THURSDAY, 4 FEBRUARY 2016		
Senate **15:40 - 17:40**	**L.3: Conservation Planning** (Chair:)	
15:40	**L.3.1: Bartuszevige**	**Using Landscape Design to Develop a Waterfowl Conservation Plan** (Anne M. Bartuszevige*, Alex Daniels, Kyle Taylor)
16:00	**L.3.2: Fleming**	**Decision Support for Land Acquisition in the National Wildlife Refuge System** (Kathleen Fleming, Keenan Adams, Sean Fields, and Ken Fowler)
16:20	**L.3.3: Doherty**	**Building the Foundation for International Conservation Planning for Breeding Ducks Across the US and Canadian Border** (Kevin E. Doherty*, Jeffrey S. Evans, Johann Walker, James H. Devries, David W. Howerter)
16:40	**L.3.4: Laing**	**Waterfowl Brigades: Preparing the Next Generation of Conservationists** (Jared D. Laing*)
17:00	**L.3.5: Devney**	**Contract, Farm and Farmer Influencers on CRP Enrollment Decisions** (John Devney*, Neeraj Dhingra, William Lesch, David Roberts, Cheryl Wachenheim)
17:20	**L.3.6: Ringleman**	**Estimating Carrying Capacity at Local Scales: A Case Study from Forsythe National Wildlife Refuge** (Kevin M. Ringelman*, Christopher K. Williams, Paul Castelli, Mason L. Sieges, Rebecca Kern, Ted Nichols, Steve Earsom)

L.3: Conservation Planning (Chair:)

L.3.1: Bartuszevige

Using Landscape Design to Develop a Waterfowl Conservation Plan

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Despite our best efforts, we are still losing wetland habitat at an alarming rate. Traditionally, we create conservation plans that reflect what the landscape and habitats once were; our intent is to go back to some arbitrary point in time. However, a rapidly changing climate has forced us to look forward and try to predict where conservation will be most needed in the future. Landscape design is a relatively new concept in the landscape ecology literature; it uses the science of landscape ecology (e.g., understanding pattern and process) to design landscapes that will meet conservation goals and provide for societal needs. The Playa Lakes Joint Venture has adopted a landscape design approach to update their conservation planning for playas to support stated NAWMP continental waterfowl goals. With input from partners, we hypothesized on the important drivers that would effect change on the landscape, modeled current and future scenarios, identified playas where conservation effort would best be spent and, with the broader partnership, identified conservation opportunities to bring the design to fruition. Our partnership identified tillage likelihood, wind energy development, oil and gas development, High Plains Aquifer depletion and climate change as the most important drivers in the western Great Plains. We developed tillage likelihood, wind development risk and oil and gas development risk models, based on published models. To understand climate impacts to agriculture in the region, we used National Agriculture Statistics Service crop data and World Bank data. The result is a cutting edge, progressive plan that allows our partnership to envision a future of playa conservation and achievement of the new NAWMP waterfowl goals, which spurred the development of innovative conservation opportunities.

L.3.2: Fleming

Decision Support for Land Acquisition in the National Wildlife Refuge System

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One of the 3 primary conservation goals of the USFWS National Refuge System's (NWRS) new strategic growth policy is to acquire lands that contribute to the waterfowl population objectives of the North American Waterfowl Management Plan (NAWMP). We discuss the ongoing development of a science-based decision support tool (DST) to prioritize land acquisition to achieving NAWMP continental population objectives, and associated step-down objectives of the Migratory Bird Joint Ventures (JVs). This process consists of several steps. First, an interim decision tree was developed through collaboration with USFWS Migratory Bird Program staff, utilizing a combination of waterfowl

survey data and population/habitat models to characterize landscapes in the US in terms of their potential to support populations of high-priority waterfowl species. Ranking criteria for breeding populations were based on waterfowl abundance; criteria for migrating/wintering populations were based on an index of harvest. Second, JV expertise was solicited through a structured decision making process and subsequent meetings with JV science coordinators, to refine ranking criteria and identify potential conservation planning datasets which could be incorporated into the tool as surrogates for abundance. These included food energy by land-cover type and wetland density. Third, collaborative data sharing relationships will be established between NWRS and the JVs, to provide ongoing data support for future funding allocation decisions. By leveraging JV expertise and data, the NWRS can acquire land more effectively to benefit priority waterfowl species in the US.

L.3.3: Doherty

Building the Foundation for International Conservation Planning for Breeding Ducks Across the US and Canadian Border

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We used publically available data on duck breeding distribution and recently compiled geospatial data on upland habitat and environmental conditions to develop a spatially explicit model of breeding duck populations across the entire Prairie Pothole Region (PPR). Our spatial population models were able to identify key areas for duck conservation across the PPR and predict between 62.1 – 79.1% (68.4% avg.) of the variation in duck counts by year from 2002 – 2010. The median difference in observed vs. predicted duck counts at a transect segment level was 4.6 ducks. Our models are the first seamless spatially explicit models of waterfowl abundance across the entire PPR and represent an initial step toward joint conservation planning between Prairie Pothole and Prairie Habitat Joint Ventures. Our work demonstrates that when spatial and temporal variation for highly mobile birds is incorporated into conservation planning it will likely increase the habitat area required to support defined population goals. A major goal of the current North American Waterfowl Management Plan and subsequent action plan is the linking of harvest and habitat management. We contend incorporation of spatial aspects will increase the likelihood of coherent joint harvest and habitat management decisions. Our results show at a minimum, it is possible to produce spatially explicit waterfowl abundance models that when summed across survey strata will produce similar strata level population estimates as the design-based Waterfowl Breeding Pair and Habitat Survey (r^2 = 0.977). This is important because these design-based population estimates are currently used to set duck harvest regulations and to set duck population and habitat goals for the North American Waterfowl Management Plan. We hope this effort generates discussion on the important linkages between spatial and temporal variation in population size, and distribution relative to habitat quantity and quality when linking habitat and population goals across this important region.

L.3.4: Laing

Waterfowl Brigades: Preparing the Next Generation of Conservationists

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Hunter numbers are declining at alarming rates. At the same time, an increasingly urban population with a lack of understanding for the natural world and how it functions is now the norm. Over 20 years ago Bobwhite Brigades was created to address both of these issues, and today continues strongly with 5 camp themes covering bobwhite, bass, buckskin, ranch, and waterfowl. It is a hands-on, wildlife intensive, youth leadership development camp that strives to put conservation leaders in every community. The motto for Brigades is, "tell me and I forget, show me and I understand, involve me and I remember." That theme is central in all camps and they strive to put conservation professionals presenting information to kids from ages 13-17 every summer. The waterfowl brigades was developed five years ago and covers information on all topics relevant to waterfowl conservation. Topics covered include all aspects of biology, ecology, and management, along with shooting and hunting. A strong emphasis is put on habitat management in Texas, including plant identification and the concepts and principles of moist soil management. It is like an entire college level course presented in 5 days. A typical day at camp starts at 6:00am and isn't over until midnight at the earliest. Along with the science, the kids are involved in leadership and team-building exercises throughout camp. The kids are all presented with the opportunity to return for a waterfowl hunt the following winter as well, and many are still hunting today. These youth will be leaders in our community in the future, and whether they stay with hunting or not, or pursue a degree in natural resource management or not, they are well aware of the challenges in the conservation world and will use this knowledge to assist them in decision making throughout their life.

L.3.5: Devney

Contract, Farm and Farmer Influencers on CRP Enrollment Decisions

John Devney[1]*, Neeraj Dhingra[2], William Lesch[3], David Roberts[3], Cheryl Wachenheim[3]

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The Prairie Pothole Region (PPR) of the United States including parts of Montana, North Dakota, South Dakota, Minnesota and Iowa is the most important waterfowl production area in North America, covering approximately 185,000 square miles of wetlands. It is a rich habitat of many species although nearly half of the prairie potholes and surrounding grasslands have been converted for production. Fluctuations in commodity prices have been presented as the primary cause for this land-use turnover, including of land prior-enrolled in the Conservation Reserve Program (CRP). Program contract design and other factors also influence program enrollment decisions. To better understand this relationship, interviews were conducted with 87 farmers and ranchers throughout the PPR. Detailed feedback was gathered about the CRP and other programs and practices that influence waterfowl habitat in the region. A choice experiment was conducted

during the interview process to specifically assess farmer design preferences for CRP contracts. An increase in the maximum allowable payment, length of contract, and the government's share of establishment cost increased intended enrollment, whereas, a fixed-term contract length and imposing land use restrictions on enrolled land decreased intended enrollment. Relative importance of contract attributes depended on farm and farmer characteristics and farmer attitudes and behaviors. For example, interviewees who expressed specific concerns in response to an open-ended question about the CRP including: differing guidelines for maintenance, inconsistent eligibility criteria, rules for mid-term management, and contract terms were less likely to enroll in CRP. Key lessons from the research include that (1) the right to hay or graze contract land is important for farmers in the region, particularly those with livestock; (2) an adjusted payment scheme may increase enrollment; (3) rental rate is important; and (4) farmer concerns can help explain program enrollment. A mail survey to 5,000 PPR landowners followed the interviews. It is currently underway; and the forthcoming data is expected to strengthen and broaden that from the interviews.

L.3.6: Ringleman

Estimating Carrying Capacity at Local Scales: A Case Study from Forsythe National Wildlife Refuge

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The management of North American waterfowl on the wintering grounds is based on the premise that the amount foraging habitat can limit populations. To estimate the carrying capacity of winter habitats, managers use bioenergetic models to quantify energy (food) availability and energy demand, and use these models as planning tools to meet regional conservation objectives. Regional models provide only coarse estimates of carrying capacity because habitat acreage, habitat energy values, and temporal trends in population-level demand are difficult to quantify precisely at large scales. Here, we take advantage of a wealth of detailed data collected on American Black Ducks (*Anas rubripes*) at Forsythe National Wildlife Refuge, New Jersey to create a detailed local model of carrying capacity. We used a meta-analysis of >2200 core samples collected from Atlantic coast habitats to estimate food supply and we used 24-hr black duck time budgets to estimate daily energy expenditure. We then estimated population-level energy demand by scaling a ground-survey-based migration curve to fit mid-winter waterfowl survey and aerial transect survey data. We also built migration curves and coarsely estimated population energy demand for other waterfowl to create a complete local carrying capacity model. Our results show that peak abundances of waterfowl in November approach the local carrying capacity of Forsythe refuge. This model allows for relative assessment of biases and uncertainties in carrying capacity modeling, and serves as a framework improving local and regional waterfowl management tools.