University of Connecticut | Department of Agricultural and Resource Economics
Center for Environmental Sciences and Engineering

Generating Revenues from "Consumers" for Ecosystem Services: Lessons from Bobolink Farming

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Univ Connecticut; *U Washington; #University of Vermont

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USDA United States Department of Agriculture National Institute of Food and Agriculture

Virginia Coast Reserve Long-Term Ecological Research

NRCS Natural Resources Conservation Service

NOAA Sea Grant Rhode Island

Broad Goals

- Create markets for (localized) public goods by
  - Generating revenues from consumer demand = donations from beneficiaries
  - Leverage Experimental Economics
  - Lead donors to contribute more of their personal value

- Additional tools - to leverage the power of markets
  - Improve provision of ecosystem services
  - Create private markets, without dependence on government authority.
  - Aesthetic or cultural ecosystem services, wildlife = public goods

First project -Selling Farm Ecosystem Services:

with Chris Anderson and Emi Uchida

- For-profit farm product
  - Grassland bird habitat
  - Bobolinks on hayfields
  - Farm contract
  - Sell share to residents
- Pay farmers for management to protect nesting birds

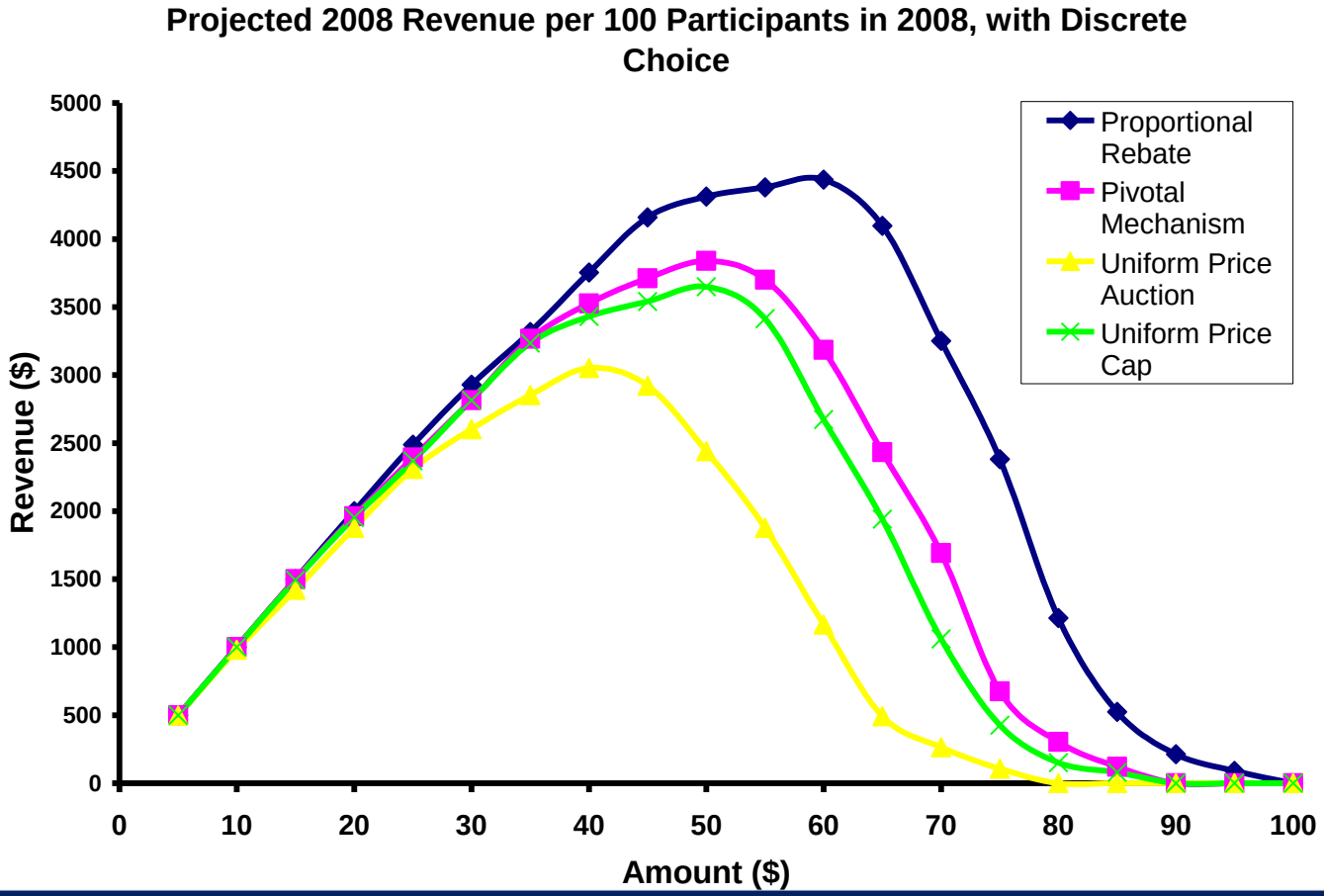
USDA United States Department of Agriculture | National Institute of Food and Agriculture

NRCS Natural Resources Conservation Service

The “public good” : Bobolink nesting habitat

- Bobolinks are legally protected, not endangered. Labelled as “species of concern”.
- Establish ground nests in hay fields from mid-May to early June.
- Coincides with peak nutritional value of hay.
- Harvesting of hay causes **almost complete** loss of Bobolink eggs and youngs from destroyed nests and exposure to predation.
- Wildlife ecologists recommend **at least 10 acres** of hayfield for bobolink breeding.

Used Donations with Provision Point (min funding target) – delivered single fields



Motivation – *Scaling up*

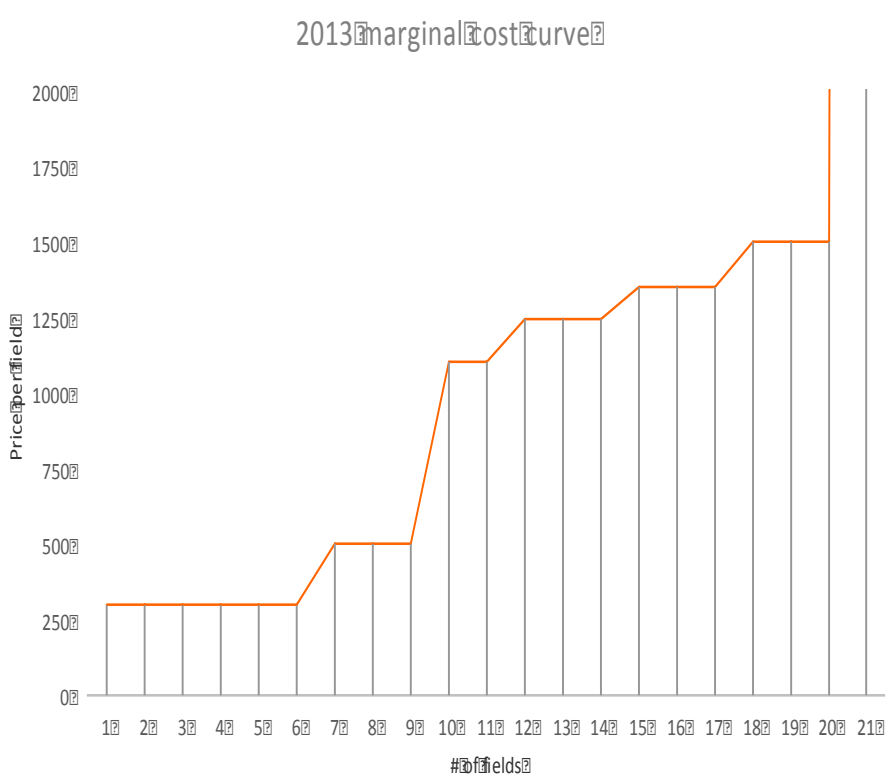
Critical need:

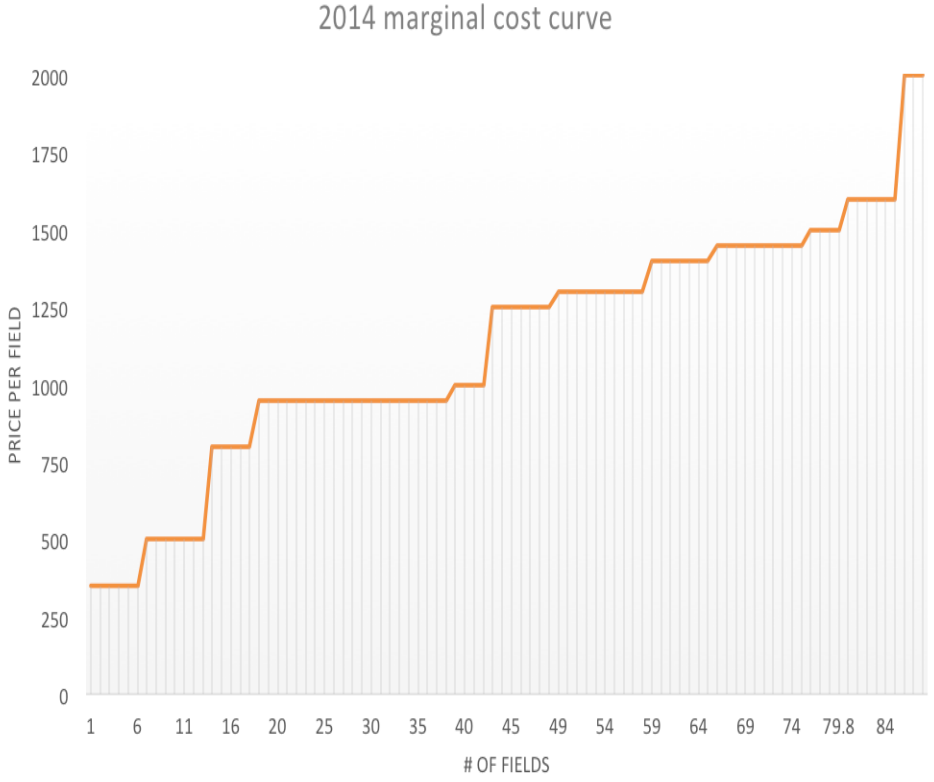
- **Rules of exchange that reduce free-riding, enable providers to benefit**

Proposed Solution:

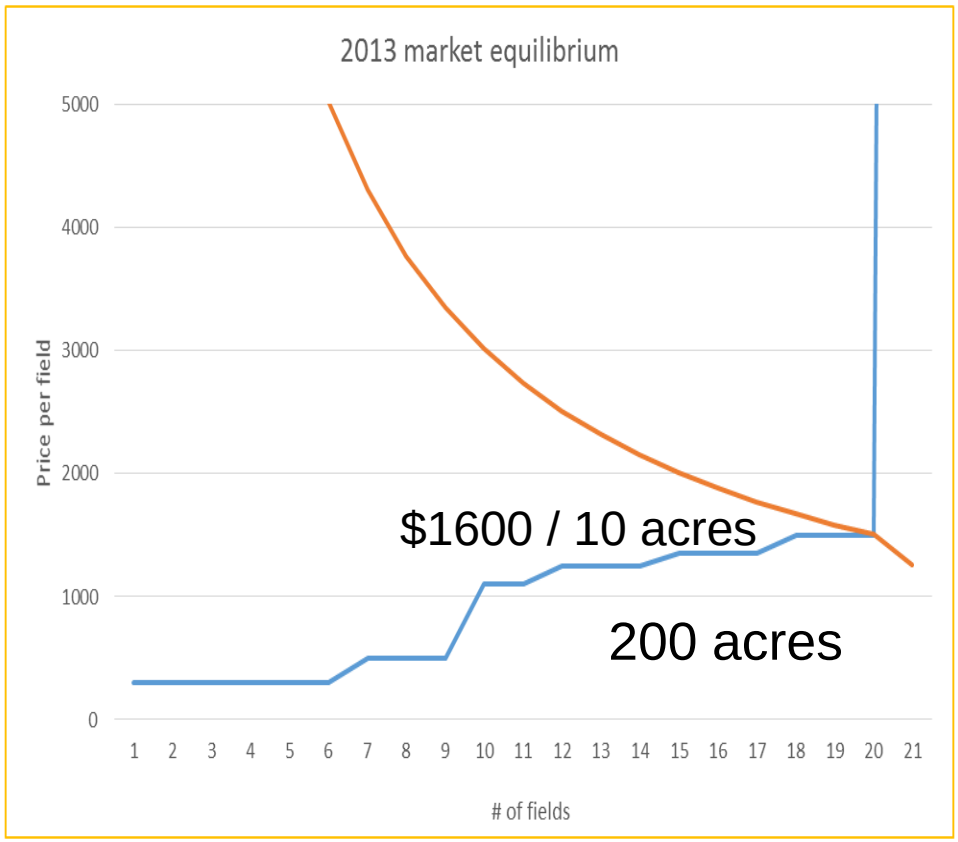
- Connect individuals' payment to specific goods
- "Buying" Bobolink fields - ***not*** some other "good cause"
- Create market to *balance* "supply" (marginal cost) with "demand" (average revenue)
  - Determines quantity
- I**ndividualized price auction (IPA)** (Smith and Swallow 2013; Encyclopedia)

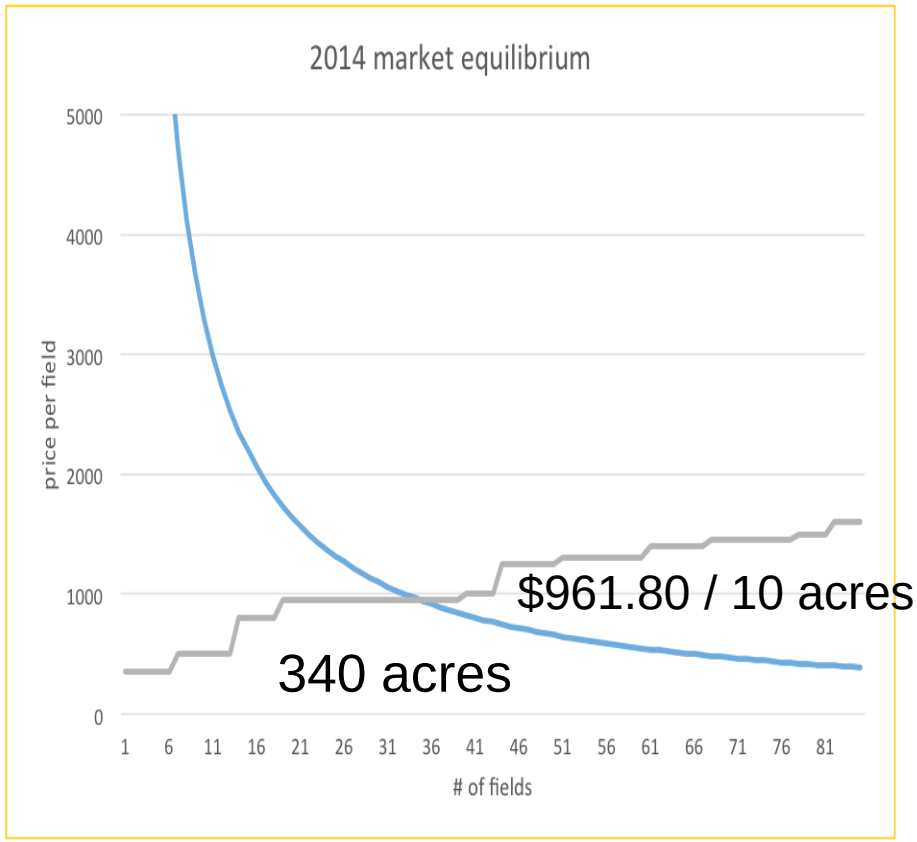
Supply by Uniform Price Reverse Auction – Marginal cost curves (Vermont 2013 and 2014)





Market: 2013 and 2014 Vermont

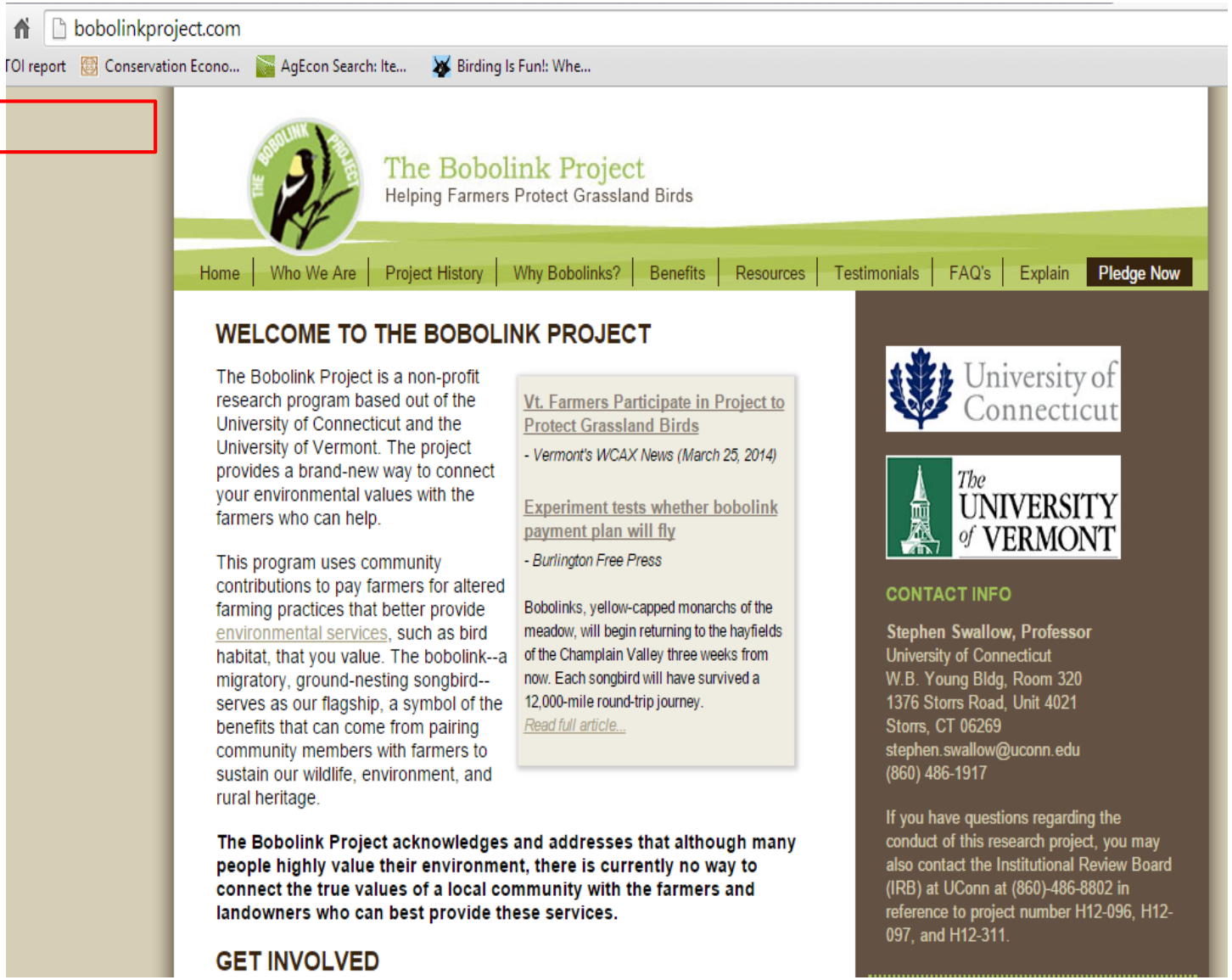




Challenges = Communication

- Marketing outreach
- Direct mail
- Web site presence
- Advertising – newspapers, NPR:
  - "Helping communities help farmers sustain safe bird habitat on viable farms"
- Jamestown and Aquidneck Island, RI
- Vermont's Champlain Valley

Bobolinkproject.com



Solicitation

- Donor's "offer schedule," test:
  - Per field price vs total for each quantity
  - Suggested donation
    - 1st field ($40, $60); 4th field ($25, $30) ($40, $45)
    - No suggestion; some examples
  - Option for "flat" donation vs no option
  - The extent of the "offer schedule"
    - 4-5 fields; 10 fields; 20 fields; 40 fields; 100 fields
    - Division of ranges (4 or 5 donation blanks)
  - Interest, commitment of farmers

Example of Payment Card, RI 2013

Bobolink Project Pledge Agreement:

• We have farmers ready to contract for up to **4**, 10-acre hayfields for bobolinks in Middletown this year.

• Please fill out each line in the pledge card below, letting us know how much you can contribute depending on the level of success we have. After we receive everybody's pledges, we determine how many fields we can protect this summer--by starting from 1 field and going as far as pledges allow.

• You will only be charged for the highest number of 10-acre hayfields that everyone's pledges will support.

-For example, if total pledges let farmers protect 3 fields at most, we will only bill you for the pledge you made on the "3 fields" line, and no other line will be used.

• If you prefer, you may pledge a single amount (below the table), for which we will bill you if we can provide at least one field.

• You will be charged only the proportion of your pledge needed to provide a field or fields.

-For example: Let's say we receive enough money to fund three fields, but we only need 95% of the money we raised in pledges to do so. In this case, we would only bill you 95% of your total pledge on the 3-fields line.

Please mail this card back before April 29. We will mail you a final bill before May 3 for the amount of your pledge needed to protect bobolink-nesting habitat. Please keep in mind that this process is not cheap for farmers. This year, we estimate farmers may require at least $5,000 to protect just 1 field.

«Title» «First» «MidInit» «Last» «Suffix»
«Street_Address»
«City», «State» «ZIP»

ID NUMBER: «ID»
(Use this ID number to pledge online!!)
www.bobolinkproject.com

YOUR PLEDGE CARD

Please consider pledging at least $60 for the first field, and $40 each for four fields.
FOR EXAMPLE: If you can provide 3 fields I pledge $50 per field for a potential total of: $150.

Please fill out all lines in the table below (a blank line means a zero pledge for those fields):

If the Bobolink Project can provide:	I pledge to contribute:	for a potential total of:
1 field	$_____ per field	x 1 field = $_____
2 fields	$_____ per field	x 2 fields = $_____
3 fields	$_____ per field	x 3 fields = $_____
4 fields	$_____ per field	x 4 fields = $_____

OR PLEDGE A SINGLE AMOUNT: $_____ (This will only be billed if we can provide at least one field)

Phone #: _____ Email Address: -

Please note: We will not share personal information with anyone, and will use it only in managing the Bobolink Project and your pledge.

Solicitation table: 4 fields

YOUR PLEDGE CARD

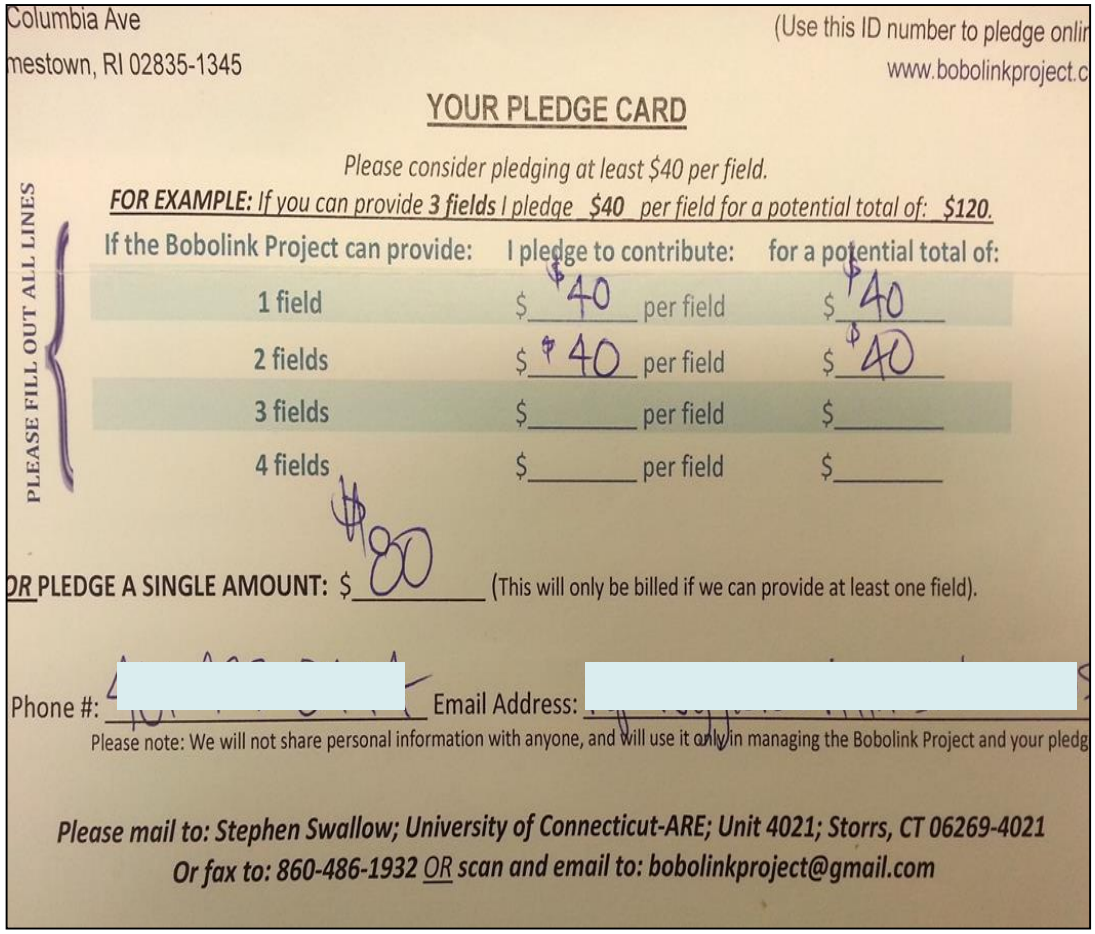
*Please consider pledging at least **$60** for the first field, and **$40** each for four fields.*
FOR EXAMPLE:** If you can provide **3 fields** I pledge **$50** per field for a potential total of: **$150.

Please fill out all lines in the table below (a blank line means a zero pledge for those fields):

If the Bobolink Project can provide:	I pledge to contribute:	for a potential total of:
1 field	$_____ per field	x 1 field = $_____
2 fields	$_____ per field	x 2 fields = $_____
3 fields	$_____ per field	x 3 fields = $_____
4 fields	$_____ per field	x 4 fields = $_____

OR **PLEDGE A SINGLE AMOUNT:** $_____ (This will only be billed if we can provide at least one field).

Example of Payment Card, RI 2013



Columbia Ave
mestown, RI 02835-1345

(Use this ID number to pledge onlir
www.bobolinkproject.c

YOUR PLEDGE CARD

Please consider pledging at least $40 per field.

FOR EXAMPLE:** If you can provide **3 fields** I pledge **$40** per field for a potential total of: **$120.

PLEASE FILL OUT ALL LINES

If the Bobolink Project can provide:	I pledge to contribute:	for a potential total of:
1 field	$ 40 per field	$ 40
2 fields	$ 40 per field	$ 40
3 fields	$ _____ per field	$ _____
4 fields	$ _____ per field	$ _____

OR PLEDGE A SINGLE AMOUNT: $ 80 (This will only be billed if we can provide at least one field).

Phone #: [redacted] Email Address: [redacted]

Please note: We will not share personal information with anyone, and will use it only in managing the Bobolink Project and your pledg

Please mail to: Stephen Swallow; University of Connecticut-ARE; Unit 4021; Storrs, CT 06269-4021
Or fax to: 860-486-1932 OR scan and email to: bobolinkproject@gmail.com

Vermont – 20 fields, offer totals

«Title» «First» «MidInit» «Last» «Suffix»
«Street_Address»
«City», «State» «ZIP»

ID NUMBER: «ID»
(Use this ID number to pledge online!!)
www.bobolinkproject.com

YOUR PLEDGE CARD

*Any amount helps, but please consider pledging at least **$100** for the first two fields.*
FOR EXAMPLE:** If the project can provide **3-5 fields** I pledge a total of: **$125.
Please fill out all lines in the table below (a blank line means a zero pledge for those fields):

If the Bobolink Project can provide:	I pledge a total of:
1-2 fields	$_____
3-5 fields	$_____
6-10 fields	$_____
11-20 fields	$_____

payment card VT 2013

Shelburne, VT 05482-7619

www.bobolinkproject

YOUR PLEDGE CARD

*Any amount helps, but please consider pledging at least **$60** for the first two fields.*
FOR EXAMPLE:** If the project can provide **3-5 fields** I pledge a total of: **$75.

PLEASE FILL OUT ALL LINES IN THE TABLE BELOW:

PLEASE FILL OUT ALL LINES

If the Bobolink Project can provide:	for a total of:
1-2 fields	$ 75.
3-5 fields	$ 76.
6-8 fields	$ 100.
9-10 fields	$ 125.

Phone #: _____ Email Address: [redacted]

Please note: We will not share personal information with anyone, and will use it only in managing the Bobolink Project and your pled

4440 Route 30
Middlebury, VT 05753-9483

ID NUMBER: A0121B
(Use this ID number to pledge online!)
www.bobolinkproject.com

YOUR PLEDGE CARD

*Any amount helps, but please consider pledging at least **$30** each for the first two fields, for a total of **$60**.*
***FOR EXAMPLE:** If the project can provide **5 fields** I pledge **$15** per field for a potential total of: **$75**.*

PLEASE FILL OUT ALL LINES IN THE TABLE BELOW:

PLEASE FILL OUT ALL LINES

If the Bobolink Project can provide:	I pledge to contribute:	for a potential total of:
1 field	$ 15 per field	$ 15
2 fields	$ 15 per field	$ 15
3 fields	$ 15 per field	$ 15
4 fields	$ 15 per field	$ 15
5 fields	$ 15 per field	$ 15

Phone #: [redacted] Email Address: N/A

Please note: We will not share personal information with anyone, and will use it only in managing the Bobolink Project and your pledge.

payment card VT 2013

Shoreham, VT 05770-9405

(Use this ID number to pledge onlin
www.bobolinkproject.c

YOUR PLEDGE CARD

*Any amount helps, but please consider pledging at least **$60** for the first two fields.*
FOR EXAMPLE:** If the project can provide **3-5 fields** I pledge a total of: **$75.

Please fill out all lines in the table below (a blank line means a zero pledge for those fields):

PLEASE FILL OUT ALL LINES

If the Bobolink Project can provide:	I pledge a total of:
1-2 fields	$ 40
3-5 fields	$
6-10 fields	$
11-20 fields	$

Phone #: [redacted] Email Address: [redacted]

Please note: We will not share personal information with anyone, and will use it only in managing the Bobolink Project and your pled

Burlington, VT 05408-2450

www.bobolinkproject.com

YOUR PLEDGE CARD

*Any amount helps, but please consider pledging at least **$50** each for the first two fields, for a total of **$100**.*
FOR EXAMPLE:** If the project can provide **3-5 fields** I pledge **$25** per field for a potential total of: **$125.

PLEASE FILL OUT ALL LINES IN THE TABLE BELOW:

PLEASE FILL OUT ALL LINES

If the Bobolink Project can provide:	I pledge to contribute:	for a potential total of:
1-2 fields	$ 50. per field	$ 100.
3-5 fields	$ 20. per field	$ 100.
6-10 fields	$ 10. per field	$ 100.
11-20 fields	$ 5. per field	$ 100.

Phone #: [redacted] Email Address:

Please note: We will not share personal information with anyone, and will use it only in managing the Bobolink Project and your pledge.

Please mail to: Stephen Swallow; University of Connecticut-ARE; Unit 4021; Storrs, CT 06269-4021

Vermont 2014 Stepwise question / donations

- Attempt to increase clarity
- Series of questions for consideration of donation commitment versus quantity

- Versus
  - Just a flat donation solicitation treatment

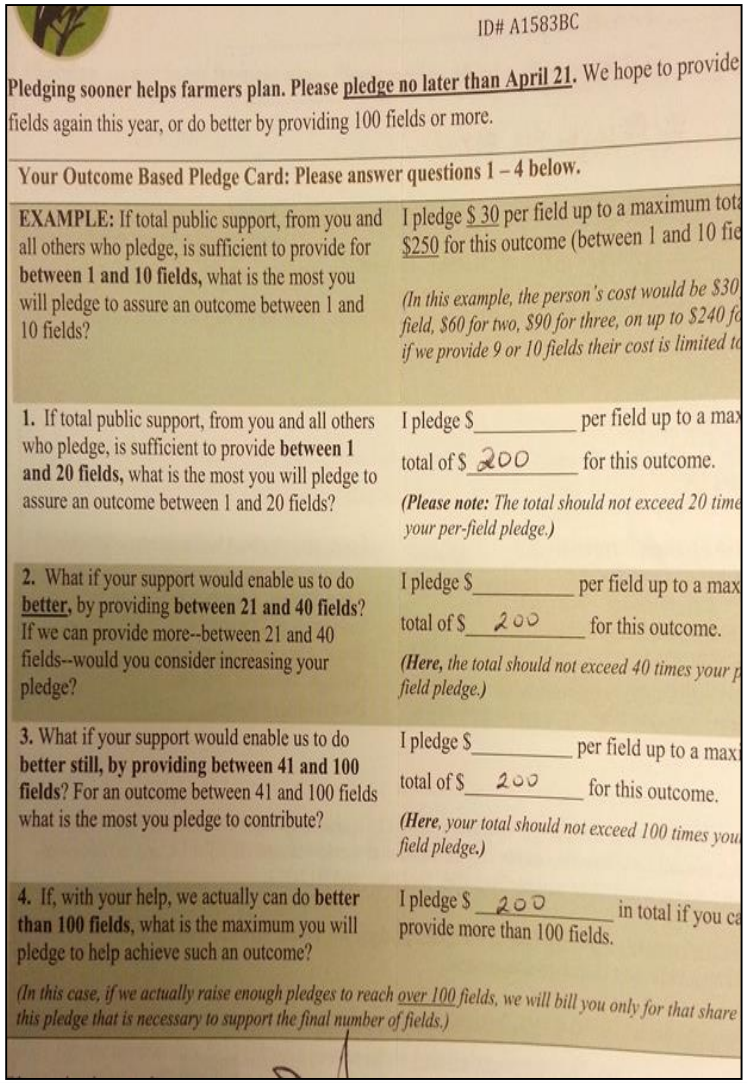
Pledging sooner helps farmers plan. Please pledge no later than April 21. We hope to provide 20 fields again this year, or do better by providing 40 fields or more.

Your Outcome Based Pledge Card: Please answer questions 1 – 4 below.

EXAMPLE: If total public support, from you and all others who pledge, is sufficient to provide for **between 1 and 10 fields**, what is the most you will pledge to assure an outcome between 1 and 10 fields?	I pledge $ 30 per field up to a maximum total of $250 for this outcome (between 1 and 10 fields). *(In this example, the person's cost would be $30 for one field, $60 for two, $90 for three, on up to $240 for 8, but if we provide 9 or 10 fields their cost is limited to $250.)*
1. If total public support, from you and all others who pledge, is sufficient to provide **between 1 and 10 fields**, what is the most you will pledge to assure an outcome between 1 and 10 fields?	I pledge $_____ per field up to a maximum total of $_____ for this outcome. *(Please note: The total should not exceed 10 times your per-field pledge.)*
2. What if your support would enable us to do **better**, by providing **between 11 and 20 fields**? If we can provide more--between 11 and 20 fields--would you consider increasing your pledge?	I pledge $_____ per field up to a maximum total of $_____ for this outcome. *(Here, the total should not exceed 20 times your per-field pledge.)*
3. What if your support would enable us to do **better still, by providing between 21 and 40 fields**? For an outcome between 21 and 40 fields what is the most you pledge to contribute?	I pledge $_____ per field up to a maximum total of $_____ for this outcome. *(Here, your total should not exceed 40 times your per-field pledge.)*
4. If, with your help, we actually can do **better than 40 fields**, what is the maximum you will pledge to help achieve such an outcome?	I pledge $ _____ in total if you can provide more than 40 fields.

(In this case, if we actually raise enough pledges to reach over 40 fields, we will bill you only for that share of this pledge that is necessary to support the final number of fields.)

Example of Payment Card, VT 2014



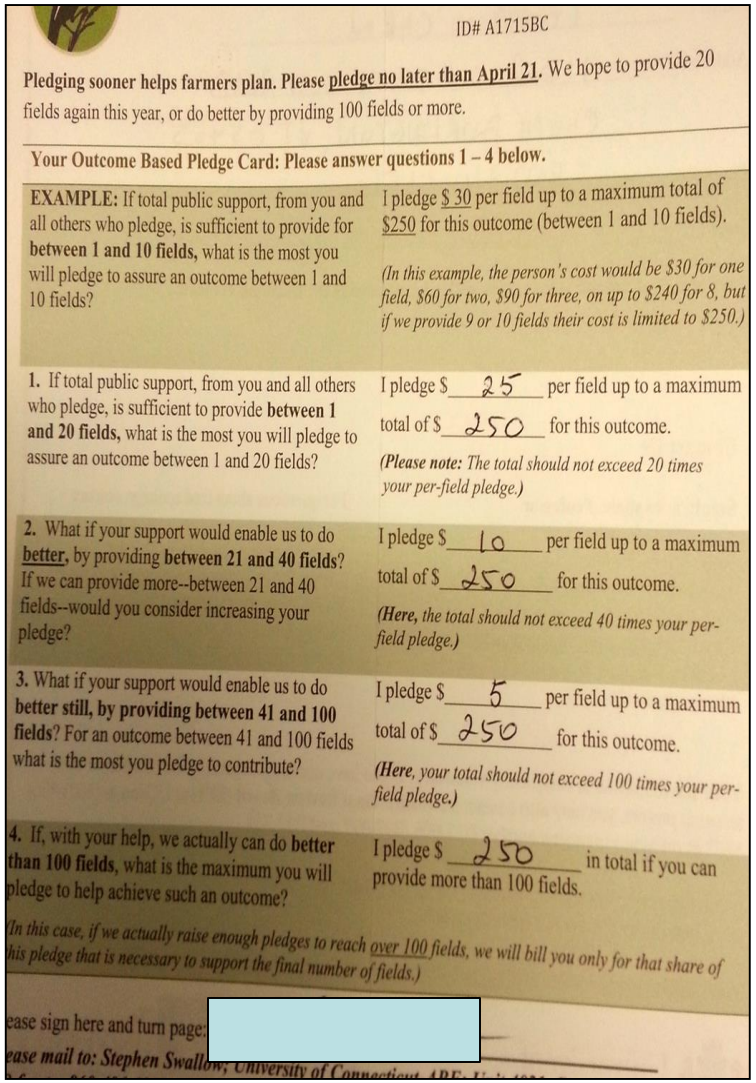
ID# A1583BC

Pledging sooner helps farmers plan. Please pledge no later than April 21. We hope to provide fields again this year, or do better by providing 100 fields or more.

Your Outcome Based Pledge Card: Please answer questions 1 – 4 below.

EXAMPLE: If total public support, from you and all others who pledge, is sufficient to provide for **between 1 and 10 fields,** what is the most you will pledge to assure an outcome between 1 and 10 fields?	I pledge $ 30 per field up to a maximum tota $250 for this outcome (between 1 and 10 fie *(In this example, the person's cost would be $30 field, $60 for two, $90 for three, on up to $240 fo if we provide 9 or 10 fields their cost is limited to*
1. If total public support, from you and all others who pledge, is sufficient to provide **between 1 and 20 fields,** what is the most you will pledge to assure an outcome between 1 and 20 fields?	I pledge $_____ per field up to a max total of $ 200 for this outcome. ***(Please note:** The total should not exceed 20 time your per-field pledge.)*
2. What if your support would enable us to do **better,** by providing **between 21 and 40 fields**? If we can provide more--between 21 and 40 fields--would you consider increasing your pledge?	I pledge $_____ per field up to a max total of $ 200 for this outcome. ***(Here,** the total should not exceed 40 times your p field pledge.)*
3. What if your support would enable us to do **better still, by providing between 41 and 100 fields**? For an outcome between 41 and 100 fields what is the most you pledge to contribute?	I pledge $_____ per field up to a max total of $ 200 for this outcome. ***(Here**, your total should not exceed 100 times you field pledge.)*
4. If, with your help, we actually can do **better than 100 fields,** what is the maximum you will pledge to help achieve such an outcome?	I pledge $ 200 in total if you ca provide more than 100 fields.

(In this case, if we actually raise enough pledges to reach over 100 fields, we will bill you only for that share this pledge that is necessary to support the final number of fields.)



ID# A1715BC

Pledging sooner helps farmers plan. Please pledge no later than April 21. We hope to provide 20 fields again this year, or do better by providing 100 fields or more.

Your Outcome Based Pledge Card: Please answer questions 1 – 4 below.

EXAMPLE: If total public support, from you and all others who pledge, is sufficient to provide for **between 1 and 10 fields,** what is the most you will pledge to assure an outcome between 1 and 10 fields?	I pledge $ 30 per field up to a maximum total of $250 for this outcome (between 1 and 10 fields). *(In this example, the person's cost would be $30 for one field, $60 for two, $90 for three, on up to $240 for 8, but if we provide 9 or 10 fields their cost is limited to $250.)*
1. If total public support, from you and all others who pledge, is sufficient to provide **between 1 and 20 fields,** what is the most you will pledge to assure an outcome between 1 and 20 fields?	I pledge $ 25 per field up to a maximum total of $ 250 for this outcome. ***(Please note:** The total should not exceed 20 times your per-field pledge.)*
2. What if your support would enable us to do **better,** by providing **between 21 and 40 fields**? If we can provide more--between 21 and 40 fields--would you consider increasing your pledge?	I pledge $ 10 per field up to a maximum total of $ 250 for this outcome. ***(Here,** the total should not exceed 40 times your per-field pledge.)*
3. What if your support would enable us to do **better still, by providing between 41 and 100 fields**? For an outcome between 41 and 100 fields what is the most you pledge to contribute?	I pledge $ 5 per field up to a maximum total of $ 250 for this outcome. ***(Here**, your total should not exceed 100 times your per-field pledge.)*
4. If, with your help, we actually can do **better than 100 fields,** what is the maximum you will pledge to help achieve such an outcome?	I pledge $ 250 in total if you can provide more than 100 fields.

(In this case, if we actually raise enough pledges to reach over 100 fields, we will bill you only for that share of this pledge that is necessary to support the final number of fields.)

ease sign here and turn page:

***ease mail to: Stephen Swallow,** University of Connecticut ARE*

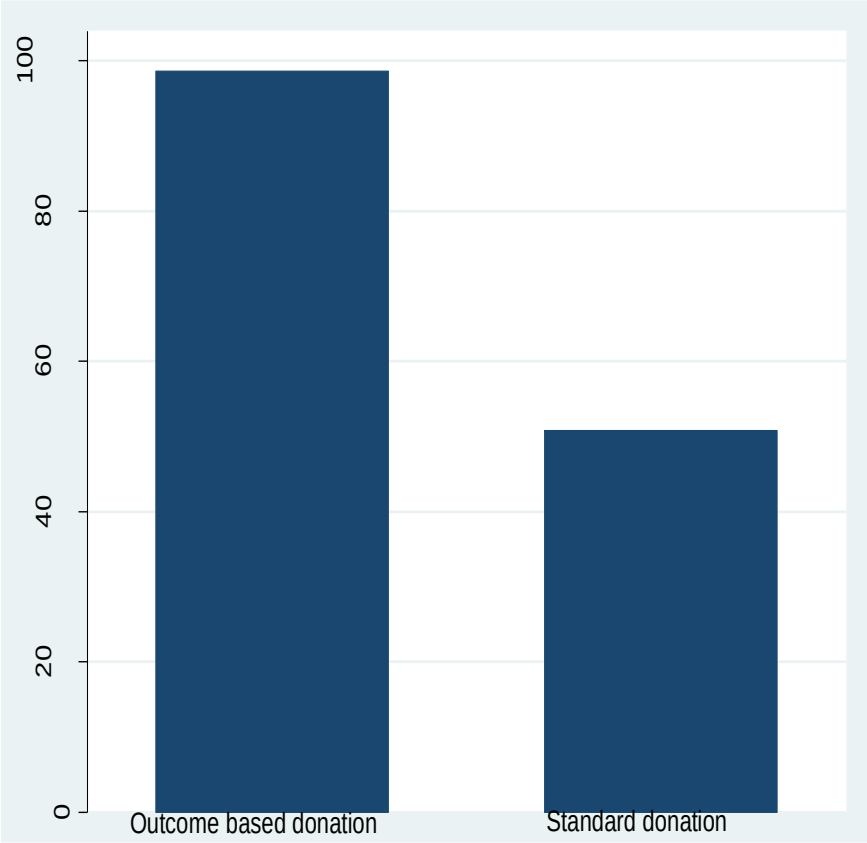
Results (RI 2013)

- **People voluntarily contribute to public goods** affecting a community's quality of life.

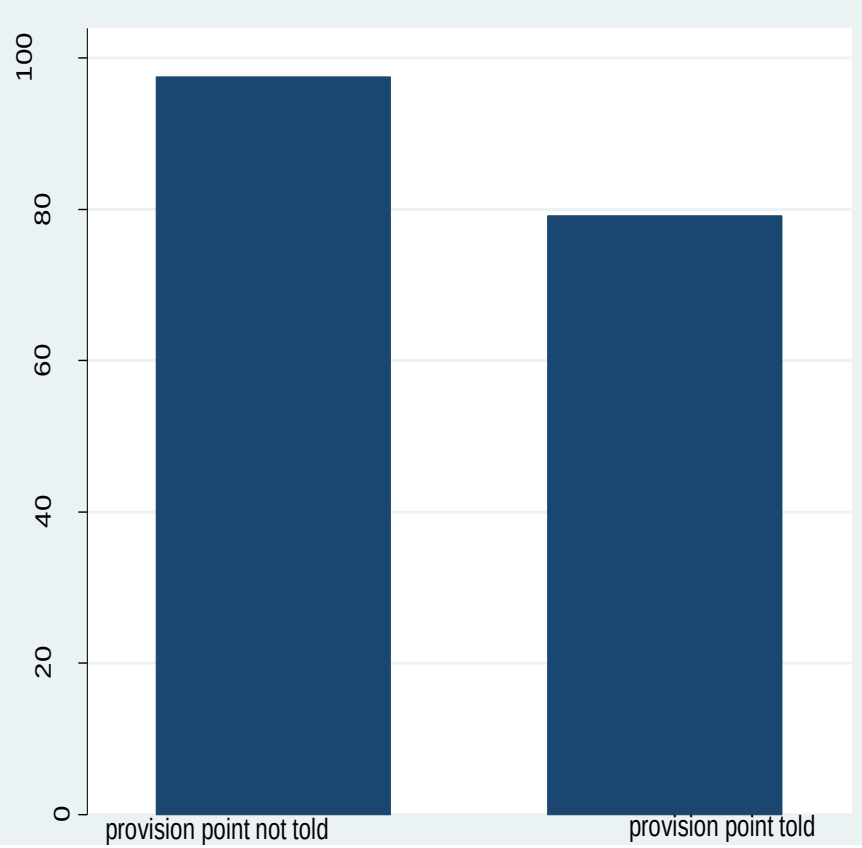
- Rhode Island: **$3,800** in Jamestown and over **$2300** in Aquidneck Island to protect nesting habitat on 40 acres of Rhode Island hayfields.
  - Jamestown field $3800; two Aquidneck fields at $780 each.
  - 99 contributors
- **45%** (Jamestown), **31% (**Aquidneck) **contributed a flat amount**.
- **8.5%** failed to pay pledge (without web option).

Results (RI 2013)

Offer-schedule solicitation generated 90% higher pledges (P=0.0013) than flat donation



Info on provision cost made no significant difference (P=0.82).

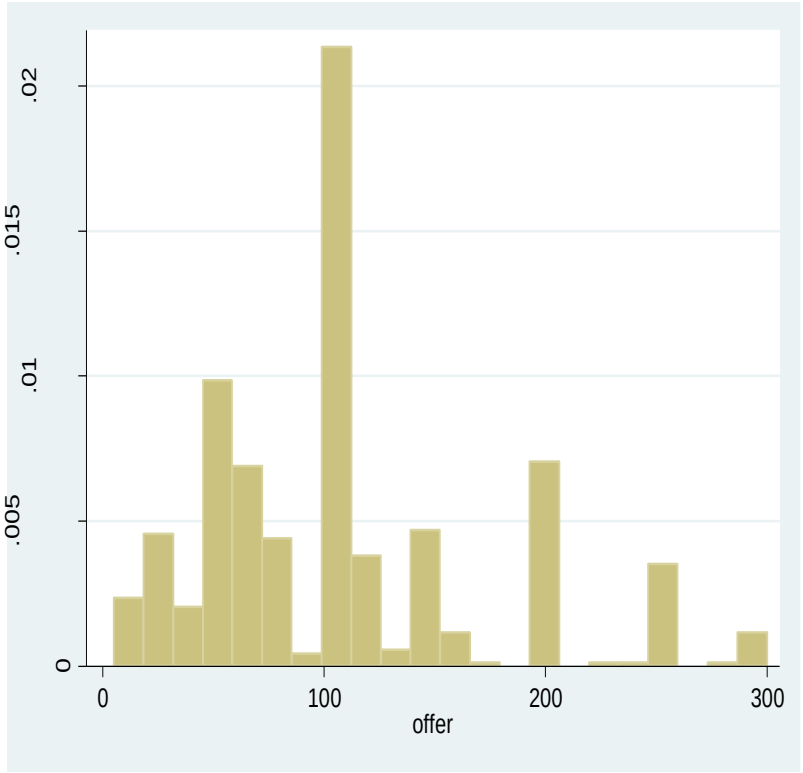


Results (Vermont 2013 and 2014)

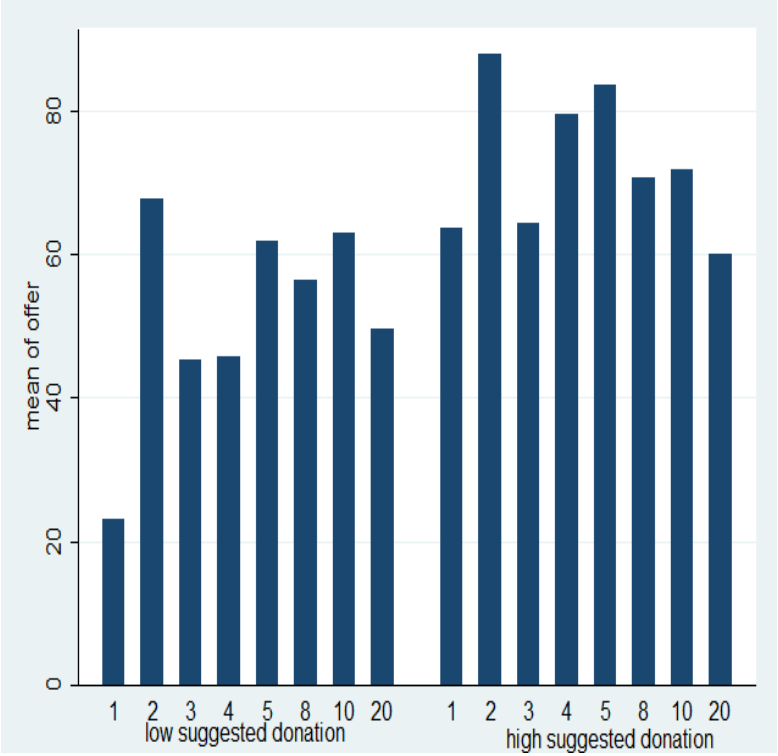
- Both years – about $32,000 from 210 donors (2014) and 234 donors (2014)
- **Higher amount from online donors with same treatment**.
- Some tendency for lower contribution with 5 steps rather than 4 (but not signficant)
- 2013: About 67% donated flat amount, *even using the quantity-based tables*.
- 2014: 80% donated flat amount using quantity-based solicitation, but *on the web* only 41% made a flat donation
- **5.5% failed to pay** pledge.
- Offer range: $10 to $300-$500, outliers at $1000, $2000, and $5000 (paid)

Results (Vermont 2013)

Frequency distribution of offers
(outliers removed: 2 pledges over $2000, one pledge of $1000 and four pledges of $500)

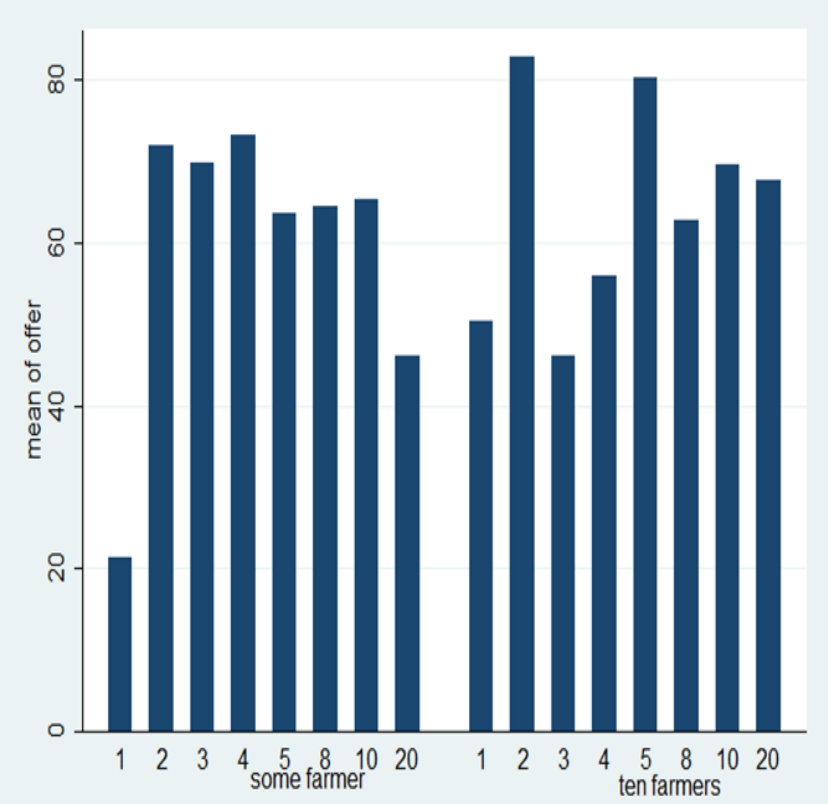


Higher suggested donation generated a significantly higher offers (P <0.005)

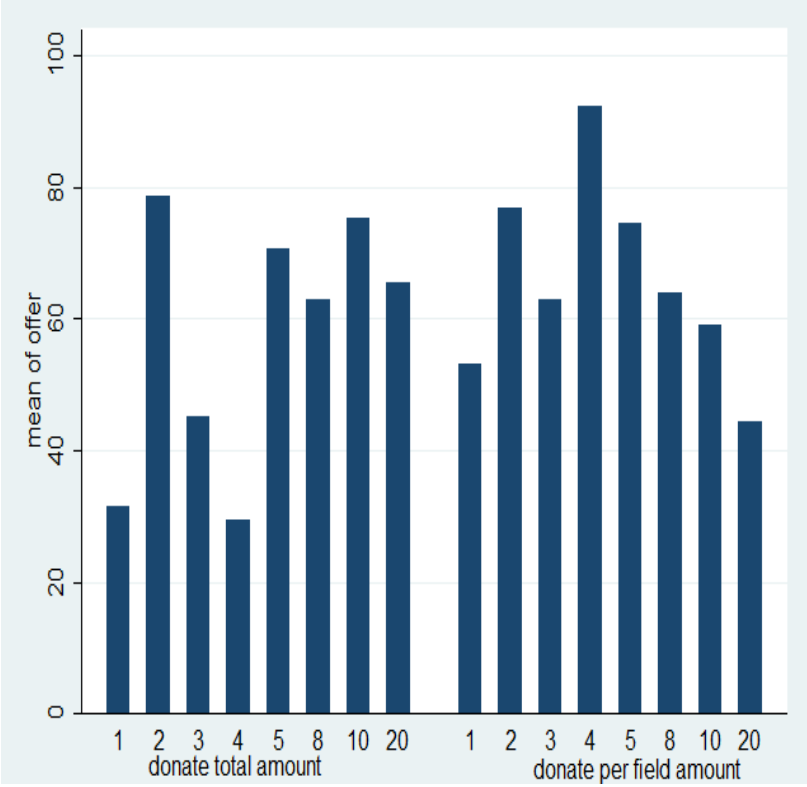


Results (Vermont 2013)

Info on certainty of farmer interest generated higher offers (p <0.08).

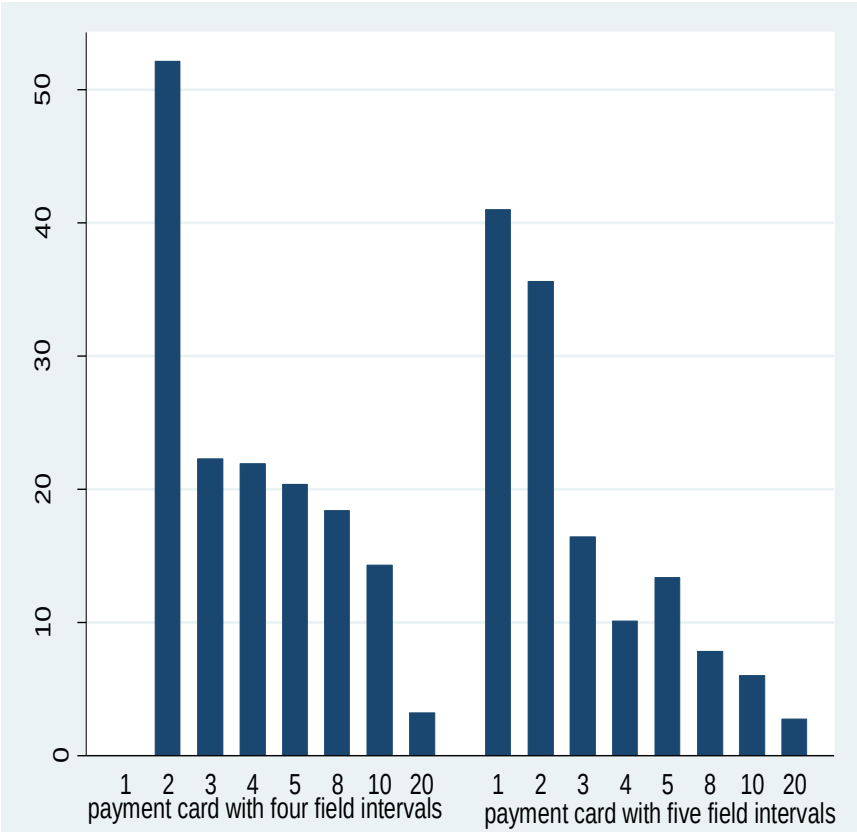


This donor pool donated about the same with per-field solicitation versus flat option (p=0.20)

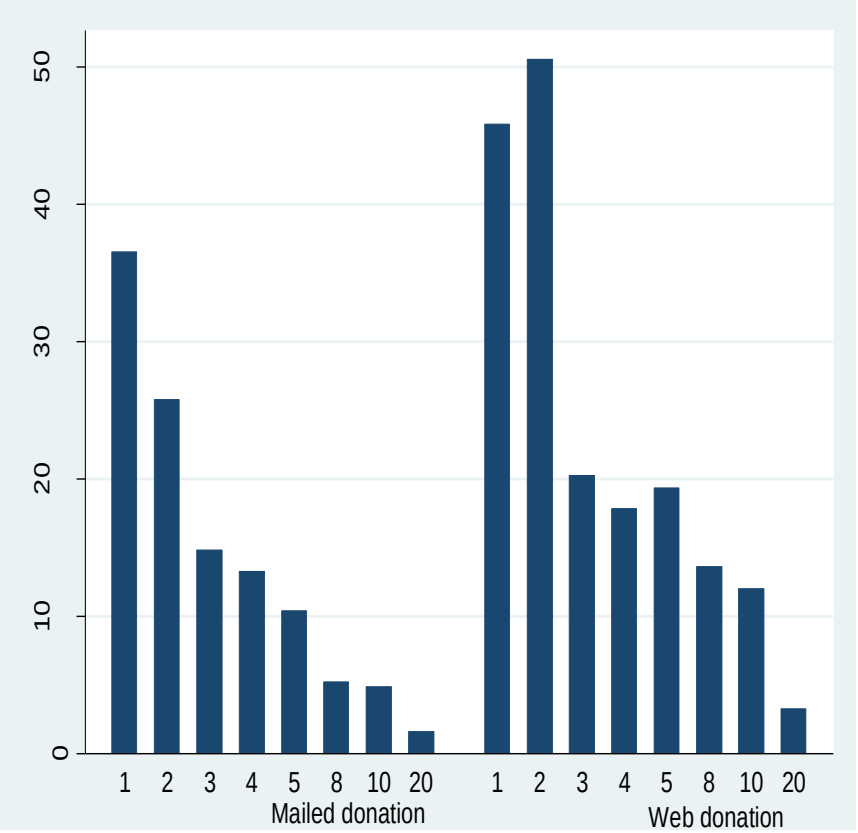


Results (Vermont 2013)

Donations with 5 quantity ranges about same as 4 quantity ranges (P = 0.274).



Donors on-line contributed a significantly more (P=0.04).



Results (Vermont, 2013)

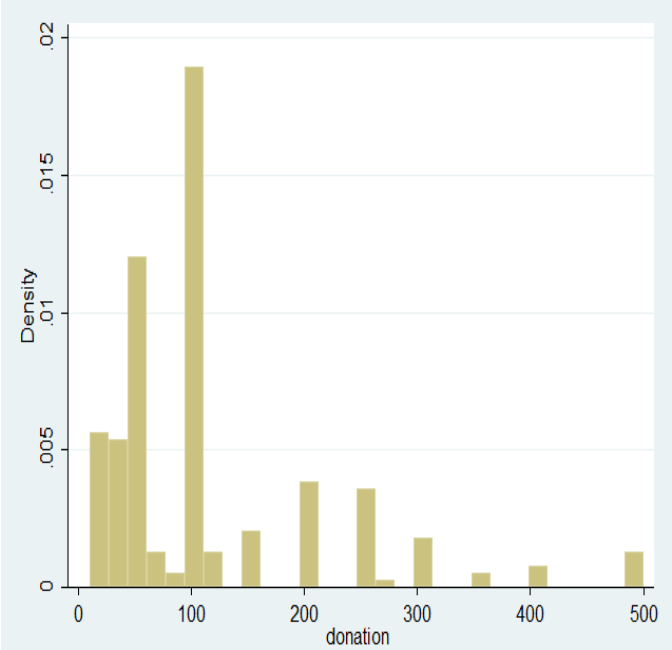
10- or 20-field solicitation: larger donations than 5-field

Probability of flat donation not related to treatment variables

		Log (average contribution)
Log(field)	Log of number of fields	**-0.444*****(0.133)
Sughigh	Sughigh=1 if suggested contribution = high, 0 otherwise	**0.407****(0.143)
Perfield	Perfield =1 if solicitation type is per field, 0 otherwise	0.199(0.155)
Farm10	Farm10= 1 if we have 10 farmers available, 0 otherwise	0.238(0.137)
Max10	Max10=1 for those who contributed for up to 10 fields	**0.498*****(0.135)
Max20	Max20=1 for those who contributed for up to 20 fields	**0.397****(0.151)
L5	L5=1 who made decision on 5 field intervals	-0.163(0.148)
Webdonation	Webdonation=1 for those who donated online	**0.376***(0.189)
Constant		**3.147*****(0.183)
Log(Field)* max10		-0.229(0.149)
Log(Field)*max20		**-0.366****(0.128)
Log(Field)*sughigh		-0.0130(0.0928)
Log(Field)*perfield		-0.0549(0.0951)
Log(Field)*farm10		-0.150(0.0833)
Log(Field)*l5		0.0356(0.0847)
Log(Field)*webdonation		0.123(0.115)
Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$		
R^2		0.437

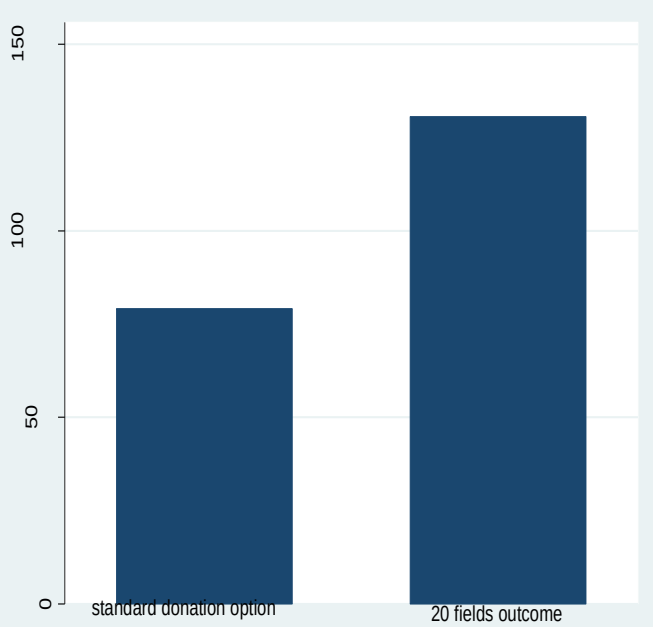
Results (Vermont 2014)

- In 2014, we raised **$32,848** in pledges from **234 donors** and were able to provide **340 acres** of nesting habitat.
- Five farms received **$961.60** for each 10-acre parcel.
- We raised roughly the same amount of money in both years in Vermont, we were able to increase the acreage dramatically by **increasing the competition among farmers.**
- **2%** of bad pledge rates.



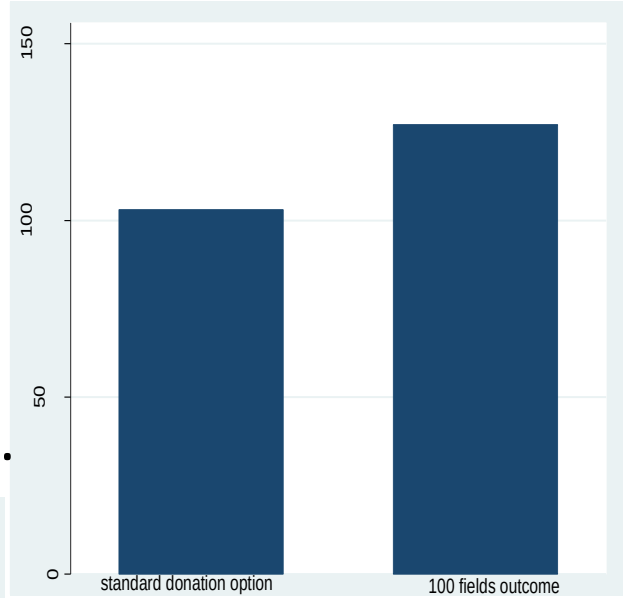
Frequency distribution of donation
(After removing one outlier of $5000)

Results (Vermont 2014)



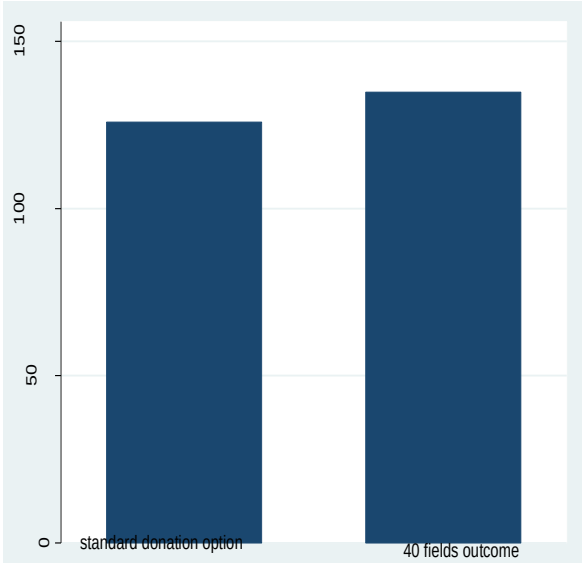
20-fields solicitation generated higher donation (P= 0.0001)

Significantly higher pledges from offer-schedule (quantity based) solicitation, even if donated flat amount (P = 0.0001).



100-fields solicitation generated higher donation (P= 0.0082).

40-field solicitation failed to generate significantly higher donation (P = 0.27)



One Big Obstacle

- Clarity / transparancy … it's "new"
- Reduced Econ Mechanism Advantage
  - "I love this program, but I find your pledge funding too convoluted for me. I pledge $30 …"
  - "I found filling this too confusing! I would rather just make a donation no matter the number of fields."
  - "I'm sorry to say that the mechanics of your pledge drive are most confusing …I hope I'm wrong, but it makes me doubt the success of your project, so I'm only pledging a small amount. I love birds…You had good publicity."
  - Thank you so much for pursuing the Bobolink Project on behalf of one of the most delightful birds on planet Earth!… he wonderful bubbling song in the top of our hawthorn bush… we are so very sad knowing that many young birds are dying…"

Conclusion

- Need to overcome the natural inertia from standard (common) donation approach.
- Design mechanisms to capture the full willingness to pay
- But simple enough so as not to lose revenue from less participation.

- Experimental Economics tests show rules of exchange can increase donations = revenues for private business of ecosystem services

- Field communication and marketing – human behavioral reality – may undermine some advantages

Plan to test Dynamic Flow Chart solicitation 2015

1. How much would you be willing to donate to help us be sure to get between 5 and 10 fields enrolled (we won't do less than 5)?

Enter $ here

"Bobolink Baseline Supporter"

2. Would you consider adding to your donation in order to help us support between 11 and 30 fields?

$ from 1 copied here + Enter additional $ here (may be zero, but we hope not) = Total $ calculated / inserted here

3. Would you consider, again, adding to your donation in order to help us support between 31 and 60 fields?

$ from 2 copied here + additional $ here (may be zero, but we = Total $ calculated / inserted here

4. If your additional donation allows us to get beyond 60 fields, perhaps toward 100 fields or more, what is the donation you will make?

$ from 3 copied here + additional $ here (may be zero, but we = Total $ calculated / inserted here

Test "recognition categories"
Give info on range / typical donations
Give info on needs to sustain or grow past 200-340 acres.

Questions/ Comments?

For more information about the Bobolink Project, please visit

www.bobolinkproject.com

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