

## Appendix

### State of Alaska Comments

Proposed USFWS Rulemaking – Docket No. FWS-R7-NWRS-2014-005:  
*Non-Subsistence Take of Wildlife, and Public Participation and Closure Procedures,  
on National Wildlife Refuges in Alaska*

#### Section 3 – page 16, Excerpts from letters and other refuge documents:

- **Letter from Yukon Flats National Wildlife Refuge to Gerald Nicholia, Chair Eastern Interior Alaska Subsistence Regional Advisory Council, October 12, 2006:** *“What we have done and will continue to do: The Refuge staff has worked with the Alaska Department of Fish and Game, Council of Athabascan Tribal Governments (CATG), and local residents to develop and implement a moose management plan. That plan recommended that local residents: 1) increase bear and wolf harvest, 2) improve harvest reporting, and 3) decrease the take of cow moose, all in an effort to double the moose population in GMU 25D in the next 10 years. CATG harvest reports indicate that objectives 1 and 2 are being addressed; however, the continued harvest of cow moose is likely offsetting progress to increase the moose population.*

*Since 2002, there have been several state and federal regulatory changes to:*

- *Liberalize brown bear seasons and bag limits*
- *Liberalize black bear seasons and bag limits and allow fall baiting*
- *Align state and federal bear hunting seasons”*

- **Letter from the Department of the Interior to Gerald Nicholia, East Interior Regional Advisory Council, December 12, 2006:** *“Allow sale of handicraft items made from bears taken under federal regulations. I would encourage your council to continue to work closely with the Federal agencies and the State in developing management options to ameliorate, to the extent possible, the adverse effects of predation on wildlife resources utilized by subsistence users. In addition to seeking predator reduction programs on Federal lands which are consistent with the legal and policy mandates of the land managing agencies, opportunities for predator management on lands under state jurisdiction should be explored, as appropriate. Additionally, the council may be able to encourage increased harvests of predators by local residents under current State hunting and trapping regulations where applicable.*
- **Alaska Maritime 1988 CCP p. III-16:** *The Service will fulfill it’s the Alaska Lands Act obligations to maintain natural diversity by managing indigenous populations so that they do not decline unnaturally below the levels that existed on December 2, 1980, when the refuge was established. According to legislative history, the term "natural diversity" reflects an intent to maintain the flora and fauna on the refuge in a healthy and natural combination, and not to emphasize management activities favoring some species to the detriment of others. Although it stresses use of natural means, avoiding artificial development and habitat manipulation programs, **the term is not intended to restrict the Service's authority to manipulate habitat for the benefit of fish and wildlife populations within a refuge, or for the benefit of fish and wildlife populations within a refuge, or for the benefit of the use of such populations by people as part of the balanced management program mandated by the Alaska Lands Act and other laws.***

*The term is also not intended to preclude predator control on refuge lands in appropriate instances (Congressional Record - H 12352 1980; S 15131 1980) [emphasis added. Similar language also in Arctic 1988 CCP, Kanuti 1987 CCP, Nowitna 1986 CCP—list not inclusive]*

- **Yukon Delta Draft 1987 CCP**, p. 212: *Wildlife Management. It is the intent of the Service to maintain wildlife populations on the Yukon Delta Refuge at levels near the carrying capacity of refuge habitats, subject to naturally occurring fluctuations in populations. The Service will focus its efforts on increasing those populations which are currently suppressed (e.g., arctic-nesting geese, caribou, moose) and on maintaining the currently healthy populations of other wildlife species and the productivity of habitats on the refuge, ensuring that the full complement of native flora and fauna continue to exist on the refuge in their natural diversity. [Emphasis added]*
- **Alaska Peninsula Revised 2006 CCP**, p. 31: 2.3.11.7 Fish and Wildlife Control. *These activities involve the control, relocation, and/or removal of native species, including predators, to maintain natural diversity of fish, wildlife, and habitats. These management actions may be employed with species of fish and wildlife within their original range to restore other depleted native populations.... Predator management includes the relocation, removal, sterilization, and other management of native predators to accomplish management objectives. **The Service considers predator management to be a legitimate conservation tool** when applied in a prudent and ecologically sound manner and when other alternatives are not practical. The key requirements are that a predator-management program be ecologically sound and biologically justified. In keeping with the Service's mandate to first and foremost maintain the biological integrity, diversity, and environmental health of fish and wildlife populations at the refuge scale, **a predator population will not intentionally be reduced below a level consistent with the low-end of natural population cycles (see 601 FW 3)....***

*Normal environmental education and population-management activities—such as trapper education programs and **regulation changes that allow for increased harvests of predatory animals by licensed trappers and hunters—are not considered to be “predator management.”*** [Emphasis added. Similar or identical language in Innoko Revised 2008 CCP, Kanuti 2008 Revised CCP, Kenai 2010 Revised CCP, Kodiak 2008 Revised CCP, Koyukuk/Northern Unit Innoko/Nowitna Revised 2009 CCP, Selawik Revised 2011 CCP, Tetlin 2008 Revised CCP, Togiak 2009 Revised CCP—list not inclusive]

- **Innoko Revised 2008 CCP**, p. 2-41: 2.4.10.1 *Habitat Management Habitats are managed in keeping with the purposes, goals, and objectives of a refuge. In Alaska, this means habitats are largely managed to maintain natural diversity and natural processes. However, **in some cases, habitats are manipulated to maintain or improve conditions for selected fish and wildlife populations**, to control invasive plant species, or to manage fire fuels on refuge lands. These habitat management and manipulation activities will be carried out in support of the purposes, goals, and objectives of the refuge. Generally, refuges use the least intrusive management measures needed. **Where practical and economically feasible, habitat management practices should maintain a natural appearance on the landscape. Habitat management practices—even those carried out for the benefit of a single species or small group of species— will, to the***

*extent possible, maintain the natural diversity of native (indigenous) wildlife species and habitat types. [Emphasis added]*

- **Arctic Refuge General Hunting CD (January 2015)**

Description of Uses(s) - *The State of Alaska divides the state into game management units (GMUs). The following GMUs fall within the boundaries of the Refuge: 25A, 25B, 25D, 26B, and 26C. General hunters are required to follow current State and Federal hunting regulations, including the requirements for applicable licenses and permits. **The State of Alaska is primarily responsible for managing fish and resident wildlife through setting seasons, bag limits, methods and means of harvest, and licensing of commercial guiding operators.** [Emphasis added]*

Anticipated Impacts of Uses - *The Refuge is directly involved in review and implementation of the regulatory process and administrative oversight of general hunting. Because of combined regulatory (harvest) and law enforcement efforts of the State and Refuge personnel, **direct impacts from general hunting under existing management should have minimal impacts to fish and wildlife resources, other Refuge resources, or other Refuge users.** [Emphasis added]*

Justification - *General hunting is an activity that Congress intended to preserve when the Refuge was designated by ANILCA. General hunting in the Refuge provides the public with quality general hunting opportunities found few places in the world. **To ensure sustainability of harvest of local residents, the State Board of Game and the Federal Subsistence Board regularly adopt regulations in response to wildlife population levels and management needs. These regulations provide adequate protection for wildlife resources and continued hunting opportunities, in balance with other Refuge purposes.** Emerging issues will be further monitored and, if needed, regulated to ensure Refuge resources and visitor experiences are protected. When conducted in accordance with Service regulations, **I find that these uses will not materially interfere with or detract from the purposes for which the Refuge was created, including Wilderness Act purposes for the Refuge Wilderness area and fulfillment of the mission of the Refuge System.** [Emphasis added]*

- **Arctic Refuge Subsistence Activities CD (January 2015)**

Anticipated Impacts of Use(s) - ***Fish and wildlife harvested by subsistence users at current and projected levels-in accordance with established State and Federal regulations pertaining to season, bag limits, and methods of harvest-are not expected to have long-term impacts on the overall populations of fish and wildlife resources in the Refuge.** State and Federal biologists monitor fish and game populations, and State and Federal regulatory bodies continually respond to management needs by adopting regulations to ensure the continued health of fish and wildlife populations. **The combination of Alaska State hunting regulations (5AAC) and the Federal Subsistence Regulations (50 CFR Part 100) are intended to provide a sustainable harvest over the long term.** It is possible that localized or short-term population reductions may occur due to unanticipated changes in physical condition of animals, environmental conditions, distribution, predation, and harvest pressure.[Emphasis added]*

- **Selawik Refuge Subsistence Activities CD (July 2011)**

Anticipated Impacts of Uses - *Fish and wildlife harvested by subsistence users at current and projected levels (and in accordance with established State and Federal regulations pertaining to seasons, bag limits, and methods of harvest) are not expected to have long-term impacts on the overall populations of fish and wildlife resources within the refuge...The combination of Alaska State hunting regulations (5AAC) and the Federal Subsistence regulations (50 CFR Part 100) are intended to provide a **sustainable harvest over the long term**. It is possible that localized or short-term population reductions may occur due to unanticipated changes in physical condition and distribution of animals, environmental conditions, predation, and harvest pressure... Anticipated and unanticipated impacts to resident fish and wildlife populations and subsistence opportunities can be mitigated through further restrictions on methods, means, seasons of harvest, and bag limits by **the Alaska Boards of Fisheries and Game** and the Federal Subsistence Board, or through subsequent revisions of the Comprehensive Conservation Plan.*

**Section 3 – page 16: Fire suppression data:**

Table 1. Proportion of fires on which initial attack was taken by fire management option and major ownership in Alaska, 2001-15<sup>a</sup>. Locations composed fires detected, whereas perimeters composed the subset of fires >100 acres. Suppression occurred on 38% of the 627 fire locations with origin on national wildlife refuges managed by the U.S. Fish and Wildlife Service.

	<u>Fire Option<sup>b</sup></u>	<u>BLM</u>	<u>FWS</u>	<u>NPS</u>	<u>STATE</u>	<u>No. fires</u>
<u>Based on fire locations</u>	<u>Full</u>	<u>0.39</u>	<u>0.26</u>	<u>0.19</u>	<u>0.15</u>	<u>862</u>
	<u>Modified</u>	<u>0.39</u>	<u>0.56</u>	<u>0.47</u>	<u>0.23</u>	<u>486</u>
	<u>Limited</u>	<u>0.34</u>	<u>0.37</u>	<u>0.32</u>	<u>0.21</u>	<u>1727</u>
	<u>No. fires</u>	<u>654</u>	<u>627</u>	<u>298</u>	<u>1496</u>	<u>3075</u>
<u>Based on fire perimeters</u>	<u>Full</u>	<u>0.50</u>	<u>0.32</u>	<u>0.29</u>	<u>0.25</u>	<u>118</u>
	<u>Modified</u>	<u>0.33</u>	<u>0.59</u>	<u>0.71</u>	<u>0.27</u>	<u>152</u>
	<u>Limited</u>	<u>0.41</u>	<u>0.44</u>	<u>0.42</u>	<u>0.24</u>	<u>969</u>
	<u>No. fires</u>	<u>348</u>	<u>278</u>	<u>172</u>	<u>441</u>	<u>1239</u>
	<u>Managed area (million ac.)<sup>c</sup></u>	<u>80.8</u>	<u>70.6</u>	<u>53.9</u>	<u>93.7</u>	
	<u>Proportion of Alaska<sup>d</sup></u>	<u>0.22</u>	<u>0.19</u>	<u>0.15</u>	<u>0.26</u>	

<sup>a</sup>Source: Alaska Fire Service, fire locations database (1939-2015) and large fire database (1940-2015), downloaded 30 March 2016 from <http://fire.ak.blm.gov/predsvcs/maps.php>. Ownership: federal Bureau of Land Management (BLM), U.S. Fish and Wildlife Service (FWS; also tabulated from database field USFWS), National Park Service (NPS), and state of Alaska (database fields STA and State). Cross-tabulation is based on count of records indicating initial attack where cells have values for initial attack date (both databases) and indicating total fires by fire ID (locations) and estimated acres (perimeters).

<sup>b</sup>Source: [http://fire.ak.blm.gov/content/maps/aicc/Alaska\\_Fire\\_Management\\_Options.pdf](http://fire.ak.blm.gov/content/maps/aicc/Alaska_Fire_Management_Options.pdf). Modified often reverts to Limited following a conversion date in mid-July.

<sup>c</sup>Source: <http://alaskacenters.gov/upload/Land-Ownership-Alaska-7-11.pdf> (2007 data).

<sup>d</sup>These four ownerships compose about 82% of Alaska, which has 365 million upland acres excluding water (Gallagher and Todd 1991, *Who’s planning Alaska: the Alaska planning directory*. Alaska Cooperative Extension Service, Fairbanks).

Table 2. Proportion of fires with origin on national wildlife refuges in Alaska that received suppression activity, 2002-15<sup>a</sup>. Sixteen percent of fires were suppressed, and suppressed fires were on average 9272 acres smaller than unsuppressed fires.

	<u>Total reported fire starts</u>		<u>Un-suppressed fires</u>		<u>Suppressed fires</u>	
	<u>No. fires</u>	<u>Acres</u>	<u>No. fires</u>	<u>Acres</u>	<u>No. fires</u>	<u>Acres</u>
	<u>599</u>	<u>7,487,765</u>	<u>506</u>	<u>7,053,655</u>	<u>93</u>	<u>434,111</u>
<u>Average fire size (ac)</u>		<u>12,500</u>		<u>13,940</u>		<u>4,668</u>

<sup>a</sup>Source: Alaska Interagency Coordination Center, Fairbanks (email from GaBriella Branson to Glenn Stout, 31 March 2016).

**Section 5, page 28 – supplemental NEPA comments:**

*Trophic Cascade*

The Environmental Analysis (EA) for the Proposed Federal Rule includes several literature citations relating to trophic cascades, with primary reference to Terborgh and Estes (2010), *Trophic Cascades; predators, prey, and the changing dynamics of nature*, and the Ripple et al. (2014) article. These two publications are cited in the opening paragraph of section 4.3.1.1 of the EA and are ostensibly the foundation of the Service’s discussion related to population dynamics, in which the Service endeavors to build the argument for *Trophic Cascade* due to a theorized *potential* decrease in apex predators by hunters in Alaska through state authorizations for harvest. However, not only do these citations not support the Service’s interpretation, the citations actually contradict their position.

The opening paragraph on page 40 of the EA, states; “*The recent predator harvest liberalizations under State regulations on refuges in Alaska may have population-level effects on targeted predators because anticipated additional harvest, while unknown, may be high (Terborgh and Estes, 2010, Ripple et al. 2014).*” However, this statement is not supported by either citation or other documentation in the EA. Neither citation discusses or analyzes Alaska predator harvest due to regulation liberalizations or why additional harvest should be anticipated, or any population-level effects resulting from potential additional predator harvest in Alaska. Neither citation discusses or analyzes why current or additional harvest of predators should be characterized as “high” in Alaska, except that Terborgh and Estes do claim (pg. 342), “...*although gratuitous, recreation-driven extirpation of wolves and other carnivores occurs in Alaska....*” This is an unsubstantiated reference that the EA fails to analyze or discuss in any objective manner but which drives much of the conclusions. If in fact Terborgh and Estes are the basis of the Service’s claim related to the effect of regulated harvests effects on predators, then they should

substantiate in detail how “extirpation of wolves or other carnivores” actually occurred in Alaska from IM programs or regulations.

Conceptually, this premise also conflicts with the many case studies provided by Terborgh and Estes (2010), where *Trophic Cascade* was observed when predators were specifically eradicated, pushed to extinction, or harvested at rates far in excess of the levels documented in Alaska through general harvest or I.M.:

- Pg. 62, Peter Lake..removed [all] piscivores,
- Pg. 33, 30%-60% reduction of gastropods and isopods,
- Pg. 38, sea otters, near extinction,
- Pg. 42, sharks reduced 87%-99%,
- Pg. 50, sea otters, lobsters, fish, depleted or eliminated,
- Pg. 82, turtles, manatees, large fishes to the point of extinction,
- Pg. 83, killed 98% of the existing sea urchin population,
- Pg. 101, Cod, reduced to a small fraction of its historical maximum,
- Pg. 137, wolf and puma, widely extirpated,
- Pg. 141, predator extirpation leads to trophic cascade,
- Pg. 144, moose densities higher without [all] wolves,
- Pg. 144, deer irruption after wolf extirpation,
- Pg. 146, wolf was extirpated south of Scotland,
- Pg. 147, [in] eastern U.S. wolves were effectively extirpated,
- Pg. 151, after wolf elimination... Yellowstone,
- Pg. 257, strongest evidence...[all] predators have been removed,
- Pg. 337, strongly interactive species...their disappearance leads to the simplification of ecosystems,
- Pg. 355, elimination of megafauna
- Pg. 365, whale populations by more than 90%,
- Ripple et al, Pg. 1241484-3, wolf extirpation, Pg. 1241484-4, large-carnivore extirpation, Pg. 1241484-5, predator extirpation.

(A 30%-60% predator reduction was the lowest level of removal referenced in Terborgh and Estes. It should also be noted that the temporal and spatial aspects of perturbations were also an important variable.)

Estimated harvest rates of bear populations in Alaska are typically much less than 6% annually in most Game Management Units, so the Service comparison to Terborgh and Estes (2010) is a misinterpretation of the examples Terborgh and Estes (2010) provided. Even in IM areas, harvest rates range only as high as 0%-16% [Unit 16=2-16% bl. bears, Unit 19A=1.8-3.4% bl. bears/2.5-5% br. bears, Unit 19D=0-4.3% bl. bears (2016 IM Annual Reports to Board of Game)]. The levels of predator removal in the case studies presented in Terborgh and Estes are orders of magnitude greater than those observed in Alaska, including in IM areas, not to mention occurring on more restricted temporal and spatial scales. In fact, Terborgh and Estes explained on Pg. 35 that ecologists/managers must, “...*distinguish the trivial from the consequential.*” In Chapter 17 (Pg. 288) of Terborgh and Estes (2010), Scheffer stated, “*Also, it is quite common that the system is insensitive over certain ranges of the external conditions while*

*responding strongly around some threshold condition.*” Furthermore, Terborgh and Estes identify a lengthy list of mitigating factors that reduce trophic cascade effects, and the mix of these factors (biotic and abiotic) which increase complexity and resilience to possible perturbations;

- Pg. 6, shift[s] in community composition caused by altered herbivory regimes...could be very slow processes especially if the vegetation is woody,
- Pg. 11, spatial mobility, behavioral flexibility buffer against unstable dynamics,
- Pg. 17, Pg 279-285, Pg. 309-310, Fire is an abiotic alternative states variable (physical driver),
- Pg. 57, the presence of a refuge changes interaction strength and trophic cascades,
- Pg. 76, linkages coupling two strong interactions occur less often than expected by chance, thus buffering natural communities from trophic cascades.,
- Pg. 89, trophic interactions including omnivory and ontogenetic dietary switching are believed to dampen strong trophic effects and weaken trophic responses,
- Pg. 103, southern sites had more diverse communities...as a result were able to maintain function despite depletion,
- Pg.107, ecosystem response times to shifts in trophic interacts...are typically much longer on land than they are in water,
- Pg. 112, Hairston (1991) predicted less trophic control in early succession [communities],
- Pg. 137, the perturbation needed to force the state shift involved the exclusion of an entire trophic level,
- Pg. 195, lower species diversity...should strengthen the trophic cascade,
- Pg. 195, if there are several kinds of predators, one may have less effect due to compensation,
- Pg. 270, Multiple states: top-down or bottom-up,
- Pg. 271, Synthesis: Interactions of bottom-up and top-down chains,
- Pg. 303, Plastic responses of prey to predators, (e.g. plant defense strategies, herding, mimicry, migration, etc.)
- Pg. 322, diverse habitat types,
- Pg. 325, temperature.

Most of these *Trophic Cascade* mitigating factors, are present to some degree in Alaska’s intact ecosystems, but were not analyzed in the EA. Clearly, *Trophic Cascade*, is a reality for managers to always be cognizant of, and for that reason ADF&G diligently monitors habitat and body condition indicators to assess those potential effects throughout Alaska.

However, the two-fold argument posited by the Service subsequently fails in two ways; 1) The position that liberalized methods and means under general hunting regulations will greatly increase harvest; is refuted by available harvest data noting little increase in harvests and/or 2) that small increases in harvest have the potential for trophic cascade; is refuted by Terborgh and Estes (2010). Eventually, the use of the Terborgh and Estes (2010) citation undermines the Service’s position related to the potential effect of Trophic Cascade more than it supports it.

The position is further eroded by inconsistent logic which is highlighted by Terborgh and Estes (2010). Terborgh and Estes state (Pg. 17, Pg. 279-285, Pg. 309-310), “*fire is physical driver of alternative [trophic] states.*” A real and actual ecosystem effect currently impacting Alaska Refuges is fire suppression, as opposed to the potential effects predicted from inconsequentially low rates of predator

harvest under general hunting regulations. As many as 15-38% of fires that occurred on Alaska Refuges reported an initial attack (suppression effort) (see table). Using fire perimeters based on the conservative estimate of from Analysis #1 (see the table below), 93 fires x 9,272 acres = 862,312 acres (61,594 acres/year) were potentially unburned due to suppression, and increases to 2,225,321 acres (148,355 acres/year) under analysis #2. As a land management agency, the Service has failed to acknowledge the more significant ecological perturbation of fire suppression on the landscape and is inconsistent in their claim to manage for naturally functioning ecosystems.

	Total Reported Fire Starts		Un-Suppressed Fires		Suppressed Fires		Proportion of fires Suppressed (%)
	# Fires	Acres	# Fires	Acres	# Fires	Acres	
USFWS lands (Analysis #1 – 2002-2015)	599	7,487,765	506	7,053,655	93	434,110.5	15.5
USFWS lands (Analysis #2 – 2001-2015)	627	--	387	--	240	--	38.2
Avg. Acres/Fire (fire perimeter)				13,940		4,668	9,272 acres/fire avg. difference

Throughout pages 40-57 of the EA, the use of the indefinite terms; *likely* (27), *likelihood* (7), *potential* (42), *may*, or *could*, are exhaustive and often misapplied. In scientific and statistical applications, the term *likely* implies an occurrence has a higher probability (>50%) of occurring, than not occurring. Notably, the Service used these terms to imply that even a single occurrence (e.g. 1:1,000,000) represents a proof of the assertion of likelihood. This is a logical fallacy, used throughout the document, and contradicts common scientific standards of communication.

In the context of *Trophic Cascades*, there are at least three major inconsistencies in the Service’s logic that invalidate the findings of the EA; 1) the level of perturbation caused by current predator harvest in Alaska does not raise to the level of the case studies in Terborgh and Estes (2010), and regardless, State law prohibits reductions of wildlife, including predators, to those low levels, 2) the suppression of fire on Alaska Refuges is a far more significant perturbation (or absence) at the ecosystem level, as identified in Terborgh and Estes (2010), and yet the Service ignores that type of abiotic perturbation when claiming “natural function” mandates (currently acting at significant landscape and temporal scales on Alaska Refuges), 3) relative to predator harvest, human harvest of prey species populations is consistently at higher levels than that for predators, presumably creating an imbalance, but the Service makes no argument to increase predator harvest to offset regulated harvest of prey species by all forms or hunting (moose=>wolves/black bears, caribou=>wolves/ brown bears, seals=>polar bears/orcas, whales=>orcas, waterfowl=>foxes/lynx/pike, salmon=>sharks/brown bears/Anisoptera spp., etc.). The Service asserts that dire outcomes will result from harvest on the order of just tens of predators/GMU,



but is silent on harvest rates on the order of hundreds and thousands of prey/GMU, and is silent on the suppression of thousands and tens of thousands of acres of fire on Alaska Refuges. Because of these fundamental logical failures and misapplication of scientific evidence, it is clear that the standard of “sound professional judgement” as discussed in the EA is not consistently applied as part of an agency management strategy.

The foundation of the Proposed Rule, as described through the EA, shows an intense interest, consistent with the “*recent resurgence of interest*” (Terborgh and Estes, 2010; pg. 287) in the ecological principle of *Trophic Cascades*. Unfortunately, the Service has not been able to describe or, “...*distinguish the trivial from the consequential...*” (Terborgh and Estes, 2010; Pg. 35).” As wrong as it would be to claim that no perturbations can trigger a *Trophic Cascade*, it is equally wrong to claim that every perturbation will trigger a *Trophic Cascade*.