2023 Colorado Bat Working Group Meeting
9 am – 4 pm, November 8, 2023
Bighorn Room, Colorado Parks and Wildlife
6060 Broadway, Denver, Colorado

In-Person Attendees:
Dan Neubaum – Colorado Parks and Wildlife, Species Conservation
Dave Klute – Colorado Parks and Wildlife, Species Conservation
Kristen Philbrook – National Park Service
Mikele Painter – US Forest Service
Aurelia DeNasha – US Forest Service
Tyler Newton – Colorado Parks and Wildlife, State Parks Resource Stewardship
Chris Keef – Bureau of Land Management, Region Office
Kristin Salamack –CDOT/ USFWS Liaison
Chris Branigan – Bat Rehabber/Nuisance Operator
Haley Price - USGS Fort Collins Science Center
Jennifer Zedalis – Colorado Cave Survey
Jeremy Siemers – Colorado Natural Heritage Program
Brian Riechert – USGS Fort Collins Science Center
Jack Grider – Colorado Parks and Wildlife, Health Program
Kyle Nelson – Colorado Natural Heritage Program
Nick Solick – Vesper Bat Detection Services
Donald Solick – Vesper Bat Detection Services
Amy Ray –
Frankie Tousley – Colorado Natural Heritage Program/ USGS Fort Collins Science Center
Andrea Schuhmann – USGS Fort Collins Science Center
Kirk Navo – Head First Biological Consulting
Tanya Dewey – Colorado State University
Kevin Castle – Colorado State University

Virtual Attendees:
Jonathan Lewis – Rocky Mountain National Park
Erickson Smith – Jefferson County Open Space
April Estep – Colorado Parks and Wildlife, Southeast Deputy Regional Manager
Thomas Orr – Mesa County Public Health
Melissa Neubaum – Colorado Parks and Wildlife, State Parks Resource Stewardship
Jason Roth – Colorado Department of Transportation Region 4
Ryan Prioreschi – City of Boulder Open Space and Mountain Parks
Ash Malmlov – Bat Health Foundation
Annie Hoffman – Colorado Department of Transportation Region 4
Aaron Corcoran – University of Colorado at Colorado Springs, JNABR Associate Editor
Paul Fowler – National Speleological Survey Caver
Cora Marrama – USFS, Arapaho and Roosevelt National Forest
Elizabeth Hood – Colorado Natural Heritage Program
Mylea Bayless – Bat Conservation International
Susan Spaulding – Boulder County Open Space
Sarah Gaulke – Colorado State University, PhD student
Jeff Peterson – Colorado Department of Transportation

Megan Mueller – Rocky Mountain Wild
Niki Desautels – Bats Northwest
Jeni Windorski – USFS, Leadville
Nathaniel West – BLM, Tres Rios Field Office
Jason Roth – Colorado Department of Transportation
John Stephenson – Denver Museum of Nature and Science
Brooke Hines – Burns & McDonnell Consulting
Tracey Hart

Agenda/Notes:

Greetings and introductions, housekeeping (Neubaum)

1) Agenda, virtual check-in
2) Western Bat Working Group updates (Schorr)
    - 2023 Meeting in person, Victoria, B.C.
        - Huge success, came out ahead money-wise
        - Next meeting is in 2025 in San Diego, in April
        - These meetings focus on the management level
        - Rob has noted, what used to be bat research news is transitioning into a Journal of North American Bat Research. Consider this if you are looking to publish.
        - Initiating a collaborative scholarship for underrepresented folks to attend future North American Society of Bat Research (NASBR) meetings
        - Questions about Journal of North American Bat Research can reach out to Aaron Corcoran

3) Nuisance/Exclusion page and CO Bat Lit page: Take a look at the Colorado Bat literature and let Dan know of missing literature from CO to add!
4) Colorado Parks and Wildlife Bat Coordinator Update (Klute): Dan Neubaum has filled the vacancy for the CPW Bat Coordinator (Tina Jackson's backfill).

White-nose Syndrome Updates

1) General updates at the national and state levels (Neubaum/Verant)
    - Confirmed Pd locations in CO
        - Spring 2023, 5 locations confirmed with Pd and 1 location with WNS. At Bent's Old Fort National Historic Site, in 2022 was just Pd, in 2023 first bat found with white-nose.
        - 2 species affected, Yuma myotis with WNS, MYLU in norther counties with Pd.
        - These were all found in maternity roosts, confirmed through swabs and guano
        - Continuing to monitor across the state, no positives in Western counties
        - 13 of the 19 species in CO susceptible
        - Current efforts,
            - Swabbing at hibernacula, limited due to disturbance to bats
            - Maternity site swabbing, and collecting guano
            - Late spring mist netting to swab foraging bats at 7 sites
            - Also public outreach/education campaign: what WNS is and how to report potential cases

        - Coordinating with state rabies lab and rehabilitators for reported signs
    - Positive samples creeping in along natural corridors from neighboring states
    - Have done site checks at abandon mines and caves,
        - Roost microclimates data, set up temp monitors to determine if microclimate is suitable for Pd in our caves and mines
        - At potentially suitable sites, unknown if sites microclimate vary in the summer, if that would impact pd establishment and persistence
        - Also looking at winter movement through acoustic monitoring so determine if species are moving as expected
        - Noticed very few calls in winter from little browns, so much snow in talus slopes, seems bats may be buried, therefore recording less movement. This might be a driving force in winter acoustic results
    - Still need to know where bats at maternity colonies are spending the winter
    - How WNS progressing across the west and CO, could play out different than expected (back east)
    - Detections to date and winter detections, none positive yet. Movement of WNS is really just getting started, creeping in
    - Talking with NWHS about vaccines and other options

- National spread, WNS prevention
    - Good news: able to pull together national WNS Meeting, organized trip to Joshua tree, caught a western yellow bat!
    - Many talks were recorded
    - Breakout sessions
        1) How to prioritize roosts for managements
        2) Treatment actions for WNS
        3) Bat marking guidelines and how to coordinate samples
    - State of the bats, report releases this year
    - Current spread of WNS across NA, starting to fill in the west
    - Still much we don't' know about different susceptibilities in different species
    - Most notable updates, WNS confirmation in Yuma myotis in CO and in one fringed myotis and cave myotis in NM

- 2023 CO surveillance efforts (capture, guano)
    - WNS surveillance results and monitoring at summer roost sites
        1) Difficult to monitor hibernacula in winter, West shows fewer bats and fewer sites to even monitor
    - Solution is to monitor in summer
    - Good understanding of Townsends, which aren't impacted as other myotis spp,
    - Mark recapture, swabbing and guano to determine presence of pd/WNS
    - Yampa Valley monitoring of MYLU, established pre-WNS baseline data for survival and fidelity

2) Gateway and Steamboat PIT work (Siemers)
    - Two sites, barn and house in Steamboat Springs, examples of buildings where owners do not want exclusions.

- Methods: trapping locations since 2014, 1741 individuals tagged, manual recaptures on 180 individuals. Suspect individuals learn and would not be able to be recaptured after initial. Roosts biased towards adult females, only a few adult males, 20% juveniles
- Results: over summer and overwinter survival, is comparable to other sites without WNS
- Shows behavior at two roosts is very different, fidelity isn't as high at barn. Could be how captures occur, more openings at the barn so more opportunities for bats to avoid capture, as opposed to house where openings are fewer and easier to trap.
- Takeaways: established baselines, high fidelity especially for females
- One other site, more recently, Gateway Natural Area: Poudre Canyon Larimer County, old water treatment site, owners not trying to exclude bats
- Wing Damage Index:
  - Later season, how much healing can take place on wings over time?
  - Is this what we're seeing?
  - This indicates how much damage to the wing is occurring
- Pd sampling: Gateway positive on environmental swab in June 6 2022, bat swabs positive from June 1 2023. Barn roost positive for pd from pooled guano in June 20th 2022, environmental samples negative, house roost pd positive bat, pooled guano negative.
- Are lower densities of bats a function of smaller cave colonies, these bats are not coming into contact with as many other bats as compared to the east. Important point, bulk of MYLU pop has been suggested to be in eastern portion of the continent due to large cave hibernacula, but most western states have large summer colonies, so we may not understand fully where the bulk of the population is.

3) Fort Laramie (Schorr)
   - PIT tagging and vaccinations
     - Fort Laramie National Historic Site, maternity colony of MYLU, several thousands, Pd and WNS surveillance for several years, 2018 Pd was first detected. Park was able to establish collaboration with park service to understand what impact of WNS, second bat condo was built for goal of secondary site should one be compromised by WNS. Enhance surveillance in 2023 to better understand progress in the colony, this summer initiated vaccine study (ongoing)
     - Pit tagging and vaccination, very successful, 200 bats captured in several hours. Half received vaccine, half a placebo, all received wing band, to compare effectiveness of the vaccine.
     - Questions: looking to start a study of pooled guano under bridges (MYLU, and TBC), check for pd as well, where should we send the data or should we go through NAU? Answer: NAU can test for Pd, but let them know both tests are needed. Would NWHC also want those samples? Answer: Dan can help coordinate. Questions: national prevalence map, reflects cave and karst systems across the US, keep close eye on if this tracks with where we find positive Pd vs positive WNS. Answer: in theory, we see lower spread in the west, artifact of use in karst systems by bats in west.
       https://pubs.usgs.gov/sir/2008/5023/07weary.htm
     - Question: where to find more info on "fat bat" project habitat enhancement as way to help bats survive? Answer, modifying habitat in Pennsylvania, also

creating better foraging habitat. Problem is there is little known on what mgmt actually has positive impacts on populations at a larger scale, BCI has more info on Fat Bats.

- Question: is CPW doing Pd sampling at new sites, Boulder has many potential colonies. Answer: maternity colony sampling and guano collection. Always looking for new survey sites, focusing on myotis species. Please reach out with areas we could build into the survey. Triage where we put efforts, always open ears to new thoughts and locations. Also, anecdotally keeping track of wing scores.
- Question, is CPW still keeping three dead bat rule? Answer, any signs should be sent in for testing.
- Survivability and susceptibility varies in species and across country, fatter bats seem to have greater chance of survival. Evidence of Northerns, some coastal populations seem to be surviving.
- Will add link in notes to short stories of northerns surviving

15 Min Break

Keeping white-nose at bay (Grider)

1) Timing and effectiveness of treatments
    - Confirmed/suspected pd locations, looking at ways to use data being gathered
    - Data 2012 to 2017, swabs in MYLU
    - Built multi scale dynamic occupancy hurdle model. Cave can be unoccupied, pathogen is NOT present, samples three times, can confirm no presence. This model predictions probability of detection at a site.
    - Can quantify the amount of pathogen in the sample, based on how many times the sample was amplified via florescence. Taking known quantities to determine how many cycles are needed, equate this to the load.
    - Dynamic model does not allow for false positives
    - Take-home: early on variation in proportion of occupied hibernacula, hurdle models allows use of covariates otherwise unable to. Best predicted by cave load and hibernacula type.
    - Prevalence over time, best predictor is the number of species, and year of arrival
    - Huge difference in current model vs the multiscale hurdle model, up to three years earlier detection using new model. If we apply within the state, can pick up on space and time and better idea of how pd is moving and progressing over time.
    - Questions: did you look at colony size? Answer yes, colony size did not effect, contacts are made regardless of how many bats are present. Maybe the difference in species susceptibility?

Could WNS manifest differently in Western N.A. (Neubaum)

1) Differences in Eastern vs Western Mylu populations
    - Range wide Variability on WNS manifestation in MYLU, a review of factors,
    - Objectives to summarize known info, then highlight differences and how that might influence the spread of Pd
    - Global differences, WNS does not always result in severe disease, in Eurasian bats develop WNS in different time in hibernation which results in low mortality rates

- Tippy Dam, have not seen large population die-offs as with other eastern locations, likely because of different microclimate and microbial community present
- Looking at solo case in Washington, in 7 years post 1st WNS, see spread was very different than in east. Much slower than expected, what lead to this difference? Microclimate is critical and suspect this relates to the spread and severity of WNS.
- Aggregation size also could also be important, or maybe not, in WNS variations. In talus slopes, microclimate and humidity changes remarkable between summer and winter (even deep down), caves back east are very stable microclimates, does the fluctuation inhibit the spread?
    - Aggregation size and autumn movement distances could also play a role.
    - Western bats seem to make very short movements a few kilometers, is this playing a role in the spread as well? This is backed up by the genetic work on MYLU. Relatively small numbers of individuals using sites, fungal loads on females lower by later august due to heat at maternity sites and grooming, or was it simply because of summer conditions not being favorable to the fungus, males show higher loads due to cooler summer roost site selection, thoughts that they can reinfect each other during fall swarming
    - Smaller gene flow shown in western MYLU, which can play a role in how fungus spreads
    - Methods for monitoring in the west will have to differ from east, turning focus to maternity colonies for disease surveillance is one way. But we should still work towards finding and surveying hibernacula to get clearer picture of West
    - Putting effort into NA Bat and long-term capture surveys could be effective
    - Question: Is it possible bats are in better condition going into hibernation in the west? Answer, possibly but some studies suggest western bats are actually smaller. Our bats also may have a much shorter feeding window depending on the location. Logical to think different eco regions and habitat types play into things as well. Swarming project is looking at what bat species show up together, did not test for WNS, just posing a possible infection path for fugus during swarming.
    - Questions: Jewel cave, any updates? Yes, interesting example: occurs on eastern MT interface with Plains, has many bats, makes you wonder if bats are traveling further to this site due to lack of availability in the eastern portion of the state? Took large hit, behaving like the eastern sites. Atypical site for the west. Moving west, you see bats using other types of sites such as talus slopes. Finding MYLU using variable resources based on availability and ease of access. Water element could also play a role in hibernaculum use

Myotis volans hibernation strategies, habitat use, and genetic structure (Dewey)

- Monitoring at CSU Mountain Campus for 5 years, last 4 have begun in May through October
- Bats not showing up until June, but not leaving until November
- ~9000ft elevation along South Fork, Cache La Poudre, radio telemetry
- Catching reproductive females almost exclusively
- Break through this year, resulted in interesting patterns, populations like this that are very difficult to track to maternity roosts, suggest looking for WNS signs at all capture sites not just at roosting locations.
- Found bearings this year, but frequently not actual roost locations
- Found they are using the landscape in a much broader sense than thought before.

- Found one bat 8 miles from original capture locations
- Maybe the females have warm roost and good foraging in the riparian corridor but are moving much further for the roosts.
- Volans and elevation: most frequently found species at high elevations
- Question, Answer, no, it did not effecting the foraging site
- Suggest swabbing not based on a date, but on the availability of bats based on idea that Myvo show up later in season at high elevations

Lunch Break (First audio ends and second audio file resumes after lunch)

Pending tri-colored bat listing (Salamack)

1) What does a bat listing for CO look like?
2) Bat listing discussion
    - Current USFWS Listing Status
        - Proposed for listing a little over a year ago, originally proposed final listing for September 2023, that has been pushed for guidance documents to catch up. No new timeline yet.
        - Range in CO, mapping in progress, based on NA Bat data, current map was based on the assumption tricolors followed waterways and riparian systems
        - Conversation on “forest limited” vs “not forest limited”, might be different guidance based on the habitat types and roosting opportunities
        - Current details on presence and habitat behavior, confirmed in a handful of counties
        - Prevailing thoughts that they are fleeing areas of heavy WNS
        - Showing up in relatively low densities
        - Detected above ~9000 ft elevation, possible they occur higher than originally thought
        - No known maternity colonies or hibernacula in CO
        - TCB tend to roost in larger diameter deciduous and possibly pine trees and leaf/needle clusters
        - Don’t show roost fidelity as highly as other species
        - Gudance tools: range wide determination key, (Kristin can send if interested) tackles ALL types of activities. Not currently finalized, drafted
        - Federal highways Programmatic BO in the works, add TCB
        - Working on presence/absence structure survey guidance
        - Survey Guidelines, will follow Indiana and northern long-eared bat survey guidelines, have the ability to be updated every year, may be changes March 2024 for TCB updates
        - Survey Guidelines: projects in suitable habitat, chance of adverse effect, use NLEB acoustic level of effort (LOE)
        - Summer range May 15-August 15
            - Linear, minimum 4 detector nights per km
            - Non-linear, minimum 14 detector nights per 123 acres of suitable habitat
            - If no HF (>35kHz) no qualitative analysis needed, assume absence
            - No automated acoustic ID approved for use in western US where TCB overlaps with similar spp such as Canyon bat
            - Results honored for 5 years (2 for transportation projects)

- Kaleidoscope Pro and BCID are in the process of getting approved, service is leaning towards acoustics for presence rather than mist netting as it is assumed TCB are flying too high to be captured in nets
- Consultations: avoid activity May15-July 31, CDOT short determination key for routine bridge/culvert (>4ft tall) maintenance:
  - Habitat w/in 1000ft?
  - Evidence of habit use 2 years max before project?
  - Will talus of other rock be disturbed?
  - And trees >4" dbh trees to be removed?
  - Removal can be done outside pupping season?
  - Nightwork?
- Questions? Reach out to Kristin_salamack@fws.gov Colorado Field Office TCB Lead or Marykay_watry@fws.gov at the Colorado Field Office, USFS BIL Team
- Question: given that acoustic will be a big part of detections for presence, what will that look like? Answer, 97% accuracy for TCB, very easy manually as well. Historically, limited data set to inform auto ID. Overlap of canyon bat and TCB, acoustics are difficult to differentiate between, should be careful in SE CO. Question, thoughts on development of programmatic BO for veg or fuels projects? Question, share of acoustic data or equipment? How to fund this? Listening Lab @ ____ using listening Moths, looking for opportunity for partnering. Communicate with the State to fold into existing survey efforts. Limited number of detectors can be loaned out from NA Bat, but that is largely for people waiting on already ordered equipment and long-term studies.

Bat Health (Malmlov/Branigan)

1) Wing wasting in CO bats
   - Different than the scarring and defects in the wings from WNS
   - Aim to define spectrum of health to disease through physiology metrics in bat
   - History: bats presenting with swollen joints and necrosis of wing membranes, unable to fly, discharge on wing, pain
     - Recovery time is about 1 week, 2 for healing to be seen
     - Diagnosis is either wing wasting or erosive dermatitis
     - Treated with antibiotic and topical gel, NSAID
     - About 6 cases per year
   - Not a lot of existing literature to help tend to bats
   - Most through Bat World, care facility in Texas
   - Mean presentation is in joints and wing membrane
   - Conclusions: occurs across multiple states and species, suspect both are the same thing, wing wasting and erosive. Much work needed to identify causes
   - Approaching opportunistically, lots of work needed to establish trends,
   - Not all cases as severe as listed in limited literature
     - Noticing wings become transparent
   - Histopathology: dermatitis, incidental ectoparasites (lice and demodex), multiple organ involvement. Heart: inflammatory cell influx; carpal joint: influx of inflammatory cells, scarring, inflammation, bone loss; wing: thickening, inflammatory cells

- Disease timeline, ruled out fungal infection, seems to be bacterial in origin, mycoplasma, unknown incubation period, bats can recover, is this dues to intervention or normal course of disease, long term consequences is joint issues preventing flight
- Plan: rehab inquiries to define the problem, document symptoms and rate of recovery and range of treatments, collect more samples, define pathology/physiology, inform treatment
- For questions, call Ash Malmlov (ash@bathealthfoundation.org, 303-861-4173) or Chris Branigan (cbranigan720@gmail.com, 720-351-1098)
- Question, is this a recently presenting disease or has it been around? Answer, we just haven't been exposed to it, need to connect communities to get more info on it.
- Question, have you collected ticks? Answer, have not, but keeping in mind for possible transmission vector

2) When is rabies testing needed?/Variation in County Health Dept Responses
    - Goal is to have open discussion for how people are submitting animals for rabies testing, and disease trends. Can protocols be bolstered and protect bats?
    - Resources: compendium of animal rabies prevention and control, CO revised statutes, CDPHE website
    - National recommendations, surveillance should not be limited to
    - Trends, 30% of species tested in 2021 and 22 were bats, about 10% were positive for rabies
    - Question, what were the criteria for animals being submitted and tested? Answer, rabies testing in CO is bizarre, one indicator is WHO is the submitter, bats are submitted with public health's knowledge, if a bat is alive, suggest it should be euthanized and tested if there was an exposure. Bats are being tested are ones that either exposed a person or domestic animal. Often don't have enough info to determine what type of exposure it was initially. Only gatekeeping is if the state is willing to pay for testing.
    - Testing Trends through the year, most testing when bats are available. Most testing in big browns, animals are speciated by the one doing the necropsy. Defining exposure, for indications for rabies testing. Assay, direct antibody test, fee waived for wild carnivores of bats suspected or confirmed contact with human, domestic pet or livestock
    - Decision tree for if a pet is exposed, if an exposed pet is vaccinated, can the bat be sent to rehab and/or be released? Can the bat be quarantined rather than euthanized if not vaccinated?
    - Guidelines for domestics
    - Conclusions: how are samples being submitted? Target goal for percent positives for surveillance? Areas where we can be more intentional in surveillance?
        a. No breakout viruses. Very possible euthanizing young bats, do we need to euthanize bats if the pet is vaccinated? Can the flow chart for determinations/decision process be changed to standardize County approach? Answer difficulty with changing guidelines are governmental.

North American Bat (NABat) Monitoring efforts (Schuhmann)

- Broad overview: international network to improve collective understanding of where bats are and how that changes over time.

- Status and trends, completed and published 1st set of variable data report – summer occupancy
  - Shows downward trend, covered 12 species,
- Summer abundance report should be coming out soon, under review now.
- All available through Science Base
- USFS R2 approached to help develop training to facilitate and participated in NA Bat
- CPW has shared almost 30,000 bat records with NABat.
  b. 1) Armstrong publication 1994
  c. 2) Scientific Collections permits
  d. 3) CPW bat database
- Stationary Acoustics, CO had great stationary records since the addition of the CPW records. Capture accounts and colony counts low
- New distribution data was release on science base for TCB, can be used for conservation efforts
- AFWA recently released resolutions across agencies to consider transportation structure impacts on bats\NABat drafted guidance intended to help standardize protocols and encourage submission of data to NABat database. All data can be pulled into NABat to help inform information gaps
- Updates to expand NABat R Package, options for queries, data submissions, custom reports, access to geospatial data
- Improved collation and accessibility to analytical tools and resources
- Self-scheduled NABat support meetings at NABat.org, "book tech support appt" button
- New and updated training videos under quick links, all videos have timestamps to skip to needed info easily
- Improving definitions for upload templates and data request outputs, making more user-friendly
- Updates to partner Portal: Redesigning the partner portal entirely. Making it easier to see what users need to improve their data or assess needs.
- NABat hosts working groups for each survey methodology, stationary acoustic working group developing better system to get species list by location. Ans example, removing pallid bat from historic range maps based on extensive data collected over time, also providing better maps for red category species

1) 2023 Colorado accomplishments (Siemers)
   - Negotiating forming a regional Bat Hub, Utah, Montana, Colorado, Wyoming, etc
   - A way to do regional analyses to see how WNS is moving across the region, and leverage some resources.
   - Most states had things going on prior to the Hub
   - Site is not live, Rocky Mountain Bat Hub: available to anyone (eventually), currently working on apps to help upload and view data on site. Can toggle through different years to view different species, currently only displaying projects Jeremy is listed on through NA Bat, need to give permission to get your data set added to Hub site. Working on species richness map, also potentially looking at activity level maps as well.
   - Reach out to Jeremy to get data included
   - What are the next steps in the Hub? In negotiations with the other states held up by personnel turnover. Mostly a tool based on acoustic data, but there is a push to get other data types added more frequently.
   - Ran a mobile route near Fort Laramie, interested in activity around the known roost, if there was association in picking up more bats with the known roost. Could show critical corridors for bat use.
2) Modeling bridge use by bats (Frankie Tousley)

- One Health: predictive roost model. Began in 2022, followed up in 2023 with more robust survey methodology this year. Found many roosts this year, data in process now with University of Montana. Less about results, more CAN WE predict? Made to find free-tailed bats, offshoot to help bolster the number of known roosts. Next year, hopefully can use predictive model in a different region. Looking for local help in searching bridges
- Bats and Transportations structures, message Andrea to be added to the distribution list. Info is also available on NABat.org on "News" page
- Anyone who is working with large data, had two-day workshop hearing from folks working with large data sets, workshop available on NABat.org. One of the choke points is getting the data compressed, NABat now has an auto compression ability, reach out to Frankie if you are interested

BCI State of the Bats (Bayless)

1) How it was derived
2) Findings
   - Mylea Bayless: Bat conservation international
   - Email for copy of State of the Bat Report
   - Purpose: assess the conservation status of species of bats in NA
   - 1,469 bat species on earth, 154 in NA
   - Expert Elicitation, essentially used nature serve process, allows to capture in-expert uncertainty, and eliminate bias of own data. Converted each expert response into a certainty estimate
   - 108 experts participated in assessment effort
   - Began elicitation just before covid, sent out request in US and Canda, Mexico held a series of virtual workshops.
   - What was assessed, nature serve criteria, asked for best estimates of range extent, pop size, pop trends, impacts of threats
   - Threats: IUCN threat categories to standardize across countries, threats roll up like tiers, getting less broad as it goes up
   - Impacts of Threats: scope and severity of the threat, the two together provide relative ranking evaluating "threat"
   - Example, Florida Bonneted Bat: occurs just in southern Florida, last assessed in 2015 on the red list "vulnerable", during elicitation experts asked to estimate range extent, next populations size, population trends, and threats: climate change (temperature extremes).
   - Threats to Bats: identified the primary threats to all bats: habitat loss, climate change, pollution, energy production, direct mortality, ____
   - Top 5 threats vary significantly by country
   - Level 2 category threat ranked,
   - Ranked across countries, they become more similar
   - How do we summarize and share this information? Report is summarized for public consumption. Working on a peer-reviewed manuscript for a more scientific audience.
   - Report is available in Spanish and French, and in an interactive online format
   - Outline: limited to 12 pages to not overload the public
     - Struggled with how to show the threats, and both levels
     - One of the most compelling graphics shows the number of species and their status in each country.
   - Questions, reach out to Amanda Adams (aadams@batcon.org)

- Digital copy: https://digital.batcon.org/state-of-the-bats-report/2023-report/

15 Minute Break

AML summary (Navo/Thompson)

1) A review of the Bats/Inactive Mines Projects & the AML program
   - Important time for abandon mines to be discussed in face of other threats taking priority
   - The discovery of the AML program was in 1990, 10 years after the reclamation activities began in CO by Division of Minerals and Geology
   - How it started: Kirk transferred down to San Luis Valley, Orient Mine, huge TABR roost,
   - In 1990, Dr. Armstrong working in Durango in two mines, learned the mines were going to be closed, contacted Judy Shepard (retired CPW) for more details. This kicked off the project identifying the need based on other abandoned mines in similar situations
   - Project launched to survey the mines, found the mines were across land ownerships, complicating efforts. Project was funded mostly by grants federal funding, etc.
   - Recruited volunteers for large scale project, used detectors and visual surveys outside mines
   - Between 1990-2009, over 58,000 volunteer survey hours, including detector surveys, gate surveys, gate confirmation trips, and assisting with capture surveys
   - Most seasonal crews were recruited from volunteers who stayed on the project long-term
   - Training began with some DMG project managers and John Burghardt. Having caver Tom Ingersoll involved speed things up, 1997 started standardized protocols
   - Bat gates and Mines, by 2009 almost 6,000 installed, used many different designs based on needs and safety,
   - Species results: 14 species, Townsend most documented using mines, roughly 6,300 bats captured, across 37 counties
   - Funding from a variety of sources, $1.3 million
   - Mine field evaluations from 2010-2022, fewer and fewer surveys, now based on experience for recommendations for gate needs
   - Funding from DRMS still continued today
   - 2010-2022, 2,929 mines evaluated, 148 projects, 756 bat gate recommendations
   - In 2012 CNHP took over project lead, 2013 shifted from surveys to site info based approach, work continued through 2015
   - Data has provided significant contribution to species info across CO
   - What is the future plan for the bats and abandoned mines?
     - Many people who worked on the project are retiring, needs have shifted, need to assess what is still needed and how to address those needs. Need to understand the history of the project to address that. Many of the first WNS monitoring sites were abandon mine sites. Question, after the gates go in, what are the maintenance needs? Answer, some sites frequently vandalized, mining side is responsible for maintaining, however if there is not communication between wildlife and mining, those safeguards fall off the awareness.
     - Installing gates eventually became so efficient it was cheaper to install a gate rather than send a crew in to backfill a site, but that often meant we still didn't get data from that site first.
     - Sites are not officially listed/protected from public view
     - Question, department of energy, have several sites on BLM that are monitored, reach out for that information, our roosts are spread out and not necessarily

individually biologically significant, but the area as a whole might be significant; abandoned mines might be very significant for TCB in the long run

- Question, Is there a good way to asses abandoned mines which have gates without a door? Answer, possibly acoustic surveys, not as good as internal for confirming use by hibernators.

Round table: Anyone with info to share with the CO Bat Community

- Caver Registration requested when visiting caves on USFS, form on FS website, mostly on the White River.
- Colorado Bat Watch site went live this year
  - Have gotten 70 observations so far, three in range of 100-300 bats
  - https://coloradobatwatch.org/