

June 4, 2016

Chair Brian Yablonski and FWC Commissioners
Florida Fish and Wildlife Conservation Commission
620 South Meridian Street
Tallahassee, Florida 32399-1600

Dear Chair Yablonski and FWC Commissioners:

On January 11, 2016, we were among a group of biologists and representatives of the Florida Wildlife Federation that met with FWC staff to discuss the 2015 black bear hunt. Our hope was to provide input to potential future hunts, understand the FWC protocol for harvest limits and generally discuss the methods in which the 2015 hunt, and future hunts would be carried out. As a follow-up, we submit the following letter in the interest of helping the agency make science-based decisions regarding this issue.

The most oft-cited criticism among wildlife professionals was that data were lacking to support the 2015 bear hunt and harvest objectives. We commend FWC for their effort to update the statewide bear population and density estimates, which have been collected using up-to-date, rigorous methods (Humm et al., 2015, 2016). The results suggest that the state's black bear population has increased since the last estimate was gathered in 2003 (Simek et al., 2005). However, as good as these are, they lack enough of the right kind of information to indicate the maximum sustainable harvest rate that will maintain stability of these populations. Here, we explain our conclusion by examining the population data that are currently available. We recommend additional data collection and population modelling in order to inform management decisions moving forward.

We believe that a more focused effort at understanding the effects of harvest, using rigorous population assessments and population modeling, is necessary. In Florida, we see these analyses conducted on an annual basis for game fish species like red drum, snook and spotted seatrout (Chagaris et al., 2015). The field work, data collection, and statistical analyses required for these stock assessments are conducted by FWC biologists under the auspices of the Fish and Wildlife Research Institute. Because of the intense public scrutiny, and particularly because of its role as an umbrella species, we recommend that similar analyses be conducted for the Florida black bear. We also recommend that FWC establish a system of bear sanctuaries where bears in core habitat would be protected from hunting. The purpose of the sanctuaries is to provide protected source populations in which reproductive rates and survival will be maximized.

IMPORTANCE OF DEMOGRAPHIC MODELS TO SET HARVEST OBJECTIVES

The prevalence of population viability analysis is a testament to its effectiveness in helping states and provinces manage bear populations. Individual bear populations are subject to varying pressures from roadkill, the development of habitat, mast failures, and flooding. In the southeastern United States alone, Virginia (Bridges, 2005), Arkansas (Clark and Eastridge, 2006), Louisiana (Laufenberg et al., 2016), Kentucky (Murphy et al., 2016), and Tennessee (S. Murphy, personal communication) have each instituted demographic monitoring projects to provide managers with accurate information on bear population dynamics and trends. We anticipate FWC will implement its own version of these studies as recommended in the current bear management plan.

It is important to address the meaning of the term “stable,” as it relates to population biology: a stable growth rate suggests a population for which birth rates are equal to mortality rates such that each individual will merely replace itself (growth rate = 1). A growth rate < 1 indicates that each individual will not replace itself and the population will decline. A growth rate > 1 indicates that each individual will do more than replace itself and the population will grow. Demographic data, meaning *age-specific survival and reproductive rates*, are required to estimate population growth rates, assess which age classes play the greatest role in determining population growth rates, and simulate the effects of increased mortality, to which hunting contributes. Population size and density estimates alone are insufficient metrics for setting harvest objectives if the objective is to maintain stable populations because they do not account for dynamic trends at work in any given population.

We believe that detailed demographic data should be collected in each hunted Bear Management Unit (BMU) before hunting continues in that BMU. In addition to population size and density, managers should be aware of sex and age class ratios within each black bear subpopulation. A biologist preparing to describe the status and resiliency of a given bear population should know the answers to the following questions:

- How many adult females are present in a given subpopulation?
- What proportion of the subpopulation are juvenile males?
- How many cubs are born each year?
- Of these cubs, how many are surviving to the age of first reproduction (recruitment)?
- What are annual survival rates for adult females and cubs in each subpopulation?
- What are overall mortality rates across each subpopulation?
- What are the specific causes of mortality?

Each of these metrics is important for making informed predictions about the ability of hunted populations to respond to increased mortality. Standard methods of data collection would include radio-telemetry monitoring, mark-recapture, and winter den checks. Mark-recapture methods currently used to estimate population size should be expanded to include estimates of survival, per capita recruitment, and genetic exchange for future viability analyses. FWC biological research staff understands the need to address these questions and have obtained some of the relevant data for the Central BMU. With the exception of the Central BMU, there are scant data or analyses available for the remainder of the hunted subpopulations in the state, including North Florida (Dobey et al., 2005), East Panhandle, and South Florida. None of the data collected to date in these three BMUs provide the demographic data necessary to determine the maximum sustainable harvest.

FWC's CURRENT APPROACH TO DEFINING HARVEST LIMITS

How did FWC determine the harvest objectives for bears in each hunted BMU in 2015? The objectives were based primarily on the assumption that a bear population can withstand 20-25% annual human-caused mortality and still maintain a stable population (Bunnell and Tait, 1980). The FWC harvest objective was calculated as the difference between 20% and other sources of mortality (roadkills, nuisance bear kills, poaching, etc.). For example, if it is estimated that there is a 13% annual mortality rate from these sources then an additional 7% can be removed from the population by hunting and still maintain a stable population. In our opinion, this approach for setting harvest objectives (rather using actual demographic data from the BMUs) is flawed and can lead to significant overestimates of allowable harvest. Therefore, the goal should be to make management decisions based on current demographic information and population viability modelling for each subpopulation.

CENTRAL BMU POPULATION ANALYSES

We illustrate our point with data from the central BMU. Prior to the recent bear hunt, both Hostetler et al. (2009) and Garrison et al. (2007) evaluated demographic patterns for subpopulations within the Central BMU. Hostetler and coauthors incorporated data from Garrison et al. (2007) to examine the effects of various levels of bear removal rates on population growth in order to simulate the effects of increased mortality in two subpopulations within the Central BMU. Both analyses were based on telemetry studies, using radio collars to track a portion of each population (including cubs), the mortality documented throughout their field work, and its various causes.

Application of the demographic data and models published in Hostetler et al. (2009) show a maximum sustainable harvest rate in the Central BMU between 0% and 4% for maintaining population stability. Based on the 2015 population estimate (N = 1296) delivered by University

of Tennessee biologists (Humm et al., 2015), this equals a maximum allowable harvest of 52 adults and yearlings. This rate is notably lower than the harvest objectives of 100 bears (8% harvest rate) set by FWC in 2015. Further, the actual take from the 2015 hunt exceeded the objective (N=143), resulting in an 11% removal rate. The health of the bear population is determined not only by the removal rate but also by other sources of mortality. It should be noted that in the Central BMU roadkills, euthanized bears, illegal killings, and unknown causes resulted in 126 mortalities in 2015, irrespective of harvests through legal hunting. When the 2015 harvest total is combined with other known 2015 bear mortality in the Central BMU, the population is estimated to have lost at least 265 individuals, for a 20% mortality rate. This is *five times* the maximum sustainable rate for maintaining a stable bear population in the Central BMU, according to Hostetler et al. (2009). Multiple researchers have described scenarios where states with aggressive removal and harvest regimes (e.g., Arkansas) (harvest objectives $\geq 20\%$) destabilized large bear populations, leading to rapid declines (Howe et al., 2007, Clark et al., 2010).

A closer investigation of the data and the location of the 2015 harvest reveals more troubling results. There were 54 bears harvested from Ocala National Forest (a subpopulation of the Central BMU), where Humm et al. (2015) estimate a population of 373 individuals. Again, this harvest rate of about 14% far exceeds Hostetler and coauthors' recommended removal rates for maintaining stable population growth (1-10%, or 5-37 bears, based on the Humm et al. population estimate). Thus, the data and analyses presented by Hostetler et al. (2009), Garrison et al. (2007) and Humm et al. (2015) do not support another Florida black bear hunt in the Central BMU at current levels. Allowing the overall hunt to continue as it did in 2015, with the harvest of nearly 300 bears, and the continuing high rate of roadkill, lethal control by wildlife managers, and poaching, may well plunge multiple subpopulations into sharp decline, as it has done in other states with similarly structured hunts (Howe et al., 2007, Clark et al., 2010). Furthermore, the Hostetler et al. study cautions that their population models do not consider stochastic events (random processes) such as prolonged drought, acorn/mast failure, and disease that can reduce survival and reproductive rates (and population growth rate) in any given year below replacement level. When these factors are taken into account, long-term growth rates of the study population are likely to be even lower than reported and sustainable removal rates even less.

GUIDANCE FROM THE 2012 BEAR MANAGEMENT PLAN

The most recent and significant step in management action on the part of the state was the publication of the 2012 Florida Black Bear Management Plan, which coincided with the removal of the bear from the Threatened list. The Plan was developed through an exhaustive public process between 2008 and 2012. The overarching objective of the Plan is to *maintain a sustainable statewide population of Florida black bears in suitable habitats throughout Florida*

for the benefit of the species and people (FFWCC 2012; p. 33). Also consistent throughout the Plan is a clearly, repeatedly stated objective to facilitate genetic exchange among subpopulations by “creating functional landscape connections among them.” The conservation community was involved in shaping the 2012 plan through the Technical Assistance Group and we were pleased to see the emphasis placed on functional connectivity to benefit the more impoverished bear subpopulations in Florida, such as those at Chassahowitzka, in Highlands and Glades Counties, and at Eglin Air Force Base.

FWC has produced no comprehensive revision to the current bear management plan that identifies a need to introduce hunting to any given subpopulation, nor has it explained how that change in management approach will impact the smaller subpopulations. It would appear that the harvest objectives as they now stand do not promote genetic diversity within and among the subpopulations. The objectives for connecting subpopulations of Florida black bear were key elements of the bear management plan. Since hunting was not specifically accounted for in the plan, efforts associated with land conservation and management of existing and potential bear habitat would seem to be imperative to a comprehensive plan to enhance genetic connectivity between subpopulations. Prior to initiating future hunts, FWC should evaluate the goals and objectives for protecting and enhancing habitat between subpopulations with the specific intention to assure a stable, connected, statewide population of bears.

BEAR HABITAT AND CONNECTIVITY

The fragmented arrangement of bear populations throughout Florida presents a daunting challenge, particularly considering the current and projected growth of the human population in the state (Cerulean, 2008). Habitat loss and fragmentation, the threat of future habitat change, and the resulting impacts on the Florida black bear remain primary threats to the species in the long term (Dixon et al., 2007). We recognize that monitoring the changes in habitat availability for each subpopulation is a high priority for FWC and we encourage the continuation of those projects. The increase in the overall statewide population should not obscure the fact that multiple bear populations in the state remain isolated, genetically impoverished, and at risk. Both Chassahowitzka (Big Bend BMU) and Highlands/Glades County (South Central BMU) are likely to go extinct without intervention that restores landscape connectivity with other, larger populations (Maehr et al., 2001).

To investigate connectivity and gene flow we support expanding the non-invasive hair trapping project to monitor transects in corridors between the respective primary ranges of the subpopulations. Dixon et al. (2006) demonstrated the effectiveness of this methodology and documented a functional genetic connection between populations in the North and Central BMU, which were previously isolated. We suggest prioritizing the connections between at-risk

populations and those populations with higher genetic diversity; between Apalachicola National Forest (high genetic diversity) and Eglin Air Force Bases (low genetic diversity); between Chassahowitzka Wildlife Management Area (low genetic diversity) and Ocala National Forest (high genetic diversity); and between Big Cypress National Preserve (high genetic diversity) and Highlands/Glades counties (low genetic diversity).

Establishing monitoring regimes and developing annually-adjustable metrics is useful for making informed predictions about the ability of hunted populations to respond to increased mortality pressure. In addition, regional biologists and conservation property managers in charge of planning habitat management activities and hunting regulations on their properties benefit from having frequently updated information from monitoring programs.

ESTABLISH A SANCTUARY SYSTEM

We recommend that FWC establish a black bear sanctuary system throughout the state with protected areas (no hunting) in each of the BMUs. The purpose of these sanctuaries is to protect core habitat with a breeding nucleus of female bears on well-managed public land where reproduction, recruitment, and survival rates are maximized. Such a sanctuary system would provide for the long-term stability of Florida's black bear population. In Florida, we propose that federal lands such as the National Forests of Florida (Apalachicola, Ocala, and Osceola) encompassing 1.25 million acres, Big Cypress National Preserve (729,000 acres), and Department of Defense lands be designated as black bear sanctuaries. Bear hunting could occur outside of the sanctuaries where appropriate with hunting objectives set through biological sustainability analyses.

CONCLUSIONS AND RECOMMENDATIONS

In summary, we believe FWC should postpone additional bear hunts until:

1. Completion of demographic analyses necessary to determine maximum sustainable harvest rates for North Florida, East Panhandle and South Florida BMUs.
2. For the Central BMU, if bear hunting continues in 2016, harvest objectives should be revised to follow the conservative recommendations of Hostetler et al. (2009).
3. The bear management plan is updated to address mortality from hunting and a renewed focus on landscape connectivity between subpopulations.
4. Establishment of a system of bear sanctuaries in Florida.

Florida is a growth state, where perhaps the most commonly repeated demographic statistic is that 1,000 new human residents arrive each day. With that influx comes direct impacts to

Florida black bear habitat and the inevitable expansion of infrastructure, such as new highways, that further fragment subpopulations. Therefore, there is an essential and growing need to conserve habitat and maintain genetic connectivity to ensure the long-term survival of the Florida black bear. Updated, science-based decisions on the future of bear hunting in Florida will help assure that the recovery of the Florida black bear continues.

We offer these recommendations with respect for the fine work of FWC biologists and law enforcement, whom we recognize for their efforts not only towards the conservation of the black bear, but for hundreds of other wildlife species. We look forward to working in partnership with FWC to achieve our mutual conservation objectives.

Thank you very much for your consideration.

Sincerely,

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