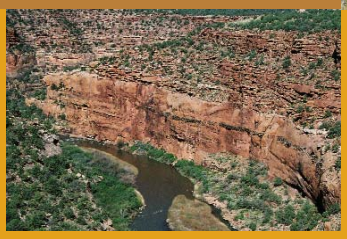
Uranium Mining, Tourism and Outdoor Recreation in Gateway, Colorado



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Shaping the Future of the West

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July 2009

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Shaping the Future of the West

The nonprofit Sonoran Institute inspires, informs and enables community decisions and policies that respect the land and people of western North America. Facing rapid change, communities in the West value their natural and cultural assets, which support resilient environmental and economic systems. Founded in 1990, the Sonoran Institute helps communities conserve and restore those assets and manage growth and change through collaboration, civil dialogue, sound information, practical solutions and big-picture thinking.

The Sonoran Institute contributes to a vision of a West with:

- *Healthy landscapes*—including native plants and wildlife, diverse habitat, open spaces, clean air and water—from northern Mexico to Western Canada.
- *Vibrant communities* where people embrace conservation to protect quality of life today and in the future.
- *Resilient economies* that support prosperous communities, diverse opportunities for residents, productive working landscapes and stewardship of the natural world.

Uranium Mining, Tourism and Outdoor Recreation in Gateway, Colorado

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We hope this report helps local officials and residents of Gateway, Colorado as they contend with development initiatives in this spectacular landscape. The outcomes may well provide important lessons for other regions that encounter the opportunities and challenges of a rapidly changing West.

Luther Propst
Executive Director
Sonoran Institute
June 2009

Viewed from Gateway Canyons Resort, the iconic Palisade is a geographic landmark for Gateway, Colorado.

Photo: Ian G. Wilson, Sonoran Institute

EXECUTIVE SUMMARY

The current economy of the Gateway area is primarily based on tourism and outdoor recreation.

Gateway, Colorado and the surrounding area of Mesa County are home to an impressive landscape with a variety of valuable resources. Research indicates that people are moving to the rural West primarily due to quality-of-life considerations or factors such as clean air and water, outdoor recreational opportunities, low crime rates and a pleasant climate.

Mesa County contains extensive public lands, including federal land, protected public lands (including designated wilderness, McInnis Canyons National Conservation Area, Dominguez-Escalante National Conservation Area, Colorado National Monument and wilderness study areas) and the Dolores and Gunnison Rivers. These areas provide key environmental amenities that are important to the quality of life and help drive local and regional economic development. An influx of visitors-turned-residents will stimulate the local economy through demand for new home construction and a full range of goods and services.

In the West, services and professional jobs and government employment have steadily increased since 1970. Employment in mining and agricultural sectors has changed little over the last 35 years. In Mesa County, personal income derived from the mining sector experienced a boom-and-bust cycle over the decade between 1974 and 1984. Personal income from mining has shrunk steadily since 2003. Due to low uranium prices, local employment and other economic activity associated with uranium exploration and mining is very low at the present time. Future employment and economic activity that could be associated with mining are difficult to estimate, as it is highly dependent on uranium commodity prices, which have been volatile over the last few years.

The current economy of the Gateway area is primarily based on tourism and outdoor recreation. In 2005, Gateway Canyons Resort opened, offering local employment and increased economic activity. Expanded resort operations could result in increased visitation, leading to increased purchases made by the resort and the visitors and a surge in tourism taxes. In the past five years, tourism and outdoor recreation have grown and, relative to mining, contribute more to the county's economy. However, mining has the potential to displace tourism and travel spending, employment and public (tax) revenues.

Based on the presence in the Gateway area of uranium mines with additional potentially minable uranium resources, recent uranium claim staking and mineral exploration activity, the potential exists for increased local uranium mining activity.

Risks associated with such increased activity include underground workings collapsing, the risk of open mine shafts and accidental falls and collapse, groundwater contamination, worker exposure to radiation and extensive public health risks resulting from uranium ore processing. This can lead to long-term health risks and an expectation of continuing public costs.

There are risks of operational conflicts between tourism/recreation activities and mining operations. Uranium exploration and mining activities in the Gateway area could negatively affect air quality, solitude, wildlife habitat, water quality and scenic views. With the loss of these unspoiled amenities, there could be a negative impact on visitor experiences, impairing the area's ability to attract visitors.

RECOMMENDATIONS

LOCATION OF CLAIMS

Local communities should be aware of the existence of nearby uranium mining claims, associated risks, potential impacts and plans for proposed mineral exploration and mining activities. Plans of operations are available from the Bureau of Land Management.

VIABILITY OF MINING COMPANIES

A large proportion of the thousands of new uranium mining claims staked in recent years are speculative in nature. It is important that citizens become informed regarding the ownership of the mining claims and the companies that will conduct mining. It is critical that companies proposing to conduct mining operations have the requisite technical abilities, mining experience and financial viability to safely and properly operate the mines, as well as to complete appropriate remediation and reclamation after the mines close.

OFFSITE IMPACTS OF MINE OPERATIONS

Several issues potentially associated with individual mining operations call for input and oversight by local communities. Ore from individual mines must be hauled to regional uranium mills for processing. This will increase truck traffic on backcountry roads and area highways, leading to potential conflicts with other road users and possibly creating safety issues. These should be addressed in mine operation plans.

WATER QUALITY

Dewatering old mine workings, onsite ore stockpiling and other operations associated with mining could create surface and groundwater impacts. Local communities should be aware of the potential for surface and groundwater impacts and ensure that the permitting process addresses these risks.

VIEWSHEDS

Mining activities, especially open-pit operations, can create extensive surface disturbance and thereby impact scenic viewsheds. As these viewsheds are part of what draws visitors into the area, local communities should ensure that mine permits and operational plans protect these important environmental amenities.

FISCAL IMPACTS

In addition to issues associated with individual mine operations, local communities should be cognizant of potential cumulative impacts deriving from an increase of mining across the area. Due to the extensive uranium mineralization present in the Uravan Mineral Belt and adjacent areas, and in consideration of the many thousands of uranium mining claims present in the region, a sustained increase in uranium prices could result in another mining boom. Should this occur, area communities and governments would need to be prepared to deal with associated direct and indirect impacts. These would derive primarily from an expanded workforce and increased traffic on the road system.

INTRODUCTION

The spectacular landscape of red rock canyons, high mesas, mountains and the Dolores River in the vicinity of Gateway, Colorado, hosts a variety of valuable resources. For more than 100 years, people have hunted, fished, grazed cattle, irrigated crops and extracted metals in this landscape. For just as long, people have enjoyed the exquisite vistas, rafted the Dolores, explored the canyons and mesas and simply toured the area. As time has passed, the extractive uses of this landscape have generally diminished relative to the non-extractive uses, although one extractive use, uranium mining, has seen multiple boom-and-bust cycles.

Non-extractive uses, in the forms of outdoor recreation and tourism, while long occurring in the area, have only relatively recently begun to make a significant contribution to the area's small economy. This is primarily due to a general increase in tourism, along with the opening of Gateway Canyons Resort and the resulting spin-off effects.

The uranium price spike that began in early 2005 and peaked in mid-2007 drove a large increase in uranium mineral exploration activity in the Gateway area as well as in other southwestern Colorado locales, southeastern Utah and northwestern New Mexico. In addition to exploration, there was an increase in applications for permits to mine and mill uranium ores, both in the Gateway vicinity and in the broader area.

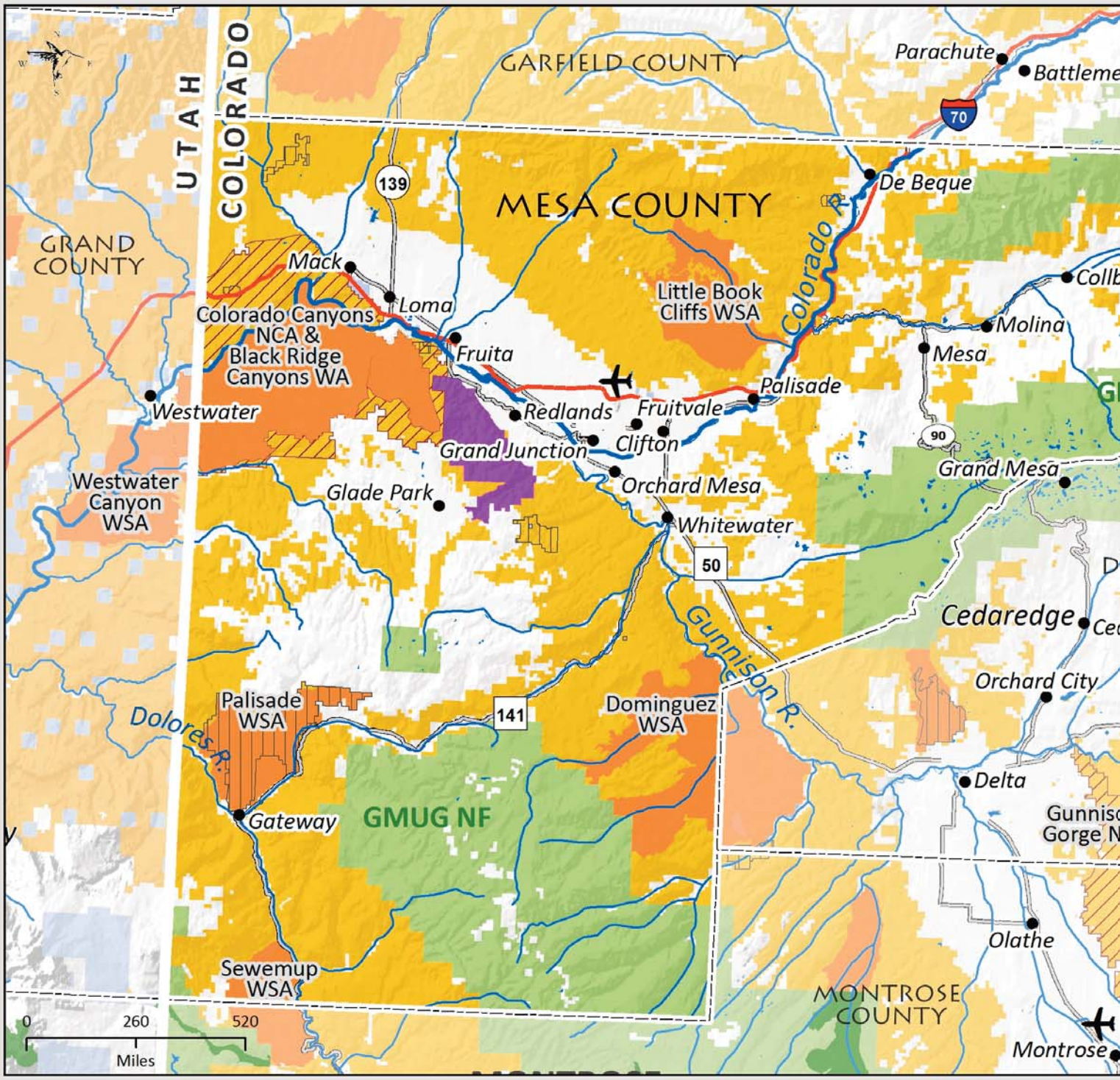
Uranium mining's potential conflicts with tourism and outdoor recreation are a concern, locally in Mesa County, and in southwestern Colorado in general.

The proliferation of claims and associated activity in the Gateway area will increase road use and related traffic safety issues. There also may be an impact on visitor experiences given mining activities' proximity to the resort and to scenic and recreation amenities. Finally, there may be public health and water quality impacts associated with uranium's radiological and chemical toxicity.

Mining has the potential to displace tourism and travel spending, employment and public (tax) revenues. Tourism and outdoor recreation have grown in the past five years and, relative to mining, contribute more to the county's economy.

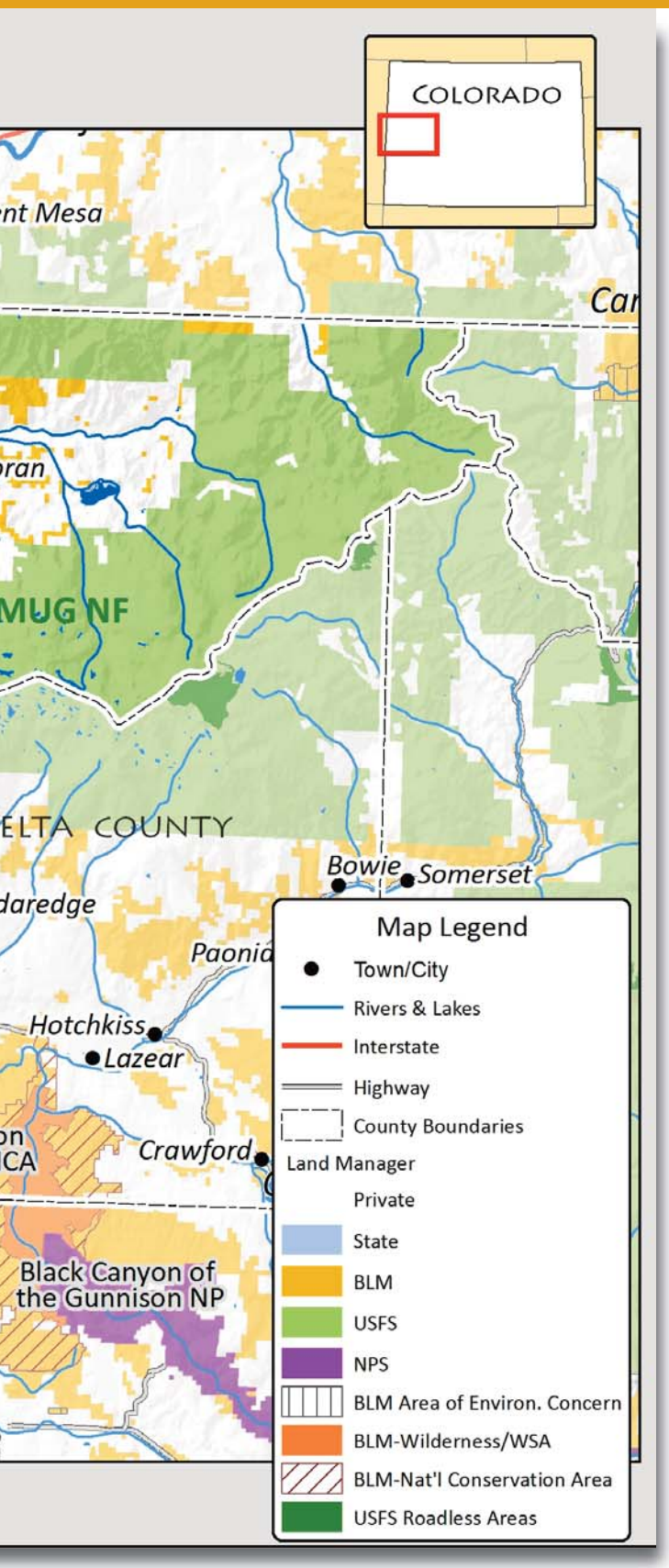
The dramatic increase in mining claims and exploration activity in the region, in conjunction with its proximity to area amenities and communities, poses difficult economic choices. Uranium mining may displace more sustainable, amenity-based economic activities and result in costly, long-term environmental and public health and safety impacts. A broader assessment of these costs and impacts is needed to help local officials and residents understand the implications of mining on their communities.

Mesa County, Colorado



Map created by Sonoran Institute, 2008

GMUG NF = Grand Mesa, Uncompahgre and Gunnison National Forest



Map 1: Study Area

GEOGRAPHIC CONTEXT

As there are significant geographic components to the issues discussed in this report, it is important to establish a geographic context. Map 1 shows the area of focus for this report, Mesa County, Colorado, and the area around Gateway, a small unincorporated community on the Dolores River in the southwestern corner of the county.

As can be seen on the map, Mesa County contains extensive public lands, mostly federally managed. The county is approximately 73 percent federal land, managed by the U.S. Forest Service, Bureau of Land Management and the National Park Service. The National Forest lands are in the eastern and southwestern portions of the county, and the BLM lands are mainly in the western half. Protected public lands in the forms of designated wilderness, McInnis Canyons National Conservation Area, Dominguez-Escalante National Conservation Area, Colorado National Monument and wilderness study areas make up about 11 percent of the county. The Dolores and Gunnison Rivers are important tributaries of the Colorado River. Interstate 70, U.S. Highway 50 and Colorado State Highway 141 provide primary tourist, traveler and industrial access to the area.

> Mesa County contains extensive public lands, mostly federally managed.

Gateway sits along the 133-mile Unaweep/Tabeguache Scenic and Historic Byway, which winds through red sandstone in the spectacular Unaweep Canyon.

Photo: Ian G. Wilson, Sonoran Institute

ECONOMIC CONTEXT

To establish a context for the economy in the Gateway area, it is useful to examine the economy of the West, how that economy is changing and the factors driving the changes. For the purposes of this report, the West is defined as the 11 contiguous mainland states of Washington, Idaho, Montana, Oregon, Wyoming, California, Nevada, Utah, Colorado, Arizona and New Mexico.

Abundant research indicates that people are moving to the rural West to live, work and conduct business primarily due to quality-of-life considerations or amenities such as clean air and water, outdoor recreational opportunities, low crime rates and a pleasant climate, among others (Beyers, Lindahl et al. 1995; Johnson and Rasker 1995; McGranahan 1999; Shumway and Otterstrom 2001). This is a switch from the past when people often migrated to an area primarily based upon employment availability. In this new structure of local economic development, business and jobs follow the people instead of the reverse (Whitelaw 1992). People move to an area because of its amenities, often visiting first as tourists. Known as "amenity migration," this in-migration then stimulates the local economy through demand for new home construction and a full range of goods and services. Once a more robust local economy exists with additional amenities such as health care facilities, arts and entertainment or regular airline service, a new round of migrants is attracted and the cycle repeats.

Protected public lands such as designated wilderness, national parks and national conservation areas provide key environmental amenities that are important contributors to quality of life. As such, protected public lands are significant assets for local and regional economic development. An extensive study of the role of protected public lands in economic prosperity in the West, conducted by the Sonoran Institute, concluded that counties with protected public lands or close to protected lands have the fastest economic growth (Rasker, Alexander et al. 2004). The same study also found evidence that, in addition to protected public lands, other conditions are important for economic prosperity. These include good transportation access to metropolitan areas via road and airline connections, an educated workforce and a diverse local economy.

The economy of the West has changed greatly over the last 30 to 40 years. Three of the most significant trends are: 1) a rapid growth in the role of services in the economy; 2) the rise of non-labor sources of income; and 3) the diminished levels of jobs and income from extractive industries.

The Bureau of Economic Analysis of the U.S. Department of Commerce (BEA) defines services as "products that cannot be stored and are consumed at the place and time of their purchase." This category includes an extremely wide range of sectors, including arts and entertainment, lodging and food services, health and social services, finance, insurance and real estate, engineering and scientific services, and public administration, among others. This wide variety of activities includes high-wage, high-skill occupations like doctors and financial consultants, as well as low-wage, low-skill positions such as landscapers and hotel maids. As such, it is important to differentiate categories of service-sector jobs in order to understand which service subsectors are growing.

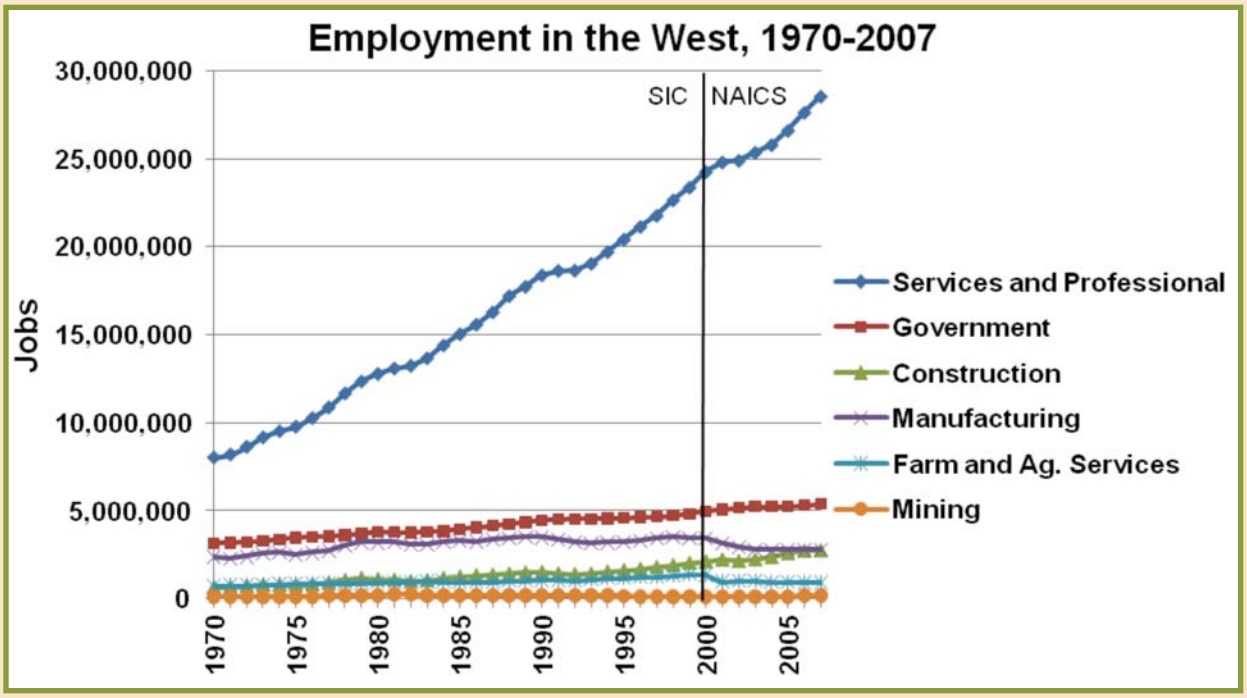


Figure 1: Employment, Western U.S., 1970-2007[1]

Source: Bureau of Economic Analysis, U.S. Dept. of Commerce

Producer services is a relatively high-wage category and includes occupations such as real estate, insurance, finance, engineering, business services and research. This category is a large component of the "knowledge economy." *Consumer services* is mostly a low-wage category that includes food service, accommodation, retail and personal services. By tracking the various service categories, it is possible to obtain a clear picture of a local economy.

As can be seen in Figure 1, nearly all of the new jobs created in the West since 1970 have been in the services and professional category. Government employment has risen steadily across the period. Construction jobs have generally increased in number with occasional slight downturns and a strong uptrend from 1992 to 2005. Manufacturing has risen and fallen, dropping over the last seven years to levels of the late 1970s. Employment in the mining and agricultural sectors has changed little over the last 35 years.

On Route 141 heading south to Gateway, the majestic Unaweep Canyon embraces all visitors.

Photo: Ian G. Wilson, Sonoran Institute

The fastest-growing service sector in the West in the period between 2001 and 2006 was producer services, which grew by 24 percent and accounted for 12.2 percent of all new personal income. This was followed by government, growing by 18 percent over the same period and accounting for 17.5 percent of new personal income. The growth in this service subsector was largely driven by a nearly 42 percent increase in personal income derived from military employment.

Non-labor income derives from two sources: investments and transfer payments. Investments provide dividends, interest and rent. This includes income from retirement plans and investment accounts. Transfer payments are government payments to individuals, such as Social Security and Medicare.

As can be seen in Figure 2, non-labor sources are the second largest source of personal income and the second-fastest-growing source in the West, accounting for 30 percent of all personal income in 2005 and 32 percent of new income growth between 1970 and 2005. In some areas of the West, non-labor income is the single largest source of income for many communities and has become a very important source of economic growth as people build second homes and retire in areas they formerly visited as tourists.

As the economy of the West has grown and diversified over the last 30 to 40 years, the traditional extractive industries of mining, logging, oil and gas, and agriculture have become a much smaller component of the economy in a relative sense. In 2000, personal income from these sectors in non-metropolitan counties represented less than eight percent of total personal income, down from 20 percent in 1970 (Rasker, Alexander et al. 2004). As can be seen in both Figures 1 and 2, nearly all of the growth in employment and personal income has been in other sectors of the economy. Productivity increases driven by technological advances in the extractive industries have led to decreasing labor requirements. Higher-quality resource discoveries elsewhere in the world, in conjunction with freer international trade and low-cost labor, also contribute

1 The U.S. Bureau of Commerce categorizes economic activity data using the Standard Industrial Classification (SIC) and the North American Industry Classification System (NAICS). The SIC data are available for the period up to 2000. The Bureau of Commerce discontinued providing SIC data in 2000 and switched to the NAICS, which was developed in part to better describe the service sectors of the U.S. economy. The SIC and the NAICS methods of classifying economic activity differ. Essentially, the SIC was based on what was produced and the NAICS is based on how services and products are created. The NAICS is a completely new system of classification and, because of this, there is a discontinuity in the time series data. Although the two classification systems are different and the data are not strictly comparable, it is possible to map some of the categories from one system to the other in order to construct time series of the data. On time-series graphs which span the date of the classification change—the year 2000—a line in the graph denotes the boundary of the two data sources.

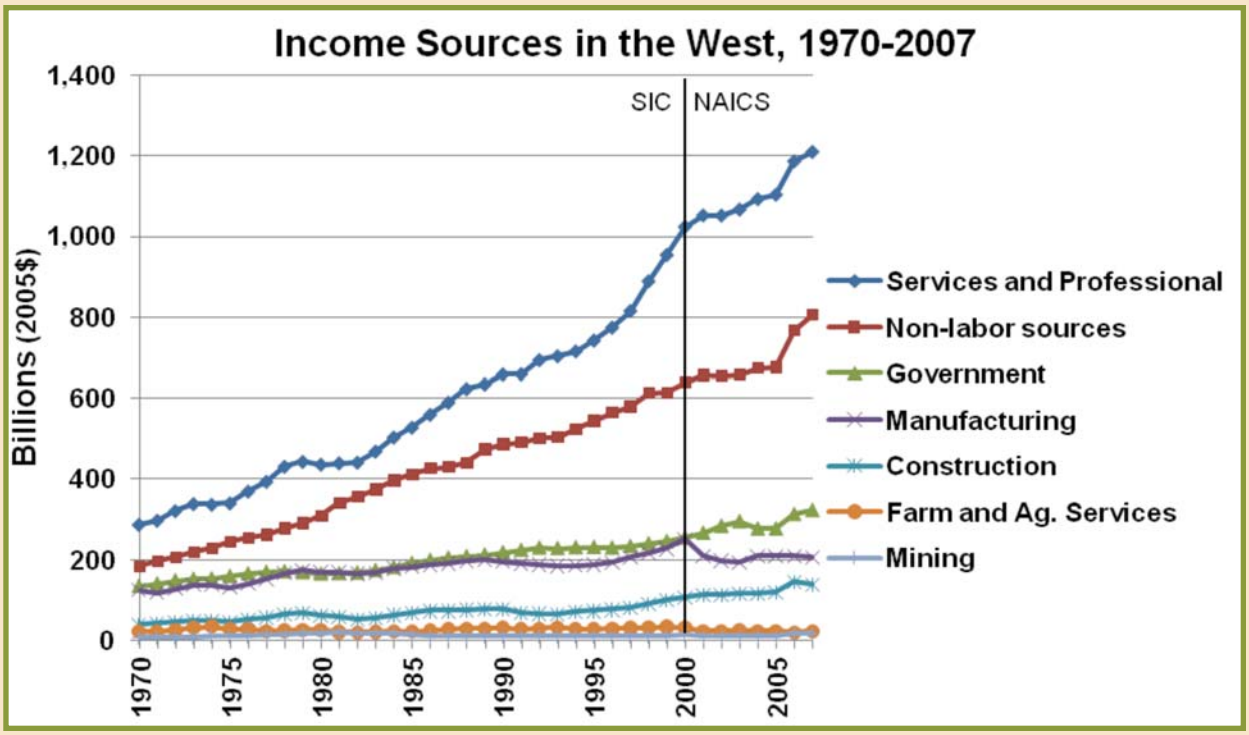


Figure 2: Income Sources, Western U.S., 1970-2007
Source: Bureau of Economic Analysis, U.S. Dept. of Commerce

to the long-term decline of the resource industries in the West.

Rasker et al. (2004) found that states and counties in the West that were more dependent on the "transformative" industries such as mining, logging, agriculture and manufacturing had the slowest economic growth, whereas those with a diversified economy that were more dependent on producer services grew the fastest.

To summarize the changing economy of the West:

- The economy over the last three to four decades has become much more diversified, with a mix of service-sector businesses joining the traditional extractive resource industries. The amenity economy and knowledge economy are very important components of the economic picture in the West.
- Protected public lands such as designated wilderness, national parks and national conservation areas provide key environmental amenities that are important contributors to quality of life. As such, protected public lands are significant economic assets for local and regional economic development.

Counties with protected public lands or close to protected lands have the fastest economic growth. In addition to protected public lands, other conditions are important for economic prosperity including good transportation access to metropolitan areas via road and airline connections, an educated workforce and a diverse local economy.

- The service industries have grown greatly during the last 30 to 40 years. There is a wide diversity in wage levels among the service sectors. Locales with a "knowledge economy," having a greater proportion of producer services such as finance, engineering and business services, have faster growth than areas dependent on low-wage consumer services such as accommodations and food service.
- Retirement and investment income has become a very significant economic driver in many rural areas of the West.

The extractive industries are a much smaller but still important sector of the economy. The West is no longer dependent on resource extraction, with only a few exceptions. The extractive industries are not likely to provide a significant source of new employment and income. Counties and states with resource-based economies also have the slowest economic growth.

Dolores River, Colorado

Photo: Sonoran Institute

THE CHANGING ECONOMY OF MESA COUNTY

The population of Mesa County was estimated at 139,082 in 2007. Population growth in the county between 1970 and 2007 was about 84,500 people, an increase of about 155 percent. Since 2000, the county population has grown 20 percent. For comparison, population in the Denver area grew by about 119 percent from 1970 to 2007 (U.S. Census Bureau 2008).

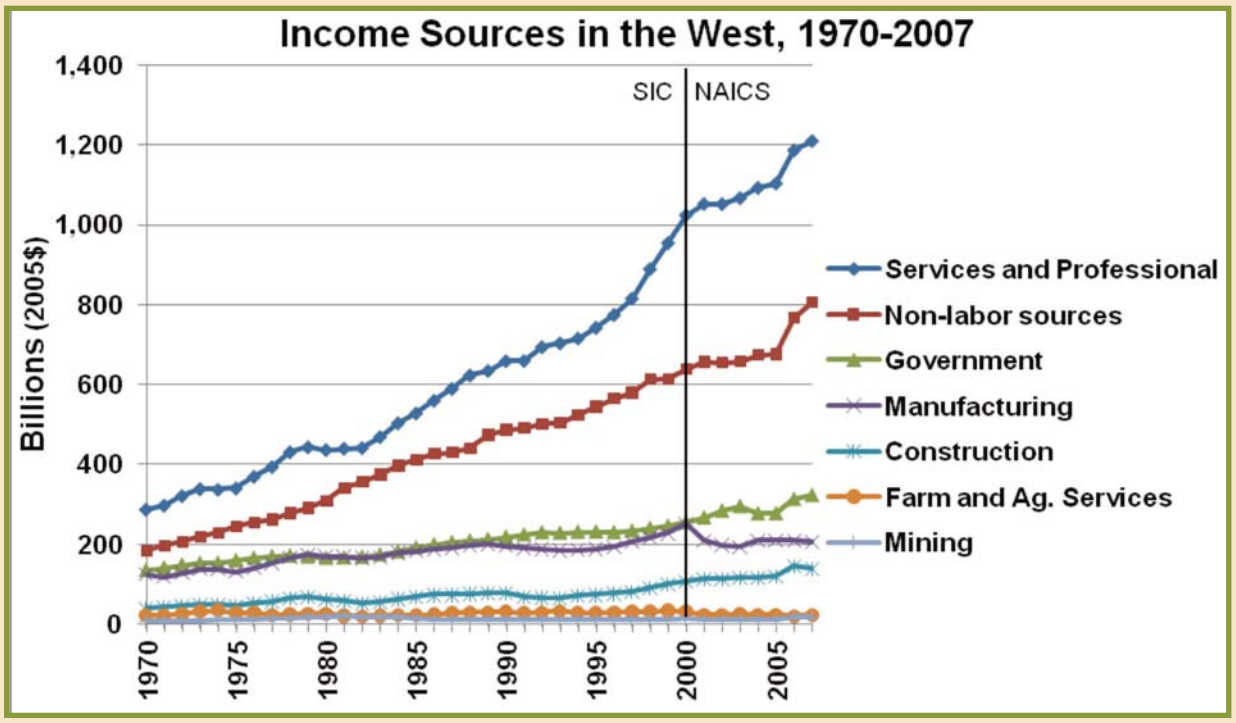


Figure 3: Income Sources, Mesa County, 1970-2007
Source: Bureau of Economic Analysis, U.S. Dept. of Commerce

Over the period of 1970-2007, 45 percent of the personal income growth was in the services and professional sector. Non-labor income accounted for 38.5 percent of the new personal income over the same period. These two sectors were the fastest-growing and largest sources of personal income, as can be seen in Figure 3. Government personal income increased steadily and significantly over the period. Construction income cycled up and then down between about 1974 and 1986, and has risen fairly steadily from about 1995. Manufacturing and agricultural sources of personal income from 1970 to 2006 were slightly increasing and slightly decreasing, respectively.

Except for the mid-1970s to mid-1980s boom-and-bust cycle and the recent steep rise in mining (oil and gas), personal income and the nearly parallel construction sector behavior, these trends generally match those of the West. Also, non-labor sources are more important in Mesa County, as can be seen by comparing Figures 2 and 3.

It is useful to examine how personal income growth was distributed within the category of services. In Mesa County, for the period 2001-2006, consumer services increased by 28 percent and accounted for 7.4 percent of new personal income. This service subsector was followed closely by producer services, increasing by 23 percent and responsible for 11.1 percent of new personal income. The service subsector making up the largest proportion of new personal income was government services, with 12.1 percent of new personal income over the period.

MINING AND OIL/GAS SECTOR

Personal income derived from the mining sector, which includes oil and gas exploration, development and production, experienced a boom-and-bust cycle over the decade between 1974 and 1984 and has risen sharply again since 2003 in response to high oil and gas prices. It is important to note that nearly all of the personal income in the mining sector is derived from oil and gas extraction and the associated service industry. The actual mining component, which includes metallic and non-metallic mines (principally coal and aggregate), accounted for about 8.5 percent of this sector in 2006, a proportion that has shrunk steadily since the current oil and gas boom in the area started in 2003.

Although difficult to quantify, economic activity in the mining and oil/gas sector stimulates economic activity in other sectors, creating a multiplier effect as salaries, wages and business income are re-circulated in the local economy. A significant proportion of employees in this sector are not local residents, travelling to the area to work and returning to their home between work tours. This diminishes the local multiplier effect.

In the period 2001-2006, the oil and gas subsector grew more than any other at 425 percent and was responsible for the largest proportion of new personal income at 18.6 percent. This is not surprising given the large increase in natural gas extraction activity in the county and in adjacent areas served by firms with offices in Grand Junction.

As the prices of oil and natural gas have decreased dramatically since July 2008, the boom has turned to bust, with oil and gas sector activity in Mesa County and surrounding areas dropping significantly. Hiring freezes have been instituted, layoffs are occurring, petroleum company budgets have been reduced and drilling rigs have been idled. In addition, businesses that provide services and goods for the petroleum companies and their employees are starting to feel negative impacts (Lofholm 2009; Riccardi 2009).

TOURISM AND TRAVEL

Tourism can be a very important component of an economy as it generally brings a significant proportion of income from outside an area. In this sense, it can be considered an "export" industry. Economic impacts of tourism are often difficult to measure due to the wide variety of activities comprising the sector. These are served by a range of businesses such as hotels and resorts, restaurants and bars, air and ground transportation firms, and food and sporting goods stores, among others. Due to this economic diversity, the tourism and travel sector is not present as a single, explicit category in the SIC or NAICS. To understand this sector of the economy, one common approach is to gather data from the component industries along with tax data, and construct an integrated model of tourism's economic impacts.

The Palisade overlooks Gateway Canyons Resort, Gateway Colorado

Photo: Ian G. Wilson, Sonoran Institute

An increasingly significant aspect of the tourism economy are those impacts arising from second homes and vacation residences. Repeat visitors to a vacation destination often want to have a more permanent, private or comfortable place to stay when they visit. Frequently, these repeat visitors will purchase or build a second home. This leads to impacts in the construction industry and the firms that supply that industry. The acquisition of the homes involves financial, legal and real estate services. Property management services can be a part of the impacts as the new homeowners seek to rent or lease their homes when they are not present. When the new owners or renters occupy the property, it creates a demand for resident goods and services such as groceries, household goods, utilities, repair, maintenance, landscaping and housekeeping. Often, second homes become primary residences as people retire to an area or bring their job or business with them, becoming what are known as amenity migrants. All these factors result in significant economic impacts resulting from second homes driven initially by tourism.

The importance of environmental amenities and protected public lands to tourism in the West cannot be overstated, especially in Mesa County and the Gateway area. Protected public lands such as designated wilderness, national and state parks, national forests, and national conservation areas provide key environmental amenities that attract visitors, such as clean air and water, scenic beauty, and locations for hiking, rafting, mountain biking, camping and rock climbing, among others.

COLORADO TOURISM

Visitors to Colorado spent an estimated $9.8 billion in 2007 (the most recent data available), an increase of 10 percent over 2006. The largest segment of visitors traveled to the state for vacations involving outdoor recreation. This was followed by touring trips, special event trips and ski trips (Longwoods International 2008). About 40 percent of the travel

spending in the state occurs in the Denver metropolitan area. Another 28 percent occurs in the mountain resort region encompassing Eagle, Grand, Gunnison, La Plata, Montrose, Pitkin, Routt, San Miguel and Summit counties. The remainder is spread out across the rest of the state. Travel spending is actually more important in the rural counties than in the metropolitan counties because it is a much larger proportion of the local economies (Dean Runyan 2008).

MESA COUNTY TOURISM IMPACTS

Local tourism impacts have been estimated in studies prepared for and by the Colorado Tourism Office (CTO) and the Demography Division of the Colorado Department of Local Affairs (DOLA). The 2005 economic base analysis prepared by DOLA indicated that 13.1 percent of export-oriented employment in Mesa County was the result of tourism-related activities (including second homes), up from 8 percent in 1999 (Center for Business and Economic Forecasting 2001; Colorado Department of Local Affairs 2007). As such, tourism is a small but growing industry in the county.

The CTO commissioned a study by Dean Runyan Associates to analyze tourism in the state during the period 1996 to 2007 (Dean Runyan 2008). Dean Runyan Associates used its proprietary Regional Travel Impact Model to estimate direct impacts resulting from spending by visitors to the state. The report, released in June 2008, provides estimated direct visitor spending, employment, personal income and government tax revenue generated by travelers to Colorado. These estimates do not include impacts generated by second-home activities. Estimates were developed for the entire state and sub-state regions and were also broken down by county.

Total direct travel spending in Mesa County in 2007 was estimated at $259.7 million. Figure 4 is a graph of estimated total direct travel spending and earnings in the county generated by those expenditures for the period 1996-2007.

The travel industry generates a significant proportion of state and local government revenues through the collection of state and local sales tax, lodging tax, and motor fuel tax on visitor spending, as well as income taxes on individuals and corporations. An important aspect of tax receipts generated by travel spending is that most of the taxes are paid by visitors instead of residents. In Mesa County, estimated total direct government revenue for 2007 was $13.2 million. Figure 5 shows state and local tax revenue generated by travel spending from 1996-2007.

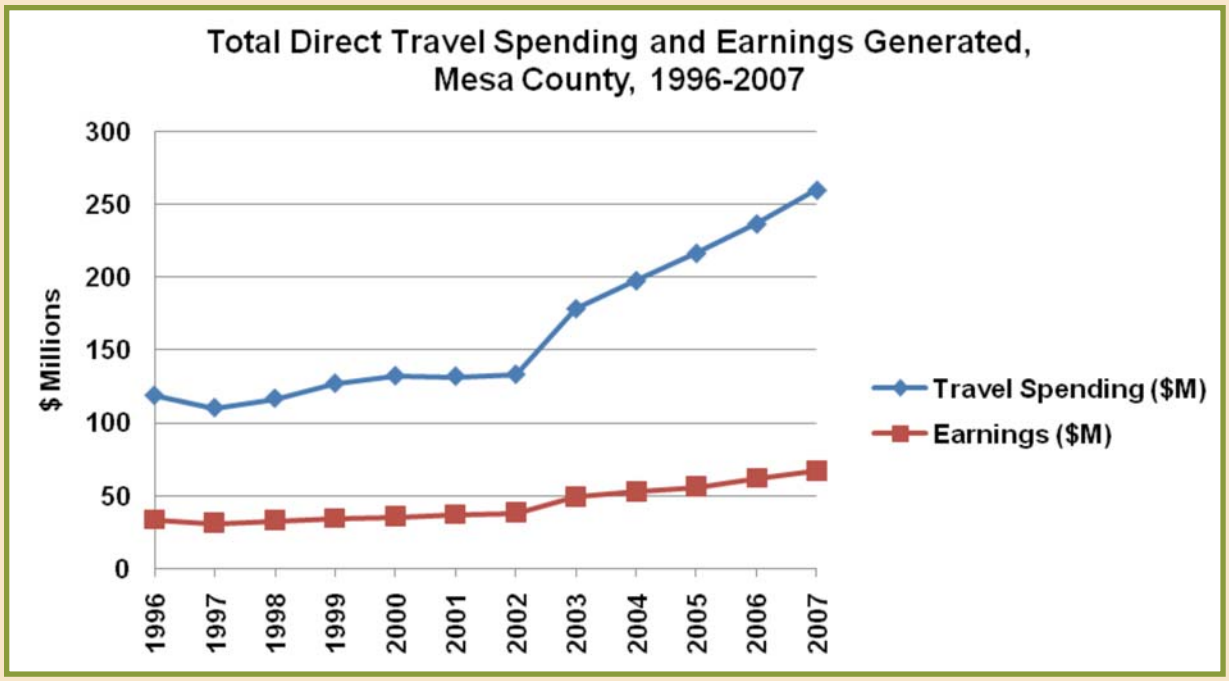


Figure 4: Total Direct Travel Spending and Earnings, Mesa County, 1996-2007
Source: Dean Runyan Associates

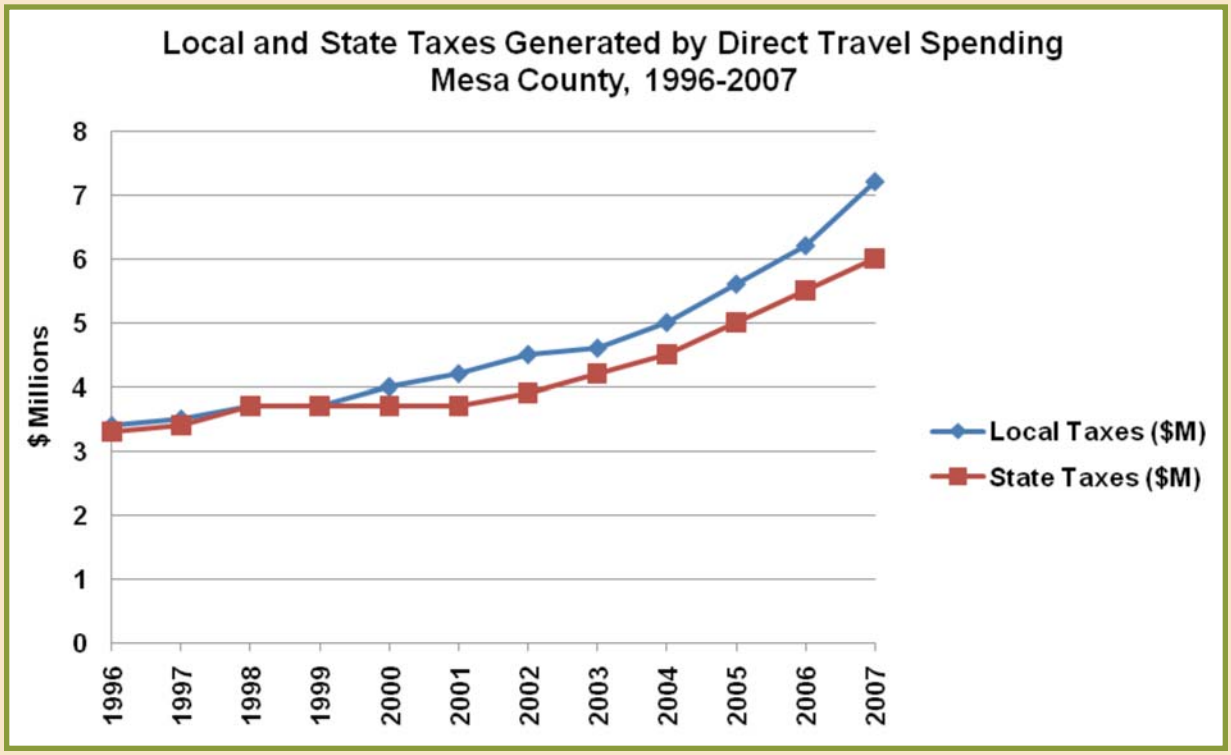


Figure 5: Travel-Generated Tax Revenue, Mesa County, 1996-2007
Source: Dean Runyan Associates

HUNTING, FISHING AND WILDLIFE-VIEWING IMPACTS

Hunting, fishing and wildlife viewing are outdoor recreation activities that generate important levels of economic activity across Colorado due to spending by residents and non-residents. The Colorado Department of Wildlife commissioned a study on economic impacts of outdoor recreation activities using 2007 data (BBC Research and Consulting 2008). The report contains county-level breakdowns of direct, indirect and induced impacts, however, only direct impacts will be presented here. County-level estimates were only available for hunting and fishing, and were not developed for wildlife viewing due to data constraints. It is important to note that there may be some degree of overlap between these impacts and general tourism impacts.

Tourism, outdoor recreation, hunting, fishing and wildlife viewing are very important to the economy of Mesa County.

The economic impacts of hunting, fishing and wildlife viewing comprise trip expenses, such as accommodations, food and fuel purchases, equipment purchases, license fees and spending by the Colorado Division of Wildlife. In 2007, hunting and fishing activities directly contributed $43.98 million to the Mesa County economy. The largest proportion was due to fishing, followed by hunting.

While not reported at the county level, wildlife watching probably contributes a significant sum to the county economy. Statewide direct expenditures for 2006 wildlife watching were estimated at $703 million, versus $1 billion for hunting and fishing. If the ratio is similar in Mesa County, that would equate to about $31 million in direct wildlife-viewing expenditures.

ENVIRONMENTAL AMENITIES AND THE MESA COUNTY ECONOMY

Tourism, outdoor recreation, hunting, fishing and wildlife viewing are very important to the economy of Mesa County. These activities depend on the area's extensive environmental amenities, such as scenic beauty, wildlife habitat, areas for active outdoor recreation and clean air, which attract visitors and appeal to local residents. Because of this, these and other aspects of the natural environment are important economic assets that support the local and regional economy.

GATEWAY AREA ECONOMY

Gateway is a small community located on Colorado State Highway 141 near the confluence of West Creek and the Dolores River (see Maps 1 and 2). The town is surrounded by extensive public lands managed by the Bureau of Land Management and the U.S. Forest Service.

The economy of the Gateway area is relatively small, due to the low population. The town has a population that varies seasonally; full-time residents number approximately 150-200, with perhaps another 200 in the surrounding area. Boxes in the Gateway post office number about 400. The local school enrollment (2008-2009) is about 40 in kindergarten through 12th grade.

TOURISM AND OUTDOOR RECREATION

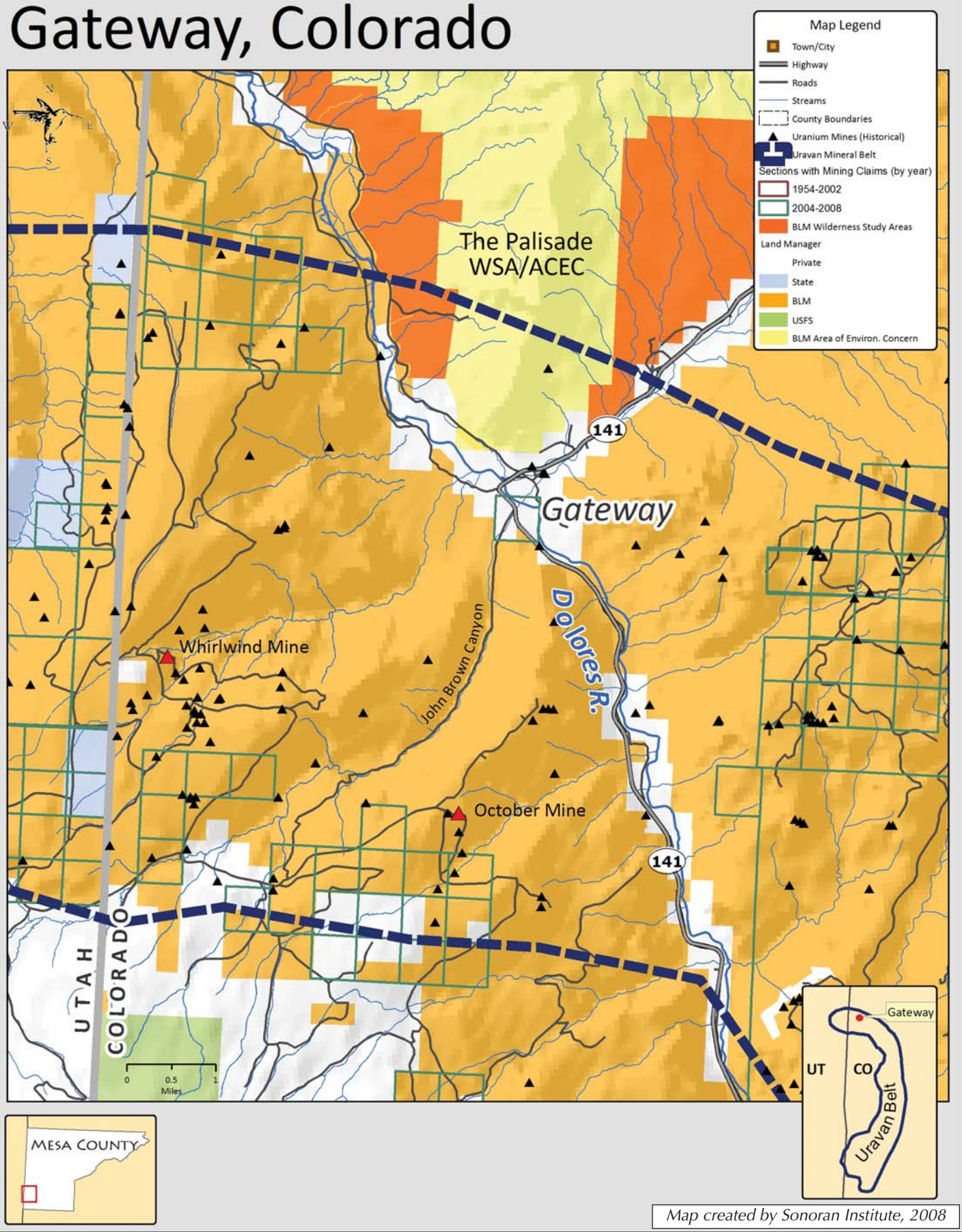
The largest contributor to the local economy is Gateway Canyons Resort, which opened in July 2005. The operation currently has 56 guest rooms, a spa, automobile museum, restaurant, grocery store, gas station and an outdoor recreation-gear store. A 250-seat events center is under construction and three more luxury lodges are planned to be constructed in the next few years. The resort is promoted as a center for outdoor recreation and adventure (Gateway Canyons Resort 2009).

Approximately 60 people are currently employed at the resort (Standish 2009). The average annual wage in Colorado's leisure and hospitality industry in 2007 was approximately $19,000 (Bureau of Labor Statistics 2009). Construction to expand the resort provides additional temporary employment.

Information developed in support of the BLM Gateway Area Recreation Management Plan indicates that public lands in the surrounding area are used by local residents and visitors for a wide variety of outdoor recreation activities, including hiking, rock climbing, mountain biking, horseback riding, ATV riding, motorcycling, camping, hunting, fishing, rafting, four-wheel driving, snowmobiling, cross-country skiing, wildlife watching and photography. Day visitors spend an average of about $80, mostly on food and motor fuel. Overnight visitors have an average trip expenditure of approximately $500, mostly on lodging and shopping. The primary destination of over 60 percent of the visitors was the public lands in the area (Virden, Budruk et al. 2008).

As Gateway Canyons Resort expands, additional employment and economic activity will occur. New employees will be required for the resort operations, and additional workers will be necessary for new construction. It is also likely

Gateway, Colorado



Map created by Sonoran Institute, 2008

that an expanding visitor base will create new jobs in other businesses that will arise to serve the visitors, such as restaurants, gift shops and recreation guide services, among others. Other economic impacts associated with an expanded resort operation and increasing numbers of visitors will derive from purchases made by the resort and the visitors, along with taxes paid on the purchases of goods and services. Multiplier effects associated with the increased business activity will likely create some additional employment and economic activity.

URANIUM MINING

Uranium mining activity in the Gateway area is currently centered at the Whirlwind Mine. In September 2008, Energy Fuels Resource Corporation (Energy Fuels) completed the permitting process to mine up to 200 tons per day of uranium ore at the property, which is approximately four miles southwest of Gateway on the Colorado-Utah border (see Map 2). The plan of operations indicates an initial mining rate of 100 tons per day and 10 to 12 employees, expanding to 200 tons per day with 24 employees. The average salary of the miners would be $40,000 to $50,000.

The uranium ore would be hauled via John Brown Canyon Road, Colorado Highways 141 and 90, Utah Highway 46, and U.S. Highway 191 to the White Mesa Mill in Blanding, Utah. Estimated project life is 10 years (Bureau of Land Management 2008).

In response to the drop in uranium prices in 2008, the company placed the mine operation on standby effective November 21, 2008 as part of a "capital preservation strategy" (Energy Fuels Inc. 2008).

The run-up in uranium prices over the period from 2004 through 2007 increased the value of low-grade ore stockpiles left by earlier mining efforts. In 2008, permits were issued for the removal of approximately 7,500 tons of low-grade ore from the October Mine, located about four miles due south of Gateway. The mining plan calls for loading of the ore and hauling it to the White Mesa Mill in Blanding, Utah (Bureau of Land Management 2008). The operation would likely employ two or three employees for one month.

Several additional historical uranium mines with potentially minable resources exist in the area surrounding the Whirlwind Mine. This area is known as the Beaver Mesa Mining District. Historical mine production in the area included at least 7 million pounds of uranium ore and 24 million pounds of vanadium ore. Energy Fuels controls additional mining properties in the area through lease agreements (Bureau of Land Management 2008). Another company, Blue Rock Energy Corporation (Blue Rock), also had options on properties in the area, having conducted sampling operations at the Cone Mountain property. The property was recently released by Blue Rock, which had not met an option payment due to market conditions (Blue Rock Resources Ltd. 2009).

Based on the presence in the Gateway area of uranium mines with additional potentially minable uranium resources, recent uranium claim staking and mineral exploration activity, the potential exists for increased local uranium mining activity. The timing and levels of future employment and economic activity that could be associated with such mining is difficult to estimate, as it is highly dependent on uranium commodity prices, which have been volatile over the last few years. Should the uranium price rebound to levels near $100/lb, there would likely be increased employment and economic activity associated with mining in the Gateway area.

In summary, the current economy of the Gateway area is primarily based on tourism and outdoor recreation. Due to low uranium prices, local employment and other economic activity associated with uranium exploration and mining is very low at the present time. As such, at this time (early 2009), uranium mining makes a much smaller contribution to the local economy. Future activity in this economic sector will likely cycle up and down with uranium prices (see the following section on boom-and-bust cycles in the Uravan Mineral Belt).

The outdoor recreation and tourism economy in the area is likely to continue to grow as Gateway Canyons Resort expands and the number of visitors to the area increases. Another factor to consider when comparing local impacts of these two economic sectors is that most of the employees in the tourism and outdoor recreation sector are likely to be local residents. These employees will spend a greater portion of their incomes in the local economy than mining employees who are more likely to be out-of-area residents.

THE URAVAN MINERAL BELT

Gateway is located at the northern end of the Uravan Mineral Belt (UMB), an arcuate zone of uranium-vanadium ore deposits within the Morrison Formation. The UMB extends across the western portions of Mesa, Montrose and San Miguel counties in Colorado, and extends slightly into Grand and San Juan counties in Utah (see Map 3) (Motica 1968).

Uranium and vanadium ores have been mined from the UMB since their first discovery in 1898. The Belt has seen several boom-and-bust cycles. From 1910 to 1923 the first boom occurred with ores in the UMB exploited primarily for radium with a small amount of byproduct uranium and vanadium. In 1923, high-grade uranium deposits were discovered in the Congo and this source supplanted ores from the UMB. The first bust occurred from 1923 to 1937, during which there was hardly any mineral production in the area (Motica 1968).

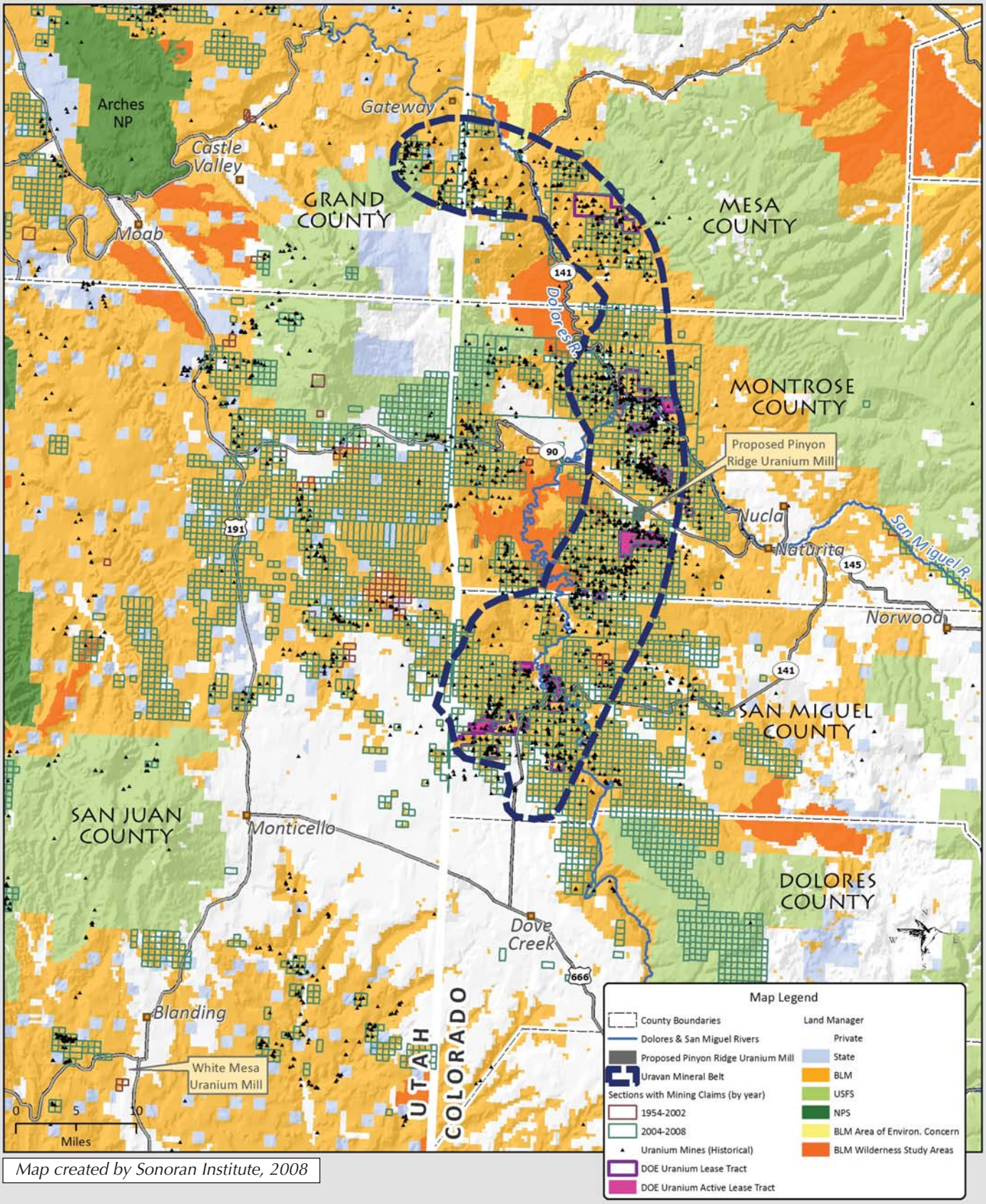
The second boom in the area began in 1937, based on increasing demand for vanadium for use in steel production. Vanadium mining continued until 1944, with some byproduct uranium extracted for use in the Manhattan project. This was followed by a three-year bust period of very little mining activity in the area after the end of World War II (Motica 1968).

A third boom started in 1948 with the onset of the Atomic Energy Commission (AEC) domestic uranium procurement program. This boom ended essentially in 1962 when the AEC ended the program, but waning production continued under the AEC "stretch-out" program until 1970.

With the partial release of market controls in the 1970s and a growing international demand created by nuclear power expansion, prices increased dramatically, reaching $50/lb in 1977. This fourth boom came to an end after the incident at the Three Mile Island Nuclear Generating Station in Pennsylvania in March 1979. The price dropped very rapidly until 1983 and continued to decline throughout the remainder of the 1980s. Low prices then continued until 2003. During this period, uranium mining almost completely ceased in the UMB and elsewhere in the region.

The fifth boom-and-bust cycle began in 2004 when the price of uranium started moving up yet again, peaking at about $136 in June 2007. This most recent uranium price run-up resulted in a huge increase in uranium exploration activity in the UMB and adjacent prospective areas in Colorado and Utah. Many thousands of new mining claims were staked in Colorado from 2004 through 2007, many of them in the UMB (see Map 3). Several mines were permitted and min-

Mining Claims and Uranium Mines in Vicinity of Uravan Mineral Belt



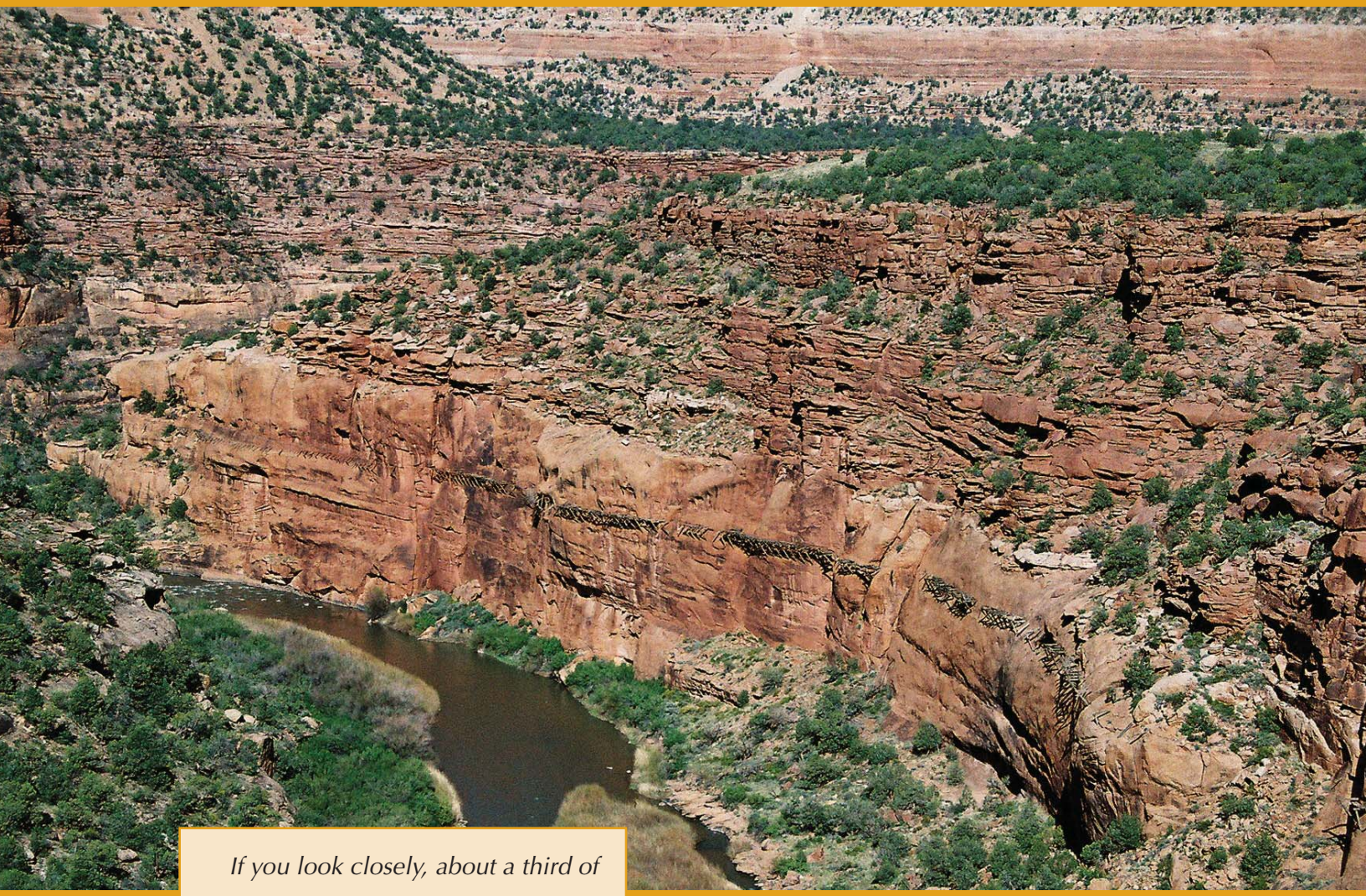
Map created by Sonoran Institute, 2008

ing re-started at some properties. Also during this period, a new uranium mill was proposed for the Paradox Valley (see Map 3) and the permitting process initiated. The price of uranium has since plunged again to about $50/lb in early February 2009. This has initiated a new bust with properties closing down, workers furloughed, exploration programs slowing down and mines going on standby (Energy Fuels Inc. 2008; Jaffe 2008; Blue Rock Resources Ltd. 2009).

In light of the multiple boom-and-bust cycles that have occurred in the UMB over the last hundred or so years and given the historical and continuing volatility of uranium prices, it seems highly likely that the area will see similar cycles in the future. Price increases will most likely be accompanied by claim-staking rushes, increased exploration activities and increased mining activities. A period of sustained high uranium prices could also result in the permitting and opening of new uranium milling operations in or near the UMB. With price decreases, exploration programs will wane and mines will shut down.

It is highly likely that uranium mining in the Gateway area will continue to see boom-and-bust cycles in the future.

Map 3: Uravan Mineral Belt and Vicinity



If you look closely, about a third of the way down from the top of the prominent sandstone cliff in the middle of the image you can see the remains of the Hanging Flume. This was constructed in 1889-1890 and was used to deliver water from the San Miguel River to a gold placer mine operation.

Dolores River Canyon, Colorado

Photo: Sonoran Institute

HUMAN HEALTH RISKS, ENVIRONMENTAL/ ECOLOGICAL IMPACTS AND SOCIAL COSTS ASSOCIATED WITH URANIUM EXTRACTION

The uranium mined in the UMB has been extracted mainly from underground mines using common techniques. As the uranium concentration in produced ores in this area is generally low (approximately 0.27 percent uranium by weight), the ores were usually concentrated at milling facilities within local mining districts or in nearby towns (Motica 1968). The mining and milling processes create human health risks and environmental impacts.

Some risks associated with uranium mining in the UMB are those commonly encountered in all underground mining operations. Underground workings can collapse, causing surface property damage. Open mine shafts and adits create risks from accidental falls and collapse. If the underground workings intersect the groundwater table, this exposes the ores to the atmosphere. Sulfide ore minerals, if present, can be oxidized and subsequently generate acid mine drainage (International Atomic Energy Agency 2004).

LANDSCAPE

The removal and placement of soil, rock and tailings caused by mining activities results in extensive changes to the natural land surface. These changes include the destruction of surface features and loss of landscape diversity. Landscape features often are important for wildlife and plant habitat, as well as aesthetic value. Surface disturbance associated with mining activities can destroy or degrade cultural resources, such as archaeological, historical and sacred sites for indigenous peoples.

SOILS

Impacts on soils due to surface disturbance can be significant, especially in desert areas where soil formation occurs very slowly. Soils are generally removed prior to mining and used to cover the re-contoured land surface during reclamation. Once the soil has been disturbed, its characteristics regarding pore size and structure, permeability, ability to hold water and microbial populations are drastically changed. Return to pre-disturbance structure may take tens to hundreds of years. Mining areas with a thin soil profile and limited soil, such as rocky areas, may lose the soil resource completely, which will make re-vegetation difficult.

EROSION/RUNOFF

Erosion of exposed bedrock, soil, waste rock and tailings is likely to occur due to mining activities as vegetation is stripped and earth materials are removed, processed and/or placed in embankments. If surface runoff and slope angles are not carefully controlled, erosion will increase in the mined area, potentially leading to sediment transport and deposition long distances from the mine.

WATER

In preparing historical mines for new exploration and mining activities, as well as during ongoing mining operations, mine workings must often be dewatered. The effluent removed from the workings may be contaminated with toxic metals and other compounds. Discharge of untreated contaminated mine water can potentially negatively impact local ecosystems and create human health hazards. The discharge of mine waters to intermittent or ephemeral streams can result in a change in the hydrological regime of the streams. The dewatered effluent can also infiltrate shallow groundwater aquifers and change the overall groundwater chemistry (U.S. Environmental Protection Agency 2006).

MILL TAILINGS

Uranium milling residues, known as tailings, have a host of characteristics that increase their potential for negative environmental impacts. Mill tailings are radioactive, and the radioactivity persists for very long periods — thousands of years in some cases. Various toxic heavy metals and chemical compounds are present in tailings. The presence of sulfide minerals may cause acid mine drainage. In the past, mill tailings were commonly disposed of in thin, surface deposits, increasing their exposure to the environment and increasing the risk of surface water contamination, disposal of toxic and radioactive dust and radiation release (International Atomic Energy Agency 2004; U.S. Environmental Protection Agency 2006; U.S. Environmental Protection Agency 2007).

Uranium mining residue and mill tailings are often deposited in impoundments that are subject to failure. This can take the form of cracking, embankment collapse, erosion by rainwater or streams, overflow of tailings dams and spillway collapse, among others. Longer-term failure can include radioactive dust dispersal by wind, erosion of embankments, acid drainage and surface water contamination (International Atomic Energy Agency 2004; U.S. Environmental Protection Agency 2007).

ECOLOGICAL

The ecological risks from uranium extraction are not well understood. This is because research into these biological impacts is a recently developed science and has mostly been focused on human health risk. Recent interest in biological impacts has arisen from a series of observations and realizations. These include: 1) the fact that plants and animals can ingest radionuclides and create a risk to organisms higher in the food chain; 2) fish populations have declined in some uranium mining areas; and, 3) significant negative human health impacts of radioactivity may imply negative impacts on other organisms. Aside from impacts due to radioactivity, also of concern is the chemical toxicity of uranium, other radionuclides and other metals and minerals in the ores (International Atomic Energy Agency 2004; U.S. Environmental Protection Agency 2007).

HUMAN HEALTH

The extraction and concentration of uranium ores produces an entire set of human health impacts resulting from radioactivity. Uranium undergoes radioactive decay resulting in a chain of radionuclides that emit various forms of radiation which can present significant human health hazards, most notably the risk of radiogenic cancer. Uranium, its decay products and other metals and minerals present in uranium ores also pose other significant health risks, including fibrosis and kidney diseases, among others (International Atomic Energy Agency 2004; U.S. Environmental Protection Agency 2006; U.S. Department of Justice 2008).

For a discussion of some of the social costs associated with historical uranium mining and processing in western Colorado, please see the appendix to this report.

Although modern mining and processing techniques obviate many health risks associated with historical industry practices, a potential still exists for human health risks, environmental and ecological impacts and social costs associated with the mining and processing of uranium ores. This argues for caution on the part of communities in areas where these activities are proposed.

Dolores River, Colorado

Photo: Sonoran Institute

POTENTIAL NEGATIVE LOCAL AND REGIONAL ECONOMIC EFFECTS FROM URANIUM MINING

Uranium mining has the potential to negatively impact local and regional economies in southwestern Colorado in several ways, including:

- generating operational conflicts between tourism/recreation activities and mining operations;
- causing environmental/ecological impacts to natural amenities that are important economic assets;
- creating economic instability due to boom-and-bust cycles; and,
- producing public costs associated with public health risks and environmental remediation.

The proliferation of claims and associated activity in the Gateway area will result in increased road use and related traffic safety issues. The primary mine access and ore-haulage route for the Whirlwind Mine and other mining properties in the area includes a section of John Brown Canyon Road (see Map 2). This road is a principal vehicular access route to the backcountry west of Gateway and is also used by mountain bicyclists. At peak production, it is estimated that 28 light-vehicle trips and 18 heavy-vehicle trips would occur daily due to the Whirlwind Mine (Bureau of Land Management 2008). Activity at other mining properties would also amplify traffic on the John Brown Canyon Road. This would increase dust generation and expand the potential for accidents involving recreational road users and mining traffic, as well as negatively affect wildlife. Similar and other types of conflicts would likely arise with other proposed uranium exploration and mining operations and tourism/recreation activities in the area of the Uravan Mineral Belt.

The Whirlwind Mine, October Mine and other properties in the local mining district are within five to ten miles of Gateway Canyons Resort. Uranium exploration and mining activities in the Gateway area could negatively affect air quality, solitude, wildlife habitat, water quality and scenic views. To the extent that these and other natural environmental amenities that draw visitors to the area are degraded, this could negatively impact visitor experiences and thereby impair the area's ability to attract visitors. The same can be said for the entire Uravan Mineral Belt. In addition to the uranium resources present in this area, there are extensive and unique environmental amenities that should be protected because they are important assets essential for local and regional economic development.

Uranium mining (and mining in general) is appealing to communities because it is perceived as good for economic development, generally because of the high wages paid by the mining industry and other contributions to the local economy; however, several factors associated with mining cause it to be detrimental to the economic development of communities in the longer term.

Mining profits are a function of production costs and metals prices. Metals are traded in the international market and are subject to global economic forces. As a result, metals prices are volatile; decreasing when there is overcapacity or large stockpiles and increasing when production or stocks are low relative to demand. Mines tend to shut down when prices are low and re-open when prices increase again. The multiple boom-and-bust cycles the Uravan Mining Belt has experienced are a perfect example of these effects. This causes mining income, employment and payrolls to be unstable. In addition, mining operations tend to have relatively short lives, generally less than 20 years. People with specialized skills tend to leave when mines close to seek mining employment elsewhere. In an area with multiple mines, the opening and closing of individual mines leads to even more instability in community income from mining.

This income volatility creates uncertainty for community economies, leading to investment risk. This, in turn, can lead to lack of investment in the local economy by outside investors. Local business owners and entrepreneurs will not want to put money into business ventures if there is a risk of layoffs or mine closure. Community government expenditure decisions may also be affected if the local tax base is mining dependent. All of these factors impact negatively on local and regional economies and thereby impede the development of stable, sustainable economies.

The potential exists that a significant sustained increase in the price of uranium could cause another boom in the area.

Also, as described in the appendix to this report, historical uranium mining and milling operations in the Uravan Mineral Belt and elsewhere have been the source of extensive public health risks and environmental impacts that have generated billions of dollars in public costs. Many of the remediated sites will require monitoring and evaluation for hundreds if not thousands of years. Although modern mining and processing techniques greatly diminish potential health and environmental risks from new operations, substantial risks remain. Added to this are the great uncertainties with respect to how uranium ore mining and processing will impact natural ecosystems.

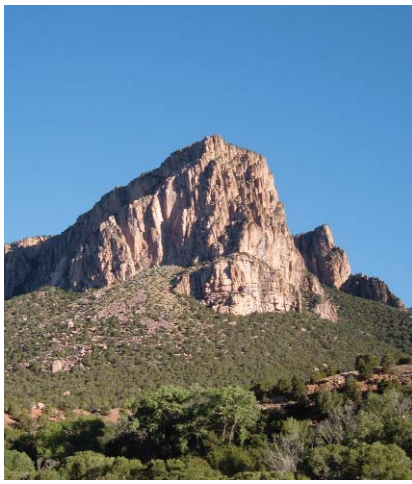
The risks and uncertainties inherent in uranium mining and processing, along with potential long term environmental, economic and social impacts that can result from these activities argue strongly that the entities involved should have the technical capabilities as well as the financial strength and stability to initiate and conduct the operations safely and in an environmentally responsible manner.

It is especially critical that the entities involved in mining and processing have the resources to complete the process of reclamation, restoration and closure.

Due to the industrial structure of the mining industry, the possibility of significant monetary gain, and the ease with which federal mining claims can be staked and transferred, a large proportion of mining claims that are staked are speculative. Many times the individuals or companies staking the claims have no desire or intent to actually mine the claims or to be involved with the properties on a long-term basis. They are speculating that they may be able to sell or option the claims at a profit to consortia or larger mining companies. As such, some of these individuals or companies will not have the requisite expertise and resources to conduct operations responsibly. This is something for potentially impacted communities to be aware of and to consider when providing input to the permitting process.

As a result of the extensive uranium resources present in southwestern Colorado and in light of the many thousands of uranium mining claims staked in the area in recent years, the potential exists that a significant sustained increase in the price of uranium could cause another uranium boom in the area. If this occurred, the potential cumulative impacts would be extensive. The U.S. Department of Energy (DOE), in its Environmental Assessment of the new Uranium Leasing Program, estimated that if 42 mining claims were developed consistent with expectations for DOE lease tracts in western Colorado, impacts would be comparable to 570 new workers and 150 daily haul-truck ore shipments on area roads. Development on 42 claims would represent less than 1% of the recently staked uranium claims in the area. Should production occur on all claims in the area, thousands of new workers would be required and thousands of haul trucks would be operating on regional roads (U.S. Department of Energy 2007). It is highly unlikely that all claims would come into production, but even if a much smaller but still significant proportion did, the cumulative impacts on the area would be large. There would likely be a need for worker and family housing, increased public school attendance, increased demand for social services, higher road maintenance requirements and increased public safety needs. Local communities and governmental jurisdictions would bear greater impacts and associated costs.

As a result of uranium mining's potential impacts on local and regional economies, Gateway and other local communities should carefully compare potential benefits and costs to determine whether uranium mining projects are justified. A broader assessment of the costs, benefits and impacts is needed to help local officials and residents understand the implications of mining on their communities. These issues must be critically examined as the decisions made will strongly impact the area's future economic prosperity and sustainability.



Unaweep Canyon, Gateway, Colorado

Photo: Ian G. Wilson, Sonoran Institute

Dolores River Canyon at Paradox

Photo: Ian G. Wilson, Sonoran Institute

RECOMMENDATIONS

The likelihood that future uranium price increases will cause another resurgence of uranium exploration, mining and processing means that local communities should be prepared to provide input to the mining decision process. Public input to National Environmental Policy Act (NEPA) processes, as well as county, state and federal permitting processes, provides opportunities for citizen oversight. Community members should consider the following issues:

- **Location of Claims**
  Local communities should be aware of the existence of nearby uranium mining claims, associated risks, potential impacts and plans for proposed mineral exploration and mining activities. Plans of operations are available from the Bureau of Land Management.

- **Viability of Mining Companies**
  A large proportion of the thousands of new uranium mining claims staked in recent years are speculative in nature. It is important that citizens become informed regarding the ownership of the mining claims and the companies that will conduct mining. It is critical that companies proposing to conduct mining operations have the requisite technical abilities, mining experience and financial viability to safely and properly operate the mines, as well as to complete appropriate remediation and reclamation after the mines close.

- **Offsite Impacts of Mine Operations**
  Several issues potentially associated with individual mining operations call for input and oversight by local communities. Ore from individual mines must be hauled to regional uranium mills for processing. This will increase truck traffic on backcountry roads and area highways, leading to potential conflicts with other road users and possibly creating safety issues. These should be addressed in mine operational plans.

- **Water Quality**
  Dewatering old mine workings, onsite ore stockpiling and other operations associated with mining could create surface and groundwater impacts. Local communities should be aware of the potential for surface and groundwater impacts and ensure that the permitting process addresses these risks.

- **Viewsheds**
  Mining activities, especially open-pit operations, can create extensive surface disturbance and thereby impact scenic viewsheds. As these viewsheds are part of what draws visitors into the area, local communities should ensure that mine permits and operational plans protect these important environmental amenities.

- **Fiscal Impacts**
  In addition to issues associated with individual mine operations, local communities should be cognizant of potential cumulative impacts deriving from an increase of mining across the area. Due to the extensive uranium mineralization present in the Uravan Mineral Belt and adjacent areas, and in consideration of the many thousands of uranium mining claims present in the region, a sustained increase in uranium prices could result in another mining boom. Should this occur, area communities and governments would need to be prepared to deal with associated direct and indirect impacts. These would derive primarily from an expanded workforce and increased traffic on the road system, and could include:
  - workforce housing requirements;
  - increased demand for social services;
  - increased costs to local school districts;
  - higher public safety costs; and,
  - higher road maintenance requirements.

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APPENDIX— SOCIAL COSTS ASSOCIATED WITH HISTORICAL URANIUM MINING AND PROCESSING

If strict precautions are not observed, uranium miners and millworkers can be exposed to radon gas, among other toxins. For much of the early history of uranium mining and ore processing in the U.S., the health risks were not clearly understood and proper worker precautions were not implemented. As a result, many of these workers were exposed to radiation and contracted cancer and other diseases. In 1990, Congress passed the Radiation Exposure Compensation Act, which provided for payments to individuals exposed to radiation from nuclear weapons tests or from work in uranium mines and mills. To date, more than 6,400 miners, millworkers and ore-transport workers have received compensation totaling nearly $645 million. Additional cases are pending (U.S. Department of Justice 2009).

Recognizing the human health hazards and negative environmental impacts arising from uranium mill tailings, the U.S. Congress passed the Uranium Mill Tailings Radiation Control Act in 1978. As a result, the U.S. Department of Energy established the Uranium Mill Tailings Remedial Action (UMTRA) project to remediate mill tailings sites. Seven former millsites in Colorado were remediated under the program, including sites at Durango, Grand Junction, Gunnison, Maybell, Naturita, Rifle and Slick Rock. All of these sites except Maybell have groundwater contamination to varying degrees. All are either in the headwaters, tributaries or main stem of the Colorado River. The clean-up expenditures of the overall project as of the end of 1999 totaled nearly $1.5 billion (Energy Information Administration 2009).

The UMTRA remediation of the Climax Uranium Company millsite in Grand Junction is notable as an example of extensive public health risks resulting from uranium ore processing. The mill was constructed in an industrial part of Grand Junction and began operating in 1951, processing ores from many mines in the Uravan Mineral Belt to extract uranium and vanadium concentrates. From 1951 until the mill was closed in 1970, approximately 2.3 million tons of ore were processed to extract an estimated 11.7 million pounds of uranium concentrate and 46.1 million pounds of vanadium concentrate (Energy Information Administration 2009). During the 1950s and 1960s, mill tailings were given away to the public and an estimated 300,000 tons were used as sand in concrete, stucco, bricks and backfill, among other uses. Products made with the tailings were used to construct homes, schools, churches and commercial buildings. Locations where uranium mill tailings were used were termed “vicinity properties.” Under UMTRA and other federal legislation, approximately 4,300 vicinity properties were remediated. The total cost of the Grand Junction UMTRA remediation was

approximately $504 million (Energy Information Administration 2009).

The practice of using uranium mill tailings as construction materials was widespread before the health hazards were recognized. The UMTRA project and other clean-up efforts notwithstanding, it is estimated that over 1 million cubic yards of uranium mill tailings remain in Colorado. It is expected that new deposits of uranium mill tailings will be found and known deposits will be disturbed, thus creating a long-term health concern and an expectation of continuing public costs (Colorado Department of Public Health and Environment 2009).

Contamination at one former millsite in the Uravan Mineral Belt was extensive enough to result in designation as an EPA Superfund site, evacuation of remaining residents, and demolition of all buildings and structures. The town of Uravan no longer exists. As early as 1912, a radium processing plant was operating in Uravan. The town was established in 1935. Uranium and vanadium mills operated in the town until 1984. In 1986, the area was placed on the EPA Superfund list. The remediation effort took about 20 years and was deemed complete by the EPA in September, 2008. Extensive remediation was necessary at the site. The total cost was approximately $127 million, paid for by Umetco, a subsidiary of Dow Chemical Company (U.S. Environmental Protection Agency 2005; U.S. Environmental Protection Agency 2008).

View of the Gateway Canyon Resort property, Gateway Colorado

Photo: Ian G. Wilson, Sonoran Institute

Unaweep Canyon, Gateway, Colorado

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