Invasive Plant Species Noxious Weeds

Introduction

Invasive plant species are non-native plants that can inhabit and negatively alter native plant communities. A number of invasive species are recognized as noxious, meaning laws have been developed to restrict their spread and effect on the environment. Dry vegetation types and areas affected by road development, grazing, logging, fire, or other disturbances are most susceptible to weed invasion. Typically, invasive species have the ability to spread rapidly and reproduce in high numbers, which enables them to effectively crowd out native plant populations. Some can pose serious threats to the composition, structure, and function of native plant communities. Field observations, road surveys, and weed treatment records indicate that the presence and extent of invasive plant populations is expanding within the analysis area.

Information Sources

The Montana State noxious weed list was consulted, and invasive species of concern were identified. In addition, a recent weed risk assessment (WRA) project in the Northern Region of the U.S. Forest Service (Mantas 2003) has identified additional species that pose a threat to native vegetation. Noxious weed surveys were conducted from June through August 2005 along major road corridors and proposed haul routes within the project area.

This assessment of non-native and noxious weeds incorporates by reference the Noxious and Invasive Weed Control (NIWC) EA, March 2001 (Project File Exhibit Q-5). The objective of the Forest-wide project is to implement an adaptive integrated pest management strategy to control and reduce the presence of noxious and invasive weeds on NFS lands.

A Weed Risk Assessment project for the Western Montana Planning Zone of the U.S. Forest Service (USDA Forest Service 2003) provided the methodology to analyze weed risk (Project File Exhibit H 8).

Analysis Area

Spatial Bounds

The analysis area for this proposed project is based on the area of the project's influence/impacts on the potential introduction and spread of noxious weeds within the project area. Because, ground disturbance increases the potential for weed establishment and spread, the analysis area includes all treatment units and road systems with activity related to this proposed project.

Temporal Bounds

The temporal bounds are 10 to 20 years after the decision is signed. Vegetation conditions would take approximately 10 to 20 years to return to more existing closed canopy and understory cover

conditions following implementation of the thinning and burning treatments. During this time, opening of the canopy and increased soil disturbance from thinning and ground activities may increase the potential for weed establishment and spread resulting in competition with native vegetation.

Affected Environment

Historic Condition

In the late 1800s, exotic plant species rapidly became established in North America due to the introduction of species for agricultural and experimental purposes. This introduction rate dropped in the mid-1900s because of the depression, wars, and decreased travel abroad. A dramatic increase in global travel and trade introduced many more species, and they are rapidly expanding in aerial distribution. Some of these species are growing at an exponential rate. Locally, establishment and rate of spread may have been influenced by timber harvest, road building, and to some degree grazing; all vectors for the spread of weeds. Most of these activities began in the 1960s on the Flathead National Forest. Some roadless areas remain relatively weed free because of healthy undisturbed native plant communities where few vectors exist for the spread of weeds.

The Flathead National Forest has been less affected than many other public lands because most invaders are best adapted to grasslands, shrublands, and warmer/drier forest types than exist here. Regardless, exotics have significantly altered species composition locally. Areas of high risk, severely impacted by noxious invaders adapted to our climate, do occur and have altered native plant communities.

Existing Condition

A. Invasive Species of Concern

Areas most susceptible to invasion by weeds are areas of severe ground disturbance (e.g., parking lots, gravel pits, roads, skid trails, horse corrals). However, once established on a disturbed site, many weed species can spread onto relatively undisturbed adjacent areas. Non-forested plant communities are also at high risk for invasion by weed species. Most forested communities are less susceptible to invasion and infestation by weed species because of the shade and competition for water and nutrients they provide (with the exception of orange and yellow hawkweeds). However, some invasive species have been successful at invading warm/drier forest types dominated by Douglas-fir and/or ponderosa pine. The warm-dry forest conditions found in this project area make those forest communities more susceptible to invasion, especially if they are disturbed. In addition, the project area is located in close proximity to the lower elevation valley floor and urban interface. Consequently, the project area is more vulnerable to weed establishment, persistence, and subsequent potential risk to native habitats. Invasive plant species are more likely to establish and spread from adjacent disturbed areas such as the urban interface and more likely to persist at lower elevations.

In the project area, there is a concern that invasive plants may spread into treatment areas, especially where susceptible conditions exist. Weed invasion and expansion has been observed in areas of past timber management projects.

Invasive species considered for this analysis are those listed as noxious by the State of Montana, as well as other exotic species determined to be highly invasive. They are displayed below in Table

3-12. Of the1,062 vascular plant species known on the Flathead National Forest, about 110 are classified as exotic. Of these, over 42 species are classified as invasive. Within the project and adjacent areas, ten noxious weed species and four undesirable weed species of concern have been observed as shown in Column 3 of Table 3-12.

TABLE 3-12.
NOXIOUS WEED SPECIES OF CONCERN WITHIN THE COONEY MCKAY PROJECT AREA

Scientific Name[a]	Common Name	Known from the Project Area	Potential invader to the Project Area[c]
Category 1 – Widespread established[b]			
Acroptilon repens (C. repens)	Russian knapweed		X
Cardaria draba	hoary cress		X
Centaurea biebersteinii (C. maculosa)	spotted knapweed	X	
Centaurea diffusa	diffuse knapweed		X
Cirsium arvense	Canada thistle	X	
Convolvulus arvensis	field bindweed		X
Cynoglossum officinale	hound's-tongue	X	
Euphorbia esula	leafy spurge		X
Hypericum perforatum	St. John's-wort	X	
Leucanthemum vulgare (Chrysanthemum. leucanthemum)	ox-eye daisy	X	
Linaria dalmatica	Dalmatian toadflax	X	
Linaria vulgaris	yellow toadflax		X
Potentilla recta	sulphur cinquefoil	X	
Tanacetum vulgare	common tansy	X	
Category 2 – Recently established, rapidly spreading[b]			
Hieracium aurantiacum	orange hawkweed	X	
Hieracium caespitosum, H. floribundum, H. piloselloides, H. pretense	yellow hawkweed complex	X	
Lepidium latifolium	perennial pepperweed		X
Lythrum salicaria	purple loosestrife		X
Lythrum virgatum	wandlike loosestrife		X
Ranunculus acris	Tall buttercup	X	
Senecio jacobaea	tansy ragwort		X
Tamarix spp.	salt cedar or tamarisk		X
Category 3 – Not yet detected or small occurrence[b]			
Centaurea solstitialis	yellow starthistle		X
Chondrilla juncea	rush skeletonweed		X
Crupina vulgaris	common crupina		X
Iris pseudacorus	yellowflag iris		X
Isatis tinctoria	dyer's woad		X
Myriophyllum spicatum	Eurasian water milfoil		X

TABLE 3-12.
NOXIOUS WEED SPECIES OF CONCERN WITHIN THE COONEY MCKAY PROJECT AREA

Scientific Name[a]	Common Name	Known from the Project Area	Potential invader to the Project Area[c]
Additional Invasives of Concern for the Flathead National Forest			
Veronica officinalis	common speedwell		NA
Tripleurospermum perforata (Matricaria inodora, M. perforata) (undesirable)	scentless chamomile		X
Tragopogon dubius	goat's beard/salsify	X	
Sonchus spp.	perennial sowthistle		X
Potentilla argentea	silvery cinquefoil		X
Phalaris arundinacea	reed canarygrass	X	
Euphorbia species (cautionary)	spurge (all)		X
Elymus repens	quackgrass		X
Cirsium vulgare	bull thistle	X	
Chorispora tenella	purple mustard		X
Carduus nutans	musk thistle		X
Campanula rapunculoides (undesirable)	creeping bellflower		X
Bromus tectorum	cheatgrass		X

[a] Nomenclature follows the USDA Plants Database: USDA, NRCS 1999. The PLANTS database (http://plants.usda.gov/plants). National Plant Data Center, Baton Rouge, LA 70874-4490 USA.
[b] Montana Department of Agriculture Noxious weed categories
Category 1 is defined as noxious weeds that are currently established in the State and generally widespread in many counties of the state. Management criteria include awareness and education, containment and suppression of existing infestations and prevention of new infestations. These weeds are capable of rapid spread and render land unfit or greatly limit beneficial uses.
Category 2 is defined as noxious weeds that have recently been introduced into the state or are rapidly spreading from their current infestation sites. These weeds are capable of rapid spread and invasion of lands, rendering lands unfit for beneficial uses. Management criteria include awareness and education, monitoring and containment of known infestations and eradication where possible.
Category 3 is defined as noxious weeds that have not been detected in the state or may be found only in small, scattered, localized infestations. Management criteria include awareness and education, early detection and immediate action to eradicate infestations. These weeds are known pests in nearby states and are capable of rapid spread and render land unfit for beneficial uses.
[c] Potential invasive plant species of concern with potential to impacts ecosystem integrity for the analysis area. (Put in "c" here for footnote.)

B. Surveys

Major roads, proposed haul routes, and treatment units were surveyed for noxious weeds in 2006 and 2007. These sites are considered most susceptible to establishment and serve as vector corridors for spread into newly disturbed areas. Approximately 2,058 acres were surveyed for invasive plants. Fourteen invasive species were mapped during surveys. Weeds were mapped and estimations of percent infested were documented (Project File Exhibit H-9, Field Survey Summary).

The most abundant and widely distributed noxious weed species in the project area is Canada thistle (*Cirsium arvense*) and spotted knapweed (*Centaurea biebersteinii*), followed by oxeye daisy (*Leucanthemum vulgare*) and sulphur cinquefoil orange (*Potentilla recta*). Also present of significant concern is orange and yellow hawkweed (*Hieracium aurantiacum*, *H. floribundum*) and St. John's wort (*Hypericum perforatum*) as shown in Table 3-13.

State listed Category 2 noxious weeds species, orange hawkweed, meadow/yellow hawkweed, and tall buttercup are of greatest concern in the area. These species are recently established (within the last 5 to 10 years) and are rapidly expanding in established areas.

TABLE 3-13.
OCCUPIED ACRES WITHIN WEED SURVEY AREAS OF COONEY MCKAY PROJECT AREA

State Category	Species	Common Name	Percent Occupied of Acres Surveyed*	Acres Occupied within Surveyed Areas
1	*Cirsium arvense*	Canada thistle	39	155.34
1	*Centaurea biebersteinii*	spotted knapweed	17	69.29
1	*Leucanthemum vulgare*	oxeye daisy	12	48.91
1	*Potentilla recta*	sulphur cinquefoil	10	41.71
NA	*Phalaris arundinacea*	reed canarygrass	9	35.69
NA	*Cirsium vulgare*	bull thistle	6	23.64
2	*Hieracium aurantiacum*	orange hawkweed	2	9.46
1	*Hypericum perforatum*	St. John's wort	2	7.34
2	*Hieracium floribundum*	yellow hawkweed	1	4.16
2	*Ranunculus acris*	tall buttercup	<1	1.71
1	*Linaria vulgaris*	dalmatian toadflax	<1	0.64
1	*Tanacetum vulgare*	common tansy	<1	0.05
NA	*Tragopogon dubius*	yellow salsify	<1	0.04
NA	*Artemisia absinthium*	absinthium	<1	0.01

* calculated from 2006 surveys only

The amount and distribution of the above invasive plants is highly variable within the project area, ranging from scattered isolated individuals to small dense groups. These species occur along portions of many of the roads, gravel pits, and other disturbed sites. Invader weed species tend to be shade-intolerant, with the exception of orange hawkweed (personal observation). Invasive plants establish in disturbed areas where other plants are slow to establish and recover. These areas are mostly associated with road right-of-ways, landing sites for timber harvesting, gravel pits, mechanically piled slash burn piles, skid roads, mechanical site preparation treatment on well drained or shallow soils, power line corridors, and mines. Most of the area outside of these more heavily disturbed sites has experienced limited invasive plant establishment.

C. Weed Management

The Flathead National Forest has completed an EA analyzing the effects of treating noxious and invasive plants (USDA Forest Service 2001a - FNF Noxious and Invasive Weed Control Environmental Assessment) (Project File Exhibit Q-5). A Forest-Wide Weed Management Plan is currently under development to outline methodology in prioritizing treatment and inventory and monitoring protocols. In addition, this plan will outline a methodology for minimizing the establishment and spread of invaders in all projects and Special Use Permits, such as grazing allotments and timber

management areas. Currently, treatment and inventory is prioritized at quarterly meetings of the Flathead National Forest Weed Advisory Group. Factors for prioritization include:

- **Weed invasive category** as outlined in the Flathead National Forest Noxious and Invasive Weed Control EA (Project File Exhibit Q-5) and shown in Table 3-14 below.
- **Level of invasive risk** to a potential vegetation group.
    - The Western Montana Planning Zone Weed Risk Assessment is used as a tool to ascertain the level of invasiveness for weed species within potential vegetation groups (Project File Exhibit H-8).
- **Special areas** that are threatened by weed invasion.
    - Particular areas of greater conservation concern need additional protection from weed invasion. Examples would be designated wilderness, sensitive plant habitat, and pristine native plant communities.
- **Potential for increased off-site movement** of weeds that could increase the spread to new areas.
    - Weed infestations that are located along roads, at trailheads, in grazing allotments, or at high use recreation sites are higher priority for treatment because of the increased vectors of spread in these areas.

D. Control and Containment

Efforts to control the spread of noxious weeds include prevention, containment, and eradication methods. Eradication is generally limited to localized areas and Category 2 and 3 species. Methods used for eradication include hand pulling and herbicide applications. Approximately 20 miles of roads have been treated with herbicides within the project area.

TABLE 3-14.
WEED TREATMENT PRIORITIZATION ON THE FLATHEAD NATIONAL FOREST

Forest Priority	State Category	Objectives	Prioritization Factors
1	3 (Potential Invaders)	Currently absent on FNF; goal is prevention, then eradication, if possible	detection available funds
2	2 (New Invaders)	Localized containment and strong emphasis on overall population reduction	available funds relative invasive nature of the species and its potential to displace native vegetation potential for off-site movement of seeds relative ecological importance of rarity of the site that could be damaged by the presence of the invader species
3	1 (Widespread Invaders)	Containment and localized reduction of populations	available funds relative invasive nature of the species and its potential to displace native vegetation potential for off-site movement of seeds relative ecological importance of rarity of the site that could be damaged by the presence of the invader

Containment methods are used to prevent weeds from spreading into new areas and reducing the coverage, if possible, in existing infestations. Containment methods include closing infested areas to travel, washing vehicles and equipment upon entering or leaving an infested area, using weed free seed and straw mulch for re-vegetation, hand pulling, and herbicide application around the perimeter of the infestation. Prevention uses similar techniques as containment, with the objective of preventing a new weed infestation rather than limiting spread of an existing one.

Environmental Consequences

Alternative 1
Direct and Indirect Effects

Alternative 1 provides the least opportunity for creating new weed habitat due to no new areas of ground disturbance. However, roads currently open may continue to serve as corridors for weed spread. Invasive species considered in the analysis area could potentially expand by utilizing roads as vector corridors. Once seeds are dispersed to a new site, habitat type and disturbance patterns influence the establishment potential of invasive plant species. Because Alternative 1 proposes no ground disturbance related to this project, the potential for noxious weeds species to establish in undisturbed areas is low. With the exception of orange and yellow hawkweeds, noxious weed species commonly require disturbance, bare ground openings, and reduced competition (early successional habitat conditions) for initial establishment. However, if established, the ability for weed species to out-compete existing native vegetation, to sustain its occurrence, and potentially alter native habitat functions is largely dependent on the habitat conditions and the life history, morphology, phenology, ecology, and reproductive biology of the individual weed species.

Orange and yellow hawkweeds are Category 2 species (recent invaders to Montana). Life history and reproductive biology of these two invasive hawkweeds allow for rapid spread, once established, not only on open areas but also under forested conditions. Unlike the other known weeds in the project area that remain primarily within open disturbed areas, orange and yellow hawkweeds can spread into forested habitats beneath the forest canopy despite reduced understory light levels (personal observations).

Alternative 1 – No Action
Cumulative Effects

The project area is highly susceptible to weed invasion due to its proximity to the urban development. Weed establishment is opportunistic in disturbed soils and open bare ground, common in development of urban areas. This may result in a high risk level of spread from adjacent urban areas to disturbed areas in the project area.

Past ground disturbing activities such as timber harvest, road construction, trail construction, road maintenance, and fire suppression activities (e.g. fireline, dozer line, and safety zone construction) have contributed to the establishment and spread of noxious and invasive plants in the area. Recreational and economic land uses (hunting, hiking, fishing, logging, mushroom harvesting, firewood gathering, etc.) have also promoted the spread of weed seeds, as users and their vehicles serve as vectors for weed seed spread. All these activities are likely to continue into the future.

Weed control efforts may increase in the area as surveys have detected new and growing infestations resulting from other proposed and ongoing actions on the Flathead National Forest and surrounding

lands. Road closures on FS system roads have likely decreased the spread of weeds because of the reduced potential of traffic to carry weed seeds. Also, the No Action Alternative would be less likely to address existing weed populations within the project area than would the action alternatives (that provide for treatment of haul routes within the project area). However, the project treatments from the action alternatives have identified Design Criteria (See Table 2-14) to help reduce the potential for weeds to spread into un-infested areas or newly disturbed areas created by the action alternatives. The No Action Alternative would create the least amount of disturbed areas for potential new weed establishment and spread. Nevertheless, the total existing condition of infested weed acres is expected to continue to increase with existing uses in the No Action Alternative.

Under Alternative 1, there is a potential for large, stand replacing fire. In the absence of no vegetation treatments, fuel conditions would generally persist and fuel loadings would increase throughout the project area. The overall result would be a continuation of fuel loadings with potential for increased fire risk over time. A large fire within the project area could potentially increase and spread noxious weeds into new areas. Wildland fire would increase exposed bare ground that may be susceptible to new weed establishment. Areas most at risk of weed encroachment following a wildland fire are areas adjacent to roads and areas where suppression activities have occurred with nearby existing weed populations.

Alternatives 2, 3, and 4
Direct and Indirect Effects

Vegetation treatments and temporary road construction are proposed for this project. General effects on the risk to weed establishment and spread are discussed below by activity. Areas with more acres of ground disturbance or open roads are expected to have greater vulnerability to weed colonization and spread.

A. Timber Harvest and Other Vegetation Treatments

The effects of logging are variable depending on the amount of ground disturbed during the activity; the more bare soil exposed, the more germination substrate is available for colonizing weed seeds. Ground-based systems (tractor) with wheeled machinery usually disturb more ground than skyline cable systems, which use a combination of both skyline and tractor operating systems. Areas used for landings with any logging system can also be highly impacted.

The amount of area disturbed may vary by prescription planned. With non-commercial harvesting, less volume would be removed, more canopy cover (shade) would remain, and less soil would be disturbed than with light retention. All alternatives propose the same acres of non-commercial harvesting (hand treatments). Commercial harvesting would remove more volume, increase ground disturbance, and reduce post-harvest canopy cover.

Alternative 2 proposes the greatest number of acres for commercial thinning and tractor logging. **Alternatives 3 and 4** propose similar acres for commercial harvesting and tractor logging systems. **Alternative 2** would increase the risk to native communities in the project area from weed establishment and spread compared to **Alternatives 3 and 4**.The differences in these logging systems and prescriptions by alternative are displayed in Table 3-15 below.

TABLE 3-15.
LOGGING SYSTEM AND PRESCRIPTIONS BY ALTERNATIVE

	Alt. 1	Alt. 2 (Acres)	Alt. 3 (Acres)	Alt. 4 (Acres)
Logging System				
Cable	0	4	4	4
Tractor	0	756	637	691
Forwarder	0	110	110	110
Cable/Tractor	0	51	51	40
Hand	0	50	50	50
Total Logging System Acres	**0**	**971**	**852**	**895**
Prescription				
Commercial Harvest				
Commercial Thin	0	561	561	550
Old Growth Maintenance	0	119	0	119
Seed Tree	0	79	79	14
Salvage	0	69	69	69
Thin From Below	0	93	93	93
Total Harvest Acres	**0**	**921**	**802**	**845**
Non-Commercial Treatment				
Thin From Below	0	50	50	50
Pre-Commercial Thinning	0	105	105	105
Ecosystem Burning	0	1,833	1,833	1,833
Total Treatment Acres	**0**	**2,909**	**2,790**	**2,833**

Machinery can also spread weed seeds if not washed prior to use; therefore, Design Criteria (Table 2-14) include cleaning all off-road equipment prior to entering the area. Use of dedicated skid trails would also minimize spread across units. Other criteria designed to minimize soil impacts would also aid in reducing noxious weed spread (Please refer to the Soils Section of this document).

The potential for weed establishment into native plant communities from proposed fuels treatments also depends on the amount of ground disturbed during the activity. As discussed above with logging systems, the more bare soil exposed, the more germination substrate is available for colonizing weed seeds. Fuels treatment methods using excavators to pile slash would disturb more ground and expose more bare soil than hand piling the slash piles. In addition, underburning harvest units and burning the slash piles would reduce competing native vegetation and expose some bare mineral soil to create a favorable environment for noxious weeds. Consolidated fuels in excavator slash piles would also burn hotter than dispersed underburns and expose more bare mineral soils. Alternative 2 would post more risk to weed establishment as this alternative proposes the greatest proportion of excavator piling and burning as described in Table 3-16 below.

Post harvest weed surveys would occur in all (ground disturbed areas) treatment units and lands affected by activities; slash pile burns, and all existing and temporary system roads used for the project (See Appendix A). Based on results from the surveys, weed treatments would occur as needed in these areas. Surveys and treatments are dependent upon funding. These measures would not eliminate all weed seeds from establishing, but would reduce the potential for establishment and spread.

TABLE 3-16.
SLASH TREATMENT METHOD ACRES LISTED IN ORDER OF MOST GROUND DISTURBANCE TO THE LEAST

Slash Treatment	Alt. 1	Alt. 2 (Acres)	Alt. 3 (Acres)	Alt. 4 (Acres)
Grapple Pile/Burn/Chipping	0	887	768	845
Hand Pile/Lop& Scatter	0	155	155	155
Underburn	0	34	34	0
Total	**0**	**1,076**	**957**	**1,000**

Ecosystem Maintenance Burning: An estimated 1,883 acres of upper elevation forest and shrubland stands are proposed for prescribed burning, using aerial and hand ignition methods (for all actions alternatives). Weed surveys were not conducted in these areas. However, potential for weed occurrences in these upper elevations is low due to the low density of roads in the proposed burn area. In addition, the burn areas are upland areas distant from urban development. Burning in these upper elevations would be of cool, low to moderate intensity. Potential for weed establishment and spread into the burned areas is low due to the low intensity burns and the low potential for weed occurrences currently known in the burn area. Should weeds become established in these upper elevation forest, potential for spread of weeds would be low. The prescribed burns would have short term low intensity disturbance that would promote understory native vegetation to compete with potentially establishing weeds.

B. Temporary Road Construction and Haul Routes

Portions of the existing Road network would be used to implement this project. Use of existing roads facilitates weed establishment because cars and trucks, along with mountain bikes and horses, are among the main vectors of weed spread. All alternatives propose similar miles of roads for hauling as shown in Table 3-17.

TABLE 3-17.
MILES OF HAUL ROUTES PROPOSED BY ALTERNATIVE

Alternative 1	Alternative 2	Alternative 3	Alternative 4
0 miles	20.9 miles	20.1 miles	17.9 miles

Temporary road construction activities would expose bare soil and parent material, creating suitable substrates for weed germination. In addition, use of these temporary roads may also contribute to the dispersal and spread of weed seeds. **Alternatives 2 and 3** propose **1.25 miles** of temporary roads and would pose the highest risk of altering native plant communities with the greatest potential for weed expansion and dispersal. **Alternative 4** proposes construction of **1.0 miles** of temporary road. This alternative would provide fewer miles of exposed bare soil and reduce the risk of invasive weed establishment. Proposed weed control actions, revegetation, and closing these roads to vehicular use would lessen the establishment and spread of weeds (See Design Criteria, Table 2-14).

Road maintenance to implement best management practices is also proposed for all action alternatives (between 17.9 to 20.9 miles). This activity would also create new ground disturbance for potential new weed establishment.

Alternatives 2, 3 and 4
Cumulative Effects

The Cumulative Effects Worksheet (Project File Exhibit H-10) considers and describes proposed activities in addition to the past, current, and reasonably foreseeable activities listed at the beginning of this chapter in Tables 3-1 and 3-2. Those activities that cumulatively contribute indiscernible effects are not included in this section. Those activities that cumulatively affect the species or habitat are discussed below.

In addition to the cumulative effects described for Alternative 1, the action alternatives would also contribute to cumulative effects to the degree described in the direct and indirect effects section above for each proposed activity.

People, vehicles, domestic animals, wildlife, and wind are all vectors contributing to the transport of weeds within the project area. Once seeds are dispersed to a new site, habitat type and disturbance patterns influence the establishment potential of invasive plant species. The potential for each species to establish is also dependent on life history, morphology, phenology, ecology, and reproductive biology of the individual weed species.

Many past, present, and foreseeable actions have and would contribute to weed risk and spread in the project area (see discussion of Alternative 1 above). Additional acres, outside and adjacent to the treatment units would become more susceptible to weed invasion from a number of weed species as a result of this action. Areas with greater miles of open roads, road use, and bare ground exposure would increase facilitation of weed spread. This contribution to cumulative effects would be greatly reduced, however, by Design Criteria (Table 2-14) that would lessen the impact of weed spread; specifically aggressive weed treatments, soil stabilization measures, re-vegetation of disturbed sites, restoration of constructed temporary roads, and post implementation monitoring/treatment of areas with high potential of new weed establishment resulting from the vegetation treatments (post implementation monitoring/treatment dependent on funding – See Appendix A). The objectives of the weed treatments associated with the action alternatives are to reduce the short-term potential for new establishment into the freshly disturbed areas created by this project, not to reduce the total infested acres of the project area. Haul routes for the project would be treated for noxious weeds. These haul routes do contain existing populations of noxious weeds which will be treated under the action alternatives. Alternative 1 would treat 0 miles, Alternative 2 would treat **20.9 miles**, Alternative 3 would treat **20.1 miles** and Alternative 4 would treat **17.9 miles**.

As with Alternative 1, the potential for wildland fire to occur in the analysis area exists with Alternatives 2, 3, and 4. Wildland fire and associated suppression efforts may also contribute to the spread and establishment of new weed populations. With Alternatives 2, 3, and 4, the potential for wildland fire to occur in the analysis area may be reduced by treatments. In addition, wildland fire burning after treatments of Alternatives 2, 3, and 4 may not burn with the same intensity as Alternative 1. The decreased intensity may reduce the potential for weed establishment. However, old skid trails or other remnant staging areas from Alternative 2, 3, and 4 treatments may act as establishment points or corridors for weed establishment and spread. Also, as with Alternative 1, suppression efforts from potential wildland fire may also increase the potential for weed spread into new areas. The degree of suppression efforts deployed as compared to Alternative 1 is unknown and is dependent on the type of wildland fire that may occur.

In summary, the action alternatives may increase the infested noxious weed acres from existing conditions, more so than the No Action Alternative, even with the lack of weed treatments and risk of a larger wildland fire for Alternative 1. The risk of weed establishment from a large wildland fire occurring in the future under Alternative 1 is less than risk of weed establishment from the known treatments to occur under Alternatives 2, 3, and 4. This is due to the ground disturbance proposed for all action alternatives that would create new areas for potential new establishment of weeds. Furthermore, Alternative 2 would have the greatest potential for weed establishment over Alternative 3 and 4. Potential for weed establishment in Alternatives 2, 3, and 4 would be ameliorated with Design Criteria and monitoring and treatments discussed above.

Regulatory Framework and Consistency

Management direction for noxious and invasive weed control on the Flathead National Forest is set at the national and forest levels. Forest Service policies were developed in response to Federal laws guiding implementation of noxious weed control actions. These policies are set forth in Amendment 2000-95-5 of the FSM, Chapter 2080, Noxious Weed Management, and have been incorporated into the Forest Plan. Treatment and monitoring of known weed populations in the project area would be implemented under the authority and guidance of the Flathead National Forest Noxious and Invasive Weed Control Decision Notice (May 2001) and EA (March 2001) (Project File Exhibit Q-5). These were designed to meet legal requirements and Forest Service policies for noxious weed control. The proposed project incorporates and is consistent with the FNF Weed Control Decision. Design Criteria and management requirements for actions proposed under this project follow requirements documented in the FSM Amendment for Noxious Weed Management, road and timber management projects.