Hello,

Thank you, House Committee on Public & Behavioral Health, & Human Services, for reading my testimony. I am Dr. Christy Briles an Associate Professor at CU Denver and environmental scientist that runs the CU Denver Bee Project. I am a second-generation Coloradoan and grew up on a farm in Montrose. Pollinators and pollination have been extremely important in my life and now in my career as an academic. First, I grew up surrounded by agricultural crops. As a young kid, I fondly remember a beekeeper bringing bee boards to place in our barn for the alfalfa bees, those crazy bees making their nests in siding vent holes of our house, and using my first digital camera to snap pictures of pollinators in our pasture. But, something happened as I became older…there were fewer and fewer pollinators to observe. Then came the honeybee collapse of the mid-2000s as I was a graduate student at the University of Oregon. I studied pollen, and its many uses in environmental reconstruction, geolocation and authentication, and environmental monitoring. When I finally made it back to Colorado for my academic position in 2013, I decided to build a research program around these topics, and specifically, understanding resource availability for bees in harsh environments (e.g. semi-arid, urban, agricultural mono-cultures, contaminated). We use both non-native and native bees in our research.

One thing we are learning, and that concerns us, is that urban and agricultural locations are food "swamps" for pollinators. This means that our honeybees bring in and abundance of pollen to their hives that are not very nutritious, and in agricultural locations there are a lower diversity of pollen types than in urban and suburban locations. Since honeybees are pollen generalists, we assume that they are good collectors of the variety of plants available to all pollinators. While this data is a few years away from publication, there are studies that point to a need to increase the amount and variety of native plants in agricultural and urban environments to support native pollinator populations.

Another concern is the limited diversity and abundance of native bees in the urban environment. Our published research suggests that there is a significant decline in both as you move from the wildland to urban center of Denver. The outliers in the spatial trend were ruderal and managed garden spaces where there was a greater abundance of plant resources (native and non-native). Again, this points to the need for more plantings of <u>useful</u> plants for pollinators. I emphasize the word "useful" in that statement, as not all plants are useful resources for pollinators. The study also showed many honeybees making up the bee population in the Denver area. There are many hobbyist beekeepers in the Denver area and therefore an army of honeybees consuming vast amounts of plant resources. Research studies outside CO are also beginning to point to resource competition and disease spread between native and non-native honeybee populations. This topic is currently circulating in Denver now.

Finally, I wanted to point out that there is much research on honeybees, because there are many more funding avenues for studying them and due to the honeybee collapse. However, the funding available for native pollinators is much less. While this is changing do to research findings, and the significant declines of beneficial insects, there is a need to keep adding to the study after the initial one is done. I teach a class on bees every summer and the wealth of newly published research is staggering and encouraging. I also think there is useful information that is directly applicable to Colorado from other states and even outside the US. I hope that the study will go beyond Colorado's borders. Also, honeybees are not native to the US, and while useful in some agricultural contexts, are not the answer to our pollinator declines. Therefore, due to the abundance of literature on honeybees, and less on native pollinators, the study needs to take this imbalance into account.

In summary, this is a very important study that many other states have taken as first steps in determining how to combat pollinator declines. I am a huge supporter of this bill and I encourage you to pass it!

Thanks,

Dr. Christy Briles

Testimony May 3, 2022

Chairman and members of the committee, thank you for allowing me the time to speak with you today in support of Senate Bill 22-199. My name is Dr. Julie Morris and I am a faculty member in the Department of Biological Sciences at the University of Denver. I am also privileged to have been born and raised in this beautiful state of Colorado. I grew up on the Western Slope, which I credit for my deep love and appreciation of our states agricultural systems and natural systems that support our cultures and economies.

The unique collection of natural resources in our state provide important ecosystem services (including food, climate regulation, erosion control, and recreation), that support the health and well-being of our people.

There is a rising awareness that pollinating services are critical to the human food supply especially in the face of accelerating human population growth. It is estimated that approximately 1/3 of our food supply depends on insect pollination in order to produce fruits and seeds that feed us and that are necessary to produce the next generation of crops. It also crucial to understand that these same pollinating services similarly support the health and resilience of natural ecosystems. Pollination is classified as a supporting and regulating ecosystem service - meaning that loss or changes to this service can lead to imbalance and loss of resilience in the system overall. The unique diversity of agriculture and natural systems in our state, need to be supported by a similar diversity of pollinators. Loss in pollination services, leads to loss in plant health and productivity, and these consequences are passed up the food chain to the consumers, including ourselves.

It is critical to recognize that all of the components in our agricultural and natural systems, including pollinators, interact in very intricate and complex ways that we are still working to fully understand. This imperfect understanding makes the work of our farmers and land managers increasingly challenging as they are faced with making decisions that will have lasting impact on the future health of these resources. Everyone can agree that management decisions are always supported and improved when they are based on the most up to date and accurate information.

For these reasons I urge you to pass SB22-131 in order to better understand this unique important natural resource in our state.

House Public & Behavioral Health & Human Services
05/03/2022 01:30 PM
SB22-199 Native Pollinating Insects Protection Study
Typed Text of Testimony Submitted

Name, Position, Representing	Typed Text of Testimony
Paul Opller For Self	Insects constitute by far the most diverse and important animal pollinators in the Colorado. The only other animal pollinators are 4 species of hummingbirds and these are well-studied and protected under the Migratory Bird Treaty Act of which the U.S. is a signatory. Bees (Apoidea, Order Hymenoptera) –Bees are Colorado's most important pollinators, given their complex relationships with flowering plants, and importance to both natural and agricultural systems. There are at least 946 described species of bees that occur in Colorado (Scott et al, 2011). Excluding the introduced European honeybee (Apis mellifera) and 10 species accidentally introduced from Eurasia, that leaves 936 native species. This is likely an underestimate of statewide diversity, as recent studies have added to our knowledge. For instance, over 9 days of bee survey in eastern Colorado, Jamieson et al. (2019) added 425 county-level species occurrence events and 15 new statewide records. There are also most likely many undescribed bee species and further survey will likely show that additional species known from surrounding states actually include Colorado in their ranges.

Good Afternoon—

Thank you Chairman Coleman and the rest of the Senate State, Veterans and Military Affairs Committee for the opportunity to testify IN FAVOR of SB22-199.

My name is Beth Conrey and I own Bee Squared Apiaries. I operate what is called a "sideliner" beekeeping operation in Larimer, Weld, Boulder and Denver counties with colonies located from the roof of the Denver Botanic Gardens to Silver Reef organic farm in Wellington. I currently manage approximately 175 colonies. Beekeeping is my life and my livelihood.

Honey bees are quite different than the native bees that are the primary subject of this bill. Colorado is home to a jaw-dropping number of native bees—approximately 950 species! This is nearly the highest biodiversity in the United States! Why? Because we have such a variety of different biomes from our high mountain peaks to our sandy, dry southeastern corner and everything in between.

The difference between honey bees and the other 900+ species of resident bees is not simply the fact that only honey bees make honey (TRUE!). Honey bees are colony bees and rely on the synergy of the entire colony to survive and thrive. Honey bees are, therefore, typically managed by humans just like other livestock and are widely utilized to enhance managed crop production systems.

The rest of these bees are solitary bees. They live in their own independent housing structures located within plant stems and in the ground. Some of them may be quite gregarious—but they are still solitary and their entire

reproductive success is dependent on the individual bee. This critical difference makes it incredibly difficult to determine how these insects are faring in our increasingly challenging world.

Further, honey bees are generalist pollinators. This means that they collect protein (pollen) and carbohydrates (nectar) from a huge variety of flowering plants. Solitary bees are specialist pollinators and have incredibly complex insect/plant relationships with some bees only pollinating a single plant specie. Many of our native plants depend upon their native bees to reproduce and vice-versa. The success of both depends upon this interaction and the loss of one ensures the loss of the other.

In the past decades, many research dollars have been spent on studying honey bee health declines. However, these results are not necessarily applicable to our native solitary bees due to these differences. Because so little is known, and so much ecosystem health depends on these tiny insects, I urge you to vote in favor of this bill.

Thank you.

SB22-199, the Native Pollinator Study Bill

Hello, I am Dr. Maggie Gaddis. I am the Executive Director of the Colorado Native Plant Society, a restoration ecologist and faculty member at the University of Colorado - Colorado Springs. I am speaking to you today in support of SB22-199, the Native Pollinator Study Bill. Thank you Senators Jaquez Lewis and Priola, and Representatives Kipp and Froelich. Your sponsorship demonstrates bipartisan support for this bill.

We need to understand how to protect pollinators by studying them in native and contrived habitats. **This bill will facilitate our understanding of future effects of landscape-scale habitat conversion, which always results in a reduction of native habitat and native plants.**

I wanted to give you a sense of how disorienting a new landscape might be to a pollinator.

https://phys.org/news/2019-02-bee-eye-camera-bees-food-environment.html

Research shows that bees (the most common research subject) can learn to respond to visual and scent-based cues. **Will they learn fast enough to survive if we continue our rapid conversion of native habitats?** For example, here's what a bee sees. We see the yellow flower. The middle flower is a UV-colored image. Bees see light we don't see. The white and pink flower is what the bee sees with its compound eyes. This is a honeybee, the most common research subject. **What about our native pollinators? We need to know so much more to understand how to protect them.**

What if you lived in a novel environment? Would you be able to adapt and survive? What if you went to the grocery store and this was what you had to pick, would you

know how to cook these foods? Would you even know they are edible? **This is the disorientation our pollinators encounter in novel environments.**

https://firstwefeast.com/eat/2013/06/14-strange-fruits-and-vegetables-youve-probably-never-heard-of/

More than 80 percent of the world's flowering plants need a pollinator to reproduce. We need pollinators too. One out of every three bites of our food, including fruits, vegetables, chocolate, coffee, nuts, and spices, is created with the help of pollinators.

I urge you to support the Native Pollinator Study Bill, SB22-199.

Regarding the execution of the study, there are numerous researchers, community organizations, municipalities and business leaders in Colorado who could contribute in the implementation of the study. **We will support the Department of Natural Resources in their execution of the Native Pollinator Study Bill.**

Maggie Gaddis, M.S., Ph.D.
Executive Director, Colorado Native Plant Society
ColoradoNativePlantSociety@gmail.com

My name is Dr. Adrian Carper, and I am a Research Associate in the Dept of Ecology and Evolutionary Biology and the Museum of Natural History at the University of Colorado, Boulder. I'm here today representing myself, and not speaking on behalf of the University. But I'm testifying from more than a decade of experience in studying pollinators, their diversity, and how humans impact them. And one of the most common questions I'm asked, is 'how are our pollinators doing here in CO?" And my answer is, it's really hard to know. That's in part because CO has such an extremely diverse pollinator community, including nearly 1,000 species of bees, fifth in the nation in terms of statewide diversity, hundreds of species of butterflies, and thousands of species of moths, flies, wasps and beetles.

And that diversity is critical to our natural resources because they depend on pollinators. Our parks and greenspaces all have flowering plants that depend on pollinators to produce the seeds and fruits that sustain our wildlife. And we depend on those natural areas for clean air and water, but also for tourism and recreation, all of which contribute to better human health and well-being.

The reality is we've been studying pollinators in CO for over a hundred years, and CO is home to some of the world's most eminent pollinator researchers, some of which have observed firsthand over the decades, changes in pollinator and plant communities, and how they interact.

But, increasingly, scientists like myself, and others you may hear from today, are concerned that the data we collect, the patterns we observe, and the conclusions we draw, point to the loss of our pollinating insects.

And I don't think I can emphasize enough, that we are testifying today, not only given our knowledge and expertise about pollinators, but because, based on our experience, we understand that we should be concerned about pollinators in our state, and we think the DNR should address them.

Afterall, the mission of the DNR is: 'to develop, preserve, and enhance the state's natural resources for the benefit and enjoyment of current & future citizens. And having abundant and diverse pollinator communities is crucial to the integrity of our natural ecosystems. However, we know that our pollinators are vulnerable to habitat loss and degradation, and climate change exacerbates both, posing huge risks for pollinators, and we think our government should be planning ways to mitigate these impacts.

This bill would create a much needed first step, a study, to compile what we know about pollinators here in CO, how much they are at risk, and what current policies address them. Moreover, this study will identify what information we still need to collect in order to make the most-informed decisions to ensure that we have abundant and diverse pollinator communities now and in the future.

Dr. Adrian Carper