Cumulative Impacts Analysis

A Report of CDF Director's THP Task Force

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Dean Cromwell, Norm Hill, Tom Hoffman , Marc Jameson, John Munn, Bill Snyder, and Bill Stewart

In September 1998, CDF Director Wilson appointed a Task Force to suggest how to improve the Timber Harvest Plan (THP) process and to facilitate communication with other agencies. As the complexity of land use issues in forested areas of California has increased, greater pressure has been placed on the THP process to make the final determination on what constitutes good forestry in California. A central issue that the Task Force addressed was the current weakness of the process by which cumulative impacts are addressed. The Task Force recommends that CDF provide:

- better background information on natural processes,
- watershed level analysis protocols,
- clearer guidance on cumulative impact analysis (including changes in the Forest Practice Rules),
- clearer guidance on mitigation measures, and
- expanded monitoring, training, and information.

The Problem

There are many different ideas in California about how a forest ought to be managed and perceptions of acceptable risk from different management approaches. While the California Department of Forestry and Fire Protection (CDF) has lead agency authority for granting a State permit for conduct of timber operations, a number of other State and federal agencies have concerns that CDF must address. Declarations of impaired water quality under the Federal Clean Water Act and the listing of several wildlife and fish species under the Federal Endangered Species Act are two distinct types of federal government concerns. Also, a variety of landowners, interest groups, and the public have very strong concerns about how forested landscapes are managed.

The conduct and evaluation of timber operations under the Forest Practice Rules and other applicable statues and regulations takes place in this larger context—more people, underlying ecological systems, competing land uses, and different values and perceptions of acceptable risk. A central issue is the limited amount of guidance for, and information in, the cumulative impact sections of Timber Harvest Plans. While CDF can do some things itself to respond to the changing larger context, a more successful approach needs to address issues at different levels.

Privately owned forestlands in California vary widely in ownership and condition. As a result, treatment of cumulative impacts varies greatly between Timber Harvest Plans and regions of the State.

Most of the focus of this report is on more complex THPs, especially on the North Coast. Recent court cases have underscored the importance of adequately documenting any conclusions in timber harvesting plans that no significant adverse cumulative impacts will result. The basic legal standard for CDF is that conclusions must be supported by analysis and explanation.

Current Status

In some plans, Registered Professional Foresters (RPFs) do not provide explanations for conclusions regarding cumulative impacts. To date, conclusions are that either: 1) there is no significant impact; or 2) there will be no significant impacts after mitigation. Frequently there is a reiteration of those mitigation measures or alternatives mandated by application of the rules of the Board of Forestry. There is often little or no description of what the mitigation is specifically intended to accomplish and to what extent it is expected to function in that capacity.

Some cumulative impact analyses concentrate only on on-site effects and mitigations. If there is any consideration of off-site impacts, it often is a listing of past THPs or of wildlife species thought to be present. This can lead to long THPs that provide data without analysis.

Technical Rule Addendum #2 requires an evaluation of both on-site and off-site interactions of impacts from proposed project activities with the impacts of past and reasonably foreseeable future projects. There is a need to provide explanations of off-site interactions of proposed project activities with the impacts of past and reasonably foreseeable future projects.

Board rules define “past projects” as generally being limited to a time frame back to ten years. However, under CEQA, RPFs and CDF may need to consider impacts of past projects longer in duration if the remaining impacts could be affected by current timber operations. In any event, there is a duty to mitigate any significant impacts before a plan can be approved (unless there is a finding of Overriding Considerations).

RPFs often do not cite sources of information used to make or support conclusions. The RPF is required to conduct the assessment based on information that is reasonably available before submission of the THP and to cite these sources. If a conclusion is reached that there will be no significant impacts after mitigation, RPFs still must cite sources and explain how the mitigations will reduce impacts to less than a level of significance (except for those mitigations and alternatives mandated by application of the rules of the Board of Forestry). This is especially true where assessment areas may be presumed to have the potential to have a significant cumulative impact from timber operations. Examples of potentially significant cumulative effect issues could include, but not be limited to, 303d impaired watersheds, watersheds with high harvest levels, sensitive viewsheds, and high traffic areas.

The Need for a Stronger Framework for Evaluating Timber Harvest Plans

Neither CDF nor other state agencies have completed consistent or systematic watershed assessments that can provide information to project submitters to guide cumulative impacts analysis. Absent any guidance from CDF and review team agencies, it will be very difficult to consistently improve

cumulative impacts analysis in THPs. There must be agreement about what resources are at risk, the nature of possible impacts of timber harvesting on these resources, what kinds of mitigations are appropriate, and what are meaningful baselines and ways to measure progress. Review team agencies must work together to coordinate data and assessment, at least at the planning watershed level.

This is a more coordinated way of working and will require a broader joint agency/RPF focus than now given to review of individual THPs. The Board, CDF, and review team agencies must be clear in their expectations of information to be submitted with THPs, and RPFs should know this in advance. Much could be gained by a sustained and coordinated effort to improve slope stability mapping and to capture the body of knowledge shared among Fish and Game biologists, other agencies, and persons with special knowledge of a watershed. Lacking this, the agencies should at least attempt to call attention to what is known for each planning watershed and the goals for lessening the risks to resources.

This increased coordination potentially will be expensive and time consuming, especially if the State provides for a program of uniform watershed assessment and an aggressive program of making information and training available. Successful implementation of a number of the Task Force recommendations will require new funding and new staff for all review team agencies.

The recommendations contained in this report are best aimed at the most complex THPs with many resources at risk. A 40-acre THP on the North Coast with new road construction proposed on potentially unstable slopes near residences in a TMDL watershed containing listed salmonid species will require a much greater level of assessment and analysis than a 40 acre THP in Modoc or Lassen county on flat ground with no watercourses. The level of detail necessary to adequately address cumulative effects will vary depending on site-specific circumstances. Understanding this, the task force recommends that at a minimum, all THPs, regardless of complexity, should be required to meet the standards proposed in *Appendix "A"—Suggested Rule Changes for Discussion*.

At the very least, CDF will need to reemphasize that, in preparing cumulative impacts analysis, RPFs for each applicable category in the Cumulative Impact Assessment should consider the current condition, the potential for the project to significantly impact relevant resources, the potential for incremental impact from the project, and whether the individual impacts or combination of impacts would rise to the level of a significant adverse impact on the environment. With each submitted plan, CDF should also clarify that they expect RPFs to cite information sources and to provide a rationale for their conclusions, including a brief description of what mitigations (except those specifically required by Board rules) are specifically intended to accomplish and to what extent each is expected to function in that capacity.

Specific Recommendations

Better information on natural processes

- *In conjunction with the Division of Mines and Geology, provide for a listing of available maps and other slope stability data that is relevant to THP preparation for plans within a watershed or other appropriate geographic unit; the first focus should be watersheds on the North Coast.*

- *Facilitate completion of Sustained Yield Plans (SYPs) or similar larger scale planning documents and develop a planning watershed information reference base for information contained in the SYP.*
- *Make available from CDF and Review Team agencies information that is relevant to both watershed-level assessment and to cumulative impacts analysis.*
- *Provide funding to provide data for computer modeling (SHALSTAB using 10-meter digital data) of potential slope stability hazards for watersheds on the North Coast that list sediment as a water quality impairment.*

Watershed level analysis

- *In conjunction with other review team agencies, develop a listing by planning watershed of resources at risk where timber operations may have the potential to add to cumulative impacts.*

Clear guidance on cumulative impact analysis

- *CDF request that the Board of Forestry consider changes to Forest Practice Rules to improve the quality of cumulative impacts analysis.*
- *In consultation with other agencies, provide guidance to RPFs and others on what hillslope and instream monitoring protocols to use and under what conditions.*
- *Clarify what are the respective roles and areas of professional expertise, such as finishing the discussions between the Board of Forestry and the Board of Registration for Geologists and Geophysicists.*
- *Continue programs to provide feedback on the effectiveness of current practices and provide this information to agencies and RPFs.*

Clear guidance on mitigation measures

- *With other agencies, review existing procedures and protocols that are commonly used as part of the THP process to design mitigation measures and try to agree on what is lacking or is acceptable—including:*
  - *Determine if the protocols and procedures used in THP development (rules focus on unstable slopes, the watercourse and lake protection rule framework, and use of technical rule addendum and mapping protocols) are sufficient to define the nature of the processes that mitigations are designed to address; and*
  - *Clarify how each agency evaluates the risk associated with mitigations.*
- *With other agencies, review the results of the Monitoring Study Group on the effectiveness of current Forest Practice Rules.*
- *Review with other agencies the structure and possible uses of information to be obtained from the revised Monitoring Form for the Protection of the Beneficial Uses of Water.*

Expanded monitoring, training, and information

- *Develop common training programs for agency staffs on technical matters within their jurisdiction, such as sharing training academy courses or conducting joint training session.*
- *Revise and strengthen existing programs such as the Watershed Academy and California Licensed Forester workshops to include more focus on relevant hillslope and instream processes.*
- *Developing a cadre of agency and industry field personnel that have experience in California and are willing to teach others in matters related to cumulative impacts analysis via special seminars, videos, or televised training sessions.*
- *Determine which are the most useful current texts and protocols, reprint them if copies are short, explore the ability to provide them over the internet, and use in training.*
- *Determine what is necessary to develop and maintain an information repository for interested persons in each planning watershed or other relevant geographical units.*

1. Need for Better Information on Natural Processes

Over the last few years, a number of factors focused the need to understand potential impacts of timber operations interacting with natural ecological processes. These include:

- the listing of salmonids under the Federal Endangered Species Act;
- the thrust of the federal Environmental Protection Agency on the Clean Water Initiative to reduce non-point source pollutants (including sediment);
- the review of the management measures under the Coastal Zone Management Act;
- movement of people into forested watersheds and the impact of landslides and flooding during large storm events in California and Pacific Northwest; and
- the evolution of the Headwaters purchase, the Pacific Lumber Company (PALCO) Habitat Conservation Plan (HCP), and PALCO harvesting in North Coast watersheds.

Baseline information on natural processes, such as geomorphology and instream dynamics, is rapidly increasing. Agencies and the public stay abreast of changing information. Available information, from CDF's own work, is sometimes delayed or not easily available. More detailed ecological knowledge and sophisticated concerns require more comprehensive watershed or other large scale analysis and guidance in impact assessment. Addressing questions or trends in impaired water bodies or in listed salmonids will require much more focus on quantitative standards and measurements of relevant parameters related to natural processes. As a result, RPFs and CDF are encountering more difficult questions as part of plan preparation and review. Three examples are illustrative:

- Concerns over cumulative impacts arising from hydrologic change related to intense harvesting

  In some recent plans, the public and agencies have expressed concern that increased flood frequencies will be caused by decreased foliage interception loss and lead to aggradation that will

accelerate rates of bank erosion and undercutting of inner gorge slopes downstream of the areas logged. Concerns are also expressed that chronic turbidity levels will continue to increase in downstream channels due to lack of forested buffers around Class III channels, increased length of the active road network, and continuation of high levels of winter road use.

- Concerns over "properly functioning" riparian processes

  The concern is that without all components of a riparian system in place, and working together, the system will not operate well and therefore should not be disturbed by timber operations. An example comes from a recent petition to the Board of Forestry where the position is taken that timber harvesting should not be allowed because large woody debris is lacking and there is no source to replenish the wood. The impacts of removing larger trees cannot be mitigated and no harvesting should be permitted.

- Concerns over the impact of harvesting on late seral stage forest habitat

  This concern is raised sometimes when there is only a small amount of late seral stage habitat left in a watershed or biological assessment area. Board rules focus on the importance of this habitat for wildlife. Yet public comments also raise non-wildlife related concerns over the loss of larger, older trees and related forest conditions such as more duff on the forest floors, higher nutrient levels in forest soils, and the existence of fungi.

The ability of CDF, other state agencies, professional foresters and landowners to respond to these factors is limited in part by available knowledge and understanding. And to some degree, the response has been hindered by the lack of coordination between agencies and by the slowness to assimilate and agree on the reliability of available scientific and technical resources.

Currently, there are significant improvements in progress both in coordination and in focused scientific review of hillslope and instream processes. There has been progress in understanding road impacts and in the natural recovery processes of watersheds. The Watershed Protection and Restoration Council (WPRC) provided the mechanism for basic coordination in programs related to salmonids. This appears to be continuing under the California Biodiversity Council. A WPRC Committee of Scientists is reviewing the effectiveness of Forest Practice Rules in dealing with salmonids. In addition, the U.C. Committee on the Scientific Basis for Evaluation of Cumulative Watershed Effects in Forested Landscapes is examining approaches relevant to both hillslope and instream related cumulative effects.

Although considerations overlap, the CDF Task Force is not addressing the same problem areas as these scientific reviews. The Task Force does believe that these efforts are critical and CDF will benefit substantially from their work. In as much as the Board of Forestry is currently dealing with concerns related to landslides and flooding, the Task Force recommends two steps that will help RPFs be aware of potential slope stability problems. These are:

- In conjunction with the Division of Mines and Geology, provide for a listing of available maps and other slope stability data that is relevant to THP preparation for plans within a watershed or other geographic unit.

- Provide funding to collect data for computer modeling (SHALSTAB using 10-meter digital data) of potential slope stability hazards for watersheds on the North Coast that list sediment as a water quality impairment.

2. Watershed or "Problemshed" Level Analysis

Analysis of natural processes potentially affected by timber operations often requires a scope of analysis larger than just the project area. This larger area of analysis can be referred to as a "problemshed," where the area varies by the problem at hand. For fish, it may be a watershed or even a subwatershed. For wildlife, the area may be much larger—and cut across a number of watersheds.

The Forest Practice Rules require that a cumulative impacts analysis be completed for the appropriate assessment area. An assessment area covers an area large enough to be meaningful to the resource at risk (fish, wildlife, etc.). Ideally, a larger scale assessment has been completed for the problemshed and gives information upon which to analyze the impacts of the project. Issues related to such things as peak flow, landslide risk, sediment transport, the status of stream reaches and habitat condition, road systems and networks, and rates of harvest over time must be considered in a context bigger than a single THP, such as a planning watershed or groups of planning watersheds. This is also true of questions related to wildlife habitat, though a watershed may not be the best unit of problemshed analysis.

The difference between problemshed assessment and cumulative impacts analysis based on that assessment merits emphasis—and it is key to understanding the changing scope of THP content. The problemshed assessment is larger scale and tells the current status of resources at risk, factors causing the risk, and how past and current land uses may add to the risk. It may also include targets for recovery and a range of possible land use mitigations. In contrast, a cumulative impacts analysis, as required by the California Environmental Quality Act and the Forest Practice Act and Rules, addresses on-site and off-site impacts of a project, both individually and taken in combination with other projects. The problemshed assessment gives the background and framework against which a cumulative impact analysis can be written.

The Board of Forestry, when it designed the Sustained Yield Plan (SYP) and related rules in 1993, recognized that larger scale analysis was going to be needed in the future. However, for several reasons, approved SYPs have progressed slowly and the focus of both watershed assessment and cumulative impact analysis has centered on individual THPs. Court rulings have criticized discussion of mitigations and alternatives in THPs and show that CDF is in a much stronger legal position when there is clear reasoning in the THP record to substantiate its decisions.

However, neither CDF nor other State agencies have completed consistent or systematic watershed assessments that can provide information to project submitters to guide cumulative impacts analysis. And, absent any guidance from CDF and review team agencies, it will be very difficult to consistently improve cumulative impact analysis in THPs. There must be agreement about what resources are at risk, the

nature of possible impacts of timber harvesting on these resources, what kinds of mitigations are appropriate, and what are meaningful baselines and ways to measure progress. Review team agencies must work together to coordinate data and assessment, at least at the planning watershed level. This is a new, more coordinated way of working and will require a different focus than now given to review of individual THPs.

All parties involved in the process also need to take advantage of the current larger scale planning efforts currently underway through SYPs, HCPs, and TMDLs. These may provide additional ways to link site specific projects undertaken through a THP with the larger scale planning efforts. This linkage needs to be made to insure that site-specific projects in terms of timing, silvicultural methods, protection measures, etc. are consistent with objectives and analysis that has been done in the larger scale planning documents.

The Board, CDF, and review team agencies must be clear in their expectations of information to be submitted with THPs and RPFs should know this in advance. If anything, the complexity of issues often raised in cumulative effects suggests more preplan consultation by RPFs with review team agencies. This is especially true with plans in water-quality impaired watersheds, in areas of salmonid habitat, or where there is risk of peak flow flooding or slope failure with potential downstream impacts to life and property.

The Task Force believes that the State has an obligation to make as much information as possible available to RPFs. This is especially true for watersheds with multiple landowners. Much could be gained by a sustained and coordinated effort to improve slope stability mapping and to capture the body of knowledge shared among Fish and Game biologists, other agencies, and persons with special knowledge of a watershed. Lacking this, the agencies should at least attempt to call attention to what is known for each planning watershed and the goals for lessening the risks to resources.

The Task Force makes recommendations under Item 3 below that will address concerns in this section.

3. Clearer Guidance on Cumulative Impact Analysis

The Task Force identified two kinds of issues with the current treatment of cumulative impacts by the THP process. The first issue is the uneven, sometimes cursory, treatment of cumulative impacts in THPs submitted by RPFs. The second issue is the need for thorough discussion and analysis of cumulative effects as part of a proposed THP. Sustained Yield Plans that are in various stages of completion provide more detail and analysis at a larger scale, but for the most part these are not complete and current THPs do not necessarily reflect the scope of information contained in the SYP.

The quality of cumulative impact assessments submitted as part of THPs varies widely. Observations from CDF THP review staff cite the following examples of where analysis could be improved:

- Selection of cumulative assessment area(s).
- Selection of species of management concern.
- Realistic impact assessments upon species.

- Late-seral forests.
- Impacts on habitat attributes (large snags and logs over rotation age; and on a landscape basis where needed).
- Balance of softwoods and hardwoods.
- Assessment of road related impacts.
- LWD status and recruitment potential.
- Water temperature.
- Sediment levels, transport, and contribution of timber harvesting.
- Lack of recognition of impacts from past projects >10 years.
- Lack of predictability of future projects, often limited to next few months.

These concerns are echoed by public comments about the quality of cumulative impact assessments. Examples include:

- Lack of evaluations of other projects beyond a list of THPs, silviculture, and status.
- Failure to look at downstream impacts of peak flow.
- Paucity of information on non-THP impacts.
- Vague or absent link between impacts of other projects and how present project is modified to mitigate for the potential cumulative impacts.
- Discussion of the rate of harvest of assessment areas over time as it relates to vegetative cover.
- Alternatives dealt with by "canned language" with little review by CDF.

Current Rules provide adequate authority to make improvements in cumulative impact assessment within a THP. However, the Forest Practice Rules (FPR) do not set a clear standard of when or how much information RPFs should submit in support of THPs and are not clear about the differences (and expectations) between a larger scale watershed assessment and an analysis of cumulative effects based on that assessment.

The FPRs establish the context in which RPFs submit cumulative impacts analysis and related information as part of the THP process. (SYPs are a different process.) For the most part, the rules set a screening process that assumes RPFs will fully analyze the impacts of timber harvesting operations and will design appropriate mitigation measures. If the RPF finds that significant effects will occur, more explanation is necessary. If CDF has questions about impacts, then CDF is empowered to ask for both the information used by the RPF to support the proposed THP and additional data necessary to fully evaluate the plan. The FPRs themselves do not set a clear standard about how much information or analysis should be included by RPFs with THPs in support of their conclusions about cumulative impacts.

On one hand, it is clear that the THP impacts must be considered in a larger context and that RPFs must provide sufficient information to allow the Director to make conclusions:

> *897(b)(2) Individual THPs shall be considered in the context of the larger forest and planning watershed in which they are located, so that biological diversity and watershed integrity are maintained within larger planning units and adverse cumulative impacts, including impacts on the quality and beneficial uses of water, are reduced.*
>
> *897(b)(3) RPFs who prepare THPs have the responsibility to provide the Director with information about the plan and resource areas and the nature and purpose of the operations proposed which is sufficiently clear and detailed to permit the Director to exercise the discretion and make the determinations required by the Act and rule.*

From Technical Rule Addendum #2:

> *The RPF shall list and briefly describe the individuals, organizations, and records used as sources of information in the assessment of cumulative impacts…Records of information used in the assessment shall be provided to the Director upon request….*

On the other hand, the FPRs place limits on the scope of cumulative impacts analysis and the information that must be included with the submitted THP. The Director must ask for additional information if deemed necessary.

> *898 …If the RPF indicates that significant adverse impacts will occur, the RPF shall explain in the plan why alternatives or additional mitigation measures that would significantly reduce the impact are not feasible.*
>
> *...Cumulative impacts shall be assessed based upon the methodology described in Board Technical Rule Addendum No. 2…The RPFs and plan submitter's duties under this section shall be limited to closely related past, present, and reasonably foreseeable probable future projects within the same ownership and to matters of public record. The Director shall supplement the information provided by the RPF and the plan submitter when necessary to insure that all relevant information is considered.*

In addition, from Technical Rule Addendum #2:

> *…The RPF preparing a THP shall conduct an assessment based on information that is reasonably available before submission of the THP. RPFs are expected to submit sufficient information to support their findings if significant issues are raised during the Department's review of the THP…*

From the Watershed Resources Section of the Addendum:

> *Cumulative watershed effects occur within and near bodies of water or significant wet areas.*
>
> *Watershed impacts shall be based on "significant on-site and downstream cumulative effects on beneficial uses of water."*
>
> *Watershed effects include sediment, water temperature, chemical contamination, and peak flow.*
>
> *The following general guidelines may be used when evaluating watershed impacts. The factors described are general and may not be appropriate for all situations. No actual measurements are intended. However, quantitative or narrative water-quality objectives set forth in an applicable Water Quality Control Plan must be complied with.*

As a result of this rule structure, CDF often is faced with the lack of analysis by RPFs in cumulative impacts sections of THPs. Some foresters do a good job in relating mitigation to cumulative impacts. However, RPFs almost always state that there are no significant effects after mitigation so there is no more mitigation or analysis required. Many plans merely quote Addendum #2 as to the potential adverse impacts of timber operations on temperature, sediment, and the like. The result is that during the review process, CDF must determine if more information is needed. CDF then has the responsibility to ask for additional mitigation measures that it thinks are reasonable and necessary.

This system where CDF determines whether more information is necessary during the review process and after filing may still be appropriate where THPs are not too complex or involve relatively simple, low impact timber operations. It does not seem appropriate where there are concerns over listed salmonids and impaired water quality on the North Coast. It also may be very difficult to explain how Basin Plan standards will be met when the FPRs say that no actual measurements are intended. Moreover, at times, when the RPF and CDF Inspector are very familiar with the site, their observations and conclusions may not be well documented in the THP or inspection reports. This is because the operations, the impacts, and mitigation measures may be obvious to them, and the need to document these thought processes may be overlooked.

Hence, the Task Force recommends that CDF and the Board act to obtain three goals: 1) CDF and review team agencies indicating in advance what they expect in content and quality of cumulative impact analysis; 2) clarifying the responsibility of the RPF to provide certain information in the THP upon submission, including a clear description of expectations for both watershed assessment and cumulative impact analysis; and 3) making it clear that as a condition for filing, submitted plans must include information that explains how RPFs reached findings and conclusions regarding cumulative impacts.

Specifically, the Task Force suggests that:

- *CDF request that the Board of Forestry consider changes to Forest Practice Rules suggested in Appendix A.*
- *In conjunction with other review team agencies, develop a listing by planning watershed of resources at risk where timber operations may have the potential to add to cumulative impacts. The list would also include primary limiting factors that contribute to the threat or impairment of the resource and the ways in which timber operations may interact with these factors to adversely affect the resource. It would also help if CDF and Review Team agencies could provide a list of information, literature, and a procedure for researching and adding new information that should be considered by RPFs in preparing plans to addresses these considerations.*
- *Facilitate completion of SYPs or similar larger scale planning documents and develop a planning watershed information reference base for information contained in the SYP.*

- *Make available from CDF and Review Team agencies information that is relevant to both watershed-level assessment and to cumulative impacts analysis.*

4. Development of Mitigation Measures

A problemshed assessment should focus cumulative impact discussion on limiting factors to resources at risk. In the same way that agencies need to tell landowners about the factors at risk, agencies have the obligation to be clear about what kinds of mitigations they believe will be acceptable. The acceptance of mitigations, either directly or implicitly, reflects how each agency interprets their mandate to protect the resource and what is acceptable risk from a mitigated project. To the extent that agencies differ in their risk assessment, project proponents can receive different evaluations by agencies reviewing their proposals and may face delays or more requests for information.

The Federal Clean Water Act (as reflected in designation of impaired water bodies) and the Federal Endangered Species Act (as reflected in salmonid listings) tolerate less risk in design of project mitigations than with proposals not involving such concerns. However, this does not necessarily mean that mitigations or alternatives must be selected that "just do less." For example, while harvesting less or leaving larger buffer zones (from which trees may eventually fall in watercourses) may be chosen as mitigations for lack of large woody debris, a more effective approach might be to actively place large wood in streams. This could be true even if these explicit actions involve a chance that fish could be harmed by the act of placing large logs in the stream.

If agencies do not agree on the risk assessment or find a way to resolve differences, then several outcomes over time are possible—among these are: 1) a project proponent adopts a design that satisfies the agency with the lowest risk tolerance; 2) agencies disagree, the project moves ahead, and is litigated using agency differences as a basis for legal action; or 3) agencies disagree, the project moves ahead without litigation, and CDF's role as lead agency is potentially weakened further as other agencies find ways to use their legal authority to force different decisions in the future.

The Task Force believes that differences in agency perception of risk and their resolution in project decisions or acceptance of mitigations are to be expected. However, it does seem that more could be done to focus this discussion and find more ways to help landowners and project submitters cope with the variety of agency viewpoints. This is probably easier said than done, but the Task Force suggests the following as starting points:

- *With other agencies, review existing procedures and protocols that are commonly used as part of the THP process to design mitigation measures and try to agree on what is lacking or is acceptable – including:*
  - *Determine if the protocols and procedures used in THP development (rule focus on unstable slopes, the watercourse and lake protection rule framework, and use of technical rule addendums and mapping protocols) are sufficient to define the nature of the processes that mitigations are designed to address; and*
  - *Clarify how each agency evaluates risk associated with mitigations.*

- *CDF request that the Board of Forestry consider changes to Forest Practice Rules suggested in Appendix A.*
- *With other agencies, review the results of the Monitoring Study Group on the effectiveness of current Forest Practice Rules.*
- *Review with other agencies the structure and possible uses of information to be obtained from the revised Monitoring Form for the Protection of the Beneficial Uses of Water.*

5. Conclusion—Monitoring; More Training and Information

Future THPs, at least those that are more complex, will need to show more consistently a level of analysis that looks at areas larger than the THP itself. It will be necessary for RPFs to explain conclusions about beneficial uses of water and other resources. In some cases, there will be a need to reference measured parameters relative to potential cumulative impacts and to trace resource trends and the impacts of timber operations. Reasoning will have to be explained more consistently in THPs; it cannot be assumed that persons reading the THP will necessarily know all the facts that led the RPF and CDF to make conclusions. THPs will have to show how mitigations are related to impacts and to carefully explain how off-site impacts relate to resources at risk. RPFs also need to be aware of, and to use, up-to-date information and to anticipate the importance of maintenance, monitoring, and feedback over time.

This is a tall order for RPFs and agencies. It means a lot of agency coordination about expectations and an efficient way to communicate these expectations. It also will require common training programs and an aggressive effort by agencies and RPFs to share observations about the effectiveness of assessment techniques and mitigation measures.

The conclusion to the Task Force review is simple: in the end, improvement in cumulative impacts analysis in THPs depends largely on better training and information. Coordination, training, and making information available will be expensive and will require new staff and funding. To this end, the Task Force—in addition to earlier suggestions—recommends the following:

- *Develop common training programs for agency staffs on technical matters within their jurisdiction, such as sharing training academy courses or conducting joint training sessions.*
- *Revise and strengthen existing programs such as the Watershed Academy and California Licensed Forester workshops to include more focus on relevant hillslope and instream processes.*
- *Develop a cadre of agency and industry field personnel that have experience in California and are willing to teach others on matters related to cumulative impacts analysis via special seminars, videos, televised training sessions, or information easily accessible over the Internet.*

- *Determine which are the most useful current texts and protocols, reprint them if copies are short, and use in training.*
- *Determine what is necessary to develop and maintain an information repository for interested persons in each planning watershed or other relevant geographical unit.*
- *Clarify what are the respective roles and areas of professional expertise, such as finishing the discussions between the Board of Forestry and the Board of Registrations for Geologists and Geophysicists.*
- *Continue programs to provide feedback on the effectiveness of current practices and provide this information to agencies, RPFs, and the public.*
- *In consultation with other agencies, provide guidance to RPFs and others on what hillslope and instream monitoring protocols to use and under what conditions.*

Appendices

Appendix A. Suggested Rule Changes for Discussion

1. Amend 897(b)(3) to add a sentence to read:

> While the responsibility for implementation of the Act and rules belongs to the Director and the Department, RPFs who prepare THPs have the responsibility to provide the Director with information about the plan and resource areas and the nature and purpose of the operations proposed which is sufficiently clear and detailed to permit the Director to exercise discretion and make the determinations required by the Act and rules. This information must be sufficient to show the full scope of the potential impacts of the project, including full project description and impact evaluation.

2. Amend 912.9 (3), 932.9 (3), and 952.9 (3) - the "mitigation table - as follows (crossout and italics show proposed changes):

~~(3)~~ ~~Will the proposed project, as presented, in combination with past, present, and reasonably foreseeable probable future projects identified in items (1) and (2) above, have a reasonable potential to cause or add to significant cumulative impacts in any of the following resource subjects?~~

(3) For each of the Resource Areas identified in Addendum #2, the RPF shall indicate which factors as described were considered. For each factor considered the RPF shall first address the potential for significant adverse impacts directly attributable to the project (on-site) which are considerable and how these impacts would be mitigated to a level of non-significance. The RPF shall consider the potential for the incremental impact from the project to create a significant adverse impact when added to closely related past, present and reasonably foreseeable probable future projects identified in items (1) and (2) above, to create a significant impact and how these impacts if any will be mitigated to a level of non-significance.

Resource Area and factors considered	Yes-after mitigation (a)		No-after mitigation (b)		No reasonably potential significant effects (c)	
	On-site	Off-site	On-site	Off-site	On-site	Off-site
1. Watershed						
a. sediment effects						
b. water temperature						
c. organic debris						
d. chemical contamination						
e. peak flow						
f. canopy cover						
2. Soil Productivity						
a. organic matter loss						
b. surface soil loss						
c. soil compaction						
d. growing space loss						
3. Biological						
a. pools and riffles						
b. large woody material						
c. near water vegetation						
d. snags/den/nest trees						
e. downed large woody debris						
f. multistory canopy						
g. road density						
h. hardwood cover						
i. late seral characteristics						
j. late seral habitat continuity						
k. special habitat elements						
4. Recreation						
5. Visual						
6. Traffic						
7. Other						

a) Yes means that potential significant adverse impacts are left after application of the forest practice rules and mitigations or alternatives proposed by the plan submitter.
b) No after mitigation means that any potential for the proposed timber operation to cause significant adverse impacts has been substantially reduced or avoided by mitigation measures or alternatives proposed in the THP and application of the forest practice rules.
c) No reasonably potential significant effects means that the operations proposed under the THP do not have a reasonable potential to join with the impacts of any other project to cause cumulative impacts.

3. Amend the last sentence of Sec. 912.9 (4), 932.9 (4), and 952.9 (4) as follows:

(4) If column (a) is checked in (3) above describe why the expected impacts cannot be feasibly mitigated or avoided and what mitigation measures or alternatives were considered to reach this determination impacts. If column (b) is checked in (3) above describe what mitigation measures have been selected which will substantially reduce or avoid reasonably potential significant cumulative impacts (except for those mitigation measures or alternatives mandated by application of the rules of the Board of Forestry) and explain how these measures will prevent or provide the necessary reduction of significant adverse impacts to the environment."

4. Renumber Section 912.9 (6), 932.9 (6), and 952.9 (6) to 912.9 (8), 932.9 (8), and 952.9 (8).

5. Add new Sections 912.9 (6) and (7), 932 (6) and (7), and 952 (6) and (7) as follows:

- "(6) Summarize the current condition of each resource within the identified assessment area, with particular emphasis on those areas where impacts of the proposed projects may combine with impacts of past, current, and reasonably foreseeable future projects to create or add to an existing significant environmental problem."

- "(7) Identify and describe the method or methods used to determine whether interactions between past, current, and reasonably foreseeable future projects will or will not result in significant adverse impacts on the environment.

6. Alter the sentence in the 4th paragraph of the "Introduction" section of Technical Rule Addendum #2 to read:

"The RPF preparing a THP shall conduct an assessment based on information that is reasonably available before submission of the THP. ~~RPFs are expected to submit sufficient information to support their finding if significant issues are raised during the Department's review of the THP."~~The Director, based upon a review of the plan, may reject for filing any THP that does not contain analysis and/or information to explain how the RPF reached findings and conclusions regarding the potential of the THP to result in significant on-site or cumulative impacts.

7. Alter the discussion in the "Watershed Resources Section" of Technical Rule #2 to read:

"The following general guidelines may be used when evaluating watershed impacts. The factors described are general and may not be appropriate for all situations. ~~No actual measurements are intended.~~ Reference to measured parameters may be necessary to explain findings and conclusions, especially when complying with ~~However, quantitative or narrative~~ water-quality objectives set forth in an applicable Water Quality Control Plan ~~must be complied with~~."

Appendix B - Summary Of Applicable Cumulative Effects Rules

4 **895.1** ***Cumulative Impacts*** means those impacts as defined in 14 CCR 15355.

Note: 14 CCR 15355 states that cumulative effects "refers to two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts.
(a) The individual effects may be changes resulting from a single project or a number of separate projects.
(b) The cumulative impact from several projects is the change in the environment which results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time."

4 **897(b)(2)** Individual THPs shall be considered in the context of the larger forest and planning watershed in which they are located, so that biological diversity and watershed integrity are maintained within larger planning units and ***adverse cumulative impacts***, including impacts on the quality and beneficial uses of water are reduced.

4 **898 Feasibility Alternatives**

Cumulative impacts shall be assessed based upon the methodology described in Board Technical Rule Addendum Number 2, Forest Practice Cumulative Impacts Assessment Process and shall be guided by standards of practicality and reasonableness. The RPF's and plan submitter's duties under this section shall be limited to closely related past, present and reasonably foreseeable probable future projects within the same ownership and to matters of public record. The Director shall supplement the information provided by the RPF and the plan submitter when necessary to insure that all relevant information is considered.

[912, 932, 952].9 contains a "***Cumulative Impacts Assessment Checklist***" required for all THPs.

STATE OF CALIFORNIA
BOARD OF FORESTRY
CUMULATIVE IMPACTS ASSESSMENT

(1) Do the assessment area(s) of resources that may be affected by the proposed project contain any past, present, or reasonably foreseeable probable future projects? Yes ___ No___

If the answer is yes, identify the project(s) and affected re-source subject(s).

(2) Are there any continuing, significant adverse impacts from past land use activities that may add to the impacts of the proposed project? Yes ___ No ___

If the answer is yes, identify the activities and affected resource subject(s).

(3) Will the proposed project, as presented, in combination with past, present, and reasonably foreseeable probable future projects identified in items 1 and 2 above, have a reasonable potential to cause or add to significant cumulative impacts in any of the following resource subjects?

	Yes after mitigation (a)	No after mitigation (b)	No reasonably potential significant effects (c)
1. Watershed	_____	_____	_____
2. Soil Productivity	_____	_____	_____
3. Biological	_____	_____	_____
4. Recreation	_____	_____	_____
5. Visual	_____	_____	_____
6. Traffic	_____	_____	_____
7. Other	_____	_____	_____

a) Yes, means that potential significant adverse impacts are left after application of the forest practice rules and mitigations or alternatives proposed by the plan submitter.

b) No after mitigation means that any potential for the proposed timber operation to cause significant adverse impacts has been substantially reduced or avoided by mitigation measures or alternatives proposed in the THP and application of the forest practice rules.

c) No reasonably potential significant effects means that the operations proposed under the THP do not have a reasonable potential to join with the impacts of any other project to cause cumulative impacts.

(4) If column (a) is checked in item 3 above describe why the expected impacts cannot be feasibly mitigated or avoided and what mitigation measures or alternatives were considered to reach this determination impacts. If column (b) is checked in item 3 above describe what mitigation measures have been selected which will substantially reduce or avoid reasonably potential significant cumulative impacts except for those mitigation measures or alternatives mandated by application of the rules of the Board of Forestry.

(5) Provide a brief description of the assessment area used for each resource subject.

(6) List and briefly describe the individuals, organizations, and records consulted in the assessment of cumulative impacts for each resource subject. Records of the information used in the assessment shall be provided to the Director upon request.

4 Technical Rule Addendum #2

As indicated above, the methodology for CE analysis shall be that described in Technical Rule Addendum #2. Technical Rule Addendum #2 requires certain things.

1. "This assessment shall include evaluation of both on-site and off-site interactions of proposed project activities with the impacts of past and reasonably foreseeable future projects."

2. "The RPF preparing a THP shall conduct an assessment based on information that is reasonably available before submission of the THP. RPFs are expected to submit sufficient information to support their findings if significant issues are raised during the Department's review of the THP."

3. "The RPF shall establish and briefly describe the geographic assessment area within or surrounding the THP for each resource subject to be assessed and shall briefly explain the rationale for establishing the resource area. This may be a narrative description or may be shown on a map."

4. "The RPF shall list and briefly describe the individuals, organizations, and records used as sources of information in the assessment of cumulative impacts, including references for listed records and the names, affiliations, addresses, and phone numbers of specific individuals contacted. Records of information used in the assessment shall be provided to the Director upon request."

5. "Past and Future Activities

Past and future projects included in the cumulative impacts assessment shall be described as follows:

A. Identify and briefly describe the location of past and reasonably foreseeable probable future projects as defined in 14 CCR 895.1 within described resource assessment areas.

B. Identify and give the location of any known, continuing significant environmental problems caused by past projects as defined in 14 CCR 895.1.

The RPF who prepares the plan or supervised designee shall obtain information from plan submitters (timberland or timber owner) about past, and future land management activities and shall consider past experience, if any, in the assessment area related to impacts of the proposed operations, rates of recovery, and land uses. A poll of adjacent owners is not required to determine activities on adjacent ownerships."

4 **913.1(d)(3) & 933.1(d)(3) Shelterwood Removal Step [Northern and Southern only]**

If the extent and intensity of the ground disturbance caused by the harvest is essentially the same as would have been caused by a clearcut or will cause ***adverse cumulative effects*** on wildlife as determined by the RPF or Director, the size limitations, and separation (spacing) by logical logging unit requirements of 14 CCR 933.1(a) [953.1(a)] are applicable unless the post harvest stand, regardless of average diameter, meets area stocking standards of 14 CCR 933.3(a)(1)(A) or (B) [953.3(a)(1)(A) or (B)]

4 **1090.5(u) Contents of NTMP**

A description of the ***cumulative effects analysis*** with supporting information, including impact of projected harvesting over the life of the plan.

Appendix C – Suggested Checklist to Plan Reviewers

NOTE: MAY ALSO BE USED TO HELP GUIDE RPFS IN PREPARING CUMULATIVE IMPACTS ANALYSIS.

SECTION IV-CUMULATIVE IMPACTS ANALYSIS

A) Inclusion of 14 CCR 952.9 "CUMULATIVE IMPACTS CHECKLIST" would still be required

B) Inclusion of information identified in Technical Rule Addendum #2 would still be required for the following:

C) Identification of resource areas

1) Identification of information sources

2) Listing of past and future activities for each assessment area

3) Identification and location of any known significant environmental problems caused by past projects.

D) For each of the following resource areas make sure an assessment is included of the project's potential for:

1) impacts directly attributable to the project itself which are considerable and would lead to significant adverse impacts and how these impacts would be mitigated to a level of non-significance.

2) the potential for the incremental impact from the project when added to closely related projects to create a significant impact and how these impacts, if any will be mitigated.

E) Resource areas to be considered include those listed in Technical Rule Addendum #2. For each applicable element consider current condition; likelihood that project would significantly impact each element; the potential for incremental impact from the project and whether the individual impacts or combination of impacts would rise to the level "significant adverse impact on the environment" as defined in 14 CCR 895.1. Provide rationale and supporting information as necessary to support conclusions reached.

1) Watershed Impacts for the following impact types:

a) Sediment

I. Is the watershed assessment area within any of the following:

A. An impaired waterbody listed under Section 303(d) of the Clean Water Act.

B. A watershed listed as "Sensitive" by the Board of Forestry under 14 CCR 956.8

C. Habitat for a federally or state-listed salmonid species.

D. A watercourse which has been determined to have ongoing cumulative impacts by the Department of Forestry.

II. What is the current condition of the watercourse with respect to sediment?

III. What information or process was used to determine watercourse condition?

IV. Are any of the following sediment sources applicable to the project area and the assessment area?

Sediment Source	On-site	Within Assess. Area
A. Harvest Mass Wasting	_____	
B. Harvest Surface Erosion	_____	
C. Harvest-Bank Erosion	_____	
D. Roads-Mass Wasting	_____	
E. Roads-Surface Erosion	_____	
F. Roads-Bank Erosion	_____	
G. Road Washouts, Gullies or small slides	_____	

V. For each of the potential sediment sources listed above which have been determined to potentially impact water quality, indicate how each will be reduced to a level of significance through application of standard forest practice rules; mitigations or combinations of forest practice rules and mitigations for the following:

A. Individual impacts attributable to the project

B. Incremental impacts from the project which might add to closely related projects

b) Water temperature

I. Is the watershed assessment area within any of the following:

A. An impaired waterbody listed under Section 303(d) of the Clean Water Act

B. A watershed listed as "Sensitive" by the Board of Forestry under 14 CCR 956.8

C. Habitat for a federally or state listed salmonid species.

D. A watercourse which has been determined to have ongoing cumulative impacts by the Department of Forestry.

II. What is the current condition of the watercourse with respect to temperature?

III. What information or process was used to determine watercourse condition?

IV. Are any of the following temperature increasing sources applicable to the project area and the assessment area?

Temperature Increase	On-site	Within Assess. Area
A. Sedimentation		
B. Canopy removal		
C. Shallow with low flows		
D. Dark Stream bottom		
E. Exp. To warm air		

V. For each of the potential temperature sources listed above which have been determined to potentially impact water quality, indicate how each will be reduced to a level of insignificance through application of standard forest practice rules; mitigations or combinations of forest practice rules and mitigations for the following:

A. Individual impacts attributable to the project

B. Incremental impacts from the project which might add to closely related projects

c) Organic debris effects

I. What is the current condition of the watercourse with respect to Organic Debris Effects?

A. Instream levels of large woody debris.

B. Recruitment potential from existing WLPZ areas

C. Presence of unstable volumes of large debris

I. What information or process was used to determine watercourse condition with respect to large woody debris?

II. Are any of the following large woody debris concerns applicable to the project area and the assessment area?

Large woody Debris Concerns	On-site	Within Assess. Area
A. Lack of In-channel debris		
B. Lack of Recruitment Pot.		
C. Unstable large debris		
D. Migration blockage		

I. For each of the Large Woody Debris concerns listed above which have been determined to potentially impact water quality, indicate how each will be reduced to a level of insignificance through application of standard forest practice rules; mitigations or combinations of forest practice rules and mitigations for the following:

A. Individual impacts attributable to the project

B. Incremental impacts from the project which might add to closely related projects.

d) Chemical contamination effects

I. Are any of the following chemical contamination concerns applicable to the project area and the assessment area?

Chemical Contamination Concerns	On-site	Within Assess. Area
A. Road Treatments		
B. Equipment contamination		
C. Run-off from burns		
D. Silvicultural run-off		

II. For each of the chemical contamination concerns listed above which have been determined to potentially impact water quality, indicate how each will be reduced toa level of insignificance through application of standard forest practice rules; mitigations or combinations of forest practice rules and mitigations for the following:

A. Individual impacts attributable to the project

B. Incremental impacts from the project which might add to closely related projects

e) Peak flows

I. ls there potential to lead to adverse impacts associated with peak flows?

Management Concern	On-site	Within Assess. Area
A. Road influenced run-off routing		
B. Silvicultural openings		
C. Other(describe)		

II. For each of the peak flow concerns listed above which have been determined to potentially impact water quality indicate how each will be reduced to a level of insignificance through application of standard forest practice rules; mitigations or combinations of forest practice rules and mitigations for the following:

A. Individual impacts attributable to the project

B. Incremental impacts from the project which might add to closely related projects.

2) Soil Productivity impacts

a) Organic matter loss

I. What are the current conditions of the organic matter element of the soil resource in terms of:

A. surface litter component?

B. downed woody debris?

II. Are significant losses of organic matter anticipated from:

Activity	On-site	Within Assess. Area
A. Skidding		
B. Mech. Site Prep.		
C. Prescribed burning		
D. Other(describe)		

III. For each of the concerns listed above which have been determined to potentially impact soil productivity, indicate how each will be reduced to a level of insignificance through application of standard forest practice rules; mitigations or combinations of forest practice rules and mitigations for the following:

A. Individual impacts attributable to the project

B. Incremental impacts from the project which might add to closely related projects.

b) Surface soil loss

I. What is the current condition of the surface soil on the project area and within the assessment area?

II. Are significant losses of organic matter anticipated from:

Activity	On-site	Within Assess. Area
A. Skidding		
B. Mech. Site Prep.		
C. Mass Wasting		
D. Other(describe)		

III. For each of the concerns listed above which have been determined to potentially impact soil productivity, indicate how each will be reduced to a level of insignificance through application of standard forest practice rules; mitigations or combinations of forest practice rules and mitigations for the following:

A. Individual impacts attributable to the project.

B. Incremental impacts from the project which might add to closely related projects.

c) Soil compaction

I. What are the current conditions on site and within the assessment area with regards to compacted soils?

II. Will the current project impact the area in compacted soils in light of the following activities:

Activity	On-Site	Within Assess. Area
A. New Roads		
B. Landing Construction		
C. Skid Trails		
D. Mech. Site Prep.		
E. Winter Operations		
F. Other(describe)		

III. For each of the concerns listed above which have been determined to potentially impact soil productivity, indicate how each will be reduced to a level of insignificance through application of standard forest practice rules; mitigations or combinations of forest practice rules and mitigations for the following:

A. Individual impacts attributable to the project.

B. Incremental impacts from the project which might add to closely related projects.

d) Growing space loss

I. What current conditions are contributing to growing space loss on the project area and within the assessment area?

II. Will the current project result in loss of growing space due to the following activities:

Activity	On-Site	Within Assess. Area
A. New Road Construction		
B. Landing Construction		
C. Permanent Skid Trails		
D. Other(describe)		

III. For each of the activities listed above which havebeen determined to potentially impact soil productivity, indicate how each will be reduced to a level of insignificance through application of standard forest practice rules; mitigations or combinations of forest practice rules and mitigations for the following:

A. Individual impacts attributable to the project.

B. Incremental impacts from the project which might add to closely related projects.

3) Biological Resources

a) Aquatic or near water habitat conditions on the THP:

I. List and discuss any known rare, threatened, or endangered species or species of special concern that may be directly or indirectly affected by the project activities.

II. Describe any significant known wildlife or fisheries resource concerns within the immediate project area and the biological assessment area.

III. What is the current condition of the aquatic and near-water habitat with respect to:

A. Pools and Riffles

B. Large Woody Material

C. Near Water vegetation

IV. What current project activities have the potential to result in impacts to the aquatic and near aquatic habitat:

Activity	On-Site	Within Assess. Area
A. New Road Construction		
B. Landing Construction		
C. WLPZ operations		
D. Stream Crossings		
E. Site Preparation		
F. Use of Existing Roads		
G. Use of Existing Landings		
H. Others(describe)		

V. For each of the activities listed above which havebeen determined to potentially impact aquatic and near water habitat, indicate how each will be reduced to a level of insignificance through application of standard forest practice rules; mitigations or combinations of forest practice rules and mitigations for the following:

A. Individual impacts attributable to the project.

B. Incremental impacts from the project which might add to closely related projects.

b) Biological Habitat conditions on the THP and the immediate surrounding area.

I. List and discuss any known rare, threatened, or endangered species or species of special concern that may be directly or indirectly affected by the project activities.

II. Describe any significant known wildlife resource concerns within the immediate project area and the biological assessment area.

III. What is the current condition of the biological habitat elements described below within the project area and within the assessment area?

A. Snags/den/nest trees

B. Down large woody debris

C. Multistory canopy

D. Road Density

E. Hardwood cover

F. Late seral(Mature) forest characteristics

G. Late Seral habitat continuity

H. Special habitat elements

IV. What current project activities have the potential to result in impacts to the biological habitat:

Activity	On-Site	Within Assess. Area
A. New Road Construction		
B. Landing Construction		
C. Silvicultural Method(s)		
D. Hazard reduction		
E. Site Preparation		
F. Use of Existing Roads		
G. Use of Existing Landings		
H. Timing of Operations		
I. Others(describe)		

V. For each of the activities listed above which have been determined to potentially impact biological habitat, indicate how each will be reduced to a level of insignificance through application of standard forest practice rules; mitigations or combinations of forest practice rules and mitigations for the following:

A. Individual impacts attributable to the project.

B. Incremental impacts from the project which might add to closely related projects.

4) Recreational Resources

a) Identify the recreational activities involving significant numbers of people in and within 300 ft. of the logging area.

I. Fishing
II. Hunting
III. Picnicking
IV. Camping
V. Other(describe)

b) Identify any recreational Special Treatment Areas described by the Board of Forestry.

c) What current project activities have the potential to result in impacts to the recreational uses identified:

Activity	On-Site	Within Assess. Area
A. New Road Construction		
B. Landing Construction		
C. Silvicultural Method(s)		
D. Hazard reduction		
E. Site Preparation		
F. Use of Existing Roads		
G. Use of Existing Landings		
H. Timing of Operations		
I. Others (describe)		

d) For each of the activities listed above which have been determined to potentially impact recreational use, indicate how each will be reduced to a level of insignificance through application of standard forest practice rules; mitigations or combinations of forest practice rules and mitigations for the following:

A. Individual impacts attributable to the project.

B. Incremental impacts from the project which might add to closely related projects

5) Visual Resources

a) Identify any Special Treatment Area designated by the Board of Forestry because of visual values

b) Determine how far the project is from a point that significant numbers of people might view the project.

c) Identify the manner in which the project will be viewed.

d) What current project activities have the potential to result in impacts to the visual resources identified:

Activity	On-Site	Within Assess. Area
A. New Road Construction		
B. Landing Construction		
C. Silvicultural Method(s)		
D. Hazard reduction		
E. Site Preparation		
F. Use of Existing Roads		
G. Use of Existing Landings		
H. Timing of Operations		
I. Others(describe)		

e) For each of the activities listed above which have been determined to potentially impact visual resources indicate how each will be reduced to a level of insignificance through application of standard forest practice rules; mitigations or combinations of forest practice rules and mitigations for the following:

A. Individual impacts attributable to the project.

B. Incremental impacts from the project which might add to closely related projects.

6) Vehicular Traffic

a) Identify whether any publicly owned roads will be used for the transport of wood products.

b) Identify any public roads that have not been used recently for the transport of wood products from the proposed timber harvest.

*c) I*dentify any public roads that have existing traffic or maintenance problems.

d) Identify how the logging vehicles used in the timber operations will change the amount of traffic on public roads, especially during heavy traffic conditions.

e) For each of the questions listed above which have been determined to potentially impact traffic, indicate how each will be reduced to a level of insignificance through application of standard forest practice rules; mitigations or combinations of forest practice rules and mitigations for the following:

A. Individual impacts attributable to the project.

B. Incremental impacts from the project which might add to closely related projects.

Appendix D – Examples Of Mitigation Measures Related To Cumulative Impacts Analysis For Watershed Impacts Related To Sediment

To illustrate typical mitigation measures that relate to potential cumulative effects, the Task Force cites the following examples. They are taken from two random samples of 1998 Timber Harvesting Plans from the North Coast and deal with the most commonly cited potential cumulative impacts – watershed impacts related to sediment. THP wording is paraphrased and summarized.

Sample impact: Old skid trails and truck roads in creek bottoms built prior to the Forest Practice Act continue to erode and deposit sediment into watercourses.

Mitigation: Correcting diversions and instituting improved drainage will lead to a long term reduction of sediment into streams and road stability will be achieved.

Sample impact: Sedimentation of watercourses continues.

Mitigation: Reduce potential for mass wasting by limiting tractor operations on slopes greater than 40%.

Sample impact: Past projects resulted in increased sediment inputs and increased channel downcutting, bank erosion. Current conditions predict low potential for increased stream or lake sediment.

Mitigation: Improve drainage away from unstable areas.

Sample impact: Continued use of near and instream roads, landings, and skid trails over the long term will work against recovery of the larger watershed.

Mitigation: Abandon existing road systems, do not use near stream roads, reduce tractor yarding on slopes over 65%, and conduct an ongoing stream restoration programs.

Sample impact: Sediment impacts from historic logging and roading.

Mitigation: Upgrade existing skid trails and roads. Potential for accelerated sediment (short term) is not expected to exceed the capacity of the channel. Haul routes are primarily on ridges away from watercourse. Al skid trails on slopes greater than 50% to be used are existing, and will be flagged.

Sample impact: Landscape is unstable regardless of human intervention.

Mitigation: Keep yarding corridors narrow and minimize high lead yarding to limit the concentration of water. Use selective harvesting to minimize risk of mass wasting. Design road construction to not influence unstable areas or to not create sources of channelized surface runoff (such as remove existing fill, segregate the organics, and the fill shall be replaced as a compacted, benched and keyed fill with a backdrain).

Sample impact: Sediment reaching watercourse.

Mitigation: No new road construction; no skid trails in WLPZ; no skid trials in ELZ unless flagged by RPF; no landings in WLPZ or ELZ; use helicopter logging; repair and install waterbreaks and related erosion control facilities on all dirt roads; no winter operations; no wet period operations.

Sample impact: THP is in sediment impaired watershed. Road is over an unstable area (small slope failure)

Mitigation: Ramp over slide proposed. PHI says that road slump is caused by saturated soils from recent winter storm. Ramp road down rejected as continuing to channel water down to area of poor soil permeability. Insloping road past point to discharge downroad will provide for improved road drainage.

Sample Impact: Significant areas of unstable slopes noted in a portion of the plan. Portion of feature includes three unstable areas that are each about an acre in size. Evident of recent movement includes fresh slumps which have been tilted, and sharp barren scarp banks which are scattered across the hillside. There are also areas of dormant landslides.

Mitigation: Retain about 50% of the total crown canopy in area. Timber harvest upslope from dormant landslide will be retained until the proposed harvest area regenerates.

Sample Impact: Several small, active unstable areas within THP area. Features generally are the result of natural underlying geologic conditions, or improper drainage. Causes include natural storm and flood damage, larger deep seated ancient earth flows, and the absence of road abandonment measures in the pre-1960's logging operations. Within the THP area, the cumulative impact considerations deal with a massive and relatively deep-seated earthflow and an existing railroad at the top of the earthflow. Smaller surface and inner gorge landslides exist in association with larger watercourses. Surface tension cracks, ponded water, and surface wet areas may be the result of subsurface faulting and voids created during movement of the surface mantle. In the past, the old cut-ban, and/or overburden fill slope of the railroad grade many have failed during peak flow events when soils were saturated.

Mitigation: Roads and skid trails outsloped at 2%, rolls in grade established, no new skid trails on unstable areas and seasonal crossings being rock armored. Cable yard slopes in excess of 65% and no tractor operations on them.

Other examples of mitigations cited as addressing sediment impacts from continued harvesting include:

- Take corrective action to repair erosion on roads and skid trails occurring from past practices
- Increase culvert size
- Storm proof culverts
- Unplug existing culverts
- Install rocked fords as opposed to permanent culverts; show dimensions and schematic plans for these crossings. If culverts must be used, then rockarmor the downstream channel
- Use energy dissipaters on culvert spouts
- Remove slough from roads without casting
- Shape road prism to drain surface waters from unstable areas
- Install rolling dips
- Outslope the roads wherever possible and pull back berms across the road or breach them.
- Stabilize the banks
- Reshape road
- Do not conduct operations on unstable area
- Use backup drainage structures
- Ban post harvest burning
- Extend the maintenance period for roads
- No winter period operations
- Change tractor hauling to cable yarding in unstable areas
- No harvesting on unstable slopes within 100 feet of a watercourse
- Harvest only 50% of trees on unstable area