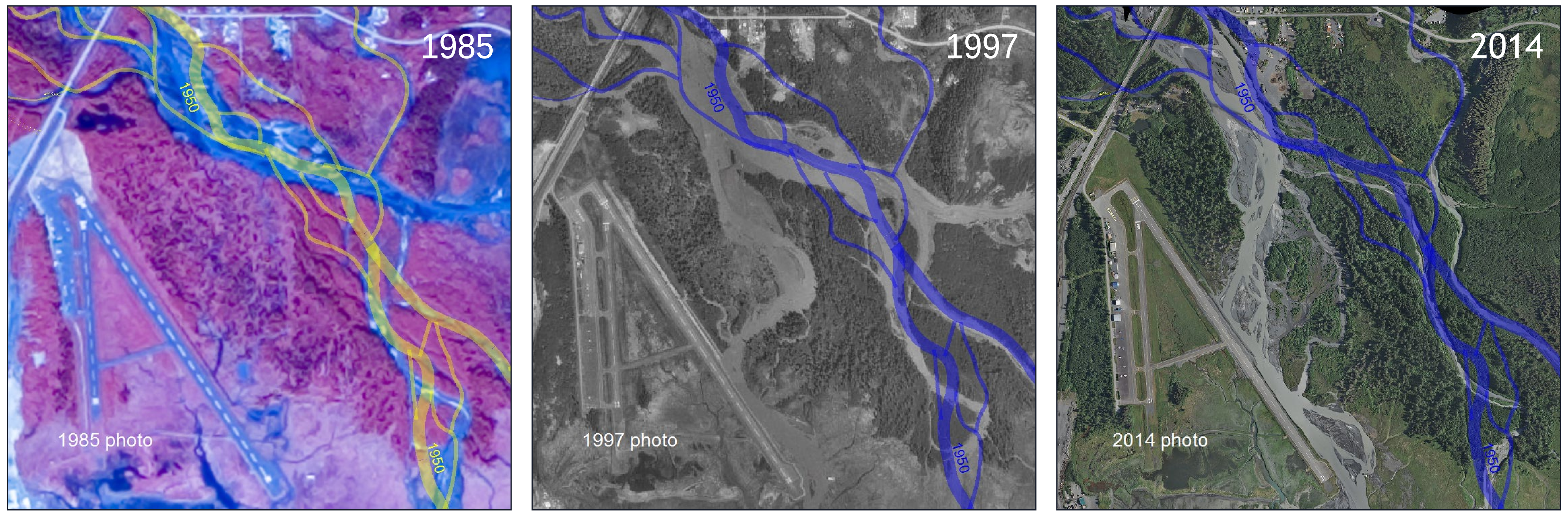
Challenge: HYDROLOGY

River flooding has caused:

- Extensive erosion that compromises the runway's pavement structure. As floodwaters recede, fines (the binding material or "glue") in the base materials are washed out, leaving voids between the large rocks under the pavement.
- Reduction of pavement strength, resulting in weight restrictions being placed on the main runway.

Why is River Hydrology an Engineering Challenge?



Solutions to river flooding must be cost-effective, long-lasting, and compliant with the requirements to secure environmental permits — a tough set of requirements considering:

River "Flood Zone"

- As you can see from the photos above, the Resurrection River isn't just near the airport—the main runway is located within the river's floodway. No engineering solution can permanently change the fact that the runway and the river compete for the same real estate.

River Type — On the Move and Hard to Control

- The Resurrection River is a braided river, meaning that it constantly moves from channel to channel within the floodplain—as the photos above show. Where any braided river will move over time is always a guess, but this is particularly true for the Resurrection River, which carries a lot of natural sediment (gradually clogging existing channels as it settles out) and meltwater (carving new channels during peak seasonal flows). Attempts to control braided rivers provide only short-term benefits, or else require constant maintenance and demand continual funding.

The Resurrection River has caused recurring damage to Seward Airport.

In 2013 alone, the river overtopped the runway 10 times.

Ways to Address the Challenging Hydrology

Raise, Armor, and Reconstruct Runway 13-31	The project will explore ways to better **protect Runway 13-31** (the existing main runway) from flooding by raising the elevation, adding armor protection, and then reconstructing the runway.	See Alternative 1.1 at Station 3
Close Runway 13-31 and Improve Runway 16-34 Instead	The project will explore ways to **improve Runway 16-34** (the existing crosswind runway) in terms of length, width, elevation, and flood protection/armoring. This idea explores closing the main runway to allow floodwater better access to the existing floodplain.	See Alternative 2.2 and Alternative 3.0 at Station 3
Reroute and/or Dredge the Resurrection River	Rerouting the river via dredging or other in-stream options **is not viable.** These types of solutions require continual maintenance, funding, and permitting. Neither a dedicated funding source nor staff to manage the effort are available from DOT&PF.	Not an option

Seward Airport Today

✈ Runway 13-31 (main runway) 4,249 feet x 100 feet

✈ Runway 16-34 (crosswind runway) 2,289 feet x 75 feet

The project will focus on solutions to meet **near-term needs** of the current based aircraft PLUS medevac aircraft (King Air B200).

- ✈ A minimum runway length of **3,300 feet** will serve the existing based aircraft and medevac operations. (See the highlighted "Current Demand & Medevac" column in the table at right for the other minimum dimensions.)

The project will continue to consider a longer, 4,000-foot runway as a future growth scenario to accommodate the potential demand for commuter aircraft such as the Beech 1900 or the Dash-8.

- ✈ See the "Growth Scenario & Emergency Preparedness" column in the table at right for other minimum dimensions.

Challenge: AVIATION DEMAND

Ways to Address the Aviation Demand Challenges

Required Runway Dimensional Standards

(highlighted column notes dimensions to meet aviation demand at Seward Airport)

Feature	Current Based Aircraft Group	Current Demand & Medevac (King Air B200) *Recommended for Near-Term Development*	Growth Scenario & Emergency Preparedness (Beech 1900) *Consider for Long-Term Development*	Dimensions of Existing Main Runway (13-31)
Aircraft Approach Category	A	B	B	B
Aircraft Design Group	I	II	II	II
Runway Length	3,300 feet	3,300 feet	4,000/4,700 feet	4,249 feet
Runway Width	60 feet	75 feet	75 feet	100 feet
Visibility Minimums	1 mile	1 mile	1 mile	1 mile
Crosswind Component	10.5 knots	13 knots	16 knots	13 knots
Runway Safety Area	120 ft x 3,780 ft	150 ft x 3,900 ft	150 ft x 5,300 ft	150 ft x 4,749 ft
Object Free Area	400 ft x 3,780 ft	500 ft x 3,900 ft	500 ft x 5,300 ft	500 ft x 4,749 ft
Runway Protection Zone	1,000 ft x 500 ft x 700 ft	1,000 ft x 500 ft x 700 ft	1,700 ft x 500 ft x 1,010 ft	1,000 ft x 500 ft x 700 ft
Part 77 Primary Surface	500 ft x 3,700 ft	500 ft x 3,700 ft	500 ft x 5,100 ft	500 ft x 4,649 ft
Part 77 Approach Slope	20:1 (visual)	20:1 (visual)	20:1 (visual)	20:1 (visual)

Station #3 shows these dimensional standards as Alternatives.

Alternative 2.2 is the alternative recommended for near-term development. It meets FAA criteria for improvements to meet expected aviation demand.

FAA will support development of the airport to meet Aircraft Approach Category B and Aircraft Design Group II (B-II), which is 3,300 feet long by 75 feet wide, with visual approach capabilities. This standard is consistent with the 2008 Airport Master Plan and approved Airport Layout Plan.

Challenge: AVIATION DEMAND

A facility as large as the existing airport isn't needed to accommodate the expected future aviation activity.

That means funding improvements that rebuild the airport to the existing size may not be possible or practical.

Why is Aviation Demand an Engineering Challenge?

Sometimes what we ***want*** to design / fund differs from what we ***can*** design / fund. Improvement funding is determined by aviation demand. Specific challenges related to aviation demand in Seward include:

The number of operations (landings + takeoffs) at Seward Airport is **low** when compared to other airports statewide.

- ✈ The Seward Airport forecast estimates the number of operations will grow as shown below.

Operations	Base Year: 2013	+5 Years		+10 Years		+15 Years	
Local GA	2,000	2,127	2,208	2,260	2,438	2,402	2,693
Itinerant GA	4,000	4,252	4,417	4,520	4,877	4,805	5,387
Medevac	200	213	220	228	243	243	268
Air Taxi/Charter	4,500	4,713	4,969	5,085	5,485	5,406	6,056
TOTALS	10,700	11,375	11,814	12,093	13,043	12,856	14,404

Reference: Seward Airport Improvements, Revised DRAFT Aviation Activity & Facility Requirements, July 13, 2015.

- ✈ The number of operations is also low when compared to similar airports.

Airport	Annual Operations (2013)
Seward Airport (SWD)	10,700
Kenai Airport (ENA)	38,950
Homer Airport (HOM)	48,085
Dillingham Airport (DLG)	50,823

Aircraft using the airport now and in the future determine improvements.

- ✈ FAA can't fund "build it and they will come" improvements. Engineers must design improvements to serve the existing and forecast aircraft fleet mix based on the design aircraft. Below is the historical fleet mix.

Operator	Aircraft	Airport Approach Category	Airport Design Group	Use
LifeMed	King Air B200	B	II	Medevac
LifeFlight	King Air B200	B	II	Medevac
Guardian	King Air B200	B	II	Medevac
Scenic Mountain Air	Cessna 172	A	I	Flightseeing / air taxi
Seward Air	Super Cub PA-18	A	I	Personal
Private	Cessna 172 Super Cub PA-18	A	I	Personal
Private	Cessna 170	A	I	Personal
Grant Aviation	King Air B200	B	II	Air taxi / charter
Homer Air	Cessna C206/207/209/210 Stationair	A	I	Air taxi / charter
Smokey Bay Air	Cessna C206/207/209/210 Stationair	A	I	Air taxi / charter
Iliamna Air Taxi	Pilatus PC-12	A	II	Air taxi / charter
Island Air Service	Cherokee 6	A	I	Air taxi / charter
Alaska Central Express	Beech 1900	B	II	Air taxi / charter
ERA Aviation	Beech 1900	B	II	Air taxi / charter
Frontier Flying Service	Beech 1900	B	II	Air taxi / charter
Warbelows	Cessna 172	A	I	Air taxi / charter
Wright Air Service	Cessna 208 Caravan	A	II	Air taxi / charter
Other: Operators who requested permission to land in 2013	Lear 35 (11 requests) Gulfstream 5 (16 requests) DC-6	C C B	I III III	
Other: U.S. Coast Guard search and rescue activities and exercises	C-130	C	IV	

Reference: Seward Airport Improvements, Revised DRAFT Aviation Activity & Facility Requirements, July 13, 2015. Data from 2007-2013.

Additional Challenges

FAA design guidance requires the selection of a design aircraft, based on operations, to determine the size of facility that can be funded.

- ✈ **The design aircraft is the most demanding aircraft** (or family of aircraft) that REGULARLY uses the airport (now or in the future). The size of this aircraft sets the airport's length, width, and other dimensions.
- ✈ "Regular use" is defined as 500 operations (landings + takeoffs) per year.
- ✈ The most demanding aircraft (largest wingspan and longest runway length needed) currently using Seward Airport is the **King Air B200**, which is used for medical evacuations. While the annual operations of the medevac airport alone don't meet the FAA threshold of 500, the B200 is a part of the "family" of B-II aircraft serving Seward, which taken together do meet the threshold.
- ✈ Larger aircraft such as the C-130 and small charter jets do not fly into or out of Seward Airport often enough to meet the FAA's threshold of **regular** use.
- ✈ FAA does not fund public airports to support military operations or aircraft.

"Need to Know" Concepts

Aircraft Approach Category is a letter code (A to E) that classifies aircraft based on the speed at which the aircraft approaches a runway for landing. Category A aircraft approach at a slower speed than Category E aircraft; the higher the approach speed, the longer the runway needed.

Aircraft Design Group is a numerical code (I to VI) that groups aircraft by wingspan size. Group I has the smallest wingspan range, while Group VI aircraft has the widest wingspan range. The wider the wingspan range, the wider the runway needed.

Challenge: FUNDING

Challenge Number One

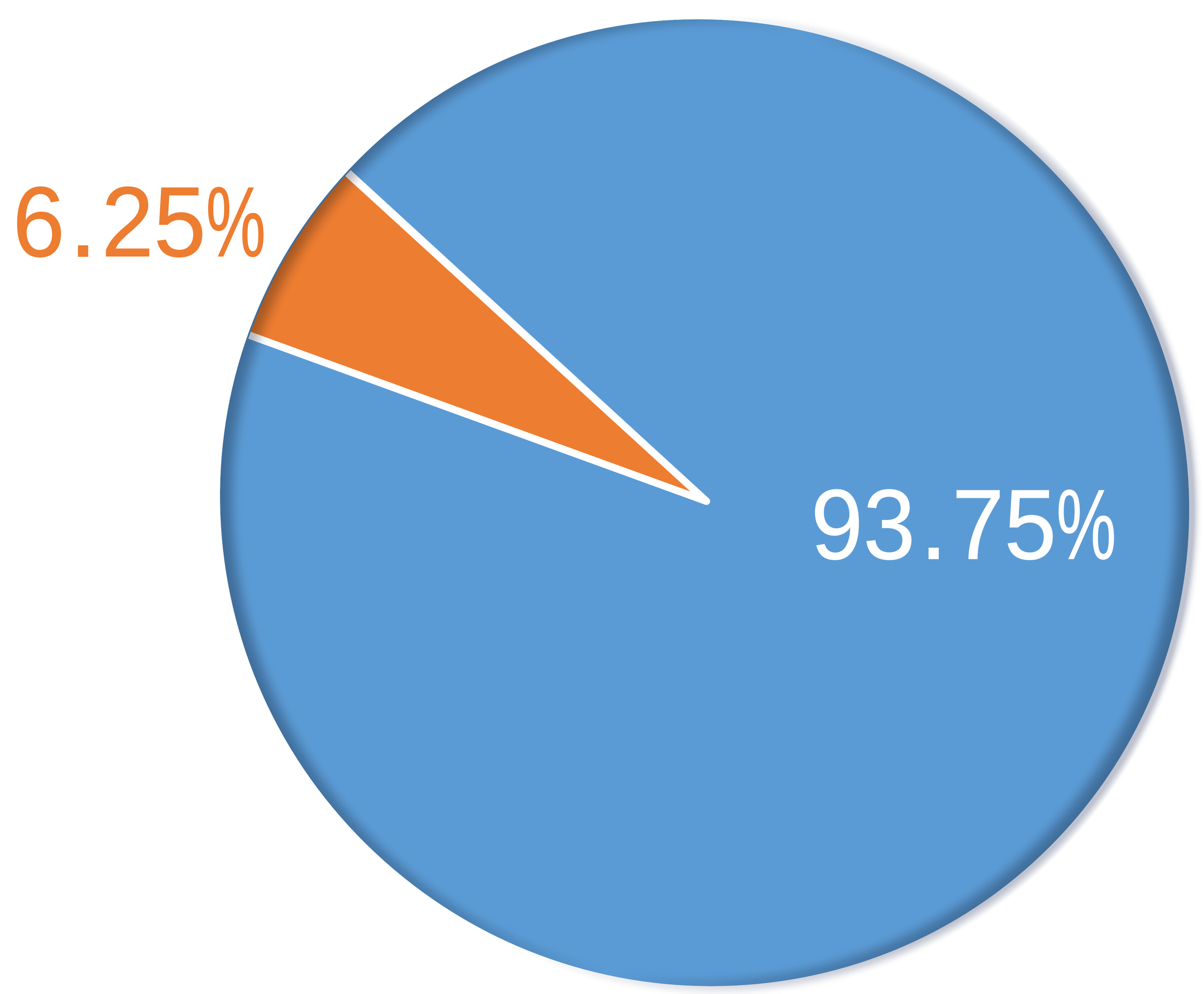
The FAA Airport Improvement Program (AIP) funding is based on a **competitive** scoring system. To receive funding, a project must score well. For the Seward Airport this is a challenge because of:

- The Competition!—Alaska has 249 state-owned airports and 20 municipally owned airports, all seeking funding. Many of these airports are the only means of year-round transportation of people, clothing, food, and fuel for their respective communities.
- Alternative Access—Airports with alternative access such as roads, railroads, and marine vessels do not score as high.
- No other funding source is readily available to DOT&PF. State funding through other sources is not likely in the near term due to Alaska's current fiscal crisis.
- Combining funding sources, although not impossible, proves to be difficult due to timing and commitments of other agencies.

Sources of Funding

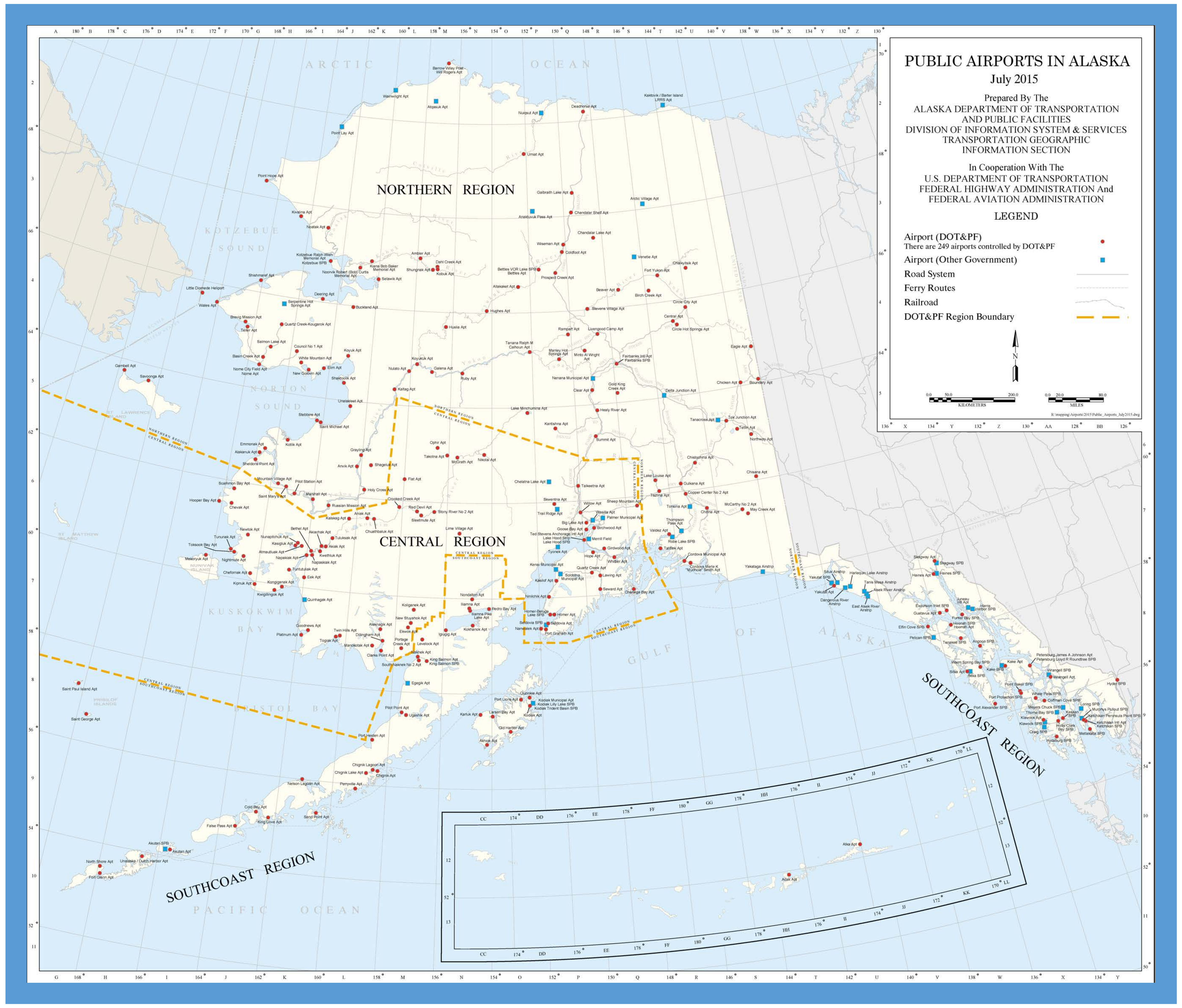
***Primary:** FAA Airport Improvement Program*

***Secondary:** State of Alaska funds*



"Since 2007, economic pressures—including high fuel prices, the financial crisis, and the ensuing recession of 2007–2009—contributed to airline restructuring...general aviation activity, which includes all forms of aviation except commercial and military, has also declined over the last decade. **Because many sources of airport funding, including federal support and locally generated revenue, are tied to aviation activity, for many airports these trends mean less funding available** for infrastructure development."

Statement of Gerald L. Dillingham, Ph.D., Director, Physical Infrastructure Issues
Highlights of GAO-14-658T, a testimony before the Subcommittee on Aviation, Committee on Transportation & Infrastructure, House of Representatives



...And More Challenges...

- The AIP program has about $213 million to spend each year, and this is typically spread over 10 to 15 projects per year.
- The current estimate for the Seward Airport Improvements Project is about $20 million (about 10% of the AIP annual budget).
- Federal/state dollars continue to shrink, while the cost of construction increases.
- Due to budget cuts, future funding is not secure.