Alberta Conservation Association
2017/18 Project Summary Report

Project Name: Angler Recruitment and Retention Trends in Alberta

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Partnerships

Alberta Environment and Parks

Key Findings

- After precipitous declines in the 1990s and early 2000s, per capita sales of recreational angling licences in Alberta appear to have stabilized.
- Of nine variables hypothesized to impact licence sales in Alberta, licence cost and the number of trout stocked in a year were the best predictors of angler licence sales.
- As licence cost rose, licence sales were found to have declined, but sales increased as the number of trout stocked in the province increased.

Introduction

Since 1985, the number of licensed anglers in Canada has declined by 31 percent despite a 30 percent increase in the population over the same time frame. Anglers are also much older than they used to be, with the mean age of Canadian anglers increasing from 41 in 1975 to 50 in 2010, suggesting that decreased popularity is primarily due to poor recruitment of young anglers. Alberta trends mirror those observed nationally. Since 1985, the number of licensed anglers in the province has declined by 27 percent, while the population has grown by 38 percent. In 2010, the average age of Alberta anglers was 45. Recent licence sales data suggest the precipitous declines in anglers observed in the 1990s and early 2000s is over, but the fundamental question remains: what factors influence yearly angler licence sales in Alberta?

Methods

I obtained annual Alberta resident angler licence sales data from the Alberta Government for the period 1975 – 2015. Based on a literature review, I identified nine variables demonstrated to impact angler licence sales where time-series data were readily available for Alberta (Table 1). Data were obtained for the variables of interest from provincial and federal government sources.

Table 1. Nine variables demonstrated to impact angler licence sales and hypothesized relationship to per capita resident angler licence sales in Alberta.

Variable	Description	Predicted relationship to licence sales
catchables	Total stocked of 20-cm fork-length trout in thousands.	positive
fee	Resident angler licence cost adjusted for inflation (2015 dollars).	negative
fuel	Consumer Price Index of gasoline for Alberta (2002 = 100).	negative
lakes	Total number of lakes stocked with trout.	positive
precip	Summer average precipitation departure (%) from normal (1961 – 1990 reference period) for the Prairies region.	negative
temp	Summer average departure (ºC) from normal (1961 – 1990 reference period) for the Prairies region.	positive
trout	Total stocked of trout in millions.	positive
t_trout	Total metric tons of trout stocked.	positive
unemploy	Unemployment rate of Albertans aged 15 – 64.	varies

To assess the relationship and predictive power of these variables to per capita licence sales in Alberta, I used an auto regressive integrated moving average (ARIMA) model. The ARIMA model is commonly used to analyse time-series data where individual data points are dependent (Hyndman and Athanasopoulos 2013). Variables were assessed individually and ranked by AIC corrected for small sample size (AIC_c), I used root mean squared error (RMSE) to compare model performance (Hyndman and Athanasopoulos 2013).

Results

Of the nine variables I considered, licence cost and the number of trout stocked in a year were the best predictors of angler licence sales (Table 2).

Table 2. Comparison of nine variables hypothesized to predict per capita resident angler licence sales in Alberta (1975 – 2015) analysed using ARIMA models. The base model included no predictor variable and is included in the model set for comparison. Models with a lower AIC_c and RMSE than the base model were considered better predictors of licence sales.

Variable	AIC_c	RMSE	Relationship to licence sales
fee	101.08	0.76	negative
trout	109.31	0.83	positive
t_trout	113.94	0.88	positive
precip	114.47	0.89	negative
base	114.55	0.91	not applicable
lakes	114.87	0.89	positive
temp	114.92	0.89	positive
unemploy	116.50	0.91	positive
catchables	116.60	0.91	positive
fuel	120.32	0.76	negative

As licence cost rose, licence sales were found to have declined, but sales increased as the number of trout stocked in the province increased. All other variables were found to have the predicted relationship to per capita licence sales but did not perform appreciably better than the base model.

Conclusions

The social and economic benefits of recreational angling to society are well documented but the factors influencing angler licence sales in Alberta have gone largely unexamined. My models undoubtedly oversimplify the complexity of factors influencing licence sales and cannot identify causation. However, the relationships between licence cost and number of trout stocked to per capita licence sales I identified are intuitive and bear consideration when proposing changes to licence fees or Alberta's stocking program.

Communications

- Study results presented at the World Recreational Fishing Conference.

Literature Cited

Hyndman, R.J. and G. Athanasopoulos (2013) Forecasting: principles and practice. OTexts: Melbourne, Australia. Available online at http://otexts.org/fpp/. [Accessed on January 30, 2017].