



Best Management Practices: Protecting Water and Wildlife

Interstate Oil and Gas Compact Commission
Midyear meeting

June 3-5, 2012 – Vancouver, BC

Matt Sura, Natural Resources Law Center, University of Colorado Law School



Best Management Practices for Oil and Gas Development

Intermountain Oil and Gas BMP Project – www.oilandgasbmps.org

Project Components

- Searchable Database and Bibliography
 - Voluntary and required practices
 - CO, MT, NM, UT, WY
 - Beyond the Region
- Website Background Materials
 - Resource Pages
 - Law and Policy (Federal, state, local, tribes)
- Research Services
- Workshops

Environmentally Friendly Drilling Program Partner

Natural Resources Law Center University of Colorado Law School

Intermountain Oil and Gas BMP Project

Welcome to the Intermountain Oil and Gas BMP Project Website

HOME SEARCH BIBLIOGRAPHY RESOURCES LAW & POLICY TRAINING & WORKSHOPS FORUM ABOUT US

BEST MANAGEMENT PRACTICES

The Natural Resources Law Center and its partners welcome you to this free-access website of Best Management Practices (BMPs) for oil and gas development in the Intermountain West. BMPs are mitigation measures applied to areas being developed for oil and gas to promote energy development in an environmentally sensitive manner.

The focus of this website is a searchable database addressing surface resources affected by oil and gas development. The database includes both mandatory and voluntary Best Management Practices currently in use or recommended for responsible resource management in the states of Colorado, Montana, New Mexico, Utah, and Wyoming.

The BMP database is not intended to represent a consensus on what the best practices are for specific applications nor to advise users on the current legal requirements for specific locations. Rather, the database describes each practice and documents the source of the practice (who requires or recommends it in what specific applications). The database provides a link to the source of the BMP and, where possible, it provides supplemental information, including construction specifications, illustrations, pictures, maps, monitoring reports, and evaluations of the potential of the practice for mitigating impacts of development. Because practices change over time, database users should check with appropriate authorities to verify the latest requirements and recommendations for your area.

BMP CATEGORIES

The database includes BMPs to address a variety of resources and issues...

- Air Quality and Emissions
- Aquatic and Riparian Values
- Community
- Cultural/Historic
- Grazing and Agriculture
- Human Health and Safety
- Land Surface Disturbance
- Noise
- Other
- Soils (Conservation, Pollution, Reclamation)
- Vegetation
- Visual Aesthetics
- Water Quality and Pollution
- Water Quantity and Rights
- Wildlife

[Browse all](#)

WHAT'S NEW

Tribal governments have begun to regulate oil and gas development through tribal codes, ordinances, and constitutions, and, in some cases, through specific BMPs. Check out our new Tribal Law section for more information.

New Resources sections: Hydraulic Fracturing and Economics of BMPs

The Intermountain BMP Project is a work in progress. Currently, the database includes BMPs for a variety of resources (see the BMP Categories section) from a range of source documents (see the Bibliography), including project Environmental Impact Statements, Resource Management Plans, state wildlife agency guidelines, and industry and conservation group reports and websites.

BMP SEARCH

What management practices are recommended or required for oil and gas development? To find out, use the drop down menus or type keywords. For a more refined search, click "Advanced Search" or use the **BMP SEARCH** button.

Keywords:

Category:

Location:

[Advanced Search...](#)

TRAINING AND WORKSHOPS

Best Management Practices – What? How? and Why? Thank you to everyone who participated in...

SEARCH THE BIBLIOGRAPHY

Our searchable bibliography includes over 400 publications, including environmental impact statements, agency guidelines, and many technical reports, websites, and...

PARTNERS

The structure and content of this website is being developed in conjunction with project partners and advisors from government, industry, the conservation community, academia and...



BMP Definitions

Bureau of Land Management / BMP Project

“State-of-the-art mitigation measures applied to oil and natural gas drilling and production to help ensure that energy development is conducted in an environmentally responsible manner.”

Very broad definition that includes BMPs ranging from voluntary to required

http://www.blm.gov/wo/st/en/prog/energy/oil_and_gas/best_management_practices.html



BMP Definitions

- Colorado Oil & Gas Conservation Commission

Practices that are designed to prevent or reduce impacts caused by oil and gas operations to air, water, soil, or biological resources and to minimize adverse impacts to public health, safety, and welfare, including the environment and wildlife resources. *COGCC Rule 100 (Definitions).*

What is a BMP?

- State of the Art or “Best Practices”
- Mitigation Measures
- Environmentally Responsible



Procedural Best Management Practices

Stakeholder Participation

- Public Participation
- Voluntary Measures
- Surface Owner Initiated Measures
- Collaborative Efforts

BMPs are Traditionally Voluntary

Sources

- NGOs/Non-Profits
- Industry
- Academia



Voluntary BMPs from NGOs/Non-Profits

- Biodiversity Conservation Alliance – Drilling Smarter: Using Directional Drilling to Reduce Oil and Gas Impacts in the Intermountain West
<http://www.voiceforthewild.org/greatdivide/WesternHeritageAlt2.PDF>
- The Western Heritage Alternative – A Sustainable Vision for the Public Lands and Resources of the Great Divide
<http://www.voiceforthewild.org/blm/pubs/DirectionalDrilling1.pdf>



Voluntary BMPs from Industry

- The Petroleum Association of Wyoming – Sage Grouse Management, Recommended Management Practices

<http://www.pawyo.org/html/home.htm>



- **AboutNaturalGas.com**
 - XTO Energy (subsidiary of ExxonMobil)
 - Discusses measures taken to ensure environmental responsibility.

Voluntary BMPs from Industry

Marcellus Shale Coalition

- NOT mandatory
- Addresses full range from site development to restoration



Voluntary BMPs from Academia

Proposed in published studies, dissertations,
and research papers



Greater Sage-Grouse Population
Response to Natural Gas Field
Development in Western
Wyoming

by Matthew J. Holloran

[http://eqc.state.wy.us/orders/Land
%20Closed%20Cases/11-4803%20Lost
%20Creek%20ISR,%20LLC/Exhibit%2012.pdf](http://eqc.state.wy.us/orders/Land%20Closed%20Cases/11-4803%20Lost%20Creek%20ISR,%20LLC/Exhibit%2012.pdf)



From BMP to Law

1. Voluntary Measure →
2. Guideline →
3. Lease Stipulation /Condition of Approval →
4. Regulation →
5. Law



So... where do many of the new oil and gas regulations come from?

The Oil and Gas Industry

Both the worst and the best companies

Voluntary BMPs are Becoming Mandatory

- Ground Water Protection Council
Founded to promote and ensure the use of BMPs and fair but effective laws regarding comprehensive ground water protection.
- GWPC, together with the Interstate Oil and Gas Compact Commission, manages the FracFocus website -- <http://fracfocus.org>



Voluntary BMPs are Becoming Mandatory

States are beginning to require companies to disclose the chemicals used on FracFocus

Example – Colorado

Within 60 days following a hydraulic fracturing treatment, operators must post information about the chemicals used on FracFocus.

COGCC Rule 205(A)(b).

Example – Texas

- The Texas Railroad Commission shall require operators to disclose the chemicals used for hydraulic fracturing. *Tex. Nat. Res. Code § 91.851.*

- The Texas Railroad Commission requires disclosure on the FracFocus website. *16 Tex. Admin. Code § 3.29.*



Voluntary BMPs are Becoming Mandatory

BLM is considering requiring companies to disclose the chemicals used on FracFocus

<http://www.gpo.gov/fdsys/pkg/FR-2012-05-11/pdf/2012-11304.pdf>



Voluntary BMPs are becoming Mandatory

Regulations implementing the Clean Air Act

- Green Completions are a BMP that minimize emissions during the flow back stage

Flowback is captured, gas and liquid hydrocarbons are separated, and sold as product

- EPA's NSPS for the Oil & Natural Gas Sector require green completions

- Summary of the final rule: <http://www.epa.gov/airquality/oilandgas/pdfs/20120417fs.pdf>



Incorporating BMPs into Field Development on Public Lands

Public Lands & Minerals

- Resource Planning
- Leasing
- Permitting

Both at the state and federal level

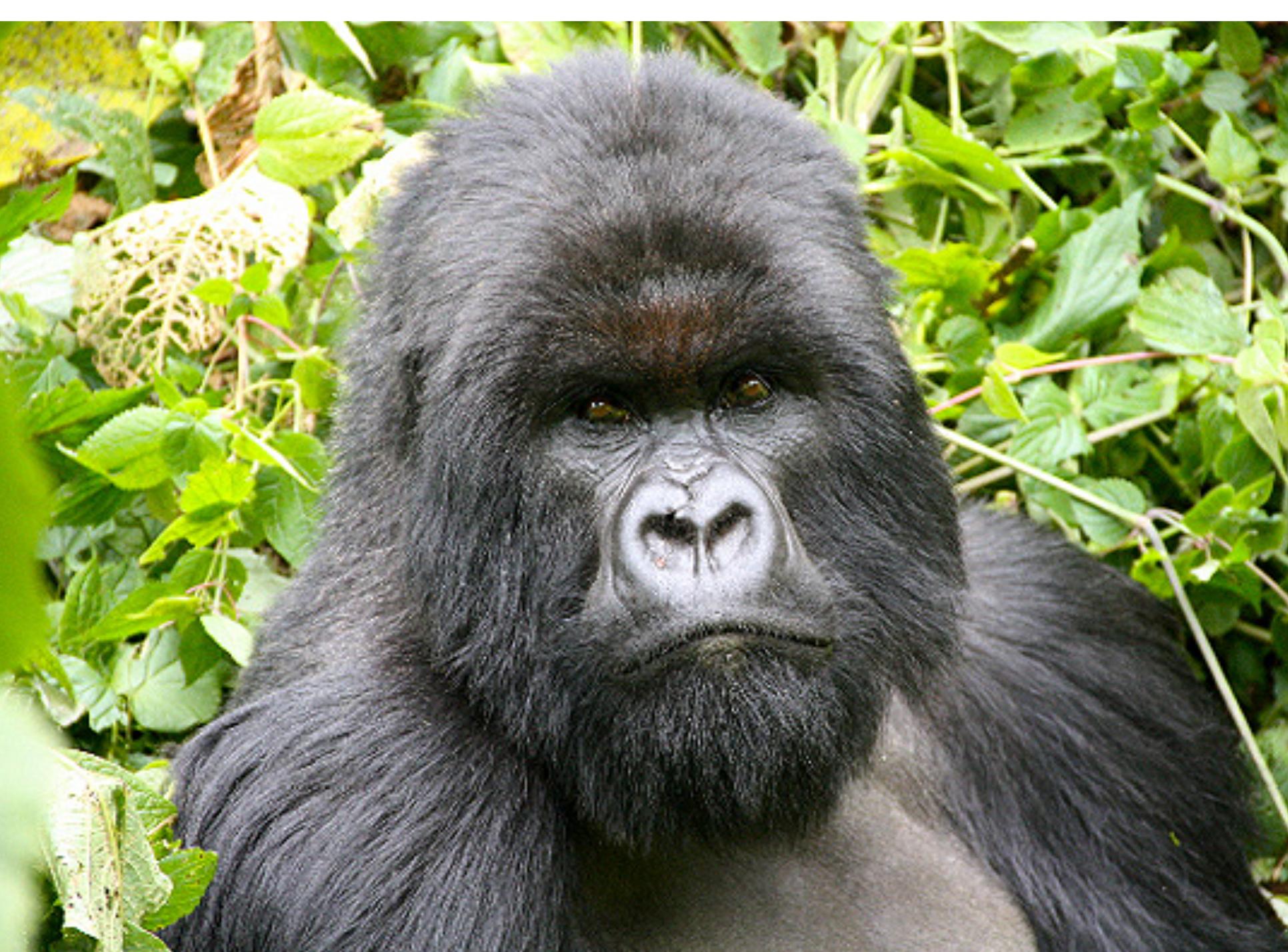




WILDLIFE PROTECTION







Voluntary BMPs

State Guidance Material

Example – Wyoming

Recommendations for Development of Oil & Gas
Resources within Crucial and Important Wildlife Habitats

[http://wgfd.wyo.gov/web2011/Departments/Wildlife/pdfs/
HABITAT_OILGASRECOMMENDATIONS0000333.pdf](http://wgfd.wyo.gov/web2011/Departments/Wildlife/pdfs/HABITAT_OILGASRECOMMENDATIONS0000333.pdf)



Potentially Required BMPs

Wildlife Protection

BMPs to minimize habitat fragmentation and minimize surface disturbances

Example – Colorado

–If proposed drilling location is located in a sensitive wildlife habitat, the Colorado Division of Wildlife can identify BMPs as conditions for approval of the APD.
COGCC Rule 1202.



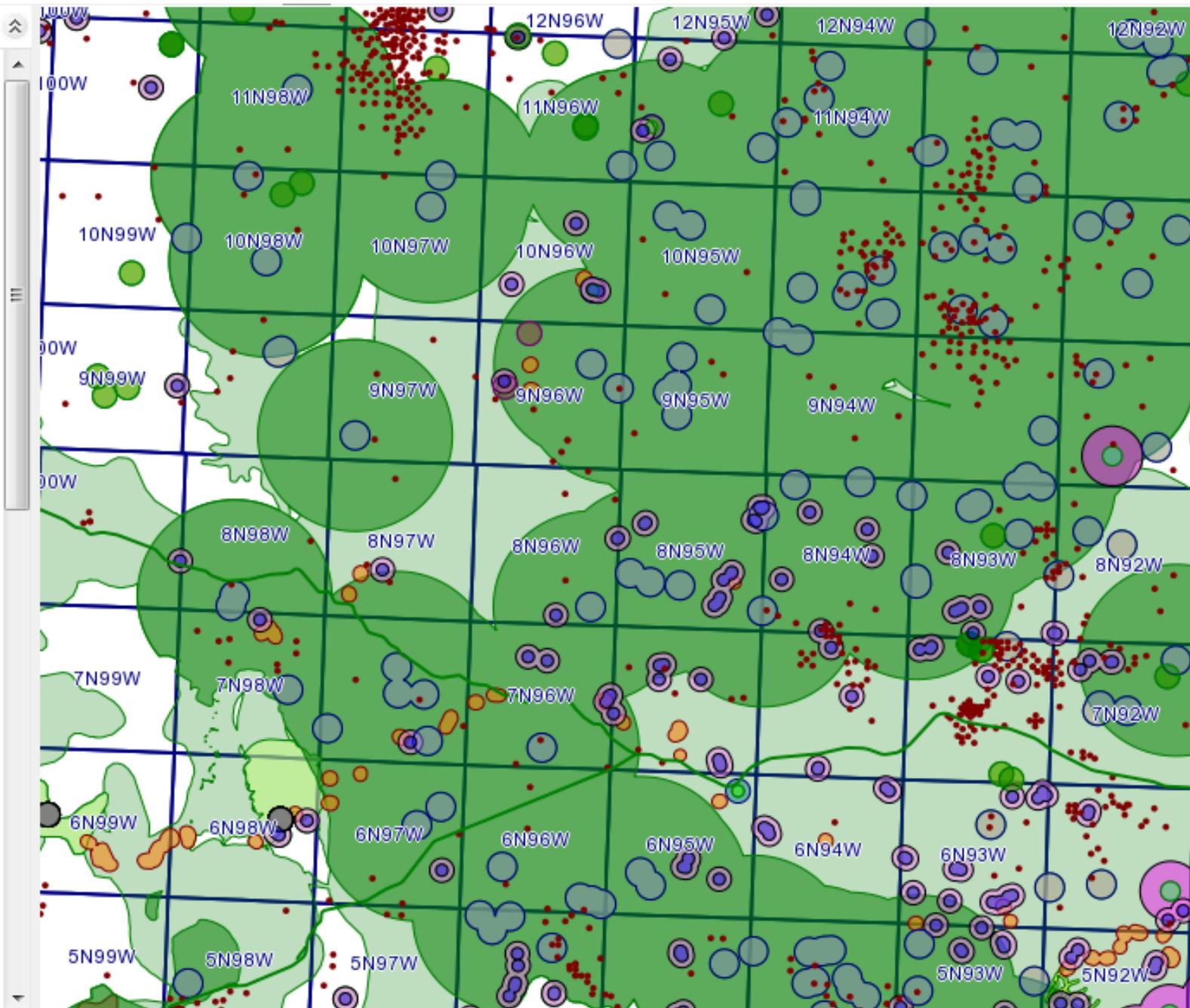
Potentially Required BMPs

- ***Sensitive wildlife habitat***
 - requirements such as the consolidation of new facilities to minimize impact to wildlife,
 - the use of remote monitoring of well production to the extent possible, and
 - minimizing construction widths where pipelines cross riparian areas, streams, and critical habitats. (See Rules 1203 and 1204 for a complete list).
- ***Restricted Surface Occupancy Areas*** (Rule 1205)
 - category is for those wildlife habitats that are so sensitive that no drilling activity should take place.
- ***Wildlife mitigation plans can cover larger area***



Layers

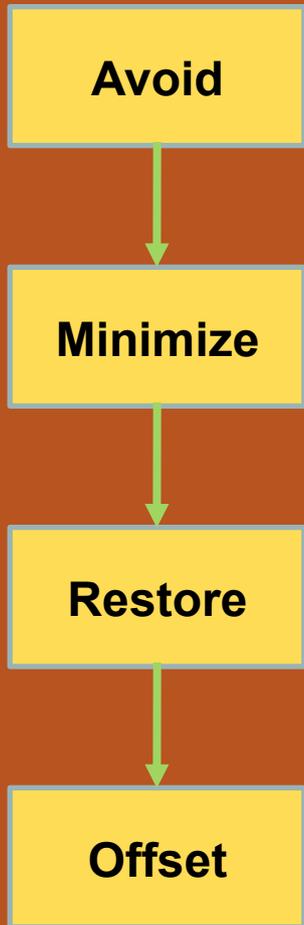
- O&G Facilities
- COGCC Data
- Roads & RRs
- Water Resources
- SecTwpRng
- Wildlife DOW
- Energy Liaisons
- DOW Districts
- State Wildlife Area
- WMPs
- Black Bear
- DOW_RSO
- DOW_SWH
- Riparian Buffer
- RSO Detail
 - Gld Eagle Nest
 - B Eagle Nest
 - Osprey
 - Peregrine Falcon
 - Prairie Falcon
 - Northern Goshawk
 - Ferruginous Hawk
 - Columbian STG
 - Greater Sage Gr
 - Gunnison Sage Gr
 - Plains ST Gr



How can we best achieve goals for energy development, nature conservation, and other priorities?



Development by Design (DbD)



A **science-based tool** to identify opportunities to **avoid, minimize, and/or mitigate** the impacts of energy development across a **region** (e.g., Niobrara formation) **or site** (e.g., an operator's future development area).

Addresses **surface features**

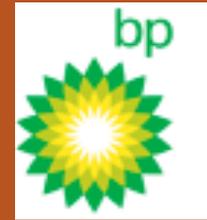
Goal: **No net loss** for nature

Development by Design Basics

18 projects in the Western U.S.,
Australia, Mongolia, and Latin America



Sample Partners



Sample Industries



Assemble Team of Experts



Identify Project Boundaries



Identify & Map Key Features



Identify Onsite Priorities



Identify Offset Goals & Opportunities



	Gail Martinez	
BLM Little Snake	Jeremy Casterson	
	Roy McKinstry	
	Bernie Weynand	
BLM Rock Springs	Carrie Nelson	
	Jeromy Caldwell	
	Nicholas Kaczor	
	Bill deVergie	
	Brad Petch	
CDOW	Brett Walker	
	Brian Holmes	
	Darby Finley	
	Jamin Grigg	
	John Broderick	
	Justin Olson	
	Kim Kaal	
	Orrin Duvuvuei	
	Consultants & others	David Allison
		Todd Graham
Wayne Burkhardt		
Questar	Mike Smith	
	Stephanie Tomkinson	
	Vinnie Rigatti	
TNC	Chris Pague	
	Holly Copeland	
	Joseph Kiesecker	
	Megan Kram	
USFWS	Dan Blake	
	Mark Bellis	
	Scott Covington	
WYG&F	Jim Wasseen	
	Mark Zornes	
	Patrick Burke	
	Tim Woolley	

Assemble Team of Experts



Identify Project Boundaries



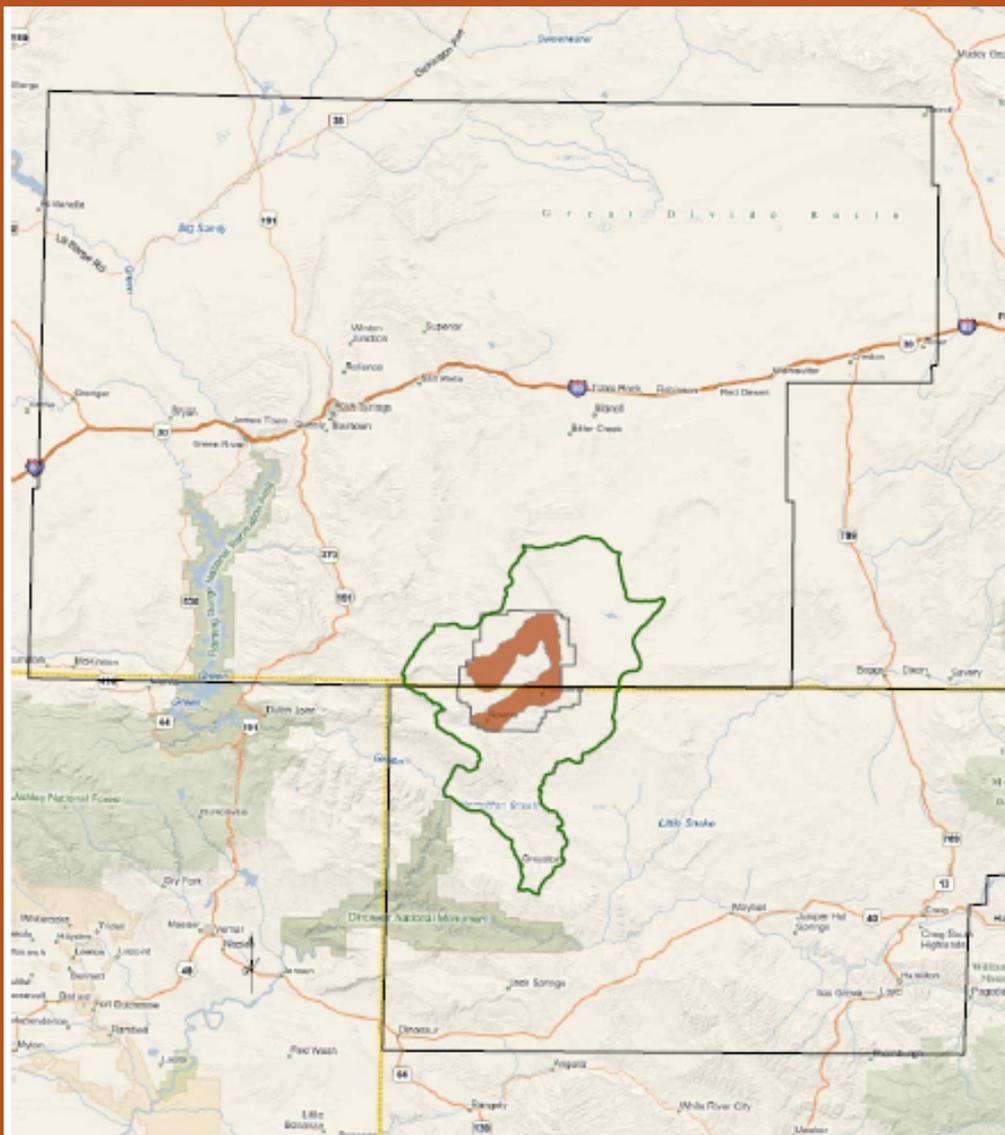
Identify & Map Key Features



Identify Onsite Priorities



Identify Offset Goals & Opportunities



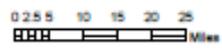
Hiawatha Natural Gas Field Mitigation Planning Project



- Vermillion Basin
- Off-site Planning Boundary
- Hiawatha Project Boundary
- Planned Development Area



Mapping and analysis prepared by The Nature Conservancy
N. Copeland 5/28/2010



Assemble Team of Experts



Identify Project Boundaries



Identify & Map Key Features



Identify Onsite Priorities



Identify Offset Goals & Opportunities



Assemble Team of Experts



Identify Project Boundaries



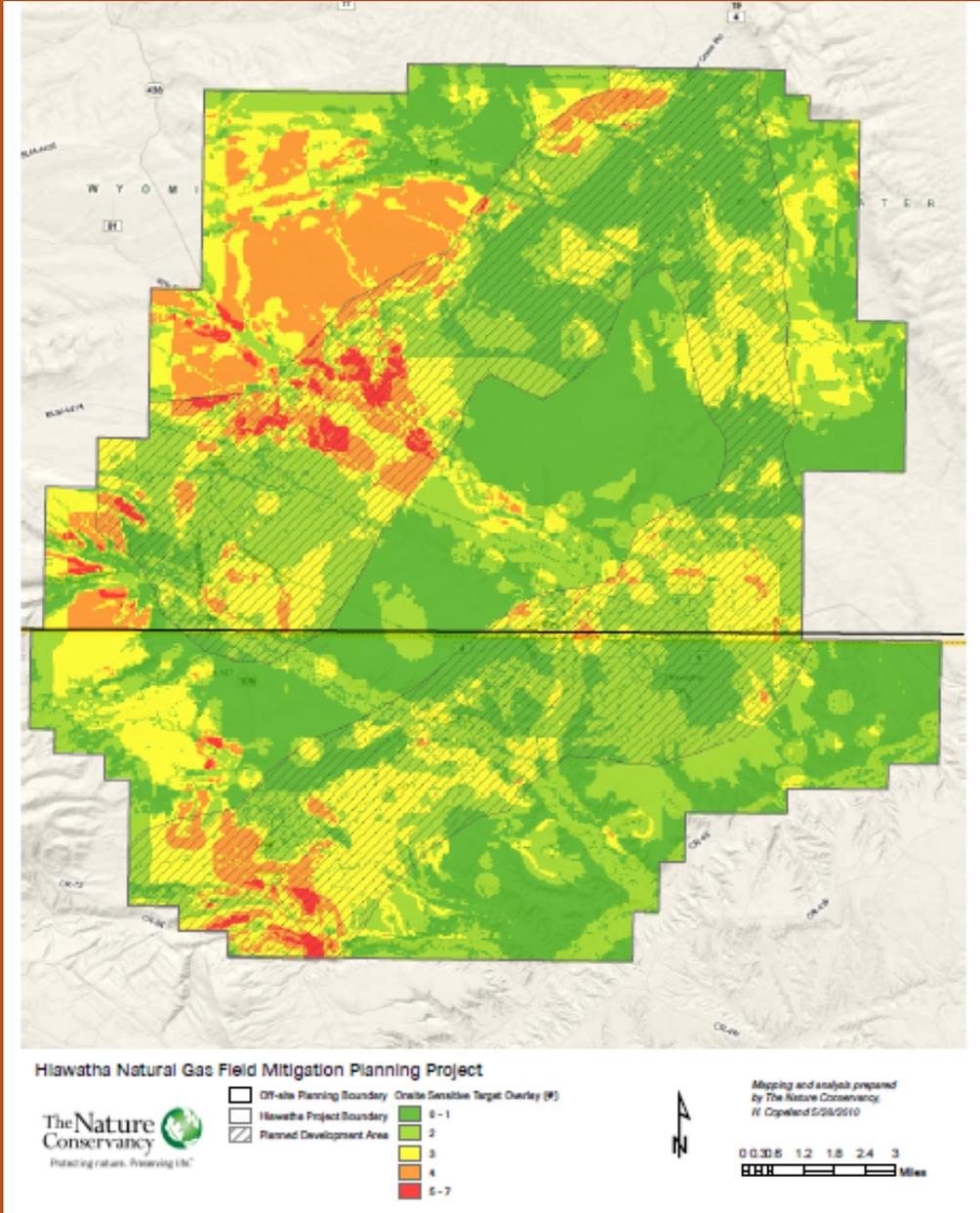
Identify & Map Key Features



Identify Onsite Priorities



Identify Offset Goals & Opportunities



Assemble Team of Experts



Identify Project Boundaries



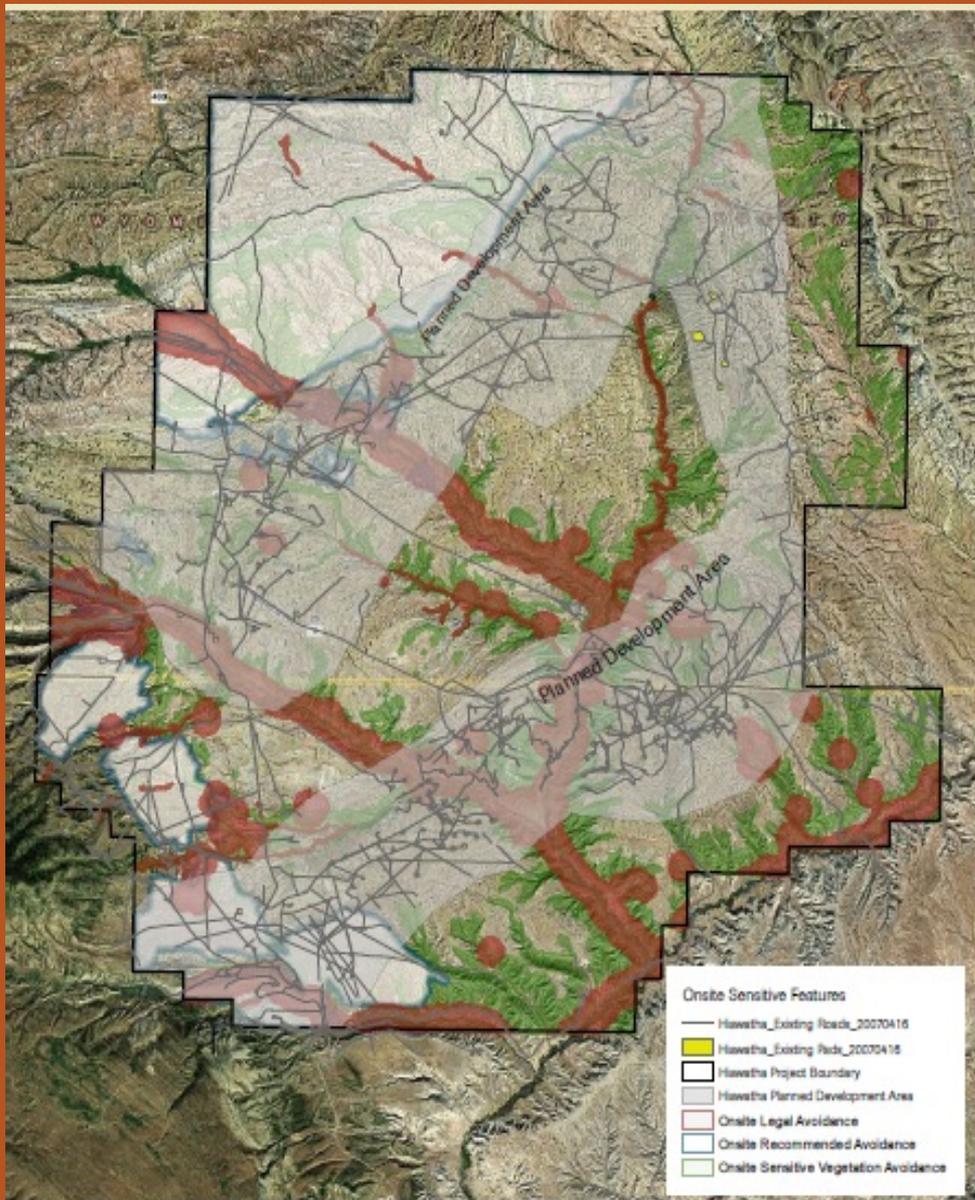
Identify & Map Key Features



Identify Onsite Priorities



Identify Offset Goals & Opportunities



Assemble Team of Experts



Identify Project Boundaries



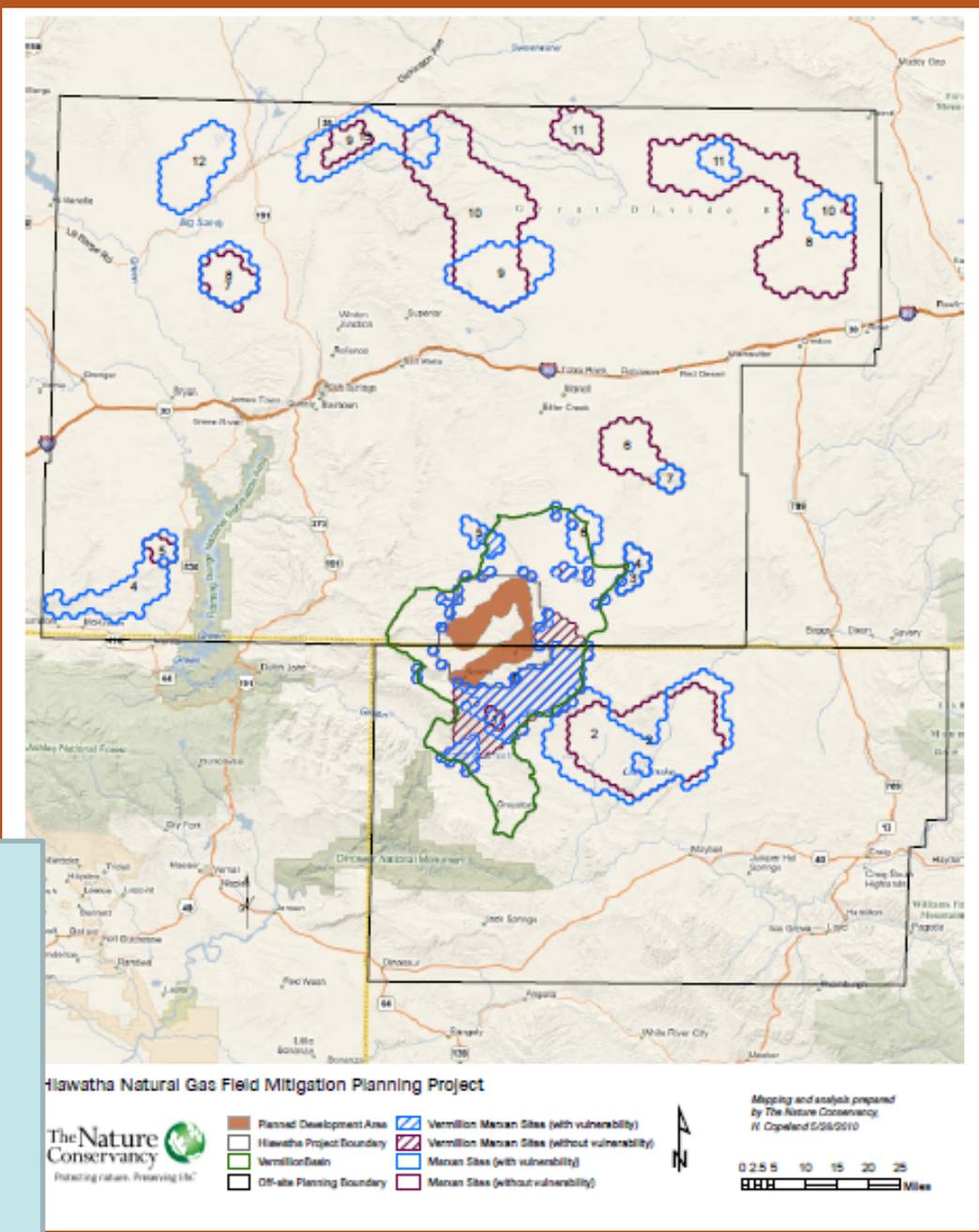
Identify & Map Key Features



Identify Onsite Priorities



Identify Offset Goals & Opportunities



Target	Acres goal
Long-eared myotis bat	3,558
Pygmy rabbit	92,262
Wyoming pocket gopher	29,400
Golden eagle	259
Mountain plover	70,483
Sage-grouse breeding	75,501
Sagebrush Shrubland	127,325

Why participate in Development by Design?

- More certainty
- Understand tradeoffs, spend money wisely
- Public relations
- To do the right thing/adhere to mission
- Inform negotiations with surface owners



DbD project site in northeastern CO

About TNC:

www.nature.org

- Mission: To conserve the lands and waters on which all life depends.
- 50 states, 30+ countries
- Science-based
- Seeks to work collaboratively

About DbD:

• <http://www.nature.org/ourinitiatives/urgentissues/smart-development/index.htm>

• Joe Kiesecker, Lead Scientist.

jkiesecker@tnc.org

• Bruce McKenney, DbD Strategy Director.
bmckenney@tnc.org



WATER SUPPLY PROTECTION

Required BMPs

Public Water System Protection

Example - Colorado

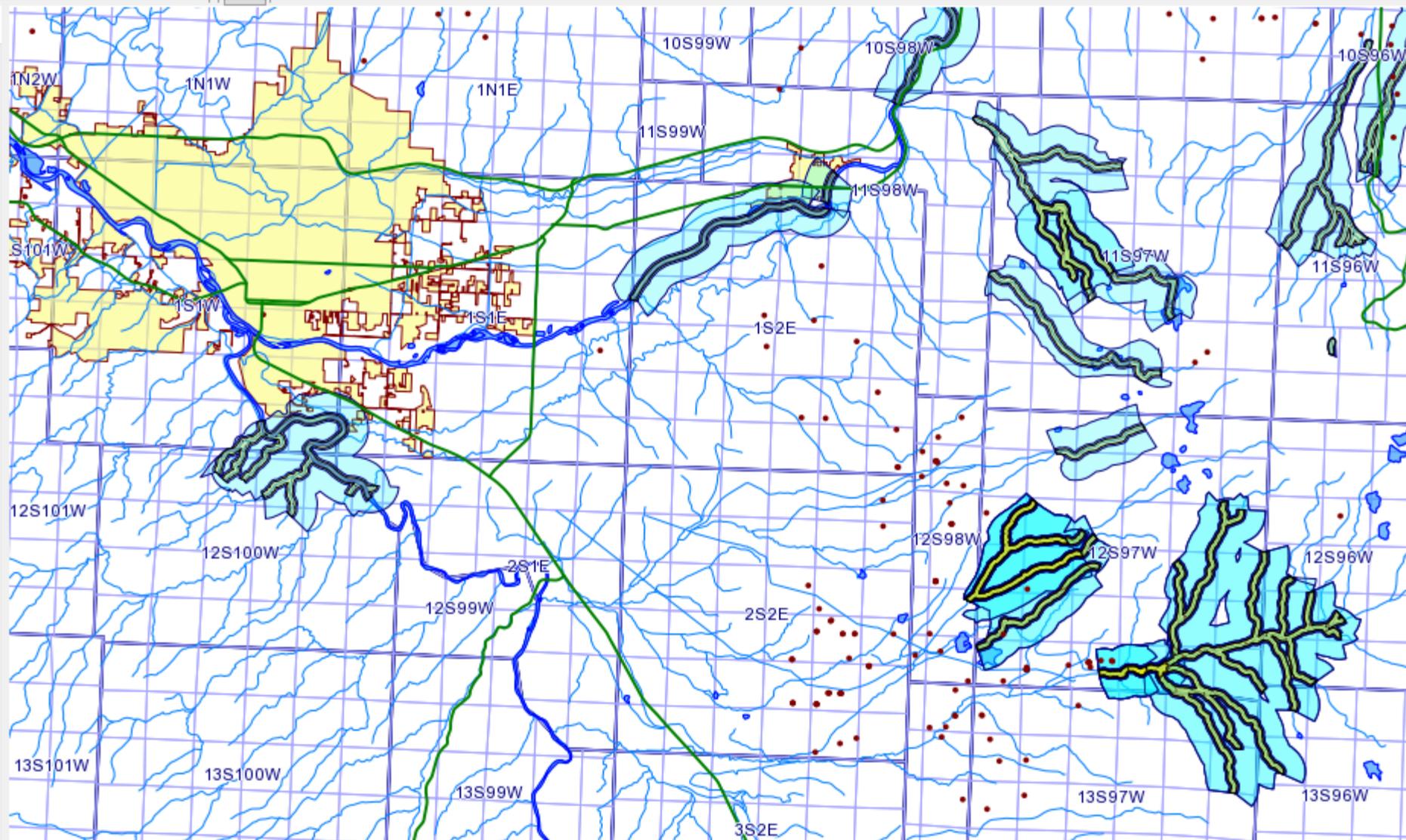
Regulations contain requirements for existing oil and gas locations to ensure that public water supplies are protected. *COGCC Rule 317B*.

Regulations state that operators “shall” maintain BMPs to comply with the rule.



Zone	Classified Water Supply Segments in Feet (meters)	Requirements
Internal Buffer	0 - 300 ft (0 - 92 m)	No surface occupancy without variance
Intermediate Buffer	301 – 500 ft (92 – 153 m)	Pitless drilling systems, berms to contain spills around storage tanks, collection of baseline water quality data, emergency spill response program.
External Buffer	2,640 ft (153 – 805 m)	Collection of baseline data, emergency spill response program





City of Grand Junction and Palisade watersheds

Potentially Required BMPs

Consultation

Example - Colorado

Local governments can request that the COGCC consult with the Colorado Department of Public Health and Environment on an Oil and Gas Location Assessment. *COGCC Rule 306(d)*.

Colorado Department of Public Health and Environment can make written recommendations, which can include BMPs



FRIDAY

THE DAILY SENTINEL

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JANUARY 20, 2006 ■ GRAND JUNCTION, COLORADO

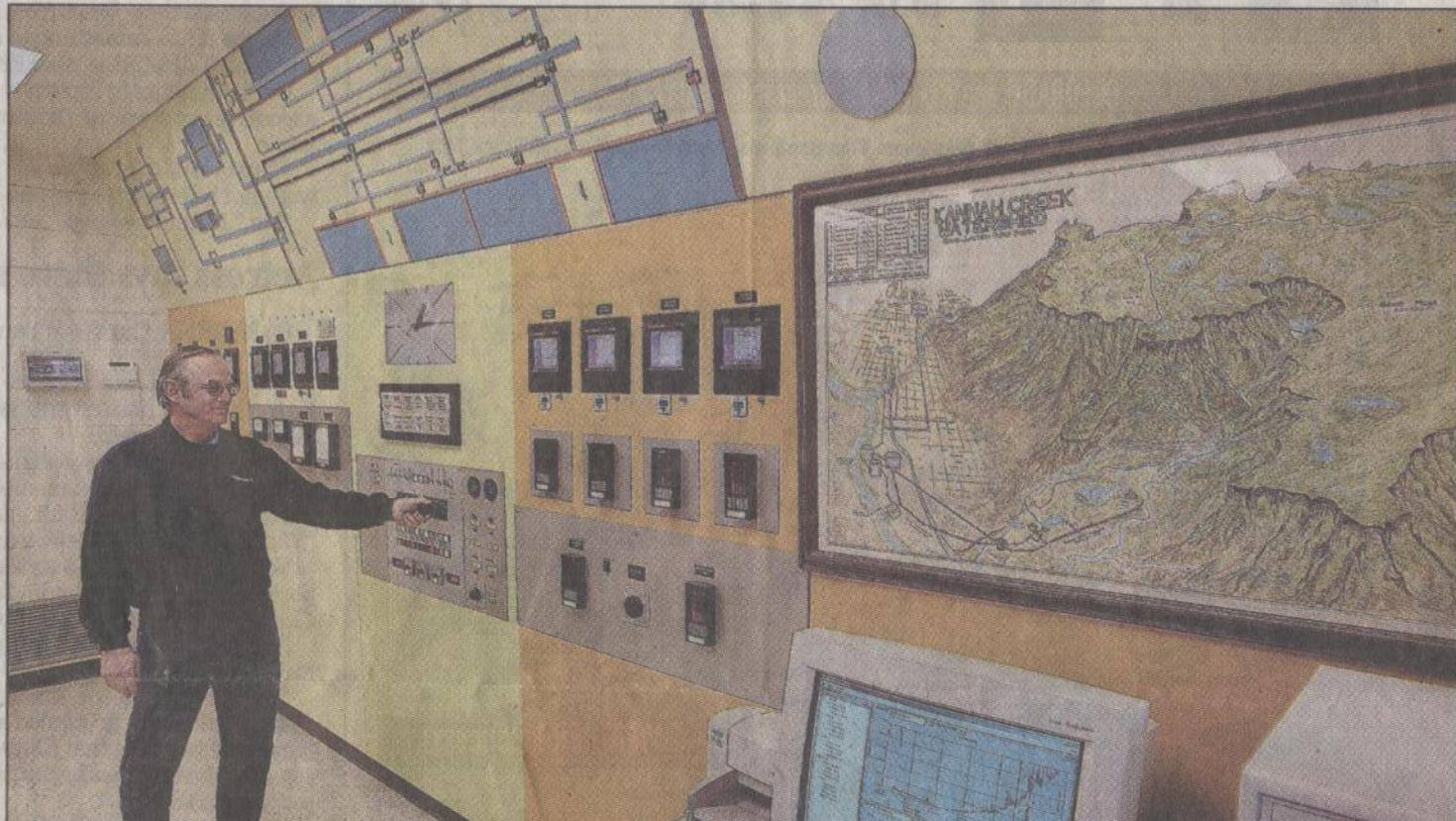
GJ: No drilling on mesa

*City Council
to fight lease
of property
in watershed*

By **MIKE WIGGINS**
The Daily Sentinel

The Grand Junction City Council will fight a plan that could open the city's watershed on Grand Mesa to oil and gas development, saying it wants to take every precaution to safeguard the city's drinking water.

Council members voted 5-2 Wednesday night to oppose a federal lease sale offering more than 13,000 acres on the mesa for drilling. The city will send a formal letter of protest to the Bu-



Greed wins one over nature

Grand Mesa must brace for all that drilling brings

With the news still fresh that the Bureau of Land Management refused to consider the wishes of the cities of Grand Junction and Palisade, as well as a slew of local and state politicians, and went head and leased this city's backyard to oil companies, we say, "Who's surprised?"

This is a federal government in bed with developers, and getting lumpier the minute from all the cash being stuffed under the mattress.

A recent story in the Washington Post reported the nation's giant oil octupi ... err companies, gathered record profits for 2004.

You pay \$2.50 a gallon for gas and Exxon Mobil Corp., the biggest oil frump in the world, pockets after-tax profits of \$26 billion dollars, up 52 percent from 2003.

ChevronTexaco had \$13 billion in profits, up 85 percent from a year ago. Shell Oil had profits of \$19 billion, up 48 percent from 2003.

drill rigs like porcupine quills and the unmarred flanks of what we lovingly consider the world's largest flat-top mountain begins to look like Rulison South.



DAVE BUCHANAN

A generation ago, Rulison was home to close-knit families, horse-and-cattle operations, venerable orchards growing apples and cherries and irrigated fields growing some of the best hay in the valley.

Today, there's still a few remnants of that better time but most of Rulison Basin is buttugly, a throw-away sacrificed to energy companies too busy sticking a well in every piece of ground that holds still to notice they've destroyed a community and a way of life.

Get ready for dusty roads (wells need monitoring every day, seven days a week), the eye-searing flames from wells flaring 24 hours a day, burning enough gas to end any so-called shortage, and garish lights from drilling rigs hiding the night sky.

Not like the BLM really cares



A SIGN OF THE TIMES

DAVE BUCHANAN

COLORADO STATE STATUTES

31-15-707S. Municipal utilities.

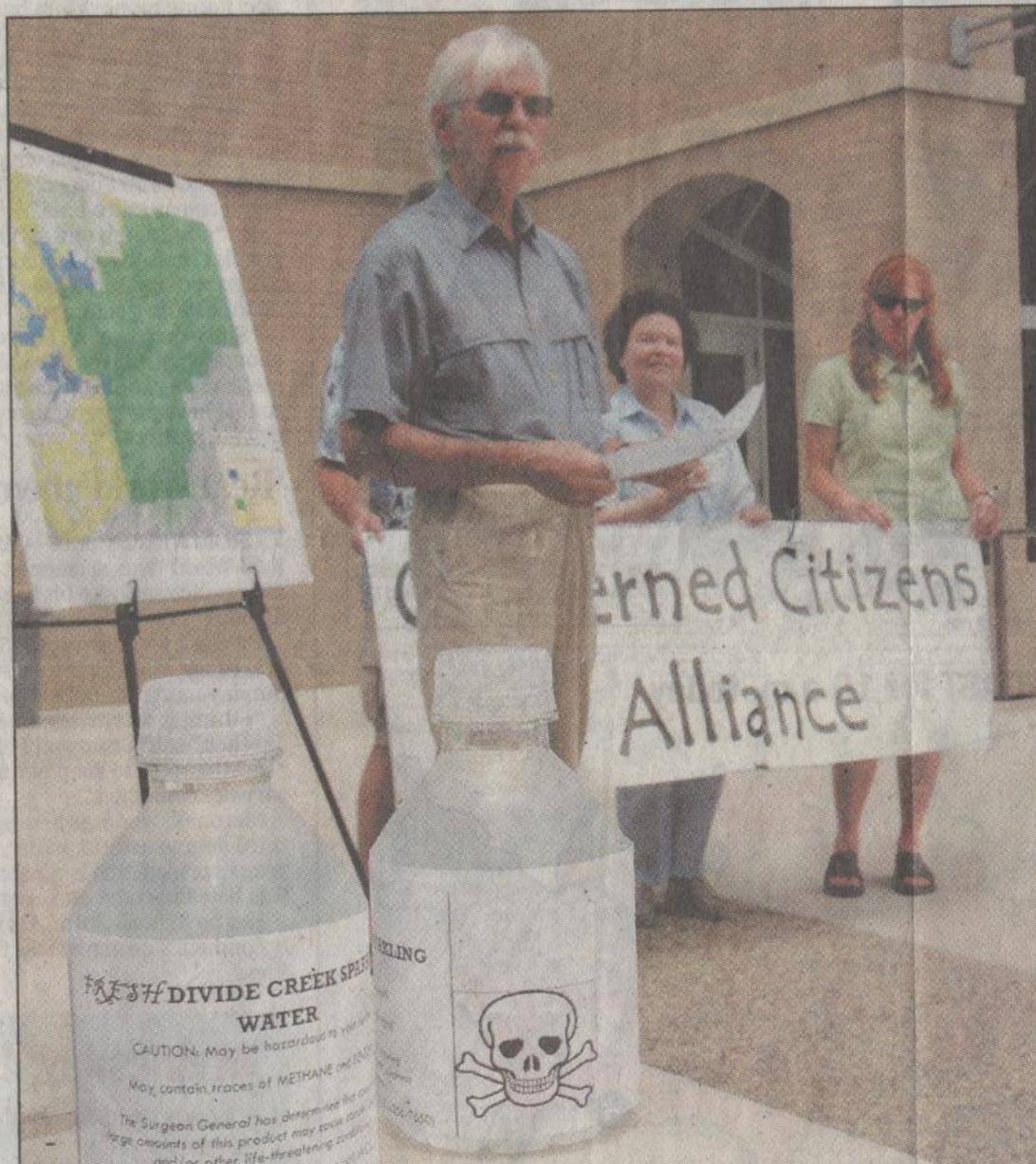
(1) The governing body of each municipality has the power:

(b) To construct or authorize the construction of such waterworks without their limits and, for the purpose of maintaining and protecting the same from injury and the water from pollution, their jurisdiction shall extend over the territory occupied by such works and all reservoirs, streams, trenches, pipes, and drains used in and necessary for the construction, maintenance, and operation of the same and **over the stream or source from which the water is taken for five miles above the point from which it is taken and to enact all ordinances and regulations necessary to carry the power conferred in this paragraph (b) into effect;**

- supplying water quality “baseline” data and extensive planning documents before permit is issued;
- supplying description of activity including any toxic chemicals that will be brought into the watershed;
- providing a list of best management practices that will reduce risk to water quality;

- posting a bond that would cover 100% of potential damages;
- hiring additional third-party monitors to ensure the operations will not harm our water supply; and
- no measurable increase in pollution of Grand Junction's water supply is allowed

GJ voters may clear the water on drilling



Proposal to protect watersheds from contamination by oil, gas

By DANIE HARRELSON
The Daily Sentinel

Grand Junction voters could weigh in on a proposal this fall to protect their drinking water from contamination by oil and gas drilling and other industrial operations that could threaten the city's water supply.

A local chapter of Western Colorado Congress kicked off its campaign Tuesday outside City Hall to collect the 1,580 signatures necessary to get its proposed city ordinance on the November ballot.

The Concerned Citizens' Alliance aims to enhance the city's ability to guard its water quality against the following "high-risk" activities:

- excavating a large amount

of soil;

- using or transporting large amounts of hazardous materials; and

- timber, mining, feedlot operations and oil and gas drilling.

The proposed ordinance wouldn't bar energy companies or other industry from the city's watershed, said Matt Sura of the Grand Junction-based Western Colorado Congress.

It would empower the city to require drillers and other operations within the city's watershed to take additional precautions to prevent pollution of the city's water supply, Sura said.

See **WATER**, page 8A ➤



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Catholic questions about the environment

Q: What does the environment have to do with being a Catholic?

A: In his New Year's message of 1990, Pope John Paul II said, "In our day, there is growing awareness that world peace is threatened not only by the arms race, regional conflicts and continued injustices among peoples and nations, but also by a lack of due respect for nature, by the plundering of natural resources and by a progressive decline in the quality of life...Faced with the widespread destruction of the environment, people everywhere are coming to understand that we cannot continue to use the goods of the earth as we have in the past."

He continues, "Modern society will find no solution to the ecological problem unless it takes a serious look at its life-style. In many parts of the world, society is given to instant gratification and consumerism while remaining indifferent to the damage which they cause...Simplicity, moderation, and discipline, as well as a spirit of sacrifice, must become part of everyday life, lest all suffer the negative consequences of the careless habits of the few."

At a Symposium on religion and science held in Santa Barbara in 1997, Bartholomew I, patriarch of the 250-mission-member Eastern Orthodox (Christian) Church, declared, "To commit a crime against the natural world is a sin."

Q: In Colorado communities are troubled by possible contamination of drinking water because of natural gas and oil drilling close to water sources. Does the church have a position on the right to clean drinking water?

A: "As a gift from God, water is a vital element essential to survival; thus, everyone has a right to it," said Pope John Paul II in 2004. The Compendium of the Church says, "Satisfying the needs of all, especially of those who live in poverty, must guide the use of water and the services connected with it."

Inadequate access to safe drinking water...

Care for God's Creation
We show our respect for the Creator by our stewardship of creation. Care for the earth is not just an Earth Day slogan; it is a requirement of our faith. We are called to protect people and the planet, living our faith in relationship with all of God's creation.

This environmental challenge has fundamental moral and ethical dimensions that cannot be ignored.



Statue of St. Francis of Assisi, patron of animals and the environment, is outside St. Felix, Clifton Springs, N.Y. Founder of the Friars Minor, or Franciscans, this Italian saint whose feast is celebrated Oct. 4 dedicated himself to poverty and humility.

must therefore respect the particular goodness of every creature, to avoid any disordered use of things which would be in contempt of the Creator and would bring disastrous consequences for human beings and their environment" (Catechism of the Catholic Church, 399). Yes, some animals become extinct over time due to weather changes, ice age and floods.

Today endangered species become extinct because of Global warming and global dimming. As temperatures, humidity, soil and vegetation change it can ruin a habitat for an endangered species in a limited range. Endangered species tend to have lowered genetic diversity of their small numbers, which limits their ability to adapt to different climates. Endangered species often depend one on one or a few species for food, some of which are also vulnerable to global warming.

Human population growth and ever-increasing consumption rates cause: severe deforestation, habitat fragmentation, water scarcity, climate change, loss of biodiversity and pollution. (Quote from National Wildlife Federation's Endangered Species Act.)

Q: Is there a hopeful environmental perspective for the future?

perpetuity, for the land is mine; with me you are but aliens and tenants. Throughout the land that you hold, you shall provide for the redemption of the land." And regardless of our faith traditions, all citizens and leaders of this country have a duty to ensure that the lands we hold collectively are cared for and protected.

Q: What about so-called "endangered species?" Isn't it only natural that certain species become extinct over time? If this weren't true, then there would still be dinosaurs roaming the earth today.

A: "Each of the various creatures, willed in its own being, reflects in its own way a ray of God's infinite wisdom and goodness. Man

WEDNESDAY

SENTINEL

AUGUST 2, 2006 ■ GRAND JUNCTION, COLORADO

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Activists: Keep water safe

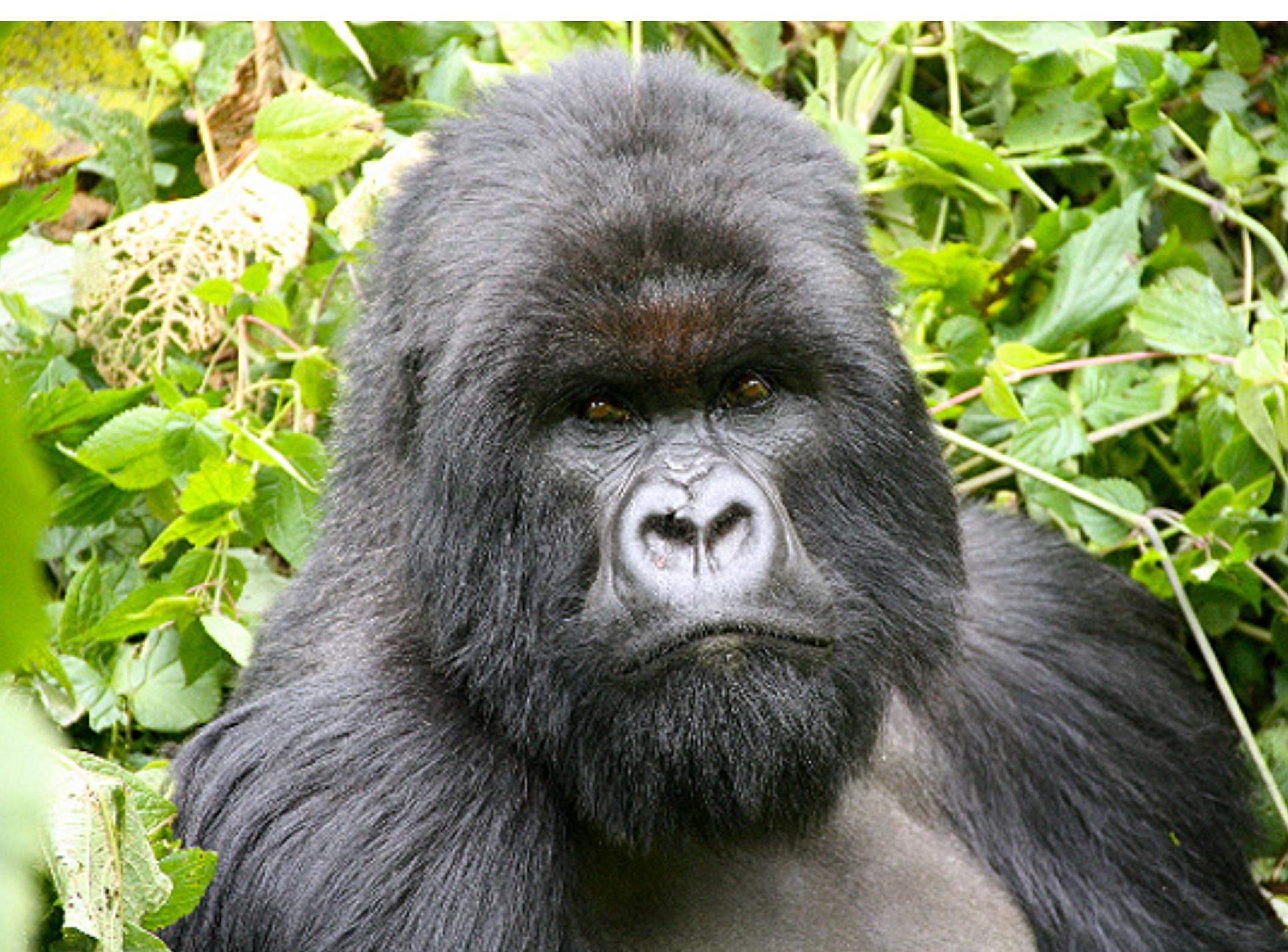
Thousands opposed to drilling in watershed

By GARY HARMON
The Daily Sentinel

Environmental organizers on Tuesday turned more than 4,000 signatures in to City Hall, calling on the Grand Junction City Council to adopt a restrictive watershed drilling ordinance.

The Western Colorado Congress collected 4,150 signatures for the ordinance in about three weeks and in doing so, said board member Bill Grant, showed government officials and politicians that "there are some places that should not be drilled." Municipal watersheds, which on that





MODEL REGULATORY FRAMEWORK FOR HYDRAULICALLY FRACTURED ONSHORE HYDROCARBON EXPLORATION AND PRODUCTION WELLS

- Southwestern Energy
- Environmental Defense Fund



A collaborative effort of environmental NGOs and over ten oil and gas companies.

- Surveyed all U.S. state standards (Texas was foundational in many respects),
- incorporated BMPs from the American Petroleum Institute, Underground Injection Control Rules
- and received ideas from numerous conversations with petroleum engineering consultants.

*Being used as a “foundational” document
by State of Ohio*





In the rare instances where there has been ground water contamination there have been three primary causes:

1. the oil and gas producing layer is adjacent or close to ground water,
2. gas and other pollutants make their way through incomplete casing cement, or
3. ground water is contaminated through a spill, leaking waste pits, or through poor disposal practices.



Framework requirements:

1. Database of quality water sources and oil and gas wells.
2. Permit conditions to protect water sources
3. Pre-drilling water quality sampling
4. Well construction (drilling) standards
5. Well completion standards
6. Production and well monitoring
7. Plugging and abandoning



Quality water sources *can be threatened by*

- “Close proximity well”: The production zone is close to the quality water
 - has less than 500 vertical feet (152.4 meters) of intervening zone between the shale and quality water source without a known confining layer, or
- Or there is an inadequate “confining layer” that is capable of safely containing the hydraulic fracturing fluid.
 - has more than 500 vertical feet (152.4 meters) of intervening zone, but which the regulatory agency determines should nevertheless be classified as a close proximity well because the intervening zone does not contain an adequate confining layer.



Permit conditions to protect water sources

- Waste disposal plan,
- emergency response plan,
- well construction plan
- Others...



Require baseline data

- Standardized distance from well
- Standardize chemicals tested

Already being done voluntarily by
operators in Colorado



Well construction (drilling) standards

- All well casing meets standards and is sufficiently cemented or otherwise anchored in the hole
- All zones containing protected water are isolated and sealed off to effectively prevent contamination or harm to any water
- All potentially productive zones, zones capable of causing annular overpressurization, or corrosive zones are isolated and sealed off
- State certified cementers, quality cement



Well completion standards

- An evaluation of the intervening zone and transmissive faults shall be undertaken;
- The wellbore's mechanical integrity shall be positively assessed, tested and maintained;
- The well shall be stimulated in such a manner that all injected fluids are directed into the zone(s) to be hydraulically fractured;
- All chemical additives injected into the wellbore shall be of known quantity and description; and
- There should be ongoing monitoring of completion operations.



Production and well monitoring

- First 30 days of critical importance,
- installation of a properly functioning pressure relief device on any casing annulus,
- operator must report all pressure releases from required pressure relief devices to the regulatory agency within 24 hours of detection.



Plugging and abandoning

- plugs of a minimum of 100 ft (30.5 m) in length must extend at least 50 ft (15.2 m) below and 50 ft (15.2 m) above the top of the uppermost hydrocarbon stratum and the base of the deepest protected water stratum.
- The cement used must be of a quality grade and
- the cementer must be licensed by the state

Intermountain Oil & Gas BMP Project

Many of the documents discussed during the presentation can be found on the website

www.oilandgasbmps.org

Natural Resources Law Center University of Colorado Law School

Intermountain Oil and Gas BMP Project

Welcome to the Intermountain Oil and Gas BMP Project Website

HOME SEARCH BIBLIOGRAPHY RESOURCES LAW & POLICY TRAINING & WORKSHOPS FORUM ABOUT US

BEST MANAGEMENT PRACTICES

The Natural Resources Law Center and its partners welcome you to this free-access website of Best Management Practices (BMPs) for oil and gas development in the Intermountain West. BMPs are mitigation measures applied to areas being developed for oil and gas to promote energy development in an environmentally sensitive manner.

The focus of this website is a searchable database addressing surface resources affected by oil and gas development. The database includes both mandatory and voluntary Best Management Practices currently in use or recommended for responsible resource management in the states of Colorado, Montana, New Mexico, Utah, and Wyoming.



The BMP database is not intended to represent a consensus on what the best practices are for specific applications nor to advise users on the current legal requirements for specific locations. Rather, the database describes each practice and documents the source of the practice (who requires or recommends it in what specific applications). The database provides a link to the source of the BMP and, where possible, it provides supplemental information, including construction specifications, illustrations, pictures, maps, monitoring reports, and evaluations of the potential of the practice for mitigating impacts of development. Because practices change over time, database users should check with appropriate authorities to verify the latest requirements and recommendations for your area.

BMP CATEGORIES

The database includes BMPs to address a variety of resources and issues...

- Air Quality and Emissions
- Aquatic and Riparian Values
- Community
- Cultural/Historic
- Grazing and Agriculture
- Human Health and Safety
- Land Surface Disturbance
- Noise
- Other
- Soils (Conservation, Pollution, Reclamation)
- Vegetation
- Visual Aesthetics
- Water Quality and Pollution
- Water Quantity and Rights
- Wildlife

[Browse all](#)

BMP SEARCH

What management practices are recommended or required for oil and gas development? To find out, use the drop down menus or type keywords. For a more refined search, click "Advanced Search" or use the **BMP SEARCH** button.

Keywords:

Category:

Location:

[Advanced Search...](#)

TRAINING AND WORKSHOPS

Best Management Practices – What? How? and Why? Thank you to everyone who participated in...

SEARCH THE BIBLIOGRAPHY

Our searchable bibliography includes over 400 publications, including environmental impact statements, agency guidelines, and many technical reports, websites, and...

WHAT'S NEW

Tribal governments have begun to regulate oil and gas development through tribal codes, ordinances, and constitutions, and, in some cases, through specific BMPs. Check out our new **Tribal Law** section for more information.

New Resources sections: **Hydraulic Fracturing** and **Economics of BMPs**



The Intermountain BMP Project is a work in progress. Currently, the database includes BMPs for a variety of resources (see the **BMP Categories** section) from a range of source documents (see the **Bibliography**), including project Environmental Impact Statements, Resource Management Plans, state wildlife agency guidelines, and industry and conservation group reports and websites.

PARTNERS

The structure and content of this website is being developed in conjunction with project partners and advisors from government, industry, the conservation community, academia and...



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