KEY FINDINGS

The results of the community case studies completed for this analysis show that runway extensions create the following benefits for remote Alaska communities:

- Improved service reliability
- Increased safety
- Reduced cost of flying fuel to communities

A runway extension can be critically important for improving the reliability and safety of air service at an airport. Improved air service reliability has the potential to save lives at remote villages whose only access to emergency medical service is provided by air. In addition, the well-being of a community is enhanced by a runway extension that allows larger aircraft to deliver fuel in greater volumes, at reduced transportation costs, and with improved reliability. In the long run, improvements to the state's transportation infrastructure can make a significant reduction in the cost of importing energy and other goods, which would then result in lower living costs and higher standards of living.

Runway extensions may contribute to other potential economic benefits:

- Reduced fresh fish and other cargo shipping/ transportation costs
- Reduced air carrier operating costs for flights

These benefits are more dependent on the volume of cargo/ mail/passengers transported than a runway extension itself. If volumes support the use of larger aircraft, a runway extension would enable carriers to realize economic efficiencies to transport cargo, mail, and passengers. It would be at the discretion of the carriers to pass those cost savings on to the customers (the communities).

In order for a runway extension to increase the economic development of a community, there must be economic activities prior to the runway extension that will generate higher volumes of cargo or numbers of passengers due to the lower transportation costs associated with larger aircraft using the runway. Without such aviation-responsive economic activity, a runway extension has little effect on a community's economic development.

Koyukuk Runway after extension (4,000 feet)

Source: DOT&PF

Future Runway Length Decisions

Runway length is a critical element of airport planning and development. The 1996 Alaska Aviation System Plan recommended a runway length for Community Class Airports of 3,000 feet. The statewide standard for Community Class runway lengths was changed from 3,000 feet to 3,300 feet in response to Change 6 in FAA Advisory circular 150-5300, which required a runway length of 3,200 feet for non-precision instrument flight approaches. The department's 3,300-foot statewide standard resulted from an additional 100 feet being added to the 3,200-foot minimum FAA standard, to accommodate variation in temperature and elevation. The 3,300-foot minimum standard has since guided airport development at many rural airports.

This analysis does not find a single runway length which guarantees all of the potential benefits discussed in this report to every community. Because the actual benefits realized by a community are dependent on a great many factors, the state may choose to evaluate runway length requirements for each airport on a case-by-case basis. Airport master plans, airport layout plans, and regional transportation plans may consider airport and community-specific factors such fleet mixes, stage lengths, elevations, temperatures, economic vitality, and other factors in determining the most appropriate runway length for each community.

Economic Analysis of Runway Extensions

A COMPONENT OF THE ALASKA AVIATION SYSTEM PLAN

INTRODUCTION

The Alaska Aviation System Plan (AASP) sets the vision for aviation in Alaska. It documents the existing aviation network, identifies needed airport improvements, sets funding priorities, and proposes aviation policy. The AASP has prepared special studies of important aviation issues, such as the *Economic Analysis of Runway Extensions*.

The purpose of this special study is to analyze the effect of longer runways on rural Alaska communities. The study evaluates the effect of runway length on economic development activities and community well-being by completing case studies of seven remote Alaska communities that have had or are expecting runway extensions or newly constructed, longer runways: Eek, Egegik, Kongiganak, Koyukuk, Quinhagak, Perryville and Sand Point (See Figure 1).

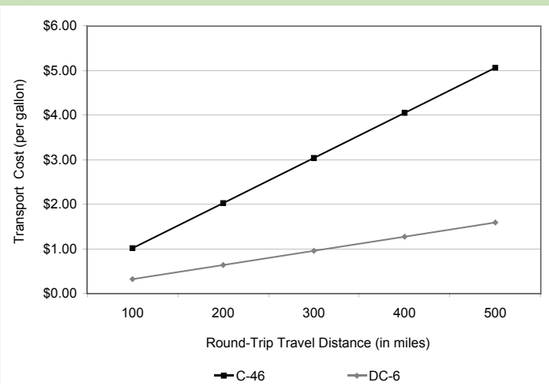
Figure 1. Geographic Locations of Case Study Communities

Source: Alaska Map Company, 2009.

Community Benefits

Regardless of any significant impact on a community's economic development, longer runways provide improved reliability and safety and reduced fuel transportation costs for remote Alaska communities.

Figure 2. Estimated Air Transportation Costs for Fuel



Source: Northern Economics, Inc. calculations based upon communications with Everts Fuel (Adams, D., 2009).

Note: Miles are in statute miles.

Improved Reliability and Safety

A runway extension can be critically important for improving air service reliability and safety, and ensuring that residents of remote villages have access to medical services in case of an emergency situation. Improved air service reliability and safety were reported by all case study communities and by some of the carriers operating in communities that had runway extensions. A reliable and safe transportation system also provides the basic foundation for economic development.

Reduced Fuel Transportation Costs

All of the case study communities receive fuel by barge two to three times each year. In general, barged fuel costs less than $1 per gallon to transport and is less expensive than flown fuel (Institute of Social and Economic Research, 2008). Nevertheless, three of the case study communities (Koyukuk, Egegik and Perryville) experienced situations in the past two years where they needed to receive fuel by air. The cost of transporting fuel by air decreases with a longer runway which allows larger aircraft to deliver more fuel in a single trip. As shown in figure 2, fuel transport cost savings due to a longer runway and larger airport increase as the distance flown increases.

Other Benefits

Economic benefits directly or solely attributable to runway extensions are difficult to identify due to the presence and interaction of many other variables. Even so, a longer runway may contribute to reduced fish transportation costs, reduced cargo shipping costs, and/or reduced air carrier operating costs.

Reduced Fish Transportation Costs

Reducing transportation costs for processed fish has been cited in the past by communities as an important reason for lengthening runways. Based on the results of the case study communities, the relationship between reduced transportation costs and runway length appears to be highly dependent upon the existing economic activities and opportunities in the community. For example, fishing communities such as Egegik and Sand Point have strong commercial fisheries that produce millions of pounds of seafood annually. In these communities with strong existing fisheries, a runway extension can lower fish hauling costs. Even though commercial fish processors transport the majority of their fish by barge, some fresh fish is flown out, depending on the market conditions.

Table 1 shows the estimated cost difference of flying fresh fish out on a smaller plane versus a larger plane at Sand Point (i.e., before runway extension and after extension).

Reduced Cargo Shipping Costs

Runway length may affect economic development by decreasing the cost of shipping cargo to and from communities; however, high volume shipments are necessary for this benefit to be experienced by rural communities. For example, cargo shipping costs may decrease when a community is completing a large capital improvement project and bringing materials in by air. In general, however, air carriers are unlikely to change their freight rates for day-to-day shipments after a runway extension.

Table 1. Estimated Cost Difference for Shipping 100,000 Pounds of Fish

Community	Amount shipped	Small plane	Large plane	Cost difference
Sand Point	100,000 pounds	$0.80/pound $80,000	$0.50/pound $50,000	***$30,000***

Source: Calculations based on communications with Coastal Villages Seafoods (Hall, J., 2009) and Aleutia (Cumberlidge, B., 2009).

Everts Air Fuel
Source: Melissa Osborn, Fairbanks International Airport

If cargo volume is sufficient to justify the use of larger aircraft, the cost savings as compared to the use of smaller aircraft are considerable. For example, prior to Eek's 2002 runway extension, Arctic Transportation could only use its Cessna 207 and had to restrict payloads to 1,000 pounds. After the extension, it could fly in its CASA 212—an aircraft with a 5,000 pound payload. Table 2 shows a comparison of flying freight to Eek with a Cessna 207 and a CASA 212.

Table 2. Changes in Shipment Costs to Eek

	Payload (in pounds)	Hourly operating cost	Per-pound shipping cost	Delivery cost estimate (based on one hour of travel) 5,000 pounds	100,000 pounds
Cessna 207	1,000	$525	$.52	$3,900	$78,000
CASA 212	5,000	$2,100	$.42	$2,100	$42,000
Difference ($)				$1,800	$36,000
Difference (%)				-46%	-46%

Source: Northern Economics, Inc. calculations based upon 2009 costs provided by Arctic Transportation (Brown, M., 2009).

Reduced Air Carrier Operating Costs

A runway extension could also reduce operating costs for passenger travel, cargo shipping and receiving (including fresh fish), and bypass mail service. Total cost savings to an air carrier from a runway extension are based on potential larger aircraft and the higher volume of passengers, cargo, or mail the carrier transports.

The study compared direct operating costs per passenger for aircraft used in the case study communities and the size of aircraft flown. In general, operating costs per passenger decrease as aircraft become larger. A runway extension will not automatically result in the use of larger aircraft and lower operating costs; the volume of passengers must be great enough to financially support using the larger aircraft. Furthermore, even if air carriers realize cost savings there is no guarantee that these savings will be reflected in lower passenger fares or cargo rates.

Loading salmon at Quinhagak
Source: Coastal Villages Region Fund, 2008

Although a longer runway does not guarantee the use of larger aircraft, data indicates that communities with runway extensions were served by larger aircraft after their runway extensions. Between 2002 and 2008, the total number of passengers and the average number of passengers per flight increased by larger percentages in the case study communities that received runway extensions compared to Alaska communities that did not receive runway extensions during that same period.[1] While the number of flights dropped by nearly 40 percent for both groups, case study communities saw a 79 percent increase in the annual number of passengers compared to just 16 percent in the comparison group. This resulted in a 197 percent increase in the number of passengers per flight in case study communities with runway extensions, compared to an 84 percent increase in the comparison group (see Table 3).

Table 3. Passengers, Flights, and Passengers per Flight by Comparative Groups

Category	Change from 2002 to 2008: Comparative Communities with No Runway Extension	Change from 2002 to 2008: Case Study Communities with Runway Extensions
Number of Passengers	+16%	+79%
Number of Flights	-37%	-40%
Number of Passengers per Flight	+84%	+197%

Source: Northern Economics, Inc. calculations based on U.S. Department of Transportation, Bureau of Transportation Statistics. 2009.

The decreased number of flights between 2002 and 2008 was coupled with an increase in the average number of seats available per passenger flight in both community groups. In 2002, communities with extended runways and those without extended runways had nearly the same number of seats available per flight. However, between 2002 and 2008 communities with runway extensions saw their average number of seats available per flight nearly triple while the average number of seats available per flight in communities without extended runways only doubled (Table 4). The significant increase in number of seats available per flight indicates that communities with runway extensions were served by larger aircraft after their runway extensions.

Table 4. Average Seats per Passenger Flight, 2002 and 2008

Year	Change from 2002 to 2008: Comparative Communities with No Runway Extension	Change from 2002 to 2008: Case Study Communities with Runway Extensions
2002	24 seats	23 seats
2008	46 seats	68 seats
Percent Increase	94%	196%

Source: Northern Economics, Inc. calculations based U.S. Department of Transportation, Bureau of Transportation Statistics. 2009.

[1] The comparison group of communities without extended runways includes Tununak, Nelson Lagoon, Kwigillingok, Old Harbor, Togiak, King Cove, Beaver, Hughes, Eagle, and Grayling.