

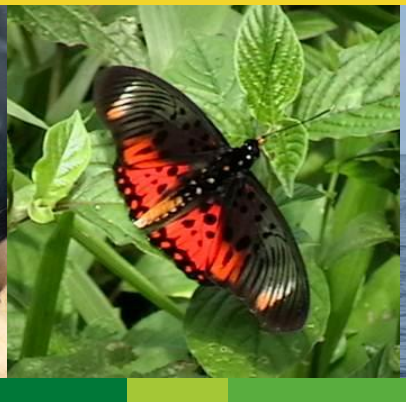


A BIANNUAL NEWSLETTER BY THE ANIMAL BEHAVIOR SOCIETY CONSERVATION COMMITTEE

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The Conservation Behaviorist

The ABS Conservation Committee

Created in 1997, the Conservation Committee aims to encourage ABS members to participate in research programs addressing the interface between animal behavior and conservation science. By identifying and evaluating the areas in which behavioral research has contributed to conservation, as well as the fields that need development, the Committee seeks to generate discussion and promote studies in behavior and conservation.

Upcoming events and programs

The 50th Annual Conference of the Animal Behavior Society will be held in Boulder, Colorado, July 28- August 1, 2013.

It's a good year for Conservation Behavior…

Conservation Behavior workshop July 28 at ABS Boulder 2013. See page 3 for details.

Conservation Behavior Symposium at ABS Boulder 2013. See page 4 for details.

Fig 1. Island Scrub-Jay (Photo Colin Woolley)

Fig 2. Island Scrub-Jay habitat (Photo Michelle Desrosiers)

Conservation meets animal behavior in the study of a rare island bird

By: Lisa Angeloni, Luke Caldwell and Michelle Desrosiers, Colorado State University

Santa Cruz Island, largest of the Channel Islands off the coast of California, is home to several unique species, including the rare Island Scrub-Jay, *Aphelocoma insularis* (Fig. 1), whose population is estimated at fewer than 3000 individuals (Sillett et al. 2012). Found only on this rugged 96-square-mile island, the Island Scrub-Jay is the most range-restricted and only island-endemic bird in continental North America. The small range of the species, recent evidence of population decline, and growing concern about its vulnerability to disease, natural disaster, and climate change prompted The Nature Conservancy and the National Park Service, who jointly manage the island, to initiate a monitoring and research program in 2008. Research in the Angeloni lab at Colorado State University has focused on one of the goals of this conservation initiative, to learn more about the reproductive ecology and behavior of this species in order to inform management decisions.

Though relatively undeveloped and unpopulated, the landscape of Santa Cruz Island was dramatically altered by cattle, feral sheep and pigs that were remnants of an earlier ranching era. Chaparral and scrub vegetation (Fig. 2), premium habitat for the Island Scrub-Jay, is slowly recovering after the removal of those nonnative ungulates. In light of the island's changing vegetative landscape, we were particularly interested in understanding the effect of habitat characteristics on reproductive behavior and breeding success of the Island Scrub-Jay.

Island Scrub-Jays are socially monogamous, though not genetically monogamous (Desrosiers et al. in prep), and breeding pairs maintain year-round and potentially lifelong territories. They build nests in shrubs and trees, females incubate 2-5 eggs per nest (Fig. 3) and both adults participate in feeding the young (Fig. 4) (Caldwell et al. in press). By monitoring territories across a range of habitat over several years, we discovered that a large fraction of nests failed at the egg and nestling stages, with over 90% of these failures caused by nest predators like the island fox, gopher snake, Cooper's Hawk, Common Raven and other Island Scrub-Jays. However, because pairs re-nested up to 6 times and produced as many as 18 eggs within a single breeding season, they were still able to fledge an average of 1-2 young per year despite high predation (Caldwell et al. in press). Habitat characteristics within a pair's territory did not affect parental behavior, such as clutch size, feeding rates, or nest attendance. However, vegetation characteristics did influence nest predation; nests that were more concealed and that occurred in territories with greater canopy cover were less likely to be depredated (Caldwell et al. in press). This suggests that continued habitat regeneration on Santa Cruz Island may improve the reproductive success of the Island Scrub-Jay by reducing predation on nests.

Fig. 3. Island Scrub-Jay nest with eggs (Photo Luke Caldwell)

In addition to high levels of nest predation, another factor that may limit population growth is that a subset of the population includes non-breeding, non-territorial "floaters", perhaps because of habitat saturation on the island. We are exploring why some individuals manage to establish a breeding territory while others do not. For example, we found that male territory holders were larger than non-territorial males, suggesting that larger males may be competitively dominant, although we did not detect behavioral dominance by larger males in our observations of agonistic interactions (Desrosiers et al. in prep). In some cases, even young birds in their first breeding season formed pairs and claimed small territories between established territories, but they were typically unable to successfully breed (Desrosiers et al. in prep). Continued exploration of environmental and life history factors that limit territory establishment and reproduction will provide important demographic data for the Island Scrub-Jay.

The overarching goal of our work on the Island Scrub-Jay has been to collect data on reproductive behavior and demography for a species of conservation concern. This information is currently being used in a population viability analysis and can inform management decision about habitat restoration and predator control, as well as more proactive options under consideration for the Island Scrub-Jay, like captive breeding, translocation, and vaccination (Morrison et al. 2011). Typical of research at the conservation-behavior interface, a critical element of our work has been the involvement of scientists with diverse expertise, including Dr. T. Scott Sillett at the Smithsonian Migratory Bird Center, Dr. Scott Morrison at The Nature Conservancy, Dr. Victoria Bakker at Montana State University, Dr. Cameron Ghalambor, Dr. Chris Funk and Katie Langin at Colorado State University, and the many other biologists who are invested in the conservation of the Island Scrub-Jay.

Fig. 4. Island Scrub-Jay nestling (Photo Michelle Desrosiers)

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Sillett TS, Chandler RB, Royle A, Kéry M, Morrison SA. 2012. Hierarchical distance-sampling models to estimate population size and habitat-specific abundance of an island endemic. *Ecological Applications* 22, 1997-2006.

TWO BIG CONSERVATION BEHAVIOR EVENTS

AT THE 50TH ANNUAL ANIMAL BEHAVIOR SOCIETY MEETING

THE CONSERVATION BEHAVIOR WORKSHOP – Sunday, 28 July

Bruce Schulte & Misty Mcphee, Organizers

"There is often a lack of communication between the fields of conservation and animal behavior. To bridge this gap, we will be conducting a one-day workshop aimed at applying behavioral theory and research to solving real-world conservation problems. The workshop will provide a unique and valuable opportunity for the practitioners to learn about the challenges and rewards of applying behavioral biology in the field. Ideally this two-way interaction will inspire future research and networking to aid in solving the increasingly complex problems of real-world conservation. Three conservation problems for which a behavioral approach is likely to facilitate solutions will be presented by wildlife managers at the beginning of the day. We will then break out into focus groups and discuss potential solutions. At the end of the day we will regroup, report on the potential solutions and identify commonalities that may be applicable more broadly to other systems. New collaborations between wildlife managers and animal behaviorists are expected to emerge from this workshop.

Schedule:

10:30 am: Introduction to Workshop. M. Elsbeth McPhee.

11:00 am: Human wildlife conflict - influence of anthropogenic and natural food resources. Heather Johnson, Colorado Parks & Wildlife

11:15am: Management of protected bird species at the Vancouver airport. David Bradbeer, Vancouver Airport

11:45am: Sea otter and commercial fisheries regulation in Alaska on black bear behavior and demography. Verena Gill, US Fish & Wildlife Service

12:15pm: Human wildlife conflict - Coyotes and bicycles. Valerie Matheson, Urban Wildlife Conservation Coordinator, Boulder

12:45pm - 1:30pm Lunch Break

1:30pm: Breakout sessions (facilitator, room)

1. Black bears (ME McPhee, west ballroom)
2. Birds /airport (B Schulte, UMC247
3. Otters /fisheries (R Swaisgood, UMC382/6)
4. Coyotes /bicycles (R Buchholz, Aspen rooms)

3:20pm-3:45pm: break

3:45pm-5pm: Session reports and wrap up

Contributed Symposium 1: Trends in Conservation Behavior – Monday 29 July 2013

Esteban Fernandez-Juricic & Bruce Schulte Organizers

SPEAKERS	AFFILIATION
Brad Blackwell	USDA
Daniel Blumstein	UCLA
Steven Cooke/ Connie O'Connor	Carleton University, Canada
Andy Sih	UC Davis
Craig Willis	University of Winnipeg, Canada

Conservation behavior is the application of knowledge of animal behavior to solve wildlife conservation problems. This discipline has made important empirical contributions to multiple conservation aspects, from captive breeding to managing interactions between humans and wildlife. This symposium will address the future of conservation behavior in the next decade. Early and mid-career researchers from academia and environmental agencies will address the novel conceptual frameworks that apply behavior to conservation biology and the new methodological tools used to solve challenging conservation problems that involve animal behavior. One of the goals of the symposium is to develop a list of basic behavioral problems that need more research that would facilitate their application to wildlife management problems (e.g., habituation).

An Interview with a Conservation Biologist – Whit Gibbons, Ph.D.

For approximately 18 years, Dr. Whit Gibbons has been a Senior Research Ecologist at the Savannah River Ecology Laboratory (SREL), Head of SREL's Environmental Outreach and Education Program and a Professor of Ecology at the University of Georgia. His research has focused on the population dynamics and ecology of aquatic and semi-aquatic vertebrates, involving detailed population studies of fish, amphibians, and reptiles, particularly turtles and snakes. A primary objective has been to determine functional relationships between population parameters (e.g., survivorship, reproductive output, dispersal rate) and both natural and human-influenced habitats and environmental conditions. Recently, his research has expanded into Conservation Behavior. The Conservation Behaviorist spoke to Dr. Gibbons about his studies in this area and how he views the emerging field.

CB: What has inspired your efforts to work at the interface of animal behavior and conservation?

WG: Many conservation efforts are in response to detrimental effects of human activities that occur because of conflicts with the innate behavior of different species that clash with abrupt environmental alterations for which a species has no evolutionary background. Programmed animal behavior such as seasonal migratory, reproductive, and feeding patterns can often be maladaptive for animals living in modified and degraded habitats, and their behavior must be factored in to many conservation efforts.

CB: In 2008, you published the article: "How Do Highways Influence Snake Movement? Behavioral Responses to Roads and Vehicles." The purpose of this study was to gauge the response of particular species of snakes to both a road and a vehicle. Since roads and vehicles have significant and adverse impacts on wildlife and ecosystems, your research has implications for conservation-based planning. Would you describe briefly how you conducted this study?

WG: This study was designed and conducted by one of my graduate students at SREL, Kimberly Andrews, who ultimately received her Ph.D. in Ecology from UGA. The basic method for the study was to release a snake at the edge of a road while the investigators were concealed from view and then record the snake's directional angle across the road and the time to cross the road (or its avoidance of the road entirely). In a separate test, the response of an individual snake to a passing vehicle when on the road was determined.

Photo by: J.D. Wilson

CB: Later in the article you describe how "road ecology" is a growing field of interest. Would you describe this field?

WG: Road ecology is simply the study of the features of roads, such as habitat location, width, traffic patterns, and many other road variables that affect animal responses. It also involves determining how critical various factors of a species' ecology and life history are affected, such as mortality and survivorship, disruption of migratory routes, impacts on reproduction, and many other features of the ecology and life history of various species.

CB: In this study you used a model incorporating interspecific crossing speeds and angles. Would you explain how you developed this model and what specifically it was designed to model?

WG: One of the most important models from Dr. Andrews' study and that was in the papers we co-authored together was that the speed at which certain snake species crossed roads (which were determined from field experiments) and their response to a passing vehicle determined the probability of an individual being killed while crossing at different traffic densities. The model can be used to predict the population half-life for species in an area based on the levels of road avoidance, speed of crossing, and traffic density.

CB: What were your major findings from this study?

WG: In short, a major finding from the studies was that America's road system is devastating to snake populations in almost all parts of the country because snake's cross perpendicularly to a highway (causing maximum body exposure for an oncoming vehicle) but that most species move too slowly to safely cross in high traffic density areas. Another finding was that significantly more male snakes of most species examined, based on a sample size of more than 15,000 snakes of 35 species, are killed on roads than females. The assumption is that males encounter roads more often because they travel greater distances and more frequently in search of females during mating seasons. However, road mortality on female snakes can high enough to cause severe impacts on snake populations in some situations.

CB: You conclude that the results obtained for the particular species of snakes in this study cannot be generalized to other species of snakes.

Many of the conclusions actually can be generalized to other species of snakes, although each species must be examined in the context of its own behavior and activity patterns for certain aspects. The movement of snake's perpendicular to a highway is expected to be a universal finding for all species. Likewise, the model that crossing speed vs. traffic density is applicable to all species of snakes.

CB: Have these findings been applied to conservation related planning and wildlife management?

WG: The model mentioned above is an important one that deserves to be applied by highway planners and wildlife managers. They have not been to date, although the opportunities exist, if transportation departments, developers, and other agencies and organizations that have negative impacts on the environment would provide the research funds for proper research to be done. The findings from the snakes/roads studies (as is true for many faunal groups) should be considered each time a road is being planned that will use public funds.

Whit Gibbons of the University of Georgia's Savannah River Ecology Lab with a Canebrake Rattlesnake (*Crotalus horridus*), one of the species used in road ecology research and conservation programs to determine the impact of the nation's highways on snakes.

CB: You describe road development could lead to the local extinction of some species that are highly sensitive to roads if measures are not implemented to minimize the impact. Would you be able to name a few particular measures that have been, or will be, implemented to minimize impact to specific species?

WG: Probably the simplest measure that could be done with all new road systems being developed and retrofitted to many old ones is the use of wildlife tunnels that let animals get from one side to the other. The research necessary to implement these measures should be supported for all public road systems throughout the country.

CB: If you had the time to do further work in this area, where would you focus?

WG: The most important directions today are related to conducting research on newly developed roads to determine the most effective mitigation measures. Wildlife tunnels, signage, regional education programs, highway speed controls, and other forms of mitigation or even amelioration need to be tested comparatively in different regions. No new highway in the United States should be allowed to be built without a thorough assessment of what the impacts of road kills and fragmentation will be on animal populations.

CB: In what ways do you find animal behavioral studies currently offer valued contributions to wildlife conservation initiatives in the field? How could these contributions offer more value in the future?

WG: Animal behavior research is essential for understanding the complete biology of any animal species and is critical for wildlife conservation initiatives. Field, in contrast to laboratory, experiments, would greatly enhance behavioral insights for most species.

CB: Generally speaking, what further research do you believe would be most beneficial for scientists to conduct at the animal behavior level that could contribute to conservation efforts?

WG: Knowing the patterns of animal behavior for particular species under natural conditions and what the range of variability for these behaviors are within the context of natural habitats and those modified by anthropogenic changes is vital for conservation efforts and habitat management. The only way to alter how human changes will affect a species, beneficially or detrimentally, is to know how the species will behave under natural and altered situations.

For the full story see Andrews, K.M., Gibbons, J.W., and Reeder, T. W. (2005). How do Highways Influence Snake Movement? Behavioral Responses to Roads and Vehicles. *Copeia*: December 2005, Vol. 2005, No. 4, pp. 772-782. Retrieved online: http://www.asihcopeiaonline.org/doi/abs/10.1643/0045-8511%282005%29005%5B0772:HDHISM%5D2.0.CO%3B2

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HYBRIDIZATION WITHIN CANINE SPECIES:

The Problem and Its Implications for Conservation Behavior Research

By: Elizabeth Peterson

Hybridization threatens the survival of many species in the wild,[1-2] but is especially problematic for rare endangered species. Many species are now threatened by hybridization where habitat ranges have been significantly reduced, forcing species that were once isolated from one another to co-exist and either outcompete one another or interbreed.[3] Several factors have contributed to hybridization, including habitat fragmentation, introduction of invasive species, and habitat changes. As humans continue to alter natural environments, hybridization will become more prevalent and likely more problematic[1]. Thus, research is needed to understand the effects of hybridization on species persistence and the mechanisms that influence it.

The presence and impact of canine hybrids has been wildly debated within conservation research and the political community. Recent developments in genetic screening have made it apparent that coyotes, wolves and domesticated dogs are interbreeding in different parts of the United States.[4-5] One area where more research is desperately needed is the impact of hybridization on the behavior of coyote and wolf species, which may greatly impact the evolution of these species and their ability to survive in the ever-changing landscape of the United States.

Wild populations of wolves hybridize with coyotes and domesticated dogs; this is incredibly detrimental to efforts to recover wolf populations. The movement of dog and coyote genes into wolf populations can cause an increase in aggressive behaviors and a reduction in viability with natural populations.[5-6] Hybridization between these species may also induce significant changes to behaviors that are important for social interactions, hierarchies, and mating systems.

Wolves and coyotes are ecological competitors, meaning that they will compete for resources in the same habitats; therefore, hybridization would not be expected.[2] The development of pre-zygotic reproductive barriers would, theoretically, eliminate hybridization between competing species.[2.6] However, fertile offspring between wolves and dogs, dogs and coyotes, and coyotes and wolves have been observed in both laboratory conditions and field observations.[2.6] Similar to mixed breed domesticated dogs, there is substantial phenotypic variation in hybrids of wild species of canines, which makes identifying hybrids difficult without the use of scat genetic analyses.[2] Weights, pelage, and color are variable depending on the parental sires, particularly if they were sired from domesticated dogs of variable breeds.[7-8]

Coyotes have hybridized with domesticated dogs, producing fertile offspring in the wild.[2] Coyote-dog hybrids, referred to as coydogs, may be unable to coexist with coyote populations, as they compete for the same food resources and may not be well adapted for survival in harsh winter conditions.[7] Direct observations of coydog behavior have been conducted in laboratory conditions and have shown that the timing of the mating season for these animals is highly variable. One study found a markedly earlier mating season[8] and another showing a later shift.[9] More research is needed to determine whether a shift in reproductive timing will influence fitness in these animals.

While there is substantial variation in the behavior of wolf-coyote hybrids as well, they are impossible to distinguish from wolves if using morphology alone.[4] In wolf-coyote hybrids, Ryon et al.[10] have found marked differences between male and female social hierarchies, in a similar pattern to coyotes and hunting dogs. Male hybrids exhibit lower levels of aggression when they live exclusively with other males.[10] Female hybrids showed more social display, howling, and scent marking, particularly in the presence of males.[10] In pure wolves, age-dominant organization is quite complex with an alpha male at the top of the hierarchy in the pack, mated pairs, same-sex relationships, and familial relationships.[11] If levels of aggression are heightened or decreased in coyote-wolf hybrids, then this could disrupt the social organization of the pack and hamper other behaviors that are essential for survival, such as cooperative hunting and the cohesiveness of the pack.

Because of common evolutionary origin, similarities in behavior exist in play and agonistic interactions among the canine species.[12] However, hybridization between the species may be modifying those behaviors that have enabled the wolf and coyote species to successfully coexist and survive prior to human disturbance. Changes in behaviors that are important for survival may have major consequences for the species including effects on their reproductive fitness and whether they can persist as separate species. Further research is needed to shed light on the impact of hybridization on canine behavior and its implications on the conservation of wolves and coyotes.

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Send letters, announcements, comments and contributions to: The Conservation Behaviorist dmshier@ucla.edu. Deadlines for articles are the 15th of the month preceding the next news update. The next deadline is October 15th. Contributions submitted by members of the Animal Behavior Society and judged by the Conservation Committee to be appropriate will be published in the Conservation Behaviorist. The publication of such material does not imply ABS or the Conservation Committee endorsement of the opinions expressed by contributors.

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