ICRB LANDSCAPE ECOLOGY STARS REPORT

CHAPTER 13A

May 2, 1996

Compositional Trends of Broadscale Vegetation Types Within the Interior Columbia River Basin

Jeffrey L. Jones

Wendel J. Hann

AUTHORS

JEFFREY L. JONES is a wildlife biologist, U.S.D.A. Forest Service, Northern Region, Missoula MT

WENDEL J. HANN is a landscape ecologist, U.S.D.A. Forest Service, Northern Region, Missoula MT

INTRODUCTION

The composition of communities across a landscape directly affects ecosystem processes and functions. Consequently, an understanding of the dynamics of community composition is required for the accurate portrayal of subsequent changes to ecosystem processes and functions. A landscape's composition of vegetation communities has ecological implications at many scales. Furthermore, landscapes are spatially and temporally dynamic, but the detect ability of changes varies by both temporal and geographic scales. Studies of the magnitude and rate in which landscape composition varies improve the predictability of the effects of those change on ecological processes and functions, as well as estimates of the suitability and probability of persistence for relevant biota. However, such studies must be conducted across multiple temporal and spatial scales in order to better understand the complexity of ecosystem dynamics.

Hessburg and others (1996) assessed recent historical trends of vegetation within the Interior Columbia River Basin (ICRB) using mid-scale data from sampled subwatersheds. Jones and others (1996) used a continuous coverage of broadscale vegetation data to assess the change of vegetation communities within 164 subbasins of the ICRB over a longer historical time frame. They also quantified the departures of communities from expected historical conditions within subbasins to study coarse patterns of vegetation change throughout the ICRB. However, we believed an assessment of broadscale vegetation changes across larger geographic scales within the ICRB was still needed to provide a different context of the potential ecological effects of change. Furthermore, we wanted to evaluate whether or not observed changes were consistent across varying spatial and temporal scales. We hoped that quantitative data of the spatial differences of broadscale vegetation change would assist biologists and botanists to infer persistence probabilities of relevant biota. As an example, a species may be widely or sparsely distributed throughout a landscape, or be restricted to relatively smaller areas within a landscape (e.g., peripheral, disjunct, or endemic distribution patterns; Lesica and Shelly 1991). The persistence of widely or sparsely distributed species may be more closely associated with the community composition of the entire ICRB. On the other hand, the persistence of other species, having smaller geographic ranges or peripheral, disjunct or endemic distributions, may be more closely correlated with the community composition of smaller landscapes.

We discuss the historical change in composition of broadscale vegetation communities throughout the ICRB using two spatial scales of analyses: across the entire ICRB as a whole, and within 13 Ecological Reporting Units (ERUs) within the ICRB (see Jensen and others (1996) for a description and derivation of ERUs). The ERUs had different biophysical compositions (Jensen and others 1996). Consequently, they also had different inherent disturbance patterns and processes, as well as variable human-influenced disturbances. By evaluating two scales, we can see if compositional trends were consistent across scales, or if in fact they varied spatially throughout the ICRB.

Three indices of vegetation change are required to better understand the effects of vegetation trends on ecosystem dynamics. The proportional change of a community's areal extent (i.e., class change) is valuable because it quantifies the change of that community relative to itself. The proportional change of a community relative to the landscape (i.e., landscape change) is also insightful, because it factors in the dominance of that type within the landscape. It's quite likely that the availability of a relatively rare community type may change substantially through time, which may have substantial ecological consequences. However, the proportional change of a rare community may not significantly affect the overall composition of the landscape because that community only comprised a relatively minor component. Conversely, a seemingly insignificant change of a community which dominates a landscape may also have significant ecological ramifications. For example, a 10 percent change in areal extent of a community that occupies 80 percent of a landscape will significantly alter the composition of that landscape, as will an 80 percent change of a community that comprises 10 percent of the landscape. Even so, substantial changes of a community's areal extent may still not have substantial ecological ramifications if those changes occurred within some expected range of variation in which biological entities and processes have evolved. Consequently, only by comparing the magnitude of change to some historical range of expected conditions can we fully ground the ecological implications of vegetation trends on ecosystem structure, composition, and functions.

METHODS

Broadscale vegetation conditions were mapped at 1-km^2 resolution to describe current and historical conditions. Menakis and others (1996) described the derivation of the historical and current broadscale vegetation layers of the ICRB. We derived 24 broadscale terrestrial community types by aggregating 41 cover types and 25 structural stages (Appendix Q). Cover types and structural stages were grouped according to similar moisture, temperature, and elevation gradients, as well as having similar broadscale structures.

We used two spatial scales and three indices of change to quantify areal changes of terrestrial communities between historical and current periods. Compositional changes were assessed across the Interior Columbia River Basin (ICRB) as a whole, and for Ecological Reporting Units (ERUs; Figure 1) within the ICRB. These changes were evaluated in respect to the terrestrial community (i.e., class change), the landscape (i.e., ICRB or ERU), and the historical range of a community's area (i.e., departure index).

Class changes quantified the proportion of a terrestrial community's area which varied between the historical and current periods. We estimated class change by:

$$CC = ((TCA_C\ !\ TCA_H)'\ TCA_H)*100$$

where CC = percentage of class changed;

TCA_C = current area of terrestrial community.

TCA_H = historical area of terrestrial community;

Landscape changes quantified the areal proportion of the landscape (ICRB or ERU) which changed as a result of a change in areal extent of a terrestrial community type. We estimated landscape change by:

$$LC = ((TCA_C - TCA_H)/LA)*100$$

where LC = percentage of landscape changed;

TCA_C = current area of terrestrial community;

TCA_H = historical area of terrestrial community;

LA = landscape area (ICRB or ERU).

We constructed transition matrices of terrestrial communities to further our understanding of class and landscape changes (Jones 1996). The transition matrices tracked the flux of individual 1-km^2 pixels between historical and current periods. For example, we wanted to know if a pixel classified as an upland herbland community during the historical period remained upland herbland, or changed to some other community in the current period. The dominant transitions within a landscape (i.e., those affecting at least one percent of the ICRB or ERU) were summarized.

Terrestrial community type departures were determined by comparing the current areal extent of each type to their modeled 75th and 100th percent historical ranges. Historical ranges of terrestrial community types were simulated for the ICRB and individual ERUs using CRBSUM, a spatially explicit, deterministic vegetation simulation model with stochastic properties (Keane 1996). The minimum and maximum values from a single 400-year run of CRBSUM, and outputs for simulation years 0, 50, 100, 200, 300, and 400, were used to define historical ranges. The initial conditions for the historical simulations and the simulation process were described by Menakis and others (1996) and Long and others (1996), respectively. We then calculated the 75th percent historical mid range by adding or subtracting 12.5 percent of the historical range to the historical minimum and historical maximum, respectively. Five departure classes were defined based on the relationship between the current area of each community type to its simulated 75th and 100th percent historical ranges (Table 1, Figure 2).

We used class changes, landscape changes, and departure indices to determine ecologically significant changes of terrestrial communities. We judged the absolute value of class changes $\geq$20 percent and landscape changes $\geq$1.0 percent as ecologically significant, but only if the departure indices indicated that the current area of the terrestrial community occurred above or below the terrestrial community's 75th percent historical mid range (i.e., departure classes 1, 2, 4, and 5). In turn, areal changes resulting in departure classes 1, 2, 4, and 5, were ecologically significant if either the historical or current areas of a community exceeded one percent of the landscape, and the class change exceeded five percent.

Riparian vegetation types appeared to be under-represented in the historical layer and over-represented in the current layer. Aspen, herbaceous wetlands, and shrub wetlands, which generally occur in scattered, relatively small- to medium-sized patches, tend to be under-estimated as mapping resolution increases (Turner and others 1989). Consequently, in that the historical vegetation layer was developed at a coarser resolution than the current vegetation layer (Menakis and others 1996), it is likely that the two mapping efforts contained different biases. In fact, rectification with the potential vegetation types indicated that the aspen, herbaceous wetlands, and shrub wetlands, and consequently, the riparian terrestrial community types (i.e., riparian herblands, riparian shrublands, and riparian woodlands) were likely more abundant on the historical landscape than our data indicated (see Appendix A, and Menakis and others (1996) for a description of potential vegetation types, and the derivation of the historical vegetation layer). We did not report the changes of riparian terrestrial communities because they could not be accurately quantified.

RESULTS

Interior Columbia River Basin

Richness of terrestrial communities increased by three anthropogenic types (i.e., agriculture, urban, and exotics) between historical and current periods. Currently, agriculture is the second most dominant type within the ICRB. Out of 21 terrestrial communities, alpine, rock/barren, and water did not change between historical and current periods (Table 2).

We detected significant changes in respect to class for 11 of 21 types (Table 2). Ecologically significant negative trends were evident in six terrestrial communities (upland herbland, upland shrubland, early-seral lower montane forest, late-seral single-layered lower montane forest, late-seral multi-layered lower montane forest, and late-seral multi-layered subalpine forest). The early-seral lower montane forest and late-seral single-layered lower montane forest communities declined by more than 75 percent. Conversely, significant positive trends occurred in five terrestrial communities (early-seral subalpine forests, mid-seral lower montane forest, mid-seral montane forest, late-seral single-layered subalpine forest, and upland woodland).

Ecologically significant changes relative to the ICRB landscape were apparent with seven terrestrial communities (Table 2). The agriculture, exotics, mid-seral montane forest, and mid-seral lower montane forest communities increased across substantial areas within the ICRB, whereas late-seral single-layered lower montane forest, upland herbland, and upland shrubland communities declined across substantial areas. The decrease in upland shrubland and upland herbland communities accounted for nearly a 21 percent change of the ICRB as a whole. Conversely, conversions to agriculture occurred across 16 percent of the ICRB .

The transitions of upland herbland and upland shrubland communities into the agriculture type dominated the changes which occurred in the ICRB (Table 3). Other dominating changes involved the transitions of early- and late-seral forest communities into mid-seral forest communities which occurred across seven percent of the ICRB. Although transitions between the upland herbland and upland shrubland communities occurred in both directions, the net change favored the upland shrubland type.

The areal extents of all but four (alpine, rock/barren, water, and early-seral montane forest) terrestrial communities occurred outside of their 75 percent historical mid range. However, the departure indices for the mid-seral subalpine forest, late-seral single-layered montane forest, late-seral multi-layered montane forest, and urban communities were not ecologically. significant.

A significant shift among the areal extents of early-, mid-, and late-seral forest communities occurred between historical and current time periods. The distribution of mid-seral forest communities increased at the expense of both early- and late-seral forest communities. Late-seral and early-seral forest communities had net declines across six and one percent of the ICRB, respectively (Table 2). However, as a group, the areal extent of mid-seral forest communities increased across nearly nine percent of the ICRB.

Blue Mountains ERU

Richness of terrestrial communities increased by three anthropogenic types (i.e., agriculture, urban, and exotics) between historical and current periods (Table 4). Currently, agriculture is the most dominant type within the Blue Mountains ERU. Of the 20 terrestrial communities we observed in the Blue Mountains ERU, only the alpine, rock/barren, and water types did not change between historical and current periods.

We failed to detect significant changes in respect to class for 50 percent of the terrestrial communities that occurred within the Blue Mountains ERU (Table 4). Five communities declined significantly (early-seral lower montane forest, late-seral single-layered lower montane forest, late-seral single-layered subalpine forest, mid-seral subalpine forest, upland herbland, and upland shrubland). The late-seral single-layered lower montane forest and mid-seral subalpine forest declined by more than 75 percent. Conversely, significant positive trends occurred with four of the terrestrial communities (early-seral subalpine forest, late-seral multi-layered montane forest, mid-seral lower montane forest, and mid-seral montane forest). The mid-seral montane forest, late-seral multi-layered montane forest, and early-seral subalpine forest communities increased by more than 200, 300, and 600 percent, respectively. Although, the early-seral montane forest, late-seral single-layered montane forest, and late-seral multi-layered subalpine forest communities increased substantially, their trends were not ecologically significant.

Ecologically significant changes relative to the Blue Mountains ERU were apparent in nine of 20 terrestrial communities (Table 4). Three communities decreased across significant proportions of the ERU (upland shrubland, upland herbland, and late-seral single-layered lower montane forest), whereas significant increases in area were evident with the agriculture, exotics, early-seral subalpine forest, late-seral multi-layered montane forest, mid-seral lower montane, and mid-seral montane forest types. The decline of the upland herbland and late-seral single-layered lower montane forest communities occurred across 18 and 15 percent of the Blue Mountains ERU, respectively. Conversely, approximately 17 percent of the ERU was converted to the agriculture community type.

The areal extents of most (65 percent) terrestrial communities occurred outside of their 75 percent historical mid range. Although the urban community type occurred above its historical range, its departure was not ecologically significant.

The areal reduction of the upland shrubland and upland herbland communities was almost entirely attributable to agricultural conversion (Table 5, Jones 1996). Virtually all (96 percent) of the late-seral single-layered lower montane forest type was transformed: 27 percent went to mid-seral lower montane forest, 26 percent went to mid-seral montane forest, and 22 percent went to the late-seral multi-layered montane forest community type. Conversely, the increase in late-seral multi-layered and mid-seral montane forest communities occurred predominantly at the expense of late-seral single-layered and mid-seral lower montane forest communities.

As a group, the composition of late-seral forest communities declined from 23 to 15 percent of the Blue Mountains ERU (a 35 percent decline). However, late-seral single-layered forest communities decreased, whereas late-seral multi-layered forest communities increased (Table 4). The increases in both early- and mid-seral forest communities were ecologically significant.

Central Idaho Mountains ERU

The richness of terrestrial communities of the current period was greater than the historical period due to the addition of three anthropogenic communities - agriculture, exotics, and urban (Table 6). Of the 21 terrestrial communities occurring within the Central Idaho ERU, seven currently occur within their 75 percent historical mid range (alpine, late-seral multi-layered montane forest, late-seral multi-layered lower montane forest, mid-seral montane forest, rock/barren, upland shrubland, and water). Ecologically significant trends occurred for 10 and 11 community types in respect to class and landscape, respectively. The areal extent of the early-seral lower montane forest, late-seral single-layered lower montane forest, upland herbland, and upland woodland communities decreased by more than 50 percent. In terms of landscape change, the loss of upland herblands and the conversion to agriculture affected the largest proportion of the Central Idaho ERU (nine and six percent, respectively).

Although a substantial class change and landscape change occurred with the late-seral multi-layered lower montane forest and mid-seral montane forest communities, respectively, these changes were not ecologically significant. On the other hand, even though the areal extent of the late-seral multi-layered subalpine forest and urban communities types presently occur outside of their historical mid ranges, these departures were not ecologically significant.

The 51 percent areal decline of the upland herbland community was attributed primarily to increases in upland shrubland, agriculture, and mid-seral lower montane forest communities (Table 7, Jones 1996). The decline in late-seral single-layered lower montane communities largely occurred due to transitions into mid-seral and late-seral multi-layered montane forest communities. Similarly, disturbances converted the mid-seral subalpine forest type to the early-seral subalpine forest type, converted the mid-seral montane forest type to the early-seral subalpine type, and converted the upland woodland type to the upland herbland type. Conversely, successional processes were most likely responsible for the changes of the early-seral lower montane forest community to the early-seral montane forest, mid-seral montane forest, and mid-seral lower montane forest communities.

As a group, late-seral forest communities decreased from 16 to 15 percent of the Central Idaho Mountains ERU (Table 6). However, the declining trend was not consistent among all types of late-seral forest communities. Late-seral single-layered forest communities decreased, whereas late-seral multi-layered forest communities increased significantly. As a whole, mid-seral forest communities also declined, whereas early-seral forest communities increased significantly.

Columbia Plateau ERU

We detected 20 broadscale terrestrial community types within the Columbia Plateau ERU (Table 8). However, the alpine and late-seral single-layered subalpine forest communities have always been extremely rare in that they never occupied more than 0.004 percent of the landscape. The areal extents of five community types (alpine, early-seral subalpine forest, late-seral multi-layered montane forest, late-seral single-layered montane forest, and water) presently occur within their 75 percent historical mid ranges. Ecologically significant trends were detected for 10 and eight communities in respect to class and landscape, respectively. Five communities (early-seral lower montane forest, late-seral single-layered lower montane forest, late-seral multi-layered subalpine forest, mid-seral subalpine forest, and upland herbland) declined by more than 75 percent. Conversely, three communities (late-seral single-layered montane forest, mid-seral montane forest, mid-seral lower montane forest and upland woodland) increased by more than 100 percent. The declines in area of the upland herbland and upland shrubland communities occurred across approximately 53 percent of the Columbia Plateau ERU.

Conversely, approximately 45 percent of the ERU has been converted to agriculture.

Although we detected substantial class changes of the early-seral subalpine forest, late-seral multi-layered montane forest, and late-seral single-layered montane forest communities, these changes were not ecologically significant (Table 8). Similarly, the 35 percent increase of the late-seral single-layered subalpine forest community was not deemed significant, as the current area did not amount to more than 0.004 percent of the ERU. Using similar logic, we concluded that although the areal extents of the late-seral single-layered subalpine forest and urban communities presently occur above their historical mid ranges, we did not regard these changes as significant.

The Columbia Plateau ERU was dominated by agricultural conversions of the upland herbland and upland shrubland communities (65 and 47 percent, respectively; Table 9; Jones 1996). Approximately 94 percent of the late-seral single-layered lower montane forest community was altered by the loss of larger-diameter trees and/or an increase in stocking levels of montane species. These forests changed predominantly to mid-seral lower montane (46 percent), late-seral multi-layered lower montane (18 percent), or mid-seral montane forest (15 percent) community types. The encroachment of the upland woodland community into the upland shrubland community occurred across 4 percent of the ERU.

Lower Clark Fork ERU

Nineteen community types were detected within the Lower Clark Fork ERU (Table 10). However, the exotics community only occupied 0.004 percent of the landscape during the current period, and the upland shrubland community only appeared across 0.1 percent of the landscape during the historical simulations (i.e., it did not occur during the historical or current periods). Relative to the historical period, the current period had three additional anthropogenic community types (agriculture, exotics, and urban). However, again, the areal extent of the exotics community was insignificant. Conversely, three types (late-seral multi-layered lower montane forest, late-seral single-layered lower montane forest, and upland woodland) were no longer evident during the current period. Thus, the richness of terrestrial communities did not vary between historical and current periods.

Ecologically significant trends relative to class and landscape were apparent with 11 and nine community types, respectively (Table 10). Three terrestrial communities (late-seral multi-layered lower montane forest, late-seral single-layered lower montane forest, and upland woodland) were lost completely, and the areal extents of four others (early-seral lower montane forest, late-seral multi-layered montane forest, late-seral multi-layered subalpine forest, and upland herbland) declined by more than 80 percent.

The distribution of forest communities has converged toward middle-aged forests. That is, the forested communities were homogenized within the Lower Clark Fork ERU. All together, late-seral forests communities decreased from 25 to two percent of the Lower Clark Fork ERU (a 93 percent decline), while early-seral forest communities declined 53 percent. Both single- and multi-layered late-seral forest declined significantly. On the other hand, mid-seral communities as a whole, increased by 106 percent. The areal extents of two of the three mid-seral forest communities (mid-seral montane forest and mid-seral subalpine forest) increased by more than 100 percent. In fact, the increase of the mid-seral montane forest community occurred across 36 percent of the landscape.

Although substantial areal declines occurred with the early-seral subalpine forest and late-seral single-layered subalpine forest communities these changes were not ecologically significant (Table 10). Similarly, we did not regard the substantial departures of the exotics, upland shrubland, and urban communities as ecologically significant.

The areal extent of the mid-seral montane forest community increased at the expense of the late-seral single-layered and mid-seral lower montane forest communities (Table 11, Jones 1996). Virtually all of the late-seral single-layered lower montane forest type changed to either mid-seral montane or mid-seral lower montane forest communities. Similarly, virtually all of the late-seral multi-layered lower montane forest community was converted to predominantly mid-seral montane or mid-seral lower montane forest communities. A comparable process was evident in subalpine forest communities where a 95 percent decline of the late-seral multi-layered subalpine forest type was attributable to a subsequent increase of both early- and mid-seral montane and subalpine forest communities. Non-forest communities were dominated by the 100 percent conversion of the upland woodland type to the upland herbland community, and the alteration of 87 percent of the upland herbland community by either agricultural development or encroachment by lower montane forest communities.

Northern Cascades ERU

The richness of terrestrial communities increased by three anthropogenic types between historical and current periods (Table 12). Of 20 terrestrial communities, we observed ecologically significant trends with 11 and 10 communities relative to class and landscape, respectively. All of the seven community types that had significant declining class trends lost nearly 60 percent or more of their respective areas. The areal decline of the late-seral singe-layered lower montane forest community (96 percent) dominated the changes that occurred within the Northern Cascades ERU.

Although the early-seral lower montane forest community increased by more than 200 percent across 1.2 percent of the Northern Cascades ERU, the change was not ecologically significant (Table 12). Similarly, the increase of the late-seral multi-layered montane forest across nearly 1.3 percent of the ERU did not deviate significantly from historical conditions. Conversely, although the exotics and urban community types deviated substantially from their historical mid ranges, these changes were not ecologically significant.

Virtually all of the decline in the late-seral single-layered lower montane forest community was due to transitions to predominantly younger stands of mid-seral lower montane and montane forest communities (Table 13, Jones 1996). Other forest communities were also dominated by changes to younger forests.

An increase of the early-seral montane forest community occurred largely at the expense of mid-seral montane and mid-seral subalpine forest communities. However, the increase in the mid-seral lower montane forest community was derived from both ends of the successional pathway - mostly originating from the late-seral single-layered lower montane forest and early-seral montane forest, and to a lesser degree, upland shrubland communities. In respect to non-forest communities, the seven percent of the Northern Cascades ERU which was converted to agriculture was largely derived from the upland shrubland and upland herbland communities. Nearly 74 percent of the upland shrubland community, which existed historically, was lost to agricultural development (38 percent), mid-seral lower montane forest (19 percent), or upland woodland (12 percent) communities.

As a group, late-seral forest communities decreased from 28 percent to 13 percent of the ERU (a 54 percent decline; Table 12). We detected significant declines in both single- and multi-late seral forests. Conversely, both early- and mid-seral forests increased.

Northern Glaciated Mountains ERU

The richness of terrestrial communities increased by three anthropogenic types between the historical and current periods (Table 14). Of the 20 terrestrial communities that occur in the Northern Glaciated Mountains ERU, the areal extents of only three (rock/barren, upland woodland, and water) existed within their historical mid ranges during the current period. Ecologically significant trends were detected for 14 and 13 community types in respect to class and landscape, respectively. The areal extents of eight community types decreased by more than 75 percent. The late-seral single-layered montane forest, late-seral single-layered lower montane forest, and late-seral multi-layered subalpine forest communities were nearly eliminated from the Northern Glaciated ERU between historical and current periods. Conversely, three communities (late-seral single-layered subalpine forest, mid-seral montane forest, and upland woodland) increased by more than 100 percent.

Broadscale structures of forest communities within the Northern Glaciated Mountains ERU become significantly more alike as the composition of forest communities shifted towards middle-aged forests . With the exception of the late-seral single-layered subalpine forest (which increased), all late-seral forest communities declined by more than 90 percent (Table 14). Over all, the areal extent of late-seral forest communities declined from 29 to three percent of the Northern Glaciated ERU. Ecologically significant declines were also detected for all early-seral forest communities. On the other hand, the areal extents of all mid-seral forest communities significantly increased across 34 percent of the Northern Glaciated Mountains ERU. Thus, mid-seral forest communities have increased at the expense of early- and late-seral forest communities.

Although the upland woodland community increased by more than 400 percent, the change was not ecologically significant (Table 14). Conversely, the areal increases of the exotics and urban communities, which presently occur at levels well above their historical ranges, were also not ecologically significant.

The Northern Glaciated Mountains ERU was dominated by transitions towards more homogeneous montane forests. The nearly one-third of the ERU which was converted to the mid-seral montane forest community, originated mostly from the early-seral and late-seral multi-layered montane forest communities (Table 15, Jones 1996). Large-diameter trees were removed from montane forest communities, while younger forests developed more complex structures. The 91 percent areal decline of the late-seral multi-layered montane forest community was dominated by transitions to mid-seral (72 percent) or early-seral montane forest (16 percent) communities. Almost all of the late-seral multi-layered subalpine forest type was similarly converted to younger forest communities. Single-layered lower montane and montane forest communities were nearly eliminated as a result of conversions to mid- or early-seral communities. Agricultural conversions dominated the transitions of non-forested communities, affecting 13 percent of the Northern Glaciated Mountains ERU. Most of the agricultural development occurred within upland herbland and upland shrubland communities.

Northern Great Basin ERU

The richness of terrestrial communities increased from 14 to 18 types between the historical and current periods (Table 16). The four additional communities detected in the current period included two anthropogenic types (agriculture and exotics), and the late-seral single-layered montane forest and late-seral multi-layered subalpine forest communities, two communities that have always been extremely rare within the Northern Great Basin ERU. Historical simulations indicated that the early-seral subalpine forest and mid-seral subalpine forest communities never comprised more than 0.09 percent of the landscape. Furthermore, neither community exceeded 0.002 percent of the landscape during the historical or current periods.

Ecologically significant class and landscape trends were detected for eight and four communities, respectively (Table 16). Most of the early-seral lower montane forest and upland herbland communities (89 and 55 percent, respectively) were converted to other communities between historical and current periods. Conversely, the areal extents of four communities (late-seral montane multi-layered forest, late-seral montane single-layered forest, late-seral subalpine multi-layered forest, and upland woodland) increased by more than 200 percent. However, of these communities, only the increasing trends of the late-seral montane multi-layered forest and upland woodland types had measurable effects relative to the Northern Great Basin ERU.

The areal extents of five of 19 terrestrial communities currently occur within their historical mid ranges (alpine, late-seral single-layered lower montane forest, late-seral multi-layered subalpine forest, upland shrubland, and water). Thus, although the late-seral single-layered lower montane forest and late-seral multi-layered subalpine forest experienced substantial class changes, these changes were not ecologically significant, as they appeared to occur within the historical range of variability for these types. Similarly, the decline of the upland shrubland community across seven percent of the ERU seemed to occur within the normal range of historical conditions.

The transitions of terrestrial communities within the Northern Great Basin ERU were dominated by the areal decline of the upland shrubland community (Table 17, Jones 1996). The alteration of the upland shrubland community was in turn dominated by conversions to agriculture, exotics, or upland woodland terrestrial communities. Agricultural development, the invasion of exotics, and the encroachment of the upland woodland community occurred almost exclusively within the upland shrubland community. Sixty four percent of the areal decline of the upland herbland community was attributable to the encroachment of the upland woodland and lower montane forest communities, and to a lesser degree by the conversion to upland shrubland, exotics, or agriculture communities. Successional processes were largely responsible for the loss of 25 percent of the late-seral single-layered lower montane forest community, and the increase of the late-seral multi-layered montane forest community. The areal decline of the late-seral single-layered lower montane forest type was dominated by the development of the structurally more complex late-seral multi-layered montane and lower montane forest communities. Similarly, the increase of the late-seral multi-layered montane forest type was primarily a result of the successional development of early- and mid-seral montane forest, as well as the late-seral single-layered lower montane forest communities.

As a group, late-seral forest communities increased from five to seven percent of the Northern Great Basin ERU (Table 16). The net increase was dominated by a significant increase in late-seral multi-layered forest types as late-seral single-layered forest types declined. Early-seral forest communities declined significantly in respect to class only. Although the area of mid-seral forest communities declined, the trend was not significant.

Owyhee Uplands ERU

The richness of terrestrial communities increased from 13 to 20 types between historical and current periods (Table 18). The seven additional communities included three anthropogenic types (agriculture, exotics, and urban) and four subalpine forest communities. However, only the agriculture and exotics community comprised a substantial proportion of the Owyhee Uplands ERU during the current period.

Ecologically significant class and landscape trends were detected for eight and four communities, respectively (Table 18). The dominant changes affecting the composition of the Owyhee Uplands ERU included agricultural conversion and decline of the upland shrubland community across 12 and 13 percent of the landscape, respectively. Six of the 20 community types (alpine, early-seral montane forest, late-seral multi-layered montane forest, mid-seral subalpine forest, upland shrubland, and water) occurred within their historical mid ranges during the current period. Although substantial departures occurred with the early-seral subalpine forest, late-seral multi-layered subalpine forest, late-seral single-layered subalpine forest, and urban communities, all still occurred within their historical ranges. Consequently, their changes were not ecologically significant.

Terrestrial community transitions within the Owyhee Uplands ERU were dominated by the agricultural conversion of 12 percent of the area; most of which occurred within the upland shrubland community (Table 19, Jones 1996). The invasion of exotics occurred almost exclusively within the upland shrubland community. The areal decline of the late-seral single-layered lower montane forest community was largely attributable to disturbances which resulted in their conversion to early- and mid-seral montane forest communities. In addition, the areal decline of the early-seral lower montane forest community was a result of transitions to mid-seral communities of montane and lower montane forests, or the early-seral montane forest community.

Snake Headwaters ERU

The richness of terrestrial communities increased from 18 to 19 types between the historical and current periods (Table 20). Three anthropogenic types occurred in the current, but not in the historical periods. Conversely, the early-seral lower montane forest and late-seral multi-layered forest communities occurred historically, but not during the current period.

Of the 21 community types detected within the Snake Headwaters ERU, ecologically significant trends relative to class and landscape were observed for 11 and nine communities, respectively. As mentioned earlier, the early-seral lower montane forest and late-seral multi-layered lower montane forest communities were eliminated between historical and current periods. Similarly, the late-seral multi-layered montane forest, late-seral multi-layered subalpine forest, upland shrubland, and upland woodland communities declined by more than 75 percent. Conversely, the early-seral subalpine forest and late-seral single-layered lower montane forest communities increased by over 1000 percent.

The areal extents of five of the 21 terrestrial community types occurred within their historical mid ranges during the current period (alpine, early-seral montane forest, late-seral single-layered lower montane forest, rock/barren, and water; Table 20). The substantial departures that occurred with the mid-seral lower montane forest and urban communities were not ecologically significant.

The upland shrubland community type was eliminated across 13 percent of the Snake Headwaters ERU. Nearly one-half of the decline of the upland shrubland community was a result of agricultural development (Table 21, Jones 1996). The remainder of the transitions were dominated by a change to the mid-seral montane forest community. Forested communities were dominated by transitions towards younger, less structurally complex communities. A 92 percent areal decline of the late-seral multi-layered montane forest type was dominated by changes to early- and mid-seral montane forest communities, and to a lesser degree, to the mid-seral subalpine forest community. Likewise, the decline of 90 percent of the late-seral multi-layered subalpine forest community was a result of transitions to both early- and mid-seral subalpine forest, and early- and mid-seral montane forest communities.

The distribution of forest communities became more centered around middle-aged forests. As a whole, late-seral forests decreased from approximately 16 to four percent of the Snake Headwaters ERU (Table 20). The areal extents of early-seral forest communities also declined significantly, whereas, mid-seral forest types increased significantly.

Southern Cascades ERU

The richness of terrestrial communities within the Southern Cascades ERU increased by three anthropogenic communities (agriculture, exotics, and urban) between historical and current periods (Table 22). During this time interval, ecologically significant class and landscape trends occurred with nine and 10 communities, respectively. The class changes of the late-seral single-layered montane and lower montane forest communities dominated the changes that occurred across the Southern Cascades ERU. The late-seral single-layered montane forest community increased, whereas the late-seral single-layered lower montane forest community decreased across approximately eight percent of the ERU.

Six of 21 communities occurred within their historical mid ranges during the current period (alpine, early-seral montane forest, late-seral single-layered subalpine forest, upland woodland, rock/barren, and water; Table 22). Although substantial areal changes occurred with the early-seral montane forest and late-seral single-layered subalpine forest communities, the changes were not ecologically significant. Similarly, although the current areal extents of the exotics and urban communities occurred well above historical conditions, the increases were not ecologically significant.

Terrestrial community transitions within the Southern Cascades ERU were dominated by increases in both late-seral single-layered montane and late-seral multi-layered montane forest communities which affected nearly nine and eight percent of the ERU, respectively (Table 23, Jones 1996). The increase of the late-seral single-layered montane forest type was derived predominantly from late-seral single-layered and mid-seral lower montane forest, and the mid-seral montane forest communities, whereas the increase in the late-seral multi-layered montane forest type occurred at the expense of mid-seral subalpine forest, and mid-, early-, and late-seral single-layered montane forest types. The nine percent areal decline of the late-seral single-layered lower montane forest community was primarily attributable to a transition to the mid-seral lower montane forest type. Successional processes were largely responsible for the observed decreases in mid-seral subalpine and montane forest communities. Nearly one-half of the mid-seral subalpine forest type changed into the late-seral multi-layered montane forest community, although 24 percent was converted into the early-seral montane forest community. The decline of the mid-seral montane forest community was dominated by an increase of the late-seral multi-layered montane forest type. Changes of non-forest communities were dominated by the agricultural conversion of approximately 60 percent of the upland shrubland community.

As a group, late-seral forest communities increased from approximately 30 to 35 percent of the Southern Cascades ERU (Table 22). The net change of late-seral forest communities was dominated by the increase of multi-layered communities, as the decline with single-layer communities was insignificant. The areal extent of early-seral also increased, whereas the area of mid-seral forest communities decreased.

Upper Clark Fork ERU

The richness of terrestrial communities increased from 18 to 19 community types between historical and current periods (Table 24). During this time interval, three anthropogenic communities (agriculture, exotics, and urban) were added, while two communities (late-seral single-layered montane and late-seral single-layered lower montane forest) were eliminated.

Of the 21 communities detected within the Upper Clark Fork ERU, the areal extents of only the alpine, rock/barren, and water types occurred within their historical mid ranges during the current period (Table 24). The majority of the terrestrial communities had ecologically significant class (67 percent) and landscape trends (62 percent). Seven of eight communities which had significantly declining class trends decreased by more than 80 percent.

With the exception of the late-seral single-layered subalpine forest community, all late-seral forest communities declined by more than 90 percent (the late-seral single-layered montane and lower montane forest communities disappeared completely; Table 24). As a group, the areal extent of late-seral forest communities declined from 15 to one percent of the Upper Clark Fork ERU. Conversely, mid-seral lower montane and subalpine forest increased by more 150 percent. The structures of broadscale forest communities became more homogenized between historical and current periods. A net loss of early- and late-seral forest communities affected seven and 15 percent of the ERU,, respectively. Conversely, the net increase of mid-seral forest communities occurred across nearly 28 percent of the Upper Clark Fork ERU.

Transitions within the Upper Clark Fork ERU were dominated by the 73 percent decline of the upland herbland community (Table 25, Jones 1996). Agricultural conversion and encroaching lower montane and montane forest communities were each responsible for nearly a 33 percent areal reduction of the upland herbland type. Transitions to mid-seral subalpine, mid-seral lower montane, and mid-seral montane forest communities occurred on approximately 11, 11, and nine percent of the ERU, respectively. The areal extent of the mid-seral lower montane forest community increased by the encroachment into the upland herbland community, and the loss of large-diameter trees from the late-seral single-layered lower montane forest community. The mid-seral subalpine forest community increased via transitions from early- and mid-seral montane forest types. The increase of the mid-seral montane forest type was derived predominantly from the successional development of the early-seral montane forest community, as well as from the loss of large-diameter trees in the late-seral multi-layered montane forest type.

Upper Klamath ERU

The richness of terrestrial communities increased from 18 to 20 communities between historical and current periods (Table 26). During this time interval, three anthropogenic communities (agriculture, exotics, and urban) developed, while the mid-seral subalpine community was eliminated.

Of the 21 terrestrial communities detected within the Upper Klamath ERU, four types (alpine, late-seral single-layered lower montane forest, rock/barren, and water) occurred within their historical mid ranges during the current period (Table 26). Ecologically significant class and landscape trends were detected for 12 and 11 terrestrial communities, respectively. Two community types (early-seral lower montane forest and mid-seral subalpine forest) were virtually eliminated, and the areal extents of three others (early-seral subalpine forest, upland herbland, and upland shrubland) declined by more than 75 percent. Conversely, the areal extents of the late-seral single- and multi-layered montane forest communities increased by over 1600 percent, and the upland woodland community increased by more than 100 percent. Over all, forest communities seemed to get older as we detected net areal declines of early-seral (two percent) and mid-seral (19 percent) forest communities, while late-seral forest communities increased across 27 percent of the Upper Klamath ERU.

Although the late-seral single-layered lower montane forest community declined across three percent of the Upper Klamath ERU, its areal extent during the current period still existed within its historical mid range (Table 26). Consequently, we did not regard the change as ecologically significant. Similarly, the substantial departures that were detected with the exotics, late-seral single-layered subalpine forest, and urban communities were also not ecologically significant, as none of these communities comprised substantial proportions of the Upper Klamath ERU.

Terrestrial community transitions within the Upper Klamath ERU were dominated by the progression of young to older forests, and the development of more complex structures (e.g., single-layered to multi-layered stands). Species composition also changed substantially. The increase of late-seral montane forest communities were dominated by the conversion of lower montane forest types (Table 27, Jones 1996). More specifically, the increase of the late-seral multi-layered montane forest community was derived largely from late-seral single-layered and mid-seral lower montane forest types, and to a lesser degree by the development of the mid-seral montane forest community. Similarly, the increase of the late-seral single-layered montane forest community was dominated by the development of mid-seral and late-seral single-layered lower montane forest communities. More complex structures also developed in lower montane forest communities. Non-forested communities were dominated by transitions into upland woodland or lower montane forest types. Of the 95 percent decline of the upland herbland community, 34 percent developed into lower montane forest communities and 19 percent was transformed into the upland woodland type. Nearly 32 percent of the upland herbland community was converted by agricultural development.

Upper Snake ERU

The richness of terrestrial communities declined from 16 to 14 communities between historical and current periods (Table 28). Although three anthropogenic communities (agriculture, exotics, and urban) developed during this time interval, five endemic community types (early-seral lower montane forest, early-seral subalpine forest, late-seral multi-layered montane forest, late-seral multi-layered lower montane forest, and late-seral multi-layered subalpine forest) were eliminated.

Ecologically significant class and landscape trends occurred between historical and current periods for 10 and four communities, respectively

(Table 28). Although, five community types were completely eliminated, in sum, they only accounted for an approximate 0.1 percent change of the Upper Snake ERU. Changes of two communities dominated the compositional alteration of the ERU. Agriculture conversion occurred across 33 percent of the landscape, whereas the areal decline of the upland shrubland community occurred throughout 46 percent of the Upper Snake ERU.

Of the 19 terrestrial communities that were detected within the Upper Snake ERU, five (alpine, late-seral single-layered montane forest, late-seral single-layered lower montane forest, mid-seral montane forest, and water) occurred within their historical mid range during the current period (Table 28). The substantial class trends observed with the late-seral single-layered montane forest (-54 percent), late-seral single-layered lower montane forest (73 percent), and mid-seral montane forest (118 percent) communities seemed to be within the historical norm as all of the communities occurred within their historical mid ranges during the current period.

Terrestrial community transitions within the Upper Snake ERU were dominated by the 46 percent decline of the upland shrubland community, and the conversion of a large proportion (36 percent) of the ERU to agriculture (Table 29, Jones 1996). In addition to agricultural conversion, the uplands shrubland community was also extensively invaded by exotics.

DISCUSSION

As expected, the changes of broadscale terrestrial community types did not occur uniformly throughout the ICRB. By the nature of its geographic extent, and variation in geologic history and climatic regimes, the diversity of biophysical environments within the ICRB is inherently complex (Jensen and others 1996). Consequently, so to is the variation of disturbance regimes (natural and human influenced (Long and others 1996) and subsequent composition of potential vegetation types (Hann and Jones 1996). Only three ERUs (Lower Clark Fork, Owyhee Uplands, and Upper Snake) essentially reflected the same changes of terrestrial communities that we observed for the ICRB as a whole. With the exception of as many as four community types, the pattern of terrestrial community departures within nine ERUs approximated those of the ICRB. However, the vegetation changes that we observed within the Upper Klamath ERU were very dissimilar to those observed for the ICRB. The greatest variation in trends of a single community type among the 13 ERUs occurred with the mid-seral subalpine forest community. The current area of this community occurred well below its historical mid range within four ERUs, well above its historical mid range in eight ERUs, and occurred within its historic mid range within one ERU. Other terrestrial community types having a relatively wide variation of departure indices among the ERUs included the early-seral montane forest, early-seral subalpine forest, late-seral multi-layered forest, late-seral single-layered montane forest, and upland woodland types. Conversely, there was virtually no variation of departure indices of nine terrestrial communities (agriculture, alpine, early-seral lower montane forest, mid-seral lower montane forest, rock/barren, upland herbland, urban, and water) among the 13 ERUs and the ICRB.

Over the period of the last 100 to 150 years, disturbances within forest communities favored the development of mid-seral forest communities at the expense of both late-seral forest, and to a lesser degree, early-seral forest communities. A net increase of mid-seral forest communities, and net declines of early- and late-seral forest communities was detected for the ICRB as a whole, as well as within the Lower Clark Fork, Upper Clark Fork, and Northern Glaciated Mountains ERUs. These changes were most likely a consequence of both fire suppression and timber harvest activities throughout the assessment area. Timber harvest reduced the areal extent of late-seral forest communities, while fire suppression limited the recruitment of early-seral forest communities. Apparently, harvest activities resulting in early-seral forest communities has not kept pace with the successional rates of change of younger stands. Consequently, the distribution of seral communities within forested environments is currently much more dominated by middle-aged forests, than it had been historically.

Over all, the relative magnitude of change we detected in lower montane forest communities was greater than that observed within subalpine forest communities. Natural disturbance frequencies within lower montane communites are typically greater than those of subalpine environments (Long and others 1996). Successional rates of change occur more slowly in subalpine environments. Consequently, the effect of altering those disturbance regimes accrue much faster in lower montane environments. In addition, human settlement patterns tend to concentrate in lower, more hospitable environments. Thus, the direct and indirect effects of human occupancy also tend to be oriented around lower montane communities. Agricultural development, grazing, fire suppression, and timber harvest have all had significantly greater impacts over relatively longer time periods on lower montane forests as compared to subalpine forests.

Through the use of continuous broadscale data, our assessment of vegetation dynamics within the ICRB provided a different context of ICRB ecosystems when compared to Hessburg and others' (1996) midscale assessment, which used finer-grained, but sampled data, to assess more recent historical changes. Inherent tradeoffs exist in regards to broad, but shallow assessments, versus a deeper, sampled data set of finer-resolution information. Rarer landscape elements are generally more readily detected using finer-grained techniques (Turner and others 1989). However finer-resolution data is much more costly to obtain and analyze. In addition, fine-grained historical data are often not available for comparative analyses with current data, or at least, only readily available for more recent time frames. Consequently, assessments of change across longer temporal periods may not be feasible with fine-grained data.

We were able to make some comparisons at the ERU level of our broadscale vegetation trends to the midscale vegetation trends reported by Hessburg and others (1996). Variables used in the midscale assessment which approximated some of our terrestrial communities, or further aggregation of terrestrial communities, included three physiognomic types (woodland, shrubland, and herbland), the ponderosa pine cover type, and three forest structural classes (stand initiation, old multi-story, and old single-story). These midscale variables were comparable to our upland woodland, upland shrubland, and upland herbland terrestrial communities, and aggregations of four lower montane forest communities, three early-seral forest communities, three late-seral multi-layered forest communities, and three late-seral single-layered forest communities, respectively. As expected, there were some discrepancies between the two data sets. However, considering the two analyses were conducted at different resolutions (1-km^2 and 4-ha for broadscale and midscale, respectively) and assessed trends across different time periods (approximately 100 to 150 years versus the past 30 to 70 years for broadscale and midscale, respectively), the conclusions were remarkably similar. The most frequent discrepencies involved vegetation types for which we observed significant trends, whereas the midscale assessment did not. These discrepencies commonly occurred with the forest structural types within the Lower Clark Fork, Upper Clark Fork and Northern Glaciated Mountains ERUs, and the wood and shrub physiognomic types within the Northern Cascades, Northern Glaciated Mountains, Upper Clark Fork, and Upper Klamath ERUs. In respect to forest structural types, we likely detected trends because our assessment period included the occurrence of the expansive wild fires that occurred throughout the Lower Clark Fork, Upper Clark Fork, and Northern Glaciated Mountains ERUs during the early 1900s - prior to the assessment period used in the midscale assessment. The apparent discrepencies with the wood and shrub physiognomic types may be attributable to differences in the resolution and/or the time periods for which trends were assessed. Conflicting trends (i.e., in which the broadscale and midscale assessments detected opposite trends) most commonly involved the upland herbland terrestrial community and herbland physiognomic types. We detected significant declines of the upland herbland community within 12 of 13 ERUs, whereas Hessburg and others (1996) detected positive trends of the herbland physiognomic type within five ERUs, and no significant change of this type within four ERUs. However, these differences in trend are not unexpected since the midscale's herbland physiognomic types included exotics and irrigated pasture cover types, whereas the broadscale upland herbland community type excluded these cover types. Conflicting trends also occurred with the old multi-story structural class and the late-seral multi-layered forest communites in the Blue Mountains ERU, the stand initiation structural class and early-seral forest communities in the Central Idaho Mountains ERU, the woodland physiognomic type and the upland woodland community in the Snake Headwaters ERU, and the ponderosa pine cover type and lower montane forest communities in the Southern Cascades and Upper Clark Fork ERUs. At this time, we are unable to establish rational hypotheses regarding the factors responsible for these conflicting trends.

We commonly detected substantial trends of terrestrial community types between historical and current periods which apparently occurred within the expected range of historical variation. Thus, major compositional changes of at least some broadscale communities was apparently the norm, rather than the exception. Only by grounding observed changes to some historical range of conditions, can the ecological consequences of change be fully understood.

Broadscale assessments may provide important context across large geographic areas, but by default, lack the necessary resolution to address finescale processes, or the persistence of biota which rely upon fine-scale structures. Because of the coarse resolution inherent with broadscale assessments, many issues may not be adequately addressed and will require an additional assessment conducted at a finer resolution. Landscape elements that occur in small to medium-sized patches are commonly overlooked, or underestimated with coarse resolution data (Turner and others 1989). For example, we were unable to accurately assess trends of riparian vegetation types which most commonly occur as small patches or narrow stringers. Similar, 1-km^2 resolution may not be suitable to adequately assess forest structural classes, and particularly non-forest structures, as they were defined in the midscale and broadscale assessments of the ICRB.

Inherent to any scale of assessment, is the need to summarize data to some geographic unit. For this analysis, we chose to summarize broadscale community composition and trends at the ERU and ICRB levels. We do not imply that our observations are consistent at various scales. In fact, we detected spatial variation of vegetation changes at the ERU level which were not consistent with those observed for the ICRB as a whole. Furthermore, our transition matrices indicated that variation also occurred within an ERU. Some pixels of a particular community type stayed the same between historical and current periods. Other pixels of that community type were converted to another community type, while pixels of other types changed into the community that we were concerned with. Consequently, the trends we observed at the ERU level should not be interpreted as meaning a consistent trend occurred everywhere throughout the ERU where a particular community exists.

SUMMARY

With few exceptions, we detected significant changes of broadscale vegetation types across the ICRB between historical and current periods. Only three terrestrial community types did not change - alpine, rock/barren, and water. As groups, the areal extent of late-seral forest communities (single- and multi-layered), and to a lesser extent early-seral forest communities, declined significantly within the ICRB, whereas the extent of mid-seral forest communities increased. When considered in their entirety, the areal extents of lower montane forest communities decreased, montane forest communities increased, and subalpine forest communities stayed about the same. A substantial change in composition also occurred in non-forest environments: the agriculture, exotics, and upland woodland communities increased, whereas the upland herbland and upland shrubland communities declined significantly within the ICRB.

The compositional changes within ERUs did not always reflect the observed trends for the ICRB as a whole. Although significant declines in late-seral single-layered forest communities were detected in eight ERUs, no trends were observed in five ERUs (Northern Great Basin, Owyhee Uplands, Snake Headwaters, Southern Cascades, and Upper Snake), and the Upper Klamath ERU actually had an increasing trend. Changes of the late-seral multi-layered forests as a group were much more variable among ERUs; significant declines occurred in five ERUs (Lower Clark Fork, Northern Cascades, Northern Glaciated, Snake Headwaters, and Upper Clark Fork), significant increases in five ERUs (Blue Mountains, Central Idaho Mountains, Northern Great Basin, Southern Cascades, and Upper Klamath), and no substantial trend in three ERUs (Columbia Plateau, Owyhee Uplands, and Upper Snake). Mid-seral forest communities increased within nine ERUS, whereas early-seral forest types decreased within six of 13 ERUs). With few exceptions, we detected significant declines in extent of the upland herbland and upland shrubland communities across all ERUs. Changes in areas of the upland woodland community was more variable among ERUs.

LITERATURE CITED

Hann, Wendel J; Jones, Jeffrey L. 1996. Broadscale processes of vegetation and site change in the Basin. In: Keane, Robert E.; Jones, Jeffrey L.; Riley, Laurienne S.; Hann, Wendel J., tech. eds. 1996. Multi-scale landscape dynamics in the Interior Columbia Basin and Portions of the Klamath and Great Basins. Gen. Tech. Rpt. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station.

Hessburg and others. 1996. Historic and current patterns of mid scale landscapes in the Interior Columbia Basin and Portions of the Klamath and Great Basins. Gen. Tech. Rpt. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station.

Jensen, Mark;etc. 1996. Biophysical environments of the Basin. In: Quigley, Thomas M.; Arbelbide, S.J., tech. eds. An assessment of ecosystem components in the Interior Columbia Basin and portions of the Klamath and Great Basins. Gen. Tech. Rpt. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station; (Quigley, Thomas M., tech. ed. The Interior Columbia Basin Ecosystem Management Project: Scientific Assessment).

Jones, Jeffrey L. 1996. Transition matrices data file. In: Hann, Wendel J.; Long, Donald; Menakis, James P.; Jones, Jeffrey L.; Gravenmier, Rebecca;

Keane, Robert E; Hessburg, Paul E.; Jensen, Mark E.; Riley, Laurienne. 1996. Landscape ecology assessment and evaluation of alternatives data analysis record. Report on file with Interior Columbia Basin Ecosystem Management Project, USDA Forest Service and USDI Bureau of Land Management.

Jones, Jeffrey L.; Hessburg, Paul F.; Smith, Bradley G. 1996. Broadscale vegetation departures within subbasins of the Interior Columbia River Basin. In: Keane, Robert E.; Jones, Jeffrey L.; Riley, Laurienne S.; Hann, Wendel J., tech. eds. 1996. Multi-scale landscape dynamics in the Interior Columbia Basin and Portions of the Klamath and Great Basins. Gen. Tech. Rpt. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. (Quigley, Thomas M., tech. ed. The Interior Columbia Basin Ecosystem Management Project: Scientific Assessment).

Keane Robert E. 1996. Simulating course-scale vegetation dynamics using the Columbia River Basin succession model -- CRBSUM. In: Keane, Robert E.; Jones, Jeffrey L.; Riley, Laurienne S.; Hann, Wendel J., tech. eds. 1996. Multi-scale landscape dynamics in the Interior Columbia Basin and Portions of the Klamath and Great Basins. Gen. Tech. Rpt. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. (Quigley, Thomas M., tech. ed. The Interior Columbia Basin Ecosystem Management Project: Scientific Assessment).

Lesica, P.; Shelly, J.S. 1991. Sensitive, threatened and endangered vascular plants of Montana. Montana Natural Heritage Program, Occasional Publ. No. 1. Helena, MT. 88p.

Long, Donald; Peterson, Bill; Hann, Wendel. 1996. Development of management prescriptions for modeling disturbance regimes and succession in the Interior Columbia River Basin. In: Keane, Robert E.; Jones, Jeffrey L.; Riley, Laurienne S.; Hann, Wendel J., tech. eds. 1996. Multi-scale landscape dynamics in the Interior Columbia Basin and Portions of the Klamath and Great Basins. Gen. Tech. Rpt. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. (Quigley, Thomas M., tech. ed. The Interior Columbia Basin Ecosystem Management Project: Scientific Assessment).

Menakis, James P.; Long, Donald; Keane, Robert E. 1996. The development of key broadscale layers and characterization files. In: Keane, Robert E.; Jones, Jeffrey L.; Riley, Laurienne S.; Hann, Wendel J., tech. eds. 1996. Multi-scale landscape dynamics in the Interior Columbia Basin and Portions of the Klamath and Great Basins. Gen. Tech. Rpt. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. (Quigley, Thomas M., tech. ed. The Interior Columbia Basin Ecosystem Management Project: Scientific Assessment).

Turner, M.G.; O'Neill, R.V.; Garner, R.H.; Milne, B.T. 1989. Effects of changing spatial scale on the analysis of landscape pattern. Landscape Ecology. 3:153-163.

Figure Captions

Figure 1--Ecological Reporting Units (ERUs) within the Interior Columbia River Basin (ICRB).

Figure 2--Relationship between current areal extent of terrestrial community types and their respective historical ranges.

Table Captions

Table 1.--Terrestrial community departure classes.

Table 2.--Changes of broadscale terrestrial communities between historical and current periods within the Interior Columbia River Basin.

Table 3--Dominant transitions of terrestrial communities within the Interior Columbia River Basin.

Table 4--Changes of broadscale terrestrial communities between historical and current periods within the Blue Mountains Ecological Reporting Unit of the Interior Columbia River Basin.

Table 5--Dominant transitions of terrestrial communities within the Blue Mountains Ecological Reporting Unit of the Interior Columbia River Basin.

Table 6--Changes of broadscale terrestrial communities between historical and current periods within the Central Idaho Mountains Ecological Reporting Unit of the Interior Columbia River Basin.

Table 7--Dominant transitions of terrestrial communities within the Central

Idaho Mountains Ecological Reporting Unit of the Interior Columbia River Basin.

Table 8--Changes of broadscale terrestrial communities between historical and current periods within the Columbia Plateau Ecological Reporting Unit of the Interior Columbia River Basin.

Table 9--Dominant transitions of terrestrial communities within the Columbia Plateau Ecological Reporting Unit of the Interior Columbia River Basin.

Table 10--Changes of broadscale terrestrial communities between historical and current periods within the Lower Clark Fork Ecological Reporting Unit of the Interior Columbia River Basin.

Table 11--Dominant transitions of terrestrial communities within the Lower Clark Fork Ecological Reporting Unit of the Interior Columbia River Basin.

Table 12--Changes of broadscale terrestrial communities between historical and current periods within the Northern Cascades Ecological Reporting Unit of the Interior Columbia River Basin.

Table 13--Dominant transitions of terrestrial communities within the Northern Cascades Ecological Reporting Unit of the Interior Columbia River Basin.

Table 14--Changes of broadscale terrestrial communities between historical and current periods within the Northern Glaciated Mountains Ecological Reporting

Unit of the Interior Columbia River Basin.

Table 15--Dominant transitions of terrestrial communities within the Northern Glaciated Mountains Ecological Reporting Unit of the Interior Columbia River Basin.

Table 16--Changes of broadscale terrestrial communities between historical and current periods within the Northern Great Basin Ecological Reporting Unit of the Interior Columbia River Basin.

Table 17--Dominant transitions of terrestrial communities within the Northern Great Basin Ecological Reporting Unit of the Interior Columbia River Basin.

Table 18--Changes of broadscale terrestrial communities between historical and current periods within the Owyhee Uplands Ecological Reporting Unit of the Interior Columbia River Basin.

Table 19--Dominant transitions[1] of terrestrial communities within the Owyhee Uplands Ecological Reporting Unit of the Interior Columbia River Basin.

Table 20--Changes of broadscale terrestrial communities within the Snake Headwaters Ecological Reporting Unit of the Interior Columbia River Basin.

Table 21--Dominant transitions of terrestrial communities within the Snake Headwaters Ecological Reporting Unit of the Interior Columbia River Basin.

Table 22--Changes of broadscale terrestrial communities within the Southern Cascades Ecological Reporting Unit of the Interior Columbia River Basin.

Table 23--Dominant transitions of terrestrial communities within the Southern Cascades Ecological Reporting Unit of the Interior Columbia River Basin.

Table 24--Changes of broadscale terrestrial communities within the Upper Clark Fork Ecological Reporting Unit of the Interior Columbia River Basin.

Table 25--Dominant transitions of terrestrial communities within the Upper Clark Fork Ecological Reporting Unit of the Interior Columbia River Basin.

Table 26--Changes of broadscale terrestrial communities within the Upper Klamath Ecological Reporting Unit of the Interior Columbia River Basin.

Table 27--Dominant transitions of terrestrial communities within the Upper Klamath Ecological Reporting Unit of the Interior Columbia River Basin.

Table 28--Changes of broadscale terrestrial communities within the Upper Snake Ecological Reporting Unit of the Interior Columbia River Basin.

Table 29--Dominant transitions of terrestrial communities within the Upper Snake Ecological Reporting Unit of the Interior Columbia River Basin.

Figure 1 not available

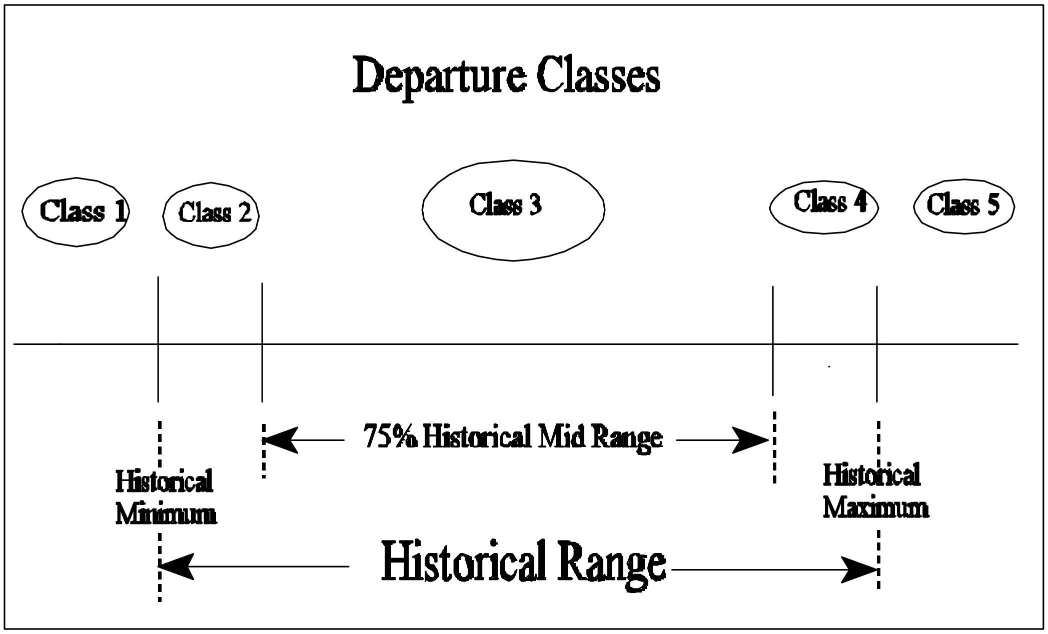

Figure 2.--Relationship between current areal extent of terrestrial community types and their respective historical ranges.

Table 1--Terrestrial community departure classes.

Departure Class	Relationship of current area to historical ranges
1	A_c[1] < Historical Minimum
2	Historical Minimum $\leq$ A_c <-75% Historical mid range
3	A_c is within 75% historical mid range
4	75% Historical mid range < A_c $\leq$ Historical Maximum
5	A_c > Historical Maximum

[1]A_c = Current area.

Table 2--Changes of broadscale terrestrial communities between historical and current periods within the Interior Columbia River Basin.

Terrestrial Community	Historical Area (%)	Current Area (%)	Class Change (%)[1]	ICRB Change (%)[2]	Departure Class[3]
Agricultural	0.00	16.06	N.A.[4]	16.06*	5*
Alpine	0.16	0.16	-0.18	-0.00	3
Early-seral Montane Forest	8.67	7.94	-8.40	-0.73	3
Early-seral Lower Montane Forest	1.10	0.26	-76.75*	-0.85	1
Early-seral Subalpine Forest	1.21	1.80	48.20*	0.58	5*
Exotics	0.00	2.06	N.A.	2.06*	5*
Late-seral Montane Multi-layer Forest	3.80	3.38	-11.18	-0.43	1*
Late-seral Montane Single-layer Forest	0.78	0.85	8.38	0.07	2
Late-seral Lower Montane Multi-layer Forest	2.16	1.42	-34.55*	-0.75	1*
Late-seral Lower Montane Single-layer Forest	5.56	1.08	-80.61*	-4.48*	1*
Late-seral Subalpine Multi-layer Forest	1.23	0.45	-63.83*	-0.79	1*
Late-seral Subalpine Single-layer Forest	0.57	0.78	36.32*	0.21	5*
Mid-seral Montane Forest	10.48	16.62	58.58*	6.14*	5*
Mid-seral Lower Montane Forest	4.91	7.52	53.03*	2.60*	5*
Mid-seral Subalpine Forest	2.72	2.70	-1.02	-0.03	4
Rock/Barren	0.24	0.24	0.00	0.00	3
Upland Herbland	14.88	4.94	-66.82*	-9.94*	1*
Upland Shrubland	36.71	25.50	-30.53*	-11.21*	1*
Upland Woodland	1.91	2.85	49.49*	0.94	5*
Urban	0.00	0.16	N.A.	0.16	5
Water	0.94	0.94	0.00	0.00	3

[1]Class change = percent change relative to the terrestrial community.
[2]ICRB change = percent change of the ICRB attributable to the terrestrial community change.
[3]Departure classes = index of current areal extent of broadscale terrestrial communities in respect to their historical ranges (see text). Classes are: (1) is < historical minimum; (2) is ≥ historical minimum but <75% historical mid range; (3) is within 75% historical mid range; (4) is >75% historical mid range and ≤ historical maximum; (5) is > historical maximum.
[4]Not applicable since the terrestrial community did not exist during the historical period.
*Ecologically significant changes.

Table 3--Dominant transitions[1] of terrestrial communities within the Interior Columbia River Basin.

Terrestry Community		
Historical Period	Current Period	Proportion of ICRB[2] Area (%)[3]
Upland Shrubland	Agricultural	9.0
Upland Herbland	Agricultural	6.6
Early-seral Montane Forest	Mid-seral Montane Forest	3.9
Mid-seral Montane Forest	Early-seral Montane Forest	2.2
Late-seral Montane Forest Multi-layer	Mid-seral Montane Forest	2.1
Upland Herbland	Upland Shrubland	2.1
Late-seral Lower Montane Forest Single-layer	Mid-seral Lower Montane Forest	1.8
Late-seral Lower Montane Forest Single-layer	Mid-seral Montane Forest	1.4
Upland Herbland	Mid-seral Lower Montane Forest	1.3
Upland Shrubland	Upland Woodland	1.3
Mid-seral Lower Montane Forest	Mid-seral Montane Forest	1.2
Upland Shrubland	Exotics	1.1
Upland Shrubland	Upland Herbland	1.0

[1]Dominant transitions were those affecting at least one percent of the landscape.
[2]ICRB = Interior Columbia River Basin
[3]Proportion of landscape affected = the area of the landscape in which a terrestrial community changed into another terrestrial community.

Table 4--Changes of broadscale terrestrial communities between historical and current periods within the Blue Mountains Ecological Reporting Unit of the Interior Columbia River Basin.

Terrestrial Community	Historical Area (%)	Current Area (%)	Class Change (%)[1]	ERU Change (%)[2]	Departure Class[3]
Agricultural	0.00	17.40	N.A.[4]	17.40*	5*
Alpine	0.28	0.28	0.00	0.00	3
Early-seral Montane Forest	9.89	12.06	21.93	2.17	3
Early-seral Lower Montane Forest	1.08	0.36	-66.73*	-0.72	1*
Early-seral Subalpine Forest	0.17	1.27	651.30*	1.10*	5*
Exotics	0.00	1.44	N.A.	1.44*	5*
Late-seral Montane Multi-layer Forest	2.10	9.31	342.38*	7.20*	5*
Late-seral Montane Single-layer Forest	0.54	1.00	86.04	0.46	3
Late-seral Lower Montane Multi-layer Forest	4.00	3.38	-15.59	-0.62	3
Late-seral Lower Montane Single-layer Forest	15.47	0.59	-96.21*	-14.88*	1*
Late-seral Subalpine Multi-layer Forest	0.38	0.55	44.05	0.17	3
Late-seral Subalpine Single-layer Forest	0.51	0.27	-46.91*	-0.24	3
Mid-seral Montane Forest	3.83	11.97	212.33*	8.13*	5*
Mid-seral Lower Montane Forest	10.04	14.72	46.68*	4.69*	5*
Mid-seral Subalpine Forest	1.02	0.19	-81.40*	-0.83	1*
Upland Herbland	24.94	7.40	-70.35*	-17.55	1*
Upland Shrubland	21.15	13.90	-34.29*	-7.25*	1*
Upland Woodland	2.70	3.09	14.29	0.39	3
Urban	0.00	0.15	N.A.	0.15	5
Water	0.28	0.28	0.00	0.00	3

[1]Class change = percent change relative to the terrestrial community.
[2]ICRB change = percent change of the ICRB attributable to the terrestrial community change.
[3]Departure classes = index of current areal extent of broadscale terrestrial communities in respect to their historical ranges (see text). Classes are: (1) is < historical minimum; (2) is ≥ historical minimum but <75% historical mid range; (3) is within 75% historical mid range; (4) is >75% historical mid range and ≤ historical maximum; (5) is > historical maximum.
[4]Not applicable since the terrestrial community did not exist during the historical period.
*Ecologically significant changes.

Table 5--Dominant transitions[1] of terrestrial communities within the Blue Mountains Ecological Reporting Unit of the Interior Columbia River Basin.

Terrestry Community		
Historic Period	Current Period	Proportion of ERU[2] Area (%)[3]
Upland Herbland	Agricultural	10.7
Upland Shrubland	Agricultural	5.6
Late-seral Lower Montane Forest Single-layer	Mid-seral Lower Montane Forest	4.3
Late-seral Lower Montane Forest Single-layer	Mid-seral Montane Forest	4.1
Late-seral Lower Montane Forest Single-layer	Late-Seral Montane Forst Multi-layer	3.5
Mid-seral Lower Montane Forest	Mid-seral Montane Forest	2.5
Mid-seral Lower Montane Forest	Late-seral Montane Forest Multi-layer	2.5
Upland Herbland	Mid-seral Lower Montane Forest	2.4
Upland Herbland	Early-seral Montane Forest	2.3
Early-seral Montane Forest	Mid-seral Lower Montane Forest	2.0
Early-seral Montane Forest	Mid-seral Montane Forest	1.7
Upland Shrubland	Mid-seral Lower Montane Forest	1.6
Upland Herbland	Upland Shrubland	1.5
Upland Woodland	Upland Herbland	1.5
Late-seral Lower Montane Forest Single-layer	Early-seral Montane Forest	1.4
Late-seral Lower Montane Forest Single-layer	Late-seral Lower Montane Forest Multi-layer	1.3
Upland Herbland	Upland Woodland	1.3
Mid-seral Montane Forest	Early-seral Montane Forest	1.3
Upland Shrubland	Upland Woodland	1.1
Late-seral Lower Montane Forest Multi-layer	Mid-seral Lower Montane Forest	1.1
Mid-seral Lower Montane Forest	Early-seral Montane Forest	1.0

[1]Dominant transitions affected at least one percent of the landscape.
[2]ERU = Ecological Reporting Unit.
[3]Proportion of landscape affected = the area of the landscape in which a terrestrial community changed into another terrestrial community.

Table 6--Changes of broadscale terrestrial communities between historical and current periods within the Central Idaho Mountains Ecological Reporting Unit of the Interior Columbia River Basin.

Terrestrial Community	Historical Area (%)	Current Area (%)	Class Change (%)[1]	ERU Change (%)[2]	Departure Class[3]
Agricultural	0.00	5.46	N.A.[4]	5.46*	5*
Alpine	0.20	0.20	0.00	0.00	3
Early-seral Montane Forest	12.82	14.99	16.96	2.17*	5*
Early-seral Lower Montane Forest	2.01	0.54	-73.25*	-1.47*	1*
Early-seral Subalpine Forest	3.47	6.76	94.53*	3.28*	5*
Exotics	0.00	1.69	N.A.	1.69*	5*
Late-seral Montane Multi-layer Forest	3.30	6.34	91.95*	3.04*	3
Late-seral Montane Single-layer Forest	1.56	0.86	-45.05*	-0.70	1*
Late-seral Lower Montane Multi-layer Forest	2.74	1.96	-28.45	-0.78	3
Late-seral Lower Montane Single-layer Forest	3.56	0.42	-88.31*	-3.14*	1*
Late-seral Subalpine Multi-layer Forest	1.95	1.94	-0.31	-0.01	1
Late-seral Subalpine Single-layer Forest	2.62	3.46	32.26*	0.84	5*
Mid-seral Montane Forest	17.88	16.73	-6.42	-1.15	3
Mid-seral Lower Montane Forest	5.84	8.47	45.06*	2.63*	5*
Mid-seral Subalpine Forest	6.79	4.86	-28.42*	-1.93*	1*
Rock/Barren	0.50	0.50	0.00	0.00	3
Upland Herbland	17.78	8.76	-50.71*	-9.01*	1*
Upland Shrubland	13.07	13.61	4.08	0.53	3
Upland Woodland	3.11	0.71	-77.21*	-2.40*	1*
Urban	0.00	0.03	N.A.	0.03	5
Water	0.20	0.20	0.00	0.00	3

[1]Class change = percent change relative to the terrestrial community.
[2]ICRB change = percent change of the ICRB attributable to the terrestrial community change.
[3]Departure classes = index of current areal extent of broadscale terrestrial communities in respect to their historical ranges (see text). Classes are: (1) is < historical minimum; (2) is ≥ historical minimum but <75% historical mid range; (3) is within 75% historical mid range; (4) is >75% historical mid range and ≤ historical maximum; (5) is > historical maximum.
[4]Not applicable since the terrestrial community did not exist during the historical period.
*Ecologically significant changes.

Table 7--Dominant transitions[1] of terrestrial communities within the Central Idaho Mountains Ecological Reporting Unit of the Interior Columbia River Basin.

Terrestry Community		
Historical Period	Current Period	Proportion of ERU[2] Area (%)[3]
Upland Herbland	Upland Shrubland	4.9
Mid-seral Montane Forest	Early-seral Montane Forest	4.5
Early-seral Montane Forest	Mid-seral Montane Forest	3.8
Upland Herbland	Agricultural	3.1
Upland Woodland	Upland Herbland	2.7
Upland Shrubland	Agricultural	2.5
Mid-seral Subalpine Forest	Early-seral Subalpine Forest	2.1
Upland Herbland	Mid-seral Lower Montane Forest	1.9
Mid-seral Montane Forest	Late-seral Montane Forest Multi-layer	1.8
Mid-seral Lower Montane Forest	Mid-seral Montane Forest	1.5
Mid-seral Montane Forest	Mid-seral Subalpine Forest	1.5
Mid-seral Montane Forest	Early-seral Subalpine Forest	1.5
Upland Herbland	Early-seral Montane Forest	1.3
Mid-seral Montane Forest	Mid-seral Lower Montane Forest	1.3
Mid-seral Subalpine Forest	Early-seral Montane Forest	1.3
Early-seral Montane Forest	Mid-seral Subalpine Forest	1.2
Mid-seral Subalpine Forest	Mid-seral Montane Forest	1.1
Late-seral Montane Forest Multi-layer	Mid-seral Montane Forest	1.0

[1]Dominant transitions affected at least one percent of the landscape.
[2]ERU = Ecological Reporting Unit.
[3]Proportion of landscape affected = the area of the landscape in which a terrestrial community changed into another terrestrial community.

Table 8--Changes of broadscale terrestrial communities between historical and current periods within the Columbia Plateau Ecological Reporting Unit of the Interior Columbia River Basin.

Terrestrial Community	Historical Area (%)	Current Area (%)	Class Change (%)[1]	ERU Change (%)[2]	Departure Class[3]
Agricultural	0.00	44.46	N.A.[4]	44.46*	5*
Alpine	0.00	0.00	0.00	0.00	3
Early-seral Montane Forest	2.22	1.58	-28.71*	-0.64	1*
Early-seral Lower Montane Forest	0.63	0.10	-84.06*	-0.53	1*
Early-seral Subalpine Forest	0.02	0.02	-28.64	-0.01	3
Exotics	0.00	2.46	N.A.	2.46*	5*
Late-seral Montane Multi-layer Forest	0.47	0.65	38.15	0.18	3
Late-seral Montane Single-layer Forest	0.04	0.13	230.15	0.09	3
Late-seral Lower Montane Multi-layer Forest	1.02	1.21	18.55	0.19	5*
Late-seral Lower Montane Single-layer Forest	3.13	0.19	-93.93*	-2.94*	1*
Late-seral Subalpine Multi-layer Forest	0.02	0.01	-78.42*	-0.02	1*
Late-seral Subalpine Single-layer Forest	0.00	0.00	35.48	0.00	5
Mid-seral Montane Forest	1.12	3.47	210.23*	2.35*	5*
Mid-seral Lower Montane Forest	2.60	6.14	136.40*	3.54*	5*
Mid-seral Subalpine Forest	0.05	0.00	-91.48*	-0.05	1*
Upland Herbland	35.15	6.71	-80.92*	-28.44*	1*
Upland Shrubland	48.55	24.03	-50.50*	-24.51	1*
Upland Woodland	3.10	7.54	143.41*	4.44*	5*
Urban	0.00	0.28	N.A.	0.28	5
Water	0.62	0.62	0.00	0.00	3

[1]Class change = percent change relative to the terrestrial community.
[2]ICRB change = percent change of the ICRB attributable to the terrestrial community change.
[3]Departure classes = index of current areal extent of broadscale terrestrial communities in respect to their historical ranges (see text). Classes are: (1) is < historical minimum; (2) is ≥ historical minimum but <75% historical mid range; (3) is within 75% historical mid range; (4) is >75% historical mid range and ≤ historical maximum; (5) is > historical maximum.
[4]Not applicable since the terrestrial community did not exist during the historical period.
*Ecologically significant changes.

Table 9--Dominant transitions[1] of terrestrial communities within the Columbia Plateau Ecological Reporting Unit of the Interior Columbia River Basin.

Terrestry Community		
Historical Period	Current Period	Proportion of ERU[2] Area (%)[3]
Upland Shrubland	Agricultural	23.0
Upland Herbland	Agricultural	23.0
Upland Herbland	Upland Shrubland	4.2
Upland Shrubland	Upland Woodland	3.9
Late-seral Lower Montane Forest Single-layer	Mid-seral Lower Montane Forest	1.5
Upland Herbland	Mid-seral Lower Montane Forest	1.2
Early-seral Montane Forest	Mid-seral Montane Forest	1.0

[1]Dominant transitions affected at least one percent of the landscape.
[2]ERU = Ecological Reporting Unit.
[3]Proportion of landscape affected = the area of the landscape in which a terrestrial community changed into another terrestrial community.

Table 10--Changes of broadscale terrestrial communities between historical and current periods within the Lower Clark Fork Ecological Reporting Unit of the Interior Columbia River Basin.

Terrestrial Community	Historical Area (%)	Current Area (%)	Class Change (%)[1]	ERU Change (%)[2]	Departure Class[3]
Agricultural	0.00	3.24	N.A.[4]	3.24*	5*
Early-seral Montane Forest	26.24	15.10	-42.46*	-11.14*	2*
Early-seral Lower Montane Forest	3.77	0.03	-99.12*	-3.74*	1*
Early-seral Subalpine Forest	5.64	1.50	-73.35	-4.14	3
Exotics	0.00	0.00	0.00	0.00	5
Late-seral Montane Multi-layer Forest	12.74	1.19	-90.70*	-11.56*	1*
Late-seral Montane Single-layer Forest	0.57	0.46	-20.01*	-0.11	1*
Late-seral Lower Montane Multi-layer Forest	3.57	0.00	-100.00*	-3.57*	1*
Late-seral Lower Montane Single-layer Forest	6.93	0.00	-100.00*	-6.93*	1*
Late-seral Subalpine Multi-layer Forest	0.75	0.04	-95.05*	-0.71	1*
Late-seral Subalpine Single-layer Forest	0.10	0.06	-38.44	-0.04	3
Mid-seral Montane Forest	28.61	64.11	124.08*	35.50*	5*
Mid-seral Lower Montane Forest	6.86	7.08	3.18*	0.22	3
Mid-seral Subalpine Forest	1.81	5.69	214.49*	3.88*	5*
Upland Herbland	1.49	0.29	-80.69*	-1.20*	1*
Upland Shrubland	0.00	0.00	0.00	0.00	1
Upland Woodland	0.03	0.00	-100.00*	-0.03	1*
Urban	0.00	0.15	N.A.	0.15	5*
Water	0.84	0.84	0.00	0.00	3

[1]Class change = percent change relative to the terrestrial community.
[2]ICRB change = percent change of the ICRB attributable to the terrestrial community change.
[3]Departure classes = index of current areal extent of broadscale terrestrial communities in respect to their historical ranges (see text). Classes are: (1) is < historical minimum; (2) is ≥ historical minimum but <75% historical mid range; (3) is within 75% historical mid range; (4) is >75% historical mid range and ≤ historical maximum; (5) is > historical maximum.
[4]Not applicable since the terrestrial community did not exist during the historical period.
*Ecologically significant changes.

Table 11--Dominant transitions[1] of terrestrial communities within the Lower Clark Fork Ecological Reporting Unit of the Interior Columbia River Basin.

Terrestrial Community		
Historic Period	Current Period	Proportion of ERU[2] Area (%)[3]
Early-seral Montane Forest	Mid-seral Montane Forest	18.7
Late-seral Montane Forest Multi-layer	Mid-seral Montane Forest	9.4
Mid-seral Montane Forest	Early-seral Montane Forest	5.1
Mid-seral Lower Montane Forest	Mid-seral Montane Forest	4.2
Late-seral Lower Montane Forest Single-layer	Mid-seral Montane Forest	3.9
Early-seral Lower Montane Forest	Mid-seral Montane Forest	2.3
Late-seral Lower Montane Forest Multi-layer	Mid-seral Montane Forest	2.2
Late-seral Montane Forest Multi-layer	Early-seral Montane Forest	2.0
Late-seral Lower Montane Forest Single-layer	Mid-seral Lower Montane Forest	2.0
Early-seral Subalpine Forest	Mid-seral Subalpine Forest	2.0
Early-seral Subalpine Forest	Mid-seral Montane Forest	1.5
Mid-seral Montane Forest	Mid-seral Subalpine Forest	1.5
Early-seral Subalpine Forest	Early-seral Montane Forest	1.4
Early-seral Montane Forest	Mid-seral Subalpine Forest	1.0

[1]Dominant transitions affected at least one percent of the landscape.
[2]ERU = Ecological Reporting Unit.
[3]Proportion of landscape affected = the area of the landscape in which a terrestrial community changed into another terrestrial community.

Table 12--Changes of broadscale terrestrial communities between historical and current periods within the Northern Cascades Ecological Reporting Unit of the Interior Columbia River Basin.

Terrestrial Community	Historical Area(%)	Current Area (%)	Class Change (%)[1]	ERU Change (%)[2]	Departure Class [3]
Agricultural	0.00	6.24	N.A.[4]	6.24*	5*
Alpine	0.95	0.95	0.00	0.00	3
Early-seral Montane Forest	12.53	23.45	87.15*	10.92*	5*
Early-seral Lower Montane Forest	0.53	1.70	222.20	1.17	3
Early-seral Subalpine Forest	1.10	3.82	248.41*	2.72*	5*
Exotics	0.00	0.20	N.A.	0.20	5
Late-seral Montane Multi-layer Forest	7.75	9.02	16.42	1.27*	3
Late-seral Montane Single-layer Forest	1.49	1.42	-4.96	-0.07	3
Late-seral Lower Montane Multi-layer Forest	4.17	1.43	-65.79*	-2.75*	1*
Late-seral Lower Montane Single-layer Forest	12.01	0.52	-95.65*	-11.48*	1*
Late-seral Subalpine Multi-layer Forest	2.11	0.53	-75.00*	-1.58*	1*
Late-seral Subalpine Single-layer Forest	0.37	0.15	-59.38*	-0.22	1*
Mid-seral Montane Forest	22.56	23.28	3.22	0.73	3
Mid-seral Lower Montane Forest	8.06	15.61	93.66*	7.55*	5*
Mid-seral Subalpine Forest	11.03	4.28	-61.19*	-6.75*	1*
Upland Herbland	5.56	2.20	-60.52*	-3.37*	1*
Upland Shrubland	7.47	1.92	-74.37*	-5.56*	1*
Upland Woodland	1.18	2.05	73.60*	0.87	5*
Urban	0.00	0.11	N.A.	0.11	5
Water	1.05	1.05	0.00	0.00	3

[1]Class change = percent change relative to the terrestrial community.
[2]ICRB change = percent change of the ICRB attributable to the terrestrial community change.
[3]Departure classes = index of current areal extent of broadscale terrestrial communities in respect to their historical ranges (see text). Classes are: (1) is < historical minimum; (2) is ≥ historical minimum but <75% historical mid range; (3) is within 75% historical mid range; (4) is >75% historical mid range and ≤ historical maximum; (5) is > historical maximum.
[4]Not applicable since the terrestrial community did not exist during the historical period.
*Ecologically significant changes.

Table 13--Dominant transitions[1] of terrestrial communities within the Northern Cascades Ecological Reporting Unit of the Interior Columbia River Basin.

Terrestrial Community		
Historical Period	Current Period	Proportion of ERU[2] Area (%)[3]
Mid-seral Montane Forest	Early-seral Montane Forest	8.7
Late-seral Lower Montane Forest Single-layer	Mid-seral Lower Montane Forest	5.2
Mid-seral Subalpine Forest	Early-seral Montane Forest	4.4
Early-seral Montane Forest	Mid-seral Montane Forest	4.0
Upland Herbland	Agricultural	3.3
Late-seral Montane Forest Multi-layer	Mid-seral Montane Forest	3.1
Late-seral Montane Forest Multi-layer	Early-seral Montane Forest	2.9
Upland Shrubland	Agricultural	2.9
Mid-seral Montane Forest	Late-seral Montane Forest Multi-layer	2.5
Late-seral Lower Montane Forest Single-layer	Mid-seral Montane Forest	2.4
Mid-seral Subalpine Forest	Early-seral Subalpine Forest	2.3
Early-seral Montane Forest	Mid-seral Lower Montane Forest	2.2
Mid-seral Subalpine Forest	Mid-seral Montane Forest	2.0
Late-seral Lower Montane Forest Multi-layer	Mid-seral Lower Montane Forest	2.0
Mid-seral Montane Forest	Mid-seral Subalpine Forest	1.9
Mid-seral Lower Montane Forest	Mid-seral Montane Forest	1.6
Upland Shrubland	Mid-seral Lower Montane Forest	1.4
Late-seral Lower Montane Forest Single-layer	Late-seral Montane Forest Multi-layer	1.4
Early-seral Montane Forest	Late-seral Montane Forest Multi-layer	1.4
Mid-seral Subalpine Forest	Late-seral Montane Forest Multi-layer	1.0

[1]Dominant transitions affected at least one percent of the landscape.
[2]ERU = Ecological Reporting Unit.
[3]Proportion of landscape affected = the area of the landscape in which a terrestrial community changed into another terrestrial community.

Table 14--Changes of broadscale terrestrial communities between historical and current periods within the Northern Glaciated Mountains Ecological Reporting Unit of the Interior Columbia River Basin.

Terrestrial Community	Historical Area (%)	Current Area (%)	Class Change (%)[1]	ERU Change (%)[2]	Departure Class[3]
Agricultural	0.00	11.75	N.A.[4]	11.75*	5*
Early-seral Montane Forest	17.79	11.42	-35.80*	-6.37*	1*
Early-seral Lower Montane Forest	2.13	0.32	-85.22*	-1.82*	1*
Early-seral Subalpine Forest	2.27	1.30	-42.98*	-0.98	1*
Exotics	0.00	0.09	N.A.	0.09	5
Late-seral Montane Multi-layer Forest	12.10	1.14	-90.55*	-10.96*	1*
Late-seral Montane Single-layer Forest	1.96	0.01	-99.27*	-1.94*	1*
Late-seral Lower Montane Multi-layer Forest	3.08	0.11	-96.41*	-2.97*	1*
Late-seral Lower Montane Single-layer Forest	7.95	0.05	-99.31*	-7.90*	1*
Late-seral Subalpine Multi-layer Forest	3.34	0.05	-98.58*	-3.29*	1*
Late-seral Subalpine Single-layer Forest	0.56	1.41	153.72*	0.86	5*
Mid-seral Montane Forest	18.81	46.05	144.85*	27.24*	5*
Mid-seral Lower Montane Forest	7.34	13.45	83.30*	6.11*	5*
Mid-seral Subalpine Forest	4.58	5.90	28.63*	1.31*	5*
Rock/Barren	0.01	0.01	0.00	0.00	3
Upland Herbland	9.33	1.53	-83.59*	-7.80*	1*
Upland Shrubland	6.01	1.30	-78.35*	-4.71*	1*
Upland Woodland	0.25	1.34	437.03	1.09	3
Urban	0.00	0.29	N.A.	0.29	5
Water	2.36	2.36	0.00	0.00	3

[1]Class change = percent change relative to the terrestrial community.
[2]ICRB change = percent change of the ICRB attributable to the terrestrial community change.
[3]Departure classes = index of current areal extent of broadscale terrestrial communities in respect to their historical ranges (see text). Classes are: (1) is < historical minimum; (2) is ≥ historical minimum but <75% historical mid range; (3) is within 75% historical mid range; (4) is >75% historical mid range and ≤ historical maximum; (5) is > historical maximum.
[4]Not applicable since the terrestrial community did not exist during the historical period.
*Ecologically significant changes.

Table 15--Dominant transitions[1] of terrestrial communities within the Northern Glaciated Mountains Ecological Reporting Unit of the Interior Columbia River Basin.

Terrestrial Community		
Historical Period	Current Period	Proportion of ERU[2] Area (%)[3]
Early-seral Montane Forest	Mid-seral Montane Forest	10.3
Late-seral Montane Forest Multi-layer	Mid-seral Montane Forest	8.7
Upland Herbland	Agricultural	4.2
Upland Shrubland	Agricultural	3.8
Late-seral Lower Montane Forest Single-layer	Mid-seral Montane Forest	3.4
Late-seral Lower Montane Forest Single-layer	Mid-seral Lower Montane Forest	3.2
Mid-seral Lower Montane Forest	Mid-seral Montane Forest	3.1
Mid-seral Montane Forest	Early-seral Montane Forest	2.9
Upland Herbland	Mid-seral Lower Montane Forest	2.4
Late-seral Montane Forest Multi-layer	Early-seral Montane Forest	2.1
Early-seral Montane Forest	Agricultural	1.5
Late-seral Lower Montane Forest Multi-layer	Mid-seral Montane Forest	1.4
Late-seral Montane Forest Single-layer	Mid-seral Montane Forest	1.4
Early-seral Montane Forest	Mid-seral Lower Montane Forest	1.3
Mid-seral Subalpine Forest	Mid-seral Montane Forest	1.2
Upland Herbland	Upland Woodland	1.2
Late Seral Subalpine Forest Multi-layer	Mid-seral Montane Forest	1.2
Late Seral Subalpine Forest Multi-layer	Mid-seral Subalpine Forest	1.1
Late-seral Lower Montane Forest Multi-layer	Mid-seral Lower Montane Forest	1.1
Mid-seral Montane Forest	Mid-seral Subalpine Forest	1.0

[1]Dominant transitions affected at least one percent of the landscape.
[2]ERU = Ecological Reporting Unit.
[3]Proportion of landscape affected = the area of the landscape in which a terrestrial community changed into another terrestrial community.

Table 16--Changes of broadscale terrestrial communities between historical and current periods within the Northern Great Basin Ecological Reporting Unit of the Interior Columbia River Basin.

Terrestrial Community	Historical Area (%)	Current Area (%)	Class Change (%)[1]	ERU Change (%)[2]	Departure Class[3]
Agricultural	0.00	2.35	N.A.[4]	2.35*	5*
Alpine	0.05	0.05	0.00	0.00	3
Early-seral Montane Forest	1.73	1.06	-38.76*	-0.67	1*
Early-seral Lower Montane Forest	0.20	0.02	-89.28*	-0.18	1*
Early-seral Subalpine Forest	0.00	0.00	0.00	0.00	2
Exotics	0.00	2.30	N.A.	2.30*	5*
Late-seral Montane Multi-layer Forest	0.09	2.41	2552.81*	2.32*	5*
Late-seral Montane Single-layer Forest	0.00	0.26	10541.67*	0.25	5*
Late-seral Lower Montane Multi-layer Forest	1.03	1.21	17.40	0.18	5*
Late-seral Lower Montane Single-layer Forest	3.69	2.78	-24.69	-0.91	3
Late-seral Subalpine Multi-layer Forest	0.00	0.02	247.92	0.01	3
Late-seral Subalpine Single-layer Forest	0.14	0.15	6.70	0.01	5
Mid-seral Montane Forest	1.21	0.90	-25.24*	-0.31	1*
Mid-seral Lower Montane Forest	2.46	2.60	5.52	0.14	5*
Mid-seral Subalpine Forest	0.00	0.00	0.00	0.00	1
Upland Herbland	1.73	0.79	-54.54*	-0.95	1*
Upland Shrubland	83.07	75.63	-8.95	-7.44	3
Upland Woodland	0.69	2.35	241.20*	1.66*	5*
Water	2.24	2.24	0.00	0.00	3

[1]Class change = percent change relative to the terrestrial community.
[2]ICRB change = percent change of the ICRB attributable to the terrestrial community change.
[3]Departure classes = index of current areal extent of broadscale terrestrial communities in respect to their historical ranges (see text). Classes are: (1) is < historical minimum; (2) is ≥ historical minimum but <75% historical mid range; (3) is within 75% historical mid range; (4) is >75% historical mid range and ≤ historical maximum; (5) is > historical maximum.
[4]Not applicable since the terrestrial community did not exist during the historical period.
*Ecologically significant changes.

Table 17--Dominant transitions[1] of terrestrial communities within the Northern Great Basin Ecological Reporting Unit of the Interior Columbia River Basin.

Terrestrial Community		
Historical Period	Current Period	Proportion of ERU[2] Area (%)[3]
Upland Shrubland	Agricultural	2.6
Upland Shrubland	Exotics	1.7
Upland Shrubland	Upland Woodland	1.6

[1]Dominant transitions affected at least one percent of the landscape.
[2]ERU = Ecological Reporting Unit.
[3]Proportion of landscape affected = the area of the landscape in which a terrestrial community changed into another terrestrial community.

Table 18--Changes of broadscale terrestrial communities between historical and current periods within the Owyhee Uplands Ecological Reporting Unit of the Interior Columbia River Basin.

Terrestrial Community	Historical Area (%)	Current Area (%)	Class Change (%)[1]	ERU Change (%)[2]	Departure Class[3]
Agricultural	0.00	11.76	N.A.[4]	11.76*	5*
Alpine	0.09	0.09	0.00	0.00	3
Early-seral Montane Forest	0.50	0.43	-13.14	-0.07	3
Early-seral Lower Montane Forest	0.09	0.02	-72.82*	-0.06	1*
Early-seral Subalpine Forest	0.00	0.02	0.00	0.02	4
Exotics	0.00	3.11	N.A.	3.11*	5*
Late-seral Montane Multi-layer Forest	0.01	0.02	165.79	0.01	3
Late-seral Montane Single-layer Forest	0.01	0.08	592.04*	0.07	5*
Late-seral Lower Montane Multi-layer Forest	0.02	0.01	-46.34*	-0.01	1*
Late-seral Lower Montane Single-layer Forest	0.17	0.01	-96.24*	-0.16	1*
Late-seral Subalpine Multi-layer Forest	0.00	0.00	0.00	0.00	1
Late-seral Subalpine Single-layer Forest	0.00	0.02	0.00	0.02	5
Mid-seral Montane Forest	0.03	0.39	1306.50*	0.36	5*
Mid-seral Lower Montane Forest	0.19	0.31	62.73*	0.12	5*
Mid-seral Subalpine Forest	0.00	0.01	0.00	0.01	3
Upland Herbland	5.40	4.12	-23.73*	-1.28*	1*
Upland Shrubland	89.18	76.12	-14.64	-13.06	3
Upland Woodland	1.13	2.15	89.56*	1.02*	5*
Urban	0.00	0.16	N.A.	0.16	5
Water	0.13	0.13	0.00	0.00	3

[1]Class change = percent change relative to the terrestrial community.
[2]ICRB change = percent change of the ICRB attributable to the terrestrial community change.
[3]Departure classes = index of current areal extent of broadscale terrestrial communities in respect to their historical ranges (see text). Classes are: (1) is < historical minimum; (2) is ≥ historical minimum but <75% historical mid range; (3) is within 75% historical mid range; (4) is >75% historical mid range and ≤ historical maximum; (5) is > historical maximum.
[4]Not applicable since the terrestrial community did not exist during the historical period.
*Ecologically significant changes.

Table 19--Dominant transitions[1] of terrestrial communities within the Owyhee Uplands Ecological Reporting Unit of the Interior Columbia River Basin.

Terrestrial Community		
Historical Period	Current Period	Proportion of ERU[2] Area (%)[3]
Upland Shrubland	Agricultural	9.7
Upland Herbland	Upland Shrubland	2.9
Upland Shrubland	Exotics	2.6
Upland Shrubland	Upland Herbland	2.4
Upland Shrubland	Upland Woodland	1.1

[1]Dominant transitions affected at least one percent of the landscape.
[2]ERU = Ecological Reporting Unit.
[3]Proportion of landscape affected = the area of the landscape in which a terrestrial community changed into another terrestrial community.

Table 20--Changes of broadscale terrestrial communities within the Snake Headwaters Ecological Reporting Unit of the Interior Columbia River Basin.

Terrestrial Community	Historical Area (%)	Current Area (%)	Class Change (%)[1]	ERU Change (%)[2]	Departure Class[3]
Agricultural	0.00	8.65	N.A.[4]	8.65*	5*
Alpine	0.96	0.96	0.00	0.00	3
Early-seral Montane Forest	13.17	11.27	-14.45	-1.90	3
Early-seral Lower Montane Forest	0.02	0.00	-100.00*	-0.02	1*
Early-seral Subalpine Forest	0.38	4.23	1008.89*	3.85*	5*
Exotics	0.00	1.47	N.A.	1.47*	5*
Late-seral Montane Multi-layer Forest	7.72	0.59	-92.32*	-7.12*	1*
Late-seral Montane Single-layer Forest	1.23	1.85	50.61*	0.62	4*
Late-seral Lower Montane Multi-layer Forest	0.02	0.00	-100.00*	-0.02	1*
Late-seral Lower Montane Single-layer Forest	0.00	0.05	1092.11	0.04	3
Late-seral Subalpine Multi-layer Forest	6.18	0.65	-89.49*	-5.53*	1*
Late-seral Subalpine Single-layer Forest	0.63	0.88	39.51*	0.25	5*
Mid-seral Montane Forest	23.75	26.86	13.11	3.11*	5*
Mid-seral Lower Montane Forest	0.17	0.17	-2.19	-0.00	4
Mid-seral Subalpine Forest	5.14	7.21	40.31*	2.07*	5*
Rock/Barren	0.05	0.05	0.00	0.00	3
Upland Herbland	9.46	6.32	-33.20*	-3.14*	1*
Upland Shrubland	13.57	0.66	-95.10*	-12.91*	1*
Upland Woodland	1.03	0.22	-78.67*	-0.81	1*
Urban	0.00	0.13	N.A.	0.13	5*
Water	0.79	0.79	0.00	0.00	3

[1]Class change = percent change relative to the terrestrial community.
[2]ICRB change = percent change of the ICRB attributable to the terrestrial community change.
[3]Departure classes = index of current areal extent of broadscale terrestrial communities in respect to their historical ranges (see text). Classes are: (1) is < historical minimum; (2) is ≥ historical minimum but <75% historical mid range; (3) is within 75% historical mid range; (4) is >75% historical mid range and ≤ historical maximum; (5) is > historical maximum.
[4]Not applicable since the terrestrial community did not exist during the historical period.
*Ecologically significant changes.

Table 21--Dominant transitions[1] of terrestrial communities within the Snake Headwaters Ecological Reporting Unit of the Interior Columbia River Basin.

Terrestrial Community		
Historic Period	Current Period	Proportion of ERU[2] Area (%)[3]
Upland Shrubland	Agricultural	6.7
Early-seral Montane Forest	Mid-seral Montane Forest	5.9
Mid-seral Montane Forest	Early-seral Montane Forest	5.2
Upland Shrubland	Mid-seral Montane Forest	4.0
Late-seral Montane Forest Multi-layer	Mid-seral Montane Forest	3.3
Mid-seral Montane Forest	Mid-seral Subalpine Forest	2.8
Upland Herbland	Agricultural	1.9
Late Seral Subalpine Forest Multi-layer	Mid-seral Montane Forest	1.7
Late-seral Montane Forest Multi-layer	Early-seral Montane Forest	1.6
Late Seral Subalpine Forest Multi-layer	Mid-seral Subalpine Forest	1.5
Late Seral Subalpine Forest Multi-layer	Early-seral Subalpine Forest	1.5
Mid-seral Subalpine Forest	Early-seral Subalpine Forest	1.4
Mid-seral Subalpine Forest	Mid-seral Montane Forest	1.2
Late Seral Subalpine Forest Multi-layer	Early-seral Montane Forest	1.0
Upland Woodland	Upland Herbland	1.0

[1]Dominant transitions affected at least one percent of the landscape.
[2]ERU = Ecological Reporting Unit.
[3]Proportion of landscape affected = the area of the landscape in which a terrestrial community changed into another terrestrial community.

Table 22--Changes of broadscale terrestrial communities within the Southern Cascades Ecological Reporting Unit of the Interior Columbia River Basin.

Terrestrial Community	Historical Area (%)	Current Area (%)	Class Change (%)[1]	ERU Change (%)[2]	Departure Class[3]
Agricultural	0.00	5.94	N.A.[4]	5.94*	5*
Alpine	0.26	0.26	0.00	0.00	3
Early-seral Montane Forest	10.61	13.35	25.84	2.74	3
Early-seral Lower Montane Forest	0.89	0.26	-70.17*	-0.62	1*
Early-seral Subalpine Forest	0.51	1.37	169.00*	0.86	5*
Exotics	0.00	0.28	N.A.	0.28	5
Late-seral Montane Multi-layer Forest	5.97	13.31	122.90*	7.34*	5*
Late-seral Montane Single-layer Forest	1.50	9.72	549.28*	8.22*	5*
Late-seral Lower Montane Multi-layer Forest	5.35	3.02	-43.51*	-2.33*	1*
Late-seral Lower Montane Single-layer Forest	16.15	7.67	-52.53*	-8.48*	1*
Late-seral Subalpine Multi-layer Forest	1.03	0.95	-7.64	-0.08	1*
Late-seral Subalpine Single-layer Forest	0.06	0.10	55.59	0.04	3
Mid-seral Montane Forest	20.73	16.76	-19.17	3.97*	1*
Mid-seral Lower Montane Forest	13.05	14.32	9.77	1.27*	5*
Mid-seral Subalpine Forest	4.95	0.72	-85.55*	4.24*	1*
Rock/Barren	0.05	0.05	0.00	0.00	3
Upland Herbland	3.67	1.15	-68.81*	-2.53*	1*
Upland Shrubland	6.56	2.64	-59.72*	-3.92*	1*
Upland Woodland	5.56	5.09	-8.38	-0.47	3
Urban	0.00	0.19	N.A.	0.19	5
Water	2.53	2.53	0.00	0.00	3

[1]Class change = percent change relative to the terrestrial community.
[2]ICRB change = percent change of the ICRB attributable to the terrestrial community change.
[3]Departure classes = index of current areal extent of broadscale terrestrial communities in respect to their historical ranges (see text). Classes are: (1) is < historical minimum; (2) is ≥ historical minimum but <75% historical mid range; (3) is within 75% historical mid range; (4) is >75% historical mid range and ≤ historical maximum; (5) is > historical maximum.
[4]Not applicable since the terrestrial community did not exist during the historical period.
*Ecologically significant changes.

Table 23--Dominant transitions[1] of terrestrial communities within the Southern Cascades Ecological Reporting Unit of the Interior Columbia River Basin.

Terrestrial Community		
Historical Period	Current Period	Proportion of ERU[2] Area (%)[3]
Late-seral Lower Montane Forest Single-layer	Mid-seral Lower Montane Forest	5.7
Mid-seral Montane Forest	Late-seral Montane Forest Multi-layer	4.8
Mid-seral Montane Forest	Early-seral Montane Forest	4.5
Upland Shrubland	Agricultural	4.0
Early-seral Montane Forest	Mid-seral Montane Forest	3.9
Early-seral Montane Forest	Late-seral Montane Forest Multi-layer	2.6
Late-seral Lower Montane Forest Single-layer	Late-seral Montane Forest Single-layer	2.5
Mid-seral Lower Montane Forest	Early-seral Montane Forest	2.1
Mid-seral Lower Montane Forest	Late-seral Lower Montane Forest Single-layer	2.1
Mid-seral Lower Montane Forest	Late-seral Montane Forest Single-layer	2.1
Mid-seral Subalpine Forest	Late-seral Montane Forest Multi-layer	2.1
Mid-seral Montane Forest	Late-seral Montane Forest Single-layer	2.0
Late-seral Lower Montane Forest Multi-layer	Mid-seral Lower Montane Forest	1.9
Late-seral Montane Forest Multi-layer	Mid-seral Montane Forest	1.8
Late-seral Lower Montane Forest Single-layer	Mid-seral Montane Forest	1.6
Early-seral Montane Forest	Mid-seral Lower Montane Forest	1.3
Late-seral Lower Montane Forest Single-layer	Late-seral Lower Montane Forest Multi-layer	1.3
Late-seral Montane Forest Multi-layer	Early-seral Montane Forest	1.3
Mid-seral Montane Forest	Late-seral Lower Montane Forest Single-layer	1.2
Late-seral Montane Forest Multi-layer	Late-seral Montane Forest Single-layer	1.2
Late-seral Lower Montane Forest Single-layer	Late-seral Montane Forest Multi-layer	1.1
Mid-seral Subalpine Forest	Early-seral Montane Forest	1.1
Mid-seral Lower Montane Forest	Late-seral Lower Montane Forest Multi-layer	1.1
Late-seral Lower Montane Forest Multi-layer	Late-seral Lower Montane Forest Single-layer	1.1
Late-seral Lower Montane Forest Single-layer	Early-seral Montane Forest	1.1
Upland Herbland	Agricultural	1.1
Mid-seral Lower Montane Forest	Mid-seral Montane Forest	1.0

[1]Dominant transitions affected at least one percent of the landscape.
[2]ERU = Ecological Reporting Unit.
[3]Proportion of landscape affected = the area of the landscape in which a terrestrial community changed into another terrestrial community.

Table 24--Changes of broadscale terrestrial communities within the Upper Clark Fork Ecological Reporting Unit of the Interior Columbia River Basin.

Terrestrial Community	Historical Area (%)	Current Area (%)	Class Change (%)[1]	ERU Change (%)[2]	Departure Class[3]
Agricultural	0.00	8.80	N.A.[4]	8.80*	5*
Alpine	0.03	0.03	0.00	0.00	3
Early-seral Montane Forest	13.92	8.51	-38.91*	-5.42*	1*
Early-seral Lower Montane Forest	2.09	0.23	-88.98*	-1.86*	1*
Early-seral Subalpine Forest	2.27	2.96	30.08*	0.68	5*
Exotics	0.00	0.67	N.A.	0.67	5
Late-seral Montane Multi-layer Forest	4.55	0.32	-93.01*	-4.23*	1*
Late-seral Montane Single-layer Forest	2.16	0.00	-100.00*	-2.16*	1*
Late-seral Lower Montane Multi-layer Forest	3.14	0.10	-96.81*	-3.04*	1*
Late-seral Lower Montane Single-layer Forest	3.45	0.00	-100.00*	-3.45*	1*
Late-seral Subalpine Multi-layer Forest	1.85	0.10	-94.35*	-1.75*	1*
Late-seral Subalpine Single-layer Forest	0.39	0.46	17.79	0.07	5
Mid-seral Montane Forest	26.90	35.45	31.76*	8.54*	5*
Mid-seral Lower Montane Forest	6.01	16.85	180.64*	10.85*	5*
Mid-seral Subalpine Forest	4.09	12.72	210.97*	8.63*	5*
Rock/Barren	4.06	4.06	0.00	0.00	3
Upland Herbland	19.87	5.42	72.73*	-14.45*	1*
Upland Shrubland	1.39	1.12	19.68	-0.27	1*
Upland Woodland	2.84	0.34	-88.21*	-2.51*	1*
Urban	0.00	0.22	N.A.	0.22	5
Water	0.10	0.10	0.00	0.00	3

[1]Class change = percent change relative to the terrestrial community.
[2]ICRB change = percent change of the ICRB attributable to the terrestrial community change.
[3]Departure classes = index of current areal extent of broadscale terrestrial communities in respect to their historical ranges (see text). Classes are: (1) is < historical minimum; (2) is ≥ historical minimum but <75% historical mid range; (3) is within 75% historical mid range; (4) is >75% historical mid range and ≤ historical maximum; (5) is > historical maximum.
[4]Not applicable since the terrestrial community did not exist during the historical period.
*Ecologically significant changes.

Table 25--Dominant transitions[1] of terrestrial communities within the Upper Clark Fork Ecological Reporting Unit of the Interior Columbia River Basin.

Terrestrial Community		
Historical Period	Current Period	Proportion of ERU[2] Area (%)[3]
Early-seral Montane Forest	Mid-seral Montane Forest	8.0
Upland Herbland	Agricultural	6.4
Mid-seral Montane Forest	Mid-seral Subalpine Forest	5.9
Upland Herbland	Mid-seral Lower Montane Forest	4.6
Early-seral Montane Forest	Mid-seral Subalpine Forest	2.8
Mid-seral Montane Forest	Early-seral Montane Forest	2.5
Late-seral Montane Forest Multi-layer	Mid-seral Montane Forest	2.5
Late-seral Lower Montane Forest Multi-layer	Mid-seral Lower Montane Forest	2.3
Upland Herbland	Mid-seral Montane Forest	2.2
Late-seral Lower Montane Forest Single-layer	Mid-seral Lower Montane Forest	2.2
Upland Woodland	Upland Herbland	1.8
Mid-seral Montane Forest	Mid-seral Lower Montane Forest	1.7
Mid-seral Subalpine Forest	Mid-seral Montane Forest	1.5
Mid-seral Lower Montane Forest	Mid-seral Montane Forest	1.5
Upland Herbland	Early-seral Montane Forest	1.3
Early-seral Lower Montane Forest	Mid-seral Lower Montane Forest	1.1
Upland Shrubland	Agricultural	1.0
Upland Herbland	Upland Shrubland	1.0

[1]Dominant transitions affected at least one percent of the landscape.
[2]ERU = Ecological Reporting Unit.
[3]Proportion of landscape affected = the area of the landscape in which a terrestrial community changed into another terrestrial community.

Table 26--Changes of broadscale terrestrial communities within the Upper Klamath Ecological Reporting Unit of the Interior Columbia River Basin.

Terrestrial Community	Historical Area (%)	Current Area (%)	Class Change (%)[1]	ERU Change (%)[2]	Departure Class[3]
Agricultural	0.00	6.83	N.A.[4]	6.83*	5*
Alpine	0.04	0.04	0.00	0.00	3
Early-seral Montane Forest	5.53	5.00	-9.63	-0.53	1*
Early-seral Lower Montane Forest	1.58	0.01	-99.60*	-1.57*	1*
Early-seral Subalpine Forest	0.30	0.08	-75.01*	-0.23	1*
Exotics	0.00	0.34	N.A.	0.34	5
Late-seral Montane Multi-layer Forest	0.98	16.82	1610.28*	15.84*	5*
Late-seral Montane Single-layer Forest	0.03	6.92	27125.98*	6.89*	5*
Late-seral Lower Montane Multi-layer Forest	8.18	15.22	85.97*	7.04*	5*
Late-seral Lower Montane Single-layer Forest	22.30	19.23	-13.77	-3.07	3
Late-seral Subalpine Multi-layer Forest	0.74	1.38	85.46*	0.63	5*
Late-seral Subalpine Single-layer Forest	0.60	0.66	10.63	0.06	5
Mid-seral Montane Forest	6.48	1.66	-74.36*	-4.82*	1*
Mid-seral Lower Montane Forest	18.14	6.85	-62.24*	-11.29*	1*
Mid-seral Subalpine Forest	1.52	0.00	-100.00*	-1.52*	1*
Rock/Barren	0.12	0.12	0.00	0.00	3
Upland Herbland	14.59	0.98	-93.26*	-13.61*	1*
Upland Shrubland	8.64	2.17	-74.89*	-6.47*	1*
Upland Woodland	3.67	9.42	156.48*	5.75*	5*
Urban	0.00	0.21	N.A.	0.21	5
Water	5.12	5.12	0.00	0.00	3

[1]Class change = percent change relative to the terrestrial community.
[2]ICRB change = percent change of the ICRB attributable to the terrestrial community change.
[3]Departure classes = index of current areal extent of broadscale terrestrial communities in respect to their historical ranges (see text). Classes are: (1) is < historical minimum; (2) is ≥ historical minimum but <75% historical mid range; (3) is within 75% historical mid range; (4) is >75% historical mid range and ≤ historical maximum; (5) is > historical maximum.
[4]Not applicable since the terrestrial community did not exist during the historical period.
*Ecologically significant changes.

Table 27--Dominant transitions[1] of terrestrial communities within the Upper Klamath Ecological Reporting Unit of the Interior Columbia River Basin.

Terrestrial Community		
Historical Period	Current Period	Proportion of ERU[2] Area (%)[3]
Late-seral Lower Montane Forest Single-layer	Late-seral Lower Montane Forest Multi-layer	6.1
Upland Herbland	Agricultural	4.7
Mid-seral Lower Montane Forest	Late-seral Lower Montane Forest Single-layer	4.7
Late-seral Lower Montane Forest Single-layer	Late-seral Montane Forest Multi-layer	4.3
Upland Shrubland	Upland Woodland	4.0
Mid-seral Lower Montane Forest	Late-seral Lower Montane Forest Multi-layer	3.9
Mid-seral Montane Forest	Late-seral Montane Forest Multi-layer	3.5
Mid-seral Lower Montane Forest	Late-seral Montane Forest Multi-layer	3.2
Mid-seral Lower Montane Forest	Late-seral Montane Forest Single-layer	3.0
Upland Herbland	Upland Woodland	2.8
Late-seral Lower Montane Forest Multi-layer	Late-seral Lower Montane Forest Single-layer	2.7
Upland Herbland	Late-seral Lower Montane Forest Single-layer	2.6
Upland Herbland	Late-seral Lower Montane Forest Multi-layer	2.4
Late-seral Lower Montane Forest Single-layer	Late-seral Montane Forest Single-layer	2.3
Early-seral Montane Forest	Late-seral Montane Forest Multi-layer	2.3
Late-seral Lower Montane Forest Single-layer	Mid-seral Lower Montane Forest	2.2
Mid-seral Lower Montane Forest	Early-seral Montane Forest	1.7
Late-seral Lower Montane Forest Multi-layer	Late-seral Montane Forest Multi-layer	1.3
Upland Shrubland	Agricultural	1.3
Upland Herbland	Mid-seral Lower Montane Forest	1.3
Upland Shrubland	Late-seral Lower Montane Forest Single-layer	1.1

[1]Dominant transitions affected at least one percent of the landscape.
[2]ERU = Ecological Reporting Unit.
[3]Proportion of landscape affected = the area of the landscape in which a terrestrial community changed into another terrestrial community.

Table 28--Changes of broadscale terrestrial communities within the Upper Snake Ecological Reporting Unit of the Interior Columbia River Basin.

Terrestrial Community	Historical Area (%)	Current Area (%)	Class Change (%)[1]	ERU Change (%)[2]	Departure Class[3]
Agricultural	0.00	32.52	N.A.[4]	32.52*	5*
Alpine	0.02	0.02	0.00	0.00	3
Early-seral Montane Forest	0.61	0.28	-54.59*	-0.33	1*
Early-seral Lower Montane Forest	0.03	0.00	-100.00*	-0.03	1*
Early-seral Subalpine Forest	0.01	0.00	-100.00*	-0.01	1*
Exotics	0.00	10.04	N.A.	10.04*	5*
Late-seral Montane Multi-layer Forest	0.11	0.00	-100.00*	-0.11	1*
Late-seral Montane Single-layer Forest	0.10	0.04	-54.48	-0.05	3
Late-seral Lower Montane Multi-layer Forest	0.02	0.00	-100.00*	-0.02	1*
Late-seral Lower Montane Single-layer Forest	0.04	0.08	73.08	0.03	3
Late-seral Subalpine Multi-layer Forest	0.04	0.00	-100.00*	-0.04	1*
Mid-seral Montane Forest	0.29	0.62	117.51	0.34	3
Mid-seral Lower Montane Forest	0.11	0.20	81.66*	0.09	5*
Mid-seral Subalpine Forest	0.16	0.01	-96.29*	-0.15	1*
Upland Herbland	8.95	8.80	-1.64	-0.15	1
Upland Shrubland	85.57	39.35	-54.01*	-46.22*	1*
Upland Woodland	0.93	2.49	166.89*	1.56*	5*
Urban	0.00	0.19	N.A.	0.19	5
Water	0.04	0.04	0.00	0.00	3

[1]Class change = percent change relative to the terrestrial community.
[2]ICRB change = percent change of the ICRB attributable to the terrestrial community change.
[3]Departure classes = index of current areal extent of broadscale terrestrial communities in respect to their historical ranges (see text). Classes are: (1) is < historical minimum; (2) is ≥ historical minimum but <75% historical mid range; (3) is within 75% historical mid range; (4) is >75% historical mid range and ≤ historical maximum; (5) is > historical maximum.
[4]Not applicable since the terrestrial community did not exist during the historical period.
*Ecologically significant changes.

Table 29--Dominant transitions[1] of terrestrial communities within the Upper Snake Ecological Reporting Unit of the Interior Columbia River Basin.

Terrestrial Community		
Historical Period	Current Period	Proportion of ERU[2] Area (%)[3]
Upland Shrubland	Agricultural	31.8
Upland Shrubland	Exotics	7.3
Upland Shrubland	Upland Herbland	5.9
Upland Herbland	Agricultural	4.5
Upland Shrubland	Upland Woodland	1.6

[1]Dominant transitions affected at least one percent of the landscape.
[2]ERU = Ecological Reporting Unit.
[3]Proportion of landscape affected = the area of the landscape in which a terrestrial community changed into another terrestrial community.