Boarding the bus to the ASI

Report on the Second Advanced Study Institute on Mathematical Modeling in Conservation Biology at the Kenya Wildlife Service Training Institute

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In support of expanding the collaborative network and interdisciplinary knowledge base in the field of mathematical modeling of questions in conservation biology for Africans and Americans, researchers from the United States and six countries throughout Africa met in Naivasha, Kenya, from January 10-15, 2011. This second Advance Study Institute (ASI) was both a follow-up to the previous ASI held in South Africa in 2010, and a new ASI for a new cohort of students and researchers. The week was dedicated to a research-based, multidisciplinary, collaborative learning experience for graduate students from Kenya, Nigeria, South Africa, Tanzania, Tunisia, Ethiopia, and the United States. In addition, students from four project groups formed at the first ASI returned to work on their research face to face after six months of working remotely. This Advanced Study Institute (ASI) welcomed students from the fields of mathematics, ecology, conservation biology, and wildlife and natural resource management.

Researchers working in the fields of mathematical modeling and conservation biology (see list below) provided a series of lectures in population viability analysis, global climate change, harvesting, disease modeling, conservation genetics, remote sensing, reserve design, agent-based modeling and practical concerns in real-world conservation and management. These lectures established a common background among the students, while examining the range of fields pertinent to research into questions in mathematical modeling in conservation biology. These lectures were augmented with computational exercises, in multiple software platforms, giving students hands-on experience and coded examples to build on. The first evening gave us the opportunity to mingle and share research – new participants took part in a poster session, while returning groups presented their project research in progress. Inspired by presentations, new participants formed small groups in which they defined, and then pursued research into problems relevant to conservation and management efforts in Africa.

Selection of projects and the course of the research were guided carefully by the mentoring researchers (again, see list below) to encourage a diversity of concepts and ability of the outcome to inform real-world policy decisions once the research was accomplished. The student research projects included agent-based modeling of anti-poaching strategies amongst villages with human-elephant conflict, modifying epidemiological models of bovine tuberculosis in African buffalo to understand directed culling efforts in the face of different transmission scenarios, modeling population viability and management of impacts on the flamingoes in Lake Nakuru, and spatial modeling of landscape fragmentation and elephant movement corridors in Kenya. Returning students were given the bulk of the meeting time to continue working on the projects begun at the first ASI in South Africa and were encouraged to utilize available faculty to answer questions that arose during the course of their research.

Throughout the course of the ASI, returning participants were able to share experiences from their research projects with the new students and helped to mentor the newly formed groups. All participants eagerly engaged in cross-disciplinary dialogue, and were enthusiastic to learn new techniques that could be applied to their own research or challenges within their own countries. In addition to lectures and time spent on research, participants were given time to

informally discuss differences between US and African experiences in higher education. Two field trips were also taken so that African and US students could experience some of the parks and reserves near the KWSTI, including Lake Naivasha and Lake Nakuru National Park. The opportunity to observe lions, buffalo, flamingos and other "charismatic megafauna" in a wild setting gave rise to discussions on practical conservation techniques and contributed to the selection of regional-based research topics by the new participants.

All participants committed to continuing their research after the formal close of the ASI, working towards the production of a manuscript to be submitted for presentation and publication. In this way, the structure of the research experience not only expanded the students' understanding and capability within the field of mathematical conservation biology, but also continues to foster ongoing intercontinental collaborations with fellow students in hopes of generating a truly global cohort of life-long colleagues. Selected projects will be presented at this summer's meeting of SMB/ECMTB in a mini-symposium "Reports from US - African BioMathematics Initiative: Conservation Biology".

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Further details about the Second ASI in Conservation Biology are available at the website: dimacs.rutgers.edu/Workshops/ASICBII/.

List of Advanced Study Institute Researchers and Mentors: Holly Gaff, Old Dominion University; Sadie Ryan, UC Santa Barbara; David Gauthier, Old Dominion University, James Osundwa, UN Environment Programme, Kenya; Michael Washington, CDC. We were also joined by Wandera Ogana, University of Nairobi; George Owiti, Principle of KWSTI Naivasha; the Vice Chancellor of the University of Nairobi; Anotida Madzvamuse, University of Sussex.

Faculty, students and KWS Staff