

United States  
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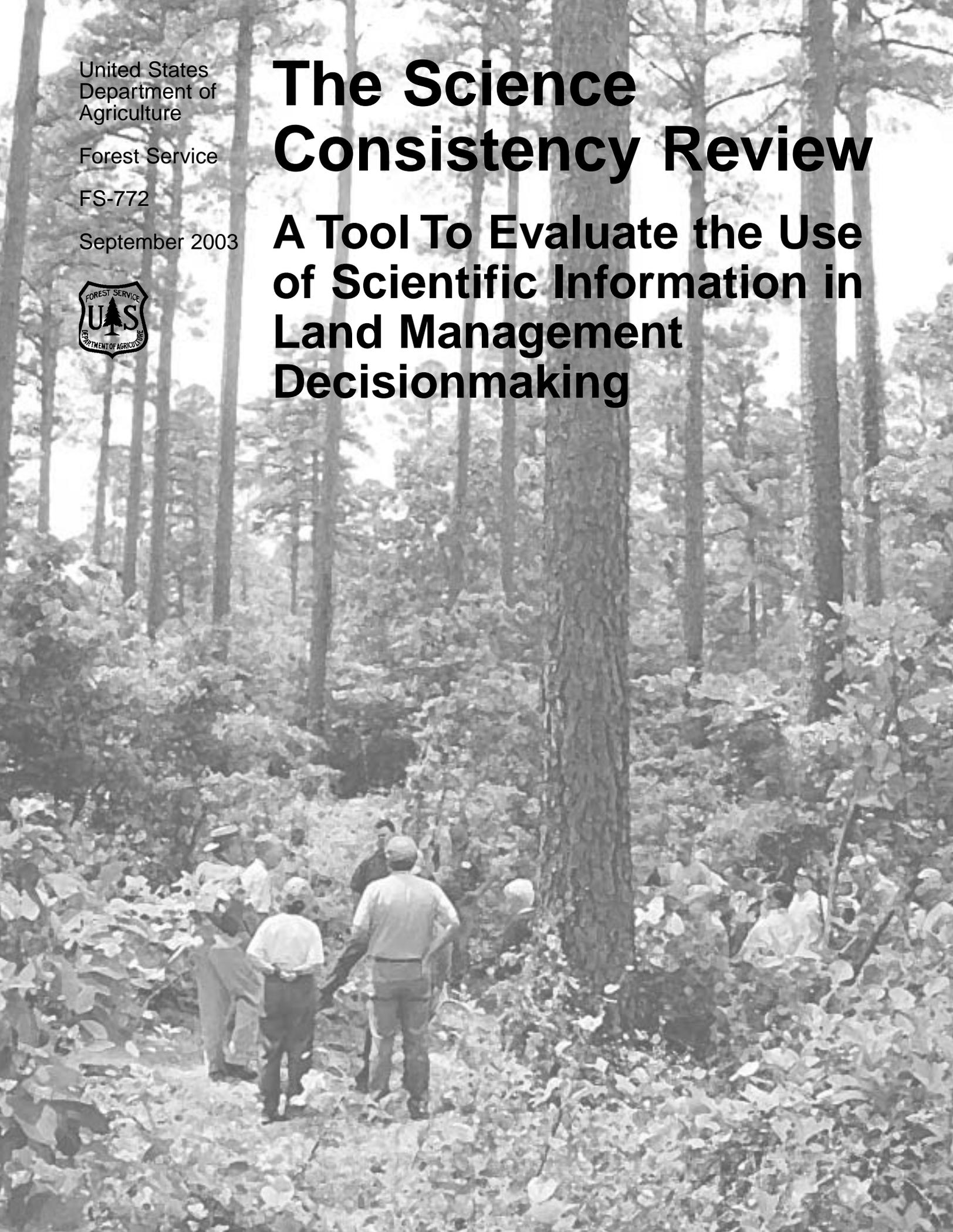
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# The Science Consistency Review

## A Tool To Evaluate the Use of Scientific Information in Land Management Decisionmaking





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## Abstract

The paper outlines a process called the science consistency review, which can be used to evaluate the use of scientific information in land management decisions. Developed with specific reference to land management decisions in the U.S. Department of Agriculture Forest Service, the process involves assembling a team of reviewers under a review administrator to constructively criticize draft analysis and decision documents. Reviews are then forwarded to the responsible official,

whose team of technical experts may revise the draft documents in response to reviewer concerns. The process is designed to proceed iteratively until reviewers are satisfied that key elements are consistent with available scientific information. Variations of the science consistency review have been applied elsewhere, but this paper represents the first effort to standardize the process for application to decisions within the agency.

## Preface

The Forest Service has a long history of using scientific information to support forest management. Given the increased complexity of scientific information and of management decisions especially on national forests, additional tools can help land managers and planners ensure that decisions about management of national forests are consistent with the best available science. There are several ways to accomplish this consistency, such as by using science consistency reviews (SCRs), peer reviews, or science advisory boards. This document provides specific guidelines for conducting SCRs of national forest decisions.

Formal SCRs have been conducted on several national forest management decisions, such as those involving the Tongass National Forest Plan and the Sierra Nevada Framework. Those reviews, as well as descriptions of the SCR process, have been published in several Forest Service publications and technical journals. Until now, however, decisionmakers have had no standardized process to follow in conducting SCRs. To address this limitation, the agency's National Leadership Team convened a work group to develop guidelines for the conduct of SCRs that built on lessons learned from previous reviews, were scalable to the amount of effort appropriate to the decision being considered, and were

practicable. The work group developed draft guidelines, which were then extensively reviewed and pilot tested.

Decisionmakers should use these guidelines sparingly, when appropriate, and only after careful consideration of the cost of the review relative to the expected benefit. The expectation is that formal, documented SCRs will be used infrequently and only when the additional level of thoroughness is judged necessary to ensure that decisions are consistent with the best available science. Until the Forest Service is more experienced in the use of SCRs, managers should consider deciding for themselves whether to implement a formal SCR.

In those limited cases where the SCR is appropriate, decisionmakers should expect that it will be helpful in ensuring that the responsible official considers the appropriate science and that the decision made is consistent with that science. The use of these reviews should also enhance the public's recognition during appeals and litigation that science factors have been carefully considered and clearly documented. In those limited cases where a documented SCR is prepared, it may actually reduce overall decisionmaking costs and improve timeliness.



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## Introduction

Concern over Federal land management decisions has grown in recent years. Public debates over activities on Federal land have been contentious, especially regarding the management of national forests. Decisions on the management and use of national forest lands are based on many different considerations and values. Although Federal land managers can make choices concerning how to balance the various risks and tradeoffs involved, their decisions face questions from the public about whether the management direction and its associated effects, outcomes, and outputs are appropriate.

Increasingly, this scrutiny centers on the question of whether appropriate and relevant scientific information has been considered in reaching a particular decision. Decisions are made from an array of choices available to policymakers and land managers, and scientific information is critical to understanding and informing those choices. Those with an interest in the outcome of land use decisions generally support the notion that analysis and decision documents should be consistent with available scientific information.

The responsible official can choose from a number of methods to evaluate the scientific information before making such decisions. Examples include scientific peer review, science advisory boards, science consistency reviews (SCRs), or expert opinion. The purpose of this white paper is to outline a recommended process for the SCR, a formal review in which scientists or other knowledgeable individuals are invited to assess the pertinent scientific information and to determine how that information has been synthesized in the documentation of a given decision. Discussion centers on several topics:

1. the definition of the SCR and its application in decisions,
2. the roles and relationships of the participants,
3. actions to be taken before the SCR begins,

4. the conduct and iterative nature of the review, and
5. a description of the products of the SCR.

The development of these guidelines does not represent an implicit preference or agency endorsement of the SCR approach over peer review, science advisory boards, or other methods. Agency leaders believe that the SCR process has value in certain situations, and they have been concerned that no guidelines were available for its application.

These guidelines, then, were developed to standardize the SCR process and to guide land managers and others who choose to employ it. Special attention was given to ensuring the guidelines:

- Incorporated existing agency experience with science consistency evaluations. They reflect the lessons learned in antecedent efforts such as the Tongass Land Management Plan Revision, the Interior Columbia Basin Final Environmental Impact Statement, the Sierra Nevada Framework for Conservation and Collaboration, and the Northern Great Plains Land Management Plan Revision.
- Can be used for small or large decisions, for situations of little or great complexity, and with emphasis on practical application and real-world constraints.
- Were peer reviewed by scientists, land managers, and administrators, both inside and outside the agency; their constructively critical comments led to modifications and improvements in the process.
- Were field tested on a small project on the Shoshone National Forest, with the help of the Rocky Mountain Research Station, which also resulted in refinements of the process.

Thus, the guidelines reflect current thinking by both National Forest System (NFS) and Research and Development (R&D) personnel on the best way to implement the SCR.



## Definition and Purpose of the Science Consistency Review

A **science consistency review** is defined as *the process used to determine whether an analysis or decision document is consistent with the best available science. That review is accomplished by judging whether scientific information of appropriate content, rigor, and applicability has been considered, evaluated, and synthesized in the documents that underlie and record land management decisions.* Those documents include both the analysis documents (environmental assessments or environmental impact statements) and the decision documents (decision memo, decision notice, or record of decision).

The SCR process is proposed as an optional tool for agency officials to use in considering the adequacy and thoroughness of scientific information supporting land management decisions within the Forest Service. The basic element of the SCR process is the review of a draft document that asks and answers the following four questions:

1. Has applicable and available scientific information been considered?
2. Is the scientific information interpreted reasonably and accurately?
3. Are the uncertainties associated with the scientific information acknowledged and documented?
4. Have the relevant management consequences, including risks and uncertainties, been identified and documented?

The overall SCR process encompasses actions before the reviews begin, the conduct of the reviews, the revision of the draft document in response to reviews, and the finalization of the decision. Figure 1 highlights key elements and the iterative nature of the process.

When carried to completion, the process will result in a final SCR report that land managers can use to document that a decision is consistent with the best available scientific information. The steps taken to arrive at that final report, however, will be the most important. Interim SCR reviews will highlight elements that are not consistent with available scientific information, and draft analysis and decision documents will be revised accordingly in response to the interim review. Thus, the end of the SCR process is almost anticlimactic—if the final SCR report declares all elements to be fully consistent, the responsible official then can assert that a decision is consistent with the best available science.

The SCR process has a number of other advantages as well. Participants in the process are expected to define the extent and scope of the scientific information related to the particular document under review. They can determine what scientific information might be applicable, and judge its quality and usefulness. They can identify and quantify the expected risks and consequences from implementing the proposed action or the alternative

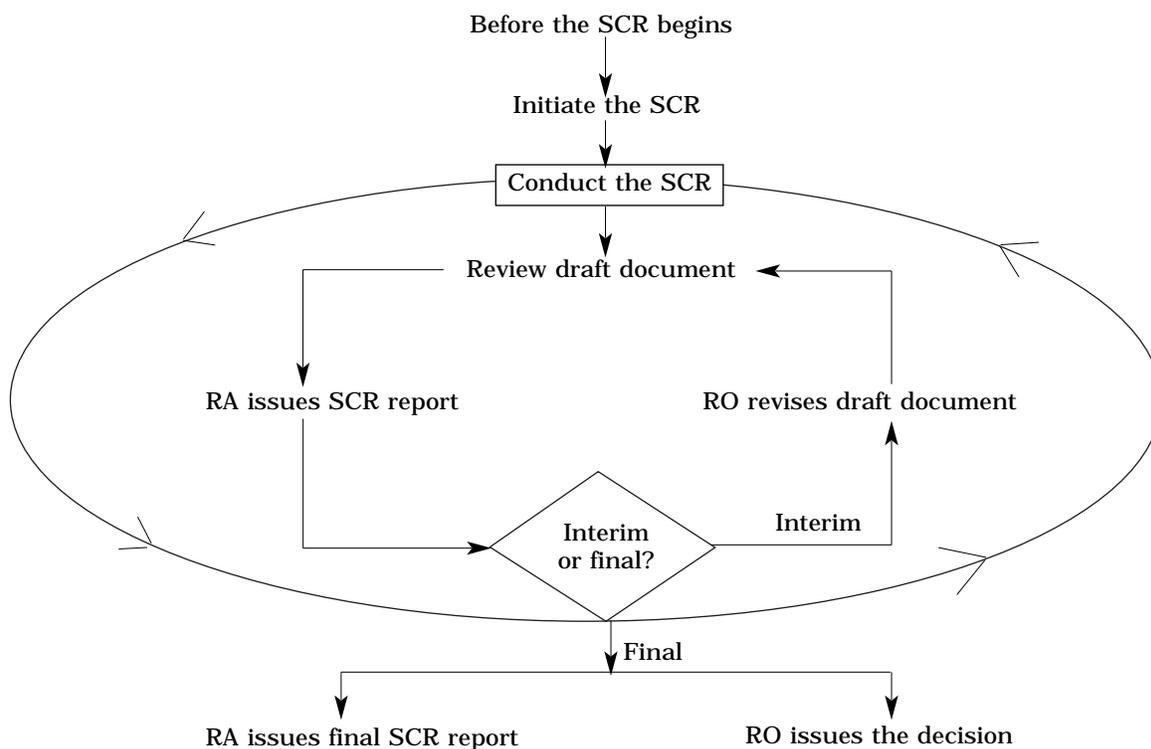


Figure 1. Flowchart outlining the SCR process.

actions. Lastly, they must evaluate whether the effects of implementing the proposed and alternative actions are consistent with what would be inferred from the scientific literature and expert judgment, and whether those effects are reasonably interpreted and disclosed in the reviewed document.

The final SCR report gives the decisionmaker a document to justify that the information on which his or her decision is based is consistent with available scientific information. The final report discloses what elements were evaluated and the criteria by which they were evaluated for science consistency. It provides a product in the form of a rating document disclosing the results of the evaluation. Together, these elements enable land managers and scientists to deal proactively with any concerns, either inside or outside the agency, that some body of relevant science might not have considered in the decision.

The SCR process is used to support or enlighten a decision, not to make one. SCR participants are not authorized to validate, ratify, or make a decision; that responsibility rests solely with the responsible official. Neither the SCR reports nor the participants who prepare them should make judgments about the balance managers achieve among competing objectives or what levels of risk they should take. The reports must not drive the decision process to a particular end, nor should they make specific recommendations regarding actions. When prepared properly, the SCR does not advise a decisionmaker for or against a particular course of action.



Moreover, just as the SCR is not intended to allow reviewers to usurp the decisionmaking authority of the responsible official, neither is it intended to make reviewers responsible for the decisions or outcomes that result from those decisions. Ultimately, the responsible official must carry the weight of whatever decisions are made.

Finally, the SCR process should not substitute for other established processes that may be more appropriate. For example, the SCR is the wrong tool to use to evaluate assessments, bibliographies, "state-of-the-art" papers, or scientific papers<sup>1</sup>. These should be reviewed using the scientific peer review process rather than the SCR process. Having peer review processes in place throughout the planning process would aid in the science evaluation of the draft analysis or decision document, but the peer review process is separate from the SCR review as described in this white paper.

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<sup>1</sup> However, this is not to say that SCR reports are independent of the scientific literature. On the contrary, if a draft document being reviewed by the SCR reviewers fails to include an assessment or scientific paper that the reviewer thinks is germane to the draft document, he or she must direct the technical experts to that source.

## SCR Participants and Their Roles

### Responsible Official

The responsible official is the person in the Forest Service hierarchy who is ultimately responsible for making and executing the land management decision. Typically this person is a regional forester, forest supervisor, or district ranger. The responsible official makes choices related to selecting a preferred alternative, balancing risk, and considering tradeoffs associated with ecological, social, and economic outcomes and effects. Although the responsible official may not be directly involved in the SCR review itself, he or she is responsible for the content of the draft document under review, how the feedback from the review is considered, whether the feedback is incorporated into revisions of the draft document, and how the decision is made.

### Technical Experts

Technical experts are those individuals participating directly or indirectly in the development of draft analysis or decision documents subject to review. Often technical experts are interdisciplinary (ID) team members; typically they are professional employees, and they may or may not have advanced academic degrees. Generally, the technical experts on the ID team will directly review, reference, and incorporate information from science literature, expert opinion, or the science assessment, if applicable, into the draft documents. They will also be responsible for modifying draft documents based on feedback in the SCR report.

### Reviewers

Reviewers are the experts who actually perform the SCR. A reviewer must have scientific credibility in the field but not necessarily an advanced academic degree. In some cases, a person with local or traditional knowledge may be appropriate. Reviewers can be R&D scientists; university faculty members; scientists with State agencies, tribes, or other Federal agencies; or NFS staff or technical experts not attached to the particular project or unit under review. Reviewers can also be scientists or experts from private companies, consultants, or nongovernmental organizations.

Above all, reviewers must be seen as being fair and impartial. They must not inject their own values or preferences into their judgments. They must confine themselves to technical judgments of scientific consistency as it is defined. It is probably impossible for a reviewer to be completely objective in reviewing a draft document, but he or she should reduce the amount of subjective elements used as much as possible. Though it may be difficult for some reviewers to separate technical evaluations from their own values or policy beliefs, doing so is critical to the impartiality of the SCR report.

For issues that are small in scope (as defined by geographic area, subject matter, or complexity), the reviewers may act independently. For issues of larger scope, the reviewers may need to have more interaction as a team, potentially with a designated team leader. Having reviewers work together, especially on complex issues, may help sort out elements that have interdisciplinary focus.

### Review Administrator

The review administrator is responsible for the conduct of the review and any interim or final SCR reports. The review administrator may be a R&D station director or a subordinate administrator or scientist designated by the station director. Alternatively, the review administrator may be a regional office staff director or a staff director from another forest. He or she might also be an appropriate research administrator outside the agency, such as a dean or department head of a land grant university identified in consultation with the agency.

For a given SCR, the review administrator is identified by R&D leadership with input from the responsible official. Whether the prospective review administrator is inside or outside the agency, he or she should be willing and able to serve. The review administrator's supervisor will need to concur with this selection as well. Selection of the review administrator must be made with sensitivity to the contention expected in the documents to be reviewed, the desire to maintain appropriate scientific independence from the draft documents, and the need to address concerns that might arise over any perceived bias.

Although the review administrator is responsible for the SCR, in order for the process to be successful, he or she should establish a collaborative relationship with the responsible official. The review administrator will perform the following:

- identify candidate reviewers,
- select reviewers and negotiate their availability and schedules,
- disseminate the materials to be reviewed to the review team,
- coordinate the review itself, and
- address disagreements among different reviews or reviewers.

For a small-scale review, the review administrator may be one of the reviewers, working either alone or as a member of a small team. The review administrator may have broader authority to direct the review team and work with a separate review team leader. For more extensive reviews, the review administrator summarizes the reviews for the responsible official. Regardless of the scale of the project, the review administrator is responsible for preparing the SCR report and transmitting that report to the responsible official.

## Others Involved

The broader public already has a number of opportunities to comment on the technical aspects of draft documents and their supporting materials. Typically, members of Congress, advocacy groups, and the public, including individuals and nongovernmental organizations, can be involved in a decision through formal comment on draft documents (such as their review of a draft environmental impact statement). The responsible official, with the review administrator's concurrence, may choose to have any applicable SCR reports available for public examination before a decision is issued.



## Administration of the SCR

Overall, the responsible official decides whether to initiate the SCR, and is responsible for providing the review team with the documents for review. The review administrator is then responsible for the review process and reports, and the responsible official is responsible for all modifications of the documents under review. The SCR process is most effective if agency officials work collaboratively rather than confrontationally.

Occasionally, a R&D administrator may be particularly interested in the use of science in a draft analysis or decision document that could be clarified using the SCR process. This situation should be addressed collaboratively since it is normally the responsible official who initiates and funds the SCR. An expert may unilaterally initiate a technical or scientific review of an analysis or decision document without the responsible official's collaboration or funding; but in that event the responsible official reserves the right to apply the SCR report or not, at his or her discretion. If strong disagreements cloud the decision to engage or terminate the formal SCR process as described, the next level of line authority should resolve the disagreements.

Both the responsible official and review administrator should maintain appropriate administrative records that document the initiation and conduct of the SCR process. For example, the review administrator would file letters that transmit the interim or final SCR reports; the responsible official would file letters transmitting the revised draft analysis or decision documents for the subsequent iterative review. At the conclusion of the SCR process, these letters would become part of the administrative record of the decision.

The composition and structure of the team working on an SCR is critical. These people represent the credibility of the process to the scientific community and the public at large. How this team is selected and managed has significant bearing on the results of the process. The responsibilities of the key participants at various stages of the process are shown in table 1, and the overall process for conducting the review is listed in table 2. Discussion on each step follows.

### Before the SCR Begins

The initial contact regarding the possibility of conducting an SCR should be made between the responsible official and the appropriate R&D person<sup>2</sup>, because station and region leadership should be

aware of any SCR taking place within their respective jurisdictions. That initial contact enables the responsible official to review the various alternatives available for evaluating the scientific information for the proposed decision, and whether the SCR process is the best tool available to support his or her decision. Until a standard process is in place, informal connections among managers and R&D scientists are the most effective means to identify the need for an SCR.

Many factors enter into the decision to choose the SCR process rather than peer review, science advisory boards, or other methods. Table 3 provides a conceptual framework that summarizes the appropriate considerations and provides examples of the specific risks and benefits of using an SCR. If a decision falls on the higher end of the risk scale, conducting a stand-alone SCR might not be warranted.

Two economic questions can also guide the responsible official in deciding to choose the SCR:

- Are the returns associated with the potential outcomes from the decision greater than the costs of conducting the SCR?
- Is the cost of the SCR not going to be greater than the cost of making a wrong decision?

There will be times, however, when the consequences of not conducting an SCR are outweighed by its benefits, despite the financial costs. If the controversy associated with a decision is expected to be intense, a responsible official may decide that the SCR process must be engaged regardless of its cost, for reasons of legal defensibility, public credibility, or sustainability. This might include situations where the processes affected by and involved in land policy, planning, management, or decision alternatives are so complex that a high degree of controversy results regardless.

### Triggering the SCR Process

If the responsible official decides to engage the SCR process, the review administrator becomes responsible for its conduct and completion. Accordingly, the first step is to identify the review administrator. If the review administrator works for R&D, a letter from the supervisor, station director, or deputy chief of R&D would be appropriate; similarly, if the review administrator comes from within the NFS, line authority to assign the task would derive from the supervisor, regional forester, or deputy chief of the NFS. A review administrator from outside the agency should have the support of his or her supervisor as well.

Table 4 (a and b) illustrates how using the SCR might benefit the forest planning and project planning processes. The SCR can assure the responsible official that the best available science was used appropriately at that step and that it will contribute to focusing sub-

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<sup>2</sup> One way to proceed with this is to establish a point of contact within each R&D research station, and within the Washington Office R&D staff, to handle requests or referrals for SCRs of a regional or national scope, respectively. For example, within the Southern Research Station, a logical point of contact would be the Assistant Station Director for Planning and Applications.

Table 1. Roles of participants in an SCR, in order of performance

Role	Participant				
	Responsible Official	Technical Expert	Reviewer	Review Administrator	
Identifies need for SCR <sup>*</sup> .	XX	X <sup>**</sup>		X	
Initiate the SCR.	XX			X	
Establish scope of the SCR. Develop budget; identify sources of funding. Develop timeline. Establish standards for interaction between participants and public. Establish criteria for selection of reviewers.	XX			XX	
Conducts assessments and environmental analysis. Develops alternatives and effects analysis. Documents processes. Conducts interdisciplinary team meetings. Prepares documents for SCR review.		XX			
Establish administrative structure for review team. Select reviewers. <sup>***</sup>	X			XX	
Iterative steps for interim and final SCR reports <sup>****</sup>	Develop elements to be evaluated.	X	XX	X	X
	Approve elements to be evaluated.	X			XX
	Convenes reviewers; administers the review.				XX
	Performs the review.			XX	
	Provides reviewers with requested documentation; may develop additional documentation as needed.		XX		
	Approves the interim/final SCR report.				XX
	Ensure communication between technical experts and reviewers.	XX			XX
	Ensure that interim or final SCR report does not advocate any particular decision and that scientific information and consistency evaluations are value neutral.			X	XX
	Reconcile reviews.			X	XX
	Review and comment on SCR report.	XX	X		
	Directs modification of document based on interim SCR report.	XX			
	Modify document using interim SCR report.	X	XX		
Responsible for and approves final SCR report.				XX	
Responsible for management decision.	XX				

XX = primary responsibility  
X = secondary responsibility

<sup>\*</sup> SCR may be conducted on both analysis documents and decision documents, such as drafts of an Environmental Assessment or Environmental Impact Statement or a Decision Notice or Record of Decision.

<sup>\*\*</sup> A technical expert may request the responsible official to initiate an SCR if the technical expert believes that areas of their expertise would benefit from an unbiased review.

<sup>\*\*\*</sup> There is a relationship between the selection of reviewers and the selection of elements. Identification of additional elements during the process may necessitate additional or different reviewers.

<sup>\*\*\*\*</sup> Modifications in the draft document may be subject to an additional review by the reviewers (the iterative process).

Table 2. Suggested process for conducting a formal SCR.

<b>Initiating the review:</b>
<ol style="list-style-type: none"> <li>1. Initial contact between responsible official and R&amp;D contact.             <ol style="list-style-type: none"> <li>a. Explore alternatives for evaluating scientific information in the proposed decision.</li> <li>b. Decide whether an SCR is the best tool to apply in the given case.</li> <li>c. Select the review administrator, if responsible official has elected to use the SCR.</li> </ol> </li> <li>2. Letter from responsible official to review administrator asks for review.             <ol style="list-style-type: none"> <li>a. Prepare a written charter, memorandum of understanding, or other authorizing document.</li> <li>b. Establish the scope, content, review elements, and sideboards for the review.</li> <li>c. Forecast the expected timeframe for the review.</li> <li>d. Clarify the openness of the review among participants and with the public.</li> <li>e. Determine how to pay for the SCR.</li> </ol> </li> <li>3. Review administrator establishes review team.             <ol style="list-style-type: none"> <li>a. Consult with responsible official and other domain experts to find appropriate reviewers.</li> <li>b. Establish administrative structure for the review team.</li> </ol> </li> <li>4. Review administrator and responsible official issue the charge to the review team.             <ol style="list-style-type: none"> <li>a. Introduce team charter, documents to be reviewed, and appropriate supporting materials.</li> <li>b. Reinforce the need for impartiality on part of reviewers.</li> </ol> </li> </ol>
<b>Conducting the review:</b>
<ol style="list-style-type: none"> <li>1. Selecting the review elements.             <ol style="list-style-type: none"> <li>a. Technical experts provide initial list of elements from document to reviewers.</li> <li>b. Technical experts, reviewers, responsible official, and review administrator review the proposed elements.</li> <li>c. Revised list of elements and justifications are returned to review administrator for final approval.</li> <li>d. Elements should be written so they can be answered with "yes" or "no" under the evaluation criteria.</li> </ol> </li> <li>2. Scoring elements against criteria.             <ol style="list-style-type: none"> <li>a. The elements and criteria form a matrix of rows and columns.</li> <li>b. Each reviewer records a yes or no rating in each cell of the matrix.</li> <li>c. Narrative justification statements must accompany ratings by which reviewers explain their evaluations and offer suggestions for changes that would achieve consistency.</li> </ol> </li> <li>3. Reconciling reviews.             <ol style="list-style-type: none"> <li>a. Reviewers forward the finished reviews to the review team leader or review administrator.</li> <li>b. The review administrator reconciles variations in review content.</li> <li>c. The review administrator collates the reviews and prepares a summary SCR report for the responsible official.</li> </ol> </li> <li>4. Preparing the review report.             <ol style="list-style-type: none"> <li>a. Draft or interim reports are anticipated as part of an iterative process that may result in a revised document that needs an additional iteration.</li> <li>b. The review administrator may conduct or request a review of the final team report to ensure that the report does not advocate any particular decision or alternative, and that the evaluations are value neutral.</li> </ol> </li> </ol>
<b>Completing the review:</b>
<ol style="list-style-type: none"> <li>1. The responsible official and review administrator jointly make the ultimate decision that the process is complete.</li> <li>2. The interim or final report is transmitted from the review administrator to the responsible official.</li> <li>3. Responsible official directs technical experts to refine the draft document based on the SCR report.</li> <li>4. If necessary, the revised document is returned to the review team for further review.</li> <li>5. The process concludes when the final SCR report and the decision are issued by the review administrator and responsible official, respectively.</li> </ol>

Table 3. A conceptual framework that the responsible official should consider in making the decision regarding whether to conduct an SCR, the amount of effort to expend, and the time needed for an SCR

Factor To Consider	Potential Effects* (Risks & Benefits)	
	Low (SCR probably not needed or met by smaller effort)	High (SCR may be helpful and may require larger effort)
Spatial and temporal scales	<ul style="list-style-type: none"> <li>Localized site conditions</li> <li>Small watershed</li> </ul>	<ul style="list-style-type: none"> <li>Broad geographic ranges and multiple agencies</li> <li>Transcend organizational boundaries</li> </ul>
Duration of effects	<ul style="list-style-type: none"> <li>Short-term effect on communities, economy, and/or environment</li> </ul>	<ul style="list-style-type: none"> <li>Long-term effect on communities, economy, and/or environment</li> </ul>
Scope of decision	<ul style="list-style-type: none"> <li>Routine management actions (site-specific)</li> </ul>	<ul style="list-style-type: none"> <li>Large-scale regional and forest plans or plan amendments</li> </ul>
State of knowledge	<ul style="list-style-type: none"> <li>Well-developed routine analysis</li> <li>Professionally recognized science finding</li> </ul>	<ul style="list-style-type: none"> <li>Emerging science and technology</li> <li>Disputed findings and interpretations</li> </ul>
Data availability	<ul style="list-style-type: none"> <li>Well developed</li> <li>Generally accepted</li> <li>Associated risk small</li> </ul>	<ul style="list-style-type: none"> <li>Data gaps</li> <li>Arguably insufficient data</li> <li>Highly disputed</li> </ul>
Scope of effects	<ul style="list-style-type: none"> <li>Limited effect on or change to communities</li> </ul>	<ul style="list-style-type: none"> <li>Long-ranging associated risks to the environment</li> </ul>
Controversy	<ul style="list-style-type: none"> <li>Limited in scope and action</li> </ul>	<ul style="list-style-type: none"> <li>Highly disputed and/or arguably insufficient data</li> </ul>

\* The term "effects" refers to risks, benefits, outcomes, and outputs.

Table 4a. Benefits that might be obtained from initiating the SCR at various steps in forest planning.

Step in the Forest Planning Process	Incremental Decision Made	Benefits of an SCR
Current condition*	Identify resource condition and trends.	Assess the adequacy and accuracy of the information on condition and trends for the resources of interest.
Adequacy of existing plan direction to achieve the desired future condition	Establish decisions to be made in the plan revision.	Assess the reality of the desired future condition.
Proposed action	Establish initial proposal for actions to move resource conditions toward desired future condition.	Assess the potential of proposed action to move resource conditions toward desired future condition.
Issue identification	Identify the significant issues to be addressed in the Environmental Impact Statement.	Assess the scientific basis for the issues and the potential effects of the proposed action.

\* Planning directives requires use of best available science at these steps.

<b>Step in the Forest Planning Process</b>	<b>Incremental Decision Made</b>	<b>Benefits of an SCR</b>
Alternative development	Identify alternative actions that meet the purpose and need, and address the significant issues.	<ol style="list-style-type: none"> <li>1. Assess whether there is a scientific basis that states whether the alternatives address the range of significant issues.</li> <li>2. Assess if the alternatives will move resource conditions toward the desired future condition.</li> <li>3. Identify applicable, but missing, information (e.g., assessments, literature, databases, traditional environmental knowledge, etc.)</li> <li>4. Assess if assumptions used in alternative development are adequately documented.</li> </ol>

Table 4b. Benefits of the SCR in project or other planning.

<b>Step in the Forest Planning Process</b>	<b>Incremental Decision Made</b>	<b>Benefits of an SCR</b>
Identify purpose and need	Establish that there is a need to take action.	Assess the adequacy and accuracy of the understanding of the condition and trends for the resources of interest.
Proposed action	Establish the proposed actions to address the identified purpose and need.	Assess the potential of the proposed action to address the identified need.
Issue identification	Identify the issues to be addressed in the NEPA process.	Verify the scientific basis for why the issues are potential side effects to the proposal.
Alternative development	Identify alternative actions that meet the purpose and need and address the issues.	<ol style="list-style-type: none"> <li>1. Assess whether there is a scientific basis that the alternatives address the range of issues.</li> <li>2. Assess if the alternatives will move resource conditions toward the desired future condition.</li> <li>3. Identify applicable, but missing, information (e.g., assessments, literature, databases, traditional environmental knowledge, etc.)</li> <li>4. Assess if assumptions used in alternative development are adequately documented.</li> </ol>
Analysis**	Decide whether the analysis is adequate, given the level of risk and uncertainty.	<p>Assess adequacy of risk portrayal.</p> <p>Assess rigor of analysis.</p>
Decision	Decide what actions to implement.	Assess whether or not decision rationale that is based on science is scientifically supported.
Monitoring**	Choose methodology and protocols for assessing implementation of the plan.	Assess whether monitoring plan adequately addresses uncertainty involving risks or the uncertainty of effects.

\*\*\* SCR review of analysis reports can ensure that the data, methodology, and conclusions are scientifically credible. SCR review of monitoring reports can ensure that the data are being properly interpreted, monitoring plans use current methodology, and the plans are designed to collect pertinent data.

sequent steps of the planning process as well as the incremental decisions made at those steps. It is not implied that the SCR should be used at each step of the planning process. In determining when to use an SCR, a responsible official should weigh many factors, such as the complexity at that step of the planning process, the risk to resources or to the success of the planning process if inconsistency occurs, the intent to use an SCR at a future step or the use of one in a previous decision, and administrative concerns such as cost or timing.

The best time to initiate an SCR, however, is early in the planning process. Both the overall planning and the SCR process will proceed more smoothly if early versions of the draft analysis and decision documents are reviewed and revised. Generally, the interaction among participants should begin with a review of the first draft of the analysis document. If the process is initiated well after these initial draft documents have been prepared, one should expect a more complicated review for reviewers, and a more extensive revision by the technical experts.

### Initiating the SCR Review

The SCR review is initiated through the responsible official's formal written request (on official correspondence) to the review administrator. For the administrative record, the responsible official must retain the documents that resulted in the initiation, conduct, and conclusion of the SCR.

Several factors are important to consider as the responsible official and review administrator outline the overall administrative context of the proposed SCR. One suggestion to facilitate mutual understanding is to prepare a formal written charter, memorandum of understanding, or similar document that states how issues are to be handled for the SCR under consideration, especially for those SCRs that have wide scope. The decisions requiring consideration at the outset include, but may not be limited to, the following issues:

- The first priority is to establish the scope of the review, emphasizing the relevant issues that will be the focus of the review. The initial request from NFS determines the general outline of the SCR, but the review administrator and responsible official must work together to decide exactly what form the SCR will take. This includes decisions about whether to review all or part of a document, whether one or more iterations are anticipated, the number of team members likely to be needed, and similar sideboards. These decisions must reflect the funding available for the review.
- The timeframe for the review must be established. The length of the time commitment required of the team members should also be decided early. The time commitment to complete such a process can be significant, and the responsible official and review administrator need to be cognizant of that from the start. Time constraints will play a role in determining who can be involved and the expected cost of the review.

- The degree of openness of the SCR process among the participants and with the public should be established. The SCR process is one where technical feedback occurs among the participants, and procedures must be in place so that critiques remain constructive. Moreover, since reviewers traditionally have had less contact with the public than technical experts, the participants' roles in interacting with the public must be established. The time to clarify these administrative relationships is at the beginning of the process so as to minimize conflict.
- Finally, a key priority is to determine how to pay for the SCR. Details regarding the estimated cost of supporting the review team and the source of funds (specific job codes) to conduct the review must be agreed to in advance. Depending on the scope of the matter, the cost of conducting the SCR could be high. Reviewers' compensation must be established; this could include salary and travel reimbursement for agency reviewers, and travel reimbursement and honoraria for reviewers outside the Federal Government. Generally, the NFS would be responsible for the costs involved.

### Selecting the Review Team

The review administrator is responsible for selecting the members of the review team and for establishing an administrative structure for the conduct of the review. Although the review administrator selects the reviewers for the SCR, the responsible official should be consulted regarding the appropriateness of individual reviewers.

Reviewers should have three attributes: expertise, credibility, and independence from authorship of the draft document. Reviewers must represent the breadth of expertise needed to address the elements under review, and should be recognized in their fields as having sufficient experience and knowledge to speak on a given subject. They must have credibility in their areas of expertise, or neither their fellow reviewers nor the technical experts responsible for the modifications to the draft documents will regard their comments as authoritative. Finally, independence from authorship of the draft document is needed, so that no one is put in the awkward position of reviewing his or her own work. Often, a technical expert responsible for writing part of the draft document is a local or regional expert on the subject involved; nevertheless, any responsibility for authorship of the draft document should exclude one from consideration as a reviewer of that document. This does not mean, though, that an expert who is frequently cited in a draft document but who was not involved in preparing it should not review that document; in fact, such a person may be the ideal reviewer.

The number of reviewers on a team should relate to the scale and magnitude of the issues involved and the available resources. There are potential advantages for the perceived objectivity of the interim or final SCR report if the composition of the team represents a cross-section of the scientific community. The availability

and willingness of each team member to participate should not be disregarded. Serving as a member of an SCR team may require a major commitment of time and energy, and reviewers should be made aware of the expected commitment at the outset.

If the SCR is expected to be a major task, a team leader may be needed; for small efforts, the review administrator may assume this role. A team leader coordinates the activities of the review team members. The team leader should be willing and able to lead a group of scientists. If the team has meetings, it might also be advisable to have an additional person functioning as a team facilitator; this may apply only for efforts that include large teams and more complex tasks.

### **The Charge to the Team**

The initial charge to the SCR team is crucial to establishing working practices and managing the resulting expectations of the group. This can be done informally or formally using a charter or other appropriate document, but both the responsible official and review administrator need to sign any formal document used. The charge or charter should be delivered to the team at the first opportunity. Reviewers should be clearly advised that the SCR takes no position and expresses no opinion regarding which particular alternative should be selected.

The draft document under review along with appropriate supporting materials must be introduced to the review team in an effective manner. Reviewers should be charged with reviewing those elements in the draft document that pertain to their expertise, using the standard criteria for evaluation discussed below. Reviewers must have a clear understanding of the parts of the draft document to be reviewed, as identified by the review administrator and the responsible official.

The team should be directed to seek consensus as they conduct their review, but not given a mandate to achieve it. The team members should be able to work independently in their areas of expertise, but the group as a whole should be able to work together and provide input to each other's reviews. The concept is parallel to the interdisciplinary team of technical experts who assembled the documents under review. Meetings of reviewers might be valuable but are not required for the work to be accomplished. Team members should allocate tasks within the group among themselves or at the direction of the review administrator or team leader, as appropriate, such that all elements of the review are covered. Discussions and assignments need to be clear and focused. Should any disagreements or disputes arise among reviewers when the initial charge is presented, the review administrator should resolve them.





## The Conduct of the Review

### The Review Process

The SCR process is designed to be flexible and scalable, especially for small analysis or decision documents at the project or plan amendment level. It is intended to make efficient use of reviewer time and effort. For a project-level or plan amendment, the time and effort for each iteration of the SCR is analogous to that invested in the review of scientific manuscripts of equivalent length, and the iterative process will have a limited number of cycles. For decisions with greater scale, complexity, or contentiousness, the SCR may require a larger review team, a larger investment in reviewer time and effort, and a greater number of iterations.

The core of the SCR is a team review of a draft analysis or decision document and supporting materials. The elements to be reviewed will depend on the particular document under review. The evaluation criteria are more general, however, and have been standardized as suggested elsewhere in this white paper. Although the elements to review will differ, the evaluation criteria are common to reviews in any situation.

The review should be structured as a matrix by which each element is evaluated according to each of the evaluation criteria (table 5). In this context, the elements can be visualized as rows and the criteria as columns. Each cell of the matrix should have explanatory notes written by members of the review team that explain the evaluation. In instances where the rating is less than ideal, explanatory notes should state what changes would make the document acceptable.

Completed reviews are returned to the review administrator, who reconciles them and prepares an interim or final review report. That report, including pertinent material from the individual reviews, is returned to the responsible official for potential revisions of the draft document or supporting material. Draft or interim reports are anticipated as part of the process, and may result in a revised document that needs an additional review. Closure may require several iterations, but throughout the process the two interests, science and decisionmaking, must remain separate and independent. Revisions of the draft document are returned to the review team for additional review. Any changes to the document(s), however, are at the discretion of the responsible official.

The cycle repeats until the review administrator and the responsible official agree that the intent of the review has been achieved, after the iterative cycle of interim SCR reports and modifications of analysis and decision documents has achieved its intent. Ideally, that point in time will have two attributes: the review administrator will approve a final SCR report that evaluates all elements of a draft document to be science-consistent, and the responsible official will issue a decision based on that draft document.

Experience has shown that the ideally cooperative relationship between reviewers and technical experts, and perhaps also between the responsible official and review administrator, might fall short of a final SCR report that evaluates all elements as consistent. Such an outcome could occur if the number of iterations becomes excessive, if the response to an interim SCR report is insufficient, or if disagreement exists on how to make an element consistent. Under such circumstances, the responsible official or review administrator could prematurely terminate the SCR process.

### Selecting the Elements

The review administrator, in consultation with the responsible official, selects the elements to review. Since not all elements subject to an SCR are equally important, the responsible official and his or her technical experts (the management side) should collaborate with the review administrator and his or her reviewers (the review team) to identify those elements. The management side brings knowledge of policy considerations, and the members of the review team (as well as the managers) bring knowledge of technical and scientific information. The review administrator must use both areas of knowledge to prepare a list of elements from the document that would benefit from an SCR.

The decision about which elements in the draft document should be included in the review process can be based on results from project scoping, past experience by the technical experts or reviewers, or based on their own merits. The following list of selection factors can help identify what issues may be important to a particular situation and whether the potential elements can be addressed by an SCR:

1. The scientific information about an element is important to the potential decision.
2. An element is sufficiently important to affect the substance of the decision.
3. Public interest or official policy has identified an issue as important.
4. Excessive conflict or uncertainty exists within available scientific information.
5. A potential element is relevant to the agency and within its authority for decisions.
6. The information prepared for the draft document has sufficient scientific credibility.

An element should meet both factors 1 and 2, plus at least one of factors 3 through 6, to merit consideration in the review.

Elements should be drafted so they can be answered with a categorical yes or no rating. If an element is identified for which there is no expert on the review team, an additional reviewer with appropriate expertise may be required. Issues of scale are important and are best addressed in the elements.

Table 5. A sample excerpt from a matrix of elements and criteria to be used in evaluating science consistency.

For each element, technical experts should provide an explanation of the purpose and thinking behind the element to improve the reviewer’s comprehension of the element to be rated. For each rating in each cell, reviewers should provide a note explaining why and how the rating was derived, including suggestions that could be used to improve a "no" rating.

Elements	Criteria for Decision			
	Is the relevant scientific information considered?	Is the scientific information reasonably interpreted and accurately presented?	Are the uncertainties associated with the relevant scientific information acknowledged and documented?	Are the relevant management consequences identified and documented, including associated risks and uncertainties?
<b>1. Old Forests and Associated Species</b>				
1.a. Spotted owl habitat requirements and availability				
1.b. Spotted owl population trends				
1.c. Silvicultural prescriptions to create old forest habitat				
1.d. Conservation approaches for Canada lynx				
<b>2. Fire and fuels</b>				
2.a. Current and future fuel loading				
2.b. Current and future wildfire trends				
2.c. Smoke emissions and effects on human health				
2.d. Effectiveness of treatments for fuel reduction				
<b>3. Nonnative invasive species</b>				
3.a. Effects of spotted knapweed on native communities				
3.b. Treatments to control spotted knapweed				
3.c. Effects of zebra mussels on native aquatic communities				
<b>4. Economic and Social Well-being</b>				
4.a. Rural community economic and population trends				
4.b. Role of nontimber forest products in local livelihoods				
4.c. Recreational and economic importance of off-highway vehicles				
4.d. Effects of timber harvest trends on local communities				

After the elements are drafted, the review team leader or review administrator must confirm that elements are relevant and correct. The responsible official should agree that each element is germane to the decision. The review administrator, however, under his or her responsibility for the overall SCR, has final approval of the list of elements for review. For those SCRs in which a formal charter is developed, the final list of elements can be included in the charter.

It is conceivable that a revised document in response to an interim SCR report would result in modification of the elements to review. Suggestions for new elements might come from technical experts, reviewers, the review administrator, or the responsible official. Again, final inclusion of a new element in a subsequent iterative review would be at the discretion of the review administrator.

### **The Evaluation Criteria**

Although the elements are specific to issues, the criteria by which elements are evaluated are standard for all cases and independent of the scale of the decision. The following criteria are the recommended set of questions that decisionmakers should use in the context of the issues being addressed in the planning document and in the decision itself.

#### **Criterion 1: Is the relevant scientific information considered?**

The first criterion requires that the document under review contain a sufficiently thorough array of information from associated scientific literature, documented case studies, scientific assessments, or expert opinion (as applicable) addressed to form the scientific foundation for a decision. Typical questions that might arise during review of this criterion include the following:

- 1a. Is the breadth and depth of the scientific information in the planning documents thorough enough to include the scientific consensus as well as any contradictory or conflicting areas?
- 1b. Are diverse sources of information (literature, assessments, case studies, expert opinion) referenced and synthesized adequately?
- 1c. Is all the scientific information used in the document under review credible and applicable?

In the context of the planning process, many ways can be used to incorporate scientific information. An SCR must address whether the document recognizes this core information and handles areas of controversy.

#### **Criterion 2: Is the scientific information reasonably interpreted and accurately presented?**

This second criterion requires that the technical experts understand the scientific information, that the information is used in an appropriate manner (such as in application to appropriate regions and physiographic conditions), and that it is presented in a manner consistent with the assumptions and interpretations provided by the authors of the particular scientific literature being cited. Typical questions that reviewers might ask under this criterion include the following:

- 2a. Are the assumptions in the scientific literature, assessments, or expert opinion concerning specific fundamental points clearly identified?
- 2b. For areas of controversy, are scientific disagreements on the issues discussed? Are differing or opposing views selectively used or fairly presented?
- 2c. Are the citations accurate, credible, and appropriately used?
- 2d. Is the scientific information correctly interpreted and applied for the specific conditions and geographic areas in the draft document? Is the scientific information originally formulated at similar scales and geographic areas? If not, what was offered as a bridge to the planning area spatial scale?
- 2e. Is the use of theory balanced and supported by data? Are fundamental points in the scientific information based on appropriate ecological, economic, or social theory?
- 2f. Is the use of scientific information value neutral (unbiased)?
- 2g. Are the weights given to varied sources of information clear and appropriate?

#### **Criterion 3: Are the uncertainties associated with the relevant scientific information acknowledged and documented?**

Uncertainty in scientific information represents primarily the statistical variability associated with data and temporal and spatial scales. Variability in disturbance regimes and pertinent extreme events constitutes another form of uncertainty. Transferability of sources of information and the theoretical bases of interpretation also could cause uncertainty. Typical questions that reviewers might ask under this criterion include the following:

- 3a. Is uncertainty in the scientific information acknowledged, adequately disclosed, and appropriately described?

- 3b. Is the uncertainty from different sources of information reported clearly?
- 3c. Is the reliability of the data acknowledged and documented?
- 3d. Are there gaps in scientific knowledge that need to be acknowledged and documented? Has incomplete or unavailable information been recognized?

**Criterion 4: Are the relevant management consequences identified and documented, including associated risks and uncertainties?**

The previous three criteria dealt with the scientific information. This criterion deals with the application of that information to potential or selected management actions. Consequences resulting from projected management alternatives carry various levels of risk that must be addressed. Typical questions that reviewers might ask under this criterion include the following:

- 4a. Are relevant consequences from each proposed management alternative identified, described, and analyzed appropriately?
- 4b. Has scientific information been used appropriately to estimate the projected consequences of management actions?
- 4c. Are projected management actions stated and documented in such a way that implementation effects can be predicted?
- 4d. Is the risk associated with proposed actions and projected consequences reasonably addressed?
- 4e. Are the amount and quality of scientific information commensurate with the proposed land management activities and the resource risks and uncertainties associated with those activities?

**Scoring the Consistency of Elements Against Criteria**

The elements and criteria define the scope of the review. Results must be clear and communicated effectively to both the reviewers and the technical experts. If the reviewers do not understand the questions or disagree about what the questions are, the outcome will not be valid. The recommended approach is to use a matrix of elements and criteria both for presenting the questions and for summarizing the result of a review, with additional explanatory text supporting the entry in each cell (table 5).

The recommended rating system for the review is to produce one "yes" or "no" for each element under each criterion, and to provide narrative documentation for the rating that was assigned. Moreover, if the rating is "no," the narrative should provide detail on what needs to change to improve the rating.

The narrative is critical. The reviewer should offer several ways that an inconsistent element could be made consistent. This gives the technical experts more latitude in modifying the draft document, and it steers the reviewer away from the position of advocating one course of action in a particular element.

**Reconciling the Reviews**

Multiple reviewers may disagree on some or many of the scores in the evaluation matrix. The review administrator has the task of reconciling conflicting reviews. The review administrator must establish the nature of the reviewers' disagreements and resolve them objectively. In some cases a way to measure and describe the degree of disagreement among the reviewers for each response may be advisable; the level of disagreement provides information about the level of confidence in the evaluation.

The review administrator must provide feedback that separates personal bias from scientific differences among the reviewers' positions and the rigor or degree of effort made by the reviewers. The following are suggestions to resolve differing reviews, listed in order of those requiring least effort to those requiring the most effort. The review administrator—

1. Sends the responsible official the reviews as they stand, with no recommendation or summarization of conflicts.
2. Unilaterally chooses one answer in the review that seems to reflect the opinion of the majority of the team members or otherwise seems most appropriate.
3. Acts as an associate editor and adds his or her recommendations, giving more or less weight to each review.
4. Contacts reviewers, interprets their findings, and produces a reconciled report.
5. Prepares a unified team response, but includes dissenting opinions from reviewers.
6. Asks a third-party technical expert to review the reviews and evaluate the merit of each of the reviewers' positions.
7. Convenes the reviewers in an evaluation panel, enabling them to discuss the evaluations and persuade each other to change their positions, but without forcing consensus.

This process seeks a consensus of the group, but does not mandate consensus. Some interaction among the reviewers enables them to clarify their points and provide more useful information to the responsible official. For complex or large-scope issues, it may be useful to have a team facilitator to help sort through differences. The objectivity and independence of such a person can prove to be a valuable asset to the overall process.

## Science Consistency Review Products

An SCR must be an interactive and iterative collaboration between science and management. The responsible official and his or her technical experts will be able to use the SCR report in a number of ways, by revising the reviewed document, by challenging the evaluation result, or by issuing a decision that discloses an incomplete consistency result. The latter two choices set up a potentially irreconcilable process, and should be avoided. The revision process is preferred in that it offers the only means of obtaining a final SCR report that declares a document is fully consistent with available scientific information.

### Draft or Interim Review Team Report

An anticipated outcome of the iterative SCR process is that draft review team reports (unofficial) or interim review team reports (official) may result in a revised document that needs an additional review. Draft reports may be helpful for reviewers and technical experts who are working closely together in the iterative process, and these would be shared directly between reviewers and technical experts. Interim reports provide a more formal process, which would include formal transmittal letters from the review administrator to the responsible official, and these may be needed as part of the administrative record for the decision. The responsible official would forward the interim report to the appropriate technical experts for use in revising the draft document.

Ultimately, the draft or interim report is provided to the responsible official for one of two actions: to accept it as is, or to use it as guidance to technical experts for revisions that may be needed to address questions raised by the review. Subsequent reviews may ensue. Ultimately, the responsible official decides whether to repeat the review process. This opens the possibility that a responsible official might issue a decision based on an analysis or decision document for which the latest interim SCR report finds some elements to be inconsistent with available scientific information.

This would fall short of the preferred way to terminate the SCR process, but would be within the responsible official's authority.

### Final Review Team Report

A final written report is the ultimate product of the SCR process. The review administrator should submit a transmittal letter, which can be filed as part of the administrative record of the decision, along with the interim and final reports to the responsible official. The review administrator is responsible for preparing an executive summary and for transmitting the body of the review report. The written SCR report should document the process of the review, including selecting the reviewers, selecting the elements, assembling the information under review, and describing how disagreements among reviewers were reconciled. If a matrix of elements and criteria was used with summary ratings, this should be included as well. Narratives supporting the summary ratings should also be included. Upon request from one or more of the reviewers, and at the discretion of the review administrator, an additional dissenting (minority) report may be transmitted along with the final summary report. Finally, the review administrator may conduct or request a review of the final team report to ensure that the report does not advocate any particular decision or alternative and that the evaluations are value neutral.

### Completion

The responsible official decides when the process is complete. Between completion and success lies the report that is written for, delivered to, and accepted by the responsible official. The review administrator should transmit the completed report to the responsible official. The SCR documents should become part of the planning analysis file, and they should be made public at the same time as the decision and the National Environmental Policy Act (NEPA) document are made public.



## Implementing the SCR Process

Widespread implementation of the SCR process within the agency will require attention to several organizational and policy issues beyond the scope of this white paper. These issues include primary purpose, analysis gridlock, potential for appeals, reviewer workload, and adaptive response to early SCR efforts. Such issues point to the need for guidance from agency leadership when the SCR process is made available to the Forest Service at large.

According to the "primary purpose" financial management strategy within the agency, costs for conducting the SCR would generally be the responsibility of an appropriate budget line item or combination of budget line items within the NFS budget. In addition, some experience with the conduct and cost of an SCR under the process outlined in this white paper is needed for future budget planning purposes.

The potential for the SCR process to add to the length of time needed to issue a decision must be balanced by the increased defensibility of a decision that can be documented as consistent with available scientific information. If the benefits of using the SCR process do not outweigh the added time required to issue the decision, managers may want to consider tools other than the SCR process outlined here.

There is some question about whether conducting an SCR for a given project will establish a formal or informal precedent for similar reviews of projects of comparable size and complexity. There is also a concern about whether using the SCR process in a given decision opens the door to appeals of similar decisions where the SCR process was not used. The SCR process must be implemented in a way that addresses these concerns.

It is acknowledged that the SCR process will increase the demand on reviewers' time and effort. If the SCR process becomes a required or widely used, rather than elective, part of planning, then scientists and administrators could spend a significant amount of their time conducting these reviews.

There may be instances where a scientist or research administrator has concerns about the manner in which agency officials are using science outputs and products. Several ways exist to resolve such concerns, such as direct communication, involvement with the NEPA process externally, or progression of concerns internally within the overall Forest Service organizational hierarchy. There may be instances where a review administrator unilaterally reviews a draft document using the SCR process outlined herein; however, if both the responsible official and review administrator are willing cooperators in the SCR, it dramatically increases the likelihood that the SCR report will be favorably received.

Finally, the SCR process proposed herein will no doubt evolve as it is applied in different situations. It is important to adaptively respond to early experience with the SCR process as outlined in this white paper. One would expect that NEPA coursework might be modified to provide training in the SCR process to technical experts and responsible officials; similarly, review administrators and reviewers would benefit from such training. In addition, technology transfer tools, such as a Web site to facilitate extending the SCR process to the field, would be required. For these and other reasons, interim staff support at the Washington Office level will be valuable as the SCR process is introduced to the agency at large.



## Summary

The responsible official should consider the SCR as an optional tool to use when he or she thinks that the scientific information contained in a draft analysis or decision document could benefit from a review. When conducted as suggested in this white paper, the SCR will essentially serve as a report by reviewers to validate the scientific information used in the draft decision or analysis document, and it will enable the responsible official to assert that a decision based on those documents is consistent with available scientific information.

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## Appendix 1—Frequently Asked Questions

### 1. Why do a science consistency review?

A science consistency review (SCR) helps the responsible official to fully appreciate all the scientific information relevant to a draft analysis or decision document, and to make revisions in a draft document so it better reflects the best available scientific information. The responsible official can use the SCR process to obtain valuable information on the use and interpretation of scientific information in the draft document under review, and he or she can include that information when revising the draft document. If carried to the point where the final SCR report documents that all reviewed elements are consistent with the best available scientific information, the responsible official can then defensibly argue that the decision based on that reviewed document is also consistent with available scientific information. For certain decisions, the responsible official may find it helpful to offer such an assertion.

### 2. To be consistent, does a decision have to conform to the science?

No. Decisions are based on many factors: economic conditions, political issues, legal concerns, ecological interests, and so on. Science alone does not make the decision. If the decisionmakers found the relevant scientific information, interpreted it correctly, recognized the inherent error of it, and made reasonable predictions using it, the decision will be consistent with the available scientific information, but does not necessarily have to conform to it.

### 3. Am I legally required to do an SCR?

Decisionmakers should check the latest Forest Service directives, but at the time this document was written there was no requirement to complete an SCR before making a decision. In addition to SCRs, other methods such as scientific peer review or science advisory boards are available for evaluating the scientific information used to support decisions.

### 4. What is the distinction between a peer review and a science consistency review?

Scientific peer review refers to evaluation of the science that forms a basis for analysis. An SCR refers to evaluation of whether the responsible official has appropriately interpreted the scientific information in coming to a decision. A peer review is done to see if the science that addresses relevant issues is correct; a consistency review evaluates whether the science is used correctly.

A peer review can be defined more generally as any review of documents that evaluates the quality and validity of the information contained therein. A doctor's second opinion is an example of peer review. Scientific peer review includes evaluation of the validity of the

information itself, and of whether the information is applied, used, or acknowledged in a reasonable manner.

An SCR evaluates whether the information in a draft decision document is interpreted properly, and whether the interpretation is properly disclosed in a decision. It has to include some elements of a peer review, such as whether the scientific information used in a planning and decision process is properly interpreted and used, but the process goes further in that the SCR evaluates whether uncertainties and risks have been captured in the draft document and whether conclusions drawn in development of planning documents use scientific information appropriately. A draft analysis or decision document may propose alternatives involving actions that scientific information shows are less than optimal, but if interpreted and considered properly, would still be consistent with science.

Interpreting and disclosing information and effects are the important points. Both peer review and SCR include a check of whether all relevant information has been considered, but only the SCR provides a decisionmaker with feedback that describes what information was used and how it was interpreted, and discloses the factors and risks involved in coming to the decision.

### 5. What is the product of the SCR?

The ultimate product is a final report issued by the SCR review administrator that addresses whether a draft decision document has considered, and is consistent with, available scientific information. Interim reports offer a more structured way for technical experts to respond to reviewer evaluations through iterative review and revision of the draft document under review. In both interim and final reports, the SCR is conducted by evaluating specific, detailed elements according to a set of standard criteria.

No statements in the SCR should address the decision itself. Rather, an SCR should address the question, "Is the technical information supporting the decision consistent with science, and has the decision process interpreted and disclosed appropriate information?" The report may include dissenting views from reviewers.

### 6. Does the SCR certify the decision as scientifically credible?

The SCR does not certify a decision as scientifically credible. When conducted as suggested in this white paper, the SCR results in interim or final reports by reviewers that validate the scientific information used in the draft decision or analysis documents, and these reports can be used to modify those draft analysis and decision documents.

If the analysis document is consistent with science, or changed to become consistent with science, and if the

decision document adequately discloses that applicable science was considered and interpreted correctly, and if opportunities and risks were correctly analyzed, then the responsible official can claim that the decision is consistent with the best available science. Granted, the decision may be influenced by social or economic factors that could result in a different decision being made than if science had been the only factor considered. Nonetheless, the outcome of the SCR enables the responsible official to claim that the decision is science-consistent.

### **7. Exactly what documents and analyses will be covered in the SCR?**

An SCR may be requested for any analysis or decision documents in which scientific information is used in land management planning or environmental disclosures. Examples may include but are not limited to forest plans, environmental impact statements, environmental assessments, records of decision, or decision notices. Ideally, the SCR is conducted through an iterative process whereby reviewers review early drafts of analysis documents, technical experts revise them, and this iterative process of review and revision continues throughout the preparation of final decision documents.

### **8. Will it make me change my documents?**

The SCR process is designed to give the responsible official constructively critical feedback on draft analysis and decision documents, so it is unlikely that a responsible official would choose to follow the SCR process without the expectation that some revision would follow. The SCR report identifies weaknesses in the interpretation and use of scientific information and offers suggestions for revision in order to achieve consistency with available science. The decision on whether to revise the draft document remains with the responsible official, but the constructively critical feedback provided would foster revision to make the revised document more accurately reflect the effects and risks as they are understood in the scientific literature. Thus, if the responsible official embarks on the SCR process, he or she should expect to undertake revisions in the draft documents.

### **9. Is the SCR made part of the administrative record?**

All official correspondence between the responsible official and the review administrator will become part of the administrative record. Draft or interim reports exchanged between reviewers and technical experts may not necessarily be part of the administrative record, but retained written communications associated with this process would be subject to the Freedom of Information Act and would be discoverable. Similarly, the responsible official decides whether the SCR report should be included or appended to the Environmental Assessment or Environment Impact Statement.

### **10. Can I do this with less than a full-time dedicated team?**

The amount of time required of the review team depends on the scope of the decision and how much scientific information relates to the decision. The SCR process was designed to be scalable to different levels of analysis. As such, having a team of three reviewers look at a draft document for only one or two iterations could complete the process. Decisions of greater scope and complexity may require greater effort and greater organizational distance. The proposed structure was developed, however, to use the reviewers' time efficiently.

### **11. Who pays for the SCR? Do primary purpose financial concepts answer any questions about who pays for it?**

According to the "primary purpose" financial management strategy within the agency, costs for conducting the SCR would be the responsibility of an appropriate budget line item or combination of budget line items, logically falling to the NFS side of the budget. Widespread application of the SCR process could be quite costly.

The informal or formal agreement between the responsible official and review administrator that authorizes the SCR effort should specify how the work will be paid for. Insofar as the conduct of an SCR is an elective process within the line authority of the responsible official, the cost of conducting it would logically come from some appropriate function under the authority of the responsible official—in other words, from planning-related budget line items within the NFS budget.

### **12. How much will the SCR cost?**

Costs cannot be determined easily, but are an important consideration in conducting an SCR. As a practical and pragmatic matter, asking a reviewer to prepare one or two reviews within a short period of time would be done as an in-kind contribution by the reviewer, in a professional courtesy capacity similar to that of providing a peer review of a scientific paper. The more intensive the demands made on a reviewer above this minimal level, though, the greater the likelihood that the responsible official will need to support reviewer expenses, including salary and any travel costs.

### **13. What will the SCR buy me?**

Successful completion of the SCR will provide the following:

1. more accurate estimates of an action's effects and risks,
2. development of more, or different, options or management alternatives as draft documents are revised, and
3. increased public credibility and/or legal defensibility for decisions.

**14. Will an SCR keep me out of court or keep me from getting sued?**

No, but an SCR may help the responsible official make a more informed decision, and may provide a stronger defense if the decision does wind up in court.

**15. Can an SCR be an easy and quick process?**

The SCR process can be done in a quick and easy manner, especially for decisions of smaller scale and complexity. Larger decisions will require greater effort.

**16. When in the planning process should an SCR take place?**

The earlier in the planning process that the SCR takes place, the better. If conducted in ideal circumstances, the first interim SCR report would be generated upon review of the first draft of the analysis document. A second interim SCR report would be based on the final analysis document. The final SCR report would be generated on the final draft of the decision document. Experience suggests that if the SCR process is initiated late in the game, revisions may be more disruptive to the overall planning process than if the interim SCR reviews had been done with early drafts of analysis and decision documents.

**17. What will trigger the SCR?**

The SCR begins when a responsible official makes some informal contact with the nearest appropriate R&D staff about whether to conduct an SCR for a given project. Motivations to request a review may include the desire to make a considered resource management decision, or to document the process of making an honest effort to understand the issues that affect a decision, as might be helpful in litigation.

This is not to say that R&D must be a part of the process, but it seems logical to suggest that leadership in NFS regional offices and R&D station headquarters should be aware of any SCR efforts occurring within their respective jurisdictions. That informal contact will enable the responsible official to visit with R&D personnel and others, if appropriate, to discuss whether the SCR process or some other method is most appropriate for the particular situation. If R&D becomes substantively involved in the SCR through assignment of a review administrator or reviewers, R&D line authority must authorize that participation. If the SCR is conducted using NFS staff or external reviewers, however, such authorization or participation would not be needed.

**18. Is there a minimum size requirement for an SCR?**

No, there is no minimum size requirement. The process as designed can be made to apply to small efforts such as a project-level, site-specific decision or a forest plan amendment.

**19. How big should the scope of the analysis and decision be to do an SCR?**

The process for conducting an SCR is designed to be flexible and scalable, especially for small analysis or decision documents at the project or plan amendment level. It is intended to make efficient use of reviewer time and effort. The scope of the analysis and decision is perhaps less important than the implications of scientific information for the analysis and decision.

**20. Do I need an SCR for a project or just for a plan amendment?**

The responsible official decides when to do an SCR, and that decision would encompass issues of scale.

**21. Do SCRs work only in the Pacific Northwest?**

Although the SCR process has been applied to a number of large, high-profile efforts in the Pacific Northwest, the process outlined in the attached white paper can be and has been applied in other regions, and could be modified to fit any agency land base in the Nation. SCRs have been used in the Sierra Nevada Forest Plan process, as well as in the Northern Great Plains Assessment. Moreover, with some modification to the process and to the agency affiliation of those filling various SCR roles, the SCR process could be conducted on management plans for forest industry lands or even for forest land owned by nonindustrial private forest landowners.

**22. Who initiates an SCR?**

The responsible official has the responsibility to initiate an SCR. Since the costs are borne by the appropriate budget line under the responsible official's direction, the responsible official has line authority to decide whether to engage the SCR process.

A station director or other R&D administrator with concerns about the use of science in a draft decision document can also initiate the SCR process. Ideally this would occur with the responsible official's cooperation and support. One cannot rule out the possibility that a scientist or administrator could conduct a unilateral review of a draft analysis or decision document using R&D funds; however, to move forward as outlined in this white paper, the responsible official's cooperation and support are essential for any review to serve as the basis for revising the draft document. Any such revisions remain within the purview of the responsible official.

**23. How can someone other than the responsible official handle concerns about the inappropriate use of science in land management?**

If science is being misinterpreted, the scientific community needs to set the record straight. A station director, assistant director, or scientist may want to retain control over how scientific information is used, but no scientist has control over how his or her published information is interpreted, other than

through further publication and discussion of the results and interpretations.

A number of ways exist to resolve such concerns. First, the concerned individual can ask the responsible official to initiate the SCR process. If the concerned individual has sufficient administrative or scientific credibility, that request would be difficult to ignore. If the responsible official decides not to initiate an SCR, however, other avenues remain available to the concerned individual. These include providing detailed comments in a forest plan or in other public documents during the public comment process, communicating directly with the technical experts who developed the decision document, or writing follow-up articles in research publications that critique any misinterpretations. Disagreements among agency personnel can be handled through resolution at increasingly higher levels of line authority.

Whenever scientists or research administrators have questions about the scientific consistency of a decision, however, they have a responsibility and an obligation to act, such as through an official letter to the responsible official.

**24. Should Forest Service scientists ever be excluded for reasons of agency affiliation? Should different people be used for intermediate or final reviews? If so, under what circumstances should this occur?**

Scientists within R&D are set apart administratively from the NFS, and they have no authority for management of national forests. As such they can be and often are viewed as independent from the agency's mission of national forest management. There may be situations in which these scientists should be excluded as reviewers, such as when a scientist provided direct input to the analysis or decision document, but it is not necessary to exclude them as reviewers simply because of their affiliation with the Forest Service.

Overall, the affiliation of reviewers should be kept flexible for different situations. Selecting the review team is the joint responsibility of the responsible official and review administrator. Sometimes agency scientists or NFS technical experts are the most appropriate reviewers, but certainly others with relevant expertise can fill this role.

The selection of those who will conduct the review should be based on their (1) expertise, (2) credibility, and (3) independence from the decision. Therefore, deciding who conducts the SCR review depends on both the nature of the draft decision document and the personnel who possess those three attributes.

Anyone asked to participate in drafting the decision document should be disqualified from its review under the SCR, under the axiom that a professional should not review his or her own work. For example, a scientist with certain expertise may be asked to participate in the preparation of a draft document, and if that scientist

accepts, he or she should not subsequently be asked to review it. On the other hand, if a scientist has been extensively cited in a draft analysis or decision document that he or she did not prepare, that scientist may be the best person to review the draft document.

Multiple iterations of review will probably be needed after a draft document is revised in response to an initial SCR. The same reviewers are generally expected to review any revised documents. Reviewers may be replaced if the review administrator decides that their contributions are not appropriate; examples would include a reviewer who insists on making policy recommendations or proves unable to meet deadlines. The responsible official or review administrator may request a peer review of the final SCR report.

**25. Can an SCR be done entirely within NFS?**

Yes, an SCR can be done entirely within NFS, provided the reviewers are not involved in drafting the document reviewed and are knowledgeable about the scientific information discussed in the document.

**26. How can I find out about the experiences of others who have done an SCR?**

A number of publications are available that discuss experience gained in the use of Science Consistency Evaluations in the Pacific Northwest and Pacific Southwest. Those evaluations were similar to the SCR process discussed here. This SCR process was designed to be more streamlined, however, and to capture the best elements of those previous efforts.

**27. Is the Federal Advisory Committee Act (FACA) an issue during an SCR?**

The FACA does not appear to be an issue. The presumption is that an SCR "contracts" with outside persons to evaluate documents and provide reports. Even if an outside review administrator coordinates the SCR, as long as the report is simply something the responsible official uses and it does not advocate a particular decision, FACA may not be relevant. Moreover, the SCR report is considered information—a means of providing technical expertise—rather than something advocating or endorsing a particular action.

**28. Must an SCR reviewer be a scientist?**

No, the only attributes the reviewer must have are expertise, credibility, and independence from the draft decision document. Thus, a reviewer might be a Ph.D. scientist, but he or she also could be a technical expert or line officer who has these three attributes. In some cases a manager may do the review independently, especially on relatively small-scale issues. The goal of the process is to ensure that decisions are consistent with relevant scientific information; to accomplish this, the review administrator should bring to the review any person who has the required academic and scientific credentials to address the issues.

**29. What is the importance of the administrative record in an SCR? What elements of the SCR are private between the review administrator and the responsible official?**

An administrative record is the first thing looked at in a judicial review. It documents the process as specified by NEPA.

**30. Is the SCR subject to the Freedom of Information Act (FOIA)?**

Yes, all "agency records" that exist at the time of an FOIA request are subject to the Act. An "agency record" is located in an official file and can be in the form of a handwritten draft report, typed interim or final report, video tape, audio tape, drawing, photo, computer disk, email message, or sticky note. A personal document, however, created by an employee that is not shared with others, does not contain substantive agency information, and is not located in the official files may not be an "agency record." A complete discussion of agency records vs. personal records can be found at the following Web site: [http://www.usdoj.gov/oip/foia\\_updates/Vol\\_V\\_4/page5.htm](http://www.usdoj.gov/oip/foia_updates/Vol_V_4/page5.htm).

Depending on the circumstances involving each individual FOIA request, however, all or portions of an SCR record may be withheld, based on FOIA exemptions such as Exemptions 3 and 5:

- Exemption 3 protects information exempted by statute—i.e., the Archaeological Resources Protection Act, or the National Historic Preservation Act; for example, the location of an archaeological site identified in an SCR might be withheld.
- Exemption 5 protects inter- and intra-agency records that are part of an agency's deliberative process; for example, a draft or interim SCR report might be withheld until the agency's deliberative process is completed, by the regional forester's issuance of a final resource management decision, if the release would cause "harm" to that deliberative process.

If you have questions about the treatment of draft records, contact your regional FOIA coordinator. A complete discussion of the "foreseeable harm" standard can be found at the following Web site: [http://www.usdoj.gov/oip/foia\\_updates/Vol\\_XV\\_2/page3.htm](http://www.usdoj.gov/oip/foia_updates/Vol_XV_2/page3.htm).

The administrative record should include the final SCR report to document the consideration of scientific information in the agency's resource management decisionmaking process. Draft and interim SCR reports may be made part of the agency record.

**31. Must unanimity be reached among SCR team members?**

Complete scientific unanimity will seldom be achieved. If substantial disagreements exist among members of the review team and have not been resolved, those disagreements should be documented within the report. The review administrator has the task of reconciling

contradictory reviews. This can best be done by establishing the nature of the reviewers' disagreement and resolving it objectively. A number of possibilities for reconciling such reviews are proposed in the white paper.

**32. Must the methods and process used to elicit the reviewers' science consistency judgments be science-consistent?**

Conceptually, the methods used in the review process must themselves be consistent with the available science. If there is concern about this aspect, the review administrator or responsible official can request a peer review of the SCR addressing the issue. This may be a researchable opportunity as SCRs are conducted.

**33. Is there a need for each element to be completely consistent under every criterion?**

The review administrator, in consultation with the responsible official, decides which elements to include, and the review must clearly identify those elements. The available science is an important factor in this decision. Decisions need to state how much available scientific information has been considered, and the responsible official must be flexible enough to live with evaluations that include some elements that are not "fully consistent." The review administrator is responsible for identifying the elements to review, but the responsible official decides whether to issue a decision when some elements might be listed as "not consistent."

**34. Is there a general preference of line officers for ratings: binary ratings, 5-point scales, text narrative, or other?**

The "yes or no" rating is used here because it requires a reviewer to make a hard decision. But beyond that, the narrative that the reviewer prepares to justify the ranking is the most critical part of the review. It should identify factors that influence ratings, with specific recommendations for what needs to be strengthened or what factors had the most influence on the rating. Distinction needs to be made between whether "the science is not conclusive" and "the science could be clear but not enough information is presented."

Ideally, the reviewers should offer suggestions as to how to achieve consistency on a particular element. The most useful reviews are those that include a variety of options for achieving science consistency, since there can be multiple decisions that are all science-consistent.

A summary of which elements or criteria may be most important with respect to the decision document would be useful, especially if particular elements are interrelated with or strongly influence a large number of others. The responsible official, however, may decide that some elements are important enough to outweigh inconsistencies in other elements.

**35. How "optional" is a revision by the responsible official if the process is initiated? If an SCR report is delivered to the responsible official, does this mandate a revision of the document reviewed?**

The SCR report does not mandate revision. The responsible official has discretion in deciding whether to revise the draft documents in response to an SCR report, unless agency policy essentially says that decisions "must be consistent" with scientific information.

Because the responsible official initiates the review, the SCR report is intended for that responsible official, who then must decide how to respond to it. Revisions to the initial document may or may not be needed. Existing NEPA policy requires disclosure of the rationale for a decision; thus, acknowledgment of receiving the report should be included in the decision document. Once the responsible official initiates the process,

however, it seems logical to carry it to completion—to revise the draft document, repeatedly if necessary, if the SCR report suggests that certain elements are not science-consistent.

**36. When is the SCR finished?**

An individual SCR report is finished when the review administrator submits an interim or final SCR report to the responsible official. The larger SCR process—which may have multiple reviews and revisions—comes to conclusion when the review administrator and responsible official agree that it is finished. Ideally, this consists of two steps: 1) The review administrator issues a final SCR report indicating that all elements in the draft document have been reviewed and are consistent with the review criteria, and 2) the responsible official accepts the final SCR report and issues a decision based on that draft document.

## Appendix 2—Lessons Learned

The following are some examples of lessons learned from past science consistency reviews (SCRs). These reviews include the Interior Columbia Basin Final Environmental Impact Statement (ICB), Tongass Land Management Plan Revision (TLMP), Sierra Nevada Framework for Conservation and Collaboration (SNFCC), and Northern Great Plains Land Management Plan Revision (NGP).

These lessons learned should be viewed in the context of adaptive management. They are taken from specific situations, and may or may not relate to the subject matter of the SCR, the composition of the SCR team, and the amount of interaction between the team members and the resource managers. Most of these teams were predominantly Forest Service scientists (either R&D or National Forest System), Federal scientists, external academic (university) scientists, independent consultants, or a combination of the above.

The reviews were characterized by the following kinds of interaction: high levels of frequent interaction among science and management teams; moderate levels of interaction, perhaps constrained by distance or communication issues; and low levels of interaction with very few and/or one-way interactions.

### Scenario A

Predominantly R&D scientists; moderate level of interaction constrained by distance and communication (ICB):

- Reviewers should clearly articulate why the decision document was found to be inconsistent with science. Where possible, try to propose more than one solution to each inconsistency item. Try to leave some decision space for managers.
- Reviewers should stay neutral. When proposing changes, focus on strengthening the science consistency and stop short of advocating a position on the decision or editorial fixes to better conform to individual beliefs, values, or writing style.
- Technical experts can easily get defensive and argue that the issue is adequately covered. A better question might be to ask whether the science suggestion will strengthen the document. It often takes less time to fix inconsistencies than to debate their merit; in other words, do not waste time on the small issues. If it will strengthen the document, just do it.
- Responsible officials should remind themselves that they would rather be asked the tough questions now, internally, than later in public meetings or in court.
- Technical experts need to be clear about the criteria for selecting elements for consistency evaluation and the criteria for judging consistency of those elements. It is important to agree up front with the review

administrator on what elements will be evaluated. Write them down. Discuss them with resource managers and technical experts so that everyone knows what the standards will be. Criteria are more in the realm of the science team, but they should be discussed with the resource management team for their input, understanding, and ownership.

- All participants in an SCR need to be as careful about how something is said as what is said. Do not let it become personal. When deadlines are short and frustration is high, tempers can fly. The review administrator and responsible official must intervene before conflicts among staff escalate; a neutral liaison can be useful to assist the interaction between science and management. Consider focusing the discussion between the science team and management team through a single spokesperson for each. Conduct facilitated meetings, if necessary. While individual, one-on-one discussions among members of the science and management teams can be useful and productive, they can also degenerate into friction and personality issues. Schedule face-to-face time and jointly discuss options to resolve; communicating by email often escalates rather than solves the problem.
- Technical experts and resource managers should separate the most important elements from minor ones—there probably will be many more inconsistencies than imagined. Stratify the "show stoppers" from the multitude of others needing improvement and concentrate on these issues first.
- Technical experts and reviewers should be open to more than one way to resolve an inconsistency. Often the issue is not black and white; try to find middle ground based on time constraints and the sensitivity of the issue.
- SCRs can be very time-consuming, and it can be tempting to take shortcuts. The rigor and time required for the evaluation depend on the scope of the management issues and the potential level of conflict arising from the decision. Time spent up front in designing the SCR will be time well spent. Decisions about the rigor and time required are more in the realm of the resource management team, but should be discussed and negotiated with the science team.
- Responsible officials should not attempt to negotiate out of or sidestep science issues that may not reflect well on the proposed decision document.
- All participants should stay within their appropriate roles. Resource managers decide, disclose, and manage. Scientists evaluate, in a value-neutral way, the use and disclosure of appropriate scientific information.

### **Scenario B**

Predominantly external scientists: non-Forest Service Federal, academic, State, private sector; low levels of interaction constrained by time (SNFCC).

- The time available and needed for an SCR are both crucial considerations that need to be settled up front.
- The responsible official should be considerate of how much time can be expected from external reviewers and be able to provide any needed support.
- The responsible official and review administrator should define the purposes and roles up front. They need to be clear about how many iterations of interaction they expect will occur, and they should provide a structured setting for participation.
- The responsible official and the review administrator should do their best to provide incentives (both monetary and nonmonetary) for outside reviewers to participate and to make their participation as smooth and easy as possible. Participants should not feel like this is a chore.
- For this scenario, an independent review administrator who is not affiliated with the Forest Service is recommended.

### **Scenario C**

Predominantly Forest Service research scientists; high levels of interaction, defined roles maintained, close proximity, high iteration of review and interaction (TLMP).

- An understanding of the standards of evidence and documentation required by science is a key prerequisite.
- Participants in the SCR must understand the role of scientific debate.
- The executive leadership needs to be engaged and supportive.
- The partnership needs to be formed and formalized at the beginning.
- Scientists need to have an understanding of working in the litigation environment.
- Timeframes are crucial.
- Focusing on decisionmaking versus science is a way to keep discussion away from personalities.

### **Scenario D**

Predominantly external land grant university scientists; low levels of interaction constrained by time (NGP).

- The responsible official should provide a structured setting for the reviewers, with deadlines clearly stated.
- The technical experts and resource managers should clearly articulate what is to be done and the evaluation criteria to be applied

### **Scenario E**

Predominantly internal higher level NFS scientists or experts; moderate to low levels of interaction constrained by time. (Note: this scenario represents the use of internal agency experts who have not been involved in the development of a decision document as reviewers. The Chugach National Forest has, as of January 2002, gone through several drafts of review in which the review was conducted by regional office staff.)

- The coordination and protocol for conducting an SCR with regional or similar-level NFS scientists or experts should come from a high-level regional administrator.
- The responsible official and review administrator should set timelines for producing a consistency report, and provide adequate time for careful review and written documentation.
- The SCR report should include documentation on the science literature or information considered by the reviewers.
- The responsible official and review administrator should ensure that the reviewers were not involved in preparing the decision document and that they have been insulated from internal pressure to generate findings of a particular nature.

### **Common Elements**

- All participants in an SCR need to be clear on what criteria should be used.
- All participants should be clear about boundaries between management decisions and scientific information and the roles of managers/decisionmakers and scientists.
- Especially in the case of reviewers, the responsible official and review administrator should be clear about time and personnel commitments and deadlines.