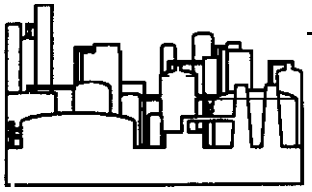

# Implications of Resources Management at the Nevada Test Site

*Charles R. Malone*

*The U.S. Department of Energy's Nevada Test Site (NTS) is taking steps to implement the department's policy on long-term stewardship of land and facilities. They are following an approach consisting of comprehensive resources management based on the federal ecosystem management initiative. Results of the program will be applied to planning new facilities and future land uses at the* NTS. *One important aspect will be the NTS Environmental Restoration Program, a critical factor in future uses of the site. Information acquired through resources management planning can be used at the NTS for evaluating environmental risks, deciding cleanup priorities and alternative remedial strategies, and for future land use planning. The NTS land and facilities resources management program might serve as a model for other DOE sites.*

The U.S. Department of Energy (DOE) has embarked on a creative program of environmental stewardship at the Nevada Test Site (WI'S). Sustaining bat DOE missions and natural resources through comprehensive, integrated resources management is both the framework and the goal of the program. This objective responds to DOE Policy 430.1 concerning land and facility use planning. Adopted in 1996, the policy aims at achieving sustainable development through ecosystem management. Activities at the NTS that will benefit from this initiative are the Environment Registration (ER) Program and the National Environmental Policy Act (NEPA) process. With both the ER Program and NEPA, the resources management program will significantly enhance human and ecological health risk assessments. These are crucial elements of setting cleanup priorities, evaluating alternative cleanup solutions, siting new facilities, and planning for long-term uses of the NTS.

The ecosystem-based approach to resources management at the NTS is consistent with what would be needed for a DOE-wide effort toward a comprehensive method for environmental protection and resources

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management at DOE nuclear weapons complex sites. The essential administrative components for such 'an approach to environmental management including DOE Policy 430.1, already exist within the DOE's national resources stewardship program.' The stewardship program, announced in late 1994, addresses DOE land and facilities. By mid-1997, the stewardship policy and a corresponding implementing order (DOE Order 430.1) were in place. Both directives concern achieving sustainable development through ecosystem management. For example, DOE Policy 430.1 states:

> It is the Department of Energy's policy to manage its land and facilities as valuable national resources. Our stewardship will be based on the principles of ecosystem management and sustainable development. We will integrate mission, economic, ecological, social, and cultural factors in a comprehensive plan for each site that will guide land and facility decisions. Each comprehensive plan will consider the site's larger regional context and be developed with stakeholder participation. This policy will result in land and facility uses that support the Department's critical missions, stimulate the economy, and protect the environment.

*A novel aspect of the policy includes developing goals and objectives jointly between the DOE and its stakeholders.*

The DOE framed its creative environmental stewardship policy in the context of managing site life-cycles as a way to sustain site development future uses, and associated natural resources.' A novel aspect of the policy includes developing goals and objectives jointly between the DOE and its stakeholders. Equally novel is that the comprehensive land and facility use plans to be developed for each DOE site will consider the site's larger regional context. These enlightened principles for managing DOE's resources, natural and managing, stem from the ecosystem management concept that arose from the White House's 1993 National Performance Review. In the DOE, implementing the reformative resource principles in the context of life-cycle asset management will occur through DOE Order 430.1, which calls for the comprehensive land-use planning process mentioned in DOE Policy 430.1.

The idea that the DOE's innovative land and facility stewardship process would affect the DOE ER Program was presented in a booklet that accompanied the Secretary of Energy's announcement of the resources stewardship policy in 1994 (see note 2). Entitled *Department of Energy—Stewards of a National Resource,* the publication included a section that addressed the DOE ER and Waste Management Programs in the context of determining human health risks and setting remediation goals for long-term land use decisions. The cleanup program is vital to comprehensive land use planning for future uses of all DOE sites.

Future reuse of lands and facilities managed by the DOE will involve stakeholder participation, a defining principle of ecosystem management. This aspect of the applied ecological approach is new to the DOE, but the DOE recognizes its importance. Ecosystem management should not be dismissed as an esoteric idea before considering the concept's

defining principles (**Exhibit 1**). The concept is more about people than it is about traditional ecology. True, ecosystem management is grounded in recent developments of applied ecology, but it grew from lessons learned the hard way concerning improper management of natural resource commodities and collapsing human economies. An often intimidating feature of the concept for federal land management agencies is its keystone principles of openness and of involving diverse stakeholders in cooperative and coordinated environmental decision making. Those principles alone explain why ecosystem management rapidly evolved into the foundation for pursuing sustainable development

**Exhibit 1. Defining Principles of Ecosystem Management as a Means for Achieving Sustainable Development**

- Includes humans as part of ecosystems and assumes that humans must depend on and be responsible for sustaining natural resources and human economies.
- Requires partnerships and cooperation between federal, state, and local governments with respect to managing public lands in a sustainable manner.
- Involves open, joint decision making that includes affected stakeholders and interests.
- Uses an interdisciplinary approach that integrates the socioeconomic and ecological goals of regional stakeholders.
- Bases management on ecological regions as opposed to jurisdictional boundaries.
- Recognizes the limits of current ecological knowledge and involves adaptive management policies and practices as information becomes available.

## ECOSYSTEM MANAGEMENT AND THE NEVADA TEST SITE

An integrated approach to cleaning up ER sites at the NTS is a timely idea in view of the enlightened federal policy regarding "a proactive approach to ensuring a sustainable economy and a sustainable environment through ecosystem management." The preceding quote defines the postmodern approach to comprehensive environmental protection and resources management and is from a report by Vice President Al Gore that accompanied the White House National Performance Review.' From this followed creation of the Interagency Ecosystem Management Task Force (IEMTF) and its June 1995 overview report on using the ecosystem approach to achieve healthy ecosystems and sustainable economies.' Subsequently, the White House produced a memorandum of understanding (MOU) to foster ecosystem management which was signed by all federal land management departments and agencies.

Following the MOU, the federal departments and agencies that had not already done so took steps to initiate the new approach to environmental management. The DOE anticipated the White House policy by announcing its revised land and facility resource policy in late 1994. The DOE Nevada Operations Office saw the useful application of the new management strategy to the NTS ER Program and took steps to relate cleanup activities to the forthcoming directives on land and facilities management during a site-wide Environmental Impact Statement (EIS) process initiated in 1994. To accommodate the DOE land and facilities use policy at the NTS, the Nevada Operations Office developed a comprehensive Resources Management Plan (RMP) for the site (see note 1). In this context, "resources" includes both land and DOE facilities.

During the NTS EIS process, the DOE and interested stakeholders interacted regarding managing land and facilities. This led to a framework for the resources management process based on ecosystem management. The final US included the framework as Volume Two. Stake-holders considered the framework document to be sound with respect to the Secretary of Energy's December 1994 policy statement on stewardship of DOE's land and facility resources. The "comprehensive plan for each site" mentioned in the Secretary's statement is the plan mandated by DOE Order 430.1 on Life Cycle Asset Management that is required of each DOE site, which was the goal for the NTS RMF. The goal was stated in the RMP framework document as follows:

*When DOE mission requirements at the* NTS *and the goals for resources conflict, NEPA toil! evaluate proposed resolutions.*

> The goal of the Resource Management Plan is to establish a process for managing resources to ensure long-term diversity and productivity of affected ecosystems and sustainable use of land and facilities on the NTS. The process will be based on the principles of ecosystem management and be developed with the participation of surrounding land managers and other interested parties. The DOE/NV will use this process to assess the impact of existing facilities and activities, and evaluate the selection, design, location, and impact of proposed facilities and activities. The plan will identify the criteria for evaluating the compatibility of these activities with human health and safety, ongoing missions, existing infrastructure, cultural and natural resources, public values, and other resource issues and constraints.

**Exhibit 2** illustrates the qualitative goals for managing resources at the NTS as identified in the RMP framework document. As the process develops, the goals will take on more definitive, quantitative characteristics that can be used to identify limits on resource uses and conflicts between alternative uses of the NTS resources. The goals are meant to be used to evaluate DOE activities' effects on resource issues and to identify management actions needed for wise resource use and sound ecosystem management.

When DOE mission requirements at the NTS and the goals for resources conflict, NEPA will evaluate proposed resolutions. In such

**Exhibit 2. Goals for Resource Management at the Nevada Test Site That Axe To Be Pursued Through the Resource Management Plan, DOE Policy 430.1. and DOE Order 430.1**

- Ensure the sustainability of DOE missions, land resources, and existing facilities by managing them in a way that most effectively uses and protects them.
- Accommodate expanded uses of the NTS through proactive planning based on sustainable development.
- Maintain adequate water supplies on the NTS while ensuring long-term sustainability of DOE missions and surrounding ecosystems.
- Site new facilities to minimize human health risks, to take advantage of existing facilities, and to enhance future uses of the site.
- Site new facilities to comply with legal controls on land use, to protect undisturbed ecological areas, and to be in areas with suitable natural features such as soils, slope, and drainage.
- Sustain ecosystems and assets, including existing capital, native biota, uncontaminated water, and cultural resources.
- Achieve these goals in a manner that considers and stimulates local and regional socioeconomic values.

cases, solutions may include canceling a proposed mission, modifying a proposed mission to reduce impacts on a resource, modifying existing missions, or not achieving a goal. Stakeholders would have a voice in the resolution procedures through the informal RMP process, as well as through the mandated NEPA process. Decision makers thus would have stakeholder comments and project costs and benefits to consider in resolving a conflict.

A careful analysis of DOE's land and facility use policy and the purpose of the NTS RMP reveals that changes can be expected regarding how the DOE Nevada Operations Office manages the environment and the environmental impact assessment process. This is especially true with respect to public and stakeholder participation in DOE programs at the NTS. The changes will evolve as the NTS RMP process develops. That this will occur is evident from the NTS RMP Project Execution Plan (U.S. DOE 199Th) (see note 1). Presented in the plan is the project work schedule through FY99 with a total budget of $1.8 million. The plan also includes significant details on the work breakdown structure and the schedule (Exhibit 3) for accomplishing the RMP.

In accomplishing its goal, the NTS RMP will include baseline conditions for ecosystems as well as for the DOE facilities at the NTS. The ecosystems are not well understood at the NTS because attention has focused principally on regulated components of ecosystems, such as

**Exhibit 3. Schedule for the Resource Management Plan Process for the Nevada Test Site as of Fall 1997**

| | |
|---|---|
| SUMMER 1997— | Briefings to key stakeholders to acquaint them with the NTS RMP process. |
| FALL 1997 ---- | Resources workshops with stakeholders to identify resource issues and goals. |
| EARLY 1998— | Identification of resource limitations to achieving sustainable development |
| EARLY 1998— | Identification of available resource information and the tools needed to acquire needed information. |
| MID-LATE 1998— | Monitoring resource use and determining the changing status of resources. |
| MID-1998—— | Assessment of cumulative impacts associated with ecosystem-based resource management. |
| LATE 1998— | Updating and publishing the first iteration of the RMP. |
| OUTLYING YEARS- | Reiterations of the RMP based on additional knowledge of ecosystems and on updated information on NTS facilities. |

threatened and endangered species. Compensating for the deficit of information on baseline ecosystem conditions cannot be accomplished in just a few years. Thus, the first iteration of the NTS RMP will utilize what information is available, identify additional information needs, and contain plans for establishing comprehensive baseline conditions. Much of this task will be accomplished through a long-term ecosystem monitoring program that is part of the ecosystem management process.

Because of insufficient information on baseline ecosystem conditions at the time the NTS site-wide US was prepared, the DOE was unable to apply ecosystem management for that process. The DOE Nevada Operations Office made an informal agreement with stakeholders, including the State of Nevada, to proceed with the traditional DOE approach to the US process for the NTS in

exchange for a commitment to prepare an RMP once the US was completed. This working arrangement between the two sides of the issue is proceeding to the advantage of both. For example, the DOE has a final EIS which can be amended for new facilities at the NTS while the RMP is being developed.

Stakeholders are assured that the DOE in Nevada will pursue ecosystem management for the NTS, as well as for the region. The regional context will be achieved through cooperative agreements with other government agencies, including those of the State of Nevada. The decision making process also will be open to other stakeholders as provided for by the principles of ecosystem management.

## REGIONAL IMPLICATIONS AND OTHER OPPORTUNITIES

*One of the novel aspects of the DOE land and facility use policy was that resources management at DOE sites is to address not only the site itself but also to consider the site's importance on a regional basis.*

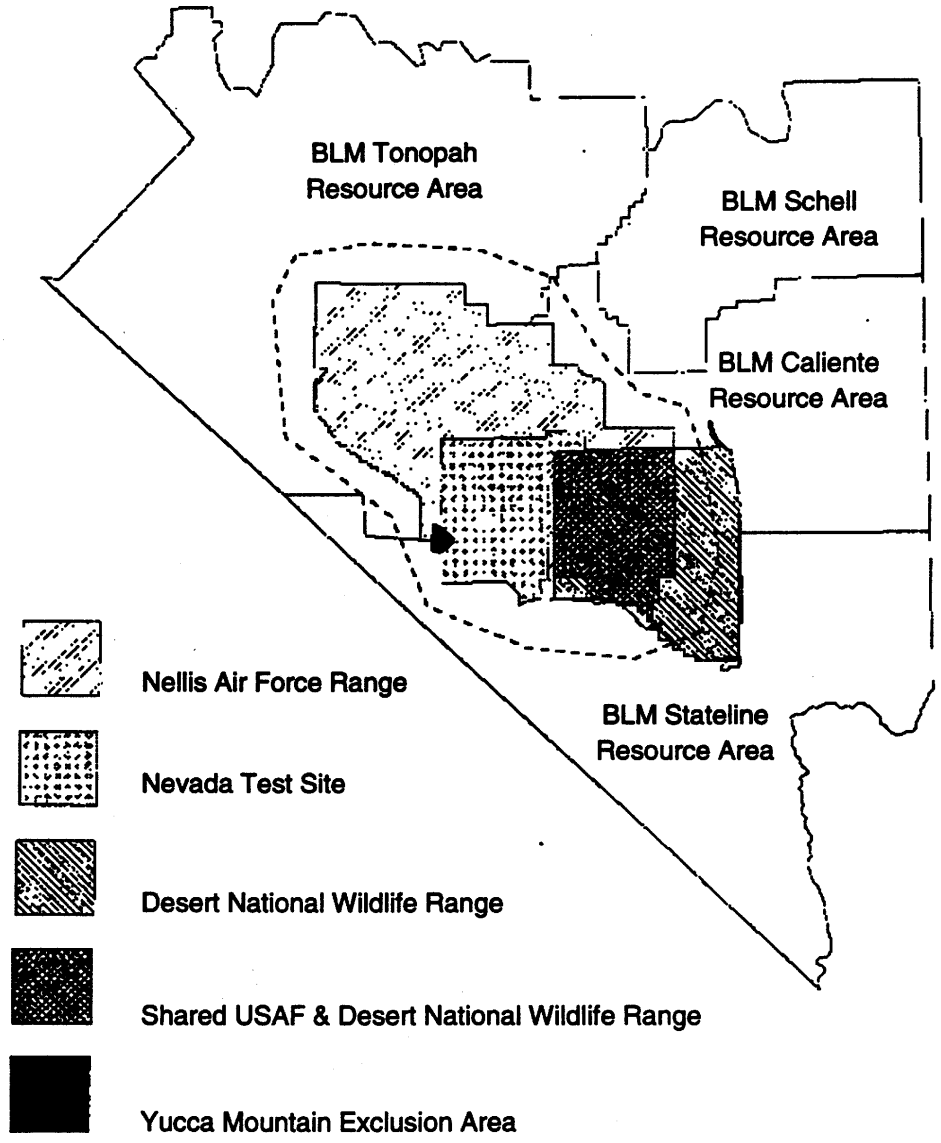
At this point it is a good idea to consider some of the implications and opportunities associated with ecosystem-based resources management planning at the NTS. Rec~all that one of the novel aspects of the DOE land and facility use policy was that resources management at DOE sites is to address not only the site itself but also to consider the site's importance on a regional basis. Exhibit 4 shows the region in southern Nevada shared by the DOE with the U.S. Department of Defense (the Air Force) and the U.S. Department of the Interior's Bureau of Land Management (BLM) and Fish and Wildlife Service (FWS). The Air Force, the BLM, and the FWS have policies and directives regarding ecosystem management. Especially noteworthy in this regard is the Nellis Air Force Range, which is located on three sides of the NTS.

In managing the Nellis range, the Air Force must adhere to integrated natural resources management directives that involve ecosystem management. These mandates are similar to those of the DOE's resources stewardship program. Thus, the Air Force's required Integrated Natural Resources Management Plan (INRMP) is similar to the NTS RMP regarding use of the ecological approach to sustain military missions (i.e., sustainable development). In general, however, the Air Force has less institutional experience and technical expertise in such matters than the DOE has and, for now, must look to others for assistance with respect to ecosystem management. Thus, for preparing the first INRMP document for the Nellis range: guidance is being provided under a partnership agreement with The Keystone Center and The Nature Conservancy. Especially noteworthy is the two private organizations' natural resources stewardship dialogue. The dialogue is similar to earlier generic policy dialogues carried out by The Keystone Center and The Nature Conservancy (see note 5). In this instance, however, the activity is site specific, in that it addresses the Nellis Air Force Range and the common ecological region the range shares with the DOE NTS and other federal lands and agencies. The Air Force's action presents an opportunity to apply the ecosystem approach across jurisdictional boundaries, as does the NTS RMP.

The Nellis range dialogue process involves not only the DOE but the U.S. Department of the Interior, the State of Nevada; and local governments. Key stakeholders also are involved in an effort to achieve a coordinated and

cooperative approach to achieving sustainable development in the NTS-Nellis region. Both the Keystone Center and the Nature Conservancy are at the forefront of implementing ecosystem management on public lands. For this reason, chances are reasonably

**Exhibit 4. Map of Southern Nevada Showing the Ecological Region, Enclosed by the Dashed Line, That Includes the Nevada Test Site and Other Federal Lands**




good that the regional effort in southern Nevada can succeed.

The Nellis range dialogue is anticipated to result in an interagency cooperative agreement that will include the agencies of the Department of the Interior participating in the regional ecosystem management effort. Both the BLM and FWS have policies in place for committing to the ecosystem management processes of the NTS and the Nellis range. This is important because, as Exhibit 4 shows, the western half of the FWS wildlife refuge is

shared with the Nellis Air Force Range. The shared portion of the refuge will be addressed by the Air Force INRMP now underway. Fundamental natural resources management is a process familiar to the Interior agencies, and the add-on principles of postmodern ecosystem management can be accommodated readily.

As for the opportunities the NTS RMP presents to the DOE, two obvious ones concern the baseline environmental data that will be kept current. First, the information will expedite the NEPA process for proposed new facilities by having up-to-date information on the natural resources and existing facilities at the NTS. This means that alternative facility siting decisions and their environmental impact assessments need await only the proposed design specifications. The second opportunity will be the ready availability of much of the environmental information needed for the ER Program. Useful baseline information will include much of the data on environmental conditions necessary for performing human and ecological health risk assessments and for deciding the degree of cleanliness needed for future uses of the NTS.

The DOE could similarly use the NTS RMP regarding its Yucca Mountain site. Located partly on the NTS and partly on lands managed byte Air Force and the BLM (Exhibit 4), Yucca Mountain is the site DOE selected for the world's first geologic repository for permanent storage of the nation's defense and commercial high-level nuclear waste. The DOE has excluded the Yucca Mountain Project from coverage by the NTS RMP process principally to avoid potential delays that the process may incur. For this reason, the site stands as the sole area within the surrounding ecological region that is not included in the regional ecosystem management initiative stemming from the WI'S RMP and the INRMP for the Nellis range. This is unfortunate because the health and integrity of the regional ecosystem that includes the Yucca Mountain site is important to the long-term performance of a nuclear repository at the **site.1o**

*Only in recent years has the state-of-the-art of ecosystem science reached a state of development to facilitate the applied ecosystem approach.*

With respect to the DOE's NEPA process, the comprehensive and integrated resources management approach followed by the NTS RMP should improve the interdisciplinary character of related assessments, evaluations, and decisions. Advocates of NEPA have long sought a comprehensive approach to ecosystem management as the Act and its regulations imply. However, there has not been a functional holistic concept for achieving the degree of comprehensiveness and integration NEPA envisions. Only in recent years has the state-of-the-art of ecosystem science reached a state of development to facilitate the applied ecosystem approach.

Essentially the same can be said of the DOE ER Program. Integrated environmental risk assessment and the science of ecosystem restoration are new disciplines that ecosystem management serves well. it is unlikely that achieving an integrated approach for the cleanup program with revised laws and regulatory schemes will come any time soon. The ecosystem management strategy being taken for the NTS RMP can be tested at the NTS. If found promising, the approach can be considered for the DOE nuclear weapons complex cleanup program under the recently launched 10-year integrated Strategic Planning Program."

A useful characteristic of the NTS RMF approach is that it cuts across DOE's various programs (i.e., defense, environmental health and safety, environmental management, environmental restoration, and waste management) at DOE's nuclear weapons complex sites.

*The* N'2'S *RMP approach could serve as a model for other DOE nuclear weapons complex sites.*

## CONCLUSIONS

The DOE's ongoing national resources stewardship initiative stands to benefit the Department in view of enlightened postmodern ideas regarding managing public lands and resources. Planning for integrated resources management such as is underway at the NTS appears to be a credible and effective means for conforming with the DOE's directives regarding resources stewardship. Thus, the NTS RMP approach accommodates the Department's Land and Facility Use Planning Policy (DOE Policy 430.1) and its Life Cycle Asset Management Order (DOE Order 430.1), both of which require ecosystem management as a basis for administering DOE's land and facility resources. This approach to land and facility stewardship would complement the DOE's expanding attitudes concerning openness and collaboration with stakeholders. Existing administrative directives within the DOE are sufficient for undertaking resources management based on ecosystem management.

The NTS RMP approach could serve as a model for other DOE nuclear weapons complex sites. Such a department-wide program would facilitate the DOE's broad initiative regarding future uses of former nuclear weapons complex sites. A paramount issue faced by all DOE sites engaged in the ER Program is "How clean is clean enough for what uses?" This is a vital socioeconomic concern regarding DOE's public stakeholders and their perception of the Department's intentions. Such matters are at the heart of the national policy initiative regarding sustainable development and ecosystem management that arose from the White House's 1993 National Performance Review.

The resources stewardship activity coincides with an effort to foster government interagency cooperation in managing regional natural resources. Along with two other federal departments, the DOE is involved with key public land stakeholders in addressing resources management issues within a common ecological region in southern Nevada. To date, a significant benefit of the regional initiative is that predominantly adverse public opinion is improving in the state. This is yet another benefit that can follow from a sincere commitment to human-oriented ecosystem management principles. The same would be true for the Yucca Mountain Project if the DOE would include the prospective repository site in the NTS RMP.

Innovative, progressive resources management planning at the NTS appears to be the first such attempt within the DOE. Another first at the NTS is the DOE's involvement with regional ecosystem management at a former nuclear weapons site. These creative and enterprising initiatives capture the spirit of national resources stewardship set forth by the Secretary of Energy in 1994. They are not to be dismissed lightly as the DOE progresses into the post-Cold War era. Much of what the Depart-

ment still needs to accomplish depends on initiatives similar to those being taken for the NTS. Serious consideration should be given to the appropriateness and advantages that such actions have to offer regarding other nuclear weapons complex sites. 4'

NOTES

1. A "Framework for the Resources Management Plan" was developed as Volume Two of U.S. DOE, Final Environmental Impact Statement for the Nevada Test Site and Off-Site Locations in the State of Nevada, US DOE/NVO, Las Vegas, 1996, NV DOE/EIS 0243. A commitment to prepare a resource management plan for the NTS was included in the Record of Decision for the 1996 NTS final environmental impact statement, Federal Register 61(16 December 1996), no. 241: 65551-65563. A Resources Management Plan Project Execution Plan, dated June 2,1997, was made public by the DOE on July 8,1997.

2. The DOE's national resources stewardship initiative was announced in H. O'Leary, Land and Facility Use Policy, Memorandum to Secretarial Officers and Operations Office Managers, Secretary of Energy, Washington, DC, 21 December, 1994. Included with the memorandum was US. Department of Energy, Department of Energy Stewards of a National Resource, US DOE, Washington, DC, December 1994, DOE/FM-0002. The formal stewardship program was established by U.S. DOE, Land and Facility Use Planning Policy, DOE, Washington, DC, 9 July 1996, P430.1, and by U.S. DOE, Life Cycle Asset Management Order, U.S. DOE, Washington, DC, 24 August 1997, DOE 0430.1.

3. U.S. DOE, Charting the Course. U.S. DOE, Washington, DC, April 1996, US. DOE, DOE/EM-0283; Resourceful Reuse: A Guide to Planning Future Uses of Department of Energy Sites, U.S. DOE, Washington, DC, May 1996, DOE/EM-0285.

4. Federal policy for the ecological approach to managing natural resources on federal
lands was set forth in Vice President Al Gore, Reinventing Environmental Management
Accompanying Report of the National Performance Review, Creating a Government
That Works Better&Costs Less, White House National Performance Review, Washington,
DC, September 1993; Interagency Ecosystem Management Task Force 1995-1996, The
Ecosystem Approach: Healthy Ecosystems and Sustainable Economies, Vols. I—HI. The
White House Office of Environmental Policy, Washington, DC.

5. The Keystone Center, The Keystone National Policy Dialogue on Ecosystem Management, The Keystone Center, Keystone, CO. October 1996; The Nature Conservancy, Conserving Biodiversity on Military Lands: A Handbook for Natural Resources Managers, The Nature Conservancy, Arlington, VA, 1996; Ecological Society of America, The Report of the Committee on the Scientific Basis for Ecosystem Management, *Ecological Applications* 6 (1995) no. 3: 665-691; RE. Grumbine, "What Is Ecosystem Management?" *Conservation Biology* 8(1994) no. 1: 27-38; C.A. Wood, "Ecosystem Management: Achieving the New Land Ethic," *Renewable Resources Journal*, Spring 1994: 6-12.

6. See note 4.

7. Id.

8. Air Force and U.S. Department of Defense policies and directives for INRPM documents are explained in U.S. Air Force, Draft Integrated Natural Resources Management Plan— Nellis Air Force Base/Nellis Air Force Range, Environmental Management Directorate, 99th Air Base Wing~ Nellis Air Force Base, Nevada (March 1997).

9. The State of Nevada has encouraged the federal agencies involved to cooperatively address land resource planning and management including the ecological region shared by the Nellis range and the NTS. This occurred in a meeting at the BLM's Las Vegas District office on November 6, 1996. The meeting was hosted by the Bureau of Land Management Resources Advisory Council for southern Nevada.

10. C.R. Malone, "Ecology, Ethics, and Professional Environmental Practice: The Yucca Mountain, Nevada Project as a Case Study," *The Environmental Professional* 17(1995): 271-284; Cit Malone, "The Federal Ecosystem Management Initiative in the U.S.," In J. Lemons, K Goodland, and L Westra (eds.), *Environmental Sustainability: Case Studies on the Prospects of Science and Ethics,* Kluwer Academic Publishers, Dordreche, The Netherlands (in press).

11. Details for the U.S. DOE's 10-year Integrated Strategic Planning Program are in US DOE, Accelerating Cleanup: Focus on 2006 (Discussion Paper), DOE, Washington, DC, 1997, DOE/EM-0327.