**FORTY-FIFTH ANNUAL MEETING AND SYMPOSIUM OF THE DESERT TORTOISE COUNCIL**

Excalibur Hotel and Casino, Las Vegas, Nevada  
February 20–23, 2020

*Speaker order: First person listed is the speaker, unless an asterisk indicates another author  
NOTE: Time is specific to each speaker

<table>
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<tr>
<th>Date</th>
<th>Event</th>
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<tbody>
<tr>
<td><strong>FEBRUARY 20, 2020</strong></td>
<td>Field Trip to the Ivanpah Head-start Facility, led by Tracey Tuberville, Kurt Buhlmann and/or Brian Todd</td>
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<tr>
<td>7:00–9:00 PM</td>
<td>Mixer with hors d’oeuvres hosted by Southern Nevada Environmental, Inc. at the Excalibur Ballroom</td>
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<td><strong>FEBRUARY 21, 2020</strong></td>
<td><strong>ANNUAL BUSINESS MEETING AND PRESENTATIONS IN THE EXCALIBUR BALLROOM E, F, G, AND H</strong></td>
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<tr>
<td>7:30 AM – 5:00 PM</td>
<td>Registration; also on February 22 and until the morning of February 23 in the Foyer to the Excalibur Ballrooms</td>
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<td>8:00 AM</td>
<td><strong>Annual Business Meeting of the Desert Tortoise Council</strong></td>
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| 9:30 AM        | **Welcome Address and Report on Desert Tortoise Council’s Activities in 2019**  
Michael W. Tuma, Chair, Board of Directors, Desert Tortoise Council |
| 9:45 AM        | **Introduction of Meeting Chairs:** Bruce Palmer\(^1,2\) and Ed LaRue\(^1,3\);  
\(1\)Member, Board of Directors, Desert Tortoise Council, and  
\(3\)Jacobs Engineering Corporation, AZ; and  
\(1,2\)Circle Mountain Consultants, CA |
| 9:55 AM        | **Auction and Other Announcements**  
Mari Quillman: Member, Board of Directors, Desert Tortoise Council and ECorp Consulting Inc., CA |

**Session 1. Plenary Addresses and Annual Award**  
Chair: Kristin H. Berry, Desert Tortoise Council and U.S. Geological Survey, Riverside, CA

Plenary Address 1. Kristin H. Berry Annual Award: Richard Spotts
10:00 AM  Political expediency, career security, status quo management, greatly contribute to rapid declines of desert tortoise populations
Richard Spotts: St. George, Utah

Plenary Address 2.  Ranavirus, research, and rehabilitation; The interconnectedness of conservation strategies
10:35 AM  Sue J. Carstairs¹, C. Davy²,³, J. Paterson⁴, and S. Vilaca²:
¹Ontario Turtle Conservation Centre, ²Trent University, ³Ontario Ministry of Natural Resources and Forestry, Ontario, Canada

Plenary Address 3.  On the right track: Understanding and reducing the impact of railways on Gopherus
11:10 AM  Rhett M. Rautsaw¹, S.A. Martin², B.A. Vincent³, K. Lanctor⁴, M.R. Bolt⁵, R.A. Seigel², and C.L. Parkinson¹: ¹Clemson University, SC; ²Ohio State University; ³University of California, Santa Barbara; ⁴University of Florida, ⁵Gainesville; ⁶Kennedy Space Center, FL, ⁶Towson University, MD

11:45 AM  Panel of Plenary Speakers for Discussion

12:00 PM  Lunch

Session 2. Representatives from the Department of Interior Present Recovery Efforts of their Agencies
Chair: Rebecca Jones¹ and Michael Vamstad²: Member, Board of Directors, Desert Tortoise Council; and ²Joshua Tree National Park

1:20 PM  Desert Tortoise Management and research in Joshua Tree National Park
Michael Vamstad: Joshua Tree National Park, CA

1:30 PM  BLM: Tortoise Management
Amy L. Fesnock: Bureau of Land Management, Washington, DC

1:40 PM  Management of Desert Tortoise Habitat on Bureau of Land Management Lands in California
Mark Massar: U.S. Bureau of Land Management, California Desert District

1:50 PM  Washington County Habitat Conservation Plan – A recent and ongoing project summary
Mike Schijf and Cameron Rognan, Washington County HCP, UT
2:00 PM  Recovery Progress at Mojave National Preserve  
Matt Bristol, N. Darby, and D. Hughson: Mojave National Preserve, CA

2:10 PM  Monitoring use of underpasses by Mojave desert tortoises (Gopherus agassizii) to inform culvert design and function  
Florence M. Deffner¹, P.E. Myers², K. Holcomb³, and M. Slaughter²:  
U.S. Fish and Wildlife Service, NV¹ and CA³; Bureau of Land Management, NV²

2:20 PM  U.S. Fish and Wildlife Service Update on Desert Tortoise Recovery Activities  
Vincent James: U.S. Fish and Wildlife Service, CA

2:35 PM  Toward a coherent, range-wide Mojave desert tortoise management strategy for the Bureau of Land Management  
Bryan P. Wallace¹,², A. Kissel¹, J. Anderson¹, J. Belak¹, S. Storz¹, B.G. Dickson¹, and A. Fesnock³: ¹Conservation Science Partners, CA; ²Ecolibrium, Inc., CO; and ³Bureau of Land Management, CA

2:50 PM  Panel Discussion

3:05 PM  Refreshments in Excalibur Ballrooms A, B, C, and D

Session 3. Genetics of Gopherus agassizii and G. morafkai and herpesvirus TV 2  
Chair: TBD

3:30 PM  Using Whole Genome Data to Understand Speciation of Desert Tortoises in Western Arizona  
Greer Dolby¹, T.H. Webster¹, T. Edwards³, D.F. DeNardo¹, M.A. Wilson¹, and Kenro Kusumi¹: ¹Arizona State University; and ²University of Utah; and ³University of Arizona

3:45 PM  Does the Coachella Valley in southern California influence gene flow in Agassiz’s desert tortoise (Gopherus agassizii) populations?  
Jeffrey E. Lovich¹, T. Edwards², K.H. Berry³, Shellie Puffer¹, K. Cummings¹, J. Ennen⁴, M. Agha⁵, R. Woodard⁶, K. Brundige⁷, and R.W. Murphy⁸: U.S. Geological Survey, ¹AZ and ³CA; ²University of Arizona; ⁴Tennessee Aquarium, TN; ⁵Washington Dept. of Fish and Wildlife; ⁶Ridgecrest, CA; ⁷Coachella Valley Conservation Commission; ⁸Royal Ontario Museum
4:00 PM  The Genome of Testudinid herpesvirus 2: Preliminary data
Frances C. Origgi, J. Braun, and B.A. Rideout: ¹University of Bern, Switzerland; and ²San Diego Zoo Global, CA

4:15 PM  Panel Discussion

Session 4.  Featured Speaker and Book Author:
Chair:  TBD

4:30 PM  Fire and Fauna, tales of a life untamed: Reflections and reading from my memoir
Joan E. Berish; Sandia Park, NM

5:10 PM  Adjourn to Poster Session and Mixer

5:30 PM  Mixer. Greet Special Guests, Award Winners, and Featured Speakers: Richard Spotts, Sue Carstairs and Rhett Rautsaw
Book Signing with Joan Berish

6:30 PM  Mixer and Buffet Dinner: Excalibur Ballrooms A, B, C, and D

SATURDAY, FEBRUARY 22, 2020  PRESENTATIONS IN THE SONORAN BALLROOM

7:00–8:00 AM  Breakfast: Excalibur Ballrooms A, B, C, and D

Session 5.  Illegal Trade in Turtles at Regional, National, and International Levels
Chair: Cristina Jones: Member, Board of Directors, Desert Tortoise Council; and Arizona Game and Fish Department, Phoenix

8:00 AM  Introduction to the Session
Cristina Jones: Arizona Game and Fish Department, Phoenix

8:05 AM  Current trends in the global turtle trade: Food, pets and the rise of investment Trading
Brian D. Horne¹ and Cristina A. Jones²: ¹Wildlife Conservation Society, NY; and ²Arizona Game and Fish Department, Phoenix

8:35 AM  Illegal live reptile trade in the United States: An overview of topics and trends
Bruce J. Weissgold: Fairfax, VA

9:05 AM  An overview of the illicit turtle trade in Florida and enforcement efforts
Capt. Van Barrow, Florida Fish and Wildlife Conservation Commission, FL
9:35 AM  Recent turtle confiscations in the United States  
U.S. Fish and Wildlife Service, CA

10:05 AM  Panel Discussion

10:20-10:45  Refreshments: Excalibur Ballrooms A, B, C, and D

Session 6. The Common Raven: Data Summaries, Methods, and Recovery Efforts  
Chair: TBD

10:45 AM  Common Raven nesting density and success in California’s Desert Tortoise Critical Habitat Units  
Ally P. Xiong and K.E. Nussear: University of Nevada, Reno

11:00 AM  Recent applications of technology to desert tortoise conservation: Projects underway  
Tim Shields: Joshua Tree, CA

11:15 A.M.  Novel management tools for subsidized avian predators and a case study in the conservation of a threatened species  
Tim Shields¹, *Andrea Currylow²,³, B. Hanley⁴,⁵, S. Boland⁶, W. Boarman, and M. Vaughn⁶: ¹Hardshell Lavs, AK; ²ACEological Research & Consulting, CA; ³University of Southern California; ⁴Cornell University, NY; and ⁵Sundance Biology Inc., CA

11:30 AM  Addressing the Raven Food Subsidy Problem by engaging restaurants to cover their trash  
James Danoff-Burg, K. Mulroe, and A. Ocañas: The Living Desert Zoo and Gardens, Palm Desert, CA

11:45 AM  Panel Discussion

12:00 PM  Lunch

Session 7. Augmentation of Desert Tortoise Populations by Translocation and Head-starting  
Chair: Bryan Wallace, Conservation Partners, Inc.

1:30 PM  Survivorship of Resident and Translocated Tortoises from 2013-2018 in the Greater Trout Canyon Area, Nevada  
Linda J. Allison, U.S. Fish and Wildlife Service, Reno

1:45 PM  The 2017-2019 Tortoise Translocation by the Marine Corps Air Ground Combat Center  
Brian T. Henen, Marine Air Ground Task Force Training Command, CA
2:00 PM  Head-starting *Gopherus agassizii*: Some lessons from the Twentynine Palms Marine Base Project
*Kenneth A. Nagy, B.T. Henen, and L. Scott Hillard: University of California, Los Angeles; and Marine Corps Air Ground Combat Center, CA*

2:15 PM  Evaluating techniques for optimal head-starting of the Mojave Desert Tortoise (*Gopherus agassizii*)
*Brian Todd¹, P. McGovern², J.M. Peaden¹, J.A. Daly², K.A. Buhlmann², and T.D. Tuberville²: ¹University of California, Davis; and ²University of Georgia*

2:30 PM  Panel Discussion

**Special Announcement**

2:50 PM  **Zulu Nyala – A South African Wonderland!**
*Ed LaRue: Wrightwood, CA*

3:00 PM  Refreshments: Excalibur Ballrooms A, B, C, and D

**Session 8. Conservation and Management of Desert Tortoises by Non-profit Organizations**
*Chair: TBD*

3:30 PM  Captive Tortoise Management in the Mojave Desert
*Sarah A. Mortimer and K.D. Shaw: Tortoise Group*

3:45 PM  Update of Activities and Concerns at the Desert Tortoise Research Natural Area
*Robert W. Wood: Desert Tortoise Preserve Committee, Inc., CA*

4:00 PM  Protecting the Iconic Desert Tortoise
*Ileene Anderson¹, L. Belenky¹, and P. Donnelly²: Center for Biological Diversity. ¹CA and ²NV*

4:15 PM  Panel Discussion
Chair: TBD

4:30 PM The Discovery of a new population of Pancake tortoises on a Black Rhino Conservancy in Kenya
Marc Dupuis-Desormeaux1,2, V. Wasonga3, F. Awuor3, D. Kimiti4, G. Chege4, T. Kaaria4, F. Kobia4, and B.D. Horne5,6: 1York University, Ontario, CA; Lewa Wildlife Conservancy, 2Canada and 4Kenya; 3National Museums of Kenya; 5Wildlife Conservation Society, NY; and 6Turtle Survival Alliance, SC

Session 10. Inexpensive Methods for Studying Turtles
Chair: TBD

4:45 PM Utilizing do-it-yourself open-source technologies to make easier the life of the turtle biologist
Patrick W. Cain, Georgia Gwinnett College

5:00 PM Announcements and Adjournment

5:30 PM Mixer and Review of Student, Other Posters, and Photos: Excalibur Ballrooms E, F, G, and H
Book Signing with Joan Berish

6:30 PM Dinner, Excalibur Ballrooms A, B, C, D

7:30 PM Awards

8:00 PM Banquet Address: Turtles, Turtles, and More Beautiful Turtles
Brian Horne, Wildlife Conservation Society, NY

8:30 PM Raffle and Auction


7:00–8:00 AM Breakfast, Excalibur Ballrooms A, B, C, and D

Session 11. Connectivity between Remaining Desert Tortoise Populations

8:15 AM Connectivity and the Framework for Recovery of the Mojave Desert Tortoise
Linda J. Allison: U.S. Fish and Wildlife Service, NV
8:30 AM  
**Existing desert tortoise spatial models as a foundation toward understanding connectivity**  

8:45 AM  
**Making decisions today: Putting together existing information on connectivity**  
*Roy C. Averill-Murray*: U.S. Fish and Wildlife Service, NV

9:00 AM  
**Connecting the plots: The relationship between linear barriers, disturbance, and habitat linkages to Mojave desert tortoise genetic connectivity**  
*Kirsten E. Dutcher*¹, *A.G. Vandergast*², *T.E. Esque*³, *M.D. Matocq*¹, *J.S. Heaton*¹, and *K.E. Nussear*¹: ¹University of Nevada; U.S. Geological Survey, ²CA and ³NV

9:15 AM  
**Progress toward understanding the impacts of land use and climate change on desert tortoise structural genetics and corridor functionality**  
*Ken. E. Nussear, J.S. Heaton*¹, *S.D. Bassett*¹, *S.D. Boyle*¹, *M. Matocq*¹, *A. Parandhaman*¹, *D. Friend*¹, *S. Wright*¹, *K. Dutcher*¹, *S. Hromada*¹, *C. Mitchel, A. Vandergast*², and *T. Esque*³: ¹University of Nevada; U.S. Geological Survey, ²CA and ³NV

9:30 AM  
**Using movement to inform conservation corridors for Mojave desert tortoises (Student Paper)**  
*Steven J. Hromada*¹, *T.C. Esque*², *A.G. Vandergast*³, *C.I. Mitchell*¹, *K.E. Dutcher*¹, *M. E. Gray*⁴, *T. Chang*⁴, *B.G. Dickson*⁴⁻⁵, and *K.E. Nussear*¹: University of Nevada¹, U.S. Geological Survey, ²NV and ³CA, Conservation Science Partners, CA; and ⁵Northern Arizona University

9:45 AM  
**Assessing critical habitat breadth for the Mojave desert tortoise**  
*Kevin T. Shoemaker*¹, *M. Walden*¹, *E. Hunter*², *T.C. Esque*³, and *K.E. Nussear*²: ¹University of Nevada; ²Georgia Southern University, ³U.S. Geological Survey, NV

10:00 AM  
Refreshments, Excalibur Ballrooms A, B, C, and D

10:30 AM  
**Land use futures for the Mojave Desert, USA: Implications for the Mojave desert tortoise**
Session 12. Research on populations of two species of desert tortoise: *Gopherus agassizii* and *G. morafkai*

Chair: TBD

11:00 AM  
**Influence of environmental conditions on size-at-maturity of the Mojave desert tortoise and gopher tortoise (Student Paper)**  
M.A. Walden\(^1\), E. Hunter\(^2\), K.K. Drake\(^3\), K.E. Nussear\(^1\), T.C. Esque\(^3\), and K.T. Shoemaker\(^4\):  
\(^{1}\)University of Nevada; \(^{2}\)Georgia Southern University; and \(^{3}\)U.S. Geological Survey, NV

11:15 AM  
**Using spatial information to improve methods for estimating density for the desert tortoise (Student Paper)**  
Corey I. Mitchell\(^1\), K.T. Shoemaker\(^1\), T.C. Esque\(^2\), A.G. Vandergast\(^3\), J.S. Heaton\(^4\), K.E. Dutcher\(^1\), S.J Hromada\(^1\), and K.E. Nussear\(^1\):  
\(^{1}\)University of Nevada; and \(^{3}\)U.S. Geological Survey, NV

11:30 AM  
**Revisiting health and disease at sites in the Ivanpah and Fenner valleys, California, after 18 to 23 years**  
Kristin H. Berry and Michael Tuma:  
U.S. Geological Survey, CA

11:45 AM  
**A novel application of the USFWS line distance sampling data: Estimating range-wide trends in occupancy for Mojave Desert Tortoises**  
Amanda M. Kissel\(^1\), B. Wallace\(^1\), B.G. Dickson\(^1\), J. Belak\(^1\), L. Allison\(^2\), and R. Averill-Murray\(^1\):  
\(^{1}\)Conservation Science Partners, CA; and \(^{2}\)U.S. Fish and Wildlife Service, NV

12:00 PM  
Lunch

1:15 PM  
**Announcement of Student Awards**  
Michael Tuma: Chair, Student Awards: Member, Board of Directors, Desert Tortoise Council

Session 12. continued  
Chair: TBD

1:30 PM  
**Spatially explicit population viability analysis for Mojave desert tortoises in the northeastern portion of their range**
Seth M. Harju1, S.M. Cambrin2, and Roy C. Averill-Murray3:
1Heron Ecological, LLC, ID; 2Clark County Desert Conservation Program, NV; and 3U.S. Fish and Wildlife Service, NV

1:45 PM

The Eagletail Mountains: Returning to a Sonoran desert tortoise long-term monitoring plot
Chad A. Rubke1, R. P. O’Donnell1, C.A. Jones1, and E. H. Masters2: 1Arizona Game and Fish Department; and 2Bureau of Land Management, AZ

2:00 PM

Space use of Sonoran desert tortoises (Gopherus morafkai)
Roy C. Averill-Murray1, C.H. Fleming2,3, and J. D. Riedle4: 1U.S. Fish and Wildlife Service, NV; 2National Zoological Park, VA; 3University of Maryland; and 4Kansas Dept. of Wildlife, Parks, and Tourism

2:15 PM

Panel Discussion

2:30 PM

Adjourn

POSTERS: Excalibur Ballroom A, B, C, and D
Listed in order by first author’s name and name identified with an asterisk if speaker is not the first author

Road Warriors: Citizen Scientist Monitoring for Mojave Desert Tortoise Road Mortality and Live Encounters to Identify Priority Areas for Fence Installation
Florence M. Deffner1, Jennifer Wilkening1, Sarah Mortimer2, Kobbe Shaw2, Kristi Holcomb3, Kerry Holcomb4, and Cathy Wilson1: U.S. Fish and Wildlife Service, 1NV and 4CA; 2Tortoise Group, NV; and 3NV Department of Transportation, NV

Ecologically Founded Intelligent and Aversive Decoy Device to Protect Vulnerable Species (e.g., Mojave Desert Tortoise) from Targeted Predation and Provide Data-Driven Insights
Caroline A. Kingsley1, Kenneth E. Nussear2, Danny C. Reinke3, and Michael P. Jenkins1: 1Charles River Analytics Inc., MA; 2University of Nevada-Reno, NV; and 3Edwards Air Force Base, CA

Development of a Genotyping Protocol for Mojave Desert Tortoise Scat
Anna Mitelberg1, *Amy G. Vandergast1, Ken E. Nussear2, Kirsten Dutcher2, and Todd C. Esque3: U.S. Geological Survey, 1CA and 3NV; and 2University of Nevada
Progress Towards a New *Gopherus morafkai* Reference Genome to Identify Structural Genetic Differences Underlying Physiological Adaptations of Mojave and Sonoran Desert Tortoises
Joseph P. Orton, Raul Araya Donoso, Dale F. DeNardo, Kenro Kusumi, and Greer A. Dolby: Arizona State University

Understanding the Role of the Adaptive Edge for the Desert Tortoise in a Changing Climate
Anjana Parandhaman¹, M.D. Matocq², D.P. Boyle¹, S.D. Bassett¹, A.G. Vandergast³, T.C. Esque³, Jill S. Heaton¹, and Kenneth E. Nussear¹.¹ University of Nevada; and U.S. Geological Survey, ²CA and ³NV