

Demographic and Geographic Factors Affecting Site Permissions

NWQMC

Portland, Oregon

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Stream Probabilistic Monitoring Program

**Our Vision: Healthy Kansans living in safe and sustainable environments
Our Mission: To protect and improve the health and environment of all Kansans**

Overview

- Program background
- Site selection protocol
- Why ask these questions?
- Data types examined & methods
- Preliminary results
- Conclusions & next steps

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Kansas Probabilistic Stream Monitoring

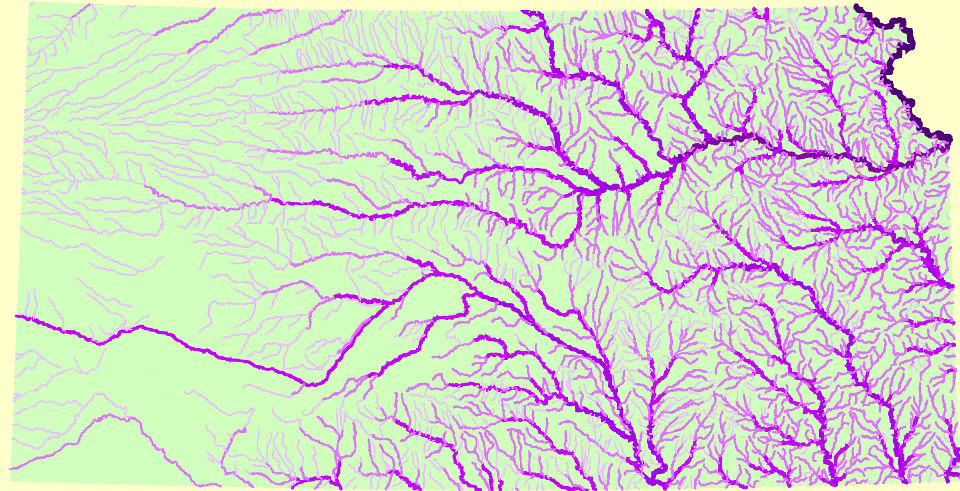


- Program established 2006
 - Complements targeted monitoring
- Program staff: 2 scientists
 - Clerical support from admin assistant
- Sample 30-50 sites/year
 - Macroinvertebrates, habitat, water chemistry, fish tissue chemistry

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Survey Design

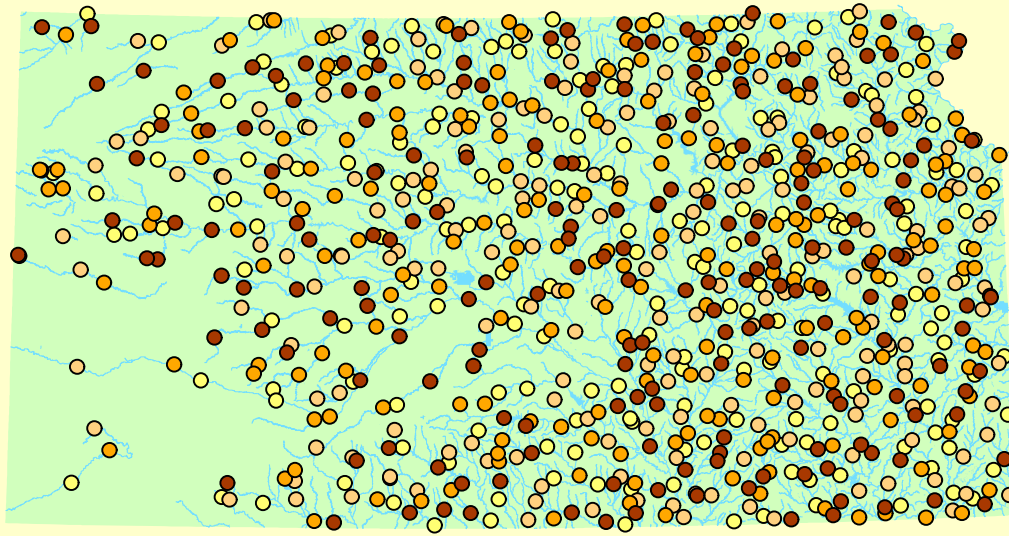
- Sample frame: Kansas Surface Water Register
 - KSWR includes perennial streams as well as intermittent streams that provide important refugia for aquatic life
- Design: Unstratified and unweighted
- Over 80% of Kansas streams have est. median flow ≤ 10 cfs (40% ≤ 1 cfs)
- De facto emphasis on smaller streams



10-year median flow estimates in order-of-magnitude classes from <1 cfs to $>10,000$ cfs (USGS, 2002).

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Site selection process



The 800 prospective sites of Probabilistic Survey Design B, 150 of which will be sampled 2010-2013.

1.
Reconnaissance
 2.
Landowner research
 3.
Permissions
- 2006-2013:
*921 sites to yield 348
sampleable*

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Desk reconnaissance



- Wet/perennial → keep
- Nontarget → discard
- Dry with undefined channel → discard
- Unknown → field reconnaissance



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Field Reconnaissance



- May confirm flow status during prior summer low-flow
- Water chemistry sampling begins first quarter
- Landowner may provide more info

Unique ID = Site # _____ + Access Point ID: [X / A / B / Supp
This point is [X-site / Upstr. Bridge proxy / Dnstr. bridge proxy / S
Access point notes: _____
Stream name _____ County _____
Date & Time _____ Crew initials _____
Lat: _____ Lon: _____
Recent precip & runoff: _____
Current drought status for county (lookup): _____

Water present in visible reach

Flowing or at least continuous in channel
Relative to channel features, water level looks: [Low / No
Apparent current velocity: [Still or backed-up / Slow /
Est. avg. channel width: _____ ft / _____ in || Est. min. wid
Est. avg. channel depth: _____ ft / _____ in || Est. max. dep

Pooled
Number of pools visible: _____ || Est. dimensions of largest
Length: _____ ft / _____ in || Width: _____ ft / _____ in
Are the pools likely connected by hyporheic flow? [Yes /
Are the pools evidently just the result of recent precipitation? ?

Water not present in visible reach
Defined channel present [Yes | No] || If yes, then channel subst
[Aquatic or wetland veg. / Terrestrial veg. / Bare soil or mud /
Water & channel notes: _____

In your judgment, is the reach visible from this access point:

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Landowner Research



- After initial reconnaissance
- Non-trivial time investment
 - Up to 200 sites at a time (for 2-3 yrs sampling)
 - 105 county appraisers
 - Online mapping application or contact by email, phone, or fax
 - Identify relevant owner/s
 - Add phone number from whitepages, if available

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Permissions Packet

The mission of KDHE is to protect the health and environment of all Kansans by promoting responsible choices.

We are grateful to the citizens and landowners of Kansas who provide access to sample the rivers and streams on their property for statewide water quality monitoring. Without their cooperation, this program would not be possible.

CONTACT INFORMATION

For more information about BEFS and its programs, visit our website at [www.kdhe.ks.gov](#)



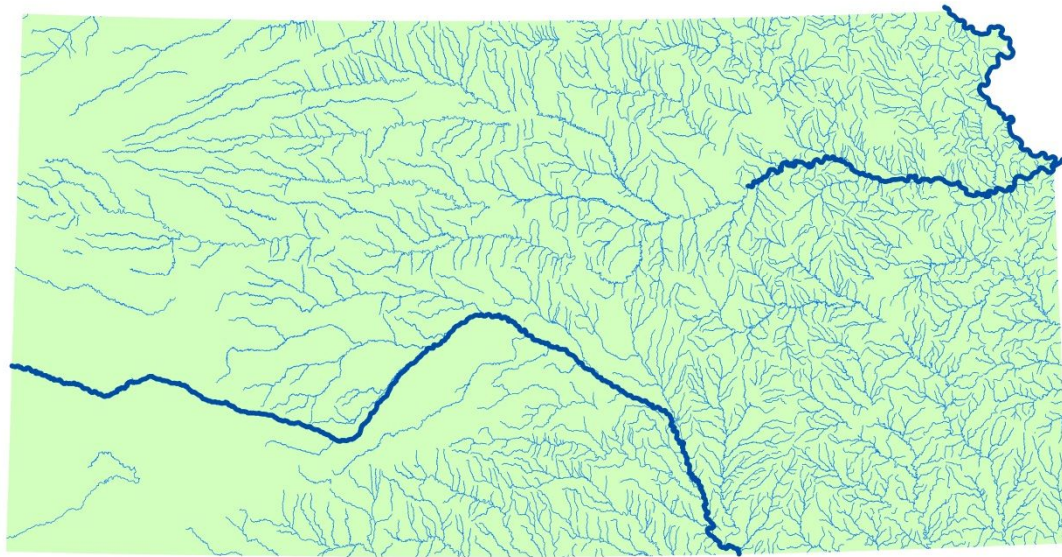
Photo: C. Thompson

Probabilistic Stream

- Brochure
- Letter
- Maps
- Permission form
 - Yes/No/Limited
- Postpaid return envelope
- Follow-up in 4-6 weeks
 - Phone calls or postcard

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Why the questions?



- Legally navigable & accessible waterways: Missouri, Kansas, and Arkansas Rivers.
- All others: Water is owned by the people of Kansas, but streambeds & banks owned by individuals

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Why the questions?

- Many sites are lost in the permission process
- A few citizens, though courteous, are mistrustful of government: “I just don’t want you here.”
- Check for “invisible” factors that could yield obvious bias and affect results
- Aim to improve permission rate: identify and mitigate any factors associated with rejection

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Questions

- Does landowner type (individual, business, organization) bias final site selection?
- Does landowner demographic matter (sex, age, number, whether local or “absentee”)?
- Do site characteristics affect permissions?
 - Stream size, land use in immediate area, region of state, remoteness?
- Emphasis on basic data exploration

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Data Types & Methods

- Started with 921 sites from 2006-2013
 - 521 from Survey Design A + 400 from B
- Reduced to 727 where we sought permissions
 - 625 wet sites
 - Also incl. 102 dry, due to early permissions, drought
- **857 owners**
 - Including 16 for public access sites
- Some sites have multiple owners & vice versa
 - “Sites” and “Owners” data reviewed separately

Augmenting & recoding data

- Simple geospatial calculations
 - Distance from x-site to landowner
 - Most mailing addresses geocoded using ESRI streetmap 2010
 - Many PO boxes replaced with street addresses via lookup in whitepages.com
 - A few uncodeable (e.g., RR, PO boxes) placed on city centroids

Augmenting & recoding data

- Calculated land use in 1-mile radius
 - KS GAP dataset
 - Collapsed into classes: Cropland, Wooded, Prairie, Pasture, Urban
- Distance to nearest Interstate, State, or US highway

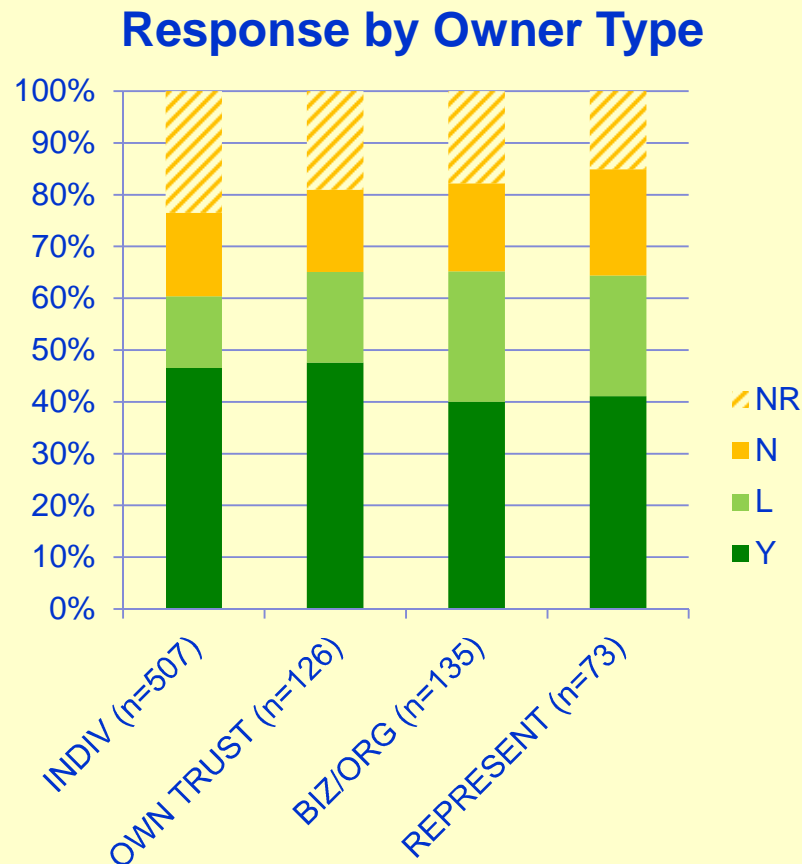


Augmenting & recoding data



- Sex inferred from name for most owners
 - Some unknown (e.g., if biz/org name only)
- Age class available for many individuals at *whitepages.com* (lookup in 2011-12)
- Age/sex retained for “biz” contact names (often smaller ag operations) but not considered relevant for larger orgs
- Many living trusts – assume owner is alive and is the contact, unless a different trustee is named
 - Trusts thus divided into two classes

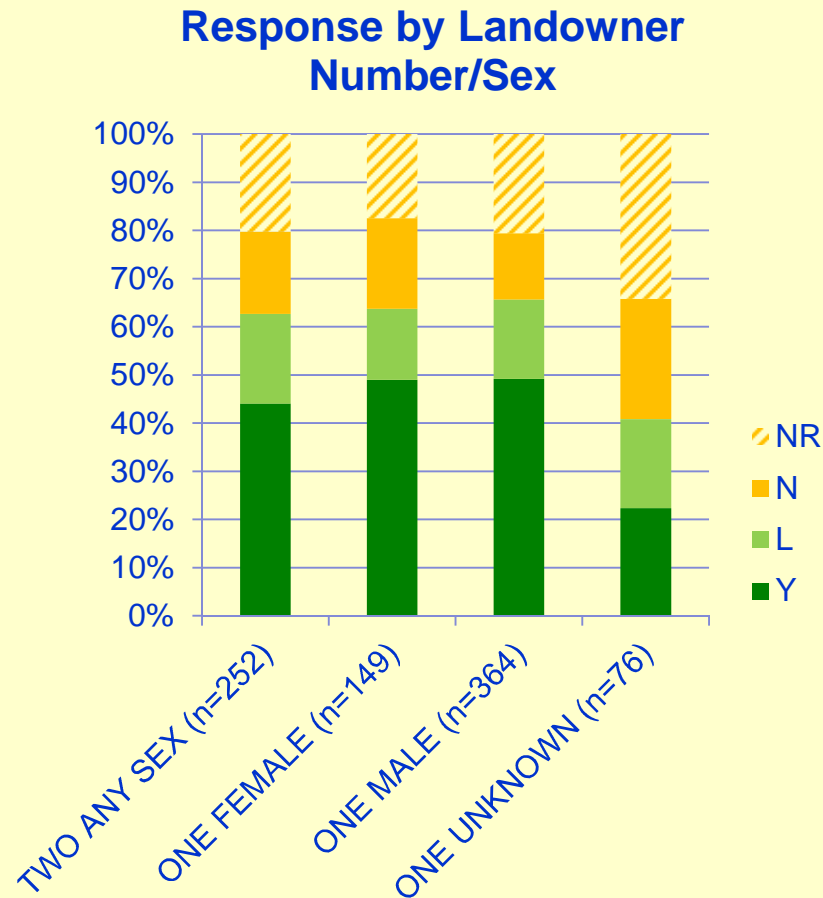
Preliminary Results - Type



- Overall access rates similar, though apparently biz/org/rep may impose more restrictions
- Notes
 - Does not include 16 public access
 - “Representative” is any named person that represents another individual or a group, incl. trusts

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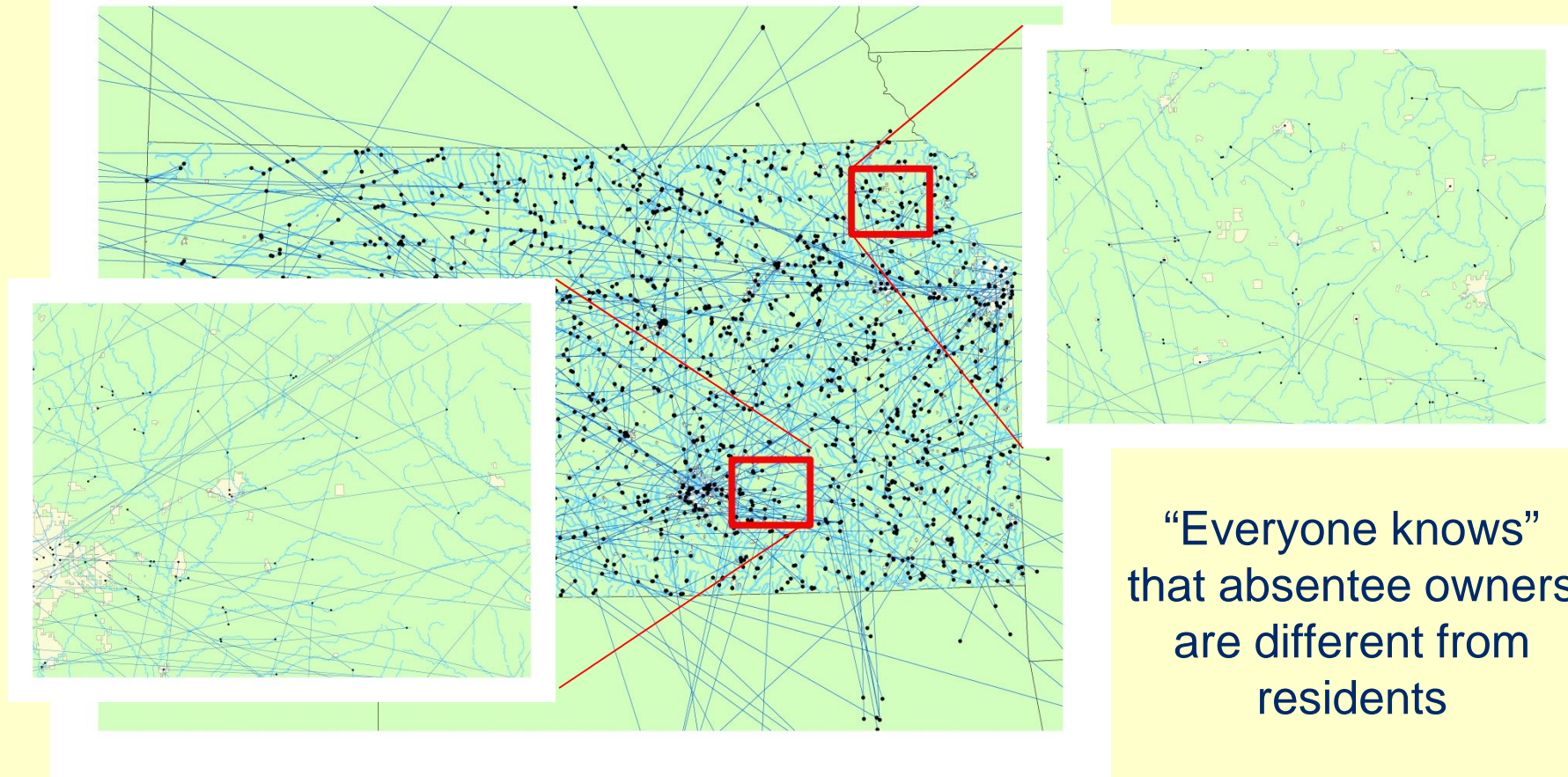
Preliminary Results – Type



- Overall acceptance rates for any one male, female, or any pair appear similar
- **Unknown-sex individual rate obviously lower**
 - These were addressed to “Property Manager” because there was no “c/o”
 - How to reach these?
- **Notes**
 - Does not include 16 public access

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Preliminary Results – Distance

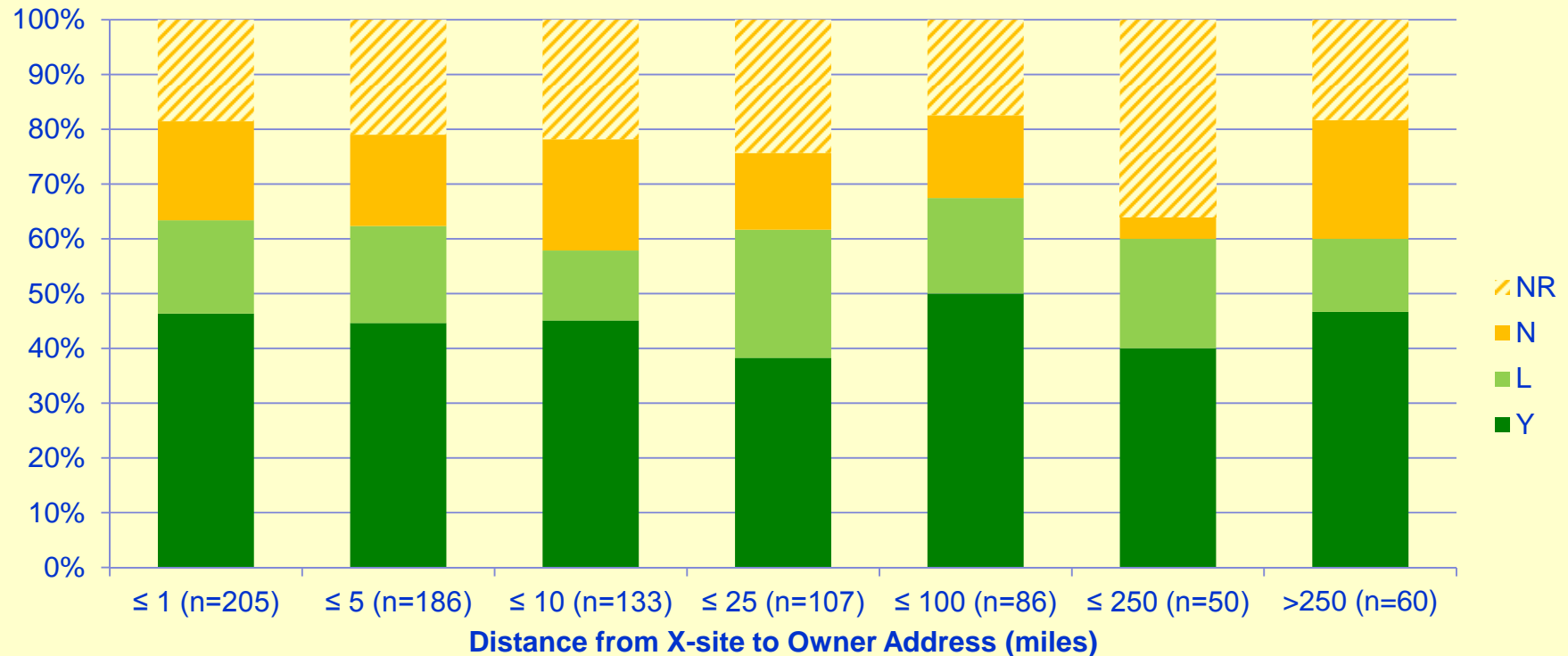


“Everyone knows”
that absentee owners
are different from
residents

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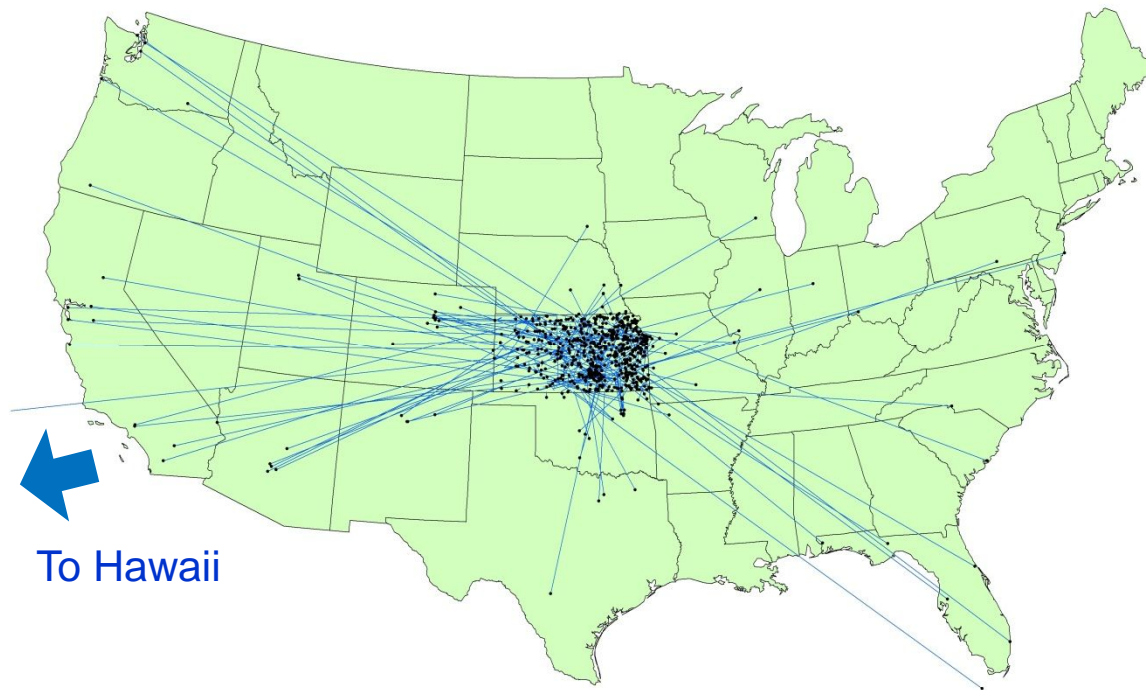
Preliminary Results - Distance

Response by Distance



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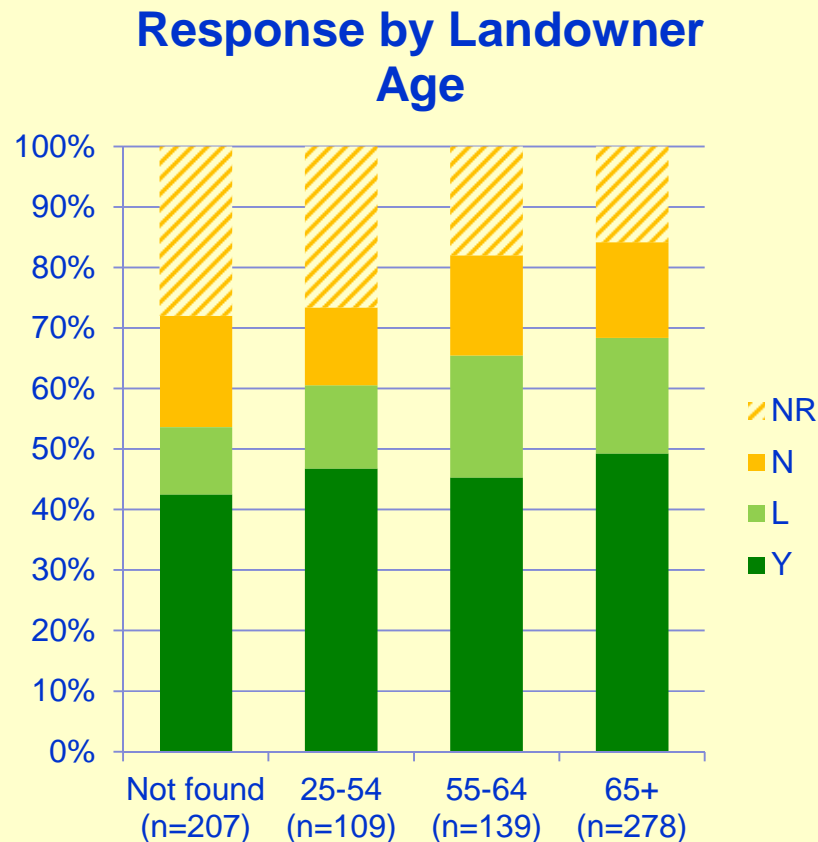
Preliminary Results – Distance



- 89% of owners (762/897) live in Kansas
- Common perception that land is being sold to out-of-staters.
- *Is perception wrong, not detectable here, or could it be that land with surface water is not sold?*

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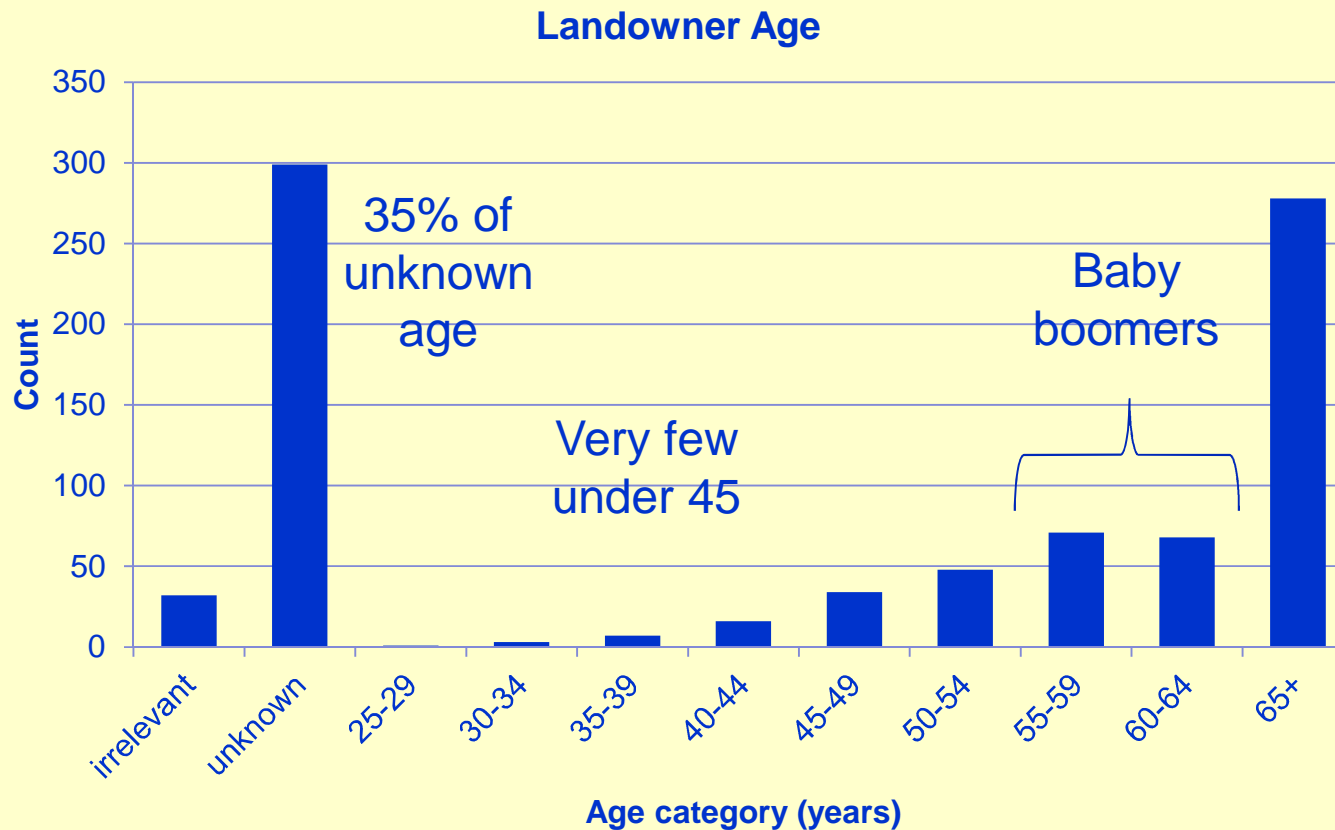
Preliminary Results – Age



- Older owners give more definitive AND more positive responses
- Could “age not found” individuals be those without land phone lines?
- Notes
 - Does not include 16 public access
 - Does not include 124 where age deemed irrelevant (organization, trust representative, etc)

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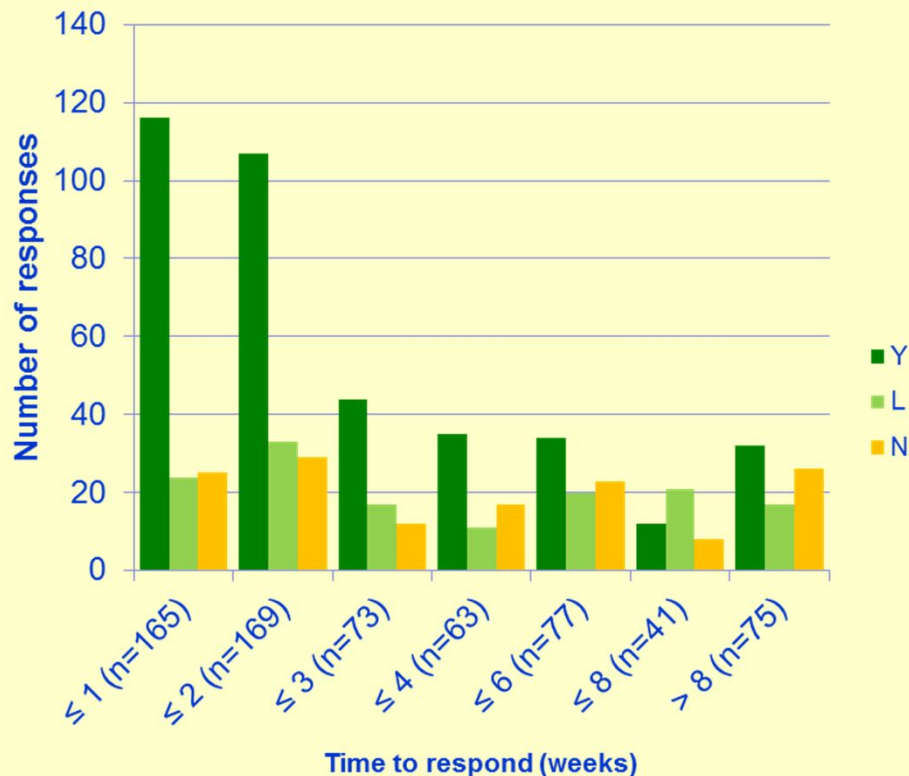
Preliminary Results – Age



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Preliminary Results – Response Time

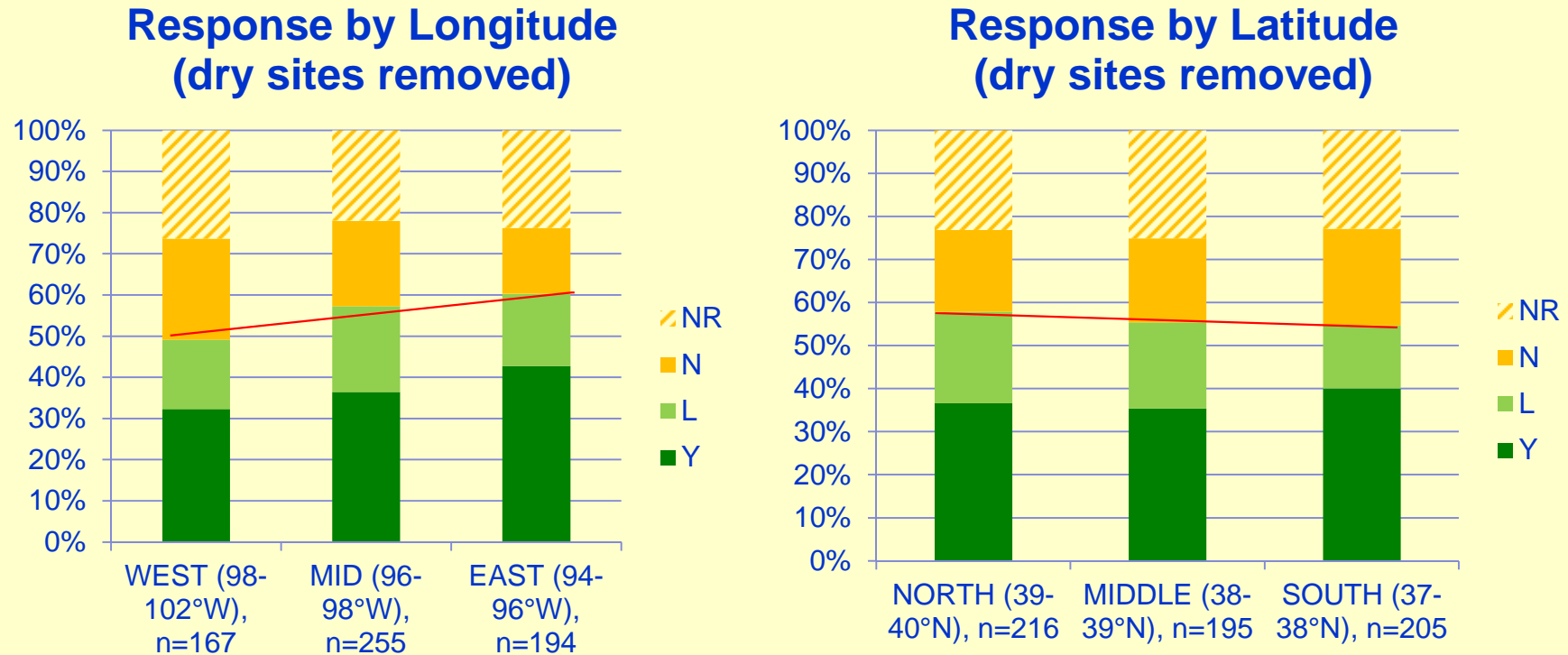
Responses vs. Time



- Early responses are overwhelmingly positive
- Contacts database doesn't currently track
 - Exact deadline
 - Details of follow-up communication
- How best to determine when to give up?
- Notes
 - Does not include 16 public access

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Preliminary Results – Region

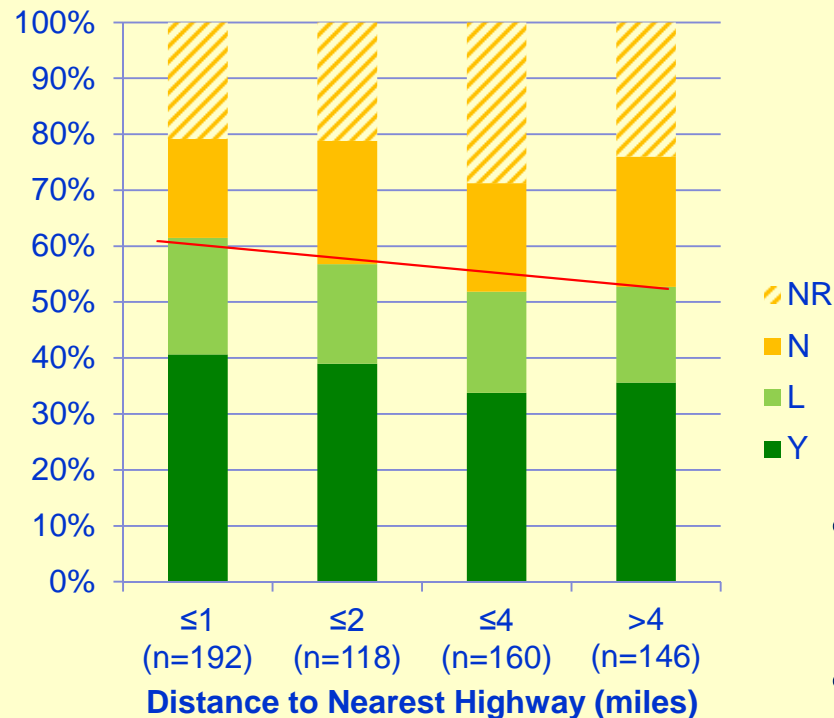


- ***Need to investigate apparent regional biases***

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Preliminary Results – Distance to Road

Response by Road Proximity
(dry sites removed)

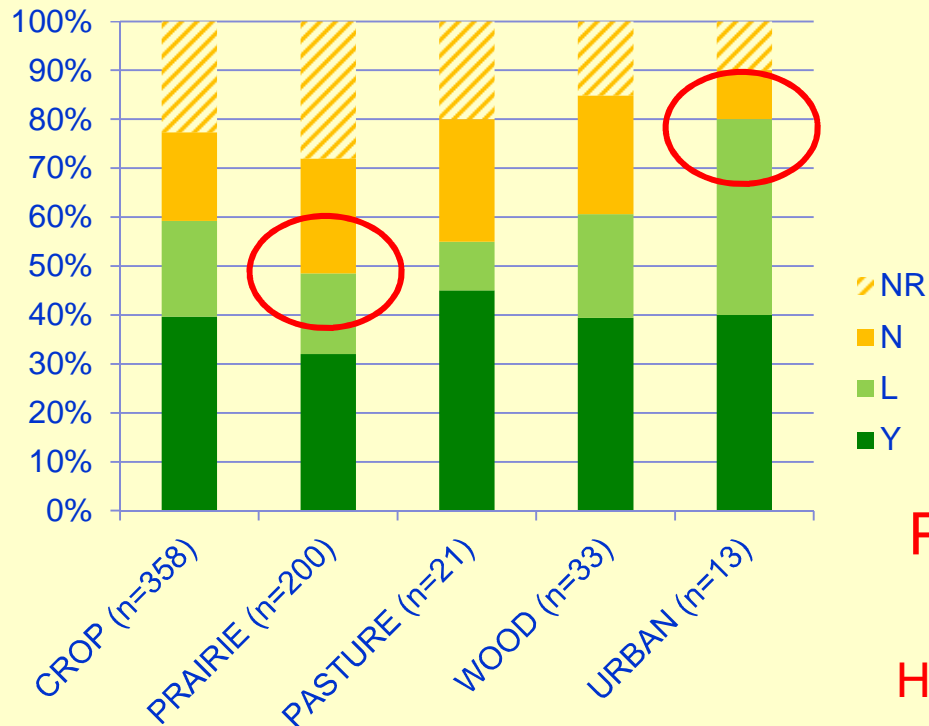


- Permission more likely for sites closer to highways
- Hunch: this is highly correlated with region?

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Preliminary Results – Land Cover

Response by % Dominant Land Cover (1-mile radius)



Prairie lower & urban higher than crop, pasture, woodland?
Hard to interpret, but potentially important

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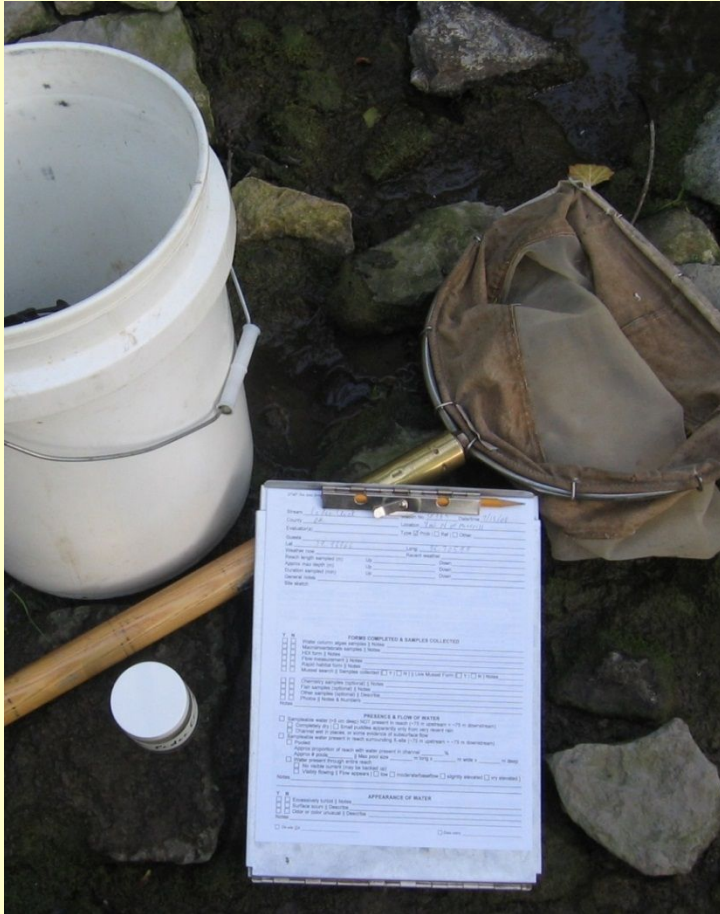
Conclusions

- Most landowners are state residents and over 65
- Older owners respond more positively and more definitively
- Early responses are overwhelmingly positive
- “Property Managers” less likely to reply than named persons



- Apparent regional trends: easier access in NE, harder in SW
- Access appears easier in urban areas? (small n)

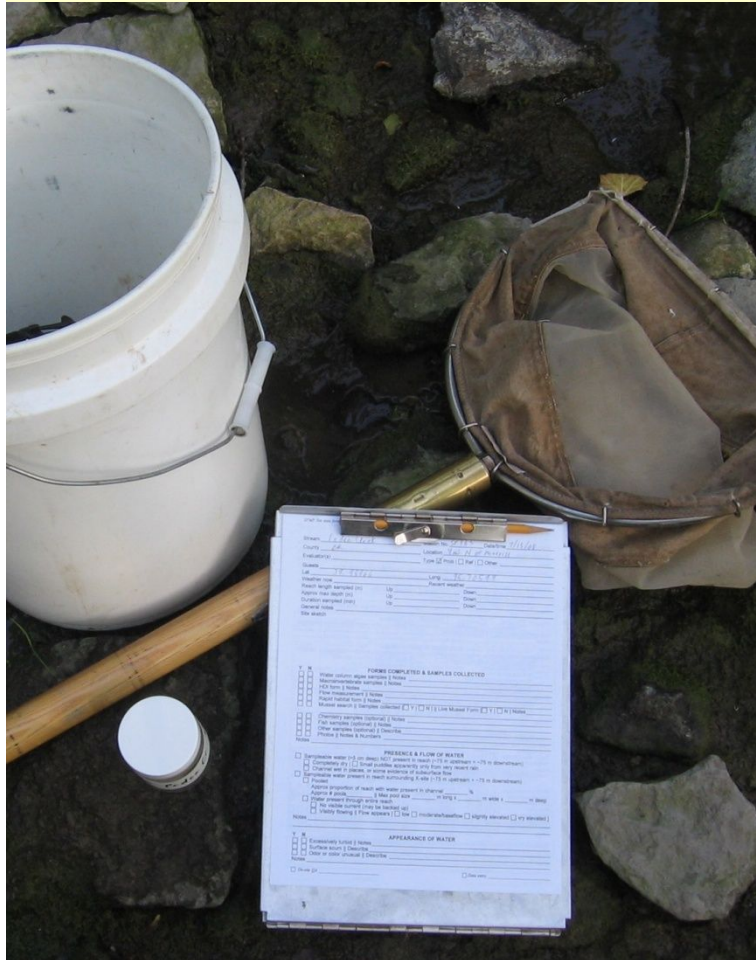
Next steps



- Formal (statistical) examination of variables
- Determine whether biases affect assessment
- Decide whether & how to compensate
- Track followups in database – determine how they affect permissions
- Use County Appraiser's data to infer use: zoning, parcel size, buildings

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Other Considerations



- “Limited” is an important permission category for KS
- How will we get phone numbers when everyone’s mobile?
- Most landowners are over 65 – what does this mean for land ownership over the next 25 years?
- Any probabilistic program manager who has significant site loss from the permissions process should look for biases

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Acknowledgements

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** All at KDHE except Tony, who is everywhere*

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Questions or Suggestions



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