

# Plumage Patterns in Chickadees

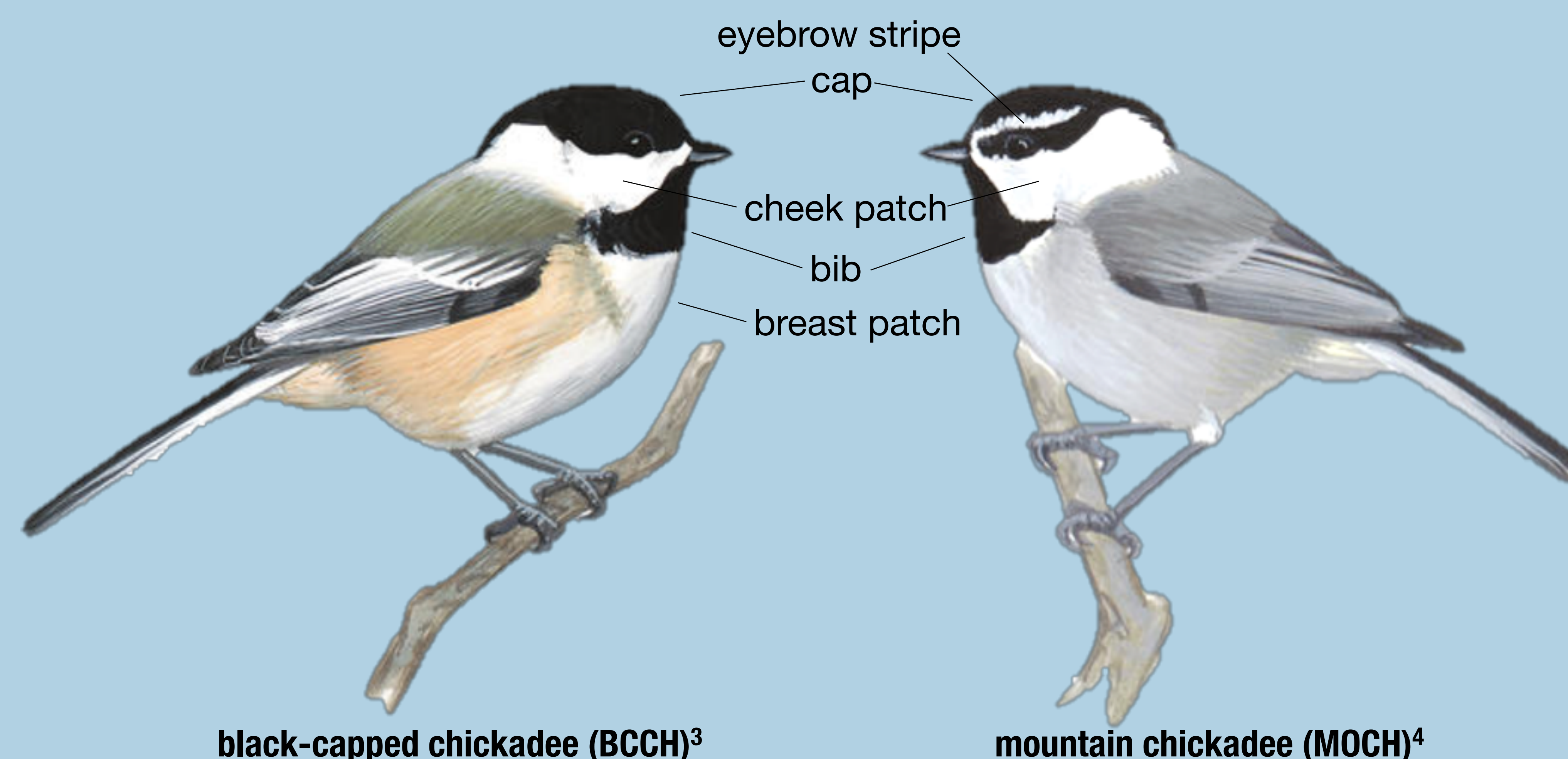
Quantifying plumage variation between and within *Poecile atricapillus* and *Poecile gamebli*

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## Introduction

- Plumage mediates **social interactions** and **reproductive transactions**<sup>5</sup>
- Black-capped (*P. atricapillus*) and mountain (*P. gamebli*) chickadees occasionally **hybridize**<sup>1</sup> (Figure 1)
- **Plumage variation** within and between chickadee species is poorly understood
- Little information exists on how **plumage mediates reproductive transactions** in chickadees

## How does plumage vary between black-capped and mountain chickadees as well as across the age groups and sexes of each species?



**Figure 3: Left:** The plumage patches that will be analyzed; **Right:** Sample photos of museum specimens that will be used for analysis. For each specimen: belly, left-side and back will be photographed in visible and UV light. UV Chroma (proportion of total reflectance from 300-400 nm), reflectance and patch size will be analyzed using ImageJ<sup>1</sup>.

CU Boulder Museum Specimen Photos



## Potential Significance

- Mechanisms that maintain **species barriers** between BCCH and MOCH
- Method for identifying **hybrid individuals** using morphology (Figure 4)



**Figure 4:** Potential hybrid chickadee. Photo by Ryan Shaw.

## References

<sup>1</sup> Grava et al. 2012. <sup>2</sup> Meigs et al. 1983. <sup>3</sup> Sibley DA. Black-capped Chickadee. Audubon. <sup>4</sup> Sibley DA. Mountain Chickadee. Audubon. <sup>5</sup> Woodcock et al. 2005.

## Acknowledgments

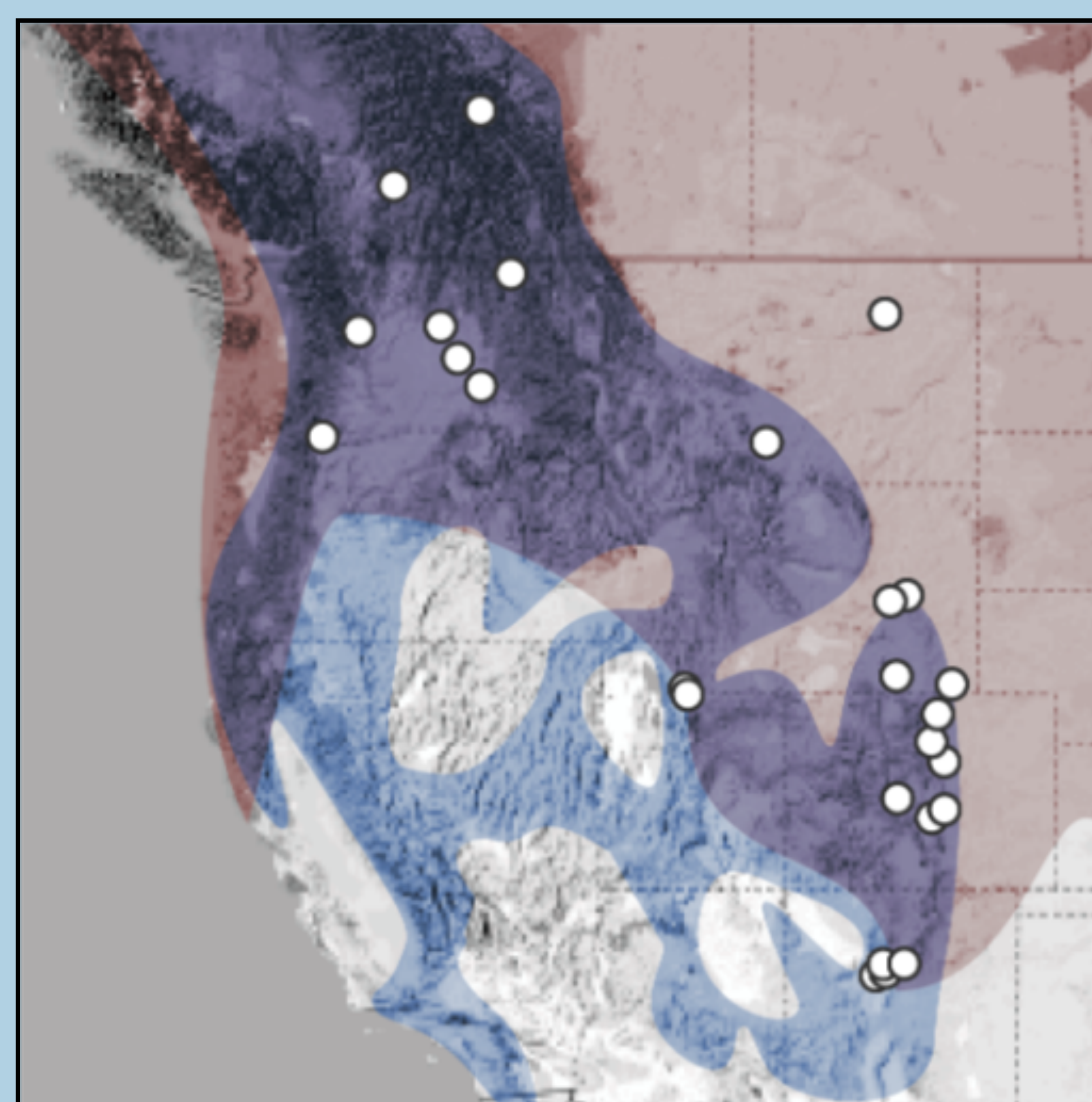
Special thanks to Jolyon Troschianko and Martin Stevens for the Image Calibration and Analysis Toolbox User Guide. This manual was essential to the assembly of necessary camera equipment. Additional thanks to Emily Braker for allowing me access to the museum collections.

## Methods

- 350 **nest boxes** in and around Boulder, CO to monitor breeding of wild BCCH and MOCH (Figure 2)
- **Photograph** BCCH and MOCH from the CU Boulder and Denver **museum collections** and wild-caught birds (Figure 3)
- Analyze the photos using **ImageJ** (Figure 3)
- **Sex individuals** using DNA extraction and polymerase chain reaction (PCR)
- **Age individuals** using outer tail feathers<sup>2</sup>



**Figure 2:** Long-term study nest box.



**Figure 1:** Black-capped (red) and mountain (blue) chickadee distributions. Purple indicates range overlap. White points indicate recorded areas of potential hybridization. Figure by Daniel Jackson.