

AK LEGISLATURE SPECIAL COMMITTEE FILES SCOMM 156 3333

management, transparency of process, enforcement, traceability, historic effectiveness, habitat protection, tradition, and an FAO checklist, as well as a sustainability forum section. Downloadable tools are available including the sustainability brochure, sustainability white paper, Marine Protected Areas brochure and white paper, fact sheets and other resources. A wallet card showcasing sustainable Alaska Seafood species has also been created.

As you can see from our efforts to date, this concept of sustainable fisheries management is very important in today's markets. We will continue to develop this theme in the year ahead, to explain to the world that since statehood, Alaska has a proven track record in effective resource management that conforms to international standards. This all rests on our Constitution, the sound scientific management of our resources by the State of Alaska and the National Marine Fisheries Service, and on the public process used to allocate the resources.

Thank you.

State of Alaska

SARAH PALIN, Governor

Commercial Fisheries Entry Commission

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Juneau, AK 99811-0302

MEMORANDUM

To: Cook Inlet Salmon Task Force
Representative Craig Johnson, Chair
Senator Lyda Green, Vice-Chair
Representative Kyle Johansen
Representative Mark Neuman
Representative Bill Stoltze
Representative Mike Doogan
Senator Charlie Huggins
Senator Lesil McGuire
Senator Bill Wielechowski
Senator Tom Wagoner

Date: October 7, 2008

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From: Bruce Twomley, Commissioner
Commercial Fisheries Entry Commission

Subject: Report to the Cook Inlet Salmon
Task Force on the Buy-Back
Program under the Alaska
Limited Entry Act

I. INTRODUCTION

The Cook Inlet Salmon Task Force requested Commissioner Bruce Twomley¹ of the Alaska Commercial Fisheries Entry Commission (CFEC or Commission) to report on the buy-back program authorized by the Alaska Limited Entry Act² and whether the program could serve the goals of the Cook Inlet Salmon Task Force.

As discussed in detail below, whether the voluntary buy-back program authorized by the Limited Entry Act would be helpful to the Cook Inlet Salmon Task Force would depend upon whether the goals

¹ Having been appointed to the commission by Governor Jay Hammond in 1982, Commissioner Twomley has reported on buy-back to the Alaska Legislature and to the Board of Fisheries a number of times. Additionally, Twomley is the principal author of the only optimum number decision upheld by the Alaska Supreme Court in *Simpson v. State*, CFEC, 101 P.3d 605 (Alaska 2004).

² AS 16.43.010--AS 16.43.990.

agreed upon by the Task Force are consistent with the three enumerated statutory purposes that authorize a buy-back program under the Limited Entry Act.³ To paraphrase the statutory standards, the Limited Entry Act requires a buy-back program to produce a well conserved, economically healthy fishery which includes a sufficient number of participants to protect the reliance interests of those dependent on the fishery. The statutory standards also suggest a long-term commitment to the well-being of the fishery and its participants.

The Limited Entry Act also authorizes a private opportunity to buy out limited entry permits. However, any form of reducing the number of entry permits in a commercial fishery raises a State Constitutional issue: if the fishery were to become too exclusive under the Alaska Constitution, the State would have an obligation to put more permits back into the fishery.

This report begins with a brief profile of two Cook Inlet commercial fisheries: the Cook Inlet salmon drift gillnet fishery and the Cook Inlet salmon set gillnet fishery. These fisheries show substantial Alaskan participation. More than 1,000 Alaska residents hold entry permits in one or the other.

Finally, this report examines the statutory authorization for a buy-back program under the Limited Entry Act as well as some constitutional and other issues that arise from implementation of a buy-back program.

II. PROFILES OF THE COOK INLET SALMON DRIFT GILLNET AND SET GILLNET FISHERIES

A. Cook Inlet Salmon Drift Gillnet Fishery

In the Cook Inlet salmon drift gillnet fishery, 571 permit holders are entitled to participate.⁴ During the 2007 fishing season, participants in the drift gillnet fishery grossed an estimated \$13.0 million.⁵

³ AS 16.43.290 [quoted in Section III. A. of this report].

⁴ Attachment A (presenting figures as of year-end 2007).

⁵ *Id.* (sometimes referred to as ex-vessel value).

Alaska residents hold 398 out of the 571 drift gillnet entry permits for this fishery.⁶ Alaska residents thus hold 70% of the Cook Inlet salmon drift gillnet entry permits.⁷ Additionally, a substantial number of permit holders (227) live in areas local to the fishery.⁸

For September of 2008, CFEC estimated the market value of a Cook Inlet salmon drift gillnet entry permit to be \$33,300.⁹ As of that date, a lower bound estimate of the combined value of all permits in the fishery would be \$19.0 million.¹⁰ Over the years, permit values have ranged from \$11,700 in 2002 to \$202,058 in 1990.

B. Cook Inlet Salmon Set Gillnet Fishery

In the Cook Inlet salmon set gillnet fishery, 738 entry permit holders are entitled to participate.¹¹ During the 2007 fishing season, participants grossed an estimated \$10.5 million.¹²

Alaska residents hold 608 of the 738 entry permits for this fishery. Alaska residents thus hold 82% of the Cook Inlet salmon set gillnet entry permits.¹³ Additionally, a substantial number of permit holders (257) live in areas local to the fishery.¹⁴

For September of 2008, CFEC estimated the market value of a Cook Inlet salmon set gillnet entry permit to be \$13,300.¹⁵ As of that date, a lower bound estimate of the combined value of all set gillnet entry permits in the fishery would be \$9.8 million.¹⁶ Over the years, permit values have ranged from \$8,000 in 2002 to \$98,514 in 1990.

⁶ *Id.* at 2.

⁷ *Id.*

⁸ *Id.* at 2. Additionally, an explanation and examples of areas considered local to the fishery are provided in Attachment C.

⁹ http://www.cfec.state.ak.us/mnu_permit_values.htm.

¹⁰ Individuals who continue to hold their permits tend to value them at more than the market price. In addition considering the additional costs of vessels, gear, fuel and other expenses, the value of entry permits represents only a portion of the investment in an individual fishing operation.

¹¹ Attachment B (presenting figures as of year-end 2007).

¹² *Id.* (as of year-end 2007).

¹³ *Id.* at 2.

¹⁴ *Id.* Additionally, an explanation and examples of areas considered local to the fishery are provided in Attachment C.

¹⁵ http://www.cfec.state.ak.us/mnu_permit_values.htm

¹⁶ Individuals who continue to hold their permits tend to value them at more than the market price. In addition considering the additional costs of vessels, gear, fuel and other expenses, the value of entry permits represents only a portion of the investment in an individual fishing operation.

III. THE BUY-BACK PROGRAM UNDER THE ALASKA LIMITED ENTRY ACT

A. The Limited Entry Act

The function of a voluntary buy-back program under the Limited Entry Act is to reduce the number of limited entry permits in a commercial fishery to a number considered optimum for the fishery's long-term benefit.¹⁷

AS 16.43.290 authorizes the commission to undertake a voluntary buy-back program if the program would achieve "a reasonable balance" of the following three purposes reflected in the determination of:

- (1) the number of entry permits sufficient to maintain an economically healthy fishery that will result in a reasonable average rate of economic return to the fishermen participating in that fishery, considering time fished and necessary investments in vessels and gear;
- (2) the number of entry permits necessary to harvest the allowable commercial take of the fishery resource during all years in an orderly, efficient manner, and consistent with sound fishery management techniques;
- (3) the number of entry permits sufficient to avoid serious economic hardship to those currently engaged in the fishery, considering other economic opportunities reasonably available to them.

In short, a buy-back program under the Limited Entry Act would be required to reduce permits down to numbers that served three goals: (1) an economically healthy fishery providing a reasonable average rate of economic return to the participants; (2) a well conserved fishery capable of capturing the allowable commercial harvest "during all years" in an orderly and efficient manner; and (3) a fishery with a sufficient number of permits to protect the reliance interests of those individuals dependent on the fishery and lacking reasonably available economic alternatives. The "during all years" language together with the opportunity to modify an optimum number in response to substantial changes of circumstance over time suggest a long-term commitment to the well-being of a fishery and its participants. A buy-back program demonstrated to serve these goals would come within the commission's statutory authority

¹⁷ AS 16.43.290--16.43.330.

B. Constitutional and Other Issues Arising from the Buy-Back Remedy

Those familiar with buy-back under the Limited Entry Act are cautious about this remedy, because (among other issues) it raises a serious constitutional issue. Reducing the number of permits in a limited fishery creates the risk the fishery could be found to be too exclusive under Article VIII, Section 15 of the Alaska Constitution.¹⁸ To remain constitutional, a limited fishery cannot exceed the constitutional authority for limited entry: namely, to serve conservation and to prevent economic distress among fishermen.¹⁹ Consequently, a limited entry program should impinge on the open-to-entry principles of the Constitution as little as possible.²⁰ In the event a fishery does become too exclusive, the commission is required to put more permits back into the fishery.²¹

The only means by which the commission can attempt to protect a buy-back program from unconstitutionality is to perform an optimum number study under AS 16.43.290 in order to determine the optimum number of permits for the fishery.²² The commission would require at least a year and one-half to complete optimum number studies of the Cook Inlet drift and set net fisheries. However, because of the constitutional nature of the issues entailed in an optimum number study, a court could always second-guess the commission and make an independent determination that a fishery had become too exclusive.²³ If a fishery were found to be too exclusive, the commission has the duty to create and sell more permits for the fishery.²⁴ The possibility of adding more permits back into a fishery creates an obvious risk for those who finance a buy-back program.

To finance a buy-back program, the commission is authorized to assess fishermen up to 7% of their gross earnings.²⁵ An investment, such as a state loan to be repaid over time from the assessment would be necessary for a program to have an initial impact making it practicable for remaining fishermen to tax themselves to pay off the cost. There is no statutory provision, however, for any initial

¹⁸ *Johns v. CFEC*, 758 P.2d 1256, 1265-1266 (Alaska 1988).

¹⁹ *Id.* at 1266.

²⁰ *Id.*

²¹ *Id.*

²² *Id.*

²³ *Simpson v. State, CFEC*, 101 P.3d 605, 609 (Alaska 2004).

²⁴ *Johns*, 758 P.2d at 1266; *Simpson*, 101 P.3d at 613-614; and AS 16.43.330.

²⁵ AS 16.43.310. However, actually imposing a tax on permit holders already suffering from economic pressure would be difficult unless a referendum of the affected fishermen supported the measure. By analogy, the legislature required a favorable vote by 2/3's of all permit holders before a salmon fishery association could institute an assessment for the purpose of fleet consolidation. AS 43.76.230.

investment in a buy-back program. Without a funding mechanism for a front-loaded purchase and retirement of permits, such a program may attract little support from the permit holders. A buy-back program under the Limited Entry Act would be entirely voluntary.²⁶

Additionally, the commission has never performed an optimum number study for a set net fishery, and doing so could be problematic. The commission's research staff warns of difficulties with data in a set net fishery, where landings attributable to a number of entry permits may be recorded under only a single permit.

Finally, regulatory intervention in the Cook Inlet drift and set net fisheries may hinder efforts to conduct a meaningful optimum number study. The *Vanek* case documents the fact that, from 1996 through 2002, the Alaska Board of Fisheries reduced fishing opportunities available to both the drift and set net fisheries.²⁷ However, well before the period of time addressed in the *Vanek* case, there was considerable pressure on the Board to restrict fishing in these two fisheries. In response, by 1990, the Entry Commission made the Cook Inlet drift and the Cook Inlet set net fisheries high priorities for completing adjudications of pending applications, in order to reduce participants to the maximum numbers as soon as practicable.

This kind of human, regulatory intervention in the Cook Inlet drift and set net fisheries may create an obstacle to a meaningful optimum number analysis. In determining optimum numbers, CFEC normally gathers all of the data and creates models in an attempt to anticipate the effects of known variables that respond to natural and market conditions. In previous optimum number studies, variables like price and availability of the resource generally change according to cycles within a range that can be determined, while the regulatory treatment remains fairly constant. In contrast, the regulatory treatment of these Cook Inlet fisheries presents a moving target of a different nature. Projecting the effects of this variable into the future would be very difficult and could undermine the utility of an optimum number study.²⁸

²⁶ AS 16.43.300(b).

²⁷ *Vanek v. Alaska Board of Fisheries*, AK Supreme Court No. S-12579, Opinion No. 6308 (Sept. 19, 2008) at pps. 2-4.

²⁸ Other buy-back related issues include the substantial cost of retiring unfished permits and the likelihood that unrestrained fishing power could dissipate favorable effects of buy-back over time.

C. A Private Alternative to the Formal Buy-Back Program

As discussed above, buy-back under the Limited Entry Act is a cumbersome and issue-laden remedy. The Limited Entry Act, however, also facilitates a much simpler opportunity to buy out limited entry permits. Under AS 16.43.150(i), any permit holder may relinquish his permit back to the state. Because fishermen have this power, anyone could pay a permit holder to relinquish the individual's entry permit. In fact, this is the statutory tool recently employed by the Southeast Revitalization Association to retire 35 permits from the Southeast salmon purse seine fishery--so far the only buy-back program undertaken in Alaska.

The simplicity of this private approach, however, does not eliminate the major constitutional issue. A private buy-back program would still run the risk of creating a fishery too exclusive under the state constitution, thereby requiring the state to put more permits back into the fishery.²⁹

IV. CONCLUSION

A buy-back program for permits in a limited fishery is authorized under the Limited Entry Act, but only if the statutory and constitutional purposes of limited entry would be served by the program. Roughly, the statutory purposes that must be served by a buy-back program are to produce a well conserved, economically healthy fishery with a sufficient number of participants to protect the reliance interests of those dependent on the fishery. The statutory purposes also suggest a long-term commitment to the well-being of the fishery and its participants.

A private opportunity for buying out limited entry permits is also authorized by the Limited Entry Act but subject to the same constitutional constraints. Under either scenario, the numbers of permits in a fishery could be reduced to a point where the fishery became too exclusive under the State Constitution requiring the state to put more permits back into the fishery.

If buy-back under the Limited Entry Act does not meet the needs of the Cook Inlet Salmon Task Force, or, if the Task Force agrees upon goals different from the enumerated purposes for buy-back authorized by the Limited Entry Act, new legislation may be required.

²⁹ *Johns* 758 P.2d at 1266.

State of Alaska
Commercial Fisheries Entry Commission
Permit Statistics for Alaska's Cook Inlet Drift Gillnet Limited Entry Salmon Fishery: 1998 - 2007

June 4, 2008

Fishery Description	Year	Permit Residency	Permits Issued	Permits Fished	Permits		Total Pounds Harvested	Estimated Gross Earnings	Permit Value
					Not Fished	% Not Fished			
S 03H Salmon, Drift Gillnet, Cook Inlet	2007	Resident	401	297	104	25.9	13,409,028	\$12,973,923	\$29,200
		Nonresident	170	120	50	29.4			
		Year Totals	571	417	154	27			
	2006	Resident	400	293	107	26.8	6,125,229	\$5,159,160	\$28,800
		Nonresident	170	103	67	39.4			
		Year Totals	570	396	174	30.5			
	2005	Resident	405	334	71	17.5	17,142,608	\$15,344,259	\$39,300
		Nonresident	166	137	29	17.5			
		Year Totals	571	471	100	17.5			
	2004	Resident	400	313	87	21.8	19,336,476	\$11,801,740	\$20,300
		Nonresident	171	127	44	25.7			
		Year Totals	571	440	131	22.9			
	2003	Resident	396	293	103	26	10,891,761	\$6,329,162	\$15,700
		Nonresident	176	125	51	29			
		Year Totals	572	418	154	26.9			
	2002	Resident	394	284	110	27.9	12,635,440	\$5,686,049	\$11,700
		Nonresident	178	125	53	29.8			
		Year Totals	572	409	163	28.5			
	2001	Resident	395	323	72	18.2	6,255,845	\$3,711,269	\$22,300
		Nonresident	179	144	35	19.6			
		Year Totals	574	467	107	18.6			
	2000	Resident	391	347	44	11.3	6,414,163	\$4,438,593	\$32,300
		Nonresident	186	166	20	10.8			
		Year Totals	577	513	64	11.1			
	1999	Resident	391	336	55	14.1	10,395,737	\$12,134,809	\$25,200
		Nonresident	185	151	34	18.4			
		Year Totals	576	487	89	15.5			
	1998	Resident	395	361	34	8.6	5,406,367	\$4,303,378	\$42,000
		Nonresident	186	167	19	10.2			
		Year Totals	581	528	53	9.1			

Notes:

Data for 2007 are preliminary and may be incomplete.
 Data are considered confidential when fewer than four people participated in a fishery.
 Selected data fields are represented by "0" when no activity has occurred in a fishery (i.e., closure).
 Gross earnings are estimated using an average annual ex-vessel price per area, species and gear type.
 These data are aggregated by type of permit fished, and thus contain both targeted and incidentally landed species.
 Data includes only commercial catch landed on valid permits. Data associated with test fishing, illegal landings, derbies, hatchery cost recovery fishing, educational permits or unmatchable permits are excluded.
 Percentages of permits not fished are calculated within each resident category.

**Table 1a. Distribution of Cook Inlet Salmon Drift Gillnet Permit Holders by Resident Category:
Initial Issuance and Yearend 2007**

	Resident	Non-Resident	Total
Permits Initially Issued	386	187	573
Yearend 2007 Permits Held	398	173	571

**Table 1b. Geographic Distribution of Cook Inlet Salmon Drift Gillnet Permit Holders by Resident Category:
Initial Issuance and Yearend 2007**

	ARL	AUL	ARN	AUN	NR	Total
Permits Initially Issued	167	11	197	11	187	573
Yearend 2007 Permits Held	221	6	156	15	173	571

ARL: Alaska resident of a Rural community which is Local to the fishery for which the permit applies;
 ARN: Alaska resident of a Rural community which is Nonlocal to the fishery for which the permit applies;
 AUL: Alaska resident of an Urban community which is Local to the fishery for which the permit applies;
 AUN: Alaska resident of an Urban community which is Nonlocal to the fishery for which the permit applies;
 NR: Nonresident of Alaska;

State of Alaska
Commercial Fisheries Entry Commission
Permit Statistics for Alaska's Cook Inlet Set Gillnet Limited Entry Salmon Fishery: 1998 - 2007
June 4, 2008

Fishery Description	Year	Permit Residency	Permits		Permits		Total Pounds Harvested	Estimated Gross Earnings	Permit Value
			Issued	Fished	Not Fished	% Not Fished			
S 04H Salmon, Set Gillnet, Cook Inlet	2007	Resident	618	405	213	34.5	10,258,292	\$10,450,349	\$14,000
		Nonresident	120	78	42	35			
		Year Totals	738	483	255	34.6			
	2006	Resident	616	405	211	34.3	8,935,533	\$8,591,257	\$12,500
		Nonresident	122	77	45	36.9			
		Year Totals	738	482	256	34.7			
	2005	Resident	615	418	197	32	16,625,895	\$15,407,868	\$10,000
		Nonresident	122	81	41	33.6			
		Year Totals	737	499	238	32.3			
	2004	Resident	621	407	214	34.5	15,504,196	\$11,120,561	\$7,600
		Nonresident	118	74	44	37.3			
		Year Totals	739	481	258	34.9			
	2003	Resident	618	408	210	34	12,119,220	\$8,086,607	\$8,600
		Nonresident	124	64	60	48.4			
		Year Totals	742	472	270	36.4			
	2002	Resident	620	425	195	31.5	10,987,787	\$5,547,596	\$8,000
		Nonresident	123	71	52	42.3			
		Year Totals	743	496	247	33.2			
	2001	Resident	623	421	202	32.4	6,608,371	\$4,081,429	\$10,600
		Nonresident	121	84	37	30.6			
		Year Totals	744	505	239	32.1			
	2000	Resident	622	446	176	28.3	5,490,871	\$4,319,800	\$12,200
		Nonresident	123	87	36	29.3			
		Year Totals	745	533	212	28.5			
	1999	Resident	618	465	153	24.8	7,809,505	\$9,993,704	\$13,200
		Nonresident	127	91	36	28.3			
		Year Totals	745	556	189	25.4			
	1998	Resident	620	469	151	24.4	5,670,497	\$4,351,636	\$20,600
		Nonresident	125	90	35	28			
		Year Totals	745	559	186	25			

Notes:

Data for 2007 are preliminary and may be incomplete.
Data are considered confidential when fewer than four people participated in a fishery.
Selected data fields are represented by "0" when no activity has occurred in a fishery (i.e., closure).
Gross earnings are estimated using an average annual ex-vessel price per area, species and gear type.
These data are aggregated by type of permit fished, and thus contain both targeted and incidentally landed species.
Data includes only commercial catch landed on valid permits. Data associated with test fishing, illegal landings, derbies, hatchery cost recovery fishing, educational permits or unmatchable permits are excluded.
Percentages of permits not fished are calculated within each resident category.

**Table 2a. Distribution of Cook Inlet Salmon Set Gillnet Permit Holders by Resident Category:
Initial Issuance and Yearend 2007**

	Resident	Non-Resident	Total
Permits Initially Issued	690	56	746
Yearend 2007 Permits Held	608	130	738

**Table 2b. Geographic Distribution of Cook Inlet Salmon Set Gillnet Permit Holders by Resident Category:
Initial Issuance and Yearend 2007**

	ARL	AUL	ARN	AUN	NR	Total
Permits Initially Issued	202	16	446	26	56	746
Yearend 2007 Permits Held	243	14	349	2	130	738

ARL: Alaska resident of a Rural community which is Local to the fishery for which the permit applies;
 ARN: Alaska resident of a Rural community which is Nonlocal to the fishery for which the permit applies;
 AUL: Alaska resident of an Urban community which is Local to the fishery for which the permit applies;
 AUN: Alaska resident of an Urban community which is Nonlocal to the fishery for which the permit applies;
 NR: Nonresident of Alaska;

DECISION RULES USED TO DESIGNATE URBAN, RURAL, LOCAL, AND NONLOCAL

Urban and rural designations are based upon the most recent information from Census 2000. During this cycle, the Census Bureau significantly changed its method of classifying areas as rural or urban. In general, there are now more Alaska places designated as rural, and consequently more permits issued and held by rural residents.

Urban and Rural Classification

For Census 2000, the Census Bureau classifies as "urban" all territory, population, and housing units located within an urbanized area or an urban cluster. It delineates these boundaries to encompass densely settled territory, which consists of:

1. Core census block groups or blocks that have a population density of at least 1,000 people per square mile and
2. Surrounding census blocks that have an overall density of at least 500 people per square mile

The Census Bureau's classification of "rural" consists of all territory, population, and housing units located outside of urbanized areas or urban clusters. Geographic entities, such as census tracts, counties, metropolitan areas, and the territory outside metropolitan areas, often are "split" between urban and rural territory, and the population and housing units they contain often are partly classified as urban and partly classified as rural.

Local/Nonlocal

The local/nonlocal distinction is linked to Commercial Fisheries Entry Commission administrative areas that are based on regulatory boundaries of the fishery. Coastal communities as well as some inland communities are considered local to the Cook Inlet set gillnet and drift gillnet salmon fisheries.

The Cook Inlet local area includes all but the eastern edge of the Anchorage Borough. The line dividing the Cook Inlet and Prince William Sound ADF&G regulatory areas is extended inland directly north. That is, the line runs from Cape Fairfield at 148°50'W, north to 61°32'N (just north of Bodenbug Butte and south of Palmer) and then west to 150°30'W (to the community of Susitna) and thereafter follows, at a little distance inland, the western shore of Cook Inlet, ending at Cape Douglas.¹

Alaska cities considered local to the Cook Inlet set gillnet and drift gillnet salmon fisheries are listed in the following table:

¹ "Changes in the Distribution of Alaska's Commercial Fisheries Entry Permits, 1975-2007" CFEC Report Number 08-5N, Appendix A.

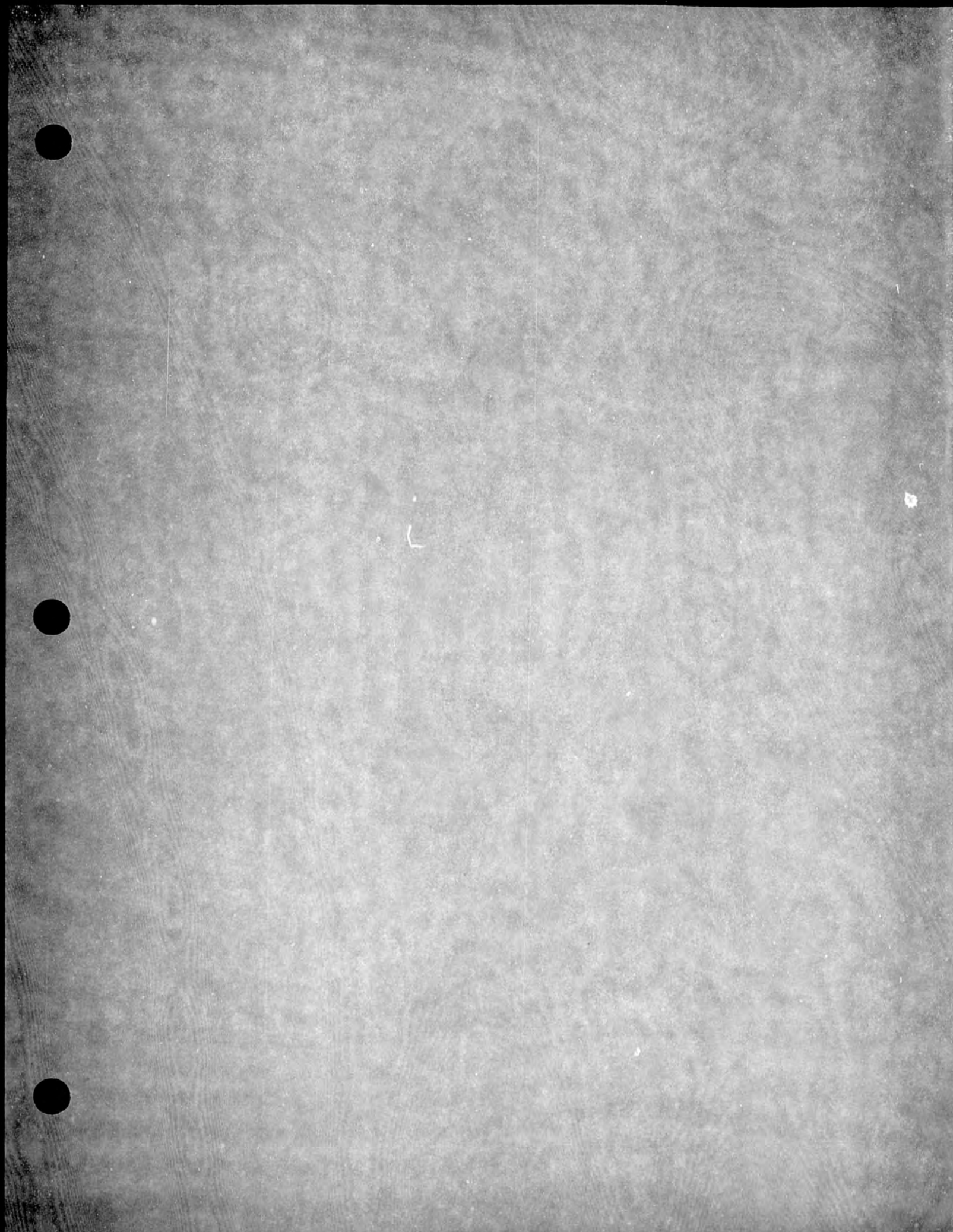
Alaska Cities Considered Local to the Cook Inlet Set and Drift Gillnet Salmon Fisheries

Census Area	City	Zip Code	City Population	Rural / Urban Indicator
Anchorage Municipality	Anchorage	99501 - 99509, 99511 - 99524, 99599	260283	U
	Birchwood	99577	260283	U
	Bird Creek	99540	260283	U
	Chugiak	99567	260283	U
	Eagle River	99577	260283	U
	Eklutna	99577	260283	U
	Elmendorf AFB	99506	260283	U
	Fire Island	99506	260283	U
	Fire Lake	99577	260283	U
	Fort Richardson	99505	260283	U
	Girdwood	99587	260283	U
	Indian	99540	260283	U
	Kern	99510	260283	U
	Peters Creek	99577	260283	U
	Portage	99587	260283	U
	Potter	99510	260283	U
	Rainbow	99510	260283	U
	Spenard	99509	260283	U
Kenai Peninsula Borough	Anchor Point	99556	1845	R
	Bear Cove	99603		R
	Bear Creek		1748	R
	Beluga		32	R
	Beluga River	99682		R
	Chenik			R
	Clam Gulch	99568	173	R
	Cohoe	99669	1168	R
	Cooper Landing	99572	369	R
	Crown Point		75	R
	Diamond Ridge		1802	R
	English Bay	99603		R
	Fox River		616	R
	Fritz Creek	99603	1603	R
	Funny River		636	R
	Grouse Creek Group			R
	Halibut Cove	99603	35	R
	Happy Valley		489	R
	Homer	99603	3946	R
	Hope	99605	137	R
	Jakolof Bay	99603		R
	Kachemak	99603	431	R
	Kalifornsky	99611		R
	Kalifornsky		5846	R
	Kasilof	99610	471	R
	Kasitsna Bay	99603		R
	Kenai	99611	6942	U
	Kustatan			R
	Lowell Point		92	R
	Miller Landing		74	R

Alaska Cities Considered Local to the Cook Inlet Set and Drift Gillnet Salmon Fisheries

Census Area	City	Zip Code	City Population	Rural / Urban Indicator
Kenai Peninsula Borough	Moose Pass	99631	206	R
	Nanwalek	99603	177	R
	Nikishka	99635		R
	Nikiski	99635	4327	R
	Nikolaevsk	99556	345	R
	Ninilchik	99639	772	R
	Port Graham	99603	171	R
	Portlock	99603		R
	Primrose		93	R
	Red Mountain	99663		R
	Ridgeway		1932	R
	Salamatof	99611	954	R
	Seldovia	99663	286	R
	Seldovia Village	99663	144	R
	Seward	99664	2830	R
	Soldotna	99669	3759	U
	Sterling	99672	4705	R
	Sunrise	99669	18	R
	Tyonek	99682	193	R
Matanuska-Susitna Borough	Alexander			R
	Alexander Creek			R
	Big Lake	99652	2635	R
	Bodenburg Butte	99645		R
	Butte		2561	R
	Gateway		2952	R
	Knik	99687		R
	Knik River		582	R
	Knik-Fairview		7049	R
	Lakes		6706	U
	Palmer	99645	4533	U
	Point Mackenzie		111	R
	Susitna		37	R
	Wasilla	99654, 99687	5469	U

Attachment C
(3 of 3)



STATE OF ALASKA

SARAH PALIN, GOVERNOR

DEPARTMENT OF FISH AND GAME

DIVISION OF COMMERCIAL FISHERIES DIVISION OF SPORT FISH

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ISSUES RELATED TO THE 2008 UPPER COOK INLET SALMON SEASON

Members of the public spanning an array of individuals, organizations, and interests raised questions about various aspects of salmon fisheries management by the Alaska Department of Fish and Game (department) in Upper Cook Inlet during 2008. This document was prepared by staff from Commercial Fisheries and Sport Fish divisions in an attempt to answer several of the major questions that were received, improve understanding, and broadly communicate the department's rationale for those management actions this season. Questions and responses are grouped together based on whether they primarily apply to the commercial or sport fisheries recognizing there is significant overlap on several issues.

COMMERCIAL FISHERIES

Issue 1. Please address the assertion that the department told the Alaska Board of Fisheries (board) it was not going to use the Bendix sonar counter to monitor the Yentna River sockeye salmon escapement in 2008; please explain where in the board meeting transcripts it says the department would manage for the Yentna River sockeye salmon escapement goal as counted by Bendix sonar; please explain allegations that the department told the board that: 1) DIDSON (Dual Frequency Identification Sonar) would be used in conjunction with weirs to monitor Yentna River escapement, 2) that the Yentna River sockeye salmon escapement goal was not based on Bendix sonar counts, and 3) Bendix sonar counts could not be used as an index of escapement into the Yentna River.

Response: While there were numerous discussions of the shortcomings of the Bendix sonar counts during the February 2008 board meeting, the department was clear on the record that it did not yet have an adequate database to allow immediate transition to DIDSON. At the time of the board meeting there were only 2 years of paired counts for Bendix sonar and DIDSON. Similarly, there were only 2 years of comparative counts for the weirs relative to both sonars and only 1 year of accompanying counts for sonar, weir, and mark/recapture comparison. While this information indicated the Bendix sonar

counts were low relative to other counting methods, there was not enough data upon which to base a revision of the escapement goal or a transition to an alternative enumeration method.

The escapement goal report (Review of salmon escapement goals in Upper Cook Inlet, 2007) is available at:

http://www.boards.adfg.state.ak.us/fishinfo/meetinfo/2007_2008/uci/uciescapgoalre.pdf), which was presented orally and in writing to the board, recommended no change to the Yentna River sockeye salmon escapement goal. The Susitna River sockeye salmon action plan advanced by the department and approved by the board at the February 2008 meeting clearly indicated that Bendix sonar would continue to be used to estimate fish passage and that the department objective was to continue comparing Bendix sonar and DIDSON estimates. The department indicated to the board during deliberations on Proposal 163 (February 12, 2008) that it would manage for the escapement goal range of 90,000 to 160,000 sockeye salmon to the Yentna River. This goal is based on the historical data set of Bendix sonar counts.

There was no discussion during board deliberations of simply changing the methodology of counting sockeye salmon while retaining the existing goal. Also, there was no decision by the board to allow the drift fleet to fish according to the regulations regardless of what the resultant escapement might be relative to the established goal. As explained in Record Copy (RC) 12 and during discussion of the action plan, the department was still evaluating the DIDSON system as a replacement for the Bendix sonar. The information presented to the board on the DIDSON, mark-recapture estimates, and lake productivity was clearly preliminary. These studies will continue during this period of equipment transition and assessment, likely for at least one more year.

The department is currently conducting a thorough review of the Yentna River sockeye salmon goal. The intent of this exercise is to determine the most appropriate escapement goal given new information that indicates not only that the Bendix sonar counts are different from weir, mark/recapture, and DIDSON counts, but that the distribution of spawners within the drainage also appears to have changed from when the original goal was set. This analysis must also consider difficulties associated with run reconstruction and species apportionment of the sonar counts.

Issue 2. Why was the drift gillnet fleet restricted on July 10? What new and significant inseason information was used to justify this restriction?

Response: The department has flexibility to use emergency order authority to manage salmon fisheries to achieve escapement goals. The board's intent to give the department better tools for meeting escapement goals and the authority to use them was clearly a major theme of the February 2008 board meeting. In the past, the department has invoked multiple closures or restrictions within both the Upper Cook Inlet commercial drift fishery and the Northern District set gillnet fishery to achieve the Yentna River sockeye salmon sustainable escapement goal of 90,000 to 160,000 fish. Even with these

restrictions, the department has failed more often than not to meet the goal. With the run projection for 2008 being similar to the last several years, the department determined that restrictions beyond those in regulation would be necessary to achieve this goal. Because of the time lag between Cook Inlet fisheries and sockeye salmon passage at the Yentna River sonar location, and the below average run projection, it was determined that the July 10 drift period restriction to the Kasilof Section, rather than allowing drift gillnet fishing in all of Drift Area 1, was necessary this year. The final Yentna River sockeye salmon escapement was estimated at a minimum of 90,180 fish.

Issue 3. Didn't the July 10 drift restriction violate the court decision in the Peninsula Marketing Association (PMA) case? What authority does the commissioner have to take this action given the ruling by the Alaska Supreme Court in the PMA case?

Response: The department's action did not conflict with the PMA decision because the department did not overrule a board decision. While the board rejected proposals for drift fleet restrictions that would have been applicable every year, it was careful to maintain the department's flexibility to use emergency order authority to manage the fisheries for the purpose of meeting escapement goals. The Yentna River sockeye salmon escapement goal is a long established goal that the department did not recommend changing. Neither did the board adopt an Optimal Escapement Goal to supersede the department's goal. Again, the board clearly intended to give the department better tools for meeting escapement goals and the authority to use those tools.

Issue 4. Why was a complete Yentna River sockeye salmon escapement goal review not performed before the 2008 season?

Response: Departmental staff from both Commercial Fisheries and Sport Fish divisions did a complete review of all Cook Inlet escapement goals prior to the February 2008 board meeting. This review was published in November 2007 in response to specific public commitments to have a number of important board reports available approximately 2 months before the meeting. As a result of this review no change was recommended to the Yentna River sockeye salmon escapement goal. At the time of the review, there was insufficient data upon which to base a change in the goal. Even at the time of the board meeting, there was still insufficient data upon which to base a change in the goal. As stated in the response to Issue 1, the department made it clear during the meeting that it did not yet have an adequate database to allow immediate transition to DIDSON, and that management for weir counts alone was problematic because of the increased lag time between the fishery and the weirs. Also, the department does not know what portion of the total Yentna River sockeye salmon escapement is monitored with weirs.

After reviewing available information, public process requirements of the regulations (5 AAC 39.223 (b) (8) and (9)), and available staff time, the department made the decision to undergo a reanalysis of the escapement goal during the fall and winter of 2008/2009.

Issue 5. Why didn't the department take more aggressive management action in the commercial fishery (e.g. opening the Kasilof River Special Harvest Area (KRSHA), fishing into windows, and allowing set nets to fish out past ½ mile) at the same time as the Kasilof River Personal Use (PU) dipnet area was expanded and the Kasilof River sport fish bag limit was increased?

Response: The KRSHA may be used for harvesting of salmon by gillnets when it is projected that the Kasilof River sockeye salmon escapement will exceed 275,000 fish. However, the board directed the department that the KRSHA should rarely, if ever, be opened and only for conservation reasons. In 2008, there were conservation concerns for Kenai River late-run sockeye salmon beginning in mid-July. Management actions taken after July 15, outlined in this response, were taken to promote harvest of sockeye salmon bound for the Kasilof River, while reducing the harvest potential of Kenai River bound stocks. Final sockeye salmon sonar passage on the Kenai River was only 615,000 fish compared to the final inriver run goal of 650,000 to 850,000. Beginning July 15, 2008, set gillnetting in the Kasilof Section of the Upper Subdistrict was only allowed within ½ mile of the mean high tide mark on the Kenai Peninsula shoreline. This was intended to concentrate commercial harvests to the extent possible on Kasilof River sockeye salmon stocks. Beginning July 27, commercial fishing was limited to the KRSHA. This was to further reduce the incidental commercial catch of Kenai River late-run sockeye salmon because this salmon run in 2008 appeared to be much smaller than forecast based on escapement passage rates and the Offshore Test Fish program. While the Kenai River sockeye salmon run was weak, the escapement rate of sockeye salmon into the Kasilof River was proceeding at a rate greater than that needed to assure optimum escapement levels.

Issue 6. Why didn't the department close statistical area 245-70 from July 16 through August 10 as some believe the board intended during its 2005 meeting?

Response: The department has interpreted the board's action in 2005 to mean drift gillnet fishing is to be restricted to Drift Areas 1 and 2 for two of the regular periods between July 16 and July 31. During 2008, there were five regular periods during these two weeks. Closing Statistical Area 245-70 from July 16 through August 10 would essentially have restricted drift gillnet fishing to Drift Areas 1 and 2 for all seven periods between July 16 and August 10, rather than just 2 periods.

After reviewing the regulation, recordings, and documentation from the 2005 Upper Cook Inlet Board of Fisheries meeting, as well as materials considered by the board in 2008, the department, in consultation with Department of Law, determined that the interpretation previously adopted by the department was the only reasonable interpretation. The board's action pertaining to Drift Areas 1 and 2 would have little if any effect if the intent was to exclude Statistical Area 245-70 (which is to the west of Drift Area 2) from areawide openings rather than just from Drift Area 1 and 2 openings.

In the board's action on Proposal 83 at the 2008 meeting, the board took up and adopted RC 187, which set out the full text of 5 AAC 21.353 and made several amendments to it. During the course of the proposal deliberations, despite the focus primarily on coho, there were discussions of impacts on sockeye harvests and the department believes the board was clearly on notice as to how the regulation had been interpreted and implemented. The board's adoption of this proposal without changing the regulatory language relating to the July 16-31 restrictions indicates that the board agreed with the regulatory language reflecting the decisions made at the 2005 meeting.

The department has filed a technical correction to more clearly reflect the board's intent that only 2 openings during the July 16-31 time period will normally be restricted. In 2008, the last Upper Cook Inlet wide drift gillnet period occurred on July 24.

Issue 7. Given the very poor return of king salmon to Upper Cook Inlet through mid-June, 2008, why did the department initially ban use of bait to manage the Deshka River king salmon sport fishery rather than close the fishery; why did the department close the Alexander Creek drainage to king salmon sport fishing rather than restrict or close the commercial gillnet fishery; why doesn't ADF&G require genetic sampling of commercial catches to verify the destinations of the fish caught?

Response: The Division of Sport Fish often takes iterative or step-down measures to reduce harvest potential rather than closing a fishery completely. Given the uncertainty of run timing of Deshka River king salmon in 2008, restricting the use of bait was used as a step-down measure to diminish the harvest of king salmon while the department continued to monitor run strength. The sport fishery was later closed beginning at 11:00 p.m. on Friday June 20 when it became clear that run strength was weak.

The king salmon run to Alexander Creek was poor in 2006 and even lower in 2007; however, other westside Susitna River king salmon escapement goals were met or exceeded both years. If commercial fishing had a significant role in the poor runs of Alexander Creek king salmon, escapements in the other tributaries would have also been poor. This indicates that the run failures of king salmon to Alexander Creek are likely the result of drainage specific circumstances.

Most of the king salmon harvest occurring in northern Cook Inlet is by sport anglers. The Northern District set gillnet commercial fishery harvest is generally only about 2 to 3 percent of the entire run of king salmon to northern Cook Inlet streams. The Northern District king salmon commercial fishery operates with very limited time and gear. During 2008, there were 5 regularly scheduled 12-hour fishing periods, except for the most productive waters from the Theodore River to the Susitna River, which were open for only one period. During 2008, this fishery was closed on 23 and 26 June to reduce harvest of northern Cook Inlet king salmon because of the closure to sport fishing in the Deshka River.

The department is currently collecting genetic baseline data from king salmon that, hopefully in the future, will allow sampling commercial fisheries as well as marine sport fisheries to estimate stock-specific contribution to the harvest.

SPORT FISHERIES

Issue 1. What was the rationale for liberalizing the Kasilof River sockeye salmon sport and personal use fisheries; these fisheries were expanded for the remainder of the season with a six fish bag limit in the sport fishery and personal use dip netting to the Sterling Highway Bridge while the commercial drift gillnet fishermen believe they were often restricted; how was the department able to project exceeding the escapement goal in mid-July when these fisheries were liberalized?

Response: As provided for in 5 AAC 75.003 EMERGENCY ORDER AUTHORITY (2)(A), the department has emergency order authority to increase sport fish bag and possession limits when the total escapement is projected to exceed the escapement goal and the total harvest under the increased bag and possession limit will not reduce the escapement below the goal. The authority to modify the personal use fishery is provided by "AS 16.05.060 EMERGENCY ORDERS. (a). This chapter does not limit the power of the commissioner or an authorized designee, when circumstances require, to summarily open or close seasons or areas or to change weekly closed periods on fish or game by means of emergency orders."

By mid-July, sockeye salmon passage into the Kasilof River continued at a rate that could have jeopardized staying below the upper end of the escapement goal range without a reduction in the rate of escapement. Expanding the area open to dip net fishing and increasing the sport fish bag and possession limits were used, in conjunction with fishing set gillnets in the Kasilof Section within ½ mile of shore beyond the time provided for in management plans, in an effort to slow the rate of sockeye salmon escapement into this system.

The best inseason information available early in the season are the sonar counts and the commercial harvest. In 2008, this combination gave general indications that the Kasilof River sockeye salmon run would at least equal, if not exceed, the forecast. The passage estimate through July 16 was 158,000 sockeye salmon, 8,000 fish more than the lower end of the escapement goal range. These counts occurred while the commercial fishery was operating in excess of the 51 emergency order hours specified in the Late Run Kenai River sockeye salmon management plan in the Kasilof Section, out to ½ mile. The combination of high inriver sonar passage rates while there was substantial fishing pressure, and with historically half the run still remaining, gave the indication that the Kasilof River sockeye salmon escapement would be near or exceed the upper end of the optimal escapement goal (OEG). The same information used by the department to allow fishing time in excess of 51 hours of emergency order time in the Kasilof Section within ½ mile was also used to increase the bag limit in the sport fishery and extend the area open to the personal use dip net fishery.

Although the emergency orders to liberalize the Kasilof River personal use and sport fisheries were posted just before Announcement #21 which brought the total setnet commercial fishery emergency order hours for that week up to 56 hours, 5 hours in excess of that specified in the management plan, discussions occurred throughout the week among Sport Fish and Commercial Fisheries staff at the area, region, and headquarters levels so that staff in both divisions were aware of these various management actions.

Issue 2. Please explain under what authority ADF&G can override regulation 5 AAC 75.003 relative to bag and possession limit alteration when an existing management plan prohibits such actions. Examples of such actions during the 2008 season include the elimination of bait for Deshka River Chinook salmon and the increase in bag limit for coho salmon on the Little Susitna River.

Response: The regulatory sport fish emergency order authority provision (5 AAC 75.003) is not clearly written, but there is good justification for the department adjusting methods, means, and bag limits to meet escapement goals.

The emergency order authority provision is internally inconsistent. The introductory paragraph, read in isolation, would seem to prohibit changing a bag limit or methods and means anytime that the bag limit or method and means is stated in a regulation designated as a management plan. However, the following provisions, (1) and (2) clearly indicate that the commissioner may use changes to bag limits, methods, and means to manage for escapement goals. Salmon management in Alaska is based on achieving escapement goals and it makes little sense to ignore the two provisions that clearly give the department the tools necessary to meet this objective. In the case of Little Susitna coho salmon the Little Susitna River Coho Salmon Management Plan (5 AAC 60.170) (b) clearly states "The department shall manage the sport fishery in the Little Susitna River to obtain an escapement goal of 10,100 – 17,700 non-hatchery coho salmon into the Little Susitna River upstream of the Parks Highway Bridge."

These internal inconsistencies may be resolved by interpreting the introductory paragraph to only prohibit an emergency order under this section where there are explicit provisions in the plan for increasing or decreasing a bag limit or changing methods and means.

To fully resolve the issue and prevent future uncertainty the board could consider changes to the regulatory language in the first paragraph of 5 AAC 75.003, consistent with this interpretation to read:

"The commissioner may, by emergency order, change bag and possession limits and annual limits and alter methods and means in sport fisheries. These changes may not reduce the allocation of harvest among other user groups. An emergency order may not supersede provisions for increasing or decreasing bag and possession limits or changing methods and means established in regulatory management plans established by the Board of

Fisheries. The commissioner will use emergency order authority to manage sport fishing opportunity in the following circumstances. . ."

Issue 3. If fishing restrictions are imposed inseason on the commercial fishing fleet for conservation purposes, shouldn't the burden be shared by all users of the Kenai River salmon resource? What is the department's position on whether harvest restrictions for conservation of salmon headed to the Kenai River will be shared by all users or if the burden will be unilaterally imposed on commercial harvesters?

Response: The various commercial net fisheries, the sport fishery, and the personal use fishery all have distinct characteristics, and they are subject to separate controls within board-approved management plans. All of them are to be managed to help assure attainment of escapement goals, but by virtue of their distinctive character and separate regulatory controls, they are not all managed in exactly the same way.

In this case, sport fishing for sockeye salmon, including catch-and-release fishing, was closed downstream of the Kenai River sockeye salmon sonar counter, effective 12:01 a.m., Friday August 1 (EO #2-RS-1-24-08). The personal use fishery closed by regulation at essentially the same time. In addition, the sockeye salmon bag and possession limit was reduced to one fish upstream of the Kenai River sonar counter, effective 12:01 a.m., Wednesday, August 6 (EO #2-RS-1-25-08). These restrictions were part of an effort by the department, which also included a reduction in commercial fishing, to achieve an optimal escapement goal of 500,000 – 1,000,000 spawning sockeye salmon.

Issue 4. Please explain why the Sport Fish Emergency Order (2-RS-1-24-08) on July 30 referenced an inriver run goal for Kenai River sockeye salmon of 750,000 to 950,000, when subsequently the inriver run goal was adjusted to 650,000 to 850,000; why was the sport fishery above the Soldotna bridge reduced to a one fish bag and possession limit when some department staff were questioning whether the sonar count would reach 650,000.

Response: Inriver run goals for the Kenai River late-run sockeye salmon are linked to projected run size. When the run is projected to be between 2 million and 4 million fish, the inriver run goal is 750,000 to 950,000 fish. Based on the preseason run projection, the Kenai River inriver run goal was 750,000 to 950,000 fish. In late July the department uses available inseason information including commercial catch, escapement, and Offshore Test Fish project results to make a final projection for Kenai River late-run sockeye salmon run strength. In 2008, staff met on July 29 to make the final inseason projection. Because of the uncertainty in the data, it was not possible to determine with confidence whether the run would be less than 2 million or just over 2 million. Staff decided to wait until after the Offshore Test Fish project was completed on July 31 to make a final inseason projection. Therefore on July 30, the inriver run goal was still 750,000 to 950,000.

On August 1, staff made the projection that the Kenai River late-run sockeye salmon run strength was slightly less than 2 million fish. Based on this projection, the inriver run goal changed to 650,000 to 850,000 fish per regulation for a run less than 2 million. The sport fishery above the bridge is managed such that the lower bound of the OEG of 500,000 fish will be achieved, not the 650,000 to 850,000 inriver run goal. Given the characteristics of the fishery and likely harvest that would occur, the department reduced the bag limit above the sonar to one fish effective August 6, 2008. At that time, neither Division was confident enough that the 650,000 fish minimum goal would not be met to close all fishing for the remainder of the season.

Issue 5. Why did the Palmer Sport Fish division staff observe the drift fleet from the air?

Response: This flight was a training exercise for a junior staff member in the Palmer office who was becoming better educated on what the Central District drift gillnet fishery looks like when operating.

Issue 6. It appears that every year the king salmon sonar estimates spike as soon as sockeye salmon enter the river and the escapement estimate for king salmon is therefore flawed; how are counts of small kings, known as jacks, accounted for in the sonar enumeration and escapement goal determination? This has become a crucial issue because some people believe larger king salmon have been eliminated from the river by overfishing in both commercial and sport fisheries.

Response: Regarding the Kenai River king salmon sonar estimates, the department has long admitted that the Kenai River king salmon sonar estimates are inflated to some degree by presence of sockeye salmon. This occurs because of difficulties identifying sockeye and king salmon with the sonar gear, and the overlap in run timing of these two species. Kenai River king salmon sonar project biologists and crew do their best to make this problem as small as possible. However, there is no clear relationship between daily king salmon sonar estimates observed at river mile 8.5 and the Kenai River sockeye salmon sonar estimates observed at river mile 19 when the estimates are lagged 1-2 days (i.e., the department assume it takes 1 to 2 days for sockeye to migrate from mile 8.5 to mile 19). In other words, if sockeye salmon dramatically influenced estimates of king salmon abundance, then trends in king salmon estimates lagged a day or two should mirror trends in sockeye salmon estimates. At times this does occur, but not on a very consistent basis.

The same is true on an annual basis. Again, if sockeye salmon were dramatically influencing estimates of king salmon abundance, then years of high sockeye salmon abundance inriver would result in relatively high king salmon sonar estimates, and years of low sockeye salmon abundance inriver would result in relatively low king salmon abundance estimates. This is also not seen on a consistent basis.

Second, regarding age composition of the run, it is likely some jack king salmon are included in the sonar estimates. Jack king salmon are usually observed primarily in early July. In fact, when it appears there are small king salmon in the sonar, small king salmon

are also caught in the Kenai River king salmon netting project conducted at river mile 8.5. However, jack king salmon make up a very small percentage of the inriver abundance of Kenai River king salmon.

Late-run Kenai River king salmon are predominantly age-1.3 and 1.4. This means they spend 1 year as a young fish in freshwater, 3-4 years in the ocean, plus time spent in the gravel, so in terms of total age these fish are 5 and 6 year old fish. These two age classes comprise 70 to 80%, if not more, of the run each year. If these age classes were overharvested in commercial and sport fisheries, then one would expect the proportion of these age classes in the escapement to be lower than the proportion of these age classes in the total run. This has not occurred. Data from 1986 to 2006 indicates that the percentage of these two age classes in the escapement is about the same as those in the total run, indicating that the overall harvest appears fairly well distributed among these two age classes.

Issue 7. What is the background and reasoning behind the new regulations on boat motor restrictions for the personal use dip net fishery on the Kenai River?

Response: The regulation prohibiting the use of two-stroke motors in the personal use fishery, which occurs in the lower Kenai River in July, was adopted by the board during their February 2008 Upper Cook Inlet meeting. There were numerous proposals calling for restrictions on the use of two-stroke motors in the personal use and sport fisheries. These proposals became available to the public in June of 2007 and the legal notice made it clear that final regulatory language might be different from the proposed regulations. The board accepted written comments from the public through the end of its Upper Cook Inlet meeting which lasted from February 1 through 12, 2008, and also provided an opportunity for public testimony and public panel input during that meeting.

Water quality sampling over the last 7 years has consistently shown that hydrocarbons originating from gasoline-burning engines have far exceeded state standards during the busiest days on the river in July. These repeated high levels of hydrocarbons led the Alaska Department of Environmental Conservation to declare the lower 19 miles of the Kenai River as "Impaired". This required the state to take actions to alleviate the pollution sources. The U.S. Environmental Protection Agency has tested and concluded that older two-stroke engines contribute 12 to 20 times more unburned fuel into the environment than a four-stroke engine of a similar size. Prediction models for the river show that removing the two-stroke engines from the river during the month of July will greatly reduce the level of hydrocarbons in the water below the state's "Impaired" threshold standard of 10 parts per billion (ppB).

Water quality samples were taken at river mile 5 and at river mile 1.5 to try and get an idea of the contribution of hydrocarbons by the boaters in that stretch of water. Results of the tests revealed that the highest occurrence of hydrocarbons at river mile 5 was 11.5 ppB, while the highest occurrence at river mile 1.5 on the same day was 22.6 ppB. This reading was taken on July 21 while the personal use fishery was open. The results are a compelling indication that the personal use fishery is a major contributor to exceeding the

statewide standard. Additional information on the water quality sampling conducted on the Kenai River can be found at:

<http://www.kenaiwatershed.org/waterquality.html>

and

http://www.dec.state.ak.us/water/wnpssc/pdfs/Kenai%20Report_FINAL_14Jan04.pdf

The proposal the board adopted complements the recently adopted Department of Natural Resources (DNR) regulation that prohibits the use of two-stroke motors during the month of July within the boundaries of the Kenai River Special Management Area (KRSMA). KRSMA extends from Kenai Lake, downstream to river mile 4.0. The area open to personal use fishing from a boat in the Kenai River is from ADF&G markers near the Kenai City dock upstream to the Warren Ames Bridge (between river miles 1.5 to 5.1) so there is an overlap of 1.1 miles where boaters are subject to the DNR regulations, which are more restrictive than the regulation just passed by the board. Both DNR and board regulations require the use of four-stroke motors during the month of July, but DNR regulations also limit the horsepower to 50 hp and limit boat length to 21 feet. Under board regulations, there is no limit to horsepower or boat length. The DNR regulations apply to all boaters (whether they are fishing or not), while the board's regulation only applies to taking fish with a dip net from a vessel. The board has been advised by the Department of Law that its authority clearly encompasses boating activities and habitat conservation measures that are tied directly to fishing. The board has not attempted to extend its authority to regulate boating activities unrelated to fishing.

Sport fishing from boats below the Warren Ames Bridge is a rare occurrence. Although sport fishing angling effort over the last few years has moved down lower in the river to some extent, significant sport fishing does not generally occur in July below the bridge due to water conditions and gear conflicts. The personal use fishery opens July 10 and the primary user group in the lower river below the Warren Ames Bridge in July is the personal use fishery.

There are some commercial fishing vessels that also utilize the lower river. The larger commercial vessels that anchor in the river use diesel fuel and generally port their exhaust into the air and not into the water. Further, diesel fuel does not contain the BTEX that has been found in hydrocarbon tests. There are some commercial skiffs that use two-stroke outboard motors to deliver fish to the processors located in this area. That use is thought to be minimal. Some commercial fishermen also use skiffs with two-stroke motors to transport themselves to their fishing vessels that are on anchor. These uses certainly emit hydrocarbons into the river, but not nearly to the extent that the personal use fishery involving several hundred boats simultaneously in the water does. The board has not determined that this limited use presents sufficient cause for concern to require it to test the limits of its authority by attempting to regulate the use of two-stroke motors for transportation.

In summary, the board took action within its authority to limit hydrocarbon discharges directly related to fishing activity, in a fishery that has been identified as a significant contributor to violations of water quality standards in the lower river. The lower river

provides important habitat for juvenile salmon and thus protection of this area from excessive hydrocarbon emissions is important to conservation and development of the Kenai River salmon fisheries. The lower 4.0 miles of water is outside of the KRSMA, so DNR regulations do not apply, but the board has authority over fishing activities in this area. If the actions taken by both agencies do not result in meeting water quality standards, other solutions, including further restrictions in the sport, personal use, and commercial fisheries, will have to be considered.

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Various Interested Individuals

SCOMM

156:4

Introduction to Genetics

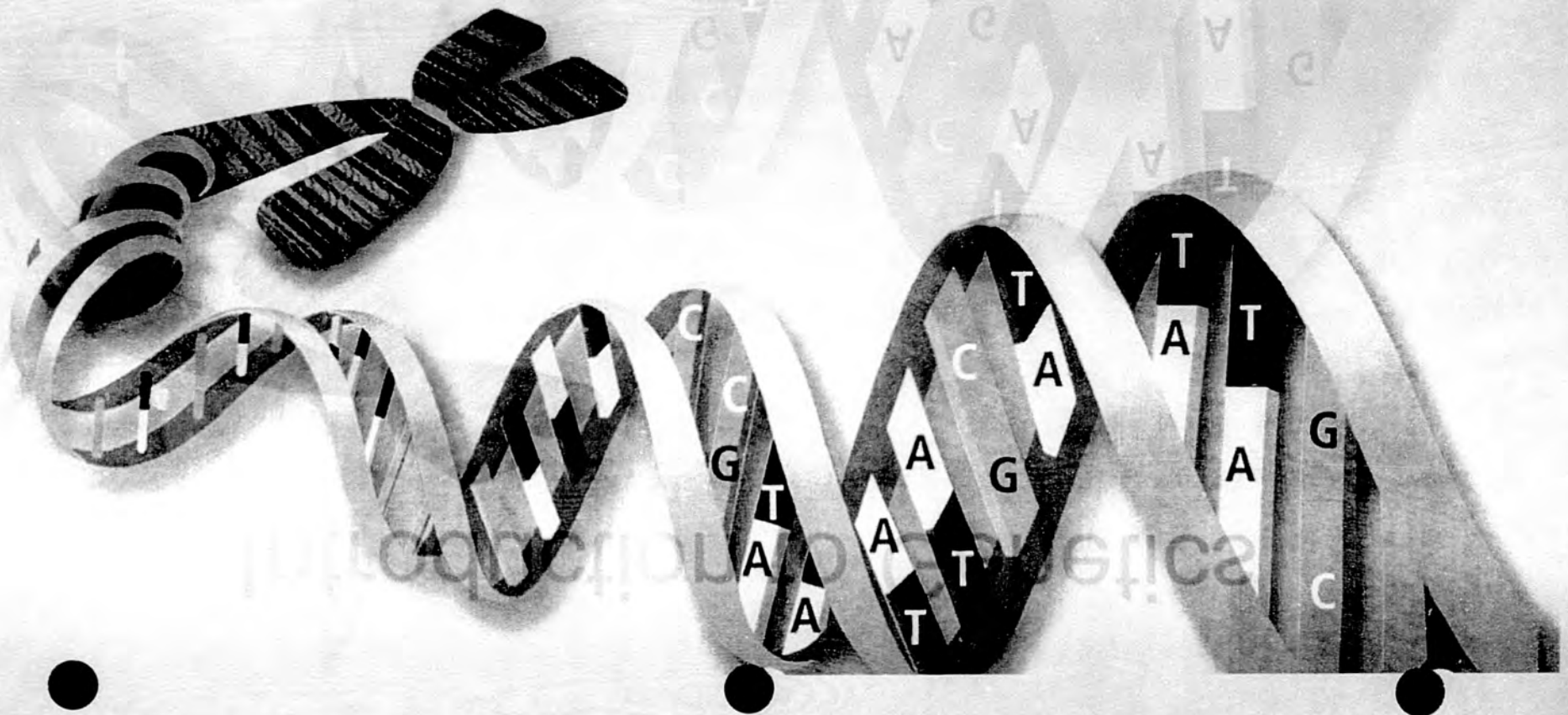


Bill Templin

Gene Conservation Laboratory

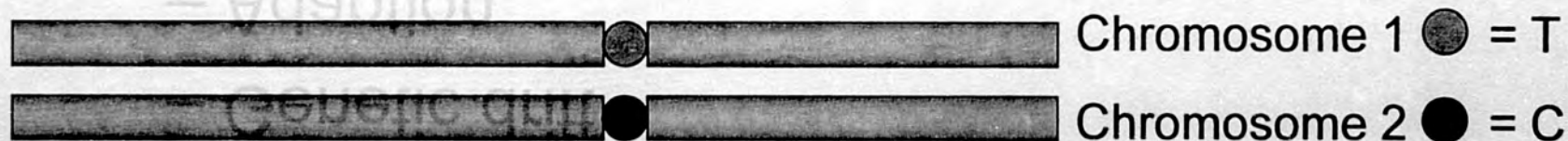
Alaska Department of Fish and Game

- 1) All fish have two sets of chromosomes – one inherited from each parent.
- 2) Each chromosome is made up of a string of nucleotides (A,G,T,C's).
- 3) Every fish has slightly different strings.
- 4) A site where two different nucleotides occur is called a single-nucleotide polymorphism (SNP).

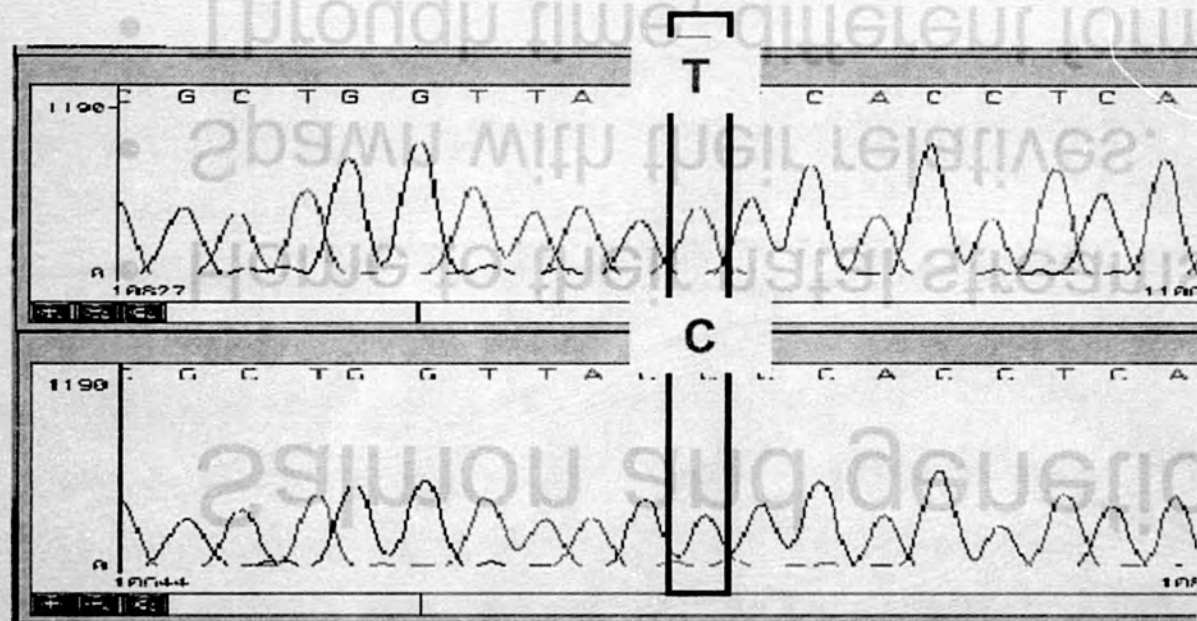


Single Nucleotide Polymorphism (SNP)

DNA base change at a single base



↑
DNA sequence
↓



Salmon and genetic structure

- Home to their natal streams.
- Spawn with their relatives.
- Through time, different forms of each SNP become more or become less common within each population.

– Genetic drift

– Adaption

Chromosome 5 ● = C

Chromosome 1 ● = T

DNA base change at a single base

single nucleotide polymorphism (SNP)

Variation among populations for one SNP "One_E2-65"

Mama/Papa L.



Talkeetna R.



Big L.



Fish Cr.

Chilligan R.



Wolverine Cr.



Skilak L.

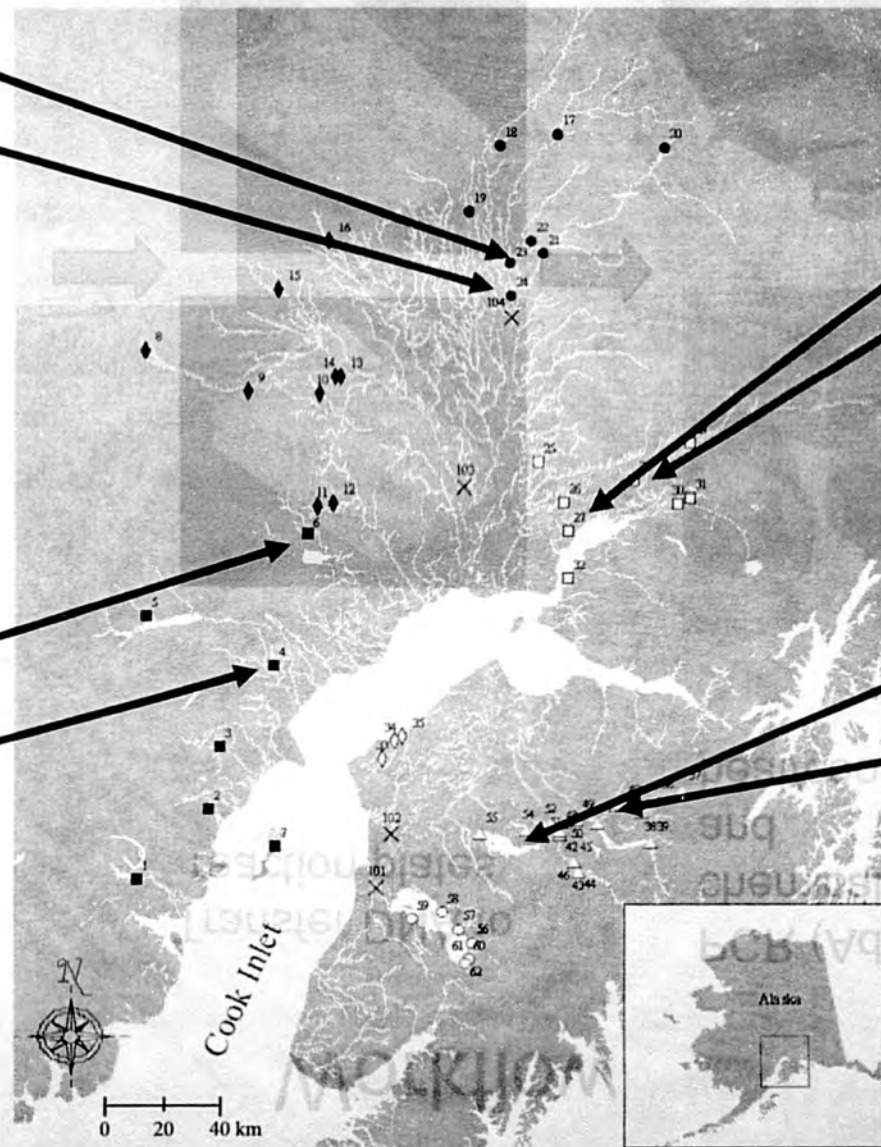


Tern L.

Frequency of:

■ "A" allele

■ "T" allele



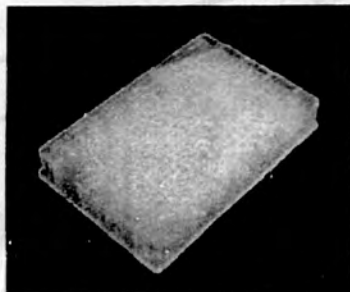
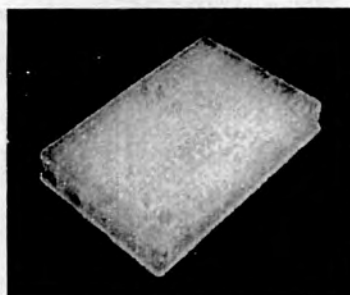
Workflow

Extract DNA
from fin

Transfer DNA to
reaction plates

PCR (Add
chemicals and
heat/cool)

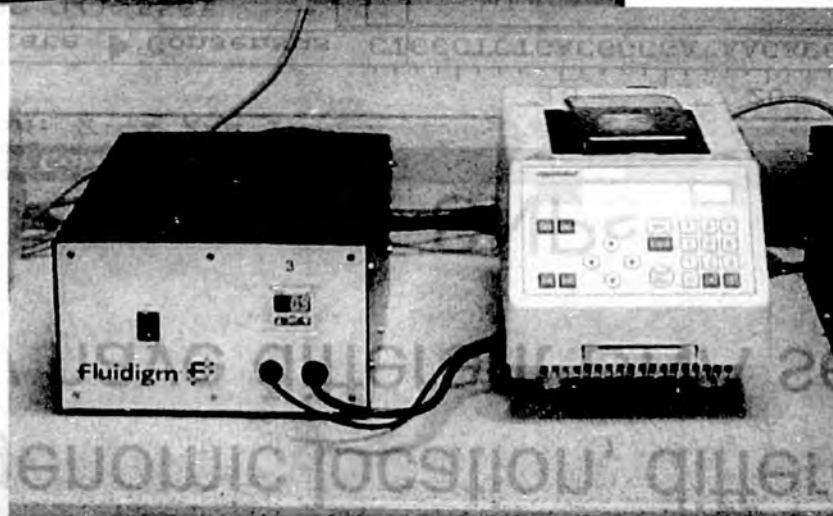
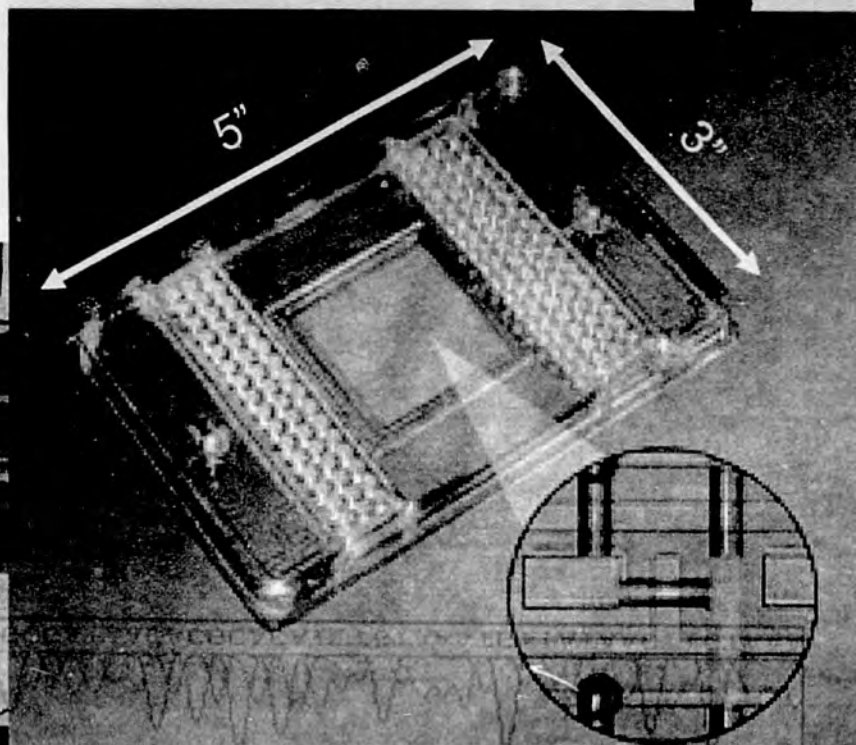
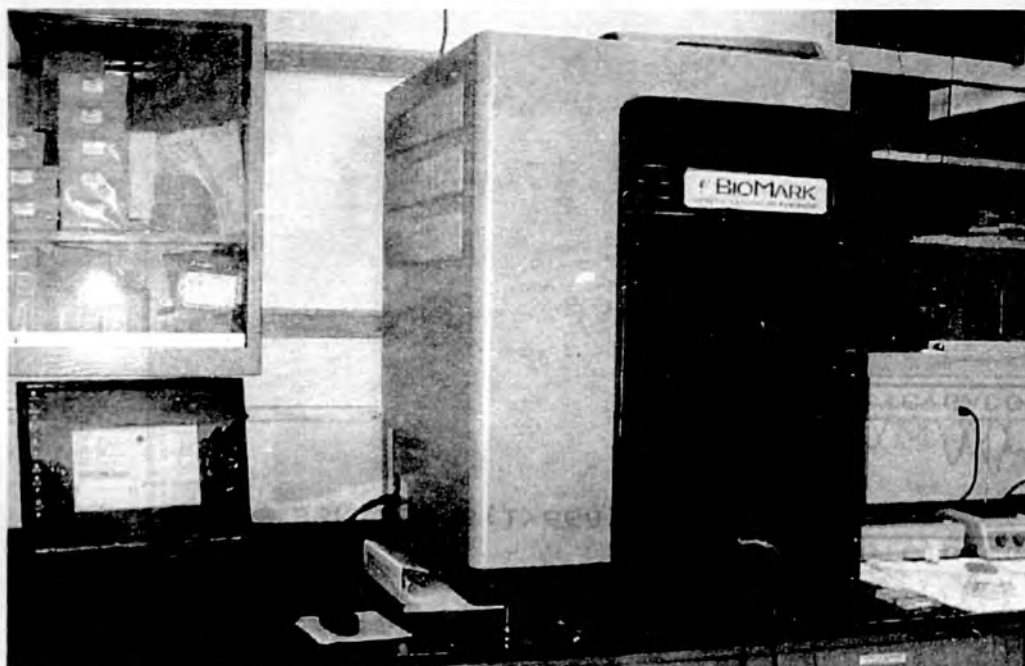
Collect
results



Variation among populations for one SNP

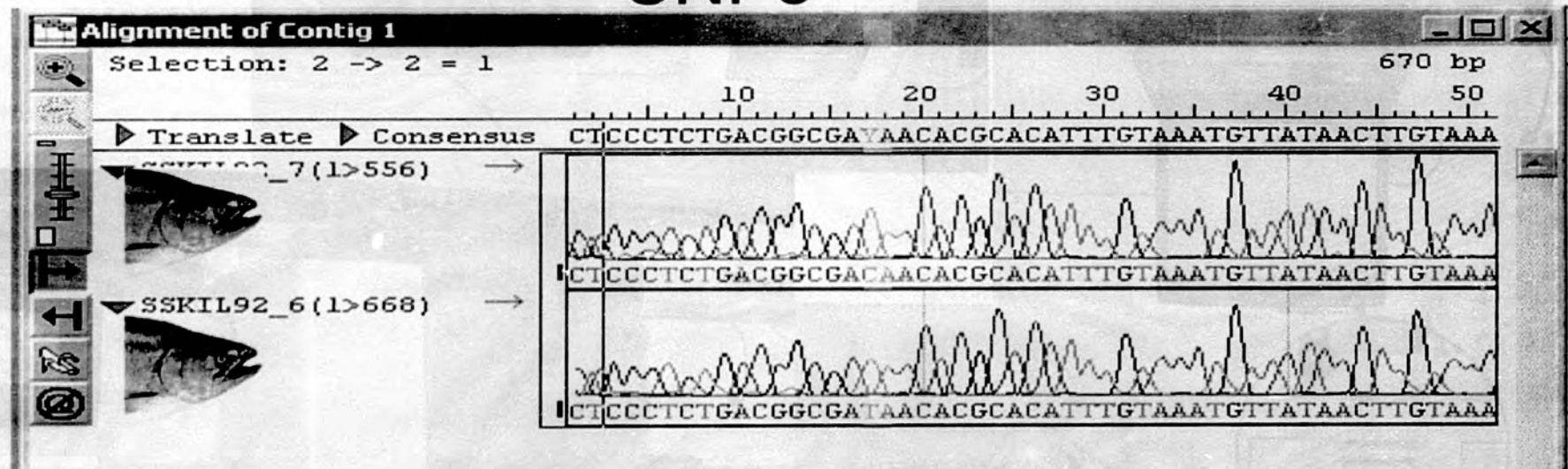
Microfluidics:

low error, high throughput



At any genomic location, different individuals may have different DNA sequences.

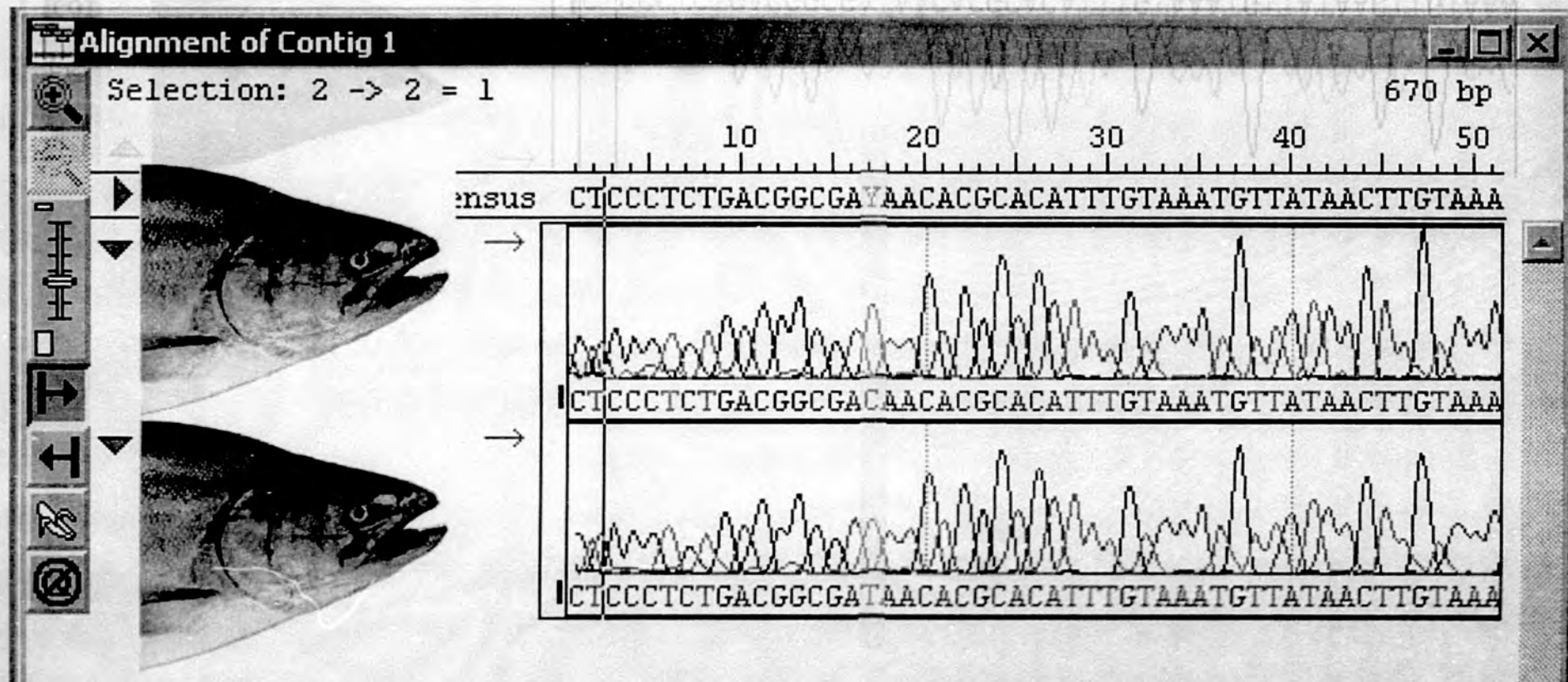
SNPs



low error, high throughput

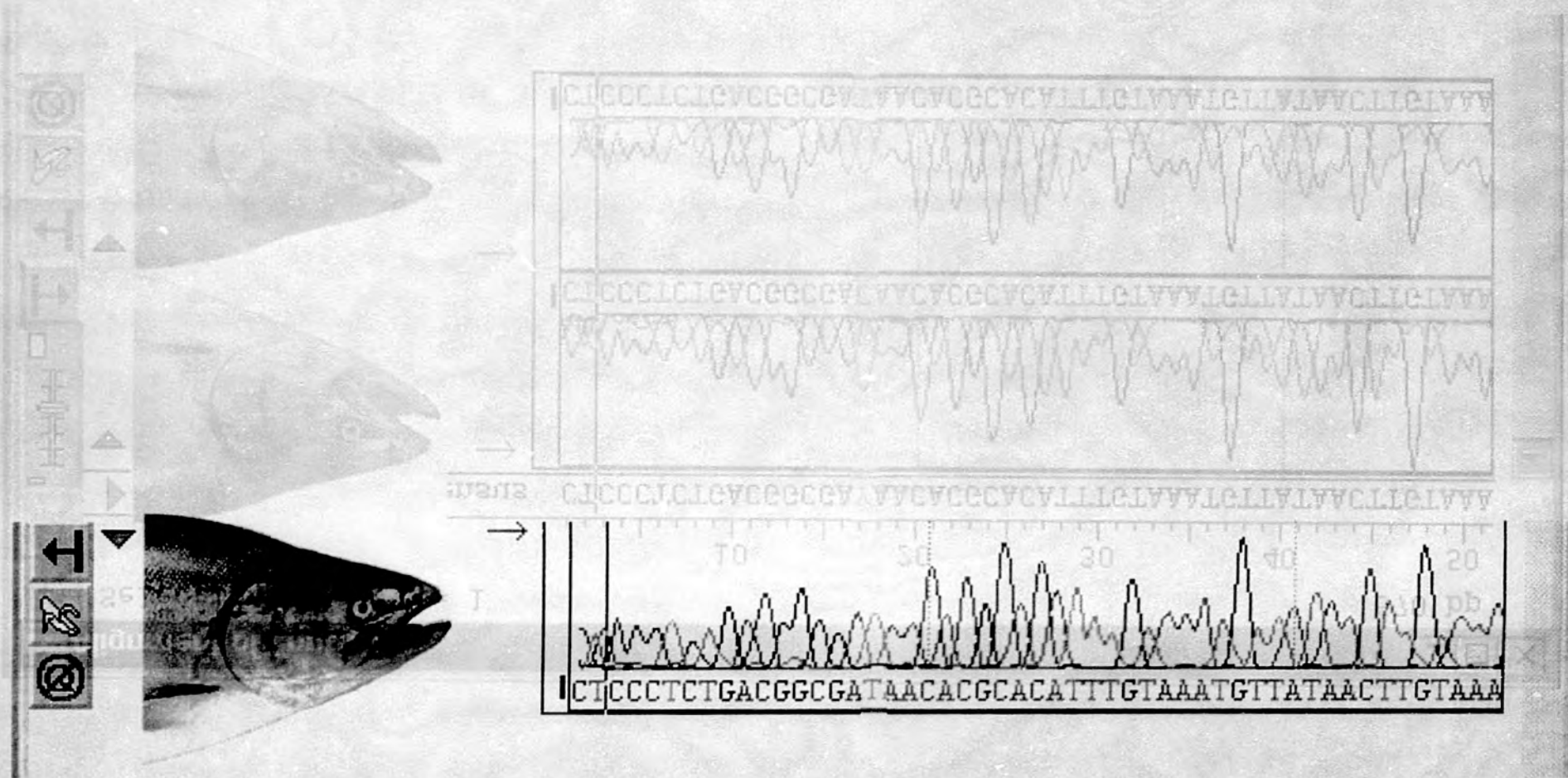
Microfluidics:

5'-nuclease assay



5'-nuclease assay

5'-nuclease assay



5'-nuclease assay

5'-nuclease assay



CTCCCTCTGACGGCGATAACACGCACATTTGTAAATGTTATAACTTG

Tad-man



blope

2'-nuclease assay

5'-nuclease assay

Taq-man

probe



5'-nuclease assay

5'-nuclease assay

Taq-man

probe

DNA polymerase



Fluorescent tag



T

Taq-man

probe

5'-nuclease assay

5'-nuclease assay

Taq-man

probe



Fluorescent tag

DNA boiling



Taq-man

probe

5'-nuclease assay

5'-nuclease assay

Taq-man

probe



Quencher
(prevents fluorescence)



T

Taq-man

probe

5'-nuclease assay

5'-nuclease assay

Taq-man

probe



(highlights fluorescence)
Quencher



T

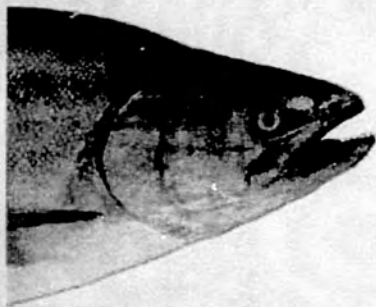
probe



5'-nuclease assay

Taq-man

probe



Taq-man

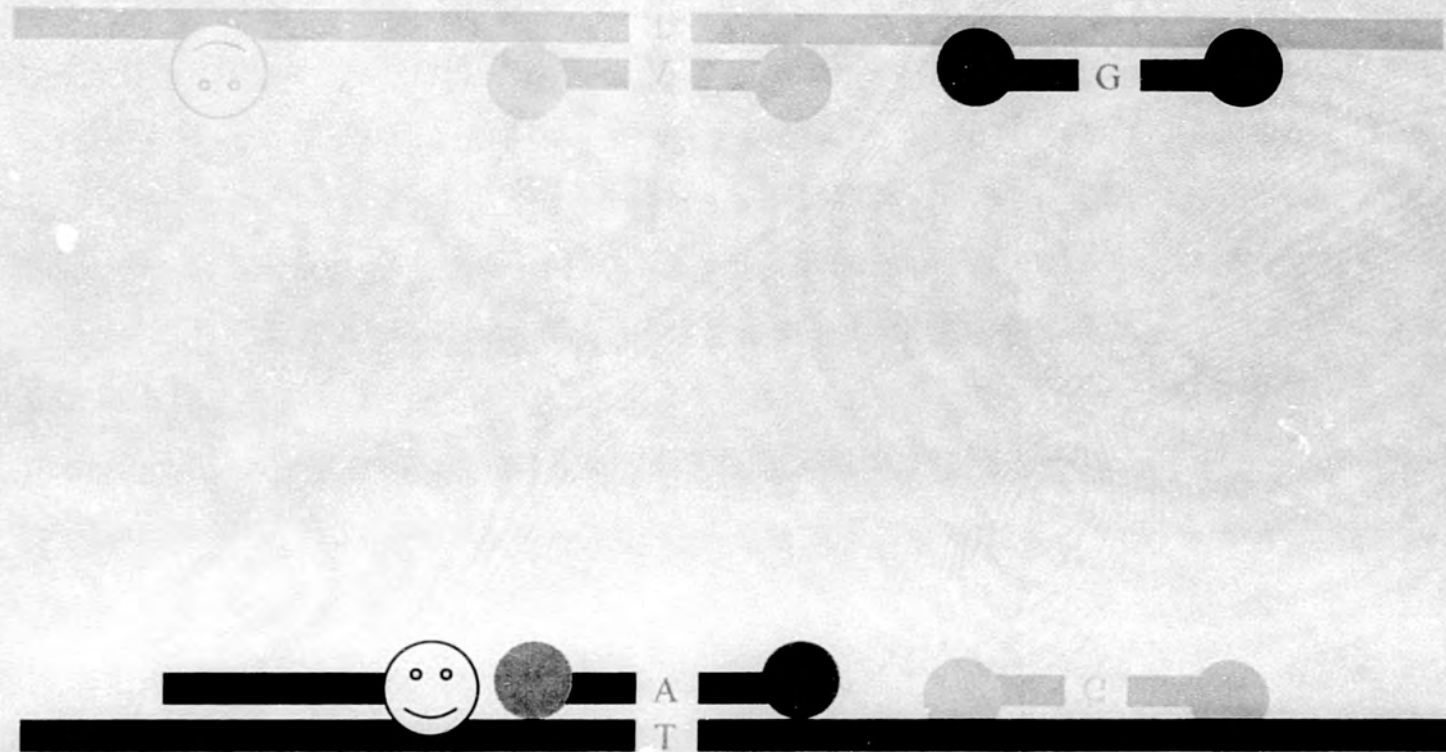
probe

5'-nuclease assay

5'-nuclease assay

Taq-man

probe



Taq-man

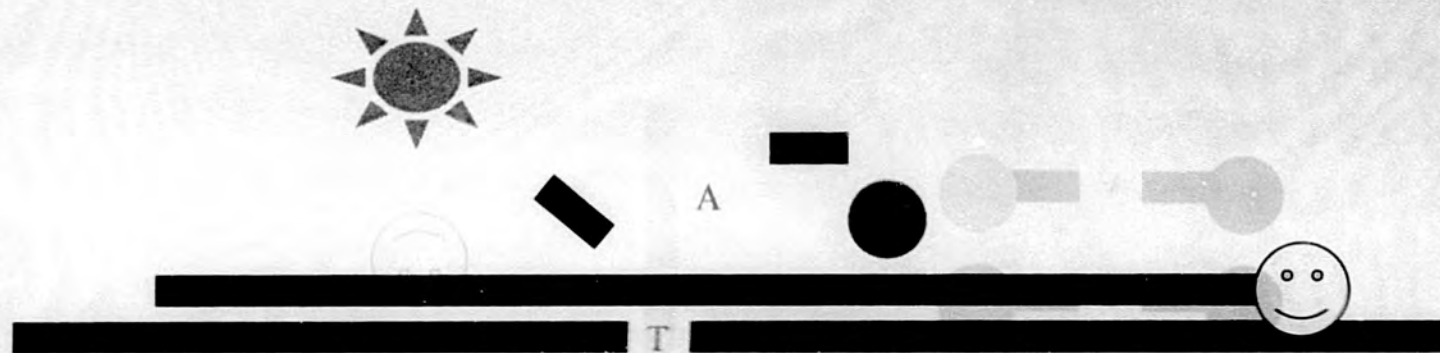
probe

5'-nuclease assay

5'-nuclease assay

Taq-man

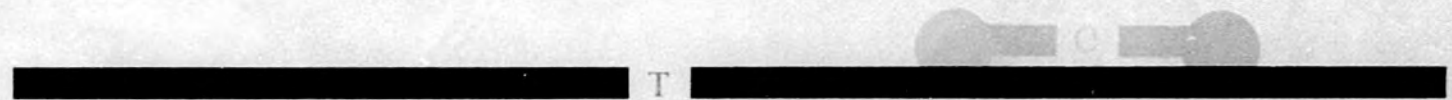
probe



5'-nuclease assay

Taq-man

probe



Taq-man

probe

5'-nuclease assay

5'-nuclease assay

Taq-man

probe



Taq-man

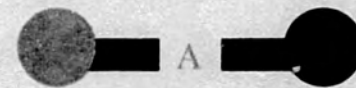
probe

5'-nuclease assay

5'-nuclease assay

Taq-man

probe



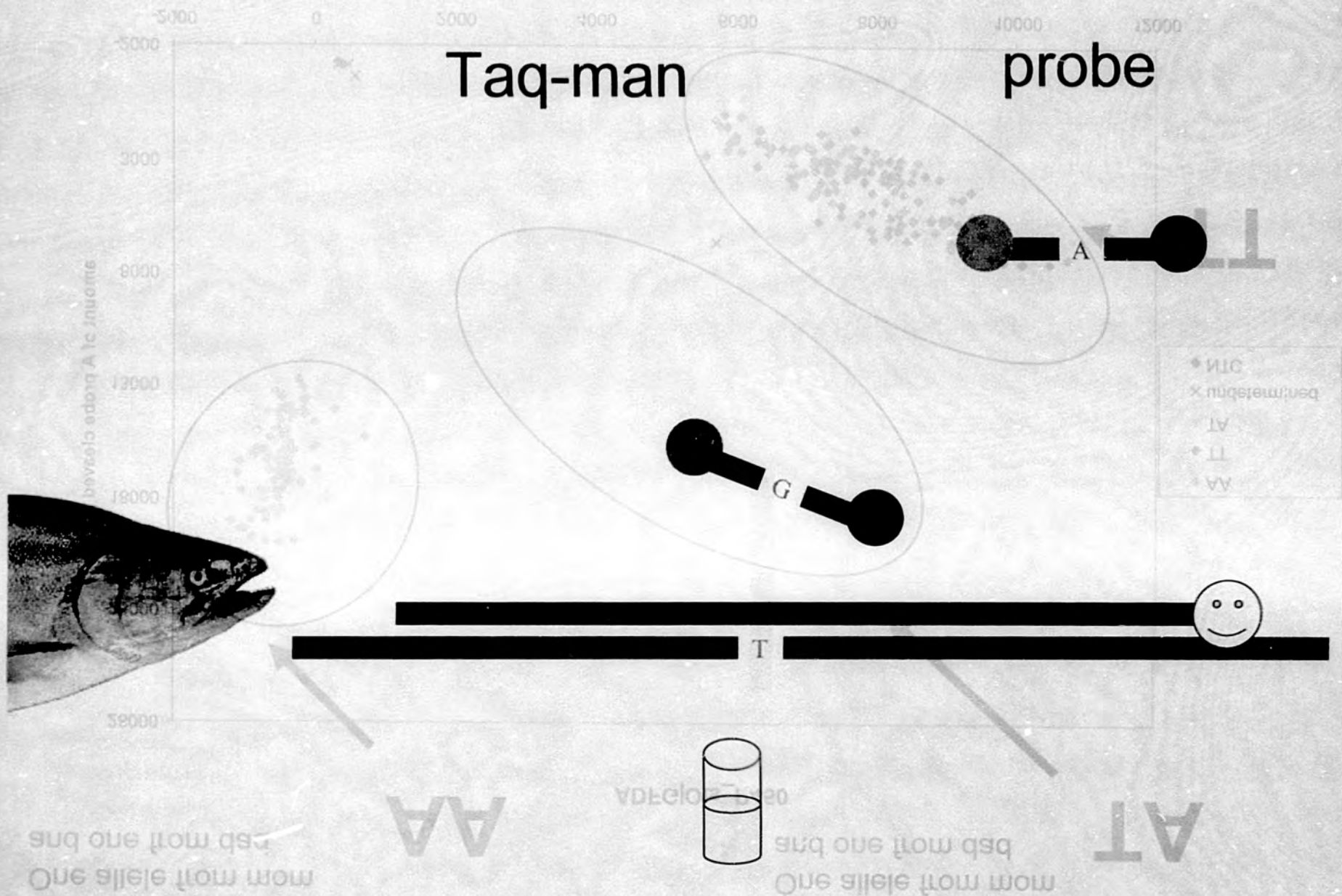
probe

Taq-man



5'-nuclease assay

5'-nuclease assay



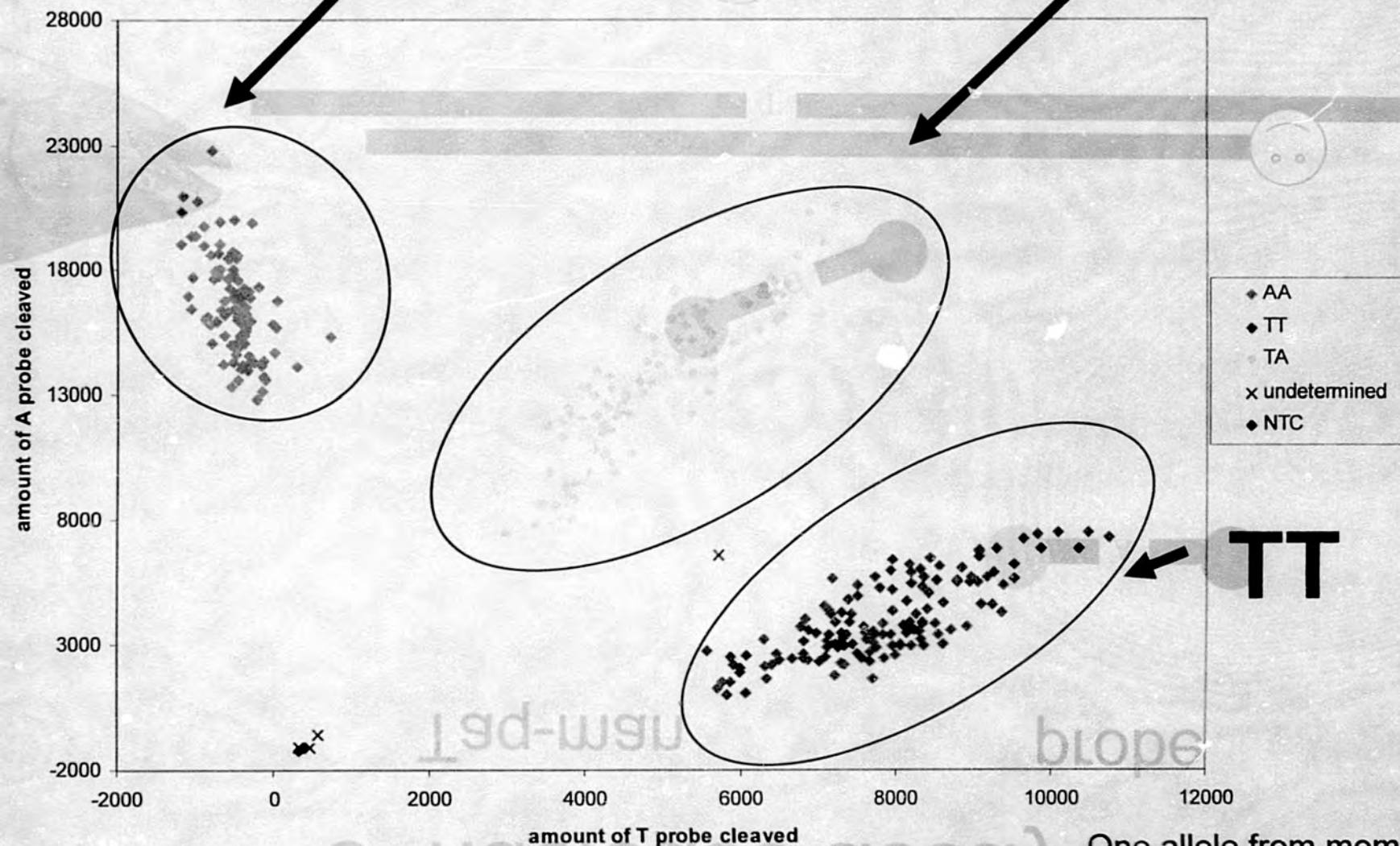
One allele from mom
and one from dad

AA

One allele from mom
and one from dad

TA

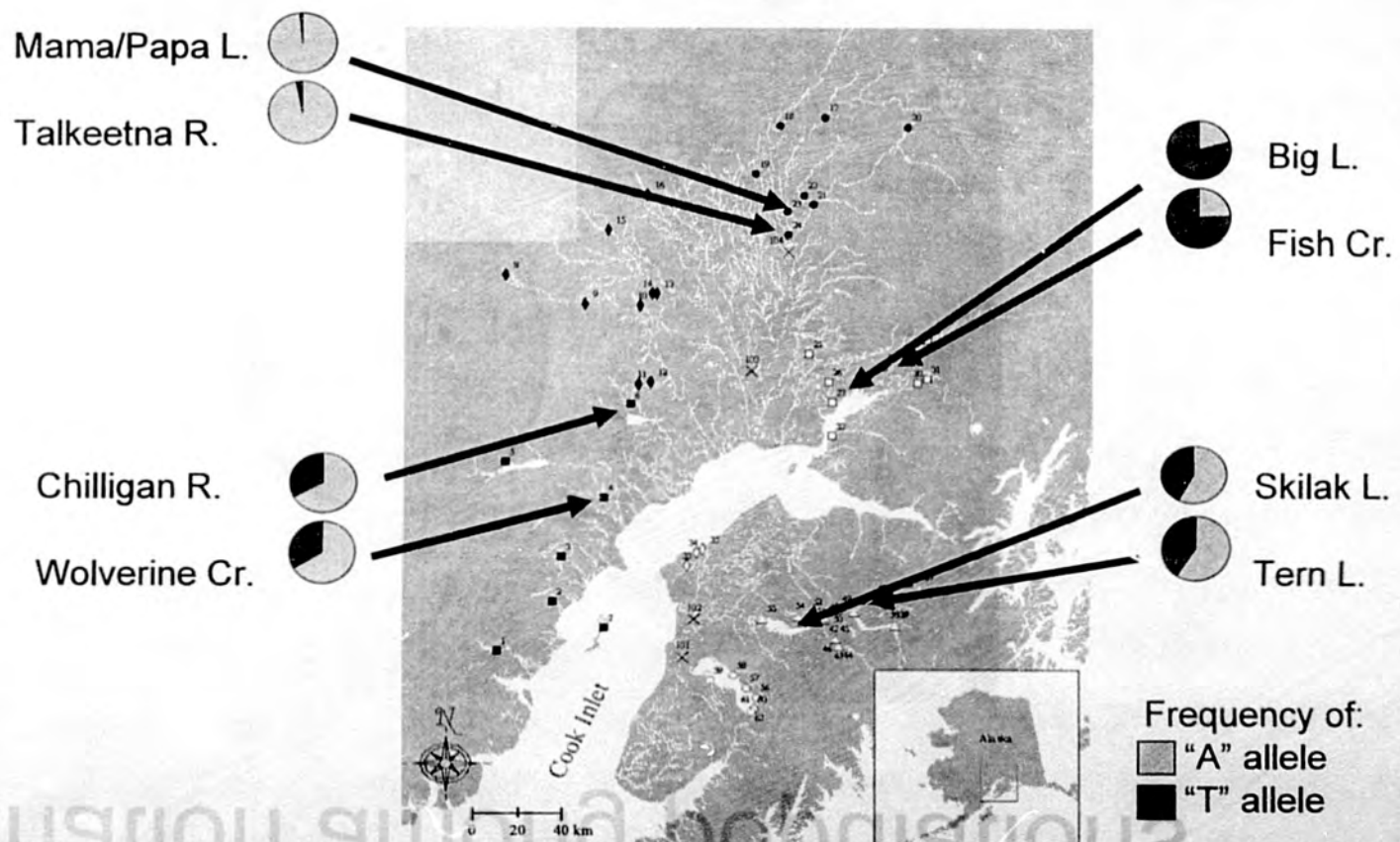
ADFG|Ots_P450



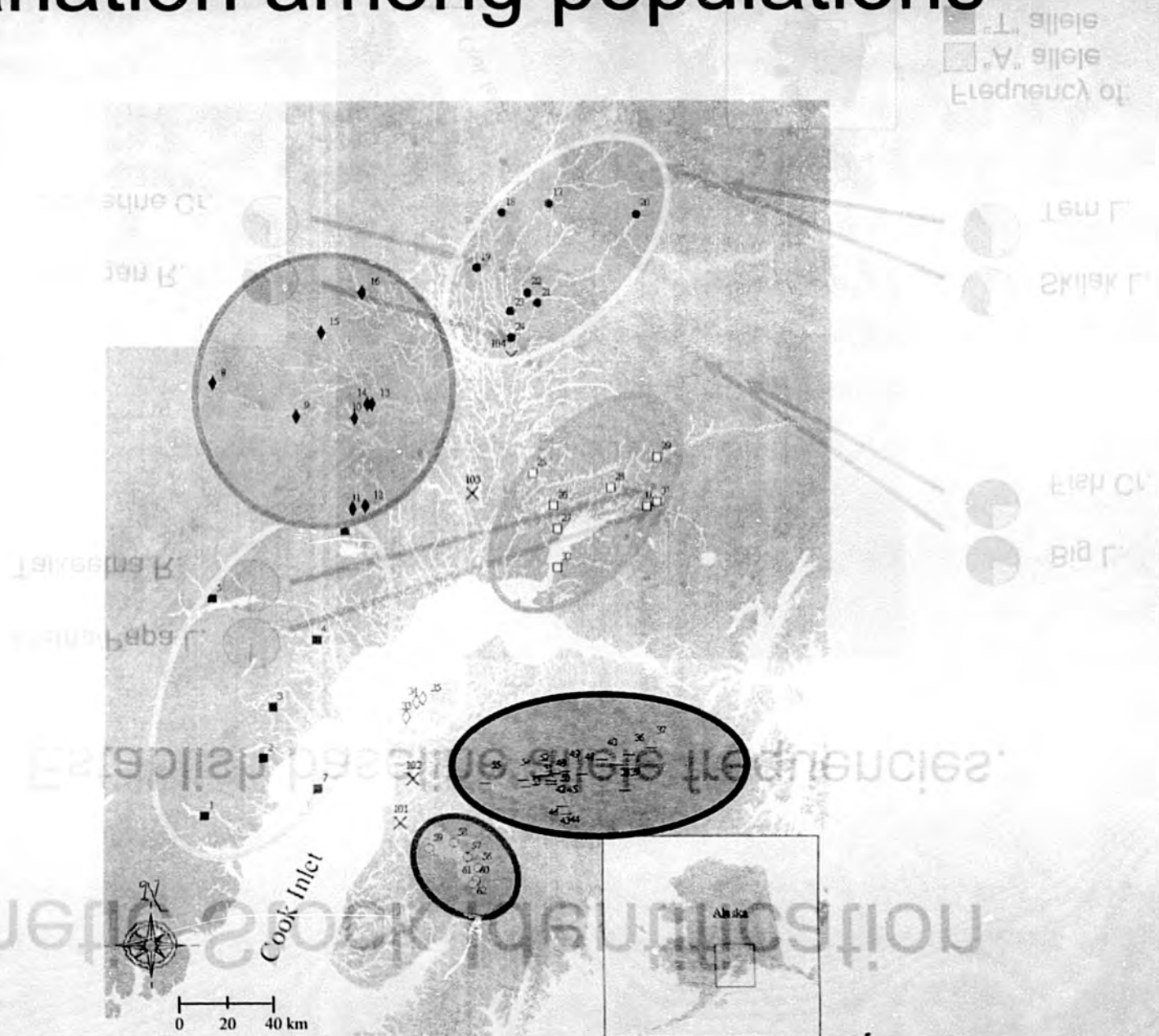
One allele from mom
and one from dad

Genetic Stock Identification

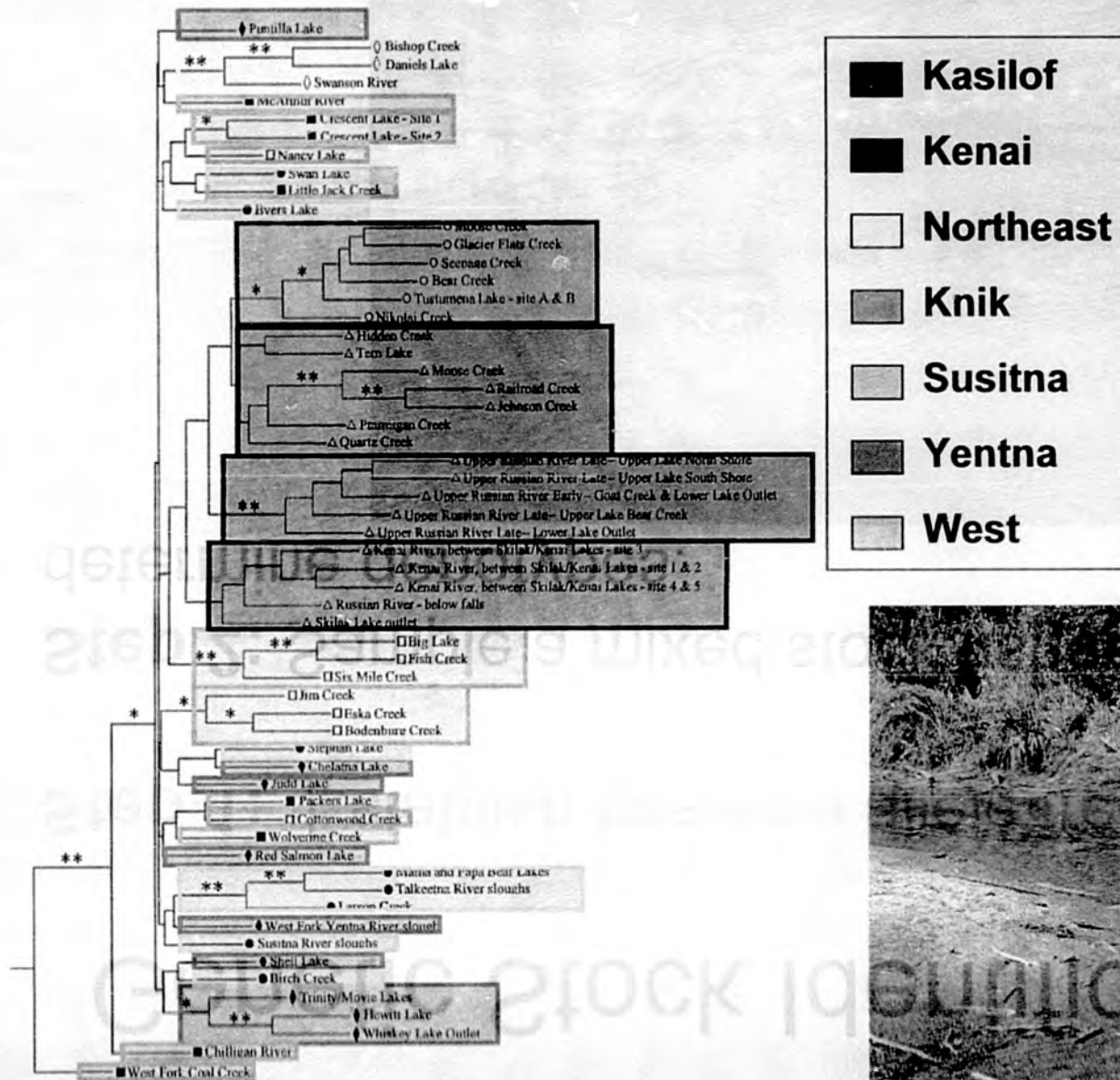
Step 1: Establish baseline allele frequencies.



Variation among populations



N-J tree on Nei distances



Genetic Stock Identification

Step 1: Establish baseline allele frequencies.

Step 2: Sample a mixed stock fishery and determine genotypes.



Genetic Stock Identification

Step 1: Establish baseline allele frequencies.

Step 2: Sample a mixed stock fishery and determine genotypes.

Step 3: Estimate stock composition that will best explain the mixture genotypes (fishery).

