InstreamImpact

Securing Water Rights from Decommissioning Coal Plants for Instream Flows in the Western United States

Authors | Vivon Crawford, Chris Schmuckal, Gokce Sencan, Erica Slowik, Alina Werth

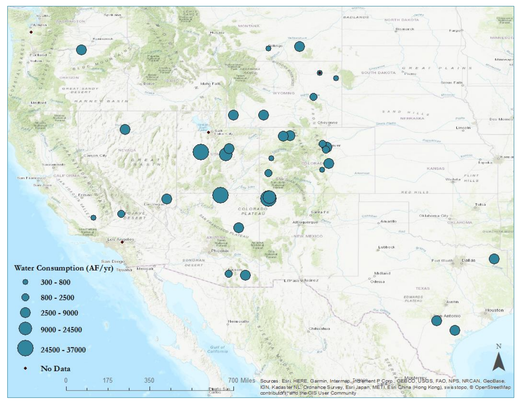
https://instreamimpact.weebly.com/

Advisors | Jim Salzman (Bren), Charles Wight (TNC)

1 PROJECT MOTIVATION

Coal energy production is declining in the United States due to the increasing cost-competitiveness of natural gas and renewable energy sources. Stringent environmental regulations enacted in recent years have also contributed to this trend. Importantly, coal energy production requires a significant amount of freshwater for operations, specifically cooling.

InstreamImpact spent the last year exploring the potential for our client, The Nature Conservancy (TNC), to reallocate water from retiring coal plants back to the environment—where it is often needed the most.



35 coal plants are scheduled to retire between 2015 and 2035 across the western U.S. The size of the circle corresponds to the volume of water used for energy production.

With a focus on the **western U.S.**, the project involved three main steps:

1. Identify retiring coal plants and research the laws that govern water transfers in western states
2. Develop an approach to (1) understand the key assets held by coal plants, (2) evaluate the potential environmental benefits, and (3) assess the implications of two financing strategies
3. Apply the approach to three retiring coal plants and create a guidance document summarizing relevant legal, environmental, and financial aspects of water right acquisitions from coal plants

2 OUR APPROACH

Identify Assets Owned by the Coal Plant

Compile site-specific data on water withdrawals and consumption for energy production processes, and evaluate existing storage and diversion infrastructure.

Analyze How TNC Ownership of Assets Can Benefit the Environment

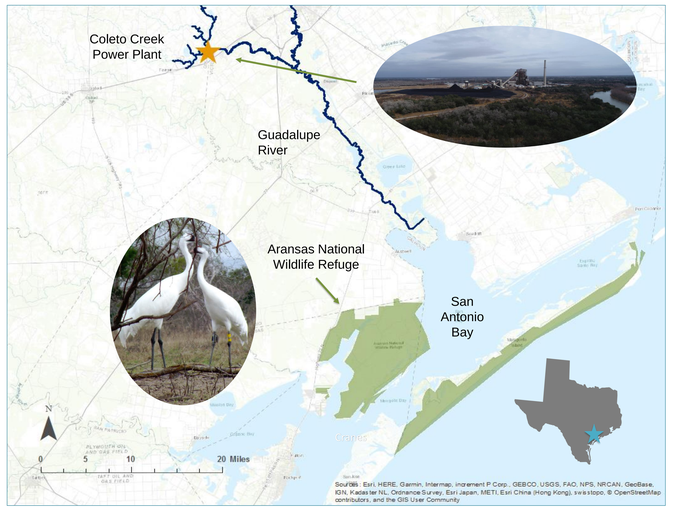
Determine the magnitude of increased streamflow and identify the potential impact of the additional water on local plant and animal species

Understand TNC's Options for Acquiring the Assets

Compare the implications of acquiring water rights under two financing strategies: (1) **donations and grants**, and (2) **impact investing**, in which a portion of the water is leased to other users to generate a return for investors

3 COLETO CREEK CASE STUDY

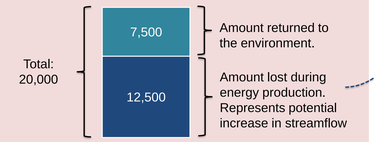
The approach was used to analyze Coleto Creek Power Plant, a coal plant in southeast Texas, which has a generating capacity of 600 MW. While the power plant does not have a scheduled retirement date, TNC is interested in the plant's water right because of its proximity to San Antonio Bay and the Aransas National Wildlife Refuge (ANWR), which is the wintering habitat of the highly endangered whooping crane *(Grus americana)* population.



The map shows the location of Coleto Creek Power Plant in Goliad Texas, which diverts water from the Guadalupe River. The Guadalupe River flows into San Antonio Bay and ANWR, where the endangered whooping crane winters.

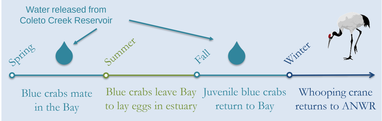
Coleto Creek Power Plant owns two assets valuable to TNC, including:

1. Annual Water Use (acre-feet/year):



2. Storage Capacity: max. 35,000 acre-feet

Reallocating the water lost during energy production to the environment can lower salinity levels in San Antonio Bay. Blue crabs, the primary food source of the whooping crane, benefit from low salinity levels during the spring and fall. Coleto Creek's storage capacity allows TNC to release water during this time.



Donations and Grant Funding

TNC can pursue a combination of private donations and federal/state grants to purchase water from Coleto Creek Power Plant. At an average purchase price of $1,400/acre-foot, the total acquisition cost is:

$30.4 M

Impact Investing

TNC can also pursue impact investing to fund the acquisition. The lease price required to ensure an 8% return on investment for different quantities of water is summarized in the figure below.

4 CONCLUSION

For TNC, the most important **assets** owned by the coal plant include:

1. The right to consume a large proportion of the total amount of water diverted from nearby streams or rivers
2. The infrastructure to store water, such as a reservoir or cooling pond

To maximize **environmental benefits**, TNC should prioritize coal plants that:

1. Are in close proximity to an endangered plant or animal species
2. Divert water from a smaller tributary rather than a main river

- **Donations and Grants** can be used to finance water acquisitions when the environmental benefit is located either upstream or downstream of the coal plant, even if spatially distant
- **Impact investing** is most viable when: (1) a coal plant is upstream from a high-value water user, such as a city, and (2) the environmental benefit is in close proximity downstream of the coal plant

5 NEXT STEPS

We recommend that TNC consider the following in future acquisition opportunities:

1. Impacts of altering coal plant infrastructure, such as removing dams or water diversion impediments
2. Improvements in water quality that may result from the reallocation of water back to the environment
3. Partnerships with energy companies that seek to donate their assets as a way to finance plant closures
4. Potential to capitalize on marginal water savings in cases of conversion to natural gas facilities

ACKNOWLEDGEMENTS

We would like to thank our client, The Nature Conservancy, for its generous support of this project, especially Charles Wight for his input and dedication. Additionally, we would like to thank Brian Richter of Sustainable Waters for his invaluable expertise. A special thanks to Jim Salzman, our advisor, along with Bob Wilkinson, our external advisor, and all the other individuals who supported this project along the way.