

Oregon IPM Center and Dept. of Horticulture  
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**A. EDUCATION AND EMPLOYMENT INFORMATION**

Education

- 2012 Ph.D. Biology, University of New Mexico, Albuquerque
- 2003 B.S. Zoology (*Magna cum laude*), Oregon State University, Corvallis. Minor: Chemistry
- 2001 A.A. Biological Sciences, Central Oregon Community College, Bend

Extra-Education Trainings

- 2022 Introduction to Python I and II, Oregon State University, Corvallis
- 2018 Bayesian Statistics for Ecologists Workshop, US Geological Survey, Boise, ID
- 2017 High Performance Computing in R Course, US Geological Survey, Denver, CO
- 2016 Diversity in the Classroom Workshop Series, University of Arizona, Tucson
- 2013 Pedagogy Workshop, National Institute of Health Postdoctoral Excellence in Research and Teaching (NIH PERT) program, University of Arizona, Tucson
- 2008 Species Distribution Modeling Workshop, American Museum of Natural History Center for Biodiversity and Conservation, Portal, AZ
- 2003 Tropical Conservation Ecology, Institute for Tropical Ecology and Conservation, Summer term 2003, Bocas del Toro, Panamá

Positions

- 2018–cur. Research Associate, Oregon IPM Center, Oregon State University, Corvallis
- 2017–2018 Ecologist, USGS Forest and Rangeland Ecosystem Science Center, Boise, ID
- 2013–2016 Postdoctoral Fellow, NIH PERT program, Dept. of Ecology and Evolutionary Biology and Center for Insect Science, University of Arizona, Tucson
- 2015 Adjunct Faculty, Pima Community College, Tucson, AZ
- 2013 Adjunct Faculty, Dept. of Ecology and Evolutionary Biology, Univ. of Arizona, Tucson
- 2012–2013 Postdoctoral Research Associate, Dept. of Ecology and Evolutionary Biology, University of Arizona, Tucson
- 2012 Project Assistant, Office for Support of Effective Teaching, University of New Mexico, Albuquerque
- 2009–2011 Teaching Assistant, Dept. of Biology, University of New Mexico, Albuquerque

2007–2009 National Science Foundation (NSF) GK-12 Fellow, Univ. of New Mexico, Albuquerque  
2005–2012 Research Assistant, Dept. of Biology, University of New Mexico, Albuquerque  
2004–2005 Lab Manager, Dept. of Ecology and Evolutionary Biology, University of California,  
Los Angeles

## **B. TEACHING, ADVISING AND OTHER ASSIGNMENTS**

Note: Teaching and advising is not in my job description, but I co-developed and instructed a course at OSU in Winter 2023 (HORT 499/599: Ecological Systems Modeling).

### **1. Instructional Summary**

HORT 499/599 – Ecological Systems Modeling  
Winter Term 2023, 3 credits  
Co-developed and instructed with Dr. Len Coop

### **2. Student and Participant/Client Evaluation**

Not applicable – I have not had teaching responsibilities at OSU.

### **3. Advising**

Not applicable – I have not had advising responsibilities at OSU.

### **4. Other Assignments**

#### **Phenology, climate suitability, and infection risk models and tools**

***Situation.*** Agricultural decision-makers need science-based, ecologically-informed site and spatialized models to help manage and monitor pests, their crop hosts, and their natural enemies. With respect to invasive species, decision makers need information on *where* an invasive species could potentially establish and *when* developmental stages are expected to occur, because this knowledge can support and improve strategic and tactical pest management decisions. Similarly, optimizing biological control programs can benefit from knowledge of where and when biological control agents will exert sufficient pressure on target pests.

***Approach.*** I have co-developed a spatialized modeling tool known as DDRP (**D**egree-**D**ay, **R**isk, and **P**henological event mapping system), which was designed to predict real-time and forecasted phenology and climate suitability of insect species in the contiguous US. This work included (1) building models for 16 high-risk pest insects as part of a USDA-APHIS-PPQ (Center for Plant Health Science & Technology Program) cooperative agreement; (2) co-developing a version of DDRP that models insects with photoperiodic cued diapause to support biological control programs for three invasive plant species; and (3) co-developing a third version of DDRP that models infection risk and climate suitability for an invasive fungal pathogen causing boxwood blight. I am currently developing a web app to make boxwood blight forecasts more accessible to stakeholders, increasing DDRP's capabilities to model moisture-sensitive organisms, and validating model forecasts using ground-based observation data for select species.

***Outcomes and impact.*** I helped develop DDRP models for 14 of the 16 target insect species for the PPQ-S&T cooperative agreement. Regularly updated (every three days) models forecasts for all

species are available at <http://uspest.org/CAPS>. The DDRP platform, models, and associated documentations including technical reports and a detailed user-manual were handed over to PPQ-S&T in 2020, and they are available at USPEst.org and in a GitHub repository ([https://github.com/bbarker505/ddrp\\_v2](https://github.com/bbarker505/ddrp_v2)). The impacts of this work are currently unknown because we're not sure how PPQ S&T is using DDRP code and models in their existing workflows. However, our recently funded USDA NIFA AFRI Tactical Sciences in Biosecurity grant (Coop, Barker, and Crimmins) will support work to make DDRP forecasts more accessible and visible to decision makers, and to seek feedback from end-users on how forecasts are influencing their pest surveillance and management decisions.

**Scholarship.** Work related to DDRP has resulted in 10 technical reports, three peer-reviewed journal articles (two as first author), two book chapters (both as co-author), and 16 presentations (10 as first-author). I have been a co-PI or PI on six grants, two of which were funded (NIFA AFRI Tactical Sciences in Biosecurity grant, and Oregon Department of Agriculture Nursery Research grant) and one that is pending (DoD Strategic Environmental Research and Development Program, SERDP). I led the writing of a USDA CPPM Extension Implementation Program Area grant, although I was not listed as a co-PI.

### **Spatial population and movement models and tools**

**Situation.** Technologies that enable direct measurement of organisms are increasing our ability to observe, model, and apply data from the natural world. In particular, the use of remote sensing technologies for the surveillance and analysis of target organisms can provide real-time information on factors relevant to their management, such as their distribution, activities, and dispersal capabilities. However, the development of affordable remote sensing networks and tools for ecological management is only in its infancy.

**Approach.** I have been collaborating with Integrative Economics, LLC (based in Portland, OR) in research and development activities related to using data from remote sensing networks to build and validate models for insect pests and beneficials. Over an *ca.* 4-month period, I developed a movement model for codling moth, which is a major pome fruit pest in the Pacific Northwest. A primary goal of this work is to better predict the activities and spread of codling moth using remotely-sensed insect detection data and environmental data as inputs.

**Outcomes and impact.** This work is very preliminary owing to funding limitations. However, a primary project outcome will include real-time, multi-model sensor networks and modeling services for tracking insect populations in agricultural and natural (conservation) settings. Increased knowledge of pest activities and movements can improve the timeliness and precision of management tactics, which will increase crop production, the use of non-chemical IPM tactics, and overall sustainability.

**Scholarship.** I secured funding for this collaborative project from Integrative Economics in October 2021 (\$4,424, spread across four months). The movement model for codling moth was presented in informal Zoom meetings and in R Markdown documents.

## Collaborative Programs

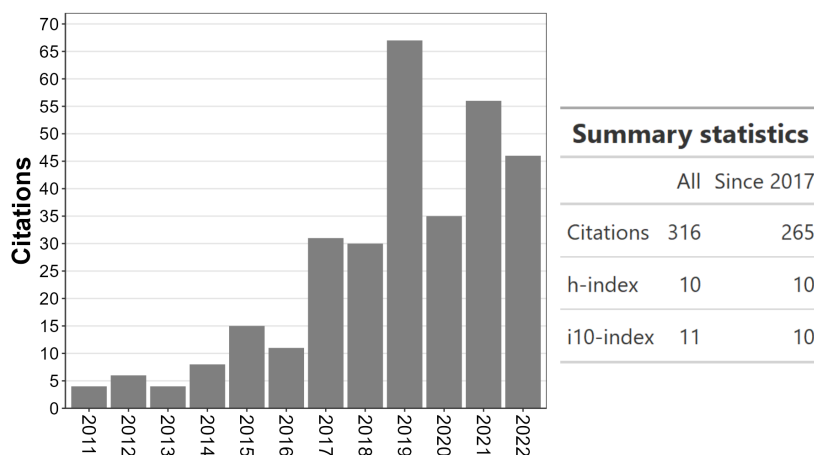
Program and Funding	Participants	Recent Activities	Meetings at Which I Participated
DoD SERDP grant, “Advanced Understanding and Methods of Invasive Species Control” program	Co-PIs and key collaborators from USDA ARS and CA Dept. of Food and Agriculture	Submitted and awarded a \$1.5M grant to study and model a new biocontrol insect for yellow starthistle	Several conference calls between Nov 2021–Mar 2022, presented research to Technical Review Board meeting (Sep 13, 2022)
USDA NIFA AFRI grant, “Tactical Sciences in Biosecurity” program	Co-PIs and key personnel from OSU and the USA National Phenology Network	Hold monthly meetings to discuss logistics and timelines for developing and operationalizing models at the USA National Phenology Network website	Numerous conference calls between Fall 2018–present, approximately 12 meetings in 2022
Pest alert / dashboard system for Oregon	Seth Dorman (USDA ARS) and OIPMC members	Met in February 2023 to discuss next steps developing a pest alert and dashboard system for OR and WA	Meetings in 2021 (Nov 17, Nov 22), 2022 (Jan 14, Feb 4, Oct 13, Nov 4), and 2023 (Feb 7, Mar 1)
Boxwood Blight Epidemiology Group	Chuan Hong and other researchers working on boxwood blight	Quarterly online meetings with research presentations and discussion of infection risk factors	Meetings in 2021 (Aug 10, Oct 25) and 2022 (Feb 7)
Portland R User Group	Professionals and students who use R	Bi-weekly meetings for Cascadia R Conference, co-organized Jan/Feb/Mar meetups, gave demo in Mar	Bi-weekly meetings for Cascadia R Conference between Jan and Apr 2023, presented at meetup in Mar 2023
Integrative Economics, LLC	Economist / remote sensing specialists / modelers	Meetings to discuss upcoming grant opportunities to continue collaborative work	Informal meetings ( <i>ca.</i> 6 months) since 2019, and weekly calls between Oct 2021 and Feb 2022

## C. SCHOLARSHIP AND CREATIVE ACTIVITY

Summary of peer-reviewed publications

Time frame	Refereed papers	Book chapters	Extension publications	TOTAL
2018–present (with OSU)	5	2	1	10
Prior to 2018	12	0	0	10
<b>TOTAL</b>	<b>17</b>	<b>2</b>	<b>1</b>	<b>20</b>

Plot of citation counts for my peer-reviewed publications from 2011 to 2022, and a summary of my citations counts, h-index, and i10-index according to Google Scholar (accessed on 19 Sep 2022).



### 1. Publications

#### a) Peer-reviewed

My role in publications is designated by the following codes:

**C = Conceptualization** – Ideas; formulation or evolution of overarching research goals and aims.

**D = Data curation** – Management activities to annotate (produce metadata), scrub data and maintain research data (including software code, where it is necessary for interpreting the data itself) for initial use and later re-use.

**\$ = Funding acquisition** – Acquisition of the financial support for the project leading to this publication.

**FA = Formal analysis** – Application of statistical, mathematical, computational, or other formal techniques to analyze or synthesize study data.

**I = Investigation** – Conducting a research and investigation process, specifically performing the experiments, or data/evidence collection.

**M = Methodology** – Development or design of methodology; creation of models.

**A = Project administration** – Management and coordination responsibility for research activity

*planning and execution.*

**R = Resources** – Provision of study materials, reagents, materials, patients, laboratory samples, animals, instrumentation, computing resources, or other analysis tools.

**S = Software** – Programming, software development; designing computer programs; implementation of the computer code and supporting algorithms; testing of existing code components.

**G = Visualization** – Preparation, creation and/or presentation of the published work, specifically visualization/data presentation.

**W1 = Writing – original draft** – Preparation, creation and/or presentation of the published work, specifically writing the initial draft (including substantive translation).

**W2 = Writing – review & editing** – Preparation, creation and/or presentation of the published work by those from the original research group, specifically critical review, commentary or revision – including pre- or post-publication stages.

\* = Undergraduate Student.

## **i. Refereed Publications**

**Barker, B. S.,** L. Coop, and C. X. Hong. 2022. Potential distribution of invasive boxwood blight pathogen (*Calonectria pseudonaviculata*) as predicted by process-based and correlative models. *Biology* 11:849. <https://doi.org/10.3390/biology11060849>. C, D, FA, I, M, A, S, G, W1

Grevstad, F. G., T. Wepprich, **B. S. Barker,** L. B. Coop, R. Shaw, and R. S. Bouchier. 2022. Combining photoperiod and thermal responses to predict phenological mismatch for introduced insects. *Ecological Applications* 32:e2557. <https://doi.org/10.1002/eap.2557>. M, S, W2

**Barker, B. S.,** L. Coop, T. Wepprich, F. Grevstad, and G. Cook. 2020. DDRP: real-time phenology and climatic suitability modeling of invasive insects. *PLoS ONE* 15:e0244005. <https://doi.org/10.1371/journal.pone.0244005>. C, D, FA, I, M, A, S, G, W1

**Barker, B. S.,** D. S. Pilliod, M. Rigge, and C. G. Homer. 2019. Pre-fire vegetation drives post-fire outcomes in sagebrush ecosystems: evidence from field and remote sensing data. *Ecosphere* 10:e02929. <https://doi.org/10.1002/ecs2.2929>. C, D, FA, I, M, A, S, G, W1

Braasch, J. E, **B. S. Barker,** and K. M. Dlugosch. 2019. Effective population size variation during invasion of *Centaurea solstitialis*. *Molecular Ecology* 28:2546–2558. <https://doi.org/10.1111/mec.15104>. D, FA, I, W2

**Barker, B. S.,** D. S. Pilliod, J. Welty, R. S. Arkle, M. G. Karl, and G. R. Toevs. 2018. An introduction and practical guide to use of the Soil-Vegetation Inventory Method (SVIM) data. *Rangeland Ecology & Management* 71:671–680. <https://doi.org/10.1016/j.rama.2018.06.003>. C, D, FA, I, M, A, G, W1

**Barker, B. S.,** J. E. Cocio\*, S. R. Anderson, J. E. Braasch, F. E. Cang, H. D. Gillette, and K. M. Dlugosch. 2018. Potential limits to the benefits of admixture during biological invasion. *Molecular Ecology* 28:100–113. <https://doi.org/10.1111/mec.14958>. C, D, FA, I, G, W1

**Barker, B. S.,** and J. A. Rodríguez-Robles. 2017. Origins of introduced populations of the Puerto Rican Coquí, *Eleutherodactylus antillensis*, in Saint Croix and Panamá. *Copeia* 105:220–228. <https://doi.org/10.1643/CG-16-501>. C, D, FA, \$, I, M, A, G, W1

**Barker, B. S.,** K. Andonian, S. M. Swope, D. Luster, and K. M. Dlugosch. 2017. Population genomic analyses reveal a history of range expansion and trait evolution across the native and invaded range of yellow starthistle (*Centaurea solstitialis*). *Molecular Ecology* 26:1131–1147. <https://doi.org/10.1111/mec.13998>. C, D, FA, I, M, A, G, W1

Dlugosch, K. M., F. E. Cang, **B. S. Barker,** K. Andonian, S. M. Swope, and L. H. Rieseberg. 2015. Evolution of invasiveness through increased resource use in a vacant niche. *Nature Plants* 1:15066. <https://doi.org/10.1038/nplants.2015.66>. FA, I, M, G, W1

**Press:** UA News Article: <http://uanews.org/story/when-plants-become-space-invaders>

**Barker, B. S.,** J. A. Rodríguez-Robles, and J. A. Cook. 2015. Climate as a driver of tropical insular diversity: comparative phylogeography of two ecologically distinctive frogs in Puerto Rico. *Ecography* 38:769–781. <https://doi.org/10.1111/ecog.01327>. C, D, FA, \$, I, M, A, G, W1

**Barker, B. S.,** and A. Ríos-Franceschi. 2014. Population declines of Mountain Coquí (*Eleutherodactylus portoricensis*) in the Cordillera Central of Puerto Rico. *Herpetological Conservation Biology* 9:578–589. [http://www.herpconbio.org/Volume\\_9/Issue\\_3/Barker\\_Rios-Franceschi\\_2014.pdf](http://www.herpconbio.org/Volume_9/Issue_3/Barker_Rios-Franceschi_2014.pdf). C, D, FA, \$, I, M, A, G, W

**Press:** *FrogLog* (Newsletter of the Declining Amphibian Survival Alliance). 123:43.

**Barker, B. S.,** J. A. Rodríguez-Robles, V. S. Aran\*, A. Montoya\*, R. B. Waide, and J. A. Cook. 2012. The role of sea-level fluctuations and topography in generating island diversity: phylogeography of the Puerto Rican Red-eyed Coquí, *Eleutherodactylus antillensis*. *Molecular Ecology* 21:6033–6052. <https://doi.org/10.1111/mec.12020>. C, D, FA, \$, I, M, A, G, W1

**Barker, B. S.,** R. B. Waide, and J. A. Cook. 2011. Deep intra-island divergence of a montane forest endemic in the Caribbean: phylogeography of the Puerto Rican frog *Eleutherodactylus portoricensis* (Anura: Eleutherodactylidae). *Journal of Biogeography* 38:2311–2325. <https://doi.org/10.1111/j.1365-2699.2011.02578.x>. C, D, FA, \$, I, M, A, G, W1

**Press:** *FrogLog* (Newsletter of the Declining Amphibian Survival Alliance). 100:61.

**Barker, B. S.,** and Y. E. Sawyer. 2011. *Aspidoscelis tessalatus* (Common Checkered Whiptail) and *Salvadora hexalepis deserticola* (Big Bend Patch-nosed Snake). *Herpetological Review* 42:304. WI

**Barker, B. S.,** P. C. Phillips, and S. J. Arnold. 2010. A test of the conjecture that G-matrices are more stable than B-matrices. *Evolution* 64:2601–2613. <https://doi.org/10.1111/j.1558-5646.2010.01023.x>. D, FA, I, G, W1

**Barker, B. S.,** R. W. Henderson, and R. Powell. 2009. Geographic distribution. *Epicrates monensis granti*. *Herpetological Review* 40:455–456. W1

## ii. Book Chapters

Bowers, J. H., J. R. Malayer, B. Martínez-López, J. LaForest, C. T. Barger, A. D. Neeley, L. B. Coop, **B. S. Barker**, A. J. Mastin, S. R. Parnell, A. A. Cosse, B. J. McCluskey, S. C. Isard, and J. M. Russo. 2022. Surveillance for early detection of high-consequence pests and pathogens. Pages 120–177 in K. F. Cardwell and K. L. Bailey, editors. *Tactical Sciences for Biosecurity of Animal and Plant Systems*. IGI Global, Hershey, Pennsylvania, USA. <https://doi.org/10.4018/978-1-7998-7935-0.ch005>. C, I, G, V, W1

Coop, L., and **B. S. Barker**. 2020. Advances in understanding species ecology: phenological and life cycle modeling of insect pests. Pages 43–96 in M. Kogan and L. Higley, editors. *Integrated Management of Insect Pests: Current and Future Developments*. Burleigh Dodds Science Publishing, Sawston, England. <https://doi.org/10.19103/AS.2019.0047.02>. I, G, W1

## iii. Extension Publications

Coop, L., **B. S. Barker**, and M. Ragozzino. 2023. Integrated Pest Management: Biological Control. Pages N2–N7 in N. Kaur, editor. *2023 Pacific Northwest Insect Management Handbook*. Oregon State University Extension and Experiment Station Communications. Updated Annually. <https://pnwhandbooks.org/insect/ipm/biological-control> (Updated annually). I, W1

## b) Other Publications

Summary of other publications (not peer-reviewed)

Time frame	Technical reports/White papers	Software and manuals	Newsletters	TOTAL
2018–present	10	3	1	13
Prior to 2018	0	0	0	0
<b>TOTAL</b>	<b>10</b>	<b>3</b>	<b>1</b>	<b>13</b>

## i. Technical White Papers

**Barker, B. S.**, and L. Coop. 2021. Egyptian cottonworm, *Spodoptera littoralis*. Phenology/degree-day and climate suitability model analysis for USPEST.ORG. Prepared for USDA APHIS PPQ. Vs. 1.0 (1/8/21). [https://uspest.org/CAPS/Spodoptera\\_littoralis\\_white\\_paper.pdf](https://uspest.org/CAPS/Spodoptera_littoralis_white_paper.pdf). FA, I, M, G, W1

**Barker, B. S.**, and L. Coop. 2020. Sunn pest, *Eurygaster integriceps*. Phenology/degree-day and climate suitability model analysis for USPEST.ORG. Prepared for USDA APHIS PPQ. Vs. 1.0 (8/11/20). [http://uspest.org/CAPS/Eurygaster\\_integriceps\\_white\\_paper.pdf](http://uspest.org/CAPS/Eurygaster_integriceps_white_paper.pdf). FA, I, M, G, W1

**Barker, B. S.**, and L. Coop. 2020. Silver Y moth, *Autographa gamma*. Phenology/degree-day and climate suitability model analysis for USPEST.ORG. Prepared for USDA APHIS PPQ. Vs. 1.0 (7/15/20). [http://uspest.org/CAPS/Autographa\\_gamma\\_white\\_paper.pdf](http://uspest.org/CAPS/Autographa_gamma_white_paper.pdf). FA, I, M, G, W1

**Barker, B. S.**, and L. Coop. 2020. Pine tree lappet moth, *Dendrolimus pini*. Phenology/degree-day and climate suitability model analysis for USPEST.ORG. Prepared for USDA APHIS PPQ. Vs. 1.0



(6/11/20). [http://uspest.org/CAPS/Dendrolimus\\_pini\\_white\\_paper.pdf](http://uspest.org/CAPS/Dendrolimus_pini_white_paper.pdf). FA, I, M, G, W1

**Barker, B. S.**, and L. Coop. 2020. Small tomato borer, *Neoleucinodes elegantalis*. Phenology/degree-day and climate suitability model analysis for USPEST.ORG. Prepared for USDA APHIS PPQ. Vs. 2.0 (4/26/20). [http://uspest.org/CAPS/Neoleucinodes\\_elegantalis\\_STB\\_model.pdf](http://uspest.org/CAPS/Neoleucinodes_elegantalis_STB_model.pdf). FA, I, M, G, W1

**Barker, B. S.**, and L. Coop. 2020. Oak ambrosia beetle, *Platypus quercivorus*. Phenology/degree-day and climate suitability model analysis for USPEST.ORG. Prepared for USDA APHIS PPQ. Vs. 1.0 (3/27/20). [http://uspest.org/CAPS/Platypus\\_quercivorus\\_white\\_paper.pdf](http://uspest.org/CAPS/Platypus_quercivorus_white_paper.pdf). FA, I, M, G, W1

**Barker, B. S.**, and L. Coop. 2020. Japanese pine sawyer beetle, *Monochamis alternatus*. Phenology/degree-day and climate suitability model analysis for USPEST.ORG. Prepared for USDA APHIS PPQ. Vs. 1.0 (2/26/20). [http://uspest.org/CAPS/Monochamis\\_alternatus\\_white\\_paper.pdf](http://uspest.org/CAPS/Monochamis_alternatus_white_paper.pdf). FA, I, M, G, W1

**Barker, B. S.**, and L. Coop. 2020. Tomato leafminer, *Tuta absoluta*. Phenology/degree-day and climate suitability model analysis for USPEST.ORG. Prepared for USDA APHIS PPQ. Vs. 1.0 (1/23/20). [http://uspest.org/CAPS/Tuta\\_absoluta\\_white\\_paper.pdf](http://uspest.org/CAPS/Tuta_absoluta_white_paper.pdf). FA, I, M, G, W1

**Barker, B. S.**, and L. Coop. 2019. Honeydew moth, *Cryptoblabes gnidiella*. Phenology/degree-day and climate suitability model analysis for USPEST.ORG. Prepared for USDA APHIS PPQ. Vs. 1.0 (12/9/19). [http://uspest.org/CAPS/Cryptoblabes\\_gnidiella\\_white\\_paper.pdf](http://uspest.org/CAPS/Cryptoblabes_gnidiella_white_paper.pdf). FA, I, M, G, W1

**Barker, B. S.**, and L. Coop. 2019. False codling moth, *Thaumatotibia leucotreta*. Phenology/degree-day and climate suitability model analysis for USPEST.ORG. Prepared for USDA APHIS PPQ. Vs. 1.0 (12/2/19). [http://uspest.org/CAPS/Thaumatotibia\\_leucotreta\\_white\\_paper.pdf](http://uspest.org/CAPS/Thaumatotibia_leucotreta_white_paper.pdf). FA, I, M, G, W1

## ii. Software and Software Manuals

Coop, L., and **B. S. Barker**. 2020. Computing infrastructure requirements and user guide for hosting DDRP models. Prepared for APHIS PPQ and other collaborators. Online at: <https://uspest.org/CAPS/> and at [https://github.com/bbarker505/ddrp\\_v2](https://github.com/bbarker505/ddrp_v2). G, W1

Wepprich, T., L. Coop, **B. Barker**, and F. Grevstad. 2020. Biological control voltinism mismatch maps using DDRP. Model interface for three weed biological control insect species. Online at: <https://uspest.org/dd/dodmaps> (Released Oct, 2020). S

**Barker, B. S.**, L. Coop, T. Wepprich, G. Cook, and D. Upper. 2020. Degree-Day, establishment Risk, and Phenological event mapping (DDRP) system, version 2. Model code, species parameter files, and regularly updated model forecasts. Online at: <https://uspest.org/CAPS/> (forecasts) and at [https://github.com/bbarker505/ddrp\\_v2](https://github.com/bbarker505/ddrp_v2) (code and parameter files). D, M, A, S

## iii. Newsletters

**Barker, B. S.**, and C. Park. 2022. Tools for forecasting pests extends to annual weeds and biocontrol agents. Newsletter for the Western Society of Weed Science. Winter 2022, 5–6. Online at: <https://wsweedscience.org/wp-content/uploads/WSWS-Newsletter-2022-Winter.pdf>. G, W1

## 2. Presentations to Peers

Summary table of presentations to peers at professional meetings in the last 10 years

Year	Within Region	National	International	TOTAL	No. invited
2018–present (with OSU)	15	12	4	32	14
2012–2018 (prior to OSU)	5	7	4	16	3
<b>TOTAL</b>	20	19	8	48	17

### i. Within-region Presentations

20. **Barker, B. S.**, L. Coop, A. Rosemartin, and T. Crimmins. 2023. Spatial forecast of phenology and climate suitability for emerald ash borer, *Agrilus planipennis*. Oral presentation at the annual Entomological Society of America Pacific Branch Meeting, Apr. 3, 2023. Seattle, WA. *ca.* 30 attendees.
19. Coop, L., and **B. S. Barker**. 2023. Phenological mapping approaches for IPM decision support. Oral presentation at the annual Entomological Society of America Pacific Branch Meeting, Apr. 3, 2023. Seattle, WA. *ca.* 30 attendees.
18. **Barker, B. S.**, and L. Coop. 2023. Boxwood blight model and impact for PNW nurseries. Webinar for the Pesticide Safety Education Program, College of Agricultural Sciences, Oregon State University, Jan. 18, 2023. Online. 135 attendees. **Invited.**
17. **Barker, B. S.**, L. Coop, A. Rosemartin, and T. Crimmins. 2023. Updates and implementation of a spatialized phenology model for emerald ash borer. Oral presentation at the Pacific Northwest Insect Management Conference, Jan. 9, 2023. Portland, OR. *ca.* 40 attendees.
16. **Barker, B. S.**, and L. Coop. 2022. DDRP: real-time mapping of pest phenology and climate suitability. Oral presentation for the USDA APHIS PPQ Plant Pest Risk Analysis group, Nov. 18, 2022. Raleigh, NC. 10 attendees. **Invited.**
15. **Barker, B. S.** 2022. Spatial modeling in R to help detect emerald ash borer, a new invader in the Pacific Northwest. Lightning talk at the 6th annual Cascadia R Conference, Sep. 17, 2022. Online event. *ca.* 75 attendees.
14. Rivedal, H., **Barker, B. S.**, and I. Sandlin. 2022. Barriers for exports and predictive tools for invasive pests. Oral presentation at the 4th annual Oregon IPM Summit, Mar. 14, 2022. Corvallis, OR. *ca.* 8 attendees.
13. **Barker, B. S.**, and L. Coop. 2022. DDRP: phenology and climate suitability modeling to predict when and where invasive and IPM pests can arise. Oregon State Agency IPM Coordinating Committee Semiannual Meeting. Feb. 2, 2022. Online event. 13 attendees.
12. **Barker, B. S.**, L. Coop, and T. Crimmins. 2022. Expanding a spatial modeling platform with emphasis on invasive insects, plant diseases, and weeds. Oral presentation at the Pacific Northwest Insect Management Conference, Jan. 10, 2022. Online. 95 attendees.
11. **Barker, B. S.** 2021. Modeling pest distributions, phenology, and population dynamics to safeguard US agricultural lands. Seminar for the Dept. of Crop and Soil Science, Oregon State

University, Oct. 25, 2021. Corvallis, OR. *ca.* 20 attendees.

10. **Barker, B. S.**, L. Coop, T. Wepprich, and F. Grevstad. 2020. DDRP: a new platform to model phenology and risk of establishment. Oral presentation at the Pacific Northwest Insect Management Conference, Jan. 6, 2020. Portland, OR.
9. Coop, L., and **B. S. Barker**. 2020. A new phenology model for bronze birch borer. Oral presentation at the Pacific Northwest Insect Management Conference, Jan. 6, 2020. Portland, OR.
8. **Barker, B. S.** 2019. Modelling climate suitability and phenology to safeguard U.S. agricultural and natural resources from invasive pests. Seminar for the Dept. of Horticulture, Oregon State University, Nov. 12, 2019. Corvallis, OR. Online at: <https://horticulture.oregonstate.edu/horticulture/2019-horticulture-seminar-series>
7. **Barker, B. S.** 2019. Modelling climate suitability and phenology to safeguard U.S. agricultural and natural resources from invasive pests. Lightning talk at the 3rd Cascadia R Conference, Jun. 8, 2019. Bellevue, WA. Online at: [http://cascadiarconf.com/img/presentations\\_2019/BBarker\\_RCascadia\\_talk.pdf](http://cascadiarconf.com/img/presentations_2019/BBarker_RCascadia_talk.pdf)
6. Coop, L. B., **B. S. Barker**, T. Wepprich, and F. Grevstad. 2019. DDRP: Modeling degree-days, risk of establishment, and phenological event maps. Poster presentation at the Pacific Branch of the Entomological Society of America Conference, Apr. 2, 2019. San Diego, CA. Online at: [http://uspest.org/ipm/Coop\\_et\\_al\\_DDRP\\_platform\\_ESA\\_Pacific\\_March\\_2019.pdf](http://uspest.org/ipm/Coop_et_al_DDRP_platform_ESA_Pacific_March_2019.pdf)
5. **Barker, B. S.** 2017. Ecological genomics of native and invasive yellow starthistle and its biocontrol insect. Seminar for the USGS Forest Rangeland and Ecosystem Science Center, Oct. 26, 2017. Boise, ID.
4. **Barker, B. S.** 2015. Population genomics of native and introduced yellow starthistle and its biocontrol insect. Seminar for the Dept. of Entomology, University of Arizona, Nov. 13, 2015. Tucson, AZ. **Invited.**
3. Alexandre, N., A. Gloss, **B. S. Barker**, and N. K. Whiteman. 2015. Population genomics of antagonistic evolution in a specialist herbivore and its toxic plant host. Poster presentation at the 5th annual Undergraduate Research Day Poster Session of the Dept. of Ecology and Evolutionary Biology, University of Arizona. Apr. 19, 2015. Tucson, AZ.
2. Welchert, J., **B. S. Barker**, and K. M. Dlugosch. 2015. Testing congruency of geographic and genetic population structure for a biocontrol insect and its invasive plant. Poster presentation at the 5<sup>th</sup> annual Undergraduate Research Day Poster Session for the Dept. of Ecology and Evolutionary Biology, University of Arizona, Apr. 19, 2015. Tucson, AZ.
1. **Barker, B. S.** 2012. Phylogeography of a widespread Puerto Rican frog: the role of climate change, topography, and human-mediated introductions. Brown Bag Seminar for the Dept. of Ecology and Evolutionary Biology, University of Arizona, Sept. 11, 2012. Tucson, AZ.

## ii. National Presentations

19. **Barker, B. S.** 2023. Real-time forecasts of phenology and climate suitability for emerald ash borer. Webinar for the EAB University, Apr. 13, 2023. Online. 17 attendees. Online at: <https://youtu.be/GSAird76myM>

18. **Barker, B. S.** 2023. An introduction to using R for horticultural data analysis. Webinar for the American Society for Horticultural Science, Jan. 30, 2023. Online. 149 attendees. **Invited.**
17. **Barker, B. S.**, F. Grevstad, L. Coop, and D. Bean. 2022. Managing yellow starthistle using a new biocontrol agent: an integrative and geo-climatic modeling approach. Oral presentation to the Technical Review Board for the DoD Strategic Environmental Research and Development Program (SERDP) program, Sep. 13, 2022. Online. *ca.* 10 attendees. **Invited.**
16. Coop, L., and **B. S. Barker.** 2022. Boxwood blight modeling: how weather and climate influence disease. Annual Western Horticultural Inspection Society (WHIS) Meeting, Oct. 6, 2022. Online event. 106 participants. Invited.
15. Coop, L., and **B. S. Barker.** 2022. How do weather and climate impact boxwood blight? A modeling approach to aiding in boxwood disease management. Webinar for the tHRive web series, Horticulture Research Institute, AmericanHort Foundation. Sept. 7, 2022. Online event. **Invited.**
14. Coop, L., and **B. S. Barker.** 2022. Boxwood blight management: A decision support tool for both infection and establishment risk. Oral presentation at Plant Health 2022, the annual conference for the American Phytopathological Society. Aug. 8, 2022. Pittsburgh, PA. **Invited.**
13. **Barker, B. S.**, L. Coop, and T. Crimmins. 2022. DDRP: a modeling tool to forecast insect phenology and risk of establishment. Oral presentation at the Ecological Forecasting Initiative conference, May 23, 2022. Online event. Online at: [https://uspest.org/ipm/Barker\\_EFI\\_talk.mp4](https://uspest.org/ipm/Barker_EFI_talk.mp4)
12. **Barker, B. S.**, L. Coop, and T. Wepprich. 2021. Modeling phenology and climate suitability of invasive insects in real-time to improve surveillance and management. Oral presentation at the Entomological Society of America Conference (given remotely), Oct. 13, 2021. Denver, CO. **Invited.**
11. Coop, L., and **B. S. Barker.** 2021. Forecast systems for boxwood blight – when and where to be on alert. Oral presentation at Cultivate 21 – AmericanHort, Jul. 11, 2021. Columbus, OH. **Invited.** Online at: <https://www.boxwoodhealth.org/knowledge-center> and [https://uspest.org/ipm/Len\\_Coop\\_Boxwood\\_Blight\\_Columbus\\_OH\\_July\\_2021.mp4](https://uspest.org/ipm/Len_Coop_Boxwood_Blight_Columbus_OH_July_2021.mp4)
10. **Barker, B. S.** 2020. Modeling real-time climate suitability and phenology of invasive pests to safeguard U.S. agricultural resources. Seminar for the Dept. of Biological Sciences, Northern Arizona State University (given remotely), Oct. 23, 2020. Flagstaff, AZ. **Invited.**
9. **Barker, B. S.** 2020. Modeling populations of invasive species to protect U.S. agricultural and natural resources. Seminar for the Biology, Chemistry and Environmental Science Department, Northern New Mexico College, Mar. 6, 2020. Española, NM. **Invited.**
8. Grevstad, F., T. Wepprich, **B. S. Barker**, L. Coop, and D. Bean. 2019. Incorporating photoperiodism in insect phenology models. Poster presentation at the U.S. Dept. of Defense Strategic Environmental Research and Development Program (SERDP) Symposium, Dec. 3, 2019. Washington, DC.
7. **Barker, B. S.**, D. S. Pilliod, and C. Homer. 2018. Drivers of vegetation change in Herd Management Areas in the Great Basin. Oral presentation at the Wild Horse and Burro Symposium of the Society for Range Management Conference, Jan. 13, 2018. Sparks, NV.

6. Pilliod, D. S., **B. S. Barker**, and C. Homer. 2018. Assessing vegetation change through time: Bridging SVIM and AIM through Landsat. Oral presentation at the Science of Working Lands Symposium of the Society for Range Management Conference, Jan. 13, 2018. Sparks, NV.
5. **Barker, B. S.** 2017. Evolution in changing environments: lessons from introduced and endemic species. Seminar for the Dept. of Biological Sciences, California State Polytechnic University, Pomona, Feb. 21, 2017. Pomona, CA. **Invited.**
4. **Barker, B. S.** 2016. Evolution in changing environments: lessons from introduced and endemic species. Seminar for the Dept. of Biology, California State University San Marcos, Feb. 15, 2016. San Marcos, CA. **Invited.**
3. **Barker, B. S., O. Sert, J. Welchert, L. Gomez, and K. M. Dlugosch.** 2015. Genomic analysis of native and introduced populations of a biocontrol insect and its invasive host plant. Poster presentation at the NIH Institutional Research and Academic Career Development (IRACDA) Annual Conference, June 15, 2015. San Diego, CA.
2. **Barker, B. S.** 2015. Multiple origins of introduced populations of the Puerto Rican Red-eyed Coqui (*Eleutherodactylus antillensis*). Lightning talk at the Evolution Conference, Jun. 24, 2015. Snowbird, UT.
1. **Barker, B. S.,** and K. M. Dlugosch. 2015. Population genomic analysis of the origin and adaptive evolution of invading yellow starthistle. Poster presentation at the Evolution Conference, Jun. 22, 2015. Snowbird, UT.

### iii. International Presentations

8. Waide, R. B., J. Thompson, and **B. S. Barker.** 2022. Patterns of resistance and resilience in forest bird populations subjected to hurricanes and droughts. Oral presentation at the Association for Tropical Biology and Conservation Conference. July 14, 2022. Cartagena, Colombia.
7. Coop, L., **B. S. Barker,** and C. Hong. 2022. Integrating short and long term risk models for boxwood blight. Poster presentation at the 10th International IPM Symposium, Mar. 2, 2022. Denver, CO. Online at: <https://ipmsymposium.org/2021/posters.html>. 300 attendees.
6. **Barker, B. S.,** L. B Coop, and T. Crimmins. 2022. DDRP: a modeling tool to guide decision making for pest surveillance and management. Poster presentation at the 10th International IPM Summit, Mar. 2, 2022. Denver, CO. Online at: <https://ipmsymposium.org/2021/posters.html> 300 attendees.
5. Coop, L., and **B. S. Barker.** 2021. Predicting boxwood blight infection and establishment risk using CLIMEX, correlative, and DDRP modeling platforms. Online presentation at the 2nd Boxwood Blight Epidemiologist's Meeting (given over Zoom), Oct. 25, 2021. International group, *ca.* 20 attendees. **Invited.**
4. **Barker, B. S.,** O. Sert, S. J. Keller, and K. M. Dlugosch. 2017. Landscape genomic analyses reveal adaptation to climate in introduced biocontrol weevils. Oral presentation at the International Biogeography Society Conference, Jan. 10, 2017. Tucson, AZ.
3. **Barker, B. S.,** O. Sert, and K. M. Dlugosch. 2017. Landscape genomic analyses reveal adaptation to climate in introduced biocontrol weevils. Oral presentation at the Population and Conservation Genomics Symposium, International Plant and Animal Genome Conference, Jan.

17, 2017. San Diego, CA.

2. **Barker, B. S.**, and K. M. Dlugosch. 2015. Ecological genomics of native and invading yellow starthistle. Oral presentation at the Population and Conservation Genomics Symposium of the International Plant and Animal Genome Conference, Jan. 10, 2015. San Diego, CA.
1. **Barker, B. S.**, and K. M. Dlugosch. 2014. Population genomic analysis of the origin and adaptive evolution of invading yellow starthistle. Poster presentation at the International Plant and Animal Genome Conference, Jan. 13, 2014. San Diego, CA.

### 3. Grant and Contract Support

Total grant and contract support towards my program: \$394,831 for salary; \$1,237,238 for other direct costs. The DoD SERDP award is pending approval by the Technical Review Board. Grants and fellowships received prior to joining OSU are not reported.

Year(s)	PD(s)	Agency	Title	Total \$	\$ my program
May 2023 – May 2028	Barker, B. S., F. Grevstad, D. Bean, and L. Coop	DoD/Strategic Environmental Research and Development Program	Managing yellow starthistle using a new biocontrol agent: an integrative experimental and geo-climatic modeling approach	\$1,556,466	\$1,365,102
Jan 2022 – Dec 2022	Barker, B. S.	Oregon Dept. of Agriculture	Implementing and validating a boxwood blight infection risk model for the Oregon nursery industry	\$18,000	\$18,000
Apr 2022 – Jul 2025	Coop, L., B. S. Barker, and T. Crimmins	USDA/NIFA/AFRI/Tactical Sciences in Biosecurity	Enhancing U.S. biosecurity with improved pest forecasts and public engagement	\$993,810	\$156,625
Sep 2021 – Aug 2024	Coop, L. (current PD), Barker, B. S. (co-wrote grant, key personnel)	USDA/NIFA/CPPM/Extension Implementation Program Area	Oregon Extension IPM: Meeting critical needs through adoption, education, decision support, and pest impact assessment	\$536,875	\$87,918
Oct 2021 – Feb 2022	Barker, B. S. (role – research support)	Integrative Economics, LLC.	Contract to conduct population and movement modeling	\$4,424	\$4,424

## **D. SERVICE**

Service activities conducted since joining OSU in 2018 are summarized below.

### **1. University Service**

#### i. Department/unit

Hiring Committee Member, Oregon IPM Center

- IPM Educator position (2023)
- Communications Director position (2019)

#### ii. University

United Academics of OSU (UAOSU)

- Representative Assembly Member, College of Agricultural Sciences (2021–current)
- Co-chair, Political Education Committee (2022–current)
- Delegate, American Federation of Teachers – Oregon (2023-current)

### **2. Service to the Profession**

#### i. Peer Reviewer (year and no. of manuscripts reviewed)

- *Diversity and Distributions* (impact factor = 4.09): 2022–1
- *Biology* (impact factor = 5.17): 2022–1
- *Global Ecology and Conservation* (impact factor = 3.38): 2021–1
- *Insects* (impact factor = 2.14): 2021–1
- *Evolutionary Applications* (impact factor = 5.18): 2023–1, 2022–1, 2019–2
- *Molecular Ecology* (impact factor = 6.19): 2019–1, 2020–2, 2021–1, 2022–1

#### ii. Conference Co-organizer

- Co-organizer and Session Moderator, Cascadia R Conference (2021, 2022, 2023).
- Co-organizer, symposium for Entomological Society of America Pacific Branch meeting (Apr 2023), “*Spatial risk modeling and decision support systems for IPM*”

#### iii. Journal Co-Guest Editor

Co-Guest Editor, special issue for *Frontiers in Insect Science*, “Ecological Modelling, Geographic Information System and Remote Sensing Approaches for Improved Pest Risk Assessment” (2022–2023).

#### iv. Member, Ecological Forecasting Initiative

Joined the Ecological Forecasting Initiative’s “Methods and Cyberinfrastructure” working group in 2022, which is working to identify and fill gaps in computing resources, cyberinfrastructure, and methods used by scientists to produce ecological forecasts (attended *ca.* 4 meetings in 2022).

#### v. Presenter, R Workshop for the American Society for Horticultural Science (Jan 2023)

### **3. Service to the Public (professionally related)**

#### i. Co-organizer, Portland R User Group

Participate and co-organize monthly events (“Aggregate” meetups) where users of the R programming language can learn new skills and knowledge and troubleshoot issues.

- ii. Presenter, demos on use of R programming language
  - “An introduction to the tidyverse,” Aggregate Meetup, Portland R User Group (Mar 2023)
  - “Brief demo of tidy evaluation”, Aggregate Meetup, Portland R User Group (Mar 2022)
  - “Purrr demo for Aggregate,” Aggregate Meetup, Portland R User Group (May 2021)
  - “Intro to parallel processing in R”, R Ladies Seattle Group (Feb 2021)
  - “Intro to parallel processing in R”, Aggregate Meetup, Portland R User Group (Aug 2020)

iii. K-12 Outreach

Participated in an outreach event that introduced high school students to career options (2019).

## **E. AWARDS**

None

## **F. DIVERSITY, EQUITY, AND INCLUSION**

Increasing participation in science education and research by members of groups that have traditionally been underrepresented in STEM disciplines is critical for innovation and the advancement of science. Since I began my career in science, I have engaged in multiple activities to help address the challenge of recruiting and retaining students and professionals from underrepresented groups. To date, I have involved 15 undergraduates with my research program, 11 of whom were Hispanic and several of whom were first-generation college attendees. Most of these students leveraged their research experience to complete their degrees, pursue advanced degrees in Biology, or build careers in K-12 science education, public health, and biotechnology.

I employ a variety of instructional strategies for diverse learners in the classroom. I learned many of these strategies while working as an NSF GK-12 fellow in science classes at Belen Middle School (Belen, New Mexico), which serves a low income and minority population, and found that they are equally effective in the college classroom. For example, I often replace traditional lectures with problem-solving based lessons centered on data analysis and interpretation, because students are typically more successful in classes that use stimulating, active learning methods. I look forward to applying these skills when I teach a population modeling course at OSU in Winter 2023.

I became a representative for the faculty union UAOSU in 2021 to help advance diversity, equity, and inclusion on campus. I have helped faculty resolve workplace issues and questions, and I am involved with discussions surrounding issues of equity at OSU, such as efforts to correct faculty salary inequities. I am currently the co-chair of the newly formed Political Education Committee, which seeks to educate faculty members about issues related to higher education at the local, state, and federal level.

My activities with the R user community since 2019 have helped make computer programming more accessible and inclusive. As a co-organizer for the Portland R User Group, I help organize monthly meetups where attendees can learn new programming skills and troubleshoot coding issues. Meetups currently take place on Zoom to maximize accessibility, and they are promoted on social media and email to attract a diverse crowd of professionals and students. Each meetup typically has about 10 to 20 attendees. I have given three demos on R packages and functions, which involves providing participants with interactive sessions where they can work through code and ask questions. Additionally, I help organize the annual Cascadia R Conference, which is geared towards bringing together R users in the Pacific Northwest to learn new skills, share knowledge, and network.