

**FINAL REPORT
LANDSCAPE ANALYSIS**

**CHAPTER 2:
ISSUES AND KEY QUESTIONS**

Prepared for:

**USDA FOREST SERVICE
SPRING MOUNTAINS NATIONAL RECREATION AREA
HUMBOLDT-TOIYABE NATIONAL FOREST**
Contract No. AG-9360-C-06-0003

Prepared by:

ENTRIX, INC.
Las Vegas, NV

Project No. 3138801

August 2008

**FINAL REPORT
LANDSCAPE ANALYSIS
CHAPTER 2: ISSUES AND KEY QUESTIONS**

Prepared for:

**USDA FOREST SERVICE
SPRING MOUNTAINS NATIONAL RECREATION AREA
HUMBOLDT-TOIYABE NATIONAL FOREST**
4701 North Torrey Pines Drive
Las Vegas, Nevada 89130

Prepared by:

ENTRIX, INC.
8010 W. Sahara Avenue, Suite 110
Las Vegas, Nevada 89117
702-413-1020

Project No. 3138801

August 2008

	PAGE
1.0 INTRODUCTION.....	1
2.0 FOREST SERVICE ISSUES AND KEY QUESTIONS IDENTIFICATION PROCESS.....	1
2.1 Documentation.....	2
2.2 Forest Service Proposed Issues and Key Questions.....	2
2.2.1 <i>Core Topic: Species and Habitat Protection/Maintaining Species Viability.....</i>	<i>3</i>
<i>Proposed Issue.....</i>	<i>3</i>
<i>Proposed Key Questions.....</i>	<i>4</i>
2.2.2 <i>Core Topic: Recreation and Human Use.....</i>	<i>4</i>
<i>Proposed Issue.....</i>	<i>4</i>
<i>Proposed Key Questions.....</i>	<i>4</i>
3.0 ENTRIX VERIFICATION OF ISSUES AND KEY QUESTIONS.....	4
3.1 Review of Principal Landscape and Management Concerns.....	4
3.2 Meeting with Forest Service.....	5
3.3 Verification Process.....	5
3.4 ENTRIX Modification of Key Issues and Questions.....	6
3.4.1 <i>Biological Issue and Key Questions Revision.....</i>	<i>6</i>
3.4.2 <i>Human Use Issue and Key Questions Revision.....</i>	<i>6</i>
4.0 FINAL ISSUE AND KEY QUESTIONS.....	7
4.1 Core Topic: Species and Habitat Protection/Maintaining Species Viability.....	7
4.1.1 <i>Issue.....</i>	<i>7</i>
4.1.2 <i>Key Questions.....</i>	<i>7</i>
4.2 Core Topic: Recreation and Human Use.....	8
4.2.1 <i>Issue.....</i>	<i>8</i>
4.2.2 <i>Key Questions.....</i>	<i>8</i>

APPENDICES

Appendix A	Forest Service Information Needs Assessment Process
------------	---

ACRONYMS AND ABBREVIATIONS

EAWS	Ecosystem Analysis at the Watershed Scale
Forest Service	U.S.D.A. Forest Service
GIS	Geographic Information Systems
INA	Information Needs Assessment
MSHCP	Multiple Species Habitat Conservation Plan
NRA	National Recreation Area
RFP	Request for Proposal
TEUI	Terrestrial Ecological Unit Inventory

1.0 INTRODUCTION

The second step in the process for conducting a landscape analysis is to identify issues and key questions to focus or drive the analysis on essential issues. The purpose of this step is to:

- Focus the analysis on the key elements of the ecosystem that are most relevant to the management questions, human values, or resource conditions within the Spring Mountains National Recreation Area (Spring Mountains NRA).
- Determine which core questions are applicable, establish the level of detail needed to address applicable core questions, and document rationale for determining that a core question is not applicable.
- Identify additional relevant topics and questions based on issues in the Spring Mountains NRA.
- Formulate key analysis questions for the Spring Mountains NRA based on indicators commonly used to measure or interpret the key ecosystem elements.

The goals of the analysis are to:

- Identify opportunities for providing recreation management and development while also providing for long-term species protection on the Spring Mountains NRA.
- Document the effectiveness of U.S.D.A. Forest Service management strategies in meeting the goals for species of concern and identify changes in the management direction where needed.

This chapter identifies the **issues** and **key questions** that will focus the landscape analysis on the elements of the landscape that are most relevant to the resource conditions and management questions on the Spring Mountains NRA. The **issues** are the factors that triggered the analysis. The **key questions** focus the scope of the analysis.

The process and rationale utilized to determine the issues and key questions for the analysis are documented within this chapter. First, the process utilized by the U.S.D.A. Forest Service (Forest Service) in creating an initial proposed set of issues and key questions is described. This is followed by a description of the process utilized by ENTRIX to modify and then verify the final set of issues and key questions. The chapter concludes by identifying the landscape elements critical to addressing the key questions.

2.0 FOREST SERVICE ISSUES AND KEY QUESTIONS IDENTIFICATION PROCESS

While a guiding document for a landscape analysis is the Ecosystem Analysis at the Watershed Scale: Federal Guide for Watershed Analysis (EAWS), the Forest Service identification of issues and key questions evolved out of an internally developed process called the Information Needs Assessment (INA). The INA process was developed by a Spring Mountains NRA Geographic Information Systems (GIS) analyst to identify data needs for a Spring Mountains NRA landscape analysis. It soon became apparent that the INA process that the Forest Service was utilizing to identify data needs was analogous to the process outlined in EAWS to identify issues and key questions. The INA process included the development of issues and key

questions, prioritization, and determination of proposed issues and key questions. Detailed information on the process is given in Appendix A. The overriding questions, along with the results, outcomes, and group members are included in the Landscape Analysis Overriding Questions Table also presented in Appendix A.

The overriding questions were discussed and narrowed to the final Forest Service proposed issues and key questions that were presented in the Request for Proposal (RFP) - AG-9360-S-05-0030 Landscape Analysis on the Spring Mountains National Recreation Area, Humboldt-Toiyabe National Forest (see Section 2.3).

Throughout the INA process, ten white papers were produced. These papers covered a variety of topics, including the data needs, content areas, core topics, and specific questions. The white papers are summarized in Appendix A.

2.1 DOCUMENTATION

The INA process was documented in a table including all of the original 150 draft questions. These questions were organized into a table that included the following information:

- Content area
- Associated overriding question
- Votes received
- Re-worded question
- Whether the question was dropped
- Data needed to answer the question
- Existing data
- Data gap information

This table is presented in Appendix A.

2.2 FOREST SERVICE PROPOSED ISSUES AND KEY QUESTIONS

After adopting the EAWS process in early 2005, the Forest Service began developing the proposed issues and key questions out of the INA overriding questions. The EAWS process recommends the following four steps to identifying issues and key questions:

- **Step 1:** Identification of issues in the Spring Mountains NRA;
- **Step 2:** Prioritization of issues to identify the most important or relevant for anticipated management activities within the Spring Mountains NRA;
- **Step 3:** Identification of indicators most likely to reveal conditions of the core topics; and

- **Step 4:** Formulation of key questions about specific processes or conditions based on the issues and indicators.

Once a list of issues is compiled, a preliminary assessment of priorities can be done. For example, designating each issue as high, moderate, or low priority enables evaluation of the necessity and probability for resolving each issue in the Landscape Analysis. In setting priorities for the issues and key questions, the Forest Service considered:

- Reasons for doing this Landscape Analysis (triggering events)
- Presence of critical populations
- Presence of threatened and endangered species
- Anticipation of land management decisions or projects
- Resolution process for issues deferred from prior planning efforts
- Ranking the urgency for resolution
- Documenting criteria used to prioritize the issues
- Reevaluating priorities for addressing an issue during the analysis as more information becomes available

In order to formulate key questions for the Landscape Analysis, the following steps were taken:

- Indicators most useful in measuring or interpreting conditions of the core analysis topics were identified
- Based on the indicators, key questions were developed, recognizing that each issue may have several key questions
- A series of questions were developed that became progressively more refined

Key questions were designed that 1) addressed the issues, 2) focused on ecosystem elements that influence and are influenced by potential management actions, and that can be measured at the landscape scale, 3) promoted synthesis among the core topics, and 4) are expected to be addressed by the analysis.

2.2.1 Core Topic: Species and Habitat Protection/Maintaining Species Viability

The results of the INA and EAWS processes determined two core topics: *species and habitat protection/viability* and *recreation and human uses*. Each of these core topics has an associated issue and several key questions. The initial set of issues and key questions proposed by the Forest Service are outlined below.

Proposed Issue

Under natural conditions, plant and animal species have a high degree of resiliency and can maintain viability; however, management activities and human uses on the Spring Mountains NRA may be affecting habitat and species viability.

Proposed Key Questions

1. How does recreation affect key species and habitats? Which types and locations of recreation activities are having more substantial effects on species and habitats?
2. How have historical fire patterns and current fire management affected key species and habitats?
3. How is development affecting key species and habitats? Which types and locations of development are having a more substantial effect on species and habitats?
4. How are non-native species affecting key species and habitats? Which are having more substantial effects on species and habitats?
5. How have natural and human modification of hydrologic and stream channel systems affected key species and habitats?

2.2.2 Core Topic: Recreation and Human Use

Proposed Issue

The different type of human uses and the typical forest visitors have changed dramatically over the past 10 years and will continue to change, making it difficult for the Forest Service to balance uses with each other and with species viability.

Proposed Key Questions

1. What are the projected trends in recreation and other human uses?
2. What management strategies and infrastructure can better balance and accommodate diverse recreational demands while still protecting Spring Mountains NRA resources?
3. What are the recreation management strategies that can respond to those recreation demands in light of the capabilities and limits of the resources?
4. How does current agency management direction affect the availability and diversity of recreation opportunities? (Including the role of the Clark County Multiple Species Habitat Conservation Plan and Spring Mountains National Recreation Area Conservation Agreement that mandate mitigation on National Forest System Lands from Las Vegas Valley development.)

3.0 ENTRIX VERIFICATION OF ISSUES AND KEY QUESTIONS

3.1 REVIEW OF PRINCIPAL LANDSCAPE AND MANAGEMENT CONCERNS

As the purpose of the key issues and questions is to focus the analysis on the key elements of the ecosystem most relevant to the management questions and objectives, ENTRIX reviewed the Forest Service proposed issues and key questions in light of the key landscape elements and management concerns of the Spring Mountains NRA summarized in Chapter 1, Characterization. As described in Chapter 1, many of the key elements of the Spring Mountains NRA are shaped by the area's topographic relief and high elevations, which create a "sky island" of montane habitats isolated by the surrounding desert valley floors.

The swift elevation change in the Spring Mountains NRA results in a wide variation in precipitation and temperature patterns, creating micro-ecosystems that support a diverse array of plant and animal life. Many of these plants and animals are species found only in the Spring Mountains. These endemic species typically occur in isolated and/or small habitat areas, making species viability vulnerable to both human activities and natural stochastic events, such as fire and insect infestations. A primary management concern on the Spring Mountains NRA is protecting the viability of the numerous special status species.

The proximity of the Spring Mountains NRA to the rapidly expanding Las Vegas metropolitan area is another primary landscape element related to several Forest Service management concerns. As the Las Vegas population increases and becomes more diverse, more Las Vegas residents and area visitors are drawn to recreate in the high altitudes of the Spring Mountains NRA, which provides a cooler climate and attractive outdoor setting for many recreational opportunities. The expansion of the Las Vegas urban area is also resulting in greater proximity of local residents as urban growth encroaches on the Spring Mountains NRA boundaries. The increasing and changing nature of human pressure on the Spring Mountains NRA is resulting in greater demands on the transportation and recreation infrastructure, and is also potentially impacting the viability of species and habitats. A primary management concern for the Spring Mountains NRA is accommodating human use demands while still protecting biodiversity and species viability.

3.2 MEETING WITH FOREST SERVICE

ENTRIX and the Forest Service met on March 21, 2006, to discuss the proposed set of issues and key questions formulated by the Forest Service and presented in the RFP. The discussion focused on the purpose and the management concerns behind each issue and key question. This process revealed that there were a few points relevant to the Forest Service management questions and objectives that were not adequately covered by this set of issues and key questions. The discussion also revealed that several points were not appropriately emphasized.

Regarding the biological issue and key questions, the discussion identified the need to address the cumulative effects of different types of impacts, the role of natural processes in ecosystem health, and the relative impacts of actions managed by the Forest Service versus actions not managed by the Forest Service. Regarding the human use issue and key questions, the discussion revealed a need to address recreation demand and the ability of the Spring Mountains NRA to accommodate this demand. Another identified research priority was the linkage between management and recreation demands, opportunities, and impacts.

3.3 VERIFICATION PROCESS

Following the March 21, 2006, meeting with the Forest Service, ENTRIX revised the human use issue and both the biological and human use key questions, to ensure that the Forest Service management questions and objectives would be addressed in the landscape analysis. ENTRIX utilized a three-step process to revise and verify the issues and key questions. In each step of the process, ENTRIX verified that each primary management concern was encompassed in one of the key questions and would thus be included in the analysis. In this three-step process ENTRIX considered:

1. Management objectives and questions expressed by the Forest Service during the INA process (see Section 2) and also at the March 21, 2006, meeting (see Section 3.2). The priority-level of the management questions was also noted during this process.

2. Primary landscape and management concerns identified in the characterization process and outlined in Section 3.1.
3. Prominent site-specific elements of the Spring Mountains NRA, including high-use recreation sites and facilities (e.g., the ski resort) and specific ecological niches (e.g., springs that provide habitat for endemic species). (Although the analysis is at the landscape level and is focused on landscape elements, the questions were reviewed to ensure that they were sufficiently broad to be applicable to site-specific elements.)

The questions were thus modified to incorporate the primary management objectives and questions as well as the key landscape elements.

3.4 ENTRIX MODIFICATION OF KEY ISSUES AND QUESTIONS

3.4.1 Biological Issue and Key Questions Revision

The proposed biological issue was not modified, but several key questions were revised and one question was added. The biological questions were revised to ensure the factors that most affect forest health were addressed. For example, forest diseases and insect infestations were not included in the initial set of questions but were incorporated into the final set. Additionally, two of the questions were revised to clarify whether the actions and processes addressed are managed by the Forest Service. In addition, the question regarding modifications to hydrologic systems was re-worded to clarify the intent of the question.

During the March 21, 2006, meeting, the topic of combined, or cumulative, effects of human activities and natural processes was discussed. The characterization process in Chapter 1 revealed several potential activities or actions that may threaten species viability on the Spring Mountains. Therefore, an additional biological question was added in order to incorporate the combined, or cumulative, effect of activities and natural processes occurring on the Spring Mountains NRA into the analysis. The cumulative effect of activities and processes affecting a species are as important to understand as studying the effect of each individually; which, when considered alone, may not indicate the true nature or magnitude of threats to species viability. Additionally, the effects of multiple actions or processes may be synergistic; the effect on a species of one activity or process may be different in the presence of another. The addition of cumulative effects to the analysis will lead to a broader understanding of the degree to which Forest Service management can protect species viability and ecosystem health.

3.4.2 Human Use Issue and Key Questions Revision

The proposed human use issue was modified, as were all human use key questions. The population in the Las Vegas vicinity is growing rapidly, resulting in increased visitation to the Spring Mountains NRA. To capture this essential landscape element, the human use issue was modified to include the role of rising recreation demand in challenging the Forest Service's ability to meet management objectives. The human use issue was also modified to explicitly incorporate the management objective of providing recreational opportunities.

During the March 21, 2006, meeting with the Forest Service, the discussion on the human use questions frequently focused on the linkage between management and recreation demands, opportunities, and impacts. Several of the proposed key questions were combined into one question in order to focus the analysis on how current management strategies influence and accommodate recreation. To best accommodate recreational pressure, it is necessary to gain

an understanding of how management influences the capacity of different facilities to meet recreation demand as well as the compatibility of different types of recreational activities. Additionally, management strategies can influence recreational demand, both in terms of visitor numbers and recreational activities pursued. Recreational facilities and management strategies may also influence the impacts of recreation on the natural resources of the Spring Mountains NRA. A better understanding of how management strategies or infrastructure can reduce recreation impacts can lead to improvements not only in the condition of biological resources but also in the capacity of the Spring Mountains NRA to accommodate recreational pressure.

An additional human use question was included to specifically focus the analysis on recreation management actions that are required to protect species viability. Although the provision of recreational opportunities is a management objective, the protection of species viability is required by several management documents, including the National Forest Management Act, the Forest Service Manual, the Humboldt-Toiyabe General Management Plan, and the Spring Mountains National Recreation Area Conservation Agreement. To meet this management requirement, it may be necessary to modify recreation management strategies and actions.

4.0 FINAL ISSUE AND KEY QUESTIONS

Once the questions had been modified by ENTRIX, they were reviewed and discussed with Forest Service personnel prior to finalization. The final issues and key questions are presented below.

4.1 CORE TOPIC: SPECIES AND HABITAT PROTECTION/MAINTAINING SPECIES VIABILITY

4.1.1 Issue

Under natural conditions, plant and animal species have a high degree of resiliency and can maintain viability; however, management activities and human uses on the Spring Mountains NRA may be affecting habitat and species viability.

4.1.2 Key Questions

1. How do recreation activities affect key species and habitats? Which types and locations of recreation activities are having more substantial effects on species and habitats?
2. How does current fire management affect key species and habitats compared to historical fire patterns?
3. How is development affecting key species and habitats? Which types and locations of development are having a more substantial effect on species and habitats?
4. How are non-native species affecting key species and habitats? Which are having more substantial effects on species and habitats?
5. How have natural and human modification of hydrologic and stream channel systems affected key species and habitats?

4.2 CORE TOPIC: RECREATION AND HUMAN USE

4.2.1 Issue

The rapidly expanding visitor use and the changing nature of recreational activities on the Spring Mountains NRA challenge the Forest Service to provide for recreation opportunities and species viability.

4.2.2 Key Questions

1. How does current agency management direction from NRA enabling legislation, GMP, the Clark County MSHP and CA affect the availability and diversity of recreation opportunities on the Spring Mountains NRA?
2. In light of current and future recreational demands and use patterns on the Spring Mountains NRA, what potential recreation strategies would be most effective in providing for recreation opportunities while maintaining species viability?

APPENDIX A

FOREST SERVICE: INFORMATION NEEDS ASSESSMENT PROCESS

FOREST SERVICE INFORMATION NEEDS ASSESSMENT PROCESS

The Forest Service began conducting the INA by brainstorming for issues and questions that a landscape analysis of the Spring Mountains NRA could address. The INA included determining if the necessary Spring Mountains NRA data was available to conduct the landscape analysis.

The Forest Service developed the INA process, which involved three steps. The first step was to describe the purpose of the Spring Mountains NRA landscape analysis. This step was documented in the *Draft Project Task Plates*. The following five content areas were developed to organize the INA:

- Biological/Physical
- Cultural/Ethnographic
- Recreation/Social Use
- Facilities Needs
- Transportation

According to this document, the overall purposes for the five content areas of the INA were to:

- Describe and characterize the bio-physical conditions of the landscape
- Identify the locations of native place names and identify the cultural significance of the areas
- Describe the current and desired recreational and social uses of the Spring Mountains NRA
- Describe and inventory existing public and administrative facility use
- Inventory and assess access opportunities

The next step in the INA process was to ask specific questions that, when answered, would allow the Forest Service to describe/identify/inventory/assess each of the content areas. For example, to describe the social uses of the Spring Mountains NRA the Forest Service INA team might have asked, "What are the current, future, and potential visitor demographics?" or "What activities do visitors to the Spring Mountains want to do and where?" Two workgroups within the Forest Service were assembled to identify issues and determine which core questions were applicable to a landscape analysis of the Spring Mountains NRA. These two workgroups were the Natural Sciences group and Social Sciences group, who focused the analysis on key elements of the ecosystem and formulated key questions for the analysis.

The last step of the INA process conducted by the Forest Service was to gather and display data that would answer each question. For example, to answer the question about visitor activities on the Spring Mountains NRA, the Forest Service INA team would list and map current activities.

Forest Service Information Needs Assessment Meetings

A Forest Service INA meeting was held on March 24, 2004. The Forest Service met to discuss the purpose of the INA and to discuss what the Forest Service wanted the Spring Mountains NRA landscape analysis to answer. The agenda for the meeting consisted of the follow items:

- Agree on a format for the INA.
- Brainstorm questions for the five content areas.
- Identify information needed to answer the questions.
- Identify which data exist and which need to be collected.

The group identified over 150 questions. The questions were grouped into the five content areas previously listed. A content area subgroup was developed to refine the questions.

On April 8, 2004, the Forest Service met to present each content area's refined list of questions, and to discuss data needed to answer each question. The group discussed an approach for focusing the INA by asking the following questions:

- Are the questions appropriate for a landscape analysis of the Spring Mountains NRA to address?
- Are there questions that the landscape analysis cannot address because the data is not available or not available at the right time?
- Does the question help with the scope of work described in the original Clark County Multiple Species Habitat Conservation Plan (MSHCP) proposal?

On May 3, 2004, the Forest Service INA team met to present their revised list of questions, identifying those that should be eliminated due to a lack of data. The Forest Service INA team then discussed the availability of existing data that would be needed to answer the questions and the need to synthesize information for many of the questions, and identified data gaps. Data gaps were primarily related to biological surveys, social surveys, and Terrestrial Ecological Unit Inventory (TEUI) data. The Forest Service INA team identified specific gaps in information related to employee surveys, resident surveys, and vegetation information. Team members were to refine their questions and data needs again by May 14, 2004, asking themselves, "How will addressing these questions help develop management strategies for the Spring Mountains NRA?"

On May 17, 2004, the Forest Service Integration and Strategy group brainstormed to develop overriding questions drawing from the INA questions and other sources. Questions were prioritized based on how answering the questions would contribute to each of four indices of success. The indices of success were defined as follows:

- The landscape analysis will provide guidance for the protection for species of concern and address species viability, biodiversity hotspots, and habitats at risk.
- Integrated assessment of the Spring Mountains NRA will provide direction for management while providing for conservation.

- Biological assessment and synthesized data will provide a basis for cumulative effects analysis.
- Assembled data sets will provide information needed for planning at a variety of levels including landscape and site-specific.

In a meeting on May 24, 2004 the Forest Service Integration and Strategy group met with Forest Service management to discuss overriding questions and to decide on priority questions that would guide the Spring Mountains NRA landscape analysis. At the end of May, the INA questions were matched with the overriding questions, making sure that the data gaps were covered.

RESULTS OF THE INFORMATION NEEDS ASSESSMENT

Overriding Questions

The overriding questions that resulted from the INA are provided below. They are categorized into levels 1, 2, and 3.

- Level 1 is assessment of resource conditions.
- Level 2 is focused on more integrated cause and effect analysis including interrelationship analysis, trends, and the risk of doing nothing.
- Level 3 is recommendations and management opportunities and outcomes.

Level 1 Overriding Questions

1. What is the historical and current range of species and habitats of concern?
2. What are the historical and current physical conditions of the landscape?
3. What are the historical and current vegetation patterns on the Spring Mountains?
4. What are the current conditions in recreation and social use?
5. Who are the users, what are their activities, and where are they going?
6. What are the condition, size, location, and quantity of facilities, and what is the demand for facilities (administrative and visitor facilities)?
7. What has been done for environmental education?
8. What and where are the culturally significant sites?
9. What is the current management direction for the Spring Mountains NRA?

Level 2 Overriding Questions

1. What are the projected trends in recreation and social use?
2. How is management direction (biodiversity hotspots, Conservation Agreement, Clark County MSHCP, Forest Plan, fire strategies) affecting species viability?

3. How do management actions affect watershed health?
4. What human and natural factors are negatively or positively affecting species viability?
5. Why and how are human and natural (disturbance) factors negatively or positively affecting species viability?
6. What and where are the conflicts between species of concern and recreation?
7. How effective has environmental education been in reducing stressors to species of concern?
8. What and where are the potential conflicts between current and recommended management and cultural resources?
9. Do we have the services, facilities, and transportation systems to respond to visitors' needs and experiences?

Level 3 Overriding Questions

1. What conservation measures and management actions do we need to reduce stressors and protect species viability?
2. How can we use adaptive management to respond to changes in social and biological conditions?
3. What things do we need to monitor to evaluate the status of the Spring Mountains NRA?
4. What are the priority projects or opportunities needed to address current conflicts?
5. What is the priority for environmental education projects?
6. Which visitors' demands and experiences does the Spring Mountains NRA have the capacity to meet, and which can't we meet?

The overriding questions were discussed and narrowed to the final Forest Service proposed issues and key questions that were presented in the Request for Proposal (RFP) - AG-9360-S-05-0030 Landscape Analyses on the Spring Mountains National Recreation Area, Humboldt-Toiyabe National Forest (see Section 2.3).

White Papers

Throughout the INA process, ten white papers were produced. These papers covered a variety of topics, including the data needs, content areas, core topics, and specific questions. The white papers are summarized below.

Level 1 Overriding Questions (August 2004). This white paper presented the Level 1 questions. Questions addressed in the white paper for each overriding question include the following:

- What data do we need to answer the question?

- What data do we have or plan to have to answer the question?
- What data are missing?
- What are we going to do about the missing data?

Level 2 Overriding Questions (September 2004). This white paper presented the Level 2 questions. Questions addressed in the white paper for each overriding question include the following:

- What Level 1 questions are answering this Level 2 question?
- Are we missing any Level 1 questions and what are they?
- What did the group decide to do about the missing Level 1 question(s)?

Changes in the Role of Fire on the Landscape and Changes in Vegetative Conditions across the Landscape (May 2005). This white paper addressed the impact of fire and vegetation changes on the Spring Mountains. Historically, fire played a major role in the Spring Mountains. Fire exclusion (suppression) and other factors such as drought and insect damage created a build-up of fuels, changed the vegetation pattern, and changed the role of fire. Forest vegetative conditions have changed since “pre-settlement.”

Core Topic: Species and Habitat Protection/Maintaining Species Viability (April 2005). This white paper discussed key questions and indicators relating to species viability in the Spring Mountains NRA. A primary issue for the Spring Mountains NRA Landscape Assessment is viability of plant and animal species and habitats. The Spring Mountains NRA has a list of 80 special status plant and animal species, 7 MSHCP ecosystem types, 4 niche habitats, and 39 biodiversity hotspots that have the highest priority to the Spring Mountains NRA for protection and in determining management activities.

Core Topic: Hydrology (March 2005). This white paper discussed key questions and indicators related to hydrology in the Spring Mountains. The Spring Mountains supply a source of water from springs and streams, which are a rare commodity in Southern Nevada. It is critical to maintain existing flows and ground-water levels for wildlife and plants.

What are the Historical and Current Physical Conditions of the Landscape? This white paper discussed geology and geomorphology, water, climate, soils, and air quality conditions of the Spring Mountains NRA and the Las Vegas Valley.

Question 6: Who are the Users, What are Their Activities and Where are they Going? This white paper discussed uses and locations for hiking and backpacking; equestrians; fuelwood collection; research, inventory and monitoring; OHV; snow-related activities; and other activities.

Question 28: What is the Current Management Direction for the Spring Mountains NRA? This white paper discussed different management documents and management direction within the Spring Mountains NRA.

Overriding Question 7: Facilities (November 2004). This white paper discussed the following facilities within the Spring Mountains NRA: 1) administration sites, 2) water troughs, enclosures, and fences, 3) Nell Property, 4) information kiosks/interpretation/signs, 5) picnic areas,

6) trailheads, 7) group camps, 8) ski area, 9) campgrounds, 10) special use facilities, 11) roads and motorized trails, and 12) hiking/biking/equestrian trails.

Question 4: What are the Historical and Current Vegetation Patterns on the Spring Mountains? This white paper discussed how fire, range grazing, and the invasion of exotics have impacted the vegetation patterns on the Spring Mountains. It also summarizes the available information on these impacts.

FOREST SERVICE PROPOSED ISSUES AND KEY QUESTIONS

After adopting the EAWS process in early 2005, the Forest Service began developing the proposed issues and key questions out of the INA overriding questions. The EAWS process recommends the following four steps to identifying issues and key questions:

- *Step 1:* Identification of issues in the Spring Mountains NRA;
- *Step 2:* Prioritization of issues to identify the most important or relevant for anticipated management activities within the Spring Mountains NRA;
- *Step 3:* Identification of indicators most likely to reveal conditions of the core topics; and
- *Step 4:* Formulation of key questions about specific processes or conditions based on the issues and indicators.

Once a list of issues is compiled, a preliminary assessment of priorities can be done. For example, designating each issue as high, moderate, or low priority enables evaluation of the necessity and probability for resolving each issue in the Landscape Analysis. In setting priorities for the issues and key questions, the Forest Service considered:

- Reasons for doing this Landscape Analysis (triggering events)
- Presence of critical populations
- Presence of threatened and endangered species
- Anticipation of land management decisions or projects
- Resolution process for issues deferred from prior planning efforts
- Not giving all issues the same weight or the same urgency for resolution
- Documenting criteria used to prioritize the issues
- Reevaluating priorities for addressing an issue during the analysis as more information becomes available

In order to formulate key questions for the Landscape Analysis, the following steps were taken:

- Indicators most useful in measuring or interpreting conditions of the core analysis topics were identified

- Based on the indicators, key questions were developed, recognizing that each issue may have several key questions
- A series of questions were developed that became progressively more refined

Key questions were designed that 1) addressed the issues, 2) focused on ecosystem elements that influence and are influenced by potential management actions, and that can be measured at the landscape scale, 3) promoted synthesis among the core topics, and 4) are expected to be addressed by the analysis.

Core Topic: Species and Habitat Protection/Maintaining Species Viability

The results of the INA and EAWS processes determined two core topics: *species and habitat protection/viability*, and *recreation and human uses*. Each of these core topics has an associated issue and several key questions. The initial set of issues and key questions proposed by the Forest Service are outlined below.

Proposed Issue

Under natural conditions, plant and animal species have a high degree of resiliency and can maintain viability; however, management activities and human uses on the Spring Mountains NRA may be affecting habitat and species viability.

Proposed Key Questions

1. How does recreation affect key species and habitats? Which types and locations of recreation activities are having more substantial effects on species and habitats?
2. How have historical fire patterns and current fire management affected key species and habitats?
3. How is development affecting key species and habitats? Which types and locations of development are having a more substantial effect on species and habitats?
4. How are non-native species affecting key species and habitats? Which are having more substantial effects on species and habitats?
5. How have natural and human modification of hydrologic and stream channel systems affected key species and habitats?

Core Topic: Recreation and Human Use

Proposed Issue

The different type of human uses and the typical forest visitors have changed dramatically over the past 10 years and will continue to change, making it difficult for the Forest Service to balance uses with each other and with species viability.

Proposed Key Questions

1. What are the projected trends in recreation and other human uses?

2. What management strategies and infrastructure can better balance and accommodate diverse recreational demands while still protecting Spring Mountains NRA resources?
3. What are the recreation management strategies that can respond to those recreation demands in light of the capabilities and limits of the resources?
4. How does current agency management direction affect the availability and diversity of recreation opportunities? (Including the role of the Clark County MSHCP and Conservation Agreement that mandate mitigation on National Forest System Lands from Las Vegas Valley development.)