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WHAT IS THE VALUE OF A FISHING TRIP? A COMPARISON OF PUBLIC AND PRIVATE ANGLERS IN COLORADO AND CALIFORNIA

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Introduction

Stocking fish in order to enhance the quality of fisheries for recreational anglers is a common practice across the United States. According to the Colorado Division of Wildlife (CDOW), 58 million warm-water fish and 13 million sub-catchable cold-water fish are stocked each year in Colorado. The total cost of this program is over 75 million dollars (CDOW, 2010). In California, 7 million rainbow trout were stocked in 2010, and 20 million young salmon are expected to be released in 2011 (CDFG 2010).

The recreational fishing tourism market is similar to other markets, and those anglers who are targeting fish are just like the consumers of other commercial goods: both are the final users in the supply chain. The difference, however, is that recreational anglers do not necessarily pay for fishing directly. Instead, they spend money *indirectly* on travel costs in order to access the fishery (although they do often pay private fishery entrance and membership fees as well). For organizations such as CDOW and CDFG, as well as

private fishery owners, knowing anglers' preferences, where they spend their money, and how they value various fishery attributes will help them to better manage their fisheries.

In order to address these questions, data was collected from more than one thousand anglers at California public and Colorado public and private fisheries. Survey questions addressed anglers' preferences for site attributes, various fishing and non-fishing activities, and expenditure patterns for private and public anglers in different regions. This information should prove useful to fisheries managers by informing marketing decisions and stocking plans.

The report has two parts: 1) comparisons and analysis of the differences in demographics, preferences, expenditure patterns and values for fishery attributes between anglers at private and public fisheries in Colorado and California, and 2) using the *Contingent Valuation Method* to analyze the willingness to pay, or the economic value, for a recreational fishing trip.

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Extension programs are available to all without discrimination.

Section 1: Study Overview

1.1 Survey methodology

Surveys were administered to recreational anglers in three regions: Colorado private sites, Colorado public sites, and California public sites.⁴ During the summer and fall of 2009, surveys were handed out to 1841 anglers at 53 private and public fisheries.

Questions in the survey addressed 4 elements:

- 1) demographic information,
- 2) personal preferences for choosing the water body (as well as activities participated in during the fishing trip),
- 3) trip expenditures
- 4) annual recreation trip information.

In order to obtain the most representative sample possible, surveys were distributed in-person and on-site. Along with their survey questionnaire, anglers were given a pre-stamped return envelope, and were asked for their address in order to enter them into a raffle for \$100 gift certificates to Cabela's (an outdoor equipment retailer). A thank you/reminder postcard mailed 10 days after the first contact, and for anglers who had not yet responded, a second survey was sent to encourage participation.

In Colorado 873 anglers in public fisheries and 355 in private fisheries were given surveys, with 489 and 222 surveys returned for a response rate of 56% and 63%, respectively. An additional 613 surveys were

distributed to California public sites, with 359 surveys returned for a response rate of 59%.

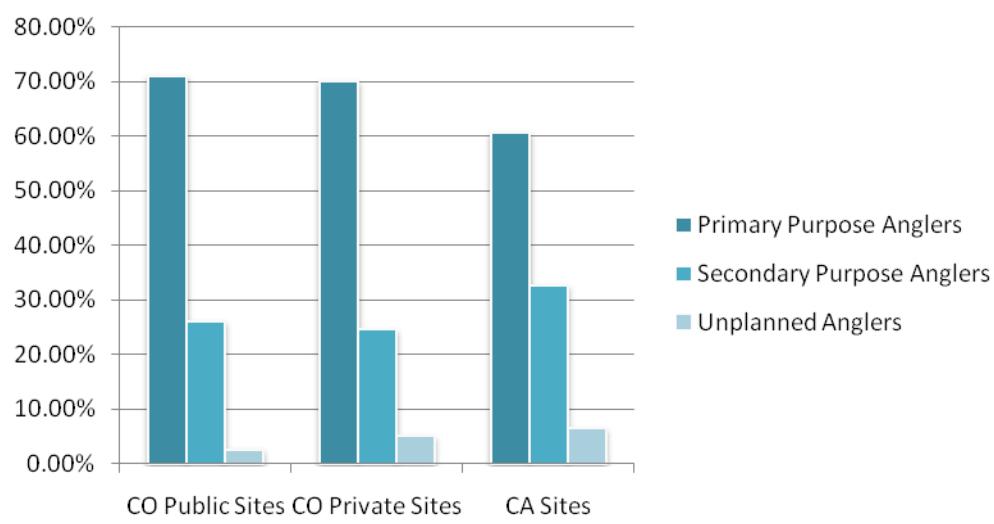
1.2 Purpose of Fishing Trip

Survey participants were asked to categorize themselves into one of three groups by the motivation of the trip to the water body where they received the survey.

1. Primary purpose anglers – Visitors who consider the fishing experience in this water body as the main purpose for the trip.
2. Secondary purpose anglers – Visitors who consider fishing as one of many equally important reasons for the trip.
3. Unplanned anglers – Visitors who did not initially plan, but incidentally stop to fish.

This fact sheet concentrates only on primary purpose anglers for the following two reasons. First, primary purpose anglers make up the largest part in each group, which is 71% in Colorado public participants, 70% in Colorado private participants, and 60.73% in California participants (see figure 1). Secondly, primary purpose anglers' preferences are most important to the fishery managers and private

Figure 1: The Purpose of the Fishing Trip



⁴ Several industry advisors were consulted in order to gain access to private fishery anglers in Colorado. Unfortunately, no such industry advisors were available in California.

producers. This is because while unplanned and secondary purpose anglers decide to visit fisheries for many unknown factors (unrelated to fishing), primary purpose anglers visit a fishery due to the characteristics of that fishery (which are directly manageable).

Section 2: Recreational Anglers' Characteristics and Behavior

2.1 Demographic Statistics

The survey data reveal several interesting differences between private fishery anglers and their public fishery counterparts. The average age of private anglers in Colorado was 60, which was higher than 50 and 53 for Colorado and California public anglers, respectively. The typical private fishery angler has earned a Bachelor's degree (16 years of education), compared with AA or Associate's degree level for Colorado and California public fishery anglers. In addition, 77% of Colorado public anglers were employed, followed by 70% of California anglers and 62% of Colorado private anglers. 46% of private fishery anglers are retired (approximately 15% higher than Colorado public anglers and California anglers).

Anglers at private fisheries have the highest average income of \$148,000, which was \$50,000 and \$45,000 higher than Colorado and California public anglers, respectively. Furthermore, 49% of the Colorado private anglers surveyed earned over \$125,000 per year, compared with 38% and 35% of California public anglers and Colorado public anglers, respectively. Table 1 summarizes the demographic statistics of survey respondents.

2.2 Anglers' Preferences

2.2.1 Anglers Participating in Activities On-site

The survey asked anglers about the most important aspects of choosing the fishing site of their most recent trip. Results indicated that besides enjoying catching fish, the majority of anglers in both Colorado and California enjoy other elements of a fishing trip, including spending quality time with friends and family at clean and peaceful sites with beautiful scenery and convenient amenities.

Overall, the top four most preferable and least preferable aspects of recreational fishing experience reported by anglers at all sites were:

Most important	Least important
1. Cleanliness of Site	1. Horseback Riding
2. Peaceful Setting	2. Rafting
3. Fishing with Friends and Family	3. OHV Recreation
4. Viewing Scenery	4. Fishing near skilled anglers

Anglers also indicated their participation rates in various activities at the fishery. Fishing activities, especially bank fishing and boat fishing, were the primary activities for all three angler groups. Other popular activities were spending fishing time with family and friends, and viewing scenery and wildlife. Few anglers tend to participate in rafting, kayaking, canoeing, OHV recreation, horseback riding, and belly boat fishing. Figure 2 summarizes the activities anglers participated in on-site.⁵

Table 1: Angler Demographic Statistics

	Colorado Public Anglers	Colorado Private Anglers	California Anglers
% Male	88%	89%	91%
% Employed	77%	62%	70%
% Retired	31%	46%	32%
% Private Fishing Club Member	5%	79%	7%
Age	50	60	53
Years of Education	15	16	14
Income	\$ 98,000	\$148,000	\$103,000

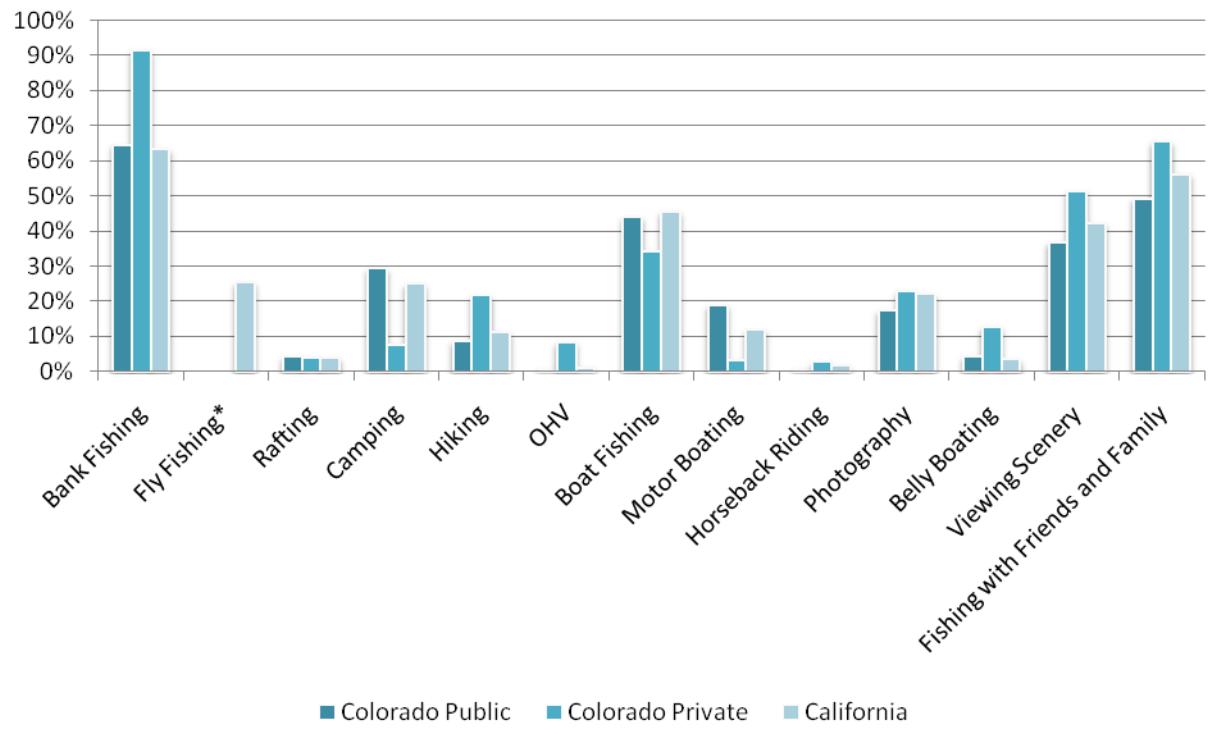
⁵ Anglers were surveyed on-site, but surveys were distributed in most cases to anglers in parking lots, potentially mitigating concerns regarding sample selection bias (i.e. more bank fishermen surveyed due to on-bank survey distribution).

2.2.2 Targeted Fish Species

Survey data indicates that all three angler groups primarily target trout. It is not a coincidence that trout far outweighed other targeted species such as bass, walleye, and catfish: according to Halverson (2010), the major species of fish stocked in most states in the United States is trout.

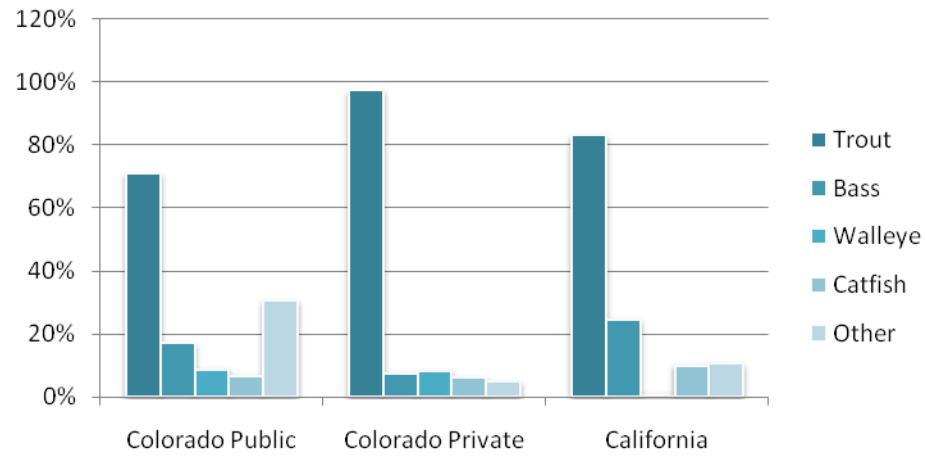
A few other species noted on the survey forms were Sturgeon, Striped Bass, Arctic Char and Grayling, Perch, Crappie, Bluegill and other Sunfish, Muskie, Pike, Kokanee Salmon, Crawfish and Wiper. However, they were all small minorities. Targeted species by angler type are displayed in Figure 3.

Figure 2: Activities that Anglers Participated in On-Site



* A question about fly-fishing participation was accidentally omitted during the creation of the Colorado survey.

Figure 3: Targeted Fish Species



2.3 Angler Expenditures

2.3.1 Western Region Expenditures

Anglers' expenditures fall into a variety of categories on a typical fishing day. Generally, public fishery anglers expend more money on gasoline, fishing licenses, and supplies than private fishery anglers, while private fishery anglers spend more on package deals and guide fees. Activities such as camping and horseback riding do not constitute a major fraction of angler spending. Expenditure patterns for a number of goods and services are displayed in figure 4.

The average Colorado angler spends \$138 and \$135 per day at public and private fisheries, respectively. This is much lower than the average of \$180 per day spent in California. The average daily expenditures of gasoline for California fishery anglers were \$53, which was \$17 and \$38 higher than Colorado public and private fishery anglers, respectively. One potential reason is that the survey only asked about *expenditures west of the Colorado-Kansas border*, which excludes

expenditures on items such as airline tickets and gasoline for anglers visiting from outside of the study region.

2.3.2 Out of State Visitation

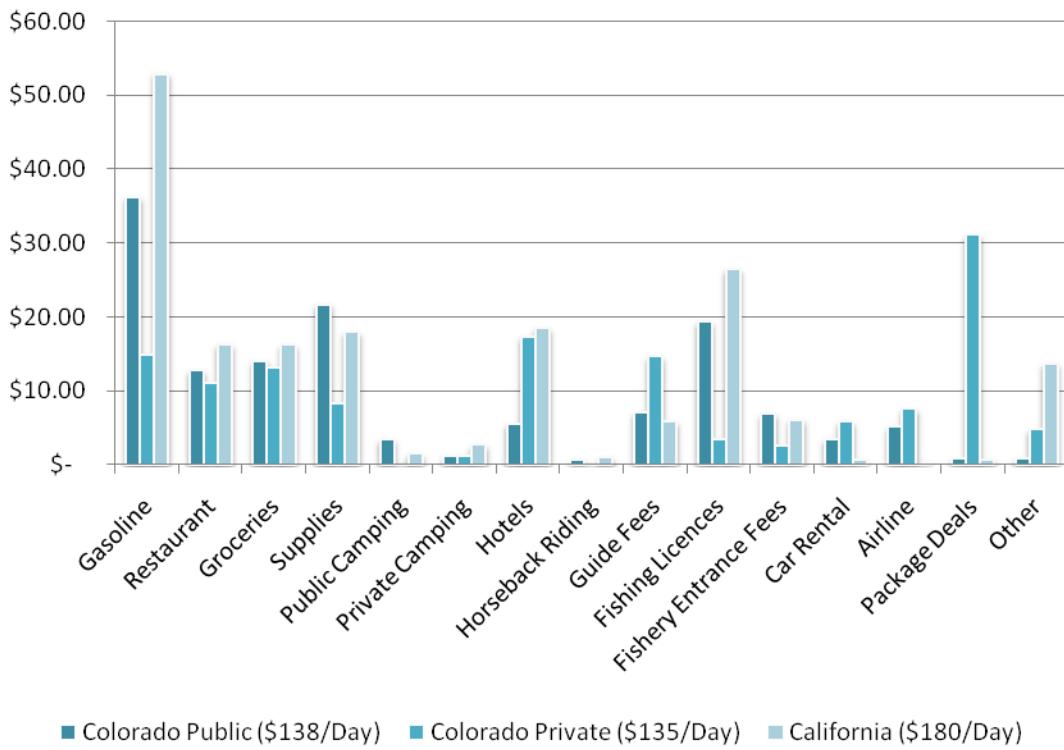
Many of the dollars that are spent in Colorado and California are dollars that are imported from outside of those states. Although surveys suggest that the majority of anglers stay in-state for their fishing trips, 16.6% of Colorado private fishery anglers were from other states. This is contrasted to 6.6% in Colorado public fisheries and 9.0% in California fisheries. This may be a function of marketing efforts by private fisheries to out-of-state anglers. Regional visitation patterns can bee seen in figure 5.

Section 3: What is the Value of a Fishing Trip?

3.1 The Contingent Valuation Method (CVM)

The CVM is a survey-based economics model which is widely used in identifying the value of

Figure 4: Daily In-Region Angler Expenditures by Category



various non-market goods and activities (in this case, recreational fishing). By asking anglers whether they would pay an *additional* dollar amount for their recent trip (over and above their current travel costs), researchers can infer the median amount that anglers would pay *over and above* their current costs. This is a measure of the net economic benefits of recreational fisheries: anglers would be happy to pay more, but instead they simply enjoy those surplus benefits. This is very different, and often unrelated, to anglers' expenditures for a particular trip.

A secondary capability of the CVM is the ability to estimate the effect that angler and fishery characteristics have on a particular angler's willingness to pay (WTP). For example, does fishing with friends increase or decrease an angler's WTP? This is important for making WTP comparisons across fisheries and for helping managers identify the elements of their fishery which deserve the most attention.

3.2 Willingness to Pay

The median willingness to pay for each group of anglers is shown in Figure 6. Colorado private anglers have the highest level of willingness to pay per trip (\$552), followed by California public anglers (\$479). Colorado public anglers have the lowest willingness to pay per fishing trip (\$343).

When compared with the expenditures for anglers (shown in 2.3), we see a slightly counterintuitive result (i.e. anglers with lower daily expenditures have higher WTP). One possible reason may be the different amount of time spent on their trips. Colorado public and California anglers both spent an average of 5.5 days on their trip, while CO private anglers spent 11.8 days on average (leading to higher total expenditures). This may lead to the higher willingness to pay for a trip to a Colorado private fishery. Furthermore, considering the demographic statistics, Colorado

Figure 5: In-State vs. Out-Of-State Anglers



Figure 6: The Willingness to Pay for Anglers

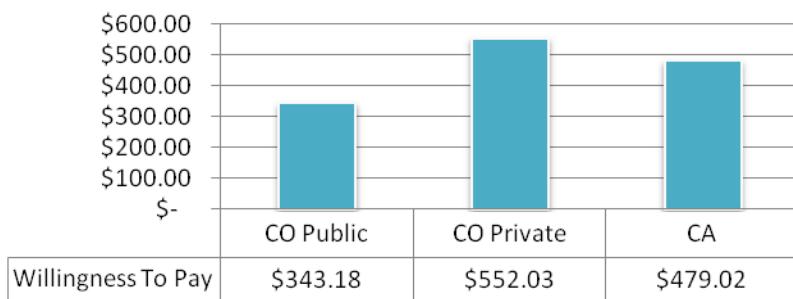


Table 2: The impacts of variables

	CO public	CO private	CA
Fish with friends	+**	+	-
Member of fishing, hunting or sportsman's organization	-	-**	+
Travel time in the trip	+***	+	+**
Trip days in a year	+**	+	-
Time spends on fishing	-	+**	+***

***Significant at the 1% level, **Significant at the 5% level, *Significant at the 10% level

private anglers earn \$50,000 higher and \$45,000 higher income than Colorado public and California anglers. In addition, 16.56% of Colorado private anglers came from outside of Colorado, which is 7.6% higher than California anglers, and 9% higher than Colorado public anglers. We can expect that this group of anglers to be more interested in fishing and care more about their fishing experience. Finally, as mentioned in section 2.3.1, no information was collected about expenditures made outside of the Western Region, so Colorado private anglers may in fact spend *even more* than what is reported here.

3.3 What Leads to a Greater WTP?

Different anglers may derive different levels of satisfaction from a fishery, depending on the characteristics of the fishery *and* the characteristics of the angler. Table 2 illustrates some of the variables which influence an angler's willingness to pay for a fishing trip.

Fish with friends – The statistics indicated that among the Colorado public anglers, those who prefer to spend recreational fishing experience with friends are willing to pay more for their trips. This relationship was not present for Colorado private and California public anglers'.

Member of fishing, hunting or sportsman's organization – 64% of Colorado private anglers are members of these organizations. On average they spend \$440 on one trip, compared with \$311 for non-members. The negative relationship may seem counter-intuitive, but one possible explanation could be that the membership costs essentially absorb some of the economic value of fishing trips.

Travel Time – For public anglers, the more time one angler spends traveling, the more money he is willing to pay. Travel time appears to be a proxy for avidity.

Trip days in a year – The data from Colorado public anglers significantly show that anglers who take more annual fishing trips derive more economic value from their trips. Again, annual fishing days seems to be a proxy for avidity.

Time spent on fishing – The amount of time that was spent on fishing activities is a proxy for the importance of fishing in their trip. For both Colorado private and California public anglers, those who spend more time on fishing during their trip derive greater value from their trips.

Section 4: Conclusion

The study summarized the preferences and characteristics of three groups of anglers: Colorado private, Colorado public, and California public anglers. We find that these three groups of anglers have many similarities, as well as many differences. For example, a typical Colorado private angler is about 60 years old, with an average annual income of \$148,000 (compared with \$100,000 for their public counterparts). They are more likely to be retired, and have more visits from outside of Colorado. Their trips are often long and expensive, averaging 11.8 days away from home. Colorado private anglers typically enjoy \$552 of *net value* per trip.

Compared with Colorado private anglers (16% of whom are visiting from out of state), over 90% of California public anglers are from within-state. Furthermore, 77% of surveyed California public anglers are employed (compared with just over 60% of Colorado private fishery anglers). Their net value per fishing trip is \$343. Additionally, California public anglers spend the most per day (\$180), and accrue \$479 in net value per fishing trip.

In spite of these differences, all groups of anglers share some common preferences. Besides bank

fishing and boat fishing, they all show enthusiasm for spending time with friends and family, and for fishing at sites with beautiful scenery. Trout, bass, walleye, and catfish are the most popular targeted fish species, although some anglers fish for other species such as Kokanee salmon and Sturgeon.

In summary, for fishery managers, identifying anglers' personal characteristics and fishery preferences will help to enhance the efficiency on both stocking decision and on business planning. In particular, fishery managers who wish to encourage angler visitation (and ensure a quality experience for anglers), should focus on creating an environment which is family-friendly, peaceful, and easily accessible.

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