


KENAI PENINSULA BOROUGH


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CITY OFFICE
JOHN J. WILLIAMS
MAYOR

MEMORANDUM

TO: Grace Merkes, Assembly President
Members of the Kenai Peninsula Borough Assembly

THRU: John J. Williams, Borough Mayor 

FROM: Bonnie L. Golden, Grants Manager 

COPY: Max Best, Planning Director

DATE: February 15, 2008

SUBJECT: Ordinance No. 2007-19-39: Appropriating \$100,000 to the Kenai Watershed Forum for restoration projects

Ordinance 2007-19-39 is on the Assembly's agenda for consideration on February 19, 2008. The ordinance, when enacted, will appropriate \$100,000 to the Kenai Watershed Forum (KWF) for restoration projects. Attached is additional information regarding:

1. KWF's process to complete a fish passage project,
2. A list of culvert projects that would benefit from the Borough funding, and
3. An explanation on how these projects were selected.

If you would like additional information, please let me know.

/bg

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The mission of the **Kenai Watershed Forum** is to work together for **healthy watersheds** on the **Kenai Peninsula**.

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Current Projects

[Daniel's Creek](#)

[Mayflower St.](#)

[Crooked Creek](#)

[Ruby Creek](#)

[Tract 3 Road Ninilchik River Tributary](#)

Completed Projects

[Slikok Creek](#)

[Bean Creek](#)

[Leaf Creek](#)

[Silver Salmon Creek](#)

[Pepper Road Crossing](#)

[Mink, Doghouse, & Swan Creeks](#)

[Two Moose Creek](#)

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What happens when fish can't reach their nurseries?



photo credit US Forest Service

After a comprehensive strategic planning effort, our restoration focus is entirely dedicated to reconnecting baby salmon nurseries to the ocean. While we don't have many hydroelectric dams on the Kenai Peninsula, we do have a large number of roads with poorly designed or maintained culverts that prevent adults and juvenile salmon from accessing the habitat they need. There are dozens of culverts that need our help and beginning in 2002, we have been restoring 1 to 2 culverts each year. Other organizations are focusing their efforts on direct bank habitat and providing responsible access, and we believe it is important to provide the most amount of restored habitat per dollar spent - and that opportunity is found in restoring fish passage.

We would like to acknowledge both the Nature Conservancy of Alaska and the AK Department of Fish and Game for helping us best define our strategic restoration efforts.

We urge you to explore the links at the left and see past, current, and future projects.

Steps taken to complete a fish passage project

1. Identify priority sites and secure project funding
2. Measure stream width, depth, and slope
3. Analyze stream sediment
4. Work with engineering firm to design plans that simulate the stream width, depth, and slope
5. Get permits from multiple agencies
6. Hire construction contractors and order pipe or other structure
7. Divert stream around existing culvert
8. Remove old culvert
9. Replace with new culvert as per permits
10. Fill ~20% of the new culvert with gravel/sand mixture similar to the natural stream
11. Close diversion and return water to designed channel in new culvert
12. Stabilize the road slope with rock and native vegetation
13. Monitor the results over time

Together with the Alaska Department of Fish & Game, we have been assessing culverts across the entire Kenai Peninsula. We know of more than 350 roads crossing salmon bearing streams. Half of these have been evaluated and over 70% are problematic for the migration of fish. This translates into several hundred miles of habitat being off limits to fish on the Kenai Peninsula.

What we look for...

In the field we evaluate how high the drop or "perch" is at the outlet. If it is greater than 4-inches, baby fish can't make it up. If the slope of the culvert is too steep or too narrow, the water flows too fast, also denying fish the ability to make it to their nurseries.

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	Road ownership	Surveyed	Site No.	Y (NAD 83)	X (NAD 83)	Category	Stream	Road	Length blocked to next crossing or end of cataloged stream (meters)	Length (miles)	Notes
Tier 1 culverts	Borough	ADF&G	KPCS1EK046	60.493144	-149.84384	Red	Bean Creek	Ptamigan Rd	2,013	1.25	gradient = 3.5%, constriction = 0.77
	Borough	KWF	27_2005	60.513345	-150.79135	Red	Unnamed Creek	Duncan Rd	596	0.37	perch = 12.24"
	Borough	KWF	2_2007	60.528455	-150.77001	Red	Unnamed Creek	Gene Autry Rd	135	0.08	gradient = 4.9%, perch = 4.3"
	Borough	ADF&G	KPCS1NK085	60.507178	-150.85635	Red	Unnamed Creek	Stephens Rd	838	0.52	gradient = 4.75%, perch = 3.12" (gray)
	Borough	KWF	7_2005x	60.153575	-149.42442	Red	Unnamed Creek	Old Exit Glacier Rd	115	0.07	perch = 12", gradient = 2.72%, constriction = 0.189, lots of adult pinks trying to get through
	Borough	KWF	77_2007	60.154313	-149.42444	Red	Unnamed Creek	Old Exit Glacier Rd	563	0.35	perch = 5.4", gradient = 1.5%, constriction = 0.22, lots of adult pinks trying to get through
	Borough	KWF	29_2007	60.167468	-149.39062	Red	Unnamed Creek	Timber Drive	33	0.02	gradient = 2.7%, constriction = 0.33; new road

Tier 2 culverts

Borough	KWF	81_2006	59.852403	-151.62754	Red	Unnamed Creek	Santiago Lane	730	0.45 + ~1 mile	gradient=18.38%, constriction ratio=0.67 (gray), perch=24"
Borough	KWF	121_2006	60.486371	-151.00397	Red	Soldotna Creek	Keystone Drive	1,676	1.04 + another 0.5 mile potential habitat	constriction ratio=0.4615, perch=3.6" (gray)
Borough	KWF	30_2005	60.690535	-151.25528	Red	Bishop Creek	Vendevere Rd	492	0.31 mile + Parson's Lake (102 acres)	constriction ratio=0.104; road is sinking into the wetlands
Borough	ADF&G	KPC041A023	59.994753	-151.4941	Red	Unnamed Creek	Oil Well Road	0	0+ 0.25 mile and pond (4 acres)	gradient=1.23%
Borough	ADF&G	KPCS1NK087	60.51812	-150.79446	Red	Unnamed Creek	Scout Lake Loop	187	0.12 + ~1 mile	questionably red, resurvey pending
Borough	KWF	16_2006	60.527674	-150.98447	Red	Unnamed Creek	Messer Street	255	0.16 mile + east Mackey Lake	gradient=3.56%
Borough	KWF	16_2007	60.490613	-149.81222	Red	Unnamed Creek	Snug Harbor Road	0	0.00	gradient=3.1486%, constriction ratio=0.4412, perch=0.12 (gray)



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How culverts were identified

KWF used GIS to identify locations where the roads crossed state cataloged anadromous streams. After identifying these locations, the culverts were surveyed using high-precision survey equipment based on ADF&G's established culvert survey protocol. We used these measurements to calculate slope, channel constriction, and perch. These three variables are used to determine if a juvenile salmon can migrate upstream of these culverts or if the culverts create a barrier. Once a barrier was identified KWF used this information to determine how "red" these barriers were to prioritize which culverts should be replaced first.

Culvert prioritization criteria

Tier 1 culverts based on:

1. Overall red ranking on culverts crossing state cataloged anadromous streams that are blocking the longest length of cataloged habitat upstream
2. The "redness" of the perch, constriction, and gradient variables; looked for culverts on state cataloged streams with values significantly inadequate in one or more of these fields
3. The general quality of habitat just upstream from the crossing; excluded crossings heavily influenced by human uses just upstream

Tier 2 culverts based on:

1. Overall red ranking that wasn't already included in Tier 1
2. One or more red rankings for perch, constriction, or gradient variables with limited state-cataloged stream upstream

Summary

Over several field seasons, 270 culverts have been located and surveyed across the Kenai Peninsula. Of these a total of 48 (18%) provide adequate passage, 93 (34%) provide marginal passage, and 129 (48%) provide inadequate passage. On borough owned and maintained roads alone, a total of 33 culverts were found and surveyed, 14 that block and 4 that partially block juvenile salmon passage. KWF has not yet surveyed all salmon-stream culverts and will likely be working again this summer to finish the survey.

KWF identified 7 culverts on borough roads to fall within the Tier 1 category and 7 culverts to fall within the Tier 2 category. See [borough_culverts.xls](#) for specifics on each culvert. Also see this link to view a map of all of the priority culverts: http://www.kenaiwatershed.org/Culverts/priority_culverts.html