



Natural Capital Valuation to Optimize Value on Private Lands



MONTROSE
ENVIRONMENTAL

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April 17, 2024



maximize the creation or accessibility of opportunities and good jobs. The initiative shall aim to conserve and restore public lands and waters, bolster community resilience, increase reforestation, increase carbon sequestration in the agricultural sector, protect biodiversity, improve access to recreation, and address the changing climate.

Sec. 216. Conserving Our Nation's Lands and Waters. (a) The Secretary of the Interior, in consultation with the Secretary of Agriculture, the Secretary of Commerce, the Chair of the Council on Environmental Quality, and the heads of other relevant agencies, shall submit a report to the Task Force within 90 days of the date of this order recommending steps that the United States should take, working with State, local, Tribal, and territorial governments, agricultural and forest landowners, fishermen, and other key stakeholders, to achieve the goal of conserving at least 30 percent of our lands and waters by 2030.

(i) The Secretary of the Interior, the Secretary of Agriculture, the Secretary of Commerce, through the Administrator of the National Oceanic and Atmospheric Administration, and the Chair of the Council on Environmental Quality shall, as appropriate, solicit input from State, local, Tribal, and territorial officials, agricultural and forest landowners, fishermen, and other key stakeholders in identifying strategies that will encourage broad participation in the goal of conserving 30 percent of our lands and waters by 2030.

(ii) The report shall propose guidelines for determining whether lands and waters qualify for conservation, and it also shall establish mechanisms to measure progress toward the 30-percent goal. The Secretary of the Interior shall subsequently submit annual reports to the Task Force to monitor progress.

In January 2021,
President Joe Biden
issued an Executive Order
pledging to conserve

30%

of United States lands
and waters by 2030

(Exec. Order 14008, 2021)



'30 by 30' initiative

Great!.....But.....

- Currently, parklands, monuments, national forests, and other protected areas in the US do not adequately protect the country's unique habitats and species (Hamilton et al. 2022)
- 60% of land in the US is privately owned, and habitat for **95%** of all federally RTE flora and fauna occur on private land (U.S. GAO 1994)

How do we incentivize
private land
conservation?

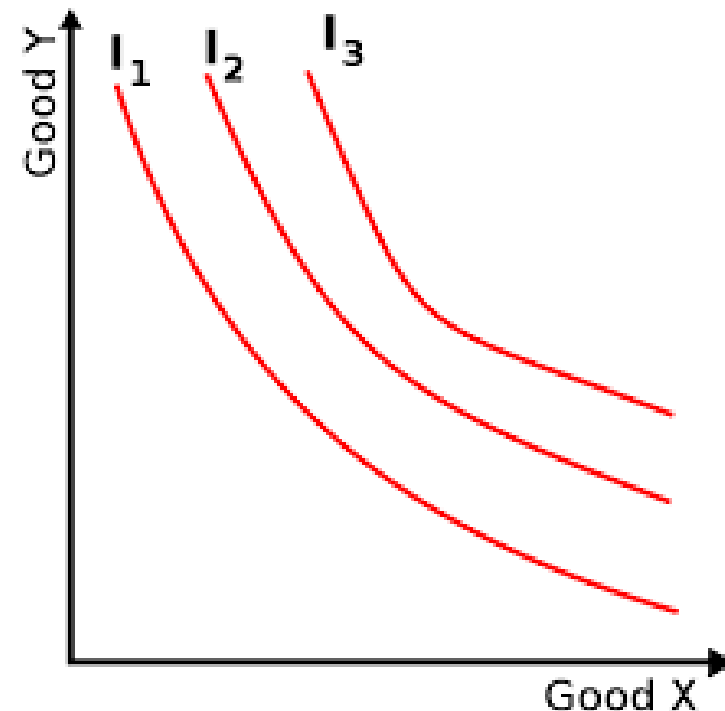


Incentivizing Private Land Conservation

Original Thinking

- Derived utility from the land/parcel
- Multiple factors on parcels contribute to its value (\$\$)
- Basic ex: What do you value in a day?
 - Sleep, work/study, eating
 - If we had unlimited time, we could do anything we wanted!
- All work, no sleep, no food = bad day
- We would probably choose a mix of things that bring us the most happiness while still keeping an eye on the future

$$U(X_1, X_2, \dots, X_n) = f(X_1, X_2, \dots, X_n)$$



Incentivizing Private Land Conservation

Original Thinking

- “A forest is only seen for its trees”
 - Highest and best use would typically be timber, commercial/residential development, mining
- If the only offer to a private land owner is based on this amount, why conserve?

$$\underline{U(X_1, X_2, \dots, X_n)} = f(X_1, X_2, \dots, X_n)$$



U(acreage, number of trees, minerals, etc.)



Incentivizing Private Land Conservation – How do we change this?

Updated Thinking

- “Can’t see the forest through the trees”
 - Are we missing something in our valuation process?
 - Think back to your day: Are there things you might have forgotten to include? (Recreation, seeing family/friends)
 - No true \$ market amount on these things, but they increase utility/have high value
- How do we value conservation efforts?
- Will the value of conservation be more than typical market values?

$$\underline{U(X_1, X_2, \dots, X_n)} = f(X_1, X_2, \dots, X_n)$$

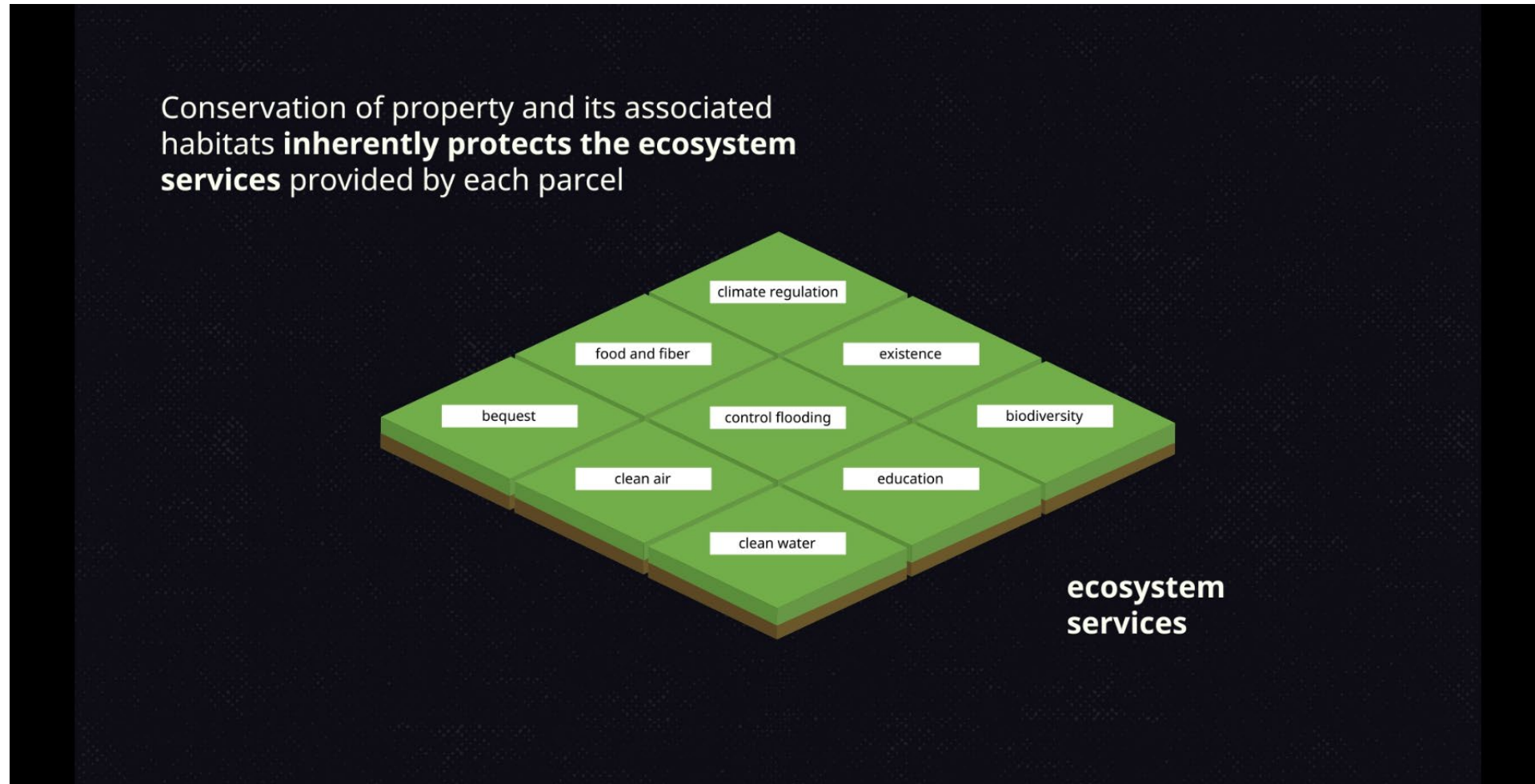


$$U(\text{RTE species, biodiversity, etc.})$$



How do we value conservation efforts?

- We know parcels have values often overlooked in typical market valuations



How do we value conservation efforts?

- Ask people how they value these goods and services, or see how they react to policies that impact them
- E.g.- Ask about gas price changes, or see gas usage if policies change

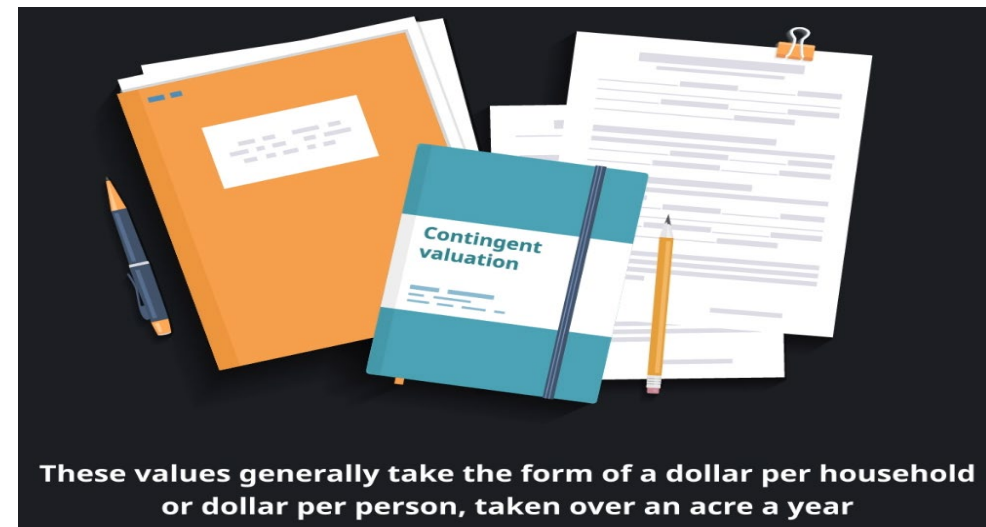
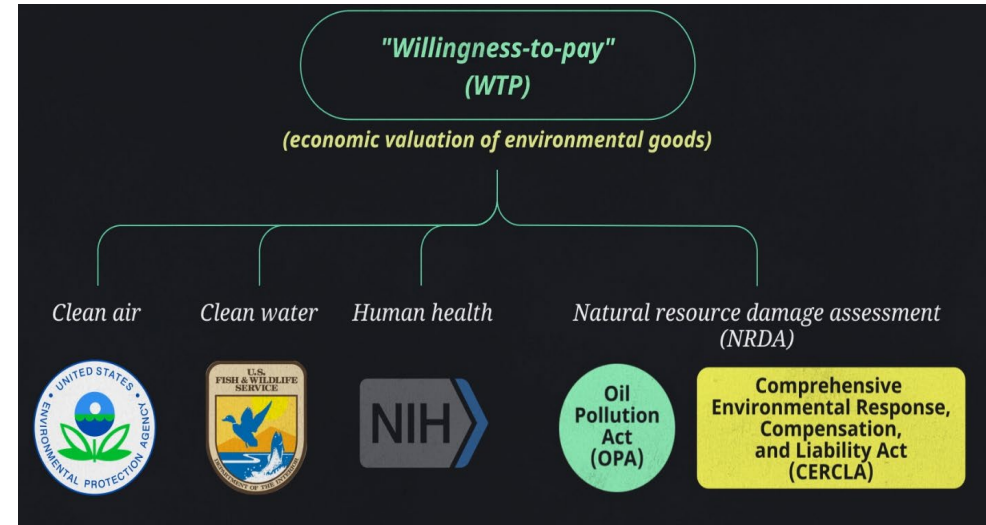
**Several insights to economic valuation of ecosystems indicate that,
per the National Research Council (2005)**

- 1** Values arise from the preferences of individual people; thus, values are estimated for individuals or households and then aggregated to obtain the value that society places on changes in ecosystem quality
- 2** Valuation methods are used to estimate the gains or losses that people may experience because of changes in ecosystems to inform policy discussions and decision-making



How do we value conservation efforts?

- These types of values are called “willingness-to-pay” (WTP)
- How much am I willing to pay to obtain more of that good? (How much WTP to conserve a gopher tortoise?)
- Defensible, proven method to value environmental goods (EPA, NIH, OPA)
- A great way to put a \$ amount to a non-market good



“Standing on the Shoulders of Giants”

- We valued over 120 private properties across 5 states in the Southeastern U.S.
- How the heck do we conduct WTP studies for all the RTE species and environmental goods?
 - Impossible – We didn’t. Recall, all work = bad day.
- A largescale literature review would allow us to obtain values for hundreds, if not thousands of species and environmental goods
- While this was done for every parcel, we next walk through an example of an Alabama property



Benefit transfer approach



**pre-existing studies
from various policy sites**

**predicted welfare estimates
(like willingness-to-pay)**



Step 1

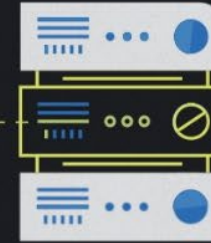
We accessed two ecosystem service databases to identify readily available "willingness-to-pay" studies:



*The Environmental Valuation
Reference Inventory (EVRI)*

Environment and Climate Change Canada

(EVRI, n.d.)



*The Ecosystem Services
Valuation Database (ESVD)*

**Foundation for Sustainable Development
and Brander Environmental Economics**

(Foundation for Sustainable Development, 2021)

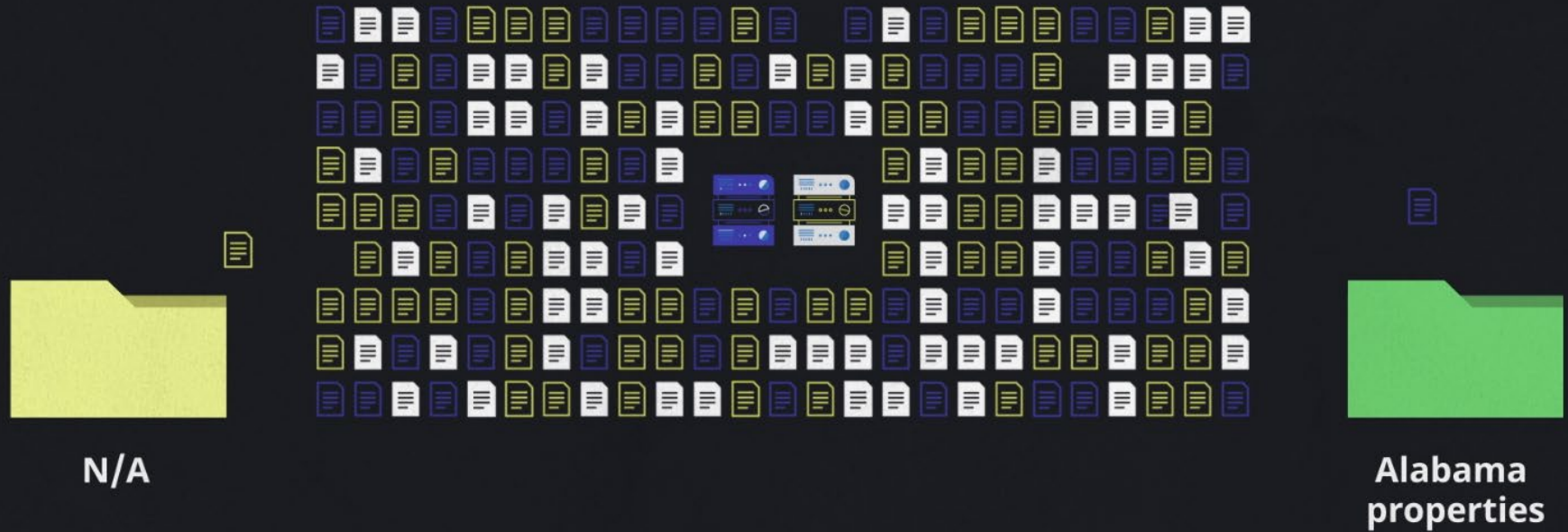


In total, these databases contain nearly **5,000** "willingness-to-pay" studies



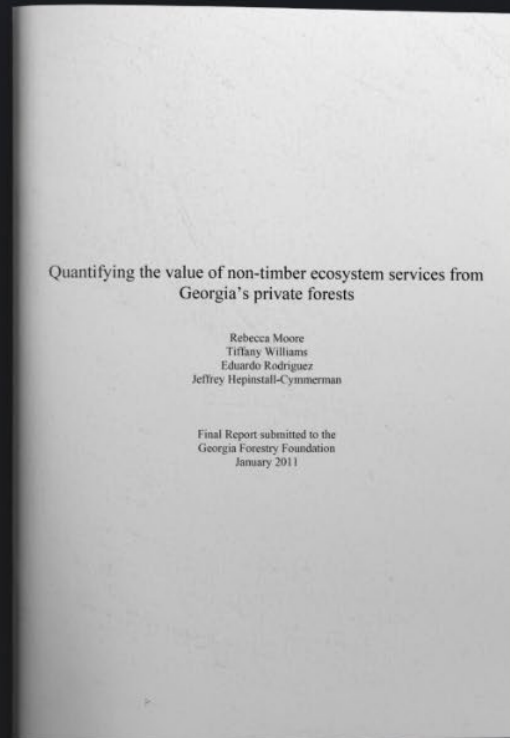
Step 2

We next reviewed and filtered through these studies for relevance and applicability to the Alabama properties



Step 2

Based on **local populations and site considerations** to narrow the "willingness-to-pay" studies even further



**Alabama
properties**

(Moore et al., 2011)



Step 2

Consideration of "willingness-to-pay" values at this step included:



Study geographic location:

We focused on studies developed in the southeast United States; with preference for populations that were similar in culture, income level, and geographic location



Step 2

Consideration of "willingness-to-pay" values at this step included:

Study geographic location



Parcel size:

We selected studies that evaluated, within an order of magnitude of, the size of the subject parcel to increase accuracy



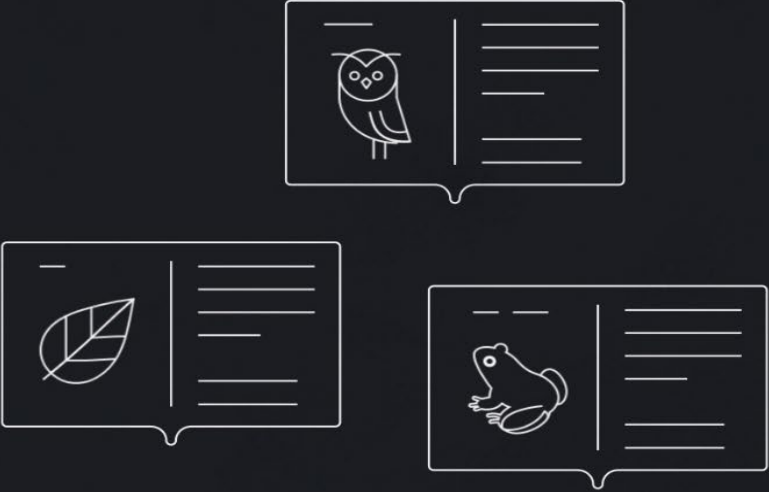
- We had to physically go to parcel sites and verify habitats and species present
- E.g., we would not want to include a WTP study on conserving sharks for a parcel in NW Alabama

Step 2

Consideration of "willingness-to-pay" values at this step included:

Study geographic location
Parcel size

Parcel habitats:
We focused on studies that valued the habitats and species present on the parcels



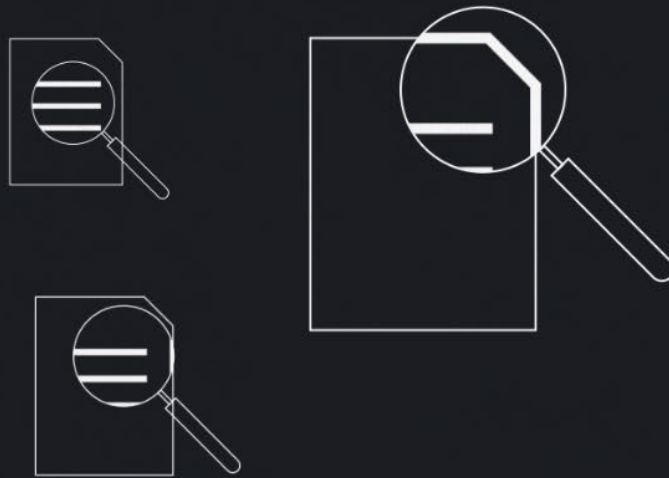
The image shows three icons representing different habitats: an owl, a leaf, and a frog. Each icon is accompanied by a list of text, suggesting a study or survey related to that habitat. The owl icon is at the top, the leaf icon is at the bottom left, and the frog icon is at the bottom right.



Step 2

Consideration of "willingness-to-pay" values at this step included:

Study geographic location
Parcel size
Parcel habitats



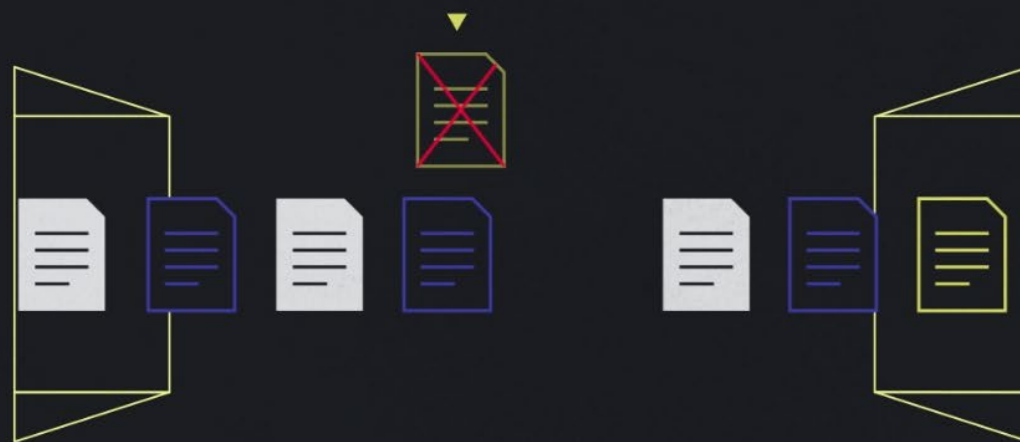
Study applicability:

We evaluated the appropriateness and methods of each study



Step 2

Based on this filtering process, many initially identified studies were disqualified based upon a lack of site-specific information or appropriate methodology



Putting it all together

- Now, we combine it all. We know the habitats and species on the parcel, and we know how people value each one.
- We calculate and aggregate a new \$\$ value for that parcel, if conserved rather than sold for highest and best use
- Many values are much higher, and owners have shown interest in conservation when provided with these benefits in easements



Future Work/Use Cases

- We continue to apply this sort of thinking to other areas of environmental economics
 - **Harmful Algal Blooms (HABs)** : attempting to understand full cost of these blooms (health, tourism, ecosystem, species, etc.) so that funding for mitigation and prevention becomes paramount
 - Florida manatees dying during blooms
 - **Offshore Decommissioning**: What to do with oil jackets at end-of-life
 - Species using rigs as a safe haven. Removing rig costs more, leaving it in place not only saves money, but saves these species



