

Agency: Commerce, Community and Economic Development**Grants to Named Recipients (AS 37.05.316)****Grant Recipient: Cook Inlet Aquaculture Association****Federal Tax ID: 92-0063954****Project Title:****Project Type: Planning and Research**

Cook Inlet Aquaculture Association - Tustumena Lake Smolt Monitoring

State Funding Requested: \$25,000**House District: Kenai Areawide (28-30)**

Future Funding May Be Requested

Brief Project Description:

Research project to count the number of sockeye salmon smolt migrating from Tustumena Lake into the Kasilof River.

Funding Plan:

Total Project Cost:	\$33,000
Funding Already Secured:	(\$0)
FY2015 State Funding Request:	(\$25,000)
Project Deficit:	\$8,000

Funding Details:

N/A

Detailed Project Description and Justification:

The Cook Inlet Aquaculture Association (CIAA) has been operating smolt traps at the Kasilof River for 16 years to count the number of sockeye salmon smolt migrating from Tustumena Lake into the Kasilof River. The smolt enumeration compliments the adult monitoring conducted by the Alaska Department of Fish and Game and helps the Department to manage the Kasilof River fishery. The request for funding is to allow CIAA to continue the Tustumena Lake smolt enumeration project.

See attached project description and budget.

Project Timeline:

FY15 - \$26,000

FY16 - \$7,000

Entity Responsible for the Ongoing Operation and Maintenance of this Project:

Cook Inlet Aquaculture Association

Grant Recipient Contact Information:

Name:	Gary Fandrei
Title:	Executive Director
Address:	40610 Kalifornsky Beach Rd Kenai, Alaska 99611
Phone Number:	(907)283-5761
Email:	gfandrei@ciaanet.org

Has this project been through a public review process at the local level and is it a community priority? Yes No

<i>For use by Co-chair Staff Only:</i>
11:57 AM 5/13/2014

TUSTUMENA LAKE (KASILOF RIVER) SMOLT MONITORING METHODS

Environmental Conditions

To assess the environmental conditions during the sockeye salmon smolt migration personnel recorded estimated percent cloud cover, water level measured to the nearest tenth of a foot, precipitation measured to the nearest millimeter, and water and air temperatures measured to the nearest degree centigrade. All measurements were recorded at 5:00 PM each day (CIAA Staff, 2013).

Smolt Enumeration

To conduct the Tustumena Lake sockeye salmon smolt monitoring project, two inclined plane smolt traps, or collection facilities, were placed in the thalweg of the Kasilof River near river mile 6.3 and 7.1. Each collection facility consisted of one inclined plane trap and a double compartment live box supported by a twin pontoon raft (Todd, 1994). Trap 1 was positioned near river mile 7.1, near the Kasilof Bridge, and functioned as the marking site. Trap 2 was positioned near river mile 6.3 and functioned as the recapture site.

Trap 1 was operational on 24 May before any significant smolt migration occurred and was used to capture sockeye smolt in the mark-recapture procedure. Trap 2 was operational on 24 May and remained the site of the total count procedure, recapture site, and smolt characteristics sampling for the duration of the enumeration. Field personnel physically identified each fish by species and released the fish downstream of the trap to continue in their migration. The daily capture count was used with trap efficiencies to determine the total estimated sockeye salmon smolt outmigration.

The mark-recapture technique used in this project involved a stratified sampling design in which approximately 1,000 sockeye smolts were color marked with dye and released from Trap 1 once per week. Personnel conducted the mark-recapture tests Monday night each week. Once the sample was collected, personnel transferred the smolt into a container containing the dye solution Bismark Brown Y (1 gram of dye per 30.4 Liters of water) and monitored the health of the fish for approximately 45 minutes. Upon release, approximately 10–15 dyed smolt were set aside in a smaller container and monitored for an additional hour to record the quality of dye retention as well as vitality. Personnel monitored the number of daily recaptured dyed sockeye smolt at Trap 2 for five days following release of dyed fish at Trap 1. Any sockeye smolt mortality was not

included in the total number released. The number of smolt recaptured in Trap 2 was then used to estimate the proportion of migrating smolts captured (the trap capture efficiency) and the total estimated smolt migration.

Statistical procedures for estimating the population of migrating smolts (N) followed the *simple stratified M-R design* for One-Site sampling experiments described by Carlson et al. (1998) where:

U = total unmarked population size;
 N = total population size;
 N_h = total population size in stratum h ;
 u_h = total number of unmarked smolts captured in stratum h ;
 M_h = number of marked smolts released in stratum h ;
 m_h = number of marked smolts recaptured in stratum h ;
 L = number of strata or periods; and

$$\hat{U} = \sum_{h=1}^L \hat{N}_h - M_h = \sum_{h=1}^L \frac{u_h (M_h + 1)}{m_h + 1}$$

The variance of the population estimate $v(N)$ and the 95% confidence interval (CI) were estimated as:

$$v(\hat{N}) = \sum_{h=1}^L v(\hat{N}_h) = \sum_{h=1}^L \frac{(M_h + 1)(n_h + 1)(M_h - m_h)(n_h - m_h)}{(m_h + 1)^2 (m_h + 2)};$$

And,

$$(CI) = \hat{N} \pm 1.96\sqrt{v(\hat{N})}.$$

This method assumes:

- All marked fish released upstream pass the trap before the next release of marked fish;
- The probability that a dyed or unmarked fish enters the trap equals the trap efficiency for all dyed or marked fish;
- Fish are captured or not captured in the trap independently of the fate of other fish;
- All fish entering the trap are counted, and;
- Trap efficiencies do not change significantly during the smolt migration.

The proportions of age-1, age-2, and age-3 smolt were calculated using the data computed from the aforementioned notations and formulas with the following notations and formulas:

U_i = total unmarked population size for age class = i ;

U_h = total unmarked population size for stratum = h ;

U_{hi} = total unmarked population size for age class i , in stratum = h ;

P_i = proportion of unmarked smolt for age class = i ;

P_h = proportion of unmarked smolt for stratum = h ;

P_{hi} = proportion of unmarked smolt for age class = i , in stratum = h ;

a_i = total number of samples of age class = i ;

The estimated number of migrating age = i smolt was calculated as:

$$U_i = \sum U_h P_{hi}$$

Proportion of age = i smolt was calculated as:

$$P_i = \frac{1}{U} \sum U_h P_{hi}$$

The variance of the proportion of age = i smolt in stratum = h was calculated as:

$$v(P_{hi}) = \frac{P_{hi}(1 - P_{hi})}{a_h - 1}$$

The variance of the number of age = i smolt in stratum = h was calculated as:

$$v(U_{hi}) = U_h^2 v(P_{hi}) + P_{hi}^2 (U_h) - v(U_h)(P_{hi})$$

Therefore, the variance of the estimated number of age = i smolt was calculated as:

$$v(U_i) = \sum v(U_{hi})$$

Confidence intervals (95%) estimates for number of age = i smolt are:

$$U_i \pm 1.96 \sqrt{v(U_i)}$$

Field Projects, FY14

Tustumena Lake

Project Total: 33,136

PROJECT: Tustumena SMOLT Draft 19-Jan-13 Total: \$ 33,136

100 SALARIES\LABOR 20,436

Special Projects Manager	(	2.0	percent	)					1,493
Biologist	(	4.0	percent	)					2,339
Project Technician	(	4.0	percent	)					2,442
Seasonal, Daily (Total)	(	2	people x	118	\$/day x	60	Days)		14,163

*5 days
10 days
10 days*

200 TRAVEL 0

300 CONTRACTS\SERVICES 2,750

Communications									
308	Cell Phone	(	2	mos x	125	\$/month)			250
Permits and Fees									
316(b)	Workers Liability (Workers Comp)								500
322	Lease (Property)	(	2	mos x	250	\$/month)			500
Training									
340	Safety								500
Repair and Maintain									
335	Vehicles								500
326	Other Camp Equipment								500

400 SUPPLIES 4,950

404	Groceries	(	2	people x	22.50	\$/day x	60	days)	2,700
408	Fuels								750
Camp									
431	Hand Tools/Small Equip.								500
427	Repair & Maintain - Vehicle								500
423	Repair & Maintain - Other Equipment								500

500 Equipment 5,000

Used Truck									5,000
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*Project methods changed in 2012
Requires use of vehicle or additional
regualr staff time*

<u>Tutstumena</u>	<u>33,136</u>
<u>100 SALARIES\LABOR</u>	<u>20,436</u>
<u>200 TRAVEL</u>	<u>0</u>
<u>300 CONTRACTS\SERVICES</u>	<u>2,750</u>
<u>400 SUPPLIES</u>	<u>4,950</u>
<u>500 Equipment</u>	<u>5,000</u>

Introduced by: Johnson, Mayor
Date: 12/03/13
Action: Adopted
Vote: 8 Yes, 0 No, 1 Absent

**KENAI PENINSULA BOROUGH
RESOLUTION 2013-082**

**A RESOLUTION ASKING THE ALASKA DEPARTMENT OF FISH AND GAME TO
CONTINUE ENUMERATION ESTIMATES OF KASILOF RIVER SOCKEYE SMOLT**

WHEREAS, the Kasilof River sockeye run is important both to the economy of the Kenai Peninsula Borough and to commercial, personal use and sport fisheries; and

WHEREAS, any disease or fresh water survival problems for sockeye will appear in smolt migration numbers two or three years before the problem can be recognized in adult returns; and

WHEREAS, the Alaska Department of Fish and Game (ADF&G) has, together with Cook Inlet Aquaculture Association, counted Kasilof River sockeye smolt out-migration numbers since 1980; and

WHEREAS, ADF&G has announced its intention to discontinue counting Kasilof River sockeye smolt in 2014; and

WHEREAS, the communities of Kasilof, Cohoe and Clam Gulch gathered at Tustumena School on October 2, 2013 and voiced their unanimous support of having ADF&G continue funding the Kasilof River sockeye smolt enumeration estimates; and

WHEREAS, the Alaska Dept of Fish and Game predicts sockeye annual returns for the Kasilof River and uses smolt enumeration estimates in those calculations; and

WHEREAS, new sockeye smolt traps were built in 2012 and are available for counting Kasilof River sockeye smolt in 2014;

NOW, THEREFORE, BE IT RESOLVED BY THE ASSEMBLY OF THE KENAI PENINSULA BOROUGH:

SECTION 1. That the Kenai Peninsula Borough Assembly asks the State of Alaska and the Alaska Department of Fish and Game to fund Kasilof River sockeye smolt enumeration estimates again in 2014.

SECTION 2. That this resolution takes effect immediately upon adoption.

ADOPTED BY THE ASSEMBLY OF THE KENAI PENINSULA BOROUGH THIS 3RD DAY DECEMBER, 2013.

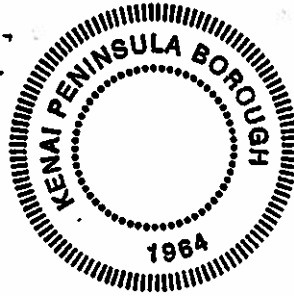


Hal Smalley, Assembly President

ATTEST:



John Blankenship, MMC, Borough Clerk



Yes: Bagley, Haggerty, Johnson, McClure, Ogle, Smith, Wolf, Smalley
No: None
Absent: Pierce

KENAI PENINSULA BOROUGH

Kenai Peninsula Borough Assembly

144 North Binkley Street
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Phone 907-714-2160
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Hal Smalley, Assembly President
Bill Smith, Vice President

MEMORANDUM

TO: Hal Smalley, Assembly President
Kenai Peninsula Borough Assembly Members

FROM: Brent Johnson, Assembly Member *B for Brent Johnson*

DATE: December 3, 2013

RE: Resolution 2013-082; Asking the Alaska Department of Fish and Game to Continue Enumeration Estimates of Kasilof River Sockeye Smolt

A State salmon hatchery was built at Crooked Creek, a tributary of Kasilof River, in 1973.¹ Sockeye egg gametes were subsequently collected at Tustumena Lake, incubated in the hatchery and released back into Tustumena Lake as "fry." Sockeye fry typically rear in Tustumena Lake for one year and then migrate down Kasilof River as "smolt" on their way to rearing in the Pacific Ocean.

The State of Alaska established a Kasilof River sockeye salmon smolt trap study in 1980 to establish estimates on fresh water survival rates.² Cook Inlet Aquaculture Association (CIAA) took over management of Crooked Creek Hatchery in 1993, and also took over the smolt trap estimates. In 2004 the Ninth Circuit Court closed the hatchery operation based on potential conflicts with goals of the 1980 Andy Simon Wilderness Area, which encompasses most of Tustumena Lake.

The State of Alaska and Cook Inlet Aquaculture Association recognized a scientific value in the sockeye smolt estimates and have worked together to continue them through 2013. In recent years ADF&G has provided the money for the smolt counts while CIAA has hired the experts who have done the actual work. The same person, a KPB resident, has led the work for many years.

1 McNair, Marianne. Alaska Salmon Enhancement Program, 2001 Annual Report, by Alaska Dept of Fish & Game, March 2002, Table 3, page 6.

2 Flagg, Loren; Owecke, Michael; and Waite, David. Sockeye Salmon Smolt Studies, Kasilof River, Alaska, 1982. For Fred Division, ADF&G, page 24.

Financial considerations have led the ADF&G to announce their plans to discontinue the project. Many fishermen believe the State should be expanding smolt counts to include chinook salmon, not discontinuing sockeye smolt counts. Fishermen and processors use the annual sockeye predictions to help plan for upcoming seasons. In addition, freshwater survival rates are important for science purposes.

This resolution asks the State of Alaska and the Alaska Department of Fish and Game to continue funding the sockeye smolt count.

Your consideration is appreciated.



COOK INLET AQUACULTURE ASSOCIATION

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Kenai Peninsula Borough Assembly
Clerks Office
144 North Binkley
Soldotna, Alaska 99669

February 10, 2014

Re: Support for State Funding Priority 2014: Elodea Eradication Project

Dear Assembly Members,

Cook Inlet Aquaculture Association (CIAA) is a private, non-profit corporation organized under the laws of the State of Alaska, engaged in salmon enhancement work throughout the Cook Inlet Region. The purpose of this letter is to offer our support for the Kenai Peninsula Borough's State Funding Priority 2014 Capital Project: Elodea Eradication Project.

Since 1976, CIAA has worked to protect and enhance wild salmon stocks for the common property fishery in the Cook Inlet Region. Our work includes the installation and adjustments of a water flow control structure at the outlet of Daniels Lake to help migrating salmon return to the lake. We clearly understand the threat invasive Elodea poses to our wild salmon stocks if left unchecked in Alaska lakes by altering the habitat.

We recognize that the discovery of Elodea in Beck, Stormy, and Daniels lakes requires immediate action to have a good chance of eradicating the infestations—using pesticides, in this case, is the best option to meet this goal of rapid response. We support the \$700,000 funding request that allow the development of a comprehensive Elodea eradication program, including the use of the pesticide Floridone to treat this infestation before it spreads and becomes a much larger issue.

We understand that \$700,000 may seem like a large amount, but one only needs to look at the invasion history of other species, such as kudzu or zebra mussels, to realize this amount is a drop in the bucket compared to what it costs when an invasive species takes over—in economic losses, and in costs associated with controlling (not eradicating) the invasive plant or animal. It has been shown time and again that controlling an invasive

plant or animal once it takes hold can cost millions or even hundreds of millions of dollars.

Another example closer to home is the multi-year effort by ADF&G to remove invasive northern pike from the Soldotna Creek drainage, where native fish populations have already been decimated by the pike in most of the drainage lakes. It is estimated that around \$750,000 will be spent on this effort, and this does not take into account the recreational and economic losses resulting from the loss of native fish, or the funding that will be needed to restock the lakes.

It is important that the funding is in place to eradicate Elodea in Daniels, Stormy, and Beck lakes to stop it from spreading to other lakes, and seriously threatening our native species, habitat, and economies. Thank you for this opportunity to provide our support.

Sincerely,



Gary Fandrei
Executive Director

Cc: Representative Mike Chenault
Representative Kurt Olson
Representative Paul Seaton
Senator Peter Micciche
Senator Gary Stevens
Senator Cathy Giessel