Viability Procedures for Use in Forest Plan Revision

Operational Draft: This document is prepared to provide guidance to forest plan revision teams. As this guidance is implemented we expect to learn improved ways to do this work. As we learn, this document will be updated. This document was reviewed and revised as appropriate in April 2010 to conform with the requirements of the 1982 Planning Rule Provisions.

Sources

National Forest Management Act of 1976 (NFMA)
1982 NFMA Implementing Regulations
Holthausen, R.S. White paper on managing for population viability. Draft. July, 2003.

Definitions

NFMA: Plans developed in accordance with this section shall…provide for diversity of plant and animal communities **based on the suitability and capability of the specific land area in order to meet overall multiple use objectives…**

1982 NFMA Implementing Regulations

Sec. 219.19 Fish and wildlife resource. Fish and wildlife habitat shall be managed to maintain viable populations of existing native and desired non-native vertebrate species in the planning area. For planning purposes, **a viable population shall be regarded as one which has the estimated numbers and distribution of reproductive individuals to insure its continued existence is well distributed in the planning area. In order to insure that viable populations will be maintained, habitat must be provided to support, at least, a minimum number of reproductive individuals and that habitat must be well distributed so that those individuals can interact with others in the planning area**.

Sec. 219.26 Diversity. Forest planning shall provide for diversity of plant and animal communities and tree species **consistent with the overall multiple-use objectives of the planning area. Such diversity shall be considered throughout the planning process**. Inventories shall include quantitative data making possible the evaluation of diversity in terms of its prior and present condition.

Background

NFMA and the 1982 implementing regulations require:

- That viability be specific to the forest (e.g., the planning area);
- That the forest plan maintains a number of individuals of a species to insure its continued existence is well distributed in the plan area.
- That viable populations be maintained by providing for well distributed habitat within the planning area;
- That viability will be provided for in a manner consistent with the suitability and capability of the planning area as well as with multiple use objectives.

Note that the provisions to provide for well distributed populations and habitats means that formal viability methods, such as Population Viability Analysis (PVA), are not adequate for meeting the regulatory definition of viability.

So…

What is a well distributed species? It depends on…

- the life history characteristics of the species;
- the historical distribution of the species and its habitat;
- the current distribution of the species and its habitat;
- the potential distribution of the species and its habitat, based both on capability as well as other management objectives.

It is not to be expected or required that well distributed will mean the same thing for all species.

What is an acceptable level of assurance of viability? Consider the following…

P1: Assurance of viability must be compatible with key multiple use objectives.
P2: Assurance of viability must be based on providing well distributed habitat within the planning area.
P3: The degree to which habitat can be provided within the planning area varies by species.
P4: The degree to which a species and its habitat is affected by management varies according to the multiple use objectives.

Therefore, viability varies by species, planning area, and by multiple use objectives.

So there is no single acceptable level of assurance of viability. In fact, viability assurance is dependent upon policy and legal considerations as well as technical considerations. Therefore viability is best expressed as a degree of risk based on the species under consideration and the proposed management activities.

What is an adequate level of analysis? If assurance of viability depends upon the degree of risk, than the degree of analysis required will also depend upon the degree of risk. A species which is very rare within the planning area, or which is disproportionately affected by management activities, would require a greater level of analysis to provide assurance of viability. Conversely, a species that is widespread within the planning area, or which is relatively unaffected by management, would require somewhat less analysis to provide an assurance of viability.

Depending upon the availability of data , the following information should be considered for each species:

1. The trends (both historical to current, as well as projected future) in the quantity, quality, and distribution of habitat;
2. The trends in distribution and abundance of the species;
3. How habitat quantity, quality, and distribution is affected by management activities.

In addition, the habitat and population trends of management indicator species (MIS) should be considered in determining assurance of viability, especially when comparing different management options to achieve multiple use objectives.

Primarily, any analysis should be logical, use currently accepted science, and should address contrary views of respected scientists.

Procedures for Implementing Species Viability Provisions

Successful implementation of the species viability provision of NFMA can be accomplished at the LRMP level through the following process:

1. Description of the ecological context;
2. Identification of species for which there is a viability concern;
3. Collection of information on species for which there is a viability concern;
4. Identification of species groups;
5. Description of conservation approaches;
6. Development of LRMP alternatives;
7. Evaluation of effects on viability of the LRMP alternatives, and
8. Monitoring.

This is not a stand-alone process for addressing viability; the steps have been fully integrated into the overall Forest Planning process as required by the regulations.

Note that steps 1 through 4 were completed in the Assessment of the Management Situation (AMS); steps 5 through 8 are the steps required in Plan Development.

1. Description of the ecological context.

This has already been accomplished as part of the AMS.

Remember that the overall assumption of ecosystem management is that **managing systems within the range of conditions that native species have experienced over evolutionary time is likely to maintain populations of those species.**

Description of the ecological context provides reference, current, and potential distribution of habitat within the planning area. Comparison of the reference and current distribution of habitats can suggest system-based strategies for maintaining appropriate ecological conditions that contribute to viability of species. Management strategies can then be crafted that maintain ecosystem conditions within the expected range of variability that contributes to the maintenance of species viability.

2. Identification of species for which there is a viability concern.

This has already been accomplished as part of the AMS. Note that the evaluation started with all species in the planning area and, through screening for rarity and risks, resulted in a list of species requiring evaluation. More extensive documentation, and increased conservation emphasis, will be necessary for a subset of species that are documented or suspected to be at risk within the LRMP area. **Note that many species, especially plants, are intrinsically rare and, where their populations are demonstrably secure despite their rarity, may not need explicit conservation attention.**

3. Collection of information on species for which there is a viability concern.

This was initially conducted for the AMS, but in reality needs to be continued and refined throughout the planning process. The information to be collected was listed above (page 2). As species conservation risks as a result of management become clearer, the information needed to address these risks will become more apparent. **Uncertainty regarding management approaches increases if this required information is not readily available; both the information available and not available should be disclosed.**

4. Identification of species groups.

In the AMS, we focused on grouping species by Habitat Associations and by Risk Factors. These groupings were not mutually exclusive; a species can be in more than one group. Both of these groupings are useful in addressing viability and are discussed below:

Habitat associations: The concepts of community types, plant association, and seral (or structural) stages provided by plant ecologists form a foundation for grouping terrestrial species by similarity of habitats. Seral/structural stages as well as vegetation types should be used when grouping species by habitat, because the viability of some species may be dependent on a particular stage that is underrepresented or in poor ecological condition.

Grouping by risk factors: Examination of the causes of species endangerment and extinction demonstrates that a limited number of general factors contribute to the majority of species conservation problems. The dominant risk factors or threats to species persistence can be used as an organizing framework to group species for effects analysis.

The categories of risk factors can also be used to organize and propose particular management alternatives that directly alter the perceived threat. **As such, risk factor groupings can provide a framework for the efficient development of effective mitigation measures (i.e., conservation approaches and plan components).**

5. Description of conservation approaches.

Begin with the "coarse filter" approach:

> Focus on providing a characteristic diversity of system states for each major ecosystem feature. Departure of the current condition from the reference condition is important in determining the array of structural and compositional states which should be provided.
>
> At this stage only consider broad management practices that provide for system composition, structure, and function. This will provide consistency for species with similar viability concerns (e.g., habitat is poorly distributed or not as abundant in the current condition as it was in the reference condition).

[Three kinds of species will fall through the coarse filter:

1) Species whose habitat is not well-distributed in the planning area.
2) Species whose habitat is well-distributed in the planning area, but the species does not occupy a substantial proportion of the habitat.
3) Species with little to no habitat association.]

Overall ecosystem management direction likely provides appropriate conditions for maintenance of most of these species and its habitat.

Use the "fine filter" approach for those species whose viability concerns were not addressed, or only partially addressed, by the coarse filter. Species requiring the fine filter will generally fall in to two categories:

species requiring fine-scale habitat components not addressed or described in the broad system descriptions (e.g., cliffs, caves, springs, seeps, breeding sites);

species for which the causes of concern are not related to habitat.

In the first case, species-specific (or species-group specific) direction may be required to insure viability; in the second case, the specific risks will have to be mitigated for each species or risk-grouping.

Both coarse and fine filter conservation approaches should contain a range of options which provide a lesser or greater risk to viability for each species or species group. Providing a range of options is necessary because it is unlikely that any one range of conservation approaches will minimize risk to viability for all species, and also a range of options now will expedite development of plan components for LRMP alternatives later in the process.

[Species at high risk are those where the conservation measures developed have little effect, or those for which effective conservation measures are difficult to generate]

When LRMP alternatives are developed, the conservation approaches should serve as sources of information for forest-wide standards and guidelines and management area direction.

6. Development of LRMP alternatives.

Develop LRMP alternatives based on the broad ecosystem requirements as well as the species-specific requirements. It is suggested that the coarse-filter requirements for each species or species group be described, and then the sets of coarse-filter direction in each LRMP alternative be compared to these requirements. This will allow for a clear assessment of which LRMP alternatives have a higher risk to viability of which species. A similar array of fine-filter requirements against fine-filter LRMP direction can be constructed for the same purpose. This will expedite evaluation of alternatives.

7. Evaluation of effects on viability of the LRMP alternatives.

Both the National Environmental Policy Act (NEPA) and the NFMA require that effects to species viability be disclosed. Guidelines for evaluating species viability for each LRMP alternative are:

Evaluation of effects should be framed as a risk and uncertainty assessment, rather than a simplistic determination of viable/not viable.

The evaluation must include assessment of both short-term and long-term risks. The timeframe over which long-term risks are projected should be determined based on biology of the species (e.g., generation time, response time to changed conditions, recolonization capability), on the time needed for the overall ecosystem to respond to proposed management (e.g., how quickly will a departed system begin trended towards reference condition), as well as on LRMP time frames.

The spatial scale of the evaluation should reflect the scale at which biological populations of the species operate.

In addition to the projected future condition, the analysis should also address the current condition and, where possible, **the reference condition of the species**.

The evaluation must consider both conditions that will be provided on National Forests, and cumulative effects of all land ownerships and of actions outside of National Forests.

The obligation under the NFMA regulations is to provide habitat on National Forests that would allow for the species continued existence, well-distributed in the plan area. The plan area is defined as National Forest lands. Thus, the evaluation must include an assessment of the likelihood that appropriate conditions for the species are to be provided on National Forest lands, even if conditions outside of National Forests place the species at risk and threaten population processes of the species.

For most species, the only practical quantitative analysis is assessment of habitat conditions. It is, however, essential that we make a connection from habitat conditions to population consequences, even if this connection has to be established through general ecological principles due to lack of knowledge of species population processes.

The assessment of conditions that are "well-distributed" must be based on the species natural history and historical distribution, the potential distribution of its habitat, and recognition that habitat and population distribution is likely to be dynamic over time.

Basic requirements for the evaluation are that it be logical, consistent, consider all relevant information, and disclose both risks and levels of uncertainty.

Peer review of evaluations contributes to their rigor and credibility.

The processes of identifying conservation approaches, developing alternatives, and evaluating viability may be iterative. The results of viability evaluations may suggest the need for a refined set of alternatives that would then require additional evaluation. The need for such iteration should be taken into account when timelines for planning are established.

We will most likely rely on two techniques for assessing viability; habitat information and, in some cases, population status and characteristics. Both have certain assumptions and limitations which should remembered and disclosed.

Evaluations based on habitat information:

This method relies on three primary assumptions:

1) that attributes of suitable habitat are known well enough to identify areas that meet the life requisites of the species;

2) that the amount, condition or quality of suitable habitat is correlated with fitness; and

3) that habitat is limiting so that changes in amount of suitable habitat are correlated with changes in population status.

Viability assessments based on habitat inventories and projections are useful to the degree that these assumptions are met, but testing the assumptions may not be possible. Evaluation relying solely on habitat has a major shortcoming: actual populations, including their current status and dynamics, are not explicitly considered. Such an evaluation may be useful to demonstrate broadly that a species status is likely to decline, improve, or remain unchanged. However, habitat evaluation as a stand alone technique should not be relied upon to make critical determinations in high-risk situations.

Population trend based on census and presence/absence data:

Population count data and presence/absence data can be used to estimate population trend over time.

1) The expense of collecting the data and the need to collect data over a period of years to allow the analysis of trends and to estimate variance in vital rates means that these data are rare for all but a few species.

2) Interpretations need to be restricted to both the geographic area and the time period within which the data were collected. Population data can be used to project future population status only if an assumption is made that population trends either remain constant over that future time, or change in some specified way (see habitat evaluations, above).

3) The potential for bias in the estimates of overall rate of population increase must be understood and should be used to temper conclusions drawn from the data.

Estimates of trend based on census and presence/absence data may be very useful measures of the relative health of two or more populations and thus provide useful information for making decisions concerning those populations.

Determinations that integrate the results from multiple techniques are generally more robust than those dependent on a single technique.

8. Monitoring

The primary purpose of monitoring species-at-risk and their habitats is to determine whether management actions need to be modified. The establishment of monitoring objectives for species-at-risk must take into account the state of current knowledge about the species, its rarity, detectability, level of risk, the strength of association between habitat conditions and population dynamics, and the expected lag time between disturbances and biological responses.

The following are monitoring objectives related to whether management actions need to be modified to meet species viability needs:

1) Determine whether the status of selected species is in keeping with plan direction (for very rare or poorly distributed species, species without habitat associations, or for Federally listed species for which population monitoring is specified in the recovery plan, or for which population monitoring is considered important).

2) Determine whether ecological conditions for selected species are consistent with plan direction (for species whose population dynamics are believed to be responsive to changes in ecological conditions).

3) Determine whether there are unexpected changes in habitats or populations for species that were not identified to be of concern during the planning process (to address whether all species that ought to have been considered in the planning process were identified).

4) Investigate assumptions made about effects of management on ecological conditions for species for which there is a viability concern (for species with clear habitat associations, but uncertainty regarding the effects of management).

5) Investigate assumptions about the effects of management on species populations (for species where the link between management action and species status is uncertain).

It may not be necessary to monitor a host of habitat attributes or population parameters. Much can be gained by monitoring one or two carefully chosen indicators that are fairly easy to measure or observe, particularly if these indicators are responsive to changes in stressors that are monitored over the same period of time.

Documenting Viability

Information on species and viability should appear in the following sections of the LRMP:

1. Analysis of the Management Situation (AMS). This should provide an explanation of how species considered for analysis in the planning process were determined, provides the ecological context for viability analysis, and should discuss basic habitat relationships, species status, threats to viability, relationship of species to ecosystem processes, and methods that were used to group species.

2. Goals and Objectives. Maintaining species viability should be stated as a Forest Goal and also incorporated into the broader goals of ecosystem diversity and ecological sustainability. Objective statements should be based on identified conservation approaches and other species information.

3. Forest-wide Standards and Guidelines. Standards and guidelines provide specific language for providing appropriate ecological conditions for species analyzed in the planning process.

4. Plan Alternatives. Maintaining species viability must be a goal of every LRMP alternative. However, not every alternative will achieve the goal of viability with the same level of certainty. Alternatives will differ in the likelihood of maintaining viable populations, and the risks of species extirpations. Alternatives may differ in both the overall ecosystem management direction that is applied, and additional direction that is incorporated to provide for species needs.

5. Management Area Direction. Provisions for species viability should be included in the direction for specific management allocations.

6. EIS: Affected Environment. The full list of species considered should be included in the Affected Environment chapter of the EIS. The chapter should highlight some of the same features as the Analysis of the Management Situation, discussed above.

7. EIS: Effects and Consequences. This section contains the evaluations of species viability. Effects specific to National Forests, and cumulative effects, must both be disclosed. Effects should be projected over an appropriately long period of time, address a meaningful portion of the species range, and be framed as a risk assessment rather than a simple determination of viable/not viable.

8. Monitoring Plan. The monitoring section of the LRMP should display how species viability will be monitored, and feedback processes that will be used to improve management based on monitoring results.