# The Effect of Forest Management of Secondary Coniferous Forests on User's Landscape Appreciation and Psychological Restorativeness.

*Norimasa TAKAYAMA[1]

1. Forestry and Forest Products Research Institute in Japan

-INTRODUCTION: We investigated the influence of forest management on landscape appreciation and the psychological restorative effect in an on-site setting by exposing respondents to an unmanaged coniferous forest (U.F.), and a managed coniferous forest (M.F.) for a particular period. The both forests, which consisted of Japanese larch and Japanese red pine (a second-growth forest), were fairly similar in the land cover type and vegetation one another.

-METHODS: We considered the experiment in late July. We set the two experimental plots (0.25 ha) in the both forests of Fuji Iyashinomoroi Woodland Study Center as U.F. setting and M.F. setting. Here, the mean temperature, relative humidity and sound pressure were almost the same during the experiment except illuminance. The respondents were eighteen individuals (eighteen males; aged twenties to fifties) for the experiment. As for eliminating an order effect, the respondents were divided into the two groups (Group A and Group B) in every nine-person. The respondents of Group A were exposed to U.F. setting at first and then were done to M.F. setting. However, the respondents of Group B were exposed to each setting by the opposite order. They were individually exposed to the both settings while sitting for 15 min. In the both settings, the respondents were required to answer the three questionnaires to investigate the psychological restorative effect at before and after the experiment (mood; POMS, affect; PANAS, subjective restorativeness; ROS). For comparison of landscape appreciation, the respondents were required to answer other two questionnaires at after the experiment (scene appreciation (SD), a restorative property of environment (PRS)).

-RESULTS: As a comparison result by the statistical test, regarding a restorative property of environment (PRS), M.F. setting had statistically higher property in "Being away" and "Coherence", "Compatibility" than U.F. setting (p< .05). About scene appreciation (SD), M.F. were appreciated statistically higher in "brightness," "openness," "comfort," "beauty," "safeness" and "healthiness" (p< .05), and "order" and "thin" (p< .01). On the other hands, by the result of two-way repeated ANOVA (difference of setting (U.F. -M.F.) ×presence of experience (before exposure -after exposure)), there were no statistical relationship with the mutual interaction between difference of setting and presence of experience in "mood" (POMS), "affect" (PANAS) and "subjective restorativeness" (ROS).

Then, as a result of having checked both the main effects, the difference of setting did not seem to raise a psychological restorativeness. Otherwise, the presence of experience could give a statistical influence negative "affect" (PANAS; p< .05) and "tension and anxiety" (POMS; p< .05). The difference of setting also reduced numerical values for them in M.F. setting. In contrast, before and after exposure could give a statistical influence and raise "vigor" in U.F. setting (POMS; p< .05).
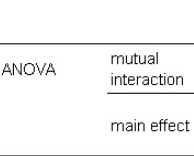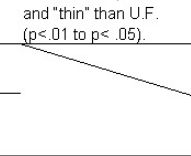
-CONSSIDERATION: Consequently, negative affect, tension, and anxiety might come to decrease because the managed forest setting had a sufficient restorative property of the environment and the better scenic environment. Conclusively, respondents would obtain a psychological restorativeness to some extent by being exposed to M.F. setting. On the other hand, even though vigor rose in U.F. setting, we would consider the reason for it by these three hypotheses as follows;

1) all the respondents were men. 2) the sample group had a tendency toward a relatively low neuroticism and a high extroversion by the personality traits test which we also conducted as one of the optional tests. 3) if we referred to the Kaplan's landscape preference theory, we could think of the possibility that U.F.

setting would bring a sense of mystery and exploration to the respondents who had the trait mentioned above.

Keywords: Landscape appreciation, restorativeness , Thinning, Secondary Coniferous Forests, Forest Management

table 1. summary of questionnaires using the experiment and the result of analysis.

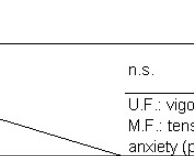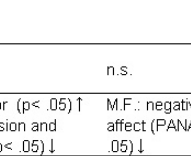| category | | Landscape appreciation | | Psychological restorativeness | | |
|---|---|---|---|---|---|---|
| abbreviated form | | SD | PRS | POMS | PANAS | ROS |
| official name | | Semantic differential method | Perceived restorativeness Scale | Profile of mood states | Positive and negative affect schedule | Restorative outcome scale |
| contents | | scene appreciation | restorative property of environment | mood | affect | subjective restorativeness |
| number of subscales | | 25 | 5 | 6 | 2 | 1 |
| timing of the measurement | | after exposure | | before and after exposure | | |
| wilcoxon signed rank test | | M.F was statistically higher in "brightness", "openness", "comfort", "beauty", "safeness", "healthiness", "order" and "thin" than U.F. (p<.01 to p< .05). | M.F. was statistically higher in "Being away", "Coherence" and "Compatibility" than U.F. (p<.05). | | | |
| two-way repeated ANOVA | mutual interaction | | | n.s. | n.s. | n.s. |
| | main effect | | | U.F.: vigor (p< .05)↑ M.F.: tension and anxiety (p< .05)↓ | M.F.: negative affect (PANAS; p< .05)↓ | n.s. |



Photo. Unmanaged Forest (U.F.)                     Photo. Managed Forest (M.F.)

U. F.: unmanaged forest, M. F.: managed forest, ↑ :increased, ↓ :decreased