ACWA 09-12: Final Report

Sustainable Trail Design for Aquatic Habitat Protection: Deep Creek and Anchor River Watershed

An Assessment of the Water Hole Trail Affected by the Caribou Hills Fire

And

Plan for the Watermelon Trail/Beaver Creek Crossing

Prepared by:

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Description and Purpose: This project addresses ACWA Waterbody Protection priorities. Streams of the lower Kenai Peninsula support healthy sport and commercial fisheries, and provide important subsistence resources for Alaska Natives and other groups. This project addresses ACWA high priority actions for the Anchor River and Deep Creek watersheds. **This report will: 1)** Reassess the Water Hole Trail in the Deep Creek watershed to assure scheduled trail work will effectively minimize water quality impacts. Because of the 55,000 acre fire that burned in the Caribou Hills during the summer of 2007, trail reroute plans needed to be reassessed because of potential changes to drainage, soils and topography, and **2)** Develop a trail plan for the Watermelon Trail and Beaver Creek ATV crossing in order to reduce habitat and water quality impacts.

This final report will evaluate and describe the project accomplishments and their environmental benefits. These environmental benefits will be determined by the success of the trail reassessment and planning to reroute trails on or near stream crossings in the two watersheds, as well as preparation work to span the ATV crossing on Beaver Creek.

Part 1: Assessment of Water Hole Trail Affected by the Caribou Hills Fire

Much of the original Water Hole Trail rerouting was based on pre-fire soils, vegetation and drainage patterns; changes to these features did occur during the fire and will affect future trail planning efforts. The HSWCD has been assessing viable reroutes along the Water Hole Trail during recent years, and has continued to do so through the spring of 2009. In late summer 2008, HSWCD installed approximately 1,700 feet of porous plastic pavement trail hardening material along the Water Hole trail, including about 1,400 feet of rerouted trail on the western side of Deep Creek. This 1,400-foot reroute was placed to the north of "Grandpa's Water Hole" instead of the planned location to the south of the original seismic line trail. This decision was based on new sight lines exposed after the fire. Because of these new sight lines, the HSWCD Trails Coordinator was able to come up with a preliminary trail reroute on the eastern side of Deep Creek, where the Water Hole trail is currently on a seismic line with significant drainage issues and is unsafe for ATV travel. A map of this proposed reroute is attached along with maps of the reroute built in 2008. The Homer District will continue planning and seeking funding to improve viable trails, such as the Water Hole Trail, in the Caribou Hills.

In early July 2008, HSWCD's previous Trails Coordinator, Bill Steyer, and previous Invasive Plants Coordinator Sarah Eastin, along with Kevin Meyer from the National Parks Service Rivers Trails and Conservation Assistance (RTCA) Program, Neil Shishido from DNR, DMLW, and members of the Caribou Hills Cabin Hoppers participated in a field visit to the Water Hole Trail. The purpose of the visit was to begin reassessing the trail's geography as it was revealed by the 2007 fire and to explore the potential use of GeoBlock as a trail hardening tool. This visit, along with other field visits and the related planning time, was made possible by an ACWA grant through the Department of Environmental Conservation.

Figure 1: 7/22/2008; Div. of Forestry Interns help stage geoblock on newly graded trail reroute near Grandpa's Water Hole

During this visit, Kevin Meyer and Bill Steyer agreed that the reroute on the south side of the trail (see attached map) designed by Seth Ex, previous Trails Coordinator, was not as good an option as another, much shorter option on the North side of "Grandpa's Water Hole". This new option presented itself that day because of the post-fire open sight lines. Kevin Meyer gave suggestions on routes

based off soil assessments and drainage, and provided this assistance through the NPS RTCA program.

During the summer of 2008, the HSWCD built this newly designed, shorter (1,400 foot) reroute and hardened it using GeoBlock, a plastic porous pavement. This part of the project was paid for by the NRCS WHIP (Wildlife Habitat Incentives Program). A DNR Division of Forestry Student Intern team joined HSWCD employees to build the reroute and install GeoBlock.

On May 22, 2009, the new HSWCD Trails Coordinator Alder Seaman and the Invasive Plants Coordinator Blane Spellman, along with head Soil Scientist Mike Mungoven from the USDA Soil Survey out of Homer performed a post-fire assessment along the Water Hole Trail in the Deep Creek watershed. They were joined by Dave Brann, a local trails expert. The purpose of the field visit was to survey several sites along the trail near the Deep Creek crossing to see how the 2007 Caribou Hills fire affected the soil and vegetation.

Post-Fire Assessment

Six Post-Fire Assessment locations were sampled on May 22nd, all located on or near the Water Hole Trail. This assessment contains a brief description of the geographic characteristics, soils and vegetation at each sampling site, as well as photos and a map showing locations of the sample sites. At each site, Mike Mungoven dug a soil pit to explore the damage to the organic matter, while Blaine Spellman surveyed existing plants within 100 feet of each soil pit. It should also be mentioned that we did not see any fire breaks left over from 2007.

Figure 2: 5/22/2009; Blaine Spellman determines post-fire plant succession adjacent to the Water Hole Trail

Using these geographic characteristics, we were able to determine that the fire had burned swiftly and not as intensely as we expected, at least in the locations we sampled. The fact that each site's organic mat was relatively intact, combined with the large amounts of healthy budding young willow verified this determination. In almost every location, there were at least 2 inches of organic mat intact on or near the surface of the soil pit. This most likely indicates that if changes to drainage patterns occurred, they were minor as well. For our sustainable trail building purposes, this is a good indication that the routes we have planned will still be viable in the post-fire setting. The spruce trees did not fare so well; blackened stumps dot the landscape. Mike and Blaine agreed that the trees burned intensely, in part because of the Spruce Bark Beetle kill of years past. The blaze's damage was focused at the roots of the previously dead spruces, but the other vegetation was not as adversely affected by the blaze. This means that changes in drainage patterns, topography, and vegetation may not be as extreme as we originally expected.

Site Descriptions

1) Slope: 32%; Aspect: SE facing

Elevation: 422 meters

Organic Matter: 2 ½ "

Soil: Boxcar Silt Loam with some coarse fragments

Vegetation: All trees were burned and dead; I found no spruce (*Picea glauca*) or birch (*Betula paperyifera*) regeneration. Salix sp. were clearly burned, however, the fire was not intense enough to kill root systems as Salix bushes were regenerating. Dominant over-story species was Salix barclayi. Dominant understory species were *Calamagrostis canadensis/Chamerion angustifolium*. There was a thick layer of *Calamagrostis* litter. Under litter there was a layer of moss. Other species identified: *Achillea millefolium*, *Festuca altaica*, *Lupinus nootkatensis*, *Sanguisorba canadensis*.

2) Slope: 3%; Aspect: NNW facing

Elevation: 425 meters

Organic Matter: 2"

Soil: Mutnala Silt Loam: mucky, wet soil with more coarse fragments; gravel platform about shovel deep

Vegetation: All paper birch and spruce trees were burned and dead. Salix sp. and scrub birch were clearly burned, however, the fire was not intense enough to kill

root systems as Salix and birch bushes were found regenerating. Dominant over-story species was Salix barclayi. Dominant understory species were *Calamagrostis canadensis/Chamerion angustifolium*. I found wet depressions at this sight with trace amounts of *Carex sp*. Other species identified: *Cornus canadensis, Equistum arvense, Sanguisorba candadensis, Pyrola* sp.

3) Slope: 5%; Aspect: E facing

Elevation: 430 meters

Organic matter: more than 8" (histic epipedon)

Soil: Boxcar silt loam or Chunilna mucky silt loam: wet soil, discharge slope, scattered organics throughout

Vegetation: There were scant traces of fire at this sight. This was a spruce/ericaceous community and is likely very wet soils (noted by the Sphagnum). The dominant overstory was white spruce (however it was < 10% cover) so it would be considered a woodland. The dominant understory was composed of *Betula nana*, *Empetrum nigrum*, *Ledum decumbens*, *Carex bigellowii*, *Pedicularis sp*. Under this ericaceous mat was a significant amount of *Sphagnum sp*. (approx. 60%). Other species found: *Vaccinium vidis-idaea*, *Vaccinium ovalifolium*, *Eriophrum sp*., *Equisetum arvense*, *Chamerion angustifolium*, *Carex sp*.

4) Slope: 52%; Aspect: S facing

Elevation: 439 meters

Organic Matter: 4"

Soil: Mutnala Silt Loam, gravel starting at 15"

Vegetation: Prior to the fire, there was no spruce/birch growing on this steep hillside. There were trace amount of bushes found and they were burned by regenerating. Dominant overstory was *Calamagrostis canadensis*. There was 65% of the ground

Figure 3: 5/22/09; Mike Mungoven digs soil pit #4, adjacent to the GeoBlocked reroute as part of the post-fire assessment

covered by grass litter. Other species found: *Salix barclayi*, *Chamerion angustifolium*, *Sanguisorba canadensis*, *Geranium erianthum*, *Luzula parviflora*.

5) Slope: 10%; Aspect: ESE facing

Elevation:

Organic Matter: 5”

Soil: Nikolaevsk silt loam or Salamatof peat: gravelly, sandy, well-drained soil. Seasonal frost 10- 12” down.

Vegetation: This sight had many free standing and burned white spruce trees. Those trees were all dead and I found no evidence of spruce seedling regeneration. There were trace amounts of bushes and no trees found at this site. Dominant overstory was *Calamagrostis canadensis /Chamerion angustifolium*. Other species found: *Sanguisorba canadensis, Heracleum maximum, Veratrum viride, Equisetum arvense, Geranium erianthum, Sambucus racemosa*.

6) Slope: 3%; Aspect: SSE facing

Elevation:

Organic Matter: 5”; stratified organics throughout pit

Soil: Tlaikakila silt loam or Nikolaevsk silt loam; some coarse fragments, deeper sand layer here, damper than site 5

Vegetation: This site had a house site that burned completely to the ground. It was the only place I saw mineral soil. Trees were dead. Dominant shrub overstory was *Sambucus racemosa/Salix* (barclayi?)sp.(although they only occupied approx. 10% cover). The dominant understory was *Calamagrostis canadensis/Chamerion angustifolium*. Other species found: *Heracleum maximum, Geranium erianthum, Achillea millefolium, Equistum arvense, Athyrium filix-femina, Sanguisorba canadensis*.

Part 1 Conclusions

The Water Hole Trail leads into the Central Plateau Trail, one of the few sustainable trails within the Caribou Hills trail network. Encouraging ATV traffic on these trails helps accomplish goals established in the HSWCD Trail Condition Assessments in the Caribou Hills. The Homer District has and will continue to work with stakeholders through the ATV Work Group to encourage adoption of a Caribou Hills trails plan.

Now that a 1,400-foot GeoBlocked reroute is in place on the western side of Deep Creek, near "Grandpa's Water Hole", ATV traffic is encouraged to continue up the other side of the trail on the eastern side of Deep Creek. The trail is in a "fall-line" state on that side, because of its seismic-line history, its wet soils, and its usage types. Since the Water Hole trail leads directly to the comparatively sustainable Central Plateau Trail, the HSWCD would like to reroute this portion of the Water Hole trail. This would not only make the trail safer for hunters and recreationists, it would also significantly mitigate trail-related impacts to water quality. It is anticipated that HSWCD's summer 2008 hardened reroute has mitigated turbidity loading from that side of the creek. Vegetation is already growing back through the GeoBlock and the old trail tread is healing now that ATV traffic is limited to the hardened trail. If the trail were rerouted and hardened where needed on the east side of Deep Creek, it is anticipated that negative effects to water quality will be similarly minimized.

During the post-fire assessment on May 22nd, Dave Brann and Mike Mungoven agreed that rerouting the Water Hole trail further north after it crosses Deep Creek would be a more sustainable solution, as there is a series of small, drier uplands that would keep the trail off of those drainage slopes until it met up with the original Water Hole trail above tree line where it joins the Central Plateau trail. This potential reroute is shown on the attached maps. Considering that organic matter is generally intact within the fire's perimeter, we can assume that soil maps of the area are still mostly valid, as well as topographic and drainage maps used to draw a potential reroute.

There is still a lot of planning work to be done, and HSWCD has been continuing to assess reroute options on the east side of Deep Creek during the spring of 2009. We have recently been seeking funding for continued work in the Caribou Hills, and particularly the continuation of the Water Hole Trail. It is important to the HSWCD to continue developing these worthy trail projects and to keep seeking permission and funding.

Part 2: Plan for Beaver Creek Crossing on the Watermelon Trail

The HSWCD has very recently been awarded an ACWA grant from DEC for improving the ATV crossing at Beaver Creek on the Watermelon Trail. The project is being funded at $47,625 including match funding. An outline of the workplan and a copy of the line item budget are included in the following pages. The HSWCD has accomplished the task of obtaining permission from the following agencies: Kenai Peninsula Borough, Alaska Department of Natural Resources, US Army Corps of Engineers, and the Alaska Department of Fish and Game. Copies of these permits are attached at the back of this report. Also note the attached site development diagram and map. The Homer District has also completed the task of finding a donated bridge structure, which has been inspected and certified by Carey Meyer, P.E. at 4000 lbs. The Load Capacity Certification is included in this report.

The purpose and general work plan for this project is in two parts: **1)** staging a bridge structure upstream of the current in-water crossing, and **2)** rerouting the trail's approach upstream to the bridge while blocking off and rehabilitating the old crossing, scheduled for late summer 2009/early spring 2010.

Figure 4: 2004; Beaver Creek Crossing aerial photo taken by Cliff Larson (DNR) as part of the Deep Creek and Anchor River Off-Road Vehicle Trails Assessment

Line Item Budget

Cost Category	Grant Amount	Non-Federal Match	Total
Salaries/ Benefits	13,323.50	4,800	**18,123.50**
Travel	343.75	1,000	**1,343.75**
Equipment/Freight		6,200	**6,200**
Materials/Supplies	5,020	1,000	**6,020**
Contractual	8,137.75	3,000	**11,137.75**
Insurance		4,800	**4,800**
Other			
Administration/ Indirect			
Total:	**26,825**	**20,800**	**47,625**

Outline of Workplan

1) Stage and install bridge structure (heavy-duty flatbed trailer) approximately 60 feet upstream of the current in-water crossing on Beaver Creek

2) Relocate the trail approaches to the newly installed bridge; build ramps to ends of bridge using gabion baskets and fill material from near the site, install railings, and post official weight limit signage.

3) Perform a streambank restoration of the old in-water crossing and thoroughly block off the old trail after all other work at the site is complete. Simple lifts and willow brush layers will be used according to techniques in "Streambank Revegetation and Protection: A Guide for Alaska" (revised 2005). Signage will be installed to keep trail users off the restored streambanks.