

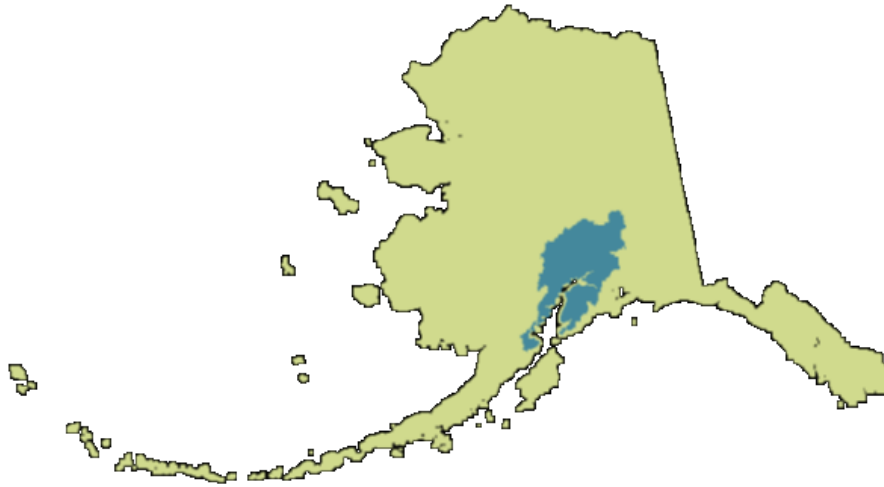


Citizens' Environmental Monitoring Program

Watershed Overview



Woodard Creek



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.

Citizens' Environmental Monitoring Program
Watershed Overview
Woodard Creek
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Introduction

Citizens' Environmental Monitoring Program

With nearly a million miles of streams and rivers in Alaska, the lack of baseline water quality information—especially in populated regions such as Southcentral Alaska, home to the vast majority of Alaskans—may result in an inability to provide adequate oversight on future development. In response to this gap in knowledge, Cook Inletkeeper's volunteer water quality monitoring began in 1996 with the formation of the Citizens' Environmental Monitoring Program, known to many by its acronym—CEMP. The Citizens' Environmental Monitoring Program, the first of its kind in Alaska, is designed to meet the need for baseline water quality data for local watersheds around Southcentral Alaska. Baseline data collection is the primary aim of the CEMP model. Many waterbodies in Alaska have not been polluted, and we rely on these systems to support our fish, wildlife, and human communities. Inletkeeper created the CEMP to provide Alaskans with the tools needed to be active stewards of our water and watersheds for future generations. By training citizen volunteers to monitor water quality we are empowering the community to keep its eyes and ears tuned to changes that may impact and threaten Alaska's water resources.

Baseline Reports

As we complete baseline data collection for a given waterbody, we create a baseline water quality report to compile watershed-specific information. Each report covers background on the CEMP methods and quality assurance measures, GIS analyses of the individual watershed, and the water quality data we've collected through the years. Finally, each report provides suggestions for future monitoring efforts. It is our intention that these reports will become a comprehensive baseline water quality library which will provide landowners, city councils, developers, and communities with valuable information for responsible decision-making.

Watershed Overviews

These sub-reports cover information on the history of CEMP at each individual creek currently being monitored and various watershed-specific GIS analyses, such as land cover, land ownership, etc. This information is important to gain a more broad understanding of what factors are playing a role within the watershed. Once CEMP data analyses are completed, the information within these reports will be used to complete the baseline water quality reports for each creek.

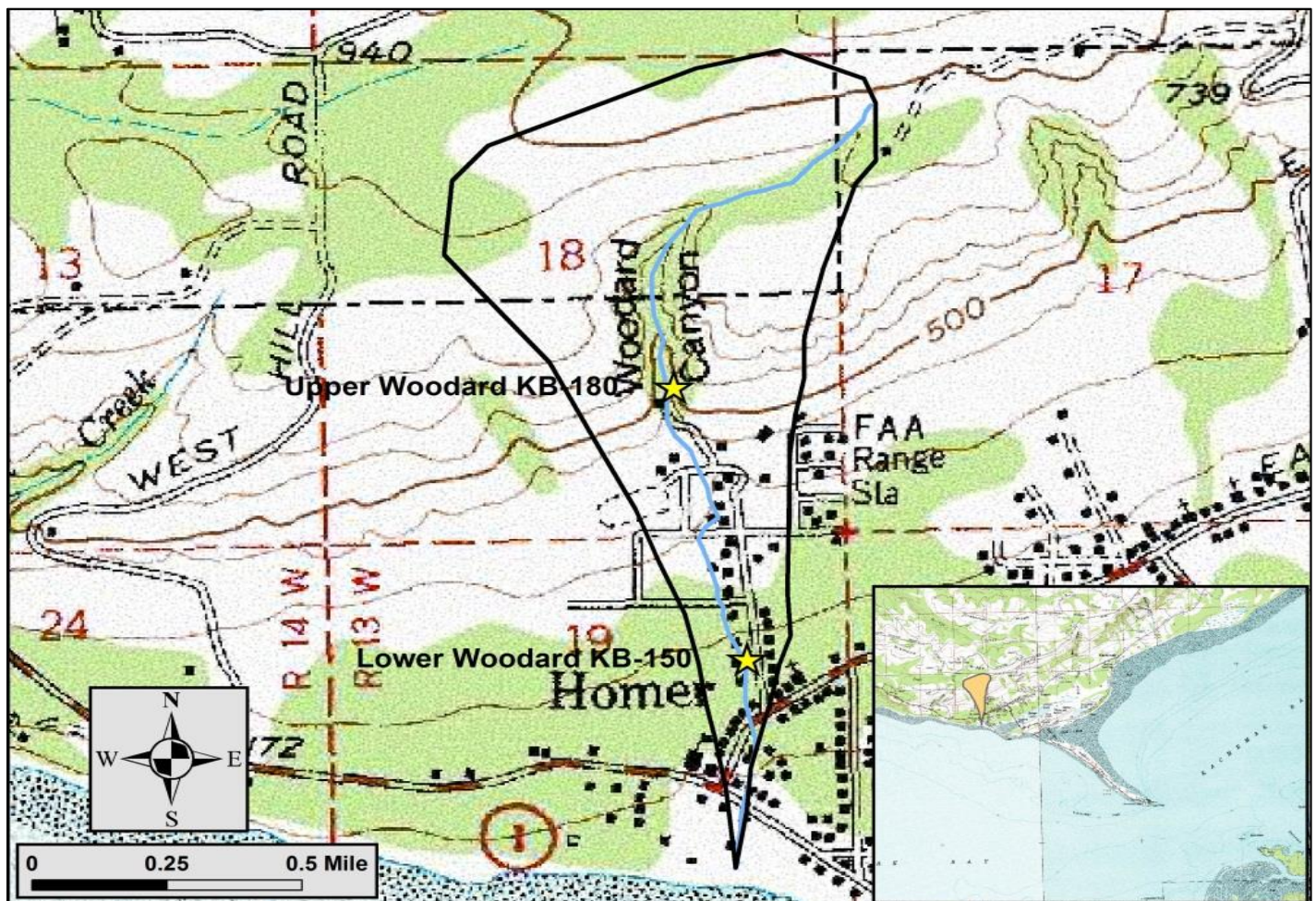
Woodard Creek

The Woodard Creek watershed is the greatest-developed watershed monitored by Cook Inletkeeper, draining about 0.6 square miles (384 acres) into Kachemak Bay.

CEMP History

For decades, Woodard Creek and the canyon were referred to as either ‘Woodard’ or ‘Woodward Creek’, and even ‘Cooper Creek’ prior to the ‘Woodard’ naming. After going through records from the US Board on Geographic Names in 2000, it was confirmed that the official name of the creek and canyon is ‘Woodard’. This process is documented in the *Woodard Creek Watershed Project* from 2000.

The greatest threat to Woodard Creek, and the reason it was chosen for CEMP, is urban development. With over 28% of the watershed considered ‘developed’, Woodard Creek watershed is the most-developed watershed monitored by CEMP. In 2002, a GIS impervious surface analysis, conducted by Inletkeeper staff, concluded that 11% of the watershed is considered impervious surface. With high urban development, impervious surfaces and



(Watershed boundary: National Resources Conservation Service Watershed Boundary Database, 2010; Topographic maps: United States Geological Survey)

culvertization in the lower reaches, and storm water draining from Bartlett Road and Pioneer Avenue, great concerns for Woodard Creek are exceedances in fecal coliform counts, temperature, and turbidity.

Woodard Creek has been monitored since the start of CEMP in 1996, starting with two sites at the mouth of the creek. A site off of Jenny Way was added in 1997, and two more in 1998 near the ends of Bartlett Road (our current CEMP sites). A sixth site was chosen in 2000 in the headwaters of Woodard Canyon. Within the last few years, CEMP monitoring sites were reduced to our two current sites: KB-180 by the hospital and KB-150 at the Pratt Museum.

Events of Concern

In urban areas, creeks face many risks as a result of construction and development.

In 1999, a leak was discovered in the underground fuel tank at the gas station on Sterling Highway. Contaminated soil was excavated in spring 2000, and soil samples analyzed by American Environmental concluded that Woodard Creek was not being contaminated from the leak.

In the early 2000's, Woodard Canyon was repeatedly threatened by fill piles sloughing down the canyon from Karen Hornaday Park and the construction of a private driveway (see photographs at right). Upon site visits, CEMP volunteers observed sediment inputs into Woodard Creek from these piles. Erosion control fences were erected in futile efforts to control the slough material, and are still somewhat intact today.

The two 100-year storms of fall 2002 had a high impact on Woodard Creek.



(Top) Picture taken during private driveway construction in 2000, viewing steep slope and soil sloughing into Woodard Canyon/Woodard Creek; (Bottom) Birds-eye view of driveway, accessed from Google Maps 26 July 2012

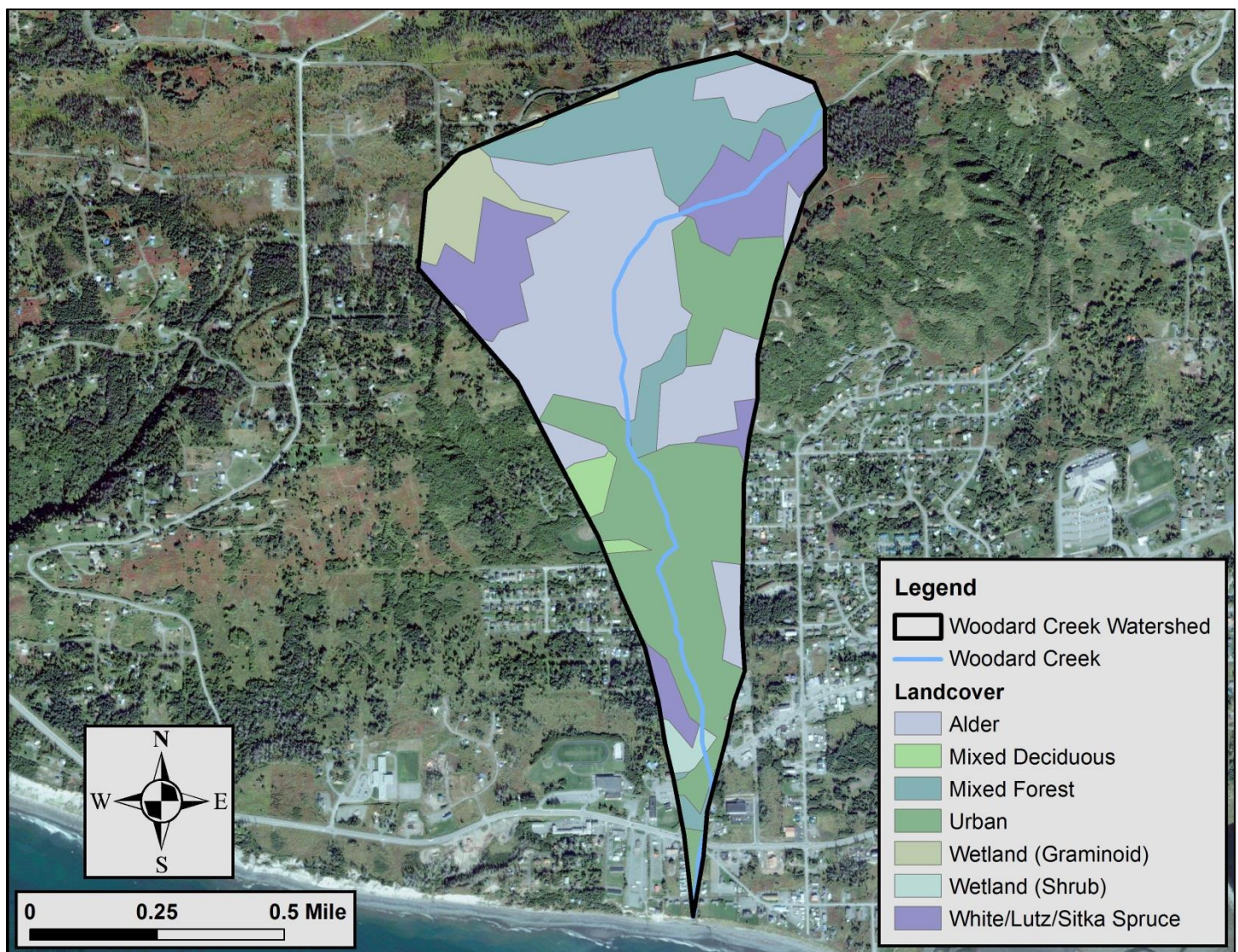
Normally a low-flow system, inputs caused the creek to swell, blowing out many culverts along its flow path. The floods severely disrupted the bed sediment of Woodard Creek, wiping out the intact macroinvertebrate populations. Upon the first bug assessment of KB-150 in June 2003, only five EPT (pollution ‘sensitive’) individuals were found, out of a total of 286 macroinvertebrates. By August, the population made a swift rebound, and EPT’s made up 59% of the total macroinvertebrate sample.

From spring 2005 to 2006, the Bartlett/Hoho Rehabilitation Project took place along Bartlett and Hohe Streets to improve the roads and install a storm water filter along the Bartlett Street for the storm water drainage system. To view the effects of road construction practices on Woodard Creek, Inletkeeper staff monitored the creek for turbidity, temperature, zinc, lead, discharge, specific conductance, and suspended solids. The effectiveness of the new storm water filter was also monitored. Results revealed that, as is to be expected in an area of high impervious surfaces, turbidity levels in Woodard Creek were high and construction practices worked well to keep excess solids from entering the creek. The new storm water filter was also found to be effective. To view the full results of the monitoring project, see *Bartlett/Hohe Rehabilitation Project Water Quality Monitoring Report*.

Watershed Overview

Land Cover

The upper half of the Woodard Creek watershed is fairly undeveloped and offers a variety of habitat types. Alder stands are predominant throughout Woodard Canyon and are scattered throughout the upper reaches of the watershed, along with mixed forest and spruce stands. The lower reaches are mostly urban, making up about 28% of the watershed.



Vegetation types within Woodard Creek Watershed (Watershed boundary: National Resources Conservation Service Watershed Boundary Database, 2010; Basemap: ArcGIS Server Service, Quickbird satellite imagery, 2003; Landcover: Kenai Fish and Wildlife Service)

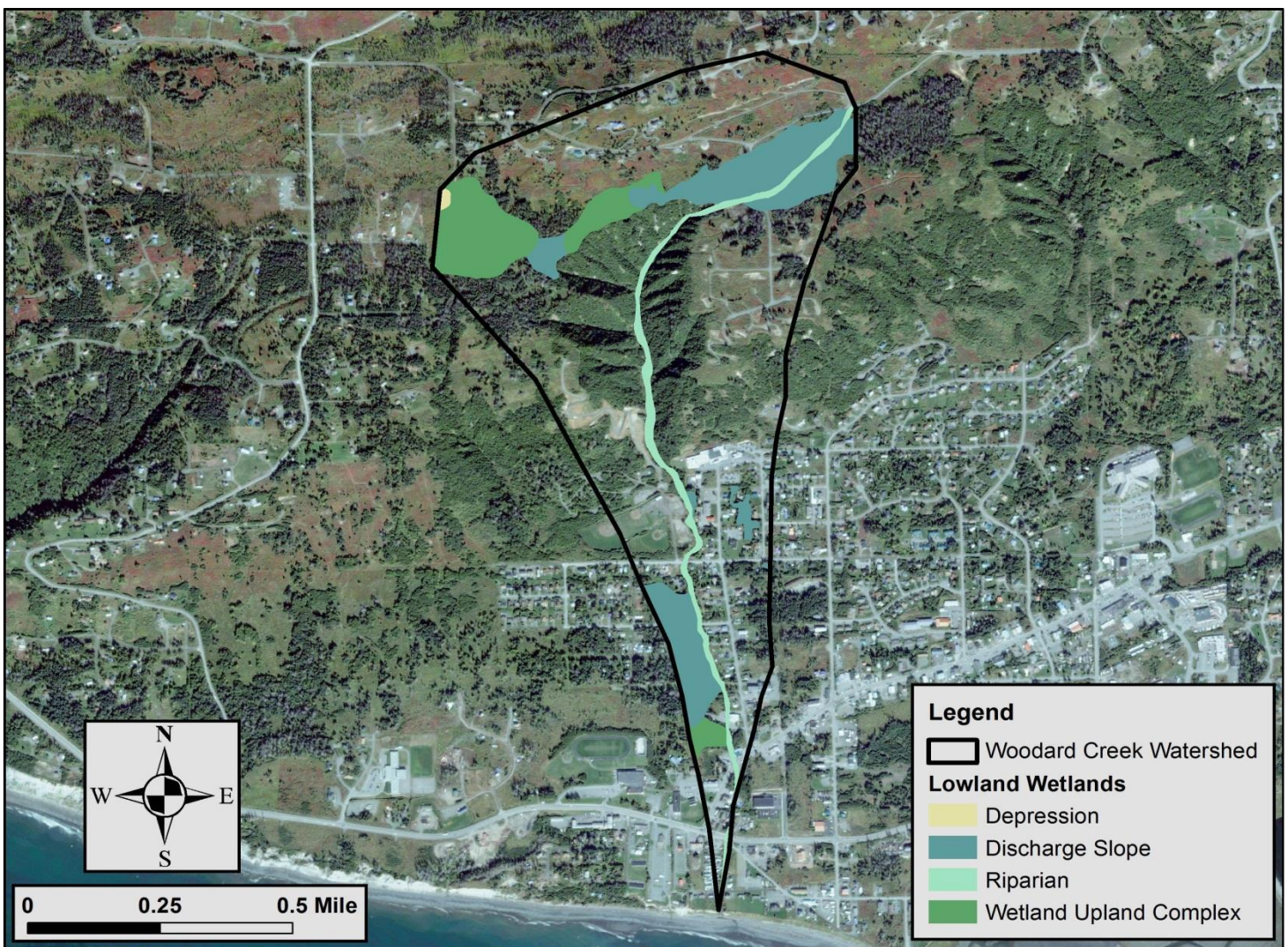
Wetlands

Wetland features make up about 20% of the watershed. Most are located above Woodard Canyon, but some are within town in the lower reaches (see image below).

Wildlife

Since the lower reaches of the watershed are heavily developed, this does not provide good habitat for terrestrial wildlife. Moose have been observed browsing and dropping young in forested patches of town. Eagles and other birds have been seen nesting in the area as well. The upper, undeveloped reaches provide much more appropriate habitat for these animals.

Woodard Creek does not support salmon populations.

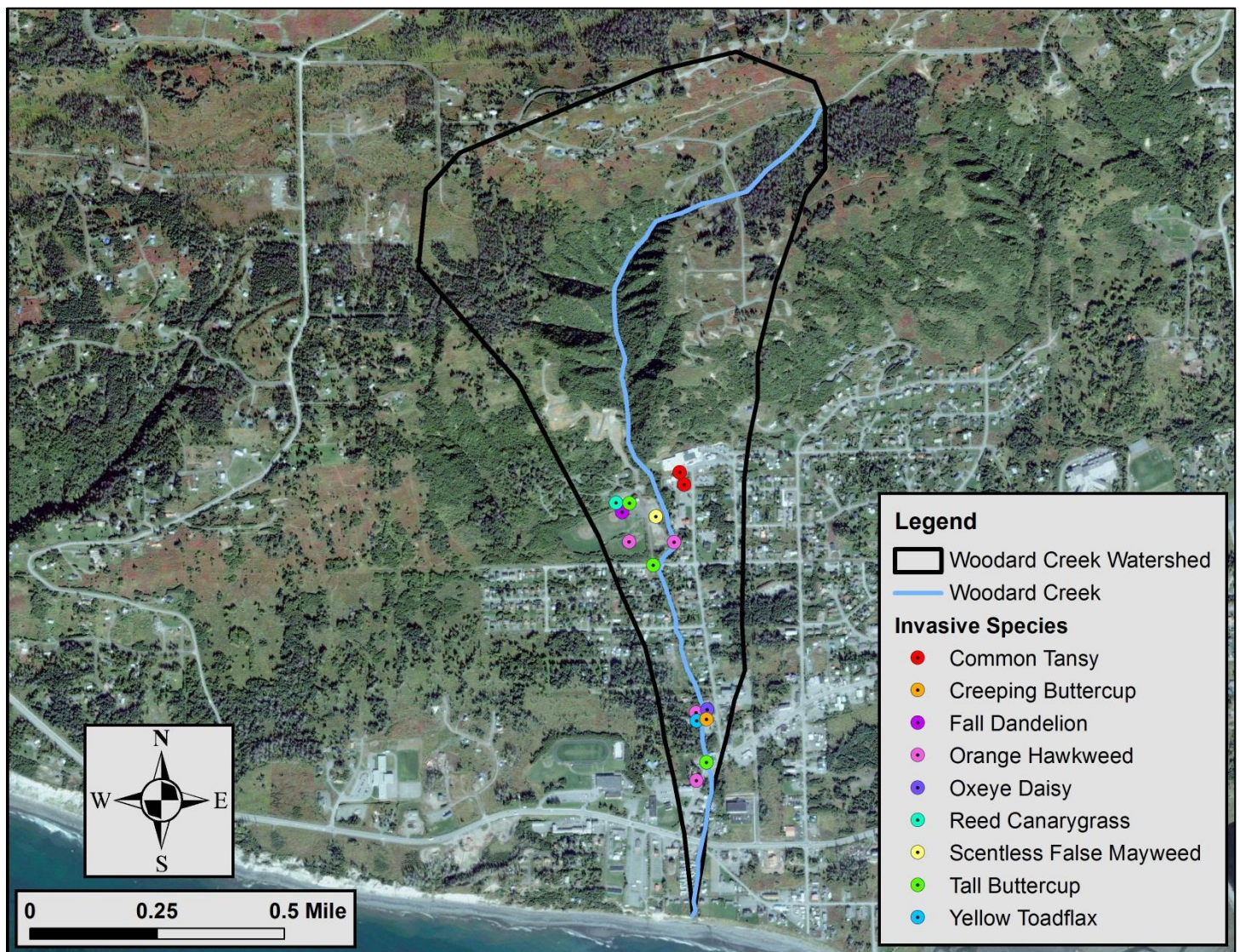


Wetland features in Woodard Creek watershed (Watershed boundary: National Resources Conservation Service Watershed Boundary Database, 2010; Basemap: ArcGIS Server Service, Quickbird satellite imagery, 2003; Wetlands: Wetland Mapping and Classification of Kai Lowland, Alaska, 2007)

Invasive Species

Fifteen observations of invasive species have been reported within the Woodard Creek watershed (see map below). Most have been observed around the South Peninsula Hospital, Karen Hornaday Park, and the Pratt Museum.

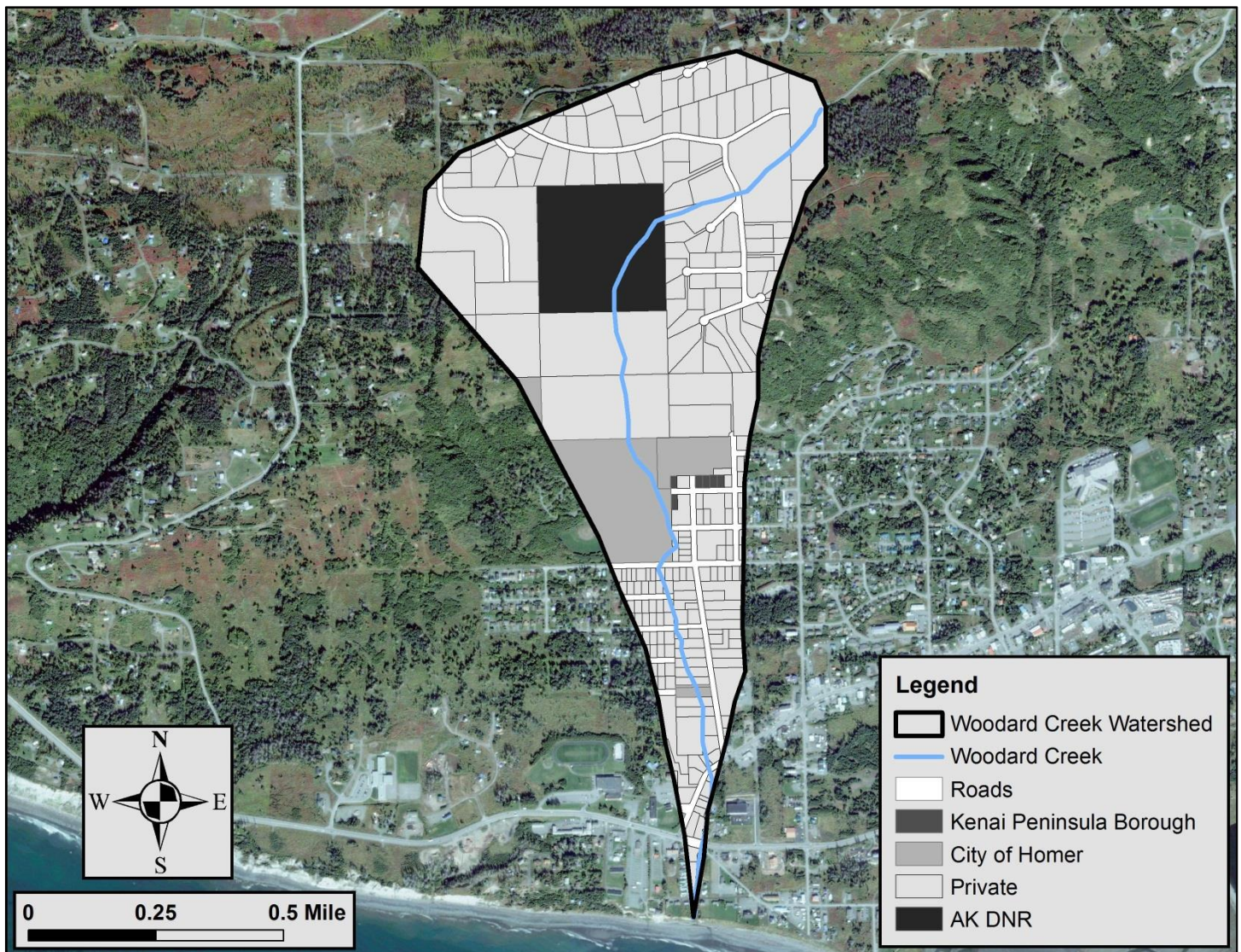
As is to be expected, most observations are made where people tend to frequent, either along roads or trail systems. The upper reaches of Woodard Creek are less developed, and thus are not visited often for surveys.



Invasive species reported within the Woodard Creek watershed (Watershed boundary: National Resources Conservation Service Watershed Boundary Database, 2010; Basemap: ArcGIS Server Service, Quickbird satellite imagery, 2003; Invasive species: Alaska Exotic Plants Information Clearinghouse Data Portal, accessed July 2012)

Land Ownership

Private-owned parcels make up about 78% of the watershed ownership. City of Homer-owned parcels make up about 10% of ownership, including land surrounding the South Peninsula Hospital and Karen Hornaday Park and a parcel just up the street of the Pratt Museum on Bartlett Street. Kenai Peninsula Borough owns some small parcels just outside of the hospital area. A large parcel in the upper reaches of Woodard Canyon, owned by Alaska Department of Natural Resources, makes up about 11% of land ownership.



Land ownership within the Woodard Creek Watershed (Watershed boundary: National Resources Conservation Service Watershed Boundary Database, 2010; Basemap: ArcGIS Server Service, Quickbird satellite imagery, 2003; Ownership parcels: Kenai Peninsula Borough GIS Division, 2010)

Stream Walk Habitat Assessment

Habitat assessments for Woodard Creek CEMP sites KB-150 and KB-180 were performed on June 27, 2012, over a 50-meter (164 feet) reach at each site.

The ‘Stream Walk’ habitat assessment is performed to provide the community with a snapshot of the physical environment surrounding a CEMP sampling site. This physical assessment compliments the chemical and biological monitoring done over time by volunteers. Though similar in some aspects to the habitat assessment done

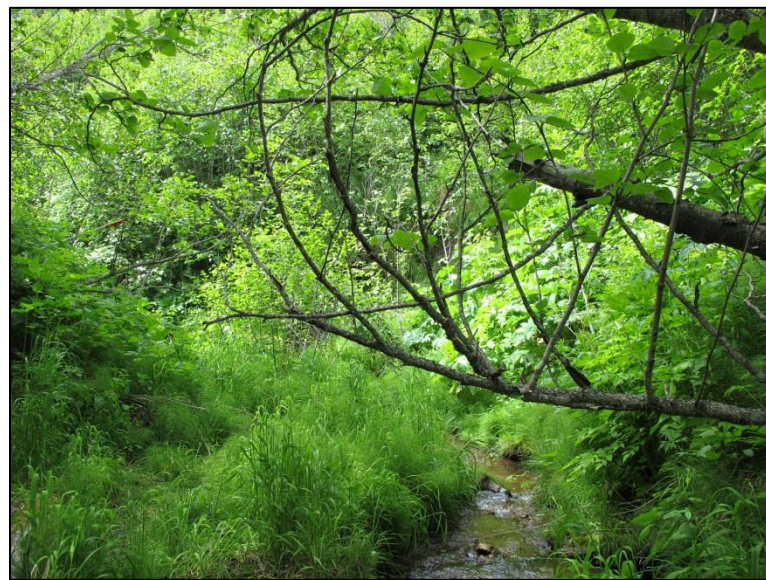


Upstream view along reach at KB-180, June 2012.

during bioassessment, the ‘Stream Walk’ is designed to provide detailed habitat information outside of bioassessment sampling session. Stream Walks can be incorporated into future monitoring plans on a regular basis and can provide qualitative information on the surrounding stream habitat in a cost- and time-effective manner.

Upper Woodard KB-180

The reach began at the CEMP site and continued upstream for 50 meters, following the curves of the creek. Water level was considered to be 90% of bank full, with fairly clear water. About half of the streambed was composed of gravel, and the remainder was split between silt/clay, sand, and cobbles. Boulders present along the reach were mostly reserved to the few short



Downstream view along reach at KB-180, June 2012.

cascades. Stream width ranged from 2.6 to 6.3 feet, but was normally 4 feet wide. Depths ranged between 3 and 11 inches, and normally flowed at 5 inches deep.

Bank stability was mostly ranked as ‘stable’ for both sides of the reach. Banks were fairly low on the left bank, and both banks were heavily vegetated and secured by root masses. A few areas of bank failure were observed on the right bank, rating about 15% of it as ‘moderate’. Failing erosion controls for the right bank were

observed at the upper end of the reach (see image at right).

The riparian zone extends to over 60 feet up both banks. Riparian vegetation is predominantly alder for both zones, with grasses, ferns, and pushki making up the remainder.

This reach is located within a City of Homer parcel. The only observable human impacts were the erosion controls from the driveway construction and the trail from the hospital to the CEMP site, maintained by volunteers. This section of the creek is not used for human recreation.



Failing erosion controls viewed at upper end of reach at KB-180, right bank, June 2012.

Lower Woodard KB-150

The 50-meter reach began at the CEMP site, just below the culvert at the Pratt Museum parking lot, and continued downstream, following the curves of the creek. Water level was at about 90% bank full, with clear water. Stream bed composition was

mostly made up of sand and gravel, with a greater gravel presence. The remainder was composed of silt/clay and cobbles, with a couple boulders dispersed along the reach. Stream width ranged between 2.1 and 7.5 feet, and normally was 4 feet wide. Depth ranged between 3 inches and 1.4 feet, and normally flowed at 6 inches deep.



Upstream view along reach at KB-150, June 2012.

Bank stability was ranked as ‘stable’ for almost the entire reach, with only 10% of the right bank rated as ‘moderate’ for some higher banks. The riparian zone extended to over 60 feet on the right bank. The left bank is closely neighbored by the Pratt Museum parking lot and the Homestead Building, yielding a riparian zone length between 24 and just over 60 feet. The majority of the left riparian zone was at 60 feet along the reach. Riparian vegetation was largely composed of alders, dominating the left

bank. Pushki, horsetail and grasses made up about half of the right bank vegetation, and the remainder of the left. A few spruce trees were present at the end of the reach on the left bank.

This reach is located within a Homer Society of Natural History parcel. The culvert under the Pratt Museum parking lot appeared intact with no damage or blockages. There is no apparent human activity within this reach of the stream.



Downstream view along reach at KB-150, June 2012.

With a 60-foot buffer zone up both banks, only 40% of the immediate Woodard Creek area is considered as undeveloped and unprotected. This percentage is located in the mostly undeveloped headwaters.

Future Monitoring

Habitat assessments and photo point monitoring should occur every other year, as close to the same date each time as possible. If change is occurring more rapidly at the site, assessments will be made more frequently.

GIS analysis on impervious cover in the watershed will be performed when new satellite imagery becomes available to Inletkeeper staff.



Culvert under Pratt Museum parking lot at head of KB-150 reach, June 2012.

During future site visits, culvert assessments should be made to monitor for any damage, blockages, or other threatening issues.

If there is substantial development or increases in impervious cover in the watershed, consider landowner outreach to maintain riparian habitat and ensure continued high water quality.

Acknowledgements

We would like to thank Joel Cooper, whose invaluable insight and previous involvement with CEMP helped to piece together some of the CEMP's history with Woodard Creek.

We would also like to thank our over 300+ CEMP volunteers throughout the years. Without their dedication and continued support, we would be unable to do this work. They have taken time to attend training sessions, yearly recertifications, and have gone into the field in all weather conditions to collect these water quality data.

Inletkeeper would like to especially thank Dan Bogan of the University of Alaska Anchorage's Environment and Natural Resources Institute for his ongoing support and training. Dan has volunteered many hours to CEMP and the CEMP Partnership – our program is stronger and the data are better because of his time and efforts.

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