Photo Credit: Chris Ray

NAPC V: Virtual Conference 2023
FINAL CONFERENCE REPORT
Abstracts & Presentations

Schedule for Synchronous Conference

The meeting will begin at 9am PT / 10am MT/ 11am CT /12pm ET; times below listed in MT)

10am – Welcome & Conference Goals (Erik Beever)
10:15am – Save the date: In-person NAPC VI next summer (Johanna Varner)
10:20am – Explanation of working group set up (Johanna Varner & Peter Billman)

10:30am – 11:15am – Working Group Meetings I (Breakout Rooms):*Climate OR Genetics*
Meeting Notes/Agenda: Climate
Meeting Notes/Agenda: Genetics
11:15am – 11:20am – Regroup & Move to Next Working Group Session

11:20am – 12:05pm – Working Group Meetings II (Breakout Rooms): *Field Methods OR Research & Review OR Education & Public Engagement*
Meeting Notes/Agenda: Field Methods
Meeting Notes/Agenda: Research & Review

Meeting Notes/Agenda: Education & Public Engagement

12:05pm – 12:35pm – Break
12:35pm – 12:40pm – Regroup & Move to Next Working Group Session

12:40pm – 1:25pm – Working Group Meetings III (Breakout Rooms): *Distribution & Habitat OR Behavior, Health, and Physiology*

Meeting Notes/Agenda: Distribution & Habitat
Meeting Notes/Agenda: Behavior, Health, & Physiology
1:25pm – 1:30pm – Regroup in Main Room

1:30pm – 2:30 pm – Working Group Reports: Each group will get 7 mins to summarize discussions, action items, and next steps

2:30pm – 3pm – Next steps, input for NAPC VI

Notes document
3:00pm – Adjourn

Photo Credit: Craig Stevenson

Recorded Talks

Please watch these pre-recorded talks before attending the synchronous conference, which will be primarily comprised of working group meetings, as per the schedule above. ***Comments and questions may be made in the comments of YouTube (please monitor your own video for comments/questions) and/or by emailing the corresponding author in the address below.*** However, there will not be a live Q&A session for recorded talks in the meeting.

Thematic Session: Climate

Emily Monk, University of Colorado Boulder; Memorial University of Newfoundland and Labrador, St. John's
Chris Ray, University of Colorado Boulder

An increase in American pika habitat temperature over 50 years on Niwot Ridge. The American pika (*Ochotona princeps*) requires access to subsurface microclimatic refugia for behavioral thermoregulation. However, the quality of these refugia may degrade with climate change, increasing the pika's climate exposure. We compared recent (2009-2021) free-air and subsurface temperatures with a rare historical (1963-1964) dataset from the same

location by replicating historical sensor placements. Recent free-air temperatures were often warmer than the historical record, and subsurface temperatures exhibited even stronger warming between periods. The greatest change occurred during winter months, when temperatures were much lower in the historical record than during recent years, especially at subsurface sensor placements. If these results are representative, microclimates important for pika thermoregulation might be warming faster than free-air temperatures, and may no longer experience a deep freeze during winter.

Presentation Link: https://youtu.be/NHj4npCGhMM
Correspondence: emily.monk@colorado.edu

Jennifer L. Wilkening, U.S. Fish and Wildlife Service, National Wildlife Refuge System,
Erik A. Beever, U.S. Geological Survey, Northern Rocky Mountain Science Center; Montana State University
David H. Wright, California Dept. of Fish and Wildlife
Jocelyn M.R. Hirose, Parks Canada (Banff, Yoho & Kootenay National Parks)
(and 46 additional coauthors:
https://www.sciencedirect.com/science/article/pii/S0006320723000423)

Lower adaptive capacity among pikas than in other mountain-dwelling small mammals. Climate-change effects can be moderated by levels of exposure, sensitivity, and adaptive capacity (AC). AC can be defined as the ability of an organism to respond distributionally, behaviorally, or genetically to climatic variation. Here, we utilized an attribute-based framework to assess adaptive capacity of American pikas (*Ochotona princeps*), as a species and at different taxonomic levels, and four sympatric species inhabiting mountainous areas. Pikas were assessed as having lower AC relative to other species, whereas a habitat-generalist species (deer mouse, *P. maniculatus*) exhibited the highest. Among pika lineages, AC levels were lowest in *O. p. uinta* (Utah). AC levels were lower in interior-Great Basin pikas than across the entire *O. p. schisticeps* lineage, consistent with the observed pattern of population losses in this region. We conclude that lower AC levels in pikas further indicates a high susceptibility to contemporary climate change, as corroborated by other studies.

Presentation Link: https://youtu.be/p8-QbOOwhAc
Correspondence: jennifer_wilkening@fws.gov

Thematic Session: Conservation & Management

Chris Smith, University of Nevada at Reno
Badmaa Dovchin, Montana State University
April Craighead, Craighead Institute
Tumursukh Jal, Park Director Ulaan Taiga Park Administration
Battogtokh Tumur, Ranger Ulaan Taiga Park Administration

Daurian pika population fluctuations in the Darhad Valley of Mongolia. Daurian pika (*Ochotona daurica*) live in grassland colonies, similar to prairie dogs in North America, and are a keystone species for the soils and plants of the steppe, despite significant increases in grazing pressures. We surveyed 87 randomly generated plots across the 100 km long Darhad Valley in northern Mongolia in the fall of 2019 and summer of 2022. Populations in 2019 showed around 50% occupancy on the valley floor, and their density correlated with taller grass height and higher forb cover, likely reflecting predator cover and winter hay-piling foods. In the summer of 2022, the population crashed to around 20% occupancy, likely due to a large flood that strangely did not impact the northern part of the valley. Grazing appears to strongly impact pika populations in typical years, but factors related to geophysical location of habitat and its soil permeability, compounded with strong spring temperature fluctuations may have larger impacts through stochastic events.

Presentation Link: https://youtu.be/UrUUV5-TFcQ
Correspondence: chrissmith@unr.edu

Rachel Billings, University of Colorado Boulder
Chris Ray, University of Colorado Boulder

First steps in audio classification of pika vocalizations using deep learning. Bioacoustics can provide valuable insights into wildlife population dynamics, evolutionary patterns, and behavior through the analysis of vocalizations. Previous research in bioacoustics has focused primarily on bat, bird, and marine mammal species, while relatively few of these studies have addressed alpine mammals. This study begins to address this gap by applying deep learning to the classification of calls by the American pika. Threshold detection was used to extract pika calls logged by automated recording units deployed in the Rocky Mountains (CO, USA). Calls were stored as individual samples, human-validated, and manually labeled. Using a neural network to identify samples in a test dataset as either “short” or “long” calls resulted in >80% accuracy. Future directions for the study include expanding classification to other features, such as location and sex, and developing a labeled pika vocalization dataset to advance the feasibility of analyzing large amounts of field data.

Presentation Link: https://youtu.be/Rncq03g3PWQ
Correspondence: rachel.billings@colorado.edu

Thematic Session: Distribution & Habitat

Chris Ray, University of Colorado Boulder
Jasmine Vidrio, University of Colorado Boulder

Long-term data reveal a severe decline in recruitment of the American pika on Niwot Ridge. A dramatic decline in American pika habitat occupancy during this century has been forecast for Rocky Mountain National Park (Colorado, USA), due in part to climatic curbs on recolonization of empty habitats by juvenile recruits. To evaluate this forecast, we reviewed available data on climate and juvenile recruitment from just south of the park, at the Niwot

Ridge Long-Term Ecological Research site. We used generalized linear models to relate the number of juveniles captured to year and warm-season temperature metrics, while accounting for interannual variation in breeding dates, trapping effort and capture dates. From 1981 to 2020, the number of juveniles captured per adult declined dramatically and inversely with time or warm-season temperature, and this decline could not be explained by changes in trapping effort, capture dates or breeding phenology. This climate-related decline in pika recruitment near the park lends support to the previous forecast of range contraction.

Presentation Link: https://youtu.be/lgUOIpom_6o
Correspondence: cray@colorado.edu

Chris Smith, University of Nevada at Reno
Mila Opalenik, University of Nevada at Reno
Joseph Stewart, UC Davis
Kevin Shoemaker, University of Nevada at Reno

Drivers of pika occupancy in the Northern Sierra: preliminary results. Research suggests American pika (*Ochotona princeps*) in the northern Sierra are experiencing extirpations linked to higher summer temperatures. We re-surveyed 60 talus patches sampled in 2015-17, along with 60 newly surveyed sites, all between South Lake Tahoe and Sierraville, CA (100 miles). Of the 60 sites re-surveyed, few had changed status, with 4 going extinct and 3 being colonized. We near-exhaustively surveyed seven areas at a 1 km diameter and found they had recently gone extinct (preserved scat present); this includes most of the Carson Range. We modeled pika occupancy as a function of talus area, talus diameter, summer temperatures, precipitation, vapor pressure deficit (a metric of dryness), and solar insolation at distances varying from 0-5 km from each talus patch. Preliminary model comparison suggested that summer temperatures within 5 km best-predicted occupancy. We hope to survey more patches this coming year to provide a better picture of regional occupancy.

Presentation Link: https://youtu.be/bB4EpgR96Vc
Correspondence: chrissmith@unr.edu

David Wright, California Dept Fish & Wildlife,
Erik Beever, U.S. Geological Survey, Northern Rocky Mountain Science Center; Montana State University
J. A. E. Stewart, Dept Environmental Science & Policy, UC Davis, CA
A. M. Gill, Bozeman, MT
F. Gerraty, UC Santa Cruz, CA
M. Robinson, Dept Ecology, Montana State University, Bozeman, MT
J. Fitzgerald, unaffiliated
T. Rickman, Lassen National Forest, Susanville, CA
K. Klingler, University of Massachusetts, Amherst, MA
A. B. Smith, Missouri Botanical Garden, St. Louis, MO

An impassable gap dividing pika distribution in Northern California. The American pika's distribution in California has been considered as continuous from the northern California border to the southern Sierra Nevada. Because of recent losses of pika distribution in and near California, we surveyed extensively throughout the Feather River divide to clarify its status. To previously known localities, our surveys added 10 talus patches currently pika-

occupied and 20 patches with evidence only of past occupancy; 156 surveys found no pika sign. Pika-occupied patches were clustered in only 4 locales (e.g., 6 occupied patches atop English Mt.), whereas previously-occupied patches spread across 15 locales, suggesting contraction of distribution. We documented a broad, likely uncrossable gap in pika distribution across the divide. Pikas appear effectively isolated into at least two distributional areas in California. The southern region is unlikely to have any connectivity with other pikas, raising conservation and climate-adaptation concerns.

Presentation Link: https://www.youtube.com/watch?v=f95jAZxLt3A
Correspondence: dwrighteco@protonmail.com

Erik A. Beever U.S. Geological Survey, Northern Rocky Mountain Science Center; Montana State University
Dylan K. Ryals, Purdue University, Dept. of Entomology
Adam B. Smith, Missouri Botanical Garden, Center for Conservation and Sustainable Development
Peter D. Billman, Univ. of Connecticut, Dept. of Ecology & Evolutionary Biology
April Craighead, Craighead Institute, Bozeman, MT

Patterns and predictors of pika occupancy and density, across the Greater Yellowstone Ecosystem Refugia are important landscape components for individual, population, and species persistence, at many spatio-temporal scales. We surveyed for pika occupancy and abundance across the GYE region, which is predicted to be a pika distributional stronghold. Across 331 patches surveyed in both 2014-2016 and 2019-2021, between-period re-colonizations (12) were ~half of patch-level blink-outs (23); extirpations strongly outpaced recolonizations in only 1 of our 4 studied areas (Gallatin NF). However, pika abundance in GNF pika-extant patches rose between periods. Vegetation appears not limiting, GYE-wide. Top models for occupancy and abundance primarily reflected snowpack and its retention, sometimes accompanied by summer-time rain or vapor pressure deficit. We observed higher density and fewer distributional losses of pikas, relative to other regions – aligning with previous pika-distribution forecasts of GYE as a refugium. Our findings mirror 2016 results from 8 western-USA national parks.

Presentation Link: https://youtu.be/UV_XUyVW8lA
Correspondence: ebeever@usgs.gov

Marie L. Westover Los Rios Community College District, Department of Biology
Erik A. Beever U.S. Geological Survey, Northern Rocky Mountain Science Center; Montana State University
Adam B. Smith Missouri Botanical Garden, Center for Conservation & Sustainable Development
Francis D. Gerraty University of California, Santa Cruz, Department of Ecology and Evolutionary Biology
Peter D. Billman University of Connecticut, Department of Ecology and Evolutionary Biology
Felisa A. Smith University of New Mexico, Department of Biology

Climate drives patterns of occupancy and density more strongly than biogeography Identifying the factors that drive species distributions and abundance is a central aim in ecology. Our study seeks to evaluate the influence of climate, biogeography, and ecological factors on occupancy and density of American pikas (*Ochotona princeps*). We

surveyed 596 talus patches for density, current and previous occupancy of pikas from 2016-2021 at the southern edge of their range in the Rocky Mountains. We investigated which factors influenced current and previous occupancy, as well as pika density. Across our study, we found that 36.6% of patches were occupied by pikas, 44.8% were previously occupied, and 18.6% had no evidence of pikas. The top-ranked models to describe binary occupancy, ordinal occupancy, and density were distinct, but shared similar patterns. Temperature variables were consistently more influential than precipitation, isolation, or other ecological factors, suggesting the importance of temperature to pika occupancy and density at the trailing range edge.

Presentation Link: https://youtu.be/PbBKpJgHzWE
Correspondence: mariewestover@gmail.com

Thematic Session: Education & Public Engagement

Johanna Varner, Colorado Mesa University
Megan Mueller, Rocky Mountain Wild
Stefan Ekernas, Denver Zoo
Chris Sprague, tCubed Studios
Alex Wells, Denver Zoo

Presenting Pika Patrol: A mobile app dedicated to community monitoring of pikas! We developed a custom mobile app for volunteers to record pika observations. "Pika Patrol" allows users to collect and submit sound, photographs, and other data on pikas as well as view offline training materials. In Fall 2023, we launched Pika Patrol for both Apple and Android devices. Since then, the app has gotten over 1,200 downloads, and users have submitted 117 photos and 30 sound observations. This year, we plan to further broaden engagement by fixing bugs identified by users, translating the app into Spanish, and developing interactive maps and training materials for partner organizations to easily integrate Pika Patrol into their programming. Pika Patrol was developed by the Colorado Pika Project, but other community monitoring efforts have also formally integrated the app into their programming. We hope that this platform will become an easy and engaging way to centralize data collection and engage more citizen scientists in monitoring this charismatic species.

Presentation Link: https://youtu.be/k3kiM3Wzkrw
Correspondence: jvarner@coloradomesa.edu

Thematic Session: Genetics & Genomics

Bryson M.F. Sjodin, University of British Columbia, Okanagan
Michael A. Russello, University of British Columbia, Okanagan

Comparative genomics reveal putative evidence for high-elevation adaptation in the American pika High-elevation environments pose challenges for species, including lower atmospheric oxygen content, reduced temperatures, and higher levels of UV radiation. Previous work on American pikas has shown preliminary evidence for high-elevation adaptation; however, investigations to date have been limited to a fraction of the genome. Using a comparative genomics approach, we identified putative regions under selection across the American pika genome. We found functional enrichment of pika-specific orthologs related to hypoxia, metabolism, mitochondrial function, and DNA repair. We found 15 expanded gene families with terms enriched for hypoxia adaptation and detected 196 positively selected genes, with 41 genes having putative adaptative links to hypoxia, cold tolerance, and response to UV. Genes such as OXNAD1, NRDC, and those involved in DNA repair are important targets for future research on the functional implications of adaptation to changing environments in the American pika.

Presentation Link: https://youtu.be/rHlS1rFVOks
Correspondence: bryson.sjodin@ubc.ca

Danielle A. Schmidt, University of British Columbia, Okanagan
Kurt E. Galbreath, Department of Biology, Northern Michigan University, Marquette, MI, USA
Michael A. Russello, University of British Columbia, Okanagan

Phylogenomics of American pika (*Ochotona princeps*) lineage diversification Quaternary climate oscillations have profoundly influenced current species distributions. For many montane species, including American pikas, such fluctuations were a prominent driver in species range shifts, often resulting in intraspecific diversification. Previous American pika research suggests that historical climate fluctuations resulted in five mitochondrial DNA lineages that diverged between 0.76-1.36mya. Here, we used genome-wide data (25,244 SNPs) collected across the American pika range to reconstruct the number, patterns, and timing of diversification of the major lineages. We found evidence for six distinct lineages that underwent multiple rounds of divergence between 0.048-1.89mya. We also detected significant population differentiation across multiple spatial scales, with levels of standing genetic variation similar to previous work. Given current subspecies designations, detection of an additional lineage may potentially have taxonomic and conservation implications.

Presentation Link: https://youtu.be/ZxLW1DoaYTM
Correspondence: danielle.schmidt@ubc.ca

Kate Arpin, University of British Columbia Okanagan
Danielle Schmidt, University of British Columbia Okanagan
Bryson Sjodin, University of British Columbia Okanagan
Tony Einfeldt, Parks Canada
Michael Russello, University of British Columbia Okanagan

Developing a genetic monitoring tool for American pikas using non-invasive and archival samples Genetic information can aid in understanding spatiotemporal population trends and connectivity of American pikas, particularly by using non-invasive (NIS) or archival samples (AS) to supplement ecological surveys. However, DNA from NIS and AS is often of low quality and quantity, hindering genotyping success. Using contemporary tissue samples

(n=77), we developed a multi-purpose Genotyping-in-Thousands by sequencing panel (307 SNPs) for American pikas of the Northern Rocky Mountains lineage and applied it to archival tissue (n=17) and fecal pellet samples (n=129) to identify individuals and sex, estimate relatedness, and infer population structure. The panel demonstrated high efficacy with contemporary and archival tissue samples (94.7% and 90.5% genotyping success, respectively); however, genotyping error was high (28.4%) for fecal pellets, currently limiting its power as a monitoring tool using NIS and highlighting the need for further optimization of sample and data collection.

Presentation Link: https://youtu.be/1a8ax2G4CyM
Correspondence: kearpin@mail.ubc.ca

Thematic Session: Health & Physiology

Airy Peralta, University of Colorado Boulder
Chris Ray, University of Colorado Boulder

Occupancy surveys reveal a healthy pika population in a region hit by rabbit hemorrhagic disease Many species are threatened by more than one aspect of global change. The American pika, a small lagomorph, might be stressed by both climate change and exotic disease. We surveyed for evidence of these threats in Great Sand Dunes National Park (Colorado, USA), where climate-mediated pika losses are predicted and a variant of rabbit hemorrhagic disease (RHDV2) is causing mortality in the surrounding lagomorph community. In 2022, we surveyed for fresh sign of pikas and other lagomorphs using a spatially representative sample of 115 plots, including 48 plots surveyed for pikas in 2010-2012. Each plot was centered on pika habitat and extended into surrounding habitats via two transects. Pika sign was nearly ubiquitous in plots above tree line and was at least as common in 2022 as in 2010-2012. Other lagomorph sign was detected mainly below tree line. These data will be used to model lagomorph occurrence across the park as a proxy for exposure to RHDV2, which might prove lethal to pikas.

Presentation Link: https://youtu.be/_91fToT3WLw
Correspondence: airy.gonzalezperalta@colorado.edu

Ashley Whipple, U.S. Geological Survey
Chris Ray, University of Colorado - Boulder
Johanna Varner, Colorado Mesa University
James Kitchens, Warren Wilson College
Alisa Hove, Warren Wilson College
Jessica Castillo Vardaro, San Jose State University
Jennifer Wilkening, U.S. Fish and Wildlife Service

Stress-associated metabolites vary with season and habitat across populations of the American pika If organisms are less stressed in higher quality habitats, then metrics of physiological stress could help indicate habitat quality to inform conservation efforts. We tested this hypothesis in a system with previously characterized metrics of habitat quality and stress by measuring fecal glucocorticoid metabolites (FGMs) from Colorado pikas living in taluses with or without subsurface ice. Taluses with ice have subsurface environments that are buffered from free air temperatures and may provide good quality habitat for climate-sensitive species like pikas. Using linear mixed effect models, we found support for interacting effects on FGM levels, which covaried with season, elevation, putative ice presence, graminoid cover, graminoid to forb cover ratio, and increased exposure to higher subsurface temperature. Our results contribute to the growing evidence that FGMs might be developed as a tool to assess habitat quality, and that taluses with ice may be important refugia for pikas.

Presentation Link: https://youtu.be/3ySXfoGqwgw
Correspondence: awhipple017@gmail.com

Emma Perkins, University of Colorado Boulder
Chris Ray, University of Colorado Boulder

Identifying predictors of ectoparasite abundance on American pikas in Colorado Climate change will alter the distribution and prevalence of ectoparasites that vector disease due to changes in the environment as well as host distribution and physiology. Factors that influence ectoparasite load on the American pika (*Ochotona princeps*) have received little study despite recent focus on pika losses that might be related to diseases circulating in small mammal communities. This study relates pika flea and ear mite load to environmental and host characteristics using generalized linear mixed-effect models in an information-theoretic framework to rank factors that might influence the future of vector-borne diseases in this system. We sampled 298 pikas and their habitats during June-November of 2008-2017 at four sites in Boulder County, Colorado. Both fleas and ear mites were best predicted by environmental rather than host characteristics, suggesting there might be relatively direct effects of future changes in the environment on pika disease transmission.

Presentation Link: https://youtu.be/t2AJH-PvnmA
Correspondence: emmatdperkins@gmail.com

Hilary H. Rinsland, Northern Michigan University
Kurt E. Galbreath**,** Northern Michigan University

Investigating *Bartonella* prevalence as a potential stressor in American pika populations Range reduction and habitat fragmentation for thermo-restricted American pikas (*Ochotona princeps*) may make them more susceptible to novel disease spillover resulting from new species interactions in a changing landscape. Therefore, it is important to understand the distribution and diversity of pika-associated pathogens, such as *Bartonella*, a bacterial genus that has potential implications for the health of pika populations. This study used a geographically extensive sample of DNA extractions collected from fleas representing the five *O. princeps* lineages. *Bartonella grahamii* was identified in fleas in 16 of 34 of the localities distributed across the entirety of the *O. princeps* lineages. The minimal genetic variation across the sampling distribution indicates a recent expansion by the bacterium

throughout the *O. princeps* range, occurring well after the second North American colonization of pikas from Asia during the Pleistocene.

Presentation Link: https://youtu.be/RIfAo6QVeR4
Correspondence: hrinslan@nmu.edu

Thematic Session: Interspecies Interactions

Mallory Sandoval Lambert, Utah State University
Johanna Varner, Colorado Mesa University
Johan T. du Toit, Utah State University

Ecological interactions between American pikas and mountain goats in Utah Pikas and mountain goats are naturally sympatric in many areas, but goats have been introduced to Utah, providing an opportunity to study interactions with pikas near their range limits. Goats and pikas could interact through competition, resource partitioning or facilitation. I am exploring these yet-unknown interactions through a field experiment in the La Sals. At 10 sites, a full exclosure excludes both species, a partial exclosure excludes goats, and an open plot allows both. Camera traps verify species visitation. After each season, I clip, collect, and compare plant biomass across plots to calculate consumption by each species. Baseline biomass was similar among plot types, suggesting that future differences will be due to grazers. Pikas are also using the partial exclosure and both are grazing in the open plot. This study will inform management by providing evidence to guide goat transplants and advancing our understanding of interactions between pikas and other species.

Presentation Link: https://youtu.be/2SduE3l70LI
Correspondence: mal.s.lambert@usu.edu

Peter D. Billman, University of Connecticut
Mark C. Urban, University of Connecticut

Competitive exclusion by pikas towards woodrats in the Southern Rockies In response to climate change, species are often shifting upslope in montane regions. However, responses vary among species, in part due to biotic interactions. One species that is retracting upslope in portions of its range is the American pika (*Ochotona princeps*). Within talus habitats, other species may then benefit from the loss of pikas. Two species that also occupy talus are yellow-bellied marmots (*Marmota flaviventris*) and bushy-tailed woodrats (*Neotoma cinerea*). Here, we investigate their co-occurrence patterns from field surveys across 157 sites in the Southern Rockies in 2022. Using structural equation modeling, we evaluated how biotic and abiotic conditions constrain these species' distributions differently. Preliminary results suggest pikas are primarily constrained by climate and competitively exclude woodrats from most sites, but all other species' interactions appear neutral. Therefore, bushy-tailed woodrats will likely benefit as pikas continue retracting upslope.

Presentation Link: https://youtu.be/Pna7uRK7eik
Correspondence: peter.billman@uconn.edu

NORTH AMERICAN PIKA CONSORTIUM CONFERENCE (VIRTUAL) – WORKING GROUP DISCUSSIONS

NOTES (MAY 24, 2023)

GROUP: EDUCATION AND PUBLIC ENGAGEMENT

ALL - Welcome! please fill in your contact information in the table below

Current Lead: *Johanna Varner* ***Recorder:*** *Kelly Klingler*

Working Group Member	Affiliation	Email
Johanna Varner	Colorado Mesa University	jvarner@coloradomesa.edu
Megan Mueller	Rocky Mountain Wild	megan@rockymountainwild.org
Melissa VanAllen	Unity Environmental University	mvanallen20@unity.edu
Kelly Klingler	UMass Amherst	kklingler@umass.edu
Alisa Hove	Warren Wilson College	ahove@warren-wilson.edu
Otto Crouch	Warren Wilson College	ocrouch.f20@warren-wilson.edu
Chris Norment	SUNY Brockport	cnorment@brockport.edu
Mila Opalenik	University of Nevada Reno	milaopalenik@icloud.com
Alice Henderson	www.GISforWildlife.com	GIS_Wildlife@yahoo.com
Joan MacKenzie	pika photographer/painter	joan@pikaworks.com
Amy Roush	Ecology/preserve mgmt	canyonwren4@gmail.com

PREVIOUS NOTES for reference:

- Notes from 2017 meeting (TWS) are here.
- Notes from 2015 meeting (Golden) are here - go to page 11.
- *No notes from 2012 conference working group (Portland). 2010 (inaugural) conference did not have detailed notes on the structure or goals of the group.*

NORTH AMERICAN PIKA CONSORTIUM CONFERENCE (VIRTUAL) – WORKING GROUP DISCUSSIONS

NOTES (MAY 24, 2023)

GROUP: EDUCATION AND PUBLIC ENGAGEMENT

Review and Update Goals and Role of Working Group:

1. **Facilitate productive connections** between organizations that engage public audiences in pika monitoring or research projects and facilitates sharing of protocols, processes and data sharing

2. **Lower barriers & provide support** for researchers, educators, and organizations to conduct meaningful public engagement activities (e.g., K-12 student partnerships, course-based undergraduate research experiences (CUREs), citizen/community science, outreach, and media relations)

3. *Should we have a goal related to media relations, such as supporting pika researchers in talking with reporters?*
    a. *Repository or reference of where the literature stands what we have support for*
    b. *Acknowledge that we're not the only voices related to conservation status of pikas*
    c. *Ensure that this allows for flexibility - potential to interface with Research & Review*
    d. *Standardization and consistent messaging but new data are always coming out*
    e. *Media training?*

Group Progress/New Data to discuss since 2017 Meeting:

- **Release of the Pika Patrol mobile app:** Could this be used as a centralized place for pika volunteer monitoring programs? We are in discussions about developing customizable forms or a place for volunteers to indicate that they are participating in a particular program. Datasharing agreements
    - Plans to translate the app into Spanish in 2023-2024 to reach broader audiences, and to develop materials to support community organizations in programming activities that use the app
- **We need to re-generate a list of active programs that monitor pikas:** Which ones survived the pandemic?

Project Name	**Website**	**Status 2023 & Notes**
Colorado Pika Project (formerly Front Range Pika	https://pikapartners.org/	ACTIVE

NORTH AMERICAN PIKA CONSORTIUM CONFERENCE (VIRTUAL) – WORKING GROUP DISCUSSIONS

NOTES (MAY 24, 2023)

GROUP: EDUCATION AND PUBLIC ENGAGEMENT

Project)		
Cascades Pika Watch	http://oregonzoo.org/pika	ACTIVE (post-COVID revival in 2023 & JV is hopeful that the OZ will pick this up in the future)
ASC Pika Project on iNaturalist	https://www.inaturalist.org/projects/asc-pika-project	ACTIVE (*observations submitted in 2022*) - but unclear if it's being monitored actively? The "project website" is dead and it has an outdated FRPP logo
Seventh Generation Institute	https://www.seventh-generation.org/monitoring-climate-and-pika	
Mountain Studies Institute / Pika Net	https://www.mountainstudies.org/pikanet	
Nature Mapping Jackson Hole	https://jhwildlife.org/our-work/nature-mapping/	
Montana Pika Survey / Craighead Institute	http://craigheadresearchprior.weebly.com/pika-research.html	
High Country Citizen Science / Glacier National Park	https://www.nps.gov/rlc/crown/high-country-citizen-science-project.htm	
North Cascades Bioblitz?	https://www.nps.gov/noca/blogs/pika-project.htm	

NORTH AMERICAN PIKA CONSORTIUM CONFERENCE (VIRTUAL) – WORKING GROUP DISCUSSIONS

NOTES (MAY 24, 2023)

GROUP: EDUCATION AND PUBLIC ENGAGEMENT

Knowledge Gaps & Challenges:

- **Funding** is still a big need to support public engagement / C*sci programs (especially to support a volunteer coordinator).
- **Recruitment of diverse or underserved audiences:** Areas with high density of citizen science programs are located in places with lots of willing volunteers (who are mostly affluent and well-educated; e.g., Denver, Portland) and not necessarily in areas with highest conservation priority or data needs (e.g., southern Utah, New Mexico, or Great Basin)
- **Maintaining volunteer engagement:** Volunteer dropout rates can be high, and it is difficult to maintain commitment and enthusiasm post-training. This was HUGE during COVID, without in-person connections or support.
- **Data analysis:** Difficulties in analyzing public-generated data and making them really management-relevant. Absence observations are lower confidence, and data collection protocols vary between projects (compatibility issues)
- **Assessment:** Gathering data about the effectiveness of these efforts, in order to support and implement data-driven and evidence-based best practices

Communication Strategies (shared Google Drive folder, Google doc, etc.):

1. We have a google forum group that can function as a listserv. This could help facilitate better communication? https://groups.google.com/g/pika-cit-sci - it's been dormant since we set it up in 2015 but this could be revived

Specific opportunities for collaboration:

1. USFS Citizen Science Competitive Funding Program: Requires a USFS partner. Current plans are to run a competition in Spring 2024. This project has previously supported Colorado Pika Project & Cascades Pika Watch
2. **Development of CUREs for pikas:** Alisa Hove - genetic sexing of pikas from scat and/or tissue samples. Other ways to integrate pika research into the undergraduate curriculum?
    a. Introduction to eDNA, in Intro to Genetics course
    b. Tissue based DNA extracts and scat extracts
    c. 3 main overarching questions

NORTH AMERICAN PIKA CONSORTIUM CONFERENCE (VIRTUAL) – WORKING GROUP DISCUSSIONS

NOTES (MAY 24, 2023)

GROUP: EDUCATION AND PUBLIC ENGAGEMENT

i. Estimate sex ratio of one area, pairwise consistency of fecal vs tissue based samples, PCR replication, Y chromosome
ii. Experimental design, positive and negative PCR controls
iii. 3 groups share and present with lightning talk
iv. Formal lab report, integrate three mini studies together

d. Challenge: relating to organism that students have never seen. Right now, pikachu is a good link.
e. **Colorado Pika Project**, **iNaturalist and/or Pika Patrol app** occupancy survey data is open source! Could be developed into a CURE or data-science based activity or module or workshop
    i. Presence only dataset, how to base inferences based on this
f. Bioacoustic data workshop or module using pika vocalizations
    i. Short-calls and long-calls, regional dialects
    ii. Kaleidoscope program analysis
    iii. Deep Learning

3. Public-facing information about pikas and engagement - central repositories
    a. Facebook page and website, Alice Henderson
        i. Volunteer recruitment and engagement
        ii. https://www.facebook.com/PikaWatch
        iii. https://pikawatch.wixsite.com/pikawatch
4. Pika videos
    a. Teaching resources: assemble repository of resources or films
        i. Behavioral ecology, raw footage analysis
        ii. Assemble a list of videos that educate people about pikas in general
    b. Alice Henderson documentary
    c. Kristi Odom in Colorado: Nikon ambassador - has amazing footage and is working on a documentary
    d. Jerry Folgert - trailer for unfinished documentary
    e. Resources available on www.pikaworks.com, Joan MacKenzie
5. Elementary, K-12 materials development, Melissa VanAllen
    a. Kindergarten to 1st grade age group
    b. Website materials!

NORTH AMERICAN PIKA CONSORTIUM CONFERENCE (VIRTUAL) –
WORKING GROUP DISCUSSIONS
NOTES (MAY 24, 2023)
GROUP: EDUCATION AND PUBLIC ENGAGEMENT

Short-Term Goals/Tasks (3 months to 1 year):

Short Term Goals/ Quick Wins	Next Steps	Leader/ collaborators
1. Which community science programs and what state they have been left in	*Fill in table above*	
2. Develop better support for getting pika research into the undergraduate classroom	*Alisa will share protocols and materials*	
3. Assemble a list of pika videos and educational resources that could be used to educate about pikas (in classes, or public audiences)		
4. Think about virtual attendance option for working group participation for NAPC VI (for anyone who wants to continue to be involved in this discussion but can't attend the meeting?)		

NORTH AMERICAN PIKA CONSORTIUM CONFERENCE (VIRTUAL) – WORKING GROUP DISCUSSIONS

NOTES (MAY 24, 2023)

GROUP: RESEARCH AND REVIEW

All are welcome! Please add your contact information to the table below

Working Group Member	Affiliation	Email
Chris Ray	University of Colorado	cray@colorado.edu
Jaime Hood	Parks Canada	jaime.hood@pc.gc.ca
Leona Svancara	IDFG	leona.svancara@idfg.idaho.gov
Irina Ruf	Senckenberg Research Institute and Natural History Museum Frankfurt, Germany	irina.ruf@senckenberg.de
Kate Arpin	UBC Okanagan	kearpin@student.ubc.ca
Erik Beever	USGS-NOROCK and MT State University	EBeever@usgs.gov
Mike Russello	UBC Okanagan	michael.russello@ubc.ca
Tomoki Sakiyama	Hokkaido University, Japan	wisdom.tree.1994@gmail.com
Marie Westover	Los Rios Community Colleges	mariewestover@gmail.com
Nifer Wilkening	USFWS	jennifer_wilkening@fws.gov
Bobby Tommaney	UConn	rjtommaney@aol.com
Rick Brown	Wldf, Cal Poly Humboldt	Rick.Brown@humboldt.edu
Alex Krevitz	Independent	yukonyukon@aol.com

NORTH AMERICAN PIKA CONSORTIUM CONFERENCE (VIRTUAL) – WORKING GROUP DISCUSSIONS

NOTES (MAY 24, 2023)

GROUP: RESEARCH AND REVIEW

LEAD: ___Chris Ray__ _____RECORDER: _____

PREVIOUS NOTES for reference:

- Notes from 2017 meeting (TWS) are here.
- Notes from 2015 meeting (Golden) are here - see the final two pages, 14-15.
- Notes from 2012 conference working group (Portland) are here.

Review and Update Goals and Role of Working Group:

These three objectives sum up themes in previous meetings of this working group:

1. Research tool development, including a reference database, data archives (e.g., microclimatic data), and collections (e.g., scat, hair, tissue, ectoparasites)

2. Identify research opportunities and publicize knowledge gaps important for advancing research and management

3. Support synthetic analyses and reviews of regional and range-wide patterns

Group Progress/New Data to discuss since 2017 Meeting:

Progress on the above objectives has been uneven:

1. No publicized reference database, but good progress related to synthetic papers (below); development of a data archiving workflow and partial data archive for microclimatic data (Ray et al. in prep.); no shared/publicized physical collections, but some analyses of ectoparasite collections (Brinkerhoff et al. 2019, Rinsland et al. in prep.)

NORTH AMERICAN PIKA CONSORTIUM CONFERENCE (VIRTUAL) – WORKING GROUP DISCUSSIONS

NOTES (MAY 24, 2023)

GROUP: RESEARCH AND REVIEW

2. No papers focusing specifically on research opportunities and knowledge gaps important for advancing research and management, but many papers filling various gaps

3. Two synthetic analyses published on distributional patterns, one with strong support from this group (Adam Smith et al. 2019) and two with shorter author lists (Andrew Smith 2020, Connie Millar et al. 2018); one synthetic analysis of adaptive capacity with strong support from this group (Beever et al. 2023); one phylogenetic synthesis (Schmidt et al. in review?) (not submitted yet, in progress)

Knowledge Gaps:

- Fire effects?
- Fish and wildlife identified some knowledge gaps in 2010 listing decision; maybe we could revisit and address what progress has been made in those areas of knowledge.

Updated Needs & Objectives

- Provide an authoritative reference on pikas as a model system
- Coordinate across other working groups
- Reconsider the objective of publishing a paper on knowledge gaps because there is no need to further the narrative that we don't understand pikas; alternatively, be more specific in our messaging, addressing specific knowledge gaps such as those that might hamper effective management
- Create and maintain centralized repositories of pika research resources and products; also, a web page for pointing to research groups and their products

NORTH AMERICAN PIKA CONSORTIUM CONFERENCE (VIRTUAL) – WORKING GROUP DISCUSSIONS

NOTES (MAY 24, 2023)

GROUP: RESEARCH AND REVIEW

- Use the Adam Smith et al. 2019 db of >33k observations to address additional questions
- Consider whether there is a need to focus on changing fire regimes to address associated threats, generate interest and attract funding
- Leverage research resources and products to address management questions
- Emphasize the management relevance of our research, including genetic studies

Identify Challenges

- Project leaders have not carried some projects to completion, partly because some products are quickly outdated. Can we take advantage of living/working documents to engage more contributors and facilitate updates?
- We developed a database of research projects/groups, but it was quickly outdated. Could we instead collect (brief, structured) researcher profiles on a website where each researcher/group is responsible for populating a profile and keeping it up to date?
- Documents/references can become obsolete very quickly. We can create living documents that point people to where resources are.
- Allowing everyone to edit living documents could result in lost resources or lost meanings; many products should only be posted as pdfs or other non-editable formats, and a repository like Google Drive should be used to facilitate recovery of lost folders/files/edits

NORTH AMERICAN PIKA CONSORTIUM CONFERENCE (VIRTUAL) –
WORKING GROUP DISCUSSIONS

NOTES (MAY 24, 2023)

GROUP: RESEARCH AND REVIEW

Short-Term Goals/Tasks (3 months to 1 year):

Short Term Goals/ Quick Wins	Next Steps	Leader/ collaborators
1. Create a reference database (that is, a database of references relevant to pika research)	Decide on the format and request contributions	*Volunteer here!*
2. List possible data archives and physical collections to publicize	Query the working groups for ideas	*Volunteer here!*
3. Outline a manuscript describing the past and future utility of Ochotona as a model taxon for studies of ecology, behavior and evolution	Query the working groups for best examples; refer to the Kraatz et al. 2021 Lagomorpha example (https://www.frontiersin.org/articles/10.3389/fevo.2021.636402/full)	*Volunteer here!*
4. Draft a repository structure that should be easy to navigate to find specific NAPC resources	Query working groups for lists of potential resources	*Volunteer here!*
5. Review the supplemental information in Beever et al. 2023 (adaptive capacity paper) for info relevant to 1-4 above		*Volunteer here!*

NORTH AMERICAN PIKA CONSORTIUM CONFERENCE (VIRTUAL) –
WORKING GROUP DISCUSSIONS

NOTES (MAY 24, 2023)

GROUP: RESEARCH AND REVIEW

Long-Term Goals/Tasks (1 + years):

Long Term Goals	Next Steps	Leader/ collaborators
1. Maintain the reference database	Get input on how this should be structured	*Volunteer here!*
2. Develop data archives and collections	Develop some simple forms for metadata, describing archives and collections, and make these available to all NAPC lists	*Chris Ray and ? Volunteer here!*
3. Produce more synthetic research	Discuss new ideas for using the 33K+ observation database developed for the Adam Smith et al. (2019) Nature Climate Change paper	*Volunteer here!*
4. Produce a synthetic analysis of microclimatic data	Enlarge the clean and archived database of microclimatic data	*Members of this working group and the Climate working group?*
5. Use existing genetic data (e.g., Galbreath samples) to propose population units at risk	Get management-agency input; consider "Evolutionarily Significant Units" or other frameworks incorporating genomic data as a basis for this project	*Volunteer here!*

Communication Strategies (shared Google Drive folder, Google doc, etc.):

1. OneDrive or Google Drive, which might serve best as a general repository?

2. WesternPikas listserve

NORTH AMERICAN PIKA CONSORTIUM CONFERENCE (VIRTUAL) – WORKING GROUP DISCUSSIONS

NOTES (MAY 24, 2023)

GROUP: RESEARCH AND REVIEW

3. World Lagomorph Society hosting of NAPC repositories?

4. NAPC website updated with a page for profiles (photo + researcher/research group name + contact info + blurb on research focus + links to relevant resources/repos)

Specific funding agencies/opportunities for collaboration:

1. Denver Zoo has a funder that might be able to help with repositories (Megan Mueller of Rocky Mountain Wild mentioned this)

2. World Lagomorph Society might consider hosting repositories (Irina Ruf, WLS treasurer, mentioned this and said she would discuss this possibility with the WLS president if she could get prior information on how large we expect our repos to be; Airy Peralta noted that the “mid-size” storage offered by Google Drive is 250GB for $30/yr)

3. We can ask the CU-Boulder INSTAAR IT coordinator (Chad Stoffel) whether there’s a CU hosting option that would work well over the long term, but Airy Peralta pointed out that there are often limits on Google Drive storage that are specific to each institution

NORTH AMERICAN PIKA CONSORTIUM CONFERENCE (VIRTUAL) – WORKING GROUP DISCUSSIONS

NOTES (MAY 24, 2023)

GROUP: FIELD METHODS

ALL - Welcome! please fill in your contact information in the table below

Working Group Member	Affiliation	Email
Peter Billman	University of Connecticut	peter.billman@uconn.edu
Jocelyn Hirose	Parks Canada, Banff (Lake Louise, Yoho and Kootenay National Parks)	jocelyn.hirose@pc.gc.ca
Max Plichta	University of Alaska	MaxPlichta@Gmail.com
Rick Brown	Wildlife, Cal Poly Humboldt	Rick.Brown@humboldt.edu
Shannon Stotyn	Canadian Wildlife Service	shannon.stotyn@ec.gc.ca
Nathaniel Hunsdorfer	San Jose State University	nathaniel.hunsdorfer@sjsu.edu
Mackenzie Jeffress	Nevada Department of Wildlife	mrjeffress@ndow.org
Airy Peralta	CU Boulder/Niwot Ridge LTER	aigo5934@colorado.edu
Jessica Castillo Vardaro	San Jose State University	jessica.castillo-vardaro@sjsu.edu
Jaime Hood	Parks Canada - Banff National Park	jaime.hood@pc.gc.ca
Rachel Billings	CU Boulder	rachel.billings@colorado.edu
Jazmine Camacho Servin	San Jose State University	jazmine.camachoservin@sjsu.edu
Diana Catalina Palacios	Kent State University	dpalaci1@kent.edu
Bobby Tommaney	UConn	rjtommaney@aol.com
Lucas Moyer-Horner	U of Utah	lrmhorner@gmail.com

NORTH AMERICAN PIKA CONSORTIUM CONFERENCE (VIRTUAL) – WORKING GROUP DISCUSSIONS

NOTES (MAY 24, 2023)

GROUP: FIELD METHODS

Carly Wickhem	WA Dept of Fish and Wildlife	carly.wickhem@dfw.wa.gov
Chris Smith	University of Nevada, Reno	chrissmith@unr.edu
Ashley Whipple	USGS	awhipple017@gmail.com
Lisa Larson	Parks Canada	lisa.larson@pc.gc.ca

- Historic contact list managed as a Google Sheet

PREVIOUS NOTES for reference:

- Notes from the 2017 meeting (TWS) are here.
- Notes from the 2015 meeting (Golden) are here - go to page 7.

LEAD: Max Plichta RECORDER: TBD

Review and Update Goals and Role of Working Group:

1. Compiling and making available protocols for various aspects of pika research and monitoring.
2. Compiling a list of tips & tricks, recommended equipment, etc.

Group Progress/New Data to discuss since 2017 Meeting:

- Group Progress
    - Established dropbox is no longer in use, as a temporary solution here is a Google Drive folder that I've structured in the same fashion.
- New Data
    - Remote Sensing/Equipment
        - Temperature loggers

NORTH AMERICAN PIKA CONSORTIUM CONFERENCE (VIRTUAL) – WORKING GROUP DISCUSSIONS

NOTES (MAY 24, 2023)

GROUP: FIELD METHODS

- Coordinate with the climate working group regarding equipment recommendations.
  - If performance is different, maybe come up with a correction measure.
- Cameras
- Acoustic monitoring
  - Acoustic detectors, which devices are being used and what works/doesn't.
  - Carly Wickhem and Mackenzie Jeffress were interested; University of Nevada Reno was doing some work on this, as well as Chris Ray.
  - Record response from long-call play-back.
  - Follow up w/ Lucas Moyer-Horner on ARU specific deployment.
- Transmitters? (potential resource: Aidan Beers 2011 (thesis))

- Methods for occupancy surveys
  - Effectiveness of long-call play-back. Regional dialects.
    - Chris Smith to share a pre-recorded long call.
  - How does occupancy surveys strategies change in regards to landscape 'type' montane v lava tubes/scapes
  - Occupancy survey types - plot versus talus patch scale; pros/cons
    - Inventory surveys versus monitoring
      - Searches and documenting old sign (excavating old pellets)
  - Detection probabilities (see latest manuscript: https://doi.org/10.1002/ece3.10019)
  - Other species data (woodrats, marmots, etc.)
  - Abundance and density (based on visuals, calls, sign? vs. using genetics to estimate abundance; mark-recapture); Home range
    - Parks Canada doing trials with animal counts (no haypiles) to determine abundance

NORTH AMERICAN PIKA CONSORTIUM CONFERENCE (VIRTUAL) – WORKING GROUP DISCUSSIONS

NOTES (MAY 24, 2023)

GROUP: FIELD METHODS

- Handling protocols and guidance from Chris Ray.
  - Are there protocols for reducing potential hemorrhagic disease spread?
- Citizen science protocols and applications
  - Pika Patrol mobile app
- Stress hormone sampling (feces)
- Ecto-parasite and disease-specific sampling
- Genetic sampling protocols
- Old scat samples for radiocarbon dating

Knowledge Gaps:

Updated Needs & Objectives:

- Identifying a new lead/co-leads for this working group ;)
  - Peter Billman willing to take the lead moving forward.
- Needs & Objectives established in 2017
  - There was continued interest in an inventory survey protocol that could be used for management purposes (e.g., baseline surveys by consultants for the NEPA process).
  - Challenges still include making protocols available, finding the right protocol for the objective(s), understanding the pros and cons of various protocols and standardizing where possible.

Identify Challenges:

- Challenges still include making protocols available, finding the right protocol for the objective(s), understanding the pros and cons of various protocols and standardizing where possible.

NORTH AMERICAN PIKA CONSORTIUM CONFERENCE (VIRTUAL) –
WORKING GROUP DISCUSSIONS

NOTES (MAY 24, 2023)

GROUP: FIELD METHODS

Short-Term Goals/Tasks (3 months to 1 year):

Short Term Goals/ Quick Wins	Next Steps	Leader/ collaborators
1. Formalize a Google Drive or other preferred method for protocol sharing.	Identify the most favorable method and advertise availability.	Peter Billman, Max Plichta
2. Add more content to the share drive regarding protocols, data sheets, citizen science efforts, management advice, and tips and tricks from the community.	● Send out a one-time, or yearly survey to collect protocols and recommendations ● Identify point people for each general category (see right). These people will seek out information, including by contacting associated working group leads and then place them on the share drive.	● Behavioral ● Other species ● Trapping ● Occupancy and Management ● Citizen Science ● Remote sensing ○ Temperature Probes ○ Audio Recording

NORTH AMERICAN PIKA CONSORTIUM CONFERENCE (VIRTUAL) – WORKING GROUP DISCUSSIONS

NOTES (MAY 24, 2023)

GROUP: FIELD METHODS

Long-Term Goals/Tasks (1 + years):

Long Term Goals	Next Steps	Leader/ collaborators
1.Update and manage a website where protocol, datasheets, data, citizen science work, and locations of research can be available for everyone to access.	*Reach out to other working groups to see if there is a more established google drive. Having a single place to store all NAPC resources.*	

Communication Strategies (shared Google Drive folder, Google doc, etc.):

1. We have a Dropbox that has received little use and a temporary Google Drive Folder:

https://drive.google.com/drive/folders/1zsRVHOhnCTxSUJ018o3P82S0BjIr7pJ8

Point person - monthly reminders? Add protocols to Drive.

2. Eventually something like GitHub

3. Basecamp for project management - (possibly?) free for .edus

Specific funding agencies/opportunities for collaboration:

1. Additional funding may not be needed for the tasks identified.

NORTH AMERICAN PIKA CONSORTIUM CONFERENCE (VIRTUAL) – WORKING GROUP DISCUSSIONS

NOTES (MAY 24, 2023)

GROUP: DISTRIBUTION AND HABITAT

ALL - Welcome! please fill in your contact information in the table below

Current Lead: *Mackenzie Jeffress (temporarily)* ***Recorder:***

Working Group Member	Affiliation	Email
Peter Billman	University of Connecticut	peter.billman@uconn.edu
Mackenzie Jeffress	Nevada Department of Wildlife	mrjeffress@ndow.org
Jocelyn Hirose	Parks Canada, Banff (Lake Louise), Yoho and Kootenay NPs	jocelyn.hirose@pc.gc.ca
Shannon Stotyn	Canadian Wildlife Service	shannon.stotyn@ec.gc.ca
Jazmine Camacho Servin	San Jose State University	jazmine.camachoservin@sjsu.edu
Marie Westover	Los Rios Community Colleges	mariewestover@gmail.com
Mila Opalenik	University of Nevada Reno	milaopalenik@icloud.com
Tomoki Sakiyama	Hokkaido University, Japan	wisdom.tree.1994@gmail.com
Melissa VanAllen	Unity Environmental University	mvanallen20@unity.edu
Nathaniel Hunsdorfer	San Jose State University	nathaniel.hunsdorfer@sjsu.edu
Thomas Butler	Cal Poly Humboldt	twb33@humboldt.edu
Leona Svancara	IDFG	leona.svancara@idfg.idaho.gov
Chris Norment	SUNY Brockport	cnorment@brockport.edu
Chris Smith	University Nevada Reno	chrissmith@unr.edu
Bobby Tommaney	University of Connecticut	rjtommaney@aol.com

NORTH AMERICAN PIKA CONSORTIUM CONFERENCE (VIRTUAL) – WORKING GROUP DISCUSSIONS

NOTES (MAY 24, 2023)

GROUP: DISTRIBUTION AND HABITAT

Chris Ray	University of Colorado	cray@colorado.edu
Lisa Larson	Parks Canada	lisa.larson@pc.gc.ca
Lucas Moyer-Horner	U of Utah	lrmhorner@gmail.com
Carly Wickhem	WA Dept of Fish and Wildlife	carly.wickhem@dfw.wa.gov
Alice Henderson	www.GISforWildlife.com	GIS_Wildlife@yahoo.com
Jaime Hood	Parks Canada - Banff National Park	jaime.hood@pc.gc.ca
Alex Krevitz	Independent	yukonyukon@aol.com

PREVIOUS NOTES for reference:

- Notes from 2017 meeting (TWS) are here.
- Notes from 2015 meeting (Golden) are here - go to page 12.
- *No notes from 2012 conference working group (Portland). 2010 (inaugural) conference did not have detailed notes on the structure or goals of the group.*

Review and Update Goals and Role of Working Group:

1. Identify appropriate climate metrics at different scales

2. Improved quantification of how pikas use the landscape. Identifying atypical habitats. What's a patch?

3. Improve/standardize modeling, including use of presence/**absence** and best predictor variables

4. Monitoring across the ranges

Group Progress/New Data to discuss since 2017 Meeting:

NORTH AMERICAN PIKA CONSORTIUM CONFERENCE (VIRTUAL) – WORKING GROUP DISCUSSIONS

NOTES (MAY 24, 2023)

GROUP: DISTRIBUTION AND HABITAT

1. Put together a "pika atlas" for each region across the range? Mackenzie Jeffress authored one for the Great Basin (Nevada) that could be used as a template. In Canada, the Yukon Conservation Data Centre (NatureServe Canada) maintains a spatial database of collared pika locations (not absences) for public distribution via an online portal (e.g. GeoYukon (gov.yk.ca)). Patti Krueger USFS interested. Peter Billman - could be helpful for other states. But funding these projects, which are time-intensive, would require identifying leads and funding. Also, updating these "every 5 years" would also be a challenge. Megan Mueller (Rocky Mountain Wild) sees a path forward in Colorado through collaboration with the Denver Zoo and wildlife/land management agencies. Someone suggested Natural Heritage programs. Canadian perspective: maybe we should be prioritizing the leading edge? iNaturalist might provide good data, along with museum records. Absences are also important, and those are commonly missing from most data sources. An interactive online map would be ideal. Add this all as a separate objective for this working group.

2. Develop a talus layer. Combine localized digitizations? ENM for talus? Leona Svancara says an ENM is possible (they tried it) but this sort of modeling is confounded by spatially varying landscape features. Some areas have such small talus/lava-tube habitat patches that are difficult to detect in any sort of imagery. GE imagery that casts shadows can help with determining grain (clast) size, and Chris Smith has had better success with digitization when using this sort of imagery. And what's a patch? This group could probably put together a best practices paper? Using the rock glacier database is helpful in some landscapes. Can we classify talus types, usefully? Zooniverse could be leveraged to crowd-source some of this effort? Megan Mueller has spent a little time considering the crowd-sourcing option. Mackenzie Jeffress tried something similar, and could offer perspectives. Can GEDI data be used for talus mapping?

3. Develop monitoring that spans the trailing and leading edge for each NA species.

NORTH AMERICAN PIKA CONSORTIUM CONFERENCE (VIRTUAL) – WORKING GROUP DISCUSSIONS

NOTES (MAY 24, 2023)

GROUP: DISTRIBUTION AND HABITAT

4. Develop sub-groups to discuss what we've learned about pika habitat from our various efforts at mapping habitat?

Knowledge Gaps:

Updated Needs & Objectives

From 2017: There is a need to gather and summarize data on methods used to delineate patches and habitat surrounding those patches. There is a need to begin examining the importance of various habitat variables in promoting and hindering connectivity among patches across the landscape.

Collectively, we have mapped and ground-truthed a lot of talus, but each project has been independent. Can we combine those efforts to train a model? Some of us (e.g., Leona Svancara and colleagues) have tried Ecological Niche Modeling to predict talus locations, but there are apparently spatially varying processes that interfere with prediction across broad spatial scales. Still, each of our local efforts could probably inform talus distributions across larger extents than our digitizations. Examples include digitization and ground-truthing of taluses across northern New Mexico (Marie Westover), Great Sand Dunes National Park (Chris Ray/Airy Peralta) and (coming soon) Glacier National Park (Lucas Moyer-Horner).

Identify Challenges

NORTH AMERICAN PIKA CONSORTIUM CONFERENCE (VIRTUAL) – WORKING GROUP DISCUSSIONS

NOTES (MAY 24, 2023)

GROUP: DISTRIBUTION AND HABITAT

From 2017: Mapping talus is difficult! Spatial data is often too coarse or expensive for use in smaller studies and understanding vegetation around patches is complicated by these variables as well as patch delineation. CalTopo is helpful in identifying talus patches.

- Do we understand the geologic and morphology underpinnings of pika habitat?
- Does Landfire do a better job of talus classification than SWReGap?
- Is there a TNC product from the ecoregional assessment mapping that is useful for
- mapping potential talus habitat?

Short-Term Goals/Tasks (Before June 2024 ASM meeting):

Short Term Goals/ Quick Wins	Next Steps	Leader/ collaborators
1. Compile resources/ protocols for mapping talus/lava habitat		
2. Compile what we know about pika habitat attributes		
3.		

NORTH AMERICAN PIKA CONSORTIUM CONFERENCE (VIRTUAL) – WORKING GROUP DISCUSSIONS

NOTES (MAY 24, 2023)

GROUP: DISTRIBUTION AND HABITAT

4.		

NORTH AMERICAN PIKA CONSORTIUM CONFERENCE (VIRTUAL) – WORKING GROUP DISCUSSIONS

NOTES (MAY 24, 2023)

GROUP: DISTRIBUTION AND HABITAT

Long-Term Goals/Tasks (1 + years):

Long Term Goals	Next Steps	Leader/ collaborators
1. "Atlas" rangewide for each species		
2.		
3.		
4.		

NORTH AMERICAN PIKA CONSORTIUM CONFERENCE (VIRTUAL) – WORKING GROUP DISCUSSIONS

NOTES (MAY 24, 2023)

GROUP: DISTRIBUTION AND HABITAT

Communication Strategies (shared Google Drive folder, Google doc, etc.):

1.

2.

Specific funding agencies/opportunities for collaboration:

1.

2.

Who will do the report-out to the larger group?

NORTH AMERICAN PIKA CONSORTIUM CONFERENCE (VIRTUAL) – WORKING GROUP DISCUSSIONS

NOTES (MAY 24, 2023)

GROUP: BEHAVIOR, HEALTH AND PHYSIOLOGY

ALL - Welcome! please fill in your contact information in the table below

Working Group Member	Affiliation	Email
Nifer Wilkening	USFWS	jennifer_wilkening@fws.gov
James Wilson	Retired	sunjavaman@yahoo.com
Rick Brown	Wildlife, Cal Poly Humboldt	Rick.Brown@humboldt.edu
Airy Peralta	CU Boulder	aigo5934@colorado.edu
Irina Ruf	Senckenberg Research Institute and Natural History Museum Frankfurt, Germany	irina.ruf@senckenberg.de
Alisa Hove	Warren Wilson College	ahove@warren-wilson.edu
Kelly Klingler	UMass Amherst	kklingler@umass.edu
Jessica Castillo Vardaro	San Jose State University	jessica.castillo-vardaro@sjsu.edu
Johanna Varner	Colorado Mesa University	jvarner@coloradomesa.edu
Ashley Whipple	USGS	awhipple017@gmail.com
Katie Christie	ADF&G	katie.christie@alaska.gov
Rachel Billings	CU Boulder	rachel.billings@colorado.edu
Nathaniel Hunsdorfer	San Jose State University	nathaniel.hunsdorfer@sjsu.edu
Jazmine Camacho Servin	San Jose State University	jazmine.camachoservin@sjsu.edu
Diana Catalina Palacios	Kent State University	dpalaci1@kent.edu

NORTH AMERICAN PIKA CONSORTIUM CONFERENCE (VIRTUAL) – WORKING GROUP DISCUSSIONS

NOTES (MAY 24, 2023)

GROUP: BEHAVIOR, HEALTH AND PHYSIOLOGY

LEAD: _Nifer Wilkening_____RECORDER: __Kelly Klingler___ _____

PREVIOUS NOTES for reference:

- Notes from 2017 meeting (TWS) are here.
- Notes from 2015 meeting (Golden) are here - pages 5-7.

Moving forward, is anyone interested in leading or co-leading this working group?

Review and Update Goals and Role of Working Group:

1. To standardize the current protocols related to stress physiology, disease ecology, and population health in American pika populations in the Intermountain west.

2. To generate a bank of baseline stress data (GCM and GC), disease metrics, and related health issues for relative comparisons among populations within an eco-region and regional lineages, and to understand how these relate to estimates of survival and population persistence.

3. To inform conservation efforts by identifying populations at risk of extirpation due to disease or chronic stress and how climate change might influence this.

Group Progress/New Data to discuss since 2017 Meeting:

Varner, J., Carnes-Douglas, Z. J., Monk, E., Benedict, L. M., Whipple, A., Dearing, M. D., ... & Ray, C. (2023). Sampling a pika's pantry: Temporal shifts in nutritional quality and winter preservation of American pika food caches. *Ecosphere*, *14*(5), e4494.

Whipple, A. L., Ray, C., Varner, J., Kitchens, J. N., Hove, A. A., Castillo Vardaro, J. A., & Wilkening, J. L. (2022). Stress-associated metabolites vary with both season and habitat across populations of a climate sentinel species. Arctic, Antarctic, and Alpine Research, 54(1), 603-623.

Colman, R. E., Brinkerhoff, R. J., Busch, J. D., Ray, C., Doyle, A., Sahl, J. W., ... & Wagner, D. M. (2021). No evidence for enzootic plague within black-tailed prairie dog (Cynomys ludovicianus) populations. *Integrative Zoology*, *16*(6), 834-851.

NORTH AMERICAN PIKA CONSORTIUM CONFERENCE (VIRTUAL) – WORKING GROUP DISCUSSIONS

NOTES (MAY 24, 2023)

GROUP: BEHAVIOR, HEALTH AND PHYSIOLOGY

Gorman, P. R. (2021). Photographic evidence of heterospecific coprophagy in american pika. *Northwestern Naturalist*, *102*(2), 164-165.

Whipple, A. L., Ray, C., Wasser, M., Kitchens, J. N., Hove, A. A., Varner, J., & Wilkening, J. L. (2020). Temporal vs. spatial variation in stress-associated metabolites within a population of climate-sensitive small mammals. *Conservation Physiology*, *9*(1), coab024.

Benedict, L. M., Wiebe, M., Plichta, M., Batts, H., Johnson, J., Monk, E., & Ray, C. (2020). Microclimate and summer surface activity in the American pika (Ochotona princeps). *Western North American Naturalist*, *80*(3), 316-329.

Brinkerhoff, R. J., Rinsland, H. S., Sato, S., Maruyama, S., & Ray, C. (2020). Vector-Borne Pathogens in Ectoparasites Collected from High-Elevation Pika Populations. *EcoHealth*, *17*, 333-344.

Camp, M. J., Shipley, L. A., Varner, J., & Waterhouse, B. D. (2020). Activity patterns and foraging behavior of American pikas (Ochotona princeps) differ between craters of the moon and alpine talus in Idaho. *Western North American Naturalist*, *80*(1), 49-69.

Westover, M. L., & Smith, F. A. (2020). Investigating the role of environment in pika (Ochotona) body size patterns across taxonomic levels, space, and time. *Journal of Mammalogy*, *101*(3), 804-816.

Westover, M. L., Lizewski, K. A., Klingler, K. B., & Smith, F. A. (2020). Isotopic niche of the American pika (Ochotona princeps) through space and time. *Canadian Journal of Zoology*, *98*(8), 515-526.

Hall, L. E., & Chalfoun, A. D. (2019). Behavioural plasticity modulates temperature‐related constraints on foraging time for a montane mammal. *Journal of Animal Ecology*, *88*(3), 363-375.

McIntyre III, T. J. (2019). Are Highways Stressful for Pikas?: Analysis of Stress Hormones of the American Pika (Ochotona princeps) Living Adjacent to Interstate 90 in the Cascade Range of Washington State.

Kohl, K. D., Varner, J., Wilkening, J. L., & Dearing, M. D. (2018). Gut microbial communities of American pikas (O chotona princeps): evidence for phylosymbiosis and adaptations to novel diets. *Journal of Animal Ecology*, *87*(2), 323-330.

Hall, L. E., & Chalfoun, A. D. (2018). What to eat in a warming world: do increased temperatures necessitate hazardous duty pay?. *Oecologia*, *186*(1), 73-84.

Rinsland, H. (2018). Bartonella and Y. pestis screening in ctenophyllus armatus terribilis for conservation application for the America pika (ochotona princeps) in the Rocky Mountain front range.

Waterhouse, M. D., Sjodin, B., Ray, C., Erb, L., Wilkening, J., & Russello, M. A. (2017). Individual‐based analysis of hair corticosterone reveals factors influencing chronic stress in the American pika. *Ecology and evolution*, *7*(12), 4099-4108.

NORTH AMERICAN PIKA CONSORTIUM CONFERENCE (VIRTUAL) – WORKING GROUP DISCUSSIONS

NOTES (MAY 24, 2023)

GROUP: BEHAVIOR, HEALTH AND PHYSIOLOGY

Foley, P., Roth, T., Foley, J., & Ray, C. (2017). Rodent–pika parasite spillover in western North America. *Journal of medical entomology*, *54*(5), 1251-1257.

Jakopak, R. P., Hall, L. E., & Chalfoun, A. D. (2017). Organizing the pantry: cache management improves quality of overwinter food stores in a montane mammal. *Journal of Mammalogy*, *98*(6), 1674-1681.

Klingler, Kelly B. "An integrated investigation of the population genetics, physiological stress, and movement patterns in the American pika." PhD diss., 2017.

Beever, E. A., Hall, L. E., Varner, J., Loosen, A. E., Dunham, J. B., Gahl, M. K., ... & Lawler, J. J. (2017). Behavioral flexibility as a mechanism for coping with climate change. *Frontiers in Ecology and the Environment*, *15*(6), 299-308.

Knowledge Gaps:*Updated Needs & Objectives*

• Winter physiology still remains a black box for pikas---biggest gap in our understanding of pika health

▪ Collar-based data loggers, camera or acoustic traps may be helpful?

· Genetic predispositions related to health and physiology

▪ Is there any evidence to suggest a genetic predisposition to higher stress (i.e. heritability/ genetics of the stress response)?

- Rabbit Hemorrhagic Disease Virus 2 (RHV2)
    - Potential for jumping from leporids
    - Lack of understanding regarding the vulnerability of American pika
- Novel exposure to disease related to community level dynamics
    - Risk of disease related to changing environmental conditions
- Number of olfactory turbinates are reduced in pikas, 5 species (see Ruf 2014, AnatRec 297:2031–2046)
    - Surface area of bony lamella and function/performance
    - Bony structure for proxy of mucosa
    - Combining functional morphometrics with physiology
        - Olfactory performance differs from leporids?
        - Thermoregulation and climate adaptation! Potential for morphometric study of bony structures/mucosa/surface area complexity with body size
- Documenting parasites and pathogens that affect pikas
    - How do ectoparasite distributions vary across their range?

NORTH AMERICAN PIKA CONSORTIUM CONFERENCE (VIRTUAL) – WORKING GROUP DISCUSSIONS

NOTES (MAY 24, 2023)

GROUP: BEHAVIOR, HEALTH AND PHYSIOLOGY

Identify Challenges

· Winter physiology studies require relatively easy access to field sites, as well as collection of fecal pellets not saturated by ice and snow.

· Not enough researchers are trapping and marking pikas so there are limited opportunities to collect parasites, GC samples, or acquire survival estimates through mark-recapture ▪ May be able to account for this with genetic mark-recapture supplemented with a subset of the population being trapped each year

▪ Also, the only way to collect fleas, earmites, or blood (which would enable tracking of disease such as Hanta Virus or plague)

Difficulties with obtaining permits and approvals

- Build standardized protocols for reducing disease spread
    - Bleaching boots, or other cleaning and disinfection methods for live-trapping
- What do the ectoparasites look like in other proximate species?
    - Marmots, woodrats, ground squirrels
    - What else are species sharing other than just the talus?
    - Community level ectoparasite dynamics
    - NEON database. Also, long-term marmot trapping at Gothic (Crested Butte, CO), maybe they collect fleas and can collaborate!
    - Arctos archiving!

Short-Term Goals/Tasks (3 months to 1 year):

Short Term Goals/ Quick Wins	Next Steps	Leader/ collaborators
1.Development of a standardized stress physiology protocol, partnering with labs to measure glucocorticoids		*Ashley can help with this*

NORTH AMERICAN PIKA CONSORTIUM CONFERENCE (VIRTUAL) –

WORKING GROUP DISCUSSIONS

NOTES (MAY 24, 2023)

GROUP: BEHAVIOR, HEALTH AND PHYSIOLOGY

2. Google form survey; share protocols, samples, permit applications; form a database!		*Jo can help set this up, not until mid-June*
3. Lots of people have various physiological samples in storage (ectos, fecal samples, etc.). Create a system for people to connect/communicate with each other about sharing these samples		
4.		

Long-Term Goals/Tasks (1 + years):

Long Term Goals	Next Steps	Leader/ collaborators
1. Still need a synthesis paper on physiological study methods and frontiers		

NORTH AMERICAN PIKA CONSORTIUM CONFERENCE (VIRTUAL) –

WORKING GROUP DISCUSSIONS

NOTES (MAY 24, 2023)

GROUP: BEHAVIOR, HEALTH AND PHYSIOLOGY

2. Still need a paper that collates what is known regarding pika studies on captivity (Denver Zoo published two notes, PhD theses of JH Severaid (1955), H. Robert Krear (1965) and Denise Dearing (1995), Preston Sommers should be interviewed, MacArthur and Wang (1973, 1974).		
3. Need individual and population level estimates of the effects of stress on survival (What are the fitness costs to higher stress? Does it vary individually?)—most useful may be a multi-regional stress, climate and survival paper.		
4.Broad-based initiative to collect fleas and earmites—bank samples for general study. Also, important to collect ceacal and fecal pellets and store in RNAlater for investigation of gut microbes		

NORTH AMERICAN PIKA CONSORTIUM CONFERENCE (VIRTUAL) –

WORKING GROUP DISCUSSIONS

NOTES (MAY 24, 2023)

GROUP: BEHAVIOR, HEALTH AND PHYSIOLOGY

5. Labs are not set up for stress physiology analysis so create a list of labs where this could occur (maybe Ashley could help).		
6. Consolidate sample sets of ectoparasites for comparison among different species (for ex, ectoparasites from pikas and associated marmots, rodents, other species in the area; Hilary is interested in this. Chris Ray may have samples from other species in the traps).		

Communication Strategies (shared Google Drive folder, Google doc, etc.):

1.

2.

Specific funding agencies/opportunities for collaboration:

1.

2.

NORTH AMERICAN PIKA CONSORTIUM CONFERENCE (VIRTUAL) –
WORKING GROUP DISCUSSIONS

NOTES (MAY 24, 2023)

GROUP: CLIMATE

ALL - Welcome! please fill in your contact information in the table below

Working Group Member	Affiliation	Email
Peter Billman	University of Connecticut	peter.billman@uconn.edu
Jocelyn Hirose	Parks Canada, Banff (Lake Louise), Yoho and Kootenay National Parks	jocelyn.hirose@pc.gc.ca
Jaime Hood	Parks Canada	jaime.hood@pc.gc.ca
Leona Svancara	Idaho Dept of Fish and Game	leona.svancara@idfg.idaho.gov
Mackenzie Jeffress	Nevada Department of Wildlife	mrjeffress@ndow.org
Rachel Billings	CU Boulder	rachel.billings@colorado.edu
Lisa Larson	Parks Canada	lisa.larson@pc.gc.ca
Marie Westover	Los Rios Community Colleges	mariewestover@gmail.com
Ashley Whipple	USGS	awhipple017@gmail.com
Rick Brown	Wildlife, Cal Poly Humboldt	
Erik Beever	USGS-NOROCK and MT State University	EBeever@usgs.gov
Chris Norment	SUNY-Brockport	cnorment@brockport.edu
Max Plichta	University of Alaska	MaxPlichta@Gmail.com
Alice Henderson	www.GISforWildlife.com	GIS_Wildlife@yahoo.com
Airy Peralta	CU Boulder	aigo5934@colorado.edu
Katie Christie	Alaska Department of Fish and Game	katie.christie@alaska.gov
Melissa VanAllen	Unity Environmental University	mvanallen20@unity.edu

NORTH AMERICAN PIKA CONSORTIUM CONFERENCE (VIRTUAL) –
WORKING GROUP DISCUSSIONS

NOTES (MAY 24, 2023)

GROUP: CLIMATE

Emily Monk	Memorial University of Newfoundland/ CU Boulder	emily.monk@colorado.edu
Mila Opalenik	University of Nevada Reno	milaopalenik@icloud.com
Tomoki Sakiyama	Hokkaido University, Japan	wisdom.tree.1994@gmail.com
Thomas Butler	Cal Poly Humboldt	twb33@humboldt.edu
Chris Smith	University Nevada at Reno	chrissmith@unr.edu
Carly Wickhem	WA Dept of Fish and Wildlife	carly.wickhem@dfw.wa.gov
Johanna Varner	Colorado Mesa University	jvarner@coloradomesa.edu
Robert Tommaney	University of Connecticut	robert.tommaney@uconn.edu
Shannon Stotyn	Canadian Wildlife Service	shannon.stotyn@pc.gc.ca
Alex Krevitz	Independent	yukonyukon@aol.com

LEAD(S): _Erik Beever____ _____RECORDER: _____Mackenzie Jeffress_____

Review and Update Goals and Role of Working Group:

1. Procedures/protocols for temperature sensors.

    a) How to manage the data and time series (*Chris Ray has developed code for sensors; goal is to put this code on Github + server backups*)
    b) Sensor placement – *interstitial* (avoid sensor & housing touching ground; cannot be hit by direct sunlight; near center of activity but

not in it; bias towards larger rocks that pikas are more likely to use); *2-m* (c

c) Agreement on specific pika-relevant microclimate metrics. (***EAB to create a GoogleDrive folder, and place ANJ's existing summary there)***
d) Information (pros/cons; actual measurement comparisons) of various sensors (TOMST TMS4, HOBOs, iButtons, LogTags).

2. Metrics at a coarser-scale/GIS.

a) Sources of climate data (PRISM, ClimateNA).
b) Limitations.
c) Mechanistic (see Billman paper, Smith et al., Beever et al. papers).

3. How to look at different thresholds/adaptive capacity for climate for various populations/locations (spatial variation)?

a) Local adaptation vs. niche conservatism.

Group Progress/New Data to discuss since 2017 Meeting:

Smith et al. (2019) – >33K independent records

NORTH AMERICAN PIKA CONSORTIUM CONFERENCE (VIRTUAL) – WORKING GROUP DISCUSSIONS

NOTES (MAY 24, 2023)

GROUP: CLIMATE

Knowledge Gaps:

Updated Needs & Objectives

R codes for pulling in these metrics/files

Climatic effects at different life stages.

Variability across a range. Even comparing American pikas to collared pikas. Katie Christie (AK DFG, Anchorage) interested in collaboration on this topic.

Marie Westover - time-scales of weather/climate. Best practices. How many years? Which years? Airy Peralta - Averages over longer time periods or near-term conditions?

Identify Challenges -

at the end of the session, there was a brief discussion of the scale at which to address questions. It made me think about the transition in population ecology through contemporary landscape and population ecology… from wondering about proper scales to the importance of addressing different questions at the appropriate scale. Perhaps, the questions aren't about which scale should we all be focused on, but rather which scale should be used to assess different types of questions.

Short-Term Goals/Tasks (3 months to 1 year):

Short Term Goals/Quick Wins	Next Steps	Leader/Collaborators

NORTH AMERICAN PIKA CONSORTIUM CONFERENCE (VIRTUAL) –
WORKING GROUP DISCUSSIONS

NOTES (MAY 24, 2023)

GROUP: CLIMATE

1. Table comparing sensors (pros/cons). Could actually test/compare paired readings between brands & sensors.		Leona Svancara and Airy Peralta - background and experience on TOMST TMS4s and ONSET's HOBO. Erik Beever experience with iButtons. Alphamach Nautical lite - Alice Henderson testing.
2. Protocols/procedures for sensor deployments		
3. Table of pika-relevant microclimate metrics including references.		
4. Repository for R code for pulling in these metrics/files		
5. Table of pika-relevant metrics at a coarser-scale/GIS. Sources of climate data (PRISM, ClimateNA). Limitations. References.		

NORTH AMERICAN PIKA CONSORTIUM CONFERENCE (VIRTUAL) –
WORKING GROUP DISCUSSIONS

NOTES (MAY 24, 2023)

GROUP: CLIMATE

NORTH AMERICAN PIKA CONSORTIUM CONFERENCE (VIRTUAL) –
WORKING GROUP DISCUSSIONS

NOTES (MAY 24, 2023)

GROUP: CLIMATE

Long-Term Goals/Tasks (1 + years):

Long Term Goals	Next Steps	Leader/ collaborators
1.		
2.		
3.		
4.		

NORTH AMERICAN PIKA CONSORTIUM CONFERENCE (VIRTUAL) – WORKING GROUP DISCUSSIONS

NOTES (MAY 24, 2023)

GROUP: CLIMATE

Communication Strategies (shared Google Drive folder, Google doc, etc.):

1.

2.

Specific funding agencies/opportunities for collaboration:

1.

2.

NORTH AMERICAN PIKA CONSORTIUM CONFERENCE (VIRTUAL) – WORKING GROUP DISCUSSIONS

NOTES (MAY 24, 2023)

GROUP: POPULATION GENETICS AND POPULATION GENOMICS

ALL - Welcome! please fill in your contact information in the table below

Working Group Member	Affiliation	Email
Michael Russello	UBC Okanagan	michael.russello@ubc.ca
Jessica Castillo Vardaro	San Jose State University	jessica.castillo-vardaro@sjsu.edu
Alisa Hove	Warren Wilson College	ahove@warren-wilson.edu
Irina Ruf	Senckenberg Research Institute and Natural History Museum Frankfurt, Germany	irina.ruf@senckenberg.de
Nathaniel Hunsdorfer	San Jose State University	nathaniel.hunsdorfer@sjsu.edu
Jazmine Camacho Servin	San Jose State University	jazmine.camachoservin@sjsu.edu
Chris Ray	University of Colorado	cray@colorado.edu
Danielle Schmidt	UBC Okanagan	danielle.schmidt@ubc.ca
Aarati Basnet	Kent State University	aaratibasnet662@gmail.com
Kelly Klingler	University of Massachusetts, Amherst	kklingler@umass.edu
Lucas Moyer-Horner	University of Utah	lrmhorner@gmail.com
Kate Arpin	UBC Okanagan	kearpin@student.ubc.ca
Diana Catalina Palacios	Kent State University	dpalaci1@kent.edu

NORTH AMERICAN PIKA CONSORTIUM CONFERENCE (VIRTUAL) – WORKING GROUP DISCUSSIONS

NOTES (MAY 24, 2023)

GROUP: POPULATION GENETICS AND POPULATION GENOMICS

LEAD: ___Mike Russello_____RECORDER: _Kelly Klingler__

Review and Update Goals and Role of Working Group (from 2017 meeting; need an update):

1. To standardize genetic/genomic protocols being used across pika research labs to improve comparative power, and enable collaboration
2. To inform conservation efforts with an understanding of the genomic patterns within populations, between regions, and across the range of the American and Collared pika spp.
3. To provide state and local agencies as well as outreach/citizen science groups with the protocols and materials necessary for effective genetic sample collection

Group Progress/New Data to discuss since 2017 Meeting:

- We need to share best practices, DNA metabarcoding, GT-seq panels, etc.
- Pikas in Peril project established field surveys and scat sampling protocol
    - NDOW, National parks, Colorado Pika Project
- Jessica Castillo Vardaro's Lab
    - Comparing populations for which we have historic specimens from 1915-1925
        - Evidence for population decline in Yosemite, slight decrease in genetic diversity
        - Expanding to Sierra Nevada and Great Basin, compare with different demographic trajectories
    - Pika Diet, using DNA metabarcoding, ITS primers uni-plant primers (300 bp)
        - P6, trnL markers, smaller fragment 75-100 bp, not a ton of specificity
        - went with ITS, greater differentiation power
- Adaptive genomic offset, RAD-seq
    - measure of how genetic variation would have to change to maintain current environmental associations
    - geographic areas of the range that may be under higher stress and understand from an adaptive perspective
- Detecting CNVs, genotype-by-environment analysis to detect range wide
    - each lineage, pseudo replicates
- Ecto-parasites, lots of data collected on this front, also used genetic methods, Hilary
- High quality chromosome level reference

NORTH AMERICAN PIKA CONSORTIUM CONFERENCE (VIRTUAL) – WORKING GROUP DISCUSSIONS

NOTES (MAY 24, 2023)

GROUP: POPULATION GENETICS AND POPULATION GENOMICS

Knowledge Gaps:

- Individual, site level, range wide?
- Linking phenotypes to genotypes
    - Physical, behavioral, physiological traits
    - Forward Genomics!
    - More integrative approach
- Follow individuals by collecting scat
    - SNP panel (GT-seq)
    - Lineage-level is more likely than a range-wide panel
    - Sexing, individual ID, genetic diversity estimate
- More fine-scale conservation delineation is needed
    - Neutral and adaptive genetic variation
    - Within lineages!
- Collared pika focus is needed too!
- Still need a centralized repository for protocols and best practices!
    - DNA extraction protocols needed!
- Provide field tools!

NORTH AMERICAN PIKA CONSORTIUM CONFERENCE (VIRTUAL) – WORKING GROUP DISCUSSIONS

NOTES (MAY 24, 2023)

GROUP: POPULATION GENETICS AND POPULATION GENOMICS

Updated Needs & Objectives

Identify Challenges

NORTH AMERICAN PIKA CONSORTIUM CONFERENCE (VIRTUAL) –
WORKING GROUP DISCUSSIONS

NOTES (MAY 24, 2023)

GROUP: POPULATION GENETICS AND POPULATION GENOMICS

Short-Term Goals/Tasks (3 months to 1 year):

Short Term Goals/ Quick Wins	Next Steps	Leader/ collaborators
1. Centralized repository for NAPC, different sections, one place for resources		
2.		
3.		
4.		

NORTH AMERICAN PIKA CONSORTIUM CONFERENCE (VIRTUAL) –
WORKING GROUP DISCUSSIONS

NOTES (MAY 24, 2023)

GROUP: POPULATION GENETICS AND POPULATION GENOMICS

Long-Term Goals/Tasks (1 + years):

Long Term Goals	Next Steps	Leader/ collaborators
1.		
2.		
3.		
4.		

NORTH AMERICAN PIKA CONSORTIUM CONFERENCE (VIRTUAL) – WORKING GROUP DISCUSSIONS

NOTES (MAY 24, 2023)

GROUP: POPULATION GENETICS AND POPULATION GENOMICS

Communication Strategies (shared Google Drive folder, Google doc, etc.):

1.

2.

Specific funding agencies/opportunities for collaboration:

1.

2.