

1992 BRISTOL BAY STAFF MEETING MINUTES



Regional Information Report¹ No. 2A92-06

By

Thomas E. Brookover

**Region II
333 Raspberry Road
Anchorage, Alaska 99518-1599**

April 2, 1992

¹ Contribution 92-02 from the Dillingham area office. The Regional Information Report Series was established in 1987 to provide an information access system for all unpublished divisional reports. These reports frequently serve diverse ad hoc informational purposes or archive basic uninterpreted data. To accommodate timely reporting of recently collected information, reports in this series undergo only limited internal review and may contain preliminary data; this information may be subsequently finalized and published in the formal literature. Consequently, these reports should not be cited without prior approval of the author or the Division of Commercial Fisheries.

1992 BRISTOL BAY STAFF MEETING MINUTES

February 4 - 6, 1992
Anchorage Regional Office
Anchorage, Alaska

Prepared By:
Thomas E. Brookover

Regional Informational Report¹ No. 2A92 -06

Alaska Department of Fish and Game
Division of Commercial Fisheries, Central Region
333 Raspberry Road
Anchorage, Alaska 99518-1599

March 23, 1992

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BRISTOL BAY STAFF MEETING MINUTES

February 4 - 6, 1992
Anchorage Regional Office
Anchorage, Alaska

Attendants: Bob Murphy, Linda Brannian, Richard Russell, Jeff Regnart (Recorder), Barry Stratton, Drew Crawford, Bev Cross, Virginia Shook, Ken Florey, Dennis Haanpaa, Kathy Rowell, Tom Brookover (Recorder), Steve Fried, Fritz Funk, Jeff Skrade, Jim Miller, Wayne Dolezal, Paul Skvorc, Dan Huttenan, Chris Kelly (CFEC).

ASSIGNMENTS:

- Steve Fried 1. Assist Dennis Haanpaa in researching options/finding a graduate student interested in the Tikchik whitefish research/test fishery.
- Bev Cross 1. Provide Ken Florey with total costs for each project no longer operating, for the most recent year operated.
2. Contact Don Rogers about funding (processors, Univ.?) for Area M catch samples.
- Linda Brannion 1. Conduct an inquiry regarding reducing tower counts.
- Kathy Rowell 1. Compile processor packets for the Togiak herring fishery.
- Ken Florey 1. Write Denby Lloyd regarding putting the funds available from the vacant Dillingham research position back into the allocation.
- Dennis Haanpaa 1. A.G.'s opinion on whether or not we can charge a fee for transfers. This needs to be finalized by the first week in April.
2. Write out options regarding seasonal comp. time to the management and research staff.
3. Check on the options for the Whitefish test fishery.
4. Check on the status of the Public Safety helicopter for use during the Togiak herring fishery.
5. Verify Brookover's emergency order authority for herring.
6. Check on the SOP for District test fishing policy.
7. Call Bob Clasby on current status of First Aid training for seasonals.
- Jeff Skrade 1. Send Ken Florey a memo detailing herring management responsibilities for the 1992 season.
2. Distribute the Bristol Bay Fisheries Conference agenda to management and research staff as soon as it becomes available.
3. Submit a new CIP request (Dillingham bunkhouse roof) to Dennis Haanpaa by August.
- Richard Russell 1. Provide Dennis Haanpaa with a cost breakdown for eastside coho management surveys and fall spawning ground surveys.
2. Supply Anchorage with needed numbers of blue and green cards, transfer and agent authorization forms.

- Tom Brookover
1. Look into the potential for a phone dialing system similar to the one available in King Salmon (246-INFO).
 2. Provide Dennis Haanpaa with a cost breakdown for westside coho management surveys and fall spawning ground surveys.
- Jeff Regnart
1. Talk to Jeff Fox about reporting fish caught but not sold.
 2. Attend March Board of Fisheries meeting for setnet offshore distance discussions.

II. HEADQUARTERS

- A. General Overview, and
- B. Budget Outlook.

Fritz Funk was the only person present from headquarters, and therefore Ken Florey gave a very brief summary of the budget outlook. Basically there is no more money to be found this year, and a supplemental increment is up in the air at this point.

Also discussed was a concern, voiced by Linda Brannion, over software compatibility within the Division and the need to reinforce a divisional standard. Computer Services may apparently be using or going to use Word software, and there seems to be an incompatibility problem between different versions of Lotus software.

C. Headquarters Staff Changes

Fritz Funk discussed the new computer analyst position in Juneau, which is the only new position in headquarters at this time.

D. SB 337 (Early Retirement Bill)

Ken Florey explained the bill, how it would apply to the Department and Division and the changes that may occur in staffing as a result. The bill appears to have support in Juneau, and if it passes, the bill would impact management staff in several regions. The effects could range as far as major departmental revisions and may possibly include the formation of one division. He also explained SB 338 and how temporary time can be used to meet the 20-year requirement.

E. Escapement Goal Policy Update

Ken Florey stated that the policy update was at headquarters for review at this time and there has been no recent news on its progress.

F. Regulation Book Printing Schedule

Richard Russell asked that the standard order of 400 books be increased since the board meetings were held this winter, and Ken Florey recommended increasing the order by 1/3. Fritz Funk mentioned that the herring regulations have yet to be certified. Jeff Skrade said it would help if the management staff could review the books every year to help reduce errors, and requested that the reg books be available for the Bristol Bay Fisheries Conference if possible.

G. North Peninsula Sockeye Scale Digitizing and Collection

Richard Russell stated that Region III staff is planning to collect scales on the North Peninsula but no money is available for digitizing, which is estimated at \$15,000 - \$20,000. Scale samples exist back to 1985, and staff would like to look at these samples to compare to anomaly years on the Kvichak River.

II. REGIONAL STAFF

A. Budget

1. FY92 Pre-audit.

Ken Florey gave an overview of the 1991 post-audit. Although the region as a whole came very close to the original allocation, the Bristol Bay area is \$105,000 in the red. Florey relayed Denby's opinions on why the Bristol Bay area is consistently over budget, which primarily included concerns with overhead budget and the high cost of seasonals.

Monthly fixed costs were discussed and a need was expressed by Russell and Skrade to be able to better track monthly fixed costs, such as electric and phone (long-distance) bills. Although monthly costs are obtained on the audit tracking system, itemized bills cannot be had.

A discussion followed on the cost of premium pay for seasonals. Richard Russell said that the seasonals are not working more time than in past years, but voiced concerns about the quality of the data and possible trouble getting good workers if the amount of time worked or the number of people is reduced. Jeff Regnart and Richard Russell said that they would prefer cutting sampling time on tower projects before reducing tower counts, because counting is a priority over sampling. Tom Brookover mentioned the need for an assessment of the loss of accuracy vs. reductions or revisions in counting times, i.e. the cost of reducing counting time, and Bev suggested further review of count accuracies before considering tower counting cut backs. Bev Cross suggested that seasonal employees should be supervised more closely, and seasonals should document their work.

2. Equipment Needs.

Ken Florey asked for a prioritized list of needs from management and research staff.

3. Ugashik, Naknek, and Wood River Smolt Funding.

Dennis Haanpaa said there is no funding for the Ugashik, Naknek and Wood River Smolt projects. Ken Florey said that he would like to see these projects back, but they are low priority and there is no funding. Richard Russell and Ken Florey agreed that it would be helpful for budget considerations, to have the total cost for each project for the last year they operated.

4. Funding for Fall Management Surveys.

Ken Florey asked Russell and Brookover to provide him with an estimate for the fall surveys.

5. Yellowbook Update.

Richard Russell was concerned that the allocations are out of date and the Yellow Book needs to be updated. Jeff Skrade also mentioned that expenditures have remained the same, yet the pre-audits are consistently in the red. Ken Florey said that Denby Lloyd would like to see the Yellow Book be more realistic, and Dennis Haanpaa said that Denby is looking into the potential of plugging in either previous year's post-audit or actual expenditures over the last five years. At this time the money that funded Jim Woolington's research position will remain in the regional allocation, and will go towards more realistic allocations for the remaining projects in Bristol Bay (Florey noted that he would write Denby explaining this assumption).

6. CIP Update.

Dennis Haanpaa said that in October, Commissioner Rosier submitted a list of statewide maintenance improvements to the office of Management and Budgets, which included the King Salmon bunkhouse maintenance, buoys and markers and statewide sonar upgrades. The request for the Dillingham bunkhouse roof will need to be resubmitted, and will be due to Dennis in August.

B. Personnel

1. Permanent Employee Project Responsibilities 1992

a. Herring Management. Tom Brookover will assume management responsibility for the Togiak herring fishery, and Dennis Haanpaa will verify Brookover's e.o. authority. Dennis Haanpaa will fill in as needed in the Dillingham office.

b. Herring Aerial Assessment. Tom Brookover will assume Russell's previous role as lead aerial surveyor, and Jeff Regnart will fill in as backup surveyor. Russell pointed out that his estimates vs. Brookover's agree for the most part, little benefit is gained by having a third person in the helicopter, and he (Russell) will be available in the case of an emergency.

c. Herring Research. Kathy Rowell reported no changes for the 1992 season.

d. Salmon Westside Management. Some discussion about the role of the management trainee; Brookover being more involved in Nushagak management.

e. Salmon Eastside Management. At this time it is unknown whether the current FBI trainee is returning, and Dennis Haanpaa suggested that Regnart become more involved in Egegik and Ugashik as the opportunity arises.

f/g. Salmon Research. Bev Cross handed out a tentative list of duties for research staff. A discussion followed on the

importance of inseason digitizing, and resulted in a cutback on funding for inseason digitizing this year. Jim Miller will be the new project leader for Portage Creek, and Drew Crawford will assume Jim Woolington's duties for Igushik Inriver Test Fish Project and Catch Sampling. Bev made the point that management staff on the westside needs to designate time each day for staff meetings and include Drew. This schedule was approved.

2. Supervisory Help for Herring and Salmon.

According to Ken Florey, Dennis Haanpaa will be out; according to Dennis Haanpaa, Ken Florey will be out. At any rate, it sounds like Paul Larson will, and Steve Fried will not be out for herring.

3. Management/Research/Biometric Interactions.

Linda Brannion stated that she is keeping track of interactions, and Brookover noted his current involvement with Fred Jameson regarding catch and aerial survey databases.

4. Seasonal Hiring.

Discussion ensued on who is/is not returning as seasonal employees.

a. Ways to reduce the cost of seasonals. Here it was agreed that no change would be made to counting times/schedules on tower projects until a complete analysis has been conducted on the loss of accuracy vs. lost seasonal cost.

Discussion on seasonal comp. time. This has become a problem on the eastside; seasonals are deferring overtime and taking comp time instead, and when seasonals transfer projects, the last project worked gets charged the accrued comp time. Also, in many instances the result is more money being paid due to an increase in annual leave accrual and the number of holidays worked. Dennis Haanpaa will write out options regarding the comp. time policy and effect on seasonals.

Florey mentioned that, to give managers a better perspective of what happens in other areas, the region was planning on cross-training staff by having them travel to another areas, but the plans got cut short due to budget. As a result, Regnart will visit the False Pass fishery (Cold Bay) during June, and Bob Murphy said that Dave Prokopowich may visit the Togiak herring fishery.

C. Meeting Schedule.

1. Bristol Bay Fishery Conference.

Jeff Skrade outlined the Fishery Conference as an important public event. Ken Florey said that regional staff would not attend due to budget concerns, especially in light of recent interaction at the

board meeting in Dillingham.

2. Regional Planning Team Meetings and Status.

There has been no meeting scheduled by the BB-RPT since last year's Fishery Conference, when the planning team mothballed itself due to lack of funding/interest. Richard Russell suggested that he be replaced as the representative.

3. Cominco "Pebble Beach" Mine Status.

Jeff Regnart said the initial cost of the Cominco project was 500 million dollars. The projected cost is now at 840 million, and that Cominco is now reconsidering. Game Division has already received funding for 2 man months (estimated at \$60,000). Wayne Dolezal said that Cominco has been drilling for 5 years in Bristol Bay for copper and gold, and have also found crystal and hard rock deposits 5000 feet long. Waste disposal is a concern. There are several road options being considered. Studies of potential impact on fish and game is being proposed. Ground breaking is estimated for 1995. Wayne Dolezal indicated that the project has been placed on a lower priority based on preliminary feasibility studies.

4. Kodiak Staff Meeting Review.

Richard Russell said that the Kodiak Staff meeting went well. Doug Molyneaux was also present at the meeting. They discussed the need for scales samples from Dutch Harbor. They indicated that the Dutch Harbor Fishery may not happen due to subsistence fishery at Nelson Island. There is no money to sample, but may be able to collect scales if Kathy Rowell can press and read them.

According to Bob Murphy the False Pass Fishery sampling program currently runs from July to August. \$13-15,000 would be needed to fund the month of June. Richard Russell stated that this is a price setting fishery and that post-season information is valuable. Since the processors ask for this information more than any other entity, is it possible to have the processors fund the project?

Bob Murphy said the coho sampling would continue when possible. Funding was cut last year, but incidental coho will be sampled and left over funds will also be used for sampling coho.

Bob will be responsible for managing the Bear River and Ilnik River fisheries, among others. Ilnik stocks will be managed until July 15, and beginning July 1, he will coordinate management with Bristol Bay staff. Bob also explained that Bear River and Three Hill sections will be managed for Bear River stocks.

Richard Russell volunteered time to observe on surveys of Cinder River/Port Heiden, and mentioned a need for helo time for markers.

IV. PROGRAM REVIEW

A. Salmon

1. 1992 Management

a. Togiak-(Tom Brookover) Weak king run expected, the critical time for Kings will be the last two weeks of June (possible will be closed). As of 7/1 sockeye management takes over, fishing 4 days a week, possible extension first week of July. Expecting good returns for both chums and pinks. Will be cautious with management of coho, will go to coho management second week of august, 2 days a week.

b. Nushagak-(Jeff Skrade) Looks good for fishing kings this year, 90,000 on the table to harvest. Portage creek Sonar will start counting by the 10 of June. Sockeye this year should be strong, chums and pinks are an unknown, coho could be strong.

c. Naknek-Kvichak-(Jeff Regnart) Not expecting a strong run of Kings this year, will be fishing 4 days a week with further fishing time reductions possible. Expecting good sockeye runs returning to both the Naknek and Kvichak. Should be an avg. chum and coho year in the district. With the new wording of section "F" in the regulations the chances of a single gear type opening was greatly reduced.

d. Egegik-(Richard Russell) Plans to keep the district closed for the first two weeks of the season for conservation of kings. Will probably need subsistence openings during that same time (will open it to subs. by E.O., red gear only). After the 23 of June he plans to go fishing for sockeye. There were some changes to the Egegik allocation plan that could help in reducing the possibility of overescapement.

e. Ugashik-(Richard Russell) Will manage the district similar to 1991 season, will monitor the escp. very closely. Some concerns over the king run strength, expects and average chum run and a good coho run.

Decisions:

1. Test fisherman fishing for the managers will be paid \$2.00 a fish and \$150.00 a tide in 1992 (Down from \$3.00 a fish in 1991).
2. Outlook paper should include regulation changes for each district and bay wide regulation changes are to be presented at the end. The managers will put it together and send a final copy to Dennis Haanpaa to OK by April 1.
3. Send Jeff R. to the March Board meeting in Anch. when the Board revisits the set net offshore distance in the Kvichak section.

2. 1992 Research (see attachment)

a. Kvichak and Egegik Smolt-(Drew Crawford) Kvichak smolt will

operate from May 14 to June 20 with 3 technicians. Egegik Smolt will operate from Mat 19 until June 13 with 4 technicians. Research would like to fyke-net Ugashik for AWL information, management would support that effort any way they could.

b. Kvichak Sidescan Sonar-(Dan Huttenan and Paul Skvorc) During the time that the side scan and Bendix gear operated together there was a 3% difference, both seemed to have the same sensitivity to weather, side scan looks at 88% of the river compared to the 7% that the Bendix gear looks at. The main advantage to running the side scan in 1992 would be for experience. Paul Skvorc's recommendation would be to wait for the 1993 season and use some new gear that will be available by that time that runs at 120 megahertz and costs between 30 to 50K.

c. East Side Test Fish-(Barry Stratton) Projects will be run similar to 1991. Kvichak test will start on June 19 with two new technicians. Egegik test will start on June 11 with at least one new tech. This project desperately needs a new boat, present boat is getting very costly to keep up and is no longer considered safe. Ugashik test will start on June 20 with at least one new tech., this start up date is several days later than in 1991, due to excessive overtime in 1991. Barry Stratton plans on reducing the overtime in each of the test fishing camps by reducing the amount of scale samples.

d. East Side Catch Sampling-(Bev Cross) Projects will be run similar to 1991. Barry Stratton will be in charge of the program this year due to Jim Miller's involvement on the West Side. There will be 3 samplers, two are returning. 1 will start on June 18 and the other two will start on June 24. There will not be anyone available to do inseason SPA due to the reorganization of the staff.

e. Naknek-Kvichak Stock I.D. Project-(Bev Cross) The stock I.D. project that was occurring in the Egegik district will be moved to the Naknek-Kvichak district in 1992. Bev Cross wants to touch base with Jeff Regnart on what information would be useful in the management of the district.

f. Nushagak Sonar-(Bev Cross) Startup date will be on June 10. Operation of the site will be similar to 1991 with exception of Jim Miller being directly in charge of the site and the use of different mesh sizes (up to four different sizes, pink year). They will run the project until August 15. Management wants it run until the 21, an additional \$10,000 is needed to do so.

g. Westside Catch Sampling-(Drew Crawford) similar operation to 1991 except that Drew will be running the program.

h. Igushik Test Fish-(Bev Cross) Discussion of whether or not to keep the project funded. Management thought that the information was important and wants to keep it. It was decided to leave the project in the water for 1992 and run it similar to 1991.

3. WhiteFish Test Fishery-(Dennis Haanpaa)

A proposal needs to be developed by the staff that addresses the informational needs of the department i.e Biomass, Age classes and Age at Maturity. Ken Florey does not think it is economically feasible. To gather the information from the test fishery a technician or Graduate student would be needed. Subsistence is willing to split the cost with us to go and collect some information from the subsistence catches. Steve Fried and Dennis Haanpaa will look into the options.

4. Togiak River Test Fish-(Tom Brookover)

Tom would like some way of knowing what is entering the lower part of the river. He would like to see a feasibility study done. We could use USF&W seasonals that will be in the area to do a test run to see if it is workable. Dennis Haanpaa wants the subject incorporated into the Togiak Management Plan that is being developed.

5. Nushagak Coho Salmon Plan

Discussion of whether or not the BER of 90,000 is too low. Another meeting to address these concerns is planned for sometime in March. For 1992 we will go with 110,000 fish in river by August 15.

6. Togiak Salmon Management Plan

Togiak Advisory Committee has a tentative meeting date of March 3.

7. Tower Counting Review

Budget cutting topic, if we could count every other hour or less hours in a 24 hour period than present we could cut the overtime hours for the tower projects significantly. Linda Brannian will notify Juneau of our intent (a change in how we count could have significant public repercussion so Juneau should be brought in early on). Virginia Shook will have some time in the next few months to keypunch the hourly counts. Egegik and Togiak Towers are the most costly so they will be looked at first.

B. Herring

1. 1992 Outlook and Changes.

Kathy Rowell noted that the Togiak herring biomass is still in a state of decline. Age 13/14 component is down 12-13% in the 1992 forecast, but 1991 held the largest showing of age-4 fish in years. Age 8 and 9 comprise more than 50% of the forecasted biomass.

2. Management Concerns.

Jeff Skrade proposed extending the closing date for test fish bids until after the first seine opening to eliminate plugged companies.

It was also outlined that during herring Jeff Skrade would head the test fishing and Tom Brookover would fly the surveys, and harvests would be targeted for the front end of the run. Recent board actions affecting the herring fishery include: a definition of crewmember duties in the spawn on kelp fishery; a housekeeping change in the Togiak/Nunavachak boundary line, and; a limit of 100 fathoms of gear placed on gillnet vessels during open fishing periods.

a. Ken Florey suggested that any fish held in a seine over 24 hours be considered dead, and included either as waste or sold fish.

3. Work Force.

With the budget concerns, Dennis Haanpaa suggested cutting back on the FB I and other seasonal positions for herring. Kathy Rowell opted to give up the Tongue Point camp. Jeff Skrade said that there would be little to save logistically by giving up one camp, only saving on Line 100. Ken Florey decided to cut the camp at Tongue Point and eliminate the FB I position during herring. Kathy Rowell also requested more direct supervision over technicians by the management staff.

4. Sampling Plans.

Kathy Rowell and Steve Fried agreed to redesign the sampling program in lieu of losing the Tongue Point camp. Sampling efforts will probably be concentrated in Togiak Bay and scaled back in the western areas. The possibility of getting voluntary samples from the processors was also discussed.

5. Aerial Survey Responsibility. See III. B. 1. b.

6. Helicopter Contract and Public Safety Machine.

Dennis Haanpaa gave the go-ahead for Jeff Skrade to pursue a new contract for 1993, since 1992 is the last year remaining on the present 3-year contract. In addition he (Haanpaa) will check on the status of the public safety helo.

7. Fish Tickets.

Virginia Shook has had a number of problems with the 1991 fish tickets; areas were left unmarked or lumped together with Togiak, bait percentages were in error, and dates were wrong. Although these types of errors are present in most years, 1991 was seemed to be worse than usual. Jeff Skrade said that sample fish tickets are explained to processors, but the processors dump the responsibility on the tenders. Kathy Rowell will make up the processor packets for 1992.

8. Post Season Sampling.

Ken Florey suggested keeping post-season sampling/surveys contingent on test fishing (point estimates) funds. If there is no funding, it will be the spotters responsibility for early surveys/spotting.

9. Remote Sensing.

Fritz Funk gave an overview of the pilot study by Borstad Ass. at Togiak last spring. Basically the spectral imaging data and observer data appear to coincide, but there are several unknowns, and the comparisons may not be as close as stated in the study. At this point the methodology appears feasible, and the next step would be a trial in district-wide production mode. Next time, if there is a next time, the Department may try to take the project in-house by renting the equipment, processing the images, and doing most of the analysis. However, there is no funding for the remote sensing project this spring.

Russell commented that remote sensing is potentially the next generation in biomass estimation, as the imaging device "saw" herring where he, the observer, did not. This may have application both in turbid water and milt-laden water.

10. Inseason Reporting.

Will continue in 1992 just like 1991.

C. Reports

1. Herring - 1988-1991 C&E and the 1991-92 forecast reports need to be finished.

2. Salmon

a. Management-AMR sent to Anch. by April 1.

b. Research-have completed 19 reports and have 9 left to finish. Ahead of where they usually are at this time of year. Barry Stratton needs a break on production reports, needs to be able to do something more interesting.

3. POP-Individuals need to check them, but the general thought was that they were up to date.

4. RIR-Steve Fried gives the final numbers, Jeff Skrade gives out the footnote number.

D. Maintenance Needs

1. King Salmon-bunkhouse, rooms are complete except for taping, painting and hanging the doors.

2. Igiugig-The main cabin needs foundation work and a new water heater. Question was how much should we do since we don't own the buildings and could be moving if the lease is increased.

3. Dillingham will need a new roof soon.

4. Discussion on first aid training for seasonals, Dennis Haanpaa will check on it.

VI. MISCELLANEOUS

1. 48 Hour Transfer Program

The proposed transfer program:

June/July avg. transfer per month =	500	
3 people @ 1.5 mo/per side		
(\$6,000 per person)	=	\$60,000
divided by the avg. transfer	<u>2,000</u>	
		\$ 30.00/transfer

The actual number of transfers will probably be lower so we will charge \$50.00 per transfer. Dennis Haanpaa will check with the Attorney General's office to check the legality of setting fees. CFEC will need direction if they are to handle the program.

A. CFEC (Chris Kelly)

1. 1992 Plans- They will spend the last week of April in Dillingham. This will mean less time for Salmon.

They will be in Dillingham from June 8 until the 13 and then will go to King Salmon from June 15 until July 10. There will be no one in Dillingham from June 13 on, the information will have to be Penn-Packed to King Salmon. After the 10th of July they will leave the computer and programs for us to use if we would want to. Right now they will need a modem to print this year in season due to a change in the states computer system.

24 Hour Office Hours-A charge of \$50.00 a transfer was discussed to fund the extra cost of keeping the office open around the clock. We would need 4 seasonals for 1.5 man months each. Dennis Haanpaa is going to check with the A.G. office on whether or not we can charge a fee for each transfer.

Chris Kelly mentioned that if a box for district registration was included on the permit renewal form that Blue cards would no longer be needed.

Blue Cards-Anchorage will send them out again this year. Chris Kelly wants the CFEC number and the ADF&G number locations on the blue card switched for ease of data entry. Richard Russell needs to supply Anchorage the number of forms needed for 1992. Russell suggest that there is no need to print the address on the fishermans part of the card.

6. Email for Bristol Bay would need \$20,000 worth of equipment and

dedicated line to run. Does cut down on phone calls, faxes and memos being sent through the mail. Decided that is too expensive right now, but is a good idea.

BRISTOL BAY STAFF MEETING AGENDA

February 4-5-6, 1992
Anchorage Regional Office Annex
Anchorage, Alaska

I. ADMINISTRATION

- A. Appointment of Chairman
- B. Assignment of Recorder(s)
- C. Agenda Review/Additions

II. HEADQUARTERS

- A. General Overview
- B. Budget Outlook (FY92 and FY93)
- C. Headquarters Staff changes from last year (flow chart)
- D. SB 337 - impacts on Division if it passes (current status)
- E. Escapement Goal Policy update
- F. Regulation book printing schedule and quantity
- G. North Peninsula sockeye scale digitizing and collection
- H. Questions

III. REGIONAL STAFF

- A. Budget
 - 1. FY92 pre-audit
 - 2. Equipment needs
 - 3. Ugashik, Naknek, and Wood Rivers smolt funding?
 - 4. Funding for fall management surveys?
 - 5. Yellowbook update
 - * 6. CIP UPDATE
- B. Personnel (New Flow Charts)
 - 1. Permanent Employee Project Responsibilities 1992
 - a. Herring Management
 - b. Herring Aerial Assessment
 - c. Herring Research
 - d. Salmon Westside Management (inc trainee)
 - e. Salmon Eastside Management (inc trainee)
 - f. Westside Research
 - g. Eastside Research
 - 2. Supervisory Help for Herring and Salmon
 - 3. Management/Research/Biometrics Interactions
 - 4. Seasonal Hiring (status)
 - a. Ways to reduce the cost of seasonals? (Russell)
- C. Meeting Schedule
 - 1. BB Fishery Conference (April)
 - 2. BB-RPT meetings and status
 - 3. Cominco "Pebble Beach" mine (status and meetings)
 - * 4. KODIAK STAFF MEETING REVIEW

* AGENDA ADDITIONS

IV. PROGRAM REVIEW

A. Salmon

1. 1992 Management (Board Action and/or biological)
 - a. Togiak (Brookover)
 - b. Nushagak (Skrade)
 - c. Naknek-Kvichak (Regnart)
 - d. Egegik (Russell)
 - e. Ugashik (Russell)
2. 1992 Research Project Plans
 - a. Kvichak and Egegik Smolt Upward Sonar (Crawford)
 - b. Kvichak Smolt Sidescan Sonar (Huttunen)
 - c. Kvichak, Egegik, Ugashik River Test (Stratton)
 - d. Eastside Catch Sampling (Miller)
 - e. Nak-Kvi Stk Id Test (Cross, Miller)
 - f. Nushagak Sonar (Cross, ??)
 - g. Westside Catch Sampling (Cross, ??)
 - h. Igushik Test Fish (Cross, ??)
3. Whitefish Test Fishery
4. Togiak River Test Fishery
5. Nushagak Coho Salmon Management Plan
6. Togiak Salmon Management Plan

* 7. ~~TOWEN~~ ESC. REVIEW

B. Herring

1. 1992 outlook and changes (Rowell)
2. Management concerns (Skrade)
 - a. Holding of herring to improve roe percentage
3. Work force (seasonal by camp, and duties)
4. Sampling plans
5. Aerial survey responsibility
6. Helicopter contract and Public Safety machine
7. Fish tickets (Rowell)
 - a. Supervisory designee
 - b. Processor reporting problems
 - c. Database and can we use it? (Brookover)
8. Post season sampling (Rowell)
9. Remote Sensing - review and discussion (Funk)
10. In-season reporting

C. Reports (status)

1. Herring Reports
2. Salmon Reports
 - a. Management
 - b. Research
3. Project Operational Plans

* 4. TUR # ASSIGNMENTS.

D. Maintenance Needs

1. King Salmon
 - a. bunkhouse status

V. Fish and Wildlife Protection - 1992 program

VI. Miscellaneous

1. 48 hour transfer program (CFEC, contract, or in-house)
 - a. District registration cards; ordering, mailout

2. Salmon Fish tickets
 - a. Processor reporting problems?
 - b. Reporting of fish not sold
3. King Salmon sewer project up-date (Russell)
4. King Salmon phone message service up-date (Russell)
5. First Aid Training
6. Email for the Bay?
7. Open - whatever we forgot?

Distribution:

Lloyd
Larson
Clasby
Florey
Haanpaa
Fried
Brannian
Crawford
Cross
Stratton
Rowell
Miller
Skrade
Brookover
Russell
Regnart
Prigge
Probasco
Nicholson
Kelly, Chris
Capt. Phil Gilson
Huttunen



ALASKA DEPARTMENT OF₁ FISH AND GAME

DIVISION OF COMMERCIAL FISHERIES MEMORANDUM

TO: Fritz Funk
Statewide Herring Biometrician
Division of Commercial
Fisheries, Juneau

DATE: January 29, 1992

PHONE: 267-2377

FROM: Kathy Rowell *Kathy*
Fisheries Biologist
Division of Commercial
Fisheries, Anchorage

SUBJECT: Report Review: "Remote
Sensing of Bristol Bay Herring"
by Borstad and Associates

Thank you for the opportunity to review the report entitled "Remote Sensing of Bristol Bay Herring" by Borstad and Associates. The report was reviewed with the perspective of examining the success of the feasibility study, description of the technique (as required by an individual not familiar with the technology) for future stock assessment in Bristol Bay, and accuracy of reported results. Attached are detailed comments by page and paragraph. The following is a summary of those comments.

This study indicates spectral image processing or CASI could be a technique to be further explored for Togiak herring stock assessment. The feasibility study has proven that herring may be identified by a specific spectral band in the Togiak District. Secondly, given the validity of the baseline assessment, the spectral bandwidth for herring is different than that of aquatic vegetation which can be a source of error in visual aerial survey assessment. The database created from this type of assessment may be stored and re-accessed for repeatable estimates for additional analysis. The study confirmed Dick Russell's observations that the larger schools provide the greatest contribution to the biomass. The most important result from this study is that an enhanced video image showed presence of a herring school not visible on the simultaneous unenhanced video image. Thus the CASI system can detect fish beyond the ability of that of a human surveyor.

The technique is promising but there are a number of concepts in the report that are conflicting, overstated or not well explained.

Baseline Spectral Imaging

The report explains the methods used to obtain the baseline spectral range for herring in the Togiak District were used to define the range for all herring observations in the feasibility study. The baseline range was determined under poor lighting conditions and in weather that "hampered" data collection. The band width was determined from only one school that was not

groundtruthed for species composition. An explanation of why such limited data collected under poor conditions can be used to base an entire study would be helpful.

Several references through the report state that the spectral band width identifying capelin off the North Atlantic coast is similar to that of British Columbia herring and Togiak herring. Capelin and other forage fish species are frequently present at varying levels of abundance in the Togiak District, concurrent with the presence of herring. Whether multiple species of forage fish (capelin, smelt, saffron cod, etc.) can be distinguished from herring needs to be addressed and is recommended for future investigation.

Weather Limitations

A statement in the Summary section says that data collection was possible even under severe weather conditions. This statement is not consistent with other statements in the report that the operation was indeed hampered by poor weather conditions. These inconsistencies need to be resolved and are outlined paragraph by paragraph in the attached comments. It is fact that Borstad and Associates were not able to fly during severe weather conditions. The dates of CASI surveys were also days ADF&G performed surveys.

Swath Width

The swath or path of the video image is very narrow at lower altitudes (1,500 ft). The report states that the narrow swath may limit full assessment of large herring schools. Flying at higher altitudes (8,000 ft) would diminish this problem. However, the ceiling in Bristol Bay is frequently 2,000 ft or lower. Secondly, the CASI system is sensitive to turbulence which, as Dick Russell noted, can be a problem at the 8,000 ft. elevation. Further explanation of the liabilities of not assessing full school size and potential solutions in this section would be appreciated.

The information presented regarding school size and distribution were very informative. However, the data were averaged to represent a 450m^2 area for altitudes ranging from 1,600 ft to 3,900 ft. Because flight altitude is an issue for future implication of this study, these data represented in this section should be stratified into 750-1,000 ft components.

Visual Estimate vs. CASI estimate

At first glance the correlation between the observer (Dick Russell) and CASI estimates of biomass is encouraging ($r^2=.99$). These results are referenced in several sections of the report. Closer examination of the analysis reveals several problems that essentially invalidate the analysis and it's conclusion. The sample size is extremely small as only four of eight schools were included. Secondly, the report states that there was difficulty determining which schools in the visual estimate corresponded to the CASI estimate. Schools that looked most alike were included in the

regression analysis, eliminating the "ambiguous observations". The "high correlation" is therefore readily explained. The regression analysis and its continuous reference throughout the report as a successful comparison should be eliminated.

I get the impression from reading the report, that the concept of a constantly changing biomass distribution and school configuration is not fully understood by the authors. The report provides good recommendations however, regarding a better method of surveying for future comparisons between visual and CASI methodology.

In the discussion section of the report, there is a review of past studies using CASI for stock assessment. There are several references to the high correlation of the CASI method to the old methodology. Some description of the data and statistics regarding the analysis used in the report is appropriate because the same statements presented for the Bristol Bay data were very misleading.

The report states uncertainty for the first test whether the visual observer used the biomass from one pass over the survey area or documented results from all three transects. Per Dick Russell, the visual estimate results are a singular estimate (but not a summation) from all three transects.

Density

The concept of determining density by color shading of the school surface area is addressed. This concept is appealing but assumes that vertical distribution of herring throughout the school is the same as that witnessed at the surface area an unproven concept. School configuration frequently changes on the grounds as the biomass spawns and moves around the fishing district. The need to groundtruth hydroacoustically any school density assessment as mentioned in the report is necessary. This topic seems beyond the scope of the feasibility study.

Efficiency

Comments describing the time required to process CASI data are not consistent. Page 38 states that 200 schools per day (2.5 days) were required to process images from the Togiak herring study. This estimate conflicts with the statement that 5 to 15 minutes are required for processing each image. For the 492 school images processed, this results in a range of 41 to 123 hours, or 4.1 to 12.3 working days that are 10 hours in length. Coupled with the 2-3 days of time required for data management, the resultant turn around time ranges from about 1.5 to 3-five day work weeks. Clarification of time in number of hours for the image processing, analysis and data management of the Togiak herring data is needed.

The statement in the Summary section of the report that describes a future 10 hour turn around time to provide a biomass estimate from a four hour survey is not clearly defined. It seems that a projection of the time required to process data would depend on the

amount of data collected. The quantity of data collected would depend on the area surveyed and survey design which have yet to be considered. It is extremely premature for Borstad and Associates to state that they anticipate a turn around time of 10 hours for a four hour survey when the survey area is undefined. This estimate also appears extremely premature because of the large amount of time currently required to process and manage the data from the feasibility study. A description of the area and number of transects that could be recorded in a four hour period and processed within a 10 hour time limit and a description of requirements to streamlining the data processing, analysis and management to accomplish these objectives would be appropriate.

Another conflict is the statement on page 34 that the complete survey area could be mapped everyday in a true biomass assessment versus the statement that "it is not reasonable to expect complete CASI coverage of the fishing district except on occasion". What survey area is being referenced here?

Results of past studies are described in the Discussion section but are not related to the Togiak data in terms of magnitude of assessed population or biomass, logistics, weather patterns, survey frequency and duration, and data quantity. These studies have been described as successful therefore these comparisons would be helpful to the ADF&G staff in technique evaluation.

Future assessment

The remote sensing technique could be a promising tool for stock assessment of the Togiak herring population. Flying conditions and cloud cover impact both CASI and visual aerial survey abundance estimates. Presence of milt, turbid water, changing light conditions and species identification limit effectiveness of the visual aerial survey observations, problems that may be solved by this remote sensing technique. Continued feasibility analysis to address these questions, to continue refinement and testing of the technology and to provide better time estimates of data processing and analysis are warranted.

cc: Florey, Haanpaa, Fried, Russell, Skrade, Brookover, Brannian, Skvorc, Huttenun

Detailed comments:

Page i. Para 1. Introduction. Significant recruitment has not been observed since 1983 when the 1978 year class were recruited into the biomass as age 5 herring.

Page i. Para 1. Both gill net and purse seine fishermen harvest herring. This fishery may be identified as a sac roe fishery since the marketed product is herring roe.

Page i. Para 2. Though some modeling of harvest trends has been performed, biomass estimates and stock assessment has always been determined using visual aerial survey estimates rather than harvest trends. Limitations of the visual aerial survey technique are the justification for examining other survey tools.

Page 1. Para 3. Sentence states that data was collected despite severe weather conditions. Page 12 states that storm conditions prevented data collection. Please be specific in describing the weather limitations. Estimates were not performed on truly severely poor weather dates.

Page 2. Para 1. "Push broom" imager is not defined. This is a good location to describe previous studies and results by Borstad and associates.

Page 7. Para 1. Type of statistics software is not defined. Is this a commercial software package and what type of statistics are needed? Reference is too generic.

Page 7. Para 3. Figure 2.? is missing the reference number.

Page 10. Para 4. Again what statistics are being referenced by the sentence "Several other statistics referenced..."

Page 11. Para 3. Dick Russell was the trained surveyor and Katherine Rowell was the observer.

Page 12. Para 3. The first sentence refers to a "Scientific Authority". Who is the **Scientific Authority** of Dillingham.

Page 12. Para 3. Statement that storm conditions prevented flying opportunities conflicts with statement in introduction that data was collected under severe weather conditions.

Page 14. Para 7. First sentence again conflicts with statement in summary that data was collected despite severe weather conditions.

Page 14. Para 2. Only one school observed in very limiting conditions was used to develop baseline data for entire feasibility study. Sample size of one school is very small and such little data requirement needs to be further explained.

Page 15. Para 1. What is the significance of the spectra being noisier than usual because of low signals obtained under heavy clouds? Cloud cover is common in Bristol Bay and would be encountered in future study applications, how the noisier spectra would affect future application, if at all needs to be explained.

Page 22. Para 2. The visual estimate was a single combination of surveys (not a summation) rather than just a single or the total of 3 three surveys over the transect.

Page 22. Para 2, line 3. Reference to Table 3.3 is actually 3.2.

Page 22. Para 2, lines 2-15. This section is the most important finding of the entire study. The emphasis on the visual observation versus CASI documentation should be diminished and more credibility given to the fact fish were detected in an enhanced video image that would not have been detected by the human eye.

Any further discussion regarding the high correlation of the visual versus CASI observations is completely thwarted by the first four lines in paragraph 2 on page 22.

Page 23. Para 2. Description of correlation between CASI and observer should be eliminated. The points included in the regression were selected on the basis of agreement so of course the correlation will be high. This analysis is not appropriate and is misleading as it is referenced throughout the document.

Page 24. Para 3. Swath width for this analysis was averaged for all flights within altitudes of 1600 to 3900 feet. It seems more appropriate to stratify within the 2000 foot altitude difference to truly see the difference in school assessment at different elevations. Would the swath widths be averaged if there were variation in survey altitude for a true biomass assessment for a single survey of a small area?

Page 24. Para 3. Was the 450m² school area weighted by flight altitude?

Page 24. Para 4. The meaning of the statement "the relatively low abundance of schools greater than 450m² hides existence of large schools which contribute greatly to the total biomass" is puzzling. Does this mean that the 450m² swath width is too narrow for full assessment of large schools? Again stratification of results between needed 1600 and 3600 ft altitudes would seem more appropriate than averaging the swath width for all heights and observations.

Page 24. Para 4. The term scene is undefined. If it is a single video frame, please so state.

Page 26. Para 1. The last sentence implies the herring run was

over when in fact it was just building. Peak biomass was observed May 16. Movement of the biomass is dynamic. The fish may not have been in the area which was being surveyed at the time of the survey.

Page 30. Para 2. Again the generic term "several statistics" was referenced. Please explain what statistics are being discussed.

Page 30. The section on density could be a useful application, the to describe school density by a surface area measurement assumes subsurface or vertical density of the fish is uniform throughout the school, untenable by CASI.

Page 31. Para 1. Please describe the definition of "density index", units of measurement and how it was derived.

Page 34. Para 1, line 4. Generic reference to "statistical applications" . Please again describe the applications.

Page 34. Para 1, line 7. The statement that the complete survey area could be mapped everyday in a true biomass assessment situation seems to conflict with the statement that "it is not reasonable to expect complete CASI coverage of the fishing district except on occasion". Also, please qualify the proposed survey area either by landmarks, number of miles, or in flight time, particularly since a survey design has not been developed.

Page 34. Para3. This paragraph should be eliminated. How can one predict without any indication of survey design and quantity of data collected in the surveys?

Please state how many surveys or transects specified length could be processed in the 10 hour time period. Otherwise, the statement is exceedingly premature.

Page 35. Para 1. Figure number is missing.

Page 36. Para 1. The statement regarding limited comparison with visual observers suggests that CASI is accurate. Please eliminate this reference and all other references to the high correlation or accuracy of the visual vs. CASI comparison.

Page 36. Para 1. The first sentence infers reference to the entire biomass rather than the observations of the feasibility study.

Page 36. Para 2. Need to address scenario when all schools are small in survey area, which is sometimes a reality. Would these small schools then not be included in the assessment?

Page 36. Para 2. A figure depicting the distribution seems appropriate.

Page 37. Para 2. Personnel that perform visual aerial surveys of the Togiak District are not trained through use of aerial photographs but are trained on the ground by experienced surveyors.

Page 37. Para 2, sentence 3. Contradicting statement as previous statements have emphasized the high correlation between CASI and visual estimate. The previous discussion on page 22 said that in the visual versus CASI survey comparison that there was uncertainty as to whether surveyors visual estimate was the sum or observed biomass for each of three transects or the total of all schools in the survey areas. Please be consistent.

Page 37. Para 2. Please eliminate reference to high correlation analysis between CASI and visual comparison.

Page 38. Para 1. Time estimate for data processing not consistent with 5 to 15 minute range for 492 schools (see earlier discussion under general comments).

Page 38. Para 2. CASI did or did not detect schools beneath milt? This conclusion is unclear or was the concept tested? Please clarify.

Page 38. Para 2. Why is the boundary estimation procedure for post spawning herring the most time consuming component of the area estimation procedure? Is it school size or configuration?

Page 38. Para 3. Areal should be spelled aerial.

Page 39. Para 1. Line 6. Areal should be spelled aerial and AKF&G should be ADF&G.

Page 39. Para 2. What additional work and local knowledge is required to produce confidence interval on the estimate?

Page 39. para 3. "Scene" is not defined but referenced here and earlier. Should specify if it is truly a video frame of a certain area.

Page 39 Para 3. Areal should be aerial.

Page 40. Para 1. Reference figure depicting map of surveyed area.

Page 40. Para 3. The report states the the swath would increase by 2-3 cm wide if camera is mounted obliquely but do not state at what altitude this could be accomplished. Is this increase at an altitude of 10,000 ft.?

Page 42. Para 1. "Other statistics" is another generic reference that does not define to the contractor what information one can expect to receive from this process.

Page 42. Para 1. Does "Aerial survey" in sentence 4 refer to CASI or to former and aerial photograpnic techniques?

Page 42. Para 1. How "good" is the agreement between the aerial surveys and hydroacoustic assessment of previous studies? More detail of the methods used to determine that agreement would be appropriate. Were similar methods used as those presented in the visual versus CASI estimates for the Togiak study?

Page 43. Para 1. Good discussion of past work. But how do the logistics, weather patterns, total biomass or population size, database size and potential data manipulation and processing time compare between Bristol Bay and Newfoundland?

Page 43. Para 2. The acquisition of data is faster with CASI as compared to aerial photographs but what of the comparison between processing time?

Page 43. Para 2. Was the correlation computed in the same manner as the correlation between observer and visual documentation in this report? Were inconsistent data points included in this correlation analysis? Please explain how many "scenes", images or schools were processed over what time period and if inconsistent data were included.

Page 43. Para 2. Final sentence mentions air photo images and to recognize capelin from seaweed. Why was preliminary spectral analysis used to discriminate between seaweed and herring not performed for this area?

Page 43. Para 3. Please limit statements to observations in study area as CASI observations occurred over a very short duration of the biomass present at the beginning of the herring run.

Page 43. Para 3. Please change "migrates into spawning grounds" to "Schools observed in this study."

Page 44. Para 1. Herring usually form large strung out schools of varying shapes and sizes after spawning.

Page 44. Para 2. The concept of density estimation should be eliminated.

1992 Herring Forecast
Togiak District, Bristol Bay, Sac Roe
and Spawn - on Kelp Fisheries

by
Katherine Rowell
Fishery Biologist
Anchorage

The Togiak District of Bristol Bay extends from Cape Constantine to Cape Newenham and supports the largest spawning population of Pacific herring in the eastern Bering Sea. Herring move into the Togiak District from their overwintering grounds near the Pribilof Islands during spring months to spawn. These herring then feed during their post spawning migration southward along the Alaska Peninsula, concentrate in the vicinity of Unalaska Island, and return to their overwintering grounds in the fall. The primary harvest of this herring population occurs in the Togiak District by a sac roe fishery prosecuted during the spring spawning migration. Lesser harvests are taken during the summer months in the Dutch Harbor food and bait fishery and as bycatch in the domestic pollock trawl fishery in the Dutch Harbor and Unimak Island areas.

Beginning in late April the nearshore area of the Togiak District is surveyed daily from small aircraft to determine relative abundance, distribution, and spawning success of Pacific herring. Biomass estimates have been derived from the number and size of herring schools observed during these surveys. Use of aerial surveys to estimate the Togiak herring spawning biomass began in 1978. Observed abundance has ranged from 242,298 tons in 1979 to 76,960 tons in 1980 (Figure 1). The 1980 biomass was believed to be an underestimate due to poor visibility and overall poor survey conditions experienced that season.

In 1991, herring were first observed in the Togiak District 6 May. The first significant biomass of herring was documented 9 May. Poor visibility from storms passing through the fishing district limited survey conditions and observations of herring schools at the beginning of the season. When it was apparent that biomass assessment was not possible, managers used the forecasted guideline level of 8,793 tons from the forecasted biomass of 50,214 tons to open the commercial fishery. Commercial fishing periods for purse seine gear were opened 10 and 12 May and for gill net gear, 10 and 11 May. Spawning out herring were first observed leaving the district 13 May. The peak survey count of 51,498 tons was observed 16 May, three days after the final commercial fishing period. Assessment of the biomass continued the remainder of the season as

weather conditions improved.

Between 10 May and 17 May, herring age 9 and older comprised 64% of the sampled population. The shift from older to younger fish dominating the biomass was not detected in the biological samples until late in the season. Younger herring became more prevalent beginning 19 May where only 34% of the population were age 9 and older.

The final revised biomass estimate of 83,229 tons was the sum of (1) the entire peak biomass estimate observed 16 May (51,498 tons); 2) the entire biomass observed of spawnouts observed exiting the district along the Nushagak District 13 and 15 May (8,684 tons); 3) the removal by the commercial fishery of 14,970 tons, less the test fish estimates of 226 tons; and 4) the entire biomass observed 24 May (8,303 tons).

Age composition and biomass were monitored on the grounds after the ADF&G field camps were dismantled. Herring were observed on the grounds from 31 May through 9 June. The data from this reconnaissance was not included in the revised biomass or age composition estimates. The significance of these post season observations to the herring population assessed inseason is under evaluation. These data have not been available to us in past years and there is little understanding regarding residence time of herring once they enter the grounds.

The commercial sac roe harvest (preliminary) for the Togiak District totaled 14,970 tons during the 1991 season. This harvest was the largest harvest since 1985. Herring sold for a sac roe product comprised 97% of the harvest. The remaining 3% of the catch was purchased for food and bait. Roe recovery averaged 10.1% for the purse seine catch and 8.8 % for gill net caught herring.

The purse seine fleet of 200 vessels caught 79% of the total Togiak District harvest. The catch of 11,788 tons was harvested two fishing periods occurring 10 and 12 May. The gill net harvest of 3,182 tons, on 10 and 11 May. The harvest was taken by 170 permit holders and comprised 21% of the total sac roe harvest.

The 1991 age distribution was estimated from herring collected both during the commercial fishery and daily from areas of significant biomass sightings throughout Togiak District. Volunteered commercial or departmental vessels made multiple purse seine or gill net sets to capture herring throughout the spawning migration. Age structure of the population was determined from herring

captured by variable mesh gill net or purse seine gear. Samples were pooled across three day periods where possible to represent major fluctuations in estimated biomass for each fishing section. Herring from the commercial harvest were also sampled for age, size, and gonad condition. Samples were collected from tenders and fishing boats for each gear type and fishing section at the close of the commercial fishing period. Approximately 9,200 herring were sampled for biological data over the period of 6 May through 9 June 1991.

The 1991 Togiak District spawning migration consisted of 228 million herring weighing 83,229 tons (Table 1). Herring ranged in ages from 3 to 18 years. Fifty seven per cent of the biomass and 44% of the population was comprised of herring age 9 and older. The 1977 (age 14) and 1978 (age 13) age classes dominated the biomass between 1984 and 1990. The contribution by these year classes to the entire biomass has since decreased and contributed only 20% of the biomass and 15% of the population in 1991 (Figure 2). A spawning escapement of 66,933 tons was estimated after subtracting from the spawning biomass, removals by the sac roe fishery within the Togiak District and by the Dutch Harbor food and bait fishery.

A schedule of increasing natural mortality with age was used (Table 2) to project the abundance of the 1991 population. The growth and mortality schedules were revised to incorporate data collected from 1980 through 1989. An estimated 165 million herring, with a biomass of 60,214 tons is expected to return to the Togiak District in 1991 (Table 2). Herring age 9 or older will comprise 51% of the forecasted biomass as the abundance of the 1977 and 1978 year classes declines. The contribution of the 1977 and 1978 year classes appearing as age 15 and age 14 fish will continue to decrease to 6% of the biomass and 4% of the population as natural mortality rates for these older aged fish has increased. Year classes which follow in size are the 1984 (age 8), 1983 (age 9), and (1987) age 5, with respective forecasted contributions of 29%, 24%, and 16% to the biomass (Figure 3).

In past years, older herring have arrived on the fishing grounds before the younger or recruit age classes. The emphasis of the fishery and subsequent biomass assessment has been directed towards the older fish. This separation of older and younger age classes results in a paucity of information regarding the younger and later appearing age classes. Year class strength represented by the abundance of herring at age 5 was derived from aerial survey results and annual age composition estimates. In the Togiak

District, strong recruitment was last detected in 1982-83 when the 1977 and 1978 year classes joined the spawning biomass representing 197 and 189 million age-5 fish (Figure 4). Recruitment has since averaged 12.5 million fish annually. The 1974 year class was the largest in this series and contributed 586 million 5-year-old recruits to the 1979 biomass. The number of 5-year old recruits to the 1991 biomass totaled 3.4 million fish (Figure 4) and is considered well below average. The presence of the 1987 age class (age 4) during the 1991 season is the the strongest appearance of age 4 herring since 1982. The significance of these age 4 herring and other recruit year classes (age 3 and 5) which are not fully available to the assessed biomass, is currently difficult to evaluate. There has yet to be recruitment of any year class into the fishery of the magnitude that will replace the contribution by the diminishing 1977 and 1978 year classes.

The 1992 forecast is based on the revised biomass estimate of the prior season. Any biomass present on the grounds during the 1991 season but not documented due to poor weather conditions was not considered in the revised estimate. The biomass estimates performed at the beginning of the 1991 season were underestimates of fish present in the fishing district. In addition, we are unable to predict the full introduction of young fish (ages 3-4) to the biomass. Young herring ages 3 and 4 were observed in the biomass during the 1991 season but were not fully recruited. The significance of these younger age classes to the future of the population has yet to be determined. The 1992 forecast for the Togiak Herring spawning biomass is therefore believed to be a minimum estimate.

The 1991 spawning biomass of herring in the Togiak District is projected to be 60,214 tons (Tables 1, 2). The average size of an individual is expected to be 331 grams. Performance of the forecast has been conservative since 1984 (Figure 5) with an average forecast error (1984-91) of 32%

The Bristol Bay Herring Management Plan (AAC27.865) allows for a maximum 20% exploitation of the Togiak herring population when abundance is above threshold of 35,000 tons. The Togiak herring stock remains in a state of decline. The abundance of the 1977 and 1978 year classes is declining and will contribute 6% of the biomass in 1991. Continued exploitation of this population at 20% remains appropriate as most of the harvest occurs on older fish at the beginning of the run, and because the forecast traditionally has been less than the actual return. By the management plan, ADF&G shall set aside approximately 1,500 short tons for the Togiak

District herring spawn-on-kelp harvest, followed by a 7% reduction for the Dutch Harbor food and bait fishery. The remaining harvestable surplus is allocated to the sac roe fishery and shall be managed for a removal of 25% by the gill net fleet and 75% by the purse seine fleet. In years when circumstances prevent adequate biomass assessment, the fishery will be exploited on the pre-season projected return. Should a manageable separation of the year classes occur, a harvest of the younger age classes may transpire if a threshold of 20,000 tons of these younger fish are present on the grounds.

In 1991 the recommended total allowable harvest is 12,043 tons and represents 20% of the forecasted biomass. In accordance with the management plan the allocation would then be 1,500 tons for the spawn-on-kelp fishery, 738 tons for the Dutch Harbor food and bait fishery, and 9,805 tons for the sac roe fishery.

Table 1. Togiak District year class composition of the 1991 Pacific herring harvest, escapement, and total run biomass and the 1992 projected biomass.

Year Class	Age Class	1991 Harvest (tons)				1991 Escapement (tons)		1991 Total Run			1992 Togiak Projected Herring Biomass					
		Sac Roe		Food and Bait	Total Harvest (tons)	Biomass (tons)	No. of Fish (X 1,000)	% by Wt.	% by No.	Year Class	Age Class	Biomass (tons)	No. of Fish (X 1,000)	% by Wt.	% by No.	
		Purse Seine	Gill Net													
1990	1	0	0	0	0	0	0	0	0.0	0.0						
1989	2	0	0	0	0	0	0	0	0.0	0.0	1990	2	0	0	0.0	0.0
1988	3	0	0	0	0	11	11	75	0.0	0.0	1989	3	0	0	0.0	0.0
1987	4	94	5	1	100	5,928	6,028	36,875	7.2	16.1	1988	4	57	326	0.1	0.2
1986	5	12	1	1	13	650	663	3,408	0.8	1.5	1987	5	9,741	42,486	16.2	25.8
1985	6	63	12	2	77	920	997	3,665	1.2	1.6	1986	6	916	3,244	1.5	2.0
1984	7	904	325	86	1,315	11,957	13,272	42,043	15.9	18.4	1985	7	1,427	4,302	2.4	2.6
1983	8	1,455	675	119	2,249	12,671	14,920	41,472	17.9	18.2	1984	8	17,399	46,289	28.9	28.1
1982	9	499	191	70	760	3,843	4,603	11,335	5.5	5.0	1983	9	14,175	34,292	23.5	20.8
1981	10	2,228	453	176	2,857	7,245	10,102	23,165	12.1	10.2	1982	10	1,957	4,395	3.3	2.7
1980	11	862	288	155	1,305	3,760	5,065	10,811	6.1	4.7	1981	11	6,202	13,177	10.2	8.0
1979	12	2,026	510	312	2,848	7,170	10,018	20,631	12.0	9.0	1980	12	1,180	2,400	2.0	1.5
1978	13	2,549	567	254	3,370	7,952	11,322	22,297	13.6	9.8	1979	13	3,754	7,388	6.2	4.5
1977	14	832	135	132	1,099	4,385	5,484	10,910	6.6	4.8	1978	14	2,953	5,663	4.9	3.4
1976	15	144	0	15	159	365	524	1,059	0.9	0.6	1977	15+	595	1,121	0.8	0.4
1974	16	117	21	0	138	54	192	322	0.2	0.1						
1973	17+	3	0	3	6	22	28	55	0.0	0.0						
Total		11,788	3,182	1,326	16,296	66,933	83,229	228,123	100.0	100.0			60,214	164,821	100.0	100.0

Table 2. Projection of the 1992 Pacific herring biomass in the Togiak District.

Age (i)	Mean Wt. ^a at time (i)	Age Interval	G ^b	M ^c	A ^d	e ^{Ai}	A _(i+1) -M _i +G _i	Age Class	1991 Total Return (tons)	1991 Harvest (tons)	1992 Projection (tons)	% by Weight	Number of Fish (X 1,000)	% by Number
2	000.0	2-3	0.000	0.000	0.00	0.000	-2.05	2						
3	110.0	3-4	0.362	0.000	-2.05	7.745	-0.40	3	11	0	0	0.0	0	0.0
4	158.0	4-5	0.275	0.000	-0.77	2.153	-0.29	4	6,028	0	57	0.1	326	0.2
5	208.0	5-6	0.208	0.000	-0.56	1.754	-0.15	5	663	100	9,741	16.2	42,486	25.8
6	256.0	6-7	0.162	0.000	-0.36	1.429	0.01	6	997	13	916	1.5	3,244	2.0
7	301.0	7-8	0.125	0.000	-0.15	1.163	0.12	7	13,272	77	1,427	2.4	4,302	2.6
8	341.0	8-9	0.095	0.054	0.00	1.000	0.04	8	14,920	1,315	17,399	28.9	46,289	28.1
9	375.0	9-10	0.074	0.259	0.00	1.000	-0.18	9	4,603	2,249	14,175	23.5	34,292	20.8
10	404.0	10-11	0.055	0.465	0.00	1.000	-0.41	10	10,102	760	1,957	3.3	4,395	2.7
11	427.0	11-12	0.044	0.670	0.00	1.000	-0.63	11	5,065	2,857	6,202	10.2	13,177	8.0
12	446.0	12-13	0.033	0.875	0.00	1.000	-0.84	12	10,018	1,305	1,180	2.0	2,400	1.5
13	461.0	13-14	0.026	1.080	0.00	1.000	-1.81	13	11,322	2,848	3,754	6.2	7,388	4.5
14	473.0	14-15	0.019	1.286	0.00	1.000	-1.27	14	5,484	3,370	2,953	4.9	5,663	3.4
15	482.0	15-16	0.016	1.491	0.00	1.000	-1.47	15+	744	1,396	453	0.8	859	0.4
16	490.0	16-17	0.010	1.696	0.00	1.000	-1.69							
17+	495.0	17-18	0.000	1.902	0.00	1.000	-1.90							
Total									83,229	16,296	60,214	100.0	164,821	100.0

^a Weight at time $i = 515 \exp[-\exp^{-0.264(i-4.63)}]$.

^b Instantaneous growth rate $G = \ln(W_{i+1}/W_i)$.

^c Instantaneous natural mortality schedule based on the average age-specific mortality for 1980-89.

^d Availability (A) schedule based on biomass at age data, 1980-1989.

^e Projection $P_{i,1992} = [\text{Total Return}_{i,1991} \exp(-A_i) - C_{i,1991}] \exp(A_{i+1} - M_i + G_i)$.
 Model development documented in Baker, T.T. 1991. Cohort analysis of Pacific herring in the Togiak District, Alaska 1980-90. in Proceedings of the International Herring Symposium, 1990. University of Alaska, Sea Grant Marine Advisory Program, Fairbanks.

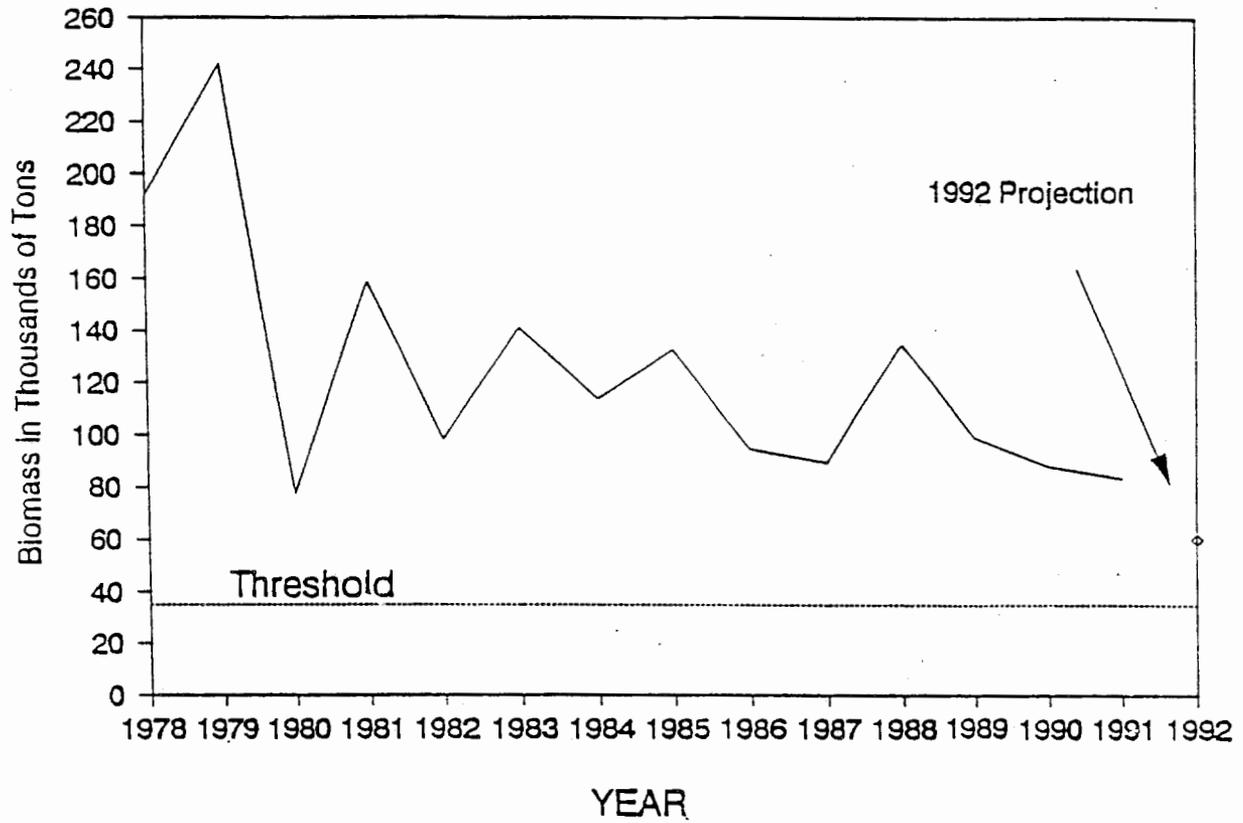


Figure 1. Togiak District herring biomass as estimated from aerial surveys. The 1992 biomass (diamond) was projected from the 1991 unharvested spawning biomass. The threshold biomass required before a commercial harvest is allowed is 35,000 tons.

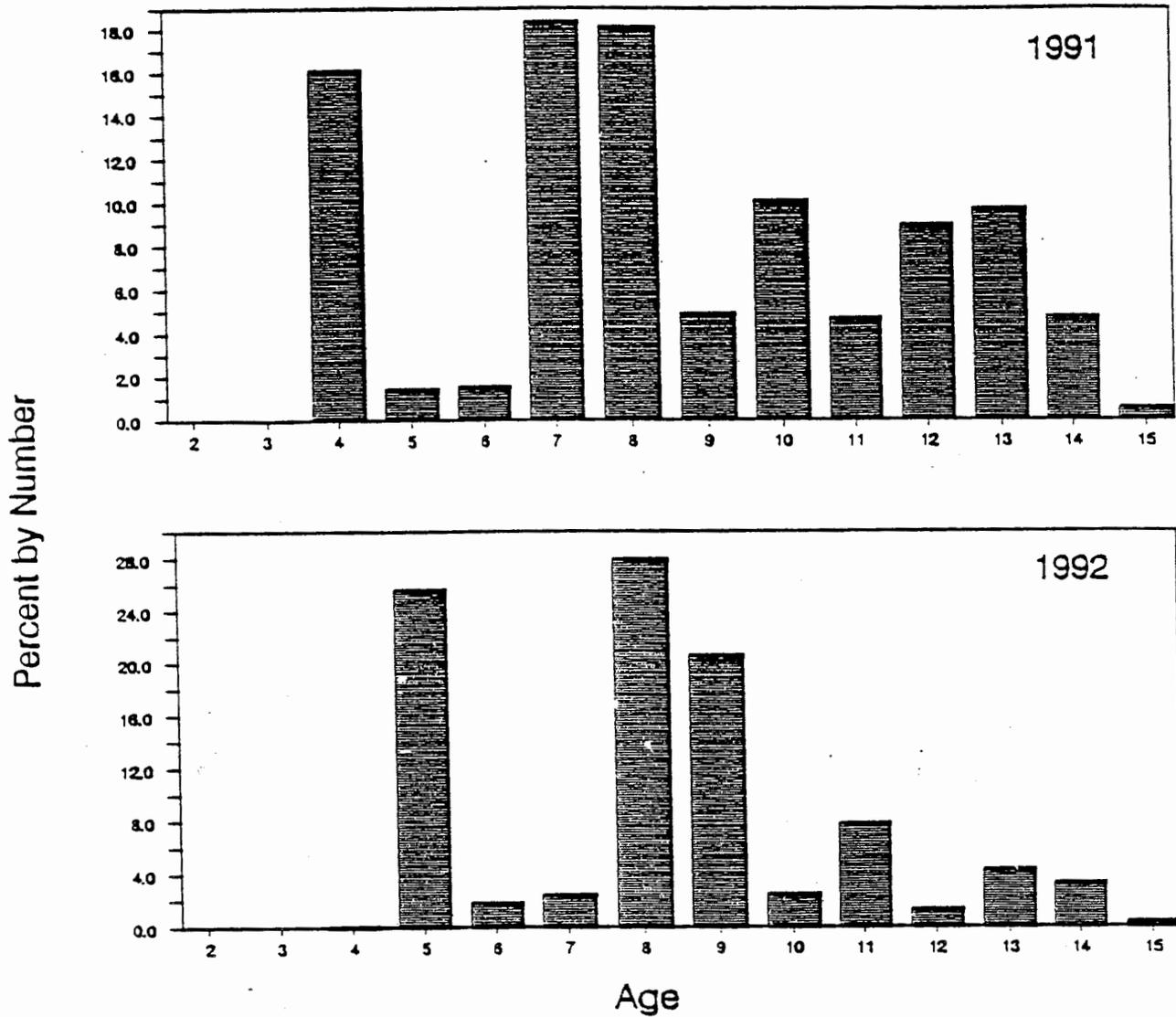


Figure 2. Age composition of the Togiak District herring population by number, in 1991 and projected for 1992.

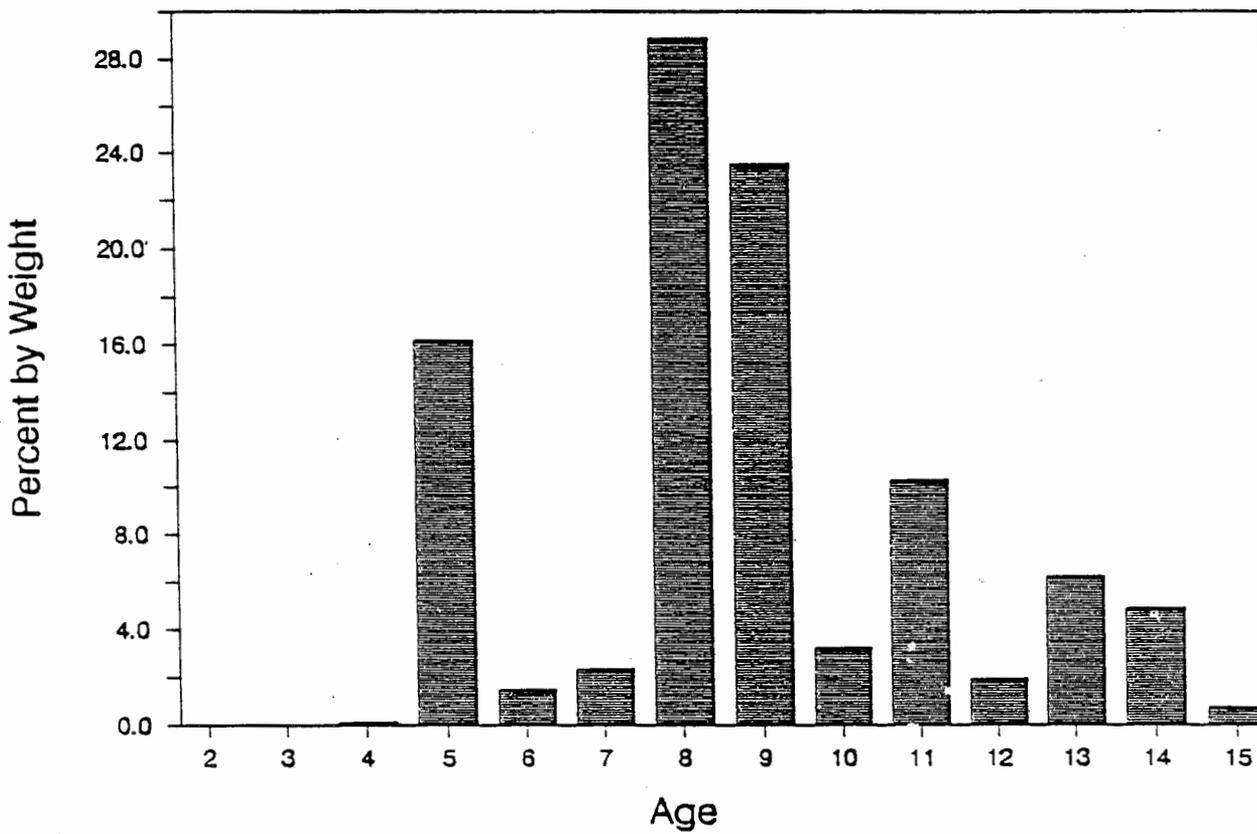


Figure 3. Age distribution by weight of the 1992 biomass forecasted for Togiak District herring. The mean weight is projected at 331 grams.

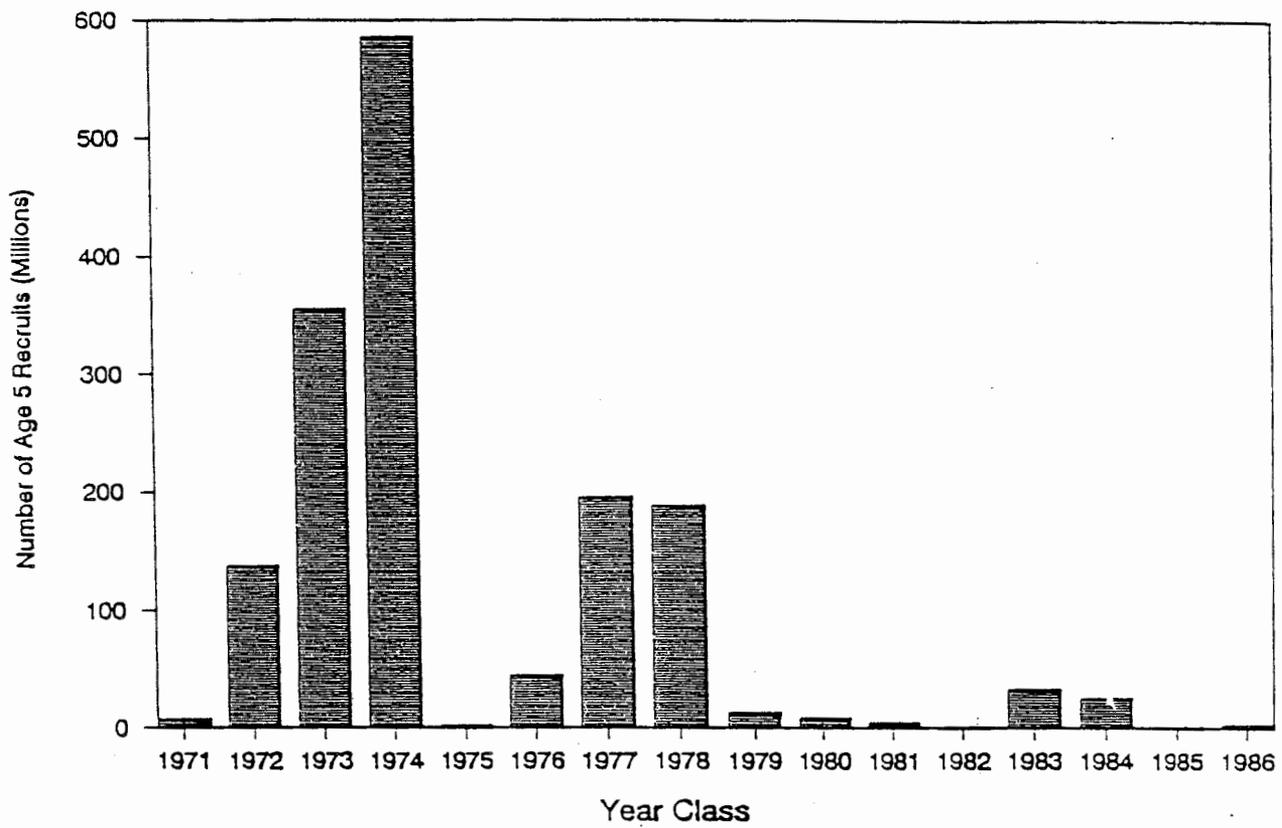


Figure 4. Historical year class strength of Togiak District herring in numbers of five year old fish.

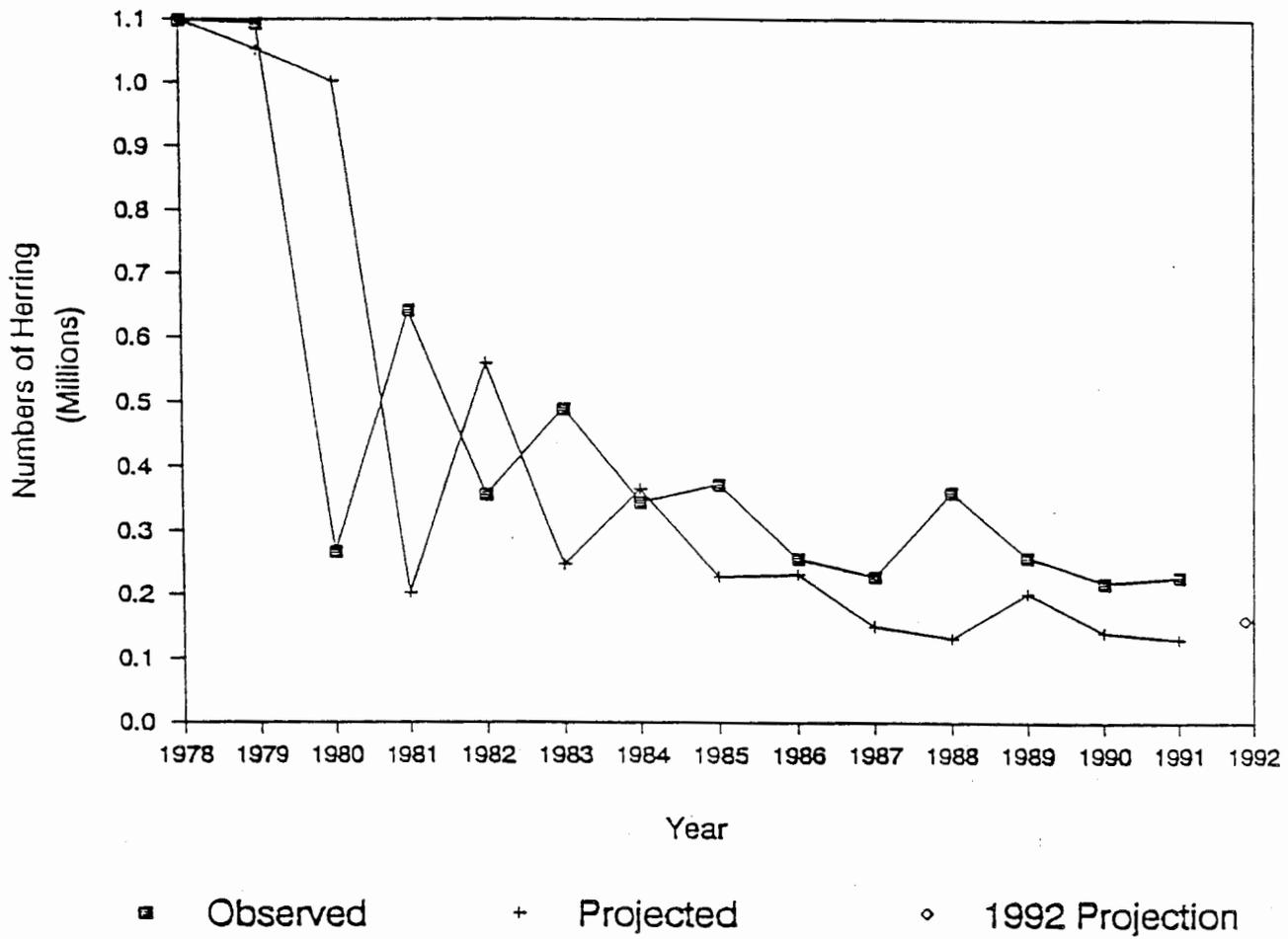
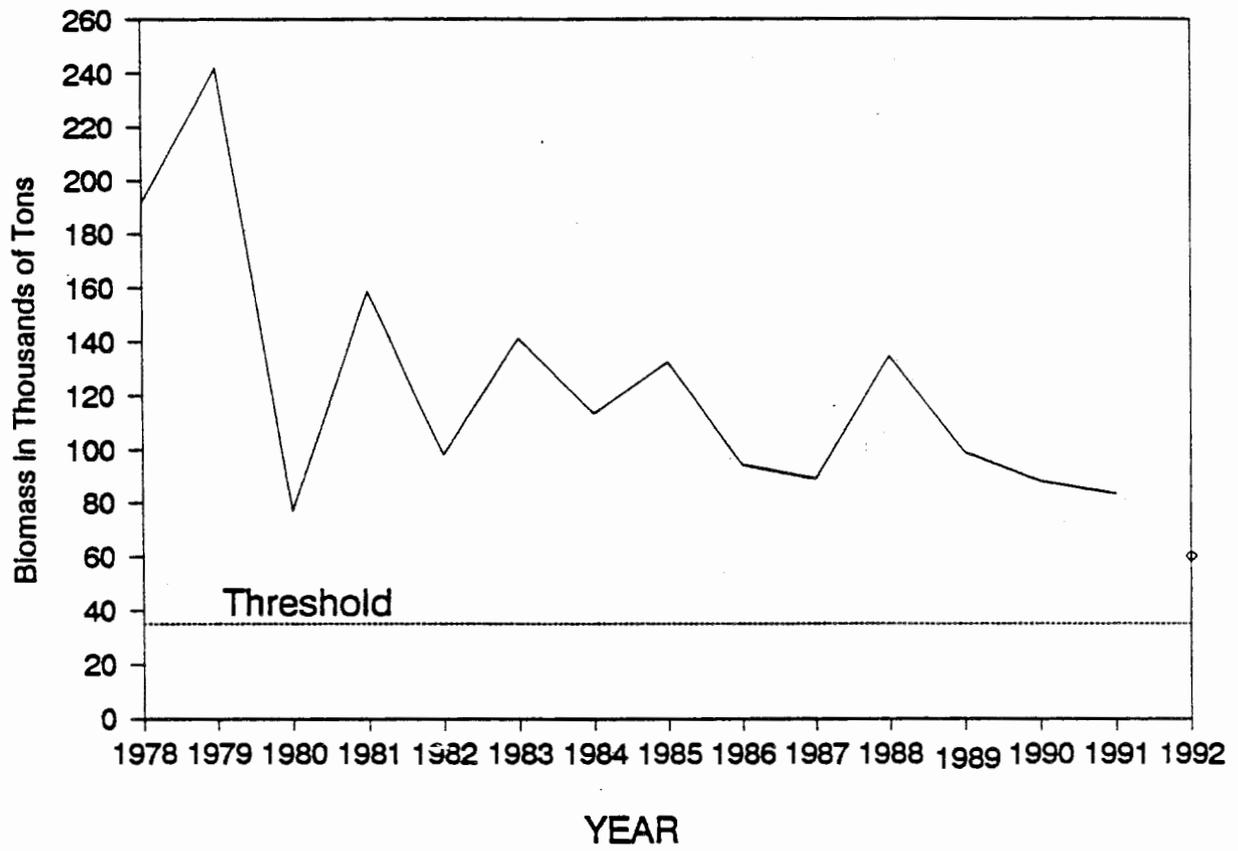


Figure 5. Performance of the Togiak District herring forecast based on the revised schedule of increasing mortality with age.

Togiak District Pacific Herring

Total Run Biomass 1978-91

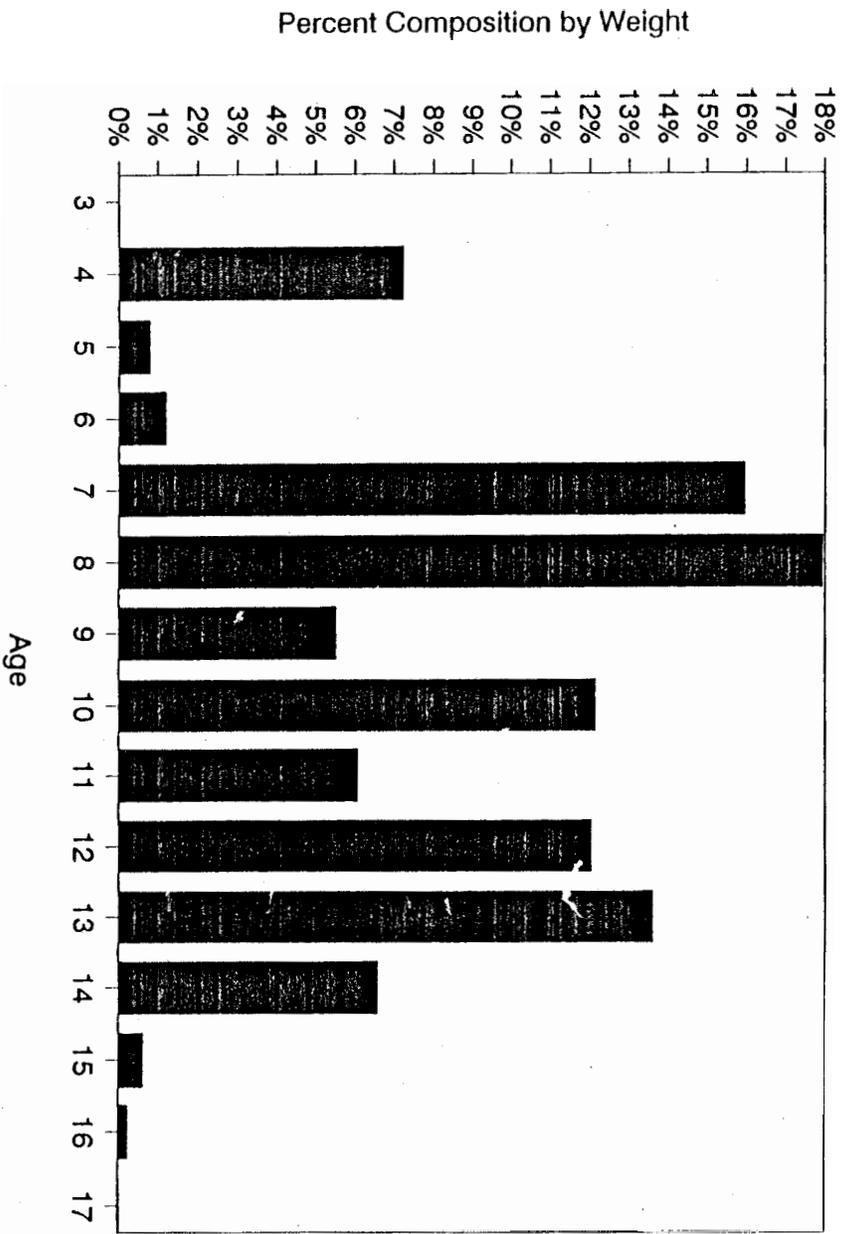


◇ 1992 Projection

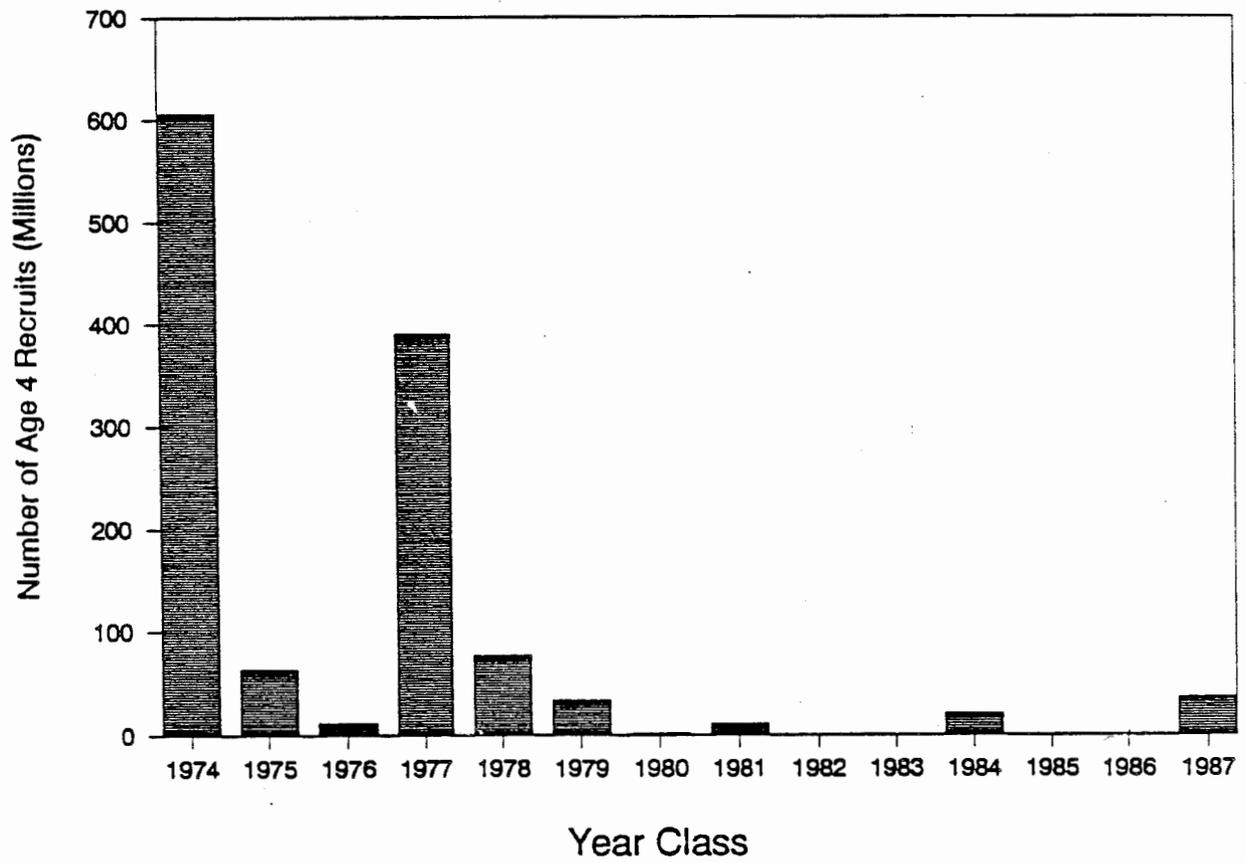
Table 1. Togiak District year class composition of the 1991 Pacific herring harvest, escapement, and total run biomass and the 1992 projected biomass.

Year Class	Age Class	1991 Harvest (tons)				1991 Escapement (tons)		1991 Total Run			1992 Togiak Projected Herring Biomass					
		Sac Roe		Food and Bait	Total Harvest (tons)	Biomass (tons)	No. of Fish (X 1,000)	X by Wt.	X by No.	Year Class	Age Class	Biomass (tons)	No. of Fish (X 1,000)	X by Wt.	X by No.	
		Purse Seine	Gill Net													
1990	1	0	0	0	0	0	0	0	0.0	0.0	1990	2	0	0	0.0	0.0
1989	2	0	0	0	0	0	0	0	0.0	0.0	1989	3	0	0	0.0	0.0
1988	3	0	0	0	0	11	11	75	0.0	0.0	1988	4	57	326	0.1	0.2
1987	4	94	5	1	100	5,928	6,028	36,875	7.2	16.1	1987	5	9,741	42,486	16.2	25.8
1986	5	12	0	1	13	650	663	3,408	0.8	1.5	1986	6	916	3,244	1.5	2.0
1985	6	63	12	2	77	920	997	3,665	1.2	1.6	1985	7	1,427	4,302	2.4	2.6
1984	7	904	325	86	1,315	11,957	13,272	42,043	15.9	18.4	1984	8	17,399	46,289	28.9	28.1
1983	8	1,455	675	119	2,249	12,671	14,920	41,472	17.9	18.2	1983	9	14,175	34,292	23.5	20.8
1982	9	499	191	70	760	3,843	4,603	11,335	5.5	5.0	1982	10	1,957	4,395	3.3	2.7
1981	10	2,228	453	176	2,857	7,245	10,102	23,165	12.1	10.2	1981	11	6,202	13,177	10.2	8.0
1980	11	862	288	155	1,305	3,760	5,065	10,811	6.1	4.7	1980	12	1,180	2,400	2.0	1.5
1979	12	2,026	510	312	2,848	7,170	10,018	20,631	12.0	9.0	1979	13	3,754	7,388	6.2	4.5
1978	13	2,549	567	254	3,370	7,952	11,322	22,297	13.6	9.8	1978	14	2,953	5,663	4.9	3.4
1977	14	832	135	132	1,099	4,385	5,484	10,910	6.6	4.8	1977	15+	595	1,121	0.8	0.4
1976	15	144	0	15	159	365	524	1,059	0.9	0.6						
1974	16	117	21	0	138	54	192	322	0.2	0.1						
1973	17+	3	0	3	6	22	28	55	0.0	0.0						
Total		11,788	3,182	1,326	16,296	66,933	83,229	228,123	100.0	100.0			60,214	164,821	100.0	100.0

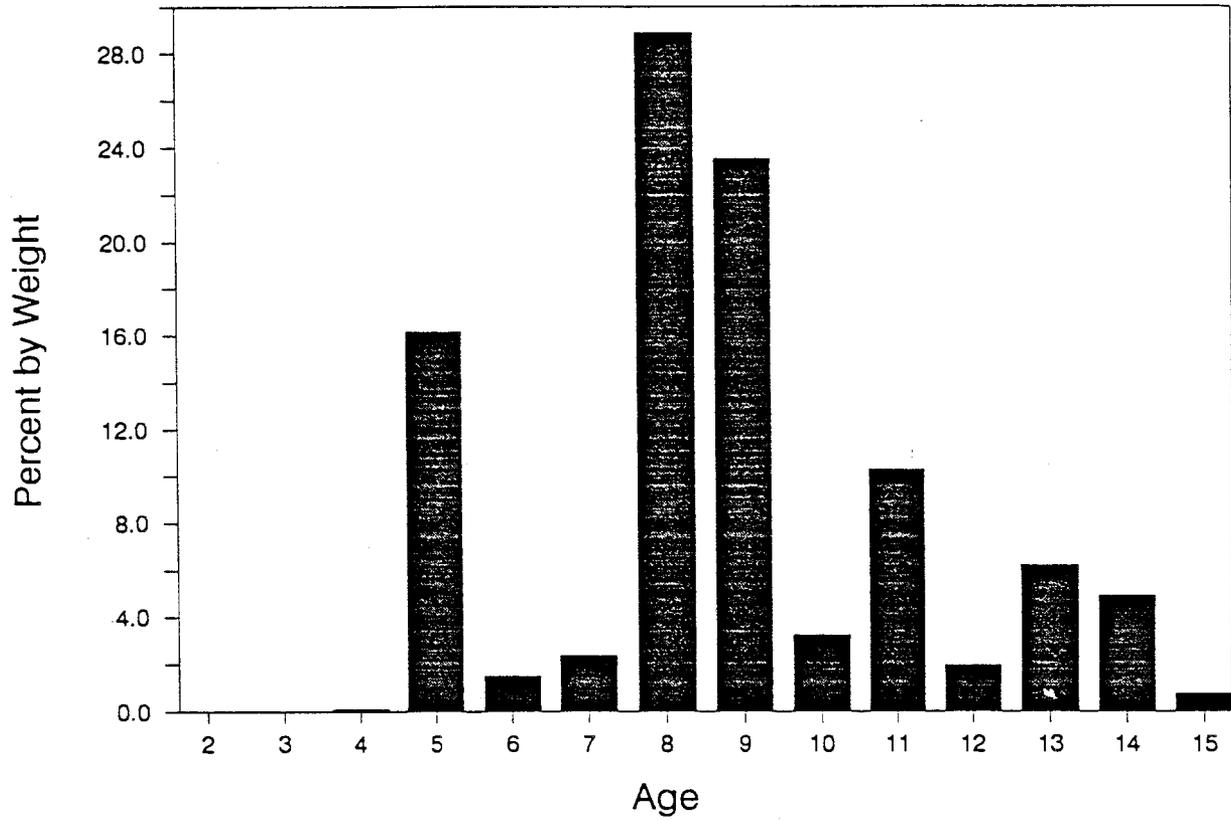
1991 Age Composition Togiak Herring Inshore Biomass



Number of Age 4 Recruit Herring by Age Class



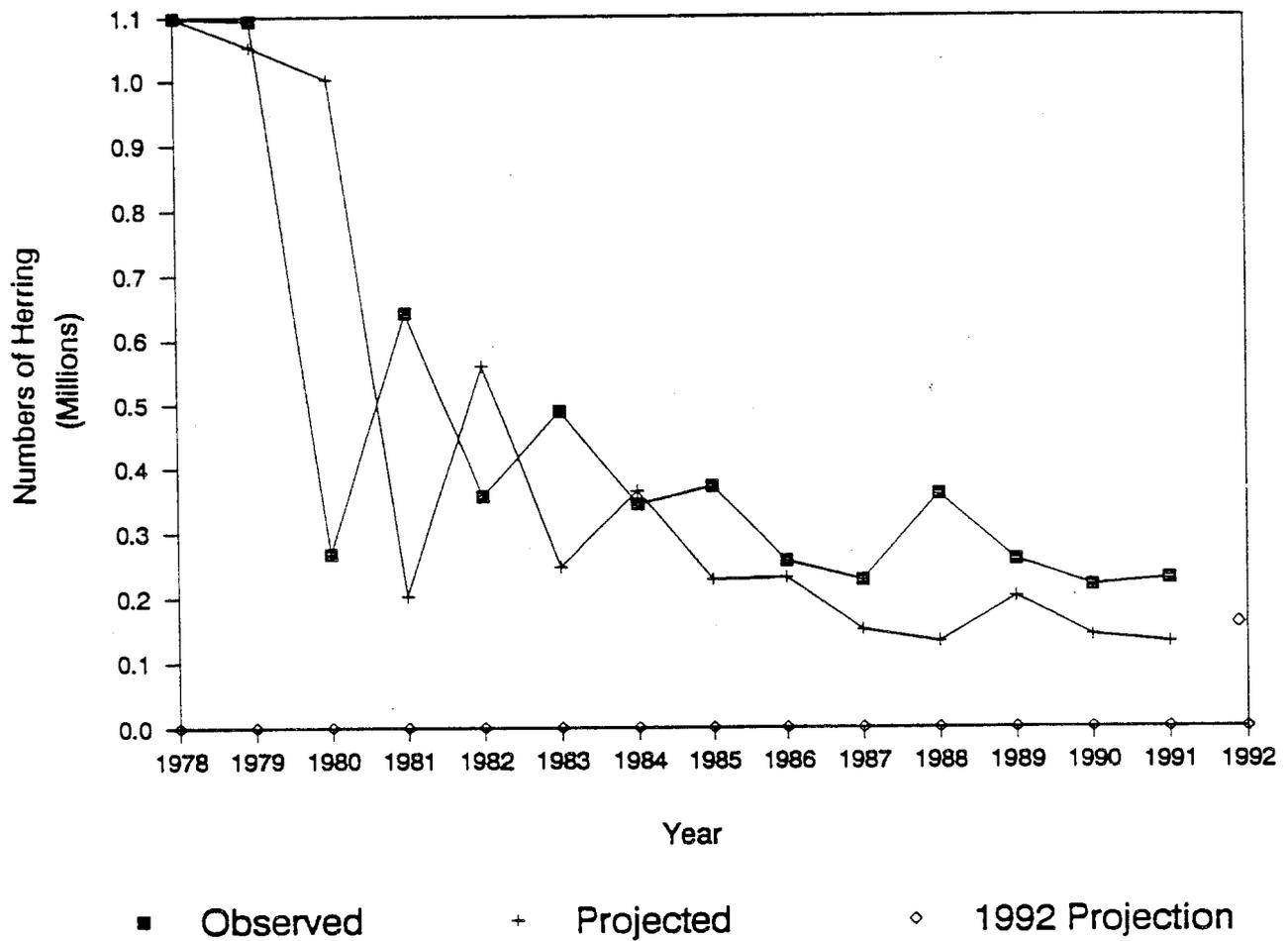
Forecasted 1992 Age Composition Togiak Herring Inshore Return



Forecast Performance

by Number

Togiak Herring Total Run Biomass, 1978-1991



1992 FORECAST AND HARVEST ALLOCATION TOGIAK HERRING BIOMASS

	Biomass (Short Tons)	Harvest (Short Tons)
Forecasted Total Biomass:	60,214	
Exploitation @ maximum 20% for Total Allowable harvest:		12,043
Togiak Spawn-on-kelp Fishery (Fixed Allocation)		1,500
Remaining Allowable Harvest:		10,543
Dutch Harbor Food/Bait Fishery @ 7.0% :		738
Remaining Allowable Harvest for Togiak District Sac Roe Fishery:		9,805
Purse Seine allocation 75.0%		7,354
Gill net allocation 25.0%		2,451

1990

Table 1. Daily observed biomass estimates (short tons) of herring during the 1990 season by index area, Togiak District, Bristol Bay, Alaska. ^a

Survey Conditions	Survey Time	Survey No.	Survey Length (Mi)	Milt Sightings		Estimated Biomass by Index Area. ^b											Daily Date ^c	
				NUS	(Mi)	KUK	MET	NUK	UGL	TOG	TNG	MTG	HAG	OSK	PYR	CN		Total
4/22-4/25	Poor-Good	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4/26-4/27	^d	0	0.0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	0
4/28	Good-Fair	0	0.0	-	0	0	0	0	0	0	0	0	-	-	-	-	-	0 ^e
4/29	Good-Fair	0	0.0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	0 ^f
4/30	Good	pm	0	0.0	0	0	0	0	0	0	0	0	-	-	-	-	-	0
5/01	Good	pm	0	0.0	12	0	0	0	0	0	0	0	-	-	-	-	-	12 ^g
5/02	Fair-Poor	pm	0	0.0	0	0	0	0	0	0	0	0	-	-	-	-	-	0 ^h
5/03	Fair-Poor	pm	0	0.0	-	0	0	0	0	0	0	0	-	-	-	-	-	0 ⁱ
5/04	Good	pm	0	0.0	-	8	0	0	0	0	0	0	0	-	-	-	-	8 ^j
5/05	Fair	am	0	0.0	-	0	0	0	0	0	0	0	-	-	-	-	-	0 ^k
5/06			0	0.0	-	0	0	0	0	0	0	0	-	-	-	-	-	0
5/07	Good-Poor	pm	1	0.8	-	0	15	15	844	49	586	22,349	12,501	5,382	-	-	-	41,741 ^l
5/08	Fair	am-pm	1	8.3	-	2	12	296	16,694	8,800	12,674	11,395	21,921	85	-	-	-	71,879
5/09	Poor-Fair	am-pm	63	37.1	-	0	-	-	-	-	-	-	-	-	-	-	1,610 ^m	1,610
5/10	Fair-Poor	am-pm	6	3.3	720	6,127	0	144	-	-	-	-	-	-	-	-	-	6,991 ⁿ
5/11		pm	5	1.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5/12	Fair	pm	2	1.8	17,906	6,058	1,508	264	2,883	19,109	720	778	187	2,452	43	-	-	51,908
5/13			0	0.0	-	-	-	74	651	13,888	0	351	93	409	-	-	105 ^m	15,571
5/14	Fair	am-pm	2	2.0	-	1,137	1,892	314	1,088	4,797	0	870	14	15	-	-	-	10,127
5/14	Good	pm	1	2.0	-	-	2,360	285	0	-	-	-	-	-	-	-	-	2,645 ^o
5/15	Fair	am	1	1.0	-	-	-	66	85	14,526	-	-	-	-	-	-	-	14,677 ^o
5/16	Poor	am	0	0.0	-	0 ^o	2	225	15	0 ^o	2	-	0 ^o	-	-	-	-	244 ^o
5/17			-	-	-	-	0 ^o	1,897 ^o	92 ^o	-	-	-	-	-	-	-	-	1,989 ^o
5/18			0	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5/19	Unsatisfactory	am	0	0.0	-	-	0 ^o	-	1,345	0	-	-	-	-	-	-	-	1,345 ^o
5/19	Poor	pm	0	0.0	-	-	0	2,423	0	-	-	-	-	-	-	-	-	2,423 ^o
5/20	Poor	am-pm	0	0.0	-	-	-	110	240 ^o	-	-	-	-	-	-	-	-	350 ^o
5/21	Unsatisfactory	pm	0	0.0	-	-	-	498	-	-	-	-	-	-	-	-	-	498
5/22-5/24	Poor		0	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5/25	Poor	am	0	0.0	0	0	0	0	622	0 ^o	-	-	-	-	-	-	-	622 ^o
	Unsatisfactory																	
5/26-5/27			0	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5/28	^p	pm	1	7.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5/29-5/30			0	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5/31	Excellent	pm	1	0.7	2,586	866	4,231	2,049	458	5,425	26	71	67	207	0	0	0	15,986

55,000 ton spotted estimate, 5/27

Date ^c	Survey Conditions	Survey Time	Milt Sightings		Estimated Biomass by Index Area. ^b											Daily Total		
			No.	Length (Mi)	NUS	KUK	MET	NUK	UGL	TOG	TNG	MTG	HAG	OSK	PYR		CN	
6/01-6/04 ^d			0	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	0
6/05	Fair	pm	0	0.0	0	679	160	937	250	8,476	2	18	48	15	0	0	0	10,585
Total			94	65.7														

- ^a Togiak District Pacific herring biomass was estimated at 88,105 short tons for the 1990 season. The estimate is derived from summing proportions of peak aerial surveys as depicted by changes in age composition.
- ^b Index Areas: NUS- Nushagak Peninsula; KUK-Kulukak; MET-Metervik; NUK-Nunavachak; UGL-Ungalikthluk/Togiak; TOG-Togiak; TNG-Tongue Point; MTG-Matogak; HAG;Hagemeister; OSK-Osviak; PYT-Pyrite Point; CN-Cape Newenham.
- ^c Surveys were conducted intermittently from 22 April to 27 April, flown regularly 28 April through 25 May, and intermittently between 26 May and 5 June.
- ^d No survey conducted.
- ^e Schools of smelt observed in the District.
- ^f Six tons biomass of smelt observed behind Tongue Point (TNG index area).
- ^g 950 ton biomass of smelt observed in combined TOG, TNG,MTG index areas.
- ^h 1,151 ton biomass of smelt observed in combined UGL, TNG, MTG, PYR index areas.
- ⁱ 565 ton biomass of smelt observed in MTG index area.
- ^j 626 ton biomass of smelt observed in the combined UGL, TNG, MTG, PYR index areas.
- ^k 1,590 tons of smelt observed in the NUK, UGL, TOG and MTG index areas.
- ^l Peak survey.
- ^m Biomass observed along shoreline of Crooked and High Islands.
- ⁿ Survey of the NUN to NUK index areas indicated eastward movement of additional biomass.
- ^o Partial Survey.
- ^P Area surveyed 28 May. Biomass estimate not quantified. Significant numbers of schools present in the Nunavachak, Kulukak Bay, and Togiak Bay sections. Significant biomass (narrow band, 15 miles in length,) of herring was observed exiting the District along the Nushagak Peninsula.

1991

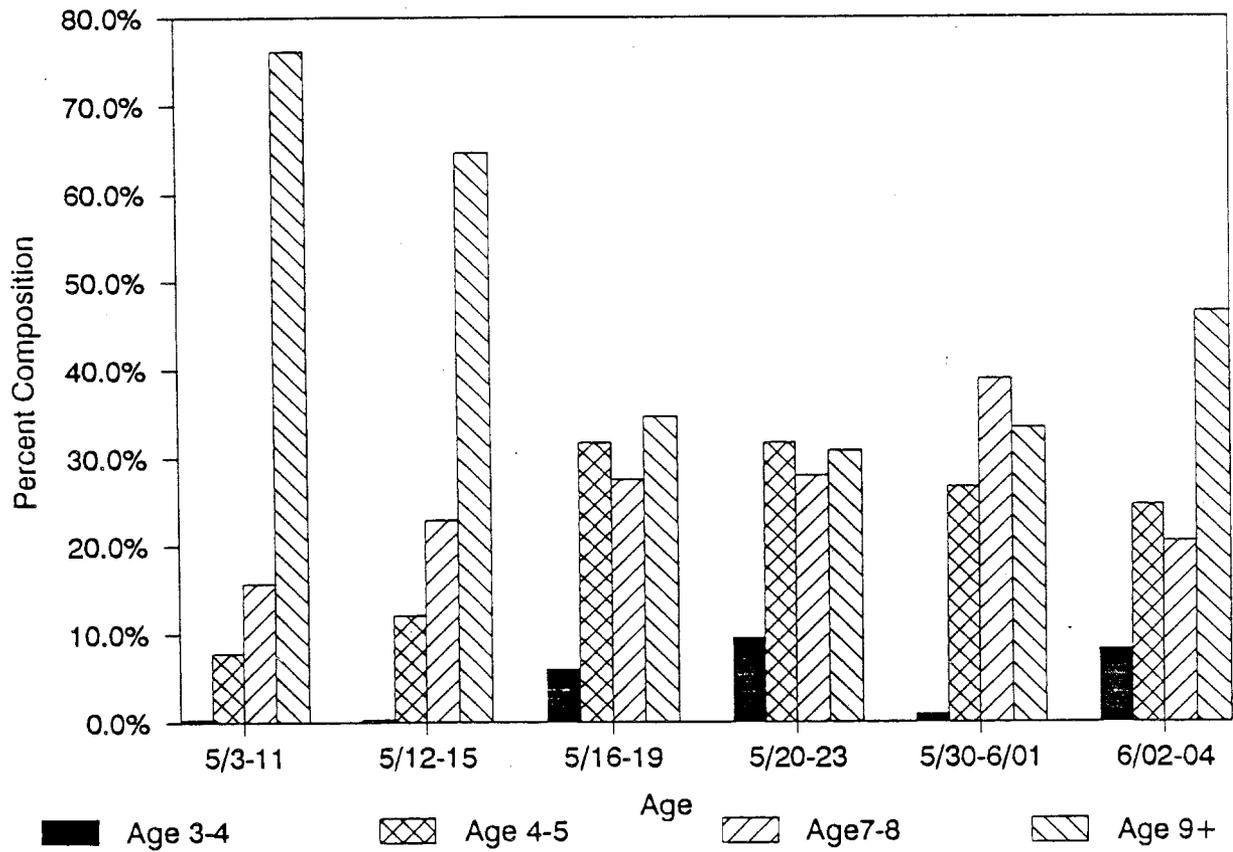
Table 4. Daily observed biomass estimates (short tons) of herring during the 1991 season by index area, Togiak District, Bristol Bay, Alaska. ^a

Survey Date	Survey Conditions	Survey Time	No. Length (Mi)		Milt Sightings				Estimated Biomass by Index Area. ^b							Daily Total			
					NUS	KUK	MET	NUK	UGL	TOG	TNG	MTG	HAG	OSK	PYR		CN	WAL	
4/19	Good	pm	0	0.00	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4/24	Fair	pm	0	0.00	-	0	0	0	0	0	-	-	-	-	-	-	-	-	0
4/28	Good	am	0	0.00	-	0	0	0	0	0 ^d	0	0	0	-	-	-	-	-	0
5/01	Fair-Poor	pm	0	0.00	-	-	0	0	0	0	-	0 ^d	0	-	-	-	-	-	0
5/03	Fair	pm	0	0.00	-	0	0	0	0	0	0 ^d	0 ^d	0	0	-	-	-	-	0
5/06	Poor	am	0	0.00	-	0	0	0	0	0	0	0	0	-	-	-	-	0	
5/06	Fair	pm	0	0.00	0	-	-	-	0	0	0 ^d	0	65 ^d	-	-	-	-	-	65
5/07	Poor	am	0	0.00	-	-	0	0	8	0	0	0	0	0	0	-	-	-	8
5/07	Fair	pm	0	0.00	-	0	0	0	0	0	0 ^d	0 ^d	38	-	-	-	-	-	38
5/08	Fair-Poor	am	0	0.00	-	-	-	0	0	0	0	0	0	-	-	-	-	0	
5/09	Fair	pm	3	1.00	-	-	0	0	3,920	68	1,440	3,785	0	0	-	-	1,607	10,820	
5/10	Fair-Poor	am	24	17.75	-	J	0	1,968	3,963	3,599	0	2,909	3,073	-	-	-	-	15,512	
5/11	Fair	am	21	24.50	-	0	1,711	396	17	2,729	637	1,210	2,150	924	-	-	-	9,774	
5/12	Fair-Poor	am-pm	24	20.75	-	-	-	-	395	2,276	571	1,246	99	427	0	-	-	5,014	
5/13	Good	am	5	2.10	7,878	916	3,092	3,368	2,829	11,027	794	1,863	305	1,913	115	-	85	34,185	
5/14	Good	am	1	0.50	-	-	-	-	1,871 ^c	7,313	594	779	3,269	1,832	-	-	-	15,658	
5/15	Good-Fair	am	1	0.10	806	6,163	450	1,667	2,015	27,396	969	1,868	5,144	2,817	382	-	-	49,677	
5/16	Fair	am	1	0.50	0	11,195	146	1,883	683	28,931	23	1,327	4,867	220	1,637	586	-	51,498	
5/18	Fair	pm	0	0.00	8	3,212	2,103	3,736	389	1,658	1,258	469	0	3,136	-	-	-	15,969	
5/20	Good-Fair	pm	2	0.20	226	3,673	4,166	8,469	2,641	9,223	769	578	648	3,963	0	0	-	34,356	
5/24	Good	pm	5	1.00	0	1,436	2,797	2,235	193	0	1,040	274	0	328	-	-	-	8,303	
5/28	Good	am-pm	0	0.00	0	368	213	1,390	7,163	0	360	1,260	224	599	-	-	-	11,577	
5/31	Fair-Poor	pm	2	0.50	348	267	5,394	1,458	122	0	0	0	0	-	-	-	-	7,589	
6/05	Fair	pm	1	0.50	0	216	633	1,162	261	1,353	4,388	0	1,299	0	-	-	551	9,863	
6/08	Fair	pm	0	0.00	13	0	1,340	1,092	2,468	3,303	5,302	5	812	0 ^c	-	-	-	14,335	
Total				90	69.40														

- ^a The revised total run biomass for Togiak District Pacific herring was estimated at 83,229 short tons for the 1991 season. The revised biomass estimate was derived from the peak biomass observed 16 May summed with the biomass observed during the 24 May survey, the commercial sac-roe harvest taken 10-12 May, and the biomass observed exiting the Nushagak index area, May 13 and May 15.
- ^b Index Areas: NUS- Nushagak Peninsula; KUK-Kulukak; MET-Metervik; NUK-Nunavachak; UGL-Ungalikthluk; Togiak; TOG-Togiak; TNG-Tongue Point; MTG-Matogak; HAG;Hagemeister; OSK-Osviak; PYT-Pyrite Point; CN-Cape Newenham; WAL-Walrus Islands.
- ^c Partial survey.
- ^d Smelt schools observed.
- ^e ' - ' denotes no survey conducted.

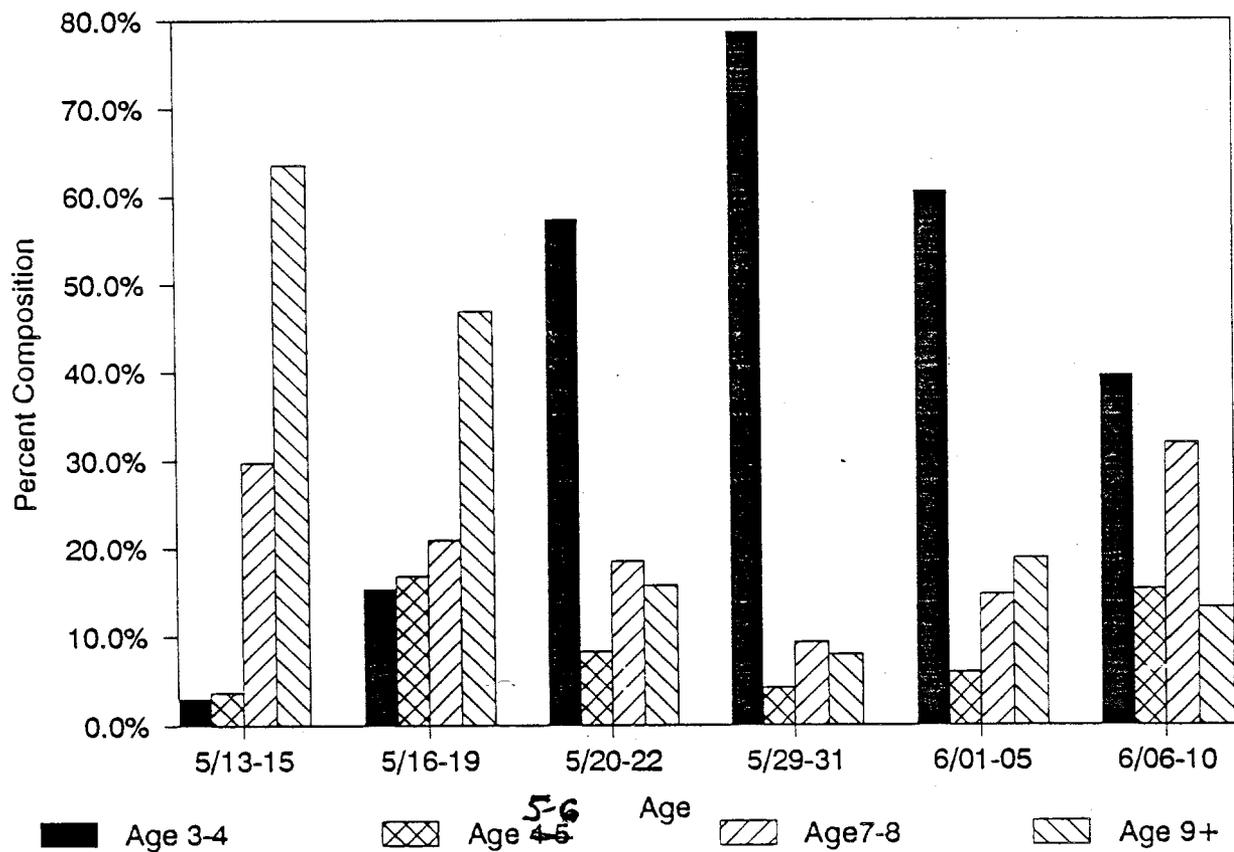
Age Composition of Samples by Date

Togiak Herring 1990 N=4,942



Age Composition of AWL Samples by Date

Togiak Herring 1991 N=8,200



MEMORANDUM

STATE OF ALASKA
DEPARTMENT OF FISH AND GAME

TO: Distribution

DATE: January 14, 1992

FILE: 92fpquot.wp

TELEPHONE: 267-2381

FROM: Beverly Cross ^{BAC}
Bristol Bay Research Leader
Commercial Fish
Anchorage

SUBJECT: Shumagin/Unimak
Guideline Harvest
By Week for
June 1992

The total number of sockeye salmon returning to Bristol Bay in 1992 is forecasted to be 39,598,000 and the total harvest is projected to equal 28,813,000. The South Peninsula June fishery guideline harvest equals 8.3% of the total Bristol Bay projected harvest (6.8% for South Unimak and 1.5% for Shumagin Islands). Based on the 1992 forecast, the number of sockeye salmon allocated for harvest during the South Peninsula June fishery in 1992 is 2,391,000 (1,959,000 for South Unimak and 432,000 for Shumagin Islands). Weekly harvest levels according to the management plan are:

SOUTH UNIMAK AND SHUMAGIN JUNE FISHERY
GUIDELINE HARVEST

Weekly Period	Weekly Percent	South Unimak	Shumagin Islands	Total
13 - 18 June	35%	686,000	151,000	837,000
19 - 25 June	45%	881,000	195,000	1,076,000
26 - 30 June	20%	392,000	86,000	478,000
Total		1,959,000	432,000	2,391,000

I will be sure to inform you of any changes in the Bristol Bay forecast which would affect the allocation to the South Peninsula June 1992 fisheries.

- Distribution: Anchorage - Brannian, Buklis, Cannon, Crawford, Florey, Fried, Haanpaa, Hilsinger, Miller, Stratton
Dillingham - Brookover, Skrade
Juneau, HQ - Eggers, Geiger, Larson, Lloyd, Savikko
King Salmon - Regnart, Russell
Kodiak - Barrett, Nicholson, McCullough, Probasco, Shaul

BRISTOL BAY RESEARCH STAFF ORGANIZATION

NAME & TITLE	FIELD PROJECT SUPERVISED	# EMPLOYEES SUPERVISED	REPORTS
Crawford FBII	Kvichak Upward Smolt Sonar Egegik Upward Smolt Sonar Igushik Test Fish Westside Catch Sampling West Inseason Run Analysis	3-FTII 4-FTII 2-FTII 3-FTII	Smolt TFR Asst Test Fish TFR Asst C&E TFR
		12 Seasonals	2.0 Reports
Miller FBI	Nushagak Sonar	4-6FTII	Nushagak Sonar RIR Nushagak Sonar FRB
		6 Seasonals	2.0 Reports
Stratton FBII	Kvichak R. Test Fish Egegik R. Test Fish Ugashik R. Test Fish Eastside Catch Sampling Inseason Scale Aging Post Season Stk Id	2-FTII 2-FTII 2-FTII 4-FTII 2-FTII 1-FTII	Asst Test Fish TFR East Stk ID TFR Asst C&E TFR
		13 Seasonals	2.0 Reports
Vacant FTII/III	Post Season Digitizing		Digitize Scales
Cross FBIII	Inseason Run Analysis Nak-Kvi Stk Id Test Asst East Catch Samp Asst Inseason Scale Age Asst Postseason Stk ID	2-Full FBII 1-11mm FBI 3-FTII	Forecast RIR Nak-Kvi Stk Id RIR Esc Goal RIR
		2 Fulltime 4 Seasonals 4 Seasonals Asst Supervision	3.0 Reports

COST ANALYSIS

FY92 budget has \$69.2 thousand budgeted for FBII position in Dillingham. Under Scenario 2, the FBII position would be replaced with an 11 month FBI located in Anchorage (savings of \$19,300). In addition, because the FBI would be dedicated to the Nushagak sonar project he could take over as one of the field crew members (savings of \$9,000). The replacement of the FBII with a FBI would result in a savings of approximately \$28,300 per year in general funds. In addition, FY92 test fish budget includes \$33,000 for 8 mm of digitizing time at the FBI level. We would not do inseason digitizing, therefore we would only need 6 mm of FTII time at a cost of \$19,000, a savings of \$14,000 in test fish funds. Replacement of the FBII with an FBI would result in a savings of \$28,300 in general funds, and \$14,000 in test fish funds for a total savings of \$42,300.

BRISTOL BAY RESEARCH STAFF ORGANIZATION

IMPACTS

PROS:

- 1) Saves money.
- 2) Crawford given inseason responsibilities, his position is more secure.
- 3) Miller given more responsibilities. Better use of his capabilities. Jim has expressed a desire to expand his training, he is interested in learning sonar. Secures Jim's position with Bristol Bay research.

CONS:

- 1) No smolt sidescan sonar feasibility study.
- 2) No inseason scale digitizing
- 3) Whitefish test fishery supervised by other Bristol Bay staff
- 4) Escapement goal reports reduced to RIR, more similar to meeting notes
- 5) Crawford and Miller field season extended.
- 6) Increased inseason workload, Stratton and Cross.
- 7) FBI with no sonar experience taking over a major sonar project.
- 8) Must hire and train a new digitizer.

BRISTOL BAY RESEARCH REPORTS 1991-92

REPORT	AUTHOR	STATUS	DATE DUE
REPORTS COMPLETED			
88 PWS C&E TFR	Crawford	Done	01/91
91 BB Staff Meeting Notes RIR	Crawford	Done	03/91
89 Stock ID Report TFR	Cross/Stratton/Miller	Done	02/92
90 Stock ID Report TFR	Stratton/Miller/Cross	Done	01/92
90 Egegik Testfish RIR	Miller/Cross	Done	03/91
83-90 BB Stk Id Handout	Stratton	Done	03/91
88-90 Egegik Stk Id Handout	Miller	Done	03/91
90 Smolt TFR	Crawford	Done	12/91
91 Smolt TFR	Crawford	Draft	02/92
90 Nushagak Sonar RIR	Woolington	Draft	09/91
91 Nushagak Sonar RIR	Woolington	Draft	11/91
91 River Testfish TFR	Stratton	Done	01/92
90 C&E Report TFR	Stratton	Done	03/91
92 BOF Nush Chinook Esc Goal RIR	Cross	Done	12/91
92 BOF Nush Coho Esc Goal RIR	Cross	Done	12/91
92 BOF Kvichak Sock Esc Goal RIR	Cross	Done	12/91
92 BOF Report - Stock ID RIR	Stratton/Miller	Done	12/91
92 BOF Report - Egegik Stk Id RIR	Miller/Stratton	Done	12/91
92 BOF Report - Forecast RIR	Cross	Done	12/91
92 BOF Report - N. Pen Stk Id RIR	Stratton/Miller	Done	11/91
19 Reports 01/91-02/92			
REPORTS TO BE COMPLETED			
91 C&E Report TFR	Stratton/Crawford	? Depends Final #	
91 Stock ID TFR	Stratton/Miller	Draft (1/2)	03/92
91 BB Forecast RIR	Cross	Draft (1/2)	03/92
92 BB Forecast RIR	Cross		05/92
Nushagak Chinook Esc Goal FRB	Cross		10/92
BB Sockeye Esc Goal Eval FRB	Cross		11/92
Nushagak Coho Esc Goal RIR	Cross		12/92
91 Kvichak Smolt Sidescan RIR	Crawford		04/92
84-86 UCI Other Species C&E RIR	Cross		???
9 Reports Analyses Complete But Not Published			