Richard Schuster, PhD

Research Scientist, Carleton University
Conservation Prioritization Consultant,
Nature Conservancy Canada
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SUMMARY

I am an interdisciplinary conservation biologist and Research Scientist at Carleton University, studying the ecological impacts of human activities and develop novel techniques to prioritize conservation areas and strategies. I have an excellent theoretical and applied background in quantitative ecology and statistics and spatial big data analysis. I develop novel analytical tools for researchers and other practitioners to explore and use in the conservation planning and management.

EDUCATION

PhD
July 2014

University of British Columbia (UBC)
Forest and Conservation Sciences
Faculty of Forestry

Dissertation Title: Systematic conservation planning in human-dominated landscapes: maximizing efficiency in biodiversity conservation via carbon sequestration and land management

Advisors: Peter Arcese (Principal Advisor, UBC), Sarah Gergel (UBC), Tara Martin (Commonwealth Scientific and Industrial Research Organisation), Valerie LeMay (UBC).

MSc
June 2009

University of Graz (UG)
Zoology

Thesis Title: The Crowsnest Highway and its effects on a multi-species community of mammals.

Advisor: Heinrich Römer (UG)

Wildlife Ecology and Game Management courses
June 2008

University of Natural Resources and Applied Life Sciences (BOKU)
Department of Integrative Biology and Biodiversity Research

Academic exchange for MSc at UG
September 2005 – Mai 2006

Uppsala University
Department of Ecology and Evolution

BSc
June 2006

University of Graz (UG)

Zoology

Project Titles: The Wildebeest migration in the Serengeti.
Software application for cricket movement tracking.

Advisors: Gerald Kastberger (UG), Heinrich Römer (UG)

Diploma College of Electrical Engineering
October 1997 Power Engineering and Power Electronics
Wels, Austria

PROFESSIONAL HISTORY

I took a total of 2 years and 8 months of parental leave between finishing my PhD in 2014 and 2019.
Due to COVID related childcare responsibilities (my partner is a physician in our community and needs to work full time), I have been working part time (at 50%) since May 2020.

Research Scientist Carleton University
Conservation Prioritization Consultant Nature Conservancy of Canada (NCC)

01/2020 – current
- Modernizing NCC's conservation prioritization methods
- democratize conservation decisions beyond NCC

Decision support tool developer United Nations Development Programme

06/2019 –06/2020
- Developer for Systematic Conservation Planning (SCP) for National Biodiversity Planning and Reporting to the Convention on Biological Diversity

Liber Ero Postdoctoral Research Fellow Carleton University
11/2016 – 01/2020 (including part time and full-time parental leave) Department of Biology

- Combining full annual cycle population models and conservation optimization to address population declines of migratory birds in Canada

Decision support tool developer The Nature Trust of British Columbia
01/2018 – 12/2018

- Relative Ecological Assessment Tool. Developed a climate refugia layer to extend the existing tool and allow for property acquisition planning with climate change effects in mind.

Web portal developer Wildlife Conservation Society Canada
05/2018 – 06/2019

- Website development with online form and data storage for research partnership with Moose Cree First Nation to study lake sturgeon

Data analyst Wildlife Conservation Society Canada
08/2018 – 09/2019

- Systematic testing WCS Intact Forest Tool its efficacy in boreal forest regions. Provide recommendations for improvements, and regional changes.

Parental leave
04/2018 – 9/2018
10/2018 – 04/2019 (part time; 3 days a week)

Data analyst Ducks Unlimited Canada
03/2018

- Province wide (BC) interpolation of probability of observation data for 240 bird species

Web framework developer Fisheries and Oceans Canada
02/2018

- Arctic Salmon project community data input pilot project to allow participating community members to ender their catch data.

Web app developer Fisheries and Oceans Canada
02/2018

- Arctic Salmon Mapping Tool to help visualize fish catch data collected by participating community members and create annual reports that are emailed back to communities.

Web app developer Maclean Environmental Consulting
12/2017 – 03/2018 (5 days)

- Mikisew Cree First Nation: Flow data visualization tool (pilot).

Web app developer Inter-Tribal Council of Michigan, Inc.
01/2018

- Inter-Tribal Forest Understory Adaptation Project Mapping Tool (pilot).

Expert Task Team member Environment and Climate Change Canada
09/2017 – 10/2017

- Identifying areas important for Biodiversity and Ecosystem Services report.

Decision support tool developer The Nature Trust of British Columbia
08/2017 – 12/2017

- Relative Ecological Assessment Tool. Updates and staff training.

Decision support tool developer
08/2017 – 10/2017 Simon Fraser University

- Run-of-River decision support tool as an R Shiny app

Analyst Wildlife Conservation Society Canada
03/2017 – 12/2017
11/2016 – 01/2017

- Key Biodiversity Area's Criterion C (ecological integrity) applied to Canada and Alaska as a first case study using this new IUCN criterion.

Parental leave
04/2016 – 10/2016

Postdoctoral Research Fellow The Nature Trust of British Columbia
06/2015 – 03/2016 (TNTBC) +
University of British Columbia (UBC)
Forest and Conservation Sciences

- Cross-boundary Planning for Resilience and Restoration of Endangered Oak Savannah and Coastal Douglas-fir Forest Ecosystems
- Tax shifting as an option for funding conservation initiatives
- Species distribution model performance using multiple modelling techniques and variable types
- Relative Ecological Assessment Tool updates for TNTBC

Postdoctoral Research Fellow University of British Columbia (UBC)
07/2014 – 06/2015 (10h/week) Forest and Conservation Sciences
(in addition to full time parental leave)

- Web application development for the Marxan conservation planning software
- Application and extension of PhD thesis methods to regional and local government levels

Service Contractor Independent contractor
06/2015, 03/2015, 10/2014, 06/2014, 03/2014

- Mapping support for the development of a Coastal Douglas-Fir and Associated Ecosystems Conservation Partnership (CDFCP) Conservation Strategy.
- Marxan Conservation Tool Development for the Islands Trust Area. (Islands Trust)
- Identification of optimal candidate areas for conservation and stewardship efforts in the Coastal Douglas-fir zone. (CDFCP)
- Carbon and biodiversity mapping for the Islands Trust area as well as cost effectiveness analysis of land protection in the Islands Trust area compared with the larger region. (Islands Trust)
- Identification of optimal candidate areas for conservation and stewardship efforts in the Coastal Douglas-fir zone. (CDFCP)

Integrative Training & Education internship 04/2014-09/2014

The Nature Trust of British Columbia
Vancouver, British Columbia

- Relative Ecological Assessment Tool development
- Web application development using R that allows TNTBC to more thoroughly and efficiently evaluate potential land purchases using scientific assessments, spatial data, and information about compatible or incompatible land uses

Visiting Scientist — Commonwealth Scientific and Industrial
09/2013-01/2014 — Research Organisation (CSIRO)
Brisbane, Australia

- Visiting scientist with the Conservation Decisions Team at CSIRO, supported by an Endeavour Research Fellowship. Work on a collaborative project on Marxan conservation solutions with members of the Environmental Decisions Group, University of Queensland.

Research Assistant — University of British Columbia (UBC)
10/2009-03/2010 — Centre for Applied Conservation Research

- Demography, genetics and behaviour of island bird populations.
- Development of GIS, R and Visual Basic tools for application in the analysis of bird and plant species count data from the Southern Gulf Islands.

Lead developer — Webak Games Austria
2002 — Gmunden, Austria

- Lead developer of software applications using C and C++
- Systems manager

Design engineer — Lederhilger automation engineering
2000 — Allhaming, Austria

- Designing engineer of Recycling Machines
- Systems manager

Paramedic — Detachment: Kirchdorf/Krems
1999, 2001 — Austrian Red Cross, Upper Austria

- Paramedic and driver for the Red Cross Ambulance service

AWARDS AND GRANTS

Submitted — NSERC Alliance grant. Prioritizing resources for conserving biodiversity in Canada ($966,000) PIs: Joeseph Bennett, Richard Schuster, Lenore Fahrig, Steve Cooke; Collaborators: Lisa McLaughlin (NCC), Paul A Smith (ECCC), Andrea

Reid (UBC), Richard Pither (ECCC), Ryan Norris (NCC), Amanda Martin (ECCC), Josie Hughes (ECCC), Vivian Ngyuen (Carleton).

2020-24 Nature Conservancy of Canada. Modernizing NCC's conservation prioritization methods. ($308,000 CAD) PIs: Joseph Bennett, Richard Schuster

2019-21 Pacific Institute for Climate Solutions. Climate Adaptive Planning for British Columbia. ($166,695 CAD) PIs: Oscar Venter, Peter Arcese

2017 SESYNC workshop. Indigenous communities: Pathways to promote social-ecological sustainability in the face of climate change, Annapolis, Maryland.

2016-20 Liber Ero post-doctoral Fellowship ($150,000 CAD) (2 yr program + 2 yrs parental leave)

2014 North Pacific Landscape Conservation Cooperative (NPLCC). Cross-boundary Planning for Resilience and Restoration of Endangered Oak Savannah and Coastal Douglas-fir Forest Ecosystems ($52,500 CAD) PI: Peter Arcese

2013 UBC Mary and David Macaree Fellowship ($3,000 CAD)

2013 Australia Endeavour Research Fellowship ($18,500 AUD)

2013 UBC Killam Graduate Teaching Award ($1,000 CAD)

2013 UBC W. and H. Hesse Research Award ($2,400 CAD)

2012 UBC Hesse Fellowship in Ornithology ($16,000 CAD)

2012 UBC W. and H. Hesse Research Award ($3,150 CAD)

2011 UBC Hesse Fellowship in Ornithology ($16,000 CAD)

2011 UBC Mary and David Macaree Fellowship ($3,000 CAD)

2010 UBC Hesse Fellowship in Ornithology ($10,000 CAD)

2008 UG Faculty of Science Scholarship ($3,000 EUR)

2007 Federal Science and Research (FRS) Grant for Study Abroad ($6,000 EUR)

2006-09 FRS Masters Study Grant ($35,000 EUR)

2006 Upper Austrian Govt. Special Sponsorship for Studies Abroad ($800 EUR)

2005 FRS Grant for Study Abroad ($6,000 EUR)

2002-06 FRS Bachelor Study Grant ($43,000 EUR)

PEER-REVIEWED PUBLICATIONS

34. **Schuster, R.**, Hanson, J. O., Strimas-Mackey, M., & Bennett, J. R. (2020). Exact integer linear programming solvers outperform simulated annealing for solving conservation planning problems. PeerJ, 8, e9258.

33. McCune, JL, Rosner-Katz, H, Bennett, JR, **Schuster, R**, Kharouba, HM. Do traits of plant species predict the efficacy of species distribution models for finding new occurrences? Ecol Evol. 2020; 00: 1– 14.

32. Loretto, M. C., **Schuster, R.**, Federspiel, I. G., Heinrich, B., & Bugnyar, T. (2020). Contextual imitation in juvenile common ravens, Corvus corax. Animal Behaviour, 163, 127-134.

31. Bolliger, C. S., Raymond, C. V., **Schuster, R.**, & Bennett, J. R. (2020). Spatial coverage of protection for terrestrial species under the Canadian Species at Risk Act. Ecoscience, 1-7.

30. Raymond, C. V., McCune, J. L., Rosner-Katz, H., Chadès, I., **Schuster, R**., Gilbert, B., & Bennett, J. R. (2020). Combining species distribution models and value of information analysis for spatial allocation of conservation resources. Journal of Applied Ecology, 57(4), 819-830.

29. Wilson, S., **Schuster, R.,** Rodewald, A., Bennett, J, Smith, A, Arcese, P. (2019) Prioritize diversity or declining species? Trade-offs and synergies in spatial planning for the conservation of migratory birds. *Biological Conservation 239, 108285*.

28. McCune, J. L., Colla, S. R., Coristine, L. E., Davy, C. M., Flockhart, D. T. T., **Schuster, R**., Orihel, D. M. (2019) Are we accurately estimating the potential role of pollution in the decline of species at risk in Canada?. *FACETS 4 (1), 598-614.*

27. Rodewald, A., Strimas-Mackey, M., **Schuster, R.**, Arcese, P. (2019) Tradeoffs in the value of biodiversity feature and cost data in conservation prioritization. *Scientific Reports 9 (1), 1-8*.

26. Locke, H., Ellis, E. C., Venter, O., **Schuster, R.**, Ma, K., Shen, X., Woodley, S., Kingston, N., Bhola, N., Strassburg, B. B. N., Paulsch, A., Williams, B., Watson, J. E. M. (2019) Three Global Conditions for Biodiversity Conservation and Sustainable Use: an implementation framework. National Science Review 2019 6(6). DOI:10.1093/nsr/nwz136.

25. Roy, C., Michel. N. L., Handel, C. M., Van Wilgenburg, S. L., Burkhalter, J. C., Gurney, K. E. B., Messmer, D. J., Princé, K., Rushing, C. S., Saracco, J. F., **Schuster, R.**, Smith, A. C., Smith, P. A., Sólymos, P., Venier, L. A., Zuckerberg, B. (2019) Monitoring boreal avian populations: how can we estimate trends and trajectories from noisy data? Avian Conservation and Ecology 14(2):8.

24. Rodewald, A., Strimas-Mackey, M., **Schuster, R.**, Arcese, P. (2019) Beyond canaries in coal mines: impacts of Andean mining concessions on migratory birds. *Perspectives in Ecology and Conservation, 17(3), 151-156* .

23. **Schuster, R.*,** Germain, R. R.*, Bennett, J. R., Reo, N.J., and Arcese, P. (2019) Biodiversity on Indigenous-managed lands equals that in protected areas. *Environmental Science & Policy*. Doi: 10.1016/j.envsci.2019.07.002 **denotes co-lead authors*

22. Hanson, J., **Schuster, R.**, Strimas-Mackey, M., Bennett, J. (2019) Optimality in prioritizing conservation projects. *Methods in Ecology and Evolution*. Doi: 10.1111/2041-210X.13264

21. **Schuster, R.**, Wilson, S., Rodewald, A. D., Arcese, P., Fink, D., Auer, T., & Bennett, J. R. (2019). Optimizing the conservation of migratory species over their full annual cycle. *Nature communications*, 10(1), 1754. Doi: 10.1038/s41467-019-09723-8

20. Hill, C. J., **Schuster, R.**, & Bennett, J. R. (2019). Indigenous involvement in the Canadian species at risk recovery process. *Environmental Science & Policy*, 94, 220-226. Doi: 10.1016/j.envsci.2019.01.017

19. Dey, C. J., Yurkowski, D. J., **Schuster, R.**, Shiffman, D. S., & Bittick, S. J. (2018). Patterns of uncertainty in life-history and extinction risk for Arctic vertebrates. Arctic Science, 4(4), 710-721. Doi: 10.1139/as-2018-0006

18. Coristine*, L.E., Jacob*, A.L., **Schuster*, R.**, Otto*, S.P., Baron, N.E., Bennett, N.J., Bittick, S.J., Dey, C., Favaro, B., Ford, A., et al. (2018). Informing Canada's commitment to biodiversity conservation: A science-based framework to help guide protected areas designation through Target 1 and beyond. *FACETS* 3, 531–562. doi: 10.1139/facets-2017-0102 **denotes co-lead authors*

17. Germain, R. R., **Schuster, R.**, Tarwater, C. E., Hochachka, W. M. and Arcese, P. (2017), Adult survival and reproductive rate are linked to habitat preference in territorial, year-round resident Song Sparrows Melospiza melodia. *Ibis*. doi:10.1111/ibi.12557

16. **Schuster, R.**, Law, E. A., Rodewald, A., Martin, T.G., Wilson, K. A., Watts, M., Possingham, H. P. and Arcese P. (2017) Tax-shifting and incentives for biodiversity conservation on private lands. *Conservation Letters*. doi:10.1111/conl.12377

15. Arcese, R., Rodewald, A, **Schuster, R.**, Venter, O., and Bennett, J. R. (2017) Public-private partnerships to meet international biodiversity treaty targets and stem extinction. Book chapter in: Reflections of Canada: Illuminating Our Opportunities and Challenges at 150+ Years. Peter Wall Institute for Advanced Studies, UBC.

14. Loretto, M.-C., **Schuster, R.**, Itty, C., Marchand, P., Genero, F. and Bugnyar, T. (2017): Fission-fusion dynamics over large distances in raven non-breeders. *Scientific Reports*, **7**, 380, DOI:10.1038/s41598-017-00404-4.

13. Lee-Yaw J.A., Kharouba H.M., Mahony C., Bontrager M., Csergő A.M., Noreen A.M.E., Li Q., **Schuster R.**, and Angert A.L. (2016) A synthesis of transplant experiments and ecological niche models suggests that range limits are often niche limits. *Ecology Letters* 19 (6) 710-722.

12. Jackson, C. L., **Schuster, R.**, and Arcese, P. (2016) Release date influences first-year site fidelity and survival in captive-bred Vancouver Island marmots. *Ecosphere* 7 (5).

11. Loretto, M.-C., Reimann, S., **Schuster, R.**, Graulich, D. M., and Bugnyar, T. (2016) Shared space - individually used: Spatial behaviour of non-breeding ravens (*Corvus corax*) close to a permanent anthropogenic food source. *Journal of Ornithology* 157 (2), 439-450.

10. Loretto, M.-C., **Schuster, R.**, and Bugnyar, T. (2016) GPS tracking of non-breeding ravens reveals the importance of anthropogenic food sources during their dispersal in the Eastern Alps. *Current Zoology* 62 (4), 337-344.

9. Schmitt, V., Federspiel, I., Eckert, J., Keupp, S., Tschernek, L., Faraut, L., **Schuster, R.**, Michels, C., Sennhenn-Reulen, H., Bugnyar, T., Mussweiler, T., Fischer, J., (2015). Do monkeys compare themselves to others? *Animal Cognition*. 19 (2), 417-428.

8. Germain, R.R., **Schuster, R.**, Delmore, K.E., and Arcese, P. (2015) Habitat preference facilitates successful early breeding in an open-cup nesting songbird. *Functional Ecology* 29 (12), 1522-1532.

7. **Schuster R.** and Arcese P. (2015). Effects of disputes and easement violations on the cost-effectiveness of land conservation. *PeerJ*, 3, e1185.

6. Delmore, K.E., Hübner, S., Kane, N.C., **Schuster, R.**, Andrew, R.L., Câmara, F., Guigó, R., and Irwin, D.E. (2015) Genomic analysis of a migratory divide reveals candidate genes for migration and implicates selective sweeps in generating islands of differentiation. *Molecular Ecology* 24, 1873–1888.

5. Arcese P., **Schuster R.**, Campbell L., Barber A., and Martin T.G. (2014) Deer density and plant palatability predict shrub cover, richness, diversity and aboriginal food value in a North American archipelago. *Diversity and Distributions* 20, 1368-1378.

4. **Schuster R.**, Martin T.G. and Arcese P. (2014) Bird community conservation and carbon offsets in western North America. *PloS One* 9, e99292.

3. **Schuster R.**, Römer H. and Germain R.R. (2013) Using multi-scale distribution and movement effects along a montane highway to identify optimal crossing locations for a large-bodied mammal community. *PeerJ* 1, e189.

2. **Schuster R.** and Arcese P. (2013) Using bird species community occurrence to prioritize forests for old growth restoration. *Ecography*, 36, 499–507.

1. Trobe D., **Schuster R.** and Römer H. (2011) Fast and reliable decisions for a dynamic song parameter in field crickets. *Journal of Comparative Physiology – A*, 197, 131-135.

PUBLICATIONS IN REVIEW

Baisero D., **Schuster R**., Plumtre A. J. Redefining irreplaceability: a first global assessment. *In review in Conservation Letters*.

Mitchell M., **Schuster R.**, Jacob A., Hanna D., Dallaire C., Raudsepp-Hearne C., Bennett E., Lehner B, Chan K. Identifying key ecosystem service providing areas to inform national-scale conservation planning. *In review in Environmental Research Letters*.

Grantham, H.S., Duncan, A., Evans, T.D., Jones, K., Beyer, H., **Schuster, R.**, Walston, J., Ray, J., Robinson, J., Callow, M., Clements, T., Costa, H.M., DeGemmis, A., Elsen, P.R., Ervin, J., Franco, P., Goldman, E., Goetz, S., Hansen, A., Hofsvang, E., Jantz, P., Jupiter, S., Kang, A., Langhammer, P., Laurance, W.F., Lieberman, S., Linkie, M., Malhi, Y., Maxwell, S., Mendez, M., Mittermeier, R., Murray, N., Possingham, H., Radachowsky, J., Samper, C., Silverman, J., Shapiro, A., Strassburg, B., Stevens, T., Stokes, E., Taylor, R., Tear, T., Tizard, R., Venter, O., Visconti, P., Wang, S. & Watson, J.E.M. (2020). Modification of forests by people means only 40% of remaining forests have high ecosystem integrity. *In review in Nature Communication*.

Buxton, R.T., Nyboer, E., Pigeon, K., Raby, G., Rytwinsky, T., Gallager, A., **Schuster, R.**, Lin, H.Y., Lenore, F., Bennett, J., Cooke, S., Roche, D. Avoiding wasted research resources in conservation science. *In review in Conservation Science and Practice*.

Buxton, R.T., Bergman, J., Lin, H.Y., Binley, A., Avery-Gomm, S., **Schuster, R.**, Roche, D., Bennett, J., Three lessons conservation science can learn from the COVID-19 pandemic. *In review in Conservation Biology*.

PUBLICATIONS IN REVISION/PREPARATION

Schuster R., Buxton R., Hanson J. O., Binley A., Pittman J., Tulloch V., La Sorte F., Garcia R., Verburg P. H., Rodewald A. D., Wilson S., Arcese P., Possingham H., Bennett J. Biodiversity conservation in an uncertain world. *In preparation.*

Lin H-Y, **Schuster R.**, Wilson S., Cooke S., Rodewald A., Bennett J. Protect stopover sites of migratory birds considering resident species and land use patterns. *In revision*.

Chaplin-Kramer B., Neugarten R., Sharp R., Collins P., Polasky S., Hole D., **Schuster R.**, Strimas-Mackey M., Mulligan M., Turner W., Brandon C., Diaz S. Shaw R., Johnson J., van Soesbergen A., Noon M. Mapping critical natural assets for people globally. *In preparation.*

Hanson, J., **Schuster R.**, Morrell, N., Strimas-Mackey, M., Watts, M., Arcese, P., Bennett, J., and Possingham, H. prioritizr: Systematic conservation planning in R. In preparation.

Hirsh-Pearson K., **Schuster R.**, Ray J., Venter O. Canada's human footprint reveals large wild areas juxtaposed against areas under immense anthropogenic threat. *In preparation*.

Morell N., Schuster R., Arcese P. Systematic conservation prioritisation in the Northern Andes: integrating focal species and multiple goals. *In preparation*.

Visty H., Schuster R., Wang T., Arcese P. Climate warming and the establishment of resident populations in a former obligate migrant. *In preparation.*

Federspiel I., Schmitt V., **Schuster R**., Rockenbach C., Braun A., Loretto M.-C., Michels C., Fischer J., Mussweiler T., Bugnyar T. Are You Better Than Me? Social Comparisons in Carrion Crows (Corvus corone). *In revision.*

NON-PEER REVIEWED PUBLICATIONS, REPORTS AND SOFTWARE

Software

Hanson JO, **Schuster R**, Morrell N, Strimas-Mackey M, Watts ME, Arcese P, Bennett J, Possingham HP (2019). prioritizr: Systematic Conservation Prioritization in R. R package version 4.1.3.2. Available at https://github.com/prioritizr/prioritizr.

Hanson JO, **Schuster R**, Strimas-Mackey M, Bennett J (2019). oppr: Optimal Project Prioritization. R package version 0.0.4, https://CRAN.R-project.org/package=oppr.

Schuster R, O'Connor C (2019) Learning from lake sturgeon: data entry app to report observations about the health of the river. R Shiny tool. Available here: http://www.learningfromlakesturgeon.ca/contributing-to-data-collection/

Hanson JO, **Schuster R**, Morrell N, Strimas-Mackey M, Watts ME, Arcese P, Bennett J, Possingham HP (2019). prioritizrdata: Conservation Planning Data Sets. R package version 0.2.3. https://github.com/prioritizr/prioritizrdata.

Schuster R, Hanson JO, Morrell N, Strimas-Mackey M, Watts ME, Arcese P, Bennett J, Possingham HP (2019). prioritizrshiny: Shiny interface for Systematic Conservation Prioritization in R. R package version 0.0.1. https://github.com/prioritizr/prioritizrshiny.

Schuster R., Morrell N., Crombie M., Arcese P (2018). CDFCP prioritization: A prioritization tool for the conservation of Coastal Douglas-for Forest and Savannah Habitats of the Georgia Basin. Shiny tool. Available at https://github.com/ricschuster/CDFCP_prioritization.

Schuster R., Dunmall K. (2018) Interactive, browser-based mapping tool that allows to map salmon harvest by species, abundance, and locations. R Shiny tool. Not available online due to data sharing restrictions.

Schuster R., Mann J., Wright P. (2019) Peace River Break prioritization: supporting tool for developing a climate-change conscious approach to systematic conservation planning in the Peace River Break. R Shiny tool. Not available online due to data sharing restrictions.

Schuster R., Popescu V., Munshaw R., Dubman E., Wood Laurie, Palen W. (2018) BC Run of River Decision Support Tool. Interactive tool to identify groups of future Run-of-River projects that overlap the least with user-defined biodiversity values while prioritizing user criteria for power production, cost, and geography. R Shiny tool. Not available online due to data sharing restrictions.

Schuster R., Curtis I, Wright P. (2018) Wild hearts prioritization: supporting tool for systematic conservation planning in the Wild Harts region. R Shiny tool. Not available online due to data sharing restrictions.

Schuster R, Maclean B (2018) Flow data visualization tool. Processing of trip track and hazard kml data and trip track and river hazard visualization. R Shiny tool. Not available online due to data sharing restrictions.

Schuster R, Warman L (2018) Relative Ecological Assessment tool. This tool allows the Nature Trust of BC staff to thoroughly and efficiently evaluate potential land purchases using scientific assessments, spatial data, and information about compatible or incompatible land uses. R Shiny tool. Not available online due to data sharing restrictions.

Schuster R, Coristine L.E., Jacob A.L., Otto S.P., Baron N.E., Bennett N.J., Bittick S.J., Dey C., Favaro B., Ford A., et al. (2018). Online supporting app for: Informing Canada's commitment to biodiversity conservation: A science-based framework to help guide protected areas designation through Target 1 and beyond. R Shiny tool. Available here: https://forbasin.forestry.ubc.ca/LEF_Target1_support/

Schuster R, Clark R (2018) Inter-Tribal Forest Understory Adaptation Project Mapping Tool. Interactive, browser-based mapping tool that allows visualization for current and future importance values for two tree species across Michigan. R Shiny tool. Not available online due to data sharing restrictions.

Schuster R (2017) Fire risk assessment app. Supporting tool for a National Socio-Environmental Synthesis Center workshop on "Indigenous communities: Pathways to promote social-ecological sustainability in the face of climate change". R Shiny tool. https://forbasin.forestry.ubc.ca/SESYNC_UN/

Schuster R., Crombie M., Morrell N., Arcese P (2016) NPLCC prioritization: A Prioritization Tool for the Conservation of Coastal Douglas-fir Forest and Savannah Habitats of the Georgia Basin and Puget Sound Lowland. R Shiny tool. https://forbasin.forestry.ubc.ca/NPLCC.v0.13/

Reports

Robertson, C., **Schuster, R.**, Mitchell, M., Cameron, R., Jacob, A., Preston, S., Neupane, A., Vickers, A., and McMillan, S. (2018) Identifying Areas Important for Biodiversity and Ecosystem Services in Canada. A Pathway to Canada Target 1 Expert Task Team paper. Prepared for Government of Canada (110pp). Link

Morell, N., **Schuster, R.**, and Arcese, P (2017) Marxan Tutoral for the Costal Douglas-Fir Conservation Partnership. Software documentation (42pp). Link

Ford, A. T., Coristine, L., Davies, K., Flockhart, T., Jacob, A., Palen, W., Pittman, J., **Schuster, R.**, Orihel, D., and Otto, S. (2016) Improving environmental assessment in Canada. Liber Ero Fellowship program letter to Minister Catherine McKenna in input for the Canadian Environmental Assessment Act reform. Link

Coristine, L, Pittman, J., and **Schuster, R**. (2016) Early-career researchers in Canada's science-policy landscape: barriers and opportunities. Canadian Science Policy Centre. Link

Schuster, R. and Warman L. (2016) The Nature Trust of British Columbia: Relative Ecological Assessment Tool (37pp).

Schuster, R., Crombie, M., Morrell, N., and Arcecse, P. (2016) A Prioritization Tool for the Conservation of Coastal Douglas-fir Forest and Savannah Habitats of the Georgia Basin and Puget Sound Lowlands (56pp). Link

Emmings, K., Golumbia, T., Miller, K., and **Schuster, R**. (2015) Coastal Douglas-fir and Associated Ecosystems Conservation Partnership (CDFCP) Conservation Strategy: Study Area and Local Government Scenarios. Technical report for the CDFCP 15pp.

Schuster, R. (2015) Protected Area Network development for the Islands Trust Area. Technical report for The Islands Trust (37pp).

Schuster, R. (2014) Relative Ecological Assessment tool. Software documentation for The Nature Trust of British Columbia (34pp).

Schuster, R. (2014) Coastal Douglas-fir and Associated Ecosystems Conservation Partnership (CDFCP) Summary Table. Technical report for the CDFCP (13pp).

Schuster, R. (2014) Carbon and Biodiversity Mapping and Assessment for the Islands Trust Area. Technical report for The Islands Trust (14pp).

Schuster, R. (2005) Software application for cricket movement tracking. University of Graz, Austria. 45pp

SKILLS AND EXPERIENCE

- Fluency in English and German (mother tongue)
- Extensive professional expertise in programming: C, C++, R, Visual Basic, Python, Perl
- Extensive GIS experience, including development of analytical Python scripts.
- Proficiency in a variety of scientific field techniques and equipment

CAREER DEVELOPMENT

2017 *Cultural Sensitivity Training*
Effective ways to engage Indigenous and local communities in conservation research, including: diversity-inclusion, cross-cultural collaboration, legacy impacts, and the Sahtú region and Dél̨ı̨nę Dene language and orthography.

2017 *Facilitation Training*
Facilitation planning, tools, and strategies for conflict scenarios and non-neutral facilitation events. Topics included: group climate and norms, scoping and assessment, process design, managing group discussions, and interventions.

2016 *Science communication and policy interface*

Bridging the worlds of science and journalism, power tools for science communication, practice interview with attending journalists, the power of storytelling, creating policy briefs and discussing them in meetings with MP's.

2016 *Media and Communications Training*
Training to enhance written, audio, and video communication of scientific research with the media and general public. Components included: using message box, developing an elevator pitch, the art of the interview, practice interview sessions with media, development of press releases, etc.

WORKSHOPS AND SYMPOSIA ORGANIZED

2019 Introduction to Marxan/MarZone & prioritzr. PacMARA workshop in Victoria, British Columbia, Canada. Co-organized with Norma Serra. Organized and led prioritzr section (1 day). 16 participants, 4 days.

2018 A prioritization tool for the conservation across the province of British Columbia. Workshop at the BC Protected Areas Research Forum, Prince George, Canada. Co-organized with Oscar Venter and Peter Arcese. 40 Parciticpants, ½ day.

2018 Instructor: Prioritizing conservation actions: development and application of Marxan type spatial planning tools workshop, University of Northern British Columbia (UNBC), Canada.

2018 Canada's pathway to meeting Aichi Target 11: current state and next steps. Symposium at the North American Congress for Conservation Biology, Toronto, Canada. Co-organized with Jeff Wells and Aerin Jabob. 11 invited speakers, 3h.

2018 Statistical analysis in R; 2-day workshop Vienna Doctoral School Cognition, Behavior and Neuroscience, University of Vienna, Austria.

2017 Statistical analysis using R; 1-day workshop for members of the Biology department at Carleton University.

2016 Key Biodiversity Areas Criterion C Workshop: Assessing Sites with Ecological Integrity. Hosted by Wildlife Conservation Society Canada, Toronto, Canada. Host: Justina Ray. My role: analyst. 18 participants, 2 days.

2015 Introduction to R; Workshop for participants at the Graduate Meeting 2015. Konrad Lorenz Forschunsstelle, University of Vienna, Austria.

2013 Advanced Occupancy and Abundance Modelling; Main Instructor, 2-day workshop for members of the Wildlife Institute of India. UBC

2013 Statistical analysis using R; Main Instructor, 2-day workshop for members of the Wildlife Institute of India. UBC.

TEACHING EXPERIENCE

2019	Instructor: Prioritizing conservation actions: development and application of Marxan type spatial planning tools workshop, University of Northern British Columbia (UNBC), Canada.
2019	Guest lecture: Democratizing Spatial Planning for Nature and People, Environmental Resource Management (ENVS 6119), York University, Canada.
2018	Guest lecture: Using hierarchical models to identify old-forest patches, UNBC.
2018	Guest lecture: Introduction to conservation prioritization tools, Planning for Agriculture, University of Waterloo, Canada.
2017	Lecturer, Systematic Conservation Planning with practical examples using online tools, Carleton University.
2016	Lecturer, Prioritizing conservation actions: development and application of Marxan spatial planning tools in the Georgia Basin. Topics: 'Species Distribution Models' and 'Algorithms and Approaches to Systematic Conservation Planning' (FRST 507c). UBC
2012-14	Guest lecturer for UBC courses FRST 532B (Spatial Statistics), CONS 101, FRST 495, FRST 532B (Bayesian analysis) and University of the Frasier Valley Forest Ecology (BIO 430)
2014	Teaching Assistant (TA), Advanced Regression Analysis (FRST 530). UBC
2011-13	TA, Biological Diversity and Forest Management (FRST 495). UBC
2013	TA, Applied Multivariate Statistics (FRST 531). UBC
2011	TA**,** Introduction to Conservation Science (CONS 101). UBC
2010	Instructional Skills Program for International Teaching Assistants. UBC
2008	TA, Aggression Behaviour. University of Graz (UG), Austria.
2008	TA, Methods of Analyzing Social Systems in the Animal Kingdom. UG
2008	TA, Social Behaviour of Animals and Humans. UG

STUDENT MENTORING

PhD students

Miguel Arias, UNBC (2019 – current) Human Footprint index for British Columbia.

Xavier Corredor Llano, UNBC (2019 – current) Climate Adaptive Planning for British Columbia.

Allison Binley, Carleton (2018 - current) Using citizen science to increase monitoring efficiency and prioritize conservation efforts.

MSc students

Chris Morgan, UNBC (2019 – current) Systematic Conservation Planning in Tsay Keh Dene Territory: Incorporating Climate Change and Interweaving Traditional Ecological Knowledge

Karen Dietrich, UNBC (2018 – current) Climate Adaptive Planning for British Columbia

Kristen Hirsh-Pearson, UNBC (2018 - current) A framework for mapping cumulative threats and its application to Canada.

Jaimie Vincent, Carleton (2018 – 2020) Can we use eBird data as a proxy for inferring migratory connectivity?

Nina Morell, UBC (2016 - 2018) Using species distribution models to prioritize conservation in the Northern Andes.

Cassie Hill, Carleton (2016 - 2018) Involvement of Indigenous Peoples in Species at Risk recovery planning in Canada.

Calla Raymond, Carleton (2016 - 2018) Value of information to improve the decision-making process associated with endangered species conservation.

Honours

Clark Bolliger, Carleton (2018) How well protected are Canada's species at risk? An examination of SARA's coverage on federal land?

M.-A. Leclerc, UBC (2013) Species Management in Human Dominated Landscapes

Undergraduate Student Research Projects

S. Sellars, Carleton (2020) Development of web mapping framework for conservation planning tools with Nature Conservancy of Canada

C. Bolliger*, Carleton (2018) An Assessment of SARA's Habitat Coverage for Terrestrial Species at Risk.

J. Pon, Carleton (2016)

W. Wang, UBC (2015) Map comparisons for different species distribution model techniques.

N. Morrell, UBC (2015) Cross-boundary planning for ecosystem resilience and restoration.

A. Barber*, UBC (2011) Deer density and plant palatability predict shrubs.

L. Cambell*, UBC (2011) Deer density and plant palatability predict shrubs.

M. Combie, UBC (2010) Demography of song sparrows.

(* resulted in co-authorship on a paper)

PROFESSIONAL SERVICE

- Academic editor: PeerJ
- Peer reviewer: Animal Conservation, Journal of Avian biology, Diversity, Ecography, Ecological Indicators, Ecology, Landscape Ecology, PLoS One, Journal of Biogeography, PeerJ, Avian Conservation and Ecology, Natural Sciences Education, Regional Environmental Change, Biological Conservation, Land Use Policy, Journal of Applied Ecology, One Earth, Conservation Science and Practice, FACETS, Canadian Journal of Zoology, Methods in Ecology and Evolution, Conservation Biology, Science Advances, Nature Communications, One Earth, Stochastic Environmental Research and Risk Assessment, Journal of Applied Ecology.
- Scientific reviewer for the Cooperative Monitoring, Evaluation and Research (CMER) Committee of the University of Washington (2014)
- Award and grant committee member:
    - International Forestry Students' Association (IFSA) Food and Agriculture Organization of the United Nations (FAO) internship (2013)
    - IFSA travel grants for the International Forestry Student' Symposium (2013)
    - Graduate Teaching Award UBC (2014)

STUDENT SERVICE

2013	Received the UBC Killam Graduate Teaching Assistant Award
2012	Recognized as a UBC "Student Leader" by the President's Office.
2011 – 2012	International Forestry Student Association (IFSA) – Head of Web Commission (elected). Secretariat location: Freiburg, Germany.
2011 – 2012	IFSA – Regional Representative North America (elected).
2010 – 2012	IFSA local chapter UBC: re-established IFSA membership. Chapter president 2011 -2012 (elected). UBC.
2010 – 2012	UBC Forestry Graduate Student Association. International Representative (elected).

CONFERENCE PRESENTATIONS AND INVITED SEMINARS

Schuster R, Hanson JO, Morrell N, Strimas-Mackey M, Watts ME, Arcese P, Bennett J, Possingham HP (2020) Democratizing Conservation Planning for Nature and People. North American Congress for Conservation Biology, virtual, oral. (Invited symposium)

Schuster R (2020) Democratizing Conservation Planning for Nature and People. UNBC public presentation, Terrace, BC, (invited seminar)

Schuster R (2020) Democratizing Conservation Planning for Nature and People. Interdisciplinary Conservation in Canada, Semiar Series, York University, Toronto, Canada. (invited seminar, remote)

Schuster R., Hanson J.O. (2019) prioritzr – Systematic conservation planning in R. Roadmap for Marxan Workshop. Brisbane, Australia. (invited talk)

Schuster R. (2019) Democratizing Spatial Planning for Nature and People. National Wildlife Research Center seminar series, Ottawa, Canada. (Invited talk, remote)

Schuster R. (2018) Data interaction, analysis and communication in a unified framework. Incorporating climate change and climate adaptation data into regional conservation planning and management in northwestern Canada. Workshop at the BC Protected Areas Research Forum (BCPARF), Prince George, Canada. (invited talk)

Schuster R. (2018) Democratizing Spatial Planning for Nature and People: prioritzr + shiny. BCPARF, oral.

Schuster R. (2018) Coastal Douglas-fir conservation partnership and tool. A prioritization tool for the conservation across the province of British Columbia. Workshop at BCPARF (co-organizer with Oscar Venter and Peter Arcese)

Schuster R. (2018) Protected Areas Planning & Science-Based Framework To Help Guide Protected Areas Designation Through Target 1 & Beyond. Canadian Council on Ecological Areas Workshop, Toronto, Canada, oral. (Invited talk)

Schuster R, Hanson JO, Morrell N, Strimas-Mackey M, Watts ME, Arcese P, Bennett J, Possingham HP (2018) Democratizing Spatial Planning for Nature and People: prioritzr + shiny. Canadian Council on Ecological Areas Workshop, Toronto, Canada, oral. (Invited talk)

Schuster R, Hanson JO, Morrell N, Strimas-Mackey M, Watts ME, Arcese P, Bennett J, Possingham HP (2018) Systematic conversation prioritization in R: Democratizing Spatial Planning for Nature and People using the prioritzr package. North American Congress for Conservation Biology, Toronto, Canada, oral. (Invited symposium)

Schuster, R. (2018) Introduction to conservation prioritization tools, Seminar, Institute for Sustainable Economic Development, BOKU - University of Natural Resources and Life Sciences, Vienna, Austria.

Schuster, R. (2017) Introduction to conservation prioritization tools, Association of Professional Biology, webinar.

Schuster, R. (2017) Data interaction, analysis and communication in a unified framework. SESYNC workshop. Indigenous communities: Pathways to promote social-ecological sustainability in the face of climate change, Annapolis, Maryland.

Loretto, M-C., **Schuster, R.**, Bugnyar, T. (2017): Linking fission-fusion dynamics to social complexity in a large-brained songbird. 11th Göttinger Freilandtage, Göttingen, Germany, poster.

Loretto, M-C., Beck, K., **Schuster, R.**, Bugnyar, T. (2017): From large scale movements to local food caches - the spatial behaviour of non-breeding ravens. 6th International Bio-logging Symposium, Konstanz, Germany, poster.

Ray, J., **Schuster, R.**, Robards, M., Soares, R. (2017) Application of the new key biodiversity area (KBA) criterion for ecological integrity. International Congress for Conservation Biology, Cartagena, Colombia, oral.

Arcese, P., **Schuster, R**., Rodewald, A., Law, E., Martin, T., Wilson, K. (2017) Complementarity in Biodiversity, Riparian and Carbon Values: Trade-offs vs Co-benefits. International Congress for Conservation Biology, Cartagena, Colombia, oral.

Law, E., **Schuster, R.**, Rodewald, A., Wilson, K., Arcese, P. (2017) Who will conserve? Understanding stakeholders to improve prioritization of private land conservation. International Congress for Conservation Biology, Cartagena, Colombia, oral.

Morrell, N., Appleton, R., Arcese, P., **Schuster, R.** (2017) Environmental co-benefits of habitat conservation for Andean bears. International Congress for Conservation Biology, Cartagena, Colombia, oral.

Loretto, M-C., Beck, K., **Schuster, R.**, Bugnyar, T. (2017): Variation in space use of non-breeding ravens: From large scale movements to local food caches. 35th International Ethological Conference, Estoril, Portugal, poster.

Loretto, M-C., **Schuster, R.**, Bugnyar, T. (2017): Movement strategies of non-breeding ravens. Annual Conference of the British Ornithologists' Union, Coventy, UK, oral.

Schuster, R., Bennett, J., Rodewald, A., Wilson, S., Marra, P., and Wells, J. (2016) Full annual cycle population models and conservation optimization for migratory birds. Oral presentation at 'Frank discussion', Cornell lab of Ornithology.

Schuster, R., Morell, N., Kleynhans, E., and Arcese, P. (2016) Cross-boundary Planning for Resilience and Restoration of Endangered Ecosystems. Oral presentation at Wildlife and Landscape Science Division, Environment and Climate Change Canada.

Schuster, R., Morell, N., Kleynhans, E., and Arcese, P. (2016) Cross-boundary Planning for Resilience and Restoration of Endangered Ecosystems. Oral presentation at Biology Seminar Series, Carleton University.

Arcese, P., **Schuster, R.**, Kleynhans, E.J., Rodewald, A.D., Wilson, S.D. (2016) Climate and Land Use Drivers of Species Distribution in Conservation Prioritization. Oral presentation North American Ornithological Conference.

Loretto, M-C., **Schuster, R.**, Bugnyar, T. (2016): Fission-fusion dynamics over large distances in wild non-breeding ravens. Oral presentation at the 8th European Conference on Behavioural Biology, Vienna, Austria.

Schuster, R., Bennett, J., Rodewald, A., Wilson, S., Marra, P., and Wells, J. (2016) Full annual cycle population models and conservation optimization for migratory birds. Oral presentation to the Conservation Science - Bird Population Studies group at Cornell lab of Ornithology.

Schuster, R., Morell, N., Kleynhans, E., and Arcese, P. (2016) eBird specied distribution models and cross-boundary conservation planning. Oral presentation at 'Frank discussion', Cornell lab of Ornithology.

Schuster, R., Morell, N., and Arcese, P. (2015) Marxan tool demonstration: How does the model work and how can you make use of it? Oral presentation at the 13th Conservation Connection Forum.

Gow E., **Schuster, R**., Laforge M. and Arcese P. (2015) Olive-sided flycatcher occurrence in relation to habitat in British Columbia. Poster presentation American Ornithologists' Union meeting.

Schuster, R. (2015) Distribution models, variables and data. Oral presentation at the Cross-boundary Planning for Resilience and Restoration of Endangered Oak Savannah and Coastal Douglas-fir Forest Ecosystems workshop.

Schuster, R. (2015) Community Maps using expert elicitation. Oral presentation at the Cross-boundary Planning for Resilience and Restoration of Endangered Oak Savannah and Coastal Douglas-fir Forest Ecosystems workshop.

Schuster, R. (2014) How does the Marxan Tool work? Oral presentation at the Coastal Douglas-fir and Associated Ecosystems Conservation Partnership Marxan Tool Demonstration and Workshop.

Arcese, P., **Schuster, R.** and Martin T. (2012) Birds as Indicators of 'Ecological Integrity' and Human Influence: using occupancy maps to prioritize conservation effort. Oral presentation North American Ornithological Conference.

Schuster R., Arcese P., Martin T., Bennett J. and Gonzales E. (2011) Restoring old growth forests of the Pacific coast. Oral presentation to the BC Protected Areas Research Forum.

Schuster R. and Arcese P. (2011) Using bird species occurrence to prioritize Old-forest restoration. Oral presentation at the 129th American Ornithologists' Union meeting.

Schuster R., Arcese P., Martin T., Bennett J. and Gonzales E. (2011) Systematic conservation area design in the Coastal Douglas-fir zone. Oral presentation to the Coastal Douglas-fir (CDF) Stewardship Workshop.

Schuster, R., Arcese, P., Bennett, J., Blight, L.K., Essek, M. and Germain, R. (2011) Applied ecology and evolution in the Arcese Lab. Poster presentation at the Faculty of Forestry Research Evening, Forest Sciences Centre, University of British Columbia, Vancouver (FFRE)

Blight, L.K., Arcese, P., Bennett, J., Jackson, C. and **Schuster, R.** (2010) Applied ecology and evolution in the Arcese Lab. Poster Presentation at the FFRE.