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**ABSTRACT:** This study is the first characterization of German sport fishing anglers in Alaska. A survey was taken of 601 residents of Germany who had purchased a 1998 Alaska fishing license. Of the 601 individuals surveyed, 363 responded, and after eliminating the undeliverable surveys, a response rate of 61.7% was achieved. The German anglers who participated in the Alaska sport fishery are predominantly male, employed, married, and have children. The average age is approximately 45 years old. Fully one-quarter of the surveyed anglers came from the German state of Bavaria. More than half of the German anglers fishing Alaska have visited Alaska multiple times. Reasons for return trips include the Alaska wilderness, abundance of salmon and halibut, beautiful countryside, friendly people, remoteness, solitude, nature, and scenery. Salmon were the most popular targeted species by German anglers, with sockeye *Oncorhynchus nerka*, coho *O. kisutch*, and chinook salmon *O. tshawytscha* leading the way. The results of this study show a high level of satisfaction among German anglers who fish in Alaska. The level of satisfaction was modeled and the parameters were estimated using an ordered probit model. The results of the German angler satisfaction estimation indicate that trip satisfaction was likely to be increased for those fishermen who exceeded their expectations in regard to the number and size of fish caught, were dedicated to fly-fishing, who exhibited pre-trip preferences towards a favorable fishing environment, and who encountered less crowding conditions than expected.

### INTRODUCTION

Hallo, beissen die lochse? English translation: Hello, are the salmon biting? Whether one is fishing on Montana Creek for coho salmon *Oncorhynchus kisutch* or on the Russian River for sockeye salmon *O. nerka*, the influence of the German angler in Alaska is hard to ignore. Despite being a relatively low percentage of non-Alaskan residents who purchase sport fishing licenses, German speaking anglers have a highly visible presence in the Alaska sport fishing experience and are often seen fishing in well-organized groups. In addition, their presence is noticed because German anglers may tend to congregate on popular Alaska salmon streams and because it is easy to notice the anglers who are speaking German. This study is the first known attempt to directly solicit survey responses from German sport fish anglers in Alaska regarding their level of fishing satisfaction, fishing behavior, and expenditures using angler surveys.

The importance of accurate sport fishing survey data continues to increase as the demand for sport fishing opportunities grows. There are an increasing num-

ber of surveys that document various aspects of the sport fishing experience in Alaska with the most comprehensive being the annual Alaska Department of Fish and Game (ADF&G) statewide harvest survey (e.g., Howe et. al. 2001). This ADF&G mail survey focuses on statewide participation, effort, and catch of both residents and nonresidents in Alaska. A newly implemented ADF&G saltwater charter vessel logbook census (Dean and Howe 1999) focuses on the charter effort and catch by fishers in Alaska with a goal of complete compliance by all charter operations. Other surveys are sporadic, focusing on additional aspects of the fisheries. For example, Maharaj and Carpenter (1997) estimated the economic impact of sport fishing in Alaska. In a recent study (Herrmann et al. 2001) participants were surveyed on the lower Cook Inlet, soliciting responses to questions on effort, catch rates, socioeconomic characteristics, hypothetical trips, and fishing and living expenses on respondent's most recent halibut or salmon sportsfishing trip.

Despite a leveling off of resident licenses, Alaskan sport fishing license sales have risen steadily since the early 1960s (Howe et. al. 2001). The overall growth is

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due to the strong demand from nonresidents (Figure 1). Between 1961 and 1999, license sales to nonresidents grew from 26.0% to 60.9% of total sport fishing license sales. Since 1992, nonresident anglers surpassed resident anglers in terms of the number of fishing licenses purchased. Overall, sport fishing license sales increased from 55,564 to 441,870 over the same time period.

In 1998, 3,173 anglers from German speaking countries purchased Alaska sport fishing licenses; this comprised 1.2% of the total nonresident licenses sold (Howe et al. 2001). Over one-third of all visitors to Alaska from overseas are German-speaking people from Germany, Austria, and Switzerland (ACED 1993). How-

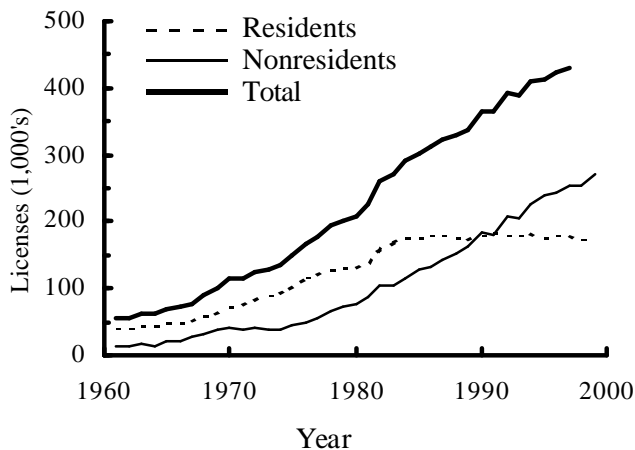


Figure 1. Number of Alaska sportfishing licenses sold, by residency status, 1961-1999 (Howe et al. 2001).

ever, to our knowledge, there is no publicly available data that examines the fishing behavior, experience, and expenditures of the German-speaking visitors to Alaska. Not only is this survey valuable because of the importance of the German anglers but it may also reflect to some extent the attitudes and satisfaction level of other overseas fishermen.

## METHODS

### Mail-out Survey

The Alaska Department of Fish and Game provided the names and addresses of all anglers from Germany who had purchased a fishing license during the summer of 1998. Of these 1,770 German licenses, only 601 of the addresses were usable. The smaller num-

ber of usable licenses was due to several factors such as the German handwriting is often difficult for Americans to read and the German addressing system is different from that of the American system. Some were rejected because they were American military stationed in Germany. As such, the data set was reduced to include only those positively viable addresses which yielded 601 names. Once mailed, however, only thirteen surveys came back as undeliverable. In order to increase the response rate, a postcard describing the study was sent a week prior to mailing the German-language survey. A Russian River fishing fly was included with the mailed survey as an incentive. Five hundred and eighty-eight respondents received the survey and 363 subjects responded by the time our analysis began for a 61.7% response rate.

The German angler survey was broken into five sections, each designed to solicit different information (Appendix A). In the first section the German anglers that fished in Alaska were asked a series of questions prior to directly being asked about their Alaska trip. These questions were designed to solicit the general angling preferences of Germans that choose to fish in Alaska. The second section asked questions about their specific behavior while they were in Alaska. These questions included specific fishing questions as well as general questions about types of travel, accommodations, group size, and group composition. The third section was designed to solicit the German angler level of satisfaction with the trip. Included in this section were questions about expenditures. In the fourth section, information was solicited on how the trip was planned and in the fifth section, socioeconomic data was gathered. In addition to the general interest in the survey information, a specific grouping of four types of questions were embedded in the survey to use in modeling German trip satisfaction. This grouping included angler and species preferences, fishing experience, and socioeconomic characteristics.

### Angler Preference

To solicit information about angler preference a number of questions were asked that were not specifically related to the Alaska trip. These questions covered types of waters fishers liked best; the importance of quantity, size, and type of fish caught; the importance of fishing environment on the fishing experience; and the dedication of the angler to fishing in general as well as fishing importance in the anglers lives in relation to other recreational activities. A series of questions were also asked to ascertain fishers attitudes on various statements designed to elicit fishing preferences.

### Species Preference

Questions were asked to determine whether German anglers targeted king, coho, sockeye, chum, and pink salmon, halibut, and/or grayling.

### Fishing Experience

These questions were specific to the Alaska fishing experience. Questions included items such as the traveling group size, amount of money spent, time spent, how the individual fished, how satisfied they were with various fishing expectations and whether they were fulfilled (e.g., did the number of fish caught meet expectations).

### Socioeconomic Characteristics

Information on the age, sex, marital status, children, employment, education, and income of German anglers was gathered.

### Statistical Analysis

The satisfaction level was hypothesized to be a function of angler preferences prior to taking the trip, the trip's targeted fish species, the Alaska fishing experience, and socioeconomic characteristics.

Satisfaction =  $f$  (Angler Preferences, Species Preference, Fishing Experience, Socioeconomic Characteristics). (1)

To estimate the model's parameters an ordered probit model was used (Greene 1997).

$$y = \mathbf{b}'\mathbf{x} + \mathbf{e} \quad (2)$$

This model was derived and parameters were estimated using the maximum likelihood technique. The ordered probit model estimates the probability that an individual with the individual and trip characteristics falls into one of the five satisfaction categories. In particular,

$$\begin{aligned} P(y=0) &= \Phi(\mathbf{g}_1 - \mathbf{x}'\mathbf{b}), \\ P(y=1) &= \Phi(\mathbf{g}_2 - \mathbf{x}'\mathbf{b}) - \Phi(\mathbf{g}_1 - \mathbf{x}'\mathbf{b}), \\ P(y=2) &= \Phi(\mathbf{g}_3 - \mathbf{x}'\mathbf{b}) - \Phi(\mathbf{g}_2 - \mathbf{x}'\mathbf{b}), \\ P(y=3) &= \Phi(\mathbf{g}_4 - \mathbf{x}'\mathbf{b}) - \Phi(\mathbf{g}_3 - \mathbf{x}'\mathbf{b}), \text{ and} \\ P(y=4) &= 1 - \Phi(\mathbf{g}_4 - \mathbf{x}'\mathbf{b}) \end{aligned} \quad (3)$$

is estimated for the unknown parameters ( $\mathbf{b}, \mathbf{g}$ ) using standard iterative methods.

As the interpretation of the ordered probit model is not straightforward some additional discussion is warranted. The estimated  $\mathbf{b}$  parameters cannot be interpreted in the usual way as when linear estimation techniques are utilized. From examination of the parameters themselves, all one can tell is the directional influence that the variable will exert on satisfaction. The average satisfaction level is expected to rise with variables that have positive coefficients and fall with variables that have negative coefficients. However, marginal effects of changes in the explanatory variables need to be calculated. In our case there are three different methods of calculating the marginal effects. The first is used for continuous explanatory variables. In our case, the equations for our five satisfaction level categories would be as follows:

$$\begin{aligned} \frac{\partial P(y=0)}{\partial x} &= \mathbf{f}(\mathbf{g}_1 - \mathbf{x}'\mathbf{b}) \mathbf{b}, \\ \frac{\partial P(y=1)}{\partial x} &= [\mathbf{f}(\mathbf{g}_1 - \mathbf{x}'\mathbf{b}) - \mathbf{f}(\mathbf{g}_2 - \mathbf{x}'\mathbf{b})] \mathbf{b}, \\ \frac{\partial P(y=2)}{\partial x} &= [\mathbf{f}(\mathbf{g}_2 - \mathbf{x}'\mathbf{b}) - \mathbf{f}(\mathbf{g}_3 - \mathbf{x}'\mathbf{b})] \mathbf{b}, \\ \frac{\partial P(y=3)}{\partial x} &= [\mathbf{f}(\mathbf{g}_3 - \mathbf{x}'\mathbf{b}) - \mathbf{f}(\mathbf{g}_4 - \mathbf{x}'\mathbf{b})] \mathbf{b}, \text{ and} \\ \frac{\partial P(y=4)}{\partial x} &= \mathbf{f}(\mathbf{g}_4 - \mathbf{x}'\mathbf{b}) \mathbf{b}. \end{aligned} \quad (4)$$

This method was used to calculate the marginal effects for just the two quantitative variables (income and the number of group females). However, it is illustrative of what the marginal effects represent. The second method is used for indicator variables (which are binary in nature). The marginal effects for indicator variables are calculated by differencing the categorical probabilities under the two values that the indicator variables can take. The third method involves the explanatory variables that are categorical. In this case, a unit movement above and below the mean will result in asymmetric marginal effects. To approximate a single marginal effect the average was used for a one-unit increase/decrease in the categorical averages. In all cases, the sum of the marginal effects must add to zero since they are a shift of the normal distribution generating the categorical probabilities in Eq. (3) (Greene 1997).

## RESULTS

### Survey

Of the 588 German fishermen that presumably received the survey, 363 responded (61.7% response rate). The German anglers who participated in the Alaska sport fishery are predominantly male (88.3%). Eighty-seven point five percent are employed, 65.9% are married, 52.7% have children, and 29.7% are college graduates. The average age is approximately 45 years old and the average household size is 3.55 people (in which approximately one-half of each household fished in Alaska in 1998). Over one-quarter of the German participants surveyed came from a household income in excess of 8,000 Deutsche marks (DM) per month (\$4,376 based on a 1998 summer conversion rate of 1.828 DM per U.S. dollar). Fully one-quarter of those surveyed came from the German state of Bavaria.

For the German angler visiting Alaska, fishing is an important recreational activity in their everyday lives. Nearly a quarter of the visitors listed "fishing" as their most important outdoor activity (23.4%), with 43.5% listing "fishing" as one of their three top overall outdoor activities. For some, fishing is just an activity done for leisure, while others have created an art or science out of angling. Over one-third (36.8%) of German anglers surveyed belong to a fishing club or organization and approximately 24.8% subscribe to at least one fishing magazine. Many German anglers (37.3%) who fished in Alaska consider themselves expert anglers, specializing in certain techniques. One-third (33.3%) thought of themselves as generalists who have established the sport as a regular leisure activity and use a wide variety of techniques. Finally, 29.4% described themselves as occasional anglers (see Bryan 1977). Anglers visiting Alaska have the option of bringing their own equipment (rods, reels, rain gear, etc.) or renting or borrowing equipment. German anglers generally prefer to bring their own equipment on overseas fishing trips. Three-fourths (75.6%) prefer to bring all their own equipment, 14.6% of German anglers prefer to bring some equipment, and 9.8% prefer not to bring any equipment.

The anglers indicated that the natural surroundings around their fishing locations were more important than the success of actually catching fish (Figure 2). A large majority (84.8%) indicated that the fishing environment, including the social and natural setting, was extremely or very important. A sizeable proportion (53.7%) felt that the type of fish was extremely or very important to their fishing experience. A considerably smaller number felt that the size of the fish (28.3%)

and number of fish (19.7%) were extremely or very important to the fishing. In general, those who come to Alaska prefer to fish in fresh water indicating a preference for large streams and rivers followed by lakes, small streams, and finally, salt water (Figure 3.) Overall, 57.5% of German anglers fly-fished to some extent, with 17.1% dedicated to only fly-fishing. When sorted by fishing type, a dedicated fly-fishing (or partial fly-fishing) preference was highest for small stream fishing followed by large streams and lakes (Figure 4).

Just under one-half (48.0%) of the German anglers fishing in Alaska were visiting for their first time, while 16.2% were making their second trip, 10.9% their third trip, 6.4% their fourth trip, and 18.5% had made more than five trips to Alaska. According to their open-ended responses, the most frequently mentioned reasons for returning to Alaska include the following: wilderness, abundance of salmon and halibut *Hippoglossus stenolepis*, the beautiful Pacific countryside, friendly people, remoteness, solitude, and nature and scenery. Of the German anglers fishing in Alaska just 13.1% traveled alone. Nearly one-half (45.0%) of the anglers who made the fishing trip to Alaska traveled with only friends. Another 24.2% trav-

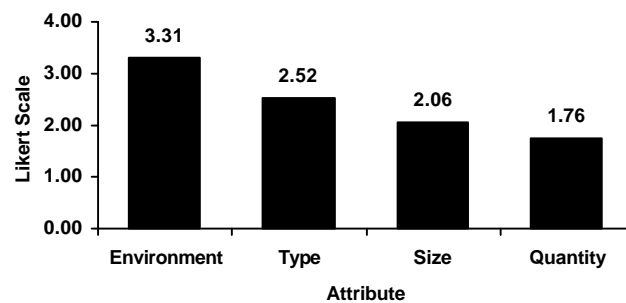


Figure 2. Importance of fishing attributes to German anglers surveyed in 1998; 4 = extremely important, 3 = very important, 2 = moderately important, 1 = slightly important, and 0 = not important at all.

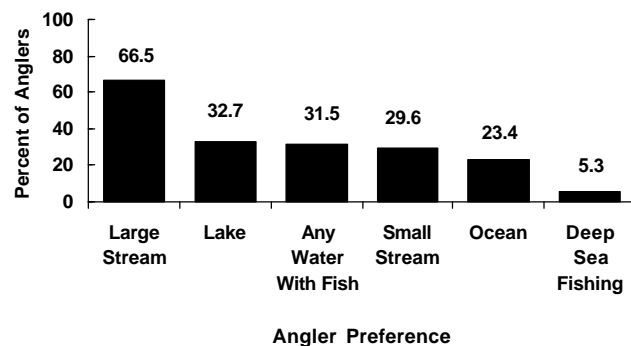


Figure 3. Body of water preferences of German anglers surveyed in 1998; more than one preference could be selected.

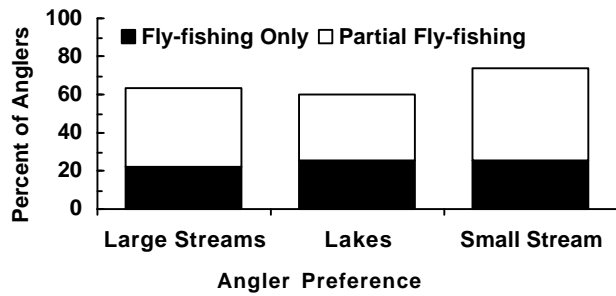


Figure 4. German angler fly-fishing and body of water preferences.

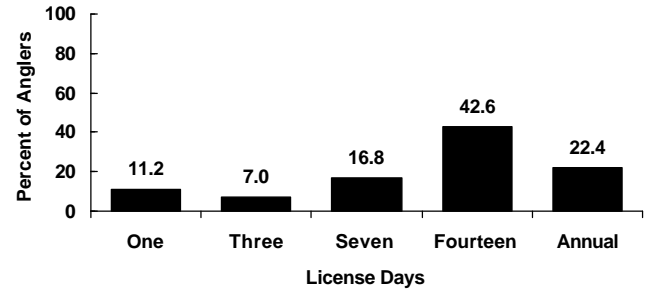


Figure 5. Percentage of German anglers purchasing various length Alaska fishing licenses in 1998.

eled with family, 11.9% traveled with both friends and family, and 5.8% traveled with an organized tour group or club. The average German travel party size was 4.1. When asked which Alaskan city was nearest their fishing trip, Kenai was mentioned the most often followed by Homer, Soldotna, Anchorage, and Valdez.

During 1998, the majority of German anglers visiting Alaska purchased a 14-day fishing license. This was followed by an annual fishing license, a 7-day fishing license, a 1-day fishing license, and a 3-day fishing license (Figure 5). Over a third (35.7%) of the anglers indicated that the primary purpose of their trip was fishing, while 64.3% said that fishing was only one of many activities of their trip. These German anglers spent an average of 20.9 days in Alaska. Almost one-half were spent fishing (9.6 days). Depending on the fishing type and location, anglers can fish from the river bank, boat, or both. Most anglers (48.2%) fished from the bank. Another 8.8% fished exclusively from a boat and 43.0% indicated that they fished from both the bank and a boat.

Of the seven species that were examined, sockeye, coho, and chinook salmon were the favorite targets for the German angler with over 83% of the anglers fishing for at least one species of salmon (Table 1). Catch rates varied among species and are affected by fish availability as well as catch limits. The highest re-

ported catches of salmon were pink *O. gorbuscha* followed by chum, sockeye, coho, and chinook. For the highly prized chinook salmon an average daily catch of approximately two fish was reported with an average of less than one retained. The highest daily catch for any species was reported for Arctic grayling *Thymallus arcticus*. Approximately one-quarter (24.7%) of the German anglers said that they caught more fish than expected, 43.8% caught the same as expected, and 31.5% caught less than expected.

An overwhelming majority (82.1%) said that they were either very or extremely satisfied with their fishing trip (Figure 6). This satisfaction was reinforced when asked about the specifics of their satisfaction (Table 2). In general, the German anglers were very happy about their fishing experience in Alaska. In terms of money spent, they were slightly less satisfied with the investment return although a general level of happiness was indicated. In regard to the number of fish caught, the answers were more neutral. When asked about success in catching a "trophy" fish, the German anglers were less enthusiastic but still happy about their performance.

The mean expenditure on the Alaska portion of their trip expenditures was 5,132 DM, which is equivalent to \$2,804 at the 1998 summer exchange rate of 1.83 DM per U.S. dollar. The median expenditure was

Table 1. Species preference and success of the surveyed German angler fishing in Alaska, 1998.

Species	% of Anglers Fishing For Each Species	Daily Average Kept	Daily Average Released	Daily Total Average
Sockeye salmon	40.8	1.94	2.15	4.09
Coho salmon	40.4	1.68	2.00	3.68
Chinook salmon	38.2	0.80	1.22	2.02
Pink salmon	26.9	1.54	3.81	5.35
Halibut	20.7	1.42	2.02	3.44
Grayling	20.4	2.75	6.28	9.03
Chum salmon	11.0	1.01	3.38	4.39

Table 2. Responses to specific survey questions concerning satisfaction by German anglers, 1998.

Specific Satisfaction Question	Average rating <sup>a</sup>
I thoroughly enjoyed fishing in Alaska	3.15
The fishing trip was well worth the money that I spent to take the trip	2.59
I caught more fish than I expected	2.22
I am satisfied with the amount of people I encountered	2.15
I caught what I consider a "trophy" fish on this trip	2.05

<sup>a</sup> Likert scale (Trochim 1999): 4 = extremely happy, 3 = very happy, 2 = happy, 1 = less happy, 0 = unhappy.

4,000 DM (\$2,265). Satisfaction, when couched in terms of money spent, was slightly diminished but was still relatively high with 66.1% of Germans saying that they were either very or extremely satisfied with their fishing trip (Figure 7). Possibly more revealing were the answers to the question about returning to Alaska on a future trip. An overwhelming 97.4% said that they would return. The median amount of time that they planned to wait until their return trip was 2 years. Finally, the German anglers were asked about the upper limit they would be willing to spend for their fishing trip in Alaska. Nearly three-quarters (71.7%) would be willing to spend more than they spent, 21.3% the same, and 7.0% less.

### Modeling Satisfaction

From the German anglers who returned the survey, it is apparent that most are relatively satisfied with their fishing experience (Table 2). In response to the specific statement "I thoroughly enjoyed fishing in Alaska" the German angler average rating was 3.15 out of 4. We have reported a variety of individual characteristics and specific Alaska fishing attributes that we believe help shape the German anglers' opinion of their Alaska fishing experience. An interesting question emerges regarding the attributes that were significant in explaining individual variations from the average

experience. The ordered probit model was utilized to assist in the search for statistically significant attributes and the differing effects on the probability of satisfaction from these attributes. Of 363 possible observations, 296 were used and 67 were excluded because at least one of the observations was incomplete. The remaining observations are 81.5% of the returned surveys. This could lead to a concern over item non-response issues. In particular, "individuals are not particularly anxious to divulge their incomes, whether total, or amounts in certain categories..." (Rubin 1987). This was true for our survey questions included in the modeling of angler satisfaction. Of the 67 excluded observations, 42 were excluded because of anglers not filling in their incomes (a 11.4% loss due to the income variable). The result of the item non-responses can be a loss of efficiency (fewer observations) or bias. Rubin (1987) reports that lower income respondents are the most likely to not fill in their incomes. However, it was decided to leave the income variable in as it was not a major focus of this study and because the resulting bias from excluding it may outweigh the costs of deleting the variable. In any case, the estimation without the income variable did not alter the directional effects of the reported estimation.

The equation of satisfaction determination is presented after several variables were deemed statistically insignificant in earlier runs (Tables 3 and 4). As

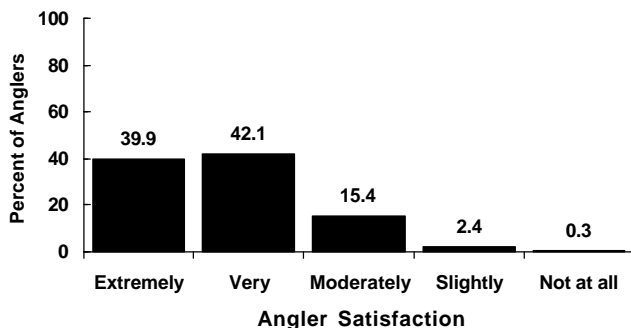


Figure 6. Overall satisfaction of surveyed German anglers fishing in Alaska in 1998.

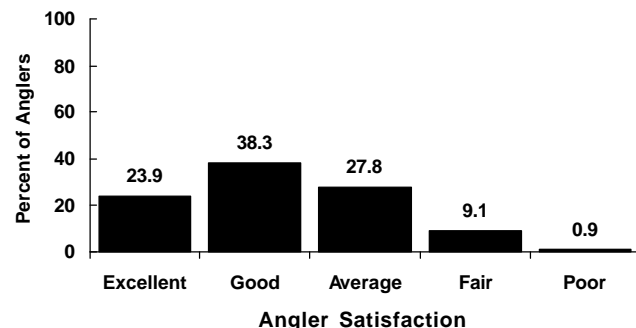


Figure 7. Overall satisfaction of surveyed German anglers fishing in Alaska in terms of money spent in 1998.



Table 3. The ordered probit estimation of satisfaction by attribute for German anglers in Alaska, 1998<sup>a</sup>.

Attribute	Coefficient	Std. Error	z-Statistic	Probability
Fly-fish	0.335	0.185	1.809	0.070
Fish environment	0.241	0.078	3.090	0.002
Game fish	-0.186	0.074	-2.500	0.013
Want fish	-0.161	0.066	-2.441	0.015
Dedicated fisher	-0.195	0.108	-1.805	0.071
Purpose is fishing	-0.292	0.154	-1.895	0.058
Females in group	0.158	0.077	2.051	0.040
Chinook salmon focus	-0.278	0.141	-1.978	0.048
Grayling focus	-0.278	0.192	-1.445	0.149
Catch success	0.380	0.081	4.709	0.000
Trophy success	0.133	0.068	1.957	0.050
Lack of crowding	0.232	0.081	2.858	0.004
Married	-0.311	0.164	-1.898	0.058
House income	0.025	0.016	1.535	0.125

<sup>a</sup>The likelihood ratio statistic is 121 ( $P$ -value = 0.000), the likelihood ratio index (Pseudo- $R^2$ ) is 0.182.

stated, the interpretation of the ordered probit model is not straightforward. By using the marginal effects with the estimated equation we can get a better picture of variables that contribute to and affect levels of happiness (Table 5). For example, "fly-fish" is a binary indicator variable which equals 1 if the German angler fishing Alaska was a dedicated fly fishermen and zero otherwise. The variable was significant at the  $P$ -value of 0.07 (all variables were statistically significant at the 90% ( $P$ -value = 0.10) level except for grayling and income). The marginal effects show that if the German angler is dedicated to fly-fishing there is an increased probability (12.99%) of an angler being in the extremely satisfied category. This increase comes from the other four categories so that the total marginal effect from all five categories is zero as changes in probabilities in any category must be exactly offset by changed probabilities in all remaining categories.

Results of the German angler satisfaction estimation indicate that trip satisfaction increased for those fishermen who were dedicated to fly-fishing, and anglers who exhibited pre-trip preferences towards a favorable fishing environment. Also of importance are anglers in groups with higher numbers of females, and those who exceeded their expectations in regard to the number and size of fish caught and who encountered less crowding conditions than expected. Higher income anglers were also more satisfied although this variable was not statistically significant with a high level of confidence.

Dissatisfaction was exhibited by anglers who felt a priori that it was very important to catch a challenging game fish and who also indicated an above average unhappiness if they did not catch any fish. Also, anglers who were the most dedicated fishers and whose primary purpose of the trip was to fish showed less

satisfaction in their Alaska trip than the average participant who combined fishing with other Alaska activities. Married members of the trips showed less satisfaction than the single members. Fishers whose trips included a focus on chinook salmon or grayling were also less satisfied than the average trip that included other targeted species. Perhaps trips did not live up to their expectations because they did not catch their trophy fish. However, in all cases the level of overall satisfaction was still quite high.

## DISCUSSION

If it is important for the State of Alaska to supplement its dwindling income from oil extraction then it is important for the tourism industry and sport fishery managers to have an increased knowledge of whether participants are pleased with their travel experiences (Roehl et al. 1993). Both repeat visitations from overseas travelers and new visitors can benefit the Alaskan economy. In 1996, it was estimated that sport fishing in Alaska contributed \$548 million in direct expenditures, \$955 million in total economic output, and supported 12,626 jobs (ASA 2001).

This is the first comprehensive survey of German anglers in Alaska and one of the few in-depth surveys of overseas sport fishing anglers. In 2001, Germany ranked third behind Japan and the United Kingdom in overseas visitors to the United States with 1,786,000 visitors (OTTI 2001). The results of this study show a high level of satisfaction among the German anglers who fished Alaska in 1998 and a desire of the overwhelming number of respondents to return. Reported reasons for the satisfying trip experience included the Alaska wilderness, abundance of salmon and halibut,

Table 4. Definitions of variables used in the ordered probit estimation of satisfaction, by attribute, for German anglers in Alaska, 1998.

Dependent Variable	Meaning	Measurement
Satisfaction	“Overall, how satisfied were you with your 1998 trip to Alaska?”	Likert scale of 0 to 4 where 4 is extremely satisfied with the trip, 3 very, 2 moderately, 1 slightly, and 0 not at all satisfied
Independent Variables		
Fly-fish	Do you prefer fly-fishing to other types of fishing	1 if dedicated solely to fly-fishing, otherwise 0
Fish environment	Rated on importance for the German fisher	Likert scale of 0 to 4 where 4 is extremely important, 3 very, 2 moderately, 1 slightly, and 0 not at all important
Game fish	“I am happiest with the fishing trip if I catch a challenging game fish”	Likert scale of 0 to 4 where 4 is strongly agree, 3 agree, 2 neutral, 1 disagree, and 0 strongly disagree
Want fish	“If I thought that I wouldn’t catch a fish I wouldn’t go fishing”	Likert scale of 0 to 4 where 4 is strongly agree, 3 agree, 2 neutral, 1 disagree, and 0 strongly disagree
Dedicated fisher	Are you an expert angler, generalist, or occasional angler	3 is an expert, 2 is a generalist, and 1 is an occasional angler.
Purpose is fishing	Fishing is main purpose of trip to Alaska or just one of many	1 = yes, 0 = no
Females in group	Number of women in fishers group	
Chinook salmon focus	Focused on chinook salmon as one of the species targeted	1 = yes, 0 = no
Grayling focus	Focused on grayling as one of the species targeted	1 = yes, 0 = no
Catch success	“I caught more fish than expected”	Likert scale of 0 to 4 where 4 is extremely happy, 3 very happy, 2 happy, 1 less happy, and 0 unhappy.
Trophy success	“I caught what I consider was a ‘trophy’ fish on this trip”	Likert scale of 0 to 4 where 4 is extremely happy, 3 very happy, 2 happy, 1 less happy, and 0 unhappy.
Lack of crowding	“I encountered more people than I expected”	Likert scale of 0 to 4 where 4 is extremely happy, 3 very happy, 2 happy, 1 less happy, and 0 unhappy.
Married		1 = yes, 0 = no
House income		15 categories (where 1 is the lowest and 15 the highest.)

the beautiful countryside, friendly people, remoteness, solitude, and nature and scenery. The satisfaction modeling supported these comments where overall satisfaction was high for those catching fish, which were influenced by a positive fish environment, and a lack of crowding pressure. Indeed, the result of the modeling indicated that those fishermen who were more apt to take part in the entire Alaska experience (not just fishing) were more likely to have a positive experience. In all cases satisfaction levels remained relatively high.

The determinant of trip satisfaction for the German visitor has similarities with other studies of satisfaction that focused on U.S. residents. Felder (1984) in a survey of Maryland charter boat fishermen calculated a score of 3.15 (using the same five point Likert scale where 4 is extremely satisfied and 0 not at all satisfied) when fishermen were asked to rank the statement “I thoroughly enjoyed the fishing trip” (p. 79). Our score was also 3.15 for the similar question “Overall, how satisfied were you with your 1998 trip to Alaska?”

Table 5. Marginal effect probabilities in order of the largest increase in the extremely satisfied category (in percentages).

	Not at all Satisfied $P(y=0)$	Slightly Satisfied $P(y=1)$	Moderately Satisfied $P(y=2)$	Very Satisfied $P(y=3)$	Extremely Satisfied $P(y=4)$
Catch success	-0.06	-0.67	-7.18	-6.10	14.02
Fly-fish	-0.03	-0.41	-5.63	-6.92	12.99
Fish environment	-0.03	-0.40	-4.56	-4.00	8.99
Lack of crowding	-0.03	-0.38	-4.41	-3.87	8.69
Females in group	-0.02	-0.25	-3.00	-2.68	5.95
Trophy success	-0.02	-0.21	-2.53	-2.25	5.01
House income	0.00	-0.04	-0.48	-0.43	0.95
Want fish	0.02	0.26	3.06	2.71	-6.05
Game fish	0.03	0.30	3.52	3.11	-6.95
Dedicated fisher	0.03	0.32	3.70	3.26	-7.31
Grayling focus	0.04	0.50	5.54	4.19	-10.27
Purpose is fishing	0.05	0.52	5.78	4.47	-10.82
Chinook salmon focus	0.05	0.52	5.78	4.47	-10.82
Married	0.04	0.45	5.64	5.74	-11.87

Similarly, the Felder study found a slight decrease in enjoyment when the question was conditioned upon money spent. They calculated a score of 2.75 which was again identical to our score when we asked "In terms of money you spent, would you say that the value you received relative to your satisfaction of the trip was..." Felder found the motivation for fishing on charter boats to be based most highly on the need to get away, relaxation, and to be outdoors. In a companion study of Delaware charter fishermen, Graefe and Felder (1986) found similar, although slightly lower, levels of satisfaction. Holland and Ditton (1992) hypothesized that trip satisfaction was the fulfillment of psychological outcomes and found that environmental quality and a sense of freedom to be the two most important factors of sportfishing in Texas. Despite the fact that all three studies used different statistical techniques to rank trip components of satisfaction, all studies found that the fishing environment was a very important determinant in trip satisfaction. Our study also found that fishing environment (and a lack of crowding) were very important determinants in trip satisfaction. The fact that our study found that the most influential determinant to be *catch success* is not surprising. The expectations of fishing success when coming to Alaska are generally quite high and likely to be a major draw of nonresident fishermen.

This model of German angler satisfaction is an initial attempt to isolate factors most influential in forming trip satisfaction of Germans and hence, most influential in forming deviations away from average trip satisfaction. To get a more complete picture, factors regarding the non-fishing portions of the trips would need to be included (Jamrozy and Muzaffer 1994). Also, this basic model structure does not tell us why a Ger-

man angler may or may not take a trip. For example, Aas (1995) found that non-fishing factors, such as lack of time, were more important in deciding whether one takes a fishing trip than fishing factors for Norwegian anglers.

Finally, as is the case with most surveys, the non-response rate is an issue to be noted. There is evidence that non-responses in angler surveys tend to be skewed toward the participants who exhibit less participation (Tarrant et al. 1993). The reason that this may be observed is that these participants are less dedicated to the sport. In our survey, this might seem to lead to an overestimate of satisfaction as those who are dedicated to the sport might be more likely to answer the survey and probably more likely to be satisfied. However, in our survey we found the dedicated anglers to be slightly less satisfied with the overall trip so it is difficult to make any generalizations about the effect that the non-response rate may have. In any case, the non-response rate is raised as a cautionary note.

Although this study was considered successful, there were difficulties with respect to designing a survey instrument for international non-English speaking anglers. One of the primary concerns of this study is that 64% of the addresses obtained from the ADF&G were not usable. Some ways this problem can be dealt with in the future is to get people familiar with German handwriting and addresses to input the raw licensing data. Optimally, the fishing license itself could be updated to make the format more amendable to international addresses. In spite of these problems, we believe that overall the findings present a fairly accurate picture of German anglers and give some indication of the satisfaction of other foreign and overseas anglers.

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Appendix A. German angler survey and response rate (English Version)

**Section I — Angling Preferences – This section asks about your fishing preferences in general.**

**Which of the following best describes where you like to fish? (Check all that apply)**

- Any Water Containing Fish
- Lakes
- Large Stream
- Small Streams
- Ocean
- Deep Sea Fishing

**Do you prefer:**     Fly-fishing     Spin Fishing     Both

**Do you prefer to bring your own fishing equipment on fishing trips?**

- YES
- YES, Some Equipment
- NO, None

**Please rate the following on importance when you are fishing.**

	Extremely Important	Very Important	Moderately Important	Slightly Important	Not at All Important
Quantity of Fish	4	3	2	1	0
Size of Fish	4	3	2	1	0
Type of Fish	4	3	2	1	0
Fishing Environment Including Social and Natural Setting	4	3	2	1	0

**Which of the following best describes you? (Please check only one)**

- Occasional Angler: Those who fish infrequently because they are new to the activity and have not established it as a regular part of their leisure, or because it simply has not become a major interest.
- Generalist: Anglers who have established the sport as a regular leisure activity and use a variety of techniques.
- Expert Angler: Highly committed angler who specializes in a particular method, largely to the exclusion of all other techniques.

**Compared to your other outdoor recreation activities (such as hunting, camping, golfing, etc.), would you rate recreational fishing as? (Please check only one)**

- Your most important outdoor activity
- Your second most important outdoor activity
- Your third most important outdoor activity
- Only one of many outdoor activities
- I rarely fish

**Please indicate the extent to which you agree or disagree with each of the following statements.**

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
The more fish I catch, the happier I am	4	3	2	1	0
I usually eat the fish I catch	4	3	2	1	0
I would rather catch 1 or 2 big fish than 10 smaller fish	4	3	2	1	0
I'm just as happy if I don't keep the fish I catch	4	3	2	1	0
I like to fish where there are several kinds of fish to catch	4	3	2	1	0
I'm happiest with the fishing trip if I catch a challenging game fish	4	3	2	1	0
If I thought I wouldn't catch any fish, I wouldn't go fishing	4	3	2	1	0
I like to fish where I know I have a chance to catch a "trophy" fish	4	3	2	1	0
When I go fishing, I'm not satisfied unless I catch at least something	4	3	2	1	0

**Are you a member of a fishing club or organization?**

- YES (If YES, please identify): \_\_\_\_\_
- NO

**How many members of your family members fished in Alaska in 1998?**

- 1     2     3     4     More than 5

**Do you subscribe to magazines devoted to fishing?**

- YES (If YES, please identify): \_\_\_\_\_
- NO

**How many vacation trips did you take in 1998?**       1     2     3     4     More than 5

**How many of these trips were overseas?**       1     2     3     4     More than 5

**On how many of these overseas trips did you go fishing?**     1     2     3     4     More than 5

If you fished, what were the locations of these trips where you fished? (Please list the City, State, and Country)

Nearest City: \_\_\_\_\_ State \_\_\_\_\_ Country \_\_\_\_\_  
 Nearest City: \_\_\_\_\_ State \_\_\_\_\_ Country \_\_\_\_\_  
 Nearest City: \_\_\_\_\_ State \_\_\_\_\_ Country \_\_\_\_\_

**SECTION II – This section asks about your activities while in Alaska**

**Where did you clear customs for entry in the United States?**

\_\_\_\_\_

**Including 1998, how many times have you visited Alaska? (Please check only one)**

- 1     2     3     4     More than 5

**Was this your first time fishing in Alaska?**     YES     NO

If you answered NO, why do you like to fish in Alaska? \_\_\_\_\_  
 \_\_\_\_\_

**What was the total number of days that you spent in Alaska in 1998?** \_\_\_\_\_ days

**How many of those days did you actually spend fishing in Alaska?** \_\_\_\_\_ days

**Please indicate which of the following statements best describes the purpose of your trip to Alaska**

- Fishing was the main purpose of my trip to Alaska.
- Fishing was one of many activities of my trip to Alaska.

**During your Alaska travel which of the following means of transportation did you primarily use only within Alaska? (Please check only one)**

- Private Vehicle
- Rental Vehicle
- Rental RV
- Railroad
- Airplane
- Ferry
- Cruise Ship
- Scheduled Bus
- Motorcoach Tour
- Bicycle
- Foot
- Own Boat
- Rented Boat or Boat of Friend or Relative or Friend
- Other

**What type of accommodations did you use primarily? (Please check only one)**

- Hotel
- RV Park-Campground
- Wilderness Camping
- Friends/Relatives Home
- Accessible by Automobile
- Bed & Breakfast
- Cruise Ship
- Boat
- Lodges
- Remote

**Type of fishing license purchased:**  1 day  3 day  7 Day  14 Day  Annual

**What type of group did you fish with in Alaska in 1998? (Please check only one)**

- By Yourself
- Friends
- Family
- Family & Friends together
- Club
- Organized Tour Group

How many people, including yourself were in your group? \_\_\_\_\_  
 Of these people, how many were women? \_\_\_\_\_

**Did you fish from the:**  Bank  Boat  Both

**If you fished from a boat: (Check all that apply)**

- Did you hire a guide or boat service independently?  YES  NO
- Was it part of a tour package?  YES  NO
- Did you use your own boat?  YES  NO
- Did you use a friend's boat?  YES  NO

For your Alaska fishing trips in 1998 please fill in the following table.

For each of these species	Chinook Salmon (King)	Coho Salmon (Silver)	Sockeye Salmon (Red)	Chum Salmon (Dog)	Pink Salmon (Humpty)	Halibut	Grayling Other _____
What was your average catch per day that you kept?							
What was your average catch per day that you released?							
Would you be willing to pay an additional DM_____ to double your expected catch (Total amount kept <u>and</u> released)? (Please answer yes or no for each species)							
Would you be willing to pay an additional DM_____ to double your catch limit (Total amount that you are allowed to keep)? (Please answer yes or no for each species)							

Overall, would you say that with regard to the amount of fish caught (either number of fish or poundage)?

- You caught more than expected.
- You caught what you expected.
- You caught less than expected.

Did you buy a Derby ticket?       YES    NO

If you answered YES, please indicate the type of Derby (chinook or coho salmon, etc.) and location where the Derby was held:

**SECTION III – This section asks about your contentment with the Alaska trip in 1998**

Overall, how satisfied were you with your 1998 trip to Alaska? (Please circle only one)

Extremely Satisfied      Very Satisfied      Moderately Satisfied      Slightly Satisfied      Not at all Satisfied

How well do the following statements describe your feelings about the fishing portion of your 1998 trip to Alaska?  
Please evaluate the statements below according to the following scale:

	Extremely Happy	Very Happy	Happy	Less Happy	Unhappy
I caught more fish than I expected.	4	3	2	1	0
I encountered more people fishing than I expected.	4	3	2	1	0
I thoroughly enjoyed fishing in Alaska.	4	3	2	1	0
The fishing trip was well worth the money spent to take the trip.	4	3	2	1	0
I caught what I consider a "trophy" fish on this trip.	4	3	2	1	0
I did not catch the type of fish I had hoped to on this trip.	4	3	2	1	0



**All things being equal, how much more likely would it be that you patronized Alaskan businesses who had German speakers on their staff?**

- Would make no difference
- Would make some difference
- Would make a great deal of difference
- Absolutely

How much did you spend on the Alaska portion of your trip? \$ \_\_\_\_\_ (Please quote in Deutsche Marks)

**In terms of money you spent, would you say that the value you received relative to your satisfaction of the trip was**

- Excellent
- Good
- Average
- Fair
- Poor

**What is the upper limit you would be willing to spend for your Alaska trip? \$ \_\_\_\_\_ DM**

**Would you return to Alaska on a future trip?**  YES  NO

**If so, what year?** \_\_\_\_\_

What would make future trips to Alaska more enjoyable? Please feel free to write in the space below provided.

**Ice fishing is a popular sport in the winter in Alaska, would you be interested in the art of this type of fishing?**

- YES
- NO

**Did you participate in any fishing tournaments outside of Alaska?**

How often in 1998? \_\_\_\_\_ Where? \_\_\_\_\_

**Please indicate which of the following situations best describes your feelings towards "Catch and Release?"  
(Please check only one)**

- Anglers should only be allowed to catch their limit.
- I feel catch and release is a great management tool that keeps the number of fish up and anglers happy.
- I feel catch and release does not matter because most fish die after being released or most people keep the fish anyway.

**If you came to visit us in the winter what would you be interested in doing?**

- Dog Racing
- Snow Machining
- Dog Sled trips
- Visiting Hot Springs and Northern lights
- Nordic Skiing
- International Ice Sculptures
- Events of the Native Population
- Bush Tours

**SECTION IV – Trip Plan – In this section we ask how you planned your 1998 trip to Alaska.**

**How long before you departed on this trip did you decide to travel to Alaska**

- Less than 3 months  
 3-5 months  
 6-11 months  
 1 year or more

**When did you actually make your travel arrangement?**

- Less than 3 months  
 3-5 months  
 6-11 months  
 1 year or more

**How did you make arrangements for your Alaska trip? (Please check only one)**

- Bought a packaged trip  
 Purchased day trips, etc. locally in Alaska  
 Purchased tour package for part of my trip.  
 Completely on own with no packages in advance

**Did you consider alternative locations besides Alaska in which to vacation in 1998?**

- YES  
 NO

If YES, which other locations? \_\_\_\_\_

What interested you about these other locations? \_\_\_\_\_

**What information sources were used in planning or influenced your decision to travel to Alaska? (Check all that apply)**

- |  |   |
|--|---|
| <input type="checkbox"/> Travel Agent  | <input type="checkbox"/> Previous visit   |
| <input type="checkbox"/> Alaska Und Kanadas Yukon  | <input type="checkbox"/> The Alaska Reiseplaner inklusive Kanada's Yukon        |
| <input type="checkbox"/> Alaska, APA Guides  | <input type="checkbox"/> Columbia Baxter Alaska Travel Practical and Affordable |
| <input type="checkbox"/> Milepost  | <input type="checkbox"/> GEO Special 1987 and 1995                              |
| <input type="checkbox"/> AAA Tour Book   | <input type="checkbox"/> Internet Site  |
| <input type="checkbox"/> Word of Mouth   | <input type="checkbox"/> Other sources, Which one(s)? _____                     |
| <input type="checkbox"/> Bells' Mile by Mile Travel Guide for Alaska, Yukon & British Columbia |   |

**SECTION V – Demographics – This section asks you questions about sex, age, income, education, and more.**

**What is your gender?**     Female     Male

**What is your age?**

- |                                   |                                |                                |                                  |
|-----------------------------------|--------------------------------|--------------------------------|----------------------------------|
| <input type="checkbox"/> Under 20 | <input type="checkbox"/> 30-39 | <input type="checkbox"/> 50-59 | <input type="checkbox"/> 70-79   |
| <input type="checkbox"/> 20-29    | <input type="checkbox"/> 40-49 | <input type="checkbox"/> 60-69 | <input type="checkbox"/> Over 80 |

**Are you?**

- Single
- Married without children
- Married w/children
- Unmarried with children

If you have children how old are they? \_\_\_\_\_

**What kind of degrees do you have?**

- 9 years primary schooling
- 10 years of primary schooling
- Still in training (apprenticeship)
- University Degree

**Type of employment**

- |   |  |
|---|--|
| <input type="checkbox"/> Owner                          | <input type="checkbox"/> Other civil servant |
| <input type="checkbox"/> Independent profession         | <input type="checkbox"/> Skilled worker      |
| <input type="checkbox"/> Small/medium sized business    | <input type="checkbox"/> Other worker        |
| <input type="checkbox"/> Managerial salaried employee   | <input type="checkbox"/> Farmer              |
| <input type="checkbox"/> Other salaried employee        | <input type="checkbox"/> No longer working   |
| <input type="checkbox"/> Managerial government employee |  |

**What is your household monthly income in Deutsche Marks?**

- |   |   |
|---|---|
| <input type="checkbox"/> Under 1,500 DM   | <input type="checkbox"/> 5,000 – 5,500 DM   |
| <input type="checkbox"/> 1,500 – 2,000 DM | <input type="checkbox"/> 5,500 – 6,000 DM   |
| <input type="checkbox"/> 2,000 – 2,500 DM | <input type="checkbox"/> 6,000 – 6,500 DM   |
| <input type="checkbox"/> 2,500 – 3,000 DM | <input type="checkbox"/> 6,500 – 7,000 DM   |
| <input type="checkbox"/> 3,000 – 3,500 DM | <input type="checkbox"/> 7,000 – 7,500 DM   |
| <input type="checkbox"/> 3,500 – 4,000 DM | <input type="checkbox"/> 7,500 – 8,000 DM   |
| <input type="checkbox"/> 4,000 – 4,500 DM | <input type="checkbox"/> More than 8,000 DM |
| <input type="checkbox"/> 5,000 – 5,500 DM |   |

**How many people other than yourself live in your household?** \_\_\_\_\_ person(s)

**How many people contribute to this income?** \_\_\_\_\_ person(s)

**Where are you from?** \_\_\_\_\_



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