

NEW DIRECTIONS AND COMMON CHALLENGES IN FEDERAL STEWARDSHIP OF VISUAL RESOURCES

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Abstract.—The need to protect and preserve natural, cultural, and scenic resources is an escalating imperative for those tasked with managing Federal public lands and seascapes. The rise in energy development activities can compromise critical visitor experiences when they encroach on settings and seascapes cherished for their naturalness, scenic beauty, and cultural significance. The role of public land and offshore management agencies involves accommodating the demand for resource development while protecting the visual value and integrity of those resources' natural character. This paper describes how the USDA Forest Service, Bureau of Land Management, National Park Service, and Bureau of Ocean Energy Management address visual resource issues in the context of energy development, and it provides an agency history of managing visual resources, new directions in visual resource stewardship policy, and challenges faced.

INTRODUCTION

The Organic Acts of the USDA Forest Service, National Park Service, and Bureau of Land Management direct the principal Federal land management agencies of our Nation to conserve scenery, consider aesthetics, and protect natural scenic values for the enjoyment of present and future generations. Individuals, friends, and families that venture into the natural settings of our Federal public lands benefit from the many positive personal and social outcomes of their experiences. Among these outcomes, evidence-based medical research continues to reveal undeniable relationships between doses of nature and improvements in health ranging from stress reduction to bolstering the human immune system (Sullivan et al. 2014). In addition, visitation to Federal public lands contributes significantly to the \$103 billion American outdoor recreation economy. Visits to Federal public lands reached 889 million in 2016 with visitors spending upwards of 49 billion dollars supporting 826,000 jobs. Local communities and businesses in proximity to these Federal lands significantly benefit

from the economic activity and spending associated the outdoor recreation opportunities provided within these locations (Cline and Crowley 2018).

However, national priorities for energy development, which include conventional and renewable energy resources, have placed uncommon pressure on Federal public landscapes and offshore areas that are favorable for solar, wind, geothermal, oil and gas, and other energy-related development. The demand for new transmission and pipeline corridors to carry this energy to market will also contribute to the rising pressures affecting the landscape's visual character. Creative solutions are needed to address the multiple and sometimes conflicting values for which Americans depend upon our Federal land base.

The Forest Service, Bureau of Land Management, National Park Service, and Bureau of Ocean Energy Management are all trying to address the escalating demand for renewables source of energy generation and transmission on public lands and the challenges it presents to management and stewardship of visual resources. These agencies share many similar challenges; however, their approaches to resolving these common issues vary due to the unique circumstances at each agency. Some agencies have approval authority for proposed energy generation developments, and all may have concerns about large-

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scale changes to the viewsheds that are outside of their authority but contribute to the visitor experience within their boundaries. Public agencies with authority and oversight of land use and development are also constantly trying to balance the competing issues of preserving visitor use and the quality of outdoor experiences against the demand for resource extraction, harvesting, and surface development. Each agency has a systematic process to address their particular set of visual resource stewardship issues under the authorities granted by Congress.

FOREST SERVICE: SCENERY MANAGEMENT PAST, PRESENT, AND FUTURE

The Forest Service has a long history of managing for scenery resources, dating back to the early 20th century. The agency hired Frank Waugh in 1916 to evaluate the potential uses of the National Forests for outdoor recreation and hired its first landscape architect, Arthur Carhart, in 1919, demonstrating an early commitment to maintaining and enhancing the visual qualities of the outdoor environment (USDA Forest Service 1995). As our National Forests became a primary source of timber, helping to feed the growth of suburbia after the World War II, the agency began to lose touch with those important values. In 1976, public outrage at the visual impacts from Forest Service clear cutting practices led, in large part, to passage of the National Forest Management Act, which requires National Forests to create management plans to protect natural resources while providing for multiple uses.

With this foundation, the agency began to craft a systematic approach to managing for scenery. The effort was guided by Burton Litton's landmark publication, "Forest Landscape Description and Inventories" (1968), which introduced terms and concepts that later evolved into our Visual Management System or VMS (USDA Forest Service 1974). While timber harvests increased in size and scope through the 1980s, VMS became an integral method for protecting scenery values through visual mitigation. A large workforce of trained landscape architects was hired to implement this system, summing at 300 in the mid-1980s. The 1990s saw changes in forest management and greater attention to environmental protection, including increased opportunities for public involvement in management

decisions. This opened the door to updating VMS to the current Scenery Management System or SMS (USDA Forest Service 1995), which incorporates a more social and ecological context to establishing desired conditions for scenery.

More recently, the Forest Service updated the guidance and direction for how land and resource management plans (Forest Plans) are created and revised. Within this guidance, referred to as the Forest Service 2012 Planning Rule (36 CFR Part 219, USDA Forest Service 2012), the role of scenery has been reinforced by making stronger connections between desired conditions for scenic character and sustainable recreation. The rule makes it mandatory to address scenic character on par with other resources. Along with guidance for recreation settings under the Recreation Opportunity Spectrum or ROS framework (USDA Forest Service 1982), the SMS guidance is key to the way the agency is addressing sustainable recreation (Brunswick, this proceedings). Because plan components for scenery and recreation must be balanced with other resource considerations, there is an opportunity to create integrated goals and desired conditions for National Forest landscapes, which in turn can help create more shared ownership of scenic character outcomes.

The opportunities for broadening shared stewardship of scenery resources are apparent in light of the increasing multiple-use demands on Forest Service lands. Growing agency focus on restoration and forest resiliency projects requires that scenery management objectives be viewed as part of the purpose and need for sustaining desired character, instead of being viewed as a potential obstacle to ecosystem projects. Increased interest in – and applications on Forest Service lands for – renewal energy projects (geothermal, hydropower, wind, and solar) further reinforce the need to account for the potential cumulative effects to scenery across the larger landscape. This is critical as scenery resources help to define the very landscapes in which people live, work, and play.

Data from National Visitor Use Monitoring and similar research continue to demonstrate that expectations for scenery (driving for pleasure, views from sought after places to live, high-quality outdoor recreation settings) are increasing (e.g., USDA Forest Service 2016). The agency is responding through programs such as

Iconic Places, which emphasizes quality recreation experiences in landscapes with special designations and acute public interest across the Nation – which naturally coincide with highly scenic landscapes. The agency is also starting to protect scenery during both the day and at night via, for example, the first National Forest Dark Sky Sanctuary (Gila National Forest Cosmic Campground) and other dark sky designations at Chimney Rock National Monument and the Sawtooth National Forest.

Finally, in the context of a significantly diminished workforce of landscape architects and others skilled in visual (scenic) resource management, accomplishing these goals in the future will be a challenge. It will be necessary to make concentrated efforts to train others and create champions of the program. Updates to the manuals and handbooks for the agency are forthcoming along with updated protocols for SMS inventories. Efforts will also continue to create formalized training for SMS in order to teach Forest Service land managers and others the roles and responsibilities for inventorying and managing scenic resources.

BUREAU OF LAND MANAGEMENT: VISUAL RESOURCE MANAGEMENT

Unlike the Forest Service and National Park Service, conservation-based land management was not part of the Bureau of Land Management's (BLM) stewardship culture until the 1970s. The BLM's legacy began with the General Land Office (GLO), which was established in 1812 for the sole purpose of using the "public domain lands" to generate Federal revenue. The GLO's primary method for generating revenue was to survey, plat, and sell public domain lands. In 1946, the Truman Administration merged the GLO with the U.S. Grazing Service (created in 1939) to form the BLM.

By the 1960s, the several hundred duplicative, outdated, and conflicting public land laws that directed the BLM were inadequate to address the prevailing issues and social concerns for landscape and natural resource management (Reams 1978). President Kennedy noted that BLM lands were "vital to the Nation's economic well-being, but suffered from uncontrolled use and lack of proper management." Kennedy called upon the BLM to resolve resource

conflicts through balanced-use based on an inventory of public land resources (Muhn 1988). To address this, Congress passed the Classification and Multiple Use Act of 1964 and later the Federal Land Policy and Management Act (FLPMA) in 1976 (43 U.S. Code Chapter 35).

FLPMA shaped the BLM's focus to a multiple-use and sustained-yield mandate with the goals of protecting the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archaeological values. The law also gives the BLM authority to set aside lands for special levels of protective management to prevent irreparable damage to important scenic values, as well as historic and cultural values and "areas of critical environmental concern."

At the time that FLPMA was passed, the BLM was responsible for administering 451 million acres (Reams 1978). Today, the BLM manages 248 million surface acres, primarily in 13 western states, and 700 million acres of subsurface mineral estate nationwide according to multiple use and sustained-yield principles.

Brief History of BLM Landscape Architecture and Visual Resource Management

Landscape architects have long been interwoven into the administration and operations of the Forest Service and National Park Service; however, this role did not find its place in the BLM until the 1960s. The first BLM landscape architect was hired in Oregon in 1961 to help with planning, site design, site development, and maintenance programming in accordance with the new statewide recreation policy handbook (Muhn 1988). In 1965, outdoor recreation and its dependence on quality settings and natural beauty became a topic of national and White House conversation. Landscape architects and scenery management subsequently gained a more prominent foothold within the agency (Hagan 1998).

In 1975, the BLM issued its first policy manual and handbooks on managing visual resources (Hagan 1998). These directives established the contrast rating process for assessing visual impacts to landscape settings (Bureau of Land Management 1980). While adjusted over time, these procedures still remain at

the core of the BLM's visual resource management program.

Landscape architecture is now a scarce skill within the BLM and this will likely remain the case as the trend of shrinking Federal budgets continues. While the total number of BLM employees with the title of landscape architect now rests at six, the BLM VRM program offsets this long-term attrition through support from private sector landscape architecture contractors. The BLM also has other positions occupied by landscape architects who are instrumental in implementing VRM policy and procedures (e.g., planning and environmental coordinators, outdoor recreation planners, natural resource specialists, and lands and realty specialists). Through strategic recruitment and training within the BLM, and collaborating with industry and private sector, the BLM's VRM program continues to build momentum and thoughtful execution of the basic visual design and visual resource stewardship principles.

Recent Activity in the Visual Resource Management Program

National priorities and State energy portfolios have increased the energy industry's pressure to use public landscapes for solar, wind, geothermal, and other energy-related development. The demand for new transmission corridors to carry renewable energy to market also has the potential to alter landscape character (Bureau of Land Management 2015). The BLM is re-evaluating VRM procedures to address the various forms and scales of energy development, as well as a new set of impact phenomena, such as glare cast from solar arrays and heliostats.

The VRM program is also reframing the visual resource inventory during all stages of land use planning, project-level planning and design, and post-development monitoring, creating a more complete picture of scenic resource conditions, changes, and trends. Monitoring changes to the visual character of public lands and updating the visual inventory process to accurately reflect these changes empowers the BLM to be better stewards of the visual environment and make more informed decisions regarding where energy development should occur while being mindful of scenic character that is worthy of protecting or restoring.

Other visual resource-related products from the BLM, several of which were accomplished through an interagency agreement with the Department of Energy's Argonne National Laboratory, include:

- Visual Resource Clearinghouse Website: <http://blmwyomingvisual.anl.gov>. This Website is an inclusive and comprehensive source of information about visual resource stewardship.
- Visual Resource Inventory (VRI) Data Standard and Geodatabase Management Guidelines. The BLM issued a VRI data standard in 2012 with the aim of establishing a National and publicly accessible data set. While data gaps still exist, the majority of BLM lands have been inventoried and the data will be available through BLM's Navigator portal by the end of 2018.
- BLM Environmental Color Chart. The BLM's Environmental Color Chart CC001 was updated and released in 2013 based on field research. Copies may be ordered via email at BLM_OC_PMDS@blm.gov or fax to 303-236-0845.
- Technical Note 446: The Use of Color for Camouflage Concealment of Facilities. The escalation of oil and gas production triggered the need to look at enhanced means to mitigate the visual impacts of these projects. The BLM collaborated with camouflage pattern consultants, retired military personnel who specialized in camouflage theory and science, and the energy industry to develop suitable patterns and application methods (Bureau of Land Management 2015).

The BLM has also funded a number of visibility research and best management practice publications under an agreement with Argonne National Laboratory including:

- [Wind Turbine Visibility and Visual Impact Threshold Distances in Western Landscapes.](#)
- [Electric Transmission Visibility and Visual Contrast Threshold Distances in Western Landscapes.](#)
- [Best Management Practices for Reducing Visual Impacts of Renewable Energy Facilities on BLM-Administered Lands.](#)

- [Visibility and Visual Characteristics of the Ivanpah Solar Electric Generating System Power Tower Facility.](#)
- [Visibility and Visual Characteristics of the Crescent Dunes Solar Energy Power Tower Facility, 2017.](#)

Training

The BLM continues to provide courses in visual resource management, which are open to all BLM employees, employees of other federal agencies, private contractors, industry personnel, and others with a stake in the management of visual resources (e.g., academicians, students, state and local government interests, and those representing nongovernment organizations). Courses are coordinated and delivered through the BLM's National Training Center in Phoenix, AZ.

NATIONAL PARK SERVICE: VISUAL RESOURCE PROGRAM

Since its inception, the National Park Service (NPS) has been charged with protecting some of America's most scenically treasured landscapes. However, there has not been a consistent service-wide effort to address scenery protection concerns. The Visual Resource Program (VRP), conceived within the Air Resources Division, has started to change that (Meyer and Sullivan, this proceedings). As with any new endeavor, the program has met challenges; one of the primary challenges is that considering scenery as a resource to measure, manage, and protect is a new concept across most of NPS. While some NPS units, notably Blue Ridge Parkway, have been actively working to protect scenery for many years (Johnson, this proceedings; Noe and Hammitt 1988), many Parks just assumed the scenery would always be there and remain intact.

Since many parks have not dealt directly with managing visual resources, a second challenge has been simply raising awareness of the program within NPS and among other agencies and partners that NPS work with every day. To develop a viable scenery management program, NPS needs to achieve a level of service-wide consistency in approaches and practices that other federal agencies—especially the Bureau of Land Management and Forest Service—have built over the past 40 plus years. Our primary efforts in working

toward this goal have been developing an inventory process and incorporating visual resources into park planning.

Despite the initial lack of visibility of the program, we have initiated inventories at 30 NPS units ranging from cultural/historical sites to natural resource or “scenery” parks. The inventory process is also gaining traction with NPS units and programs that work extensively with partners and stakeholders such as the Appalachian Trail and the Wild and Scenic Rivers Program.

As the basic inventory process has become more mature, we have set out to develop additional tools so that parks are able to use the inventory data and provide resources for longer term implementation of the inventory:

- A spatial database has been developed along with basic GIS spatial analysis tools. The database can create summary reports of the data for specific locations as well as overall status reports. In addition to several types of view shed analyses, GIS spatial analysis tools have been developed as open source so that parks are able to customize the analysis to meet their needs.
- We are currently developing a comprehensive training manual for use at our onsite workshops and for future reference so that parks can more effectively continue the inventory beyond the workshop.
- Development of a visual impact assessment (VIA) tool is under way. We were able to bring on a landscape architect intern during the summer of 2017 to jump start the process. Somewhat analogous to the BLM contrast rating process, the VIA tool will correspond directly to the inventory data the parks collect and allow them to assess the potential impacts of projects.

To assure its long-term viability, visual resource management needs to be incorporated into park planning documents. The NPS currently uses a planning framework that consists of developing small resource management plans and strategies based on the fundamental purpose of the park rather than developing a comprehensive general management plan as parks used to do. We have achieved some success in integrating VRP into the park planning components known as Foundations as well as specific activity

plans known as resource stewardship strategies. As personnel, management priorities, and landscapes change, having a clear management approach for visual resources will help assure consistency in applying the VRP.

BUREAU OF OCEAN ENERGY MANAGEMENT: CHALLENGES TO VISUAL IMPACT ANALYSIS

The U.S. Department of the Interior Bureau of Ocean Energy Management (BOEM) manages offshore energy resources on the U.S. Outer Continental Shelf (OCS). BOEM coordinates energy development, environmental protection, and economic development through the responsible management of offshore resources. BOEM's regulatory authority includes submerged lands extending from 3 to 200 nautical miles off the coastline of the United States, a total of 1.7 billion acres.

For the BOEM, experience gained from public input and consultation meetings with lessees has brought to light several challenges for visual impact analysis (VIA) in development of offshore wind energy projects. Note that the information summarized here is discussed in more detail in Warner, this proceedings.

Design Envelopes

The United Kingdom has developed an approach to project implementation called a Project Design Envelope (PDE) (Rowe et al. 2017). A PDE allows a project proponent to submit a reasonable range of design parameters in its permit application, and it allows the permitting agency to analyze the maximum impacts that could occur from all potential design parameters. Once the permit application is approved, the sponsors design a project that fits within the approved range of parameters.

BOEM supports voluntary use of the PDE approach for wind energy development projects but the concept does present several procedural challenges for NEPA and National Historic Preservation Act (NHPA) compliance in the United States. Under both of those Acts, assessments of impacts are based on exact (and not flexible) project designs. After the initial approval, the built project is supposed to adhere carefully to the design specifications. Any change in, for example, the number or layout of turbines in a wind energy

development project would require redoing the impacts analysis and resubmitting the designs for regulatory approval.

Traditional Cultural Properties

National Park Service-defined traditional cultural properties (TCP) are "eligible for inclusion in the National Register because of its association with cultural practices or beliefs of a living community" (National Park Service undated; see also Parker and King 1998). TCPs may include large ocean landscapes with historic significance. When this is the case, the historic, current, and potential future conditions of the oceanscapes and the associated views become the subject of analysis in proposed wind energy development projects.

To date, this has only actually happened once (Warner, this proceedings). In that case, Nantucket Sound off the shore of Massachusetts was found to be a potential TCP during the predesign analysis of an offshore wind project.

Mitigation

Under both NEPA and Section 106 of the NHPA, proposed wind energy projects must consider mitigation strategies to reduce or remove adverse effects of the project on marine resources, including visual resources. Because of the limited number of wind energy projects developed to date on the OCS, the implications of these requirements and the possible range of mitigation strategies are still evolving. In some cases, mitigation may include physical design elements such as sensor-controlled lighting on turbines or strategic placement of turbines. In other cases, mitigation may include indirect design elements such as developing educational or interpretive materials that describe the history of the area.

The Role of Simulations

Visual simulations have already proven to be critical components of VIA analyses for offshore wind energy projects. Realistic simulations can provide powerful information for all stakeholders to use and react to during the public engagement, design, and planning stages of project development. Early experience suggests that wind energy project simulations should be created from multiple viewpoints on the landscape (key observation points) and should take into account

a range of dynamic factors such as the effects of changing sunlight and weather conditions.

Among the agencies presented in this paper, BOEM is very new to VIA and visual resource stewardship in general. This has allowed the Bureau to build on the long experience and lessons learned by other Federal agencies over the past decades. BOEM is committed to building on this legacy of VIA scholarship and experience and to continuing to learn and adapt as proposed OCS wind energy projects present new challenges and opportunities in the future.

CONCLUSION

Each agency has its own set of methods for managing the public's visual environment. These methods have developed over time and are rooted in and influenced by agency history and legacy. Visual resource management professionals sometimes express a desire for Federal land management agencies to agree on a common and unified process for visual resource impact assessment. While this aim is sound in principle, it is very difficult in practice given the differences between the agencies' mandates and missions.

The basic concepts of visual resource stewardship are the same under the Congressional mandates for different agencies but the nuanced differences among the agencies' administrative responsibilities force variations in procedures. One fortunate outcome from these different approaches is a comprehensive and varied set of methods that enriches the professional practice of visual resource stewardship.

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