November 23, 2002

Margaret Boland, Forest Supervisor
Klamath National Forest,
1312 Fairlane Road, Yreka, California 96097

ATTN: Anne Yost, Interdisciplinary Team Leader

Re: Scoping comments on the Noxious and Invasive Plant Control Project

Dear Ms. Boland:

The Environmental Protection Information Center has reviewed the scoping notice for the Noxious and Invasive Plant Control Project (NIPCP). The Klamath National Forest has proposed spraying of four toxic herbicides (glyphosate, clopyralid, triclopyr, and dicamba) and introduction of two exotic insects (hairy weevil and peacock fly) to control "noxious and invasive" plants on 27,000 acres of the Klamath National Forest (KNF) for at least five years. The Forest is requesting scoping comments on the development of the Environmental Impact Statement (EIS).

Please consider the following comments in your development and analysis within the EIS.

We are opposed to the use of any herbicide or biological control on the Klamath National Forest because of the significant adverse health and environmental impacts. The KNF should not spray toxic herbicides that will poison the air, land, and water. Herbicides and biological controls may cause an irreversible and irretrievable commitment of resources due to their toxicity and persistence in the environment. We believe that the EIS should specifically address the time frame of the proposed activities, as opposed to, "Implementation would begin in the spring and summer following the decision and extend for a period of at least five years."(NIPCP pg.15). The scoping notice also did not disclose the quantity proposed for use. The time frame of at least five years is too nebulous, and is also the lack of information regarding quantities proposed for each chemical/product. The EIS will not be able to sufficiently analyze all the impacts from the proposed action if the time frame of the proposed activity is not more clearly defined, and quantities are not provided.

The scoping notice provided minimal information about the proposed chemicals, the proposed formulations, the proposed quantity, and the products proposed for use for each target species. These deficiencies should be addressed in the EIS. The EIS should provide mapped locations for each of the 17 target plants, as opposed to the scoping notice maps, which only generally show information about groups of plants in the "A" rating, or the "B" and "C" ratings, and the potential treatment areas. The lack of specific information makes it difficult to assess the scope and extent of the activities proposed, the potential impacts, and the purpose and need for the proposed action. The EIS should fully disclose which chemical products are proposed for use on each particular plant, including the manufacturer, the inert ingredients, the proposed surfactant, and the dilution factor, on a site-specific basis. The EIS should also

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specifically describe the glyphosate formulation for aquatic use. In fruit flies, both Roundup and Pondmaster (an aquatic herbicide consisting of glyphosate and a "trade secret" surfactant) increased the frequency of sex linked lethal mutations. The EIS should address the potential for application of multiple chemicals at one site over time if more than one target species is present, and the synergistic health and environmental effects that will result from the application of multiple chemicals, surfactants, and the inert ingredients used at the same place over time. The EIS should assess the potential adverse health and environmental impacts of each of the chemicals and each of the products proposed for use.

The following section outlines our specific concerns associated with each chemical.

GLYPHOSATE. Glyphosate is a broad spectrum herbicide, and the only non-selective herbicide proposed for use by the KNF. Trade names for products containing glyphosate include Gallup, Landmaster, Pondmaster, Ranger, Roundup, Rodeo, and Touchdown. Glyphosate is manufactured by Monsanto Company. It may be used in formulations with other herbicides. There are two forms of glyphosate; N-(phosphonomethyl) glycine and isopropylamine salt of glyphosate. Which form and product is the KNF proposing to use? Glyphosate products contain different inert ingredients, such as ammonium sulfate, benzisothiazolone, 3-iodo-2-propynyl butylcarbamate, isobutene, methyl pyrrolidinone, pelargonic acid, polythoxylated tallowamine, potassium hydroxide, sodium sulfite, sorbic acid, and isopropylamine. What inert ingredients will be applied in combination with the glyphosate, and what are the documented health effects?

Glyphosate containing products are acutely toxic to animals, including humans. Laboratory studies have found that all glyphosate containing products include medium term toxicity (salivary gland lesions) long term toxicity (inflamed stomach linings) genetic damage (in human blood cells) effects on reproduction (reduced sperm counts in rats, increased frequency of abnormal sperm in rabbits), and carcinogenicity (increased frequency of liver tumors in male rats and thyroid cancer in female rats) (Cox 1998). People who were occupationally exposed to glyphosate herbicides had a threefold higher risk of hairy cell leukemia, a form of the cancer non-Hodgkins lymphoma. In addition, glyphosate has been associated with an increase in miscarriages, premature births, and attention deficit disorder. We are concerned that the human population and the wildlife will be exposed to the same health risks.

Another alarming issue about glyphosate is the acute toxicity of the fumes from the chemical if they are volatized. Volatization could occur through prescribed fire, an escaped campfire, or any other wildfire situation if the fire produced enough heat to cause decomposition of the chemical. According to lab studies, when heated to decomposition, glyphosate emits very toxic fumes of nitrogen oxides and phosphorus oxides (Sax and Lewis 1989). How is the KNF able to ensure that the areas where herbicides are applied will not also be subjected to enough heat that noxious toxic fumes will not endanger firefighters, the community, the terrestrial, air, and aquatic environment?

TRICLOPYR. Triclopyr is a selective herbicide used to kill broadleaf plants. Two forms of triclopyr are used in herbicides. Trade names for herbicides containing triclopyr include but are not limited to Access, Crossbow, ET, Garlon, Grazon, PathFinder, Redeem, Rely, Remedy, and Turflon. The main manufacturer is Dow AgroSciences. The herbicide may be mixed with picloram or with 2,4-D to extend its utility range. While just triclopyr is known as 3,5,6-trichloro-2-pyridinyloxy acetic acid, herbicides contain either triethylamine salt of triclopyr, or the butoxyethyl ester of triclopyr. Which form and what products is the KNF proposing to use?

Triclopyr has many different documented toxicities. Triclopyr causes an increase in breast cancer, an increase in genetic damage such as dominant lethal mutations, an increased incidence of reproductive problems, and damage to the kidneys. The ester form of triclopyr is highly toxic to fish, inhibits behaviors

in frogs that help them avoid predators, and decreases the survival rate of baby birds. Triclopyr also inhibits the growth of mycrorhizal fungi, and with fixation of atmospheric nitrogen. Triclopyr is mobile in soil and readily contaminates wells, streams, and rivers. The major breakdown product of triclopyr (3,5,6-trichloro-2-pyridinol) disrupts normal growth and development of nervous systems and accumulates in fetal brains. We are very concerned that these same effects will occur in wildlife and people if the KNF uses this chemical on our National Forest.

We are intrigued that most of the herbicides chosen are toxic to broadleaf plants, not grasses, such as triclopyr, dicamba, and clopyralid. There are many exotic grasses present on the KNF, yet it appears that exotic grasses are not targeted at all. There is the possibility that all broadleaf plants will be killed by herbicides, yet the species composition will remain largely exotic because no native grasses are present. If the exotic grass species are already dominant, conditions will not be conducive for re-establishment of native grass species. We can only conclude that result of the project may in fact be to increase grazing opportunities for livestock as opposed to protecting overall species diversity and ecosystem function. Nowhere in the purpose and need of the proposed project is managing invasive weeds for the benefit of livestock mentioned, except in terms of grazing as a factor that increases the rate of establishment and spread for most noxious weeds. The EIS should address what the purpose and need is for spraying at each location, the future desired condition of the ecosystem, and how the selected herbicide will achieve those objectives at each site.

Species diversity in most ecosystem types that are not exclusively grasses would best be served by other treatment systems that do not non-selectively kill all broadleaf plants. The example state listed rare plant in the scoping notice, the Siskiyou mariposa lily (*Calochortus persistens*), is a broadleaf plant, yet the area is proposed for treatment with triclopyr, an herbicide that is most toxic to broadleaf plants. It has been documented that triclopyr can have unintended effects on plants that are not the target of the herbicide application. These effects include drift damage, genetic damage, inhibition of mycrorrhizal fungi, reduction of nitrogen cycling, damage to mosses and lichens, and stimulation of algae blooms. Therefore, we do not believe that herbicides will meet the objectives outlined in the scoping notice for the proposed project, and particularly at the site of the Siskiyou mariposa lily (*Calochortus persistens)*.

CLOPYRALID. Clopyralid is a selective herbicide used to kill broadleaf plants. Clopyralid is often sold under the brand names Transline, Stinger, Reclaim, Confront, and many others, and is produced primarily by Dow AgroSciences. Clopyralid comes in three different forms, the triethylamine salt of clopyralid, the triisopropylamine salt of clopyralid, and the monoethanolamine salt of clopyralid. Which form(s) is the KNF proposing to use, and which product? Clopyralid is a long lasting, persistent herbicide that has even been banned from use in Washington because contaminated plant material in compost was affecting the growth of future crops because it does not break down in the composting process (Coddington, 2002). Clopyralid is also extremely persistent in soil, according to an EPA review, with persistence as long as 14 months. Yet while Clopyralid is persistent in soil, it volatilizes easily, move away from the application site, and can adversely affect nontarget broadleaf plants, according to the EPA. Because of the toxicity of Clopyralid, volatilization of only one percent of applied Clopyralid would be enough to damage nontarget plants. As a result, Clopyralid could jeopardize all nontarget plants, lichens, bryophytes, and mosses, including survey and manage, MIS, and rare, threatened, or endangered flora and fauna on the KNF. Clopyralid is also toxic to beneficial insects. How will the KNF ensure that nontarget plants and beneficial insects are not adversely impacted by herbicide use, particularly with the risk of drift?

Resistance to Clopyralid has been documented in a yellow starthistle population in Washington. What if herbicide applications are ineffective because the local populations develop resistance to the herbicide? The KNF will be forced to continue applying larger, more toxic quantities of herbicides in an attempt to implement an effective control treatment, yet the end result will be an increasing toxic, poisoned environment with little or no guarantee of effectiveness in eradicating the target species. This same

concern is also applicable to all the other proposed herbicides and the likelihood of resistances developing over time to herbicide treatments. How will the KNF address this problem? What are the proposed application rates for each herbicide, and the dilution factor? What if they prove ineffective?

Clopyralid is associated with substantial reproductive problems, including skeletal abnormalities in fetuses, an increase in hydrocephaly, a reduction in the number of red blood cells, and a reduction in the weight of fetuses. It is unknown whether Clopyralid causes cancer. How will the KNF ensure that this chemical does not cause adverse health effects in wildlife, fish, and people?

DICAMBA. Dicamba is another selective herbicide that is used to kill broadleaf plants, produced by Sandoz Crop Protection, and PBI/Gordon Corp. There are two common forms of the herbicide, the 2-methoxy-3,6-dichlorobenzoic acid form, and the dimethylamine salt. Common product names include Banvel , Banvel GST(Sandoz Crop Protection), and Trimec (PBI/Gordon Corp) (Trimec also contains 2,4-D and mecoprop). Which form and which product is the KNF proposing to use?

Dicamba acts by mimicking auxins in the plant, resulting in abnormal cell division. It also acts by inhibiting an enzyme found in the nervous system, acetylcholinesterase. Inhibition prevents the smoth transition of nerve impulses. It inhibits enzymes in anaimal livers that detoxify and excrete foreign chemicals. An oral dose of 3.5 oz. would kill an average sized human. Dicamba caused reproductive problems even at extremely low doses in laboratory tests. These adverse effects were exhibited in both mammals and birds. Dicamba is also alarmingly mutagenic, significantly increasing the unwinding rate, or single strand breaks, of the genetic material in rat livers. It also caused unscheduled DNA synthesis and an increase in sister chromatid exchanges. Dicamba has also caused mutations in bacteria. Dicamba greatly increases the risk of contracting the cancer non-Hodgkin's lymphoma up to two decades after exposure. There are also impurities in the products that increase the potential carcinogenicity, such as dimethylnitrosamine, which causes cancer in lab animals. Given the potential adverse health effects, why is the KNF proposing to use such a toxic chemical? What will the KNF do to ensure that the environment is protected from this poisonous chemical?

Dicamba volatizes easily from plant surfaces, particularly when temperatures are over 85?F, which are exceeded daily in the summer on the KNF. Vapors can drift up to 5-10 miles, which greatly increases the chance of contamination of nontarget plants, wildlife, water sources, streams, and areas that could be adversely effected. Another documented effect of Dicamba was that it increases the incidence of plant diseases, Bipolaris sorokiniana, or leaf spot disease, and the take-all infection. It also reduces germination of other plants, such as oak seedlings, and reduced the soils ability to fix nitrogen. Dicamba is also persistent in the soil, and has been documented to last as long as 13 months. Dicamba also persists longer in dry soils than in wet soils. We are extremely concerned about the toxicity, drift potential, and persistence of this chemical and expect the KNF to fully analyze the potential adverse effects that may result from using products containing Dicamba. We are also concerned that Dicamba may increase the risk of other plant diseases on the KNF.

Dicamba also contains numerous toxic inert ingredients. Virtually all the testing that has been done on Dicamba have been on the chemical itself, not the products and their inert ingredients and contaminants. There is evidence that these other ingredients greatly increase the toxicity and the health risks. We are very concerned that these health risks are largely unknown and believe that the EIS should disclose how little we know about the health and environmental risks associated with this chemical, the other herbicides proposed for use, including the inert ingredients, and any other chemicals used on the KNF, including but not limited to rodenticides, fire retardants, fire propellants, and any other pesticides, and the potential for synergistic effects with surfactants, and between chemicals if multiple chemicals are used at the same location over time. We also believe that what we do know enough about the risks to know that the toxicity of these chemicals far outweighs any of the dubious benefits of herbicide treatments.

Spraying toxic herbicides will cause significant adverse cumulative impacts on the Salmon and Klamath River watersheds, including but not limited to the plants, mushrooms, wildlife, fish, and birds. The EIS should fully disclose the potential impacts to all non-target flora and fauna present within and around the areas proposed for treatment, including listed, threatened, candidate, survey and manage, and Management Indicator Species (MIS). The KNF should not spray herbicides within ten feet of water as proposed because waters of the Klamath National Forest provide drinking water and other beneficial uses, as well as spawning and rearing habitat for federal Endangered Species Act (ESA) and California Endangered Species Act (CESA) listed and candidate salmon and steelhead, which are also important to traditional Native Americans and other forest users. The impacts of herbicide spraying to beneficial water quality uses, cultural uses, and tribal trust resources of the forest should be carefully considered and addressed as part of the EIS.

Many of the plants are considered desirable garden plants and are listed on the internet as cultivars available for sale. At the same time, all the noxious weeds proposed for treatment are associated with disturbance, roads, vehicles, logging, livestock grazing, mining, fire suppression activities, and application of fire retardants, the EIS must address the root causes of the spread of noxious weeds rather than simply attempting to address the symptoms if any degree of success is to be achieved through the noxious weed program. The extent of noxious weeds on the KNF is a statement about what a poor land manager the KNF and the neighboring private lands are of their rangelands. Most "weed problems" are really "people problems" from poor land management and a lack of ecological insight. It is easy to reach for a tool like fire, mowing, or herbicides to attack an out-of-control weed, but often those tools do little to get to the root cause of the weed infestation, and sometimes make the problems worse. Any decent Integrated Pest Management Program (IPMP) recognizes the importance of good range management practices for managing populations of noxious weeds. Proper grazing management is essential. Nowhere in the scoping notice was any mention made that the KNF will be attempting to address the sources of the noxious weeds and grazing management, rather than simply the presence of the plant itself after it has already been introduced and spread through poor land management practices. For example, maintaining pastures and rangeland in good condition is a primary factor for thistle management. To favor pasture and rangeland grass growth, do not overgraze. Fertilize only when necessary and according to soil testing recommendations. To successfully manage musk thistle, prevent seed formation.

Because fire retardants are essentially fertilizer, the application of fire retardants can be expected to increase the distribution of thistles, and should be minimized. We are concerned that the use of fire rretardants is increasing the proliferation of noxious weeds on the KNF. We request that the EIS analyze the combined effects of fire retardants, noxious weeds, and herbicide use on the KNF. We are concerned that the manufacturer of the fire retardant phos-chek is also the same manufacturer of glyphosate (Monsanto). We believe this constitutes a conflict of interest and unfair business practices. We are greatly concerned that there is an incentive for dumping excessive fire retardants (phos-chek) as part of fire suppression activities that will cause a proliferation of noxious weeds that can then be treated with herbicides (glyphosate).

We are concerned that if herbicides are used, it will be virtually impossible to have any degree of success without multiple applications. This would greatly increase the level of toxicity that nontarget plants, wildlife, and the people would be exposed to over the course of one growing season. Where are the populations of spotted knapweed, squarrose knapweed, diffuse knapweed, musk thistle, leafy spurge, dalmation toadflax, scotch thistle, taurian thistle, dyer’s woad, whitetop, Russian knapweed, perennial pepperweed, Canada thistle, yellow starthistle, scotch broom, meadow knapweed, and houndstounge specifically located? The maps provided with the scoping notice did not provide enough information to allow adequate analysis of the potential threats and impacts from each plant, and whether the proposed

action is necessary. We request more detailed mapping of locations in the EIS for each of the above mentioned plants. How many applications of herbicides in one season is the KNF proposing to apply on each plant? We are concerned that the KNF does not have any specific cultural measures proposed for the listed noxious weeds in the scoping notice. Without follow-up pulling of plants, and revegetation, no method will be successful. Mowing can greatly reduce seed production. Mowing, just after flowering, but prior to seed maturation is an option for areas with little other vegetation that are not steep or rocky. Hand removal and hand clipping prior to seed maturation are other management options, although soil disturbance may promote other weed colonization (Rocky Mountain National Park). Hot prescribed burns may reduce established stands of knapweed. A follow-up of selective pulling and digging will further reduce populations. Annual burns have reduced populations by 5-90% and may be correlated with burn intensity. Reseeding with a native species is recommended (the Nature Conservancy, 1999). We request that the KNF develop an alternative that emphasizes cultural control (removing the plants, mowing, prescribed burning, concentrated, rotational grazing, followed by planting with native species). Much of the literature suggests that continued diligent removal of the plant prior to flowering would be more successful than application of herbicides.

Spotted knapweed *(Centaurea maculosa)*. Spotted knapweed is a short-lived, noncreeping perennial that reproduces from seed and forms a new shoot each year from a taproot. Perennial plants resume growth in early spring and bolt at approx. the same time as diffuse knapweed. Flowering occurs through the summer into fall. The seeds are the primary source of reproduction. Seeds remain viable after eight years of burial. Spotted knapweed germinates in spring or fall. Unless cultural techniques are used when plants are removed, the Spotted knapweed will reinvade. Seeding suitable perennial grasses or broadleaf plants is necessary to prevent weed reinvasion. Seeds dispersed by livestock, rodents, vehicles, in hay or commercial seed. Livestock (sheep, goats, cattle) will eat diffuse and spotted knapweed. Recent research completed by Colorado State shows that cattle grazing diffuse knapweed twice in spring decreased seed set by 50 percent and tumbling off-site over winter by 15 percent. Cattle were managed to achieve 50 percent utilization of pasture and were allowed to graze at two 10-day intervals when diffuse knapweed was bolting and about 6 to 12 inches tall.

Squarrose knapweed *(Centaurea squarrosa)*. This is a long-lived taprooted perennial typically reaching heights of 12 to 18 inches. Unlike diffuse knapweed, seed heads are highly deciduous, falling off the stems soon after seeds mature. Squarrose knapweed is well adapted to dry, disturbed areas and open habitats. It is rare on crop lands or irrigated pasture because it cannot tolerate cultivation or excessive moisture. The seed heads readily attach to animal fur and vehicle tires. We believe the most effective way to deal with this plant is to minimize disturbance where it occurs, and pull plants before they set seed, followed by repeated visits to the area to remove any re-occurring plants or new seedlings.

Musk thistle *(Carduus Nutans)*. Musk thistle is a biennial weed that reproduces only from seed. The key to successful musk thistle control is to prevent seed production. Therefore, mowing, clipping, burning, and even grazing could be used to control populations of this plant. Vigorously growing grass competes with musk thistle, and fewer thistles occur in pastures where grazing is deferred. Seedlings normally emerge early in spring, develop into rosettes and spend the first season in this growth stage. Seedling emergence also can occur in fall. All seedlings grow into rosettes and overwinter in that stage. Musk thistle's tolerance to most herbicides increases after it bolts. Musk thistle will not tolerate tillage and can be removed easily by severing its root below ground with a shovel or hoe. Mowing can effectively reduce seed output if plants are cut when the terminal head is in the late-flowering stage. Gather and burn mowed debris to destroy any seed that has developed. We are concerned that the KNF has not adequately explored alternative methods of control to herbicides, such as mowing, clipping, burning, and even rotational grazing. We request that the EIS address the phenology of each plant, its growth habits, and other methods of control that do not use herbicides.

Leafy Spurge *(Euphorbia esula).* Intensive, long-term, integrated management is necessary to reduce leafy spurge infestations. The KNF is not capable of maintaining the level of management necessary to eradicate this plant. At Devil's Tower National Monument in Wyoming, managers have been spraying on an annual basis for about 20 years and have not eradicated leafy spurge populations. We question the likely effectiveness of herbicides for eradicating this species. A combination of hand digging and pulling combined with prescribed burning over the long term may be more effective than herbicides. This plant is a perfect example of a weed that would be most effectively eradicated using the Salmon River Restoration Council model, which would provide the level of long term, integrated management needed to eradicate this plant.

Dalmation Toadflax *(Linaria genistifolia ssp. Dalmatica).* Dalmatian toadflax was introduced into North America as an ornamental, fabric dye, and folk remedy. It escaped from gardens to infest farmland, pastures, and rangeland. Unfortunately, toadflax continues to be sold commercially as an ornamental plant, and is recommended for zeriscape (low-water-use) landscape plantings. Viable seeds in the soil may continue to germinate for 10 to 15 years. This plant is another perfect example of a weed that would be most effectively eradicated using the Salmon River Restoration Council model, which would provide the level of long term, integrated management needed to eradicate this plant. Repeated hand grubbing can be effective, combined with competitive planting. How large are the populations on the KNF? We request that the EIS document the population size for each of the noxious weeds, and the acreage occupied by the plant at each site in order to evaluate and analyze the likely effectiveness of each potential treatment method.

Scotch thistle (*Onopordum acanthium*). Infestations of Scotch thistle often start in disturbed areas such as roadways, campsites, burned areas, and ditch banks. The weed adapts best to areas along rivers and streams, but can be a serious problem in pastures, grain fields, and range areas.

No single control method should be used in managing weeds. A combination of methods (IPM) should be used. An integrated pest management plan deals with prevention as well as control. Eradication of weed species is often not a practical goal but in most cases reducing infestation to manageable levels should be the objective. Control of Scotch thistle starts with good grazing management and attention to disturbed areas where the plants can become established. Small infestations should be eradicated before they spread, and establishment of other plants encouraged. We are concerned that herbicides will retard the establishment of desirable native broadleaf plant species, creating conditions more favorable for the re-establishment of noxious weeds.

Taurian Thistle *(Onopordum tauricum).* Scotch thistle blooms June-September, making it a difficult plant to target effectively with herbicides because of the varying degrees of development. One of the primary difficulties in chemical control of these thistles is their ability to germinate nearly year round. Small infestations should be physically removed or cut a few inches below the soil surface. Mowing by early flowering will reduce seed production, but may require repeated treatment because populations typically exhibit a wide range of developmental stages among individual plants. Slashing should be done prior to flowering since seed may mature in the capitula (seed head) after cutting. Plants should not be mowed following seed set, as this increases chances for dispersal.

Dyer's Woad (Marlahan Mustard) *(Isatis tinctoria).* Hand pulling is the most effective method of controlling infestations. Plants should be pulled at least twice per year: once at the beginning of May when flowers start to bloom and once 2--3 weeks later to eliminate any remaining plants. Eradication of dyer's woad will require persistent and intensive monitoring from year to year. Since dispersal is solely dependent on seed production, it is important to carry flowering plants out of the area because they may continue to produce seeds even after they are pulled. We are concerned that the KNF has not adequately

explored the literature and alternative methods of treating this plant that do not involve herbicides yet are documented as being the most effective method or eradication.

Whitetop *(Cardaria draba).* Whitetop favors disturbed soils with moderate moisture, especially road-sides, ditch banks, sub-irrigated pastures and rangeland. Because of the extensive root system, it is difficult to eliminate by any means, including herbicides. The roots must be removed and the site diligently monitored for plants that may emerge from root fragments. Mowing reduces seed production.

Russian Knapweed *Acroptilon repens.* Successful control is most likely achieved with a combination of approaches; mowing, competitive cropping, ceasing irrigation, decreased grazing, removing outlying plants, and increasing the general health of the grasslands. This has effectively controlled Russian knapweed on Nature Conservancy lands.

Perennial pepperweed *(Lepidium latifolium).* *L. latifolium* readily invades disturbed areas and bare soils. The weed is spread by seed and rhizomes. In pastures, infestation is probably from contaminated hay or from movement of seeds in irrigation water from riparian habitats. The seeds do not have a hard seed coat and so longevity in the soil may be short (several years). Therefore, reinfestation from a seed bank in the soil after population control may be low. *L. latifolium* does not survive prolonged flooding during the growing season so this may be a control option if flooding is possible. Reseeding of exposed soil after the removal of *L. latifolium* will help prevent reinfestation. Seeds and below ground perennial organs are commonly spread by river and irrigation systems. Rhizomes and seeds are often a contaminate of fill dirt or top soil during construction. Seeds can be carried on equipment, especially tires, dried flower arrangements, livestock, waterfowl, contaminated hay, feedstuffs and straw used in soil stabilization projects. Maintain healthy stands of desirable plants to prevent infestation. It is essential to stop seeding (over 6 billion seeds can be produced per acre) but increasingly important that broken root pieces are not spread to clean areas.

Canada Thistle *(Cirsium Arvense).* Tilling can reduce or eliminate *Cirsium arvense*, if conducted repeatedly for several years. . Mowing just twice a year, in mid-June and September may reduce or contain Canada thistle. When mowing, cut high enough to leave > 9 leaves/stem, or >20 cm of bare stem tissue, as mature Canada thistle leaves and stems independently inhibit development of shoots from rootbuds. Smother crops are used in integrated pest management systems for Canada thistle on agricultural lands.

Yellow Starthistle *(Centaurea solstitialis).* Prescribed burning and mowing have been used to effectively control star thistle. The Six Rivers National Forest is implementing the Surprise Creek Restoration project, which will utilize a combination of methods (without herbicides) to achieve the desired goals. We encourage the KNF to consult with John McCrae at Six Rivers National Forest regarding star thistle.

Scotch Broom *(Cytisus scoparius).* Pull out the entire plant, including roots. When the soil is moist, small plants can be pulled easily by hand. Winter and spring are good seasons to do this in California. Larger plants must be removed with a tool such as a weed wrench(tm). Be sure to remove the entire plant. Broken stems re-sprout and are much harder to remove for the next person. Plants can be left where pulled. Well planned prescribed burns in fall can further reduce the broom in infested grasslands: Dense infestations of broom and infestations in the shade remain too moist to carry fire and will require pulling and some time to dry prior to a successful burn. A head fire is likely to only burn the tops off of the broom, and the broom will survive. A slow, hot, backing fire kills most of the broom. Some plants are consumed outright, and others are scalded around the root collar, later dying from the injury. Use of a backing fire reduces the need for laborious manual removal. Prescribed burns in grass consume some

broom seeds and break the seed coats of others, allowing pathogens to enter and kill the seeds. Still other seeds may be stimulated to germinate so that plants can be pulled out. Over time, regular prescribed burning may be expected to help deplete the pool of long-lived buried broom seed in grasslands (Redwood National Park). We are concerned that the KNF has not adequately explored the full range of treatment methods for eradicating scotch broom, and request that the EIS give full treatment to these alternatives.

Because noxious weeds are often concentrated around recreational high use areas, and livestock that are consumed as food, spraying toxic substances where people (including infants) and livestock graze, recreate, and gather plants for food and medicine will pose a serious health hazard to the public. The impacts to human health for all ages and both sexes should be fully analyzed. Because these health risks are significant, the EIS should include and fully analyze an alternative that utilizes only physical and cultural control without the use of herbicides. Please fully develop in the EIS and adopt an alternative modeled on the Salmon River Restoration Council's Cooperative Noxious Weed Program (CNWP). Over the past five years, this program has achieved great progress toward eradication of spotted knapweed within the Salmon River watershed, which is over 90% national forest lands. Eradication has been accomplished without the use of toxic herbicides and with strong emphasis on community involvement and forest user education, which is more likely to be successful in the long term.

The EIS must determine whether the control of a target species is possible. The EIS should fully document the justification for each chemical proposed at any given site. The KNF should determine through the EIS whether eradication or control is feasible or practical, and the methods that would be most effective in achieving control or eradication. Non-native weeds have been introduced and spread on the KNF as a result of cattle grazing, recreation, firefighting, logging, mining, road construction, reconstruction and maintenance, as well as many other uses. The EIS should fully analyze the likelihood of control through herbicides while these other activities continue unabated. Given the high mobility of our population and the level of uses of the KNF, it appears unlikely that control and eradication of the 17 target species is feasible at this time unless source populations on private lands are addressed, and activities that spread noxious weeds are more closely monitored and managed.

The combined cumulative health, ecological, cultural and environmental effects, risks and impacts should be evaluated within the EIS against the dubious benefits of spraying toxic chemicals that may not control or eradicate the target species, yet will persist in the environment in the future. The EIS should include a full cost-benefit analysis of the risks and costs of spraying, including but not limited to costs in terms of health, ecological, aquatic, and biodiversity risks in terms of impacts on non-target species, and retarded recovery of the environment due to chemical persistence that may in fact favor re-establishment of nondesirable species.

Thank you for carefully considering these comments in preparation of the EIS and in making your decision.

Sincerely yours,

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/s/Christine Ambrose

References

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