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WHO IS STOCKING PRIVATELY PRODUCED FISH? A LOOK AT THE CUSTOMERS OF THE PRIVATE, RECREATION-BASED AQUACULTURE INDUSTRY IN COLORADO ¹

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1. Introduction

Millions of fish are stocked by the Colorado Division of Wildlife (CDOW) every year. Most Coloradoans are familiar with the process: a CDOW truck arrives at a lake, releases 10 inch Rainbow Trout, and leaves. Shortly thereafter, anglers arrive and catch the fish. In fact, while there are 3.5 million catchable trout stocked each year in Colorado, CDOW also stocks 58 million warm-water and fish and 13 million sub-catchable cold-water fish each year (CDOW, 2012). However, to date, little has been documented about the *private* stocking of recreational fish in Colorado. Privately stocked fisheries provide an alternative recreation outlet for anglers and come in many forms: dude ranches, fishing clubs, fee fishing ponds, and even private backyard ponds.

The purpose of this factsheet is to document the expenditure patterns, preferences and demographic statistics of a variety of first point-of-sale customers of

Aquaculture Suppliers of Recreational Fish (also known as the ASRF industry). The Department of Agricultural and Resource Economics at Colorado State University administered the project in conjunction with participation of faculty members throughout the Western United States (West of the Colorado-Kansas border). The participants include faculty from the University of Arizona, University of California, Davis, University of Idaho, and New Mexico State University.

2. Sampling Frame and Demographic Statistics of Private Fishery Managers

2.1 Survey Distribution and Fishery Type

Between late 2009 and early 2010, surveys were mailed to 686 private fishery managers in Colorado. 94 of these were either returned as undeliverable or indicating that the manager was no longer in business. Of the remaining 592 managers, 260 responded for a response rate of 44%. Figure 1 shows types of ASRF customers who responded to the survey. ⁴

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⁴ Researchers at CSU developed the survey with the help of Cline Trout Farms and Liley Fisheries. The sampling frame was created with help from Cline Trout Farms, Liley Fisheries and E&J Fish Farms. Data was collected via the Dillman Tailored Design Method (Dillman, 2000).

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2.2 Demographic Statistics

The typical respondent to the ASRF customer survey is a 60 year old married man with a college education and 13 years of experience stocking fish. He still has one child at home, and in many cases either his wife or his child are contributing to household expenses. Most managers live on site, with 5% of their annual income derived from fish-stocking related services. This low percentage is due mainly to the fact that nearly half of the ASRF customers are not businesses at all: they stock fish in backyard ponds for their own pleasure. Many of

these customers, however, are businesses, purchasing fish from ASRF producers and subsequently selling these fish, along with a package of recreation services, to anglers.

3. ASRF Customer Industry Scope

3.1 Number of ASRF Customers in Colorado

As mentioned above, ASRF customers come in many forms, including private backyard ponds, private dude ranches, private fishing clubs, homeowners' associations, fee fishing operations, and even public fishery

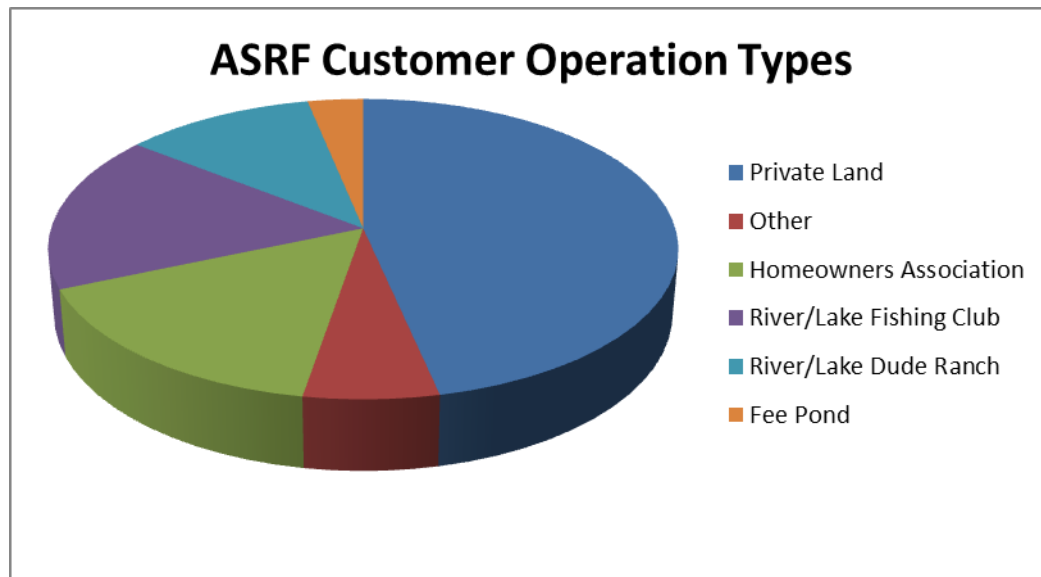


Figure 1. ASRF Customers Operation Types.

Table 1. ASRF Customer Demographics

	Average	Standard Deviation	Minimum	Maximum
Age	58.51	11.49	94	24
% Male	90%	31%	0%	100%
Years of Experience	12.79	12.43	0	64
Years of Education	15.80	2.17	9	19
Household Members	2.84	1.47	1	11
Contributing Members	1.67	0.78	0	6
% Married	89%	69%	na	na
% With Home On Site	59%	49%	na	na
% of Income from Fishery	5%	18%	na	na

managers. However, the total number of ASRF customers is uncertain. What is known is the amount of money spent per surveyed customer, on average, on ASRF products. We also have estimates of total ASRF sales in Colorado (see Deisenroth and Bond, 2010). Using total ASRF industry sales in Colorado, and assuming that the sample of ASRF customers is representative of the ASRF customer population, total ASRF industry sales in Colorado can be divided by individual customer purchase amounts to infer the number of ASRF customers. Hence, there are approximately 2,700 ASRF customers in Colorado.

3.2 ASRF Customer Expenditures and Sales

The average ASRF customer spends approximately \$2650 on ASRF products and attributes \$13,500 of annual sales to the purchase of these products. Total expenditures related to fishing average just under \$17,000 annually (not all fisheries operate for profit). Figures 2 and 3 show ASRF customer Expenditures and Sales.

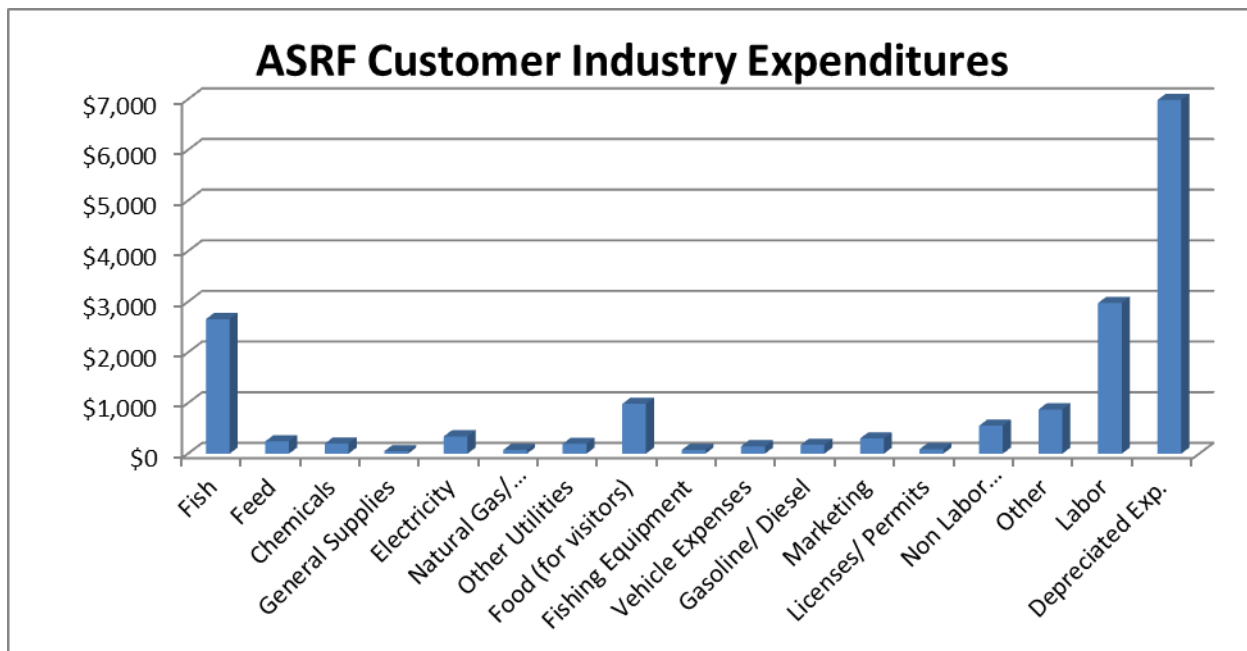


Figure 2. ASRF Customer Industry Expenditures (nearly \$17,000 annually).



Figure 3. ASRF Customer Industry Sales (over \$13,500 annually).

3.3 Species Stocked by ASRF Customers

Most privately-raised fish that are stocked in Colorado are Rainbow Trout. This makes sense: it is the most widely stocked fish in the world (Halverson, 2010). Colorado habitat and climate is also conducive to trout, with cool summers and an abundance of mountain water bodies. Brown Trout are stocked by 20% of surveyed customers. Private fisheries also stock warm-water species: 20% stock Grass Carp and Fathead Minnows (often for pest control), and 15% stock Bass and Sunfish. Other species stocked include Catfish and Walleye. Stocking information by species can be found in figure 4.

3.4 Activities Enjoyed at ASRF Customer Sites

Of course there are many anglers who visit fisheries for the sole purpose of fishing, but many for-profit private fishing operations actually offer a multitude of activities for potential visitors. Activities include horseback riding, biking, rafting, and camping. Also, the actual fishing element of private fishing operations comes in many forms, including ponds, lakes, and streams. This yields a variety of potential fishing opportunities ranging from fly-fishing to bank fishing to boat fishing (figure 5).

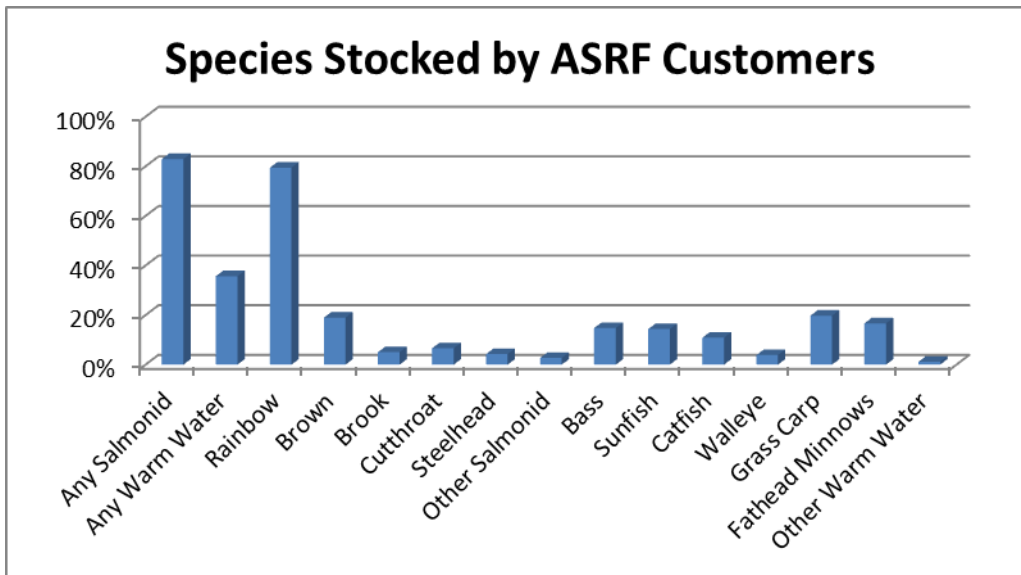


Figure 4. Species Stocked.

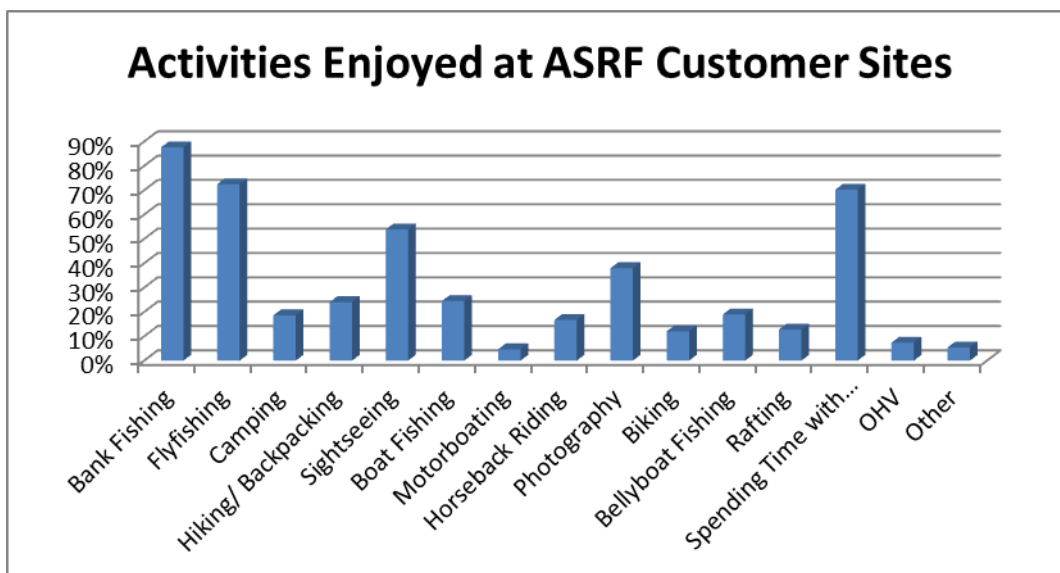


Figure 5. Activities Enjoyed at ASRF Customer Sites.

4. Economic Contribution of Privately Stocked Fisheries

Oftentimes, policies that are relevant to a particular industry are crafted with the economic scope, and economic importance, of that industry in mind. To date, no study has documented the economic importance of the businesses and individuals who stock privately-produced fish. Survey data pertaining to expenditures and sales of privately-stocked fisheries in Colorado are used to create a new industry sector in IMPLAN, an economic impact software program.⁵ IMPLAN uses pre-existing data of a regional economy to trace the flow of a dollar from one business to the next. In essence, IMPLAN software allows researchers to predict exactly how much economic activity will be generated by a single dollar being spent in one sector. Additional economic activity is generated by that dollar when the owner or manager of the operation spends a portion of the money within the defined region (in this case the Western US) on inputs (e.g. labor). The recipients of that money, in turn, spend a portion of it on other items within the region. The results of the analysis are often reported as economic multipliers: a multiplier of 1.25 says, for example, that for every dollar spent on industry X, an

additional \$0.25 cents “ripples” throughout the economy. Table 2 shows multipliers for the ASRF customer sector in the Western region.

Every dollar of ASRF customer sale results in an additional \$0.79 in additional economic activity and every million dollars sold support 41 full-time jobs in the Western region. Due to the ripple effects of dollars spent on inputs, every job directly supported by the ASRF customer sector implies an additional 0.28 jobs in the region. Annually, we estimate that just over \$36 million dollars are spent at privately stocked fisheries (dollars directly attributable to fish stocking). As such, Colorado private fisheries generate nearly \$65 million worth of economic activity in the Western United States annually, and support just over 2,500 full-time jobs.

Although the multipliers presented above indicate the economic contribution of Colorado ASRF customers to the Western United States, most of these contributions are likely to occur in the state of Colorado. This is due to the fact that most angler tourism in Colorado is from in-state anglers (although many anglers visit from out-of-state and from outside of the Western Region). Figure 6 illustrates the percentage of sales to in-state vs. out-of-state anglers.

Table 2: ASRF Customer Multipliers

	Direct Effect	Total Effect
ASRF Customer Output	1.00	1.79
ASRF Customer Employment ^a	31.76	40.80

^a Employment Multipliers are a function of each \$1 Million spent.

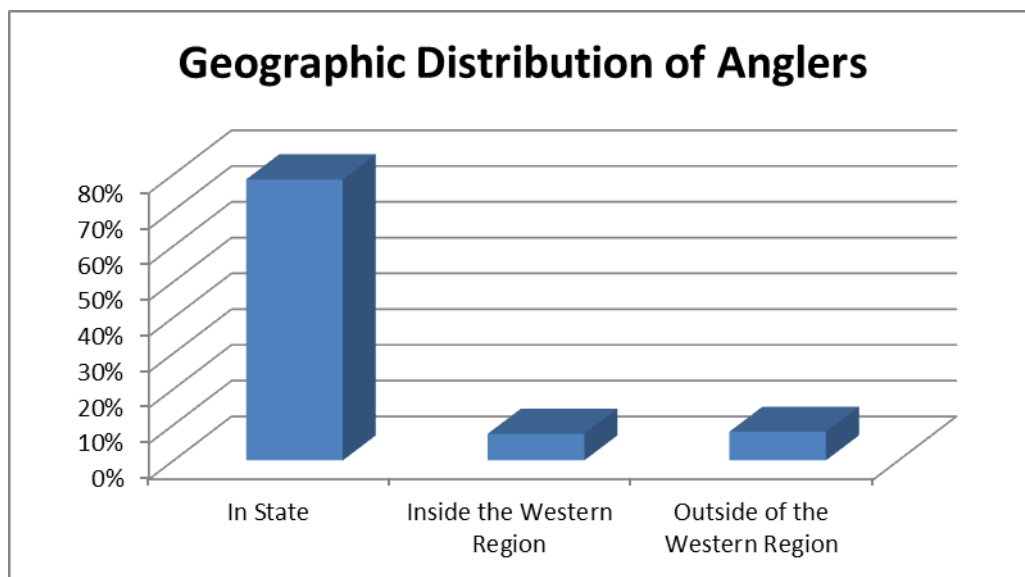


Figure 6. Geographic Distribution of the ASRF Customer Sales.

⁵ IMPLAN is a short form for Impact analysis for PLANing.

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