

United States
Department of Agriculture

Forest Service

Tongass National Forest
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Reply to: 1920-2-1 (RS-G-10-h)

Date: November 27, 1995
Revised: November 29, 1995

Subject: Other Terrestrial Mammals Panel Assessment Summary

To: Bruce René, TLMP

cc: Terry Shaw and Winston Smith, FSL/TLMP

Introduction

On November 7 and 8, 1995, a panel of wildlife scientists met to offer professional judgment regarding the effects of implementing proposed TLMP alternatives on selected terrestrial mammals of Southeast Alaska. This memo documents the background information that was provided to the panel, lists the mammals considered by the panel, describes the approach used by the panel in assigning likelihood outcomes, and summarizes the results of the panel's work.

Background Information

Panelists were provided verbal, written, and graphical information concerning biological resources and management of the Tongass National Forest (Tongass).

The following talks were delivered to the panel:

- Human history of Alaska and the laws since 1959 affecting the Tongass by Jim Case, Alaska Marine Highway
- Ecology of the Tongass by Michael McClellan, FSL
- Forest Planning Process by Bruce René, TLMP
- Alternatives by Chris Iverson, TLMP/Regional Office
- Panel Rating Process by Terry Shaw, FSL/TLMP
- Mammals of Southeast Alaska, Rod Flynn, Alaska Department of Fish and Game.

The following written materials were made available to panelists:

- TLMP Framework for Development of Draft Alternatives (handout)

- Panel Process (handout)
- Forest-wide Standards and Guidelines (11/6/95 draft)
- Review comments on TLMP Assessments
- Extinction Rates in Archipelagoes: *Implications for Populations in Fragmented Habitats* by T.V. Burkey, *Conservation Biology*, 9(3):527-541.
- *The Mammals of Southeast Alaska. A Distribution and Taxonomic Update* by S.O. MacDonald and J.A. Cook, 1994. University of Alaska Museum, Fairbanks, 152 pp.
- Timber harvest levels by Value Comparison Unit (VCU)
- Additional acres potentially to be harvested through year 2095, by alternative
- Miles of existing roads in 1995
- Estimated miles of road to be constructed by VCU by Alternative for Years 1995-2095.

The maps listed below were displayed for panelists:

- Land Use Designations for each alternative
- Areas potentially to be harvested by year 2095 for each alternative
- Old-growth projected for year 2095 with old-growth polygons superimposed
- VCU boundaries
- Existing roads
- Proposed road map for Ketchikan Area.

Mammal Groups Considered

The panel identified two groups of mammals for evaluation: (1) widely distributed taxa associated with productive old-growth (*widely distributed group*), and (2) endemic taxa associated with productive old-growth (*endemic group*). Refer to meeting notes for explanations on how these groups were derived.

The widely distributed group is comprised of the following:

1. black bear (*Ursus americanus pugnax* Swarth)
2. Canada lynx (*Lynx canadensis canadensis* Kerr)
3. wolverine (*Gulo gulo luscus* Linnaeus)
4. fisher (*Martes pennanti* [Rhoads] Miller)
5. northern flying squirrel (*Glaucomys sabrinus zaphaeus* [Osgood] A.H. Howell)
6. river otter (*Lutra canadensis mira* Goldman)
7. mountain goat (*Oreamnos americanus columbiae* Hollister)
8. silver-haired bat (*Lasiorycteris noctivagans* [LeConte] Peters)

9. California Myotis (*Myotis californicus caurinus* Miller)
10. Keen's Myotis (*Myotis keenii keenii* [Merriam] Miller and G.M. Allen)
11. little brown Myotis (*Myotis lucifugus alascensis* Miller)
12. long-legged Myotis (*Myotis volans longicrus* [True] Miller and G.M. Allen).

The endemic group is comprised of the following:

1. Prince of Wales Island flying squirrel (*Glaucomys sabrinus griseifrons* A.H. Howell)
2. beaver (*Castor canadensis phaeus* Heller)
3. Keen's mouse (*Peromyscus keeni sitkensis* Hogan et al. 1993)
4. red-backed vole (*Clethrionomys gapperi stikinensis* Hall and Cockrum)
5. red-backed vole (*Clethrionomys gapperi solus* Hall and Cockrum)
6. red-backed vole (*Clethrionomys gapperi wrangeli* [V.Bailey] Hall and Cockrum)
7. red-backed vole (*Clethrionomys gapperi phaeus* Swarth)
8. Admiralty Island meadow vole (*Microtus pennsylvanicus admiraltiae* Heller)
9. Sitka meadow vole (*Microtus oeconomus sitkensis* Merriam)
10. ermine (*Mustela erminea aiascensis* Hall)
11. ermine (*Mustela erminea initis* Hall)
12. ermine (*Mustela erminea celenda* Hall)
13. Admiralty Island ermine (*Mustela erminea salva* Hall)
14. Suemez Island ermine (*Mustela erminea seclusa* Hall).

Assignment of Likelihood Outcomes

The panel used the following approach for assigning likelihood scores for each group. Likelihood scores given to the most vulnerable or sensitive taxon within a group were applied to the entire group. For example, if a panelist reasoned that habitat conditions created by Alternative 6 represented a 30 percent likelihood that Outcome V (extirpation) would occur for Keen's Myotis, then the panelist would assign a 30 percent likelihood score for Outcome V to the *widely distributed group*.

Summary of Panel Results

A summary of panel discussions and predicted likelihood outcomes is presented below. Likelihood scores characterized below are those that were developed after individual panelist ratings were given and discussions of alternatives were completed. Information provided during discussion by panelists with more Tongass experience assisted the other panelists with making more informed decisions about assignment of likelihood points. Refer to the meeting notes and

evaluator forms for more detailed information concerning the panel process. It should be emphasized that these outcomes are predictions based upon limited scientific information and the best professional judgment of the wildlife scientists on the panel within the framework established by the TLMP planning team.

The panel predicted that all of the proposed alternatives had some likelihood of causing extirpation within the endemic group. This prediction was attributed to both historical and proposed timber related activities; likelihoods increased with higher levels of timber harvest proposed. The panel's stated position was that any alternative that would result in extirpation was unacceptable on National Forest Lands. For various reasons the panel also predicted that Mountain goat, one ermine (*Mustela erminea salva*), beaver (*Castor canadensis phaeus*), and Admiralty Island meadow vole would experience Outcome I conditions under all alternatives

The panel also predicted that most of the alternatives have a high likelihood of creating conditions where wildlife populations would be no longer well distributed and viability could be significantly compromised. According to the panel, a serious problem (viability) could exist once a taxon or group reaches Outcome II or III (depending on the circumstances). Most of the alternatives (except Alternative 1) had some likelihood of causing extirpation of some taxa in the *widely distributed group*.

Alternative 1 was generally considered by the panel as the alternative least likely to negatively impact taxa under consideration. The panel predicted a higher likelihood that the *widely distributed group* would experience ephemeral range distribution gaps (Outcome II); the *endemic group* would occur more frequently in refugia (Outcome IV). Panelists assigned these outcomes based upon historical levels of timber related activities. The panel suggested that Alternative 1 could be improved by restoring old-growth in extensively harvested areas (northern Prince of Wales Island for example).

Alternative 5 was regarded by panelists as the second least likely alternative to negatively impact taxa under consideration. The panel predicted higher likelihoods that the *widely distributed group* would experience both ephemeral and permanent range distribution gaps (Outcomes II and III) that could affect viable populations well-distributed across the planning area. Little brown **Myotis** was cited as one animal whose local populations would be more ephemeral under this alternative; it was predicted that fisher could experience significant gaps in its historic range. The *endemic group* would more likely be restricted to refugia under Alternative 5 (Outcome IV). These circumstances would increase the risk of extirpation as a result of isolation. Prince of Wales Island flying squirrel was noted as one animal that would likely only exist in refugia. A relatively longer rotation, uneven- and two-aged management systems, and old-growth retention were features the panel liked about this alternative. Panelists stressed that reserves proposed under this

alternative should be carefully located within the ranges of vulnerable wildlife and that corridors be truly functional as defined in the V-pop report.

Panelists ranked Alternatives 3, 4, 6, and 8 as intermediate among the alternatives in terms of likelihood of negatively impacting taxa under consideration. For both the *widely distributed* and *endemic* groups, likelihood scores were fairly evenly distributed among Outcomes II, III, and IV; scores for outcome extremes (I and V) were consistently lower for these alternatives. For most of these alternatives, local populations of Sitka mouse could become more ephemeral (Outcome II); northern flying squirrel could experience permanent gaps in its historic range or exist only in refugia (Outcome III or IV); fisher could exist only in refugia (Outcome IV). The panel suggested that Alternatives 3, 6, and 8 could be improved by lengthening rotation ages and reducing harvest levels. The greater protection afforded riparian habitat proposed under Alternative 3 was identified by the panel as a positive feature for maintaining viable river otter populations.

The panel considered Alternatives 2, 7, and 9 to be most likely among alternatives to create wildlife viability problems. The panel predicted that implementation of these alternatives would result in high likelihoods that both the *widely distributed and endemic* groups would exist only in refugia (northern flying squirrel for example) or would become extirpated (Keen's *Myotis* for example). It was suggested that these alternatives could be improved by incorporating several features of Alternative 5-- longer rotations, uneven-aged management, and higher levels of riparian habitat protection.

Other Panel Recommendations

The panel provided the following additional recommendations that it felt should be considered in the preparation of the Forest Plan:

- Develop an alternative that more closely follows the Viable Population Committee's (V-Pop) recommendations: Need to apply reserves, establish functional corridors, maintain beach fringes, and maintain linkages (refer to V-pop report).
- Develop standards and guidelines for small islands
 - 0 minimum size below which no management activity is permitted
 - 0 percent harvest allowed by island size
 - 0 importance for population connectivity
 - 0 level of endemism.
- Map individual taxon ranges and compare the ranges with proposed locations of development-oriented land use designations for effects analyses.

- Consider extremely rare bats such as Keen's Myotis. It is currently on the Red List in British Columbia and only three specimens have been collected from the Tongass. Because of the paucity of data, the panel was unable to state whether a viable Keen's Myotis population now exists.
- Collect more basic information on the distribution ranges of all mammal taxa on the Tongass.

/s/ KENT R. JULIN

Kent R. Julin
Facilitator, Other Terrestrial Mammals Panel
Research Forest Ecologist
FSL/TLMP

OTHER TERRESTRIAL MAMMALS PANEL
Panel Assessment Meeting Notes - Tongass Land Management Plan (TLMP)
Chapel By The Lake, November 7-9, 1995

The panel session began with group introductions. In attendance were:

Facilitator: Kent Julin, USDA Forest Service, FSL-TLMP, Juneau, Alaska
Local Resource Person: Rod Flynn Alaska Department of Fish and Game,
Douglas, Alaska

Evaluators:

- Howard Sakai, Redwood National Park, Orick California
- Bill Block, USDA Forest Service, Rocky Mountain Station FSL,
Flagstaff, Arizona
- Joe Cook University of Alaska Museum, Fairbanks, Alaska
- Lowell Suring, Chugach National Forest, Anchorage, Alaska

Recorder: Ellen Campbell, USDA Forest Service, Regional Office, Juneau,
Alaska

Silent Observer: Fristi Kantola, USDA Forest Service, Regional Office,
Juneau, Alaska

Other members of the TLMP Team in the room and participated in the discussion
during short intervals:

- Terry Shaw, FSL-TLMP, Juneau, Alaska
- Winston Smith, FSL-TLMP, Juneau, Alaska

Meeting Notes for November 7, 1995

The charge to the group was to look at "other terrestrial mammals" and how they could respond to implementation of each of the draft TLMP alternatives. Each evaluator will provide an individual score. The group will first need to identify which species or groups to look at and determine how to deal with species and groups that are very different in habitat requirements and biology.

Q: Why was this panel assembled in the first place? Why are we to look at "other terrestrial mammals?" A: This panel will look at terrestrial mammals that were not covered by other panels (such as brown bear and deer).

C: We need to look at species restricted to islands, if we get endangered species, they will be on islands.

Q: Are we talking viability, or are we to look at more than that for example harvestable surplus? A: Might use different standards for different species depending on whether they are harvested or not.

Rod Flynn, provided a general overview of the terrestrial mammals of Southeast Alaska.¹

There are 54 documented terrestrial mammal species, 27 endemic species (maybe more).

Five (5) introduced, most are undesirable, some extinct now:

- Norway rat (*Rattus norvegicus*)
- house mouse (*Mus musculus*)
- raccoon (*Procyon lotor*) - extirpated
- arctic fox (*Alopex lagopus*) - extirpated
- elk (*Cervus elaphas* - Etolin Island area)

Six (6) bats - most are rare and distributions poorly understood

- little brown bat (*Myotis lucifuga alascensis*) - Southeast-wide
- Keen's myotis (*Myotis keenii keenii*, - rare)
- long-legged myotis (*Myotis vofans longicrus*) - rare
- California myotis (*Afotis californica caurinus*) - rare
- silver-haired bat (*Lasionycteris notivagans*) - rare
- big brown bat (*Eptesicus*; -fuscus) - not confirmed

Eleven (11) species on distribution edge

Extremely rare

- collared pika (*Ochotona collaris*) - White Pass, Skagway
- arctic ground squirrel (*Spermophilus parryii*) - White Pass, Skagway
- fisher (*Martes pennanti pacifica*) - Taku River; southern mainland-
- least weasel (*Mustela nivalis*) - Glacier Bay
- mountain lion (puma *concolor*) - Stikine River
- caribou (*Rangifer tarandus*)
- Dali's sheep (*Ovis dalli*) - Chilkat River

u n c o m m o n

- bushy-tailed woodrat (*Neotoma cinerea occidentalis*) - mainland
- coyote (*Canis latrans*) - mainland
- red fox (*Vulpes vulpes*) - mainland
- Canada lynx (*Lynx canadensis*) - mainland

Two (2) endemic species - very restricted distribution

- Glacier Bay water shrew (*Sorex alaskanus*²) - Glacier Bay

Coronation Island vole (*Microtus coronarius*²) - Coronation Island

Five (5) cosmopolitan species

beaver

(*Castor canadensis belugae*) - remainder of Southeast

(*Castor canadensis phnew*²) - Admiralty; Baranof, and Chichagof islands

ermine

(*Mustela erminea arctica*) - Yakutat and Glacier Bay

(*Mustela erminea alascensis*²) - mainland

(*Mustela erminea initis*²) - Baranof and Chichagof islands

(*Mustela erminea salva*²) - Admiralty Island

(*Mustela erminea cdelenda*²) - Prince of Wales Island

(*Mustela erminea seclusa*²) - Suemez Island

mink

(*Mustela vison energumenos*) - mainland

(*Mustela vison nesolestes*²) - Alexander Archipelago

river otter

(*Lontra canadensis mira*²) - Southeast Alaska endemic

black-tailed deer

(*Odocoileus hernionus sitkensis*²) - Southeast Alaska

Seven (7) widely distributed species

common shrew

(*Sorex cinereus cinereus*) - Skagway

(*Sorex cinereus streatori*) - mainland and northern islands

dusky shrew

(*Sorex monticolus aiascensis*³) - Yakutat

(*Sorex monticolus ellassodon*²) - Admiralty, Baranof, Kuiu, Kupreanof,
Prince of Wales islands

(*Sorex monticolus longicaudus*³) - mainland, Wrangell Island

(*Sorex monticolus malitiosus*²) - Warren Island

(*Sorex monticolus obscurus*) - Upper Lynn Canal, coast mountains

Keen's mouse

(*Peromyscus keeni algidus*³) - northern Lynn Canal

(*Peromyscus keeni hylaeus*) - Admiralty, Kupreanof, Mitkof,
Prince of Wales islands

(*Peromyscus keeni macrorhinus*³) - mainland

(*Peromyscus keeni oceanicus*²) - Forester Island.

(*Peromyscus keeni sitkensis*²) - Baranof, Chichagof, Coronation, Duke,
and Warren islands.

long-tailed vole

(*Microtus longicaudus littoralis*³) - mainland and most islands

- (*Mircotus longicaudus vellerosus*) - Skagway
 wolf
 (*Canis lupus ligoni*²) - mainland, southern islands
 black bear
 (*Ursus americanus pugnax*²) - mainland, southern islands
 (*Ursus americanus emmonsii*²) - mainland, southern islands
 brown bear
 (*Ursus arctos horribilis*) - mainland, northern islands

Eighteen (18) narrowly distributed species

- water shrew (*Sorex plaustris navigator*) - mainland
 snowshoe hare (*Lepus americana dalli*) - northern mainland
 hoary marmot
 (*Marmota caligata caligata*) - mainland
 (*Marmota caligata vigilis*²) - Glacier Bay
 red squirrel
 (*Tamiasciurus hudsonicus petulans*) - Glacier Bay to Skagway
 (*Tamiasciurus hudsonicus picatus*²) - mainland, most islands
 except Prince of Wales Island
 northern flying squirrel
 (*Glaucomys sabrinus griseifrons*²) - Prince of Wales Island
 (*Glaucomys sabrinus zaphaeus*³) - mainland
 northern red-backed vole
 (*Clethrionomys rutilus dawsoni*) - northern mainland
 (*Clethrionomys rutilus glacialis*²) - Yakutat to Glacier Bay
 southern red-backed vole
 (*Clethrionomys gapperi phaeus*²) - southern mainland
 (*Clethrionomys gapperi saturatus*) - southern mainland
 (*Clethrionomys gapperi solus*²) - Revillagigedo Island.
 (*Clethrionomys gapperi stikiniensis*²) - Stikine R. to Cleveland Penn.
 (*Clethrionomys wrangeli*²) - Wrangell Island
 meadow vole
 (*Mircotus pennsylvanicus admiraltiae*²) - Admiralty Island
 (*Mircotus pennsylvanicus alcorni*) - Chilkat Valley
 (*Mircotus pennsylvanicus rubidus*) - Taku & Stikine valleys, Mitkof
 Island
 tundra vole
 (*Mircotus oeconomus littoralis*) - Northern Lynn Canal to Yakutat
 (*Mircotus oeconomus sitkensis*²) - Baranof & Chichagof islands
 (*Mircotus oeconomus yakutatensis*²) - north Yakutat Bay
 muskrat
 (*Ondatra zibethicus spatulatus*) - mainland, Admiralty & Revillagigedo

islands
 northern bog lemming
 (*Snaptomys borealis truei*) - mainland, Wrangall Island
 meadow jumping mouse
 (*Zapus hudsonius aiascensis*) - mainland, Revillagigedo Island
 western jumping mouse
 (*Zapus princeps saltator*) - mainland
 porcupine
 (*Erethizon dorsatum nigresens*) - mainland & adjacent islands
 (*Erethizon dorsatum myops*) - mainland north of Lynn Canal
 marten
 (*Martes americana actiosa*) - northern mainland east of Lynn Canal
 (*Martes americana caurina*) - mainland
 (*Martes americana kenaiensis*) - west of Lynn Canal to Yakutat
 wolverine
 (*Gulo gulo luscus*) - mainland; Mitkof, Kreprianof, Kuiu, Wrangell,
 Revillagigedo Island.
 moose
 (*Alces alces andersoni*) - southern mainland
 (*Alces alces gigas*) - northern mainland
 mountain goat
 (*Oreamnos americana columbine*) - mainland; Baranof & Revillagigedo
 islands

¹ Based on MacDonald, S. O. and J. A. Cook. 1994. The mammals of Southeast Alaska. A distribution and taxonomic update. University of Alaska Museum, Fairbanks, Alaska. 152pp.

² mammal species endemic to Southeast Alaska

³ mammal species largely confined to Southeast Alaska

The "Viable population committee" (V-pop) selected 13 species to examine in depth -

brown bear, marten, wolverine, northern flying squirrel, wolf, lynx, black bear, least weasel, mink, river otter, mountain goat, Keen's mouse, Coronation Island vole

Brown bear, marten, and wolf will be handled in separate panels, there is relatively more information available about these species and there is sensitivity about them.

Q: Why did the viability committee select these species? A: Used a rating system but do not want to prejudice panel in selection of species to look at this time.

C: V-pop panel seemed to pick charismatic/ hunted/high profile species. A: This panel can look at whole complement of species, not just V-pop list.

C: Recommendations by Kiester and Eckert not included; one evaluator expressed disappointment. Should have been included in planning process already. This panel has to start from scratch. Recommendation have already been given for inventory, recognizing lack of knowledge, and that archipelagos are very complicated (underlying other problems). We do not have basic information for critical review. Need to discuss basic information needed in order to provide scientific input, not comfortable with what we are being asked to do.

C: Perhaps discuss species in two blocks - Old-growth species and endemics (unusually large number). For some of the endemics, we're not sure of true subspecies as they were described long ago). Need to take proactive approach to gather information for next planning round. We're trying to put science on the Tongass without data. We're putting our professional judgment on the line in front of public, but working with little information.

C: Every group works with information gaps.

C: Have some general information on what is there. We need to proceed, acknowledging the level of concern with gaps in information.

C: Recognize that Keen's myotis a taxon of concern (red list in British Columbia). Perhaps for some species that we know something about, we can attempt rating. For others, say we made attempt but no conclusion.

Q: What do we know about assemblages of small mammals?

C: Can look at old-growth dependent species.

Q: What do we know about small mammal use of young-growth? A: Do know that bats do not use it, can make general statement.

Q: Would bats use 2-age harvest area? A: Probably. Uneven-aged management would have less impact on most species when compared to clearcutting. Riparian areas are subject to windthrow, but still have structure - not like clearcutting.

Q: Is there a relationship between size of islands and endemism? A: Many islands have not been looked at, not sure if named endemic are 'true' though genetic work indicates so far that endemics are real. C: Smaller islands more prone to endemism; islands farther further from the mainland are probably also more prone to endemism.

Q: What other concerns are there besides timber harvest? A: mining, road-building, recreation. C: These are probably lesser impacts than timber harvest.

Q: What is the definition of well-distributed and are we supposed to be considering it also? A: Maintaining species persistence in its historic range over time (100 years).

Q: How many squirrels do you have to have, and where do they need to be to be "well-distributed"? C: On a stand-by-stand basis, will not have viable populations in some stands as they are harvested, so what scale do we need to look at? If not on stand-by-stand, then on watershed, or ecological province?

C: Some species have range larger than stand, so have to look larger than stand level.

First look at old-growth-dependent species:

bats - 5 species (as a group), maybe Keen's myotis should be looked at as separately important. Other species at edge of range with few records.

C: Perhaps another habitat category to look at is riparian.

C: back to old-growth - Looking at "productive old-growth" not all old-growth because of harvesting. Lots of species found in forest but not exclusively in old-growth or even exclusively in forested habitats. Can say some species are "old-growth associated" but cannot make call on if they are "old-growth dependent".

C: Need to also think about young-growth, a sterile environment. Likely 150 years before recolonization occurs by forest-associated species.

C: May not be able to select "old-growth dependent" species, may be more comfortable defining species as "old-growth associated."

Q: Define old-growth? A: Anything not cut so far. Wide range of tree size, height, dependent on site conditions, equal or more than 8,000 board ft/ac.

C: Perhaps should call group "old-growth associated" rather than "dependent." C: Better to look at "strongly-associated."

Development of "widely distributed old-growth associated taxa" list. The panel began by reviewing the taxa contained in the V-pop list.

The panel decided to include the following six taxa from the V-pop list:

1. wolverine (*Gulo gulo luscus*)
2. northern flying squirrel (*Glaucomys sabrinus zaphaeus*)
3. Canada lynx (*Lynx canadensis canadensis*)
4. black bear (*Ursus americanus pugnax*)
5. river otter (*Lontra canadensis mira*)
6. mountain goat (*Oreamnos arnericanus columbiae*)

The panel decided to add the following taxa to the V-pop list:

7. Keen's Myotis (*Myotis keenii keenii*)
8. silver-haired bat (*Lasionycteris noctivagans*)
9. long-legged Myotis (*Myotis volans longicrus*)

10. California Myotis (*Myotis californicus caurinus*)
11. little brown Myotis (*Myotis lucifugus alascensis*)
12. fisher (*Martes pennanti*)

The panel decided to exclude the following six taxa from the V-pop list:

- Brown bear (*Ursus arctos horribilis*) -- addressed by brown bear panel)
- wolf (*Canis lupus ligoni*²) -- addressed by wolf panel
- Marten (*Martes americana actuosa*, *Martes americana caurina*, *Martes americana kenaiensis*) -- addressed by marten panel
- Least weasel (*Mustela nivalis*) -- not necessarily strongly old-growth associated
- Mink (*Mustela vison energumenos*, *Mustela vison nesolestes*) -- not necessarily strongly old-growth-associated
- Coronation Island Vole (*Microtus coronarius*) -- will not be affected by proposed alternatives

The panel decided to include Keen's mouse (*Peromyscus kenni sitkensis*) to the list of endemics.

Development of "endemic group" list. The panel used the Mammal Taxa Endemic to Southeast Alaska list from MacDonald and Cook (1994) to compile a list of endemic taxa for consideration. The following taxa were used from this list:

1. Prince of Wales Island flying squirrel (*Glaucomys sabrinus griseifrons*) Prince of Wales Island
2. beaver (*Castor canadensis phaeus*) Admiralty Island and possibly Chicagof Island
3. Keen's mouse (*Peromyscus keeni sitkensis*) Baranof, Chichagof, Coronation, Warren, Duke Islands
4. red-backed vole (*Clethrionomys gapperi stikinensis*) Stikine River, Cleveland Peninsula
5. red-backed vole (*Clethrionomys gapperi solus*) Revillagigedo Island
6. red-backed vole (*Clethrionomys gapperi wrangeli*) Wrangell Island, Sergief Island, Stikine River

7. red-backed vole (*Clethrionomys gapperi phaeus*) Boca de Quadra, Chikamin River, adjacent British Columbia
8. Admiralty Island meadow vole (*Microtus pennsylvanicus admiraltiae*) Admiralty Island
9. Sitka meadow vole (*Microtus oeconomus sitkensis* Merriam) Baranof and Chichagof islands
10. ermine (*Mustela erminea alascensis*) - mainland
11. ermine (*Mustela erminea initis*) Baranof and Chichagof islands
12. ermine (*Mustela erminea celenda*) Prince of Wales, Long, and Dall islands
13. Admiralty Island ermine (*Mustela erminea salva*) Admiralty Island
14. Suemez Island ermine (*Mustela erminea seclusa*) Suemez Island

The taxa listed below were removed from the MacDonald and Cook (1994) list by the panel because (1) they were determined not to be impacted because of their limited range, (2) are not strongly old-growth associated, (3) are widespread and management activities are not likely to affect their viability or distribution, or (4) will be discussed by a separate panel:

- dusky shrew (*Sorex monticolus malitiosus*) Warren and Coronation islands - will not be affected by any alternatives
- dusky shrew (*Sorex monticolus delassodon*) Southeast Alaska and Queen Charlotte Islands - widespread
- Glacier Bay water shrew (*Sorex alaskanus*) galcier Bay - not affected
- hoary marmot (*Marmota caligata vigilis*) Glacier Bay - not affected
- red squirrel (*Tamimcius hudsonicus petulans*) Southeast Alaska - widespread and mgmt actions not likely to affect viability or distribution
- Keen's mouse (*Peromyscus keeni hylaeus*) most of Alexander Archipelago and mainland - widespread
- Keen's mouse (*Perornyscus keeni oceanicus*) Forrester I - not affected
- northern red-backed vole (*Clethrionomys rutilus glacialis*) Glacier Bay) - not affected

- tundra vole (*Microtus oeconomus yakutatensis*) North shore of Yakutat Bay; Antell 1987 - not on the Tongass National Forest
- Coronation Island vole (*Microtus coronarius*) Coronation, Warren, and Fox-rester islands - not affected
- wolf (*Canis lupus ligoni*) Southeast Alaska - discussed by wolf panel
- black bear (*Ursus americanus pugnax*) Southeast Alaska - considered within widely distributed groups
- mink (*Mustela vison nesolestes*) Alexander Archipelago - widespread

C: Want to stay inclusive, not delete all widespread species.
Next look at distributions and degree of overlap:

Northern portion of Southeast Alaska:

- Admiralty Island - beaver, 1 microtus, 1 ermine
- Chichagof Island - peromyscus, tundra vole (*Microtus*), 1 ermine,
- Baranof Island - same taxon as for Chichagof Island

Northern mainland (down to Stikine River) - 1 ermine

Central islands:

- Wrangel I - s. red-backed vole (*Clethionomys*)
- Revillagigedo I - s. red-backed vole (different subspecies)

Southern Islands and mainland:

- s. red-backed vole (two subspecies)
- 2 ermine species (Prince of Wales and Suemez islands)
- northern flying squirrel

Continued discussion of distribution of old-growth associated species:

Wolverine - also access consideration. Kuiu, Mitkof, Kupreanof islands
C - Need information on species-habitat relationship. Are there limiting factors for some species? Are there management practices which may enhance habitat?

Northern flying squirrel - needs cavities, concern for movement in areas of fragmentation. Endemic to Prince of Wales Island and on entire mainland, though appears to be more abundant on south mainland

lynx - associated with snowshoe hare. On northern mainland, managed as furbearer with tripping season. There is some question as to whether this is a persistent population or if only immigrants from Canada. Snowshoe hares are not abundant. Species uses specialized habitat.

Black bear - on southern islands and mainland, not on Admiralty Baranof, and Chichagof islands (where brown bears are). Lack of food in understory in young-growth, access concerns, attraction to dumps is a concern, potential depletion of denning site with removal of old-growth.

River otter - marine associated with beach fringe, uses areas within 500 feet of beach, denning sites generally inland and associated with old-growth.
C: Beach fringe and riparian area management are very relevant.

Mountain goat - throughout mainland and introduced on Revillagigedo and Baranof islands. generally in winter they go low, even dropping down to saltwater. Distribution is patchy throughout Southeast Alaska and there is little interchange between populations. If human access improves, it is possible for a population to be hunted out even with restrictive hunting regulations. Helicopter tours may have impact.

Bats - For all species except little brown, distribution in Southeast Alaska is known from fewer than 5 specimens. Of those species, Keen's myotis on "red list" in British Columbia. Distribution is Oregon, Washington, British Columbia, and Alaska). University of Alaska Masters student looked at bat distribution in different habitats and found highest activity in riparian areas (feeding), constant activity in old-growth areas (possibly roosting), little bit of activity in clearcuts, no activity in young-growth (for this study there were 4 sites replicated 3 times). There were 370 caves explored--bat activity in a number of caves but no colonies. More use in winter. Relationship between karst and bats not known but good topic to explore.

Q: will use old-growth as roost sites? A: Yes. Do not know much about winter range of bats.

Endemics - a brief discussion of relevant biology:

Beaver - Islands are marginal habitat, low quality food. Better on mainland with deciduous valleys.

Ermine - Q: Maybe in competition with marten? A: Makes different use of habitat than marten. Can use clearcuts, scrub, widely distributed. Voles are their primary food, voles will decrease in Young-growth.

Peromyscus - Uses a wide variety of forested and non-forested habitats. Young-growth will provide little food. Common, but this year in southern Southeast Alaska numbers were low.

Tundra vole (*Microtus*) - came from the north down and this is southern limit of range. Generally not found in young-growth because of absence of herbaceous vegetation and seeds;

C- Need to look at timeframe for planning horizon, after 25th year, habitat does not change much before 100-year planning horizon reached.

Red-backed vole (*Clethrionomys*) - similar to tundra vole, probably uses more forested habitat than open.

Q: Want to rate endemics individually or by group?

C: If by group, then have to go with alternative 1 as only acceptable alternative.

C: Will lose some resolution if doing as a group as one alternative may have no impact on a specific endemic species in one area yet have considerable negative influence on another species in an adjacent area. Can give negative ratings for different species for different areas.

Q: Useful to team to have 10 ratings for each alternative for endemic? A: Integration has to occur somewhere either by panel or TLMP team.

Q: Do endemics as group and then old-growth associated list by individuals?

C: Even if not rated individually, important points can come out in notes from discussion.

Decided to first look at widely distributed species, then look at endemics.

Decided to look at two groups for evaluation: endemics as a group and old-growth-associated species (V-pop list plus bats and fisher) as a group.

Need to look at historic range of species, not current range when evaluating effects of each alternative.

Q: What is historical range? A: Range pre-European settlement. There have been range changes between historical range and current because of 40 years of logging and other activities. Difficult to consider how to take this into account. Need to consider the cumulative effect of past management along with future management effects.

Meeting notes for November 8, 1995

Instructions for scoring alternatives: numbers are anonymous, but a big difference in numbers emerges, then we may want to ferret out why. If an alternative has a lower probability of a species or group surviving, may want to look at means to increase probability of survival.

Q - How will numbers to be used? A: Numbers per se will not be used, but discussion text will be used in effects analysis.

C: Little known about most endemics, may be more endemics than we now know about. Has been 40 years of logging so may have extirpated some endemics already.

C: Base rating on known distribution of know endemics, not on unknown species already gone.

C: Clear that rating based on this, but recognize that some areas have already been hit hard enough to possibly extirpate some endemics already. Rating on northern flying squirrel and microtus on Baranof Island based on prior cutting.

C: Because of lack of data, some species may occur elsewhere but we just do not know yet.

C: Lack of information on distribution, habitat use. Don't know how habitat used, then how can we come out with rating score? Need more information.

Q: When can a panelist change his score? A: Whenever you want. The scoring sheets will be returned to you.

C: Hard to put down numbers.

C: Can adjust score at any time, or do not have to change it at all.

C: Need more to come from this group is we need more information and average scores, unless we push extirpation issue, nothing will come out of group action.

C: Think we have enough information to make these determinations. Have populations on Prince of Wales Island where permanent gaps already exist.

C: Uncomfortable as to whether this information will really be used and assimilated. Unless strong statement made on extirpation (i.e., "something bad is going to happen" or has happened) then information not used.

C: Probably true. If response is neutral, then it will probably not carry much weight.

C: Just numbers do not give much guidance, but discussion (regarding Prince of Wales Island for example) can be used.

C: One bat taxon listed in British Columbia, tied to old-growth, but so far no consideration to date in Southeast Alaska.

Q: Anyone map out endemics and overlay with plans? A: Not until yesterday when we discussed it.

C: Attempt at gap analysis would be good, point out concentrations of endemics (Prince of Wales Island concentration, Suemez and other outer islands).

Following scoring, panelists discussed ratings by alternatives:

Alternative 1

C: Lack of information, not sure if species severely restricted in distribution, or will they be extirpated or have they been extirpated. Timber harvesting will be minor but there will be lots of roads and more wilderness use (may affect river Otters).

C: Rating were relative, Alternative 1 most benign, all others rated in relationship to Alternative 1.

C: One panelist stated that he looked at a 100-year perspective. Most concerned with endemics (ermine on different islands, northern flying squirrel, species on Suemez Island, Clethrionomys; on Revillagigedo Island). Also feeling that we're missing endemics that need to be on the list and meanwhile some islands are being harvested heavily. Some endemics may disappear, others may end up on endangered species list. Some species are going to drop out quickly with continuing habitat changes. Concerned with Keen's myotis, also with more widely distributed species that are trapped (such as wolverine). Tripling roads, increased roading on Prince of Wales Island and concerned about wolf.

C: Impacts already there for some endemics, and some old-growth associated species currently exist only in refugia. Permanent gaps already exist for some old-growth and endemics. Shrubby Island was cited as a possible gap between Prince of Wales Island and interior islands.

Q: How are first round and second round numbers to be used? A: How adjusted numbers weighted will depend on discussion, good justification for changing scores. Will have greater effect on how their used. If adjusted scores have same degree of uncertainty as original scores, then probably both carry same weight. C: There is a perspective of uncertainty, do not know about patch size, interactions, how to guard against demographic stochasticity, do not know about configuration of young-growth blocks, residuals, corridors, dispersal capability of species, population structures.

C: Still not clear as to how score to be used. Would like to see some kind of likelihood indication for maintaining viability. This system would do that, but it means you have to use numbers to indicate probability.

C: Could just rank 9 Alternatives, from 1-9 as to probability of maintaining viability.

C: Would look at both relative ranking, and scores. They might be same, but might not. Need to point out problems with certain species under specific alternatives.

C: One panelist was able to key in on old-growth and do some ranking. Might rescore differently, though. Alternative 1 - impacts on endemics probably greater than on old-growth species, some possibility that endemic species have already been extirpated or are restricted to refugia. Old-growth associated species are in better shape because they are more widespread, not in as bad shape as endemics. It is not a "given" that doing more inventory will turn up more problems, it might show that some subspecies are in better shape than thought. Might not turn up more endemics, but might show that those we know about are wider-spread.

C: Northern flying squirrel is on both lists (endemics and old-growth associated), Prince of Wales flying squirrel and other subspecies elsewhere.

Q: What can we do to Alternative 1 to improve conditions for the species we are discussing? A: Allow young-growth to mature, take it out of timber base, do repeated entry but will get repeated disturbance. Second growth management is controversial.

Q: What about increasing beach buffers? A: Not necessarily do much to improve things, beach buffers will be there anyway

Q: What about increased roading for multiple entries? A: Already taken into consideration.

C: Mitigation for Alternative 1 might be some form of restoration.

Alternative 5

C: This is the reserve matrix theme, which recognizes that some portions of certain areas have already exceeded threshold.

C: Alternative 5 and Alternative 1 are similar in scoring. Q: Same reasons?

C: Endemics scores drop for 1 panelist. Feels this is significant shift.

Completely unacceptable to think in terms of extirpation of species. If plan has some probability of extirpating species, then open to litigation. Scored based on what we know, maybe endemics we know of are surrogates for others out there. May be more conservative for second scoring.

C: Someone from TLMP will review this, it will be in the planning record.

C: Cannot determine how it will be used, but if we are ranking, want to err on side of conservative.

C: Considered uneven-aged management, enter less land with fewer roads, Future cuts will emulate natural disturbance. When it comes to riparian areas, need to be as conservative as possible (as happened in Southwestern United States)

C: Looked at old-growth retention.

Q: What proportion of sales will use uneven-aged management, and exactly how will units be harvested (what trees are selected), how much woody debris is remaining. What do natural blow-downs look like.

C: Lots of uncertainties need to be looked at before uneven-aged management applied on ground.

C: Remember this is forest level plan, specific actions will be in an Environmental Impact Statement for the individual project.

C: So standards and guidelines could say "cuts should emulate natural system."

C: Want to avoid cut-and-dried standards and guidelines, but want harvest to emulate natural conditions. Want us to move toward what natural conditions look like rather than cookbook. Uneven-aged management most appealing, as most events are very small and large events very rare.

Compared to rest of alternatives, Alternative 1 seems closest to emulating natural processes.

C: Wants to make sure enough protection for caves.

Q: Any guideline on what percent of an island can be cut in this alternative?

A: No, but there is a percent by Value Comparison Unit (VCU).

C: Needs to be some consideration for "island stepping-stones," some islands are almost completely cut.

Q: Any guideline on amount of cutting by size of island? Cutting most of a small island has greater impact than cutting most of large island. A: Not aware of any standards in TLMP

C: Probably should, especially in terms of clearcutting. Probably economical to cut small islands, maybe push to cut most of them completely, but these likely have the highest risk for endemics.

C: Some islands have greater potential for endemics, small islands off the west coast of Prince of Wales Island.

C: Alternative 5 incorporates both reserves and matrix, could help by incorporating the whole reserve strategy on top of matrix. Much less value to put reserves in 4 areas where it does not meet intent, this is misrepresentation.

C: In Honker Divide, the reserve does not meet intent. It is not been demonstrated that corridors and beach fringes are adequate for connectors. This is not implementing strategy as proposed by V-Pop. Intent was to have matrix and corridors, but here reserves were just plucked out and called "implementing committee recommendations." Made strong recommendations: need to 1) apply reserves, 2) establish functional corridors, 3) maintain beach fringes and 4) maintain linkages. Need to carefully plan location of reserves, and make sure corridors are functional. Will include linkages other than riparian and beach fringes. Those alone

may not be adequate. Should be an Alternative with the full reserve strategy along with matrix developed and presented.

C: Nothing done with TLMP so far to develop a "V-pop alternative." It's been inferred that reserve strategy is "V-pop committee strategy" but only part of it is being implemented.

C: Even if there is an interconnected framework, it may not match with the distribution of species of concern. Could put reserves on a northern island for example, but miss helping those species to the south.

Q: Why are the reserves put where they won't do any good any more? A: In 100-200 years they may do some good, maybe.

C: If connected they may do some good, if not, then they won't do good.

What if they took reserve system in Alternative 3 and put it in Alternative 5. Big step but need to add linkages, make sure they're there.

Q: Who developed the alternatives? A: Developed by interdisciplinary team. Need to balance timber demand.

C: May be something we can do, moderate Alternative 5 and get linkages.

C: Would be good to develop alternatives that includes viability for all species, that has high likelihood of maintaining viability and distribution. "Team that put this alternative together missed the boat." For timber alternative, this seems to be the "better choice."

C: Suggested forest-wide standards for islands:

1) there should be a minimum island size below which no management activity is permitted (can't come up with an island size right now);

2) above minimum island size, there will be a relative % of the matrix to be harvested. (C: Need minimum threshold of old-growth to be retained);

3) consider whether the island is important as a connection between other islands, etc.;

4) level of endemism. Island with endemics should have special consideration. C: Minimum size of islands will vary with species of concern on the island, connection to other islands.

The next Alternative favored is 4 or 6. One panelist saw not much difference between 4,3 and 6.

Alternative 6 - Amount of acres harvested, miles of roads similar between Alternatives 6 and 5. Changes suggested for Alternative 5 should be applied to Alternative 6.

Q: Should all alternatives include full range of suggestions? A: Not all, though several should have. Alternatives at far end may have extirpations, yet it has been mentioned before that this is unconscionable. More acres harvested in Alternative 6 than in Alternative 5. In first 100 years Alternative 6 produces more pulp. Everything said for Alternative 5 applies to Alternative 6. Projected harvest could produce more fragmentation quickly.

Q: Do you want us to modify these alternatives, or just look at them as they are? A: Go through each, discuss differences in scores, then discuss what we can do to make them better. Could give them all the same suggestions as made for Alternative 5, but this doesn't provide range of alternatives.

C: These suggestions affect different species differently and it gets complicated. Job is not to rewrite alternatives, but to evaluate. We know that what we'd suggest is the same.

Alternative 4 C: Harvest level high, might have greater effect on old-growth associated species.

C: This alternative is "middle of the road," might not be too bad for some species.

C: Ground rule: score assigned to the most vulnerable species in each group determines the score for entire group?

C: Felt there was retention of some structure. Would be enough components left to maintain all species.

Discussion during lunch:

C: Consider concept of concentrating activities in certain areas, leave others alone. Single tree selection volume will not be credited to Allowable Sale Quantity (ASQ), but group selection will.

After lunch, continue discussion of alternatives.

Alternative 3 (reserves only, 100-year rotation). 100-year rotation is a problem, reduced scores. Increasing chance of extirpation of endemics, which danger continues to increase as this panelist goes down alternatives in descending rank. Sees high risk with this alternative and those remaining of extirpation of endemics.

Q: Do others feel reserves adequate? A: One panelist was unwilling to give any rating due to extirpation, but has since changed his mind, and will likely revise his score.

Q: This alt allows some harvest in beach fringe, does this affect rating? A: If no cutting, might help old-growth species, but not **endemics**.

C: This alternative retains 10-20% trees. Why not retain more for better corridors? A: If ASQ stays constant, then retaining trees more will force us onto more acres to get volume.

C: This alt has maximum riparian protection, river otter would be less negatively affected in this alt.

Q: Potential for large areas to be altered between reserves, no threshold as to how much area could be affected. This is reason why one panelist rated this alternative so low, greater chance of isolated patches.

Alternative 8: Looks like Alternative 3 with less riparian protection, also timber emphasis base, more land managed for timber and minerals. Same comment about 100-year rotation. Have more extirpations in mind when re-scoring this. Hard for some people on panel to do initial score, do not know area, learning things second-hand from discussion. Need to come up a couple days earlier to see area, be provided a hand-out to read ahead of time. Could shorten planning process presentation, add information on prior planning efforts and input for wildlife (such as V-pop report discussion).

Getting back to Alternative 8: some species might be extirpated. Have to consider "island stepping-stones." For example, if Shrubby Island all cut and if Kashevarof Islands cut we lose the stepping stones to and from Prince of Wales Island. Some examples of species possibly extirpated under Alternative 8: Keen's myotis, wolverine, species that may only be in refugia - black bear, northern flying squirrel, and 3 species of bats (*Lasionictus noctivagans*, *Myotis volans*, *M. californicus*). There is no information on how much deforestation has to happen before extirpation occurs, just have to do best guess.

Panel then developed the following table to identify where problems may exist with individual taxa (Outcomes II, III, IV, and V) Blanks indicate where the panel identified no problems. The Outcome I's were added for several taxa when that information was offered by panelists.

RANKED ALTERNATIVES

More Acceptable

Less Acceptable

TLMP ALTERNATIVES	1	5	4	3	6	8	2	9	7
Widely Distributed Group									
wolverine (<i>Gulo gulo luscus</i>)					IV	V	V	V	V
northern flying squirrel (<i>Glaucomys sabrinus zaphaeus</i>)		III	III	III	IV	IV	IV	IV	IV
Canada lynx (<i>Lynx canadensis canadensis</i>)						IV	IV	IV	IV
black bear (<i>Ursus americanus pugnax</i>)		III	III	III	IV	IV	IV	IV	IV
river otter (<i>Lontra canadensis mira</i>)								IV	IV
mountain goat (<i>Oreamnos americanus columbiae</i>)	I	I	I	I	I	I	I	I	I
Keen's Myotis (<i>Myotis keenii keenii</i>)	IV	IV	IV	IV	V	V	V	V	V
silver-haired bat (<i>Lasionycteris noctivagans</i>)		III	III	III	IV	IV	IV	IV	IV
long-legged Myotis (<i>Myotis volans longicrus</i>)		III	III	III	IV	IV	IV	IV	IV
California Myotis (<i>Myotis californicus caurinus</i>)		III	III	III	IV	IV	IV	IV	IV
little brown Myotis (<i>Myotis lucifugus alascensis</i>)		II	II	II	II	III	III	III	III
fisher (<i>Martes pennanti</i>)		IV	IV	IV	IV	V	V	V	V

RANKED ALTERNATIVES

More Acceptable

Less Acceptable

TLMP ALTERNATIVES	1	5	4	3	o	8	2	9	7
Endemic Group									
Prince of Wales Island flying squirrel (<i>Glaucomys sabrinus griseifrons</i>)		IV	IV	IV	IV	V	V	V	V
beaver (<i>Castor canadensis phaeus</i>)	I	I	I	I	I	I	I	I	I
Keen's mouse (<i>Peromyscus keeni sitkensis</i>)		II	II	II	II	III	III	III	III
red-backed vole (<i>Clethrionomys gapperi stikinensis</i>)						IV	IV	IV	IV
red-backed vole (<i>Clethrionomys gapperi solus</i>)				II	II	III	III	III	III
red-backed vole (<i>Clethrionomys gapperi wrangeli</i>)				IV	IV	V	V	V	V
red-backed vole (<i>Clethrionomys gapperi phaeus</i>)				II	II	III	III	III	III
Admiralty Island meadow vole (<i>Microtus pennsylvanicus admiraltiae</i>)	I	I	I	I	I	I	I	I	I
Sitka meadow vole (<i>Microtus oeconomus sitkensis</i>)	III	III	III	III	III	IV	IV	IV	IV
ermine (<i>Mustela erminea alascensis</i>)		II	II	II	II	III	III	III	III
ermine (<i>Mustela erminea initis</i>)						III	III	III	III
ermine (<i>Mustela erminea celenda</i>)						IV	IV	IV	IV
Admiralty Island ermine (<i>Mustela erminea salva</i>)	I	I	I	I	I	I	I	I	I
Suemez Island ermine (<i>Mustela erminea seclusa</i>)						V	V	V	V

C: This is a lot of guesswork but it will carry more weight if this panel does it than if planning team did it. This is our best professional judgment!

C: We have missed a whole host of species that we did not evaluate such as *Zapus* and *Microtus* species, *Synaptomys*, beaver on islands. Two species of *Zapus*. Do not know if Chichagof Island and Admiralty Island beavers are different subspecies.

One species left off is *Microtus coronarius* (might occur on Prince of Wales Island, but never been looked at). Forest Service is impacting many islands in vicinity (Suemez Island, Sea Otter Sound islands).

Q: Do forest-wide standards and guidelines in large package apply? A: standards and guidelines vary by alternative. Current plan would have standards and guidelines but they might not have all those in package. So 'current' Alternative 9, if applied under new plan, would not be the same as in past because new standards and guidelines would apply.

Alternative 7 (timber base with no mitigation)

C: Pretty bad.

Q: What can be done to make it better? A: Change it to Alternative 5 plus all mitigations. This alternative has short rotation, no old-growth protection, worst protection for riparian, doesn't provide for deer, worst protection for beaches and estuaries, no concern about fragmentation. It'll all be young-growth.

C: Wants discussion about alternatives, some of which may not be acceptable at all.

Began discussion as to how people defined the Outcome Categories (OCs).

C: As we move from OC III to IV, lose viability because distribution no longer maintained.

C: Once a species moves to OC V, it is not viable per definitions. If there are permanent gaps in the population, might still be interchange at some small level. Could be occasional dispersal. If there are permanent gaps, it's more likely for small populations to be extirpated.

Q: Does this panel determine what they define as viability? A: Helpful to have panel members or individuals give definitions.

C: "Viable" and "well-distributed" are critical terms that are not defined as stated on rating sheet. If a species drops to OC III, then it's no longer well-distributed. To be well-distributed, the species needs to be OC II or above. C: Could be instances if it falls in OC II and might still have viability concerns. Could be events that extirpate one of the sub-pops. Are there any species that could still be well-distributed yet be in OC 3 or 4?

C: OC I is definition of well-distributed in one panelist's opinion. therefore other outcome categories are not well-distributed.

C: Some species are **already** below OC I.

Q: What is the reason we have to define this? A: Understand where each panelist is coming from when rating alternatives. Do we have common understanding.

C: Thought we were looking at threshold below which we have a problem, and most feel it happens at OC II or III. Must recognize that once a species or group reaches OC II or III we have a problem. Look at chart, once we get past top Alternative or 2, we have serious problem.

C: Must recognize that we need serious research, does not seem to be an understanding that research is important. Many units do not recognize value of research. Many units think timber is what agency does, yet do not recognize that other resources enter in and are also important. We are doing the best we can with the little data we have, but need more data. Every biologist in Forest Service says the same. We are just beating head against wall. Good monitoring proposals are rigorous and take time and money. Yet most monitoring is usually cursory. The Forest Service not doing its job of monitoring, not rigorous.

Q: Is there option of no cutting? Yes, in some areas.

Panel then re-rated alternative, and noted reasons for changes on rating forms.

Q: Are there some things that could happen in 10 years that would be mean a different rating from when considering 100 years?

C: Might want to rank alternatives in terms of 'OK' or Not OK'?

C: Need to look at 10-year planning period under each alternative, what would be concerns?

Panelists would like to see notes and copy of summary documents. They would also like to see draft effects analysis.

C: Can make some predictions at certain locations. Predict that in 10 years more species would fall into OC IV and V. This is referring specifically to endemics, but also high uncertainty about some old-growth associated species such as Keen's myotis, fisher, do not know about wolverine.

C: Nothing in alternatives other than Alternative 1 that endemics will be better off, more likely will be worse off. Very brief discussion about restoration measures, facilitator mentioned silvicultural treatments to speed up development of old-growth characteristics.

Q: What about structures? A: Maybe nest structures for bats or flying squirrels, though probably not practical. Marten will eat anything that goes into such a nest box.

Q: Are there research opportunities to determine baseline?

Q: Which projects will be affected by a new plan? A: The Regional Forester and Area Supervisors can give direction as to what is to be done within-progress activities. Stuff can be grandfathered in. Things to be cut this summer are shown on the maps provided to the panels as harvested.

C: 2-age harvesting system or uneven-aged could be a whole lot different than clearcut effects.

C: Likely life of plan is 10 years, which is why we want some feed-back on 10 year effects. For overall viability considerations, however, need long look, plus law mandates we look at long planning period.

Panelists provided relative ranking of alternatives:

Panelist 1	Panelist 2	Panelist 3	Panelist 4
1 (more acceptable)	1 (OK)	1 (good)	1 (good)
5	5	5	5
4	4	4	4
3	3	3	3
6	6	8	6
8	8	6	8
2	2	2	2
7	9	7	9
9 (less acceptable)	7 (worse)	9 (bad)	7 (bad)

Kent volunteered to provide copies of notes and summarized evaluation numbers.

C: Initial look may indicate that scores are all over the board, but they're not. Probably could group outcomes I and II, and outcomes III-V. Winston volunteered to do.

Rod is to review notes from Ellen. Kristi is to send her written-up notes to Ellen.

Silent Observer's Summary of the Other Terrestrial Mammals Panel

Defining the Task

Most groups working together the first time go through a “groping” stage, when they define their task and determine how to accomplish it. The terrestrial mammals group had a prolonged “groping” stage. It lasted about five hours. Had the group been dealing with one species, it would have been much easier for them to define their task. They wanted to know:

- why they were analyzing impacts of the alternatives on “other terrestrial mammals,”
- why the animals on the list were selected,
- how they could analyze the impacts on so many species when some panel members had little background knowledge of each of those species and their habitats on the Tongass,
- and how the TLMP staff would use the information they provided.

TLMP staff answered the first **two** questions, and the group seemed to accept their explanations. The resource specialist assigned to the panel gave some background information on each species. They were glad to get the background information on the species, but at least two panel members said at that time they would have liked to have gotten more information. Several TLMP staff members who were asked said they did not know how the data would be used. The group found this to be frustrating.

By the second day, all the other panel members, including those from Alaska were also saying lack of information was hindering effective operation of the group.

Group Interactions

This group communicated effectively. No one dominated the conversation or tried to impose his views on others. The participants from Alaska talked

more than the others the first day, but that was because people were asking them background questions about Southeast Alaska and the species being considered. No one in the group appeared to be timid about expressing his views. The facilitator remained neutral throughout the discussions and made it clear he was there to seek information from the panel.

There were two communication difficulties during the two days. One time the group disagreed with an individual and he appeared to tune everyone out for about 15 minutes - he left the room for five minutes, then returned and walked around looking at maps, then sat down and did not contribute anything. After about 15 minutes someone drew him into the conversation and he was back on track. This was so minor an incident I would not have noted it, except it was one of the only things to note, and that was my assigned task. My perception was that this did not have any impact on the overall communication of the group.

The other communication glitch occurred during a discussion of Alternative 1. Each person explained the reason for his scoring, except one person who said he did not care to comment. Because of this, the group never fully communicated about this alternative. I do not know whether this had an impact on the overall communication of the group. The individual involved appeared not to think so.

For all other discussions, the group seemed to thoroughly communicate with each other.

Evaluation of the Role of the Silent Observer

I did not really think this group needed a silent observer. The facilitator did such a good job guiding the group without expressing his views, and reading the group and responding appropriately to them, I had very little advice to give him during the breaks. However, had the group gotten into a verbal battle, or had someone dominated, or someone refused to participate, or the facilitator asked loaded questions designed to get a specific response he wanted - then a silent observer would have been quite helpful.

Evaluator Form

Tongass Land Management Plan Revision -- Panel Assessments

November 7-8, 1995

Panel Name: Other Terrestrial Mammals

Evaluator: 1

Species Name: Endemic Group

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	10	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
II	80	50	40	20	40	30	50	35	70	40	60	40	10	10	10	15	10	10
III	10	20	40	30	30	30	40	25	20	20	30	20	20	20	40	25	40	30
IV	0	10	20	30	30	20	10	20	10	20	10	20	50	30	50	30	50	40
V	0	10	0	20	0	20	0	20	0	20	0	20	20	40	0	30	0	20
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: After ratings reflect higher probabilities of adverse effects of past and proposed management on species viability.

Evaluator Form

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

Panel Name: Other Terrestrial Mammals

Evaluator: 2

Species Name: Endemic Group

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	20	0	20	0	20	20	20	0	20	0	20	20	20	0	20	20	20	0
II	20	0	20	0	20	20	20	0	20	0	20	20	20	0	20	20	20	0
III	20	5	20	0	20	20	20	10	20	10	20	20	20	0	20	20	20	0
IV	20	85	20	15	20	20	20	80	20	85	20	20	20	5	20	20	20	10
V	20	10	20	85	20	20	20	10	20	5	20	20	20	95	20	20	20	90
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: Alt 1: Harvest low, lowest impact; Alt. 2: Even-aged, least riparian protection, no old-growth retained, 100-year rotation;
Alt 4: 200-year rotation, old-growth retention; Alt. 5: Reserves, 200-year rotation; old-growth retention.

Evaluator Form

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

Panel Name: Other Terrestrial Mammals

Evaluator: 3

Species Name: Endemic Group

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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
II	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
III	30	25	0	0	10	5	10	10	10	10	5	5	0	0	0	0	0	0
IV	70	70	10	10	75	70	80	75	85	80	35	30	2	2	10	10	5	5
V	0	5	90	90	15	25	10	15	5	10	60	65	98	98	90	90	95	95
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: Other Terrestrial Mammals

Evaluator: 4

Species Name: Endemic Group

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	40	0	0	10	10	20	15	30	20	10	10	0	0	10	5	0	0
II	20	30	10	0	10	10	40	20	50	30	20	10	10	0	20	10	10	0
III	10	20	20	15	60	30	30	30	20	25	60	25	20	10	60	20	20	5
IV	0	5	70	65	20	35	10	25	0	20	10	40	70	65	10	50	70	60
V	0	5	0	20	0	15	0	10	0	5	0	15	0	25	0	15	0	35
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 X Totals of outcomes must = 100

Notes on changed scores: Essentially all changes occurred because of consideration of species that may already have been extirpated or of species that are not known

SUMMARY BEFORE

Panel Name: Other Terrestrial Mammals Tongass Land Management Plan Revision -- Panel Assessments

Species Name: Endemic Group

November 7-8, 1995

Alternative 1							
Evaluator	1	2	3	4	5	6	Mean
Outcomes							
I	10	20	0	70			25
II	80	20	0	20			30
III	10	20	30	10			18
IV	0	20	70	0			23
V	0	20	0	0			5

Alternative 2							
Evaluator	1	2	3	4	5	6	Mean
Outcomes							
I	0	20	0	0			5
II	40	20	0	10			18
III	40	20	0	20			20
IV	20	20	10	70			30
V	0	20	90	0			28

Alternative 3							
Evaluator	1	2	3	4	5	6	Mean
Outcomes							
I	0	20	0	10			8
II	40	20	0	10			18
III	30	20	10	60			30
IV	30	20	75	20			36
V	0	20	15	0			9

Alternative 4							
Evaluator	1	2	3	4	5	6	Mean
Outcomes							
I	0	20	0	20			10
II	50	20	0	40			28
III	40	20	10	30			25
IV	10	20	80	10			30
V	0	20	10	0			8

Alternative 5							
Evaluator	1	2	3	4	5	6	Mean
Outcomes							
I	0	20	0	30			13
II	70	20	0	50			35
III	20	20	10	20			18
IV	10	20	85	0			29
V	0	20	5	0			6

Alternative 6							
Evaluator	1	2	3	4	5	6	Mean
Outcomes							
I	0	20	0	10			8
II	60	20	0	20			25
III	30	20	5	60			29
IV	10	20	35	10			19
V	0	20	60	0			20

Alternative 7							
Evaluator	1	2	3	4	5	6	Mean
Outcomes							
I	0	20	0	0			5
II	10	20	0	10			10
III	20	20	0	20			15
IV	50	20	2	70			36
V	20	20	98	0			35

Alternative 8							
Evaluator	1	2	3	4	5	6	Mean
Outcomes							
I	0	20	0	10			8
II	10	20	0	20			13
III	40	20	0	60			30
IV	50	20	10	10			23
V	0	20	90	0			28

Alternative 9							
Evaluator	1	2	3	4	5	6	Mean
Outcomes							
I	0	20	0	0			5
II	10	20	0	10			10
III	40	20	0	20			20
IV	50	20	5	70			36
V	0	20	95	0			29

SUMMARY AFTER

Panel Name: Other Terrestrial Mammals Tongass Land Management Plan Revision -- Panel Assessments

Species Name: Endemic Group

November 7-8, 1995

Alternative 1							
Evaluator	1	2	3	4	5	6	Mean
Outcomes							
I	10	0	0	40			13
II	50	0	0	30			20
III	20	5	25	20			18
IV	10	85	70	5			43
V	10	10	5	5			8

Alternative 2							
Evaluator	1	2	3	4	5	6	Mean
Outcomes							
I	0	0	0	0			0
II	20	0	0	0			5
III	30	0	0	15			11
IV	30	15	10	65			30
V	20	85	90	20			54

Alternative 3							
Evaluator	1	2	3	4	5	6	Mean
Outcomes							
I	0	20	0	10			8
II	30	20	0	10			15
III	30	20	5	30			21
IV	20	20	70	35			36
V	20	20	25	15			20

Alternative 4							
Evaluator	1	2	3	4	5	6	Mean
Outcomes							
I	0	0	0	15			4
II	35	0	0	20			14
III	25	10	10	30			19
IV	20	80	75	25			50
V	20	10	15	10			14

Alternative 5							
Evaluator	1	2	3	4	5	6	Mean
Outcomes							
I	0	0	0	20			5
II	40	0	0	30			18
III	20	10	10	25			16
IV	20	85	80	20			51
V	20	5	10	5			10

Alternative 6							
Evaluator	1	2	3	4	5	6	Mean
Outcomes							
I	0	20	0	10			8
II	40	20	0	10			18
III	20	20	5	25			18
IV	20	20	30	40			28
V	20	20	65	15			30

Alternative 7							
Evaluator	1	2	3	4	5	6	Mean
Outcomes							
I	0	0	0	0			0
II	10	0	0	0			3
III	20	0	0	10			8
IV	30	5	2	65			26
V	40	95	98	25			65

Alternative 8							
Evaluator	1	2	3	4	5	6	Mean
Outcomes							
I	0	20	0	5			6
II	15	20	0	10			11
III	25	20	0	20			16
IV	30	20	10	50			28
V	30	20	90	15			39

Alternative 9							
Evaluator	1	2	3	4	5	6	Mean
Outcomes							
I	0	0	0	0			0
II	10	0	0	0			3
III	30	0	0	5			9
IV	40	10	5	60			29
V	20	90	95	35			60

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	25	13	5	0	8	8	10	4	13	5	8	8	5	0	8	6	5	0
II	30	20	18	5	18	15	28	14	35	18	25	18	10	3	13	11	10	3
III	18	18	20	11	30	21	25	19	18	16	29	18	15	8	30	16	20	9
IV	23	43	30	30	36	36	30	50	29	51	19	28	36	26	23	28	36	29
V	5	8	28	54	9	20	8	14	6	10	20	30	35	65	28	39	29	60

Evaluator Form

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

Panel Name: Other Terrestrial Mammals

Evaluator: 1

Species Name: Widely Distributed Group

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	10	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
II	80	40	40	30	40	40	50	50	70	60	60	40	10	10	10	10	10	10
III	10	30	40	50	30	40	40	30	20	30	30	40	20	20	40	30	40	30
IV	0	20	20	10	30	15	10	20	10	10	10	15	50	30	50	40	50	35
V	0	0	0	10	0	5	0	0	0	0	0	5	20	40	0	20	0	25
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: Other Terrestrial Mammals

Evaluator: 2

Species Name: Widely Distributed Group

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	20	0	20	0	20	20	0	0	0	0	20	20	0	0	20	20	0	0
II	20	70	20	0	20	20	20	10	20	10	20	20	0	0	20	20	0	0
III	20	25	20	5	20	20	40	65	40	85	20	20	0	0	20	20	0	0
IV	20	5	20	25	20	20	40	25	40	5	20	20	50	20	20	20	50	25
V	20	0	20	70	20	20	0	0	0	0	20	20	50	80	20	20	50	75
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: Other Terrestrial Mammals

Evaluator: 3

Species Name: Widely Distributed Group

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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
II	60	50	0	0	5	0	10	5	10	10	0	0	0	0	0	0	0	0
III	30	40	0	0	60	60	60	55	70	70	10	10	0	0	0	0	0	0
IV	10	10	15	15	35	25	30	30	20	10	70	60	5	5	20	20	10	10
V	0	0	85	85	0	15	0	10	0	10	20	30	95	95	80	80	90	90
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: Other Terrestrial Mammals

Evaluator: 4

Species Name: Widely Distributed Group

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	5	0	20	5	20	10	5	0	0	0	5	0	0	0
II	15	15	5	5	15	65	70	70	70	70	15	15	5	0	15	10	3	0
III	5	5	15	15	30	15	10	15	10	10	30	30	10	10	30	30	7	5
IV	0	0	80	65	50	15	0	10	0	10	50	50	85	70	50	50	90	70
V	0	0	0	15	0	5	0	0	0	0	0	5	0	20	0	10	0	25
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

Panel Name: Other Terrestrial Mammals Tongass Land Management Plan Revision -- Panel Assessments

Species Name: Widely Distributed Group

November 7-8, 1995

Alternative 1							
Evaluator	1	2	3	4	5	6	Mean
Outcomes							
I	10	20	0	80			28
II	80	20	60	15			44
III	10	20	30	5			16
IV	0	20	10	0			8
V	0	20	0	0			5

Alternative 2							
Evaluator	1	2	3	4	5	6	Mean
Outcomes							
I	0	20	0	0			5
II	40	20	0	5			16
III	40	20	0	15			19
IV	20	20	15	80			34
V	0	20	85	0			26

Alternative 3							
Evaluator	1	2	3	4	5	6	Mean
Outcomes							
I	0	20	0	5			6
II	40	20	5	15			20
III	30	20	60	30			35
IV	30	20	35	50			34
V	0	20	0	0			5

Alternative 4							
Evaluator	1	2	3	4	5	6	Mean
Outcomes							
I	0	0	0	20			5
II	50	20	10	70			38
III	40	40	60	10			38
IV	10	40	30	0			20
V	0	0	0	0			0

Alternative 5							
Evaluator	1	2	3	4	5	6	Mean
Outcomes							
I	0	0	0	20			5
II	70	20	10	70			43
III	20	40	70	10			35
IV	10	40	20	0			18
V	0	0	0	0			0

Alternative 6							
Evaluator	1	2	3	4	5	6	Mean
Outcomes							
I	0	20	0	5			6
II	60	20	0	15			24
III	30	20	10	30			23
IV	10	20	70	50			38
V	0	20	20	0			10

Alternative 7							
Evaluator	1	2	3	4	5	6	Mean
Outcomes							
I	0	0	0	0			0
II	10	0	0	5			4
III	20	0	0	10			8
IV	50	50	5	85			48
V	20	50	95	0			41

Alternative 8							
Evaluator	1	2	3	4	5	6	Mean
Outcomes							
I	0	20	0	5			6
II	10	20	0	15			11
III	40	20	0	30			23
IV	50	20	20	50			35
V	0	20	80	0			25

Alternative 9							
Evaluator	1	2	3	4	5	6	Mean
Outcomes							
I	0	0	0	0			0
II	10	0	0	3			3
III	40	0	0	7			12
IV	50	50	10	90			50
V	0	50	90	0			35

SUMMARY AFTER

Panel Name: Other Terrestrial Mammals Tongass Land Management Plan Revision -- Panel Assessments

Species Name: Widely Distributed Group

November 7-8, 1995

Alternative 1							
Evaluator	1	2	3	4	5	6	Mean
Outcomes							
I	10	0	0	80			23
II	40	70	50	15			44
III	30	25	40	5			25
IV	20	5	10	0			9
V	0	0	0	0			0

Alternative 2							
Evaluator	1	2	3	4	5	6	Mean
Outcomes							
I	0	0	0	0			0
II	30	0	0	5			9
III	50	5	0	15			18
IV	10	25	15	65			29
V	10	70	85	15			45

Alternative 3							
Evaluator	1	2	3	4	5	6	Mean
Outcomes							
I	0	20	0	0			5
II	40	20	0	65			31
III	40	20	60	15			34
IV	15	20	25	15			19
V	5	20	15	5			11

Alternative 4							
Evaluator	1	2	3	4	5	6	Mean
Outcomes							
I	0	0	0	5			1
II	50	10	5	70			34
III	30	65	55	15			41
IV	20	25	30	10			21
V	0	0	10	0			3

Alternative 5							
Evaluator	1	2	3	4	5	6	Mean
Outcomes							
I	0	0	0	10			3
II	60	10	10	70			38
III	30	85	70	10			49
IV	10	5	10	10			9
V	0	0	10	0			3

Alternative 6							
Evaluator	1	2	3	4	5	6	Mean
Outcomes							
I	0	20	0	0			5
II	40	20	0	15			19
III	40	20	10	30			25
IV	15	20	60	50			36
V	5	20	30	5			15

Alternative 7							
Evaluator	1	2	3	4	5	6	Mean
Outcomes							
I	0	0	0	0			0
II	10	0	0	0			3
III	20	0	0	10			8
IV	30	20	5	70			31
V	40	80	95	20			59

Alternative 8							
Evaluator	1	2	3	4	5	6	Mean
Outcomes							
I	0	20	0	0			5
II	10	20	0	10			10
III	30	20	0	30			20
IV	40	20	20	50			33
V	20	20	80	10			33

Alternative 9							
Evaluator	1	2	3	4	5	6	Mean
Outcomes							
I	0	0	0	0			0
II	10	0	0	0			3
III	30	0	0	5			9
IV	35	25	10	70			35
V	25	75	90	25			54

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	28	23	5	0	6	5	5	1	5	3	6	5	0	0	6	5	0	0
II	44	44	16	9	20	31	38	34	43	38	24	19	4	3	11	10	3	3
III	16	25	19	18	35	34	38	41	35	49	23	25	8	8	23	20	12	9
IV	8	9	34	29	34	19	20	21	18	9	38	36	48	31	35	33	50	35
V	5	0	26	45	5	11	0	3	0	3	10	15	41	59	25	33	35	54