

# **COLORADO OIL AND GAS CONSERVATION COMMISSION (COGCC)**

## **2021 ANNUAL REPORT**

to the

**WATER QUALITY CONTROL COMMISSION (WQCC)**

and

**WATER QUALITY CONTROL DIVISION (WQCD)**

of

**THE COLORADO DEPARTMENT OF  
PUBLIC HEALTH AND ENVIRONMENT  
(CDPHE)**



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# **COLORADO**

## **Oil & Gas Conservation Commission**

Department of Natural Resources

**IN ACCORDANCE  
with  
THE AUGUST 28, 1990 MEMORANDUM OF AGREEMENT  
and  
THE IMPLEMENTING PROVISIONS OF SENATE BILL 89-181**

January 28, 2022

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## **1.0 Introduction**

The Colorado Oil and Gas Conservation Commission (COGCC) is an implementing agency for water quality standards and classifications adopted by the Water Quality Control Commission (WQCC) for groundwater protection. This authority was provided by Senate Bill (SB) 89-181, and is restated and clarified by a Memorandum of Agreement (MOA) that was adopted by the agencies on August 8, 1990.

Section 5.1 of the MOA specifies that the COGCC must report annually to the WQCC and the Water Quality Control Division (WQCD) about how its programs assure compliance with WQCC water quality standards and classifications for the activities that are subject to the jurisdiction of the COGCC.

This 30th annual report provides an overview of COGCC functions and a summary of calendar year 2021 activities, with a focus on groundwater protection programs. Major issues concerning the implementation of water quality standards and classifications are also reported. Following the “Mission Change” rulemaking, completed in late 2020, much of 2021 was dominated by efforts to operationalize and implement the new rules. Additionally, as in 2020, COGCC operations were impacted in numerous ways in 2021 due to the ongoing SARS-CoV-2 (or COVID-19) pandemic, community response to COVID-19, and various public health orders at the state and local levels.

## **2.0 WQCC/WQCD and COGCC Coordination and Public Outreach**

### **2.1 Inter-agency Coordination**

In 2021 the COGCC, WQCC, and WQCD coordinated implementing the provisions of SB 89-181 and the MOA. COGCC and the Colorado Department of Public Health and Environment (CDPHE) Office of Emergency Preparedness and Response staff communicated frequently through email and telephone calls regarding spills at or near oil and gas facilities when there was some question as to whether or not a spill was exploration and production (E&P) waste. COGCC took the lead for all E&P waste spills.

COGCC Director and staff met with WQCD staff (virtual) on August 31 and November 16 to discuss program issues and regulatory changes. Agenda items included follow up on various active investigations, enforcement matters, and E&P waste management practices within the oil and gas industry. Due to COVID-19 in person meeting restrictions, all meetings were held virtually, through electronic meeting platforms.

## **2.2 Public Outreach**

The COGCC employed the following strategies for effective communication with the public and the regulated industry.

### **2.2.1 Commission Hearings**

In 2021, the COGCC held weekly or more frequent Commission Hearings depending on Commission business. The 2021 meeting have been virtual meetings due to COVID-19 in person meeting restrictions, but public participation in the virtual meetings remained high throughout the year. In addition to regular business meetings, the Commission held at least one evening “listening session” per month, at which minimal business besides hearing public comment was conducted.

### **2.2.2 Scheduled Meetings**

COGCC staff participates in regularly scheduled meetings with the regulated community and other interested stakeholders in parts of the state with active oil and gas operations. Issues with in-person meetings and COVID-19 restrictions limited most of the regularly scheduled meeting in 2021. As COGCC staff worked to implement the “Mission Change” rules which became effective January 15, 2021, staff held weekly and then later monthly “Operator Training” meetings to help the regulated community navigate the new requirements and guidance documents. These virtual meetings typically attracted over 150 participants.

The Gas and Oil Regulatory Team (GORT), established by COGCC Order focuses on oil and gas operations in the San Juan Basin in southwestern Colorado. GORT meetings provide a forum for meaningful dialogue between operators, citizens, county and

local governments, the Southern Ute Indian Tribe (SUIT), the Bureau of Land Management (BLM), the U.S. Forest Service (USFS), and the COGCC. The GORT did not meet in 2021 due to COVID.

The Northwest Colorado Oil and Gas Forum (NWCOGF) which focuses on the Piceance Basin and other operations in the northwestern part of the state, also did not meet in 2021 due to COVID. The NWCOGF is co-chaired by Garfield County and the COGCC Director or Deputy Director; other state, federal, and local government agencies, the oil and gas industry, and concerned landowners and citizens regularly participate.

COGCC staff typically attend GORT and NWCOGF meetings and give presentations on emerging issues and hot topics, as well as routine updates on operations statewide and in the respective geographic areas. COGCC will work with stakeholders to evaluate the need and venue or format for these meetings in 2022 based on the statewide COVID situation.

### **2.2.3 Stakeholder Participation**

COGCC continues to solicit participation in the regulation of oil and gas exploration and production. Stakeholders, including the oil and gas industry, local governments, citizens, other regulatory agencies, non-governmental organizations, agriculture interests, and the environmental community provide input into permitting, policy development, rulemaking, and other processes. During the Mission Change rulemaking, the Commission identified the need for several specific stakeholder groups. Of these, the Biological Resources Working Group met and worked to develop a draft working definition of biological resources, and an outline of a path forward for incorporating the protection of biological resources into COGCC regulatory framework.

### **2.2.4 Local Government Designee Program**

COGCC created the Local Governmental Designee (LGD) program via rulemaking in 1992 to provide a conduit of information between local governments and the COGCC. COGCC bolstered the LGD program in 2012 with the addition Local Government

Liaison (LGL) staff to assist and facilitate participation in the LGD program through training, outreach, and providing information, data, and presentations about specific aspects of oil and gas operations, COGCC rules, use of the COGCC website, and the COGCC's changing regulatory program under SB 19-181. COGCC created the Community Relation Unit in 2018, which includes a Community Relations Liaison working under the supervision of the COGCC Communications Officer.

As of December 2021, 63 local governments, including two combined city-county governments (Denver and Broomfield), 53 other counties, 263 municipalities (besides Denver and Broomfield), and 9 special districts are registered to participate in the LGD program.

In 2021, staff outreach included the following:

- Training on navigating the COGCC Website (April 13)
- COGCC meet and greet with Broomfield staff (July 8)
- LGD Program Orientation with Erie staff (July 29)
- Local Government breakfast, Glenwood Springs (November 2); and
- Local Government breakfast, Craig (November 3)

The COGCC Staff supported issues of local government concern, including local air monitoring concerns and development of new local oil and gas regulations. In addition, COGCC staff worked to inform community members and LGDs of other events such as commission hearings and SB 19-181 related training opportunities.

#### **2.2.4 COGCC Website**

The COGCC continues to use its website to make announcements and distribute information and data. COGCC information and data systems are described further in Section 3.3.

### **3.0 COGCC Organization**

#### **3.1 COGCC Commissioners**

The Colorado Oil and Gas Conservation Act (The Act), as amended by SB 19-181, specifies the composition of the full time professional Commission.



The Act requires seven Commissioners, five of whom are appointed by the Governor with the consent of the Senate, and two ex officio voting members who are the Executive Directors of the Department of Natural Resources (DNR) and the CDPHE.

The five professional members are appointed taking into account the need for geographical representation of areas of the state with high levels of current or anticipated oil and gas activity or employment. Of the five, the expertise required is as follows:

1. One appointed member must have substantial experience in the oil and gas industry;
2. One appointed member must have substantial expertise in planning or land use;
3. One appointed member must have formal training or substantial experience in environmental protection, wildlife protection, or reclamation;
4. One appointed member must have professional experience demonstrating an ability to contribute to the commission's body of expertise that will aid the commission in making sound, balanced decisions; and
5. One appointed member must have formal training or substantial experience in public health.

Excluding the executive directors, no more than three members may be from the same political party. Biographies of the Commissioners are posted on the OGCC website <http://cogcc.state.co.us/about.html#/commissioners>.

### **3.2 COGCC Staff**

The COGCC has 133 full time employee (FTE) positions located in the Denver office and throughout the state in field offices. The Staff include engineers, environmental protection specialists (EPS), field compliance inspectors, reclamation inspectors, permitting specialists, hearings officers, and a variety of other professionals. Table 3-1 summarizes each group and their primary functions. Table 3-1 reflects several changes the COGCC made to its organization structure in 2021. The current organizational chart and a series of maps showing regional areas of responsibility are included as Appendix 1.

Table 3-1. COGCC Groups and Primary Functions

Group	Number of FTE	Primary Functions
Executive	5	Director, Deputy Director and Executive Assistant; community relations and communication
Environmental	21	Spills, remediation projects, pit closures, site closure, complaint investigation and response, environmental projects, interim and final reclamation; environmental database, special projects
Engineering	19	Analyzing and Permitting downhole wellbore plans, underground injection control (UIC) permitting, oil/gas facility oversight, flowline integrity
Orphaned Well Program	5	Plugging orphan wells, orphan site investigation, clean-up, and reclamation
Compliance	38	Inspection of oil/gas wells, facilities, and locations; complaint intake and response, management and resolution; enforcement, agency contact for responding to emergency situations and working with emergency response personnel
Planning & Permitting	23	Reviewing and analyzing oil and gas development plan and comprehensive area plan applications, permitting oil and gas wells, evaluating oil and gas Location assessments, cumulative impacts information, & pit permitting
Information & Applied Technology	11	Information systems & records, public room, database management/support, GIS, website and webform development/support, production reporting & levy collection
Hearings & Regulatory Affairs	5	Hearings, rulemaking, regulatory affairs
Financial	6	Budget management, procurement, purchasing, financial assurance

Staff functions that directly relate to water resource protection and compliance with groundwater and surface water standards include the following:

**Permitting and Engineering** - Applications for Permit to Drill (APD) are reviewed to ensure compliance with all rules related to aquifer protection. Oil and gas wells must be designed, installed, and maintained to prevent the migration of fluids or gas between formations or into aquifers. Permit specialists and engineering staff review drilling permit applications for surface casing and cementing requirements, among other requirements designed to protect aquifers. The COGCC issued 569 APDs in 2021 through November 10, down from over 800 in 2020.

**Location Assessments** - Under the Oil and Gas Development Plan and Form 2A process, Operators are required to provide site-specific environmental information about surface locations. Consultation by the CDPHE and Colorado Division of Parks and Wildlife (CPW) with the COGCC, the surface owner, and the operator is required in some circumstances. Oil and Gas Location Assessment (OGLA) specialists review and evaluate Oil and Gas Development Plan applications and publicly available information to determine whether the proposed oil and gas operations have the potential to negatively impact water resources, public health, safety, welfare, the environment, or wildlife resources. The COGCC issued 52 Form 2As in 2021 through November 15. Notably, 47 of those Form 2As were approved prior to January 15, 2021, when the Mission Change Rules took effect; the approved Form 2As were subject to a rigorous environmental review by staff and the Director, but did not require Commission approval of an Oil and Gas Development Plan.

**Underground Injection Control (UIC) Permitting** - The USEPA delegated authority to COGCC to review, approve, and monitor the injection of E&P waste into Class II UIC wells. COGCC staff coordinates with WQCD, DWR, and US EPA staff to ensure that operators of Class II injection wells in Colorado comply with UIC rules and regulations to prevent contamination of Underground Sources of Drinking Water (USDWs). COGCC's staff geologic experts review UIC permits for site-specific matters, such as the occurrence of faults and potential for induced seismic activity. Based on this analysis, UIC permits include Conditions of Approval (COAs) pertaining to injection pressures, daily injection rates and volumes. Commercial and non-commercial injection operations are actively managed by the COGCC in conjunction with the U.S. Geological Survey Earthquake Notification Service, through the installation and continuous monitoring of several local seismometers to evaluate if injection of produced water has some relationship to local seismicity. The COGCC has instituted a "traffic light" monitoring system, which dictates specific mitigation measures, up to requiring injection to be halted if seismic activity reaches specific levels. Through December, COGCC Staff approved 2 Class II UIC well permits in 2021.

**Pit Permitting** - Operators may construct pits at oil and gas locations for a variety of purposes, most commonly to contain drill fluids and cuttings, produced water and flow back, and for the reuse and recycling of produced water. COGCC is responsible for permitting pits (Form 15), inspecting their operation, and overseeing their closure. The OGLA and EPS staff review pit permits for construction and operational details, and evaluate the environmental setting to ensure that the pit can be used without causing adverse environmental impacts. The Director may apply conditions of approval with additional provisions to protect waters of the state, public health, or the environment. In 2021, COGCC approved one Form 15. Applications for new pits are down significantly over previous years reflecting both a decrease in new oil and gas activity in areas that traditionally have used pits for produced water disposal and widespread industry use of “pit-less” drilling and completion activities. The Mission Change Rules, effective January 15, 2021, require permits (Form 15) and lining for all new pits, including drilling pits; this requirement will bolster the protections of groundwater resources from these potential sources of contaminants.

**Centralized E&P Waste Management Facility Permitting** - COGCC environmental staff permit non-commercial centralized E&P waste management (CE&PWM) facilities under Rule 908. Generally, these facilities are larger than a typical tank battery or pit that might handle wastes from only one or a few wells. These larger facilities handle wastes from many wells and often from more than one field or lease operated by a single oil and gas operator. These facilities may include lined pits, land treatment facilities, land application areas, drill cuttings solidification facilities, or tank batteries. A permit is required for these CE&PWM facilities and, as part of the approval process, staff evaluates the proposed site, operation, financial assurance, potential environmental impacts, and preliminary closure plans. These facilities are currently required to have financial assurance in an amount equal to the estimated cost for proper closure, abandonment, and reclamation. During 2021, the COGCC received one CE&PWM facility submission with the review in process. No new centralized CE&PWM facilities permitted and no CE&PWM facilities closed. There are 48 active permitted centralized CE&PWM facilities in the state.

**Oversight of Produced Water Disposal** - Over 300 million barrels of water are co-produced with oil and gas production annually. Approximately 70 percent of the produced water is disposed or used for enhanced recovery by underground injection. Most produced water that is not injected is disposed in evaporation and percolation pits or discharged under a Colorado Discharge Permit System (CDPS) permit. Disposal facilities may be commercial and subject to oversight by CDPHE or they may be private and subject to oversight by COGCC. To minimize waste and the use of fresh water, many operators are reusing and recycling produced water and other fluids for drilling and well completion activities including hydraulic fracturing (frac) treatment operations. COGCC staff review UIC permits, pit permits, centralized E&P waste management permits, and other proposals, including water reuse and recycling plans, to ensure that produced water is handled appropriately.

**Complaint Response** - COGCC responds to complaints from all parties. Once received through the online intake process or by phone, the complaint specialist first determines if the complaint falls under the jurisdiction of COGCC regulatory authority. If the complaint is related to another regulatory agency, COGCC will make a formal referral to the appropriate agency on behalf of the complainant. For complaints under COGCC authority, the complaint specialist will determine the appropriate group within COGCC to assign the complaint. For example the Compliance Unit handles a large percentage of complaints such as odor, noise, dust, trash and other operational issues. As related to protection of groundwater, the Environmental Group responds to complaints alleging oil and gas impacts to domestic water wells. The Environmental unit also responds to complaints where groundwater or surface water may be threatened by spills/releases or the management of E&P waste.

Complaint investigations generally include a site visit where COGCC staff inspect the location of the complaint. For complaints related to domestic water wells, the environmental unit collects representative groundwater samples and has them analyzed at laboratories to determine if oil & gas operations impacted groundwater quality. Regardless the type of complaint, COGCC staff investigate to determine if there were violations of applicable rules. Where violations are discovered, COGCC

issues corrective actions to the operators to mitigate the issue. In cases where complaints result in the discovery of rule violations, enforcement actions are pursued with the operators.

In 2021, COGCC received 408 complaints. The majority (175; 43%) were related to noise with the second largest category (95; 23%) related to odors. Thirty-five complaints were assigned to the environmental unit for investigation of various allegations related to groundwater and surface water contamination, spills/releases, and other threats to the environment. Of the 35, seven complaints were specifically related to concerns about water quality from domestic water wells. Each of the water wells was sampled and a report was provided to the complainant with a detailed discussion of the results. Of those seven domestic water well investigations, COGCC staff did not identify impacts to any of the wells resulting from oil and gas operations.

**Spill/Release Response and Remediation Oversight** - Spill response by the environmental staff includes onsite inspections, sample collection, remediation oversight, and review of reports, remediation plans, analytical data, and operating practices, to ensure protection of surface and groundwater, in accordance with COGCC rules and WQCC standards and classifications. Spills are tracked in COGCC's Master Records Database (MRDB) and can be accessed via the COGCC website. COGCC's oversight of spills, releases, remediation projects, and environmental investigations is discussed in more detail in Section 6 of this report.

**Orphaned Well Program** - The COGCC used appropriated funds and claimed financial assurance to perform plugging and abandonment, remediation, and reclamation work at 117 orphaned oil and gas sites in 18 counties: Adams, Archuleta, Broomfield, El Paso, Elbert, Jackson, La Plata, Larimer, Lincoln, Logan, Mesa, Moffat, Montezuma, Morgan, Rio Blanco, San Miguel, Washington, and Weld. As part of this work, COGCC plugged 55 wells, commenced remediation at 3 sites, and commenced reclamation at 15 sites during Fiscal Year 2021. Much of COGCC's remediation and reclamation efforts during the last few fiscal years have focused on sites with large volumes of impacted material or sites with a large surface area of impacted material, resulting in

a low site count for remediation and reclamation. The program was also short-staffed without an environmental remediation professional for much of the year. Ongoing reclamation maintenance of stormwater BMPs, weed control, and maintenance seeding was also performed at other locations that were reclaimed in prior fiscal years. For Fiscal Year 2022 and future fiscal years, as a result of expected federal grant funding, the Orphaned Well Program budget will approximately double. The new level of funding will be sufficient to plug up to about 70 wells and remediate or reclaim up to about 150 typical sites each year.

**Enforcement** - As of December 1, 2021, the Commission has issued 20 enforcement orders, including 13 Administrative Orders by Consent and seven Orders Finding Violations. These orders resolved 49 Notices of Alleged Violations and imposed \$6,989,455 in gross penalties, of which \$3,406,785 was conditionally suspended.

### 3.3 COGCC Information/Data Systems

Each year COGCC works to improve its data management systems and GIS as time and resources allow. Primary data systems that were improved or developed in 2021 include:

- Webforms - migrated the 'eForms' application to a new electronic forms framework along with all existing electronic forms (additionally 4 new forms & 25 revised forms were introduced in 2021 as part of Mission Change rules implementation)
- Geographic Information Systems (GIS) - updated map layers associated with Mission Changes rules and introduced automations for receiving and processing GIS data attachments with electronic forms
- Environmental Database improvements
- Data Downloads - new data sets made available
- Online Environmental Reports
- Daily Activity Dashboard (oil and gas activity monitoring tool)

Brief descriptions of the changes for each system are provided in the following sections.

### 3.3.1 Webforms

COGCC recently converted its electronic form filing system to utilize an html-based web application called “Webforms” that replaces the “eForm” application. Like eForms, the new Webforms application allows operators to submit applications and notices electronically, with the system providing automatic email notices to appropriate parties, including the applicant or operator, COGCC staff, and local governments or other regulatory entities. Rule changes from the implementation of SB 19-181 have required extensive revisions of many existing electronic forms, as well as the creation of several new ones over the past year.

With Webforms, operators are able to submit forms and attachments electronically. COGCC staff review and approve the forms electronically, and data from the forms are uploaded to the Master Record Database (MRDB) upon approval. For forms that require review by multiple staff members (e.g., permitting, engineering, etc.), each staff member involved in the process passes their task within the electronic forms system.

### 3.3.2 GIS - Geographic Information Systems

The COGCC GIS Online Interactive Map is an important tool used by staff, industry, and other agencies to submit and process permits, create reports, and view information related to exploration and development. The COGCC GIS Online Interactive Map is also a go-to resource for the general public and interested stakeholders regarding environmental concerns and siting issues related to current and planned drilling and production activity.

The COGCC GIS Online Interactive Map contains over 170 spatial datasets including oil and gas well locations, permits, spacing orders, field boundaries, and useful reference information such as cities, rivers, roads, sections, land ownership, permitted water wells, etc. Aerial photos, topographic quads, and geologic maps are also included as valuable information resources. The newest version of the online mapping system allows users to zoom to a specific street address or parcel for much of Colorado; has improved printing functionality; and includes a live connection to COGCC’s



environmental sampling database. To aid operators and other interested parties with their own GIS work, the COGCC website provides GIS shapefiles for download, including files that have daily updated well information, permit and pending permit data, and wellbore traces for directional and horizontal wells across Colorado. Recently added are downloads of KMZ files for well locations that can be used in Google Earth on smartphones and tablets. The COGCC GIS Online Interactive Map is regularly recognized as one of the best state-level oil and gas resources in the nation.

### 3.3.3 Environmental Database

The Groundwater Protection Council (GWPC) in conjunction with the COGCC has developed a publicly available, searchable database of groundwater, surface water, and soil sample analytical results from throughout the state. Referred to as the COENV database, it has been active since September 2012. The COENV database has sampling data dating back as far as 1941. The environmental database currently contains over 20,927 sample locations and 61,917 individual samples (as of November 16, 2021). In 2021, 3,100 total samples were added to the database. Since the Statewide Rule 609 and the GWA Rule 318A for groundwater sampling went into effect on May 1, 2013, COGCC has received a total of 15,431 water samples from 3,321 separate locations from operators in compliance with the rules.

The data can be easily accessed through the GIS Online Interactive Map. Sample locations with available water and natural gas data appear as green triangles when the “Sites with Lab Data” layer is turned on. The user can double click on a sample site and gain access to the analytical data for that site.

All of the data collected by COGCC Staff and under the following COGCC Rules are available:

- Rule 411.a.(2).C.ii - Baseline Surface Water Monitoring related to Surface water Supply Areas;
- Rule 411.b. (4).B - Reporting Groundwater Monitoring Data related to Groundwater Under the Direct Influence of Surface Water and Type III Aquifer Wells;

- Rule 420 - Bradenhead Test Reporting;
- Rule 614.b.(3) - Coalbed Methane Coal Outcrop and Coal Mine Monitoring;
- Rule 615 - Groundwater Baseline Sampling and Monitoring;
- Rule 805 - UIC Analytical Requirements for Injection Fluid Analysis;
- Rule 907.b.(9) - Centralized E&P Waste Management Facility Groundwater Monitoring;
- Rule 909.j - Produced Water Quality Analysis; and
- Previous COGCC Rules 317B, 318A.f, 608 and 609; and older samples from COGCC orders and the Colorado Oil and Gas Association (COGA) Voluntary Baseline Sampling Program.

The Form 43 (Analytical Data Submittal) allows operators to upload water quality data to the COGCC COENV database through the use of an electronic data deliverable (EDD). The Form 43 was released in 2018.

At this time the COGCC has completed amending the Form 43 to allow operators to submit analytical data related to the new rules promulgated under SB19-181 that went into effect on January 15, 2021. Analytical data will continue to be submitted via Form 43 to meet the new requirements.

The data provided to the COGCC is also available to the public through the COGIS data system available on the COGCC website. In April 2014, the COENV database was made available for download in an Access database format for those who wish to query large datasets.

### 3.3.4 Data Downloads

Historically, the COGCC has provided production data, spacing order data, and GIS shapefiles for download from the website. Available GIS data include well surface locations and directional data (updated daily), pits, oil and gas fields, high priority wildlife habitat, 100-year floodplain data, and approximate buffers associated with COGCC Rule 317B - Public Water System Protection (this will be updated to reflect the rule change to Rule 411 and the inclusion of Groundwater Under the Direct Influence of Surface Water and Type III Aquifer Wells).

In addition to GIS data listed above, and in an effort to increase transparency, the COGCC aggregates datasets directly from our MRDB and provides them for public use. The MRDB, managed and maintained by COGCC with assistance from the Governor's Office of Information Technology (OIT), is a comprehensive repository of Colorado's oil and gas data. Although all the data is available through interactive search tools on the website, these downloads allow the industry, public, non-governmental organizations, or other interested parties to access large amounts of data in searchable formats so that they may run their own analyses. These datasets are updated periodically.

The [data downloads](#) available are:

- Complaint Data
- Notice of Alleged Violation (NOAV) Data
- Flowline Notice to Operators (NTO) Inventory
- Mechanical Integrity Test (MIT) Data
- Spill and Release Data
- Analytical Sample Data
- Field Inspection Reports
- Production Data
- Spacing Orders
- GIS Shapefiles

The COGCC is developing additional data downloads for future release.

### 3.3.5 Online Environmental Reports

Written reports for COGCC-managed baseline sampling projects and other special environmental studies, such as status reports for monitoring Project Rulison in Garfield County and the various aquifer characterizations are posted on the website under the "[Library](#)" tab where they are primarily organized by basin and available for download as portable document format (PDF) files.

Although not new, the brochure, [How Well Do You Know Your Water Well](#) continues to be very popular. The brochure includes information about mitigating methane in

water wells, current contact information for various agencies, and water well maintenance and recordkeeping. COGCC provides this useful brochure to water well owners when water samples are collected from their wells by COGCC, operators, or third party contractors.

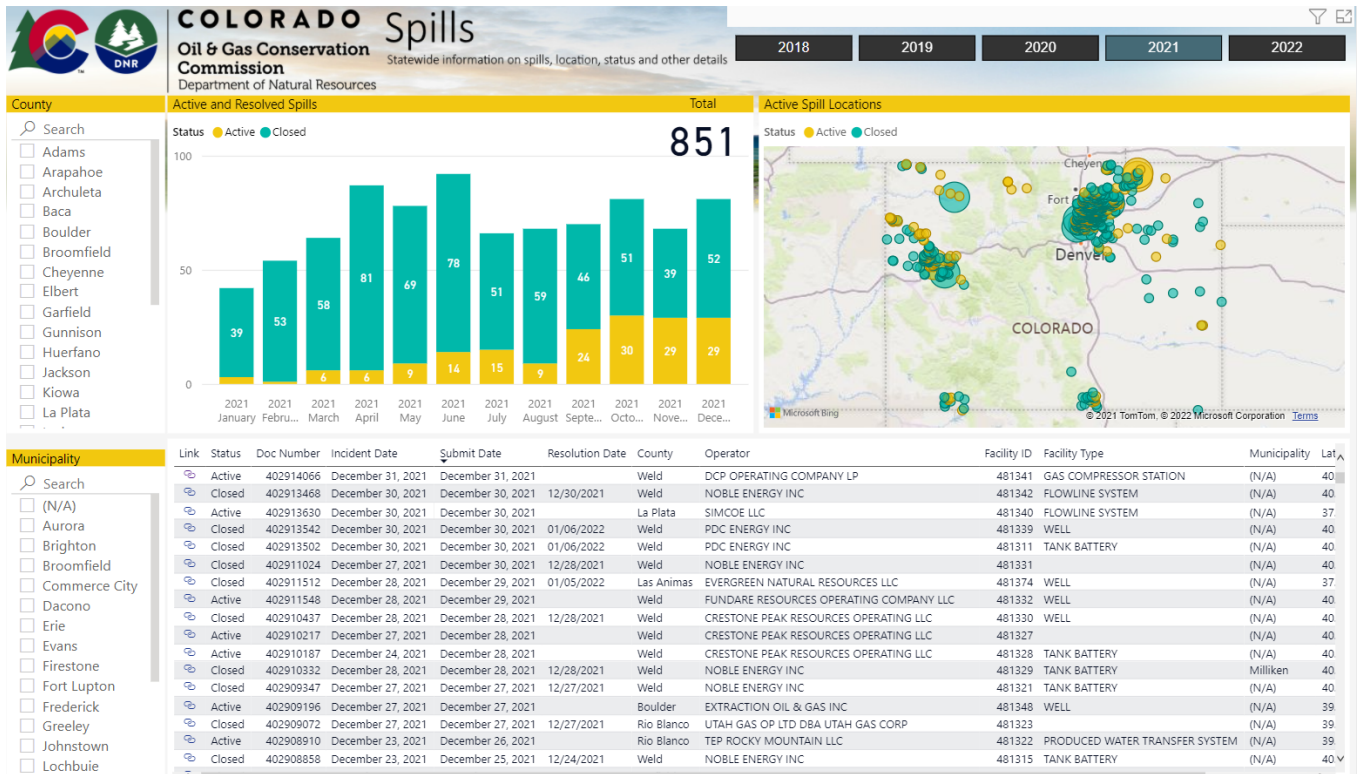
### 3.3.6 Daily Activity Dashboard

The [Daily Activity Dashboard](#) is a web-based tool designed to give local governments, the public, and other stakeholders a more efficient way to access, sort, and display the most commonly used data related to oil and gas operations. The Dashboard is a visual interactive tool that allows a user to generate custom statistical charts, graphs, tables, reports, and simple maps based on data that are updated daily.

The Dashboard does not offer any new types of oil and gas data to the public, or replace existing ways of searching for online oil and gas data in the Colorado Oil and Gas Information System, but instead provides a convenient way to access information on pending permits, well status, production, well inspections, NOAVs, active notifications and spills. This tool can be accessed by clicking “Dashboard” in the main menu of the COGCC homepage and continues to be a popular page on our website.

Anybody interested in tracking spills related to oil and gas in Colorado can utilize the Daily Activity Dashboard. It provides spill data back to 2018 and provides current numbers of spills reported by year with functionality to search spills by County or Municipality. It also provides a map with spill locations and links to the actual spill reports. For a more in depth dive into spill and remediation information, COGCC developed a tutorial available on the website under the Environmental section on the Help page. This tutorial helps explain the Daily Activity Dashboard search methods as well as COGCC database tools available to the public on the website. Last, under the Data tab on the website, COGCC provides several data downloads available to the public for spills under the Environmental section.

Figure 3-1. Daily Activity Dashboard Screenshot



### 3.4 COGCC Environmental Program and Project Funding

The General Assembly annually appropriates a line item within COGCC’s budget for the environmental staff to respond to, investigate, prevent, monitor, or mitigate conditions that threaten or actually cause adverse impacts to air; water; soil; public health, safety, and welfare; or wildlife resources. This work includes, but is not limited to, the collection of water and soil samples, laboratory analyses of the samples, and review and analysis of laboratory results and other environmental data. For Fiscal Year 2021-2022, the appropriation for this line item remained at \$312,033.

In addition, the General Assembly annually appropriates a line item to fund special environmental protection and mitigation studies including, but not limited to, gas seepage mitigation studies, outcrop monitoring studies, soil gas surveys in the vicinity of plugged Orphaned wells, and baseline water quality and subsequent follow-up

studies. The intent was to provide readily available funds for special projects as the need arises. The COGCC reports all expenditures made from this line item in the previous year to the General Assembly in its annual budget request. The full appropriation for this line item in Fiscal Year 2021-2022 remains at \$325,000.

In addition to the foregoing, COGCC receives an annual appropriation to respond to emergencies related to oil and gas operations that threaten or cause significant adverse impacts to public health, safety, welfare, or the environment. For FY 2021-22, this appropriation is \$150,000, consistent with prior year appropriations. The COGCC also receives an annual appropriation for plugging, abandoning, and reclaiming orphaned wells (PROW). The FY 2021-22 appropriation for the PROW line item is \$3.85 million.

#### **4.0 Senate Bill 19-181**

On April 3, 2019, the Senate passed SB 19-181, which the Governor signed into law on April 16, 2019. This Bill required several changes to the overall regulatory framework of the COGCC, which included; appointment of a professional commission by the Governor, increased local government control over the siting of oil and gas locations, changes in the Oil and Gas Location Assessment review process, and formal rulemakings for Flowlines, Practice and Procedure, Alternative Location Analysis, Cumulative Impacts and “Mission Change.” Mission Change is discussed in more depth in Section 4.3.

Starting in late 2019 and continuing through 2020 many key issues identified in SB 19-181 were addressed in a thorough examination of the COGCC's Rules. Significant rule revisions were enacted and made effective January 15, 2021.

#### **4.1 Mission Change Rules**

The appointed Professional Commission was seated on July 1, 2020 and the new Commission conducted significant rulemaking hearings addressing Mission Change, Alternative Location Analysis, Cumulative Impacts, and Compensatory Mitigation for Wildlife, as required by SB 19-181. The hearings began August 24, and addressed the

200-600 Series rules followed by the 800, 900 and 1200 Series rules in October. Those rule revisions addressed the following series:

- 200 Series - General Rules
- 300 Series - Drilling, Development, Production and Abandonment
- 400 Series - Unit Operations, Enhanced Recovery Projects
- 500 Series - Practice and Procedure
- 600 Series - Safety Regulations
- 800 Series - Aesthetic and Noise Control
- 900 Series - Environmental Impact Prevention
- 1200 Series - Protection of Wildlife Resources

These major revisions to the COGCC rules were approved by the Commission at the November 23, 2020 hearing. The implementation date of the new rules is January 15, 2021. The rulemakings were required to implement the change to the COGCC's mission from "fostering the responsible development of oil and gas resources in a manner that protects" to "regulating the development of oil and gas resources to protect" public health, safety, welfare, and the environment and wildlife resources.

Notable changes to the COGCC's rules that affect the protection of groundwater as a result of Mission Change are described in some detail below.

Former Rule 317B was amended to enhance protections for certain surface water segments—specifically those 5 miles upstream from a surface water public water system intake—through more stringent operational requirements and increased buffer or setback distances. Rule 411 also now includes provisions for protecting shallow groundwater public supply wells. The new provisions include concentric buffer zones or setbacks around the wells, consultation requirements during the oil and gas development plan application process, and potentially groundwater monitoring provisions. These newly amended and adopted rules protect critical groundwater and surface water resources.

Rule 608.g adopted a requirement for operators to provide general secondary containment around all fluids handling equipment or implement a written spill

contingency plan. The rule provides specific details for the contingency plan and is overall intended to function similarly to the Federal Spill Prevention, Countermeasures, and Control (SPCC) requirements, but are somewhat more broadly applicable. These spill prevention measures will help prevent migration of contaminants from the surface to shallow groundwater.

Prior to the adoption of the Mission Change rules, the COGCC had baseline groundwater sampling and monitoring requirements in several places throughout the rules and the requirements may have differed by basin or development type. Rule 615 consolidates all those rules into one place and sets consistent monitoring standards across the state. Though wells that were drilled under a prior rule regime will continue to be sampled under those former requirements, in the long run the consistency afforded by the adoption of Rule 615 will make for more straightforward data collection and analysis in the future. The baseline groundwater sampling and monitoring program has been an important component of the COGCC's demonstration of protection of groundwater resources during drilling and completion of oil and gas wells statewide since 2013 and in the San Juan Basin in southwest Colorado, for much longer.

To improve clarity, the Commission consolidated all its rules related to UIC administration to the 800 Series. The COGCC generally strengthened provisions within the 800 Series to ensure that underground disposal of produced fluids is fully protective of usable groundwater. Permitting requirements were clarified and strengthened, adding to the already rigorous environmental review conducted on UIC permit applications; the Director and Commission were also given more clear guidelines on when it is appropriate to deny a UIC permit application. The Rules also establish and enhance the COGCC's program to prevent induced seismicity associated with underground injection. The COGCC achieved recertification of the delegated program from USEPA with support from WQCD on the improvements to the rules.

The 900 Series were significantly amended with respect to management of E&P waste and spill prevention, reporting, and clean up. The Rule Series title was even changed



from “E&P Waste Management” to “Environmental Impact Prevention,” indicating the intent of these important rules. In Rule 902 and 905.a.(2) the Commission adopted very plain language requirements that “Operators will prevent Pollution” and “Operators will conduct E&P Waste management activities, and construct and operate all Oil and Gas Locations, to protect the Waters of the State from adverse environmental impacts caused by E&P Waste.” These Rules are not only clearer in their intent for protection of groundwater resources, they are anticipated to be more straightforward to enforce.

In Rules 908, 909, and 910, the Commission adopted numerous changes to the requirements for pits used to contain E&P Waste, including produced water. First, in Rule 908, the Commission required permitting prior to construction for all pits, including single well drilling pits which were previously exempt. Second, in Rule 909, the Commission improved record-keeping requirements and required fluids analyses to be conducted and reported for all operating pits. These requirements facilitate better groundwater protection by improving publicly available pit location and operational history records and ensuring that a record of the chemical content of the fluids within the pits is established—information that may be critical during pit closure activities to ensure cleanup of soil and prevention of groundwater contamination. Lastly, and similar to the permitting requirements, the Commission now requires in Rule 910 all pits to be lined. Obviously lined pits have a lower likelihood of releasing their fluid contents to the environment and contaminating groundwater.

COGCC Rule 911 requires a Form 27, Site Investigation and Remediation Workplan be submitted and approved before the removal and closure of all facilities on an oil and gas location. This expands the prior requirement from applicability only to production pits and partially buried produced water vaults to all pits, tanks and other surface equipment, flowlines, and wellhead equipment. The early involvement of environmental staff or consultants for the operator and environmental protection specialists for the agency have resulted in improved oversight and better practices during facility closure. As will be discussed later, this improvement to the rule has

resulted in operators finding, documenting, and cleaning up numerous cases of historical contamination that previously would not have been formally addressed. Several of these cases have involved groundwater impacts, and it is suspected that with the continued plugging and abandonment of aging vertical wells, many more such cases will be identified in the coming years.

Following a review of spills and releases throughout the state, staff recommended, and the Commission adopted, Rule 912 with tighter spill reporting thresholds, making more spills reportable. The COGCC's rules have long required the investigation and clean-up of all spills of any size, but many small or unknown volume spills or releases went unreported, and therefore undocumented. Some of the changes include mandatory reporting for spills where the volume is unknown, where the spill daylights to the surface from a subsurface source, and spills where more than 10 cubic yards of soil was necessarily removed to clean it up. The COGCC now requires the reporting of a leak of natural gas which causes an accumulation of natural gas in soil or which impacts groundwater. With the additional reporting requirements, the COGCC expects more thorough characterization of impacts and more prompt clean up, both of which will reduce impacts to groundwater.

The Commission also changed some of the COGCC's requirements for reporting on active site investigation and remediation projects in Rule 913. Importantly, the COGCC now requires a detailed implementation schedule and quarterly project updates for all active projects; this reporting will ensure an active dialogue between the agency and the operator and will reduce the likelihood of a project going stale or stagnating as other priorities get in the way, resulting in faster cleanup. The COGCC also clarified closure requirements to ensure consistent application of the rules across the state, in different producing basins, operational environments, operators, and staff.

The Commission also clarified the rules around establishing and relying upon groundwater points of compliance in Rule 914. More consistent use and application of points of compliance will result in better protection of groundwater resources.

Former table 910-1 which established the soil and groundwater concentrations used for cleanup standards was updated in collaboration with CDPHE staff to align the COGCC’s cleanup concentrations with those of the Solid Waste and Hazardous Materials Division and the WQCD. Rule 915 and Table 915-1 establish rigorous cleanup standards and clear direction for the process to achieve closure of a spill, release, or remediation project. There are alternate cleanup concentrations for sites where a pathway to groundwater exists, thereby enhancing the protection to groundwater resources.

As part of COGCC’s implementation efforts, the environmental unit staff developed and provided training for fourteen new guidance documents. These guidance documents are published on the COGCC website, and serve to assist operators in fully complying with the rule changes listed above, thereby helping to ensure protection for groundwater resources. Links to all guidance documents and training presentations can be found here:

[https://cogcc.state.co.us/reg.html#/opguidance\\_mc](https://cogcc.state.co.us/reg.html#/opguidance_mc) and here:

[https://cogcc.state.co.us/reg.html#/opguidance/operator\\_meetings\\_archive](https://cogcc.state.co.us/reg.html#/opguidance/operator_meetings_archive).

## **5.0 Oil and Gas Exploration and Production Activity**

The following sections describe statewide oil and gas activity. Data presented are current through November 2021, unless otherwise noted. Additionally, monthly oil and gas production reporting is required to be submitted 45 days following the end of the month; COGCC staff then process the production reports, resulting in a delay of 60 to 90 days before production is finalized. Therefore, annual production data provided in this report are estimates, with final annual production typically available on the COGCC website by April of the following year.

### **5.1 Drilling Permits and Rig Activity**

The COGCC has received 686 Applications for Permit to Drill (APDs) in 2021 –a 38% decrease in the number of APDs received compared to 2020, and 50% less compared

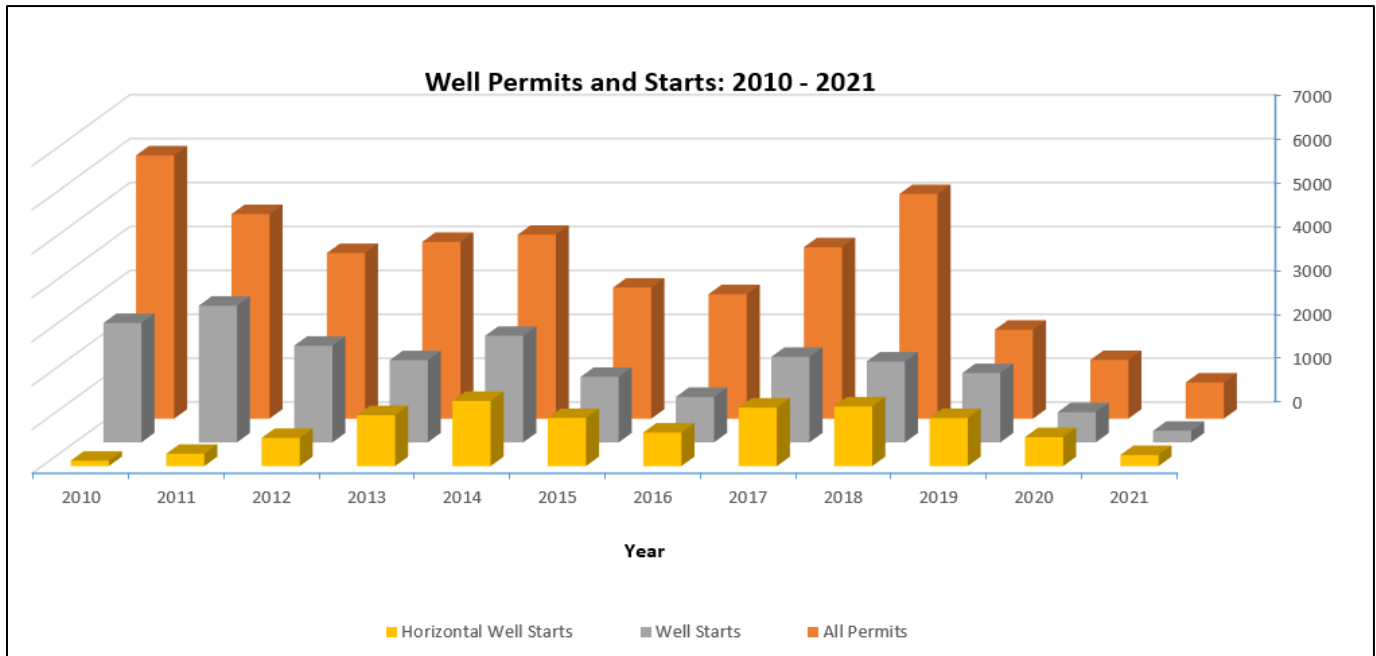
to 2019. For 2021, the commission approved 569 permits as of November 10 versus 1,114 permits in 2020. In 2021, 52% of the approved well permits were located in Weld County. The COGCC has recorded 562 spud notices in 2021 through mid-November. This is a 23% decrease from 2020 and a 62% decrease from 2019.

Another metric to gauge activity level is the number of wells drilled; COGCC tracks all well starts including conventional and horizontal well starts. As of November 2021, there were 263 well starts statewide, compared to 688 well starts in 2020, 1,578 in 2019 and 1,842 in 2018. In 2021, 252 wells starts were for horizontal wells, or approximately 96% of the total well starts for the state. As in recent years, horizontal drilling associated with the Niobrara and Codell Formations in the Denver-Julesburg (DJ) Basin continues to dominate the drilling activity in the State. In 2021, 152 (95%) of the horizontal wells starts for the state were in Weld County targeting the Niobrara and Codell Formations. Over the past decade, wells drilled in Colorado have shifted from a dominance of vertical wells to horizontal wells as shown in Table 5-1 and Figure 5-2, below.

**Table 5-1. Annual Permit and Well Start Activity 2010 - 2021**

<b>Year</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>
<b>All Permits</b>	5996	4659	3773	4025	4190	2987	2835	3906	5116	2026	1336	686
<b>Well Starts</b>	2719	3114	2202	1872	2428	1492	1036	1950	1842	1578	688	263
<b>Horizontal Well Starts</b>	123	280	641	1160	1484	1096	764	1334	1360	1094	661	252
<b>Percent Horizontal</b>	5%	9%	29%	62%	61%	73%	74%	68%	74%	69%	96%	96%

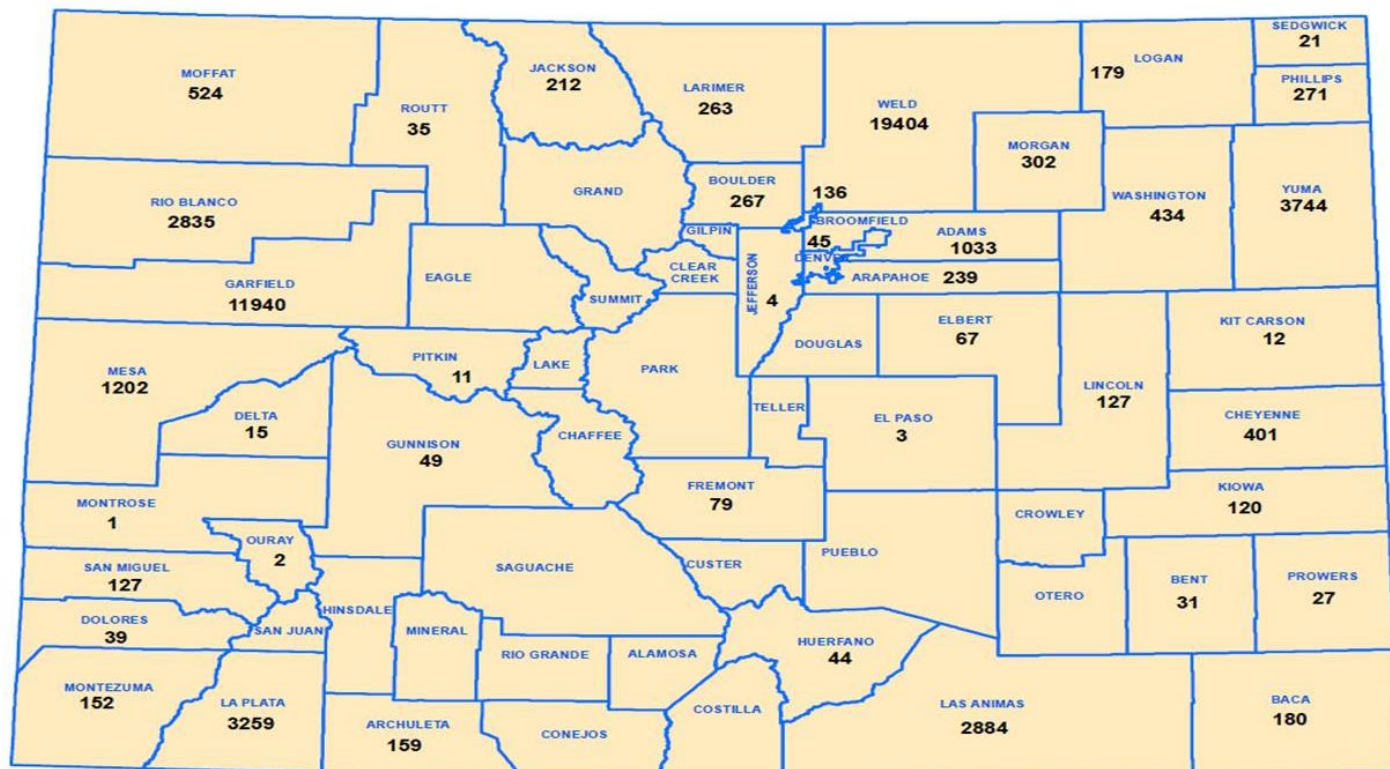
Figure 5-1. Annual Permit and Well Start Activity 2010 - 2021



The 2021 average weekly active rig count for Colorado stood at 10 through the first week of November. By comparison, the average weekly active rig count in Colorado was 30 rigs in 2019 and 10 rigs in 2020. Assuming crude oil and natural gas prices remain elevated after the precipitous price drop seen in 2020, a modest increase in rig activity in 2022 is expected.

As of December 2021, there were 49,866 active wells in the state. Figure 5-2 shows the number of active wells by County. Weld and Garfield counties have the most active wells, with 19,404 and 11,940 wells, respectively, followed by Yuma County with 3,744 and La Plata County with 3,259 wells.

**Figure 5-2. Number of Active Wells by County**



## 5.2 Oil Production

COGCC estimates that statewide oil production for 2021 will be approximately 147.6 million barrels (Mbbls) of oil produced after final accounting. This is the second year over year decline in crude oil production in nearly a decade. The production high (all-time) was in 2019 of nearly 193 Mbbls. According to the U. S. Energy Information Administration (EIA), Colorado accounts for over 4% of the total crude produced in the United States and ranks 5th among states in production as of July 2020.

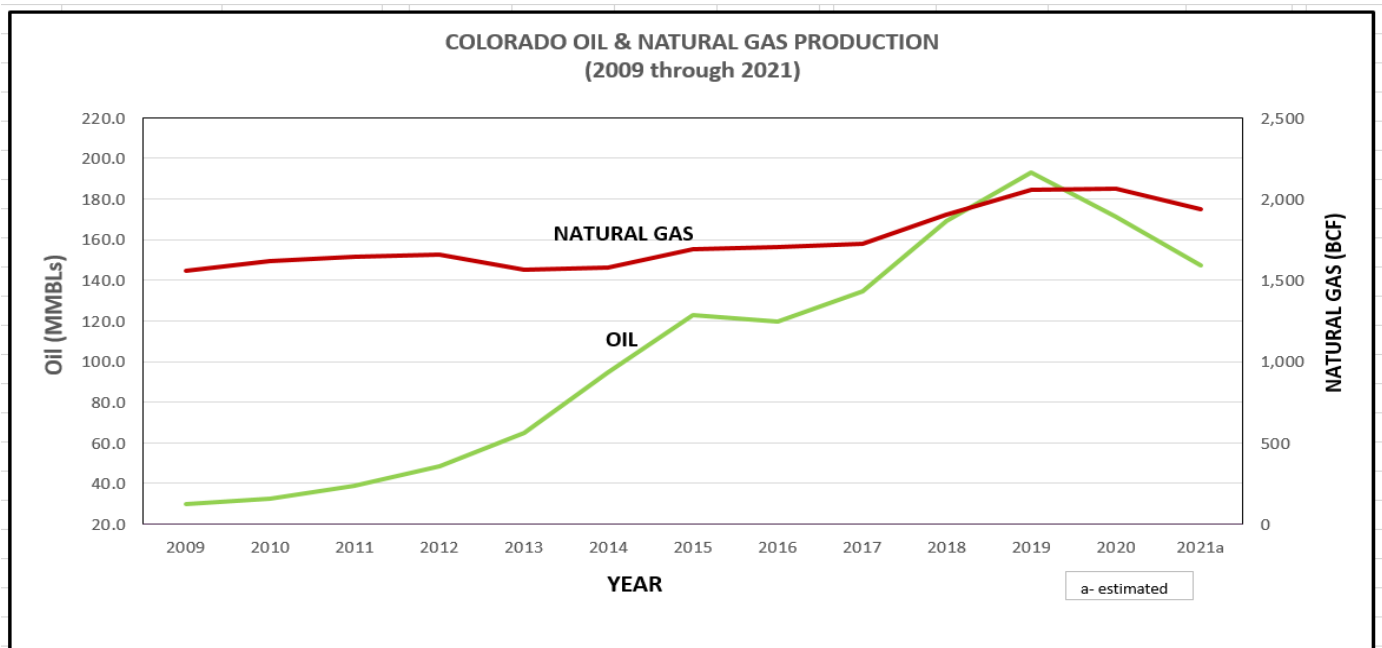
Development of the prime Niobrara shale assets in the Greater Wattenberg Area continues with the rapid production decline rates of horizontal wells (estimated to be from 30% to greater than 50% in the first year). Generally production decline rates are offset by new drilling, however, the decrease in new well drilling (2020 and 2021) is reflected in the drop in cumulative production. In the longer term, estimates of the Niobrara shale resource are as high as 2 billion barrels of oil with the Wattenberg field being the fourth largest in the nation based on proven reserves.

### 5.3 Natural Gas Production

Colorado was ranked seventh in the nation for marketed natural gas production. The EIA estimates that conventional and unconventional output from Colorado basins accounts for 5.5% of the total annual U.S. natural gas production. The state contains 11 of the largest natural gas fields in the country, leads the nation in gross withdrawals from coalbed methane wells, and contains almost a quarter of the economically recoverable coalbed methane in the country.

The COGCC estimates that approximately 1.94 trillion cubic feet (tcf) of natural gas were produced in Colorado in 2021. This volume is on track to be slightly less than the all-time highest production records of 2.064 tcf in 2020. Since 2009, Colorado’s oil production has dramatically increased from 30.0 million bbl to the current levels, while natural gas production has remained relatively flat (Figure 5-3).

Figure 5-3. Colorado Oil and Gas Production 2009-2021



### 5.4 Economic Value

The COGCC estimates the total dollar value for combined oil and natural gas produced in Colorado in 2021 to be approximately \$15.5\*. For comparison, the combined value

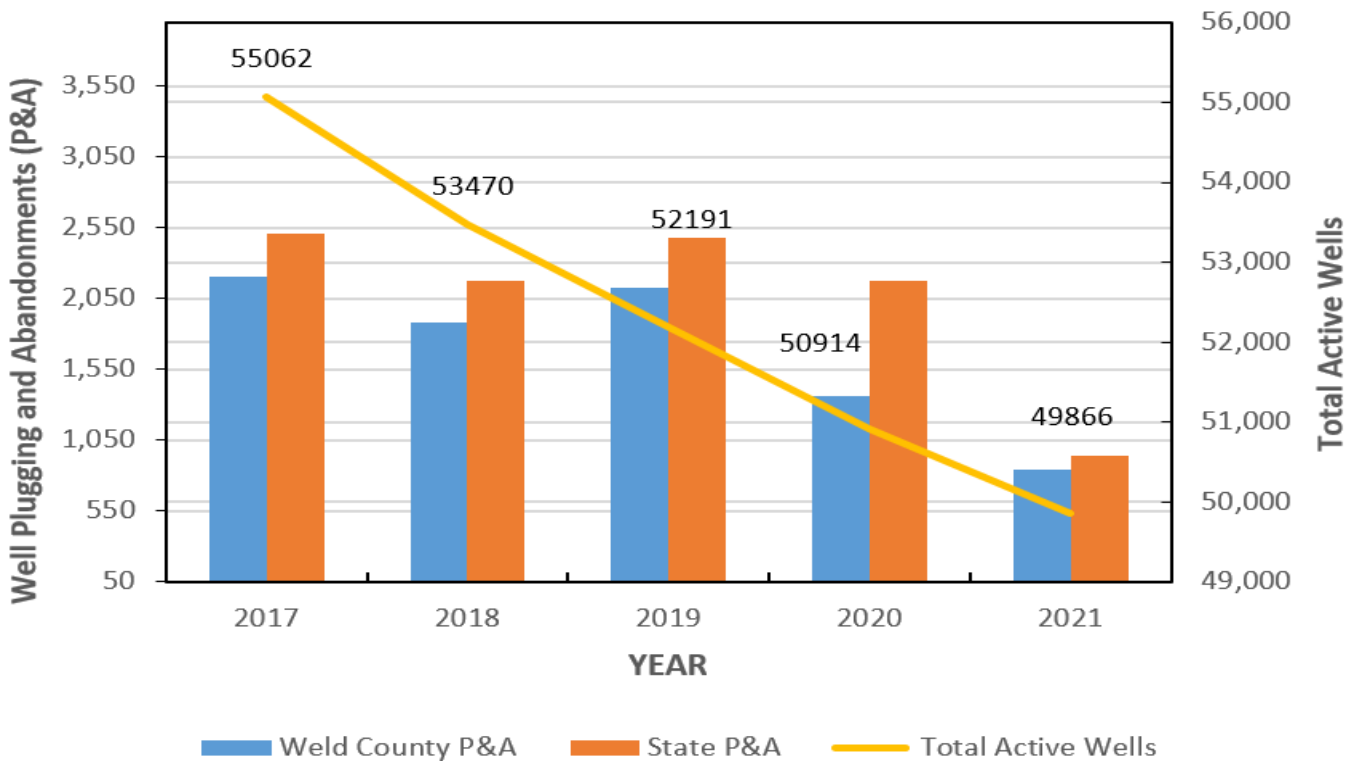
was \$9.4 billion in 2020, \$14.6 billion in 2019, \$15.5 billion in 2018, \$11.5 billion in 2017 and \$8.7 billion in 2016.

\*\$53 per BBL for oil and \$4 MMCF for gas was used in the estimate.

### 5.5 Total State Well Count vs Well Plugging and Abandonment

The number of wells plugged in Colorado in 2021 outpaced the number of new active wells. Due to ongoing horizontal development in the Greater Wattenberg Area (GWA) Field primarily in Weld County, a significant number of older conventional wells continue to be plugged. A total of 942 wells were plugged in 2021 bringing the active well count down to 49,866.

Figure 5-4. Well Plugging and Abandonment and Total Active Wells 2017 - 2021





## 6.0 Statewide Spills/Releases, Remediation Projects, and Environmental Investigations

Operators are required to report spills and releases of E&P waste and produced fluids that occur as a result of oil and gas operations in accordance with COGCC Rule 912 using a Form 19 - Spill/Release Report. Reporting is required for all types of produced fluids and E&P waste, although oil, condensate, and produced water are the substances most commonly spilled or released. These substances fall under the E&P waste exemption to regulation as hazardous wastes under Subtitle C of the Resource Conservation and Recovery Act (RCRA); therefore, they are subject to COGCC jurisdiction. COGCC defines spills as “any unauthorized sudden discharge of E&P waste to the environment” and releases as “any unauthorized discharge of E&P waste to the environment over time.”

Through December 31, 2021, a total of 851 spills/releases were discovered and reported to the COGCC for the calendar year. In comparison, there were 476 spills in 2020, 639 in 2019 and 578 reported in 2018. There were two primary reasons for the large increase in reported spills in 2021. First, the Mission Change Rules went into effect on January 15, 2021; as updated, Rule 912 included several new reporting thresholds for spills. Second, Rule 911 required Operators to submit Form 27 remediation plans to document the closure of all facilities when wells are plugged and related production facilities are decommissioned. In the past, there was no formal requirement for closure documentation except for pits and partially buried vessels.

Figure 6-1 shows the number of Form 19s (all) and Initial Form 19s processed the past 3 years. The data are divided by the eastern and western halves of the state. It is clear that the number of Initial Form 19s (new spills or releases) has risen sharply in the eastern half of the state where most plugging and abandonment activity is occurring. This is a direct result of better environmental oversight during those P&A and facility decommissioning activities.

**Figure 6-1. 2019-2021 Spill Reporting**



In accordance with the MOA for Response to Spills/Releases to Surface Water, the COGCC notifies the WQCD of spills or releases impacting surface waters. In 2021, there were four such spills or releases to surface waters reported to WQCD staff. COGCC and WQCD staff coordinate on the follow up and oversight of these spill cleanups, including enforcement for any rule violations that led to or resulted from the spill or release.

During 2021 96 spills were reported that either impacted or threatened to impact groundwater. Of those 96 spills, 95 were located in the east half of the state primarily in the Greater Wattenberg Area typically within Weld and part of Adams County.

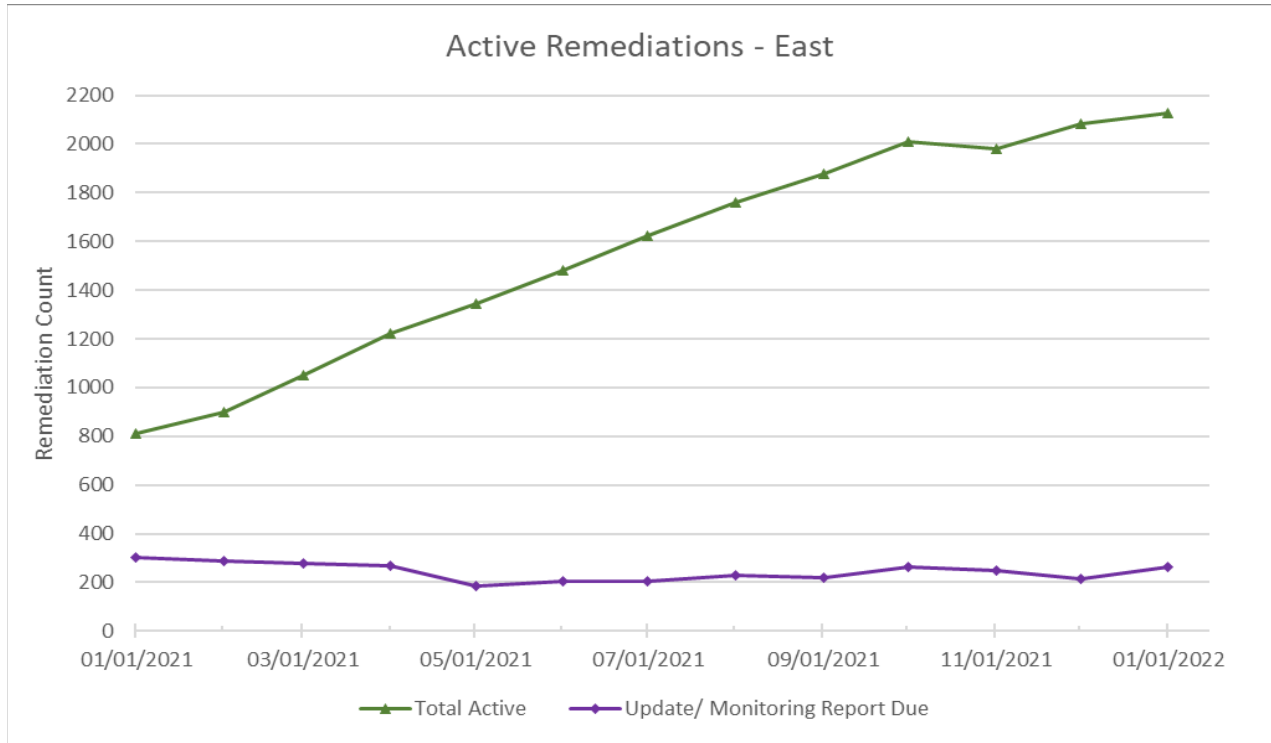
Where groundwater has been threatened or impacted, operators are required to:

- immediately eliminate any ongoing release,
- investigate the extent of contamination,
- remove the source of contamination (such as the impacted soils in contact with groundwater or liquid phase hydrocarbon product),
- remediate, establish points of compliance, and
- monitor any remaining contaminant levels until contaminants of concern are in compliance with Table 915-1 standards and Regulation 41 groundwater quality standards.

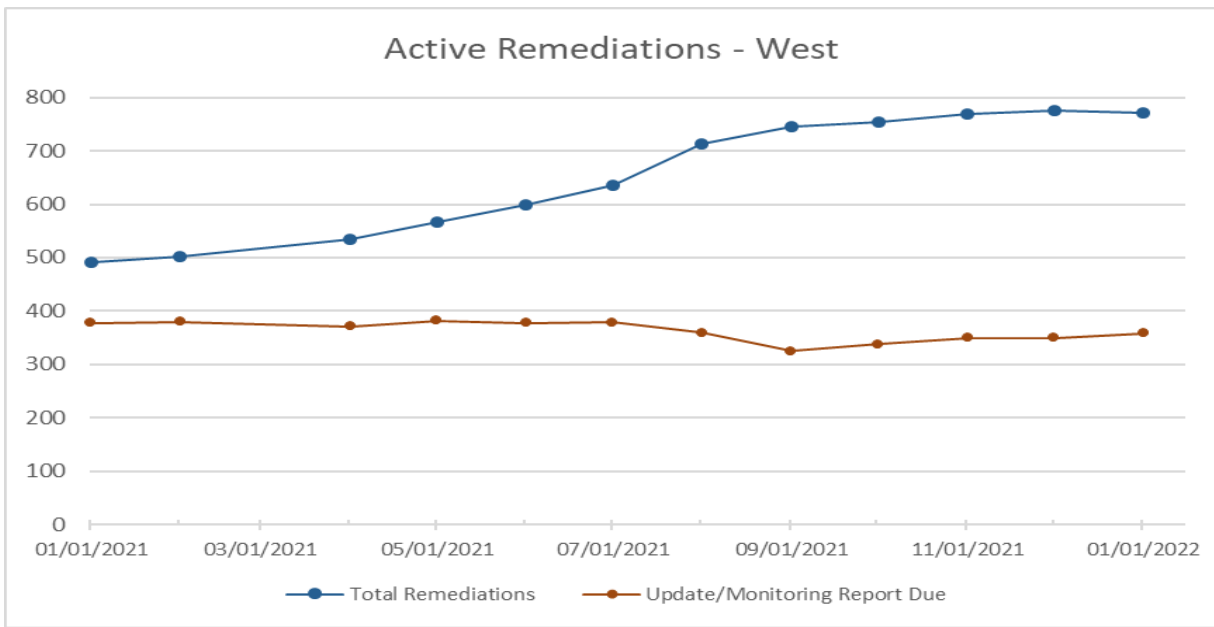
Spills and releases are considered “closed” when both all soils and groundwater have been demonstrated to meet the cleanup criteria of Table 915-1 or when the operator requests to continue their site investigation and remediation under an approved workplan. Most spills and releases which impact groundwater are closed through the latter process due to the duration of the remediation projects. In 2021, 833 spills and releases were closed.

Remediation projects are tracked in the COGCC’s database and can be accessed on the COGCC website. Through November 1, 2021, the COGCC received 2,192 new remediation plans, and closed 802 remediation projects. Figure 6-2 and Figure 6-3 show the number of active remediation projects in the east and west halves of the state, respectively. These charts show a dramatic increase in active remediation projects in the eastern half of the state, again reflecting the significant P&A activity in the DJ Basin, and a smaller, but still significant increase in active remediation projects on the western slope. In addition to the growing number of active remediation projects, COGCC is also monitoring hundreds of ongoing cleanup projects statewide, these are reflected in the relatively flat lines of “Update/Monitoring Report Due” in each graph. In all COGCC staff processed almost 6,000 Form 27s in 2021.

**Figure 6-2. Eastern Colorado Remediation Projects**



**Figure 6-3. Western Colorado Remediation Projects**



As previously stated, the new spill reporting thresholds and facility closure requirements have resulted in a substantial increase in the number of spills reported on Form 19s and the number of investigation and remediation projects established and reported on Form 27s. The significance of this increase is better protection of the environment and groundwater resources at the end of the life of an oil and gas development project and decreased risk of residual contamination being left in place for a land owner or surface owner to discover later. Because of the required site assessments performed to document facility closure, many more spills/releases were discovered and reported. These spills were not generally active spills, but more typically historic impacts most commonly of residual soil contamination. In 2021, 195 spills or releases were discovered and reported at wellheads during plugging and abandonment. In the past, these spills might not have been discovered or reported because there was no closure assessment required directly at the wellhead.

# APPENDIX 1

## COGCC Organizational Chart

### COLORADO OIL & GAS CONSERVATION COMMISSION

