

2A95-08

**1995 BRISTOL BAY STAFF MEETING MINUTES**

**March 7-8, 1995  
Anchorage Regional Office**



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and  
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**Regional Information Report<sup>1</sup> No. 2A95-08**

**Alaska Department of Fish and Game  
Division of Commercial Fisheries Management and Development  
Central Region  
333 Raspberry Rd.  
Anchorage, Alaska 99518**

**March 1995**

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<sup>1</sup> Contribution 95-08 from the Bristol Bay area. The Regional Information Report Series was established in 1987 to provide an information access system for all unpublished divisional reports.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 the need for up-to-date information, reports in this series may contain preliminary data.



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### ASSIGNMENTS

#### Linda Brannian

1. Contact Carmine DiCostanzo to inform him of our intentions to install LAN in Dillingham. (Get him involved.)
2. Meet with Bev Cross to discuss the technical operation of counting towers, document methodology, calibration, sources of error, and determine format, feasibility, and necessity of reporting.

#### Tom Brookover

1. Determine what, if any, fuel tanks are buried underground on the Dillingham ADF&G compound.
2. Explore the options available for producing maps. Look at options available and costs. Also determine what mapping has already been completed and what mapping still needs to be done.
3. Spawning Ground Survey Report for 1995.

#### Jim Browning

1. Produce RIR from BB staff meeting notes taken by Browning/Miller recorders.
2. AMR editor for 1996.

#### Bev Cross

1. Contact Bob Murphy to discuss scale pattern analysis of North Peninsula and Bristol Bay stocks. (Concerning the industries mention at the BOF meeting that they would provide funding for SPA studies.)
2. Placed in charge of sending out District Registration Cards.

3. Meet with Linda to discuss the technical operation of counting towers, document methodology, calibration, sources of error, and determine format, feasibility, and necessity of reporting.

Dennis Haanpaa

1. 1995 Outlook Paper by April 6 (Individual components to Dennis by March 24).

Jeff Regnart

1. Investigate options and purchase either a new fax machine or a fax/modem computer card for the King Salmon office.
2. Check with the Attorney Generals office on the bonding process and how the Department handles it. Prepare and obtain bids for the herring test fishing contracts.
3. Re-word the processor checklist (salmon) to clean up and to eliminate the loophole that allows processor to move into a district without immediately notifying ADF&G.
4. Get together with Tim Baker to produce a new oral catch report program.

Kathy Rowell

1. The 3-wheeler in King Salmon will be sent to Dillingham for use at TFI during herring season. Kathy will be responsible for its care.

Keith Weiland

1. AMR editor for 1995.

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Attendance: Anderson, Brannian, Browning, Brookover, Crawford, Fisher, Fried, Funk, Graham (FWP), Haanpaa, Hilsinger, Miller, Regnart, Rowell, Russell, Weiland, Wiedmer.

## I. Administration

- A. Appointment of Chairperson - Dennis Haanpaa
- B. Appointment of Recorder(s) - Jim Browning and Jim Miller
- C. Agenda Review / Changes

ATTACHMENT 1 provides an outline of the issues and topics discussed during the meeting. Some changes and additions to this outline include:

- I. D. "Summary of Board Activities" was added,
- IV. C. "Habitat Issues" was moved to I. E.,
- II. C. 5. "Replacing Nancy Deslauriers" was added,
- IV. A. "District Registration Cards" was moved to III. A. 7. c.

## D. Summary of Board of Fish Activities (Hilsinger)

The Alaska Board of Fisheries voted down the chum cap. The setnet allocation was voted down over the weekend. Mesh size restriction for North Peninsula gillnets was passed Sunday morning. They decided that they would not be able to finish all the proposals; and asked staff for list of proposals that need to be reviewed before 1995 season. BOF addressed some of these proposals. The Board decided to take up proposals not yet addressed in March 1996. There was debate between Nov. 1995 and March 1996. BOF wants department to complete scale pattern analyses through 1994 season before North Peninsula interception of Bristol Bay salmon issue is taken up March of 1996.

Assignment - Bev Cross contact Bob Murphy of the Kodiak staff to discuss North Peninsula scale pattern analysis (Industry offered to provide additional funds for scale pattern analysis to be completed by March 1996).

Hilsinger said that we should set up a team from the Dept. to write up an operational plan for the project, including model test criteria, funding sources and levels, etc. "We won't go anywhere unless we all go together". Director Koenings approves of this idea. Brannian felt that a good precedent would be set by Industry providing funding for a project developed and conducted by the department. A discussion followed regarding a report on Kodiak interception of Cook Inlet sockeye that was pulled due to lack of peer review.

Board did not address (or act on) many issues. Shellfish proposals were scheduled for March of 1996 in Dutch Harbor. Discussion regarding Board action on June fishery of North Peninsula. Russell said that mesh restrictions could affect us in Bristol Bay due to its effect on how soon the quota could be taken. Haanpaa explained that the department told the Board that with the weekly periods and percentages in the regulation book, if the forecast was low, the Department would come back to the Board out of cycle. Hilsinger related that the Board had told the Department that if chum salmon were not on the Endangered Species list, there wouldn't be a problem managing for sustained yield.

Question regarding a position paper on North Peninsula interception being written by Probasco. No one knew if it was out or available.

Next call for proposals - April 10. Haanpaa will be discussing proposals with Kodiak staff next week. Russell said that the Board would be taking up the definition of "drift gillnetting" next week as a statewide proposal.

#### E. Habitat Issues / Concerns (Mike Wiedmer)

Tazimina Hydro Electric Project. This project is proposed between Lake Iliamna and Lake Clark. Congress allowed the FERC (Federal Energy Regulatory Commission) licensing process to be shortened. The project is on a fast track so it could move along quickly with only a 50 day review process. Department has concerns about some resident fish stocks near area of intake. Russell asked about NPS' request for possible use of electronic field screens around intakes?

Lake and Peninsula Borough. The borough will select 187,000 acres of state land. They will probably select prime recreational areas along rivers with emphasis on revenue generation potential. The Department is concerned for habitat degradation along the river corridor due to development.

Nushagak/Mulchatna Recreational Rivers Management Plan. This plan controls use on state land only - directed at guide camps, etc. Commercial enterprises

continue to increase. As Borough selects land for revenue generation and development, state's ability to regulate use on these lands will cease.

Cominco. - This company will do exploratory work on the Nushagak (near Koliganek) this season. Possible pebble copper mining operation proposed.

Egegik Bay. Seafood processor wants to build a solid fill dock in Egegik to move frozen fish. Site and design not good due to being located in the middle of set net sites near Coffee Pt. Applicant is going to Egegik for public comment. Setnetters complain of not getting to comment on proposed construction. Russell will attend one of these meetings to comment on habitat concerns.

Resource Development. Bristol Bay off limits for oil development for the short term. Mining interest is picking up. Proposed logging activity is the hottest item as far as potential impact due to timber prices being higher now. Areas that weren't profitable before could now be logged profitably. Village Corporation in Dillingham is interested in timber harvest in Wood River/Tikchik State Park and rafting logs down the Wood River to tidewater for chipping and loading for export. State Div. Forestry passing out Federal money for timber plans. Native corporations have land in-holdings within State parks.

ADF&G's Authority to Regulate Activities. 1) Streams with no knowledge of fish: no regulatory authority (ADEC in control). 2) Streams with known resident fish: authority to maintain fish passage. (AS 16.05.840) 3) Streams with known anadromous fish: authority to maintain fish habitat (AS 16.05.870) - must be in the Anadromous Waters Atlas. Coverage of streams in Bristol Bay is poor. Very few accurate documentations of spawning and rearing locations. If we see fish in a particular stream, please note location (GPS fix or Lat. & Long.) and relay to Habitat Div. We must document presence of anadromous fish to get stream listed in the atlas. We need to include specific information - date, location, species, # fish. The Department can only regulate the portion of the stream downstream from where fish were recorded. The process takes approximately 1 year to get stream listed in Atlas once fish presence is documented. Regnart requested Habitat Div. to give fisheries managers a list of areas under serious consideration for development and they can watch these areas closer. Information that is not included in the atlas can only be used to regulate logging practices under the Forest Practices Act, no other activity can be affected with information not contained in the atlas. Discussion between Weidner and Brannian regarding BIA's aggressive attitude toward logging of native-owned land.

## II. Regional Issues

### A. Administration Issues

#### 1. Computer Services

##### a. Software Direction

New SOP makes MicroSoft Word and Excel the standard. Divisional provision for allowing exception for Wordperfect in DOS environment is more restrictive. Area offices shouldn't feel forced to start using Excel for spreadsheet applications, Lotus still in wide usage. Most areas agreed to start using MSWord this fall after field season, all offices should have a copy available. Two standards - WP in DOS, MSWord in Windows. As hardware upgrades occur, computers with the required RAM, will need to switch to Windows and Word. Russell discussed the need to bring area office staff into Anchorage for training. Browning pointed out that Soldotna staff found that it was cheaper to bring somebody to area office for training. Russell discussed the problems of trying to hold the training in the office while normal office functions were going on, such as telephones, etc. Hilsinger pointed out that training could be scheduled around staff meetings or other trips to town. Miller related that Crawford is already producing smolt reports in Word and both Miller and Crawford are starting to use Word and Excel. Brannian said that it's easy to read WP using Word, and that area staff should at least know Word well enough to read a Word document if sent to you. Russell asked if there was funding budgeted for the software upgrade to MS Office products. Brannian answered that Campbell said that no crosstraining was necessary. Rowell asked if the network (Anchorage LAN) would continue to support WP. Current versions used are: Word for Windows v. 3.1, DOS v. 6, Excel v. 5, Lotus v. 4 or 5.

##### b. Regional Database

IFDB - Integrated Fisheries Database. Weiland talked to Larry Talley and Scott Johnson about getting IFDB in Region II. Area offices can access this database region wide, but need to input current data regularly. Can obtain catch, escapement, and fish ticket data. They currently use the VAX (UA mainframe), but thought we could get by with a souped up PC with 10 people

connected. Initially hardware and software would cost \$20,000 to \$25,000 to set up, plus two full time people (programmer and database manager). Software used would be R-base. Discussion followed regarding benefits of IFDB system versus major expense. System would give area offices easy access to other area data. Weiland asked about translation problems if software switches to Excel. Regnart pointed out the priority of wide area network hookup first for area offices. Brannian told staff about NMFS having money to start databasing systems in central region. Tim Baker is involved with this. We could have that person work in Anchorage and produce a database that we can use also as part of the NMFS contract. Hilsinger - there are already individual databases around the region. Databases are not complete but they're a start for the IFDB system. Databases are in different formats (Fortran, ASCII, Rbase, Lotus). Brannian said that the department is thinking of moving away from Rbase towards a Windows based database (Access or FoxPro). These are more user friendly. When Fred Jansen leaves, there will be no more programmers available to help with these specialized application programs.

## B. Budget

### 1. FY95 Pre-Audit

Hilsinger report that the bottom line is: Region II is \$6,000 in the hole. Major issues for Bristol Bay:

1) Test fish - projecting overspending allocation by \$110,000.

Hilsinger discussed this with Clasby (deputy director) and found that it is a common problem in the Bay. Typically revenue generated offsets spending over allocation. We are requesting a 20% increase in test fish allocation for FY96. Any monies over the allocation go into the general fund. Region II test fish summary came out 58K to the good.

Regnart asked about overspending our regional TF allocation and requesting surplus funds from Kodiak/Westward region's TF allocation. Hilsinger explained process for requesting additional TF allocation. He also discussed legislature cutting CFMD "Program Receipt Authority" and how the process of increasing "Program Receipt Authority" is difficult now with certain legislators against increasing state spending.

2) All line 500 items cut out of Pre-Audit, minor program changes only. Hilsinger advised staff that 1 outboard motor was cut from Nushagak sonar and the "pan & tilt" rotator. Miller discussed the utility of the pan & tilt rotator.

- 3) Changes in test fish monies - Miller's salary moved to general fund.
- 4) Discussion on CFMD funding of subsistence projects. Haanpaa pointed out that the Cook Inlet subsistence fishery costs of 20K were not reimbursed. If CFMD didn't have to fund Subsistence projects, we would have more money for line 500.
- 5) Russell asked if project program dates were affected by pre-audit? NO. He mentioned that there could be some changes when the Federal government took over subsistence management on navigable waterways.

## 2. Update - Funding Sources / Concerns

Russell asked about smolt funding (Ugashik). Haanpaa - will address that issue under Program Review.

## 3. Update - Dillingham New Office

Brookover talked to Elmer Sorensen. Office move is a go. Brookover forwarded his comments on the architect's notes and layout to Sorensen. Project should be bid on this April for construction this summer. CFMD and Sport Fish would be moving in this fall/winter. No money needed from FY95. Will need FY96 money for phones, furniture, etc. Haanpaa advised that Dillingham ADF&G staff will have to decide that. Brookover expressed the idea of tearing down old bunkhouse and using the old office as storage and sleeping area.

Brookover brought up plans for Local Area Network for computers in Dillingham when all divisions are in the new building. Browning had discussed the installation with Denny Johnson of Computer Services and presented cost estimates for LAN/WAN (Attachment 2). Need to be in LAN before can participate in WAN. 56KB line will be installed in June. Cost to access WAN will depend on where it is installed. LAN -- 15 machines (\$6500) prorated on a per machine basis between divisions. WAN -- \$7,000 hardware cost to include 2 high speed modems and cabling for 15 machines, \$366/month and \$20 phone line. Staff would want to have King Salmon networked and accessible via WAN also. Would need LAN supervisor. Browning has volunteered. According to John Wilcock in Cordova it would require 2 to 3 weeks per year plus some training. Discussion of pros and cons of LAN and WAN. Hilsinger asked if current telephone charges would cover the cost of new network (\$366)? CFMD's current cost for Email is \$100-\$150 per month, with other divisions sharing the \$366/month WAN

fee, CFMD's costs would not exceed current Email charges. Network would make Email quicker between King Salmon and Dillingham and would give access to CFEC files. Russell asked about the ability to mothball LAN/WAN during the off season. Browning said that there was good support on the local (area) level among divisions as well as regional interest in WAN access. Brannian was assigned the responsibility of contacting Carmine DiCostanzo to inform him of our intentions to install LAN/WAN in Dillingham and getting him involved. He is to negotiate for the installation of the routers needed for access instead of individual area offices negotiating. Hilsinger wanted Dillingham staff to inform region of expense for this hook-up, so if we have a surplus at the end of the season, we can spend it on this. CFMD portion of LAN/WAN expense is approximately \$4,500. This would be an FY96 expense. Browning will keep the regional staff advised of costs, and coordinate with Regnart for King Salmon LAN/WAN needs.

#### 4. CIP Monies

This topic was tabled until Hilsinger provides CIP figures.

#### 5. Fuel Tanks - King Salmon

Three large fuel tanks have been underground in King Salmon since 1970. These tanks were discussed at last year's BB staff meeting. Following that discussion, Haanpaa sent Headquarters a memo. The tanks in King Salmon need to be dug up and replaced with above ground tanks. There is considerable danger of leakage occurring and major clean up expense being incurred. It is one of the major items listed on the CIP. Cost is projected to be about \$45,000. If it is not approved for FY96 in the CIP monies, we need to document request in case of leakage. Haanpaa suggested that the managers continue documenting their concerns and attempting to gain funding. Brookover was given the assignment of checking to see what tanks in Dillingham are buried underground.

#### 6. Wish List

##### a. East Side

i. Second Fax machine for King Salmon office. Weiland said a second fax is needed to devote to the processors (sending announcements and receiving catch reports). Regnart estimated

cost of a plain paper FAX machine at under 2K. Hilsinger suggested looking into a computer fax/modem. Regnart was assigned the responsibility of checking w/ Jeff Fox in Soldotna where they just bought a new FAX machine, and looking at the price of fax machines verses fax/modem board for a computer.

ii. Cellular phones for camps. Regnart discussed the relative costs and utility of cellular phones for field camps. Can be used to replace SSB radios, and are less than \$200. Bristol Bay Telephone Coop has agreed to lend a cell phone to ADF&G to test at each camp. On this subject, Russell mentioned that he has not sent out SSB radios yet this winter for service. If plans are for their use instead of cellular phones, we should do it now. Brookover has had the SSB radios that were serviceable last season serviced, and surplused the ones that weren't. He has had Fred Nielson with Bristol Bay Electronics service West Side radios. Russell will also send his radios over to Fred for servicing.

iii. Regnart requested that if more money becomes available, please let the managers know so they can put together a wish list.

vi. River test fish motors. Crawford discussed having motor problems with 55 hp outboard motors currently used on East Side T.F. projects. Recommended purchasing one new motor each year. He needs one each new 50 hp. motor for Egegik and Ugashik, and also requested a 70 hp motor for the Kvichak T.F. project. Haanpaa asked if there was a inventory list of motors in the Bay, and if motors were assigned to specific projects. Yes, Mark Reynolds keeps an inventory of all motors. No, motors are used on projects on a first come, first serve basis. Haanpaa asked if there were spare motors in the Bay. Weiland pointed out that Reynolds wanted to buy 2 new 30 hp motors per year. Rowell was asked about old herring 55 hp motors? Miller said those are being used by the Nushagak Sonar project. Brannian suggested purchasing 1 motor each year using T.F. funds and 1 motor each year from General Fund. It was agreed that this should be done. Haanpaa and Russell discussed the need for a 75 hp motor for Kvichak T.F.

v. Egegik Smolt/Tower boat. Crawford requested the purchase of a new 15 ft. "Roughneck" skiff for this project.

b. West Side

i. Nuyakuk Tower. Brookover asked if \$8K was still in the request for the counting tower. Hilsinger said that \$8,000 is not presently included in the pre-audit. Nuyakuk tower project is gone. Later in meeting Hilsinger said we might reconsider this project and put the request back in.

ii. Mobile phone. Cost is about \$1,500 for the phone. The hub is in Dillingham and has a 20 mile radius. There will be a local line fee. Can be used on test boats. Tom wants to purchase one this year, and one next year. Could be used on aerial surveys.

iii. Copier. Present copier will be okay until new office move in the fall. If move is delayed, there will be a need for a new copier (The new office has a good copier) for us.

iv. In order to upgrade to Windows, we need to purchase 2 new 486 (or Pentium) computers for Browning and Jackson. Cost would be about \$2,500 each.

v. Boats at Wood and Igushik Tower projects are in bad shape and will need to be replaced in near future. Regnart discussed standardizing on "Roughneck" skiffs, all long shaft and all welded construction.

B. Personnel.

1. Seasonal hiring practices (Comp Time, etc.)

Personnel: Roberta Fisher discussed many personnel topics. The clearinghouse opens March 15. Will need Director's Approval to hire Tech III's and FBI's. Fishery Biologist qualifications are under review. All FB's should re-submit to insure placement on the register. There is a new field office manual including new hiring papers and SOP manual additions. There is also a new volunteer form that now consists of only one form (no liability waiver form). Seasonals are still allowed comp leave, and they must still indicate on each time sheet that they want the comp leave instead of overtime.

## 2. PDQ Update

PDQ's are pretty much caught up. Check with Wayne Prigge if you are wondering about specific PDQ's. Prigge does all personnel tracking. Hilsinger asked about a rewrite of class specs for FBI's making them overtime exempt. All FBI's are currently overtime eligible. There will be a bargaining unit hearing on May 1-2 for FBIII's trying to transfer to the supervisory bargaining unit. Russell discussed ASEA treatment of FBIII's that are trying to become SU members. Russell informed staff that Nancy Deslauriers is transferring out of King Salmon to Palmer effective March 16, so we will need to bring the new Admin. Clerk that Sellers is recruiting into Anchorage to meet with Fisher's staff. Fisher agreed. Fisher said all performance evaluations should be mailed directly to Mo Sloan and any questions should also be addressed to her.

Accounting: Fisher discussed problems with TR's and Airway Bills. We must put specific wording "Travel Agent Not Available" on TR. BTA (Business Travel Account) should only be used through travel agent. Rowell asked if we could still write TR's for airfreight. Yes. Purchase Requests over \$1,000.00 must be forwarded to to Regional Supervisor for approval. Fisher suggested that Audit Trail Reports be reviewed when they come out to keep track of expenditures. Fisher discussed the initiation of a new budget coding structure that will be in effect for July 1. New Fishery Unit codes, New collocation codes, and New project codes. Haanpaa and Fisher discussed TA's and the need for lodging receipts to accompany TA's or per diem would be credited as income and become taxable. Fisher related new SOP on meals, and specific wording needed on evaluations regarding merit increase. Regnart related a problem last year with illegible time sheets being faxed to Anchorage, and asked if King Salmon cam "Pen Pak" (air courier) timesheets in? Roberta said yes, arrange it with Jaime Walker and be sure to do it on the 1st or 2nd day of the pay period. Brookover mentioned that he has a problem with people not responding when they are sent their evaluations. Fisher said to send them certified, keep track of response date, and in cover letter offer for them to call and discuss their evaluation with the supervisor. If you get no response, then turn in an unsigned evaluation with the green certified mail card. Fisher's staff: Walker - Payroll; Prigge - Personnel; Jan Gamble - Accounting; and Suzie Kaiser - Test Fish.

### 3. Permanent Staff Changes

a. Retirements. No retirements in the Bay this season at least until January 1996. Hilsinger - an early RIP is not very probable. Russell said that it looks like May 31, 1996 is a probable retirement date for him. Haanpaa will have a post season meeting this fall to reassign some of Russell's responsibilities.

b. Needs. Cross (Research) plans to hire an FBI ten month permanent/seasonal. Goal is to have person start May 1 and work through February 28. Russell suggested having the person work through March (Board Meetings). Their responsibility will be to help supervise smolt and test fish projects during the summer and to digitize and assist in report writing (Stock ID and C&E reports) during the winter.

### 4. CFEC Role/Plans

Weiland had contacted Chris Kelly, CFEC. Chris will be in Dillingham for herring from April 17-21. They won't be going to Togiak (TFI) because it is too difficult to transport the equipment there and it probably would warrant that. CFEC will be in King Salmon for the salmon season June 12 to July 14 and in Dillingham June 5-9. Regnart asked if CFEC wasn't shortening their time commitment in Dillingham compared to past years. Brookover will check on this.

### D. Meeting Schedule and Attendance

#### 1. Spring Fishery Conference - Dillingham

April 6-8. Tentative agenda includes a couple topics important to ADF&G: how to keep permits in Bristol Bay and marketing. Haanpaa stated that we should have one representative from the East Side management staff attend the meeting. Brookover will be on vacation. Browning and Russell will attend. Fritz Funk asked if any of the topics included herring. Brookover advised that just the 1995 outlook for Togiak herring was part of our presentation.

2. Meeting in Egegik March 21 on the dock proposal mentioned earlier. Russell will attend this meeting.

3. The May 1-2 hearing on FBIII's moving into Supervisory Unit mentioned earlier. Russell will attend. Brookover doesn't need to since his PCN isn't involved.

4. National Biological Survey would like to conduct a Becharof Refuge ecosystem study. They have requested ADF&G's participation. It was suggested that we could request monies for projects like extending the Egegik Tower. No decision was made on who would attend from our staff.

### III. Program Review

#### Herring

##### A. 1995 Season Forecast

Rowell presented outlook for 1995. Strong forecast of 149,000 tons. We will probably see more than the forecast on grounds, since forecast is biased low. Sacroe harvest in Togiak forecasted at 26,000 tons. (See Attachment 3 {Table 3}) Expect 7 and 8 year old year classes to comprise 62% of returning biomass. (See Attachment 3 {Figure 3}). Haanpaa asked about the mean weight for 1994 season. Rowell replied that approximately 348 grams was the weighted mean. Rowell discussed Figure 5 showing "Year class size of 5 yr. old recruits" (See Attachment 3 {Figure 5}).

##### B. Stock Assessment and Harvest Policy (Rowell and Funk)

###### 1. Inseason vs. postseason biomass estimates 1986-94.

Rowell presented the information in Attachment 4 "Togiak Herring Management Information Summary"

###### 2. Conflicting abundance trends from age comp vs. aerial surveys

Rowell explained the ASA (Age Structured Assessment) model and how it was produced. Aerial survey data does not agree with age class data over the years. Age class shows a peak in mid 1980's. Aerial survey shows a flat curve (See Attachment 3 {Figure 2}). Because of this discrepancy between age data and aerial survey data, they are trying to compromise between the two. Regnart asked if there could be a problem with age sampling or could sampling effort be varying.

### 3. What constitutes the "best" subset of aerial surveys

Funk said the ASA model tries to come up with reasonable solution from both sets of data. Russell pointed out that spotter pilot observations seemed to agree with aerial surveys, so he is surprised that there were estimates of so many more fish from the age data (See Attachment 3 {Figure 2}). He believes surveys were missing some fish that enter the fishery in Kulukak section, but not as many as is being suggested by the ASA model. Funk told the staff that the discrepancy between age data and aerial survey was not unusual, Prince William Sound also has similar conflicts with spawning surveys. Funk suggested that maybe someday we might want to manage inseason off the forecast since there is so much variability in our estimate techniques, rather than agonizing inseason over our biomass estimates and quotas. Brookover said that we would be able to rely on it after some years of looking at the forecast performance. Rowell related that the age data is becoming less reliable due to reduced age sampling. She would like to see more sampling if we are going to continue to rely on the age information. Haanpaa is uncomfortable releasing data like Figure 2 to the public. The public may think we are missing a large portion of the potential harvest. Hilsinger pointed out that the current age structure indicates that there had to be alot more biomass around a few years ago; the number of 15 yr. olds today shows that. Regnart asked about how variable the mortality factor is, and pointed out that a few percentage points difference in mortality each year over 15 years could make a large discrepancy. A discussion followed regarding recruitment and it's effect on the "dome shape" of Figure 2. Funk related that we would have to see large recruitment and biomass to get "dome' back up to 500,000 tons. Funk said there are several things we can look at to fine tune aerial surveys: 1) Point estimate calibration data (already have data, need to work it up); 2) Resident time (timing curve approach); 3) Surface area estimation, perhaps using photography; and 4) Consistency of peak adding methods. (See Attachment 4 {Table 5})

### 4. Thresholds: Where do we go from here?

There is a large range due to the inconsistencies in age composition time series vs. aerial survey time series. Funk discussed whether the threshold taking into account socio-economic factors should be in regulation. Rowell said that perhaps the threshold should be developed in-house and then presented more clearly to the Board of Fisheries. Funk related that the threshold stabilizes yield at the expense of maximizing yield. A discussion followed on threshold levels (See Attachment 6), escapement goal policy and what should be in regulation. Regnart expressed the

desire to get threshold out of regulation. Haanpaa pointed out that the Dutch Harbor food and bait fishery is dependent on current Togiak herring threshold level. Haanpaa sees no problem with leaving current 35,000 tons figure in regulation. (See Attachment 6 "TOGLAK HERRING THRESHOLD LEVELS")

### C. Test Fish Program

#### 1. Point Estimate

Brookover discussed pre-season bid process and bonding requirements. In past, inseason bids have been the most successful. Post-season bids have not worked well. Pre-season bids would let the processor know what to expect. Also pre-season bids allows us to get the fish when the timing is good rather than being restricted to post-season. There would be a bonding requirement saying that the processor would take the herring whenever we test fish. The one company that Brookover and Regnart have been in touch with said they would be interested in doing this. Question about whether there was a specified tonnage to be taken for calibration purposes. Regnart will check with the Attorney Generals office on the bonding process, how the Department handles it, and prepare and obtain bids for the herring test fishing. Funk asked if there were specific locations where we know we need the point estimates concentrated? Regnart said that in the past, we haven't had much choice. But, if possible we can concentrate on specific areas and depth zones.

#### 2. Late Season Data Collection

The stock assessment program is truncated to half of what it used to be. There is concern that we are losing important data, and the resulting postseason biomass estimates are compromised because of the reduced data collection (See Attachment 7). Rowell would like to charter a vessel to obtain samples during late season. We have had problems of getting samples in the areas where the biomass is observed, and would like to try late season sampling. Haanpaa instructed Rowell to put together a yellow book increment package and submit it for the budget; or we could try to increase the test fish allocation for FY97 so we could then put together an estimated cost and submit it as a test fish project. The later method was preferred. Rowell asked if we couldn't use the point estimate test fish contract for that. Haanpaa pointed out that we couldn't because we were already over our allocation for herring test fish.

March 8, 1995

D. Herring Season 1995

1. Outlook, Effort, Markets, Harvest

The herring biomass is forecasted to be 149,000 tons, and will yield the second largest sac roe harvest of 26,000 tons. There is a possibility that the harvest may even be larger than expected. In terms of effort, Brookover is getting indications that both the gillnet and seine fleet will be larger this year than in 1994, especially the gillnet fleet. Processor capacity should also be higher (Brookover is anticipating 3,500 to 4,000 tons per day). Management inseason will be comparable to last year. Even with the Board of Fisheries regulation changes, Brookover anticipates management techniques to be similar to 1994. He plans to have the seine fleet standing by for short notice openings. If necessary he also intends to reduce the size of the areas open for fishing in an attempt to reduce the amount of fishable biomass.

2. 1995 Program Plans

a. Management Operations

Inseason herring management will again be conducted from the Togiak Fisheries (TFI) complex. Fuel will be purchased directly from TFI. The helicopter time will be paid for on a block by block basis inseason with no pre-season contract. Helicopter payment will be with a Transportation Request. Brookover plans to use fixed wing aircraft for aerial surveys in the beginning of the season. Projecting 40 hrs. of helicopter and 40 hrs. of fixed wing flying time. Browning and Brookover will begin flying surveys in late April and staff will set-up at TFI when fish are spotted. Rowell will have her people on stand-by ready to start when fish are seen. Haanpaa requested that Brookover compare his final aerial survey allocations to what he originally submitted. Rowell asked Brookover about the outlook and market for capelin. Brookover indicated that TFI has expressed some interest in capelin and that the National Marine Fisheries Service has also expressed interest in studying capelin.

Brookover mentioned that he has been in contact with Charlie Burkey who is also interested in a point estimate calibration test fish contract and obtaining a test fish processor/vessel. He is

hoping to use one of the buyers from Bristol Bay. It could be possible to combine the bidding process for the two areas and allow the processors to bid on both areas (Bristol Bay and Kuskokwim) together or separately. Apparently Charlie Lean may also be interested in including Norton Sound in the bidding process. A discussion took place and it was decided that Brookover would keep in touch with Lean and Burkey and they would decide how to proceed with the bid process.

Rowell distributed an ice edge map and sea surface temperature chart (See Attachment 8 "Sea Surface Thermal and Ice Analysis"). It is still too early to predict whether the herring will show early or late. The ice edge usually recedes rapidly in March and then slows in April. The weather service thinks the ice edge could continue receding rapidly through April. This coupled with the fact that the 3° isotherm has already moved north of the Aleutians, possibly indicates an early showing of herring.

b. Work Force and Visiting Personnel

Management staff on the herring grounds this year will include Brookover, Browning, Regnart, Haanpaa, and Brad Palach. Research staff will include Rowell and three seasonal sampling technicians. Visiting staff will include Cindy Anderson, John Hilsinger, and Linda Brannian. Fritz Funk may also visit. Protection will require housing for three officers.

Cindy Anderson will again come to Togiak to assist in whatever capacity she can. She will be in Togiak until the herring start showing in Security Cove. She is willing to assist with data entry and would like to fly on aerial surveys whenever it is possible.

Question was asked regarding Virginia Shook's availability to assist Jackson in the Dillingham office during herring season. Brookover indicated that having an extra person in the Dillingham office for about 1 1/2 weeks during herring season would be a tremendous help for Jackson. Hilsinger said he would see who in addition to Shook might be available to assist during that time.

Mark Reynolds and Brad Palach will set up TFI sometime prior to May 1. After that, Mark will begin working on buoys and then on putting out markers. Brookover does not anticipate much on-

grounds work for Mark at TFI.

c. Room and Board

ADF&G is paying for up to 15 people to be housed at TFI. Brookover said there would be enough beds for all staff. PR has been forwarded to accounting for lodging.

d. Sampling Program

The sampling program worked well last year. Rowell indicated that having Palach inform the processors of our sampling needs was very helpful. The orange sample bags suggested by Ken Florey were also advantageous and will be used again this season. Sampling will again be done out of a weatherport. According to Brookover, TFI is willing to provide a similar set-up as last year. The 4-wheeler worked real well last year. However, the 4-wheeler borrowed last year broke down at the end of the season. It was determined that there were extra ATV's in King Salmon and Regnart offered to lend a recently repaired 3-wheeler to the West Side and the herring project. Rowell will be responsible for it's care while it is on the West Side. Regnart and Russell will decide whether or not the 3-wheeler will stay on the West Side.

e. Inseason Communications

In 1994 there was some problems with the single side band (SSB) communications. This upcoming season Brookover plans to try improving SSB communication. We will have a handheld VHF aircraft radio available for use. Staff will still be limited to only one phone at TFI. It is possible to use email, but Brookover thinks it would not be worth it. He plans to continue faxing reports to Dawn Jackson in Dillingham.

3. Inseason Reporting of Survey and Harvest Data

The spreadsheets for survey and harvest data are updated as the data becomes available. Brookover asked Rowell if it would be possible to obtain age composition data the morning after a fishery occurs (sometimes it has taken several days to get this information). The problem arises when the samples get backlogged, it is easier to process them in sequence rather than processing the most recently collected samples first. It would

be possible to just obtain length frequency. However, the amount of time it takes to get length frequency summaries to Brookover will depend on how quickly samples can be obtained from the processors. Rowell said that it helps when Brookover puts out requests for people to transport samples from the processors to TFI. It was decided that if the need for samples is critical, Brookover will put out the request. Rowell will keep Brookover updated on the samples available for processing, and Brookover will provide Rowell with a prioritized list of the samples that he needs length frequencies for. Rowell will also try to make one technician available for one hour each day to obtain length frequency samples only.

#### 4. Fish Ticket Program

The fish ticket editing for 1994 is complete. Russell pointed out that this will be the first time in the history of Bristol Bay that the fish tickets have been complete for the past year prior to the season beginning for the following year, an "ATTABOY" is due Regnart and coworkers. In 1995 catch will be reported by period this year instead of by day as it was in the past. Processors will be informed to write period numbers on the fish tickets. This seemed to work well last year.

#### 5. Board of Fish Actions / Implications for Management / Options

Three actions taken by the Board of Fish that are of particular importance are: 1) new 36 hr holding limit (from time of closure) for purse seiners, 2) regulation to make it illegal to have on board more than the legal limit of gear, and 3) reduction in legal purse seine depth.

#### 6. Fish and Wildlife Protection Plans

Capt. Graham anticipates having similar personnel and equipment as last year. Protection has a mandate from the Board of Fish to look at seine depth. They will proceed since the new seine regulations are in effect and they will be measuring seines. Two Protection vessels (P/V Wolstad and PS 1) will be on scene and possibly four aircraft (R22 helicopter, one C185, and two cubs). Two investigators will also be assigned to the Bristol Bay fishery this year.

Brookover informed Capt. Graham that communication between ADF&G and Protection was improved last season as a result of having an officer at the TFI compound at all times. Brookover asked if there was a more secure communication system than the single side band radio. According

to Capt. Graham, Protection uses a satellite communication system. Unfortunately, ADF&G does not have the capability to use this system. He said Protection personnel in the area could be contacted via telephone and the Kodiak office, but this may not be feasible due to time delays.

Brookover asked for Capt. Graham's opinion on placing a boundary line through the middle of Nunavachak Bay. If there is a large volume of fish in Nunavachak, Brookover wants the flexibility to be able to create a boundary line through the middle of the bay in order to cut the bay in half and reduce fishing area. Capt. Graham stated that it could be a problem for Protection, but that if it has to be done then Protection will deal with it. He further stated that if it is done, Brookover should use loran coordinates to define the line.

Capt. Graham informed the staff that Protection is trying to improve their intelligence in Bristol Bay and that if ADF&G personnel hear of any rumors of illegal activities, they should make a note of it and provide the information to Protection.

## Salmon

### A. Management - 1995 Season

#### 1. Togiak

There is a concern over the decline of chinook salmon in the Togiak Section of Togiak District. The total run declined from 46,000 in 1985 to 15,000 in 1991. It is believed that management action taken in 1992 has helped reverse this declining trend (1994 total run was 25,000). These actions included mesh size restrictions and closures the last two weeks of June, these actions combined resulted in reduced exploitation rates. Mesh size restrictions will be used again in 1995 starting June 1, and two to three day periods or complete closures will occur the last two weeks of June.

Total run for sockeye salmon is forecast to be 508,000. The escapement goal is 150,000. Browning is anticipating a moderate management approach, and plans to fish harder in early July.

The 1994 coho salmon harvest was double the long term average. The 1995 coho salmon return is coming off of a poor parent year (38,000 in 1991). Browning will shorten the 4-day fishing periods in August as

needed.

Chum salmon are returning off a good parent year and have a healthy outlook for 1995.

The Togiak Management Plan is on the agenda change request for the March Board of Fisheries meeting. ADF&G is currently in the process of commenting to the Advisory Committee on the draft version of the plan. The current version would only require regulation changes, so the staff is questioning the need for a complete plan. The Board will consider the agenda change request next week and probably take up the revised plan in October 1995 or February 1996.

Hilsinger expressed concern over increasing sockeye salmon fishing in early July when we will be decreasing fishing periods in late June. If we are worried about chinook, then why increase fishing in early July? Browning is looking at the increasing run trend for chinook and expecting it to continue; they should be able to conserve the chinook necessary for the escapement goal at the end of June and by fishing harder for sockeyes in early July, avoid the extended periods in late July. This would distribute the sockeye harvest more evenly over the entire run. Brookover stated that they plan to look at the sockeye run model inseason to get an idea of sockeye run timing.

## 2. Nushagak

The 1995 chinook forecast is 177,000. This is considered a minimum and the run may be stronger. Brookover is anticipating short openings and more periods. If he encounters a long lull such as the seven day lull encountered in 1994, he plans to have an opening regardless of subsistence indicators. He may impose a mesh size restriction dependent on sockeye timing.

The 1995 sockeye salmon forecast of 3.5 million is similar to 1994's forecast and higher than the ten year average. The Wood River forecast is for an above average run while a relatively weak run is expected for the Nushagak River. For this reason, Brookover will fish conservatively on the front end. The Igushik River forecast is average. There is a possibility of brood year interaction, but Brookover believes the run will probably be less than last year. He anticipates Igushik section openings early in the season to control the Igushik escapement. He also plans to observe Igushik test.

A weak run of 87,000 coho salmon is anticipated for 1995. Brookover is anticipating no directed fishery for coho salmon. He will continue to fish for sockeye until the coho catch reaches 6,000 to 7,000 or until more coho are being caught than are sockeye.

Brookover asked if Nuyakuk tower is funded for this season. The personnel would be provided by the University of Washington and ADF&G would provide equipment, food, and supplies. Hilsinger said it was dropped from the budget, but that it could probably be added into the pre-audit. Brookover expressed concern about the Tikchik Lake sockeye salmon escapement. He pointed out that even with the tower in place it would be difficult to correlate tower counts with sonar counts without some idea of the Nushagak/Mulchatna escapement. Haanpaa instructed Brookover to budget for aerial surveys of the Nushagak/Mulchatna system in an attempt to quantify the sockeye escapement in that system. Brookover asked Brannian if age composition and specifically zero checks could be used. Brannian stated that to do this we would need samples from the Mulchatna.

### 3. Naknek/Kvichak

The 1995 sockeye salmon total run to the Naknek/Kvichak District is forecast to be 30.8 million. With a total escapement goal of 11.2 million, this leaves an estimated harvest of 19.6 million. Regnart is anticipating more effort early in the season. The Naknek forecast is higher than in 1994; Regnart is anticipating no protective measures. He anticipates ten to twelve hour periods with windows as much as possible, and to fish more aggressively. He plans to test fish early on. He also hopes to get a good bulk of the escapement from the middle of the run.

Regnart plans to use gear restrictions early in the season to protect chinook salmon. He will fish conservatively for coho salmon, starting with 4 day openings and reducing to 3 days or closing if necessary.

The Board of Fisheries changes in the management plan will not come into effect until 1996.

### 4. Egegik

The 1995 sockeye salmon total run to Egegik District is forecast to be 13.1 million. With a escapement goal of 1 million, this leaves a estimated harvest of 12.1 million. This would be the third largest harvest on record. Two-ocean five year olds and three-ocean six year olds are

forecast to be the largest component. Russell is expecting a reduced amount of effort this season due to the large Kvichak forecast and the difficulties of fishing in the Egegik District. The emergency opening period will begin on June 16 and Russell plans on having a targeted sockeye opening by June 22 or 23. He plans to continue using window closures and may have short notice openings. Test fishing has not been needed in the Egegik District for the past few years, but Russell will have people ready if the need arises this season.

The 1994 season experienced a small catch of chinook salmon, but a good escapement. Russell plans to fish 4 days/week prior to June 16 using small mesh gear.

Russell's 1994 aerial surveys of Egegik River only counted 2,000 to 3,000 chum salmon. Counts used to be around 10,000 to 12,000. According to Russell there is not much that can be done to help the chum salmon other than have windows to allow chums through and to fish sockeye harder early in the season.

The U.S. Fish and Wildlife Service has offered to provide funding for extending the Egegik Tower project from July 22 through September 10. Last season they extended the project using their own people, but this season would like to pay ADF&G to use our technicians. Russell was informed that he would have to write up a cooperative agreement.

Russell plans to have Weiland double-up with him when he flies aerial surveys on Egegik and Ugashik this year so that Weiland can become more familiar with flying surveys on these systems. Keith will manage the Ugashik District and will become more involved in management of the Egegik District.

## 5. Ugashik

The 1995 sockeye salmon forecast of 5.4 million is similar to last year. With an escapement goal of 700,000, the estimated harvest is 4.7 million. Weiland expects to manage Ugashik District similar to last year. He anticipates one or two openings in late June. A large component of two-ocean fish is forecast (62%). Weiland expects the effort to be similar to last season. However, Russell noted that early openings could draw more effort into the district. Weiland plans to test fish early in the season.

Weiland will protect chinook salmon early in the season. After the EO period ends he plans to have 4-day per week fishing for coho salmon until

he can obtain some performance data, at which point he will cut back if necessary.

## 6. Buoys

It was suggested to not deploy all eleven buoys on the East Side this season. Protection contends that because buoys move, they only result in more tickets. Reducing the number of buoys will also save deployment costs. Therefore, seven of the eight buoys in the Ugashik District will not be deployed and they will be stored in King Salmon as back-ups. This will leave one buoy each in Ugashik and Naknek/Kvichak Districts, and two buoys in Egegik District. On the West Side a total of three buoys are deployed, all three in the Nushagak District.

## 7. Processor Packets

### a. Oral Catch Reports (catch by 5-digit stat area)

Regnart would like to develop a catch report program that is similar to the West Side program and that can be used Bay wide. Regnart will work with Tim Baker to develop a catch report program that is menu driven, easy to use, easy to modify, and that is capable of producing catch reports by 5-digit stat area. Regnart hopes to have the new program ready to use this season.

### b. Final Operation Reports

Regnart requested a change in the reporting process. In the past we have asked for information on how the companies processed the product. Regnart pointed out that Herman Savikko in Juneau requests this information already and that it is a duplication of effort for us to request it also. It was agreed that this question would be deleted from the report. The report would still ask for number of fish, poundage of fish, average weight, and price per pound.

Brookover pointed out that there was a discrepancy of some sort between the Final Operation Report and the regulation book. He cited a problem he had last season with a processor moving into the Togiak District without notifying the Dillingham ADF&G office. The company said they had indicated on their processor checklist that they may buy in Togiak and that this fulfilled the requirement set forth in the regulation book. It was decided that

the processor checklist needs to be re-worded in order to eliminate this confusion. Regnart was assigned the responsibility of re-wording the checklist.

c. District Registration Cards

1. Postmark Date

Protection has found that in some cases fish ticket dates have preceded the card drop-off date. These instances occurred when the card was mailed but did not get to the ADF&G office prior to the time the fishermen first began fishing. The magistrate has indicated that according to the regulations, the card only needs to be postmarked for the fishermen to begin fishing. Capt. Graham will check into changing the regulation and, if needed, the Department will put in an agenda change request for the October 1996 BOF meeting to change the wording on the regulation. Capt. Graham requested that we print a space on the cards for a department representative to initial, sign, and date when the card arrives in the ADF&G office.

2. Return Address Change to Dillingham

Dawn Jackson suggested changing the return address on registration cards to Dillingham and having the Dillingham staff alphabetize the cards. This idea was rejected because CFEC was not in Dillingham long enough to enter the cards and Dillingham would not have the man-power to handle the large influx of cards.

3. Ordering and Mailing

The annual lengthy discussion on ordering and mailing blue cards was a little more productive this year than in the past. The discussion covered many of the same arguments that have been heard over the last few years. The major problem is that ADF&G spends a relatively large amount of money each year to mail district registration cards out to each permit holder, then many of the permit holders request a duplicate card inseason. Regnart suggested that we stop sending out blue cards and that we require fishermen to come to the one of the field offices or

regional office to obtain a district registration card. Crawford suggested maintaining a record of who requests a duplicate and then mail only to those who do not request a second card. A second solution suggested by Crawford was to charge for the duplicate card. Somebody also suggested program receipts. Brookover suggested personal identification numbers and electronic records, but Protection has already contemplated this method and has concluded it would make enforcement more difficult. Russell emphasized that if we stop sending out registration cards, then we should at least send them out this year and give the fishermen a one year notice that we will not be sending them out in 1996. In the end it was decided that the cards would be ordered and mailed out in 1995, but that the Department will cease mailing out registration cards in 1996. During the 1995 season there will be a news release informing fishermen that registration cards will not be mailed out in 1996 and that they will be available in the Anchorage, King Salmon, and Dillingham ADF&G offices. This notice will also be placed in the 1995 outlook paper. Later in the meeting, Cross was placed in charge of sending out registration cards for 1995.

## B. Research

### 1. Kvichak, Egegik, Ugashik Smolt

#### a. Kvichak Smolt

Crawford anticipates no major changes in 1995. The project is budgeted to operate from May 15 through June 18. The 1995 crew will be the same as last year.

Summary of 1994. Lake ice was a problem in 1994. The crew was at the site on May 17, but was unable to count until May 28 due to ice. First signs of smolt (bird feeding activity) were observed on May 20. The first fyke net catch on May 29 indicated a relative low abundance of smolt. Age composition of this catch indicated that we were probably still on the front end of the run. The 1994 smolt outmigration was 83.8 million.

b. Naknek Smolt

This project will not be funded by the Park Service in 1995. The first draft of the 1994 RIR was sent to the Park Service in February, and Crawford is currently producing a two year (1993-1994) summary report. This project budget currently has a balance of \$4,875. The Park Service has directed ADF&G to spend the remaining money on smolt equipment.

Summary of 1994. Few weather related problems were experienced in 1994 and no ice problems were encountered. Sonar counts did have to be adjusted for bad transducers. No signs of smolt were observed prior to startup on May 19. The first smolt counts and fyke net catches occurred on May 20. On June 2 a large number of smolt were observed passing just outside the offshore array. The total 1994 smolt outmigration was 74.9 million.

c. Egegik Smolt

Crawford expects no major changes for 1995. Anticipated operating dates are May 15 to June 16. The crew will consist of four experienced seasonals.

Summary of 1994. There were no major equipment or weather problems in 1994. No signs of smolt were observed prior to startup on May 21. The first fyke net catch on May 22 indicated low abundance, and the age composition indicated that we were still on the front end of the run. The total 1994 smolt outmigration was 94.1 million.

d. Ugashik Smolt

No major changes are planned for 1995. The expected operation dates are May 15 to June 15. A three-person crew will work the project in 1995.

Summary of 1994. Weather was favorable for smolt counting in 1994. There were no signs of smolt prior to the startup date of May 20. The first fyke net catch on May 22 indicated low abundance. Age composition is not a good indicator of outmigration timing in Ugashik River. The 1994 smolt outmigration estimate was relatively low (30.0 million).

The Ugashik smolt project is funded in 1995 with \$45,000 in State CIP monies. This money can be spent all in 1995 or in small increments over several years. Mitch Seaburt, Chairman of the Lower Bristol Bay Fish and Game Advisory Committee, has expressed interest in securing outside agency funding to assist with funding Ugashik Smolt in 1995. Seaburt has been in contact with the Pilot Point City Council and the Lake and Peninsula Borough about funding Ugashik Smolt. Neither expressed interest in funding the entire project, but they may be interested in funding part of the project. Crawford provided Seaburt with a copy of the project description and a summary of anticipated project costs for 1995. Haanpaa requested that Crawford send follow-up letters to Pilot Point City Council and to Lake and Peninsula Borough if he doesn't hear from Seaburt within the next week.

2. Kvichak, Egegik, Ugashik River Test Fish

a. Kvichak River Test Fish

No major changes are planned for 1995. Expected operating dates are June 8 through July 15 -20. In 1994 the project caught a total of 1,545 sockeye salmon. Total fish sales of 2,269 lbs grossed \$1,535. Best travel time on the last day of the project was 2 days.

b. Egegik River Test Fish

No major changes are planned for 1995. expected operating dates are June 12 through July 10-16. In 1994 the project caught a total of 1,259 sockeye salmon. Total fish sales of 7,098 lbs grossed \$4,259. Best travel time on the last day of the project was 1.5 days.

c. Ugashik River Test Fish

No major changes are planned for 1995. Expected operating dates are June 21 through July 13-20. In 1994 the project caught a total of 974 sockeye salmon. Total fish sales of 3,680 lbs grossed \$2,555. Best travel time on the last day of the project was 1 day.

3. East Side Catch Sampling / Scale Aging

Scale aging will operate similar to last five years. Two scale agers will

be located in King Salmon. All scales will be processed through King Salmon. The managers will set priorities on scale aging.

Catch sampling will also operate similar to the last five years. Cross will have three catch samplers working for her. She also hopes to use test fish personnel when available. Catch samplers can also assist with test fish. Two electronic measuring boards will be used. The sampling design and number of samples will be similar to the last five years.

#### 4. Stock I.D. Studies

##### a. Naknek Section

Cross plans to concentrate on the Peterson Point area and to obtain stock composition estimates by date for catches made during the flood and ebb. She anticipates having problems due to the conflicts with commercial openings. She will try to test fish during closures. She's not planning on hiring additional test fish personnel, but may use catch samplers when the district test fish personnel are available to catch sample.

##### b. Middle Bluff

Cross plans to test fish in the same areas that were fished in 1993-1994. She also may add an area to the north to test the theory that Kvichak contributions increase north of Middle Bluff. She will fish in Middle Bluff whenever she is unable to test fish in Naknek.

#### 5. Nushagak Sonar

Miller anticipates running the project similar to last season. He felt the crew did an excellent job of conducting the apportionment process in camp last season. Dave Vozka (crew leader) filed a grievance with the union to upgrade his PCN to a FWTIII. It looks like that will be approved. New offshore autorotators and tripods will be used this season. The new tripods should speed up the deployment process, but the first installation may go a little slow. Miller hopes this will not cause too much of a delay in the sonar startup date. The crew is budgeted to start June 6 and the sonar should be operational by June 10. The test fish crew starts June 18. Miller needs a PCN to hire a Technician to replace Matt Holland who resigned last fall. Holland's PCN was borrowed from herring research. Haanpaa instructed Miller to check with Wayne Prigge for extra PCN's around the region. If not, Miller can just use the herring research PCN.

Another PCN may also become available before the beginning of the season.

#### 6. Igushik River Test Fish

This project will operate similar to last season. At this point it looks like both technicians are returning, however the crew leader (Jane Browning) has expressed interest in working on another project. The crew is budgeted to start June 16. The project will end around July 15 depending on run timing. Haanpaa asked what the fish sales were from this project, and Miller estimated about \$1,000 to \$1,500 gross. Haanpaa also questioned if the project was useful to Brookover for making management decisions. The answer was "yes".

#### 7. West Side Escapement Sampling

The current sampling is adequate for age composition information. If we plan to use age-0 fish as an estimator for stock composition, we will have to increase sampling at Nushagak and Wood Rivers. It would be difficult to increase sampling from seines at the sonar site. Brookover asked about reviewing the age-0 data prior to the 1995 season. Brannian said she would discuss it with Cross to see if research would have time to do this.

#### 8. Tower Operations (Calibration)

Regnart expressed concern that there has been no technical or statistical reporting of the tower counts. He pointed out that this is not a problem in terms of management, but eventually someone may scrutinize tower operations and techniques. He would like to calibrate and determine what the sources of error are and just how much error there is. (Basically, how accurate are the sonar counts and how can we make them more accurate?) In order to do this, we would first have to determine what the objectives are. Brannian and Cross were assigned the task of evaluating and documenting tower operation, sources of error, reporting requirements, etc.

### C. Fish and Wildlife Protection Plans

Capt. Graham expects their operation to be similar to last season. He foresees no major problems. They will have the same number of boats and aircraft that they did last season. They will operate a R-22 helicopter, a Cessna 185, and two Super Cubs. One concern that he did express is that the FWEO job class is being eliminated. This means the seasonal officers will no longer have enforcement

authority, they can only be support personnel, drive boats, etc. They are trying to deal with this.

As mentioned earlier in the meeting, Protection is attempting to increase intelligence in the Bay. To assist with this, Capt. Graham will assign two investigators to Bristol Bay for about 3 to 4 weeks. They will not be working undercover, but they will be asking a lot of questions. Again, Graham asked ADF&G personnel to report any information on illegal activity.

Protection will try to get over to Togiak more this season with both aircraft and boats. The Protection pull-out in July will depend on the 1996 budget. Starting in June of 1996 Graham thinks Protection will start shifting its efforts to the Peninsula (both North and South).

Regnart asked Capt. Graham about the problem of fishermen not recording personal use chinook on their fish tickets. Capt. Graham said that if it is that big of a problem then FWP start looking for it. He will discuss it with Regnart.

## Reports

### A. Assignments

#### 1. Herring

The 1992 and 1994 herring forecast RIR's have been completed. The 1995 forecast report is also complete. The 1995 catch and escapement report will be finished this month. Rowell also worked with Fritz Funk to complete two Board of Fisheries reports this winter. Rowell's next priority will be to complete the 1990-1994 catch and escapement reports. Haanpaa suggested combining these years into one report. Rowell will get together with Brannian to discuss this.

#### 2. Salmon

##### a. AMR

Regnart said the 1994 AMR final report will be out in the next three weeks. Russell commended Regnart and Weiland for having the AMR tables completed in time for the Board of Fish meeting. It was decided that there would be an annual rotation for editorship of the AMR. Weiland was assigned editorship for 1995 and Browning for 1996.

b. Spawning Ground Surveys

Brookover was assigned the editorship for the 1995 Spawning Ground Surveys report. As with the AMR, the Spawning Ground report will also be on an annual rotation for editorship.

c. 1995 Outlook

Managers should each have their portion of the 1995 outlook paper to Haanpaa via Email by March 24. Brookover stated that the herring outlook will also be completed by that date.

d. Research

Since January of 1994 Crawford and Miller have been assigned authorship or co-authorship of fourteen reports. Four final reports and four draft reports have been completed. Three draft reports are in progress, and three reports have yet to be completed.

Maintenance

A. King Salmon Complex

1. Land Status

At this time, ADF&G does not have deed to the land on which the King Salmon complex sits. DOT has proprietorship, but will deed the land back to ADF&G.

2. Russell plans to have the inside and outside of the complex painted hopefully this spring. He also mentioned that the bunkhouse roof still leaks, but that Juneau has been made aware of the problem.

B. Dillingham Complex Status

Construction on the new wing of the renovated ADF&G office should begin sometime this summer. Brookover has reviewed the building plan. Both the old game building and the current bunkhouse will be demolished and Brookover hopes to put gravel on the old sites to be used as boat or other storage areas. The bunkhouse is top priority for demolition, but this will not occur until after the 1995 field season. Maintenance needs include replacement of one of the shop doors, or at least replacement of panel on the door. Brookover will talk to Elmer Sorensen about this.

#### E. Field Camps

Wood River bunkhouse is in better shape after having maintenance work completed on it last summer. The roofs of the Igushik and Togiak Tower cabins are in poor shape and will need some work.

#### IV. Miscellaneous

##### A. Salmon Fish Ticket Status/Needs

Regnart indicated that the editing was about 98% complete. Weiland will be sending Brookover and Russell a copy so they can review their districts. Russell complemented Regnart and Weiland on completing the fish ticket editing in a timely manner. Russell pointed out that this is the first time in Bristol Bay history that we will be entering the field season with the previous year's fish tickets complete. Russell also suggested that Weiland work closely with Autumn this season because it will be her last year as fish ticket editor and Weiland should become familiar with the inseason editing process.

According to Regnart, the fish ticket system in general works O.K. There are some inherent problems with the database that cannot be explained. These are not major problems and Juneau has been informed of them. Regnart said there is a problem with recording personal use catch on fish tickets. He expressed concern that fishermen and processors are failing to record personal use catch. Capt. Rich Graham with Fish and Wildlife Protection indicated that if this is a serious problem, protection can start looking for its occurrence. He will get together with Regnart and discuss the problem.

Russell suggested that keypunching the actual fish ticket number (serial number) in addition to the our stamped number would be beneficial for enforcement.

##### B. Habitat Issues

Discussed earlier.

#### V. Other

A. Bed and Breakfast in Dillingham for visiting regional staff. Haanpaa has reserved a Bed and Breakfast in Dillingham for June 26 to July 7.

B. Russell asked that Cross be reminded to reserve the wet rental from DOT for catch samplers this season.

**BRISTOL BAY STAFF MEETING**

**March 7-9, 1995  
Anchorage ADF&G Office**

**8:30 a.m. - New Conference Room**

**I. Administration**

- A. Appointment of Haanpaa-Chairperson
- B. Appointment of Browning/Miller-Recorder(s)
- C. Agenda Review/Changes

**II. Regional Issues**

- A. Administration Issues
  - 1. Computer Services
    - a. Software direction (Brannian)
    - b. Regional database (IFDB)
- B. Budget
  - 1. FY:95 Pre-Audit
  - 2. Update - funding sources/concerns
  - 3. Update - Dillingham new office
  - 4. CIP monies
  - 5. Fuel Tanks - King Salmon
  - 6. Wish List
    - a. East Side
      - i. second Fax machine
      - ii. cell phones for camps
      - iii. other?
    - b. West Side
      - i. (too long to itemize)
- C. Personnel
  - 1. Seasonal hiring practices/needs for '95
  - 2. PDQ Update (Fisher)
    - a. comp-time (Fisher)
  - 3. Permanent staff changes
    - a. retirements
    - b. needs
  - 4. CFEC Role/Plans
- D. Meeting Schedule and Attendance
  - 1. Spring Fishery Conference -Dillingham

**III. PROGRAM REVIEW**

**TOGIAC HERRING**

- A. 1995 Season Forecast, (Rowell)
- B. Stock Assessment and Harvest Policy (Funk/Rowell)
  - 1. Inseason vs. postseason biomass estimates 1986-94
  - 2. Conflicting abundance trends from age comp vs. aerial surveys
  - 3. What constitutes the "best" subset of aerial surveys

4. Thresholds: where do we go from here
- C. Test Fish Program
  1. Point estimate
  2. Late season data collection
- D. Herring Season 1995
  1. Outlook, effort, markets, harvest
  2. 1995 Program plans
    - a. Management operations
    - b. Work force, visiting personnel
    - c. Room and board
    - d. Sampling program
    - e. Inseason communications
  3. Inseason reporting of survey and harvest data
  4. Fish Ticket program
  5. BOF actions/implications for management/options
  6. Fish and Wildlife protection plans (Capt. Graham)

#### SALMON 1995 SEASON

- A. Management
  1. Togiak (Browning)
  2. Nushagak (Brookover)
  3. Naknek/Kvichak (Regnart)
  4. Egegik (Russell)
  5. Ugashik (Weiland)
  6. Buoys
  7. Processor Packets
    - a. Oral catch reports (catch by 5-digit stat area)
    - b. Final operation reports
  8. Maps and mapping (Brookover)
- B. Research
  1. Kvichak, Egegik, Ugashik smolt (Crawford)
  2. Kvichak, Egegik, Ugashik Rivers test fish (Crawford)
  3. East side catch sampling/scale aging
  4. Stock I.D. studies
    - a. test fish program
      - i. flood vs. ebb fisheries (Nak/Kvi)
  5. Nushagak sonar (Miller)
  6. Igushik River test fish (Miller)
  7. West side escapement sampling
  8. Tower Operations (calibration)
- C. Fish and Wildlife Protection plans (staff)

#### REPORTS

- A. Assignments
  1. Herring
  2. Salmon
    - a. AMR - editor
    - b. Spawning Ground Surveys
    - c. 95 Outlook
    - d. Research
  3. Other

**MAINTENANCE**

- A. King Salmon complex status
  - 1. Land status
- B. Dillingham complex status
- C. Outboard motors, status
- D. Boats, status
- E. Field Camps

**IV. MISCELLANEOUS**

- A. District Registration Cards
  - 1. Return address change to Dillingham
  - 2. Ordering and mailing
- B. Salmon Fish Ticket status/needs
- C. Habitat issues (Dolezal/Wiedmer)

**DISTRIBUTION:**

Koenings  
Clasby  
Larson  
Eggers  
Haanpaa  
Fried  
Funk  
Hilsinger  
Brady  
Brannian  
Crawford  
Cross  
Rowell  
Regnart  
Miller  
Shook  
Browning  
Brookover  
Russell  
Fisher  
Saunders  
Gamble  
Delaney  
Hepler  
Dolezal  
Westward Region  
Kelly - CFEC  
Capt. Graham - FWP

February 17, 1995

Conference call w/ Denny Johnson - Computer Services - Juneau

Local Area Network (LAN) required to participate in Wide Area Network (WAN):

LAN cost specifics: 15 Machines

- Novell Netware (up to 25 users) . . . . .	\$2,450.00	\$2,450.00
- Network cards (1 per machine hook-up) . . . . .	\$ 100.00 ea.	\$1,500.00
- Synoptics 10 base T hub (allows File Server plus 11 other computers to connect into a LAN) . . . . .	\$1,600.00	
If more than 12 machines total, we'd need another card for hub . . . . .	\$ 200.00	\$1,800.00
- Post Office software (for LAN on File Server) . . . . .	\$ 400.00	\$ 400.00
- Patch cables (25 ft.)(1 per machine including file server) \$	20.00 ea.	\$ 300.00
- Note: A File Server for the network is needed; however, we feel that between now and the planned hookup in the fall, with equipment upgrades and general scrounging, we can come up with a machine that will suffice. The machine should be at least a 386 w/ 16 megs of RAM, and 250 megs of storage for software.		\$6,450.00

WAN cost specifics:

- Department of Labor is picking up the cost of the "56 KB digital dedicated phone line" being installed in Dillingham in May or June. This line will be our access to WAN.
- Hardware costs for our hookup, including 2 high-speed modems and cabling for up to 15 machines . . . . . \$7,000.00
- Monthly costs for WAN access . . . . . \$ 366.00/month
- Local phone charges from A.D.F.& G. bldg. to drop site . . \$ 22.00/month  
(Drop site is where Dept. of Labor ends up bringing this 56KB line to; should be either Job Service or State Trooper bldg.)
- All current Email charges will go away
- C.F.E.C. will contribute some funds due to their summer usage.
- Denny Johnson of Computer Services will handle PR's for equipment purchases.

**Table 3. Forecasted Togiak herring biomass for 1995 and harvest allocations as directed by the Bristol Bay Management Plan.**

Allocation Guideline	Forecast Biomass (tons)	Harvest Allocation (tons)
	149,053	
Exploitation (0-20%) for Total Allowable harvest @ maximum 20%		29,811
Spawn-on-kelp (fixed Allocation)		1,500
Remaining Allowable Harvest		28,311
Dutch Harbor Food/Bait (7% of remaining harvest)		1,982
Allowable Harvest for Togiak Sac Roe Fisheries		26,329
Purse Seine allocation	75.0%	19,747
Gill net allocation	25.0%	6,582
Total Sac Roe harvest		26,329

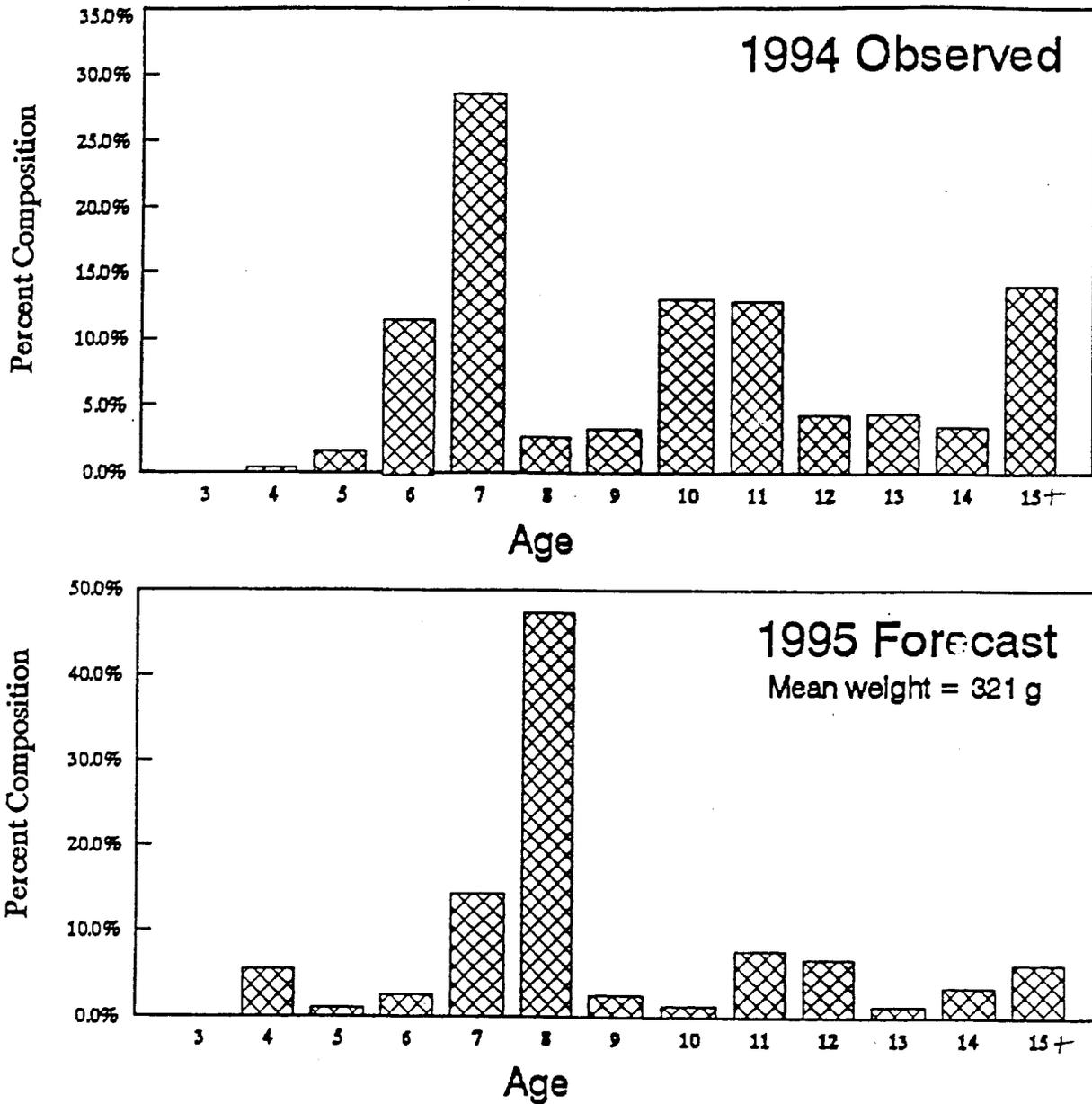


Figure 3. Age distribution of the Togiak District herring population by weight, observed (top) in 1994 and projected (bottom) for 1994. Mean fish weight is projected to be 321g.

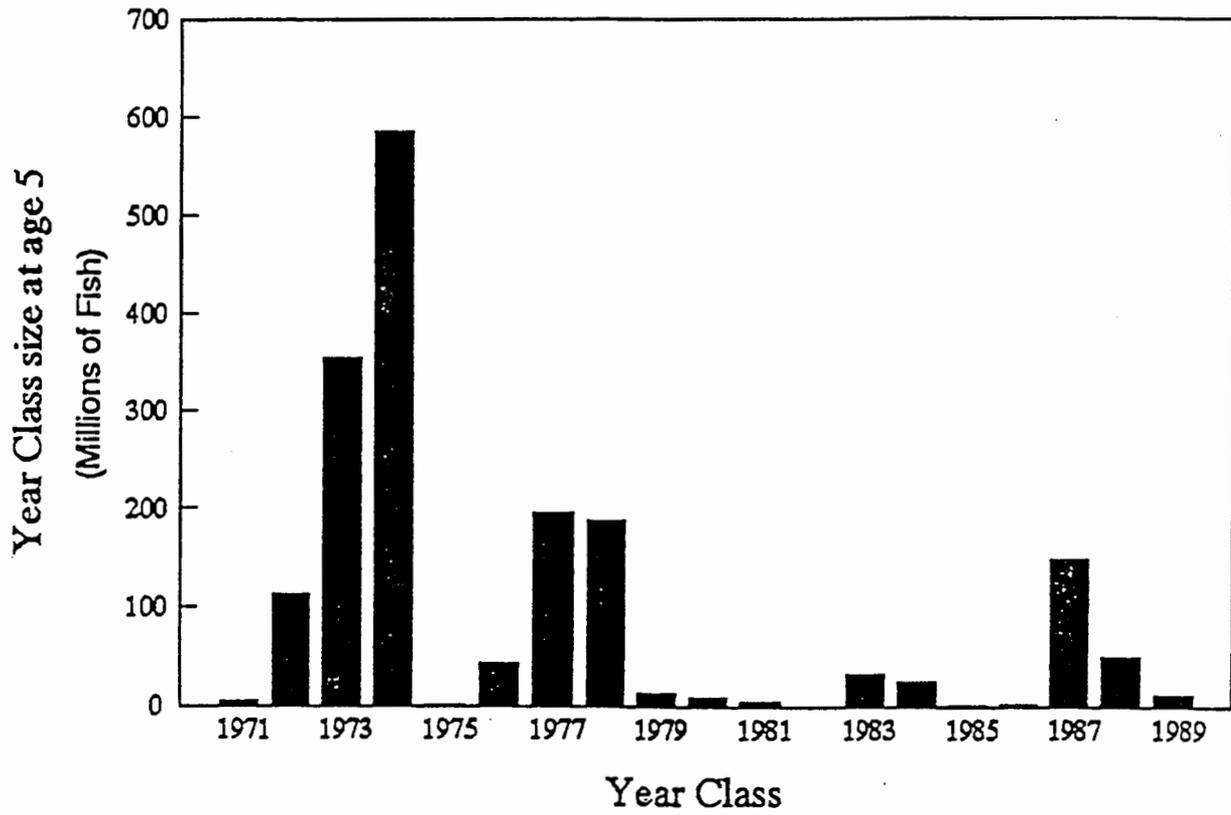


Figure 5. Year class strength of Togiak District herring in numbers of five year old recruits.

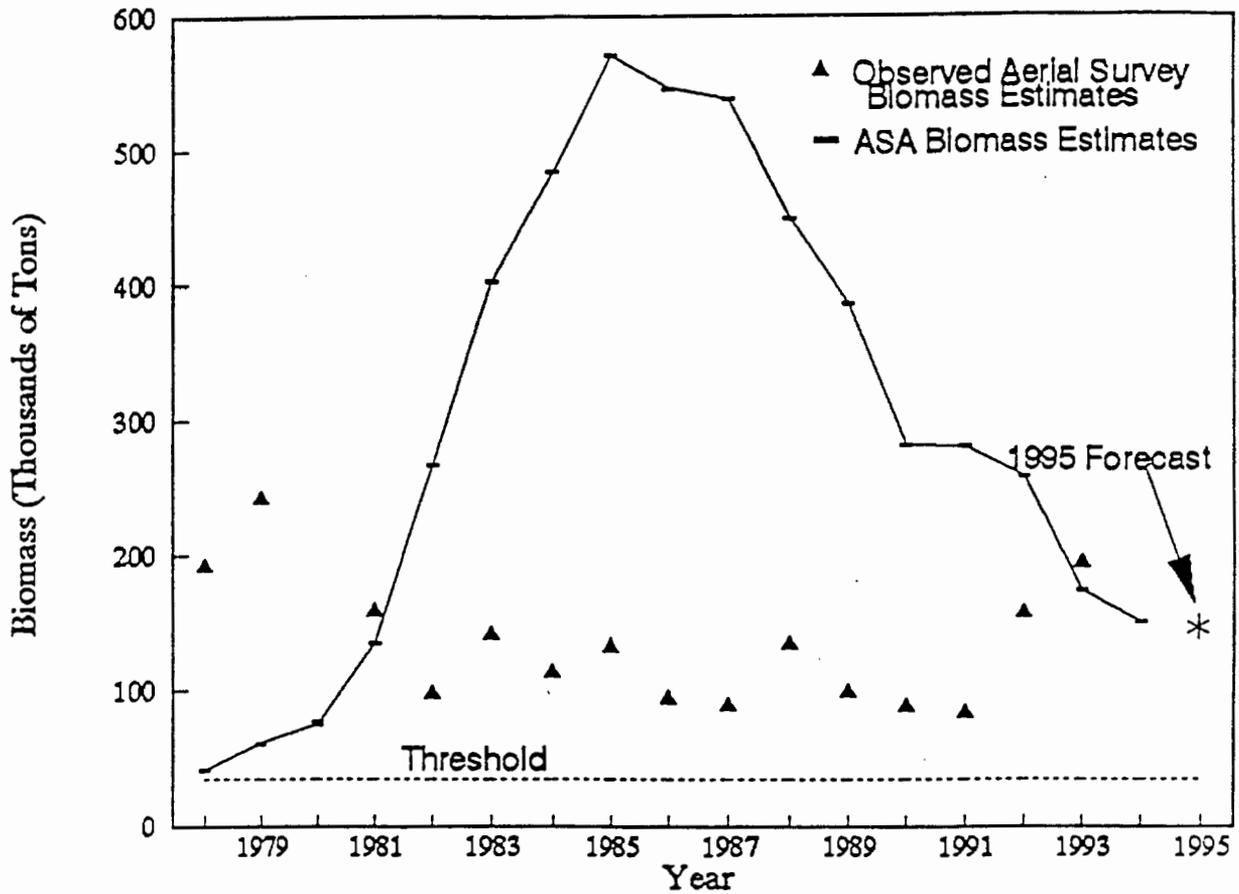
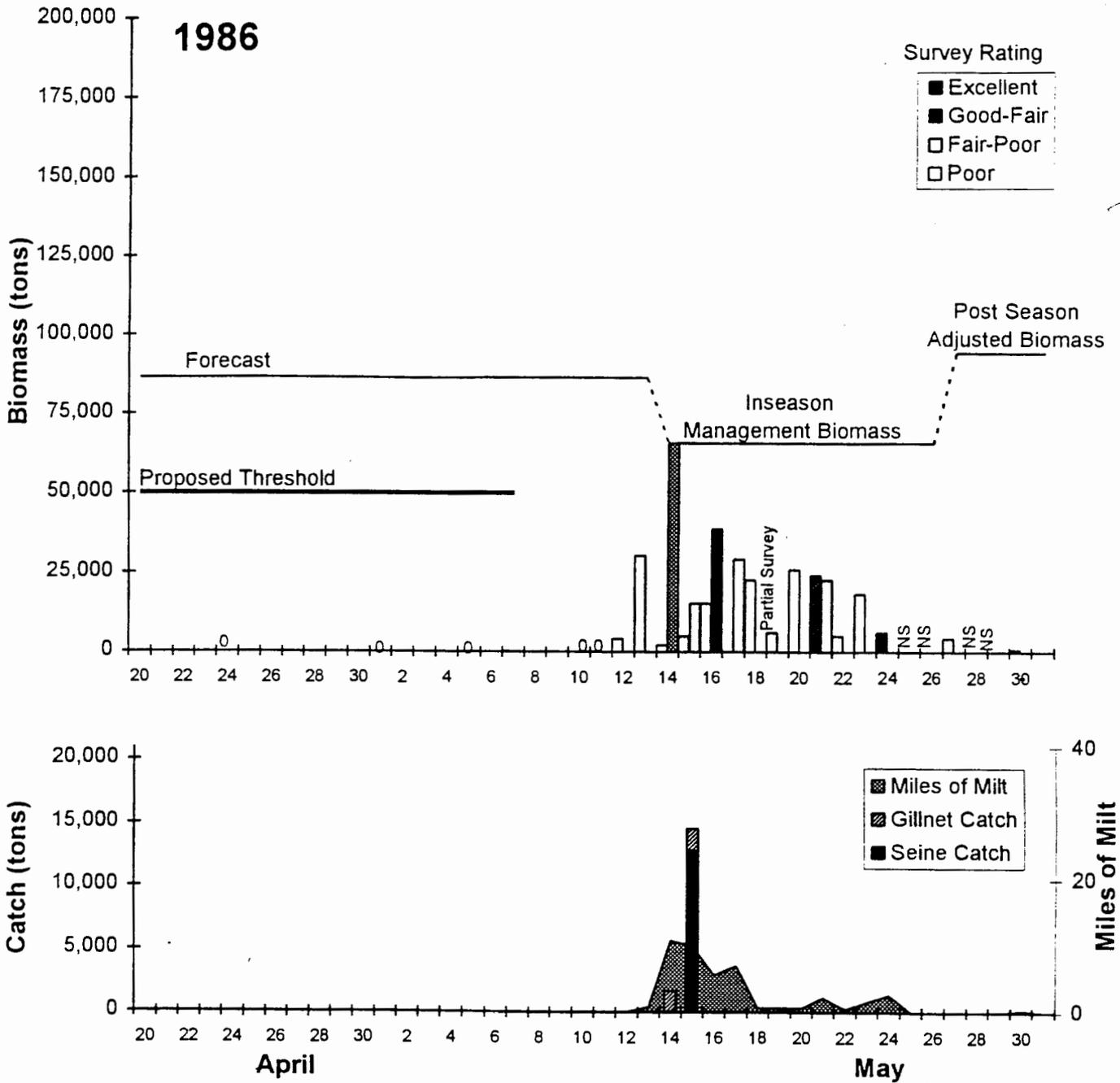
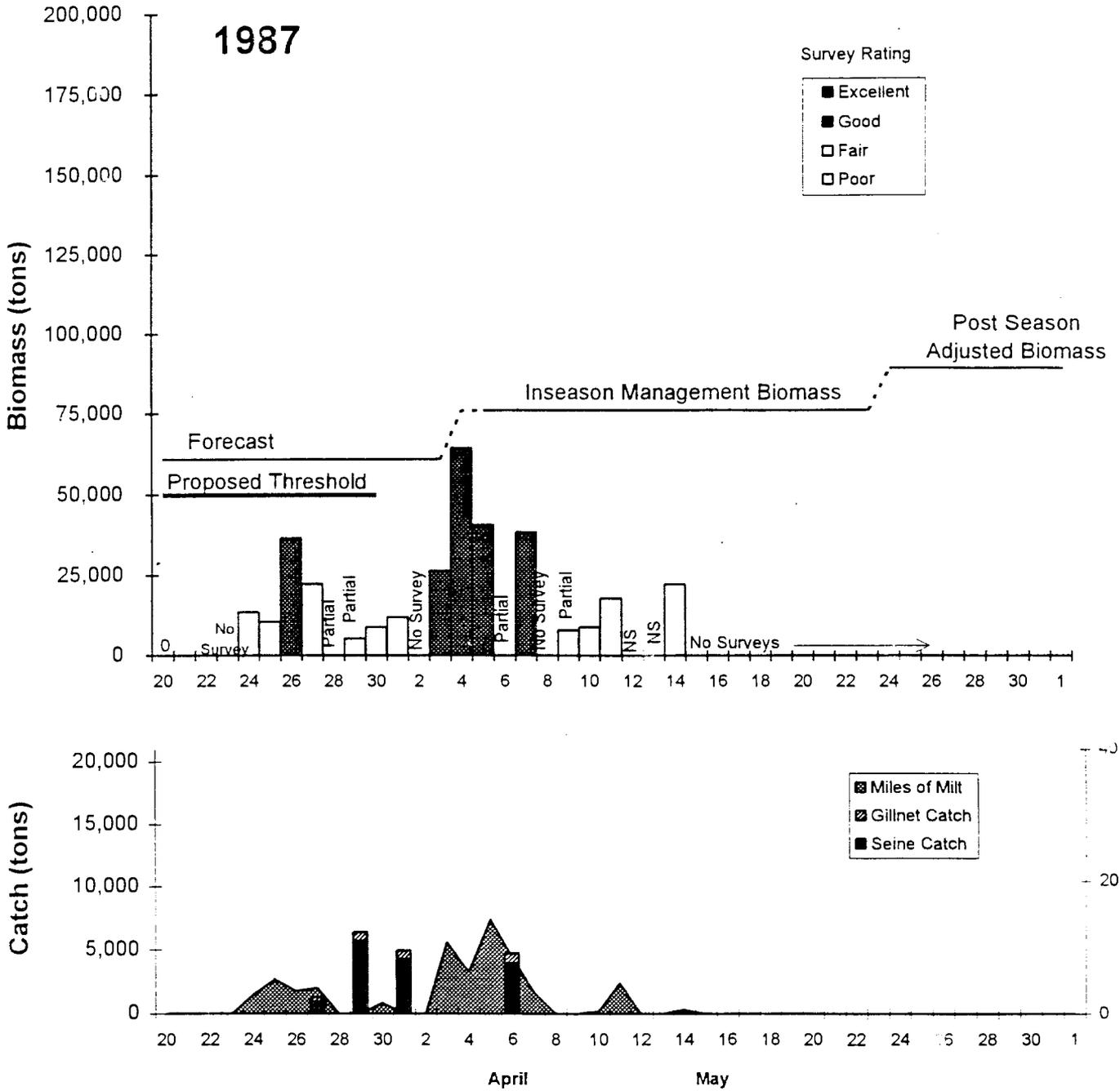


Figure 2. Historical sequence of the Togiak District herring biomass as estimated from aerial surveys and age structured analysis. The 1995 biomass (asterisk) was projected from an age structured analysis of catch and abundance data. Documentation of the threshold biomass at 35,000 tons is required before a commercial harvest is allowed.

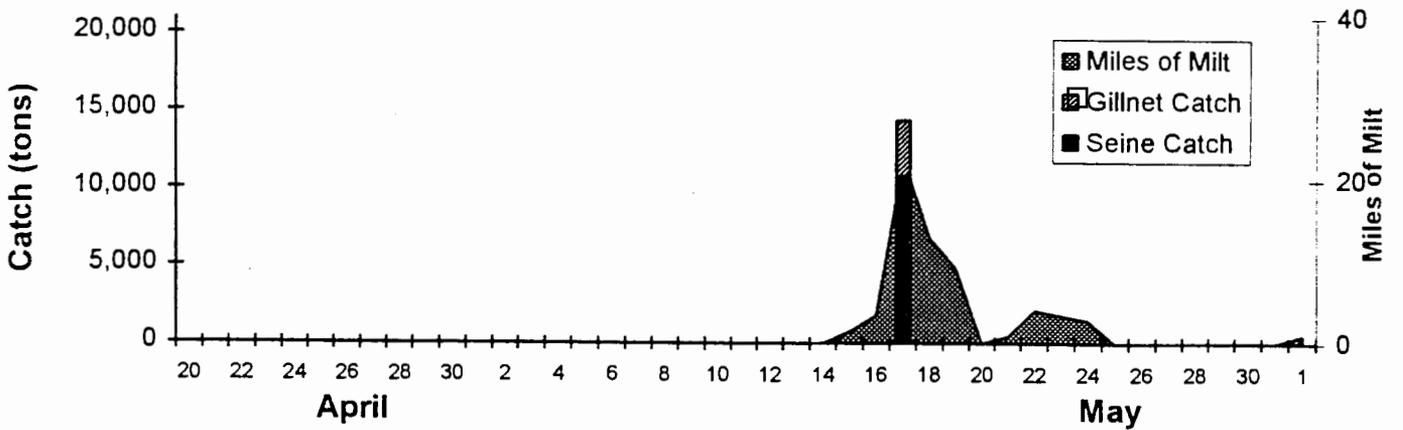
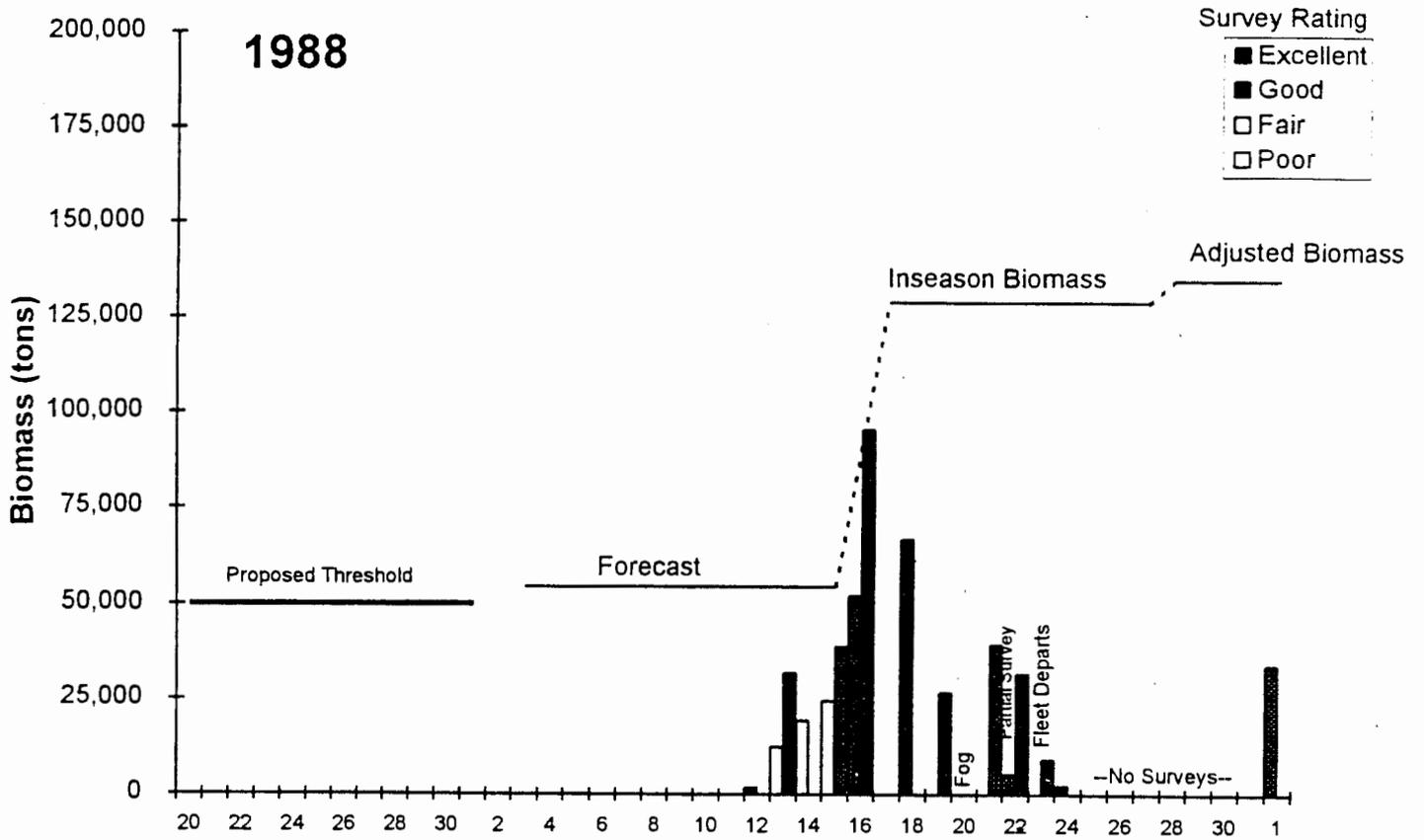
## Togiak Herring Management Information Summary



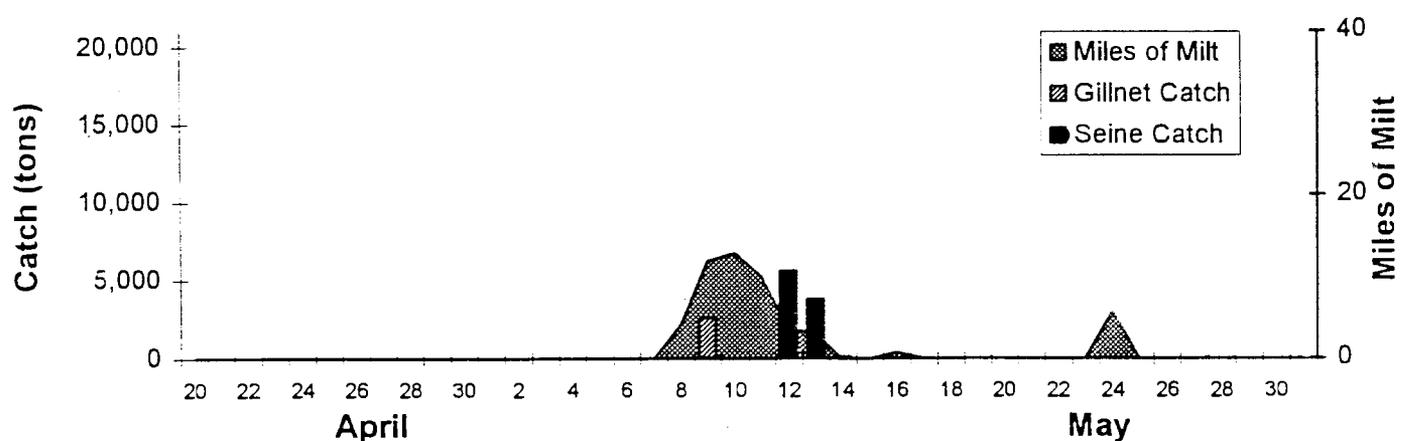
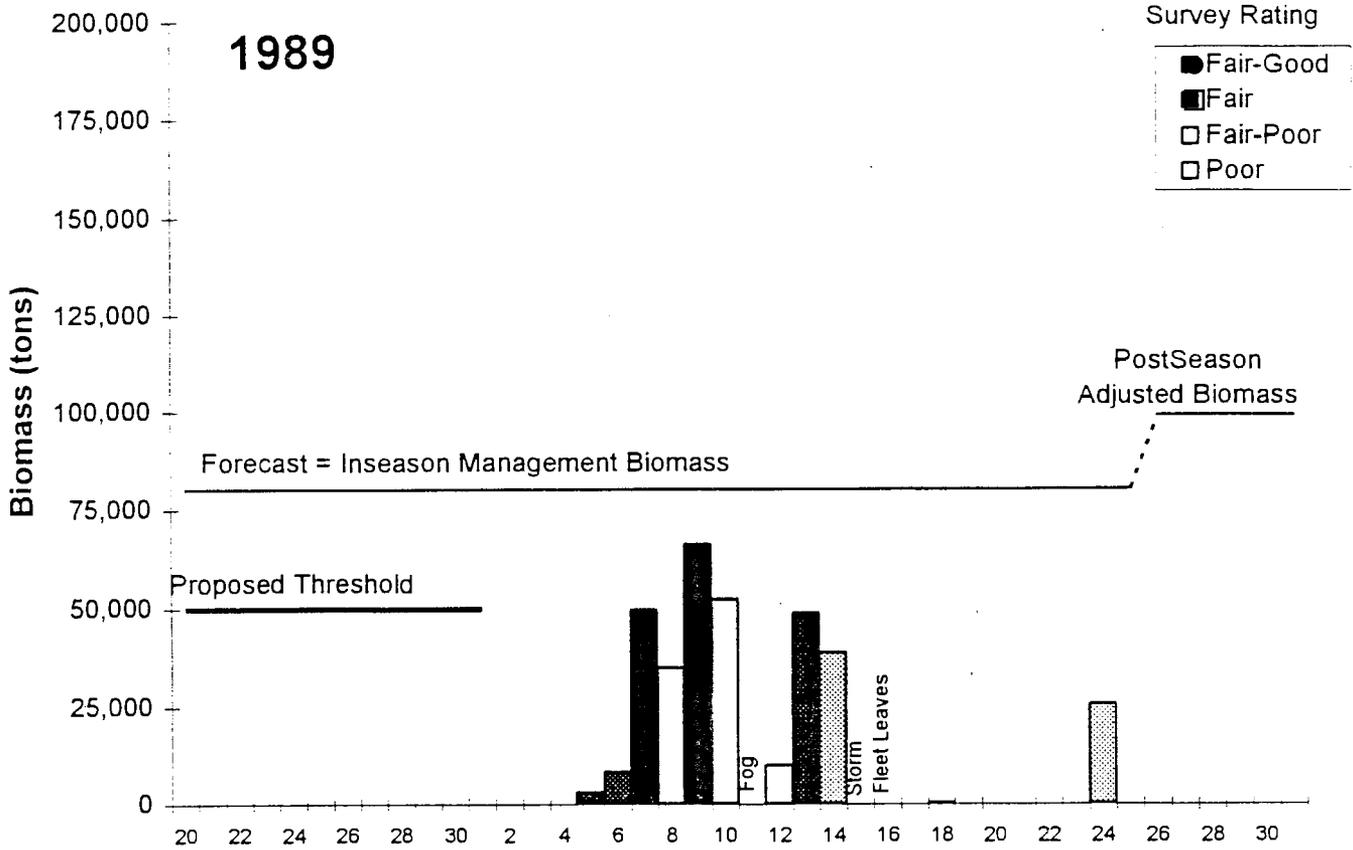
# Togiak Herring Management Information Summary



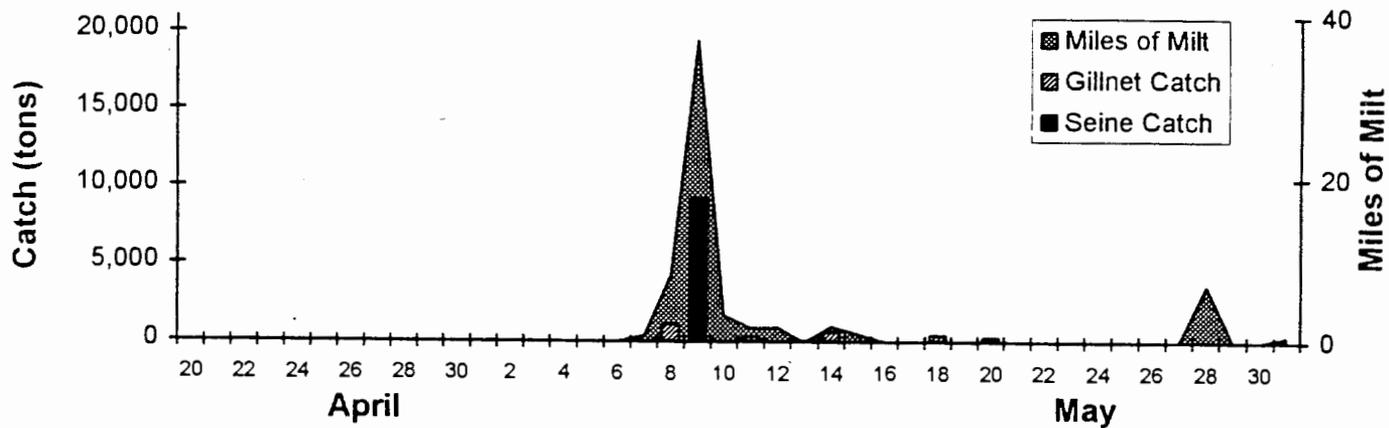
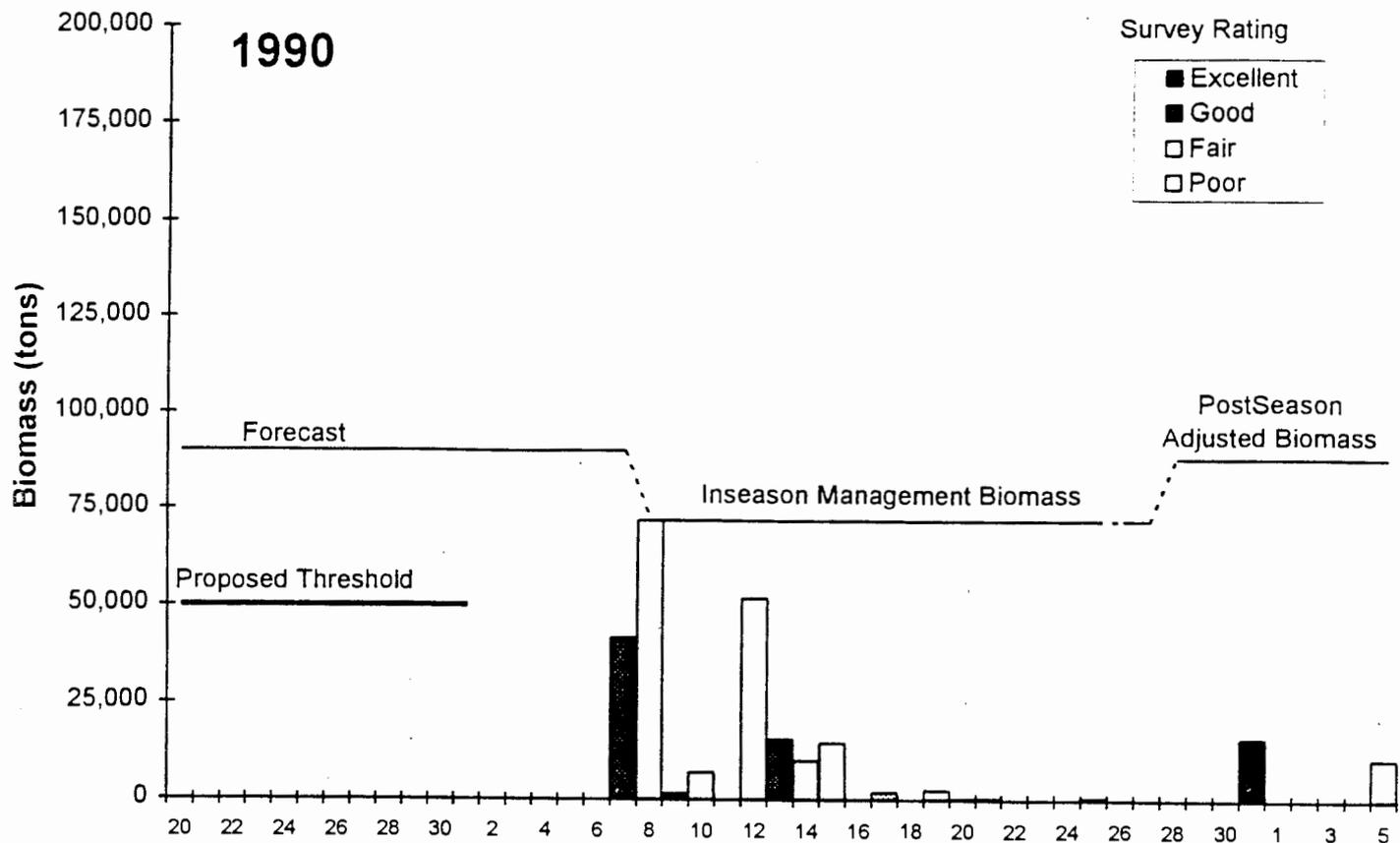
## Togiak Herring Information Summary



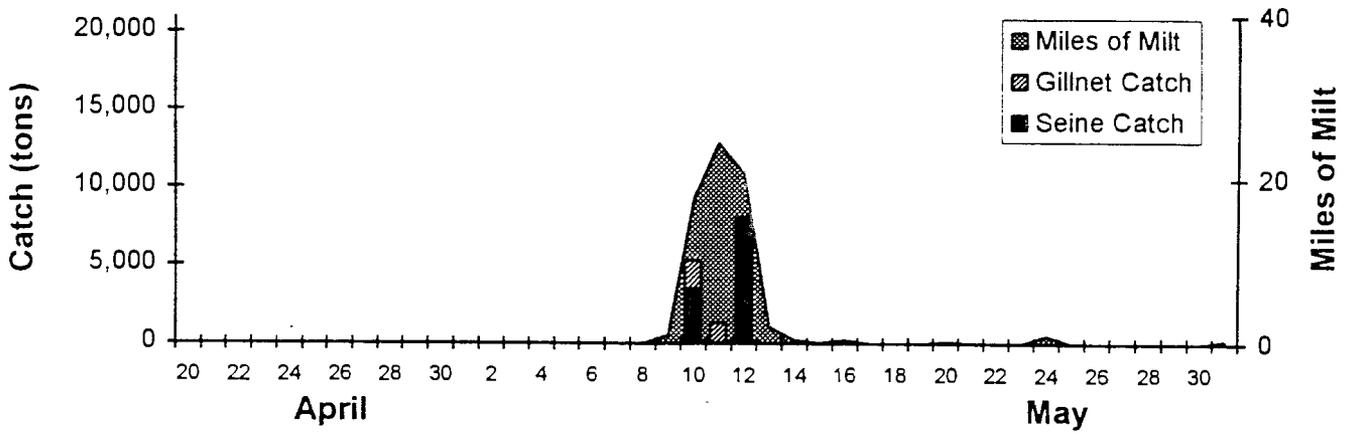
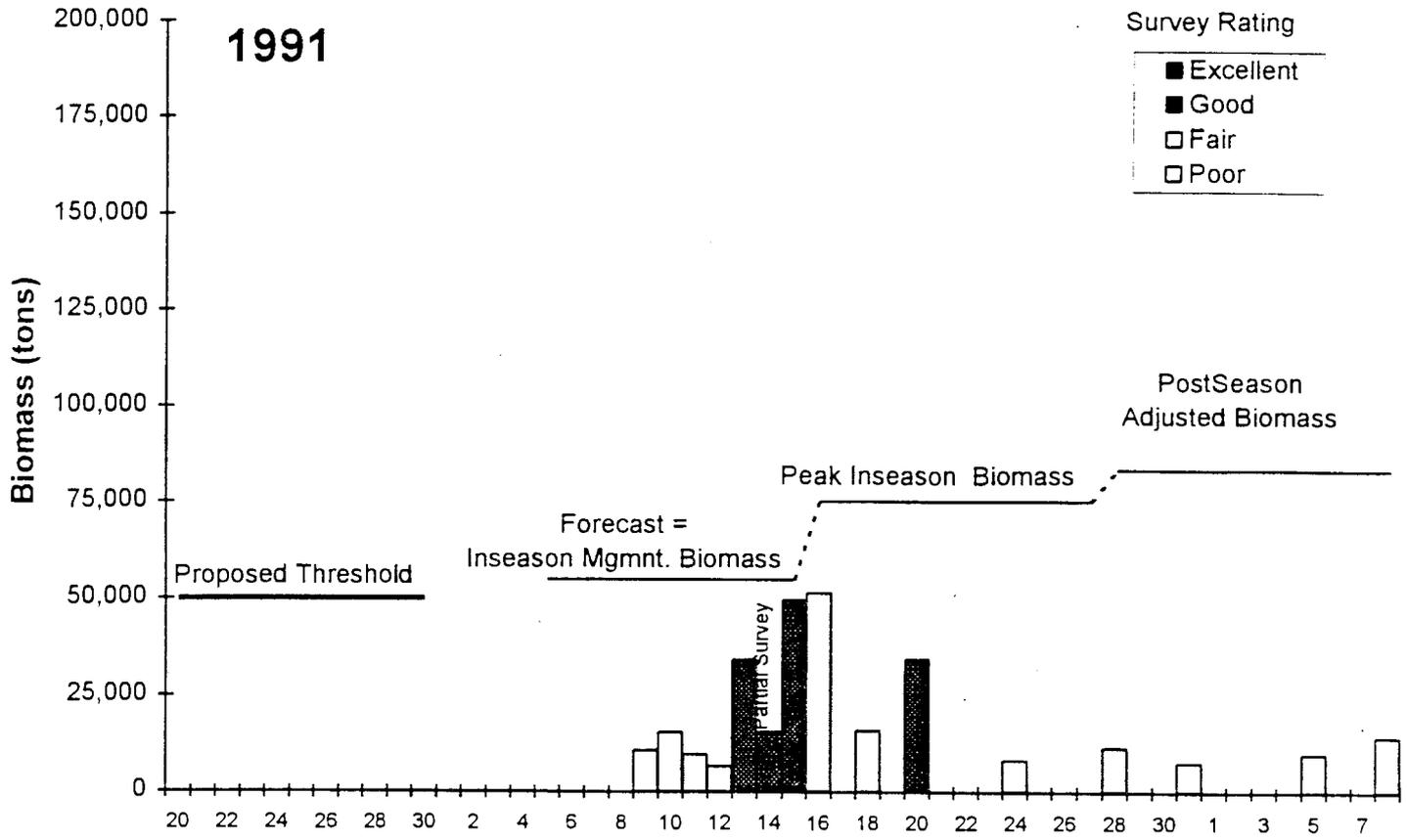
# Togiak Herring Management Information Summary



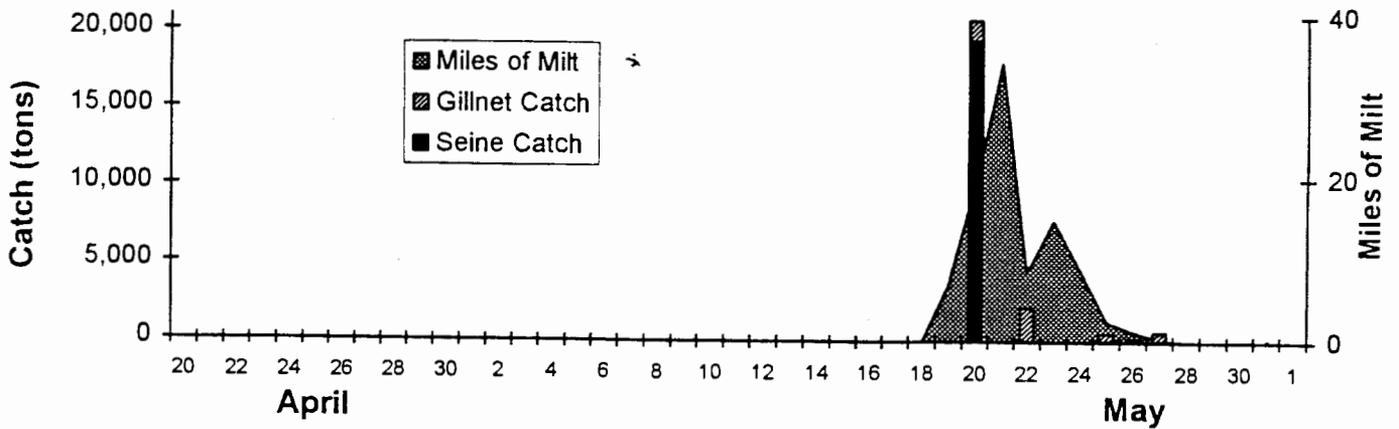
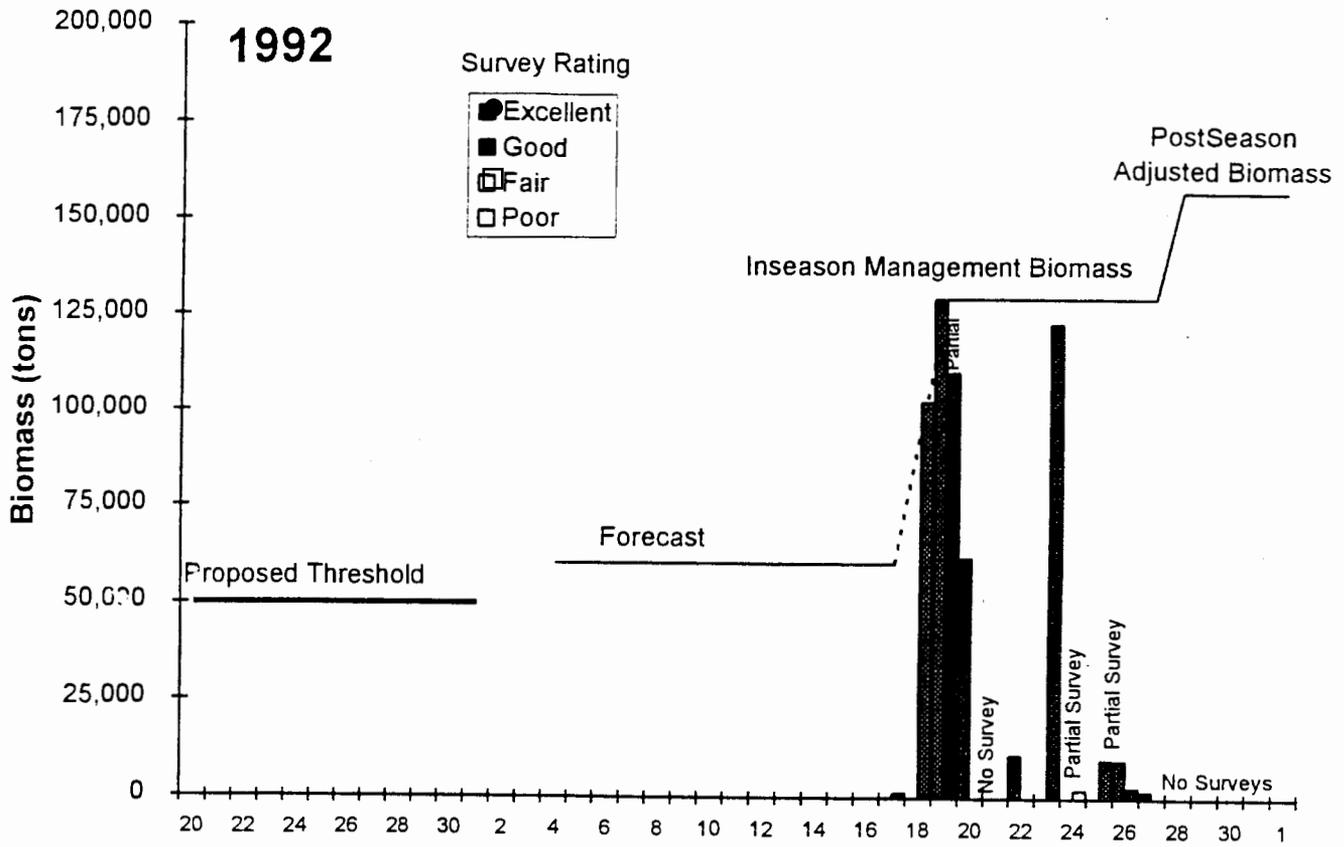
## Togiak Herring Management Information Summary



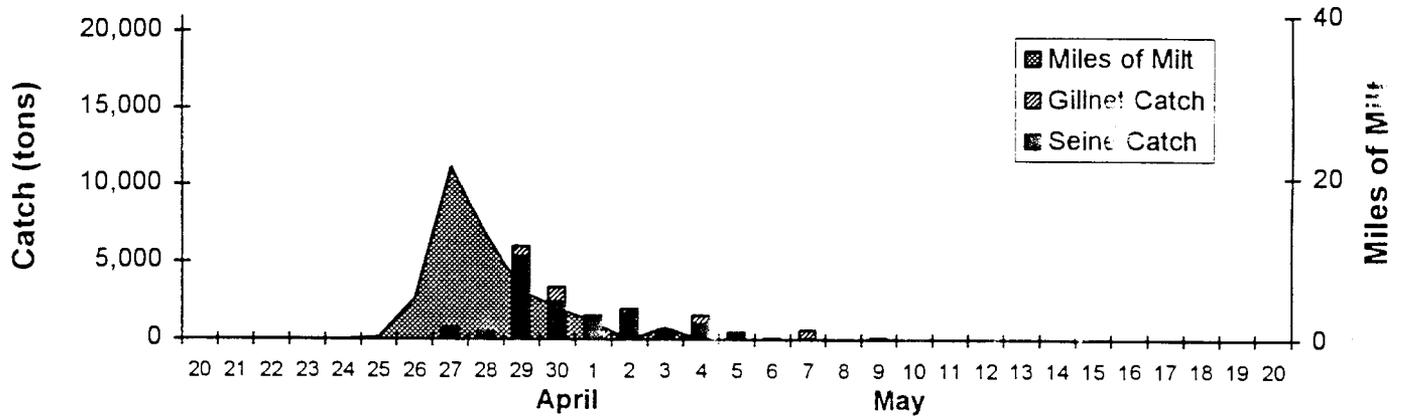
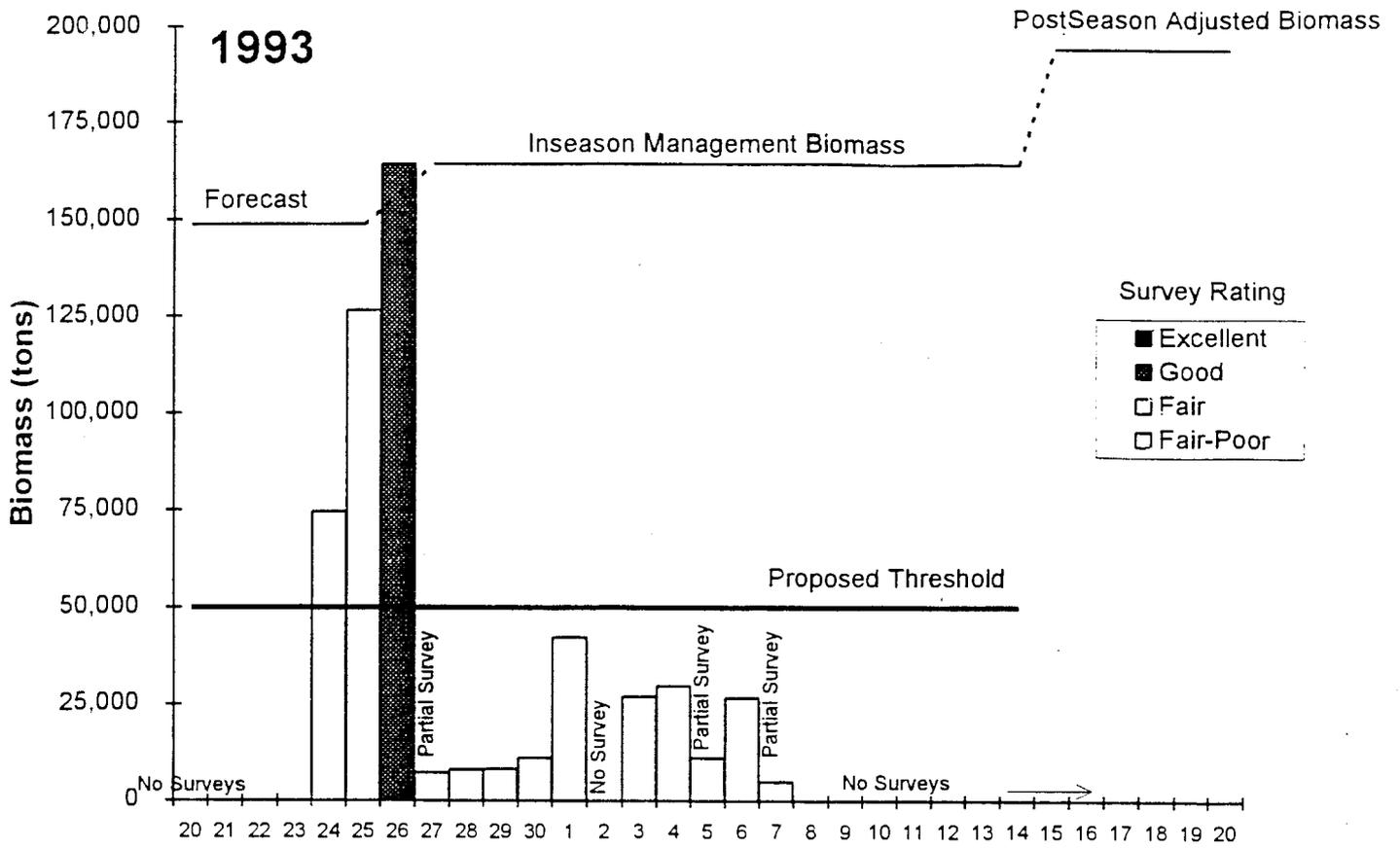
## Togiak Herring Management Information Summary



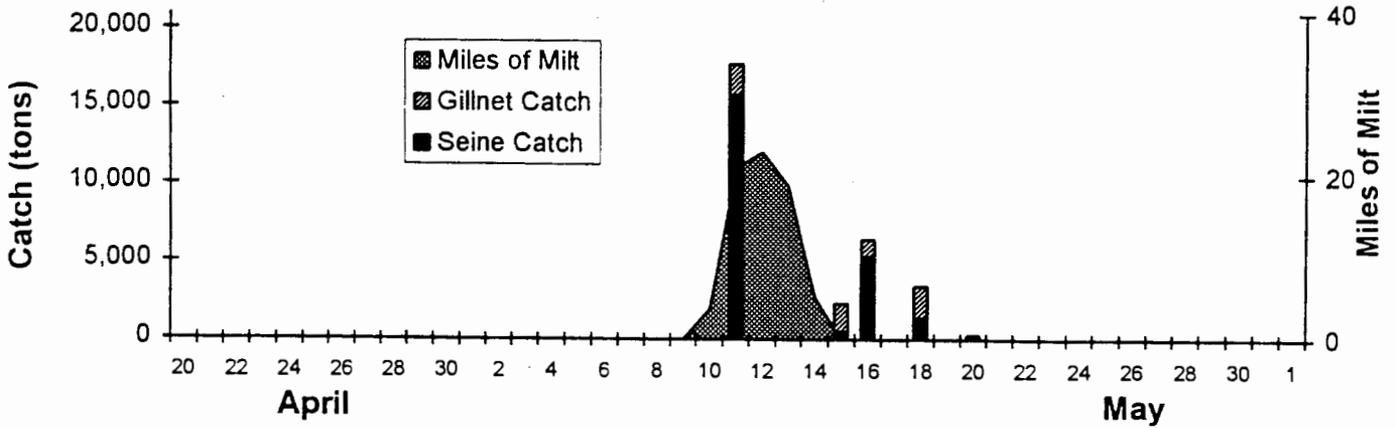
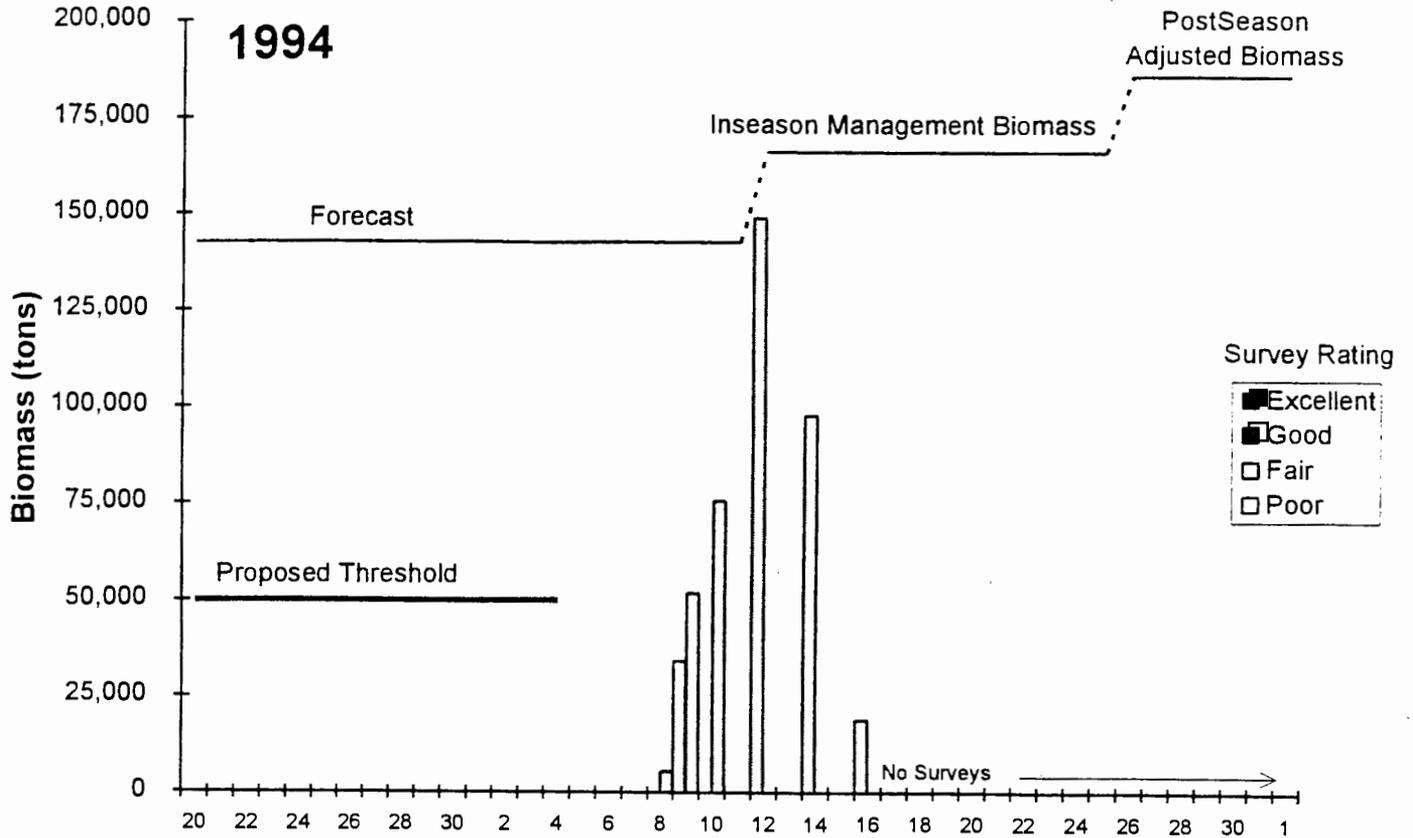
# Togiak Herring Management Information Summary



### Togiak Herring Management Information Summary



# Togiak Herring Management Information Summary



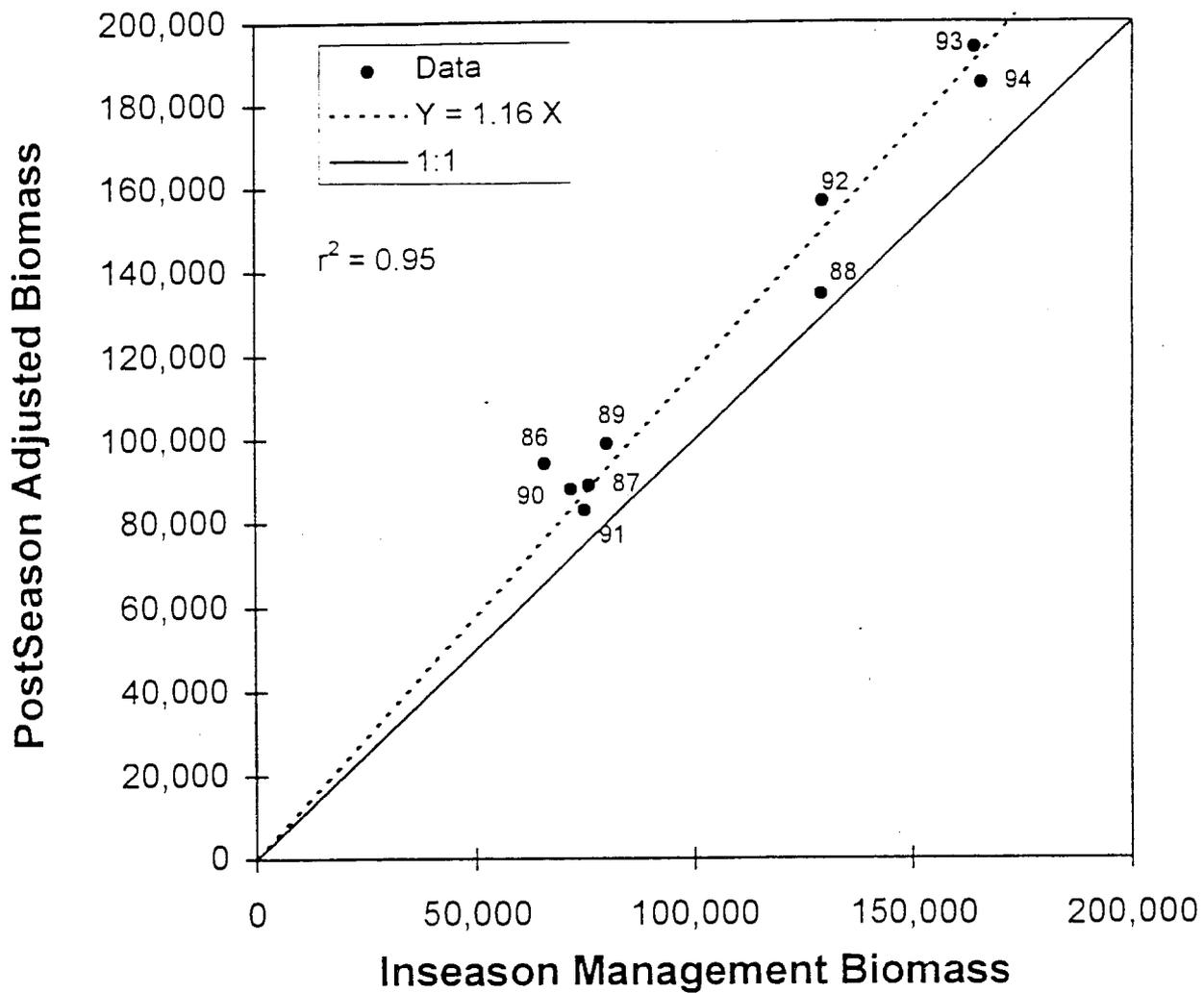


Table 5. Aerial survey run biomass estimates and ratings for the Togiak herring population. The highest rated aerial surveys, (1981, 1983, 1985, 1988, 1992, 1993) are marked with an asterisk. <sup>a</sup>

Survey Year	C	D	E	F	G	H	I	J	Rating Total (E+F+G+H)	Biomass (tons)
	Surveys (partial)	Surveys (Complete)	Ratio D/(C+D)	Avg Survey Rating	Peak Survey (5 pts)	Survey Rating (Peak)	Total # Surveys	Total Surveys with fish		
1980	15	5	0.25	3.1	2	4.5	21	20	9.9	68,686
1981	8	25	0.76	2.8	4	4.5	34	33	12.1 *	158,650
1982	3	13	0.81	3.4	5	4.0	18	16	13.2 **	97,902
1983	4	25	0.86	2.8	4	4.5	29	29	12.2 *	141,782
1984	3	15	0.83	3.5	3	3.0	33	18	10.3	114,881
1985	0	13	1.00	3.0	5	2.5	16	13	11.5 *	131,400
1986	6	15	0.71	2.4	4	3.0	28	21	10.1	94,699
1987	8	9	0.53	3.0	2	2.0	23	20	7.5	88,400
1988	5	9	0.64	3.9	4	4.0	21	13	12.6 *	134,717
1989	4	8	0.67	3.9	3	2.5	13	12	10.1	98,965
1990	16	4	0.20	2.7	2	3.0	28	20	7.9	88,105
1991	3	8	0.73	3.7	4	2.5	22	11	11.0	83,229
1992	9	3	0.25	4.1	3	4.0	28	12	11.3 *	156,955
1993	4	9	0.69	2.9	3	3.8	13	13	10.4 *	193,847
1994	1	6	0.86	3.0	3	3	16	7	9.9 <sup>b</sup>	185,454

<sup>a</sup> The 1982<sup>14K</sup> aerial survey rated highly but was not used in the 1994 forecast model.

<sup>b</sup> 1994 survey used because of being the most recent estimate of abundance associated with recent recruitment event (introduction of 1987 and 1988 year classes.)



TOGLIAK HERRING THRESHOLD LEVELS

By

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and

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January 1995

(Submitted to: Alaska Fishery Research Bulletin)

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## INTRODUCTION

Harvest policies for Pacific herring in Alaska involve thresholds and exploitation rates. When the spawning biomass is above threshold, exploitation rates are generally 20%. For some areas, a variable exploitation rate up to a 20% maximum is used. Fishing ceases when the biomass is below threshold to enable a population to more quickly recover from low levels of abundance. For some species "conservation thresholds", below which a population may experience complete reproductive failure, are sometimes defined based on features of a well-understood spawner-recruit relationship. Alternatively, for Pacific herring and many other species, a "productivity threshold" is defined in terms of quickly returning a population to productive levels. Thresholds defined in terms of productivity are always higher than conservation thresholds designed to merely prevent extinction.

Herring thresholds for most areas were first established in regulation in the early to mid-1980's. These initial thresholds were established rather arbitrarily, usually based on some proportion of past catches or abundances. In recent years a number of papers providing formal methods for determining appropriate productivity thresholds have appeared in the scientific literature. Based on this research, the Alaska Department of Fish and Game has been reviewing threshold levels for herring fisheries around Alaska. This paper reviews the available methods and data for determining thresholds and recommends a revised threshold for management of herring that spawn near Togiak in Bristol Bay, Alaska.

Harvest policies, such as the threshold/exploitation rate harvest policy for herring, always reflect a tradeoff between maximizing yield from a resource, and maintaining stable yields over the long term. For example, a herring exploitation rate higher than 20% will increase the average yield considerably, but stock size and harvests will be much more variable from year to year. At very high exploitation rates stock size fluctuations can be so pronounced that there are reproductive failures during low periods of abundance. At very low exploitation rates, yields can be more constant from year to year, and stock size will fluctuate less. Any choice of thresholds and exploitation rates is a decision about the tradeoff between maximizing yield and maintaining catch and resource stability. A threshold/exploitation rate harvest policy is a compromise between constant exploitation rate and fixed escapement strategies. When the biomass is high, a constant exploitation rate is used to provide a balance between average yield and variation of yield. When the biomass drops to low levels, the fixed escapement strategy is adopted to protect the population and more quickly return it to productive levels.

The current Togiak threshold of 35,000 tons was established by regulation in 1987. When this regulation was adopted, only a limited time series of stock assessment information was available for the Togiak herring population. The threshold level was calculated by taking 25% of the average of annual biomass estimates from 1978 through 1985. This time series excluded three years data when the abundance estimates were unreliable.

Most threshold analyses express threshold levels as a percentage of a long term average spawning biomass in the absence of fishing, or "average unfished biomass" (AUB). AUB is an estimate of what the long term average biomass would be if fishing were never allowed. AUB is of necessity based on observed historical data, which almost always has been collected under the influence of fishing. Simulation models are usually used to try to remove the effects of fishing on the level of recruitment and observed measures of abundance when calculating AUB.

Threshold levels have been set at 25% of AUB for the major British Columbia herring fisheries since 1985 (Haist 1990). This criteria was established based on the simulation model described in Hall et al. (1988). Haist (1990) and Schwiebert (1993) also reviewed the British Columbia herring policy, using alternative model formulations, and concluded that 25% of the AUB was an appropriate choice.

Recently Zheng et al. (1993) and Zheng (1994) analyzed harvest policies for Pacific herring in Alaska using a much more comprehensive model than earlier studies. This model incorporated stock assessment measurement error, harvest policy implementation error, autocorrelation of environmental effects on recruitment, and alternative forms of spawner-recruit relationships. Thresholds set at 25% of AUB with exploitation rates of 20% were on the conservative side of the recommendations by Zheng et al. (1993) and Zheng (1994). Although setting exploitation rates at 20% was more conservative than their optimal policy, they noted that the effect of having such a conservative harvest policy caused little loss in their measure of long term yield and stability of yield. At a 20% exploitation rate, average yields were maximized when thresholds were approximately 25% of the AUB (Figure 1). Based on the work of Zheng et al. (1993), and Zheng (1994) and almost a decade of experience with this policy in British Columbia, the Alaska Department of Fish and Game recommended and the Alaska Board of Fisheries adopted the 25% AUB threshold criteria for Prince William Sound herring in 1994.

## METHODS

Following Zheng et al. (1993) and Zheng (1994), the basic approach used to determine AUB was to use a population dynamics model based on historical data to simulate a herring population undergoing the processes of recruitment, growth and natural mortality for a long period of time. It is assumed throughout this analysis that fishing effects are confined to removals of the population so that fishing does not affect growth, natural mortality, maturity, or the shape of the relationship between spawners and recruits. Three primary areas of uncertainty about AUB were investigated. First, the effect of various assumptions about the relationship between spawners and recruits on AUB was investigated. Second, the dependence of the magnitude of the historical biomass on certain assumptions about maturity, survival, and aging error in the available data was investigated. The last area of uncertainty about AUB examined was the poor correlation between aerial survey abundance trends and likely long term abundance trends evident in the time series of age composition data.

### *Population Dynamics Data Sources*

The basic set of population dynamics data came from the age-structured assessment (ASA) model used for the 1995 forecast (Rowell and Funk 1994). The ASA model synthesizes the multitude of observed historical data for 1978-94 (purse seine age compositions, run age compositions, and selected aerial survey biomass estimates) into a single set of estimates of biomass, maturity, purse seine availability and survival. The best fit set of estimates (Table 1) reflect what we believed to be appropriate assumptions

about maturity, survival, aging errors, and aerial survey errors. Changing these assumptions had little affect on the 1995 forecast biomass. However, changing these assumptions did affect the magnitude of biomass during the high abundance period of the mid-1980's (Figure 2). The recruitment of the 1977 and 1978 year classes was the dominant event in the time period studied, visible as the large "dome" shape in biomass, which reached a peak between 1984 and 1988. A review of aerial survey methods and ratings (Brannian et al. 1993) determined that aerial survey ratings during the mid-1980's were often poor or used different methods than in recent years (1992-1994). As a result that aerial survey biomass estimates from this period may not be comparable to those of recent years. Because there were no comparable or reliable aerial surveys from the mid-1980's, there is considerable uncertainty about the magnitude of the biomass "peak" in 1984-88. Weak constraints on the functional forms of maturity and survival in the ASA model produced relatively high peak biomass estimates of around 700,000 tons (Figure 2). Specifying that full maturation and availability to the fishery occurred at relatively young ages produced the lowest peak biomass estimate for the 1984-88 time period of about 350,000 tons. Pooling all herring age 9 and older into a single category to reduce the influence of aging errors produces a "medium-low" peak biomass estimate of 500,000 tons. The "best fit" set of estimates (Table 1) used for the 1995 forecast describes a biomass time series intermediate between the extreme high and low peak biomass scenarios.

Uncertainty about some of the past aerial survey abundance estimates increased the uncertainty about historical biomass trends. In herring aerial surveys, surface area measurements of herring schools obtained during these surveys are converted to volume based on water depth in the area the schools were observed (Lebida and Whitmore 1985). School volume is then converted to density based on a small set of "calibration samples" where observers estimated herring school sizes just before purse seine vessels captured and measured the entire school. Estimates for subsections of the fishing district or index areas on a given survey are then summed to attain a total biomass estimate. The quality of these abundance estimates are affected by water clarity, the length of the survey, and weather conditions which determine the frequency of surveys throughout the season. Good weather conditions in recent years (1992-1994) have provided the visibility and duration of surveys throughout the fishing season that have increased the confidence in the total estimate of abundance compared to those of earlier years.

### *Average Unfished Biomass Simulations*

The simplest estimate of AUB is to reconstruct what the biomass would have been from the initial cohort size estimates of Table 1, without any fishing removals, using a simple survival model:

$$N_{a+1,y+1} = S_a \cdot N_{a,y} \quad (1)$$

where the starting  $N_{a,y}$  are abundances at age  $a$  in year  $y=1978$  from the first row and column of Table 1, and  $S_a$  is the survival rate from Table 1. The simulation, as well as stock assessment analyses for Togiak herring, begin at age 4, because three year old herring are only rarely encountered on the spawning grounds. As in the ASA model of Rowell and Funk (1994), herring aged 15 and older were

pooled into a single "15+" age class. Run biomass ( $B_y$ ) was determined as:

$$B_y = \sum_a \rho_a \cdot w_a \cdot N_{a,y} \quad (2)$$

where  $\rho_a$  is the age-specific maturity, and  $w_a$  are the 1981-94 average weights at age from Table 1.

Slightly more complicated estimates of AUB were analyzed by modelling the potential dependence of the number of age 4 recruits on spawning biomass. The spawning biomass and recruits from the 1995 ASA forecast model (Funk and Rowell 1994) indicate two large recruitment events at small stock sizes, with little apparent trend in recruitment at larger stock sizes (Figure 3). Four possible spawner recruit models were used. First, an empirical spawner-recruit model divided the observed spawner-recruit data into 3 quantiles, based on spawning biomass. When the spawning biomass was within a particular quantile, a number of recruits was selected at random from the recruitment data in that quantile. Second, a Ricker model was fit to the spawner-recruit data to estimate recruits in year  $y$  ( $R_y$ ) from the run biomass four years earlier ( $B_{y-4}$ ):

$$R_y = B_{y-4} e^{a(1-B_{y-4}/b)} \quad (3)$$

where  $a$  and  $b$  are parameters to be estimated. Third, a Beverton-Holt model was fit to the spawner-recruit data:

$$R_y = \frac{a \cdot B_{y-4}}{b + B_{y-4}} \quad (4)$$

where  $a$  and  $b$  are parameters to be estimated specific to the Beverton-Holt model. The stochastic nature of the spawner-recruit process was simulated by adding a randomly selected residual from fitting the spawner-recruit model to the recruitment value specified by the deterministic Ricker or Beverton-Holt model. Lastly, density-independent recruitment was modelled by selecting recruit numbers entirely at random from the age 4 recruits in 1978-94 estimated by the ASA model (first column of Table 1).

For the AUB estimates with recruitment feedback, simulations were carried out for 1,000 years. During the first year of a 1,000 year simulation, a starting population for the first year was chosen by randomly selecting the mature numbers at age from one of the 17 years (1978-94) in the ASA model. For the remaining 999 years of the simulation, the survival model (equation 1) was used to determine the abundance of age 5 to 15+ herring. In years 2 through 4 of the simulation, and the number of age 4 recruits was chosen as a function of the spawning biomass in year 1 of the simulation and the spawner-recruit model selected (empirical, Ricker, Beverton-Holt, or density-independent). Starting with the 5th year of the simulation, the number of age 4 recruits was determined by the spawning biomass 4 years

earlier, and the spawner-recruit model selected. To remove the effects of the first-year starting conditions (which include the effect of fishing), the simulation was carried out for 1,000 years and the AUB was calculated only from simulation years 251-1000. Examination of trial runs showed that the effect of fishing in the starting conditions was negligible after 250 years. To further remove the effect of specifying the first-year starting conditions, AUB was determined from the average of 25 replicate 1,000 year simulations, where the starting conditions were determined randomly and independently in each replicate.

## RESULTS AND DISCUSSION

Thresholds set at 25% of the AUB are the current practice for most herring fisheries that have used and analyzed thresholds. The 25% AUB criteria is also consistent with the recommendations from the most recent theoretical analyses of optimal harvest policy in the literature. The current 35,000 ton threshold for Togiak is lower than this standard for three reasons. First, 1978-85 biomass estimates on which the threshold is based include a history of fishing. Unfished biomass based on this times series would clearly be higher than these estimates. Second, the 1978-85 time period includes data from a number of years that are now thought to be underestimates of biomass. Third, the 1978-85 time period under-represents the contribution to long-term average biomass of strong recruitment events like the 1977-78 year classes. Longer-term studies of recruitment processes in the Bering Sea (Wespestad 1991, Zheng 1993) indicate that such strong year classes occur approximately every 8-12 years on the average. The 1978-85 time period includes data from the initial phase of the biomass buildup resulting from a strong recruitment event. However, because survival rates for Bering Sea herring are relatively high, biomass pulses from strong recruitment events last almost 10 years so that this period under-represents the longer term contribution to average biomass from a strong recruitment event. All of our analyses suggest that the threshold at Togiak should be raised in order to be consistent with the 25% AUB criterion.

### *Spawner-Recruit Analyses*

The Ricker curve fit to the spawner-recruit data from the "best fit" ASA model achieves a maximum value at relatively low biomass, because of the location of the 1977 and 1978 year classes (Figure 3). Because there is not much data from the early part of the time series in the ASA model, it is likely that the spawning biomass in 1977 and 1978 is underestimated somewhat. If the spawning biomass in 1977 and 1978 were actually higher than estimated in the ASA model, the effect would be to increase AUB and thresholds. Because of the location of the 1977 and 1978 year classes, the Beverton-Holt spawner-recruit curve reaches an asymptote very quickly. The spawner-recruit data were grouped into 3 quantiles to achieve a nonparametric "empirical" method of describing the relationship between spawners and recruits. The midpoint of the gap between the 1981 and 1982 spawning biomasses (184,000 tons) appears to be a reasonable boundary between the lower and middle quantiles. Quantile boundaries as depicted in Figure 3 were labelled "4½,4½,5" in the AUB analyses. To investigate the effect of moving the

quantile boundaries, the boundary between the lower and middle quantiles was moved to 123,000 tons to reflect a "4,5,5" allocation of the 14 spawner recruit pairs to quantiles, and to 245,000 tons to reflect a "5,4,5" allocation.

Zheng (1994), and Wespestad (1991) also studied spawner-recruit relationships for Bering Sea herring. Both of these studies examined data for all Bering Sea herring stocks combined. Togiak herring are by far the largest component, comprising 81% of the average biomass in aerial surveys. Wespestad (1991) reports that Togiak herring comprise 80% of the eastern Bering Sea herring biomass. Both of these studies utilized foreign fishery records to extend the time series back to the late 1950's. With many more years of data, these spawner-recruit relationships (Figure 4) are very similar to the more recent data from Togiak alone (Figure 3). Zheng (1994) locates the 1977 and 1978 data pairs at somewhat higher spawning biomass. Because the frequency of strong year classes drives the AUB simulations, it is important to note that the strong recruitment frequency in the relatively short time series in this study (1977-90 year classes) appears representative of the frequency in the longer time series.

### *Average Unfished Biomass and Thresholds*

In typical AUB simulations, spawning biomass oscillates widely because of the infrequent recruitment of very strong year classes (Figure 5). Starting conditions have a large amount of influence during the initial years of the simulation, but the cumulative average spawning biomass became stable by 250 simulated years. AUB typically varied among the individual replicate 1,000 year simulations by about 20,000 tons (Figure 5). The mean of 25 replicates was quite stable.

All 9 assumptions about the spawner recruit relationship were examined for the "best fit" ASA base biomass scenario (Table 2). An assortment of assumptions about the spawner-recruit relationship was examined for other scenarios. AUB in the scenarios examined ranged from a low of 210,061 tons for the deterministic Beverton-Holt scenario based on the "best fit" ASA biomass time series, to a high of 379,000 tons for the "highest ASA" base biomass assuming density-independent recruitment.

Using a very different stock assessment model and data from the foreign fishery during the 1960's and 1970's, Zheng et al. (1993) report AUB for the entire Bering Sea as 421,000 metric tons. Assuming 80% of the Bering Sea herring is comprised of Togiak herring, as estimated from aerial surveys and given by Wespestad (1991), the Togiak AUB would be 371,258 short tons.

Because aerial surveys are often used for inseason management decisions at Togiak and the ASA biomass trends are often quite different from aerial survey biomass trends, it was desirable to derive an AUB estimate firmly grounded in aerial survey data. Using the "best fit" 1995 forecast ASA model, the biomass with fishing over the 1978-94 period averaged 82% of what the biomass would have been with no fishing. Applying the 82% figure to the average biomass from the "highly rated" 1981, 1988, and 1992-94 aerial surveys would give an AUB of 200,321 tons, and a corresponding threshold of 50,080 tons. However, the 1988 aerial survey is extremely inconsistent with the other "highly rated" years in view of the age composition data's consistent description of very strong 1977 and 1978 year classes. Excluding the 1988 aerial survey, the AUB for the average of the 1981, 1992, 1993, and 1994 aerial

survey biomass estimates, assuming the fished biomass was 82% of the unfished biomass as in the ASA, would be 209,748 tons, with a corresponding threshold of 52,437 tons.

Because of the uncertainty about the peak biomass levels during the mid-1980's and the uncertainty in the spawner-recruit data, threshold recommendations range from 50,000 tons all the way up to 95,000 tons (Table 3). Because aerial surveys are still used inseason at Togiak to evaluate whether thresholds have been achieved, it is desirable to retain an estimate of AUB firmly grounded in aerial survey data. Based on the available data, the threshold at Togiak should be raised to at least 50,000 tons to be consistent with the 25% AUB criteria used elsewhere for Pacific herring. Re-examination of the aerial survey estimates and standardization of data analyses throughout the aerial survey time series is required to better translate ASA-based thresholds to inseason aerial survey estimates.

The moderately high level of abundance and the age composition dominated by the 1987 and 1988 year classes suggest that the population is stable and will not be dependent on a recruitment event for sustainability for a period of at least 5 years. Abundance trends from age composition have been very consistent and predictable for Togiak herring and will provide adequate warning should a stock decline eventually become apparent. Further analysis of the historical aerial survey data to apply methods of determining season total aerial survey biomass consistent with present methods could reduce the uncertainty about threshold recommendations considerably. These analyses and a re-examination of appropriate threshold levels should be completed well before the earliest time that declines to problematic levels should occur.

It is not likely that further analysis of abundance data alone will reduce the uncertainty about the spawner-recruit relationship. Following Weststad (1991), the inclusion of environmental data could explain at least some of the spawner-recruit variability. However, even if spawner-recruit relationships were more predictable with environmental variation, the noise evident in the spawner recruit relationship over long time series will remain, unless some of the environmental variation is also predictable over long time periods or subject to human control.

To place the proposed 50,000 ton threshold in context, it should be noted that the lowest aerial survey biomass estimate observed to date was approximately 76,000 tons in 1980, under poor aerial survey conditions. Revising the threshold at Togiak has potential implications for the Dutch Harbor food and bait herring fishery as well as the Togiak sac roe fishery. Alaska Board of fisheries regulations specify that the Dutch Harbor fishery be closed in years when the Togiak stock is below threshold.

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Table 1. Abundance (millions of fish) by year and age, survival (percent surviving by age), and maturity (percent mature) estimates from the age-structured analysis used for the 1995 Togiak herring forecast (Rowell and Funk 1994). Abundance at age 4 was used as the recruitment time series for the threshold simulations.

Age:	4	5	6	7	8	9	10	11	12	13	14	15+
<i>Abundance:</i>												
1978	296.8	207.2	53.7	0.5	5.5	1.4						
1979	20.7	229.1	152.7	36.5	0.3	4.1						
1980	93.1	14.8	166.5	108.6	24.8	0.1	2.6					
1981	1,642.1	72.0	10.8	109.1	66.7	14.7	0.0	1.4				
1982	1,606.8	1,285.7	54.8	8.0	78.2	47.4	9.9	0.0	0.8			
1983	675.2	1,261.0	985.2	40.8	5.9	56.7	32.5	6.4	0.0	0.3		
1984	213.2	532.5	978.7	748.2	30.4	4.2	38.7	21.5	4.0	0.0	0.2	
1985	381.2	168.7	418.5	759.6	573.3	22.8	2.4	26.6	14.2	2.5	0.0	0.1
1986	94.8	301.6	132.6	324.5	580.3	434.3	16.0	1.4	17.3	8.8	1.5	0.0
1987	306.7	75.1	238.0	103.8	251.4	446.8	318.9	11.1	0.9	10.9	5.2	0.8
1988	243.8	243.1	59.3	186.4	80.4	193.7	328.2	223.7	7.3	0.5	6.5	3.4
1989	35.6	193.3	192.0	46.5	144.6	62.0	141.7	228.3	148.6	4.4	0.3	5.4
1990	39.2	28.2	152.5	150.1	36.0	110.9	45.4	98.7	151.1	93.2	2.6	2.9
1991	584.3	31.0	22.2	118.8	115.4	27.4	80.1	31.3	64.5	93.5	54.5	2.8
1992	307.6	462.1	24.4	17.2	90.4	86.5	19.5	54.4	20.0	39.2	53.8	31.1
1993	63.4	242.2	358.6	18.4	12.4	63.4	57.3	12.5	33.1	11.4	21.4	42.6
1994	30.4	50.0	188.6	273.2	13.6	9.0	43.2	37.2	7.6	19.4	6.2	31.9
<i>Survival:</i>												
	79%	79%	79%	79%	79%	76%	72%	68%	65%	61%	57%	54%
<i>Maturity:</i>												
	20%	40%	64%	83%	100%	100%	100%	100%	100%	100%	100%	100%
<i>Weight (g):</i>												
	153	200	246	294	334	375	400	416	451	450	485	487

Table 2. Average unfished biomass (AUB) and thresholds estimated for Togiak herring under different combinations of base biomass population dynamics estimates and assumptions about spawner-recruit relationships. The selected aerial survey base biomass scenarios were converted from fished to unfished biomass based on the "best fit" ASA model, where fished biomass between 1978 and 1994 averaged 82% of 1978-94 unfished biomass, given the observed recruiting year class strengths.

Base Biomass Scenario		Assumption about Spawner-Recruit Relationship								
		None (Observed = Long Term)	Density Independ- ent	Density Dependent						
				Empirical			Ricker		Beverton-Holt	
				4,5,5	4½,4½,5	5,4,5	Deterministic	Stochastic	Deterministic	Stochastic
<b>AUB</b>	Highest ASA		379,946							
	Best Fit ASA	343,505	377,304	249,118	321,303	374,182	315,698	387,116	210,061	382,390
	Med. Low ASA (9+ Max Age)				242,265					
	Low ASA		310,880	235,693						
	1959-88 VPA (Zheng 1994)							371,258		
	1981,88,92-94 Aerial Surveys	200,321		Not Applicable						
1981,92-94 Aerial Surveys	209,748		Not Applicable							
<b>Threshold</b>	Highest ASA		94,987							
	Best Fit ASA	85,876	94,326	62,279	80,326	93,545	78,925	96,779	52,515	95,597
	Med. Low ASA (9+ Max Age)				60,566					
	Low ASA		77,720	58,923						
	1959-88 VPA (Zheng 1994)							92,815		
	1981,88,92-94 Aerial Surveys	50,080		Not Applicable						
1981,92-94 Aerial Surveys	52,437		Not Applicable							

Table 3. Summary of alternative threshold scenario results for Togiak herring, by 10,000 ton threshold increment. Each box label shows the base biomass scenario and the assumption about spawners and recruits.

				1959-88 VPA (Zheng): Ricker
				Best Fit ASA: Stochastic Bev-Holt
				Best Fit ASA: Stochastic Ricker
				Best Fit ASA: Empirical 5,4,5
1981,92-94 Aerial Surveys.: None				
1981,88,92-94 Aerial Surv.: None				
Low ASA: Empirical 4,5,5	Best Fit ASA: Empirical 4,5,5	Low ASA: Density Independent	Best Fit ASA: Empirical 4½,4½,5	Best Fit ASA: Density Independent
Best Fit ASA: Determin. Bev. Holt	Med. Low ASA: Empir. 4½,4½,5	Best Fit ASA: Deterministic Ricker	Best Fit ASA: None	Highest ASA: Density Independent

Threshold:    50,000 - 60,000 tons      60,000 - 70,000 tons      70,000 - 80,000 tons      80,000 - 90,000 tons      90,000 - 100,000 tons

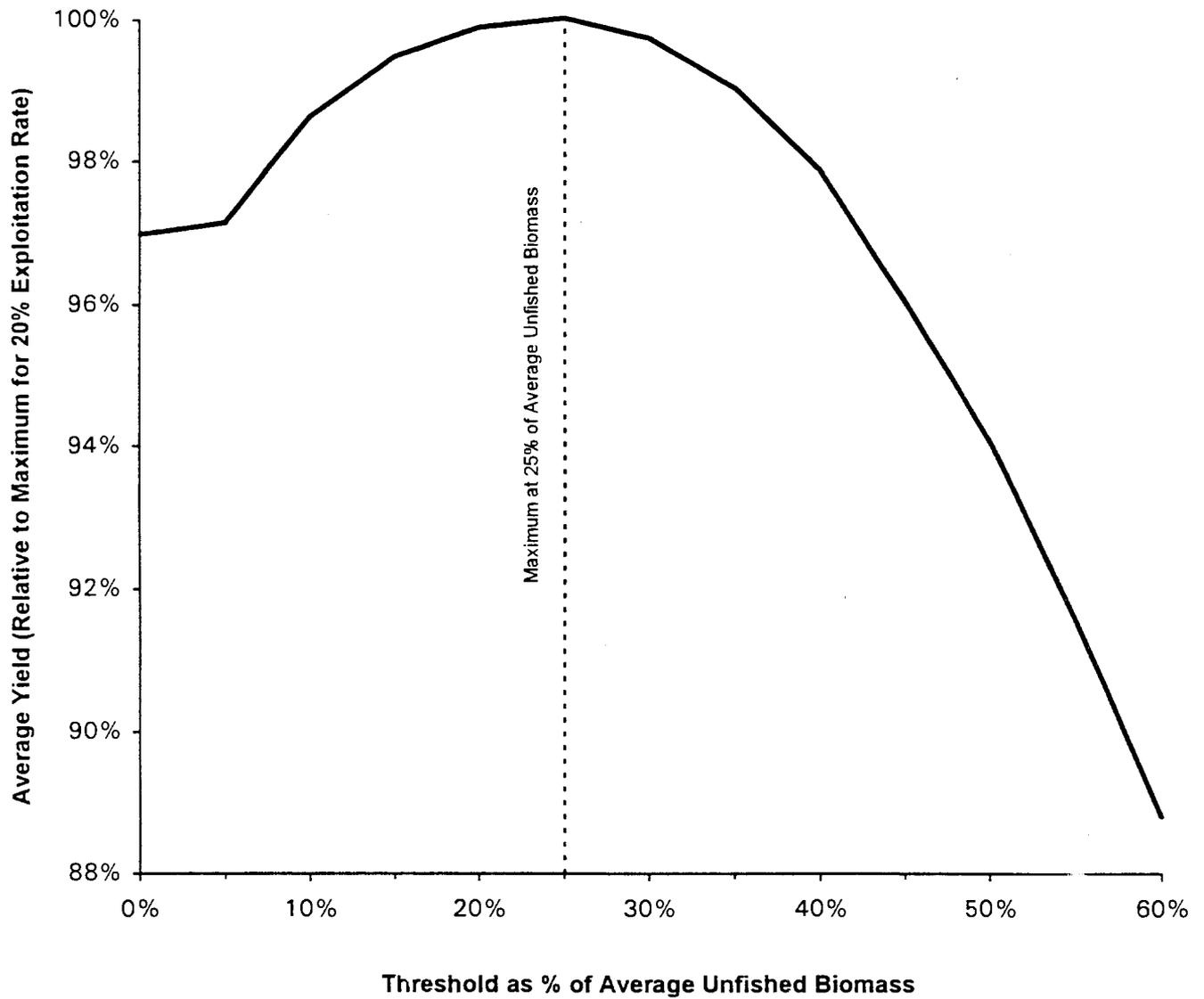


Figure 1. Average yield at a 20% exploitation rate, as a function of threshold level, where average yield is expressed as a percentage of the maximum yield at a 20% exploitation rate (data from Zheng (1994)). Average yield is maximized when thresholds are approximately 25% of the average unfished biomass.

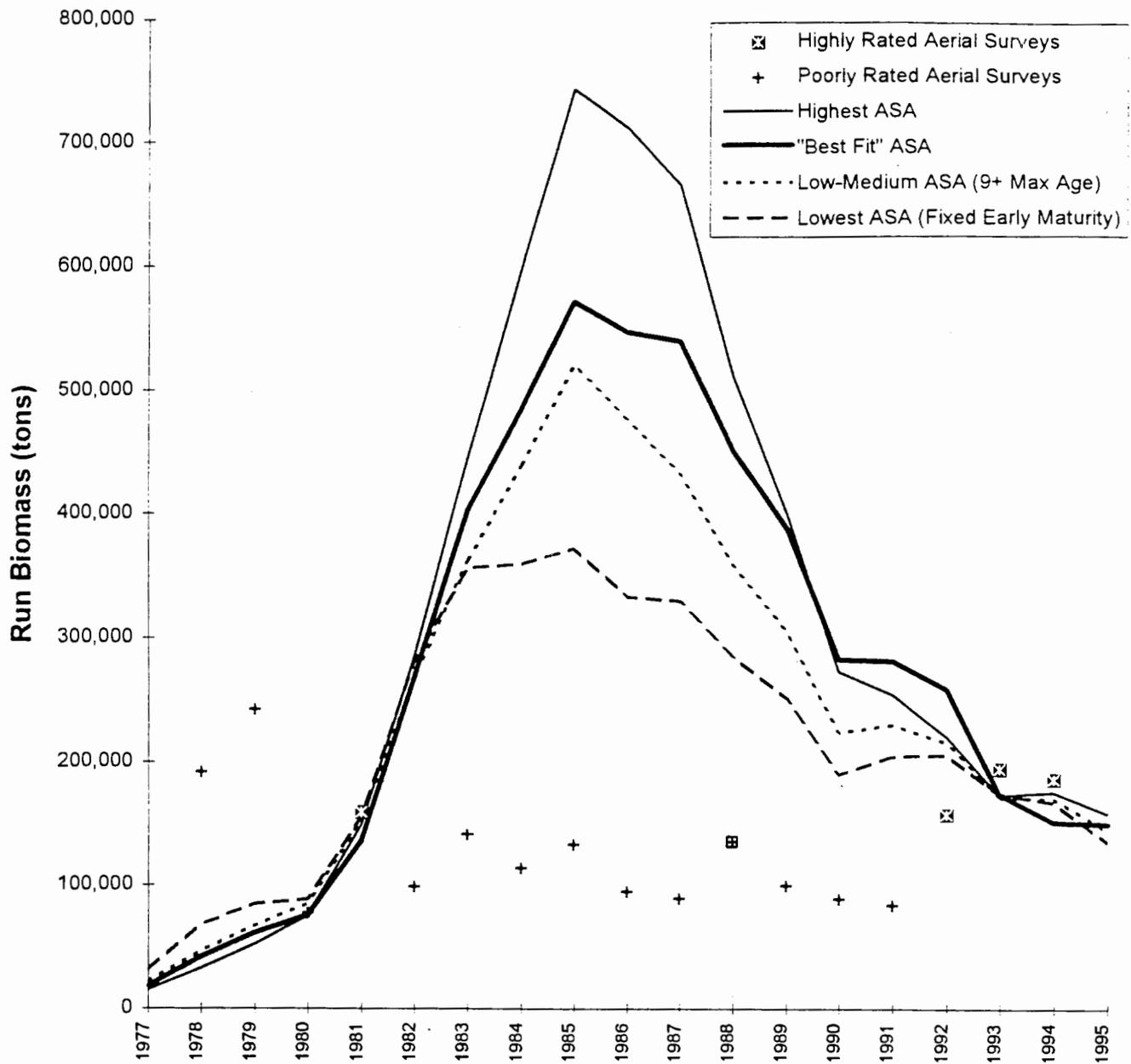


Figure 2. Range of run biomass estimates from the age-structured assessment (ASA) model used for the 1995 Togiak herring forecast under various assumptions, and highly and poorly rated aerial survey biomass estimates. The 1988 aerial survey, although rated highly, was not used for the 1995 forecast ASA model because it strongly conflicted with the highly rated 1992-94 aerial surveys about the biomass pulse resulting from the 1977 and 1978 year classes.

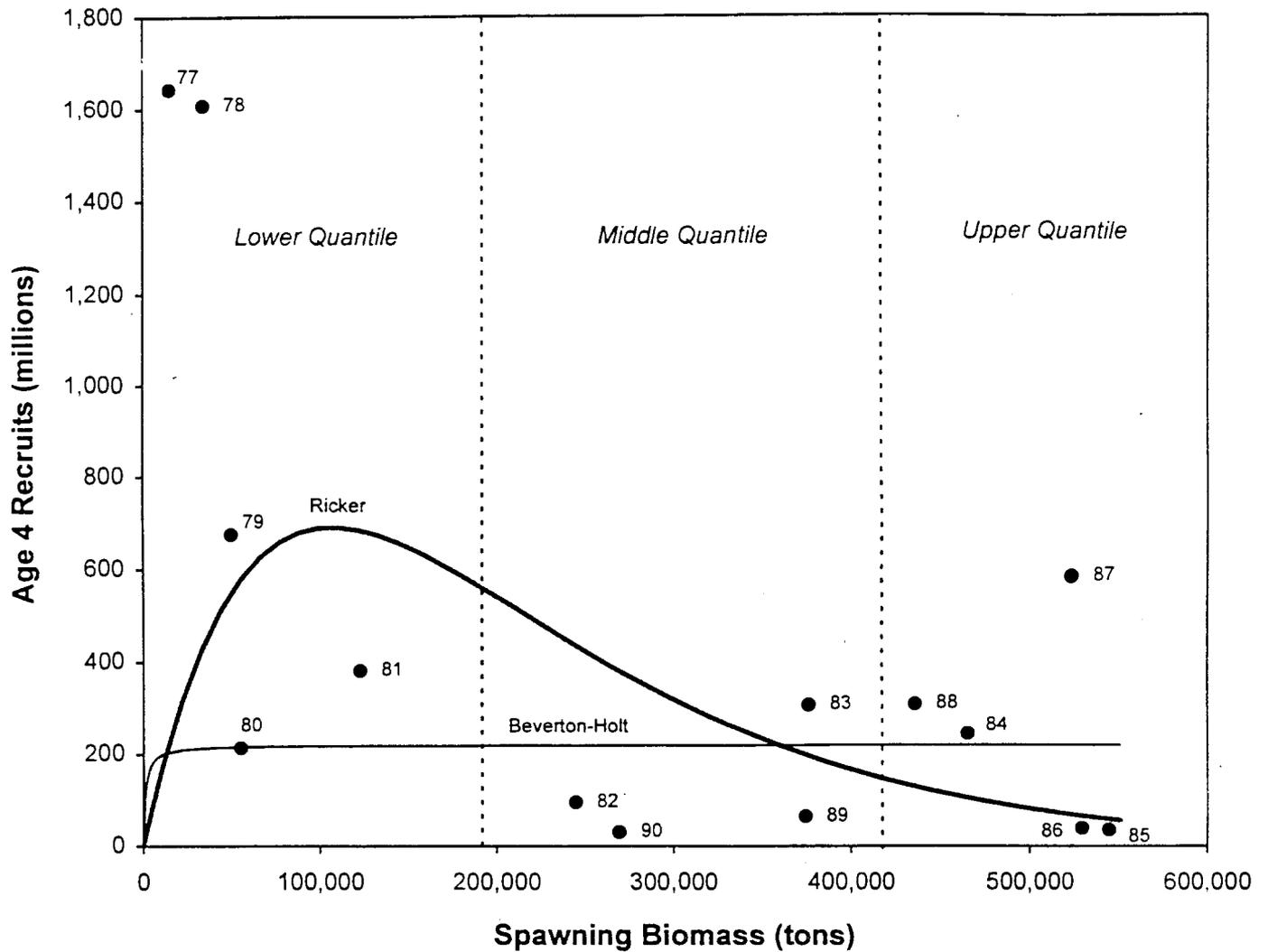


Figure 3. Relationships between spawning biomass and recruits for Togiak herring. Spawning biomass and age 4 recruit data points are taken from the age-structured assessment model used for the 1995 forecast (Rowell and Funk 1994). Ricker and Beverton-Holt spawner recruit functions were fit to these data by nonlinear least squares. The three quantiles shown were used to describe an empirical relationship between spawners and recruits for the average unfished biomass simulation model.

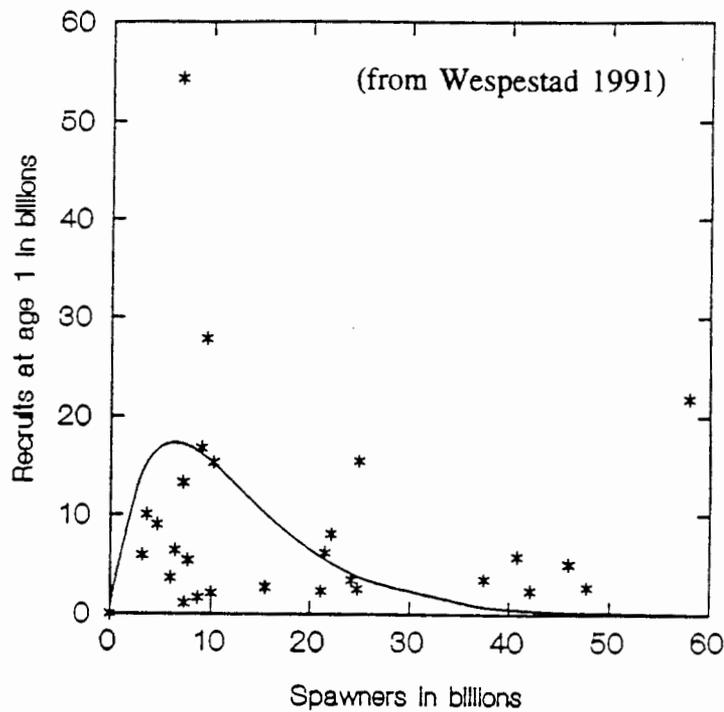
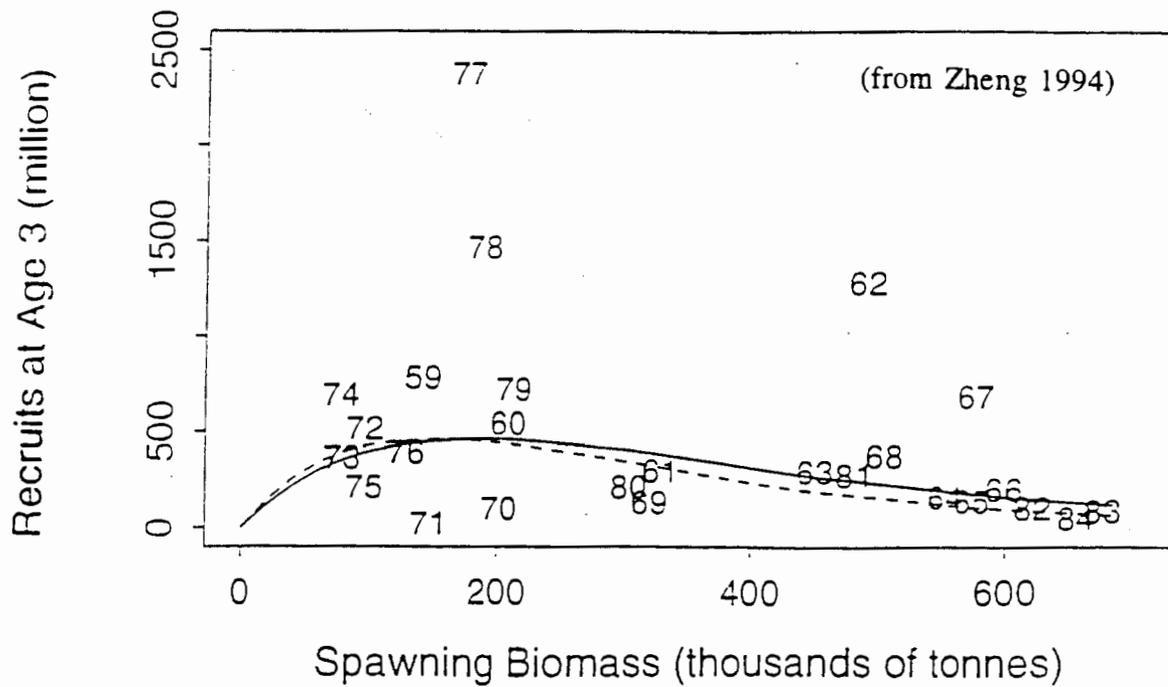


Figure 4. Spawner-Recruit relationships for eastern Bering Sea herring computed by Zheng (1994), using recruitment measured at age 3 (top), and by Wespestad (1991), using recruitment measured at age 1 (bottom). Both are based on a very long time series of data extending back to the start of the foreign herring fishery in the late 1950's, both are based on data from all Bering Sea herring combined and both show fitted Ricker curves.

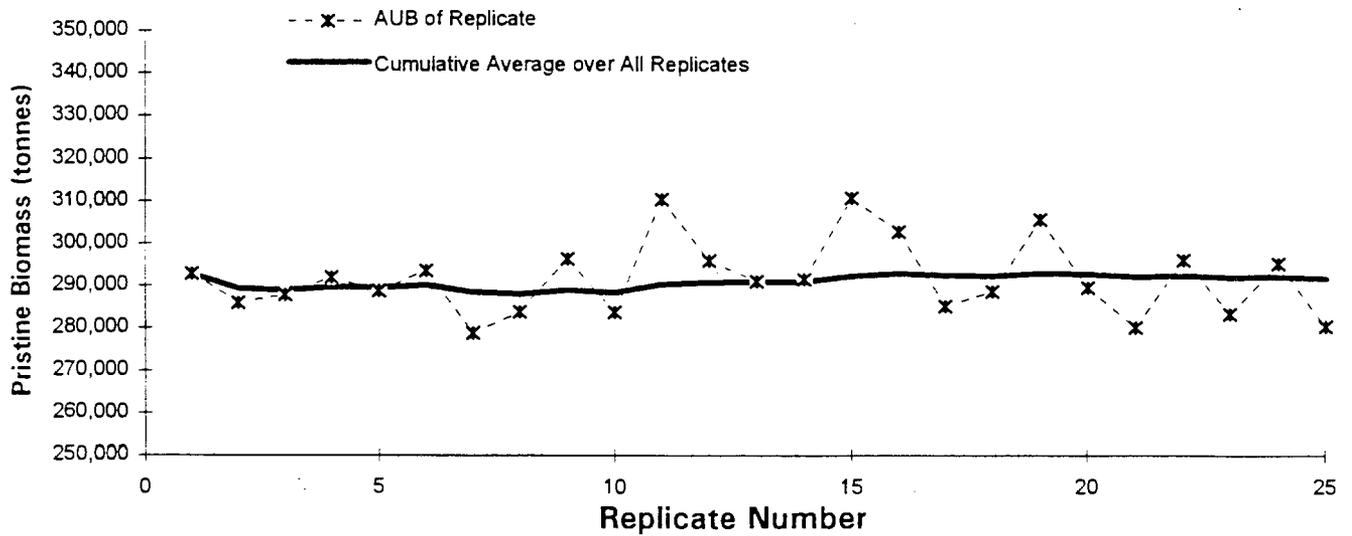
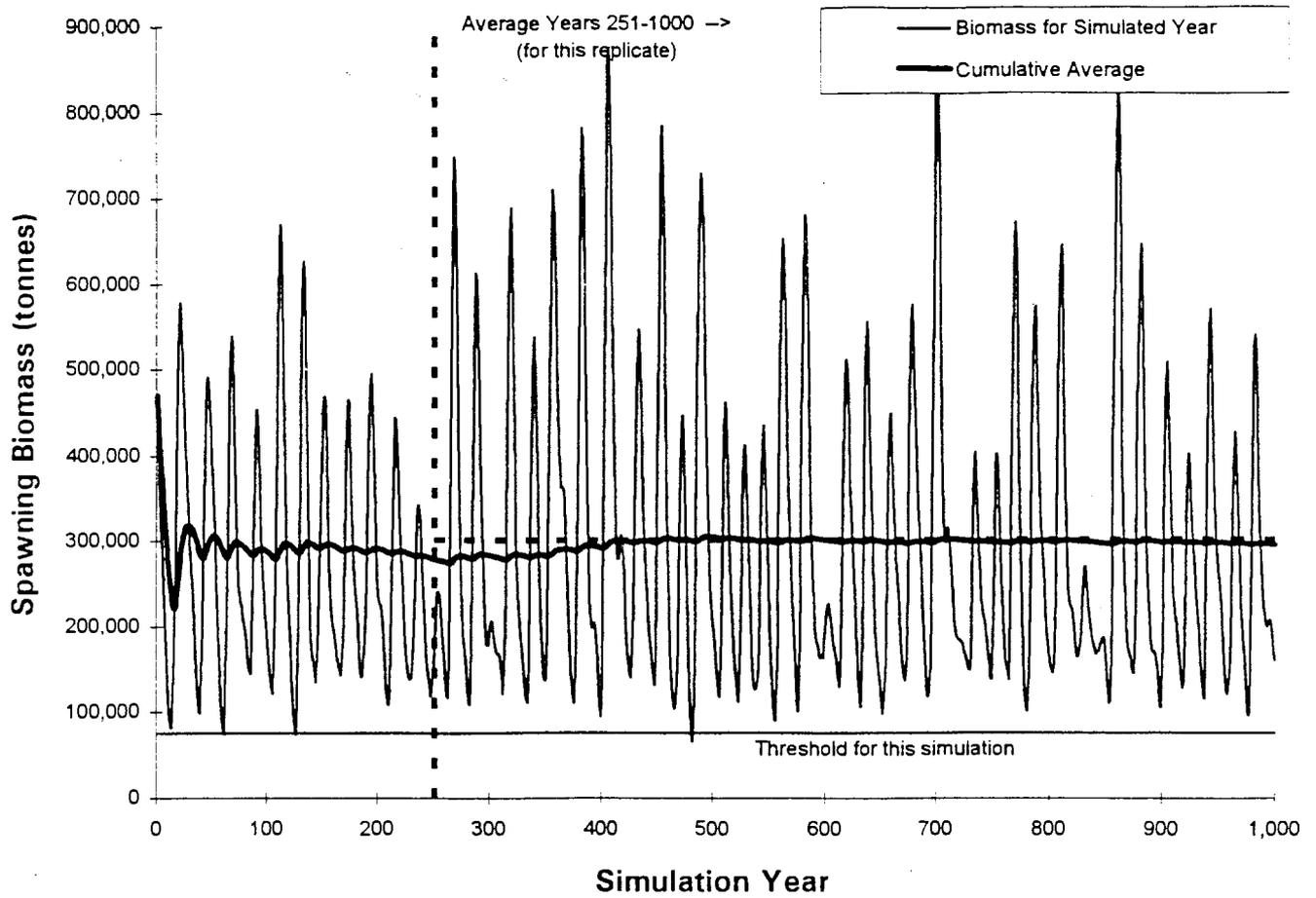
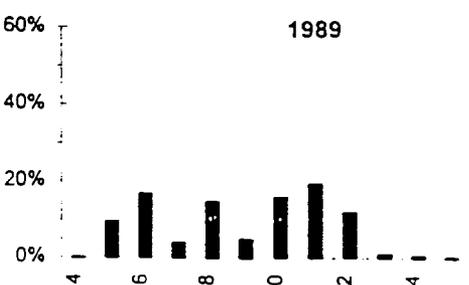
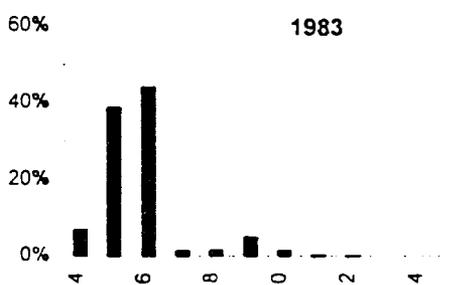
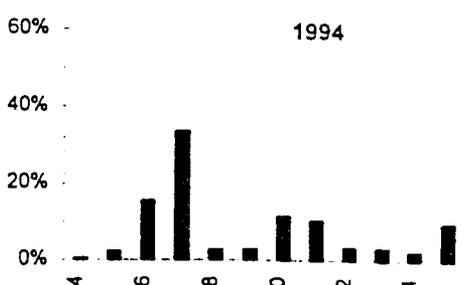
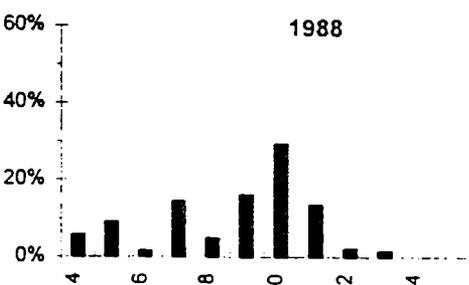
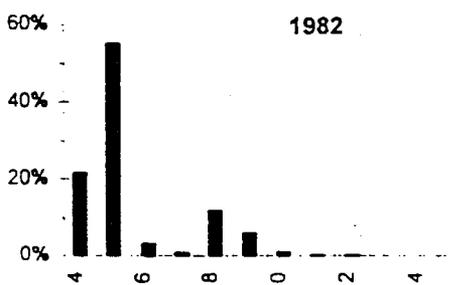
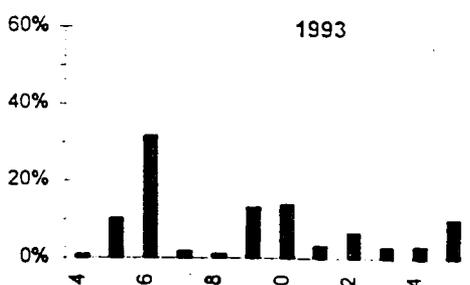
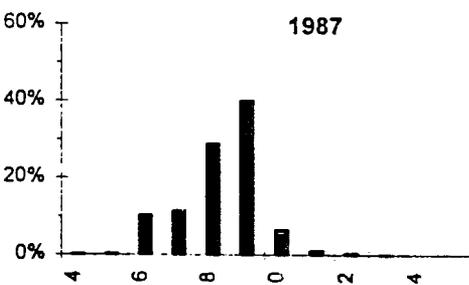
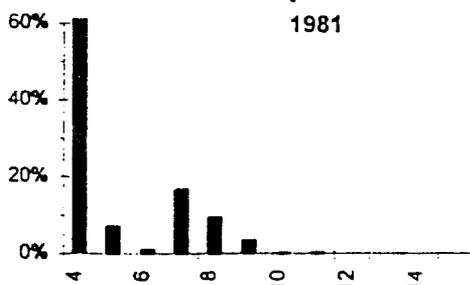
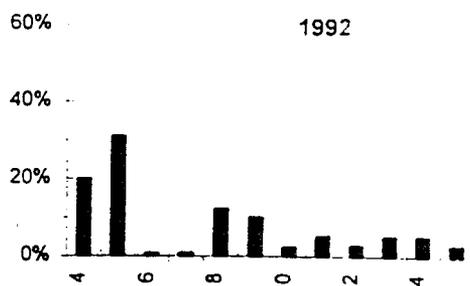
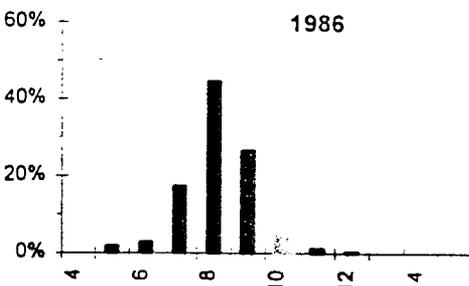
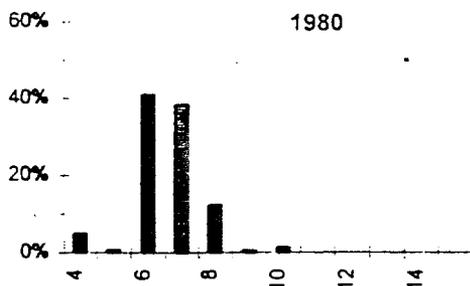
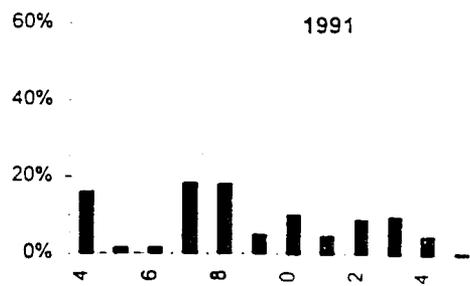
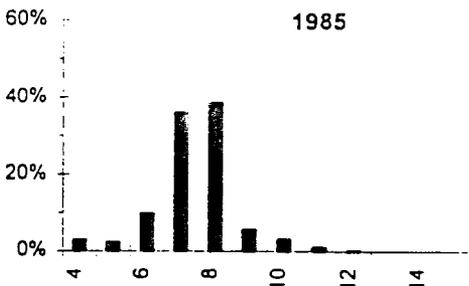
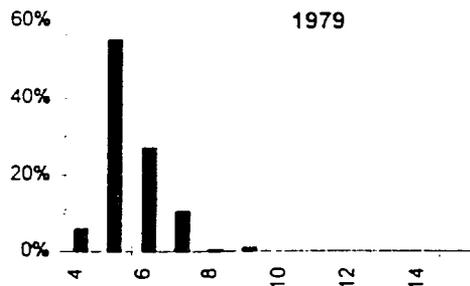
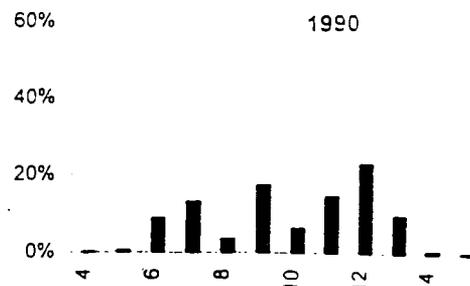
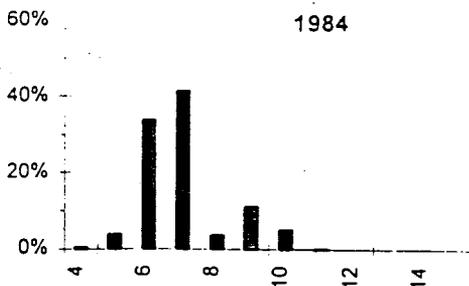
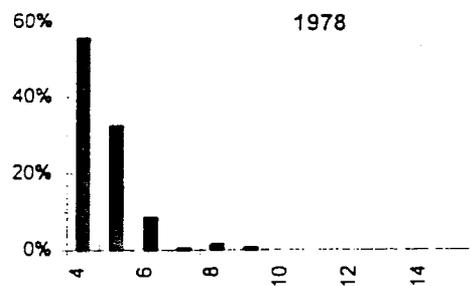


Figure 5. Example of average unfishable biomass simulation using the empirical spawner-recruit model with the "best fit" ASA parameter estimates for a single 1,000 replicate (top) and the results and average of 25 replicates (bottom).

"OBSERVED" TOGIAC HERRING AGE COMPOSITIONS: TOTAL RUN



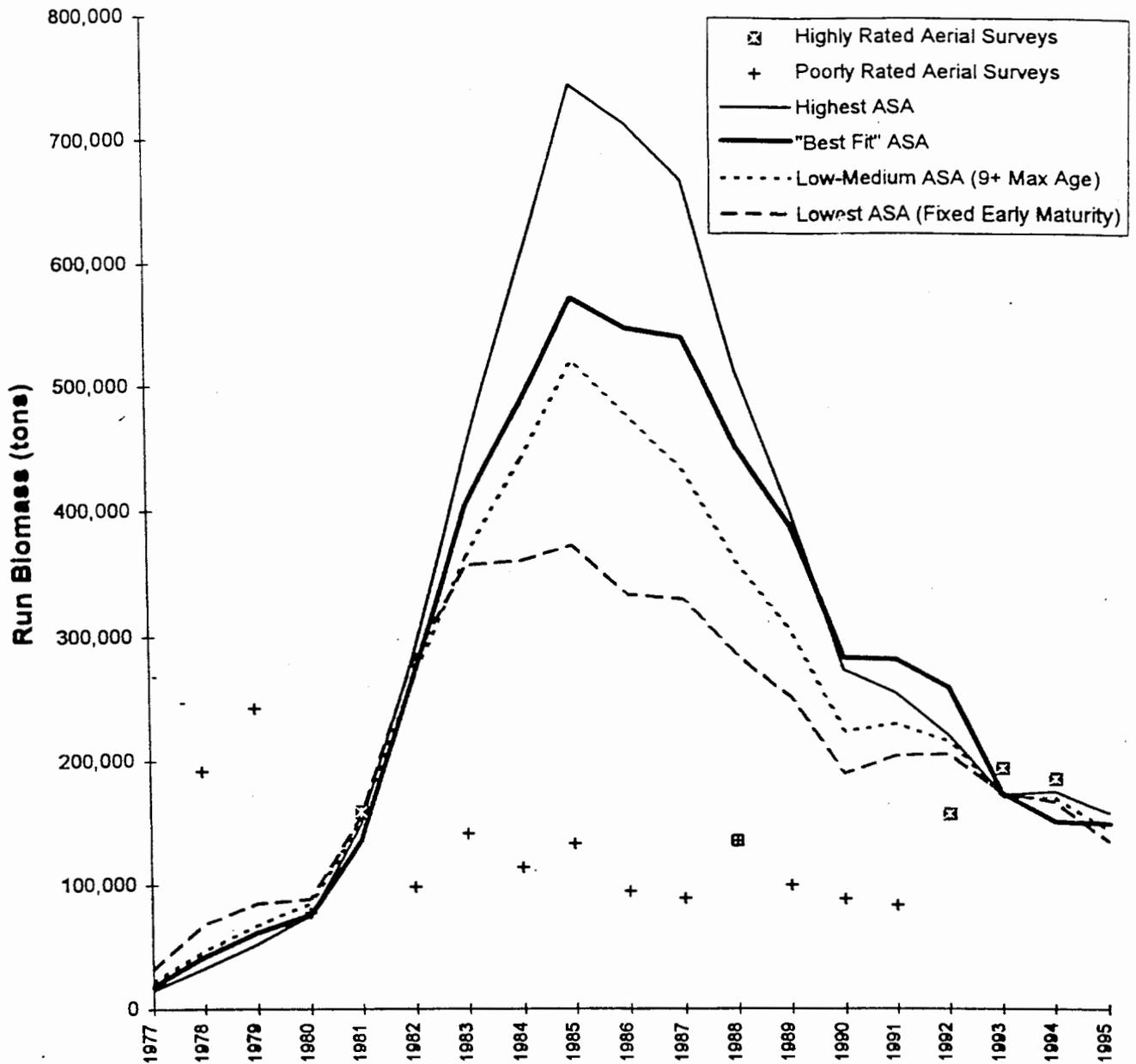
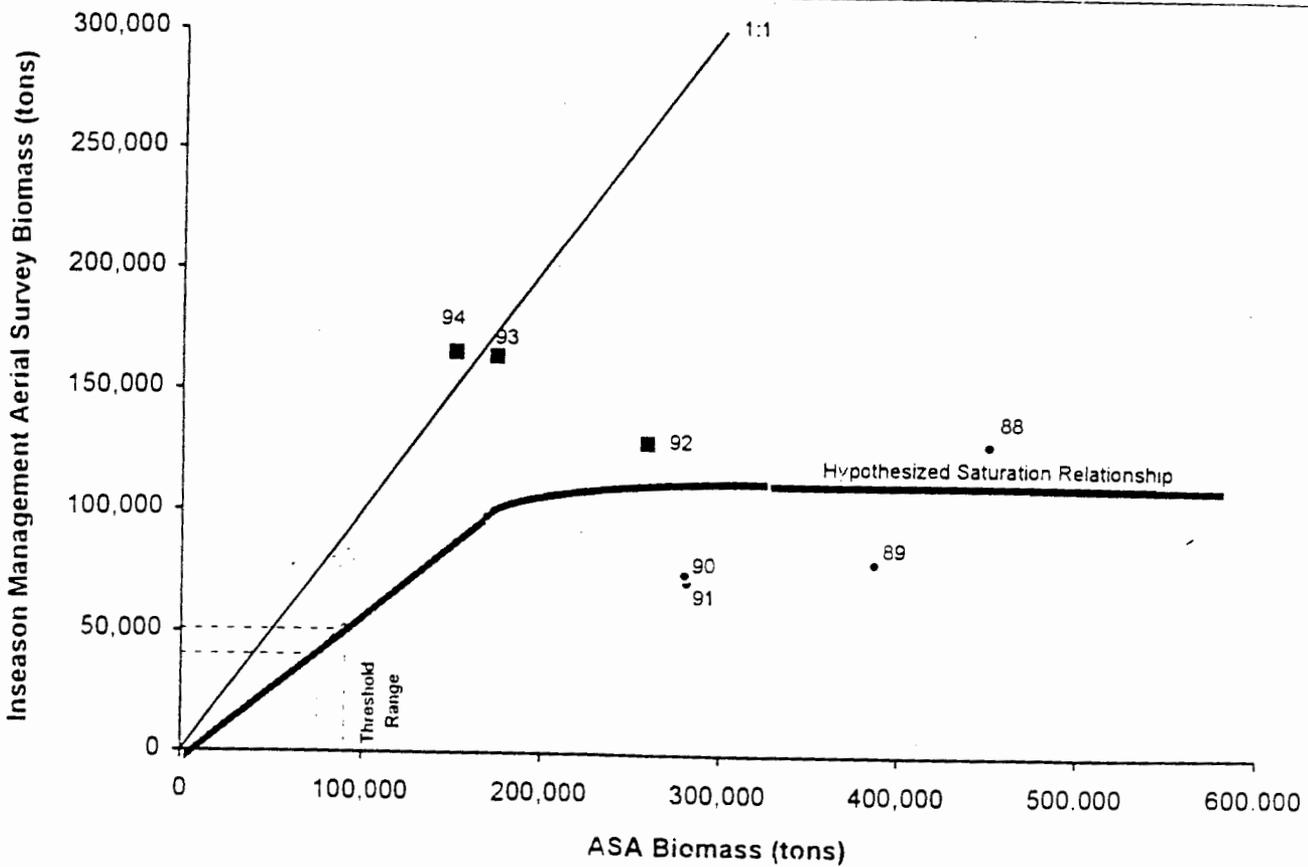
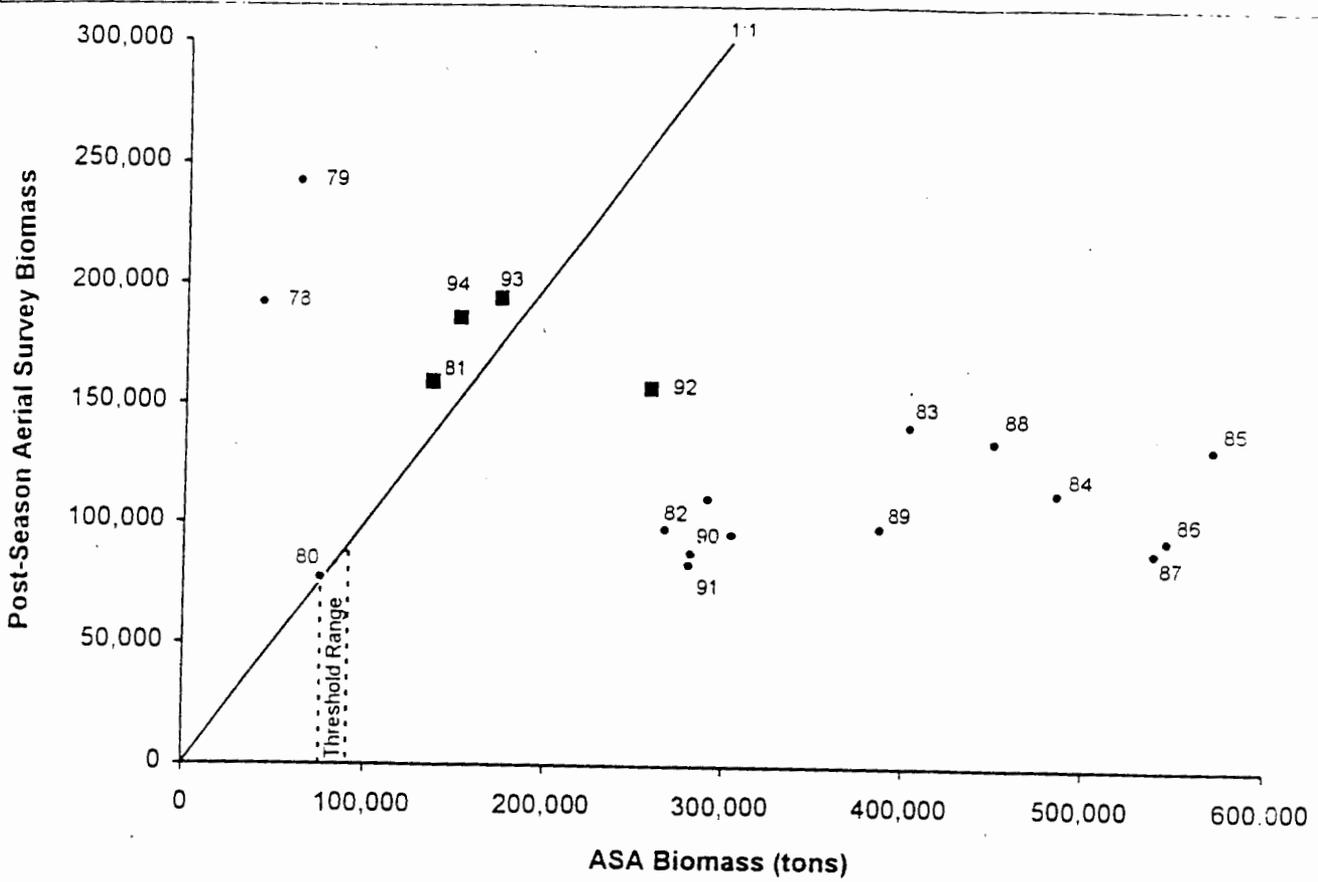
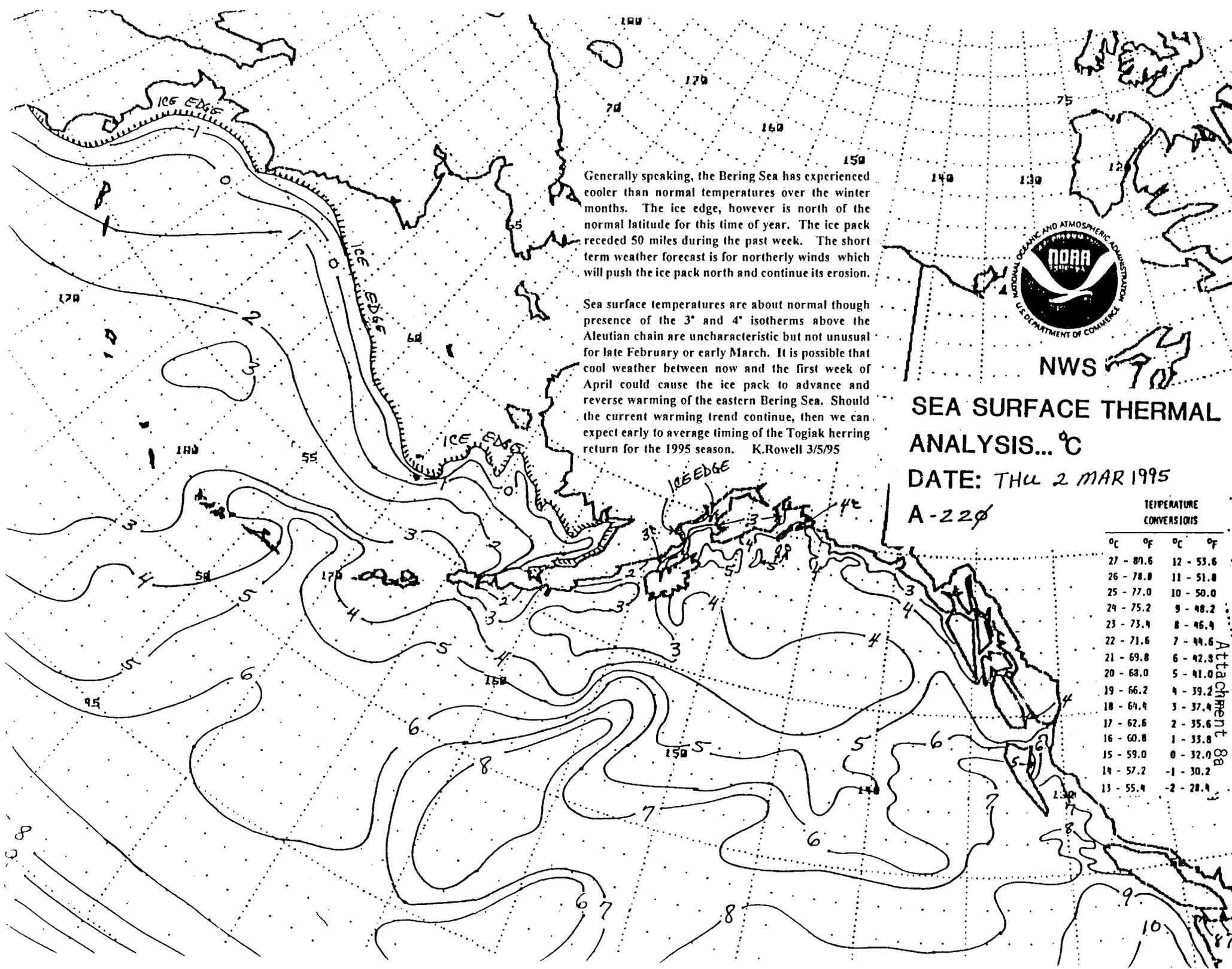


Figure 1. Range of run biomass estimates from the age-structured assessment (ASA) model used for the 1995 Togiak herring forecast under various assumptions, and highly and poorly rated aerial survey biomass estimates. The 1988 aerial survey, although rated highly, was not used for the 1995 forecast ASA model because it strongly conflicted with the highly rated 1992-94 aerial surveys about the biomass pulse resulting from the 1977 and 1978 year classes.





Generally speaking, the Bering Sea has experienced cooler than normal temperatures over the winter months. The ice edge, however is north of the normal latitude for this time of year. The ice pack receded 50 miles during the past week. The short term weather forecast is for northerly winds which will push the ice pack north and continue its erosion.

Sea surface temperatures are about normal though presence of the 3° and 4° isotherms above the Aleutian chain are uncharacteristic but not unusual for late February or early March. It is possible that cool weather between now and the first week of April could cause the ice pack to advance and reverse warming of the eastern Bering Sea. Should the current warming trend continue, then we can expect early to average timing of the Togiak herring return for the 1995 season. K.Rowell 3/5/95



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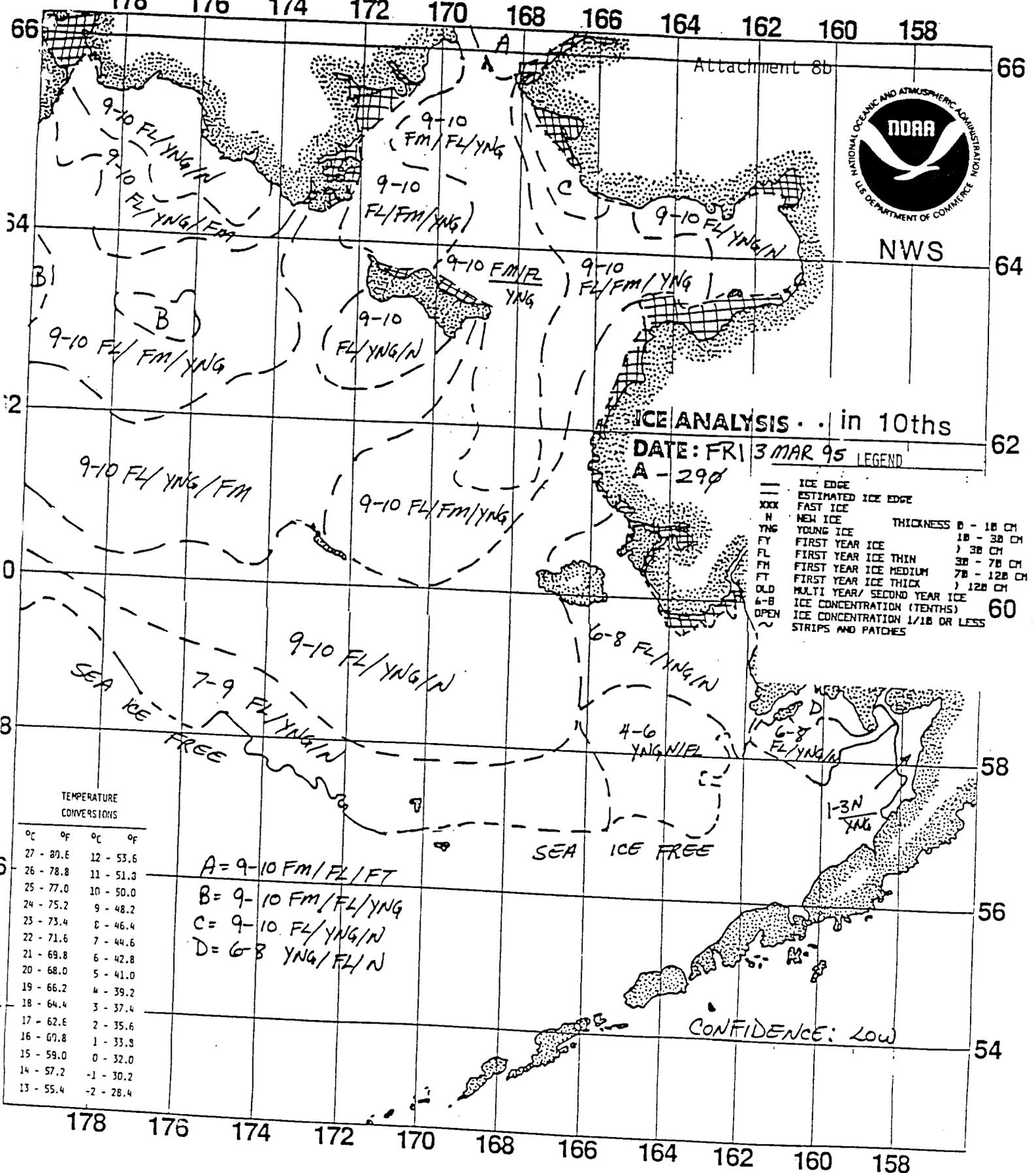
# SEA SURFACE THERMAL ANALYSIS... °C

DATE: THU 2 MAR 1995

A-220

TEMPERATURE CONVERSIONS			
°C	°F	°C	°F
27	80.6	12	53.6
26	78.8	11	51.8
25	77.0	10	50.0
24	75.2	9	48.2
23	73.4	8	46.4
22	71.6	7	44.6
21	69.8	6	42.8
20	68.0	5	41.0
19	66.2	4	39.2
18	64.4	3	37.4
17	62.6	2	35.6
16	60.8	1	33.8
15	59.0	0	32.0
14	57.2	-1	30.2
13	55.4	-2	28.4

Attachment 8a



Attachment 8b



NWS

ICE ANALYSIS . . in 10ths

DATE: FR 3 MAR 95  
A - 290

- LEGEND
- ICE EDGE
  - ESTIMATED ICE EDGE
  - XXX FAST ICE
  - N NEW ICE
  - YNG YOUNG ICE
  - FY FIRST YEAR ICE
  - FL FIRST YEAR ICE THIN
  - FM FIRST YEAR ICE MEDIUM
  - FT FIRST YEAR ICE THICK
  - OLD MULTI YEAR/ SECOND YEAR ICE
  - 6-8 ICE CONCENTRATION (TENTHS)
  - OPEN ICE CONCENTRATION 1/10 OR LESS
  - ~ STRIPS AND PATCHES
- THICKNESS
- 0 - 10 CM
  - 10 - 30 CM
  - 30 - 70 CM
  - 70 - 120 CM
  - 120 CM

TEMPERATURE CONVERSIONS

°C	°F	°C	°F
27	80.6	12	53.6
26	78.8	11	51.3
25	77.0	10	50.0
24	75.2	9	48.2
23	73.4	8	46.4
22	71.6	7	44.6
21	69.8	6	42.8
20	68.0	5	41.0
19	66.2	4	39.2
18	64.4	3	37.4
17	62.6	2	35.6
16	60.8	1	33.8
15	59.0	0	32.0
14	57.2	-1	30.2
13	55.4	-2	28.4

A = 9-10 FM/FL/FT  
 B = 9-10 FM/FL/YNG  
 C = 9-10 FL/YNG/N  
 D = 6-8 YNG/FL/N

CONFIDENCE: Low

