Data mining with grit: The case of youth multi-year fishing and hunting license holders

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Acknowledgements

- Doug Nygren
- Arlan Hair
- Bill Blair
- Connor Chance-Ossowski (CCO)
- Anglers and hunters who completed the survey
Retention, Recruitment, & Reactivation (R3) Efforts in Kansas

- HD research
- RBFF partnership
- Urban Fishing Program\Aquatic Education
- Marketing
- Create\improve fisheries
- Fishing newsletters
- Facebook

- Fishing Atlas
- Fishing Regulation Summary
- Agency web site
- Fishing maps
- Put and take stockings
- Remove barriers to participation
- License data mining\pricing strategies\gap analysis
Youth Multi-year License (YMY)

- Fishing
- Hunting
- Fishing and Hunting Combo
Youth Multi-year License (YMY)

• Offered in 2011
• Only for KS residents
• Ages 16-20
• Valid thru year turn 21
### Youth Multi-year License (YMY)

<table>
<thead>
<tr>
<th>License</th>
<th>Cost</th>
<th>Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual Resident Fishing</td>
<td>$27.50</td>
<td></td>
</tr>
<tr>
<td>Youth Multi-Year Resident Fishing (16-20 years old)</td>
<td>$42.50</td>
<td>$95.00</td>
</tr>
</tbody>
</table>
# Youth Multi-year License (YMY)

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<tr>
<td>Annual Resident Fishing/Hunting Combo</td>
<td>$42.50</td>
<td></td>
</tr>
<tr>
<td>Youth Multi-Year Resident Fishing/Hunting Combo</td>
<td>$72.50</td>
<td>$140.00</td>
</tr>
<tr>
<td>(16-20 years old)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Objective

• To determine if youth multi-year licenses are a useful tool to retain hunters and anglers
MULTI-YEAR YOUTH LICENSES OFFER BARGAIN YEARS

Multi-year licenses offered for fishing, hunting, or in combination; 
spring is perfect time for combo license
PRATT — The Kansas Department of Wildlife and Parks (KDWP) 
now offers a resident multi-year youth hunting and/or fishing 
license, providing convenience and saving money for young 
hunters and anglers. The new youth licenses will be available for 
resident youth age 16 through 20. After purchasing the multi-year 
license, no hunting or fishing license will have to be purchased until 
the person turns age 21. The one-time purchase, multi-year youth 
fishing or hunting license is $40. And while spring turkey season is 
a good time to purchase a multi-year hunting license, fishing season is gearing up. This make is timely to purchase a one-time multi-year youth fishing/hunting combination license for $70.
The best times of your life just got less expensive

She'll be 16 before you know it and off to college in the blink of an eye. Don't miss a single chance to be on the water with your daughter by chasing a multi-year youth fishing license.

The Kansas Department of Wildlife and Parks offers resident multi-year hunting and fishing licenses for youth 16-21. For a one-time investment of $42.50, you can give your teenager a hunting or fishing license that will last until they turn 21. A combination multi-year hunting/fishing license is $72.50. Regular one-year licenses are $20.50, so if you buy your daughter the multi-year fishing license for her sixteenth birthday, you'll save more than a hundred bucks!

And you'll be investing in more time with your teenager. Your license dollars help fund Kansas' wildlife and fisheries management and conservation programs.

Libby Hancock, Northwest H.S.
Libby is a sophomore at Northwest High and participates in cross country, softball and track for the Grizzlies and has lettered in cross country and track. Libby carries a 4.0 GPA, belongs to the FCA and Newsmagazine at school and volunteers for child care at her church. When outdoors, Libby enjoys hunting and trap shooting. Her special outdoor trophy is a 10-point buck she shot last year while hunting with her dad. After high school, Libby plans to attend college and go into the medical field.

Like camo, we've got you covered.
Enjoying the outdoors shouldn't break the bank. That's why we've created money-saving, multi-year fishing and hunting licenses for residents age 16-21.

Are you a resident age 16-21 who enjoys the outdoors? Consider getting a multi-year fishing and hunting license. For a one-time investment of $42.50, you can have a fishing or hunting license, or for $72.50 a combination multi-year hunting/fishing license that will last through the year you turn 21. That's up to five years of hunting and fishing for less than $15 a year!

Visit ksoutdoors.com or call 1-800-918-2877 to get yours today.
Methods

- Data mining license database using SAS Enterprise Guide 7.1
Methods

- Data mining license database using SAS Enterprise Guide 7.1
Methods

• N = 3,000
• Randomly-selected from license files
• Mixed-mode mail and internet
• Three mailings July and August
License Sales for Ages 16 - 20

<table>
<thead>
<tr>
<th>Year</th>
<th>Annual License</th>
<th>YMY</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>323</td>
<td></td>
</tr>
<tr>
<td>2016</td>
<td>20,293</td>
<td>2,930</td>
</tr>
<tr>
<td>2015</td>
<td>23,253</td>
<td>2,082</td>
</tr>
<tr>
<td>2014</td>
<td>24,364</td>
<td>1,755</td>
</tr>
<tr>
<td>2013</td>
<td>24,704</td>
<td>1,638</td>
</tr>
<tr>
<td>2012</td>
<td>25,827</td>
<td>1,531</td>
</tr>
<tr>
<td>2011</td>
<td>25,563</td>
<td>1,634</td>
</tr>
</tbody>
</table>
Who is purchasing a YMY?
Are there differences in who is and isn’t purchasing a YMY?

• Look at variables we have available in license database to determine significant predictors
  • Where bought – vendor
  • When bought – specific year, month, season
  • Gender – male versus female
Results – pre-survey data mining

- **Sex**
  - $\chi^2 = 553.043$, df = 1, $P < 0.001$
  - Males have 1.8 times the odds of purchasing a YMY than Females.

<table>
<thead>
<tr>
<th></th>
<th>No YMY</th>
<th>Yes YMY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>91,785</td>
<td>8,431</td>
</tr>
<tr>
<td></td>
<td>71%</td>
<td>82%</td>
</tr>
<tr>
<td>Female</td>
<td>37,097</td>
<td>1,846</td>
</tr>
<tr>
<td></td>
<td>29%</td>
<td>18%</td>
</tr>
</tbody>
</table>
Results – pre-survey data mining

• Where License Purchased

<table>
<thead>
<tr>
<th>Where License Purchased</th>
<th>No YMY</th>
<th>Yes YMY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Superstores</td>
<td>415,266</td>
<td>5,670</td>
</tr>
<tr>
<td>Internet</td>
<td>79,562</td>
<td>1,871</td>
</tr>
<tr>
<td>KDWPT Offices</td>
<td>61,342</td>
<td>1,273</td>
</tr>
</tbody>
</table>

• $\chi^2 = 764.557$, df = 13, $P < 0.001$
Results

- N = 3,000
- Randomly-selected from license files
- Mixed-mode mail and internet
- Three mailings July and August
- 802 useable surveys
- 30% response rate
- Weight data to correct for nonresponse bias
Who purchased your YMY license?

- Parent(s)
- Myself
- Other family member
- I don't remember
- Friend
- Other
Was this license purchased for you as a gift?

- No: 60%
- Yes: 30%
- I don't remember: 10%
How did you know or hear about the YMY?

- From the license vendor: 35%
- Word of mouth: 30%
- I didn't know about the YMY until I received it as a gift: 15%
- From the fishing or hunting regulations summary: 10%
- I don't remember: 5%
- Other: 5%
How important would you say the YMY was to your fishing or hunting participation?

<table>
<thead>
<tr>
<th>Category</th>
<th>Fished</th>
<th>Hunted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fished/Hunted every year anyway</td>
<td>55</td>
<td>60</td>
</tr>
<tr>
<td>Fished/Hunted most but not every year</td>
<td>20</td>
<td>10</td>
</tr>
<tr>
<td>Occasionally fished/hunted, but not all years</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>Would not have fished/hunted at all</td>
<td>10</td>
<td>5</td>
</tr>
</tbody>
</table>
Who primarily taught you how to fish or hunt?

- Parent(s): 79.5% (Fish), 73.0% (Hunt)
- Grandparent: 9.5% (Fish), 5.7% (Hunt)
- Self-taught: 4.2% (Fish), 4.2% (Hunt)
- Other family member: 3.3% (Fish), 7.3% (Hunt)
- Friend: 2.8% (Fish), 5.9% (Hunt)
- Other: 0.6% (Fish), 1.9% (Hunt)
- Fishing clinic/Youth: 0.2% (Fish), 2.0% (Hunt)
Was there a change in fishing/hunting participation rate after the purchase of the YMY?

- Paired t-test to compare participation rate before and after purchase of YMY

<table>
<thead>
<tr>
<th>Year</th>
<th>Did you go fishing?</th>
<th>Did you go hunting?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Example: 2011</td>
<td>Yes / No / I don’t remember.</td>
<td>Yes / No / I don’t remember.</td>
</tr>
<tr>
<td>2011</td>
<td>Yes / No / I don’t remember.</td>
<td>Yes / No / I don’t remember.</td>
</tr>
<tr>
<td>2012</td>
<td>Yes / No / I don’t remember.</td>
<td>Yes / No / I don’t remember.</td>
</tr>
<tr>
<td>2013</td>
<td>Yes / No / I don’t remember.</td>
<td>Yes / No / I don’t remember.</td>
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<tr>
<td>2016</td>
<td>Yes / No / I don’t remember.</td>
<td>Yes / No / I don’t remember.</td>
</tr>
<tr>
<td>2017</td>
<td>Yes / No / Unsure</td>
<td>Yes / No / Unsure</td>
</tr>
</tbody>
</table>
Was there a change in fishing/hunting participation rate after the purchase of the YMY?

**Mean participation rate BEFORE YMY**

- Fishing 78.3%
  
  \[ t = 3.89, \text{df} = 646, P < 0.001 \]

- Hunting 63.2%
  
  \[ t = 2.43, \text{df} = 563, P = 0.015 \]

**Mean participation rate AFTER YMY**

- Fishing 83.4%
  
  *effect size small, d = 0.08*

- Hunting 66.8%
  
  *effect size small, d = 0.05*
### Data mining – Results

Evidence of retention...?

<table>
<thead>
<tr>
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<th>No YMY</th>
<th>Yes YMY</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age 17 in 2011</strong></td>
<td>5,594</td>
<td>383</td>
</tr>
<tr>
<td><strong>Retained in 2016 at age 22</strong></td>
<td>2,753</td>
<td>319</td>
</tr>
<tr>
<td><strong>Percent Retained</strong></td>
<td>49%</td>
<td>83%</td>
</tr>
</tbody>
</table>
Conclusions

• Are we just offering a bargain to those individuals who would have purchased an annual license each year anyway?
  • Do us more harm than good – Certified Anglers and Hunters for Fed Aid allotment?

...To be determined
How important would you say the YMY was to your fishing or hunting participation?

- Fished/Hunted every year anyway
- Fished/Hunted most but not every year
- Occasionally fished/hunted, but not all years
- Would not have fished/hunted at all

Percent

Fished
Hunted
Conclusions continued

• We must get to the Parents!
  • Recommender system at point of sale
  • Data flux household ID

• “We noticed Jimmy’s license is about to expire. Would you like to renew his license as well? We have a multi-year license that would save you $95.

• Majority are not gifts, just a part of being a parent and buying something to support their children.
Conclusions continued

Constraints we can’t necessarily impact, like major life events, or we would have to get creative...?

Move out of state

More leaving than coming into KS
Conclusions continued

• Results are encouraging
• Need more time for cohorts to age out of the license
• Survey YMY holders
  • Fishing and hunting participation over time
  • YMY license keep them engaged in the sport?
Conclusions continued

• In 2016: KDWPT implemented a 5 year license available to all residents

• Similar analysis with that group
Questions...?