APPENDIX A - Best Management Practices for Weed Control

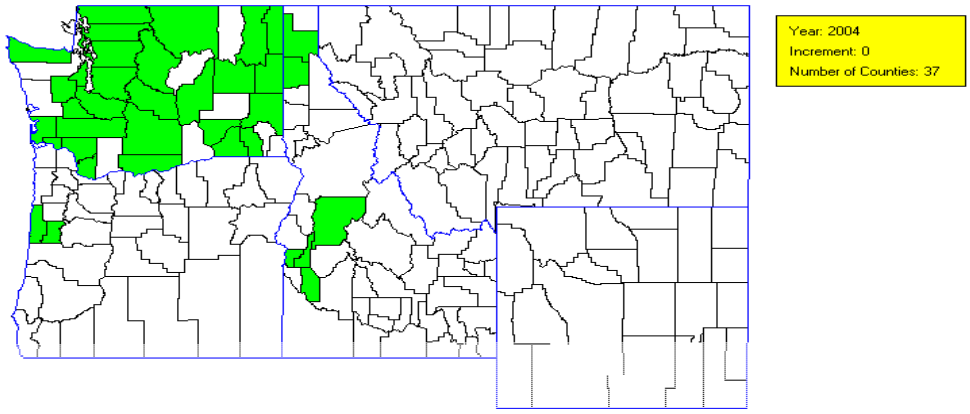
This appendix contain four parts: the first part contains prevention practices that are unique to the Gallatin National Forest; the second part contain practices listed in the Forest Service Manual 2080; the third part contains a sample Special Use Supplemental Clause; and the last part is a copy of the Weed Free Feed Special Order for all National Forests in Montana.

Best Management Practices For Weed Control – Unique to the Gallatin National Forest

Aquatic Weed Prevention Practices

Eurasian watermilfoil is rapidly spreading into this area but currently has not been found in Montana. This plant forms very dense mats of vegetation on the water's surface, interfering with water recreation and inhibiting waterflow. It spread rapidly, mostly by fragmentation of plant parts. The following prevention practices are recommendations that will help to prevent contamination of waterways in Montana.

Distribution of Eurasian watermilfoil in Washington, Idaho, Montana and Wyoming as of the spring of 2004 (http://invader.dbs.umt.edu).



Aquatic Weeds: To prevent new weed infestations and the spread of existing weeds such as Eurasian Watermilfoil, avoid or remove sources of weed seed and propagules.

- Provide outreach to state fish and game departments, counties, and other agencies concerning the unique prevention measures and control practices associated with aquatic weeds.

- Inspect boats (including air boats), trailers, and other boating equipment and remove any visible plants, animals, or mud before leaving any waters or boat launching facilities. Drain water from motor, live well, bilge, and transom wells while on land before leaving the vicinity. Wash and dry: boats; tackle; downriggers; anchors; nets; floors of boats;

props; axles; trailers; and other boating equipment, to kill weeds not visible at the boat launch.

- Before transporting to new waters, rinse boat and boating equipment with hot (40°C or 104°F) clean water, spray boat or trailer with high-pressure water, or dry boat and equipment for at least 5 days.

- Inspect seaplanes and remove weeds from floats, wires, cables, water rudders, and pump floats; wash with hot water or spray with high-pressure water, or dry for at least 5 days.
- Before take-off – avoid taxiing through heavy surface growths of weeds before takeoff; raise and lower water rudders several times to clear off plants. If weeds were picked up during landing, clean off the water rudders before take-off and leave the water rudders up during take-off. After take-off – if water rudders were down during take-off, raise and lower water rudders several times to free weed plant fragments while over original body of water or over land. If weeds remain visible on floats or water rudders, the pilot may return to flight origin and remove plants if an extra landing and takeoff is not a safety concern.

- Maintain a l00 foot buffer of aquatic weed-free clearance around boat launches and docks.

- Promptly post sites if aquatic invasives are found. Confine infestation; where prevention is infeasible or ineffective, close facility until infestation is contained.

- Wash and dry tackle, downriggers, float tubes, waders, and other equipment to remove or kill harmful species not visible at the boat launch.

- Avoid moving weed plants from one body of water to another.

- Avoid running personal watercraft through aquatic plants near boat access locations. Instead, push or winch watercraft onto the trailer without running the engine. After the watercraft is out of the water, start the engine for 5-10 seconds to blow out any excess water and vegetation. After engine has stopped, pull weeds out of the steering nozzle. Inspect trailer and any other sporting equipment for weed fragments and remove them before leaving the access area. Wash or dry watercraft before transporting to another body of water.

- Waterfowl hunters may use elliptical, bulb-shaped, or strap anchors on decoys, because these types of anchors avoid collecting submersed and floating aquatic plants. Inspect waders and hip boots, removing any aquatic plants, and where possible, rinse mud from them before leaving the water. Remove aquatic plants, animals, and mud attached to decoy lines and anchors.

- Construct new boat launches and ramps at deep-water sites. Restrict motorized boats in lakes near areas that are infested with weeds. Move sediment to upland or quarantine areas when cleaning around culverts, canals, or irrigation sites. Clean equipment before moving to new sites. Inspect and clean equipment before moving from one project area to another.

Best Management Practices For Weed Control – As Outlined in the FS Manual 2080

FSM 2000 – NATIONAL FOREST RESOURCE MANAGEMENT

ZERO CODE 2080 – NOXIOUS WEED MANAGEMENT

Supplement No.: R1 2000-2001-1

Effective Date: May 14, 2001

Duration: Effective until superseded or removed

Approved: KATHY A. MCALLISTER
Acting Regional Forester

Date Approved: 04/27/2001

Posting Instructions: Supplements are numbered consecutively by Title and calendar year. Post by document name. Remove entire document and replace with this supplement. Retain this transmittal as the first page of this document.

New Document(s):	2080	16 Pages
Superseded Document(s):	None. (This is the first supplement to this Manual.)	0 Pages

Digest:

	This supplement implements an Integrated Weed Management approach for management of noxious weeds on National Forest System lands in Region 1.

2080.4 - Responsibility.

Encourage weed awareness and education in employee development and training plans and orientation for both field and administrative work.

2080.43 - Forest Supervisor.

Forest Supervisors are responsible for:

1. Emphasizing weed awareness and weed prevention in all fire training, especially resource advisors, fire management teams, guard school, and district orientation.

2. Adding weed awareness and prevention education to Fire Effects and Prescribed Fire training.

3. Giving helicopter managers training in weed prevention and mitigation measures.

4. Resource Advisors should provide briefings to identify operational practices to reduce weed spread.

5. Providing Field Observers with weed identification aids and striving to avoid weed infestations in fire line location.

2080.44 - District Rangers.

District Rangers are responsible for:

1. Providing weed prevention briefings for helibase staff.

2. Ensuring at least one permanent staff member per District is trained and proficient in weed management.

3. Applying weed treatment and prevention on all Forest Service administrative sites including Ranger Stations, trailheads, campgrounds, pastures, interpretive and historic sites.

2081.2 - Prevention and Control Measures.

1. Roads.

a. Required Objectives and Associated Practices.

(1) Incorporate weed prevention into road layout, design, and alternative evaluation. Environmental analysis for road construction and reconstruction will include weed risk assessment.

(2) Remove the seed source that could be picked up by passing vehicles and limit seed transport in new and reconstruction areas.

(a) Remove all mud, dirt, and plant parts from all off road equipment before moving into project area. Cleaning must occur off National Forest lands. This does not apply to service vehicles that will stay on the roadway, traveling frequently in and out of the project area.

(b) Clean all equipment prior to leaving the project site, if operating in areas infested with new invaders as determined by the Forest Weed Specialist. Reference Contract Provision C/CT 6.626.

(3) Re-establish vegetation on bare ground due to construction and reconstruction activity to minimize weed spread.

(a) Revegetate all disturbed soil, except the travel way on surfaced roads, in a manner that optimizes plant establishment for that specific site, unless ongoing disturbance at the site will prevent weed establishment. Use native material where appropriate and available. Use a seed mix that includes fast, early season species to provide quick, dense revegetation. To avoid weed contaminated seed, each lot must be tested by a certified seed laboratory

against the all State noxious weed lists and documentation of the seed inspection test provided.

(b) Use local seeding guidelines for detailed procedures and appropriate mixes. Use native material where appropriate and available. Revegetation may include planting, seeding, fertilization, and weed-free mulching as indicated by local prescriptions.

(c) Monitor and evaluate success of revegetation in relation to project plan. Repeat as indicated by local prescriptions.

(4) Minimize the movement of existing and new weed species caused by moving infested gravel and fill material. The borrow pit will not be used if new invaders, defined by the Forest Weed Specialist, are found on site.

(5) Minimize sources of weed seed in areas not yet revegetated. If straw is used for road stabilization and erosion control, it must be certified weed-free or weed-seed free.

(6) Minimize roadside sources of weed seed that could be transported to other areas during maintenance.

(a) Look for priority weed species during road maintenance and report back to District Weed Specialist.

(b) Do not blade roads or pull ditches where new invaders are found.

(c) Maintain desirable roadside vegetation. If desirable vegetation is removed during blading or other ground disturbing activities, area must be revegetated according to section (3) (a), (b), (c) above.

(d) Remove all mud, dirt, and plant parts from all off road equipment before moving into project area. Cleaning must occur off National Forest lands. (This does not apply to service vehicles that will stay on the roadway, traveling frequently in and out of the project area.)

(e) Clean all equipment prior to leaving the project site, if operating in areas infested with new invaders, as determined by the Forest Weed Specialist. Reference Contract Provision C/CT 6.626.

(f) Straw used for road stabilization and erosion control will be certified weed-free or weed-seed-free.

(7) Reduce weed establishment in road obliteration/reclamation projects. Revegetate according to section (3) (a), (b), (c) above.

b. <u>Recommended Objectives and Associated Practices.</u>

(1) Retain shade to suppress weeds. Consider minimizing the removal of trees and other roadside vegetation during construction, reconstruction, and maintenance, particularly on southerly aspects.

(2) Consider re-establishing vegetation on bare ground due to construction and reconstruction activity to minimize weed spread. Road maintenance programs should include scheduled fertilization to maintain vigor of competitive vegetation (3-year period suggested).

(3) Minimize the movement of existing and new weed species caused by moving infested gravel and fill material. All gravel and borrow sources should be inspected and approved before use and transport. The source will not be used if the weeds present at the pit are not found at the site of intended use. If weeds are present, they must be treated before transport and use.

(4) Minimize roadside sources of weed seed that could be transported to other areas. Weed infestations should be inventoried and scheduled for treatment.

(5) Ensure that weed prevention and related resource protection are considered in travel management. Consider weed risk and spread factors in travel plan (road closure) decisions.

(6) Reduce weed establishment in road obliteration/reclamation projects. Consider treating weeds in road obliteration and reclamation projects before roads are made undriveable. Monitor and retreat as indicated by local analysis and prescription.

(7) Evaluate and prioritize noxious weeds along existing Forest Service access roads leading to project area and treat as indicated by local analysis and prescriptions, before construction equipment moves into project area. New road construction must be revegetated as described in Weed Prevention measure, see Roads Required Objectives and Associated Practices section (3) (a), (b), (c) above.

2. ***Recreation, Wilderness, Roadless Areas.***

a. Required Objectives and Associated Practices.

(1) Minimize transport and establishment of weeds on National Forest Service lands.

(a) Include environmental analysis for recreation and trail projects in weed risk assessment.

(b) Post and enforce statewide weed-free feed orders.

(c) Seed only when necessary at backcountry sites to minimize introduction of nonnative species and weeds. Reseed according to Roads (3) (a), (b), (c) above.

(2) Reduce weed establishment and spread from activities covered by Recreation Special Use Permits.

(a) Include Clause R1-D4, (or subsequent approved direction), in all new and reissued recreation special use permits, authorizations, or other grants involving ground-disturbing activities. Include this provision in existing ground-disturbing authorizations, which are being amended for other reasons.

(b) Revegetate bare soil resulting from special use activity according to Roads (3) (a), (b), (c) above.

(3) Prevent weed establishment resulting from land and float trail use, construction, reconstruction and maintenance activities.

(a) Clean all equipment prior to leaving the project site, if operating in areas infested with new invaders (as determined by the Forest Weed Specialist).

b. Recommended Objectives and Associated Practices.

(1) Minimize transport and establishment of weeds on National Forest System (NFS) lands.

(a) Encourage backcountry pack and saddle stock users to feed only weed-free feed for several days prior to traveling off roads in the Forest. Before entering NFS land, animals should be brushed to remove any weed seed.

(b) Stock should be tied and/or held in the backcountry in such a way as to minimize soil disturbance and avoid loss of native/desirable vegetation.

(c) Maintain trailheads, boat launches, outfitter and public camps, airstrips, roads leading to trailheads, and other areas of concentrated public use in a weed-free condition.

(d) Motorized and/or mechanized (such as mountain bikes) trail users should inspect and clean their vehicles prior to using NFS lands.

(2) Consider reducing weed establishment and spread from activities covered by recreation, special use permits. Consider including Clause R1-D4, (or subsequent approved direction), by amending existing ground-disturbing authorizations as indicated by local prescriptions.

(3) Prevent weed establishment resulting from land and float trail use, construction, reconstruction, and maintenance activities.

(a) All trail crews should inspect, remove, and properly dispose of weed seed and plant parts found on their clothing and equipment.

(b) Inspect and approve all gravel and borrow sources before use and transport. The source will not be used if the weeds present at the pit are not found at the site of intended use. If weeds are present, they must be treated before transport and use.

3. Cultural Resources.

Required Objectives and Associated Practices. Reduce weed establishment and spread at archeological excavations.

Revegetate bare soil resulting from cultural resource excavation activity according to the Roads (3) (a), (b), (c) section above.

4. Wildlife, Fisheries, and Botany.

Required Objectives and Associated Practices. Incorporate weed prevention into wildlife, fisheries, and botany project design.

a. Include weed risk assessment in environmental analysis for wildlife, fish and botany projects with ground disturbing actions.

b. Revegetate bare soil resulting from wildlife and fish project activity according to the Roads (3) (a), (b), (c) section above.

c. Remove all mud, dirt, and plant parts from all off road equipment before moving into project area. Cleaning must occur off National Forest lands. (This does not apply to service vehicles that will stay on the roadway, traveling frequently in and out of the project area.)

d. Clean all equipment prior to leaving the project site, if operating in areas infested with new invaders (as determined by the Forest Weed Specialist).

5. Range.

a. Required Objectives and Associated Practices.

(1) Ensure weed prevention and control are considered in management of all grazing allotments.

(a) Include weed risk assessment in environmental analysis for rangeland projects.

(b) When other plans do not already address noxious weeds, include practices and control measures in Annual Operating Plans.

(2) Minimize ground disturbance and bare soil.

(a) Revegetate, where applicable, bare soil from grazing activities according to the Roads (3) (a), (b), (c) section above.

(b) Check areas of concentrated livestock use for weed establishment and treat new infestations.

(3) Minimize transport of weed seed into and within allotments.

(a) Remove all mud, dirt, and plant parts from all off road equipment before moving into project area. Cleaning must occur off National Forest lands. (This does not apply to service vehicles that will stay on the roadway, traveling frequently in and out of the project area.)

(b) Clean all equipment prior to leaving the project site, if operating in areas infested with new invaders (as determined by the Forest Weed Specialist).

(c) Straw used for road stabilization and erosion control will be certified weed-free or weed-seed-free.

b. Recommended Objectives and Associated Practices.

(1) Transport of weed seed into and within allotments should be minimized.

(a) Avoid driving vehicles through off-road weed infestations.

(b) Feed certified weed-free feed to livestock for several days prior to moving them onto the allotment to reduce the introduction of new invaders and spread of existing weed species. Consider using transitional pastures when moving animals from weed infested areas to the National Forest. (Transitional pastures are designated fenced areas that can be logistically and economically maintained.)

(c) Consider excluding livestock from sites with new invaders or treat new invaders in these areas before entry by livestock.

(2) Maintain healthy desirable vegetation that is resistant to noxious weed establishment.

(a) Consider managing forage utilization to maintain the vigor of desirable plant species as described in the Allotment Management Plan.

(b) Minimize or exclude grazing on restoration areas until vegetation is well established.

6. Timber.

a. Required Objectives and Associated Practices.

(1) Ensure that weed prevention is considered in all pre-harvest timber projects.

(a) Include weed risk assessment in environmental analysis for timber harvest projects.

(b) Remove all mud, dirt, and plant parts from all off road equipment before moving into project area. Cleaning must occur off National Forest lands. (This does not apply to service vehicles that will stay on the roadway, traveling frequently in and out of the project area.) Reference Contract Provision C/CT6.26

(c) Clean all equipment prior to leaving the project site, if operating in areas infested with new invaders (as designated by the Forest Weed Specialist). Reference Contract Provision C/CT6.261

(2) Minimize the creation of sites suitable for weed establishment. Revegetate bare soil as described in the Roads (3) (a), (b), (c) section above.

b. Recommended Objectives and Associated Practices.

(1) Ensure that weed prevention is considered in all timber projects.

(a) Consider treating weeds on roads used by timber sale purchasers. Reference Contract Provision C/CT6.26.

(b) Treat weeds on landings, skid trails and helibases that are weed infested before logging activities, where practical.

(2) Minimize the creation of sites suitable for weed establishment. Soil disturbance should be minimized to meet harvest project objectives.

(3) Consider monitoring for weeds after sale activity and treat weeds as indicated by local prescriptions.

(a) Consider trust, stewardship, or other funds to treat soil disturbance or weeds as needed after timber harvest and regeneration activities.

(b) Consider monitoring and treating weed infestations at landings and on skid trails after harvest.

7. Minerals.

a. Required Objectives and Associated Practices.

(1) Minimize weed establishment in mining, oil and gas operations, and reclamation.

(a) Include weed risk assessment in environmental analysis for minerals and oil and gas projects.

(b) Include weed prevention measures in operation and/or reclamation plans.

(c) Retain bonds until reclamation requirements are completed.

(d) Revegetate bare soil as described in the Roads (3) (a), (b), (c) section above.

(2) Remove seed source and limit seed transport into new or existing mining and oil and gas operations. Remove all mud, dirt, and plant parts from all off road equipment before moving into project area. Cleaning must occur off National Forest lands. (This does not apply to service vehicles that will stay on the roadway, traveling frequently in and out of the project area.)

(3) Minimize weed spread caused by moving infested gravel and fill material.

(a) The borrow pit will not be used if new invaders (as defined by the Forest Weed Specialist) are found on the site.

(b) Remove all mud, dirt, and plant parts from all off road equipment before moving into project area. Cleaning must occur off National Forest lands. (This does not apply to service vehicles that will stay on the roadway, traveling frequently in and out of the project area.)

(c) Do not establish new gravel and fill material sources in areas where new invaders are present on National Forest Service lands. Where widespread weeds occur at new pit sites strip at least the top 8" and stockpile contaminated material. Treat weeds at new pits where widespread weeds are present.

b. Recommended Objectives and Associated Practices.

(1) Consider removing seed source and limiting seed transport into new or existing mining and oil and gas operations. Where applicable, treat weeds on project access routes. Reference Contract Provision C/CT6.27.

(2) Minimize weed spread caused by moving infested gravel and fill material.

(a) Inspect and approve all gravel and borrow sources before use and transport. The source should not be used if the weeds present at the pit are not found at the site of intended use. If weeds are present, they should be treated before transport and use.

(b) Consider maintaining stockpiled material in a weed-free condition.

(c) Check the area where pit material is used to ensure that no weed seeds are transported to the use site.

8. Soil and Water.

a. Required Objectives and Associated Practices.

(1) It is required that integrated weed prevention and management be used in all soil, watershed, and stream restoration projects.

(a) Include weed risk assessment in environmental analysis for soil, watershed, and stream restoration projects with ground disturbing actions.

(b) Revegetate bare soil resulting from excavation activity according to the Roads (3) (a), (b), (c) section above.

(c) Remove all mud, dirt, and plant parts from all off road equipment before moving into project area. Cleaning must occur off National Forest lands. (This does not apply to service vehicles that will stay on the roadway, traveling frequently in and out of the project area.)

(d) Clean all equipment prior to leaving the project site, if operation in areas infested with new invaders (as designated by the Forest Weed Specialist).

(e) Straw used for road stabilization and erosion control will be certified weed-free or weed-seed-free.

b. Recommended Objectives and Associated Practices.

Integrate weed prevention and management in all soil, watershed, and stream restoration projects by considering treating weeds in road obliteration and reclamation projects before roads are made undriveable. Monitor and retreat as indicated by local prescriptions.

9. Lands and Special Uses.

a. Required Objectives and Associated Practices.

(1) Incorporate weed prevention provisions in all special use permits, road use permits, and easements.

(a) Include weed risk assessment in environmental analysis for land projects with ground disturbing actions.

(b) Revegetate bare soil as described in the Roads (3) (a), (b), (c) section above, as a condition of the authorization.

(c) Include approved special use provision R1-D4, see FSH 2709.11, chapter 50, (or subsequent approved direction) in all new and reissued special use

permits, authorizations, or other grants involving ground disturbing activities. Include this provision in existing ground disturbing authorizations, which are being amended for other reasons .

(d) Include noxious weed prevention and control measures as indicated by local prescriptions in new or reissued road permits or easements granted pursuant to FLPMA (P.L. 94579 0/2/76), FRTA (P.L. 88657 0/3/64) or subsequent authorities. This includes FLPMA Private and Forest Road Permits and Easements; FRTA Private and Forest Road Easements; Cost Share Easements; and Road Use (commercial haul) Permits (7730). (While the approved terms and conditions of certain permits or easements may not provide for modification, the necessary weed prevention and control provisions may be included in written plans, specifications, stipulations and /or operation and maintenance plans attached to and made a part of the authorization.)

(e) Clean all equipment prior to leaving the project site, if operating in areas infested with New Invaders (as designated by the Forest Weed Specialist).

(2) Minimize weed spread caused by moving infested gravel and fill material.

(a) Do not establish new gravel and fill material sources on National Forest Service lands in areas where new invaders are present. Where widespread weeds occur at new pit sites strip at least the top 8" and stockpile contaminated material. Treat weeds at new pits where widespread weeds are present.

(b) Remove all mud, dirt, and plant parts from all off-road equipment before moving into project area. Cleaning must occur off National Forest lands. (This does not apply to service vehicles that will stay on the roadway, traveling frequently in and out of the project area.)

b. Recommended Objectives and Associated Practices.

(1) Incorporate weed prevention provisions in all special use permits, road use permits and easements.

(a) Consider including special use provision R1-D4 by amending existing ground disturbing authorizations as indicated by local prescriptions.

(b) Consider including noxious weed prevention and control provisions by amending existing ground disturbing authorizations when determined to be necessary by the authorized officer. (While the approved terms and conditions of certain permits or easements may not provide for modification, the necessary weed prevention and control provisions may be included in written plans, specifications, stipulations and/or operation and maintenance plans attached to and made a part of the authorization.)

(2) Minimize weed spread caused by moving infested gravel and fill material. All gravel and borrow sources should be inspected and approved before use and transport. The source should not be used if the weeds present at the pit are not found at the site of intended use. If weeds are present, they should be treated before transport and use.

10. Fire.

a. Required Objectives and Associated Practices.

(1) Increase weed awareness among all fire personnel. Include weed risk factors and weed prevention considerations in the Resource Advisor duties on all Incident Management Teams and Fire Rehabilitation Teams during pre-fire, pre-incident training.

(2) Mitigate and reduce weed spread during wild fire activities

(a) Initiate establishment of a network of helibases, camps and staging areas that will be maintained in a noxious weed-free condition.

(b) Minimize weed spread in camps by incorporating weed prevention and containment practices such as mowing, flagging or fencing weed patches, designating weed-free travel routes and washing equipment.

(c) Inspect all fire going vehicles regularly to assure that undercarriages and grill works are kept weed seed free. All vehicles sent off Forest for fire assistance will be cleaned before they leave or return to their home.

(3) Minimize weed spread during smoke jumper operations.

(a) Inspect, remove, and properly dispose of weed seed and plant parts found on clothing and equipment.

(b) Coordinate with Weed Specialist(s) to locate and/or treat practice jump areas.

(4) Mitigate and reduce weed spread in Air Operations.

(a) Initiate establishment of a network of helibases that will be maintained in a noxious weed-free condition.

(b) Minimize weed spread at helibases by incorporating weed prevention and containment practices such as mowing, flagging or fencing weed patches, designating weed-free travel routes.

(c) Provide weed prevention briefings for helibase staff.

(d) Inspect, and if necessary clean, contract fuel and support vehicles before and after each incident when traveling off road or through weed infestations.

(e) Inspect and remove weed seed and plant parts from all cargo nets.

(5) Mitigate and reduce weed spread from Logistics Operations activities.

(a) Look for weed-free camps, staging, drop points and parking areas.

(b) Regularly inspect and clean fire vehicles as necessary to assure that undercarriages and grill works are kept weed seed free.

(6) Integrate weed prevention and management in all prescribed burning. Mitigate and reduce weed spread during prescribed fire activities.

(a) Include weed risk assessment in environmental analysis for prescribed fire projects.

(b) Coordinate with local Noxious Weed Management Specialist to utilize helibases that are maintained in a weed-free condition, whenever possible.

(c) All crews should inspect, remove, and properly dispose of weed seed and plant parts found on their clothing and equipment.

(d) Add weed awareness and prevention education to Fire Effects and Prescribed Fire training.

(7) Encourage desirable vegetation during rehabilitation activities.

(a) Revegetate only erosion susceptible and high risk areas (as defined in Regional Risk Assessment Factors and Rating protocol) as described in the Roads (3) (a), (b), (c) section above.

(b) Straw used for road stabilization and erosion control will be certified weed-free or weed-seed-free.

b. Recommended Objectives and Associated Practices.

(1) Mitigate and reduce weed spread during fire activities.

(a) Initiate establishment of a network of helibases, camps, and staging areas on private land that will be maintained in a noxious weed-free condition.

(b) Consider checking and treating weeds that establish at cleaning sites after fire incidents, during rehabilitation.

(c) Emphasize Minimum Impact Suppression Tactics (M.I.S.T.) to reduce soil and vegetation disturbance.

(2) Minimize weed spread during smokejumper operations. Travel through weed infested areas should be avoided or minimized.

(3) Mitigate and reduced weed spread from Logistics Operations activities. Traffic should be routed through camps to avoid weed infested areas.

(4) Integrate weed prevention and management in all prescribed burning. Mitigate and reduce weed spread during prescribed fire activities.

(a) Consider treating high risk areas (as defined in Regional Risk Assessment Factors and Rating protocol) with weed infestations (such as roads, disturbed ground) before burning and check and retreat after burning if necessary.

(b) Consider avoiding ignition and burning in high risk areas (as defined in Regional Risk Assessment Factors and Rating protocol) that cannot be treated before or after prescribed fire.

(5) Encourage desirable vegetation during rehabilitation activities.

(a) Check and treat weeds at cleaning sites and all disturbed staging areas.

(b) Treat weeds within the burned area as part of rehabilitation plan to reduce weed spread.

(c) Check weed spread resulting from fire and fire suppression activities.

(d) Consider applying for restoration funding for treatment of weed infestations within the fire area.

11. Administration.

a. Required Objectives and Associated Practices.

(1) Ensure all Forest Service employees are aware of and knowledgeable about noxious weeds.

(a) Train Line Officers in noxious weed management principles and practices.

(b) Each unit will have access to Weed Specialist at the Ranger District or Supervisor's Office.

(2) Ensure all Forest workers are reducing the chance of spreading noxious weeds. All Forest workers will inspect, remove, and properly dispose of weed seed and plant parts found on their clothing and equipment including Forest Service vehicles.

b. Recommended Objectives and Associated Practices.

Consider a reward program for weed awareness, reporting, and beating new invaders.

2082 - COOPERATION.

1. Required Objectives and Associated Practices. Coordinate road maintenance activities with herbicide applications to maximize efficacy. Ensure road blading and roadside herbicide applications are coordinated chronologically to minimize herbicide use and increase effectiveness.

2. Recommended Objectives and Associated Practices. Consider providing Plans Section with weed control contact familiar with weeds in the fire area.

2082.2 - Methods of Cooperation.

6. Region 1 Required Objectives and Associated Practices.

a. Reduce weed establishment and spread at archeological excavations. Passports In Time programs and other Cultural Resource workers shall be given weed briefings and will inspect, remove, and properly dispose of weed seed and plant parts found on their clothing and equipment.

b. Promote weed awareness and prevention efforts among range permittees. Discuss weed awareness and prevention practices at annual permittee meetings.

Sample Special Use Supplemental Clause; USDA-Forest Service, Northern Region

Include a weed prevention and control provision, such as the following supplemental clause example, in all new special-use authorizations such as, permits, easements, and leases, or when those authorizations are amended, when there are ground-disturbing activities.

The following is a weed prevention and control supplemental clause approved for use in Region 1. **(Reminder: Supplemental clauses used in a special use authorization must be reviewed and approved by the Regional Forester, after review by the local Office of the General Counsel.)**

R1 SUPPLEMENT 2709.11-2000-1 **2709.11, 50**
EFFECTIVE 02/08/2000 **Page 31 of 41**

R1-D4 - Noxious Weed/Exotic Plant Prevention and Control. Use this clause in all authorizations involving ground disturbance which could result in the introduction or spread of noxious weeds and/or exotic plants. This clause may also be used where cooperative Agreements for noxious weed control are in place with state and local governments.

> The holder shall be responsible for the prevention and control of noxious weeds and/or exotic plants of concern on the area authorized by this authorization and shall provide prevention and control measures prescribed by the Forest Service. Noxious weeds and exotic plants of concern are defined as those species recognized by *(insert county weed authority and/or national forest*) in which the authorized use is located.
>
> The holder shall also be responsible for prevention and control of noxious weed and exotic plant infestations which are not within the authorized area, but which are determined by the Forest Service to have originated within the authorized area.
>
> When determined to be necessary by the authorized officer, the holder shall develop a site-specific plan for noxious weed and exotic plant prevention and control. Such plan shall be subject to Forest Service approval. Upon Forest Service approval, the noxious weed and exotic plant prevention and control plan shall become a part of this authorization, and its provisions shall be enforceable under the terms of this authorization.

With respect to the second paragraph of the above provision, the intent is to apply this provision only for a well defined confined area such as a narrow linear right-of-way where it can be determined without a doubt that the noxious weeds resulted from the activities of the holder.

Weed Free Feed Special Order for all National Forests in Montana.

SPECIAL ORDER
OCCUPANCY AND USE
ON NATIONAL FOREST SYSTEM LANDS
IN THE STATE OF MONTANA

Pursuant to the Regulations of the Secretary of Agriculture, Title 36 CFS 261.50 (a) and (b), the following acts are prohibited within all National Forest System lands within the State of Montana.

These restrictions are in addition to those enumerated in Subpart A, part 261, Title 36 of the Code of Federal Regulations and will remain in effect from October 6, 1997, until rescinded or revoked.

1. The possession or storage of hay, grain, straw, cubes, pelletized feed or mulch that is not certified as being noxious weed free or noxious weed seed free by an authorized State Department of Agriculture official or designated county official; each individual bale or container must be tagged or marked as weed free and reference the written certification (36 CFR 261.58 (t)).

Pursuant to 36 CFR 261.50 (e), the following are exempt from this Order:

A. Persons with a permit specifically authorizing the action or omission.
B. Transporting feeds, straw, or hay on Federal, State, and county roads that are not Forest Development Roads or Trails.

The above restrictions are necessary to prevent the spread of noxious weeds on National Forest Systems lands (16 USC 551). Upon issuance of this order, all previous orders requiring the use of certified noxious weed free or noxious weed seed free forage on NFS lands in Montana shall be superceded.

Violation is punishable by a fine of up to $5,000 and/or up to six months imprisonment (16 U.S.C. 551 and 18 U.S.C. 3571 (b) (6).

/S/ Kathleen A. McAllister — 10-8-97

HAL SALWASSER — Date
Regional Forester
Northern Region

APPENDIX B - Procedures for Mixing, Loading, and disposal of Herbicides; Spill Plan; And Example Job Hazard Analysis. Aerial applications require an additional air safety plan, FHS 6709.11 (22.11b), 2109-14.

Procedures for Mixing, Loading, and Disposal of Herbicides

The following measures will apply to all pesticide applications:

- All mixing of pesticides will occur at least 100 feet from surface waters or wellheads.
- Dilution water will be added to the spray container prior to addition of the herbicides.
- All hoses used to add dilution water to spray containers will be equipped with a device to prevent back siphoning.
- Applicators will mix only those quantities of herbicide that can be reasonably used in a day.
- During mixing, mixers will wear all necessary personal protective equipment as required by the pesticide label and the Health and Safety handbook.
- All empty containers will be tripled rinsed and the solution will be disposed of by spraying near the application site at rates that do not exceed those on the spray site.
- All unused pesticide will be stored in a locked building, with spill containment and met requirements of a temporary pesticide facility FSH 2109,40.
- All empty and rinsed herbicide containers will be punctured and properly disposed of.

Herbicide Spill Plan

Pesticide spill prevention and clean-up, as well as storage, transport, and disposal procedures are covered in detail in Forest Service Handbook (FSH) 2109.12 Pesticide Storage, Transportation, Spills, and Disposal. Any herbicide projects would follow the direction given in this handbook. It is available for review at U.S. Forest Service offices.

Required Equipment

The following equipment will be available with vehicles or pack animals used to transport pesticides and in the immediate vicinity of all spray operations. A full list of spill kit contents are in FSH 2109-14, 60

1. A shovel
2. A broom (except backcountry operations)
3. 10 pounds of absorbent material or the equivalent in absorbent pillows
4. Large plastic garbage bags
5. Rubber gloves
6. Safety goggles
7. Protective overalls
8. Rubber boots

Material Safety Data Sheets,labels, JHA and spill plans will be reviewed with all personnel involved in the handling of pesticides. Copies of MSDA, labels will be with applicators.

EPA Guidance/CHEMTREC.

The following material from the U.S. EPA document entitled Applying Pesticides Correctly: A Guide for Private and Commercial Applicators will be reviewed with all personnel involved in handling pesticides.

CLEAN UP OF PESTICIDE SPILLS

Minor Spills: Spill less than five gallons

Keep people away from spilled chemicals. Rope off the area and flag it to warn people. Do not leave unless someone is there to confine the spill and warn of the danger. If the pesticide was spilled on anyone, wash it off immediately. Confine the spill. If it starts to spread, dike it up with sand and soil. Use absorbent material such as cat litter, absorbent pillows, soil, sawdust, or absorbent clay to soak up the spill. Shovel all contaminated material into a leak proof container for disposal. Dispose of it as you would excess pesticides. Do not hose down the area, because this spreads the chemical. Always work carefully and do not hurry. Control access to the area until the spill is completely cleaned up.

Major Spills: In Montana a spill of 5 gallons or more must be reported to the state

The cleanup of a major spill may be too difficult for you to handle, or you may not be sure of what to do. In either case, keep people away, give first aid if needed, and confine the spill. Then call Chemtrec or the State pesticide authorities for assistance. Chemtrec stands for Chemical Transportation Emergency Center, a public service of the Manufacturing Chemicals Association with offices located in Washington D.C. Chemtrec provides immediate advice for those at the scene of emergencies. Chemtrec operates 24 hours a day, seven days a week, to receive calls for emergency assistance. For help in chemical emergencies involving spills, leaks, fire, or explosions, call toll-free **800-424-9300** day or night. This number is for **emergencies** only
If a major pesticide spill occurs on a highway, have someone call the highway patrol or the sheriff for help. (Carry these phone numbers with you.) Do not leave until responsible help arrives, in this case the local Montana Department of Agriculture Pesticide Specialist for the project area.

Northern Region Guidance In addition the section from the Northern Region Emergency and Disaster Plan entitled "Hazardous Materials Releases and Oil Spills" will be reviewed with all appropriate personnel (see following paragraph) publication and reporting requirements as outlined in this section will be followed in the unlikely event of a serious spill.

HAZARDOUS MATERIALS RELEASES AND OIL SPILLS
(Excerpted from the Northern Region Emergency and Disaster Plan)

Authority: Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA); and Superfund Amendments and Reauthorization Act of 1986 (SARA). Other statutes that may apply include Resource Conservation and Recovery Act (RCRA); Hazardous and Solid Waste Amendments (HSWA); Toxic Substances Control Act (TSCA); Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA); Clean Water Act (CWA); and Clean Air Act (CAA).

Definition: A hazardous materials emergency or oil spill is defined as any release or threat of release of a hazardous substance or petroleum product that presents an imminent and substantial risk of injury to health or the environment.

A release is defined as any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injection, escaping, leaching, dumping or disposing into the environment.

Releases that do no constitute an immediate threat, occur entirely within the work place, are federally permitted, or are a routine pesticide application, are not considered to be an emergency and are not covered by this direction.

Responsibility: The first person who knows of a release and is capable of appreciating the significance of that release has the responsibility to report that release.

Only emergency release response and reporting is covered by this direction. Appropriated Regional Office staff specialists who should be notified directly of all non-emergency releases will accomplish who should be notified directly of all non-emergency releases will accomplish non-emergency reporting.

An emergency release of a hazardous substance or petroleum product may be from a Forest Service operation or facility; from an operation on National Forest land by a permit holder, contractor, or other third party; or from a transportation related vehicle, boat, pipeline, aircraft, etc., crossing over, on or under Forest Lands. Response and/or reporting by Forest Service employees will differ in each situation:

1. If the release is from a Forest Service facility or operation, the Forest Service and employee(s) is clearly the "person in charge", and is fully responsible for all reporting. Immediate response action is limited to that outlined in emergency plans and only to the extent that personal safety is not threatened.
2. If the release is from a third party operation, the Forest Service will only respond and/or report the emergency if the third party fails to take appropriate action.
3. If the release is from a transportation related incident, the Forest Service will only respond and/or report the emergency if the driver or other responsible party is unable or fails to take appropriate action.

Response Action Guide: the primary responsibility of any Forest Service employee(s) encountering a hazardous materials emergency or oil spill is completed and accurate reporting to appropriate authorities in a timely manner.

Forest Service employee(s) will not assume an incident command role for any hazardous materials emergency of spill, but may provide support services as directed by an authorized Federal On-Scene Coordinator (OSC) or other State or local authority.

Within the limits of personal safety, common sense, and recognition of the dangers associated with any hazardous materials emergency or spill, Forest Service employee(s) may provide necessary and immediate response action until an authorized OSC or other authority can take charge. These actions may include:

- Public warning and crowd control;
- Retrieval of appropriate information for reporting purposes.

Additionally, and only after verification of the type of hazardous material involved and its associated hazards, a Forest Service employee(s) may also take actions including;

- Rescue of persons in imminent danger;
- Limited action to mitigate the consequences of the emergency.

Under no condition shall a Forest Service employee(s);

- Place themselves or others in imminent danger.
- Perform or direct actions that will incur liability for the Forest Service.

If there is any question that the emergency may constitute a threat to personal safety, limit your response to public warning and reporting or the incident.

Precautions: When approaching the scene of an accident involving cargo, or other unknown or suspected hazardous material emergency including oil spills:

- Approach incident from an upwind direction, if possible;
- Move and keep people away from the incident scene;
- Do not walk into or touch an spilled material;
- Avoid inhaling fumes, smoke, and vapors even is no hazardous materials are involved;
- Do not assume that gases or vapors are harmless because of lack of smell; and,
- Do no smoke, and remove all ignitions sources.

ORANIZATIONS FOR EMERGENCY AND TECHNICAL ASSISTANCE

CHEMTREC – Chemical Transportation Emergency Center – 800-424-9300 (24 hours) (For assistance in any transportation emergency involving chemicals).
Rocky Mountain Poison Control Center – 800-525-5042 (24 hours); 303-629-1123 (24 hours).
National Agricultural Chemicals Association – 202029301585 (for pesticide technical assistance and information referral).
Bureau of Explosives 202-293-4048 (For explosive technical assistance).
Centers for Disease Control 404-633-5313 (For technical assistance regarding etiologic agents).
EPA Region 8 (MT, ND, SD) Emergency Response Branch 303-029301723
EPA Region 10 (ID) Superfund Removal and Invest Section 206-422-1196

Montana Department of Health and Environmental Sciences (24 hours) 406-444-6911
Water Quality Bureau 406-444-2406
Solid Waste Management Bureau 406-444-2821
Idaho Department of Health and Welfare
Water quality Bureau 208-334-5867
Solid Waste Bureau 208-334-5879

HAZARDOUS MATERIALS RELEASES AND OIL SPILLS CONTACT LIST AND IMMEDIATE ACTION GUIDE

Individual

Action	Contact
Do not expose yourself or others to any unknown materials. Do not attempt rescue or mitigation until material has been identified, and hazards and precautions noted. Warn others and keep people away. Approach only from upwind. Do not walk in or touch material. Avoid inhaling fumes and vapors. Do not smoke, and remove ignition sources.	District Ranger, or Dispatcher
Report the incident. Complete "Reporting Action Guide" within reasonable limits of exposure and timeliness, and report information to District/Forest Dispatcher	District/Forest Dispatcher
If there is any question that the incident is a threat to personal safety, limit response to public warnings and reporting.	

District

Action	Contact
Insure reporting individual is aware of hazards associated with incident.	Forest Dispatcher
Obtain as much information as possible, complete a copy of the Reporting Action Guide and relay all information to Forest Dispatcher.	
For fixed facilities, verify if possible, whether or not an emergency guide, Spill Prevention Control and Countermeasure Plan, or similar response plan is available for the specific emergency. If so, implement the response actions as indicated.	
Dispatch additional help, communication systems, etc., to incident scene if incident is on National Forest land or is caused by Forest Service activity or facility. Otherwise support as requested by official in charge.	
If there is any question that the incident is a threat to personal safety, limit response to public warning and reporting.	

Forest

Action	Contact
Immediately contact the Forest Hazardous Materials Incident Commander who will take the following actions: Determine is the incident is a true emergency. Determine who is the responsible party for the incident, and whether appropriate actions and reporting have been accomplished. From available information, determine hazards and precautions, if possible, and relay further instructions to reporting individual	Forest Hazardous Materials Incident Coordinator who will determine extent of emergency. If incident is determined reportable, contact: National Response Center; EPA Hazmat emergency response;

through the District. Initiate appropriate local reporting actions, and coordinate responses with District. Arrange Forest support for on-scene coordinator and/or local emergency response officials as requested.	Regional Incident Dispatcher; County sheriff and/or county disaster and emergency services coordinator; State Emergency and Disaster organizations; and Internal Forest Contacts
Make appropriate local emergency contacts as directed by Forest Hazardous Materials Incident Coordinator.	
Relay information from Forest Hazardous Materials Incident Coordinator back to District and up to Regional Office as appropriate.	

Regional Incident Dispatcher

Action	Contact
Immediately contact the Regional Hazardous Materials Incident Coordinator who will take the following actions: Personally work with Forest Hazardous Materials Incident Coordinator to determine extent of the emergency. If incident is reportable, implement the following actions: By computer mailing list notify the Regional Forester, Deputy Regional Forester, Staff Directors and Attorney-in-charge (OGC); Contact other Regional Office (RO) specialists, other agency personnel, etc., as necessary to determine scope of problem and appropriate actions. RO specialist contacts include: Regional Watershed Coordinator (water); Regional Reclamation Officer (mining); Regional Safety and Health Program Manager; Regional Cooperative Forestry and Pest Management; Arrange Regional Support for on-scene coordinator and/or local emergency response officials as requested; Arrange a Regional Investigation/follow-up team if determined necessary; Keep Regional Forester, Staff Directors and OGC advised of situation via routine computer updates.	Regional Hazardous Materials Incident Coordinator; Regional Emergency Coordinator; If incident is determined to be reportable, verify the National Response Center and appropriate Federal, State, and local contacts have been made; WO Engineering; WO Personnel Management.

Although reporting requirements vary depending on the type of incident, the responsibility of the employee(s) in the field is limited to collecting appropriate information and relaying it to the proper level of the organization in a timely manner. Following is a list of the information that should be collected, if possible; however, it is more important to maintain personal safety and report in a timely manner than to collect all information.

1. Date
   Time of release:
   Time discovered:
   Time reported:
   Duration of release:

2. Location (include state, county, route, milepost, etc.)

3. Chemical name:
   Chemical identification number:

4. Known health risks:

5. Appropriate precautions if known:

6. Source and cause of release:

7. Estimate of quantity release (gallons):
   Quantity reaching water (gallons):
   Name of affected watercourse:

8. Number and type of injuries:

9. Potential future threat to health or environment:

10. Your Name:
    Phone number for duration of emergency
    Permanent phone number

11. For transportation related incidents, also report:
    Name and address of carrier:
    Railcar or truck number:

If there is any doubt whether an incident is a true emergency or whether reportable quantities of hazardous materials or petroleum products are involved, or whether a responsible party has already reported the incident, always report the incident.

FS-6700-7 (11/99)

U.S. Department of Agriculture Forest Service	**1. WORK PROJECT/ACTIVITY** **Weed Spraying with Herbicides**	**2. LOCATION**	**3. UNIT**
JOB HAZARD ANALYSIS (JHA) References-FSH 6709.11 and -12 (Instructions on Reverse)	**4. NAME OF ANALYST**	**5. JOB TITLE**	**6. DATE PREPARED**

7. TASKS/PROCEDURES	**8. HAZARDS**	**9. ABATEMENT ACTIONS Engineering Controls * Substitution * Administrative Controls * PPE**
General herbicide use	Exposure/Contamination	Read the product label before each use and follow the directions
Loading	Spill/contamination Back/muscle strains	Keep chemicals and related equipment in designated area of vehicle outside the passenger area. If bedliners are used, only use those made of non-porous material. Carry herbicide containers inside a catch basin. Make sure lids are on tight, containers upright & secure; use gloves when handling chemical containers. Read the Material Safety Data Sheets for herbicide used. Carry emergency containment equipment (shovel, kitty litter, plastic bags). If less than 5 gallons, then disperse widely. If more than 5 gallons, this is considered a hazardous material spill; notify dispatch and they will notify other officials. Use good lifting techniques: bent knees, close postioning, upright back.
Mixing herbicides	Exposure/spills Synergism	Wear face shield or goggles, chemical resistant rubber gloves, long sleeves, pants, and chemical resistant rubber boots (use insoles to improve fit). Fill tank half way with water, add herbicide, then finish filling tank. Read Material Safety Data Sheets for spcific herbicides. Use only recommended amounts. Close container immediately after use. Be Aware of the effects of Mixing chemicals. Read labels.
Spraying herbicides	Exposure Trips/Falls	Wear personal protective equipment: goggles or glasses to protect eyes from drift; long sleeves; clean chemical resistant gloves to protect arms and hands; long pants and chemical resistant boots. Use unlined equipment because liners can carry residue. Wear disposable or washable coveral as added protection against drift or spills. Wash or dispose of after each use. Avoid walking through treated areas. Think about hands: do not touch your face or food until hands are washed. Treat chemicals with respect. Don't get complacent. Do not spray if temperature is over 85 degrees Fahrenheit because increased volitilization. Do not spray if winds are above about 10 miles per hour. Take extra time when walking with PPE on. Goggles and respirators can reduce your field of vision. Watch your footing and balance. A backpack sprayer can throw you off balance. Use insoles in rubber boots to improve fit.
Clean-up	Contamination	After emptying sprayer tank fill with water and spray as if it were a herbicide to clean the equipment. Wash outside of sprayer with soap and water in the field. Wash all personal protective equipment in the field with soap, dispears solution on site. Return all equipment to proper storage area. Bathe or shower as soon as possible after spraying. Wash clothing separate from other laundry.
Transporting to and from worksite	Vehicle accidents Chemical spills	Drive defensively, ensure vehicle is in proper running condition, use safety belts. Secure chemicals, backpack sprayers & slip-tank. Carry shovel and plastic bags to clean-up spills. If less than 5 gallons, then disperse widely. Otherwise, if more than 5 gallons, this is considered a hazardous material spill; notify dispatch and they will notify other officials.
Spraying herbicide - slip-tank sprayer	Personal contamination	Check fittings and hose clamps for leaks before use; keep spray gun pointed in safe direction, store securely & relieve excess pressure when not in use. Wear all ppe: gloves, boots, safety glasses, coveralls.

Spraying herbicide - backpack.	Personal contamination Slips/Falls	Keep wand pointed down at all times; wedge hand between handle and trigger when traversing rough terrain; check equipment for leaks before use; don't carry heavy loads in sprayer; wear all PPE. Working on rough terrain - look for firm footing; avoid area if too steep, tighten shoulder straps to prevent excessive tank movement.
Spraying herbicide - ATV	Vehicle accidents Personal contamination	Travel at speeds less than 15 mph, and on slopes less than 10 %, the following PPE requirements are less stringent than for other uses of ATVs because of low speeds: wear an approved mountain bike helmet that protects your head but not cause overheating; wear rubber gloves and boots when spraying herbicides (avoid leather that absorbs chemicals); wear eye protection, long sleeved shirts and pants. When loading and unloading ATVs from trailers or pickup trucks use caution, beware of pinch points, keep ramps at low angle by using natural terrain features such as slope/ditches, watch for hidden obstacles when backing; make sure ATV is securely fastened when transporting (fasten to chassis to avoid influence of shock absorbers). If spray tank is loaded with liquid, the extra weight will change the ATVs center-of-gravity; never climb steep ramps or slopes. Inspect sprayer equipment prior to use, inspect fittings hoses and nozzles, replace if worn. Keep wand pointed down and be aware of wind direction when traveling..
ATV travel between project areas	Vehicle accidents	When travel at speeds greater than 15 mph, or on slopes less than 10 % then wear a motor cycle helmet (three quarter or full) The helmet shall meet requirements of the Department of Transportation, ANSI or Snell Memorial Foundation standards. Also wear leather gloves, long pants and sleeved shirt, appropriate foot wear, eye protection (such as goggles, glasses or face shield). Review sections 13.22 – to 13.24 in FSH 6709.11 Health and Safety Code Handbook.

10. LINE OFFICER SIGNATURE	**11. TITLE**	**12. DATE**

JHA Instructions (References-FSH 6709.11 and .12)

The JHA shall identify the location of the work project or activity, the name of employee(s) involved in the process, the date(s) of acknowledgment, and the name of the appropriate line officer approving the JHA. The line officer acknowledges that employees have read and understand the contents, have received the required training, and are qualified to perform the work project or activity.

Blocks 1, 2, 3, 4, 5, and 6: Self-explanatory.

Block 7: Identify all tasks and procedures associated with the work project or activity that have potential to cause injury or illness to personnel and damage to property or material. Include emergency evacuation procedures (EEP).

Block 8: Identify all known or suspect hazards associated with each respective task/procedure listed in block 7. For example:

a. Research past accidents/incidents.

b. Research the Health and Safety Code, FSH 6709.11 or other appropriate literature.

c. Discuss the work project/activity with participants.

d. Observe the work project/activity.

Emergency Evacuation Instructions (Reference FSH 6709.11)

Work supervisors and crew members are responsible for developing and discussing field emergency evacuation procedures (EEP) and alternatives in the event a person(s) becomes seriously ill or injured at the worksite.

Be prepared to provide the following information:

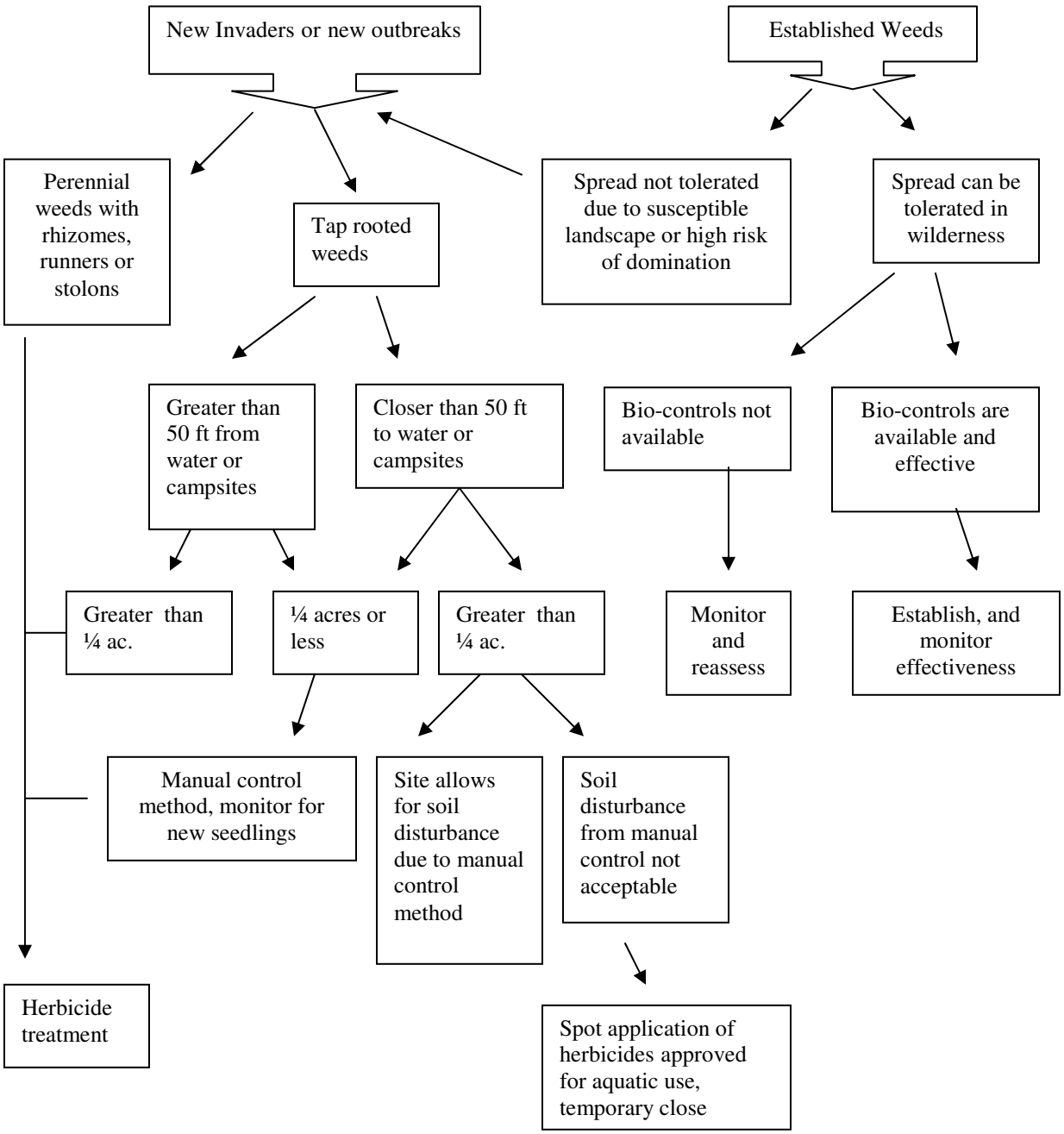
a. Nature of the accident or injury (avoid using victim's name).
b. Type of assistance needed, if any (ground, air, or water evacuation).
c. Location of accident or injury, best access route into the worksite (road name/number), identifiable ground/air landmarks.
d. Radio frequencies.
e. Contact person.
f. Local hazards to ground vehicles or aviation.
g. Weather conditions (wind speed & direction, visibility, temperature).
h. Topography.
i. Number of individuals to be transported.
j. Estimated weight of individuals for air/water evacuation.

The items listed above serve only as guidelines for the development of emergency evacuation procedures.

JHA and Emergency Evacuation Procedures Acknowledgment

e. A combination of the above. **Block 9: Identify appropriate actions to reduce or eliminate the hazards identified in block 8. Abatement measures listed below are in the order of the preferred abatement method:** **a. Engineering Controls (the most desirable method of abatement). For example, ergonomically designed tools, equipment, and furniture.** **b. Substitution. For example, switching to high flash point, non-toxic solvents.** **c. Administrative Controls. For example, limiting exposure by reducing the work schedule; establishing appropriate procedures and practices.** **d. PPE (least desirable method of abatement). For example, using hearing protection when working with or close to portable machines (chain saws, rock drills, and portable water pumps).** **e. A combination of the above.** **Block 10: The JHA must be reviewed and approved by a line officer. Attach a copy of the JHA as justification for purchase orders when procuring PPE.** **Blocks 11 and 12: Self-explanatory.**	**We, the undersigned work leader and crew members, acknowledge participation in the development of this JHA (as applicable) and accompanying emergency evacuation procedures. We have thoroughly discussed and understand the provisions of each of these documents:** **SIGNATURE DATE** **SIGNATURE DATE**

APPENDIX C – Wilderness Minimum Tool Guidelines



APPENDIX D – Surface Water Quality

The following table shows the maximum amount of herbicide (in pounds of active ingredients) that can be treated within any watershed per year. If more than one chemical is used within a drainage in any given year, then use the amount for the most restrictive herbicide. For example, in the Upper Madison watershed when using picloram in combination with any other herbicide, limit the total amount of herbicide to 90 pounds of active ingredient.**Maximum amount of active ingredient for 12 herbicides per year for all of the 6th order Hydrologic Units Codes on the Gallatin National Forest**

HUC6 Watershed Number	Watershed Name	Maximum lbs of Picloram per huc (Tolerance 0.07[1])	Maximum lbs of 2,4-D amine per huc (Tolerance 42)	Maximum lbs of Chlorsulfuron per huc (Tolerance 25)	Maximum lbs of Clopryralid per huc (Tolerance 10.3)	Maximum lbs of Dicamba per huc (Tolerance 2.8)	Maximum lbs of Glyphsphate per huc (Tolerance 14.0)	Maximum lbs of Hexazinone per huc (Tolerance 25.7)	Maximum lbs of Imazapic per huc (Tolerance 10)	Maximum lbs of Imazapyr per huc (Tolerance 10)	Maximum lbs of Metsulfuron Methyl per huc (Tolerance 15)	Maximum lbs of Sulfometuron methyl per huc (Tolerance 15)	Maximum lbs of Triclopyr per huc (Tolerance 0.11)
100200070202	Upper Madison	90	50655	30152	12423	3377	16885	30996	12061	12061	18091	18091	133
100200070203	Dry Canyon	51	28324	16859	6946	1888	9441	17331	6744	6744	10116	10116	74
100200070204	S. Fk.Madison	30	16522	9834	4052	1101	5507	10110	3934	3934	5901	5901	43
100200070205	Denny	81	45212	26912	11088	3014	15071	27665	10765	10765	16147	16147	118
100200070304	Duck Red Canyon	46	25662	15275	6293	1711	8554	15703	6110	6110	9165	9165	67
100200070305	Greyling	62	34522	20549	8466	2301	11507	21124	8219	8219	12329	12329	90
100200070306	Tepee	22	12373	7365	3034	825	4124	7571	2946	2946	4419	4419	32
100200070505	Hebgan Lake	69	38781	23084	9511	2585	12927	23730	9234	9234	13850	13850	102
100200070601	Upper Beaver	34	19200	11428	4708	1280	6400	11748	4571	4571	6857	6857	50
100200070602	Cabin	24	13712	8162	3363	914	4571	8390	3265	3265	4897	4897	36
100200070603	Lower Beaver	36	19889	11839	4878	1326	6630	12170	4735	4735	7103	7103	52
100200070801	Sheep	15	8398	4999	2060	560	2799	5139	2000	2000	2999	2999	22
100200070802	Mile	24	13486	8027	3307	899	4495	8252	3211	3211	4816	4816	35
100200071601	Cherry	33	18344	10919	4499	1223	6115	11225	4368	4368	6551	6551	48
100200080103	Headwaters Gallatin	75	41901	24941	10276	2793	13967	25639	9976	9976	14965	14965	110
100200080107	Upper Taylor	50	27811	16554	6820	1854	9270	17018	6622	6622	9933	9933	73

HUC6 Watershed Number	Watershed Name	Maximum lbs of Picloram per huc (Tolerance 0.07[1])	Maximum lbs of 2,4-D amine per huc (Tolerance 42)	Maximum lbs of Chlorsulfuron per huc (Tolerance 25)	Maximum lbs of Clopryralid per huc (Tolerance 10.3)	Maximum lbs of Dicamba per huc (Tolerance 2.8)	Maximum lbs of Glyphsphate per huc (Tolerance 14.0)	Maximum lbs of Hexazinone per huc (Tolerance 25.7)	Maximum lbs of Imazapic per huc (Tolerance 10)	Maximum lbs of Imazapyr per huc (Tolerance 10)	Maximum lbs of Metsulfuron Methyl per huc (Tolerance 15)	Maximum lbs of Sulfometuron methyl per huc (Tolerance 15)	Maximum lbs of Triclopyr per huc (Tolerance 0.11)
100200080108	Wapiti	40	22342	13299	5479	1489	7447	13671	5320	5320	7979	7979	59
100200080303	West FK West Gallatin	19	10730	6387	2631	715	3577	6566	2555	2555	3832	3832	28
100200080402	Elkhorn	16	8847	5266	2170	590	2949	5414	2107	2107	3160	3160	23
100200080403	Buck	26	14522	8644	3561	968	4841	8886	3458	3458	5187	5187	38
100200080404	Beaver	23	12908	7683	3166	861	4303	7898	3073	3073	4610	4610	34
100200080405	Porcupine	21	11517	6856	2825	768	3839	7048	2742	2742	4113	4113	30
100200080406	Dudley Levinski	22	12082	7192	2963	805	4027	7393	2877	2877	4315	4315	32
100200080407	Deer Aspestos	19	10555	6283	2589	704	3518	6459	2513	2513	3770	3770	28
100200080501	SF Spanish	18	9975	5937	2446	665	3325	6103	2375	2375	3562	3562	26
100200080504	Twin	16	9204	5478	2257	614	3068	5632	2191	2191	3287	3287	24
100200080601	Portal	16	8788	5231	2155	586	2929	5377	2092	2092	3139	3139	23
100200080602	Moose Tamphry	22	12580	7488	3085	839	4193	7698	2995	2995	4493	4493	33
100200080603	Swan	27	14987	8921	3675	999	4996	9171	3568	3568	5353	5353	39
100200080604	Squaw	44	24775	14747	6076	1652	8258	15160	5899	5899	8848	8848	65
100200080605	Cascade	23	12838	7642	3148	856	4279	7856	3057	3057	4585	4585	34
100200080607	Logger	22	12042	7168	2953	803	4014	7369	2867	2867	4301	4301	32
100200080701	Yankee Wilson	17	9690	5768	2376	646	3230	5929	2307	2307	3461	3461	25
100200080702	Big Bear	27	15354	9140	3765	1024	5118	9395	3656	3656	5484	5484	40
100200080703	S Cottonwood	41	23145	13777	5676	1543	7715	14163	5511	5511	8266	8266	61
100200080801	Jackson Meadow	56	31179	18559	7646	2079	10393	19078	7424	7424	11135	11135	82
100200080802	Bear Canyon	27	15202	9049	3728	1013	5067	9302	3619	3619	5429	5429	40

HUC6 Watershed Number	Watershed Name	Maximum lbs of Picloram per huc (Tolerance 0.07[1])	Maximum lbs of 2,4-D amine per huc (Tolerance 42)	Maximum lbs of Chlorsulfuron per huc (Tolerance 25)	Maximum lbs of Clopryralid per huc (Tolerance 10.3)	Maximum lbs of Dicamba per huc (Tolerance 2.8)	Maximum lbs of Glyphsphate per huc (Tolerance 14.0)	Maximum lbs of Hexazinone per huc (Tolerance 25.7)	Maximum lbs of Imazapic per huc (Tolerance 10)	Maximum lbs of Imazapyr per huc (Tolerance 10)	Maximum lbs of Metsulfuron Methyl per huc (Tolerance 15)	Maximum lbs of Sulfometuron methyl per huc (Tolerance 15)	Maximum lbs of Triclopyr per huc (Tolerance 0.11)
100200080803	Bozeman	63	35253	20984	8645	2350	11751	21571	8393	8393	12590	12590	92
100200080804	Bridger Canyon	54	30143	17942	7392	2010	10048	18445	7177	7177	10765	10765	79
100200080805	Beasley M	30	16795	9997	4119	1120	5598	10277	3999	3999	5998	5998	44
100200080901	Hyalite	54	30317	18046	7435	2021	10106	18551	7218	7218	10827	10827	79
100200081002	Pass Mill	26	14616	8700	3584	974	4872	8944	3480	3480	5220	5220	38
100200081003	Reese	58	32713	19472	8023	2181	10904	20017	7789	7789	11683	11683	86
100200081103	Sypes	33	18506	11016	4538	1234	6169	11324	4406	4406	6609	6609	48
100301010302	S FK Sixteenmile	55	30933	18413	7586	2062	10311	18928	7365	7365	11048	11048	81
100301010303	Sixteenmile	17	9474	5639	2323	632	3158	5797	2256	2256	3384	3384	25
100700010806	Crevice	61	34064	20276	8354	2271	11355	20844	8111	8111	12166	12166	89
100700010901	Bear	53	29672	17662	7277	1978	9891	18157	7065	7065	10597	10597	78
100700010902	Eagle Reese	57	31846	18956	7810	2123	10615	19487	7582	7582	11374	11374	83
100700020101	Cinnebar	18	10118	6022	2481	675	3373	6191	2409	2409	3613	3613	26
100700020102	Mulherin	29	16058	9558	3938	1071	5353	9826	3823	3823	5735	5735	42
100700020103	Basset	35	19602	11668	4807	1307	6534	11995	4667	4667	7001	7001	51
100700020104	Cedar	17	9572	5698	2347	638	3191	5857	2279	2279	3419	3419	25
100700020105	Upper Tom Miner	22	12046	7170	2954	803	4015	7371	2868	2868	4302	4302	32
100700020107	Lower Tom Minor	40	22498	13392	5517	1500	7499	13767	5357	5357	8035	8035	59
100700020108	Sphinx Slip and Slide	30	16559	9856	4061	1104	5520	10132	3943	3943	5914	5914	43
100700020301a	Upper Mill	33	18587	11064	4558	1239	6196	11373	4425	4425	6638	6638	49
100700020301b	Rock	2	1175	699	288	78	392	719	280	280	420	420	3

HUC6 Watershed Number	Watershed Name	Maximum lbs of Picloram per huc (Tolerance 0.07[1])	Maximum lbs of 2,4-D amine per huc (Tolerance 42)	Maximum lbs of Chlorsulfuron per huc (Tolerance 25)	Maximum lbs of Clopryralid per huc (Tolerance 10.3)	Maximum lbs of Dicamba per huc (Tolerance 2.8)	Maximum lbs of Glyphsphate per huc (Tolerance 14.0)	Maximum lbs of Hexazinone per huc (Tolerance 25.7)	Maximum lbs of Imazapic per huc (Tolerance 10)	Maximum lbs of Imazapyr per huc (Tolerance 10)	Maximum lbs of Metsulfuron Methyl per huc (Tolerance 15)	Maximum lbs of Sulfometuron methyl per huc (Tolerance 15)	Maximum lbs of Triclopyr per huc (Tolerance 0.11)
100700020302b	Passage	29	16518	9832	4051	1101	5506	10108	3933	3933	5899	5899	43
100700020303a	Lower Big	26	14477	8617	3550	965	4826	8859	3447	3447	5170	5170	38
100700020303b	West Fork Mill	42	23508	13993	5765	1567	7836	14385	5597	5597	8396	8396	62
100700020304a	Donahue Daily	32	17953	10686	4403	1197	5984	10986	4275	4275	6412	6412	47
100700020304b	East Fork Mill	71	39945	23777	9796	2663	13315	24443	9511	9511	14266	14266	105
100700020305a	Lower Mill	46	25789	15351	6324	1719	8596	15781	6140	6140	9210	9210	68
100700020305b	Sixmile	41	22726	13528	5573	1515	7575	13906	5411	5411	8117	8117	60
100700020306	Emigrant	40	22582	13442	5538	1505	7527	13818	5377	5377	8065	8065	59
100700020308	Eightmile	43	24010	14292	5888	1601	8003	14692	5717	5717	8575	8575	63
100700020309	Pole Conlin	83	46375	27604	11373	3092	15458	28377	11042	11042	16563	16563	121
100700020402	Trail	61	34103	20299	8363	2274	11368	20868	8120	8120	12180	12180	89
100700020403	Pine West	39	21866	13015	5362	1458	7289	13380	5206	5206	7809	7809	57
100700020404	Pine East	57	32080	19095	7867	2139	10693	19630	7638	7638	11457	11457	84
100700020405	Deep	36	20252	12055	4966	1350	6751	12392	4822	4822	7233	7233	53
100700020406	Suce Strickland	58	32391	19280	7943	2159	10797	19820	7712	7712	11568	11568	85
100700020502	Dry	30	16635	9902	4079	1109	5545	10179	3961	3961	5941	5941	44
100700020505	Mission	65	36651	21816	8988	2443	12217	22427	8726	8726	13090	13090	96
100700020801	Rainbow	47	26557	15808	6513	1770	8852	16250	6323	6323	9485	9485	70
100700020802	Upper Boulder	22	12219	7273	2996	815	4073	7477	2909	2909	4364	4364	32
100700020803	Meatrack	28	15582	9275	3821	1039	5194	9535	3710	3710	5565	5565	41
100700020804	Upsidedown Bridge	40	22220	13226	5449	1481	7407	13597	5291	5291	7936	7936	58
100700020806	West Chippy	8	4724	2812	1158	315	1575	2890	1125	1125	1687	1687	12
100700020807	Shorty	22	12410	7387	3043	827	4137	7594	2955	2955	4432	4432	33

HUC6 Watershed Number	Watershed Name	Maximum lbs of Picloram per huc (Tolerance 0.07[1])	Maximum lbs of 2,4-D amine per huc (Tolerance 42)	Maximum lbs of Chlorsulfuron per huc (Tolerance 25)	Maximum lbs of Clopryralid per huc (Tolerance 10.3)	Maximum lbs of Dicamba per huc (Tolerance 2.8)	Maximum lbs of Glyphsphate per huc (Tolerance 14.0)	Maximum lbs of Hexazinone per huc (Tolerance 25.7)	Maximum lbs of Imazapic per huc (Tolerance 10)	Maximum lbs of Imazapyr per huc (Tolerance 10)	Maximum lbs of Metsulfuron Methyl per huc (Tolerance 15)	Maximum lbs of Sulfometuron methyl per huc (Tolerance 15)	Maximum lbs of Triclopyr per huc (Tolerance 0.11)
100700020808	Middle Boulder	51	28337	16867	6949	1889	9446	17340	6747	6747	10120	10120	74
100700020809	Upper East Boulder	55	30831	18352	7561	2055	10277	18865	7341	7341	11011	11011	81
100700020811	Lower Boulder	42	23700	14107	5812	1580	7900	14502	5643	5643	8464	8464	62
100700020903	Blacktail	21	11648	6933	2856	777	3883	7127	2773	2773	4160	4160	31
100700020904	Middle West Boulder	28	15860	9441	3890	1057	5287	9705	3776	3776	5664	5664	42
100700020905	Lower West Boulder	58	32426	19301	7952	2162	10809	19842	7720	7720	11581	11581	85
100700020906	Boulder	72	40551	24137	9945	2703	13517	24813	9655	9655	14482	14482	106
100700021102	E FK Upper Deer	38	21326	12694	5230	1422	7109	13050	5078	5078	7617	7617	56
100700021103	Upper Deer	42	23524	14003	5769	1568	7841	14395	5601	5601	8402	8402	62
100700021104	Lower Lower Deer	42	23734	14128	5821	1582	7911	14523	5651	5651	8477	8477	62
100700021302	West Bridger	23	12640	7524	3100	843	4213	7734	3009	3009	4514	4514	33
100700030101	Fairy Carrol	34	18796	11188	4610	1253	6265	11501	4475	4475	6713	6713	49
100700030102	Upper Flathead	32	17900	10655	4390	1193	5967	10953	4262	4262	6393	6393	47
100700030201	Shields Headwaters	59	33299	19821	8166	2220	11100	20376	7928	7928	11892	11892	87
100700030202	Smith	35	19737	11748	4840	1316	6579	12077	4699	4699	7049	7049	52
100700030207	Horse	57	31736	18891	7783	2116	10579	19420	7556	7556	11334	11334	83
100700030301	Brackett	49	27485	16360	6740	1832	9162	16818	6544	6544	9816	9816	72
100700030402	Cottonwood	55	30695	18271	7528	2046	10232	18783	7308	7308	10963	10963	80
100700030403	Rock	54	30117	17927	7386	2008	10039	18429	7171	7171	10756	10756	79
100700030405	Canyon	22	12541	7465	3076	836	4180	7674	2986	2986	4479	4479	33
100700030406	Bangtail	18	9927	5909	2434	662	3309	6074	2363	2363	3545	3545	26
100700030408	Willow	25	13939	8297	3418	929	4646	8529	3319	3319	4978	4978	37

[1] Tolerance level is estimated using the lowest 96 hour LC50 for cutthrout or rainbow trout then multiplying by 1/20 (an added safety factor) to achieve no detectable impact to these species.

The Relative Toxicity of Herbicides on Trout; Soil half-life, Mobility; and Solubility.

Herbicide	**96- hour LC50 – cutthroat trout (mg/l or ppm)**	**96- hour LC50 – Rainbow trout (mg/l or ppm)[1]**	**Soil half-life (days)**	**Potential for Mobility**	**Solubility (mg/l or ppm)[1]**
Clorsulfuron	--	>250	30-120	High	300-7,000
Clopyralid[10]	--	103.5	15-287	High	1,000-300,000
Dicamba[2]	>50	28-135	7-42	High	500,000
Glyphosate[4]	--	1.3-14 (>1,000 for Rodeo®)	3 to several years	Low	12,000-900,000
Hexazinone[5]	--	320-420	30-180	High	33,000
Imazapic[12]	--	>100	31-233	Moderate	2,200
Imazapyr[9]	--	110	Several months	Moderate to High	11,272
Metsulfuron-methyl[11]	--	>150	14 - 180	High	1,750-9,500
Picloram technical grade[8]	3.8 –6.2	19.3	20-300	High	430
Picloram- potassium salt[8]	1.5	--	--	High	200,000
Sulfometuron methyl[7]	--	>12.5	30	Low	10-300
2,4-D acid[6]	57-72	2-14	30 or less	High	890-800,000
Triclopyr[3]	--	0.7-552	30-46	Moderate	23-2,100,000

[1] Range in data due to variation in chemical forms (salt vs. acid)
(http://npic.orst.edu/tech.htm; or Handbook of Toxicity Test Conducted at Columbia National Fisheries Research Laboratory, 1996-78. US Dept of the Interior, Fish and Wildlife Service, Resource Publication 137, Washington, D.C. , 1980;

[2]USDA Forest Service 1996b. Vanquish (dicamba) risk assessment final report. Syracuse Environmental Research Associates, Inc. (SERA)

[3]_____ 1996c. Selected commercial formulations of triclopyr – Garlon 3A and Garlon 4 risk assessment final report. (SERA)

[4]_____ 1996d. Selected commercial formulations of glyphosate – Accord, Rodeo, Roundup and roundup Pro risk assessment final report. (SERA)

[5]_____ 1997b. USDA Forest Service. Selected commercial formulations of hexazinone – human health and ecological risk assessment final report. (SERA)

[6]_____ 1998a. 2,4-Dichlorophenoxyacetic acid Formulations – Human Health and Ecological Risk Assessment Final Report. (SERA)

[7]_____ 1998b. Sulfometuron mthyl (Oust) final draft.. Syracuse Environmental Research Associates, Inc. (SERA)

[8]_____ 1999a. Picloram (Tordon K and Tordon 22K) - Final Report. Syracuse Environmental Research Associates, Inc. (SERA)

[9]_____ 1999b. Imazapyr (Arsenal, Chopper, and Stalker Formulations), Final Report. Syracuse Environmental Research Associates, Inc. (SERA)

[10]_____ 1999c. Clopyralid (Transline), Final Report. Syracuse Environmental Research Associates, Inc. (SERA)

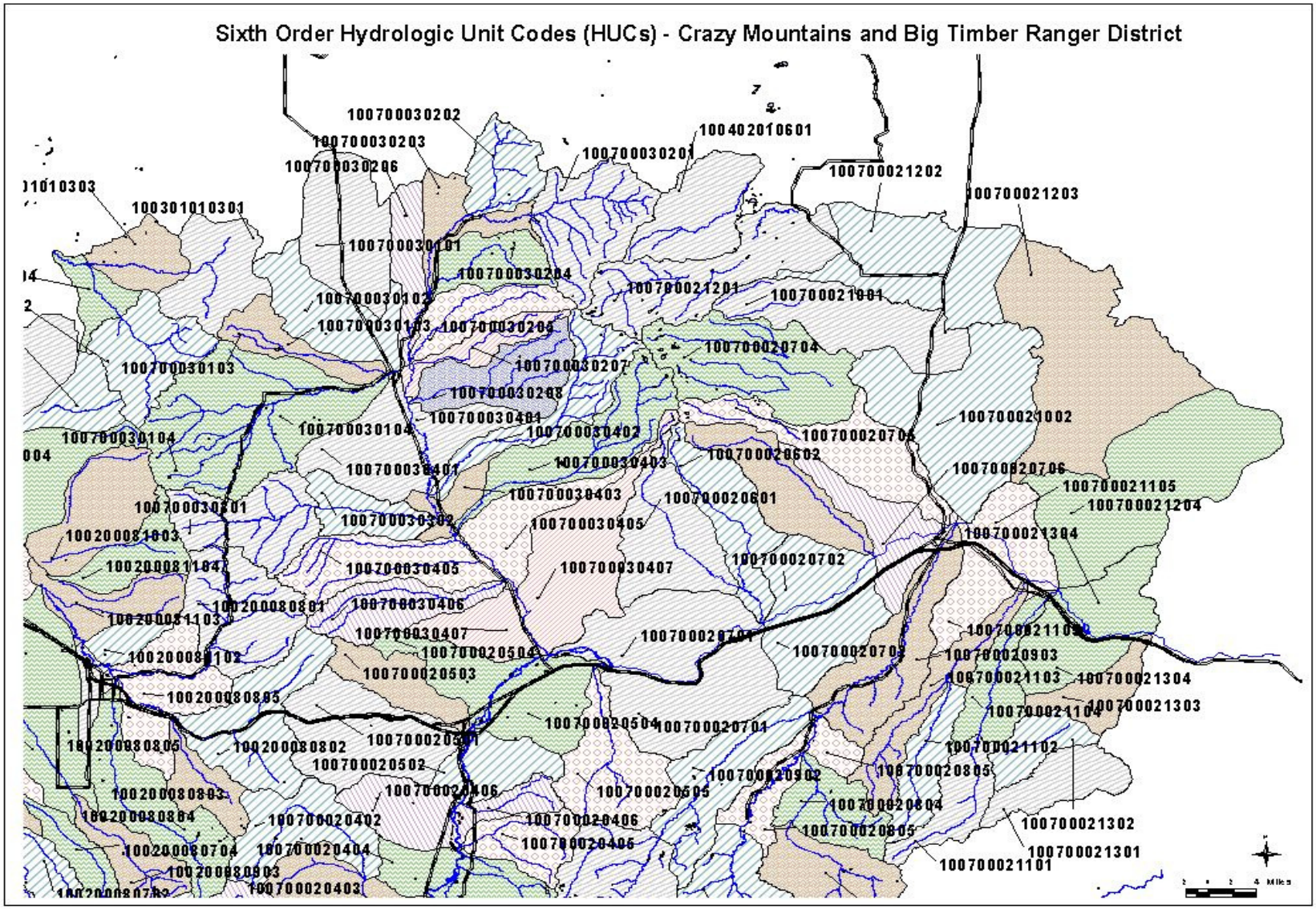
[11]_____ 2000b. Metsulfuron methyl (Escort) Final Report. Syracuse Environmental Research Associates, Inc. (SERA)

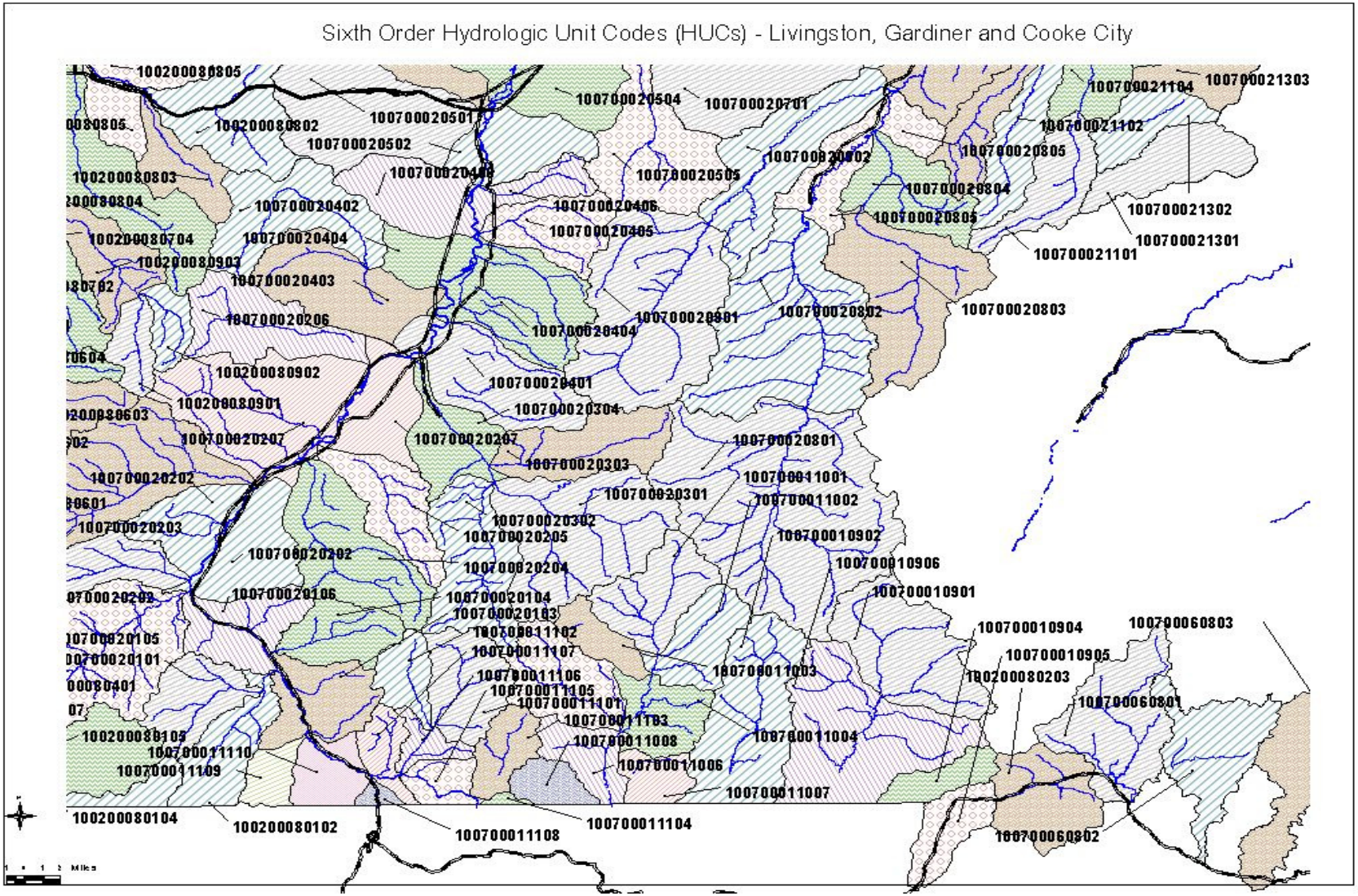
[12]_____ 2001a. Impazapic (Plateau and Plateau DG) – Human Health and Ecological Risk Assessment Final Report. (SERA)

Herbicide water quality standards as listed in Circular WQB-7 Montana Water Quality Standards, (http://www.deq.state.mt.us/wqinfo/Circulars/WQB-7.PDF, Dec 2002). Aquatic Life Standards and Bio-concentration Factors are not listed because they have not been determined by Montana Department of Environmental Quality for the herbicides listed in this EIS.

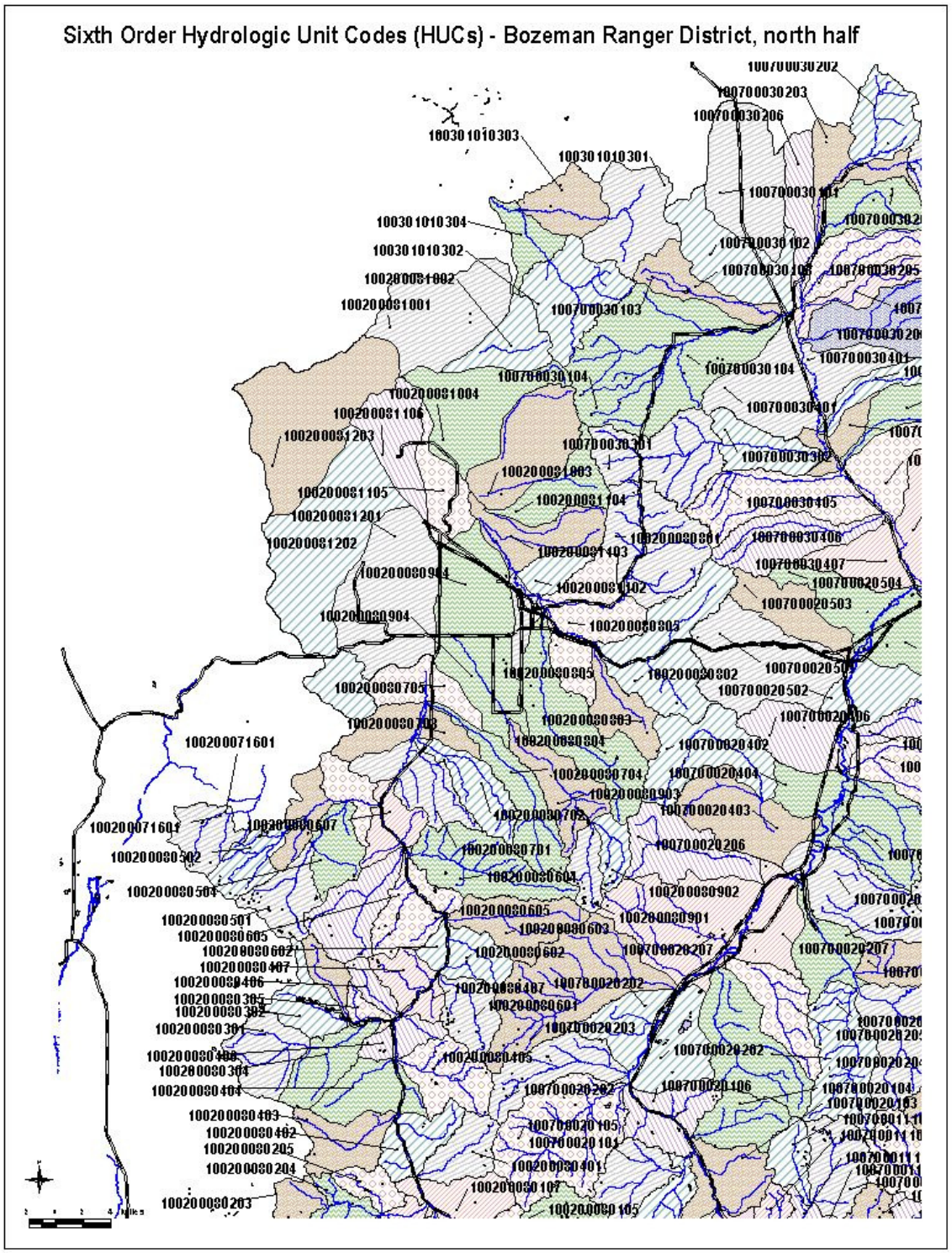
Common Name	**Human Health Standards**		**Required Reporting Value**[+] micro-grams/liter
	Surface Water micro-grams/liter	**Groundwater** micro-grams/liter	
2,4-D	70	70	1
Chlorsulfuron	15	15	No Set Standard
Clopyralid	3,500	3,500	No Set Standard
Dicamba	200	200	No Set Standard
Glyphosate	700	700	50
Hexazinone	400	400	No Set Standard
Imazapyr	21,000	21,000	No Set Standard
Methsulfuron methyl	1,750	1,750	No Set Standard
Picloram*	500	500	1
Imazapic	Not listed	Not listed	Not listed
Sulfometuron methyl	1,750	1,750	No Set Standard
Triclopyr	350	350	No Set Standard

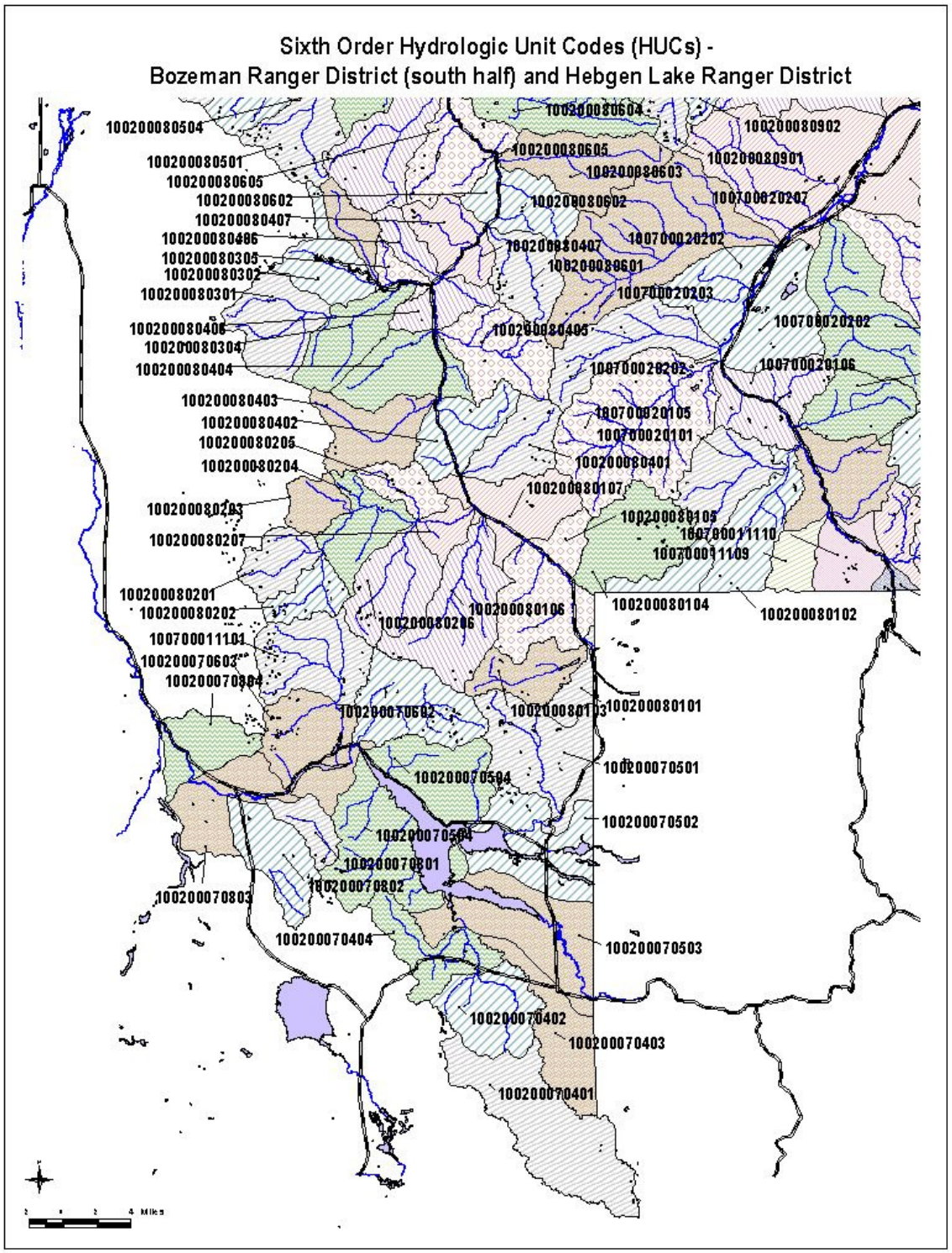
[+] Required Reporting Value is the Department of Montana best determination of a level of analysis that can be achieved in routine sampling. It is based on levels actually achieved at both commercial and government laboratories in Montana using accepted methods. The Required Reporting Value is the detection level that must be achieved in reporting ambient or compliance monitoring result to the Department. Higher detection levels may be used if it has been demonstrated that the higher detection levels will be less than 10% of the expected level of the sample.


Sixth Order Hydrologic Unit Codes (HUCs) - Crazy Mountains and Big Timber Ranger District
100700030202
100700030203
100700030206
100402010601
100700030201
100700021202
100700021203
100301010301
100700030101
100700030204
100700021201
100700021001
100700030102
100700030103
100700030205
100700020704
100700030207
100700030208
100700030401
100700021002
100700030104
100700030402
100700020705
100700020602
100700030403
100700020706
100700021105
100700021204
100700030301
100700030302
100700020601
100700030405
100700021304
100200081003
100200081104
100700030404
100700030407
100700020702
100200080801
100700030406
100200081103
100700030407
100700020504
100700020503
100200080803
100700020701
100700020703
100700020903
100700021103
100700021304
100700021104
100700021303
100200080805
100200080802
100700020501
100700020502
100700020504
100700020701
100700021102
100700020805
100700020902
100200080803
100700020406
100700020605
100700020804
100200080804
100700020402
100700020406
100700020405
100700020805
100700021302
100200080704
100700020404
100700021301
100200080903
100700021101
100700020403
Miles


Sixth Order Hydrologic Unit Codes (HUCs) - Livingston, Gardiner and Cooke City
100200080805
100700020504
100700020701
100700021104
100700021303
100700020501
100200080802
100700021102
100700020502
100700020805
100200080803
100700020505
100700020804
100700020406
100700021302
100700020402
100700020805
100700020405
100200080704
100700020404
100700021301
100200080903
100700021101
100700020403
100700020206
100700020901
100700020802
100700020803
100700020404
100200080902
100700020401
100200080901
100700020304
100700020207
100700020207
100700020801
100700020303
100700020202
100700011001
100700020301
100700011002
100700020203
100700020302
100700020205
100700010902
100700020202
100700020204
100700010906
100700020106
100700020104
100700010901
100700020103
100700011102
100700020105
100700011107
100700020101
100700011106
100700011003
100700011105
100700011101
100700011103
100700011004
100200080109
100700011008
100700011110
100700011006
100700011109
100700011007
100200080104
100200080102
100700011108
100700011104
100700060803
100700010904
100700010905
100200080203
100700060801
100700060802
Miles

LW2-007592


Sixth Order Hydrologic Unit Codes (HUCs) - Bozeman Ranger District, north half
100700030202
100700030203
100700030206
100301010303
100301010301
100700030101
100301010304
100301010302
100700030102
100200081002
100700030105
100700030205
100200081001
100700030103
100700030206
100700030104
100700030401
100200081004
100200081106
100200081203
100700030301
100700030302
100200081003
100200081105
100200081104
100700030405
100200081201
100200081202
100200080901
100700030406
100200081103
100700030407
100200080904
100200081102
100700020504
100700020503
100200080904
100200080803
100200080805
100200080802
100700020501
100200080705
100700020502
100200080708
100200080803
100700020406
100200071601
100200080804
100700020402
100200080704
100700020404
100200080903
100200080705
100700020403
100200071601
100200080607
100200080701
100700020206
100200080302
100200080604
100200080504
100200080902
100200080605
100200080501
100200080901
100200080603
100200080605
100200080602
100700020207
100200080602
100200080407
100200080406
100700020202
100200080305
100200080487
100200080601
100200080302
100200080301
100700020203
100200080408
100200080405
100700020202
100200080304
100700020106
100200080404
100200080403
100200080402
100700020105
100200080205
100700020101
100200080204
100200080401
100200080107
100200080203
100200080105


Sixth Order Hydrologic Unit Codes (HUCs) -
Bozeman Ranger District (south half) and Hebgen Lake Ranger District
100200080504
100200080501
100200080605
100200080602
100200080407
100200080406
100200080305
100200080302
100200080301
100200080406
100200080304
100200080404
100200080403
100200080402
100200080205
100200080204
100200080203
100200080207
100200080201
100200080202
100700011101
100200070603
100200070304
100200080604
100200080605
100200080603
100200080602
100200080407
100200080601
100200080405
100200080902
100200080901
100700020207
100700020202
100700020203
100700020202
100700020106
100700020105
100700020101
100200080401
100200080107
100200080105
100700011110
100700011109
100200080106
100200080206
100200080104
100200080102
100200080101
100200070602
100200080103
100200070501
100200070504
100200070502
100200070504
100200070801
100200070802
100200070803
100200070404
100200070503
100200070402
100200070403
100200070401
Miles

APPENDIX E – Ground Water Analysis

Rating Groundwater Vulnerability to Herbicide Contamination, base on the RAVE: Relative Aquifer Vulnerability Evaluation (Montana State University Extension Service, 1990. MDA Technical Bulletin 90-01A)

Introduction

Pesticide applicators of today are faced with growing concern over the potential for pesticide contamination of ground water. Over 50% of all Montanan's and 95% of the agricultural community consume ground water as their source of drinking water. Protecting this fragile resource from pesticide contamination is imperative, because some pesticides may be harmful to humans at very low concentrations and clean-up of ground water is extremely difficult. Pesticide residues in ground water may also adversely affect sensitive crops and wildlife.

To help farmers and pesticide applicators reduce the potential for contaminating ground water with pesticides, an aquifer vulnerability scoring system; RAVE: Relative Aquifer Vulnerability Evaluation has been developed. This numeric scoring system helps individuals evaluate pesticide selection for on-site ground water contamination potential. RAVE is designed only as a guidance system and does not replace the need for safe and judicious pesticide application required in all situations.

In most cases pesticide contamination of ground water can be avoided by using common sense and following label instructions. However, some areas are particularly vulnerable to pesticide contamination and thus require special consideration prior to making an application. The use of this score card may indicate whether an alternative pesticide should be used within a given area or if the area is not suited to pesticide applications.

Several major factors in a particular area determine the relative vulnerability of ground water to pesticide contamination. Nine of these factors have been incorporated into the RAVE score card and are defined below. A value for most of these factors can be determined by a simple on-site inspection. If a value for a particular factor is not known, contact the appropriate agency for assistance. A listing of agency contacts is provided below. Pesticide leaching potential is based on the soil persistence and mobility of a pesticide. A list of leaching potentials for some commonly used pesticides is given below.

Factor Definitions

Irrigation Practice: A rating based on whether a field is flood, sprinkler or non-irrigated.
Depth to Ground Water: The distance, in vertical feet, below the soil surface to the water table.
Distance to Surface Water: The distance, in feet, from the field boundary to the nearest flowing or stationary surface water.
Percent Organic Matter: The relative amount of decayed plant residue in the soil (see soil test results, county soil survey or consult the SCS). This may be estimated by soil color; darker soil generally indicates higher organic matter (most Montana soils are < 3 %).
Pesticide Application Frequency: The number of times the particular pesticide is applied during one growing season.
Pesticide Application Method: A rating based on whether the pesticide is applied above or below ground.
Pesticide Leachability: A relative ranking of the potential for a pesticide to move downward in soil and ultimately contaminate ground water based upon the persistence, sorptive potential and solubility of the pesticide.
Topographic Position: Physical surroundings of the field to which the pesticide application is to be made. Flood plain = within a river or lake valley, Alluvial Bench = lands immediately above a river or lake valley, Foot Hills = rolling up-lands near mountains, Upland Plains = high plains not immediately affected by open water or mountains.

Sources of Information

Soils Information: (1) USDA-SCS soil survey, district offices in most county seats; (2) Montana State University (MSU) Extension Service in most county seats, State Soil Specialist in Bozeman (994-4601); (3) MSU Department of Plant, Soil and Environmental Sciences (994-4601).

Ground Water Information: (1) Montana Bureau of Mines and Geology in Butte (496-4155), in Billings (657-2938); (2) United States Geological Survey in Helena (449-5225); (3) Montana Department of Health and Environmental Sciences, Water Quality Division (444-2406); (4) Montana Department of Natural Resources and Conservation, Water Resource Division (444-6601).

Pesticide Information: (1) Montana Department of Agriculture, Agricultural Sciences Division. Headquarters: Helena (444-5400), Regional offices: Billings (652-3615), Bozeman (587-9067), Great Falls (761-0926), Glasgow (228-9510), Missoula (329-1340); (2) MSU Extension Service offices in most county seats, Pesticide Specialist in Bozeman (994-3518); (3) US EPA Montana Office in Helena 457-2690).

Directions for Use of the RAVE Score Card

The RAVE score card can be completed in a matter of minutes. On a separate sheet of paper write down the appropriate value for each of the nine factors listed on the score card. For example; at a sprinkler irrigated site the "Irrigation Practice Factor" would be assigned a value of 7. Once all of the factors have been assigned a value, total all values. This total should then be compared to the Score Card Interpretation Scale to determine the relative vulnerability of ground water to contamination by an individual pesticide. Higher scores indicate higher vulnerability of ground water to pesticide contamination. If a high score is received, select an alternative pesticide and compare the results.

Score Card Interpretation Scale

| ---------- |

30 60 100

Low Concern High Concern

THE RAVE SCORE CARD

DEPTH TO GROUND WATER:		
*2-10 ft	20	
10-25 ft	12	
25-50 ft	5	
> 50 ft	0	_____
DISTANCE TO SURFACE WATER:		
1-100 ft	5	
100-500 ft	3	
> 500 ft	2	_____
TOPOGRAPHIC POSITION:		
Floodplain	15	
Alluvial bench	10	
Rolling foothill	5	
Upland plain	2	_____
SOIL TEXTURE:		
Gravelly	15	
Sandy	15	
Loamy	10	
Clayey	5	_____
PERCENT SOIL ORGANIC MATTER:		
0-1%	5	
**1-3%	3	
> 3%	2	_____
IRRIGATION PRACTICE:		
Flood irrigated	10	
Sprinkler irrigated	7	
Non-irrigated	2	_____
PESTICIDE APPLICATION FREQUENCY:		
> 1/year	5	
1/year	2	_____
PESTICIDE APPLICATION METHOD:		
Soil applied	5	
Foliar applied	2	_____
PESTICIDE LEACHING INDEX:		
***High	20	
Moderate	10	
Low	5	_____

Total ALL Rankings for the field and pesticide in question here:

* If water table < 2 feet deep, applications should probably notbe made

** If unknown, use this value
*** See Table 1 for pesticide leaching index

Interpretation of RAVE Scores

The RAVE score card rates aquifer vulnerability on a scale of 30 to 100 for individual application sites and pesticides. Higher values indicate high vulnerability of ground water to contamination by the pesticide used in the evaluation. Those values greater than or equal to 65 indicate a potential for ground water contamination. In such instances alternative pesticides should be sought which have a lower leaching potential. Scores of 80 or greater indicate that pesticide applications should not be made at this location unless an alternative product greatly reduces the score. Scores between 45 and 64 indicate a moderate to low potential for ground water contamination and scores less than 45 indicate a low potential for ground water contamination by the pesticide in question. Even in such cases, careful use of pesticides and following label instructions is imperative to protect ground water.

Herbicides

chlorsulfuron (Glean)	high
clopyralid (Stinger, Curtail)	high
dicamba (Banvel)	high
glyphosate (Roundup)	low
hexazinone (Velpar)	high
imazapic (Plateau)	high
imazapyr (Arsenal)	high
metsulfuron methyl (Ally)	high
picloram (Tordon)	high
sulfometuron methyl (Oust)	med
triclopyr (Garlon)	med
2,4-D	high
2,4-D amine (Curtail)	high
2,4-D ester (Curtail M)	high

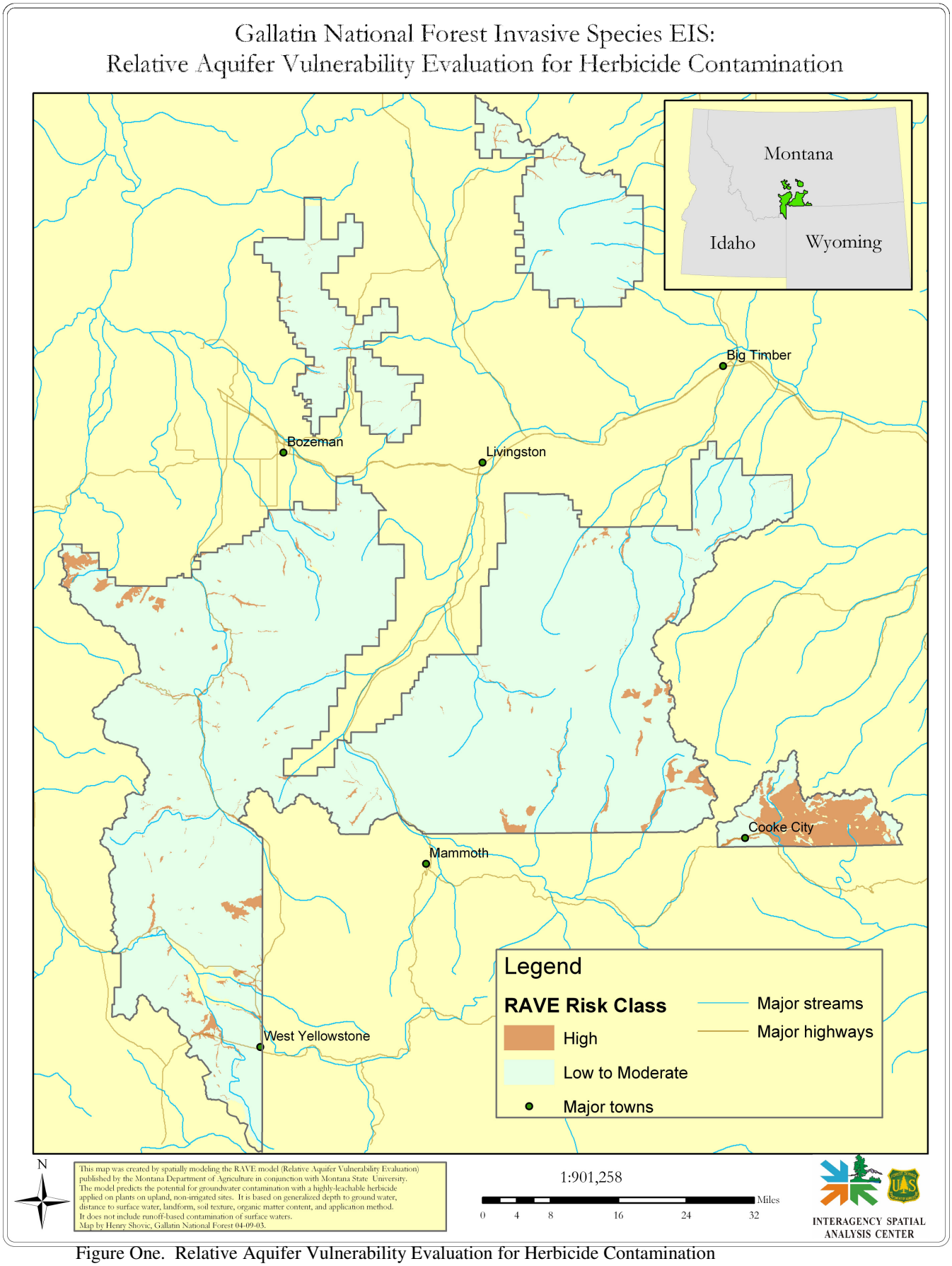


Figure One. Relative Aquifer Vulnerability Evaluation for Herbicide Contamination

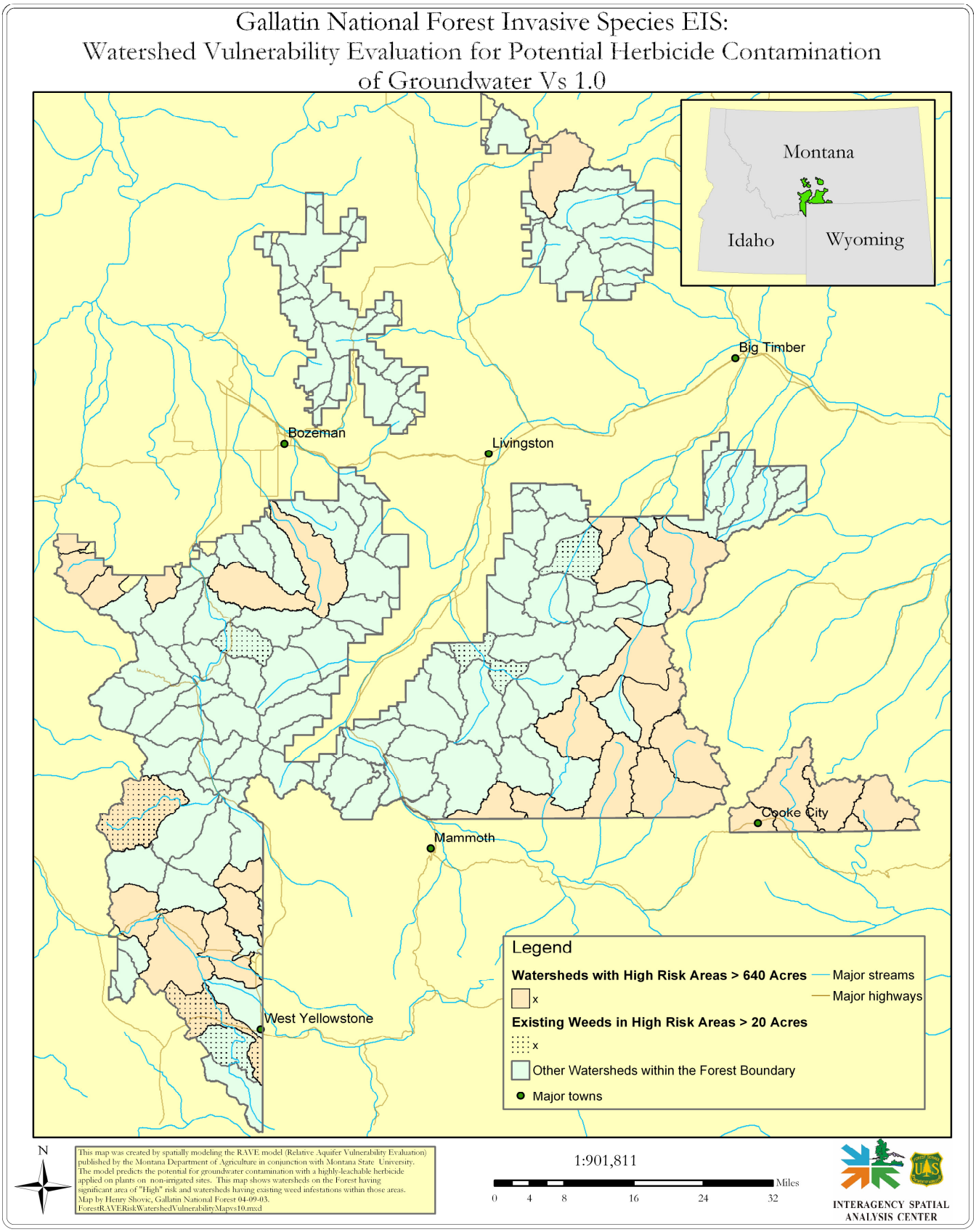


Figure Two. Watershed Vulnerability Evaluation for Potential Herbicide Contamination of Groundwater

BIOLOGICAL ASSESSMENT

FOR

TERRESTRIAL WILDLIFE SPECIES

Noxious and Invasive Weed Control

Gallatin National Forest

Prepared By:

/s/ Andrew Piles — 1-13/2005

Name — Date

TABLE OF CONTENTS

FIGURES

TABLES

SUMMARY

Determination of Effects

Implementation of the proposed Federal action is not likely to jeopardize the continued existence of the gray wolf; may affect, but is not likely to adversely affect the grizzly bear, Canada lynx, and bald eagle.

Consultation Requirements

In accordance with the Endangered Species Act (ESA), its implementation regulations, and FSM 2671.4, the Gallatin National Forest is required to request written concurrence from the United States Fish and Wildlife Service (FWS) with respect to determinations of potential effects on the gray wolf, grizzly bear, Canada lynx, and bald eagle.

Need For Re-Assessment Based On Changed Conditions

The Biological Assessment findings are based on the best current data and scientific information available. A revised Biological Assessment must be prepared if: (1) new information reveals effects, which may impact threatened, endangered, and proposed species or their habitats in a manner or to an extent not considered in this assessment; (2) the proposed action is subsequently modified in a manner that causes an effect, which was not considered in this assessment; or (3) a new species is listed or habitat identified, which may be affected by the action.

INTRODUCTION

The purpose of this Biological Assessment is to review the possible effects of the proposed federal action on threatened, endangered, and proposed species and their habitats. Threatened, endangered, and proposed species are managed under the authority of the Federal Endangered Species Act (PL 93-205, as amended) and the National Forest Management Act (PL 94-588). Section 7 of the Endangered Species Act directs Federal departments and agencies to ensure actions authorized, funded, or carried out by them are not likely to jeopardize the continued existence of threatened or endangered species or result in the destruction or adverse modification of their critical habitats (16 USC 1536).

This Biological Assessment analyzes the potential effects of the proposed federal action on all threatened, endangered, and proposed species known or suspected to occur in the proposed action influence area (Table 1). This species list was provided in the document "Threatened, Endangered, and Candidate Species for the Gallatin National Forest" (U.S. Fish & Wildlife Service 2004).

Table 1. Threatened, Endangered And Proposed Species Known Or Suspected To Occur Within The Influence Area Of The Proposed Action.

Species	Status	Occurrence
Gray Wolf *(Canis lupus)*	Nonessential Experimental	Known
Grizzly Bear (*Ursus arctos*)	Threatened	Known
Canada Lynx (*Lynx canadensis*)	Threatened	Known
Bald Eagle (Haliaeetus leucocephalus)	Threatened	Known

PROPOSED PROJECT

Project Area

The project would occur on lands administered by the USDA Forest Service within the Gallatin National Forest. The Forest is located in southwest Montana on approximately 1.8 million acres of land in parts of Carbon, Gallatin, Madison, Meagher, Park, and Sweet Grass Counties (Figure 1-1).

Proposed Action

The Gallatin National Forest proposes weed control on 13,260 acres (10,600 acres noxious weeds, 1,995 acres invasive plants, and 665 acres tall larkspur control). Actual treatment would provide for:

- 5,179 acres ground herbicide application;
- 255 acres aerial herbicide application;
- 4,985 acres biological control (herbicide treatment will be used along the perimeter and small patches to contain the weeds);
- 41 acres pulling (herbicides may be used to reduce plant density to low levels, then pull isolated plants);
- 2,135 acres cultural (herbicides or grazing may be used to reduce plant density then plant more desirable vegetation);
- 665 acres of larkspur control through herbicide, fertilizing, mineral supplement, sheep grazing, and supplementing native biological control agents.

Implementation would occur over a 5 to 15 year period. Not all acres would be treated every year. Acres treated will depend on available funding and on a priority rating system described in Figure 2. Most areas would be treated repeatedly for 5 to 8 years to ensure effective control. Monitoring would be used to determine effectiveness and to identify areas that would need to be re-treatment or if treatment areas could be reduced based on effectiveness of previous treatments.

Table 2 has a current list of invasive plants that will be treated. The list will be updated as new plants are recognized as a threat to the ecosystem. Tall larkspur control would occur separately on a case-by-case basis between the allotment permittee and the responsible District Range Management Specialist.

Figure 2. Gallatin National Forest Weed Treatment Priority Rating System.

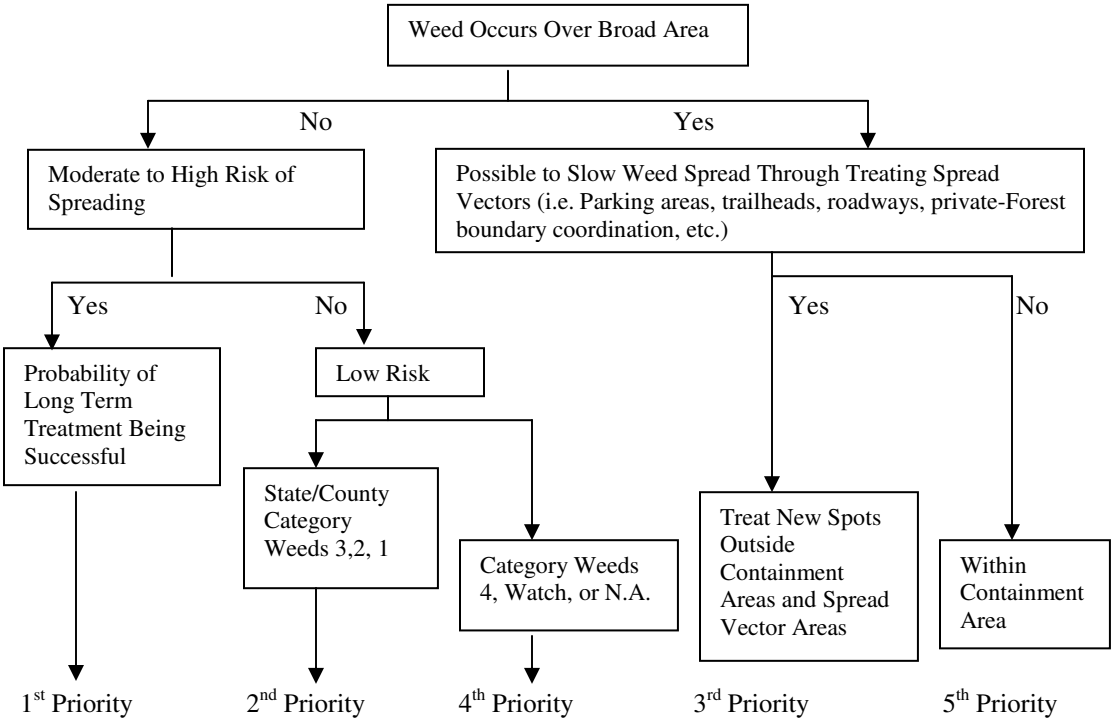


Table 2. Invasive Plant Species List as of 2004. This list will change as new plants are determined to be a threat to the ecosystem.

Montana State Noxious Weed List -2003		**County Noxious Weeds (combines Carbon, Gallatin, Madison, Meagher, Park, and Sweet Grass Counties) and additional invasive plants for the Gallatin National Forest**	
Common Name	**Scientific Name**	**Common Name**	**Scientific Name**
Category 1*			
Canada thistle	*Cirsium arvense*	common burdock	Arctium minus
common tansy	*Tanacetum vulgare*	common cocklebur	*Xanthium strumarium*
Dalmatian toadflax	*Linaria dalmatica*	black henbane	*Hyoscyamus niger*
diffuse knapweed	*Centaurea diffusa*	field scabious	*Knautia arvensis*
field bindweed	*Convolvulus arvensis*	meadow knapweed	*Centaurea pratensis*
hounds-tongue	*Cynoglossum officinale*	mullien	*Verbascum thapsus*
leafy spurge	Euphorbia esula	musk thistle	*Carduus nutans*
ox-eye daisy	*Chrysathemum leucanthemum or Leucanthemum vulgaris*	poison hemlock	*Conium vulgare*
St Johnswort (goatweed)	*Hypericum perforatum*		
Spotted knapweed	*Centaurea maculosa or C. biebersteinii*	Absinth wormwood	*Artemisia absinthium*

Montana State Noxious Weed List -2003		**County Noxious Weeds (combines Carbon, Gallatin, Madison, Meagher, Park, and Sweet Grass Counties) and additional invasive plants for the Gallatin National Forest**	
sulfur cinquefoil	*Potentilla recta*	Bull thistle	*Cirsium vulgare*
Russian knapweed	*Acroptilon repens or Centaurea repens*	Cheat grass	*Bromus tectorum*
yellow toadflax (butter and eggs)	Linaria vulgaris	Golden chamomile	*Anthemis tinctoria*
white top (hoary cress)	*Cardaria draba*	Perennial sowthistle	Sonchus arvensis
white top (hoary cress)	*Cardaria draba*	Plumeless thistle	*Caruus acanthoides*
Category 2 *		Scentless chamomile	*Anthemis arvensis*
dyer's woad	Isatis tinctoria	White bryony	*Bryonie albas*
meadow hawkweed complex	*Hieracium pratense, H.floribu*	Tall Larkspur	*Delphinium occidentale*
orange hawkweed	*Hieracium aurantiacum*		
perennial pepperweed	*Lepidium latifolium*		
purple loosestrife	*Lythrum salicaria or L. virgatum*		
tall buttercup	Ranunculus acris		
tamarisk	*Tamarix spp*		
tansy ragwort	*Senecio jacobaea*		
Category 3*			
common crupina	Crupina vulgaris		
Eurasian milfoil	*Myiophyllum sibiricum*		
yellow flag iris	*Iris pseudacorus*		
yellow starthistle	*Centaurea solstitialis*		
rush skeletonweed	*Chondrilla juncea*		

*Categories of weeds are based upon their distribution across the State. Category 1 weeds are currently established and generally widespread in many counties of the State. Category 2 weeds recently introduced or rapidly spreading from current infestation sites. Category 3 weeds are those not detected or found only in small, scattered, localized infestations.

Table 3. Area treated by method under the Proposed Action.

	Biological control*	**Cultural***	**Mechanical***	**Herbicide**	**Aerial**	**Tall Larkspur**
Acres	4985	2,135	41	5,179	255	665

** Some acres are counted more than once because more than one species is present on the same site and each species may have unique treatment strategy.
* Herbicides will be used in conjunction with biological, cultural and mechanical control methods.

New weed infestations could be treated provided that the steps identified in the Adaptive Management section are followed. All infestations will use the priority decision process outlined in Figure 2 to determine the type of treatment on each weed infestation. Likewise, all infestations will use Figure 2 to determine the appropriate treatment for new weed sites. If the weeds are in the Wilderness, then Wilderness Minimum Tool Guidelines will be used.

One feature of the Proposed Action is the flexibility to use updated herbicides as they are registered and approved by the EPA. All herbicides will be applied according to label specification; or when additional mitigation is required by Forest Service policy as described in this chapter. Impacts on soil and water will be mitigated to meet Montana Water Activities and Pesticide Application Requirements, Northern Region Soil and Water Standards, and Gallatin Forest Plan Standards. Table 4 lists some of the herbicides addressed in this document.

Table 4. EPA Registered Herbicides Available for weed control under the Proposed Action.

Common Name	Partial List of Trade Names	Target Weed Species (general)
2,4-D*	Hi-Dep®, Weedar 64®, Weed RHAP®, Amine 4®, Aqua-Kleen	thistles, sulfur cinquefoil, dyers woad, knapweeds, purple loosestrife, tall buttercup, whitetop knapweeds
Chlorsulfuron	Telar®	dyer's woad, thistles, common tansy, houndstongue, whitetop, tall buttercup
clopyralid	Stringer®, Curtail®, Transline®, Redeem®	thistles, yellow starthistle, hawkweeds, knapweeds, rush skeletonweed, oxeye daisy
dicamba	Banvel®, Clarity®, others	houndstongue, yellow starthistle, common crupina, hawkweed, oxeye daisy, tall buttercup, blueweed, leafy spurge, tansy ragwort, knapweeds,
glyphosate	Roundup®, Rodeo®, Accord®, Glyphomate®	purple loosestrife, field bindweed, yellow starthistle, thistles, cheatgrass, common crupina, toadflax,
Hexazinone	Velpar®, Pronone 10G®	cheatgrass, oxeye daisy, yellow starthistle, thistles
Imazapyr	Arsenal®, Chopper®	dyers woad, field bindweed
Methsulfuron methyl	Escort, Ally	houndstongue, thistle, sulfur cinquefoil, common crupina, dyers woad, purple loosestrife, common tansy, whitetop, blueweed
Picloram*	Tordon®, Grazon®, Pathway®	thistles, yellow starthistle, common crupina, hawkweeds, knapweeds, rush skeleton weed, common tansy, toadflax, leafy spurge
Imazapic	Plateau®	cheatgrass, leafy spurge, toadflax
Sulfometuron methyl	Oust®	cheatgrass, whitetop, oxeye daisy, tansy ragwort, musk thistle
Triclopyr	Garlon®, Redeem®, Remedy®	hawkweed, sulfur cinquefoil, purple loosestrife, knapweed, oxeye daisy, thistle

Herbicide Treatments

Herbicide selection would be based on environmental conditions such as groundwater depth, soil type, non-target vegetation, and management objectives. Tables 4 and 5 display examples of herbicides proposed for use and a range of application rates. Herbicide selection considers the following criteria:

•Herbicide label considerations
•Herbicide effectiveness on target weed species
•Proximity to water or other sensitive resources
•Soil characteristics
•Potential unintended impacts to non-target species such as conifers or shrubs
•Application method (aerial, ground, or wick applicator)
•Other weed species present at the site, and effectiveness of herbicides on those species (for example spotted knapweed infestations with inclusions of toadflax)
•Adjacent treatments (private land)
•Timing of treatments (spring/fall)
•Priority weed – new invaders vs. existing.

Table 5. Herbicide Application Rates and Timing.

Weed Species	Plant biology	Herbicide	Rate	Application Timing
Spotted knapweed Diffuse knapweed Yellow starthistle	Tap root	Tordon®	1 pint/ac	Active growth Bolt to early bud; fall
		Curtail®	2 quarts/ac	
		Transline®	2/3 pint/ac	
		2,4-D	1 quart/ac	Rosette to bolt
Sulfur cinquefoil	Tap rooted	Tordon®	1 pint/ac	Active growth
		2,4-D	1 quart/ac	Rosette to bolt
St. Johnswort	Perennial/Deep-root Rhizominous	Tordon®	1 pint/ac	Pre-bloom
		2,4-D	1 quart/ac	Seedling/pre-bloom
Canada thistle	Perennial/Deep-root Rhizominous	Tordon®	1 pint/ac	Late bolt pre-bud
		Curtail®	2 quarts/ac	Bolt - early bud
		Tarnsline®	2/3 pint/ac	Bolt to pre-bud
		2,4-D	1 quart/ac	Bolt
Musk thistle	Tap rooted	Tordon®	1 pint/ac	Rosette to bolt. Fall rosette
		Curtail®	2 quarts/ac	
		Tarnsline®	2/3 pint/ac	
		2,4-D	1 quart/ac	Rosette to bolt
Leafy spurge	Perennial/Deep-root Rhizominous	Tordon®	1 quart/ac	Full flower/fall
		Plateau®	8-12 oz/ac	Fall prior to frost
		2,4-D	1 quart/ac	Full flower
Dalmatian toadflax/yellow Toadflax	Perennial/Deep-root Rhizominous	Tordon®	1 to 2 pint/ac	Flower / fall
		Plateau®	8/10 oz/ac	Fall prior to frost
		Telar	1.5 oz/ac	Spring/fall
		2,4-D	1 to 2quarts/ac	Flower
Houndstongue	Perennial/tap root	Escort®	0.25-0.5 oz/ac	Rosette to bolt
		Telar®	1 oz/ac	Fall
		2,4-D	1 quart/ac	Rosette
Common tansy	Perennial/ Rhizominous	Escort®	0.3-1.0 oz/ac	Full flower/fall
		2,4-D	1 quart/ac	Full flower
Oxeye daisy	Perennial/Shallow – rooted / Rhizominous	Tordon®	1 pint/ac	Late bud/early bloom
		Escort®	0.05 oz/ac	
		2,4-D	1 quart/ac	
Russian knapweed	Perennial/Deep-root Rhizominous	Tordon®	1 pint/ac	Fall, early bud
		Curtail®	2 quarts/ac	Early bud
		Transline®	1 pint/ac	Early bud
		2,4-D	1 quart/ac	Early bud
Hawkweeds	Perennial//Rhizominous	Curtain®	2 quarts/ac	Rosette to bolt
Tansy ragweed	Perennial/fibrous root	Transline®	1 pint/ac	Rosette to bud; fall
Whitetop	Perennial/ Rhizominous	Escort®	03.-0.5 oz/ac	Rosette to pre-bud
		2,4-D	1 quart/ac	Rosette
Cheatgrass	Annual/fibrous root	Glyphosate	2-4 oz/ac	Early –pre-root development
Tall buttercup	Fibrous/Tap rooted	2,4-D	2 quarts/ac	Rosette to bolt
		Clarity	1 quart/ac	
Tall larkspur	Perennial/Tap Rooted	Tordon Escort	1 quart/ac .8-1.6 oz./ac	Rosette to bolt

Note: these are the most commonly used herbicides and rates are examples. In all cases, application rates would be those indicated on herbicide labels or less. On going testing may result in new instructions on rate and target species.

Herbicides, like biological control agents, go through an extensive screening and testing process before they are registered and approved for use, by the U.S. EPA. Initial pesticide registrations with the EPA typically require a minimum of 120 tests, take seven to ten years to complete, and cost between $30 and $50 million. Herbicide labels have the force of law and include safe handling practices, application rates, and practices to avoid undesirable impacts to humans and the environment.

Chemical treatments would include both ground and aerial herbicide applications, in compliance with the mitigation measures listed in this document. Chemical applications would take place at the appropriate time of year for targeted weed species and incorporate environmental considerations such as proximity to raptor nests or other resources of concern. Equipment such as helicopters, trucks, ATVs, horses, backpack sprayers, and other hand held application equipment will be used. Herbicides proposed for use include picloram, 2,4-D, clopyralid, dicamba, glyphosate, imazapyr, imazapic, hexazinone, chlorsulfuron, imazapic, metsulfuron methyl, sulfometuron methyl, and triclopyr. Following the Adaptive Management Strategy, other herbicides permitted by the EPA and registered for use by the Montana Department of Agriculture may be used when they become available, if the herbicide is water soluble and less environmentally persistent than picloram. This would occur after interdisciplinary review and line officer approval.

Surfactant adjuvant would be used in certain situations to increase efficacy, primarily on target species with a waxy cuticle (especially toadflax), or when temperature and humidity are not optimal (but still within label and more locally-prescribed limits) yet other conditions, such as plant phenology, are ideal. Surfactants may be used during period of drought. Surfactants proposed for use will follow the same mitigation measures as picloram. Only those labeled for use in and around water would be used within 50 feet of water, or the edge of sub-irrigated land, whichever distance is greater, or on high run-off areas. Some surfactants are labeled for use in and around water including Activate Plus ®, LI-700 ®, Preference ®, R-11 ®, Widespread® and X-77®.

Areas with aerial applications would also include ground applications, to treat buffer areas and skipped areas. These areas are estimated at 5 to 10 percent of the aerial treatment acres. Based on monitoring, follow-up aerial and ground treatments are expected to occur on third and fifth years after initial treatment, as portions of the dormant seed or root system propagate. Based on previous experience with weed treatments, it is likely that the treatment areas would then enter “maintenance mode” where spot treatments of infestations would continue to occur until weeds are eradicated. Aerial application will not be in designated wilderness areas, research natural areas, or near sensitive area (such as near water or sensitive plants). Sites identified for aerial treatment are either not accessible by roads (previous roads have been decommissioned) or have steep slopes which make the walking difficult.

Improper aerial application will not be allowed. All herbicide applicators, whether Forest Service or contractor employees, will follow label instructions. A field inspector will be on-site during all aerial applications to monitor drift and compliance with label specification.

Ground applied herbicide treatments would occur in areas where there is good access, a manageable size of infestation, and available funding.

Biological Control Treatments –

Existing and newly approved biological controls would be introduced where appropriate. Some of the biological control agents in use are: thistle seed head beetles (*Ceutorhynchus litura*), knapweed seed head gall flies (*Urophora affinis, U.quadrifasciata,* and *Larinus minutus*), knapweed root feeding insect (*Agapeta zoegana*, and *Cyphocleonus achates*); leafy spurge flee beetles (*Aphona czwalilnae* and *A. lacertoa*); toadflax root boring beetles (*Mecinus janthinus*); and toadflax seed head beetles (*Gymnetron linariae* and *Brachyperolus pulicarius*) and a defoliating moth (*Calophasia lunula*). As of yet, only leafy spurge has a biological control agent that can substantially reduce plant density in a wide variety of sites. Sites with both large number of acres (more than 25 to 50 acres) and with weed species that have an effective biological control agent available, will be managed with biological control. Since biological control agents are usually very slow to establish and will never eradicate its host, these sites will need to be contained with the use of herbicides.

Cultural Treatments –

Cultural treatments, such as selective grazing or reseeding, would occur on sites where the native vegetation lends itself to this type of treatment. Four areas were identified, by weed managers, as being appropriate for cultural treatment:

Durham meadow (T6S, R5E, Sec 12) in the Gallatin Canyon would see a change in grazing (from horses to high intensity short duration cattle grazing), followed with herbicide treatments, fertilization and re-seed to native grass (till and drill-seed into old fields);
Gardiner valley (numerous locations) cheat grass and crested wheatgrass would be treated with herbicide and then planted with native grasses (till and drill-seed into old fields);
Re-vegetate (plant with native grasses, shrubs and cottonwoods) an abandon gravel pit (T12S, R5E, Sec 17) after herbicide treatment; and
Plant native grass and forbs after spraying orange hawkweed at Lonesomehurst summer-homes (T13S, R4E, Sec 33) near West Yellowstone.

Most of the other weed sites currently have an adequate source of native plants and do not require additional seeding with native species.

Mechanical Treatments

Mechanical treatments, such as hand pulling, would occur on particularly sensitive areas, or areas of small infestations. Hand pulling is not effective on plants that spread via roots because the soil needs to be excavated repeatedly to remove all root fragments. Sites less than 0.1 acre with non-rhizomatous species and low weed density would be hand pulled. On some sites herbicides will be used in conjunction with pulling to help reduce plant density so that pulling is cost efficient.

Conservation Measures for Threatened & Endangered Species

1. Sheep and goat grazing for weed control purposes would not be used on Gallatin National Forest lands south of Interstate 90 to prevent conflicts with grizzly bears and bighorn sheep.

2. A herder and guard dogs would be present to monitor sheep and goats used for weed control purposes at all times (applies north of I-90).

3. The local District Ranger would be notified within 24 hours of any loss of sheep or goats being used for weed control purposes on the Gallatin National Forest, along with any observations of grizzly bears or wolves in proximity to the sheep or goats (applies north of I-90).

4. Sheep and goats being used for weed control purposes would be removed from the Gallatin National Forest within 24 hours of any grizzly bear or wolf depredations (applies north of I-90).

5. The carcasses of sheep or goats that died while being used for weed control would be removed from the Gallatin National Forest within 24 hours to avoid habituation of grizzly bears or wolves to livestock as carrion (applies north of I-90).

6. Sheep and goats used for weed control would be contained each night within the perimeter of an electric fence (applies north of I-90).

7. Herders of sheep and goats used for weed control purposed would be required to receive training from the U.S. Fish & Wildlife Service, Montana Fish, Wildlife, & Parks, or other authorized agency in the use of hazing techniques to prevent depredations by wolves. Herders would be required to implement those techniques when wolves are known to be in proximity to domestic sheep or goats being used for weed control (applies north of I-90).

8. The herder would be required to comply with the Gallatin National Forest food storage order so that human and livestock/pet foods, refuse, and other attractants were made unavailable to bears (applies north of I-90).

9. Only 8 hours of aerial spraying would be allowed in grizzly bear core habitat within a given Bear Management Subunit each year. Aerial spraying will be coordinated with other administrative uses to prevent recurring helicopter flight within secure habitat.

10. Herbicides would only be applied at concentrations and using techniques that would minimize mortality of native trees and shrubs to protect habitat for bald eagles, lynx, and other species.

11. Picloram will not be used within 50 feet of water bodies, or the edge of subirrigated land, whichever is greater. In watersheds where picloram delivery modeling indicated possible concerns use alternatives such as treating infestations with another appropriate herbicide and /or biological control as appropriate.

12. Herbicides sprayed within 50', or the edge of subirrigated land (whichever is greater) and the high water mark of a water body will be those approved for use near water (e.g. Aqua-Kleen®, Amine 4, Glyphomate®, or Rodeo®). Herbicide application within this zone will occur when winds are <10 mph and blowing away from these areas.

13. On each side of streams and wetland, a 300-foot buffer would be established where aerial applications would not be allowed.

14. No ester formulations of herbicides will be used because of their toxicity to fish.

15. No aerial spraying would be allowed within Zone I and II (800 meters) of an active bald eagle nest from February 1 – August 15.

16. No human activities associated with weed control would be allowed within zone I (<400 meters) of an active bald eagle nest from February 1-August 15, except within 20' of roads that are open for public motorized use.

17. District/Forest wildlife biologists would review and coordinate weed management projects with the District/Forest weed coordinators to identify raptor nesting areas, grizzly bear core habitat, wolf territories, or other critical wildlife areas that may be affected, to ensure the mitigation measures described in this report are implemented properly.

HERBICIDE TOXICITY TO TERRESTRIAL MAMMALS AND BIRDS

Exposure of terrestrial animals to herbicides may result from several actions including direct spray application, ingestion of plants or other items that have been sprayed, grooming, and indirect contact with vegetation that has been sprayed or inhalation of spray (Syracuse Environmental Research Associates, Inc. 1998*a*, page 4-13). Wildlife may spend long periods in contact with contaminated vegetation (Syracuse Environmental Research Associates, Inc. 1998*a*, page 4-16), or ingest contaminated vegetation or prey (Syracuse Environmental Research Associates, Inc. 1998*a*, page 4-17).

Pesticides have been identified as a major cause of mortality for numerous species. Organophosphorus and carbamate insecticides are currently the chemicals most commonly associated with mass mortality of wildlife, especially migratory birds (Vyas 1999). The herbicides proposed for use on the Gallatin National Forest (Table 6) are different chemical compounds. The effects of many herbicides on mammalian and avian wildlife have not been studied in detail, although most herbicides have been tested on laboratory animals (especially rats, mice, rabbits, and dogs). Findings are then extrapolated to wildlife (USDA Forest Service 1992, page III-F-1), which means that conclusions regarding the effects of these chemicals on wildlife are somewhat uncertain. However, risk levels for herbicide use are calculated in a very conservative manner and worst-case exposure scenarios have been studied for most herbicides. Lethal Dose 50 values are used as a measure of toxicity and are defined as the quantity of chemical per unit body weight that would cause lethal effects in 50% of a study population with a single dose. Reported LD50 values for herbicides were sometimes highly variable (Table 6), reflecting differences among studies such as use of different species or exposure techniques, varying sample sizes, etc. Despite this variability in LD50's, data are sufficient to determine that the herbicides proposed for use under the Proposed Action are generally of low toxicity to mammalian and avian wildlife (Table 6). Exposure to extremely high levels of most herbicides through direct ingestion or spraying during laboratory studies often lead to death or a variety of sub-lethal toxic effects including damage/irritation to the nervous system, kidneys, eyes, skin; inhibition of reproduction; and

other problems. However, the doses required to produce such effects were much higher than those wildlife would encounter from application of herbicides in the field even under worst-case scenarios.

In addition to the active ingredients in chemicals used for weed control, commercial herbicide formulations contain various inert ingredients. These ingredients have been placed in 4 categories by the Environmental Protection Agency according to their toxicity (Moore 1987). The categories are: 1) inerts of toxicological concern; 2) potentially toxic inerts/high priority for testing; 3) inerts of unknown toxicity; and 4) inerts of minimal concern. The majority of inerts are currently in category 3, indicating that there is a large degree of uncertainty regarding the effects of inert ingredients. Also largely unknown are the possible synergistic effects of various inert ingredients and pesticides.

The long-term fate of herbicides in the environment is also a concern. Bioaccumulation is the process by which chemicals enter the food chain from the environment, whereas bio-magnification is the increase in concentration of these chemicals from one link in the food chain to the next. The combined effects of these processes means that small concentrations of chemicals can lead to toxic effects, especially for organisms high in the food chain. However, for bio-magnification to occur, the chemical must be long-lived, mobile, and fat-soluble. If a chemical is not long-lived, it will break down before entering the food chain. If it's not mobile, such as when its bonded to soil, it is unlikely that it could be taken up by an organism. If it is water-soluble rather than fat-soluble, it will be excreted by the organism. The herbicides proposed for use in this project (Table 6) appear to be rapidly excreted (LABAT-ANDERSON Inc. 1992, page III-C-32; Syracuse Environmental Research Associates 1998*b*, page 3-7; Syracuse Environmental Research Associates 1999, page 3-5; Syracuse Environmental Research Associates 2001, page 3-6) and do not accumulate in tissues, although data was often limited. Because of this, these herbicides present a low risk for bio-magnification.

Table 6. Toxicity of herbicides proposed for use on the Gallatin National Forest. Data are from [1]*Pesticide Fact Sheets* (PFS), Information Ventures, Inc. (http://infoventures.com/e-hlth/pesticides), [2]*Human Health and Ecological Risk Assessments* (ERA), Syracuse Environmental Research Associates, Inc. (http://www.fs.fed.us/foresthealth/pesticide/risk.htm), [3]Risk Assessment for Herbicide Use in Forest Service Regions 1, 2, 3, 4 and 10 on Bonneville Power Administration Sites, LABAT-ANDERSON, Inc. 1992.

Chemical name (common brand names)	Mammalian toxicity (LD50 in mg/kg body weight)	Avian Toxicity (LD50 in mg/kg body weight)	Risk Assessment
2,4-D (amine form) (Hi-Dep, Weedar 64, Weed RHAP A-4D, Weed RHAP A)	[1]moderate (639 >5,000) [2]low /moderate (100-1800)	[1]low/moderate (472->2,000) [2]low/moderate (300-5,000)	Good data for mammals and birds; birds somewhat less sensitive than mammals; exposure not expected to cause observable adverse signs of toxicity but may lead to eye or skin irritation; exposure at higher than expected levels also affects kidneys, nervous system, and thyroid and may lead to vomiting, diarrhea, and muscle twitches.

Chemical name (common brand names)	Mammalian toxicity (LD50 in mg/kg body weight)	Avian Toxicity (LD50 in mg/kg body weight)	Risk Assessment
Chlorsulfuron (Telar)	[1]nearly nontoxic (<5,000) [3]very slightly toxic (5,545)	[1]nearly nontoxic (<5,000) [3]very slightly toxic (>5,000)	Most data are from experimental mammals, there is some uncertainty about extrapolating conclusions to wildlife; potential for adverse effects to mammals and birds appears to be remote.
Clopyralid (Stinger, Reclaim, Transline)	[1]low (none given) [2]low (>3,000-5,000)	[1]low (none given) [2]low (1,465)	Well studied in experimental mammals but not birds or other wildlife; potential for adverse effects to mammals and birds appears to be remote, given available data.
Dicamba (Banvel, Banex, Trooper)	[1]slightly toxic (566-3,000) [2]low (600->3,000)	[1]nearly nontoxic (673-2,000) [2]low (none given)	Most data are from experimental mammals, there is some uncertainty about extrapolating conclusions to wildlife; toxic effects unlikely for application rates at or above those normally used.
Glyphosate (Roundup, Rodeo, Accord)	[1]nearly nontoxic (none given) [2]low (1,500->5,000)	[1]nearly nontoxic (3,850) [2]low (1,500->5,000)	Good data on mammalian and avian wildlife; toxic effects very unlikely even at highest allowable application rates.
Hexazinone (Velpar, Velpar ULW, Velpar L, Pronone 10G)	[1]nearly nontoxic (none given) [2]low (none given)	[1]nearly nontoxic (3,850) [2]low (2,258)	Most data are from experimental mammals, there is some uncertainty about extrapolating conclusions to wildlife; available data indicate it is unlikely to cause adverse effects to terrestrial species; ingestion of crystals by birds immediately after application may cause reproductive effects or overt signs of toxicity.
Imazapyr (Arsenal, Chopper, Contain)	[1]nearly nontoxic (4,800-5,000) [2]low (none given)	[1]nearly nontoxic (<2,150) [2]low (none given)	Most data are from experimental animals, there is some uncertainty about extrapolating conclusions to wildlife; little data on toxic levels; sufficient data are available to conclude that adverse effects to terrestrial species are unlikely under typical or worst-case cases of exposure.
Metsulfuron methyl (Escort, Ally)	[1]nearly nontoxic (none given) [2]low (>2,000)	[1]nearly nontoxic (<2,150) [2]low (>2,000)	Most data are from experimental mammals, there is some uncertainty about extrapolating conclusions to wildlife; sufficient data are available to conclude that adverse effects to terrestrial species are unlikely under typical or worst-case cases of exposure; may cause weight loss at sub-lethal doses.
Picloram (Tordon, Grazon, Access, Pathway)	[1]low (<950-8,200) [2]low (3,000-5,000)	[1]nearly nontoxic (<2,000) [2]low (>2,000)	Most data are from experimental mammals, there is some uncertainty about extrapolating conclusions to wildlife; adverse effects to mammals or birds are unlikely under typical or worst-case cases of exposure.
Imazapic	[2]low (none given)	[2]low (none given)	Most data are from experimental mammals, there is some uncertainty about extrapolating conclusions to wildlife; larger mammals affected more than smaller, however adverse effects to mammals or birds are unlikely under typical or worst-case cases of exposure.

Chemical name (common brand names)	Mammalian toxicity (LD50 in mg/kg body weight)	Avian Toxicity (LD50 in mg/kg body weight)	Risk Assessment
Sulfometuron mthyl (Oust)	[1]low (<5,000 *ppm*) [2]low (none given)	[1]low (<5,620 *ppm*) [2]low (none given)	Very limited data on birds; observable effects to most mammals & birds not expected; possible reproductive effects to some species although evidence is not conclusive.
Triclopyr (Garlon, Grazon)	[1]slightly toxic (310-713) [2]low (none given)	[1]very low (1,698) [2]low (none given)	Good data for birds and mammals; application rates at or above those normally used not expected to affect terrestrial animals.

SPECIES ASSESSMENT

Gray Wolf (*Canis lupus*)

Population and Habitat Status

Wolves were reintroduced to the Yellowstone area in 1995. The Forest Service is a full partner in implementing the conservation measures outlined in the Federal Register final rule, November 22, 1994. Wolves reintroduced to Yellowstone National Park (YNP) and the Greater Yellowstone Area (GYA), have been designated as a non-essential experimental population in accordance with Section 10 of the Endangered Species Act. The gray wolf historically occupied the Gallatin National Forest, and the Forest is within the Greater Yellowstone Gray Wolf Recovery Area. At the end of 2003, there were an estimated 301 wolves in this area (USFWS et al. 2004, page 1). There are approximately 14 packs whose territories are entirely or partially within the Forest, but only 1-2 packs are known to den on the Forest (J. Fontaine, U.S. Fish & Wildlife Service, personnel communication on 04/28/03).

In the Yellowstone area, wolves feed on elk, deer, moose, bison, and other ungulates, but elk are their primary prey (USFWS et al. 2003, page 12-13). Wolves have also preyed on livestock (USFWS et al. 2003, page 17), resulting in their relocation or lethal removal. Wolves follow big game movements and may concentrate on elk winter ranges or elk calving areas (USDI 1993, pages 6-27 to 6-28). Pups are whelped in a den during the spring (Mech 1970, page 123), and moved to a rendezvous site several months later when they are able to leave the den until they are mobile enough to travel with the pack (Mech 1970, page 146-148).

Wolf territories are variable and may range from 60 to 900 square miles in size. Wolf packs recently reintroduced into YNP initially ranged over an area of 650 square miles (Fritts et al. 1997, pages 22-23). Wolves may occupy a variety of habitats including grasslands, sagebrush steppes, coniferous and mixed forests, and alpine areas. Wolf distribution and habitat use is more closely tied to availability of food (especially ungulate prey) and denning areas than to vegetation cover type. Because of this, there would be overlap between habitat used by wolves and areas treated for weeds.

Elk populations, which are the primary prey for wolves, are not currently limited by weed infestations on the Gallatin National Forest. However, low-to-mid elevation rangelands that have a high risk for infestation by weeds also commonly serve as elk winter ranges (Rice et al. 1997, pages 627-628), and this is the case for elk winter ranges on the Forest. Infestations of weeds such as spotted knapweed can lead to 60-90% decreases in forage production on winter ranges (Rice et al. 1997, page 628), which decreases the number of ungulates that winter ranges can support (Trammel and Butler 1995, page 814).

Table 7. Gray Wolf population and habitat status.

Wolf Activity	Den Site	Rendezvous Site
Packs	Known	Known

Direct, Indirect, and Cumulative Effects Analysis

Effects to gray wolves were analyzed for the area within the Gallatin National Forest boundary. This area was chosen because effects to wolves from project activities are not expected outside this area.

Wolves would be likely to occasionally contact herbicides by dermal absorption following contact with sprayed plants. There is also a very small chance that they could be directly sprayed with herbicide during aerial application. However, the toxicity of herbicides proposed for use is low. Although there is uncertainty involved with the toxicity of some herbicides and inert ingredients, the chances of wolves receiving doses great enough to cause toxic effects would be very low.

Elk forage availability would temporarily decrease in areas treated with herbicides, but would begin recovering within 2-3 years of herbicide treatment (Rice et al. 1997, page 631). Treatments would not be expected to affect elk population trends during this time. Over the long term, weed treatments could be sufficient to maintain elk populations. Therefore, wolves could benefit from this project because it would promote a sustained prey base.

The use of sheep and goats for weed management could lead to possible conflicts with wolves. Wolf depredation can be a problem when commercial sheep grazing operations are located in proximity to areas occupied by wolves (U.S. Fish & Wildlife Service 1987, page 71). This could lead to conditioning of wolves to livestock as food, and lead to conflicts with livestock on adjacent grazing allotments resulting in management removals of grizzly bears. However, grazing of goats and sheep would not be allowed on the Gallatin National Forest south of I-90 due to the potential for conflicts with grizzly bears and bighorn sheep (see Grizzly Bear section of this document). Where it would be allowed north of I-90, the grazing use proposed differs from typical commercial grazing operations in several key ways that would reduce the likelihood of depredations and subsequent management removal of wolves. Goats and sheep would be used in localized areas. Bands of sheep and goats would be much smaller than those typically associated with commercial livestock grazing. Additionally, preventative measures would be applied to lessen the chances of depredation conflicts developing. Herders and guard dogs would be used to monitor herds, and would immediately report any losses of their stock. Sheep and goats would be removed from the Forest if wolf depredations were to occur. Herders would be required to immediately

dispose of any sheep or goat carcasses to prevent attracting wolves, receive training from the U.S. Fish & Wildlife Service or other authorized organization in the use of hazing techniques to prevent depredations by wolves, and to implement those techniques when wolves are known to be in proximity to domestic sheep or goats being used for weed control. Electric fencing would be used to contain sheep and goats at night. Despite such precautions, wolves have preyed upon domestic sheep being used for weed control in the Yellowstone area (Bangs 2003, page 2) with resulting management removal of a wolf, and there is potential for this to occur on the Forest when goats or sheep are used.

Wolves could be displaced by activities such as ground-based herbicide spraying. However, activities would be of relatively short duration during daylight hours, so disturbance or displacement would be very temporary and affect only localized areas. Aerial spraying would be more likely to disturb or displace wolves than ground spraying, but the additive disturbance of this treatment on wolves would be discountable due to the short duration and localized nature of aerial spraying. Weed treatment activities would not disturb wolf denning activities because dens are typically located in inaccessible areas where weed control would be unlikely to occur (J. Fontaine, U.S. Fish & Wildlife Service, personnel communication on 04/28/03).

Cumulative Effects Baseline

A large variety of human activities occur in the analysis area that contribute to the spread of weeds, including livestock grazing, timber harvest, and a wide variety of recreational uses. Forest Service projects such as timber sales and prescribed fires, road maintenance, recreational activities and vehicle use, special use permits (both recreation events and non-recreation), livestock grazing, and summer home residence may also contribute to the spread of weeds. Recently adopted Best Management Practices (Forest Service Manual 2080) for preventing weed spread are incorporated as mitigation measures in project plans, which helps limit weed spread from Forest Service actions.

Weed control using herbicides and other methods is an activity that has been occurring for years in the analysis area, and undoubtedly will continue for many years into the future. Private landowners, county governments, and other state and federal agencies all use herbicides to control weeds although the amount of usage is difficult to quantify.

Elk populations, which provide the bulk of the forage base for wolves in the analysis area, are generally robust. Private land development is probably the main threat to elk populations, but public land winter range is also available. The quality of public lands winter ranges may become more important in the future as private land winter ranges are lost to development. The continued spread of weeds on elk winter ranges would likely decrease forage availability and could ultimately lead to lower elk populations in the future.

Cumulative Effects Analysis

The herbicides proposed for use are water-soluble and do not bio-accumulate, so cumulative toxic effects to wolves resulting from bio-accumulation would not occur. The use of herbicides has been compatible with wolf recovery and is expected to continue to be so in the future.

Isolated cases of disturbance to wolf dens from human activity have occurred in the past (Smith 1998, page 5), but have not affected wolf recovery. Disturbance or displacement of wolves under this alternative would be infrequent and have discountable cumulative effects to wolves.

This project would make an important contribution towards containing the spread of weeds at levels sufficient to sustain elk populations in the analysis area, thereby providing an adequate prey base for wolves in the foreseeable future.

Determination of Effects

I have determined implementation of the proposed Federal Action **is not likely to jeopardize the continued existence of the gray wolf or result in the destruction or adverse modification of critical habitat**. My determination is based on the following rationale:

1. Denning activities would not be disrupted.
2. The project would promote a sustained suitable prey base for wolves.
3. Toxic effects to wolves would be very unlikely to result from herbicide application.
4. Wolf removals due to goat or sheep depredations are not expected occur because of the preventative measures built into the project.

Recommendations For Removing, Avoiding, or Compensating Adverse Effects

There are no additional recommendations.

Grizzly Bear (*Ursus arctos*)

Population and Habitat Status

The grizzly bear was once found throughout much of the lower 48 states west of the Mississippi River. Currently, their distribution is restricted to 5 discreet populations: the Greater Yellowstone Ecosystem in portions of MT, WY, and ID; the Northern Continental Divide Ecosystem in MT; the Cabinet-Yaak area in MT and ID; the Selkirk Mountains in ID and WA; and the North Cascades in WA (Servheen 1993, pages 11-13). The Gallatin National Forest provides important habitat for grizzly bears in the Yellowstone Ecosystem. The Greater Yellowstone Ecosystem grizzly bear population has increased in size and distribution over the past decade, and has now met all recovery criteria (IGBC 2003, page 16). They have expanded their range on the Forest over the past several decades, and most areas of the Forest located south of I-90 are currently occupied habitat (Schwartz et al. 2002, page 209).

Grizzly bears are large omnivores that typically utilize a wide variety of foods. Vegetation such as roots, tubers, bulbs, berries, nuts, and green herbaceous plants are seasonally important to grizzly bears. Additionally, high calorie animal food sources such as ungulates, ground squirrels, carrion, fish, and insects are highly valuable to them when they can be obtained (Servheen 1993, page 7). To utilize such a wide variety of foods, bears use a wide variety of vegetation types spread out over large distances. These vegetation types include

lower elevation sagebrush/grasslands or Douglas-fir stands as well as higher-elevation whitebark pine, lodgepole pine, and Engelmann spruce/subalpine fir.

Because maintaining secure areas with low levels of human disturbance is a key component of grizzly bear habitat management, Amendment 19 to the Gallatin Forest Plan adopted guidance from the Interagency Grizzly Bear Committee Taskforce Report – Grizzly Bear/Motorized Access Management (IGBC 1998) as standards for road density and motorized access within the recovery zone. These standards require that there be no decrease in core areas within each Bear Management Subunit. Core areas are at least 0.3 miles from any open road or trail, where no motorized or high-intensity non-motorized use is allowed during the non-denning period. The Final Conservation Strategy for the Grizzly Bear in the Yellowstone Area provides additional direction for access management, and specifies that reoccurring low-level helicopter flights should not be allowed within core habitat (IGBC 2003, page 39).

Grizzly bear depredations on domestic sheep and goat grazing allotments have long been a source of conflict between humans and bears. The Gallatin Forest Plan (USDA Forest Service 1986, pages G-15, G-16) and Final Conservation Strategy for the Grizzly Bear in the Yellowstone Area (IGBC 2003, page 43) both contain standards addressing this fact. The applicable Forest Plan standards are: 1) the District Ranger will specify in the annual permittee plan of use appropriate measures for removal or destruction of livestock carcasses to avoid habituation of grizzlies to livestock as food; 2) in the event livestock are preyed upon, the following procedures will be used...remove livestock from allotment. The standards from the Conservation Strategy are: 1) no new active commercial livestock grazing allotments will be created inside the primary recovery area; and 2) there will be no increases in permitted sheep animal months inside the primary recovery area from the identified 1998 baseline.

Table 8. Grizzly Bear population and habitat status.

Bear Management Unit	Sub-unit	Visual Sightings	Mortality
Boulder/Slough	#1	yes	Yes
	#2	yes	Yes
Crandall/Sunlight	#1	yes	Yes
Lamar	#1	yes	Unknown
Hellroaring/Bear	#1	yes	Yes
	#2	yes	Yes
Gallatin	#1	yes	Unknown
	#2	yes	Yes
	#3	yes	Yes
Hilgard	#1	yes	Yes
	#2	yes	Yes
Madison	#1	yes	Yes
	#2	yes	Yes
Henry's Lake	#2	yes	Yes
Plateau	#1	yes	Unknown

Direct, Indirect, and Cumulative Effects Analysis

Grizzly bears would be likely to occasionally contact herbicides by ingesting plants that had been sprayed and by dermal absorption following contact with sprayed plants. There is also a very small chance that grizzly bears could be directly sprayed with herbicide during aerial application. However, the toxicity of herbicides proposed for use is low, as are the chances of grizzly bears receiving doses great enough to cause toxic effects. However, this must be qualified by the fact that there is uncertainty regarding the toxicity of some herbicides and inert ingredients.

Mortality of non-target plants in herbicide treatment areas would temporarily reduce spring foraging opportunities for grizzly bears. However, native vegetation would begin to recover and provide forage within 2-3 years of herbicide treatment (Rice et al. 1997, page 631). In the long term, spring foraging opportunities would be improved because treatments would sufficient to maintain native forage plants for grizzly bears.

Grazing by goats and sheep in grizzly bear habitat to favor the growth of native plants could be used under this alternative. Grizzly bears could be attracted to and prey upon these animals. This could result in the conditioning of grizzly bears to livestock as food, and lead to conflicts with livestock on adjacent grazing allotments. Therefore, grazing by sheep and goats would not be allowed on Gallatin National Forest lands south of I-90, which includes all areas on the Forest currently occupied by grizzly bears. This would be in compliance with standards from the Final Conservation Strategy for Grizzly Bears in the Yellowstone Area (IGBC 2003, page 43), which specify only that no new allotments would be created and no animal months would be allocated in the PCA. In the Bridger and Crazy Mountains north of I-90 where goats and sheep could be used, there would be numerous requirements to minimize the potential for bear mortality if bears colonized these areas. Bands of sheep and goats would be much smaller than those typically associated with commercial livestock grazing, and would be used in localized areas. Herders and guard dogs would be used to monitor herds, and would immediately report any depredations. Electric fencing would be used to contain sheep and goats at night. Camps would be subject to the food storage order and herders would be required to immediately dispose of any sheep or goat carcasses to prevent attracting bears. Sheep and goats would be removed from the area immediately if grizzly bear depredations were to occur. Application of these measures would ensure compliance with applicable Gallatin Forest Plan grizzly bear standards (USDA Forest Service 1987, pages G-15, G-16).

Activities such as ground-based herbicide spraying and grubbing would be of short duration in any given spot, so any displacement would last only a few days. Bears could resume use of treated areas shortly thereafter. No aerial spraying is currently proposed within grizzly bear core habitat, although the need for this activity may arise in the future. Aerial spraying of a weed patch would occur once per year, and would be completed in several hours or less. Only 8 hours of aerial spraying within core habitat per BMS per year would be allowed in order to limit disturbance within core habitat. This would be consistent with core habitat management direction from Forest Plan Amendment 19 and the Conservation Strategy, because there would be no reduction in core habitat and there would be no reoccurring low-level helicopter flights over core habitat.

Cumulative Effects Baseline

Cumulative effects to grizzly bears were analyzed for the 15 Bear Management Subunits on the Gallatin National Forest (Boulder Slough #1&2; Crandall/Sunlight #1; Hellroaring/Bear #1&2; Gallatin #1,2, &3; Hilgard #1&2; Lamar #1; Madison #1&2; Henry's Lake #2; and Plateau #1), because BMS's are approximately the average size of a female grizzly bear's home range and contain all necessary seasonal habitat components.

A large variety of human activities occur in the analysis area, many of which may disturb or displace grizzly bears. Grizzly bear access management in the recovery zone is designed to balance these effects by providing core habitat characterized by a low level of human activity that could cause disturbance to bears. The analysis area was 3,319 mi^2, and approximately 2,648 mi^2 or 80% of this was secure habitat (IGBC 2003, page 151). The amount of secure habitat in these BMS's was deemed adequate, because at least that much was present in 1998 when the grizzly bear population achieved recovery goals (IGBC 2003, page 145). The exceptions were the Henry's Lake #2, Gallatin #3, and Madison #2 BMS's that were identified as having potential for improvement (IGBC 2003, pages 43-44).

Threats to several major grizzly bear food sources in the analysis area have been documented. The long-term persistence of whitebark pine trees, whose nuts provide a critical seasonal food source for grizzly bears (Mattson et al. 1990, page 1622), is threatened by blister rust, mountain pine beetle attack, and climate change (Tomback et al. 2001, page 9). Increased development of private lands may decrease habitat availability for ungulate populations, which are more important to bears in the Yellowstone area than to other grizzly populations (IGBC 2003, page 46). Bears may be forced to rely more on herbaceous vegetation if these food sources decline in the future. Weeds have not been implicated as a major threat to grizzly bear forage, but the potential does exist for this to become more of an issue in the future if weeds spread into core habitat and other areas with low access densities that are preferred grizzly bear habitat.

Forest Service projects such as timber sales and prescribed fires, road maintenance, recreational activities and vehicle use, special use permits (both recreation events and non-recreation), livestock grazing, and summer home residence may contribute to the spread of weeds. Recently adopted Best Management Practices (Forest Service Manual 2080) for preventing weed spread are incorporated as mitigation measures in project plans, which would help limit weed spread from Forest Service actions. A large variety of human activities also occur in the analysis area that contribute to the spread of weeds.

Weed control with herbicides is an activity that has been occurring for years in the analysis area, and undoubtedly will continue for many years into the future. Private landowners, county governments, and other state and federal agencies all use herbicides to control weeds.

Cumulative Effects Analysis

The use of herbicides has been compatible with grizzly bear recovery and is expected to continue to be so in the future. The herbicides proposed for use are water-soluble and do not bio-accumulate, so cumulative toxic effects to grizzly bears resulting from bio-accumulation would not occur.

Weed control activities would not alter or other access values in any of the 15 BMS's. Aerial spraying in core habitat could temporarily displace grizzly bears from localized areas. However, cumulative effects resulting from such actions would be discountable given the limitations on aerial spraying in core habitat built into the project, due to their short duration and localized nature. Adjacent areas of core habitat would continue to be managed to provide secure grizzly bear habitat.

The project is not expected to lead to mortality of grizzly bears as a result of goat and sheep grazing or other weed control activities, and therefore would not contribute cumulatively towards overall bear mortality in the Yellowstone Ecosystem.

Implementation of the project would make a small contribution towards maintaining grizzly bear foraging opportunities in the analysis area.

Table 9. Grizzly Bear; Gallatin National Forest Plan Biological Opinion, Incidental Take Statements, Standards.

Standards	Pre-Treatment	During-Treatment	Post-Treatment	Compliance
Incidental Take Statements (1995) In Recovery Zone				
CA (Secure) no decrease	2,648 acres / 80%	2,648 acres / 80%	2,648 acres / 80%	Yes - Aerial treatments in core habitat within limits allowed by Final Conservation Strategy
ORD no increase	N/A	No change in ORD.	N/A	Yes
TRD no increase	N/A	No change in TRD.	N/A	Yes

CA = Core Area or Secure Area, ORD = Open Road Density, TRD = Total Road Density.

Table 10. Grizzly Bear; Gallatin National Forest Plan Standards, and FP Biological Opinion for the Recovery Zone.

Standards	Pre-Treatment	During-Treatment	Post-Treatment	Compliance
Other Plan Standards (Appendix G and H)				
Type of Project				
Range Management				
Protect griz habitat	N/A	No goat/sheep grzing south of I-90 (where bears currently occur).	N/A	Yes
Alter sheep allotments if losses to griz	N/A	No goat/sheep grazing south of I-90. Goats and sheep used for weed control purposes would be removed within 24 hours if grizzly bear depredations occur north of I-90.	N/A	Yes
Monitor griz mortality	N/A	Herder required to notify local District Ranger of any grizzly bear mortalities where grazing used north of I-90.	N/A	Yes
Evaluate new or	N/A	No goat/sheep grazing	N/A	Yes

Standards	Pre-Treatment	During-Treatment	Post-Treatment	Compliance
vacant allotments prior to stocking		south of I-90. Use of goats/sheep for weed control north of I-90 would be coordinated prior to implementation with wildlife biologist to minimize conflicts with grizzly bears.		
Instruct permittee how to dispose of carcasses if losses	N/A	Herders required to dispose of carcasses where grazing allowed north of I-90.	N/A	Yes
FSO in force	N/A	Herders required to comply with Food Storage Order where grazing allowed north of I-90..	N/A	Yes

Table 11. Grizzly Bear; Gallatin National Forest Plan Standards for Management Areas.

Other Plan Standards by MA (see MA desc. for more detail)				
MA14 mixed grass/forest (big game wintering) in griz habitat				
No new sheep allotments	N/A	No new allotments created.	N/A	Yes

Determination of Effects

I have determined implementation of the proposed Federal Action **may affect, but is not likely to adversely affect** the grizzly bear. My determination is based on the following rationale:

1. The project would be in compliance with standards in the Gallatin Forest Plan and Final Conservation Strategy for Grizzly Bears in the Yellowstone Area.
2. Measures would be built into the project to limit the likelihood of bear depredations upon sheep and goats used for weed control, and resulting bear mortality.
3. Toxic effects to grizzly bears from herbicide use are not expected.
4. The project would promote foraging opportunities for grizzly bears by maintaining native vegetation communities.

Recommendations For Removing, Avoiding, or Compensating Adverse Effects

There are no additional recommendations.

Canada Lynx (*Lynx canadensis*)

Population and Habitat Status

On March 24, 2000, the U.S. Fish and Wildlife Service (USFWS) published its determination on the status for the contiguous U.S. distinct population segment of the Canada lynx (*Lynx canadensis*). The lynx is now listed as a "threatened" species in the contiguous United States. In January 2000, the *Canada Lynx Conservation Assessment and Strategy* (LCAS) was published, which establishes conservation measures to conserve lynx habitat and provides management strategies to reduce or eliminate effects to lynx resulting from management activities on federal lands.

Lynx prefer a mosaic of early-successional forest stands for foraging and late-successional forests with deadfall for security cover and denning habitat (Ruggiero et.al. 1994, p. 86). In winter, lynx inhabit the mid to high elevations where snow excludes other predators. Denning habitat occurs most often in subalpine fir forests where there is a high amount of down material (Ruggiero et.al. 1994, p. 89).

Lynx are associated with conifer habitat that supports their primary prey, snowshoe hares. Primary forest types that support snowshoe hare are subalpine fir, Engelmann spruce, Douglas-fir and lodgepole pine. The key component of snowshoe hare habitat is dense understory vegetation. In winter, lynx forage for hares in vegetation that provides high density of young conifer stems or branches that protrude above the snow (Ruediger et al. 2000, p. 1-4 and 1-7). Snowshoe hares appear to avoid clear-cuts and very young stands (Ruediger et al. 2000, p. 1-7). However, landscapes with various age classes, primarily mid to advanced successional stages resulting from burns and clear-cuts that support dense understory vegetation, may be more likely to support high snowshoe hare populations (Ruediger et al. 2000, p. 1-4).

Table 12. Canada Lynx population and habitat status.

Canada Lynx Activity	Project Within Lynx Elevation Zone	Foraging Habitat	Denning Habitat
Known	Yes	No	No

Direct, Indirect, and Cumulative Effects Analysis

Suitable lynx habitat and weed infestations generally do not overlap, because lynx are typically found in dense forested stands in which weeds are not able to compete with native vegetation due to the lack of sunlight. Although approximately 9% of known weeds infestations on the Forest are in subalpine fir habitat types, these are found along roads and in clearcuts that have not yet regenerated enough for weeds to be shaded out, and are unsuitable lynx habitat. Weed treatments in these areas would use herbicides such that mortality of regenerating trees and shrubs would be minimized, and would not affect the potential of the habitat to regenerate to a suitable condition for lynx. One exception is orange hawkweed, which can invade closed-canopy forests and is currently known to occur on one 20-acre site on the Forest. Because its distribution is so limited, treatments of orange hawkweed are not

expected to occur within the next 10-15 years on a scale that could affect lynx or their habitat.

There would be a small chance of disturbance or displacement of lynx resulting from herbicide use, especially aerial spraying. However, these activities would be of short duration and occur in localized areas, and any direct, indirect, or cumulative effects to lynx would be discountable.

Determination of Effects

I have determined implementation of the proposed Federal Action **may affect, but is not likely to adversely affect** the Canada lynx. My determination is based on the following rationale:

1. Suitable lynx habitat and weed treatment areas would generally not overlap.
2. Disturbance and displacement of lynx resulting from herbicide spraying would have discountable effects.

Recommendations For Removing, Avoiding, or Compensating Adverse Effects

There are no additional recommendations.

Bald Eagle (*Haliaeetus leucocephalus*)

Population and Habitat Status

Bald eagle populations in the United States have increased dramatically since the species was listed under the Endangered Species Act in 1978, and have met criteria for removal from the threatened species list. Bald eagles in Montana have mirrored the national trend, increasing from 12 known nest sites in Montana during 1978 (MT Bald Eagle Working Group 1994, page 6) to approximately 330 in 2003 (K. Dubois, Montana Fish, Wildlife, & Parks, personal communication 08/20/2004). There are currently 8 known active nest sites on the Forest, all of which are in the Hebgen and Earthquake Lake area near West Yellowstone. Three of these nests are located in a relatively small area on Horse Butte along Hebgen Lake.

In Montana, bald eagle nest sites are generally distributed around the periphery of lakes and reservoirs $\geq$ 80 acres (32.4 ha) as well as in forested corridors within one mile (1.6 km) of major rivers (MT Bald Eagle Working Group 1994, page 2). In Montana, an annual breeding cycle from initiation of courtship and nest building through fledging of young occurs approximately from February 1-August 15 (MT Bald Eagle Working Group 1994, page 22). Once fledged, young are dependent on adults for 6 to 10 weeks (MT Bald Eagle Working Group 1994, page 3).

Adults may migrate or remain within their ecosystems during the winter. Wintering bald eagles occupy areas near unfrozen portions of lakes and free flowing rivers, or upland areas where ungulate carrion and lagomorphs are available (MT Bald Eagle Working Group 1994, page 4). Bald eagles primarily winter in open water areas of Hebgen and Earthquake Lakes, along with the Madison, Gallatin, and Yellowstone Rivers.

An available prey base may be the most important factor determining the nesting habitat suitability (MT Bald Eagle Working Group 1994, page 2), the nesting density (MT Bald Eagle Working Group 1994, page 2) and the productivity (MT Bald Eagle Working Group 1994, page 2) of bald eagles. Bald eagles are opportunist feeders and will prey on fishes, waterfowl, lagomorphs, and some ground dwelling mammals, as well as ungulate carrion. In the Hebgen Lake area, fish made up the majority of prey items observed obtained by breeding pairs (Stangl 1994, page 73). Ungulate carrion and waterfowl may also have been seasonal food sources (Stangl 1994, page 74).

Bald eagles may be affected by a variety of human activities (MT Bald Eagle Working Group 1994, page 4). Responses of eagles may range from abandonment of nest sites to temporary temporal and spatial avoidance of human activities. Responses may also vary depending on type, intensity, duration, timing, predictability and location of human activities. Individual pairs may respond differently to human disturbances because some birds are more tolerant than others (MT Bald Eagle Working Group 1994, page 4). Generally, eagles are most sensitive to human activities during nest building, egg-laying, and incubation from February 1-May 30 (MT Bald Eagle Working Group 1994, page 22). Human activities during this time may cause nest abandonment and reproductive failure. Once young have hatched, a breeding pair is less likely to abandon the nest. However, eagles may leave the nest due to prolonged disturbances, exposing young to predation and adverse weather conditions (MT Bald Eagle Working Group 1994, page 22).

Management direction for bald eagles was provided by the Montana Bald Eagle Management Plan. This document provides guidelines for managing human activities around bald eagle nest sites (MT Bald Eagle Working Group 1994, pages 22-25). It recommends that human activities should not exceed low intensities (such as dispersed recreation) within Zone I (<400 m of a nest) or zone II (<800 m of a nest) of eagle nests from February 1-August 15. Within zone III (<4 km of a nest), it was recommended that human activity should not reach a level where cumulative effects decrease habitat suitability. Additionally, it was recommended that pesticides should not be used in a manner which pose a hazard to eagles.

Table 13. Bald Eagle population and habitat status.

Bald Eagle Activity	Nest Site	Roost Site	Foraging Habitat
Known	Yes	No	Yes

Direct, Indirect, and Cumulative Effects Analysis

Effects to bald eagles were analyzed for the area within the Gallatin National Forest boundary. This area was chosen because effects to eagles from project activities are not expected outside this area.

Bald eagles would be most likely to contact herbicides around Hebgen and Earthquakes Lakes. This is especially true for the Horse Butte area, where there are numerous weed infestations and 3 nesting pairs of bald eagles. Some herbicides including 2,4-D amine, hexazinone, dicambia, and triclopyr may cause eye irritation or injury, but eagles would be very unlikely to contact these herbicides such that they would experience these effects (such

as through direct spraying). No aerial spraying would be allowed <800 m of an active bald eagle nest, which would prevent the direct spraying of adult birds or chicks in and around their nests. The chances of bald eagles being directly sprayed would otherwise be very small, as there would be considerable disturbance from ground monitoring crews and aircraft associated with aerial spraying. Eagles are a highly mobile species and would likely fly away before being sprayed if they were perched in an aerial spray unit. Eagles may occasionally perch on the ground in treated areas, and could absorb small amounts of herbicide through contact with sprayed vegetation. If an eagle did contact herbicides, the amount of herbicide absorbed would be very low and toxic effects would be unlikely due to the low toxicity of herbicides proposed for use. The uncertainty regarding the toxicity of some herbicides and inert ingredients would add some risk of toxic effects, but this risk would be very low given the protection measures guiding application of herbicides described in the Proposed Action. The herbicides proposed for use do not appear to bio-accumulate or bio-magnify, so the probability of toxic effects to eagles resulting from them eating contaminated prey would also be very low. The project would therefore be in compliance with recommendations from the Montana Bald Eagle Management Plan to not use pesticides in a manner that is hazardous to eagles (MT Bald Eagle Working Group 1994, page 24).

Weed treatments proposed under this alternative would have discountable effects upon bald eagle habitat or their forage base. To protect bald eagle nesting habit, herbicides would be applied only in concentrations where tree mortality would be unlikely to result. Past herbicide use has not been known to kill potential nest trees for bald eagles on the Forest, and this is expected to continue to be the case although isolated cases could occur. Fish populations in major water bodies such as Hebgen and Earthquake Lakes that are the most important to bald eagles would not be affected by herbicide use because protection measures would be applied to prevent mortality of fish and other aquatic species (see list of Conservation Measures). Effects to the bald eagle forage base within the analysis area are not expected.

Because of the high potential for disturbance to nesting eagles from aerial spraying, aerial spraying would not be allowed within zones I or II (<800m) of bald eagle nests. Ground-based human activities associated with the project would not be allowed within zone I (<400 m) of an active nest, except <20' of roadways open to public motorized use (such as the Horse Butte Road #610) where disturbance already occurs. These measures would be in compliance with recommendations for bald eagle nesting territory management (MT Bald Eagle Working Group 1994, pages 22-25) and would effectively prevent disturbance of nesting eagles. Project activities could otherwise lead to the occasional disturbance and displacement of foraging eagles, but these effects would be discountable due to the localized nature of treatments and the availability of alternative foraging locations.

Cumulative Effects Baseline

Weed control with herbicides is an activity that has been occurring for years in the analysis area, and undoubtedly will continue for many years into the future. Private landowners, county governments, and other state and federal agencies all use herbicides to control weeds. Other pesticides including organophosphates and carbamates are also in use and have caused bald eagle mortalities in the analysis area (Greater Yellowstone Bald Eagle Working Group 1996, page 15).

Large diameter trees suitable for nesting are limited along Hebgen and Earthquake Lakes, which are the primary eagle breeding areas in the analysis area. This area is dominated by small-diameter lodgepole pine, whereas most eagle nests occur in larger Douglas-firs. Douglas-fir trees >18" in diameter in the analysis area are currently experiencing heavy mortality due to bark beetle infestation. While many of these trees will persist as snags for years, it could lead to a future shortage of suitable bald eagle nest trees if adequate trees are not recruited to replace them.

The forage base for bald eagles in the analysis area appear stable, and despite the threat of whirling disease fish populations remain robust (Stangl 2000, page IV-17).

A large variety of human activities occur in the analysis area. The human population in the analysis area is growing rapidly. The potential for disturbance and displacement of eagles has therefore also increased. Although private land eagle habitat may be affected more, recreational use of public lands will also continue to cause disturbance problems for eagles in the future. They could also be discouraged from foraging in these areas. Recreational activities currently do not appear high enough to prevent bald eagles from effectively using available habitat. For example, 7 of the 8 known bald eagle nests on Hebgen and Earthquake Lakes successfully fledged a total of 12 chicks during 2003 (USDA Forest Service, unpublished data). Only the Horse Butte nest has been chronically unproductive over the past several years, and a variety of factors besides recreational use may be involved with this nest. Although recreational use does not currently appear to be affecting bald eagles in the analysis area, it could increase beyond some threshold level in the foreseeable future.

Cumulative Effects Analysis

The herbicides proposed for use are water-soluble and do not appear to bio-magnify. Therefore, no toxic cumulative effects to bald eagles are expected under this alternative.

The proposed weed treatments would no direct or indirect effect upon the forage base for eagles, and would therefore not have any cumulative effect. Any mortality of potential or existing nest trees would be rare occurrences, so cumulative impacts to bald eagle habitat are expected to be very low.

There would be some cumulative effects to foraging bald eagles that were displaced due to weed control activities under this alternative, because birds would be displaced to other areas that would likely have other human activities such as fishing and boating. However, these effects foraging eagles resulting from this alternative would be minimal because of the localized, short duration nature of activities.

Table 14. Bald Eagle; management of bald eagle breeding territories.

Guidelines*	Pre-treatment	Post-Treatment	Compliance
Zone I – Nest Site Area; within ¼ mile radius around the nest			
Maintain and protect nest site characteristics including: snags, nest trees, perch trees, roost trees, and vegetative screening	N/A	Herbicides would only be applied at concentrations that would avoid tree mortality.	Yes
Eliminate disturbances	N/A	Yes	Yes-no project activities allowed within zone I from February 1-August 15 except for <20' of roads open to

Guidelines*	Pre-treatment	Post-Treatment	Compliance
			public motorized use.
Existing levels of human activities can continue if the breeding area has at least a 60 percent nesting success, has fledged at least three young during the preceding five years, and has a low potential hazard rating	N/A	N/A	Yes-no project activities allowed within zone I from February 1-August 15 except for <20' of roads open to public motorized use.
Additional human activity should not occur within Zone I from initiation of nesting to one month after hatching (2/1 to 8/15), unless the activity is consistent with bald eagle conservation	N/A	N/A	Yes-no project activities allowed within zone I from February 1-August 15 except for <20' of roads open to public motorized use.
Permanent development and habitat alteration that may negatively affect the suitability of the breeding area should be avoided or prohibited within this zone	N/A	Herbicides would only be applied at concentrations that would avoid tree mortality.	Yes
Zone II – Primary Use Area; within ½ mile radius around the nest			
Maintain habitat components and the ecological integrity of the nesting territory including currently used and potential nesting habitat	N/A	Herbicides would only be applied at concentrations that would avoid tree mortality.	Yes
Minimize disturbances	N/A	N/A	Yes - no aerial herbicide spraying allowed within zones I or II of an active bald eagle nest from February 1-August 15
Eliminate hazards	N/A	No structures or hazards proposed	Yes
Low intensity activities can occur. High intensity activities should not occur during the nesting season (2/1-8/15)	N/A	N/A	Yes - no aerial herbicide spraying allowed within zones I or II of an active bald eagle nest from February 1-August 15
Habitat alterations should be designed and regulated to ensure preferred nesting and foraging habitat characteristics are maintained	N/A	Herbicides would only be applied at concentrations that would avoid tree mortality.	Yes
Permanent developments, which may increase human activity levels during the nesting season, should not be constructed	N/A	No developments proposed	Yes
Zone III – Home Range; all potential foraging habitat within 2 ½ miles around the nest			
Maintain suitable foraging habitat, prey base, perch, and roost sites	N/A	Conservation measures incorporated to protect prey and habitat	Yes
Minimize disturbance within key areas	N/A	N/A	Yes – no defined key areas in site specific mgmt plan.
Minimize hazards	N/A	No structures proposed	Yes
Maintain integrity of the breeding area	N/A	Conservation measures incorporated to protect prey and habitat.	Yes
Human activities should be designed and regulated to minimize disturbance and avoid conflicts with bald eagle key use areas	N/A	Activities generally of short-duration with minimal impacts on any key use areas.	Yes
Habitat alterations should be designed to	N/A	Conservation measures	Yes

Guidelines*	Pre-treatment	Post-Treatment	Compliance
ensure the prey base and important habitat components are maintained or enhanced		incorporated to protect prey and habitat.	
Pesticides should not be used in a manner posing a hazard to bald eagles	N/A	Herbicides proposed for use of low toxicity, not known to bio-accumulate or bio-magnify	Yes
Structures posing a hazard should be located and designed to minimize or avoid risk of injury to bald eagles or their prey	N/A	No structures or hazards proposed	Yes
The Montana Best Management Practices for Forestry can provide guidelines for the preservation of water quality and fish and waterfowl prey base	N/A	N/A	Forestry BMP's do not apply to this type of project.

Determination of Effects

I have determined implementation of the proposed Federal Action **may affect, but is not likely to adversely affect** the bald eagle. My determination is based on the following rationale:

1. Disturbance to nesting bald eagles would be minimized by implementation of the Conservation Measures.
2. Effects to bald eagle habitat and prey base are not expected.
3. Toxic effects to bald eagles from herbicide use as proposed are not expected.

Recommendations For Removing, Avoiding, or Compensating Adverse Effects

There are no additional recommendations.

CONSULTATION

(Document letters and/or phone conversations with the FWS including: names, dates, discussions, conclusions, and other pertinent information. Also, include important contacts with other Federal and State Agency employees.)

1. phone conversation with Joe Fontaine, USFWS MT Field Office, 04/29/03
2. email from Jay Frederick, USFWS MT Field Office, 07/24/03
3. email from Kristi Dubois, MT Fish, Wildlife, & Parks, 08/20/04
4. email from Katrina Dixon, USFWS MT Field Office, 12/01/04

LITERATURE CITATION

Bangs, E. 2003. Gray wolf recovery weekly progress report, week of 7/18/03 to 7/24/03. U.S. Fish & Wildlife Service. Helena, MT. 4 pages.

Fritts, S. H., E. E. Bangs, J. A. Fontaine, M. R. Johnson, M. K. Phillips, E. D. Koch, and J. R. Gunson. 1997. Planning and implementing a reintroduction of wolves to Yellowstone National Park and Central Idaho. Restoration Ecology, Volume 5: 7-27.

Greater Yellowstone Bald Eagle Working Group. 1996. Greater Yellowstone bald eagle management plan: 1995 update. WY Game and Fish Department, Lander WY 825280. 47 pp.

Interagency Grizzly Bear Committee. 1998. Revised Grizzly Bear Committee Taskforce Report – Grizzly Bear/Motorized Access Management. 6 pages.

Interagency Grizzly Bear Committee. 2003. Final Conservation Strategy for the Grizzly Bear in the Yellowstone Area. USDI Fish and Wildlife Service. Missoula, MT. 160 pages.

LABAT-ANDERSON, Inc. 1992. Risk assessment for herbicide use in Forest Service Regions 1, 2, 3, 4, and 10 and on Bonneville Power Administration sites. Arlington, VA. USDA Forest Service Contract # 53-3187-9-30.

Mattson, D., B. Blanchard, and R. Knight. 1990. Food habits of Yellowstone grizzly bears, 1977-1987. Canadian Journal of Zoology. 69: 1619-1629.

Mech, L. D. 1970. The Wolf: The ecology and behavior of an endangered species. University of Minnesota Press. St. Paul, MN. 384 pp.

Montana Bald Eagle Working Group. 1994. Montana Bald Eagle Management Plan. Bureau of Reclamation. Billings, MT. 104 pages.

Moore, J. 1987. Inert ingredients in pesticide products; policy statement. Environmental Protection Agency. FR Doc. 87-8787. 16pp.

Rice, P., J. Toney, D. Bedunah, and C. Carlson. 1997. Elk winter forage enhancement by herbicide control of spotted knapweed. Wildlife Society Bulletin 25: 627-633.

Ruediger, B., J. Claar, S. Gniadek, B. Holt, L. Lewis, S. Mighton, B. Naney, G. Patton, T. Rinaldi, J. Trick, A. Vandehey, F. Wahl, N. Warren, D. Wenger, and A. Williamson. 2000. Canada Lynx Conservation Assessment and Strategy. USDA Forest Service, USDI Fish and Wildlife Service, USDI Bureau of Land Management, and USDI National Park Service. Forest Service Publication #R1-00-53, Missoula, MT. 142 pp.

Ruggiero, L., K. Aubry, S. Buskirk, L. Lyon, W. Zielinski, tech editors. 1994. The Scientific Basis for Conserving Forest Carnivores: American Marten, Fisher, Lynx, and Wolverine in the Western United States. General Technical Report RM-254. Ft. Collins, CO. USDA Forest Service, Rocky Mountain Forest and Range Experiment Station. 184 pages.

Schwartz, C.C., M.A. Haroldson, K. Gunther, and D. Moody. 2002. Distribution of grizzly bears in the Greater Yellowstone Ecosystem, 1990-2000. Ursus 13:203-212.

Servheen. 1993. Grizzly bear recovery plan. USDI Fish and Wildlife Service. Missoula, MT. 181 pages.

Smith, D. 1998. Yellowstone wolf project: annual report, 1997. National Park Service, Yellowstone Center for Resources, Yellowstone National Park, WY. YCR-NR-98-2. 20 pages.

Stangl, J.T. 1994. Effects of monitoring effort and recreational patterns on temporal and spatial activities of breeding bald eagles. Master of Science Thesis. Montana State University, Bozeman, MT. 74 pages.

Stangl, J.T. 2000. Ecology and Management of Bald Eagles on Hebgen and Earthquake Lakes, Gallatin County, MT. USDA Forest Service, Gallatin National Forest, Hebgen Lake Ranger District.

Syracuse Environmental Research Associates, Inc. 1998*a*. 2,4-D: Human Health and Ecological Risk Assessment prepared for the USDA Forest Service. Fayettville, NY. (http://www.fs.fed.us/foresthealth/pesticide/risk.htm)

Syracuse Environmental Research Associates, Inc. 1998*b*. Sulofmeturon methyl (OUST) - human health and ecological risk assessment. Prepared for USDA Forest Service. Fayetteville, NY.

Syracuse Environmental Research Associates, Inc. 1999. Clopyralid (Transline) - human health and ecological risk assessment. Prepared for USDA Forest Service. Fayetteville, NY.

Syracuse Environmental Research Associates, Inc. 2001. IMAZAPIC (Plateau and Plateau DG) – human health and ecological risk assessment. Prepared for USDA Forest Service. Fayetteville, NY.

Trammel, M., J. Butler. 1995. Effects of exotic plants on native ungulate use of habitat. Journal of Wildlife Management 59: 808-816.

Tomback, D., S. Arno, R. Keane. 2001. Whitebark pine communities: ecology and restoration. Island Press, Washington, D.C. 440 pages.

United States Department of the Interior. 1993. Draft EIS for the Reintroduction of Gray Wolves to Yellowstone National Park and Central Idaho. U.S. Fish and Wildlife Service, Helena, MT.

U.S. Fish and Wildlife Service. 1987. Northern Rocky Mountain wolf recovery plan. U.S. Fish and Wildlife Service, Denver, CO. 119 pages.

U.S. Fish and Wildlife Service. 2004. Threatened, Endangered, and Candidate Species for the Gallatin National Forest, 09/14/2004. Montana Field Office, Helena, MT. 2 pp.

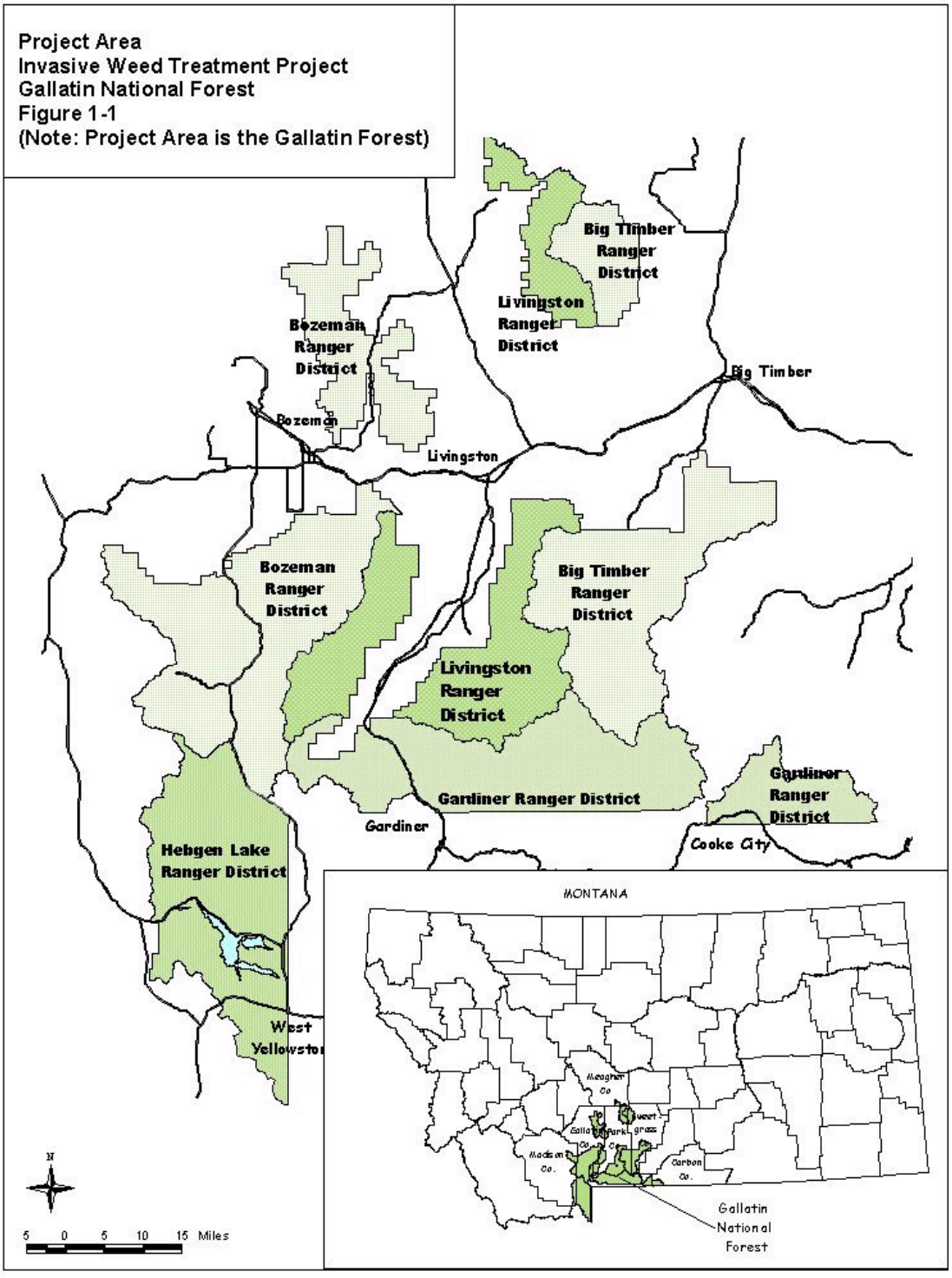
U.S. Fish and Wildlife Service, Nez Perce Tribe, National Park Service, and USDA Wildlife Services. 2003. Rocky Mountain Wolf Recovery 2002 Annual Report. T. Meier, ed. USFWS, Ecological Services, 100 N Park, Suite 320, Helena, MT. 64 pp.

U.S. Fish and Wildlife Service, Nez Perce Tribe, National Park Service, and USDA Wildlife Services. 2004. Rocky Mountain Wolf Recovery 2003 Annual Report. T. Meier, ed. USFWS, Ecological Services, 100 N Park, Suite 320, Helena, MT. 65 pp.

USDA Forest Service. 1987. Gallatin National Forest - Forest Plan. Bozeman, MT.

USDA Forest Service. 1992. Risk assessment for herbicide use in Forest Service Regions 1, 2, 3, 4, and 10 and on Bonneville Power Administration Sites. USDA Forest Service Contract #53-3187-9-30.

Vyas, N. 1999. Factors influencing estimation of pesticide-related wildlife mortality. Toxicology and Environmental Health, 15: 186-191.


Project Area
Invasive Weed Treatment Project
Gallatin National Forest
Figure 1-1
(Note: Project Area is the Gallatin Forest)
Big Timber Ranger District
Livingston Ranger District
Bozeman Ranger District
Big Timber
Bozeman
Livingston
Bozeman Ranger District
Big Timber Ranger District
Livingston Ranger District
Gardiner Ranger District
Gardiner Ranger District
Gardiner
Cooke City
Hebgen Lake Ranger District
West Yellowstone
MONTANA
Meagher Co.
Sweet grass Co.
Gallatin Co.
Park Co.
Madison Co.
Carbon Co.
Gallatin National Forest
N
5 0 5 10 15 Miles

United States Department of the Interior

FISH AND WILDLIFE SERVICE

ECOLOGICAL SERVICES
MONTANA FIELD OFFICE
100 N. PARK, SUITE 320
HELENA, MONTANA 59601
PHONE (406) 449-5225, FAX (406) 449-5339

File: M19 Gallatin National Forest (I)

February 4, 2005

Rebecca Heath, ~~Forest~~ Supervisor
Gallatin National Forest, Supervisor's Office
10 East Babcock
P.O. Box 130
Bozeman, Montana 59771

Dear Ms. Heath:

This is in response to your January 12, 2005 request for U.S. Fish and Wildlife Service (Service) review of the biological assessment for federally listed threatened and endangered species regarding the effects of the proposed Noxious Weeds and Invasive Species Control Project. The project is located on lands within the Gallatin National Forest (Forest) in portions of Carbon, Gallatin, Madison, Meagher, Park and Sweet Grass Counties in Montana.

The proposed action involves weed control on 13,260 acres of the Forest. Treatment would include ground herbicide application, aerial herbicide application, biological control, pulling, and grazing. Implementation would occur over a 5 to 15 year period. Not all acres would be treated every year and acres treated would depend on funding and a priority rating system. There are several conservation measures proposed to minimize impacts to listed species and their habitat.

The Service has reviewed the biological assessment and concurs with the determination that the proposed action is not likely to adversely affect the threatened grizzly bear (*Ursus arctos horribilis*), the threatened Canada lynx (*Lynx canadensis*) or the threatened bald eagle (*Haliaeetus leucocephalus*). The Service acknowledges the not likely to jeopardize the continued existence determination for the nonessential experimental gray wolf (*Canis lupus*). Therefore, pursuant to 50 CFR 402.13 (a), formal consultation on the species referenced above is not required.

The Service bases its concurrence on the information and analysis in the biological assessment and discussions with Andy Pils and Marion Cherry, biologists on the Forest. Toxic effects to grizzly bears from herbicide use as proposed are not expected. Sheep or goat grazing for weed control would not occur within grizzly bear occupied habitat, which is the Forest south of I-90. The proposed project would be in compliance with the Forest Plan and the Final Conservation Strategy for grizzly bears in the Yellowstone area. Weed treatment areas and suitable lynx habitat would generally not overlap. Toxic effects to bald eagles from herbicide use as proposed are not expected. No aerial spraying would be allowed within zones I and II of an active bald eagle nest from February 1 to August 15. No human activities associated with weed control

would be allowed within zone I of an active bald eagle nest from February 1 to August 15. Project effects on grizzly bears, Canada lynx and bald eagles would be insignificant and discountable.

If the final plan is changed so as to have effects on threatened or endangered species other than those described in the biological assessment, a revised biological assessment will be necessary. The Service will then issue a letter of concurrence/non-concurrence on the revised biological assessment.

We appreciate your efforts to ensure the conservation of threatened and endangered species as part of your responsibilities under the Endangered Species Act, as amended. If you have questions or comments related to this issue, please contact Katrina Dixon or me at 406-449-5225.

Sincerely,

R. Mark Wilson

R. Mark Wilson
Field Supervisor

Appendix G – Aerial Spray Recommendations / Drift Model Results

The following recommendations were taken from Appendix F of the Lolo National Forest Big Game Winter Range and Burned Area Weed Management Final EIS (USFS. 2001b) and from Aerial Herbicide Application for Noxious Weed Control in Northern Region (Kulla, A. 2003).

Aerial Spray Recommendations

The treatment block should be marked with flagging to mark the block corners or clearly described and reviewed with applicator. It would be desirable to have a GPS system on board to record helicopter swaths, position, and boom on and off times and location.

In canyon areas, winds should follow the typical diurnal pattern of upslope during the day and down slope during the night. These diurnal winds result from heating and cooling of the surface. Clear skies with solar radiation reaching the surface during the day cause up canyon and upslope winds. Cooling that occurs after sunset generates upslope or drainage winds. Given that waterways/riparian areas are often located in the bottom of canyon areas, it is essential to avoid drift down canyon and downslope. Down canyon and downslope winds will likely occur on clear days following daytime hours. To prevent spray from drifting down canyon/downslope, winds should be up canyon and upslope. Also, inversion can result in spray drifting off site; winds indicate that an inversion is not present.

Avoid spray drift impacting non-target sites by taking the following steps:

- When treating next to sensitive areas spray in the morning when up canyon and upslope winds are well established and blowing up canyon (most sensitive areas are down canyon). The specific time will need to be determined by real-time weather monitoring.
- Maintain boom pressure at less than 40psi.
- Monitor spray pressure during flight, since changes in pressure can change the application rates and may change the drop size.
- Use nozzles designed for medium to coarse droplet size (240 to 400 microns)
- Use drift agent to help maintain large droplet size.
- Check nozzles and review calibration with pilot.
- Begin the first swath 300 feet from any sensitive area.
- Mark boundaries so they are clearly understood by the pilot. Fly area with pilot prior to treatment to verify location. Use GPS to document boundaries and record treatment flight paths.
- Monitor treatment boundaries next to sensitive areas with spray deposit cards to detect any possible drift. Train people in how to handle the cards, interpret the cards (many things can contaminate the cards such as dew, moisture from hands, insects) and also document results. Card lines should also be placed in treated areas under full spray to serve as a reference.
- Monitor and record weather in the area. The weather should be monitored in real time for operational control and to help with the post-spray analysis. Strive for winds from 3 to 6 miles per hour. Don't treat if rain is predicted within next 24 hours.
- Conduct Forest Service Cramer-Barry-Grim (FSCBG) or AGDISP computer models to evaluate drift potential and to develop operational and drift mitigation measures prior to treatment.

AGDISP Spray Dispersion Model Predictions

AGDISP model predictions were conducted by Harold Thistle, Ph.D., USDA Forest Service, Morgantown, WV to assist in developing aerial spray strategies for proposed applications to control noxious weeds on the Gallatin National Forest. The predictions can be used to do the following:

- Plan operational methodologies.
- Determine size of buffer strips to prevent or minimize sensitive area contamination
- Decide under which wind and other atmospheric conditions to conduct aerial spraying

Three commonly used aircrafts in Western Montana are the: Bell 47 Soloy, Bell 206BIII, and Hiller 12E. Table G-1, 2, and 3 lists the AGDISP model inputs.

Table G-1: Spray Conditions— AGDISP Model Inputs for Hiller 12E

Release Height – 10 and 25 Feet Above Ground
Operating Speed 40 mph
Formulation Tordon/Picloram
Application Rate 2 gal/acre
Swath Width 40 feet
Temperature 70 deg. F.
Relative Humidity 60%
Wind Speed 6mph
Nozzle Vertical Distance -8.70 feet
Nozzle Type and Orientation CP/0 degrees
Number of Nozzles 29
Rotor Diameter 35.43 feet
Nozzles Evenly spaced over 100% of the boom
Wind Directions Crosswind, 45 degrees (where the direction of a north wind is 0 degrees)

Table G-2: Spray Conditions— AGDISP Model Inputs for Bell 206BIII

Release Height – 10 and 25 Feet Above Ground
Operating Speed 80 mph
Formulation Tordon/Picloram
Application Rate 2 gal/acre
Swath Width 45 feet
Temperature 70 deg. F.
Relative Humidity 60%
Wind Speed 6mph
Nozzle Vertical Distance -9.01 feet
Nozzle Type and Orientation TeeJet D4-46/0 degrees
Number of Nozzles 35
Rotor Diameter 33.37 feet
Nozzles Evenly spaced over 100% of the boom
Wind Directions Crosswind, 45 degrees (where the direction of a north wind is 0 degrees).

Table G-3: Spray Conditions— AGDISP Model Inputs for Bell 47 Soloy

Release Height – 10 and 25 Feet Above Ground
Operating Speed 50 mph
Formulation Tordon/Picloram
Application Rate 2 gal/acre
Swath Width 45 feet
Temperature 70 deg. F.
Relative Humidity 60%
Wind Speed 6mph
Nozzle Vertical Distance -8.07 feet
Nozzle Type and Orientation D8 Jet/45 degrees
Number of Nozzles 16
Rotor Diameter 37.17 feet
Nozzles Evenly spaced over 100% of the boom
Wind Directions Crosswind, 45 degrees (where the direction of a north wind is 0 degrees)

Summary from 5 simulations showing the amount of expected herbicide (oz/acres) at 100 and 300 feet intervals. The application rate is 2 gallons per acre.

Feet downwind	G1 – 10 FT oz/ac	G1 - 25 FT oz/ac	G2 - 10 FT oz/ac	G2 - 25 FT oz/ac	G3 - 10 FT oz/ac	G3 - 25 FT oz/ac
100 FT	0.176	0.510	0.643	0.552	0.552	0.913
300 FT	0.006	0.044	0.083	0.114	0.096	0.206

Modeling runs demonstrate that:

- Most of the spray is deposited in the treatment block;
- There would be essentially no deposition in the sensitive areas with a buffer of 300 feet.