

WTP for Biodiversity Protection: Evidence from Waikamoi Preserve

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AERE Drinking Group

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Biodiversity Loss and Invasive Species

- ▶ Rosenberg et al. (2019) *Science*
 - ▶ 3 billion birds (29%) in N. America lost since 1970.
 - ▶ Spatz et al. (2017) *Scientific Advances*
 - ▶ 41% of the world's "highly threatened vertebrates" live on islands.
 - ▶ 60% of these islands negatively impacted by invasive species.
- ⇒ Need to study invasive species' impact on biodiversity.

The Nature Conservancy - Waikamoi Preserve



- ▶ The single-largest privately held nature preserve in the state of Hawai‘i.
 - ▶ **Very limited public access**
- ▶ ‘Ōhi‘a-dominant forest
 - ▶ Home to 27 species of rare plants and 10 species of birds, including 6 threatened and endangered bird species.

Waikamoi Preserve

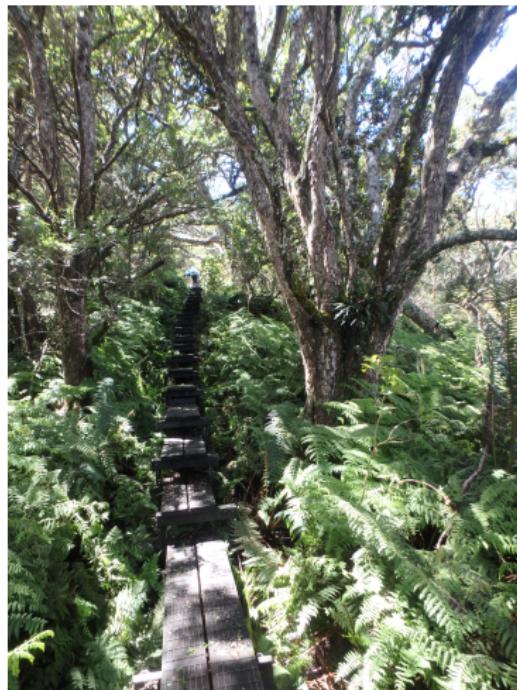


Photo Credit: TNC Volunteer, Trail Maintenance Sept. 2016

Waikamoi Preserve



Waikamoi Preserve



Confluence of Circumstances

1. Since 2014, Rapid ‘Ōhi‘a Death (ROD) has been killing ‘ōhi‘a trees in Hawai‘i.
 - ▶ ‘Ōhi‘a trees comprise 80% of the native forests, and serve as critical habitat for birds.
2. In 2016, the American Birding Association added Hawai‘i to its North American Birding List (demand shock)
 - ▶ The Nature Conservancy is seeking a long-term solution to provide increased access to Waikamoi.

Questions

1. How much are people willing to pay for expanded access to the Preserve?
2. **How much are people willing to pay to mitigate the risks to the Preserve posed by invasive species and climate change?**

Literature

- ▶ Bird biodiversity: Kolstoe and Cameron 2017, Kolstoe et al. 2018
- ▶ Giguere et al. (2020) - use CV to estimate WTP to protect hemlock from woolly adelgid
- ▶ Richardson & Lewis (under review) - use CV to estimate WTP for individual bears.

The Survey

- ▶ Pin down location, familiarity questions.
- ▶ CV, 2 sets of DCE cards.
- ▶ Sociodemographics

CV

To address the threats posed by ROD and other invasive species, TNC Maui is evaluating whether to set up an **Invasive Species Rapid Response Fund**. The Fund would raise money that would be used specifically to **detect** the first evidence of an invasive species, such as ROD, and **mitigate** any related damage it might cause if detected in Waikamoi Preserve.

Examples of expenses related to this effort include:

- \$100 = memory cards to hold drone imagery to monitor weed removal efficacy on a quarterly basis
- \$1000 = one hour of helicopter time to conduct an aerial 1000-acre ROD detection survey on a quarterly basis
- \$2000 = felling and removing one infected tree as needed

If the Fund were established, it would help keep the 'ōhi'a forest in Waikamoi healthy for an additional **10 years**. The Invasive Species Rapid Response Fund would only be financially viable only **if \$50,000 in donations can be raised**. If the total amount is not raised, the Fund would not be established and individual donations would be refunded. If donations are greater than this amount, the extra money would be used for additional invasive species mitigation.

Would you make a **one-time donation** of **\$1500** to the **Invasive Species Response Fund?**

CV

Key points:

- ▶ Single-shot donation for Invasive Species Rapid Response Fund
- ▶ Provision point: \$50,000
- ▶ Bid amounts: 25, 50, 100, 250, 500, 750, 1000, 1500, 2000

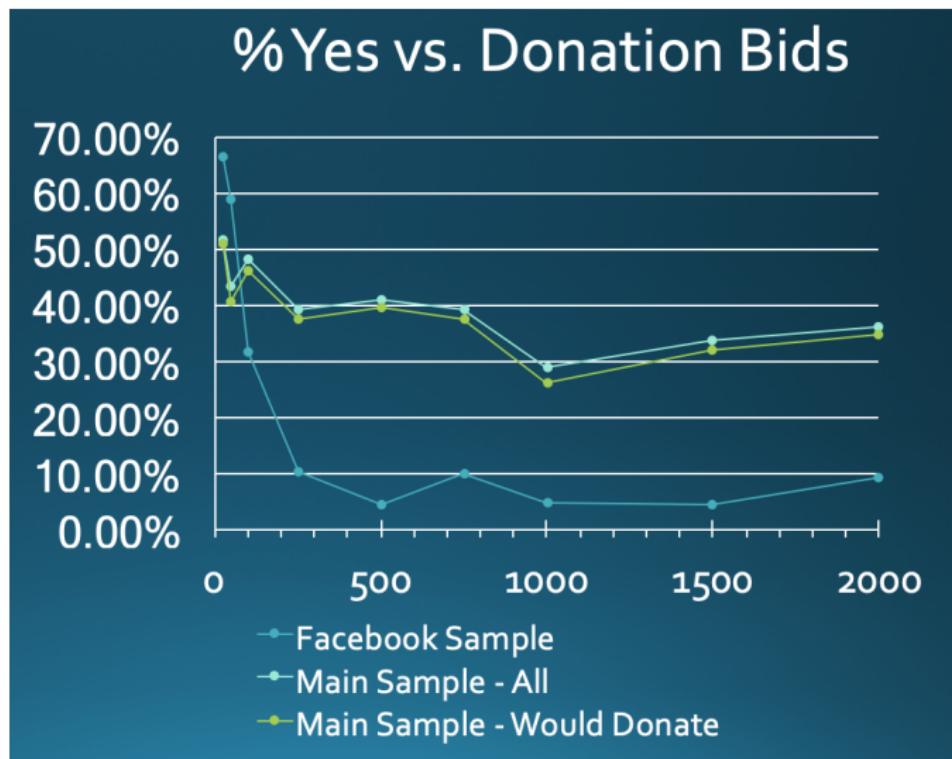
Sampling

- ▶ Qualtrics
 - ▶ now: 890
 - ▶ eventually: 1000
- ▶ Instagram, Facebook, Twitter:
 - ▶ TNC
 - ▶ ABA
 - ▶ Cornell Ornithology Lab

The Sample

Variable	Facebook Sample		Qualtrics Sample	
	N	Mean	N	Mean
Female	190	\$41%	890	58%
Age	150	46	890	47.35
HH Income (\$1000s)	111	85.09	882	83.86
Env. Membership: general	190	56%	890	20%
TNC Membership	190	18%	890	10.2%

CV uptake



Reasons for bid rejection

- ▶ Can't afford to donate – 68%
- ▶ Too many other good causes that are urgent – 13%
- ▶ Would donate a different amount (less) – 11%
- ▶ I don't think there's a real risk of invasive species – 1%
- ▶ Other – 5%
- ▶ “I doubt that the fund would succeed” – 2%

CV WTP estimates

Sample	N	WTP*
Facebook	190	\$112.75 (0.00067)
Qualtrics	890	\$385.18 (0.00000)
Qualtrics - certain	862	\$365.74 (0.00001)

*Turnbull lower bound

Next Steps

- ▶ Estimate WTP using different estimators: logit/probit, spike (whatever that is)