

## Pacific SW Region Natural Range of Variation Assessments for Forest Planning

### A summary of the process and the products

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According to the Forest Service 2012 Planning Rule (36 CFR 219):

*“Assessments rapidly evaluate existing information about relevant ecological, economic, and social conditions, trends, and sustainability and their relationship to the land management plan within the context of the broader landscape. The responsible official shall consider and evaluate existing and possible future conditions and trends of the plan area, and assess the sustainability of social, economic, and ecological systems within the plan area, in the context of the broader landscape.”*

The Planning Rule identifies 15 topic areas that must be addressed in the assessment.

### Terrestrial ecosystems and system drivers

See Proposed FSH 1909.12 Chapter 10, Section 12.11 which requires that “the responsible official should identify and evaluate the ecological integrity of terrestrial and aquatic ecosystems within the plan area.”

#### Steps include:

1. Identify relevant ecosystems to be evaluated and the appropriate scale for the assessment
2. Rapidly evaluate available information about those ecosystems, including composition, structure, and function, by:
  - A. Selecting key ecosystem characteristics for the evaluated ecosystems that will permit evaluation of ecological integrity (sustainability)
  - B. Describe the Natural Range of Variation (NRV) for key ecosystem characteristics, when such information is readily available
  - C. (describes an alternative to NRV assessment)
  - D. Describe current condition and trends of the key ecosystem characteristics
3. Identify and evaluate system drivers and stressors
4. Describe the projected future status of ecosystem integrity, using the key ecosystem characteristics, by:
  - A. Describing the status of the key ecosystem characteristics by comparing NRV to current conditions, or
  - B. (describes alternative where NRV assessment is not available)

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5. Identify status of key ecosystem characteristics and determine whether that are “functioning in a way that contributes to ecosystem integrity and sustainability.”

### Natural Range of Variation (NRV) assessments

Carried out by Pacific SW Region Ecology Program. Each ecologist assigned one or two chapters. Work began October, chapters are more or less finished, will be further refined over the next few months. Summary information and draft chapter have been turned in to the Planning Assessment Team.

#### Details:

1. Identify ecosystems to be addressed
  - A. NRV assessments are focused on terrestrial ecosystems
  - B. We used Barbour and Billings (2000) Sugihara et al. (2006), Barbour et al. (2007), MCV, Van de Water and Safford (2011), and California WHR classification, and then requested input from about 25 academic, NGO, and agency experts. Ecosystems had to be able to be mapped, relatively well-studied, common in some form to all of the sources above, and represented through much of the bioregional assessment area. Settled on:
    - i. Forest types
      - a. Yellow pine
      - b. Mixed conifer
      - c. Red fir
      - d. Subalpine
      - e. Pinyon-juniper
      - f. Hardwoods
        - Oak-dominated forests
        - Aspen
    - ii. Shrub types
      - a. Chaparral
      - b. Sagebrush
    - iii. Herbaceous types
      - a. Montane meadows
    - ii. Combined types
      - a. Riparian vegetation
2. Determine appropriate scale
  - A. Spatial: SNEP/SNFPA boundary
    - i. NRV reference data used from outside of area when necessary and reasonable

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- B. Temporal: Holocene (12,000 ybp to today), with period 1500-1850 set as principal historical reference period (this is the HRV standard)
  - i. FSH 1902.12 guidance: should be before widespread Euro American influence
3. Determine key ecosystem characteristics (= ecological indicators)
  - A. Guidance from FSH 1902.12 Chapter 10
    - i. “Key ecosystem characteristics include the dominant ecological characteristics that describe the composition, structure, function, and connectivity of terrestrial, aquatic, and riparian ecosystems that are relevant to addressing important concerns about the land management plan. Key ecosystem characteristics are identified, selected, and evaluated during the assessment phase, brought forward to inform the development of plan components, and may be useful for monitoring progress towards maintaining or restoring ecological integrity. Key ecosystem characteristics may be added or modified during the planning phase.”
    - ii. Need to be characteristics that can be measured, are meaningful, and for which we have data both now and in the past, as well as in contemporary reference ecosystems. Also should be something which will respond to Forest Service management, or “indicates something about the limits to Forest Service authority or the inherent capability of the land.”
    - iii. Some examples provided in FSH 1902.12 Chapter 10 (12.14 exhibit 01)
    - iv. Key ecosystem characteristics include ecological processes (“drivers and stressors”)
  - B. Generated list of ecological indicators (= key ecosystem characteristics)
    - i. Ecological indicators: “measurable characteristics of the structure (e.g., genetic, population, habitat, and landscape pattern), composition (e.g., genes, species, populations, communities, and landscape types), or function (e.g., genetic, demographic/life history, ecosystem, and landscape disturbance processes) of ecological systems.” (Niemi and McDonald. 2004. ARES 35: 89-111)
    - ii. See spreadsheet. Based on hierarchy of:
      - a. Ecosystem attribute
        - Composition
        - Structure
        - Function
      - b. Ecological hierarchy
        - Population/species

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- Community/ecosystem
  - Landscape/region
  - c. Indicator group (examples)
    - Species diversity
    - Physiognomy
    - Productivity
    - Biogeography
    - Nutrient cycling
    - Patchiness
    - Connectivity
    - Disturbance
      - Fire, grazing, logging, wind, floods, etc.
  - d. Indicators
  - e. Variables
  - f. Units
4. NRV assessments
- A. 11 Chapters, Introductory chapter to be written
  - B. NRV is based on historical and contemporary reference systems. Direct data when available, inference where necessary and justifiable
  - C. Includes comparisons to current conditions and summary of literature re. possible future trends
  - D. Used Rocky Mtn Region HRV assessments from early 2000s as rough templates (show examples)
  - E. Outline (show example)
    - i. Introduction
    - ii. Methods
    - iii. NRV descriptions
      - a. Function
      - b. Structure
      - c. Composition
    - iv. Summary of NRV deviations
    - v. Literature cited
    - vi. Tables and figures
  - F. Timeline
    - i. Dec 14: Preliminary bibliography assembled
    - ii. Feb 11: Final drafts due for internal review
    - iii. Feb 15: Internal reviews due
    - iv. Feb 25: Delivery of draft chapters to Planning staff

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Forest Plan Revision

- v. Mar 11: Final revised drafts due for external review
  - vi. Apr 1: External reviews due
  - vii. Week of Apr 8: Final NRV summaries due
5. Assessment of ecological integrity
- A. Compare NRV to current conditions and trends
  - B. Consider possible future conditions and trends

Work began in October, 2012. NRV assessments have been subject to internal and external review. They are 30-50+ pages for each chapter. Focus is on peer reviewed publications, including papers in press or soon to be in press; government publications; Forest Service and other federal and state agency data; and in some cases academic theses or dissertations. Because information on the historical state of some ecosystems and ecological processes and patterns is scarce, in some cases we also refer to published anecdotal information from the mid-19<sup>th</sup> to early 20<sup>th</sup> centuries. We do not refer to anecdotal information from more recent times.