

FINDING OF NO SIGNIFICANT IMPACT

Environmental Assessment for Integrated Pest Management of Invasive Plants on Kodiak National Wildlife Refuge and Vicinity

SUMMARY

The U.S. Fish and Wildlife Service (Service) proposes to adopt an adaptive Integrated Pest Management (IPM) approach, including allowance for use of aminopyralid and glyphosate herbicides as appropriate, for prevention, control, and eradication of invasive plants on Kodiak National Wildlife Refuge (Refuge) and vicinity. *IPM is a science-based, decision making process that incorporates management goals, consensus building, pest biology, monitoring, environmental factors, and selection of the best available technology to achieve desired outcomes while minimizing effects to non-target species and the environment and preventing unacceptable levels of pest damage* (U.S. Fish and Wildlife Service policy 569 FW 1 [USFWS 2010]). The Environmental Assessment (EA) can be viewed at http://alaska.fws.gov/nwr/planning/nepa/pdf/ea_ipm_kodiak.pdf. It includes an analysis of the consequences of the following three alternative approaches to future management of invasive plants:

- No action—discontinue Refuge and Service-sponsored management of invasive plants;
- Adopt an IPM approach that does not allow the use of herbicides; and
- Proposed action—adopt an IPM approach that would allow the use of herbicides.

We chose the proposed action over other alternatives because it would be the most effective means of conserving habitat for native species. The proposed action remains consistent with Service policies and legal directives, while minimizing potential risks to the environment, non-target organisms, and human safety and health. This Finding of No Significant Impact (FONSI) documents the conclusion that the proposed action will not have significant impacts on the quality of the human environment.

ACTION PURPOSE & NEED

An invasive species is an *alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health* (Executive Order 13112). Invasive plants are non-native species considered to have high potential for displacing native plants, disrupting ecosystem function, and degrading fish and wildlife habitat. Though many non-native plant species occur in the Kodiak Archipelago, relatively few demonstrate strong invasive tendencies—characterized by displacement of native plants and presumed alteration of community functional relationships—that pose a significant threat to the Refuge resources. As detailed in the EA, concerns are focused on the most highly invasive species of plants. Between 2002 and 2009, twenty-eight infestations including 10 highly invasive species were documented on federal and private lands within the legislative boundary of Kodiak NWR, properties managed by the Refuge in Kodiak, and federal lands of Alaska Maritime NWR. Sixteen of 28

infestations were small, less than one-tenth acre, and the remaining 12 ranged in size from approximately one-tenth acre to an acre.

The Refuge developed the EA to respond to a 2008 lawsuit, and to strategically address an invasive plant problem and threat of greater magnitude and extent than apparent from results from initial assessments. In 2008 two non-profit organizations sued the Alaska Region of the Fish and Wildlife Service regarding the use of herbicide to restore native plants and communities on Refuge lands infested with invasive plants. In 2009 the U.S District Court in Anchorage, Alaska, dismissed the suit following a declaration from the Service suspending herbicide use on Alaska NWRs pending completion of National Environmental Policy Act (NEPA) requirements. In response, the Refuge discontinued its use of herbicides and initiated EA development to comply with NEPA requirements including provision of public comment opportunity. In addition, an evaluation of survey data acquired between 2004 and 2009 indicated that highly invasive species were more widespread on lands in and adjacent to the Refuge than documented in an earlier analysis. Consequently, the Refuge needed to formulate a comprehensive strategy to address an issue of increased scope and complexity.

National Wildlife Refuges are managed to protect and conserve native plant communities and the ecosystem services they provide as directed by Service policy (601 FW 3, Biological Integrity, Diversity, and Environmental Health). Consistent with this directive, and others stated in the Refuge's Revised Comprehensive Conservation Plan of 2008 (USFWS 2008), control and/or eradication action would be initiated when highly invasive species are detected on Refuge lands and adjoining private lands where the Refuge has habitat management authority based on Conservation Easement Agreements.

SUMMARY OF PROPOSED ACTION

Kodiak NWR encompasses approximately 1,775,649 acres within its legislative boundaries including the southwestern two-thirds of Kodiak Island, most of Uganik Island, and about 54,000 acres on Afognak and Ban islands. Of this acreage, approximately 8% is private land and 92% is federal land. Most (96%) of the private land is owned by three Native Corporations including Akhiok-Kaguyak, Inc., Koniag, Inc., and Old Harbor Native Corporation. In addition, Kodiak NWR is responsible for habitat management on 4,595 acres of Alaska Maritime NWR lands comprised mainly of numerous small, widely scattered islands adjacent to the larger islands of the Kodiak Archipelago. Refuge headquarters is based in the City of Kodiak, about 250 air miles southwest of Anchorage and about 21 miles northeast of the Kodiak NWR boundary.

The proposed action would adopt an IPM approach. This would include a broad combination of actions including environmental education and prevention activities, surveys to assess and monitor status of invasive plants, and control or eradication of documented infestations of highly invasive plants. Refuge-led control actions would target and address infestations on federal lands, as well as adjoining private lands

where the Refuge has habitat management authority based on Conservation Easement Agreements.

In cooperation with the Kodiak Soil and Water Conservation District, the Refuge would promote an IPM approach to manage highly invasive plants on non-federal lands. In some cases, the Refuge anticipates that non-federal landowners and/or cooperators such as the District may request either financial or direct management assistance from the Service. Other sources of Service funding which could be used to help non-federal partners address invasive plant management issues could include (but are not limited to) the Service's Coastal, Partners for Fish and Wildlife, and Tribal Wildlife Grants programs. Projects supported by Service programs to control highly invasive plants on non-federal lands of the Kodiak Archipelago would be included within the scope of the EA where they utilized the same IPM approach and techniques described in that document. Projects which fall outside the scope of the EA would need to ensure that the appropriate level of NEPA had been conducted for that work. Additionally, when the District is requested by a landowner to manage an infestation and the District requests support of the Refuge, the scope of Refuge cooperation could include application of any recommended IPM methods including manual or mechanical methods and use of aminopyralid or glyphosate herbicides, subject to project (PUP) review and approval by the Service's Alaska Regional Office and Refuge Manager.

Following IPM planning and evaluation, manual and mechanical methods would be applied exclusively to control highly invasive plants where an infestation consisted of 10 or fewer plants per infestation area. In larger infestations, physical control methods would be used in conjunction with either aminopyralid or glyphosate herbicide use. Aminopyralid would be used to manage infestations of highly invasive species of broadleaf forbs in terrestrial upland environments. Commercial formulations of glyphosate registered for use in upland and wetland aquatic environments would be used to manage highly invasive grasses, shrubs, and trees. Only the least toxic non-ionic surfactant and colorant would be added to the water-herbicide tank mixture in the field to increase herbicide performance, application efficacy, and worker safety.

All projects involving applications of herbicide by Service personnel or Service-supported cooperators would require approval of a Pesticide Use Proposal (PUP). The PUP process ensures compliance with Service policy and applicable laws. It also may identify additional site- or project-specific requirements (e.g., best management practices, endangered species consultation if applicable, recommended personal protective equipment, etc.). Following PUP review and approval, equipment testing, site preparation, public posting, and applicator training, herbicide would be applied in strict accordance with herbicide label requirements, and all applicable state and federal laws. Most applications would entail applying herbicide directly to invasive plant foliage with a pressurized backpack sprayer equipped with a spray wand. All control actions would be monitored to ensure compliance with legal requirements, maintain worker safety, and assess treatment efficacy.

EFFECTS AND FINDINGS

The Refuge evaluated the effects of the proposed action on the physical and biological environment. The net effect was determined to be minor and negative in the short-term. The effects are minor because of the very limited area of infestations and negative because of the potential for proposed herbicides to adversely affect soil fauna and non-target vegetation intermixed with highly invasive species. However, these negative impacts would decline to negligible levels within 10 years following implementation due to successful control or eradication of infestations and consequent reduction in herbicide usage. Over the long-term, Refuge resources would benefit from management under the proposed action. Expansion of existing infestations would be prevented, and native vegetation would be successfully restored on infestation sites. This benefit would increase from minor to moderate in direct relationship to the area that could have been occupied by highly invasive species had the proposed action not been implemented.

Human health and safety were special concerns when considering an invasive plant management strategy, due to potential for herbicide exposure to applicators, public, and employees including those with families who reside in government housing at Refuge Headquarters. Concerns were allayed by the thorough analysis of potential effects of herbicide on human safety and health, and the proposed safety mitigation measures. Because the two types of herbicide proposed for use are minimally toxic, the inherent level of health risk associated with exposure is minimal. The Refuge would further minimize safety risk for applicators by requiring full compliance with training requirements, herbicide label and Service PUP stipulations, and agency standards for safe herbicide storage, transportation, use, and disposal (USFWS 2009 – Pesticide Users Safety policy). In the case of public visitors, employees, and their families, the Refuge would minimize safety risk by posting a notification that temporarily closed areas to use by the public and others during and immediately after application (at minimum encompassing any applicable herbicide label re-entry restrictions and Alaska Division of Environmental Quality regulatory requirements), and by requiring full compliance with the label and safety standards by workers engaged in herbicide use, transportation, storage, and disposal.

The potential impacts of herbicide use to human health and ecological resources of the Refuge and vicinity would be minimized by the limited scope of herbicide application coupled with effective implementation of an IPM approach including, as appropriate, use of herbicides and adjuvants of low toxicity. The herbicides aminopyralid and glyphosate, along with the aforementioned adjuvant types, are expected to collectively control the full suite of highly invasive plants identified by the Refuge. Yet they also are regarded as minimally detrimental to human health, biological resources, and ecosystem processes. The Refuge has proposed to maximize safety and health and minimize adverse ecological impacts of herbicide use by adopting a series of safety practices and mitigation measures. These include: establishment of a minimum threshold size of invasive plant infestations which could qualify for herbicide application (more than 10 plants per infestation area); reliance on Certified Pesticide Applicators to

direct vegetation management projects involving herbicide use; routine testing of the functional sufficiency of application equipment; posting and temporary access restriction of public places subject to herbicide application; training and monitoring of workers involved in applications; use of herbicides in a manner consistent with label requirements; and limits on maximum annual use of herbicide. Proposals for application of herbicides would require systematic review and approval by the Service through the PUP process, and if warranted other authorities such as the Endangered Species Act, to ensure the proposed use was appropriate, environmental characteristics were evaluated, and safety standards were addressed.

PUBLIC INVOLVEMENT

The Refuge provided two primary opportunities for public involvement during the EA development process. These consisted of a scoping assessment prior to formal development of the EA document, and an invitation to review and comment on the EA in July 2010. Both public involvement efforts are summarized below.

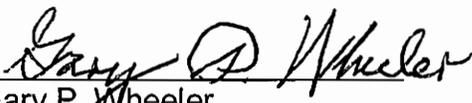
In July 2009, the Refuge distributed a scoping letter to 174 parties (individuals, conservation organizations, municipalities, congressional representatives, lawsuit plaintiffs, local media, etc.). Six responses were received. Two responses supported an IPM approach including herbicide use. Four responses expressed concerns about potential human health and ecological impacts associated with proposed use of two herbicides. The Refuge subsequently framed its alternatives and analysis of consequences in consideration of public concerns expressed in the scoping process.

In July 2010, the Refuge notified the same parties that it sought review and comments of the EA during a 30-day period. Eleven responses were received. Four supported Alternative 2 (adopt an IPM approach that does not allow use of herbicides); five supported Alternative 3, the proposed action; one posed a question but did not express a particular preference among alternatives; and one indicated that none of the alternatives was acceptable and suggested the Refuge needed to complete an environmental impact statement (EIS). The Refuge examined public responses and identified 13 issues, all of which pertained to its evaluation of environmental consequences of the proposed action. Please refer to the attachment for the Refuge's responses to these issues. In its response to public comments, the Refuge addressed the sufficiency of references used to support the evaluation of environmental consequences, clarified some aspects of the analysis provided in the EA, and provided additional interpretations.

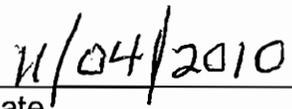
FINDING OF NO SIGNIFICANT IMPACT

Based on review and evaluation of the information contained in the EA, public comments, and our responses to concerns raised in these comments, I have determined that the proposed project is not a major federal action that would significantly affect the quality of the human environment as defined in Section 102 (2) c of the National Environmental Policy Act of 1969. This determination is made after full

consideration of the context and intensity of the project. There are no known irreversible or irretrievable commitments of resources. The analysis of the EA indicated that there will not be significant impacts, individually or cumulatively, on the quality of the human environment. The proposed action will not jeopardize any federally-listed threatened or endangered species or their habitats. Invasive plant management using an Integrated Pest Management approach including, as appropriate, conservative and judicious use of pesticides, is consistent with Department of Interior and Fish and Wildlife Service policies, and other applicable laws including the Alaska National Interest Lands Conservation Act, which established legal purposes of the Kodiak NWR and Alaska Maritime NWR to conserve fish and wildlife populations and habitats in their natural diversity, to provide opportunity for continued subsistence uses by local residents, and to ensure water quality and necessary water quantity within the Refuge. The proposed action will not establish a precedent for any future action with significant effects. I agree with this conclusion, and therefore find that an EIS does not need to be prepared. The proposed action may be implemented immediately.



Gary P. Wheeler
Refuge Manager



Date

Attachment. Response to public comments on the Environmental Assessment: Integrated Pest Management of Invasive Plants on Kodiak National Wildlife Refuge and Vicinity, June 2010.

Issue: Potential impacts to phytoplankton and juvenile salmon of herbicide application.

Response: See discussion on pp 58-59 of the EA pertaining to potential impacts of proposed herbicide use to aquatic resources including aquatic invertebrates and fishes. This evaluation indicated that impacts of proposed herbicide uses would negligibly affect aquatic invertebrates and fishes. Impacts to phytoplankton from proposed herbicide use would be negligible for the following reasons. Because use of aminopyralid would be restricted to small scale, low volume, ground-based directed foliar applications in uplands, we expect that most or all aminopyralid residues would be retained and biodegraded in soils in the upland application area and, therefore, high concentrations of residues would not be transported into streams and lakes. To minimize potential transport of aminopyralid into water bodies, we proposed prohibition of aminopyralid use within a 10 foot buffer of water bodies. Nonetheless, we acknowledged the possibility that trace residual aminopyralid concentrations may inadvertently enter water bodies. If this occurred, we expect the impact to phytoplankton would be negligible due to the extremely small amount of herbicide applied (ounces per acre), interception by target vegetation, rapid dilution and degradation by sunlight, and the relatively low toxicity of aminopyralid to phytoplankton. Despite very limited testing of phytoplankton and algae, results of exposure studies suggested that aminopyralid was slightly toxic to diatoms and algae and moderately toxic to cyanobacteria (EPA 2005, SERA 2007).

Proposed use of glyphosate would involve commercial formulations that were registered in Alaska for use in upland and aquatic environments. This herbicide would be used to control highly invasive plants in uplands and seasonally dry wetlands using directed foliar spray, cut-stem, or injection application methods. We also indicated that some applications may target invasive plants growing in water or seasonally flooded sites. As discussed on page 47 of the EA, we do not expect offsite transport of glyphosate from upland application areas to water bodies because of the strong tendency of residual glyphosate to bind with soil organic matter coupled with an expected moderate biodegradation rate (SERA 2003). In water, exposure to residual glyphosate would be limited due to dilution, degradation by microbial action, and binding with organic matter and sediments (SERA 2003). Finally, the herbicide glyphosate was proposed for use specifically because of its reported very low toxicity to aquatic invertebrates and fishes—a probable primary reason that certain commercial formulations such as AquaMaster® are registered for use in aquatic sites.

A published risk assessment of glyphosate effect on phytoplankton indicated that most species subject to direct exposure would be detrimentally affected with the level of adverse effect ranging from low to high and correlated to herbicide concentration level (SERA 2003). However, results from some studies indicated that growth of certain species of phytoplankton was stimulated when exposed to low concentrations of

glyphosate (SERA 2003). Based on the characteristics of proposed glyphosate use coupled with the very limited size and scope of applications to flooded sites, we expect that aquatic organisms including phytoplankton would be negligibly affected.

Issue: Herbicides proposed for use will persist much longer in [the Kodiak area] than in a southerly climate and the EA failed to address the fate of these chemicals in a northern coastal environment.

Response: Review of available information indicates that use aminopyralid and glyphosate in the Kodiak Archipelago would follow documented patterns of degradation and dissipation with variation attributed mainly to soil type, temperature-mediated rates of soil microbe metabolism, density of vegetation, and duration of sunlight exposure (SERA 2003, EPA 2005, SERA 2007). In addition, we examined a study that evaluated dissipation of glyphosate in forested study plots in the vicinity of Seward and Fairbanks, Alaska (Newton et al 2008). In that study, most glyphosate did not penetrate beyond the soil surface, residues declined throughout the year with highest rates associated with warmest temperatures, and residues declined to levels almost beyond measurement capacity after one year had elapsed following application. The climate regime of Kodiak lowlands does not substantially differ from the regime found in some other areas of the conterminous western United States (e.g., foothill and mountain region of the Cascades of Oregon and Washington), as documented in National Ocean and Atmospheric Administration records (NOAA 2010). We expect that rates of herbicide dissipation would not substantially differ among North American areas of similar mean annual temperature and precipitation.

Issue: The EA failed to consider the toxicity of adjuvants.

Response: Implementation of the proposed action would allow the use of herbicide as part of an Integrated Pest Management approach in the appropriate situations. In addition to the uses and effects of herbicides, we considered the uses and effects of adjuvants while formulating the strategy described in Alternative 3. None of the commercial herbicide formulations we proposed for use contain any known chemically or biologically active adjuvants. Furthermore, we specifically chose not to use glyphosate commercial formulations that contained surfactants.

Because they lack surfactants within the formulated products, the two herbicides types proposed for use (with active ingredients aminopyralid, glyphosate) would require addition of adjuvants, a surfactant and a colorant, to the backpack sprayer tank mix to maximize herbicide efficacy, application performance, and safety of applicators (colorant only). After careful consideration of various surfactants, we proposed use of AGRI-DEX[®] which is considered compatible with commercial formulations of aminopyralid (e.g., Milestone[™]VM) and glyphosate (e.g., Aquamaster[®]). Compared to other surfactants, AGRI-DEX[®] is substantially lower in toxicity to aquatic resources, including fishes (SERA 1997; Smith et al. 2004). For specific discussion of surfactant concerns and effects refer to pages 50, 59, and 64 of the EA. We will strictly adhere to

label stipulations when determining the appropriate volume of surfactant to add to a set volume of water and herbicide tank mix.

Since both of the proposed herbicide types are clear liquids, a colorant such as Hi-Light® would be added to the herbicide tank mix to facilitate (1) application efficiency by marking sprayed vegetation, and (2) applicator safety by indicating exposure. Usage of this product is allowed in both terrestrial and aquatic environments by the EPA. The MSDS for Hi-Light® assessed it as a level “1” on the hazard code scale (i.e., hazard, minor reversible injury possible) (Becker Underwood 2009). Moreover, it may cause skin, eye, and respiratory irritation upon direct exposure. The material was assessed to be non-carcinogenic, non-mutagenic, and non-teratogenic by the manufacturer.

Issue: The EA insufficiently addressed training and supervision of herbicide applicators.

Response: The Service has established policy (242 FW 7) that governs Pesticide Users Safety, directing the safe use of pesticides, both on and off of Service lands (USFWS 2009). This policy is designed to protect personnel from on-the-job exposure to pesticides (including herbicides) that have the potential to cause adverse health effects. The policy addresses various aspects of pesticide use including training, mixing, formulating, loading, applying, transporting, and storing pesticides; disposing of pesticides and emergency spill clean-up activities; and the application and use of pesticides by non-Service personnel on Service-owned or leased property

Additionally, the Service’s policy on Integrated Pest Management (569 FW 1) encourages workers involved in applications of general use pesticides, such as those proposed for use under Alternative 3 of the EA, to obtain official certification as pesticide applicators or to have their work supervised by a Certified Pesticide Applicator (USFWS 2010). A “general use” pesticide is a pesticide that may be legally purchased and used by a person other than a certified applicator (ADEC 2010, 18 AAC 90.990). Since the inception of its IPM-based invasive plant management program, Refuge personnel primarily involved with invasive plant management have been certified as pesticide applicators by the Alaska Department of Environmental Conservation. Our certified pesticide applicators have been responsible for purchasing and maintaining application equipment; provision of worker training and safety; operational planning of pesticide applications; supervision of workers involved in applications; and compliance with application prescriptions, herbicide label stipulations, and all applicable state and federal regulations. We would continue to apply these same standards in the future. For additional discussion of the proposed role of certified applicators in worker supervision and training, please refer to pages 23 and 24 of the EA.

Issue: Interagency coordination has been insufficient particularly regarding the Alaska Department of Fish and Game.

Response: The Refuge has regularly and routinely notified, solicited input from, and otherwise coordinated its Invasive plant management plans and actions with other

organizations and agencies. In the case of Camp Island, the Refuge has routinely coordinated management of orange hawkweed with Koniag, Inc., the primary landowner, and the Kodiak Soil and Water Conservation District, an agency directed to facilitate conservation projects on private land. The Alaska Department of Fish and Game has been aware of invasive plant management at Camp Island since planning of field operations were initiated in fall 2002. Prior to 2009, the Department had not expressed any concerns about our invasive plant management program. When it did request information regarding herbicide use at Camp Island, we responded promptly and thoroughly, and did not receive any follow-up questions.

The State of Alaska officially commented on the EA in summer 2010. The State's process of response development included compilation, review, and synthesis of comments submitted by its various agencies. The State is on record as supporting implementation of the management strategy proposed under Alternative 3 of the EA.

As stated in the EA, we would continue to coordinate with private landowners, governmental agencies, and public organizations whose interests may be influenced by the Refuge's invasive plant management actions. We expect to engage these entities, as appropriate, when we plan and evaluate IPM options for management of area- and project-specific infestations of invasive plants.

Issue: The EA indicated that the Refuge expects to continue routine herbicide application for an indefinite period of time into future, and it failed to consider cumulative effects.

Response: We repeatedly stated our expectations in the EA regarding projected short and long-term management of invasive plants with an IPM approach including herbicide use as appropriate. Examples follow. In Table 2.3 we stated that most of the small and large infestations (subsequently identified on page 33) would be eradicated within 10 years following approval of the management strategy detailed in Alternative 3, the proposed action. In the Environmental Consequences chapter, we evaluated cumulative effects of Alternative 3 implementation on Refuge resources and human health and concluded that negative effects would decline in response to reduction in the total area of infestation subject to management. Our concluding remarks in that chapter stated that impacts attributed to implementation of Alternative 3 would decline to a negligible level within 10 years due to successful control of infestations and consequent reduction in herbicide usage. We nonetheless acknowledged a probable need to continue to apply an IPM approach in the long term if additional invasive plant infestations were documented in the Refuge vicinity.

Issue: The EA failed to consider regulations pertaining to applications of herbicide over water.

Response: Under Alternative 3, we stated that a glyphosate herbicide registered for aquatic use in Alaska (e.g., Aquamaster®) may be used to control highly invasive species such as reed canarygrass and creeping buttercup in and adjacent to aquatic

habitat. Such species often occur in seasonally flooded, temporarily flooded, or saturated riparian wetland sites. Operational considerations of treatments, such as herbicide application near or over water, would be evaluated for each infestation area based project and subject to Service review and approval in a Pesticide Use Proposal. Where a project evaluation indicated potential for over-water application (including any of the aforementioned types of flooded sites), we would apply for a permit with the Alaska Department of Environmental Conservation per regulation 18 AAC 90.505 (ADEC 2010). Additionally, implementation of any herbicide applications to and near waters of the U.S. would require approval of a Pesticide General Permit by the Environmental Protection Agency. This new federal permit requirement takes effect in April 2011. For additional information on this permit requirement see: http://cfpub.epa.gov/npdes/home.cfm?program_id=410

Issue: The EA failed to consider the potentially harmful effects of herbicide on water.

Response: We evaluated potential effects of aminopyralid and glyphosate on water quality and aquatic resources in the EA. With respect to aminopyralid, we concluded that toxicity and potential for toxic contamination by small-scale, low-volume, directed foliar, terrestrial-based applications was extremely low. For infestations that occurred near water, we would require that no application occurred within 10 feet of water to prevent potential for contamination of water and aquatic resources. With respect to glyphosate, we similarly concluded that potential for harm to water quality, aquatic resources, and human health was minimal from low-volume, directed foliar applications of herbicides registered for use in both aquatic and terrestrial sites.

Issue: The EA failed to consider potentially harmful effects of herbicide on fish and wildlife.

Response: We described the effects of herbicide on wildlife and aquatic resources including fishes on pages 54 through 60 of the EA. In accordance with federal regulations, specifically 43 CFR 46, we incorporated by reference Syracuse Environmental Research Associates, Inc.'s findings from comprehensive risk assessments of glyphosate (SERA 2003) and aminopyralid (SERA 2007). These assessments included extensive review of the scientific literature regarding documented and projected effects of those herbicides on fish and wildlife. We explicitly acknowledged the limited understanding of herbicide influence on the fish and wildlife taxa represented on the Refuge. Nonetheless, we concurred with SERA's assessments and concluded that effects of proposed herbicide application would be negligible on Refuge fish and wildlife resources due to the low volume, small scale, ground-based directed foliar application combined with utilization of best management practices restricting the scope of applications, and, foremost, adherence to herbicide label requirements. Furthermore, the proposed program would substantially benefit fish and wildlife by restoring and maintaining integrity of their native habitats.

Issue: The EA failed to consider potentially harmful effects of herbicide on Refuge visitors.

Response: Please refer to pages 63-65 of the EA for our assessment of the effects to public (Refuge visitors) of proposed aminopyralid and glyphosate herbicide use. In that analysis, we concluded that the proposed herbicide applications would pose an insubstantial direct, indirect, or cumulative risk to public safety and health. This conclusion was based upon the types of proposed herbicide applications (low volume, small scale, limited geographic scope, ground-based directed foliar operated in remote, seldom visited areas) coupled with our interpretation of SERA's (2003, 2007) risk assessments of these herbicides. Potential for public health risk would be further minimized by adherence to herbicide label requirements and all applicable federal and state laws, including the requirement to post notification of operations and temporary closure in public areas subject to herbicide application, as detailed in 18 AAC 90.630 (ADEC 2010).

Issue: The EA failed to address potential harmful effects of herbicide at extremely low levels.

Response: In accordance with federal regulations, specifically 43 CFR 46, we incorporated by reference the findings of comprehensive risk assessments performed by SERA of glyphosate (SERA 2003) and aminopyralid (SERA 2007). SERA's assessment process included extensive review of the scientific literature regarding documented and projected ecological and human health effects of proposed herbicides at concentrations typically applied in the field, in addition to higher volumes associated with accidental discharge. Results of these assessments indicated that both chemicals posed minimal adverse risk to non-target organisms, human health, and the environment when applied in accordance with herbicide label requirements. We concurred with this assessment and stated that the proposed limited use of herbicides would entail low level safety risk and potential for minor adverse ecological effects in years immediately following implementation of Alternative 3. We stated that the likelihood of safety risk and adverse ecological effects would be further diminished by our proposed restriction to adjuvants of least toxicity; low volume, small scale, ground-based directed foliar application method; and utilization of best management practices restricting the scope of applications. We concluded that safety risk and adverse ecological effects would decline to negligible levels within 10 years due to successful control of invasive plant infestations and consequent reduction in herbicide usage.

Issue: The EA failed to address the potential for endocrine disruption of humans and wildlife by glyphosate (see Porter's literature review).

Response: We reviewed the papers cited in Dr. Porter's literature review (Porter 2010). Results of some studies cited by Porter indicated a potential for endocrine disruption when glyphosate pesticide occurred in concentrations substantially exceeding those expected from any proposed Refuge applications. In addition, most of the adverse effects cited by Porter were attributed to use of Roundup[®] and/or POEA (polyethoxylated tallowamine), a constituent of Roundup[®]. Because we propose use of

glyphosate-based products which do not contain POEA (e.g., Aquamaster®), and because we will apply pesticides at label-stipulated rates, we conclude that our proposed pesticide use would not pose a substantial risk of endocrine disruption to people or wildlife.

Issue: The EA failed to address the detrimental effects of inert ingredients in the chosen commercial formulations of herbicides.

Response: Only herbicides that contain the active ingredients glyphosate or aminopyralid are currently proposed for use under Alternative 3. While specific products are not named in the EA, only two aminopyralid formulations are currently registered in Alaska: Milestone™ and Milestone™VM. According to a recent Human Health and Ecological Risk Assessment (SERA 2007), water is the only inert ingredient present in these two formulated products.

The EA specified that the Refuge would use a glyphosate formulation that is approved for both terrestrial and aquatic uses, such as Aquamaster®. The EA then portrayed Aquamaster® as a representative chemical in this group of herbicides. The Material Safety Data Sheet for Aquamaster® confirms that the only inert ingredient is water (Monsanto 2005). While other aquatic formulations of glyphosate are currently registered for use in Alaska, we anticipate using Aquamaster®, in part because the manufacturer has verified that water is the only inert ingredient. There should not be any adverse effects associated with water as an inert ingredient in the herbicidal products named above.

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