Via Certified Mail

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RE: 60-Day Notice of Intent to Sue: Violations of the Endangered Species Act related to the Registration of Pesticides Impacting the Polar Bear

This letter serves as a sixty day notice on behalf of the Center for Biological Diversity of intent to sue the U.S. Environmental Protection Agency ("EPA") and its officers and officials over violations of Section 7 of the Endangered Species Act ("ESA")(16 U.S.C. § 1531 *et seq*.) for actions and inactions related to the registration, reregistration, and continued authorization of numerous pesticides pursuant to the Federal Insecticide, Fungicide, and Rodenticide Act ("FIFRA") (7 U.S.C. § 136-136y) which are known to or likely to adversely affect the polar bear and other ESA-listed species in the Arctic. This letter is provided pursuant to the 60-day notice requirement of the citizen suit provision of the ESA, to the extent such notice is deemed necessary by a court. *See* 16 U.S.C. § 1540(g).

On May 15, 2008, the polar bear was listed as a threatened species under the ESA. 73 Fed. Reg. 28213. This regulation was made effective upon publication, triggering the affirmative obligations and prohibitory restrictions of the ESA. Notwithstanding the fact that the polar bear has now been subject to the protections of the ESA for over a year, the EPA has failed to take required actions under the ESA in furtherance of the conservation of the polar bear and in order to ensure its actions do not jeopardize the species. As detailed below, the continued registration, reregistration, and authorization of numerous pesticides pursuant to FIFRA which

are known to, or likely to, adversely affect the polar bear poses significant threats to the continued existence of the species. Specifically, pesticides and pesticide derivatives, approved for use in the United States by EPA are known to be transported long-distance via various atmospheric, oceanic and biotic pathways to the Arctic, where such chemicals, individually and collectively, bioaccumulate in polar bears, adversely affecting health, reproduction and survival of these apex predators of the Arctic. EPA must examine or reexamine each of the agency actions described below, as well as its overall pesticide programs, pursuant to its obligations under Section 7 of the ESA, and modify, suspend or cancel these actions as necessary to comply with the unambiguous mandate of the ESA to avoid jeopardizing the polar bear.

I. LEGAL AND FACTUAL BACKGROUND

A. The Endangered Species Act

The Endangered Species Act, 16 U.S.C. §§ 1531-1544, ("ESA") was enacted, in part, to provide a "means whereby the ecosystems upon which endangered species and threatened species depend may be conserved...[and] a program for the conservation of such endangered species and threatened species..." 16 U.S.C. § 1531(b).

The ESA vests primary responsibility for administering and enforcing the statute with the Secretaries of Commence and Interior. The Secretaries of Commerce and Interior have delegated this responsibility to the National Marine Fisheries Service ("NMFS") and the U.S. Fish and Wildlife Service ("FWS") respectively. 50 C.F.R. §402.01(b). FWS has responsibility for the polar bear.

Section 2(c) of the ESA establishes that it is "…the policy of Congress that all Federal departments and agencies shall seek to conserve endangered species and threatened species and shall utilize their authorities in furtherance of the purposes of this Act." 16 U.S.C. § 1531(c)(1). The ESA defines "conservation" to mean "…the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to this Act are no longer necessary." 16 U.S.C. § 1532(3). Similarly, Section 7(a)(1) of the ESA directs that the Secretary review "…other programs administered by him and utilize such programs in furtherance of the purposes of the Act." 16 U.S.C. § 1536(a)(1).

In order to fulfill the substantive purposes of the ESA, federal agencies are required to engage in consultation with FWS (and/or NMFS) to "insure that any action authorized, funded, or carried out by such agency...is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the adverse modification of habitat of such species... determined...to be critical..." 16 U.S.C. § 1536(a)(2) (Section 7 consultation).

Section 7 consultation is required for "any action [that] may affect listed species or critical habitat." 50 C.F.R. § 402.14. Agency "action" is defined in the ESA's implementing regulations to include "(b) the promulgation of regulations; (c) the granting of licenses, contracts, leases, easements, rights-of-way, permits, or grants-in-aid; or (d) actions directly or indirectly causing modifications to the land, water, or air." 50 C.F.R. § 402.02.

At the completion of consultation FWS will issue a biological opinion that determines if the agency action is likely to jeopardize the species. If so, the opinion may specify reasonable and prudent alternatives that will avoid jeopardy and allow the agency to proceed with the action. 16 U.S.C. § 1536(b). FWS may also "suggest modifications" to the action during the course of consultation to "avoid the likelihood of adverse effects" to the listed species even when not necessary to avoid jeopardy. 50 C.F.R. § 402.13.

An agency's duty to avoid jeopardy is continuing, and "where discretionary Federal involvement or control over the action has been retained or is authorized by law," the agency must in certain circumstances reinitiate formal consultation:

> (a) If the amount or extent of taking specified in the incidental take statement is exceeded;
> (b) If new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered;
> (c) If the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the biological opinion; or
> (d) If a new species is listed or critical habitat designated that may be affected by the identified action.

50 C.F.R. § 402.16.

Section 7(d) of the ESA, 16 U.S.C. § 1536(d), provides that once a federal agency initiates consultation on an action under the ESA, the agency, as well as any applicant for a federal permit, "shall not make any irreversible or irretrievable commitment of resources with respect to the agency action which has the effect of foreclosing the formulation or implementation of any reasonable and prudent alternative measures which would not violate subsection (a)(2) of this section." The purpose of Section 7(d) is to maintain the environmental status quo pending the completion of consultation. Section 7(d) prohibitions remain in effect throughout the consultation period and until the federal agency has satisfied its obligations under Section 7(a)(2) that the action will not result in jeopardy to the species or adverse modification of its critical habitat.

These ESA requirements apply to EPA's registration of pesticides under FIFRA. *Wash. Toxics Coalition v. EPA*, 413 F.3d 1024, 1032 (9th Cir. 2005) ("We agree with the Eighth Circuit that even though EPA registers pesticides under FIFRA, it must also comply with the ESA when threatened or endangered species are affected."); *Defenders of Wildlife v. Administration*, 882 F.2d 1294 (8th Cir. 1989) (affirming section 7's application to EPA's registration of pesticides). Moreover, under FIFRA, EPA retains the authority to withdraw, modify or condition pesticide registrations, giving it ongoing discretion to make any decision regarding the sale and use of pesticides. *See* 7 U.S.C. § 136a(c)(7). As discussed in *Wash. Toxics Coalition v. EPA*,

> EPA retains ongoing discretion to register pesticides, alter pesticide registrations, and cancel pesticide registrations. See 7 U.S.C. § 136a-d. Because EPA has

> continuing authority over pesticide regulation, it has a continuing obligation to follow the requirements of the ESA. We have respected such continuing obligations in well-reasoned authority that binds us here.
>
> In this case, EPA has similar discretion "to inure to the benefit" of listed species. Pesticide registrations under FIFRA are ongoing and have a long-lasting effect even after adoption. EPA retains discretion to alter the registration of pesticides for reasons that include environmental concerns. See 7 U.S.C. §§ 136d(c)(1)-(2), 136(l).

413 F.3d at 1033.

B. The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)

Congress enacted the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) to regulate the use of pesticides in the United States. *See* 7 U.S.C. §§ 136-136y. FIFRA charges the EPA with registering, reviewing, amending, and reregistering chemicals and chemical formulations for use as insecticides, fungicides, and pesticides in the United States. *Id*. Under FIFRA, a pesticide generally may not be sold or used in the United States unless it has an EPA registration for that particular use. 7 U.S.C. § 136a(a). EPA may register a pesticide if it makes the following determinations: (1) the labeling complies with FIFRA's requirements; (2) the composition claims are warranted; (3) the pesticide will perform its intended function; and (4) the pesticide will not cause unreasonable adverse effects on the environment. 7 U.S.C. § 136a(c)(5). The culmination of the registration process is EPA's approval of a label for the particular pesticide. FIFRA makes it unlawful to use a pesticide in a manner inconsistent with the label, *Id*. at § 136j(2)(G), or to make any claims that differ substantially from the label. *Id*. at § 136j(1)(B).

EPA must classify pesticides as general or restricted use pesticides, depending on the risks posed to the environment. Where necessary to guard against unreasonable adverse environmental effects, EPA must classify a pesticide as restricted use. 7 U.S.C. § 136a(d)(1)(C). Restricted use pesticides are subject to additional regulatory restrictions, particularly concerning application of the pesticide. *Id*. EPA must reclassify pesticides as restricted use pesticides where necessary to prevent unreasonable adverse effects on the environment. *Id*. at § 136a(d)(1)(C)(2).

After approving a pesticide registration, EPA retains discretionary involvement and control over that registration. EPA must periodically review pesticide registrations with a goal of reviewing each pesticide registration every 15 years. *Id*. at § 136a(g)(1). EPA has the authority to compel registrants to submit data necessary for a reregistration review. *Id*. at § 136a(g)(2). Even apart from such explicit data submission requirements, registrants must submit to EPA any information about registered pesticides' unreasonable adverse effects on the environment. *Id*. at § 136d(a)(2). EPA takes such information into account in reviewing and, where necessary, modifying the pesticide registrations.

EPA is in a process of reregistering pesticides that have been on the market for years and often decades prior to enactment of the environmental registration requirements currently in place. 7 U.S.C. § 136a-1. EPA has the authority and duty to impose restrictions on harmful uses of the pesticides, including those uses that cause harm to threatened or endangered species, as part of the re-registration determination.

The EPA Administrator has the authority to cancel pesticide registrations whenever "a pesticide or its labeling or other material required to be submitted does not comply with the provisions of this Act or, when used in accordance with widespread and commonly recognized practice, generally causes unreasonable adverse effects on the environment." 7 U.S.C. § 136d(b). The Administrator may immediately suspend a pesticide registration to prevent an imminent hazard. *Id*. § 136d(c). An announcement by the Administrator of an intent to cancel a pesticide use often results in the registrant's voluntary cancellation of, or agreement to further constraints upon, that use.

C. The Listing of the Polar Bear Under the ESA

On May 15, 2008, FWS listed the polar bear (*Ursus maritimus*) as a threatened species under the ESA. 73 Fed. Reg. 28213. While the listing rule for the polar bear was based primarily on the impacts of global warming on the species, FWS recognized that contaminants negatively impact the species:

> [I]ncreased exposure to contaminants has the potential to operate in concert with other factors, such [as] nutritional stress from loss or degradation of the sea ice habitat or decreased prey availability and accessibility, to lower recruitment and survival rates that ultimately would have negative population level effects.

73 Fed. Reg. at 28292

D. Impacts of Pesticides on Polar Bears

As FWS acknowledged in the listing rule for the polar bear, persistent organic pollutants (POPs), many originating as pesticides in the United States, are transported by global processes to the Arctic and ultimately into the tissues of polar bears, affecting the species' health reproduction and survival:

> Contamination of the Arctic and sub-Arctic regions through long-range transport of persistent organic pollutants has been recognized for over 30 years. These compounds are transported via large rivers, air, and ocean currents from the major industrial and agricultural centers located at more southerly latitudes. The presence and persistence of these contaminants within the Arctic is dependent on many factors, including transport routes, distance from source, and the quantity and chemical composition of the releases….

> The Arctic ecosystem is particularly sensitive to environmental contamination due to the slower rate of breakdown of persistent organic pollutants, including organochlorine (OC) compounds, the relatively simple food chains, and the presence of longlived organisms with low rates of reproduction and high lipid levels. The persistence and tendency of OCs to reside and concentrate in fat tissues of organisms increases the potential for bioaccumulation and biomagnification at higher trophic levels. *Polar bears, because of their position at the top of the Arctic marine food chain, have some of the highest concentrations of OCs of any Arctic mammals*. Considering the potential for increases in both local and long-range transport of contaminants to the Arctic, with warmer climate and less sea ice, the influence these activities have on polar bears is likely to increase.

73 Fed. Reg. at 28290-28291 (emphasis added; internal citations omitted).

1. Pesticide Use in the United States

Pesticide contamination is pervasive in U.S. waterways, and the pesticides introduced into these waterways provide a source of contamination to remote regions such as the Arctic. Over 1 billion pounds of pesticides are used each year in the United States to control weeds, insects and other organisms (Gilliom et al. 2007). The U.S. Geological Survey's ("USGS") 2006 Report (updated in 2007) regarding pesticides in U.S. waters, found that

> At least one pesticide was detected in water from all streams studied and … pesticide compounds were detected throughout most of the year in water from streams with agricultural (97 percent of the time), urban (97 percent), or mixed-land-use watersheds (94 percent). In addition, organochlorine pesticides (such as DDT) and their degradates and by-products were found in fish and bed-sediment samples from most streams in agricultural, urban, and mixed-land-use watersheds—and in more than half the fish from streams with predominantly undeveloped watersheds. Most of the organochlorine pesticides have not been used in the United States since before the NAWQA studies began, but their continued presence demonstrates their persistence in the environment. (USGS 2006).

The USGS Report's lead author, Robert J. Gilliom, in a presentation entitled "Pesticides in the Nation's Water Resources," stated that "throughout the nation, almost every time and place that you observe a stream or river in a populated area you are looking at water that contains pesticides, inhabited by fish that contain pesticides" (USGS 1999).

The USGS findings indicate that streams and ground water in basins with significant agricultural or urban development, or with a mix of these land uses, almost always contain mixtures of nutrients and pesticides (Gilliom et al. 2007). At least one pesticide was found in almost every water and fish sample collected. *Id*. Moreover, individual pesticides seldom occurred alone; almost every sample from streams contained two or more pesticides. *Id*. The USGS noted a direct correlation between the amounts of pesticides used and the frequency of

pesticides found in our surface waters. Extensive herbicide use in agricultural area has resulted in widespread occurrence of herbicides in agricultural streams and shallow ground water. *Id*. The most heavily used agricultural herbicides, such as Atrazine, Metolachlor, and Alachlor, were detected most often in the sampling. Concentrations of insecticides were more commonly found in urban streams, with levels frequently exceeding their ALCs. *Id*.

Once a pesticide is introduced into the environment it may be influenced by a variety of processes affecting the pesticide's persistence and movement in the environment which ultimately determine the level of harm the pesticide poses to "non-target" plants and animals. The pervasive presence of pesticides in our waterways provides a significant source of contaminant introduction that affects not only the non-target organisms local to the site of introduction, but also non-target species in more remote regions. Waterways are involved in numerous avenues of long-range transport of pesticides, as discussed in more detail below, and this coupled with the persistence of many of these compounds is having a lasting deleterious effect on species in the fragile Arctic ecosystem. In particular, pesticides are having negative health impacts on the polar bear.

2. Pesticide Fate and Long-range Transport

Pesticide contamination in the Arctic is primarily due to sources outside the Arctic, including the contiguous United States, and various pathways are able to transport such contaminants over great distances. It is widely documented that numerous pathways carry contaminants from more Southern latitudes to various locations throughout the Arctic. The importance of these pathways is evidenced by the fact that present levels of pesticide contaminants cannot be explained by known potential sources within the Arctic, and can therefore only be explained by long-range transport from lower latitudes (Hansen et al. 1996; de March et al. 1998; Macdonald et al. 2000).

For relatively pristine regions like the Arctic, four primary pathways appear to exist for the transport of contaminants to the Arctic ecosystem: atmospheric transport, ocean currents, transpolar ice pack, and large Arctic rivers. These mechanisms are able to carry contaminants great distances to, from, and within the Arctic. The relative importance of each pathway depends on the chemical and physical properties of the substance and its emissions in the source region, which may vary over time. The transport mechanisms are described below, and reported in much greater detail in the Arctic Monitoring and Assessment Programme (AMAP) Reports of 2002 and 2004 and the AMAP 2009 report on Arctic Pollution.

Atmospheric transport is responsible for transport of many persistent contaminants through global warming and cooling systems and precipitation. In the global climate system, the Arctic cools the warmer air and water arriving from lower latitudes, and as the cooling air releases rain and snow it deposits contaminants. Strong south to north air flows exacerbate this transport of contaminants, and special mechanisms selectively favor the accumulation of certain pesticides in the Arctic. These contaminants end up on the ground, in meltwater in rivers, and in the top layer of the ocean, where biological productivity is highest and where most of the apex predators of the Arctic live and feed.

Ocean currents are a slow but important pathway, and the significance of ocean pathways appears higher than once realized. Ocean waters are a major storage reservoir and transport medium for water and soluble persistent organic pollutants ("POPs"). Long distance marine transport of contaminants from previous mid-latitude releases results in accumulations in Arctic sediments.

Sea ice can carry contaminants across the Arctic and release them in the productive melting zone of the North Atlantic. Sea ice may be important in transporting POPs and other contaminants from coastal sediments during the winter, and from deposition from the atmosphere, with subsequent redistribution during ice melt.

Arctic rivers are a significant pathway for contaminant transport to the Arctic, often associated with extreme seasonal fluctuations due to freeze-up and meltwater flushing characteristics. Rivers carry contaminants and process them through sedimentation and resuspension of particles. Suspended solids can carry high levels of pesticides into the Ob and Yenisey river deltas, as do sediments in the Indigirka and Pechora rivers. Sedimentation processes play a critical role in depositing particles in estuaries, deltas and Arctic coastal shelves.

In addition to the above mentioned transport routes, organic contaminants may also be transported into the Arctic via pelagic organisms (crustaceans, fish, marine mammals) and migratory birds, animals that migrate in large groups throughout different climate zones into the Arctic. These organisms can transfer the pollutants into higher-level organisms via the Arctic food web.

3. The Threat of Current Use Pesticides to the Arctic

Legacy pesticides are still having a dramatic effect on the Arctic, and current use pesticides are beginning to pose a threat. Many of the pesticides that are believed to cause the currently identified effects on the health of Arctic species are legacy pesticides that have been banned by the United States for many years or even decades. To this day, however, their effects still persist. For example, certain organochlorine pesticides (*e.g.,* HCH) are no longer registered for production or use in agricultural activities, but these chemicals and their metabolites still persist from previous times of use and are believed to be impacting the immune system and reproductive capacity of various species. The health effects displayed by Arctic species are due in large part to exposure of the animals over an extended period of time, and the dangers of delayed effects are often ignored.

Current use pesticides that are presently registered by the EPA are found at detectable levels in the Arctic, and they are beginning to accumulate in the same manner the banned, legacy pesticides have. These current use pesticides are predicted to have many of the same health effects on endangered and threatened species as the banned legacy pesticides. Many of these current use pesticide contaminants are so persistent that they will likely remain in the environment for years or even decades, and we do not even know the extent to which the current use of the pesticides may impact the Arctic ecosystem in decades to come.

Even more worrisome is the effect these current use pesticides may have in combination with the banned pesticides and other contaminants, such as PCBs, that still persist in significant levels in the Arctic ecosystem. Since these pollutants are persistent in the environment and resist degradation, the health effects of these contaminants will increase temporally due to both accumulation and continued exposure.

4. Effects of Pesticides on the Polar Bear and its Habitat

The polar bear is severely impacted by the introduction of pesticide contamination, and is exhibiting numerous health issues including immune, endocrine, and reproductive effects. Polar bears are an apex predator in Arctic marine ecosystems and are exposed to high levels of pollutants that are biomagnified with each step higher in the food web. Because species comprising the Arctic marine ecosystem are highly dependent on fat for insulation, buoyancy and energy storage, pollutants are accumulated in higher and higher levels up the food chain. Simple organisms have limited capacity to metabolize and excrete these chemicals so they bioaccumulate in the predators of the food web. Polar bears are particularly vulnerable to lipophilic contaminants because they eat a fat rich diet. Ringed, bearded, and harp seals comprise the main food of polar bears and since the blubber layer is preferentially eaten by the bears, the intake of any lipophilic pollutant is particularly high.

Unfortunately, many of the pesticide pollutants found in the Arctic ecosystem are lipophilic, and bond tightly to fat molecules. The pollutants of most concern to the polar bear in particular are organophosphates and organochlorines that are, or were, used in industry or as pesticides. Levels of persistent organic pollutants including pesticides in adipose and blood plasma of polar bears has been investigated in numerous studies. Additional studies have documented the effects of persistent organic pollutants, including pesticides, on polar bears, including impacts to endocrine function and homeostasis, immune function, cub and female survival, reproduction and development, and enzyme function:

> The current understanding of contaminant- induced biological effects in polar bears points to evidence that chronic exposure to CHCs [chlorinated hydrocarbon contaminants] and their metabolites may compromise endocrine functions and homeostasis (Sandau, 2000; Norstrom, 2000; Skaare et al., 2001; Letcher et al., 2002; Haave et al., 2003; Oskam et al., 2003, 2004; Braathen et al., 2004), immune functions (Bernhoft et al., 2000; Norstrom, 2000, 2001; Skaare et al., 2001b; Larsen et al., 2002; Lie et al., 2004a, 2005; Kirkegaard et al., 2005), cub and reproductive female survival (Derocher et al., 2003), reproduction and development (Wiig et al., 1998), and hepatic P450-enzymes induction (Bandiera et al., 1995; Letcher et al., 1996).

(Verrault et al. 2005: 371).

In addition to the original pesticides, metabolites and degradation products of these contaminants also pose a significant risk, and may in fact be even more toxic to the polar bears than the initial pesticide (Verreault et al. 2005, Gebbink et al. 2008a,b).

a. Immunological Effects of Pesticides on Polar Bear Populations

Polar bears are at higher risk of infections due to the documented effects of cumulative pesticide use. Lie et al. (2004) assessed the effects of organochlorines on the immune function of free ranging polar bears in Svalbard, Norway (higher organochlorine concentrations) and Churchill, Canada (lower organochlorine concentrations). Bears with high concentrations of ΣPCBs, organochlorine pesticides (ΣOCPs), or the interaction of ΣPCBs and ΣOCPs had decreased ability to produce antibodies to vaccinations of influenza-, reo- and herpes viruses, tetanus toxoid, and *Mannheimia sp*. (Lie et al. 2004). In addition, high PCB concentrations were correlated with decreases in IgG (the major immunoglobulin class in blood), indicating a possible suppression of antibody-mediated immunity (Skaare et al. 2002; Lie et al. 2004). Thus polar bears with high concentrations of ΣOCPs and ΣPCBs may be more susceptible to infections than polar bears with lower contaminant concentrations. As summarized by Fisk et al. (2005), "These results are very significant and suggest that contaminant exposure may have increased the polar bear's susceptibility to infections."

b. Endocrine Disruption by Pesticides and other POPs

Endocrine disruptors are synthetic chemicals that mimic natural hormones, disrupting natural processes by sending false messages, blocking real messages, preventing synthesis of the body's own hormones, and accelerating the breakdown and excretion of hormones. Endocrine disruption effects how an organism develops and functions. Reproductive disorders, immune system dysfunction, thyroid disorders, types of cancer, birth defects and neurological effects have all been linked to endocrine disruption. Endocrine disruption plays a significant role during critical development of organisms. Numerous current-use pesticides that are found in the Arctic are listed by the Center for Bioenvironmental Research of Tulane and Xavier Universities as endocrine disruptors, including endosulfan, dieldrin, methoxychlor, dicofol, alachlor, and atrazine.

In polar bears organochlorines have been shown to impact thyroid hormones and retinol (vitamin A). Braathen et al. (2004) found that PCBs affected five thyroid hormone ("TH") variables in female polar bears and two TH variables in males, causing a higher incidence of TH imbalance found in female polar bears compared with males (Braathen et al. 2004). Thyroid hormones control fetal brain development and behavior, as well as growth, metabolism, and reproduction throughout the life of the animal (AMAP 2002). The researchers stated that the negative relationship found between PCBs and thyroid hormones raises concern about the possible effects of PCB exposure on the learning ability and behavior of polar bears with high PCB concentrations (Braathen et al. 2004). Retinol concentrations have also been linked to PCB and HO-PCB concentrations, where retinol concentrations were negatively correlated with persistent PCB congener concentrations and positively correlated with HO-PCB concentration (Fisk et al. 2005). Retinol is thought to be important in the growth and development of epithelial tissues and the immune system.

Organochlorines, including pesticides and PCBs, have also been linked to decreasing cortisol levels in polar bears (Oskam et al. 2004). Oskam et al. (2004) detected a significant negative effect of organochlorines on cortisol variation in Svalbard polar bears. The researchers

concluded that alterations of cortisol levels could threaten the polar bears' health by inhibiting key physiological processes including the regulation of the energy metabolism, maintenance of growth and development, and responses to stress (Oskam et al. 2004).

Finally, high concentrations of ΣPCBs, ΣCHLs, ΣDDTs, and dieldrin were significantly correlated with reductions in bone mineral density in subadult bears of both sexes and adult males, likely through their action as agonists and antagonists to naturally endogenous hormones (Sonne et al. 2004).

c. Reproductive Impacts from Pesticides and other POPs

i. Impacts on reproductive hormones

Adult female polar bears with higher PCB concentrations from Svalbard, Norway exhibited higher progesterone concentrations (Haave et al 2003). Haave et al. (2003) speculated that high levels of progesterone could inhibit secretion of follicle-stimulating hormone, thus preventing normal ovulation from occurring. In another study, the levels of the male hormone testosterone, which plays a vital role in sexual development, were low in bears with high PCB loads (AMAP 2002).

ii. Impacts on reproductive organs

Organohalogen pollutants, including pesticides, appear to impact the size of East Greenland polar bear genitalia. Sonne et al. (2006) found a significant inverse relationship between OHCs, testis length and baculum length and weight for both subadults and adults. For subadults, dichlorodiphenyl trichloroethanes, dieldrin, chlordanes, hexacyclohexanes, PCBs, and PBDEs showed significant relationships, and for adults hexachlorobenzene [HCB] showed a significant relationship. In addition, baculum bone mineral densities decreased with increasing chlordanes, DDTs, and HCB in subadults and adults, respectively. For females, Sonne et al. (2006) detected a significant inverse relationship between ovary length and ΣPCB and ΣCHL, respectively, and between ovary weight and ΣPBDE and uterine horn length and HCB. Sonne et al. (2006) concluded that these pollutants "may pose a risk to this polar bear subpopulation in the future because of reduced sperm and egg quality, quantity and uterus and penis size/robustness."

Wiig et al. (1998) observed a high occurrence of female pseudohermaphroditism among polar bears in Svalbard between 1988-1997, which they suggested could have resulted from endocrine disruption from the high concentrations of PCBs found in this population. Another case of female pseudohermaphroditism was observed in East Greenland in 1999 (Lunn et al. 2002).

iii. Increased cub mortality

Polar bear cubs are born in an altricial, highly undeveloped state and weigh only about 1.5 pounds at the time of birth. Polar bears breed in February/March, and implantation of the fertilized embryo will take place around late August to early September, giving the fetus just 3 months of gestational development. During the hard winter months, the mother bears fast and nurse their young to a weight that allows the cubs to survive in the harsh Arctic conditions. Cubs

are able to grow quickly and survive due in large part to the very fat rich milk provided by the mother bear during the first year of a cub's life.

When animals are inactive for long periods, they lose weight, thereby concentrating the contaminant levels that remain in their bodies. Because female polar bears are fasting during gestation, their pollution loads on a per pound basis increase dramatically as they utilize their fat stores, causing excretion of the contaminants into their system. As the mother bear nurses her cubs, she is injecting them with a heavy dose of contaminants dissolved in the fats of her milk, and the undeveloped cubs are exposed to very high pollution loads from their mother. This contaminant excretion into the milk can profoundly affect cub mortality.

Several studies indicate evidence for reduced cub survival in association with high organochlorine concentrations in their mothers. Adult female polar bears with cubs had significantly lower concentrations of ΣPCBs, ΣDDTs, ΣCHLs, ΣHCHs, ΣClBs than females that had lost their cubs by the following fall (AMAP 2004; Skaare et al. 2002). The researchers suggested that high intake of PCBs by cubs at a critical period in their development could be leading to higher mortality (AMAP 2004; Skaare et al. 2002). Derocher et al. (2003) documented a relative lack of older females with cubs-of-the year (females ≥16 years of age) in Svalbard compared to other populations, which supports a link between high PCB levels in Svalbard bears and reduced reproduction and cub survival (AMAP 2002; AMAP 2004). Derocher et al. (2003) concluded that "there are suggestions of contaminant-related population level effects that could have resulted from reproductive impairment of females, lower survival rates of cubs, or increased mortality of reproductive females."

iv. Effects on embryonic implantation and development

Embryonic implantation is a complex developmental process that involves an intimate "crosstalk" between the embryo and uterus. Synchronized development of the embryo and differentiation of the uterus to the receptive state are both essential to the implantation process. Successful execution of the events of implantation involves participation of numerous endogenous factors, including hormone levels, fat stores of the mother, lipid mediators, and the like.

Certain species, such as the polar bear, exhibit delayed implantation, which is a mechanism that certain animals use as a measure to ensure that they will have the ability to care for their young following birth. Polar bears coordinate birth with the winter season, and cubs are born and undergo their initial development phase while in the den with their mothers. Pregnant polar bears hibernate (or "den") for the winter, and fast during the entire period of birth and initial feeding of the cubs. If a pregnant polar bear doesn't put on enough weight in the prior season to sustain her through a denning period, or if chemicals impact on the hormonal balance necessary for appropriate implantation, the embryo will be reabsorbed and the mother bear will not den, instead remaining active throughout the winter.

Data suggests that species with delayed implantation are more vulnerable to the effects of pollution through endocrine disruption. Organochlorines and their metabolites in particular have been shown to impair maturation, fertilization, and embryonic development of oocytes following

exposure to an environmentally relevant organochlorine mixture (Campagna et al. 2001). The organochlorine mixture used in the study mimicked that which contaminates the Arctic marine food chain, and the oocytes were also from an animal that exhibits delayed implantation, the pig. As polar bears have only one estrous cycle per year, prevention of ovulation and an implantation cycle will result in no cubs for that year, and the cumulative effect of this may be quite dramatic on subpopulations if the levels of reabsorption of embryos rises in females.

II. VIOLATIONS OF LAW

A. Failure to Insure Against Jeopardy to the Polar Bear

As described above, the consultation obligations of the ESA clearly apply to the EPA's registration and approval of pesticides under FIFRA. 16 U.S.C. § 1536(a)(2); 50 C.F.R. § 402.14; *Wash. Toxics Coalition v. EPA*, 413 F.3d at 1032 ("We agree with the Eighth Circuit that even though EPA registers pesticides under FIFRA, it must also comply with the ESA when threatened or endangered species are affected."). Also as demonstrated above, numerous pesticides registered for use in the United States are known to likely affect the polar bear. To our knowledge, EPA has failed to consult on any pesiticide as to its effects on the polar bear. As such the agency has violated its procedural and substantive obligations to ensure against jeopardizing the species.

Specific pesticides approved for use by the EPA that "may affect" the polar bear and therefore require consultation are described below. For each of these pesticides, EPA must either: (1) reinitiate consultation for those pesticides for which the agency has previously consulted with regard to other species, or (2) initiate consultation for those pesticides that have yet to be reviewed under the consultation process for any species.

1. Organophosphates

Over thirty-five organophosphates ("OPs") registered by EPA are used extensively for agricultural purposes. Of the OPs studied by the USGS, Chlorpyrifos, Malathion, and Diazinon were detected in the greatest percentage of water samples and at the highest concentrations (USGS 2007). Chlorpyrifos, which has more pounds of active ingredient applied to cropland than any other OP, was the most widely distributed OP in surface water. *Id.* Diazinon was the most commonly detected OP in urban streams. *Id.*

OPs exhibit high acute toxicity due to irreversible inhibition of cholinesterase enzymes. Exposure of wildlife to cholinesterase inhibiting pesticides disrupts normal neuromuscular control. Death can occur rapidly due primarily to respiratory failure. Organophosphate exposure can result in chronic effects in animals such as reproduction impairment and delayed neuropathy.

The following is a list of OPs that have been detected in the Arctic which may affect the polar bear and therefore require consultation.

a. Chlorpyrifos

Chlorpyrifos is the most widely used insecticide with both agricultural and urban uses. Chlorpyrifos was found to cause 80% mortality to 17 of 23 beneficial insects tested by the International Organization for Biological Control (Hassan et al. 1988). Synergistic interactions between Chlorpyrifos and a variety of other chemicals have been observed–enhancing the potency of Chlorpyrifos (Cox 1995). Endangered species Levels of Concern (LOCs) are exceeded for small mammals, birds, freshwater fish and invertebrates, and estuarine fish and invertebrates for most Chlorpyrifos uses.[1]

In the Arctic, Chlorpyrifos has been found in seawater, sea ice, and marine fog in the Bering and Chukchi Seas (Chernyak et al. 1996), in snow samples on sea ice from the Chukchi and Beaufort Seas (Garbarino et al. 2002), in snow samples in Alaskan national parks (Hageman et al. 2006), in air samples in the eastern Canadian archipelago (AMAP 2009), in subarctic and Arctic lakes in Canada (AMAP 2009), and in fish samples in Alaskan parks (AMAP 2009).

EPA has consulted with FWS at least five times on potential effects of Chlorpyrifos for various uses on endangered and threatened species. However, EPA has never consulted on the impacts of Chlorpyrifos on the polar bear. EPA issued a Reregistration Eligibility Decision for Chlorpyrifos in July of 2006.

Because use of Chlorpyrifos as authorized by EPA, at a minimum, "may affect" the polar bear, and very likely adversely affects the species, EPA has an obligation to consult on whether registration and/or reregistration of the pesticide jeopardizes the continued existence of the polar bear. EPA's failure to consult violates the agency's procedural and substantive mandates under Section 7 of the ESA.

b. Diazinon

Diazinon is a non-systemic insecticide used in agriculture to control soil and foliage insects and pests on a variety of fruit, vegetable, nut and field crops. Diazinon is also used on non-lactating cattle in an insecticidal ear tag. Prior to the cancellation of all residential uses by 2004, Diazinon was used outdoors on lawns and gardens, indoors for fly control, and in pet collars designed to control fleas and ticks. Diazinon was one of the most widely used insecticides for household and agricultural pest control. In 2000, the EPA announced an agreement with the registrants of Diazinon to cancel all residential uses of Diazinon. Indoor uses were cancelled in 2002 and outdoor uses in 2004, leaving only agricultural uses for Diazinon.

[1] In the registration and reregistration process, EPA conducts an ecological risk assessment, which evaluates the likelihood that exposure to the pesticide may cause harmful ecological effects. Specifically, EPA uses the quotient method to evaluate potential risk to nontarget organisms. Applying this method, risk quotients (RQs) are calculated by dividing the estimated concentrations of a pesticide in the environment by results from ecotoxicity studies in various organisms. A risk results when an RQ exceeds an LOC. An LOC is a value calculated based on the category of nontarget organism and category of concern. When an LOC is exceeded EPA presumes a risk of concern to that particular category. Consequently, when an LOC is exceeded it is fair to infer that that species may be affected by that pesticide. EPA further characterizes ecological risk based on any reported aquatic or terrestrial incidents to nontarget organisms in the field. Based on this information, EPA evaluates the risk posed by the pesticide to nontarget organisms including endangered and threatened species.

Although current agricultural uses of Diazinon are limited to selected crops, and Diazinon products (other than cattle ear tags) are regulated as restricted use pesticides, their continued use poses a threat to the Arctic. EPA has identified ecological risks of concern from Diazinon use, particularly to birds, mammals, bees, fish, and aquatic invertebrates. Diazinon RED, p.7. The EPA also found that Diazinon is highly toxic to mammals dermally and very highly toxic to them based on inhalation exposure, as well as very highly toxic to freshwater fish and invertebrates following acute exposure. *Id.* Of particular note is the finding that the endangered species levels of concern for Diazinon was exceeded for wildlife, aquatic life and terrestrial plants in semi-aquatic areas for all registered use rates of Diazinon. *Id.*

Diazinon has been detected in an ice cap in Svalbard (Hermanson et al. 2005) and in subarctic and Arctic lakes in Canada (AMAP 2009).

EPA has never consulted on the impacts of Diazinon on the polar bear. EPA issued a Reregistration Eligibility Decision for Diazinon in July of 2006.

Because use of Diazinon as authorized by EPA, at a minimum, "may affect" the polar bear, and very likely adversely affects the species, EPA has an obligation to consult on whether registration and/or reregistration of the pesticide jeopardizes the continued existence of the polar bear. EPA's failure to consult violates the agency's procedural and substantive mandates under Section 7 of the ESA.

c. Disulfoton

Disulfoton is an insecticide and acaricide primarily used on a variety of field grown agricultural crops, fruit and nut trees, ornamentals, and Christmas trees. Endangered species LOCs have been exceeded for birds, mammals, freshwater fish, freshwater invertebrates, marine/estuarine fish, and marine/estuarine invertebrates. Disulfoton Revised EFEA, 03/2000, p. 58. Endangered terrestrial, semi-aquatic and aquatic plants may also be affected. *Id*. EPA acknowledges that limitations will be required to protect endangered species. *Id*.

Disulfoton has been detected in subarctic and Arctic lakes and snow (AMAP 2009).

EPA has never consulted on the impacts of Disulfoton on the polar bear. EPA issued a Reregistration Eligibility Decision for Disulfoton in July of 2006.

Because use of Disulfoton as authorized by EPA, at a minimum, "may affect" the polar bear, and very likely adversely affects the species, EPA has an obligation to consult on whether registration and/or reregistration of the pesticide jeopardizes the continued existence of the polar bear. EPA's failure to consult violates the agency's procedural and substantive mandates under Section 7 of the ESA.

d. Fenitrothion

Fenitrothion is an organophosphate insecticide used for commercial greenhouses and outdoor ornamentals. It is highly toxic to birds and aquatic organisms. Endangered species LOCs are exceeded for acute effects to aquatic invertebrates and in some instances to birds and wild mammals, as well as chronic effects to birds and aquatic invertebrates. Fenitrothion RED Factsheet, p. 5. Results from a study where pregnant rats were treated with 0, 5, 10 and 15 mg/kg of the product Sumithion 50EC daily through gestation days 7 to 15, showed a significant difference in mortality up to day 16 postpartum. At the 15 mg/kg dose, 17.5% of the pups died; at the 10 and 5 mg/kg dose, 16.0% of the pups died; at the 0 mg/kg dose, 5% of the pups died. Extension Toxicology Network (Extoxnet) *Pesticide Information Profile on Fenitrothion*. The EPA acknowledges that limitations on fenitrothion's use may be required to protect listed species.

Fenitrothion has been detected at increasing concentrations in an ice cap in Svalbard (Hermanson et al. 2005) and in subarctic and Arctic lakes and snow (AMAP 2009).

EPA has never consulted on the impacts of Fenitrothion on the polar bear. EPA issued a Reregistration Eligibility Decision for Fenitrothion in July of 2006.

Because use of Fenitrothion as authorized by EPA, at a minimum, "may affect" the polar bear, and very likely adversely affects the species, EPA has an obligation to consult on whether registration and/or reregistration of the pesticide jeopardizes the continued existence of the polar bear. EPA's failure to consult violates the agency's procedural and substantive mandates under Section 7 of the ESA.

e. Methyl-parathion

Methyl-parathion is a restricted use insecticide and acaricide used to control boll weevils and other insect pests of agricultural crops. Methyl-parathion use is heaviest in the southern United States and California (cotton growing areas). At currently proposed rates, endangered species LOCs are exceeded for all species groups except plants. Methyl-parathion Revised Envtl Fate and Effect Assessment, 08/1999, p. 61. EPA concluded that, with a great deal of certainty, the use of methyl-parathion poses significant risk to nontarget organisms in terrestrial and aquatic environments. *Id*. Acute and chronic effects on birds, mammals, bees, and aquatic invertebrates are likely to occur as a result of its application. *Id*.

Methyl-parathion has been detected at increasing concentrations in an ice cap in Svalbard (Hermanson et al. 2005) and in subarctic and Arctic lakes and snow (AMAP 2009).

EPA has never consulted on the impacts of Methyl-parathion on the polar bear. EPA issued a Reregistration Eligibility Decision for Fenitrothion in July of 2006.

Because use of Methyl-parathion as authorized by EPA, at a minimum, "may affect" the polar bear, and very likely adversely affects the species, EPA has an obligation to consult on whether registration and/or reregistration of the pesticide jeopardizes the continued existence of the polar bear. EPA's failure to consult violates the agency's procedural and substantive mandates under Section 7 of the ESA.

f. Terbufos

Terbufos is an insecticide-nematicide used to control a variety of insect pests on corn, sugar beets and sorghum. Approximately 7.5 million pounds of active ingredient are used annually. Ecological risks to terrestrial and aquatic organisms have been recognized as a concern by EPA. Terbufos IRED, executive summary, p.2. EPA's concern about potential adverse effects to terrestrial and aquatic organisms is based on the agency's assessment and fish kills associated with the use of Terbufos on corn. *Id*. Aquatic incidents indicate Terbufos is the leading cause of fish kills among pesticides applied to corn and is fourth in causing fish kills for any pesticide applied to any crop. *Id.* at 29. These incidents appear to be associated with normal use. Terbufos presents high acute and chronic risks to nontarget terrestrial species. *Id*. at 28. Acute and chronic LOCs are exceeded for aquatic organisms.

Terbufos has been detected in seawater, sea ice, and marine fog in the Bering and Chukchi Seas (Chernyak et al. 1996), at increasing concentrations in an ice cap in Svalbard (Hermanson et al. 2005), and in subarctic and Arctic lakes and snow (AMAP 2009).

While EPA has initiated at least three consultations with FWS on the effects of Terbufos application to corn crops on listed species, EPA has never consulted on the impacts of Terbufos on the polar bear. EPA issued a Reregistration Eligibility Decision for Terbufos in July of 2006.

Because use of Terbufos as authorized by EPA, at a minimum, "may affect" the polar bear, and very likely adversely affects the species, EPA has an obligation to consult on whether registration and/or reregistration of the pesticide jeopardizes the continued existence of the polar bear. EPA's failure to consult violates the agency's procedural and substantive mandates under Section 7 of the ESA.

2. Non-OP Pesticides

a. Atrazine

Atrazine is a widely used triazine herbicide which is used on major food crops as well as non-crop areas across the U.S. Atrazine is both persistent and mobile in surface and ground water. Atrazine, Reregistration Eligibility Science Chapter, Environmental Fate and Effects Chapter, April 22, 2002 ("Atrazine RED"). The EPA has found that there is "widespread environmental exposure that (1) has resulted in direct acute effects on many terrestrial plant species at both maximum and typical use rates, (2) may have caused direct effects on aquatic non-vascular plants which in turn could have caused reductions in primary productivity, (3) may have caused reductions in populations of aquatic macrophytes, invertebrates, and fish, (4) may have caused indirect effects on aquatic communities due to loss of species sensitive to Atrazine and resulting in changes in structure and functional characteristics of the affected communities." Atrazine RED, p.2. The ecological risk assessment found exceeded levels of concern for direct chronic effects on mammals, birds, fish, aquatic invertebrates and direct acute effects on nontarget terrestrial and aquatic plants. Atrazine may persist at concentrations in excess of LOCs for months. *Id*. at p.3. EPA also stated that LOCs for endangered species are exceeded

for terrestrial plants, vascular aquatic plants, fish, and aquatic invertebrates. *Id.* at 94. EPA also noted that although direct effects of Atrazine use on birds, mammals, and beneficial insects was not anticipated, indirect effects were seen.

Atrazine has been detected in seawater, sea ice, and marine fog in the Bering and Chukchi Seas (Chernyak et al. 1996) and in subarctic and Arctic lakes and snow (AMAP 2009).

EPA has never consulted on the impacts of Atrazine on the polar bear. EPA issued a Reregistration Eligibility Decision for Atrazine in April of 2006.

Because use of Atrazine as authorized by EPA, at a minimum, "may affect" the polar bear, and very likely adversely affects the species, EPA has an obligation to consult on whether registration and/or reregistration of the pesticide jeopardizes the continued existence of the polar bear. EPA's failure to consult violates the agency's procedural and substantive mandates under Section 7 of the ESA.

b. Alachlor

Alachlor is an herbicide from the chloroacetanilide family. It is used mainly to control annual grasses and broadleaf weeds corn (maize), soybean, and peanut farming. Alachlor is highly mobile and moderately persistent. These two characteristics are generally observed in chemicals that reach ground water and surface water. The EPA found in the report Alachlor, Reregistration Eligibility Determination ("Alachlor RED"), that Alachlor presents a clear hazard to groundwater quality, and reliable monitoring studies have demonstrated that Alachlor, even when used according to label directions, results in significant groundwater contamination. Alachlor use also results in groundwater in the use areas being contaminated with degradation products, which are also very mobile and persistent. The monitoring studies also showed that Alachlor levels in surface water result in effects on aquatic plants and indirectly on aquatic animals. Alachlor RED p. 9.

The EPA has determined that Alachlor produces tumors in laboratory rats and mice, and that humans can be exposed to Alachlor through consumption of treated crops, consumption of water containing Alachlor, or contact during handling and use as a pesticide. Based on this finding, use in potato crops, in aerial applications, and around groundwater have been banned. Cornell Herbicide Profile on Alachlor, Profile 6/85.

Alachlor has been detected in seawater, sea ice, and marine fog in the Bering and Chukchi Seas (Chernyak et al. 1996) and in subarctic and Arctic lakes and snow (AMAP 2009).

EPA has never consulted on the impacts of Alachlor on the polar bear. EPA issued a Reregistration Eligibility Decision for Alachlor in September of 1998.

Because use of Alachlor as authorized by EPA, at a minimum, "may affect" the polar bear, and very likely adversely affects the species, EPA has an obligation to consult on whether registration and/or reregistration of the pesticide jeopardizes the continued existence of the polar

bear. EPA's failure to consult violates the agency's procedural and substantive mandates under Section 7 of the ESA.

c. Chlorothalonil

Chlorothalonil is a broad spectrum, non-systemic fungicide. It was first registered for use in the US in 1966, and in 1997, it was the third most used fungicide in the US, behind only sulfur and copper, with some 12 million lbs used in agriculture alone that year. In the US, Chlorothalonil is used predominantly on peanuts, potatoes, and tomatoes, as well as on golf courses and lawns. Pesticide Use in U.S. Crop Production, National Center for Food and Agricultural Policy, 1997. Including non-agricultural uses, the EPA estimates that on average almost 15 million lbs were used in annually from 1990-1996. Reregistration Eligibility Decision (RED) for Chlorothalonil, US EPA, 1999.

For multiple broadcast applications of Chlorothalonil and based on average residues, the mammalian chronic level of concern of 1 is exceeded for applications to turf and orchards (short grass food source). The EPA also acknowledged that registered uses of Chlorothalonil may adversely affect endangered species of birds (chronically), mammals (chronically), freshwater fish (acutely and chronically), freshwater invertebrates (acutely) and aquatic plants. EPA also acknowledged that the limitations in the use of Chlorothalonil may be required to protect endangered and threatened species. Chlorothalonil RED, p. 153.

Chlorothalonil has been detected in seawater, sea ice, and marine fog in the Bering and Chukchi Seas (Chernyak et al. 1996) and has been found in water and air in the eastern Canadian archipelago and in subarctic and Arctic lakes in Canada (AMAP 2009).

EPA has never consulted on the impacts of Chlorothalonil on the polar bear. EPA issued a Reregistration Eligibility Decision for Chlorothalonil in September of 1998.

Because use of Chlorothalonil as authorized by EPA, at a minimum, "may affect" the polar bear, and very likely adversely affects the species, EPA has an obligation to consult on whether registration and/or reregistration of the pesticide jeopardizes the continued existence of the polar bear. EPA's failure to consult violates the agency's procedural and substantive mandates under Section 7 of the ESA.

d. Dicofol

Dicofol is an organochlorine pesticide that is chemically related to DDT. Dicofol is primarily used as a miticide that is used against red spider mite. The EPA found that dicofol may accumulate in plants and therefore be available to mammals. P.76, Difocol RED. The mammalian reproductive study of difocol indicates that dicofol had an effect on mammalian reproductive physiology and on offspring, including reduced viability of young; an increased number of stillborn births, an increased number of early deaths, and a weight reduction of the young. *Id.* pp.87-88.

Dicofol has been detected in Arctic air samples (AMAP 2009).

EPA has never consulted on the impacts of Dicofol on the polar bear. EPA issued a Reregistration Eligibility Decision for Dicofol in September of 1998.

Because use of Dicofol as authorized by EPA, at a minimum, "may affect" the polar bear, and very likely adversely affects the species, EPA has an obligation to consult on whether registration and/or reregistration of the pesticide jeopardizes the continued existence of the polar bear. EPA's failure to consult violates the agency's procedural and substantive mandates under Section 7 of the ESA.

e. DCPA (Dachtal)

DCPA or Dachtal is used for selective preemergence weed control on ornamental turf and plants, strawberries, seeded and transplanted vegetables, cotton, and field beans. The risks of concern include carcinogenic risk to children playing on lawns post-treatment, carcinogenic risk through contaminated drinking water, chronic risks to wild mammalian species, including endangered species, and acute risks to freshwater and estuarine mollusks, including endangered species. The EPA's ecological effects risk assessments also indicate that there may be a concern for endangered mammals and mollusks exposed to DCPA. (Reregistration Eligibility Decision for DPCA 11/1998).

Dachtal has been found in snow from the Alaskan coast; in air, seawater and invertebrates from the Canadian Arctic; in subarctic and Arctic lakes in Canada; in Russian river sediment; in fish and seals from the Canadian Arctic; and in fish from Alaskan parks (AMAP 2009).

EPA has never consulted on the impacts of DCPA/Dachtal on the polar bear. EPA issued a Reregistration Eligibility Decision for DCPA/Dachtal in September of 1995.

Because use of DCPA/Dachtal as authorized by EPA, at a minimum, "may affect" the polar bear, and very likely adversely affects the species, EPA has an obligation to consult on whether registration and/or reregistration of the pesticide jeopardizes the continued existence of the polar bear. EPA's failure to consult violates the agency's procedural and substantive mandates under Section 7 of the ESA.

f. Endosulfan

Endosulfan is a broad spectrum contact insecticide and acaricide registered for use on a wide variety of vegetables, fruits, cereal grains, and cotton, as well as ornamental shrubs, trees, vines, and ornamentals for use in commercial agricultural settings. Total average annual use of endosulfan is estimated at approximately 1.38 million pounds of active ingredient (lbs. ai), according to Agency and registrant estimates. An estimated 1.4 million to 2.2 million pounds of endosulfan are applied annually. Endosulfan produces neurotoxicty effects. Endosulfan EFED Risk Assessment for the Reregistration Eligibility Decision for Endosulfan (Thiodan), 04/2001, at Endosulfan Summary (hereinafter "Endosulfan RED"). Additionally, incident data has confirmed toxicity to both birds and fish. *Id.* Outside of incidents associated with

organophosphates and carbofuran, endosulfan-related incidents account for the greatest percentage of nontarget mortality reported in EPA's Ecological Incident Information System. EPA also acknowledges that endosulfan is an endocrine disruptor. EPA Memorandum, Dec. 11, 2000, Endosulfan: Evaluation of Registrant Submission *Endosulfan: Evaluation of Possible Endocrine Effects in Mammalian Species*, US EPA, Office of Prevention, Pesticides and Toxic Substances; Endosulfan RED, p. 30.

EPA's ecological assessment indicates that endosulfan is "very highly toxic to both terrestrial and aquatic organisms." Endosulfan RED, p. 2. Endosulfan is likely to result in acute and chronic risk to both terrestrial and aquatic organisms. *Id.* at 24. Mortality to nontarget fish is probable; there is a 90% probability that roughly 60% of all aquatic species will suffer 50% mortality for the most vulnerable uses." *Id*. Current endosulfan use rates on 88% of the crops modeled will exceed acute high risk LOCs more than 99% of the time. *Id*. at 25.

EPA states in the RED that "[a]lthough the [FWS] issued a biological opinion on endosulfan in 1989 many additional species have been federally listed since that time and determination of jeopardy to these newly listed species has not been assessed. Additionally, the 1989 biological opinion did not consider endangered insects." Endosulfan RED, at cover page; *see also id.* at p.31. Furthermore, EPA states that at current application rates, endosulfan use is likely to result in both acute and chronic risks to endangered/threatened species. *Id*. at p.31.

Endosulfan has been detected in seawater, sea ice, and marine fog in the Bering and Chukchi Seas (Chernyak et al. 1996), in snow samples on sea ice from the Chukchi and Beaufort Seas (Garbarino et al. 2002), in snow samples in Alaskan national parks (Hageman et al. 2006), in air samples across the Arctic (Su et al. 2008), in air and precipitation samples in Canada (Tuduri et al. 2006), and in surface seawater across the Arctic with the highest-detected α-endosulfan concentrations in the Bering and Chukchi Seas (Weber et al. 2006).

Endosulfan (α- and β-endosulfan) has been detected in subcutaneous adipose tissue of polar bears (2 ng/g wet weight and 4 n/g lipid weight) sampled along the Beaufort Sea coast of Alaska in spring 2003 (Bentzen et al. 2008). Endosulfan has also been detected in adipose tissue and blood of polar bears from Svalbard at a mean concentration of 6.7 ng/g wet weight (Gabrielsen et al. 2004). In addition, endosulfan was detected in the blubber of minke whales in the European Arctic (Hobbes et al. 2003), and endosulfan sulfate (an endosulfan break-down product) was detected in the blubber of male beluga whales in the eastern Canadian Arctic (Braune et al. 2005). Age-adjusted mean concentrations of endosulfan sulfate in beluga blubber in the Canadian Arctic increased 3-fold during a twenty year period from 1982-2002 (Braune et al. 2005).

EPA has never consulted on the impacts of Endosulfan on the polar bear. EPA issued a Reregistration Eligibility Decision for Endosulfan in July of 2002 and a Revised Reregistration Eligibility Decision in November of 2007.

Because use of Endosulfan as authorized by EPA, at a minimum, "may affect" the polar bear, and very likely adversely affects the species, EPA has an obligation to consult on whether registration and/or reregistration of the pesticide jeopardizes the continued existence of the polar

bear. EPA's failure to consult violates the agency's procedural and substantive mandates under Section 7 of the ESA.

g. Metolachlor

Metolachlor is a broad spectrum herbicide used for general weed control in many agricultural food and feed crops (primarily corn, soybeans, and sorghum), and on lawns and turf, ornamental plants, trees, shrubs and vines, rights of way, fencerows and hedgerows, and in forestry. It is the second most widely used herbicide in the United States. Acute as well as chronic exposures to nontarget organisms can result from direct applications, spray drift and runoff. The LOC for acute and chronic effects to endangered avian species eating short grass is exceeded at an application rate of 6 lbs/acre. Metolachlor RED, 12/1994, p. 37. The endangered species LOC is exceeded for small mammals eating short grass at an application rate of 2 lbs/acre. *Id*. Endangered species LOC is exceeded for freshwater fish in shallow water bodies. *Id*. Metalochlor has been found to adversely affect the growth and development of juvenile fish at low level concentrations. This is of concern given the fact that it is among the top five pesticides detected in surface water in the Midwest.

Metolachlor has been detected in seawater, sea ice, and marine fog in the Bering and Chukchi Seas (Chernyak et al. 1996), at increasing concentrations in an ice cap in Svalbard (Hermanson et al. 2005), and in subarctic and Arctic lakes and snow (AMAP 2009).

EPA has never consulted on the impacts of Metolachlor on the polar bear. EPA issued a Tolerance Reassessment Progress and Interim Risk Management Decision for Metolachlor in July of 2006.

Because use of Metolachlor as authorized by EPA, at a minimum, "may affect" the polar bear, and very likely adversely affects the species, EPA has an obligation to consult on whether registration and/or reregistration of the pesticide jeopardizes the continued existence of the polar bear. EPA's failure to consult violates the agency's procedural and substantive mandates under Section 7 of the ESA.

h. Trifluralin

Trifluralin is an herbicide used to control annual grasses and some broadleaf annual weeds on a variety of crops, shrubs, and flowers. It is used mostly on cotton, as well as on soybeans and some fruits and vegetables. Skeletal abnormalities were observed in the offspring of mice exposed via gavage. U.S. Environmental Protection Agency. *Health and Environmental Effects Profile for Trifluraline*. EPA/600/x-84/234. For aquatic animals (fish and invertebrates), Trifluralin ranked as moderate to high toxicity according to the hazard classification scheme. Risk quotients for acute effects do not indicate concerns for nonendangered species, but the more sensitive endangered species risk quotients are exceeded (for freshwater fish, RQ 0.03 to 0.08 versus an LOC of 0.05). In rats and rabbits exposed via gavage, depressed fetal weight was observed. U.S. Department of Health and Human Services. Registry of Toxic Effects of Chemical Substances (RTECS, online database). National Toxicology Information Program, National Library of Medicine, Bethesda, MD. 1993. In addition, laboratory and field studies

suggest exposure-related abnormalities in vertebral development at concentrations below those where acute effects are anticipated. Trifluralin RED, p. 18.

Trifluralin has been detected in seawater, sea ice, and marine fog in the Bering and Chukchi Seas (Chernyak et al. 1996) and in subarctic and Arctic lakes and snow (AMAP 2009).

EPA has never consulted on the impacts of Trifluralin on the polar bear. EPA issued a Tolerance Reassessment Progress and Interim Risk Management Decision for Trifluralin in August of 2004.

Because use of Trifluralin as authorized by EPA, at a minimum, "may affect" the polar bear, and very likely adversely affects the species, EPA has an obligation to consult on whether registration and/or reregistration of the pesticide jeopardizes the continued existence of the polar bear. EPA's failure to consult violates the agency's procedural and substantive mandates under Section 7 of the ESA.

In sum, each of the above-listed pesticides has been detected in the environment within the range of the polar bear. Pesticide contamination has been linked to negative immune, endocrine, and reproductive effects on polar bears. The occurrence of these pesticides in the Arctic stems in whole or in part from their use outside the Arctic, including use in the lower 48 United States. Each of the above-listed pesticides could not be lawfully used in the United States absent registration by the EPA. EPA's registration of such pesticides constitutes "agency action" under the ESA, and since such action, at a minimum, "may affect" the polar bear, EPA is required by Section 7 of the ESA to ensure through consultation that registration of these pesticides does not jeopardize the continued existence of the polar bear. EPA has utterly failed to comply with this procedural and substantive mandate.

B. Violation of Conservation Obligations

Section 2(c) of the ESA establishes that it is "…the policy of Congress that all Federal departments and agencies shall seek to conserve endangered species and threatened species and shall utilize their authorities in furtherance of the purposes of this Act." 16 U.S.C. § 1531(c)(1). The ESA defines "conservation" to mean "…the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to this Act are no longer necessary." 16 U.S.C. § 1532(3). Similarly, Section 7(a)(1) of the ESA directs that the Secretary review "…other programs administered by him and utilize such programs in furtherance of the purposes of the Act." 16 U.S.C. § 1536(a)(1). The Supreme Court stated in *TVA v. Hill* that these provsions of the ESA create a "stringent mandatory language [that] reveals an explicit congressional decision to require agencies to afford first priority to the declared national policy of saving endangered species." *TVA v. Hill*, 437 U.S. 153, 183 and 185 (1978). EPA has utterly failed to satisfy this duty by failing to use its authorities to regulate pesticide use in the United States so as to avoid the adverse impacts of pesticides on the Arctic ecosystem and, by extension, the polar bear.[2]

[2] EPA is also in violation of Section 7(a)(1) for its failure to prevent take of polar bears resulting from pesticides authorized by the agency. *See, e.g. Sierra Club v. Babbitt*, 65 F.3d 1502, 1511 fn. 15 (9th Cir. 1995) ("Indeed, section 7(a)(1) would appear to *require* the BLM to utilize its authority under the stipulation to suspend an activity

III. CONCLUSION

As described above, Sections 2(c) and 7(a)(1) of the ESA place affirmative conservation mandates on EPA to utilize its authorities in furtherance of the purposes of the ESA. 16 U.S.C. §§ 1531(c)(1) & 1536(a)(1). EPA's actions described above authorizing pesticide use that contaminate the Arctic violate these provisions as they do not further the conservation of the polar bear; in fact they do just the opposite, as they authorize activities that adversely impact individual bears, degrade and pollute polar bear habitat, and undermine the ability of the species to persist in a warming climate.

Also as discussed above, Section 7 of the ESA requires each federal agency to insure that any action authorized, funded, or carried out by such agency . . . is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the adverse modification of habitat of such species . . . determined . . . to be critical . . ." 16 U.S.C. § 1536(a)(2); 50 C.F.R. § 402.14(a). To accomplish this goal, agencies must consult with FWS and FWS must conduct intra-agency consultation whenever their actions "may affect" a listed species. 16 U.S.C. § 1536(a)(2); 50 C.F.R. § 402.14(a). There is no reasonable dispute that each of the pesticide registrations/reregistrations listed above constitutes an "agency action" as that term is defined under the ESA. 50 C.F.R. § 402.02. Nor can there be any dispute that these actions "may affect" the polar bear. To the degree EPA has already initiated/reinitiated consultation, the continued authorization of these pesticides constitutes a violation not only of Section 7(a)(2), but also of the requirements of Section 7(d), which prohibits federal agencies from making "any irreversible or irretrievable commitment of resources." 16 U.S.C. § 1536(d). Section 7(d) prohibitions remain in effect throughout the consultation period and until the federal agency has satisfied its obligations under section 7(a)(2) that the action will not result in jeopardy to the species or adverse modification of its critical habitat.

If the polar bear is to survive in a rapidly warming Arctic, other adverse impacts to the species such as from pesticides and other contaminants, must be reduced to an absolute minimum or eliminated entirely. The polar bear will not survive the coming decades if we as a society do not address these intertwined threats to its existence. Prompt compliance with the ESA by the EPA is an essential step towards this end.

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that would result in a taking.")(emphasis in original). The term "take" is defined broadly to include "harass, harm, pursue, hunt, shoot, wound, trap, kill, capture, or collect, or to attempt to engage in any such conduct." 16 U.S.C. § 1532(19); 50 C.F.R § 17.3. Registration of pesticides is a federal action that can cause the take of listed species. *Defenders of Wildlife*, 882 F.2d at 1300. As discussed above, many of the pesticides registered by the EPA are toxic to the polar bear, have been found in the Arctic environment, and are causing impacts to the species that amount to take. Section 9 of the ESA generally prohibits any person, including federal agencies, from taking any endangered or threatened species. 16 U.S.C. § 1538(a)(1)(B). However, in the case of the polar bear, FWS has promulgated a special rule pursuant to Section 4(d) of the statute that exempts from the take prohibition of the ESA activities harming the polar bear that originate outside the current range of the species. 50 C.F.R § 17.40(q). Notwithstanding this illegal rule, EPA still has an obligation under Section 7(b)(4) to minimize and mitigate the impacts of any taking on the polar bear. 16 U.S.C. § 1536(b)(4). Neither EPA nor FWS have complied with this provision.

In sum, EPA's pesticide registrations/reregistrations listed above without completing consultation on the impacts of such activities on polar bears, constitute ongoing violations of Section 7 of the ESA. If EPA does not act within 60 days to correct the violations described in this letter, the Center will pursue litigation against you and your agencies and officials in Federal Court and seek declaratory and injunctive relief. An appropriate remedy that would prevent litigation would be for the EPA to initiate formal consultation under ESA Section 7 regarding the effects of these pesticide on polar bears, including analyzing the cumulative effects of these pesticides in the context of a warming climate. Moreover, EPA must rescind or suspend registration of all pesticides that "may affect" the polar bear pending the completion of such consultation.

If you have any questions, wish to meet to discuss this matter, or feel this notice is in error, please contact me at 760-366-2232 x304. Thank you for your concern

Sincerely,

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