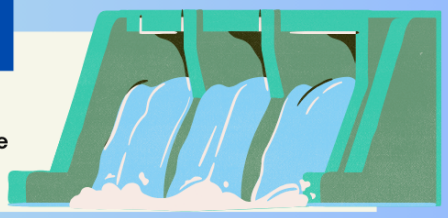
Does Income Effect dam removal prospects?

inspired by the success of the tribally driven Klamath River Dam Removal of 2024, we investigated a less obvious, but commonly cited stakeholder effect in dam removal- the income of those living around dam-formed water sources.



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Introduction

- One of the most heavily researched correlations in dam removal is the industrial/agricultural use of water, which is straightforward.
- We wanted to explore lesser known correlations.
- Dams and their removals are highly unique situations, with highly varying effects on the water body and on the nearby population.
- As our background education on news reports and research papers suggests that some dam removal projects are highly resisted by the local populace if that populace owns valuable property along a dam-formed lake.
- Because data is not readily available on changes in property values before and after dam removal, we seek to explore a wealth to opposition relationship via income because this should not be affected by the valuation change of properties after removal.

Objective

Identify income surrounding dams to see if dam removal and nearby income are correlated.

Methodology

- Loaded, cleaned, and merged a set of removed dams from American Rivers, and a set of current dams from the US National Inventory of Dams into California entries with relevant information.
- Used longitude and latitude coordinates of our shared set to batch process in the US Census' Geocoder API and retrieve a GEO_ID census code to append.
- Used GEO_ID codes to search for median income data for each instance of dams, using the American Community 5-year 2022 survey on income.
- All data work was performed in R language and the RStudio environment.

Results

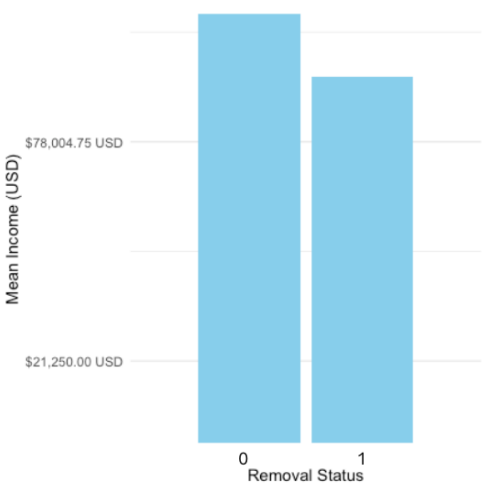
- The correlation between removal and median income is -0.0997, indicating a weak negative correlation.
- The overall standard deviation of median incomes is 47,320.47 USD.
- The mean of median income for the removed group is higher at 111,075 USD than for the not removed group at 94,942 USD.
- Standard deviation of income is higher for the removed group at 47,100 USD. compared to the not removed group 47,331 USD.
- The removed group has a significantly larger sample size (577) than the "not removed" group (60).
- The standard error is lower for the removed group at 1961 USD compared to the not removed group at 6110 USD.
- The 95% confidence intervals for the mean income are wider for the not removed group due to the smaller sample size.

Analysis

- The weak negative correlation suggests a slight tendency for higher income to be associated with dams that were not removed, but this relationship is not strong.
- The relatively wide range of median incomes across the data indicates a diverse income distribution.
- The higher mean income for the removed group might suggest a potential benefit of dam removal, but further analysis is needed to determine if this difference is statistically significant and due to dam removal rather than other factors.
- The larger sample size for the removed group provides a more precise estimate of its mean income.
- The wider confidence intervals for the not-removed group highlight the uncertainty associated with the smaller sample size.

Median Income by Removal Status

Mean of Median Income by Removal Status



Conclusion

Our correlation is present, but weak.

We conclude that the correlation may not be usable due to the wide confidence interval due to differences in our available data between removed and not removed dams- we feel that study is not currently possible without more data.

More data collection on the locations of removed dams is recommended.

Sources and Literature

American Rivers. (2024, February). Raw Dataset—ARDamRemovalList_figshare_Feb2024 [Data set]. Retrieved September 27, 2024, from https://www.americanrivers.org/category/dam-removal/

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