Changing Consumer Willingness to Pay: a time series evaluation of factors impacting Floridians' desire to preserve water resources

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Abstract

This study sought to gauge Florida's consumers' willingness to pay for protecting the future of Florida's water supply from 2013 to 2016. This study used a value approach for estimating consumer's willingness to pay for a 10 percent and a 50 percent increase in their water bill. The study also sought to identify dissonance between Florida's consumers to determine influencers of their willingness to pay. The study found an increasing percentage of consumers willing to support the protection of Florida's water supply since 2013. As well, income was a common factor influencing respondent's willingness to pay. Knowing this dissonance can help decision makers make informed polices and regulations about future water conservation strategies for the future.

Introduction

It is projected that nearly 80% of the world population faces potential threats to water security (Vorosmarty et al., 2010). A lack of water security means threats to a fundamental resource that is integral in food and energy production, transportation, infrastructure development, and health (Gleick, 1993). According to Young and Loomis (2014) water has four unique features that make it both difficult and necessary to estimate its economic value, including: physical attributes, water demand, social attitudes, and political considerations. Therefore, distinguishing the value of water has been problematic and many decisions on the usage of water have been in favor of allocating the resource to less valuable purposes (Young & Loomis, 2014). To ensure proper resource management, and to prevent exploitation of water, it is imperative that agriculturalists and economists be able to determine the factors that shape the consumers value for the resource.

Demand over water sources will grow alongside conflicts and tension as an exponentially increasing population draws on the resource for agricultural, industrial, and economic development (Madani, 2010). This rising demand coupled with a finite supply of water equates to an increasing cost for the vital resource (Water Supply and Demand, n.d.). The state of Florida is no exception. Projections provided by the Bureau of Economic and Business Research estimate Florida's population will grow from between 23,000,000 to approximately 29,000,000 by the year 2040 (Smith & Rayer, 2013). The state has also seen frequent issues with water quality including algae bloom and spring degradation (Drumm, n.d.). To help mitigate these issues Florida has an established water management system designed around four districts: St. Johns River, Suwannee River, South Florida, and Southwest Florida water management (Water

management districts, n.d.). The districts work to provide programming, information, and expertise to properly manage Florida's water. Florida's increasing population and water resource degradation make it a central state to observe and its established water management districts are prime partners for future implementations.

A growing false belief is held over the abundance of the water supply and this ideology has led to a host of the world's water problems (Dell, 2010). Often times it is only during moments of stress, such as a severe water shortage, that the realization of the finite nature of water is accepted. The 2013-2017 drought in California attracted global attention as the state suffered and fought over the limited amount of available water (U.S. Drought Monitor- California, n.d.). However, the problems facing water are not only with droughts, but also are over concerns of wasteful water use and pollution from all types of consumers (Geller, Erickson, & Buttram, 1983). Floridians have been exposed to algae blooms frequently, but some of the most newsworthy blooms have grown recently from Lake Okeechobee watershed (Kennedy, 2016). The significance of these events cannot be understated and knowing the impact these water scares have on consumers is important for future water conservation strategies. Therefore, research should be conducted gauging changes in consumers' perception on the importance of water conservation. Frequent exposure to poor water conditions may be a stimulus for Floridians to protect the resource.

Floridians exposure to water degradation can be one of a few stimulants to encourage preservation, another could be economic growth. The United States has seen an increase in Economic growth since the 2008-2009 Great Recession. The state of Florida began seeing marginal growth in 2010-2011 as consumers were still recovering the recession and rebuilding

their trust in the economy (Florida Economic Outlook, 2017). The state began to see further strides toward recovery between 2012-2013 and 2015-2016 (Florida Economic Outlook, 2017). The Florida Economic Estimating Conference then declared a “return to normalcy” during 2016-2017 and projected to continue in the future (Florida Economic Outlook, 2017). Florida’s increasing economic stability can be a strong influencer of consumers’ willingness to pay. Water conservation efforts must be made by every industry in order to protect the resource from degradation and universally one aspect that can help curb consumption is through prices (Water for the future, n.d.). It has been recognized that changes in prices and pricing system can have significant effects on water consumption (Water for the future, n.d.). Other factors associated with impacting water consumption include the adoption of water saving technologies, best management practices, and programs of education. However, it has been shown that high water prices encourage investment in water saving technologies and an emphasis on management practices (Water for the future, n.d.). Therefore, future water demand strategies should focus on price for it not only discourages overuse, but also stimulates innovation.

This study hopes to evaluate consumer’s willingness to pay for water conservation efforts from 2013 to 2016 to determine if there are any shifts in consumers support of water preservation. The researchers also will identify factors that influence a consumer’s willingness to pay for water preservation in Florida. By exploring the socioeconomic factors that influence a consumer’s willingness to pay then decision makers can make informed policies and programs that capitalize on this information. Recognizing the trends and changes seen in consumer’s

annually and knowing the socioeconomic factors that consumers have dissonance in will better inform decision makers of appropriate water conservation strategies.

Literature Review

Researchers have explored a variety of methods for estimating the value of water. A study by Lund (1995) focused on using mathematical programming as an approach for determining water customers' willingness to pay for water reliability. This approach could be effective for suggesting water conservation programs that are specific to a customer's economic status (Lund, 1995). Mathematical programming is considered superior to other approaches because it values an entire probability distribution of shortage levels, as opposed to examining single shortage levels with different probabilities (Lund, 1995). Lund notes that mathematical programming has disadvantages when compared to contingent evaluation, specifically revolving around the predetermination of customer rationale. Assuming customers will always react in a cost-minimizing manner is a frequent factor assumed by the mathematical method that is not fully supported by literature (Kahneman & Tversky, 1979). Lund concludes that this approach could be used for the design of water conservation programs, but this was out of range of his study.

Nationally the value of clean water for the public has been estimated on a variety of scales. The Carson and Mitchell study (1993) is one of the most noteworthy assessments of a national study, which evaluated consumers' willingness to pay for boatable, fishable, and swimmable quality water. The study uses the contingent valuation method to approximate the monetary amount an individual is willing to give in exchange for a public good. The national study used a scenario where estimated contributions reflected potential benefits and found that on average

households were willing to pay a total of $242 for boatable, fishable, and swimmable quality water, with a 95% confidence interval ranging from $205-279 (Carson & Mitchell, 1993). Average willingness to pay for the categories was $93 for boatable water, $70 for fishable, and $78 for swimmable quality water (Carson & Mitchell, 1993).

Agriculture and natural resource economists work diligently to manage natural resources by preventing overexploitation and developing strategies to maximize benefit verses cost. Properly managing resources is essential for resource longevity (Why is NRM necessary?, 2007). However, a consistent issue facing natural resources longevity is when they are regarded as common property and are inevitably overused, such as with the "tragedy of the commons" (Bromley & Cernea, 1989). This ideology forms the basis of overexploitation for natural resources, as externalities- unaccounted costs of resource use, arise and often lead to pollution and destruction of the resource (Clark, 1973). Therefore, to encourage conservation of water it is imperative that this common property resource have a cost associated with it that accounts for externalities.

Butler and Memon (2005) discussed water consumption patterns and factors driving consumption trends. They noted that water consumption changes by location based on climate, availability, technology and innovation, water price structure, incentives, and legislative provisions (Butler & Memon, 2005). As well, Butler and Memon found that per capita consumption in households changed based on the number of people in the household, affluence, age, and recreation such as gardening. Water conservation technologies were heavily discussed, but fiscal policies were another strong proponent towards conservation.

This research uses a contingent survey approach to evaluate consumers' willingness to pay an additional cost to protect the future of Florida's water supply. The study evaluates a 10% and a 50% increase in water bills to pay for conservation efforts, hence covering a portion of the external costs (Clark, 1973). By reviewing socioeconomics factors, such as in the Butler and Memon study (2005), then the study can determine which factors have a significant influence on a consumer's willingness to pay for conservation.

Purpose & Objectives

The purpose of this study is to identify socioeconomic factors that impact a consumer's willingness to pay to protect Florida's water supply. The information gathered will allow decision makers to make informed choices on how best to encourage water conservation. The following research objectives guided the study:

1. Determine consumers' willingness to pay for an increase of 10% in their water bill for the protection of Florida's water supply
2. Determine consumers' willingness to pay for an increase of 50% in their water bill for the protection of Florida's water supply
3. Identify if consumer's willingness to pay has changed between 2013 and 2016
4. Determine the socioeconomic factors that distinguishes a consumers' willingness to pay

Methodology

A quantitative study was conducted to evaluate Florida consumers' willingness to pay for the protection of Florida's future water supply. The study questions were researcher developed and used an online survey design that has been conducted annually since 2012. To accomplish the objectives the study used questions gauging consumers' willingness to pay for a 10% and a 50%

increase in their water bill given it would protect the future water supply. These dichotomous variables can be found in table XX. Respondents were asked the questions in pairs based upon the determinant of if the respondent was a home owner or rented. The reason for this split was to better represent what each of the parties would pay for their water bills. Respondents who considered themselves neither home owner or renters were not considered. Prices were based on a 10% increase in their water bill for the first variable and a 50% increase in the second. Socioeconomic factors such as income, sex, race, education, political affiliation, and age were also measured and their measurements can be found in Table XX as well.

Table XX. Variables

Dependent Variables		
Variable:	Scale:	Description:
House_10	No=0 Yes=1	If your current water bill was $100 a month, would you accept it going up by $10 a month, for a total water bill of $110 a month, if the increase ensured a future water supply in Florida?
House_50	No=0 Yes=1	If your current water bill was $100 a month, would you accept it going up by $50 a month, for a total water bill of $150 a month, if the increase ensured a future water supply in Florida?
Rent_10	No=0 Yes=1	If your current water bill was $50 a month, would you accept it going up by $5 a month, for a total water bill of $55 a month, if the increase ensured a future water supply in Florida?
Rent_50	No=0 Yes=1	If your current water bill was $50 a month, would you accept it going up by $25 a month, for a total water bill of $75 a month, if the increase ensured a future water supply in Florida?
Independent Variables		
Variable:	Scale:	
Age_Category	1=18-19; 2=20-29; … 8=80 & older	
Sex	1=Male; 2=Female	
Race	1=White; 2=Black; 3=Asian; 4=Native American; 5=Multiracial	
Education	1= >12th grade; 2=High school graduate; 3=Some college, no degree; 4=2-year college degree; 5=4-year college degree; 6=Graduate or professional degree	
Political_Affiliation	1=Republican; 2=Democrat; 3=Independent;	

Own_Rent	1=Own; 2=Rent; 3=Other
Hispanic	0=No; 1=Yes
Income	1=$24,999 or less; 2=$25,000-49,999; 3=$50,000-74,999; 4=$75,000-149,999; 5=$150,000-249,999, 6=$250,000 or more

Prior to data collection the survey instrument was evaluated by a panel of experts. The experts specialized in water issues, survey design, and public opinion research to ensure face and content validity. The panel of experts included an Extension specialist in water economics and policy, the Director of the {Center}, the Chief Executive Officer of [Association], the Director of [Institute], an assistant professor specializing in agricultural communications from the [University], and the Associate Director of the [Center]. Following this review a pilot test was conducted with 50 respondents' representative of the target population to confirm the reliability of the constructs.

The survey was then distributed using a public opinion survey research company and was sent throughout the state of Florida to respondents aged 18 or older. Data was collected using a non-probability opt-in sampling method. The data was collected for five years with a total of 2338 respondents throughout (Year one: 519 respondents, Year two: 749 respondents, Year 3: 523 respondents, Year 4: 547 respondents). Information about year to year demographics can be found in the appendix. Quotas were set *a priori* and attention filters were integrated throughout the survey. If a respondent did not fill a quota or pass an attention filter then they were dismissed and their responses were not recorded. Completed responses totaled ____ (Year one: _____ respondents, __% participation rate; Year two: _____ respondents, ___ %; Year 3: ____ respondents, ___%; Year 4: _____ respondents, ___ %). To negate issues that arise with non-probability data collection, post stratification weighting methods were applied to

ensure the responses were representative of the population of interest (Baker et al., 2013; Kalton & Flores-Cervantes, 2003). Data was weighted based on the 2010 U.S. census.

The data was analyzed using SPSS. Objectives one and two were compared using frequencies to show the percentage of consumers willing to pay for a 10 percent and a 50 percent increase by year and as a total (Table XX & Table XX). Objective three used a chi-square test to determine the significance of variations in variables from year to year (Table XX). Table XX through XX include the binary regression models used to evaluate factors that impact consumers' willingness to pay. A binary logit model was chosen given the binary nature of the four dependent variables. The categorical nature of the independent variables were also taken into consideration and the reference category for each of the variables is shown in the results.

Results

Objective 1: Willingness to pay for a ten percent increase

Table XX and XX show the frequency and percentages of home owners and renters that are willing to pay for a 10 percent increase in their water bills given that it would ensure the future of Florida's water supply. Homeowners show a trend of increasing willingness to support this increase from 2013 to 2016. Renters show a similar increase from 2013 to 2015, but then decreased to a low of approximately 74 percent in 2016.

Table XX. House_10

	2013		2014		2015		2016		Total	
	N	%	*N*	%	*N*	%	*N*	%	*N*	%
Yes	234	64.6	382	68.2	131	75.7	243	85.0	990	71.7
No	128	35.4	178	31.8	42	24.3	43	15.0	391	28.3
Total	362	100	560	100	173	100	286	100	1381	100

Table XX. Rent_10

	2013		2014		2015		2016		Total	
	N	%	*N*	%	*N*	%	*N*	%	*N*	%

Yes	123	78.3	150	79.4	280	80.0	193	73.9	746	78.0
No	34	21.7	39	20.6	70	20.0	68	26.1	211	22.0
Total	157	100	189	100	350	100	261	100	957	100

Objective 2: Willingness to pay for a fifty percent increase

The evaluation of respondents' willingness to pay for a 50 percent increase in their water bill to protect the future of Florida's water supply can be found in tables XX and XX. There was an increase in homeowners' willingness to pay, from a low of approximately seven percent in 2013 to a high of 49 percent in 2016. Renters agreeance to a 50 percent increase was similar to their willingness to pay for a 10 percent increase, that being an increase from 2013 to 2015, but then a downward shift in 2016.

Table XX. House_50

	2013		2014		2015		2016		Total	
	N	%	*N*	%	*N*	%	*N*	%	*N*	%
Yes	24	6.6	73	13.0	48	27.7	140	49.0	285	20.6
No	338	93.4	487	87.0	125	72.3	146	51.0	1096	79.4
Total	362	100	560	100	173	100	286	100	1381	100

Table XX. Rent_50

	2013		2014		2015		2016		Total	
	N	%	*N*	%	*N*	%	*N*	%	*N*	%
Yes	15	9.6	42	22.2	122	34.9	55	21.1	234	24.5
No	142	90.4	147	77.8	228	65.1	206	78.9	723	75.5
Total	157	100	189	100	350	100	261	100	957	100

Objective 3: Comparison of willingness to pay over time

To evaluate the statistical difference between years a chi-squared test was used. The results are displayed in Table XX below. The test showed that the year evaluated was a significant independent variable in determining the participants' willingness to pay for three of the four variables. Homeowners' willingness to pay for a 10 percent and a 50 percent increase in their water bill and renters' willingness to pay for a 50 percent increase in their water bill all show

significant relationships with the year surveyed. The Phi-values for the variables show the strongest relationship can be seen in homeowners willingness to pay for a 50 percent increase (Phi-Value=.389).

Table XX. Chi-Squared Table

	Chi-Square	P-value	Phi
House_10	38.414	.000	.167
Rent_10	3.524	.318	.061
House_50	208.450	.000	.389
Rent_50	41.499	.000	.208

Objective 4: Changing willingness to pay

Tables XX through XX show the four binary logit models for predicting the participants' willingness to pay for a 10 percent and a 50 percent increase in their water bill. The models evaluate participants based on the socioeconomic factors discussed earlier. Reference categories are displayed next to the variable name.

Table XX. Binary Logit Model- House_10

Variable	Parameter Estimate	Standard Error
Age_Category (Ref. 80 or older)		
18-19	1.971**	.779
20-29	1.989***	.586
30-39	1.952***	.577
40-49	.977*	.567
50-59	.776	.553
60-69	.645	.555
70-79	.342	.580
Income (Ref. $24,999 or less)		
$25,000 to $49,999	.315	.211
$50,000 to $74,999	.544**	.219
$75,000 to $149,999	.958***	.237
$150,000 to $249,999	1.228***	.417
$250,000 or more	.730	.696
Education (Ref. less than 12^{th})		
High school graduate	-.253	.693
Some college	-.773	.689
2-year degree	-.518	.697
4-year degree	-.492	.696

Graduate	-.300	.711
Race (Ref. White)		
Black	-.917***	.263
Asian	.539	.630
Native American	.313	.868
Multiracial	-.140	.541
Political_Affiliation (Ref. Republican)		
Democrat	.275	.168
Independent	-.033	.173
Hispanic (Ref. No)		
Yes	.043	.252
Sex (Ref. Female)		
Male	.203	.140
Constant	-.286	.882
Model Fit Statistics		
Log Likelihood	1302.525	
Cox & Snell R-Squared	.107	

*: Significant at the 0.10 level.
**: Significant at the 0.05 level.
***: Significant at the 0.01 level.

Table XX shows the binary logit model for homeowners' willingness to pay for a 10 percent increase in their water bill given it would protect the future of Florida's water. Significant variables are shown with asterisks. The model shows that the age category has significant groups in comparison with the reference category of 80 years and older. Age groups 18-19, 20-29, 30-39, and 40-49 are significantly more likely to agree to a 10 percent increase than compared to those 80 and older. Income was also significant for several groups compared to the reference group of those who make $24,999 or less. Respondents in income brackets of $50,000 to $74,999, $75,000 to $149,999, and $150,000 to $249,999 are more likely to agree to an increase of 10 percent. The model also shows that individuals who are black are less likely to agree to the increase in their water bill than compared to individuals who identify as white.

Table XX. Binary Logit Model- Rent_10

Variable	Parameter Estimate	Standard Error
Age_Category (Ref. 80 or older)		

18-19	1.688	1.129
20-29	.028	.859
30-39	-.119	.864
40-49	-.057	.871
50-59	-.490	.857
60-69	-.455	.852
70-79	-.350	.881
Income (Ref. $24,999 or less)		
$25,000 to $49,999	.495**	.220
$50,000 to $74,999	1.024***	.291
$75,000 to $149,999	.740**	.324
$150,000 to $249,999	-.336	.639
$250,000 or more	-1.101	1.126
Education (Ref. less than 12th)		
High school graduate	.539	.536
Some college	.785	.545
2-year degree	.342	.550
4-year degree	.662	.561
Graduate	.546	.599
Race (Ref. White)		
Black	-.429	.320
Asian	-1.047**	.489
Native American	.383	1.151
Multiracial	1.082	1.066
Political_Affiliation (Ref. Republican)		
Democrat	.160	.226
Independent	-.058	.237
Hispanic (Ref. No)		
Yes	-.585*	.318
Sex (Ref. Female)		
Male	-.157	.188
Constant	.531	.939
Model Fit Statistics		
Log Likelihood	780.361	
Cox & Snell R-Squared	.057	

*: Significant at the 0.10 level.
**: Significant at the 0.05 level.
***: Significant at the 0.01 level.

The binary logit model for renters' willingness to pay for a 10 percent increase given it would protect the future of Florida's water supply is shown in table XX. The model shows that income is a significant factor in determining their willingness. Respondents' in the income brackets of

$25,000 to $49,999, $50,000 to $74,999, and $75,000 to $149,999 were significantly more likely to agree to an increase than compared to the reference group of respondents who make less than $24,999. Individuals who identify as Asian were less likely to be willing to agree to an increase than when compared to those who identify as white. As well, those who identify as Hispanic were less likely to agree to an increase than those who identify as non-Hispanic.

Table XX. Binary Logit Model- House_50

Variable	Parameter Estimate	Standard Error
Age_Category (Ref. 80 or older)		
18-19	1.587**	.792
20-29	1.063	.688
30-39	.694	.681
40-49	-.012	.696
50-59	-.778	.696
60-69	-1.413*	.723
70-79	-.799	.765
Income (Ref. $24,999 or less)		
$25,000 to $49,999	-.063	.305
$50,000 to $74,999	.237	.303
$75,000 to $149,999	.799***	.300
$150,000 to $249,999	1.074***	.383
$250,000 or more	.789	.641
Education (Ref. less than 12th)		
High school graduate	-1.365**	.624
Some college	-1.373**	.619
2-year degree	-1.767***	.638
4-year degree	-1.069*	.618
Graduate	-.914	.636
Race (Ref. White)		
Black	-.209	.314
Asian	-.125	.416
Native American	.683	.943
Multiracial	-.680	.540
Political_Affiliation (Ref. Republican)		
Democrat	.229	.190
Independent	-.001	.214
Hispanic (Ref. No)		
Yes	.642***	.227
Sex (Ref. Female)		
Male	.587***	.164

Constant	-.972	.291
Model Fit Statistics		
Log Likelihood	1007.938	
Cox & Snell R-Squared	.179	

*: Significant at the 0.10 level.
**: Significant at the 0.05 level.
***: Significant at the 0.01 level.

Table XX shows the binary logit model for homeowners' willingness to pay for a 50 percent increase in their water bill given it would protect the future of Florida's water supply. The model shows that age was a significant variable to consider, with 18-19 year olds being more likely to agree to an increase in their water bill than 80 year olds and older. Individuals who identify as 60-69 years old were less likely than 80 year olds to be willing to pay for an increase. Income was also significant, with those who make $75,000 to $149,999 and $150,000 to $249,999 being more likely to pay for an increase of 50% than those who make $24,999 or less. The model shows that education was significant, with those who have a high school education, some college, a 2-year degree, and a 4-year degree all being less likely to pay for an increase of 50 percent in their water bill than those individuals who have less than a 12th grade education. Individuals who identify as Hispanic were more likely than non-Hispanic respondents to agree to an increase. The model also shows respondents who are male were more likely than females to agree to a 50 percent increase in their water bill.

Table XX. Binary Logit Model- Rent_50

Variable	Parameter Estimate	Standard Error
Age_Category (Ref. 80 or older)		
18-19	20.926	12574.722
20-29	20.087	12574.722
30-39	20.056	12574.722
40-49	20.349	12574.722
50-59	19.502	12574.722
60-69	19.847	12574.722
70-79	19.062	12574.722

Income (Ref. $24,999 or less)		
$25,000 to $49,999	.377	.250
$50,000 to $74,999	.860***	.284
$75,000 to $149,999	.976***	.319
$150,000 to $249,999	.393	.831
$250,000 or more	.481	1.248
Education (Ref. less than 12th)		
High school graduate	-.240	.558
Some college	-.262	.570
2-year degree	-.878	.598
4-year degree	-.556	.591
Graduate	-.629	.627
Race (Ref. White)		
Black	.057	.323
Asian	-.192	.542
Native American	.466	.941
Multiracial	1.556**	.625
Political_Affiliation (Ref. Republican)		
Democrat	.211	.230
Independent	.100	.239
Hispanic (Ref. No)		
Yes	-.529	.359
Sex (Ref. Female)		
Male	-.012	.188
Constant	-21.298	12574.722
Model Fit Statistics		
Log Likelihood	776.463	
Cox & Snell R-Squared	.067	

*: Significant at the 0.10 level.
**: Significant at the 0.05 level.
***: Significant at the 0.01 level.

The binary logit model for renters' willingness to pay for a 50 percent increase given it would protect the future of Florida's water supply is shown in table XX. The model shows that respondents who make between $50,000 to $74,999 and $75,000 and $149,999 were significantly more likely to be willing to pay for an increase of 50 percent than when compared to those who make less than $24,999. As well, those who identify as multiracial were more likely than those who consider themselves as white to agree to an increase.

The models consistently show a disparity for homeowners and renters when it comes to income brackets compared to those who make less than $24,999. The models for homeowners show a disparity between age groups when compared to those who are 80 years and older. Other variables appeared significant throughout the models, but not as consistently as the variables listed above. For example, if considering the models for increasing the respondent's willingness to pay by 10 percent then race was a significant variable, but the groups impacted by race were different between homeowners and renters. As well, the models for increasing the respondent's willingness to pay by 50 percent only had income in common as a significant variable.

Conclusion

This study identified the socioeconomic factors that impact a consumer's willingness to pay for increases in their water bill given the protection of Florida's water supply in the future. The study evaluated the trends of consumers' willingness to pay over four years and compared respondents' willingness year by year using a chi-squared test. As well, binary logit models were used to identify the socioeconomic factors that have been influencers of a respondent's willingness to pay over the course of time.

Objective 1-3: Comparison of willingness to pay over time

The study found that the year the respondents were evaluated was a significant variable for the respondents' willingness to pay- given they were a homeowner or a renter willing to pay for a 50 percent increase (Table XX). The most dramatic change in consumer's willingness can be seen in table XX, which displays a homeowners' willingness to pay for a 50 percent increase in their water bill. In 2013 approximately seven percent of individuals were willing to pay for the

increase in their water bill, then in 2016 49 percent of homeowners were willing to pay for the increase.

In table XX, the highest recorded willingness to pay percentage is seen, with 85 percent of homeowners willing to pay for an increase of 10 percent in their water bill given it would protect the future of Florida's water supply. The increase that is noticed in homeowner's willingness to pay from 2013 to 2016 can potentially be attributed to the bolstering economy in Florida and the growing awareness of issues facing Florida's water (Florida Economic Outlook, 2017; U.S. Drought Monitor- California, n.d.; Kennedy, 2016).

Objective 4: Changing willingness to pay

According to Florida's Economic Estimating Conference the state has reentered a state of normalcy (Florida Economic Outlook, 2017). However, while a strengthening economy could be considered a strong factor in respondent's increasing willingness to pay seen during 2013 to 2016, reentering normalcy would mean this increase could be shunted in the future. In order to continue this trend of increasing willingness to pay it is important to understand the dissonance between consumers' to better focus future initiatives.

Tables XX through XX show the binary logit models for increasing homeowner and renter's willingness to pay for a 10 percent and a 50 percent increase in their water bill given the future protection of Florida's water. Factors that appeared consistently as influencers of willingness to pay is the income bracket, while other factors such as age and race inconsistently appeared throughout the models. However, age disparity did appear as a significant factor affecting homeowners. Tables XX and XX show that when compared with respondents 80 years and older that younger groups were more likely to be willing to pay for the increases.

Implications

Decision makers should take into consideration the significance of income brackets on consumer's willingness to pay for protecting Florida's water supply. Individuals who made more annually were more likely to choose to protect Florida's water financially, therefore future programs and initiatives that include price increases should be made in lite of this information. Since water consumption increases with affluence, it is encouraging to see these groups as being more willing to pay for conservation efforts (Butler & Memon, 2005). In the future adopting fiscal policies that increase water bills for the sake of water conservation could be an effective tool, as mentioned by Butler and Memon, and should be well received given the increasing willingness seen in tables XX and XX. While the increase in water prices, that would include the cost of externalities, can also stimulate innovation by consumers to expand conservation efforts (Clark, 1973; Water for the future, n.d.).

As well, knowing the dissonance between income groups can help messages and marketing programs be intently made towards these groups. Audience segmentation can be an effective strategy for encouraging acceptance of increasing water bills. Diminishing consumer externalities by focusing on those groups that most overuse water can be a strategy that highlights on audience segmentation, and according to this study could be well received (Clark, 1973). This information may be most readably used by Florida's water management districts by creating distinctive messages to educate the diverse income groups.

Recommendations

Future recommendations for researchers would be to apply further elements from the studies and theories directed by Lund (1995), Carson and Mitchell (1993), and Clark (1973).

For example, Lund (1995) noted his mathematical approach could be effective for suggesting water conservation programs that are specific to a customer's economic status. This study suggests that income was a factor of dissonance between groups willingness to pay for water conservation. Knowing there is a dissonance in Florida's consumers future research should use a mathematical approach for determining willingness to pay. This will define specific amounts consumers will support and then they can be compared to the cost of externalities.

Carson and Mitchell (1993) determined willingness to pay for consumers' conservation of fishable, boatable, and swimmable water, while this study evaluated consumers' willingness to protect Florida's water as a whole. Future research should be conducted on Florida's consumers' willingness to protect specific areas of Florida water, such as springs, lakes, rivers, or any area indigenous to Florida's water. As well, studies should be conducted on consumers' willingness to pay for externality costs. Comparisons can then be made for respondents in different areas around Florida to determine if proximity to water issues impacts acceptance of costs.

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Appendix

Year 2013		
	N	%
Sex		
Male	239	46.1
Female	250	53.9
Age_Category		
18-19	4	0.8
20-29	55	10.6
30-39	49	9.4
40-49	67	12.9
50-59	131	25.2
60-69	135	26.0
70-79	72	13.9
80 or older	6	1.2
Own_Rent		
Own	360	69.4
Rent	143	27.6
Other	16	3.0
Hispanic		
Yes	45	8.7
No	474	91.3
Race		
White	458	88.2
Black	37	7.1
Asian	5	1.0
Native American	5	1.0
Multiracial	3	0.6
Other	11	2.1
Education		
< 12^{th} Grade	3	0.6
High school graduate	116	22.4
Some college	128	24.7
2-year college degree	130	25.0
4-year college degree	66	12.7
Graduate	76	14.6
Political_Affiliation		
Republican	144	27.7
Democrat	187	36.0
Independent	127	24.5
Other	61	11.8
Income		
$24,999 or less	114	22.0

$25,000 - $49,999	177	34.1
$50,000 - $74,999	123	23.7
$75,000 - $149,999	90	17.3
$150,000 - $249,999	14	2.7
$250,000 or more	1	0.2
	Year 2014	
	N	%
Sex		
Male	271	36.2
Female	478	63.8
Age_Category		
18-19	29	3.9
20-29	109	14.6
30-39	108	14.4
40-49	88	11.7
50-59	182	24.3
60-69	166	22.2
70-79	56	7.5
80 or older	11	1.5
Own_Rent		
Own	502	67.0
Rent	219	29.2
Other	28	3.7
Hispanic		
Yes	64	8.5
No	685	91.5
Race		
White	655	87.4
Black	50	6.7
Asian	16	2.1
Native American	2	0.3
Multiracial	21	2.8
Other	5	0.7
Education		
< 12^{th} Grade	23	3.1
High school graduate	144	19.2
Some college	225	30.0
2-year college degree	106	14.2
4-year college degree	185	24.7
Graduate	66	8.8
Political_Affiliation		
Republican	213	28.4
Democrat	246	32.8
Independent	181	24.2

Other	109	14.5
Income		
$24,999 or less	141	18.8
$25,000 - $49,999	228	30.4
$50,000 - $74,999	193	25.8
$75,000 - $149,999	154	20.6
$150,000 - $249,999	29	3.9
$250,000 or more	4	0.5
	Year 2015	
	N	%
Sex		
Male	261	49.9
Female	262	50.1
Age_Category		
18-19	45	8.6
20-29	152	29.1
30-39	113	21.6
40-49	80	15.3
50-59	64	12.2
60-69	53	10.1
70-79	14	2.7
80 or older	2	0.4
Own_Rent		
Own	229	43.8
Rent	248	47.4
Other	46	8.8
Hispanic		
Yes	69	13.2
No	454	886.8
Race		
White	402	76.9
Black	63	12.0
Asian	17	3.3
Native American	5	1.0
Multiracial	22	4.2
Other	14	2.7
Education		
< 12^{th} Grade	18	3.4
High school graduate	152	29.1
Some college	154	29.4
2-year college degree	64	12.2
4-year college degree	91	17.4
Graduate	44	8.4
Political_Affiliation		

Republican	116	22.2
Democrat	162	31.0
Independent	121	23.1
Other	124	23.7
Income		
$24,999 or less	139	26.6
$25,000 - $49,999	164	31.4
$50,000 - $74,999	101	19.3
$75,000 - $149,999	87	16.6
$150,000 - $249,999	25	4.8
$250,000 or more	7	1.3
	Year 2016	
	N	%
Sex		
Male	260	47.5
Female	287	52.5
Age_Category		
18-19	8	1.5
20-29	134	24.5
30-39	154	28.2
40-49	67	12.2
50-59	72	13.2
60-69	73	13.3
70-79	33	6.0
80 or older	6	1.1
Own_Rent		
Own	361	66.0
Rent	152	27.8
Other	34	6.2
Hispanic		
Yes	67	12.2
No	480	87.8
Race		
White	471	86.1
Black	37	6.8
Asian	22	4.0
Native American	3	0.5
Multiracial	7	1.3
Other	7	1.3
Education		
< 12^{th} Grade	10	1.8
High school graduate	112	20.5
Some college	86	15.7
2-year college degree	75	13.7

4-year college degree	184	33.6
Graduate	80	14.6
Political_Affiliation		
Republican	189	34.6
Democrat	202	36.9
Independent	118	21.6
Other	9	1.6
Income		
$24,999 or less	96	17.6
$25,000 - $49,999	149	27.2
$50,000 - $74,999	113	20.7
$75,000 - $149,999	155	28.3
$150,000 - $249,999	26	4.8
$250,000 or more	8	1.5