Colorado Bat Working Group Annual Meeting, October 7, 2020, 9am – 3pm
Virtual via Zoom

Attendees: Dan Neubaum (CPW), Rob Schorr (CNHP), Jeremy Siemers (CNHP), Beth Stevenson (CNHP), Andrea Schuhmann (CNHP), Tina Jackson (CPW), Phil Nyland (USFS), Jeni Windorski (USFS), Larisa Bishop-Baros (WEST, Inc.), Missy Siders (BLM - retired), Delana Friedrich (CPW), Matt Rustand (BLM), Susan Spaulding (Boulder County), Kirk Navo (CPW – retired), Donal Solick (Vesper Bat), Ali Khalighifar (post-doc, USGS), Kristin Philbrook (NPS), Lance Carpenter (CPW), Aaron Sidder (BCI – NEPA Compliance), Mike Sherman (CPW), Kristen Lear (UGA), Teresa Childers (NPS), Charles Osborne (Osborne Pest Management), April Estep (CPW), Brad Udell (USGS), Brian Reichart (USGS), J Martin , Dane Smith (USGS), Bethany Straw (USGS), Dana Shellhorn (USFWS), Jaclyn Johnson (USGS), Missy Dressen (USFS), Ryan Bagg, Ryan Prioreschi (City of Boulder), Brooke Hines (HBR), Paul Cryan (USGS) Michelle Verant (NPS), Mikele Painter (USFS), Amanda Bevan (PhD at UNC Greeley), Will Keeley (City of Boulder), Jenny Roberts (Fort Collins Natural Areas), Robin Sell (BLM), Erin Lehmer (Fort Lewis College)

Agenda:

9:00 – Greetings and introductions, housekeeping – Neubaum
- Agenda, virtual check-in
- Western Bat Working Group Meeting
  - Victoria, BC Meeting (April 12th-15th Canceled)
  - Potential options being worked on

9:30 – COVID19 implications for bats – Cryan/Jackson
- Background on SARS-CoV-2
- Risk assessment summary
- Current state of testing for bats
- Status of work in CO – rehabbers, pest control operators, monitoring & surveillance

10:40 – White-nose Syndrome
- General updates at the national and state levels – Cryan/Jackson
  - Nearest locations to CO, new positive detections
  - CO surveillance efforts (guano)
- Updates for USFS and BLM related to triggered cave closures –Dressen/Rustand

11:40 – Climbers for Bat Conservation – Schorr
- Efforts to develop guidelines for climbing buffers around caves
- Bat climbing surveys & data management

12:30 – NABat – North American Bat Monitoring efforts
- 3 Species Status Assessment & database development –Reichert
- 2020 Colorado accomplishments – Siemers/Jackson

1:30 – CBWG tour of new web page – Schorr

1:45 – Project Updates/Round Table (break inserted if needed)
- Monitoring for presence of Pd & fungal community examination –Lehmer/Navo
- Steamboat Mylu population analysis – Schorr
- Distribution modeling to inform CO bat habitat selection – Neubaum (if time permits)

9:00 am – Introductions

WBWG update: Dan discussed voting, fees, and the postponement of the WBWG annual meeting. There will be a virtual meeting with low ($5-10) registration fee, on the same dates. Announcements for abstracts will be coming soon. New board will decide where the next meeting will be. Likely will be in Vancouver, BC where it was originally scheduled for 2021.

CBWG update: Dan asks the attendees about whether there is desire to have formal board terms. Currently, it's been on a volunteer basis. Dan wants to know if this should be formalized. Rob suggested formalizing something can hold people accountable. Kirk thinks it's helpful to have a formalized system to make sure there are things that are accomplished. Dan suggests making a small subcommittee to review formalizing structure and positions. Dan will recruit the current board to weigh in on the potential of structuring this.

Updating the Matrix
It's about time to update the Bat Matrix. Expectations were to update every 5 years. It was originally compiled in 2012. Jeremy is willing to lead this effort, starting this winter. Kirk and Dan volunteered to help.

Covid-19 and bats
National update. Where are we now?
Paul – the concerns: In Feb/Mar 2020 disease research groups were approached by USFWS. Given that there are plans to handle bats (internal in caves/mines and external) in spring, what precautions should be taken regarding Covid-19? Can humans infect bats with Covid? Do N.A. bats already have exposure/experience with other covid viruses? Long story, short: Paul worked on coronaviruses in local populations (Fort Collins, Mesa Verde NP). Those bats had alpha-coronaviruses, some that had not been described (mid-2000s, after SARS-1 occurred in US). Paul has been as much on a public outreach venture as much as disease research, clarifying the prevalence of coronaviruses. He, and others, advocate redirecting focus on ecological/aesthetic importance of bats. Take focus away from bats as vectors. It's clear that coronaviruses, and SARS-CoV-2 (in Asia), are circulating in bat populations. SARS-CoV-2 is a beta-coronavirus that is a unique group, and it wasn't clear whether beta-coronaviruses can occur in N.A. Recent publication, "Possible risks of SARS-CoV-2 spillover from humans to free-ranging wildlife: a case of study of bats" clarifies distribution of coronaviruses around the world. Early on, the risk was unknown, so the recommendation to not handle bats was wise. Given the case of WNS in Europe and the ramifications of Pd arriving in N.A., there was reason to be cautious. It could infect bats to produce mass-mortality (but bats are particularly good at fighting viruses, so unclear about spread and mortality). It is unlikely the virus could wipe-out bats, but if we want to develop a vaccine, we want to limit the disease's distribution, which without measures would make it more unmanageable. Take away: risk is low, but ramifications could be large. Caution is warranted. Restrict handling where possible.

Paul's publication on SARS and bats,
https://journals.plos.org/plospathogens/article?id=10.1371/journal.ppat.1008758

Risk assessment regarding SARS and bats,
https://pubs.er.usgs.gov/publication/ofr20201060

Beta-coronaviruses are restricted to Europe, Asia, and Africa, and C. and S. America. SARS-related coronaviruses are in Europe, Asia, Africa, but see Paul's publication for clarification.

Question, Dan: the infection trials were done on EPFU, has anyone done trials with myotids, considering they are more susceptible to WNS? Paul doesn't know of any, possibly because of the limited access to numbers of myotis. Michelle weighs-in: Work is being done on multiple bat species cell strains. This alleviates the need for whole animal trials.

Colorado Update (Tina)

When it hit in March, there was need for immediate response to reduce risk to bats. There were internal (CPW) evaluations to evaluate risk and recommendations. Bat handling that is conducted by Control Operators for bat exclusion was outside CPW purview (Colorado Dept of Agr). CPW did not permit any bat handling for research, but they were regularly reviewing requests on a case-by-case basis, focusing on PPE use. Some permits were given for captive colonies, and bat rehabilitation. Colorado asked bat rehabbers not to release bats, and are sampling guano from these bats prior to release. Guano testing is still being conducted. The thing that has not been addressed has been the efficacy of winter colony visits: What is a good protocol for human and bat health, and what does it mean for bats that are handled? Discussions with the disease ecology community will continue this winter. CPW wants to implement protocols, but need to know the risk. Use of PPE does reduce risk, but doesn't eliminate it. If any of these bats do come back positive, it would be the first record of SARS-CoV-2 nationally so it would be highly scrutinized.

Question, Dan: Could Tina share what Texas been doing?
Tina: There are many variations regarding how states have handled this situation. Some states don't allow bat rehabilitation. Some states don't think it affected their bat populations, so they released rehabbed bats. Some states are still allowing handling for research. Texas allowed rehabbers to release bats if rehabbers and bats showed no symptoms. Pennsylvania brought all their bats to one rehabber to limit human exposure. In Colorado, the rehabbers had only two rehabbers doing the rehab. Kentucky and Tennessee were allowing netting.

Question, Rob: Was Texas releasing based on testing or "showing symptoms" (regarding Texas)?
Tina: "Showing symptoms"

Question, Michelle: Were rehabbers being tested?
Tina: Yes, some were, but it's outside CPW to be recommending that.

Comment, Paul: USFWS endangered species work need some level of monitoring for rare species for compliance issues, so they walked back the "no handling" recommendation for those situations.

Comment, Tina: Concerns regarding felids and mustelids because they can harbor SARS. Paul mentions that other groups of species are even more susceptible. Bats may be the least of our concern because of their ability to fight viral infection.

Question, Dan: What's the timeline for handling bats?
Tina thinks we can get back to it in summer 2021. Likely, we'll need to be wearing n95 masks without valves to prevent bat infection. If anyone is planning winter work, please reach out to Tina so you can coordinate (tina.jackson@state.co.us).

Comment, Michelle: Michelle would like to know of NPS projects that might be occurring in winter, and evaluate which ones can be postponed. She and Tina will coordinate to chat further. Michelle's contact: michelle_verant@nps.gov.

White-nose Syndrome
Paul: *National outlook, WNS research update*
Paul is surprised there hasn't been greater spread detected. It is expanding in WA. Not detected in CO yet. At Ft Laramie, Wyoming (SE Wyoming) there are bat condominiums on stilts, that have been

monitored for >2 years and have not seen mass mortality despite bats there having been identified as Pd+.

Paul encourages visiting www.whitenosesyndrome.org to see the latest maps, by state and county. They are more-easily downloaded.

Internationally, Pd has been in European populations and continues to be. Mostly their bats are not forming large clusters overwinter. Does this insulate them from mass mortality events? In N.A., there are still questions regarding why some species are more susceptible.

Question, Andrea: No mass mortality at Fort Laramie. What's your feeling regarding the stability of that population? Paul doesn't know why that population has been stable. He expected that, after the spring of 2018 detection, the population would crash the following spring. That hasn't happened yet.

Comment, Tina: In Texas, they saw some evidence of mortality. Citizens were reporting seeing bats dead. Tina also points out that the Fort Laramie population is a maternity colony, and detection of mortality may be masked compared to monitoring hibernacula.

Question, Rob: How was Pd originally diagnosed at Ft Laramie? An individual was capture in a mist net and swabbed. Michelle: Also saw fluorescence's that were alarming, but some of the wing morphology was likely due to mite infestation. This was part of a broader-scale surveillance of colonies during spring, where bats are being captured and sampled.

Update from Michelle: Pd confirmed in Texas with large mortality events, but not at a roost site. Pd was detected in MT for first time. All of the mass mortality of bats in Texas was *Myotis volans* (cave myotis). The "mass mortality" was recorded by citizen records of bats found on the landscape. Tina: The detection of the MT bat were from a maternity colony from under a bridge, and there was some worry about using the wood from that bridge for other uses as it could transport the fungus.

Michelle and Paul: Both advocate for early-spring guano sampling to identify mortality events

Comment, Tina: CPW has "Bat Line" where citizens can report bat observations: https://cpw.state.co.us/learn/Pages/WildlifeHealthWNS.aspx

Comment, Dan: Regarding how models of WNS spread have been unreliable for Colorado. It predicted the front of the disease should have been by us already. That could be a product of detectability or disease spread dynamics.

Comment, Tina: Site at Gateway near Fort Collins still comes back negative. Same with Steamboat Springs' maternity colonies.

Question, Amanda: Is the map of sampling locations available? Tina and Dan can make one available Tina mentions the evidence of bats flying by partially-frozen ponds to drink in the Pawnee National Grasslands.

Comment, Paul: USGS has been putting bat-backpacks that can record temp and humidity on several species including MYLU. An EPFU came back after nearly a year later, and saw some of the temps that

bats were roosting at. This may clarify hibernacula temperature/roosting conditions for bats away from known roosts.

Question, Dana: Regarding guano sampling. She was wondering if taking a guano sample at the Pueblo Chemical Depot is feasible because the biologist is interested. Tina directed her to Ed Schmal (CPW) out of Pueblo. Additionally, CPW is still working with State Health Lab to get rabies bats tested for Pd.

Comment, Paul: Discusses the idea of further surveying talus slopes to look for colonies. He is developing "Open Bat Monitoring" project that will provide low-cost equipment for monitoring and provide open-source software for monitoring. There are technological advances using Raspberry Pi's (https://www.raspberrypi.org) that can produce small, low-cost solutions, such as audio recording, imagers, video recording, etc.

Missy D/Matt: USFS and BLM updates
Missy: She is reviewing updates to USFS monitoring plans. White River NF, Black Hills are some of the priority areas because of cave features. Once fires calm down they will be increasing efforts to review. The Fort Laramie detection changes USFS strategy. Rocky Mountain Wild, CNHP, and USFS have started citizen science project to monitor urban/suburban roosts. Rocky Mountain Wild has a pika monitoring project where they have had citizen scientists document bats at talus slopes.

Robin: Matt has secured additional funding to monitor some BLM mines. Matt concurs.

Climbers for Bat Conservation presentation: Rob
Rob talks about the CBC program and findings, including trying to generate science based buffers around caves in relation to climbing routes. Difficult as not much research is available for reference. Lance Carpenter noted seeing a lack of crevice roosts in areas with lots of climbing at Castlewood S.P. but is still analyzing data. Dan N. noted a few maternity colonies using crevices on routes in Colorado N.M. and suggests that season and amount of climber use on the route are likely to affect use by bats.
www.climbersforbats.colostate.edu

NABat update: Brian Reichert
www.nabatmonitoring.org
Created in 2015, probabilistic-sampling and analysis for understanding bat distribution and populations
See the website for a full description of the program

FY2021 activity:
Cloud-based IT infrastructure
Data products – status/trends, data visualizations, reports
Outreach and engagement – community/citizen scientist projects
NABat Standard Operating Procedures

SSA – Species Status Assessment process
NABat is providing data for this management decision process
Tricolored, northern long-eared, and little brown myotis evaluations
Evaluate species viability

Analytical Support:
Summer populations: Occupancy and acoustic activity, annual rate of change in occupancy

Winter populations: Hibernacula counts
Bat Tool v2.0: future projections of population change, comparing future viability given different stressors

NABat Monitoring Hubs – These are regional epicenters that would facilitate communication, data exchange regionally
PNW – OR, WA, ID
Pacific – CA, NV
Desert SW – AZ, NM
Rocky Mountain – WY, UT, CO
Midwest – MN, IA, MO, WI, IL, IN, MI, OH
NE – ME, NH, MA, CT, NY, PA, NJ, RI
Mid-Atlantic – WV, VA

Tina: conversations with Nichole Bjornlie (WGFD) and Kim Hersey (UT) applying for funding to support a bat hub in our region. There is ongoing discussion of supporting hubs and the unique structure each one utilizes.

Tour of the NABat data/partner portal
Addresses data requests to the web-portal

Question, Paul: What are criteria for access? Can anyone partner?
Brian: Yes, anyone can partner.

State update – NABat work
Tina – all our grids were visited.
Jeremy – Same number of cells (52) as last year. BLM concentrated some sampling around Royal Gorge (24-26 cells), and NPS/CNHP concentrated work in RMNP. Fires did deter sampling in some areas. For CPW bios, the NABat website can provide more-detailed reports from their areas.

Question, Kristen: For data requests, can you only see available data by using the "public"-access filter?
Brian: Yes, but even for non-public data, you can request access.

CBWG website tour – Rob
Rob takes people through the website (https://cnhp.colostate.edu/cbwg/). Dan talks about the Bat Exclusion component on the website. He'll be asking for review of these documents soon. For now, Rob will disable access to the documents and content until review has been conducted.

State projects
Kirk and Erin Lehmer: Summer guano and bat sampling for detecting *Pseudogymnoascus*
Kirk takes us through the need for surveillance methods for understanding western bat populations
- Sampling at Gateway Natural Area along the Poudre River near Fort Collins
- Netting, swabbing (n = 25)
- Collected guano in trays that were left over the summer (mid-May to early-August)

Erin takes us through the analysis – amplify genetic region for fungi to ID to group/species
- Found differences in fungal communities between guano and the bats
- *Pseudogymnoascus* were available on guano and bats, but were not be identified to species level; could be taken to species with more analysis.

- No evidence of Pd
- Provides a technique for identifying fungi of the *Pseudogymnoascus* genus

Kirk reminds us that guano is easier to collect and doesn't require permits or trained staff.

Question, Rob: how does this technique differ from the techniques that identifies Pd?
Michelle: Real-time PCR addresses specific region that can ID Pd directly

Question, Dan: Do you have the same ability to detect *Pseudogynoascus* throughout the summer?
Erin: It was consistent throughout the summer.

Rob: Little brown bat population monitoring
Rob presented PIT-tag monitoring of MYLU
Two roosts in Routt County: A house southeast of Steamboat Springs, and a barn near Hayden
PIT-tagging bats from 2014-2018
Nearly 2,000 bats tagged, only ~250 recaptured manually
Using PIT-tag reading antennas, reencountered tagged bats >8,000 times
Presented survival, abundance, and fidelity estimates for the two roosts
Higher fidelity at the house (true maternity colony)
Lower fidelity and varying population sizes at barn (transition roost, evening roost)

Roundtable:
Tina – working with Brooke Hines and CDOT with a host of roosts CDOT has found. Discussing monitoring and sampling.

Amanda – Working with Rick Adams on high-elevation records of tri-colored bats. Please share your obs with Amanda. Amanda's contact: Amanda.Bevan@unco.edu