

Housing Market Impacts of Removing Legacy Pollutants in Great Lakes Areas of Concern

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Indiana Water Summit

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Cassidy, Alecia, Meeks, Robyn, and Moore, Michael. **Cleaning Up the Great Lakes: Housing Market Impacts of Removing Legacy Pollutants.** *Journal of Public Economics*, 226, 104979, October 2023.

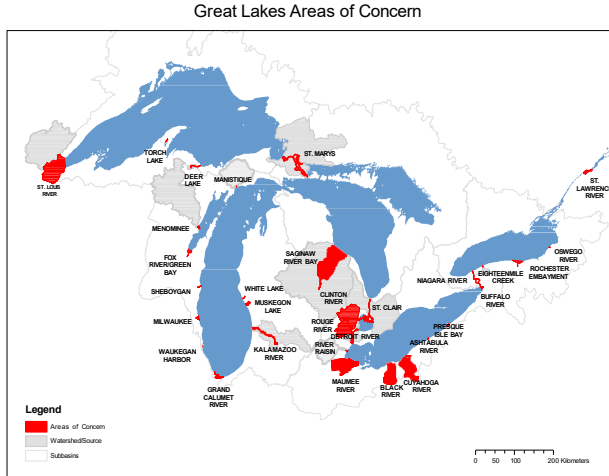
In loving memory of Michael Moore (September 13, 1954 – May 11, 2025)

Motivation

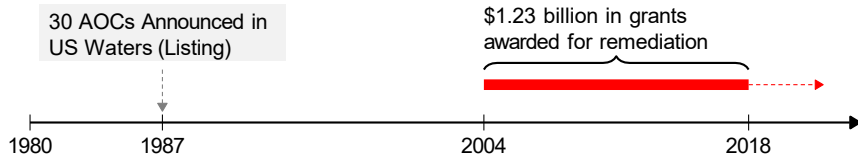
- ▶ The Great Lakes provide drinking water and recreational value to millions of people
- ▶ Manufacturing plants have left a legacy of toxic pollutants (PCBs, PBDEs), creating the stigma of the “Rust Belt”
- ▶ Areas of Concern (AOC) program designed to clean them up
- ▶ What were the economic impacts of listing and cleanup?

Areas of Concern

AOCs: 31 water-based areas across the five Great Lakes with legacy toxic pollutants and water quality degradation.



Timeline



Research Questions and Contribution

- ▶ AOC program is large-scale:
 - ▶ We study \$1.23 billion in federal funding for 1,367 projects
- ▶ How did it affect local economies?
- ▶ **Research questions:**
 - ▶ Does AOC listing reduce housing values?
 - ▶ Do remediation grants increase housing values?
 - ▶ Do grant benefits exceed costs?

Preview of Findings

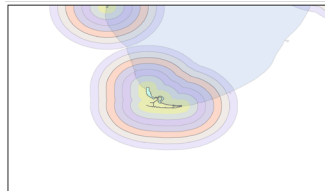
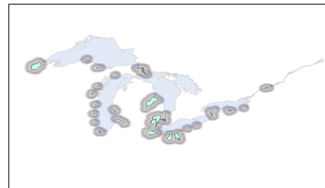
- ▶ **AOC listing decreases property values by \$25,700 (15.8%)**
 - ▶ Pure information effect - people value clean water!
- ▶ **Grants increase property values**
 - ▶ 0.02-0.05 cents per dollar of grants
 - ▶ \$5,510-\$10,070 per average completed grant
- ▶ **Grant benefits significantly exceed costs**
 - ▶ Reject null hypothesis that benefits = costs at 5% level

- ▶ **Housing data:** CoreLogic sale prices (1980–2017)
 - ▶ Single-family residential homes near AOCs
- ▶ **Grants data:** Comprehensive federal spending on all 1,367 remediation projects to AOCs (2004–2017)
 - ▶ Great Lakes Legacy Act and Great Lakes Restoration Initiative
 - ▶ Project-level data with start/completion dates

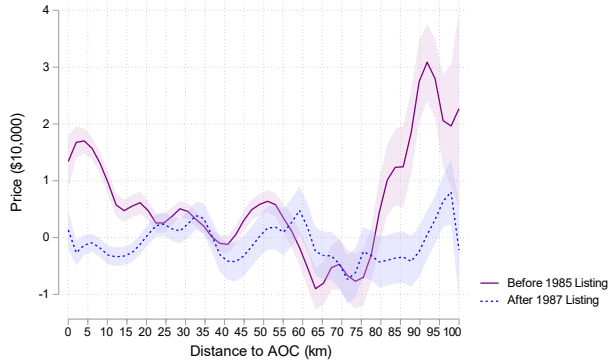
1. Does AOC listing reduce housing prices?

Approach: Near vs Far, Before vs After

- ▶ Difference-in-differences design
 - ▶ **Treatment:** 0–20 km from AOC
 - ▶ **Control:** 25–35 km from AOC
 - ▶ Before vs after 1987 listing
- ▶ House fixed effects: compare same house before/after listing
- ▶ Control for trends in:
 - ▶ Distance to Great Lakes
 - ▶ Superfund site status
 - ▶ House characteristics

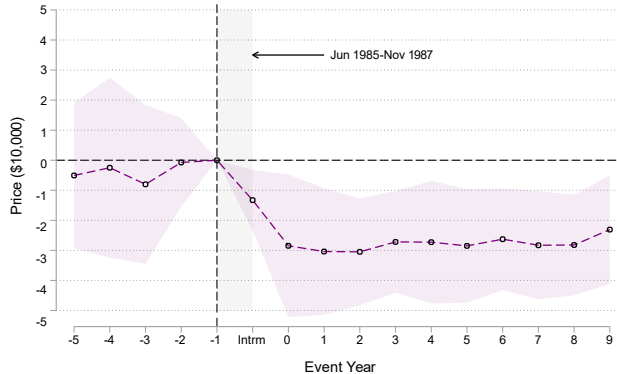


Where Do Treatment Effects End?



Treatment effects extend to at least 20 km, effects dissipate by 30-35 km.

Listing Results: Event Study



Negative, persistent effects after AOC listing in 1987.

Listing Results: Magnitude

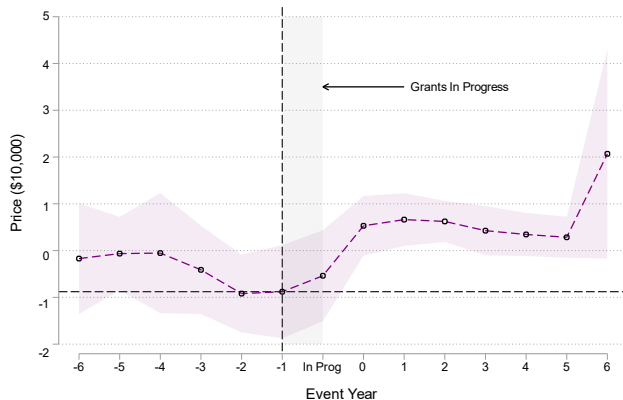
Listing effect estimate: \$25,700* decrease (15.8% of mean price) within 20 km of AOC.

2. Do grants raise housing prices?

Grants Analysis: Approach

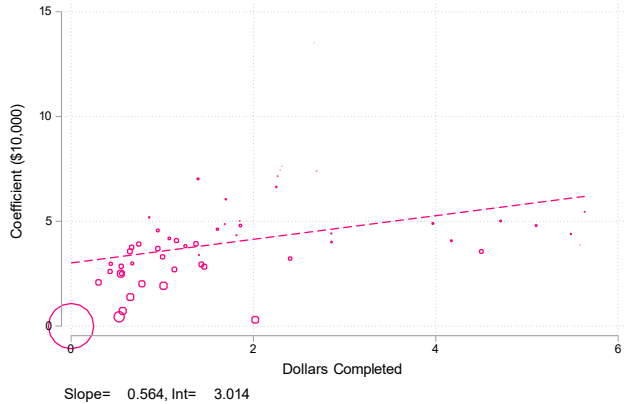
- ▶ Use variation in **grant timing** and **grant amounts** across AOCs
- ▶ House fixed effects: compare same house before/after grants
- ▶ Focus on 0–20 km from AOCs (where listing effects were found)
- ▶ Separate effects of:
 - ▶ Grants started (in progress)
 - ▶ Grants completed

Grants: Event Study



Price increases of ~\$15,000 when grants are completed (but this rolls in multiple grants completed at the same time)

Variation in Grant Amounts



More money= more housing price increase

Grants Results: Effect of Grant Dollars

We find the following impacts of a dollar of grants:

- ▶ 0.35*** cents per grant dollar started
- ▶ 0.18*** additional cents per grant dollar completed
- ▶ **0.53*** cents per grant dollar in total**

Grants: Economic Magnitude

- ▶ **Per dollar of grants:** 0.53 cents increase in housing prices
- ▶ **Average completed grant:** \$1.9 million
- ▶ **Average house price increase:** \$10,070 per completed grant
- ▶ **Important:** Effects are much more significant after grant completion, not during progress

Cost-Benefit Analysis of Grants

- ▶ **Housing stock:** 3.38 million houses within 20 km of AOCs that received grants
- ▶ **Federal grant costs:** \$1.2 billion (completed grants only)
- ▶ **Total costs** (including matches): \$2.1 billion
- ▶ **Estimated benefits:** \$92.2 billion [95% CI: \$8.7B, \$222.7B]
- ▶ **Result:** Reject null that benefits = costs at 5% significance level

Comparison to Similar Programs

Program	Benefits > Costs?	Study
Great Lakes AOCs	Yes**	This study
Clean Water Act Grants	No	Keiser & Shapiro (2019)
Superfund (average)	No	Greenstone & Gallagher (2008)
Superfund (some sites)	Yes	Gamper-Rabindran & Timmins (2013)
Brownfields (most sites)	Yes	Haninger, Ma & Timmins (2017)

AOC grants program stands out as rare case of clearly passing benefit-cost test.

And, this ignores other benefits of grants:

- ▶ Improved infrastructure
- ▶ Tourism
- ▶ Labor Market Effects

Caveat: Inconclusive Comparison of Grants with Listing

- ▶ Listing implied an average house price **drop** of **\$25,700**.
- ▶ Over the course of all grants, the average house price **increase** for the same houses is **\$27,295**.
- ▶ But, confidence intervals are large enough that we cannot reject the null hypothesis that the boost in housing price due to grants exactly overcame the drop due to listing.

Sobering Lesson:

- ▶ Results highlight the harm to homeowners from a federal program that drew attention to problematic and polluted sites, thus stigmatizing their properties, without the timely provision of federal or private funding to remediate the pollution at those sites.

Conclusion

- ▶ **AOC listing** had large negative effects on housing prices
 - ▶ Pure information effect - people value clean water!
- ▶ **Spatial scope:** Effects extend farther than typical environmental studies (20+ km)
- ▶ **Remediation grants** significantly increased housing prices
 - ▶ Benefits substantially exceed costs
- ▶ **Policy implication:** Funding for environmental cleanup can overcome stigma effects and generate substantial economic benefits

Thank you!

Questions?

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