able to use adaptive management (Holling 1978) to test our ideas of forestry-wildlife relations through land management programs applied on the ground. By monitoring the results and adapting your models and management methods, you can probably improve timber-wildlife integration five times as fast as if you waited for researchers to conduct controlled experiments on every practice.

That is all I have time to cover. This has been a very brief review of a complex subject, so if you expect to make use of models in management decision-making I encourage you to read some of the papers I have referred to. The topic of making proper use of models is one that deserves particular attention.

In closing, I would like to emphasize that as life gets more complicated for all resource managers, we will have no choice but to make better and more frequent use of models. They are powerful tools. Let's make sure we use them well.

REFERENCES


USING GEOGRAPHIC INFORMATION SYSTEMS TO ASSIST WITH THE INTEGRATED MANAGEMENT OF FORESTRY AND WILDLIFE HABITAT

MARVIN A. ENG
B.C. Ministry of Environment, Wildlife Branch, Victoria, B.C. V8V 1X5

R. SCOTT McNAY
B.C. Ministry of Forests, Research Branch, Victoria, B.C. V8W 3E7

ABSTRACT

Forestry activities have substantial impacts on wildlife habitat, but there are few analytical tools to assist with the assessment of those impacts. Planning for wildlife habitat needs is a difficult task because many wildlife species move among forest stands to obtain resources. Therefore, wildlife managers must include the need for diversity of habitats over large (watershed-sized) areas in their planning. The development of geographic information systems (GIS) has made it possible to build analytical tools that explicitly incorporate the spatial aspects of wildlife habitat requirements into habitat plans.

The Habitat Assessment and Planning (HAP) tool, described here, is one such analytical tool that is currently under development as part of a cooperative project between the B.C. Ministries of Environment and Forests. An example of the way in which the tool can assist in making decisions about habitat management needs is given for the winter habitat of black-tailed deer.

INTRODUCTION

Habitat management is commonly used to achieve wildlife population objectives. However, wildlife managers frequently do not have control over the timing and placement of habitat manipulations that indirectly result from extensive forestry. Foresters have control but are often not aware of the effects of forestry on wildlife habitat. The resulting lack of integrated planning has often led to conflict. The Habitat Assessment and Planning (HAP) tool was developed specifically to aid in resolving one such conflict; the fate of old-growth forest stands that are deferred from harvesting because they are winter range for black-tailed deer (Odocoileus hemionus columbianus) and Roosevelt Elk (Cervus elaphus roosevelti). However, we believe that the HAP tool has general applicability to many wildlife species throughout British Columbia.

Timber development and habitat management often occur at very different "operational" planning horizons. Wildlife managers should plan over time frames of at least 20 years and base their activities on both stands and watersheds. Timber managers treat stands or small groups of stands independently. The differences in spatial scale occur because animals must move to obtain resources and trees do not.
Consequently area-based planning is less difficult for forestry than it is for wildlife. The Habitat Assessment and Planning (HAP) tool assists in the integration of planning for these two values.

INSTITUTIONAL FRAMEWORK

Initial development of the HAP tool has concentrated on the task of responding to 5 year "operational" forestry plans submitted by the companies to the Ministry of Environment for review and approval. Habitat Protection Biologists and Technicians from Ministry of Environment review the 5 year plans and suggest changes to the areas and scheduling of cutting to reduce the impact on wildlife habitat. This task is extremely complex and requires a good understanding of species habitat requirements, forest successional patterns and knowledge of local conditions. The current procedure is restricted in spatial and temporal scope yet it is time consuming and assessments of impacts on wildlife habitat are subjective.

Use of GIS and the HAP tool will help alleviate these problems by:

1. automating many of the manual aspects of the tasks;

2. identifying a small subset of the total area where site specific knowledge is critical; and

3. reducing the spatial and temporal complexity by modelling habitat quality.

CONCEPTUAL FRAMEWORK

The HAP tool has been designed as a mechanism that provides information to managers which they can use to make decisions. The tool itself will not make decisions. Decision making by managers will enable adaptive management procedures (Walters 1986) to be included in the process of habitat management.

In developing the HAP tool we have used the simplest models that provided useful results. An expert specifies those aspects of the system which he believes are important to the management goal. This approach makes development, application and validation of the models easier and it allows managers to easily understand, and therefore believe in, the system (Bunnell 1989).

"Game abundance should increase in situations where various types of food and cover come together" (Leopold 1933). This concept is the core of the HAP tool. Previous attempts to incorporate habitat interspersion into wildlife planning, through the use of "interspersion indices" (e.g. Hienen and Cross 1983), were not adequate because they "added up" interspersion and did not represent the relationship among individual habitat polygons (stands). Adequate representation of spatial interspersion is possible only by processing habitat data while retaining its spatial integrity. This is only feasible through computerized map analysis (GIS).
DESCRIPTION OF THE HABITAT ASSESSMENT AND PLANNING (HAP) TOOL

The HAP tool is a series of micro-computer based models that allow forestry and wildlife managers to incorporate the spatial and temporal aspects of wildlife habitat into operational forestry plans and habitat plans. The HAP tool helps managers to:

1. assess wildlife habitat suitability and forestry impacts;
2. develop plans that minimize negative impacts and increase the benefit of forestry to wildlife habitat;
3. identify data gaps and the risk of uncertain management actions;
4. assess priorities for habitat management projects; and
5. document the rationale used to make decisions that affect wildlife habitat.

The HAP tool consists of 3 component parts:

1. a regional priorities model;
2. a watershed assessment model; and
3. a management options model.

Each model has linked inputs and outputs that operate in an integrated and iterative fashion (figure 1). The regional priorities model is used to prioritize planning units (watersheds) in terms of the need for habitat management (McNay et al. 1987).

The watershed assessment model is then applied to each high priority planning unit. Watershed assessment is a stepwise and iterative process. In the initial step current habitat suitability, for a wildlife species, is assessed. Proposed forest harvesting scenarios are overlaid on the existing conditions and changes in vegetation through time are determined. The resulting habitat suitability under each scenario is compared with agency objectives. Input to the model includes large scale GIS data and proposed forestry plans. Model outputs are of 4 types:

1. Data gaps: stands where available data are not sufficient for a reliable assessment.
2. Sensitive Stands: stands where large changes in habitat suitability may result.
3. Future Forecasts: changes in habitat suitability through time.
Figure 1. Framework for the Habitat Assessment and Planning tool.
4. **Documentation:** records of the results of the watershed assessment to aid in future evaluation of decisions.

If agency objectives are not met the management options model is used to obtain a relative cost/benefit ratio for the proposed management action.

**WATERSHED ASSESSMENT PROCESS: AN EXAMPLE FOR BLACK-TAILED DEER ON VANCOUVER ISLAND**

Winter habitat suitability for black-tailed deer was assessed for 11 000 hectares on southeastern Vancouver Island, British Columbia (described by McNay and Doyle 1987). The first step in the watershed assessment process, evaluation of current habitat suitability, requires a model of winter habitat suitability for black-tailed deer as described in detail in Eng et al. (1989). The model (figure 2) is based on the following premises.

Snowfall on Vancouver Island exhibits a cyclic pattern with severe winters re-occurring at approximately 18 year intervals (Page 1990.) Therefore, for long-term population viability, black-tailed deer require access to habitat that will enable them to survive both mild and severe winters. We have found that accessibility of severe winter habitat is influenced by the migratory behaviours of individual deer. Deer exhibit three different migratory behaviours. Obligate migrators (individuals that move at the same time of year regardless of weather conditions) will spend the winter on severe winter habitat (i.e. for those deer severe winter habitat must be adjacent to mild winter habitat). Year-round residents (individuals that do not migrate) will move up to 0.75 km from mild winter habitat to severe winter habitat. Facultative migrators (individuals that move from summer to winter range depending on day-to-day changes in weather conditions) will move up to 3.0 km from mild winter habitat to severe winter habitat (McNay and Doyle 1987).

Within a single day deer require food and cover (primarily stands that intercept snow thus maintaining the availability of forage). The quality of habitat increases as the distance between these two attributes decreases. The habitat quality of a given location is also constrained by its aspect and elevation. High elevation north facing slopes tend to receive more snow and retain it longer (i.e. lower quality) than do low elevation south facing slopes (i.e. higher quality). The suitability of a given location differs between years because deer require better snow interception cover during a severe winter than during a mild winter and deer movements are more constrained by deep snow during a severe winter.

Current vegetation cover was classified using the methods described by Klinka et al. (1984). Each plant association and successional stage was rated from 0.0 to 1.0 for its ability to provide forage and snow interception cover. Combined aspect and elevation classes were also rated from 0.0 to 1.0 in terms of the constraints they placed on the ability of current vegetation cover to provide deer habitat. Ratings were based on judgements of field biologists familiar with black-tailed deer in the area.
Figure 2. Winter habitat suitability model for black-tailed deer.
Distance buffers from high quality forage and high quality mild winter and severe winter cover were calculated. The distance buffers were rated in terms of the likelihood that a deer would move that distance in shallow or deep snow. In severe winters with deep snow deer are reluctant to move out of cover (figure 3).

To create the winter habitat suitability map, ratings for forage quality, cover quality and the distance buffers were combined using a complex averaging procedure and then multiplied by the rating for aspect-elevation. Each polygon was categorized as adequate or inadequate habitat based on the resulting value (inadequate <0.5< adequate). Map layers representing adequate severe and mild winter habitat were overlaid creating a composite winter habitat suitability map (figure 4). Distance buffers around adequate severe winter habitat that included adequate mild winter habitat within 0.75 km and 3.0 km represent the migratory behaviour types of black-tailed deer, as described above.

A proposed habitat manipulation, in which most of the remaining low elevation old growth would be harvested between 1990 and 2010, was then assessed. The successional stage of each stand was changed to simulate conditions at the year 2020. A reassessment of winter habitat suitability in 2020 was conducted using the methodology outlined above (figure 5).

If the objective was to maintain the current quantity and distribution of winter habitat at 2020, then this objective would clearly not be met (compare figures 4 and 5). The amount of adequate severe winter habitat will not decrease substantially from 1990 to 2020, even though most of the low elevation old growth will be harvested, because the model predicts that new severe habitat will develop at the edges between old second growth (which provide cover) and younger stands (which provide food). However, the amount of inadequate habitat will increase from 49.2% to 64.0% of the assessment area during the planning period and the amount of habitat suitable for supporting facultative migrators will decrease substantially. Deer winter habitat will be severely fragmented, particularly in the western portion of the assessment area.

OPPORTUNITIES AND CONSTRAINTS

The use of geographic information systems offers significant advantages over analog maps in the assessment and planning of wildlife habitat because daily and seasonal habitat interspersion requirements can be realistically modelled. Iterative assessments, comparing different scenarios, can be accomplished with minimal effort. The resulting output can be used to develop recommendations for changes to habitat manipulation scenarios and habitat enhancement programs.

However, there are several difficulties with the widespread application of this technology. Suitable models for management purposes (notably forest succession models) may be lacking and data may not be sufficiently detailed or reliable (current vegetation cover information). However, the most important difficulties relate to corporate and institutional attitudes:

1. effective use of the technology requires that wildlife managers explicitly
Figure 3. Model ratings for distance from food and cover during mild and severe winters.
Figure 4. Projected winter habitat suitability map of the study area in 1990.
Figure 5. Composite winter habitat suitability map of the study area in 2020.
state their habitat objectives and develop methods of comparing those objectives to the objectives of other resource sectors; and

2. management at all levels of industry and government must be willing to accept the cost and short term reduction in staff productivity that will be associated with the implementation of the technology.

LITERATURE CITED


A CASE HISTORY OF SUCCESSFUL INTEGRATED RENEWABLE RESOURCE MANAGEMENT PLANNING IN THE EAST KOOTENAYS.

R. GREENFIELD

Ministry of Forests, Cranbrook, B.C. V1C 4L1

ABSTRACT

The Trench Plan is a strategic plan for the management of various renewable resources in the East Kootenay Rocky Mountain Trench. The Trench Plan area was divided into management polygons based upon the biophysical capability for various resources. For each of these management polygons, the primary resource uses were defined, an average percent forest cover was prescribed consistent with those primary resources uses, and basic resource values and management considerations were listed. Thus, the Trench Plan is an area-specific compilation of management strategies for Crown Land within the east Kootenay Rocky Mountain Trench area. The interagency planning process involving three provincial government ministries (Ministry of Forests, Ministry of Environment, and Ministry of Agriculture and Food) is described, as is the application of the plan.

The Trench Plan area falls within both the Invermere and Cranbrook Forest Districts. The actual Trench Integrated Renewable Resource Management Plan (Trench Plan) for the Cranbrook Forest District alone is a 200+ page document containing information and strategies for over 350 "management polygons" (geographical units) with associated color theme maps.

INTRODUCTION

The East Kootenay is endowed with abundant natural resources -- forests, forage (grasslands) and wildlife habitat, agriculture, and minerals. The first four are considered "renewable" since they can be reproduced (renewed) over time. However, managing to maximize any one of these resources has a resultant impact on the production of the other resources. For example, prescribed fire can improve forage production by removing young seedlings that compete with forage for sunlight and nutrients (forage values are increased while timber values are compromised). Similar examples could be cited for many combinations of resources.

This relationship between two or more resource values has posed significant challenges to different resource users and to the government agencies charged with managing these resources. The overlap of resource values has sometimes led to conflict and confrontation. In most cases, land can be managed to support a number of resources but to do so, compromise is essential. The challenge is to decide the relative importance (priority) of the various resources on specific areas of land. To plan resource management strategies for an area of land, it must first be decided which natural resource uses or values are more important, which are less important, and how much trade-off is appropriate.

This planning approach is referred to as "Integrated Resource Management"-- the planning of natural resource management to optimize benefits from all resources to
society - recognizing that compromise and trade-off is required.

Historically, the Southern Rocky Mountain Trench area has been difficult to manage on an integrated basis. This is due to its high value for wildlife winter range, grazing for domestic livestock, agriculture, timber, outdoor recreation and the competing needs of the various resource users. In the past, discussions between the different resource managers have been contentious. Debate sometimes focussed on different management philosophies or differences in personality, rather than on the biophysical capability of the land.

Another form of this discussion is what I call the Ologist debate. This is where the Agrologist, the Biologist and Technologist would each insist they were right. Often they would call in other Ologists, such as Pedologist, Entomologists, Hydrologists and Pathologists to re-enforce their claims. If this didn’t work the special interest groups would enter the fray.

Often the decision would have to be made by the local Forest Service District Manager. This often led to problems. Some may sound familiar to you. If so you may need a strategic plan.

THE TRENCH INTEGRATED RENEWABLE RESOURCE MANAGEMENT PLAN

The Trench Plan is a strategic plan for the management of various renewable resources in the Rocky Mountain Trench. The Trench Plan area was divided into management polygons based upon biophysical capability for various resources. For each of these management polygons, the primary resource uses were defined, an average percent forest cover was prescribed consistent with those primary resource uses, and basic resource values and management considerations were listed. Thus, the Trench Plan is an area-specific compilation of management strategies for Crown Land within the east Kootenay Rocky Mountain Trench area. The interagency planning process involved three provincial government ministries: Ministry of Forests, Ministry of Environment, and Ministry of Agriculture and Food. The planning process was initiated to try to overcome the following problems:

- Missed opportunities for forest and forage enhancement due to length of time to crank a proposal through the system.

- Wasted time in having to set up a round table referral for every proposal. Concensus was often difficult to obtain because we lacked an overall strategy.

- Inadequate overview of all resources and capability to produce more grass, trees, etc.

- Lack of support from the public and users because we could not clearly show them where we were going.

- We needed a data base to refer public interest groups to as a demonstration that
progress is being made at managing the resources in the Trench.

- Difficulty in preparing development plans due to lack of long term goals and land use decisions.

THE PLANNING PROCESS

It became obvious that we needed an integrated renewable resource management plan and that this plan should be based on objective, biophysical, resource data. There were a number of existing operational plans, so imposing a strategy over top of them is a bit backwards. Therefore it was important to recognize traditional uses such as Christmas Tree Permits, Co-ordinated Resource Management Plans, Woodlots, Cutting Permits, etc.

In 1985 the two "Southern Trench" District Managers from Invermere and Cranbrook and the Regional Wildlife Biologist sat down and hammered out a basic framework for such a strategy.

We met with the 3 Regional Managers/Directors from Forests, Environment and Agriculture in November 1985 and obtained their support to embark upon what eventually became known as the Trench Interated Renewable Resource Management Plan. (TIRRMP) or simply the Trench Plan.

A Steering Committee was struck consisting of myself, the Regional Wildlife Biologist, the District Manager from Invermere and the Agrologist from the Ministry of Agriculture and Foods. The Ministry of Agriculture Rep has never attended the planning sessions but assure us they support the plan.

Our purpose was contained in a simple statement endorsed by the three Regional Managers/Directors.

"To stratify Forestry, Wildlife and Range Management priorities for the Crown Land portion of the Southern Rocky Mountain Trench to assist in developing an integrated renewable resource management plan. Must be simple and expedient."

Not a very detailed term of reference and probably the reason there was a lot of confusion early in the game as to what we wanted, how we are going to achieve it and where the resources were going to come from. In hindsight this was probably a good thing because it allowed the people that were to be responsible or implementing the plan a say in how it should be put together. If you want reasonable assurance that any local plan is going to work you have to allow the users to develop it. This is not to say that upper echelon planners do not contribute. They are a good resource when the field staff run into snags. The two District Planning Officers were key players in putting the plan together as were the field staff and Resource Officers. As it turned out the process was neither simple nor expedient.

In 1986, the detailed planning began. A planning team was established, chaired
by the Forest Service District Planner, and included representatives from the planning, timber, range, recreation, wildlife, and agriculture departments of the involved Ministries.

At this stage we decided that we would concentrate on land capability before historic use. It quickly became evident that capability studies were out of the question so we began to look at Forestry Site index classifications because this information was readily available. The first set of maps we produced used a hand coloring scheme to show good sites as 1st priority, poor sites as 2nd priority and low sites and open range as 3rd priority. Crown Range Priorities became the mirror image of this. i.e.: Priority 1 range was Priority 3 timber, etc. Wildlife habitat needs also fit in fairly well with this system because the mix of Wildlife species depends upon the maintenance of a mix of forest types and seral grassland/schrub stages.

It is therefore possible to develop a land use designation system which nearly maximizes the production of the more seral dependent species and the more mature forest dependent species with minimal losses of timber production from medium and good sites. I must emphasize though - that this is not a Wildlife priority system. It is based on ungulate habitat needs by dependency upon forest cover. A class one wildlife area would require 0-10% forest cover and 90-100% seral shrub/grassland - while class 3 for wildlife would require 50-100% forest cover and 0-50% seral shrub/grassland.

Incidently, most of the trench is rated as moderate to very high capability winter range for one or more wild ungulate species. Using the information gathered, the maps were compared and the Crown land in the Cranbrook portion of the Trench Plan was divided into approximately 380 management areas (referred to as"management polygons"). These polygons varied in size between 100 and 1800 hectares. The boundaries were then modified by local knowledge, physical features and structures, and occasionally administrative restrictions.

Once the above management polygons were identified, the planning team began to establish "primary resource uses" for each area. Once the "primary resource uses" were established for each "management polygon", the problem of expressing their relative priority and reflecting this in the management prescriptions had to be addressed. It was essential that measurement criteria be used which were relevant to all resources.

Many discussions were held on this subject before it was decided that the amount of forest cover would be the management prescription for each management polygon. It was agreed that, in general, forage for cattle and wildlife depended on the amount of sunlight which reached the ground. This in turn depended on the amount of forest cover. Other wildlife requirements, such as snow interception (thermal cover), hiding cover, and travel corridors, also depended on the degree to which an area was forested. Of course the timber resource is also dependent on the amount of forest cover.

An area with timber as a priority would be given a higher target forest cover than an area with grazing as a priority. Desired forest cover levels varied for wildlife, depending on the species and their requirements in an area. Generally, sheep and
mule deer prefer open country, elk prefer moderate cover, and whitetail deer prefer heavier forest. Integration of different resources were discussed, and compromises obtained, using a common frame of reference.

Primary Resource Uses (up to three per polygon) were established for each management polygon and listed in order of priority. A target average percent forest cover was assigned (eg. 35-70% or 0-10%) based on the relative priority of resource uses. A range in value was necessary to reflect the dynamic nature of the resources being managed (eg. a forest may be opened up by timber harvesting and will then fill in again until the next disturbance such as timber harvesting or fire again opens up the area). This data, plus additional information pertaining to specific polygons, were recorded in the Trench Plan.

Each management polygon also received a preliminary evaluation for the suitability of prescribed fire as a management tool. This was based on the primary resource uses and management objectives prescribed, local knowledge, and the inherent sensitivity of the site.

APPLICATIONS OF THE TRENCH PLAN

General Implementation

The Trench Plan identifies the primary resource uses, target percent forest cover, key resource values and concerns, and the types of general management prescriptions that are appropriate for each management polygon. This information is documented in a tabular format for ease of reference. By reaching interagency agreement on resource use priorities for each management polygon, along with target values for forest cover, conflict between different resource uses can be greatly reduced.

The Trench Plan will be used to:

1. provide broad integrated resource management direction for renewable resource management on each management polygon;

2. provide a framework for prioritizing resource management activities in the East Kootenay Rocky Mountain Trench (eg. heavily forested areas which have been targeted for lower forest cover values because of wildlife or cattle requirements should logically become a higher priority for timber harvesting);

3. provide a basis for evaluating other work proposals (eg. Canada Works Comfor, FEP, etc.) or give direction to proposals for habitat, range, or forest improvement projects within the Trench Plan area;

4. provide for a more efficient referral process that can concentrate on operational specifics (eg. concentrate on how a prescribed burn for forage
5. can be used for budgeting.

It must be recognized that, in order to meet the broad management objectives of the Trench Plan, more detailed development plans will have to be prepared for those management polygons in which management activities are to occur. For example, the average percent forest cover prescribed may be met by:

1. having an even distribution of trees over the entire unit as a result of spacing or selective harvesting systems; or,

2. having a patchwork of open and forested areas; or,

3. by a combination of open and forested areas in conjunction with areas that have been spaced or selectively harvested.

These detailed plans will be done on a priority basis using the Co-ordinated Resource Management Planning (CRMP) process.

REVIEW

Minor updates to resource values and other site specific information for management polygons will be made on a continuous basis as new information becomes available.

Updates to the fundamental prescriptions, such as Primary Resource Use and the average percent forest cover, will be conducted on a periodic, as needed, basis. These updates will be made by reviewing the entire Trench Plan. Changes in one area may require change or compromise in other areas in order to maintain an overall balance between resource uses. The need for this type of review will be evaluated at least once a year.

The Trench Plan will become part of the "Status Quo" Option in the TSA Analysis for the next Cranbrook TSA Plan. Since the Trench plan area constitutes only 7% of the net land base for the TSA the potential impact of the Trench Plan on the Allowable Annual Cut is expected to be negligible. Benefits to other resource values from the Trench Plan are expected to be considerable.

We have presented the plan to the Licenced Resource Users, other Resource Managers, local Government and the general public with positive results.

Using their feedback to make changes where practical, we will then have the plan signed off by the three Ministries.
STRATEGIC AND OPERATIONAL LAND USE PLANNING IN THE EAST KOOTENAY TRENCH, BRITISH COLUMBIA

RAYMOND A DEMARCHI

Ministry of Environment, Cranbrook, B.C. V1C 2G2

ABSTRACT

Strategic planning in the form of the (East Kootenay) Trench Renewable Resource Integrated Management Plan (TRRIMP) followed operational planning in the form of Coordinated Resource Management Planning (CRMP) in southeastern British Columbia. Despite the successful implementation of CRMP's over most of the Crown land in the East Kootenay Trench, the absence of a land use strategy resulted in the renewal of former land and resource use debates. It is expected that the adoption of the TRRIMP land use strategy will lead to the re-establishment of cooperation between agencies and resource users and improvements in resource management. As well as providing functional land and resource plans for the East Kootenay Trench, the planning processes serve as an example for the remainder of the Province.

INTRODUCTION

British Columbia is a province which consists largely of rugged, mountainous terrain or high plateaus with a limited land area suitable for human settlement. Most of this province - fully 92.5 percent - is publicly owned Crown land which is administered by the provincial government. Thus, a single provincial government owns and controls a land area consisting of more than 216 million acres. However, less than five percent of this land base is situated in valley bottoms in the southern half of the Province and it is within these limited valleys that the numerous land use interests compete for land, resources and space.

The various provincial government agencies created to administer these public lands have conflicting mandates and the various resource interests often individually seek to maximize returns from their resource-use activities at the expense of others. Several attempts to develop a provincial land use management strategy have not been successful.

The absence of any orderly approach to land use management has bred considerable conflict and controversy amongst user groups. The Rocky Mountain Trench of the East Kootenay region is a microcosm of land use problems found almost everywhere else in the Province. Government ministry initiatives to maximize wood fibre, livestock, wildlife and recreation all on the same acre all at the same time from land of variable capability has given the East Kootenay Region the reputation of being one of the most controversial if not hostile environments in which to practice forestry, operate a cattle ranch or to manage range or wildlife in the Province. Other government and private initiatives such as hydro electric reservoir, utility and
transportation corridor projects and urban, industrial and commercial recreational developments, most unplanned and often unilaterally imposed, have reduced the resource land base and heightened competition for remaining land and resources.

The uses made of the remaining public lands in the East Kootenay Trench - some 500,000 acres - are both varied and intensive. Most British Columbians take the use of these lands for granted, assuming that their use opportunities will always exist. However most people do not realize that the land base is not secure. In fact the provincial government has never developed a policy which would uphold retention of important resource lands in public ownership or a land use plan or strategy which would provide the basis for an improved system of resource management planning.

Perhaps this problematical situation on public lands in British Columbia is not unique. Certainly the Province does not suffer from the same sort of complicated, multiple ownership of lands prevalent in the western United States or the overlapping jurisdictions of federal and state administrations. Also the Province's harsh climate and geography limit land use options greatly simplifying the resource management equation. Superficially at least, the situation in British Columbia could be more readily resolved and the considerable energies spent in conflict and debate could be channelled towards developing commonly shared or non-conflicting goals and in resolving technical problems of public resource management in the Province.

STRATEGIC AND OPERATIONAL PLANNING

It is important to distinguish between strategic land use planning and operational resource management planning. These terms, strategic and operational and land use and resource management, refer to the two basic levels of planning and are not mere planners' jargon. Strategic land use plans establish which land uses and how much of each use can and ultimately will be produced on a given planning unit. Although the data that are fed into the decision-making process may be edited, collated and analyzed by public employees and private consultants, the ultimate decisions as to where and how much are political.

Operational planning, such as coordinated resource management planning, must follow from official land use plans and strategies such as the East Kootenay Trench Plan as it is the operational CRMP which sets out how and by whom the goals identified in the strategic land use plan are to be achieved (Anderson, 1977). Because CRMP is essentially operational planning at the tree fallen, cattle grazing, shrub burning, dirt moving level, the implementation of an operational plan in the absence of a land use plan or strategy will ultimately lead to conflict and controversy.

This is the stage upon which CRMP was introduced to the East Kootenay Region in British Columbia in June 1975 and which led to conflict and controversy between resource agencies and uses after the benefits of CRMP first began to appear (Demarchi, 1988). Despite these shortcomings and the controversies which occurred, the benefits of CRMP are significant and would have been even greater if introduced after a land use strategy such as the East Kootenay Trench Plan had been adopted.
by senior government.

The CRMP process, as well as defining the individual agency goals and objectives for distinct units of land, provided a forum whereby provincial government resource planners and managers could exchange information and resolve issues before they were escalated to senior bureaucratic or even political levels. Licensed and permitted resource users such as loggers and grazing permittees were included in the planning process thus removing a major obstacle toward integrated resource management - that of creating political issues of minor events by making decisions regarding public resources without consulting with the authorized users.

However, major political decisions such as how much of each resource product was to be produced were not made. As yields of forage, wood fibre and wildlife began to improve along with new grazing, logging and big game hunting opportunities, demands for these resources once again began to increase. The tendency of most resource managers is to try to maximize the yield of the particular resource that they are paid to manage while specific resource user and advocacy groups seek to maximize their share without concern for the impacts that their activities and demands have on others. The "tragedy of the commons" began to repeat itself as the various resource factions began to lobby for an increased share of the improved, expanded resource pie (Hardin, 1968).

In the absence of an official land use strategy the fabric of CRMP consisted mainly of good will between resource managers and licenced users. Often cooperation sprung from the recognition of common problems or common adversaries and not from any formal recognition or acceptance of each other's resource production objectives or commitments. A fortuitous combination of personalities forged CRMP in the absence of an official land use strategy but once the initial euphoria wore off it was insufficient to keep it functioning at the same level.

CONCLUSION

That a strategic land use plan was prerequisite to achieving proper integration and management of public renewable resources was, unfortunately, not apparent at the onset of CRMP. In the absence of provincial or regional goals for timber, or forage for livestock, or habitat for wildlife, it was necessary to assume the status quo. Resource compromise decisions were deferred indefinitely thus ensuring that mainly local interests and not necessarily provincial values or interests would prevail. Objective economic cost: benefit analysis were considered but affected the outcome of each CRMP only in minor, benign ways. In some instances on some land units this ensured the continuation of marginal activities at the expense of more economically viable alternatives.

There are some dangers and some pitfalls to consider. While strategic planning at both the provincial and regional level could provide significant benefits, inflexible, rigid plans would not. Built-in flexibility which provided for changes in public demands and attitudes would increase their acceptability to elected politicians and reduce
bureaucratic rigidity. At the same time it is obvious that most of the hard land use
decisions in British Columbia have been made by nature as most of the Province's
land uses are constrained by geography and climate which are often limiting to
severely limiting. However, not all resource sectors would benefit from such
planning - particularly those such as mining which presently have nearly a free rein to
prospect and explore all but a tiny fraction of excluded lands in the Province (i.e.
National and most Provincial parks).

All planning requires compromises and strategic land use planning is no
exception. For wildlife interests the compromises may mean fewer wildlife overall or
fewer of one species than another. To livestock interests, the costs may be in the
form of shorter grazing seasons, fewer permitted livestock or increased herding to
accommodate special grazing regimes. To timber interests it may mean reduced annual
cut levels to accommodate longer rotations or deferments for habitat protection. The
benefits, however outweigh the costs primarily in the form of resource base protection
and improved management of all resources.

To summarize, strategic planning is a prerequisite to operational planning. In the
east Kootenay we got it backwards but unlike the remainder of British Columbia, at
least we did it. Now you have an example of what to do and how to do it.

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INTEGRATED RESOURCE MANAGEMENT IN THE KOOTENAYS: A FOREST INDUSTRY PERSPECTIVE WITH EXAMPLES OF SUCCESS

D. MELENKA

Crestbrook Forest Industries, Cranbrook, B.C. V1C 4J7

ABSTRACT

The objective of our company, like all other forest industries in the province is to maintain a supply of timber that will keep our mills operating. As a consequence, we often find ourselves in the middle of disagreements between various government agencies and/or user groups that restricts, reduces or threatens to eliminate our supply of wood.

To deal positively with the situation, we entered negotiations with both government agencies and the public, modifying plans where it was necessary to protect wildlife, watershed, or other values. Examples of several integrated resource management initiatives in which we participated, provide evidence that problems appearing at first to be win/lose confrontations, can be turned into win/win situations using this process.

INTRODUCTION

When our company started negotiating for integrated Forestry/Wildlife Management in the Kootenays our principal goal was to develop and maintain access to a regular supply of timber to keep our three sawmills, one veneer plant and our pulp mill operating. This goal, I suggest, was the same for all forest companies in the province. This goal is as important to Crestbrook Forest Industries now as it was in the past and I expect it to be as important in the future. Achieving this objective while accommodating the expectations of other forest resource users, required sincere involvement in the management decision making process which we and others within the forest industry had never before experienced - it was to become a "whole new ball game".

As the major users of the forest resource we were continuously mired in the middle of confrontations between the Ministry of Forests, other government resource agencies and their user groups. As an example, the Ministry of Environment, insisted that some snags be left standing to provide food and shelter for cavity nesting birds, birds of prey and small mammals. The Workman’s Compensation Board demanded that all snags be felled to ensure a safe work place for our forest workers. The protection division of the Ministry of Forests wanted the snags felled because they were a very real threat to a forest due to their lighting prone presence.

It became very obvious that a procedure was required to deal with the new and complicated issues, but how it would function and where it would fit into the overall
scheme of things were as much a problem for government agencies and the public as it was for our company.

INTEGRATED MANAGEMENT

Crestbrook had always been aware of the impacts of timber harvesting on Wildlife. In particular such species as moose, elk, deer, grizzlies and mountain caribou. Our company officially acknowledged this impact and asserted its responsibilities towards wildlife in a policy statement which appeared in Management Working Plan No. 4 for Tree Farm Licence #14 (TFL #14) 1972. It states, "In our opinion game populations will be enhanced if managed. As game populations are limited by winter range, artificial wintering range is developed, in part, by logging lower elevation timber stands". I would also like to emphasize that instead of receiving support or acknowledgement from the resource management agencies and the public for introducing forest harvesting methods and prescriptions which were beneficial to wildlife, Crestbrook was usually criticized for carrying out forest activities which were counter to the various ministry policies.

The above comments are not intended as criticisms, however, I must state that a combination of mistrust, misunderstanding and institutional squabbling which occurred at that time made it nearly impossible for anyone to recognize all but the obvious benefits of well planned forest harvesting prescriptions. We were often "damned if we did and damned if we didn’t". In retrospect we were attempting to serve too many masters, including our senior management, bankers and shareholders. It was a difficult time then and still is today.

Demands on the forest land base were onerous. It seemed everybody wanted something. Timber for our mills, clean water teeming with trout, places for wildlife to hide, feed and breed, landscape for viewing wilderness, recreation, and cutovers, "yes" cutovers, to turn cattle onto.

Our first serious planning attempts began in 1973/74 by assembling resource information for all harvesting areas. We prepared resource folios which included forest, recreation, agriculture and wildlife capabilities based on standards used by the Canada Land Inventory (CLI). Forest inventory data was mapped along with specific wildlife habitat considerations. These resource folios helped to identify problem areas, but more importantly, they brought us all together to look for solutions and to discuss each other’s concerns. These face to face encounters were the beginnings of communications which enabled us to build the trust and understanding essential in developing an integrated planning process.

We were forced to examine forest harvesting prescriptions and opt for methods which would benefit wildlife wherever possible. To do this with any confidence required thinking "Ecosystematically". This type of thinking led us to look for the beneficial factors instead of belaboring the bad. We worked from a positive rather than a negative mind set. Planning had become a worthwhile experience.
Coordinated Resource Management Planning

In 1975 coordinated resource management planning (CRMP) was started and although it had a predominantly range management focus the planning process brought us all together in a formal procedure. Within a year the procedure was institutionalized. Forest planners, ranchers, loggers, hunters and fishermen and their government agency counterparts were working together toward integrating their management goals. Public involvement became a new and important step toward managing and using the public or crown resources.

Pine Beetle Infestation

However, while we were building new institutional relationships, natural forces were at work. During the late 1960's and early 1970's major outbreaks of rocky mountain pine beetle erupted throughout the mature lodgepole pine forests of the Pacific northwest including southeast British Columbia. Particularly hard hit were the large stands of lodgepole pine located in the Kootenay, White and Flathead rivers located in the east Kootenay. Extensive salvage operations were undertaken so timber harvests increased substantially. Environmental concerns increased as well. The question of impacts to fish and wildlife were raised with every new salvage effort.

Large clear cuts appeared, much as they might have if the dead and dying timber had been damaged by wildfire. However, contrary to many of the concerns raised at the time, the results of our increased harvesting activities were either much more beneficial to wildlife than expected or had a generally neutral impact. For the most part, the stands harvested occurred in the dry montane spruce zone (MSA) and dry Engleman Spruce Sub alpine Fir Zone (ESSFa). It was also possible to break up the large configuration of cutovers by leaving stands of residual fir, larch and immature stands of unaffected lodgepole pine and spruce.

During the same period, a new system of ungulate management was introduced by the Ministry of Environment. This management scheme coincided with both the major lodgepole pine salvage and new range management programs of the Ministry of Forests. These new management programs resulted in pronounced increases in elk populations and noticeable increases in moose and deer populations.

The Blewett Watershed

During the mid 1970's with forest planning strained to its limit Crestbrook announced its intention to investigate forest harvesting opportunities in the Blewett area southwest of Nelson. The immediate response to our intention to harvest timber within the Blewett area met with very loud opposition, which was expressed at open public information meetings. Crestbrook’s planning staff had now entered into a new unfamiliar planning process.

With the formation of the Blewett watershed committee chaired by Dr. Bruce Fraser, a process of communication was established involving the residents of the
community, various government agencies and industry. The public involvement planning process became the major factor that changed a very negative attitude to a positive attitude toward forest harvesting with the watershed area. In addition to the public involvement process, Crestbrook gave complete assurance to the water users of the area that any impact on the water quality and quantity caused by timber harvesting would be the full responsibility of the company. Crestbrook committed itself to total responsibility and accountability. The result was that timber harvesting and post harvesting activities occurred as planned and these activities continue to this time.

1985 Forest Fires

In 1985 another major natural event struck the east kootenay which impacted heavily on the forest and wildlife resources. Large wildfires swept through seven major drainages east and west of Canal Flats. Hardest hit were the Coyote/Lussier, Blackfoot, North White, Sandown/Findlay, Skookumchuck and Matthew Creek drainages. Approximately fifty thousand hectares (125,000 acres) were severely damaged. Again Crestbrook embarked upon a major salvage program in an attempt to minimize the loss of a valuable timber resource. However, unlike our major Rocky Mountain Pine Beetle Salvage Program during the late 1960’s and 1970’s these huge cutovers were the direct result of wildfires. Beneficial gains to wildlife, especially elk, moose and deer of these salvage operations, however, were similar to those of the beetle salvage operations.

The Trench Plan

The Trench Integrated Renewable Resource Management Plan is another land use planning process that involves a wide variety and number of other forest user groups. Although the "Trench Plan" is basically intended to stratify forestry, wildlife and range management priorities, other resource users such as agriculture, recreational camping, fishing, hunting, trapping and rural development must be considered as well.

From a Forest Industry (Crestbrook) perspective our planning staff supports a planning process that provides integrated resource management direction for renewable resource management. Crestbrook welcomes a process that allows for an efficient referral system that concentrates on operational specifics, that minimizes negative impacts, and that supports positive gains for other forest resource users.

The Trench Plan area constitutes only 7.0% of the net land base of the Cranbrook timber supply area, therefore, the potential impact on the allowable annual cut is expected to be negligible and the benefits to the other forest resource users are expected to be considerable. Although the Trench Plan is the result of an inter-agency planning process, the forest industry will review the document and, if necessary suggest changes.
CONCLUSION

By using the pine beetle infestation situation, the Blewett Watershed situation, the 1985 fire situation and lastly, the Trench Integrated Renewable Resource Management Plan, I have attempted to explain how Crestbrook becomes involved in harvesting operations that are the result of natural events and also how we deal with integrated resource management planning. Both Government and public pressures over the past twenty years have had major influences on our harvesting activities and I suggest these pressures will increase in the immediate future.

Our major concern back in the 1960's was to secure the forest land base making certain that whatever we did with timber harvesting and the timber resource, there would always be left in place, a healthy productive forest ecosystem, which would produce timber, wildlife and recreational pursuits for our children and theirs.

Assurance of timber supply has always been threatened by natural forces like insects, disease and wildfire, but it is now threatened by increasing demands for more recreational use rather than industrial uses.

In the past we all worked together in developing a positive planning process to achieve economic and social benefits from timber harvesting activities. Today (1990) we see the emergence of a strong, negative sentiment from a public which seems unwilling to accept timber harvesting regardless of the benefits created for wildlife and other outdoor pursuits.

Our company continues to financially support research projects that are specifically aimed at forestry, wildlife and fisheries. Several projects completed and ongoing include; Elk Creek - Elk/logging study, Flathead River - Canadian Border Grizzly Bear Study Selkirk Mountain Caribou Study, Whiteswan/Alice’s Lake, Whitetail Lake, and Cherry Lake Spawning Channel Development. In addition, recreational projects are also undertaken throughout our operating areas. They include construction and establishment of boat launching ramps, fishing docks and camp sites.

Integrated Resource Management Planning (IRMP) which has, to a large extent replaced coordinated Resource Management Planning (CRMP) for almost ten (10) years, may not be adequate in coordinating or meeting all of the expectations we have for or from our forest land base. Nevertheless, Crestbrook is proud of its successes and achievements in the integration of Forestry, Wildlife and Recreational Management within our provincial forests.

Crestbrook is fully committed to the wise use of the Public’s forest resource and will continue to participate with both the public and Government agencies in the integration of forestry, wildlife, recreation and other forest uses, so long as the end results are both ecologically and economically sound.
PERSPECTIVES ON INTEGRATED MANAGEMENT

D. HEBERT

Ministry of Environment, Wildlife Branch, Williams Lake, B.C. V2G 1R8

ABSTRACT

As a result of six years of hard struggle, the Wildlife Branch managed to convince the Ministry of Forests to defer logging on 32,000 ha for the benefit of the Itcha-Ilgachuz caribou herd, but this meets the winter range requirement of less than half the population. Suggestions by timber interests that intensive forestry practices can increase the volume of timber cut annually by fifty percent are based on assumptions that show a total disregard for wildlife and other values. To be viable, a process integrating the management of timber and wildlife values must provide a level playing field where wildlife values are considered before timber and or pulpwood harvesting tenures are allocated, and in which timber managers attitudes towards wildlife and other values are improved.

INTRODUCTION

Symposia on integrated management have been conducted in B.C. for almost 20 years. The presentations I have made during that time period have identified and emphasized the mature timber requirements of various wildlife species. However, many of the comments I made at the earlier workshops and many of the problems I identified are still applicable today.

Success has been defined as a favourable or satisfactory outcome. In most cases, the outcome is satisfactory to one party, the Forest Managers, but not necessarily to all parties. Successful integration should be defined as the ability to meet the requirements of the various resources, including wildlife species or complements of species.

LEVEL OF INTEGRATION

The biology, management and planning for the Itcha-Ilgachuz caribou herd demonstrates the relative success of integrated management procedures and policy.

Within the Quesnel Timber Supply Area (TSA) there are approximately 900,000 ha. of merchantable timber. The TSA planning process identified a special management area in which no logging would occur for 20 years, or indefinitely if information supported continuing the deferral. This special management area includes only 14,000 ha. of merchantable timber and results in a 1.6% reduction in the allowable annual cut (AAC) within the Quesnel TSA.

The Williams Lake TSA plan includes a proposed special management area which excludes 120,000 ha. from timber harvesting activities. This area includes
18,000 ha. of merchantable timber, and accounts for a 1.6% AAC reduction in the Williams Lake TSA.

As a result of these deferrals, four questions could be asked:

1. Was the planning process a success?
2. Is this integrated management?
3. Did we meet the requirements of the main wildlife species?
4. Did we meet the needs of species biodiversity.

The Itcha-Ilgachuz caribou herd has specific seasonal habitat requirements. The special management or features area accounts for the majority of calving, rutting and summer range. However, under the existing integrated management system, only 25 to 50% of the winter range requirements have been protected. There has been extensive logging throughout the winter range and future proposed logging will continue to alienate winter range habitat.

The existing deferral of 32,000 ha. of merchantable timber from the Williams Lake and Quesnel TSAs provides approximately 21 ha/caribou/winter (1500 caribou). This does not include areas of wetland lichen production, forest terrestrial lichen production or non-merchantable forest lichen production which may also provide winter forrage. The special management area (100,000 ha) and the deferred area (32,000 ha) do not meet the requirements of the potential western caribou population (3000-4000 animals without the impact of wolves).

The current integrated management process provides a very crude estimate of the carrying capacity of the area. Requirements for mature timber and arboreal and terrestrial lichen production complicate the process significantly. By comparison, logging in the East Kootenay region of B.C., with the associated production of successional stages and resultant increase in elk production, is a much simpler situation and could probably be accomplished with many different cut patterns and cutting rates. Under a regime of mild winters, the results of different timber harvesting scenarios would probably be similar and even if they were different, we probably couldn't measure the difference in numbers of elk anyway.

Within the special management areas of the Quesnel and Williams Lake TSA's have the needs of biodiversity been met? The integrated management prescriptions have met some or most of the needs of marten, fisher, lynx, moose and wolverine. Many of the needs of grizzly bear, marten and fisher have not been met due to activities surrounding the immediate boundary.

In a recent provincial trapper questionnaire, habitat was listed as declining significantly in the central interior for all fur bearers, except coyote and wolf. Logging was listed as the main cause of the decline in all cases.

Although, this management process addressed some of the winter range
requirements of caribou and some of the needs of biodiversity, it took 6 hard years to reach this point. The Wildlife Branch was not asked to participate fully on the working group of the TSA. It had to lobby, argue and fight to achieve a full position in the discussions. Similarly, there was little, if any public involvement during the first five years of the process. As controversy developed around the Itcha-Ootsa-Blackwater area, the need for public input was at least recognized. This controversy resulted in the Dean and Blackwater LRUP’s.

On the positive side; there was an opportunity to educate many foresters regarding the needs of wildlife and to realize that much of their data for this area is just as inadequate as ours or more so. After spending a day discussing age-volume curves for the west Chilcotin and switching the net down from 70% to 30%, you soon realize that a 1.6% AAC reduction is relatively insignificant in the entire scheme of forest management.

Since some form of timber commitment or tenure is granted first while other resource users are only asked for recommendations, the inequities of the TSA planning process became patently obvious. In fact, while the TSA options were being examined by the Chief Forester, the Ministry of Forests was in the process of allotting pulp agreement 19 which overlapped most of the TSA planning area. In the current "integrated management process" the question was not "should there be a P.A. 19 in this area following proper planning"; rather, the question was "who should we give the pulp agreement to, Cariboo Fibreboard or Skeena Cellulose."

PROCESS

Currently there is no legislated protection (O.I.C.) for the Itcha special management area. It was originally proposed as a Wildlife management area (W.M.A.), while in the later stages of discussion it has been considered as a wilderness area candidate. Although Ministry of Environment and Forest staff generally agree that the best and highest use relates to the wildlife values of the area, the present Regional Manager has suggested that he will either block or not support its status as a W.M.A.

Thus, although some of the seasonal requirements of caribou have been protected, current integrated management procedures have not yet insured that the requirements of this population have been met.

On a provincial scale, it is difficult to decide whether integrated management really exists when the Cariboo Lumber Manufacturers Association states that: the study (S.F.U. wilderness study) ignores the impact of "withdrawal of available mature stands of timber (3.5% AAC reduction in Prov.) where the industry would have to operate while awaiting regrowth".

M. Apsey and the Science Council of B.C. are stating that with 100 million dollars/year they can increase the AAC by 50% in 30 years. The token statements about protecting the environment while increasing the AAC by 50% show a complete lack of understanding about the requirements of wildlife and other resource users.

To complicate matters even further, a recent forest symposium at the University
of B.C. stressed the need to increase the complexity of managed forests. They suggested that, "native species diversity would be maintained only if managed plantations contained the structural features typical of natural forests" (uneven aged, snags, deadfall, fungi, etc.). This obviously means a drastic change in the rate of cut, harvesting procedures and forest management in general.

Some more advanced foresters, are finally suggesting that "until this is done, representative tracts of natural young, mature and old growth forest should be retained. Although it took until 1990 for foresters to make these statements, there may be sufficient time for it to filter down through the ranks.

CONCLUSION

If integrated management is ever going to be successful, there must be several changes to the process.

1. The playing field must level out. There should be a resource impact assessment prior to issuing a commitment in the form of tenure, not after tenure has been granted. There should be no more P.A. 19's overlapping TSA planning areas, unless planning incorporates them properly.

2. Timber managers must be educated and their attitudes toward wildlife and other resource users must change.

3. Legislation and policy must provide the opportunity to make decisions, where it is warranted, which favour high value wildlife populations and habitat.

At present, as decisions move to higher levels, it becomes increasingly difficult to make decisions which do not favour timber harvesting. This occurs because resource comparisons are difficult to assess and foresters make decisions in favour of their bias. Also, without proper policy and legislation, political and industrial pressure can be severe.

I would like to end with a quotation from the Haida Nation, which was borrowed by John Turner and more recently by Sheila Copps during her campaign speech in Vancouver:

"We have not inherited the forests from our ancestors - we have borrowed them from our children".
PERSPECTIVES ON SUCCESSFUL INTEGRATION

BOB FLINTON

Fletcher Challenge Ltd., Williams Lake, B.C. V2G 1M3

ABSTRACT

The planning committee for the Williams Lake Timber Supply Area Analysis was successful in integrating the requirements for Critical Mule Deer winter range into the timber supply analysis. The solution involved identifying critical ranges and changing the timber management system to protect the attributes required for winter range. The result was a reduction in annual allowable cut of 60,000 m³ and maintenance of a population of 12,000 mule deer. The participants accepted this as a reasonable integration of two conflicting requirements.

INTRODUCTION

Having lived and worked in the forest of one area of the province for 20 years provides a person with the opportunity to watch the normal cycles of "Mother Nature". It makes one realize that a manager of any natural resource must work with "Mother Nature" to achieve any level of management. Nature has the ultimate control over natural resources and we as managers can only try to influence, or direct these natural controls. For example, in the Cariboo during the late 1970's and early 1980's we had a major Mountain Pine Beetle outbreak. The forest resource managers in both the ministry and industry attacked this problem with all the expertise and money they could muster. It was a major battle. However, in the end it was two unseasonably early frosts which killed off the beetles and solved the problem. I am certain that the effort of forest managers reduced the potential impact of the epidemic but ultimately it was "Mother Nature" that controlled it. Nature also ultimately controls wildlife populations, for example, my daughter gave me Cyril Shelford's book for Christmas and in it he describes two periods when there were very few game animals. He describes a trip made by Simpson, a Hudson's Bay trader. In 1806 Simpson journeyed by canoe from Fort St. James to Williams Lake and back. They never saw a game animal on the whole trip. This is hard to imagine. Again in the early 1900's when Shelford's parents homesteaded on Oosta Lake there were no game animals and they lived on fish. This is the same time that the large elk herds disappeared from the Chilcotin Plateau. Shelford blames wolves for both these major declines in wildlife populations.

The point I am trying to make is that as resource managers, we manage as best we can with the best knowledge available, but ultimately "Mother Nature" has the final say in our success or failures.
INTEGRATING WILDLIFE AND TIMBER MANAGEMENT IN THE CARIBOO REGION

Keeping in mind our ability to influence natural populations, I would now like to describe what I consider to be an example of successful integration of Mule deer winter range requirements into the Williams Lake Timber Supply Area Analysis.

First I should describe the requirements of a mule deer winter range. They are: mature Douglas fir, South or West facing slopes, and light or moderate snow fall.

Mature Douglas fir is critical for winter ranges because it provides both snow interception and feed. The large crowns maximize the interception of snow and at the same time breakage from the upper crown provides an important part of the winter diet for Mule deer. Douglas fir is also a valuable commercial tree species and thus the conflict between forestry and wildlife develops.

Winter range is critical for the maintenance of the Mule deer population. These ranges provide winter areas for a deer population that covers a large area during the summer. Deer from Knife Creek, which is close to Highway 97, travel as far as Wells Grey Park in summer, and deer that winter near the Fraser River travel as far as Coast Mountains in the summer. The summer range for some deer is only twenty miles from their winter range. These relatively small winter ranges are critical to the survival of a deer population that is widely distributed in summer.

When producing the second five year plan for the Williams Lake Timber Supply Area, a planning committee was formed to direct the timber analysis. This committee had representatives from the Ministry of Forests, Ministry of Environment (Fish and Wildlife), and timber licensees. The planning committee decided to plan for the maintenance of critical Mule deer winter range. This was accomplished by identifying 28 critical ranges that would be managed to maintain the essential requirements of winter range. For planning purposes, they were to be managed on a 250 year rotation rather than 120 which is optimum for timber yield. This should maintain winter ranges while providing a reduced timber harvest. The impact on the long run sustainable yield for the Williams Lake timber supply area was approximately 2%. It doesn’t sound like much, but it represents 60,000 m3 of annual harvest. This represents approximately 60 full time jobs in forestry, logging, hauling, and milling. A significant but acceptable trade-off for maintenance of a population of 10,000 to 12,000 mule deer. There was also a commitment made during the planning process to develop a detailed management plan for each of the twenty eight critical winter ranges. These plans are to be developed jointly by the Timber Supply Area Planning committee with the Ministry of Environment being the lead agency. These plans are now being produced.

Why did it work? This is an interesting question. For the past 20 years timber harvesting in Mule deer winter ranges has been an ongoing battle. Why, after 20 years was it resolved? I think it was for the following reasons: the Ministry of Forests hired a researcher, Harold Armleder, to research the interaction of forestry and winter range. This produced information on deer use of winter range and the movements to and from summer ranges. This information was accepted by forestry and wildlife people. Harold also conducted research on levels of harvesting in winter ranges to
study the impact of light partial cuts on capability of winter ranges. This research lead to the, "Handbook for Timber and Mule deer Management Co-ordination on Winter Ranges in the Cariboo Forest Region". It was Harold Armleder's research that convinced forest managers of the critical importance of the winter ranges to the survival of Mule Deer populations. His research on harvesting impacts also paved the way for a compromise solution.

Jeanne Halleran [Conference Facilitator] asked me to address four specific points in my presentation. I would like to summarize these points:

1. The initial problem of integrating Mule Deer Winter Range into Timber Supply Area Analysis was the lack of data that was acceptable to managers of the conflicting resources.

2. The lack of data was resolved by mutually acceptable research which addressed both the problem and possible solutions.

3. At the T.S.A. Planning level there was no formal mechanism for public involvement other than the ministry of Forests & Environment mandate to represent the public. Public involvement at the T.S.A. Planning level would be very difficult because it is a very technical process and involves theory rather than on the ground decisions. Public involvement would be more productive at the individual winter range plan stage where the impacts on other users such as trappers, grazing permittees, guide outfitters, fish and game clubs, community associations, etc. should be incorporated into the plan.

4. There is no simple solution for conflict resolution. Resolutions of conflict have a much better chance of successful field implementation if people who implement them in the field are involved in resolution process. Forced resolutions that field people think are unreasonable and unworkable will not be successfully implemented.

CONCLUSION

When he was District Forester at Prince George, Bill Young had a successful method for resolving disputes. He would call the disputing parties into his office to discuss the problems. He would describe the consequences of not resolving the problem. He would then lock the combatants in a room and not let them out until a resolution was reached. It worked well in that era.

I think the best solutions to conflict will be found at the local field level rather than at a high administrative level. Land use conflicts tend to disappear when the disputing parties are actually standing discussing the problem on the ground at the site of the dispute.
Thank you for listening to my presentation. I am firmly convinced that there is room for all resource users on the same land base and that integration is the key to success.

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PERSPECTIVE ON INTEGRATION OF FORESTRY AND WILDLIFE RESOURCES

BOB CLARK

B.C. Ministry of Forests, Vanderhoof, B.C. V0J 3A0

ABSTRACT

The principal difficulty facing integrated resource management in British Columbia is the attitude of individuals participating in the process. Success requires the observation of ten rules of behaviour, which are listed.

INTRODUCTION

The watershed of the upper Blackwater river is rich in a variety of values. This drainage contains a world class canoe route, excellent opportunities for guided and unguided angling, heritage sites that are of particular importance to native people, wildlife, and timber values that, while significant, are subordinate to other values. In order to reduce conflicts in the area, we developed the "Upper Blackwater Local Resource Use Plan".

LOCAL RESOURCE USE PLANNING

Our challenge was to develop a Local Resource Use plan that all users would buy-in to, starting from a position of mistrust by most participants. The administrative framework that we worked within was the Local Resource Use Planning process. This lead to the development of a "Special Emphasis Area" that will be presented to the Chief Forester for his consideration during the 1991 re-analysis of the Prince George Timber Supply Area. I believe we have been successful in this and now have a draft plan ready for full public input which has been endorsed in principle by the planning team.

As I look forward to the development of more difficult plans in our district I believe it is important to start with some of the simpler areas and move forward, building upon success. I foresee Local Resource Use Plans someday over the entire district with the emphasis in each one reflecting the values in the zone. In our district the emphasis may switch from recreation, to range, to woodfibre.

I have a few words for all of you who believe timber is the only resource that pays this Province's bills. The 1990s' will insist that the so called other resources get their equal share of attention - because the public is demanding it.

Now for those Fish and Wildlife managers who are smugly nodding your approval out there. I remind you that the days of developing wildlife management
plans and lake stocking programs without referral to other agencies or the public are over. We must learn to live with each other, not in spite of each other.

Now on to the more complex issue of how we achieved success in our situation:

RULES FOR INTEGRATED MANAGEMENT

1. Listen to what people have say even (or especially) when it conflicts with your own goals or values.

2. Know enough about the values to respect them and converse intelligently about them.

3. Trust others to be experts in their respective fields and encourage people to stay within their areas of expertise.

4. The chairman must be genuinely committed to making the process work and must enter into it in a whole hearted and honest manner.

5. Work towards "Informed Concensus" where everyone feels responsibility to produce a workable plan.

6. The Forest Service or anyone else chairing the planning session must be as well prepared as possible with maps, air photos, inventory and stenographic service. All stakeholders should be encouraged to be well prepared.

7. Success can be attributed to good communication which encourages everyone to work on, buy-in and become part of the plan.

8. As many of us here are managers I direct this at you:

   - encourage innovation
   - encourage risk taking
   - encourage high performance standards

9. Be open during the process and be willing to be wiser today than you were yesterday - in other words, be ready to change if appropriate.

10. Be willing to recommend trade-offs to Government. I for one believe that we as informed professionals are in the best position to recommend solutions.
CONCLUSION

In conclusion, I would like to speak to the issue of how conflicts should be resolved in the event all of the aforementioned does not work.

The Standing Forest Resources Commission struck by the previous Minister has been given the task of recommending solutions in these difficult situations. I believe that they can resolve most issues and their current course of action involving calling for public input and holding public hearings is commendable. It is very important that they move expeditiously as they need some successes so as to be seen by the public at large to be the solution to these issues.

An optimistic viewpoint I admit, but one that we are moving toward fulfilling.