Homer BEACH Monitoring

FY 2011 Final Report

Prepared for:

Alaska Department of Environmental Conservation
Alaska Clean Water Action BEACH Grant #11B-01

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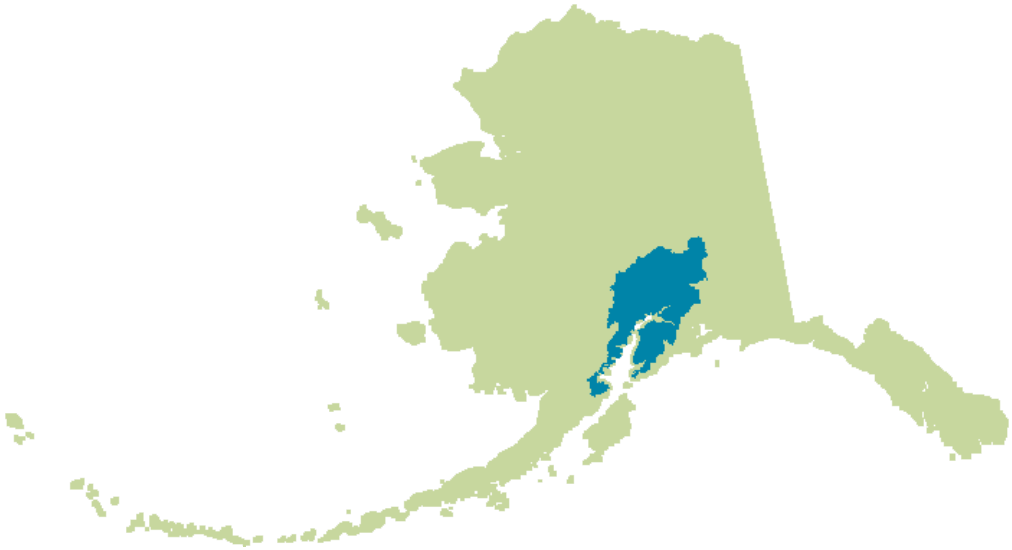

Cook Inletkeeper is a community-based nonprofit organization that combines advocacy, outreach, and science toward its mission to protect Alaska's Cook Inlet watershed and the life it sustains.

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Homer BEACH Program
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Beaches in Homer are highly valued for the abundant marine life and beautiful views. They are utilized year-round by visitors and residents a host of recreational activities.

INTRODUCTION

Beaches are a valuable recreational resource in Alaska. They provide access to coastal recreation waters for swimming, surfing, fishing, playing, and many other water-contact activities. Alaskans do not limit their recreational activities to sandy beaches - gravelly, rocky, or mud-covered beaches are commonly used for recreation. Even in Alaska, recreational activities involving water contact could make them sick if the water is contaminated with human or animal waste (e.g., sewage or other sources of fecal pollution).

On the Lower Kenai Peninsula, coastal beaches are a major tourist attraction as well as an integral resource for local residents. Beaches around Homer, Alaska are increasingly popular destinations for sports such as surfing and kitesurfing. Kitefest 2011 was held over Memorial Day weekend. This annual kitesurfing festival, held on the beach and in the water at Mariner Park, drew over 100 people this year. Throughout the year, visitors and local residents enjoy shore-based fishing, tidepooling, walking, birdwatching, horseback riding, and running their dogs along Homer's beaches (see Figures 1 and 2).

Figure 1. Kitesurfers enjoy the afternoon wind at Mariner Park in Homer, May 2011.

Bacterial contamination of coastal waters can originate from sources such as shoreline development, wastewater collection and treatment facilities, septic tanks, urban and stormwater runoff, disposal of human waste from boats, commercial and domestic animals and natural animal sources such as wildlife. Pathogenic bacteria in contaminated water can cause people who are exposed to it to experience stomach aches, diarrhea, and eye or skin infections. People who swim and recreate in waters contaminated with such bacterial pollution are at an increased risk of becoming ill. Water quality monitoring at beaches near potential sources of fecal contamination and where beaches are recreationally used can reveal conditions that indicate an elevated risk of becoming ill from water contact.

BEACH: Nationwide & Alaska

Authorized by the Beaches Environmental Assessment and Coastal Health (BEACH) Act of 2000, the Environmental Protection Agency (EPA) provides grant funding nationwide to eligible states, tribes, and territories to establish monitoring and notification programs for fecal contamination at recreational beaches. According to the National Resources Defense Council's report *Testing the Waters* (published in 2011), in 2010 the EPA allocated $9.8 million for BEACH monitoring in coastal and Great Lakes states around the country. The number of beach closures and advisories increased by 29% from 2009 – the second-highest number of closures or advisories in the 21 years of the NRCD's *Testing the Waters* reporting.

The Alaska Department of Environmental Conservation (ADEC) administers the BEACH program in Alaska, and sampling is done by ADEC and by Grantees under the Alaska Clean Water Action (ACWA) grant program around the state.

Figure 2. Families at Land's End in Homer fish from shore for flounder and other fish during the spring and summer months.

During 2010 in Alaska, 299 water samples were taken at 12 different beaches around the state. There were 15 exceedences of water quality standards, which represent 5% of all water quality samples putting Alaska in the top 10 beaches around the country for low bacterial exceedences. Nine of the 12 Alaskan beaches sampled in 2010 are located on the Kenai Peninsula. Three additional beaches in 2010 were in the Bristol Bay region. These were each sampled 3 times with no exceedences of water quality standards.

BEACH Monitoring in Homer

In 2007, the City of Homer and Cook Inletkeeper partnered with the Alaska Department of Environmental Conservation to develop a local BEACH monitoring program. The goals of the Homer BEACH Program are to ensure public health and protect beach users from potential exposure to bacterial pathogens. Since 2007, the Homer BEACH Program has received support from the ADEC in the form of training, funding for transporting and analysis of water samples, and staff time for local oversight of the BEACH program. Inletkeeper staff and local volunteers began monitoring Homer beaches for bacteria on July 22, 2008. Samples are taken weekly at local beaches (see BEACH Monitoring Locations on page 6) from April through August each year. The Fiscal Year (FY) 2011 sampling occurred from July 6 – August 24, 2010 and from April 25 – June 14, 2011. FY12 sampling begins on July 6, 2011. Table 1 shows the number of samples taken each year of the Homer BEACH Program, through June 14, 2011.

Table 1. Number of sampling events by location since the beginning of sampling through the Homer BEACH Program in Fiscal Year 2009.

Homer BEACH Sampling Location	FY09	FY10	FY11	Total
Bishop's Beach	0	0	17	**17**
Mariner Park	8	9	16	**33**
Land's End	5	9	16	**30**
Total	**13**	**18**	**49**	**80**

METHODS

Homer BEACH Monitoring Locations

In February 2008, the 'Monitoring Plan for Kachemak Bay DEC-Priority Beaches' was submitted and approved by ADEC. This document helped to begin the Homer BEACH Program. The Homer Spit was the only area included on the list of ADEC Recreational Beaches in the Homer area, and as such the development of Inletkeeper's BEACH monitoring plan was restricted to sampling sites located along the Homer Spit. A sampling schedule was designed to include alternate sampling at Mariner Park (a popular summer camping location and public access point to the beaches along the Spit) and Land's End (at the end of the Spit, just beyond the State Ferry Terminal, the Homer Harbor, the Fish Factory and Auction Block processing plants, and a location where many people fish from shore during the summer months).

Figure 3. BEACH sampling locations in Homer during FY11 include Bishop's Beach, Mariner Park, and Land's End.

Starting in FY11, Bishop's Beach was included as a sampling location and weekly sampling included all 3 Homer beach locations: Bishop's Beach, Mariner Park, and Land's End. Bishop's Beach is a popular beach-walking and tide-pooling location in the heard of Old Town Homer. The Homer Wastewater Treatment plant is nearby, and the outflow pipe from the plant is located 2,000+ feet offshore from Bishop's Beach. Figure 3 shows the locations of all Homer BEACH sites, with a detailed map for Bishop's Beach (A), Mariner Park (B), and Land's End (C).

BEACH Monitoring Parameters

Two types of bacteria are used as indicators of potential fecal contamination in marine waters: fecal coliforms (*Escherichia coli or E. coli)* and enterococci. Both groups of bacteria are found in the feces of birds and humans; however, the EPA recommends enterococci as an indicator of contamination in marine waters given the poor survivability of *E. coli* in salt water. The State of Alaska has water quality criteria for both fecal coliforms and enterococci, and the Homer BEACH Program monitors for both types of bacteria (see Table 2 for the water quality standards associated with each parameter).

FY11 BEACH Methods

In FY11, monitoring for bacteria began on July 6, 2010 and ended for the summer season on August 24, 2010. Spring sampling began on April 25, 2011 and finished on June 14, 2010. Beach sampling occurred for a total of 16 weeks at Homer beaches.

Samples were collected once per week at all three sampling locations: Bishop's Beach, Mariner Park, and Land's End. The Alaska BEACH Standard Operating Procedures (SOPs) were followed for sample collection and handling, and all samples were collected by Inletkeeper staff and/or trained volunteers throughout the field season. Information on beach conditions was rec-

Table 2. State and Federal bacteria water quality standards for marine recreation. Alaska uses fecal coliform bacteria while the federal Environmental Protection Agency uses enterococci. Through the BEACH Program, Inletkeeper collects samples to test for both parameters.

Fecal Coliform Water Quality Standard (Alaska Department of Environmental Conservation)	
Single-sample	200 fecal coliforms per 100 mL
Geometric mean (average) of 5 samples within 30 days	100 fecal coliforms per 100 mL
Enterococci Water Quality Standard (Environmental Protection Agency)	
Single-sample	276 enterococci per 100 mL
Geometric mean (average) of 5 samples within 30 days	35 enterococci per 100 mL

orded at each location during sampling on the Beach Field Form. Recreation and other beach usage activities were noted, as well as the presence of wildlife, or other potential sources of pollution. Tide and weather data were collected for each site during sampling.

Figure 4. Inletkeeper intern Marcella Dent returns from sampling at Mariner Park. Sampling is done in approximately 3 feet of water, and samples are collected 1 foot below the surface.

Water samples were kept cool (between 1 – 10 degrees Celcius) in a sealed cooler and sent via Grant Aviation to Analytica Laboratories, a State -certified water quality laboratory. The lab enumerated the bacteria colonies following EPA-approved methods. All samples had an 8-hour hold time between sampling and analysis, with Inletkeeper required to get samples to the lab within 6 hours of sampling. Final lab results were reported via email to the Homer BEACH Program Beach Monitor (Rachel Lord, Cook Inletkeeper), Brock Tabor (ADEC BEACH Project Manager), and Cindy Gilder (ADEC BEACH Quality Assurance Officer) within 36 hours of sample collection.

Field data were entered into an MS Excel spreadsheet, and field forms were scanned and sent via email to the ADEC Project Manager. Upon receipt of the lab results, lab results and quality control measures (field blanks, duplicate samples) were checked for adherence to the approved Quality Assurance Project Plan and lab data were entered into an Excel template provided by ADEC. In the result of exceedences, all parties worked to enact the response plan that is detailed in the Homer BEACH Handbook (version 2008 for FY11. A copy of the BEACH Handbook can be found on Inletkeeper's website: www.inletkeeper.org).

RESULTS

Bishop's Beach was monitored 17 times in FY11, with samples for fecal coliform and enterococci analysis taken during each sampling event. Mariner Park and Land's End were both sampled 16 times during FY11, also for both parameters each time (see Table 3, below).

At Bishop's Beach, fecal coliform bacteria colonies were detected during 65% of sampling events, and enterococci were detected at 29% of sampling events. Fecal coliform, when detected, ranged from 1 CFU/100mL (CFU = Colony Forming Unit) to greater than 200 CFU/100mL on August 10, 2010. The method used by the lab for quantification of fecal coliform does not allow for precise enumeration of more than 200 CFUs. Enterococci, when detected, ranged from 10 MPN/100mL (MPN = Most Probable Number) to 500 MPN/100mL on August 10, 2010.

At Mariner Park, fecal coliform bacteria colonies were detected during 59% of sampling events, and enterococci were detected at 29% of sampling events. Fecal coliform, when detected, ranged from 2 CFU/100mL to 74 CFU/100mL on August 10, 2010. Enterococci, when detected, ranged from 10 MPN/100mL to 190 MPN/100mL on August 10, 2010.

At Land's End, fecal coliform bacteria colonies were detected during 59% of sampling events, and enterococci were detected at 41% of sampling events. Fecal coliform, when detected, ranged from 1 CFU/100mL to 180 CFU/100mL on May 3, 2011. Enterococci, when detected, ranged from 10 MPN/100mL to 63 MPN/100mL on August 10, 2010.

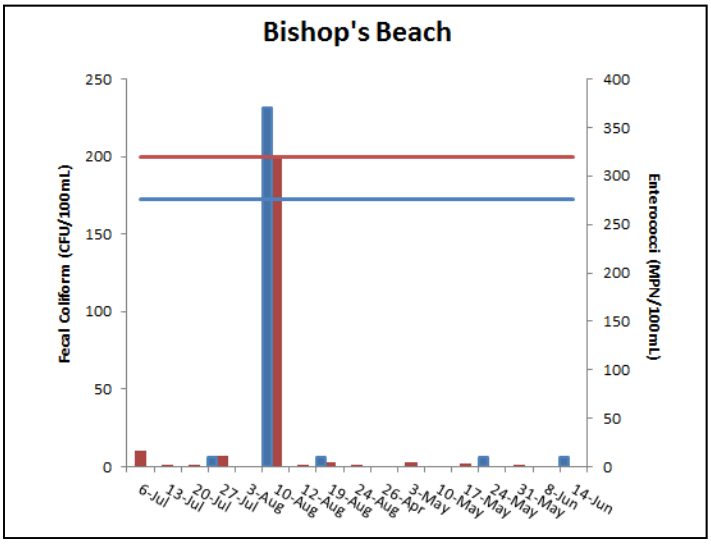
All replicate samples, collected at 50% of the sampling events, met precision goals (relative percent difference of less than 60%). Field blanks were collected and analyzed for fecal coliforms during 25% of the sampling events. One field blank came back with 4 CFU/100 mL on August 24, 2010. Field personnel reviewed protocols to ensure that all precautions against contamination of samples were taken at all sampling events. All subsequent analysis of field blank samples beginning in April 2011 met quality assurance goals of no detectable bacteria colonies.

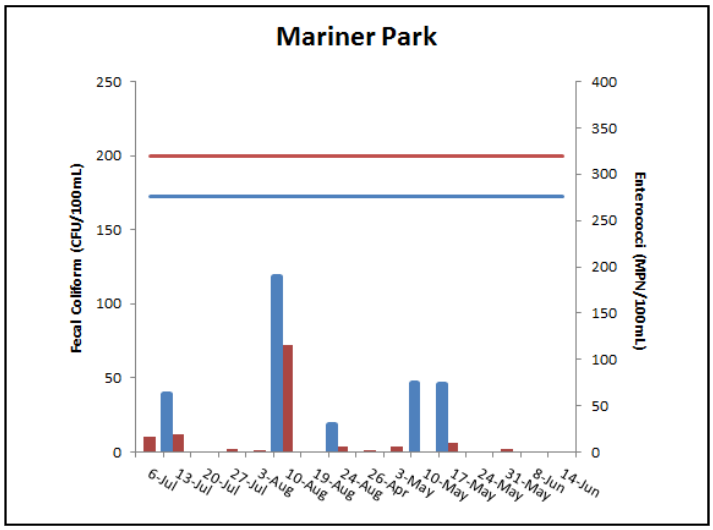
Preliminary Exceedence Response

On August 10, 2010 bacteria levels were elevated above state and federal water quality standards at Bishop's Beach (see Figure 5). Inletkeeper staff contacted the ADEC Project Manager and the Homer City Manager as soon as the results came in from the lab on August 11th. A teleconference was held with the City Manager, Inletkeeper staff, the DEC Project Manager, and the DEC Quality Assurance Officer on August 12 to discuss the exceedence and the best plan of

Table 3. Summary of sampling efforts in Homer during Fiscal Year 2011 for enterococci and fecal coliform bacteria at three local recreational beaches.

Homer BEACH Sampling Location	Enterococci				Fecal Coliform			
	# Samples	Max	Date	# Non Detects	# Samples	Max	Date	# Non Detects
Bishop's Beach	17	370	8/10/2010	12	17	>200	8/10/2010	7
Mariner Park	16	190	8/10/2010	11	16	72	8/10/2010	6
Land's End	16	63	8/10/2010	9	16	180	5/3/2011	6





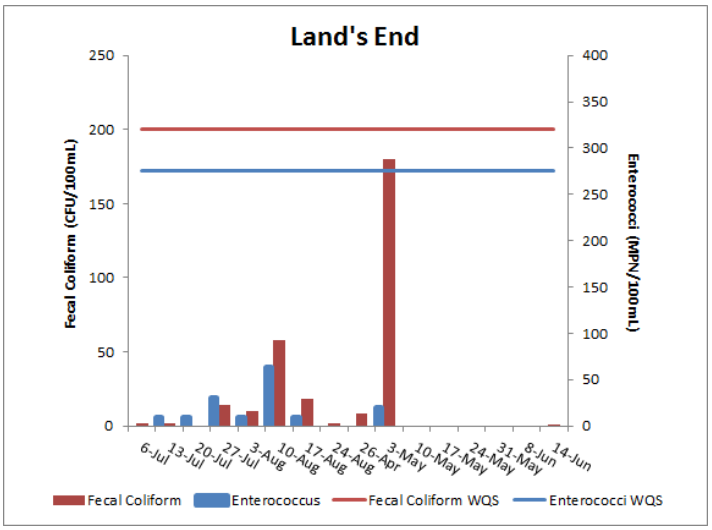


Figure 5. Results from FY11 BEACH Sampling in Homer. Red bars show fecal coliform results (on the left axis), and blue bars show enterococci results. The blue and red lines represent the water quality standards for each parameter, respectively. Fecal coliform is quantified as the number of colony forming units (CFU) per 100 mL, and is shown on the left (primary) y-axis. Enterococci is quantified as the most probably number (MPN) of bacteria per 100 mL, and is shown on the right (secondary) y-axis.

action. Inletkeeper staff re-sampled on August 12 at Bishop's Beach in 2 locations – one at the original sampling site and one approximately 100 meters west of the original site. The lab reported no exceedences from the samples collected on August 12th. Inletkeeper staff met with the City Manager on August 13 to let him know the negative results from the re-testing, and another teleconference was held with Inletkeeper staff, the DEC Project Manager, and the DEC QA Officer to debrief. As a result, revisions have been made to the updated BEACH handbook to clarify the roles of all parties in the event of a persistent exceedence. These protocols can be viewed in the FY12 Homer BEACH handbook on Inletkeeper's website: www.inletkeeper.org.

Volunteers

Eight volunteers donated 130 hours of their time to the Homer BEACH Program in FY11. Each field sampling volunteer was given a 2-hour training that included a background on the national BEACH Program through EPA, the role of ADEC, and an overview of the history of the Homer BEACH Program. Following this introduction, volunteers were trained on sampling procedures, quality control measures, and data recording following the Homer BEACH Handbook, the sample collection SOP, and the 2008 BEACH Quality Assurance Project Plan (version 2008). Volunteers were initially accompanied in the field by trained Inletkeeper staff who assisted in taking samples and data recording.

By including community members in BEACH monitoring, Inletkeeper has expanded the impact of this program to educate more beach users in the potential risks and need for monitoring for fecal contamination in recreational waters.

Figure 6. Summer Intern Eric Grazia collects water samples at Land's End on a sunny summer morning in June 2011. Fish waste from the Homer Harbor is ground and released into the Bay near the piling in the background.

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Wild Alaskan Salmon or Dirty Coal to Power China? Alaskans Speak Out

Stripmines and salmon streams are incompatible

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PacRim Coal, a Delaware corporation owned by Texans Dick Bass (owner of Snowbird Resort in Utah) and William Herbert Hunt, is proposing Alaska's largest strip mine to extract low-grade coal for export to Asia. PacRim's plans include the wholesale removal of 11 miles of Middle Creek, a major tributary of the Chuit River on the west side of upper Cook Inlet near the communities of Tyonek and Beluga. The State recognizes the Chuit River as a "river of statewide significance" for its extensive and diverse fish populations.

The Chuitna Watershed supports a healthy population of wild Alaska salmon and is widely known for its king and silver runs, rainbow trout and Dolly Varden. Fisheries biologists and restoration experts agree PacRim's proposed plan—the bank-to-bank removal of 11 miles of Middle Creek and the underlying strata to a depth of over 350 feet—will make reclamation functionally impossible. According Dr. Margret Palmer, one of the nation's foremost authorities on watershed science and stream restoration, PacRim's plans will "completely destroy" Middle Creek.

Helen Jadak testifies in Kenai. Jadak has lived on the Chuit River for more than 50 years.

In response to the direct threat PacRim's mining plan poses to wild Alaskan salmon, Cook Inletkeeper and the Chuitna Citizens' Coalition filed a petition with the State of Alaska asking the State to deem the riparian areas around the Chuit

Continued on page 6

Inletkeeper Launches New Website

In May 2011, Cook Inletkeeper introduced a redesigned website geared to keep members, watershed residents and others connected to what's going on with Cook Inletkeeper, Cook Inlet and the surrounding watershed. At the new site you can stay updated on how Inletkeeper staff works to protect Alaska's Cook Inlet and the life it sustains, and discover ways you can get involved.

A favorite function of the new site is its one-stop page for your local weather, tides and other relevant information for people headed out on the water or into the mountains. Have a smartphone? It's mobile-enabled, too. Bookmark it at inletkeeper.org/wx. You can also read about Inletkeeper programs, renew your membership, make a donation and order Cook Inletkeeper merchandise, like handmade mugs and super-soft organic cotton and recycled-poly hoodies.

www.inletkeeper.org

The new web site is the culmination of a comprehensive technology upgrade. We have also updated our data management tools and infrastructure, which we expect will meet our computer hardware needs well into this decade. We lengthened our computer lifecycle by approximately 50% and outfitted new equipment with the latest energy-efficient hardware and software to reduce Inletkeeper's footprint. Old computers will be reused and recycled. Among other things, this upgrade will provide the backbone to keep current our new, dynamic, enhanced electronic presence, enabling the use of video and images for our web and social media outlets. Streamlined grant and membership tracking will allow us to spend an even greater amount of time and effort on the things that matter most. Visit www.inletkeeper.org and see what's new!

Figure 7. Inletkeeper's bi-annual newsletter is published in May and December. Every issue includes information on the Homer BEACH Program. The Inletkeeper is directly distributed to over 400 people in the Cook Inlet watershed, and handed out at fairs and events throughout the year.

Newsletter

In order to communicate with the public about the Homer BEACH Program under the ADEC ACWA BEACH grant, Cook Inletkeeper published regular articles on the Homer BEACH Program in *INLETKEEPER*, Cook Inletkeeper's biannual newsletter (see Figure 7). The *INLETKEEPER* is printed at a quantity of 1,200 in the spring and fall, with electronic versions distributed via email and on the Inletkeeper website: http://www.inletkeeper.org. Print copies are distributed to Cook Inletkeeper's member-

ship, funders, and the general public at major events such as Ocean Fest, the Renewable Energy Fair, and other major environmental events. This outreach effort creates an opportunity for public input and also acts as tool for volunteer recruitment in the Homer area.

Homer Rotary Health Fair

Inletkeeper presented results and information about the Homer BEACH Program at the Homer Rotary Club Health Fair every November. This annual event draws nearly 1,000 community members out and provides a great opportunity for Inletkeeper to share information and answer questions about beach monitoring efforts.

In the spring of 2009, Inletkeeper created a brochure that outlines the Homer BEACH Program. This informational brochure includes concerns with and potential causes of fecal contamination, the general monitoring protocols, an overview of our risk communication plan, Frequently Asked Questions, and a list of resources for more information. Copies of the Homer BEACH brochure were distributed during FY11 at the Homer Rotary Health Fair in November.

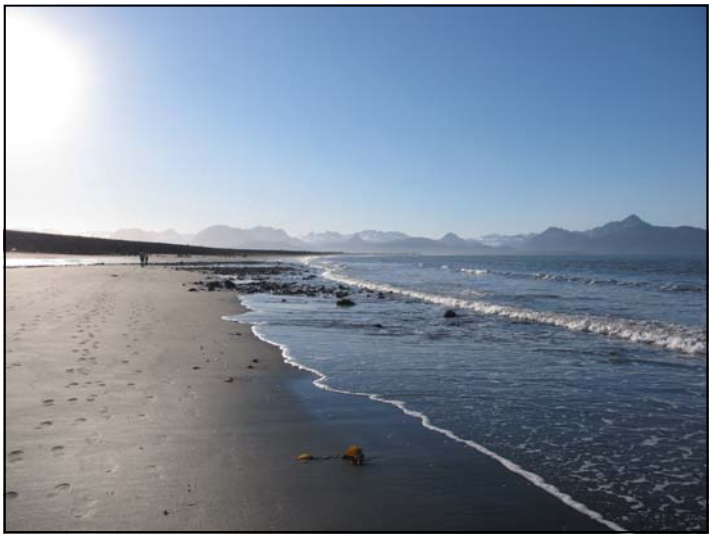
Figure 8. Cook Inletkeeper's Rachel Lord, the Homer BEACH Monitor, talks to area residents during the Homer Rotary Health Fair. BEACH results and brochures are on display in the background.

DISCUSSION

Cook Inletkeeper has successfully developed the Homer BEACH Program into an integrated and smoothly running component of its overarching water quality monitoring program. By including volunteers into the Homer BEACH Program, we not only monitor for fecal contamination on our beaches, but we also encourage community-wide stewardship of our coastal resources.

Monitoring results from FY11 suggest that there are generally low levels of fecal bacteria at Homer's recreational beaches. Although the exceedence on August 10, 2010 at Bishop's Beach was isolated to that location, elevated levels of bacteria were also found that day at both Mariner Park and Land's End. Continued sampling through August 2010 and for 8 weeks during the spring of 2011 showed consistently low levels of bacteria at all three locations, suggesting that the elevated bacteria levels on August 10, 2010 was an uncommon event at these Homer locations during 2009-2010.

With 4 years of consistently low bacteria levels at Mariner Park and Land's End, ADEC discontinued funding for sampling at these locations for Fiscal Year 2012. Inletkeeper will resume sampling at Bishop's Beach through FY12, beginning on July 6, 2011. In addition, staff and volunteers will begin sampling at two popular locations in Anchor Point, north of Homer. Whiskey Gulch beach will be sampled during July and August 2011, and the Anchor Point beach at the mouth of the Anchor River will be sampled from late-April through June 2012.



Top to bottom: Bishop's Beach, Mariner Park, and Land's End in Homer, Alaska.

ACKNOWLEDGEMENTS

Cook Inletkeeper appreciates the support of the City of Homer to ensure the safety of Homer's beaches and to increase public awareness of the risks of bacteria contamination on public beaches. We thank Erin Strang and Brock Tabor from ADEC for their help and encouragement in the development of this program.