***Comment:***

Over the years I have greatly enjoyed almost every unit of the Cibola National Forest – and I hope to visit the Grasslands in the future! I appreciate your management and stewardship of these lands. Most of my use of the Forest has been recreational, but in my professional capacity I have visited many archaeological sites and other cultural resources. Thank you for your management of these resources.

For the revised Forest Plan, I hope you will consider "uses" of cultural resources alluded to but not specifically named in topic area 13: "Cultural and historic resources and uses, native knowledge and ethics." That "use" is research. I hope the revised Forest Plan will encourage thoughtful archaeological research conducted sensitively to Tribal concerns. Archaeology today is learning remarkable, surprising things about the past and the national heritage – with minimal impacts. We can learn a lot from a little.

There are sites of great importance in every district of the Cibola National Forest. Public and Tribal interest in learning about the region's past has never been higher. And a new generation of young archaeologists – trained in Tribal collaboration – is primed to write new chapters for our national heritage. Collaborations between the archaeologists and CRM professionals of Cibola National Forest, and universities & research institutes, and Tribes could do great things with minimal impact. New knowledge will enhance the Forest's management of cultural resources and will almost certainly provide interpretation for a public increasingly engaged with cultural resources – "heritage tourism."

***Comment:***

We hope that livestock grazing will be an issue of concern and that the CNF will consider revising its forest plan to allow for allotments to be closed to livestock grazing for resources protection permanently by the responsible official.

***Comment:***

First, I believe that consideration should be given to modifying the aum's for the Zuni Mountain area grazing allotments. This fall I sponsored a grazing assessment seminar with Dr. Mary O'Brien, grazing guru for Grand Canyon Trust and the Three Forest (Dixie, Monte la Sal, and Fishlake NF's) collaboration group in southern Utah. The seminar was for my group the Rio Grande Valley Broadband of the Great Old Broads for Wilderness and the location was in the Zuni Mountains. In order to convince Dr. O'Brien to do the seminar, I took photos of two areas in the Zuni Mountains. One area was a meadow on private property that had not been grazed for around 40 years, and served as a reference area. The other was the Paxton Springs road area nearby, which is heavily grazed, and served as an example of poor grazing management. While I am not sure how much of the land along Paxton Springs road is private and how much of it is public, but it was easy for the group to see a significant difference. This difference is about the same for both private and forest service lands in the area that have continued to be grazed in the last 30+ years. I am including a link to a photo album that I created to document both areas, so you can see the difference in the areas. I tried to label things as accurately as I could. There are also photos from several different dates, including some from the late 70's and early 80's of the same area (Bad Road meadow - yes, that is the official name, and yes, it can be a significantly bad road in mud and heavy

snow seasons.) I wanted the photos from the earlier decades to show how much improved the condition of the meadow is after being ungrazed for 30+ years.

I do have several documents provided to my group by Dr. O'Brien on the effects of grazing in the southwest and the west, and would be happy to provide you with links to them.

The second issue that concerns me is that the forest service planted many ponderosa seedlings about twenty or so (?) years ago along FR50 (Zuni Canyon Road) near the beginning (north end) of the Paxton Springs road, among other areas. They have been growing like gangbusters, but are now far too close together and need to be thinned. In the grazing photos (see photo album referenced above), see photos numbered 51 and 52 for evidence of the area needing thinning. I would think that this might have been addressed by the Zuni Mountain Landscape Restoration Project, but I can find no evidence that they have any intention of thinning that far east. Actually, a great deal of thinning needs to be done on the private lands also, especially for section 1, but I am sure that is outside of the forest service's domain. Is it also outside of the landscape restoration's domain? Is there any other agency that could help private property owners thin their land? It is a wildfire debacle waiting to happen.

***Comment:***

(known as the Loop Road - Forest Rd. 445- in the Placitas area) was studied carefully a few years ago. After the study and a lot of public input, the land bound by and contained within the Loop Road was designated a protected NRA with the approval of the Forest Service.

Those community members who worked long and hard to get this protection are now wondering why the Cibola Forest Service has not been enforcing this NRA at all. In fact, within recent years it has even sanctioned and increasing number of mountain bike trails in the NRA - even including improvement of illegally poached bike trails. No mountain bike individuals have been ticketed for these illegal trails. The protection of this land now depends on the few who are watching it change rapidly without public input. We are forming a group of concerned citizens and will meet with the Tijeras office this Spring.

The Tijeras Cibola Forest Office also has allowed an informal trail mileage map created by private citizens to be posted on Forest Service signs at two parking lots. A great number of the trails on this map are within the NRA and the Tijeras office has not done anything about it. The Tijeras Cibola Office also supports a volunteer group of recreation enthusiasts including mountain bike users who call themselves Placitastrails.org. They believe they have authority to work on trails as well as widen parking areas that never existed until recently, including many in the NRA area, and apparently they are doing this with approval from Mr. Wood. Yet there has been no public survey of what area users of that land would like to see, nor meetings to address these concerns.

***Comment:***

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my use of the Forest has been recreational, but in my professional capacity I have visited many archaeological sites and other cultural resources. Thank you for your management of these resources.

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There are sites of great importance in every district of the Cibola National Forest. Public and Tribal interest in learning about the region's past has never been higher. And a new generation of young archaeologists – trained in Tribal collaboration – is primed to write new chapters for our national heritage. Collaborations between the archaeologists and CRM professionals of Cibola National Forest, and universities & research institutes, and Tribes could do great things with minimal impact. New knowledge will enhance the Forest's management of cultural resources and will almost certainly provide interpretation for a public increasingly engaged with cultural resources – "heritage tourism."

I have discussed sites on several units of the Cibola NF with Tribal representatives and there appears to be genuine interest in learning more about these sites. For example, the Gallinas Springs site in the Magdalena District: this site is remarkable both for its size & spectacular location, but even more for its pottery, which closely resembles pottery at Mesa Verde National Park (250 miles to the north!). I recently completed a minimally invasive project on a similar site at the head of Alamosa Creek, just south of the Cibola NF; and a team from Arizona State University is wrapping up limited research at a third such site a bit further south. Those three sites, with their "Mesa Verde" pottery, may correspond to traditions of Laguna and Acoma Pueblos of three clans that migrated far to the south, and later re-joined those Pueblos. This is one of many areas of potential collaboration between Tribes and archaeological researchers, with real potential for public interpretation (and appreciation) of both Tribal and archaeological perspectives.

As you know, there are many thousands of cultural resources on the Cibola National Forest, and the NF has done an excellent job managing and conserving these resources. I hope the revised plan will specifically mention the possibility for archaeology research and collaboration.

***Comment:***

I hope the new plan preserves the scenic and wilderness character of the areas of the CNF that have yet to be developed. There are areas that have not been designated as wilderness, yet possess many of the same characteristics as designated wilderness areas. One such area is in the San Mateo Mountains adjacent to the Withington Wilderness. I found that area to have many of the characteristics of wilderness.

Having large tracts of wilderness in relatively close proximity to our state's major population center is important now and will be more so as the population grows.

***Comment:***

1) Fire Closures: Is there a method to limit the size of a closure? For example, Big Block approximately 4.5 miles south of the Tijeras Ranger Station is less than 100 yards from South 14. If there is substantial danger north of I-40 could this local area remain open?

2) Raptor Closures: The entire Shield is closed between 1 March and 15 August. It appears the closure is traditional at present. What about limiting the length of the closure and / or the physical size of the closure.

3) Lower La Cueva Picnic Area: The picnic area is currently closed between late October until May of the next year. Both hikers and climbers would use the trailhead for a longer season if not closed. What are the chances of making the closure only for the coldest portion of winter?

4) Fixed Anchor Policy: The Cibola National Forest, and NM Crag + NM Mountain Club + Access Fund discussed this issue in August 2010. It would be fruitful to use the guidelines discussed at these meetings in the new forest plan revision. Specifically, reasonable fixed anchor use is both appropriate and allowed within wilderness areas.

***Comment:***

We are particularly concerned about the increasing prevalence of ORVs (and motorized dirtbikes) on public land. The damage to habitant is tremendous. When we go hiking we see deeply rutted areas with no grass and prime for erosion. Also the noise from motorized vehicles ruins our opportunity to experience the quiet save for the sounds of birds and the rustling of trees.

With the prediction of pervasive draught in the southwest our forest and grasslands will be even more vulnerable to the destructiveness of motorized vehicles. Let's make preservation of habitat and quiet places the primary goal of the Forest Plan.

***Comment:***

The New Mexico Archeological Council is thankful for the opportunity to comment on the Cibola National Forest revised management plan. NMAC has focused commentary on topics 7 (benefits people obtain from the forest) and 13 (cultural and historic resources), and has offered additional comments related to current legislative threats to the Forest. Many NMAC members and readers have carefully considered the issues for consideration and have offered commentary. This letter is a compilation of membership commentary.

1. The 1985 Forest Plan does not address establishment and oversight of Traditional Cultural Properties, an understandable omission since the 1985 Plan was written prior to enabling legislation. The new Plan must present robust mechanisms for qualifying, delineating, and monitoring Traditional Cultural Properties. The development of such mechanisms must include Tribal and professional consultation.

2. We applaud Cibola National Forest for its attention to diligent recording of heritage resources throughout the Forest and recommend that Forest management continues to sponsor landscape-level inventory surveys and analysis of historic properties across the Forest. Such actions must be conducted with sensitivity to Tribal and public concerns. Archeological inventory surveys must be conclusive and recommend readily executable treatments for threatened properties. We note the absence of ethnological and ethnographic survey in the 1985 Plan and strongly recommend the inclusion of oral and photographic recording methodologies in the new Plan.

3. Research permits on the Forest should be issued in a timely manner to qualified applicants, especially in areas of the Forest where site security has been or may be compromised. Appropriate interpretative results of research on the Forest should be utilized aggressively to foster more public archeology programs aimed at informing and educating all interested New Mexicans. Public archeology programs may include partnerships with NMAC, ASNM, Tribal components, and members of the New Mexico legislative body.

4. Cibola National Forest must take a leadership role in addressing Forest management concerns that have been widely publicized by politicians who would eradicate Federal control of the Forest. Leadership actions would include the formation of one or more committees that would actively monitor legislative efforts to displace Federal management of the Forest for the benefit of accelerated for-profit extraction interests without consideration of effective cultural resource management. The Forest must take an active role in commenting on and lobbying against such efforts.

5. Summary updates of analyses and treatments must be made available to all New Mexico Legislators so that they may better evaluate the effects of legislation that may directly impact Public Lands. A Legislative email list should be assembled and communication with Legislators should be frequent.

6. NMAC applauds efforts made by Cibola National Forest toward effective Forest management. However, Forest management must aggressively analyze and correct the perception of Federal management short-comings in order to bolster public appreciation of the Forest and to help deter legislation that would re-distribute Forest management to the State level. Such corrections may include effectively disseminating information that better equips public and legislative individuals and bodies for formulating opinions regarding Forest management.

7. I have included below an excerpt from the commentary of NMAC member Dr. Stephen H. Lekson, Curator and Professor of Anthropology, University of Colorado Museum of Natural History:

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I have discussed sites on several units of the Cibola NF with Tribal representatives and there appears to be genuine interest in learning more about these sites. For example, the Gallinas Springs site in the

Magdalena District: this site is remarkable both for its size & spectacular location, but even more for its pottery, which closely resembles pottery at Mesa Verde National Park (250 miles to the north!). I recently completed a minimally invasive project on 3 a similar site at the head of Alamosa Creek, just south of the Cibola NF; and a team from Arizona State University is wrapping up limited research at a third such site a bit further south. Those three sites, with their "Mesa Verde" pottery, may correspond to traditions of Laguna and Acoma Pueblos of three clans that migrated far to the south, and later re-joined those Pueblos. This is one of many areas of potential collaboration between Tribes and archaeological researchers, with real potential for public interpretation (and appreciation) of both Tribal and archaeological perspectives.

NMAC is hopeful that the revised Cibola National Forest Plan will aggressively address the seven points listed above, and is ready and able to help in any way it can.

***Comment:***

I am a Preservation Archaeologist at Archaeology Southwest (formerly the Center for Desert Archaeology) a private, nonprofit research organization based in Tucson, Arizona. Archaeology Southwest promotes the stewardship of archaeological and historic resources in the greater American Southwest through research, preservation, and public education.

My research with Archaeology Southwest has involved work in multiple National Forest districts. Past research projects include site documentation and condition assessment in the Apache and Gila National Forests conducted as part of the Southwest Social Networks project. This project is a multi-institutional, collaborative research effort to compile an enormous research database of prehistoric cultural resources in a large portion of Arizona and New Mexico. In addition, as part of Archaeology Southwest's Preservation Archaeology Field School, we have trained students to document sites on the Gila National Forest, providing information for our research in the Upper Gila region of New Mexico, as well as site management data for the Forest. Finally, I am collaborating with Dr. Suzanne Eckert of Texas A&M University on a research project at Goat Spring Pueblo, an important ancestral Piro archaeological site in the Cibola National Forest, Magdalena District. This project incorporates site excavations, survey, and student training and will result in new interpretations about this significant but poorly understood archaeological resource.

In addition to exploring the research potential of cultural resources within the Cibola National Forest, Archaeology Southwest is concerned with long-term resource management and site protection. In many parts of the Southwest, we have worked with local landowners and various state and federal agencies to help assess and develop protection plans for potentially threatened resources. Regular assessment and management of resources is crucial because cultural resources, especially highly visible archaeological sites, are frequently visited by the public. Unfortunately, these visits may have adverse impacts and sites may be damaged by illegal artifact collecting, looting, camping, or off-road traffic.

In my opinion, periodic revisions to the Forest Plan are essential for successful management not only of the Forest's natural resources, but also its nonrenewable cultural resources. Cultural resources are important for their research value, but they also have intrinsic heritage value as part of regional and

local histories. They also often have particular cultural or religious significance to many Native American groups. Cultural resources in the Cibola National Forest are particularly significant as they are generally protected from development and other adverse impacts and kept for the enduring benefit of the public.

***Comment:***

Torrance County Archaeology Society (TCAS) appreciates the opportunity to comment on the Cibola Forest Plan revision. We applaud the Forest Service for seeking input from the public and interest groups so early in your planning process. TCAS was invited to submit comments regarding (paraphrasing):

1) What TCAS knows about the nature of archeological, cultural, and historic resources on the National Forest;

2) What TCAS knows about the condition of these resources;

3) Why these resources are important/significant in local, regional, and national contexts;

4) Provide information and documentation regarding cultural resources on the National Forest that TCAS believes the Cibola Forest does not have.

What TCAS knows about….

TCAS membership includes residents mostly from the Estancia Basin who are ranchers and farmers some of whom are descendents of homesteaders, area teachers and businessmen, professionals in natural resource agencies, and retirees from many professions and backgrounds. Concerning archaeological, cultural and historic resources of this region, the TCAS mission statement directs our actions: preserve and protect, educate, encourage, cooperate. Our corporate knowledge and concerns for "Heritage Resources" are, in our opinion, extensive for the Mountainair and Sandia Ranger Districts and on lands of other ownership namely within Torrance, Bernalillo and Socorro Counties and beyond.

We understand that there are large unsurveyed and non-inventoried areas of the Mountainair and Sandia Districts for which the presence and condition of heritage resources remain mostly unknown. This represents a huge potential for adding to the existing significant body of knowledge.

The lands within the National Forest Ranger Districts occupying the Manzano/Sandia Mountains and the foothills, mesas and drainages extending from there are integral to the landscape and stories which was the stage on which human life ways have been played out from 12000 BC (or even earlier) to the present. Our area (especially the Estancia Basin, Middle Rio Grande drainage and Salinas Provence) is famous for archaeological/historical sites that span this period. Sites such as Sandia Cave (Sandia RD), Pueblos Colorado, Blanco and de la Mesa, Cement Spring, Kaiser Sawmill, and others are examples of some of the known sites on National Forest. Represented are site types ranging from limited activity sites (ephemeral campsites or stopovers) to permanent settlements.

Local conversation suggests there may have been a pueblo somewhere on the northwest portion of the Gallinas Mountains. From research done in association with TCAS documentation of Cement Springs and vicinity, the presence of trails and roads from the 1800's was indicated in military records, for example, the military road that James Carleton and his men build in 1855. Carleton's road also left the west Gallinas Spring (later called Cement Spring) and went south to Largo Canyon, eventually reaching Fort Stanton. Since Carleton followed an existing prehistoric trail much of the time, his road has more than just historical significance.

TCAS is aware of many specific archaeological resources that at a minimum need to be relocated, re-documented and re-evaluated. A few examples are listed:

Rock art locations

Agricultural features (historic and prehistoric)

Known and suspected Native American shrines and materials gathering locations (recent)

Pipelines, acequias, trails and other linear features

Original land survey features (bearing trees, rock monuments, line trees, Spanish land grant corners (crosses in stone)

Mines and associated features including structural (remains) [especially La Luz mine and cabin], isolated small smeltering sites, historic lime kilns and quarries

Caves including: Ellis, Sandia, Embudo, Manzano

Sawmill sites

Conditions of known sites on the National Forest vary from undisturbed and pristine to highly disturbed/impacted and in danger of serious, permanent damage and/or loss of the resource. Two examples representing differences in condition: a) a mid-sized Pueblo IV mound in the Sandia foothills represents the former and at least one rock art site along Forest Road 55 in the Manzanos, the latter. As a class or type, Rock Art sites may be among the most vulnerable to damage, especially those located along roads or trails or near residential or developed recreation areas. They are often underappreciated and thoughtlessly vandalized or by (human) nature seem to attract vandalism, and as has been witnessed in the Western USA, receive significant damage from attempts to remove rock art icons and panels for sale on the "black market". Similarly, the lure presented by potential profit from illegal sale of artifacts continues to attract pothunters, thus creating an ongoing threat to all pueblo sites. Other concerns arise over the popularity and illegal use (digging/site disturbance) of metal detectors.

TCAS has been a partner with the FS for surveillance and protection of Pueblo Colorado, Pueblo Blanco and Pueblo de la Mesa through the NM Site Watch Program since the late 1990s. We value those partnerships. Looking to the future, TCAS is ready to take on a greater role. We expect to continue as

Site Stewards. TCAS has knowledge of the location of other sites that might be considered for monitoring.

Finally, TCAS would like to be considered as a resource for helping in the area of archaeological site protection, survey and recording on the Cibola Forest. To do this, closer relations, greater trust and investment in training of willing TCAS (and Site Watch) personnel will be required. Higher levels of involvement by TCAS and Cibola Forest could be beneficial for protection of valued resources and efficacy of both organizations in that pursuit.

***Comment:***

Your letter regarding the above named project was received in the New Mexico Environment Department (NMED) and was sent to various Bureaus for review and comment. Comments were provided by the Surface Water Quality Bureau, and are as follows.

Surface Water Quality Bureau

The Cibola National Forest is beginning the process of revising the Land and Resource Management Plan (often referred to as the Forest Plan) for its mountain districts (i.e., all districts except for the National Grassland districts). The Surface Water Quality Bureau (SWQB) would like to provide some early to this process. The current Forest Plan dates from 1985. Many developments in natural resources law, policy, and science have occurred since then. For example, Section 319 of the Clean Water Act, which pertains to nonpoint source pollution control, was not part of the Clean Water Act until 1987.

Addressing Water Quality Problems

SWQB encourages the Forest to become familiar with New Mexico's Nonpoint Source Management Program Plan1, and to assist the State in its implementation. The Plan outlines six objectives. One of the main objectives is to work towards achieving water quality standards in specific priority waters (streams, mostly). These are the streams which the State has found do not meet water quality standards2, and which also have total maximum daily loads developed to better describe the impairments. Mainly due to the arid nature of the Cibola National Forest, very few of these streams are present on Cibola National Forest lands. Bluewater Creek is currently the only stream that flows on Cibola National

1 The plan is available at www.nmenv.state.nm.us/swqb/wps/Plan.

2 The main reference for water quality standards attainment is the State of New Mexico Clean Water Act §303(d)/§305(b)

Integrated List & Report, available at www.nmenv.state.nm.us/swqb/303d-305b.

Forest lands that falls into this category. Bluewater Creek above Bluewater Reservoir is listed as impaired by nutrients and temperature, and has TMDLs in place for these parameters3. The TMDL documents include estimates of pollutant load reductions necessary for the stream to meet water quality standards. In the case of temperature, the TMDL document also provides modeled canopy cover

(75.5% percent total shade) that may be necessary for the stream to never exceed its former temperature standard of 20 °C. The temperature standard4 for Bluewater Creek has since been changed. The maximum temperature is 24 °C, and temperature should not exceed 20 °C for more than six consecutive hours in a 24 hour period on more than three consecutive days.

The Environment Department has assessed (or intends to assess) water quality in relatively few waters on the Forest. Those that flow within the mountain districts (all are streams) are listed in the table below.

Table 1: State of New Mexico assessed waters within the Cibola National Forest mountain districts.

| Assessment Unit Name | Assessment Unit ID | Length on Cibola NF (mi) | Water Quality Standards |
|---|---|---|---|
| Bluewater Creek (Bluewater Rsvr to headwaters) | NM-2107.A_01 | 19.9 | 20.6.4.109 |
| Cebolla Creek (Rio Pescado to headwaters) | NM-9000.A_031 | 4.5 | 20.6.4.98 |
| Las Huertas Ck (perennial prt Santa Ana Pueblo | NM-2108.5_00 | 6.7 | 20.6.4.111 |
| Rio Nutria (Tampico Draw to headwaters) | NM-9000.A_033 | 11.8 | 20.6.4.451 |
| Rio Nutria (Zuni Pueblo bnd to Tampico Draw) | NM-9000.A_029 | 0.3 | 20.6.4.451 |
| San Pedro Creek (San Felipe bnd to headwaters) | NM-9000.A_004 | 3.8 | 20.6.4.125 |
| Seboyeta Creek (Rio Moquino to headwaters) | NM-2107.A_20 | 0.7 | 20.6.4.109 |
| Tampico Draw (Rio Nutria to headwaters) | NM-9000.A_080 | 4.8 | 20.6.4.451 |
| Tijeras Arroyo (Four Hills Bridge to headwaters) | NM-9000.A_001 | 7.6 | 20.6.4.99 |

As mentioned above, Bluewater Creek is listed as impaired and has TMDLs in place to describe the impairments. Cebolla Creek has not been assessed, but SWQB intends to assess it against water quality standards for the 2014-2016 State of New Mexico Clean Water Act §303(d)/§305(b) Integrated List & Report. SWQB examined the hydrology of Cebolla Creek on two dates5, with the result that the stream may be intermittent or ephemeral, and has not decided which which water quality standard will be applied. Las Huertas Creek is listed as impaired by turbidity and nutrients, but TMDLs have not been developed for these parameters. Las Huertas Creek was listed in the past as impaired by sedimentation, but has been delisted based on the results of a pebble count indicating only eight percent fines present. The Rio Nutria (Tampico Draw to headwaters) has not been assessed, due to dry conditions during 2004 water quality survey. San Pedro Creek has an impaired macroinvertebrate community, but a cause (i.e., an explanatory water quality parameter) hasn't been identified. Tijeras Arroyo (Four Hills Bridge to headwaters) is listed as impaired by nutrients, and has an impaired macroinvertebrate community, for which nutrient enrichment may not be the sole cause of impairment. The Rio Nutria (Zuni Pueblo boundary to Tampico Draw), Tampico Draw, and Seboyeta Creek meet their designated uses for which they have been assessed. SWQB conducted a water quality survey in the Zuni watershed in 2011, and several streams in that watershed will be assessed based on the data collected in 2011, for the 2014-2016 State of New Mexico Clean Water Act §303(d)/§305(b) Integrated List & Report.

3 The TMDL documents for Bluewater Creek and other streams are available at www.nmenv.state.nm.us/swqb/TMDL/List.

4 New Mexico water quality standards are available at www.nmenv.state.nm.us/swqb/Standards.

5 The Hydrology Protocol that was applied on one date is described at www.nmenv.state.nm.us/swqb/Hydrology.

Water Quality Protection

New Mexico Water Quality Standards apply to all surface waters of the state, as defined in the standards. As such, the Cibola National Forest is responsible for management of lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, reservoirs or natural ponds on Forest lands. Seeps, springs, and riparian ecosystems are generally either directly included in waters of the state or influence waters of the state. Another main objective of the Nonpoint Source Management Program is protecting water quality, and Cibola National Forest management is key for accomplishing that objective for waters of the state both on the National Forest and downstream of National Forest lands.

Watershed Based Planning

Another objective of the Nonpoint Source Management Program is Watershed Based Planning. For water quality improvement activities, SWQB recommends use of a planning framework described in the Nonpoint Source Program and Grants Guidelines for States and Territories (NPS Guidelines), in the October 23, 2003 Federal Register.

SWQB recognizes the value of the Watershed Condition Framework (WCF) to assist the Cibola National Forest in prioritizing watershed restoration and management activities, and encourages the Forest to incorporate WCF into the new Land and Resource Management Plan. As currently implemented, a key document utilized in the WCF is the Watershed Restoration Action Plan (WRAP). Cibola National Forest has completed a WRAP for a portion of the Bluewater Creek watershed. The WRAP provides much of the information called for in the watershed-based planning framework of the NPS Guidelines. The WCF framework serves the Forest Service appropriately because it addresses a number of resource concerns, and utilizes a broad range of indicators of watershed condition. That sixty-percent of the indicators used in the watershed condition classification are related to aquatic resources means that the two planning frameworks are nearly equivalent. One area in which the Bluewater Creek WRAP could be improved is in setting more quantitative goals related to temperature and nutrients in Bluewater Creek. The two planning frameworks would be exactly equivalent if the WRAP estimated pollutant load reductions that can be achieved with Specific Project Activities.

Interagency Cooperation

Another objective of the Nonpoint Source Management Program is increased interagency cooperation to achieve water quality goals. The New Mexico Environment Department is not able to characterize water quality or other aspects of aquatic environments and watersheds in as much detail or as

accurately as many of our cooperators. There are many opportunities for the Cibola National Forest to participate in the state water quality program, starting with the basic step of providing NMED or the Water Quality Control Commission (WQCC) with supporting information to help WQCC set realistic and attainable water quality standards. SWQB conducts a major review of water quality standards on a recurring basis, with significant changes adopted by WQCC approximately once every five years.

Another opportunity to participate is in providing data to be assessed against existing standards. Each edition of the State of New Mexico Clean Water Act §303(d)/§305(b) Integrated List & Report begins with a call for data, and a call for data is planned in spring 2013, for the 2014-2016 document.

The current Memorandum of Understanding between the New Mexico Environment Department (NMED) and Region 3 of the United States Forest Service (USDA MOU No. 12-MU-11031600-070, "New Mexico Water Quality Protection Agreement") specifically encourages the Forest Service and NMED to "share data, data analysis, and watershed assessment results to improve future planning and management activities on NFS lands", and "use such water quality information for validating existing water quality criteria and designated uses and, when appropriate, develop the data into proposed standards revisions for consideration by the Commission during regularly scheduled water quality standards reviews".

NMED is required to upload water quality data which NMED collects to STORET, where they are publically available. Cibola National Forest staff should feel free to ask for assistance if the encounter challenges locating specific data. A resource which may be useful for identifying and SWQB information resource sis the SWQB Mapper, an on-line GIS tool at http://gis.nmenv.state.nm.us/SWQB. The SWQB Mapper can be useful for identifying sampling stations and answering questions about specific streams such as impairment status and availability of TMDLs. Shape files for any of the GIS data viewable on the mapper are also available upon request.

***Comment:***

HCAE has been volunteering time on the Mt Taylor Ranger district over the last 4 years from doing trash pickup and helping install Kiosk on Mt Taylor. This has been done in partnership with New Mexico Off Highway Vehicle Alliance "NMOHVA" and Mt Taylor Ranger District.

I would like to address 2 items in your letter announcing land and resource management plan under the 2012 Forest service Planning Rule ;

Item 8: Multiple uses and their contribution to the local, regional and national economies

Item 9: Recreational settings, opportunities and access, and scenic character

When you can intertwine Item 8 and Item 9 then you can create an atmosphere that can help interject outside money into the local economies through Motorized Recreation. When you create environment which promotes rural economies to motorized recreation then you can draw parallels between Moab and Paiute Trail in Utah. Moab having a similar back ground as Grants uranium mining and mining in the rural areas around the Paiute trail. These areas have benefited from this substantially from the influx of

outside money to which their local economies directly benefit from motorized recreation. Also, the weather and environment are also similar to which you can maximize recreation quite a bit of the year

What I would not like to see:

Within the Land and Resources Management Plan for the Kiowa, Rita Blanca, Black Kettle and McCellan Creek :

Desired Conditions

The designated road and trail system accommodates various classes of motor vehicles. The system provides a safe experience that minimizes impacts to soil, water, vegetation, wildlife, scenic, and heritage resources.

Opportunities for OHV use occur where the motor vehicle use map (MVUM) shows designated roads, trails, and areas. The designated system reduces the impact of roads and trails to resource values by prohibiting unauthorized road and trail development and correcting or mitigating poorly located system roads and trails. Motor vehicle use is especially limited in areas that provide outstanding nonmotorized recreation opportunities, such as in Mills Canyon and the Santa Fe National Historic Trail corridor. Where OHV opportunities are provided, routes occur in areas where natural resource impacts can be minimized. Conflicts with other uses are minimized. A range of experiences and challenge levels appropriate for the level of recreation opportunity spectrum exists, particularly in areas designated as roaded natural, rural, and semiprimitive motorized.

Objectives

Within 15 years of plan approval:

Rehabilitate all unauthorized routes and decommissioned roads, where resource damage is occurring and as funds are available.

Close or reconstruct all routes that are identified as having health and safety issues.

I would not like to see the same thing happen within the Cibola National Forest which you did on the National Grass Lands. The Cibola NFS has no issuance of being able to work with local communities and land owners to Motorized recreation which can/could benefit local communities in the Objectives. The Objectives rehabilitates, decommissions, close or reconstructs all routes. The Cibola truly shows what you want to do and this to promote non-motorized recreation in the above Bold section above in the desired condition. If Cibola NFS didn't want this then why would you mention non-motorized opportunities in the motorized section?

What I would like to see:

True multiuse and not limiting one to benefit another

Tourism is one of greatest money makers for business in New Mexico that hasn't be exploited in the rural communities. Make it an OBJECTIVE to work with rural communities to use the NFS to bring monies to the rural economies. Enhance their ability to use OHV tourism as one of the many items it takes to support a local economy.

Promote OHV tourism access to bring others to camp and stay in local areas around and in the National forest.

Do something to help the rural communities and not reason for them to hate the bureaucratic nightmare of the United States Forest Service.

***Comment:***

I work for the Cottonwood Gulch Foundation, a non-profit that focuses on environmental and experiential education. We regularly use the Cibola NF lands for our programs, and our Base Camp borders the Cibola NF in the Zuni Mountains south of Thoreau.

We are happy to participate in the creation of a new Forest Plan. Our main concerns are the preservation of the National Forest as an ecologically healthy place. We camp, hike, backpack, and run educational programs on National Forest land every year, and while we wholeheartedly support a "land of many uses," we also know it is important to acknowledge that the days of clearcutting forests and overgrazing our grasslands need to be behind us. We support policies that preserve the health of the forest ecosystem that include sustainable practices of recreation, logging, grazing, hunting, etc. We also support active restoration in areas that have been previously damaged by humans, as well as a strong effort to prevent catastrophic forest fires, especially near our Base Camp.

***Comment:***

I have been actively pursuing archaeological and historical research in New Mexico since 1971. The skein of human existence in New Mexico captured my passion years ago and I believe that preserving our shared history in all its many manifestations (archaeology, archives, oral accounts) is important. I also know that this view is not universal and that many feel that archaeological data in particular, while interesting, are not key to our future development and should be relegated t o a lesser status when considering management of our public lands.

What is not universally understood is that archaeological data is also environmental data and that archaeology provides us with the longest available record of human interaction with a changing environment. This is because the archaeological data provides a temporal context for environmental conditions reflected in the charred plants, animal bone, soil deposition, carbon isotopes, and pollen that can be bracketed in time by the presence of artifacts and living surfaces altered by human occupation.

For the last 15 years I have been pursuing a research project on private land located on the fringes of the Cibola National Forest in Socorro County. The Canada Alamosa Project has focused on the

excavation, testing and recording of an array of archaeological sites that, taken together, reflect a 4000 year sequence of human activity in the region. Our project is multi-disciplinary and has incorporated individuals trained in botany, palynology, zoology, and soil science. Their studies have resulted in significant insights regarding the environmental history of the area, a few examples which are presented here:

1)The macrobotanical samples recovered from the fire pits and ash lenses of the prehistoric archaeological sites have yielded a robust 700 year (A.D. 700-1400) sequence reflecting the changes in the local plant community during that period. The data indicate that use of local wood shifted from a broad based use of both riparian and upland species (including ponderosa and pinon) to almost exclusive use of juniper and mesquite by the end of the sequence. Some non-woody riparian species such as fragmites are present in the archaeological remains but are not present in the canyon today, suggesting that the riparian environment was much more stable prehistorically. Mesquite is present throughout that sequence and was clearly growing at elevations of at least 6000 feet prior to A.D. 1000 and long before the introduction of cattle. As each firepit can be dated to within a 100 year period, the macrobotanical data provides a fine-grained view of changes in the prehistoric environment.

2) Pollen samples taken by soil scientists from both higher and lower terraces of the Alamosa clearly indicate that both riparian and upland terraces were supporting corn agriculture. The presence of corn and squash pollen in lower terraces now truncated by flooding point to a time when the riparian zone was much more stable and also suggests the possibility that denuding the riparian area for farming may have begun the erosional pattern that we see today.

3) Faunal material has yielded large numbers of the expected species (e.g. deer and rabbits) but has also held some surprises. Remains from the largest of the sites supports the growing body of data that the Plains of San Agustin supported herds of bison until at least the 13th century. More surprisingly, the remains of peccary, thought to have been a recent intrusion into the area, have been identified from excellent 14th century context on the Pinnacle Ruin.

4) Soil scientists have long been intrigued with the cutting and filling episodes revealed in the arroyo banks of the American Southwest. When they can be accurately dated, they reveal much about past climates. More recently the study of carbon isotopes (isotopes left in the soil after a plant has decomposed) has allowed even greater interpretation of climate change. Archaeology becomes important because human occupation of a land surface almost inevitably leaves temporally diagnostic artifacts and charcoal that can be radiocarbon dated, providing the soil scientist a temporal context for changes in both soil deposition (erosion vs. stability) and the nature of the carbon isotopes (shifts in the dominance of C3 (shrubs and woods) versus C4 (grasses) plants over time). Dr. Monger's work has provided data for the reconstruction of a 4000 year sequence of regional climate change as the carbon isotopes reflect shifting patterns of C4 and C3 plants over time. Without the presence of archaeological materials, dating these patterns would be much more difficult.

5) A final note is that serendipity (the finding of things not searched for) often plays an important role in research. Our initial goal for the Canada Alamosa Project was to gather data to reflect a 2000 year

sequence of human occupation and a changing environment within the Rio Alamosa watershed. In our last year of excavation, we worked on the Montoya Site which contains a 12th century pueblo occupation. The west side of the site is covered with an alluvial slope emanating from the canyon wall. Some pueblo rooms were set into that slope and we wondered how many more might be buried in the alluvium. Excavation of several test units revealed an organic, artifact laden fill in the upper 30-40 centimeters. Below that a hard, compact non-organic soil continued for another meter until the surface of the ancestral stream terrace was reached. At that interface several small fragments of corn cobs were found. Radiocarbon dating provided dates of 3925 and 3973 BP (before present) for these small and very grass-like cobs. These dates verify that these samples are some the very oldest corn found in the American Southwest. Most of the other early corn has been found in rock shelters. How much more might be buried in the deepest levels of open archaeological sites?

My point in this letter is to inform land managers of the various ways that archaeological sites can contribute to our understanding of the environments that they are responsible for managing. It's not just about pottery and arrowheads.

***Comment:***

We wish to comment on topic 9. (recreation settings, opportunities and access, and scenic character) as it relates to the Continental Divide National Scenic Trail.

The CDNST needs to be recognized as a Congressionally designated area and, as provided in the Forest Service Manual (2353.44b), the land management plan must establish a management area for the Trail – one that is broad enough to protect natural, scenic, historic, and cultural features.

The plan should establish (within the Mt. Taylor Ranger District) the trail class, managed uses, designed use, and design parameters for the segments of the CDNST that traverse the District and identify uses that are prohibited on those segments. The plan should prohibit motor vehicle use along the Trail, with the limited exceptions set out in FSM 2353.44b para. 11. The plan should consider whether any segment that may be located on a road is one that "is primitive and offers recreational opportunities comparable to those provided by a trail with a Designed Use of Pack and Saddle Stock;" unless the Forest is unable to locate the Trail elsewhere, it should not be located on a road. (Comprehensive Plan IV.B.1.b.)

In all cases, the plan should recognize that "the nature and purposes of the CDNST are to provide for high-quality scenic, primitive hiking and horseback riding opportunities and to conserve natural, historic, and cultural resources along the CDNST corridor" (Comprehensive Plan II.A.). In particular, the plan should reflect the provision of FSM 2353.44b para. 10 that bicycle use may be allowed only if the use will not substantially interfere with the stated nature and purposes (although detailed evaluation might be deferred to subsequent site-specific assessments).

Scenic quality is a prime consideration for achieving the goals and objectives of the CDNST. The Trail is a concern level 1 travel route, and the scenic integrity objective is to be high or very high depending on the segment. Comprehensive Plan IV.B.4c. Even beyond the CDNST management area, certain types of

activities (e.g. large energy developments) should be excluded if they would substantially interfere with the nature and purposes of the Trail.

The plan should provide for the consideration of relocations of the CDNST that would improve the setting, in particular by avoiding the necessity to walk or ride along, or in proximity to, roads. The most important potential relocation, in this regard, is the section within Forest boundaries, between Grants and lower Bonita Canyon (over San Rafael Mesa). In addition, it may be practical to move the CDNST off roads between Antelope Flats and Ojo de los Indios; if not, the road should be managed to be "primitive and [with] recreational opportunities comparable to those provided by a trail with a Designed Use of Pack and Saddle Stock"

The plan should provide for the development and protection of water sources for hikers and pack and saddle stock use – at least where the interval between natural water sources is "excessive," though it would be desirable to do so more frequently (e.g. if the interval is greater than 10 or 15 miles) where practicable. (See FSM 2353.44b. para. 9.)

I would welcome the opportunity to discuss these comments with you.

***Comment:***

We are interested in these topics from the list you sent on October 24, 2012

Terrestrial and aquatic ecosystems and watersheds

Air, soil, and water resources and quality

System drivers

T&E species and species of concern

Social, cultural and economic conditions

Benefits people obtain from the Cibola planning area

Multiple uses and their contributions

Renewable and non-renewable energy

Infrastructure

Existing and future designated areas

***Comment:***

Specific areas of interest to me relate to the rights and interest of existing Special Use Permit holders and the consideration of energy corridors as well as access to them.

***Comment:***

I am particularly concerned about hiker access in the Sandia Ranger District. I want to address two issues: wilderness group size limits and blockage by private land owners of access to trailheads on public land.

I belong to the New Mexico Mountain Club, a group with 820 individual members. It was founded in the early 1950's and is based in Albuquerque, though it has members throughout the state. All NMMC activities are open to the public. For the last sixty years, the NMMC has successfully introduced novice hikers to the beauties that surround us.

NMMC sponsors Saturday and Sunday hikes within a 120-mile radius of Albuquerque, so destinations can include all four of the Cibola Ranger Districts, the Santa Fe and Carson Nat'l Forests and other public lands. NMMC has a technical rock climbing section that makes use of crags in the Sandias and elsewhere. There are also week-end and week-long car camping and back packing outings, in-state and occasionally in Colorado, Utah and Arizona.

However, the most concentrated area of use by NMMC is in the Sandia Ranger District. The NMMC has three standing hikes every week in the Sandias. There is a Sunday afternoon hike of 3 to 5 miles, usually on the west side in winter and east side in summer, attended by 2 to 12 people. There is a Tuesday evening hike which always has a fixed destination: the La Luz trail from April to October, and the Elena Gallegos Open Space from November to March. The Tuesday hikes have been going on for at least 25 years to my knowledge. Current attendance is 2 to 8 people, but in earlier years, groups of 20 or more weren't unusual. There is also a very popular Wednesday morning hike which has been going on for 20 years or more. The Wednesday hikers are mostly retirees who are free on week days. Until this last year, the Wednesday group has been attracting 18 to 25 people for winter foothills hikes and Crest snowshoe trips, and summer hikes on the Crest and east side of the mountain. The recent enforcement of group-size limits in the Sandia Wilderness has had a big impact, particularly on the Wednesday hiking group.

There are many other groups, formal and informal making regular use of the Sandia Wilderness trails. Ones that I am personally acquainted with include the Happy Hoofers, the Wayward Women, the Tuesday Trekkers and the Albuquerque Senior Center hiking groups. The Albuquerque Mountain Rescue Team holds training sessions in the Sandia Wilderness.

I understand that a federal court decision has mandated group-size limits in the Shur Bien Trust Area, which includes the Fletcher Trail, the Movie Trail, the Rincon Trail and the southern end of the Piedra Lisa Trail. I appreciate that a transition zone has been drawn to allow a larger group-size on the La Luz Trail. I recognize that some sort of group-size limit might be desireable for a wilderness close to an urban area to prevent overuse.

However, the 10-person limit seems unnecessarily restrictive for the of the Sandia Wilderness outside of the Shur Bien Trust, given the history of decades of responsible use by local groups. The Transition Zone chops up important trails at unmarked points, which is confusing to hike planners. Serious hikers usually think of a trail as a whole. Important trails that cross from transition zone to semi-primative zone include Pino, Embudito, White Wash, Emudo, Three Gun, both ends of the Crest Trail, Barts,

Canyoncito, La Cienega, Osha, and even the Faulty Trail. In terms of how people actually use the wilderness, it makes more sense to apply the group size limit to the trail as a whole. I don't like subdividing the wilderness into zones, but If it has to be done, place the zone boundary at significant trail junctions like Oso Pass which make sense for route planning.

I feel that 20 is a reasonable group size for the entire Sandia Wilderness. If that can't be done across the board, consider issuing year-long exemption permits for groups like NMMC that have a record of responsible leadership. If overuse becomes a problem, consider a lower group-size limit for weekends when use is heaviest. In my experience as a Wednesday hiker, it's infrequent to meet anyone beyond the first mile up a wilderness trail on a weekday, especially in winter.

My second concern about the Sandia Ranger district is access to the Cole Springs picnic ground and the trailheads for Bart's and Canyoncito Trails. When I moved here in 1985, we could drive to Cole Springs. At some point, private vehicles were excluded from the road and we had to walk the extra mile or so to get to those destinations. In the last couple of years, private landowners have excluded even foot traffic on the access road. I think the Forest Service, in conjunction with other relevant jurisdictions (the county?), should assert the public's right away along historic travel routes. Re-establishing access to this portion of the Ranger District will have the positive effect of dispersing use that is now being concentrated at La Cienega and Doc Long's. Ideally, re-establishing access would include repairing the section of road that is on public land. It has become badly eroded.

One more small point: there is a need for coordination between the Sandia Ranger District and the adjacent Albuquerque Open Space about place names. Case in point: the Piedra Lisa is a popular, long-established trail at the north end of the Sandia Wilderness, easily accessed from Albuquerque. Quixotically, the Albuquerque Open Space recently applied the name Piedra Lisa to an area in the Sandia foothills at the east end of Menual Blvd. Now, when you ask Google Maps for directions to the Piedra Lisa, it takes you to the end of Menual, which is actually White Wash Trailhead. I've personally met one very confused hiker and I'm sure there have been more. I know the Forest Service didn't create this mix-up, but maybe they could establish a liaison with ABQ Open Space to solve it.

***Comment:***

My interest is in recreation opportunities in the units of the CNF. I hope the new plan preserves the scenic and wilderness character of the areas of the CNF that have yet to be developed. There are areas that have not been designated as wilderness, yet possess many of the same characteristics as designated wilderness areas. One such area is in the San Mateo Mountains adjacent to the Withington Wilderness. I found that area to have many of the characteristics of wilderness.

Having large tracts of wilderness in relatively close proximity to our state's major population center is important now and will be more so as the population grows.

***Comment:***

While I won't make it to the proposed public meetings regarding your ambitious forest plan update, I applaud your efforts.

I also am glad to see that you will be drawing from many of the existing data sources to help guide your plan development, including the 2010 NM Statewide Forest Resource Assessment.

I wanted to let you know (although it is very likely you already are aware of them) about an independent non-partisan research organization that has developed tools to assist the Forest Service and Bureau of Land Management, Headwaters Economics (http://headwaterseconomics.org/). They have an excellent free online socioeconomic tool that generates many relevant preset and custom reports based on US Census Bureau data. They also have other analysis and tools in the areas of wildfire and energy.

I highly recommend visiting their site and seeing how their efforts might dovetail with your Forest Plan revision.

***Comment:***

We would like to see the Red Canyon area thinned out. The forest is overgrown and needs to have fuel reduced to prevent another fire. The Fourth of July Canyon also needs to be thinned. I would also like to see after a fire, that we would fast track to cut large timbers that are destroyed in a fire. After the 3 fires in the Monzano Mtns., all the big trees went to waste. They could have been used as firewood, lumber or some other use. It was a shame to watch 60-70 ft. pine and spruce rot out and have no use. Shame.



Champe Green
Supervisory Forest Planner, Cibola National Forest
2113 Osuna Rd NE
Albuquerque, NM 87113

May 22, 2013

Re: Land Management Plan Assessment

Dear Champe,

With this letter, The Wilderness Society and the Sierra Club are submitting information for consideration and incorporation in the assessment phase of the Cibola National Forest Land Management Plan revision. The 2012 planning rule provides for public participation in the development of the assessment including the submission by non-governmental entities of existing information for the assessment.[1] This submission specifically addresses the "potential need and opportunity for additional designated areas" which is one of the elements that the Forest Service is required to consider in a plan assessment.[2]

In this letter, we demonstrate that there is a potential need and opportunity for additional designated areas, including recommended wilderness, on the Cibola National Forest. The opportunity lies in the fact that there are over 280,000 acres of inventoried roadless areas (IRAs) plus additional un-inventoried roadless areas, and most are not currently protected with a conservation designation specific to the ecological and social benefits they provide. By conferring protective designations, including recommended wilderness, in the forest planning process, we can meet outstanding ecological and socio-economic needs. In particular, we can protect important habitats and species and connect conservation areas regionally to enhance biodiversity and climate change adaptation. We can also provide additional

[1] 36 CFR 219.4 requires the responsible official to provide participation opportunities: "The responsible official shall provide opportunities to the public for participating in the assessment process…"

36 CFR 219.6(a)(2) requires the responsible official to "Coordinate with or provide opportunities for…. other governmental and non-governmental parties, and the public to provide existing information for the assessment."

[2] 36 CFR 219.6(b)(15) states, "In the assessment for plan development or revision, the responsible official shall identify and evaluate existing information relevant to the plan area for the following….(15) Existing designated areas located in the plan area including wilderness and wild and scenic rivers and potential need and opportunity for additional designated areas."

places for people to experience nature and wildness, and pursue outdoor nature-based activities. Surveys show that people want more wilderness and places to recreate in wildlands settings.

The body of this letter is divided into two sections. The first addresses the potential ecological need and opportunity, and the second addresses the potential socio-economic need and opportunity. We are attaching a list of references, and a number of appendices including short annotated bibliographies of selected citations. The 2012 planning rule requires the responsible official to "use the best available scientific information to inform the planning process….In doing so, the responsible official shall determine what information is the most accurate, reliable, and relevant to the issues being considered."[3] The information we used to inform this letter constitutes the best available science that we could find. We ask that you consider it as such, or explain why you are not considering it the best available science.

Section 1. Potential Ecological Need and Opportunity for Additional Designated Areas

In this section, we demonstrate that there is the opportunity to protect additional areas on the Cibola National Forest, and an ecological need to conserve biodiversity and natural systems.

A. The Cibola National Forest has the opportunity for additional designated areas.

1. The Cibola National Forest has numerous unprotected and undeveloped tracts that are available for additional protections in the forest planning process.

The Cibola National Forest currently has 137,701 acres designated as wilderness. In addition to these acres, it has 246,000 acres classified as IRAs pursuant to the Roadless Area Conservation Rule.[4] Based on our recent field inventory experiences, we know that there are additional roadless lands adjacent to and near the IRAs. Over the past year, The Wilderness Society and Sierra Club inventoried roadless lands on the Cibola National Forest in order to identify places with wilderness characteristics and/or remarkable features that may warrant special designation. We focused our efforts on approximately 285,000 acres in and around IRAs in the Magdalena, Mt. Taylor, and Sandia Ranger Districts where we have found remarkably wild and unique places. In particular, we found that it is common for the roadless lands to stretch beyond the IRA boundary, forming larger roadless patches than those identified by the IRA boundary alone.

2. The Cibola National Forest has roadless areas located adjacent to BLM Wilderness Study Areas, Lands with Wilderness Characteristics, and Special Management Areas.

There are a number of places in the Cibola National Forest where BLM Wilderness Study Areas are adjacent to IRAs. Examples of this occur at the Mt. Taylor-Guadalupe IRA and the Scott Mesa IRA. The adjacency of these undeveloped and important places offers opportunities to protect broader landscapes, especially those that include higher and lower elevation areas and a variety of habitats, and explore cooperative management opportunities. See Appendix D for maps showing adjacency of IRAs and BLM protected areas.

3. The Cibola National Forest has regionally significant wild areas.

[3] 36 CFR 219.3
[4] Final EIS for the Roadless Area Conservation Rule, Volume 2.

In 2000, Aplet et al (2000) applied a wildness index to map wildness at the scale of the contiguous United States. Grounded in the understanding that wildness is present in varying degrees in all lands as a function of the relative freedom and naturalness of the place, Aplet's wildness index is based on aggregated values for six attributes: solitude, remoteness, uncontrolled processes, natural composition, unaltered structure, and pollution. Although there are a number of wildness indices, the value of Aplet's wildness index is that it enables a consistent comparison of wildness values across a region and across the country and can point out the larger places with wildness values and the potential to connect them (Aplet et al, 2000).

When we look at the wildness map developed by Aplet et al in the region of the Cibola National Forest (see Appendix C), we see that the Cibola National Forest -- and in particular the Magdalena Ranger District -- have very high wildness values. In addition, we can see that regionally the wild lands within portions of the Cibola National Forest are important pieces in a larger network of wild lands in southwest New Mexico and southeastern Arizona that includes Bureau of Land Management Wilderness Study Areas (WSA), designated wilderness areas, and US Fish and Wildlife Service Refuges.

B. Protecting undeveloped natural areas on the Cibola National Forest will help address current ecological needs in New Mexico related to biodiversity, connectivity, and climate change adaptation.

    1. Protecting undeveloped areas helps conserve habitats, biodiversity, and enhance climate change adaption.

Undeveloped natural lands provide numerous ecological benefits. They contribute to biodiversity, enhance ecosystem representation, and facilitate connectivity (Loucks et al, 2003; USDA 2001; Crist and Wilmer, 2002; Wilcove, 1990; The Wilderness Society, 2004; Strittholt and Dellasala, 2001; DeVelice and Martin, 2001), and provide high quality or undisturbed water, soil and air (Anderson et al, 2012; Dellasalla et al, 2011). They also can serve as ecological baselines to help us better understand our impacts to other landscapes (Manage, 1997).

Forest Service roadless lands, in particular, are heralded for the conservation values they provide. These are described at length in the preamble of the Roadless Area Conservation Rule (RACR)[5] as well as in the Final Environmental Impact Statement (FEIS) for the RACR[6], and include: high quality or undisturbed soil, water, and air; sources of public drinking water; diversity of plant and animal communities; habitat for threatened, endangered, proposed, candidate, and sensitive species and for those species dependent on large, undisturbed areas of land; primitive, semi-primitive non- motorized, and semi-primitive motorized classes of dispersed recreation; reference landscapes; natural appearing landscapes with high scenic quality; traditional cultural properties and sacred sites; and other locally identified unique characteristics (e.g., include uncommon geological formations, unique wetland complexes, exceptional hunting and fishing opportunities).

In addition to the description of the value of roadless lands to the conservation of biodiversity in the FEIS, numerous articles in the scientific literature recognize the contribution of roadless and undeveloped lands for biodiversity, connectivity, and conservation reserve networks. For example,

[5] Federal Register .Vol. 66, No. 9. January 12, 2001. Pages 3245-3247.
[6] Final Environmental Impact Statement, Vol. 1, 3–3 to 3–7

Loucks et al (2003) examined the potential contributions of roadless areas to the conservation of biodiversity, and found that more than 25% of IRAs are located in globally or regionally outstanding ecoregions and that 77% of IRAs have the potential to conserve threatened, endangered, or imperiled species. Arcese and Sinclari (1997) highlighted the contribution that IRAs could make toward building a representative network of conservation reserves in the United States, finding that protecting these areas as reserves would expand ecoregional representation, increase the area of reserves at lower elevations, and increase the number of areas large enough to provide refugia for species needing large tracts relatively undisturbed by people. Crist and Wilmer (2002) looked at the ecological value of roadless lands in the Northern Rockies and found that protection of national forest roadless areas, when added to existing federal conservation lands in the study area, would 1) increase the representation of virtually all land cover types on conservation lands at both the regional and ecosystem scales, some by more than 100%; 2) help protect rare, species-rich, and often-declining vegetation communities; and 3) connect conservation units to create bigger and more cohesive habitat "patches."

Roadless lands also are responsible for higher quality water and watersheds. Anderson et al (2012) assessed the relationship of watershed condition and land management status and found a strong spatial association between watershed health and protective designations. Dellasalla et al (2011) found that undeveloped and roadless watersheds are important for supplying downstream users with high-quality drinking water, and developing these watersheds comes at significant costs associated with declining water quality and availability. The authors recommend a light-touch ecological footprint to sustain the many values that derive from roadless areas including healthy watersheds.

The Forest Service, National Park Service, and US Fish and Wildlife Service recognize that protecting and connecting undeveloped areas is an important action agencies can take to enhance climate change adaptation. For example, the Forest Service National Roadmap for Responding to Climate Change (2011) establishes that increasing connectivity and reducing fragmentation are short and long term actions the Forest Service should take to facilitate adaptation to climate change.[7] The National Park Service also identifies connectivity as a key factor for climate change adaptation along with establishing "blocks of natural landscape large enough to be resilient to large-scale disturbances and long-term changes" and other factors. The agency states that: "The success of adaptation strategies will be enhanced by taking a broad approach that identifies connections and barriers across the landscape. Networks of protected areas within a larger mixed landscape can provide the highest level of resilience to climate change."[8] Similarly, the US Fish and Wildlife Service's National Fish and Wildlife Adaptation Strategy calls for creating an ecologically-connected network of conservation areas. [9]

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[7] Forest Service, 2011. *National Roadmap for Responding to Climate Change*. US Department of Agriculture. FS-957b. Page 26.

[8] National Park Service. *Climate Change Response Program Brief.* http://www.nature.nps.gov/climatechange/adaptationplanning.cfm. Also see: National Park Service, 2010. *Climate Change Response Strategy*. http://www.nature.nps.gov/climatechange/docs/NPS_CCRS.pdf. Objective 6.3 is to "Collaborate to develop cross-jurisdictional conservation plans to protect and restore connectivity and other landscape-scale components of resilience."

[9] See http://www.wildlifeadaptationstrategy.gov/pdf/NFWPCAS-Chapter-3.pdf. Pages 55- 59. The first goal and related strategies are:

> Goal 1: Conserve habitat to support healthy fish, wildlife, and plant populations and ecosystem functions in a changing climate.

2. Protecting undeveloped areas on the Cibola National Forest will help to protect habitats, biodiversity, and enhance climate change adaption in the southwest United States.

Undeveloped areas on the Cibola National Forest contribute to the biological diversity and ecosystem integrity of the National Forest and surrounding areas. The Cibola 'sky islands' region of New Mexico is ecologically rich, hosting more species of birds and mammals than any other ecoregion in the Southwest, and is home to more than 200 rare plants and animals, of which more than 30 are listed as endangered or threatened by the federal or state governments (The Nature Conservancy, 2009). New Mexico Game and Fish, in its Comprehensive Wildlife Conservation Strategy (New Mexico Game and Fish Department, 2006), identified 80 species of greatest conservation need (SGCN)[10] in the Arizona-New Mexico Ecoregion, ranking it the second out of six ecoregions in the state for SGCN (See Map 1).[11] Similarly, it identified 53 SGCN in the Rio Grande Watershed, which contains the Cibola National Forest's four mountain districts, ranking it second out of eight watershed regions for SGCN.[12]

Menke (2008) found that the Cibola National Forest is likely to offer quality cougar habitat, and, by extension, quality habitat for a number of wide-ranging carnivores. Top-down predation is an important element in naturally functioning ecosystems (Miller et al, 2001; Terborgh et al, 1999). Menke modeled suitable cougar habitat under contract to the New Mexico's Departments of Transportation and Game and Fish to assist both departments with implementing key wildlife strategies, initiatives, and plans. The analysis focused on cougars for several reasons: 1) cougars have been identified as a species of conservation concern in both regional conservation plans and the New Mexico Comprehensive Wildlife Conservation Strategy, 2) this is the only wide ranging species for which adequate habitat data existed to conduct such an analysis, 3) it was assumed that cougar could serve as a surrogate for other wide ranging carnivorous species such as marten (*Martes americana*), gray wolf (*Canis lupus*), jaguar (*Panthera onca*), swift fox (*Vulpes velox*) and kit fox (*Vulpes macrotis*) where habitat overlaps. His model shows considerable overlap between Inventoried Roadless Areas on the Cibola National Forest and quality cougar habitat (see Map 3).

In the last decade, The Nature Conservancy (TNC) completed an ecological assessment of the eleven national forests in the southwestern region of the Forest Service in order to help the agency evaluate

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Strategy 1.1: identify areas for an ecologically-connected network of terrestrial, freshwater, coastal, and marine conservation areas that are likely to be resilient to climate change and to support a broad range of fish, wildlife, and plants under changed conditions.

Strategy 1.2: Secure appropriate conservation status on areas identified in Strategy 1.1 to complete an ecologically-connected network of public and private conservation areas that will be resilient to climate change and support a broad range of species under changed conditions.

Strategy 1.4: Conserve, restore, and as appropriate and practicable, establish new ecological connections among conservation areas to facilitate fish, wildlife, and plant migration, range shifts, and other transitions caused by climate change.

[10] SGCN are species with small or declining populations or other characteristics that make them vulnerable, including those currently listed at the state or federal level.

[11] Of the 80 SGCN in the Arizona-New Mexico Ecoregion, there are 4 amphibians, 35 birds, 16 mammals, 15 molluscs, and 10 reptiles.

[12] Of the 53 SGCN in the Rio Grande Watershed, there are 2 crustaceans, 11 fish, 6 amphibians, 18 birds, 6 mammals, 7 molluscs, and 3 reptiles.

biological and ecological diversity in the forest planning process. TNC utilized four existing landscape level ecological assessments to identify and summarize important biological values that exist on Region 3 forests. (The Nature Conservancy 2004). One of the four assessments used was their own eco-regional assessment process (The Nature Conservancy, 1999). TNC's ecoregional assessments identify the minimum set of areas (conservation areas) on the landscape that are necessary to maintain the biological diversity of the larger ecoregion. TNC's methodology for identifying key conservation areas in the Cibola National Forest is covered in Chapters 2 and 10 in their report entitled "Ecological and Biological Diversity of National Forests in Region 3" (The Nature Conservancy 2004).

TNC's analysis for the ecoregion that includes the highlands of eastern Arizona and western and central New Mexico found that the Cibola National Forest has the largest proportion of overlap with ecoregional conservation areas of all National Forests within Region 3 (see Map 2).[13] Seven individual conservation areas overlap the Cibola National Forest, totaling 703,100 acres, or 33% of the forest. Overall, 76% of the total area of these seven conservation areas overlaps the Cibola National Forest. These seven conservation areas include 39 conservation targets, including 27 individual species. In particular, TNC identified the San Mateo, Magdalena, and Datil Mountains on the Magdalena Ranger District as key conservation areas because of their ecological diversity (The Nature Conservancy, 2004).

The specific locations where conservation areas overlap the Cibola highlight important places for potential conservation of ecosystem and species diversity on the Forest and within the region. Approximately two-thirds (66.2 percent) of the area of the Cibola National Forest overlapped by conservation areas do not have a specific land use designation (i.e. Wilderness or Inventoried Roadless Area) that would serve to protect the conservation target.[14] This argues that achieving biodiversity on the Cibola National Forest most likely will not be accomplished entirely within existing designated areas, and that there exists a potential need and opportunity to designate additional areas to sustain biodiversity on the forest.

Section 2. Potential Socio-Economic Need and Opportunity for Additional Designated Areas

In addition to its ecological values, protected areas, including wilderness, are important because they contribute to people's social and economic well-being. In this section, we examine the social and economic case for additional wilderness and designated areas. We review recent trends in recreation, population growth, and public values, and discuss the economic contribution associated with wilderness, designated areas, and land conservation.

A. Public Opinion Shows a Need for More Wilderness.

[13] The assessment relied on four major datasets: (1) input from experts on different taxonomic groups and ecological systems within the ecoregion obtained through a series of experts workshops and personal interviews; (2) species and natural community occurrence data stored in the Heritage databases of New Mexico Natural Heritage Program, the Arizona Heritage Data Systems, and the Navajo Heritage Program; (3) derived land management status and vegetation layers of the Gap Analysis Program of New Mexico and Arizona; and (4) forest habitat plot data from the Forest Service. Target species and natural communities were selected based on the following: (a) all G1-G2 species and T1 and T2 subspecies; (b) all species that are endemic to the ecoregion; (c) selected G3-G5 species that are declining and are representative of, or peripheral to, the ecoregion; and (d) rare, restricted, or declining natural communities or habitat types of the ecoregion.

[14] About 19.5 percent of the overlap area is in an Inventoried Roadless Area and 14.3 percent is Wilderness Area.

Surveys consistently show that American's value wilderness and generally favor the designation of additional wilderness. For instance,

- In chapter 7 of Cordell's (2005) Multiple Values of Wilderness that addresses the social values of wilderness, Schuster et al looked at survey results at the national, regional, and state levels and found that: (a) overall there is consensus across groups within the American population that there is not enough wilderness, regardless of how the data are stratified; (b) residents support designating more wilderness in their state of residence; and (c) Americans are willing to make unspecified monetary tradeoffs to gain additional wilderness.

- As of 2006-2007, more than two-thirds of American citizens (67 percent) nationally support the designation of additional wilderness in their home state (Cordell 2008a).[15]

- As of 2001, the majority of Americans feel that the current percentage of the National Forest System designated as wilderness is not enough (Scott 2003).[16]

- Over half of Americans (almost 51%) indicated there is not enough wilderness. Only 4% expressed the opinion that there is too much (Cordell 2008a).[17]

- American's are willing to accept higher costs for electricity, gasoline, and other consumer products to have more wilderness lands designated and to have higher quality air over and near wilderness (Scott 2003).

Specific to New Mexico,

- Over half of New Mexicans believe that there is not enough designated Wilderness in their state. Only 5 percent of New Mexicans indicated they felt there was too much land designated as wilderness. (Scott 2003)[18]

B. Wilderness in New Mexico is under-represented compared to other states.

New Mexico comparatively has less designated wilderness than other western states. Consider the following statistics:

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[15] When asked how they felt about designating more of the federal lands as Wilderness in their home state, 67 percent of National Survey on Recreation and the Environment (NSRE) respondents indicated they somewhat or strongly favor more.

[16] Question: "Currently, 18% of the land in the United States' national forests is permanently protected from logging and other development. Do you think the U.S. has too much permanently protected areas in the national forests, not enough protected areas in the national forest, or the right amount of permanently protected areas in the national forests, or aren't you sure about that?" N=1,000 likely voters.

[17] NSRE respondents were asked their opinions about whether they saw the amount of federal land now designated as Wilderness as too little, about right, or too much. Over half in 2006-2007 (almost 51%) indicated there is not enough Wilderness, and 35% indicated the amount is about right. Only 4% expressed the opinion that there is already too much.

[18] A 2002 study asked residents of New Mexico if there is enough designated Wilderness in their home state. Results show 57% of residents feel that there is "not enough;" that is, there is "too little" wilderness in their state. Only 5% of New Mexicans indicated they felt there was too much land designated as wilderness.

- Nationally, designated wilderness represents just over 18% of all National Forest System acres. In Region 3, designated wilderness represents about 13% of all National Forest System acres.
- For wilderness acres in the region to achieve the national average would require the addition of about one million acres.
- Only 2% – or 1,650,596 acres – of New Mexico's total land base is protected as federally designated wilderness by all federal land management agencies, the smallest amount of the eleven western states.

C. Participation in outdoor, nature-based recreation is steady or on the rise.

Recreational surveys show that Americans are participating in increasing numbers in recreational pursuits that natural areas such as wilderness provide. According to Cordell (2008a), both the total number of Americans and the total number of days annually in which we participate in nature-based recreation have grown since 1994. In particular, viewing, photographing, and studying nature (e.g., wildlife and birds), have grown strongly (see Table 1); primitive camping and backpacking days increased 12% and 24%, respectively, between 2000 and 2008 (Cordell 2008a).

In addition, a significant percentage of Americans participate in outdoor recreation. For instance,

- Across the country, an estimated 35% of Americans, both urban and rural residents, participated in birding between 2004 and 2007 (Cordell 2008b)
- More than 90 million U.S. residents participated in some form of wildlife-related recreation in 2011. Participation is up 3% from five years earlier. The number of American's who hunted or fished rose from 33.9 million in 2006 to 37.4 million in 2011. (USFWS 2011)
- Americans take between 16 and 35 million trips to wilderness each year on their own or with a guide to hike, backpack, camp, climb mountains, ride horses, ski, raft, canoe, take pictures, view wildlife, or stargaze (Cordell 2005).

Specific to New Mexico and the Southwest region, recent surveys demonstrate that New Mexicans are very active in the outdoors:

- Forty-three percent, 27% and 17% of New Mexicans report that they day hike, primitive camp, and backpack, respectively, compared to 33%, 16%, and 11% of Americans nationally (Cordell, 2004).
- In 2012, 50% of New Mexico voters report that they are regular hikers or campers, and more than 1/3 engage in other outdoor activities such as bird watching or boating. Forty-one percent identify themselves as a hunter or angler (Colorado College, 2013).
- Two-thirds (67%) of New Mexicans plan to visit a national park in the next year (Colorado College, 2013).
- Despite their high level of outdoor activity, 87% of New Mexico voters say children not spending enough time outdoors is a serious problem (Colorado College, 2013).

Specific to the Cibola National Forest, the 2011 National Visitor Use Monitoring Report cites the two most popular recreational activities on the Cibola National Forest by far are hiking/walking and viewing natural features with 35% and 15% of visitors citing these as their main activities, respectively (USFS 2011, page 21). This compares to non-wilderness compatible activities such as off-highway vehicle riding in which less than 1% of the Cibola National Forest visitors participate as their main activity (see Table 2).

D. Wilderness visitation is predicted to continue growing.

- The number of days Americans visited wilderness and other primitive areas increased 12% between 2000 and 2008. The number of participants visiting a wilderness area increased 3% in the same time period (Cordell 2008).
- Bowker predicts that population growth in expanding cities in the West and Southwest in particular will result in increased use in wildernesses in the vicinity (Bowker et al. 2006).
- It can also be expected that population increases in the communities adjacent to the National Forests will occur because of their attractiveness in terms of the availability of quality outdoor recreation experiences, clean air and water, and a natural setting (USDA 2005).

Region 3 of the Forest Service echoes these conclusions in its wilderness evaluation guidance for forest planning under the 1982 planning rule, stating:[19]

- *Increased demand for additional wilderness in New Mexico should be anticipated based on population growth during the period of 2000 to 2010, which exceeded the national growth rate.*
- *Public demand increases with proximity to Albuquerque as a major population center in the New Mexico and the southwest.*
- *Some additional public demand for wilderness in the Southwestern Region will occur from the influx of people moving to communities in the vicinity of the National Forests.*
- *Desirability of the scenic mountainous settings available in the rural communities within and adjacent to national forests in the Southwestern Region will attract new retirees and others, further contributing to a growth in wilderness visitation.*
- *In terms of geographic distribution of wilderness, the Southwestern Region is under-represented with five percent fewer wilderness acres as compared with the representation nationally. Additionally, all quadrants in Arizona and New Mexico are under-represented with the exception of the southwest and southeast quadrants in Arizona. The most under-represented quadrants are southeast and northwest New Mexico, and northeast Arizona which are at 6 percent or less in the number of wilderness acres (compared with total federal wilderness acres).*

E. Economics Benefits of Protected Public Lands

Based on a wealth of existing rigorous and scientifically validated research, the general rule is that there is a neutral-to-positive relationship between the presence and extent of wilderness and other protected areas on one hand and the economic performance of local economies and the economic benefits available to nearby residents on the other (see Appendix A). Here are just a few examples from this body of research:

- Protected public lands can and do play an important role in stimulating local economic growth, especially when combined with access to markets and an educated workforce, and are associated with some of the fastest growing communities in the West (Rasker 2006 and Rasker et al. 2009).

- Wilderness designation enhances nearby private property value (Phillips 2004).

[19] USDA Forest Service Southwestern Region, Regional Demand for Wilderness, Wilderness Evaluation Guidance for Forest Planning.

- Wilderness and conservation lands are associated with rapid population, income, and employment growth relative to non-wilderness counties (Lorah and Southwick 2003; Lewis, Hunt and Plantinga 2002).

- There is no evidence of job losses associated with wilderness and no evidence that counties more dependent on logging, mining, oil and gas suffered job losses as a result of wilderness designation in 250 non-urban counties in the Rocky Mountains (Duffy-Deno 1998).

- The total annual value of retaining the wilderness character associated with inventoried roadless areas in New Mexico ranges up to $42 million for maintenance of water quality, $24 million for carbon sequestration, $26 million for outdoor recreation, $14 million for passive uses, and $1.4 million in enhanced property values. Annual community effects range up to 938 jobs and $23 million in personal income. (Berrens, Talberth, Thacher, Hand 2006).

Conclusion

In sum, we have demonstrated that there is a potential need and opportunity for additional designated areas, including recommended wilderness, on the Cibola National Forest. The opportunity lies in the fact that there are over 280,000 acres of inventoried roadless lands plus additional unroaded places, and most are not currently protected with a conservation designation specific to their ecological and social values.

The need for additional designated areas is both ecological and socio-economic. Ecologically, it is widely accepted in the literature that undeveloped areas are important to biodiversity and ecological integrity, and that larger and connected undeveloped areas are important for climate change adaptation. The Cibola is a remarkably undeveloped and wild forest, especially for being so close to Albuquerque and other larger population centers in New Mexico. It is recognized as having heightened ecological value by The Nature Conservancy and the State of New Mexico, and that conserving lands in the Cibola National Forest region can contribute to the ecological health of the broader region. The Cibola National Forest is home to a large number and percentage of SGCN, and has high overlap with TNC conservation areas, with 22% of the National Forest within a TNC conservation area and currently unprotected by a conservation designation of any kind. Moreover, the Cibola National Forest, if protected would fill in gaps in a regional network of conservation lands that extends within southwest New Mexico and southeast Arizona.

In terms of socio-economics, New Mexicans enjoy wilderness-compatible recreational pursuits, with participation rates higher than the national average and continuing to grow. In addition, Americans and New Mexicans in general want more lands protected as wilderness, and use in wilderness settings is anticipated to grow into the next decades. Despite this, New Mexico has less land protected as wilderness compared to the other western states. Lastly, wilderness and other protected conservation areas have no systematic detrimental effect on local economic conditions and, in most cases, have been shown to have a positive effect.

Given the information presented in this letter, we expect that the assessment report for the Cibola forest plan revision process will clearly identify a need and opportunity for additional designated areas, including recommended wilderness, and establish additional designated areas as an issue to be

addressed in the plan revision phase. We want to thank you and your team for being so willing to work with us and for your hard work on the forest plan development process. We look forward to continuing our dialogue.

Sincerely,

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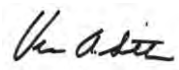

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**Table 1.** Estimated number of people participating in selected activities and total annual days of participation in the United States, 1994 to 2008. After Cordell (2008a).

| | 1994-1995 | | 1999-2001 | | 2005-2008 | | % change from 1999-2001 to 2005-2008 | | % change from 1994-1995 to 2005-2008 | |
|---|---|---|---|---|---|---|---|---|---|---|
| Nature-based Outdoor Recreation Activity | Millions of Participants Annually | Billions of Days Annually | Millions of Participants Annually | Billions of Days Annually | Millions of Participants Annually | Billions of Days Annually | Millions of Participants Annually | Billions of Days Annually | Millions of Participants Annually | Billions of Days Annually |
| Viewing Wildlife | 62.8 | 2.3 | 94.6 | 3.6 | 114.8 | 5.3 | 21.4 | 47.2 | 82.8 | 130.4 |
| Viewing Birds | 54.3 | 4.8 | 68 | 5.8 | 81.1 | 8 | 19.3 | 37.9 | 49.4 | 66.7 |
| Visit a Wilderness or Primitive Area | n/a | n/a | 68.5 | 0.98 | 70.6 | 1.1 | 3.1 | 12.2 | n/a | n/a |
| Primitive Camping | 28.1 | 0.26 | 34 | 0.28 | 33.3 | 0.34 | -2.1 | 21.4 | 18.5 | 30.8 |
| Backpacking | 15.2 | 0.13 | 22.3 | 0.22 | 22.1 | 0.28 | -0.9 | 27.3 | 45.4 | 115.4 |

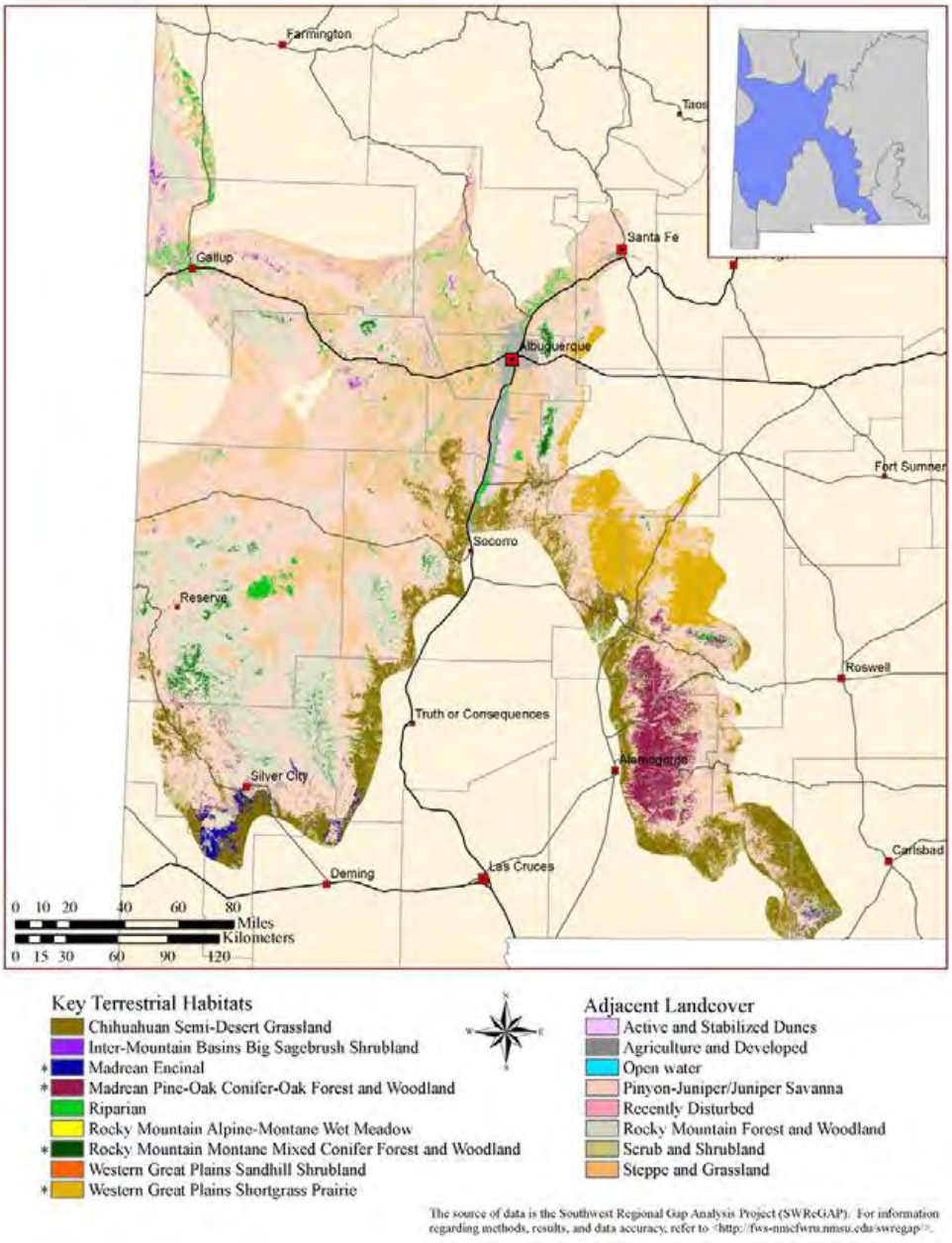
Source: National Survey on Recreation and the Environment, USDA Forest Service, Athens, GA as reported in Cordell (2008)

Table 2. Recreational Participation on the Cibola National Forest. From the National Visitor Use Monitoring Report, 2011 (USDA Forest Service, 2012)

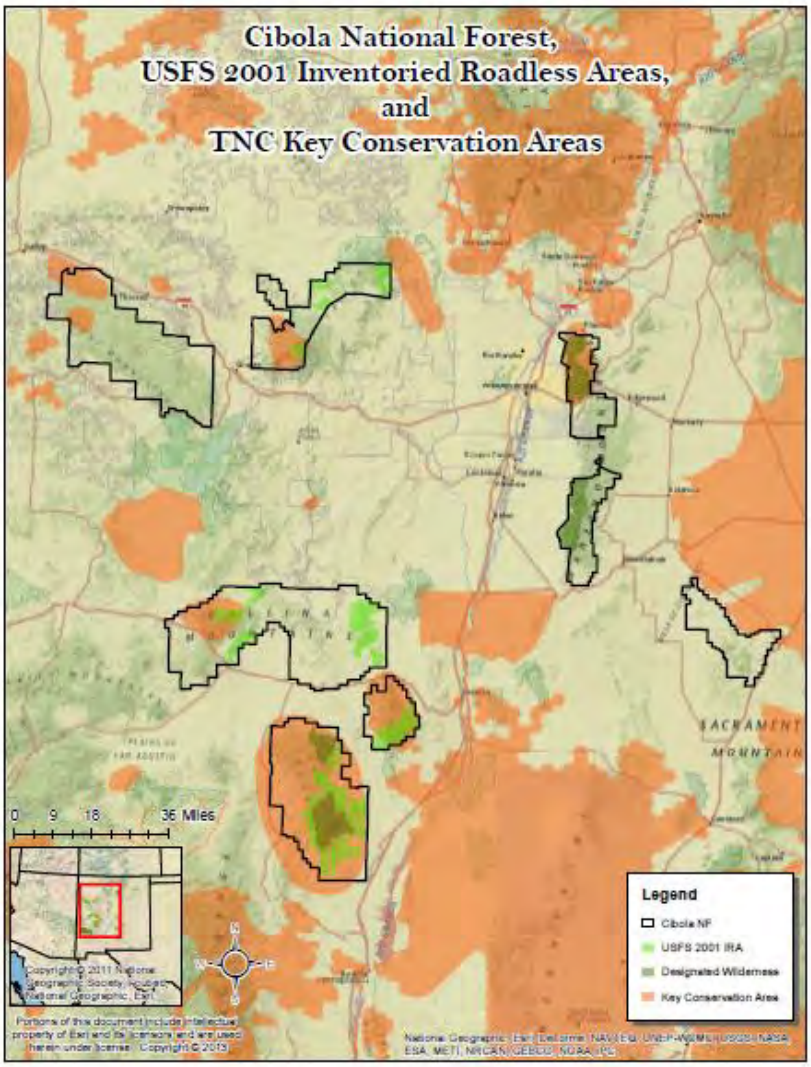
| Activity | % Participation* | % Main Activity‡ | Avg Hours Doing Main Activity |
|---|---|---|---|
| Hiking / Walking | 51.2 | 34.6 | 2.4 |
| Viewing Natural Features | 49.5 | 15.3 | 1.6 |
| Viewing Wildlife | 35.1 | 3.8 | 4.1 |
| Relaxing | 29.3 | 4.9 | 2.2 |
| Driving for Pleasure | 18.6 | 5.5 | 1.6 |
| Nature Center Activities | 13.6 | 3.0 | 1.5 |
| Bicycling | 9.8 | 9.8 | 2.3 |
| Picnicking | 9.4 | 3.6 | 2.7 |
| Nature Study | 7.5 | 0.1 | 5.0 |
| Some Other Activity | 5.5 | 3.5 | 8.1 |
| Hunting | 5.0 | 4.4 | 9.5 |
| Visiting Historic Sites | 3.8 | 0.3 | 1.0 |
| Developed Camping | 3.6 | 1.4 | 34.5 |
| Downhill Skiing | 3.4 | 3.1 | 4.3 |
| Fishing | 3.1 | 2.4 | 4.2 |
| Gathering Forest Products | 2.4 | 1.6 | 3.0 |
| Primitive Camping | 1.9 | 0.0 | 0.0 |
| Backpacking | 1.6 | 0.4 | 4.1 |
| OHV Use | 1.4 | 0.9 | 3.3 |
| Other Non-motorized | 1.2 | 1.0 | 1.8 |
| Motorized Trail Activity | 1.1 | 0.3 | 5.7 |
| Horseback Riding | 1.0 | 0.5 | 3.0 |
| Other Motorized Activity | 0.8 | 0.1 | 1.0 |
| Cross-country Skiing | 0.8 | 0.6 | 2.7 |
| No Activity Reported | 0.3 | 0.8 | |
| Resort Use | 0.2 | 0.0 | 0.0 |
| Motorized Water Activities | 0.1 | 0.0 | 0.0 |
| Non-motorized Water | 0.0 | 0.0 | 0.0 |
| Snowmobiling | 0.0 | 0.0 | 0.0 |

**Map 1 - Arizona-New Mexico Mountains Ecoregion as identified by the New Mexico Department of Game and Fish in its Comprehensive Wildlife Conservation Strategy (NMDGF 2006).**

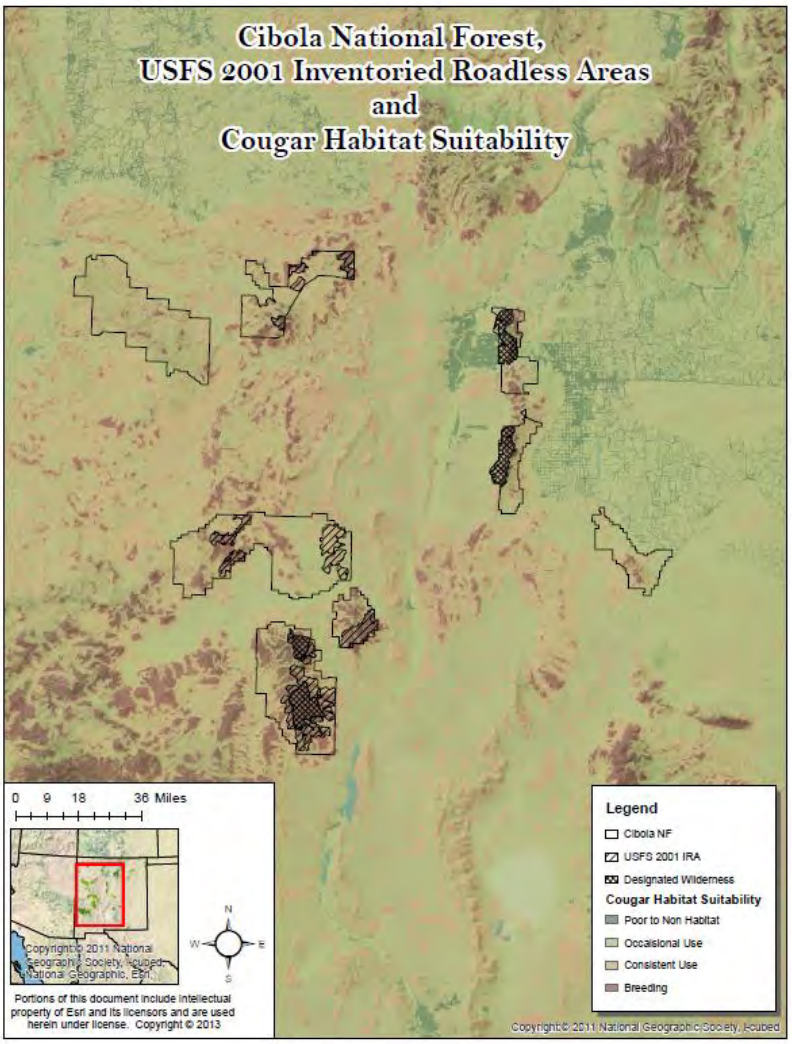
The Comprehensive Wildlife Conservation Strategy identified 80 Species of Greatest Conservation Need (SGCN) in the Arizona-New Mexico Ecoregion, which contains the Cibola National Forest's four mountain districts, ranking it the second out of six ecoregions in the state for SGCN. Map excerpted from the 2006 Comprehensive Wildlife Conservation Strategy.



**Map 2. The Nature Conservancy Key Conservation Areas Overlap with Proposed Recommended Wilderness Areas. After The Nature Conservancy, 2004.**



**Map 3. Cougar Habitat Suitability and Inventoried Roadless Areas on the Cibola National Forest. After Menke**




The cougar Habitat Suitability Model (HSM) was scaled with the following assumptions:

- 100 represents the best habitat,
- 80 represents the lowest score typically associated with successful breeding,
- 60 represents the lowest score associated with consistent use and breeding,
- 30 represents the lowest value associated with occasional use for nonbreeding activities, and
- 0 represents non-habitat.

The cougar HSM was derived with the following inputs:

- Prey availability (40%) (incorporated 25 prey animal ranges),
- Distance to roads (25%),
- Human population density by census block (15%),
- Terrain ruggedness (15%),
- Distance to interstates (3%)(areas within a mile of an interstate were given a value of 0 and the remainder of the state 100 for this input), and
- Urban areas (2%) (urban areas were given a value of 0 and the remainder of the state 100 for this input).

The final cougar HSM has a 30 meter resolution.

**Literature Cited:**


Anderson, H. Mike et al, 2012. Watershed Health in Wilderness, Roadless, and Roaded Areas of the National Forest System. The Wilderness Society, Washington DC. http://wilderness.org/resource/watershed-health-wilderness-roadless-and-roaded-areas-national-forest-system

Arcese and Sinclari, 1997. "The Role of Protected Areas as Ecological Baselines." The Journal of Wildlife Management, Vol. 61, No. 3, pp. 587-602.

Berrens, R., J. Talberth, J. Thacher, M. Hand. 2006. Economic and Community Benefits of Protecting New Mexico's Inventoried Roadless Areas. Sante Fe, NM: Center for Sustainable Economy. 69 pp. Available online at http://www.sustainable-economy.org/main/send_client_files?f=Final%2520Report.pdf.

Bowker, J.M., et al. 2006. Wilderness and Primitive Area Recreation Participation and Consumption: An Examination of Demographic and Spatial Factors. Journal of Agricultural and Applied Economics, 38,2 (August 2006):317-326. Available online at: http://ageconsearch.umn.edu/bitstream/43765/2/317.pdf

Cole, D. N. 1995. Trends in Wilderness Visitors and Visits: Boundaries Waters Canoe Area, Shining Rock, and Desolation Canyon Wildernesses. Research Paper INT-RP-483. Ogden, UT: USDA, Forest Service, Intermountain Research Station. Available online at: http://leopold.wilderness.net/pubs/273.pdf.

Colorado College, 2013. State of the Rockies Conservation Project, New Mexico Report. https://www.coloradocollege.edu/other/stateoftherockies/conservationinthewest/statereports/NewMexico.dot

Cordell, H. K., Beltz, C. J., & Green, G. T. 2008. Nature-based Outdoor Recreation Trends and Wilderness. International Journal of Wilderness, *14*(2), 7-9, 13. Available online at: http://www.srs.fs.fed.us/pubs/ja/ja_cordell022.pdf.

Cordell, K. H., Betz C. J., Fly, M. J., Mou, S., Green, G. T. 2008. How Do Americans View Wilderness: A Wilderness Research Report in the IRIS Series. Available online at http://warnell.forestry.uga.edu/nrrt/nsre/IRISWild/IrisWild1rptR.pdf.

Cordell, K. H., Eubanks, T. L., Betz, C. J., Green G. T., Stephens, B., Mou, S. 2008. American Birders – Their Numbers and Outdoor Activity Profiles. A Recreation Research Report in the IRIS Series. Available online at http://warnell.forestry.uga.edu/nrrt/nsre/IRISRec/IrisRec2rpt.pdf.

Cordell, H. K., Bergstrom, J. C. & Bowker, J. M. 2005. The Multiple Values of Wilderness. State College, PA: Venture Publishing, Inc.

Cordell, H. K., 2004. Outdoor Recreation for 21st Century America, A Report to the Nation: The National Survey on Recreation and the Environment. Venture Publishing, Inc. State College, PA.

Crist and Wilmer, 2002. "Roadless Areas: The Missing Link in Conservation." The Wilderness Society.

DellaSala, D., J. Karr, and D. Olson. Roadless areas and clean water. Journal of Soil and Water Conservation, vol. 66, no. 3. May/June 2011.

DeVelice and Martin, 2001. "Assessing the Extent to which Roadless Areas Complement the Conservation of Biological Diversity." Ecological Applications. 11(4), 2001, pp. 1008-1018.

Duffy-Deno, K. 1998. The Effect of Federal Wilderness on County Growth in the Intermountain Western United States. *Journal of Regional Science*, 38(1): 109-136.

Lewis, D.J., G.L. Hunt and A.J. Plantinga. 2002. Public Land Conservation and Employment Growth in the Northern Forest Region. *Land Economics* 78(2): 245-259. Available online at http://www.umaine.edu/mafes/elec_pubs/miscpubs/mp748.pdf.

Lorah, P., & Southwick, R. 2003. Environmental protection, population change, and economic development in the rural western United States. *Population and Environment* 24(3): 255–272. Available online at http://www.southwickassociates.com/wp-content/uploads/2011/10/Env-prot-pop-change-in-western-us-RLPAreas.pdf.

Loucks et al, 2003. "USDA Forest Service Roadless Areas: Potential Biodiversity Conservation Reserves." Conservation Ecology 7(2): 5. http://www. Consecol.org/vol7/iss2/art5.

Menke, K. 2008. Locating Potential Cougar (*Puma concolor*) Corridors in New Mexico Using a Least-Cost Path Corridor GIS Analysis. Available online at http://www.wildlife.state.nm.us/conservation/share_with_wildlife/documents/SwW08Menke.pdf.

Miller, Brian et al., "The Importance of Large Carnivores to Healthy Ecosystems," *Endangered Species Update* Vol. 18 (2001). An excellent overview of research showing top-down regulation by large carnivores. http://www.rewilding.org/MillerCarnivore.pdf.

Phillips, S. 2004. Windfalls for Wilderness: Land Protection and Land Value in the Green Mountains. Ph.D. Dissertation. Virginia Polytechnic Institute and State University, Blacksburg, VA. Available online at http://www.wilderness.net/library/documents/Phillips_2-33.pdf.

Rasker, R. 2006. An exploration into the economic impact of industrial development versus conservation on western public lands. *Society & Natural Resources*, 19(3): 191–207.

Rasker, R., P.H. Gude, J.A. Gude, & J. van den Noort. 2009. The Economic Importance of Air Travel in High-Amenity Rural Areas. *Journal of Rural Studies* 25: 343-353. Available

online at
http://headwaterseconomics.org/3wests/Rasker_et_al_2009_Three_Wests.pdf.

Scott, D. W. 2003. A comprehensive review of recent public opinion research: A mandate to protect America's wilderness. Washington, DC: Campaign for America's Wilderness. Available online at http://www.pewtrusts.org/our_work_report_detail.aspx?id=19224. Survey by Mellman Group, April 2001. As cited in Schuster R. M., et al. Chapter 7: The Social Value of Wilderness in Cordell K. H., et al. (2005) in Cordell et al. The Multiple Values of Wilderness (2005).

Steed, B.C., R.M. Yonk, and R. Simmons. 2011. The economic costs of wilderness, *Environmental Trends* Issue Brief. San Francisco: Pacific Research Institute. June 2007. 7 pp. Available online at
http://www.environmentaltrends.org/fileadmin/pri/documents/2011/brief062011.pdf.

Terborgh, John et al. 1999. "The Role of Top Carnivores in Regulating Terrestrial Ecosystems," Chapter 3 in *Continental Conservation: Scientific Foundations of Regional Reserve Networks* edited by Michael E. Soulè and John Terborgh (Island Press 1999).

The Nature Conservancy. 2004. Chapter 10: Ecological & Biological Diversity of the Cibola National Forest, Mountain Districts in Ecological and Biological Diversity of National Forests in Region 3. Available online at
http://www.fs.usda.gov/detail/r3/landmanagement/planning/?cid=fsbdev3_022067.

The Nature Conservancy. 1999. Ecoregional conservation analysis of the Arizona-New Mexico mountains. The Nature Conservancy, Santa Fe, New Mexico. Available online at
http://nmconservation.org/downloads/multi/category/ecoregional_assessment/.

U.S. Census Bureau. 2011b. March 15, 2011 Release - New Mexico's 2010 Census Population Totals. Available online at
http://www.census.gov/2010census/news/releases/operations/cb11-cn87.html.

U.S. Census Bureau. 2010. http://www.census.gov/2010census/data/apportionment-pop-text.php

U.S. Census Bureau. 2005. Population Division, Interim State Population Projections, 2005. Available online at:
http://www.census.gov/population/projections/data/state/projectionsagesex.html.

USDA Forest Service. National Visitor Use Monitoring Results for FY 2011 for the Cibola National Forest. 2012. Available online at
http://apps.fs.usda.gov/nrm/nvum/results/ReportCache/Rnd3_A03003_Master_Report.pdf.

USDA Forest Service. 2005. Socio-Economic Assessment for the Apache-Sitgreaves National Forest. Available online at
http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fsbdev3_021473.pdf.

USDA Forest Service Southwestern Region. Forest Planning Guidance. Regional Demand for Wilderness. http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5181252.pdf

U.S. Fish and Wildlife Service. 2011. National Survey of Fishing, Hunting, and Wildlife-Associated Recreation. Washington, D.C.: U.S. Fish and Wildlife Service. Available online at http://wsfrprograms.fws.gov/Subpages/NationalSurvey/2011_Survey.htm.

Several studies discuss the forces behind the changing economy of much of rural America. Many of these studies attribute strong economic and population growth to "lifestyle migrants." These are residents who either rely on investment or retirement income or who have businesses or employment which is not tied to a particular location. These migrants seek locations with high levels of amenities, including those that are associated with an abundance of protected public lands such as wilderness and national monuments.

**Berrens, R., J. Talberth, J. Thacher, M. Hand. 2006. *Economic and Community Benefits of Protecting New Mexico's Inventoried Roadless Areas*. Sante Fe, NM: Center for Sustainable Economy. 69 pp. Available online at http://www.sustainable-economy.org/main/send_client_files?f=Final%2520Report.pdf.**

Berrens et al. (2006) examine several categories of non-market economic values associated with the 1.6 million acres of inventoried roadless areas on National Forests in New Mexico. These authors use specific data on roadless area size and characteristics, data on the economic values of recreation in New Mexico, the economic value of clean water and other non-market values to estimate the total annual value of retaining the wilderness character associated with inventoried roadless areas: "Annual economic benefits range up to $42 million for maintenance of water quality, $24 million for carbon sequestration, $26 million for outdoor recreation, $14 million for passive uses, and $1.4 million in enhanced property values. Annual community effects range up to 938 jobs and $23 million in personal income." (p. 3)

**Duffy-Deno, K.T. 1998. The effect of federal wilderness on county growth in the intermountain western United States. *Journal of Regional Science*. 38(1):109-136.**

Duffy-Deno (1998) examines 250 non-urban counties in the eight intermountain west states. He finds that there is no evidence that the existence of federal wilderness is directly or indirectly associated with population or employment changes in these counties. The study also finds that there is no evidence that wilderness has any affect on resource extraction employment in these western counties.

**Holmes, F. P. and W.E. Hecox. 2004. Does wilderness impoverish rural regions? *International Journal of Wilderness*. 10(3): 34-39. Available online at http://www.wilderness.net/library/documents/IJWDec04_Holmes.pdf.**

In a study of 113 rural Western Counties, Holmes and Hecox (2004) find a positive correlation between the percent of land in designated wilderness and population, income and employment growth. They also find that wilderness is correlated with higher growth in investment income and entrepreneurial activity.

**Loomis, J.B. and R. Richardson. 2000. Economic Values of Protecting Roadless Areas in the United States. Prepared for The Wilderness Society and Heritage Forests Campaign. 44pp. Available online at http://www.sierraforestlegacy.org/Resources/Conservation/FireForestEcology/ForestEconomics/Economics-Loomis00.pdf.**

According to research by Loomis and Richardson (2000), the 42 million acres of roadless lands "…can be expected to provide almost $600 million in recreation benefits each year, more than $280 million in passive use values, and nearly 24,000 jobs. (p. iii)" In additions, these research find that roadless areas also produce between $490 million and $1 billion in carbon sequestration services and $490 million in waste treatment services.

**Loomis, J.B. 2000. Economic values of wilderness recreation and passive use: What we think we know at the beginning of the 21st century. In: McCool, Stephen F.; Cole, David N.; Borrie, William T.; O'Loughlin, Jennifer, comps. 2000. Wilderness science in a time of change conference—Volume 2: Wilderness within the context of larger systems; 1999 May 23–27;Missoula, MT. Proceedings RMRS-P-15-VOL-2. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 5-13. Available online at http://www.fs.fed.us/rm/pubs/rmrs_p015_2/rmrs_p015_2_005_013.pdf.**

Loomis (2000) estimates that the value of recreation on all U.S. wilderness lands is $574 million per year. The economic value of Western wilderness (not including Alaska) is estimated to be $168/acre or $7 billion per year. The economic value of Eastern wilderness is $468 million annually.

**Lorah, P.A. 2000. Population growth, economic security, and cultural change in wilderness counties. In: McCool, Stephen F.; Cole, David N.; Borrie, William T.; O'Loughlin, Jennifer, comps. 2000. Wilderness science in a time of change conference—Volume 2: Wilderness within the context of larger systems; 1999 May 23–27;Missoula, MT. Proceedings RMRS-P-15-VOL-2. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 230-237. Available online at http://www.fs.fed.us/rm/pubs/rmrs_p015_2/rmrs_p015_2_230_237.pdf.**

Counter to many people's beliefs, Lorah (2000) finds that counties with wilderness showed growth in income, population and employment. He also finds that the presence of wilderness in these counties has also helped them to diversify economies that had been stagnant due to over-reliance on declining resource extraction industries.

**Phillips, S. 2000. Windfalls for wilderness: Land protection and land value in the Green Mountains. In: McCool, Stephen F.; Cole, David N.; Borrie, William T.; O'Loughlin, Jennifer, comps. 2000. Wilderness science in a time of change conference—Volume 2: Wilderness within the context of larger systems; 1999 May 23–27;Missoula, MT. Proceedings RMRS-P-15-VOL-2. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 258-267. Available online at http://www.wilderness.net/library/documents/Phillips_2-33.pdf.**

Final results described in Phillips, S. 2004.Windfalls for Wilderness: Land Protection and Land Value in the Green Mountains. Ph.D. Dissertation. Virginia Polytechnic Institute and State University, Blacksburg, VA. (A summary of the doctoral thesis is provided in The Economic Benefits of Wilderness: Focus on Property Value Enhancement, Wilderness Society Science and Policy Brief, no. 2, March 2004. 8 pages.)

Data on land sales near Green Mountain National Forest wilderness areas show that the presence of wilderness areas, proximity to these wilderness areas and the extent of the wilderness areas each is associated with higher residential property values.

**Rosenberger, R.S. and D.B.K. English 2005. Impacts of Wilderness on Local Economic Development. In: Cordell, H.K., J.C. Bergstrom and J.M. Bowker (eds). The Multiple Values of Wilderness. Venture Publishing: State College, PA.**

While wilderness recreation generates some economic activity for local communities, the more important impact lies in what Rosenberger and English (2005) call a "wilderness-related advantage." They cite several research studies which together indicate that rural counties with wilderness or other protected federal lands experience greater population and economic growth than those without wilderness.

**Rudzitis, G. and R. Johnson. 2000. The impact of wilderness and other wildlands on local economies and regional development trends. In: McCool, Stephen F.; Cole, David N.; Borrie, William T.; O'Loughlin, Jennifer, comps. 2000. Wilderness science in a time of change conference—Volume 2: Wilderness within the context of larger systems; 1999 May 23–27;Missoula, MT. Proceedings RMRS-P-15-VOL-2. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 14-26. Available online at http://www.wilderness.net/library/documents/science1999/Volume2/Rudzitis_2-4.pdf.**

This study (Rudzitis and Johnson 2000) also finds that while wilderness recreation benefits to local communities are modest, the presence of wilderness appears to draw residents and new economic activity that does have a substantial positive impact on local economies.

**Anderson et al, 2012. Watershed Health in Wilderness, Roadless, and Roaded Areas of the National Forest System. The Wilderness Society, Washington DC.**
**http://wilderness.org/resource/watershed-health-wilderness-roadless-and-roaded-areas-national-forest-system**

The Wilderness Society used the first round of watershed condition assessment data from the Forest Service's Watershed Condition Framework to assess the relationship of watershed condition and land management status. Using a standardized assessment method, the Forest Service in 2010 assessed the condition of more than 15,000 individual 6th HUC watersheds across the National Forest System, and categorized them as properly functioning, functioning at risk, and impaired. Anderson et al overlaid the three watershed condition classes with three broad land management designations – Wilderness, Inventoried Roadless Areas, and roaded areas – and found a strong spatial association between watershed health and protective designations. This finding is consistent with previous scientific studies of aquatic resources in roaded and unroaded landscapes.

**Arcese and Sinclari, 1997. "The Role of Protected Areas as Ecological Baselines." The Journal of Wildlife Management, Vol. 61, No. 3, pp. 587-602.**
The authors argue for managing a representative number of protected areas as ecological baseline controls to help in understanding the effects of humans worldwide, and thus to enhance our ability to manage natural resources for a wide range of goals. To aid in evaluating human influences, areas less modified by humans are needed to use as de facto control sites. The authors suggest that the highest value of man protected areas will be realized when they are managed as ecological baseline controls.

**Crist, Michelle and Wilmer, B., 2002. "Roadless Areas: The Missing Link in Conservation." The Wilderness Society.**

The authors examine the contributions of Forest Service roadless areas to conservation in the Northern Rockies. They show that protection of national forest roadless areas, when added to existing federal conservation lands in the study area, will:

- Increase the representation of virtually all land cover types on conservation lands at both the regional and ecosystem scales, some by more than 100%.
- Help protect rare, species-rich, and often-declining vegetation communities. The protection of roadless lands would increase representation of the aspen community on conservation lands by 480% and the western hemlock community by 603%.
- Protect one vegetation community—bur oak woodland—that is not currently represented on existing conservation lands.
- Help protect lower-elevation lands—and their communities of species—that have been greatly altered by road construction, settlements, and resource extraction.
- Connect conservation units, many of which were established for their scenic and recreation values and not as wildlife habitat, to create bigger and more cohesive habitat "patches."

**DellaSala, D., J. Karr, and D. Olson, 2011. "Roadless areas and clean water." Journal of Soil and Water Conservation, vol. 66, no. 3. May/June 2011.**

The authors review the importance of inventoried roadless areas on national forests in the United States, concluding that: 1) many intact watersheds are in headwaters, 2) they supply downstream users with high-quality drinking water, and 3) developing these watersheds comes at significant costs associated with declining water quality and availability. They cite a study by Loomis (1998) that found that the cost savings to water treatment plants and highway departments from avoiding sedimentation caused by logging in inventoried roadless area watersheds is estimated at up to $18 billion annually. The authors recommend a light-touch ecological footprint to sustain the many values that derive from roadless areas, especially clean and abundant water.

**DeVelice and Martin, 2001. "Assessing the Extent to which Roadless Areas Complement the Conservation of Biological Diversity." Ecological Applications. 11(4), 2001, pp. 1008-1018.**

Assessed the extent to which inventoried roadless areas (IRAs) on USDA Forest Service lands contain biophysical features that complement the conservation reserve network (e.g., national parks, designated wilderness areas, and wildlife refuges) in the United States. Of the 83 ecoregions evaluated in the United States, 28 have 12% of their total area in conservation reserves. If IRAs are considered with conservation reserves, the number of ecoregions exceeding the 12% threshold increases from 28 to 32. When only national forest land in the ecoregions is considered, the area of designated wilderness exceeds 12% in 18 of the 45 ecoregions summarized. If IRAs are considered along with designated wilderness, the number of ecoregions exceeding the 12% threshold increases from 18 to 32. These results highlight the contribution that IRAs could make toward building a representative network of conservation reserves in the United States. Including these areas as reserves would expand ecoregional representation, increase the area of reserves at lower elevations, and increase the number of areas large enough to provide refugia for species needing large tracts relatively undisturbed by people.

**Loucks et al, 2003. "USDA Forest Service Roadless Areas: Potential Biodiversity Conservation Reserves." Conservation Ecology 7(2): 5. http://www. Consecol.org/vol7/iss2/art5.**

Examined the potential contributions of Inventoried Roadless Areas to the conservation of biodiversity. Found that more than 25% of IRAs are located in globally or regionally outstanding ecoregions and that 77% of inventoried roadless areas have the potential to conserve threatened, endangered, or imperiled species. IRAs would increase the conservation reserve network containing these species by 156%. Also looked at the conservation potential of IRAs by highlighting their contribution to the conservation of the grizzly bear (*Ursos arctos*), a wide-ranging carnivore. The area created by the addition of IRAs to the existing system of conservation reserves shows a strong concordance with grizzly bear recovery zones and habitat range. Conclude that IRAs belonging to the U.S. Forest Service are one of the most important biotic areas in the nation, and that their status as roadless areas could have lasting and far-reaching effects for biodiversity conservation.

**Wilcove, David. 1990. "Natural Resources and Environmental Issues." Natural Resources and Environmental Issues: Vol. 0, Article 7.**

Asserts that one of the strongest arguments in support of Wilderness is the preservation of biodiversity. Wild areas are reservoirs of biodiversity in this country, and their value increases as the volume of unprotected wildlands diminishes with development. He criticizes recent arguments the wilderness preservation is counterproductive to good wildlife management, arguing that most of the ecological arguments against Wilderness are unsubstantiated or inaccurate, and the Wilderness Act provides the necessary flexibility to address the major management issues that are likely to arise.

**The Wilderness Society, 2004. "Landscape Connectivity: An Essential Element of Land Management." Science and Policy Brief, Number 1. The Wilderness Society. Washington DC.**

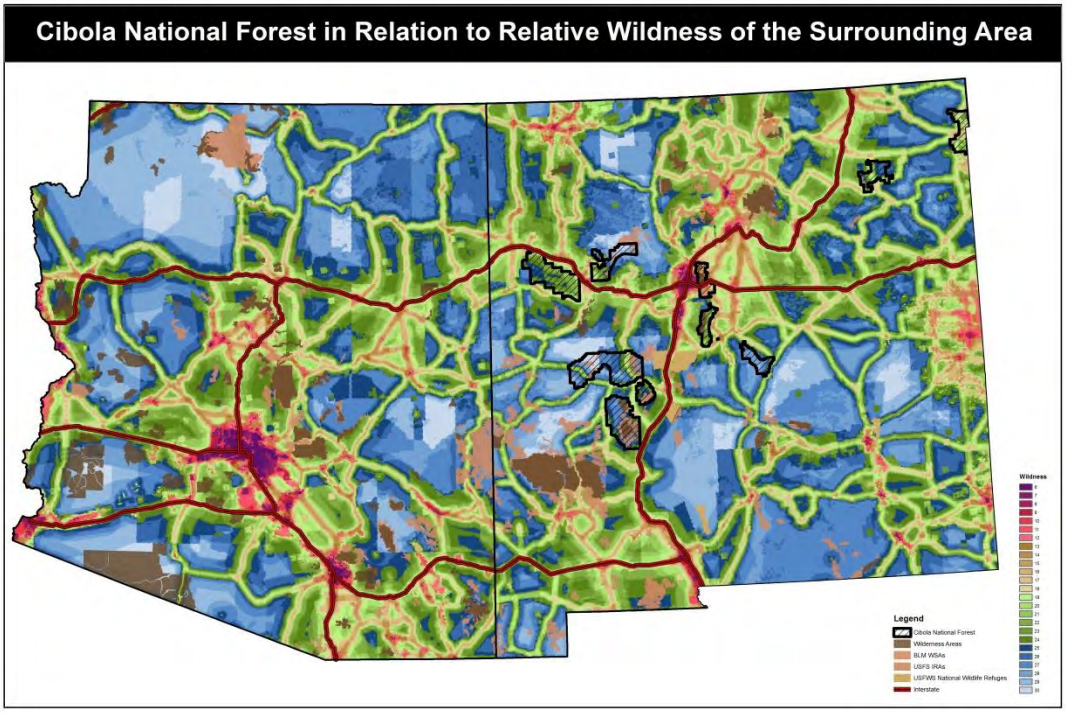
The document summarized the importance of landscape connectivity to biodiversity, concluding that:

- Loss of habitat connections across a landscape is one of the most severe threats to the survival of many wildlife species.
- Each species has evolved different needs for connectivity; to help sustain viable populations, it is essential to understand those specific needs.
- Conservation ecologists are focusing on: (1) protection of corridors that link isolated habitat patches and (2) maintenance of natural conditions in the "matrix" (land surrounding intact habitat) to ensure sufficient landscape connectivity.

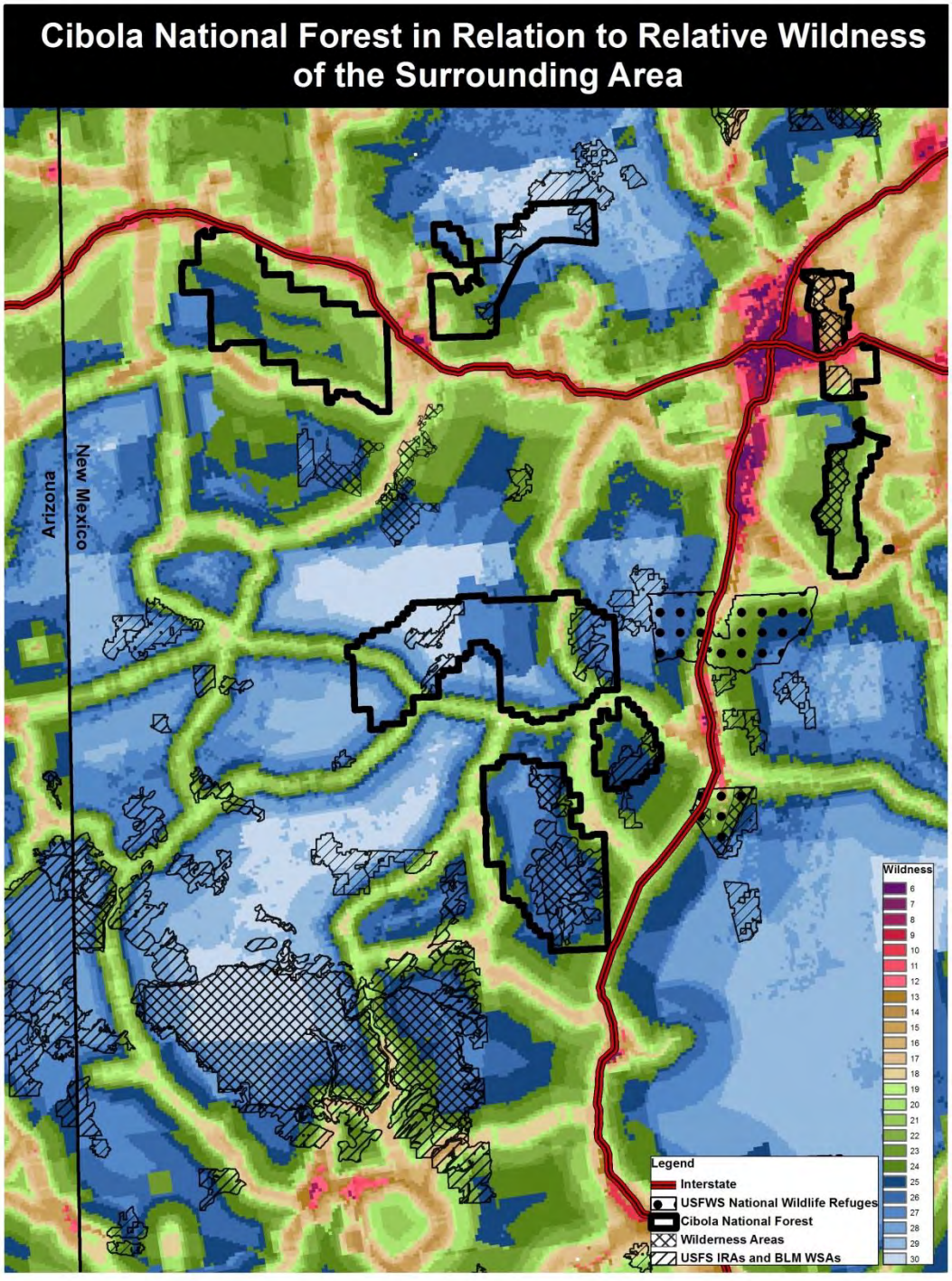
*Appendix C – Wildness of the Southwest as Mapped by Aplet et al (2000)*

The following are maps of the Southwest Region depict wildness values as calculated by Aplet et al. The first map is at a larger scale and shows the Cibola National Forest mountain units in relationship to protected lands. The second map is at a smaller scale and shows more clearly the wildness values of the Cibola National Forest mountain units.

Map 1.



Map 2.


Cibola National Forest in Relation to Relative Wildness of the Surrounding Area
Arizona
New Mexico
Wildness
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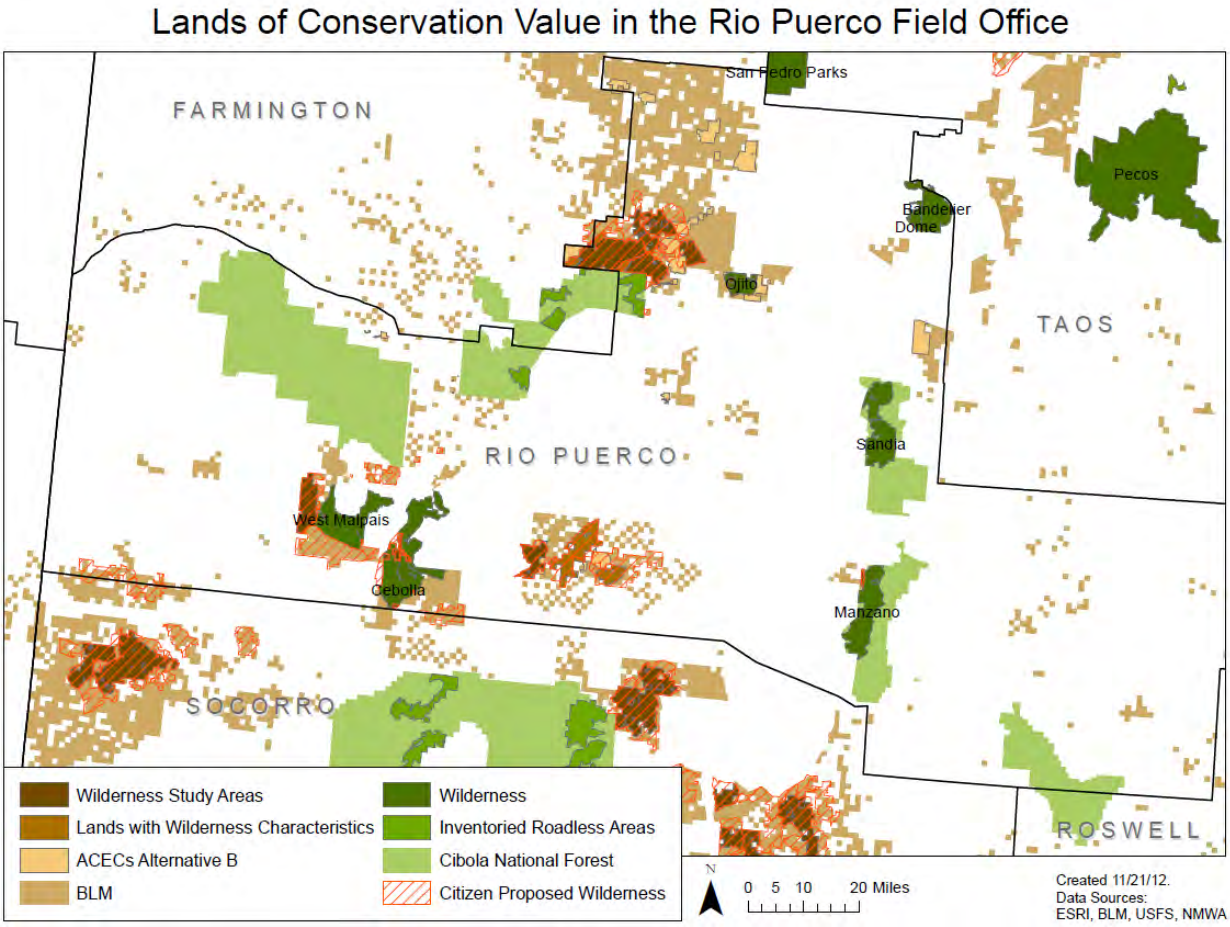
Legend
Interstate
USFWS National Wildlife Refuges
Cibola National Forest
Wilderness Areas
USFS IRAs and BLM WSAs

*Appendix D – Maps showing Adjacent Cibola National Forest Roadless Areas and Bureau of Land Management Designated Areas.*



## Lands of Conservation Value in the Socorro Field Office