

CENTRAL REGION INTEGRATED SCIENCE PARTNERSHIP FUNDS

Project Proposal

February 7, 2002

Project Title: Developing Coordinated Science Activities in Support of Land Management in the Mancos Shale Badlands of the Gunnison Gorge National Conservation Area

Principal Investigators: Paul von Guerard, Richard Grauch, Steve Hamilton, and David Catts

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Total Funding Requested: \$50,000

Proposal Submission Date: February 7, 2002

Problem:

How can BLM best manage 17,000 acres of Mancos shale badlands on the western portion of the Gunnison Gorge NCA? What land-use practices are compatible with restoration/rehabilitation of Mancos shale areas and promote sustainability of human uses, reduction of erosion and associated salinity and selenium loading, preservation and restoration of threatened and endangered plants and natural community processes? Mancos shale badlands comprise approximately 30 percent of the NCA. The current management plan for the area designates these lands as "open" meaning cross-country travel by any kind of vehicle or method is allowed. The lands have historically been used for intensive sheep grazing, National Guard tank maneuvers, illegal trash dumping, utility corridors, and other high-impact and erosive uses. The area is currently receiving high levels of use and impacts from off-highway vehicles as well as continued impacts from winter/spring sheep grazing. In some areas, all surface vegetation has been removed while other high use areas are deeply trenched with sheep and vehicle routes and invaded with noxious and invasive weeds. Another issue related to Mancos shale is the effect of erosion from outcrops of sedimentary rocks in the Gunnison Gorge NCA on aquatic habitat and fish. For example, fish kills have been observed after rainfall events in the Gunnison Gorge downstream from Mancos shale and outcrops of other sedimentary rocks. An ecological assessment in the Gunnison Gorge needs to include analysis of how Mancos shale outcrops of other sedimentary rocks relates to instream flows. The BLM needs to be able to convey to stakeholders and the public a defensible science-based rationale for land-management decisions on the NCA.

Objective: The objectives of this proposal are the following:

1) Initiate a process for USGS scientists to work side-by-side with BLM NCA staff to develop a coordinated science strategy to support on the ground management. It is proposed that science planning become part of the management plan developed for the NCA. Scientific support and recommendations will come from a team of USGS scientists representing disciplines such as surface- and ground-water hydrology, geomorphology and erosion, and biology and ecology. This team will assist the BLM NCA staff in identifying relevant natural resource characteristics and processes. The team also will provide review of the BLM NCA land-use management strategy. Support by USGS scientists would be provided through real-time consulting with BLM staff on science issues related to land management. This would be accomplished by USGS scientists participating in the BLM planning process. In FY02, specific research objectives would be identified along with areas within the NCA to conduct research. The goal will be to identify data and interpretations to support an integrated assessment of the NCA related to reduction of erosion and associated salinity and selenium loading and preservation and restoration of threatened and endangered plants and natural community processes. This research would focus on problems specific to the NCA that have transferability to other BLM lands.

2) Reconnaissance level information will be collected and existing information reviewed to identify specific research site locations and to begin describing the spatial variability within the NCA of erosion rates, bedrock composition, and water-rock interactions related to the release of trace elements and salts. Reconnaissance of biotic components will be coordinated with sampling of water, rock, soil, and sediment. This biotic sampling will aid in describing the spatial variability within the NCA and relate directly to the efforts describing the variability of abiotic components (water, rock, soil, and sediment). Linkages between biological resources (plants, invertebrates, fish and possibly animals) and physical habitat (e.g., streamside soils and adjacent upland habitats, sediments, and surface waters) are needed to give BLM

managers a holistic view of their biotic and abiotic resources. These reconnaissance level collections of biotic and abiotic samples would subsequently guide field reconnaissance surveys focused on fish (e.g., endangered native species), terrestrial wildlife (e.g., threatened, endangered, or other critical species) and the habitats within the Mancos shale badlands on which these biological resources depend. These data would be used to develop an approach for using visualization technology to manipulate environmental conditions under various land management practices.

Scope:

1) Identify individuals to represent science disciplines needed to participate with BLM/NCA staff to develop a coordinated science strategy to support on the ground management. This team of USGS scientists should be limited to three or four people that can serve as liaison with BLM staff in the planning process. An initial scoping and planning meeting will be held in Montrose at which time plans for completing objectives 1 and 2 will be developed. Plans for communication on specific science needs will be developed between BLM and USGS personnel working on a specific issue.

2) Reconnaissance-level data collection will include identification and, if possible, compilation of historical information including data sets, maps, photos, GIS coverages, and history of the area. The USGS team and the BLM NCA staff will work together using historical data and physiographic information to screen available information to determine where specific research activities are to be done within the NCA. Geomorphic analysis will include outcrop mapping, rill and gully mapping, drainage-network mapping, and quantification of hillslope characteristics such as hillslope gradient, hillslope length, aspect, convexity/concavity, and soil depth. More complex geomorphic analyses could include infiltration measurements and sediment runoff trapping. Rock and soil samples will be collected from different geomorphologic and stratigraphic settings in order to test for differences in element concentrations and to delineate sites appropriate for detailed investigation of controls on trace element residence and availability for mechanical and chemical migration into the hydro-, bio-, and atmospheres. Biotic components (plants, invertebrates, fish, and possibly animals) will be collected in coordination with abiotic sampling efforts. These data will be used to begin development of an approach for the use of visualization techniques. Specific study areas within the NCA will be identified based on results of the planning and reconnaissance done in Objectives 1 and 2.

Approach: Work elements outlined in Objectives 1 and 2 will be accomplished by meeting with BLM NCA staff to initiate an understanding of BLM science needs. This will be accomplished during an initial meeting of the entire group and during subsequent discussions, field trips, data review, and data-collection activities between USGS and BLM staff. Results of these activities will be periodically reviewed to ensure that effective communication is being established and science strategies are being developed that meet the needs of the NCA land-management activities and USGS research objectives.

Benefits: This effort will bring together geomorphologists, geochemists, ecologists, and visualization specialists from USGS to work with BLM staff at the Gunnison Gorge NCA to support DOI science needs by planning, implementing, and evaluating research results, technical information, findings, techniques, and recommendations in an ongoing process of adaptive management. The results of these efforts will develop a collaborative process that integrates the science capabilities of each USGS discipline in support of the science needed by BLM to manage the National Conservation Area.

Outcome/Products: A coordinated science strategy will be developed to support on the ground land management. Current data will be summarized and data needs identified for developing the integrated science-planning process. Reconnaissance level data collection will be done in FY02. These activities will culminate in a planning document developed by the USGS and BLM-NCA staff that outlines science needs, plans for meeting these needs, and a scope of work for each research need identified in the planning process.

Budget: The total FY02 cost of the project is \$140,000. USGS funds requested by this proposal will be matched by BLM for a total of \$100,000. The balance of the project costs are in-kind services represented by salary costs provided by Richard Grauch, Paul von Guerard, Steve Hamilton, and David Catts. It is anticipated that, for FY03, a similar funding request will be forwarded to the Regional process and that proposals will be developed and forwarded to other USGS and BLM funding processes for support of USGS/BLM science activities at the NCA. If necessary, funds can be carried over into FY03 by using a multi-year Inter Agency Agreement for BLM funds and the multi-year funding capabilities of BRD.

BUDGET:

	WRD	GD	BRD	NMD	TOTAL
Objective 1					
Salary	\$6,370	\$7,400	\$4,350	\$2,500	\$20,620
Travel	\$1,035	\$1,035	\$2,500	\$1,000	\$5,570
Transportation	\$320	\$ 320	\$ 250	-----	\$890
SUBTOTAL	\$7,725	\$8,755	\$7,100	\$3,500	\$27,080
Objective 2					
Salary	\$14,360	\$15,110	\$14,100	\$3,750	\$47,320
Travel	\$2,870	\$2,895	\$ 2,200	1,500	\$9,465
Transportation	\$880	\$880	\$ 200	-----	\$1,960
Supplies & analysis	\$2,165	\$5,260	\$ 6,000	\$750	\$14,175
SUBTOTAL	\$20,275	\$24,145	\$22,500	\$6,000	\$72,920
TOTAL	\$28,000	\$32,900	\$29,600	\$9,500	\$100,000

Timeline: Work will begin in the second quarter of FY02 through September 30, 2002. Work identified in the planning process will be summarized and budget needs identified for FY03 and beyond.

Fiscal Year 2002

Work Element	April	May	June	July	Aug	Sept.
Develop liaison process and identify science needs	X	X				
Review of existing information		X	X			
Identify areas of study within the NCA		X	X			
Reconnaissance data collection			X	X	X	
Summary report and development of proposals for FY03						X