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CLIMATE CHANGE™

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CLIMATE CHANGE™
LAW & POLICY REPORTER

FEATURE ARTICLE

WATER SCARCITY IN CALIFORNIA— GROUNDWATER SUSTAINABILITY PLANS EMERGE FOR THE STATE'S 'CRITICALLY OVERDRAFTED' BASINS

By Derek Hoffman and Chris Carrillo

For well over 150 years, the State of California did not comprehensively regulate its groundwater basin aquifers. That changed at the height of the historic multiyear drought, when the state's Sustainable Groundwater Management Act (SGMA) took effect on January 1, 2015. SGMA requires local Groundwater Sustainability Agencies (GSAs) to develop and implement Groundwater Sustainability Plans (GSPs) to achieve long-term basin sustainability. On January 31, 2020, GSPs for approximately 20 "critically overdrafted" basins were due for submission to the California Department of Water Resources (DWR). These highly anticipated GSPs are now available for review and public comment on DWR's website. The shape of groundwater management in California is *rapidly* evolving, and will continue to evolve as these and other GSPs are evaluated, updated, implemented—and in some basins—litigated.

SGMA Background

GSPs must be adopted by local GSAs and submitted to DWR by January 31, 2022 for high- and medium-priority basins that are neither adjudicated nor subject to an approved GSP Alternative. For high- and medium-priority basins that are designated "critically overdrafted," the deadline to submit adopted GSPs was two years earlier, January 31, 2020. DWR is required to post each submitted GSP on its website and evaluate it within two years for compliance with SGMA and DWR's GSP Emergency Regulations (California Code of Regulations, Title 23, Division 2, Subchapter 2, § 350 *et seq.*) (GSP Regulations). In the event that a GSA fails to submit a timely GSP, or submits a GSP that fails to satisfy SGMA and the GSP Regulations, that basin may be placed in DWR probationary status and subjected to intervention and regulation directly by the California State Water Resources Control Board.

Basin Sustainability

SGMA requires achieving basin sustainability within twenty years of GSP adoption. While SGMA provides the legal framework and minimum standards for sustainability, it authorizes GSAs to specifically define sustainability for their local basins. That determination must be based upon technical and policy considerations. GSAs are required, for example, to consider the best available science and information in developing their GSPs and projects and management actions, and are required to consider the interests of all beneficial users and uses of groundwater within the basin. (California Water Code § 10723.2.)

GSPs must identify a "sustainability goal," which is defined under SGMA as:

> . . .the existence and implementation of one or more groundwater sustainability plans that achieve sustainable groundwater management by identifying and causing the implementation of measures targeted to ensure that the applicable basin is operated within its sustainable yield. (*Id.* § 10721(u).)

"Sustainable yield" is defined as the maximum quantity of water, calculated over a *base period* representative of *long-term conditions* in the basin and *including any temporary surplus*, that can be withdrawn annually from a groundwater supply *without causing an undesirable result*. (*Id.*, § 10721(w).)

In other words, determining a basin's "sustainable yield" is complex and is intrinsically linked to avoiding specific, undesirable results. In its Draft Best Management Practice publication for Sustainable Management Criteria (SMC BMP), DWR explains the "Role of Sustainable Yield Estimates in SGMA," stating that "that SGMA does not incorporate sustainable yield estimates directly into sustainable management criteria." It continues:

> . . .basin-wide pumping within the sustainable yield estimate is neither a measure of, nor proof of, sustainability. Sustainability under SGMA is only demonstrated by avoiding undesirable results for the six sustainability indicators. (SMC BMP, p. 32.)

Thus, the careful study, definition, establishment and management of sustainable management criteria for each sustainability indicator are integral to achieving complaint and effective GSP. SGMA defines undesirable results as one or more of the following effects caused by groundwater conditions occurring throughout the basin:

- Chronic lowering of groundwater levels indicating a significant and unreasonable depletion of supply if continued over the planning and implementation horizon. Overdraft during a period of drought is not sufficient to establish a chronic lowering of groundwater levels if extractions and groundwater recharge are managed as necessary to ensure that reductions in groundwater levels or storage during a period of drought are offset by increases in groundwater levels or storage during other periods.

- Significant and unreasonable reduction of groundwater storage.

- Significant and unreasonable seawater intrusion.

- Significant and unreasonable degraded water quality, including the migration of contaminant plumes that impair water supplies.

- Significant and unreasonable land subsidence that substantially interferes with surface land uses.

- Depletions of interconnected surface water that have significant and unreasonable adverse impacts on beneficial uses of the surface water. (Wat. Code § 10721(x).)

SGMA does not define the threshold at which a specific sustainability indicator becomes *significant* and *unreasonable*. Rather, local GSAs are tasked with this weighty responsibility. Given the vast and varied users of groundwater in each basin and the potentially significant operational and financial impacts of GSP projects and management actions, the importance of establishing sustainable management criteria based upon the best available science and information and carefully informed policy considerations cannot be overstated.

GSPs must identify minimum thresholds, five-year interim milestones, and ultimate measurable objectives for each sustainability indicator. GSAs are afforded SGMA-enumerated powers, in addition to existing legal authority held by individual GSA member agencies, to implement GSPs within their jurisdictional areas. (*Id.* § 10725.) However, these powers are not unlimited. Municipalities retain, for example, their land use and well-permitting authorities, though coordination with GSAs may be required. (*Id.* §§ 10726.4, 10726.8, 10727.4). And, perhaps the most widely recognized SGMA limitation is its declared intent to "preserve the security of water rights in the state to the greatest extent possible consistent with sustainable groundwater management." (*Id.* § 10720.1(b).) SGMA expressly does not authorize a GSA to determine or alter California common law water rights or priorities. (*Id.* § 10720.5). Rather, water rights determinations remain within the role of the courts, primarily through the SGMA companion "comprehensive adjudication" legislation (California Code of Civil Procedure, Part 2, Title 10, Chapter 7, Article 1, § 830, *et seq.*). Through comprehensive adjudications, and other forms of litigation, pumpers are empowered to increase GSA accountability throughout the GSP development process, and ultimately seek a judgment as an alternative to a GSP.

'Critically Overdrafted' Basins

With the exception of a handful of GSP Alternatives (*i.e.*, specific types of basin managements plans that must satisfy specific SGMA and regulatory requirements), California's "critically overdrafted basins" represent the first group required to be managed

under GSPs. Through its Bulletin 118 publication, DWR designated twenty-one basins that are "subject to critical conditions of overdraft" based upon certain criteria in the *Water Code*. SGMA incorporates those Bulletin 118 designations. (Wat. Code § 10720.7(a).)

California's 21 critically overdrafted basins are geographically concentrated primarily in the Central Valley, in central- and southern California coastal areas and, to a lesser extent, in desert inland southern California. They include DWR Basins 1) 3-001 Santa Cruz Mid-County; 2) 3-002.01 Corralitos—Pajaro Valley; 3) 3-004.01 Salinas Valley—180/400 Foot Aquifer; 4) 3-004.06 Salinas Valley—Paso Robles Area; 5) 3-008.01 Los Osos Valley—Los Osos Area; 6) 3-013 Cuyama Valley; 7) 4-004.02 Santa Clara River Valley—Oxnard; 8) 4-006 Pleasant Valley; 9) 5-022.01 San Joaquin Valley—Eastern San Joaquin; 10) 5-022.04 San Joaquin Valley—Merced; 11) 5-022.05 San Joaquin Valley—Chowchilla; 12) 5-022.06 San Joaquin Valley—Madera; 13) 5-022.07 San Joaquin Valley—Delta-Mendota; 14) 5-022.08 San Joaquin Valley—Kings; 15) 5-022.09 San Joaquin Valley—Westside; 16) 5-022.11 San Joaquin Valley—Kaweah; 17) 5-022.12 San Joaquin Valley—Tulare Lake; 18) 5-022.13 San Joaquin Valley—Tule; 19) 5-022.14 San Joaquin Valley—Kern County; 20) 6-054 Indian Wells Valley; and 21) 7-024.01 Borrego Valley—Borrego Springs

With the exception of Pajaro Valley (for which a GSP Alternative was approved) and Los Osos Area (which is deemed adjudicated), each of the 19 remaining basins were required to submit their adopted GSPs to DWR by the January 31, 2020 deadline. DWR's GSP Portal indicates that GSPs were timely submitted (though, at the time of this writing, some had not been accepted for review as DWR awaited receipt of certain related documents).

Any practitioner that was meaningfully involved in developing those GSPs will undoubtedly acknowledge the intense effort that was required to meet the January 31, 2020 deadline. However, the submission of GSPs marks the *beginning* of the path to sustainability as GSAs continue to monitor basin conditions, implement projects and management actions, and amend and update their GSPs. Implementing the GSPs will require a greater, sustained intensity of effort and engagement, and will likely trigger litigation in some areas.

In certain basins where GSPs would impose particularly aggressive groundwater pumping restrictions and/or fees, litigation has already begun. In Borrego Springs Sub-basin (DWR Basin No. 7-024.01) located in the inland desert area of San Diego County, the local GSA developed one of the first GSPs in the state which included imposing approximately 75 percent pumping reductions. In lieu of adopting and submitting the GSP, a proposed stipulated judgment and physical solution has been negotiated among the vast majority of the basin groundwater producers and submitted to DWR as a comprehensive adjudication GSP Alternative.

In the Indian Wells Valley (DWR Basin No. 6-054) located in eastern Kern County and portions of San Bernardino and Inyo counties, the Indian Wells Valley Groundwater Authority has adopted a GSP that includes, as a primary management action, allocating a static estimated annual basin recharge of 7,650 AFY among selected groundwater users, and assigning virtually all agricultural producers a temporary, non-transferable pumping allocation comprising a fraction of groundwater in storage. Once the temporary allocations are used (which for some could be less than one year), those agricultural producers would be required to cease pumping entirely or pay yet-to-be-defined pumping fees on every acre foot of production to fund imported water infrastructure and imported water supplies. A group of agricultural interests recently filed a verified complaint in Kern County Superior Court including claims to quiet title and for declaratory relief and seeking a physical solution among a group of large groundwater producers in the basin. The complaint declares that it does *not* seek a comprehensive adjudication, citing provisions of the comprehensive adjudication law that exempt certain types of actions among limited groundwater producers that do not involve a comprehensive allocation of the basin's groundwater supply or a comprehensive determination of water rights. (Code Civ. Proc. § 833(b)(1)-(3).). The complaint does not name the GSA and does not directly challenge the GSP.

By and large, the GSPs adopted for California's critically overdrafted basins recognize and identify the basin conditions that must be addressed in order to achieve sustainability, and they identify projects and management actions that may be considered for implementation as warranted. Most GSPs seek to achieve sustainability over the SGMA-authorized 20-year timeline, recognizing that the adjustments, costs and impacts of their GSPs will require time and

careful implementation. Many GSPs appropriately prioritize monitoring, evaluating and honing their sustainable management criteria during the first five-year implementation period, prior to implementing significant projects or management actions. Nearly all GSPs have yet to clearly determine how they will fund their sustainability programs.

What follows is a closer look at select basins.

The Cuyama Basin (DWR Basin No. 3-013)

The Cuyama Basin is located within California's Central Coast Hydrologic Region, primarily in Santa Barbara County. The Cuyama Basin Groundwater Sustainability Agency is the exclusive GSA for the basin. It is a joint powers authority comprising: Kern, Santa Barbara, San Luis Obispo and Ventura counties, Cuyama Community Services District and the Cuyama Basin Water District.

Primary Sustainability Indicators of Concern

The GSP identifies declining groundwater levels and degraded water quality as the primary sustainability indicators of concern. It indicates that some areas of the basin have experienced no significant change in water levels while areas with the greatest concentration of irrigated agriculture occurs have shown declines. Groundwater quality varies but includes high levels of total dissolved solids (TDS) that exceed California's recommended secondary maximum contaminant level in some areas, and areas with high concentrations of nitrate and arsenic. The GSP finds that the lowering of groundwater levels has resulted in increased water quality degradation and elevated TDS levels. The GSP indicates that annual basin overdraft is approximately 26,000 acre-feet per year (AFY), and estimates that reducing pumping to 40,000 AFY is necessary to achieve long-term sustainability.

Projects and Management Actions

The GSP identifies primary projects and management actions including: 1) expanding monitoring programs; 2) a pumping allocation program to be implemented over a 15-year period beginning in 2023; 3) a cloud seeding project, described as a type of weather modification with the objective to increase the amount of precipitation that would fall in the Basin watershed and is estimated to yield up to 4,000 AFY of additional supply; and 4) diversion of high stormwater flows from the Cuyama River into basin recharge, which is estimated to support up to 4,000 AFY in groundwater production. Estimated implementation costs range up to approximately $5 million per year.

Salinas Valley—180-400 Ft. Aquifer (DWR Basin No. 3-004.01)

The Salinas Valley—180-400 Ft. Aquifer is located within the Central Coastal region in Monterey County. It is one of multiple Salinas Valley sub-basins. The sub-basin is named for its two-primary water-bearing units: the 180-Foot Aquifer and the 400-Foot Aquifer, and it encompasses an approximately 140 square-miles. The basin is managed by three GSAs: 1) the Salinas Valley Basin Groundwater Sustainability Agency (a joint powers authority comprising multiple counties, cities and other agencies); 2) the County of Monterey GSA; and 3) the Marina Coast Water District GSA.

Primary Sustainability Indicators of Concern

The GSP identifies declining groundwater levels and sea water intrusion as the primary sustainability indicators of concern. According to the GSP, agricultural irrigation comprises approximately 85 percent of total groundwater use within the sub-basin, and urban/domestic use primarily the remainder. According to the GSP, concentrated groundwater pumping near the coastal area has resulted in declining groundwater levels and seawater intrusion. During the drought years 2013 to 2017, increased pumping expanded the sea water impacted areas from 12,500 acres to 18,000 acres. The GSP reports that in 2005, nitrate levels exceeding the primary maximum contaminant level (MCL) were found in 32 percent of public water supply samples in the greater Salinas Valley Basin. The GSP estimates historical average sub-basin overdraft to be 10,900 AFY, and projects overdraft in the amount of 8,100 AFY in 2030, and 8,600 AFY in 2070. The GSP aims to mitigate the projected long-term projected 8,600 AFY overdraft, and to mitigate existing short-term overdraft estimated at over 40,000 AFY.

Projects and Management Actions

The GSP identifies primary projects and manage-

ment actions including: 1) a three-tiered pump fee designed to incentivize reduced pumping; 2) in-lieu projects designed to provide direct delivery of surface water to offset pumping; 3) direct recharge projects through recharge basins or injection; 4) indirect recharge projects designed to decrease evapotranspiration and increased infiltration, such as removing invasive species from riparian corridors, and capturing storm water flows; and 5) hydraulic barrier development to control seawater intrusion, such as injection wells aligned parallel to coastline areas. The GSP anticipates developing the fee structure and refining and prioritizing selected projects within the first three years of GSP implementation. The GSP estimates that planned activities will cost over $11 million over the first five years of implementation.

Merced Basin (DWR Basin No. 5-022.04)

The Merced Sub-basin is located within the northern portion of the larger San Joaquin Valley Groundwater Basin, and encompasses an area of about 801 square miles. The basin is managed by three GSAs pursuant to a memorandum of understanding: Merced Irrigation-Urban Groundwater Sustainability Agency, Merced Subbasin Groundwater Sustainability Agency, and Turner Island Water District Groundwater Sustainability Agency #1.

Primary Sustainability Indicators of Concern

The GSP identifies multiple sustainability indicators of primary concern, including declining groundwater levels, degraded water quality, land subsidence, and depletions of interconnected surface waters. Notably, the GSP indicates that loss of groundwater in storage is not a concern because historical reductions have been insignificant relative to the total volume of freshwater water storage. The historical water budget finds an annual average rate of overdraft (change of storage) of 192,000 AFY from 2006 through 2015. According to the GSP, sustainable yield was estimated by modifying conditions in the groundwater model to balance out the change in stored water over time. In order to achieve a net-zero change in groundwater storage over a long-term average condition, the GSP states that current agricultural and urban groundwater demand in the basin would need to be reduced by approximately 10 percent, absent implementation of any new supply-side or recharge projects.

Projects and Management Actions

The GSP aims to achieve its sustainability goal by allocating a portion of the estimated basin sustainable yield to each of the three GSAs and coordinating the implementation of programs and projects to increase both direct and in-lieu groundwater recharge. The GSAs have not yet reached agreement on allocations or how they will be implemented. The GSP identifies twelve potential projects, which categorically include basin recharge, monitoring wells, water system interties and additional conveyance canals, water use efficiency programs, and streamlining certain replacement wells, and other project categories. The GSP anticipates completing all projects by 2026. GSP implementation costs are estimated to range between $1.2 million and $1.6 million per year, with additional costs for projects and management actions ranging up to $22.9 million.

San Joaquin Valley—Kern Sub-Basin (DWR Basin No. 5-022.14)

The Kern Sub-basin is the southernmost area of the San Joaquin Valley Groundwater Basin. It is managed by 11 organized GSAs and five coordinated GSPs. Six GSAs are included in the GSP developed by the Kern Groundwater Authority GSA (KGA). Two GSAs are included in the Kern River Groundwater Sustainability Agency GSP. Three additional district-specific GSPs have been prepared in the sub-basin by Buena Vista Water Storage District, Henry Miller Water District, and Olcese Groundwater Sustainability Agency.

The KGA's GSP covers the largest GSA area within the sub-basin, comprising 1.2 million acres of the sub-basin's approximate 1.8 million-acre area. The KGA is a joint power authority including 16 member entities made up of water districts/agencies, groundwater banking projects, and organized non-districted lands. Each KGA member is assigned the sole right and responsibility to implement SGMA within its respective boundaries and/or management areas, in a manner determined by the member, so long as the implementation actions do not interfere with the surrounding KGA members or other GSAs.

Primary Sustainability Indicators of Concern

The KGA's GSP includes basin-wise coordinated sustainable management criteria and water modeling

budgets (historical, baseline and projected). Those budgets indicate that the basin, as a whole, averages overdraft in the amount of 324,326 AFY over the baseline conditions of which the KGA area comprises more than two-thirds of the deficit. Each KGA member agency addresses its own individual water supply sources, projects and management actions in greater detail in its individual management area plans comprising its dedicated GSP chapter.

Projects and Management Actions

The GSP indicates that KGA members have collectively identified more than 150 projects and management actions. They include expanding local and regional conveyance and recharge facilities, better utilizing surplus surface water supplies, developing new conveyance and recharge projects, and participating in the California 'WaterFix' or other thru-Delta improvement projects. Management actions include implementing district level fee structures to incentivize reduced groundwater pumping, participating in local, regional, and state-wide water markets, and establishing individual landowner groundwater allocations. According to the GSP, the coordinated modeling effort shows that the implementation of the identified projects and management actions throughout the basin would result in an average *surplus* of 85,578 AFY over the projected future baseline condition.

Conclusion and Implications

All Groundwater Sustainability Plans that were submitted to the Department of Water Resources and accepted for review are posted on DWR's website at: https://sgma.water.ca.gov/portal/gsp/all. The deadline to submit public comments on each individual GSP is also provided there. Virtually every GSP spans well over 1,000 pages (and some, over several thousand pages) including technical and other supporting attachments. The GSPs submitted for California's critically overdrafted basins collectively represent a truly "Herculean" effort to meet this crucial SGMA milestone. DWR is required to review the GSPs, consider all public comments, and render an evaluation of each GSP within two years. If the last five years have taught us anything, it is that January 2022 will be here before we know it. And at that point, DWR will have received an even larger wave of high- and medium-priority basin GSPs to review. In the meantime, GSPs for critically overdrafted basins will begin implementation, though the actual path for any particular GSP very much remains to be seen as GSAs.

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CLIMATE CHANGE NEWS

'GETTING TO NEUTRAL' REPORT FINDS CALIFORNIA CAN REACH CARBON NEUTRALITY BY 2045 FOR LESS THAN $10 BILLION PER YEAR

Experts told California lawmakers earlier this month that the state's lofty goal—carbon neutrality by the year 2045—is not only attainable, but realtively affordable through a wide-reaching plan centered around converting trash to energy, trapping and burying carbon dioxide, and working to restore wetlands and forests.

Background

George Peridas of the Lawrence Livermore National Laboratory testified during an oversight hearing that California can meet its goal of carbon neutrality by 2045 for under $10 billion a year, less than 1 percent of the state's gross domestic product. In fact, through removing carbon dioxide from the air, the state could achieve its goal at a cost of less than what is currently spent managing trash.

Peridas' testimony occurred at a hearing held as a result of a 2016 law requiring the head of the California Air Resources Board to appear at least once a year to provide an update on totals and trends associated with greenhouse gas emissions. Other experts testifying included Mary Nichols, chair of the California Air Resources Board, who argued that the state needs to continue pushing for electric vehicles. She indicated that all vehicles sold in California will have to be clean energy models by 2035, and that all vehicles on state roads must be zero emissions by 2045.

Governor Brown Set's Carbon Neutrality Goals

Shortly before leaving office, Governor Jerry Brown issued an executive order committing California to the world's most stringent climate target, asserting that California would not just run completely on renewable energy by 2045, but would reach full carbon neutrality.

In order to make good on this goal, experts have been studying negative emissions strategies to remove carbon dioxide already in the atmosphere.

Getting to Neutral

In a new report titled "Getting to Neutral—Options for Negative Carbon Emissions in California" 20 researchers from the Lawrence Livermore National Laboratory and other institutions, including Georgetown University, University of Calgary, and the University of Queensland, Australia map out strategies for California to counteract up to 125 million metric tons of carbon dioxide annually.

During his testimony, Peridas told lawmakers implementing a negative emissions blueprint would not require a technological breakthrough. Rather, a reliable source of funding to cover a modest price tag and new infrastructure can get California to its goals.

The scientists' three-pronged plan begins with the least expensive option: restoring the state's woodlands, grasslands and wetlands and turning them back into "carbon sinks." Removing diseased timber in the state's drought-ridden forests could reduce the size and amount of carbon dioxide emitted during wildfires and be converted down the line into biofuels.

Renewable Fuel from Farm, Forest and Sewage Waste

The most effective approach would require turning the 56 million dry tons produced each year from trash, farming waste, fire prevention, and sewage into various types of renewable fuels. The flux of clean fuel created from reprocessing this waste would reduce the state's need for fossil fuels. However, the conversion process is the most expensive of the possible strategies, and would require new infrastructure as well as a reliable source of biomass.

Direct Air Capture

Finally, the scientists recommend a carbon-reduction technique known as direct air capture, in which machines remove carbon dioxide directly from the atmosphere and store it thousands of feet under-

ground. Places like the Salton Sea and the Central Valley could be prime candidates for this scale of carbon storage.

Challenges from a Lack of Infrasture

Potential implementation hurdles include finding ways to transport the biofuels and carbon dioxide and building the necessary processing facilities. The plans would require navigating California's complex permitting and regulatory framework and would need to be funded in part by taxpayers. Additionally, concerns have been raised about the location of potential processing plants, which some officials worry would be built in or near disadvantaged communities already suffering from poor air quality. Peridas testified that the plants would not harm air quality, as they would be state-of-the-art and eventually reduce the amount of fossil fuels burned on freeways and roads.

Conclusion and Implications

When Governor Brown announced the goal of carbon neutrality by 2045, it was hailed as the most ambitious response to climate change yet by one of the world's largest economies. Yet there has been pervading skepticism of whether the goal was realistic and how it could be reached. The oversight hearing has provided a variety of paths forward which could result in meeting the carbon neutrality goal. Perhaps as crucial, however, is the size of the price tag needed to get the state across the finish line. Given the (relatively) small cost associated with these plans, carbon neutrality by 2045 seems more achievable than ever, provided the state takes action to carry out these plans in the near term. The Getting to Neutral report is accessible online at: https://www.llnl.gov/news/new-lab-report-outlines-ways-california-could-reach-goal-becoming-carbon-neutral-2045
(Jordan Ferguson)

UNIVERSITY REPORT OUT OF AUSTRALIA ADDRESSES THE EFFICACY OF FOREST HAZARD REDUCTION BURNING IN FOREST MANAGEMENT PRACTICES

Forest hazard reduction burning had little to no effect in slowing the most severe fires devastating Australia over the past few months, a new study has found. Initial results indicate hazard reduction is best used in a targeted way around assets to help protect them from less intense fires.

Background

Hazard reduction burning, also known as a controlled burn, involves fires set intentionally for purposes of forest management, agricultural management, habitat restoration or greenhouse gas abatement. In recent years, wild fires in California and around the world have lead to claims by politicians and public officials that regional governments should substantially increase hazard reduction burning in order to reduce the risks of massive wildfires going forward.

The conversation over efficacy of controlled burns has been most relevant in recent months in Australia, where severe wildfires have devastated much of New South Wales in the last few months. State leaders there have called for hazard reduction burning to meet a target as high as 5 percent of land each year. The Prime Minister, Scott Morrison, has indicated he may introduce national standards that would report on how much hazard reduction the states carry out each year.

Yet forest scientists from the University of Melbourne said initial results suggest that hazard reduction is best used in a more limited fashion, targeted around assets needed protection from less intense fires.

The University of Melbourne Study

The University of Melbourne used Rural Fire Service data to compare the size and severity of this season's bushfires area with areas using hazard reduction burns over the past five years. The majority of the area in which there had been prescribed burning had been razed again by bushfire in the past three months. One of the authors indicated that controlled burns did not seem to have done much at all in many areas devastated by recent fires.

The fire that raged along the south coast of New South Wales over the last few months scored 3.95 out

of 4 on a severity scale, despite recent hazard reduction burns in the area, some of which scored up to 3.8. In spite of those burns, virtually the whole area was set ablaze in the recent fires.

Hazard Reduction Burning Most Effective as Part of a Risk-Based System

The analysis suggests there is a time and place for controlled burns, and prescribed burning was likely to have helped save property in areas on the fringe of major fires or where the flames were less severe. The study indicated that hazard reduction burning is most effective when used as part of a risk-based system designed to help protect chosen assets—human life, biodiversity, property and water reserves—rather than based on an arbitrary numeric target of controlled burn areas. The study also suggested a 5 percent annual target risked leading to swathes of remote landscape being burned without any significant reduction in the risk to assets. Hazard reduction burning also risks catastrophic impacts to native animals and plants.

Other studies have determined that the climate crisis has exacerbated fire risks and reduced the window each year in which hazard reduction burning can be safely carried out. The increased threat demands both greater resources to fight fires and urgent action to reduce emissions.

The study concludes that higher temperatures, drier fuel, and stronger winds are increasingly making it unsafe to burn in the autumn and spring, but that a risk-based approach using sophisticated modelling is likely to be more effective than a specific target for the size of controlled burns.

Has Severe Drought Made It a Less Effective Technique?

Not everyone is on board with just how effective controlled burns can be. As reported by the *BBC*, a professor from the University of Swansea sees the efficacy of controlled burns greatly diminished in areas suffering from severe drought:

> Swansea University professor Stefan Doerr, an expert in wildfires, believes the practice is less effective than it used to be because of the more extreme weather Australia has started to experience. 'It can make a difference for a few years, but I'm doubtful it would make a difference in the current extreme drought conditions.' (https://www.bbc.com/news/world-australia-51020384)

Conclusion and Implications

Controlled burns have become a regular part of the conversation around strategies for stemming increasingly dangerous and widespread wild fires. The devasting fires that have occurred in California in recent years have challenged the state to come up with better solutions, including more use of controlled burns. While hazard reduction burning has its place in efforts to reduce destruction relating to fires, its efficacy must be evaluated further to determine how large a role it should play in efforts to prevent future fires. Australia in 2019 experienced unprecedented fires stemming from long-term severe drought. Lessons learned from Australia can certainly be of use to areas in the United States West were drought and forest fires are becoming quite common.
(Jordan Ferguson)

CLIMATE CHANGE SCIENCE

RECENT SCIENTIFIC STUDIES ON CLIMATE CHANGE

Discrepancy of Estimates of HFC-23 Suggest Hidden Sources

Hydrofluorocarbons (HFCs) are gases that replaced chlorofluorocarbons (CFCs) when it was discovered that CFCs were contributing to the formation of the ozone hole. HFCs were initially seen as a safer alternative to CFCs, but they have since been shown to have major climate warming potential. There are many individual molecules that fall under the HFC umbrella; the most potent climate warming HFC is HFC-23. HFC-23 is particularly dangerous for climate change because it has a high radiative efficiency, meaning it can absorb and re-release large amounts of heat, and it has a long atmospheric lifetime, which means it takes a long time for an individual molecule to leave the atmosphere.

HFCs have been regulated as part of the Kyoto Protocol—the United Nations Framework Convention on Climate Change agreement—as well as the Kigali Amendments of the Montreal Protocol—the global agreement on stopping the ozone hole. From these agreements came international commitments to reduce or eliminate HFCs, particularly HFC-23.

A collaboration led by scientists out of the University of Bristol set out to verify if the commitments being made by various countries were being upheld. To do this, they approach the HFC-23 global concentrations from both the bottom-up and from the top-down. In their bottom-up approach, they aggregate all reported sources of emissions of HFC-23 and estimate what emissions would be given common emission factors and reported production rates. For the top-down approach, they collect data from the Advanced Global Atmospheric Gases Experiment (AGAGE) network of greenhouse gas atmospheric samplers. When they combine the bottom-up approach with atmospheric modeling to estimate global concentrations and compare that to the measured concentration, they find a large discrepancy: while the bottom-up estimates indicate that global emissions between 2014 and 2017 should have dropped by 87 percent, the measured estimates show that emissions have, in fact, increased. Based on their work, the scientists hypothesize that one of two scenarios is occurring: either the reductions reported for the last few years have not yet been implemented or there are significant sources of unreported emissions.

Beyond the critical importance of reducing HFC-23, this study is important because it proposes an effective method of verifying emissions inventories. If the global community is to combat increasing greenhouse gases in the atmosphere, the international science community will need to be able to verify that various programs are working as projected and identify any previously unknown or unreported sources.

See: Stanley, K.M., Say, D., Mühle, J. *et al.* Increase in global emissions of HFC-23 despite near-total expected reductions. Nat Commun 11, 397 (2020). https://doi.org/10.1038/s41467-019-13899-4

Impact of Climate Change on the Ability of Soils to Suppress Crop Diseases

Climate change poses numerous threats to food production. Temperature extremes, droughts, and flooding all make it more difficult to cultivate crops and maintain global food security. It has been hypothesized that rising temperatures will detrimentally affect soil health, specifically with respect to suppressiveness (meaning the ability of soils to suppress plant diseases). Other factors that affect soil suppressiveness include soil pH, moisture content, clay content, and competition between the different types of microorganisms living in the soil.

In a recent study published in Applied Soil Ecology by Döring *et al.*, the effect of heat and drought stress on soils from different geographic regions was investigated using a pea plant and the fungal pathogen *Pythium ultimum* as a model system. *Pythium ultimum* affects not only the pea plant, but also corn, soybean, potato, and wheat crops by causing root rot diseases, and thus it has the potential to cause significant damage to the agricultural industry. The researchers used soil samples from Eastern Scotland, North-Eastern Germany, and Eastern Hungary to rep-

resent a range of European climates. To ensure high quality soil with stable properties, they obtained these samples from long-term field trial sites.

First, they compared the ability of the soils to suppress the *Pythium ultimum* when the soils were inoculated with different concentrations of the pathogen. To evaluate the suppressiveness, they used pea mortality as a metric. The soil from Hungary had the lowest pea mortality rate. The second experiment tested the tolerance and resilience of the soils when subjected to combined heat and drought stress. Prior to inoculating the soils with the pathogen, the researchers subjected the soils to 40°C (104°F) heat (compared to the control of 15°C (59°F)) and ~50 percent moisture content using climate-controlled chambers for four days. 21 days after sowing the pea plant seeds, the proportion of diseased peas were counted. The Scottish soils showed the poorest response to heat and drought stress compared to the German and Hungarian soils.

The researchers hypothesized that the soils responded differently to the pathogen and stress tests perhaps due to the different composition of the soil microbial communities. For instance, it is possible that the Hungarian soil had lower mortality than the Scottish soil due to previous adaptation to higher temperatures (as the site is in a slightly warmer climate than the Scottish and German sites). The researchers further suggested that soils from colder climates (such as Scotland) may be more dramatically affected by rising temperatures, leaving the plants more susceptible to pathogens unless the soil can adapt over the long term. Finally, the researchers acknowledged that their experiments were conducted under artificial conditions, and the full picture of climate change, soil suppressiveness, and plant disease cannot be understood without conducting field experiments. In addition to testing the validity of these experiments in the field, further research should be conducted in a more diverse range of ecological environments and climates to capture the ultimate global impact on crops.

See: Thomas F. Döring, Dagmar Rosslenbroich, Christian Giese, Miriam Athmann, Christine Watson, Imre Vágó, János Kátai, Magdolna Tállai, Christian Bruns. Disease suppressive soils vary in resilience to stress. *Applied Soil Ecology*, 2020; 149: 103482. https://doi.org/10.1016/j.apsoil.2019.103482

Climate Change and the Decline of Bumble Bees

Biodiversity around the globe is threatened by rising temperatures caused by climate change, as ecosystems that once provided ideal habitats are becoming significantly altered. Predicting which species will be affected by these changes, and to what extent, is a complex challenge. As ecosystems become unsuitable for certain species, those very changes become suitable for a different species. As the risk of environmental conditions becoming unfavorable for a certain species in habitats around the world increases, the risk of local extinction for that species increases as well. A recent study prepared for Science by Soroye et al. aims to explore the relationship between climate change and bumble bee populations.

Climate change introduces variability in temperatures and precipitation patterns, which poses risks to bumble bee populations by increasing the frequency at which the bees are exposed to environmental conditions that exceed their tolerances. Temperature and precipitation directly impact bumble bee mortality, as well as indirectly through changes to floral resources. Soroye et al. use a detection-corrected occupancy model to analyze a database of roughly 550,000 georeferenced records of 66 bumble bee species. Records were split into two categories, where baseline represents the years 1901 through 1974, and recent period represents the years 2000—2014. Using these data, Soroye et al. were able to compare the generated detection-corrected estimates of changes in populations between the two periods along with changes in temperature and precipitation.

The analysis resulted in evidence of a widespread decline in bumble bee populations across Europe and North America. Relative to the baseline period, the probability of bumble bee presence declined by an average of 46 percent and 17 percent in North America and Europe, respectively. These declines are closely related to the frequency and extent to which environmental conditions exceed bumble bee tolerances. In particular, temperature tended to play the most influential role. The model showed that the probability of bumble bee presence in regions that were previously occupied decreased when temperatures rose above the species' limits, whereas warming in regions that were previously too cold for bumble bees experienced an increase in the probability of occupancy. However,

overall rates of climate-change related local extinction exceeded the rates of colonization. Precipitation played a small role in impacting the probability of occupancy, where declines in bumble bee populations were more likely in sites that experienced drier conditions.

Understanding the relationship between changing environmental conditions and the response of bumble bee populations will be imperative for designing effective conservation efforts. To reduce the risk of further bumble bee local extinctions due to climate change, habitats will need to be managed to decrease the frequency at which temperatures exceed the species' tolerances. While global warming contributes to the local extinction and colonization probabilities of bumble bees, anthropogenic impacts such as agricultural intensification, pesticide use, and pathogens also play a role.

See: Soroye, P., Newbold, T., & Kerr, J. (2020). Climate change contributes to widespread declines among bumble bees across continents. *Science*.

Climate Action Challenges for Nations

Countries around the world have developed targets for reducing emissions to minimize the effects of climate change. To develop targets and track progress, countries develop national greenhouse gas (GHG) inventories. Most countries follow the internationally accepted Intergovernmental Panel on Climate Change National GHG inventory guidelines (IPCC Guidelines), which were refined in 2019 for creating GHG inventories. The United Nations Framework Convention on Climate Change guidelines (UNFCCC Guidelines) also adopted the IPCC Guidelines to allow for consistency in tracking and reporting GHG emissions of member countries.

Researchers at Stanford University, the National University of Singapore, the Brazilian Institute of Space Research and Yale University evaluated the IPCC Guidelines to determine if the methodologies are consistent with current climate change science and beneficial for driving emissions reductions and progress towards minimizing the effects of climate change. To do this they reviewed the process for updating the IPCC Guidelines and the methodology choices that were made in the latest 2019 revisions.

The goal of the review was to determine the challenges of writing an expert-synthesized guidance document for reporting emissions inventories and to provide recommendations for improvement. The researchers found that the IPCC Guidance writing process relies too much on researcher experience and requirements for submitting research is too onerous to include current findings. They found that the reporting methodologies do not provide accurate methods for accounting for emissions from all countries, especially non-OECD countries that report following Tier 1 methodologies. Tier 1 methodologies are often out of date and mechanisms are not in place for updating these methodologies based on the latest scientific research.

To reform the IPCC Guidance process, the researchers proposed (1) updating the Tier 1 methodologies using new technologies (*e.g.*, machine learning, remote sensing, and satellite imagery) to be based on the best available guidance; and (2) using a Cochrane Collaboration approach. The Cochrane collaboration approach synthesizes the latest scientific research through submission of peer-reviewed data ad pre-publication, which represents the most recent scientific discoveries and provides for more robust methodologies for decision making.

See: Leehi Yona, Benjamin Cashore, Robert B. Jackson, Jean Ometto, Mark A. Bradford. Refining national greenhouse gas inventories. Ambio, 2020; https://doi.org/10.1007/s13280-019-01312-9
(Abby Kirchofer, Libby Koolik, Shaena Berlin Ulissi, Ashley Krueder)

REGULATORY DEVELOPMENTS

IN THE FACE OF ARID NEVADA WATER SCARCITY, THE STATE ENGINEER IS IMPLEMENTING MODERN-DAY METHODOLOGY TO DETERMINE WATER SUPPLY AND WATER RIGHTS ALLOCATIONS

In establishing the pre-statutory water duty for irrigation in two recent adjudications, the Nevada State Engineer deviated from a century of judicial decrees to use, for the first time, current consumptive use estimates from a 2010 study conducted by the Nevada Division of Water Resources. Although the study indicates that this data is "more representative of expected future conditions than prior periods," and the State Engineer acknowledged that the amount of water granted in an adjudication should represent historical usage, the State Engineer nevertheless used this modern data as a basis for fixing water duties for vested rights. By doing so, the State Engineer has called into question what information should be referenced in the adjudication process.

Nevada's Adjudication Process

Like other Western states, Nevada recognizes water rights that vested prior to the enactment of the State's statutory water law. The statute specifically provides that "[n]othing contained in this chapter shall impair the vested right of any person to the use of water…." NRS 533.085. To determine the relative pre-statutory rights to use water from a source, the State Engineer conducts a general adjudication. An adjudication is a forensic inquiry of historical uses, involving field investigations, review of old records, interviews with those who have personal knowledge of long-time ranch operations, surveying and mapping of pre-statutory points of diversion and places of use.

The claimant files its claims of pre-statutory use with the State Engineer, who issues a preliminary order of determination and provides the opportunity for the filing of objections. The State Engineer then holds a hearing on objections and issues a final order of determination, which gets filed in the district court for the county in which the water source is located.

The state District Court hears exceptions to the final order and may consider additional evidence, after which it enters a final decree. Numerous Nevada water sources have been adjudicated in this manner. There are also federal decrees that adjudicate the respective rights to waters of several interstate rivers that flow into Nevada.

Duty Determinations in Nevada Water Decrees

A decree must fix the duty of water for each manner of use. Duty is the measure of water that is reasonably required on any given tract of land to maximize production without creating waste. Duty is generally measured in acre-feet per acre.

Historically, when determining such duties, the State Engineer has accounted for numerous parameters, which include: 1) wetting of the ditch that conveys the water; 2) ditch bank storage; 3) evaporative losses; 4) hydraulic head to push the water across the field; 5) secondary artificial ground water recharge; 6) plant consumption; 7) tail water/return flow; and 8) leaching of salts from the soil. In considering these parameters, courts issuing decrees have considered soil type, slope of the land, season and climate, type of crop and the method of irrigation used. The variability in conditions makes it difficult for courts to apply standard duties.

The location of measurement affects which of these parameters must be accounted for in the decreed duty. Some decrees, for example for the Truckee River, measure the duty at the field after transportation losses. Other decrees, for example for the Carson River, measure duties at both the diversion from the river to the canal and the point of delivery to the land, depending on the location of the land being served. The duties set in the Franktown Creek decree account for considerable sub-irrigation conditions. Depending on the type of culture and the location of measurement, duties can be highly variable from decree to decree.

Nevada State Engineer's Efforts to Gather Consumptive Use Data

In 2010, the Nevada Division of Water Resources issued a report entitled *Evapotranspiration and Net Irrigation Water Requirements for Nevada* (2010 Report). The 2010 Report estimated crop evapotranspiration and net irrigation water requirements for various crop types for each hydrographic basin in Nevada. Net irrigation water requirements (NIWR) is:

> . . .the amount of water necessary to supplement rainfall in a given region to grow a full yield of an irrigated crop under pristine crop conditions and a full supply of water without waste, or non-beneficial use, of water. Diamond Valley Adjudication, *Final Order of Determination* (Jan. 31, 2020).

The estimates were derived from the most recent 30 years of weather data where available. In basins that lacked weather stations, spatial interpolation was used to derive evapotranspiration (ET) and NIWR estimates. The objective of the 2010 Report was to update estimates of actual ET and NIWR statewide, which could assist resource agencies to evaluate irrigation development, transfers of irrigation water to municipal uses and litigation of water right applications and protests.

Use of NIWR to Establish Historical Water Duties

When determining the duty of a post-statutory permitted irrigation right, the State Engineer has an obligation to consider the local irrigation requirements; the duty established by local court decree "or by experimental work in such area"; the growing season, type of culture, and reasonable transportation losses"; and "any other pertinent data deemed necessary to arrive at the reasonable duty of water." NRS 533.070(2). Other than the obligation not to impair vested rights, there is no similar guideline for the State Engineer to set the allowable duty of a pre-statutory water appropriation.

In two recent adjudications, the State Engineer employed NIWR as the basis of establishing the water duties associated with vested rights. In the Diamond Valley adjudication, the State Engineer took 2.5 acre-feet per acre (the NIWR for alfalfa estimated in the 2010 Report) and added 0.5 acre-foot per acre for "conveyance losses" to come up with a 3.0 acre-feet per acre duty for all harvest crops. In the Cold Spring adjudication, the State Engineer took the NIWR value estimated in the 2010 Report and added 10 percent "transportation loss" to establish a 3.5 acre-feet per acre duty for harvest crops.

The orders in each adjudication are silent as to how the conveyance/transportation loss number was arrived at. The State Engineer also did not explain whether the various parameters that go into a duty are accounted for in this conveyance/transportation loss number. Nevertheless, in both adjudications, the State Engineer asserted that "[t]he amount of water herein granted in this adjudication represents the historical use prior to the statutory water law from the water sources."

Incongruously, these duties are lower than those that are allowed in the oldest water permits for each basin. For example, the earliest post-statutory permits issued in Diamond Valley establish a 4 acre-feet per acre duty for irrigation. In Cold Spring Valley, the earliest post-statutory permit allows 4.53 acre-feet per acre of harvest crop. This leads to the odd result that the earlier priority vested rights have a lower duty than later priority statutory permits.

Conclusion and Implications

Using recent data to estimate historical use is fraught with challenges. While current estimates of NIWR may be an appropriate starting point for determining the consumptive use component of a water duty, there are numerous other parameters that must be considered. Modern irrigation practices are more efficient than those employed by early settlers. Because an adjudication should look at the practices that were in place at the time the water was first diverted and placed to beneficial use, a more thorough discussion of historical conveyances and application methods may be warranted to determine whether NIWR plus the conveyance loss set by the State Engineer accurately reflects what was done in the past. Without this exercise, there is no assurance that vested rights have not been impaired.
(Debbie Leonard)

PENALTIES & SANCTIONS

RECENT INVESTIGATIONS, SETTLEMENTS, PENALTIES AND SANCTIONS

Editor's Note: Complaints and indictments discussed below are merely allegations unless or until they are proven in a court of law of competent jurisdiction. All accused are presumed innocent until convicted or judged liable. Most settlements are subject to a public comment period.

Due to the recent federal government shut down, many of the agencies who report on Clean Water Act civil and criminal enforcement actions have been silent resulting in a smaller than usual number of summaries below.

Civil Enforcement Actions and Settlements—Air Quality

•January 27, 2020 - The U.S. Environmental Protection Agency (EPA) has reached a settlement with Frontier Ag Inc. to resolve alleged violations of federal Clean Air Act (CAA) regulations. The settlement includes three ammonia fertilizer facilities owned by the company in Kansas, two in Bird City and one in Menlo. At the time of EPA inspections in June and October 2018, each facility contained over 10,000 pounds of anhydrous ammonia, making them subject to Risk Management Program regulations intended to protect communities from accidental releases of hazardous substances. Anhydrous ammonia presents a significant health hazard because it is corrosive to the skin, eyes and lungs. Exposure may result in injury or death. During the inspections, EPA determined that Frontier Ag Inc. failed to submit, implement and update risk management plans for the release of anhydrous ammonia; failed to ensure that the facilities' processes for handling anhydrous ammonia were designed in compliance with good engineering practices; failed to perform required tests and inspect processing equipment at the facilities; and failed to update required documentation. In response to the inspection findings, Frontier Ag Inc. took the necessary steps to return all three facilities to compliance. Under the terms of the settlement, Frontier Ag Inc. has agreed to pay a civil penalty of $71,652. In addition to achieving regulatory compliance, the company also agreed to complete a project designed to enhance safety at six of its ammonia fertilizer facilities by installing emergency shutoff valves and emergency stop buttons. Frontier Ag Inc. estimates the project will cost at least $55,000. EPA has found that many regulated facilities are not adequately managing the risks they pose or ensuring the safety of their facilities in a way that is sufficient to protect surrounding communities. Approximately 150 catastrophic accidents occur per year among the universe of regulated facilities. These accidents result in fatalities, injuries, significant property damage, evacuations, sheltering in place, or environmental damage. Many more accidents with lesser effects also occur, demonstrating a clear risk posed by these facilities. Reducing risks from accidental releases of hazardous substances at industrial and chemical facilities is a top priority for EPA. EPA identified this goal as one of seven National Compliance Initiatives in 2019.

•January 30, 2020 - The EPA, Department of Justice and the state of California announced a settlement with Kohler Co. (Kohler) resolving alleged violations of the Clean Air Act and California law. Under the terms of the settlement, Kohler will retire unlawfully generated hydrocarbon (HC) and oxides of nitrogen (NOx) emission credits. Retirement of these credits will result in approximately 3,600 tons of HC and NOx emissions reductions. In addition, the company will pay a $20 million civil penalty. The violations pertain to Kohler's manufacture and sale of millions of small, nonroad, nonhandheld spark-ignition (small SI) engines that did not conform to the certification applications Kohler was required to submit to the EPA and the California Air Resources Board (CARB). More than 144,000 of the engines were also equipped with a fueling strategy designed to cheat emissions testing standards (commonly referred to as a "defeat device"). Small SI engines are used in lawn mowers, ride-on mowers, commercial landscaping equipment, and generators. In December 2015, Kohler self-disclosed to EPA and the CARB that it had been using the wrong test cycle to test many of its small SI engines. EPA and CARB's subsequent

investigation revealed that millions of additional small SI engines were noncompliant. Examples of additional noncompliance that was discovered include:

Not fully complying with the test procedures Kohler certified to; Failing to comply with the applicable emission limits; Failing to age emission-related components for deterioration factor testing; Failing to disclose auxiliary emission control devices and adjustable parameters equipped on the engines; Making changes to production engines without amending the certification application covering those engines; and Failing to comply with the applicable production line testing requirements.

The defeat device Kohler developed and deployed on at least 144,000 electronic fuel-injected small SI engines significantly reduced NOx emissions during certification testing when compared to real-world operation (i.e., ran rich during certification testing but lean during in-use operation). The fueling strategy in the calibration was not disclosed in Kohler's certification applications and Kohler was aware that the fueling strategy was designed to reduce NOx emissions during certification testing even though the certification results were not representative of real-world operation. In addition to paying a $20 million civil penalty and retiring HC and NOx emission credits, Kohler has already taken the following steps to prevent future violations. The company has established an independent environmental regulatory compliance team, conducts annual compliance training for engine division employees, and maintains an employee code of conduct and an ethics helpline for employees to report noncompliance. Kohler estimates the compliance measures will cost approximately $3.7 million. In a separate settlement agreement resolving California-only claims, Kohler will pay an additional $200,000 civil penalty and will fund a program that will supply $1.8 million worth of solar-battery generators to low-income residents in California that live in areas subject to public safety power shutoffs to mitigate wildfire risk. The proposed settlements, lodged in the U.S. District Court for the Northern District of California, are subject to final court approval.

•February 10, 2020 - The EPA announced a settlement with the Guam Power Authority (GPA) and the Marianas Energy Company, L.L.C. (MEC) for violations of the Clean Air Act. These organizations operated residual oil-fired Electric Generating Units (EGUs) without emissions controls at the Piti and Cabras Power Plants. MEC is the former owner and current operator of the Piti Power Plant and is responsible for the violations at that facility. GPA, the current owner of both the Piti and Cabras Power Plants, is also responsible for the violations at both facilities. Older EGUs operating on residual fuel oil without emission control technology release hazardous air pollutants. The settlement will reduce emissions of hazardous air pollutants by approximately 39 tons per year. Additionally, the fuel switch required by the settlement will have an added benefit of lowering emissions of sulfur dioxide by approximately 12,500 tons per year in the Cabras—Piti area. This represents a 99 percent reduction in sulfur dioxide emissions. The settlement requires the organizations to: retrofit two Piti Engine Units by switching completely to ultra-low sulfur diesel fuel and installing emissions controls; retire and replace the Cabras Steam Units which have operated beyond their useful life; construct 100 megawatts of solar power generation; and construct a 40-megawatt energy storage system. In addition, GPA will pay a civil penalty of $400,000.

Civil Enforcement Actions and Settlements—Water Quality

•February 10, 2020 - The EPA has finalized a settlement with Airtech International, Inc. over Clean Water Act violations at its facility in Huntington Beach. Airtech International is a large-scale manufacturer of materials used in the aerospace, automotive, marine, and wind energy industries. The agreement requires the company to pay a $95,208 penalty for unauthorized industrial stormwater discharges between December 2014 and January 2019. Airtech International will also conduct five beach cleanup events and complete a habitat restoration project as part of the settlement. EPA partnered with the Santa Ana Regional Water Quality Control Board to inspect Airtech International's facility in 2018 and found the company failed to obtain a stormwater discharge permit from the California State Water Resources Control Board. Stormwater runoff from Airtech International discharges into Bolsa Chica Channel, which flows into the Bolsa Chica Ecological Reserve before entering the Pacific Ocean. EPA also found the facility failed to use best management practices—such as routinely sweeping paved surfaces

and covering areas where potential sources of pollution are stored—to reduce or eliminate pollutants in stormwater runoff. As part of the agreement, Airtech International will spend over $66,000 in 2020 to complete a Supplemental Environmental Project (SEP) to support restoration of the local marine environment. The SEP will include five beach cleanup events within Huntington Beach, an initiative to replenish native Olympia oyster shells in the Upper Newport Bay and a replanting of eelgrass to improve sustainability. Pollutants from industrial stormwater facilities, if not properly managed, can damage water quality and aquatic life. Stormwater runoff from composite tooling production facilities can include plastic resin pellets, oil, grease, and scrap metal. Federal regulations require that certain industrial facilities obtain National Pollutant Discharge Elimination System (NPDES) permits to control the discharge of pollutants in stormwater runoff into nearby water bodies. These facilities must develop and implement stormwater pollution prevention plans to prevent runoff from washing harmful pollutants into local water bodies.

Civil Enforcement Actions and Settlements—Chemical Regulation and Hazardous Waste

•January 21, 2020 - The EPA, the Justice Department and the state of Colorado announced a settlement with Denver-based K.P. Kauffman Company, Inc. (KPK) resolving alleged violations of the federal Clean Air Act and Colorado air quality regulations. The settlement, set forth in a consent decree lodged with the U.S. District Court for the District of Colorado, requires KPK to implement pollution control measures at 67 well production facilities—for a total estimated expenditure of $2.5 million. The company will also pay a $1 million civil penalty. The settlement resolves allegations made in an Oct. 5, 2018, complaint that KPK violated requirements to minimize volatile organic compound (VOC) emissions from its oil and natural gas production operations in the Denver-Julesburg Basin. VOCs are a key component in the formation of ground-level ozone, a pollutant that irritates the lungs, exacerbates diseases such as asthma, and can increase susceptibility to respiratory illnesses, such as pneumonia and bronchitis. The well production facilities covered by this settlement are in an area that does not meet National Ambient Air Quality Standards established under the Clean Air Act for ground-level ozone: the Denver Metro/Northern Front Range ozone nonattainment area. This action will contribute to the improvement of air quality in communities across the Front Range by reducing the emissions of VOCs that lead to the formation of ground-level ozone. This settlement covers 67 KPK oil and gas production facilities in Colorado's Denver-Julesburg Basin. As part of the agreement, KPK will implement measures to improve operation and maintenance practices and ensure the vapor control systems on its storage tanks are adequately designed and sized. The settlement also requires KPK to pay the United States and the state of Colorado a $1 million civil penalty, split evenly between the governments. The action is based on inspections of KPK operations conducted from 2013 to 2018 by EPA and the Colorado Department of Public Health and Environment, which found VOC emissions from many of KPK's storage tanks. Through these inspections and information requests, EPA and the state of Colorado identified alleged violations of Colorado's Regulation Number 7, including undersized vapor control systems and inadequate operation and maintenance practices. These alleged violations include federally enforceable requirements of Colorado's State Implementation Plan to improve air quality in the Denver Metro/Northern Front Range nonattainment area. This settlement represents the latest in a series of EPA and state actions to secure compliance and reduce emissions from oil and gas sources in the nonattainment area, including recent settlements with Noble Energy Inc. (2015), PDC Energy Inc. (2017), and HighPoint Operating Co. (2019). With this action, a total of 3,141 well production facilities in the area are now subject to compliance requirements mandated by joint federal/state consent decrees. In addition, when combined with state-issued compliance orders, 93 percent of production facilities with condensate storage tanks in the Denver ozone nonattainment area are currently subject to enhanced design or maintenance requirements, or both. The consent decree, lodged in the U.S. District Court for the District of Colorado, is subject to a 30-day public comment period and final court approval.

•February 10, 2020—The EPA announced that Citgo Petroleum Corp. and Oxy USA have agreed to investigate and address hazardous waste releases at the former Cities Service Refinery, 2500 E. Chicago Ave.,

East Chicago, Indiana. EPA's administrative orders on consent under the federal Resource Conservation and Recovery Act require the companies to determine the nature and extent of hazardous waste releases at the former refinery and tank terminal and clean up any releases that may pose a risk to human health or the environment. Since 1929, the former Cities Service Refinery site has gone through multiple owners and operational configurations. The northern portion of the site is the currently active Citgo petroleum terminal. The southern portion of the site remains vacant after refinery activities ceased in 1972, and the above-ground structures were razed in the 1980s.

•February 13, 2020 - The EPA, along with the Justice Department, announced the release of the Butte Priority Soils Operable Unit (BPSOU) consent decree. This document provides the framework for the continued cleanup of mining-related contamination to protect public health and the environment in Butte and Walkerville, Montana. The consent decree requires Atlantic Richfield to undertake or finance over $150 million in cleanup actions, provide financial assurances for future cleanup actions, and provide enhanced community benefits through the implementation of end land use plans along the Silver Bow Creek Corridor. Additionally, EPA Region 8 is releasing an amendment to the 2006 Record of Decision for the BPSOU that will expand cleanup efforts. The amendment will require the removal of contaminated tailings at the Northside and Diggings East Tailings areas as well as contaminated sediment and additional floodplain contamination from Silver Bow and Blacktail Creeks. The amendment will also require the treatment of more contaminated storm water before it flows into the creeks, and the capture and treatment of additional contaminated groundwater. Once executed by the parties and entered by the court, the consent decree will implement this amended remedy. The release of the consent decree will provide the commissioners of Butte Silver Bow County—who must approve the document before it can be submitted to the court—an opportunity to consider the document in a public forum. This process allows Butte Silver Bow County to inform and educate the public and the county commissioners about the content of the consent decree. Once that process concludes, the county commissioners will vote on whether to approve the document.

Indictments, Convictions, and Sentencing

•February 10, 2020 - Bernhard Schulte Shipmanagement (Singapore) PTE LTD. (Bernhard), a vessel operating company, pleaded guilty in federal court to one count of maintaining false and incomplete records relating to the discharge of bilge waste from the tank vessel Topaz Express, a felony violation of the Act to Prevent Pollution from Ships. U.S. District Judge Derrick K. Watson of the District of Hawaii accepted the guilty plea. Chief Engineer Skenda Reddy and vessel Second Engineer Padmanaban Samirajan previously pled guilty to their involvement in the offense. Under the terms of the plea agreement, Bernhard will pay a total fine of $1,750,000 and serve a 4-year term of probation. This is the largest fine ever imposed in the District of Hawaii for this type of offense. Bernhard further must implement a robust Environmental Compliance Plan, which applies to all 38 vessels operated by the company that call on U.S. ports. According to court documents and information presented in court, the defendants illegally dumped bilge waste from the Topaz Express directly into the ocean, without properly processing it through pollution prevention equipment. The defendants admitted that these illegal discharges were not recorded in the vessel's oil record book as required by law. Specifically, on three separate occasions between May and July 2019, Bernhard, acting through Chief Engineer Skenda Reddy and Second Engineer Padmanaban Samirajan, its employees, used a portable pneumatic pump and hose to bypass the ship's pollution prevention equipment and discharge bilge waste directly into the ocean. They then failed to record the improper overboard discharges in the vessel's oil record book. Additionally, during the U.S. Coast Guard's inspection of the Topaz Express, Reddy destroyed paper sounding sheets and altered a copy of the vessel's electronic sounding log, in an effort to conceal how much bilge waste had been discharged overboard without being processed through the vessel's pollution prevention equipment.
(Andre Monette)

JUDICIAL DEVELOPMENTS

CHALLENGE TO OIL POLLUTION ACT DEBT COLLECTION PROCEEDING DISMISSED BY THE DISTRICT COURT FOR IMPROPER VENUE

Water Quality Insurance Syndicate v. National Pollution Funds Center, ___F.Supp.3d___, Case No. 19 Civ. 6344 (S.D. N.Y. Jan. 27, 2020).

The U.S. District Court for the Southern District of New York recently dismissed a challenge to a debt incurred under the Oil Pollution Act because plaintiff filed the complaint in an improper venue. The ruling comes as a result of the court taking into consideration the specific venue provision in the Oil Pollution Act.

Factual and Procedural Background

The Water Quality Insurance Syndicate (WQIS) is a maritime insurer indebted to the United States and its National Pollution Funds Center (NPFC) for $57,243.39 in liabilities. The NPFC imposed liability on WQIS and Starr Indemnity and Liability Co. as Genesis Marine, LLC's (Genesis) pollution liability insurers.

Under the federal Oil Pollution Act (OPA), the federal government may impose a fine on corporations whose oil-carrying barges pose a substantial threat of discharge of oil. Here, the United States Coast Guard retrieved two barges owned by Genesis that ran aground in the Mississippi River in 2014. WQIS became liable for the fine amount after the United States Coast Guard determined that Genesis posed a substantial threat of discharge of oil under the OPA.

A 2018 trial in the District Court for the Southern District of New York (SDNY) did not find that Genesis' barges posed a substantial threat of discharge. Before the trial court issued a written decision, the NPFC informed WQIS that the Coast Guard had determined the barges posed a substantial risk of discharge. WQIS asked the NPFC to withdraw its demand for payment, leading the NPFC to open an administrative review. The review reaffirmed the NPFC's determination, leading WQIS to respond with the SDNY's affirmance that there was no substantial risk of discharge. Instead of reopening the administrative review, the NPFC referred the debt to the U.S. Department of Treasury.

WQIS filed a complaint in the SDNY, claiming that under the Administrative Procedure Act (APA), the NPFC was acting in an arbitrary and capricious manner by seeking to impose the debt because the NPFC failed to consider the SDNY's 2018 trial determination.

The NPFC moved to dismiss the action improper venue.

The District Court's Decision

OPA Venue Provision

The OPA creates a comprehensive federal plan for handling oil spill responses, including a system for prescribing reimbursement for cleanup costs. Accordingly, the OPA establishes the Oil Spill Liability Trust Find, available to pay oil-spill removal costs incurred by federal authorities. The OPA tasks the NPFC with adjudicating claims to the fund to determine uncompensated removal costs, including responses to substantial threats of a discharge from an oil vessel. If a claim becomes delinquent, the NPFC may refer unpaid debt to the Treasury Department for debt collection.

The OPA states that venue "shall be any district" in which the damages occurred, where defendant designates an agent for service, or where the defendant resides. The venue provision also states that the NPFC resides in the District of Columbia. The provision does not provide for venue based on the residence of the party challenging a debt imposed by the NPFC. Therefore, the provision limited the venue to either the location of the damage in the Eastern District of Missouri, or the District of Columbia where the NPFC resides.

OPA and APA Venue Conflicts

First, WQIS argued that the general venue provision of the APA allowed it to bring an action in the SDNY. The court rejected this argument, reasoning that Congress enacted the APA to provide a general authorization for review of agency action in the district courts" and did not intend that general grant of jurisdiction to duplicate any special statutory procedures relating to specific agencies. The court determined that the general venue provision in the APA was not as specific as the one provided in the OPA and found that the OPA mandated an exclusive source of venue for OPA claims. The court also determined that Congress intended to restrict venues to specific districts where the discharge occurred or where the defendant resided. Therefore, because the OPA had a specific venue provision to deal with this matter, the APA did not apply.

WQIS next argued that it was not seeking damages from the NPFC under the OPA so the OPA did not apply. The court dismissed this argument on the grounds that the OPA applies to all controversies arising under the act. Accordingly, WQIS's bid for relief of debt owed to NPFC is an action arising out of the OPA.

WQIS then argued that because it is liable for Genesis' debt, and because it is found in the SDNY, that it is appropriate to use that district as the venue. The court found that WQIS is the plaintiff in this matter and that under the OPA, the venue is not determined by where the plaintiff resides.

Finally, WQIS argued that NPFC can be found in the SDNY if the co-defendant United States had assigned the United States Attorney for the District as an agent for the serving process. The court determined that even if the United States is implicated in the matter, the established venue remains where the NPFC resides because the issue arose from the OPA.

WQIS did not ask the court to transfer the case to an appropriate venue if it were to find that the SDNY was an inappropriate venue. Additionally, WQIS did not indicate a preference between the Eastern District of Missouri or the District of Columbia. Therefore, the court dismissed WQIS's case without prejudice with a one-week window to file to transfer the case to an appropriate venue.

Conclusion and Implications

This case clarifies the appropriate venue for OPA claims. While the APA contains a venue provision for the review of agency actions to district courts in general, the statutory requirement that OPA claims be tried in specific venues controls the issue. Parties bringing OPA claims must bring the claim to a venue permitted by the OPA.
(Marco Ornelas, Rebecca Andrews)

CALIFORNIA COURT OF APPEAL DISMISSES CEQA CHALLENGES AS TO GREENHOUSE GAS EMISSIONS ANALYSIS FOR FAILURE TO EXHAUST ADMINISTRATIVE REMEDIES

Golden State Environmental Justice Alliance v. City of Los Angeles, *Unpub.*, Case No. B294231 (2nd Dist. Jan. 28, 2020).

In an *unpublished* decision, the Second District Court of Appeal held that petitioner's failure to exhaust administrative remedies with respect to its theories of non-compliance with the California Environmental Quality Act (CEQA) (Pub. Resources Code, § 21000) precluded the court from considering petitioner's arguments on the merits.

Factual and Procedural History

In April 2016, the City of Los Angeles (City) released a draft Environmental Impact Report (EIR) for public comment for a 34-story residential building containing 376 dwelling units, on a 2.8-acre site in West Los Angeles (Project). The draft EIR concluded that the greenhouse gas (GHG) emissions associated with the Project would have a less than significant impact on climate change.

Petitioner submitted comments on the draft EIR. Specifically, petitioner commented that the draft EIR's GHG analysis was inadequate in five respects: 1) it compared the Project's GHG emissions to the prior use on the site; 2) it amortized construction emissions over the life of the Project; 3) it failed to adequately explain the basis for its conclusion that

the Project would result in a 16.5 percent reduction in emissions from mobile sources; 4) it double-counted some energy savings; and 5) it concluded that the Project would have less-than-significant GHG impacts because the Project complied with regulatory programs meant to reduce GHG emissions.

The City issued the final EIR, which was certified by the City's deputy advisory agency. Petitioner appealed the approval of the Project and certification of the EIR to the planning commission. On administrative appeal, petitioner contended that the EIR was inadequate because: 1) it miscalculated a reduction based on mobile sources; 2) calculated reductions based on the elimination of hearths and compliance with the "CalGREEN Code"; 3) assumed that the Project should be compared to AB 32 standards to determine a proper percentage reduction; and 4) failed to commit to using Energy Star appliances.

The City planning commission certified the EIR, denied petitioner's appeal, and granted other approvals for the Project. The city council subsequently certified the EIR and approved the Project.

Petitioner filed a petition for writ of mandate alleging, among other things, that the EIR did not comply with CEQA because the it failed to adequately address GHG impacts. The trial court denied the mandate petition with respect to GHG emissions. Petitioner appealed.

The Court of Appeal's Decision

On appeal, petitioner asserted three arguments: 1) the EIR erred by directly applying the state's 2030 and 2050 GHG emissions goals set forth in Executive Orders S-3-05 and B-30-15 to the Project; 2) substantial evidence did not support the EIR's conclusion that the Project would achieve the emission reduction goals set forth in the Executive Orders; and 3) the EIR was inadequate as an informational document with regard to compliance with 2030 and 2050 emission reduction goals. The City contended that petitioner failed to exhaust its administrative remedies because it did not assert in the administrative proceedings below the theories of CEQA noncompliance it raised on appeal. The Court of Appeal agreed.

Exhaustion of Administrative Remedies Doctrine

The court first walked through the requirement and rationale behind the "exhaustion of administrative remedies" doctrine. Requiring a project opponent to exhaust administrative remedies serves to allow the agency the opportunity to decide matters within its area of expertise prior to judicial review—and reduces the burden of an overworked court system. The court emphasized that to meet this purpose, the exact issue not merely generalized statements of environmental harm must be presented during the administrative proceedings. Furthermore, it is petitioner's burden to demonstrate that the issues raised in litigation were first raised at the administrative level.

Applying the exhaustion doctrine to this case, the court found that in contrast to petitioner's appellate arguments, which concerned the Project's compliance with the emissions reduction goals set forth in the Executive Order—petitioner's comments submitted during the administrative proceedings focused on other issues related to GHG emissions. The court rejected petitioner's argument that it had exhausted because its comments "specifically brought up" the Executive Orders. The court found that even though the comments cited to the Executive Orders they did not do so in reference to the GHG emissions reduction targets. Therefore, the court held that the comments were insufficient to exhaust petitioner's administrative remedies with regard to its appellate arguments.

The court further rejected petitioner's argument that citation to the Executive Orders was sufficient to put the City on notice of its claim that the emissions standards would not be met. In doing so, the court analogized this matter with *South of Market Community Action Network v. City and County of San Francisco*, 33 Cal.App.5th 321 (2019) and *Monterey Coastkeeper v. State Water Resources Control Bd.*, 28 Cal.App.5th 342 (2018), where commenters had raised general concerns about an impact area, but not the specific issues raised on appeal. Similar to those cases, here the petitioner commented on the EIR's failure to comply with the Executive Orders but did not raise the specific issue in front of the court—*i.e.*, failure to demonstrate compliance with GHG emissions reduction targets described in the Executive Orders.

Conclusion and Implications

As an *unpublished* opinion, this case holds no precedential value. It does, however, reinforce the importance of exhaustion of administrative remedies doctrine. Sometimes a court will find that an issue has not been properly exhausted but proceed to a decision

on the merits anyhow. Exhaustion, however, is a jurisdictional prerequisite. Failure to exhaust, therefore, may obviate a petitioner's day in court altogether. At the administrative level, it is prudent to include all issues in order to preserve any potential issues for litigation.

The court's decision is available online at: https://www.courts.ca.gov/opinions/nonpub/B294231.PDF (Christina Berglund])

WASHINGTON STATE SUPREME COURT INVALIDATES DEPARTMENT OF ECOLOGY RULE ON GREENHOUSE GAS EMISSIONS

Association of Washington Business, et al. v State of Washington, Department of Ecology, Case No. 95885-8 (Wash. Jan. 16, 2020).

In a narrow 5-4 decision, the Washington Supreme Court rejected the State Department of Ecology's (Ecology) attempt to reduce greenhouse gas emissions in Washington through emission standards on natural gas and petroleum product producers and importers as outside of the authority granted by the legislature. While the court declared man-made climate change real and recognized that dramatic steps are required, the court still ruled in favor of business interests finding that Ecology does not have the authority to reach back up the supply chain to set emission standards on those who distribute the means to emit but do not actually emit themselves.

Background

Washington adopted its own Clean Air Act in 1967 (CAA). Ch. 70.94 RCW. The CAA as amended seeks to protect air quality through regulation of outdoor air pollution. The CAA delegates authorities to the Department of Ecology and regional air pollution control entities. Over time, the emphasis moved from controlling air pollution to an increasing focus on greenhouse gas emissions with the adoption of the Limiting Greenhouse Gas Emissions Act (GGEA) in 2008. Ch. 70.235 RCW. Under the GGEA, Ecology was to develop a greenhouse gas reduction plan, and implement the plan but within the confines of existing statutory authority. Ecology finally adopted the Clean Air Rule in furtherance of the GGEA in 2016. Ch. 173-442 WAC. Those are the regulations under review in the case.

A large portion of the greenhouse gas emissions in Washington come from the burning of petroleum and natural gas for automobiles and other uses of fuels which are otherwise outside of the Ecology ability to regulate as direct emitters. Under the Clean Air Rule, Ecology established green house gas emission standards for: 1) certain stationary sources, e.g. direct emitters; 2) petroleum product producers and importers; and 3) natural gas distributors. WAC 173-442-010. For those required to reduce their emissions, the rule provides three major pathways: 1) by reducing the actual emissions (for direct emitters); 2) by "undertaking recognized projects, programs, or activities that reduce emissions in real, specific, quantifiable, permanent, and verifiable ways"; or 3) purchase emission reduction units from market sources. WAC 173-442-110. Since the fuel and gas entities regulated by this rule are not direct emitters, they are limited to either undertaking projects elsewhere to offset the emissions cause by their products or buying credits from projects funded elsewhere.

Procedural History

Ecology adopted the rule in question in 2016. Consolidated petitions were filed by the Association of Washington Business together with several other trade organizations and by several natural gas distributers, seeking review of the rule under the Administrative Procedure Act as outside Ecology's authority. The Washington Environmental Council and other environmental groups filed for intervener status. The trial court ruled Ecology acted outside its authority and invalidated the rule as whole. The Washington Supreme Court granted direct review. Also invalidating the rule as it applies to those entities which are not direct emitters but allowing the rule to stand as against stationary sources.

The Supreme Court's Decision

Despite the sweeping directive address man-made climate change through development of a greenhouse gas reduction plan, the legislature has repeatedly failed to adopt any form of a cap and trade legislation which would have expressly authorized Ecology to regulate indirect emitters. This left Ecology with the authority to regulate emissions through the adoption of emission standards, but according to the court, those emission standards can only be applied against those who actually emit air pollutants. In focusing on who Ecology may regulate (direct emitters) instead of what Ecology may regulate (greenhouse gas emissions), the Court found Ecology's rule as it applies to indirect emitters to be outside the authority granted by the legislature. The Court reached this conclusion by determining that an "emission standards" is the same as an "emission limitation", and that a limitation can only be applied again those who are emitting, not those that control the means to emit. According to the court,

> [f]orcing businesses to internalize the environmental costs of their customers' actions may indirectly help limit the aggregate concentrations of greenhouse gases in the atmosphere, but it does not actually regulate the release of those contaminants.

Conclusion and Implications

The narrow decision leaves the Washington State Department of Ecology with limited means to lower emissions generally through offsets and places greater emphasis on direct emitters, which provides fewer of the inputs but without additional legislation, may now be subject to greater restrictions. Ecology's rule was an attempt to reach upstream in the supply chain though regulation of the fuel sources, costs which would be passed to those using the fuels, and which were expected to provide greater benefits. With the Court's rejection of Ecology's attempt to reach direct emitters in this manner, the goals laid out in the 2008 Act will be further delayed putting the play back in the lap of the legislature to revisit. The Court's decision also demonstrates a willingness on the Court's part to intervene in review of Ecology's rulemaking authority.
(Jamie Morin)

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