Conifer Restoration Alternate Plans
Field Survey Results

Background

Conifer restoration (hardwood conversion) is one of the most common types of alternate plans used by small forest landowners. Conifer restoration alternate plans provide flexibility to a forest landowner by allowing harvest of hardwoods within the regulatory riparian zone with the goal of re-establishing conifer near the stream to enhance long-term riparian function. An alternate plan template can reduce the effort needed to prepare and review alternate plans since a template outlines a set of strategies, that if implemented, provide the same level of protection to public resources as the standard forest practices rules. In August of 2008, the Small Forest Landowner Advisory Committee decided to develop a conifer restoration alternate plan template for inclusion in the Forest Practices Board Manual.

Before developing the template, the advisory committee felt it prudent to conduct field surveys of sites where conifer restorations had been conducted to determine: whether or not conifer restoration alternate plans are achieving the objectives of re-establishing conifer in the riparian zones, which factors contribute to the success or failure of these plans, and to gather information to aid in creating a conifer restoration template.

The advisory committee assembled a four-person interdisciplinary survey team consisting of one member each from the Department of Natural Resources, the Department of Fish and Wildlife, the Department of Ecology, and the Washington Farm Forestry Association. The team's mission was to field review all conifer restoration alternate plan forest practices applications submitted in 2003 and 2004. In October and early November 2008, the team surveyed 19 conifer restoration alternate plans. Members of the advisory committee joined the survey team for the first two field visits to help refine survey procedures.

Of the 19 alternate plans, the survey team evaluated 21 segments of fish-bearing streams. The assessment was primarily qualitative. The team recorded what was actually done on the ground, whether or not conifer was successfully established in the riparian zone, and what the impacts of the harvest were on riparian functions. Observations were based on conditions at the time of the survey. The survey was not designed to evaluate compliance with the approved forest practices application.

The team collected limited quantitative data. Five evenly-spaced transects were placed along each stream segment. At each transect the team measured shade with a densiometer, the no-cut buffer widths from the bankfull edge, the actual length of the RMZ harvest, and the number of conifers that were free to grow in a 1/50 acre plot in the harvested area of the RMZ.

The team also recorded detailed notes on the stream channel, the residual riparian stand, the five riparian functions, and discussed what worked and didn't work for each alternate plan. The evaluation was entirely qualitative, based on each team member's professional judgment. The team also looked for trends, relationships, and common occurrences.

Here are the survey team's key findings, recommendations for a template, and observations.

Key Findings

A. Of the sites reviewed, there was great variability in site conditions such as topography, channel morphology, residual species composition and density, and in the way that the plans that were implemented such as buffer widths, selective harvest vs. even-aged harvest, species selection, and maintenance.

B. Conifer restoration was generally poor, primarily due to lack of brush control and browse protection. Reforestation was a failure on 9 of the 21 sites. Six were beyond repair.

C. Double sided alternate plan harvests had more impacts on riparian functions than single sided harvests.

D. As of the survey date, although there were impacts, the 5 regulatory riparian functions were adequately protected on all but one site.

E. Sites with residual conifer in the core and/or inner zone protected the riparian functions more than those with only residual hardwoods.

F. Landowner interest and involvement appear to be important factors in the success of conifer restoration alternate plans. Resident landowners (4 out of 5) are more likely to follow through with the activities specified in the alternate plan than non-residents. Resident landowners seem to have a real sense of ownership. Although having a stewardship or management plan also indicates long-term commitment, it does not correlate to successful performance. Only 2 out of the 5 sites with stewardship plans were satisfactory. Likewise, using a consultant did not correlate to success.

Recommendations for a Template

A. Only allow single-sided conifer restoration alternate plans in the template.
   On some sites with double sided alternate plans, the negative impacts to riparian functions were increased. Other sites had large localized impacts, because they were only harvested on one side, did not have large overall impacts. Harvest on the side of the stream opposite the conifer restoration should have at least a standard rule RMZ.

B. Require that the minimum acceptable stocking level after the 5th growing season is 190 conifer trees per acre that are free to grow.
   Because of tremendous site variability, specifying the objective rather than the prescription will help the landowner monitor progress and is more meaningful to plan reviewers.

C. Require a reforestation survey and report from the landowner after the 3rd and 5th growing season that shows stocking level, average seedling height, amount of browse damage, average brush height, and what brush control will be done to ensure survival and achieve the goals of conifer restoration.
   The report requirement may prompt landowners to take a more active role in managing the alternate plan area and will aid DNR in enforcement. Suggested survey method attached.

D. Recommend in the template that some shade tolerant species be planted in the RMZ and/or on northern aspects, especially if underplanting.

A couple of sites showed better success with reforestation on south aspects than north aspects, probably due to increased sunlight. On north aspects, planting the first few rows of the RMZ with shade tolerant species will increase growth rates.

E. Emphasize in the template that conifer shall be planted even on wet sites. Choose the proper species.

One landowner planted alder, and two others managed naturally regenerated alder within the "restored" RMZ. This is actually a hardwood harvest.

F. In order to be consistent with the goal of conifer restoration, and to provide riparian functions to the stream, retain all conifers within a minimum of 75' of the stream, or to the outer edge of the inner zone.

Some of the sites had residual conifers only in the inner zone, and not the core zone. These conifers were providing shade and wood to the stream that will increase in importance as the hardwood stand in the core zone falls apart.

G. Resident landowners could be allowed more flexibility in their operations, since they tend to be "lighter on the land" and show greater success in controlling brush.

It was clearly evident that resident landowners did the best job of controlling brush and browse. Absentee landowners and those landowners who were not involved in developing the alternate plan did noticeably less brush control than those who live on the site or actively participate in managing the property.

Additional Observations and Ideas

A. Overall, riparian function was better across the landscape than expected. With a conifer restoration alternate plan there will always be impacts to riparian functions, but conifer restoration alternate plans are not detrimental to water quality as long as the alternate plan sites are well distributed across the landscape. If the alternate plan sites become clustered in an area, cumulative affects will be of concern. We need more scientific data in order to make good decisions.

B. Blowdown and sunscald were recorded at 9 of the 21 sites. Five of these were 2-sided harvests. It appears that the narrower buffers of conifer restorations, especially those that are 2-sided, may increase the susceptibility of the residual RMZ to wind damage.

C. Where possible, underplant the uncut part of the RMZ with shade tolerant species.

The uncut area closest to the stream has the most influence on riparian functions. This area also has an increased risk of blowdown after harvest. Conifer regeneration in the unmanaged/uncut part of the RMZ could help mitigate for this risk. This may involve additional maintenance. However, several landowners successfully established conifer saplings in the understory prior to their alternate plan harvests. Others underplanted as part of their hardwood conversion plans. As an incentive to do underplanting, the landowner could be allowed more flexibility in stocking levels in the harvested area, increased length of stream involved, or narrower minimum no-cut buffer widths.

D. On incised stream channels, measure the no cut buffer width from the break in slope rather than the bankfull edge.

The width of the treed buffer, when measured from the bankfull edge, can be misleading because of the lack of trees on steep banks. Buffer widths measured from the bankfull edge can result in only a single row of trees left at the top of the slope, which are often

susceptible to blowdown, reduced shading, reduced potential wood input, and can compromise bank stability.

E. For the most part, the poorest shade scores, and those with canopy openings on the harvested side were from sites with a minimum buffer width of less than 20 feet from the top of the slope.

F. In channels that are incised, the topography can enhance the shading of a stream channel with narrow buffer widths. This seemed truer with inner gorge-type stream channels where the bank was nearly vertical.

G. In general, most sites with impacts to riparian functions (seven sites graded C or less) had average buffer widths of less than 48' from the bankfull edge.

H. Several sites had stream associated forested wetlands, which made the effective forested buffer from the stream channel wider than the proposed buffer width.

I. High-grade hardwood harvest using variable width buffers may be contrary to the goals of conifer restoration. Several landowners only harvested the high quality trees rather than all of the hardwood, resulting in smaller, less effective hardwood buffers. Only the areas where the high quality trees were harvested, were subsequently replanted. If the intent is to establish conifer, selective harvest of only some of the hardwood does not achieve the conifer restoration goal.

J. One landowner planted trees at a very high density of 567 trees per acre. This stocking level guarantees the need for future thinning. If future thinning does not occur, the goal of establishing large conifers in the riparian zone will not be achieved.

K. Overhead shade was not affected by the harvest in most cases. However, openings along the harvest side resulting from narrow buffer widths reduced shade at lower sun angles. A tall single story canopy can also allow low angle insolation, which may allow air warming in the morning and evening.

L. Density and composition of the existing stand appeared to influence the effectiveness of a given buffer width. Sparse, hardwood dominated residual RMZs were often susceptible to blowdown and provided less function than those with large conifers at a given width.

M. Some alternate plans had a residual buffer consisting of a large old conifer component remaining from prior harvests using the old standard 50-foot buffer width. Harvest plans that removed all of the hardwood trees outside of this buffer had minimal impacts on the stream channel.

N. Some plans had localized impact, but due to small reach length (less than 500 feet) had little impact on overall functioning of the riparian zone.

O. There were inconsistencies in the way applicants measured bankfull width/edge. Measuring buffers from the top of the slope would help minimize measurement differences.

P. It was very difficult to determine the landowner's goals and intent from the information on the application forms. The application form needs more clarity, specifying what will be harvested, from where it will be harvested, the length and width of the harvest, where individual trees would be removed and residual conifers left. For variable width buffers, specify the minimum, maximum and average buffer width with the locations shown on a map, or require that the

applicant specify the number of trees that can be removed from within a certain distance of the channel.

Q. It was difficult to determine what the final prescription was after the ID team meeting. We need more consistent and explicit documentation.

R. Most landowners did not include a large-scale map, even though their plans were over a very small area. This needs to be required. The online mapping tool should be changed to allow printing of a 1" = 400' scale map.

S. For conifer restoration alternate plans, a 5-year forest practices permit should be required to facilitate enforcement.

Suggested method for measuring seedlings per acre.

1/50th acre plot (16'8" radius, or 29'6" x 29'6" square):

a) Take sample plots beginning 25' perpendicular to the no-cut RMZ boundary
b) Tallying planted, natural, and "free-to-grow" trees by species. Free to grow means that seedlings have at least 2 whorls above the surrounding vegetation.
c) Start the 1st plot along a stream reach 75' from the beginning of the reach. Take plots every 50'. If the reach is greater than 675', adjust distance between plots to measure a minimum of 10 plots.

1/100th acre plot (11'9" radius):

a) Take sample plots beginning 25' perpendicular to the no-cut RMZ boundary
b) Tallying planted, natural, and "free-to-grow" trees by species. Free to grow means that seedlings have at least 2 whorls above surrounding vegetation.
c) Start the 1st plot along a stream reach 75' from the beginning of the reach. Take plots every 25'. If the reach is greater than 675', adjust distance between plots to measure a minimum of 20 plots.