ATTACHMENT A
NPS RESPONSE TO PUBLIC COMMENTS

A 60-day public comment period was provided for in the EA from August 29, 2008 to October 30, 2008. Written public comment letters were received from the U.S. National Forest Service (USFS), the State of Alaska (SOA), the National Parks and Conservation Association (NPCA), Friends of Glacier Bay (FOGB), Copper Country Alliance (CCA), the Alaska Community Action on Toxics (ACAT), Alaska Survival (AS), and five individuals, many which contained substantive comments requiring a response from the NPS. Multiple acronyms representing commenters are provided for comments where more than one party makes a similar comment. Substantive comments are those that modify the existing alternatives, propose new alternatives not previously considered, supplement, improve, or modify the impact analysis, or make factual corrections. The comments and the NPS responses follow.

USFS#1: The EA is inconsistent in describing potential herbicide treatment areas, which is confusing to readers and reviewers. For Example, on page 4-22 the statement "in general, because proposed and potential herbicide applications would be relatively small (2.5 acres or smaller), …" seems to contradict the earlier statements on page 2-2, last line "A conservative projection of herbicide use under this alternative would be up to 1 acre per year in smaller treatments and 1 acre per year for unanticipated treatments" (translating to 2 acres/year). And page 2-15 Table 2.7 "Herbicides would likely be used for 20-50 acres of control over the next 10 years" (translating to 2-5 acres/year).

NPS Response
Chapters 2 and 4 of the EA have been amended to standardize estimates of acres to be treated with herbicides throughout the document. The NPS recognizes some invasive species need to be treated for multiple years or multiple times each year; however, experiences elsewhere show that treatment areas diminish each successive year. Care has been taken to expand the possible options for herbicide use in the event a new invasion is discovered within the park boundaries (see table 3.3 for list of species currently known to occur in Alaska, but not yet documented in the parks with the existing mapping efforts). If conditions remain the same, with early-detection and rapid response as the primary mode of discovery and treatment, the expected trajectory for herbicide use remains the same or drops as early detections of particularly invasive species are addressed with the most appropriate tool.

SOA #1, Regarding section 1.4 on page 1-10: The State has a one-acre criterion for pesticide applications to state land; however, this criterion does not apply to state right-of way applications because all applications within a state right-of-way require a permit and public notice, regardless of size. In many instances, invasive plants are first found along rights-of-way, which then act as corridors for further spreading. Certificated airports on state land are exempt from the permit requirements; however, an airstrip on state land may not be.

NPS Response
The revised EA is amended in section 1.4 and Appendix H to correct pesticide (herbicide) application permit criteria. The NPS will comply with all applicable Federal and State herbicide permit requirements.

SOA #2 (ISC-SRD): We also request the FONSI include the following list of federal and state compliance measures. Most of these measures are already recognized in various places throughout the EA, but this list further clarifies them and recognizes the specific conditions and requirements that are of most interest to the Alaska Department of Environmental Conservation (ADEC), a few of which are not mentioned in the EA:

- Purchase, distribute and use EPA and State registered pesticides.
- Ensure that personnel conducting or supervising pesticide applications are trained, certified and licensed.
- Follow all pesticide label requirements and be in compliance with the Alaska Pesticide Control Regulations in 18 AAC 90, and the Federal Insecticide Fungicide Rodenticide. Act (FIFRA), at all times. (FIFRA also addresses herbicides.)
- Maintain ADEC-required records of pesticide purchases and applications and make these available to ADEC on request.
- Monitor sensitive areas, endangered and threatened species, and water quality.
- Because the national parks are considered "*public places*," as defined in State Pesticide Control Regulations 18 AAC 90.630, public notification and posting requirements must be met, included the use of a specific notification sign that is available from ADEC.
- A permit from ADEC may be necessary under certain circumstances, such as a pesticide application to water or state "rights-of-way." Please contact the Pesticides Program at 1-800-478-2577 to determine the permitting requirements for a particular treatment.
- Since the State of Alaska does not have an approved list of adjuvants, we request using only adjuvants approved in Washington State. See link: http://www.ecy.wa.gov/programs/wq/pesticides/regpesticides.html
- The management plans should address both leaching into ground water and run-off and erosion to surface water. Using aminopyralid, Milestone VM as an example, according to the label "[t]*his chemical has characteristics associated with chemicals detected in groundwater. The use of this chemical in areas where soils are permeable, particularly where the water table is shallow, may result in groundwater contamination*." Given the unknown effects of this herbicide to groundwater, use of this herbicide should be limited to situations where groundwater contamination is unlikely.
- There may be special requirements if vegetation is burned or composted after an herbicide application. Additionally, the Service must follow manufacturer's recommendations and consult with ADEC Air Quality Division prior to burning a pesticide container.

NPS Response
The EA has been amended to indicate the NPS will comply with all applicable State and Federal requirements for herbicide applications. The compliance requirements are noted in appendix H of the EA (Best Management Practices for Herbicide Use). The NPS will monitor effects to sensitive areas, including endangered and threatened species where present.

SOA #3: The potential for the spread of invasive species by ORV is substantially less than reported in the EA, and the EA does not recognize the potential impacts of other possible vectors of entry, such as pack animals, airplanes, and pedestrian access. The analyses should be updated with information regarding ORV management at Glacier Bay, clarify that the unintentional spread of invasive species is not caused exclusively by ORV use, and that ORV use does not always lead to introduction of invasive species.

NPS Response
The EA is amended in the purpose and need section to indicate all likely vectors for invasive plant introductions. Mitigating measures in section 2.5 address ways to prevent unwanted infestations of invasive plants. High human use areas with ground disturbance such as roads, campgrounds, trails, ORV routes, runways, construction areas, and storage yards are examples of locations with a high likelihood of invasive plants and could be sources for new infestations.

SOA#4: EA Pages 3-24 and 3-25, Table 3.3: The "Traditional Activities and Resources Used" column under Aniakchak National Monument and Preserve states "[c]*abins may be maintained or built in support of subsistence in the monument*." By expressly referring to cabin use and construction here and remaining silent about cabins elsewhere, readers may easily infer that cabin use is not allowed where not expressly mentioned. Per 36 CFR § 13.160 "*eligible subsistence users may use an existing cabin or other structure or temporary facility or construct a new cabin or other structure*…"; therefore, we request the FONSI clarify that subsistence cabins are an appropriate use in all units where subsistence opportunities are allowed.

NPS Response
Section 3.6 of the EA has been amended to indicate 36 CFR Part 13.160 enables qualified subsistence users to use existing cabins, other structures, or temporary facilities or to construct a new cabin or structure in support of subsistence. New cabins or structures may be constructed subject to a permit from the superintendent of the area. Table 3.3 has been amended to indicate it summarizes statements in park GMPs.

SOA#5 (CCA): Page 4-9 to 4-11, 4.3.2 Impacts from Alternative 2 – NPS Proposed IPMP: When physical removal of invasive plants is completed, we advise disposing of the plant materials in such a way to address the species reproductive biology and prevent its spread within and outside of park lands. For example, Japanese knotweed can proliferate if removal methods do not include burning or otherwise isolating removed parts and revisiting and re-treating the area where weeds are removed.

NPS Response
The NPS has and will continue to mitigate this threat. Section 2.2.2 in the EA is amended to clarify the NPS procedures.

SOA#6: Page 4-51, Cumulative Impacts on Wildlife and Habitat, second sentence: This sentence states there are "*hundreds of miles of ATV trails, including over 600 miles of trails in* [Wrangell-St. Elias];" however, page 4-3 lists 470 total miles of trail in all Alaska parks. We request the FONSI clarify the inconsistency between these statistics.

NPS Response
The revised EA omits the phrase describing over 600 miles of trails in WRST, which are not all ATV/OHV trails.

SOA#7 (ISC-SRD): Page H-1, Appendix H: The second bullet states "*reduced application rates of herbicides will be used whenever possible*." References to "*reduced rates*" should clarify this means at the low end of the manufacturer's recommended application rates shown on the product label. Application at even lower rates – below the acceptable range – is problematic because it can lead to herbicide resistance. Reduced application rates may be more effective than higher application rates because translocation is enhanced prior to loss of physiologic function. Higher rates may burn off leaves and reduce translocation. The concept of reduced rates is also addressed in the next to the last bullet on the page, which discusses soil persistence.

NPS Response
Appendix H has been revised to indicate "reduced rates" means the lower end of the manufacturers recommended rates. The NPS will strive to apply herbicides at rates to assure effective control of target species in a manner that minimizes the use of herbicides - as well as herbicide resistance. Treatment strategies will be fine-tuned through the follow up monitoring (refer to decision tree).

SOA#8: Page H-4, Appendix H: The first sentence references use of a specific yellow sign. State law at 18 AAC 90 requires that a specific sign available from ADEC be used in "*public places*." The following bulleted list includes a "*restricted travel period*." We suspect this is intended to mean a "*restricted entry interval,*" which is the period one may not enter a pesticide treated area without wearing the required Personal Protective Equipment.

NPS Response
Appendix H is amended to indicate the NPS will comply with the regulations of 18 AAC 90 for posting in public places, including obtaining signs from ADEC. Additionally, refer to Appendix I: Glossary of Terms Used for pesticide notification definition.

ATTACHMENT A
NPS RESPONSE TO PUBLIC COMMENTS

NPCA#1 (FOGB): Education and Prevention
On page 2-11 you mention there are three general audiences to inform about the issue: park employees, local residents, and visitors. Can we assume that this includes construction workers outside of park employees? We also assume construction and maintenance crews accessing remote equipment sites are also included in your education efforts. NPS employees or outside contractors should take responsibility for invasive plant introductions by having invasive plant prevention inserted into contractor/employee performance evaluations. Resource Management and Maintenance divisions, as well as outside contractors, should be required to work together on new developments from inception, to planning, to implementation, to completion and review.

NPS Response
The EA text is modified to include contractors and construction workers in the audience for education and prevention of invasive species. The NPS is working to ensure that maintenance contracts specify the importance of invasive plant prevention, such as weed-free materials and all equipment needs to be pressure-washed and inspected prior to arrival. NPS NEPA documents now include statements to mitigate invasive plant introductions from field workers to assure their clothing and equipment is free of invasive plant materials before entering work sites within parks. Preventive measures are noted in section 2.5 of the EA (mitigation measures) and herbicide best management practices described in Appendix H.

CCA#1: There must be *meaningful* public notice prior to, during, and following any herbicide application. Such notice should not only be a legal notice in the *Anchorage Daily News.* There should be local notices, designed to catch the public's attention, in local media, on local bulletin boards, at visitor facilities, and on site. Local NPS staff should be consulted about how best to get the word out. On-site signs should list precautions; e.g., keeping horses and dogs from entering or sniffing the sprayed vegetation, not picking berries nearby, not drinking water nearby.

NPS Response
Appendix H has a section "Herbicide Use Notification" that details the public notification procedures, including conformance with Alaska regulations at 18 AAC 90 for posting and notifications.

CCA#2: Will entomologists be consulted about the presence of vulnerable species? The term "wildlife" should explicitly include invertebrates.

NPS Response
The NPS will not likely consult entomologists. The NPS briefly addressed invertebrates in EA section 4.11.2.1. The USFS Risk Assessments for the herbicides being considered include potential effects on surrogate insects, and the effects do not warrant consultation with entomologists.

CCA#3: Section 2.2.3 mentions "hot foam". What is that, if not a chemical treatment? What is known about its effects on humans and wildlife?

NPS Response
EA section 2.2.3 has been revised to better describe the thermal treatments, including hot foam. No effects to humans or larger wildlife are likely, but terrestrial invertebrates and other soil microbes would likely be affected.

CCA#4: "Residual control" is not well defined. What special precautions should be taken with long-lived herbicides?

NPS Response
The EA has been revised to better define residual control as used in table 2.4. Residual control is the ability of an herbicide to continue to be effective after the initial application and subsequent knock-down. Best management practices in Appendix H address precautions in applying herbicides with longer persistence.

CCA#5 (ACAT, AS, and BL): The EA fails to account for the possible longer half-lives and persistence of herbicides in northern and colder environments. Will NPS do studies to fill in the gaps in knowledge of persistence of herbicides in cold climates?

NPS Response

The EA is revised to indicate the NPS will monitor the efficacy of herbicides applied to NPS units in Alaska. Furthermore, the EA is revised in section 4.6.2 to include pertinent information from the following references on the persistence of herbicides in Alaskan environments.

Senseman, S.A. 2007. Herbicide Handbook, Nineth Edition. Weed Science Society of America, Lawrence KS. 458pp.

Burgoyne, W.E. 1981. The persistence of the herbicides 2,4-D and picloram in Alaskan soils north of latitude 60°. Agroborealis 13: 44-48.

Tilsworth, T., L.A. Johnson, J.D. Durst, Jill S. Chouinard, D.F. Mulkey, A.H. Owen, and T.L. Preston. 1991. Final Report: Alaska Railroad Corporation integrated vegetation management research project. INE 89.15. Institute of Northern Engineering, University of Alaska Fairbanks.

Tortenssen, L. and J. Stark. 1982. Persistence of triclopyr in forest soils (Herbicide for brush control, residues). Dept. of Plant Husbandry and Research Information Centre. Swedish univ. Agr. Sci. Uppsala, Sweden. Weeds and weed control: 23rd Swedish Weed Conference. Jan. 1982. Pages 393-399.

Rhodes, W.J. In review. Triclopyr Attenuation in Cold Soils . Masters thesis, University of Alaska, Fairbanks, AK.

Conn, J.S. and J.S. Cameron. 1988. Persistence and carryover of Metribuzin and triallate in subarctic soils. Can. J. Soil Sci. 68: 827-830.

Conn, J.S., W.C. Koskinen, N.R. Werdin, and J.S. Graham. 1996. Persistence of Metribuzin and metabolites in two subarctic soils. J. Envir. Quality 25:10048-1053.

Conn, J.S. and Knight, C.T. 1984. An evaluation of herbicides for broadleaf weed control in rapeseed: efficacy, phytotoxicity, and soil persistence. Univ. of Alaska Agri. Exp. Stn. Tech. Bulletin 62, 22 pp.

Newton, M., E.C. Cole, I.J. Tinsley. 2008. Dissipation of four forest-use herbicides at high latitudes. Environ. Sci. Pollut. Res. 15: 573-583.

See also response to ACAT #2.

CCA#6: If the upper estimate of herbicide proves too low to be effective and NPS believes it needs to be changed, will that trigger another NEPA process?

NPS Response

If we exceed the scope of the Integrated Pest Management Decision Tree(Fig. 2.1) and supporting information in the Invasive Plant Management Plan, additional NEPA processes would be initiated. For example, the NPS is not currently contemplating herbicide applications on large and widespread invasive plant infestations in many parks (such as common dandelions).

CCA#7 (ACAT, AS, BL): We request that 2,4-D be deleted from the herbicide list because of its toxicity to mammals and people.

NPS Response

The NPS disagrees that the possible amounts of 2,4-D to be applied by the NPS over the next 10 years would be a toxic concern for wildlife or humans in the Alaska NPS areas.

The U.S. Forest Service supports the use of 2,4-D in National Forest applications nationwide based on its risk assessment at [http://www.fs.fed.us/ foresthealth/pesticide/risk.shtml](http://www.fs.fed.us/foresthealth/pesticide/risk.shtml) . Because the NPS applications under consideration are small, localized ground broadcast or direct-on-individual-plant applications, there is no reason that the NPS applications would cause higher doses to mammals than doses evaluated and deemed not of unreasonably high risk to mammals or humans in the USFS 2,4-D risk assessment. This risk assessment considers the weight of evidence from hundreds of published papers.

CCA#8 (ACAT, AS, BL): We request that glyphosate be deleted from the herbicide list because it is only "practically" non-toxic to wildlife, and because we do not believe its surfactant is as well-studied as it should be.

NPS Response
The NPS disagrees. The NPS would apply herbicides with glyphosate only according to product labels, and glyphosate formulations with surfactants toxic to aquatic organisms would not be applied near water. Some glyphosate formulations are approved for fresh and brackish water, including estuaries and wetlands with emergent aquatic vegetation. Glyphosate is one of the few herbicides proposed in the EA that is effective in treating grasses, such as reed canarygrass.

Section 4.3.2.1 clarifies the NPS would only use glyphosate labeled for use near water (without toxic surfactants) when control of invasive plants is needed in or near aquatic areas. See also the decision tree.

See also response to ACAT#1.

ACAT#1 (AS, BL): The list of herbicides presented in the EA demonstrates that the National Park Service has not conducted a thorough evaluation of the known ecological and human health effects. ACAT and AS cited several papers describing the potential risks and hazards of these herbicides to insects, fish, wildlife, and human health and well-being.

NPS Response
The NPS disagrees because it has consulted the U.S. Forest Service risk assessments, the Oregon State University Intertox Fact Sheets, Material Safety Data Sheets for the various products with the active ingredients, and the Washington State DOT risk assessments in determining ecological and human health effects of the proposed herbicides. Available studies reviewed in the FS risk assessments for the proposed herbicides indicate a low degree of risk from exposures likely to occur to humans or animals from applications proposed for invasive plant control at Alaska Parks. All conclusions on effect to wildlife are based on the findings in the USFS risk assessments. These assessments draw on hundreds of publications, far more than the few cited in the comments.

Furthermore, the EPA considers herbicides to be a type of pesticide, which are regulated as such. Federal law requires that before selling or distributing a pesticide in the United States, a person or company must obtain registration, or license, from EPA. Before registering a new pesticide or new use for a registered pesticide, EPA must first ensure that the pesticide, when used according to label directions, can be used with a reasonable certainty of no harm to human health and without posing unreasonable risks to the environment. The NPS only uses EPA-registered herbicides and follows the directions on the label. This provides the necessary protection to the public and the environment.

The State of Alaska has approved all the herbicides the National Park Service proposes to use. Only small areas are proposed for treatment and only by hand sprayers or direct application to the plants. All employees will follow the exposure control and personal protection measures listed in the Material Safety Data Sheets and on the labels for each product to minimize the risk to employees. Employees will be certified as pesticide applicators by the State of Alaska and or the federal government. The "Herbicide Use Best Management Practices" listed in Appendix H will also be followed. All of these conditions and actions would reduce the health and safety hazard to employees and the visiting public from use of the proposed herbicides to a low or negligible level.

Although the NPS is concerned about all levels of life, the species of earthworm in the study cited by ACAT is both more sensitive than other earthworms to chemicals and an exotic species that has had deleterious effects of its own in North America (Cortet et al. 1999). The NPS applications of glyphosate are likely to be done directly to the plant rather than by broadcast spraying, which would minimize the amount of excess herbicide used.

Folmar et al. (1979) studied the toxicity of technical grade glyphosate, the isopropylamine salt of glyphosate, the formulated Roundup, and the Roundup surfactant to aquatic invertebrates and fish. Roundup, which is not labeled for use in or around water because of the known toxicity of its surfactant, and Roundup's surfactant were far more toxic than glyphosate itself. The study says:

> *Application of Roundup, at recommended rates, along ditch bank areas of irrigation canals should not adversely affect resident populations of fish or invertebrates. However, spring applications in lentic situations, where dissolved oxygen levels are low or temperatures are elevated, could be hazardous to young-of-the-year-fishes.*

The AK-EPMT would be more cautious and only use glyphosate formulations appropriate for wetland application in order to better protect aquatic fauna.

Two summary papers on glyphosate and its surfactants were prepared by Susan Monheit for the Noxious Times.

http://teamarundo.org/control_manage/docs/glyphosate_aqua_risk.pdf
http://teamarundo.org/control_manage/docs/2004summer.pdf

Addison, J.A. 2008. Distribution and impacts of invasive earthworms in Canadian forest ecosystems. Biological Invasions. Online publication date: 24-Aug-2008.

Cortet, J., A. Gomot-De Vauflery, N. Poinsot-Balaguer, L. Gomot, C. Texier, D. Cluzeau. 1999. The use of invertebrate soil fauna in monitoring pollutant effects. 35(3): 115-134.

ACAT#2 (CCA#5, AS, and BL): Herbicides presented in the EA have not been properly assessed for use in northern regions where they will have greater persistence. The persistence in the soil of herbicides listed in Appendix G of the EA is based on studies done in temperate climates and does not consider the differences in microbial activity in cold climates. In a Finnish study, the measured half-life of glyphosate was 249 days.[i] In Ontario, Canada, glyphosate had a half-life in forest soils of 24 days with detectable residues persisting for 335 days.[ii] On 3 British Columbia forestry sites, glyphosate persisted 360 days.[iii] In a Swedish study, glyphosate persisted from one to three years on eleven forestry sites.[iv] Another peer-reviewed study reported that glyphosate has a half-life of 3 days to 25 weeks in soil and 1 day to 25 weeks in water with a pH of 7.[v] 2,4-D has a soil half life of one to two weeks. However, persistence and accumulation of 2,4-D residues from normal use is possible in cold northern environments according to a review of the chemical by the World Health Organization.[vi] Also, when tracked indoors and not exposed to direct sunlight, 2,4-D can persist in carpets for up to one year after a single application at a concentration of approximately 0.5 µg/g.vii EPA determined that triclopyr is mobile in soil, is somewhat persistent and therefore has potential to leach to groundwater.

[1] Muller, M.M. et.al. 1981. Fate of glyphosate and its influence on nitrogen cycling in two Finnish agricultural soils. Bull. Environ. Contam. Toxicol. 27:724-730.

[1] Feng, J.C. and D.G. Thompson. 1990. Fate of glyphosate in a Canadian forest watershed. J. Agric. Food Chem. 38:1118-1125.

[1] Roy, D.N. et.al. 1989. Persistence, movement, and degradation of glyphosate in selected Canadian boreal forest soils. J. Agric. Food Chem. 37:437-440.

[1] Torstensson, N.T.L., L.N. Lundgren, and J. Stenstrom. 1989. Influence of climate and edaphic factors on persistence of glyphosate and 2,4-D in forest soils. Ecotoxicol. Environ. Safety 18:230-239.

[1] Relyea, R.A. 2005. The impact of insecticides and herbicides on the biodiversity and productivity of aquatic communities. Ecological Applications 15(2):618-627.
[1]World Health Organization. 1984. Report on Environmental Health Criteria for 2,4-d.

[1] Nishioka, M.G. 1996. Measuring lawn transport of lawn-applied herbicide acids from turf to home. Environmental Science and Technology 30:3313-3320.

NPS Response

The NPS does not agree that the proposed herbicides necessarily persist longer in colder northern environments. The EA is revised in section 4.6.2 to include research on herbicide persistence in Alaska soils and environments. Additional monitoring of the effectiveness and persistence of the proposed herbicides is included in section 2.4.4 of the revised EA.

Glyphosate is strongly absorbed by soil and hence is unavailable to plant roots and has shown low soil mobility in lab and field studies (Senseman 2007). In the studies listed above, researchers were able to extract glyphosate from soils in the laboratory using strong chemicals and quantified them using analytical chemistry. The greater persistence of glyphosate in soils at high latitudes is not considered a destructive impact because it *will not cause additional negative effects to plants, move offsite, or contaminate groundwater.*

Burgoyne (1981) studied the persistence of 2,4-D at 4 locations in Alaska (Anchorage, Fairbanks, near Wasilla, and Eklutna). In all cases less than 0.6 parts per million 2,4-D were found by the end of the summer following spraying and none was detected a year after application. Stacey Frutiger studied degradation and leaching of 2,4-D at Delta Junction and Valdez, Alaska in 2006-2007 (thesis in preparation, UAF). Less than 12% of the applied 2,4-D reached the soil surface due to interception by plants and vitalization. The half-life of 2,4-D at Delta Junction was 13.4 days which is similar to other areas where fate of 2,4-D was studied. Unlike more temperate regions where 2,4-D usually degrades within 60 days, very low levels of 2,4-D were found in some samples in Frutiger's Alaska study after spring thaw 300 days after application. This was because of the short summer and long period that soils are frozen in Alaska. According to Frutiger, "The main conclusion drawn from these results is that once applied to sub-arctic, vegetated soils, 2,4-D will most likely have minimal impact on ground-water sources". Because of the very small areas where NPS would make applications, low toxicity to mammals, birds and fish, rapid degradation in soil with minimal risk for leaching, 2,4-D would be an appropriate herbicide to use to eradicate susceptible invasive plants that are not easily controllable in Alaska using non-chemical means. NPS will require applicators to wear disposable slippers over foot wear to prevent herbicide residues from being tracked off-site.

There have been a number of studies of triclopyr fate in Alaska soils. Tilsworth et al. (1991) studied triclopyr persistence at 6 locations along the Alaska Railroad starting in Seward and ending at Eielson Air Force base near Fairbanks. At all sites triclopyr was still detectable one year after spraying but only in one instance did triclopyr soil residue exceed one part per million. These results were similar to those found in Sweden by Torstenssen and Stark (1982). Tilsworth et al. found that very low levels of triclopyr leached to the soil 3-foot depth; however, no lateral movement of triclopyr was found. Rhodes (2008) studied the fate of triclopyr in soil at Delta Junction and Valdez. According to Rhodes, "Triclopyr residues persisted at the 0-5 cm depth for at least 300 days following application at both field sites. Transient increases in concentration at the 0-5 cm depth were observed, presumably resulting from residue wash-off associated with precipitation events or deposition of treated vegetation on the ground surface. Vertical mobility of triclopyr was limited, indicated by a large proportion of non-detects and relatively low concentrations recorded at the 10-18 cm and 30-38 cm depths. If triclopyr were to reach ground or surface waters through transport from the target area, concentrations should remain well below toxic levels with respect to aquatic and terrestrial organisms." The above studies of triclopyr soil fate performed in Alaska show that the herbicide is moderately persistent and that there is the potential for a small amount of leaching in some locations. However, due to the very small areas of application in NPS areas the amount of triclopyr in groundwater probably would not be detectable. In addition, the low toxicity of this herbicide diminishes concern that triclopyr would have off-site impacts.

More recently, Newton et al. (2008) studied the dissipation rates of the herbicides glyphosate, imazapry, triclopyr, and hexazinone at upland and river bottom sites near Fairbanks and Windy Bay (southern tip of Kenai Peninsula), Alaska. The study concluded that the "low toxicity of these products and their metabolites combined with consistent dissipation and low mobility suggest that toxic hazard of their use at high latitudes need not be a matter of serious concern to humans, terrestrial wildlife, or aquatic systems. They are safe for use in management and rehabilitation of boreal forests when used properly." Furthermore, they recommend that "Dissipation at rates approaching those in warmer climates offer a hypothesis that micro-flora native to high latitudes may be adapted to destruction of such molecules at lower temperatures than may be indicated by experiments with microflora adapted to warmer climates. Residues pose no observable risk to wildlife or humans in the area of use when products are applied properly."

Senseman, S.A. 2007. Herbicide Handbook, Nineth Edition. Weed Science Society of America, Lawrence KS. 458pp.

Burgoyne, W.E. 1981. The persistence of the herbicides 2,4-D and picloram in Alaskan soils north of latitude 60°. Agroborealis 13: 44-48.

Tilsworth, T., L.A. Johnson, J.D. Durst, Jill S. Chouinard, D.F. Mulkey, A.H. Owen, and T.L. Preston. 1991. Final Report: Alaska Railroad Corporation integrated vegetation management research project. INE 89.15. Institute of Northern Engineering, University of Alaska Fairbanks.

Tortenssen, L. and J. Stark. 1982. Persistence of triclopyr in forest soils (Herbicide for brush control, residues). Dept. of Plant Husbandry and Research Information Centre. Swedish univ. Agr. Sci. Uppsala, Sweden. Weeds and weed control: 23rd Swedish Weed Conference. Jan. 1982. Pages 393-399.

Rhodes, W.J. In review. Triclopyr Attenuation in Cold Soils . Masters thesis, University of Alaska, Fairbanks, AK.

Newton, M., E.C. Cole, I.J. Tinsley. 2008. Dissipation of four forest-use herbicides at high latitudes. Environ. Sci. Pollut. Res. 15: 573-583.

ACAT#3: After carefully reviewing the Invasive Plant Management Plan, we urge the National Park Service to conduct further evaluation with additional scientific assessment and public involvement to determine the feasibility of alternatives. There are a range of alternatives that should be considered when managing invasive plant populations rather than the proposed application of herbicides. The Bureau of Land Management and other agencies have been successful with mechanical removal of weeds—as reported by a BLM wildlife biologist at the recent Statewide Invasive Species conference in Anchorage (October 21-23, 2008). Vinegar and hot water can be used as a replacement for herbicide formulations[viii]. Researchers from the USDA tested a vinegar solution on Canadian

Thistle, an invasive plant mentioned in the EA. They found that a combination of 5% vinegar with water killed 100% of the top perennial growth of these plants[ix]. The National Park Service must conduct a full assessment of mechanical, biological, and other alternative treatments.

[1] Moore, M. 1997. Vim and Vinegar. New York: Harper Collins. Page 37.

[1] US Department of Agriculture. 2002. Agricultural Research Service News and Events article; "Spray weeds with vinegar?". http://www.ars.usda.gov/IS/pr/2002/020515.htm. Accessed October 30, 2008.

NPS Response

The AK-EPMT will follow the Integrated Pest Management Decision Tree (Fig. 2.1). Most treatments will result in manual or physical control. We have demonstrated our success in eradicating 89 infestations over the past six years using alternative methods. These eradicated infestations, however, were generally small (a few plants) or more easily controlled species. In other cases, we have demonstrated that sustained manual control is working to diminish larger infestations, such as yellow toadflax at KEFJ. These results are comparable with other agencies. Ruth Gronquist (BLM) reported on mechanical removal of white sweetclover along the Dalton Highway at the Committee on Noxious and Invasive Plant Management (CNIPM) 2008 meeting. Similar to NPS efforts along the Nenana and Copper River drainages near Denali and Wrangell-Saint Elias National Park and Preserves, BLM has made progress with manual treatment of white sweetclover on the Dalton Highway. This technique is working on this species because the roots come out easily, but if a seed bank becomes well established, then this technique may fail in the long run. Manual removal of species with persistent roots and stolons, like perennial sowthistle, reed canarygrass, and bird vetch, are not likely to be controlled with manual removal or alternative methods.

Despite NPS manual treatment successes, some control efforts are ineffective. After four years of repeated manual removal of reed canary grass at GLBA, we have shown biomass reductions but no significant changes in the infestation extents. In addition, we have created craters from excavation of the root systems and complete elimination of the native plants. In contrast, in the gateway community of Gustavus, residents have shown that judicious use of glyphosate applied to a single blade with a sponge paintbrush has been effective at killing the grass after a single application with no visual effects to nearby native vegetation.

Biological controls were considered but eliminated in 2.6.2 based on the risks of introducing another species. Additionally, the bio-control agent requires an extensive infestation to become effective. At this point, there are few infestations that are of the magnitude to be effectively treated this way.

Studies have been completed on alternative control methods, such as a recently released study by the University of Massachusetts noted below, but they are often not effective at killing the species for the long term.

See http://www.mhd.state.ma.us/downloads/manuals/rpt_herbicides_alternative.pdfthat shows that many alternative methods are effective in the short term to suppress invasive plants. The cited study of vinegar suggests using concentrations of vinegar up to 100%, compared with household vinegar of 5% concentration. Vinegar is a diluted form of acetic acid. Although acetic acid can be derived naturally, an MSDS sheet reveals that acetic acid has significant health effects, many far worse than herbicides. Acetic acid will also lower soil pH and have effects to non-target species: (http://www.ars.usda.gov/research/publications/publications.htm?seq_no_115=142484). This is not to say that herbicide alternatives will not be considered, but just because they are organic, does not imply they are safe.

To be used as an herbicide, the product needs to be registered. In Alaska, these less toxic options are registered as 25B minimum risk products. A discussion of the conundrum of registration and what is currently available commercially is discussed in the article What's Cooking with Vinegar Recommendations? (http://aenews.wsu.edu/Oct02AENews/Oct02AENews.htm#Vinegar). Products, such as St. Gabriel Laboratories Burnout, are registered in Alaska and contain acetic acid; however, the concentration of acetic acid in this product has not proven effective at killing invasive plants.

Our task is to work to eliminate invasive plants from NPS units. Alternative 2 provides us another tool, herbicides, to use in our adaptive management strategy for invasive plant treatment. The use of herbicides, however, would not likely be the dominant control method as estimated in table 2.2.

ACAT#4: The use of herbicides to manage non-native plants is contrary to the National Park Service mission to preserve "…unimpaired the natural and cultural resources and values of the national park system for the enjoyment, education, and inspiration of this and future generations.[x]"

[1] National Park Service Mission. http://www.nps.gov/legacy/mission.html. Accessed October 30, 2008.

NPS Response

The NPS disagrees. Controlling invasive plants helps to conserve the scenery and natural and historic objects and wild life and is consistent with NPS policies, Executive Orders, and national laws. After habitat destruction, invasive species are the second greatest threat to biodiversity. We do not think the proposed invasive plant control methods including mostly physical control methods and limited uses of the listed herbicides would result in the impairment of resources or human enjoyment of the resources entrusted to the NPS. A failure to control the invasive plants will result in the impairment of park resources and values over time. We recognize an overuse of herbicides could have a similar deleterious effect. A measured and careful use of herbicides, however, could prevent the loss of natural scenery and ecosystem services threatened by invasive plants.

ACAT #5: Herbicides such as glyphosate, 2,4-D, triclopyr, imazapyr, and other herbicides have been linked to deleterious effects on the health of humans and animals.

NPS Response
As a component of an Integrated Pest Management (IPM) program, herbicides have a demonstrated treatment efficacy. The toxicological concerns have been assessed and are of an acceptable level to use in limited quantities to maintain the integrity of the park's natural resources.

The EPA registration process and subsequent risk assessments performed by the USFS (http://www.fs.fed.us/foresthealth/pesticide/risk.shtml) and BLM (http://www.blm.gov/pgdata/etc/medialib/blm/wo/Planning_and_Renewable_Resources/veis/final_eis_vol_1/final_eis_chapter.Par.40753.File.dat/Final%20PEIS%20Chapter%204%20(June%202007).pdf) serve as the foundation for these determinations.

ACAT#6 (AS & BL): The EA discusses the potential impacts of the active ingredients in herbicide preparations, but fails to describe the impacts of so called "inert" ingredients. On August 1, 2006 the Attorney General of Alaska announced that Alaska "joined with 13 other states and the U.S. Virgin Islands to petition the Environmental Protection Agency (EPA) to require pesticide manufacturers to disclose on the label of their product all hazardous ingredients. The EPA currently requires that pesticide labels disclose only the product's "active" ingredients that contain toxic materials intended to kill insects, weeds, or other target organisms

NPS Response
Federal law requires that before selling or distributing a pesticide in the United States, a person or company must obtain registration, or license, from EPA. Before registering a new pesticide or new use for a registered pesticide, EPA must first ensure that the pesticide, when used according to label directions, can be used with a reasonable certainty of no harm to human health and without posing unreasonable risks to the environment. The NPS only uses EPA registered herbicides and follows the directions on the label. The state of Alaska also approved all the herbicides proposed for potential use by the NPS. This provides the necessary protection to the public and the environment. The EPA or the State of Alaska does not consider the inert ingredients to be a hazard. Consequently the NPS does not consider the inert ingredients to be a hazard. The NPS will comply with all federal and state regulations regarding the disclosure of herbicide ingredients.

AS#1: There is no discussion of the sublethal effects of the chemicals on fish and wildlife, soil and aquatic microorganisms.

NPS Response
The NPS disagrees. The EA addresses chronic (sublethal) and sub-acute effects to aquatic organisms (including fish and microorganisms), and wildlife. Additional

information on the effects of the proposed herbicides on aquatic and soil microorganisms and its persistence in soils are included in the revised EA.

Three of the herbicides that are proposed under Alternative 2 have very high LC50's for those aquatic organisms that have been tested. Studies on sublethal exposure levels still rely on relatively high concentrations relative to those expected from spot application on terrestrial plants (e.g., Relyea, R.A. 2005. The impact of insecticides and herbicides on the biodiversity and productivity of aquatic communities. Ecological Applications 15:618-627). Generally speaking, concentrations in the mg/L range have been used. No studies have been conducted on ecological responses to the very low concentrations of herbicides that could reasonably be expected to occur in aquatic habitats as a result of spot application to terrestrial plants as proposed under Alternative 2.

The analysis of wildlife impacts does account for the potential of sublethal effects. The findings of the USFS assessments on the herbicides proposed for NPS use in Alaska Parks are based on sublethal effects as well as acute lethality. For example, for the assessment of the potential for deleterious effects in birds from exposure to aminopyralid, the no-effect level was based on a gavage (forced oral doses) study of bobwhite quail. This resulted in transitory impacts on coordination in treated birds at a dose higher than the no-effect dose used to characterize risk by the FS.

AS#2: There is no discussion of how these chemicals may affect humans who are pregnant, immune-compromised, and chemical-sensitive. The EA notes that it relies on the U.S. Forest Service risk assessments without telling us exactly what these assessments say, and so does not allow the public to review and comment on whatever information is actually used here to determine risk. The EA does not address ADA and how the use of these herbicides could affect persons with disabilities.

NPS Response

The NPS thinks the potential effects on people who may be more susceptible to adverse effects from the limited applications of herbicides is addressed because application areas would be posted both before, during, and after applications and application areas would be closed to public entry for an appropriate period of time, depending on the residence time of the active ingredients and EPA and ADEC recommendations. See Herbicide Use Best Management Practices in appendix H at the back of the EA, which describes how NPS would minimize adverse impacts to the environment and humans and notify concerned individuals. Only small areas are proposed for treatment and only by hand sprayers or direct application to the plants. No exposure to chemically sensitive visitors would occur.

The USFS risk assessments and other works cited are available to the public for review.

Applicators will be trained, certified, and licensed for use of the proposed herbicides. Labels and Material Safety Data Sheets (MSDS) recommendations for the products would be followed. Job hazard analysis forms will identify all job hazards and make *specific recommendations to eliminate or minimize the hazard by using engineering controls and or personal protective equipment. Following training, any employee not interested in applying herbicides could elect not to perform this work*

AS#3 (BL): The EA does not point to a single example where any of these herbicides have been used on any of these plants and totally and permanently removed them. Nevertheless, it continually makes conclusions based on successful eradication.

NPS Response

The EA is revised in section 4.8.2 to include citations and examples of studies showing successful control of invasive plant infestations. There are thousands of scientific studies demonstrating effectiveness of herbicides in journals, such as Ecological Society of America, Weed Science, Weed Technology, American Journal of Forestry, Natural Areas. Any method for invasive plant management is a long term commitment since not only does the currently reproductively viable population need to be eliminated, but also the soil needs to be depleted of all viable seeds. Total and permanent removal of infestations has occurred, but more often, land managers work to reduce infestation size to a manageable size, such that the invasive species no longer dominate the areas. Regardless of treatment type, many invasive plant infestations will take years if not decades to fully control because they have been depositing surplus seed to provide for the long term viability of the infestations. Only through sustained long-term treatment and monitoring will invasive plant infestations be controlled.

Alternative 2 is amended to include the following: From the data and the knowledge of the extent of the invasive plant infestations in Alaska NPS units, it is perceived that the infestations of Japanese knotweed and the smaller infestations of reed canarygrass will need a year or two of herbicide application. It is hoped that the larger infestations will be reduced to a manageable extent within a few (~2-4) years of herbicide use. At this point, manual control could be resumed and be effective at removing the residual plants and newly germinating seedlings. This process would continue until the seed bank is exhausted.

The advantage Alaska has over the lower 48 examples is that our infestations are still relatively small. When caught during the establishment phase, it is far more feasible to eradicate an infestation. To date, the AK-EPMT has completely eradicated 89 infestations by manual means, most of which were small and recently established.

AS#4: Because the NPS's preferred alternative—initiating herbicide use in the Alaska national parks— would be, without question, the beginning of a very significant change in policy and in the health and integrity of our national parks in Alaska, and because herbicide use in Alaska has been a highly controversial issue for more than three decades, we ask that NPS prepare an EIS to consider this very significant and controversial proposal.

NPS Response
An EA is the appropriate level of NEPA because the limited areal extent of treatments (<150 acres/year in over 40 million vegetated acres), the generally low toxicity of the proposed herbicides, and herbicide best management practices including posting and closing treated areas for appropriate periods of time, does not reach a level of significance in terms of impacts to the natural environment and human health and safety. Other NPS areas, such as Northern Great Plains EPMT, Yosemite National Park, Grand Canyon National Park, Rocky Mountain national Park, and Dinosaur National Monument have completed EAs for programmatic herbicide use. EPA and ADEC-approved herbicides have been applied in urban areas, public parks and fields, and agricultural areas in Alaska for decades without documented ill-effect.

AS#5: The absence of consideration of air quality and recreation and visitor use leaves two very important issues unaddressed. Air quality very well could be adversely affected by the spraying of herbicides, even using a hand-held sprayer. Studies have shown that the ground spraying of herbicides has resulted in the dispersion of the chemicals for great distances over the land and even into closed homes. This provides clear scientific evidence that the chemicals do not stay where they are put and are transported through the air to other areas, during which time the herbicide is airborne and does in fact affect air quality. (See attached 2,4-D air mobility research document).

NPS Response
The NPS disagrees that proposed application of herbicides would result in measurable impacts to air quality in Alaska NPS units. Limited volumes of chemicals would be applied with hand-held spot sprayers and using best management practices to minimize drift as noted in appendix H.

The subject mobility report is not comparable to NPS applications. The estimated exposure to 2,4-D by the most vulnerable population, young children, was an order of magnitude lower than the U.S. EPA Integrated Risk Information System reference dose.

The NPS dismissed effects to recreation and visitor use in section 1.3.2.5 of the EA because the treated areas would be small (0.0000215% of managed lands) and temporary and vast alternative areas exist for recreational uses. Furthermore, the NPS would notify the public before and after proposed herbicide applications in NPS units and would close areas during and after applications to public entry for a sufficient period of time until the chemical was absorbed into the target plants and ground and no longer available for human exposure. See Herbicide Use Best Management Practices in appendix H, which describes how the NPS would minimize adverse impacts to the environment and humans. This appendix is referred to in EA sections 2.4.2 Herbicide Use and 2.5.4 Herbicide Use Best Management Practices, among others. Because areas will be posted before, during, and after application and closed to public entry for appropriate periods of time, the exposure risk and tracking of herbicides by people and pets would be mitigated.

AS#6: The alternatives' names are deceptive. The No Action alternative described here is not 'no action' at all. Alternative One, which is labeled no action, is an alternative of many actions. The real No Action alternative is not discussed. Alternative 1 is an 'Invasive Plant Management Plan', as Alternative 2 is, and should be named as such. Alternative 2 should include Use of Herbicides in its title instead of the deceptive title that it is the one and only alternative with a proposed invasive plant management plan.

NPS Response

Alternative 1 is called No Action or "Status Quo" because the NPS would continue to use annual surveys and physical control methods to manage invasive plant infestations in Alaska NPS areas as we have for the last several years. A do nothing alternative was dismissed from further analysis because it does not address the purpose and need for action and is inconsistent with laws, Executive Orders, and NPS policies (See EA section 2.6).

AS#7 (BL): Projected Acres To Be Treated Unrealistic, Page 2-3: The graph which projects future herbicide use seems to account for only one possibility—that the weeds initially sprayed will disappear and that more weeds which need to be sprayed will not appear. This is in contradiction to every implication in the EA, which is that more and more weeds are expected to show up in the future as more areas are disturbed and more people visit. How more weed infestations add up to less herbicide use is unexplained. Also, the belief that a single or a few sprayings will eliminate invasive plants is unrealistic and has no basis in NPS's, or any other agency's, experience. For example, herbicide spraying at Camp Island in Karluk Lake has been conducted for many years on a twice a year regimen and still the orange hawkweed persists and the spraying continues. As this example of a dozen sprayings per weed infestation is considered a success by EA, the projection of number of herbicide applications per infestation and number of acres treated per year needs to be drastically altered to accommodate the reality of even what NPS terms a success.

NPS Response

The NPS partially disagrees with this comment. See also response to AS#3 above. In response to these concerns, a worst-case scenario has been considered and the number of acres potentially treated with herbicide has increased. If management continues as the NPS treatment trend suggests and the agency is allowed to act promptly, we anticipate, as stated in the original public review EA, needing to treat an extremely low number of acres with herbicide (refer to Table 2.2). In contrast, if the agency is unable to rapidly treat infestations when the acreage is small, the eventual outcome could result in much larger acres needing to be treated. Even though additional infestations in NPS units may be found each successive year where herbicides might be needed, the NPS maintains that areas treated in year- one would have a reduced treatment area in the next couple of years until no more herbicides would be needed. For example, if in year one NPS treats 12 acres, as now proposed, we think these treatment areas may be reduced by at least two thirds in the next year to about 4 acres. If we find another 3-4 acres to treat in year

2, the total treatment area would be 8 acres. We think early detection and rapid response would help keep treatment areas low and possibly result in no herbicide treatment in some years during the next decade. For these reasons we feel that table 2.2 provides a reasonable estimate of herbicide treatment areas in Alaska NPS units during the next decade.

Nationally, 12% of the NPS lands treated for invasive plant infestations have been controlled, which is defined as an infestation reduced to 1% of its original extent. This generally requires 3-10 years of treatment effort, but control is a realistic expectation. Note should be taken that in most cases manual methods will be used, and herbicide use is only for the most challenging infestations. Once an infestation has been knocked down significantly, the NPS plan is to migrate to physical control methods.

AS#8: No Risk Assessment of Herbicides Is Contained in the EA: Rather than offer a risk assessment here, which the public could comment on by reading this document, the EA refers to an internet site where a risk assessment can be found. The minor, scattered bits of information on the herbicides in this EA make a rational evaluation of their herbicide use difficult and their use on particular areas in the parks almost impossible.

NPS Response
The NPS disagrees with the assertion that inadequate information on herbicide effects is presented. The U.S. Forest Service risk assessments cited in Table 2.4 in EA section 2.4.1 of the EA is used throughout the analyses of impacts in the EA. The Council on Environmental Quality (CEQ) recommends agencies incorporate by reference various reasonably available publications used in the analyses to reduce bulk in NEPA documents (40 CFR Part 1502.21 - Incorporation by reference). Each assessment for the proposed herbicides is about 100 pages long and cites numerous references. Appendix G is a summary of potential environmental fate and effects of proposed herbicides; it is not meant as an exhaustive presentation on the subject for these herbicides. Appendix G is referenced in section 2.4.2 in the revised EA.

The annual planning process will carefully address each site proposed for treatment through the decision tree and parameters carefully outlined in this EA (Chapter 2 and Table 2.1). Chemical treatments would not take place in areas that would affect special-status wildlife. To ensure transparency, the annual work plan will be posted on the AKEPMT website by the 5th day of April, of each calendar year (http://www.nps.gov/akso/NatRes/EPMT/index.html).

AS#9: There is no consideration of possible accidents involving herbicide spraying. In the real, and non-perfect, world, accidents do occur and people and other animals and non-target plants are affected.

NPS Response
Employees will be trained as certified pesticide applicators by the State of Alaska and/or federal government. The NPS will provide additional training on the specific herbicide

labels and the MSDS for the herbicides to be used. The MSDS has specific instructions for: first aid measures, fire fighting measures, accidental release measures, handling and storage, spill plan, and exposure controls/personal protection. These recommendations will be followed should an accident occur and will minimize the adverse consequences from an accident. In the event of a spill or release of a hazardous substance, the NPS would follow directions for notifications and responses in the Alaska Federal/State Preparedness Plan for Response to Oil and Hazardous Substance Discharges/Releases (Unified Plan, 1994 as amended with 10 sub-area contingency plans), the Alaska Region NPS Oil and Hazardous Substances Spill Prevention and Emergency Response Plan (NPS, 1988), and any park-specific spill response plan.

The NPS recognizes that accidents could happen and that non-target species could be adversely affected, but so long as proper procedures are followed as outlined in Appendix H of the EA and as noted above, we estimate that the potential risks are low and manageable relative to the risks of letting invasive plants proceed uncontrolled.

AS#10: Table 2.7, which compares the 2 alternatives, does so in a cursory way and draws conclusions based on wishful thinking rather than any scientific data. The table makes statements which appear out of nowhere and are contrary to other explanations in the EA. Although the EA states that "more serious problems (with invasive plants) are on the horizon" (1-2), Table 2.7 somehow concludes that there will be a decrease in acres treated in the future. The table goes on to conclude, without any support whatsoever that "Effectiveness would be relatively high for species that are difficult to control."

NPS Response
Table 2.7 is a summary comparison of the alternatives. It summarizes the actions and expected results; it is not a summary of impacts, which is in table 2.8. Table 2.7 presents general estimates of effectiveness by alternatives based upon knowledge of difficult to control species. A few difficult-to-control species as described in the EA are close to impossible to control without herbicides; therefore the statement that effectiveness of control would be relatively high (relative to manual control method) is accurate. Tables 2.1 and 2.2 present the past and expected treatment areas from the status quo and proposed management scenarios. We project a greatly increasing acreage of invasive species that do not respond to physical control methods under the status quo management, but a significant reduction in acres treated under the proposed alternative. Table 2.7 is revised to append the phrase "with only physical control methods" to the quoted statement above in the comment. Some areas may need to be retreated with herbicides, especially where seed banks of the invasive plant species were already established before detection and removal. The careful use of appropriate approved herbicides on invasive species that fail to respond to physical control methods is the best and perhaps only way to control plants that could otherwise overrun and severely alter natural park ecosystems. See also response to AS#-7.

AS#11: There is no discussion about the use of some of the "invasive" plants for subsistence by humans or as food for animals. For example, dandelions have been shown to be a favorite food of bears, as well as having been used for food, and medicine, by humans. Nor is there discussion about how much of the chemicals may end up in the plants and animals that are used for subsistence.

NPS Response
Refer to revised decision tree to ensure subsistence by humans and sensitive fish and wildlife have been taken into consideration. Areas treated with herbicides are to be posted and closed to public entry, and animal uses of these areas would be transient and result in minimal exposures. In the USFS risk assessments, the dose to an exposed animal is assumed to be comprised of doses from multiple routes of exposure that include animals eating contaminated invasive plants as well as other plants, insects, and other animals. Therefore the exposure of subsistence hunters and gatherers to these chemicals would be small to none.

None of the species proposed for immediate treatment with herbicides are palatable to humans or animals. Oxeye daisy is toxic to herbivores. Reed canarygrass has hallucinogenic compounds that deter herbivores. Perennial sowthistle has a milky sap like dandelions that makes it unpalatable. Probably the most consumable species is Japanese knotweed, but no evidence of browse has been observed on it or any of the other species targeted for herbicide application. Removal of these species could enhance animal forage by allowing the recolonization of native species. All treatments would be posted to eliminate human consumption risks.

Dandelions may be a food source for black bears and other animals, but we have no data to conclude they are a "favorite" food source. The annual work plan will typically focus on infestations whereby the efforts of the program can reasonably get ahead of the infestation and have a realistic end point for control. At this point, most of the dandelion infestations would not be rated out as a high priority treatment option as most infestations are beyond reasonable control efforts. Containment strategies may be the only option for these larger populations.

The EA is revised in section 3.6 to indicate which plants on the invasive list for Alaska are also used for subsistence. A discussion of the risk of herbicides affecting subsistence resources and uses is presented in EA section 4.7.2.1. As noted in the EA, most of the subsistence invasive species would be removed physically or contained. Invasive species can displace important subsistence plants (e.g. white sweet clover (Melilotus alba) can overrun gravel bars and displace Eskimo or wild potato (Hedysarum alpinum), which has been collected by Native Alaskans for centuries and is an important forage food for brown bears.

AS#12: There is no scientific basis for the stated assumption that spraying toxic chemicals in the parks would "rehabilitate" native plant communities at all 16 parks. Herbicides kill native plants as well as non-native plants.

NPS Response
The EA is revised in Table 2.8 to change "rehabilitated" to "re-establish" native plant communities. Herbicides do kill native as well as non-native plants. This is why the NPS is not proposing to do large-scale broadcast spray operations. Herbicide use is proposed only when non-chemical control operations are not effective and only on a small scale using selective herbicides when feasible. Every effort would be made to target only invasive non-native plants through leaf-wipe or spot-spray methods. This would reduce herbicide application rates and soil residuals, and make any site restoration smaller in scale.

Spraying herbicides would not directly result in restored native plant communities; however, removing the invasive plant species, which may be a long-term process involving both manual and herbicidal treatments and then restoring the site if necessary with native plant seeds or transplants, would ensure a more successful recovery. Monitoring will also be integral to maintaining the treated site.

Residual herbicides in the soils may have an adverse effect on native plants in the short term. The benefits of herbicide treatments are reduced treatment time, less surface disturbance, and more rapid recovery of native plant communities. Once treatments are complete, the native plant communities surrounding an infestation are prepared to re-colonize the site with dispersal distances for native plants generally less than 100 feet. See revisions to the EA in section 4.8.2. For larger patches, the NPS would restore the areas with plantings and seedings of native plant materials per mitigation described in EA section 2.5.5.

AS#13: The repeated assertion that a patch of toadflax in the park is more dangerous than the presence of toxic chemicals is based entirely on prejudicial thinking and has no scientific support. These plants are "natural". Although they may have no history of inhabiting the parks, they nonetheless are following the natural scheme of evolution and dispersing to other areas as those areas become habitable to them.

NPS Response
After habitat destruction, invasive species are the second greatest threat to biodiversity. Entire landscapes are being converted to monocultures by highly invasive, aggressive species, which do not have the natural predators associated with their place of origin. Intervention is necessary in these cases. The NPS in general does not address all exotic species - Invasive species are thriving in un-natural locations due to human assisted migration. If humans had not intentionally or accidentally moved these species from their native ranges to areas well beyond, then invasive species management efforts would not be required.

The NPS cannot dismiss the concerns invasive species pose because they will eventually impair the natural resources of the parks. The NPS Management Policies at section 4.4.4.2 direct our parks as follows: "All exotic plant and animal species that are not *maintained to meet an identified park purpose will be managed – up to and including eradication." (NPS 2006)*

AS#14: Under glyphosate, (4-12) it is stated that "it is not clear what glyphosate/surfactant combination is proposed for use under Alternative 2." How can NPS, and the public, evaluate its use if it is not known what the product is?

NPS Response
EA section 4.3.2 has been modified to indicate only glyphosate formulations specifically designed for use near aquatic habitats, such as Aquamaster with no surfactant, would be considered for use in or near aquatic environments. Other formulations would be used if their use complied with their label. Tables 2.5 and 4.5 have been revised to include more accurate descriptions of proposed herbicides and their effects.

AS#15: The review of effects of the chemicals on aquatic resources and fish fails to mention or evaluate the potential effects on significant factors regarding fish and aquatic life survival. For example, long-term studies have shown that 2,4-D and other chemicals bio-accumulate in tissues of aquatic species, suppressing the immune system and disrupting survival behavior at sublethal concentrations. (See "Salmon Decline and Pesticides") These potential effects must be included in any review of herbicide use in our national parks.

NPS Response
None of the herbicides specifically selected under Alternative 2 has been shown to bioaccumulate in fish (USFS Risk Assessments). The study cited in the comment discusses a number of pesticides in its Table 2 (which include herbicides, insecticides, fungicides, and other chemicals) that do bioaccumulate; however, none of the selected herbicides proposed in this EA are listed in that study. The NPS will follow all herbicide labeling, which in many cases limits products from use near water. Herbicide applications in terrestrial areas will have virtually no affect on aquatic resources due to distances from aquatic systems and the expected very low concentrations of the herbicides that could reach water. The NPS will exercise caution when applying herbicides near water sources, above that required by label. For instance, many herbicides may be used up to water edges. NPS will exercise additional cautionary measures by expanding the determination process to foresee any possible migration to a water body. If there is a chance of migration, either an aquatically approved herbicide or manual methods will be applied.

AS#16: On what does NPS base its conclusion that changes in soil microorganisms "would be minor, short-lived", considering that even in warmer climates, some of these chemicals remain in the soil and in vegetation for years?

NPS Response
This conclusion is based on microbial population numbers and species shifting due to the short-term presence of the herbicide. Herbicides are not general biocides. They work on specific enzymes present mainly in plants. Shifts in bacterial populations are not generally due to direct injury-related processes, but are a result of small increases in the bacteria that degrade the herbicide as the herbicide concentrations in soil are quite small in relation to the total decomposable carbon source.

AS#17: There is no mention of monitoring of the chemicals after spraying. We ask that a program be initiated which provides monitoring of soils, water, and vegetation for persistence and mobility for each herbicide spraying project. This monitoring should continue for at least the period of time that the individual chemical is expected to persist in a northern climate, and should include an area which extends outside the spray area.

NPS Response
The EA is amended to include a description of monitoring in section 2.4.4. For each herbicide application, the NPS would monitor the efficacy (control effectiveness) of the application to remove the target invasive species and to measure damages to non-target species. Where there may be some question or concern about the persistence of the herbicide and impacts to non-target species, the NPS may sample the vegetation and soil for residual herbicide concentrations or conduct bioassays of sensitive receptors. Water would not be sampled for herbicide persistence unless applications are made in water. These monitoring efforts would help inform the NPS if additional herbicide applications are needed or advisable in the original treatment area. Steve Seefeldt of USDA Agricultural Research Service in Alaska said the NPS would be wasting time and money testing for herbicide persistence on such small treatment areas. He recommended bioassays as an option (Steve Seefeldt, pers. com.).

AS#18: The EA presents what it considers to be a worst case scenario (to subsistence) for aminopyralid, a chemical which has only been registered for use since 2006 and is considered to be of low toxicity. The example ends up with a hazard quotient number that is supposedly very low and below the level of concern. This figure is almost meaningless in giving the public a realistic view of the possible effects of aminopyralid on subsistence. And it is based on almost no real world information since the chemical has only been in use for 2 years. And even with such a shallow history, it has already caused problems that were totally unexpected from the scientific data. (See Guardian article.)

NPS Response
As noted in the EA, the NPS used the USFS risk assessments for aminopyralid at http://www.fs.fed.us/foresthealth/pesticide/risk.shtml, which provides some of the best available risk assessments for this herbicide. The EA states this herbicide is relatively new and that tests show that it is relatively benign to animal life, including humans. The cited Guardian article describes effects to garden plots in the UK where manure from farm animals, which were fed grasses from fields sprayed with aminopyralid, was spread onto the garden plots. This use of manure is contrary to the product labeling since it was

known that animals would quickly eliminate any herbicide consumed. The UK garden plots then experienced adverse effects to their broadleaf crops.

Aminopyralid does not adversely affect grasses, so the grass fields were treated with this herbicide to rid them of weeds like docks, thistles, and nettles before the grasses were fed to the cattle and horses. The herbicide passed through the animals with no observed ill effect, but the herbicide bound to the manure can affect broadleaf plants for up to a year after the manure is deposited into garden plots. Farmers subsequently spread the manure on their plots and observed wilting and dying plants, such as potatoes and greens. Furthermore, this article shows a large boom sprayer moving across a field in Florida, which is not anything like how the NPS would apply this herbicide. The article also stated, "… the trace levels of aminopyralid that are likely to be in these crops are of such low levels that they are unlikely to cause a problem to human health. Applicators are advised not to sell grasses or manure exposed to aminopyralid for up to a year after application to assure farm crops are not adversely affected in the future." The NPS is not proposing any such large-scale application of aminopyralid nor would animal feces be collected and spread on wild crops to be used by the visiting public or subsistence users. We do not think the subject article relates to what the NPS proposes for invasive plant control in disparate locations in NPS units in Alaska.

AS#19: There is no discussion of any possibility of harm to subsistence from herbicide use. There is the statement that there would be harm—"would contribute minor short-term adverse additional effects on subsistence resources and uses"—but how and what these adverse additional effects are expected to be is not made clear. And so, we are left with no information on which to evaluate the harm and to make a rational decision about whether that harm is acceptable.

NPS Response
The EA indicates in the subsistence section 4.7.2 that 1) the treatment areas would be small (<150 acres per year) out of 40,000,000 vegetated acres, 2) the most likely treatment areas (GLBA National Park, SITK, KLGO, old Denali, and KEFJ) are not open to subsistence uses, and 3) the timing of treatment would avoid subsistence activities. Therefore, the potential for measurable harm to subsistence resources and users is unlikely. The EA is amended to include that treated areas would be posted and closed to public uses, including subsistence uses, so that possible exposure of contaminants to subsistence users is minimal. The only possible "additional" harm to subsistence resources and uses would be short-term contamination of plant materials and short-term closures of these areas to public entry, including subsistence uses. See also response to AS#11. All closures would be noted in the annual work plan to be posted to the website by April 5th of each year.

AS#20: Without any scientific support, this EA concludes that there will be nearly complete control of invasive plant infestations from the use of herbicides and that wetlands will be returned to natural and healthy plant populations. There are no examples offered which show that such "complete control" is likely. Nor does the EA explain how many herbicide treatments are planned for each 'infestation' to achieve this complete control.

NPS Response
The EA is amended to replace the phrase "nearly complete control" with "effective control" in the analysis for wetlands effects in section 4.3.2.1 and 4.9.2.1. The EA is also amended in section 4.8.2 to provide citations and examples of herbicide effectiveness in controlling invasive plants. Herbicides frequently have efficacies exceeding 90%, so it is conceivable that an application of herbicide will be sufficient to get the majority of the infestation under control. Once the primary infestation is controlled, subsequent NPS monitoring and treatment would occur to remove additional mature plants and newly emerging seedlings. These subsequent efforts may take multiple years; however, those subsequent treatments may be done by manual techniques.

For instance, the perennial sowthistle infestation in GLBA covers 2.4 acres where aminopyralid is proposed. Manual control attempts in 2005, 2006, and 2008 demonstrated the challenges of treating an infestation of this size. In 2008, the infestation supports 80-100 plants per square meter. Hand digging and pulling of the species took two days for fourteen people to cover 200 square meters. To treat the whole area in a season would require 4,760 person hours or 30 people working 8-hour days for four weeks. Since volunteer weed pulls generally get 1-5 volunteers for each weed pull, this is a magnitude of assistance we are unable to attract.

Use of a selective herbicide for the first two years usually reduces invasive plant density by 90% each year. Therefore it is conceivable that subsequent treatments would be feasible by manual methods.

Year	*Gross Infested Acres*	*Infested Acres before and after herbicides*	*Density (plants/m^2)*	*Estimated number of plants*	*Effort to remove manually (person hours)*	*Effort to apply herbicide (person hours)*
1	*2.4*	*2.4*	*90*	*874,121*	*4,760*	*8*
2	*2.4*	*0.24*	*9*	*87,412*	*476*	*8*
3	*2.4*	*0.024*	*0.9*	*8741*	*47.6*	*8*

Similar shifts away from herbicides back to manual methods are anticipated for the other species. That is how Table 2.2 was derived based on the known infestations throughout the Alaska NPS and the feasibility of species for control.

Complete eradication can be a long-term commitment. Although the AK-EPMT has successfully eradicated 89 infestations to date, many of these were small and did not have a long period of establishment. Infestations like the sowthistle and oxeye daisy in GLBA have been growing for decades, and consequently, these infestations would take considerably longer to exhaust the seed source in the soil.

See also responses to AS#3 and AS#7.

AS#21: The EA states that an herbicide to be used here, aminopyralid, does not need to be evaluated for groundwater contamination because of its "low toxic nature". This is again an overly optimistic view of a chemical which has little history of use. Even the graph in Appendix G which gives information on the herbicides leaves the aminopyralid sections blank because there is so little data. To depend so heavily upon so little information, while putting our very precious wetlands at risk, is reckless and unconscionable.

NPS Response
Available studies and risk assessments for aminopyralid indicate the risks to fish and wildlife and water-related resources such as wetlands are minimal, except to target plants. The ecological risk assessment prepared for the USFS and NPS on aminopyralid at http://www.fs.fed.us/foresthealth/pesticide/risk.shtml finds this herbicide is effective on dicotyledonous plants and less so on monocots. The assessment further indicates for mammals the hazard quotients vary from 0.00001 to 0.07, which is far below the level of concern (1.0). The most likely effect to wildlife would be from the secondary effects of altering available plant life. The adverse effects of aminopyralid on birds would be higher than for mammals (0.6 for large birds consuming contaminated grasses and 0.9 for small birds consuming contaminated insects). Information on toxicity of aminopyralid to terrestrial invertebrates is limited to acute bioassays in honey bees and earthworms. The cited studies indicate no adverse effects on terrestrial invertebrates are likely. Adverse effects on sensitive non-target plant species associated with runoff would be greatest in areas with high runoff potential. These would generally be areas with clay soils, such as some wetlands. Available toxicity studies and the worst–case exposure assessments show no basis for suggesting adverse effects in fish, where the hazard quotients are at or below 0.1. EPA studies showed an even lower risk quotient to fish at or below 0.01. The hazard quotients for amphibians (northern leopard frog larvae) are similar to that for fish and do not exceed or approach a level of concern. The highest hazard quotient for aquatic invertebrates is 0.06, which is below the level of concern by a factor of 17. This hazard quotient was associated with an accidental spill of aminopyralid into a small pond. Generally the hazard quotients associated with normal application rates are far lower, in the range of 0.0003 to 0.0007. For these reasons and because small areas would receive Aminopyralid, the NPS does not find this herbicide poses more than a minor risk to water resources, wetlands, or associated biota.

AS#22: The EA seems to limit itself to 'scenery' in regard to the 'naturalness value of wilderness'. The effect of seeing a non-native plant in a park is rated as a greater danger to the 'naturalness' quotient than the presence of toxic chemicals in the soil, water, wildlife, the possibility of killing native plants, insects, causing wildlife birth defects, genetic deviations, water contamination, etc. This is clearly a shallow and limited view of what 'naturalness' is and what people desire in parks. Would a visitor truly prefer to be exposed (or have the wildlife exposed) to a synthetic chemical than to see a toadflax in bloom? And if not, then the EA's approach here and the conclusions drawn are in error.

NPS Response
Through notifications and closures the public would not be exposed to the limited uses of herbicides, and nearly all of the treatment areas would be front-country areas that are not in "designated wilderness areas". In EA section 3.10.3, we distinguish between "untrammeled" and "natural" as used in the wilderness analysis. Where untrammeled is wilderness that is essentially unhindered and free from modern human control or manipulation, natural from a biological perspective is ecological systems with native biological species composition, spatial and temporal patterns, and natural processes. This goes far beyond "scenery". The threat of having a non-native plant appear in a native biological setting is the likely spread of the non-native and the potential for it to affect large acreages of wilderness thereby changing its "natural" state by altering hydrology, fire regimes, and displacement of native species on a large scale. The application of chemicals would primarily be affecting the untrammeled character of wilderness (see EA section 4.10.2.1) because human manipulation would be allowed in the wilderness as a tradeoff for preserving the naturalness of a larger area. The effects of chemicals specifically on native plants, wildlife, aquatic resources, and soil are analyzed in those sections separately. Invasive plant treatments using herbicides in wilderness areas in the continental United States, such as the Bob Marshall Wilderness, in Montana are examples of where wilderness character is recognized as having few invasive plants.

AS#23: For a project proposal which encompasses such a significant change of policy for Alaska and such huge areas of land and waters, this EA is highly inadequate. Clearly, this highly controversial proposal—to initiate the use of herbicides in an area where herbicides have never been used and in such a unique climactic zone where the consequences are unknown due to lack of testing—meets NEPA's requirements for the preparation of an EIS. (40 CFR § 1508.27(b)(4), (5), (7)) Therefore, we ask that NPS prepare an EIS that adequately addresses and evaluates, and so allows the public to consider, this very significant and controversial action by the National Park Service.

NPS Response
The NPS disagrees with this comment. Because of the limited proposed use of relatively low toxicity herbicides (less than 150 acres/year in over 40,000,000 vegetated acres), the NPS found through analyses that the level of effects to the human environment would not become "significant" for any of the impact topics evaluated. We did not find the possible effects to the human environment highly controversial, nor the risks highly uncertain or unique, nor the cumulative effect to any of the impact topics significant either permanently or temporarily.

Becky Long (BL) #1: The herbicide material presented in the EA is inadequate and incomplete. For instance, Table 2.5 and Appendix G list 8 active ingredients that are analyzed for their characteristics and environmental fate and effects. Under each active ingredient, the herbicide products containing that active ingredient are listed. But herbicides are made up of more than the active ingredient. The NPS is proposing a total of 22 plus herbicide products (there is no listing under Triclopyr) that could be used in vegetation control. An EIS is needed which includes a detailed analysis of all 22 plus herbicide products.

NPS Response
The NPS proposes to use the subject herbicides only as directed by product labels and as appropriate considering risk assessments for the active ingredients at http://www.fs.fed.us/foresthealth/pesticide/risk.shtml. Tables 2.5 and 4.5 have been modified to focus on the active ingredients and provide product-specific information where necessary. Because the analyses of effects at potential treatment areas and methods produce minor and insignificant effects to all impact topics evaluated, the NPS does not agree that an EIS is required. See also the NPS responses to AS#23 regarding the need for an EIS and to ACAT#5 regarding inert ingredients.

BL#2: An EIS is needed because there is the potential for a significant increase of herbicide use in the future that the EA would allow. I state this based on the numbers stated throughout the EA. Page 2-9 shows that the immediate treatment for the first year would be a total of 5.5 acres at 5 sites. Pages 2-2 to 2-3 states a low estimate of 2 acres/year and an upper estimate of 10 acres/year. Table 2.2 on page 2-3 estimates 27 acres for the years 2009-2018; however, page 4-24 states that "1567 acres of parkland have been infested with medium to high risk invasive weeds." Using the Integrated Pest Management Decision Tree in figure 2.1, I see nothing preventing an NPS decision for a significant amount of herbicide treatment based on how personnel in the field and NPS staff actually define threshold, low, medium, and high risk species. Page 2.4.2 states species considered moderate to high invasive would be considered for herbicide use. Thus, the high end of acreage to be treated could be 1567 acres.

NPS Response
The EA is revised to provide more consistent estimates of future areas to be treated with herbicides. If a proposed herbicide application exceeds the scope of this document, further NEPA work would be required. The AK-EPMT has no intention of using herbicides on all invasive plant infestations. We would continue to use manual/mechanical methods as the primary mode of choice, until they are demonstrated to be ineffective. Though a medium to high risk invasive species might be considered for herbicide use, this does not mean that in all cases these species would receive herbicide applications. The bulk of the acres of invasive plant infestations (1,567 acres) reported are common dandelions or bigleaf lupine in GLBA, DENA, and, WRST. The NPS recognizes it is not possible to treat most areas with dandelion infestations, even though they have a moderate ranking at 58. This species would fall into the part of the decision tree (Fig. 2.1) that indicates it is not possible to eradicate the species park-wide; therefore, we would contain and monitor the infestations. For less widespread invasive plant infestations where a risk assessment shows herbicide applications would pose a risk to water quality or human or wildlife health, we also would not proceed with the herbicide application. Only where we find the risks to the above-mentioned resources are judged to be low, would the NPS consider authorizing an herbicide application.

Therefore, the NPS estimate of an average 10 acres or less of herbicide application each year would be consistent with expectations. With the updating of this EA in response to public comments, a worst-case scenario has been added to accommodate a treatment of up to 150 acres per year. Again, this would not be normal and would only occur if infestations could be be ultimately controlled and prevented from contaminating the broader park landscapes. We do not think an EIS is warranted for the relatively small treatment areas. See also response to AS#24.

BL#3: The Herbicide Hazard Ratings (Table 4.5) and Herbicide Health Risks (Table 4.6) under 4.5.2.1, pages 4-20 and 4-21 Direct and Indirect Impacts of Alternative 2 on Effects to Human Health and Safety are incomplete and, thus, unacceptable. The tables only list 8 herbicides. As mentioned, there are 22 plus herbicides that are proposed to be used. Roundup Pro is proposed to be used in 2009 in two places, and it is not listed in the risks and ratings table.

NPS Response

The EA is revised to combine information in tables 4.5 and 4.6 into a new table 4.5 with the active ingredients as the primary focus and trade name herbicides listed as examples, including Roundup Pro. Furthermore, the tables will include data for 2,4-D and triclopyr and omit data for sulfometuron-methyl (Oust XP). The categories in this table are how Oregon State University and Intertox, Inc. determine risks for pesticides/herbicides.

BL#4: There needs to be a category for climate change and how it will affect Alaska Park ecosystems, plant diversity and the opportunity for the establishment of new plant species that would be called invasive. The only place that this is touched on is on page 3-13, 3.2.3 GLBA Aquatic Resources: "Receding glaciers throughout GLBA are exposing new areas of barren ground and creating miles of new stream and river habitats. Such early successional stream banks and gravel bars are prime habitat for the establishment of invasive riparian plants." As the EA has stated throughout the Environmental Consequences chapter 4, approximately 6000 acres of NPS parklands has "been lost to human activities". Combine that with a changing environment due to climatic changes, it is a given that new plant species will populate the parks. Whatever the cause behind the climate change, it will cause evolutionary changes in the park ecosystem. Seeing these changes as always "invasive", "noxious" or negative may not be possible because the presence of new species may not be able to be prevented.

NPS Response

The effects of climate change are addressed in cumulative effects analyses in the revised EA. The NPS recognizes invasive species may shift their ranges north or higher in elevation in response to climate change. Most of the species of concern are already in Alaska or close by in neighboring Canadian provinces. The purpose of the invasive plant management plan is not to respond to slow migrations of plant populations, but to respond rapidly and effectively to plants that fit the definition of invasive. The primary vector for invasive plants are humans through purposeful plantings and seedings, uses of feed and straw, or transport mechanisms such as vehicles, heavy equipment, camping *equipment, shoes, and clothing. We recognize that it is not possible to prevent all invasive plants from arriving to NPS units in Alaska, but we think early detection and rapid effective response with a strong preventative program could greatly help reduce such new infestations and their spread. See EA section 2.5.1.*

BL#5: There needs to be a discussion about the biology of the appearance of a new plant species in an ecosystem. Frequently, there can be an initial phase of explosive growth for a certain period of time, then followed by a crash, a subsequent decline in population numbers, and the integration of the new species into the recipient ecosystem. Perhaps the native plants will out-compete it then. There are examples of this. Also an eradication attempt of 1 pest species can cause the outbreak of another pest species and also impacts the present native species.

NPS Response
The EA is revised in section 3.7 to describe typical invasive plant behavior. The pattern described by the comment may exist, but it is not the typical pattern unless something (herbivore, disease, and physical change) forces the invasive plants population to be checked. More typically, an invasive species has a lag phase when it is introduced in its new environment, then an exponential growth or colonization phase, then leveling off at a sustained high density when it becomes naturalized. For most of Alaska's invasive plant species we are between those first two phases, which coincidentally is the stages that are most treatable and most likely to result in eradications. The invasion process is described on this web page: http://www.weedcenter.org/textbook/3_rados_invasion.html.

Treatment of one invasive species can affect both other native and non-native species. If extensive disturbance is anticipated, it is critical that restoration plans are in place to ensure the resistance of the native plant community to subsequent invasions. Restoration is described in the EA section 2.5.5 - mitigating measures, which are usually adopted in the final decision.

BL#6: I do not think it has been proven that invasive plants displace native plants, degrades fish and wildlife habitat, and alters ecosystem processes. This must be scientifically proven before this statement can be believed. Where is it proven that white sweetclover alters soil condition by fixing nitrogen with the potential to alter sedimentation rates of river ecosystems? Page F-7 says that white sweetclover does not appear to be affecting the native plant communities in Rocky Mountain National Park. How does NPS come to the conclusion that there is a potential for this to happen? Where has it been proven that common tansy along streams restricts water flow, altering hydrology and potentially promoting deposition of fine sediment which is stated on Page 4-7?

NPS Response
After habitat loss, invasive species are the second leading threat to world biodiversity. The efforts by multiple agencies in Alaska to prevent invasive species proliferation are aimed to prevent what has happened elsewhere in the world from being repeated here. If

the statement refers to Alaskan ecosystems, we are just beginning to see the realities of what invasive species can do since our infestations are still in their infancy. As far as other locations, invasive plants have displaced native plants, degraded fish and wildlife habitat, and altered ecosystem processes (D'Antonio and Vitousek 1992; Ehrenfeld and Scott 2001; Hobbs and Huenneke 1992).

For example, cheatgrass (Bromus tectorum) has covered and dominated millions of acres of the western United States. It increases wildfire frequency, degrades native ecosystems, threatens agriculture, and changes soil morphology and organic matter dynamics.

Additional information is provided in the revised EA about the effects of white sweet clover on soil condition and native plant communities in EA in Appendix F. The effects of common tansy along streams on water flow and sedimentation are added to the revised EA in section 4.3. Source information is listed below and is added to the Reference citations in the EA.

Sources:
http://www.icbemp.gov/science/pellant.pdf,
http://uwadmnweb.uwyo.edu/UWrenewable/Faculty/Norton/wildland%20shrup%20proc%202004.pdf

Blank, R.R. and J.A. Young. 2004. Influence of three weed species on soil nutrient dynamics. Soil Science 169(5): 385-397.

Carlson, M. L., Lapina, I. V., Shephard, M., Conn, J. S., Densmore, R., Spencer, P., Heys, J., Riley, J. and J. Nielsen. 2008. Invasiveness Ranking System for Non-Native Plants of Alaska. USDA Forest Service, R10, R10-TP-143. 218 pp.

Carpenter, A.T., and T.A. Murray. 2005. Element Stewardship Abstract for Bromus tectorum L. (Anisantha tecrorum (L.) Nevski). The Nature Conservancy. Arlington, VA.

Conn, J.S., K.L. Beattie, M.A. Shephard, M.L. Carlson, I. Lapina, M. Hebert, R. Gronquist, R. Densmore, and M. Rasy. 2008 Alaska Melilotus Invasions: Distribution, Origin, and Susceptibility of Plant Communities. Arctic, Antarctic, and Alpine Research, Vol. 40, No. 2, 2008, pp. 298–308.

Royer, F., and R. Dickinson. 1999. Weeds of the Northern U.S. and Canada. The University of Alberta press. 434 pp.

Wolf, JJ, SW Beatty, G Carey. 2003. Invasion by Sweet Clover (Melilotus) in Montane Grasslands, Rocky Mountain National Park. Annals of the Association of American Geographers, 93(3), 2003, pp. 531–543.

BL#7: According to Invasion Biology, the circumboreal reed canary-grass is definitely a North American native, part of the Tertiary flora. Nevertheless, it is frequently labeled an alien and exterminated (pg.62). Page 4-6 of the EA states reed canary grass can interfere with natural hydrology of streams, eliminate the scouring action needed to maintain spawning gravels and promoting deposition of fine sediments. Where is the proof for this?

NPS Response
Reed canarygrass is likely to have had a circumboreal distribution; however, the North American genetics has likely been swamped out by the more aggressive and human-selected (for forage, ornamental, and erosion control) genetics of Eurasian introductions. The invasiveness and rankings of reed canarygrass and other invasive plant species are addressed in Carlson et al. (2008), and the origins and distribution of reed canarygrass in Alaska are summarized below:

> *Some populations of Phalaris arundinacea L. are possibly native in Alaska. Four sites that may harbor native forms are from hot springs of interior Alaska (Big Windy, Kanuti, Kilo, and Manley Hot Springs; "N?" in figure). Active mining occurred in these areas in the early 20th century and seeds may have been brought in with livestock. If these populations are native they represent important and likely unique components to the biodiversity and biogeographic history of Alaska and Beringia. Phalaris arundinacea in these remote locations should not be removed. However, monitoring may be critical as introgression with other cultivated and weedy forms can result in substantial increases in invasiveness (Merigliano and Lesica 1998). Populations south of the Alaska Range are generally associated with anthropogenic disturbance and are most likely introduced or introgressed genotypes as in the Pacific Northwest (see Merigliano and Lesica 1998). These introduced populations pose a serious threat to communities and ecosystem function. Phalaris arundinacea has been documented in the south coastal [Skagway, Craig, and Petersburg (Hultén 1968) and Juneau, Seward, Sitka, and Ketchikan (UAM 2004)], interior boreal [Fairbanks, Anchorage, and Talkeetna (Hultén 1968) and Circle, Tanana, Big Windy, Kilo, Manley, and Kanuti (UAM 2004)], and arctic alpine [Bettles (UAM 2004)] ecoregions in Alaska.*

The NPS refers the reader to appendix E of the EA, which is derived from "Invasiveness Ranking Systems for Non-Native Plants of Alaska" (Carlson et al 2008). Reed canarygrass has an invasive ranking of 83 in Alaska, one of the highest in the state. Reed Canarygrass (P. arundinacea) is native to North America, but not to Alaska (Cronquist, A., A.H. Holmgren, N.H. Holmgren, J.L. Reveal and P.K. Holmgren (1977), Intermountain Flora: Vascular Plants of the Intermountain West, U.S.A. The Monocotyledons vol. 6, New York Botanical Garden, New York). P. arundinacea has been shown to reduce the biodiversity of native wetland plants (Schooler, S. et al. (2006).

Negative per capita effects of purple loosestrife and reed canary grass on plant diversity of wetland communities, Diversity and Distributions 12:351-363). P. arundinacea is highly aggressive, establishes dense monocultures, and grows best on partially flooded soils (e.g. Perkins and Wilson (2005). The impacts of Phalaris arundinacea (reed canarygrass) invasion on wetland plant richness in the Oregon Coast Range, USA depend on beavers. Biological Conservation 124:291-295).

Sources for many of the ecological impacts of reed canarygrass are:

Apfelbaum, S.I. and C.E. Sams. 1987. Ecology and control of reed canary grass. (Phalaris arundinacea L.). Natural Areas Journal 7(2):69-74.

Hutchison, M. 1992. Vegetation management guideline: Reed Canary Grass (Phalaris arundinaceae L.). Natural Areas Journal 12(3): 159.

Lantz, L.E. 2000. Reed Canarygrass (Phalaris arundinacea L.). Washington State Noxious Weed Control Board.

Lyons, K.E. 1998. Element stewardship abstract for Phalaris arundinacea L. Reed canarygrass. The Nature Conservancy. Arlington, Virginia.

Rutledge, C. R., and T. McLendon. 1996. An Assessment of Exotic Plant Species of Rocky Mountain National Park. Department of Rangeland Ecosystem Science, Colorado State University. 97 pp. Jamestown, ND: Northern Prairie Wildlife Research Center Home Page. http://www.npwrc.usgs.gov/resource/othrdata/explant/explant.htm (Version 15DEC98).

Snyder, S.A. 1992. Phalaris arundinacea. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2004, May 5].

WSDE - Washington State Department of Ecology: Water Quality Home. Technical Information About Phalaris arundinacea (Reed Canarygrass). http://www.ecy.wa.gov/programs/wq/plants/weeds/index.html [Dec 2, 2003].

Whatcom Weeds. 2003. Reed Canarygrass (Phalaris arundinacea L.). Whatcom County Noxious Weed Control Board. Whatcom County Public Works. Bellingham, Washington. [June 8, 2004].

BL#8: Page 4-48 states, "A review of available studies indicates that there are none that detail the direct impacts of the 23 invasive plants in Alaska Parks at the wildlife population level. There are no studies that directly link habitat changes with quantified reductions in animal populations." The science is not there. I do not believe that it is scientific to use studies on other places to make strong statements about what will happen in Alaskan parks.

NPS Response

NEPA requires that agencies use the best available scientific evidence to estimate impacts. It is reasonable to infer from studies elsewhere that invasive plants would adversely affect native habitats to the extent they displace native plants and radically *alter plant communities. This effect in turn would adversely affect the animal species that have adapted to and depend for their life history requirements on these native plant communities.*

BL#9: Discussion of herbicide active ingredient CLOPYRALID
There are no publicly available studies of chronic effects, sub-chronic (medium term exposure) effects, reproductive effects and cancer causing ability for clopyralid containing products. EPA has not evaluated the ability of clopyralid to cause cancer. Thus, I have a hard time understanding how Table 4.6, pg 4-21 say the cancer risk for this herbicide is negligible?

NPS Response
NPS disagrees with this comment. The information shown in table 4.6 was developed by Oregon State University and Intertox, Inc. to assist interested parties in understanding the risks associated with herbicide use by the Washington State Dept. of Transportation. The EPA data is summarized into Fact Sheets for easy use. The fact sheet for Clopyralid contains additional information on how the various classifications for cancer risk were obtained. The MSDS for Transline (Clopyralid) states: "Cancer information: the components tested did not cause cancer in laboratory animals."

According to MSDS for the trade name Stinger (Dow AgroSciences, 40.9% clopyralid and 59.1% inert including isopropanol, ethylene oxide, propylene oxide, and di-sec-butylphenol polymer; 25-July-07):

> *Cancer information: The components tested did not cause cancer in laboratory animals.*
>
> *Teratology (birth defects): Clopyralid caused birth defects in laboratory animal studies, but only at greatly exaggerated doses that were severely toxic to the mothers. No birth defects were observed in animals given clopyralid at doses several times greater than those expected during normal exposure. Isopropanol has been toxic to the fetus in laboratory animals at doses toxic to the mother.*
>
> *Reproductive effects: For the components tested, in animal studies, did not interfere with reproduction.*
>
> *Mutagenicity: For the components tested, in-vitrio and animal genetic toxicity studies were negative.*

Information on "Subchronic, Chronic, and Other Toxicity of Clopyralid" is available from the EPA in Table 1 of http://www.epa.gov/EPA-PEST/2002/September/Day-25/p24232.htm

The BLM Vegetation PEIS (4-184) summarizes human health risk for clopyralid as:

> *There are no risks to public or occupational receptors associated with most of the anticipated typical and accidental exposure scenarios for clopyralid evaluated in the Forest Service risk assessment. Irritation and damage to the skin and eyes can result from direct exposure to relatively high levels of clopyralid; this is likely to be the only overt effect as a consequence of mishandling clopyralid (SERA 2004b). Children face low risk from consumption of water contaminated by an accidental spill.*
>
> *The human health risks of hexachlorobenzene and pentachlorobenzene were also analyzed in the Forest Service HHRA, as technical grade clopyralid may be contaminated with these chemicals. Hexachlorobenzene was evaluated for potential carcinogenicity. Based on the levels of contamination of technical grade clopyralid with hexachlorobenzene and pentachlorobenzene, and the relative potencies of these compounds compared to clopyralid, this contamination is not significant in terms of potential systemic toxic effects. In addition, the contamination of clopyralid with hexachlorobenzene does not appear to present any substantial cancer risk above the Forest Service cancer risk LOC of 1 in 1 million.*

BL#10: I disagree with Appendix G statement regarding the volatility of clopyralid that it does not evaporate easily. It is considered volatile by EPA meaning that it can evaporate from foliage and soil after application, move away from the application site, and "adversely affect non-target broadleaf plants". EPA calculated that volatilization of only 1% of applied clopyralid would be enough to damage non-target plants.

NPS Response

The EPA reference cited in the comment was from an Ecological Effects Branch (EEB) review of the clopyralid-containing herbicide Stinger for use on asparagus in Washington. This review considered Stinger to be volatile (vapor pressure 1.3 x 10^{-5} mm Hg at 25°C). Due to the risk of aerial drift and negative effects to non-target plants, the NPS will follow the practices in Appendix H, including application only under appropriate meteorological conditions, using coarse sprays, and avoiding its use in areas of sensitive surrounding vegetation. The NPS would not apply clopyralid at temperatures likely to produce volatilization and drift of the herbicide. Furthermore, Tu et al. (2001) state that "Clopyralid does not volatilize readily in the field (T. Lanini, pers. obs.). The potential to volatilize, however, increases with increasing temperature, increasing soil moisture, and decreasing clay and organic matter content (Helling et al. 1971). The USFS describes volatility of the clopyralid contaminant hexachlorobenzene, but it does not refer to volatility of clopyralid. The International Chemical Safety Card for clopyralid states "INHALATION RISK: Evaporation at 20°C is negligible; a nuisance-causing concentration of airborne particles can, however, be reached quickly." Transline (active ingredient clopyralid) has a vapor pressure of 23.5 mmHg at 20°C (Dow Agro). Consequently, water vapor pressure is 23.74 mmHg at 25°C, and it should evaporate far more rapidly than clopyralid.

Tu, M., C. Hurd, R. Robison, and J.M. Randall. 2001. Clopyralid. Weed Control Methods Handbook, The Nature Conservancy. http://tncinvasives.ucdavis.edu/products/handbook/11.Clopyralid.pdf

U.S. EPA. 1990. EEB review: 90-WA-04. Washington, D.C., Mar. 7.

BL#11: Discussion of herbicide ingredient Glyphosate:· In Appendix G, it states the half life ranges from 3 to 130 days. But according to US Department of Agriculture Research Service the half life can be up to 174 days.·

NPS Response
The EA Appendix G is revised to indicate soil half life of glyphosate could be as long as 174 days.

BL#12: I do not agree that glyphosate does not bio-accumulate in fish. Glyphosate herbicides can cause genetic damage in fish and also disrupt their immune systems.

NPS Response
See responses to ACAT#1&#5. Aquamaster, the formulation of glyphosate recommended for use near or in water, contains no surfactants or other inert ingredients. There is no evidence that glyphosate bioaccumulates in fish or any other organism. This is because it is highly soluble in water. Compounds that bio-accumulate tend to be lipophilic (fat-loving).

BL#13: There are big problems with drift and glyphosate. The American Association of Pesticide Control Officials surveyed state pesticide regulatory agencies and found glyphosate was second after 2,4-D in pesticide drift complaints. The labels on the herbicide acknowledge the drift problems. Carleton University and Environment Canada describe glyphosate drift potential effects as "severe ecological changes."

NPS Response
Only small areas are proposed for treatment and only by hand sprayers or leaf or stump dabbing to the plants. Drift of the herbicide to other areas would be minimal. Furthermore, the NPS would follow herbicide best use practices as outlined in appendix H, which specifies droplets sizes and wind and atmospheric conditions to reduce potential drift.

BL#14: In appendix G, you do not mention a half life of Imazapyr. EPA reports that the half-life is 17 months in laboratory tests. Field studies have shown the half life ranges from 21 days to 49 months. Minimum estimates of persistence in soil show 60 to 436 days.

NPS Response

Appendix G is revised to describe the half life of Imazapyr indicated in the USFS risk assessment. See also responses to CCA#5 and ACAT#2 regarding the persistence of the subject herbicides, including Imazapyr.

BL#15: No studies have been conducted on chronic toxicity of Imazapyr to birds and fish. Thus, I do not believe that the statement on page 4-10 that says imazapyr is known to have low toxicity to invertebrates and is practically non-toxic to fish can be correct. Nor is it correct to say that imazapyr does not build up in aquatic animals.

NPS Response
The NPS disagrees with the comment that there are no studies addressing the toxicity of Imazapyr to birds and fish. The USFS risk assessment for Imazapyr refers to numerous studies on its potential toxicity to birds and fish. See response to ACAT#2 regarding the residence time of Imazapyr in soil and water and its bioaccumulation in aquatic organisms and birds.

NPS considers the 18-week exposure studies to be sufficient to characterize the risk of longer than acute exposures to birds following Alaska Park herbicide applications. The USFS risk assessment on imazapyr states the following:

> ***4.1.2.2. Birds –*** *While toxicity studies on birds (Appendix 2) are less extensive than those on mammals, both ducks and quail have been assayed in 5 day acute toxicity studies and 18 week reproduction studies. As with the mammalian studies, no adverse effects have been noted in birds. In the acute studies (Fletcher 1983a,b), no mortality was observed at imazapyr concentrations of up to 5000 ppm in the diet. These acute exposures were equivalent to average daily doses of 674 mg/kg in quail (Fletcher 1983b) and 1149 mg/kg in ducks (Fletcher 1983a). Similarly, in the 18-week dietary studies, no effects on reproductive endpoints (i.e., egg production, hatchability, survival of hatchlings) were observed at dietary concentrations of up to 2000 ppm. These 18-week exposures were equivalent to average daily doses of 200 mg/kg in both quail and ducks (Fletcher et al. 1995a,b). The LD_{50} for Bobwhite quail and Mallard ducks is >2150 mg/kg (Fletcher et al. 1984a,b). Acute toxicity studies (5-day) in Bobwhite quail and Mallard ducks found no adverse effects at dietary concentrations up to 5000 ppm (Fletcher et al. 1984c,d).*

With regards to Imazapyr effects to fish the USFS risk assessment states the following:

> ***4.1.3.1. Fish –*** *Standard toxicity bioassays to assess the effects of imazapyr on fish and other aquatic species are summarized in Appendix 4. For fish, standard 96-hour acute toxicity bioassays indicate that the LC_{50} is greater than 100 mg/L. Other research suggests that imazapyr is moderately toxic to other fish species. Foreign studies found that the silver barb (Barbus gonionotus) and Nile Tilapia (Sarotherodon niloticus) are more sensitive to the acute toxic effects of imazapyr*

with 96-hour LC_{50} values of 2.71 mg/L (2.66-2.75 mg/L) and 4.36 mg/L (4.21-4.53 mg/L), respectively (Supamataya et al. 1981). This study is published in Thai with an English abstract and a full text copy of this study was not obtained and translated for the current risk assessment. As discussed in Section 4.2, the concentrations reported in this study as LC_{50} values are substantially above concentrations that may be expected in the normal use of imazapyr. Nonetheless, the results from these studies are further considered in the dose-response assessment for fish (Section 4.3) and risk characterization (Section 4.4).

The longer term toxicity of imazapyr has also been tested in an early life-stage bioassay using rainbow trout at concentrations of 0, 6.59, 12.1, 24.0, 43.1, or 92.4 mg/L for 62 days. At the highest concentration, a "nearly significant effect on hatching" was observed (Manning 1989b). The investigator judged that this effect was not toxicologically significant. A review of the data tables provided in the study does not contradict this assessment. Nonetheless, the classification of 92.4 mg/L as a NOAEL is questionable. For this risk assessment, the next lower dose, 43.1 mg/L, will be taken as the NOAEL. As discussed in Section 4.4, any of these concentrations are far in excess of concentrations that are plausible in the environment. Thus, any uncertainty concerning the classification of the 92.4 mg/L concentration has no impact on the risk characterization.

BL#16: Discussion of herbicide Triclopyr: There are no publicly available studies of chronic toxicity, mutagenicity, carcinogenicity, and reproduction of commercial triclopyr-containing products.· The half life is 10 days to 100 days lasting longer on forestry sites than on agricultural sites.· Triclopyr is very mobile in soil because triclopyr molecules are not strongly held by soil or sediment particles.· The contamination of surface water is shown in the US Geological Survey national monitoring program that found triclopyr in 8 of 20 river basins studied. A USGS study of 10 urban watersheds near Seattle, Washington, found it present at 90% of sites sampled, which shows widespread contamination. It has contaminated streams following aerial forestry, rice fields and golf course applications.· Non target plants can experience drift, genetic effects, mosses and lichens damage, inhibition of mycorrhizal fungi, and stimulation of algae blooms. This definitely must be considered by NPS. It is not practically non-toxic to soil microorganisms as stated in the EA.

NPS Response
The NPS disagrees with the statement there are no available studies of toxicity, mutagenicity, and carcinogenetic studies on products with triclopyr. The USFS risk assessments referred to above detail results from several studies. With regards to human health effects tables 4.5 and 4.6 are combined into a new table 4.5 to include risks associated with triclopyr.

The EA Appendix G is revised to include the range of triclopyr half-life in soil in addition to its average half-life in soil.

The EA is revised to better describe the persistence of proposed herbicides in Alaska soils and its effects on soil microorganisms. See also responses to CCA#5 and ACAT#2. Because the NPS is not proposing large-scale aerial applications of triclopyr, the USGS studies and others showing drift effects of triclopyr in the environment are not applicable. The NPS is only proposing spot spraying and leaf–dabbing or cut-stump swabbing with Triclopyr. Triclopyr is degraded readily by sunlight. Consequently, the statement regarding longer half-life in forested (shaded) locations is logical. The most common alternative mechanism for degradation is by microbial metabolism. Regarding soil mobility, the comment made is correct for the salt formulation; however, the acid and ester formulations bind well with soils and are unlikely to be mobile. In practice, degradation of the product occurs rapidly, which makes mobility less of an issue.

The EA is also revised in appropriate sections to address the potential toxic effects of triclopyr products on aquatic organisms (including fish), non-target plants, and human health.

The USGS summary report, The Quality of Our Nation's Water: Pesticides in the Nation's Streams and Ground Water, 1992-2001 (http://pubs.usgs.gov/circ/2005/1291/pdf/circ1291.pdf) measured for triclopyr as part of the National Water-Quality Assessment (NAWQA). Although there was no human-health benchmark to make comparisons, the compound was never found to exceed the aquatic-life benchmark. NAWQA assessed 51 of the Nation's most important river basins and aquifers and the High Plains Regional Ground Water Study, an area representing 70 percent of total water use and more than 50 percent of the population's supply of drinking water.

The USGS study of pesticides detected around Seattle did reveal a high proportion of sites with detectable triclopyr. The highest concentration measured was 1.2 ppb. The freshwater aquatic-life criteria for acute and chronic exposure to triclopyr are 5,600 and 560 ppb. Consequently, the study reveals that the observed concentrations were well below levels of concern. http://pubs.water.usgs.gov/fs-097-99

Data on the toxicity of triclopyr to aquatic organisms are scarce, but suggest low toxicity. LC50 for rainbow trout is 117 mg/L, and for bluegill sunfish is 148 mg/L, both of which are very high concentrations. Toxicity to Daphnia magna, an aquatic invertebrate is very low, with an LC50 of 1,170 mg/L. Furthermore, triclopyr is rapidly degraded in water by photohydrolysis (half life = ~10 hours).

Triclopyr is a selective herbicide and drift damage to non-target species is not likely because the NPS would use spot applications and mitigate drift risks by following the best management practices in Appendix H.

Genetic effects were detected; however, the study cited (El-Khodary et al. 1989) applied Garlon-4 to root tips of Allium cepa at concentrations of 28 to 38,400 ppm, which are all *above concentrations anticipated in the field. The NPS will only apply at concentrations approved for use.*

The study (Thompson et al. 1995) showing an algal bloom following application of the ester form of triclopyr (such as Garlon 4). Since ester forms of triclopyr are highly toxic to fish, aquatic plants, and aquatic invertebrates, this study was conducted contrary to the labeling of the product. The NPS will comply with the clear labeling of this product and not use it for application on or near water surfaces.

Newmaster et al. (1999) did show that bryophyte and lichen abundance and species richness decreased after herbicide treatments (0.71-6.72 kg/ha) in a harvested boreal mixed forest ecosystem. Triclopyr in this case was being applied forest wide for post-harvest conifer release. The NPS acknowledges there may be affects to bryophytes and lichens in the small areas proposed for treatment.

Effects to mycorhizal fungi are concerning since they play a key role in vegetation communities. The study cited in Cox (2000) did show negative effects of Triclopyr when soil concentrations exceeded 100 ppm. Typical application rates of 0.28 to 10 kg/ha for Triclopyr result in initial residue rates of 4-18 ppm, so inhibition of fungi is not likely under normal field conditions (Estok et al. 1989)

Inert ingredients may have hazards to people and the environment; however, the risk needs to take into consideration the concentration and level of exposure to these compounds.

Using the Hazardous Materials Identification System (HMIS), the inerts listed have the following health risks.

Inert Ingredient	*Health Rating*
Ethoxylated sorbitan monooleate	*1 – Irritation or minor reversible injury possible (2)*
Ethylenediamine tetraacetic acid	*1 – Irritation or minor reversible injury possible (1)*
Kerosene	*2 - Temporary or minor injury may occur*
Petroleum solvent	*not located independently, but as a component of other compounds 1 or 2*
Triethylamine	*3 - Major injury likely unless prompt action is taken and medical treatment is given (3)*

(1) Sciencelab.com
(2) http://www.researchsupply.net/PDF/Polysorbate.pdf
(3) http://phyvirtual.nju.edu.cn/material/MSDS/G82.pdf

Consequently, the component with the highest intrinsic health risk is triethylamine. In Garlon 3A, triethylamine is a minor constituent at 3.0 W/W% (http://www.cdms.net/ldat/mp0AU001.pdf).

Estok, D., B. Freeman, and D. Boyle. 1989. Effects of the herbicides 2,4-D, glyphosate, haxazinone, and triclopyr on the growth of three species of ectomycorrhizal fungi. Bull. Environ. Contam. Toxicl. 42:835-839.

Tu et al. 2001. Weed Control Methods Handbook: Triclopyr.

http://tncinvasives.ucdavis.edu/products/handbook/20.Triclopyr.pdf

BL#17: Page 5-1 states that public meetings on the EA are planned during a 60 day public review period. I never heard about any public meetings. I listen carefully to KTNA Public Radio Announcements and never heard about any meetings. Did they really happen?

NPS Response
The text on EA page 5-1 is updated to indicate no public meetings were held. The NPS originally planned public meetings when the EA was released, but no park or public person asked for one. The NPS had poor turnout for the public scoping meetings in Juneau, Anchorage, and Fairbanks. For these reasons the NPS decided the effort and expense for public meetings on this EA was not necessary, and that ample opportunities for comments in writing were available.

BL#18: Recently the active herbicide ingredient Aminopyralid has made the news in the United Kingdom and the United States. Apparently, the herbicide products Banish, Forefront, Halycon, Pharoah, Runway, Synbero, and Upfront, whose active ingredient is Aminopyralid, caused negative impacts to farms and gardens in the UK. During late 2007 and 2008, many gardeners and allotment holder and commercial growers reported abnormal growth of crops attributed to the presence of aminopyralid in manure that was used on the land. Aminopyralid binds itself to organic matter and persists for a long time. As long as there is some organic matter, it will remain present. It persists so long that Dow Agro advises susceptible crops should not be grown on treated land for at least two calendar years after spraying. Apparently, aminopyralid was sprayed on grasslands to control weeds, the grasses were harvested and fed to cows for winter feed and then their manure was sold for farming purposes. Aminopyralid does not break down in manure. Manure containing aminopyralid has caused leaves to curl, cup, bubble, and created extra side shoots, and there was stunted growth. Potatoes from the manure rotted. In July 2008 Dow Agro suspended sale of the aforementioned aminopyralid products. I saw no mention of Milestone VM. NPS should definitely check this out because they are promoting this herbicide in their EA as totally non toxic.

NPS Response
Aminopyralid is a newer herbicide, but it has under gone EPA registration and risk assessments, such as by the USFS/NPS (http://www.fs.fed.us/foresthealth/pesticide/062807_Aminopyralid.pdf), which confirm that the herbicide has a reduced risk. Concerns of aminopyralid affecting crop yields

following application of manure containing residual aminopyralid have been raised, particularly in the United Kingdom. Livestock pass the aminopyralid quickly through their bodies and do not metabolize it. Although application of manures from treated forage is contrary to product labeling, this scenario did occur and affected sensitive crops. There are still no known human risks from aminopyralid residues. Since aminopyralid has reduced risks and is highly selective for broadleaf plants, particularly those in the Asteraceae, it was selected for treatment of perennial sowthistle and oxeye daisy. See also the response to AS#18 that addresses aminopyralid effects to subsistence resources and users.

Invasive Species Coordinator for the Sitka Ranger District (ISC-SRD) #1: In the discussion of situations warranting or ruling out the use of herbicides, I think that #1 "1) the population is not an isolated population but instead is part of a larger population;" needs further clarification. As stated it may place undue limits on the ability to use herbicides to control larger populations of invasive plants. It is sometimes important and necessary to control small disjunct populations of weeds in order to contain and eventually control a larger population. While the discussion of thresholds and isolated populations in Tables 2.3 and 2.4 do help to clarify the strategy, I believe these thresholds are based on too little information about the potential of invasive species in Alaska. I think it would be reasonable to allow the Regional or National Integrated Pest Management Coordinator to determine if herbicide use is warranted on isolated populations, pursuant to the control of a larger population.

NPS Response
This plan is a conservative one to address herbicide treatment on small to intermediate sized infestations programmatically. To address infestations beyond the scope of this EA, site specific NEPA compliance would be performed.

ISC-SRD #2: I think this could be better stated to make it clear that if Alternative 2 is chosen and implemented, then 4 weed populations would be approved for treatment. The present wording could imply that each population would be treated 4 times. It would be good to specify if more than one treatment per site is envisioned.

NPS Response
The first sentence in EA section 2.4.3 is revised to clearly indicate four invasive plant infestations would be treated in year one of alternative 2. Subsequent treatments in following years would be determined after review of monitoring of efficacy and review of the decision tree.

ISC-SRD #3: “Roundup Pro” is listed as the herbicide to be used for treating reed canarygrass at Bartlett Cove. In section: 4.3.2.1 Direct and Indirect Effects of Alternative 1 on Aquatic Resources and Fish: In the "Glyphosate" discussion it states that "it appears that Roundup Pro and Roundup Ultra contain the most toxic surfactants." Unless there is a compelling reason to use this formulation, I think it would be much more prudent to propose using “Aquamaster” with a less toxic surfactant. Finally, in APPENDIX H, in a bullet statement Roundup Pro is mentioned as an acceptable herbicide to use near surface water, which is contrary to the surfactant toxicity rating mentioned in section 4.3.2.1.

NPS Response
The NPS agrees that Roundup Pro should not be used near water. The EA has been revised to recommend herbicide active ingredients with trade name formulations as possible examples. Reed canarygrass would be treated with a product containing glyphosate. NPS would use a formulation based on those registered in Alaska and the site-specific parameters that have the least toxicity. Roundup Pro's label states "Do not apply directly to water, to areas where surface water is present, or to intertidal areas…" Aquamaster would be a likely example of a glyphosate product to be used near water.

ISC-SRD #4: Appendix E - the AKNHP ranking for Sonchus arvensis is listed as 61- this species was recently re-ranked to 73, which is the number listed in Appendix B1 and B2.

NPS Response
The revised EA reflects the recently changed AKNHP rankings of several species.

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[i] Muller, M.M. et.al. 1981. Fate of glyphosate and its influence on nitrogen cycling in two Finnish agricultural soils. Bull. Environ. Contam. Toxicol. 27:724-730.

[ii] Feng, J.C. and D.G. Thompson. 1990. Fate of glyphosate in a Canadian forest watershed. J. Agric. Food Chem. 38:1118-1125.

[iii] Roy, D.N. et.al. 1989. Persistence, movement, and degradation of glyphosate in selected Canadian boreal forest soils. J. Agric. Food Chem. 37:437-440.

[iv] Torstensson, N.T.L., L.N. Lundgren, and J. Stenstrom. 1989. Influence of climate and edaphic factors on persistence of glyphosate and 2,4-D in forest soils. Ecotoxicol. Environ. Safety 18:230-239.

[v] Relyea, R.A. 2005. The impact of insecticides and herbicides on the biodiversity and productivity of aquatic communities. Ecological Applications 15(2):618-627.
[vi]World Health Organization. 1984. Report on Environmental Health Criteria for 2,4-d.

[vii] Nishioka, M.G. 1996. Measuring lawn transport of lawn-applied herbicide acids from turf to home. Environmental Science and Technology 30:3313-3320.

[viii] Moore, M. 1997. Vim and Vinegar. New York: Harper Collins. Page 37.

[ix] US Department of Agriculture. 2002. Agricultural Research Service News and Events article; "Spray weeds with vinegar?". http://www.ars.usda.gov/IS/pr/2002/020515.htm. Accessed October 30, 2008.

[x] National Park Service Mission. http://www.nps.gov/legacy/mission.html. Accessed October 30, 2008.