



FOREST SERVICE HANDBOOK NATIONAL HEADQUARTERS (WO) WASHINGTON, DC

FSH 1909.12 - LAND MANAGEMENT PLANNING HANDBOOK

CHAPTER 40 - SCIENCE AND SUSTAINABILITY

41 - SCIENCE REVIEWS IN THE LAND MANAGEMENT PLANNING PROCESS

41.1 - Purpose of Review

The purpose of science reviews is to enhance and maximize the quality and credibility of plans and planning evaluations. In addition, the purpose is to review how the best available science was taken into account, not to add to the body of scientific knowledge.

Science reviews allow the Responsible Official to document that the best available science was taken into account in the planning process. Reviews should be conducted in a timely and expeditious manner to provide useful feedback.

A science review should address four central questions:

1. Has applicable and available scientific information been considered?
2. Has scientific information been interpreted reasonably and accurately?
3. Are the uncertainties associated with the scientific information acknowledged and documented?
4. Have the relevant trends of social, economic, and ecological resources (sec. 24.23), including risks and uncertainties, been identified and documented?

41.2 - Review Process

1. The steps involved in the review process include:
 - a. Plan the review.
 - b. Conduct the review.
 - c. Respond to the review.
 - d. Document the review.

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2. Planning the review involves deciding:
 - a. What needs to be reviewed?
 - b. What level of review is needed?
 - c. What should be the timing of the review?
 - d. Who should be the reviewers?
3. Conducting the review involves:
 - a. Collecting the review material.
 - b. Preparing the review questions.
 - c. Reviewing the material.
 - d. Providing feedback.
4. Responding to the review requires:
 - a. Evaluating the feedback.
 - b. Taking appropriate actions in response to the feedback.
5. Documenting the review involves preparing the appropriate level of documentation for the planning, conducting, and responding processes.

41.21 - Levels of Review

The steps of a review vary in detail and intensity. Four levels of science review are described in Exhibit 01. Communication between the planning team specialists and their colleagues on the unit is encouraged but is considered to be outside the review process.

In addition to the factors in Exhibit 01, the Responsible Official should also consider if the cost of the review outweighs the expected benefits of the review (ex. 02 and ex. 03). Reviews should be conducted in a manner that facilitates the planning process or the approval of a plan.

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41.21 - Exhibit 01

Four Levels of Science Review

	Level 1	Level 2	Level 3	Level 4
	Informal Discussion	Informal Review	Formal Review	Structured Review
	Planning the Review			
Purpose of review	To get advice on appropriate methods. To assure that all pertinent scientific literature is properly assessed and synthesized.	To assure that relevant science information is considered and reasonably interpreted and applied with consequences, uncertainties, and risks that arise from trade-offs between resources or disciplines appropriately identified.	To assure that relevant science information is considered and reasonably interpreted and applied with consequences, uncertainties, and risks appropriately identified among plan components.	To assure that relevant science information is considered and reasonably interpreted and applied with consequences, uncertainties, and risks appropriately identified among plan components.
Scope of review	One discipline or resource	One or more resources or disciplines that may include integration.	One or more resources or disciplines that include integration.	Multiple resources and disciplines that includes integration.
Timing of review	In the formative stages. Before a task or document is completed.	After preparation of a draft document, but early enough to easily adjust the product. Integration may or may not have begun.	After preparation of a draft document, but early enough to easily adjust the product. Integration has begun.	After preparation of the draft plan.
What gets reviewed	Models, concepts, proposed methods, draft science syntheses.	Models, concepts, proposed methods, draft science syntheses, Draft specialist reports, draft plan components, draft plan.	Models, concepts, proposed methods, draft science syntheses, Draft specialist reports, draft plan components, draft plan.	Models, concepts, proposed methods, draft science syntheses, draft specialist reports, draft plan components, Draft plan.
Review initiator	Planning team specialist	Planning team specialist(s) or leader	Responsible Official	Responsible Official
Reviewers	Resource specialist. (FSH 1909.12 section 41.23)	Resource specialist or regional specialist (e.g., Regional wildlife biologist) (FSH 1909.12 section 41.23)	Regional or national subject matter experts (e.g., university professor, USFS R&D scientist) (FSH 1909.12 section 41.23)	Regional or national subject matter experts (e.g., university professor, USFS R&D scientist) (FSH 1909.12 section 41.23)

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41.21 - Exhibit 01--Continued

	Level 1 Informal Discussion	Level 2 Informal Review	Level 3 Formal Review	Level 4 Structured Review
Conducting the Review				
Approach	Discussion between a planning team specialist and a reviewer.	Materials and documents are sent to reviewer(s).	Materials and documents are sent to reviewers with written request for review.	Use a formal process such as “The Science Consistency Review” (Guldin et al, 2003 ¹).
Feedback from reviewer	Reviewer provides oral comment.	Reviewer provides written or verbal comments.	Reviewers provide written comments.	Review team provides a report.
Responding to the Review				
Results of the review	Specialist adjusts input as appropriate.	Specialist adjusts input as appropriate.	Responsible Official responds to the comments.	Responsible Official responds to the comments.
Documenting the Review				
Required documentation	Briefly summarize the contact, topic, and results.	Summarize the science questions asked, names of reviewer(s), and summary of the review and results.	Detail the science questions asked, names of reviewer(s), summary of the review, and the response to comments.	Use a formal process such as “The Science Consistency Review” Guldin, et al. 2003.
Storage of documentation	With the supporting documents	With the supporting documents	In the plan set of documents	In the plan set of documents

¹ U.S. Department of Agriculture, Forest Service. 2003. The Science Consistency Review: A Tool to Evaluate the Use of Scientific Information in Land Management Decision Making. FS-772. Washington DC: U.S. Department of Agriculture, Forest Service. 32 p.

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41.21 - Exhibit 02

Factors for Responsible Official to Consider for Level of Review

Factors	Lower Level of Review	Higher Level of Review
State of the Knowledge	Well-developed routine analysis Professionally recognized science findings.	Emerging science and technology Inconsistent findings and interpretations
Data Availability	Well-developed data Well-accepted techniques	Data gaps Highly insufficient data or collection techniques
Controversy	Generally accepted	Highly disputed
Risk (FSM 1921.83)	Risk to elements of sustainability is low	Risk to elements of sustainability is high.
Spatial and Temporal Scales of the Issue	Localized site conditions Desired conditions and plan objectives will be achieved before the next revision.	Broad geographic ranges Transcends organizational boundaries Desired conditions and plan objectives will require decades to achieve

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41.21 - Exhibit 03

Potential Benefits of Review

Step	Application of Science
Evaluations of resource condition and trends	Assess the adequacy and accuracy of the information on condition and trends for the resources of interest.
Define the need for change in the plan	Assess the achievability of the existing desired condition and objectives and the appropriateness of the guidelines.
Develop desired condition	Assess the sustainability of the proposed desired condition.
Develop plan objectives	Assess the proposed objectives for credibility, clarity, measurability, and achievability.
Develop guidelines	Assess the feasibility of the guidelines to assist in achieving the desired condition and objectives.
Determine suitability	Assess the accuracy of the suitability determinations.
Determine special management areas	Assess the sustainability of the special management areas.
Monitoring and evaluation	Assess the appropriateness of monitoring questions, protocols, and evaluation techniques.

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41.22 - Review Strategy

The Responsible Official may decide on, and implement, the level of review that is appropriate at each phase of the planning process. The initiator of a review should establish the scope, timing, and process of the reviews. The Responsible Official may establish a review strategy for the entire planning process and schedule various levels of review for specific issues and at various points in the planning process. Level 4 reviews may be rare.

It is not implied that the review should be conducted at each step of the planning process. In determining when to conduct a review, the Responsible Official should consider the factors in section 41.21, Exhibit 02.

In initiating a review, the Responsible Official should define the scope of the review, the relevant issues, and the parts of the draft document that should be reviewed.

Science information may be applied in many seemingly independent activities while amending or revising a plan. Planning issues provide a convenient and consistent context to review the consideration and application of science information. Examples of issues for which a science review may be conducted are:

1. Ecological sustainability: ecosystem and/or species diversity
2. Contributions to economic sustainability
3. Contributions to social sustainability
4. Vegetation management
5. Adaptive management (evaluation, administrative response, and monitoring)

In conducting the review, the Responsible Official should provide the reviewers with specific questions. Examples of appropriate questions are:

1. Is the correct scientific information taken into account?
 - a. 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 views?
 - b. Are sources of information referenced and synthesized adequately?
 - c. Is the documentation of how the scientific information was taken into account objective, useful, relevant, and with integrity?

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2. Is the scientific information reasonably interpreted and applied and accurately presented?
 - a. Are the inferences drawn from the science information sound?
 - b. Are the assumptions concerning specific fundamental points clearly identified?
 - c. For areas of controversy, are scientific disagreements on the issues discussed? Are differing or opposing views selectively used or fairly presented?
 - d. Are the citations accurate, credible, and appropriately used?
 - e. Is the consideration of theory appropriate and supported by facts? Are fundamental points in the scientific information based on appropriate ecological, economic, or social theory?
 - f. Are the weights given to varied sources of information clear and appropriate?
3. Are the uncertainties associated with the relevant scientific information acknowledged and documented?
 - a. Is uncertainty in the scientific information acknowledged, adequately disclosed, and appropriately described?
 - b. Is the uncertainty from different sources of information reported clearly?
 - c. Is the reliability of the information acknowledged and documented?
 - d. Are there gaps in scientific knowledge recognized and documented?
4. Are the relevant management implications noted, evaluated, and documented (including associated risks and uncertainties)?
 - a. Has scientific information been taken into account to identify and assess the likelihood that the desired conditions and objectives will contribute to sustainability?
 - b. Are unplanned disturbances, that may cause a departure from desired condition, identified appropriately?
 - c. Is the science appropriately applied in evaluating the consequences of not meeting plan desired conditions or objectives?
 - d. Is the substantial risk associated with plan components disclosed?

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41.23 - Reviewers

The initiator may identify the individuals to conduct the review, as long as they meet the qualifications shown in exhibit 01. In all levels of review, reviewers must possess three attributes:

1. Expertise,
2. Credibility, and
3. Independence from the planning process.

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. Reviewers must be independent from developing or implementing the plan (for instance, the reviewer cannot be an employee of the unit for which the plan is being developed). Reviewers may be internal or external to the federal government.