

Sara Mae Kross, PhD

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Current Position

August 2015-August 2016: Postdoctoral Scholar.

Department of Wildlife, Fish and Conservation Biology, University of California, Davis, California

Education

2013-2015: David. H. Smith Conservation Research Fellow.

Department of Wildlife, Fish & Conservation Biology, University of California Davis, and in association with The Nature Conservancy and The Society for Conservation Biology.

2008- 2012: PhD, Zoology.

School of Biological Sciences, University of Canterbury, Christchurch, New Zealand

2006- 2007: Masters in Research, Environmental Biology.

School of Biological Sciences, University of St. Andrews. St. Andrews, Scotland

2002- 2005: Bachelor of Science, Animal Science.

Cornell University, Ithaca, New York

Publications

Kross, S.M., Kelsey, T.R., McColl, C.J., & Townsend, J.M. In Review. Field-scale habitat complexity enhances avian conservation and avian-mediated pest-control services in an intensive agricultural crop. *Agriculture, Ecosystems & Environment*. 225: 140-149.

Kross, S.M., Bourbour, R.P.[†], & Martinico, B.L.[†]. 2016. Agricultural land use, barn owl diets, and vertebrate pest control implications. *Agriculture, Ecosystems & Environment*.

Rochman, C.M., **Kross, S.M.**, Armstrong, J.B.* , Bogan, M.T.* , Darling, E.S.* , Green, S.J.* , Smyth, A.R.* & Verissimo, D*. 2015. Scientific evidence supports a ban on microbeads. *Environmental Science and Technology* early view online <http://pubs.acs.org/doi/full/10.1021/acs.est.5b03909>.

Green, S.J., Armstrong, J.B.* , Bogan, M.T.* , Darling, E.S.* , **Kross, S.M.***, Rochman, C.M.* , Smyth, A.R.* & Verissimo, D*. 2015. Conservation needs diverse values, approaches and practitioners. *Conservation Letters* early view online <http://onlinelibrary.wiley.com/doi/10.1111/conl.12204/epdf>

Kross, S.M. 2014. Bird electrocutions in New Zealand. *Notornis*. 61: 170-173.

Kross, S.M., J.M. Tylianakis & X.J. Nelson. 2013. Diet compositions and prey choice of New Zealand falcons nesting in anthropogenic and natural habitats. *New Zealand Journal of Ecology*. 37: 51-59.

Kross, S.M., P.G. McDonald & X.J. Nelson. 2013. New Zealand falcon nests suffer lower depredation in agricultural habitat than in natural habitat. *Bird Conservation International*. 23: 512-519. doi 10.1017/s0959270913000130

Kross, S.M. & X.J. Nelson. 2013. Factors influencing the behavioural development of juvenile New Zealand falcons. *Emu*. 113: 84-87. doi 10.1071/mu12020

Kross, S.M., J.M. Tylianakis & X.J. Nelson. 2012. Translocation of Threatened New Zealand Falcons to Vineyards Increases Nest Attendance, Brooding and Feeding Rates. *PLoS One*. 7: e38679. doi:10.1371/journal.pone.0038679

Kross, S.M., J.M. Tylianakis & X.J. Nelson. 2012. Effects of introducing threatened falcons into vineyards on abundance of passeriformes and bird damage to grapes. *Conservation Biology*. 26: 142-149. doi: 10.1111/j.1523-1739.2011.01756.x **Recommended by Faculty of 1000**

Kross, S.M. & X.J. Nelson. 2011. A portable low-cost remote videography system for monitoring wildlife. *Methods in Ecology and Evolution*, 2: 191-196. doi:10.1111/j.2041-210X.2010.00064.x/full (selected to be highlighted on the journal homepage and 'Methods' podcast)

*Authors contributed equally and are listed alphabetically. †Undergraduate student.

Reports

Rochman, C.M., **Kross, S.M.**, Bogan, M., Darling, E., Green, S., Verissimo, D., Smyth, A., Armstrong, J. 2015. Scientific evidence supports a ban on microbeads. *Policy Brief* on behalf of the *Society for Conservation Biology*.

Kross, S.M., A. McLachlan, P. Wood, B. Fisher & B. West. 2013. Final report on the efficacy of the Invisi Shield™ technology for protecting Chardonnay, Sauvignon blanc and Merlot winegrapes from bird predation in commercial vineyards. Confidential report for Invisi Shield Limited.

Kross, S.M. 2012. Annual report from the Marlborough Falcon Conservation Trust to the New Zealand Department of Conservation.

Kross, S.M. 2011. Marlborough Falcon Conservation Trust New Zealand Falcon (*Falco novaeseelandiae*) Husbandry Manual. Report to the New Zealand Department of Conservation.

Popular Media

National Geographic Voices. October 6, 2015. *The microbeads dilemma: Does your facewash harm wildlife?* Over 2,700 social media engagements as of October 13, 2015.

<http://voices.nationalgeographic.com/2015/10/06/the-microbeads-dilemma-does-your-facewash-harm-wildlife/>

The Conversation. June 4, 2015. *Tiny beads, big problem, easy fix: why scientific evidence supports a ban on microbeads.* <http://theconversation.com/tiny-beads-big-problem-easy-fix-why-scientific-evidence-supports-a-ban-on-microbeads-42511>

Current Research

Encouraging owl predation of rodents by erecting owl boxes: myth or potential management strategy?

Utilizing literature searches, population biology, and predator-prey modeling to determine whether barn owls are capable of controlling pest-rodent populations in West Coast vineyards and orchards. I'm also advising an undergraduate student project to describe barn owl diet on nearby farms, and this work is currently in review at *Agriculture, Ecosystems & Environment*.

Field- and landscape-scale habitat management for avian diversity in an intensive agricultural landscape

Comparing avian species diversity with local- and landscape- scale habitat variability to recommend best conservation practices on farms for birds. This collaboration with a PhD student and two NGOs is *In Prep* and nearing submission, target journal: *Conservation Letters*.

Quantifying the ecosystem services tradeoffs to farmers from wild bird communities: ecosystem services (pest-control) and disservices (crop damage).

Project design, management and analysis of a large-scale experiment to measure how avian species diversity translates into pest-control services and crop damage from birds on farms in California's Central Valley. Over seventy field sites in four different crops (tomatoes, sunflowers, alfalfa, grapes) are currently enrolled in the project. One paper is currently in review at *Agriculture, Ecosystems Environment* and an additional 2 papers are *In Prep*.

Addressing the strengths and weaknesses of diversified farming systems as a biodiversity conservation strategy: a path forward

Writing a review and synthesis article about the results of a SWOT (strengths, weaknesses, opportunities, threats) analysis of the viability of diversified farming systems as a strategy for biodiversity conservation. In collaboration with a team of international agroecologists, conservation biologists and NGOs.

How do farmers perceive wild birds and bats on their farms?

Utilizing social science methods to survey farmers in the Sacramento Valley. A survey was sent to 500 farmers and was available online. The first paper from this study is currently *In Prep* with an anticipated submission date in late December 2015.

Do New Zealand falcons select prey based on nutritional composition?

Utilizing a geometric framework to compare nutrient availability in prey items with diet selection in New Zealand falcons. In collaboration with David Raubenheimer at the University of Sydney and Ximena Nelson at the University of Canterbury.

Relevant Employment

New Zealand Institute of Plant and Food Research. 2012-2013. Senior Research Associate, Marlborough Wine Research Centre. Managed a project to test a commercial bird deterrent system on both the North and South Islands in Chardonnay and Merlot blocks. Project results are embargoed by the commercialization company.

New Zealand Institute of Plant and Food Research. 2012. Research Associate, Marlborough Wine Research Centre. Assisted with a project to simultaneously run over 100 small scale fermentations to test field-based methods such as mechanical canopy thinning and terroir-based differences on final wine chemistry.

Brancott Estate Winery. 2012. Research Associate. Assisted with a project to extract and measure volatile thiols from grape juice, fermenting juice, and final wines to test for effects of terroir, picking methods, and fermentation conditions in Sauvignon Blanc.

Marlborough Falcon Conservation Trust. 2008-2013. Co-founder, Trustee and Programme Manager. Responsible for overseeing staff and running the volunteer program. Also responsible for permitting, record keeping, overseeing falcon care, grant writing, management plans, and community education and outreach. Acted as a spokesperson, with duties including hosting donors, and educating groups including primary, secondary and university students to community groups and industry practitioners.

Marlborough Falcon Conservation Trust. 2013-Present. Trustee and Scientific Advisor. Continued presence as a board member of the MFCT including advising on ongoing scientific work and education/ outreach initiatives.

Landcare Research. 2007. Field Assistant. Field study to assess invasive bird use of seed-crop fields in the Canterbury Plains and potential for carrying food-borne diseases. Duties included: mist-netting introduced and native birds, banding, drawing blood samples, cloacal swabs, radiotracking and mapping field use.

Awards, Grants and Fundraising **Total: >\$765,923 USD**

Research California Department of Food and Agriculture: Vertebrate Pest Control Research Advisory Committee. 2015-2016. USD \$76,908 *Encouraging owl predation of rodents by erecting owl boxes: myth of potential management strategy* (with Roger Baldwin)

Research Selma Herr Fund for Ornithological Research. *Measuring the capability of insectivorous birds to control pest insect outbreaks in a Yolo county vineyard.* 2015-2016. USD \$1,564

Research David H. Smith Conservation Research Fellowship. 2013-2015. USD \$145,000 plus training

Research Center for Produce Safety. 2014-2015. USD \$49,336 *Evaluation of falconry as an economically viable co-management strategy to deter nuisance birds in leafy green fields* (with Michele Jay-Russell)

Research Professors for the Future. 2014- 2015. USD 3,000 plus career development training

Research Invisi-Shield Inc. & EverEdge IP. 2012-2013. Amount confidential.

Research University of Canterbury Doctoral Scholarship 2008-2011. NZD 20,000 per annum

Research Brian Mason Scientific and Technical Trust. Grant. 2009-2010. NZD 15,000

Research Canon New Zealand Environmental Grant. 2008. NZD 5,000 for field equipment

Research Montana Winery New Zealand. Donation. 2008. NZD 2,000 for radiotracking equipment

Conservation Pernod Ricard Living Land Trust. 2012-current. NZD >500,000 sponsorship

Conservation Canterbury Community Trust. 2012. NZD 3,000 for educational materials

Conservation Marlborough District Council. 2012. NZD 2,000 for CCTV equipment

Conservation Mazda Foundation Trust. 2013. NZD 2,500 for aviary and training equipment

Conservation Trustpower Community Awards. 2012. NZD 1,000 award

Teaching Experience

- 2015** Introduction to Wildlife Ecology and Conservation. Guest Lecture: “Where the wild things are, and where we’d like them to be” (Human-Wildlife Conflict). University of California, Davis.
- 2015** Ecological Intensification. Course Co-developer and Coordinator. Coordinated speakers, assignments and grading for a graduate-level course. University of California, Davis.
- 2015** Pitch Perfect: How to communicate your research to the media. Workshop Developer and Coordinator- teaching graduate students about how to speak without using jargon, the importance of relating to people, and understanding their audience.
- 2015** Introduction to Outreach Workshop. Davis Chapter of the Society for Conservation Biology. Coordinated and helped to deliver a 2-hour workshop for graduate students on the basics of developing a lesson plan for science outreach.
- 2014** Biodiversity & Agroecology. University of California, Davis. Course Developer and Coordinator. Coordinated speakers, assignments and grading for a mixed-level class that comprised of freshmen, upper-level undergraduates, and graduate students. I have designed a full syllabus for teaching this as a semester-long lecture and field-trip based course for undergraduate students in the future.
- 2014** Wetland and waterbird conservation issues in California. University of California, Davis. Guest lecture. *Ecosystem services from birds*.
- 2012 & 2013** Lincoln University Graduate Viticulture course. Blenheim, New Zealand. Returning guest lecturer. *Control of pest birds in vineyards*.
- 2011** Sustaining native biodiversity in primary production systems. University of Canterbury (FORE 444 /BIOL 379). Lecturer on this senior-level course, 4-lecture series and two field trips on interactions between agriculture and wildlife covering topics including agricultural inputs, habitat fragmentation, meta-population theory, island biogeography, functional ecology, and biological pest control. Graded relevant exam questions.
- 2011** Principles of Animal Behaviour. University of Canterbury (BIOL 272). Tutorial developer and coordinator. Approx. 100 students. Developed the syllabus for, coordinated, and delivered innovative tutorials designed to familiarize undergraduate students with primary scientific literature through new interactive pedagogy and technology. As coordinator, duties included teaching students how to prepare multimedia presentations, facilitating online submission, assisting students with problems, and communicating with the course coordinator. Graded assignments and exams.

- 2011** Wartburg College, Iowa. Field course for senior students. Designed and taught a 3-day field-course on New Zealand ecology, the New Zealand falcon, and biological pest control. Students observed falcons and birds in vineyards, collected data, toured a winery and interviewed vineyard managers, followed by instruction in data analysis and multimedia preparation.
- 2009** Diversity of Life. University of Canterbury (BIOL 113). Teaching assistant.

Teacher Training

Student, Classroom, Instructor: Strategies for aligning teaching with learning. 2015. Seminar on current teaching methodologies, including use of technology, education equity, lesson planning and aligning assessments and activities with objectives.

Professors For the Future. 2014-2015. Selected as one of three postdoctoral fellows to take part in a professional development fellowship at UC Davis.

Seminar on College Teaching. 2014. Audited pedagogy course on teaching philosophy and methodology for higher education.

Service, Outreach & Professional Development

Liceo Cientifico, Provincia Hermanas Mirabal, Dominican Republic. 2015. Lesson on 'Why farmers need biodiversity' for a high school level English class at a science academy.

Society for Conservation Biology, Davis Chapter. 2014-2015. Co-chair of the Education and Outreach committee.

Bird Education Alliance for Conservation. 2014-2016. Member-at-Large on the Executive Committee, a Partners in Flight working group.

North American Bird Conservation Initiative (NABCI). 2015. Member of the Communications team for this International, federally run, bird conservation group.

Marlborough Falcon Conservation Trust Schools Programme. 2009-2013. Designed a primary school education curriculum that I delivered annually along with the New Zealand Department of Conservation. Over 2,000 kids in our region learned about, and got to 'meet', a New Zealand falcon.

Selected Conferences and Invited Seminars

2016 UC Davis Animal Behavior Graduate Group. Invited Seminar. *Using behavioral ecology to inform conservation management of a threatened falcon species*

2016 Vertebrate Pest Conference. Newport Beach, California (March). Two presentations: "*Gopherbusters? A review of the candidacy of barn owls as the ultimate natural pest control option*" and "*Insect pest control and bird damage as a function of distance from riparian habitat in a California vineyard*"

2015 Raptor Research Conference. Sacramento, California. Invited speaker for symposium: Ecology of Island Raptors.

2015 27th International Congress for Conservation Biology. 2015.

Organizer of round-table session entitled *Risk & Reward: Learning from past mistakes to achieve conservation success*.

Co-lead on symposium entitled *Sustainability in Agricultural landscapes: linking biodiversity to agricultural practices and policy*.

Co-lead and facilitator of a half-day workshop to conduct a SWOT analysis of the viability of diversified farming systems as a biodiversity conservation strategy.

Oral presentation as part of the Agroecology session.

- 2015** International Global Challenges University Alliance Workshop: Why Wildlife? Global Opportunities and Challenges. Participant representing UC Davis. Uppsala, Sweden.
- 2015** California Cooperative Extension: Benefits of Hedgerows Workshop. Napa, California.
- 2014 & 2015** CAPCA Ed: California Association of Pest Control Advisors. Regular speaker on the benefits of birds in vineyards and how to encourage raptors to vineyards for natural pest control. Napa and Lodi, California.
- 2015** ScienceCafe. Davis, California. *Winemaker's Wingmen*. ScienceCafes are an international effort to bring scientific discussions into social, informal, public spaces. See sciencecafes.org for more information.
- 2014** Humboldt State University, Invited Seminar, Wildlife Department Seminar Series. Arcata, California.
- 2014** Ecological Society of America. Sacramento, California.
- 2014** North American Congress of Conservation Biology. Missoula, Montana.
- 2014** Sacramento State University/ United States Geological Survey. Guest Lecture in a Colloquium hosted by Sacramento State, USGS, US Fish & Wildlife Service and the California Landscape Conservation Cooperative.
- 2013** Princeton University. Princeton, New Jersey. Wilcove Lab. Invited Seminar.
- 2013** Cornell University. Ithaca, New York. Entomology Seminar.
- 2012** Marlborough Wine Research Centre. Blenheim, New Zealand. Invited Seminar.
- 2011** Society for Conservation Biology, 25th International Congress for Conservation Biology. Auckland, New Zealand. Oral presentation. Student awards finalist.
- 2011** 'Planning & Monitoring Effectiveness of Conservation Projects' short course at the ICCB. Auckland, NZ.
- 2010** Ecological Society of America, Annual Conference. Pittsburgh, USA.
- 2010** Romeo Bragato Viticulture & Oenology conference. Blenheim, New Zealand. Selected student finalist.
- 2010** International Society for Behavioural Ecology, 13th Congress. Perth, Australia.
- 2009** Australasian Society for the Study of Animal Behaviour. Albany, New Zealand. Poster. Awarded best poster presentation by a student.

Distinctions

Awarded a 2015 'Inspirational Alumni' award by the School of Biological Sciences at the University of Canterbury.

Selected to present research to the Prime Minister of New Zealand, John Key, at the opening of the new Biological Sciences building at the University of Canterbury, 2010.

Awarded the 2012 'Best paper by a PhD student' award by the School of Biological Sciences at the University of Canterbury.

Granted the 2011 Raptor Association of New Zealand 'Kestrel' award for excellence in contribution and involvement in raptor research.

Runner-up in University of Canterbury's 'PhD in 3' 2010 speaking competition (NZD 3,000); winner of 'Biology' heat and runner-up in 'Science' heat.

Other Skills

Reviewer Animal Behaviour, Austral Ecology, Crop Protection, Current Zoology, Ecology Letters, Emu, Global Ecology and Conservation, Limnology and Oceanography, Methods in Ecology and Evolution, Notornis, New Zealand Journal of Ecology, New Zealand Journal of Zoology, New Zealand Journal of Ecology, PLoS, Journal of Raptor Research, Southeastern Naturalist, Western Birds.

Media	Active outreach through social media including twitter (@sara_kross) and the <i>WildFarms</i> blog, media and communications training for graduate students.
Fieldwork	Radio telemetry, mist-netting, passerine banding and records, raptor handling, remote videography, crop damage assessments, bird count methods.
Labwork	Dissection and identification experience, capillary electrophoresis, assays, spectrophotometry, column prep and use for extractions.
Computing	Statistical packages (R), graphics and imaging software (Photoshop, Illustrator), Mapping software (ArcGIS, Google Earth), website development, databases.
Activities	Soccer, swimming, SCUBA, photography, cooking, gardening, hiking and camping.