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## Coastal Impact Assistance Program

State of Alaska, Department of Natural Resources,  
Office of Project Management and Permitting

Volume I, Issue 2 Nov. 2013

# ciap Surge

## news 2013

### The Mapping Issue

The second issue of the *ciap Surge* is here! This issue is devoted to the various mapping initiatives taking place all over the state. Learn about the different mapping projects and who is working on them. Take a look at the back page--it features a list of all of the CIAP-funded mapping projects.

### acknowledgements

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Photo: Ocean Bay, Sitkalidak Island, Kodiak Archipelago, ShoreZone

## CIAP Advances Alaska's Mapping Initiatives

### *Multiple Mapping Projects Funded Around the State*

In a state as new as Alaska, mapping continues to be an essential need. As evidence, over \$15 million of the \$79.4 million in CIAP funds available to the State will be used to support 17 different mapping projects. These projects represent Alaska's priority needs and are being conducted by multiple state agencies, boroughs, the University of Alaska, and non profit organizations.

Projects range in scale from documenting the rate of erosion at very specific sites to supporting much larger regional mapping efforts of the entire inland coastal zone statewide. Regardless of scale, the coordination effort between mapping projects and the benefit to the public has been tremendous.

For example, the Geographic Information Network of Alaska (GINA) at University of Alaska, Fairbanks, provides the public with what is known as the Best Data Layer available. While imagery is still being acquired, GINA provides other

CIAP project managers with the ability to integrate GINA's best available high resolution imagery and high resolution elevation data sets into their desktop GIS, server, and web application environments.

If you were working on a project in the Northwest Arctic Borough, you could go on to the Coastal Information Map on DNR's Alaska Mapper website (funded by CIAP), view imagery of the area (acquired by GINA with CIAP funds), view georeferenced photos and videos prepared by ShoreZone (with CIAP funds to The Nature Conservancy) and determine if the site is within an Alaska Department of Fish and Game Special Area as included in the ADFG Special Area Notebook (updated with CIAP funds). Additionally, you could contact the Northwest Arctic Borough to learn more about subsistence uses in the area (mapped with CIAP funds) and DNR, Division of Geological and Geophysical Surveys to gather mapped information about potential geologic hazards in the area.



# Geohazards Evaluation and Geologic Mapping for Coastal Communities

**Project Manager:** Nicole Kinsman  
**Project Dates:** October 2010-October 2015  
**Project Budget:** \$2,423,940

## Project Summary

The goal of this project is to collect the necessary field data to produce and publish surficial and engineering-geologic/hazards maps of Alaskan coastal communities, prioritized in consultation with the Alaska Division of Community and Regional Affairs, the U.S. Army Corps of Engineers (COE), the Denali Commission, and affected coastal populations.

## Favorable Developments

The Division of Geological & Geophysical Surveys (DGGs) is continually seeking ways of working with outside agencies and programs to enhance coastal research in Alaska. In the 2013 field season, DGGs coordinated with a range of programs and agencies to advance coastal data products on the west coast of Alaska. These included the USGS, BLM, ASF (Alaska Satellite facility), UAF Geophysical Institute, and the ShoreZone partnership.

The CIAP-funded DGGs coastal science program has released four new publications, one poster and launched the online Alaska Tidal Datum Portal website ([www.dggs.alaska.gov/tidalportal](http://www.dggs.alaska.gov/tidalportal)).



## Shoreline Change Detection

Combining field measurements with historic aerial and satellite imagery, DGGs is mapping rates of shoreline change, inlet migration, and landform evolution to describe the contemporary conditions and geologic history of the coast.

A DGGs geologist measures the position of a bluff edge north of the main inlet in Shishmaref, Alaska (2012)



## Flood and Erosion Vulnerability

By improving topography and bathymetry measurements along the Alaska coast, documenting past hazard events, and identifying patterns of coastal sediment transport, we can now develop vulnerability maps for coastal communities.

Survey-grade GPS is used to record the elevation of November 2011 storm runoff in Unalakleet, Alaska.



## Baseline Data Collection

In support of ongoing mapping, DGGs is continually expanding Alaska's limited archive of baseline coastal data with water level measurements, coastal sediment composition and grain size, nearshore water depths, and radiocarbon dating of coastal features.

Shoreface grain size in Gambell, Alaska (2013)



# Project Manager Profile: *Meet Nicole Kinsman*



Nicole Kinsman has managed the Coastal Science Program at the Alaska Division of Geological & Geophysical Surveys since the program's full implementation in 2011. In this capacity, she leads field-based investigations of coastal landforms, erosion, and

storm surge hazards throughout the state.

When not in the field, she fills her time with the preparation of maps and reports about Alaska's shoreline and seeks new ways of improving baseline information about the coastal zone.

Originally from a rural part of up-state New York, Nicole moved to Alaska in 2010. She was drawn to a position working in Alaska because of the vast diversity of the state's shorelines, and for the opportunity to expand cold-climate coastal research. Her initial exposure to coastal erosion was when she helped her grandfather maintain a cement seawall on the icy bluffs of Lake Ontario at age six.

Nicole holds a B.A. in Geology from Colgate University and a Ph.D. in Earth Sciences from the University of California, Santa Cruz, where her doctoral research was focused on man-made beaches and coastal cliff morphology.

She has worked closely with the California Department of Boating and Waterways to improve regional coastal management by inventorying coastal development and documenting local knowledge of shoreline change. She has also worked with the U.S. Geological Survey to conduct coastal sediment transport research in southern California.

Nicole is currently an affiliated faculty member at the University of Alaska Fairbanks, where she co-advises graduate students in coastal research topics. In the last few years, she has served on several community advisory committees for northwest Alaska and has taken an active role as the Department of Natural Resources' representative to the Alaska ShoreZone program. Looking towards the future, Nicole is excited to find new ways of delivering useful coastal information to Alaskans, increasing awareness about coastal processes, and improving collaborative research within the state.



Oblique aerial image looking north along the Kivalina barrier islands at an inlet with an accreting sand spit (DGGS field investigation, July 2010). These barrier islands possess many geomorphic indicators such as relict inlets, beach ridges, overwash fans, and ice-wedge polygonal ground that attest to a long history of dynamic barrier evolution on a range of timescales. Only by investigating the history of these changing environments can we fully assess and map the vulnerability of Alaska's coastline to hazards today.

# Imagery Basemap and Elevation Model for Alaska

This project will produce a common basemap and information service for all lands within inland Alaska coastal zone and aligns with the goals of the Statewide Digital Mapping Initiative of which the Departments of Natural Resources, Military and Veterans Affairs, Environmental Conservation, Fish and Game, Commerce and the University of Alaska, Fairbanks (UAF) are participants.

The basemap consists of three primary products: ortho-rectified imagery, updated digital elevation model (DEM), and the ability to overlay current permits, land authorizations, hazards, Shorezone oblique photography, and other mapped themes. This project maps

all lands within Coastal Districts and Coastal Zones. Detailed basemaps are essential for informed decision making.

Ortho-rectified imagery has been produced and released for 555,000 square kilometers using data from the 2010 and 2011 collection season, representing 36% of statewide area of interest. This ortho-imagery is delivered as 20-km x 20-km tiles, which are shown as the light yellow coverage in the figure below.

Additional source imagery was captured summer 2012 and an additional 237,000 square kilometers of ortho-imagery tiles were processed. The quality assurance has been completed and the new

ortho-imagery coverage is now available. The total orthoimagery coverage now totals 792,000 square kilometers, about 56% of the state.

With every ortho-imagery tile delivered, a Digital Elevation Model (DEM) tile that was used to orthorectify the imagery is also delivered. So, this DEM task's progress tracks the ortho-imagery task exactly.

## Project Details

Project Manager:

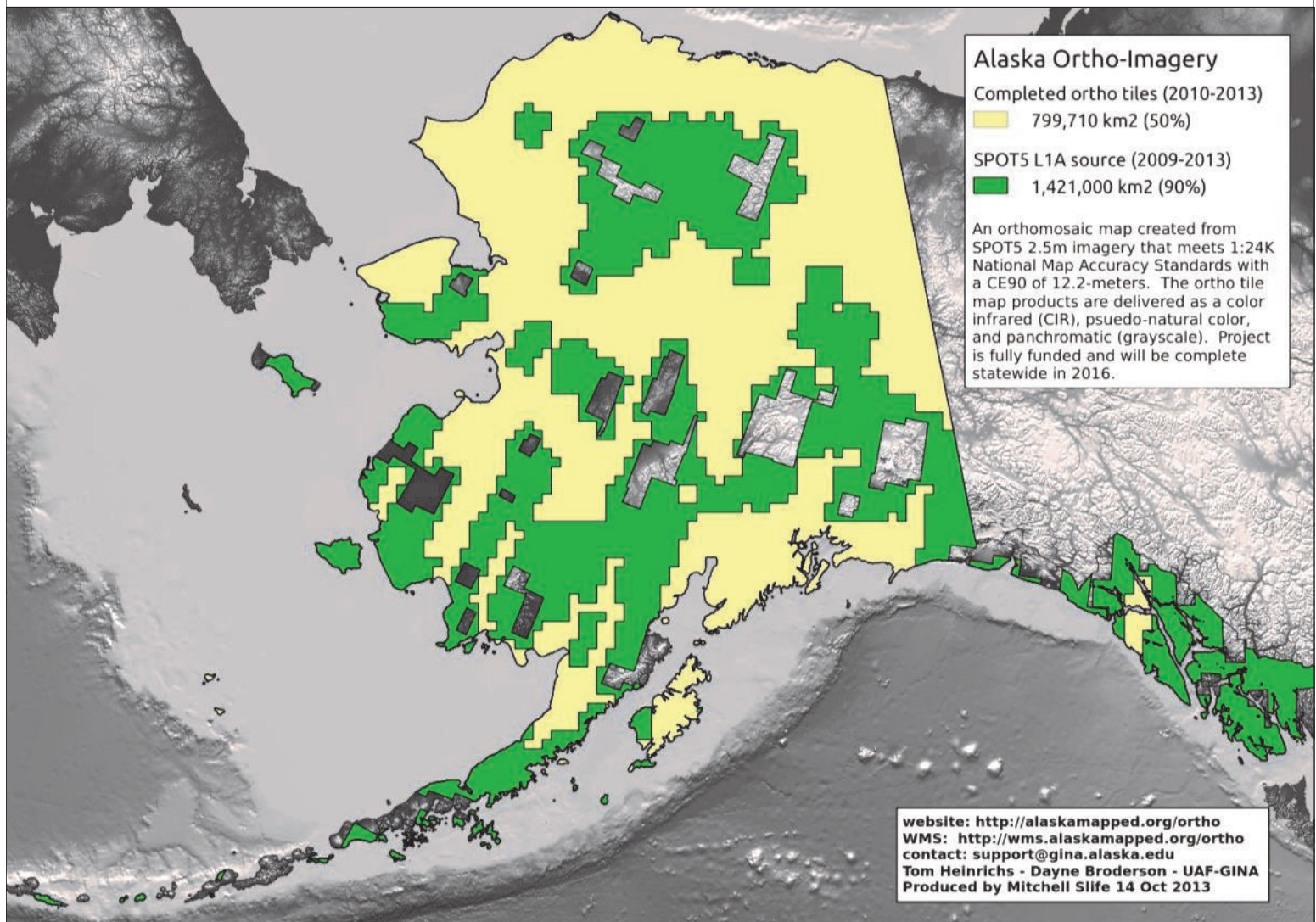
Tom Heinrichs, UAF

Project Dates:

March 2011-February 2015

Project Budget:

\$2,889,050





# Department of Natural Resources ShoreZone

## What is ShoreZone?

Shore Zone is a coastal habitat mapping and classification system in which georeferenced aerial imagery is collected specifically for the interpretation and integration of geological and biological features of the intertidal zone and near shore environment<sup>1</sup>.

## What did CIAP fund?

- The completion of nearly 30,000 km of low-tide, shoreline imagery
- Development of an interactive website (<http://www.shorezone.org>) that compiles and updates information related to the overall Shore Zone project and also includes ShoreZone tutorials, a blog function, Frequently Asked Questions section, and a link and directions for NOAA Mapper
- Estuarine Classification in Southeast Alaska
- ShoreZone Imagery Data Set Mirror and DNR ShoreZone Mapping Application Development

## Project Details

Project Manager: Norman Cohen, The Nature Conservancy

Project Dates: May 2009-May 2013

Project Budget: \$800,000

<sup>1</sup> The Nature Conservancy. (October 2011). ShoreZone Coastal Habitat Mapping Data Summary Report.



Eagle Harbor, Nagai Island, Shumagin Islands



Canopy Kelp Beds  
in Sitka Sound



Grewingk Glacier River, Kachemak Bay, Cook Inlet

## *"Fly the Coast"*

View the incredible ShoreZone imagery  
for yourself at [shorezone.org](http://shorezone.org)



# Matanuska Susitna Borough LiDAR/Imagery Project

The project objectives include the acquisition of high resolution Light Detection and Ranging (LiDAR) and aerial photography data for 3,680 square miles of the Matanuska-Susitna Borough (MSB), as well as the development of a digital elevation model, contours, ortho-rectified imagery, and additional products. All products from this project will be available to the public.

The MSB LiDAR/imagery products include:

- ½ ft., ortho-rectified, 4-band imagery for a 270 square mile urbanized area
- 1 ft., ortho-rectified, 4-band imagery for the entire 3680 square mile area
- Point Cloud Data w/ 1m true nominal pulse spacing (nps) and 0.6m nps through overlap
- Automated “vegetation” classification;

low (1-6ft), medium (6-15ft) and high (>15ft)

- 1m first return digital surface model (DSM) (aka top of canopy)
- Building footprints at 97% accuracy
- 2 ft. contours

The geospatial data acquired will be used to identify trends and impacts upon coastal resources caused by development, clearing and runoff, contaminants, flooding, wildfires, erosion, and invasive species, thereby improving the Borough's ability to protect and conserve coastal areas from such impacts.

Additional uses for the data include emergency response, land use planning and regulations, water

Right: An example of a LiDAR point and surface product from the MSB project.

body management, public works development, forestry, agriculture, and fishery management.

## Project Details

Project Manager:

Heather Kelley, MSB

Project Dates:

January 2010-December 2014

Budget:

\$1,028,176

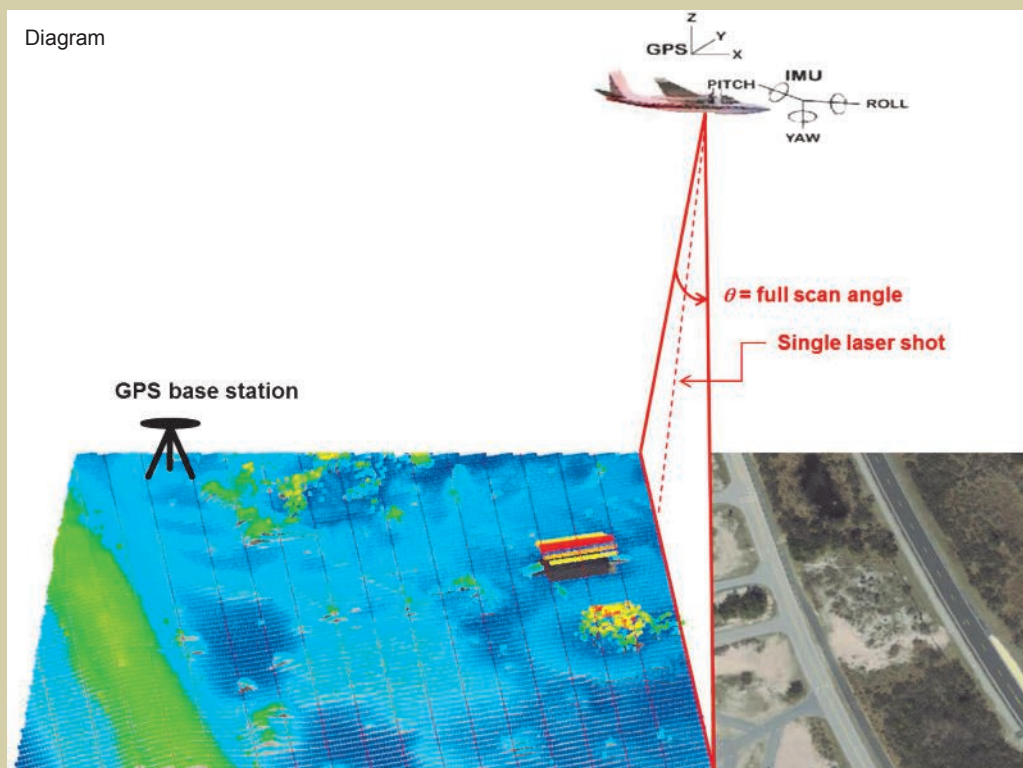


## What is Lidar?

Lidar (or LiDAR, **L**ight **D**etection **A**nd **R**anging), is an active remote sensing technique similar to radar but uses laser light pulses instead of radio waves. Lidar has become an established method for collecting very dense and accurate elevation data across landscapes, shallow-water areas, and project sites. Lidar is typically “flown” or collected from planes where it can rapidly collect points over large areas.<sup>2</sup>

2, 3, Diagram National Oceanic and Atmospheric Administration (NOAA) Coastal Services Center. 2012. “Lidar 101: An Introduction to Lidar Technology, Data, and Applications.” Revised. Charleston, SC: NOAA Coastal Services Center.

Diagram



Schematic diagram of airborne lidar performing line scanning resulting in parallel lines of measured points.<sup>3</sup>

# ADF&G Special Areas Notebook

Completed CIAP Project!

This project produced a Special Areas Notebook that provides updated and consolidated information on the legislatively-designated special areas. It includes updated maps and legal descriptions of the state's 32 refuges, sanctuaries, and critical habitat areas. Two hundred and fifty color copies were printed and are being made

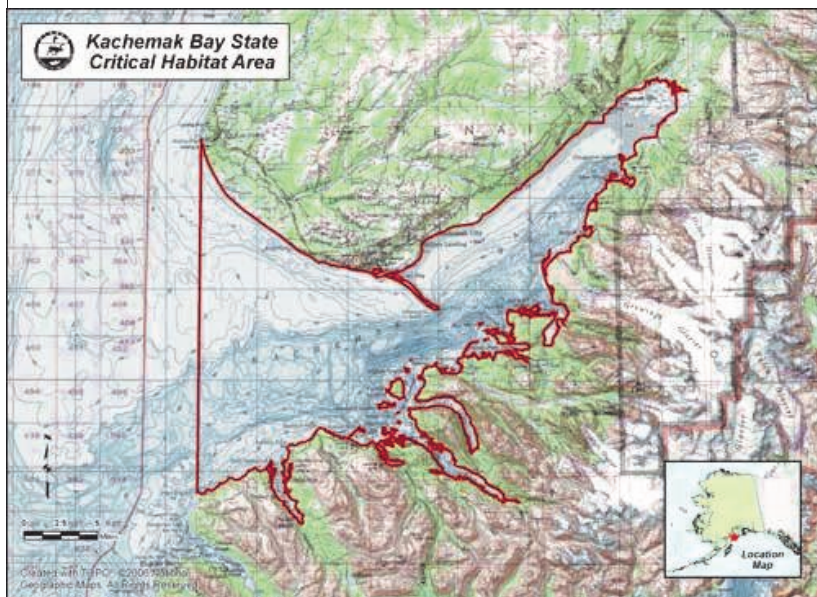
available to the public, including permit applicants, local governments, and state and federal agencies. The Special Areas Notebook will educate these entities about the locations and purposes of Alaska Department of Fish & Game (ADF&G) special areas, and make current boundary information easily available to potential developers and state agencies evaluating potential future development. This information will improve ADF&G's ability to efficiently protect the coastal areas within the Special Areas.

Research for this project highlighted prior boundary mistakes and inconsistencies. These errors were corrected in the CIAP-funded Special Areas Notebook and will improve ADF&G's management of the areas. The maps are available electronically on the ADFG website listed below.

<http://www.adfg.alaska.gov/index.cfm?adfg=maps.printable>

## Project Details

Project Manager:	Tammy Massie
Project Dates:	February 2011-June 2012
Project Budget:	\$36,200



# Community Mapping of Southeast Alaska

Completed CIAP Project!

The Community Mapping of Southeast Alaska project was completed by the State of Alaska's Division of Community and Regional Affairs, Department of Commerce, Community and Economic Development.

This project produced community maps for twelve Southeast Alaska coastal communities: Gustavus, Pelican, Tenakee Springs, Port Alexander, Port Protection, Whale Pass, Coffman Cove, Naukati Bay, Thorne Bay, Hollis, Metlakatla, and Hyder. Each map series includes existing structures, utilities, wetland areas, and streams.

New color aerial photography was obtained so improved lands and important natural areas can be displayed on maps with high resolution rectified imagery. Improved areas including roads, trails, drainage improvements, utilities, property boundaries, and building structures were identified. Streams, lakes, wetlands, vegetation, environmentally sensitive lands, and areas susceptible to natural and manmade hazards are identified. Since erosion and drainage are concerns in this region, comprehensive contour mapping were prepared for each community.



The new digital and hard copy maps were completed and distributed in December 2012 for the twelve communities noted on the map above.

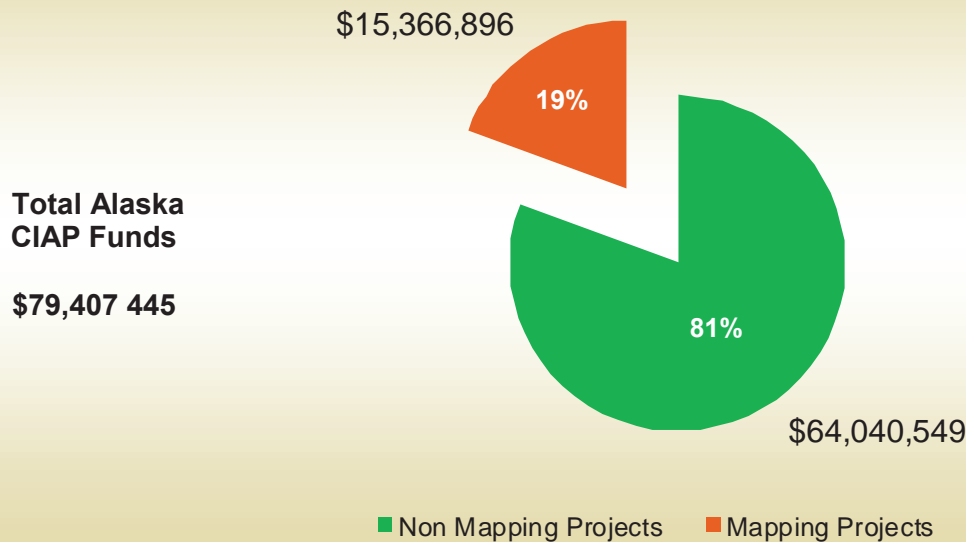
## Project Details

Project Manager:	Ruth St. Amour
Project Dates:	January 2011– June 2013
Project Budget:	\$651,200



# Alaska CIAP Mapping Projects

## Amount of Alaska CIAP Funds Spent on Mapping Projects



CIAP Funding: Direct to CPS	Project Budget
<b><i>Kenai Peninsula Borough</i></b>	
Aerial Photography/Satellite Imagery of the Kenai Peninsula Borough	\$ 499,272
Stream Channel and Elevation Modeling in the Seward Bear Creek Flood Service Area	\$ 99,272
<b><i>Kodiak Island Borough</i></b>	
Mapping of Coastal and Marine Resources	\$ 29,012
<b><i>Matanuska-Susitna Borough</i></b>	
Matanuska-Susitna Borough LiDAR/Imagery Project	\$ 1,028,176
<b><i>North Slope Borough</i></b>	
Developing Baseline Aerial Photographic Datasets for Protecting Coastal Resources near North Slope Borough Villages	\$ 555,961
<b><i>Northwest Arctic Borough</i></b>	
Improving Subsistence Information to Implement Federal Plans	\$ 1,937,430
<b>CIAP Funding: Direct to State</b>	<b>Project Budget</b>
Barrow Area Information Database (BAID) Decision Support Tools Development Project	\$ 1,638,838
Coastal GIS Module of the Southeast Alaska GIS Library	\$ 239,966
Coordination of Alaska ShoreZone Habitat Mapping and Inventory	\$ 294,466
Restoration and Mitigation Opportunities for Juneau Watersheds	\$ 75,589
Nelson Lagoon Coastal Erosion Study Project	\$ 238,800
City and Borough of Juneau Habitat Mapping and Analysis Project	\$ 1,628,164
ShoreZone Mapping	\$ 800,000
Geohazards Evaluation and Geologic Mapping for Coastal Communities	\$ 2,725,500
Imagery Basemap and Elevation Model for Alaska	\$ 2,889,050
Community Mapping for Southeast Alaska	\$ 651,200
ADFG Special Area Notebook	\$ 36,200
<b>Total \$ of all Alaska CIAP Mapping Projects</b>	<b>\$ 15,366,896</b>