Linking sportfishing trip attributes, participation decisions, and regional economic impacts in Lower and Central Cook Inlet, Alaska

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Abstract. Forecasts of the regional economic impacts of changes in the demand for recreation occasioned by regulatory changes, changes in the quality of the recreation experience, or changes in average trip costs require a model that links changes in these trip attributes to individual participation decisions and population participation rates. The probability that an individual will take a particular recreational trip is described using a nonlinear random effects probit model based on variable trip attributes and individual economic and demographic characteristics. These conditional individual probabilities are transformed into predictions of changes in total recreation demand using a simulation-based sample enumeration method. The regional impacts associated with ensuing changes in primary and secondary expenditure patterns are elucidated with a stand-alone recreation-sector module linked to a regionally adjusted zip code-level input-output model. Because the participation model allows for non-constant marginal utility, primary and secondary impacts exhibit nonlinear responses to variations in trip attributes. The modeling approach is demonstrated in an application to the saltwater sport fisheries for Pacific halibut and salmon in Lower and Central Cook Inlet, Alaska.

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1. Introduction

The lure of world-class fresh and saltwater sportfishing opportunities makes Alaska’s Kenai Peninsula one of the state’s most visited regions. This study examines the regional economic impacts of expenditures related to the saltwater sport fisheries for Pacific halibut (Hippoglossus stenolepis), and chinook (Oncorhynchus tshawytscha) and coho (O. kisutch) salmon that take place in the marine waters of Lower and Central Cook Inlet. Most of these trips originate from road-accessible segments of the western shoreline of the Kenai Peninsula. In addition to non-monetary benefits enjoyed by visiting and resident anglers, sportfishing contributes to the economic well being of Kenai Peninsula communities as infusions of new money filter through tourism related businesses and circulate within local economies.

The decision to take a sportfishing trip is predicated on the expectation that the benefits of taking the trip will exceed the associated costs. Consequently, an understanding of how that decision depends on individual demographic characteristics and attributes of the recreation experience allows prediction of how angler behavior will change in response to changes in trip attributes. For example, changes in fish stock abundance that affect catch rates or regulatory measures that affect bag and possession limits will be perceived by anglers as changes in the attribute bundle associated with their fishing trip. Because the likelihood that alternative fishing trips will be taken is expressed in probabilistic terms, confidence bounds around the predicted changes in participation rates and associated changes in regional expenditures can be estimated.

Examples of recent policy initiatives that highlight the need for regional impact analyses to account for the contribution of recreation activities include: damage assessments associated with the S.S. Glacier Bay and S.S. Exxon Valdez oil spills; potential risks associated with outer continental shelf petroleum development lease sales adjacent to prime commercial and recreational fishing grounds in Lower Cook Inlet and the Gulf of Alaska; and, management decisions to determine the allocations of allowable catches between commercial, sport, and subsistence fishers. Because oil exploration, development, and production activities in Cook Inlet could affect the productivity of adjacent fishing grounds and the quality of recreational activities, economic impact analyses are required to demonstrate the range of potential adverse impacts to communities (Northern Economics 1990; Cohen 1993; MMS 1995; Herrmann et al. 2001a). Another example is the allocation of Pacific halibut between commercial fishermen and sportfishing charterboat operators. Sportfishing in Alaska has increased considerably in the last few decades. Total purchases of fishing licenses have increased from 90,565 in 1961 to 431,894 in 1997. Over the same period, sportfishing catches of Pacific halibut have increased from less than 2% to 18% of total removals. Because Pacific halibut is a fully subscribed fishery with an overall limit on allowable removals, increases in sport catches necessitate concomitant reductions in commercial harvests. Such allocation decisions are subject to statutory and regulatory requirements to consider the effect on net benefits to the nation and the impact on small entities, including communities and small businesses.1

1 Regulatory guidelines for implementation of the Magnuson-Stevens Fishery Conservation and Management Act require that an attempt be made to assess the net economic benefits to the nation of all management actions that affect federally managed fisheries. The Regulatory Flexibility