# A Strategy for Managing Livestock Grazing Within Stream Riparian Communities on the Salmon-Challis National Forest


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## INTRODUCTION

This document describes the strategy for managing livestock grazing within riparian and aquatic communities on the Salmon-Challis National Forest. The specific purpose of the strategy is to:

1. Manage livestock grazing in a manner that will achieve and maintain healthy riparian and aquatic communities.
2. Standardize and simplify grazing management across the forest.
3. Standardize and simplify grazing consultation.
4. Emphasize achieving desired conditions through adaptive management.
5. Ensure that livestock grazing is consistent with applicable laws, rules, and regulations (e.g. – ESA, Clean Water Act, PACFISH/INFISH, forest plans, etc.).

It is anticipated that implementing this strategy will provide the forest with several benefits. These include:

1. Providing for better protection of aquatic and riparian communities.
2. Simplifying and reducing workloads associated with NEPA.
3. Simplifying and reducing workloads associated with range administration.
4. Simplifying and standardizing monitoring and reporting.
5. Simplifying and reducing workloads associated with consultation.
6. Allowing for a more efficient and effective response to FOIA's, NOI's, and litigation.
7. Providing for increased compliance with related laws, rules, and regulations.

## OVERVIEW

This strategy is to be applied in grazing units which contain perennial streams that are directly affected by livestock grazing. It does not apply to units that do not contain perennial streams or units that do not contain perennial streams directly affected by livestock grazing. The process for determining whether a unit contains a perennial stream that is directly affected by livestock grazing is found in Appendix A. Likewise, this strategy does not apply to ephemeral streams, intermittent streams, springs, seeps, ponds, or lakes. Where appropriate, livestock management and monitoring associated with these types of communities will be developed on a case by case basis.

The strategy involves a three-step process which is outlined below. This process seeks to achieve and maintain desired conditions through adaptive management as opposed to implementing a specific grazing regime. It also allows rangeland managers to customize livestock management plans to the specific conditions found in each area using any combination of livestock management techniques. The process is as follows:

**Step 1. Define desired condition**

**Step 2. Develop, implement, and revise livestock management**

**Step 2-A. Develop a livestock management plan to accomplish the standards**

**Step 2-B. Implement the livestock management plan**

**Step 2-C. Complete an implementation evaluation**

**Step 3. Conduct monitoring**

**Step 3-A. Identify designated monitoring areas**

**Step 3-B. Complete implementation monitoring annually**

**Step 3-C. Complete effectiveness monitoring every five years**

**Step 3-4. Complete an effectiveness evaluation every five years**

The specifics of each step are outlined in detail in the following sections.

## Step 1. Define desired condition

The purpose of this step is to define the desired condition of riparian communities. The desired condition is defined by goals and standards.[1] Goals are general statements that define the desired condition whereas standards are specific, objective criteria that, when accomplished, will result in the achievement of the goals. Livestock management strategies are the management that is implemented in an effort to achieve the standards. Since grazing management over the forest is generally focused at the unit[2] scale, the goals, standards, and livestock management strategies are also set at the unit scale. These are developed using Worksheet 1 and documented on Form 1. This step is completed during initial planning and reevaluated every five years or as needed.

The primary goal of this strategy is to:

> **Manage livestock grazing so as not to prevent the attainment and maintenance of healthy aquatic and riparian communities**

Many factors, in addition to livestock grazing, influence the condition of aquatic and riparian communities. Subsequently, it is unrealistic to assume that this strategy alone will result in attaining and maintaining healthy aquatic and riparian communities. Therefore, the primary goal of this strategy is to manage livestock grazing so that it does not prevent the attainment and maintenance of healthy aquatic and riparian communities. This primary goal is standardized and will be applied across the entire forest. Additional allotment or unit specific goals may be added as circumstances require.

This strategy emphasizes achieving specific standards associated with three resource characteristics. Livestock grazing has the potential to affect many attributes of riparian and aquatic communities. These attributes include substrate composition, sediment levels, channel morphology, streambank stability, pool to riffle ratio, width to depth ratio, off-channel habitat, sinuosity, floodplain connectivity, water temperature, flow regimes, fish communities, macroinvertebrate communities, and riparian communities. However, livestock grazing generally does not directly impact most of these attributes. Rather, livestock grazing indirectly impacts most of these attributes through direct impacts to greenline successional status, bank stability, and woody species regeneration. For example, livestock grazing can result in an increase in stream temperature, yet livestock grazing does not directly increase water temperature. Rather, livestock grazing indirectly increases water temperature by directly affecting greenline successional status, bank stability, and woody species regeneration. Since impacts to riparian and aquatic communities associated with livestock grazing generally occur as a result of livestock grazing directly affecting greenline successional status, bank stability, and woody species regeneration, this strategy focuses on these three resource characteristics.

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[1] The term standard as used in this strategy is interchangeable with the term objective. We use the term standard due to agency direction on the use of the term standard.

[2] This plan considers the term *unit* to be synonymous with pasture. Throughout the plan, the term *unit* is used.

The standards associated with these three resource characteristics are as follows:

> **Greenline Successional Status:** The standard for this characteristic is a greenline successional status of at least late seral (greenline successional status value ≥61[3]) (Winward, 2000). Those areas exceeding this standard at the time this strategy is implemented will at least maintain the value that existed at the time of implementation.
>
> **Bank Stability:** The standard for this characteristic is to have a bank stability of at least 80%.[3] Those areas exceeding this standard at the time this strategy is implemented will at least maintain the value that existed at the time of implementation.
>
> **Woody Species Regeneration:** The standard for this characteristic is to have sufficient woody recruitment to develop and maintain healthy woody plant populations.[4] This woody species regeneration standard applies only to the riparian areas targeted by this strategy and separate woody species regeneration standards may apply to other areas.

As circumstances require, these values can be increased to higher levels but they can not be lowered unless it is through the NEPA process and associated consultation where appropriate. Additionally, other site specific standards may also be developed as circumstances require. These three resource characteristics are evaluated during effectiveness monitoring which is described in Step 3.

Once the goals and supporting standards are established, livestock management strategies that support the goals and standards are delineated. Since many factors other than livestock grazing can influence greenline successional status, bank stability, and woody species regeneration, the livestock management strategies are not to achieve and maintain the standards, but to manage livestock so as not to prevent achieving and maintaining the standards. The livestock management strategies are listed in Table 1. These livestock management strategies represent the minimum tactics that must be included as part of the grazing program in each unit although others may be added as circumstances require.

The woody recruitment standard considers aspen and multi-stemmed woody shrub species separately. It should be determined whether management in a particular unit will include aspen, multi-stemmed woody shrub species, or both. When multi-stemmed woody shrub species are selected, the specific woody shrub species should also be specified (e.g. willow, water birch, serviceberry, chokecherry, etc). Generally, only one multi-stemmed woody shrub species is selected for a particular unit and this species

[3] See Appendix C for guidance on accounting for sampling error when evaluating this standard.
[4] There is substantial temporal and spatial variation in woody species regeneration within riparian areas which makes it extremely difficult to develop quantifiable standards that can be applied across large temporal and spatial scales. Therefore, this strategy uses a qualitative standard for woody species regeneration.

should be the one most sensitive to livestock grazing. This decision should be based on the importance of the species in a particular unit and the responsiveness of the species to livestock grazing, not merely the presence of the species. This strategy does not provide specific direction for cottonwood. If cottonwood is an important species within a unit, separate site-specific standards and management strategies can be developed.

It must be emphasized that this strategy may not result in the achievement of the standards across the entire landscape. This is due to two reasons. First, each of these characteristics naturally varies across both temporal and spatial scales. This variation is a result of natural processes such as climate cycles, fire cycles, debris flows, landslides, stream bank erosion, stream bank building, and beaver activity. Therefore, even in completely natural conditions, it is not expected that all of the standards described in this strategy would be achieved across an entire landscape at a single point in time. Second, anthropogenic influences other than grazing can influence these three characteristics, including influences such as recreation activities, roads, and water diversions. Subsequently, it would be irrational to suggest that the standards associated with this strategy could be achieved only through livestock management. Nevertheless, this livestock management strategy should ensure that livestock grazing does not prevent the attainment of these standards.

Worksheet 1. Desired conditions worksheet.

1. In the header, list the allotment name, the date completed, and the name of each person participating in the planning.
2. In column 1, list every unit in the allotment.
3. In column 2, indicate whether the unit contains a perennial stream that is directly affected by livestock grazing by entering a "Yes" or a "No." The criteria for making this determination are found in Appendix A. When a "No" is entered the remaining columns are left blank.
4. In column 3, list the goal for each unit. At a minimum this must include the goal to "Manage livestock grazing so as not to prevent the attainment and maintenance of healthy aquatic and riparian communities." Other goals may be added as appropriate.
5. In column 4, 5, and 6 list the resource characteristics, standards, and livestock management strategies for each unit. This must include the three resource characteristics and the associated standards and strategies in Table 1. These values are established as the minimum standards. As circumstances require, the values can be increased to higher levels but they can not be lowered unless it is through agency policy with corresponding NEPA and consultation. Likewise, additional characteristics, standards, and livestock management strategies can be added as circumstances require. The woody recruitment standard considers aspen and multi-stemmed woody shrub species separately. It should be determined whether management in a particular unit will include aspen, multi-stemmed woody shrub species, or both. When multi-stemmed woody shrub species are selected, the specific woody shrub species should also be specified (e.g. willow, water birch, serviceberry, chokecherry, etc). Generally, only one multi-stemmed woody shrub species is selected for a particular unit and this species should be the one most sensitive to livestock grazing. This decision should be based on the importance of the species in a particular unit and the responsiveness of the species to livestock grazing, not merely the presence of the species. This strategy does not provide specific direction for cottonwood. If cottonwood is an important species within a unit, separate site-specific standards and management strategies can be developed.

Form 1. Desired conditions form.

Allotment Name: _____

Date Completed: _____

Interdisciplinary Team Members Involved in Planning: _____

| Unit Name | Unit Contains Perennial Stream Directly Affected by Livestock Grazing | Goal | Standards and Livestock Management Strategies | | |
|---|---|---|---|---|---|
| | | | Resource Characteristic | Standard | Livestock Management Strategy |
| | | Manage livestock grazing so as not to prevent the attainment and maintenance of healthy aquatic and riparian communities | Successional Status<br>Bank Stability<br>Woody Recruitment<br>Aspen:<br>Multi-stemmed: | | |

Notes:

Table 1. Desired conditions and livestock management strategies.

| Resource Characteristic | Current Status of Resource Characteristic | Standard | Livestock Management Strategy |
|---|---|---|---|
| Greenline Successional Status | <61 (Very Early, Early, Mid) | ≥61 | Manage livestock so as not to prevent a trend towards an successional status of at least 61 |
| | ≥61 (Late, PNC) | Maintain at least the level that existed at the time the strategy was implemented | Manage livestock so as not to prevent maintaining at least the successional status that existed at the time the strategy was implemented |
| Bank Stability | <80% | >80% | Manage livestock so as not to prevent a trend towards a bank stability of at least 80% |
| | >80% | Maintain at least the level that existed at the time the strategy was implemented | Manage livestock so as not to prevent maintaining the existing bank stability |
| Woody Recruitment | Insufficient Recruitment | Sufficient woody recruitment to develop and maintain healthy woody plant populations[1] | Manage livestock so as not to prevent a trend towards sufficient woody recruitment needed to develop and maintain healthy woody plant populations |
| | Sufficient Recruitment | Sufficient woody recruitment to develop and maintain healthy woody plant populations[1] | Manage livestock to maintain sufficient woody recruitment needed to develop and maintain healthy woody plant populations |

[1] There is substantial temporal and spatial variation in woody species regeneration within riparian areas which makes it extremely difficult to develop quantifiable standards that can be applied across large temporal and spatial scales. Therefore, this strategy uses a qualitative standard for woody species regeneration.

**Step 2. Develop, implement, and revise livestock management**

The purpose of this step is to develop, implement, evaluate, and revise a livestock management plan for each allotment that will effectively implement the livestock management strategies. This step is completed annually and is a three part process. First, prior to the grazing season the livestock management plan for the allotment is developed or revised. Second, the livestock management plan is implemented over the course of the grazing season. Finally, the success of the livestock management plan is evaluated after the grazing season. Each of these sub-steps is described in detail below.

**Step 2-A. Develop a livestock management plan to accomplish the standards**

The purpose of this sub-step is to develop or revise a livestock management plan to implement the livestock management strategies. It is through this step that adaptive management is applied to the livestock management plan. This step is completed annually prior to the grazing season but after the implementation evaluation (see Step 2-C). The livestock management plan will generally be developed or revised in the following manner although the process may be altered as circumstances require. The program is developed using Worksheet 2 and is documented on Form 2. Since grazing management within an allotment is focused at the unit scale, management planning will also focus at the unit scale. Planning is completed by the range staff with input from other resource specialists.

First, the order of use is determined (i.e. pasture rotation).

Second, the resource management characteristic is selected for the unit. The resource management characteristic is defined as the resource characteristic on which management will be focused. This is determined by evaluating greenline successional status, bank stability, and woody species regeneration within the unit and determining which one is the most sensitive to livestock grazing. The characteristic that is most sensitive to livestock grazing is selected as the resource management characteristic. This characteristic may change over time or with the specific season of use. If it is not clear which characteristic is the most sensitive, more than one may be selected. This step should be completed by an interdisciplinary team.

Third, the annual indicator is selected. The annual indicator is the tool that is used to regulate the impact of livestock on the resource management characteristic. The resource management characteristics and corresponding annual indicators are listed in Table 2. Annual indicators specifically included in this strategy are stubble height, bank alteration, and woody browse. However, if one of these annual indicators is not appropriate for a particular unit, an alternative annual indicator may be selected. When an alternative annual indicator is selected, the rationale for the use of the indicator should be documented on Form 1 in the Notes section.

Fourth, the end of season annual indicator value is selected. This is done by estimating how much use can occur on the annual indicator while at the same time achieving the standards. **This value should be <u>customized</u> to the specific circumstances of each unit when sufficient data are available.** However, in the absence of sufficient data the default values identified in Table 3

will be used. The rationale for a customized annual indicator value should be documented on Form 1 in the Notes section.

In situations where greenline successional status is less than 40 (very early or early seral) there will likely not be sufficient hydric species present on the greenline to effectively monitor stubble height on hydric species. Therefore, it may not be possible to use end of season hydric greenline stubble height as the annual indicator. In these situations managers may want to consider using bank alteration, non-hydric species stubble height, or another appropriate indicator as the annual indicator. Conversely, managers may want to consider simply resting the unit until successional status improves. However, when considering this action it is critical that managers determine whether livestock are the reason for the greenline successional status being less than 40.

Fifth, the trigger is selected. The trigger is a value associated with the annual indicator which indicates when livestock should start leaving the unit. The value of the trigger is determined by estimating how much time will be needed to move livestock from the unit before the end of season annual indicator value is met. This value will vary from year to year and unit to unit. Therefore, this value should be customized to the specific circumstances of each unit. When selecting this value consideration should be given to factors such as season of use, number of head, ability to move livestock, etc. Although the trigger is typically a numeric value it may also be appropriate to have a qualitative trigger if it is clear that such a trigger will result in livestock being removed from the unit in the appropriate amount of time.

Finally, determine any other actions needed to effectively manage the unit. This will include any actions needed to improve livestock distribution and improve resource protection. This may include items such as the construction and maintenance of range improvements and other items.

As additional information becomes available through the annual implementation evaluations the resource management characteristic, annual indicator, end of season annual indicator value, and trigger should be revised for each unit as appropriate.

**Step 2-B. Implement the livestock management plan**

This step involves implementing the livestock management plan. This includes completing season of use monitoring in the designated monitoring areas to determine when the trigger is reached. These data are collected from the designated monitoring area using the appropriate protocol. The same protocols are used for both season of use monitoring and end of season monitoring and are described in Appendix B. The removal of livestock from the unit will generally begin when the trigger is reached.

**Step 2-C. Complete an implementation evaluation**

The purpose of this step is to document implementation and complete an implementation evaluation to determine whether the livestock management plan was implemented as planned. Information associated with implementation is compiled using Worksheet 3 and documented on Form 3. The implementation evaluation is conducted using Worksheet 4 and documented on Form 4.

In cases where permittees were not in compliance with any portion of their permit or AOI, including not achieving the annual indicators, it is determined whether administrative action is warranted using appropriate agency direction. The rationale and decision is communicated to permittees and regulatory agencies, if applicable. The district ranger makes this determination following input from the range staff. The district ranger may also solicit input from other district, forest, or regional staff as needed.

Once the implementation evaluation is complete, the livestock management plan is revised as appropriate (see Step 2-A). Managers ensure that the decision made as part of this sub-step are incorporated into the grazing plan revisions.

Worksheet 2. Livestock management plan development/revision worksheet.

1. In the header, list the allotment name, the fiscal year to which the livestock management plan applies, the date the plan was developed, and the name of each person participating in the planning.
2. In column 1, list each unit in the allotment.
3. In column 2, list the order of use for the grazing season. For those units that are not considered as part of this riparian strategy enter "n/a" in the remaining corresponding columns.
4. In column 3, list the resource management characteristic for the unit. The resource management characteristic is defined as the resource characteristic on which management will be focused. This is determined by evaluating greenline successional status, bank stability, and woody species regeneration within the unit and determining which one is the most sensitive to livestock grazing. The characteristic that is most sensitive to livestock grazing is selected as the resource management characteristic. This characteristic may change over time or with the specific season of use. If it is not clear which characteristic is the most sensitive, more than one may be selected. It is recommended that this step be completed by an interdisciplinary team.
5. In column 4, list the annual indicator that will be used for the selected resource management characteristic. The annual indicator is the tool that is used to regulate the impact of livestock on the resource management characteristic. The resource management characteristics and corresponding annual indicators are listed in Table 2. Annual indicators specifically included in this strategy are stubble height, bank alteration, and woody browse. However, if one of these annual indicators is not appropriate for a particular unit, an alternative annual indicator may be selected. When an alternative annual indicator is selected the rationale for the use of the indicator should be documented on Form 1 in the Notes section.
6. In column 5, list the end of season annual indicator value (e.g. 4 inch stubble height, 10% bank alteration, etc.) that will be used for the selected annual indicator. This is done by estimating how much use can occur on the annual indicator while at the same time achieving the standards. **This value should be customized to the specific circumstances of each unit when sufficient data are available.** However, in the absence of sufficient data the default values identified in Table 3 will be used. The rationale for a customized annual indicator value should be documented on Form 1 in the Notes section.
7. In column 6, list the trigger. The trigger is a value associated with the annual indicator which indicates when livestock should start leaving the unit. The value of the trigger is determined by estimating how much time will be needed to move livestock from the unit before the end of season annual indicator value is met. This value will vary from year to year and unit to unit. Therefore, this value should be customized to the specific circumstances of each unit. When selecting this value consideration should be given to factors such as season of use, number of head, ability to move livestock, etc.
8. In column 7, list any actions that must be taken prior to livestock entering the unit. This may include items such as the construction and maintenance of range improvements and other items.

9. In column 8, determine and list any actions that must be taken after livestock enter the unit. This may include items such as additional riding, more effective cleaning of units, and other items.

Form 2. Livestock management plan development/revision form.

Allotment Name: _____

Fiscal Year: _____

Date Completed: _____

Persons Involved in Planning: _____

| Unit Name | Order of Use | Resource Management Characteristic | Annual Indicator | End of Season Annual Indicator Value | Trigger | Actions to be Taken Prior to Livestock Entering Unit | Actions to be Taken After Livestock Enter the Unit |
|---|---|---|---|---|---|---|---|
| | | | | | | | |

Notes:

Table 2. Resource management characteristics and associated annual indicators.

| Resource Management Characteristic | Annual Indicator |
|---|---|
| Greenline Successional Status | End of season hydric greenline stubble height |
| Bank Stability | End of season current year bank alteration |
| Woody Species Regeneration | |
| Aspen | End of season woody browse as measured by percent use on the terminal stem of trees less than 5 feet tall |
| Willow | End of season woody browse as measured by percent use on terminal leaders of shrubs less than 5 feet tall |

Table 3. End of season annual indicator values to be used when there are insufficient data to establish a unit specific indicator value.

| Resource Management Characteristic | Status of Resource Characteristic | End of Season Annual Indicator Values: Annual Indicator | End of Season Annual Indicator Value |
|---|---|---|---|
| Greenline Successional Status | ≤40 (very early, early) | Variable[1] | Variable[1] |
| | 41-60 (mid) | Stubble Height[2] | ≥6 inches |
| | ≥61 (late, PNC) | Stubble Height[2] | ≥4 inches |
| Bank Stability | >60% | Bank Alteration | 5-10% |
| | 60-80% | Bank Alteration | 10-20% |
| | >80% | Bank Alteration | 20% |
| Woody Regeneration | | | |
| Aspen | Insufficient Recruitment | Woody Browse | ≤20% use[3] |
| | Sufficient Recruitment | Woody Browse | ≤40% use[3] |
| Multi-stemmed | Insufficient Recruitment | Woody Browse | Light Use[4] |
| | Sufficient Recruitment | Woody Browse | Moderate Use[4] |

[1] In situations where greenline successional status is less than 40 (very early or early seral) there will likely not be sufficient hydric species present on the greenline to effectively monitor stubble height on hydric species. Therefore, it may not be possible to use end of season hydric greenline stubble height as the annual indicator. In these situations managers may want to consider using bank alteration, non-hydric species stubble height, or another appropriate indicator as the annual indicator. Conversely, managers may want to consider simply resting the unit until successional status improves. However, when considering this action it is critical that managers determine whether livestock are the reason for the greenline successional status being less than 40.

[2] End of season hydric greenline stubble height. See Appendix B for more details on this annual indicator.

[3] As measured on the terminal stem of trees less than 5 feet tall (i.e. suckers). See Appendix B for more details on this annual indicator.

[4] As defined by Burton et al. (2007). "Light Use" corresponds with 11-40% percent utilization (midpoint 25%) and "Moderate Use" corresponds with 41-60% utilization (midpoint 50%).

Worksheet 3. Implementation documentation worksheet.

1. In the header, list the allotment name, the fiscal year to which the data apply, the date the data were compiled, and the name of each person completing the form.
2. In column 1, list each unit in the allotment (see Form 2).
3. In column 2, list the order of use for the grazing season (see Form 2). If a unit was not grazed, enter "Not Grazed."
4. In columns 3, 4, 5, and 6, record the number of animals (livestock), on-off dates, and AUM's as determined from the actual use reports submitted by the permittees.
5. In column 7, indicate whether the unit contains a perennial stream that is directly affected by livestock grazing by entering a "Yes" or a "No" (see Form 1).
6. In column 8, list the annual indicator (see Form 2).
7. In column 9, list the end of season annual indicator value (see Form 2).
8. In column 10, list the actual end of season annual indicator value as determined by the end of season monitoring. If annual implementation monitoring was not completed enter "Not Monitored."

Form 3. Implementation documentation form.

Allotment Name: _____
Fiscal Year: _____
Date Completed: _____
Completed by: _____

| Unit Name | Order of Use | Number of Animals (livestock) | On Date | Off Date | AUM's | Unit Contains Riparian/Aquatic Communities | Annual Indicator | End of Season Annual Indicator Value | Actual End of Season Annual Indicator Value |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |

Worksheet 4. Implementation evaluation worksheet.

1. In the header, list the allotment name, the fiscal year to which the evaluation applies, the date completed, and the name of each person participating in the evaluation.
2. In column 1, list each unit in the allotment in the same sequence as listed on Form 3.
3. In column 2, answer the question "Was the end of season annual indicator value achieved?" If the unit does not contain a perennial stream that is directly affected by livestock grazing as indicated on Form 3, column 7, enter a "n/a." If the unit was not grazed enter "Not Grazed." If annual implementation monitoring was not completed enter "Not Monitored." If a "No" is entered go to 4. If a "Yes," "n/a," "Not Grazed," or "Not Monitored" is entered, enter a "n/a" in columns 3-7 and go to 7.
4. In column 3, answer the question "Why was the end of season annual indicator value not achieved?" In column 4, indicate what will be done to ensure the annual indicator value is achieved the next time the unit is grazed. Below are some potential reasons for not achieving the annual indicator value and some potential solutions.
    a. The trigger did not allow enough time to remove livestock prior to exceeding the annual indicator value. Revise the trigger.
    b. Use was exceeded prior to being detected by season of use monitoring. Revise season of use monitoring effort.
    c. Livestock were not completely cleaned from the unit. Revise riding strategy.
    d. Livestock re-entered the unit after it was cleaned. Develop a strategy to correct the problem.
5. In column 5, answer the question "Did not achieving the annual indicator value affect achieving or maintaining the desired conditions?" This is determined by evaluating the impact of the overuse on maintaining or achieving the desired conditions. This assessment should take into consideration current resource condition, desired condition, resource condition trend, the impact of past failures to achieve the annual indicator value on desired conditions, and the extent of any resource damage resulting from overuse. The range staff is responsible for making this decision, but an interdisciplinary approach is recommended. Any concerns that can not be resolved by the team will be resolved by the district ranger. If a "Yes" is entered document the rationale in column 6 and go to 6. If a "No" is entered document the rationale in column 6, enter an "n/a" in column 7, and go to 7.
6. In column 7, indicate the adaptive action that will be implemented to restore the impact of the overuse on achieving and maintaining the desired conditions. This may include adjusting the annual indicator value, trigger, season of use, resting the unit, or other appropriate actions. Make sure to incorporate this action into the livestock management plan for the next season.
7. In column 8, answer the question "Were the permittees in compliance with the permit and AOI including the end of season annual indicator?" If a "Yes" is entered no further action is required. If a "No" is entered determine whether administrative action is warranted using the appropriate agency direction. Ensure that the rationale and decision is documented and communicated with permittees and regulatory agencies, if applicable.

Form 4. Implementation evaluation form.

Allotment Name: _____
Fiscal Year: _____
Date Completed: _____
Completed by: _____

| Unit Name | Was the end of season annual indicator value achieved? | Why was the end of season annual indicator value not achieved? | What will be done to ensure the annual indicator value is achieved the next time the unit is grazed? | Did not achieving the annual indicator value affect achieving or maintaining the desired conditions? | Rationale | Adaptive action that will be implemented to restore the impact of the overuse on achieving and maintaining the desired conditions. | Were the permittees in compliance with the permit and AOI including the annual indicator value? |
|---|---|---|---|---|---|---|---|
| | | | | | | | |

**Step 3. Conduct monitoring**

The purpose of this step is to conduct the monitoring necessary to implement this strategy. This includes both implementation and effectiveness monitoring. The monitoring associated with this strategy includes three parts. First, designated monitoring areas (DMAs) are established. Second, implementation monitoring is completed to ensure that the livestock management plan is implemented. Third, effectiveness monitoring is completed to ensure that the livestock management plan is achieving the desired conditions. Each of these sub-steps is described in detail below.

**Step 3-A. Identify Designated Monitoring Areas**

The purpose of this step is to identify the designated monitoring areas (DMAs). The DMA is the location where season of use monitoring, end of season implementation monitoring, and effectiveness monitoring take place. A minimum of one DMA will be established in each unit to which this strategy applies. Additional DMAs may be established as circumstances require. However, there should generally not be more than three DMAs per unit to ensure that workloads across the forest are manageable. The location of the DMA is determined by the district range staff with assistance from other district or forest staff as circumstances require. Information concerning the DMA is recorded on Form 5. The DMAs will be established in the following manner:

A. The district range staff selects the location of the DMA with assistance from other district or forest staff as circumstances require. The location of the DMA should be representative of the grazed portion of the unit and responsive to changes in livestock management. For example, a DMA would not be placed at a fence line or in an area that is not grazed by livestock.
B. Once the location of the DMA is established, the beginning point and direction of monitoring (i.e. upstream or downstream) are determined. The beginning point and direction should generally remain the same for the period of time that the DMA is used. However, the location of DMAs may be moved as circumstances require.
C. The location of the beginning point will be marked on the ground and described in detail. The location will be marked with a monument marker (e.g. t-post, rebar) and in a manner that can be easily located and identified. One recommended method is to use a colored t-post driven into the ground upside down with site information engraved on the anchor.
D. Information describing the location of the DMA is recorded on Form 5. This should include a latitude and longitude or UTM coordinate as determined by a GPS unit.

**Step 3-B. Complete implementation monitoring annually**

The purpose of this step is to collect data needed to complete the implementation evaluation. Among other things, this includes completing the end of season monitoring to determine whether the end of season annual indicator value was achieved. These data are collected from the DMA using the appropriate protocol. The same protocols are used for both season of use monitoring and end of season monitoring. These protocols are described in Appendix B.

Ideally implementation monitoring should occur on every unit every year. However, funding and other constraints will likely prohibit this level of implementation monitoring in most years. Nevertheless, the following minimal amount of implementation monitoring must be completed in order for this strategy to work:

1. Implementation monitoring will occur on at least 50% of the units annually
2. Implementation monitoring will occur on any unit not achieving the end of season annual indicator value during the previous grazing season
3. Implementation monitoring will occur on every unit at least every three years

Within these requirements, annual implementation monitoring should be prioritized so that units of concern are monitored appropriately. This may result in some units being monitored every year. It also possible that consultation may increase the amount of monitoring required in any given unit or allotment.

**Step 3-C. Complete effectiveness monitoring every five years**

The purpose of this step is to collect the data necessary to complete the effectiveness monitoring evaluation. At a minimum, effectiveness monitoring is completed at the DMAs and is completed in each unit every five years. Effectiveness monitoring should be completed for an entire allotment during the same year. However, in order to balance workloads, the effectiveness monitoring schedule should be staggered so that effectiveness monitoring is completed on approximately one-fifth of the allotments each year. At a minimum, effectiveness monitoring will involve assessing greenline successional status, bank stability, and woody species regeneration. This is done using the protocols described in Appendix C. Any other necessary effectiveness monitoring should also be completed at this time. If circumstances require, effectiveness monitoring may be completed more frequently than every five years. For example, more frequent effectiveness monitoring may be necessary in areas showing a downward trend.

**Step 3-D. Complete an effectiveness evaluation every five years**

The purpose of this step is to complete an effectiveness evaluation. This evaluation determines if the desired conditions are being met within individual units. This evaluation is completed for each allotment during the same year that the effectiveness monitoring is completed. The evaluation is done using Worksheet 5 and documented on Form 6. This evaluation is completed by an interdisciplinary team.

Form 5. Designated monitoring area (DMA) location form.

**Allotment Name:_____**
**Pasture Name: _____**
**Designated Monitoring Area Name:_____**
**Site Description:**

| | |
|---|---|
| **Latitude/Longitude:**<br>**Latitude:_____**<br>**Longitude:_____** | **UTM:**<br>**X (Easting):_____**<br>**Y (Northing):_____**<br>**Zone:_____** |

**Date Established:_____**
**Established By:_____**
**Monument Marker:** Metal T-post Rebar Other:_____
**Direction of Transect From Marker:** Upstream Downstream

**Photograph**

Worksheet 5. Effectiveness evaluation worksheet.

1. In the header, list the allotment name, the fiscal year, the date completed, and the name of each person participating in the evaluation.
2. In column 1, list each unit in the allotment.
3. In column 2, indicate whether the unit contains a perennial stream that is directly affected by livestock grazing by entering a "Yes" or a "No" (see Form 1). If a "Yes" is entered go to 4. If a "No" is entered no further evaluation is required. Enter an "n/a" in the remaining corresponding columns.
4. In column 3 and column 4, list the three resource characteristics and the corresponding standards. Also list any additional resource characteristics and the associated standards. These should correspond to those listed on Form 1.
5. In column 5, list the actual value of the standard as determined by the effectiveness monitoring.
6. In column 6, answer the question "Is the desired condition being achieved?" If a "Yes" is entered no further evaluation is required. Enter an "n/a" in the remaining corresponding columns. If a "No" is entered go to 7.
7. In column 7, answer the question "Is livestock grazing a contributing factor as to why the standard is not being met?" by entering a "Yes" or a "No." Provide the rational for the "Yes" or "No" determination in column 8. If a "Yes" is entered go to 8. If a "No" is entered no further evaluation is required. Enter an "n/a" in the remaining columns.
8. In column 9, answer the question "How will livestock management be altered so that grazing will not prevent the attainment of the desired conditions?"

Form 6. Effectiveness evaluation form.

Allotment Name: _____
Fiscal Year: _____
Date Completed: _____
Interdisciplinary Team Members
Involved in the Evaluation: _____

| Unit Name | Does the unit contain a perennial stream that is directly affected by livestock grazing? | Desired Condition Evaluation | | | | Is livestock grazing a contributing factor as to why the desired conditions are not being met? | Rationale | How will livestock management be altered so that grazing will not prevent the attainment of the desired conditions? |
|---|---|---|---|---|---|---|---|---|
| | | Resource Characteristic | Standard | Actual Value of the Standard | Is the desired condition being met? | | | |
| | | Successional Status | | | | | | |
| | | Bank Stability | | | | | | |
| | | Woody Recruitment | | | | | | |

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## APPENDICES

APPENDIX A. Process for determining whether a grazing unit contains a perennial stream that is directly affected by livestock grazing.

This strategy provides specific management direction for perennial streams. This direction is to be applied to all units which contain perennial streams that are directly affected by livestock grazing. This direction does not apply to perennial streams that are not affected by livestock grazing or to springs, seeps, ephemeral streams, or intermittent streams. Subsequently, a critical element of this strategy is determining whether a unit contains a perennial stream that is directly affected by livestock grazing. This section provides the direction for making that determination.

A unit is considered to contain a perennial stream that is directly affected by livestock grazing if it meets all of the following criteria:

1. The unit contains a perennial stream or a reach of a stream that is perennial. For the purposes of this strategy a stream or stream reach must meet both of the following criteria to be considered perennial:
    A. The stream/reach must flow year round during a normal water year.
    B. That portion of the stream/reach that flows year round must occupy a defined channel that is at least 100 m in length. For example, a small spring with an associated stream which is only 20 m long would not be considered a perennial stream under this strategy.
2. The perennial stream/reach is directly affected by livestock grazing. In order for a perennial stream/reach to be considered directly affected by livestock grazing it must meet both of the following criteria:
    A. Livestock must be able to directly access the riparian area associated with the stream/reach.
    B. Livestock use in the riparian area associated with the stream/reach must be consistent and significant. Consistent use is defined as livestock being in the riparian area each year that livestock are in the unit. Significant use is defined as livestock having the potential to impact the riparian area. For example, a perennial stream would not be considered directly affected by livestock grazing if livestock were only in the riparian area every few years or if livestock use in the riparian area was so light that livestock grazing would not impact the riparian area.

APPENDIX B. Protocols for completing implementation monitoring (season of use and end of season monitoring).

This appendix describes the protocols that are used for completing the implementation monitoring associated with this strategy. This includes season of use and end of season monitoring. The range staff on each district is responsible for completing this monitoring but may be assisted by personnel from other resource areas. It is critical that each person conducting this monitoring is thoroughly trained in the use of these protocols and can execute them correctly.

**It is important to note that these protocols may be replaced in the future as more refined protocols become available or as protocols are standardized within the agency.**

## PROTOCOL FOR DETERMINING STUBBLE HEIGHT

Stubble height is assessed in the designated monitoring area using the procedure described in *Monitoring Stream Channel and Riparian Vegetation – Multiple Indicators* (Burton, et al., 2007). Monitoring begins at the established point and proceeds in the established direction (see Form 5). This protocol is generally used for determining stubble height on hydric greenline species. However, this protocol may also be used in situations where the annual indicator is for non-hydric species. In those cases, the same process is followed except that the key non-hydric species are measured. The non-hydric key species used for measurements should be specified.

## PROTOCOL FOR DETERMINING BANK ALTERATION

Bank alteration is assessed in the designated monitoring area using the procedure described in *Monitoring Stream Channel and Riparian Vegetation – Multiple Indicators* (Burton, et al., 2007). Monitoring begins at the established point and proceeds in the established direction (see Form 5). End of season bank alteration monitoring should be completed within 10 days of livestock leaving the unit.

## PROTOCOL FOR MEASURING WOODY BROWSE USE ON ASPEN

Woody browse on aspen is assessed in the designated monitoring area using the procedure described in *Browsed Plant Method for Young Quaking Aspen* (USDA Forest Service 2004). Monitoring begins at the established point and proceeds in the established direction (see Form 5).

**Monitoring should only occur on aspen if aspen were selected on Form 1**. Whether aspen are monitored is dependent upon whether they are specifically included as part of grazing management for that unit. This decision is made in Step 1 and documented on Form 1. If aspen are not selected on Form 1 then browse on aspen is not determined.

Sampling is conducted **along and adjacent to the greenline** using the nearest plant technique described in the protocol. Browse is measured **only** on the terminal stem of trees less than 5 feet tall (i.e. suckers). Sampling begins at the established point and proceeds in the established direction (see Form 5). Sampling is completed for an equal distance on both banks and

continues until a total of at least 90 samples have been collected (including both right and left banks) or at least 363 feet of stream has been covered.

The Woody Species Use protocol described in *Monitoring Stream Channel and Riparian Vegetation – Multiple Indicators* (Burton, et al., 2007) that is used to monitor browse on multi-stemmed woody species was also designed to monitor woody browse on aspen. However, the procedure does not generate aspen browse data specific enough for use in this strategy. Therefore, that protocol should not be used to collect aspen browse data for this strategy.

## PROTOCOL FOR MONITORING MULTI-STEMMED WOODY SPECIES BROWSE USE

Woody browse on multi-stemmed woody species is assessed in the designated monitoring area using the procedure described in *Monitoring Stream Channel and Riparian Vegetation – Multiple Indicators* (Burton, et al., 2007). Monitoring begins at the established point and proceeds in the established direction (see Form 5).

The multi-stemmed wood species monitored with this technique may include, but are not limited to, willow, dogwood, water birch, alder, serviceberry, and chokecherry. However, **monitoring should occur only for the woody species selected on Form 1**. Whether multi-stemmed species are monitored and the particular multi-stemmed woody species monitored is dependent upon which species are specifically included as part of grazing management for that unit. This decision is made in Step 1 and documented on Form 1. If a multi-stemmed woody species is not selected on Form 1 then browse on multi-stemmed woody species is not monitored. When monitoring browse on willows the amount of use must be assessed and recorded for each willow species since browse can be quite variable between species of willow.

Although this protocol was also designed to monitor browse on aspen it should not be used to collect aspen browse data as part of this strategy (see PROTOCOL FOR MEASURING WOODY BROWSE USE ON ASPEN).

APPENDIX C. Protocols for completing effectiveness monitoring.

This appendix describes the protocols used for completing the effectiveness monitoring associated with this strategy. It is recommended that this monitoring be completed by a team based out of the forest supervisor's office. It is critical that each person conducting this monitoring is thoroughly trained in the use of these protocols and can execute them correctly.

It is also important to note that these protocols may be replaced in the future as more refined protocols become available or as protocols are standardized within the agency.

## PROTOCOL FOR MONITORING GREENLINE SUCCESSIONAL STATUS

Greenline successional status (termed ecological status in Burton, et al., 2007) is assessed in the designated monitoring area using the procedure described in *Monitoring Stream Channel and Riparian Vegetation – Multiple Indicators* (Burton, et al., 2007). Monitoring begins at the established point and proceeds in the established direction (see Form 5).

As expected, this protocol has limitations in precision and accuracy that limit the use of the data (Coles-Ritchie, et al., 2004). However, we believe that this protocol remains an important effectiveness monitoring tool. We have reviewed Coles-Ritchie, et al. (2004), correspondence from A. Winward, and our own data in an effort to determine the precision and accuracy associated with this protocol and the limits on the use of the data. Based on this review, we believe that a change of at least 10 points is needed before it can be considered to reflect a real change in greenline successional status. For example, if greenline successional status was 80 in 2000 and 85 in 2005 that would not necessarily mean that greenline successional status had changed. However, if greenline successional status was 70 in 2000 and 85 in 2005 that would likely reflect an actual change in greenline successional status.

## PROTOCOL FOR MONITORING BANK STABILITY

Bank stability is assessed in the designated monitoring area using the Salmon-Challis National Forest bank stability protocol which is described below. Monitoring begins at the established point and proceeds in the established direction (see Form 5). The Forest has elected to use this protocol rather than the one described by Burton, et al. (2007) because the Forest has long term data sets collected using the Forest protocol and the comparability of the data generated by the two protocols is not known.

As expected, this protocol has limitations in precision and accuracy that limit the use of the data (B. Rieffenberger, unpublished data). However, we believe that this protocol remains an important effectiveness monitoring tool. In 2004, a field evaluation was completed to determine the precision and accuracy associated with this protocol and the limits on the use of the data (B. Rieffenberger, unpublished data). Based on this review, it appears that a change of at least 5% is needed before it can be considered to reflect a real change in bank stability. For example, if bank stability was 80% in 2000 and 82% in 2005 that would not necessarily mean that bank stability had changed. However, if bank stability was 75% in 2000 and 82% in 2005 that would likely reflect an actual change in bank stability.

## Salmon-Challis National Forest Bank Stability Protocol

Bank stability is linked to cover factors that resist the forces of stream erosion. Cover may include vegetation, rocks, logs and other resistant materials.

Streambanks are considered stable if they do not show indications of any of the following features:

Breakdown – Obvious blocks of bank broken away and lying adjacent to the bank.

Slumping or False Bank – Bank has obviously slipped down, cracks may or may not be obvious, but the slump feature is obvious.

Fracture – A crack is visibly obvious on the bank indicating that the block of bank is about to slump or move into the stream.

Vertical and Eroding – The bank is mostly unvegetated or uncovered as defined below and the bank angle is steeper than 80 degrees from the horizontal.

Bank has bare soil with no rock, roots or vegetation to stabilize the bank and is susceptible to erosion at bankfull flows.

Streambanks are considered vegetated if they have the following features:

Perennial vegetation ground cover is greater than 50%.

Roots of vegetation cover more than 50% of the bank (deep rooted plants such as Willow and sedges provide such cover).

Streambanks are considered "unvegetated stable" if they have the following features:

Banks are protected by rocks of cobble size or larger. Need to consider the stream power and evaluate if the rocks are large enough not to move during normal high flow events, on some streams boulder size rock may be needed for bank stability.

Banks are protected by large woody debris such that they would not erode during high flow events.

Field Methodology

1) Monitoring begins at the established point and proceeds in the established direction (see Form 5).
2) Evaluate the streambank located above and below the bankfull elevation (see attached document on indicators of bankfull stage). Attachment A describes where to take measurements when side channels or backwater areas are present along the stream reach.

3) Walk both streambanks for 100 steps. At each step evaluate the streambank that is located along an imaginary line that is perpendicular to the tip of your foot. It is helpful to walk in the stream, if possible, when evaluating the banks. A step transect has been used instead of a measured transect because of the difficulty often encountered stringing a tape through thick brush. A step is defined as approximately 3 feet or one meter. Prior to beginning data collection the observer should lay out a tape for 100 feet and calibrate their step to achieve approximately 3 feet in each step.
4) Record each observation on the form in one of the four categories; vegetated stable, vegetated unstable, unvegetated stable or unvegetated unstable.
5) Sum each category for both the right and left bank.
6) Add up the vegetated stable and unvegetated stable totals for both banks and divide by 200 to get the Percent Stable Banks (assuming that 100 paces were recorded on each bank, if not divide by the total number of paces).

Equipment Necessary

1) Field form
2) Hip waders are needed on most streams for accessing both banks. On some streams the streambanks are best observed by wading down the stream.
3) Counter (optional) to keep track of number of observations.

**Attachment A**

Where to Take Measurements at Bankfull Elevation

While a streambank is normally easily defined the following situations can be observed in the field.

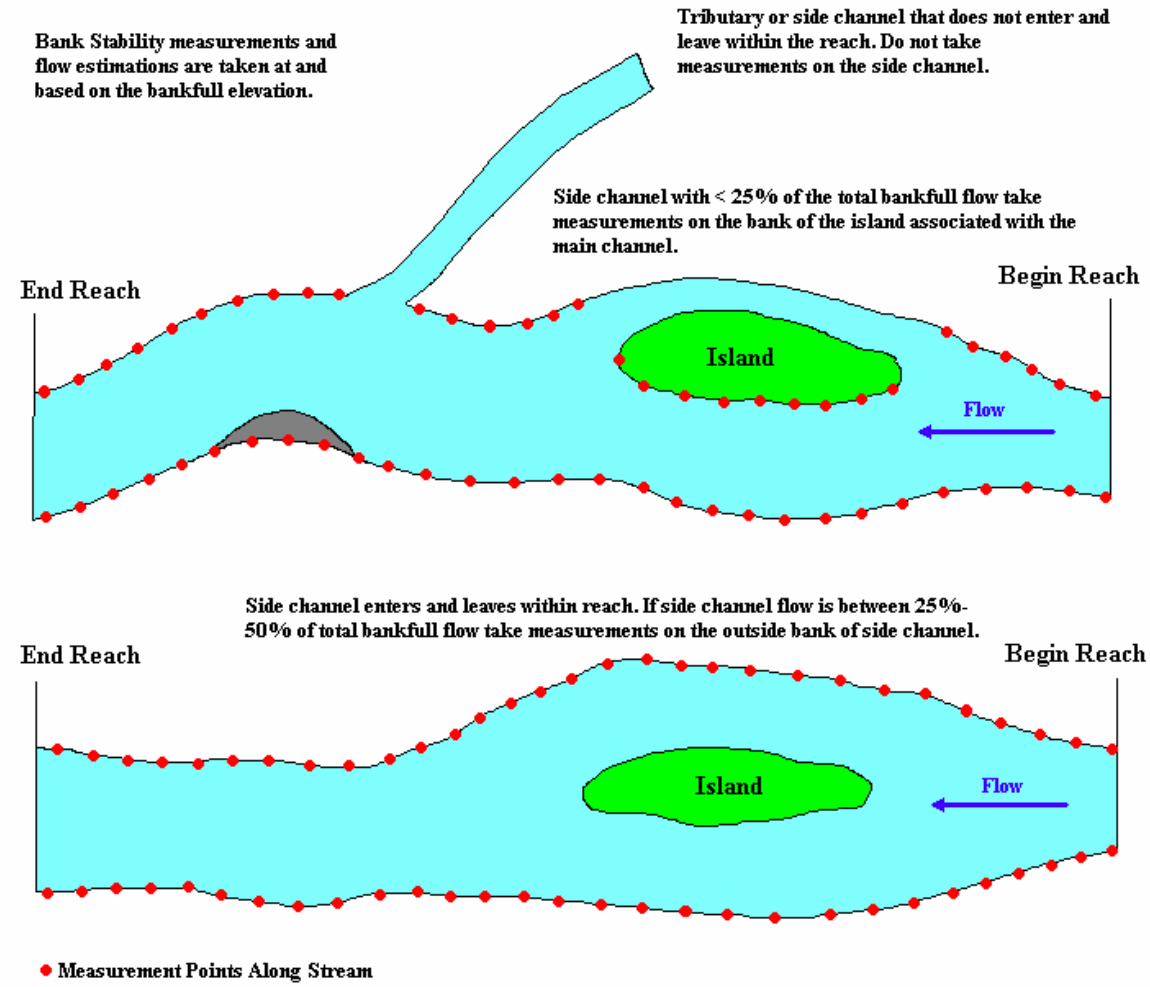
1) Multiple channels
   -When a side channel is present the observer needs to make the following assessments.
      -Does it leave and re-enter the main channel within the reach?
         If **No** do not measure the bank in the side channel. Keep making your measurements on the bank of the main channel. Cross over the confluence of the side channel and take your next measurement on the bank of the main channel. Do not count paces within the bed of the side channel. (Figure 1A).

         If **Yes** the observer needs to estimate the flow capacity of the side channel at **bankfull** stage and determine if it **is equal to or greater than 50%** of the flow of the main channel. If so than collect measurements on the outside bank of the side channel, rather than on the bank of the island associated with the main channel. (Figure 1B).

         If the side channel has a bankfull stage flow capacity **less than 50%** of the flow of the main channel than take measurements on the bank of the island associated with the main channel. Do not count paces within the bed of the side channel (Figure 1A).

2) Backwater areas along a main channel.
   - When backwater or slough areas are located along a streambank do not take bank measurements along the perimeter of the backwater. Cross over the backwater area and do not count paces within the bed of the backwater area. These areas are usually not susceptible to the erosive forces of bankfull flows and can be difficult to define bankfull features.

## Attachment A



## INDICATORS OF BANKFULL STAGE

Common bankfull indicators include (figs. 42, 43, 44, and 45):

1. TOP OF POINTBARS. The pointbar consists of channel material deposited on the inside of meander bends. They are a prominent feature of C-type channels but may be absent in other types. Record the top elevation of pointbars as the lowest possible bankfull stage since this is the location where the floodplain is being constructed by deposition.
2. CHANGE IN VEGETATION. Look for the low limit of perennial vegetation on the bank, or a sharp break in the density or type of vegetation. On surfaces lower than the floodplain, vegetation is either absent or annual. During a series of dry years, such as 1985-1990 in much of the western United States, perennial plants may invade the formerly active floodplain. Catastrophic flows may likewise alter vegetation patterns. On the floodplain (above bankfull stage) vegetation may be perennial but is generally limited to typical stream side types. Willow, alder, or dogwood often form lines near bankfull stage. The lower limit of mosses or lichens on rocks or banks, or a break from mosses to other plants, may help identify bankfull stage.
3. CHANGE IN SLOPE. Changes in slope occur often along the cross-section (e.g., from vertical to sloping, from sloping to vertical, or from vertical or sloping to flat at the floodplain level). The change from a vertical bank to a horizontal surface is the best identifier of the floodplain and bankfull stage, especially in low-gradient meandering streams. Many banks have multiple breaks, so be careful and examine banks at several sections of the selected reach for comparison. Slope breaks also mark the extent of stream terraces, which may be measured and mapped in your survey. Terraces are old floodplains that have been abandoned by a downcutting stream. They will generally have perennial vegetation, definite soil structure, and other features to distinguish them from the active floodplain. Most streams have three distinct terraces at approximately 2 to 4 feet, 7 to 10 feet, and 20 to 30 feet above the present

Figure 42. – Indicators of bankfull stage: pointbars, undercut bank, and change in vegetation.

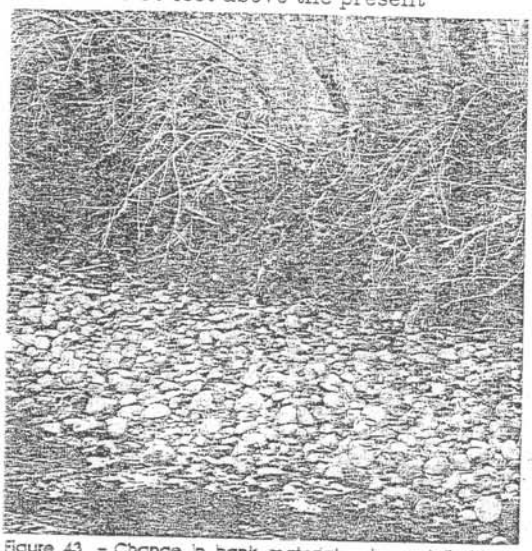


Figure 43. – Change in bank materials. Lower left side of photo shows transition from large cobble to gravel to silt along stream bank.



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FROM "Stream Channel Reference Sites" by Harrelson Rawlins & Potyondy

stream. Avoid confusing the level of the lowest terrace with that of the floodplain: they may be close in elevation.

4. CHANGE IN BANK MATERIALS. Any clear change in particle size may indicate the operation of different processes (e.g., coarse, scoured gravel moving as bedload in the active channel giving way to fine sand or silt deposited by overflow). Look for breaks from coarse, scoured, water-transported particles to a finer matrix that may exhibit some soil structure or movement. Changes in slope may also be associated with a change in particle size. Change need not necessarily be from coarse-to-fine material but may be from fine-to-coarse.

5. BANK UNDERCUTS. Look for bank sections where the perennial vegetation forms a dense root mat. Feel up beneath this root mat and estimate the upper extent of the undercut. (A pin-flag may be inserted horizontally and located by touch at the upper extent of the undercut as a datum for the rod.) This is usually slightly below bankfull stage. Bank undercuts are best used as indicators in steep channels lacking floodplains. Where a floodplain exists, the surface of the floodplain is a better indicator of bankfull stage than undercut banks that may also exist.

6. STAIN LINES. Look for frequent-inundation water lines on rocks. These may be marked by sediment or lichen. Stain lines are often left by lower, more frequent flows, so bankfull is at or above the *highest* stain line.

Deposits of pine needles, twigs, and other floating materials are common along streams, but they are seldom good indicators of bankfull stage. A receding stream may leave several parallel deposits. Floods may also leave organic drift above bankfull stage.

If stream gage data is available for the stream, observations of indicators at or near the gages may help to identify the indicators most useful for a particular area. Ratios of present-to-bankfull discharge can be used to estimate bankfull stage at nearby sites. Bankfull discharges

Figure 44. – Undercut bank and change in vegetation as indicators of bankfull stage.

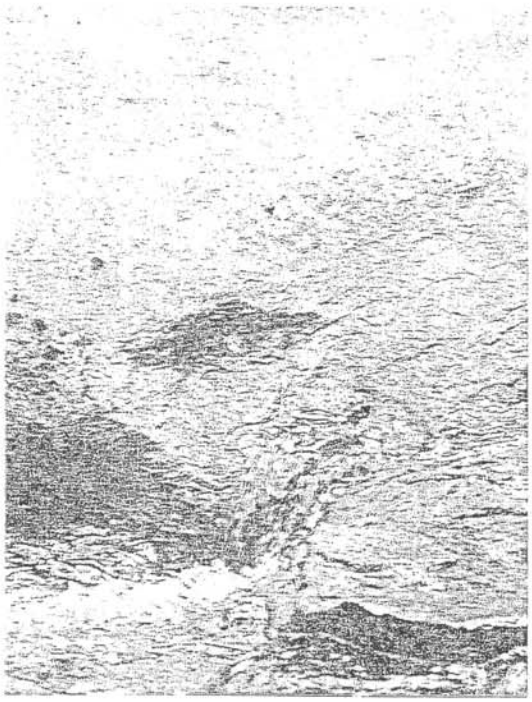

Figure 45. – Lichen break.

## PROTOCOL FOR MONITORING WOODY RECRUITMENT

Woody recruitment is assessed in the designated monitoring area using the Salmon-Challis National Forest woody recruitment protocols which are described below. The purpose of this monitoring is to determine if woody recruitment is sufficient to develop and maintain healthy woody plant populations. There is substantial temporal and spatial variation in woody species regeneration within riparian areas which makes it extremely difficult to develop quantifiable standards that can be applied across large temporal and spatial scales. Therefore, this strategy uses a qualitative standard for woody species regeneration. Separate protocols are used to evaluate recruitment for aspen and multi-stemmed species.

**Monitoring should occur only for the woody species selected on Form 1**. Whether aspen or multi-stemmed species are monitored and the particular multi-stemmed woody species monitored is dependent upon which species are specifically included as part of grazing management for that unit. This decision is made in Step 1 and documented on Form 1.

Monitoring for both aspen and multi-stemmed woody shrub species is completed at the designated monitoring area along the greenline. Monitoring begins at the established point and proceeds in the established direction (see Form 5).

The persons conducting the monitoring walk along the stream for a distance of approximately 363 feet. During this time they examine the appropriate woody species along the greenline on both sides of the stream looking at the characteristics described on the forms. Following the completion of this examination the question on the appropriate form is answered. If the desired condition is not being achieved the cause should be identified. This determination should focus on whether livestock grazing is a contributing factor.

**Aspen Form**

Allotment Name: _____
Pasture Name: _____
Designated Monitoring Area Name: _____
Fiscal Year: _____
Date Completed: _____
Completed by: _____

After evaluating the designated monitoring area answer the following question.

***Is recruitment adequate to develop or maintain healthy populations of aspen?***

**Yes** – Stands in this category will typically exhibit the following characteristics although they are not required to meet each of these characteristics to be considered as having adequate recruitment. This determination is based on professional judgment after considering these guidelines.

**Regeneration:** There are more than 500 suckers[1]/acre which is about 1 sucker/100 $ft^2$ (10 ft x 10 ft). This value can be determined by either an ocular estimate or determined using the effectiveness protocol described in *Aspen Delineation Project, 2002*.
**Recruitment:** Sufficient suckers[1] are recruiting to larger age/size classes to maintain a diverse age/size class distribution.
**Age Class Distribution:** There are trees representing three or more age/size classes.
**Plant Density:** It is difficult to see through the stand.

**No** – Stands in this category will typically exhibit the following characteristics although they are not required to meet each of these characteristics to be considered as having adequate recruitment. This determination is based on professional judgment after considering these guidelines.

**Regeneration:** There are less than 500 suckers[1]/acre or less than about 1 sucker/100 $ft^2$ (10 feet x 10 feet). This value can be determined by either an ocular estimate or determined using the effectiveness protocol described by *Aspen Delineation Project, 2002*.
**Recruitment:** Sufficient suckers[1] are not recruiting to larger age/size classes to maintain a diverse age/size class distribution.
**Age Class Distribution:** There are trees representing only one or two age/size classes.
**Plant Density:** It is easy to see through the stand.

Comments:_____
_____
_____

[1] Suckers are defined as trees less than 5 feet tall.

**Multi-stemmed Woody Shrub Species Form**

Allotment Name: _____
Pasture Name: _____
Designated Monitoring Area Name: _____
Fiscal Year: _____
Date Completed: _____
Completed by: _____

Multi-stemmed woody shrub species specifically included in this unit's management (see Form 1) (circle appropriate species):

**Willow Water Birch Serviceberry Chokecherry Other: _____**

After evaluating the designated monitoring area answer the following question.

***Is recruitment adequate to develop or maintain healthy populations of the multi-stemmed woody shrub species circled above?***

**Yes** – Stands in this category will typically exhibit the following characteristics although they are not required to meet each of these characteristics to be considered as having adequate recruitment. This determination is based on professional judgment after considering these guidelines.

**Recruitment:** There are an adequate number of sprouts and seedlings recruiting into larger age/size classes to maintain a diverse age/size class distribution. If needed, this assessment may be supplemented by quantitative data relating to willow recruitment. This data can be collected using the "Woody Species Regeneration" protocol described by Winward (2000) or Cowley (2006).
**Age Class Distribution:** There are plants representing three or more age/size classes.
**Growth Forms:** Few if any shrubs show signs of being hedged by livestock grazing (i.e. – show a "mushroom" shape or "bonsai" appearance).

**No** – Stands in this category will typically exhibit the following characteristics although they are not required to meet each of these characteristics to be considered as having inadequate recruitment. This determination is based on professional judgment after considering these guidelines.

**Recruitment:** There are not an adequate number of sprouts and seedlings recruiting into larger age/size classes to maintain a diverse age/size class distribution. If needed, this assessment may be supplemented by quantitative data relating to willow recruitment. This data can be collected using the "Woody Species Regeneration" protocol described by Winward (2000) or Cowley (2006).
**Age Class Distribution:** There are plants representing only one or two age/size classes.
**Growth Forms:** Many of the shrubs show signs of being hedged by livestock grazing (i.e. – show a "mushroom" shape or "bonsai" appearance).

Comments:_____
_____
_____