

## APPENDIX A

### BEST MANAGEMENT PRACTICES

#### Idaho Forest Practices Act

##### Section 060. Use of Chemicals and Petroleum Products.

- 03. Licensing
- 04. Maintenance of Equipment
  - a. Equipment used for transportation, storage, or application of chemicals shall be maintained in leakproof condition.
  - b. Storage in accordance with Rules of the Idaho Pesticide Law and IDAPA 02.03.03
- 05. Mixing
  - a. When water is used in mixing chemicals:
    - i. Provide an air gap or reservoir between the water source and the mixing tank.
    - ii. Use uncontaminated tanks, pumps, hoses, and screens to handle and transfer mix water for utilization in pesticide operations.
  - b. Mixing and landing areas:
    - i. Mix chemicals and clean tanks and equipment only where spills will not enter any water source or stream.
    - ii. Landing area shall be located where spilled chemicals will not enter any water source or stream.
    - iii. Rinsate and wash water should be recovered and used for make-up water, be applied to the target area, or disposed of according to state and federal laws.
- 07. Ground application with power equipment
  - a. With exception of pesticides approved for aquatic use and applied according to labeled directions, when applying pesticide, leave at least twenty-five feet untreated on each side of all Class I streams, flowing Class II streams, and areas of open water.
- 08. Hand application
  - a. Apply only to specific targets;
  - b. Keep chemicals out of all water sources or streams.
- 09. Limitations of applications
  - a. Chemicals shall be applied in accordance with all limitations and instructions printed on the product registration labels, supplemental labels, and other established by regulation of the director.
  - b. Do not exceed allowable rates.
  - c. Prevent direct entry of chemicals into any water source or stream.
- 10. Daily Records of Chemical Applications
  - a. When pesticides are applied on forest land, the operator shall maintain a daily record of spray operations which includes:
    - i. Date and time of day of application.
    - ii. Name and address of owner of property treated.
    - iii. Purpose of application.

- iv. Contractor's name or applicator's name for ground application.
  - v. Location of project (section, township, range and county).
  - vi. Air temperature (hourly).
  - vii. Wind velocity and direction (hourly).
  - viii. Pesticides used including trade or brand name, EPA product registration number, mixture, application rate, carrier used, and total amounts applied.
- d. Records retained for three years.
11. Container disposal.

Chemical containers shall be: cleaned and removed from the forest and disposed of in a manner approved by the director in accordance with applicable local, state and federal regulations; or removed for reuse in a manner consistent with label directions and applicable regulations of a state or local health department. Open burning of containers is prohibited.

12. Spills.

Spills shall be reported and appropriate cleanup action taken in accordance with applicable state and federal laws and rules and regulations.

- a. All chemical accidents and spills shall be reported immediately to the director.
- b. If chemical is spilled, appropriate procedures shall be taken immediately to control the spill source and contain the released material.
- c. It is the applicator's responsibility to collect, remove, and dispose of the spilled material in accordance with applicable local, state and federal rules and regulations and in a manner approved by the director.

13. Misapplications.

Whenever chemicals are applied to the wrong site or pesticides are applied outside of the directions on the product label, it is the responsibility of the applicator to report these misapplications immediately to the director.

## **Soil and Water Conservation Practices Handbook (FSH 2509.22) 13**

### **Vegetation Manipulation**

#### **PRACTICE: 13.07 – Pesticide Use Planning**

**OBJECTIVE:** To incorporate water quality and hydrologic considerations into the Pesticide Use Planning Process.

**EXPLANATION:** The pesticide use planning process will be used to identify problem areas and the objectives of the project, establish the administrative controls, identify treatments and preventive measures, and incorporate the hydrologic considerations contained in SWCP 13.08 through 13.13. The NEPA process addresses these considerations in terms of impacts, mitigation measures, and alternative treatment measures. Project work and safety plans specify management direction.

Factors considered in pesticide selection are: purpose of the project, application methods available, target species, timing of treatment, pest location, size of treatment area, and need for repeated treatment. Practicability of application considers: registration restrictions, form and method of application, topographic relief and areas to be avoided, and social acceptance of the project. The degree of risk considers: hazard to humans, method of application, transportation and handling hazards, carriers needed, and chemical persistence.

**IMPLEMENTATION:** The interdisciplinary team evaluates the project in terms of potential site response, potential social and environmental impacts, mitigating measures needed to protect water quality, and the need and intensity of monitoring and evaluation. The responsible Line Officer then prepares the necessary NEPA documentation, Project Plan and Safety Plan. Depending on the pesticide use, (FSM 2151.04) the Forest pesticide-use coordinator or Integrated Pest Management Working Group or regional IP-MWG reviews the documents along with the Pesticide-use Proposal, form FS-2100-2, and makes recommendations for or against approval of the project.

**REFERENCES:** NFMA; NEPA; FSM 2150 and 2323; State Hazardous Waste Management Plans; see references in “Best Management Practices” Definition 05—2 and 3.

**PRACTICE: 13.08 – Apply Pesticides According to Label and EPA Registration Directions**

**OBJECTIVE:** To avoid water contamination by complying with all label instructions and restrictions.

**EXPLANATION:** Label directions for each pesticide are detailed and specific, and include legal requirements to use.

**IMPLEMENTATION:** Constraints identified on the label and other legal requirements of application are incorporated into project plans and contracts. Responsibility for ensuring that label directions and other applicable requirements are followed rests with the Forest Supervisor or designate such as the Forest Pesticide Use Coordinator. For contracted projects, it is the responsibility of the Contracting Officer to ensure that label directions and all other requirements are followed.

**REFERENCES:** FSM 2150; see references in **Best Management Practice** Definition (05—2 and 3).

**PRACTICE: 13.09 – Pesticide Application Monitoring and Evaluation**

**OBJECTIVE:** To determine and document that pesticides have been applied safely and to provide an early warning for any contamination of water or non-target areas or resources.

**EXPLANATION:** This practice provides feedback on the placement accuracy, application amount, and any water contamination that might occur from pesticide use, so as to minimize or eliminate hazards to non-target areas or resources. Monitoring and evaluation methods include spray cards, dye tracing, and direct measurement of pesticide in or near water. Type of pesticide, equipment, application difficulty, public concern, beneficial uses, monitoring difficulty, availability of competent laboratory analysis and applicable federal, State, and local laws and regulations are factors considered when determining the monitoring and evaluation needs.

**IMPLEMENTATION:** The monitoring and evaluation of pesticide application is a component of SWCP 11.02. The need for a monitoring plan is identified during the Pesticide Use Planning Process/NEPA process. If determined necessary, this monitoring and evaluation plan will consider the same items as in SWCP 11.02. A technical staff familiar in pesticide monitoring will evaluate and interpret the monitoring results in terms of compliance, State water quality standards and adequacy of project specifications.

**REFERENCES:** FSM 2150; see references in **Best Management Practice** Definition (05—2 and 3).

**PRACTICE: 13.10 – Pesticide Spill contingency Planning**

**OBJECTIVE:** To reduce contamination of water from accidental pesticide spills.

**EXPLANATION:** A contingency plan that contains a predetermined organization and immediate actions to be implemented in the event of a hazardous substance spill will be prepared. The plan lists notification requirements, time requirements for notification, how spill will be handled, and who will be responsible for clean-up. Factors considered for each spill are: specific substance spilled, quantity, toxicity, proximity of spill to waters, and the hazard to life, property and the environment.

**IMPLEMENTATION:** The Pesticide Spill Contingency Plan will be incorporated into the Project Safety Plan. The NEPA process will provide the means for including public and other agency involvement in plan preparation. The plan will list the responsible authorities.

**REFERENCES:** SWCP 11.07; Pesticide Storage, Transportation, Spills, and Disposal Handbook (FSH 2109.12); FSM 6740, 7442, 7443, and 7460; Oil and Hazardous Substances Pollution contingency Plan for EPA Region 8 and 10, 7/26/85; R1 and R4 Emergency and Disaster Plan; see references **Best Management Practice** Definition (05—2 and 3).

**PRACTICE: 13.11 – Cleaning and Disposal of Pesticide Containers and Equipment**

**OBJECTIVE:** To prevent water contamination and risk to humans from cleaning and disposal of pesticide containers.

**EXPLANATION:** The cleaning and disposal of pesticide containers and equipment must be done in accordance with Federal, State, and local laws, regulations, and directives, and in a manner which will safeguard public health, the beneficial uses of water, aquatic organisms, and wildlife. Containers are rinsed three times, the rinse water applied on the project area as soon as practical, and the containers taken to the designated disposal site. Application equipment is also rinsed and rinse water applied to the project site before the equipment is moved from the project area.

**IMPLEMENTATION:** when the pesticide is applied by In-Service personnel, the Forest or District Pesticide Use Coordinator will locate proper rinsing and disposal sites, and will arrange for container disposal in an approved disposal site. When the pesticide is applied by a contractor, the contractor is responsible for proper clean-up and container disposal in accordance with label directions and Federal, State, and local laws.

**REFERENCES:** SWCP 11.07; Pesticide Storage, Transportation, Spills, and Disposal Handbook (FSH 2109.12); FSM 6740, 7442, 7443, and 7460; Oil and Hazardous Substances Pollution contingency Plan for EPA Region 8 and 10, 7/26/85; R1 and R4 Emergency and Disaster Plan; see references **Best Management Practice** Definition (05—2 and 3).

**PRACTICE: 13.12 – Protection of Water, Wetlands, and Riparian Areas During Pesticide Spraying**

**OBJECTIVE:** To minimize the risk of a pesticide entering surface or subsurface waters or affecting riparian areas, wetlands, or other non-target areas.

**EXPLANATION:** When applying pesticides, an untreated buffer strip will be left alongside surface waters, wetlands, and riparian areas. Factors considered in establishing buffer strip widths beyond minimums established by FSM and NEPA documents are: beneficial water uses, adjacent land use, rainfall, temperature, wind speed, wind direction, terrain, slope, soils and geology, vegetative type, and aquatic life. Other considerations include: persistence mobility, toxicity, and formulation of the pesticide, method of application, equipment used, spray pattern, droplet size, application height, and application pattern.

**IMPLEMENTATION:** Protected areas will be identified and mapped by an interdisciplinary team and the Forest Pesticide Use Coordinator during the NEPA process. Protection of untreated areas is the responsibility of the project supervisor for In-Service projects and the Contracting Officer for contracted projects. The certified commercial applicators are briefed about location of protected areas. These areas are flagged or otherwise marked when necessary to aid in boundary identification.

**REFERENCES:** FSM 2526, 2527, 2245, and 2150; see references in **Best Management Practice** (05—2 and 3).

**PRACTICE: 13.13 – Controlling Pesticide Drift During Spray Application**

**OBJECTIVE:** To minimize the risk of pesticide contaminating non-target areas.

**EXPLANATION:** Pesticide spray applications will be accomplished according to a prescription that specifies the following: areas to be left untreated, buffer areas, type of spray and associated materials, equipment and method to be used, droplet size, spray height, application pattern, flow rate, terrain and meteorological consideration. Hand spraying, with less associated risk, will have fewer application restrictions for drift than aerial spraying.

**IMPLEMENTATION:** The prescription is prepared by an interdisciplinary team and the Forest or District Pesticide Use Coordinator during the NEPA process. The Line Officer is responsible for designating a project supervisor who is responsible for ensuring that the prescription is followed during application and for terminating application if the standards are exceeded.

**REFERENCES:** FSM 2150 and 2245; SWCP 13.12; see **Best Management Practice** Definition (05—2 and 3).

#### **OTHER BMPS**

- A spill cleanup kit will be available whenever pesticides (herbicides) are transported or stored.
- A spill contingency plan will be developed prior to all herbicide applications. Individuals involved in herbicide handling or application will be instructed on the spill contingency plan and spill control, containment, and cleanup process.
- Herbicide applications will only treat the minimum area necessary for control of noxious weeds.
- No spraying will occur when wind velocity exceeds 6 miles per hour or as specified on the label.
- Do not spray if precipitation is occurring or is imminent.
- Do not spray if air turbulence is sufficient to affect the normal spray pattern.



**FOREST SERVICE MANUAL  
NORTHERN REGION (REGION 1)  
MISSOULA, MT.**

**FSM 2000 – NATIONAL FOREST RESOURCE MANAGEMENT**

**ZERO CODE 2080 – NOXIOUS WEED MANAGEMENT**

**Supplement No.:** R1 2000-2001-1

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Approved: KATHY A. MCALLISTER  
Acting Regional Forester

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<b>New Document(s):</b>	2080	16 Pages
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**Digest:**

	This supplement implements an Integrated Weed Management approach for management of noxious weeds on National Forest System lands in Region 1.
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## **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 – MANAGEMENT OF NOXIOUS WEEDS.**

### **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. Recommended Objectives and Associated Practices.

(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 travelling 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.

## APPENDIX B

### HANDLING OF HERBICIDES AND SPILL PREVENTION PLAN

#### IN CASE OF SPILLS

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 shovel
- A broom
- 10 pounds of absorbent material or the equivalent in absorbent pillows
- A box of large plastic garbage bags
- Rubber gloves
- Safety goggles or safety glasses
- Protective overalls or apron
- Rubber boots

The following information will be reviewed and be available to all personnel involved in handling of herbicides:

- **The herbicide label and applicable Material Safety Data Sheets (MSDS).**
- From the EPA guide “*Applying Pesticides Correctly: A Guide for Private and Commercial Applicators*,” the section entitled “Clean Up of Pesticide Spills” (see project file).
- From the Northern Region Emergency and Disaster Plan, the section entitled “*Hazardous Materials Releases and Oil Spills*” (see project file).
- Idaho Pesticide Applicators Training Manual (2002)

#### PROCEDURES FOR MIXING, LOADING AND DISPOSAL OF HERBICIDES

- All mixing of herbicides will occur outside of riparian habitat conservation areas (RHCA) as outlined in Table 1.
- Dilution water will be added to the spray container prior to addition of the spray concentrate.
- 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 herbicides that can be reasonably used in a day.
- During mixing, mixers will wear goggles or face shield, rubber gloves, rubber boots and protective overalls or apron.
- All empty containers will be triple rinsed and the rinsate disposed of by spraying near the application site at rates that do not exceed those on the spray site.
- All unused herbicide will be stored in a locked building in accordance with herbicide storage regulations contained in Forest Service Handbook 2109.13.
- All empty and rinsed herbicide containers will be punctured and either disposed of in a sanitary landfill, or recycled through an approved container recycling program such as CROP, a joint venture between ISDA and the agricultural chemical industry.
- Empty and rinsed containers being held for recycling must be stored in an approved herbicide storage area, and be labeled with the date triple rinsing was completed.

**Table 1- 1 Riparian Habitat Conservation Areas (RHCAs) Categories and Descriptions**

Category	Type	Description
Category 1	Fish bearing streams	RHCAs consist of the stream and the area on either side of the stream extending from the edges of the active channel to the top of the inner gorge, or to the outer edges of the 100 year floodplain, or to the outer edges of the riparian vegetation, or 300 feet slope distance (600 feet, including both sides of the stream channel), whichever is greatest.
Category 2	Permanently flowing non-fish bearing streams	RHCAs consist of the stream and the area on either side of the stream extending from the edges of the active channel to the top of the inner gorge, or to the outer edges of the 100 year floodplain, or to the outer edges of the riparian vegetation, or 150 feet slope distance (300 feet, including both sides of the stream channel), whichever is greatest.
Category 3	Ponds, lakes, reservoirs and wetlands greater than 1 acre	RHCAs consist of the body of water or wetland and the area to the outer edges of the riparian vegetation, or to the extent of the seasonally saturated soil, to the extent of moderately and highly unstable areas, or 150 feet slope distance from the edge of the maximum pool elevation of constructed ponds and reservoirs or from the edge of the wetland, pond or lake, whichever is greatest.
Category 4	Seasonally flowing or intermittent streams, wetlands less than 1 acre, landslides, and landslide-prone areas	This category includes features with high variability in size and site-specific characteristics. At a minimum the interim RHCAs must include: <ol style="list-style-type: none"> <li>the extent of landslides and landslide-prone areas;</li> <li>the intermittent stream channel and the top of the inner gorge;</li> <li>the intermittent stream channel or wetland and outer edges of the riparian vegetation</li> <li>the area from the edges of the stream channel, wetland, landslide, or landslide prone area to a distance of 100 feet slope distance.</li> </ol>

## **CLEAN UP OF PESTICIDE SPILLS**

### **Minor Spills**

- 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 or soil. Use absorbent material such as 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.
- Do not let anyone enter the area until the spill is completely cleaned up.

### **Major Spills**

- The cleanup of a major spill may be too difficult for you to handle, or you may not be sure of what to do.
- Notification and reporting requirements as outlined in this section will be followed in the unlikely event of a serious spill.

## **Emergency Response Numbers for Herbicide Spills**

CHEMTREC (800) 424-9300

Idaho Emergency Response Division (800) 632-8000

Rocky Mountain Poison Control Center – 800-525-5042 (24 hour); 303-629-1123 (24 hour).

## **HAZARDOUS MATERIALS RELEASES AND OIL SPILLS**

(Excerpted from the *Northern Region Emergency and Disaster Plan*)

**AUTHORITY:** Comprehensive Environmental Response, Compensation, and Liability Act (CER-CLA); 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, injecting, escaping, leaching, dumping, or disposing into the environment.

Releases that do not 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 the release.

Only emergency release response and reporting is covered by this direction. Appropriate RO staff specialists 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 its 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 EMPLOYEE(S) ENCOUNTERING A HAZARDOUS MATERIALS EMERGENCY OR OIL SPILL IS COMPLETE 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 or spill, but may provide support services as directed by an authorized Federal On-Scene Coordinator (OSC) or other State or local authorized 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 OF 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 any spilled material;
- Avoid inhaling fumes, smoke, and vapors even if no hazardous materials are involved;
- Do not assume that gases or vapors are harmless because of lack of smell; and,
- Do not smoke, and remove all ignition sources.
- Do not attempt rescue or mitigation until material has been identified and hazards and precautions noted.

## **Reporting**

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:  
Other chemical data:

4. Known health risks:

5. Appropriate precautions if known:

6. Source and cause of release:

7. Estimate of quantity released: 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:

For transportation related incidents, also report:

11. Name and address of carrier:
12. 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.*

## APPENDIX C



ARTHUR CARHART NATIONAL WILDERNESS TRAINING CENTER

# MINIMUM REQUIREMENTS DECISION GUIDE

## WORKSHEETS

### Selway Bitterroot Wilderness (SBW) Invasive Plant Management & Implementation Considerations

*“ . . . except as necessary to meet minimum requirements for the administration of the area for the purpose of this Act...”*

– the Wilderness Act, 1964

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#### Step 1: Determine if any administrative action is necessary.

**Description:** Briefly describe the situation that may prompt action.

The Selway Bitterroot Wilderness and surrounding lands are experiencing rapidly increasing populations of non-native, invasive plants. The presence of invasive plants results from human actions as well as natural forces. Lack of treatment on adjacent public and private lands, seed transport via recreation users along trail corridors, and natural spread via wind and wildlife are all contributing factors. While some attempts have been made to control the spread of invasive plants in the Selway Bitterroot Wilderness, lack of adequate analysis has restricted treatment options to herbicide application outside the Wilderness Boundary, manual pulling and mowing, and limited application of bio-controls to reduce the proliferation of spotted knapweed.

National recognition of the threat that invasive plants pose has increased the feasibility and funding potential to support analysis and implementation of containment and eradication in areas that previously had few resources.

To determine if administrative action is necessary, answer the questions listed in A - F on the following pages.

**A. Describe Valid Existing Rights or Special Provisions of Wilderness Legislation**

Are there valid existing rights or is there a special provision in wilderness legislation (the Wilderness Act of 1964 or subsequent wilderness laws) that allows consideration of action involving Section 4(c) uses? Cite law and section.

Yes:  No:  Not Applicable:

**Explain:**

There are no special provisions that apply specifically to management of invasive plants in The Wilderness Act (1964). Rather, the Wilderness Act tasks managers with protecting natural and unimpaired conditions, allowing exceptions to certain management actions in order to meet the minimum requirements for administration to protect the Wilderness resource. (Sections 2c, 4c, and 4d).

**Section 2 (c) Definition:** A wilderness, in contrast with those areas where man and his own works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammelled by man, where man himself is a visitor who does not remain. An area of wilderness is further defined to mean in this chapter an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, **which is protected and managed so as to preserve its natural conditions** and which (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least five thousand acres of land or **is of sufficient size as to make practicable its preservation and use in an unimpaired condition**; and (4) may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value.

**Section 4 (c) Prohibition of certain uses:** "...except as necessary to meet minimum requirements for the administration of the area for the purpose of this Act...there shall be no temporary road, no use of motor vehicles, motorized equipment or motorboats, no landing of aircraft, no other form of mechanical transport, and no structure or installation within any such area."

**Section 4 (d) Special Provisions:** "....such measures may be taken as may be necessary in the control of fire, insects, and disease..."

**B. Describe Requirements of Other Legislation**

Do other laws require action?

Yes:  No:  Not Applicable:

**Explain:**

- Noxious Weeds Act of 1974 designates the FS as the lead agency for noxious weed coordination for USDA and requires establishment of integrated management.

- The Executive Order 13112 of 1999 titled *Invasive Species* requires federal agencies to detect non-native, invasive plants and respond quickly to infestations.

**C. Describe Other Guidance**

Does taking action conform to and implement relevant standards and guidelines and direction contained in agency policy, unit and wilderness management plans, species recovery plans, tribal

Yes:  No:  Not Applicable:

**Explain:**

**Forest Service National Weed Management Strategy** – Four primary goals of Integrated Weed Management are: 1) increase the understanding and awareness, 2) develop and implement integrated weed management at all levels, 3) institutionalize consideration of noxious weeds during the planning phase of projects, 4) develop strong partnerships.

**FS policy on Environmental Management – FSM 2150**

2150.3 (3) – Use pesticides in wilderness only when necessary to protect or restore significant resource values within wilderness or on public or private lands bordering wilderness after receipt of the public or private landowner’s permission.

2151.04a (1) – Regional Foresters. Regional Foresters are responsible for reviewing and approving or disapproving all proposed pesticide uses on National Forest System lands. The Regional Forester may delegate this authority to other line officers on a case-by-case basis or by supplement to this code, except for the following:

1. Any pesticide use in Wilderness, which includes Wilderness study areas.

**Forest Service Policy on Wilderness Management - FSM 2320**

2320.3 - Policy

1. Where there are alternatives among management decisions, wilderness values shall dominate over all other considerations except where limited by the Wilderness Act, subsequent legislation, or regulations.
2. Manage the use of other resources in wilderness in a manner compatible with wilderness resource management objectives.

2320.2 - Objectives

2. Maintain wilderness in such a manner that ecosystems are unaffected by human manipulation and influences so that plants and animals develop and respond to natural forces.

2320.5 - Definitions

10. Indigenous Species. Any species of flora or fauna that naturally occurs in a wilderness area and that was not introduced by man.
11. Native Species. Any species of flora or fauna that naturally occurs in the United States and that was not introduced by man.
12. Naturalized Species. Any non-indigenous species of flora or fauna that is close genetically or resembles an indigenous species and that has become established in the ecosystem as if it were an indigenous species.

13. Exotic Species. Any species that is not indigenous, native, or naturalized.

2323.04c – Regional Forester. Unless specifically reserved to the President (FSM 2323.04a\_ or the Chief (FSM 2323.04b) or assigned to the forest Supervisor (FSM 2323.04d) or the District Ranger (FSM 2323.04e), the Regional Forester is responsible

for approving all measures that implement FSM direction on the use of other resources in wilderness. Specific responsibilities include but are not limited to:

9. Approving the use of pesticides within wilderness.

2323.26(b) – allows plant control for “noxious farm weeds by grubbing or with chemicals when they threaten lands outside of Wilderness or when they are spreading within the Wilderness, provided that it is possible to effect control without causing serious adverse impacts on Wilderness values.”

### **Selway Bitterroot Wilderness Vegetation Management Direction (1996)**

#### Objectives

- New populations of noxious weeds identified in the Wilderness will be eradicated
- Percent cover of designated weed species in key areas will decrease or remain stable from year to year
- Designated weed species will not occupy Weed Free Areas

#### Management Standards

- Priority areas for prevention and control of weed populations will be where weeds threaten to spread into Weed Free Areas, boundaries of existing weed populations targeted for containment, and areas critical to plant and animal species habitat
- Methods used in the eradication or containment of noxious or undesirable weed populations will be designed to have no significant adverse effects to native plant or animal populations or natural processes. Manual and cultural removal of weeds will be evaluated first and given preference over the use of herbicides and biological control methods. Introduction of approved biological control agents will only be allowed if the agent is host specific. Site specific environmental analysis will be conducted prior to initiating control methods

In addition to the above, weed management direction and support is provided in the following:

- The 1998 Forest Service Natural Resource Agenda placed a strong emphasis on conserving and restoring degraded ecosystems as a management priority for the 21<sup>st</sup> Century, including actions to “attain desirable plant communities and prevent exotic organisms from entering or spreading in the United States.”
- Non-native invasive plants are one of the four threats to the health of the National Forest System, identified by the Chief of the Forest Service.

- The 1998 Northern Region Overview addressed priority needs for ecosystem health and recreation, saying “Noxious weeds are one of the most serious threats to ecological integrity.” It identified integrated weed control as a priority action.
- The 1998 Forest Service Strategy for Noxious and Nonnative Invasive Plant Management provided a “roadmap into the future for preventing and controlling the spread of noxious weeds and non-native invasive plants.”
- Forest Service manual 2259.03 states “Forest officers shall cooperate fully with State, County and Federal officials in implementing 36 CRR 222.8 and sections one and two of Public Law 90-583. Within budgetary constraints, the Forest Service shall control to the extent practical, noxious farm weeds on all National Forest System lands.”
- The 2004 National Strategy and Implementation Plan for Invasive Species Management identifies the Forest Service as one of the lead agencies in the fight against invasive plants. It provides long-term direction to reduce, minimize or eliminate invasive species across all landscape and ownerships by improving the management of invasive species using science-based technology, by emphasizing partnerships, and by increasing performance and accountability, as well as communication and education.

**D. Describe Options Outside of Wilderness**

Can this situation be resolved by an administrative activity outside of wilderness?

Yes:  No:

**Explain:**

Containment and eradication of invasive plants outside the wilderness are important management strategies, but have not been sufficient to prevent the spread of invasive plants within the Selway Bitterroot Wilderness. Infestations have entered the Wilderness and spread further each year. Additional treatment must occur if invasive plants are to be contained, controlled or eradicated.

**E. Wilderness Character**

Is it necessary to take administrative action to preserve wilderness character, as described by the qualities listed below?

**Untrammelled:** Yes:  No:

**Explain:** Whether or not any action is taken, the untrammelled quality of the Wilderness is threatened. The spread of invasive plants in the Selway Bitterroot Wilderness and surrounding area is due in large part to human activity (seed introduction, spread along trails and in campsites, etc.). Allowing invasive plants to spread is a direct sign of human influence. Conversely, applying any form of “treatment” to manage invasive plants is also a manipulation or trammeling of the wilderness resource.

**Undeveloped:** Yes:  No:

**Explain:**

**Natural:** Yes:  No:

**Explain:** The presence of non-native, invasive plants degrades the natural conditions of the wilderness resource.

**Outstanding opportunities for solitude or a primitive and unconfined type of recreation:**

Yes:  No:

**Explain:** The wilderness recreation experience is in part, dependent on the wilderness setting to represent a natural and native ecosystem. If invasive plants are allowed to spread and replace native vegetation, the human experience in wilderness will be affected, as will the native vegetation types, habitats and the fish and wildlife species that depend on the natural conditions.

**Other unique components that reflect the character of this wilderness:**

Yes:  No:  Not Applicable:

**Explain:** None identified for this project area.

**F. Describe Effects to the Public Purposes of Wilderness**

Is it necessary to take administrative action in support of the public purposes for wilderness (as stated in Section 4(b) of the Wilderness Act) of recreation, scenic, scientific, education, conservation, and historical use?

**Recreation:** Yes:  No:  Not Applicable:

**Explain:** It can be argued that the presence and spread of invasive plants in wilderness will degrade the quality of the recreation experience in wilderness, as native species are replaced. This may happen due to the changes in vegetation and effects on scenery, habitat, and capacity for grazing of recreation livestock.

**Scenic:** Yes:  No:  Not Applicable:

**Explain:** Invasive plants have the potential to lower the scenic quality of an area.

**Scientific:** Yes:  No:  Not Applicable:

**Education:** Yes:  No:  Not Applicable:

**Conservation:** Yes:  No:  Not Applicable:

**Explain:** Invasive plants tend to interfere with the growth of native plants and may actually cause populations of natural species to decline, thus degrading habitat for native fish and wildlife species.

**Historical use:**      **Yes:**       **No:**       **Not Applicable:**

**Step 1 Decision: Is any administrative action necessary?**

**Yes:**       **No:**       **More information needed:**

**Explain:** Despite educational outreach, manual control efforts and limited application of bio-controls, infestations of invasive plants within the SBW continue to spread. Without implementing additional measures, infestations will continue to proliferate and significant conversion of vegetation types will continue.

Within the SBW, confining invasive plants to existing areas is critical if eradication is ever going to be possible. Spread beyond the existing, infested areas threatens the remainder of weed free areas within the Wilderness as well as adjacent, non-infested public and private lands.

Specialists estimate that existing infestations are containable and can be eradicated in some locations, given the species and known spread vectors.

Because studies have proven that treatment can effectively contain and eradicate invasive plants and trammeling will occur regardless of management actions, there is valid rational to assess management alternatives provided in the SBW Invasive Plant Management EIS.

If action is necessary, proceed to Step 2 to determine the minimum activity.

**Step 2: Determine the minimum activity.**

Description of Alternatives

For each alternative, describe what methods and techniques will be used, when the activity will take place, where the activity will take place, what mitigation measures are necessary, and the general effects to the wilderness resource and character.

**Actions common to all alternatives** Information and Education: Each Forest will continue to target wilderness visitors and adjacent land owners with information and education programs promoting weed prevention messages.

- Early Detection: Wilderness personnel will continue to implement monitoring programs to detect new infestations and map the spread of invasive plants.

- Mitigation: Protection measures will be implemented to ensure that treatment activities will not adversely affect native vegetation or water. (See Design Criteria in EIS for specifics, Chapter 2.
- Safety: Personnel will follow required safety procedures and will use personal protective equipment during the implementation of any management measures. In the event that herbicides are included as a management tool, the agency will notify the public in advance of application and will sign the immediate area for the duration of the effected period.
- Internal policy requiring 48 hour enclosure in weed free facility for all FS administrative stock.
- Use of Adaptive Management, Integrated Pest Management, and Minimum Tool strategies.

Alternative #   1  

**Description: NO ACTION**

**Treatment Summary:** No new activities, beyond those currently authorized or permitted, are considered under the “No Action” Alternative.

Treatment Objective: Allow native plant communities and invasive plants to interact **without new** management or intervention actions.

This alternative allows all currently approved methods to continue. It includes such methods as removal by hand and use of cultural means (mowing) on airstrips and at administrative sites, with limited herbicide use at administrative sites. This option also allows for continued use of previously approved bio-control agents outside the Wilderness and the continued existence, but no supplementation, of previously introduced host-specific, bio-control agents within the Wilderness.

**ALTERNATIVE 1: NO ACTION**

**Treatment Summary:**

Alt. No.	New Bio-Controls	Designated Herbicide Treatment, Non-SBW	Designated Herbicide Treatment, SBW	Dispersed Herbicide Treatment, SBW	Total Herbicide Treatment
1 *	0	<50 ac.	20ac.	0	<70ac.

***Weed-Free Watersheds:***

Objective: Allow native plant communities and invasive plants to interact without any new management or intervention actions.

Treatment Prescription:

- a) No current herbicide applications
- b) Continue manual / cultural actions = Less than 1 acre / yr
- c) No biological control releases are occurring

***Early Infestation Watersheds:***

Objective: Allow native plant communities and invasive plants to interact without any new management or intervention actions.

Treatment Prescription:

- a) Continue herbicide applications on all currently approved sites outside the Wilderness
- b) Continue manual / cultural actions = Less than 1 acre / yr
- c) Continue approved biological control releases outside the Wilderness

***Advanced Infestation Watersheds:***

Objective: Allow native plant communities and invasive plants to interact without any new management or intervention actions.

Treatment Prescription:

- a) Continue herbicide applications on all currently approved sites outside the Wilderness
- b) Continue manual / cultural actions = Less than 100 acre / yr
- c) Continue approved biological control releases outside the Wilderness

## Effects

### Wilderness Character

**“Untrammelled”** – Alternative #1 would not alter existing trends relating to trammeling in the Wilderness. Existence of invasive plants is a form of trammeling, since they are largely introduced and spread by human use in the SBW. Continued management efforts to minimize invasive plants also constitute trammeling.

**“Undeveloped”** – No effect

**“Natural”** – Alternative #1 allows all currently approved invasive plant treatment methods to continue. Under current conditions, the “natural” character of the Wilderness resource is being negatively affected as invasive plant spread and vegetative conversion continues, despite treatment efforts.

**“Outstanding opportunities for solitude or a primitive and unconfined type of recreation”** – Alternative #1 does not effect the existing opportunities for solitude or a primitive and unconfined type of recreation, since the presence of treatment crews is limited to existing field personnel on their standard monitoring rounds.

**Heritage and Cultural Resources** – Invasive weeds will continue to threaten and displace plants of cultural significance.

~~**Maintaining Contrast and Skills** – No effect on contrast. Alternative #1 relies heavily on field-going personnel to educate visitors, identify and manually treat infestations. These tasks require field skills including navigation, LNT camping, and packing stock; all relevant for maintaining a skilled wilderness workforce.~~

**Special Provisions** – No special provisions apply, relative to Alternative #1

**Safety of Visitors, Personnel, and Contractors** – There is a risk to crews from working with herbicides, tools, stock and traveling over rugged terrain. However, risk associated with Alternative #1 is relatively low, given that the risks encountered are typical of field work and herbicide applications are minimal and will be conducted by licensed applicators. Visitor safety, relative to herbicide application, can be minimized by advertising the areas and times of treatment.

**Economic and Time Constraints** – Alternative #1 offers no significant economic constraints. Primary time constraints are related to optimal treatment times, based on plant development during the growing season. All alternatives are subject to annual appropriations and agency budget priorities.

**Additional Wilderness-specific Comparison Criteria** – None identified

Alternative #   2  

**Description: PROPOSED ACTION**

**Treatment Summary: Herbicide treatment will not exceed 1500 acres/year. Bio control releases will not exceed 10,000 acres over life of project.**

This alternative **uses all currently approved methods, plus herbicides and new releases of bio-control agents on all priority areas as needed, within all portions of the project area.** Designated treatment areas include all trails and associated camps, trailheads, Selway River camps, administrative sites, airstrips, private land buffers, dam sites, etc. that are situated in currently infested areas. This option also includes roads outside of the SBW that fall within the project area.

Alternative 2 **provides opportunity for limited chemical treatment of new invaders and new colonies of established invasive plants in susceptible, non-designated treatment areas.** (Allows for treating future weed expansion and colonization in currently weed free areas or areas currently in the early infestation phase, weed condition categories I and II on Alternative maps)

**Treatment Summary: Herbicide treatment will not exceed 1500 acres/year. Bio control releases will not exceed 10,000 acres over life of project.**

Alt. No.	New Bio-Controls	Designated Herbicide Treatment, Non-SBW	Designated Herbicide Treatment, SBW ***	Dispersed Herbicide Treatment, SBW	Total Herbicide Treatment ****	Herbicide Treatments w/in 100' of H2O
2**	10,000	996	1129	500	<1500	358 +

\*\* - The Proposed Action is constrained to a total herbicide treatment of less than 1500 acres per year from all categories comprising the total acres identified in Alternative 2.

\*\*\* - Designated Herbicide Treatment Areas for Alternatives 2 & 5 include 70 acres of boating sites along the Selway River. Specific design criteria involving types of herbicides, their use and transport apply to these treatments.

\*\*\*\* - Herbicide treatment acres are an estimate, not a constraint. Constraints are specified in each alternative and/or project design criteria.

+ Up to 10% of the Dispersed Treatments may also occur w/in 100 feet of live water in addition to the figure shown in this column.

**Weed-Free Watersheds:**

Objectives:

- a) Eliminate starts of target invasive plant species that are present in the project area
- b) Eradicate all target invasive plant species that are new to the project area

Treatment Prescription:

- a) Herbicide: Treat all areas, including trails, camps and high risk susceptible dispersed habitat types, as needed, as new invasive plants are discovered.
- b) Manual / Cultural = Treat where feasible.

c) Biological Control = None currently needed; evaluate and treat when needed.

***Early Infestation Watersheds:***

Objectives:

- a) Reduce the density and range of target invasive plant species currently present in the project area.
- b) Eradicate all target invasive plants new to the project area.

Treatment Prescription:

a) Herbicide:

- \* Designated Treatment Areas: Treat up to 100% of known infestations in designated areas (including roads, trails, administrative sites, airstrips, etc.).
- \* Dispersed Treatment Areas: Treat all areas, including trails, camps and high-risk susceptible dispersed habitat types, as needed, as new invasive plants are discovered.

b) Manual / Cultural = Treat where feasible.

c) Biological Control = Treat largest areas with greatest potential to spread.

***Advanced Infestation Watersheds***

Objectives:

- a) Contain the spread of target invasive plants (such as spotted knapweed, St. Johnswort and sulfur cinquefoil) that are more common in the project area by reducing seed transport along priority vector corridors and contact sites such as system trails, camps, airstrips, administrative sites and roads.
- b) Contain the spread of target invasive plants into and out of private inholdings within the Wilderness portion of the project area.
- c) Reduce the density and range of less common target invasive plants (such as oxeye daisy).
- d) Eradicate all target invasive plant species that are new to the project area.

Treatment Prescription:

a) Herbicide:

- \* Designated Treatment Areas: Treat up to 100% of known infestations in designated areas (including roads, trails, administrative sites, airstrips, etc.).
- \* Dispersed Treatment Areas: Treat all areas, including trails, camps and high-risk susceptible dispersed habitat types, as needed, as new invasive plants are discovered.
- \* Selway River camps and boat launch sites: Treat up to approximately 70 sites, average of 1 acre each/yr.

b) Manual / Cultural = Treat where feasible.

c) Biological Control = Treat highest priority areas (current target species are spotted knapweed; St. Johnswort; Dalmatian toadflax...others as needed).

**Effects**

**Wilderness Character**

**“Untrammled”** – Existence of invasive plants is a form of trammeling, since they were largely introduced and spread by human use in the SBW. Alternative #2 would also trammel the Wilderness by increasing the size and scope of the treatment area.

**“Undeveloped”** – No effect

**“Natural”** – By increasing the size and scope of the treatment area, it is more likely that treatment will be effective at reducing the influence of invasive plants on all components of the wilderness resource. Thus, the natural condition of the SBW would be enhanced by Alternative #2. However, introducing host specific but non-native organisms to combat invasive plants may diminish the natural character of the Wilderness.

**“Outstanding opportunities for solitude or a primitive and unconfined type of recreation”** –

The following table depicts the possibility for a limited affect to solitude or a primitive and unconfined recreation experience of wilderness visitors who may encounter personnel implementing treatment activities.

<i>Alternatives</i>	<i>Person Days – Treatment (biocontrol, herbicide spray, handpulling, etc.)</i>	<i>Person Days – Monitoring and Mapping</i>	<i>Mule / Horse Days- All activities (riding, packing, herbicide, etc)</i>	<i>Season of Activity + number of field days divided into crew hitches</i>
#2	750 (example: 3 five person crews for each Forest for 50 days (up to about 2 ac/d of treatment @)	150 (3 two person crews per Forest)	200 (example: 6 animals / crew – for 5 hitches / crew @ 3 pack string days / hitch + map crew supply for 20 stock days)	48 June 1 thru Aug 1 = four 8 day hitches; Aug = one 8 day hitch; Sept = one 8 day hitch

**Heritage and Cultural Resources** – Culturally important plants would receive increased protection.

~~**Maintaining Contrast and Skills**— No effect to contrast. Alternative #2 relies heavily on field going personnel to educate visitors, identify and manually and chemically treat infestations. These tasks will require field skills including navigation, LNT camping, and packing stock; all relevant for maintaining a skilled wilderness workforce.~~

**Special Provisions** – Depending on the type of system selected to pressurize ground-based herbicide tanks, the exception in Section 4c of the Wilderness Act that applies to administrative use of motorized equipment may apply, **“except as necessary to meet minimum requirements for the administration of the area for the purpose of this Act..... , there shall be no...motorized equipment”**. (See Implementation Tool Options for further evaluation)

**Safety of Visitors, Personnel, and Contractors** – There is a risk to crews from working with herbicides, tools, stock and traveling over rugged terrain. However, risk associated with Alternative #2 remains relatively low, given that the risks encountered are typical of field work and herbicide applications will be conducted by licensed personnel and cover the amount of acres as outlined in the treatment summary box above. Visitor safety relative to herbicide application can be minimized by advertising the areas and times of treatment.

**Economic and Time Constraints** – Alternative #2 offers no other significant economic constraints. Primary time constraints are related to optimal treatment times based on plant development during the growing season. All alternatives are subject to annual appropriations and agency budget priorities.

**Additional Wilderness-specific Comparison Criteria** – None identified

Alternative #   3  

**Description: CONFINED TREATMENT AREA**

**Treatment Summary: Treatments confined to high use areas. No herbicide use within 50 feet of live water. No Bio-Controls w/in Wilderness.**

This alternative will **continue to use all currently approved methods. Inside the SBW, invasive plants will be managed without introducing new bio-controls. Herbicide use will be limited to designated treatment areas;** including all trails and associated camps, trailheads, administrative sites, airstrips, private land buffers, etc. that are situated in currently infested locations, within the project area. **No herbicides will be used with in 50’ of live water.** In addition, **Selway River camps and dam sites would not be treated with herbicides.**

Alt. No.	New Bio-Controls	Designated Herbicide Treatment, Non-SBW	Designated Herbicide Treatment, SBW	Dispersed Herbicide Treatment, SBW	Total Herbicide Treatment* ***	Herbicide Treatments w/in 100’ of H2O
3	0	945	861	0	1806	174

\*\*\*\*- Herbicide treatment acres are an estimate, not a constraint. Constraints are specified in each alternative and/or project design criteria.

<p><b><i>Weed-Free Watersheds</i></b></p> <p>Objectives: Use prevention and education methods to reduce the potential for invasive plants to spread into weed-free areas.</p> <p>Treatment Prescription: a) Herbicide: None b) Manual / Cultural = Treat where feasible. c) Biological Control = None</p>
<p><b><i>Early Infestation Watersheds</i></b></p> <p>Objectives: a) Reduce the density and range of target invasive plant species currently present in the project area. b) Eradicate all target invasive plants new to the project area.</p> <p>Treatment Prescription: a) Herbicide: * Designated Treatment Areas: Treat up to 100% of known infestations in designated areas (including roads, trails, administrative sites, airstrips, etc.). * Dispersed Treatment Areas: No herbicide treatment. b) Manual / Cultural = Treat where feasible. c) Biological Control = None.</p>
<p><b><i>Advanced Infestation Watersheds</i></b></p> <p>Objectives:</p>

- a) Contain the spread of target invasive plants (such as spotted knapweed, St. Johnswort and sulfur cinquefoil) that are more common in the project area by reducing seed transport along priority vector corridors and contact sites such as system trails, camps, airstrips, administrative sites and roads.
- b) Contain the spread of target invasive plants into and out of private inholdings within the Wilderness portion of the project area.
- c) Reduce the density and range of less common target invasive plants (such as oxeye daisy).
- d) Eradicate all target invasive plant species that are new to the project area.

Treatment Prescription:

a) Herbicide:

\* Designated Treatment Areas: Treat up to 100% of known infestations in designated areas (including roads, trails, administrative sites, airstrips, etc.).

\* Dispersed Treatment Areas: No herbicide treatment.

\* Selway River camps and boat launch sites: No herbicide treatment.

b) Manual / Cultural = Treat where feasible.

c) Biological Control = None.

**Effects**

**Wilderness Character**

**“Untrammled”** – Existence of invasive plants is a form of trammeling, since they were largely introduced and spread by human use in the SBW. Alternative #3 would also trammel the Wilderness by increasing the size of the treatment area, relative to current management.

**“Undeveloped”** – No effect

**“Natural”** – By increasing the size of the treatment area, it is more likely that treatment will be effective at reducing the influence of invasive plants on all components of the wilderness resource. Thus, the natural condition of the SBW would be enhanced by Alternative #3.

**“Outstanding opportunities for solitude or a primitive and unconfined type of recreation”** –

The following table depicts the possibility for a limited affect to solitude or a primitive and unconfined recreation experience of wilderness visitors who may encounter personnel implementing treatment activities.

<i>Alternatives</i>	<i>Person Days – Treatment (biocontrol, herbicide spray, handpulling, etc.)</i>	<i>Person Days – Monitoring and Mapping</i>	<i>Mule / Horse Days- All activities (riding, packing, herbicide, etc)</i>	<i>Season of Activity + number of field days divided into crew hitches</i>
#3	500 ( 3 five person crews for each Forest for 33 days (up to about 2 ac/d @)	80	130	32 June thru July = three 8 day hitches Aug = one 4 day hitch Sept = one 4 day hitch

**Heritage and Cultural Resources** – Culturally important plants would receive increased protection.

~~**Maintaining Contrast and Skills** – No effect to contrast. Alternative #3 relies heavily on field going personnel to educate visitors, identify and manually, chemically and biologically treat infestations. These tasks require field skills including navigation, Leave No Trace camping, and packing stock; all relevant for maintaining a skilled wilderness workforce.~~

**Special Provisions** – Depending on the type of system selected to pressurize ground-based herbicide tanks, the exception in Section 4c of the Wilderness Act that applies to administrative use of motorized equipment may apply, **“except as necessary to meet minimum requirements for the administration of the area for the purpose of this Act..... , there shall be no...motorized equipment”**. (See Implementation Tool Options for further evaluation)

**Safety of Visitors, Personnel, and Contractors** – There is a risk to crews from working with herbicides, tools, stock and traveling over rugged terrain. However, risk associated with Alternative #3 remains relatively low, given that the risks encountered are typical of field work and herbicide applications will be conducted by licensed personnel and cover the amount of acres as outlined in the treatment summary box above. Visitor safety relative to herbicide application can be minimized by advertising the areas and times of treatment.

**Economic and Time Constraints** – Alternative #3 offers no significant economic constraints. Primary time constraints are related to optimal treatment times based on plant development during the growing season. All alternatives are subject to annual appropriations and agency budget priorities.

**Additional Wilderness-specific Comparison Criteria** – None identified

Alternative #   4  

**Description: BIO-CONTROL EMPHASIS**

**Treatment Summary: No use of herbicides within Wilderness.**

This alternative would use all currently approved methods. In addition, **No herbicides would be used within the SBW. Bio-control agents would be introduced and widely distributed in all currently infested areas** to reduce spread rate of existing weed populations. Outside the SBW, but within the project area, treatments would be the same as Alternative #2. **Stock grooming stations would also be designed and constructed at the Race Track, Wilderness Gateway and Paradise trailheads.** These facilities will be located at existing trailhead sites outside the wilderness.

Alt. No.	New Bio-Controls	Designated Herbicide Treatment, Non-SBW	Designated Herbicide Treatment, SBW	Dispersed Herbicide Treatment, SBW	Total Herbicide Treatment ****	Herbicide Treatments w/in 100' of H2O
4	50,000	996	0	0	996	125

\*\*\*\*- Herbicide treatment acres are an estimate, not a constraint. Constraints are specified in each alternative and/or project design criteria.

<p><b><i>Weed-Free Watersheds</i></b></p> <p>Objectives: Use prevention and education methods to reduce the potential for invasive plants to spread into weed-free areas.</p> <p>Treatment Prescription: a) Herbicide: None b) Manual / Cultural = Treat where feasible. c) Biological Control = None currently needed; evaluate and treat when needed.</p>
<p><b><i>Early Infestation Watersheds</i></b></p> <p>Objectives: a) Within Wilderness: Reduce the density and range of target invasive plant species currently present in the area. b) Outside of Wilderness: In addition to reducing the density and range of target invasive plant species currently present in the project area, eradicate all target invasive plants new to the project area.</p> <p>Treatment Prescription: a) Herbicide: * Designated Treatment Areas: No herbicide treatment within Wilderness. Treat up to 100% of known infestations in designated areas such as roads, trails, and trailheads leading into the Wilderness, within the project area. * Dispersed Treatment Areas: No herbicide treatment. b) Manual / Cultural = Treat where feasible. c) Biological Control = Treat all infestations capable of sustaining reproducing colonies of bio-</p>

control agents.
<b><i>Advanced Infestation Watersheds</i></b>
Objectives:
a) Within Wilderness: Reduce the density and range of target invasive plant species currently present in the area.
b) Outside of Wilderness: In addition to reducing the density and range of target invasive plant species currently present in the project area, eradicate all target invasive plants new to the project area.
Treatment Prescription:
a) Herbicide:
* Designated Treatment Areas: No herbicide treatment within Wilderness. Treat up to 100% of known infestations in designated areas such as roads, trails, and trailheads leading into the Wilderness, within the project area.
* Dispersed Treatment Areas: No herbicide treatment.
b) Manual / Cultural = Treat where feasible.
c) Biological Control = Treat all infestations capable of sustaining reproducing colonies of bio-control agents.

**Effects**

**Wilderness Character**

**“Untrammelled”** – Existence of invasive plants is a form of trammeling, since they were largely introduced and spread by human use in the SBW. Alternative #4 would also trammel the Wilderness by increasing the size of the treatment area for bio-controls, relative to current management.

**“Undeveloped”** – No effect

**“Natural”** – By increasing the size of the treatment area for bio-control measures, it is more likely that treatment will be effective at reducing the influence of invasive plants on all components of the wilderness resource. From this perspective, the natural vegetative condition of the SBW may be enhanced by Alternative #4. However, introducing a host specific but non-native organisms to combat invasive plants may diminish the natural character of the Wilderness.

**“Outstanding opportunities for solitude or a primitive and unconfined type of recreation”** – The following table depicts the possibility for a limited affect to solitude or a primitive and unconfined recreation experience of wilderness visitors who may encounter personnel implementing treatment activities.

<i>Alternatives</i>	<i>Person Days – Treatment (biocontrol, herbicide spray, handpulling, etc.</i>	<i>Person Days – Monitoring and Mapping</i>	<i>Mule / Horse Days- All activities (riding, packing, herbicide, etc)</i>	<i>Season of Activity + number of field days divided into crew hitches</i>
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#4 (bio-control only inside Wilderness)	100 ( three 2 person crews – each crew does 170 releases / season for about 500 releases / yr)	30 ( three 2 person crews for each Forest to monitor / map invasive plants and track biocontrol progress / needs	72	30 Late June to mid July for goatweed / other: two 6 day hitches Aug / Sept for knapweed: three 6 day hitches
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**Heritage and Cultural Resources** – Culturally important plants would receive increased protection.

~~**Maintaining Contrast and Skills** – No effect to contrast. Alternative #4 relies heavily on field going personnel to educate visitors, identify and manually and biologically treat infestations within the SBW. These tasks will require field skills including navigation, LNT camping, and packing stock; all relevant for maintaining a skilled wilderness workforce.~~

**Special Provisions** – No special provisions

**Safety of Visitors, Personnel, and Contractors** – There is a risk to crews from working with herbicides, tools, stock and traveling over rugged terrain. However, risk associated with Alternative #4 remains relatively low, given that the risks encountered are typical of field work and herbicide applications will be conducted by licensed personnel and cover and cover the amount of acres as outlined in the treatment summary box above. Visitor safety relative to herbicide application outside the SBW can be minimized by advertising the areas and times of treatment.

**Economic and Time Constraints** – Alternative #4 offers no significant economic constraints. Primary time constraints are related to optimal treatment times based on plant development during the growing season. All alternatives are subject to annual appropriations and agency budget priorities.

**Additional Wilderness-specific Comparison Criteria** – None identified

Alternative #   5  

**Description: EXPANDED AREA**

**Treatment Summary:**

Alt. No.	New Bio-Controls	Designated Herbicide Treatment, Non-SBW	Designated Herbicide Treatment, SBW ***	Dispersed Herbicide Treatment, SBW	Total Herbicide Treatment ****	Herbicide Treatments w/in 100' of H2O
5	50,000	996	1129	2000	4125	558 +

\*\*\*- Designated Herbicide Treatment Areas for Alternatives 2 & 5 include 70 acres of boating sites along the Selway River. Specific design criteria involving types of herbicides, their use and transport apply to these treatments.

\*\*\*\*- Herbicide treatment acres are an estimate, not a constraint. Constraints are specified in each alternative and/or project design criteria.

+ Up to 10% of the Dispersed Treatments may also occur w/in 100 feet of live water in addition to the figure shown in this column.

This alternative would **use all currently approved methods. Treatment areas would be expanded beyond those proposed in Alternative 2.** Treatment is constrained by unique sub-watershed herbicide thresholds as explained in the Design Criteria, within the EIS. Designated treatment areas include all trails, associated camps, trailheads, Selway River camps, administrative sites, airstrips, private land buffers, dams sites etc that are situated in currently infested areas. **Roads outside the Wilderness, but within the project area would also be treated.**

***Weed-Free Watersheds***

Objectives:

- a) Eliminate starts of target invasive plant species that are present in the project area
- b) Eradicate all target invasive plant species that are new to the project area

Treatment Prescription:

- a) Herbicide: Treat all areas, including trails, camps and high risk susceptible dispersed habitat types, as needed, as new invasive plants are discovered.
- b) Manual / Cultural = Treat where feasible.
- c) Biological Control = None currently needed; evaluate and treat when needed.

***Early Infestation Watersheds***

Objectives:

- a) Reduce the density and range of target invasive plant species currently present in the project area.
- b) Eradicate all target invasive plants new to the project area.

Treatment Prescription:

- a) Herbicide:
  - \* Designated Treatment Areas: Treat up to 100% of known infestations in designated areas

<p>(including roads, trails, administrative sites, airstrips, etc.).</p> <p>* Dispersed Treatment Areas: Treat all areas, including trails, camps and high-risk susceptible dispersed habitat types, as needed, as new invasive plants are discovered.</p> <p>b) Manual / Cultural = Treat where feasible.</p> <p>c) Biological Control = Treat all infestations capable of sustaining reproducing colonies of bio-control agents.</p>
<p><b><i>Advanced Infestation Watersheds</i></b></p> <p>Objectives:</p> <p>a) Contain the spread of target invasive plants (such as spotted knapweed, St. Johnswort and sulfur cinquefoil) that are more common in the project area by reducing seed transport along priority vector corridors and contact sites such as system trails, camps, airstrips, administrative sites and roads.</p> <p>b) Contain the spread of target invasive plants into and out of private inholdings within the Wilderness portion of the project area.</p> <p>c) Reduce the density and range of less common target invasive plants (such as oxeye daisy).</p> <p>d) Eradicate all target invasive plant species that are new to the project area.</p> <p>Treatment Prescription:</p> <p>a) Herbicide:</p> <p>* Designated Treatment Areas: Treat up to 100% of known infestations in designated areas (including roads, trails, administrative sites, airstrips, etc.).</p> <p>* Dispersed Treatment Areas: Treat all areas, including trails, camps and high-risk susceptible dispersed habitat types, as needed, as new invasive plants are discovered.</p> <p>*Selway River camps and boat launch sites: Treat up to approximately 70 sites, average of 1 acre each/yr.</p> <p>b) Manual / Cultural = Treat where feasible.</p> <p>c) Biological Control = Treat all infestations capable of sustaining reproducing colonies of bio-control agents.</p>

**Effects**

**Wilderness Character**

**“Untrammled”** – Existence of invasive plants is a form of trammeling, since they were largely introduced and spread by human use in the SBW. Alternative #5 would also trammel the Wilderness by increasing the size and scope of the treatment beyond those acres described in Alternative #2. The difference between Alternatives 2 and 5 is the additional 1500 acres proposed for chemical treatment in Dispersed treatment areas

**“Undeveloped”** – No effect

**“Natural”** – By increasing the size and scope of the treatment area, it is more likely that treatment will be effective at reducing the influence of invasive plants on all components of the wilderness resource. Thus, the natural condition of the SBW would be maintained and protected at the highest level by Alternative #5.

However, introducing host specific but non-native organisms to combat invasive plants may diminish the natural character of the Wilderness.

**“Outstanding opportunities for solitude or a primitive and unconfined type of recreation”** –  
 – The following table depicts the possibility for a limited affect to solitude or a primitive and unconfined recreation experience of wilderness visitors who may encounter personnel implementing treatment activities.

<i>Alternatives</i>	<i>Person Days – Treatment (biocontrol, herbicide spray, handpulling, etc.)</i>	<i>Person Days – Monitoring and Mapping</i>	<i>Mule / Horse Days- All activities (riding, packing, herbicide, etc)</i>	<i>Season of Activity + number of field days divided into crew hitches</i>
#5	2100	240	600	Six 3 person crews active from June 1 to Sept 30

**Heritage and Cultural Resources** – Culturally important plants would receive the highest level of protection.

~~**Maintaining Contrast and Skills** – No effect to contrast. Alternative #5 relies heavily on field going personnel to educate visitors, identify and manually, chemically and biologically treat infestations. These tasks will require field skills including navigation, LNT camping, and packing stock; all relevant for maintaining a skilled wilderness crew.~~

**Special Provisions** – No special provisions

**Safety of Visitors, Personnel, and Contractors** – There is a risk to crews from working with herbicides, tools, stock and traveling over rugged terrain. However, risk associated with Alternative #4 remains relatively low, given that the risks encountered are typical of field work and herbicide applications will be conducted by licensed personnel and cover the amount of acres as outlined in the treatment summary box above. Visitor safety relative to herbicide application outside the SBW can be minimized by advertising the areas and times of treatment.

**Economic and Time Constraints** – Alternative #5 would have the highest cost. Primary time constraints are related to optimal treatment times based on plant development during the growing season. All alternatives are subject to annual appropriations and agency budget priorities.

**Additional Wilderness-specific Comparison Criteria** – None identified

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## IMPLEMENTATION TOOL OPTIONS COMMON TO ALL ACTION ALTERNATIVES

### Invasive Plant Treatment Options

1. Accept invasive plants and do not treat
2. Manual/Cultural treatments: Hand-pulling and mowing invasive plants
3. Use of backpack sprayers to apply herbicide
4. Use of a CO<sub>2</sub>-pressurized muleback sprayer to apply herbicide
5. Use of the battery-powered pump-driven muleback sprayer to apply herbicide
6. Biological control releases
7. Monitor invasive plant infestations

#### **1. Accepting invasive plants as a natural part of the Wilderness Resource**

National, Regional and Wilderness-specific Forest Service policy directs Wilderness managers to combat the spread of invasive plants.

#### **2. Manual/ Cultural Treatment Considerations:**

In large infestations, manual removal is not optimal. Existing seed banks have the opportunity to thrive when soil is disturbed by vast hand pulling efforts. Manual treatments are most effective for stopping small infestations when the sites are monitored and limited numbers of plants are removed from the site before seeds are set.

Cultural treatments (mowing) offer a way to minimize seed production in larger infestations by cutting the plants before seeds are produced. However, some species adapt to cutting by producing low growing flowers that are harder to prune.

#### **Herbicide Application Considerations:**

Herbicide application for all alternatives within the Wilderness refers to ground-based application by hand spraying, either from a backpack sprayer and /or a stock carried tank.

#### **Options for pressurizing tanks include the following:**

- **Hand pump, backpack pressure systems:** These are human carried and pressurized lever systems that are capable of building pressure in smaller tanks, usually less than 5 gallons. Pressurizing by hand is effective for backpack sprayers, but insufficient to pressurize larger tanks that can be carried by pack stock.
- **CO<sub>2</sub> cartridge pressure systems for packstock tanks:** A CO<sub>2</sub> cartridge provides constant tank pressure for mule-back units. These systems are more prone to accidents due to the hose-line connection between the CO<sub>2</sub> cartridge and the tank. Line leaks, low tree branches dislodging hose or similar field damage can result in the rapid and explosive release of the chemical being applied. The loud noise of an accidental, explosive release is also prone to spooking livestock and exacerbating the potential injury to both humans and stock.
- **Electric motorized pressure systems for pack stock tanks:** The electric powered muleback unit can meet the FSM 2326.02 objectives of “excluding the sight, sound and other tangible evidence of motorized equipment...” through it’s design and mitigation features. The motor makes a low whirring sound that is softer than the average, modern, household refrigerator and is not audible beyond 50 feet. Encased in a sound insulated box, the unit is almost noiseless. The pump and battery (12 volt) package is less than a cubic foot in volume (6” X 6”X 18”). The entire unit is inconspicuous when mounted in the middle of a pack saddle between the tanks.

**Herbicide Dye / Colorant Persistence**

Dye added to the herbicide mixture is an important aid for spot applications in rugged wildland settings because it clearly marks treated plants and patches. This prevents the over-application of chemical, avoids damage to non-target species and reduces the probability of skipping target plants.

The dye fades to a barely noticeable tint within two hours of application in most cases. After forty eight hours, the colorant generally disappears completely. Persistence is longer during the cooler and cloudier fall months.

**Herbicide types:** Herbicide types and applications are discussed in the Vegetation section of Chapter 3, as well as Appendices I, J, K, and M of the EIS. Protection measures pertaining to the use of Chemicals is discussed in the Design Criteria section of Chapter 2.

**Bio-controls**

The proposed use of bio-controls is discussed in the Vegetation section of Chapter 3 of the EIS.

**Crew / Stock Levels**

- a) Some of the invasive plant treatment, monitoring and mapping work can be accomplished by currently funded positions such as Wilderness Rangers, Recreation Technicians, etc. without increasing the number of people or hitches in the Wilderness.
- b) Most camping will occur within the Wilderness. Up to about 15% of the camping time might occur at trailheads and within the Magruder / Paradise corridor outside the Wilderness.
- c) Estimated crew / stock levels needed *above current staffing* in order to implement the tasks for each alternative inside the entire Wilderness are summarized as follows:

<i>Alternatives</i>	<i>Person Days – Treatment (biocontrol, herbicide spray, handpulling, etc.)</i>	<i>Person Days – Monitoring and Mapping</i>	<i>Mule / Horse Days- All activities (riding, packing, herbicide, etc)</i>	<i>Season of Activity + number of field days divided into crew hitches</i>
#1	0	0	0	0
#2	750 (example: 3 five person crews for each Forest for 50 days (up to about 2 ac/d of treatment @)	150 (3 two person crews per Forest)	200 (example: 6 animals / crew – for 5 hitches / crew @ 3 pack string days / hitch + map crew supply for 20 stock days)	48 June 1 thru Aug 1 = four 8 day hitches; Aug = one 8 day hitch; Sept = one 8 day hitch
#3	500 ( 3 five person crews for each Forest for 33 days (up to about 2 ac/d @)	80	130	32 June thru July = three 8 day hitches Aug = one 4 day hitch Sept = one 4 day hitch

#4 (bio-control only inside Wilderness)	100 ( three 2 person crews – each crew does 170 releases / season for about 500 releases / yr)	30 ( three 2 person crews for each Forest to monitor / map invasive plants and track biocontrol progress / needs	72	30 Late June to mid July for goatweed / other: two 6 day hitches Aug / Sept for knapweed: three 6 day hitches
#5	2100	240	600	Six 3 person crews active from June 1 to Sept 30

**Step 2 Decision: What is the Minimum Activity?**

**The selected alternative is:** Alternative #2

The minimum activity needing to be authorized for this proposed project involves the use of small electric pumps to pressurize stock-mounted spray tanks needed to effectively implement Alternatives 2, 3, and 5. As stated above, these alternatives would treat relatively large acreages with herbicide. The electric motors proposed would be noise-shielded and nearly inaudible beyond 50 feet from where they are being used.

**Describe the rationale for selecting this alternative**

The three alternatives that would apply herbicides inside the Wilderness range in extent of herbicide treatment from 860 to 3100 acres per year inside the SBW. Herbicide is proposed because past efforts to rely on mechanical/cultural methods of weed control, even combined with prevention efforts, have been shown to have only limited success.

Treatment methods proposed include mechanical and cultural methods, herbicide use and the release of biological controls. Despite repeated efforts, reliance exclusively on hand pulling as the primary treatment method has been insufficient to stop the spread of invasive plants within the SBW. The proposal incorporates herbicide use as management tool within the Wilderness because chemical treatment of invasive plants on high priority sites of occurrence is the only effective method, available at this time, to control most of the target species. The acreage involved is too large and too rugged to be effectively treated using only backpack sprayers and many areas are at a great distance from water in very steep terrain. Therefore, it is necessary to rely upon stock-mounted spray systems to access and apply herbicide to many of the areas needing to be treated.

Electric motors are not only efficient in keeping tanks pressurized but they also offer safety advantages by allowing the applicator to concentrate on spraying activities instead of returning to the tank every few minutes to pump up the pressure by hand.

Safety and environmental protection concerns form the basis for approving the use of a stock-mounted, battery-powered spray unit in the Wilderness, while fulfilling Forest Service direction and policy for controlling invasive plants. The stock-mounted device significantly reduces risks to the safety and health of the public, Forest field workers and contractors. It also

reduces the risk of herbicide spills. The unit diminishes safety, health and environmental hazards in the following manner:

- 1) Reduces the risk of hazardous spills by:
  - a. Allowing the same amount of work to be accomplished by one person with one mule-mounted herbicide container rather than several people with several backpack containers.
  - b. With a longer (while still accurate and pinpoint) spray range, the mule-mounted unit reduces (estimated by up to 50%) the need for the operator to navigate over steep, rocky, treacherous side slopes common along trails and other high risk infestation sites.
  - c. Reduces by 75% the number of times herbicide concentrate containers are opened and the concentrate mixed in spray tanks when comparing the larger capacity of the mule-mounted application unit to the smaller capacity backpack sprayer units.
- 2) Reduces the exposure of field personnel and the public to herbicides by allowing the same amount of work to be accomplished with fewer people and fewer herbicide application containers.
- 3) Reduces general safety hazards by:
  - a. Reducing the number of people needed to accomplish the same amount of work, the unit reduces the exposure of backpack applicators to steep unstable footing conditions that could lead to serious accidents and injury.
  - b. When used to deliver water directly to backpack operators, it eliminates the need for workers to make frequent trips to fill up backpack tanks with water prior to mixing herbicides.
  - c. On steep terrain, the stock-back unit transports herbicide mix directly to workers rather than requiring the sprayers to make numerous trips over difficult terrain to the central mixing location.
  - d. Eliminates the risk posed by CO<sub>2</sub> constant- pressure stock-back units, due to accidents caused by line leaks, low tree branches dislodging hose or similar field damage.

**Describe any monitoring and reporting requirements:**

Monitoring of all treatment areas will be conducted to determine effectiveness and minimize future treatments. Monitoring proposed for this project is outlined in the Monitoring section of Chapter 2 of the EIS.

Please check any Wilderness Act Section 4(c) uses approved in this alternative:

- |   |  |
|---|--|
| <input type="checkbox"/> mechanical transport   | <input type="checkbox"/> landing of aircraft       |
| X <input checked="" type="checkbox"/> motorized equipment (motor for stock-mounted sprayers). | <input type="checkbox"/> temporary road            |
| <input type="checkbox"/> motor vehicles   | <input type="checkbox"/> structure or installation |
| <input type="checkbox"/> motorboats   |  |

Be sure to record and report any authorizations of Wilderness Act Section 4(c) uses according to agency procedures.

	Signature	Name	Position	Date
Prepared by:				
Recommended:				
Recommended:				
Approved:				

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## APPENDIX D

### SOCIAL ASSESSMENT FOR THE SEVEN-COUNTY AREA SURROUNDING THE SELWAY-BITTERROOT WILDERNESS

#### I. Situation

The Selway-Bitterroot Wilderness is a special place, a complex ecosystem, nearly 1.4 million acres of rugged land on the eastern edge of north central Idaho and the southwestern edge of Montana. It spans the Bitterroot Mountains between the two states. It encompasses land with alpine lakes and lush meadows. It provides habitat for sensitive plant, wildlife and fish species as well as species listed under the Endangered Species Act. The wild and scenic Selway River flows through it.

The founding father of the Selway-Bitterroot Wilderness, Bob Marshall, argued passionately for the protection of the nation's last wild places. In the mid-1930s his passion convinced the chief of the Forest Service to help protect 5.4 million acres of national forests from roads and logging. These areas included the Selway-Bitterroot country Marshall knew and loved.

In 1939 Marshall furthered his cause by writing the "U" regulations, which created national forest wilderness areas, eventually totaling 14 million acres, throughout the country. The U-Regulations governed Forest Service wilderness policy for more than 20 years until the passage of the Wilderness Act in 1964. The Selway-Bitterroot Wilderness was one of 54 areas in 13 states totaling 9.1 million acres designated wilderness by the act. The National Wilderness Preservation System now includes 702 areas in 44 states totaling 107.4 million acres.

The crafters of the Wilderness Act defined wilderness in two sentences:

"A wilderness, in contrast with those areas where man and his own works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammelled by man, where man himself is a visitor who does not remain. An area of wilderness is further defined to mean in this Act an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions and which (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least five thousand acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value."

These two sentences have been – and continue to be – examined and interpreted and their meaning debated.

At the crux of the different interpretations of the act's definition of wilderness is whether the act allows managing for naturalness or managing for wildness. Peter Landres of the Leopold Institute explains: "According to this Act, wilderness should support both the attributes of naturalness and wildness." He adds, "... 'naturalness' describes an ecological condition. ..." and "wildness represents ... [a] social condition, one in which an area is untrammelled and free from human control, regardless of preexisting conditions or future consequences." His conclusion: "Managing for naturalness may sometimes conflict with managing for wildness."

Since the passage of the Wilderness Act, invasive species, including unwanted plants (“weeds”), have begun to make their way into the Selway-Bitterroot Wilderness. Now the question comes down to one of interpretation and philosophy: What action, if any, should the Forest Service take with invasive weeds in the wilderness? Should the Forest Service take no action and thereby promote wildness or take some action and thus promote naturalness?

People concerned about invasive weeds in the Selway-Bitterroot Wilderness (the stakeholders) include Tribes; outfitters and guides (including river recreation-oriented businesses and other local businesses); county governments and organized or informal groups in the communities; state and federal agencies; recreation, environmental, wildlife and “special” interests (e.g. cultural and historical resources); private landowners; and, of course, any and all citizens with a passion for America’s wilderness.

The Lolo, Bitterroot, Nez Perce and Clearwater national forests have sought input about the expansion of invasive weeds in and around the proposed project area (in and adjacent to the Selway-Bitterroot Wilderness) from Indian tribes, county governments, organizations and members of the general public over the past few years. Public meetings held in May 2005 helped gather information from the stakeholders to aid in development of the proposal.

Most people expressed concern for how the expansion of invasive plants is affecting native plant communities, wildlife and fisheries habitat, water quality, recreational and wilderness values. Others expressed concern over the effects of possible treatments of invasive weeds on native plant communities, wildlife and fisheries habitat, water quality, recreational and wilderness values. Additionally, the Nez Perce and Confederated Salish and Kootenai tribes expressed concerns about the effects of invasive plants and possible treatments on traditional cultural uses of the area.

Opinions gathered at the May 2005 meetings ranged from favoring aggressive treatments using all methods available to accepting weeds as part of an irreversibly changing vegetative landscape. People also expressed concerns over costs and effectiveness of treatments. Some expressed the concern that active management of invasive species may be in conflict with the Wilderness Act.

The four forests sent out a project scoping letter in October 2006 to gather feedback on the proposal to treat invasive weeds in an area of the Selway-Bitterroot Wilderness and in areas adjacent to the wilderness. Comments garnered fell into four categories: (1) agencies, organizations and individuals in support of treating noxious weeds in the proposed area; (2) those not in support of treatment; (3) those who could support treatment if it did not include the use of herbicides; (4) those for whom support or non-support was unclear.

## **II. Affected Environment**

### **Social Environment**

Two Montana counties and five Idaho counties encompass the population centers and outlying areas surrounding the Selway-Bitterroot Wilderness (SBW): Missoula and Ravalli counties in Montana; Idaho, Lewis, Clearwater, Nez Perce and Latah counties in Idaho.

The two cities in the seven-county area most closely associated with the SBW are Missoula, Montana (population 57,000), and Lewiston, Idaho (population 31,000). Rural towns in the area include Hamilton, Montana (population 3700); Grangeville (population 3200), Kooskia (population 675), Kamiah (population 1200), Orofino (population 3200) and Lewiston, Idaho. (Note: Population figures are based on 2000 census data.)

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An industrial character still pervades the rural towns because of the presence of sawmills. That character is diminishing for many reasons, including the decline of extractive industries like logging and mining and the arrival of newcomers who may hold different values toward natural resources.

To read more about the social context and organization of these communities, filled with data about the people who live and work there, reference three existing assessments: *The Western Montana Planning Zone Social Science and Economic Specialists' Report* (Jessica Montag and Keith Stockmann) for Lolo National Forest communities; *The Social Assessment of the Bitterroot Valley, Montana* (Janie Canton-Thompson) for those communities in the Bitterroot National Forest area; *The Social Assessment: Clearwater National Forest and Nez Perce National Forest* (Adams-Russell Consulting) for communities in the area of these two national forests. Obtain copies of the assessments at the headquarters office of the national forest of interest.

### **Attitudes, Beliefs and Values**

One way to characterize the changing attitudes, beliefs and values in the area surrounding the SBW, while simplistic, is to look at some of the differences between longtime residents and newcomers. Longtime residents tend to hold a traditional view of natural resource utilization while newcomers tend to have a preservationist perspective. Longtime residents tend to have a more local “world view” while newcomers see the world in a broader context. Longtime residents hold small town values while newcomers bring with them what is familiar to them, i.e., values useful as city dwellers in spite of fleeing population centers for a quieter, safer, more peaceful life.

Regarding attitudes, beliefs and values about wilderness, a 1998 study conducted across the U.S. by wilderness and recreation researcher scholars (H. Ken Cordell, Michael A. Tarrant, Barbara L. McDonald and John C. Bergstrom) points to how the American public views wilderness. Here is their summation:

“The public seems, in general, to support the concept of wilderness. The benefits from wilderness they (we) particularly seem to value include protection of water quality, protection of wildlife habitat, protection of air quality, protection to pass natural lands along to future generations, protection of endangered species and their habitats, preserving plant and animal ecosystems and genetic strains, protecting scenic beauty, having the option to visit an area in the future, and just knowing it is there. These were the aspects of wilderness protection that over half of the respondents indicated were either very important or extremely important. . . . Providing a source of income for tourism, personal/spiritual inspiration, and having natural areas for scientific study were the value items with the highest percentages of respondents indicating slight to no importance.”

Additionally, “. . . what this study seems to show. It indicates broad, more-than-majority, support for wildland protection based on ecological and environmental protection and on intergenerational altruism values or benefits. It seems not to show the U.S. public supports wilderness for self-serving and economic reasons.”

From the general view the public holds of wilderness to the more specific issue of weeds in the SBW, there is some information to suggest that many people favor taking action against weeds in the SBW. Following the severe 2000 fire season in Montana’s Bitterroot Valley, a survey of residents revealed many opinions and feelings about fire and its effects in the valley. Among them: two-thirds of respondents favored a reduction in weeds. Two-thirds favored the use of ground-applied herbicides, and the “vote” was split on aerial spraying, half favoring and half opposing such application. Many expressed concerns about the effects of herbicides on people, water and creatures. While not specific to the SBW, the underlying message about weeds was clear: Do something about invasive weeds, but do no harm to the environment.

Another example of potential support for weed treatment in the SBW lies to its south in the Frank Church River of No Return Wilderness (FCRNRW). A stewardship team charged with managing invasive weeds in the FCRNRW released an environmental impact statement in 1998 after considering the meaning of the Wilderness Act and ways to interpret it in light of how to manage invasive weeds. What team members Bruce Anderson and Ken Wotring decided is that “A desirable philosophical approach to invasive species is not clear in the Wilderness Act or the Forest Service Manual. An analysis of public sentiment was necessary in the search for further guidance.”

What they found, documented in an April 2001 article that appeared in the *International Journal of Wilderness*, “Invasive Plant Management Along Wild Rivers,” was that 82% of those who commented on noxious weed management in the FCRNRW supported “aggressive weed treatment actions to restore ecosystems.” Sentiments about noxious weed management in the SBW may well be similar to those expressed about the FCRNRW in part because of the proximity of the two land bases, in part because they are both in the Wilderness Preservation System.

Another “match” between the two wilderness areas: Of those who commented on the SBW proposal to take some kind of action on invasive weeds, the same percentage (82%) responded in favor. While sentiments about what action to take varied, all respondents expressed concern for potential effects treatment methods might have on the health of the environment as well as the health of visitors to the SBW.

## **Lifestyles**

The social context of the seven counties surrounding the SBW is changing fast. There are those who have lived in the area all their lives, who make their living from the land and its resources, who use the great outdoors for many of their recreational activities. They feel a strong connection to the land, in part because their jobs (e.g. logging, mill work, mining and ranching) are tied to it. Jobs equal economic stability and natural resources spell jobs. Key value themes of longtime residents include support for community members in time of need, self-reliance, limited government regulation, face-to-face interpersonal relationships.

Then there are those who are moving into the area, many of whom do not make their living from the land, who may view resource extraction as a misuse of the land and an abuse of natural resources, whose recreational pursuits may differ from those of longtime residents (e.g. recreational use of snowmobiles and ATVs).

The decline of extractive industries and the increase in the number of new residents who may hold different values toward natural resources (not tied to jobs or the economy but instead tied to their intrinsic and aesthetic value) can lead to conflicts and decrease community cohesion.

For longtime residents, a way of life known for generations is passing as newcomers buy up small or large tracts of land to carve out their own little piece of paradise, building homes (for some, lived in only part of the year), bringing with them different views of the world, different habits and ways of living. Gone are the days when residents knew just about everybody in their “neck of the woods,” when many young people could stay in the area where they grew up, get good-paying jobs, work and raise their families, where people left their houses unlocked and keys in vehicles. The transition to whatever comes next is perplexing and unsettling. What is a given now is change, frequent and continuous, and sometimes a feeling of “us versus them.”

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## **Land Use**

In the seven-county area of Idaho and Montana surrounding the SBW the national forests offer lands that provide natural resources for economic stability, natural beauty for aesthetic satisfaction, opportunities for recreational activity and much, much more. Traditionally people who lived in these counties with their mostly rural towns and outlying areas worked in the timber industry or as ranchers and miners. Most people moving to these counties do not hold jobs in resource extractive industries. They have fled cities for peace, quiet and a little piece of paradise in or near mountains and forests.

Newcomers and developers are buying land in tracts of 5, 10, 20 acres or more. Some people seek privacy while others seek views. Others are content to settle in subdivisions built on farm land or open fields. Valleys are filling up with homes, and river canyons are dotted with new houses. Some rural towns with their outlying areas are becoming bedroom communities to towns and cities like Lewiston and Missoula. Movement into towns is based on the communities' ability to provide water and sewer services while movement into rural areas is based on the availability of land.

There are "hot spots," of course, and they attract growth. Montana's Bitterroot Valley is one such place, well-known for the celebrities who live there. The population of Hamilton (Ravalli County) in the Bitterroot Valley does not change much, but its flavor changes to meet the wants and needs of people moving into the valley. Missoula (Missoula County), known for its friendly people and small-town feel, continues to grow. Subdivisions spread out and out, and rush hour in some areas is stop-and-go, much to the amazement of anyone who remembers what it was like just a few years ago.

In Idaho the Middle Fork, South Fork and main stem of the Clearwater River attract newcomers to Kooskia (Idaho County), Kamiah (Lewis County) and Orofino (Clearwater County). Crystal clear water and scenic beauty invite people to build adjacent to the rivers or perch high above them for breathtaking views up and down canyons. Subdivisions are popping up in Grangeville, perhaps spillover from McCall with its proximity to Boise, Idaho; perhaps just now being discovered and appreciated as a gem on the Camas Prairie with expansive 360-degree views that highlight dramatic and visible weather changes sweeping through the area. Lewiston (Nez Perce County) is home to a large mill and workers employed there. It also provides shopping and services for many in the area, along with a state college attracting more and more attention. Moscow (Latah County) is home to the University of Idaho and ten miles from Pullman, Washington, home of Washington State University. Subdivisions are spilling out onto the outlying landscape of both these towns.

## **Economies**

An important sector of the seven-county area, the timber industry saw changes in the 1990s when mill closures became a reality in Idaho, Montana, Washington and Oregon communities. Agriculture, too, changed with a decrease in the number of farms, full-time farmers and average farm size. The value of farms, however, increased as the appeal of the rural lifestyle attracted buyers and affected land values. All of these changes have impacted the rural character of the area surrounding the SBW.

Data from the Bureau of Economic Analysis show that personal income is up in all seven counties from 1990 to 2000. However, that tells only part of the story. Farm proprietor income is down dramatically, and non-farm proprietor income is up. Income from lumber and wood products is down except in Ravalli County, which may be understandable in light of the log home industry in the Bitterroot Valley.

Understandably, the income averages in many parts of the zone are below the national average. However, the economy is flourishing in places, along with amenity value services that have sprung up to

accommodate the wants and needs of newcomers. In these places, the cost of living has elevated to rival that of some large urban areas in the nation.

For more detail about the economies in the seven counties surrounding the SBW refer to the three existing assessments cited earlier in this document.

## **Demographics**

All seven counties in the area surrounding the SBW saw increases in population from 1990 to 2000: Missoula County, 21.5%; Ravalli County, 44.9%; Idaho County, 11.8%; Lewis, 6.5%; Clearwater, 4.8%; Nez Perce, 10.4%; and Latah, 13.5%. Increases in population can increase pressures for access and use of natural resources as well as increase land fragmentation, wildland urban interface and human-wildlife conflicts. As population increases, so can interest in public land management.

While population is important to consider, so is population density, i.e., the number of people in each square mile of land base. Missoula County population density is 37 people/square mile; Ravalli County, 15; Idaho County, 1.8; Lewis County, 7.8; Clearwater County, 3.6; Nez Perce County, 44.1; and Latah County, 32.4 people/square mile. (Note: The high percentage of federal lands in Idaho and Clearwater counties concentrates residents in pockets of private land.)

According to the 2000 census, Missoula and Ravalli counties had a majority of residents in the 0-44 age range with another (almost) one-fourth of the population in the 46-64 age range. In Idaho, Clearwater and Idaho counties showed higher median ages (in the early 40s) than the other three counties, as well as higher percentages in the 54 and older age range and lower percentages in the 18 and younger age range. Clearwater, Idaho and Lewis counties experienced decreases in the 20-35 age range from 1990 to 2000.

Discussions about the “aging of the West” suggest the potential for impacts on natural resource management from an aging population. Popular retirement areas, sometimes near national forests and parks, include scenic beauty and recreational opportunities and a populace likely interested in maintaining the quality of their surroundings.

Other facts add “flavor” and complexity to the populace in the seven-county area surrounding the SBW. The following table displays the percentages of females and males in the seven counties in 2000.

	<b>Females</b>	<b>Males</b>
Missoula County	50.0%	50.0%
Ravalli County	50.3%	49.7%
Idaho County	49.1%	50.9%
Lewis County	49.5%	50.5%
Clearwater County	46.9%	53.1%
Nez Perce County	50.8%	49.2%
Latah County	48.2%	51.8%

The following table displays the percentages of races in the seven-county area in 2000 (categories for “other ethnicity” or “two or more races” not included).

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	<b>White</b>	<b>Black</b>	<b>American Indian</b>	<b>Asian/Pacific Islander</b>	<b>Hispanic Origin</b>
Missoula County	94.0%	0.3%	2.3%	1.1%	1.6%
Ravalli County	96.7%	0.1%	0.9%	0.4%	1.9%
Idaho County	94.1%	0.1%	2.9%	0.3%	1.6%
Lewis County	92.2%	0.3%	3.8%	0.5%	1.9%
Clearwater County	94.8%	0.1%	2.0%	0.4%	1.8%
Nez Perce County	91.6%	0.3%	5.3%	0.7%	1.9%
Latah County	93.9%	0.6%	0.7%	2.2%	2.1%

For more detail about the economies in the seven counties surrounding the SBW refer to the three existing assessments cited earlier in this document.

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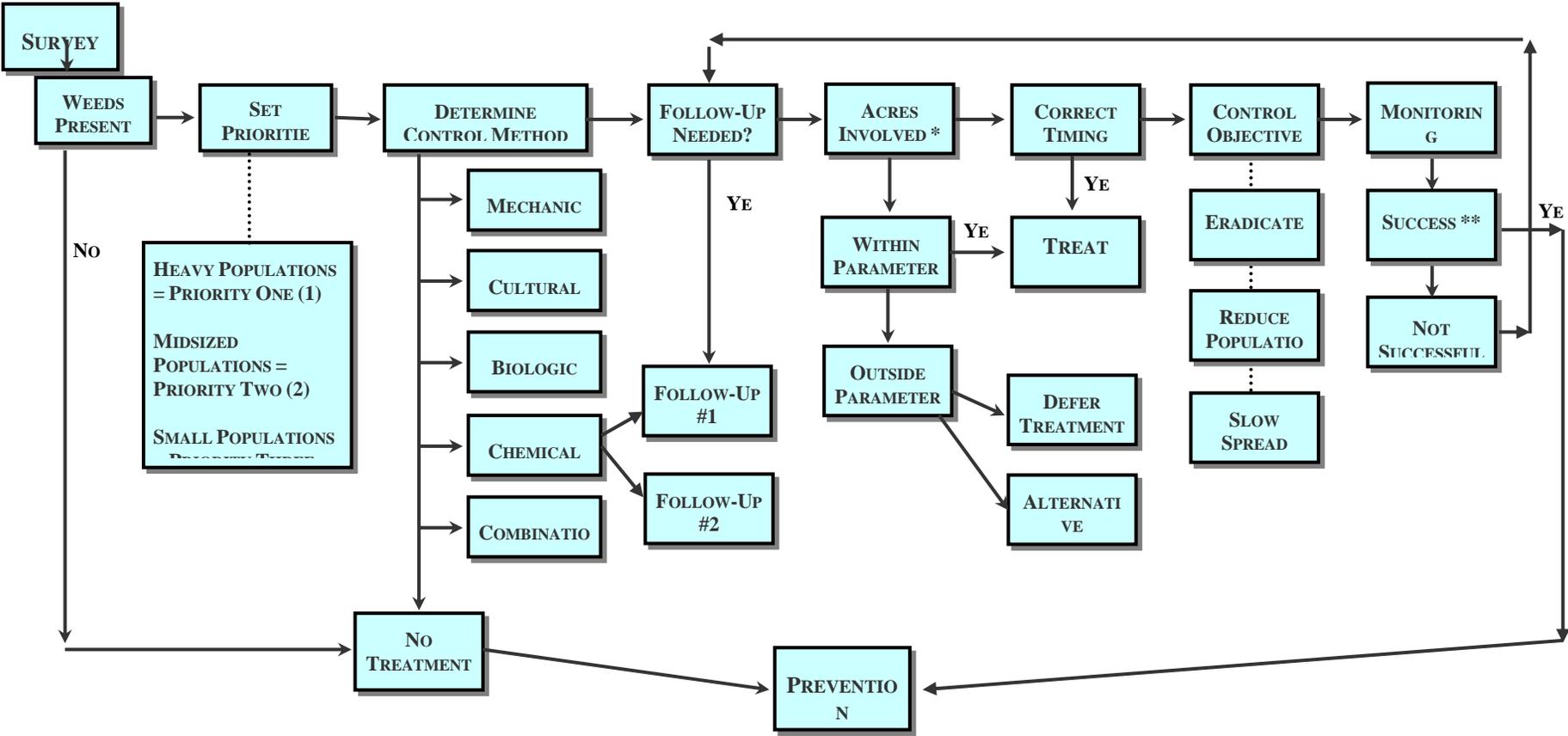
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**APPENDIX E – ADAPTIVE STRATEGY FLOW CHART**



This decision process will be used to determine treatment methods and their appropriate timing following invasive plant surveys for each site.

\* Any proposed herbicide treatment on a given site must be evaluated to determine if the acres proposed for chemical application fall within the parameters for maximum acres treated as established by Aquatics specialists.

\*\* Measure of success will be based on the invasive plant treatment objective(eradication ,reduction or containment), infestation size and percent occupancy of targeted weed species after treatment.

+++ An interdisciplinary team will review and determine the appropriateness and constraints of using any new herbicides that become available for the treatment of existing or new invaders in the project area.

## APPENDIX F

### INTEGRATED WEED MANAGEMENT APPROACH (IWM)

Integrated weed management (IWM), as defined by Sheley *et al.* (1999), is “the application of many kinds of technologies in a mutually supportive manner. It involves the deliberate selection, integration, and implementation of effective invasive plant control measures with due consideration of economic, ecological, and sociological consequences.” The IWM approach for this Project will include a multi-faceted strategy that involves education, inventory, ecological impact and risk assessment, prioritizing treatment areas, choosing management techniques, evaluating the program through monitoring, and adapting as the program evolves. Sheley *et al.* (1999) describe the overall goal of IWM as “maintaining or developing healthy plant communities (restoration) that are relatively invasive plant resistant, while meeting other land-use objectives....”

This project encompasses both Wilderness and non-Wilderness lands, resulting in a complex array of concerns and potential responses to the invasive plant problem. The IWM concept promotes an optimum response in scale, method and objective that is tailored to the unique setting and features of any invasive plant proposal. .

Key components of an IWM program include:

- Preventing encroachment into non-infested sites;
- Detecting and eradicating new introductions;
- Eradicating small populations within or adjacent to big game winter ranges and burned areas;
- Containing large invasive plant populations;
- Revegetating when necessary; and
- Properly managing competitive vegetation (Goodwin and Sheley 2001).

A successful program consists of a sustained effort, regular evaluation / monitoring, and adoption of improved strategies as they arise.

Some of the goals of implementing the various elements of IWM are to:

- Increase public awareness regarding impacts of noxious weeds to resource values;
- Limit invasive plant seed dispersal and transport along roads and trails;
- Contain neighboring weed infestations; and
- Minimize soil disturbance.

## CHOOSING MANAGEMENT TECHNIQUES

Selection of weed management tools is not a choice of one tool over another, but rather selection of a combination of tools that would be most effective on the target species for a particular location. Reliance on one method or restricting use of one or more weed management tools may prove less effective. Effectiveness and applicability of each tool varies and depends on weed biology and ecology, location, and size of the infestation, environmental factors, management objectives, and management costs.

### Mechanical Treatment

Mechanical weed management methods can be effective on small infestations. Hand-pulling and hoeing are the oldest and most traditional weed management methods. These methods are labor intensive and relatively ineffective for management of large, dense infestations of perennial noxious weeds. Best results are achieved when the entire root is removed. This is often not possible for deep-rooted or rhizomatous perennials such as leafy spurge and Canada thistle, since hand-pulling and hoeing often leave root fragments which can generate new plants. Hand-pulling or hoeing also causes disturbance that may increase susceptibility of the site to reinvasion by weeds (Brown *et al.* 1999; Duncan *et al.* 2001). While this control method is effective on single plants or relatively small infestations, it is not economically feasible on large, well-established knapweed infestations (Brown *et al.* 1999). In addition, hand-pulling plants that contain toxins or skin allergens can expose an individual to their poisonous effects (DiTomaso 1999). Hand-pulling trials conducted on spotted knapweed in western Montana and on diffuse knapweed in west-central Colorado found this treatment to be 35 percent and 0 percent effective, respectively. The treatments were completed twice per year for two consecutive years and were found to significantly increase bare ground and were also the most expensive (Duncan *et al.* 2001). European beachgrass was hand-pulled on the Oregon Dunes National Recreation Area and was found to be labor-intensive, costing nearly \$35,000 per acre for one treatment (Pickart 1997).

Test plots established on Blue Mountain (Lolo National Forest) and the Lee Metcalf National Wildlife Refuge near Stevensville, Montana, measured effects of hand-pulling on spotted knapweed. On the two sites spotted knapweed covered 76 percent and 53 percent, respectively. Average pulling cost for the two locations was calculated at \$8,498 per acre per year and is used to estimate pulling costs in this analysis (USDA FS 2001b). Hand-pulling provided 100 percent flower control and 56 percent plant control at Blue Mountain, but increased bare ground from 2.7 percent to 13.7 percent during the first year after treatment (Brown *et al.* 1999).

Mechanical treatments such as tillage are most applicable to tap-rooted weed species, small acreages, level terrain, and infestations that can be "tended" or visited on a regular basis in order to remove new germinants and re-sprouts as they occur. Tillage removes all vegetation and must therefore be combined with seeding or planting of desirable species. Although mechanical treatments can reduce seed production for the treated season, noxious weed seeds may remain viable in soil for several years (Davis *et al.* 1993; Selleck *et al.* 1962). Reinfestation of a site from residual seed in soil, especially when disturbance has occurred, will often occur without continued follow-up treatments.

Mowing or cutting is more effective on tap-rooted perennials such as spotted knapweed compared to rhizomatous perennials (Brown *et al.* 1999; Maxwell *et al.* 1984; Scholes and Clay 1994). Cutting or mowing plants can reduce seed production if conducted at the right phenological stage. For example, a single mowing at late bud growth stage can reduce the number of seeds produced on spotted knapweed (Watson and Renny 1974). Mowing can also weaken weeds' competitive advantage by depleting root carbohydrate reserves. Because of large carbohydrate reserves, mowing must be conducted several times a

year for consecutive years to reduce the competitive ability of the weed. Cost of mowing twice a year (on terrain conducive to mowing) is approximately \$200 per acre (based on 1998 dollars).

Because noxious weeds flower throughout the summer, it is difficult to time mechanical treatments to prevent flowering and seed production. Repeated mechanical treatment too early in the growing season can result in a low growth form that is still capable of producing flowers and seed (Benefield *et al.* 1999; Goodwin and Sheley 2001). Mechanical treatments on some rhizomatous weeds, such as leafy spurge, can encourage sprouting and result in an increase in stem density (Goodwin and Sheley 2001).

Mulching with plastic or organic materials can be used on relatively small weed-infested areas (less than ¼ acre), but will also stunt or stop growth of desirable native species. Mulching prevents weed seeds and seedlings from receiving sunlight necessary to survive and grow, and can smother some established weeds. Although hay mulch was used in Idaho to reduce flowering of Canada thistle (Tu *et al.* 2001), most rhizomatous perennial weeds cannot be controlled by this method because extensive root reserves allow re-growth through or around mulch.

## **Cultural Treatment**

Cultural methods of noxious weed management are generally targeted toward enhancing desirable vegetation to minimize invasive plant invasion. Planting or seeding desirable species to shade or out-compete noxious weeds, applying fertilizer to desirable vegetation, and controlled grazing are common cultural treatments. The large amount of Wilderness lands in this project area limits the application potential of this technique.

In most cases, endemic native species do not appear capable of out-competing some monoculture-forming invasive plants. On appropriate sites, herbicide application after invasive plants have emerged, followed by tillage and drill seeding, can be effective for establishing desirable species (Sheley *et al.* 1999). This process, however, can lead to increased soil compaction (DiTomaso 1999), and cannot be conducted on steep, remote, and rocky sites characteristic of most sites in the proposed treatment areas.

When seed is introduced to a site by non-natural means (e.g., seeding by humans), there is a risk of introducing non-native and/or invasive species. Use of certified weed-free seed reduces this risk. The magnitude of the risk varies and may be determined by seed source, cleaning practices, and other factors. Certified weed free seed has tolerances for certain weed species and is only certified free of certain weed seeds (Montana Weed Act Section 4.12.3010 -11).

Invasive weeds are often able to establish and occupy a site relatively fast after introduction because native species are typically slower to germinate and establish on a site. Seedling establishment of native species depends on proper seeding depths, soil, adequate moisture, prior removal of as many invasive weeds as possible, and often exclusion of livestock (Goodwin and Sheley 2001). Selection of a native versus non-native seed mix depends on management objectives.

If the objective is naturalness in a plant community dominated by less competitive species, native mixes would be used. Inside the Selway-Bitterroot Wilderness, a desirable approach would involve the collection of local native genotype seed for the production of rootstock or seed for revegetation.

Non-native species may be more appropriate outside the Wilderness where erosion control and competition with noxious weeds are the objectives. A compromise is to include short-lived, non-native, less dominant species mixed with native seeds. On many Forest sites, there is adequate residual native and desirable vegetation under the invasive weed canopy such that revegetation is not necessary. Once the invasive

weeds are removed, individual vegetation can respond and often results in a dense, competitive, and desirable vegetation community (see *Sawmill Creek Research Natural Area Restoration Project*).

Grazing can be an effective management tool on several weed species. However, the opportunities for using this method within the Selway Bitterroot Invasive Plant Management Project Area are limited. Since grazing animals prefer certain forage, selective use of this forage can shift competitive balance of plant communities (Crawley 1983; Lukan 1990). For example, goats and sheep have been used in various areas for controlling knapweed and leafy spurge. Controlled, repeated grazing of spotted knapweed by sheep has been found to reduce the number of one- and two-year-old spotted knapweed plants within an infestation (Olson *et al.* 1997). Appropriate grazing by animals preferring weeds can shift the plant community toward more desired grasses (Lacey *et al.* 1989). Conversely, grazing can also selectively reduce grass competitiveness, shifting the community in favor of weeds (Svejcar and Tausch 1991).

Use of grazing animals as a weed management tool must be based on selecting the appropriate grazer (cattle, sheep, or goats) for the target weed. Managers must also determine when, how much, and how often to graze animals to have maximum impact on the weed with minimum impact on desirable species (Olson 1999). Use of grazing animals as a weed management tool on roadsides, trailheads, and larger infestations on the Forest is limited due to factors associated with maintenance and management of the animals. A long-term commitment to small ruminant grazing is necessary for effective weed control and achievement of desired results. Noxious weeds can compensate quickly after the grazing pressure is removed because of their long-lived seeds in the soil, and because they can rapidly increase flower stem production once grazing pressure is removed (Olson *et al.* 1997, in Sheley *et al.* 1999).

## **Range Management Considerations**

Defoliation methods, such as grazing, mowing or burning, stimulate grass growth and enhance its competitive ability (Sheley *et al.* 1999). However, proper grazing management is essential in maintaining long-term objectives for weed management. Most weedy species are well adapted to invade heavily grazed areas, allowing competitive advantage.

The use of grazing animals to assist in weed control efforts would apply only in the project area outside the Wilderness. In most cases, this method will not eradicate mature infestations when used alone. Sheep and goat grazing has not been considered as an integral part of this proposal due to conflicting uses (cattle allotments) or wildlife concerns (potential for disease transmission on ranges shared between domestic sheep and Bighorn sheep), insufficient information and experience with small ruminant grazing operations, and potential predation problems.

## **Biological Treatment**

Biological weed management is the deliberate use of natural enemies (parasites, predators, or pathogens) to reduce invasive plant densities. Natural enemies and competitive vegetation prevent weed species from dominating other species in native habitats. Invasive plants are a problem in the project area due in part to a lack of these limiting factors.

Biological management is self-perpetuating, selective, energy self-sufficient, economical, and well suited to integration in an overall invasive plant management program (Wilson and McCaffrey 1999). Management with biological agents is a slow process that does not achieve eradication. Biological agents may be ineffective without being integrated with other strategies. Biological management may also not be appropriate against target plants closely related to beneficial plants because the natural enemy may be unable to discriminate between related plant species (Duncan *et al.* 2001). About 29 percent of the

biological management efforts in the United States have demonstrated some level of success (DeLouch 1991). Recent results show that *Cyphocleonus achates* is capable of reducing spotted knapweed stand density (Corn, 2003).

An invasive plant infestation may increase in density and area faster than the newly released biocontrol agent populations; therefore, other control methods may be needed in conjunction with the release of biocontrol agents. The perimeter of the infestation may be sprayed to keep it from spreading. As biocontrol agents increase in density and begin to occupy more area, herbicide use may be reduced to occasional spot treatments.

## **Treatment with Herbicides**

Use of herbicides for invasive weed treatment involves application of products developed, labeled, and produced to treat weed species at certain stages of plant growth. Herbicides considered in this analysis are “selective,” which means they control certain plant species while allowing other species to remain unaffected. Herbicides considered in this analysis, include picloram, clopyralid, metsulfuron methyl, 2,4-D, imazapic, glyphosate, dicamba, chlorsulfuron, hexazinone, sulfometuron, imazapyr and triclopyr. Several herbicides are considered because they vary in effectiveness on different invasive weeds.

The length of time each herbicide controls invasive weeds varies with the type of herbicide, environmental conditions, and target weed. Some herbicides control weeds for a short time period, while others can provide several years of control from one application. The U.S. Environmental Protection Agency (USEPA)-approved herbicide labels include safe handling practices, application rates, and practices to protect human health and the environment. A description of herbicides including copies of labels, susceptibility of weeds to different herbicides, Material Safety Data Sheets, and guidelines proposed for use on this Project are contained in the Project File. Examples of labels from commonly used herbicide are located in Appendix K. More information on herbicide labels can be found at [www.cdms.net/manuf/manuf.asp](http://www.cdms.net/manuf/manuf.asp). The Spill Plan can be found in Appendix B.

## **Invasive Plant Prevention**

Preventing introduction and spread of invasive plants is one objective of the Integrated Weed Management Program for the project area. The USFS has prepared a comprehensive Guide to Noxious Weed Prevention Practices (USDA FS 2001d) for use in planning forest and wildland resource management activities and operations. The guide assists managers and cooperators in identifying weed prevention practices that mitigate identified risks of weed introduction and spread for projects and programs. The document is.

Factors critical in a prevention program include:

- Limiting invasive plant seed dispersal occurring from vehicles and equipment traveling forest roads, and by people and domestic stock traveling forest trails;
- Containing neighboring invasive plant infestations;
- Minimizing soil disturbance;
- Detecting and eradicating newly established invasive plants;
- Establishing competitive desirable vegetation ; and

- Proper forage management, including revegetation and shade management.

In addition, the Forests depend on public education and invasive plant prevention programs to deter establishment of new invasive species such as yellow starthistle, meadow hawkweed, and rush skeletonweed. Education programs have been ongoing on all the Forests, to varying degrees, for more than a decade. These programs have helped raise public awareness about invasive plants, and what steps can be taken to help reduce the spread of existing invaders and the establishment of new invaders.

## **MONITORING**

Monitoring is the collection of data to determine effectiveness of management actions in meeting prescribed objectives. Monitoring focuses on:

- The density and rate of spread of invasive exotic plant species and the effect these aggressive plants have on natural resources;
- Effect of herbicides on noxious weeds, desirable vegetation and sensitive plants;
- Effectiveness of biological control agents;
- Effects of cultural weed management activities;
- Effects of herbicides on surface water quality; and
- Implementation of environmental protection measures.

## **PROGRAM ADAPTATION**

The adaptive management approach evaluates the effectiveness of treatment methods. Treatments are monitored and if found ineffective, the results are documented and another method employed. As new infestations and/or growth of existing infestations are identified, new treatment sites are identified or a different treatment method may be applied to meet the objectives. In addition, new chemicals that fall within the range of analyzed effects in the NEPA document may be recruited for use.

# SELWAY – BITTERROOT WILDERNESS



## INFORMATION & EDUCATION PLAN

# 2006

## Line Officer Approval Sign off Sheet

The following Line Officers, by way of signature and date, approve the Selway-Bitterroot Wilderness Information and Education Plan for adoption on their respective Forests and districts.

Signed \_\_\_\_\_ Date \_\_\_\_\_  
**Dave Campbell, West Fork District Ranger: Bitterroot National Forest**

Signed \_\_\_\_\_ Date \_\_\_\_\_  
**Chuck Oliver, Darby District Ranger: Bitterroot National Forest**

Signed \_\_\_\_\_ Date \_\_\_\_\_  
**Dan Ritter, Stevensville District Ranger: Bitterroot National Forest**

Signed \_\_\_\_\_ Date \_\_\_\_\_  
**Cindy Lane, Lochsa District Ranger: Clearwater National Forest**

Signed \_\_\_\_\_ Date \_\_\_\_\_  
**Chad Benson, Powell District Ranger: Clearwater National Forest**

Signed \_\_\_\_\_ Date \_\_\_\_\_  
**Joe Hudson, Moose Creek District Ranger: Nez Perce National Forest**

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## **INTRODUCTION**

The Selway-Bitterroot Wilderness (SBW) within the Northern Region of the Forest Service encompasses an expansive 1.3 million acres across the Montana/Idaho border. Managed by three national forests and six ranger districts, the SBW includes diverse ecological settings as well as a diversity of uses, values, and benefits. Education is one of the values of Wilderness identified in the Wilderness Act and it is also an important management tool for perpetuating the Wilderness resource; *"Wilderness areas...shall be administered ...for the gathering and dissemination of information regarding their use and enjoyment as wilderness..."*

Support for the educational component of Wilderness management is essential in order to accomplish our mandate of perpetuating a system of high quality Wilderness areas that represent natural ecosystems, for present and future generations. Education programs can be used to influence both the attitudes and behaviors of individuals, by teaching people what wilderness is, and is not, and how and why it has value.

Wilderness education programs play an important role in enlisting both local and national public support for natural resources. These programs promote a stewardship perspective that encompasses a variety of resources including: wildlife, cultural resources, and air and water quality -- all of which are integral components that contribute to broader ecosystem health. Effective Wilderness education efforts serve two primary purposes. First, they provide a proactive means of addressing responsible resource use by visitors, thus reducing the need for restoration of damaged campsites, trails, and other wilderness features. Second, these programs can reach beyond Wilderness boundaries, helping to build a constituent base, who value the concept of Wilderness as an enduring, public resource.

## **BACKGROUND: WILDERNESS EDUCATION DIRECTION**

Guidance on developing an effective education strategy is found in national and regional documents as well as within the SBW General Management Direction.

## A. National Direction

In 1991, a National Strategic Plan for Wilderness Education was developed and disseminated throughout the Forest Service. This strategy emphasized education as a preventative tool to reduce resource impacts and outlined the following five goals for Wilderness education.

1. **Effective programs:** An effective Wilderness education program is in place at all levels of the organization.
2. **Information and communication:** Information and communication channels within and outside the Forest Service support the Wilderness education program.
3. **Monitoring and evaluating:** Continuous monitoring and evaluation occur at all levels of the agency to maintain an effective program and leadership profile in Wilderness education.
4. **Workforce:** The Wilderness workforce is skilled, knowledgeable, and credible in Wilderness education techniques and tools.
5. **Resources to the field:** Resources (people, funding, and materials) for Wilderness education are concentrated at the forest and district levels.

On a broader scope, a National Conservation Education Strategic Action Plan was developed in 1999 to address all of conservation education within the Forest Service. This plan identified education efforts as a means of connecting citizens with their environment and emphasized the importance of interrelationships and the sustainability of natural and cultural resources.

The most recent national direction addressing Wilderness education efforts is the 10 Year Wilderness Challenge, initiated by the Chief of the Forest Service in 2004. The Challenge identifies education as one of ten critical elements used to measure Wilderness program accomplishments. To meet a “minimum stewardship level” Wilderness programs must rate a cumulative score of “60” in the ten elements. The education element requires successful completion of an education plan and implementation and evaluation of prioritized Wilderness education efforts.

## **B. Regional Education Strategy**

With one National Forest acre in five designated as Wilderness in the Northern Region, the Region's vision statement acknowledges the Wilderness resource as a significant national treasure and emphasizes the importance of demonstrating the highest quality of Wilderness stewardship. Education is cited as one essential tool that can be used to accomplish quality stewardship of this public resource. Regional strategies to support Wilderness education include the following measures:

1. Continue regional emphasis to elevate wilderness to "full resource status", which will garner support for wilderness program priorities such as Wilderness education.
2. Improve Line Officer support for Wilderness.
3. Emphasize the need for a diverse and highly qualified workforce in Wilderness education, selected for the specific expertise each employee brings to the field.
4. Include and emphasize Wilderness education goals and programs in the following plans for each wilderness in the Region: Wilderness Implementation Schedules, Wilderness Education Action Plans, Forest Plans and out-year budget requests.
5. Continue Wilderness education funding through "America's Great Outdoors" budget initiative.
6. Celebrate and share what works throughout the Region with communication networks.
7. Determine what's needed throughout the Region by aggregation of items from Wilderness education action plans and other means. Identify specific needs and arrange training and information transfer as needed.
8. Expand the "Master Performer" concept beyond Leave No Trace. Consider Master Performer for champions and trainers in such topics as grizzly bear sanitation and primitive tool care and use.
9. Form stronger internal partnerships with environmental education program and natural resources conservation education program. Identify key areas where efforts can be combined for the mutual benefit of each program.
10. Continue and pursue partnerships with organizations with mutual goals, such as Backcountry Horsemen, state and other federal agencies, Wilderness Watch, and the Wilderness Institute.
11. Tighten the communication network, with the realization that the remote location of many Wilderness staffs makes it difficult for them to keep in touch and stay current.

12. Plan and conduct a number of events or special Wilderness education emphases such as a Wilderness Education Workshop.

### **C. Selway - Bitterroot Wilderness General Management Direction**

The General Management Direction for the SBW, which is a component of the Forest Plans for all three managing Forests, stresses the role of education as a priority management tool for limiting resource impacts. It provides the following specific direction regarding educational efforts:

1. Public education will continue to be emphasized by SBW managers as the primary means of correcting visitor violations and developing cooperative attitudes.
2. A public education management goal shall be: A positive contact with every wilderness visitor, either in person, by letter, brochure, news media or bulletin board.
3. Education programs will be designed to teach methods and skills necessary for low impact use of Wilderness.
4. Education efforts will address: proper sanitation techniques, “Pack it in – Pack it out” litter control, proper campsite selection, use and naturalization, low impact equipment, proper stock handling techniques, protection of natural features, safety issues regarding travel and equipment in the backcountry and the role of fire and fire planning in Wilderness management.
5. Forest Service personnel will set the example of good Wilderness ethics and low impact techniques in all aspects of work and administration.
6. Continued in-service education at all levels on the concepts of wilderness, proper camping techniques, primitive skills and fire management.

Building upon these resources, the SBW Information and Education Plan is intended to be a flexible and dynamic framework that is continually updated and refined to address current and future management issues.

Each of the SBW’s six managing ranger districts have been implementing their own information and education programs to the degree practicable, based on funding, emphasis items and availability of trained instructors, teaching materials and contacts

with the public. As a result, the number, types, quality and message content of programs vary significantly from year to year and district to district.

Because so many variables influence project implementation on any district in a given year, SBW managers have begun to rely more heavily on the concept of “boundaryless management” to achieve wilderness-wide goals. Coordination to create a SBW Information and Education Plan is another form of “boundaryless” management that will help to create a more consistent, high-quality Wilderness program across the SBW.

## ***MISSION STATEMENT***

The Selway - Bitterroot Wilderness Information and Education Plan acknowledges the entirety of the Wilderness resource and the importance of preserving the ecological, cultural, historical, recreational, educational, scientific and spiritual values that comprise this unique national treasure. Information and education efforts will avidly promote a Wilderness land ethic<sup>1</sup> and will encourage active participation in Wilderness management by all citizens and Wilderness visitors.

## ***GOALS & OBJECTIVES***

**GOAL 1: All administrative units responsible for SBW management will support and contribute to a coordinated SBW Education Program by assisting with annual program planning, implementation and evaluation.**

### ***Objectives:***

1. By 2006, District Rangers will review and approve an official Information and Education Plan that will provide the framework for a coordinated, cross-boundary SBW education program. The Plan will be reviewed periodically at Policy Council meetings to incorporate updates as necessary.
2. By February of each year, the SBW Implementation Team will review annual education program summaries and proposed future action items to produce a prioritized list of information and education program targets that each district will implement; taking available resources and funding into consideration.

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<sup>1</sup>

\* “A Wilderness land ethic is a special class of land ethic. Rooted in an understanding of the unique values of Wilderness, it nurtures the desire to act in ways that will be good for the living Wilderness” 1991. USDA Forest Service. Strategic Plan: Wilderness Education. Washington DC.

3. At the end of each season (by Dec), field rangers will summarize program results and propose a list of action items for the following year, based on resource concerns that warrant increased educational emphasis.
4. At the end of each season (by Dec), field rangers will summarize program results and propose a list of action items for the following year, based on resource concerns that warrant increased educational emphasis.
5. Field rangers will document and evaluate education efforts for effectiveness, throughout the season, in order that program content and presentation formats can be improved as new information and more effective programming is developed or discovered.

**GOAL 2. SBW information and education efforts will engage both internal and external audiences, to increase awareness, knowledge, understanding and appreciation of the National Wilderness Preservation System and the SBW and promote ethical resource stewardship.**

***Objectives:***

1. Incorporate one or more of the following components in informational and educational programs:
  - address the history, unique attributes and values of the Wilderness resource,
  - identify physical and social impacts to the Wilderness resource that are relevant to the target audience,
  - describe the consequences of misuse of the Wilderness resource, (addressing consequences for both the resource and the visitor), and
  - demonstrate and promote attitudes, behaviors and techniques that promote sustainability and minimize degradation of the Wilderness resource
2. Provide accurate, accessible, and meaningful wilderness information via web pages, trailhead signage, booklets and brochures, and training opportunities.
3. Incorporate a mixture of communication channels (visual, verbal, hands-on etc) to relay accurate and age appropriate information to target audiences to better captivate the audience and influence behavioral changes that promote preservation of Wilderness qualities.
4. Provide information and education regarding the Wilderness resource in a professional and courteous manner.
5. Collaborate with stakeholders, other agencies, and public citizens in fostering wilderness awareness through the development of partnerships.

## ***ISSUES, MESSAGE DEVELOPMENT AND IMPLEMENTATION***

Previous information and education efforts across the SBW have been based on a desire to increase awareness of the Wilderness resource and address emerging and longstanding resource impacts, caused by visitors. After reviewing previous efforts and discussing current resource concerns, field rangers and program managers identified the following ten, prominent issues they felt information and education efforts could best help address. While the following list is not prioritized, it is consistent with the education topics identified within the SBW General Management Direction (C4).

1. Wilderness Awareness
2. Campsite Etiquette/Ethics
3. Improper Food Storage
4. Stock Impacts
5. Invasive Weeds
6. Illegal motorized, mechanical use
7. Fire in Wilderness
8. Campfires
9. Geocaching
10. Unleashed Dogs

Once these topics were identified, rangers worked on developing concise informational/educational messages to address each issue. Then target audiences, possible communication channels, existing reference materials, responsibility for program implementation and possible means for monitoring accomplishments were addressed (Appendices A and B). This compilation represents the core of the SBW Information and Education Plan and a starting point to identify and prioritize annual information and education targets for implementation (Appendix C). As new information or issues are identified, the existing information base can be amended or expanded and new information can be incorporated into annual programs of work.

## APPENDICES

Appendix A: Potential Target Audiences & Communication Channels

Appendix B: Issues and Message Development

- Wilderness Awareness
- Campsite Etiquette/Ethics
- Invasive Weeds
- Improper food storage
- Stock impacts
- Illegal motorized/mechanical use
- Fire in Wilderness
- Campfires
- Geocaching
- Unleashed Dogs

Appendix C: Annual Information/Education Implementation Table

Appendix D: SBW Education Effort Evaluation Review Form

Appendix E: SBW Annual Wilderness Education Presentation Record

Appendix F: Wilderness Management Policy and Direction Reviewed

## **Appendix A: POTENTIAL TARGET AUDIENCES & COMMUNICATION CHANNELS**

### **TARGET AUDIENCES:**

- Wilderness Visitors
  - Stock Users
  - School Groups
  - Community groups (civic groups, special interest groups)
  - Scouts
  - Outfitters/Guides/Clients
  - Hunters
  - Pilots and visitors arriving aerially
  - Selway and Lochsa River Boaters
- Front Country Visitors
- Non-visiting Audiences
  - Local community members
- Other: Businesses
- Forest Service Employees/Volunteers
- Other Government entities/Partners

### **COMMUNICATION CHANNELS:**

#### ***Direct channels:***

- Direct public contact in the field, on trails, at trailheads, information desks, phone conversations etc.
- Education Programs: scheduled “formal” programs in or outside the Wilderness
- Community Outreach: Meetings with special interest groups/staffed displays at county fairs etc
- Letters/e-mails to prospective or past users

#### ***Indirect channels:***

- Webpage information
- Unstaffed Bulletin Boards Displays (expect visitors to look for 20 sec to 1 min)
- Pamphlets/brochures
- Parade appearances
- News articles/ announcements
- Radio announcements

**Appendix B: Issues and Message Development**

- Wilderness Awareness
- Campsite Etiquette/Ethics
- Improper food storage
- Stock impacts
- Invasive Weeds
- Illegal motorized/mechanical use
- Fire in Wilderness
- Campfires
- Geocaching
- Unleashed Dogs

**Issue: Wilderness Awareness**

What is the Issue/concern/problem?	Why is it an issue?	Target Audiences	Educational Message	Communication Formats	Responsible for Delivery	Monitoring Items
<p>Many wilderness visitors, non visitors, FS employees, volunteers and partners are unaware of what Wilderness designation means, both legally and ethically. This lack of awareness often means they do not realize how the activities they participate in affect the wilderness resource and wilderness users.</p>	<ul style="list-style-type: none"> <li>• Uninformed recreationists are creating unacceptable physical and social impacts to Wilderness.</li> <li>• Many impacts are created by recreational activities that are not wilderness dependent.</li> <li>• Visitors who are not suitably prepared may incur injury and not understand the financial, logistical and ecological impacts associated with a remote rescue procedure.</li> <li>• Lack of public awareness may cause a lack of political support for Wilderness funding and designation.</li> </ul>	<p><b>ALL</b></p>	<p>Wilderness is designated by congress to be preserved in its <i>wild</i> state for the use and enjoyment of future and present generations. It is managed to protect certain values, such as solitude, unconfined recreation and natural processes.</p> <p>Wilderness provides:</p> <ul style="list-style-type: none"> <li>• Opportunity for solitude and primitive recreation opportunities</li> <li>• Physical challenge</li> <li>• Mental stimulation and inspiration</li> <li>• Open space and wildlife habitat</li> <li>• Undisturbed landscapes/ecosystems</li> <li>• Scientific study</li> <li>• Escape from mechanization, technology, etc.</li> <li>• Historical and cultural values</li> </ul> <p>Wilderness is a full partner in the Forest Services' multiple use mission.</p> <p>As a visitor/ FS employee etc, it is important to do your part to protect these values by adhering to LNT /minimum impact practices and all wilderness regulations.</p>	<p><b>Personal contacts</b></p> <p><b>Bulletin Boards</b></p> <p><b>Website</b></p> <p><b>Brochures</b></p> <p><b>Ed Programs</b></p> <p><b>Newspaper articles</b></p> <p><b>Map info</b></p> <p><b>Videos</b></p>	<p>Frontliners Field Rangers All employees</p> <p>Field Staff</p> <p>Field Staff w/ SO webmaster</p> <p>Front liners Field Staff SO/RO for development</p> <p>Field Staff</p> <p>Field Staff NF PAOs</p> <p>Forest/Regional Staff</p> <p>Visitor Centers Field Staff Ed programs</p>	<p># contacts</p> <p># displays</p> <p># website hits</p> <p>NA</p> <p>EEER forms # Programs, # people</p> <p># articles/yr</p> <p>NA</p> <p>NA</p>

## **WILDERNESS AWARENESS REFERENCE MATERIALS:**

### **PERSONAL CONTACTS:**

- Frontliners:** Provide frontline personnel with Wilderness info including copies of the wilderness act, SBW map, current wilderness and LNT brochures, regulations, and current hitch reports. Visitors w/ detailed questions should be directed to appropriate managerial/ field personnel.
  
- Field Staff:** Rangers and field staff should be identifiable as official FS employees if presenting FS regulation/policy. (Note that some volunteers have more influence as a peer than an authority when distributing information)

### **BULLETIN BOARDS / SIGNAGE:**

Bulletin Boards Wilderness Portals should be inspected maintained and repaired so as to represent a “cared for” appearance. Visitors typically spend less than 30 seconds at a board and rarely take away more than 3 messages. Keep boards clean, simple, updated and relevant. Information on the boards should include the following messages in an orderly, readable format:

- SBW regulations
- Area map: (color copies of immediate area, made from Forest Map and laminated)
- Pertinent information to that location (closures, special orders, special hazards, info for targeted user groups or area specific issues)
- Visitor Travel Log Box w/ sufficient Cards and writing implements
- Wilderness Boundary signs along the trail so people know when they have crossed the boundary

### **WEBSITES**

Websites offer an exceptional opportunity to share area specific information with potential wilderness visitors. Currently, information provided on the SBW is highly inconsistent across the three Forests sharing SBW management responsibility. Managers would like to provide a more consistent opening message on the web that would address basic SBW information, including:

- Basic SBW area description
- SBW regulations
- Coarse map showing the complete SBW boundary, MT/ID boundary and district Boundaries.
- Contact information for managing districts
- Updated SOW reports
- Volunteer opportunities

### **BROCHURES**

#### **Existing:**

- 7 Lakes Brochure (new in 2005)
- Keeping the Wild in Wilderness R1-83-07
- Leave No Trace pocket cards
- Leave No Weeds pocket cards
- National Wild & Scenic Rivers System
- Managing the Selway Bitterroot Wilderness R1-91-7

- Wilderness: An Enduring Resource: NWPS produced by NFF & USGS

## ED PROGRAMS

Existing:

- **The Wilderness Skills Trail:** designed for youth, primarily 4-6<sup>th</sup> grade students. This program moves students through a series of stations with visual and hands-on props where they learn about what wilderness is and about a series of Leave No Trace techniques. Lessons adapted from Project Learning Tree, Joseph Cornell, the Wilderness & Land Ethic Curriculum.
- **Scout troops Programs:** Heavy emphasis on LNT, map reading and What Wilderness is/is not. Often components of the Skills Trail are incorporated into these programs.
- **MCC: Montana Conservation Corp Leaders Program:** Emphasis on Wilderness Values and how that translates to field work, proper LNT and teaching LNT to crews.
- 
- **FS employees during spring orientations:** Wilderness Quiz, Wilderness Bingo, Wilderness Jeopardy, LNT Dice. Basic orientation to what and where Wilderness is on their districts/Forest. Emphasis that Wilderness is a program just like other program and how Wilderness may play into their jobs, what it means for them trying to accomplish a task on the ground. Explain what Wilderness Rangers do.

## WILDERNESS AWARENESS REFERENCE MATERIALS cont...

- **Wilderness Volunteers:** Typically a one on one or small group orientation to the wilderness program, how to share LNT principles w/ other users. Wilderness issues, agency management, and wilderness ranger activities.
- **University Wilderness Based Courses:** Topics are usually centered around wilderness management issues and career opportunities
- **Campground/Fireside programs :** 1-2 SBW and Wilderness Ranger Introductory programs held at CNF campgrounds/season

### Potential audiences for future programs:

- Teacher workshops
- High School Student appropriate: in class & field based programs
- SBW Artist in Resident Program

## NEWSPAPER ARTICLES

Article ideas:

- LNT for :hunting, camping, stock users
- Wilderness Rescue
- Education program or Project reports w/ photos

## MAP INFO

- National Wilderness Preservation System Map
- Bitterroot NF Map
- Clearwater NF Map
- Nez Perce NF Map

- SBW North Half Map
- SBW South Half Map
- USGS 7.5 Quads

**VIDEOS:**

- **The Greatest Good:** Long, but terrific 4 part history of the Forest Service that intertwines Pinchot, Leopold, Carhart, Muir, Teddy Roosevelt, LBJ, and the signing of the wilderness Act.

\*New teaching guide to accompany video presentation for students has been produced

- What a Wilderness Ranger does: new video to be released by MTDC in 06?

**Issue: Campsite Etiquette/Ethics**

What is the Issue/concern/problem?	Why is it an issue?	Target Audiences	Educational Message	Communication Format	Responsible for Delivery	Monitoring Item
<p>Many areas in the SBW exceed the number of sites and the condition of those sites based on Forest Plan standards.</p> <p>Visitors are not familiar with or do not practice Leave-No-Trace principles and further impact existing campsites or create new ones.</p>	<p>Impacted campsites and areas exceeding Forest Plan standards are an indication of resource damage and degrade visitor experiences of wilderness as a place natural and unmodified.</p> <p>Problems associated with campsites include:</p> <ul style="list-style-type: none"> <li>• Damage to vegetation (loss of vegetative cover, introduction of invasive and non-native species, damage to live trees and a significant reduction in down woody debris for nutrient cycling and micro niches)</li> <li>• Damage to soil (compaction and erosion, trenching, sterilization associated with campfires)</li> <li>• Fire-ring impacts (charred rocks, sterilized soil, garbage accumulation in fire rings and subsequent toxic content of ash piles)</li> <li>• Water pollution</li> <li>• Loss of solitude (when camp sites are too close to lakes and trails or are in pristine areas)</li> <li>• Loss of the sense of wildness (the human “browse line”, tree carvings and nails, fire rings, residual “camp craft” items like poles, benches, stumps etc.)</li> <li>• Altering wildlife patterns &amp; habitat</li> <li>• Exceeding stay limits increase impacts (especially hunting season)</li> <li>• Sanitation issues: proper toilet protocol</li> </ul>	<p>Wilderness visitors (backpackers, stock users, hunters, rock climbers,)</p> <p>Institutional groups (Boy Scouts, etc.)</p> <p>Volunteers</p> <p>Outfitters</p> <p>FS employees (front liners, fire, trail, etc.)</p>	<p>All LNT Principles come into play at campsites, especially Travel and Camp on Durable Surfaces</p> <p>Good campsites are found, not made.</p> <p>In popular areas, encourage the use of established campsites 200’ from water and off of trails. Select a site that is big enough for your group to avoid damaging vegetation around the site.</p> <p>In pristine areas, camp on durable surfaces (rock, gravel, grass or snow) at least 200’ from water. Avoid places where impacts are just beginning. Use stoves.</p> <p>Encourage stoves or mound fires instead of fire rings. Use existing fire rings, rather than building new ones. Burn only wood, paper and food particles in fire, not garbage, which creates toxic residues.</p> <p>Respect 14 day stay limits</p> <p>Proper LNT sanitation practices, 200ft from trails &amp; water, catholes and group latrines when necessary.</p>	<p>Personal contacts</p>	<p>Wilderness &amp; Recreation Staff, Frontliners &amp; Visitor Centers, Outfitter Administrators LEOs</p>	<p># contacts # new campsites &amp; changes in impact ratings at existing</p>
				<p>Bulletin Boards</p>	<p>Wilderness &amp; Recreation Staff</p>	<p># displays</p>
				<p>Websites</p>	<p>Wilderness &amp; Recreation Staff, SO webmaster</p>	<p># website hits</p>
				<p>Brochures</p>	<p>Wilderness Staff Forest/Regional Staff PAO's</p>	<p>NA</p>
				<p>LNT cards</p>	<p>Wilderness Staff</p>	<p># LNT cards taken</p>
				<p>Ed Programs :</p>	<p>Wilderness Staff, Education Coordinators, Volunteer Coodinators</p>	<p># programs # new campsites &amp; changes in impact ratings at existing</p>
				<p>Newspaper articles</p>	<p>Wilderness Staff PAO's</p>	<p># articles</p>

## **CAMPSITE ETIQUETTE/ETHICS REFERENCE MATERIALS:**

### **PERSONAL CONTACTS:**

- Frontliners & Visitor Centers:** Provide brochures and LNT cards. Visitors w/ detailed questions should be directed to appropriate managerial/ field personnel.
- Field Staff:** Rangers and field staff should be identifiable as official FS employees when presenting FS regulation/policy & LNT
- Outfitter Administrators:** Ensure outfitters are familiar with LNT principles and that camping techniques that minimize impacts are incorporated in permit
- LEO's:** Familiar with LNT principles and incorporated into field contacts.

### **BULLETIN BOARDS / SIGNAGE**

#### **Existing Posters:**

- Fire rings & alternate methods
- Leave No Trace Poster

### **WEBSITES**

#### **FS:**

- Forest public websites
- Wilderness.net

#### **Organizations:**

- Leave No Trace
- MT & ID Wilderness Associations

### **BROCHURES**

#### **Existing:**

- 7 Lakes Brochure (new in 2006)
- Horse Sense: R1-02-47
- Leave No Trace: Backcountry Horse Use
- Tread Lightly: 23.70.400.08/85
- The Spirit of Fair Chase: The Wilderness Hunters' Code: R1-94-4
- Keeping the Wild in Wilderness: R1-83-07
- Leave No Trace Pocket cards
- Leave No Weeds Pocket cards
- National Wild & Scenic Rivers System
- Wilderness Camping Tips: CNF R1-01-12
- Backcountry Trail Etiquette: Idaho Trails Council :HB366 Parks & Recreation 1730-1249-3/91-40M

### **EDUCATION PROGRAMS**

#### **Existing:**

- Bitterroot NF Skill's Trail
- Conservation Days (Leave No Trace)
- Clearwater NF Skill's Trail
- Forest/District Orientations
- Volunteer work group orientations
- Occasional
  - Back Country Horsemen

- County Fairs

**Needed Programs:**

- Leave No Trace Train the Trainers held locally
- Leave No Trace Stock Use held locally

**NEWSPAPER ARTICLES**

- 14 day stay limit
- Campfire impacts: Garbage in, Toxics Out
- General LNT

**Issue: Improper Food Storage**

What is the Issue/concern/problem?	Why is it an issue?	Target Audiences	Educational Message	Communication Format	Responsible for Delivery	Monitoring Item
<p>Improper food storage attracts a variety of wildlife into camp</p>	<p>Animals exposed to human food and salt diminish the wilderness experience. They do not appear wild. Their dependence on concentrated food sources leads to unnatural foraging habits. The may become a danger to themselves and others</p> <p>Wilderness provides habitat for common and threatened &amp; endangered species. Improper food storage can escalate human/wildlife conflict further threatening the feasibility and support for re-establishing populations of rare animals.(ie. grizzly bears)</p>	<p>Wilderness visitors (hunters, etc.)</p>	<p>Respect Wildlife; Never feed animals. Feeding wildlife damages their health, alters natural behaviors, and exposes them to predators and other dangers. Protect wildlife and your food by storing rations and trash securely.</p>	<p>Personal contacts:</p>	<p>OHV, Wilderness &amp; Recreation Staff LEO's Frontliners &amp; Visitor Information Centers</p>	<p># contacts Infra trails (trails meet standards for width) LEO Database Incident Reports</p>
		<p>O/G</p>	<p>A “fed bear” is a “dead bear”. Hang your food in a tree 10 feet high and 4 feet from the trunk to keep it away from bears.</p>	<p>Bulletin Boards</p>	<p>Wilderness &amp; Recreation Staff</p>	<p># displays</p>
		<p>Local Communities</p>	<p>Backpackers can purchase bear-proof food containers for situations where it is not convenient to hang food.</p>	<p>Websites</p>	<p>Wilderness Staff, SO Webmaster</p>	<p># website hits</p>
		<p>Front country/campground users</p>	<p>Horse packers can build or purchase bear- proof food panniers for convenience or to store a large amount of food without damaging trees.</p>	<p>Brochures: Tread Lightly</p>	<p>Wilderness &amp; Recreation Staff Forest/Regional Staff PAO's</p>	<p>NA</p>
		<p>Organized user groups, Including snowmobilers</p>	<p>Horse feed containing grain products will attract bears. Hang or store grain feed securely. Hay cubes will not attract bears.</p>	<p>Ed Programs</p>	<p>Wilderness Staff, Education Coordinators</p>	<p># programs</p>
			<p>Often it is the rodents that you have to worry about. They can chew holes in backpacks and spoil food. Storing food in bear-proof containers or hanging food so as to protect it from bears will also protect it from smaller opportunists.</p>	<p>Newspaper articles</p>	<p>Wilderness Staff PAO's LEO's</p>	<p># articles</p>
			<p>Deer and moose crave salt. They sometimes chew on pack straps, cinches or sweaty bandanas and can cause damage. Take extra precautions to protect gear and secure food around tame acting wildlife.</p>	<p>Signing &amp; boundary markers:</p>	<p>Wilderness &amp; Recreation Staff LEO's</p>	<p>LEO Database Incident Reports</p>

## **IMPROPER FOOD STORAGE REFERENCE MATERIALS:**

### **PERSONAL CONTACTS**

- Frontliners & Visitor Information Centers:
- Field Staff:
- LEO's/FPOs:

### **BULLETIN BOARDS / SIGNAGE**

- Caution Moose: (District created poster for Elk Summit)

### **WEBSITES**

### **BROCHURES**

#### **Existing**

- Living with (wildlife) series: produced w/ Fish Wildlife & Parks
- Welcome to Elk Summit – Moose Country R1-04-33
- Living in Bear Country: Defenders of Wildlife (2003)
- Horse Sense: R1-02-47

### **ED PROGRAMS**

#### **Existing Programs:**

- Skills Trail: Wildlife station

#### **Needed Programs:**

### **NEWSPAPER ARTICLES**

**Issue: Stock Impacts**

<b>What is the Issue/concern/problem?</b>	<b>Why is it an issue?</b>	<b>Target Audiences</b>	<b>Educational Message</b>	<b>Communication Format</b>	<b>Responsible for Delivery</b>	<b>Monitoring Item</b>
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## **STOCK IMPACTS REFERENCE MATERIALS:**

### **PERSONAL CONTACTS**

**Frontliners:** Need to know the range of brochures available as well as receive updated from the field about trail conditions that will accommodate stock passage as the season progresses and trails are opened up.

**Field Staff:** All field-going staff should be proficient in both explaining and demonstrating LNT Stock practices. It is helpful to know the location of developed campsites with stock facilities as well as forage availability and backcountry campsite durability to direct stock users to sites that are better suited for stock containment.

### **BULLETIN BOARDS / SIGNAGE**

- Horsemen poster GPO 1984-796-791
- Horse Users poster P23-09

### **WEBSITES**

### **BROCHURES**

#### **Existing:**

- Leave No Trace: Backcountry Horse Use
- Horse Sense: R1-02-47

### **ED PROGRAMS**

#### **Existing:**

- Skills Trail: Stock containment session
- Defensive Horsemanship (typically targeted for FS employees, volunteers & partners)
- Pack and Stock LNT courses at 9-mile

### **NEWSPAPER ARTICLES**

#### **Article ideas**

- Recaps of volunteer NSA & BCH work projects on FS land that improve trails and thus stock access
- Spring stock conditioning articles
- Backcountry stock challenges: address bridges, downfall and LNT stock techniques
- Summer/Fall articles that link responsible stock use/feeding with the weed free feed message, and identify where people can find information on buying weed free feed



## **INVASIVE WEEDS REFERENCE MATERIALS:**

### **PERSONAL CONTACTS:**

Frontliners Visitor Centers:

Field Staff:

### **BULLETIN BOARDS/ SIGNAGE**

#### **Existing:**

- Silent Invaders: The 10 Least Wanted (Joint agency produced)
- Native Plants: The 10 Most Desired (Joint agency produced)
- Weed Seed Free poster for Idaho (Yellow, jointly produced w/ Nez Perce NF & CNF)
- Certified Weed Signs along the highway when coming onto the CNF

### **WEBSITES**

<http://www.blm.gov/weeds/BOISUMMI.WPD.html>

<http://www.agri.state.id.us/Categories/PlantsInsects/NoxiousWeeds/watchlist.php>

<http://www.idahoweedawareness.org/>

<http://www.weedawareness.org/>

<http://agr.state.mt.us/weedpest/noxiousweeds.asp>

<http://invader.dbs.umt.edu/>

<http://www.weedcenter.org/>

### **BROCHURES**

#### **Existing:**

- Stop Noxious Weed Invasion R1-97-31
- Idaho's Noxious Weed identification booklet/calendar
- MT's Noxious Weed identification booklet/calendar
- Leave No Weeds Pocket cards

### **ED PROGRAMS**

#### **Existing Programs**

- Limited discussion in the Wilderness Skills Trail Stock session

#### **Needed Programs**

- Need: Identification program for district personnel

### **NEWSPAPER ARTICLES**

**Issue: Illegal motorized, mechanical use**

What is the Issue/concern/problem?	Why is it an issue?	Target Audiences	Educational Message	Communication Format	Responsible for Delivery	Monitoring Item
<p>Illegal motorized use has been on the rise in recent years as OHVs have become more popular and snow-machines have increased in power and efficiency.</p> <p>Motorized users may not understand the difference between wilderness and other land designations. Some are blatant violators.</p> <p>Signs and boundary markers may have been vandalized or are insufficient.</p> <p>There are inadequate numbers of agency personnel to patrol and educate.</p>	<p>Motorized use violates the Wilderness Act, which states: <i>“There shall be no temporary road, no use of motor vehicles, motorized equipment or motorboats, no landing of aircraft, no other form of mechanical transport and no structure or installation within any such area...”</i> (except where special provisions have been explicitly stated)</p> <p>Motorized use detracts from the serenity, solitude, and beauty of the wilderness and increases user conflict.</p> <p>User conflicts in non-wilderness/roadless areas are forcing increased restrictions on motorized/mechanized users</p> <p>Motorized/mechanized use may harass wildlife, spread weeds and may damage trails.</p>	<p>Wilderness visitors (hunters, etc.)</p> <p>O/G</p> <p>Local Communities</p> <p>Front country/campground users</p> <p>Organized user groups Inc. snowmobilers</p>	<p>Tread Lightly: What is and is not allowed in Wilderness regarding motorized use and how that relates to wilderness values of solitude, primitive experience and preserving natural processes.</p> <p>Ethical responsibility to help steward public land by adhering to regulations.</p> <p>Implications of being caught using a motorized/mechanized item</p> <p>Clarification on which kinds of new technology are acceptable in Wilderness and where we draw the line both, internally and externally.</p> <p>Provide info on areas where motorized/mechanized use IS allowed.</p> <p>Opportunity during the Forest Planning Process to provide input on OHV planning</p> <p>Education related to reward funding for information related to violations</p> <p>Internally, the need for increased patrols</p>	Personal contacts:	OHV, Wilderness & Recreation Staff LEO's Frontliners & Visitor Information Centers	# contacts Infra trails (trails meet standards for width) LEO Database Incident Reports
				Bulletin Boards	Wilderness & Recreation Staff	% trailheads with regs posted
				Websites	Wilderness Staff, SO Webmaster	# website hits
				Brochures: Tread Lightly	Wilderness & Recreation Staff Forest/Regional Staff PAO's	# brochures taken
				Ed Programs	Wilderness Staff, Education Coordinators	# programs
				Newspaper articles	Wilderness Staff PAO's LEO's	# articles
				Signing & boundary markers:	Wilderness & Recreation Staff LEO's	LEO Database Incident Reports

## **ILLEGAL MOTORIZED/MECHANIZED USE REFERENCE MATERIALS:**

### **PERSONAL CONTACTS**

- Frontliners & Visitor Information Centers:** Provide front liners w/ current OHV regulations, Wilderness regs related to motorized use and information related to legal OHV trail use (including seasonal closures). Visitors w/ detailed questions should be directed to appropriate managerial/ field personnel.
- Field Staff:** Rangers and field staff should be identifiable as official FS employees if presenting regulation/policy. OHV ranger plays critical role in education (including recommending open areas), signing and patrols. –
- LEO's:** Monitor areas that have problems with illegal motorized/mechanized use, Contact Bitterroot Citizen's Watch

### **BULLETIN BOARDS /SIGNAGE**

- SBW Regulations pertaining to motorized use.
- Clearly identify Wilderness boundaries with portal signs and post metal motorized restrictions.

### **WEBSITES**

- [www.treadlightly.org](http://www.treadlightly.org)
- [www.Bitterroot NF/Recreation](http://www.BitterrootNF/Recreation)
- [www.recreation.gov](http://www.recreation.gov)
- [www.americantrails.org](http://www.americantrails.org)
- [www.sharetrails.org](http://www.sharetrails.org)
- <http://fwp.mt.gov/hunting/hunteraccess/public>

### **BROCHURES**

#### **Existing Brochures:**

- Tread Lightly
- On the Right Trail: An Ethical Guide for OHV Riders
- Off Road Montana (MT FW&P)
- Driving Your Off Highway Vehicle
- Sapphire Mtn Snowmobile Trails (BNF & MT Dept of FW&P)

### **ED PROGRAMS**

#### **Existing Programs:**

- Wilderness Skill's Trail Flannel Board: Reaches 4-6<sup>th</sup> graders with interactive portion on what is and is NOT allowed in wilderness.
- Appendix M of Rocky Mt. Region Snowmobile I&E Strategy

#### **Needed Programs:**

- OHV groups

### **NEWSPAPER ARTICLES**

- Violations
- Reward/Citizen Watch Programs

**Issue: Fire in Wilderness**

What is the Issue/concern/problem?	Why is it an issue?	Target Audiences	Educational Message	Communication Format	Responsible for Delivery	Monitoring Item
<p>Fire suppression creates resource impacts (helispots, line construction, stumps, introduction of noxious weeds)</p> <p>Active fires generally have associated restrictions to public use</p> <p>Fire activity has short and long-term impacts on outfitters</p> <p>Prescribed Ignition &amp; Fire Suppression are forms of “trammeling” – manipulation – and are often accomplished using motorized equipment and mechanized access.</p>	<p>Visual impacts, such as cut stumps, retardant residue and unnatural openings left from helispot construction can affect visitor’s sense of wildness and remoteness for years (esp. when located in pristine areas where human impacts are least expected.</p> <p>Public support of prescribed fire may be jeopardized when personal use is restricted</p> <p>Outfitter livelihoods are impacted, both by cancelled bookings during area closures and during long-term changes to the landscape (hazard trees near camps, changed wildlife patterns, fire-affected trails), resulting in less support for prescribed fire and increased pressure to open trails using motorized equipment.</p> <p>Internally and externally there is confusion about the wilderness fire program:</p> <ul style="list-style-type: none"> <li>Decision making related to</li> </ul>	<p>Local communities and users (backpackers, stock users, etc.)</p> <p>Fire fighters (District crews, AFMO &amp; FMOs, Fire Teams)</p> <p>Resource advisors</p> <p>Local Users</p>	<p>MIST/MIMT</p> <p>Provide MIST?MIMT trainings to all levels Fire Org (teams, crewboss’, etc.)</p> <p>Minimize suppression impacts using MIST/MIMT</p> <p>Helispots: Construct and maintain helispots at existing administrative and airfield sites where essential for wilderness purposes. Require justification for continued use of existing helispots or for constructing new ones. Evaluate and document the need for maintained helispots in the Forest Plan.</p> <p>Allow public use in active fire areas where possible and promote safety awareness related to snags &amp; hazards. Provide current info on conditions.</p> <p>Provide outfitters with timely assessments related to their camps &amp; areas. Incorporate expectations related to fire in permits (responsibilities for client safety, trail maintenance with traditional tools,</p>	Personal contacts:	Wilderness & Fire Staff LEO’s Frontliners, PAOs & Visitor Information Centers	# contacts
				Bulletin Boards	Wilderness & Fire Staff	% Fire affected trailheads posted
				Websites	Wilderness & Fire Staff, SO Webmaster	# website hits
				Brochures:	Wilderness & Fire Staff Forest/Regional Staff PAO’s	NA
				Ed Programs	Wilderness & Fire Staff, Education Coordinators	# Programs
				Newspaper articles	Wilderness & Fire Staff PAO’s	# articles

	<p>suppression or allowing fire benefit</p> <ul style="list-style-type: none"> <li>• What tools are allowed?</li> </ul>		<p>etc.)</p> <p>Provide internal &amp; external information related to process determining go/no go and ways suppression in wilderness may be different.</p>	<p>Internal fire trainings</p>	<p>Wilderness &amp; Fire Staff</p>	<p># programs</p>
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## **FIRE IN WILDERNESS REFERENCE MATERIALS:**

### **PERSONAL CONTACTS**

**Frontliners & Visitor Information Centers:** Provide front liners w/ current fire conditions, including area closures. Visitors w/ detailed questions should be directed to appropriate managerial/ field personnel.

**Field Staff:** Rangers and field staff should be identifiable as official FS employees if presenting regulation/policy. There should also be Resource Advisor qualified wilderness rangers involved in wilderness fire (both go/no go and with on the ground suppression efforts).

**LEO's:** Monitor area closures

### **BULLETIN BOARDS / SIGNAGE**

#### **Existing:**

- Laminated signs
  - Wildland Fire Information
  - Area Closures

### **WEBSITES**

- [www.Forest/Recreation](http://www.Forest/Recreation)
- [www.firewise.org](http://www.firewise.org)
- [www.nwccg.gov](http://www.nwccg.gov)
- [www.symbols.gov](http://www.symbols.gov)

### **BROCHURES**

#### **Existing Brochures**

- Wildlands Fire Dangers: Safety & Survival Precautions for Recreationists & Homeowners
- Natural Fire in the Selway-Bitterroot Wilderness (Why Natural Fire/Process/Visitor Safety Tips)
- Incident Response Pocket Guides: Section on MIMT
- Wildland Fire in the United States: National Wildfire Coordination Group Boise ID
- You and Forest Fires: revised 1980 GPO 1983 0-404-679
- Coloring Book for Smokey's Friends: 2003 556-716
- Fire in the Mountains: R1-00-52

### **ED PROGRAMS**

#### **Existing Programs:**

- Wilderness Skill's Trail: Reaches 4-6<sup>th</sup> graders with small portion on what is and is NOT allowed in wilderness.
- Conservation Days (BNF): Reaches 6<sup>th</sup> graders with interactive program on natural fire processes
- Fire Squirts (CNF): for Idaho youth, week long summer program on fire & fire effects
- Regional Resource Advisor Trainings
- Regional Managing Fire for Resource Natural Benefit
- District level MIST/MIMT

**Needed Programs:**

- Type 2 Crewboss MIST/MIMT
- BIA MIST/MIMT

**NEWSPAPER ARTICLES:**

- Numerous

**Issue: Campfires**

What is the Issue/concern/problem?	Why is it an issue?	Target Audiences	Educational Message	Communication Format	Responsible for Delivery	Monitoring Item
<p>Depletion of downed woody debris, creation of excess social trails, tree damage.</p> <p>Too many fire rings.</p> <p>Trash left in fire rings.</p>	<p>At popular campsites or at high elevation, depletion of downed woody debris leads to unnatural conditions.</p> <p>Popular campsites often develop more than 1 ring. Lightly used campsites have a ring when none is needed. This increases barren core at the campsite which may make a site rating exceed set standards.</p> <p>See <i>“Garbage in Toxics Out” MTDC Tech Tips, Sept. 2004.</i></p>	<p>Backpackers</p> <p>Stock users</p> <p>Hunters</p> <p>Organized user groups</p>	<p>Use a lightweight stove for cooking especially at heavily used campsites or at high elevation sites. Stoves reduce impacts at campsites such as the “spider web” of user trails created from firewood gathering, the barren core at the center of the site, the unnatural depletion of firewood and damage to living trees from fire wood gathering. Burn only dead, down, dry and “dinky” firewood.</p> <p>Do not build new fire rings. Use existing fire rings, but <u>before</u> you build a fire remove any litter and scatter cold campfire ashes away from camp where they will not be seen. Dismantle the fire ring <u>after</u> use and naturalize the site – unless you are at a <u>very popular</u> site that may benefit from an established and maintained fire ring. Use a fire pan or mound fire instead of a fire ring. Pack out any garbage you found in the ring.</p> <p>Burned garbage produces toxics in the air and in the soil. It is not legal to burn any thing other than firewood, paper or food scraps in a campfire.</p>	<p>Personal contacts:</p>	<p>Wilderness rangers</p>	<p># contacts</p> <p>LEO Database Incident Reports</p>
				<p>Bulletin Boards</p>	<p>Wilderness &amp; Recreation Staff</p>	<p>% trailheads with regs posted</p>
				<p>Websites</p>	<p>Wilderness Staff, SO Webmaster</p>	<p># website hits</p>
				<p>Brochures</p>	<p>Wilderness &amp; Recreation Staff Forest/Regional Staff, PAO’s</p>	<p># brochures distributed</p>
				<p>Ed Programs</p>	<p>Wilderness Staff, Education Coordinators</p>	<p># programs &amp; # attendees</p>

Human caused wildfire	All human caused wildfires are suppressed. Suppression results in impacts.		Never leave a fire unattended. Be sure there are no fire restrictions. If it is windy, dry or hot don't build a fire. Use a fire resistant location. Carry a water bucket and shovel if possible. When you leave camp fires should either be naturalized or cold to the touch.	News articles	Wilderness Staff, Education Coordinators	# articles
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## **CAMPFIRE REFERENCE MATERIALS:**

### **PERSONAL CONTACTS**

- Frontliners & Visitor Information Centers:** Provide w/ brochures
- Field Staff:** Field staff need to read the MTDC tech tip and understand how to explain the negative result of burning non-wood materials in a fire. They also need to practice this while in the field.
- LEO's/FPOs:** Need special order for campfire toxics

### **BULLETIN BOARDS / SIGNAGE**

**Existing Posters:**

### **WEBSITES**

### **BROCHURES**

#### **Existing Brochures**

- Wilderness Sanitation: FS 66 (Revised 1978) This still implies that you should burn tin cans to remove food scraps, then pack out the cans.
- Make Campfires Safe: FS 337 reprinted 1980 GPO 0-405-842: QL 3
- Outdoor Fire Safety: FS 465 (this Supersedes FS 337)

#### **Needed Brochure**

- Need an updated message about handling food leftovers/ grease, plastics etc. Other than the MTDC tech tips report, we don't have any info for the public about the toxics produced in campfire rings

### **ED PROGRAMS**

#### **Existing Programs**

- Skills Trail Session on the pros and cons of different kinds of Campfire options

#### **Needed Programs**

- One that addresses toxics produced by burning things besides paper and wood.

### **NEWSPAPER ARTICLES**

#### **Topic ideas:**

An article might be timely if the Forest Supervisors approve a SPECIAL ORDER that would prohibit "Using a campfire to incinerate anything other than firewood, paper or food scraps"

**Issue: Geocaching**

What is the Issue/concern/problem?	Why is it an issue?	Target Audiences	Educational Message	Communication Format	Responsible for Delivery	Monitoring Item
<p>Geocaching (both physical &amp; virtual) advertise and attract visitors to new areas</p> <p>Geocaching uses non-traditional exploration – visitors rely on a technology that generates “routes” which may easily be passed on to multiple users.</p>	<p>Caches are normally in “hidden” places that do not receive use. By attracting new use to these areas, especially in pristine country, there are increased resource impacts.</p> <p>Problems associated with geocaching include:</p> <ul style="list-style-type: none"> <li>• Damage to vegetation (loss of vegetative cover, introduction of invasive and non-native species)</li> <li>• Loss of solitude (when caches are in pristine areas)</li> <li>• Loss of the sense of wildness (especially with physical caches) when human-collected artifacts are left in otherwise natural areas</li> <li>• Altering wildlife patterns &amp; habitat</li> <li>• Exceeding stay limits increase impacts (physical caches)</li> </ul>	<p>Local communities and users (backpackers, stock users, etc.)</p> <p>GPS business’</p> <p>Geocaching Web sites</p>	<p>Physical geocaching is illegal in wilderness - CFR261.58a &amp; 261.57f and on National Forest land</p> <p>Virtual geocaching has resource and social consequences</p> <p>On public land, contact managing agency before placing a physical cache</p> <p>Be respectful of area where you are placing a virtual cache. For example, if it’s near T&amp;E habitat or off-trail with fragile vegetation, re-think your cache location to avoid impacts. Monitor your location to see if impacts occur. (Paraphrased from geocaching.com info on hiding caches)</p> <p>Putting food in caches attracts animals.</p> <p>General LNT points</p>	<p>Personal contacts:</p>	<p>Wilderness &amp; Recreation Staff LEO’s Frontliners, PAOs &amp; Visitor Information Centers</p>	<p># contacts</p>
				<p>Bulletin Boards</p>	<p>Wilderness &amp; Recreation Staff</p>	<p>% Fire affected trailheads posted</p>
				<p>Websites: Get ethics into popular sites</p>	<p>Wilderness &amp; Recreation Staff, SO Webmaster</p>	<p>% websites with appropriate message</p>
				<p>Brochures:</p>	<p>Wilderness &amp; Recreation Staff Forest/Regional Staff PAO’s</p>	<p># brochures</p>
				<p>Ed Programs</p>	<p>Wilderness &amp; Recreation Staff, Education Coordinators</p>	<p># Programs</p>
				<p>Newspaper articles</p>	<p>Wilderness &amp; Recreation Staff PAO’s</p>	<p># articles</p>

Appendix G – Information and Education Plan

				Internal fire trainings	Wilderness & Recreation Staff	# programs

## **GEOCACHING REFERENCE MATERIALS:**

### **PERSONAL CONTACTS**

**Frontliners & Visitor Information Centers:** Provide front liners w/ regulations related to geocaching. Visitors w/ detailed questions should be directed to appropriate managerial/ field personnel.

**Field Staff:** Rangers and field staff should be identifiable as official FS employees if presenting regulation/policy. Monitor websites for caches described to be in wilderness and monitor locations for impacts.

**LEO's:** Monitor physical caches described to be located in wilderness for 14 day stay limits and impound.

### **WEBSITES**

- [www.eduscapes.com/geocaching/kids](http://www.eduscapes.com/geocaching/kids)
- [www.garmin.com/outdoor/geocaching](http://www.garmin.com/outdoor/geocaching)
- [www.magellangps.com/en/gpsAdventures/geocaching](http://www.magellangps.com/en/gpsAdventures/geocaching)
- [www.trimbleoutdoors.com/geocaching](http://www.trimbleoutdoors.com/geocaching)
- [www.geocaching.com/about/hiding](http://www.geocaching.com/about/hiding)
- [www.Navicache.com](http://www.Navicache.com)
- Incorporate complete ethics message in all related websites

### **BROCHURES**

#### **Needed Brochures**

- Why not in Wilderness?

### **ED PROGRAMS**

#### **Existing Programs:**

- Misc. websites

### **NEWSPAPER ARTICLES**

- If use/abuse increases

**Issue: Unleashed Dogs**

What is the Issue/concern/problem?	Why is it an issue?	Target Audience	Educational Message	Communication Format	Responsible for Delivery	Monitoring Item
<p>The number of unleashed dogs has dramatically increased on some trails, leading to and within the wilderness. People don't know when to voluntarily leash their dogs</p> <p>Accidents/incidents involving pack stock.</p> <p>Visitor conflicts, incidents, loss of solitude.</p> <p>Incidents involving multiple dogs.</p> <p>Sanitation</p> <p>Dogs chasing wildlife</p>	<p>Uncontrolled dogs disrupt the experience, solitude and safety of other visitors. Incidents caused by loose dogs create visitor conflicts. Accidents caused in part by dogs have caused personal injury.</p> <p>Most dogs are <u>not</u> used to being around horses/mules. Riders and packers have been seriously hurt or have had incidents with dogs that nearly resulted in injury.</p> <p>A dog's response to voice command varies by dog and by situation. Some unleashed dogs run ahead. People respond to unleashed dogs in different ways.</p> <p>Some dogs are aggressive or ill behaved. Some dogs don't get along. The more dogs the more likely one of them may get out of control.</p> <p>Dogs relieve themselves in campsites, near trailheads, next to water and along the trail.</p> <p>During winter wildlife maintain a delicate energy balance to survive. Unleashed dogs can put undue stress on animals when their food sources are scarce in winter and they may kill young animals in the spring.</p>	<p>All Visitors</p>	<p>While FS regulations do not require dogs to be on a leash, County Dog Ordinances apply when a "dog at large" causes property damage or injury. If in doubt leash your dog.</p> <p>On the trail you may experience sudden encounters with horses or mules. Dogs scare some horses and some mules are aggressive towards dogs. Avoid causing an accident and control your dog.</p> <p>Unleashed dogs may interfere with other's food, space, safety or solitude. Always leash your dog as a courtesy when approaching people or occupied campsites.</p> <p>A busy trail is no place for unleashed or aggressive dogs. If in doubt, find another area away from trails and roads where your dogs can run.</p> <p>Properly dispose of dog waste at least 200' away from campsites and water sources. Dog waste near the trailhead can be bagged and put in a trashcan – if you come prepared.</p> <p>It is illegal for dogs to harass wild animals. Moose or bear may chase a dog back to its owner with unpredictable results.</p>	<p>Personal contacts</p> <p>Bulletin Boards</p> <p>Websites</p> <p>Brochures</p> <p>LNT cards</p> <p>Ed Programs</p> <p>Newspaper articles</p>	<p>Wilderness rangers</p> <p>Wilderness &amp; Recreation Staff</p> <p>Wilderness &amp; Recreation Staff, SO webmaster</p> <p>Wilderness Staff Forest/Regional Staff PAO's</p> <p>Wilderness Staff</p> <p>Wilderness Staff, Education Coordinators</p> <p>Wilderness Staff and PAO's</p>	<p># contacts</p> <p>% trailheads</p> <p># website hits</p> <p># brochures taken</p> <p># LNT cards taken</p> <p># Programs &amp; # attendees</p> <p># articles</p>

## **UNLEASHED DOGS REFERNCE MATERIALS:**

### **PERSONAL CONTACTS:**

**Frontliners & Visitor Information Centers:** Should be informed of areas where dogs are restricted (such as Lolo Pass winter ski trails) and know about areas that receive heavy traffic where dogs uncontrolled dogs are more likely to cause problems with other users. Should also provide suggestions for alternate areas where visitors can take their pets.

**Field Staff:** Should address visitors in the field regarding control of their pets and alert them to situations where loose or uncontrolled dogs may interfere with wildlife, trail traffic or other concerns.

**LEO's/FPOs:** Should share the same information as field staff and enforce with a warning or citation as necessary.

### **BULLETIN BOARDS /SIGNAGE**

#### **Existing:**

- Laminated sign created by Bill Goslin for some trailheads on the E side of the SBW

#### **Needed:**

- Dogs are usually brought by individuals, so formal “Programs” are not the best medium for this message. Heavy day use areas and congested overnight areas are the areas we need to concentrate the message most. (The hotsprings are one such example of a busy area that need to address this issue.)

### **WEBSITES**

- <http://www.petnet.com.au/openspace/frontis.html>
- [http://www.thebark.com/community/advocacy\\_dogParks/dogParks.html](http://www.thebark.com/community/advocacy_dogParks/dogParks.html)

### **BROCHURES**

- None that we know of

### **ED PROGRAMS**

#### **Existing Programs:**

- The Rattlesnake has created an effective dog access program. It would be worth talking more w/ Andy Kulla and his rangers to understand what they have accomplished and see some of their materials.

#### **Needed Programs:**

### **NEWSPAPER ARTICLES**

- The Bitterroot ran an article in 2005 to address this issue

**Appendix C: ANNUAL EDUCATION IMPLEMENTATION TABLE**

Issue	Action Item	Responsibility	Target Date	Completion Date	Cost	Monitoring Results
Wilderness Awareness	Ed / school Programs	Wild Rangers	5 & 6 /07			XX students
	Backcountry Contacts	Wild Rangers	ongoing			XX Contacts
	Scout Programs	Wild Rangers	ongoing			XX Scouts
	News Releases	Wild Rangers	8/07			XX Articles
	Train FS Crews	Wild Rangers	6/07			XX employees
	Websites/Internet	Deb (SOW)	6/07			XX Hits
	SBW Foundation	Carol	Ongoing			XX meetings
Camp Etiquette/ Ethics	Ed/ school Programs	Wild Rangers	5&6 /07			XX students
	Backcountry Contacts	Wild Rangers	Ongoing			XX Contacts
	Scout Programs	Wild Rangers	Ongoing			XX Scouts
	News Releases	Wild Rangers	8/07			XX Articles
	Train FS Crews	Wild Rangers	6/07			XX employees
Improper Food Storage	Ed programs	Wild Rangers	6/07			XX Audience
	Backcountry contacts	Wild Rangers	Ongoing			XX Contacts
	Train FS Crews	Wild Rangers	Ongoing			XX employees
Stock Impacts	Ed /school Programs	Wild Rangers	6/07			XX audience
	Backcountry Contacts	Wild Rangers	Ongoing			XX Contacts
	Scout Programs	Wild Rangers	Ongoing			XX Scouts
	Train FS Crews	Wild Rangers Stock Mgrs	6/07			XX Employees
Unleashed Dogs	Backcountry contacts	Wild Rangers	Ongoing			X Contacts
	Bulletin Boards	Bill	9/07			XX posters

Issue	Action Item	Responsibility	Target Date	Completion Date	Cost	Monitoring Results
Invasive Weeds	Ed Programs for schools	Weed Specialist	6/07			XX attending & Presentations
	Backcountry Contacts	Wild Rangers	ongoing			XX Contacts
	Train FS Crews	Wild Rangers	6/07			XX people
	News Releases	PIO Team	ongoing			XX releases
	Websites/Internet	Ed Lozar	Ongoing			XX Hits
Illegal Motorized / Mechanized Use	Winter Boundary Patrols	Wild Rangers & Sheriffs	ongoing			XX Patrols
	Bulletin Boards	Wilderness Rangers	1/07			XX Signs
	Train FS Crews	Wild Rangers	1/07			XX People
Fire in Wilderness	Bulletin boards	Fire prevention techs	11/07			XX Posters
	Work w/ FS crews	Resource Advisors	11/07			XX Contacts
	Newsreleases	PIO	11/07			XX Articles
Campfires	Ed /school Programs	Wild Rangers	9/07			XX
	Backcountry Contacts	Wild Rangers	Ongoing			XX Contacts
	Scout Programs	Wild Rangers	Ongoing			XX Scouts
	Train FS Crews	Wild Rangers	6/07			XX Employees
Geocaching						

**Appendix D:** **SBW**  
**Education Effort Evaluation Review**  
**(E.E.E.R)**

**DATE of PROGRAM:** \_\_\_\_\_

**LOCATION:** \_\_\_\_\_

**PRESENTOR(S):** \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

**PRESENTATION TOPIC** \_\_\_\_\_

**TYPE OF AUDIENCE:** \_\_\_\_\_

**# OF PEOPLE in AUDIENCE:** \_\_\_\_\_

**WHAT WAS DONE? (Briefly describe the program, how long the program lasted and key points conveyed. Attach program outline and equipment or props used, if possible):**

**DID THE AUDIENCE HEAR THE INTENDED MESSAGE?**

**WHAT WORKED WELL?**

**SBW Education Effort Evaluation Review (E.E.E.R)**

**WHAT COULD BE DONE TO IMPROVE THE PRESENTATION?**

**HOW MUCH PREPARATION WAS DONE PRIOR TO THE EDUCATION EFFORT?**

**WHAT WAS THE ESTIMATED COST OF THE PROGRAM?**

**WHAT ACCOUNT COVERED THE PROGRAM'S COSTS?**

**OTHER COMMENTS:**



**Appendix F: Wilderness Management Policy & Direction Reviewed**

- 1. The Wilderness Act of 1964, Public Law 88-577**
- 2. Forest Service Manual 2320 –Wilderness Management (2323.12)**
- 3. Forest Service Handbook 2309.19 –Wilderness Management Handbook**
- 4. National Strategic Plan for Wilderness Education 1991**
- 5. Selway Bitterroot Wilderness General Management Direction 1992 Update**
- 6. Chief’s 10 Year Wilderness Challenge: 2004-2014**

## APPENDIX H

### IDAHO NOXIOUS WEED LIST

#### IDAHO'S 57 NOXIOUS WEEDS

Idaho has 57 different species of weeds which are designated noxious by state law. These weeds are designated into three levels of concern. The spread of these weeds and the damage they do to Idaho agriculture can be lessened through proper identification and handling.

##### Concern Levels:

EDRR: Early Detection / Rapid Response focuses on an eradication objective

CONTROL: Focuses on reducing the size and density of the target species

CONTAINMENT: Focuses on preventing the spread of the target species

#### STATEWIDE EDRR LIST

##### Common Name

##### Scientific Name

Brazilian Elodea

*Egeria densa* P

Giant Hogweed

*Heracleum mantegazzianum*

Hydrilla

*Hydrilla verticillata*

Policeman's Helmet

*Impatiens glandulifera*

Squarrose Knapweed

*Centaurea squarrosa*

Syrian Beancaper

*Zygophyllum fabago*

Tall Hawkweed

*Hieracium piloselloides*

Water Hyacinth

*Eichhornia crassipes*

Yellow Devil Hawkweed

*Hieracium glomeratum*

#### STATEWIDE CONTROL LIST

##### Common Name

##### Scientific Name

Black Henbane

*Hyoscyamus niger*

Bohemian Knotweed

*Polygonum bohemicum*

Buffalobur

*Solanum rostratum*

Common Crupina

*Crupina vulgaris*

Dyer's Woad

*Isatis tinctoria*

Eurasian Watermilfoil

*Myriophyllum spicatum*

Giant Knotweed

*Polygonum sachalinesnse*

Japanese Knotweed

*Polygonum cuspidatum*

Johnsongrass

*Sorghum halpense*

Matgrass

*Nardus stricta*

Meadow Hawkweed

*Hieracium caespitosum*

Meadow Knapweed

*Centaurea pratensis*

Mediterranean Sage

*Salvia aethiopis*

Musk Thistle	<i>Carduus nutans</i>
Orange Hawkweed	<i>Hieracium aurantiacum</i>
Parrotfeather Milfoil	<i>Myriophyllum aquaticum</i>
Perennial Sowthistle	<i>Sonchus arvensis</i>
Russian Knapweed	<i>Acroptilon repens</i>
Scotch Broom	<i>Sytisus scoparius</i>
Silverleaf Nightshade	<i>Solanum elaeagnifolium</i>
Skeletonleaf Bursage	<i>Ambrosia tomentosa</i>
Small Bugloss	<i>Anchusa arvensis</i>
Toothed Spurge	<i>Euphorbia dentata</i>
Vipers Bugloss	<i>Echium vulgare</i>

## STATEWIDE CONTAINMENT LIST

<u>Common Name</u>	<u>Scientific Name</u>
Canada Thistle	<i>Cirsium arvense</i>
Dalmation Toadflax	<i>Linaria genistifolia ssp. dalmatica</i>
Diffuse Knapweed	<i>Centaurea diffusa</i>
Field Bindweed	<i>Convolvulus arvensis</i>
Hoary Alyssum	<i>Berteroa incana</i>
Houndstongue	<i>Cynoglossum officinale</i>
Jointed Goatgrass	<i>Aegilops cylindrica</i>
Leafy Spurge	<i>Euphorbia esula</i>
Milium	<i>Milium vernale</i>
Oxeye Daisy	<i>Chrysanthemum leucanthemum</i>
Perennial Pepperweed	<i>Lepidium latifolium</i>
Plumeless Thistle	<i>Carduus acanthoides</i>
Poison Hemlock	<i>Conium maculatum</i>
Puncturevine	<i>Tribulus terrestris</i>
Purple Loosestrife	<i>Lythrum salicaria</i>
Rush Skeletonweed	<i>Chondrilla juncea</i>
Saltcedar	<i>Tamarix</i>
Scotch Thistle	<i>Onopordum acanthium</i>
Spotted Knapweed	<i>Centaurea maculosa</i>
Tansy Ragwort	<i>Senecio jacobaea</i>
White Bryony	<i>Bryonia alba</i>
Whitetop	<i>Cardaria draba</i>
Yellow Starthistle	<i>Centaurea solstitialis</i>
Yellow Toadflax	<i>Linaria vulgaris</i>

## MONTANA NOXIOUS WEED LIST

(INCLUDING EXISTING AND POTENTIAL TARGET INVASIVE PLANTS OF CONCERN  
FOR THE PROJECT AREA )

<u>Common Name</u>	<u>Scientific Name</u>	<u>Formal Category Within The State:</u>
		<b>1 = Established and Widespread 2 = Localized 3 = New Invader 4 = Watch List</b>
cheatgrass	<i>Bromus tectorum</i>	specie of concern**
white top	<i>Cardaria draba</i> *	1
musk thistle	<i>Cardus nutans</i>	specie of concern**
diffuse knapweed	<i>Centaurea diffusa</i> *	1
spotted knapweed	<i>Centaurea maculosa</i> *	1
Russian knapweed	<i>Centaurea repens</i> *	1
yellow starthistle	<i>Centaurea solstitialis</i> *	3
rush skeletonweed	<i>Chondrilla juncea</i> *	2
oxeye daisy	<i>Chrysanthemum leucanthemem</i> *	1
Canada thistle	<i>Cirsium arvense</i> *	1
common crupina	<i>Crupina vulgaris</i> *	3
Houndstongue	<i>Cynoglossum officinale</i> *	1
blueweed	<i>Echium vulgare</i> *	3
leafy spurge	<i>Euphorbia esula</i> *	1
orange hawkweed	<i>Hieracium aurantiacum</i> *	2
yellow hawkweed	<i>Hieracium pratense</i> *	2
St. Johnswort	<i>Hypericum perforatum</i> *	1
dyers woad	<i>Isatis tinctoria</i> *	3
dalmatian toadflax	<i>Linaria dalmatica</i> *	1
common toadflax	<i>Linaria vulgaris</i> *	1
purple loostrife	<i>Lythrum spp.</i> *	2
sulfur cinquefoil	<i>Potentilla recta</i> *	1
tall buttercup	<i>Ranunculus acris</i> *	2
tansy ragwort	<i>Senecio jacobaea</i> *	2
common tansy	<i>Tanacetum vulgare</i> *	2
saltcedar	<i>Tamarix ramosissima</i> *	2
Common burdock	<i>Arctium minus</i>	specie of concern**
Common wormwood	<i>Artemisia absinthium</i>	specie of concern**
Reed canarygrass	<i>Phalaris arundinacea</i>	specie of concern**
Field bindweed	<i>Convolvulus arvensis</i> *	1
Scentless chamomile	<i>Matricaria maritime</i>	specie of concern**
Cypress spurge	<i>Euphorbia cyparissas</i>	specie of concern**
Yellowflag iris	<i>Iris pseudocorus</i>	2
Blueweed	<i>Echium vulgare</i> *	2
Japanese knotweed	<i>Fallopia japonica</i> *	3
complex		

Appendix H – Noxious Weeds List for Idaho and Montana

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Hoary Alyssum	<i>Berteroa incana*</i>	2
Scotchbroom	<i>Cytisus scoparius*</i>	4
Eurasian watermilfoil	<i>Myriophyllum spicatum*</i>	3
Flowering rush	<i>Butomus umbellatus*</i>	3

\* denotes species formally listed as “noxious weeds” in Montana

\*\* Note: “species of concern” are plants that are recognized as having invasive characteristics and the capability to cause environmental or economic harm but are not formally listed as noxious weeds for various reasons. Some of the species of concern in the table may be of concern to either the Forest Service or the State of Montana but not necessarily both in all cases.

## APPENDIX I

### HERBICIDE RISK ASSESSMENT

*Table 1- 1: Chemical Risk Assessment Factors*

Method	Low Resolution Risk Assessment (Rice 1990)	Low Resolution Risk Assessment (Montana Level 2 Recommendations)
Soil Texture	Clay Loam	
Infiltration Rate - High	4 inches/hour	
Infiltration Rate - Low	0.5 inches/hour	
Delivery and dilution	Seven Day low flow	2-year return interval flow
Runoff and Infiltration	Half runoff, Half infiltration	All runoff
T= time of flow yielding chemical estimated	54,000 seconds (15 hours)	21,600 seconds (6 hours)
D = delivery ratio on-site producing overland flow	5%	2%
M = Maximum Probable Concentration	LC50/20 24-96 hours for fish species present or available NOEL, NOEC, NOAEL	LC50/20 for most sensitive species present
Median Lethal Concentration (mg/l or ppm)	LC50	
No Observed Effect Level	NOEL	
No Observed Effect Concentration	NOEC	
No Observed Adverse Effect Level	NOAEL	
Expected Environmental Concentration (ppm) worst case situation = Direct application into standing water	EEC	

**Table 1- 2: Calculation of Maximum Acres to be Treated**

<b>Maximum Acres to be treated per subwatershed (Rice, 1990)</b>	
Average Low Flow - Qlow (cfs)	J
Worst Case Capacity (pounds)	$C = J * 62.43 * T$
Maximum Probable Concentration LC50/20 (ppm)	M
Application Rate (lbs/acre)	R
Delivery Ratio (percent)	D
Maximum Acres to be treated in HUC 6 (acres)	$A = (M * C) / (1000000 * R * D)$
<b>Low Flow Calculation (Embry 1991)</b>	
Average Annual Flow (cfs)	$QAA = 0.0405 (P * A)^{.9641}$
Precipitation (inches)	P
Watershed Area (sq. miles)	A
Seven day low flow (cfs)	$Qlow = 0.0405 (P * A)^{.9641}$

**Table 1- 3: Herbicide Assessment Factors**

Chemicals Evaluated	Common Brand Name	Application Rate (lbs/acre)	Application Rate (pints/acre)	Herbicide Label Max Rate	LC50 (mg/l) or (ppm)	LC50/20 (ppm)	NOEL or NOEC	Source for LC50 or NOEL/NOEC
Clopyralid	Transline	0.5	2	.42-.83 L/ha	100	5	20	(www.cdms.net: 100 mg/l), (Syracuse 1999: 20 mg/l, NOAEL fish/macros)
Dicamba	Banvel, Vanquish	1.0	4	4.6 L/ha for knapweed	135	6.8		LC50 fish-trout (www.cdms.net; syngenta)
Glyphosate	Rodeo	1.5	6	6 pints/acre - knapweed	923	46.2		Rodeo = 600-1440 ppm mg/l LC50 - trout, salmon, average = 923 (syracuse 2003)
Glyphosate	Roundup	1.5	6	4 quarts/acre for knapweed	2-54	1.1		Roundup = 2-54 ppm mg/l LC50 - trout, salmon average = 22.4 ppm (syracuse 2003)
Metsulfuron methly	Escort	0.03	0.125	2 ounces/acre	150	7.5		(www.cdms.net; Dupont) LC 50 rainbow trout
Picloram	Tordon (101, 22k)	1.0	4.0	4.5 L/ha for knapweed	0.8-26		0.29	EPA, NOEC = 0.55 mg/l rainbow trout; Rice, Peak NOEC = .29 ppm 24hour Cutthroat (Syracuse 2003) 26 mg/l rainbow trout (Dow AgroSciences www.cdms.net)
Triclopyr	Garlon 3A (TEA)	1.0	2	1/3 - 1.5 gallons/acre for weeds	199-613	10	104	NOEC, LC50/96 hour fish (Syracuse 2003)
2,4 - D	Salt formulations only	1.0	4.0	4 pints/acre	240	12	10	LC50/96 hour fish (Syracuse 2001); NOEL = 10 mg/l for fish (salt & esters)
Aminopyralid	Milestone	0.11	0.4	3-7 ounces/acre	>100	5		LC50/96 hour, (technical grade) for rainbow trout from United States Office of Prevention, Pesticides Environmental Protection and Toxic Substances Agency (7501C) Pesticide Fact Sheet

**Table 1- 4: Subwatershed Information and Estimation of Average Annual and Low Flow**

Subbasin	6 <sup>th</sup> Field HUC	Subwatershed Name	Watershed (acres)	Watershed (sq. miles)	Average Annual Precipitation (inches)	Average Annual flow QAA (cfs)*	Average Low Flow Qlow (cfs)**
Bitterroot River - 17010205	170102050201	Sheephead Creek	12,397	19.4	40	24.9	2.3
	170102050202	Watchtower Creek	10,839	16.9	40	21.6	2.0
	170102050203	Soda Springs Creek	15,581	24.3	40	30.5	2.8
	170102050204	Nez Perce Fork of Bitterroot River	23,917	37.4	32	37.6	3.6
	170102050302	Boulder Creek	13,511	21.1	44	29.2	2.7
	170102050304	Trapper Creek	18,196	28.4	42	37.6	3.6
	170102050305	West Fork Bitterroot River (Lower)	22,063	34.5	27	29.3	2.7
	170102050601	Lost Horse Creek	27,803	43.4	56	75.0	7.5
	170102050602	South Fork Lost Horse Creek	19,975	31.2	48	46.6	4.5
	170102050803	Chaffin Creek	12,942	20.2	32	20.5	1.9
	170102050804	Tin Cup Creek	27,052	42.3	46	60.1	5.9
	170102050805	Rock Creek	36,735	57.4	48	83.5	8.4
	170102051002	Roaring Lion Creek	16,120	25.2	55	43.5	4.2
	170102051003	Sawtooth Creek	19,456	30.4	46	43.7	4.2
	170102051004	Canyon Creek	10,030	15.7	31	15.7	1.4
	170102051005	Blodgett Creek	18,146	28.4	57	49.9	4.8
	170102051101	Mill Creek/Sheafman Creek	25,486	39.8	44	54.8	5.3
	170102051102	Fred Burr Creek	15,395	24.1	49	37.1	3.5
	170102051103	Bear Creek	17,884	27.9	56	48.4	4.7
	170102051104	Sweathouse Creek	18,291	28.6	39	35.0	3.3
	170102051201	Big Creek	22,510	35.2	57	61.3	6.0
	170102051202	Sharroot Creek	10,949	17.1	29	16.2	1.4
	170102051203	Kootenai Creek	20,165	31.5	52	51.2	5.0
	170102051301	Bass Creek	9,271	14.5	53	24.5	2.2
	170102051304	Sweeney Creek	12,206	19.1	52	31.5	2.9
	170102051305	Larry Creek	30,083	47.0	17	26.0	2.4

Subbasin	6 <sup>th</sup> Field HUC	Subwatershed Name	Watershed (acres)	Watershed (sq. miles)	Average Annual Precipitation (inches)	Average Annual flow QAA (cfs)*	Average Low Flow Qlow (cfs)**
	170102051307	One Horse Creek	9,239	14.4	49	22.7	2.1
	170102051308	Carlton Creek	16,100	25.2	33	26.4	2.4
	170102051407	South Fork Lolo Creek	24,881	38.9	60	71.4	7.1
	170102051409	Lolo Creek - Sheldon to Mormon	31,829	49.7	33	50.6	4.9
Upper Selway 17060301	170603010201	Deep Creek	36,320	56.8	34	59.3	5.8
	170603010202	Selway River-Magruder Creek	22,801	35.6	27	30.7	2.9
	170603010203	Indian Creek	32,106	50.2	41	63.9	6.3
	170603010204	Selway River-Sheep Creek	15,461	24.2	29	22.7	2.1
	170603010205	Selway River-Bad Luck Creek	27,277	42.6	32	42.6	4.1
	170603010301	Upper Little Clearwater River	24,590	38.4	35	42.6	4.1
	170603010302	Lower Little Clearwater River	20,784	32.5	32	33.0	3.1
	170603010401	Upper White Cap Creek	35,108	54.9	53	88.2	8.9
	170603010402	Canyon Creek	27,627	43.2	47	62.5	6.1
	170603010403	Lower White Cap Creek	21,604	33.8	41	43.3	4.1
	170603010501	Upper Running Creek	24,365	38.1	43	50.4	4.9
	170603010502	Lower Running Creek	17,710	27.7	31	27.4	2.5
	170603010503	Eagle Creek	16,127	25.2	33	26.1	2.4
	170603010601	Selway River-Elk Creek	18,162	28.4	38	33.7	3.2
	170603010602	Goat Creek	18,847	29.4	44	40.8	3.9
	170603010603	Ditch Creek	11,573	18.1	44	25.3	2.3
	170603010604	Selway River-Dog Creek	27,121	42.4	44	57.7	5.6
	170603010605	Pettibone Creek	20,934	32.7	55	55.8	5.4
	170603010701	Upper Bear Creek	18,018	28.2	63	54.6	5.3
	170603010702	Wahoo Creek	13,552	21.2	63	41.6	4.0
	170603010703	Middle Bear Creek	16,446	25.7	54	43.3	4.1
	170603010704	Lower Cub Creek	17,558	27.4	55	47.0	4.5
	170603010705	Upper Cub Creek	21,329	33.3	57	58.8	5.7
170603010706	Paradise Creek	18,215	28.5	48	42.4	4.0	
170603010707	Lower Bear Creek	9,749	15.2	43	21.2	1.9	
Lower Selway 17060302	170603020101	East Fork Moose Creek Headwaters	21,615	33.8	56	58.6	5.7
	170603020102	Upper East Fork Moose Creek	22,470	35.1	48	52.1	5.0
	170603020103	Cedar Creek	16,327	25.5	55	44.1	4.2

Subbasin	6 <sup>th</sup> Field HUC	Subwatershed Name	Watershed (acres)	Watershed (sq. miles)	Average Annual Precipitation (inches)	Average Annual flow QAA (cfs)*	Average Low Flow Qlow (cfs)**
	170603020104	Middle East Fork Moose Creek	30,759	48.1	51	74.6	7.4
	170603020105	Lower East Fork Moose Creek	29,501	46.1	46	65.4	6.4
	170603020106	Upper North Fork Moose Creek	17,394	27.2	55	46.4	4.5
	170603020107	West Moose Creek	19,117	29.9	66	60.9	6.0
	170603020108	Middle North Fork Moose Creek	10,680	16.7	65	34.3	3.2
	170603020109	Rhoda Creek	36,396	56.9	60	103.6	10.5
	170603020110	Lower North Fork Moose Creek	17,577	27.5	49	42.3	4.0
	170603020111	Lower Moose Creek	11,524	18.0	47	26.9	2.5
	170603020201	Selway River-Meeker Creek	28,276	44.2	43	59.3	5.8
	170603020202	Marten Creek	20,988	32.8	51	51.7	5.0
	170603020203	Three Links Creek	28,106	43.9	48	65.3	6.4
	170603020204	Mink Creek	10,239	16.0	51	25.9	2.4
	170603020205	Selway River-Pinchot Creek	31,829	49.7	41	62.2	6.1
	170603020206	Otter Creek	10,518	16.4	49	25.6	2.4
	170603020303	Middle Meadow Creek	33,235	51.9	46	73.7	7.3
	170603020305	Buck Lake Creek	20,745	32.4	51	51.0	4.9
	170603020306	Lower Meadow Creek	31,595	49.4	43	64.8	6.4
	170603020402	Gedney Creek	30,825	48.2	50	74.0	7.3
Lochsa River - 17060303	170603030102	Boulder Creek	30,023	46.9	51	72.6	7.2
	170603030105	Spruce Creek	15,893	24.8	59	45.3	4.3
	170603030201	Upper Colt Killed Creek	24,804	38.8	61	72.0	7.1
	170603030202	Upper Big Sand Creek	17,354	27.1	57	47.7	4.6
	170603030203	Hidden Creek	10,578	16.5	62	32.5	3.0
	170603030204	Lower Big Sand Creek	24,314	38.0	55	64.9	6.4
	170603030205	Middle Colt Killed Creek	10,536	16.5	59	30.6	2.9
	170603030206	Colt Creek	16,674	26.1	55	45.1	4.3
	170603030207	Storm Creek	32,703	51.1	59	91.7	9.2
	170603030401	Upper Warm Springs Creek	13,842	21.6	52	35.2	3.3
	170603030402	Wind Lakes Creek	12,537	19.6	53	32.5	3.0
	170603030403	Lower Warm Springs Creek	19,451	30.4	48	45.3	4.3
	170603030503	Lake Creek	33,306	52.0	58	91.8	9.3
	170603030504	Lochsa River - Stanley Creek	31,587	49.4	45	67.8	6.7

Subbasin	6 <sup>th</sup> Field HUC	Subwatershed Name	Watershed (acres)	Watershed (sq. miles)	Average Annual Precipitation (inches)	Average Annual flow QAA (cfs)*	Average Low Flow Qlow (cfs)**
	170603030505	Lochsa River - Bald Mountain Creek	28,801	45.0	44	61.7	6.0
	170603030701	Lochsa River - Bimerick Creek	34,479	53.9	40	65.6	6.5
	170603030702	Old Man Creek	28,130	44.0	51	68.4	6.8
	170603030703	Split Creek	9,995	15.6	49	24.3	2.2

\*Average Annual Flow (cfs) = QAA = 0.0405 (P \* A)<sup>.9641</sup>, where P = Precipitation (inches) as weighted average for subwatershed and A = Subwatershed Area (sq. miles) (Embry 1999).

\*\*Seven day low flow (cfs) = Qlow = 0.0734\*QAA<sup>1.0701</sup> (Embry 1991).

**Table 1- 5: Herbicide Risk Assessment for Picloram Based on P. Rice 1990**

Subbasin	HUC 6	Subwatershed Name (HUC 6)	Watershed (acres)	Average Low Flow Qlow (cfs)	Worst Case Capacity (pounds)	Maximum Probable Concentration LC50/20 (ppm)	Application Rate (pounds/acre)	Delivery Ratio (percent)	Maximum Acres to be treated in HUC 6 (acres)
				J	C= J*62.43*T T = 21,600 sec.	M	R	D	A = (M * C)/(1000000*R*D)
Bitterroot Forest - 17010205	170102050201	Sheephead Creek	12397	2.29	3,091,834	0.29	1.0	2%	45
	170102050202	Watchtower Creek	10839	1.97	2,653,271	0.29	1.0	2%	38
	170102050203	Soda Springs Creek	15581	2.84	3,835,564	0.29	1.0	2%	56
	170102050302	Boulder Creek	13511	2.72	3,667,891	0.29	1.0	2%	53
	170102050304	Trapper Creek	18196	3.56	4,796,198	0.29	1.0	2%	70
	170102050305	West Fork Bitterroot River (Lower)	22063	2.73	3,676,537	0.29	1.0	2%	53
	170102050601	Lost Horse Creek	27803	7.46	10,053,892	0.29	1.0	2%	146
	170102050602	South Fork Lost Horse Creek	19975	4.47	6,032,733	0.29	1.0	2%	87
	170102050803	Chaffin Creek	12942	1.86	2,510,607	0.29	1.0	2%	36
	170102050804	Tin Cup Creek	27052	5.88	7,926,449	0.29	1.0	2%	115
	170102050805	Rock Creek	36735	8.36	11,273,978	0.29	1.0	2%	163
	170102051002	Roaring Lion Creek	16120	4.16	5,611,074	0.29	1.0	2%	81
	170102051003	Sawtooth Creek	19456	4.18	5,642,392	0.29	1.0	2%	82
	170102051004	Canyon Creek	10030	1.40	1,890,516	0.29	1.0	2%	27
	170102051005	Blodgett Creek	18146	4.82	6,500,714	0.29	1.0	2%	94
	170102051101	Mill Creek/Sheafman Creek	25486	5.33	7,181,599	0.29	1.0	2%	104
	170102051102	Fred Burr Creek	15395	3.50	4,724,938	0.29	1.0	2%	69
	170102051103	Bear Creek	17884	4.66	6,289,524	0.29	1.0	2%	91
	170102051104	Sweathouse Creek	18291	3.29	4,442,265	0.29	1.0	2%	64
	170102051201	Big Creek	22510	6.01	8,101,745	0.29	1.0	2%	117
170102051203	Kootenai Creek	20165	4.96	6,682,651	0.29	1.0	2%	97	
170102051301	Bass Creek	9271	2.25	3,030,155	0.29	1.0	2%	44	
170102051304	Sweeney Creek	12206	2.95	3,973,447	0.29	1.0	2%	58	

Subbasin	HUC 6	Subwatershed Name (HUC 6)	Watershed (acres)	Average Low Flow Qlow (cfs)	Worst Case Capacity (pounds)	Maximum Probable Concentration LC50/20 (ppm)	Application Rate (pounds/acre)	Delivery Ratio (percent)	Maximum Acres to be treated in HUC 6 (acres)
	170102051307	One Horse Creek	9239	2.07	2,795,177	0.29	1.0	2%	41
	170102051308	Carlton Creek	16100	2.43	3,282,737	0.29	1.0	2%	48
	170102051407	South Fork Lolo Creek	24881	7.07	9,536,273	0.29	1.0	2%	138
Upper Selway 17060301	170603010201	Deep Creek	36320	5.79	7,813,348	0.29	1.0	2%	113
	170603010202	Selway River-Magruder Creek	22801	2.87	3,867,361	0.29	1.0	2%	56
	170603010203	Indian Creek	32106	6.28	8,466,068	0.29	1.0	2%	123
	170603010204	Selway River-Sheep Creek	15461	2.07	2,795,817	0.29	1.0	2%	41
	170603010205	Selway River-Bad Luck Creek	27277	4.07	5,489,641	0.29	1.0	2%	80
	170603010301	Upper Little Clearwater River	24590	4.07	5,482,972	0.29	1.0	2%	80
	170603010302	Lower Little Clearwater River	20784	3.10	4,176,931	0.29	1.0	2%	61
	170603010401	Upper White Cap Creek	35108	8.86	11,952,986	0.29	1.0	2%	173
	170603010402	Canyon Creek	27627	6.13	8,260,137	0.29	1.0	2%	120
	170603010403	Lower White Cap Creek	21604	4.14	5,579,819	0.29	1.0	2%	81
	170603010502	Lower Running Creek	17710	2.54	3,418,935	0.29	1.0	2%	50
	170603010503	Eagle Creek	16127	2.41	3,251,372	0.29	1.0	2%	47
	170603010601	Selway River-Elk Creek	18162	3.16	4,263,583	0.29	1.0	2%	62
	170603010602	Goat Creek	18847	3.88	5,233,281	0.29	1.0	2%	76
	170603010603	Ditch Creek	11573	2.33	3,144,226	0.29	1.0	2%	46
	170603010604	Selway River-Dog Creek	27121	5.63	7,592,642	0.29	1.0	2%	110
	170603010605	Pettibone Creek	20934	5.43	7,320,446	0.29	1.0	2%	106
	170603010701	Upper Bear Creek	18018	5.31	7,159,363	0.29	1.0	2%	104
	170603010702	Wahoo Creek	13552	3.97	5,349,146	0.29	1.0	2%	78
	170603010703	Middle Bear Creek	16446	4.14	5,582,415	0.29	1.0	2%	81
170603010704	Lower Cub Creek	17558	4.52	6,093,152	0.29	1.0	2%	88	
170603010705	Upper Cub Creek	21329	5.74	7,743,259	0.29	1.0	2%	112	
170603010706	Paradise Creek	18215	4.05	5,456,571	0.29	1.0	2%	79	
170603010707	Lower Bear Creek	9749	1.93	2,605,387	0.29	1.0	2%	38	

Appendix I – Herbicide Risk Assessment

Subbasin	HUC 6	Subwatershed Name (HUC 6)	Watershed (acres)	Average Low Flow Qlow (cfs)	Worst Case Capacity (pounds)	Maximum Probable Concentration LC50/20 (ppm)	Application Rate (pounds/acre)	Delivery Ratio (percent)	Maximum Acres to be treated in HUC 6 (acres)
Lower Selway 17060302	170603020101	East Fork Moose Creek Headwaters	21615	5.72	7,712,054	0.29	1.0	2%	112
	170603020102	Upper East Fork Moose Creek	22470	5.05	6,807,343	0.29	1.0	2%	99
	170603020103	Cedar Creek	16327	4.22	5,694,449	0.29	1.0	2%	83
	170603020104	Middle East Fork Moose Creek	30759	7.40	9,983,645	0.29	1.0	2%	145
	170603020105	Lower East Fork Moose Creek	29501	6.43	8,675,901	0.29	1.0	2%	126
	170603020106	Upper North Fork Moose Creek	17394	4.46	6,016,956	0.29	1.0	2%	87
	170603020107	West Moose Creek	19117	5.96	8,038,594	0.29	1.0	2%	117
	170603020108	Middle North Fork Moose Creek	10680	3.23	4,350,980	0.29	1.0	2%	63
	170603020109	Rhoda Creek	36396	10.53	14,198,883	0.29	1.0	2%	206
	170603020110	Lower North Fork Moose Creek	17577	4.03	5,437,373	0.29	1.0	2%	79
	170603020111	Lower Moose Creek	11524	2.49	3,352,045	0.29	1.0	2%	49
	170603020201	Selway River-Meeker Creek	28276	5.79	7,814,307	0.29	1.0	2%	113
	170603020202	Marten Creek	20988	5.01	6,751,181	0.29	1.0	2%	98
	170603020203	Three Links Creek	28106	6.43	8,666,423	0.29	1.0	2%	126
	170603020204	Mink Creek	10239	2.39	3,225,658	0.29	1.0	2%	47
	170603020205	Selway River-Pinchot Creek	31829	6.10	8,220,700	0.29	1.0	2%	119
	170603020206	Otter Creek	10518	2.35	3,175,408	0.29	1.0	2%	46
	170603020305	Buck Lake Creek	20745	4.93	6,654,478	0.29	1.0	2%	96
170603020402	Gedney Creek	30825	7.35	9,908,424	0.29	1.0	2%	144	
Lochsa River 17060303	170603030102	Boulder Creek	30023	7.20	9,703,177	0.29	1.0	2%	141
	170603030201	Upper Colt Killed Creek	24804	7.13	9,618,248	0.29	1.0	2%	139
	170603030202	Upper Big Sand Creek	17354	4.59	6,192,622	0.29	1.0	2%	90
	170603030203	Hidden Creek	10578	3.04	4,103,388	0.29	1.0	2%	59
	170603030204	Lower Big Sand Creek	24314	6.38	8,602,724	0.29	1.0	2%	125
	170603030205	Middle Colt Killed Creek	10536	2.86	3,855,945	0.29	1.0	2%	56
	170603030207	Storm Creek	32703	9.24	12,457,523	0.29	1.0	2%	181

Subbasin	HUC 6	Subwatershed Name (HUC 6)	Watershed (acres)	Average Low Flow Qlow (cfs)	Worst Case Capacity (pounds)	Maximum Probable Concentration LC50/20 (ppm)	Application Rate (pounds/acre)	Delivery Ratio (percent)	Maximum Acres to be treated in HUC 6 (acres)
	170603030401	Upper Warm Springs Creek	13842	3.32	4,478,101	0.29	1.0	2%	65
	170603030402	Wind Lakes Creek	12537	3.05	4,111,925	0.29	1.0	2%	60
	170603030403	Lower Warm Springs Creek	19451	4.35	5,859,485	0.29	1.0	2%	85
	170603030503	Lake Creek	33306	9.25	12,477,116	0.29	1.0	2%	181
	170603030505	Lochsa River - Bald Mountain Creek	28801	6.05	8,157,692	0.29	1.0	2%	118
	170603030701	Lochsa River - Bimerick Creek	34479	6.46	8,710,649	0.29	1.0	2%	126
	170603030702	Old Man Creek	28130	6.75	9,105,293	0.29	1.0	2%	132
	170603030703	Split Creek	9995	2.23	3,012,277	0.29	1.0	2%	44
								<b>TOTAL</b>	<b>7,575</b>

## APPENDIX J

### EPA REGISTERED HERBICIDES AVAILABLE FOR USE

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

## APPENDIX K

### DETERMINATION OF MAXIMUM ACRES ANNUALLY TREATABLE (ANNUAL HERBICIDE TREATMENT THRESHOLDS)

*Table 1- 1: Maximum Annual sprayable Acreage for each herbicide with No Observable Effect (or equivalent)*

			Amino- pyralid	Clopyralid	Dicamba	Glyphosate Rodeo	Glyphosate Roundup	Methsulfuron Methly	Picloram	Triclopyrl TEA	2,4- D
			0.11	0.5	1.0	1.5	1.5	0.03	1.0	1.0	1.0
			100	100	135	923	22	150	0.8-26	199	240
	NOEL or NOEC (ppm)			20					<b>0.29</b>	104	<b>10</b>
			<b>5</b>	<b>5</b>	<b>6.8</b>	<b>46</b>	<b>1.1</b>	<b>7.5</b>		<b>10</b>	12

HUC 6	Subwatershed Name (HUC 6)	Watershed (acres)		Maximum Acres to be Treated							
			Amino- pyralid	Clopyralid	Dicamba	Glyphosate Rodeo	Glyphosate Roundup	Methsulfuron Methly	Picloram	Triclopyrl TEA	2,4- D
<b>Bitterroot River Subbasin - 17010205</b>											
0201	Sheephead Creek	12,397	7,027	1,546	1,051	4,761	113	38,648	45	1,546	1,546
0202	Watchtower Creek	10,839	6,030	1,327	902	4,086	97	33,166	38	1,327	1,327
0203	Soda Springs Creek	15,581	8,717	1,918	1,304	5,907	141	47,945	56	1,918	1,918
0302	Boulder Creek	13,511	8,336	1,834	1,247	7,386	134	45,849	53	1,834	1,834
0304	Trapper Creek	18,196	10,900	2,398	1,631	5,662	176	59,952	70	2,398	2,398
0305	West Fork Bitterroot River (Lower)	22,063	8,356	1,838	1,250	15,483	135	45,957	53	1,838	1,838
0601	Lost Horse Creek	27,803	22,850	5,027	3,418	9,290	369	125,674	146	5,027	5,027
0602	South Fork Lost Horse Creek	19,975	13,711	3,016	2,051	3,866	221	75,409	87	3,016	3,016
0803	Chaffin Creek	12,942	5,706	1,255	854	12,207	92	31,383	36	1,255	1,255
0804	Tin Cup Creek	27,052	18,015	3,963	2,695	17,362	291	99,081	115	3,963	3,963
0805	Rock Creek	36,735	25,623	5,637	3,833	8,641	413	140,925	163	5,637	5,637
1002	Roaring Lion Creek	16,120	12,752	2,806	1,908	8,689	206	70,138	81	2,806	2,806
1003	Sawtooth Creek	19,456	12,824	2,821	1,918	2,911	207	70,530	82	2,821	2,821

Appendix K – Annual Herbicide Treatment Thresholds

HUC 6	Subwatershed Name (HUC 6)	Watershed (acres)	Maximum Acres to be Treated			Glyphosate Rodeo	Glyphosate Roundup	Methsulfuron Methly	Picloram	Triclopyrl TEA	2,4-D
			Amino-pyralid	Clopyralid	Dicamba						
1004	Canyon Creek	10,030	4,297	945	643	10,011	69	23,631	27	945	945
1005	Blodgett Creek	18,146	14,774	3,250	2,210	11,060	238	81,259	94	3,250	3,250
1101	Mill Creek/Sheafman Creek	25,486	16,322	3,591	2,442	7,276	263	89,770	104	3,591	3,591
1102	Fred Burr Creek	15,395	10,738	2,362	1,606	9,686	173	59,062	69	2,362	2,362
1103	Bear Creek	17,884	14,294	3,145	2,138	6,841	231	78,619	91	3,145	3,145
1104	Sweathouse Creek	18,291	10,096	2,221	1,510	12,477	163	55,528	64	2,221	2,221
1201	Big Creek	22,510	18,413	4,051	2,755	2,998	297	101,272	117	4,051	4,051
1203	Kootenai Creek	20,165	15,188	3,341	2,272	10,291	245	83,533	97	3,341	3,341
1301	Bass Creek	9,271	6,887	1,515	1,030	4,666	111	37,877	44	1,515	1,515
1304	Sweeney Creek	12,206	9,031	1,987	1,351	6,119	146	49,668	58	1,987	1,987
1307	One Horse Creek	9,239	6,353	1,398	950	4,305	102	34,940	41	1,398	1,398
1308	Carlton Creek	16,100	7,461	1,641	1,116	5,055	120	41,034	48	1,641	1,641
1407	South Fork Lolo Creek	24,881	21,673	4,768	3,242	14,686	350	119,203	138	4,768	4,768
<b>Upper Selway River Subbasin 17060301</b>											
0201	Deep Creek	36,320	17,758	3,907	2,657	12,033	286	97,667	113	3,907	3,907
0202	Selway River-Magruder Creek	22,801	8,789	1,934	1,315	5,956	142	48,342	56	1,934	1,934
0203	Indian Creek	32,106	19,241	4,233	2,878	13,038	310	105,826	123	4,233	4,233
0204	Selway River-Sheep Creek	15,461	6,354	1,398	951	4,306	103	34,948	41	1,398	1,398
0205	Selway River-Bad Luck Creek	27,277	12,476	2,745	1,866	8,454	201	68,621	80	2,745	2,745
0301	Upper Little Clearwater River	24,590	12,461	2,741	1,864	8,444	201	68,537	80	2,741	2,741
0302	Lower Little Clearwater River	20,784	9,493	2,088	1,420	6,432	153	52,212	61	2,088	2,088
0401	Upper White Cap Creek	35,108	27,166	5,976	4,064	18,408	438	149,412	173	5,976	5,976
0402	Canyon Creek	27,627	18,773	4,130	2,808	12,721	303	103,252	120	4,130	4,130
0403	Lower White Cap Creek	21,604	12,681	2,790	1,897	8,593	205	69,748	81	2,790	2,790
0502	Lower Running Creek	17,710	7,770	1,709	1,162	5,265	125	42,737	50	1,709	1,709

HUC 6	Subwatershed Name (HUC 6)	Watershed (acres)	Maximum Acres to be Treated			Glyphosate Rodeo	Glyphosate Roundup	Methsulfuron Methly	Picloram	Triclopyrl TEA	2,4-D
			Amino-pyralid	Clopyralid	Dicamba						
0503	Eagle Creek	16,127	7,389	1,626	1,105	5,007	119	40,642	47	1,626	1,626
0601	Selway River-Elk Creek	18,162	9,690	2,132	1,450	6,566	156	53,295	62	2,132	2,132
0602	Goat Creek	18,847	11,894	2,617	1,779	8,059	192	65,416	76	2,617	2,617
0603	Ditch Creek	11,573	7,146	1,572	1,069	4,842	115	39,303	46	1,572	1,572
0604	Selway River-Dog Creek	27,121	17,256	3,796	2,581	11,693	278	94,908	110	3,796	3,796
0605	Pettibone Creek	20,934	16,637	3,660	2,489	11,273	268	91,506	106	3,660	3,660
0701	Upper Bear Creek	18,018	16,271	3,580	2,434	11,025	263	89,492	104	3,580	3,580
0702	Wahoo Creek	13,552	12,157	2,675	1,819	8,238	196	66,864	78	2,675	2,675
0703	Middle Bear Creek	16,446	12,687	2,791	1,898	8,597	205	69,780	81	2,791	2,791
0704	Lower Cub Creek	17,558	13,848	3,047	2,072	9,383	223	76,164	88	3,047	3,047
0705	Upper Cub Creek	21,329	17,598	3,872	2,633	11,925	284	96,791	112	3,872	3,872
0706	Paradise Creek	18,215	12,401	2,728	1,855	8,403	200	68,207	79	2,728	2,728
0707	Lower Bear Creek	9,749	5,921	1,303	886	4,012	96	32,567	38	1,303	1,303
<b>Lower Selway River Subbasin - 17060302</b>											
0101	East Fork Moose Creek Headwaters	21,615	17,527	3,856	2,622	11,877	283	96,401	112	3,856	3,856
0102	Upper East Fork Moose Creek	22,470	15,471	3,404	2,314	10,483	250	85,092	99	3,404	3,404
0103	Cedar Creek	16,327	12,942	2,847	1,936	8,769	209	71,181	83	2,847	2,847
0104	Middle East Fork Moose Creek	30,759	22,690	4,992	3,394	15,375	366	124,796	145	4,992	4,992
0105	Lower East Fork Moose Creek	29,501	19,718	4,338	2,950	13,361	318	108,449	126	4,338	4,338
0106	Upper North Fork Moose Creek	17,394	13,675	3,008	2,046	9,266	221	75,212	87	3,008	3,008
0107	West Moose Creek	19,117	18,270	4,019	2,733	12,379	295	100,482	117	4,019	4,019
0108	Middle North Fork Moose Creek	10,680	9,889	2,175	1,479	6,701	160	54,387	63	2,175	2,175
0109	Rhoda Creek	36,396	32,270	7,099	4,828	21,866	521	177,486	206	7,099	7,099
0110	Lower North Fork Moose Creek	17,577	12,358	2,719	1,849	8,374	199	67,967	79	2,719	2,719

Appendix K – Annual Herbicide Treatment Thresholds

HUC 6	Subwatershed Name (HUC 6)	Watershed (acres)	Maximum Acres to be Treated			Glyphosate Rodeo	Glyphosate Roundup	Methsulfuron Methly	Picloram	Triclopyrl TEA	2,4-D
			Amino-pyralid	Clopyralid	Dicamba						
0111	Lower Moose Creek	11,524	7,618	1,676	1,140	5,162	123	41,901	49	1,676	1,676
0201	Selway River-Meeker Creek	28,276	17,760	3,907	2,657	12,034	287	97,679	113	3,907	3,907
0202	Marten Creek	20,988	15,344	3,376	2,295	10,397	248	84,390	98	3,376	3,376
0203	Three Links Creek	28,106	19,696	4,333	2,947	13,346	318	108,330	126	4,333	4,333
0204	Mink Creek	10,239	7,331	1,613	1,097	4,968	118	40,321	47	1,613	1,613
0205	Selway River-Pinchot Creek	31,829	18,683	4,110	2,795	12,660	301	102,759	119	4,110	4,110
0206	Otter Creek	10,518	7,217	1,588	1,080	4,890	116	39,693	46	1,588	1,588
0305	Buck Lake Creek	20,745	15,124	3,327	2,263	10,248	244	83,181	96	3,327	3,327
0402	Gedney Creek	30,825	22,519	4,954	3,369	15,259	363	123,855	144	4,954	4,954
<b>Lochsa River Subbasin - 17060303</b>											
0102	Boulder Creek	30,023	22,053	4,852	3,299	14,943	356	121,290	141	4,852	4,852
0201	Upper Colt Killed Creek	24,804	21,860	4,809	3,270	14,812	353	120,228	139	4,809	4,809
0202	Upper Big Sand Creek	17,354	14,074	3,096	2,105	9,537	227	77,408	90	3,096	3,096
0203	Hidden Creek	10,578	9,326	2,052	1,395	6,319	150	51,292	59	2,052	2,052
0204	Lower Big Sand Creek	24,314	19,552	4,301	2,925	13,248	315	107,534	125	4,301	4,301
0205	Middle Colt Killed Creek	10,536	8,764	1,928	1,311	5,938	141	48,199	56	1,928	1,928
0207	Storm Creek	32,703	28,313	6,229	4,236	19,185	457	155,719	181	6,229	6,229
0401	Upper Warm Springs Creek	13,842	10,178	2,239	1,523	6,896	164	55,976	65	2,239	2,239
0402	Wind Lakes Creek	12,537	9,345	2,056	1,398	6,332	151	51,399	60	2,056	2,056
0403	Lower Warm Springs Creek	19,451	13,317	2,930	1,992	9,024	215	73,244	85	2,930	2,930
0503	Lake Creek	33,306	28,357	6,239	4,242	19,215	457	155,964	181	6,239	6,239
0505	Lochsa River - Bald Mountain Creek	28,801	18,540	4,079	2,774	12,563	299	101,971	118	4,079	4,079
0701	Lochsa River - Bimerick Creek	34,479	19,797	4,355	2,962	13,414	319	108,883	126	4,355	4,355
0702	Old Man Creek	28,130	20,694	4,553	3,096	14,022	334	113,816	132	4,553	4,553
0703	Split Creek	9,995	6,846	1,506	1,024	4,639	110	37,653	44	1,506	1,506

Delivery rate is 50% infiltration and 50% runoff for each subwatershed

## APPENDIX L

### ECOLOGICAL RISK SUMMARY FOR MOST COMMON HERBICIDES

General findings from a series of USFS Ecological Risk Assessment Reports, Pesticide Fact Sheets, and herbicide labels are as follows for herbicides, adjuvants and dyes potentially used by the SBW project:

<i>Clopyralid</i>	<b><i>Transline Curtail</i></b>	Clopyralid appears to be relatively non-toxic to aquatic animals. The potential for substantial effects on non-target species appears to be remote. Clopyralid does not bind tightly to soil, and leaching and subsequent contamination of ground water is likely to be minimal (USFS, 1999a). Clopyralid is more persistent than 2,4-D but less persistent than picloram.
<i>2,4-D amine</i>	<b><i>Weedar 64, Amine 4 Weed B Gone</i></b>	2,4-D amine forms are generally non-toxic to fish. Several formulations, including Weedar 64, are registered for use in and near water. Despite this certification, however, label information indicates that Weedar 64 is toxic to aquatic invertebrates. 2,4-D is unlikely to be a groundwater contaminant due to rapid degradation in most soils and rapid uptake by plants.
Glyphosate	<b><i>Rodeo Roundup</i></b>	Glyphosate is relatively non-toxic to fish. Several formulations of the herbicide, including Rodeo, which do not contain the surfactant included in Roundup) are labeled for use adjacent to water. Glyphosate readily binds to organic matter in soil and is easily broken down by microorganisms. This herbicide is especially appropriate where low soil mobility and short-term persistence are desired to alleviate environmental concerns. At the proposed application rates, no adverse effects would be anticipated from the application of Rodeo on fish, aquatic macrophytes, or aquatic invertebrates.
Metsulfuron methyl	<b><i>Escort</i></b>	Metsulfuron methyl has a low order of toxicity to fish. Similarly, aquatic invertebrates do not appear to be sensitive to the product. The herbicide is broken down in the soil by the action of microorganisms and by the chemical action of water.
Picloram	<b><i>Tordon 22K</i></b>	Picloram is moderately to slightly toxic to freshwater fish, and slightly toxic to aquatic invertebrate animals. It does not bioaccumulate in fish. Picloram can leach into groundwater in soils, which have low organic content and where the water table is very shallow .
Dicamba	<b><i>Banvel</i></b>	Dicamba is slightly toxic to fish and amphibians and is practically non-toxic to aquatic invertebrates. Dicamba does not accumulate or build up in aquatic animals. Dicamba is moderately persistent in soils and is slightly soluble in water.
Triclopyr	<b><i>Garlon 3A</i></b>	Triclopyr is a selective herbicide used in a variety of vegetation management situations such as controlling weeds or controlling vegetation in powerline, railroad, pipeline, and road rights-of-way. It is often mixed with other chemicals at varying rates to improve effectiveness and reduce the amount of herbicide applied. Triclopyr degrades rapidly in soil and water.
Aminopyralid	<b><i>Milestone</i></b>	Aminopyralid provides systemic postemergence control of susceptible broadleaf weeds. It has an auxinic growth regulator mode of action, and has a low risk of resistance development. Aminopyralid is effective at lower applied rates than other currently registered herbicides (4 to 7 oz. /acre), and its residual action reduces the need for supplemental applications, lowering the overall herbicide load within a treatment area. Initial testing shows aminopyralid to be practically non-toxic to birds, fish, honeybees, earthworms, and aquatic invertebrates.

## **APPENDIX M**

# **HERBICIDE EFFECTS ANALYSIS FOR TERRESTRIAL WILDLIFE**

### **A. Herbicide Treatments**

The effects from the use of any herbicide depends on the toxic properties (hazards) of that herbicide, the level of exposure to that herbicide at any given time, and the duration of that exposure. Risk to wildlife can be reduced by choosing herbicides with lower potential for toxic effects when exposure may occur. Exposure of wildlife to herbicides can be greatly reduced or increased depending on site-specific implementation techniques and timing used in herbicide application projects. Exposure can be reduced by such methods as streamside buffer zones, timing applications to avoid sensitive seasons, varying application methods used, and combining herbicide treatments with non-herbicide treatments to reduce overall use. These project design features, or criteria, are included in chapter 2 and would reduce potential exposures to wildlife.

The hazards associated with each herbicide active and inert ingredients, impurity or metabolite, were determined by a thorough review of available toxicological studies. For a background discussion of all toxicological tests and endpoints considered in Forest Service Risk Assessments, (SERA 2001). All of the action alternatives (alternatives 2-5) propose herbicide treatments at various acreage levels. Effects to wildlife species from herbicide exposures are evaluated using several indicators, including rate of application or pounds per acre of active ingredient. This indicator is the same for all alternatives, with the exception of total acres proposed for treatment, and so effects to species related to proposed herbicide applications will also be the same for all alternatives. However, there may be slight variations for cumulative effects.

#### ***Herbicide Risk Assessments***

Because herbicides have the potential to adversely affect the environment, the U.S. Environmental Protection Agency (EPA) must register all herbicides prior to their sale, distribution, or use in the United States. In order to register herbicides for outdoor use, the EPA requires the manufacturers to conduct a safety evaluation on wildlife including toxicity testing on representative species of birds, mammals, freshwater fish, aquatic invertebrates, and terrestrial and aquatic plants. An ecological risk assessment uses the data collected to evaluate the likelihood that adverse ecological effects may occur as a result of herbicide use.

The Forest Service conducts its own risk assessments, focusing specifically on the type of herbicide used in forestry applications. The Forest Service contracts with Syracuse Environmental Research Associates, Inc. (SERA) to conduct human health and ecological risk assessments for herbicides that may be proposed for use on National Forest System lands. The information contained in this analysis relies on these risk assessments. All toxicity data, exposure scenarios, and assessments of risk are based upon information in the FS/SERA risk assessments unless otherwise noted. FS/SERA risk assessments use peer-reviewed articles from the open scientific literature and current EPA documents, including Confidential Business Information. Specific methods used in preparing the FS/SERA risk assessments are described in SERA, 2001-Preparation. Estimates of risk are not absolute; rather, they are relative and based on assumptions contained in generic “worst case” scenarios. Risk assessments have inherent limitations and will be discussed later. See Appendix

### ***Herbicide Analysis***

The risk assessments prepared by SERA (2001, 2003, 2004) contain the detailed analysis of the potential effects to wildlife of each herbicide.

Toxicity data found in the risk assessments and exposure scenarios were used to derive quantitative estimates of dose for worst-case situations. They are summarized in tables that will follow for each herbicide proposed for use in the project area.

When enough data was available for a particular type of animal, an exposure scenario was developed, and a quantitative estimate of dose received by the animal type in the scenario was calculated (SERA, 2001). The quantitative estimates of dose were compared to available toxicity data to determine potential adverse impacts. The most sensitive response (i.e. a sub-lethal effect that occurred at the lowest dose) from the most sensitive species was used to determine the “toxicity indices” for each herbicide. Adverse affects to wildlife health such as lethargy, weight loss, nausea, and fluid loss due to diarrhea or vomiting, can affect their ability to compete for food, locate and/or capture food, avoid or fight off predators, or reproduce. The following analysis relies on these types of effects, when sufficient data exists, rather than directly lethal doses, to determine the potential for doses to cause an “adverse effect” to wildlife.

Whenever sufficient data were available to determine the dose that resulted in no observable adverse effects (NOAEL), the NOAEL was used as the toxicity index. If data were not sufficient to determine a NOAEL, other endpoints of toxicity were used, such as the lowest-adverse-effect level (LOAEL), or the dose that was lethal to 50 percent of the test population (LD<sub>50</sub>). When a LOAEL or LD<sub>50</sub> was used as the toxicity index, standard EPA methods for applying an uncertainty factor to the toxicity index to determine a level of concern were used. The standard EPA method for listed terrestrial species is to take 0.1 of the LD<sub>50</sub> (EPA/OPP 2004), which is the protocol used in this analysis when a NOAEL is not available.

### ***Uncertainty and Data Gaps***

Generally, active ingredients have been tested on only a limited number of species and mostly under laboratory conditions. While laboratory experiments can be used to determine acute toxicity and effects to reproduction, cancer rates, birth defect rates, and other effects that must be considered, laboratory experiments do not account for wildlife in their natural environments. Environmental stressors can increase the adverse effects of contaminants, but the degree to which these effects may occur for various herbicides is largely unknown. Various wildlife species may also be more or less sensitive to a particular herbicide than laboratory animals. This leads to uncertainty in the risk assessment analysis. Additional discussion of incomplete and unavailable information can be found in the EIS. In response to this uncertainty, the effects analysis has relied upon data from the most sensitive effect from the most sensitive species and has used the maximum exposure estimates from exposure calculations to determine potential for risk.

### ***Use of Surrogate Species***

Most toxicity testing utilizes surrogate species. Surrogate species serve as a substitute for the species of interest, because all species of interest could not be tested. Surrogate species are typically organisms that are easily tested using standardized methods, are readily available, and inexpensive. The physiological requirements for some organisms prohibit their use in toxicity testing because these requirements cannot be met within the test system. Rare or federally listed species are not used for a variety of reasons, including legal restrictions and having only a limited numbers of individuals available. On the rare occasions when data can be obtained from federally listed species, the limited conditions under which they are taken may bias the results (e.g. see Wiemeyer et al., 1993).

Caution should be taken when addressing ecological risk and the use of surrogates when analyzing those ecological risks. Some herbicides demonstrate more variation than others in effects among different species, and very limited numbers of species have been tested.

Because of the variation of responses among species, and the uncertainty with regard to how accurately a surrogate species may represent other wildlife, the FS/SERA risk assessments use the most sensitive endpoint from the most sensitive species tested as the toxicity index for all wildlife. This does not alleviate concerns over interspecies variations in response.

### ***Doses and Responses***

The likelihood that an animal will experience adverse effects from an herbicide depends on the following indicators:

- (1) Inherent toxicity of the chemical,
- (2) Amount of chemical to which an animal is exposed,
- (3) Amount of chemical actually received by the animal (dose), and
- (4) Inherent sensitivity of the animal to the chemical.

The toxicity of the chemical is measured by laboratory tests required by EPA. The amount of chemical to which an animal may be exposed is influenced by several factors, discussed below. When an animal is exposed to a chemical, only a portion of the chemical applied or ingested is actually absorbed or taken in by the animal (the dose). Various absorption rates for wildlife are not available, so some scenarios use the same value for exposure and dose. Also, different species have different susceptibilities to various chemicals. This is discussed more in the section on surrogates.

### ***Factors that Influence Exposure and Dose***

The exposure of an animal to an herbicide is greatly influenced by relationships between body size and several physiological, metabolic, and pharmacological processes (allometry). For example, allometric relationship dictates that animals of smaller size have a larger amount of surface area for their mass than larger animals. This relationship greatly influences basic physiological properties, such as food consumption and thermoregulation. Some of the allometric factors that influence exposure to herbicides are detailed below.

**Body Weight:** Several parameters used to estimate herbicide contact are reported on a “per body weight” basis, expressed in grams (g) or kilograms (kg). For example, both food and water ingestion rates are reported on a per body weight basis (such as gram of fresh food or water per gram of fresh body weight per day). Body weights, in units of mass, are reported as fresh weight that might be obtained by weighing a live animal in the field. Also, body weight data are used in empirical models to calculate some parameters, such as surface area, when there no specific measurements are available. Calculations of “potential dose to animal” use body weight of animals.

**Metabolic Rate:** Metabolic rate is not directly calculated in this document, or in the FS/SERA risk assessments, but reported values for various species are used to calculate food consumption requirements. It is reported on the basis of kilocalories per day for units of body weight (kcal/kg/day). Metabolic rate is closely related to body size, with smaller animals generally having higher metabolic rates than larger animals.

**Contact Rate:** Exposure involves direct contact with the herbicide, and wildlife may be exposed to herbicides by ingesting the chemical (oral) or by external contact (dermal). Oral exposures may occur from eating contaminated vegetation or prey, drinking contaminated water, or by grooming activities. Dermal exposures may occur from direct spray, or contact with contaminated vegetation or water. These contact routes are influenced by allometric relationships, as well as habitat preferences and feeding behaviors.

### ***Oral Routes***

**Food ingestion:** Small animals generally have higher caloric requirements than large animals, so a small animal ingests a greater amount of food per unit body weight compared to large animals. A 20g mouse, for example, will generally consume an amount of food equal to about 15 percent of its body weight every day, depending on calorie content of the diet. A value of 3.6 g of food consumed per day for a 20g mouse is used in the FS/SERA risk assessments for calculating exposure from contaminated food. This is equivalent to 18 percent of the body weight and is generated from general allometric relationships for food consumption in rodents (US EPA/ORD, 1993, p. 3-6, as cited in SERA, 2003-Glyphosate). This value may underestimate exposure to small mammals that consume primarily vegetation, rather than seeds (SERA, 2003a). Food consumption is calculated from caloric requirements for different sized animals for the various exposure scenarios in the FS/SERA risk assessments.

**Dietary composition:** Dietary composition is an important consideration in exposure assessments because different foods have varying herbicide residues. Grasses may have substantially higher residues than fruits or other vegetation (Kenaga, 1973; Fletcher et al. 1994; Pfleeger et al., 1996). The FS/SERA risk assessments use data from Siltanen et al. (1981) for concentrations on fruit. Also, small insects may contain higher residues than large insects, based on empirical relationships (Pfleeger et al., 1996). Some herbicides have the potential to bioaccumulate in fish; therefore fish-eating birds may be exposed. Caloric content of various foods, with caloric requirements of animals, is used to estimate daily amount of food consumed based on data from US EPA/ORD 1993 (as cited in SERA, 2003- Glyphosate). In the FS/SERA risk assessments, exposure scenarios use a large herbivore consuming 100 percent grass diet, a large bird consuming grass, a small bird consuming small insects, and a predatory bird consuming contaminated fish (SERA, 2003-Glyphosate, p. 4-14 to 4-15).

**Water ingestion:** There are well-established relationships between body weight and water consumption across a wide range of mammalian species. Mice, weighing about 20 g (0.02 kg) consume about 0.005 L of water/day (i.e. 0.25 L/kg/day). These values are used in the exposure scenarios for small mammals. Since the body size to volume relationship dictates that smaller animals will receive larger doses for a given exposure, consumption of contaminated water is not calculated for larger animals. Water ingestion is obviously influenced by environmental factors, such as heat and availability. But estimates for the variability in water consumption are not available for wildlife.

**Grooming:** Birds and mammals may spend a great deal of time grooming fur or feathers. If the animal has been exposed to herbicide, some chemical may be absorbed through the grooming process. However, a study by Gaines (1969, as cited in SERA, 2001) suggests that grooming is not significant in the toxic response of small mammals. At any rate, the doses received from grooming would be less than those received through contaminated food or direct spray, given the assumptions in the exposure scenarios. See dermal exposure route information below.

### ***Dermal Route***

Dermal contact can occur from direct spray or contact with contaminated vegetation or water. Since only a small portion of an applied herbicide would be available as dislodgeable residue on vegetation, or in a water body where it was diluted, dermal exposure is modeled only for direct spray scenarios in FS/SERA

risk assessments. The extent of dermal contact for an animal depends on the application rate of the herbicide, the surface area of the animal, and the rate of absorption. Since a larger proportion of a small animal's body would be involved, relative to larger animals, direct spray scenarios are only conducted for a small mammal and a honeybee in FS/SERA risk assessment (SERA, 2001). Skin, fur and feathers provide some protection from chemicals, and not all of the chemical on an animal will be absorbed.

Amphibians may be an exception, since their skin may be much more permeable than the skin of a mammal or bird. In this document, we assume that the skin affords no protection at all (e.g., 100 percent absorption). Scenarios with a different assumption regarding absorption may be found in the various FS/SERA risk assessments. The approach taken here (100 percent absorption) may account for multiple absorption pathways, such as dermal absorption plus that from grooming or preening. However, there is no quantitative data available regarding this assumption. The actual dose received after dermal exposure is also influenced by the specific herbicide considered since different herbicides have different dermal absorption rates and properties (SERA, 2001, section 3.9).

## B. Summary of Exposure Scenarios

An exposure scenario was developed, and a quantitative estimate of dose received by the animal type in the scenario was calculated when enough data was available (SERA, 2001). While it is possible to model exposure in a very large number of non-target animals, highly species-specific exposure assessments are of little use in the absence of species specific dose response data (SERA, 2001). The exposure assessment should not be more complicated than the dose-response assessment. Therefore, exposure scenarios used in this document are calculated when dose-response data for specific herbicides indicate that one group and/or size of animal may be more sensitive than others. For example, if data indicates that larger mammals may be more sensitive than smaller mammals, separate exposure scenarios have been developed for each. In the absence of such data, only exposures for small mammals may be calculated because they would receive the highest dose per kg body weight. The exposure scenarios, below, that are used in the Ecological Risk Assessments (SERA, 2001) and for this EIS are for mammals and birds and are not available for amphibians and reptiles. Effects to amphibians and reptiles are summarized in sections E., F., and G. in Chapter 3.7 Wildlife in the main document.

### *Acute Exposure Scenarios*

**20 g mammal exposure scenario:** A mouse-sized mammal is directly sprayed over 50 percent of body surface area and 100 percent absorption occurs over one day. A “mouse” consumes contaminated vegetation, daily food consumption equal to 18 percent of body weight (a value between seed diet and vegetation diet needs), and one day's diet is 100 percent contaminated. A “mouse” consumes contaminated insects, daily food consumption equals 50 percent of body weight, and one day's diet is 100 percent contaminated. A “mouse” consumes contaminated water (volume water consumed is based on allometric relationship) after spill of 200 gallons into a small pond (with no dissipation or degradation of the herbicide).

<b>Animal Group: 20 g mammal</b>
<b>Species Evaluated</b>
Northern bog lemming
Fringed myotis
Townsend's big-eared bat

**5 kg mammal exposure scenario:** A fox-sized animal consumes small mammal prey that has been contaminated by direct spray. Daily food consumption equals 8 percent of body weight.

<b>Animal Group: 5 kg mammal</b>
<b>Species Evaluated</b>
Canada lynx
North American wolverine
Fisher

**70 kg mammal exposure scenario:** A deer-sized animal consumes contaminated grass (grass has higher herbicide residues), daily food consumption is 14.16 kg/day (equal to 20 percent of body weight), and one day's diet is 100 percent contaminated.

<b>Animal Group: 70 kg mammal</b>
<b>Species Evaluated</b>
Rocky Mountain bighorn sheep
Shira's moose
Rocky Mountain elk
White-tailed deer

**10 g bird exposure scenario:** A small, passerine-sized bird consumes contaminated small insects and one day's diet is 100 percent contaminated.

<b>Animal Group: 10 g bird</b>
<b>Species Evaluated</b>
Black-backed woodpecker
Pileated woodpecker
Flammulated owl
Black swift
White-headed woodpecker
Mountain quail
Pygmy nuthatch
Neotropical migratory species

**4 kg predatory bird exposure scenario:** A bird-of-prey consumes fish that has been contaminated by an accidental spill of 200 gal into a small pond. Assumptions used include no dissipation of herbicide,

bioconcentration is equilibrium with water, contaminant level in whole fish is used, and upper estimate assumes 15 percent of body weight eaten/day.

A spotted-owl sized bird consumes small mammal prey that has been contaminated by direct spray.

<b>Animal Group: 4 kg predatory bird</b>
<b>Species Evaluated</b>
Bald eagle (winter)
Common loon
Harlequin duck
Belted kingfisher
American peregrine falcon
Northern goshawk

### C. Chronic Exposure Scenarios

**20 g mammal:** A mouse-sized mammal consumes contaminated vegetation for 90 days (upper estimate assumes 20 percent of diet is contaminated), and the herbicide dissipates over time. A “mouse” consumes contaminated ambient water for an extended period.

**70 kg mammal:** A deer-sized mammal consumes contaminated grass for 90 days (upper estimate assumes 100 percent of diet is contaminated), and the herbicide dissipates over time.

**4kg bird:** A goose-sized bird consumes contaminated grass for 90 days (upper estimate assumes 100 percent of diet is contaminated), and herbicide dissipates over time.

**Predatory bird:** A bird-of-prey consumes fish from contaminated water over a lifetime. Assumptions used include dissipation and degradation of herbicide is considered, bioconcentration is equilibrium with water, contaminant level in whole fish is used, and upper estimate assumes 15 percent of body weight eaten/day.

No data are available to estimate chronic exposures from contaminated insects or mammal prey, so risk from chronic exposure is estimated using the acute dose compared to the chronic toxicity index.

In this document, only the highest ranges of exposure assumptions are included, although a more complete range of possible values is included in the SERA risk assessments. For example, for a given herbicide, residues of the herbicide on vegetation that are reported in the literature will vary between studies and by vegetation type. A range of residue rates is used in the SERA risk assessment worksheets, but only the highest reported rates are used in the data reported here. Only the highest values are used here to reduce length and complexity of this document and also to present a reasonable “worst-case” exposure analysis.

Estimated doses from the above exposure scenarios are compared to toxicity levels from laboratory research. The lowest reported dose that caused the most sensitive effect in the most sensitive species is used in this analysis to indicate the potential for an adverse effect when that dose is exceeded. These doses are referred to as “toxicity indices” in this document, and NOAEL’s (No-observed-adverse-effect-level) are

used whenever possible. If available data have not identified a NOAEL, then an LD<sub>50</sub> (Lethal Dose<sub>50</sub>) or other level may be used.

#### **D. Effects of Proposed Herbicide Applications to Mammals and Birds**

The following tables summarize effects to species groups in various exposure scenarios for each of the proposed herbicides. For each active ingredient in the following tables, three application rates are noted. The “high” rate represents the highest average rate used in Forest Service applications nationally. The “typical” application rate is the average rate used in the Forest Service nationally. The “project” application rate is the rate proposed for each herbicide application in this proposed project being analyzed. The rate closest to the proposed project application rate was used to determine worst case scenario exposures as described above. Herbicide exposure risk from the proposed project activities is anticipated to be much lower

**Table 3.7- 1: Effects To Species Groups In Various Exposure Scenarios From Chlorsulfuron**

<b>Chlorsulfuron (Telar)</b>									
Highest application rate analysed = .25 lb./ac.									
Proposed project application rate = 0.07 lb./ac.									
Typical application rate: 0.056 lb./ac.									
Mammal and Bird Groups Evaluated	Small mammal-direct spray 20g	Small mammal drinks contam. H2O	Large herbivorous mammal 70kg	Med. carnivorous mammal 5kg	Small herbivorous mammal 20g	Small insectivorous mammal 20g	Large fish eating bird 4kg	Large predatory bird 4kg	Small insectivorous bird 10g
Exposure Level (High Rate/Dose)	.08 acute NOAEL	.007 acute NOAEL	.036 acute-.228 chronic NOAEL	.0016 acute NOAEL-no chronic accumulations	.002 acute-.0026 chronic NOAEL	.052 acute NOAEL-no chronic data	.00017 acute-.0000064 chronic NOAEL	.0001 acute NOAEL-no chronic accumulations	.004 acute NOAEL-no chronic data
Effects	No expected adverse effects	No expected adverse effects	No expected adverse effects	No expected adverse effects	No expected adverse effects	No expected adverse effects	No expected adverse effects	No expected adverse effects	No expected adverse effects

**Table 3.7- 2: Effects To Species Groups In Various Exposure Scenarios From Clopyralid(Transline)**

<b>Clopyralid (Transline)</b>									
Highest application rate analysed = 0.5 lb./ac.									
Proposed project application rate = 0.5 lb/acre									
Typical application rate: 0.35 lb./ac.									
Mammal and Bird Groups Evaluated	Small mammal-direct spray 20g	Small mammal drinks contam. H2O	Large herbivorous mammal 70kg	Med. carnivorous mammal 5kg	Small herbivorous mammal 20g	Small insectivorous mammal 20g	Large fish eating bird 4kg	Large predatory bird 4kg	Small insectivorous bird 10g
Exposure Level (Proposed Rate/Dose)	.45 acute NOAEL	.09 acute NOAEL -no chronic expected	.64 acute-1.92 chronic NOAEL	.06 acute NOAEL-no chronic accumulations	.03 acute-.02 chronic NOAEL	.96 acute NOAEL-no chronic data	.01 acute NOAEL-no chronic data	.01 acute NOAEL-no chronic accumulations	.19 acute NOAEL-no chronic data
Effects	No expected adverse effects	No expected adverse effects	Potential adverse effects (none at typical .35 lb./ac. or high .5 lb./ac.	No expected adverse effects	No expected adverse effects	Potential adverse effects (very low at .35 lb. rate)	No expected adverse effects	No expected adverse effects	No expected adverse effects

**Table 3.7- 3: Effects To Species Groups In Various Exposure Scenarios From Dicamba (Clarity)**

<b>Dicamba (Clarity)</b>									
Highest application rate analysed = 2 lb./ac.									
Proposed project application rate = 1.5 lb./ac. (recommend lower rate to reduce effects)									
Typical application rate: 0.3 lb./ac.									
Mammal and Bird Groups Evaluated	Small mammal-direct spray 20g	Small mammal drinks contam. H2O	Large herbivorous mammal 70kg	Med. carnivorous mammal 5kg	Small herbivorous mammal 20g	Small insectivorous mammal 20g	Large fish eating bird 4kg	Large predatory bird 4kg	Small insectivorous bird 10g
Exposure Level (Proposed Rate/Dose)	.66 – 1.98 acute NOAEL	.03 acute-.00024 chronic NOAEL	> acute and chronic NOAEL	< acute NOAEL and chronic not expected	< acute and chronic NOAEL	> acute and chronic NOAEL	< acute and chronic NOAEL	< acute and chronic NOAEL	> acute and chronic NOAEL
Effects	Potential adverse effects (none at .3 lb.)	No expected adverse effects	Adverse effects expected for acute and chronic exposure (no acute effects at .3 lb.)	No expected adverse effects	No expected adverse effects	Expected adverse effects (no acute effects for .3 lb.)	No expected adverse effects	No expected adverse effects	Adverse effects expected for acute and chronic for both .3 lb. and 2 lb. exposures

**Table 3.7- 4: Effects To Species Groups In Various Exposure Scenarios From Glyphosate (Rodeo, Roundup)**

<b>Glyphosate (Rodeo, Roundup)</b>									
Highest application rate analysed = 7 lb./ac.									
Proposed project application rate = 1.5 lb./ac.									
Typical application rate: 2 lb./ac.									
Mammal and Bird Groups Evaluated	Small mammal-direct spray 20g	Small mammal drinks contam. H2O	Large herbivorous mammal 70kg	Med. carnivorous mammal 5kg	Small herbivorous mammal 20g	Small insectivorous mammal 20g	Large fish eating bird 4kg	Large predatory bird 4kg	Small insectivorous bird 10g
Exposure Level (Typical Rate/Dose)	.3 acute NOAEL	.03 acute-.00001 chronic NOAEL	.6 acute -.3 chronic NOAEL	.024 acute NOAEL-no expected chronic accumulations	.01 acute-.001 chronic NOAEL	.793 acute NOAEL - no chronic data	.005 acute - .00001 chronic NOAEL	.0115 acute NOAEL-no chronic accumulations	.04 NOAEL-no chronic data
Effects	No expected adverse effects	No expected adverse effects	No expected adverse effects	No expected adverse effects	No expected adverse effects	No expected adverse effects	No expected adverse effects	No expected adverse effects	No expected adverse effects for acute exposure Potential adverse effects for chronic exposures

**Table 3.7- 5: Effects To Species Groups In Various Exposure Scenarios From Imazapic (Plateau)**

<b>Imazapic (Plateau)</b>									
Highest application rate analysed = 0.19 lb./ac.									
Proposed project application rate = 0.19 lb./ac.									
Typical application rate: 0.13 b./ac.									
Mammal and Bird Groups Evaluated	Small mammal-direct spray 20g	Small mammal drinks contam. H2O	Large herbivorous mammal 70kg	Med. carnivorous mammal 5kg	Small herbivorous mammal 20g	Small insectivorous mammal 20g	Large fish eating bird 4kg	Large predatory bird 4kg	Small insectivorous bird 10g
Exposure Level (Pro-High Rate/Dose)	.01 acute NOAEL	.004 acute-<.0(7)9 chronic NOAEL	<.01 acute - .02 chronic NOAEL	<.0006 acute NOAEL-no expected chronic accumulations	.<.0008 acute and.0002 chronic NOAEL	.02 acute NOAEL - no chronic data	<.00007 acute and .0(8)4 chronic NOAEL	<.0003 acute NOAEL-no chronic accumulations	<.01 acute NOAEL-no chronic effects expected
Effects	No expected adverse effects	No expected adverse effects	No expected adverse effects	No expected adverse effects	No expected adverse effects	No expected adverse effects	No expected adverse effects	No expected adverse effects	No expected adverse effects

**Table 3.7- 6: Effects To Species Groups In Various Exposure Scenarios From Metsulfuron methyl (Escort)**

<b>Metsulfuron methyl (Escort)</b>									
Highest application rate analysed = 0.15 lb./ac.									
Proposed project application rate = 0.4 lb./ac.									
Typical application rate: 0.03 lb./ac.									
Mammal and Bird Groups Evaluated	Small mammal-direct spray 20g	Small mammal drinks contam. H2O	Large herbivorous mammal 70kg	Med. carnivorous mammal 5kg	Small herbivorous mammal 20g	Small insectivorous mammal 20g	Large fish eating bird 4kg	Large predatory bird 4kg	Small insectivorous bird 10g
Exposure Level (Pro-High Rate/Dose)	.1 acute NOAEL	.009 acute - <.0(6)7 chronic NOAEL	.06 acute-.02 chronic NOAEL	.003 acute NOAEL-no chronic accumulations	.003 acute-.0003 chronic NOAEL	.08 acute NOAEL-no chronic data	.000009 acute-.0(6)3 chronic NOAEL	.00009 acute NOAEL-no chronic accumulations	.003 acute NOAEL-no chronic data
Effects	No expected adverse effects	No expected adverse effects	No expected adverse effects	No expected adverse effects	No expected adverse effects	No expected adverse effects	No expected adverse effects	No expected adverse effects	No expected adverse effects

**Table 3.7- 7: Effects To Species Groups In Various Exposure Scenarios From Picloram (Tordon)**

<b>Picloram (Tordon)</b>									
Highest application rate analysed = 1 lb./ac.									
Proposed project application rate = 1.0 lb./ac.									
Typical application rate: 0.35 lb./ac.									
Mammal and Bird Groups Evaluated	Small mammal-direct spray 20g	Small mammal drinks contam. H2O	Large herbivorous mammal 70kg	Med. carnivorous mammal 5kg	Small herbivorous mammal 20g	Small insectivorous mammal 20g	Large fish eating bird 4kg	Large predatory bird 4kg	Small insectivorous bird 10g
Exposure Level (Typical Rate/Dose)	.2 acute NOAEL	.03 acute - .00003 chronic NOAEL	0.5 acute - 0.3 chronic NOAEL	0.0216 acute NOAEL-no chronic accumulations	0.03 acute-0.003 chronic NOAEL	0.714 acute NOAEL-high chronic exposure	0.0006 acute – 0.00003 chronic NOAEL	.000754 acute NOAEL-no chronic accumulations	.03 acute NOAEL-chronic effects expected
Effects	No expected adverse effects	No expected adverse effects	No expected adverse effects	No expected adverse effects	No expected adverse effects	Expected adverse chronic effects but no adverse acute effect	No expected adverse effects	No expected adverse effects	Expected adverse chronic effects but no adverse acute effects

**Table 3.7- 8: Effects To Species Groups In Various Exposure Scenarios From 2,4-D (Weedone, Weedar, Savage)**

<b>2,4-D (Weedone, Weedar, Savage)</b>									
Highest application rate analysed = 2 lb./ac.									
Proposed project application rate = 1.0 lb./ac. (Recommend 1 lb./ac. rate or less to reduce potential effects)									
Typical application rate: 1 lb./ac.									
Mammal and Bird Groups Evaluated	Small mammal-direct spray 20g	Small mammal drinks contam. H2O	Large herbivorous mammal 70kg	Med. carnivorous mammal 5kg	Small herbivorous mammal 20g	Small insectivorous mammal 20g	Large fish eating bird 4kg	Large predatory bird 4kg	Small insectivorous bird 10g
Exposure Level (High Rate/Dose)	> acute NOAEL for 1 lb./ac. and more for 2 lb./ac.	.10 acute NOAEL - no chronic effects expected	> acute and chronic NOAEL	>.21 acute NOAEL-no chronic accumulations	>0.3 acute and 0.1 chronic NOAEL	13 times > acute non-lethal dose and 27 times > chronic LOAEL	>0.12 toxicity index->.006 chronic NOAEL for mammals	.057 acute toxicity index-potential chronic accumulations	Much greater than acute NOAEL-chronic effects expected
Effects	Expected adverse effects for 1 and 2 lb. rate)	Potential adverse acute effects but not chronic effects expected	Expected adverse effects	Expected adverse effects at 1 and 2 lb. rates	Expected adverse effects at 1 and 2 lb. rates	Expected adverse effects	No expected adverse effects	Potential adverse chronic effects but no expected adverse acute effects	Expected adverse effects at 1 and 2 lb. rates

The following table summarizes the analysis of wildlife effects from Curtail, a combination of 2,4-D and Clopyralid. Both of these chemical compounds are analysed separately in tables above. The amounts of active ingredients in the two chemicals are different in the Curtail formulation, however. The proposed project application rate of the two chemicals within the Curtail formulation is shown below. Based on the application rate, no discernable effects from the Clopyralid component are anticipated. Therefore, only effects from the 2,4-D component are displayed in the table below.

**Table 3.7- 9: Effects To Species Groups In Various Exposure Scenarios From 2,4-D combined with Clopyralid (Curtail)**

2, 4-D combined with Clopyralid (Curtail)									
Highest application rate analysed 2,4-D = 1 lb./ac. Clopyralid = .35 lb./ac.									
Proposed project application rate 2,4-D = 1 lb./ac Clopyralid = .19 lb./ac.									
Typical application rate: 2,4-D = 1 lb./ac Clopyralid = .35 lb./ac.									
Mammal and Bird Groups Evaluated	Small mammal-direct spray 20g	Small mammal drinks contam. H2O	Large herbivorous mammal 70kg	Med. carnivorous mammal 5kg	Small herbivorous mammal 20g	Small insectivorous mammal 20g	Large fish eating bird 4kg	Large predatory bird 4kg	Small insectivorous bird 10g
Exposure Level (High Rate/Dose)	> acute NOAEL for 1 lb./ac.	.07 acute - .0006 chronic NOAEL	> acute and chronic NOAEL	.21 acute NOAEL-no chronic accumulations	0.3 acute and 0.1 chronic NOAEL	7 times > acute non-lethal dose – same for chronic effects	0.12 toxicity index-.006 chronic NOAEL for mammals	.057 acute toxicity index-potential chronic accumulations	2 x > acute toxicity index –acute dose > than chronic LOAEL effects to mammals
Effects	Expected adverse effects	Potential adverse effects	Expected adverse effects	Expected adverse effects	Expected adverse effects	Expected adverse effects	No expected adverse effects	Potential chronic effects but none expected for acute	Expected adverse effects

## APPENDIX N

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## APPENDIX O

### GLOSSARY

**Active ingredient (a.i.):** The effective part of a pesticide formulation that actually destroys the target pest or performs the desired functions, or the actual amount of a technical material present in the formulation.

**Adjuvant:** Material added to the pesticide mixture to help the active ingredient do a better job of control. Examples of an adjuvant include: wetting agent, spreader, adhesive, emulsifying agent, and bark penetrant.

**Adaptive Management:** A concept of allowing decisions, which are focused on desired outcomes, to be made with the best information available and to adjust operations to achieve desired conditions.

**Annual (plant):** A plant species living for only one year or season.

**Bioaccumulation:** The retention and concentration of a substance by an organism.

**Biological Control (Biocontrol):** The dispersal or release of biocontrol agents on a noxious weed infestation (see definition of infested acre), with the intent of establishing a population of a biological control agents. An agent can be an insect, fungus, bacterium, or any other life form that preys on the weed of concern. The release of agents can occur at a single location or scattered over a site. The release can be a few individuals, a container of many individuals, or several containers with thousands of individual agents. Releases at different locations, with the intent of establishing separate populations (at least 1/4 mile apart), constitute separate releases. Release of two species of biological control agents, at the same location, in the same year, is a single release.

**Biodegradation:** The series of processes by which living systems, particularly microorganisms, degrade chemical compounds, and the breakdown products may be either more or less toxic than the parent compound.

**Biological diversity:** The variety of life and its processes, including all life forms from one-celled organisms to complex organisms such as insects, plants, birds, reptiles, fish, other animals and the processes, pathways and cycles that link such organisms into natural communities.

**Carcinogen:** A substance that causes or induces cancer.

**Chronic exposure:** Adverse effects occurring after exposure to a toxic agent for a long period (with animal testing, this is considered to be the majority of the animal's life). These effects are considered to be permanent or irreversible.

**Contain Strategy:** Target invasive plants are geographically contained and are not increasing beyond the perimeter of the infestation. Treatment within established infestations may be limited but actions are taken to control or eradicate the target plants outside those areas.

**Control Strategy:** Seed production is prevented throughout the target patch and the area coverage of the target invader is decreased over time. Prevent the target invasive plant species from expanding and dominating the vegetation of the area but accept a low level of occurrence.

**Degradation:** Physical or biological breakdown of a complex compound into simpler compounds. Dermal exposure: Contact between a chemical and the skin.

**Designated Treatment Area:** Specific fixed points or features on the landscape such as campsites, travel corridors, administrative sites, etc. that receive a relatively high level of human use with an associated high risk of infestation by invasive plants.

**Dispersed Treatment Area:** Invasive plant sites, such as grassland polygons or open timber stands, that occur randomly over the susceptible habitats within the off-trail, less accessible or remote portions of the Project Area.

**Eradication Strategy:** The target invasive plant specie is eliminated from the Project Area, including viable seeds and/or vegetative propagates.

**Exotic plant:** A non-native plant.

**Forbs:** A group of herbaceous (non-woody) plants, other than grasses, generally including wildflowers and many other plants, including those commonly referred to as weeds.

**Formulation:** The form in which a pesticide is packaged or prepared for use. A chemical mixture that includes a certain percentage of active ingredient (technical chemical) with an inert carrier.

**Gross Area:** An area of land occupied by one or more target invasive plant species. The area is defined by drawing a line around the general perimeter of the infestation, not the canopy cover of the plants. The gross area may contain significant parcels of land that are not occupied by invaders.

**Hazard analysis:** Involves gathering and evaluating data on the types of injury or disease that may be produced by a substance and on the conditions of exposure under which injury or disease occurred.

**Herbicide:** A chemical that regulates the growth of or kills specific weeds or undesirable plants.

**Hypersensitivity:** A state of extreme sensitivity to an action of a chemical; a state of altered reactivity in which the body reacts with an exaggerated immune response to a foreign substance.

**Inert ingredients:** All ingredients in a formulated pesticide product that are not classified as active ingredients.

**Infested Acre or Area:** A contiguous area of land occupied by one or more invasive plant species. The infested area is defined by drawing a line around the actual perimeter of area occupied by the canopy of the target plants.

**Inhalation:** The movement of a chemical from the breathing zone, through lung tissues, and into the blood system.

**Intake:** Amount of material inhaled, absorbed through the skin, or ingested during a specified period of time.

**Integrated Pest Management (IPM):** A multi-disciplinary, ecological approach to managing a pest, which involves the use of several control techniques in a planned, coordinated program, to limit the impacts of the pest.

**Integrated Weed Management (IWM):** This is the same concept as IPM, but it is specific to plants.

**Invasive plant:** A nonnative species that is likely to cause or has the potential to cause economic or environmental harm to the ecosystem(s) under consideration or harm to human health. Synonymous terms can include; noxious weeds, weeds, invasive weeds, exotic plants, etc.

**LD50 (Median Lethal Dose):** A measure of acute toxicity. The dose level that kills 50 percent of the test animals exposed.

**Mitigation measures or practices:** The identification of specific practices and methods that will reduce or eliminate adverse effects related to implementation of an alternative.

**Native vegetation:** With respect to a particular ecosystem, a species that, other than as a result of an introduction, historically occurred or currently occurs in that ecosystem.

**Natural community:** An assemblage of organisms indigenous to an area that is characterized by distinct combinations of species occupying common ecological zones and interacting with one another.

**NOEL (No Observed Effect Level):** In dose-response experiments, it is the exposure level which causes no statistically significant increase in frequency or severity of any effect between the exposed population and its appropriate controls.

**Non-native vegetation:** Any species that is not native to the ecosystem in question

**Non-target:** Any plant, animal, or organism that a method of treatment is not aimed at, but may accidentally be injured by the treatment.

**Noxious Weed:** A noxious weed is a plant species listed in State laws or regulations or specifically listed by a Federal agency.

**Perennial:** A plant species that has a lifespan of more than two years.

**Persistence:** Resistance to degradation due to low volatility and chemical stability. A persistent substance is expected to remain in the environment for a long time.

**Pesticide:** Any substance used to control, prevent, destroy, repel, or mitigate insects, rodents, fungi, weeds, or other forms of plant or animal life that are considered to be pests.

**Plant community:** An association of plants or various species found growing together in different areas with similar site characteristics.

**Reduction Strategy:** Shrink existing infestations in size and density while eliminating smaller clusters of target plants that are in the vicinity of or expanding out from the larger older occurrences.

**Registered herbicide:** All pesticides sold or distributed in the United States must be registered by the U.S. Environmental Protection Agency, based on scientific studies, showing that they can be used without posing unreasonable risks to people or the environment.

**Risk:** In risk assessment, the probability that an adverse effect (injury, disease, or death) will occur under specific conditions of exposure to a risk agent.

**Treated Acre:** An infested area (see definition of infested acre) where invasive plants have received treatment or retreatment by an acceptable method (chemical, biological, mechanical, cultural, manual) for

the specific objective of controlling their spread and/or reducing their density (generally reported in increments of not less than 0.1 acre for chemical and mechanical treatment).

**Threatened species:** A species that is not presently endangered but could become so in the foreseeable future.

**Threshold level:** A dose or exposure below which there is no apparent or measurable adverse effect.  
**Toxicity:** The quantity or degree of being poisonous or harmful to plant, animal, or human life.