

United States
Department of
Agriculture

Forest
Service

Tongass National Forest
Forest Plan Interdisciplinary Team
8465 Old Dairy Road
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Reply To: RS-G-10-b

Date: January 14, 1996

Subject: Northern Goshawk Viability Assessment Panel Summary

To: TLMP Revision Planning File

From: Chris Iverson, TLMP IDT

I. BACKGROUND

A panel of northern goshawk experts met in Juneau, Alaska on November 7 and 8, 1995 to evaluate the relative likelihood that TLMP Revision alternatives would maintain a persistent and well distributed population of northern goshawks across their historical range on the Tongass National Forest. Panel members integrated technical information, presented on goshawk ecology in Southeast Alaska and their personnel experience and knowledge of goshawk ecology with details concerning design elements of forest plan alternatives to develop professional judgments about likely outcomes related to the longterm persistence and distribution of northern goshawks on the Tongass National Forest.

The following information was provided to goshawk panelists to conduct this assessment:

- Overview of forest planning; Bruce Rene', TLMP.
- Overview of TLMP Revision alternatives; Chris Iverson, TLMP.
- Presentation on goshawk ecology and habitat relationships in Southeast Alaska by Or. Kimberly Titus, Research Biologist, Alaska Department of Fish and Game.
- Tongass maps illustrating all 9 planning alternatives; current productive old growth forest abundance and distribution; anticipated productive old growth condition in 2095 for all alternatives; productive old growth blocks remaining in 2095 by alternative; percent of productive old growth harvested to between 1954 to 1995 by Value Comparison Unit.
- Planned acres of productive old growth harvested by alternative by 2095.
- Acres of productive old growth harvested below 500 and 1200 feet elevation and less than 35% slopes by alternative.
- Copies of:
 - Tongass Land Management Plan Framework for Development of Draft Alternatives; Resource Assessment Panel Meetings, November 7-8 and 15-16, 1995.
 - Extinction Rates in Archipelagos: Implications for Populations in Fragmented Habitats.
 - TLMP Panel Assessment Procedures.
 - Forestwide Standard and Guidelines: Beach and Estuary Fringe: Threatened, Endangered and Sensitive Species; Riparian.

This summary provides an analysis of factors that emerged as major concepts considered and debated by panelists that influenced their likelihood outcome ratings. An analysis and comparison of ratings among alternatives is also presented. Panelists were instructed to base likelihood outcomes on the anticipated effect that implementation of each alternatives would

have in 100 years on the remaining abundance and distribution of habitats to support well distributed and persistent breeding populations of goshawks.

A complete set of notes was maintained by a recorder during the 2 day session to record data presentations, discussion, and professional debate concerning the assessment task. This information is generally not repeated in this summary as the notes are included in the TLMP planning record.

II. IMPORTANT DISCUSSION FACTORS

Panelists were generally impressed with the apparent low relative density of nesting goshawks in southeast Alaska. Less than 40 nest sites have been identified after nearly 5 years of inventory effort across the forest. Low prey diversity compared to other goshawk populations across North America was considered to be a primary influence. Panelists generally concluded that this natural condition of the region resulted in a relatively enhanced sensitivity to habitat modifications and resultant reductions in prey diversity simplification and abundance.

Important locally obtained biological data considered by panelists was the significant selection by goshawks for productive old growth forest, the avoidance of all other habitat types (especially early and mid seral conifer forests); predominant use of lower elevations (less than 1200') on relatively gentle slopes (less than 35%). Collectively, disproportionate goshawk use of productive old growth, at low elevations on gentle slopes indicated to panelists that not all old growth forest acres were of equal value to goshawks. Most timber harvest also occurs in these situations, thus causing an elevated concern among panelists of a potential disproportionate effect of planned harvest on goshawk habitat suitability; a feature not revealed just using overall statistics of net old growth acres harvested.

Riparian, beach and estuary standards and guidelines were important landscape components that incrementally contributed to enhanced confidence that an alternative would maintain suitable habitat to support well-distributed goshawk populations. Goshawks select these landscapes when productive old growth stand structure is present. Riparian, beach and estuary habitats generally support greater prey diversity and net prey productivity, features important to goshawk habitat suitability.

Discussion revealed that a principal rating component was the net proportion of all old growth on the Tongass that would be harvested in 100 years under each alternative. This surrogate indicator was used in lieu of more time to conduct detailed evaluations, uncertainty about what specific old growth acres would be harvested, and limited knowledge about goshawks in southeast Alaska. These general proportions were compared to existing percentages of young growth conifer forests in local areas of the Tongass and related goshawk status. Most notable was north Prince of Wales Island where in excess of 20% of the productive old growth had been harvested. Significant concern evolved over this harvest level and the resultant increased proportion of unsuitable, early seral forest on the landscape.

This concern was generated from relatively low density of nesting goshawks discovered relative to the significant inventory effort in those landscapes. Secondly, the behavior of the radio-marked Sarkar adult female goshawk using the northern Prince of Wales landscape exhibited potential signs of ecological stress as qualitatively evidenced by an extremely large home range, nonbreeding, and differential winter and breeding use areas; extremes among all radio-marked goshawks. Thus, qualitative judgments concluded that alternatives resulting in this or a greater percentage of the net productive old growth harvested could result in negative overall landscape consequences to sustaining a resilient, adaptable, and well distributed goshawk population in southeast Alaska.

The concept of extended rotations was viewed favorably by panelists from a conceptual standpoint. Maintenance of regenerating conifer stands in mid to late seral stand structures

from 100 to 200 years was considered to supply adequate stand structure for prey production and goshawk foraging opportunities. Panelists were frustrated however, by the assigned 100 year time frame within which we asked them to judge outcomes, as it precluded a full consideration of the potential benefits to be accrued from extended rotations. Thus the practical benefit from extended rotations was a reduced net harvest of productive old growth forests within a comparable time frame.

The concept of habitat reserves was less important as a landscape design feature than indicated for other species, as discussion revealed that management of the landscape matrix as a whole had a greater net influence on goshawk habitat suitability, distribution, and longterm persistence. Large and medium sized habitat reserves as proposed were generally considered to be too small to sustain more than one or two pairs of goshawks. Roads were not considered an adverse element and thus roadless features of reserves did not generally contribute to overall habitat suitability. Finally, panelists generally concluded that some minimum level of forest management was not considered adverse to overall goshawk habitat suitability and likely contributed to stand diversity, but clearly thresholds of net landscape composition of early seral forests were considered relatively low.

III. COMPARISON OF ALTERNATIVES

Panel ratings by alternative are presented in Table 1. Mean scores before discussion and after it for the 4 panelists are presented for each of the 5 possible outcomes. The 'before' ratings occurred following presentations on alternatives and local goshawk ecology, but before the merits of individual alternatives were discussed among panelists in relation to goshawk habitat relationships. A second rating was conducted after review by panelists of their first rating and full discussion among them about goshawks in relation to the various features of each alternative.

Scores changed very little between ratings indicating that panelists likely had a good understanding of factors involved in specific alternative design and further discussion did not enhance their understanding to significantly affect scores. The after mean scores are referenced for the remainder of the discussion since these scores reflect full dialog among panelists.

Alternative 1 essentially represents a no additional harvest alternative: Nearly 2/3's of all likelihood points were assigned to Outcome I; that is that well distributed goshawk breeding populations would be maintained across the Tongass. However, Outcome II received nearly a third of the likelihood points suggesting that even with no further reduction in old growth forest, goshawk populations could likely experience some reductions and local persistence may be more ephemeral or irregular as a result of local concentration of habitat loss from past timber harvest. Implied by this result is that any additional harvest will be additive to an existing effect.

Panel discussion generally considered the 5 different possible outcomes in relation to maintenance of a well-distributed population across the Tongass. They generally believed that Outcomes 1 and II permitted continued interaction between individuals without the establishment of gaps in distribution. Conversely, Outcomes III, IV, and V generally infer that at least some gaps in distribution exist with resulting limitations in interaction among individuals. Thus these two thresholds, combined I and II scores and combined III, IV, and V scores, are used as reference for comparing alternatives.

Alternatives 2, 7, 8, and 9 were rated by panelists as having a relatively high likelihood (combined scores for Outcomes III, IV, and V of 76, 88, 73, and 78 respectively) that, in 100 years, either gaps in distribution were likely to occur or populations would exist in isolated refugia. Both outcomes result in limitations or restriction in interaction among individuals within the population. The forestwide system of habitat reserves was considered to be of some

value in Alternative 8, but reserves alone imbedded in a matrix of early seral forest structure managed on a 100 year rotation were judged to be of insufficient size to support goshawk populations without gaps in distribution or refugia occurring.

Moderately high combined scores for Outcomes I and II occurred for Alternatives 4 and 5 (74 and 65, respectively). These alternatives have in common application of extended 200 year rotations. Panelists generally agreed that forest structure resulting from mid-seral mature forest developmental stages (100-200 years old) were more beneficial to goshawks and their prey than combinations of reserves and shorter, 100 year rotations.

Alternatives 3 and 6 had intermediate Outcome I and II combined scores of 52 and 50, respectively. In spite of partial or complete application of habitat reserves, the 100 year rotation perpetuating a less suitable early seral forest stand structure negatively affected these alternatives. Conversely, panelists had moderate uncertainty that neither of these alternatives would maintain well distributed populations with combined score from outcomes III, IV, and V of 48 (Alt 3) and 50 (Alt 6). This result suggests that under either alternative there is a nearly even chance that either permanent gaps in the distribution of goshawks will occur or that they may only exist in refugia in 100 years; in either case interaction among individuals will likely be diminished.

Because of the significant amount of legislatively reserved lands and the productive old growth forest that will likely remain intact under even the most aggressive timber harvest alternatives, panelists believed there was little chance for extirpation of goshawks from Southeast Alaska. The highest score for Outcome V (extirpation) was only an 8 for Alternative 7. However, persistence of at least one breeding pair does not represent a resilient, adaptable and viable goshawk population.

Table 1. Northern goshawk viability assessment panel likelihood ratings among 5 possible outcomes for each Tongass Land Management Plan Revision alternative.

	Outcomes	I	II	Total and II	III	IV	V	Total III, IV, V
Alternative 1	Before	70	27	97	3	0	0	3
	After	66	31	97	3	0	0	3
Alternative 2	Before	0	18	18	40	37	5	82
	After	0	24	24	40	32	4	76
Alternative 3	Before	18	32	50	32	15	3	50
	After	17	35	52	34	14	0	48
Alternative 4	Before	25	33	58	31	11	0	42
	After	23	42	65	29	6	0	35
Alternative 5	Before	30	39	69	22	9	0	31
	After	23	51	74	25	1	0	26
Alternative 6	Before	4	30	34	44	22	0	66
	After	6	44	50	33	17	0	50
Alternative 7	Before	0	12	12	38	42	8	88
	After	0	12	12	40	40	8	88
Alternative 8	Before	0	32	32	40	25	3	68
	After	0	27	27	41	29	3	73
Alternative 9	Before	0	20	20	42	33	5	80
	After	0	23	23	42	32	3	77

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Reply To: RS-G-10-b

Date: January 16, 1996

Subject: Northern Goshawk Panel Assessment
November 7-8, 1995 Meeting Notes

To: TLMP Planning Files

From: Chris Iverson, TLMP IDT

Tongass Land Management Plan Revision
Northern Goshawk Panel Assessment
Meeting Notes
November 7-8, 1995

Facilitator:

Chris Iverson, USDA Forest Service. TLMP IDT

Local Resource Specialist:

Dr. Kimberly Titus, Alaska Department of Fish and Game

Panel Members:

Dr. Richard Reynolds, USDA Forest Service, Rocky Mountain Forest Range and
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Recorder:

Mike Turzich, USDA Forest Service, Juneau Ranger District, Juneau, AK

Silent Observer:

Frances Preston, USDA Forest Service, Juneau Ranger District, Juneau, AK

Northern Goshawk panel members met on November 7 and 8 to evaluate the relative likelihood that TLMP Revision alternatives would maintain a persistent and well distributed northern goshawk population across their historical range on the Tongass National Forest after 100 years of full alternative implementation. Panelists were presented the following information:

- Overview presentation of forest planning: Bruce Rene'; TLMP
- Overview presentation of alternatives with handout copies of all visual aid overheads used; Chris Iverson; TLMP

- Presentation on northern goshawk ecology in southeast Alaska; Kim Titus, ADF&G
- Planned acres of productive old growth harvested by alternative
- Tongass maps illustrating 9 alternatives and land allocations: 1954 and 1995 productive old growth; planned productive old growth condition in 2095 for all alternatives with large and medium old growth block polygons from the old growth inventory; percent of productive old growth harvested by Value Comparison Unit (VCU) from 1954 to present: percent of productive old growth harvested in 2095 by VCU.
- Copies of the following documents were provided:
 1. Northern Goshawk Conservation Assessment.
 2. Genetic Variation and Taxonomic Status of Northern Goshawks in Arizona: Implications for Management.
 3. Extinction Rates in Archipelagos: Implications for Populations in Fragmented Habitats.
 4. Rating Mechanism. Alternative Summaries, and Alternative Matrix Table handout.
 5. Tongass Administrative Area review comments on various assessments and resource analyses including the Northern Goshawk Conservation Assessment.
 6. Forestwide Standards and Guidelines for Beach and Estuary Fringe. Riparian, and Threatened, Endangered and Sensitive Species.
 7. Total acres of productive old growth harvested assuming full implementation of each alternative
 8. Acres of productive old growth planned for harvest by alternative below 500 and 1200 feet in elevation and less than 35% slope by alternative.

Summary of Recorder's Meeting Notes for November 7-8 1995

Introduction

After panel members were presented an overview of forest planning and another on the content and framework of the TLMP alternatives, the facilitator reviewed the objectives and approach of the panel process as described in the Rating Mechanism handout. The Panel was charged with the task of review features of each TLMP alternative and assess and assess the likelihood that full implementation of an alternative would maintain a persistent and well distributed population of northern goshawks across their historical range on the Tongass National Forest. Each panel member was instructed to provide an individual and independent outcome rating for each alternative. He emphasized that the panel is NOT a consensus building process. The 5 possible 'outcome' ratings, also described in the Process handout were fully discussed. The ratings are expressions of certainty of likelihood outcomes and are not probabilities per se.

The anticipated process was described and discussed:

1. Presentation by the resource specialist, Dr. Kim Titus, regarding goshawk ecology, habitat relationships and status in Southeast Alaska. This presentation was essentially a summary of the Northern Goshawk Conservation Assessment prepared for the TLMP revision.
2. Full discussion between panelists, resource specialist, and facilitator concerning details about goshawk ecology in Southeast Alaska and the content and details of the proposed alternatives. However, there was to be no discussion between panelists at this point to compare or contrast goshawks and alternatives. This was to ensure independence in panelists ratings.
3. Panelists developed ratings of each of the 9 alternatives. Panelist anonymity was assured by having no names on the panelists rating form, and the scores were presented directly to the scribe for data entry. The panelist retained possession of his/her individual rating form.
4. Initial ratings would be summarized and provided to each panelist, resource specialist and facilitator. These ratings would be the focal point to initiate discussion about individual alternatives and their relationship to goshawk ecology and management.
5. After thoroughly exploring the ratings, further discussing the components of the alternatives a second rating of each alternative was conducted. This discussion was designed to explore

the individual alternative building block components of alternatives in order to understand their individual contributions to the panelists' rating.

After the second rating the panel assessment was to be completed.

During the initial presentation of process overview by the facilitator, a number of questions were asked.

-Q: Will we discuss the alternatives again in more depth? A: Yes, the facilitator can discuss the alternatives as necessary as a matter of clarification. Additional information will be made available when requested if it is available.

-Q: Can we discuss resource specialist presentation information with the specialist? A: Asking specific information about data or interpretation of data presented is OK. However, asking the specialist his feelings or perception of any of the alternatives is not. Comparing impacts of alternatives is not appropriate either.

-Q: Why use 100 years for the planning horizon when forest regeneration may take 500-600 years? A: It's the period we can foreseeably plan in and be reasonably certain of the outcome. It is also generally the minimum timeframe used on conservation biology literature's for viability analyses and 'longterm' persistence. Facilitator acknowledged this was a good question. Facilitator directed the group to use 100 years for the rating as the established process. It is noted both here and later, significant discomfort by some panelists with limiting a likelihood rating to only 100 years. This rating timeframe implied that the evaluators will judge certainty of an outcome in year 2095, estimating forest age and its contribution as goshawk habitat in 100 years: a 200 year rotation has little contribution as goshawk in year 100.

4: What is a gap in relation to Outcome III? A gap is dependent upon the species mobility and dispersal capability to move across landscapes. After some discussion a gap was clarified as a spatial area devoid of suitable habitat such that interaction between populations on either side of the gap would experience limitations in interaction. In other words, a gap in distribution occurs when you start triggering the interruption of interaction between individuals.

Q: Will the facilitator and resource specialist conduct assessment ratings. A: No. They can be fully involved in the discussions but pre-planning for the panel assessments explored but rejected this possibility of facilitator and resource specialist conducting ratings.

Q: Will the notes become part of the planning record? A: Yes. The discussion that transpires will likely be the most important part of the entire panel process. These discussions should reveal 'mental models' established by the panelists to highlight those alternatives design components that significantly affected their rating process.

Overview finished at this point.

Resource Specialist Presentation: Dr. Kimberly Titus, ADF&G

The Ecology of Goshawks on the Tongass N.F. Important points:

-Associated with mature forests, large ranges, and are sensitive to changes in mature forests.

Reviewed goshawk petition for endangered species status.

- Reviewed goals and objectives of goshawks studies.

- Research study methods: find goshawk nests using any means possible. Because of the difficulty locating nests, all nests found throughout Southeast Alaska are included and there is no specific or classical 'study area' except the entire southeast Alaska archipelago. In 1995, we had 8 active nests. Adults and juveniles are trapped at nests, attach radio transmitters, and use aerial telemetry to monitor movements and habitat use. Data analysis is achieved using the TLMP Geographic Information System.

- Nesting Chronology was reviewed. Dispersal may occur due to fall storms.

- Graph of active nests from 1991 to 1994 reviewed. Females have moved 40-50 kilometers to next nesting site the following year.

- Nests were found from the Juneau road system and in the process of laying out timber harvest units. There is little searching in Wilderness Areas.

- Playing tapes of goshawk calls to attract adult or juvenile birds was not very successful.

- Goshawk population on Tongass may be low and may differ by location. Distribution of prey differs widely across the forest. No hares or rabbits are available throughout SE Alaska which are a likely a key component of goshawk diet in many portions of their range. Prince of Wales

(POW) Island has no red squirrels. but most other islands have squirrels for prey. Other small animals are also not available in some locations. Populations may be patchy.

- Goshawk use areas identified using radiotelemetry are much larger than in other places where goshawks have been studied.
- Proportionally more effort has been put into searching for goshawk nests on POW than in other portions of the Tongass over the past 5 years, and only 3 nests have been located.
- Douglas Island has some hares present, four goshawk nesting areas have been found there.
- Goshawk density is unknown but may vary by an order of magnitude across the Tongass.
- Nest Site Habitat: Mean 436 ft. Range 50-750 ft. Site Aspect is variable: none between west and north. Ground Slope Mean is 17 degrees: Range 3-30 degrees. Have not found any nests on steep slopes but have not looked there. No radiomarked birds have moved to steep slopes.
- Spruce and Hemlock are the most common tree species used for nesting.
- Some birds stay in home range year round, some move to other ranges in winter, and some we don't know about.
- Juvenile birds have moved from nest area 10 to 64 miles (approximate).
- 89% of all goshawk relocations occur in old growth.
- Use GE, landcover types. to look at available habitat for birds.
- Results: Nesting: 614 Radio relocations from 32 goshawks.
 - 67% of relocations in old-growth forest types.
 - 7% in alpine cover
 - 5% in clearcuts
- In Winter: similar use but higher in old growth.
- Issues of habitat used versus availability were discussed at length. There was a desire by panelists to have a reanalysis of use of riparian habitat by goshawks from the telemetry data. This data was reanalyzed and provided the next day by the resource specialist. Panelists were interested in understanding the selection of riparian habitats relative to the abundance of this cover type on the forest. It was concluded that riparian forest cover types were selected more than their occurrence.
- Is riparian habitat important? The prey part of the assessment suggests higher diversity of animal life along the streams for possible prey species. Do other surveys of birds indicate this? Question couldn't be answered.
- Ranking habitat types reviewed: highest ranks were for old growth, high and low volumes, and riparian/beach forest. Rock/ice. clearcut and alpine were ranked low. Mature second growth showed a ranking of 4 out of 7 ranking points. Little variation was detected between nesting and winter season.
- No difference between forest edge and interior relative to availability. This was thoroughly discussed by panelists and concluded that as a predator. use of habitats is likely greatest where prey species abundance and diversity may be greatest, e.g. at ecotones and that prey abundance may not necessarily be greater in interior forest conditions (e.g. greater than 300 feet for a forest 'edge). Presenter shared that GE may not be able to represent the goshawks preference at a 300 foot scale.
- Principle prey remains at nests: Stellar's jays, grouse. varied thrush, red squirrels, etc.
- Goshawks are likely year-round residents in southeast Alaska.
- There is some pattern to goshawk use of forest type and acres around the nest site; analyses show a non-random selection Of nesting habitat, stands are generally more contiguous forest habitat and greater canopy closure than random forest plots.

Summary:

- Strong selection for productive old growth.
- No difference between nesting and non-nesting seasons.
- Strong selection against clearcut and early successional cover types.
- Unable to detect differences between selection of forest interior vs. forest edge.
- Patterns may become apparent with more data and or changes in scales.
- How does prey respond in second growth? This little direct data available but stand structure suggests that especially the stem exclusion stage is vegetatively depauperate and little structure for structural diversity and thus niche habitat for prey species.

- Red squirrels are one of the few small mammal prey species, in other parts of the range smaller mammals are a key prey item. Red squirrels use spruce trees/stands as a source of cones. Hemlock is the dominant regeneration species in clearcuts. Spruce is a seral species, *generally less* shade tolerant and is eventually dominated at any site by hemlock (over long time frames).
- Cone production by seral spruce generally begins a 50-70 years but significant production occurs after 100 years.
- Table 12 in the Goshawk Assessment was discussed with regard to stand structure and silvicultural practices and habitat suitability to goshawks. Predicted value of forest stands with different structures for nesting and foraging habitat in SE Alaska.
- 65% of goshawk telemetry relocations occurred at less than 500 ft. elevation and 88% of the relocations were less than 1200 ft. elevation. A significant amount of relocations also occurred on slopes less than 35%. This interest in elevation and slope precipitated a request for another data query for slope and elevation habitat remaining at the end of rotation at year 2095. The result of this reanalysis of acres planned for harvest below 500 and 1200 feet in elevation and less than 35% slope was provided the next day.
- Facilitator handed out a final project report concerning Genetic Analysis on Goshawks. Findings suggest that genetic analysis of blood samples from goshawk samples across the United States indicated very little genetic differences among populations. However, this data does not necessarily refute the current classification of the Queen Charlotte Coshawk subspecies that likely occurs in Southeast Alaska.
- Facilitator provided flip chart Of preliminary draft information on acres of productive old growth (POG) planned for harvest at the end of the rotation (100 years) at year 2095.
 - Alternative 1 = 0
 - Alternative 2 = 1,298.000
 - Alternative 3 = 873,000
 - Alternative 4 = 721,000
 - Alternative 5 = 666.000
 - Alternative 6 = 1,109.000
 - Alternative 7 = 1,766.000
 - Alternative 8 = 1,110.000
 - Alternative 9 = 1,606.000

General total numbers of POG forest wide were also presented:

- 5.5 million acres of POG present in 1954.
- 450,000 acres of POG on federal land has been harvested since 1900 and is in second growth stand structure.
- Private land, approximately 600,000 acres of POG has been harvested; net 1 million acres of POG has been converted to early seral stands in SE ecosystem.
- 5 million acres of POG available today.

The facilitator then reviewed the alternative maps what the colors (land allocations) represented. Panelists asked for additional maps and data for tomorrow for their second round of ratings. They specifically asked for acres of old growth in 1954, 1995, and 2095 at (less than) 500 ft. and 1200 ft. and slope less than 35%. This was all to be presented by biogeographic province.

All discussion was completed and panelists independently proceeded to rate the alternatives with likelihood score outcomes. Individual ratings were presented to the scribe for data entry and analysis. Score sheets were returned directly to the individual panelists for their use the following day.

November 8, 1995

Revised estimates of the acres of old growth harvested through full alternative implementation at year 2095 were obtained and placed on the flipchart adjacent to the estimates provided the previous day.

First Revised

- Alternative 1 = 0 0
- Alternative 2 = 1,298,000 (1,106,670)
- Alternative 3 = 873,000 (735,800)
- Alternative 4 = 721,000 (618,060)
- Alternative 5 = 666,000 (572,300)
- Alternative 6 = 1,109,000 (953,900)
- Alternative 7 = 1,766,000 (1,556,900)
- Alternative 8 = 1,110,000 (955.460)
- Alternative 9 = 1,606,000(1,402.800)

The facilitator also handed out the new GIS data query developed as requested by the panelists, POG less than 500 ft. and less than 35% Slope table. These data were requested to examine what "type" (e.g. quality of old growth) of 'green' (POG on alternative maps) old growth remained at the end of rotation in 2095. Goshawk habitat use suggested that habitats below 500' and less than 35% slope were higher quality sites. Evaluation of the new outputs suggested that only 1/4 of the old growth harvested occurred-within the screen, less than 500' and less than 35% slope. Panelists, facilitator and the resource specialist were surprised at the low value. believing that more acres would occur within this screen, based primarily on past timber harvest activity that occurred within this range. Several other queries were examined and generally confirmed the first query, suggesting that indeed much of the programmed harvest would occur over 500' and over 35% slopes. Analysis of this data was generally inconclusive.

The fundamental question was raised of the relative contribution of large reserves to goshawk viability. The discussion generally led to the conclusion that reserves certainly contribute but alone are insufficient as a conservation strategy.

This led to the next debate of examining the differences between alternatives 3 (all reserves) and 4 (all matrix management) which inherently represented 2 vastly different landscape conservation strategies. There are certainly tradeoffs between reserves and extended rotations. Panel members discussed this difference in approach at length, certainly no general agreement was reached and both approaches have advantages and disadvantages. Ultimately this disparity or relative difference between strategies should be illustrated in relative ratings between alternatives that focus on these 2 different strategies.

Unevenaged management (UM) of extended (500-1000' buffer) beach fringe and the matrix where allocated in landscapes that have exceeded harvest thresholds is generally not wanted by the timber planners and does not substantially contribute to the ASQ and is operationally expensive to obtain this timber. On the other hand, the UM prescription was an attempt to design a silvicultural prescription that emulated the natural disturbance regime that dominates the forest processes. Most panelists agreed with the Goshawk Assessment and gave this silvicultural prescription high marks for sustaining goshawk habitat structure. especially to produce prey species through habitat heterogeneity.

The panelists revisited the fundamental question of the relative value of reserves versus extended rotation to emulate old growth succession and the value of either approach to goshawk habitat conservation. At this point, the point was made that they realized that the UM prescription was a very minor component of the alternatives. They appreciated this ecological approach but suggested that rather than a token application of this ecological prescription, that an entire alternative should be built entirely based upon these ecological principles of disturbance and forest processes.

The panelists then examined the contribution of the Z-aged stand management approach and the benefits to goshawks, stand structure, and prey species production. 2-aged stand management was described again as a shelterwood that permanently retained 10-20% of the initial stand structure during clearcut harvest. The panelists generally agreed that this prescription may significantly benefit goshawks and their, prey, not necessarily immediately but later in the

successional pathway when within stand diversity is important in habitat heterogeneity and creating increased niche diversification within managed stands.

Panelists generally recommended that structure retained should be diverse in quality, types, and integrity. This residual structure adds to the diversity of the stand versus a clearcut but is not as good as uneven-aged management. The original volume in a given area should stay the same instead of going outside the unit to gain back the 10-20% left inside the unit. How do we still leave the 10-20% within the area when there is "falldown" occurring in the same area? How does the "falldown" not be counted as the 10-20%. There was also discussion that standards and guidelines should be explicit in leaving dumps of trees of varying quality and diversity throughout the stand and not retain all structure in one locality on the edge of a clearcut.

The resource specialist then presented data analyzed regarding riparian habitat requested by the panelists the previous day: Over 28% of 1200 goshawk relocations occurred in riparian habitat which was a combination of both TTRA buffers (100' on both sides of fish streams) and the 500' beach fringe; 43% of relocations occurred in upland productive old growth. Thus nearly 1/3 of all relocations occurred within the narrow riparian and beach fringe zones.

The facilitator then discussed how the next round of rating would occur. The previous ratings would be examined for each alternative; significant differences or patterns would be discussed. The facilitator wanted Panelists to specifically comment on the relative contribution of each major alternative building block component to their rating. These discussions would help discriminate those factors of disproportionate contribution to advantageous ratings for likelihood of sustaining goshawk habitat. Again the facilitator stressed that consensus was not desired nor necessary, but that a full discussion of the elements of an alternative be addressed. Following the discussion of each alternative each panelist related the alternative by assigning the 100 possible likelihood points. Original scores were retained, but second round scores could vary from initial scores. The group would then proceed through the same process to the next alternative, then re-rate. After all alternatives were completed, each panelist would have an opportunity to independently revisit their entire set of second round ratings. When completed, scores would be provided to the scribe.

Alternative 1 Discussion:

- Historic range seems to be somewhat intact. High scores in outcome 1 supports this. Outcome 2 indicates some gaps exist, possibly if interaction is low. Gap is considered a permanent gap in the time frame of 100 years.
- Alternative 1 is essentially a no further harvest alternative and represents an opportunity to rate the current condition and what effect 40 years of timber harvest has likely had on the existing goshawk population. except for the fact that cut over areas will be regenerating and supporting trees within the planning horizon to 2095. Thus second growth cut in 1994 will be 100 years old in 2095. With significant scores in outcome II (lower density and subject and increased vulnerability to stochastic events = 31) suggests that past management has already placed this species at risk of maintaining well-distributed and viable populations.
- Rating were done at this point.

Alternative 2 Discussion

- One rater moved into refugia only (80%), outcome 4.
- Reserves were considered better than managed (one panelist).
- Ratings indicated some forest management could lead to extirpation of the species across the forest (two 10%'s in outcome 5) - resource specialist observation.
- No matter of what level of timber harvest, goshawks will likely persist in SE Alaska within the next 100 years due to the presence of wilderness and monuments. A more important question is how would the population be doing from a demographic and longterm viability (distribution and interaction) point of view is another question.

- At this point the question was posed by the facilitator. what building block components are most critical to goshawk conservation and favorable likelihood ratings? The group agreed that components affecting major landscape configuration in proportion of old growth present were principal factors. These included elements such as principal timber management approach across the landscape, extended rotation superior to even-aged short rotation, VCU harvest threshold were better than no restrictions in age class distributions, presence of reserves was superior to no reserves. In contrast, other features such as beach 1 (0-500') or beach 2 (500-1000') or any of the riparian options were less significant in their contribution to an overall score - unless that feature made a significant contribution to overall landscape design. E.g. option 3 riparian that may contribute less than 10% of a landscape is less important but if Option 1 were used and protected 40-60 % of a landscape to maintain late-successional/old growth structure favored by goshawks, then it became an important overall rating ingredient. This discussion did not necessarily dismiss the value of individual landscape building block components, such as the beach and riparian components discussed earlier.
- Other variables such as riparian habitat, beach fringe, estuary cannot compensate for deficiencies in other major landscape components.
- The removal of habitat that produces prey is most of concern.
- Can improving the riparian corridor change the rating? Yes...but not to the extent necessary for a complete rating change. How the rest of the landscape is being handled overrides the effect of a larger riparian corridor left from harvesting.
- The magnitude of the transition from productive old growth to early serai stand structure is what drives the ranking of success or failure for the bird.
- Alternative was re-rated at this point.

Alternative 3 Discussion

- One panelist noticed a change he will make in Outcome 1 ranking.
- Option 1 for riparian habitat is only in key fish producing watersheds.
- The goshawk was one of the species used in the original design of large and medium reserves for this alternative. They were made for the bird.
- Size of reserves is a concern.
- Panelist preferred Alt. 3 due to its reserves.
- Alt. 3 and 5 appear similar in outcome with respect to net acres of old growth harvested.
- The huge reserves in Wilderness help the viability issue but do not necessarily help the well distributed issue.
- Reserves are not the panacea for goshawk management. Reserves were designed for viability not good goshawk management. Revisiting the size of reserves cast doubt that they alone can support a goshawk population, they are too small.
- Reserves are at different scales...Alt. 3 is at the low end of the scale. Intensity of management between reserves is crucial to the viability and distribution of the species, such that the even-aged short rotation silviculture practiced between the reserves caused significant concern while considering the merits of this alternative, such that a net of 14 points suggested that even with reserves, some portions of the population would persist only in refugia even with reserves. An average of 34 points suggested that even with reserves, there was a good chance that significant gaps in the distribution would occur indicated that well-distributed populations may not be maintained.
- Alt. 3 has reserves and habitat outside the reserves that can contribute to the support of the species.
- Panelist expressed that there is no ecological alternative within the range of alternatives (e.g. an alternative that managed commensurate with the size, scale and intensity of prevailing disturbance regimes using for example the UM prescription forestwide). This feeling was expressed and emphasized this throughout the two days of discussion. Panelists appreciated the attempt to integrate principals of disturbance ecology but token application of UM as presented was insufficient.
- The landscape design components are given a level of importance higher than the additional components (riparian, beach, estuary).

- At this point the panelist ranked the alternative again.

Alternative 4 Discussion:

- No reserves in this alternative.
- Initial likelihood outcome scores showed very few scores creating 'refugia' (Outcome IV, average score 6) and significant ratings for Outcome I - distribution similar to historic. Following an extended discussion, panelists generally held a favorable perspective of the extended rotation concept that could provide an amount and general distribution of habitat to sustain goshawks. However, 2 points of significant concern arose, the first was a general distrust that such a management scheme would ever really be implemented by the Forest Service. The second was that panelists repeated their displeasure with only rating at 100 years, and that to fully appreciate and realize the benefits of stand structure from an extended rotation a rating of a longer time period was necessary. It was reiterated that the 100 year rating was the agreed upon timeframe and that the concern would be captured in the notes and ultimate effects analysis. It was further emphasized that in spite of significant doubts that the Forest Service would ever implement such a scheme, the panelists must assume extended rotations would be implemented for a common basis for rating.
- This alternative goes to a smaller spatial analysis (VU oriented) that is more closely approximates the spatial scale over which goshawks use landscapes (e.g. use areas).
- Difficult to determine how this will look on the landscape, it does provide design flexibility.
- At this point the ratings were done again.

Alternative 5 Discussion:

- Similar to Alternative 4 except reserves are applied only in 4 biogeographic provinces. With the addition of selected reserves the ratings nearly excluded any possibility of creating refugia populations and increased ratings to the Outcome II category, e.g. reduced densities but generally the same distribution.
- Provinces with reserves have already been logged heavily. Future harvest will go to other areas.
- At this point a significant discussion ensued concerning the concept of a well distributed and representative population occurred. The rhetorical question was posed - what would be lost from a population viability or genetic diversity perspective if management choose to concentrate timber harvest on Prince of Wales Island and essentially completely sacrifice that landscape while saving other landscapes from harvest (e.g. Cleveland Peninsula). How does that affect the species if we lost every goshawk on POW? While there was significant hypothetical debate, there was no agreement on the proposed affect. Some concern was expressed that perhaps the POW genotype was perhaps 'closer' to the type locality of the Queen Charlotte subspecies and thus holds an important genetic reservoir for that subspecies, especially considering the ecological condition of goshawk habitat in coastal British Columbia. No panelist was comfortable writing off POW. In fact one panelist suggested that such an approach would be a management 'cop out' and relenting to timber management rather than good ecological forest management. No one suggested that the POW population represented a unique gene pool that needed to be conserved since the significant movement capability of the species precluded isolation of a distinct gene pool on the island. However, no one was also ready to sacrifice the island in totality as well.
- Panelists re-rated at this point.

Alternative 6 Discussion:

- Alternative 6 is similar to Alternative 2 in ratings, but a little closer to outcome 1 than outcome 5. While the 1/3 landscape retention of old growth was a key feature and maintenance of reserves in heavily managed landscapes, there remained significant concern in the matrix management of a 100 year rotation.

- Discomfort remained in the inability to provide a rating of greater than 100 years on a 200 year rotation scheme.
- Panelists re-rated at this point.

Alternative 7 Discussion:

- Conscious effort to maximize timber harvest with no specific landscape design features to manage for wildlife viability.
- Proportion of old growth in this alternative replicates problem areas for goshawks today (difficult to find relative to effort, irregular nesting).
- The 31% second growth factor was fully explained at this point by one panelist as a point of analysis. It was suggested that if one examined POW where significant past harvest had occurred (e.g. percent of second growth exceeded 25% or more) and the suspected 'population problems, then the 25-30% threshold could be used as a benchmark measure of present or potential future problems. On POW it had already been discussed that significant inventory effort had been expended there with little success in finding nests, with only 3 located. In addition reproductive performance of birds marked there is questionable, e.g. non-nesting, significant movements early in breeding season, irregular nesting, movements to other nesting habitats, etc. These behaviors were specifically examined in the Goshawk Assessment but because of insufficient sample size. However, an intuitive suspicion of a potential problem was agreed upon by the assessment team members. Collectively these factors may be indirect evidence of a stressed population and the habitat conditions there and indication of **a risk** to the population. Thus the % of the old growth harvested was used as a metric to evaluate between alternatives. and especially those that had planned to meet or exceed the 2530% level by 2095
- Panelists re-rated at this point.

Alternative 8 Discussion:

- Z-aged stand management certainly helps the species in terms of habitat structure for potential prey. Other benefits of amenity screens are turned off with base 1992 D.
- Riparian stringer through a clearcut does not have the same value as a riparian stringer in a forest mosaic or matrix.
- Panelist re-rated the alternative.

By this time in the sequence of revisiting alternatives, individual components had been already examined and discussion became abbreviated to cover the key components of the alternative and then re-rate.

Alternative 9 Discussion:

- 28% second growth element was a factor contributing to high likelihood scores for creating gaps or refugia in distribution.
- Panelist felt that this alternative needed to be rated with lower rating because it would give a **message** that this alternative provides less opportunity for success of the bird than others.
- Panelist re-rated this alternative at this point.

The group will look over each alternative now that they had a chance to review the group of alternatives. This is an opportunity for the last time to adjust ratings.

- The major landscape components were an order of magnitude higher than the other components.
- A final point of discussion brought up by the facilitator at nearly the end of the meeting was the concept of nest management. This was virtually ignored throughout the entire discussion. The group generally agreed that stand level nest management was not nearly as important as the overall condition of the quality and quantity of habitat features juxtaposed across the landscape to support a viable population. This echoes the approach taken by the Goshawk Assessment that nest site management is the inappropriate scale of management and that what happens at the landscape scale is an order of magnitude more important than at the nest stand scale. The

facilitator then indicated that a 100 acre nest stand protection standard was included in the proposed forrestwide standards and guides as direction for field personnel on what to do if an when a nest is located. Thus minimal management to maintain the integrity of the nest stand. Panelists also concluded that there are so few nests located on the Tongass. that all need to be protected.

- This also led to a discussion and general conclusion that incrementally more monitoring an knowledge of goshawk population will be required as more harvest risk is assumed within an alternative. But it was emphasized that monitoring is NO mitigation for assumed risk.

Evaluator Form

Tongass Land Management Plan Revision -- Panel Assessments

November 7-8, 1995

Panel Name: Northern Goshawk

Evaluator: X

Species Name: Northern Goshawk

Outcomes	Alternative 1		Alternative 2		Alternative 3		Alternative 4		Alternative 5		Alternative 6		Alternative 7		Alternative 8		Alternative 9	
	before	after	before	after	before	after	before	after	before	after	before	after	before	after	before	after	before	after
I	30	45	0	0	10	10	30	30	30	30	5	5	0	0	0	0	0	0
II	60	45	40	30	40	30	50	50	55	55	50	50	20	10	50	50	20	20
III	10	10	50	60	40	50	15	15	10	10	35	35	60	60	40	40	60	60
IV	0	0	10	10	10	10	5	5	5	5	10	10	20	30	10	10	20	20
V	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Did not feel comfortable to rate

Totals of outcomes must = 100

Notes on changed scores None

Evaluator Form

Tongass Land Management Plan Revision -- Panel Assessments November 7-8, 1995

Panel Name: Northern Goshawk

Evaluator: K

Species Name: Northern Goshawk

Outcomes	Alternative 1		Alternative 2		Alternative 3		Alternative 4		Alternative 5		Alternative 6		Alternative 7		Alternative 8		Alternative 9	
	before	after	before	after	before	after	before	after	before	after	before	after	before	after	before	after	before	after
I	80	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
II	20	40	0	0	20	40	30	40	30	50	0	0	0	0	0	0	0	0
III	0	0	10	10	60	40	50	50	50	50	50	50	0	10	20	20	10	10
IV	0	0	80	80	20	20	20	10	20	0	50	50	80	80	70	70	70	80
V	0	0	10	10	0	0	0	0	0	0	0	0	20	10	10	10	20	10
Total	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Did not feel comfortable to rate

Totals of outcomes must = 100

Notes on changed scores Alternatives 1,4,5, and 7: Same reason as endemics

Alternative 2: Even-aged least riparian habitat; no old-growth retained; 100-year roatation

Evaluator Form

Tongass Land Management Plan Revision -- Panel Assessments November 7-8, 1995

Panel Name: Northern Goshawk

Evaluator: A1

Species Name: Northern Goshawk

Outcomes	Alternative 1		Alternative 2		Alternative 3		Alternative 4		Alternative 5		Alternative 6		Alternative 7		Alternative 8		Alternative 9	
	before	after	before	after	before	after	before	after	before	after	before	after	before	after	before	after	before	after
I	90	80	0	0	0	20	70	40	70	40	10	10	0	0	0	0	0	0
II	10	20	30	45	30	40	10	40	10	40	60	65	30	30	60	40	60	60
III	0	0	30	30	30	25	10	20	10	20	20	25	30	30	30	35	30	30
IV	0	0	30	20	30	15	10	0	10	0	10	0	30	20	10	25	10	10
V	0	0	10	5	10	0	0	0	0	0	0	0	10	20	0	0	0	0
Total	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Did not feel comfortable to rate

Totals of outcomes must = 100

Notes on changed scores Changes made because I understood the impacts to particular species better after general discussion.

Evaluator Form

Tongass Land Management Plan Revision -- Panel Assessments

November 7-8, 1995

Panel Name: Northern Goshawk

Evaluator: YY

Species Name: Northern Goshawk

Outcomes	Alternative 1		Alternative 2		Alternative 3		Alternative 4		Alternative 5		Alternative 6		Alternative 7		Alternative 8		Alternative 9	
	before	after	before	after	before	after	before	after	before	after	before	after	before	after	before	after	before	after
I	80	80	0	0	60	40	0	20	20	20	0	10	0	0	0	0	0	0
II	20	20	0	20	40	30	40	40	60	60	10	60	0	10	20	20	0	10
III	0	0	70	60	0	20	50	30	20	20	70	20	60	60	70	70	70	70
IV	0	0	30	20	0	10	10	10	0	0	20	10	40	30	10	10	30	20
V	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Did not feel comfortable to rate

Totals of outcomes must = 100

Notes on changed scores Changes occurred based on discussion of activities of viability and well-distributed.

Summary Before

SUMMARY BEFORE

Panel Name: Northern Goshawk

Tongass Land Management Plan Revision -- Panel Assessments

Species Name: Northern Goshawk

November 7-8, 1995.

Alternative 1							
Evaluator	X	K	A1	YY	5	6	Mean
Outcomes							
I	30	80	90	80			70
II	60	20	10	20			28
III	10	0	0	0			3
IV	0	0	0	0			0
V	0	0	0	0			0

Alternative 2							
Evaluator	X	K	A1	YY	5	6	Mean
Outcomes							
I	0	0	0	0			0
II	40	0	30	0			18
III	50	10	30	70			40
IV	10	80	30	30			38
V	0	10	10	0			5

Alternative 3							
Evaluator	X	K	A1	YY	5	6	Mean
Outcomes							
I	10	0	0	60			18
II	40	20	30	40			33
III	40	60	30	0			33
IV	10	20	30	0			15
V	0	0	10	0			3

Alternative 4							
Evaluator	X	K	A1	YY	5	6	Mean
Outcomes							
I	30	0	70	0			25
II	50	30	10	40			33
III	15	50	10	50			31
IV	5	20	10	10			11
V	0	0	0	0			0

Alternative 5							
Evaluator	X	K	A1	YY	5	6	Mean
Outcomes							
I	30	0	70	20			30
II	55	30	10	60			39
III	10	50	10	20			23
IV	5	20	10	0			9
V	0	0	0	0			0

Alternative 6							
Evaluator	X	K	A1	YY	5	6	Mean
Outcomes							
I	5	0	10	0			4
II	50	0	60	10			30
III	35	50	20	70			44
IV	10	50	10	20			23
V	0	0	0	0			0

Alternative 7							
Evaluator	X	K	A1	YY	5	6	Mean
Outcomes							
I	0	0	0	0			0
II	20	0	30	0			13
III	60	0	30	60			38
IV	20	80	30	40			43
V	0	20	10	0			8

Alternative 8							
Evaluator	X	K	A1	YY	5	6	Mean
Outcomes							
I	0	0	0	0			0
II	50	0	60	20			33
III	40	20	30	70			40
IV	10	70	10	10			25
V	0	10	0	0			3

Alternative 9							
Evaluator	X	K	A1	YY	5	6	Mean
Outcomes							
I	0	0	0	0			0
II	20	0	60	0			20
III	60	10	30	70			43
IV	20	70	10	30			33
V	0	20	0	0			5

SUMMARY AFTER

Panel Name: Northern Goshawk
 Species Name: Northern Goshawk

Tongass Land Management Plan Revision -- Panel Assessments
 November 7-8, 1995

Alternative 1							
Evaluator	X	K	A1	YY	5	6	Mean
Outcomes							
I	45	60	80	80			66
II	45	40	20	20			31
III	10	0	0	0			3
IV	0	0	0	0			0
V	0	0	0	0			0

Alternative 2							
Evaluator	X	K	A1	YY	5	6	Mean
Outcomes							
I	0	0	0	0			0
II	30	0	45	20			24
III	60	10	30	60			40
IV	10	80	20	20			33
V	0	10	5	0			4

Alternative 3							
Evaluator	X	K	A1	YY	5	6	Mean
Outcomes							
I	10	0	20	40			18
II	30	40	40	30			35
III	50	40	25	20			34
IV	10	20	15	10			14
V	0	0	0	0			0

Alternative 4							
Evaluator	X	K	A1	YY	5	6	Mean
Outcomes							
I	30	0	40	20			23
II	50	40	40	40			43
III	15	50	20	30			29
IV	5	10	0	10			6
V	0	0	0	0			0

Alternative 5							
Evaluator	X	K	A1	YY	5	6	Mean
Outcomes							
I	30	0	40	20			23
II	55	50	40	60			51
III	10	50	20	20			25
IV	5	0	0	0			1
V	0	0	0	0			0

Alternative 6							
Evaluator	X	K	A1	YY	5	6	Mean
Outcomes							
I	5	0	10	10			6
II	50	0	65	60			44
III	35	50	25	20			33
IV	10	50	0	10			18
V	0	0	0	0			0

Alternative 7							
Evaluator	X	K	A1	YY	5	6	Mean
Outcomes							
I	0	0	0	0			0
II	10	0	30	10			13
III	60	10	30	60			40
IV	30	80	20	30			40
V	0	10	20	0			8

Alternative 8							
Evaluator	X	K	A1	YY	5	6	Mean
Outcomes							
I	0	0	0	0			0
II	50	0	40	20			28
III	40	20	35	70			41
IV	10	70	25	10			29
V	0	10	0	0			3

Alternative 9							
Evaluator	X	K	A1	YY	5	6	Mean
Outcomes							
I	0	0	0	0			0
II	20	0	60	10			23
III	60	10	30	70			43
IV	20	80	10	20			33
V	0	10	0	0			3

Before-After Means

BEFORE-AFTER MEANS COMPARISON

Outcomes	Alternative 1		Alternative 2		Alternative 3		Alternative 4		Alternative 5		Alternative 6		Alternative 7		Alternative 8		Alternative 9	
	Before	After	Before	After	Before	After	Before	After	Before	After	Before	After	Before	After	Before	After	Before	After
I	70	66	0	0	18	18	25	23	30	23	4	6	0	0	0	0	0	0
II	28	31	18	24	33	35	33	43	39	51	30	44	13	13	33	28	20	23
III	3	3	40	40	33	34	31	29	23	25	44	33	38	40	40	41	43	43
IV	0	0	38	33	15	14	11	6	9	1	23	18	43	40	25	29	33	33