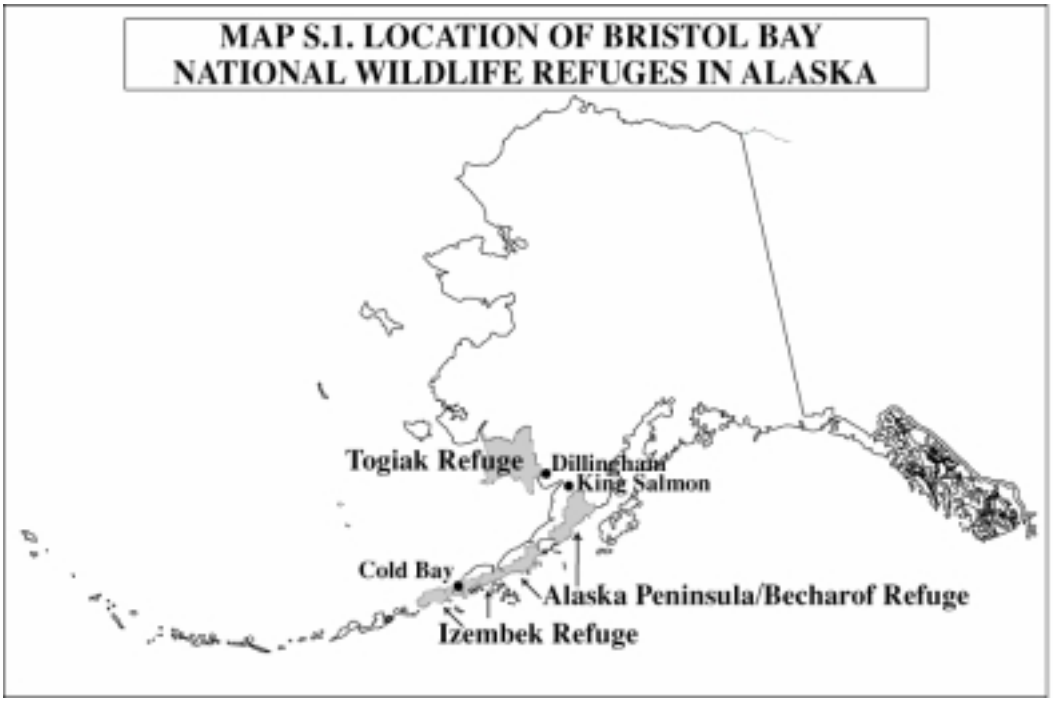
SUMMARY: ECONOMIC ASSESSMENT OF NATIONAL WILDLIFE REFUGES IN SOUTHWESTERN ALASKA

This report presents an economic assessment of the National Wildlife Refuges in Southwestern Alaska. Those refuges cover millions of acres on the Alaska Peninsula and along the north coast of Bristol Bay (Map S-1). They include large wilderness areas; spawning grounds for the rich Bristol Bay commercial salmon runs; staging areas for huge flocks of migrating waterfowl; and some of the world's best brown bear habitat. Several thousand Alaska Natives and other rural Alaskans also live in communities on or near the refuges and rely on fish, wildlife, and plants from the refuges.

The Institute of Social and Economic Research contracted with Industrial Economics, Incorporated to perform this economic assessment for the U.S. Fish and Wildlife Service. It includes measures of both economic significance and net economic value. Both are useful for policy analysis, but they measure economic activity differently. Economic significance analysis measures the role of the refuges in the regional and statewide economies. Net economic value analysis measures the overall value of the refuges, not only to Alaska but also to the U.S. as a whole.



The Fish and Wildlife Service will use this analysis to help update the Comprehensive Conservation Plans for each of the refuges, as required under Section 304 of the Alaska National Interest Lands Conservation Act. The refuges we studied are managed as three units:

Alaska Peninsula/ Becharof National Wildlife Refuge Complex—consisting of the Becharof National Wildlife Refuge and the Ugashik and Chignik units of the Alaska Peninsula National Wildlife Refuge.

Izembek National Wildlife Refuge—consisting of Izembek National Wildlife Refuge, the Pavlov and North Creek units of the Alaska Peninsula National Wildlife Refuge, and Unimak Island of the Alaska Maritime National Wildlife Refuge

Togiak National Wildlife Refuge—consisting of Togiak National Wildlife Refuge

Economic Significance of the Refuges

Economic significance analysis tells us how many jobs and how much personal income are generated in Alaska by all the expenditures associated with the refuges. Expenditures include those for managing the refuges; those made by refuge visitors; and those for commercial and subsistence harvest or other use of refuge resources. The economy of the Bristol Bay Region- Bristol Bay Borough, Lake and Peninsula Borough, Aleutians East Borough, and the Dillingham Census Area- is dominated by commercial fishing, but the jobs and income resulting from refuge activities are important to the regional economy as well as the statewide economy

The Bristol Bay national wildlife refuges generated approximately 3,200 jobs and $127 million in personal income in Alaska in 1997 (Exhibit S-1). Those are jobs generated both directly and indirectly by refuge activities, and income generated throughout the state, both within the Bristol Bay region and elsewhere in Alaska. The economic significance of the refuges will vary from year to year with many factors, including weather, hunting and fishing regulations and natural variations in resource stocks. Our estimates are for 1997 jobs and income.

EXHIBIT S.1. JOBS AND INCOME ATTRIBUTABLE TO THE BRISTOL BAY NATIONAL WILDLIFE REFUGES

	Jobs (Annual Avg.)	Personal Income (millions of 1997 $)
All Refuges	**3,225**	**$126.8**
AP/Becharof	2,173	87.7
Izembek	491	18.7
Togiak	560	20.4

Two thirds of the jobs attributable to the refuges are located in the Bristol Bay region where they account for 27 percent of all local jobs. The income associated with these jobs is more than the total household income of the region because of the large share of non-residents who work in the region but live elsewhere, particularly workers in the commercial fishing industry (Exhibit S-2).

Commercial fishing is responsible for over 90 percent of the personal income associated with the Bristol Bay refuges (Exhibit S-3). Commercial fishing also accounts for almost 90 percent of the jobs attributable to the refuges. The spawning grounds for part of the world-famous Bristol Bay red salmon fishery are on the Alaska Peninsula/Becharof refuge. That also explains why the Alaska Peninsula refuge generates by far the largest share of total jobs and income.

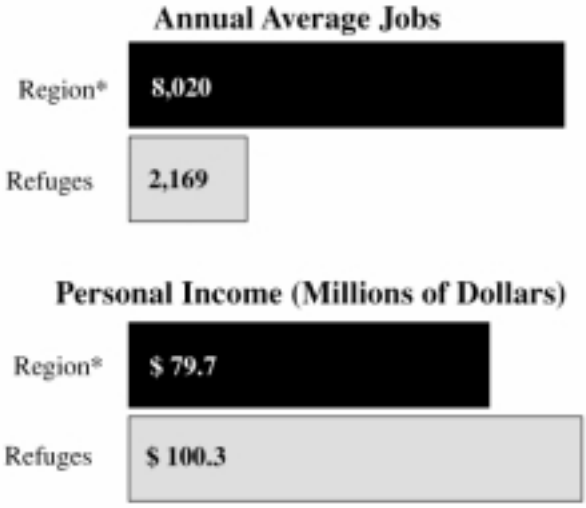
Excluding commercial fishing, the study refuges generate approximately $9.5 million in annual personal income and 362 jobs. Sport fishing generates approximately 36 percent of that $9.5 million and refuge management generates approximately 30 percent (Exhibit S-3). Subsistence activities produce approximately 20 percent of the income. (This is not the value of subsistence fish and game; it is the income produced when subsistence hunters and fishermen buy equipment or services to support their subsistence activities.) Sport hunting for big game and waterfowl creates another 10 percent of the $9.5 million. Non-consumptive uses like hiking and mountain climbing create the remaining income.

Excluding commercial fishing, the Togiak refuge contributes the most income—more than half of the $9.5 million (Exhibit S-4). The Togiak refuge includes several rivers with exceptional sport fishing opportunities, attracting anglers from throughout the world.

Non-resident sport hunters and anglers are responsible for approximately 80 percent of the $5.2 million in annual payroll generated by recreational activities on the refuges. Alaskans from areas outside Bristol Bay generate the majority of the remainder, and local residents very little (their numbers are small and they do not spend much to visit the refuges).

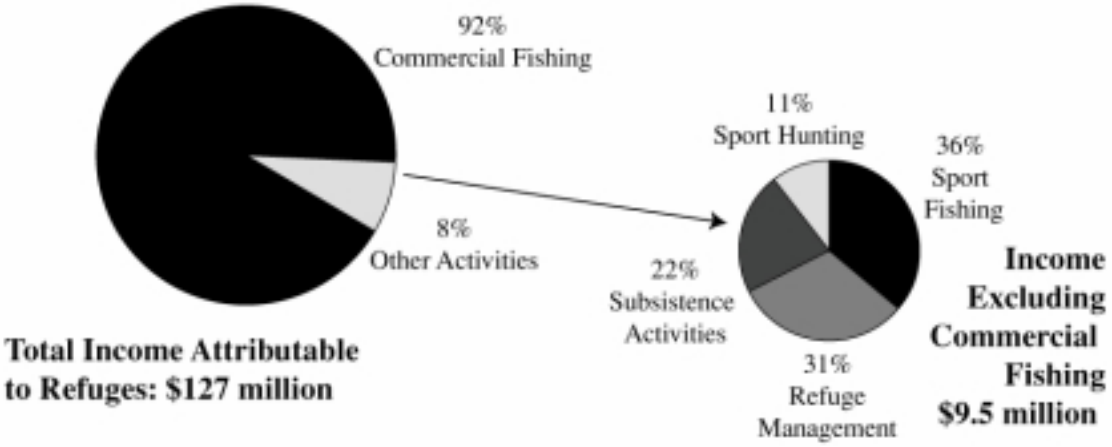
If subsistence hunting and fishing on the study refuges were paid wage work, subsistence activities would generate more than 750 jobs. While subsistence activities generate few wage-paying jobs, these activities are extremely important to the economies of communities on and near the refuges. One way of estimating the economic importance of subsistence hunting and fishing is to look at how much time is devoted to subsistence activities, and convert that estimate to an equivalent number of jobs. The time spent in subsistence activities in the Togiak refuge is equivalent to approximately 473 jobs, in the Izembek refuge, approximately 123 jobs and Alaska Peninsula refuge, approximately 166 jobs.

EXHIBIT S.2. SHARE OF REGIONAL JOBS AND INCOME ATTRIBUTABLE TO THE BRISTOL BAY NATIONAL WILDLIFE REFUGES, 1997

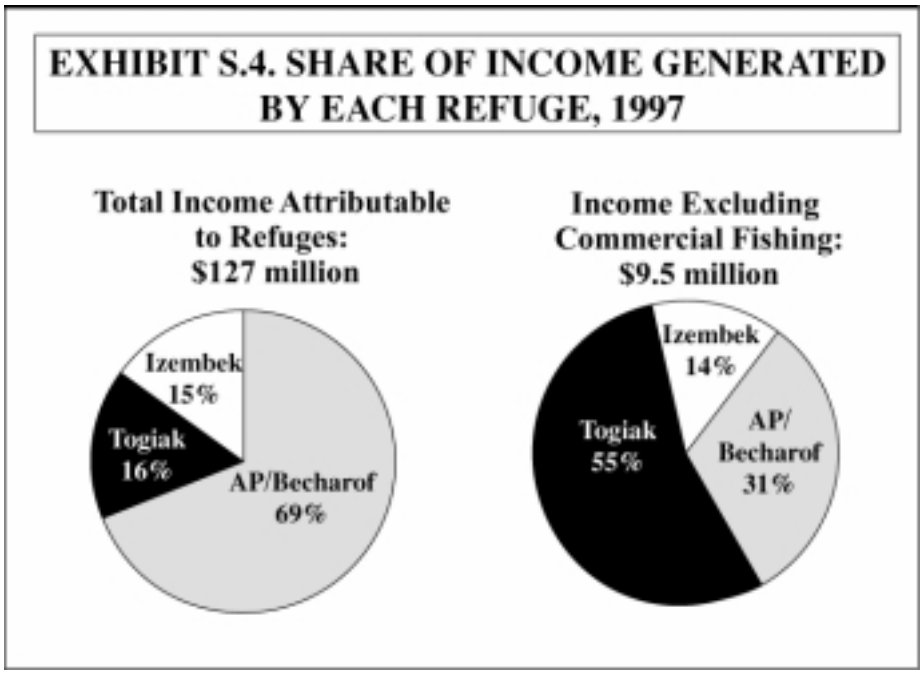


*The Bristol Bay region consists of the Bristol Bay Borough, Aleutians East Borough, Lake and Peninsula Borough, and Dillingham Census Area.

EXHIBIT S.3. ALASKA PERSONAL INCOME GENERATED BY REFUGE ACTIVITIES, 1997



Note: Non-consumptive uses generate less than 1 percent of income.



Net Economic Value of the Refuges

Net economic value analysis measures all the benefits of the refuges, less the costs of producing those benefits. Some refuge benefits—like the salmon that commercial operations harvest—have market values. But much of what we value about wildlife refuges—their beauty, for instance—does not carry a price tag assigned by a market. Net economic value analysis assigns a dollar value to both the monetary and the non-monetary benefits of the refuges. It does so by estimating how much people are willing to pay for refuge benefits, over and above their actual out-of-pocket costs. This "willingness to pay" beyond actual costs is an estimate of the value people place on the refuges.

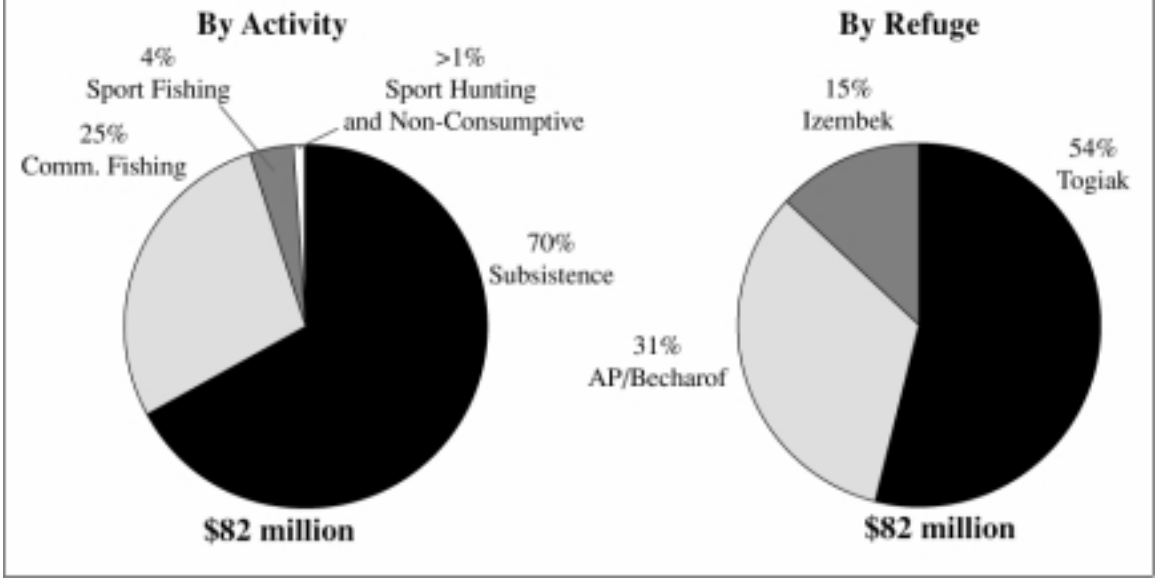
To estimate net economic value, we look at all the same refuge uses as we included when estimating economic significance. Because this method estimates a value for non-monetary benefits, we also consider what economists call "non-use" values—the value that Americans who may never visit place on the mere existence of the refuges, their areas of wilderness, and other aspects that are real but less tangible. As with economic significance, our estimates are for 1997 values.

Most of the net economic value of the Bristol Bay refuges is not in their use but in their existence. The estimated net economic value of all the refuge uses in 1997 is approximately $82 million, while the non-use value is in the range of $2.3 to $4.6 billion. This huge disparity exists partly because the remoteness of the refuges, the expense of visiting them and the harsh weather during much of the year all limit refuge use. But a more important reason is that Americans as a whole place a high value on refuge lands in Alaska, whether they ever visit them or not. Alaska is still, in the minds of many Americans, the last part of the country with huge untouched areas and prime fish and wildlife habitat. As a result, the "existence value" of the Bristol Bay refuges is very high.

Of the $82 million in net use value, approximately two-thirds is the value of subsistence activities (Exhibit S-5). Alaskans, both Native and non-Native, report a high willingness to pay for the opportunity to engage in subsistence activities. Most of the remaining one-third is commercial fishing. Commercially harvested salmon have a substantial market value, but commercial fishermen have high boat, gear, and permit expenditures—costs that have to be deducted from market value to obtain an estimate of net value.

More than half of the net use value is in the Togiak refuge, where subsistence activities have the greatest value. Approximately 30 percent of the net use value is in the Alaska Peninsula/Becharof refuge, and the remaining 15 percent is in the Izembek refuge (Exhibit S-5).

EXHIBIT S.5. USE VALUE BY ACTIVITY AND BY REFUGE, 1997



Assumptions

To develop the economic assessment of the refuges in Southwestern Alaska, we collected information on use patterns, user expenditures, and estimates of willingness to pay from published sources as well as from refuge personnel. Often the best available sources of information were several years old or were not specific either to a refuge or even to the Bristol Bay region of Alaska. The absence of current site-specific information is due to its high collection cost given the remote location of these refuges and the small number of visitors they receive. Because of the unusual and often unique characteristics of these refuges, the use of non-specific data in the analysis creates a level of uncertainty in the results. Consequently these results should be interpreted as a general description of the economic significance and net economic value of the refuges rather than as a precise estimate for 1997.

The results of the economic significance analysis would be more precise if we could conduct a survey of expenditure patterns of recreational visitors, subsistence users, and fish harvesters. This survey would need to include information about residence and travel patterns as well as expenditures while at the refuges. The results of the net economic value analysis would be more precise if we could conduct three studies. The first would obtain site and resource-specific willingness to pay information from recreational visitors to the refuges, and distinguish between residents and non-residents. The second study would obtain information from non-visitors who might nonetheless have a willingness to pay for the existence of these refuges. The third would obtain information on the net economic value of subsistence activities on the refuges. Because these would all be costly studies, we must rely on less precise information sources for our results.

The primary refuge resources that give rise to economic activity and net economic value are fish and game, both of which typically move between the refuges and the adjacent lands. For example, salmon spawn in many of the streams and lakes on these refuges and then move to the open ocean for several years before returning again to fresh water at the end of their life cycle. Although most of these salmon are harvested commercially in the ocean or caught by sport or subsistence fishermen outside the refuge boundaries, this harvest would not be possible in the absence of the spawning beds and other habitat provided to the salmon on the refuges. Consequently some share of the economic activity associated with this harvest, as well as some share of the value of the harvest, is attributable to the refuges. However there is no simple way to make this allocation between refuge and non-refuge lands. We apply simple allocation rules to distinguish refuge and non-refuge activity and value, but we recognize that other rules could be used and would be appropriate for other analytical purposes.

Appropriate Use of Results

This economic significance analysis describes the aggregate contribution of the activities associated with the refuges to the Alaska economy. It is not an analysis of the jobs and income that would be lost to the region and state of Alaska from elimination of the refuges. It is also distinct from an economic impact analysis that quantifies the change in jobs and income within a region resulting from a change in management policy or some exogenous factor influencing use of a refuge or its resources. Although it is possible to use much of the information collected for this economic significance analysis to quantify the results of such a marginal change in policy or conditions, the application of this analysis to that question must be done with care. Not only are the data in the economic significance study at best representative of the refuges on average, but marginal changes are likely not to have effects that are proportional to their size.

For example, the economic impact of policy changes that restricted access to a refuge river would depend upon the specific characteristics of that river not only in terms of the number of visitors, but also where they came from, whether they employed a guide, and the duration of their visit. Furthermore the economic impact would depend on what proportion of the visitors who have been denied access under the restrictive policy choose to visit another refuge site instead, and what proportion of those visitors choose not to visit the refuge.

The same caveat applies to the net economic value analysis that quantifies the aggregate economic value of the activities associated with the refuges. It is not a measure of the probable loss of economic value that would result from the closure of the refuges, and it cannot be used to measure the loss in value from a change in refuge management policy or in an exogenous factor influencing refuge use. These changes are likely to change the characteristics of the recreational or subsistence experience for the visitor and consequently change the value the visitor puts on those experiences. Exactly how those values would change cannot be inferred from this aggregate analysis.

For example, consider a policy change that restricted the length of visits to the refuge. The change in net economic value, as measured by the change in willingness to pay, resulting from such a policy could not be estimated by using the average willingness to pay per day from the aggregate analysis. Willingness to pay per day is likely to vary with the length of the visit, with the first day having the highest value and each successive day being less valuable than the one preceding it.

These aggregate analyses help to frame the analysis of marginal changes and place some bounds on the size of the marginal effects. However they cannot substitute for a case specific analysis if a policy change were under consideration that would effect regional employment or the net economic value of one of the refuges.