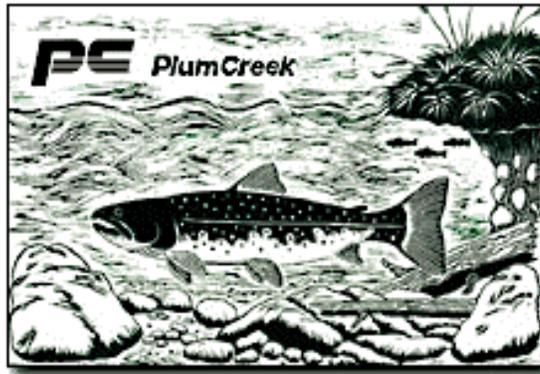


GRAZING BEST MANAGEMENT PRACTICES PLUM CREEK TIMBER COMPANY

February, 1999



Plum Creek believes that forestry and livestock grazing are legitimate land uses, and if conducted in a manner consistent with good stewardship of the land, are fully compatible with maintaining high-quality water and fisheries. Grazing of Plum Creek land will be done in an environmentally sensitive manner, and in strict compliance with Plum Creek's Environmental Principles and Grazing Best Management Practices (BMPs).

These Grazing BMPs are intended to fulfill obligations under the federal Clean Water Act. They are also a commitment in Plum Creek's Native Fish Habitat Conservation Plan that is being developed under the federal Endangered Species Act. Input from various individuals has been incorporated in the development of the BMPs. These include scientists at the University of Montana Riparian Wetland Research Program, the U.S. Fish and Wildlife Service, the National Marine Fisheries Service, and the Natural Resource Conservation Service. They also incorporate feedback received from Plum Creek's leaseholders and the Montana Stockgrower's Association.

The BMPs have four primary components:

- Minimum environmental **Performance Standards** to be achieved on Plum Creek property.
- Leaseholder development of an annual **Range Management Plan** (RMP) that describes the management system that will be implemented during that grazing season. This system must be designed to achieve the performance standards or result in an improving trend toward attainment

of the Standards. A toolbox of individual practices is provided that the leaseholder can include in the RMP. Some of these BMPs are mandatory (Such as salting away from streams and maintaining existing fencing) and some are optional (Such as fencing). Because of the site-specific nature of environmental conditions and sensitivities on each grazing lease, a simplistic set of mandatory BMPs is not workable. This system has built-in flexibility that gives leaseholders latitude to implement a system that will achieve the desired outcome.

- **Monitoring** stream and riparian conditions at several sensitive locations on the allotment at least twice each season. Monitoring involves a simple form and photo-points that are submitted to Plum Creek by the leaseholder.
- Preparation of an **End of Year Report** by the leaseholder that describes what worked well during the grazing season and what did not with regard to environmental compliance, and includes a list of things that need to be modified the next years RMP (Adaptive Management). If adequate progress is not made in attaining the performance standards, or improving conditions over time, Plum Creek may require specific practices be implemented, or terminate the lease.

Performance Standards:

The intent of **Performance Standards** is to provide a benchmark by which we can ensure that Plum Creek's corporate environmental objectives (such as clean water and healthy fisheries) are met. We believe that for the vast majority of cases, the standards outlined below will maintain or improve conditions over time. Adaptive management research (as developed under Plum Creek's Native Fish Habitat Conservation Plan and other outside research) will be the basis for refining these standards. See Appendix 1 for a series of photographs that illustrate various aspects of the BMPs.

Streambank Stability: Livestock-caused bank disturbance will affect no more than 10% of streambanks. *This will be measured as the number of feet of livestock-altered bank divided by 100 feet of measured bank.*

Riparian Compaction: Less than 10% of riparian soils will be affected by livestock hoof displacement/compaction (Riparian soils occur in the lush, damp area around streams and ponds). *This will be visually estimated over a 1/10th-acre area (66 feet by 66 feet).*

Grass Utilization: Riparian grasses, sedges, and rushes may be utilized to no less than 8 inches in height. Upland grasses may be utilized to no less than 4 inches.

Shrub Utilization: No more than 25% of the current year's shrub growth (including willows and trees) can be damaged/utilized by

livestock. *An illustration demonstrating 25% shrub utilization is shown in Appendix 2.*

Visual/Appearance: Must look good. *Subjectively rated by lease administrator.*

Tree Regeneration: Less than 10% of seedlings and other trees can have physical damage caused by livestock. This includes damage to the terminal bud and leader, or by scarring/scraping. In addition, compaction caused by livestock must not inhibit tree regeneration. *This will be visually evaluated over a 1/10th-acre area (66 feet by 66 feet).*

Shrub Regeneration: Where they can exist, shrubs must be present along streams and in riparian areas, with all age classes represented. *This is to be measured by noting presence, size classes, and numbers.*

Weeds: Note presence and species (no standard - monitor and note).

Leaseholder Requirements:

Each leaseholder must do the following to graze livestock on Plum Creek lands:

1. Each leaseholder will complete a Range Management Plan (RMP) which must be approved by the designated Plum Creek lease administrator prior to turnout (See Range Management Plans on Page 4).
2. Where current riparian conditions are not in compliance with the performance standards listed on Pages 2-3, the leaseholder's RMP must provide for steady improvement over time.
3. Each leaseholder will monitor riparian conditions at sensitive locations on their lease at least twice yearly. (See Monitoring on Pages 9-10)
4. Each leaseholder will complete an "End of Year Report." This report will summarize how performance standards were met, whether or not environmental concerns were effectively addressed, whether the RMP was fully implemented and whether it was effective, and what changes should be made to the RMP next year. Monitoring forms will be attached to the report. This report must be turned in to Plum Creek by November 1st (See End of Year Report on Page 11).

Range Management Plans:

A Range Management Plan (RMP) is a written record of your grazing goals and objectives, your plan of action to achieve these goals and objectives, and some form of measurement to determine whether you are successful. The RMP is not only your plan of action for the current year, but becomes a benchmark for future decision making and RMP adjustments. An RMP written by the leaseholder and approved by a Plum Creek representative is required prior to turnout of livestock. A sample RMP outline follows (see also example RMP in Appendix 3).

I. Objectives and Goals

- A. Plum Creek Objectives (Provided on page 1)
- B. Plum Creek Performance Standards (Listed on pages 2-3)
- C. Range/riparian condition improvements
- D. Other objectives the leaseholder may have

II. Environmental Concerns

- What are the environmental weak links of the range?
- What protection measures will be employed?
- How will the success of protection measures be evaluated?

III. Pasture and Livestock Management (Attach Map)

- A. Allowable AUMs
 - Entire allotment
 - Plum Creek portion of allotment
- B. Pasture control
 - Turnout, numbers of animals, and types of animals (breed, sex, and age)
 - Timing for moving into new pasture (delineate pastures on map)
 - Timing for pulling off of the range
 - Frequency of re-use
- C. Implementation methods
 - Transporting livestock
 - Distributing livestock
 - Watering methods
 - Planned improvements

IV. Monitoring Plans

- A. Meet Plum Creek monitoring requirements
 - Where are monitoring plots to be located?
- B. Other monitoring plans
 - Monitoring on other landowners in allotment
 - Monitoring success of leaseholders goals
- C. Make adjustments based on monitoring - the feedback loop

V. Plan to Re-plan: A season-end evaluation of RMP.

Best Management Practices (BMPs) that may be included in RMP:

Each leaseholder must identify the suite of management practices that will be included in the RMP.

This combination of management practices must be designed to meet Plum Creek's performance standards, or result in steady improvement toward attainment of the standards. No single procedure exists which will tell you how to manage livestock in a way that protects riparian, range, and water resources. Your knowledge of grazing management and the conditions specific to your allotment will be the basis for determining the combination of management practices that are appropriate.

The general categories of factors that are under your control on the allotment that can affect riparian function and fish habitat can be summarized as follows:

- Type of Livestock (breed, sex, age)
- Stocking Density
- Duration of Grazing
- Frequency of Grazing
- Timing of Grazing
- Distribution of Grazing
- Forage Utilization

The BMPs summarized in this section each address one (or more) of the controllable factors listed above. Some of these practices listed in this section are mandatory (**shown in *Italics***). The rest are to be used at the discretion of the rancher and the Plum Creek lease administrator.

Proper Use and Location of Salt

Salt shall be located well away from streams, ponds, seeps, and other riparian areas to avoid concentrating livestock use in these sensitive areas (Minimum of ¼ mile away). Salt can also be an effective tool for dispersing livestock into areas of feed that are not being used.

Salt should be moved at least twice per season. Salt is best located on south-facing slopes in the early season and in shaded areas far from streams, ponds, seeps, and other riparian areas in the late season. This BMP is most effective when done in conjunction with development of alternate water sources.

Livestock Watering Improvements and Maintenance

In areas where livestock are watering in streams and this is resulting in stream bank damage, livestock watering improvements will be considered. These may include developing springs on hills to feed a trough. *All existing watering improvements on the lease must be maintained on a frequent basis to ensure they are functioning properly.* Stock water developments should have water-catchment areas fenced out. Place a board in the water tank (cows won't drink as readily out of tanks with dead smelly critters in them – i.e., if a mouse falls in it can crawl out on the board) and place 2 ounces of copper per 1000 gallons of water to keep algae under control.

Fence Construction and Maintenance

Where livestock have caused severe riparian/stream damage and no other control mechanism is feasible, fencing may be the only solution for improving the riparian condition.

Existing fences on the lease (stream enclosures, drift fences, pastures, etc.) shall be maintained as needed to ensure they are effective. At a minimum, these fences shall be checked and repaired annually.

Fence gates will be maintained appropriately. Signs can be effective in maintaining gate closure where roads are subject to public use.

Season of Use (spring, summer, fall, season-long) -- timing of turnout

The timing of animal turnout and roundup can be critical for minimizing range and riparian damage. Riparian areas are most vulnerable when soils are at their wettest. Season-long grazing may not be a feasible alternative for protecting streams. Time the season of use to meet RMP goals.

Rotated Pastures

Having several pastures on an allotment can be an effective way to control the timing and duration of grazing in an area. Multiple pastures can be utilized in a way that minimizes riparian and stream damage and achieves RMP goals.

Riding (moving stock around)

Where cows congregate (especially in riparian areas), they should be frequently moved to minimize riparian and stream impacts.

Bulls on Range

Bulls must be managed in a way that minimizes environmental impacts. If bulls on the range are resulting in non-attainment of the performance standards listed on Page 1, they must be removed from the range.

Armor watering holes on creeks

In some cases, stream channel impacts are only located in a few areas where animals water. In some cases, armoring the channel with clean rock can prevent bank damage and sedimentation. This improvement will likely require a permit from the local Conservation District. Contact your Plum Creek lease administrator prior to implementing this management measure.

Proper Number of Animals

The number of animals utilizing the range shall not exceed the carrying capacity of the range. The carrying capacity is that level of use greater than which would result in the inability to achieve the Plum Creek performance standards (see pages 1-2). Good management may, therefore, result in a higher carrying capacity while, conversely, poor management will reduce the carrying capacity.

Yearling Herds

Turning out only yearling cows can be used effectively to achieve better distribution on the range.

Rotating Herds

In some cases, livestock herds have developed a pattern of use for a particular area. This can lead to continued use and damage of sensitive riparian areas. In some cases, rotating a new herds into the lease can help recover areas that have been impacted over the years.

Upland Wildlife Considerations

Over utilization of upland areas can have negative affects on many wildlife species. Consideration should be given to maintaining healthy and productive grassland communities in uplands, especially in areas that are important to wintering elk herds. Significant changes in vegetative species composition, reductions in ground cover, and degradation of winter forage availability in important elk wintering areas should be avoided.

Understory vegetation (such as woody shrubs) is an important source of browse, nesting areas, and cover for many wildlife species. The condition of understory vegetation should be monitored and downward trends in shrub availability should be avoided.

Vegetation Rehabilitation

Planting shrubs and trees can be effective in restoring plant communities to sensitive riparian areas, especially when done in conjunction with exclusion of grazing for a season or more. Dense shrub growth can stabilize stream banks as well as restrict livestock use along streams.

Intensify Management where Roads Cross Streams

Roads that cross streams may provide an efficient entry for livestock to sensitive stream corridors, thus encouraging unwanted riparian grazing. Management tools to employ at this key location include:

- * Wing fences back to impassable vegetation or terrain
- * Installation of slash filter windrows at toe of road fills

Use Vegetation to Restrict or Control Livestock Movement

Examples include those mentioned, such as slash filter windrows or establishment of shrubs along streams, but also includes any opportunity to utilize vegetation or woody debris which discourages free movement of livestock along stream corridors. ***In consultation with the Plum Creek lease administrator***, for instance, the leaseholder may try strategically felling trees/snags or placing debris/slash in riparian cow trails to discourage their use.

Weed Control

To prevent the spread of noxious weeds, grass seed can be applied in areas that have been stripped of vegetation. These areas include disturbed soils around salt licks and water tanks. In addition, ***notify the lease administrator of any new weeds on the allotment.***

Others ???

There are undoubtedly other BMPs that can be effective at minimizing water quality impacts. If you have had success with any particular management practice not discussed, please let us know so we can include it in future updates of this manual.

Monitoring:

Though the performance standards listed on Pages 1-2 must be met across the lease, identifying a few areas to monitor over time is helpful. Each leaseholder will monitor environmental conditions at several locations on their lease at least twice yearly. Monitoring is an opportunity for you to see how RMP implementation is working in sensitive areas and what may need to be modified. Monitoring plots are to be located in sensitive riparian areas that were identified as "environmental weak links" in the allotment in the RMP. See Appendix 4 for an example monitoring form and photograph.

Instructions

1. Agree on monitoring procedure in your Range Management Plan with the Plum Creek lease administrator prior to turnout of livestock.
2. Identify monitoring locations on the map of your leased area attached to the RMP.
3. Monitoring will be conducted twice yearly, once in mid-July and once just after the grazing season. Results are to be attached to the End of Year Report (Due November 1st) and will include photos taken at each plot with the plot number marked on each photo.
4. Take monitoring plots at agreed distance apart along the stream, answering questions, taking appropriate notes, and taking a photograph at the plot. Including a piece of paper with the plot number marked in felt pen in the photo is important to remember where the photo was taken.

Monitoring Form: Grazing in Riparian Areas

(2/99)

Leaseholder Name: _____

Date: _____

Stream Name: _____

Plot Number: _____

	<u>YES</u>	<u>NO</u>
1. Do hoof prints occupy more than 10% of the riparian area?	_____	_____
2. Are "cow pies" visible in the stream?	_____	_____
3. Are more than 10% of stream banks altered by livestock?	_____	_____
4. Is there bare, exposed soil on the stream banks?	_____	_____
5. Are multiple age classes of shrubs absent along the stream bank? _____	_____	_____
6. Does brush/willow hedging exceed 25% of the current years growth?	_____	_____
7. Are riparian grasses and sedges less than 8 inches high?	_____	_____
8. Is water in stream murky or foamy looking?	_____	_____
9. Would you refuse to drink a glass of this water (giardia aside)?	_____	_____
10. Did the condition of this monitoring plot worsen since your last visit?	_____	_____
TOTAL:	_____	_____

[] PHOTO TAKEN AT THIS POINT

OTHER OBSERVATIONS: _____

End of Year Report:

At the end of the season, it is important to review the operations for the year to evaluate what worked and what didn't. This is a valuable opportunity to determine what improvements can be made to the following years RMP and plan of operations. This evaluation must be written up and turned in to the Plum Creek administrator by November 1.

At a minimum, this report should include the following kinds of information:

- * Were Plum Creek performance standards met across the entire lease? If not, why?
- * Were environmental concerns effectively addressed?
- * Was pasture and livestock management implemented according to the RMP?
 - AUMs, numbers of animals, type of animals
 - Pasture control
 - turnout timing
 - pasture rotation and timing of rotation
 - turn in timing
 - distribution
 - forage utilization
- * Were planned range improvements implemented?
 - What worked?
 - What didn't?
- * What changes will be made to next years RMP to continue improvements in range conditions and compliance with performance standards?

Note: All monitoring forms and photos should be attached to the year end report.

**APPENDIX 1 - PHOTOGRAPHS OF PERFORMANCE STANDARDS AND
VARIOUS GRAZING BMP'S**

Fence Maintenance & Gate Closures

☹ (Right): Fences located in forested environments must be maintained frequently due to tree blowdown.



☹ (Left): Signing can be an effective way to make sure gates stay closed.

Salting & Brush Hedging

© (Right): Salt should be put out far from streams. This is a mandatory BMP on all allotments.



© (Left): Brush is starting to grow back along this stream following years of cattle grazing. Cattle utilization of brush cannot exceed 25% of the current years growth and the RMP must allow for continued improvement in the condition of this riparian area.

Bank Stability, Riparian Vegetation



☹ (Above): The stream bank on the left has unacceptable instability, too many hoofprints, and riparian grasses are overutilized. The right bank looks good. The RMP must provide for improvement in riparian condition. This might call for fall grazing, riding, or by creating a riparian pasture.



☺ (Left): This stream is recovering from past grazing. Banks are well stabilized, grasses are present, and brush is coming back. The RMP must provide for maintenance of this condition.

Bank Stability

⊗ (Right): Severe bank instability and stream downcutting can occur when riparian vegetation is absent. This allotment has had season-long grazing for over 70 years. The RMP must be written so that streamside vegetation (brush) recovers and bank stability improves. Vegetation planting or building a riparian pasture may be an effective tool in this example.



⊗ (Left): Many meadow streams on Plum Creek property suffer from severe bank instability. Because of the very fine-textured soils, these banks are very vulnerable to cattle damage. However, they can also respond very quickly to rehabilitation. RMP's must be written to provide recovery for meadow streams such as this.

Riparian Vegetation



⊖ (Above): This stream had season-long grazing for decades. As you can see, little riparian brush exists, the stream is very wide, and conditions are unacceptable. The RMP must provide for improvement in riparian condition. This might call for fall grazing, riding, or by creating a riparian pasture.



⊕ (Left): The same stream as above, six years after construction of a small test-exclosure. Note the stream is much narrower, and that grasses and brush are recovering. This is the kind of trend that Plum Creek wants.

Riparian Compaction, Hoofprints



⊗ (Left): Hillside seeps are very sensitive to compaction and cattle damage. This might be an ideal spot for a spring development leading to a watering tank.

⊗ (Right): Soft stream banks like this are also very sensitive. Cattle must not be turned out into these areas until banks have had a chance to dry out. In many cases, this will not happen until July. The RMP must specify how these impacts will be controlled and how rehabilitation will be accomplished.



Fencing



☺ (Left): Multiple pastures allow grazing duration and timing to be better managed.

☺ (Right): Fencing can also be used to protect sensitive fisheries.



Water Development



© (Left): A spring was developed on this hillside. The area was fenced off to prevent cattle trampling. Person in the enclosure is cleaning the intake. These water developments must be checked regularly to ensure that they are functioning properly.

© (Right): Spring intake (above) leads down to this watering tank. Cattle are well away from the nearest stream (in the distance). These types of developments are highly encouraged because they distribute cattle use away from sensitive riparian areas.



Fencing Where Roads Cross Streams

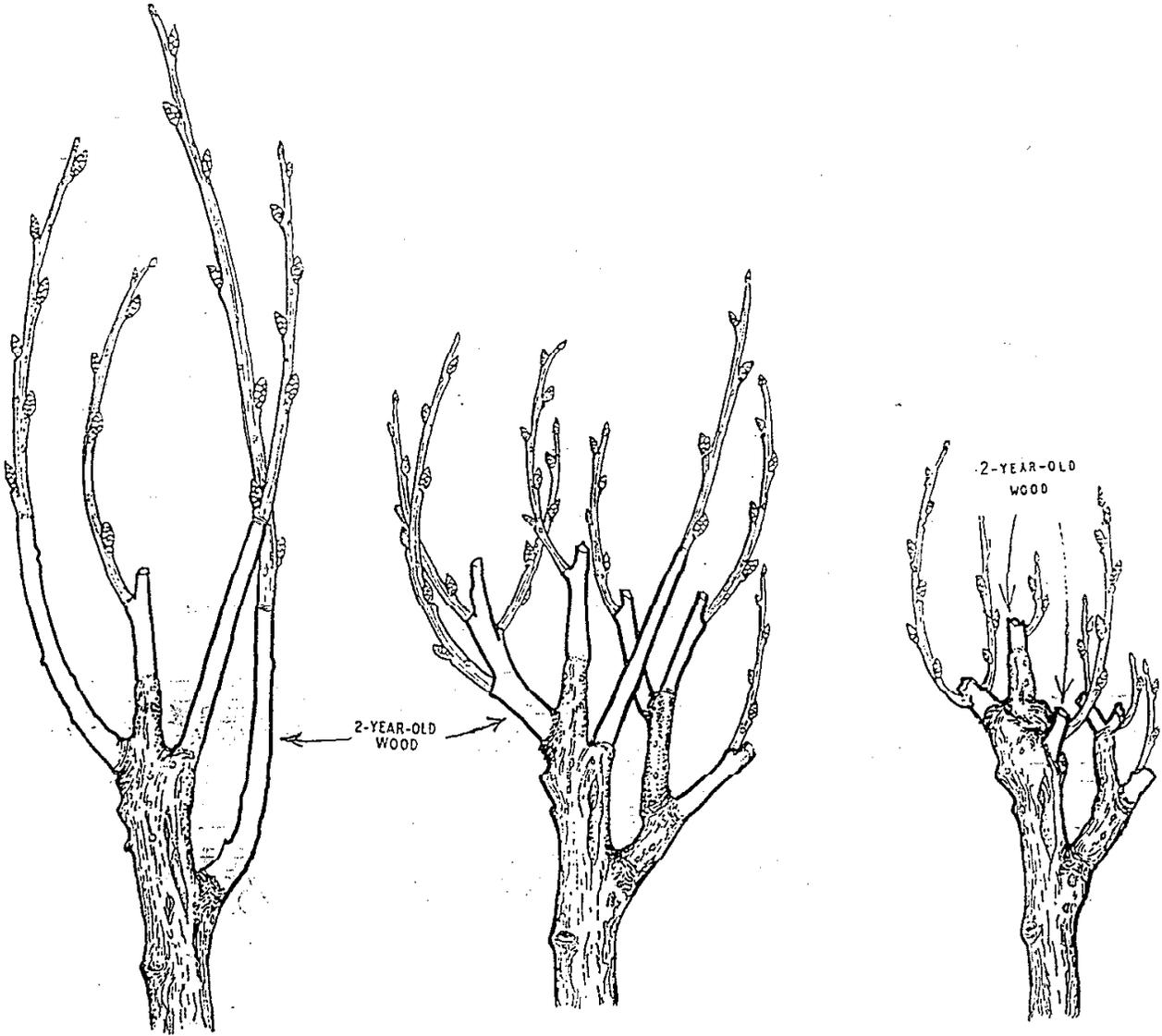
⊗ (Right): Because cattle tend to congregate along roads, stream crossing areas can become severely impacted. In this photo, cattle have caused real problems at the culvert outlet. Rehabilitation techniques in these areas include fencing, installation of watering tanks, or armoring the channel with rock to prevent sedimentation.



⊙ (Left): In this case, the rancher decided to install a small enclosure around the most severely impacted area. A spot just downstream is much more stable and the cattle can drink there. The two photographs on this page were taken one year apart.

APPENDIX 2 - SHRUB UTILIZATION CHART

SHRUB UTILIZATION



(25% Utilization)

(50% Utilization)

(75% Utilization)

✓ ACCEPTABLE

APPENDIX 3 - SAMPLE RANGE MANAGEMENT PLAN

1994 Range Management Plan -- JD Ranch

John Doe
PO Box 100, Happy Valley Montana
555-5690

Lease Location: Sections 6,7,8: Township 15 North, Range 20 West (1920 acres)

Goals and Objectives

1. Meet Plum Creek's Policy Statement outlined in the Grazing BMP's
2. Comply with Plum Creek performance standards listed in the Grazing BMP's
3. Ensure my lease is continued next year by demonstrating to Plum Creek that conditions along Deer Creek can improve while continuing grazing.

Environmental Concerns

The primary environmental concern on the lease is the condition of the riparian zone along Deer Creek. Due to over-grazing of the riparian area in past years, bank stability is very poor along much of Deer Creek. In addition, a seep in the Southwest Corner of Section 6 has been heavily trampled by cows in the past.

I will address the concern along Deer Creek by reducing the number of animals on the allotment by 20%, delaying turnout until July 1st, and by closely monitoring conditions along Deer Creek. If bank instability reaches 10%, the cows will be pulled off the range.

The seep area will be developed as a water source. This will involve placing a fence around the seep, and piping water downhill to a tank which is located in a dry area. This work will be completed by July 1st.

Success of the protection measures will be measured by making sure planned improvements are implemented, and by monitoring conditions in each area using the form provided.

Pasture and Livestock Management

The allowable AUM's for the allotment are 200. This represents a 20% reduction in AUM's from past years. Plum Creek land represents the entire allotment.

66 cow-calf pairs will be turned out on July 1st. There is one drift fence on the allotment (see map). I will turn the animals out north of the drift fence first because this area dries out the earliest. The animals will be moved to the rest of Sections 7 and 8 by early August. Roundup will occur the last week in September, unless the condition of Deer Creek requires pulling the animals off sooner.

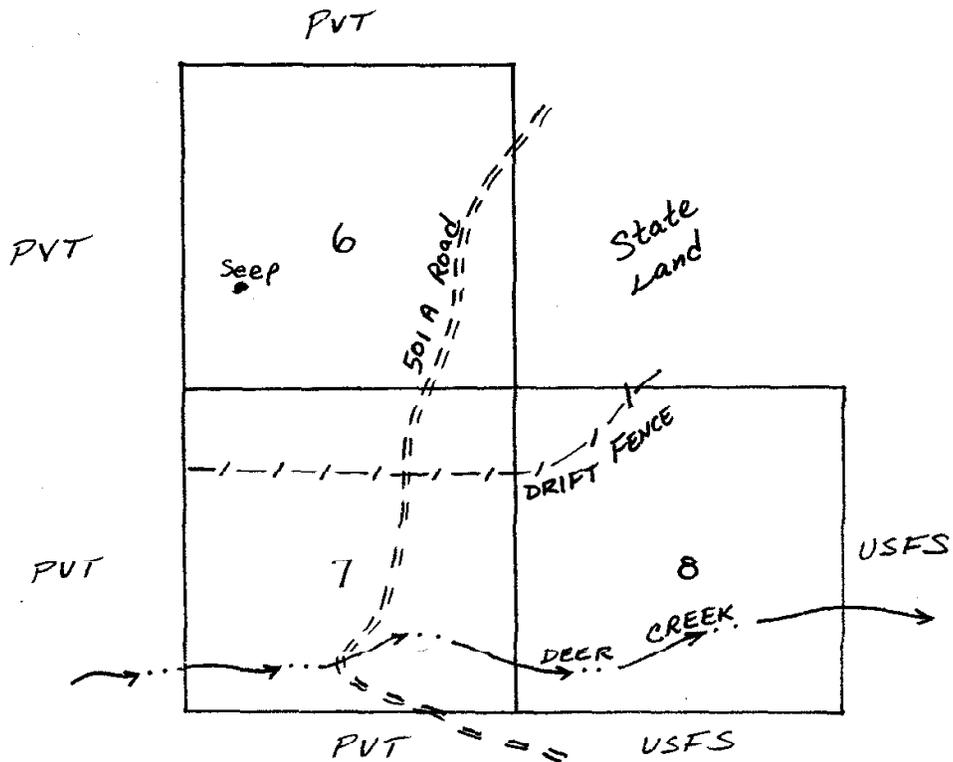
Livestock will be controlled by use of the drift fence mentioned earlier, by periodic riding, salting in strategic locations, and by developing the water source in Section 6.

Monitoring

I will meet with the Plum Creek lease administrator in May to identify the locations of monitoring plots. I anticipate locating several along Deer Creek, and one at the seep in Section 6.

The condition of Deer Creek will be monitored very closely. If conditions are unacceptable, the animals will be pulled off the range.

Allotment Map



APPENDIX 4 - SAMPLE MONITORING FORM

Monitoring Form: Grazing in Riparian Areas.

Leaseholder Name John Doe
 Date 9-21-94
 Stream Name Deer Creek
 Plot Number 1-2

	<u>YES</u>	<u>NO</u>
1. Do hoof prints occupy more than 10% of the riparian area?	___	<u>X</u>
2. Are "cow pies" visible in the stream?	___	<u>X</u>
3. Are more than 10% of stream banks unstable (vertical banks, caving in, exposed soil)?	<u>X</u>	___
4. Is there bare, exposed soil on the stream banks?	___	<u>X</u>
5. Are shrubs not visible along the stream bank?	<u>X</u>	___
6. Does brush hedging exceed 25% of the current years growth?	<u>X</u>	___
7. Are riparian grasses less than 8 inches high?	<u>X</u>	___
8. Is water in stream murky or foamy looking?	___	<u>X</u>
9. Would you refuse to drink a glass of this water (giardia aside)?	___	<u>X</u>
10. Did the condition of this monitoring plot get worse since your last visit?	___	<u>X</u>
TOTAL:	<u>4</u>	<u>6</u>

PHOTO TAKEN AT THIS POINT - Attached

OTHER OBSERVATIONS: Cattle use was very light this year. Banks have begun to stabilize & grasses are much thicker this year despite the drought. Though grass utilization was too high, the overall trend appears to be positive.

