

# Dr. Sonja Ann Christensen

## Contact Information

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## Education

1. Ph.D., Department of Fisheries and Wildlife, Specialization in Disease Ecology; May 2018. Michigan State University. Co-Advisors: Dr. William Porter and Dr. David Williams. GPA: 4.0/4.0  
*Dissertation: Population Impacts and Disease Patterns of Hemorrhagic Disease in White-Tailed Deer: Understanding the Role of an Emergent Disease. 2018. Michigan State University, East Lansing, Michigan, USA.*
2. M.Sc., Wildlife and Fisheries Science; May 2010. The Pennsylvania State University. Advisor: Dr. Duane Diefenbach  
*Thesis: Movement and habitat use of sika and white-tailed deer on Assateague Island National Seashore, Maryland. 2010. Pennsylvania State University, University Park, Pennsylvania, USA.*
3. B.Sc., Major: Biology, Ecology emphasis; Minor: Geography; December 2005. Minnesota State University, Mankato.

## Professional Appointments

- **Academic**
  - Postdoctoral Fellow – Michigan State University, East Lansing, Michigan: December 2017 – present (14 week maternity leave began May 7<sup>th</sup> 2018)
  - Graduate Research Assistant – Michigan State University, East Lansing, Michigan: August 2013 – December 2017.
  - Graduate Research Assistant and Teaching Assistant – University of Montana, Missoula, MT: August 2011 – August 2013
  - Graduate Research Assistant – The Pennsylvania State University, Pennsylvania Cooperative Fish and Wildlife Research Unit, University Park, Pennsylvania: January 2006 – May 2008.
- **Government**
  - Deer and Moose Project leader (statewide supervisor of deer and moose management) - Massachusetts Division of Fisheries and Wildlife, Westborough, MA: April 2008 – August 2011.

- Wildlife Research Biologist Paraprofessional, MN Department of Natural Resources, Farmland Wildlife Research, Madelia, Minnesota: November 2004 – January 2006.

## Publications

### ***Peer-reviewed Articles or Book Chapters (8)***

1. **Christensen, S. A.**, M. Ruder, D. M. Williams, W. Porter, and D. Stallknecht. 2020. The role of drought as a determinant of emergent hemorrhagic disease in the Eastern United States. *Accepted, in press, Global Change Biology*.
2. **Christensen, S. A.** 2020. Leading from the start. *Book chapter: Lessons in Leadership: Integrating Courage, Vision, and Innovation for the Future of Sustainable Fisheries. Accepted, in press.*
3. **Christensen, S. A.**, K. Straka, R. Mason. 2020. A New Approach to Combating CWD. Michigan is seeking scientific solutions using collaboration. *The Wildlife Professional. The Wildlife Professional, 14(2): 51-53.*
4. Carrera, R., W. B. Ballard, P. R. Krausman, J. Devos Jr., M. C. Wallace, S. Cunningham, O. J. Alcumbrac, and **Christensen, S. A.** 2015. Reproduction and nutrition of desert mule deer with and without predation. *The Southwest Naturalist, 60(4): 285-298.*
5. Krausman, P. R., **Christensen, S. A.**, McDonald J. E., and Leopold B. D. 2014. Dynamics and social issues of overpopulated deer ranges in the United States: a long term assessment. *Journal of California Fish and Game, 100(3): 434-448.*
6. Wagner, T., Diefenbach, D. R., **Christensen, S. A.**, Norton, A. S. 2011. Using Multilevel Models to Quantify Heterogeneity in Resource Selection. *Journal of Wildlife Management, 75: 1788 – 1796.*
7. McDonald, J. E., Destefano, S., Gaughan, C., Mayer, M., Woytek, W. A., **Christensen S. A.**, Fuller, T.K. 2011. Survival and harvest-related mortality of white-tailed deer in Massachusetts. *Wildlife Society Bulletin, 35: 209 – 219.*
8. McDonald, J., **Christensen S.**, Deblinger R., Woytek W. 2009. An alternative to climate change for explaining species loss in Thoreau’s woods. *Proc Natl Acad Sci USA 106:E28.*

### ***Technical Reports (3)***

1. **S. Christensen**, William Porter, and David Williams. 2018. Local-scale assessment and monitoring of deer populations following a major mortality event. Final Performance Report, WSFR Grant ID: MI W-155-R Study 1.22, Michigan Department of Natural Resources, Lansing, MI.

2. Diefenbach, D. R., and **S. A. Christensen**. 2009. Movement and habitat use of sika and white-tailed deer on Assateague Island National Seashore, Maryland. Natural Resource Technical Report NPS/NER/NRTR—2009/140. National Park Service, Philadelphia, PA.
3. Grund, M., L. Cornicelli, D. Fulton, B. Haroldson, E. Dunbar, **S. Christensen**, and M. Imes. 2005. Evaluating alternative regulations for managing white-tailed deer in Minnesota – a progress report. Pages 132-137 in P. Wingate, R. Kimmel, J. Lawrence, and M. Lenarz, editors. Summaries of Wildlife Research Findings, 2005. Division of Fish and Wildlife, Minnesota Department of Natural Resources, St. Paul, MN.

### ***Manuscripts Currently Under Review (3)***

1. **Christensen, S. A.**, D. M. Williams, W. F. Porter, and B. A. Rudolph. Spatial variation of white-tailed deer population impacts and recovery from epizootic hemorrhagic disease. *Minor revisions, Journal of Wildlife Disease*
2. **Christensen, S. A.**, M. Farr, and D. M. Williams. Assessment and Novel Application of N-mixture Models for Aerial Surveys of Wildlife. *Submitted, Ecosphere*.
3. Stanke, H.D., **S. A. Christensen**, J. Cook, and D. M. Williams. Connecting the dots: A landscape approach for Michigan CWD. *Submitted, Scientific Reports*.

## **Courses Taught**

### ***Instructor on Record***

- Michigan State University FW885. Leadership in Natural Resources and Environmental Management. Fall semester 2017. SIRS (student evaluation score, 1-5 best-worst) score: 1.  
Co-taught, W. Porter and S. Christensen

### ***Teaching Assistant***

- University of Montana WILD 480: Applied Wildlife Management (Human-Dimensions in Wildlife), Spring 2013, Faculty lead: Dr. Paul Krausman
- University of Montana WILD 370: Wildlife Habitat Management and Conservation, Spring 2012, Faculty lead: Dr. Victoria Drietz.

### ***Guest Lectures***

- MSU IBIO 355. Ecology, Honors Section. *Title*: Population impacts and patterns of disease: Integrating the ecology of infectious diseases with wildlife conservation and management. Instructor: Dr. Mary Bremigan and Dr. Marjorie Weber. Michigan State University. 26 September 2019.

- MSU FW 101. Fisheries and Wildlife Ecology and Management. *Title: Fish and Wildlife Disease Ecology.* Instructor: Dr. Mary Bremigan. 4 April 2019.
- MSU FW 462. Fish and Wildlife Disease Ecology. *Title: Effects of disease on populations of wild animals.* 8 February 2018.
- MSU FW/MC 481. Global Issues in Fisheries and Wildlife. *Title: Emerging disease in deer populations.* 28 February 2018.
- MSU FW 101. Fundamentals of Fisheries and Wildlife. *Title: Fish and wildlife disease ecology.* 22 March 2018.
- MSU FW 101. Fundamentals of Fisheries and Wildlife. *Title: Case Studies in Wildlife Disease Research: CWD and EHD in White-tailed Deer.* April 20<sup>th</sup> 2017
- Central Missouri University – Wildlife management. *Title: Fish and wildlife disease ecology. Wildlife management and disease.* March 4 2016.
- MSU FW 424 (analysis and management of fish and wildlife populations), *Title: Measuring impacts of disease in wildlife populations.* November 2014.
- MSU ENT 401 (arthropod vector disease ecology course). *Title: Emerging Deer Disease in Michigan.* Kellogg Biological Station, June 2014 and June 2015.
- WFCON 565 (wildlife population dynamics and management), *Title: Deer Management and Biology, and Deer Aging Using Tooth Wear and Replacement;* University of Massachusetts, Amherst: Fall 2008, 2009, and 2010.
- Wildlife Biology, *Title: Radio-Telemetry and Remote Sensing for Wildlife;* Framingham State College, Massachusetts March 2010.
- Radio-telemetry, Student chapter TWS techniques workshop, 2008, 2009, 2010.
- WFS 310. *Title: Radio-telemetry; The Pennsylvania State University* Fall 2007.

## **Student Research Advising**

### ***Graduate Student Mentoring***

- Jon Cook, PhD candidate, anticipated graduation August 2020.
- Noelle Thompson, PhD student, anticipated graduation May 2022.
- Jonathan Trudeau, PhD student, anticipated graduation May 2022.

### ***Undergraduate Mentoring***

- Kali Rush (graduated May 2016) – Undergraduate Research co-supervisor.
- Kelsey Fischer (graduated December 2017).
- Sydney Manning (graduated December 2017).
- Hunter Stanke (graduated May 2019) – Undergraduate Research co-supervisor.
- Addison Pletcher (graduating May 2021) – Primary supervisor.
- Avery Tilley (graduating May 2023) – Undergraduate Research primary supervisor.

## Research Grant Activity

### Awarded (total \$1,923,935)

1. **S. Christensen** and W. Porter. August 2019. *Multistate CWD Strategic Planning Initiative*. Michigan Department of Natural Resources/Michigan State University joint wildlife disease initiative. Amount: \$16,387, Awarded. Role: PI.
2. W. Porter and **S. Christensen**. Evaluating the interaction of emerging diseases on white-tailed deer populations. The Hal and Jean Glassen Memorial Foundation. September 1, 2017 – August 31, 2020. Amount: \$260,033, Awarded. Role: Co-PI.
3. D. Williams and **S. Christensen**. Influence of deer harvest regulations on antlerless harvest, abundance, and sex and age composition: implications for managing deer in the face of chronic wasting disease. Sponsor: Michigan Department of Natural Resources. May 1, 2019 – September 30, 2023. Amount: \$239,463, Awarded. Role: Co-PI.
4. K. Schuler, D. Williams, **S. Christensen**, A. Belsare, D. Walter, D. Walsh, C. Jennelle, B. Hanley. Optimizing CWD surveillance: regional synthesis of demographic, spatial, and transmission–risk factors. Michigan Department of Natural Resources/Michigan State University joint wildlife disease initiative. Amount: \$241,094, Awarded. Role: Co-PI.
5. W. Porter, D. Williams and **S. Christensen**. Management solutions for chronic wasting disease. Michigan State University, College of Agriculture and Natural Resources, AgBioResearch and MSU Extension. July 1, 2016 – June 30, 2021. Amount: \$300,000. Role: Key Personnel
6. D. Williams, W. Porter, and **S. Christensen**. Assessing drivers of spread and transmission of Chronic Wasting Disease in Michigan deer. Division of Wildlife, Michigan Department of Natural Resources. October 1, 2017 – September 30, 2022. Amount: \$502,736 + \$114,222 supplement. Role: Key Personnel.
7. W. Porter, D. Williams, and **S. Christensen**. Management of chronic wasting disease. Division of Wildlife, Michigan Department of Resources. October 1, 2016 – September 30, 2021. Amount: \$250,000. Role: Key Personnel

### Pending

1. **S. Christensen** and J. Pedersen. *North American interdisciplinary chronic wasting disease research consortium*. NCNIMSS NC-Research Multistate 5 - year proposal, *accepted pending minor revisions*.
2. **S. Christensen**, D. Stallknecht, M. Ruder, R. Russell, and K. Straka. *Does climate change explain the northward expansion of hemorrhagic disease in the Midwest?*

Preproposal. USGS Northeast Climate Adaptation Science Center RFP FY20.  
Amount: \$386,863, *Accepted for full proposal submission.*

### **Presentations at Professional Conferences (Last 5 Years)**

1. **Christensen, S. A.** Drivers of Emerging Hemorrhagic Disease. *Invited Symposium Speaker – Forthcoming.* Presentation at the 27th Annual Conference in Louisville, Kentucky, September 27- October 1, 2020.
2. Belsare, A., **S. A. Christensen**, N. E. Thompson, D. Williams, W. Porter. Model-informed strategies for chronic wasting disease management. Oral presentation at the 26<sup>th</sup> Annual Meeting of The Wildlife Society. 3 October 2019. Reno, NV.
3. Cook, J., **S. A. Christensen**, D. Williams, W. Porter. Putting out the fire: modeling the spread and spark dynamics of chronic wasting disease. Oral presentation at the 26<sup>th</sup> Annual Meeting of The Wildlife Society. 3 October 2019. Reno, NV.
4. Thompson, N. E., **S. A. Christensen**, D. Williams, W. Porter. Using agent-based modeling to improve our understanding of chronic wasting disease. Oral presentation at the 26<sup>th</sup> Annual Meeting of The Wildlife Society. 3 October 2019. Reno, NV.
5. Trudeau, J. K., D. Williams, **S. A. Christensen**, W. Porter. Michigan's white-tailed deer are going on short vacations. Oral presentation at the 26<sup>th</sup> Annual Meeting of The Wildlife Society. 3 October 2019. Reno, NV.
6. **Christensen, S. A.** Climate impacts on fish and wildlife disease. *Invited.* Oral presentation at 2019 Conservation and Climate Change: Impact on Michigan Fisheries and Wildlife Forum. 23 August 2019. East Lansing, MI.
7. Thompson, N., **S. A. Christensen**, D. Williams, W. Porter. Using agent-based modeling to improve our understanding of chronic wasting disease. Oral presentation at the 2019 International Wildlife Disease Association Conference. 6 August 2019. Tahoe City, CA.
8. Cook, J. D., **S. A. Christensen**, D. M. Williams, W. F. Porter. Learning from Others: Modeling the Growth and Spread of Chronic Wasting Disease with Limited Local Information. Oral presentation at the 2019 Annual Meeting of the Michigan Chapter of The Wildlife Society. 14 March 2019. Gaylord, MI.
9. **Christensen, S. A.**, D. Williams, and W. Porter. Application of N-mixture models for aerial surveys of wildlife: A comparison study. Oral presentation at the 9th International Deer Biology Congress. 7 August 2018. Estes Park, CO.

10. **Christensen, S. A.**, D. Williams, and W. Porter. Epizootic hemorrhagic disease affects abundance and distribution of free-ranging deer populations. Oral presentation at the 9th International Deer Biology Congress. 9 August 2018. Estes Park, CO.
11. Cook, J.D., **S. A. Christensen**, D.M. Williams, and W.F. Porter. Learning from others: Modeling the growth and spread of chronic wasting disease in an emergent area. Oral presentation at the 9th International Deer Biology Congress. 5 August 2018. Estes Park, CO.
12. Stanke, H.D., J. Cook, **S. A. Christensen**, W.F. Porter, and D.M. Williams. Connecting the dots: A landscape approach for Michigan CWD. Oral presentation at the 2018 Annual Meeting of the Michigan Chapter of The Wildlife Society. 16 March 2018. Gaylord, MI.
13. **Christensen, S. A.**, M. Ruder, D. Williams, W. Porter, J. Fischer, and D. Stallknecht. The Role of Drought as a Predictor of Hemorrhagic Disease in the Eastern United States. Oral presentation at the 41<sup>st</sup> Annual Meeting of the Southeast Deer Study Group. February 21<sup>st</sup>, 2018. Nashville, TN.
14. **Christensen, S. A.**, M. Ruder, D. Williams, W. Porter, J. Fischer, and D. Stallknecht. Drought as a risk factor for hemorrhagic disease in the eastern United States. Oral presentation at the 24<sup>th</sup> Annual Meeting of The Wildlife Society. 26 September 2017. Albuquerque, NM
15. Stanke, H., J. Cook, **S. Christensen**, W. Porter and D. Williams. Investigating the effects of landscape connectivity on the occurrence of chronic wasting disease in Michigan. Poster presentation at the 24th Annual Meeting of The Wildlife Society. September 2017. Albuquerque, NM. \*Awarded best student poster 2017
16. **Christensen, S. A.**, D. M. Williams, W. F. Porter, and B. Rudolph. Comparison of N-Mixture Models and Distance Sampling for Abundance Estimation: Application for a Deer Population. The Wildlife Society 23rd Annual Conference. 17 October 2016, Raleigh, NC.
17. **Christensen, S. A.**, D. M. Williams, W. F. Porter, and B. Rudolph. Assessing Population Impacts of EHD on free-ranging white-tailed deer in Michigan. The 4<sup>th</sup> Annual joint cervid industry meeting. 10 Aug 2016. Big Rapids, Michigan.
18. **Christensen, S. A.**, D. M. Williams, W. F. Porter, and B. Rudolph. Assessing local-scale population abundance and recovery of white-tailed deer following a disease event. Oral presentation at the 76th Midwest Fish and Wildlife Conference. 25 January 2016. Grand Rapids, Michigan.



19. Rush, K. K., **S. A. Christensen**, and D. M. Williams. Assessing Habitat-Specific Detection Probabilities for White-Tailed Deer. Oral presentation at the 76th Midwest Fish and Wildlife Conference. 25 January 2016. Grand Rapids, Michigan.
20. **Christensen, S. A.**, D. M. Williams, W. F. Porter, B. Rudolph, and A. C. Dechen Quinn. Assessing Local-Scale Population Abundance of White-tailed Deer Following a Disease Event. Presented at the Michigan Chapter of the Wildlife Society. 27 March 2015, Clare, MI.
21. Rudolph, R. W. F. Porter, D. M. Williams, **S. A. Christensen**. 2015. A science-based response to Chronic Wasting Disease. Oral presentation at the annual meeting of the Michigan Department of Natural Resources, Wildlife Division, August 2015, Roscommon, Michigan.
22. Rush, K. K., **S. A. Christensen**, and D. M. Williams. Assessing Habitat-Specific Detection Probabilities for White-Tailed Deer. Poster presentation at the annual meeting of The Wildlife Society, October 2015, Winnipeg, Manitoba, Canada.
23. Rush, K. K., **S. A. Christensen**, and D. M. Williams. Assessing Habitat-Specific Detection Probabilities for White-Tailed Deer. Poster Presentation at the 75th annual Midwest Fish and Wildlife Conference. 10 February 2015, Indianapolis, IN.

### **Selected Awards**

- Presidential Award, Michigan Chapter of The Wildlife Society. 2019.
- North Central Section of TWS Regional Outstanding Graduate Student of the Year award 2016, \$500
- The Hal and Jean Glassen Foundation Fellow Conservation Medicine Fellowship 2015 \$8,000
- Joseph G. Schotthoefer Memorial Student Award, Safari Club International Michigan Involvement Committee, September 2014. \$2,000.
- Graduate Research Enhancement Fellowship, for attendance to the Introduction to Distance Sampling Workshop at St. Andrews University, Scotland. Summer 2014. \$1,000. Michigan State University.

### **Selected Professional Engagement and Outreach**

#### ***Professional Engagement***

- *Invited participant*: Climate Change and Wildlife Health Workshop, January 7-10, 2020. Hosted by National Wildlife Health Center and USGS, Madison, WI.
- Chronic Wasting Disease Research Consortium lead and organizer (Multistate project, NCDC 234): S. Christensen, J. Pedersen, Bill Barker, and W. Porter, Leaders. Inaugural strategic planning meeting on Sept. 9-10, 2019.



- Elected Board Member, TWS National Wildlife Disease Working Group (2 year term effective October 3 2019).
- AFWA, National Fish and Wildlife Health Initiative Steering Committee: Assistant Coordinator, September 2015-present; meeting host July 2019.
- STEM teaching workshop attendee, Michigan State University, 2018-2020.
- Midwest Chronic Wasting Disease Research Initiative. December 2017 – present.
- Christensen, S.A. and W.F. Porter. Michigan Deer Disease Initiative. Invited briefing to Senator Debbie Stabenow. 5 February 2018. Lansing, MI.
- Graduate of Emerging Leaders Program at the Great Lakes Leadership Academy, (9-month program of individual and organizational leadership skills development). April – Sept. 2016.
- MSU GSO, Fundraising Committee (Chair): September 2013 – 2015.

### ***Outreach***

- Invited speaker, National Quality Deer Management Association staff visit to Michigan State University, “Emerging disease in Michigan deer: addressing challenges through research”. March 22nd 2019.
- Invited speaker, The Hal and Jean Glassen Foundation Board Meeting, project update. “Emerging disease in Michigan deer: addressing challenges through research”. March 19th 2019 and March 4<sup>th</sup> 2020.
- Invited speaker, MSU Wildlife Disease Association meeting, “Emerging disease in Michigan deer: addressing challenges through research”. February 5<sup>th</sup> 2019.
- Invited guest, Mike Avery Radio Show. EHD in Michigan. July 2016.
- Invited guest, WLEW Radio – Outdoors DNR live call-in show, Sept. 24 2015 and Nov. 10th 2016.
- Presented at The Lansing Rotary Club meeting, Lansing, MI. “Emerging disease issues for Michigan deer.” 9 July 2015.
- Invited guest, Michigan Out of Doors TV: EHD episode #1537, Sept 2015.
- Invited guest, Wild Michigan Radio show with Duran Martinez. Dec. 20th 2014.
- Invited speaker, Safari Club International Lansing chapter, annual white-tail night. Presented on deer diseases and ecology. December 11th 2014.
- Invited speaker, Becoming an Outdoor Woman deer workshop, Fall 2008, 2009, 2010.
- Co-lead telemetry workshop for School of Forest Resources Wildlife and Fisheries Science undergraduates; The Pennsylvania State University, Spring 2007.
- Invited Speaker, Pennsylvania Deer Association, Western Chapter, Annual Meeting. Deer research, PA USGS Wildlife Cooperative Unit. Fall 2006.

### **Referee and Review Service**

- Guest Editor, The Northeast Naturalist.
- Reviewer: Global Change Biology, Global Ecology and Conservation, Wildlife Society Bulletin, The Journal of Wildlife Management, The Northeast Naturalist.

## **Professional Affiliations**

- The Wildlife Society – National, North Central Section, and Michigan chapter – 2013-present
  - Michigan Chapter - served as board member, president-elect, president, and past-president, 2015-2019.
  - Board member, Wildlife Disease Working Group; Oct 2019 - present
- Wildlife Disease Association, 2015-present.
- The Wildlife Society – Montana Chapter and Northwest Section 2012 – 2013
- The Wildlife Society – New England Chapter and Northeast Section 2009 – 2013
  - Vice president, 2010-2011.
- The Wildlife Society - Pennsylvania Chapter 2006-2008
- The Wildlife Society – Minnesota Chapter 2005-2006

## **Links to Select Media Releases**

- [Chronic wasting disease threatens michigan deer hunting wildlife conservation efforts.](#) In the Field magazine, MSU. February 2020.
- [CWD study will track deer movement.](#) Interview, Times Herald, January 2018.
- Michigan Out of Doors T.V. - EHD Interview (begins at 17:50) Sept 9 2015 #1537. [Evaluating EHD impacts on Michigan's deer](#)
- [Effort to curb Lyme disease puts deer in the crosshairs](#) Interview as Massachusetts Deer Project Leader, October 26, 2010.
- [Shooting for a lower deer population,](#) Interview as Massachusetts Deer Project Leader, December 2, 2008.