Pinyon Jays in Colorado

Colorado Field Ornithologists

February 8, 2023

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LIVE LIFE OUTSIDE

Pinyon Jay Life History

Artwork Barry Kent MacKay

- Member of the Corvid Family – the Blue Crow
- Highly intelligent and clever birds
- Very vocal with complex communication
- In Colorado is a resident of Pinyon Pine-Juniper Woodland
- Highly social; spends life in flocks. Most flocks now 50-100 birds. We counted a flock of 800 birds in 2020.

Co-evolved with the Pinyon Pine tree

Pinyon Jays have unique morphological/behavioral adaptations

- Expandable esophagus to hold up to 52 pinyon pine nuts to transport
- Cache nuts - exceptional spatial memory
- Large pointed bills for opening cones
- The pinyon jay bill is featherless at its base (hence name *Gymnorhinus* – naked nostril)

Co-evolved with the Pinyon Pine

- Large wingless seeds require dispersal by animals
- Seeds are highly nutritional
- Cones take 3 years to mature
- Cones open upwards for easy access for bird dispersal
- Abundant seeds in mast years
- Trees produce mast crops every 7 to 10 years

Pinyon Jay-Pinyon Pine Mutualistic Relationship

- Individual jays can cache more than 20,000 seeds in a single season
- Can recover 95% of seeds cached
- The remaining 5% are able to germinate

Pinyon Jay-Pinyon Pine Mutualistic Relationship

- Long distance dispersal of millions of seeds (found to travel up to 12 km to cache)
- Cache seeds in open sites such as grasslands, burned areas, shrublands and sagebrush parks
- Cache sites microhabitats favorable for germination
- Can help re-plant a woodland impacted by drought, fire, insects, or clearing

Pinyon Jay Seasonal Behaviors

FALL

Pinyon cones begin to ripen in August. Pinyon Jays spend their days collecting pinyon nuts or other foods for caching.

WINTER

Seed crop becomes depleted, juveniles disperse and the flock roams widely to find seed sources.

SPRING

Breeding begins and birds stay close to colonies. Flock breaks up into breeders and non-breeders.

SUMMER

Splintering of flock into independent feeding aggregations. Young gather into a crèche. Annual molt signals end of breeding season.

Breeding

- One of our earliest nesting Passerines
- Nests in a colony
- Pairs are monogamous and are thought to mate for life
- Younger birds can help family group guard and feed fledglings

Breeding

- Courtship behaviors prior to nesting begin mid-February to early March
- Male and female build the nest with female finishing interior

Breeding

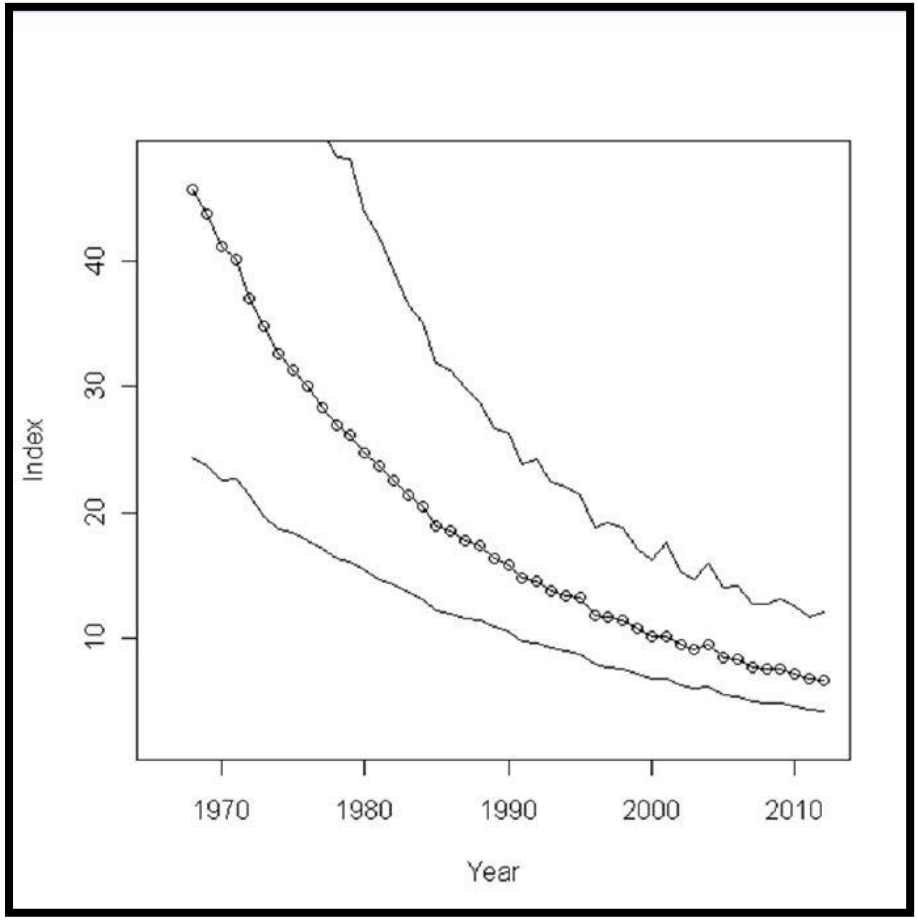
- Nest is insulated against cold early season temperatures
- # of eggs laid varies 2-5; most commonly 4
- Normally can attempt to produce 1 brood, but in good mast years can potentially attempt 2 broods. In poor mast years foregoes nesting.

Breeding

- Female incubates eggs for 17 days
- Male feeds female near nest during incubation
- Female broods for 8-10 days after which both male and female feed nestlings

Breeding

- Nestlings fledge 22-24 days
- Soon after fledging, family groups leave the colony area into the surrounding habitat
- Fledglings are fed by parents and yearlings in groups called “crèches”



(BBS analysis –Sauer et al. 2014)

Conservation Concern

- Average rate of decline 3.6%, 1968-2015
- Overall population loss of 83.5%
- Decline exceeds that of the Greater Sage-Grouse
- Further research needed to determine reasons for decline
- Petition submitted to list the species under the ESA

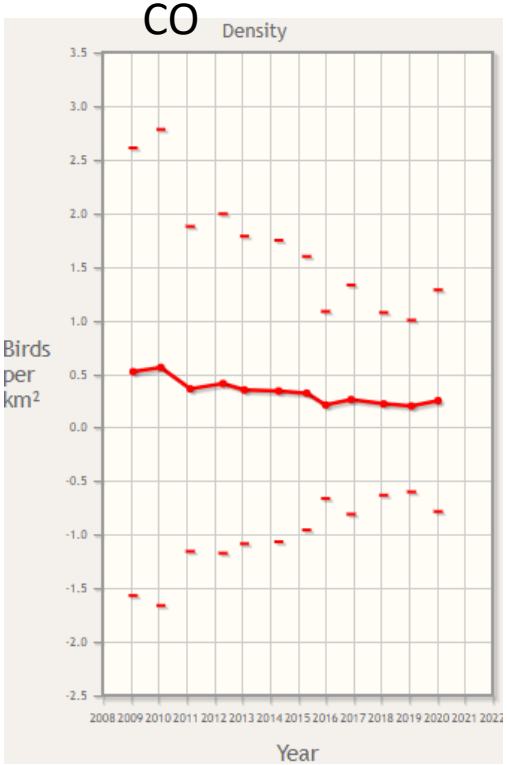
Region/State	Percentage of population	BBS Sample size (n)	BBS Trend 1968-2015 (%/yr, 95% CI)	BBS Trend 2005-2015 (%/yr, 95% CI)
Range wide				
Survey wide	NA	285	-3.69 (-5.1, -2.4)	-2.67 (-4.9, 0.4)
BCR-level				
S. Rockies/CO Plateau BCR	50.3	138	-3.16 (-4.7, -1.5)	-2.56 (-5.0, 1.4)
Great Basin BCR	37.5	53	-4.12 (-6.4, -1.8)	-3.57 (-7.7, 0.9)
Sierra Madre Occidental BCR	4.0	10	-4.00 (-10.6, 2.9)	-4.16 (-17.9, 11.1)
Northern Rockies BCR	3.2	29	-4.37 (-9.0, 0.1)	-1.81 (-12.1, 15.7)
State				
Arizona*	9.7	29	-2.13 (-5.8, 1.7)	1.28 (-7.3, 8.1)
California	3.1	30	0.49 (-4.1, 4.2)	3.42 (-2.9, 13.8)
Colorado*	9.0	51	-3.61 (-6.3, -1.0)	-3.12 (-7.8, 2.2)
Idaho*	0.2	NA	n/a	n/a
Montana*	1.7	12	-5.46 (-9.8, -0.6)	-4.12 (-17.6, 13.0)
Nebraska*	0.2	NA	n/a	n/a
Nevada*	27.3	20	-4.55 (-7.4, -1.6)	-4.66 (-9.9, 1.1)
New Mexico*	30.4	37	-3.46 (-5.6, -1.4)	-3.09 (-5.9, 0.8)
Oregon	0.3	12	-2.90 (-9.2, 3.5)	-1.13 (-9.6, 10.6)
South Dakota	0.2	4	-6.11 (-13.9, 2.9)	-8.79 (-36.3, 7.3)
Utah	15.7	65	-4.03 (-6.1, -2.1)	-3.76 (-7.1, 0.01)
Wyoming	1.4	25	-5.61 (-10.5, -1.0)	-5.35 (-17.5, 3.5)

Credit Scott Somershoe FWS

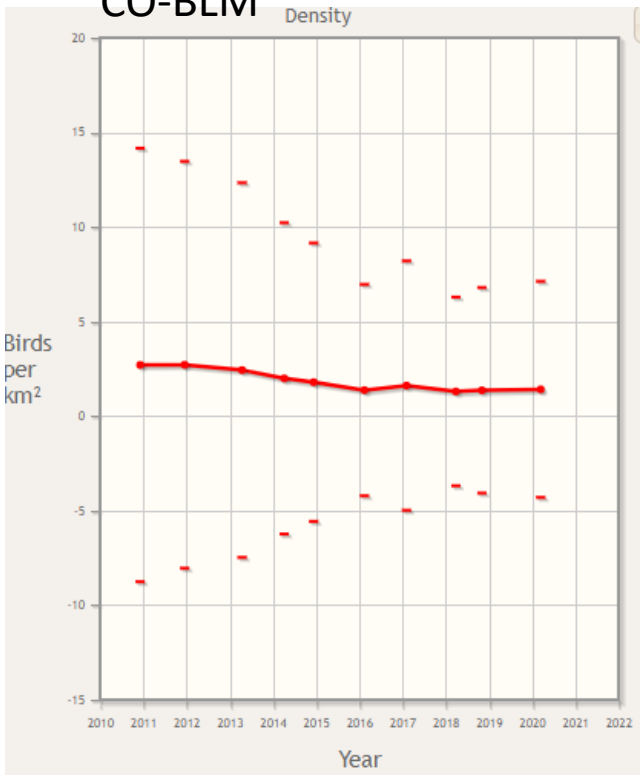
IMBCR Colorado 2009 – 2021 Trends

- Colorado 1.01 (0.97, 1.06) f=0.70 (1 indicates stable)
- Colorado BLM 1.06 (1.02, 1.11) f=1
- Region 2 USFS 1.15 (1.02, 1.32) f=0.99

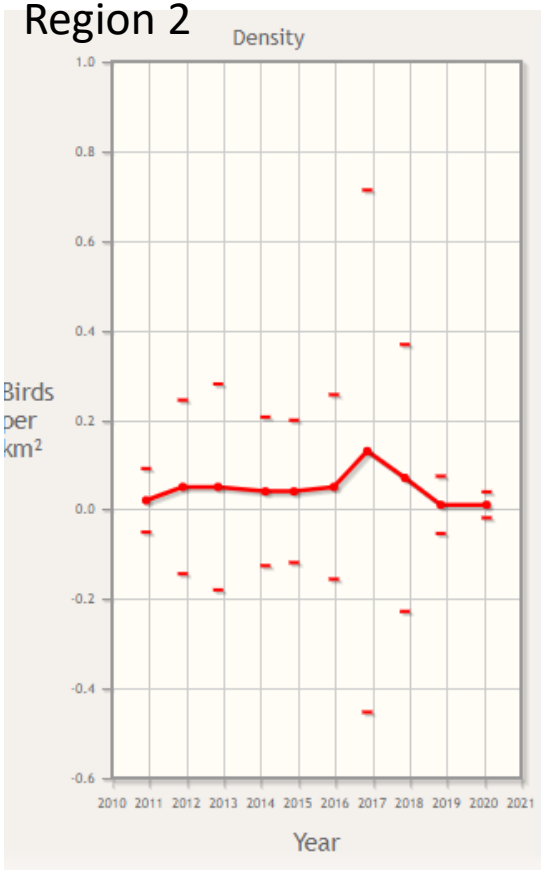
CO



CO-BLM



Region 2



Pinyon Jay Conservation Concern

- PIF Yellow List (2016 plan)
  - Pop. half-life: 19 years
- SGCN in 7 states
  - Colorado
- Road to Recovery
  - Very High Urgency Species
    - *Very large population loss, continued or accelerated decline*
- FWS 2021 Birds of Conservation Concern
- Petitioned for T&E listing, April 2022
- 2022 State of the Birds "Tipping Point Species"

Conservation Concerns

Multiple objectives for woodland management

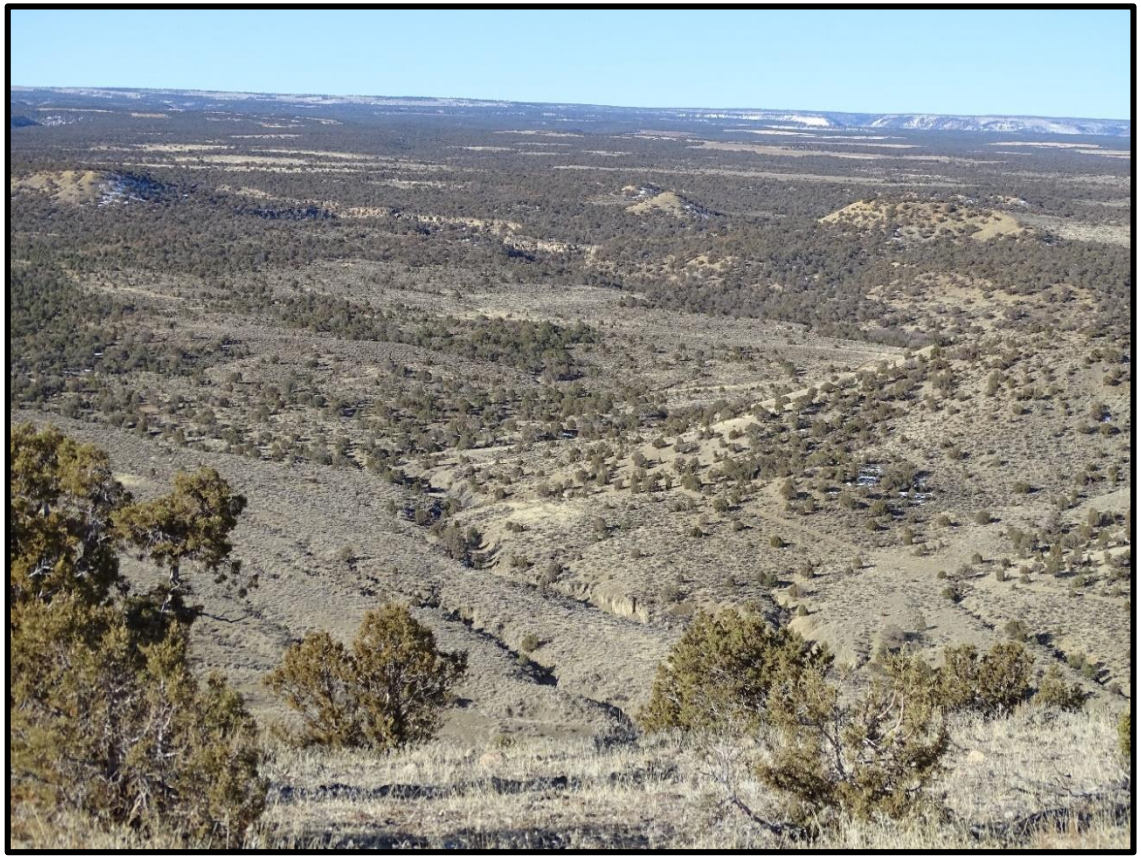
- Sage-grouse
- Big Game
- Fuels Reduction
- Forage Production
- Ecosystem Restoration

Climate change

- Long term drought
- Insect outbreaks
- Loss of mast crops

Predator Communities

PIJA Response Unknown



Pinyon Jay Working Group

- Formed in 2017 to develop and share the best available science to better understand, conserve, and manage pinyon jays and their habitat

- FWS, State Agencies, NGOs, Federal Agencies, Researchers

- Resources at:
  - Conservation Plan
  - Recommendations for surveys

  https://partnersinflight.org/resources/pinyon-jay-working-group/

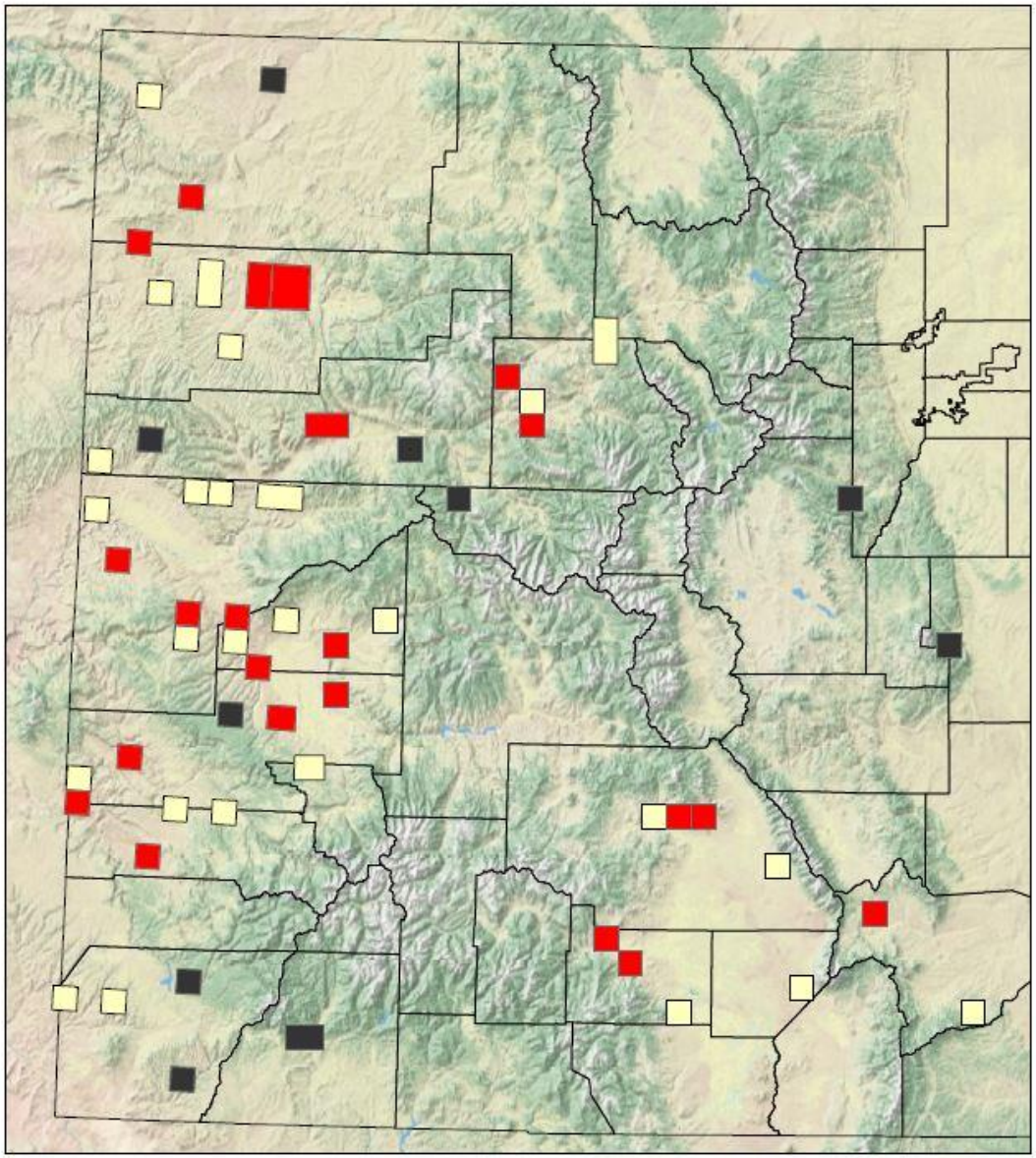
CPW's Work on Pinyon Jays

- 2018 Partnership with Utah DWR and FWS to conduct standardized surveys in CO and Utah

- 2019-2021 Landscape Scale Grid Surveys
  - BIO-Logic conducted CO surveys
  - CPW and BLM Funding

- 2020-2021 Intensive Surveys at 23 Breeding Colonies

- Developed **Survey Protocol** for BLM and USFS to locate breeding colonies to avoid treating colony areas or to design treatments to be beneficial for PIJAs



Base Map Source:
ESRI Topographic Map

Basemap Source:
ESRI composite aerial image,
Aerial photos taken summer 2018

Legend

- Pinyon Jays Detected-No Colony Confirmed
- Colony Detected
- No Pinyon Jays Detected

N

1:2,200,000

0 10 20 30 40 50 Miles

2019-2021 Pinyon Jay Breeding Surveys
Colorado Parks and Wildlife

Figure 2
Overall Results

BIO-Logic, Inc.
125 Colorado Avenue, Suite B
Montrose, CO 81401
(970) 240-4374
www.bio-geo.com

Intensive Colony Surveys 2020-2021

- Assess site fidelity to breeding colonies
- Map breeding colony size
- Evaluate nest/fledging success and potential threats to reproduction

Site Fidelity

- Revisited 23 colonies identified in landscape surveys 3x throughout breeding season
- Spent 3 days at each colony conducting morning and evening surveys
- Documented breeding behaviors
- Located and classified nests

Nest Classification

Class 1

Recently active nest (1-3 years). Clearly defined cup, large stick volume, and little debris in nest.

Class 2

Older nest (4-6 years) that still has large stick volume and vertical structure, but nest cup not well formed and full of debris.

Class 3

An old dilapidated nest (6-10 years) that lacks cup structure, sticks beginning to fall out of tree, lining of nest cup is absent.

Class 4

A nest that is not a complete nesting attempt.

Nest Findings

- Documented **281** ACTIVE nests
- Documented **1414** OLD nests

- Nest tree height. 5-32 feet. Average = 13 feet.

- Nest height. 2-23 feet. Average = 6.7 feet.

- Nest tree species:
  - 75% found in juniper trees (Rocky Mountain and Utah)
  - 25% found in pinyon pine

Example of Nest Trees – Short Young Trees

Young Healthy Trees

Mature Old Trees

Breeding Colony Size

- 37 - 1561 acres using all nests
- 86 – 400 acres using only active nests found in 2020
- 0.24 – 484 acres using only active nests found in 2021
- Active nests in colony as close as 4 m to 2.5 km apart
- Colony locations can move up to 2.4 km

Nesting and Fledging Success

- Number of ACTIVE nests per colony varied from **1 to 29 nests**

- First female found incubating
  - 28 February 2020
  - 7 March 2021

- Ending date for ACTIVE nests (fledge or fail)
  - 22 May 2020
  - 24 May 2021

- **4** colonies had no nesting activity however birds were located in each colony area

Majority of Nest Loss – Common Raven Predation

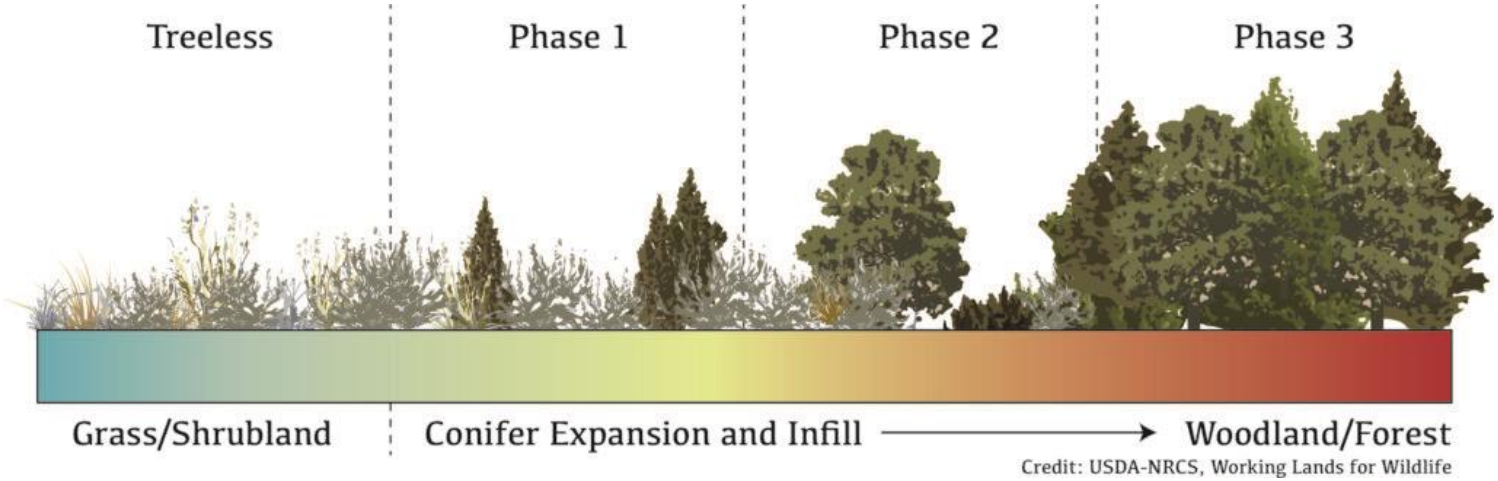
Other Predators

Breeding Habitat: Lessons Learned

- Known breeding habitat is often on the edges of pinyon juniper woodland
- Seem to prefer areas interspersed with open areas often containing shrublands and grasslands

Common Breeding Habitat of Pinyon Jays

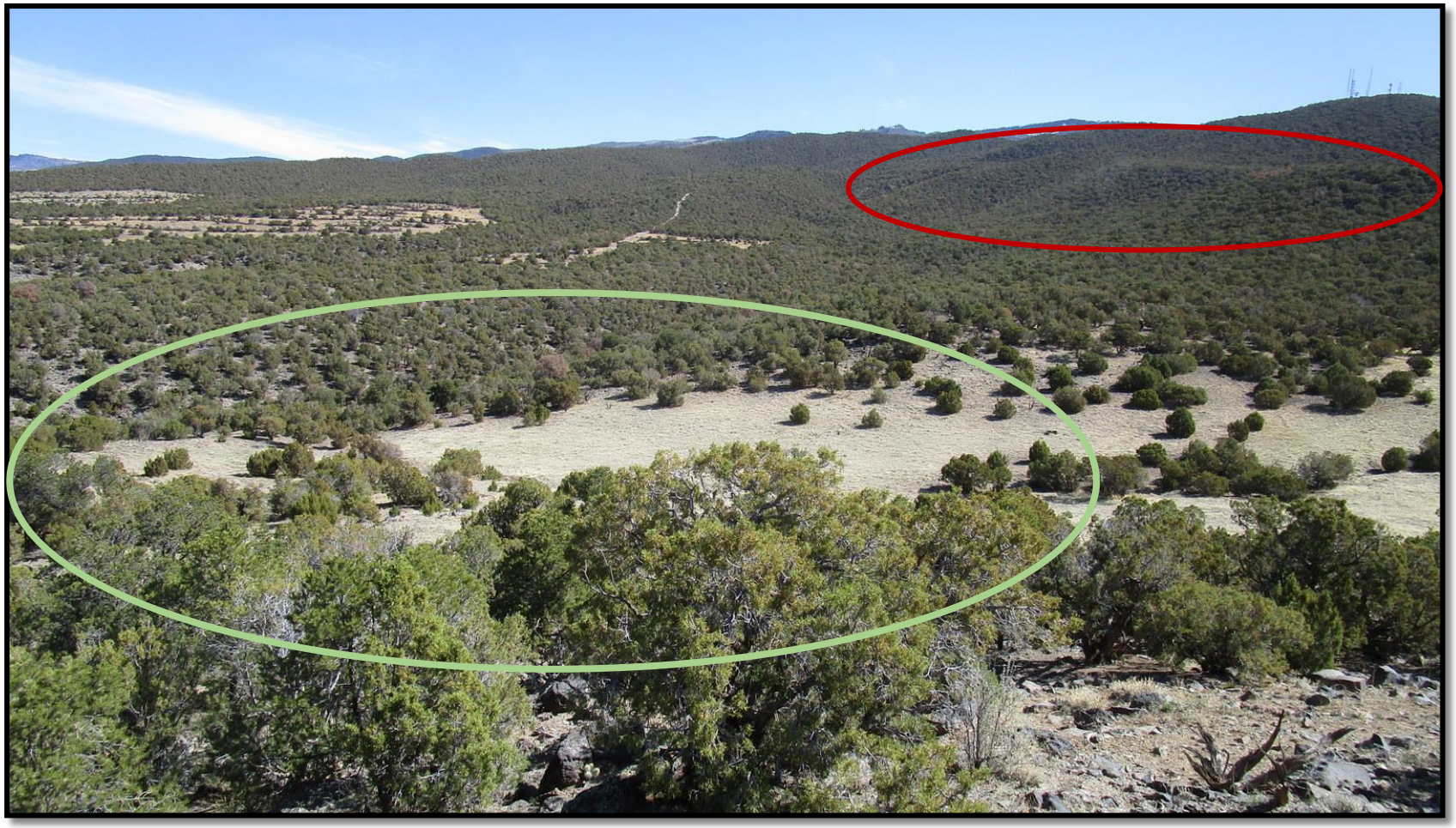
- Pinyon jays often use transitional pinyon-juniper landscapes for breeding – they use areas where trees are co-dominant with shrub and herbaceous cover (Phase 2 and edge of Phase 3)



Breeding Habitat: Lessons Learned

- We have not found them breeding within dense closed canopy woodland
- However, we don't know everything and need more information-

<u>That is where you come in!!!</u>



Citizen Science - How You Can Help

CPW would like to find new colony locations in order to:

- Help protect these areas or manage them to benefit pinyon jays
- Monitor them through time to help assess health of pinyon jay populations
- Expand knowledge of breeding range
  - Front Range Ponderosa Pine?
  - Colorado/New Mexico Border?
  - Las Animas County?

If you document pinyon jays doing breeding behaviors in an area between the dates of **February 14 - May 24** report location of observed behavior

- Liza Rossi – Liza.Rossi@state.co.us
- Amy Seglund – Amy.Seglund@state.co.us

Do not disturb breeding birds they can abandon nests – after documenting breeding behavior please leave the area

CPW will visit area to determine if there is a breeding colony

Pinyon Jay Appearance

- Sharply pointed bill
- Entirely blue except for white chin
- Immature birds a duller blue/grey
- Shorter tail as compared to other jay species

Vocalizations

- https://www.allaboutbirds.org/guide/Pinyon_Jay/sounds
- 1st Kaw – Typical contact call
- 2nd Multiple Rack – Danger call
- 4th Trills - Usually between pairs
- 5th Pipping rattle – Agitated Female
- 6th Rattle – Agitated female
- 7th Begging – Can be a female or young

Breeding Behaviors

Pair Flying Together (PF) – If you observe a pair of birds separate from a flock and fly off together, you should try and follow them to observe courtship behavior or nest building.

Mobbing (MB) – If you are at the edge or in the colony and a group of birds surrounds you (or another potential predator) and starts to make raucous warning calls, this is called mobbing. You should try to vacate to a more distant location if this happens. Helpers can be very ready to mob a potential intruder early in the breeding season and when young are fledging.

Display Flights (DF)**.** A small group of individuals fly rapidly through and above trees, emitting loud *Krawks* as they perform steep dives and sharp turns. These flights contain yearlings and adult jays and always seem to contain one or more leaders and a group of followers. Upon landing, individuals continue to chase each other up and down through the tree branches in sharp spiral patterns before initiating another flight.

Food Transfer (FT)*.* This involves one bird holding a piece of food, offering it to its mate and the mate accepting it. This is usually a silent exchange, and you generally observe a pair off by themselves doing this courtship behavior.

Silent Sitting (SS)**.** Pairs leave the foraging flock and fly to a perch, where they sit silently next to one another. While sitting near one another they may alternate raising their bill upwards displaying their white-throat bib.

Stick Manipulation (SM)**.** A male picks up a stick, a twig, or tuft of grass and if the female does not respond, he drops the material. As courtship proceeds, stick manipulation increases in frequency and becomes suggestive of nest-building. You can hear pairs in trees making soft vocalization as they begin to select a nest tree to initiate nest building.

Nest Building (NB)**.** Once a pair has selected a tree for nesting, they get to work. They both make numerous flights back and forth to collect sticks placing them in the nest tree. This is a great time to locate a nest from a distance because they make straight flights in and out of the nest tree.

Carrying Nest Lining (CNL) – Birds will collect fine, fluffy materials in their bill to line a nest. This indicates the nest is almost complete. It normally takes 5-7 days to complete a nest and for the female to start laying a clutch.

Courtship Begging (BG)**.** Females crouch before their males with their heads slightly extended, open bills pointed slightly upward, with wings flapping or fluttering. The begging calls can be very insistent and loud. Females can be seen flying after males as they continue to beg. Female begging will sound the same as nestling and fledgling begging, but in the early season you can assume it is most likely a female begging to her mate.

Copulation (CP)**.** Rarely seen. The birds stay low in the tree, and you can hear a variety of low vocalizations prior to copulation.

ACKNOWLEDGEMENTS

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Questions?