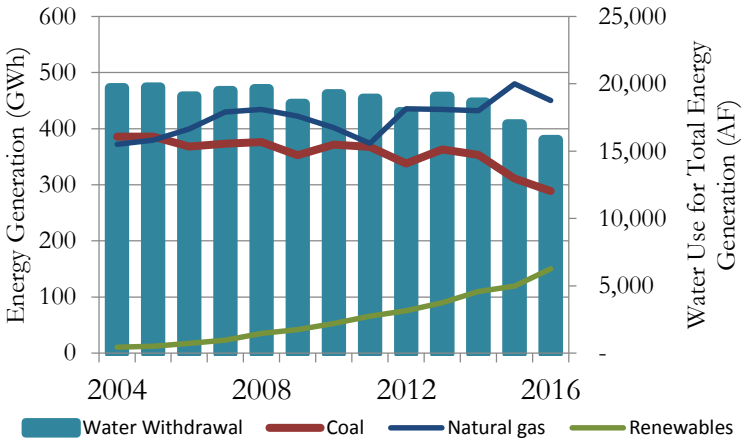
Securing Water Rights from Decommissioning Coal Plants for Instream Flows in the Western U.S.

Vivon Crawford | Chris Schmuckal | Gokce Sencan | Erica Slowik | Alina Werth
Faculty Advisor: James Salzman | Spring 2018

INTRODUCTION

COAL & WATER IN THE WEST

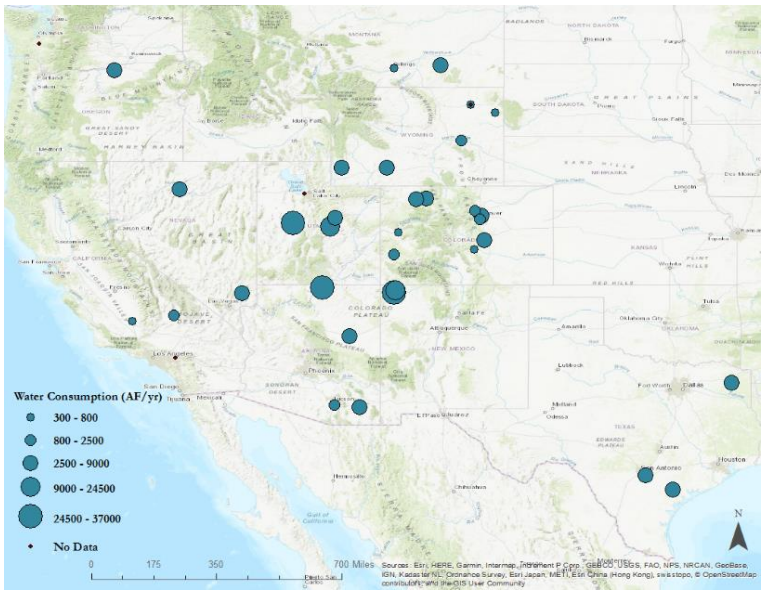
Since its peak in 2004, coal energy production has declined notably in the western U.S. The trend is driven primarily by competition with natural gas and renewable energy sources, as well as increased compliance costs associated with environmental regulations.



Coal energy production requires a substantial amount water. Depending on the cooling technology, a coal plant may divert as much as 250 acre-feet of water (AF)/megawatt (MW), up to 10 AF/MW of which is used consumptively.[1] In comparison, only 75 AF/MW is diverted for natural gas energy production, of which fewer than 6 AF/MW is used consumptively.[1] Renewable energy production requires little to no water.

Acre-foot (AF): a volume of water one acre in area and one foot in depth.

Consumptive Use: an amount of water that is consumed (e.g., lost to evaporation) and not returned to the system (e.g., river).



Past and projected coal plant retirements in the west (2015-2035).

SIGNIFICANCE

More than 35 coal plants will retire throughout the west by 2035. This means that nearly two million AF of water—approximately 13% of water use for total energy production currently in the west—will become available. The decline in coal energy production creates a unique opportunity for The Nature Conservancy (TNC) to reallocate water to the environment. Our team, InstreamImpact, developed an approach to analyze the financial costs and environmental benefits associated with acquiring these water rights.

APPROACH

What assets does the plant have?

Compile site-specific data on the coal plant's water right, which dictates their water withdrawals and consumption, and evaluate existing storage and diversion infrastructure.

How will this help the environment?

Determine the relative increase in instream flows and assess species that benefit from a larger quantity and higher quality of water in the stream.

How will the acquisition be financed?

Assess the implications of acquiring the water rights by: 1) private donations and public grant funding, and (2) impact investing, in which a portion of the water is leased to other users to generate a return on investment (ROI).

KEY FINDINGS: COLETO CREEK POWER PLANT

PLANT ASSETS

Coleto Creek Power Plant is a 600 MW facility located in southeast Texas that uses once-through cooling technology. The coal plant is located adjacent to the Coleto Creek Reservoir, which serves as both a cooling pond and recreation area. Coleto Creek Power, LP, which is owned by Vistra Energy and operates the plant owns, two water rights: 1) a diversion right and 2) an impoundment (or storage) right.

Water Rights

Owner: Coleto Creek Power, LP
Beneficial use: Power generation

Diversion Right: Water Supply

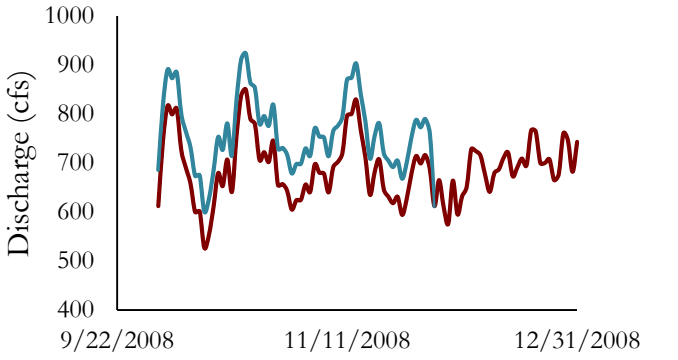
Diversion: 20,000 AF/yr
Consumptive use: 12,500 AF
Priority date: May 13, 1952

Impoundment Right: Water Storage

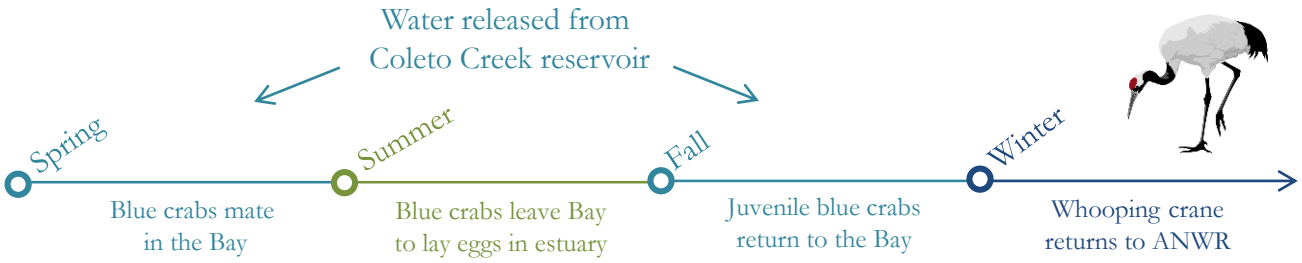
Max. storage: 35,000 AF
Min. Release: 5 cfs or min. inflow
Priority date: Jan. 7, 1977

ENVIRONMENTAL BENEFITS

Coleto Creek Power Plant is located 100 miles upstream of Aransas National Wildlife Refuge (ANWR), the last remaining natural habitat of the endangered whooping crane (*Grus americana*). Although the species only spends the winter months at ANWR, its survival depends on the life cycle of the blue crab. Coleto Creek's storage capacity allows for the release of freshwater to the Bay during spring and fall, when the blue crab needs it most.



Added flows to Coleto Creek during 2008 drought (60 days).



FINANCING OPTIONS

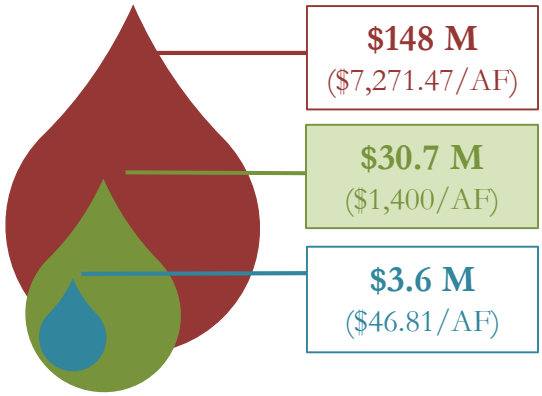
Donations & Grant Funding

In order to purchase the water rights held by Coleto Creek Power, LP, TNC can leverage a combination of federal/ state grants and private donations. Water transaction analysis reveals that the average purchase price for a water right in Texas is $1,400/AF, and ranges from $46.81/AF to $7,271.47/AF.

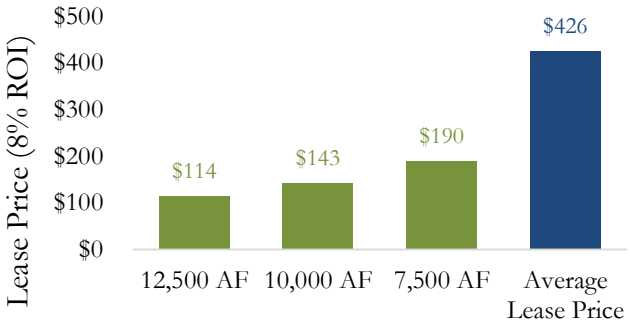
Impact Investing

TNC's Impact investing strategy uses investor funds to purchase the water right and leases a portion of that water to downstream users to generate 8% ROI, while providing environmental benefit. is another option to fund the acquisition. Sensitivity analyses reveal that TNC must lease water to downstream users between $114/AF and $190/AF, which is well below the regional average.

Total Purchase Price for 20,000 AF



Annual Lease Prices for 8% ROI



Annual lease prices for 8% ROI on $30.7 million (average) water right purchase, compared to regional average.

CONCLUSION

RECOMMENDATION

What assets does the plant have?

Coleto Creek owns a large diversion water right with a substantial amount of consumptive use. water for the environment and, perhaps most important, time the release of flows into the Guadalupe River.

How will this help the environment?

Flows released from Coleto Creek will benefit the endangered whooping crane population by supporting the freshwater needs essential to the survival of their primary food source, the blue crab.

How will the acquisition be financed?

TNC is advised to purchase the water rights held by Coleto Creek Power, LP by leveraging private donations and a combination of federal and state grant funding.

LESSONS LEARNED

Although there is no one-size-fits-all approach to evaluating a water right acquisition opportunity, several overarching themes can be extrapolated from the Coleto Creek case study to help inform future decision-making. First, state water law as well as the ownership structure, seniority, and consumptive use portion of the water rights held by retiring coal plants are key factors in determining the feasibility of a transaction. Second, adopting a holistic approach to assessing conservation benefits is critical. Third, not all water rights procurement opportunities will prove feasible, but there are legal, financial, and environmental characteristics that improve the likelihood of a transaction. Ultimately, TNC should continue to leverage its resources in novel opportunities that have a clear conservation objective and high potential to deliver results.

ACKNOWLEDGEMENTS

We would like to thank all those who supported us throughout this project. We are grateful to our client, The Nature Conservancy—especially Brian Richter (Sustainable Waters) and Charles Wight. We would also like to thank our faculty advisor, Jim Salzman, and our external faculty advisor, Bob Wilkinson.

To learn more about our project, visit **www.instreamimpact.weebly.com.**

References: 1. Averyt, K., J. Fisher, A. Huber-Lee, A. Lewis, J. Macknick, N. Madden, J. Rogers, and S. Tellinghuisen. 2011. Freshwater use by U.S. power plants: Electricity's thirst for a precious resource. A report of the Energy and Water in a Warming World initiative. Cambridge, MA: Union of Concerned Scientists. November