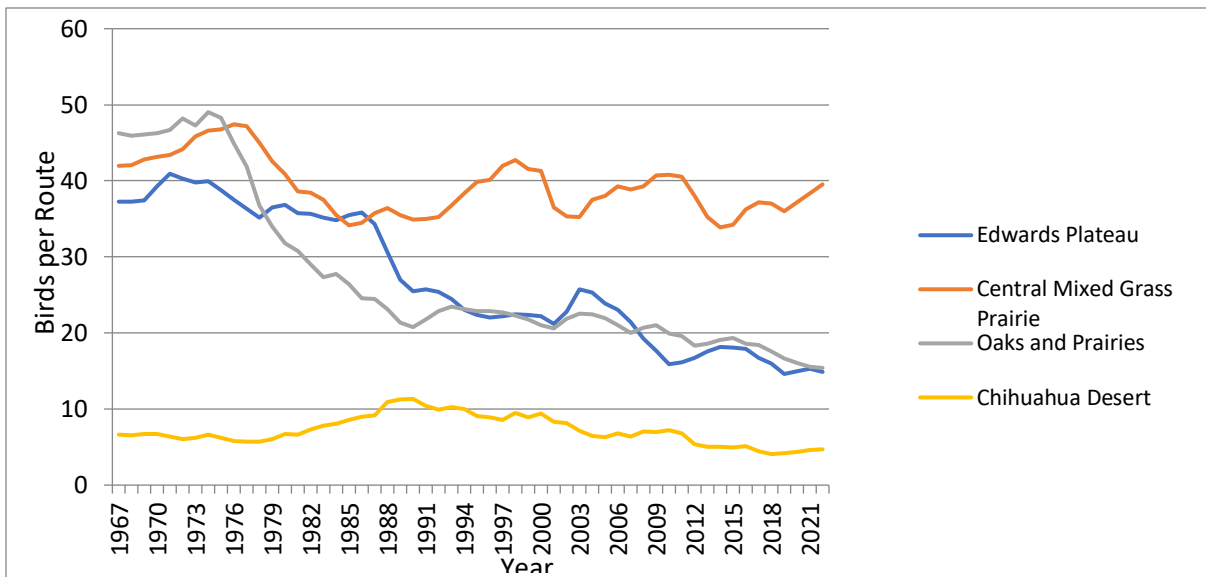

Figure 7. Relative abundance trend for brown-headed cowbirds in Texas Bird Conservation Regions based on Breeding Bird Survey data.

E. Deer and exotics

Within the 2016 BCVI SSA, we identified that overbrowsing, particularly by goats, deer, and exotics, is a threat to the BCVI by removing vegetation at heights needed by the species. The 2016 SSA identified that white-tailed deer populations within Texas Parks and Wildlife Department's (TPWD) Deer Management Units (DMU) across the Texas range of the BCVI had risen 18.3 percent, with the Edwards Plateau ecoregion alone rising 15.9 percent, between 2005-2014 (USFWS 2016, p. 54). Based on 2014 deer surveys, three DMUs in the Edwards Plateau Ecoregion and one in the Cross Timbers Ecoregion exceed the recommended deer density to allow for the successful recruitment of hardwood species and optimal foliage cover for BCVI.

Since 2014, TPWD's deer population estimates across DMUs indicate that the overall deer population across the BCVI range in Texas has decreased 15.4 percent, with the Edwards Plateau ecoregion alone decreasing 27.3 percent, between 2014-2023 (TPWD 2024). Observed deer decreases within the Edwards Plateau can partially be attributed to an anthrax outbreak in the southwest portion beginning in 2019, followed by subsequent years of drought conditions during the crucial spring and early summer months across most of the Edwards Plateau leading to years of low fawn recruitment and a deer population that is closer to carrying capacity (Blaise Korzekwa 2024, pers. comm.). Although each of the four previously identified DMUs in exceedance of recommended deer density for maintaining optimal BCVI habitat remained above recommended deer density, each had declined. The average decline in deer density across these four DMUs was 24.5 percent.

Deer population trends in Oklahoma were not quantified within the 2016 BCVI SSA. The USFWS' Wichita Mountains WR and the Fort Sill Military Reservation contain a substantial portion of the known BCVI population in Oklahoma. Staff from both facilities indicate that deer survey efforts ongoing since the 1980s indicate moderately low deer density both past and present, and substantive impacts from deer browsing are not observed (Dan McDonald USFWS 2024, pers. comm. and Jeremiah Zurenda 2024, pers. comm.). Likewise, USFWS biologist Kevin Stubbs routinely visits all known BCVI population sites and has not observed significant browse issues (Kevin Stubbs 2024, pers. comm.).

Although empirical data is not available to illustrate trends in exotic hoofstock populations in Texas and Oklahoma, it continues to proliferate to an unspecified degree. According to a 2020 National Geographic article (accessed online) there are thousands of ranches within Texas that raise exotic hoofed animals which possess over one million total non-native hoofstock belonging to 125 different species. According to the article, in 1963 there were ~13,000 exotic hoofed animals, ~72,000 in 1979, ~164,000 in 1988, and >1 million as of 2020. Axis deer have escaped from exotic ranches to established feral populations in Texas, as have additional nonnative species, such as aoudad sheep and nilgai antelope. A website for the Exotic Wildlife Association claims that exotic wildlife is a $1 billion industry, supporting over 14,000 jobs. In summary, exotic hoofstock operations overlapping with the BCVI range, largely in Texas, continue to be a residual threat to BCVI habitat availability to an unknown degree.

F. Residual Threats Evaluation

Trends in data reported from the USDA Agricultural Census for total rangeland acres dropped following data reported in the SSA (2012) but show an increase in the 2022 report. A stable trend since 1987 is apparent across the U.S. breeding range. Goat trends continue to show an overall decline; however, a slight uptick appears to be occurring based on the 2022 Agricultural Census report. This increase is largely driven by numbers reported in the South and North Recovery Units. Cattle trends reported in the Agricultural Census also continue to show an overall decrease across the U.S. breeding range of the BCVI. Data from the Breeding Bird Survey show brown-headed cowbird trends continue to decrease across the BCVI breeding range, to all time low numbers since the survey was initiated. Deer densities in Texas have decreased substantially since 2019, attributed to an anthrax outbreak and drought conditions.

Overall residual threats to the BCVI show decreasing or stable trends over the species' range; numbers or trends in exotic ungulates are not known, but some information suggests that in Texas it continues to be a residual threat to the species.

IV. Conclusion and Recommendations

Information and data collected during the interim reporting period was more than adequate to meet the recommended level for evaluating the species' status as per the PDMP. Survey information was representative of geographic areas covering the BCVI U.S. breeding range. Using this information to evaluate resiliency, redundancy, and representation, the BCVI continues to show a healthy biological status six years post-delisting. As well, the residual threats to the species continue to be low and decreasing in magnitude or are managed to provide for the needs of the species at important locations with the breeding range. No thresholds were met that would require a response as described in the PDMP.

While the major populations continue to increase or show strong stability and more Tier 1 populations have been discovered and have increased the distributional information for the species, other factors should still be considered for the next six-year period. Populations at South Llano River SP and Devils Sinkhole SNA appear to have substantially less individuals than in previous years. More data is needed, but these populations occur in the western portion of the range where the effects of habitat loss from fire suppression and BHCO parasitism are thought to be less in magnitude than areas in the eastern portion of the range. Drought effects may play a role in those years. Anecdotal and empirical evidence show the presumed effects of drought on abundance and productivity in some areas (i.e., Kickapoo Caverns SP, Mason Mtn WMA)(Mulhall 2023), but these effects appear to be highly localized. That is, some localities were affected by drought (lower BCVI abundance) but others appear unaffected in the same years. Historically, populations that have dipped low in some years due to drought or other factors have largely rebounded in subsequent years.

Surveys in the far western range continue to be a challenge to accomplish due to distance and lack of infrastructure necessary to sustain a survey crew. As noted above, the western range is

thought to be more stable due to slow vegetational succession (habitat remains suitable) and anecdotal and documented low rates of BHCO parasitism. The information gathered thus far does encompass the western-most accessible population (Big Bend NP); we expect to continue surveys of this location in the next survey period. Although surveys of Fort Sill were not produced during the reporting timeframe, this location shares a border with Wichita Mtns WR, which has a robust data set. While we assume the population at Fort Sill is maintained, we expect surveys of that location to commence in the second half of post-delisting monitoring based on coordination with biologists at the Fort.

Based on the high level of coordination and information gathered during the first six-year period, we recommend this level continue through the second half of the PDMP timeframe. This would include generating survey data from Fort Sill to better understand the status of that population. Gathering a second set of data would allow a comparison of those locations for an additional time period as intended in the PDMP. Committing resources to this effort will continue to be challenging, but important nonetheless. During this reporting period, the Texas Parks and Wildlife Department (TPWD) provided grant funds in excess of $150,000 to cover locations at State Parks. This is in addition to TPWD staff that continuously work to manage and survey WMAs. Oklahoma Department of Wildlife Conservation provided over $20,000 in grants for BCVI research in the Oklahoma breeding range. The Service also provided a $60,000 grant toward surveys at The Nature Conservancy Preserves in Texas that maintain large BCVI populations, as well as managing and surveying National Wildlife Refuge properties and assisting others with completing surveys. All partners have committed resources to this effort to make the PDMP successful. We look forward to continuing this commitment for the next reporting period.

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